

# VALUE ENGINEERING WORKSHOP

## WIDENING SR17 – IMPROVEMENTS PROJECT EDS 545 (43) Warren & McDuffie Counties, Georgia

PREPARED FOR:



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24 August 2006

## VALUE ENGINEERING TEAM STUDY

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## VALUE ENGINEERING TEAM STUDY

### PROJECT DESCRIPTION AND BACKGROUND

The EDS 545 (43) project is part of the Governor's Road Improvement Program (GRIP). This project also serves as part of the proposed economic development of Warren-McDuffie Counties. The Widening and Reconstruction of SR - 17 is essential to the effort to reduce the travel demands on the existing corridors through Northeast Georgia and Warren-McDuffie Counties.

The typical road section for this project consists of a rural 4-lane divided highway with 12 foot lanes separated with a 44' wide depressed median, and Type "B" median breaks; Six foot wide paved outside shoulders; and Two foot wide paved inside shoulders. Proposed right-of-way (ROW) would vary with intersection ROW being wider as necessary.

Major structures proposed:

- New parallel bridge over Reedy Creek (approximately 197'x41'-3")
- New parallel bridge over Little Brier (approximately 216'x41'-3")
- New parallel bridge over Big Brier (approximately 201'x41'-3")
- New bridge culvert replacement over Mill Branch Creek (170'-24')

There are 22 on-grade intersections proposed at the following locations:

State Route #296 @ Southern End	County Road #118/Hobbs Mill Road
County Road #100/Huff Road	Old Wren's Road
County Road #136/Thiele Road	County Road #135/Roy Reeves Road
County Road #17/Purvis School Road	County Road #136/Groves Road
	County Road # 382/May Road
County Road #102/Huff Bridge Road/ Huber Road	County Road #125
County Road #131/Story Randle Road	State Route #124/Milledgeville Road
County Road #130/Guy Road	Perdue Road
Fort Creek Road to the right	Luke Road
Happy Valley Road to the left	Unnamed Road
	Sweetwater Church Road
	Wire Road @ Northern End

Six (6) wetlands and thirteen (13) streams were identified along the proposed corridor.

## VALUE ENGINEERING TEAM STUDY

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### PROJECT DESCRIPTION AND BACKGROUND

#### **Need and Purpose:**

The U.S. 1/S.R. 17 improvements are part of the Governor's Road Improvement Program (GRIP). The purpose of the GRIP system of roadways is to provide multi-lane access to areas of the State that are not served by the interstate system. GRIP was initiated in the 1980's in order to address the importance of stimulating economic growth and development via an improved transportation network. Widening and reconstructing U.S. 1/S.R. 17 from a two-lane to a four-lane with a 44-foot depressed median will serve as a catalyst for the development of the east region of the State, connecting South Georgia with North Georgia. The traffic carrying capacity will be increased and the operational and safety characteristics will be improved.

#### **Project Location:**

Project EDS-545 (43). P.I. No. 222590, begins just north of S.R. 296 in Warren County and ends just north of C.R. 311/Wire Road in McDuffie County just south of Thomson. The total length of the project is approximately 11.46 miles and consists of the roadway widening by adding two parallel travel lanes with new parallel bridges at Reedy Creek, Little Brier Creek, and Big Brier Creek along S.R. 17 and reconstruction, and relocation of the existing two lanes in various locations along the project. This project is on a proposed bicycle route as identified in the Georgia Statewide Bicycle and Pedestrian Plan, in which the bike lanes will be accommodated along the proposed 6.5' paved shoulder.

#### **Description of the Approved Concept:**

The proposed EDS-545 (43) project improvements consist of widening, reconstructing, and the relocation of S.R. 17 from just north of S.R. 296 to C.R. 311/Wire Road just south of Thomson. The improvements would ensure that the existing two-lane roadway is improved where possible or reconstructed to meet the proposed design speed and current design criteria/guidelines for specified design speeds, clear zones, stopping sight distance, safety, traffic capacity, utility requirements/impacts, for the new roadway section including bike-lanes with minimal environmental impacts. The current posted speed is 55 mph.

The proposed construction of the four-lane rural roadway will provide two 12-foot travel lanes in each direction separated by a 44-foot depressed grassed median for the entire length of the project. The roadway section will include 6-foot inside shoulders (2' paved and 4' unpaved) and 10-foot outside shoulders (6.5' paved to accommodate bicycles and 3.5' unpaved).

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### PROJECT DESCRIPTION AND BACKGROUND

The proposed alignment will begin just north of S.R. 296 with the northbound roadway aligned with the existing two-lane roadway. Maintaining the existing alignment to hold the existing pavement for the northbound roadway will accommodate the widening to the west and allow the new bridge crossing over Reedy Creek that is currently being constructed under project BRN-014-1 (54) to be retained and utilized for the proposed project. Both the northbound and southbound roadway alignments then shift to the west onto new location from just south of C.R. 100/Huff Road to just north of C.R. 102/Huffs Bridge Road. The alignment then shifts to the east just south of Purvis School Road (avoids impacting the Kaolin Pit to the west) to just north of C.R. 104/Huber Road. The southbound roadway then aligns with the existing roadway to hold and retain the existing Little Brier Creek Bridge, while adding a new parallel bridge to the east. The 4-lane roadway alignment then shifts to the east onto new location from C.R. 131/Story Randle Road to a point north of C.R. 130/Guy Road. The alignment then transitions to the west side of the existing roadway aligning the northbound roadway with the existing roadway from just north of C.R. 309/Happy Valley Road to a point just north of Big Brier Creek Bridge which is to be retained, while adding a new parallel bridge. The alignment then shifts to the west onto new location from a point just south of C.R. 134/Old Wrens Road to a point just south of C.R. 136/Groves Road. The alignment then shifts to the east onto new location just north of C.R. 134/Groves Road to C.R. 311/Wire Road (Thomson Bypass, EDS-545 (3)), the roadway then transitions from a 4-lane divided roadway to the existing 2-lane rural roadway just north of C.R. 14.

The proposed design speed is 65 mph, which requires approximately ninety-five percent (95%) of the existing roadway's pavement (vertical alignment) to be reconstructed, since it does not meet the current 2001 AASHTO design standard, and is therefore considered substandard.

The existing Right of Way is 100 feet; a major 6-inch gas line is located on the east side of the roadway and runs from Wrens to Thomson within the existing right of way. In addition, a kaolin slurry line is located on the eastside of the roadway in Warren County. The proposed Right of Way is 250 feet, which will provide sufficient right of way for all improvements, with the exception of easements. Several side roads are proposed to be relocated and will require new right of way; utilities may be impacted by these relocations.

The Design Cost Estimates for the projects indicate the following:  
EDS 545 (43) project has an ECC of \$54 Million, plus ROW cost of \$12.7 Mil.

## VALUE ENGINEERING TEAM STUDY

### PROJECT DESCRIPTION AND BACKGROUND

#### CONCERNS AND OBJECTIVES:

These projects are part of an overall scheme to Widen and Reconstruct SR - 17 (EDS 545 (43)) from SR 296 to CR311/Wire Road at Thomson in Warren-McDuffie Counties, Georgia. Over the past few years, the phases of this GRIP system have been slowly coming together, as part of the Governor's Economic Development (GRIP). The rivers/creeks and topographic terrain dictate traffic patterns; residential growth; and development of commercial and industrial properties make this roadway project an economic necessity.

The following are some of the highlighted concerns and objectives noted by the VE team for project:

#### Widen and Reconstruction of SR - 17 EDS 545 (43)

CONCERNS/OBSERVATIONS	PROBLEMS/OBJECTIVES
Bike Lane Location	Currently the bike lanes are dangerously close to the travel lanes
23 On Grade Intersections	The 4% grade is generating excessive cuts and difficult intersections at the 23 on grade intersections. Some driveways will be greater than 20%.
Cost Estimate	The cost per mile is currently estimated at \$4.4 Mil and appears low (20%) based on recent bid tabs. The VE proposals contained in the report will be marked up by 40%.
95% of existing road is to be replaced	The 4% grade profile and horizontal alignment should be investigated to salvage as much of the existing pavement as feasible.
Shoulder and bike lane pavement thickness is excessive	The current design has a uniform thickness for the complete cross section of road, shoulder and bike lane
Temporary detour roads, retaining walls cost, and staging have not been identified	There will be excessive cost to the horizontal and vertical alignment in the current design and will require additional cost
Stabilization of side slope through deep cuts	The current design needs to be revised for a 3:1 side slope based on the soil characteristics of the area. Temporary shoring will be needed in many areas.

## VALUE ENGINEERING TEAM STUDY

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### KEY INFORMATION/NOTES

#### Introduction

U.S. Cost Incorporated conducted the Value Engineering Team Study on Widening and Reconstruct SR - 17 from SR 296 to CR311/Wire Road at Thomson in Warren-McDuffie Counties, Georgia. The V.E. study was conducted for three (3) days, 22-24 August 2006, at the Georgia Department of Transportation Conference Room #344 in Atlanta, GA. The study team was furnished with four projects for Widening and Reconstruction of SR – 17 from SR 296 to CR311/Wire Road at Thomson Bypass {EDS 545 (43)} which included Schematic Design submittal packages. The following individuals were members of the V.E. team:

<b>Name</b>	<b>Firm</b>	<b>Discipline</b>
Lindsey Gardner, P.E., CVS	U.S. Cost, Inc.	VETL
Brad Hale, P.E.	MAAI	Roadway Design
Sam Deeb, P.E.	MAAI	Bridge Engineer
Laland Owens	MAAI	Construction
Lisa Myers	GDOT	VE Director
Yun Tang, P.E.	GDOT	Project Manager

#### Information Phase/Function Analysis

The V.E. team was first briefed on the project design by GDOT and B & E Jackson Engineers representatives in an orientation meeting the first day of the V.E. Study. The briefing gave insight into the current design, and also into the aspects of the Widening and Reconstruction of SR - 17 from SR 296 to CR311/Wire Road at Thomson By-Pass {EDS 545 (43)} project. The briefing included a review of the design requirements and rationale for the location and arrangement of the new parallel roads, in addition to information on the placement of parallel bridges structural systems. Discussions regarding project funding, required functions, and project criteria followed the design presentation.

As a basic part of the V.E. process, the team conducted a partial function analysis session on Widening and Reconstruction of SR - 17 to identify the needs and goals of the project and facilitate the creative idea session, by addressing functions as opposed to the specific design elements.

The Basic Function of the project is to *Enhance Economy*. A strong secondary function is to *Enhance Travel* by Widening and Reconstruction of SR – 17 from SR 296 to CR311/Wire Road at Thomson By-Pass. A detailed project function analysis of the characteristics of the project and their relationships is presented in Appendix A.

## VALUE ENGINEERING TEAM STUDY

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### KEY INFORMATION/NOTES

#### Risk Analysis

The group identified the following project risk elements, which may impact the Widening and Reconstruction of SR - 17. This exercise served as a catalyst for the Creative Phase of the study, when several ideas were suggested which would mitigate these project construction risks.

#### Risk Elements:

- Delays and impact on the traveling/commuting public
- Bike lanes appear too close to high speed travel lanes
- Contractor Phasing, Staging, Coordination and Traffic Control
- Poor Progress/Quality By A Low Bid Construction Contractor
- Accidents at on-grade intersections
- Interruption to mining and truck traffic
- Stabilizing deep cuts as a result of new profiles
- No guard rails at split bridges
- Shortage and inflated cost of petroleum, cement and steel
- Maintaining uninterrupted flow of traffic on existing roads during construction – potential accidents due to multi staging in deep excavations.
- Failure to meet GDOT Schedule
- Lengthy distances between median openings

#### Project Criteria

During the meeting, project goals, criteria and sensitivities were also identified. The following prioritized listing identifies the key items of which the V.E. team should be aware. Criteria with a score of 5 or higher were considered of prime importance, and those criteria therefore must be considered in the review of any design alternative. The ranking below is the V.E. teams' impression of the sensitivity of the criteria from discussions held with Georgia DOT and the A/E representatives.

#### Project Criteria Analysis:

Life Safety	10
Operational Issues	10
Impact on mining operators (Kaolin)	10
Compliance with approved EIS	10

## VALUE ENGINEERING TEAM STUDY

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### KEY INFORMATION/NOTES

Constructibility	8
GDOT Criteria Compliance	8
Functionality	8
Life Cycle Cost (Analysis)	8
AASHTO 2001 Compliance	7
Local Code Restrictions	7
Maintenance and Operations	6
Cost Savings Impact	2

### Creative Phase

The Creative Phase of the V.E. study was initiated the morning of the second day of the study. A total of twenty (20) creative ideas were generated for further investigation by the team. Many of the creative ideas focused on enhancements to the roadway safety, line of sight, excavation techniques, utility locations, and drainage impact, plus various other design elements of the Project. Additional ideas were generated reflecting alternative materials based on an understanding of local construction products and materials and the relative costs of installing them.

A listing of all creative ideas on Widening and Reconstruction of SR – 17 from SR 296 to CR311/Wire Road at Thomson By-Pass project is included in Appendix A.

### Evaluation Phase

The ideas generated during the Creative Phase were reviewed and evaluated by the VE team during a meeting held on the morning of the second study day. The intent of the meeting was to allow the V.E. team an opportunity to discuss and evaluate the ideas. A few of the V.E. ideas were dropped at that time as being conceptually unacceptable or in conflict with established Criteria, Right of Way (ROW) conflicts, previous agreements, or local construction methods. The ranking system consisted of VE team representatives assigning a designation to each idea. Those ideas, which the V.E. Team felt had the most promise, were given a designation of 1-5 on acceptability and 1-5 on cost impact, for a maximum rating of 10 points. This is a time management tool to identify those proposals that have the greatest potential. Approximately twelve (12) out of the original twenty (20) creative ideas were deemed promising for further investigation and analysis by the V.E. team.

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### KEY INFORMATION/NOTES

The time management ranking system used by the VE team is as follows:

#### FEASIBILITY OF IDEA

- 5 points - Excellent Idea
- 4 points - Good Idea
- 3 points - Fair Idea
- 2 points – Marginal Idea
- 1 point - Poor Idea –do not develop

#### COST IMPACT

- 5 points - > \$ 1,000,000 savings
- 4 points - \$750,000 to 999,999
- 3 points - \$500,000 to 749,999
- 2 points - \$250,000 to 499,999
- 1 point – zero to \$249,999
- DS – Design Suggestion – sometimes reflects an increase in cost

#### Development Phase

The specific proposals found in the body of this report represent the positive results of investigations by the V.E. team on the Widening and Reconstruction of SR - 17 projects. Each proposal represents a quality enhancing or cost saving alternative, which is documented by words, drawings and numbers. The proposal format presents the idea, describes the original design element proposed for change and the proposed change, lists the perceived advantages and disadvantages of the proposed change and supports the idea with a detailed cost estimate for the original and proposed design. Where necessary for clarity, the proposal also includes thumbnail design drawings and supporting engineering calculations.

Many of the V.E. proposals may require some level of redesign on specific portions of the project to implement the modification. Further, several of the V.E. ideas may involve modifications to the Criteria, or current goals, of Widening and Reconstruction of SR - 17 from SR 296 to CR311/Wire Road at Thomson bypass. These ideas are presented to initiate additional discussion and investigation during the next phase of design.

#### Presentation Phase

A final presentation was not scheduled for the last day of the study.

## VALUE ENGINEERING TEAM STUDY

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### KEY INFORMATION/NOTES

#### **Resolution Phase**

Upon receipt of the Final Value Engineering Report, Widening SR - 17 from SR 296 to CR311/Wire Road at Thomson, Georgia DOT and Earth Tech representatives are requested to prepare written comments on the acceptability of each of the V.E. proposals. Responses should include the rationale for accepting, rejecting, or modifying the V.E. proposal.

#### **Basis of V.E. Cost Savings**

The cost information for proposals in this report is based on the cost data prepared by the design A/E. The savings presented in the proposals is a general order of magnitude (estimate of the potential savings) if the idea were to be accepted. These figures are solely intended to identify the most attractive design solution, and are not prepared to represent a net deduction to the overall project budget. The costs are in 2006 dollars (escalated for 5 years at 5% inflation per year). All life cycle cost analyses are prepared utilizing Present Worth methodology, a 25-year economic period, a 5.0% net discount factor (inclusive of inflation), and 3% escalation in the cost of utilities. Note: With a bid opening of 2010 it appears the total estimated escalation cost is inadequate and needs to be re-evaluated.

#### **Sustainable/Green Design Proposals**

Sustainable design incorporates energy conservation, increased use of renewable energy sources, the reduction or elimination of toxic and harmful substances in facilities, efficiency in resource and material utilization, recycling of building materials, the use of recycled material, the reduction of waste products during both the construction and operation of the facility, and facility maintenance practices that reduce or eliminate harmful effects on people and the natural environment. There are no developed sustainable proposals in this report; however, the construction contactor should have the option to employ construction techniques and materials to shorten the bridge construction time.

**VALUE ENGINEERING TEAM STUDY**

**SUMMARY OF RECOMMENDATIONS  
EDS 545(43) SR – 17 IMPROVEMENTS  
24 AUGUST 2006**

<b>IDEA NO.</b>	<b>DESCRIPTION</b>	<b>SAVINGS</b>
<b>ROADWAY/PROFILE (RW)</b>		
RW – 1.0	Modify profile to reduce earthwork from Sta. 351+00 to Sta. 410+00 (improves constructability and improves maintenance of traffic during construction)	1,715,400
RW – 2.0	Modify profile to reduce earthwork from Sta. 546+00 to Sta. 628+00 (improves constructability and improves maintenance of traffic during construction)	3,146,500
RW – 3.0	Change pavement structure to 8.7% under design by reducing graded aggregate base course from 12 inches to 10 inches	1,636,800
RW – 4.0	Reduce pavement depth of outside paved shoulders	1,197,000
RW – 5.0	Provide bicycle lane on North bound shoulder only & 4 ft paved outside shoulder on Southbound side	781,800
RW – 8.0	Coordinate design with Thomson Bypass project	Design Suggestion
RW – 10.0	Consider modifying side road alignments to improve intersection angles	Design Suggestion
RW – 13.0	Use PCC pavement in intersections where loaded Kaolin trucks are crossing the mainline or turning movements are heavy	Design Suggestion
<b>STRUCTURAL/BRIDGE (SB)</b>		
SB – 1.0	Optimize Reedy Creek Bridge w/ 2-spans Type III PSC Beams (65'-8") & BT 72 Beams (131'-4") ILO 3-spans Type III PSC Beams (65'-8" EA.)	85,000
SB – 2.0	Optimize Little Brier Creek Bridge w/ 3-spans Type II PSC Beams (72'-0" EA.) on PSC Pile Bents ILO of 6-spans T-Beam (36'-0" EA.)	248,000
SB – 2.1	Optimize Little Brier Creek Bridge w/ 2-spans BT 54in Beams (108'-0" EA.) on RC Bent ILO 6-spans T-Beam (36'-0" EA.)	144,465
SB – 4.0	Optimize Big Brier Creek Bridge w/ 2-spans Type III PSC Beams (67'-0") & BT 72 Beams (134'-0") ILO 3-spans Type III PSC Beams (67'-0" EA.)	86,250

## VALUE ENGINEERING PROPOSAL

<b>PROPOSAL NUMBER:</b>	RW-1.0
<b>PAGE NUMBER:</b>	1 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**PROPOSAL DESCRIPTION:** MODIFY PROFILE TO REDUCE  
EARTHWORK STA. 351+00 TO STA. 410+00  
(IMPROVES CONSTRUCTABILITY AND  
IMPROVES MAINTENANCE OF TRAFFIC  
DURING CONSTRUCTION).

**ORIGINAL DESIGN:** The original design profile leaves the Reedy creek bridge @ -  
1.32% grade followed by a 1000' sag vertical curve then a grade tangent of +4.74% followed by  
a 2300' crest vertical curve to PVT sta. 394+50 where a -1.11% grade begins.

**NOTE:** the 864,654 CY of earthwork used on the project estimate is actually 1,760,000 CY  
based on actual earthwork volume.

**PROPOSED CHANGE:** The proposed change recommendation is to modify the profile  
from sta. 351+00 to sta. 414+00 by placing a 55 mph sag vertical curve immediately adjacent to  
the bridge over Reedy Creek and raising the grade tangent to 4.57%. Use two crest vertical  
curves @ 65 mph speed design separated by a 950 foot grade tangent in lieu of one long vertical  
curve at sta. 383+00. This more closely follows the existing road profile reducing the two cuts  
by ± 169,000 c.y.

	INITIAL COST	OPERATING COST	TOTAL LIFE- CYCLE COST
<b>ORIGINAL DESIGN:</b>	\$ 17,864,999	\$	\$ 17,864,999
<b>PROPOSED CHANGE:</b>	\$ 7,304,487	\$	\$ 16,148,650
		<b>SAVINGS:</b>	\$ 1,715,350

**ADVANTAGES/DISADVANTAGES/JUSTIFICATION**

<b>PROPOSAL NUMBER:</b>	RW-1.0
<b>PAGE NUMBER:</b>	2 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**ADVANTAGES:**

Total life cycle cost savings of \$1,715,350.  
Traffic management under construction is not as complicated.  
Construction will be easier with shorter time duration.  
Helps balance earthwork with less waste.  
Will not require as much ROW.  
Lower back slopes not prone to failure.  
Less disturbed area requiring erosion control.

**DISADVANTAGES:**

One sag vertical curve only meets 55 mph.

**JUSTIFICATION:**

In addition, to substantially reducing the earthwork volume & costs, constructability is enhanced at the Huff Road intersection. With the original design, Huff Road traffic must be maintained while the mainline is cut down  $\pm 7$  feet. The new profile is very close to the existing Huff Road elevation. Meets AASHTO guideline except for one sag vertical curve.

## COST ESTIMATING WORKSHEET

<b>PROPOSAL NUMBER:</b>	RW-1.0
<b>PAGE NUMBER:</b>	3 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

### ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Unclassified Excavation	1	cy	1,760,000	7.25	12,760,000
<b>SUBTOTAL:</b>					12,760,000
<b>40% MARK UP:</b>					5,104,000
<b>TOTAL:</b>					17,864,000

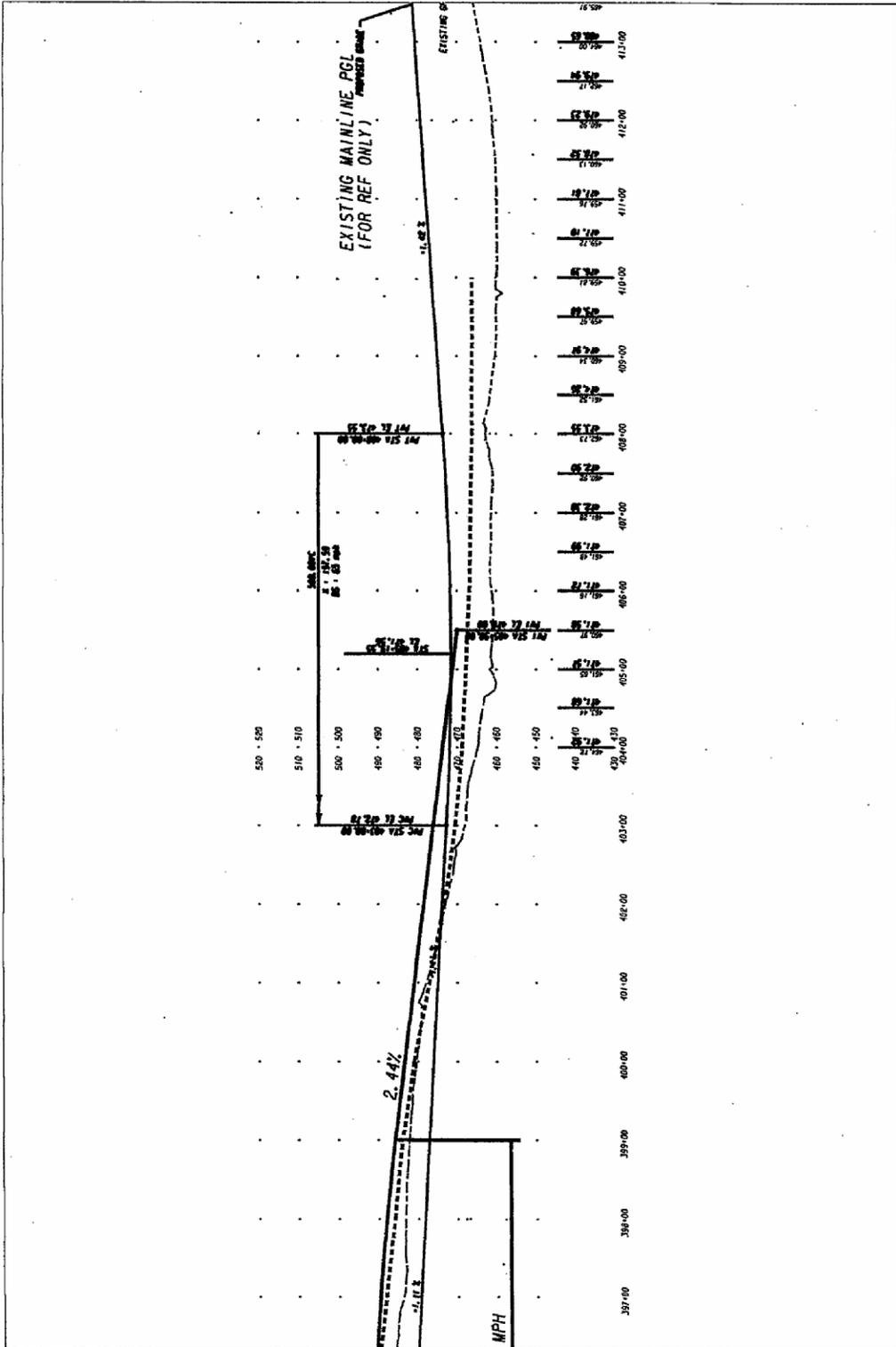
### PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Unclassified Excavation	1	cy	1,591,000	7.25	11,534,750
<b>SUBTOTAL:</b>					11,534,750
<b>40% MARK UP:</b>					4,613,000
<b>TOTAL:</b>					16,148,650

### SOURCES

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1. Project Cost Estimate</li> <li>2. CES Data Base</li> <li>3. CACES Data Base</li> <li>4. Means Estimating Manual</li> </ul> | <ul style="list-style-type: none"> <li>5. Richardson's Estimating Manual</li> <li>6. Vendor (Specify)</li> <li>7. Other (Specify)</li> </ul> |
|--|--|

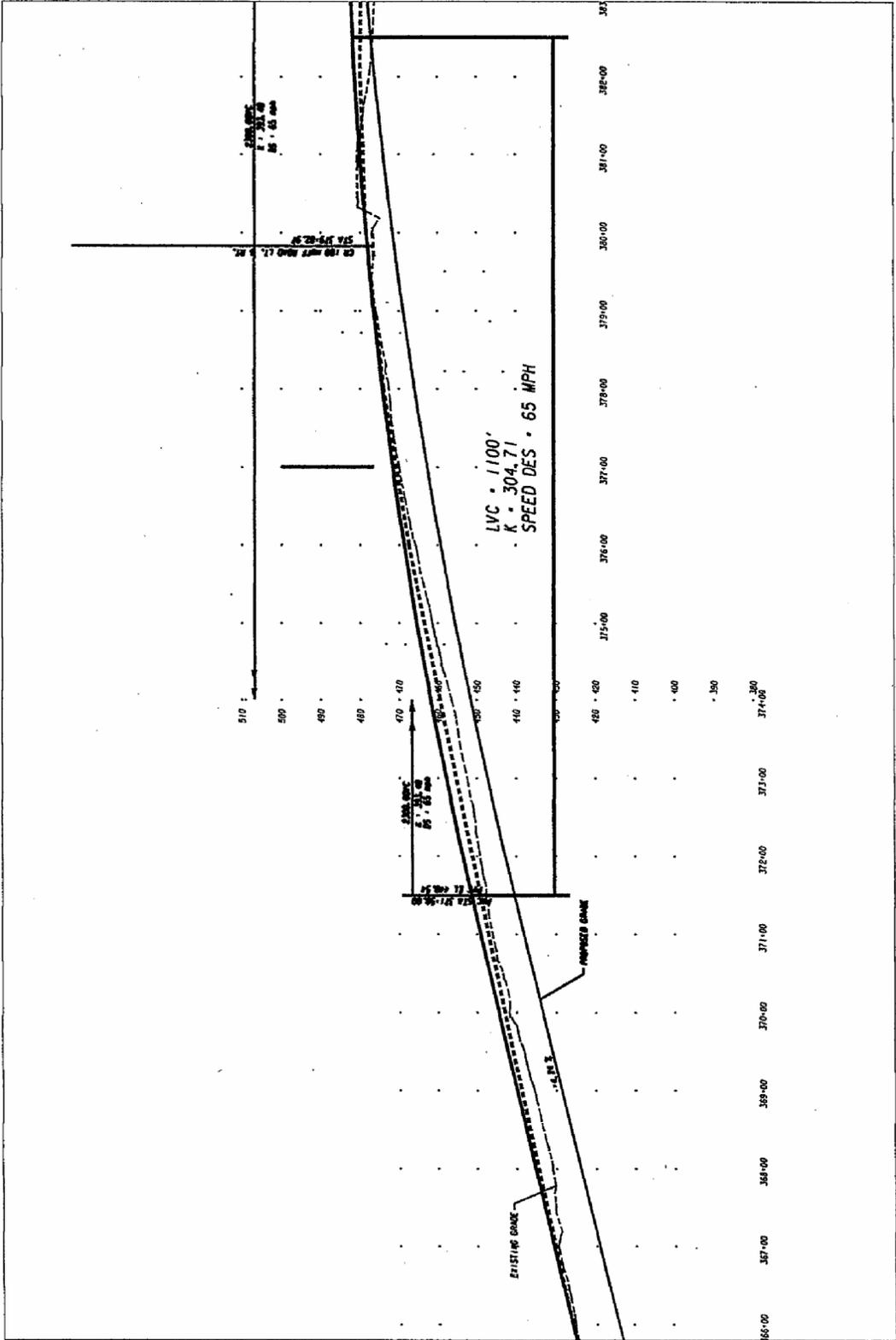
# PROPOSED CHANGE SKETCH/DETAIL



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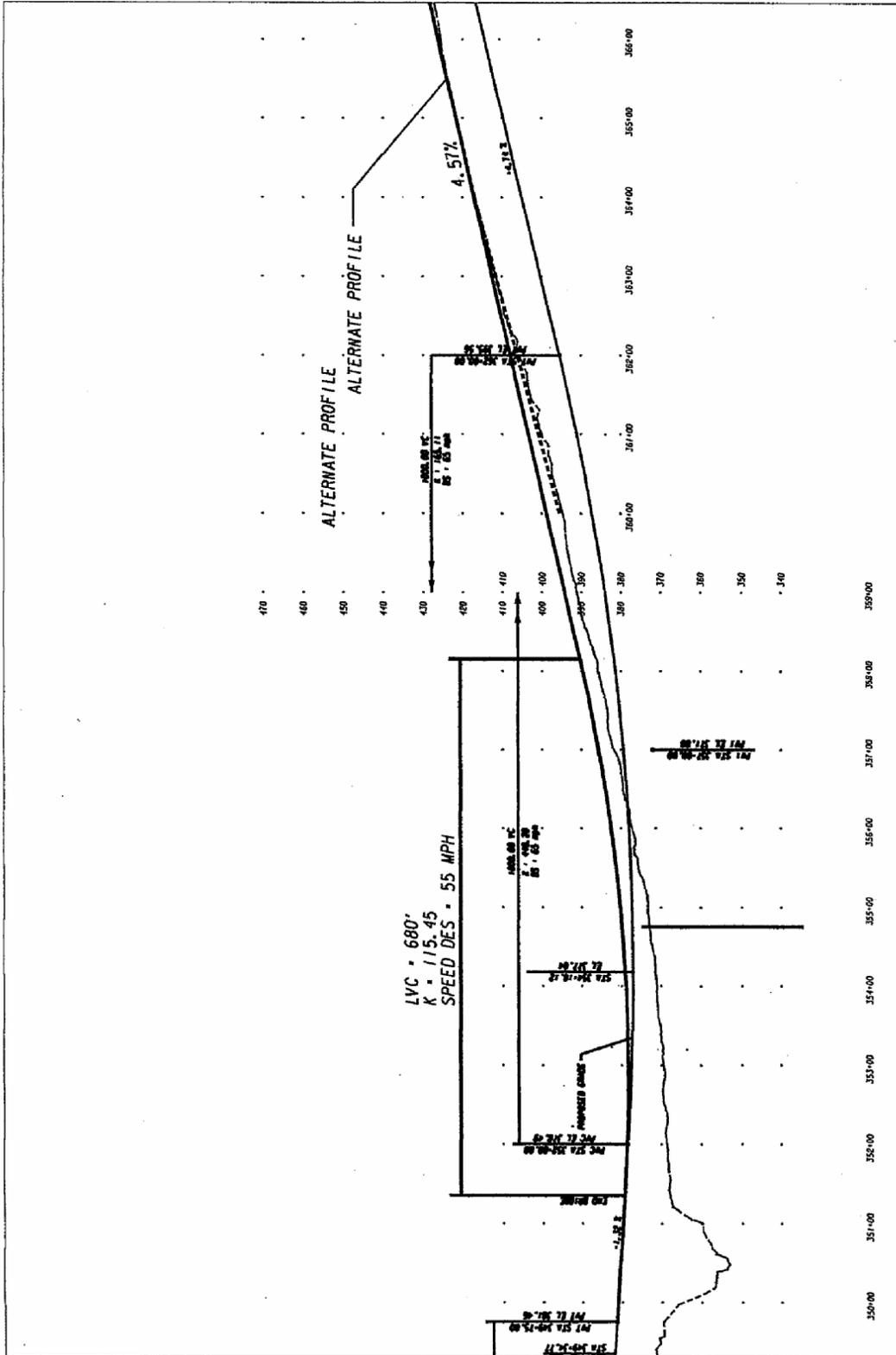


# PROPOSED CHANGE SKETCH/DETAIL



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# PROPOSED CHANGE SKETCH/DETAIL



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## VALUE ENGINEERING PROPOSAL

<b>PROPOSAL NUMBER:</b>	RW-2.0
<b>PAGE NUMBER:</b>	1 of 6

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**PROPOSAL DESCRIPTION:** MODIFY PROFILE TO REDUCE  
EARTHWORK STA. 546+00 TO STA. 628+00  
(IMPROVES CONSTRUCTABILITY AND  
IMPROVES MAINTENANCE OF TRAFFIC  
DURING CONSTRUCTION).

**ORIGINAL DESIGN:** The original design profile utilizes a -1.04% grade tangent approaching the bridge over Little Brier Creek resulting in cuts approaching 40 feet. North of the bridge at 1.92% grade result in cuts up to 28 feet.

**NOTE:** the 864,654 CY of earthwork used on the project estimate is actually 1,760,000 CY based on actual earthwork volume.

**PROPOSED CHANGE:** The proposed change recommendation holds the profile on the bridge over Little Brier Creek and immediately south of the bridge uses a -5% grade and two vertical 55 mph curves (1 sag & 1 crest) to reduce the cut section from sta. 557+00 to sta. 572+00. North of the bridge use a 4% grade and two 65 mph ea. Vertical curves (1 sag & 1 crest) in lieu of 1.92% grade.

This more closely follows the existing profile reducing earthwork by 310,000 cy.

	INITIAL COST	OPERATING COST	TOTAL LIFE- CYCLE COST
<b>ORIGINAL DESIGN:</b>	\$ 17,864,000	\$	\$ 17,864,000
<b>PROPOSED CHANGE:</b>	\$ 14,717,500	\$	\$ 14,717,500
		<b>SAVINGS:</b>	\$ 3,146,500

**ADVANTAGES/DISADVANTAGES/JUSTIFICATION**

<b>PROPOSAL NUMBER:</b>	RW-2.0
<b>PAGE NUMBER:</b>	2 of 6

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**ADVANTAGES:**

- Total life cycle cost savings of \$3,146,500.
- Traffic management during construction is not complicated.
- Total construction time will be less.
- Helps reduce waste and balance earthwork.
- Reduces ROW requirements.
- Reduces disturbed area & erosion control.

**DISADVANTAGES:**

Vertical curves meet 55 mph.

**JUSTIFICATION:**

These grade modifications will greatly reduce the amount of cut and improve constructability especially @ Storey Handle Road. The cut at Story Handle Road is reduced from ± 25 feet to ± 3 feet. The original would have required shoring, temporary pavement, temporary barriers, & detours for maintenance of traffic during construction. Additional ROW or easement would also be needed.

## COST ESTIMATING WORKSHEET

<b>PROPOSAL NUMBER:</b>	RW-2.0
<b>PAGE NUMBER:</b>	3 of 6

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

### ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Unclassified Excavation	1	Cy	1,760,000	7.25	12,760,000
<b>SUBTOTAL:</b>					12,760,000
<b>40% MARK UP:</b>					5,104,000
<b>TOTAL:</b>					17,864,000

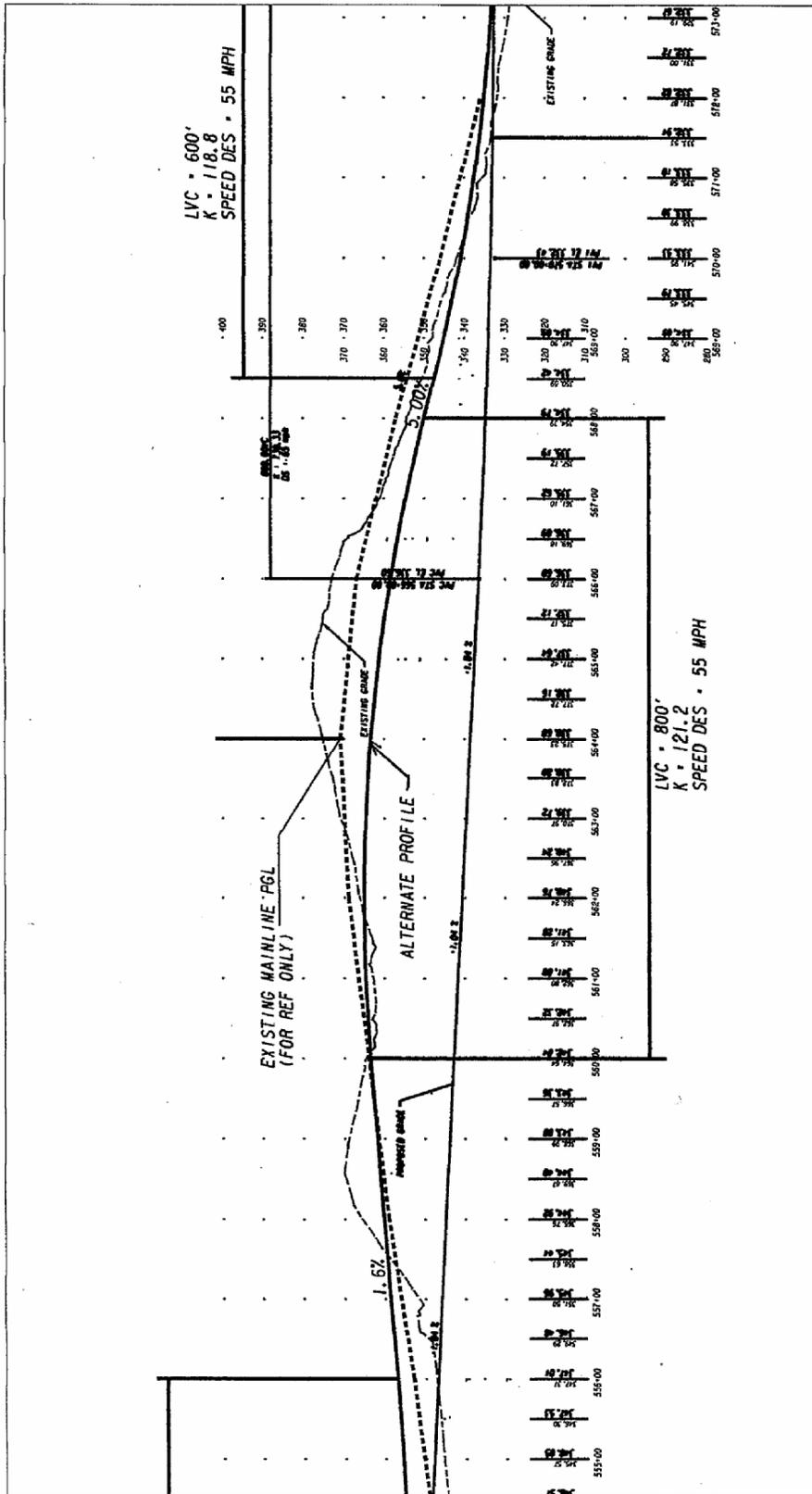
### PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Unclassified Excavation	1	Cy	1,450,000	7.25	10,512,500
<b>SUBTOTAL:</b>					10,512,500
<b>40% MARK UP:</b>					4,205,500
<b>TOTAL:</b>					14,717,500

### SOURCES

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1. Project Cost Estimate</li> <li>2. CES Data Base</li> <li>3. CACES Data Base</li> <li>4. Means Estimating Manual</li> </ul> | <ul style="list-style-type: none"> <li>5. Richardson's Estimating Manual</li> <li>6. Vendor (Specify)</li> <li>7. Other (Specify)</li> </ul> |
|--|--|

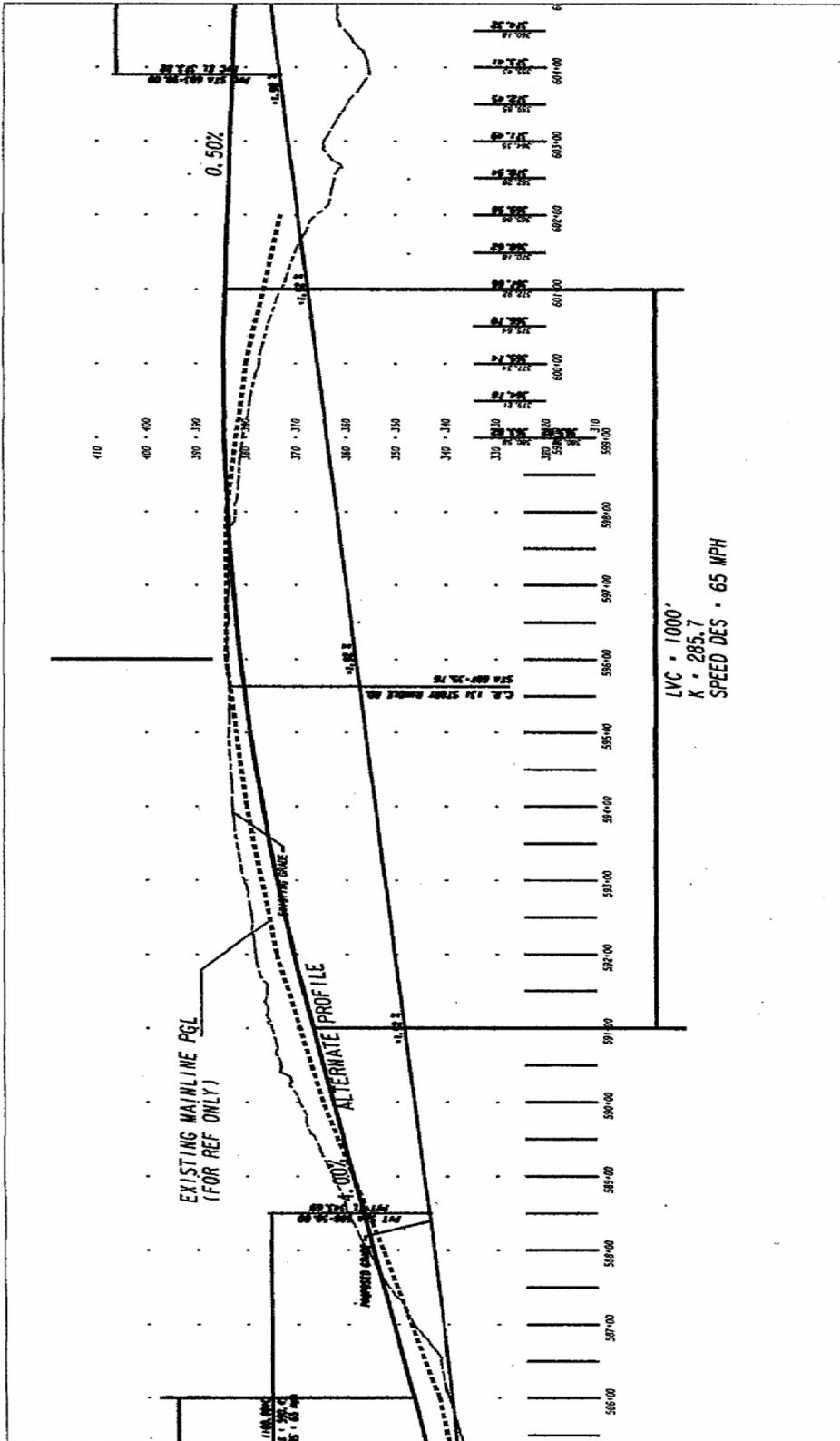
# PROPOSED CHANGE SKETCH/DETAIL



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# PROPOSED CHANGE SKETCH/DETAIL



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## VALUE ENGINEERING PROPOSAL

<b>PROPOSAL NUMBER:</b>	RW-3.0
<b>PAGE NUMBER:</b>	1 of 5

<b>PROJECT TITLE:</b>	WIDENING & RECONSTRUCTION OF SR -17 from SR 296 to Wire Road (Thomson ByPass)
<b>PROJECT LOCATION:</b>	Georgia DOT - Warren & McDuffie Counties, Georgia

<b>PROPOSAL DESCRIPTION:</b>	CHANGE PAVEMENT STRUCTURE TO 8.7% UNDER DESIGN BY REDUCING GRADED AGGREGATE BASE COURSE FROM 12 INCHES TO 10 INCHES.
------------------------------	---

<b>ORIGINAL DESIGN:</b>	The original design calls for 12 inches of graded aggregate base under 440#/sy, 220#/sy, & 135#/sy layers of 25 mm, 19 mm, & 9.5 mm Asphaltic concrete Superpave.
<b>PROPOSED CHANGE:</b>	The proposed change recommendation is to reduce the graded aggregate component of the pavement structure from 12 inches to 10 inches.

	INITIAL COST	OPERATING COST	TOTAL LIFE-CYCLE COST
<b>ORIGINAL DESIGN:</b>	\$ 9,820,929	\$	\$ 9,820,929
<b>PROPOSED CHANGE:</b>	\$ 8,184,107	\$	\$ 8,184,107
		<b>SAVINGS:</b>	\$ 1,636,822

**ADVANTAGES/DISADVANTAGES/JUSTIFICATION**

<b>PROPOSAL NUMBER:</b>	RW-3.0
<b>PAGE NUMBER:</b>	2 of 5

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson Bypass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**ADVANTAGES:**

Total life cycle cost savings of \$1,636,822.  
Placement rate would increase during construction.

**DISADVANTAGES:**

Pavement structure is under designed by 8.7%.  
Assumes overlay within 10 years.

**JUSTIFICATION:**

The original pavement design assumed a soil support value of 3.0 & a lane distribution of factor of 1.0. The recommended pavement design uses a soil support value of 3.5 from the actual soil report with a lane distribution factor of 0.85. The original design is under by 10.6% while the recommended pavement design is only under by 8.7%.

## COST ESTIMATING WORKSHEET

<b>PROPOSAL NUMBER:</b>	RW-3.0
<b>PAGE NUMBER:</b>	3 of 5

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

### ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Graded Aggregate base	1	TON	403,158	17.40	7,014,949
<b>SUBTOTAL:</b>					7,014,949
<b>40% MARK UP:</b>					2,805,980
<b>TOTAL:</b>					9,820,929

### PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Graded Aggregate base	1	TON	335,965	\$17.40	5,845,791
<b>SUBTOTAL:</b>					5,845,791
<b>40% MARK UP:</b>					2,338,316
<b>TOTAL:</b>					8,184,107

### SOURCES

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1. Project Cost Estimate</li> <li>2. CES Data Base</li> <li>3. CACES Data Base</li> <li>4. Means Estimating Manual</li> </ul> | <ul style="list-style-type: none"> <li>5. Richardson's Estimating Manual</li> <li>6. Vendor (Specify)</li> <li>7. Other (Specify)</li> </ul> |
|--|--|

# ORIGINAL CALCULATIONS

<b>PROPOSAL NUMBER:</b>	RW-3.0
<b>PAGE NUMBER:</b>	4 of 5

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

## FLEXIBLE PAVEMENT DESIGN ANALYSIS

RW-3.0

Project: EDS-545 (43) County: Warren/McDuffie  
P.I. no.: 222590  
Description: US 1/SR 17 from N. SR 296 to N. of CR 311/Wire Rd Thomson Bypass

ORIGINAL

**Traffic Data** (NOTE: AADTs are one-way)  
24-hour Truck Percentage: 14.00%  
AADT initial year of design period: 3,300 vpd (2007)  
AADT final year of design period: 5,400 vpd (2027)  
Mean AADT (one-way): 4,350 vpd

**Design Loading**  
Mean AADT      LDF      Trucks      18-K ESAL      Total Daily Loads  
4,350      \*      1.00      \*      0.140      \*      1.06      =      647

Total predicted design period loading = 647 \* 20 \* 365 = 4,723,100

**Design Data**  
Terminal Serviceability Index: 2.50  
Soil Support: 3.00  
Regional Factor: 1.60

### PROPOSED FLEXIBLE PAVEMENT STRUCTURE

Material	Thickness		Structural Coefficient	Structural Value
	mm	(in.)		
9.5 mm Superpave	40	(1.57) ✓	0.0173	0.69
19 mm Superpave	50	(1.97) ✓	0.0173	0.86
25 mm Superpave	24	(0.94) ✗	0.0173	0.42
	76	(2.99) ✗	0.0118	0.90
Graded Aggregate Base	300	(11.81) ✓	0.0063	1.89

Required SN = 5.32

Proposed SN = 4.76

>>> Proposed pavement is 10.6% Underdesign <<<

Remarks: Preliminary for Concept Validation

Prepared by Bobby Hilliard, Project Manager

October 15, 2002  
Date

Recommended State Road Design Engineer

Date

Approved Chief Engineer

Date

# PROPOSED CHANGE CALCULATIONS

<b>PROPOSAL NUMBER:</b>	RW-3.0
<b>PAGE NUMBER:</b>	5 of 5

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

## FLEXIBLE PAVEMENT DESIGN ANALYSIS

PAGE 5/5

**Project:** EDS-545(43)  
**P.I. no.:** 222590  
**Description:** SR 17

**County:** Warren, McDuffie

RW-3.0

Proposed

**Traffic Data** (NOTE: AADTs are one-way)

24-hour Truck Percentage: 14.00%  
AADT initial year of design period: 3,300 vpd (2007)  
AADT final year of design period: 5,400 vpd (2027)  
Mean AADT (one-way): 4,350 vpd

**Design Loading**

Mean AADT	LDF	Trucks	18-K ESAL	Total Daily Loads
4,350 *	0.85 *	0.140 *	0.95	= 493

Total predicted design period loading = 493 \* 20 \* 365 = 3,598,900

**Design Data**

Terminal Serviceability Index: 2.50  
Soil Support: 3.50  
Regional Factor: 1.60

### PROPOSED FLEXIBLE PAVEMENT STRUCTURE

Material	Thickness Inches	Thickness (mm)	Structural Coefficient	Structural Value
1.5 mm Superpave	1.25	(32)	0.44	0.55
19 mm Superpave	2.00	(51)	0.44	0.88
25 mm Superpave	1.25	(32)	0.44	0.55
Graded Aggregate Base	2.75	(70)	0.30	0.83
Graded Aggregate Base	10.00	(254)	0.16	1.60

Required SN = 4.83

Proposed SN = 4.41

>>> Proposed pavement is 8.7% Underdesign <<<

**Remarks:** Test Run for Cost Estimating

**Prepared by** VE Team **Date** August 23, 2006

**Recommended** \_\_\_\_\_ **Date** \_\_\_\_\_  
**State Consultant Design Engineer**

**Approved** \_\_\_\_\_ **Date** \_\_\_\_\_  
**State Pavement Engineer**

## VALUE ENGINEERING PROPOSAL

<b>PROPOSAL NUMBER:</b>	RW-4.0
<b>PAGE NUMBER:</b>	1 of 9

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**PROPOSAL DESCRIPTION:** REDUCED PAVEMENT DEPTH OF OUTSIDE  
PAVED SHOULDERS.

**ORIGINAL DESIGN:** The original design is for full depth pavement section on the outside shoulder/bike lane @ 12" GAB, 440 #/SY of 25 mm, 220 #/sy of 19 mm, and 135 #/SY of 9.5 mm Asphaltic concrete Superpave.

**PROPOSED CHANGE:** The proposed change recommendation is to reduce the outside shoulder pavement thickness to 8" GAB, 440 #/SY of 25 mm, and 135 #/SY of 9.5 mm Asphaltic concrete Superpave.

	INITIAL COST	OPERATING COST	TOTAL LIFE- CYCLE COST
<b>ORIGINAL DESIGN:</b>	\$ 4,078,590	\$	\$ 4,078,590
<b>PROPOSED CHANGE:</b>	\$ 2,881,567	\$	\$ 2,881,567
<b>SAVINGS:</b>			\$ 1,197,023

**ADVANTAGES/DISADVANTAGES/JUSTIFICATION**

<b>PROPOSAL NUMBER:</b>	RW-4.0
<b>PAGE NUMBER:</b>	2 of 9

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**ADVANTAGES:**

Total life cycle cost savings of \$1,197,023.  
Has been successfully used on many GDOT projects historically.  
Meets Design Criteria.  
Provides safety of paved shoulder.  
Provides bicycle lane as needed.

**DISADVANTAGES:**

Would require removal for future outside widening.  
Construction sequence would be slightly different.  
Does not follow guidelines given consultant.

**JUSTIFICATION:**

This recommendation achieves the design width and provides the desired bicycle lane. With low future ADT it is highly unlikely additional lanes would be added to the outside. This approach has also been used successfully on other GDOT projects.

## COST ESTIMATING WORKSHEET

<b>PROPOSAL NUMBER:</b>	RW-4.0
<b>PAGE NUMBER:</b>	3 of 9

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

### ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Graded Aggregate base	1	TON	54,342	17.40	945,551.80
25 mm Superpave	1	TON	18,977	56.65	1,075,047.05
19 mm Superpave	1	TON	9,488	56.90	539,867.20
12.5 mm Superpave	1	TON	5,822	60.60	352,813.20
<b>SUBTOTAL:</b>					2,913,278.25
<b>40% MARK UP:</b>					1,165,311.30
<b>TOTAL:</b>					4,078,589.55

### PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Graded Aggregate base	1	TON	36,230	17.40	630,402.00
25 mm Superpave	1	TON	18,977	56.60	1,075,047.05
12.5 mm Superpave	1	TON	5,822	60.60	352,813.20
<b>SUBTOTAL:</b>					2,058,262.25
<b>40% MARK UP:</b>					823,304.90
<b>TOTAL:</b>					2,881,567.15

### SOURCES

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1. Project Cost Estimate</li> <li>2. CES Data Base</li> <li>3. CACES Data Base</li> <li>4. Means Estimating Manual</li> </ul> | <ul style="list-style-type: none"> <li>5. Richardson's Estimating Manual</li> <li>6. Vendor (Specify)</li> <li>7. Other (Specify)</li> </ul> |
|--|--|

## ORIGINAL CALCULATIONS

<b>PROPOSAL NUMBER:</b>	RW-4.0
<b>PAGE NUMBER:</b>	4 of 9

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

### GAB

11.31 mi x 5280ft/mi x 6.5ft x 1ft=388,159 cu.ft. per side  
 776,318.40 cu.ft. x 140#/cu.ft. / 2000#/ton = 54,342 tons  
 54,342 tons x \$17.40/ton = \$945,550.80

### Asphalt

11.31 mi x 5280ft/mi x 6.5ft x 9 ft<sup>2</sup>/yd<sup>2</sup>=43,130 sy per side  
 25.0 mm=> 86,260 sy x 440#/SY / 2000/ton x \$56.65/ton = \$1,075,047.05  
 19.0 mm=> 86,260 sy x 220#/SY / 2000/ton x \$56.90/ton = \$539,867.20  
 12.5 mm=> 86,260 sy x 135#/SY / 2000/ton x \$60.60/ton = \$352,813.20

Original cost= \$2,913,2278.25

## PROPOSED CHANGE CALCULATIONS

<b>PROPOSAL NUMBER:</b>	RW-4.0
<b>PAGE NUMBER:</b>	5 of 9

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

Eliminate 19 mm Asphalt====→save \$539,867.20

Reduce GAB by a 1/3====→save \$315,148.80

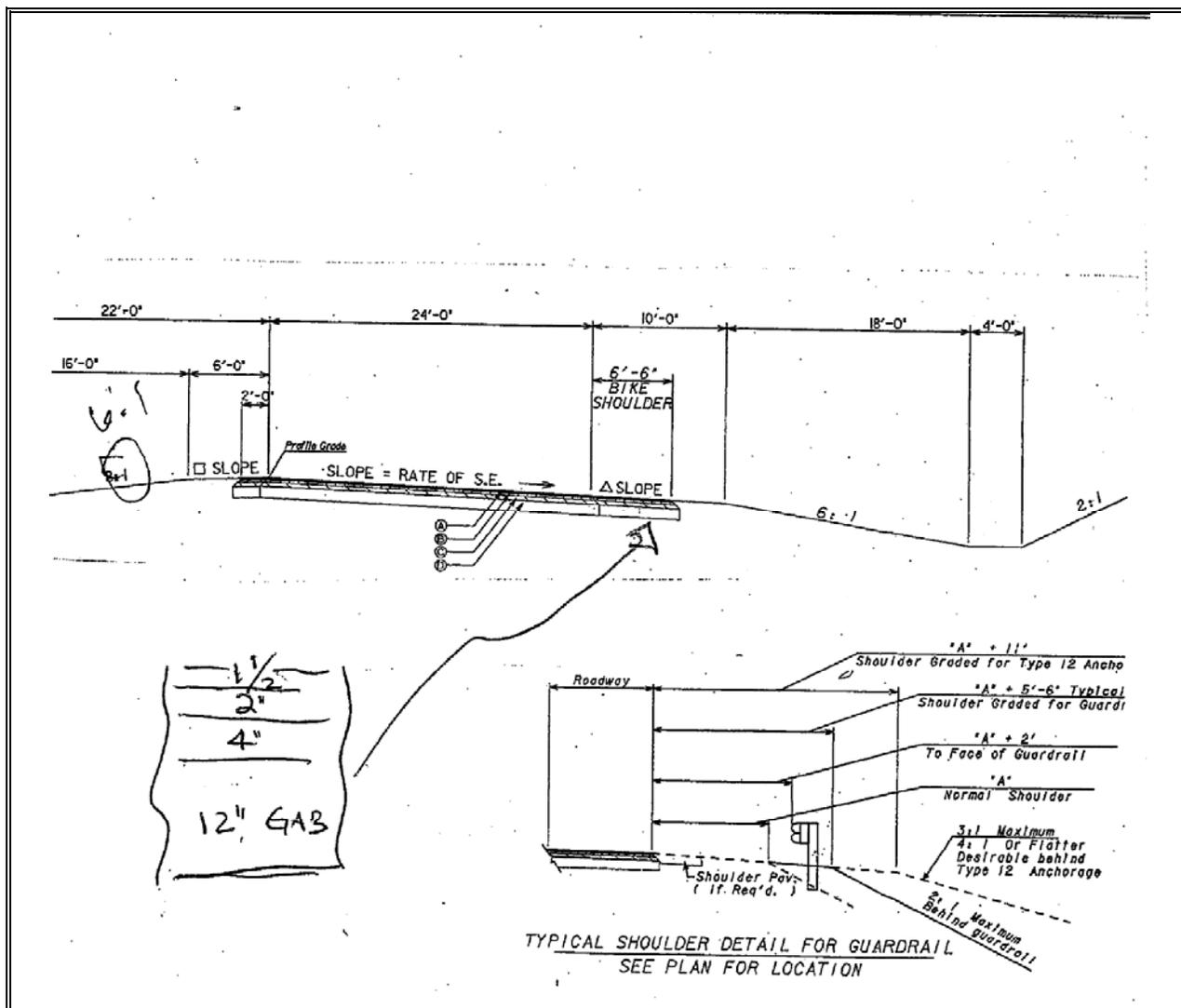
Today's cost savings====→save \$855,016.00

# ORIGINAL DESIGN SKETCH/DETAIL

<b>PROPOSAL NUMBER:</b>	RW-4.0
<b>PAGE NUMBER:</b>	6 of 9

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

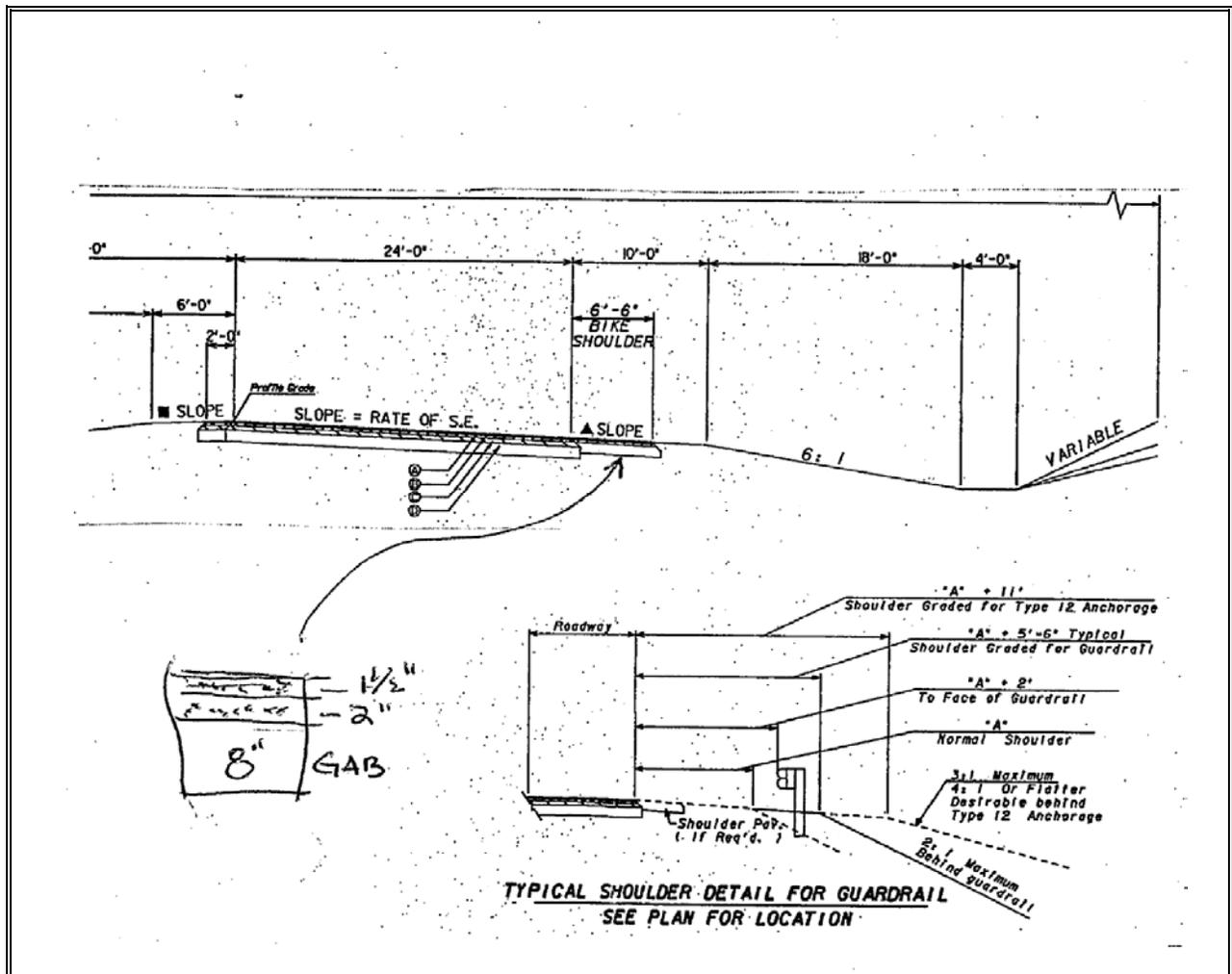


# PROPOSED CHANGE SKETCH/DETAIL

<b>PROPOSAL NUMBER:</b>	RW-4.0
<b>PAGE NUMBER:</b>	7 of 9

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

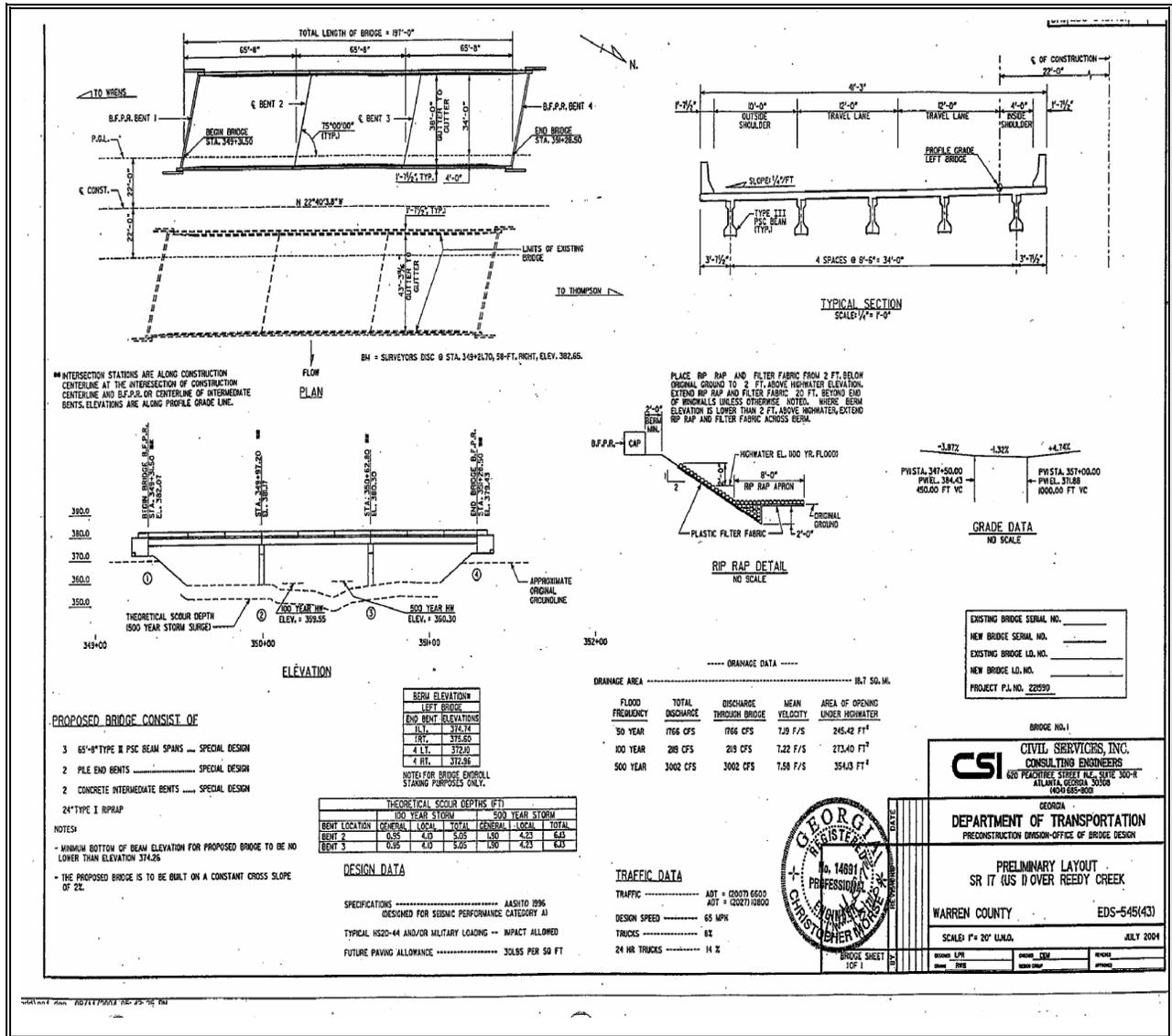


# ORIGINAL DESIGN SKETCH/DETAIL

<b>PROPOSAL NUMBER:</b>	RW-4.0
<b>PAGE NUMBER:</b>	8 of 9

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

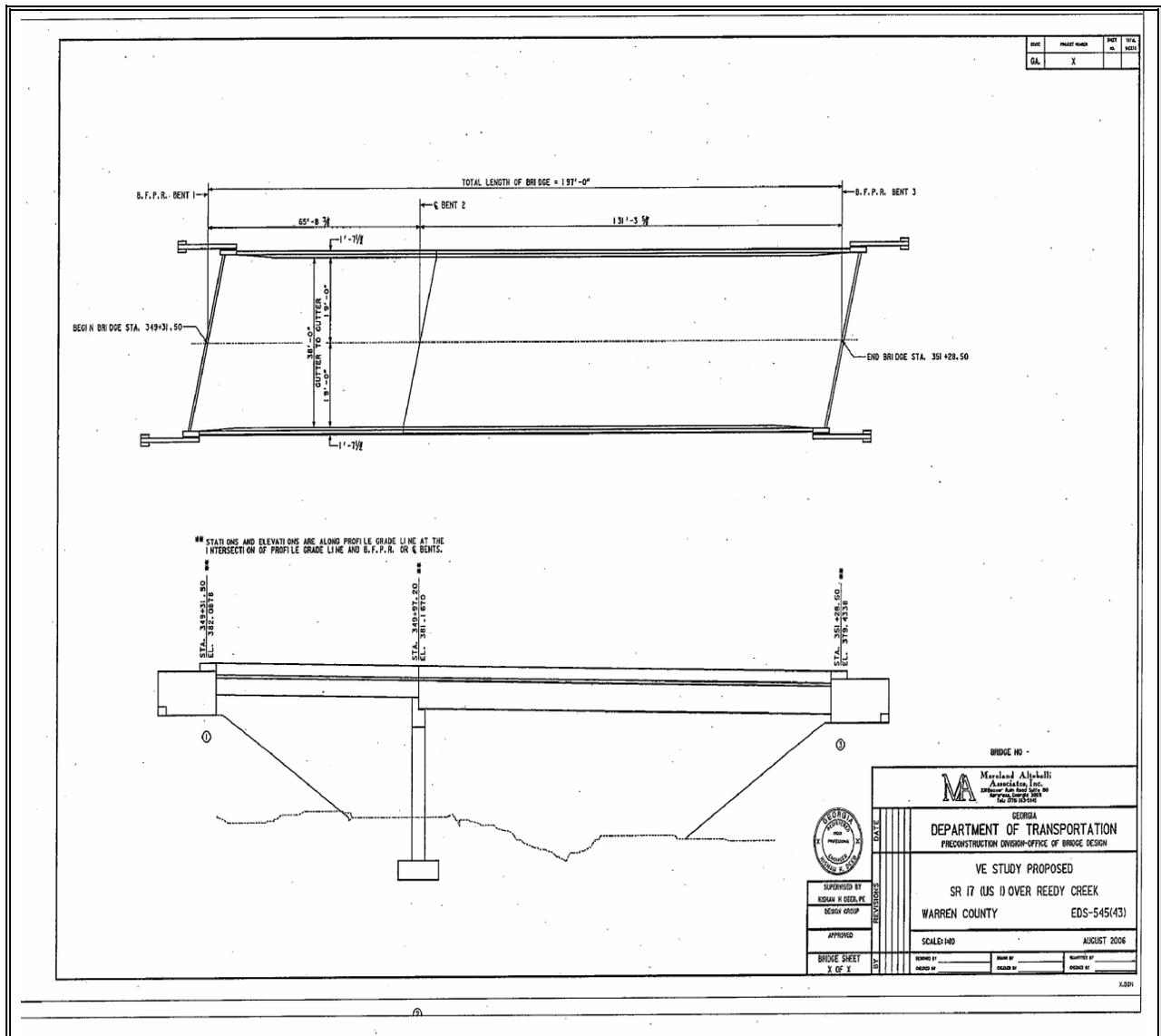


# PROPOSED CHANGE SKETCH/DETAIL

<b>PROPOSAL NUMBER:</b>	RW-4.0
<b>PAGE NUMBER:</b>	9 of 9

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia



## VALUE ENGINEERING PROPOSAL

<b>PROPOSAL NUMBER:</b>	RW-5.0
<b>PAGE NUMBER:</b>	1 of 5

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**PROPOSAL DESCRIPTION:** PROVIDE BICYCLE LANE ON NORTH  
BOUND SHOULDER ONLY & 4 FT PAVED  
OUTSIDE SHOULDER ON SOUTHBOUND  
SIDE.

**ORIGINAL DESIGN:** The original design includes outside paved shoulders, 6.5 feet wide, to be utilized as bicycle lanes.

**PROPOSED CHANGE:** The proposed change recommendation is to construct 6.5 feet wide paved shoulder/bicycle lane on the outside northbound shoulder for two directional bicycle traffic and construct a 4 feet paved shoulder southbound.

**Note: Depth of pavement remains the same as designed. For additional saving by reducing depth of pavement see RW 4.0.**

	INITIAL COST	OPERATING COST	TOTAL LIFE-CYCLE COST
<b>ORIGINAL DESIGN:</b>	\$ 2,039,355	\$	\$ 2,039,355
<b>PROPOSED CHANGE:</b>	\$ 1,257,970	\$	\$ 1,257,970
<b>SAVINGS:</b>			\$ 781,835

**ADVANTAGES/DISADVANTAGES/JUSTIFICATION**

<b>PROPOSAL NUMBER:</b>	RW-5.0
<b>PAGE NUMBER:</b>	2 of 5

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**ADVANTAGES:**

Total life cycle cost savings of \$781,385.  
Acceptable paved shoulder width by AASHTO design.  
Used on routes not on the bridge plan.  
Provides for motor vehicle safety edge ruts.

**DISADVANTAGES:**

Does not meet DOT requirements for bicycle plan.  
Two way bike traffic provides counter flow with vehicular traffic.  
Would require non standard bike signing and marking.  
Violates driver expectations both for vehicle and bicycle operators.

**JUSTIFICATION:**

While the VE Team recognizes this proposed change challenges current GDOT standard for bicycle plan, the resulting cost savings warrant consideration. Also, the anticipated bicycle traffic is almost zero and cyclists often travel in the adjacent through lane to avoid residue collected in the path.

## COST ESTIMATING WORKSHEET

<b>PROPOSAL NUMBER:</b>	RW-5.0
<b>PAGE NUMBER:</b>	3 of 5

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

### ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Graded Aggregate base	1	TON	27,171	17.40	472,779
25 mm Asphaltic Concrete	1	TON	9,489	56.65	537,529
19 mm Asphaltic Concrete	1	TON	4,744	56.90	269,951
12.5 mm Asphaltic Concrete	1	TON	2,911	60.60	176,423
<b>SUBTOTAL:</b>					1,456,682
<b>40% MARK UP:</b>					582,673
<b>TOTAL:</b>					2,039,355

### PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Graded Aggregate base	1	TON	16,721	17.40	290,440
25 mm Asphaltic Concrete	1	TON	5,860	56.65	331,952
19 mm Asphaltic Concrete	1	TON	2,930	56.90	166,708
12.5 mm Asphaltic Concrete	1	TON	1,798	60.60	108,950
<b>SUBTOTAL:</b>					898,550
<b>40% MARK UP:</b>					359,420
<b>TOTAL:</b>					1,257,970

### SOURCES

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Project Cost Estimate</li> <li>2. CES Data Base</li> <li>3. CACES Data Base</li> <li>4. Means Estimating Manual</li> </ol> | <ol style="list-style-type: none"> <li>5. Richardson's Estimating Manual</li> <li>6. Vendor (Specify)</li> <li>7. Other (Specify)</li> </ol> |
|--|--|

## ORIGINAL CALCULATIONS

<b>PROPOSAL NUMBER:</b>	RW-5.0
<b>PAGE NUMBER:</b>	4 of 5

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

### GAB

11.31 mi x 5280ft/mi x 6.5ft x 1ft=388,160 cu.ft. per side  
388,160 cu.ft. x 140#/cu.ft. / 2000#/ton x \$17.40/ton= \$472,779

### Asphalt

11.31 mi x 5280ft/mi x 6.5ft x 9 ft<sup>2</sup>/yd<sup>2</sup>=43,130 sy per side  
25.0 mm=> 43,130 sy x 440#/sy / 2000/ton x \$56.65/ton = \$537,529  
19.0 mm=> 43,130 sy x 220#/sy / 2000/ton x \$56.90/ton = \$269,951  
12.5 mm=> 43,130 sy x 135#/sy / 2000/ton x \$60.60/ton = \$176,423

Original cost= \$1,456,682

## PROPOSED CHANGE CALCULATIONS

<b>PROPOSAL NUMBER:</b>	RW-5.0
<b>PAGE NUMBER:</b>	5 of 5

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

### GAB

11.31 mi x 5280ft/mi x 4x 1ft=238,867 cu.ft.

238,867 cu.ft. x 140#/cu.ft. / 2000#/ton x \$17.40/ton= \$290,940

### Asphalt

11.31 mi x 5280ft/mi x 4ft x 9 ft<sup>2</sup>/yd<sup>2</sup>=26,635 sy

25.0 mm=> 26,635 sy x 440#/sy / 2000/ton x \$56.65/ton = \$331,952

19.0 mm=> 26,635 sy x 220#/sy / 2000/ton x \$56.90/ton = \$166,708

12.5 mm=> 26,635 sy x 135#/sy / 2000/ton x \$60.60/ton = \$108,950

Proposed change cost= \$898,550

## VALUE ENGINEERING PROPOSAL

<b>PROPOSAL NUMBER:</b>	RW-8.0
<b>PAGE NUMBER:</b>	1 of 2

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**PROPOSAL DESCRIPTION:** COORDINATE DESIGN WITH THOMSON  
BYPASS PROJECT.

**ORIGINAL DESIGN:** The original design includes reconstruction of the Thomson Bypass/Wire Road intersection. The construction schedule for the Bypass project precedes the SR 17 Project by 2 years and is currently in ROW acquisition.

**PROPOSED CHANGE:** The proposed change is to reconstruct the Thomson Bypass/SR 17 intersection with the bypass project to include all approach lanes and signalization.

	INITIAL COST	OPERATING COST	TOTAL LIFE- CYCLE COST
<b>ORIGINAL DESIGN:</b>			
<b>PROPOSED CHANGE:</b>			
<b>SAVINGS:</b>			Design Suggestion

**ADVANTAGES/DISADVANTAGES/JUSTIFICATION**

<b>PROPOSAL NUMBER:</b>	RW-8.0
<b>PAGE NUMBER:</b>	2 of 2

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**ADVANTAGES:**

Potential savings using today’s prices.  
Does not inconvenience traveling public twice in the same area.  
Utilization of higher capacity intersection longer.  
Probable accident reduction i.e. improved safety.

**DISADVANTAGES:**

Would require redesign work for Bypass project.  
Would Require increased ROW acquisition for the Bypass Project.

**JUSTIFICATION:**

The reconstruction of the intersection will occur as part of either the SR 17 or the Bypass Project. Since the Bypass project occurs earlier in time, the intersection should be reconstructed as part of that project.



**ADVANTAGES/DISADVANTAGES/JUSTIFICATION**

<b>PROPOSAL NUMBER:</b>	RW-10.0
<b>PAGE NUMBER:</b>	2 of 2

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 to Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**ADVANTAGES:**

- Improves safety and reduces the accident potential.
- Less travel time for traveling vehicles.
- Increased motorist visibility in both directions.
- Optimizes turning radii for bigger vehicles.
- Meets AASHTO Guidelines.

**DISADVANTAGES:**

- Increased ROW Cost.
- Increased construction cost.
- Often more difficult to maintain traffic during construction.
- Creates surplus ROW.

**JUSTIFICATION:**

Ideally, the project footprint should be fixed in such a manner as to maximize safety. Typically, commercial development occurs around major intersections making future realignment prohibitive from a ROW cost standpoint.



**ADVANTAGES/DISADVANTAGES/JUSTIFICATION**

<b>PROPOSAL NUMBER:</b>	RW-13.0
<b>PAGE NUMBER:</b>	2 of 2

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**ADVANTAGES:**

PCC pavement is resistant to rutting & shoring.  
Reduced rutting is desirable to control hydroplaning.  
Reduces long term maintenance at these locations.

**DISADVANTAGES:**

Difficult to maintain traffic during construction.  
Requires two different paving operations.  
Difficult to repair PCC pavement.  
Initial construction cost increased.  
Future resurfacing will require milling to tie in asphalt.

**JUSTIFICATION:**

Placing PCC pavement would virtually eliminate pavement maintenance in the intersection for about 30 yrs.



**ADVANTAGES/DISADVANTAGES/JUSTIFICATION**

<b>PROPOSAL NUMBER:</b>	SB-1.0
<b>PAGE NUMBER:</b>	2 of 5

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**ADVANTAGES:**

Total life cycle cost savings of \$84,990.  
Better Hydrological opening.  
Less drift at piers since is eliminated.  
Less wetland impact during construction due to elimination of one intermediate pier.  
Less construction time.  
Less cost.  
Less materials and forming.  
Less cofferdams.

**DISADVANTAGES:**

Spans are not symmetrical.  
Span arrangement is dissimilar to existing.

**JUSTIFICATION:**

Improved construction time, less materials, reduced cost, better hydrology and less environmental impacts are the drivers for this design change.

## COST ESTIMATING WORKSHEET

<b>PROPOSAL NUMBER:</b>	SB-1.0
<b>PAGE NUMBER:</b>	3 of 5

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

### ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
3-span bridge	7-GDOT	Lump	1	Lump	728,190
<b>SUBTOTAL:</b>					728,190
<b>40% MARK UP:</b>					291,276
<b>TOTAL:</b>					1,019,466

### PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
2-span bridge	7-GDOT	Lump	1	Lump	667,483
<b>SUBTOTAL:</b>					667,483
<b>40% MARK UP:</b>					266,993
<b>TOTAL:</b>					934,476

### SOURCES

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1. Project Cost Estimate</li> <li>2. CES Data Base</li> <li>3. CACES Data Base</li> <li>4. Means Estimating Manual</li> </ul> | <ul style="list-style-type: none"> <li>5. Richardson's Estimating Manual</li> <li>6. Vendor (Specify)</li> <li>7. Other (Specify)</li> </ul> |
|--|--|

# ORIGINAL DESIGN CALCULATIONS

<b>PROPOSAL NUMBER:</b>	SB-1.0
<b>PAGE NUMBER:</b>	4 of 5

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**Cost Estimate**

3 Span  
Type III / Endroll

Project : Ready Creek  
 Project Number : 0  
 Made By : HHD      Date : Aug-06  
 Checked By:       Date :

Tag	Pay Item	Description	Quantity	Unit	Unit Cost	Cost
3	600-1006	SUPERSTR CONCRETE, CL AA, BR NO-	205.6	CY	\$858.88	\$176,603
4	600-3101	CLASS A CONCRETE	211.6	CY	\$560.53	\$118,591
9	500-0100	GROOVED CONCRETE	1028.0	SY	\$4.94	\$5,078
10	525-1000	COFFERDAM	2.00	EA	\$26,075.34	\$52,151
11	500-2100	CONCRETE BARRIER	394.0	LF	\$40.50	\$15,957
12	511-3000	SUPERSTR REINF STEEL, BR NO-	54894.9	LB	\$1.40	\$76,573
13	511-1000	BAR REINF STEEL	48545.3	LB	\$0.85	\$39,563
16	607-9003	PSC BEAMS, AASHTO TYPE III, BR NO -	985.0	LF	\$126.98	\$125,075
8	522-1000	SHORING	1.0	EA	\$49,500.00	\$49,500
25	520-2218	PILING, PSC, 18 IN SQ	840.0	LF	\$47.20	\$39,648
43	603-2024	STN DUMPED RIP RAP, TP 1, 24 IN	627	SY	\$43.10	\$27,030
44	603-7000	PLASTIC FILTER FABRIC	627.1	SY	\$3.88	\$2,421

Bridge Sub Total = **\$728,190**  
 Unit Cost (\$ / sq ft) = **\$90**

5% Mobilization	\$36,410
5% MOT	\$36,410
2% Contingency	\$14,684

**Total Bridge Cost = \$815,574**

Deck Area (sq ft) = BL (BW) = 8126  
 Unit Cost (\$ / sq ft) = \$100

## PROPOSED CHANGE CALCULATIONS

<b>PROPOSAL NUMBER:</b>	SB-1.0
<b>PAGE NUMBER:</b>	5 of 5

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

<p><b>Cost Estimate</b> 2 Span Type III-BT 72/ Endroll</p>	<p><b>Project :</b> Reedy Creek  <b>Project Number :</b> 0  <b>Made By :</b> HHD      <b>Date :</b> Aug-06  <b>Checked By :</b>      <b>Date :</b></p>																																																																																																		
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Tag</th> <th style="text-align: left;">Pay Item</th> <th style="text-align: left;">Description</th> <th style="text-align: right;">Quantity</th> <th style="text-align: left;">Unit</th> <th style="text-align: right;">Unit Cost</th> <th style="text-align: right;">Cost</th> </tr> </thead> <tbody> <tr><td>3</td><td>500-1006</td><td>SUPERSTR CONCRETE, CL AA, BR NO-</td><td style="text-align: right;">218.8</td><td>CY</td><td style="text-align: right;">\$858.88</td><td style="text-align: right;">\$187,918</td></tr> <tr><td>4</td><td>500-3101</td><td>CLASS A CONCRETE</td><td style="text-align: right;">115.6</td><td>CY</td><td style="text-align: right;">\$560.53</td><td style="text-align: right;">\$64,796</td></tr> <tr><td>9</td><td>500-0100</td><td>GROOVED CONCRETE</td><td style="text-align: right;">1028.0</td><td>SY</td><td style="text-align: right;">\$4.94</td><td style="text-align: right;">\$5,078</td></tr> <tr><td>10</td><td>525-1000</td><td>COFFERDAM</td><td style="text-align: right;">1.00</td><td>EA</td><td style="text-align: right;">\$26,075.34</td><td style="text-align: right;">\$26,075</td></tr> <tr><td>11</td><td>500-2100</td><td>CONCRETE BARRIER</td><td style="text-align: right;">394.0</td><td>LF</td><td style="text-align: right;">\$40.50</td><td style="text-align: right;">\$15,957</td></tr> <tr><td>12</td><td>511-3000</td><td>SUPERSTR REINF STEEL, BR NO-</td><td style="text-align: right;">58199.2</td><td>LB</td><td style="text-align: right;">\$1.40</td><td style="text-align: right;">\$81,479</td></tr> <tr><td>13</td><td>511-1000</td><td>BAR REINF STEEL</td><td style="text-align: right;">25431.6</td><td>LB</td><td style="text-align: right;">\$0.85</td><td style="text-align: right;">\$21,617</td></tr> <tr><td>20</td><td>507-9032</td><td>PSC BEAMS, AASHTO, BULB TEE, 72 in, BR NO -</td><td style="text-align: right;">657.0</td><td>LF</td><td style="text-align: right;">\$173.86</td><td style="text-align: right;">\$114,228</td></tr> <tr><td>8</td><td>522-1000</td><td>SHORING</td><td style="text-align: right;">1.0</td><td>EA</td><td style="text-align: right;">\$49,500.00</td><td style="text-align: right;">\$49,500</td></tr> <tr><td>25</td><td>520-2218</td><td>PILING, PSC, 18 IN SQ</td><td style="text-align: right;">630.0</td><td>LF</td><td style="text-align: right;">\$47.20</td><td style="text-align: right;">\$29,736</td></tr> <tr><td>16</td><td>507-9003</td><td>PSC BEAMS, AASHTO TYPE III, BR NO -</td><td style="text-align: right;">328</td><td>LF</td><td style="text-align: right;">\$126.98</td><td style="text-align: right;">\$41,649</td></tr> <tr><td>43</td><td>603-2024</td><td>STN DUMPED RIP RAP, TP 1, 24 IN</td><td style="text-align: right;">627</td><td>SY</td><td style="text-align: right;">\$43.10</td><td style="text-align: right;">\$27,030</td></tr> <tr><td>44</td><td>603-7000</td><td>PLASTIC FILTER FABRIC</td><td style="text-align: right;">627.1</td><td>SY</td><td style="text-align: right;">\$3.86</td><td style="text-align: right;">\$2,421</td></tr> </tbody> </table>	Tag	Pay Item	Description	Quantity	Unit	Unit Cost	Cost	3	500-1006	SUPERSTR CONCRETE, CL AA, BR NO-	218.8	CY	\$858.88	\$187,918	4	500-3101	CLASS A CONCRETE	115.6	CY	\$560.53	\$64,796	9	500-0100	GROOVED CONCRETE	1028.0	SY	\$4.94	\$5,078	10	525-1000	COFFERDAM	1.00	EA	\$26,075.34	\$26,075	11	500-2100	CONCRETE BARRIER	394.0	LF	\$40.50	\$15,957	12	511-3000	SUPERSTR REINF STEEL, BR NO-	58199.2	LB	\$1.40	\$81,479	13	511-1000	BAR REINF STEEL	25431.6	LB	\$0.85	\$21,617	20	507-9032	PSC BEAMS, AASHTO, BULB TEE, 72 in, BR NO -	657.0	LF	\$173.86	\$114,228	8	522-1000	SHORING	1.0	EA	\$49,500.00	\$49,500	25	520-2218	PILING, PSC, 18 IN SQ	630.0	LF	\$47.20	\$29,736	16	507-9003	PSC BEAMS, AASHTO TYPE III, BR NO -	328	LF	\$126.98	\$41,649	43	603-2024	STN DUMPED RIP RAP, TP 1, 24 IN	627	SY	\$43.10	\$27,030	44	603-7000	PLASTIC FILTER FABRIC	627.1	SY	\$3.86	\$2,421	
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	<p><b>Bridge Sub Total = \$667,483</b>  <b>Unit Cost (\$ / sq ft) = \$82</b></p>																																																																																																		
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">5% Mobilization</td> <td style="text-align: right;">\$33,374</td> </tr> <tr> <td>5% MOT</td> <td style="text-align: right;">\$33,374</td> </tr> <tr> <td>2% Contingency</td> <td style="text-align: right;">\$13,350</td> </tr> </table>	5% Mobilization	\$33,374	5% MOT	\$33,374	2% Contingency	\$13,350																																																																																													
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	<p><b>Total Bridge Cost = \$747,581</b></p>																																																																																																		
	<p>Deck Area (sq ft) = BL (BW) = 8126  <b>Unit Cost (\$ / sq ft) = \$92</b></p>																																																																																																		

## VALUE ENGINEERING PROPOSAL

<b>PROPOSAL NUMBER:</b>	SB-2.0
<b>PAGE NUMBER:</b>	1 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**PROPOSAL DESCRIPTION:** OPTIMIZE LITTLE BRIER CREEK BRIDGE W/  
3-SPANS TYPE II PSC BEAMS (72'-0" EA.) ON  
PSC PILE BENTS ILO OF 6-SPANS T-BEAM  
(36'-0" EA.).

**ORIGINAL DESIGN:** The original design proposes the same span arrangements as the existing bridge over Little Brier Creek (Six 36'-0" spans) with T-beam superstructure and five intermediate pile bents.

**PROPOSED CHANGE:** The proposed design intends to optimize the design by utilizing 3-spans Type II (72'-0") in lieu of 6-spans T-Beam (36'-0" EA.). The design will enhance the hydraulic opening by eliminating three intermediate piers which would expedite the construction process as well as reduce cost. Since the difference in elevations between the floodstage and the beam bottom chord is generous a Type II PSC Beam superstructure can be accommodated and not in disagreement with the guidelines. PSC pile bents can be designed for large spans and TYPE II PSC beams with HPC concrete can extend over 70' spans. The change is feasible.

	INITIAL COST	OPERATING COST	TOTAL LIFE- CYCLE COST
<b>ORIGINAL DESIGN:</b>	\$ 1,107,564	\$	\$ 1,107,564
<b>PROPOSED CHANGE:</b>	\$ 859,958	\$	\$ 859,958
		<b>SAVINGS:</b>	\$ 247,606

**ADVANTAGES/DISADVANTAGES/JUSTIFICATION**

<b>PROPOSAL NUMBER:</b>	SB-2.0
<b>PAGE NUMBER:</b>	2 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**ADVANTAGES:**

- Total life cycle cost savings of \$247,606.
- Better Hydrological opening.
- Less drift at piers since they are eliminated.
- Less construction time.
- Less cost.
- Less materials and forming.

**DISADVANTAGES:**

- Span arrangement is dissimilar to existing.

**JUSTIFICATION:**

Improved construction time, less materials, reduced cost and better hydrology are the drivers for this design change.

## COST ESTIMATING WORKSHEET

<b>PROPOSAL NUMBER:</b>	SB-2.0
<b>PAGE NUMBER:</b>	3 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

### ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
6-span bridge	7-GDOT	Lump	1	Lump	791,117
<b>SUBTOTAL:</b>					791,117
<b>40% MARK UP:</b>					316,447
<b>TOTAL:</b>					1,107,564

### PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
3-span bridge	7-GDOT	Lump	1	Lump	604,256
<b>SUBTOTAL:</b>					604,256
<b>40% MARK UP:</b>					241,702
<b>TOTAL:</b>					859,958

### SOURCES

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. Project Cost Estimate</li> <li>2. CES Data Base</li> <li>3. CACES Data Base</li> <li>4. Means Estimating Manual</li> </ol> | <ol style="list-style-type: none"> <li>5. Richardson's Estimating Manual</li> <li>6. Vendor (Specify)</li> <li>7. Other (Specify)</li> </ol> |
|--|--|

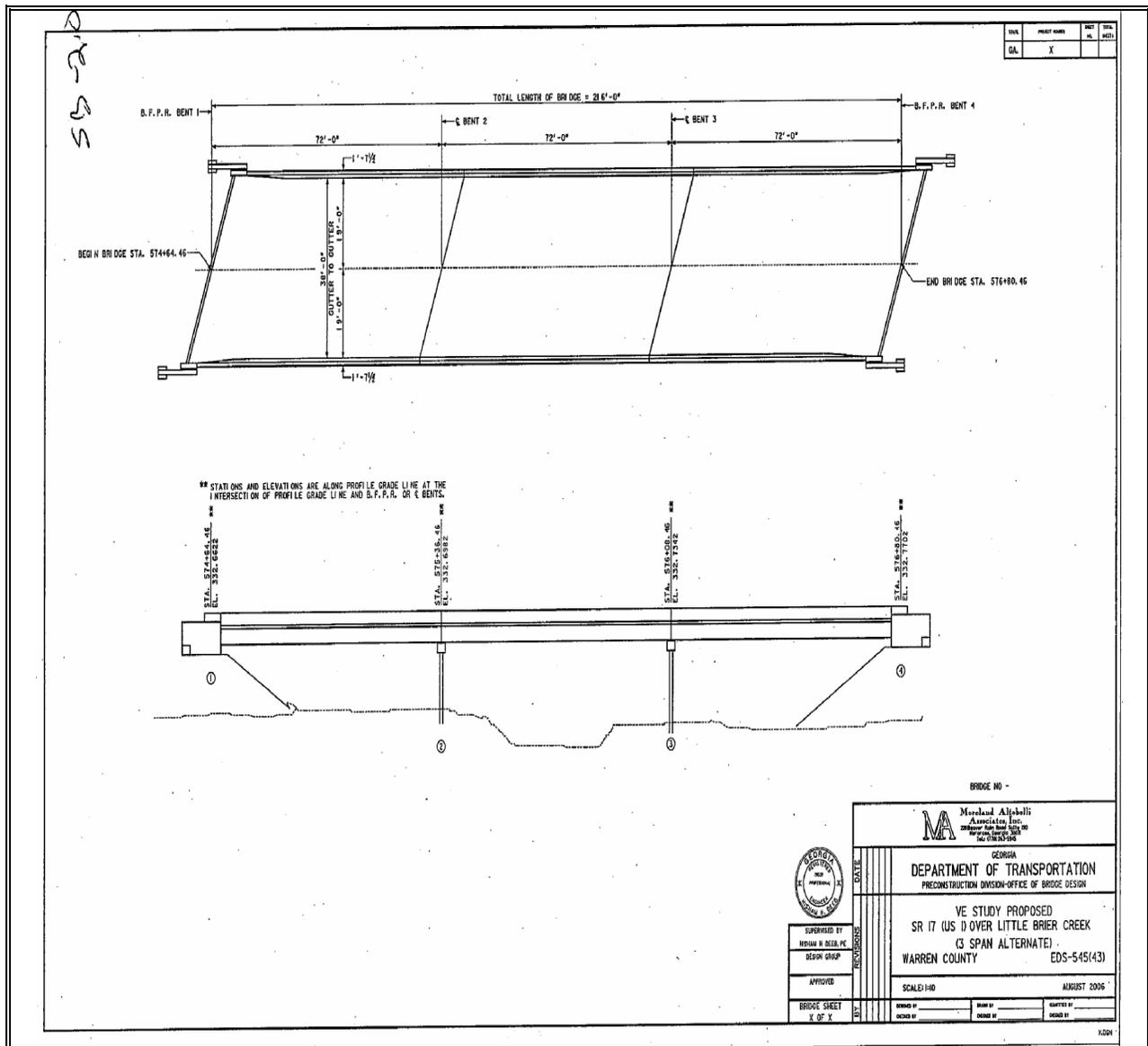


# PROPOSED CHANGE SKETCH/DETAIL

<b>PROPOSAL NUMBER:</b>	SB-2.0
<b>PAGE NUMBER:</b>	5 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia



# ORIGINAL DESIGN CALCULATIONS

<b>PROPOSAL NUMBER:</b>	SB-2.0
<b>PAGE NUMBER:</b>	6 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**Cost Estimate**

6 Span

T-Beam Pile bent

Project : Little River Creek  
 Project Number : 04  
 Made By : RHD Date : Nov-05  
 Checked By: Date :

Tag	Pay Item	Description	Quantity	Unit	Unit Cost	Cost
3	500-1006	SUPERSTR CONCRETE, CL AA, BR NO-	487.9	CY	\$858.88	\$419,042
4	500-3101	CLASS A CONCRETE	102.0	CY	\$560.53	\$57,184
9	500-0100	GROOVED CONCRETE	1104.0	SY	\$4.94	\$5,454
11	500-2100	CONCRETE BARRIER	432.0	LF	\$40.50	\$17,496
12	511-3000	SUPERSTR REINF STEEL, BR NO-	99218.0	LB	\$1.40	\$138,905
13	511-1000	BAR REINF STEEL	8518.0	LB	\$0.85	\$7,240
8	522-1000	SHORING	1.0	EA	\$49,500.00	\$49,500
25	520-2218	PILING, PSC, 18 IN SQ	1050.0	LF	\$47.20	\$49,560
43	603-2024	STN DUMPED RIP RAP, TP 1, 24 IN	995	SY	\$43.10	\$42,895
44	603-7000	PLASTIC FILTER FABRIC	995.2	SY	\$3.86	\$3,842
29	520-5000	PILOT HOLES	0.0	LF	\$186.79	\$0

Bridge Sub Total = \$791,117  
 Unit Cost (\$ / sq ft) = \$89

5% Mobilization	\$39,556
5% MOT	\$39,556
2% Contingency	\$15,822

**Total Bridge Cost = \$886,051**

Deck Area (sq ft) = BL (BW) = 8910  
 Unit Cost (\$ / sq ft) = \$99

# PROPOSED CHANGE CALCULATIONS

<b>PROPOSAL NUMBER:</b>	SB-2.0
<b>PAGE NUMBER:</b>	7 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

<p><b>Cost Estimate</b> 3 Span Type II -Pile Bent/ Endroll</p>	<p>Project : Little Brier Creek Project Number : 0 Made By : HHD Date : Aug-06 Checked By: Date : <i>SB-2.0</i></p>																																																																																				
<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Tag</th> <th style="text-align: left;">Pay Item</th> <th style="text-align: left;">Description</th> <th style="text-align: right;">Quantity</th> <th style="text-align: left;">Unit</th> <th style="text-align: right;">Unit Cost</th> <th style="text-align: right;">Cost</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>500-1008</td> <td>SUPERSTR CONCRETE, CL AA, BR NO-</td> <td style="text-align: right;">205.3</td> <td>CY</td> <td style="text-align: right;">\$858.88</td> <td style="text-align: right;">\$176,303</td> </tr> <tr> <td>4</td> <td>500-3101</td> <td>CLASS A CONCRETE</td> <td style="text-align: right;">45.6</td> <td>CY</td> <td style="text-align: right;">\$560.53</td> <td style="text-align: right;">\$25,559</td> </tr> <tr> <td>9</td> <td>500-0100</td> <td>GROOVED CONCRETE</td> <td style="text-align: right;">1104.0</td> <td>SY</td> <td style="text-align: right;">\$4.94</td> <td style="text-align: right;">\$5,454</td> </tr> <tr> <td>11</td> <td>500-2100</td> <td>CONCRETE BARRIER</td> <td style="text-align: right;">432.0</td> <td>LF</td> <td style="text-align: right;">\$40.50</td> <td style="text-align: right;">\$17,496</td> </tr> <tr> <td>12</td> <td>511-3000</td> <td>SUPERSTR REINF STEEL, BR NO-</td> <td style="text-align: right;">54602.0</td> <td>LB</td> <td style="text-align: right;">\$1.40</td> <td style="text-align: right;">\$76,443</td> </tr> <tr> <td>13</td> <td>511-1000</td> <td>BAR REINF STEEL</td> <td style="text-align: right;">10031.6</td> <td>LB</td> <td style="text-align: right;">\$0.85</td> <td style="text-align: right;">\$8,527</td> </tr> <tr> <td>15</td> <td>507-9002</td> <td>PSC BEAMS, AASHTO TYPE II, BR NO -</td> <td style="text-align: right;">1512.0</td> <td>LF</td> <td style="text-align: right;">\$116.32</td> <td style="text-align: right;">\$175,876</td> </tr> <tr> <td>8</td> <td>522-1000</td> <td>SHORING</td> <td style="text-align: right;">1.0</td> <td>EA</td> <td style="text-align: right;">\$49,500.00</td> <td style="text-align: right;">\$49,500</td> </tr> <tr> <td>25</td> <td>520-2218</td> <td>PILING, PSC, 18 IN SQ</td> <td style="text-align: right;">840.0</td> <td>LF</td> <td style="text-align: right;">\$47.20</td> <td style="text-align: right;">\$39,648</td> </tr> <tr> <td>43</td> <td>603-2024</td> <td>STN DUMPED RIP RAP, TP 1, 24 IN</td> <td style="text-align: right;">627</td> <td>SY</td> <td style="text-align: right;">\$43.10</td> <td style="text-align: right;">\$27,030</td> </tr> <tr> <td>44</td> <td>603-7000</td> <td>PLASTIC FILTER FABRIC</td> <td style="text-align: right;">627.1</td> <td>SY</td> <td style="text-align: right;">\$3.86</td> <td style="text-align: right;">\$2,421</td> </tr> </tbody> </table>	Tag	Pay Item	Description	Quantity	Unit	Unit Cost	Cost	3	500-1008	SUPERSTR CONCRETE, CL AA, BR NO-	205.3	CY	\$858.88	\$176,303	4	500-3101	CLASS A CONCRETE	45.6	CY	\$560.53	\$25,559	9	500-0100	GROOVED CONCRETE	1104.0	SY	\$4.94	\$5,454	11	500-2100	CONCRETE BARRIER	432.0	LF	\$40.50	\$17,496	12	511-3000	SUPERSTR REINF STEEL, BR NO-	54602.0	LB	\$1.40	\$76,443	13	511-1000	BAR REINF STEEL	10031.6	LB	\$0.85	\$8,527	15	507-9002	PSC BEAMS, AASHTO TYPE II, BR NO -	1512.0	LF	\$116.32	\$175,876	8	522-1000	SHORING	1.0	EA	\$49,500.00	\$49,500	25	520-2218	PILING, PSC, 18 IN SQ	840.0	LF	\$47.20	\$39,648	43	603-2024	STN DUMPED RIP RAP, TP 1, 24 IN	627	SY	\$43.10	\$27,030	44	603-7000	PLASTIC FILTER FABRIC	627.1	SY	\$3.86	\$2,421	
Tag	Pay Item	Description	Quantity	Unit	Unit Cost	Cost																																																																															
3	500-1008	SUPERSTR CONCRETE, CL AA, BR NO-	205.3	CY	\$858.88	\$176,303																																																																															
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44	603-7000	PLASTIC FILTER FABRIC	627.1	SY	\$3.86	\$2,421																																																																															
	<p>Bridge Sub Total = \$804,256 Unit Cost (\$ / sq ft) = \$68</p>																																																																																				
<p>5% Mobilization \$30,213 5% MOT \$30,213 2% Contingency \$12,085</p>																																																																																					
	<p><b>Total Bridge Cost = \$676,767</b></p>																																																																																				
	<p>Deck Area (sq ft) = BL (BW) = 8910 Unit Cost (\$ / sq ft) = \$76</p>																																																																																				

## VALUE ENGINEERING PROPOSAL

<b>PROPOSAL NUMBER:</b>	SB-2.1
<b>PAGE NUMBER:</b>	1 of 7

<b>PROJECT TITLE:</b>	WIDENING & RECONSTRUCTION OF SR -17 from SR 296 To Wire Road (Thomson ByPass)
<b>PROJECT LOCATION:</b>	Georgia DOT - Warren & McDuffie Counties, Georgia

<b>PROPOSAL DESCRIPTION:</b>	OPTIMIZE LITTLE BRIER CREEK BRIDGE W/ 2-SPANS BT 54IN BEAMS (108'-0" EA.) ON RC BENT ILO 6-SPANS T-BEAM (36'-0" EA.).
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<b>ORIGINAL DESIGN:</b>	The original design proposes the same span arrangements as the existing bridge over Little Brier Creek (Six 36'-0" spans) with T-beam superstructure and five intermediate pile bents.
<b>PROPOSED CHANGE:</b>	The proposed design intends to optimize the design by utilizing 2-span BT 54in (108'-0" EA.) in lieu of 6-spans T-Beam (36'-0" EA.). The design will enhance the hydraulic opening by eliminating four intermediate piers which would expedite the construction process as well as reduce cost. Since the difference in elevations between the floodstage and the beam bottom chord is generous a BT 54in Beam superstructure can be accommodated and not in disagreement with the guidelines. The change is feasible.

	INITIAL COST	OPERATING COST	TOTAL LIFE-CYCLE COST
<b>ORIGINAL DESIGN:</b>	\$ 1,107,564	\$	\$ 1,107,564
<b>PROPOSED CHANGE:</b>	\$ 963,099	\$	\$ 963,099
		<b>SAVINGS:</b>	\$ 144,465

**ADVANTAGES/DISADVANTAGES/JUSTIFICATION**

<b>PROPOSAL NUMBER:</b>	SB-2.1
<b>PAGE NUMBER:</b>	2 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**ADVANTAGES:**

Total life cycle cost savings of \$144,465.  
Better Hydrological opening.  
Less drift at piers since most are eliminated.  
Less construction time.  
Less cost.  
Less materials and forming.

**DISADVANTAGES:**

Utilization of a cofferdam.  
Span arrangement is dissimilar to existing.

**JUSTIFICATION:**

Improved construction time, less materials, reduced cost, and better hydrology are the drivers for this design change.

## COST ESTIMATING WORKSHEET

<b>PROPOSAL NUMBER:</b>	SB-2.1
<b>PAGE NUMBER:</b>	3 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

### ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
6-span bridge	7-GDOT	Lump	1	Lump	791,117
<b>SUBTOTAL:</b>					791,117
<b>40% MARK UP:</b>					316,447
<b>TOTAL:</b>					1,107,564

### PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
2-span bridge	7-GDOT	Lump	1	Lump	687,928
<b>SUBTOTAL:</b>					687,928
<b>40% MARK UP:</b>					275,171
<b>TOTAL:</b>					963,099

### SOURCES

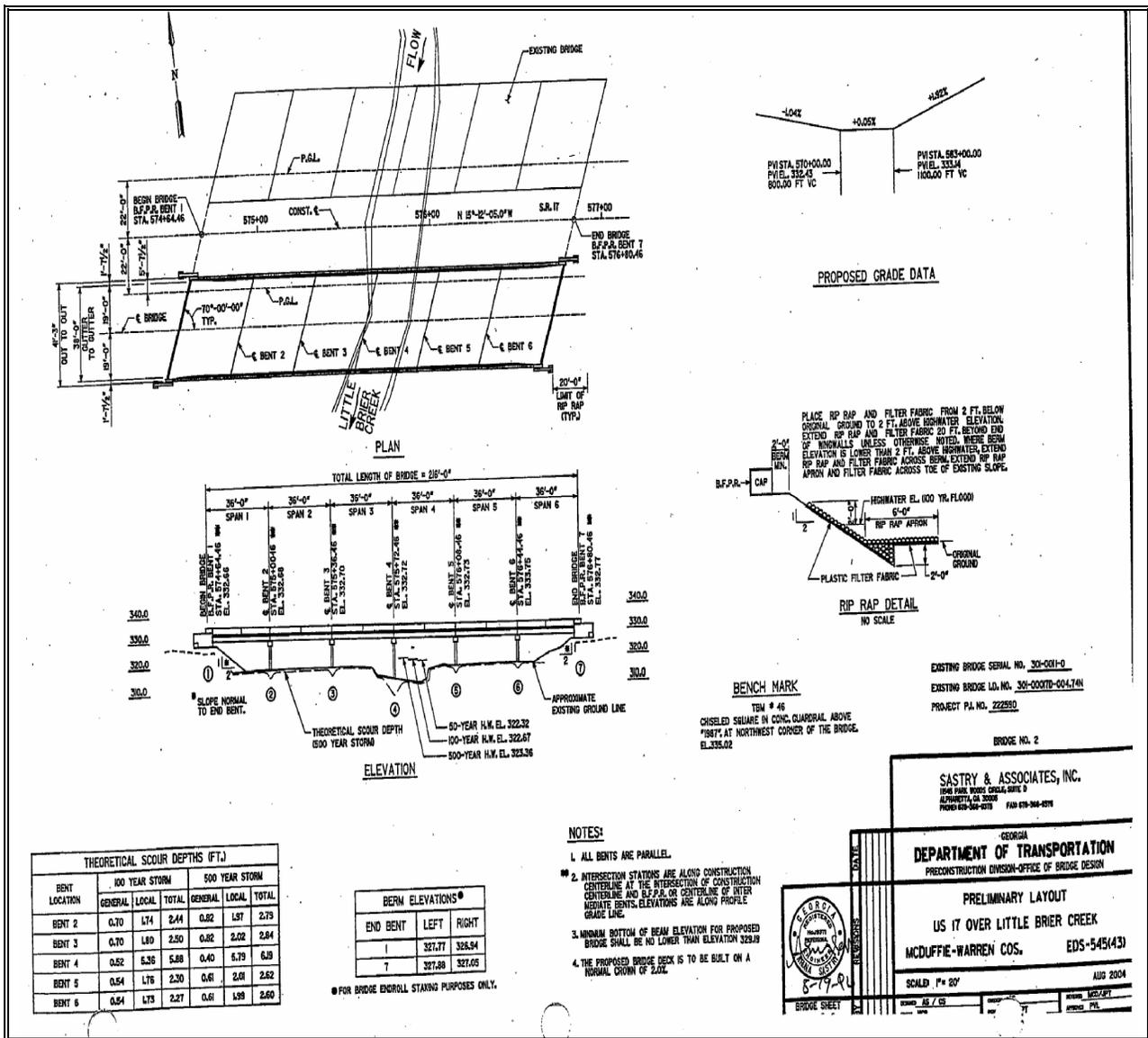
- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>1. Project Cost Estimate</li> <li>2. CES Data Base</li> <li>3. CACES Data Base</li> <li>4. Means Estimating Manual</li> </ul> | <ul style="list-style-type: none"> <li>5. Richardson's Estimating Manual</li> <li>6. Vendor (Specify)</li> <li>7. Other (Specify)</li> </ul> |
|--|--|

# ORIGINAL DESIGN SKETCH/DETAIL

<b>PROPOSAL NUMBER:</b>	SB-2.1
<b>PAGE NUMBER:</b>	4 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia



BENT LOCATION	100 YEAR STORM		500 YEAR STORM	
	GENERAL	LOCAL	GENERAL	LOCAL
BENT 2	0.70	1.74	2.44	0.82
BENT 3	0.70	1.80	2.50	0.82
BENT 4	0.52	1.35	1.88	0.40
BENT 5	0.54	1.75	2.30	0.61
BENT 6	0.54	1.73	2.27	0.61

END BENT	LEFT	RIGHT
1	327.77	328.54
7	327.88	327.65

- NOTES:**
1. ALL BENTS ARE PARALLEL.
  2. INTERSECTION STATIONS ARE ALONG CONSTRUCTION CENTERLINE AND B.F.P.R. OR CENTERLINE OF RIVER IMMEDIATE BENTS. ELEVATIONS ARE ALONG PROFILE GRADE LINE.
  3. MINIMUM BOTTOM OF BEAM ELEVATION FOR PROPOSED BRIDGE SHALL BE NO LOWER THAN ELEVATION 328.18
  4. THE PROPOSED BRIDGE DECK IS TO BE BUILT ON A NORMAL CROWN OF 2.00%

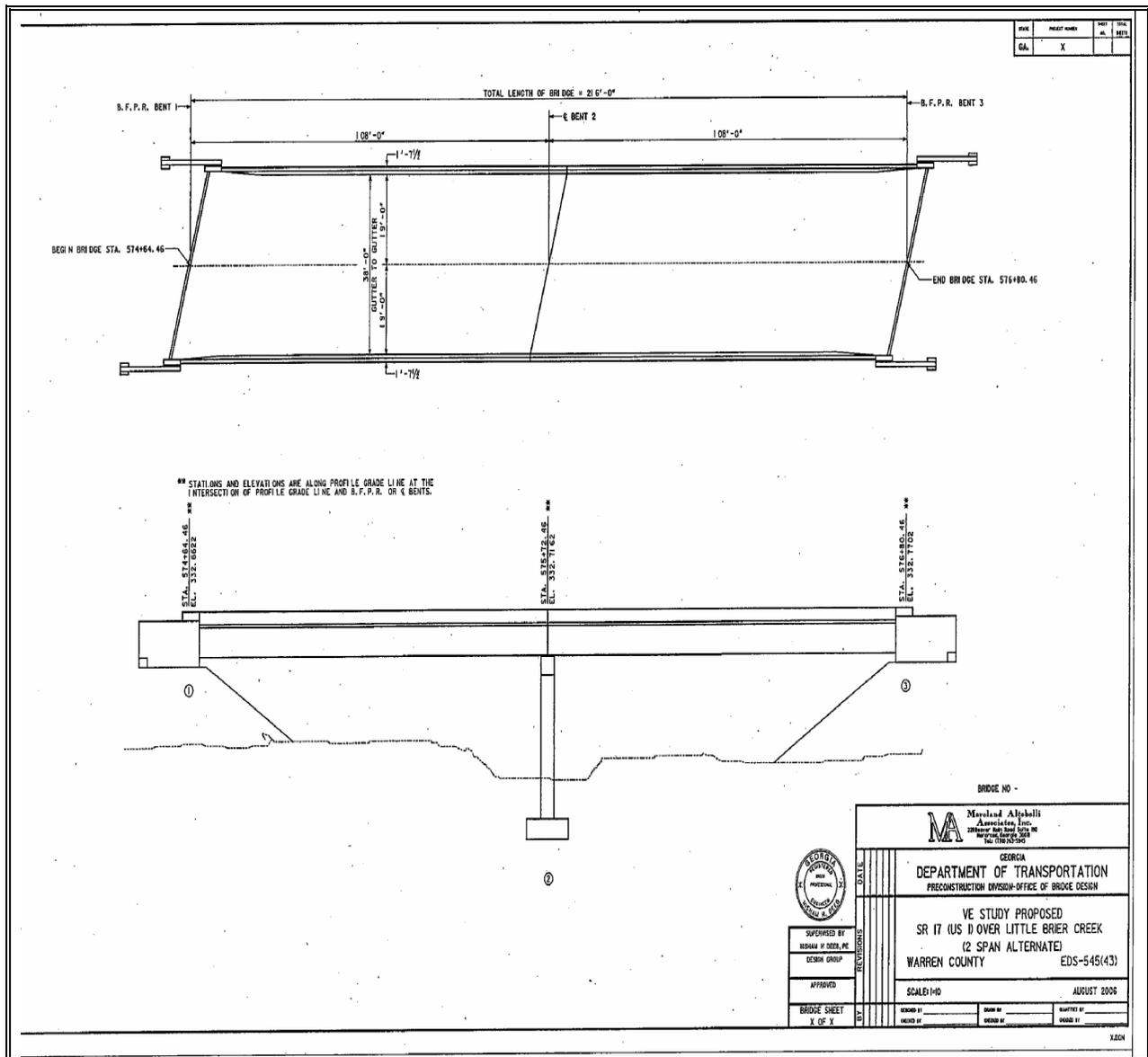
\* FOR BRIDGE ENROLL STAKING PURPOSES ONLY.

# PROPOSED CHANGE SKETCH/DETAIL

<b>PROPOSAL NUMBER:</b>	SB-2.1
<b>PAGE NUMBER:</b>	5 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia



# ORIGINAL DESIGN CALCULATIONS

<b>PROPOSAL NUMBER:</b>	SB-2.1
<b>PAGE NUMBER:</b>	6 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**Cost Estimate**

6 Span  
T-Beam Pile bent

Project : Little River Creek  
 Project Number : 0  
 Made By : HHD Date : Nov-05  
 Checked By: Date : SB-2.1

Tag	Pay Item	Description	Quantity	Unit	Unit Cost	Cost
3	500-1006	SUPERSTR CONCRETE, CL AA, BR NO-	487.9	CY	\$858.88	\$419,042
4	500-3101	CLASS A CONCRETE	102.0	CY	\$560.53	\$57,184
9	500-0100	GROOVED CONCRETE	1104.0	SY	\$4.94	\$5,454
11	500-2100	CONCRETE BARRIER	432.0	LF	\$40.50	\$17,496
12	511-3000	SUPERSTR REINF STEEL, BR NO-	99218.0	LB	\$1.40	\$138,905
13	511-1000	BAR REINF STEEL	8518.0	LB	\$0.85	\$7,240
8	522-1000	SHORING	1.0	EA	\$49,500.00	\$49,500
25	520-2218	PILING, PSC, 18 IN SQ	1050.0	LF	\$47.20	\$49,560
43	603-2024	STN DUMPED RIP RAP, TP 1, 24 IN	995	SY	\$43.10	\$42,895
44	603-7000	PLASTIC FILTER FABRIC	995.2	SY	\$3.86	\$3,842
29	520-5000	PILOT HOLES	0.0	LF	\$186.79	\$0

Bridge Sub Total = \$791,117  
 Unit Cost (\$ / sq ft) = \$89

5% Mobilization	\$39,556
5% MOT	\$39,556
2% Contingency	\$15,822

**Total Bridge Cost = \$886,051**

Deck Area (sq ft) = BL (BW) = 8910  
 Unit Cost (\$ / sq ft) = \$99

## PROPOSED CHANGE CALCULATIONS

<b>PROPOSAL NUMBER:</b>	SB-2.1
<b>PAGE NUMBER:</b>	7 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**Cost Estimate**

2 Span  
BT 54-RC Bent /  
Endroll

Project : Little Brier Creek  
Project Number : 0  
Made By : RHD Date : Aug-06  
Checked By : Date :

Tag	Pay Item	Description	Quantity	Unit	Unit Cost	Cost
3	500-1006	SUPERSTR CONCRETE, CL AA, BR NO-	239.9	CY	\$858.88	\$206,042
4	500-3101	CLASS A CONCRETE	115.6	CY	\$560.53	\$64,796
9	500-0100	GROOVED CONCRETE	1104.0	SY	\$4.94	\$5,454
10	525-1000	COFFERDAM	1.00	EA	\$26,075.34	\$26,075
11	500-2100	CONCRETE BARRIER	432.0	LF	\$40.50	\$17,496
12	511-3000	SUPERSTR REINF STEEL, BR NO-	63812.3	LB	\$1.40	\$89,337
13	511-1000	BAR REINF STEEL	25431.6	LB	\$0.85	\$21,617
18	507-9030	PSC BEAMS, AASHTO, BULB TEE, 54 in, BR NO -	1080.0	LF	\$137.43	\$148,424
8	522-1000	SHORING	1.0	EA	\$49,500.00	\$49,500
25	520-2218	PILING, PSC, 18 IN SQ	630.0	LF	\$47.20	\$29,736
43	603-2024	STN DUMPED RIP RAP, TP 1, 24 IN	627	SY	\$43.10	\$27,030
44	603-7000	PLASTIC FILTER FABRIC	627.1	SY	\$3.86	\$2,421

**Bridge Sub Total = \$687,928**  
**Unit Cost (\$ / sq ft) = \$77**

5% Mobilization	\$34,396
5% MOT	\$34,396
2% Contingency	\$13,759

**Total Bridge Cost = \$770,479**

Deck Area (sq ft) = BL (BW) = 8910  
Unit Cost (\$ / sq ft) = \$86

## VALUE ENGINEERING PROPOSAL

<b>PROPOSAL NUMBER:</b>	SB-4.0
<b>PAGE NUMBER:</b>	1 of 7

<b>PROJECT TITLE:</b>	WIDENING & RECONSTRUCTION OF SR -17 from SR 296 To Wire Road (Thomson ByPass)
<b>PROJECT LOCATION:</b>	Georgia DOT - Warren & McDuffie Counties, Georgia

<b>PROPOSAL DESCRIPTION:</b>	OPTIMIZE BIG BRIER CREEK BRIDGE W/ 2- SPANS TYPE III PSC BEAMS (67'-0") & BT 72 BEAMS (134'-0") ILO 3-SPANS TYPE III PSC BEAMS (67'-0" EA.).
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<b>ORIGINAL DESIGN:</b>	The original design proposes the same span arrangements as the existing bridge over Big Brier Creek (67'-0" spans EA.) with Type III beam superstructure and two intermediate RC column bents.
<b>PROPOSED CHANGE:</b>	The proposed design intends to optimize the design by utilizing 2-spans Type III (67'-0") & BT 72in (134'-0") in lieu of 3-spans Type III (67'-0" EA.). The design will enhance the hydraulic opening by eliminating an intermediate pier and cofferdam which would expedite the construction process as well as reduce cost. Since the difference in elevations between the floodstage and the beam bottom chord is generous a BT beam can be accommodated and not in opposition to the guidelines.

	INITIAL COST	OPERATING COST	TOTAL LIFE-CYCLE COST
<b>ORIGINAL DESIGN:</b>	\$ 1,028,237	\$	\$ 1,028,237
<b>PROPOSED CHANGE:</b>	\$ 941,987	\$	\$ 941,987
		<b>SAVINGS:</b>	\$ 86,250

**ADVANTAGES/DISADVANTAGES/JUSTIFICATION**

<b>PROPOSAL NUMBER:</b>	SB-4.0
<b>PAGE NUMBER:</b>	2 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**ADVANTAGES:**

- Total life cycle cost savings of \$86,250.
- Better Hydrological opening.
- Less drift at piers since eliminated.
- Less construction time.
- Less cost.
- Less materials and forming.
- Less cofferdams.

**DISADVANTAGES:**

- Spans are not symmetrical.
- Span arrangement is dissimilar to existing.

**JUSTIFICATION:**

Improved construction time, less materials, reduced cost and better hydrology are the drivers for this design change.

## COST ESTIMATING WORKSHEET

<b>PROPOSAL NUMBER:</b>	SB-4.0
<b>PAGE NUMBER:</b>	3 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

### ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
3-span bridge	7-GDOT	Lump	1	Lump	734,455
<b>SUBTOTAL:</b>					734,455
<b>40% MARK UP:</b>					293,782
<b>TOTAL:</b>					1,028,237

### PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
2-span bridge	7-GDOT	Lump	1	Lump	672,848
<b>SUBTOTAL:</b>					672,848
<b>40% MARK UP:</b>					269,139
<b>TOTAL:</b>					941,987

### SOURCES

- |                            |                                   |
|----------------------------|-----------------------------------|
| 1. Project Cost Estimate   | 5. Richardson's Estimating Manual |
| 2. CES Data Base           | 6. Vendor (Specify)               |
| 3. CACES Data Base         | 7. Other (Specify)                |
| 4. Means Estimating Manual |                                   |

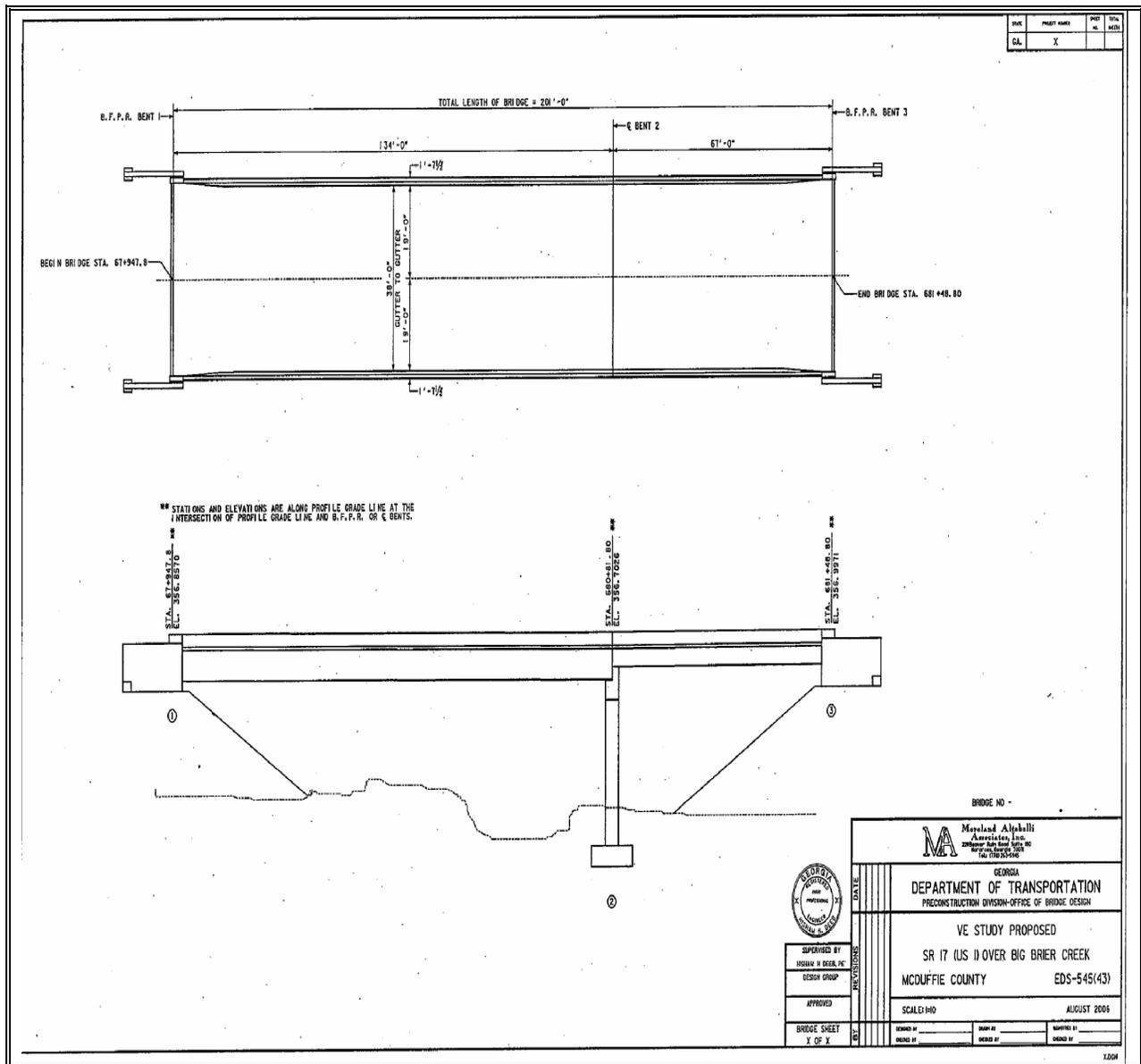


# PROPOSED CHANGE SKETCH/DETAIL

<b>PROPOSAL NUMBER:</b>	SB-4.0
<b>PAGE NUMBER:</b>	5 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia



# ORIGINAL DESIGN CALCULATIONS

<b>PROPOSAL NUMBER:</b>	SB-4.0
<b>PAGE NUMBER:</b>	6 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

**Cost Estimate**

3 Span  
Type III / Endroll

Project: Big River Creek  
 Project Number: 0  
 Made By: HHD Date: Aug 08  
 Checked By: Date:

Tag	Pay Item	Description	Quantity	Unit	Unit Cost	Cost
3	500-1006	SUPERSTR CONCRETE, CL AA, BR NO-	209.8	CY	\$858.88	\$180,189
4	500-3101	CLASS A CONCRETE	209.1	CY	\$560.53	\$117,227
9	500-0100	GROOVED CONCRETE	1044.0	SY	\$4.94	\$5,157
10	525-1000	COFFERDAM	2.00	EA	\$26,075.34	\$52,151
11	500-2100	CONCRETE BARRIER	402.0	LF	\$40.50	\$16,281
12	511-3000	SUPERSTR REINF STEEL, BR NO-	55805.5	LB	\$1.40	\$78,128
13	511-1000	BAR REINF STEEL	46009.9	LB	\$0.85	\$39,108
16	507-9003	PSC BEAMS, AASHTO TYPE III, BR NO -	1005.0	LF	\$126.98	\$127,615
8	522-1000	SHORING	1.0	EA	\$49,500.00	\$49,500
25	520-2218	PILING, PSC, 18 IN SQ	840.0	LF	\$47.20	\$39,648
43	603-2024	STN DUMPED RIP RAP, TP 1, 24 IN	627	SY	\$43.10	\$27,030
44	603-7000	PLASTIC FILTER FABRIC	627.1	SY	\$3.86	\$2,421

Bridge Sub Total = \$734,455  
 Unit Cost (\$ / sq ft) = \$89

5% Mobilization	\$38,723
5% MOT	\$36,723
2% Contingency	\$14,889

**Total Bridge Cost = \$822,590**

Deck Area (sq ft) = BL (BW) = 8291  
 Unit Cost (\$ / sq ft) = \$99

# PROPOSED CHANGE CALCULATIONS

<b>PROPOSAL NUMBER:</b>	SB-4.0
<b>PAGE NUMBER:</b>	7 of 7

**PROJECT TITLE:** WIDENING & RECONSTRUCTION OF SR -17  
from SR 296 To Wire Road (Thomson ByPass)

**PROJECT LOCATION:** Georgia DOT - Warren & McDuffie Counties,  
Georgia

<p><b>Cost Estimate</b> 2 Span Type III-BT 72 / Endroll</p>	<p>Project : Big Brier Creek Project Number : 0 Made By : HED Date : Aug-08 Checked By : Date :</p>																																																																																																																						
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VALUE ENGINEERING TEAM STUDY

CONTACT DIRECTORY

VE STUDY SIGN-IN SHEET

Project No.: EDS-545(43)

County: McDuffie Warren

PI No.: 222590 Date: August 22, 23, 24, 2006

NAME	EMPLOYEE ID NO.	DOT OFFICE OR COMPANY	PHONE NUMBER	EMAIL ADDRESS
Lisa L. Myers	00244168	Engineering Services	404-651-7468	lisa.myers@dot.state.ga.us
M.N. Raad	00729514	OTS&D	404-655-8126	m.nabil.raad@dot.state.ga.us
Lynn Bean	00294454	D2 Area 3	478 625 3681	
JAMES H. SMITH	00286956	D2 CONST	478-558-2381	
Jerry MILGAM		GDOT RW	770 986 1541	
LINDSEY GARDNER	VE TEAM	US COST	757 496 3055	LGARDNER@USCOST.COM
BRAD NALE	VE TEAM	MAAI	770-263-5945	BNALE@MAAI.NET
Laland Owens	VE TEAM	MAAI	706-865-4316	
Sam Deeb	VE TEAM	MAAI	770-263-5945	sdeeb@maai.net
Doug Franks	00809138	GDOT Bridge	404-656-5289	douglas.franks@dot.state.ga.us
RICHARD MARSHALL	00212033	GDOT Construction	404-656-5306	Richard.Marshall@dot.state.ga.us
YUN TANG	00704103	OCD	404 463 0290	
Alexis H. John	00860199	GDOT-CEL	(404) 699-6865	alexis.john@dot.state.ga.us
Dan Miller	A/E	B&E Jackson	(678) 732-3026	dmiller@bejackson.com

VALUE ENGINEERING TEAM STUDY

**FUNCTION ANALYSIS**

<b>Verb</b>	<b>Noun</b>	<b>Verb</b>	<b>Noun</b>
Improve	Flow	Accommodate	
Increase	Capacity	Reduce	Risks
Add	Lanes	Accommodate	Breakdowns
Increase	Speeds	Protect	Species
Reduce	Delays	Minimize	Mitigation
Straighten	Alignment	Segregate	Materials
Improve	Line-of-Sight	Store	Materials
Improve	Visibility	Access	Materials
Enhance	Visibility	Access	Storage
Straighten	Road	Remove	Soils
Reduce	Interruptions	Protect	Wetlands
Reduce	Delays	Relocate	Soils
Identify	Passing		
Accommodate	Passing	Minimize	Erosion
Minimize	Intersections	Contain	Flow
Improve	Intersections	Control	Flow
Reduce	Accidents	Stage	Materials
Improve	Safety	Complete	Corridor
Separate	Lanes	Reduce	Congestion
Add	Lanes	Satisfy	Codes
Install	Medians	Meet	Schedules
Enhance	Definition	Meet	Budget
Communicate	Changes	Reduce	Cost
Assure	Safety	Improve	Functions
Accommodate	Hauling	Satisfy	Agencies
Expedite	Hauling	Utilize	Guidelines
Minimize	Hauling	Construct	Bridge
Control	Traffic	Widen	Bridge
Maintain	Passage	Support	Tourism
Phase	Construction	Access	Recreation
Utilize	Resources	Protect	Species
Maximize	Utilization	Improve	Weaving
Protect	Landmarks	Help	Commuters
Guide	Traffic	Satisfy	Public
Transmit	Information	Satisfy	Commuters
Manage	Traffic	Support	Weight

VALUE ENGINEERING TEAM STUDY

**COST MODEL/DISTRIBUTION**

**WARREN-McDUFFIE COUNTIES GEORGIA**

<b>WIDEN AND RECONSTRUCT</b>	<b>COST \$</b>	<b>% OF TOTAL</b>
	\$19,404,475	35.94%
BASE COURSE		
ASPHALT PAVEMENT	\$9,820,929	18.19%
EARTHWORK - unclassified excavation	\$8,979,239	16.63%
CLEARING AND GRUBBING	\$3,640,000	6.74%
BOX CULVERTS - CONCRETE	\$2,259,844	4.19%
EROSION CONTROL	\$1,680,000	3.11%
BRIDGE STRUCTURES	\$1,666,520	3.09%
GUARDRAIL AND ANCHORS	\$1,414,538	2.62%
STORM DRAINAGE & FLARED END	\$1,195,503	2.21%
LANDSCAPING	\$802,200	1.49%
TRAFFIC CONTROL & FIELD ENGINEER	\$736,168	1.36%
PERMANENT GRASSING	\$689,872	1.28%
SEDIMENT BASINS/CONSTRUCT/REMOVE/MAINTENANCE	\$644,718	1.19%
DROP INLET	\$617,523	1.14%
MULCH FOR PERMANENT GRASSING	\$323,509	0.60%
SIGNS, STRIPS, & LIGHTS	\$199,584	0.37%
LIGHTING	\$168,000	0.31%
<b>TOTALS - Est. dated 8/16/06</b>	<b>\$54,242,622</b>	<b>100.00%</b>

## VALUE ENGINEERING TEAM STUDY

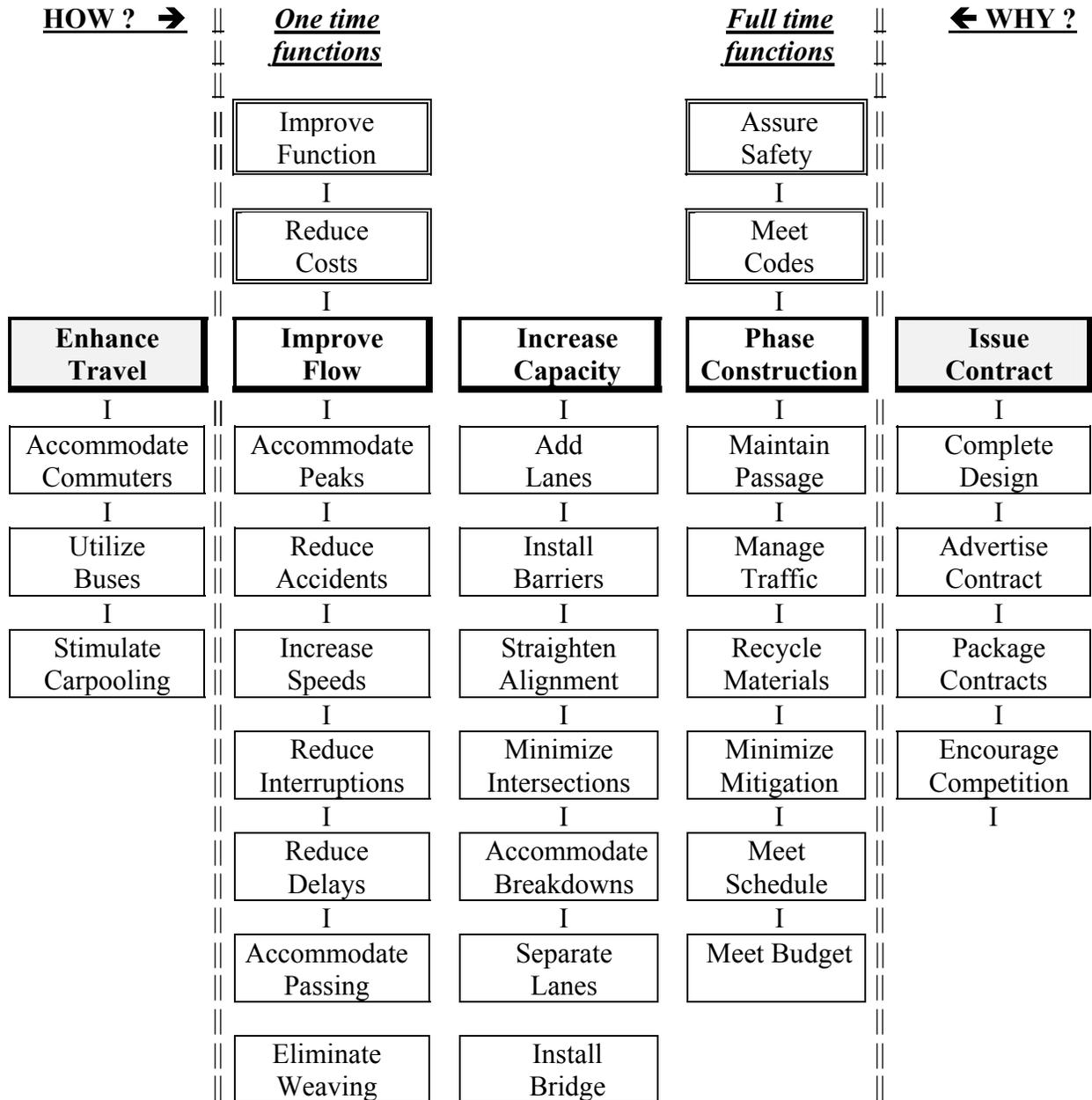
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### F.A.S.T. DIAGRAM

Note: For those unfamiliar with F.A.S.T. diagrams, the functional critical path is shown by the row of heavily lined boxes. Moving to the right should answer HOW the functions are being accomplished; moving to the left should answer the WHY question. Vertical dashed lines define the Project Scope addressed by the V.E. Team. Upper left functions in dotted boxes are Design/Team objectives, and upper right functions in the dotted boxes are inherent project requirements. Functions shown vertically under each heavy box are those, which are intended to be accomplished concurrently with their respective critical path functions. The F.A.S.T. Diagram shown represents only a few key functions extracted from the above list of functions developed by the V.E. Team. There are numerous secondary functions identified in the above list that are necessary and support the primary function of “Enhance Economy”. **The Georgia Governor’s Road Improvement Program (GRIP) system of roadways is to provide multi-lane access to areas of the State of Georgia that are not served by the interstate system. GRIP system stimulates economic growth and development via an improved transportation network.**

VALUE ENGINEERING TEAM STUDY

F.A.S.T. DIAGRAM



## BRAINSTORMING OR SPECULATION

PROJECT TITLE: Widening and Reconstruction of SR-17 {EDS 545 (43)}

PROJECT LOCATION: Warren-McDuffie Counties, Georgia

NUMBER	IDEA ROADWAY (RW)	RANK
1.0	Investigate new profile to reduce earthwork, improve constructability, and save existing pavement	5/5
2.0	Shift horizontal alignment to save existing pavement where ever feasible	5/4
2.1	Shift horizontal alignment to avoid Quarry Pit at Station 500+00 to Station 505+00	5/3
3.0	Reduce pavement thickness in accordance with GDOT criteria	5/4
4.0	Reduce outside shoulder/bike lane pavement thickness	5/3
5.0	Construct one bike lane ilo two bike lanes on opposite sides of road as currently shown	3/5
6.0	Split profile for Northbound vs. Southbound lanes to reduce earthwork	4/5
7.0	Design Variance – Design profile using 5% grade ilo 4%	See 1.0 Above
8.0	Adjust Thompson by-pass project to accommodate proposed SR-17 lanes @ intersection	DS
9.0	Investigate alternate alignment to avoid Quarry Pit @ station 500+00 to 500+05	See 2.1 Above
10.0	Construct/improve intersection angles	DS
11.0	Construct CR 125 on offset alignment to avoid cost for temporary pavement for staging	5/2
12.0	Improve critical intersections the control points for the new profile	See 1.0 Above
13.0	Install concrete pavement section @ critical truck intersections and turning medians	DS
14.0	Cost Estimate: Detour cost of temporary roads/walls/barriers and etc. has been fully addressed in current design	DS

## BRAINSTORMING OR SPECULATION

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PROJECT TITLE: Widening and Reconstruction of SR-17 {EDS 545 (43)}

PROJECT LOCATION: Warren-McDuffie Counties, Georgia

### BRIDGE

- |     |   |     |
|-----|---|-----|
| 1.0 | Optimize Reedy Creek Bridge with two spans Type III PSC beams (65'-8") and BT 72" beams (131'-4") ilo, three spans (Type III) PSC beams (65'-8" each) | 4/3 |
| 2.0 | Optimize Little Brier Creek Bridge with three spans Type II PSC beams (72''-0" on PSC pile bents ilo 6 spans "T" beam (36'-0" each)                   | 3/3 |
| 2.1 | Investigate Little Brier Creek Bridge constructing a two span BT 54" bridge   | 3/3 |
| 4.0 | Optimize Big Brier Creek Bridge with two spans Type III PSC beams (67'-0") and BT 72" beams (134'-0" ilo three spans Type III PSC beams (67'-0" each) | 4/3 |
| 5.0 |   |     |
| 6.0 |   |     |
| 7.0 |   |     |

# VALUE ENGINEERING WORKSHOP AGENDA

**US 1 / SR 17 IMPROVEMENTS EDS – 545 (43)  
FROM SR 296 TO CR 311 WIRE ROAD (12.2 MILES)**

**WARREN & Mc DUFFIE COUNTIES, GEORGIA**

## **24 HOUR - V.E. STUDY**

22-24 August 2006

The value engineering workshop for the subject project will be conducted for three (3) days from 22-24 August 2006, at **Georgia Department of Transportation, Planning Office Conference Room #344, #2 Capitol Square, Atlanta, GA; POC – Lisa Myers @ (404) 651-7468 voice, (404) 463-6161 FAX**

<b>TUESDAY</b>	0800 - 0815	<b>Introduction Phase</b>	Lindsey Gardner, P.E., CVS Team Leader, U.S. Cost, Inc. <b>(V.E. Team Only)</b>
		<i>The VETL will review previous events along with activities planned for the week and outline several areas which may be investigated by the V.E. team.</i>	
	0815 - 1000	<b>Review of Project Plans</b>	V.E. Team Only
		<i>The team members will review the project plans, cost estimates, available calculations, cost models, and cost bar graphs to gain a working knowledge of the project.</i>	
	1000 - 1200	<b>Project Design Briefing</b>	V.E. Team; A/E, GDOT
		<i>The A/E project design manager will discuss the project requirements and the proposed design solution(s) in some detail. Photos of the project site may also be presented for review by the design team. The V.E. team members will ask questions as appropriate to completely understand the project requirements as established by the user and the proposed design solution (both alternatives considered and those recommended by the design team).</i>	

1200-1300      **Lunch**

**TUESDAY (CONTINUED)**

1300 - 1500      **Function Analysis Phase**      V.E. Team

*The V.E. team will discuss the required functions of the facility to meet the mission of the project.*

1500 - 1800      **Creative Phase**  
V.E. Team

*The V.E. team will creatively review, (Brainstorm), and tabulate possible design alternatives for the project. While the designer's solution will serve as the "baseline", the team will identify alternatives not in the recommended solution, but deserving of further investigation. Each project feature will be carefully analyzed with the basic questions in mind:*

- What is the system/item?***
- What does it do(what is its basic function)?***
- What must it do?***
- What does it cost?***
- What is the item worth?***
- What else will do the same, or a better job?***
- What does that alternative cost?***

*During the creative phase, the team will not judge the ideas. The essential requirements for the project, however, must always be considered.*

**WEDNESDAY**

0800 - 1000      **Analysis Phase**      V.E. Team

*During this phase, all of the ideas or alternatives will be ranked according to their potential for life-cycle (25-year) cost reduction and the potential for acceptance by GDOT, Engineering Designers, and other appropriate parties.*

1000 - 1200      **Project Assignments**      VETL



**Estimate Report for file "EDS-545(43)\_2006-08-16"**

Section					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	450000.00	TRAFFIC CONTROL -	450000.00
153-1300	1	EA	75833.87	FIELD ENGINEERS OFFICE TP 3	75833.87
<b>Section Sub Total:</b>					<b>\$525,833.87</b>

Section Temp. Erosion Control & Earthwork					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
100-9999	1	Lump Sum	1200000.00	EROSION CONTROL	1200000.00
163-0230	3500	LB	1.66	TEMPORARY GRASSING	5810.00
163-0240	1120	TN	206.32	MULCH	231078.40
163-0531	46	EA	8652.35	CONSTRUCT AND REMOVE SEDIMENT BASIN, TP 1, STA NO -	398008.10
165-0060	46	EA	1358.81	MAINTENANCE OF TEMPORARY SEDIMENT BASIN, STA NO -	62505.26
201-1500	1	LS	2600000.00	CLEARING & GRUBBING -	2600000.00
205-0001	884654	CY	7.25	UNCLASS EXCAV	6413741.50
<b>Section Sub Total:</b>					<b>\$10,911,143.26</b>

Section Drainage					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
500-3101	2535	CY	541.65	CLASS A CONCRETE	1373082.75
511-1000	270890	LB	0.89	BAR REINF STEEL	241092.10
550-1150	2030	LF	40.05	STORM DRAIN PIPE, 15 IN, H 1-10	81301.50
550-1180	8440	LF	38.76	STORM DRAIN PIPE, 18 IN, H 1-10	327134.40
550-1240	2842	LF	50.15	STORM DRAIN PIPE, 24 IN, H 1-10	142526.30
550-1241	176	LF	55.18	STORM DRAIN PIPE, 24 IN, H 10-15	9711.68
550-1242	364	LF	82.71	STORM DRAIN PIPE, 24 IN, H 15-20	30106.44
550-1300	484	LF	62.56	STORM DRAIN PIPE, 30 IN, H 1-10	30279.04
550-1363	238	LF	127.85	STORM DRAIN PIPE, 36 IN, H 20-25	30428.30
550-1420	200	LF	108.75	STORM DRAIN PIPE, 42 IN, H 1-10	21750.00
550-1480	142	LF	116.00	STORM DRAIN PIPE, 48 IN, H 1-10	16472.00
550-1481	180	LF	152.95	STORM DRAIN PIPE, 48 IN, H 10-15	27531.00
550-4130	6	EA	483.19	FLARED END SECTION 30 IN, SIDE DRAIN	2899.14
550-4136	2	EA	725.00	FLARED END SECTION 36 IN, SIDE DRAIN	1450.00
550-4142	4	EA	1050.00	FLARED END SECTION 42 IN, SIDE DRAIN	4200.00
550-4215	22	EA	684.82	FLARED END SECTION 15 IN, STORM DRAIN	15066.04
550-4218	109	EA	695.86	FLARED END SECTION 18 IN, STORM DRAIN	75848.74
550-4224	44	EA	846.03	FLARED END SECTION 24 IN, STORM DRAIN	37225.32
<b>Section Sub Total:</b>					<b>\$2,468,104.75</b>

Section Incidental items					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
641-1100	180	LF	49.72	GUARDRAIL, TP T	8949.60
641-1200	37000	LF	16.46	GUARDRAIL, TP W	609020.00
641-5001	37	EA	576.99	GUARDRAIL ANCHORAGE, TP 1	21348.63
641-5012	49	EA	1681.31	GUARDRAIL ANCHORAGE, TP12	82384.19
653-1501	132000	LF	0.38	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, WHITE	50160.00
653-1502	132000	LF	0.43	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	56760.00
653-3501	132000	GLF	0.27	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	35640.00
668-2100	125	EA	3528.70	DROP INLET, GP 1	441087.50
700-6910	350	AC	871.61	PERMANENT GRASSING	305063.50
700-7000	1120	TN	61.12	AGRICULTURAL LIME	68454.40
700-7010	910	GL	18.19	LIQUID LIME	16552.90
700-8000	210	TN	324.04	FERTILIZER MIXED GRADE	68048.40
700-8100	17500	LB	1.98	FERTILIZER NITROGEN CONTENT	34650.00
<b>Section Sub Total:</b>					<b>\$1,798,119.12</b>

Section Pavements					
Item Number	Quantity	Units	Unit Price	Item Description	Cost

310-1101	403158	TN	17.40	GR AGGR BASE CRS, INCL MATL	7014949.20
402-3121	126706	TN	56.65	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	7177894.90
402-3141	47515	TN	60.60	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL	2879409.00
402-3192	63353	TN	56.90	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL	3604785.70
413-1000	66681	GL	1.57	BITUM TACK COAT	104689.17
433-1000	540	SY	173.26	REINF CONC APPROACH SLAB	93560.40
<b>Section Sub Total:</b>					<b>\$20,875,288.37</b>

Section Miscellaneous					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
100-9999	1	Lump Sum	120000.00	LIGHTING	120000.00
100-9999	1	Lump Sum	573000.00	LANDSCAPING	573000.00
<b>Section Sub Total:</b>					<b>\$693,000.00</b>

Section Bridges					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
100-9999	1	Lump Sum	418770.00	Little Brier No. 301-00017D-004.74N <i>791,117</i>	418770.00
100-9999	1	Lump Sum	389689.00	Big Brier No. 189-0017-002 01N <i>734,455</i>	389689.00
100-9999	1	Lump Sum	381934.00	Reedy Creek <i>728,190</i>	381934.00
<b>Section Sub Total:</b>					<b>\$1,190,393.00</b>

**Total Estimated Cost: \$38,461,882.37**

<b>Subtotal Construction Cost</b>	<b>\$38,461,882.37</b>
E&C Rate 10.0 %	\$3,846,188.24
Inflation Rate 5.0 % @ 5.0 Years	\$11,688,939.85
<b>Total Construction Cost</b>	<b>\$53,997,010.46</b>
Right Of Way	\$5,186,000.00
ReImb. Utilities	\$226,000.00
<b>Grand Total Project Cost</b>	<b>\$59,409,010.46</b>

# Preliminary Right of Way Cost Estimate

**Phil Copeland**  
 Right of Way Administrator  
 By: Jerry Milligan

Date: August 18, 2006

Project: EDS-545(43)McDuffie / Warren

P.I. Number: 222590

Existing/Required R/W: Varies/Varies

No. Parcels:

Project Termini: SR 17 / US 1 from north of SR 296 Warren to CR 311 / Wire Rd

Project Description: SR 17 Widening Improvement from north of Warren to Wire Road

**Land:**

Res / Ag ( small tract ) 29 acres @ \$ 7,500 / acre	\$ 217,500	
Res / Ag (medium tract ) 49 acres @ \$ 3,000 / acre	147,000	
Res / Ag ( large tract ) 115 acres @ \$ 2,500 / acre	<u>287,500</u>	\$ 652,000

Improvements : Residences, business, misc. site improvement 2,155,000

Relocation: Residential ( 22 )  
 Commercial ( 2 ) 490,000

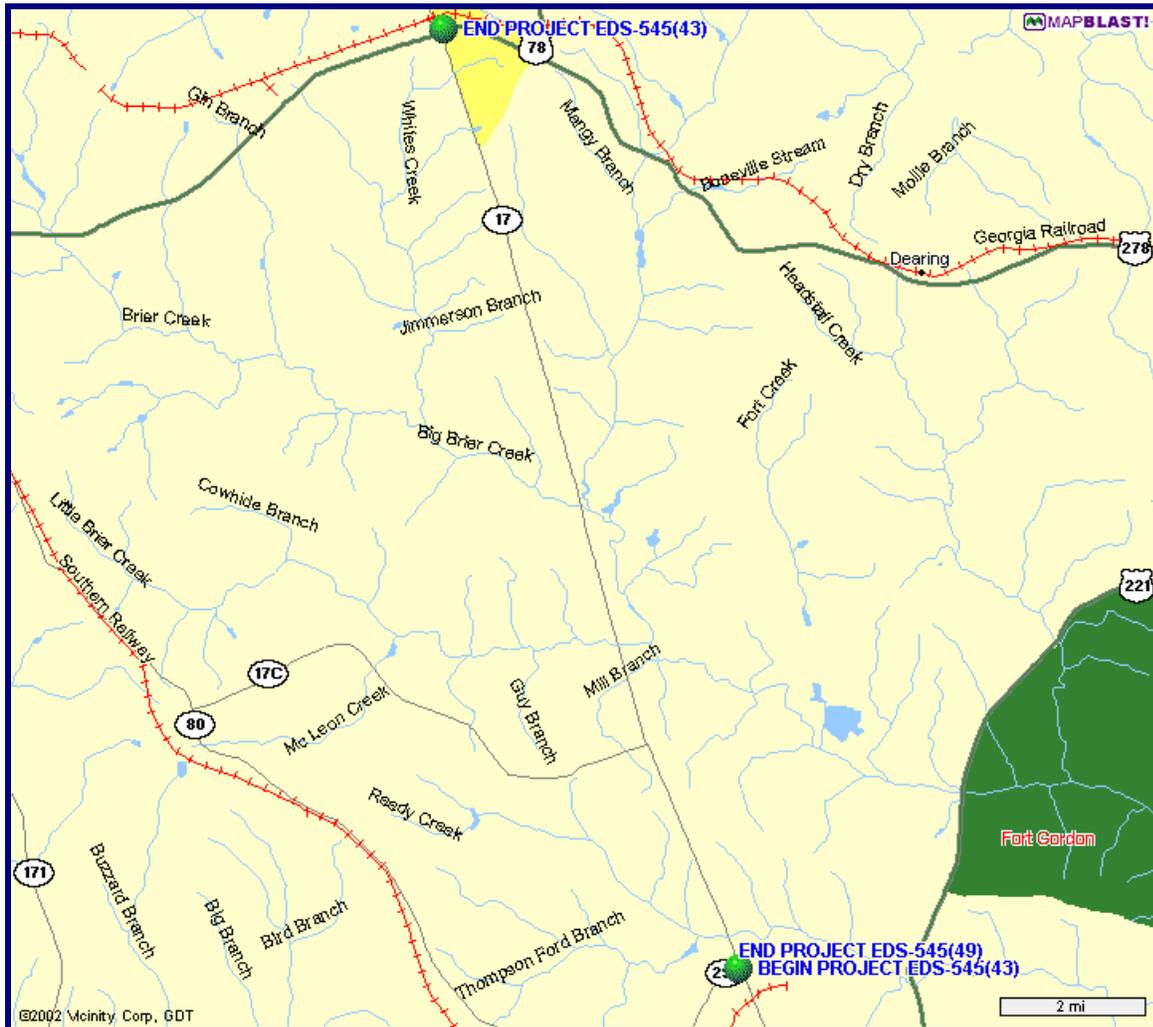
Damage : Cost to Cures ( 0 ) parcel \$  
 Uneconomic remnants ( 9 ) 135,000  
 Proximity ( 5 ) 55,000 \$ 190,000

Net Cost \$ 3,487,000

Net Cost		\$ 3,487,000
Scheduling Contingency	55 %	1,917,850
Adm/Court Cost	60 %	3,242,910
Inflation Factor	40 %	<u>3,459,104</u>
		\$ 12,106,864

**Total Cost \$ 12,106,900**

Project Map: EDS-545 (43):



U.S. 1/S.R. 17 Begins just North of S.R. 296 in Warren County and ends just north of C.R. 311/Wire Road (Thomson Bypass) in M<sup>c</sup>Duffie County.