Value Engineering Study Report

Project –
Interchange Reconstruction
I-75 at SR 27
Dooly County

P.I. No. 311665

IM-NH-75-1(227)

Value Management Team

Design Team:

T.B. Trimble, Inc.

February 2007
Revised: June 2007

PBS&J

An Employee-Owned Company

June 20, 2007

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

RE: Submittal of the revised Value Engineering Report
IM-NH-75-1(227) Dooly County
PI # 311665
US 27 and I-75
PBS&J Project Task Order No. 3

Dear Ms. Myers:

As requested, please find enclosed a CD of our Final Value Engineering Report revised to incorporate updates to Alternatives 4 and 5 for the US 27 and I-75 Interchange in Dooly County as referenced above.

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

Les M. Thomas, P.E., CVS-Life
VE Team Leader

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Value Engineering Study Report

US 27 and I-75 Interchange
Dooly County, Georgia

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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 February 5 through 8, 2007 in Atlanta, Georgia for the Georgia Department of Transportation. The subject of the Value Engineering study was the project for the new Interchange for US 27 and I-75 in Dooly County. The design is being performed by T.B. Trimble, Inc.

PROJECT DESCRIPTION

The project will construct a new bridge over I-75 providing through lanes and separated turn lanes. Additionally, two (2) new on ramps and two (2) new off ramps will be constructed in new locations and of significantly longer length. Portions of three (3) existing county roads will be abandoned and relocated. A new frontage road will be constructed to serve existing businesses whose direct access has been eliminated. The project will affect Sixteen (16) existing properties.

The expected cost of this construction is approximately $24,238,997 dollars. More information about this project may be found in the tabbed section of this report entitled ***Project Description***.

VALUE ENGINEERING PROCESS

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

- Investigation
- 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 a “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 entitled ***Study Results*** for a

review of the details of the developed alternatives. Tabbed section number four, ***Project Description,*** includes information about the project itself and tabbed section number Five, ***Value Engineering Process*** goes into more detail about the process of Value Engineering, as used in this workshop.

THE STUDY RESULTS

During the speculation phase the VE team identified **18** ideas that appeared to hold potential for either reducing the construction cost, improving the end product and/or reducing the difficulty and time of project construction.

After the evaluation phase was completed, 10 alternative ideas and 3 esign suggestions remained for further consideration. These alternative ideas and design suggestions may be found, in their documented form, in the tabbed section of this report entitled ***Study Results***. The following ***Summary of Alternatives and Design Suggestions*** coupled with the documentation of the developed alternatives should provide the reader with the information required to fully evaluate the merits of each of the alternatives.

SUMMARY OF ALTERNATIVES & DESIGN SUGGESTIONS

FINAL DISPOSITION

Georgia Department of Transportation
IM-N-75-1(227) – Dooly County
P.I. Number: 311665

Alternative Number	Description of Alternative	Initial Cost Savings	Implemented Cost Savings/Disposition	FINAL DISPOSITION
3	Utilize existing County roads	$614,532.00		
4	Utilize existing County roads - Shift to East	$564,577.00		
5	Eliminate end spans and use walled abutments	$607,451.00		
6	Reduce distance between Ramps A/C & B/D - Reduce length of all ramps	$1,773,904.00		
7	Reduce bridge width to 53'-3"	$620,288.00		
8	Reduce roadway width eliminating turn lanes	$471,077.00		
10	Delete new connector roads to CR 290 and CR 340	$142,869.00		
12	Provide direct access to service stations	DS		
13	Use asphaltic concrete in lieu of PC concrete on new ramps	DS		
15	Revise grades and verticle curves to reduce earthwork	$1,231,505.00		
16	Revisit pavement design for existing county roads	DS		
17	Delete new future 12’ lanes in ramp areas.	$504,667.00		
18	Combine ideas 4, 5, 6, 15 and 17 into a design “Scheme I”	$4,218,000.00		

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, comments on the technical justifications, 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 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 table that summarizes the alternatives and design suggestions documents that follow shortly thereafter. 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. The enclosed ***Summary of Alternatives & Design Suggestions*** may also be used as a "score sheet" within the bounds of an implementation meeting.

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***.

CREATIVE IDEA LISTING & EVALUATION

PBS&J

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75 (277)– Dooly County – P.I. Number: 311665

SHEET NO.: **1** of **1**

NO.	IDEA DESCRIPTION	RATING
1	Do Nothing	1
2	Do Nothing except add Traffic Signalization	1
3	Utilize existing County roads 340 and 209 as is	5
4	Do #3 and relocate Old Bowen Rd to CR 340 Intersection	5
5	Eliminate end spans and use walled end abutments	5
6	Decrease distance between easterly and westerly on/off ramps and ramp lengths	5
7	Reduce width of bridge to 53’ – 3”	5
8	Reduce Roadway Width, delete turn lanes (US 27)	4
9	Widen existing bridge per the 2000 plans	2
10	Delete new connector roads to CR 340 and CR 209	5
11	Delete median, provide direct connection for existing service stations	1
12	Relocate CR 155 to 300’ from new on/off ramp and provide direct access to service stations on south side.	DS
13	Use asphaltic concrete in lieu of PC concrete on new ramps	DS
15	Revise Grades and Curves to reduce earthwork	5
16	Revisit pavement design for existing county roads	DS
17	Delete new future 12’ lanes in ramp areas.	5
18	Combine Ideas (4,5,6,7,15,17) into a design “Scheme - I”	5

Rating: 1→2 = Generally not acceptable; 3 = Little Opportunity for Positive Change; 4→5 = Most likely to be Developed; DS = Design Suggestion; ABD = Already Being Done

SUMMARY OF ALTERNATIVES & DESIGN SUGGESTIONS

FINAL DISPOSITION

Georgia Department of Transportation
IM-N-75-1(227) – Dooly County
P.I. Number: 311665

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8	Reduce roadway width eliminating turn lanes	$471,077.00		
10	Delete new connector roads to CR 290 and CR 340	$142,869.00		
12	Provide direct access to service stations	DS		
13	Use asphaltic concrete in lieu of PC concrete on new ramps	DS		
15	Revise grades and verticle curves to reduce earthwork	$1,231,505.00		
16	Revisit pavement design for existing county roads	DS		
17	Delete new future 12’ lanes in ramp areas.	$504,667.00		
18	Combine ideas 4, 5, 6, 15 and 17 into a design “Scheme I”	$4,218,000.00		

Value Analysis Design Alternative

PBS&J

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75 (277)– Dooly County-- P.I. Number: 311665

ALTERNATIVE NO.: **3**

DESCRIPTION: **UTILIZE EXISTING COUNTY ROADS**

SHEET NO.: 1 of 4

Original Design:

Relocated County Road 209 and County Road 340 are to be realigned to better match their centerlines.

Alternative:

Retain county roads in existing location and tie in to newly constructed SR 27.

Opportunities:

- Reduced costs
- Reduced impact to property owners
- Reduced impact to wetlands

Risks:

- CR 209 and CR340 will be off set intersection.
- Moderate re-design

Technical Discussion:

the initial cost savings must be weighed against the complications resulting from keeping this intersection in a offset mode. As an expample, future signalizationat this intersection shoud traffic warrants suppor signalization, will be more costly.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 10,822,867	$	$ 10,822,867
ALTERNATIVE	$ 10,208,334	$	$ 10,208,334
SAVINGS	$ 614,533	$	$ 614,533

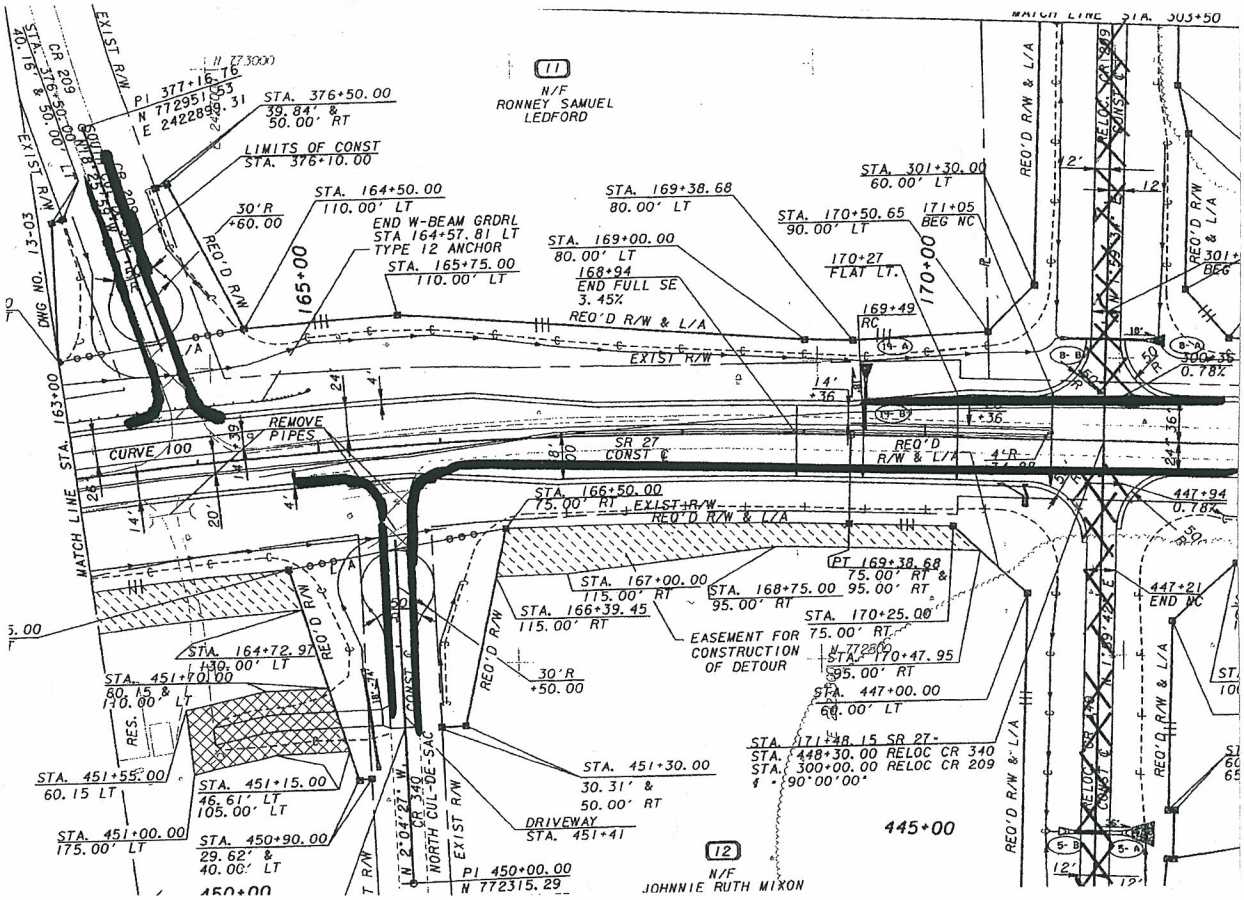
Illustrations

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

ALTERNATIVE NO.: 3

DESCRIPTION:

SHEET NO.: 2 of 4



RETAIN EXISTING COUNTY ROAD 209 and COUNTY ROAD 340. TIE IN TO SR 27 AT EXISTING LOCATION. DO NOT CONSTRUCT RELOCATED COUNTY ROADS

Calculations

PBSJ

PROJECT:	GEORGIA DEPARTMENT OF TRANSPORTATION IM-N-75-1(227) – Dooly County -- P.I. Number: 311665	ALTERNATIVE NO.: 3
DESCRIPTION:	UTILIZE EXISTING COUNTY ROADS CR 209 & CR 340	SHEET NO.: 3 of 4

CR 209

STA 300+00 - STA 327+52.96

NEW FULL DEPTH CONSTRUCTION REQUIRE FROM

STA 301+25 - STA 324+00

2275 x 24 = 54600

GAB	54600 x 0.67 x 145 ÷ 2000 =	2652.20 TONS
25mm	54600 ÷ 9 x 275 ÷ 2000 =	834.17 TONS
19mm	54600 ÷ 9 x 220 ÷ 2000 =	1667.33 TONS
9.5mm	54600 ÷ 9 x 125 ÷ 2000 =	379.17 TONS
BORROW	=	2204 CY

CR 340

STA 411+00 - STA 448+30

NEW FULL DEPTH CONSTRUCTION REQUIRED FROM

STA 414+00 - STA 448+05

3405 x 24 = 81720

GAB	81720 x 0.67 x 145 ÷ 2000 =	3969.55 T
25mm	81720 ÷ 9 x 275 ÷ 2000 =	1248.50 T
19mm	81720 ÷ 9 x 220 ÷ 2000 =	998.80 T
9.5mm	81720 ÷ 9 x 125 ÷ 2000 =	567.50 T
BORROW	=	2170 CY

COST WORKSHEET

PBS&J

PROJECT:	IM-N-75-1(227) -- DOOLY COUNTY -- Georgia DOT	ALTERNATIVE NO.:	3
DESCRIPTION:	*Utilize Existing County Roads*	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
206-0002	Borrow Excav	CY	599062	$ 10.00	$5,990,620	594688	$ 10.00	$5,946,880
310-1101	GAB Crs.	Tons	67080	$ 20.00	$1,341,600	60458.25	$ 20.00	$1,209,165
402-3110	Recyc Aconc 9.5mm Sprpve	Tons	5025	$ 85.00	$427,125	4078.33	$ 85.00	$ 346,658
402-3121	Recyc Aconc 25mm Sprpve	Tons	11275	$ 85.00	$958,375	9192.33	$ 85.00	$781,348
402-3190	Recy Aconc 19mm Sprpve	Tons	14950	$ 75.00	$1,121,250	13283.37	$ 75.00	$996,253
	Sub-total				$9,838,970			$9,280,304
Mark-up at	**10.00%**				$983,897			$928,030
	TOTAL				**$10,822,867**			**$10,208,334**

Value Analysis Design Alternative

PBS&J

PROJECT:	**GEORGIA DEPARTMENT OF TRANSPORTATION** **IM-N-75 (277)– Dooly County-- P.I. Number: 311665**	ALTERNATIVE NO.:	**4**
DESCRIPTION:	**UTILIZE EXISTING COUNTY ROAD – SHIFT TO EAST**	SHEET NO.:	1 of 5

Original Design:

Relocated CR 209 and CR 304 to shift intersection of side roads and SR 27 away from relocated ramps of I-75.

Alternative:

Utilize existing county road locations but shift intersect point of CR 209 165 feet to the east which will line up with CR 340.

Opportunities:

- Utilize existing R/W
- Minimize impact to wetlands

Risks:

- Minimal redesign

Technical Discussion:

The alternate design of shifting CR 209 165 feet to the east to line up with CR 340 will leave 400' +/- of separation from the intersection of ramps B/D with SR 27. The required minimum separation is 300 ft.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 10,822,867	$	$ 10,822,867
ALTERNATIVE	$ 10,258,290	$	$ 10,258,290
SAVINGS	$ 564,577	$	$ 564,577

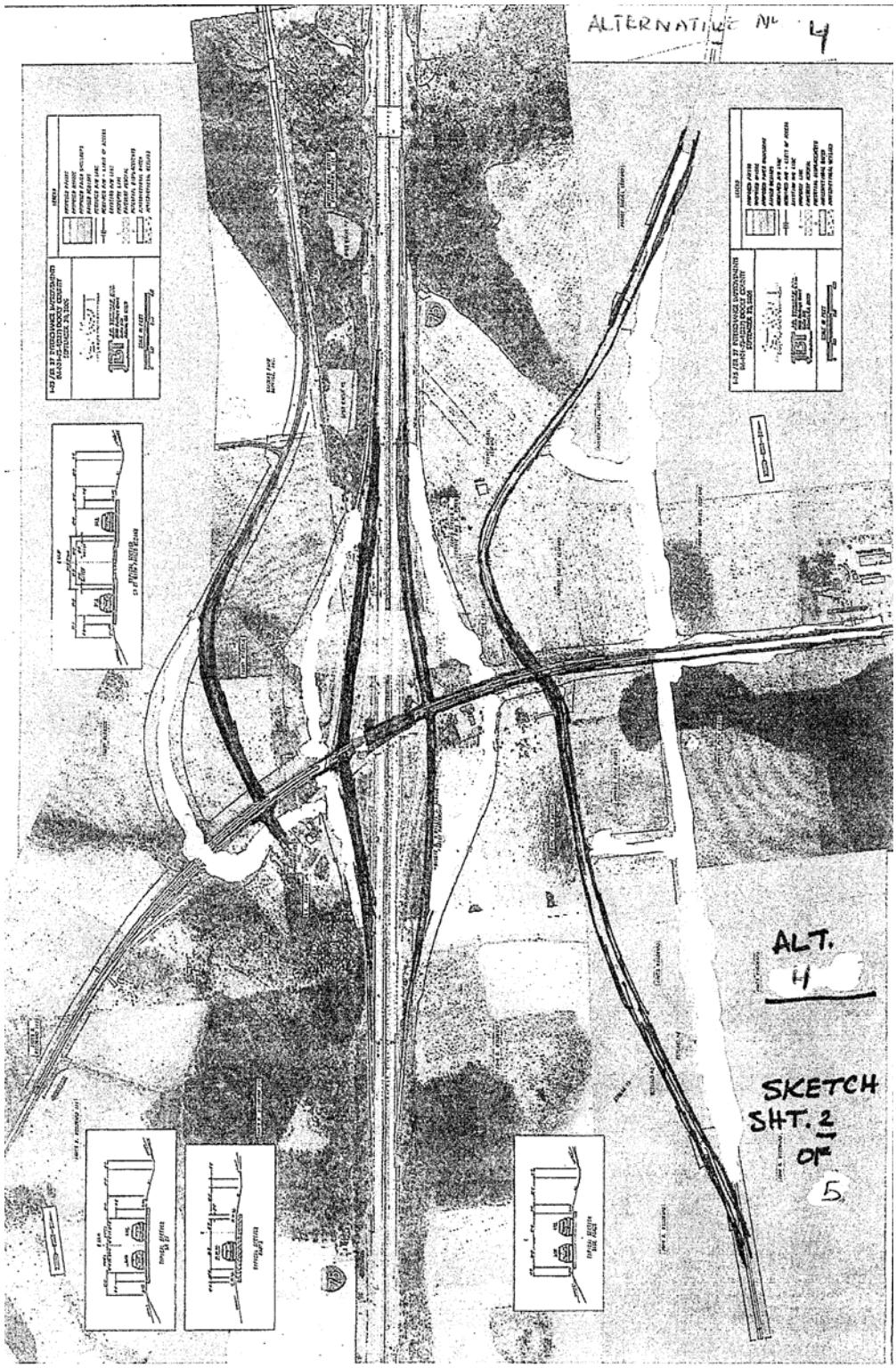
Illustrations

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75-1(227) – Dooly County – P.I. Number: 311665

ALTERNATIVE NO.: **4**

DESCRIPTION: **UTILIZE EXISTING COUNTY ROAD – SHIFT TO EAST**

SHEET NO.: 2 of 5



Calculations

PBSJ

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

ALTERNATIVE NO.: 4

DESCRIPTION: UTILIZE EXISTING COUNTY ROADS

SHEET NO.: 3 of 5

REALIGNMENT OF CR 209 AT ITS CURRENT INTERSECTION WOULD BE REQUIRED TO LINE UP WITH THE CURRENT LOCATION OF CR 340. REALIGNMENT WOULD REQUIRE CONSTRUCTION OF 500 LF OF ROADWAY

500 x 24 = 12000

GAB 12000 x 0.67 x 145 ÷ 2000 = 582.90 T
25mm 12000 ÷ 9 x 275 ÷ 2000 = 183.33 T
19mm 12000 ÷ 9 x 220 ÷ 2000 = 146.67 T
9.5mm 12000 ÷ 9 x 125 ÷ 2000 = 83.33 T

TOTAL QUANTITY CHANGE

GAB	2652.20	+	3969.55	−	582.90	= 6038.85 T
25mm	834.17	+	1248.50	−	183.33	= 1899.34 T
19mm	667.33	+	998.80	−	146.67	= 1519.46 T
9.5mm	379.17	+	567.50	−	83.33	= 863.31 T
Borrow						4374 CY

Calculations

PBSJ

PROJECT:	GEORGIA DEPARTMENT OF TRANSPORTATION IM-N-75-1(227) – Dooly County -- P.I. Number: 311665	ALTERNATIVE NO.:	4
DESCRIPTION:	UTILIZE EXISTING COUNTY ROADS	SHEET NO.:	4 of 5

CR 209

STA 300+00 - STA 327+52.96
NEW FULL DEPTH CONSTRUCTION REQUIRE FROM
STA 301+25 - STA 324+00

2275 x 24 = 54600

GAB 54600 x 0.67 x 145 ÷ 2000 = 2652.20 TONS
25mm 54600 ÷ 9 x 275 ÷ 2000 = 834.17 TONS
19mm 54600 ÷ 9 x 220 ÷ 2000 = 1667.33 TONS
9.5mm 54600 ÷ 9 x 125 ÷ 2000 = 379.17 TONS
BORROW = 2204 CY

CR 340

STA 411+00 - STA 448+30
NEW FULL DEPTH CONSTRUCTION REQUIRED FROM
STA 414+00 - STA 448+05

3405 x 24 = 81720

GAB 81720 x 0.67 x 145 ÷ 2000 = 3969.55 T
25mm 81720 ÷ 9 x 275 ÷ 2000 = 1248.50 T
19mm 81720 ÷ 9 x 220 ÷ 2000 = 998.80 T
9.5mm 81720 ÷ 9 x 125 ÷ 2000 = 567.50 T
BORROW = 2170 CY

COST WORKSHEET

PBS&J

PROJECT:	IM-N-75-1(227) – Dooly County	ALTERNATIVE NO.:	4
P.I. Number: 311665			
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
206-0002 BORROW	CY	599062	10.00	5990620.00	594688	10.00	5946880.00
EXCAV, INCL MATL							
310-1101 GR AGGR	TN	67080	20.00	1341600.00	61041.15	20.00	1220823.00
BASE CRS							
402-3110 RECYCLED	TN	5025	85.00	427125.00	4161.69	85.00	353743.65
ASPH CONC 9.5mm							
SUPERPAVE							
402-3121 RECYCLED	TN	11275	85.00	958375.00	9375.66	85.00	796931.10
ASPH CONC 25mm							
SUPERPAVE							
402-3190 RECYCLED	TN	14950	75.00	1121250.00	13430.54	75.00	1007290.50
ASPH CONC 19mm							
SUPERPAVE							
			Sub-total	9838970.00			9325718.25
			Mark-up at	983897.00			932571.83
			TOTAL	10822867.00			10258290.08
						SAVINGS:	

Value Analysis Design Alternative

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75-1(227) – Dooly County – P.I. Number: 311665

ALTERNATIVE NO.: **5**

DESCRIPTION: **ELIMINATE END SPANS AND USE WALLED ABUTMENTS**

SHEET NO.: 1 of 5

Original Design:

The original 4-span bridge is 346' long with 50' end spans and 123' intermediate spans. The bridge is on a horizontal curve super elevated. End spans 1 and 4 consist of 50' Type III PSC beams with 63" Bulb Tee Fascia beams. Spans 2 and 3 consist of 123' Bulb Tee 63" PSC beams. All spans consist of 10 beams spaced equally. The out-to-out width of the bridge is 71'-3" measured radially. The bridge accommodates two 10' shoulders, two 12' travel lanes, a 16' raised median and 4' buffers on either side of the raised median and the travel lanes. The bents are made up of concrete caps and columns.

Alternative:

The proposed alternative eliminates the 50' end spans and reduces bridge length to 246'. This can be accomplished by providing a walled abutment at the current Bent 2 and Bent 4 locations.

Also, this alternative eliminates the need for slope paving.

The alternative maintains a 17' vertical clearance to I-75 and all other current geometry.

Opportunities:

- Reduce Bridge Length
- Cost savings on slope paving

Risks:

- This configuration is typically used in urban areas where Right-Of-Way is not available.

Technical Discussion:

Special design for MSE walls will be required.

See the next sheet for the calculation of the savings noted below.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 2,099,210.00	$	$ 2,099,210.00
ALTERNATIVE	$ 1,491,759.00	$	$ 1,491,759.00
SAVINGS	$ 607,451.00	$	$ 607,451.00

Illustrations

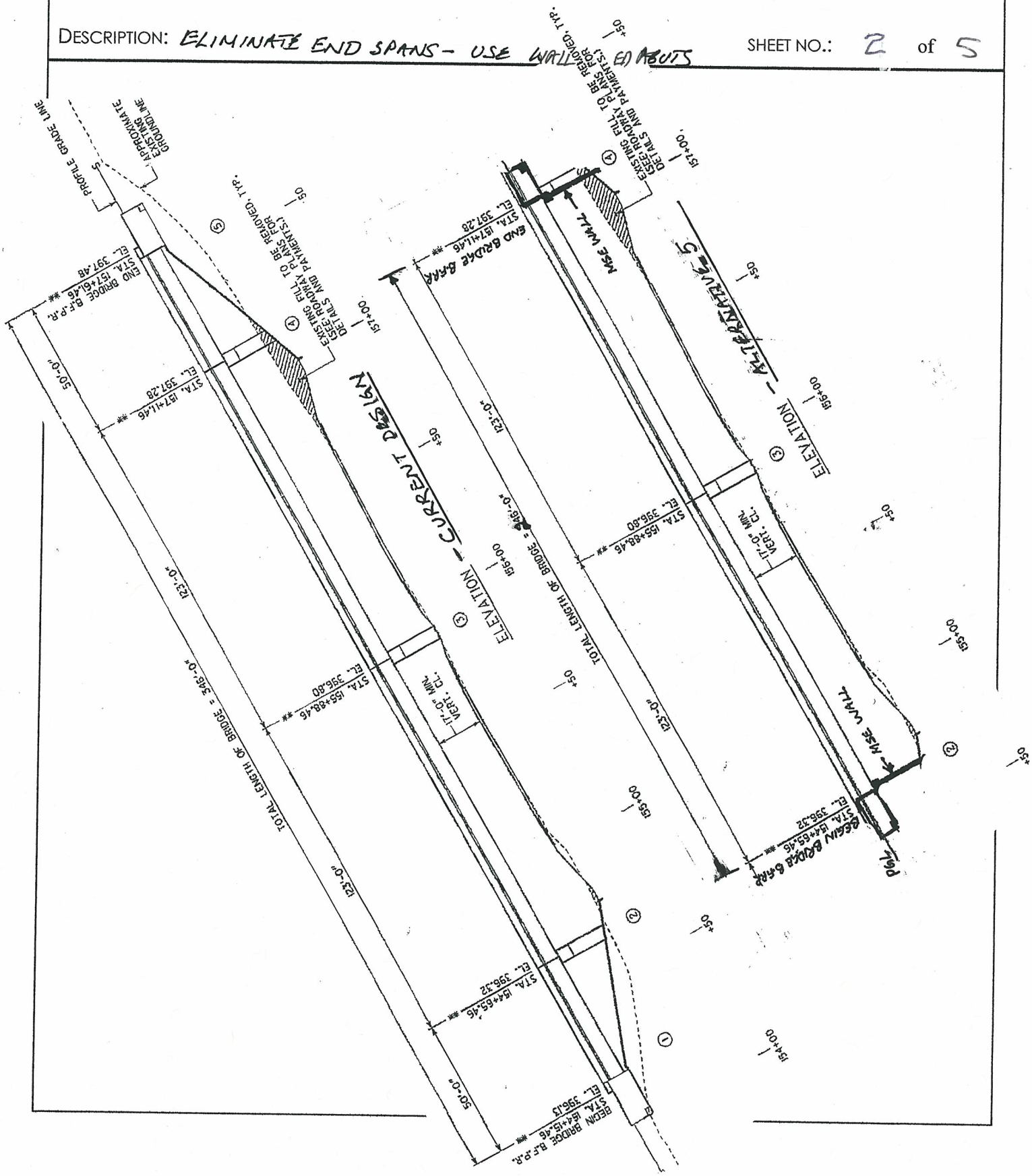
PBSJ

PROJECT: **IM-N-75-1(227) – Georgia Department of Transportation**
P.I. Number: 311665– Dooly County

ALTERNATIVE NO.: 5

DESCRIPTION: ELIMINATE END SPANS – USE WALL (E) ABUTS

SHEET NO.: 2 of 5



Illustrations

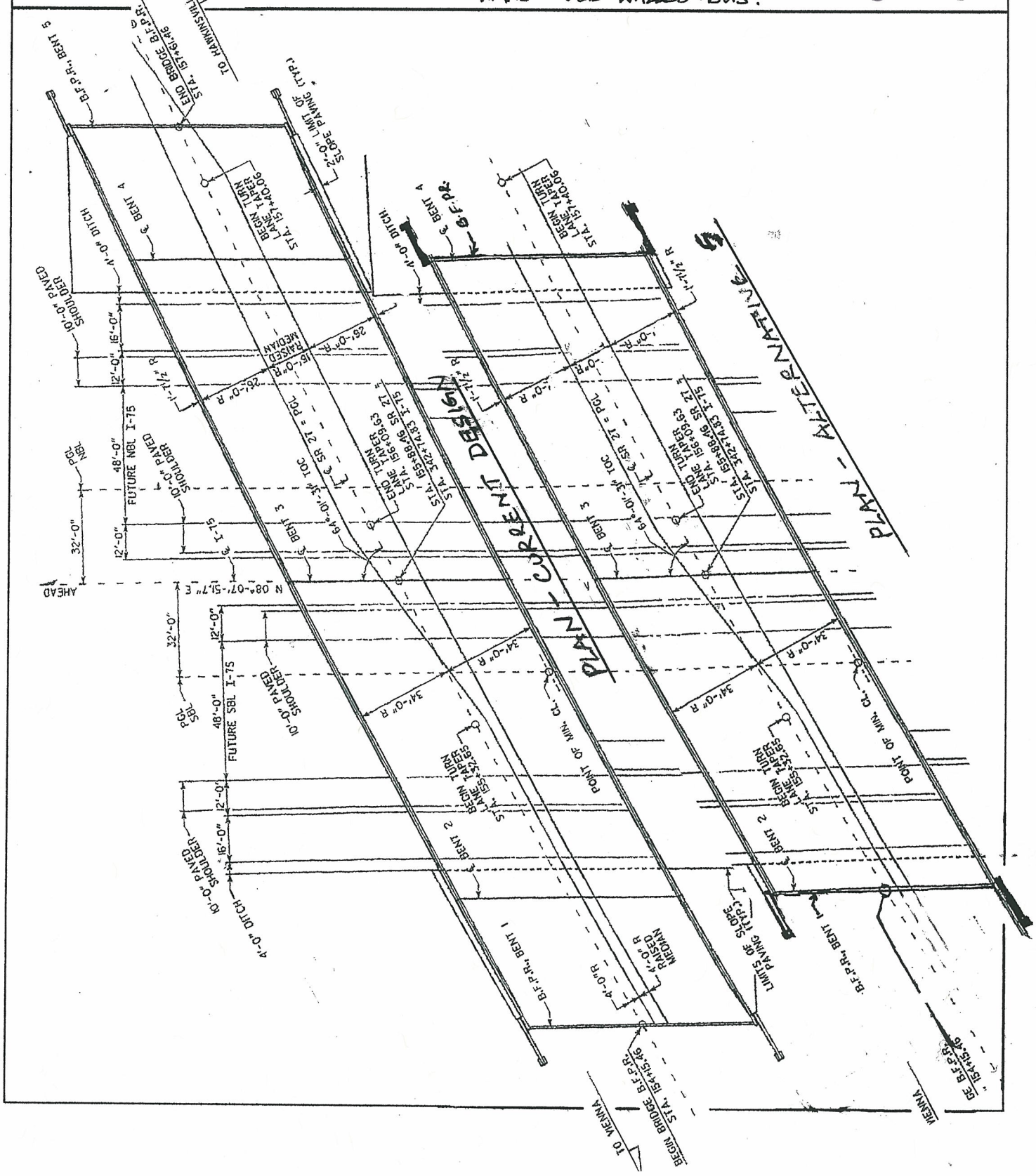
PBSJ

PROJECT: **IM-N-75-1(227) – Georgia Department of Transportation**
P.I. Number: 311665– Dooly County

ALTERNATIVE NO.: 5

DESCRIPTION: ELIMINATE END SPANS - USE WALLED ABUTS.

SHEET NO.: 3 of 5



Current Design

Superstructure:

Deck Area = 346' * 71.25' (avg.) = 24,652.5 SF

Volume of 9" thick Class "AA" Cast-in-place Deck concrete = 24652.5*(9/12)*(1/27) = 684.79 CY

Area of Raised Median = (346'*4') + 1/2(12'*76.98) + (151.43'*12') = 3663.04 SF

Volume of 6" thick Class "A" Cast-in-place Median concrete = (6/12)*(3663.04)/27 = 67.83 CY

Total length of BT 63 Girders = (2*123'*10) + (2*50'*2) = 2660'

Total length of Type III Girders = 2*50*8 = 800'

Total length of Bridge Rail = 2*346 = 692'

Substructure:

Assume 4'X4' Caps (including at end bents) and 4'X4'X18' high columns (4 at each bent)

Volume of Class "A" concrete = (5*4*4*71.25 + 3*4*4*4*18)/27 = 339.11 CY

Alternative

Superstructure:

Deck Area = 246' * 71.25' (avg.) = 17,527.5 SF

Volume of 9" thick Class "AA" Cast-in-place Deck concrete = 17527.5*(9/12)*(1/27) = 486.88 CY

Area of Raised Median = 0

Total length of BT 63 Girders = (2*123'*7) = 1722'

Total length of Bridge Rail = 2*246 = 592'

Substructure:

Assume 4'X4' Caps (including at end bents) and 4'X4'X18' high columns (3 at intermediate bent)

Volume of Class "A" concrete = (3*4*4*71.25 + 1*3*4*4*18)/27 = 158.67 CY

Assume 18' high MSE Walls at end abutments with 10' wrap around each side

Area of MSE Walls = 2*18'*71.25' + 4*18'*10' = 3285 SF

COST WORKSHEET

PBSJ

PROJECT:	IM-N-75-1(227) - Dooly County	ALTERNATIVE NO.:	5

P.I. Number: 311665, I-75 @ SR-27 Interchange

DESCRIPTION:	*Eliminate End Spans & Used Walled Abutments*	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
Type III PSC Beams	LF	800	$ 145.81	$116,648.00	0	$ 145.81	$0.00
63" Bulb Tee Beams	LF	2660	$ 190.04	$505,506.40	1722	$ 190.04	$327,248.88
Class "AA" Concrete (Sup)	CY	684.79	$ 1,122.40	$768,608.30	486.88	$ 1,122.40	$546,474.11
Bridge Railing	LF	692	$ 340.74	$235,792.08	592	$ 340.74	$201,718.08
MSE Walls	SF	0	$ 52.00	$0.00	3285	$ 52.00	$170,820.00
Class "AA" Concrete (Sub)	CY	339.11	$ 692.53	$234,843.85	158.67	$ 692.53	$109,883.74
Class "AA" Median (Sub)	CY	67.83	$ 692.53	$46,974.31	0	$ 692.53	$0.00
Sub-total				$1,908,373			$1,356,145
Mark-up at 10.00%				$190,837			$135,614
TOTAL				**$2,099,210**			**$1,491,759**

$607,451

Value Analysis Design Alternative

PBS&J

PROJECT:	**GEORGIA DEPARTMENT OF TRANSPORTATION** **IM-N-75 (277)– Dooly County-- P.I. Number: 311665**	ALTERNATIVE NO.:	**6**
DESCRIPTION:	**REDUCE DISTANCE BETWEEN RAMPS A/C & B/D - REDUCE LENGTH OF ALL RAMPS**	SHEET NO.:	1 of 4

Original Design:

The original design provided 978' between the new on/off (A, B, C, D) ramps.

Alternative:

The alternative design is to relocate the easterly on/off ramp intersection to the west to provide a minimum separation between it and the existing CR 209 and to relocate the westerly on/off ramp intersection to the east to provide enough separation to be able to provide the existing service stations a direct access driveway instead of a frontage road.

Opportunities:

- Significant cost savings
- Significant reduction in adverse effects to local business and residence
- Significant cost savings in ROW acquisition

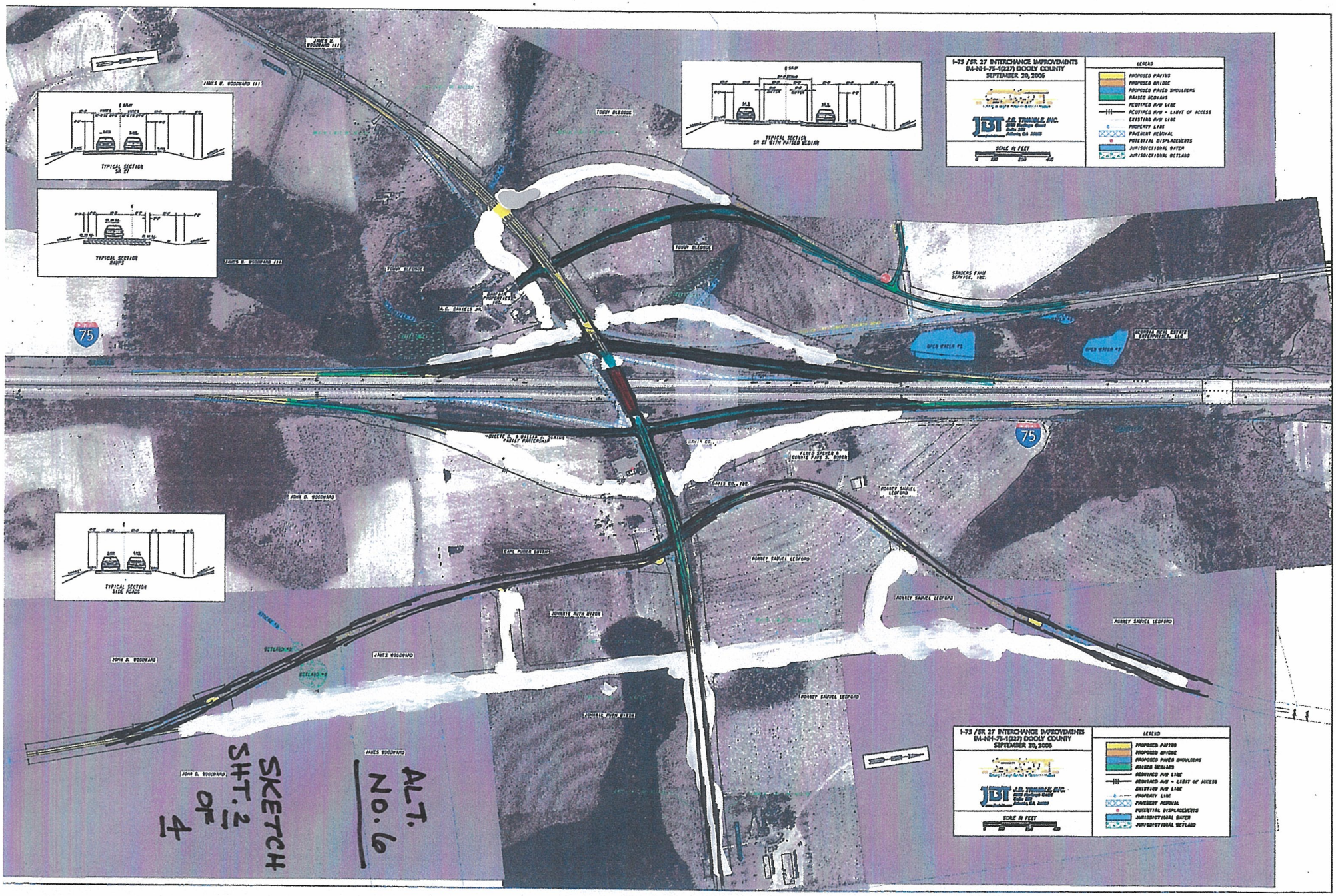
Risks:

- Moderate re-design

Technical Discussion:

The relocation of the two on/off ramps resulted in a reduction of the distance between them of approximately 300' leaving a 678' +/- separation. The required minimum separation is 300'. If this were an isolated interchange in a rural area, the desired separation would be 1,000'. It is apparent from the design of the new US 27, which will now have a raised concrete median, turn lanes, and curb and gutter, indicates that a change from rural to urban is occurring. The existing on/off ramps presently meet the design criteria for the intended use and therefore significant savings can be realized by either keeeping them or realigning them to the final locations of A, B, C and D.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 7,097,629	$	$ 7,097,629
ALTERNATIVE	$ 5,323,725	$	$ 5,323,725
SAVINGS	$ 1,773,904	$	$ 1,773,904


I-75 /SR 27 INTERCHANGE IMPROVEMENTS
IM-NH-75-1(237) DOOLY COUNTY
SEPTEMBER 20, 2006
JBT J.B. TRIMBLE, INC.
SCALE IN FEET
LEGEND
PROPOSED PAVING
PROPOSED BRIDGE
PROPOSED PAVED SHOULDERS
RAISED MEDIANS
REQUIRED R/W LINE
REQUIRED R/W - LIMIT OF ACCESS
EXISTING R/W LINE
PROPERTY LINE
PAVEMENT REMOVAL
POTENTIAL DISPLACEMENTS
JURISDICTIONAL WATER
JURISDICTIONAL WETLAND
TYPICAL SECTION SR 27
TYPICAL SECTION RAMPS
TYPICAL SECTION SIDE ROADS
TYPICAL SECTION SR 27 WITH PAVED MEDIAN
JAMES W. WOODWARD III
JOHN B. WOODWARD
JAMES WOODWARD
HARVEY SAMUEL LEGRAND
TOUCH BRIDGE
SANDERS FARM SERVICE, INC.
OPEN WATER #1
OPEN WATER #2
WETLAND #1
WETLAND #2
75
SKETCH
SHT. 2 OF 4
ALT. NO. 6

Calculations

PBSJ

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

ALTERNATIVE NO.: 6

DESCRIPTION: REDUCE DISTANCE BETWEEN RAMPS A/C & B/D
- REDUCE LENGTH OF ALL RAMPS

SHEET NO.: 3 of 4

ASSUMPTIONS: REDUCING THE DISTANCE BETWEEN RAMPS A/C AND RAMPS B/D BY APPROX. 300' WILL REDUCE THE LENGTH OF ALL RAMPS BY APPROX. 25 % AND ALL ASSOCIATED QUANTITIES.

PLAIN PC CONC. PVMT, CL HES CONC. 12" THICK

ORIGINAL → 39,660 SY

ALTERNATE → 39,660 SY − 25 % = 29,741 SY

SAY 29,750 SY

RECYCLED ASPH. CONC. 19 mm SUPERPAVE

ORIGINAL → 7040 TN

ALTERNATE → 7040 TN − 25 % = 5280 SY

GRADED AGGREGATE BASE COURSE

ORIGINAL → 32,640 TN

ALTERNATE → 32,640 TN − 25 % = 24,480 SY

EARTHWORK — BORROW EXCAVATION

ORIGINAL → 190,049 CY

ALTERNATE → 190,049 CY − 25 % = 142,537 CY

SAY 142,540 CY

COST WORKSHEET

PBSJ

PROJECT:	IM-N-75-1(227) – Dooly County	ALTERNATIVE NO.:	6
P.I. Number: 311665			
DESCRIPTION:	REDUCE DISTANCE BETWEEN RAMPS A/C AND B/D AND REDUCE LENGTH OF ALL RAMPS	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
PLAIN PC CONC. PVMT, CL HES CONC, 12" THICK	SY	39,660	85	3,371,100	29,750	85	2,528,750
RECYCLED ASPH. CONC. 19 MM SUPERPAVE	TN	7,040	75	528,000	5,280	75	396,000
GRADED AGGREGATE BASE COURSE	TN	32,640	20	652,800	24,480	20	489,600
BORROW EXCAVATION	CY	190,049	10	1,900,490	142,540	10	1,425,400
			Sub-total	6,452,390			4,839,750
			Mark-up at	10%			10%
			TOTAL	7,097,629			5,323,725
						SAVINGS:	1,773,904

Value Analysis Design Alternative

PBS&J

PROJECT:	**GEORGIA DEPARTMENT OF TRANSPORTATION** **IM-N-75 (277)– Dooly County-- P.I. Number: 311665**	ALTERNATIVE NO.:	**7**
DESCRIPTION:	**REDUCE BRIDGE WIDTH TO 53'-3"**	SHEET NO.:	1 of 5

Original Design:

The original 4-span bridge is 346' long with 50' end spans and 123' intermediate spans. The bridge is on a horizontal curve super elevated. End spans 1 and 4 consist of 50' Type III PSC beams with 63" Bulb Tee Fascia beams. Spans 2 and 3 consist of 123' Bulb Tee 63" PSC beams. All spans consist of 10 beams spaced equally. The out-to-out width of the bridge is 71'-3" measured radially. The bridge accommodates two 10' shoulders, two 12' travel lanes, and 16' raised median and 4' buffers on either side of the raised median and the travel lanes. The bents are made up of concrete caps and columns.

Alternative:

The proposed alternative reduces the out-to-out width of the bridge to 53'-3", by providing two 6' shoulders, two 12' travel lanes and a striped 14' turn lane.

Opportunities:

- Reduce cost
- Reduce bridge width
- Eliminate 3 beams
- Lower profile by at least 9"

Risks:

- Limiting widened bridge to 2 lanes with reduced shoulder widths and no raised median

Technical Discussion:

The proposed alternative reduces the out-to-out width of the bridge to 53"-3'. This can be accomplished by providing two 6' shoulders (adequate for the given ADT), two 12' travel lanes and a 14' turn lane. The turn lanes would be marked using striping and reflectors. The US 27 roadway would be widened at the on/off ramps such that this would be consistent. End spans 1 and 4 consist of 50' Type III PSC beams with 63" Bulb Tee Fascia beams. Spans 2 and 3 consist of 123' Bulb Tee 63" PSC beams. All spans consist of 7 beams equally spaced.

The alternative maintains a 17' verticle clearance to I-75.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 2,302,445	$	$ 2,302,445
ALTERNATIVE	$ 1,682,157	$	$ 1,682,157
SAVINGS	$ 620,288	$	$ 620,288

Illustrations

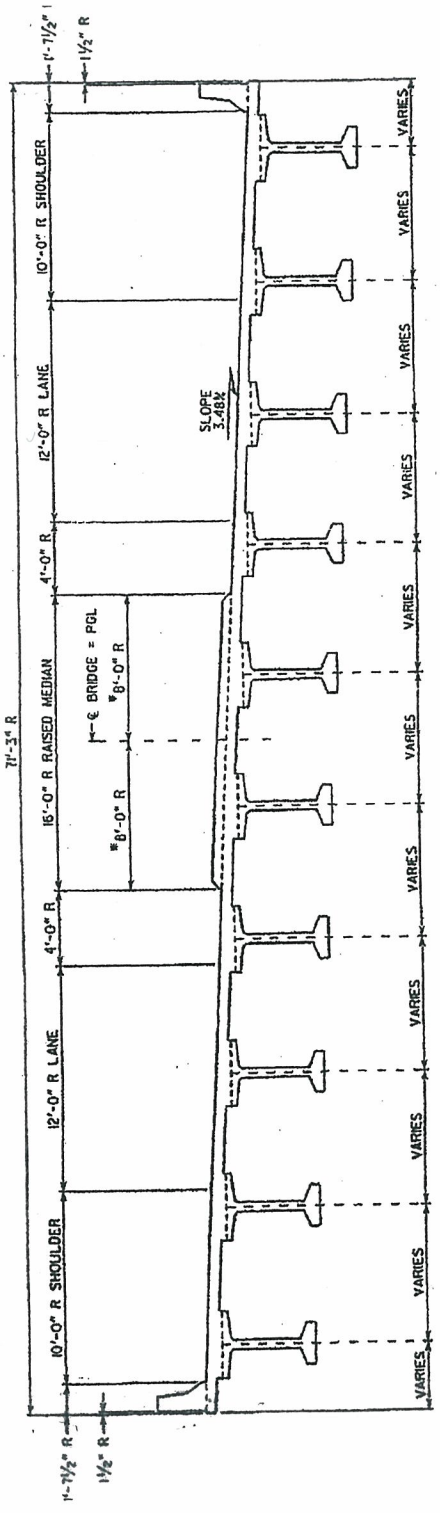
PBSJ

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

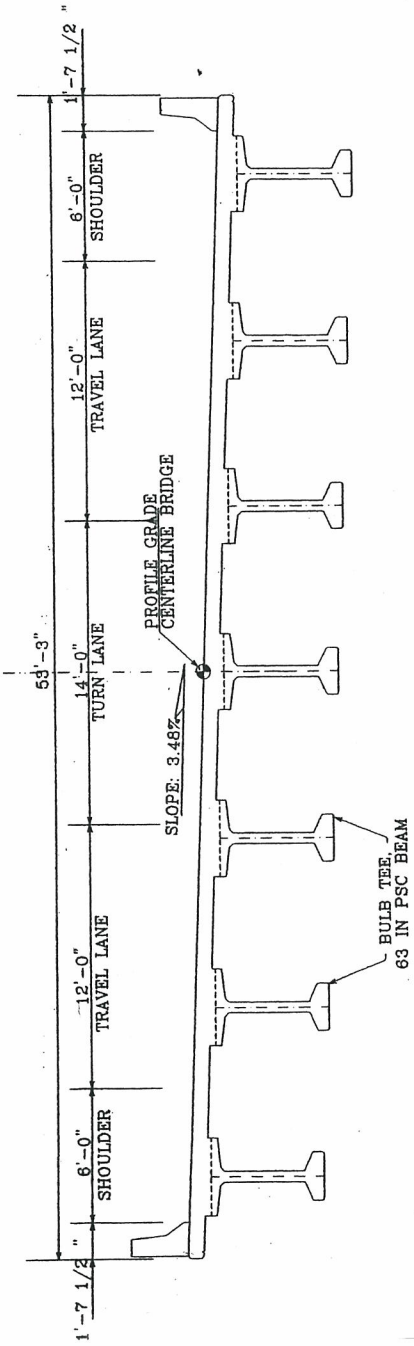
ALTERNATIVE NO.: 7

DESCRIPTION: REDUCE BRIDGE WIDTH TO 58'-3"

SHEET NO.: 2 of 5



TYPICAL SECTION - CURRENT DESIGN
SPANS 2 AND 3



ALTERNATIVE TYPICAL SECTION
(SPANS 2 AND 3)

Illustrations

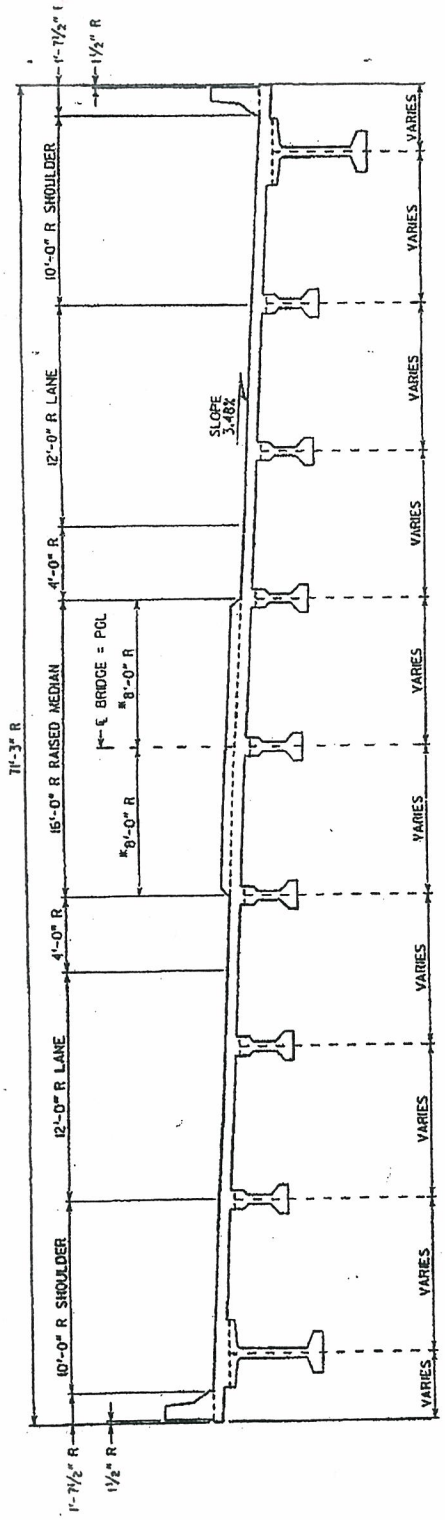
PBSJ

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

ALTERNATIVE NO.: 7

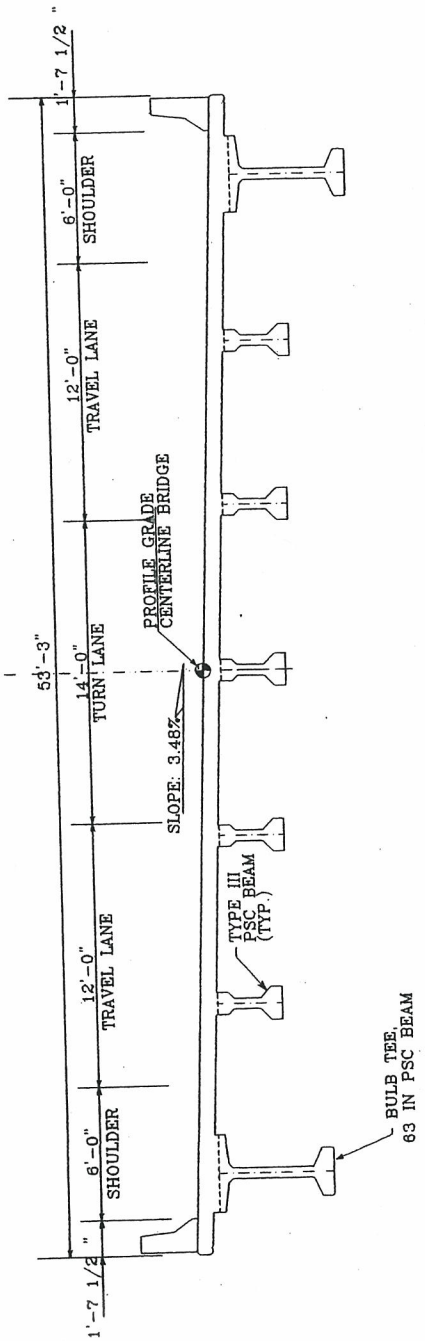
DESCRIPTION: REDUCE BRIDGE WIDTH TO 53'-3"

SHEET NO.: 3 of 5



TYPICAL SECTION – CURRENT DESIGN
SPANS 1 AND 4

NOTES: "R" DENOTES RADIAL DIMENSIONS.
* RAISED MEDIAN WIDTH VARIES ACROSS BRIDGE.



ALTERNATIVE TYPICAL SECTION
(SPANS 1 AND 4)

Calculations

PBSJ

PROJECT:	**GEORGIA DEPARTMENT OF TRANSPORTATION** **IM-N-75-1(227) – Dooly County -- P.I. Number: 311665**	ALTERNATIVE NO.:	7
DESCRIPTION:		SHEET NO.:	4 of 5

Current Design:

Deck Area = 346' * 71.25' (avg.) = 24,652.5 sq.ft.

Area of Raised Median: (346'*4') + 1/2(12'*76.98) + (151.43'*12') = 3663.04 sq. ft

Volume of 6" thick Class "A" Cast-in-place concrete = (6/12)*(3663.04)/27 = 67.83 cu. yd.

Alternative:

Deck Area = 346' * 53.25' (avg.) = 18,424.5 sq ft.

COST WORKSHEET

PBSJ

PROJECT:	IM-N-75-1(227) - Dooly County	ALTERNATIVE NO.:	7

P.I. Number: 311665, I-75 @ SR-27 Interchange

DESCRIPTION:	*Reduce Bridge Width To 53'-3"*	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
Bridge	SY	24653	$ 83.00	$2,046,157.50	18424.5	$ 83.00	$1,529,233.50
Raised Median - Class "AA"	CY	67.83	$ 692.53	$46,974.31	0	$ 83.00	$0.00
Sub-total				$2,093,132			$1,529,234
Mark-up at 10.00%				$209,313			$152,923
TOTAL				**$2,302,445**			**$1,682,157**
				Savings			$620,288

Value Analysis Design Alternative

PBSJ

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75 (277)– Dooly County-- P.I. Number: 311665

ALTERNATIVE NO.: **8**

DESCRIPTION: **REDUCE ROADWAY WIDTH ELIMINATING TURN LANES**

SHEET NO.: 1 of 8

Original Design:

The original design provided turn lanes throughout the project area.

Alternative:

The alternative design is eliminate the turn lanes beyond the on/off ramps and the bridge, (the concrete median and turn lanes are needed for the on/off ramps to improve the interchange safety.)

Opportunities:

- Substantial cost savings
- Significant reduction in adverse effects to the local business and residence
- Significant cost savings in ROW acquisition

Risks:

- Moderate re-design

Technical Discussion:

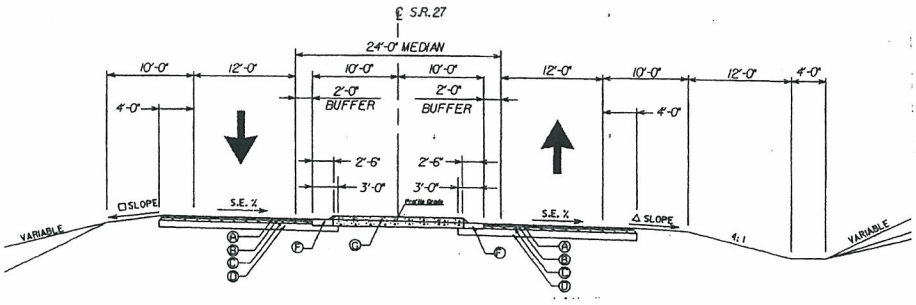
The relocation of the two on/off ramps resulted in a reduction of the distance between them of approximately 300' leaving a 678' +/- separation. The required minimum separation is 300'. If this were an isolated interchange in a rural area, the desired separation would be 1,000'. It is apparent from the design of the new US 27, which will now have a raised concrete median, turn lanes, and curb and gutter, indicates that a change from rural to urban is occurring. The existing on/off ramps presently meet the design criteria for the intended use and therefore significant savings can be realized by either keeeping them or realigning them to the final locations of A, B, C and D.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 4,298,415	$	$ 4,298,415
ALTERNATIVE	$ 3,827,338	$	$ 3,827,338
SAVINGS	$ 471,077	$	$ 471,077

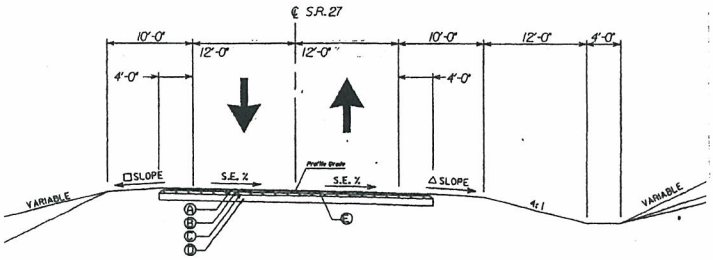
Illustrations

PBSJ

PROJECT:	**GEORGIA DEPARTMENT OF TRANSPORTATION** **IM-N-75-1(227) – Dooly County -- P.I. Number: 311665**	ALTERNATIVE NO.:	8
DESCRIPTION:	REDUCE ROADWAY WIDTH	SHEET NO.:	2 of 8



PROPOSED TYPICAL SECTION



ALTERNATE TYPICAL SECTION

*TURN LANE PAVEMENT NOT SHOWN

Illustrations

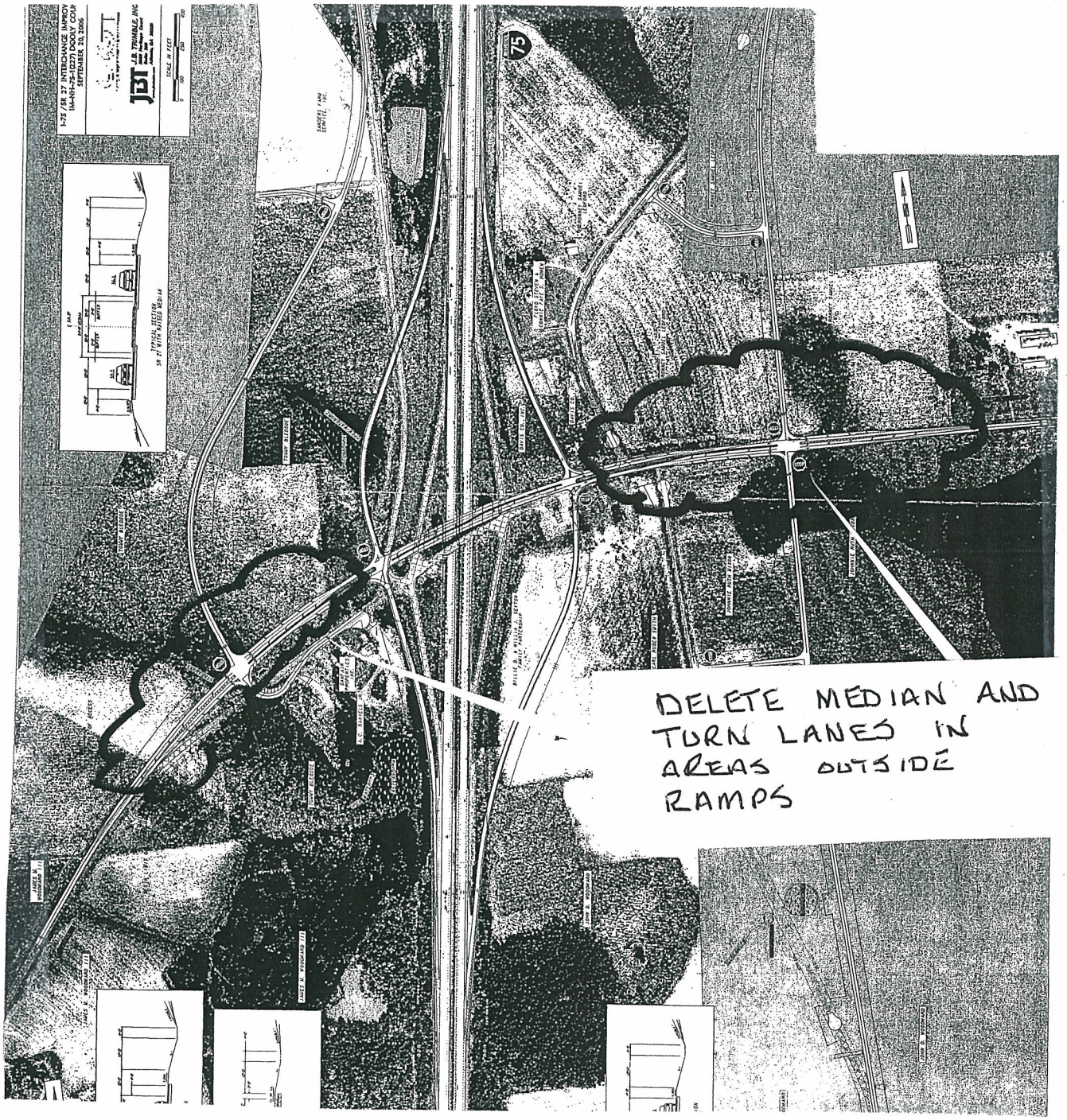
PBSJ

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

ALTERNATIVE NO.: 8

DESCRIPTION:

SHEET NO.: 3 of 8



Calculations

PBSJ

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

ALTERNATIVE NO.: 8

DESCRIPTION: REDUCE ROADWAY WIDTH ELIMINATE TURN LANES

SHEET NO.: 4 of 8

STA - SR 27 WEST	WIDTH	AREA
1) STA 131+60 Rt - STA 138+20 Rt	12-24	11880
2) STA 138+20 Rt - STA 139+40 Rt	24-36	3600
3) STA 139+40 Rt - STA 144+86 Rt	36	19656
4) STA 144+86 Rt - STA 145+92 Rt	36-18	2862
5) STA 145+92 Rt - STA 146+92 Rt	18	1800
6) STA 146+92 Rt - STA 148+08 Rt	18-36	3132
7) STA 148+08 Rt - STA 150+75 Rt	36	9612
8) STA 131+60 Lt - STA 134+00 Lt	12	2880
9) STA 134+00 Lt - STA 140+60 Lt	12-24	11880
10) STA 140+60 Lt - STA 143+72.80 Lt	24	7507.2
11) STA 143+72.80 Lt - STA 148+45 Lt	36	16999.2
12) STA 148+45 Lt - STA 149+65 Lt	36-24	3600
13) STA 149+65 Lt - STA 151+25 Lt	24	3840

STA - SR 27 EAST	WIDTH	AREA
1) STA 162+35 Rt - STA 165+75 Rt	24	8160
2) STA 165+75 Rt - STA 167+00 Rt	24-36	3750
3) STA 167+00 Rt - STA 171+48.15 Rt	36	16133.4
4) STA 171+48.15 Rt - STA 174+05 Rt	24	6164.4
5) STA 174+05 Rt - STA 180+65 Rt	24-12	11880
	SHEET SUBTOTAL	145336.2

Calculations

PBSJ

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

ALTERNATIVE NO.: 8

DESCRIPTION:

SHEET NO.: 5 of 8

STA - SR 27 EAST

	STA	WIDTH	AREA
6)	STA 162+20 Lt - STA 166+20 Lt	36-24	12000
7)	STA 166+20 Lt - STA 167+20 Lt	24-14	1900
8)	STA 167+20 Lt - STA 169+36 Lt	14	3024
9)	STA 169+36 Lt - STA 170+36 Lt	14-30	2200
10)	STA 170+36 Lt - STA 171+48 Lt	30	3360
11)	STA 171+48 Lt - STA 175+23 Lt	36	13572
12)	STA 175+25 Lt - STA 176+45 Lt	36-24	3600
13)	STA 176+45 Lt - STA 183+05 Lt	24-12	11880
		SHEET SUBTOTAL	51536

TOTAL AREA - EDGE OF PAVEMENT TO EDGE OF PAVEMENT 196872.2 sf

PROPOSED CONCRETE MEDIAN

STA	WIDTH	AREA
1) STA 144+32 - STA 148+45	8	3304
2) STA 148+45 - STA 149+16	8-14	781
3) STA 149+16 - STA 151+20	14	2856
4) STA 162+25 - STA 165+70	10	3150
5) STA 165+70 - STA 167+00	10-4	910
6) STA 167+00 - STA 170+77	4	1508
	SHEET SUBTOTAL	12509

TOTAL AREA OF PROPOSED CONCRETE MEDIAN 12509 sf

Calculations

PBSJ

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

ALTERNATIVE NO.: 8

DESCRIPTION:

SHEET NO.: 6 of 8

SR 27 WITH PROPOSED 24' WIDTH PAVEMENT

STA 131+60 - STA 151+25

1965 ft x 24 ft = 47160

STA 162+20 - STA 181+85

1965 ft x 24 ft = 47160

TOTAL 94320 sf.

AREA OF PAVEMENT CALCULATED TO BE REDUCED

TOTAL AREA FROM EP TO EP – AREA OF MEDIAN – AREA OF PROPOSED PAVEMENT

196872.2 – 12509 – 94320 = 90043.2 sf.

Calculations

PBSJ

PROJECT:	GEORGIA DEPARTMENT OF TRANSPORTATION IM-N-75-1(227) – Dooly County -- P.I. Number: 311665	ALTERNATIVE NO.:	8
DESCRIPTION:	REDUCED PAVEMENT QUANTITIES	SHEET NO.:	7 of 8

GRAD AGGR BASE

90043.2 x 0.83 x 145 ÷ 2000 = 5418.35 T

25mm SUPERPAVE

90043.2 ÷ 9 x 330 ÷ 2000 = 1650.79 T

19 mm SUPERPAVE

90043.2 ÷ 9 x 220 ÷ 2000 = 1100.53 T

9.5mm SUPERPAVE

90043.2 ÷ 9 x 135 ÷ 2000 = 675.32 T

MEDIAN

12509 ÷ 9 = 1389.89 SY

COST WORKSHEET

PBS&J

PROJECT:	IM-N-75-1(227) – Dooly County	ALTERNATIVE NO.:	8
P.I. Number: 311665			
DESCRIPTION:	REDUCE ROADWAY WIDTH	SHEET NO.:	8 of 8

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	67080	20.00	1341600.00	61661.65	20.00	1233233.00
402-3110 RECYCLED ASPH CONC 9.5mm SUPERPAVE	TN	5025	85.00	427125.00	4349.68	85.00	369722.80
402-3121 RECYCLED ASPH CONC 25mm SUPERPAVE	TN	11275	85.00	958375.00	9674.21	85.00	818057.85
402-3190 RECYCLED ASPH CONC 19 mm SUPERPAVE	TN	14950	75.00	1121250.00	13849.57	75.00	1038710.25
441-0740 CONCRETE MEDIAN 4 IN	SY	2080	28.51	59300.80	690.11	28.51	19675.04
			Sub-total	3907650.80			3479398.94
			Mark-up at	390765.08			347939.89
			TOTAL	4298415.88			3827338.83
						SAVINGS:	471077.05

Value Analysis Design Alternative

PBS&J

PROJECT:	**GEORGIA DEPARTMENT OF TRANSPORTATION** **IM-N-75 (277)– Dooly County-- P.I. Number: 311665**	ALTERNATIVE NO.:	**10**
DESCRIPTION:	**DELETE NEW CONNECTOR ROADS - CR 209 & CR 340**	SHEET NO.:	1 of 5

Original Design:

Construction of new connector roads between the relocated CR 209 and CR 340 where shown on the drawings. The proposed connector roads are located at a point between the departure and old intersect points at SR 27.

Alternative:

Delete the connector roads and replace the connectors with access at the point the new proposed alignment departs from the existing alignment.

Opportunities:

- Reduce the project costs
- Reduce the ROW required
- Reduce future maintenance costs

Risks:

- Moderate re-design

Technical Discussion:

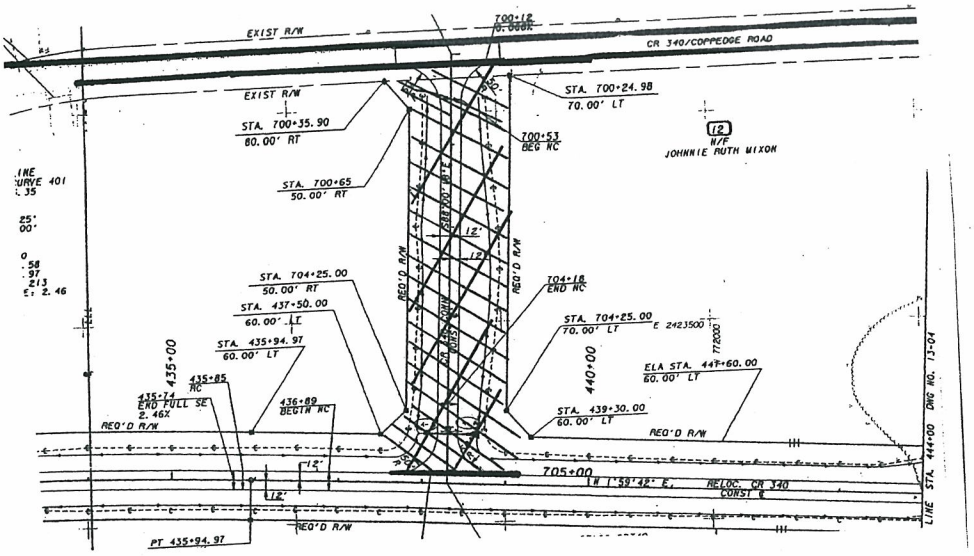
"Button Hooks" or modified turnouts would suffice due to the low traffic volumes on the dead end old alignments.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 10,822,867	$	$ 10,822,867
ALTERNATIVE	$ 10,697,997	$	$ 10,697,997
SAVINGS	$ 142,869	$	$ 142,869

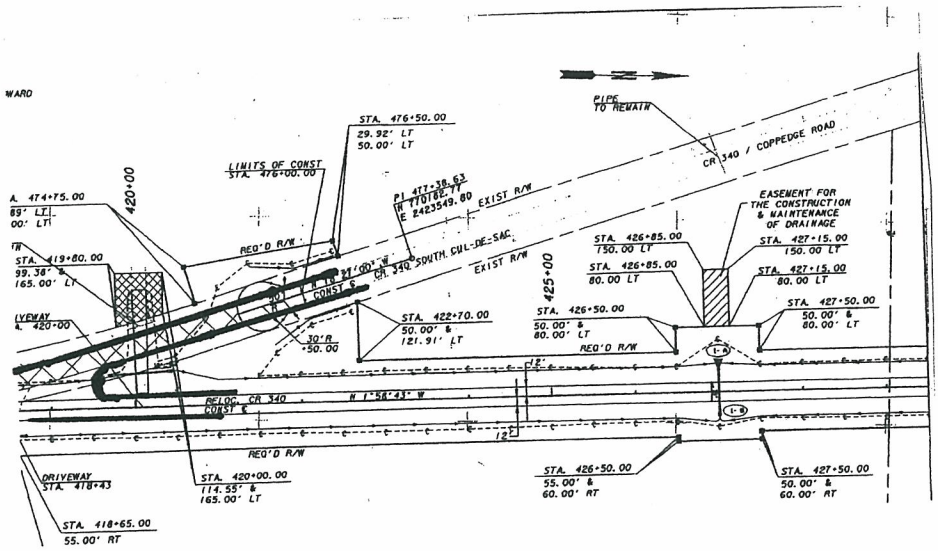
Illustrations

PBSJ

PROJECT:	GEORGIA DEPARTMENT OF TRANSPORTATION IM-N-75-1(227) – Dooly County -- P.I. Number: 311665	ALTERNATIVE NO.:	10
DESCRIPTION:	DELETE NEW CONNECTOR ROADS — CR 209 & CR 340	SHEET NO.:	2 of 5



DELETE CR 340 CONNECTOR



INSTALL "BUTTON HOOK" ACCESS @ LOCATION WHERE RELOCATED CR 340 DEPARTS OLD ALIGNMENT

Illustrations

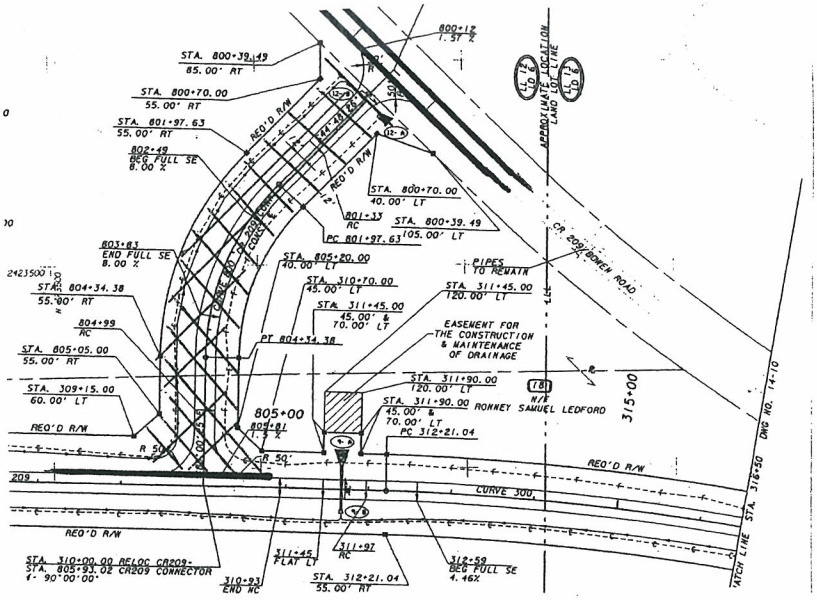
PBSJ

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

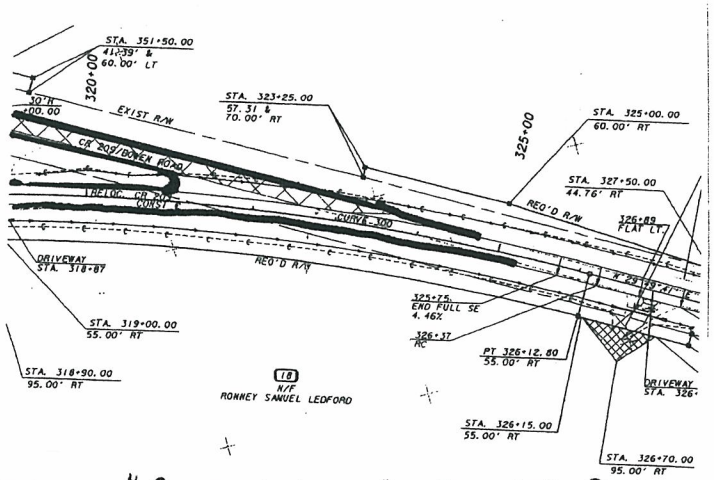
ALTERNATIVE NO.: 10

DESCRIPTION: DELETE NEW CONNECTOR ROADS CR 209 & CR 340 (CONT'D)

SHEET NO.: 3 of 5



DELETE CR 209 CONNECTOR



INSTALL "BUTTONHOOK" ACCESS @ LOCATION WHERE RELOCATED CR 209 DEPARTS OLD ALIGNMENT

Calculations

PBSJ

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

ALTERNATIVE NO.: 10

DESCRIPTION: QUANTITY CALCULATIONS

SHEET NO.: 4 of 5

DELETE CONNECTOR ROADS FOR
CR 209 & CR 340

CONNECTOR ROADS
8" GR AGGR BASE
275 lb/yd² RECYCLED ASPH 25mm
220 lb/yd² RECYCLED ASPH 19mm
125 lb/yd² RECYCLED ASPH 9.5mm

CR 209 CONNECTOR - STA 800+00.00 - STA 805+93.02

GAB 569.02 ft x 24 ft x 0.67 ft x 145 lb/ft³ ÷ 2000 lb/ton = 663.36 T
25mm 569.02 ft x 24 ft ÷ 9 x 275 lb/ft² ÷ 2000 = 208.64 T
19mm 569.02 ft x 24 ft ÷ 9 x 220 lb/ft² ÷ 2000 = 166.91 T
9.5mm 569.02 ft x 24 ft ÷ 9 x 125 lb/ft² ÷ 2000 = 94.84 T
BORROW - PER PLAN = 891 CY

CR 340 CONNECTOR - STA 700+00.00 - STA 705+17.33

GAB 493.33 ft x 24 ft x 0.67 ft x 145 lb/ft³ ÷ 2000 = 575.12 T
25mm 493.33 ft x 24 ft ÷ 9 x 275 lb/yd² ÷ 2000 = 180.89 T
19mm 493.33 ft x 24 ft ÷ 9 x 220 lb/yd² ÷ 2000 = 144.71 T
9.5mm 493.33 ft x 24 ft ÷ 9 x 125 lb/yd² ÷ 2000 = 82.22 T
BORROW - PER PLAN = 2461 CY

COST WORKSHEET

PBS&J

PROJECT: IM-N-75-1(227) – Dooly County

ALTERNATIVE NO.: 10

P.I. Number: 311665

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
206-0002 BORROW EXCAV INCL MATL	CY	599062	10.00	5990620.00	595704	10.00	5957040.00
310-1101 GR AGGR BASE CRS	TN	67080	20.00	1341600.00	65884.52	20.00	1316830.40
402-3110 RECYCLED ASPH CONC 9.5 mm SUPERPAVE GP 1 OR 2	TN	5025	85.00	427125.00	4847.94	85.00	412074.90
402-3121 RECYCLED ASPH CONC 25 mm SUPERPAVE	TN	11275	85.00	958375.00	10885.47	85.00	925254.95
402-3190 RECYCLED ASPH CONC 19 mm SUPERPAVE	TN	14950	75.00	1121250.00	14638.36	75.00	1097878.50
			Sub-total	9838970.00			9769088.75
			Mark-up at	983897.00			976908.87
			TOTAL	10822867.00			10679997.62
						SAVINGS:	142869.38

Value Analysis Design Suggestion

PROJECT:	**GEORGIA DEPARTMENT OF TRANSPORTATION** **IM-N-75-1(227) – Dooly County -- P.I. Number: 311665**	ALTERNATIVE NO.:	**12**
DESCRIPTION:	**PROVIDE DIRECT ACCESS TO SERVICE STATIONS**	SHEET NO.:	1 of 1

Original Design:

The current design, necessarily, calls for the access to various businesses and properties to be modified and "attached" via outer roads, etc.

Alternative:

If CR 155 is relocated 300' from the new on/off ramp, it may be possible to provide more direct access to the service stations on the south side.

Opportunities:

- Reduce property impact
- Initial cost savings

Risks:

- Some re-design required

Technical Discussion:

There would be a need to weigh the cost of re-design against the cost of right-of-way impact. Also, need to make sure that this change does not affect the fair treatment factor associated with handling local land owners.

Value Analysis Design Suggestion

PBS&J

PROJECT:	**GEORGIA DEPARTMENT OF TRANSPORTATION** **IM-N-75-1(227) – Dooly County -- P.I. Number: 311665**	ALTERNATIVE NO.:	**13**
DESCRIPTION:	**USE ASPHALTIC CONCRETE IN LIEU OF PC CONCRETE ON NEW RAMPS**	SHEET NO.:	1 of 1

Original Design:

The current plan is to use Portland Cement concrete for ramp pavement construction.

Alternative:

Consideration might be given to the use of asphaltic concrete for all or part of the ramp pavement.

Opportunities:

- Initial cost savings

Risks:

- Some minimal re-design required

Technical Discussion:

A partial application of this design suggestion may be in order. As an example, concrete pavement would be used in the areas where ramp traffic is to come to a stop. This would avoid asphalt pavement "roll-up". The remainder of the ramps would be asphaltic concrete.

Value Analysis Design Alternative

PBS&J

PROJECT:	**GEORGIA DEPARTMENT OF TRANSPORTATION** **IM-N-75 (277)– Dooly County-- P.I. Number: 311665**	ALTERNATIVE NO.:	**15**
DESCRIPTION:	**REVISE GRADES AND VERTICAL CURVES TO REDUCE EARTHWORK**	SHEET NO.:	1 of 4

Original Design:

Proposes to construct the new arrangement of US 27 where it crosses I-75 using a miximum grade of 3% and verticle curves which meet a 60 mph design speed criteria.

Alternative:

This alternative suggests to use steeper grades of up to 4% miximum and more conservative vertical curves to meet the intended design criteria speed of 55 mph. The verticle alignment that uses this criteria should significantly reduce the earthwork and enable better access.

Opportunities:

- Significant cost savings
- Reduced construction time
- Reduced ROW impacts

Risks:

- Moderate re-design

Technical Discussion:

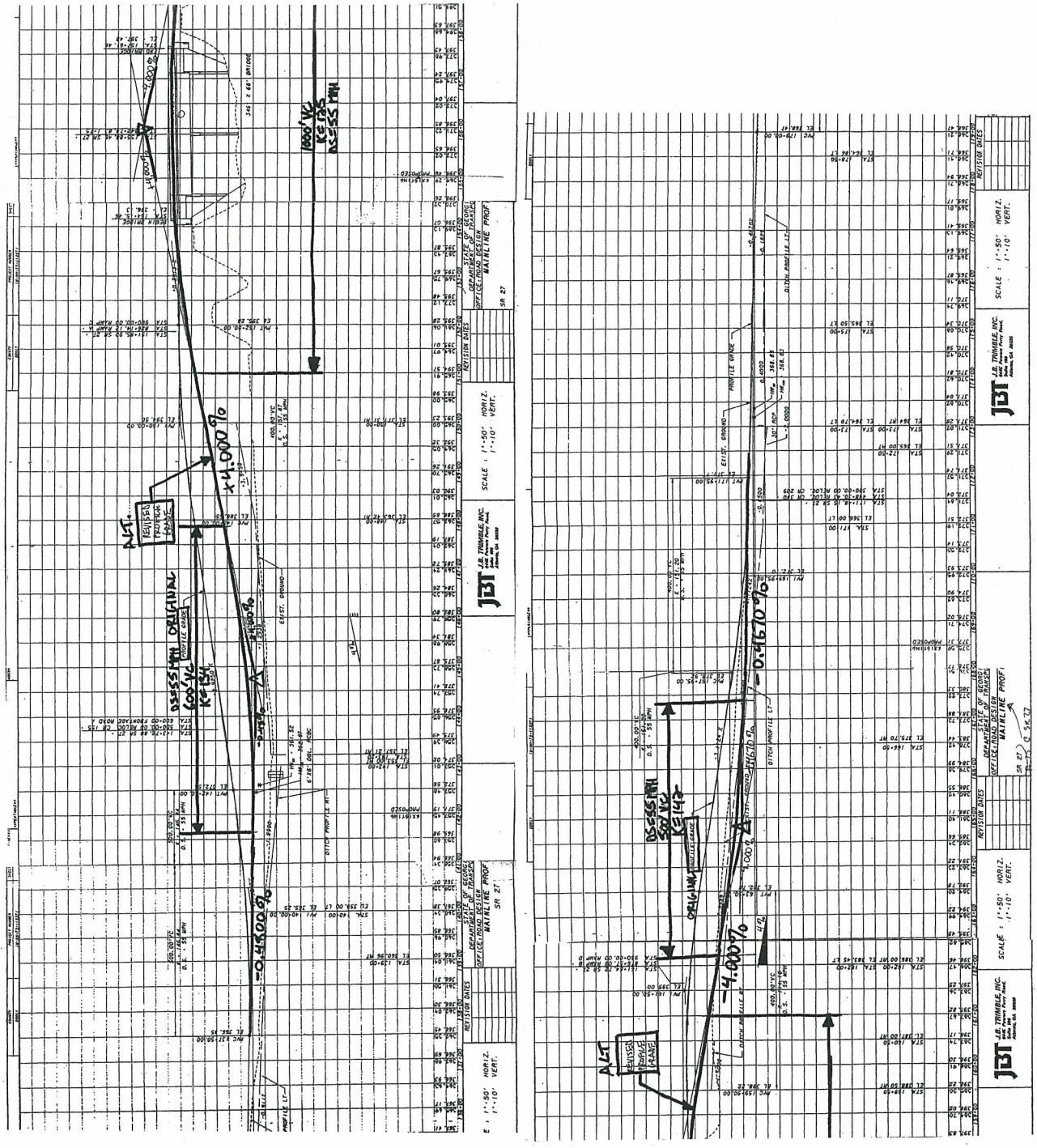
For a rural arterial with a design speed fo 55 mph, the ASHTO design manual recommends a maximum grade of 4% on level terrain or up to 5% on rolling terrain which this area is considered. Therefore, this recommended change appears to be reasonable and could be increased to 5% which would yield even more savings.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 4,894,285	$	$ 4,894,285
ALTERNATIVE	$ 3,662,780	$	$ 3,662,780
SAVINGS	$ 1,231,505	$	$ 1,231,505

Illustrations

PBS&J

PROJECT:	GEORGIA DEPARTMENT OF TRANSPORTATION IM-N-75-1(227) – Dooly County -- P.I. Number: 311665	ALTERNATIVE NO.:	15
DESCRIPTION:	REVISE GRADES AND VERTICAL CURVES TO REDUCE EARTHWORK	SHEET NO.:	2 of 4



Calculations

PBSJ

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

ALTERNATIVE NO.: 15

DESCRIPTION: REVISE GRADES AND VERTICAL CURVES TO REDUCE EARTHWORK

SHEET NO.: 3 of 4

ASSUMPTIONS: USING STEEPER GRADES OF 4% MAX. AND VERTICAL CURVES THAT MEET THE 55 MPH DESIGN SPEED ALONG THE MAINLINE (SR 27) WILL REDUCE EARTHWORK APPROX. 30%. EARTHWORK FOR THE ROADS THAT TIE INTO THE REVISED MAINLINE PROFILE WILL BE REDUCED BY THE FOLLOWING:

CR 155 → 30%
FRONTAGE ROAD A → 30%
RAMP A → 15%
RAMP C → 15%
RAMP B → 30%
RAMP D → 30%

EARTHWORK QUANTITIES

LOCATION	ORIGINAL BORROW (CY)	PERCENT REDUCED	ALTERNATE BORROW (CY)
SR 27	145,749	30%	102,024
RAMP A	4,960	15%	4,216
RAMP B	10,367	30%	7,257
RAMP C	138,541	15%	117,760
RAMP D	36,181	30%	25,327
CR 155	101,653	30%	71,157
FRONTAGE RD. A	7,484	30%	5,239
TOTAL	444,935		332,980

COST WORKSHEET

PBS&J

PROJECT:	IM-N-75-1(227) – Dooly County	ALTERNATIVE NO.:	15
P.I. Number: 311665			
DESCRIPTION:	REVISE GRADES AND VERTICAL CURVES TO REDUCE EARTHWORK	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
BORROW EXCAVATION	CY	444,935	10	4,449,350	332,980	10	3,329,800
			Sub-total	4,449,350			3,329,800
			Mark-up at	10%			10%
			TOTAL	4,894,285			3,662,780
						SAVINGS:	1,231,505

Value Analysis Design Suggestion

PROJECT:	**GEORGIA DEPARTMENT OF TRANSPORTATION** **IM-N-75-1(227) – Dooly County -- P.I. Number: 311665**	ALTERNATIVE NO.:	**16**
DESCRIPTION:	**REVISIT PAVEMENT DESIGN FOR EXISTING COUNTY ROADS**	SHEET NO.:	1 of 1

Original Design:

The existing design indicates a fairly heavy pavement design for the county roads affected by this project.

Alternative:

Consideration might be given to revisiting these specified pavement sections.

Opportunities:

- Potential cost savings

Risks:

- Minimal re-design

Technical Discussion:

The Average Daily Traffic on these roads is fairly light. If projected load-types are also light, there may be a significant cost savings associated with this pavement change.

Value Analysis Design Alternative

PBSJ

PROJECT:	**GEORGIA DEPARTMENT OF TRANSPORTATION** **IM-N-75 (277)– Dooly County-- P.I. Number: 311665**	ALTERNATIVE NO.:	**17**
DESCRIPTION:	**DELETE NEW FUTURE 12' LANES IN RAMP AREAS**	SHEET NO.:	1 of 4

Original Design:

Construction of future lanes along the proposed ramps to the gore points where shown on the typical section No. 12 for I-75.

Alternative:

Construct the ramps as located on the plans but delete the added 12' concrete pavement for future growth.

Opportunities:

- Reduce initial costs
- By postponing the future pavement, all pavement would then have the same maintenance cyle

Risks:

- Staging of pavement installation with ramp traffic
- Partial reconstruction of ramp would be required

Technical Discussion:

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 3,708,210	$	$ 3,708,210
ALTERNATIVE	$ 3,203,543	$	$ 3,203,543
SAVINGS	$ 504,667	$	$ 504,667

Illustrations

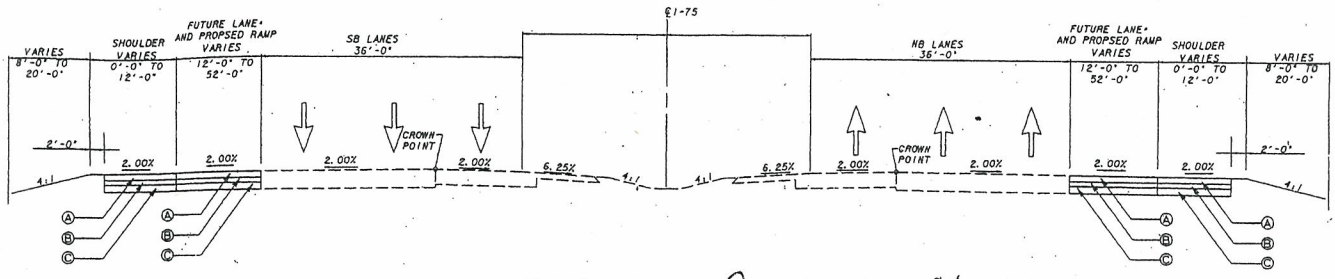
PBSJ

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

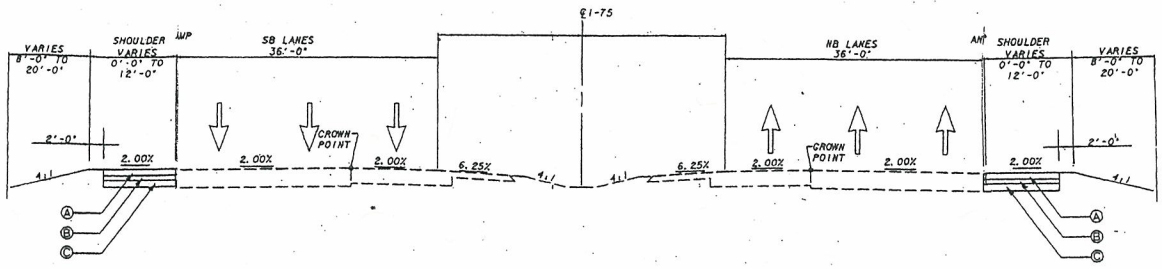
ALTERNATIVE NO.: 17

DESCRIPTION: DELETE NEW FUTURE 12' LANES (RAMP AREAS)

SHEET NO.: 2 of 4



TYPICAL SECTION No 12
CONTRACT PLANS



ALTERNATIVE TYPICAL SECTION No 12

Calculations

PBSJ

PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION
IM-N-75-1(227) – Dooly County -- P.I. Number: 311665

ALTERNATIVE NO.: 17

DESCRIPTION: DELETE 12' CONCRETE LANES FOR FUTURE

SHEET NO.: 3 of 4

QUANTITY CALCULATIONS

SB	STA 315+50.05 – STA 329+50.05	1400 lf
	STA 359+00.97 – STA 365+75.05	674.08 lf
NB	STA 319+00.05 – STA 324+74.10	574.05 lf
	STA 359+93.05 – STA 373+93.05	1400 lf

TOTAL LENGTH 4048.13

4048.13 x 12 ÷ 9 = 5397.50 yd²

COST WORKSHEET

PBS&J

PROJECT: **IM-N-75-1(227) – Dooly County** ALTERNATIVE NO.: 17

P.I. Number: 311665

DESCRIPTION: 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
439-0056 PLAIN PC	SY	39660	$85.00	3371100.00	34262.50	85.00	2912312.50
CONC PVMT, CL HES							
CONC, 12 IN TK							
				Sub-total	3371100.00		2912312.50
				Mark-up at	337110.00		291231.25
				TOTAL	3708210.00		3203543.75
						SAVINGS:	504666.30

Value Analysis Design Alternative

PBS&J

PROJECT:	**GEORGIA DEPARTMENT OF TRANSPORTATION** **IM-N-75 (277)– Dooly County-- P.I. Number: 311665**	ALTERNATIVE NO.:	**18**
DESCRIPTION:	**COMBINE IDEAS (4, 5, 6, 7, 15 & 17) INTO DESIGN SCHEME - I**	SHEET NO.:	1 of 4

Original Design:

See project description for current project configuration. (Cost = $24,238,997)

Alternative:

Redesign the project to maintain approximate location of on/off ramps at County Roads 340 and 290. The various alternatives presented earlier might be rolled into this one optimal scheme with the following cost impact as an approximation.

Apply idea 4	$564,000
Apply idea 5	$650,000
Apply idea 6	$1,773,000
Apply idea 15	$1,231,000
	$4,218,000 (savings)

Opportunities:

- Initial cost savings
- Reduced construction time
- Provide direct access to existing business and users
- Reduce ROW impact

Risks:

- Very significant re-design requirement
- Time consuming to implement

Technical Discussion:

The project is being driven by a desire to have a 1,000 foot separation between all intersections. The regulations require a 300 foot separation. The separation between the two existing intersections is approximately 500 feet which is well within the requirements. By minimizing the separation, the design could provide direct access to the local businesses, retain two of the three connecting streets, eliminate the need for a new 5,680 foot highway and 1,000 feet of connector roads.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 24,238,997	$	$ 24,238,997
ALTERNATIVE	$ 20,020,997	$	$ 20,020,997
SAVINGS	$ 4,218,000	$	$ 4,218,000

Project Description

PROJECT DESCRIPTION

This project is rather fully described in the documentation that follows. The current new estimate for the cost of construction totals $24,238,997.71. The cover sheet and content of that estimate are included

Please see the following enclosed documents

- Georgia Department of Transportation
    - Revision to the Programmed Cost Estimate (October 20, 2006)
    - Bridge Replacement/Bridge Condition Survey (May 18, 2005)
    - Cost Difference Between Rehab. Bridge and Bridge Replacement
    - Bridge Salvage Letter (December 12, 2005)
    - Traffic Analysis (Arcadis – December 15, 2005)
    - Approved Concept Report (May 8, 2000)

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

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE	IM-NH-75-1 (227) Dooly County PI # 311665- I-75 & SR 27 Interchange Reconstruction	**OFFICE**	Road Design
		DATE	October 20, 2006

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

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

SUBJECT **REVISION TO THE PROGRAMMED COST ESTIMATE**

Project Description:	Interchange Reconstruction of I-75 at SR 27	
Project Length:	1.05 miles (SR27) 2.22 Miles (county & frontage roads) 2.04 (ramps)	
Scheduled Let Date:	FY 08 (19 Oct 2007)	
Programmed Estimate:	Construction	$ 9,405,000.00
New Estimate:	Construction	$ 24,238,997.71
Reason for Revision:	To update the current programmed cost estimate due to changes in quantities and unit rates. Additional inflationary costs should be added by the Office of Financial Management.	

BAS:JSS:RDA:SAW:ss

Attachment

cc: Jamie Simpson, Financial Management Administrator
Genetha Rice-Singleton, State Scheduling Engineer

Section PERMANENT EROSION CONTROL

Item Number	Quantity	Units	Unit Price	Item Description	Cost
603-2180	680	SY	34.50	STN DUMPED RIP RAP, TP 3, 12 IN	23460.00
603-7000	680	SY	4.25	PLASTIC FILTER FABRIC	2890.00
700-6910	66	AC	838.07	PERMANENT GRASSING	55312.62
700-7000	200	TN	58.63	AGRICULTURAL LIME	11726.00
700-7010	250	GL	18.78	LIQUID LIME	4695.00
700-8000	50	TN	283.70	FERTILIZER MIXED GRADE	14185.00
700-8100	4950	LB	1.65	FERTILIZER NITROGEN CONTENT	8167.50
710-9000	3200	SY	3.65	PERMANENT SOIL REINFORCING MAT	11680.00
715-2100	23175	SY	1.89	BITUMINOUS TREATED ROVING, SLOPES	43800.75
716-2000	72325	SY	1.12	EROSION CONTROL MATS, SLOPES	81004.00
				Section Sub Total:	**$256,920.87**

Section TEMPORARY EROSION CONTROL

Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0232	35	AC	520.09	TEMPORARY GRASSING	18203.15
163-0240	1075	TN	203.42	MULCH	218676.50
163-0300	6	EA	1810.13	CONSTRUCTION EXIT	10860.78
163-0501	1	EA	916.23	CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 1	916.23
163-0503	21	EA	516.75	CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 3	10851.75
163-0520	3050	LF	13.92	CONSTRUCT AND REMOVE TEMPORARY PIPE SLOPE DRAIN	42456.00
163-0530	5000	LF	2.99	CONSTRUCT AND REMOVE BALED STRAW EROSION CHECK	14950.00
163-0531	1	EA	7859.28	CONSTRUCT AND REMOVE SEDIMENT BASIN, TP 1, STA NO - 515+00	7859.28
163-0531	1	EA	7859.28	CONSTRUCT AND REMOVE SEDIMENT BASIN, TP 1, STA NO - 858+50	7859.28
163-0550	4	EA	271.97	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	1087.88
165-0010	8250	LF	1.08	MAINTENANCE OF TEMPORARY SILT FENCE, TP A	8910.00
165-0030	2300	LF	1.31	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	3013.00
165-0060	6	EA	1047.01	MAINTENANCE OF TEMPORARY SEDIMENT BASIN, STA NO - 858+50	6282.06
165-0060	6	EA	1047.01	MAINTENANCE OF TEMPORARY SEDIMENT BASIN, STA NO - 515+50	6282.06
165-0070	2500	LF	1.73	MAINTENANCE OF BALED STRAW EROSION CHECK	4325.00
165-0085	1	EA	333.44	MAINTENANCE OF SILT CONTROL GATE, TP 1	333.44
165-0087	21	EA	169.96	MAINTENANCE OF SILT CONTROL GATE, TP 3	3569.16
165-0101	6	EA	470.73	MAINTENANCE OF CONSTRUCTION EXIT	2824.38
165-0105	4	EA	96.16	MAINTENANCE OF INLET SEDIMENT TRAP	384.64
167-1000	2	EA	1688.38	WATER QUALITY MONITORING AND SAMPLING	3376.76
167-1500	24	MO	911.79	WATER QUALITY INSPECTIONS	21882.96
171-0010	16500	LF	1.99	TEMPORARY SILT FENCE, TYPE A	32835.00
171-0030	4600	LF	3.36	TEMPORARY SILT FENCE, TYPE C	15456.00
643-8200	1250	LF	1.80	BARRIER FENCE (ORANGE), 4 FT	2250.00
				Section Sub Total:	**$445,445.31**

Section SIGNING & MARKING

Item Number	Quantity	Units	Unit Price	Item Description	Cost
500-3101	8	CY	504.54	CLASS A CONCRETE	4036.32
610-0019	6	EA	2263.14	REMOVE AND RESET LOGO SIGN -	13578.84
610-9402	1	LS	2679.88	REM STR SUPPORT, TYPE 2, INCL ILLUM SIGN SYSTEM, STA - F	2679.88
610-9402	1	LS	2679.88	REM STR SUPPORT, TYPE 2, INCL ILLUM SIGN SYSTEM, STA - A	2679.88
610-9402	1	LS	2679.88	REM STR SUPPORT, TYPE 2, INCL ILLUM SIGN SYSTEM, STA - C	2679.88
610-9402	1	LS	2679.88	REM STR SUPPORT, TYPE 2, INCL ILLUM SIGN SYSTEM, STA - B	2679.88
610-9402	1	LS	2679.88	REM STR SUPPORT, TYPE 2, INCL ILLUM SIGN SYSTEM, STA - E	2679.88
610-9402	1	LS	2679.88	REM STR SUPPORT, TYPE 2, INCL ILLUM SIGN SYSTEM, STA - D	2679.88
635-1000	158	LF	83.56	BARRICADES	13202.48

636-1020	262	SF	14.17	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 3	3712.54
636-1029	44	SF	17.89	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 3	787.16
636-1033	170	SF	21.25	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 9	3612.50
636-1041	342	SF	30.63	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 9	10475.46
636-1076	1109	SF	28.30	HIGHWAY SIGNS, ALUM EXTRUDED PANELS, REFL SHEETING TP 6	31384.70
636-2070	1551	LF	7.32	GALV STEEL POSTS, TP 7	11353.32
636-3000	30	LB	2.93	GALV STEEL STR SHAPE POST	87.90
636-3010	4	EA	391.63	GROUND-MOUNTED BREAKAWAY SIGN SUPPORT	1566.52
638-1001	1	LS	77081.52	STR SUPPORT FOR OVERHEAD SIGN, TP I , STA - 217+89	77081.52
638-1001	1	LS	77081.52	STR SUPPORT FOR OVERHEAD SIGN, TP I , STA - 414+43	77081.52
638-1001	1	LS	77081.52	STR SUPPORT FOR OVERHEAD SIGN, TP I , STA - 319+68	77081.52
638-1001	1	LS	77081.52	STR SUPPORT FOR OVERHEAD SIGN, TP I , STA - 365+79	77081.52
638-1001	1	LS	77081.52	STR SUPPORT FOR OVERHEAD SIGN, TP I , STA - 298+20	77081.52
638-1001	1	LS	77081.52	STR SUPPORT FOR OVERHEAD SIGN, TP I , STA - 388+22	77081.52
653-0120	52	EA	62.78	THERMOPLASTIC PVMT MARKING, ARROW, TP 2	3264.56
653-0140	4	EA	110.78	THERMOPLASTIC PVMT MARKING, ARROW, TP 4	443.12
653-1501	60100	LF	0.29	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, WHITE	17429.00
653-1502	45500	LF	0.29	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	13195.00
653-1704	450	LF	3.67	THERMOPLASTIC SOLID TRAF STRIPE, 24 IN, WHITE	1651.50
653-1804	1000	LF	1.74	THERMOPLASTIC SOLID TRAF STRIPE, 8 IN, WHITE	1740.00
653-1806	700	LF	1.79	THERMOPLASTIC SOLID TRAF STRIPE, 8 IN, YELLOW	1253.00
653-1810	4100	LF	0.95	THERMOPLASTIC SOLID TRAF STRIPE, 10 IN, WHITE	3895.00
653-3501	3300	GLF	0.18	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	594.00
653-3804	200	GLF	0.58	THERMOPLASTIC SKIP TRAF STRIPE, 8 IN, WHITE	116.00
653-6004	3120	SY	2.59	THERMOPLASTIC TRAF STRIPING, WHITE	8080.80
654-1001	396	EA	3.58	RAISED PVMT MARKERS TP 1	1417.68
654-1003	898	EA	3.77	RAISED PVMT MARKERS TP 3	3385.46
655-5000	4	EA	283.21	PVMT ARROW, THERMOPLASTIC, WITH RAISED REFLECTORS	1132.84
655-7000	3	EA	773.00	PAVEMENT ARROW, PREFORMED PLASTIC WITH RAISED REFLECTORS	2319.00
				Section Sub Total:	**$632,283.10**

Section LIGHTING

Item Number	Quantity	Units	Unit Price	Item Description	Cost
500-3101	128	CY	504.54	CLASS A CONCRETE	64581.12
511-1000	12800	LB	0.83	BAR REINF STEEL	10624.00
615-1200	262	LF	14.34	DIRECTIONAL BORE -	3757.08
682-3424	14436	LF	3.16	MULT COND CABLE, TP RHW, 2-#2-1-#4	45617.76
682-6120	328	LF	10.20	CONDUIT, RIGID, 2 IN	3345.60
682-6140	131	LF	26.94	CONDUIT, RIGID, 4 IN	3529.14
682-6222	9186	LF	8.63	CONDUIT, NONMETL, TP 2, 2 IN	79275.18
682-9000	1	LS	8516.85	MAIN SERVICE PICK UP POINT	8516.85
682-9000	1	LS	8516.85	MAIN SERVICE PICK UP POINT	8516.85
682-9000	1	LS	8516.85	MAIN SERVICE PICK UP POINT	8516.85
682-9000	1	LS	8516.85	MAIN SERVICE PICK UP POINT	8516.85
682-9021	11	EA	1693.79	ELECTRICAL JUNCTION BOX, CONC GROUND MOUNTED	18631.69
683-1101	16	EA	17049.38	LIGHTING TOWER, STEEL, 100 FT MH, INCL LOWERING EQUIP	272790.08
683-6586	48	EA	658.32	HIGH LEVEL LUMINAIRE, TP 5, 1000 W, HP SODIUM	31599.36
				Section Sub Total:	**$567,818.41**

Estimate Report for file "IM-NH-75-1(227)"

Section ROADWAY ITEMS

Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	134646.83	TRAFFIC CONTROL - IM-NH-75-1(227)	134646.83
153-1300	1	EA	61826.66	FIELD ENGINEERS OFFICE TP 3	61826.66
201-1500	1	LS	2615167.21	CLEARING & GRUBBING - IM-NH-75-1(227)	2615167.21
205-0001	113080	CY	8.00	UNCLASS EXCAV	904640.00
206-0002	599062	CY	10.00	BORROW EXCAV, INCL MATL	5990620.00
310-1101	67080	TN	20.00	GR AGGR BASE CRS, INCL MATL	1341600.00
310-5060	2400	SY	15.00	GR AGGR BASE CRS, 6 INCH, INCL MATL	36000.00
318-3000	35	TN	17.82	AGGR SURF CRS	623.70
402-1812	5760	TN	100.00	RECYCLED ASPH CONC LEVELING, INCL BITUM MATL & H LIME	576000.00
402-3110	5025	TN	85.00	RECYCLED ASPH CONC 9.5 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	427125.00
402-3121	11275	TN	85.00	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	958375.00
402-3190	14950	TN	75.00	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2,INCL BITUM MATL & H LIME	1121250.00
413-1000	8850	GL	1.23	BITUM TACK COAT	10885.50
433-1000	460	SY	165.00	REINF CONC APPROACH SLAB	75900.00
439-0056	39660	SY	85.00	PLAIN PC CONC PVMT, CL HES CONC, 12 INCH THK	3371100.00
441-0303	4	EA	1954.24	CONC SPILLWAY, TP 3	7816.96
441-0740	2080	SY	28.51	CONCRETE MEDIAN, 4 IN	59300.80
441-6740	6000	LF	12.49	CONC CURB & GUTTER, 8 IN X 30 IN, TP 7	74940.00
500-3101	240	CY	504.54	CLASS A CONCRETE	121089.60
500-3900	6	CY	809.60	CLASS B CONCRETE, INCL REINF STEEL	4857.60
511-1000	33625	LB	0.83	BAR REINF STEEL	27908.75
550-1180	450	LF	34.18	STORM DRAIN PIPE, 18 IN, H 1-10	15381.00
550-1181	220	LF	34.43	STORM DRAIN PIPE, 18 IN, H 10-15	7574.60
550-1182	100	LF	34.52	STORM DRAIN PIPE, 18 IN, H 15-20	3452.00
550-1184	125	LF	54.26	STORM DRAIN PIPE, 18 IN, H 25-30	6782.50
550-1185	260	LF	36.75	STORM DRAIN PIPE, 18 IN, H 35-40	9555.00
550-1240	145	LF	42.21	STORM DRAIN PIPE, 24 IN, H 1-10	6120.45
550-1241	270	LF	46.87	STORM DRAIN PIPE, 24 IN, H 10-15	12654.90
550-1244	140	LF	44.14	STORM DRAIN PIPE, 24 IN, H 25-30	6179.60
550-1300	225	LF	52.70	STORM DRAIN PIPE, 30 IN, H 1-10	11857.50
550-1301	80	LF	59.04	STORM DRAIN PIPE, 30 IN, H 10-15	4723.20
550-1360	110	LF	65.09	STORM DRAIN PIPE, 36 IN, H 1-10	7159.90
550-1480	25	LF	106.14	STORM DRAIN PIPE, 48 IN, H 1-10	2653.50
550-2180	750	LF	26.32	SIDE DRAIN PIPE, 18 IN, H 1-10	19740.00
550-3318	19	EA	701.86	SAFETY END SECTION 18 IN, STORM DRAIN, 4:1 SLOPE	13335.34
550-3324	1	EA	963.20	SAFETY END SECTION 24 IN, STORM DRAIN, 4:1 SLOPE	963.20
550-4218	18	EA	540.95	FLARED END SECTION 18 IN, STORM DRAIN	9737.10
550-4224	8	EA	624.78	FLARED END SECTION 24 IN, STORM DRAIN	4998.24
550-4230	8	EA	713.73	FLARED END SECTION 30 IN, STORM DRAIN	5709.84
550-4236	4	EA	1016.05	FLARED END SECTION 36 IN, STORM DRAIN	4064.20
550-4418	3	EA	396.35	FLARED END SECTION, 18 IN, SLOPE DRAIN	1189.05
570-1000	1	LS	4365.86	CONSTR, MAINT & REMOVE DETOUR DRAINAGE STR, NO - 1	4365.86
570-1000	1	LS	4365.86	CONSTR, MAINT & REMOVE DETOUR DRAINAGE STR, NO - 2	4365.86
576-1018	135	LF	26.64	SLOPE DRAIN PIPE, 18 IN	3596.40
610-1055	175	LF	2.01	REM GUARDRAIL	351.75
610-6155	3	EA	600.00	REM FLARED END SECTION	1800.00
620-0100	6125	LF	35.24	TEMPORARY BARRIER, METHOD NO. 1	215845.00
632-0003	2	EA	12224.86	CHANGEABLE MESSAGE SIGN, PORTABLE, TYPE 3	24449.72
634-1200	209	EA	93.25	RIGHT OF WAY MARKERS	19489.25
635-1000	635	LF	83.56	BARRICADES	53060.60
641-1100	110	LF	35.91	GUARDRAIL, TP T	3950.10
641-1200	15750	LF	15.23	GUARDRAIL, TP W	239872.50
641-2200	175	LF	20.58	DBL FACED GUARDRAIL, TP W	3601.50
641-5001	21	EA	535.08	GUARDRAIL ANCHORAGE, TP 1	11236.68
641-5012	20	EA	1674.76	GUARDRAIL ANCHORAGE, TP 12	33495.20
643-0155	8990	LF	7.01	FIELD FENCE SPCL DESIGN	63019.90
668-1100	4	EA	1857.04	CATCH BASIN, GP 1	7428.16
668-2100	1	EA	2817.39	DROP INLET, GP 1	2817.39
				Section Sub Total:	**$18,768,250.60**

Section BRIDGE NO. 1

Item Number	Quantity	Units	Unit Price	Item Description	Cost
505-1100	20306	SF	63.40	COMPOSITE STEEL GRID DECK WITH PRECAST CONCRETE SLAB	1287400.40
540-1201	1	LS	77333.77	REMOVAL OF PARTS OF EXISTING BR, STA NO -	77333.77
				Section Sub Total:	**$1,364,734.17**

Total Estimated Cost: $22,035,452.46

SUBTOTAL CONSTRUCTION COST $22,035,452.46

E+C RATE 10.0% $2,203,545

$24,238,997.71

Not saved
replace bridge

Department of Transportation
State of Georgia

HAROLD E. LINNENKOHL
COMMISSIONER
(404) 656-5206

DAVID E. STUDSTILL JR., P.E.
CHIEF ENGINEER
(404) 656-5277

LARRY E. DENT
DEPUTY COMMISSIONER
(404) 656-5212

EARL MAHFUZ
TREASURER
(404) 656-5224

INTERDEPARTMENT CORRESPONDENCE

May 18, 2005

FROM: David Crim, State Maintenance Engineer

TO: Paul Liles, P.E., State Bridge Design Engineer
Attn: John Tiernan

SUBJECT: Bridge Replacement / Bridge Condition Survey

IM-NH-75-1(227) / Dooly
P.I. No. 311665
Structure ID 093-0007-0
Location ID 093-00027D-015.64E
SR 27 over I-75

RECEIVED
MAY 20 2005

This bridge was built in 1960 and consists of concrete bents, steel beam superstructure, and a concrete deck. The original design load capacity is HS-20 and the current load rating capacity is significantly lower, less than HS-15. The sufficiency rating on the structure is 57.5, and the bridge is classified as Functionally Obsolete and requires widening. The substandard load rating is based on all three elements of the bridge. The structure does have a thin deck that is only 6.5 inches thick, which is not desirable for an interchange bridge associated with the Interstate. The deck is also in marginal condition and will require hydrodemolition/overlay. Our experience with hydrodemolition on older state route bridges with 6 inch decks has been very poor. In every case, we have either had 40% or more blow through or a need to replace the deck. The concrete caps are also under-reinforced for shear. The steel superstructure also rates below the desirable level with no direct method of rehabilitation.

Due to the substandard load rating of all elements of the bridge and the marginal condition of the deck it is recommended that this structure be replaced.

If further information is required, please contact Brian Summers at (404) 635-8179.

DC/BKS

cc: Myron Banks

Cost Difference between Rehab. Bridge and Bridge Replacement

IM-NH-75-1(227)
P.I. Number 311665
Dooly County

Cost Comparison: Bridge Rehab. Vs. Bridge Replacement

Bridge Rehab. Costs

Rehabilitation of the SR 27 bridge over I-75 in Dooly County will require hydrodemolition/overlay and widening of the existing steel beam bridge. The existing bridge is 34.7 ft wide by 254 ft long (8814 ft^2). The bridge would be widened 8 ft more on the south side and 10 ft more on the north side for a total of 4572 ft^2.

				Cost
Hydrodemolition/overlay	8814 ft^2	at	\$24 /ft^2	\$211,536
Steel Beam Bridge Widening	4572 ft^3	at	\$125 /ft^2	\$571,500
			Total	**\$783,036**

Bridge Replacement Costs

The replacement bridge is estimated to be 71.25 ft wide by 285 ft (assumed length) for a total of 20,306 ft^2.

				Cost
Bridge No. 1	20306 ft^2	at	\$80 /ft^2	\$1,624,480
			Total	**\$1,624,480**

Comparison

Bridge Rehab. Costs		\$783,036
Bridge Replacement Costs		\$1,624,480
	Difference	**\$841,444**

Bridge Salvage Letter dated December 12, 2005

HAROLD E. LINNENKOHL
COMMISSIONER
(404) 656-5206

DAVID E. STUDSTILL, JR, P.E.
CHIEF ENGINEER
(404) 656-5277

Department of Transportation
State of Georgia

LARRY E. DENT
DEPUTY COMMISSIONER
(404) 656-5212

EARL L. MAHFUZ
TREASURER
(404) 656-5224

INTERDEPARTMENT CORRESPONDENCE

December 12, 2005

FROM: David Crim, State Maintenance Engineer

TO: Brent Story, P.E., State Road and Airport Design Engineer
Attn: David Acree

SUBJECT: Salvage Material for I-75 at SR 27

IM-NH-75-1(227) / Dooly County
P.I. No. 311665
Structure ID 093-0007-0
Location ID 093-00027D-015.64E
I-75 at SR 27

The structural steel shall be salvaged from the existing bridge as a part of this construction project. The beams in Spans #1 and #4 are simple beams and shall not be cut. The beams in Spans #2 and #3 are continuous beams and shall be cut at Bent #3. The resulting beam lengths for Spans #1 and #4 will be approximately 43 feet. The resulting beam length for Span #2 will be approximately 85 feet. The resulting beam length for Span #3 will be approximately 83 feet. The resulting beams from all four spans shall be salvaged. The aluminum handrail and posts shall be salvaged.

The salvaged materials shall be delivered to the District 3 Bridge Maintenance Headquarters located in Butler, Georgia. The District Maintenance Engineer shall be contacted 2 weeks prior to delivery to allow for arrangement of unloading these materials.

If further information is required, please contact Ben Rabun at (404) 635-8179.

DCC/BFR/JAD

CC: Kenneth Robinson, District Maintenance Engineer
file

Traffic Analysis

GEORGIA DEPARTMENT OF TRANSPORTATION

INTERCHANGE ANALYSIS

I-75/SR 27
VIENNA, GEORGIA

DECEMBER 15, 2005

ARCADIS
Infrastructure, environment, buildings

1. Executive Summary

The Interstate 75/SR 27 Interchange project in Vienna, Georgia consists of four intersections, beginning at Liberty Church Road on the west end and continuing to Bowen Road/Coppedge Road on the east end. SR 27 is a two-lane, undivided rural roadway. This corridor has become a major roadway to connect the City of Vienna to I-75.

To identify the needed intersection improvements, ARCADIS conducted a capacity analysis for each intersection. Two geometric conditions were analyzed, no-build and build. The no-build condition consisted of no improvements to the existing geometry. The build condition consisted of relocating the four existing intersections on SR 27 to allow more distance between them. Capacity analyses and traffic simulations were conducted for each intersection for the open year (2010) and design year (2030). Signal warrant analyses were also performed for the open year (2010) and design year (2030) to determine whether signalized traffic control is justified for the four intersections on the study corridor.

The following tables summarize the proposed level of service (LOS) and vehicle delay for the no-build and build condition for the open and design years. The details of the analysis are included in Section 4 of this report.

Table 1. Summary of No-Build Condition (2010)

Intersection	2010 LOS (AM/PM)				2010 Control Delay(s) (AM/PM)			
	EB (L)	WB (L)	NB (LR)	SB (LR)	EB (L)	WB (L)	NB (LR)	SB (LR)
Liberty Church Road at SR 27	A/A	-	-	A/A	7.6/7.5	-	-	9.7/9.5
I-75 Southbound Ramps at SR 27	-	A/A	-	A/A	-	7.5/7.6	-	9.4/9.4
I-75 Northbound Ramps at SR 27	A/A	-	A/A	-	7.6/7.5	-	9.7/9.4	-
Bowen Road at SR 27	A/A	-	-	A/A	7.4/7.5	-	-	8.9/9.3
Coppedge Road at SR 27	-	A/A	A/A	-	-	7.4/7.5	8.9/9.2	-

Table 2. Summary of No-Build Condition (2030)

Intersection	2030 LOS (AM/PM)				2030 Control Delay(s) (AM/PM)			
	EB (L)	WB (L)	NB (LR)	SB (LR)	EB (L)	WB (L)	NB (LR)	SB (LR)
Liberty Church Road at SR 27	A/A	-	-	B/B	7.8/7.6	-	-	10.6/10.1
I-75 Southbound Ramps at SR 27	-	A/A	-	B/A	-	7.7/7.7	-	10.3/9.8
I-75 Northbound Ramps at SR 27	A/A	-	B/B	-	7.7/7.7	-	10.7/10.2	-
Bowen Road at SR 27	A/A	-	-	A/A	7.5/7.6	-	-	9.2/9.8
Coppedge Road at SR 27	-	A/A	A/A	-	-	7.5/7.6	9.2/9.5	-

Table 3. Summary of Build Condition (2010)

Intersection	2010 LOS (AM/PM)				2010 Control Delay(s) (AM/PM)			
	EB (L)	WB (L)	NB (LR)	SB (LR)	EB (L)	WB (L)	NB (LR)	SB (LR)
Liberty Church Road at SR 27	A/A	-	-	A/A	7.6/7.5	-	-	9.7/9.5
I-75 Southbound Ramps at SR 27	-	A/A	-	A/A	-	7.5/7.6	-	9.2/9.2
I-75 Northbound Ramps at SR 27	A/A	-	A/A	-	7.6/7.5	-	9.7/9.4	-
Bowen Road/ Coppedge Road at SR 27	A/A	A/A	A/A	A/A	7.4/7.5	7.3/7.3	9.4/9.5	8.9/9.9

Table 4. Summary of Build Condition (2030)

Intersection	2030 LOS (AM/PM)				2030 Control Delay(s) (AM/PM)			
	EB (L)	WB (L)	NB (LR)	SB (LR)	EB (L)	WB (L)	NB (LR)	SB (LR)
Liberty Church Road at SR 27	A/A	-	-	B/B	7.8/7.6	-	-	10.6/10.1
I-75 Southbound Ramps at SR 27	-	A/A	-	B/A	-	7.7/7.7	-	10.3/9.8
I-75 Northbound Ramps at SR 27	A/A	-	B/B	-	7.7/7.7	-	10.7/10.1	-
Bowen Road/ Coppedge Road at SR 27	A/A	A/A	A/B	B/B	7.5/7.6	7.4/7.4	9.8/10.8	10.5/11

2. Project Location

The project consists of four intersections on SR 27 at the following locations:

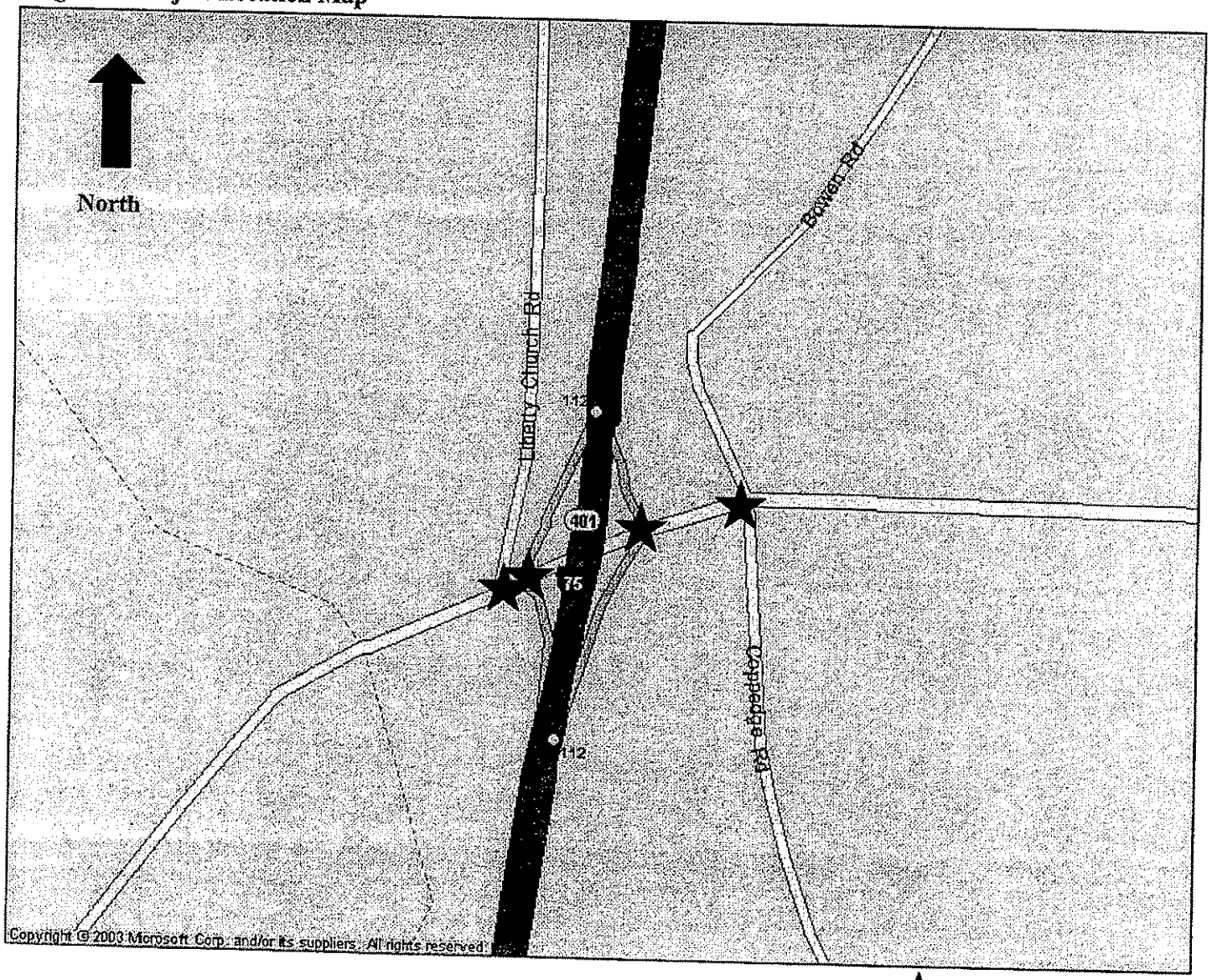
- Liberty Church Road at SR 27
- I-75 Southbound Ramps at SR 27
- I-75 Northbound Ramps at SR 27
- Bowen Road/Coppedge Road at SR 27

The four intersections on SR 27 are currently stop-controlled. The project location map is shown on Figure 1.

3. Traffic Volumes

The traffic volumes analyzed for the capacity analyses and signal warrants were provided by the Georgia Department of Transportation (Georgia DOT). These volumes included the 2030 a.m. and p.m. peak-hour and the 2010 and 2030 average daily traffic (ADT) volumes. To calculate peak-hour volumes for 2010 a.m. and p.m. peak hours, the ratio between the 2010 ADT and the 2030 ADT, which is 0.62, was used. The projected 2010 and 2030 peak-hour turning movement volumes along SR 27 at the four study intersections are shown on Figure 2 and Figure 3, respectively. The ADT volumes for 2010 and 2030 are shown on Figure 4.

Figure 1. Project Location Map

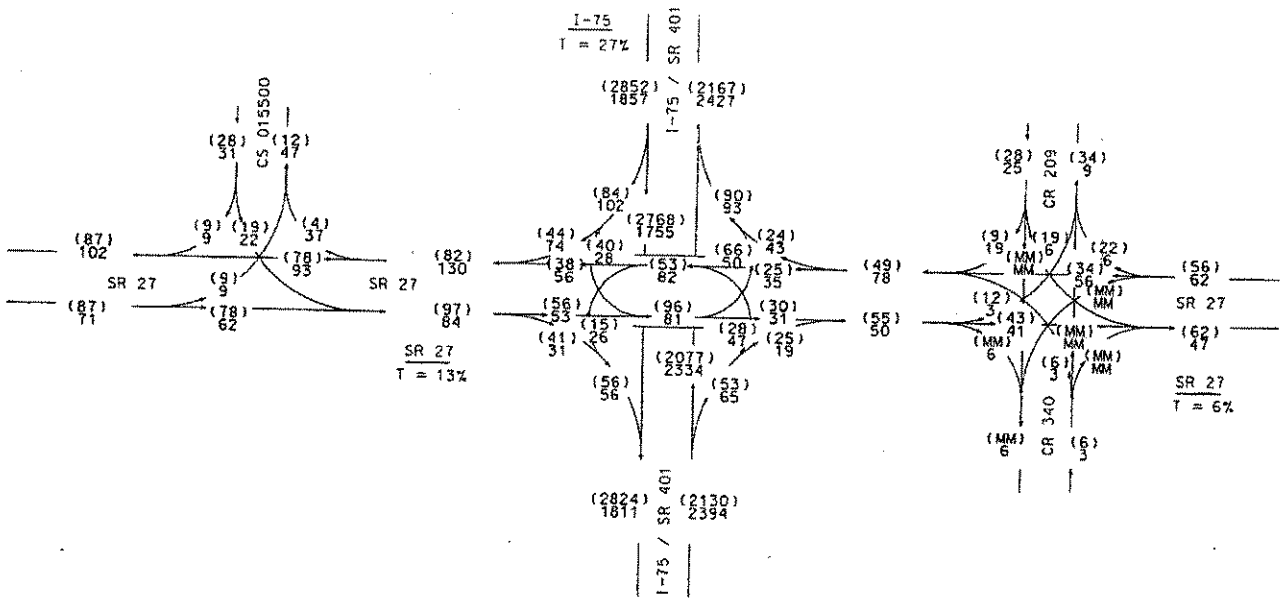


★ **Project Intersections**

Figure 2

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION

DOOLY COUNTY



NH-IM-75-1(227)
P.I.#311665
DOOLY COUNTY

SR 27 @ I-75

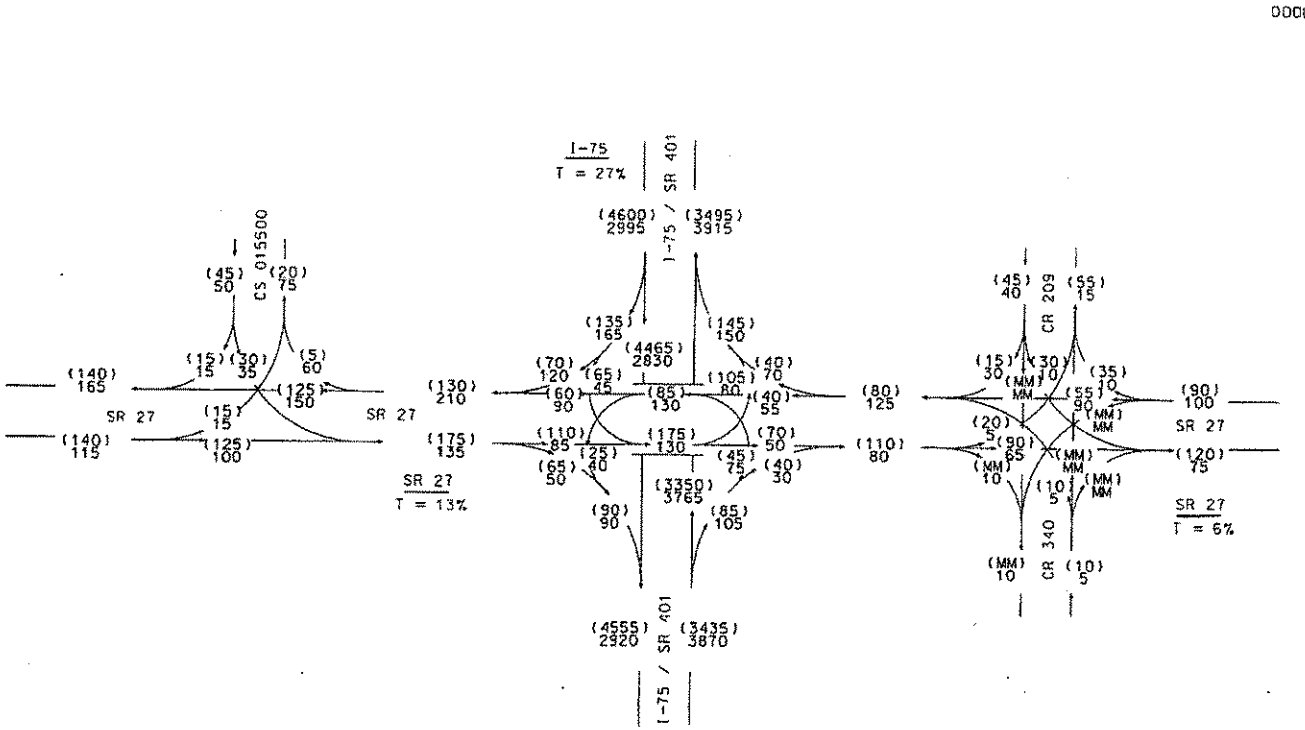
2010PM DHV = (000)
2010 AM DHV = 000

RFN
10/05

Figure 3

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION

DOOLY COUNTY



NH-1M-75-1(227)
P.I.#311665
DOOLY COUNTY

SR 27 @ I-75

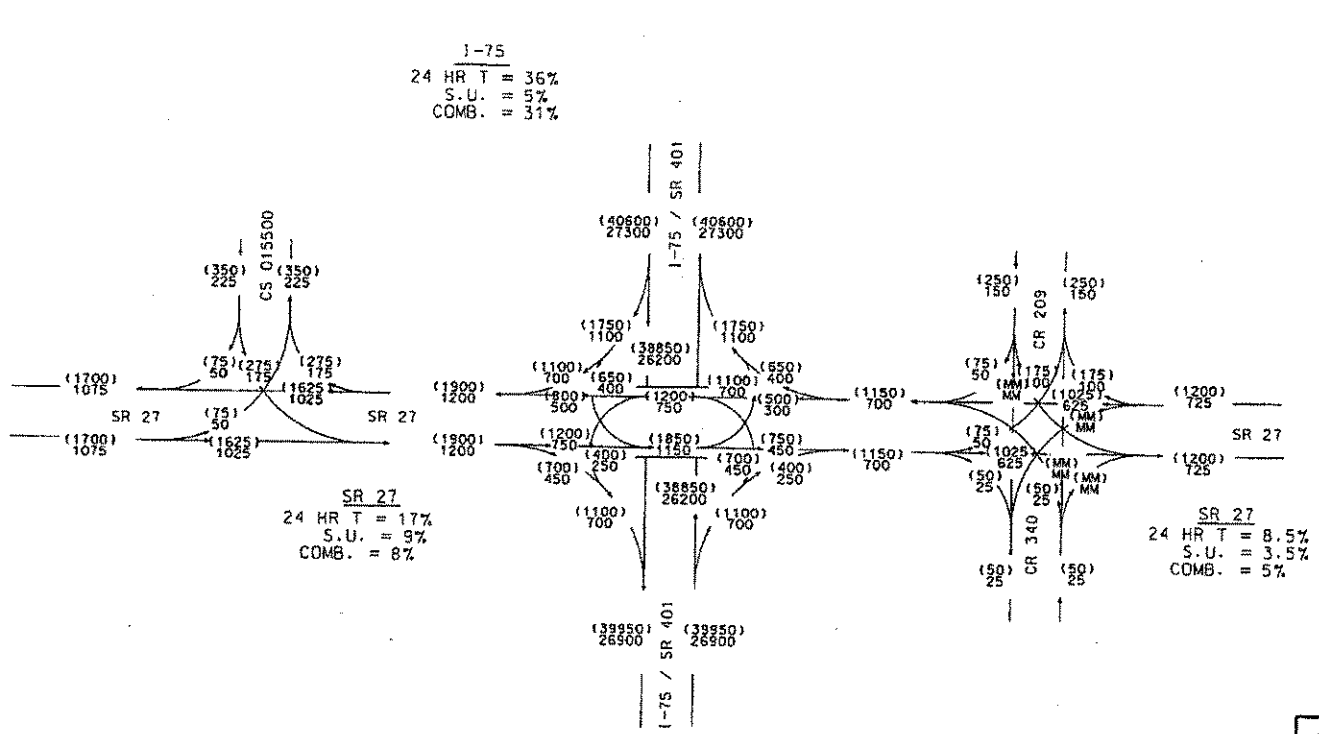
2030 PM DHV = (000)
2030 AM DHV = 000

RFN
10/05

Figure 4

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION

DOOLY COUNTY



NH-IM-75-1(227)
P.I.#311665
DOOLY COUNTY

SR 27 @ I-75

2030 ADT = (000)
2010 ADT = 000

RFN
10/05

4. Signal Warrant Analysis

This signal warrant study was performed to determine whether a traffic control signal is justified for the four intersections on the SR 27 corridor. The corridor begins at Liberty Church Road on the west end and continues to Bowen Road and Coppedge Road on the east end.

The eight signal warrants identified in the *Manual on Uniform Traffic Control Devices, Millennium Edition (MUTCD)* were analyzed based on 2010 and 2030 build year traffic volumes. Table 5 summarizes the results of the individual signal warrants.

Table 5. Summary of Traffic Control Signal Warrants

Traffic Control Signal Warrant	Results
Warrant 1, Eight-Hour Vehicular Volumes	Not Warranted
Warrant 2, Four-Hour Vehicular Volumes	Not Analyzed
Warrant 3, Peak-Hour Volumes	Not Warranted
Warrant 4, Pedestrian Volumes	Not Applicable
Warrant 5, School Crossing	Not Applicable
Warrant 6, Coordinated Signal System	Not Applicable
Warrant 7, Crash Experience	Not Applicable
Warrant 8, Roadway Network	Not Applicable

The signal warrant analyses determined that Warrant 1 and Warrant 3 were not satisfied for the four intersections on the SR 27 corridor. Therefore, signalization of the proposed intersections is not recommended.

4.1 Warrants for Justifying Traffic Control Signals

4.1.1 Warrant 1 – Eight-Hour Vehicular Volumes

Warrant 1 is intended to determine the need for a traffic signal under two conditions. The first condition, condition A, is where a large volume of intersecting traffic over an eight-hour period is the principal reason to consider installing a traffic control signal. A summary of the warrant results for condition A for the open year (2010) is shown in Table 6. A summary of Warrant 1 results for condition A for the design year (2030) is shown in Table 7.

Table 6. Warrant 1, Eight-Hour Vehicular Volume (Condition A) Evaluation

Intersection	Projected ADT Year 2010		Hourly Volume* (During 8 hours)		Required Hourly Volume		Warrant Met?
	Major	Minor	Major	Minor	Major	Minor	
SR 27 at Liberty Church Road	2,275	225	143	15	350	105	No
SR 27 at I-75 Southbound Ramps (enter and exit ramps)	1,950	1,100	122	70	350	105	No
SR 27 at I-75 Southbound Ramps (enter and exit ramps)	1,850	1,100	116	70	350	105	No
SR 27 at Coppedge Road/ Bowen Road	1,425	150	90	10	350	105	No

*Hourly Volume=ADT*6.25 percent (*Institute of Transportation Engineers Manual of Traffic Signal Design, 2nd Edition)*

Table 7. Warrant 1, Eight-Hour Vehicular Volume (Condition A) Evaluation

Intersection	Projected ADT Year 2030		Hourly Volume* (During 8 hours)		Required Hourly Volume		Warrant Met?
	Major	Minor	Major	Minor	Major	Minor	
SR 27 at Liberty Church Road	3,600	350	225	22	350	105	No
SR 27 at I-75 Southbound Ramps (enter and exit ramps)	3,100	1,750	194	110	350	105	No
SR 27 at I-75 Southbound Ramps (enter and exit ramps)	3,000	1,750	188	110	350	105	No
SR 27 at Coppedge Road/ Bowen Road	2,350	250	147	16	350	105	No

*Hourly Volume=ADT*6.25 percent (*Institute of Transportation Engineers Manual of Traffic Signal Design, 2nd Edition)*

Since the hourly breakdown volumes were not provided for Warrant 1, these traffic volumes were estimated. The *Institute of Transportation Engineers (ITE) Manual of Traffic Signal Design, 2nd edition*, states that the eight highest hour values may be obtained based upon the ADT. These values are based on the assumption that the eight highest hours will each exceed 6.25 percent of the ADT.

The second condition, condition B, is where the traffic volume on a major street is sufficiently heavy over an eight-hour period to cause significant delay or conflict for the side street entering or crossing the major street. A summary of the warrant results for condition B for the open year (2010) is shown in Table 8. A summary of the warrant results for the design year (2030) is shown in Table 9.

Table 8. Warrant 1, Eight-Hour Vehicular Volume (Condition B) Evaluation

Intersection	Projected ADT Year 2010		Hourly Volume* (During 8 hours)		Required Hourly Volume		Warrant Met?
	Major	Minor	Major	Minor	Major	Minor	
SR 27 at Liberty Church Road	2,275	225	143	15	525	53	No
SR 27 at I-75 Southbound Ramps (enter and exit ramps)	1,950	1,100	122	70	525	53	No
SR 27 at I-75 Southbound Ramps (enter and exit ramps)	1,850	1,100	116	70	525	53	No
SR 27 at Coppedge Road/ Bowen Road	1,425	150	90	10	525	53	No

*Hourly Volume=ADT*6.25 percent (*Institute of Transportation Engineers Manual of Traffic Signal Design, 2nd Edition)*

Table 9. Warrant 1, Eight-Hour Vehicular Volume (Condition B) Evaluation

Intersection	Projected ADT Year 2030		Hourly Volume* (During 8 hours)		Required Hourly Volume		Warrant Met?
	Major	Minor	Major	Minor	Major	Minor	
SR 27 at Liberty Church Road	3,600	350	225	22	525	53	No
SR 27 at I-75 Southbound Ramps (enter and exit ramps)	3,100	1,750	194	110	525	53	No
SR 27 at I-75 Southbound Ramps (enter and exit ramps)	3,000	1,750	188	110	525	53	No
SR 27 at Coppedge Road/ Bowen Road	2,350	250	147	16	525	53	No

*Hourly Volume=ADT*6.25 percent (*Institute of Transportation Engineers Manual of Traffic Signal Design, 2nd Edition)*

Warrant Satisfied: Not Satisfied

4.1.2 Warrant 2 – Four-Hour Vehicular Volumes

Warrant 2 is intended to determine if the volume of intersecting traffic over a four-hour period is significantly heavy to consider the installation of a traffic signal.

Warrant: Not Analyzed

4.1.3 Warrant 3 – Peak-Hour Volumes

Warrant 3 is intended to determine if the volumes for one hour of an average day cause the minor street traffic to suffer undue delay, therefore justifying a traffic signal. Table 10 shows the comparison between the mainline and side street vehicle approaches. A summary of the warrant results for the project corridor are shown in Table 11.

Table 10. Warrant 3, Peak-Hour Volumes (70 Percent Factor)

(Community Less Than 10,000 Populations or Above 70 Km/H or Above 40 Mph on Major Street)

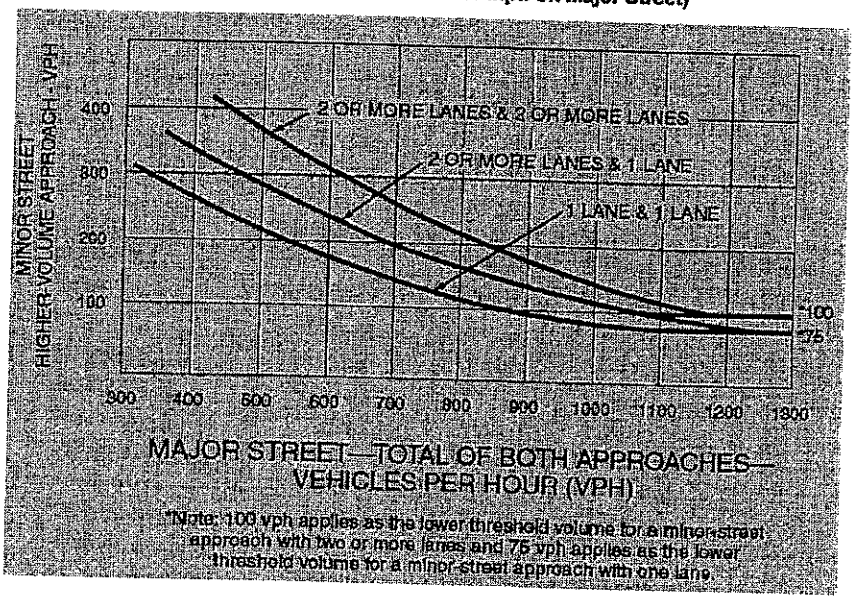


Table 11. Warrant 3, Peak-Hour Evaluation

Intersection	Peak Hour Volume (2010)		Peak Hour Volume (2030)		Warrant Met?
	Major	Minor	Major	Minor	
SR 27 at Liberty Church Road	202	47	325	75	No
SR 27 at I-75 Southbound Ramps (enter and exit ramps)	165	102	265	165	No
SR 27 at I-75 Southbound Ramps (enter and exit ramps)	158	93	255	150	No
SR 27 at Coppedge Road/ Bowen Road	124	34	200	55	No

Warrant Satisfied: Not Satisfied

4.1.4 Warrant 4 – Pedestrian Volumes

Warrant 4 is intended for application where the traffic volumes on a major street are sufficiently heavy to cause pedestrians excessive delay in crossing the major street.

Warrant: Not Applicable

4.1.5 Warrant 5 – School Crossing

Warrant 5 is intended for application where the principal reason to consider installing a traffic signal is school children crossing the major street.

Warrant: Not Applicable

4.1.6 Warrant 6 – Coordinated Signal System

Warrant 6 is intended for application where progressive movement in a coordinated signal system necessitates the installation of a traffic signal.

Warrant: Not Applicable

4.1.7 Warrant 7 – Crash Experience

Warrant 7 is intended for application where the frequency and severity of accidents are the principal reason to consider installing a traffic signal.

Warrant: Not Applicable

4.1.8 Warrant 8 – Roadway Network

Warrant 8 is intended for application where two or more major routes intersect and the traffic is encouraged to concentrate or organize traffic flow on a roadway network.

Warrant: Not Applicable

5. Capacity Analysis

The *Highway Capacity Manual, Fourth Edition*, published in 2000, outlines the process of defining the LOS and evaluating the various types of highway facilities. The manual provides procedures for evaluating stop-controlled intersections and freeway merge and diverge conditions. The Highway Capacity Software HCS+ was used to facilitate the capacity analyses for this study.

5.1 Merge Analysis

The criteria for evaluating the operation of a merge and diverge ramp are defined in the *Highway Capacity Manual* and are measured in terms of density. LOS A represents when the flow from the departing merge area is less than the capacity of the downstream freeway, whereas LOS F is when the flow from the departing merge area is more than the capacity of the downstream freeway. LOS criteria are shown in Table 12.

Table 12. Level of Service Criteria for Merge and Diverge Areas

Level of Service	Density (pc/mi/ln)
A	< 10
B	>10 to 20
C	> 20 to 28
D	> 28 to 35
E	> 35
F	Demand exceeds capacity

5.2 Diverge Analysis

The LOS criteria for diverge areas are shown in Table 12. Just as with merge area conditions, diverge areas are calculated based on unsaturated flow conditions and are not calculated when capacity has been exceeded. A poor LOS is present when demand exceeds capacity. This happens when the approaching freeway segment or the departing freeway segment is at or beyond capacity.

5.3 Unsignalized Analysis

The *Highway Capacity Manual* defines LOS for an unsignalized intersection in terms of average total vehicle delay experienced by left-turn motorists from the side street. LOS A represents little or no delay, while LOS F is very congested with average total vehicle delay exceeding 50 seconds for unsignalized intersections. LOS D is considered acceptable. LOS F is typically unacceptable. The LOS criteria for unsignalized intersections are shown in Table 13.

Table 13. Level of Service Criteria for Unsignalized Intersections

Level of Service	Control Delay Per Vehicle (Sec)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

6. Analysis and Recommendations

6.1 Merge Analysis

The existing lane configurations for the northbound and southbound ramp merges with I-75 were evaluated for 2010 and 2030. Summaries of the merge analysis results are shown in Table 14 and Table 15.

Table 14. Summary of Merge Analysis (No-Build)

Year	Period	Ramp	Speed (mph)	Density (pc/mi/ln)	LOS
2010	AM	SB On	61.0	16.2	B
	PM	SB On	60.0	21.9	C
	AM	NB On	60.0	20.0	C
	PM	NB On	60.0	18.5	B
2030	AM	SB On	60.0	22.8	C
	PM	SB On	58.0	32.0	D
	AM	NB On	59.0	28.9	D
	PM	NB On	59.0	26.5	D

Table 15. Summary of Merge Analysis (Build)

Year	Period	Ramp	Speed (mph)	Density (pc/mi/ln)	LOS
2010	AM	SB On	61.0	16.2	B
	PM	SB On	60.0	21.9	C
	AM	NB On	60.0	20.0	C
	PM	NB On	60.0	18.5	B
2030	AM	SB On	60.0	22.8	C
	PM	SB On	58.0	32.0	D
	AM	NB On	59.0	28.9	D
	PM	NB On	59.0	26.5	D

For the no-build and build conditions, results indicate that the merging ramps are an acceptable LOS for the open year (2010) and design year (2030). The HCS analyses for the merge condition are provided in Appendix A.

6.2 Diverge Analysis

The existing lane configuration for the northbound and southbound diverge from I-75 was evaluated for 2010 and 2030. Summaries of the diverge analysis results are shown in Table 16 and Table 17.

Table 16. Summary of Diverge Analysis (No-Build)

Year	Period	Ramp	Speed (mph)	Density (pc/mi/ln)	LOS
2010	AM	SB Off	65.0	18.5	B
	PM	SB Off	65.0	25.0	C
	AM	NB Off	65.1	22.1	C
	PM	NB Off	65.1	20.3	C
2030	AM	SB Off	64.8	26.0	C
	PM	SB Off	64.9	35.0	D
	AM	NB Off	65.0	31.0	D
	PM	NB Off	65.0	28.5	D

Table 17. Summary of Diverge Analysis (Build)

Year	Period	Ramp	Speed (mph)	Density (pc/ml/ln)	LOS
2010	AM	SB Off	65.0	18.5	B
	PM	SB Off	65.0	25.0	C
	AM	NB Off	65.1	22.1	C
	PM	NB Off	65.1	20.3	C
2030	AM	SB Off	64.8	26.0	C
	PM	SB Off	64.9	35.0	D
	AM	NB Off	65.0	31.0	D
	PM	NB Off	65.0	28.5	D

For the no-build and build conditions, results indicate that the diverging ramps are an acceptable LOS for the open year (2010) and design year (2030). The HCS analyses for the diverge condition is provided in Appendix B.

6.3 Accident Analysis

Georgia DOT provided accident data for the SR 27 corridor in the study area. The data represents all of the reported accidents occurring in 2002, 2003, and 2004. The data provided the number and type of accidents at specified locations.

During the three-year period, only nine accidents were reported. The most common accident type is right-angle accidents (56 percent). A summary table with accident rates for each year along the project location is provided in Appendix C.

6.4 Intersection Analysis

6.4.1 No-Build Analysis

The open year (2010) and design year (2030) a.m. and p.m. peak-hour volumes were analyzed under the current geometric conditions. The intersection delays and LOS for the 2010 and 2030 no-build condition are summarized in Table 18 and Table 19. The capacity analyses for the open year and design year are provided in Appendix D.

Table 18. Summary of No-Build Condition (2010)

Intersection	2010 LOS (AM/PM)				2010 Control Delay(s) (AM/PM)			
	EB (L)	WB (L)	NB (LR)	SB (LR)	EB (L)	WB (L)	NB (LR)	SB (LR)
Liberty Church Road at SR 27	A/A	-	-	A/A	7.6/7.5	-	-	9.7/9.5
I-75 Southbound Ramps at SR 27	-	A/A	-	A/A	-	7.5/7.6	-	9.4/9.4
I-75 Northbound Ramps at SR 27	A/A	-	A/A	-	7.6/7.5	-	9.7/9.4	-
Bowen Road at SR 27	A/A	-	-	A/A	7.4/7.5	-	-	8.9/9.3
Coppedge Road at SR 27	-	A/A	A/A	-	-	7.4/7.5	8.9/9.2	-

Table 19. Summary of No-Build Condition (2030)

Intersection	2030 LOS (AM/PM)				2030 Control Delay(s) (AM/PM)			
	EB (L)	WB (L)	NB (LR)	SB (LR)	EB (L)	WB (L)	NB (LR)	SB (LR)
Liberty Church Road at SR 27	A/A	-	-	B/B	7.8/7.6	-	-	10.6/10.1
I-75 Southbound Ramps at SR 27	-	A/A	-	B/A	-	7.7/7.7	-	10.3/9.8
I-75 Northbound Ramps at SR 27	A/A	-	B/B	-	7.7/7.7	-	10.7/10.2	-
Bowen Road at SR 27	A/A	-	-	A/A	7.5/7.6	-	-	9.2/9.8
Coppedge Road at SR 27	-	A/A	A/A	-	-	7.5/7.6	9.2/9.5	

For the no-build conditions, the LOS for 2010 and 2030 are acceptable for each intersection.

6.4.2 Build Analysis

The open year (2010) and design year (2030) a.m. and p.m. peak-hour volumes were analyzed under the proposed geometric conditions. The recommended changes were based on safety concerns and heavier turning movements onto the interstate ramps than at other intersections in the study corridor. The proposed geometric changes to the corridor are as follows:

- Add a left-turn lane westbound on SR 27 at the I-75 southbound ramps
- Add a right-turn lane eastbound on SR 27 at the I-75 southbound ramps
- Add a left-turn lane eastbound on SR 27 at the I-75 northbound ramps
- Add a right-turn lane westbound on SR 27 at the I-75 northbound ramps

The National Cooperative Highway Research Program (NCHRP) Report 457, *Evaluating Intersection Improvements: An Engineering Study Guide,* gives three criteria for providing a left-turn bay on a major road:

- A left-turn lane should be considered at any median crossover on a divided, high-speed road.
- A left-turn lane should be provided on the unstopped approach of a high-speed rural highway when it intersects with other arterials or collectors.
- A left-turn lane is recommended on the unstopped approach of any intersection when the combination of intersection volumes intersects above or to the right of the appropriate trend line.

Based on the second criteria, ARCADIS recommends the provision for a left-turn lane as specified above. The first criterion is not applicable to this project and the third criterion does not meet the volume projections.

The intersection delays and LOS for the 2010 and 2030 build conditions are summarized in Table 20 and Table 21. The capacity analyses for the open year and design year are provided in Appendix D.

Table 20. Summary of Build Condition (2010)

Intersection	2010 LOS (AM/PM)				2010 Control Delay(s) (AM/PM)			
	EB (L)	WB (L)	NB (LR)	SB (LR)	EB (L)	WB (L)	NB (LR)	SB (LR)
Liberty Church Road at SR 27	A/A	-	-	A/A	7.6/7.5	-	-	9.7/9.5
I-75 Southbound Ramps at SR 27	-	A/A	-	A/A	-	7.5/7.6	-	9.2/9.2
I-75 Northbound Ramps at SR 27	A/A	-	A/A	-	7.6/7.5	-	9.7/9.4	-
Bowen Road/Coppedge Road at SR 27	A/A	A/A	A/A	A/A	7.4/7.5	7.3/7.3	9.4/9.5	8.9/9.9

Table 21. Summary of Build Condition (2030)

Intersection	2030 LOS (AM/PM)				2030 Control Delay(s) (AM/PM)			
	EB (L)	WB (L)	NB (LR)	SB (LR)	EB (L)	WB (L)	NB (LR)	SB (LR)
Liberty Church Road at SR 27	A/A	-	-	B/B	7.8/7.6	-	-	10.6/10.1
I-75 Southbound Ramps at SR 27	-	A/A	-	B/A	-	7.7/7.7	-	10.3/9.8
I-75 Northbound Ramps at SR 27	A/A	-	B/B	-	7.7/7.7	-	10.7/10.1	-
Bowen Road/Coppedge Road at SR 27	A/A	A/A	A/B	B/B	7.5/7.6	7.4/7.4	9.8/10.8	10.5/11

Under the build condition, the LOS for 2010 and 2030 are acceptable for each intersection. The 2030 build year intersection sketches are provided in Appendix E.

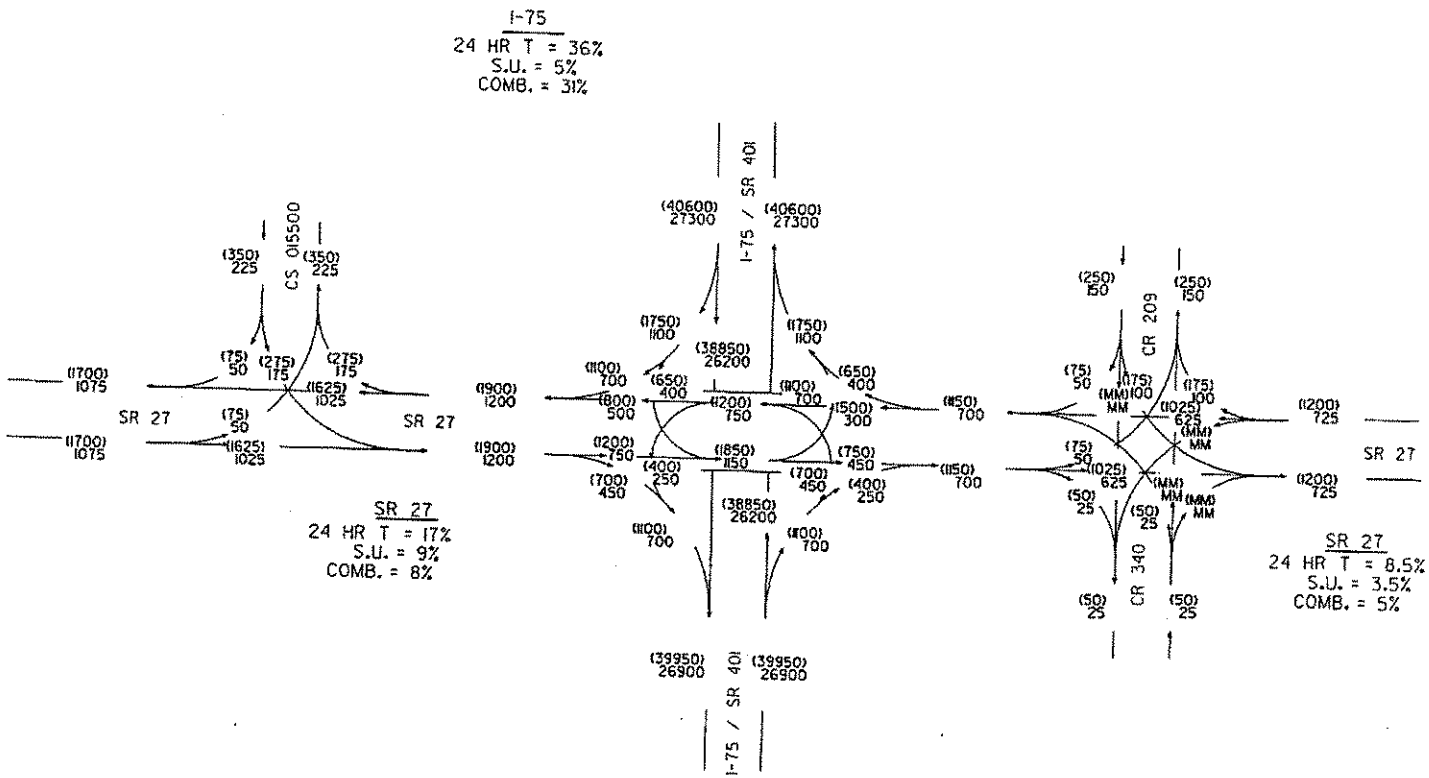
Traffic Diagrams

SHEET 1 OF 2

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION

DOOLY COUNTY

N



NH-IM-75-1(227)
P.I.#311665
DOOLY COUNTY

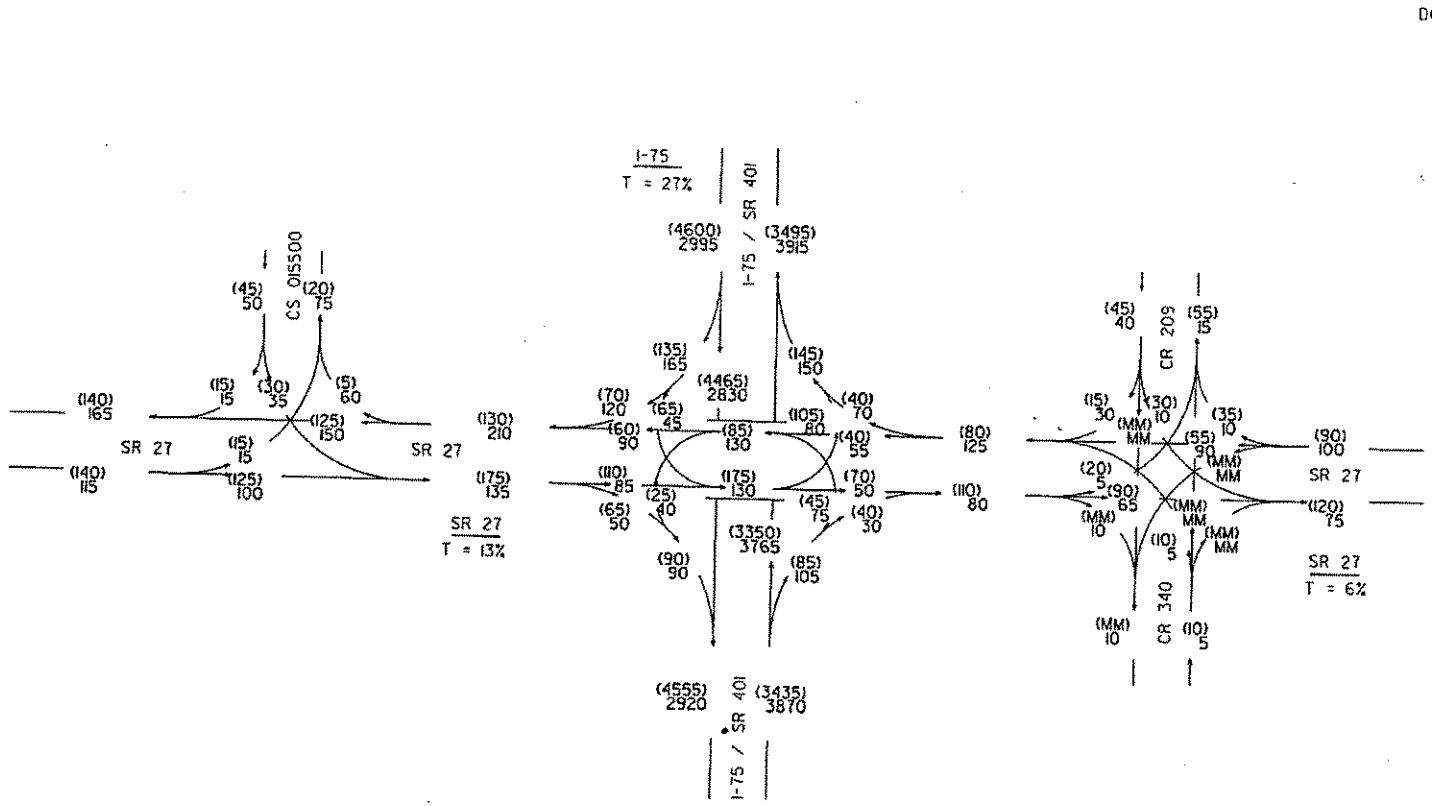
SR 27 @ I-75

2030 ADT = (000)
2010 ADT = 000

RFN
10/05

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION

DOOLY COUNTY



NH-IM-75-1(227)
P.I.#311665
DOOLY COUNTY

SR 27 @ I-75

2030 PM DHV = (000)
2030 AM DHV = 000

RFN
10/05

Approved Concept Report dated May 8, 2000

D.O.T. 66

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE IM-NH-75-1(227) Dooly County
P.I. No. 311665

OFFICE Preconstruction

DATE May 8, 2000

FROM Thomas L. Turner, P.E., Director of Preconstruction

TO Wayne Shackelford, Commissioner

SUBJECT PROJECT CONCEPT REPORT

This project is the improvements to the SR 27 interchange over I-75 north of the City of Vienna. The purpose of this project is to improve the sight distance for vehicles exiting I-75 onto SR 27. This project will also relocate CR 155, 660' away from the southbound exit ramp. The accident rates along this section of SR 27 are 252 accidents/100 million vehicle miles of travel (MVMT) in 1995; 201 accidents/100 MVMT in 1996; and 175 accidents/100 MVMT in 1997. The accident rates along this section of roadway were above the statewide average for a road of this type in 1995. State Route 27 is a two lane roadway with 8' rural shoulders and a posted speed limit of 55 MPH. The existing bridge is 254' x 34.7' with a sufficiency rating of 88. County Road 155 consists of two, 12' lanes with 10' rural shoulders. Existing 1998 traffic volumes along this section of SR 27 are 1,700 VPD. Future volumes are expected to be approximately 2,200 VPD in 2008 and 2,800 VPD in 2018. The Level of Service (LOS) along this section of SR 27 is and will remain at LOS "C" or above through the year 2018.

The proposed construction will widen the bridge on SR 27 over I-75 to allow for a 10' paved shoulder on the north side and a 12' shoulder on the south side to provide appropriate sight distance from the exit ramps. Existing SR 27 will be overlaid only. County Road 155 will be relocated 660' from the southbound exit ramp. The I-75 northbound and southbound exit ramps will be reconstructed to meet GDOT requirements and provide an intersection angle of 75° at SR 27. Ramps will be constructed 16' in width and widen to 24' at the SR 27 intersection to allow for a turn lane. The speed design is 55 MPH for SR 27 and CR 155, and 50 MPH for the ramps. Traffic will be maintained during construction.

The existing vertical curve attains desirable stopping sight distance of 45 MPH only. The intersection sight distance across the bridge from ramp terminals is improved by widening the bridge shoulders. However, a design exception will be requested for stopping sight distance.

Environmental concerns include requiring a COE 404 Permit; a NEPA document will be prepared; a public hearing will be held; time saving procedures are not appropriate.

ORIGINAL TO GENERAL FILES

D.O.T. 66

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE IM-NH-75-1(227) Dooly County
P. I. No. 311665

OFFICE Preconstruction

DATE May 30, 2000

FROM C. Wayne Hutto, Assistant Director of Preconstruction

TO SEE DISTRIBUTION

SUBJECT **PROJECT CONCEPT REPORT APPROVAL**

Attached for your files is the approval for subject project.

CWH/cj

Attachment

DISTRIBUTION:

Tom Turner
David Mulling
David Studstill (ATTN: Harvey Keepler)
Jerry Hobbs
Herman Griffin
Georgene Geary (ATTN: Michael Henry)
Marion Waters
Marta Rosen
Paul Liles
Don Mills
~~Jerry Chambers (ATTN: Ted Cobb)~~
Glenn Durrence
Jim Kennerly
FHWA

IM-NH-75-1(227) Dooly
May 8, 2000

The estimated costs for this project are:

	PROPOSED	APPROVED	PROG DATE	LET DATE
Construction (includes E&C and inflation)	$1,924,000	$3,076,000	2003	03-02
Right-of-Way	$ 612,000	$ 629,000		
Utilities*	$ 24,000	-----		

*LGPA to be sent.

This project will improve safety and operational capacity along this section of roadway. I recommend this project concept be approved.

TLT:JDQ/cj

Attachment

CONCUR _____
Frank L. Danchetz, P.E., Chief Engineer

APPROVE _____
Larry R. Dreihaup, Division Administrator, FHWA

APPROVE _____
Wayne Shackelford, Commissioner

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENTAL CORRESPONDENCE

FILE: IM-NH-75-1(227) Dooly
P.I. Number 311665

OFFICE: Atlanta, Georgia

DATE: April 20, 2000

RECEIVED
APR 25 2000

FROM: David Mulling, Project Review Engineer DTM

TO: Wayne Hutto, Assistant Director of Pre-construction

SUBJECT: **CONCEPT REPORT**

We have reviewed the concept report submitted April 13, 2000 by the letter from James A. Kennerly dated March 20, 2000, and have no comments.

The costs for the project are:

Construction	$1,521,000
Inflation	$ 228,000
E&C	$ 175,000
Reimbursable Utilities	$ 24,000
Right of Way	$ ~~611,000~~ 612,000 - 1000.

DTM

c: Jim Kennerly

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA
OFFICE OF ROAD AND AIRPORT DESIGN

PROJECT CONCEPT REPORT

Project Number: IM-NH-75-1 (227)
P. I. Number: 311665
County: DOOLY

Federal Route No.: 75
State Route No.: 27

Date of Report: 03/15/00

RECOMMENDATION FOR APPROVAL

4-12-00
DATE

James A. Kennedy
State Road and Airport Design Engineer

This project concept is contained in the Regional Transportation Improvement Program (RTIP) 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 RTIP and/or the STIP.

DATE — State Transportation Planning Administrator

DATE — State Transportation Programming Engineer

DATE — State Environmental/Location Engineer

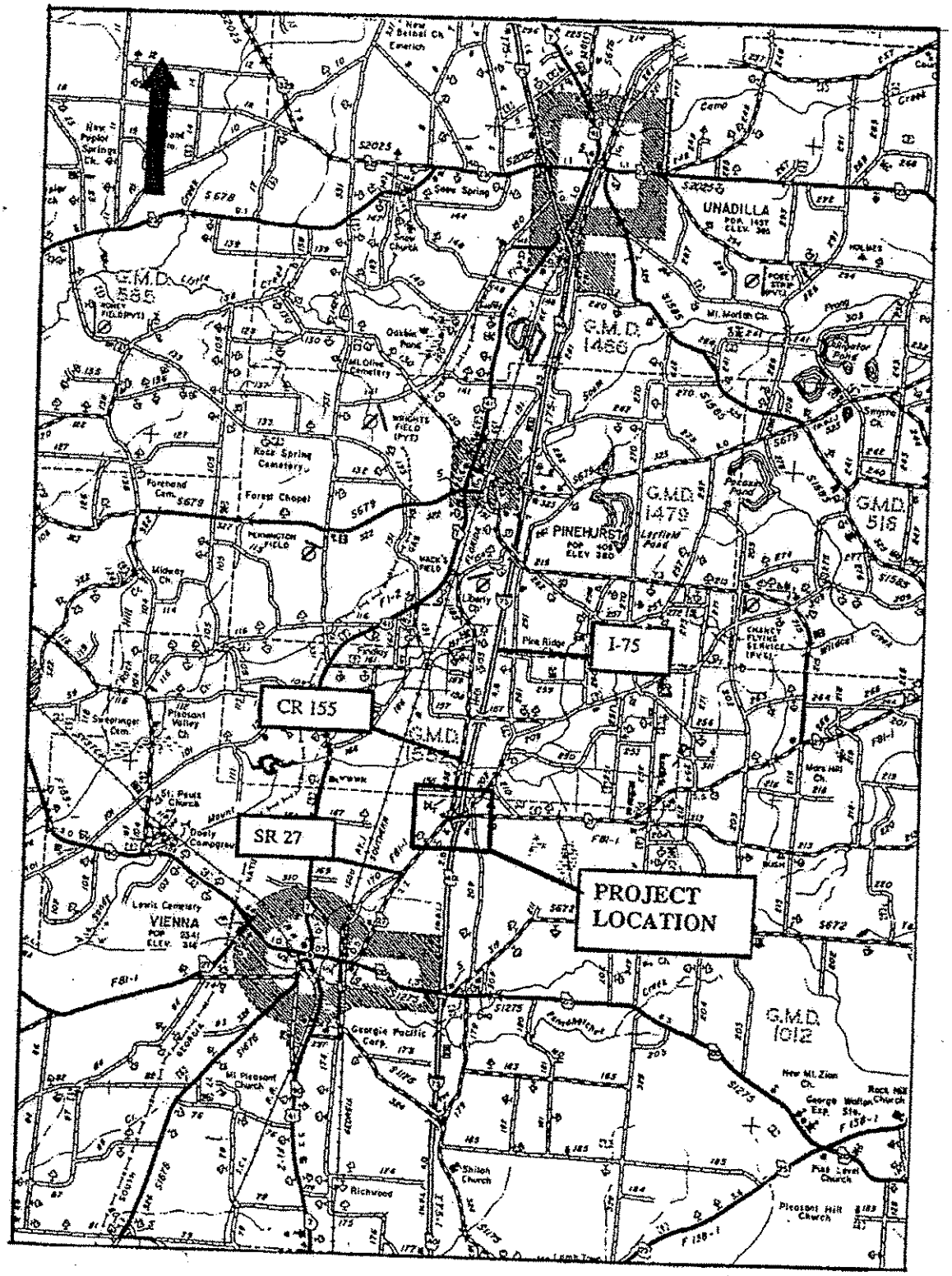
DATE — District Engineer

DATE — Project Review Engineer

DATE — State Traffic Operations Engineer

DATE — State Bridge and Structural Engineer

PROJECT MAP:


UNADILLA
PINEHURST
VIENNA
G.M.D. 1466
G.M.D. 1479
G.M.D. 518
G.M.D. 1012
I-75
CR 155
SR 27
PROJECT LOCATION

PROJECT NEED & PURPOSE:

The purpose of this project is to improve the State Route 27/I-75 interchange in Dooly County north of the city of Vienna. The project will widen the SR 27 bridge over I-75 to improve sight distance from the ramp terminals. A frontage road (CR 155) will be relocated farther away from the southbound exit ramp terminal to allow for a more acceptable distance. The northbound and southbound exit ramps will also be reconstructed to meet current exit ramp design standards. The improvements will improve the sight distance, operation and safety of this interchange.

The sufficiency rating for this bridge is 88.0. The sufficiency rating is a number from 0 to 100 and is a method of evaluating data by calculating four separate factors to obtain a numeric value which is indicative of bridge sufficiency to remain in service. The Office of Bridge Design has determined that any structure with a sufficiency rating less than 50 should be replaced rather than improved.

Located on a school bus route, the bridge is 34.7 ft. wide and 254 ft. long with 2 ft. shoulders in each direction. The current sight distance at the bridge is inadequate. The accident rates along this section of SR 27 are 252 accidents/100 million-vehicle mile of travel (MVMT) in 1995; 201 accidents/100 MVMT in 1996; and 175 accidents/100 MVMT in 1997. The accident rates along this section of roadway were above the statewide average for a road of this type (Rural Minor Arterial, non-NHS) in 1995.

Existing 1998 traffic volumes along this section of SR 27 are approximately 1,700 vehicles per day (vpd) with 19 percent generated by trucks. Future volumes are expected to be approximately 2,200 vpd in 2008; and 2,800 vpd in 2018. The level-of-service along this section of SR 27 is and will remain at an acceptable level-of-service "C" or above through the year 2018.

There is one project in the Construction Work Program that will affect this project. The project STP-081-1(23), PI 343510 which will resurface SR 27 from MP 12.18 in Vienna to the subject SR 27 bridge over I-75, MP 15.64. This project is scheduled to begin in year 2000. State Route 27 is not a Georgia bicycle route.

The proposed project will improve safety by improving sight distance for vehicles accessing SR 27 from I-75. Widening the bridge over I-75 will enhance the sight distance, traffic flow and safety for the traffic exiting and accessing the Interstate.

DESCRIPTION AND LOCATION: Widen the overpass on State Route 27 at Interstate 75 to allow for a 10 ft. shoulder on the north side and a 12 ft. shoulder on the south side to provide appropriate sight distance from the exit ramps. Existing SR 27 will be overlaid only. County Road 155 will be relocated to a distance of 660 ft. from the southbound exit ramp. The I-75 northbound and southbound exit ramps will be reconstructed to meet GDOT Construction Detail R-2 and to provide an intersection angle of 75° at SR 27.

LENGTH: Bridge Widening: 254 ft. CR 155 Relocation: 0.47 miles
NB Ramp: 0.44 miles SB Ramp: 0.36 miles

P.I.NO.: 311665

STATE ROUTE NO.: 27 FEDERAL RT NO.: 75 COUNTY ROAD NO: N/A

TRAFFIC (ADT): CURRENT YEAR 2005=2,880 vpd
PROJECTED YEAR 2025=4,030 vpd

PDP CLASSIFICATION: FOS (X) EXEMPT ( ) SF ( )

FUNCTIONAL CLASSIFICATION: Rural Minor Arterial.

EXISTING DESIGN:

TYPICAL SECTION:

S.R. 27: Two 12 ft. travel lanes with 8 ft. grass shoulders.
Ramps: One 20 ft. travel lane with 4 in. concrete integral mountable curb and 8 ft. grass shoulders.
CR 155: Two 12 ft. travel lanes with 10 ft. grass shoulders.

POSTED SPEED: 55 mph

MAX. EXISTING GRADE: SR 27: 4.8% Ramps: 4.7%

EXISTING MAJOR STRUCTURES: 1. SR 27 overpass at I-75.

S. RTG: 88.0 LENGTH: 254 FT WIDTH: 34.7FT

PROPOSED DESIGN:

PROPOSED TYPICAL SECTION:

The proposed bridge typical section consists of two 12 ft. travel lanes with a 10 ft. shoulder on the north side and a 12 ft. shoulder on the south side. The additional width on the south side shoulder is necessary to provide adequate sight distance from the ramp terminal across the bridge.

The typical section for CR 155 will be two 12 ft. travel lanes with 10 ft. grass shoulders.

The typical section for the ramps will be a 16 ft. travel lane that widens to 24 ft. to allow for a turn lane at the intersection. The inside shoulder is 6 ft. and the outside shoulder is 8 ft.

PROPOSED RIGHT-OF-WAY WIDTH: Varies.

DESIGN SPEED: 55 mph for SR 27 and CR 155.
50 mph for the exit ramps.

MAXIMUM DEGREE OF CURVATURE:

SR 27	ALLOWABLE:	5°15'
	PROPOSED:	2° 05'
CR 155	ALLOWABLE:	6°
	PROPOSED:	6°
Ramps	ALLOWABLE:	7°30'
	PROPOSED:	7°

MAXIMUM GRADE:

SR 27 ALLOWABLE: 5.0%
PROPOSED: 4.8% (Maximum grade on SR 27 occurs on the existing eastbound approach to the bridge. Reconstruction of bridge approaches is not included in the proposed alternate.)

CR 155	ALLOWABLE:	5.0%
	PROPOSED:	<2%
Ramps	ALLOWABLE:	5.0%
	PROPOSED:	4.7%

TYPE ACCESS: Limited Access.

TRAFFIC CONTROL DURING CONSTRUCTION:

1. Traffic can be maintained on SR 27 while the existing bridge is being widened.
2. There will be no need for staging on CR 155. Existing CR 155 is to remain in service until completion of the new roadway.
3. Traffic can be maintained while the relocated ramps are being built.

PROPOSED STRUCTURES: SR 27 bridge widening (length: 254 ft; width: 54 ft)

SPECIAL DRAINAGE CONSIDERATIONS: None.

SIGHT DISTANCE:

The existing vertical curve attains desirable stopping sight distance for 45 mph only. The intersection sight distance across the bridge from ramp terminals is improved by widening the bridge shoulders. Additional shoulder widening on the SR 27 south shoulder is necessary due to the skew and curvilinear alignment of SR 27 relative to the northbound exit ramp terminal.

DESIGN EXCEPTIONS REQUESTED:

CONTROLLING CRITERIA	UNDETERMINED	YES	NO
HORIZONTAL ALIGNMENT:	( )	( )	(X)
ROADWAY WIDTH:	( )	( )	(X)
SHOULDER WIDTH:	( )	( )	(X)
VERTICAL GRADES:	( )	( )	(X)
CROSS SLOPES:	( )	( )	(X)
STOPPING SIGHT DISTANCE:	( )	(X)	( )
SUPERELEVATION RATES:	( )	( )	(X)
HORIZONTAL CLEARANCE:	( )	( )	(X)
SPEED DESIGN:	( )	( )	(X)
VERTICAL CLEARANCE:	( )	( )	(X)
BRIDGE WIDTH:	( )	( )	(X)
BRIDGE STRUCTURAL CAPACITY:	( )	( )	(X)

NUMBER OF PARCELS IMPACTED: 6

DISPLACEMENTS: 2 Gas Stations

COORDINATION AND SCHEDULING

CONCEPT TEAM MEETING DATE: January 12, 2000

CONFORMS TO TIP/STIP? Yes

MEETS LOGICAL TERMINI REQUIREMENTS? Yes

P.A.R. MEETING: Not Anticipated

LEVEL OF ENVIRONMENTAL ANALYSIS: NEPA Categorical Exclusion

PUBLIC INVOLVEMENT: Public Hearing

PERMITS REQUIRED: COE 404 (Nationwide Permits), NPDES

TIME SAVINGS PROCEDURES APPROPRIATE: No.

SCHEDULING CONSIDERATIONS:

TIME TO COMPLETE ENVIRONMENTAL: 9 MONTHS

TIME TO COMPLETE PRELIMINARY RD/RW PLANS: 12 MONTHS

TIME TO COMPLETE 404 PERMIT: 4 MONTHS

TIME TO COMPLETE FINAL CONSTRUCTION PLANS: 12 MONTHS

TIME TO BUY RIGHT OF WAY: 6 MONTHS

LOCAL GOVERNMENT COMMITMENTS: None.

OTHER PROJECTS IN THE AREA:

1. SR 27 resurfacing from I-75 to Vienna (STP-081-1(23)).

PROBABLE LOCATIONS OF UST's:
There are three potential UST locations near the project. None will be impacted by construction. Two of the properties are displacements due to the acquisition of limited access.

PROBABLE LOCATIONS OF HAZARDOUS WASTE:
The three potential UST mentioned above are potential hazardous waste sites.

HISTORY OR ARCHEOLOGY:
There are four potential historic resources near the project. None will be impacted by the project.

ENVIRONMENTAL CONCERNS: None.

ALTERNATES CONSIDERED:

1. Widen existing bridge and relocate CR 155. This alternate was selected because it addresses the immediate safety concerns (sight distance) for the least cost. The bridge sufficiency rating (88.0) makes this structure a good candidate for widening. It will also accommodate the design year traffic. This alternate also includes the reconstruction of the northbound and southbound exit ramps to meet the Department's Construction Detail R-2 and to provide an acceptable intersection angle with SR 27. The ramp design allows for widening of I-75.

2. Reconstruct bridge over I-75 to four lanes with raised median to allow for the future widening of I-75. Proposed bridge would allow for vertical end walls. Ramp terminals and CR 155 would be relocated. CR 209 would be realigned to intersect SR 27 at CR 304. This alternate was not selected due to an estimated construction cost of $4,708,449 and additional right of way impacts. It also goes beyond addressing the immediate safety concerns.

3. Similar to alternate 2 except the proposed bridge would have end rolls rather than vertical end walls. This alternate was not selected due to the construction cost of $5,047,634 (longer bridge), and additional right of way impacts.

4. The "no build" alternate was also considered. This was not chosen because the inadequate sight distance at the ramps needs to be addressed.

COMMENTS: Vertical clearance was checked over I-75 for the 14 ft. widening of the bridge on the south side. The minimum of 16'-6" is maintained.

ATTACHMENTS: Cost Estimate, Typical Sections, Bridge Inventory Data Sheet, Traffic Volume Diagram, Concept Team Meeting Minutes, and Programming Document.

PRELIMINARY COST ESTIMATE

PROJECT NUMBER: 311665

COUNTY: DOOLY

DATE: April 3, 2000

ESTIMATED LETTING YEAR: 2003

PREPARED BY: GREENHORNE & O'MARA, INC.

PROJECT LENGTH: 1.35 miles

( )PROGRAMMING PROCESS (X)CONCEPT DEVELOPMENT ( )DURING PROJECT DEV.

PROJECT COST	
A. RIGHT-OF-WAY:	
1. PROPERTY (R/W & EASEMENT) 4.4 AC.	$ 383,352
2. DISPLACEMENTS: NONE	$ 0
3. OTHER COST (ADM./COST, INFLATION)	$ 228,094
SUBTOTAL:A	$ 611,446
B. REIMBURSABLE UTILITIES:	
1. RAILROAD	$ 0
2. TRANSMISSION LINES	$ 0
3. SERVICES	$ 24,000
SUBTOTAL:B	$ 24,000
C. CONSTRUCTION:	
1. MAJOR STRUCTURES	
a. OVERPASSES (254 ft. X 26 ft.) 6,604 SF	$ 330,200
b. APPROACH SLAB 160 SY	$ 15,727
SUBTOTAL:C-1	$ 345,927
2. GRADING AND DRAINAGE:	
a. EARTHWORK 25,000 CY EMBANKMENT	$ 111,500
b. DRAINAGE:	
1) CROSS DRAIN PIPE	$ 10,000
2) LONGITUDINAL SYSTEMS (INCL CATCH BASINS)	$ 0
SUBTOTAL:C-2	$ 121,500

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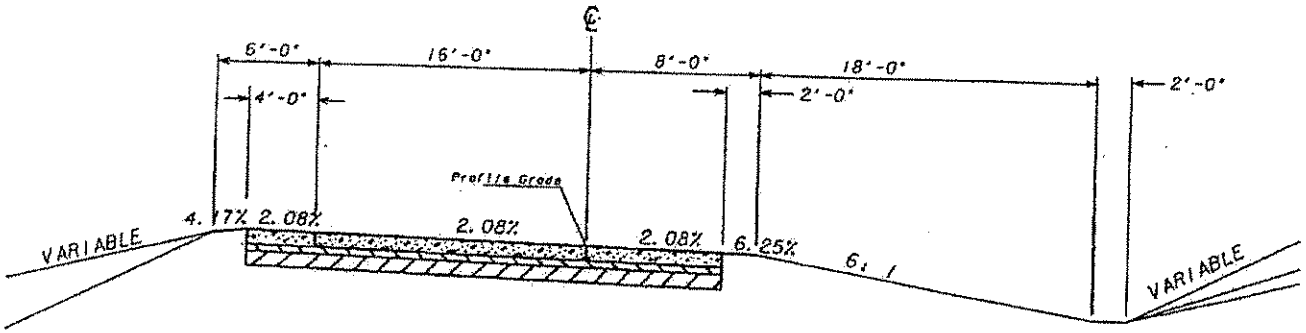
PROJECT COST		
3. BASE AND PAVING:		
a. AGGREGATE BASE – 10,471 TNS @ $13.05/ TN		$ 136,647
b. ASPHALT PAVING: SURFACE – 906 TN	$ 34.55/TN	$ 31,303
BINDER – 728 TN	$ 34.54/TN	$ 25,146
BASE - 4448 TN	$ 34.62/TN	$ 153,990
	SUBTOTAL:C-3.b	$ 347,086
c. CONCRETE PAVING		$ 585,744
d. OTHER		$
	SUBTOTAL:C-3	$ 932,830
4. LUMP ITEMS:		
a. GRASSING – 10 AC		$ 10,000
b. CLEARING AND GRUBBING - 14 AC		$ 57,020
c. LANDSCAPING		$ 0
d. EROSION CONTROL		$ 5,000
e. TRAFFIC CONTROL		$ 20,000
	SUBTOTAL:C-4	$ 92,020
5. MISCELLANEOUS:		
a. LIGHTING - NONE		$ 0
b. SIGNING - MARKING		$ 10,000
c. GUARDRAIL - 1040 LF AND 4 ANCHORS		$ 18,480
d. CURB & GUTTER - NONE		$ 0
	SUBTOTAL:C-5	$ 28,480
6. SPECIAL FEATURES	SUBTOTAL:C-6	$ 0

ESTIMATE SUMMARY			
A. RIGHT-OF-WAY		$ 611,446	
B. REIMBURSABLE UTILITIES		$ 24,000	
C. CONSTRUCTION			
1. MAJOR STRUCTURES		$ 345,927	
2. GRADING AND DRAINAGE		$ 121,500	
3. BASE AND PAVING		$ 932,830	
4. LUMP ITEMS		$ 92,020	
5. MISCELLANEOUS		$ 28,480	
6. SPECIAL FEATURES		$ 0	
SUBTOTAL CONSTRUCTION COST		$ 1,520,757	
E. & C. (10%)		$ 152,076	
INFLATION (5% PER YEAR)			
NUMBER OF YEARS	3	$ 228,114	
TOTAL CONSTRUCTION COST		$ 1,900,947	
GRAND TOTAL PROJECT COST		**$ 2,512,393**	



RAMP TANGENT SECTION

GEORGIA
DEPARTMENT OF TRANSPORTATION
TYPICAL SECTIONS

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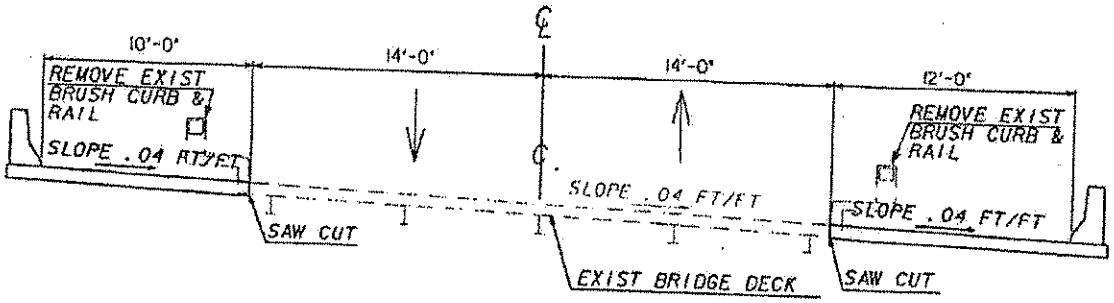
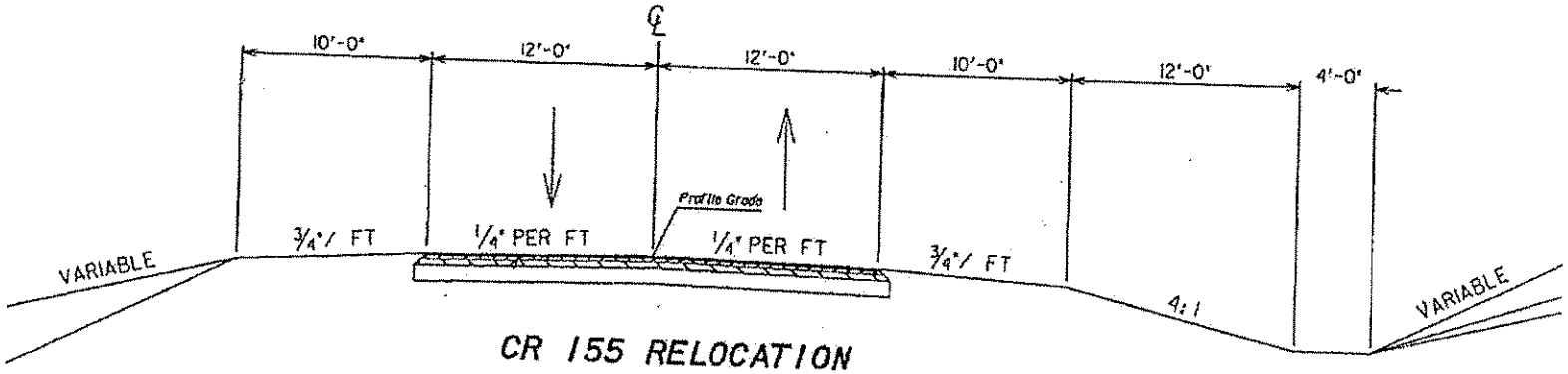


SR 27 BRIDGE WIDENING



CR 155 RELOCATION

GREENHORNE & O'MARA
2211 NEWMARKET PARKWAY
SUITE 104
MARIETTA, GA 30067
PHONE: (770) 988-9555

SR 27 BRIDGE WIDENING
CR 155 RELOCATION

GEORGIA
DEPARTMENT OF TRANSPORTATION
TYPICAL SECTIONS
PROJECT: IM-NH-75-1(227)
COUNTY: DOOLY
DATE:
DRAWING

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Location & Geography

* Structure I.D. No.: 093:0007-0
200 Bridge Information: 06

* 6A Feature Int.: I-75 (EXIT 37)
* 6B Critical Bridge: 0
* 7A Route Number Carried: SR00027
* 7B Facility Carried: SR 27
* 9 Location: 2.5 MI NE OF VIENNA
2 DOT District: 3
207 Year Photo: 1997

* 91 Inspection Frequency: 24 Date: 08/01/1997
92A Fract Crit Insp Freq: 0 00 Date: 0000
92B Underwater Insp Freq: 0 00 Date: 0000
92C Other Spc. Insp Freq: 0 00 Date: 0000

* 4 Place Code: 00000

* 5 Inventory Route (O/U): 1
Type: 3
Designator: 1
Number: 00027
Direction: 0

* 16 Latitude: 32-07.3
* 17 Longitude: 083-45.7

98 Border Bridge: 000 %Shared: 00
99 ID Number: 000000000000000

* 100 Defense Highway: 2
* 101 Parallel Structure: N
* 102 Direction of Traffic: 2
264 Road Inventory Mile Post: 015.36

* 208 Inspection Area: 08 Initials: LEM

* Location I.D. No: 093-00027D-015.64E
* XReferen I.D. No: 000-000000-000.000

D00 County

* 104 Highway System: 0
* 26 Functional Classification: 06
* 204 Federal Route Type: F No: 081-1
* 110 Truck Route: 0
206 School Bus Route: 1
217 Benchmark Elevation: 392.60
218 Datum: 2
* 19 Bypass Length: 4
* 20 Toll: 3
* 21 Maintenance: 01
* 22 Owner: 01
* 31 Design Load: 6
37 Historical Significance: 5
205 Congressional District: 08
* 27 Year Constructed: 1960
106 Year Reconstructed: 0000
33 Bridge Median: 0
34 Skew: 36
35 Structure Flared: 0
38 Navigation Control: N
213 Special Steel Design: 0
267 Type of Paint: 2

* 42 Type Service On: 1
Under: 1
214 Movable Bridge: 00
203 Type Bridge: Z-O-M-O
259 Pile Encasement: 3
* 43 Structure Type Main: 4 02
45 No. Spans Main: 002
44 Structure Type Appr: 3 3
46 No. Spans Appr: 0002
226 Bridge Curve Horz: 1 Vert: 1
111 Pier Protection: 0
107 Deck Structure Type: 1

108 Wearing Surface Type: 1
Membrane: 0
Protection: 0

SUFF. ING: 88.0

Signs & Attachments

223 Expansion Joint Type: 02
242 Deck Drains: 0

243 Parapet Location: 0
Height: 0
Width: 0

238 Curb: 1.2 2
239 Handrail: 7 7
* 240 Median Barrier Rail: 0

241 Bridge Median Height: 0
Width: 0

* 230 Guardrail Loc Dir Rear: 3
Fwrd: 3
Oppo Dir Rear: 0
Fwrd: 0

244 Approach Slab: 3
224 Retaining Wall: 0

233 Posted Speed Limit: 00
236 Warning Sign: 0
234 Delineator: 1
235 Hazard Boards: 0

237 Utilities Gas: 00
Water: 00
Electric: 00
Telephone: 00
Sewer: 00

247 Lighting Street: 0
Navigation: 0
Aerial: 0

* 248 County Continuity No: 00

Programming Data

201 Project No: I-75-1 (21) 111
202 Plans Available: 1
249 Prop. Proj No:
250 Approval Status: 0000
251 P.I. No: 000000
252 Contract Date: 0000
260 Seismic No: 00000
75 Type Work: 00 0
94 Bridge Imp. Cost: $ 0
95 Roadway Imp. Cost: $ 0
96 Total Imp. Cost: $ 0
76 Imp. Length: 000000
97 Imp. Year: 0000
114 Future ADT: 002100 Year: 2016

Hydraulic Data

215 Waterway Data
Highwater Elev: 0000.0 Year: 0000
Flood Elev: 0000.0 Freq: 000
Avg. Streambed Elev: 0000.0
Drainage Area: 00000
Area of Opening: 000000
113 Scour Critical: N
216 Water Depth: 00.0 Br Height: 00.0
222 Slope Protection: 4
221 Spur Dikes Rear: 0 Fwrd: 0
219 Fender System: 0
220 Dolphin: 0
223 Culvert Cover: 000
Type: 0
No Barrels: 0
Width: 0.0
Height: 0.0
Length: 0
Apron: 0
* 265 U/W Insp. Area: 0 Diver: ZZZ

* Location I.D. No: 093-00027D-015.64E
* XReferen I.D. No: 000-000000-000.000

Doug County

Measurements

* 29 ADT: 001400 Year: 1996
109 % Trucks: 19
* 28 Lanes On: 02 Under: 06
210 No. Tracks On: 00 Under: 00
* 48 Max. Span Length: 0085
* 49 Structure Length: 254
51 Br. Rdwy. Width: 28.0
52 Deck Width: 34.7
* 47 Tot. Horz. Cl: 28.0
50 Curb/Sdewlk Width: 2.0/2.0
32 Approach Rdwy Width: 024
* 229 Shldr Width:
Rear Lt: 8.0 Type: 8 Rt: 8.0
Fwrd Lt: 8.0 Type: 8 Rt: 8.0
Pvment Width:
Rear: 24.0 Type: 2
Fwrd: 24.0 Type: 2
Intersection Rear: 1 Fwrd: 1
36 Safety Features Br. Rail: 2
Transition: 2
App. G. Rail: 2
App. Rail End: 2
53 Minimum Cl. Over: 99'99"
Under: H 17' 02"
* 228 Min. Vert. Cl
Act. Odm. Dir: 99' 99"
Oppo. Dir: 99' 99"
Posted Odm. Dir: 00' 00"
Oppo. Dir: 00' 00"
55 Lateral Undercl. Rt: H 11.3
56 Lateral Undercl. Lt: 17.8
* 10 Max Min Vert Cl: 18' 4" Dir: 0
39 Nav Vert Cl: 000 Horz: 0000
116 Nav Vert Cl Closed: 000
245 Deck Thickness Main: 7.0
Deck Thick Approach: 7.0
246 Overlay Thickness: 0.0
211 Tons Structural Steel: 114.0
212 Year Last Painted: Sup: 1997 Sub: 0000

SUFFICIENCY RATING: 88.0

Ratings

66 Inventory Type: 2 Rating: 36
64 Operating Type: 2 Rating: 63
231 Calculated Loads
H-Modified: 20 0
HS-Modified: 25 0
Type 3: 28 0
Type 3s2: 40 0
Timber: 36 0
Piggyback: 40 0
261 H Inventory Rating: 23
262 H Operating Rating: 40
67 Structural Evaluation: 7
58 Deck Condition: 6
59 Superstructure Condition: 8
* 227 Collision Damage: 0
60A Substructure Condition: 7
60B Scour Condition: N
60C Underwater Condition: N
71 Waterway Adequacy: N
61 Channel Protection Cond: N
68 Deck Geometry: 5
69 UnderClr. Horz/Vert: 7
72 Appr. Alignment: 5
62 Culvert: N

Posting Data

70 Bridge Posting Required: 5
41 Struct Open, Posted, Cl: A
* 103 Temporary Structure: 0

232 Posted Loads H-Modified: 00
HS-Modified: 00
Type 3: 00
Type 3S2: 00
Timber: 00
Piggyback: 00
253 Notification Date: 0000
253 Fed Notify Date: 0000 0

Structure [redacted] 093-0007-0

Do[redacted] County

Location & Geography

* Structure I.D. No.: 093-0007-0-A
* 6A Feature Int.: SR 27
* 6B Critical Bridge: 0
* 7A Route Number Carried: SR00401
* 7B Facility Carried: I-75
* 9 Location: 2.5 MI NE OF VIENNA

* 91 Inspection Frequency: 00 Date: 0000
* 4 Place Code: 00000

* 5 Inventory Route (O/U): 2
  - Type: 1
  - Designator: 1
  - Number: 00075
  - Direction: 0

* 16 Latitude: 32.07.3
* 17 Longitude: 32.45.7

* 100 Defense Highway: 1
* 101 Parallel Structure: N
* 102 Direction of Traffic: 2
* 104 Highway System: 1
* 26 Functional Classification: 01
* 204 Federal Route Type: 1 No: 075-1
* 110 Truck Route:
* 19 Bypass Length: 0
* 20 Toll: 3
* 21 Maintenance: 01
* 22 Owner: 01

* 27 Year Constructed: 1960

* 42 Type Service On: 1
  - Under: 1
* 43 Structure Type Main: 4 02

* Location I.D. No: 093-00401D-111.85N
* XReferen I.D. No:

Signs & Attachments

* 240 Median Barrier Rail: 0

* 230 Guardrail Loc Dir Rear: 5
  - Fwrd: 5
  - Oppo Dir Rear: 6
  - Fwrd: 6

Measurements

* 29 ADT: 039000 Year: 1996

* 28 Lanes On: 02 Under: 06

* 48 Max. Span Length: 0085
* 49 Structure Length: 254

* 47 Tot. Horz. Cl: 54.5

* 229 Shldr Width:
  - Rear Lt: 10.0 Type: 2 Rt: 10.0
  - Fwrd Lt: 10.0 Type: 2 Rt: 10.0
  - Pvment Width:
    - Rear: 36.0 Type: 1
    - Fwrd: 36.0 Type: 1
  - Intersection Rear: 1 Fwrd: 1

* 228 Min. Vert. Cl
  - Act. Odm. Dir: 17' 11"
  - Oppo. Dir: 17' 02"
  - Posted Odm. Dir: 00' 00"
  - Oppo. Dir: 00' 00"

* 10 Max Min Vert Cl: 18' 04" Dir: 2

* 208 Inspection Area: 08 Initials: LEM
* 265 U/W Insp. Area: 0 Diver: ZZZ

Ratings

* 227 Collision Damage: 0

Posting Data

* 103 Temporary Structure: 0

* 248 County Continuity No: 00

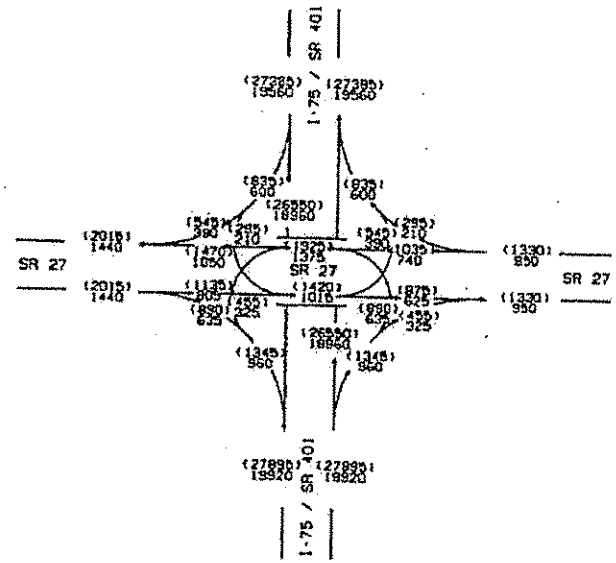
SHEET 1 OF 3

2025 AADT = (000)
2005 AADT = 000

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION

DOOLY COUNTY

N



NH-IM-75-1(227)
P.I. #311666
DOOLY COUNTY

SR 27 @ I-75

2025 AADT = (000)
2005 AADT = 000

24 HR T = 8.5%
S.U. = 3.5%
COMB. = 5%

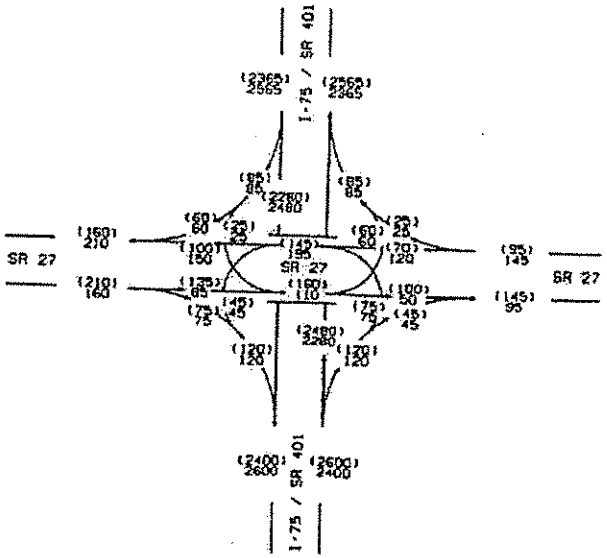
SHEET 2 OF 3

2025 PM DHV = (000)
2025 AM DHV = 000

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION

DOOLY COUNTY

N



NH-IM-75-1(227)
P.I. #311665
DOOLY COUNTY

SR 27 @ I-75

2025 PM DHV = (000)
2025 AM DHV = 000

T = 6%

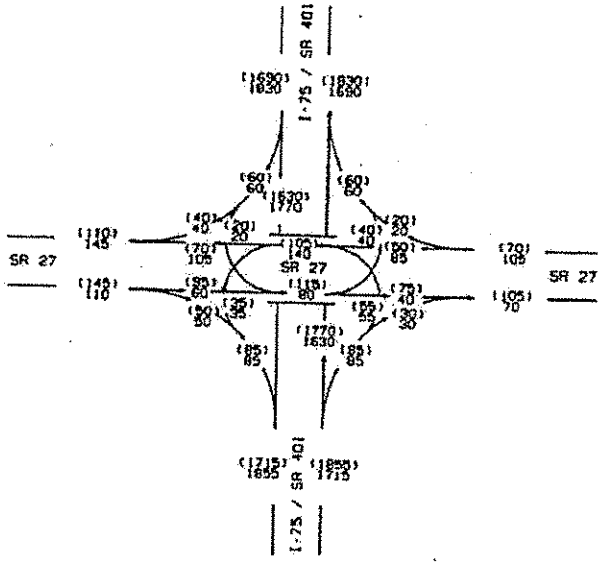
SHEET 3 OF 3

2005 PM DHV = (000)
2005 AM DHV = 000

GEORGIA DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENT/LOCATION

DOOLY COUNTY

N



NH-IM-75-1(227)
P.I. #311665
DOOLY COUNTY
SR 27 @ I-75
2005 PM DHV = (000)
2005 AM DHV = 000
T = 6%

MEMORANDUM OF CONCEPT TEAM MEETING

Project: GDOT Project Work Order No. 27
I-75 Widen Bridge and Ramps at SR 27.
Project No. IM-NH-75-1(227), Dooly County
P.I. No. 311665
G&O No. 8928

Date: January 12, 2000

Place: Offices of Road Design Conference Room

Present:

Rick Reasons	GDOT Road Design
Jim Kennerly	GDOT Road Design
Stanley Hill	GDOT Road Design
Rick Ford	GDOT R/W
Tim Smith	GDOT Traffic Ops
Jerry Wylie	Georgia Power Company
Ken Estes	GDOT Traffic Ops
Mitch Britt	GDOT Environmental
Jeff Hiott	GDOT Road Design
Dom Saulino	Parsons Brinckerhoff
Harry Graham	GDOT Traffic Ops
Kerry Gore	GDOT Utilities
Katie Mullins	GDOT Programming
Jeff Carroll	GDOT Planning
David Mulling	GDOT Engineering Services
Theon Grojean	Greenhorne & O'Mara
Rick Hartline	Greenhorne & O'Mara
Robert Lewis	Greenhorne & O'Mara

Distribution: Attendees, Jim Chambers (GDOT)

Purpose: Concept Team Meeting

DISCUSSION:

1. Stanley Hill of Road Design began by introducing the project and briefly reviewing the front end of the Concept Report.

changes are necessary. He pointed out that only one accident had occurred in the past three years and it was at the intersection of CR 155.

3. Theon Grojean of G&O briefly described each alternate. Alternate 1 proposes widening the existing bridge to increase sight distance and relocating CR 155 to a point 300 feet from the southbound exit ramp terminal. Alternate 2 proposes construction of a new bridge and new SR 27 to meet 55 MPH design speed as well as moving the ramp terminals farther away from I-75 to accommodate a longer bridge. The bridge will be lengthened enough to accommodate a proposed eight lane section on I-75, which is planned for sometime in the future. Alternate 3 is similar to Alternate 2 except that Alternate 3 proposes end rolls at the new bridge whereas Alternate 2 proposes vertical end walls.
4. Rick Ford of GDOT R/W stated that there are no severe impacts with either alternate and there are no displacements. An estimate of R/W costs will be submitted tomorrow (01/13). He cautioned against adding large easements because of the impacts to the commercial land.
5. GDOT Utilities stated that there was no estimate available, but obviously Alternate 1 will cost less for Utilities Relocation. Both Alternates, however, are pretty standard relocations.
6. Mitch Britt of GDOT Environmental stated that there was no preference for either alternative. Neither would require a public meeting and both would fall under a Nationwide Permit.
7. Katie Mullins of GDOT Programming stated the project is scheduled for letting in the 2003 program and that the R/W money is budgeted for the year 2001.
8. David Mulling of Engineering Services asked how soon would I-75 likely be widened. The widening of I-75 is not identified even in the long range plan.
9. Jim Kennerly stated that everyone should keep in mind that the project was developed for the purpose of improving sight distance, and that Alternative 2 may be a lot more than is needed. The accident history does not suggest a problem worth rebuilding the bridge. However, if CR 155 is to be relocated, it should be moved to intersect with SR 27 at a point 660 ft. from the exit ramp. That way, if SR 27 is ever widened to four lanes with a raised median we can put a median opening at that location.
10. Harry Graham stated that the project is being driven by the fact that sight distance is limited at the bridge and it is difficult for slow moving vehicles, such as school buses, to pull out. He stated a preference for Alternate 2 since the vertical curve at the existing bridge only meets a 45 mph design speed.
11. Others, however, disagreed, since Alternate 1 accomplishes the purpose of improving sight distance. It is doubtful that FHWA would approve Alternate 2 since the widening of I-75 is not in the long range plan. Also, since vertical clearance is not a problem on the existing bridge, it may be possible to widen I-75 half a lane to the inside and half a lane to the outside and still maintain the existing bridge. G&O will check the horizontal clearance in the median of I-75 for the widening.
12. The vertical curve on the existing bridge does NOT meet the current 55 MPH design speed and the sight distance (SB exit at SR 27) over the crest does NOT meet 55 MPH, although widening the bridge does move the bridge side barrier from the sight line. The vertical curve does meet 45 MPH and the sight distance is very close to meeting 50 MPH.

13. It was agreed that Alternate 1 is the preferred alternate, with the following conditions:
    a. It will mean either signing this portion of SR 27 for 45 MPH or it will require a design

exception for the vertical curve on the bridge.

b. The Concept Plan will show Limited Access to points that are 300 feet from the ramp terminals even if it means a total property take. The gas station on the east side of I-75 is closed, but the two on the west side are still operating. This should not affect environmental nor require a public meeting.

c. The intersection of CR 155 will be moved to a point that is 660 feet from the southbound exit ramp terminal as located in Alternate 2. This is to meet the minimum criteria for median opening spacing for future construction.

d. G&O will check the existing ramps with current design criteria and if they meet it, then the ramps will remain as they are. If a ramp does not meet current criteria, then the Concept Plan will show complete reconstruction of the ramp, including changing the intersection angle with SR 27 to a minimum of 75^ and terminating the ramp at I-75 to accommodate the future widening of half a lane to the outside.

The preceding represents our understanding of the items discussed. Should you have any comments or questions, please contact us so that we may incorporate them.

Respectfully submitted,
Greenhorne & O'Mara, Inc.

Theon F. Grojean, P.E.
Senior Project Manager

Department of Transportation
State of Georgia

INTERDEPARTMENTAL CORRESPONDENCE

File: IM-NH-75-1(227)/Dooly County
P.I. No. 311665

Office: Traffic Operations
Atlanta, Georgia
Date: April 14, 2000

From: Mark G. Waters, III, P.E., State Traffic Operations Engineer
To: Wayne Hutto, Assistant Director of Preconstruction

RECEIVED
APR 19 2000

Subject: Project Concept Report Review

We have reviewed the concept report on the above project for the improvements to the SR 27 interchange at I-75, north of the city of Vienna. The purpose of this project is to improve the sight distance for vehicles exiting I-75 onto SR 27. This project will also relocate CR 155 a distance of 660 feet from the southbound exit ramp.

SR 27 is a two lane rural roadway with 8 foot grassed shoulders and a posted speed limit of 55mph. The existing bridge is 34.7 feet in width and has a sufficiency rating of 88.0. CR 155 consists of two 12 foot lanes with 10 foot grassed shoulders.

The I-75 northbound and southbound exit ramps will be reconstructed, by this project, to meet GDOT requirements and provide an intersection angle of 75° at SR 27. The bridge will be widened to 46 feet, providing two 12 foot lanes, a 10 foot shoulder on the north side and a 12 foot shoulder on the south side. The additional width of the south shoulder is to provide adequate sight distance from the ramp terminal across the bridge. Ramps will be constructed 16 feet in width and widen to 24 feet at the SR 27 intersection to allow for a turn lane. The speed design is 55mph for SR 27 and CR 155, and 50mph for the ramps. Traffic is to be maintained during construction with CR 155 remaining in service until completion of the new alignment.

We request conduit be installed, on the bridge, as part of this project. The conduit would be used for the future interconnection of the Advanced Transportation Management System components in this area. Our Traffic Operations Design Office can provide details and cost estimates for inclusion in the project.

We believe this concept will improve safety and operational capacity along this section of roadway.

With the recommended statement, we find this report satisfactory for approval.

MGW:TWS

Attachment (signature page)

c: David Studstill
James A. Kennerly, State Road and Airport Design Engineer
Attention: Stanley Hill
David Mulling, w/attachment
Marta Rosen
Chuck Hasty, TMC
Mark Demidovich, TMC
Paul Liles, State Bridge Design Engineer
General Files

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 February 5 - 8, 2007 in Atlanta, Georgia for the Georgia Department of Transportation. The subject of the Value Engineering study was the project for the was the project for a new Interchange for US 27 and Interstate Highway 75 in Dooly County, Georgia. The design is being performed by T. B. Trimble, Inc.

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

Les Thomas	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**
    - **Improve Safety (at interchange location)**
- **Project Basic Function**
    - **Reduce Accidents**
        - **Provide Clearance**
        - **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 System Technique diagram that is enclosed in this report section.

- **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 worksheet enclosed. These same work sheet was 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.

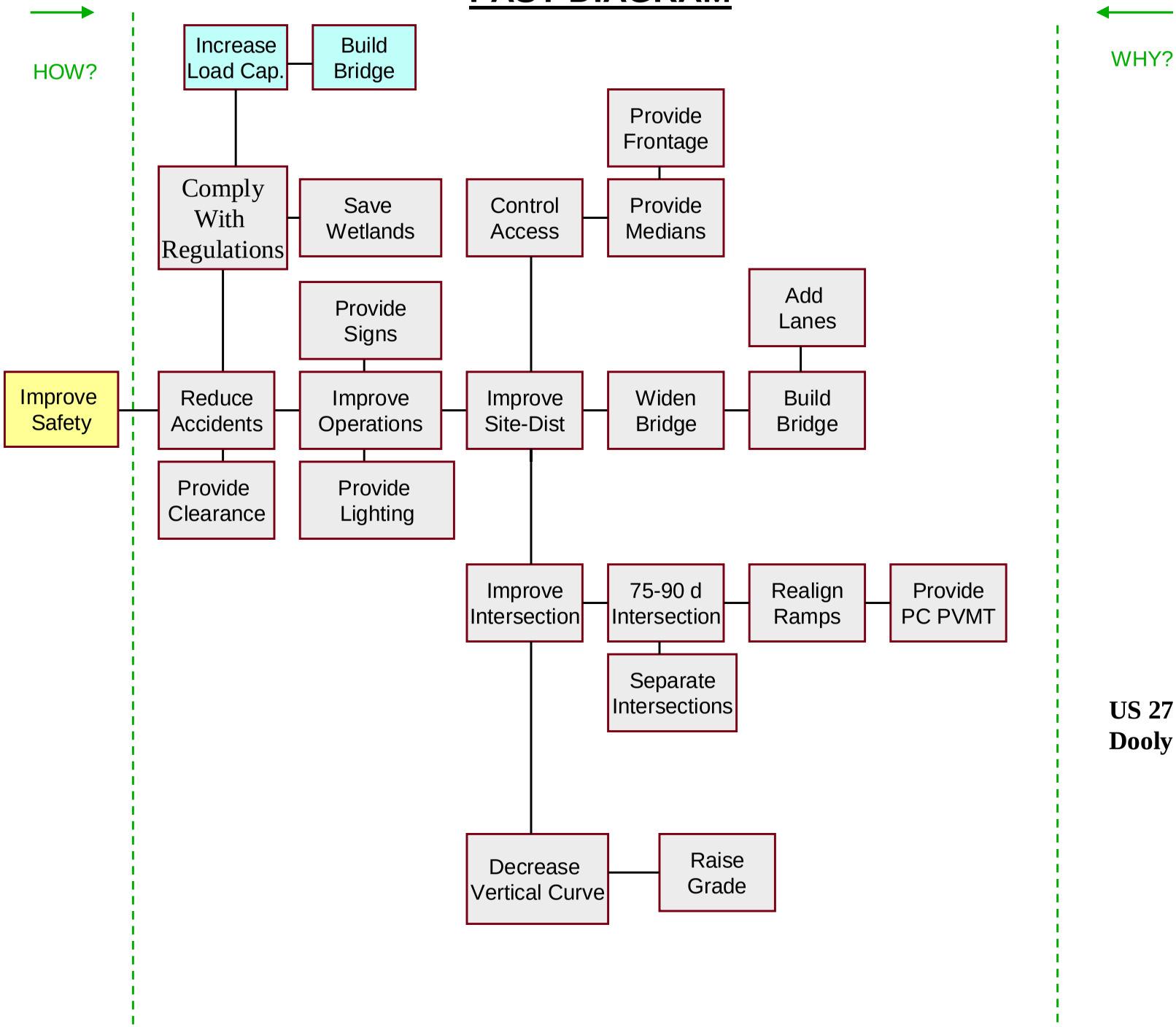
- **Development** – This is the section of the report (see tabbed section number three – Study Results) in which the alternatives are explained, sketched, documented and put to cost and technical tests to determine their suitability for implementation and for their impact on the project.

- **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.

FAST DIAGRAM

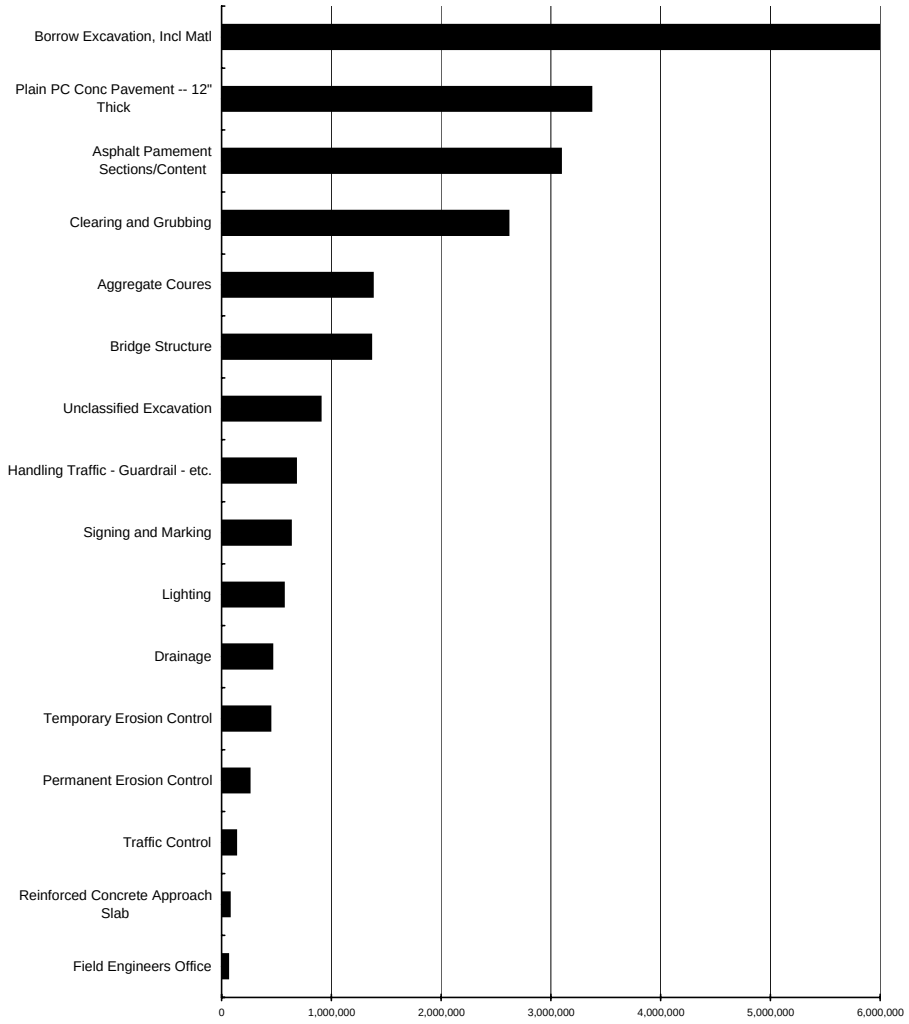


US 27 and I-75 Interchange
Dooly County, Georgia

PARETO CHART - COST HISTOGRAM

PROJECT: **US 27 and I-75 Interchange**
Dooly County, Georgia

PROJECT ELEMENT	COST	PERCENT	CUM. PERCENT
Borrow Excavation, Incl Matl	5,990,620	27.19%	27.19%
Plain PC Conc Pavement -- 12" Thick	3,371,100	15.30%	42.48%
Asphalt Pamement Sections/Content	3,093,635	14.04%	56.52%
Clearing and Grubbing	2,615,167	11.87%	68.39%
Aggregate Coures	1,378,224	6.25%	74.65%
Bridge Structure	1,364,734	6.19%	80.84%
Unclassified Excavation	904,640	4.11%	84.95%
Handling Traffic - Guardrail - etc.	678,167	3.08%	88.02%
Signing and Marking	632,283	2.87%	90.89%
Lighting	567,818	2.58%	93.47%
Drainage	464,239	2.11%	95.58%
Temporary Erosion Control	445,445	2.02%	97.60%
Permanent Erosion Control	256,921	1.17%	98.76%
Traffic Control	134,646	0.61%	99.37%
Reinforced Concrete Approach Slab	75,900	0.34%	99.72%
Field Engineers Office	61,827	0.28%	100.00%
Subtotal	**$ 22,035,366**	**100.00%**	
E & C Rate @ 10% INCL	**$ 2,203,537**		
TOTAL	**$ 24,238,903**	**Comp Mark-up:**	10%



Costs in graph include mark-ups.

DESIGNER'S PRESENTATION

MEETING PARTICIPANTS

Project: Georgia Department of Transportation

Date: 5 February 2007

IM-N-75-1(227) -- Dooly County -- P.I. Number: 311665

NAME	ORGANIZATION & TITLE	E-MAIL	PHONE
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VE TEAM PRESENTATION

MEETING PARTICIPANTS

Project: Georgia Department of Transportation

Date: 8 February 2007

IM-N-75-1(227) -- Dooly County -- P.I. Number: 311665

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Brian Summers	GDOT		

CREATIVE IDEA LISTING & EVALUATION

PBS&J

PROJECT: **GEORGIA DEPARTMENT OF TRANSPORTATION**
IM-N-75 (277)– Dooly County – P.I. Number: 311665

SHEET NO.: **1** of **1**

NO.	IDEA DESCRIPTION	RATING
1	Do Nothing	1
2	Do Nothing except add Traffic Signalization	1
3	Utilize existing County roads 340 and 209 as is	5
4	Do #3 and relocate Old Bowen Rd to CR 340 Intersection	5
5	Eliminate end spans and use walled end abutments	5
6	Decrease distance between easterly and westerly on/off ramps and ramp lengths	5
7	Reduce width of bridge to 53’ – 3”	5
8	Reduce Roadway Width, delete turn lanes (US 27)	4
9	Widen existing bridge per the 2000 plans	2
10	Delete new connector roads to CR 340 and CR 209	5
11	Delete median, provide direct connection for existing service stations	1
12	Relocate CR 155 to 300’ from new on/off ramp and provide direct access to service stations on south side.	DS
13	Use asphaltic concrete in lieu of PC concrete on new ramps	DS
15	Revise Grades and Curves to reduce earthwork	5
16	Revisit pavement design for existing county roads	DS
17	Delete new future 12’ lanes in ramp areas.	5
18	Combine Ideas (4,5,6,7,15,17) into a design “Scheme - I”	5

Rating: 1→2 = Generally not acceptable; 3 = Little Opportunity for Positive Change; 4→5 = Most likely to be Developed; DS = Design Suggestion; ABD = Already Being Done