

# Value Engineering Study Report

**Project – STP -7063 (1)  
Columbia County**



**P.I. No. 250470 Columbia County**

***Old Petersburg Road  
And Old Evans Road Widening***

***Capacity – Safety – HC Access***

**Value Management Team**



**Design Team:**

***EARTH TECH***

**January 2007**



February 13<sup>th</sup>, 2007

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

RE: Submittal of the Final Value Engineering Report  
Old Petersburg Road and Old Evans Road Widening  
Project Task Order No. 2, Contract TOOESV06796  
**Project No. STP-7063(1), P.I. 250470**  
**Columbia County**

Dear Ms. Myers:

Please find enclosed four (4) copies and a CD of our Final Value Engineering Report for the STP-7063(1) project as referenced above.

The Value Engineering Study, which was performed during the period January 22 through January 25, 2007, identified 32 alternative ideas of which 10 are recommended for implementation. The VE Team also identified 6 ideas which are recommended for the design team to consider in their final design. We believe that the 10 alternatives recommended may have a significant positive affect on the project.

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

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

Yours truly,

PBS&J

A handwritten signature in black ink, appearing to read 'Les M. Thomas', written over a faint circular stamp.

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

# *Value Engineering Study Report*

## *Old Petersburg Road And Old Evans Road Widening Columbia County*

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## *Executive Summary*

## INTRODUCTION

This report summarizes the analysis and conclusions by the PBS&J Value Engineering workshop team as they performed a VE study during the period of January 22 - 25, 2007 in Atlanta, Georgia for the Georgia Department of Transportation. The subject of the Value Engineering study was the project for the Old Petersburg Road and Old Evans Road Widening. The design is being performed by Earth Tech Consultants.

## PROJECT DESCRIPTION

The project will widen and improve Old Petersburg Road and Old Evans Road. Old Evans Road will be extended westward to a new location at Washington Road (SR-104) at its intersection with Towne Center Drive (Hereford Farm Road Extension). Also, a new bridge will be constructed to separate the new roadway from the existing CSX Railroad.

This project will distribute traffic at Washington Road and to N. Belair Road by way of Towne Center Drive, an existing five-lane facility. In addition, this project will provide cross-county traffic movement to I-20 by direct linkage to Hereford Farm Road. With the linkage to Old Petersburg/River Watch parkway, Hereford Farm Road would supplement I-20 and Columbia Road (SR-232) in serving cross-county travel demand.

The expected cost of this construction is \$28.53 million. More information about this project may be found in the tabbed section of this report entitled *Project Description*.

## VALUE ENGINEERING PROCESS

The Value Engineering Team followed the six step Value Engineering job plan as promulgated by SAVE International. This six step job plan includes the following:

- Information/Investigative Phase
- Function Analysis Phase
- Speculation/Creative/Brainstorming Phase
- Judgment/ Evaluation Phase
- Development Phase
- Recommendation
- Presentation Phase

This report is a component of the Presentation Phase. As part of the VE workshop in Atlanta, the team made an informal presentation of their results on the last afternoon of the workshop. This report is intended to formalize the workshop results and set the stage for a formal implementation meeting in which alternatives and design suggestions will typically be accepted, accepted with modifications, or rejected for cause. The worksheet

that follows, along with the formally developed alternatives and design suggestions can be used as a “score sheet” for the implementation meeting. It is also included in this report to identify, on a summary basis, the results of the workshop. The reader is encouraged to visit the third tabbed section of this report entitled *Study Results* for a review of the details of the study results. Tabbed section number four, *Project Description*, includes information about the project itself and tabbed section number five, *Value Engineering Process* goes into more detail about the process of Value Engineering, as used in this workshop.

## THE STUDY RESULTS

During the creative phase the VE team identified **32** ideas that appeared to hold potential for either reducing the construction cost, improving the end product and/or reducing the difficulty and time of project construction.

After the judgment/ evaluation phase was completed, 10 alternative ideas and 6 design suggestions remained for further consideration. These alternative ideas and design suggestions may be found, in their documented form, in the tabbed section of this report entitled *Study Results*. The following *Summary of Alternatives and Design Suggestions –Final Disposition* coupled with the documentation of the developed alternatives in the tabbed section of the report entitled *Study Results*, should provide the reader with the information required to fully evaluate the merits of each of the alternatives.

**SUMMARY OF ALTERNATIVES & DESIGN SUGGESTIONS**

**FINAL DISPOSITION**

Georgia Department of Transportation

STP -7063 (1)

P.I. Number: 250470 Columbia County

Alternative Number	Description of Alternative	Initial Cost Savings	Implemented Cost Savings/Disposition	FINAL DISPOSITION
6	Use multi-use trail in stead of a side walk and bike lane	\$318,333		
9	Reduce Gutter width from 30" to 24"	DS		
12	Optimize Pavement Design - Evaluate design to reduce the number of layers	DS		
13	Retaining Walls: For fill walls - move closer to roadway; Delete watt at Sta 98+60 Town Center Road	\$4,100		
14	Delete noise barrier	\$266,105		
15	Modify material for noise barrier	\$261,485		
19	Cross RR at Grade	\$3,186,699		
20	Delete relocation of Lynnwood Avenue	\$312,016		
22	Increase Vertical Curves to reduce fill	DS		
23	Use "Con-span" in lieu of bridge at Reed Creek Crossing	\$200,811		
24	RR crossing: reduce center span to utilize Type 4 girder or other design to reduce height of roadway.	\$332,980		
25	Wyngate Tributary: use equivalent pipe size or "Con-span"	\$44,325		
26	Use HDPE or Corrugated Smooth Wall HDPE Storm drain pipe	DS		
28	Utilize surface drainage where possible (north side)	DS		
29	Slope pavement to median, single stormwater collector	DS		
31	Eliminate sidewalks on side streets	\$34,421		
32	Re-route non-local traffic	DS		

## ***Study Results***

## STUDY RESULTS

### Introduction

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

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

This introductory sheet is followed by a table that summarizes the Alternatives and Design Suggestions documents that follow shortly thereafter. It should be noted that the alternatives that are included, which have cost estimates attached are not necessarily representative of the final cost outcome for each alternative. Some of these alternatives have components that are mutually exclusive so they may not be added together.

The users of this report are asked to consider these alternatives and design suggestions as a smorgasbord of choices for selection and use as the project moves forward. The enclosed *Summary of Alternatives & Design Suggestions* may also be used as a “score sheet” within the bounds of an implementation meeting.

### Cost Calculations

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

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

# CREATIVE IDEA LISTING & EVALUATION



PROJECT: **STP -7063 (1) – Georgia Department of Transportation**

SHEET NO.:

1 of 2

**P.I. Number: 250470 Columbia County**

NO.	IDEA DESCRIPTION	RATING
1	Construct 5 lanes, no median	1
2	Eliminate the bike lanes	1
3	Eliminate one bike lane	1
4	At the RR crossing, route the bike lanes and adjacent to the roadway, decrease the bridge width.	1
5	Delete the median from the RR bridge	2
6	Use multi-use trail in stead of a side walk and bike lane	4
7	Delete curb and gutter	1
8	Delete 2 foot planting strip	1
9	Reduce Gutter width from 30” to 24”	DS
10	Use Header curb in stead of curb and gutter	1
11	Use concrete paving in stead of asphaltic concrete	1
12	Optimize Pavement Design – Evaluate design to reduce the number of layers	DS
13	Retaining Walls: For fill walls - move closer to roadway; Delete watt at Sta 98+60 Town Center Road	4
14	Eliminate noise barrier	1
15	Modify material for noise barrier	4
16	Disconnect Industrial Blvd. from Parkway Overpass; <u>or</u> route connection to be at existing grade at either the east or west end of the overpass.	5
17	Extend the RR crossing bridge to the east and reroute Industrial Blvd. to eliminate fill	4
18	Extend the RR crossing bridge east, west, and reroute Industrial Blvd. to eliminate fill	1
19	Cross RR at Grade	4
20	Delete relocation of Lynnwood Avenue	4
21	Use Alternative Alignment tying in to Washington Road to the east of planned location	1
22	Increase Vertical Curves to reduce fill	DS
23	Use “Con-span” in lieu of bridge at Reed Creek	4

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



# Recommended Alternatives



PROJECT: **STP -7063 (1) – Georgia Department of Transportation**

SHEET NO.: **1 of 1**

**P.I. Number: 250470 Columbia County**

NO.	IDEA DESCRIPTION	RATING
6	Use multi-use trail in stead of a side walk and bike lane	4
9	Reduce Gutter width from 30" to 24"	DS
12	Optimize Pavement Design – Evaluate design to reduce the number of layers	DS
13	Retaining Walls: For fill walls - move closer to roadway; Delete watt at Sta 98+60 Town Center Road	4
14	Eliminate the noise barrier	4
15	Modify material for noise barrier	4
16	Disconnect Industrial Blvd. from Parkway Overpass; or route connection to be at existing grade at either the east or west end of the overpass.	5
19	Cross RR at Grade	4
20	Delete relocation of Lynnwood Avenue	4
22	Increase Vertical Curves to reduce fill	DS
23	Use "Con-span" in lieu of bridge at Reed Creek Crossing	4
24	RR crossing: reduce center span to utilize Type 4 girder or other design to reduce height of roadway.	4
25	Wyngate Tributary: use equivalent pipe size or "Con-span"	4
28	Utilize surface drainage where possible (north side)	DS
29	Slope pavement to median, single stormwater collector	DS
31	Eliminate sidewalks on side streets	3
32	Re-route non-local traffic	DS

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

# Value Analysis Design Alternative



<b>PROJECT: STP -7063 (1) – Georgia Department of Transportation</b> <b>P.I. Number: 250470 Columbia County</b>	ALTERNATIVE NO.: <span style="font-size: 1.5em; font-weight: bold;">6</span>
DESCRIPTION: PROVIDE MULTI-USE TRAIL IN LIEU OF BIKE LANES	SHEET NO.: 1 of 4

**Original Design:**

- The original design typical section provides for a 4'-0" Bike Lane in each direction of travel from Station 100+00 to Station 246+00. Also, provides for a 12'-0" shoulder and a 5' 0" sidewalk.

**Alternative:**

- The alternative design would be a typical section which would provide for deletion of the 4' 0" Bike Lanes from the pavement area. The 4'-0" Bike Trail width would be added to the 12'-0" shoulder and sidewalk area. The 5'-0" sidewalk would be "deleted" for a new total width of 16'. Of this 16'-0", 8'0" would be paved and used as a **Multi-Use Trail**.

**Opportunities:**

- Reduce Pavement Width by 8'-0"
- Improve Safety for Bicyclists
- Reduced Construction Time
- Reduced Right-of-way costs

**Risks:**

- Increases U-Turns movements
- Minimal redesign to accommodate U-turn movements
- May receive opposition from bicycle advocacy groups
- Some conflicts could arise from shared use between pedestrians and bicyclists

**Technical Discussion:**

This alternative provides for the possibility of using a lighter pavement section however, it may complicate right-of-way and other implementation factors.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
<b>ORIGINAL DESIGN</b>	\$ 9,121,707	\$	\$ 9,121,707
<b>ALTERNATIVE</b>	\$ 8,803,374	\$	\$ 8,803,374
<b>SAVINGS</b>	\$ 318,333	\$	\$ 318,333

# Illustrations

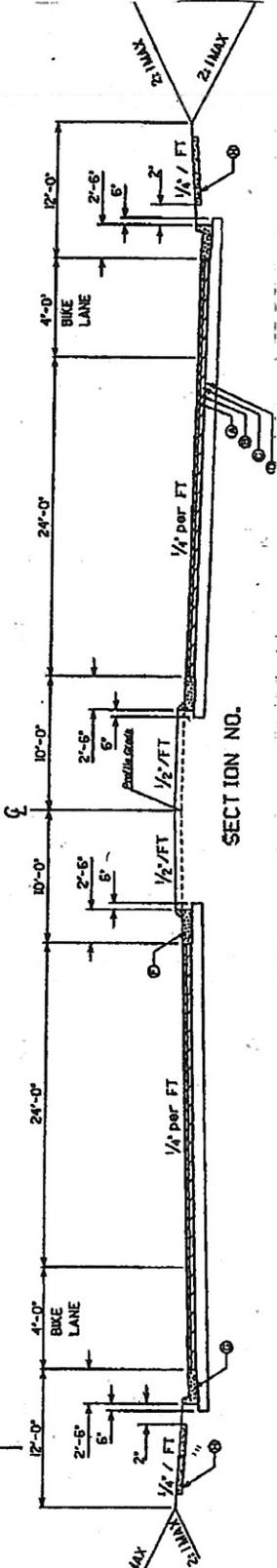
**PBSJ**

PROJECT: STP -7063 (1) – Georgia Department of Transportation  
 P.I. Number: 250470 Columbia County

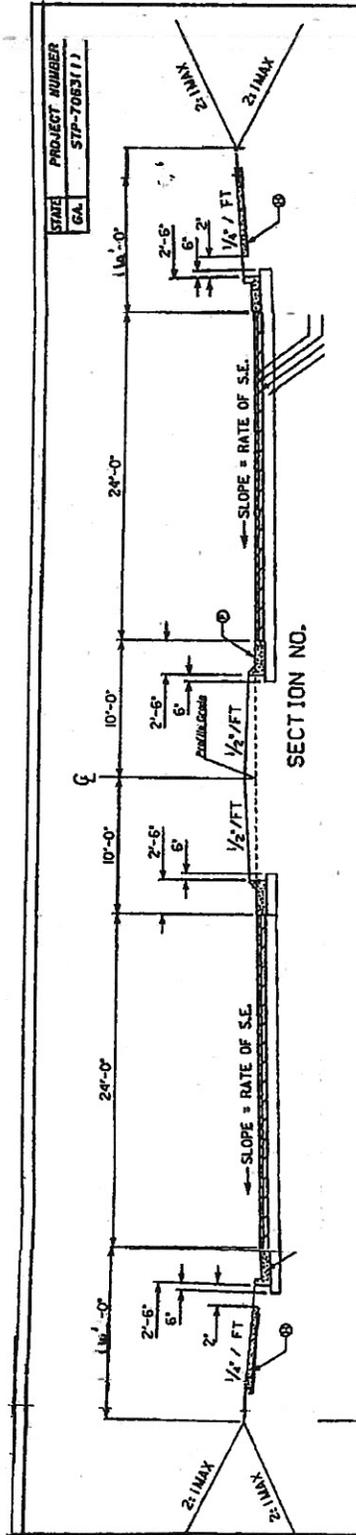
ALTERNATIVE NO.: 6

DESCRIPTION:

SHEET NO.: 2 of 4



EXISTING TYPICAL SECTION WITH 4'-0" BIKE LANES AND 12'-0" SHOULDERS



PROPOSED TYPICAL SECTION WITHOUT 4'-0" BIKE LANES AND 16'-0" SHOULDERS

STATE	PROJECT NUMBER
GA.	STP-7063(1)

# Calculations

**PBSJ**

PROJECT: **STP -7063 (1) -- Georgia Department of Transportation**

ALTERNATIVE NO.: **6**

**P.I. Number: 250470 Columbia County**

DESCRIPTION:

SHEET NO.: **3** of **4**

REDUCTION OF FULL DEPTH PAVEMENT FROM  
STA 100+00 - STA 246+00

$$2' \times 14600' \div 9 = 12978 \text{ yd}^2$$

PAVEMENT COSTS

12.5mm SUPERPAVE	$165 \times 12978 \div 2000 =$	1070 TONS
19 mm SUPERPAVE	$220 \times 12978 \div 2000 =$	1427 TONS
25 mm SUPERPAVE	$440 \times 12978 \div 2000 =$	2855 TONS
GRAB	$145 \text{ lb/ft}^3 \times 116800 \text{ ft}^3 \times 1.0A \div 2000 =$	8468 TONS

MULTI USE TRAIL

$$3' \times 14600' \div 9 = 4867 \text{ yd}^2$$

# COST WORKSHEET



PROJECT: STP -7063 (1) -- Georgia D.O.T.		ALTERNATIVE NO.: 6					
DESCRIPTION:						SHEET NO.: 4 of 4	
CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
402-3112 19mm SUPERPAVE	TN	27805	47.91	1332131.55	26735	47.91	1280873.85
402-3113 12.5mm SUPERPAVE	TN	19510	67.71	1321022.10	18803	67.71	1273151.13
402-3143 25mm SUPERPAVE	TN	34250	89.13	3052702.50	31395	89.13	2798236.35
310-1101 GAB	TN	138180	17.17	2372550.60	129712	17.17	2227155.04
441-0104 CONE SIDEWALK	SY	28106	37.12	1043294.72	32973	37.12	1223957.76
Sub-total				9121707.47			8863379.13
Mark-up at 10.00%				\$0			\$0
TOTAL				\$0			\$0

318 333.34

# Value Analysis Design Alternative



PROJECT: **STP -7063 (1) – Georgia Department of Transportation**  
**P.I. Number: 250470 Columbia County**

ALTERNATIVE NO.:  
**13**

DESCRIPTION: **RETAINING WALL MODIFICATIONS**

SHEET NO.: **1 of 6**

**Original Design:**

- Construction of Ga. Std 9031L retaining wall at Station 98+60 to Station 99+05, Riverwatch Parkway Extension

**Alternative:**

- Elimination of Wall and Grade Area from back of sidewalk to back of curb and gutter installed in circle K parking lot. All work would be completed in proposed R/W

**Opportunities:**

- Improve area between sidewalk and parking lot
- Eliminate potential conflict with underground facilities

**Risks:**

- Increased slope may hamper maintenance of grassed area

**Technical Discussion:**

The alternative should simply construction and help avoid utility problems.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 496,049	\$	\$ 496,049
ALTERNATIVE	\$ 491,936	\$	\$ 491,936
SAVINGS	\$ 4,100	\$	\$ 4,100

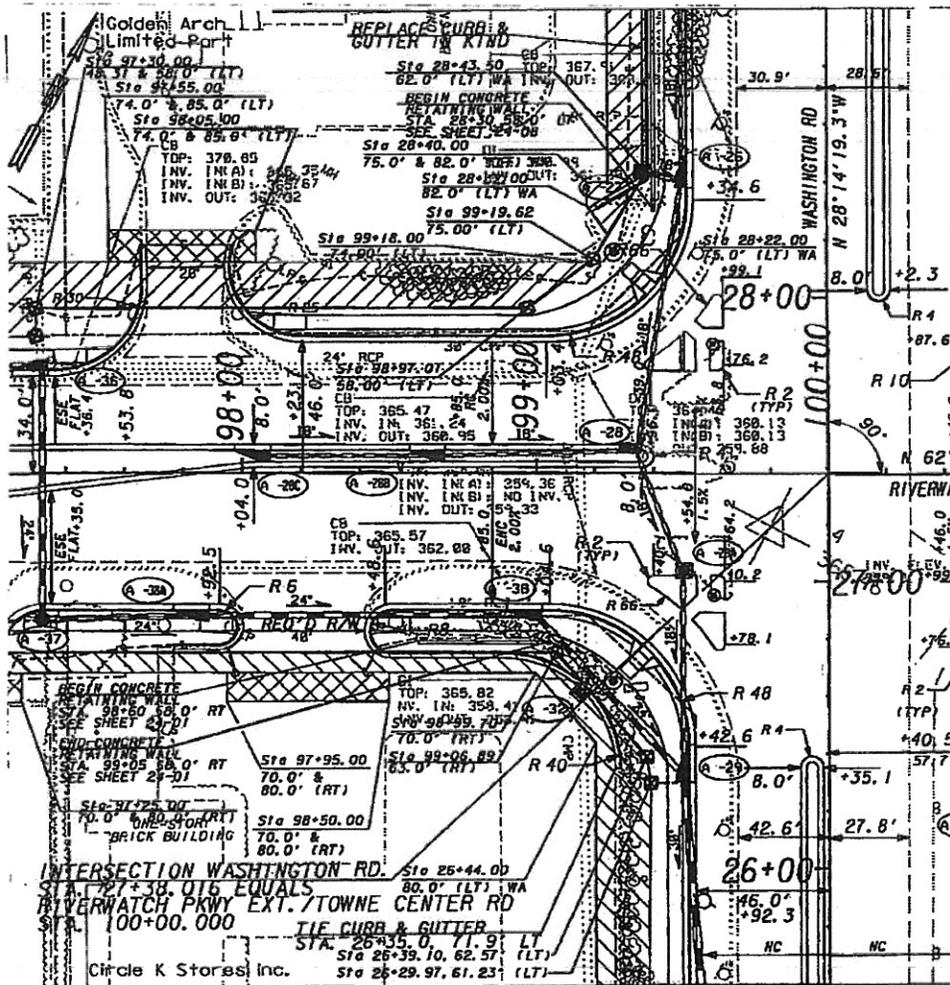
PROJECT: STP -7063 (1) - Georgia Department of Transportation

ALTERNATIVE NO.: 13

P.I. Number: 250470 Columbia County

DESCRIPTION:

SHEET NO.: 2 of 6



PLAN VIEW FOR RETAINING WALL @ STA 98+60 - STA 99+05

# Illustrations



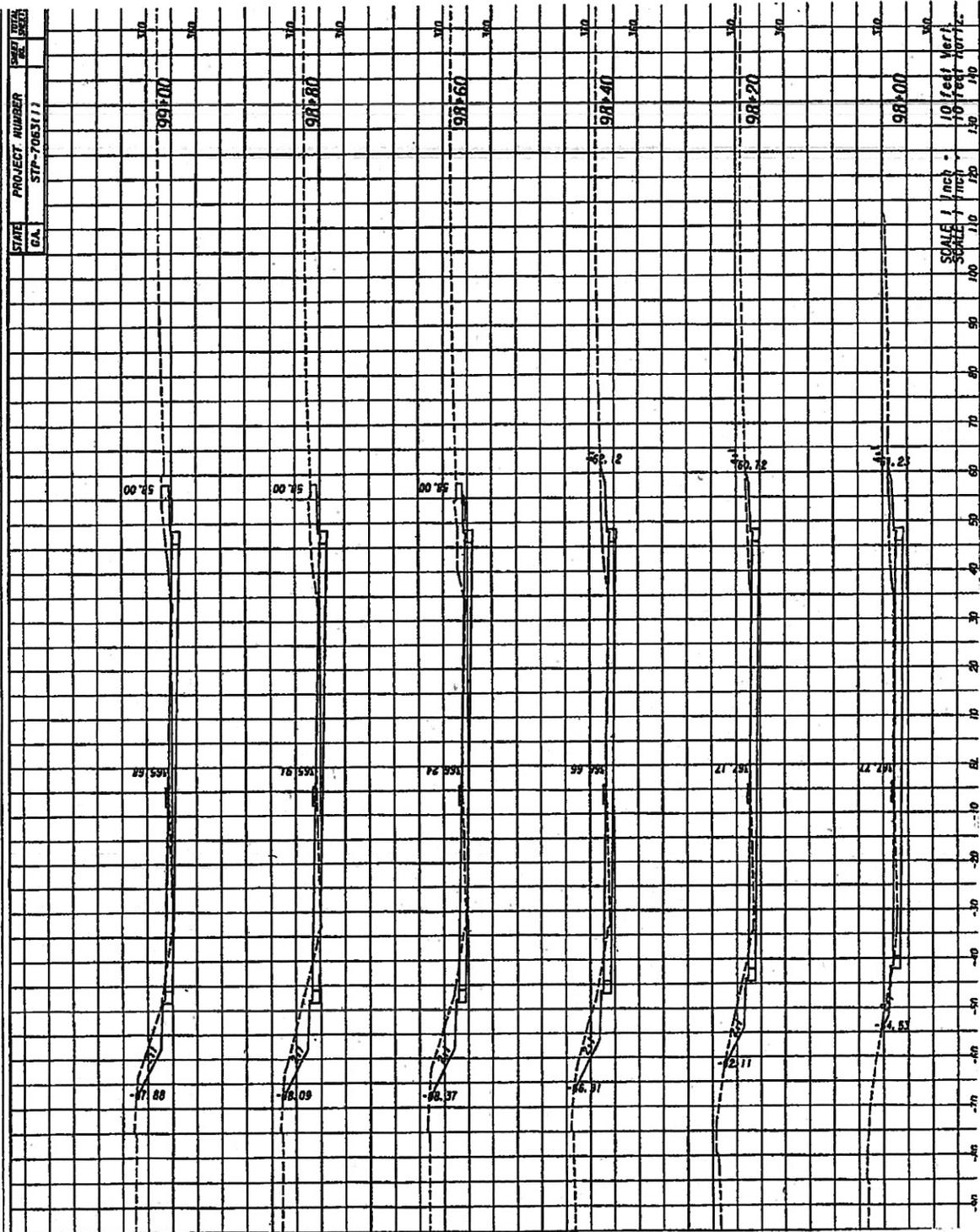
PROJECT: STP -7063 (1) - Georgia Department of Transportation

ALTERNATIVE NO.: 13

P.I. Number: 250470 Columbia County

DESCRIPTION:

SHEET NO.: 3 of 6



EXISTING CROSS SECTIONS FOR RETAINING WALL @ STA 98+00 - STA 98+05

# Illustrations



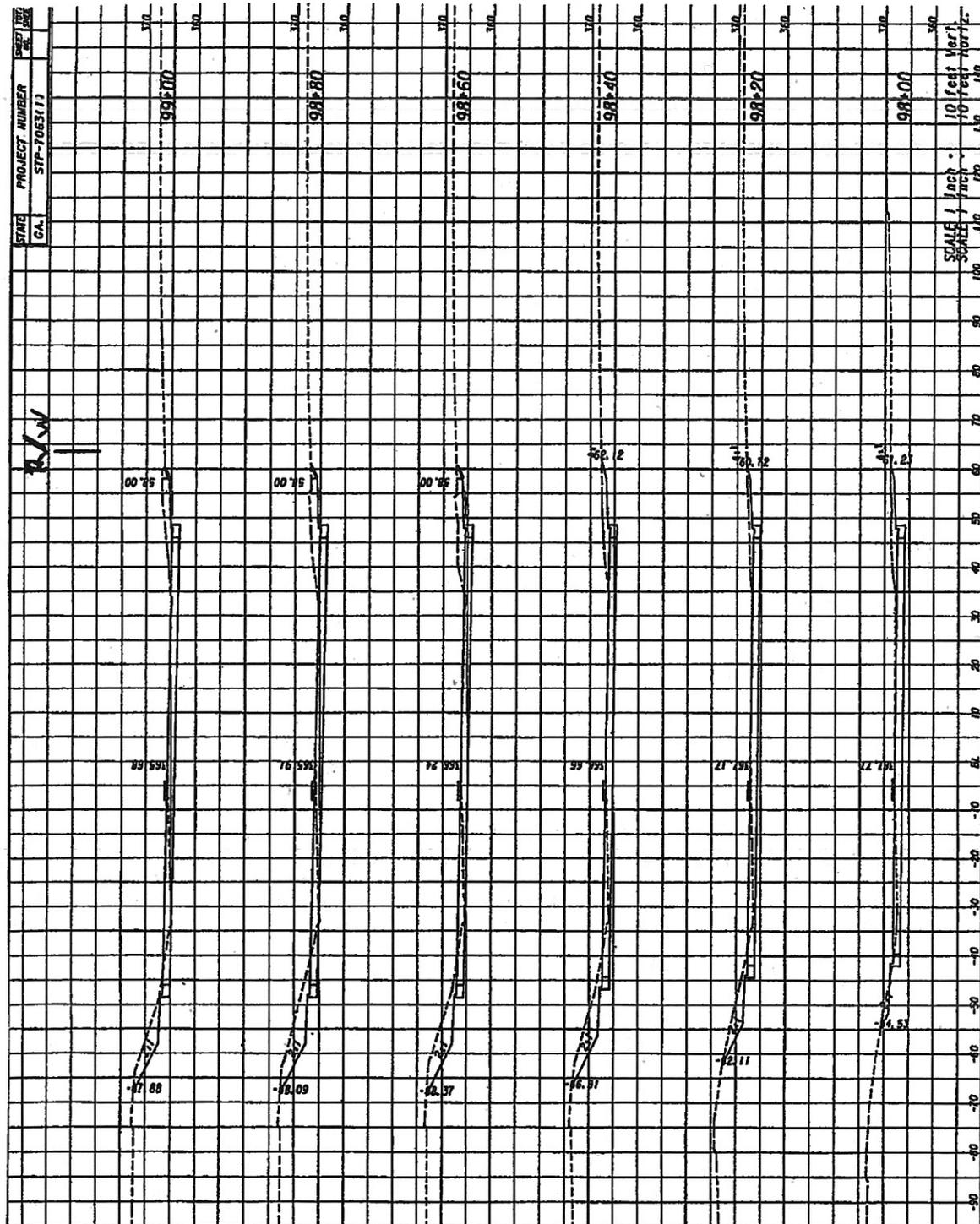
PROJECT: **STP -7063 (1) - Georgia Department of Transportation**

ALTERNATIVE NO.: **13**

P.I. Number: **250470 Columbia County**

DESCRIPTION:

SHEET NO.: **4** of **6**



PROPOSED CROSS SECTIONS AFTER ELIMINATION  
OF RETAINING WALL @ STA 98+60 - STA 99+05

# Calculations



PROJECT: STP -7063 (1) -- Georgia Department of Transportation

ALTERNATIVE NO.: 13

P.I. Number: 250470 Columbia County

DESCRIPTION:

SHEET NO.: 5 of 6



BEGIN WALL — H = 2.6

END WALL — H = 2.2

LENGTH — 40.0

HEIGHT — 4.4 (AVE)

WIDTH — 1.295 (AVE)

$$\begin{aligned} \text{VOL} &= 40.0 \times 4.4 \times 1.295 \div 27 \\ &= 8.44 \text{ cu yd} \end{aligned}$$



# Value Analysis Design Alternative



PROJECT: **STP -7063 (1) – Georgia Department of Transportation**  
**P.I. Number: 250470 Columbia County**

ALTERNATIVE NO.:  
**14**

DESCRIPTION: **ELIMINATE SOUND BARRIER**

SHEET NO.: **1 of 2**

**Original Design:**

- The original design called for the construction of a sound barrier along portions of the new road right-of-way.

**Alternative:**

- Review of the locations selected versus the locations not selected indicated that it may be reasonable to delete the sound walls shown on the plans

**Opportunities:**

- Reduce construction cost
- Reduce maintenance
- Improve visual effects

**Risks:**

- Increased sound from additional traffic

**Technical Discussion:**

The effective “sound shadow” for these walls typically is cast at an angle of 45° from the top of the wall. Hence the area benefited would only reach out 20 feet for a 20-foot high wall (example). Limited benefit for the cost.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 266,105	\$	\$ 266,105
ALTERNATIVE	\$ 0	\$	\$ 0
SAVINGS	\$ 266,105	\$	\$ 266,105



# Value Analysis Design Alternative



PROJECT: **STP -7063 (1) – Georgia Department of Transportation**  
**P.I. Number: 250470 Columbia County**

ALTERNATIVE NO.:  
**15**

DESCRIPTION: **REPLACE SOUND BARRIER WITH LANDSCAPING**

SHEET NO.: **1 of 3**

**Original Design:**

- The original proposes to construct a metal TB Sound Barrier Wall from Station 144+10 to Sta. 149+60

**Alternative:**

- The alternative proposes to replace the metal sound wall with a landscape material. Utilize Leyland cypress due to rapid growth, density and overall appearance. Plant material would be installed on 8' centers with plants 4-6' tall, 7 gallon containers.

**Opportunities:**

- Option would provide an aesthetic barrier
- Material would retain appearance without showing dirt.
- Reduced construction time
- Reduced construction cost

**Risks:**

- Plants would require approximately two years to reach height of proposed barrier (should be same size at project completion date)
- May not reduce sound as well as metal wall.

**Technical Discussion:**

Similar to alternative number 14, this approach could supply an aesthetic effect while helping to reduce sound problems.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 266,105	\$	\$ 266,105
ALTERNATIVE	\$ 4,620	\$	\$ 4,620
SAVINGS	\$ 261,485	\$	\$ 261,485

# Calculations

**PBSJ**

PROJECT: **STP -7063 (1) -- Georgia Department of Transportation**

ALTERNATIVE NO.:

**P.I. Number: 250470 Columbia County**

15

DESCRIPTION:

SHEET NO.:

2 of 3

OPTION 2

LEYLAND CYRRESS, 7 GAL CONT, 4-6 FT HT, WITH  
A RECOMMENDED SPACING OF 8 FT

BOUND BARRIER STA 144+10 - 149+60

$550 \text{ LF} \div 8 = 68.75$  USE 70 EA

# COST WORKSHEET



PROJECT: STP -7063 (1) – Georgia D.O.T.		ALTERNATIVE NO.: 15					
DESCRIPTION: REPLACE SOUND BARRIER WITH LANDSCAPE BARRIER					SHEET NO.: 3 of 3		
CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/UNIT	TOTAL	NO. OF UNITS	COST/UNIT	TOTAL
624-0101 SOUND BARRIER	SF	10674	20.74	221381.81	0	0	0
624-0101 SOUND BARRIER	SF	990	20.74	20532.60	0	0	0
700 – LELAND CYPRESS	EIA	0	0	0	70	60.00	4200.00
<b>Sub-total</b>				21914. <sup>47</sup> \$0			4200.00 \$0
<b>Mark-up at 10.00%</b>				2191. <sup>44</sup> \$0			420.00 \$0
<b>TOTAL</b>				24105.91 \$0			4620.00 \$0

# Value Analysis Design Alternative



PROJECT: **STP -7063 (1) – Georgia Department of Transportation**  
**P.I. Number: 250470 Columbia County**

ALTERNATIVE NO.:  
**19**

DESCRIPTION: **AT-GRADE CROSSING WITH CSX RAILROAD**

SHEET NO.: **1 of 1**

**Original Design:**

- The original proposes to grade separate the Riverwatch Parkway Extension roadway and the CSX railroad with the roadway on a new embankment plus structure over the CSX railroad. The original design also proposes to realign the horizontal and vertical location of Columbia Industrial Boulevard. to tie into the Riverwatch Parkway Extension on embankments to create a signalized T intersection.

**Alternative:**

- The alternative proposes to create an at-grade crossing between the Riverwatch Parkway extension and the CSX railroad. This alternative also proposes to tie Columbia Industrial Boulevard to the Riverwatch Parkway extension approx 100' to the east of the original design by maintaining the existing horizontal alignment of Columbia Industrial Boulevard.

**Opportunities:**

- Significant Cost Savings
- Reduced construction time
- Reduced right-of-way costs
- Easier constructability

**Risks:**

- Moderate Redesign
- Traffic delay due to train crossings

**Technical Discussion:**

This alternative is intended to ask, one last time prior to the project moving ahead, the question of the benefit vs. the cost of the separation. If this is a growing safety issue at this location, it is most likely that this alternative should be dismissed.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 3,684,339	\$	\$ 3,684,339
ALTERNATIVE	\$ 497,640	\$	\$ 497,640
SAVINGS	\$ 3,186,699	\$	\$ 3,186,699

# Value Analysis Design Alternative



PROJECT: **STP -7063 (1) – Georgia Department of Transportation**  
**P.I. Number: 250470 Columbia County**

ALTERNATIVE NO.:  
**20**

DESCRIPTION: **DELETE RELOCATION OF LYNWOOD AND CHERYL DRIVES**

SHEET NO.: **1 of 1**

**Original Design:**

- The original design proposes to realign the intersection of Cheryl Drive/Lynwood Drive and to extend Cheryl Drive north to Riverwatch Parkway Extension to create a 4-way intersection with Stephens Road to the north. A traffic signal is also proposed at the new 4-way intersection.

**Alternative:**

- The alternative design proposes to eliminate the realignment and extension of Cheryl Drive to Riverwatch Parkway extension leaving a 3-way or “T” intersection between Riverwatch and Stephens Road only. The remaining “T” intersection will still receive signalization

**Opportunities:**

- Potential Cost savings
- Reduced Construction Time
- Reduced Right-of-way costs

**Risks:**

- Increases U-Turn movements
- Minimal redesign to accommodate U-Turn movements

**Technical Discussion:**

The design as it stands is a routine and prudent approach – it is good to enhance opposing road meetings. The object of this alternative is to ask the project delivery team if they feel the benefit of the alignment is equal to the identified costs noted below.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 312,016	\$	\$ 312,016
ALTERNATIVE	\$ 0	\$	\$ 0
SAVINGS	\$ 312,016	\$	\$ 312,016

# Value Analysis Design Alternative



PROJECT: **STP -7063 (1) – Georgia Department of Transportation**  
**P.I. Number: 250470 Columbia County**

ALTERNATIVE NO.:  
**23**

DESCRIPTION: **BRIDGE OVER REED CREEK – USE CONSPAN –TYPE**  
**STRUCTURE**

SHEET NO.: **1 of 5**

**Original Design:**

- The original design is a 140' 3 span bridge with 40' end spans and a 60' intermediate span. The end spans consist of Type I Modified PSC beams. The intermediate span consists of Type III PSC beams. The out-to-out bridge width is 114'-5". The typical bridge cross section comprises of 12 beams spaced at 9'-9 3/4".

**Alternative:**

- The proposed alternative eliminates the end spans and replaces the intermediate span with a 60' pre-cast structure such as CON-SPAN™. The use of a segmental pre-cast structure significantly accelerates the construction time and eliminates the need for shoring the existing structure for maintenance of traffic by means of minimal closure of the road to traffic.
  - The alternative provides for two future tracks and maintains a 25' clearance from outside track centerlines to face of columns.
- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• <b>Opportunities:</b></li> <li>• Reduce Bridge Length</li> <li>• Reduce construction time</li> <li>• Eliminate staging</li> <li>• Eliminate shoring of existing structure</li> <li>• Lower profile by at least 12"</li> <li>• Enhanced aesthetics</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Risks:</b></li> <li>• Probable detour requirement for a short time</li> <li>• Sufficiency of Hydraulic opening</li> </ul> |
|---|---|

**Technical Discussion:**

Temporary traffic detour plan may be required. If not already done, channel flows may have to be investigated and, if required, portions of the channel may have to lined.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 1,141,578	\$	\$ 1,141,578
ALTERNATIVE	\$ 940,767	\$	\$ 940,767
SAVINGS	\$ 200,811	\$	\$ 200,811





# Calculations



PROJECT: STP-7063 (1) -- Georgia Department of Transportation

ALTERNATIVE NO.:

P.I. Number: 250470 Columbia County

23

DESCRIPTION: BRIDGE OVER REED CREEK

SHEET NO.: 4 of 5

## ORIGINAL DESIGN:

$$\text{DECK AREA} = 114'-5'' \times 140' = 16,030 \text{ sq. ft.}$$

$$\text{VOLUME OF DECK} = 16,030 \times \frac{8''}{12} \times \frac{1}{27} = \frac{10686.67}{27} = \boxed{395.80 \text{ CY}}$$

$$\text{SIDEWALK AREA} = 2 \times 140' \times 6' = 1680 \text{ sq. ft.}$$

$$\text{VOLUME OF SIDEWALK} = 1680 \times \frac{6''}{12} \times \frac{1}{27} = \frac{840}{27} = \boxed{31.11 \text{ CY}}$$

$$\text{TOTAL VOLUME OF CLASS "AA" CONCRETE} = \boxed{426.91 \text{ CY}}$$

$$\text{VOLUME OF 4" MEDIAN} = \boxed{14.32 \text{ CY}}$$

$$\text{TOTAL LENGTH OF TYPE I (100) PSC BEAM} = \boxed{935 \text{ ft}}$$

$$\text{TOTAL LENGTH OF TYPE III PSC BEAM} = \boxed{712 \text{ ft}}$$

$$\text{LENGTH OF BARRIER} = 2 \times 140 = \boxed{280 \text{ ft.}}$$

$$\text{VOLUME OF CLASS "A" CONCRETE} = \frac{4 \times [(114.5 \times 4 \times 4) + \frac{4 \times 4 \times 16 \times 4}{2}]}{27} = \boxed{347.26 \text{ CY}}$$

[END BENTS & INT. BENTS]  
[EXCLUDE PILES/WIND WALLS]

## ALTERNATIVE

$$\text{DECK AREA} = 60 \times 114.5' = \boxed{6870 \text{ sq. ft.}}$$

$$\text{VOLUME OF 8" DECK} = 6870 \times \frac{8''}{12} \times \frac{1}{27} = \boxed{269.63 \text{ CY}}$$

$$\text{SIDEWALK AREA} = 2 \times 60 \times 6' = 720 \text{ sq. ft.}$$

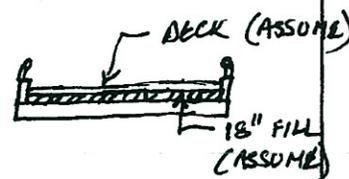
$$\text{VOLUME OF 6" SIDEWALK} = \boxed{13.33 \text{ CY}}$$

$$\text{VOLUME OF 4" MEDIAN} = \boxed{2 \text{ CY}}$$

$$\text{LENGTH OF BARRIER} = 2 \times 60 = \boxed{120 \text{ ft}}$$

$$\text{VOLUME OF CONC. (CLASS "AA") FOR PRECAST (CON-SPAN) CULVERT/BRIDGE} = \frac{2 \times 114.5 \times 1.5 \times 16 + 60 \times 1.25 \times 1 \times 114.5}{27} = \boxed{527.61 \text{ CY}}$$

$$\text{FILL VOLUME} = \boxed{477.08 \text{ CY}}$$





# Value Analysis Design Alternative



PROJECT: <b>STP -7063 (1) – Georgia Department of Transportation</b> <b>P.I. Number: 250470 Columbia County</b>	ALTERNATIVE NO.: <b>24</b>
DESCRIPTION: <b>BRIDGE OVER REED CREEK – ALTERNATIVE CONFIGURATION</b>	SHEET NO.: <b>1 of 5</b>

**Original Design:**

- The original design is a 140' 3 span bridge with 40' end spans and a 60' intermediate span. The end spans consist of Type I Modified PSC beams. The intermediate span consists of Type III PSC beams. The out-to-out bridge width is 114'-5". The typical bridge cross section comprises of 12 beams spaced at 9'-9 3/4".

**Alternative:**

- The proposed alternative eliminates the end spans and replaces the intermediate span with a 60' pre-cast structure such as CON-SPAN™. The use of a segmental pre-cast structure significantly accelerates the construction time and eliminates the need for shoring the existing structure for maintenance of traffic by means of minimal closure of the road to traffic.
  - The alternative provides for two future tracks and maintains a 25' clearance from outside track centerlines to face of columns.
- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• <b>Opportunities:</b></li> <li>• Reduce Bridge Length</li> <li>• Reduce construction time</li> <li>• Eliminate staging</li> <li>• Eliminate shoring of existing structure</li> <li>• Lower profile by at least 12"</li> <li>• Enhanced aesthetics</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Risks:</b></li> <li>• Probable detour requirement for a short time</li> <li>• Sufficiency of Hydraulic opening</li> <li>• Significant Redesign</li> </ul> |
|---|---|

**Technical Discussion:**

Temporary traffic detour plan may be required. Channel flows may have to be investigated and, if required, portions of the channel may have to be lined.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 1,141,578	\$	\$ 1,141,578
ALTERNATIVE	\$ 940,767	\$	\$ 940,767
SAVINGS	\$ 200,811	\$	\$ 200,811





# Calculations

PBSJ

PROJECT: STP -7063 (1) -- Georgia Department of Transportation

ALTERNATIVE NO.:

P.I. Number: 250470 Columbia County

24

DESCRIPTION: BRIDGE OVER CSX TRANSPORTATION

SHEET NO.:

4 of 5

## ORIGINAL DESIGN:

$$\text{DECK AREA} = 248' \times 94.5' = 23,436 \text{ sq. ft.}$$

$$\text{DECK THK} = 8''$$

$$\text{VOLUME OF DECK} = 23,436 \times \frac{8}{12} \times \frac{1}{27} = \frac{15,624}{27} = 578.67 \text{ CY}$$

$$\text{SIDEWALK AREA} = 248' \times 6' \times 2 = 2,976 \text{ sq. ft.}$$

$$\text{SIDEWALK THK} = 6''$$

$$\text{VOLUME OF SIDEWALK} = 2,976 \times \frac{6}{12} \times \frac{1}{27} = \frac{1488}{27} = 55.11 \text{ CY}$$

$$\text{TOTAL VOLUME OF CLASS "AA" CONC} = \boxed{633.78 \text{ CY}}$$

$$\text{TOTAL LENGTH OF BARRIER} = 248 \times 2 = \boxed{496 \text{ FT.}}$$

$$\text{TOTAL LENGTH OF TYPE II PSC BEAMS} = 10 \times 62' = \boxed{620 \text{ ft.}}$$

$$\text{TOTAL LENGTH OF TYPE III PSC BEAMS} = 10 \times 72' = \boxed{720 \text{ ft.}}$$

$$\text{TOTAL LENGTH OF BT 63 BEAMS} = (2 \times 61) + (2 \times 72) + (12 \times 115) = \boxed{1646 \text{ ft.}}$$

$$\text{VOLUME OF } 4'' \text{ MEDIAN} = \boxed{39.40 \text{ CY}}$$

## ALTERNATIVE:

$$\text{DECK AREA} = 200' \times 94.5' = 18,900 \text{ sq. ft.}$$

$$\text{VOL. OF 8" DECK} = 18,900 \times \frac{8}{12} \times \frac{1}{27} = \frac{12600}{27} = 466.67 \text{ CY}$$

$$\text{SIDEWALK AREA} = 200' \times 6' \times 2 = 2400 \text{ sq. ft.}$$

$$\text{VOL OF 6" SIDEWALK} = 2400 \times \frac{6}{12} \times \frac{1}{27} = \frac{1200}{27} = 44.44 \text{ CY}$$

$$\text{TOTAL VOLUME OF CLASS "A" CONC.} = \boxed{511.11 \text{ CY}}$$

$$\text{TOTAL LENGTH OF TYPE II PSC BEAMS} = 2 \times 55' \times 9 = \boxed{990 \text{ ft.}}$$

$$\text{TOTAL LENGTH OF BT 54 BEAMS} = (2 \times 55' \times 2) + (11 \times 90) = \boxed{1210 \text{ ft.}}$$

$$\text{VOLUME OF 4" MEDIAN} = \boxed{35.40 \text{ CY}}$$

$$\text{TOTAL LENGTH OF BARRIER} = 2 \times 200 = \boxed{400 \text{ ft.}}$$



# Value Analysis Design Alternative



PROJECT: **STP -7063 (1) – Georgia Department of Transportation**  
**P.I. Number: 250470 Columbia County**

ALTERNATIVE NO.:  
**25**

DESCRIPTION: **TRIPLE 10'X10' BOX CULVERT @ WYNNGATE TRIB.**

SHEET NO.: **1 of 5**

**Original Design:**

- The original design is a Triple Cell, 10'X10', GA Std. 2327 Box Culvert 155' in length exclusive of the wing walls. The wing walls are GA Std. 2326. The fill over the structure is approximately 10'. The structure is skewed approximately 30° to the normal.

**Alternative:**

- The proposed alternative replaces the Triple Cell cast-in-place structure with a pre-cast structure such as a 30' arch span of CON-SPAN™ providing an equivalent hydraulic area to that of the original design. The use of a segmental pre-cast structure significantly accelerates the construction time.

**Opportunities:**

- Reduce construction time and cost
- Eliminate or ease construction staging
- Lower profile by at least 12"
- Enhanced aesthetics

**Risks:**

- Probable detour requirement for a short time
- Sufficiency of Hydraulic opening

**Technical Discussion:**

Temporary traffic detour plan may be required. Channel flows may have to be investigated and, if required, portions of the channel may have to lined.

Note: For comparison purposes, the foundations for both designs are assumed to be the same. This is conservative, since actual foundation requirements for pre-cast box culverts are much less than for cast-in-place culverts.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 539,761	\$	\$ 539,761
ALTERNATIVE	\$ 495,436	\$	\$ 495,436
SAVINGS	\$ 44,625	\$	\$ 44,625

# Illustrations

**PBSJ**

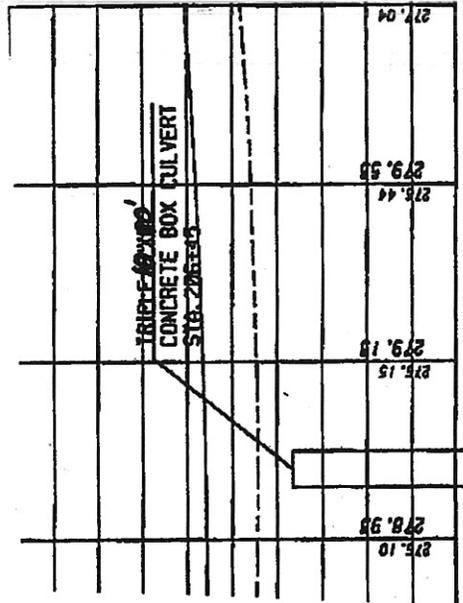
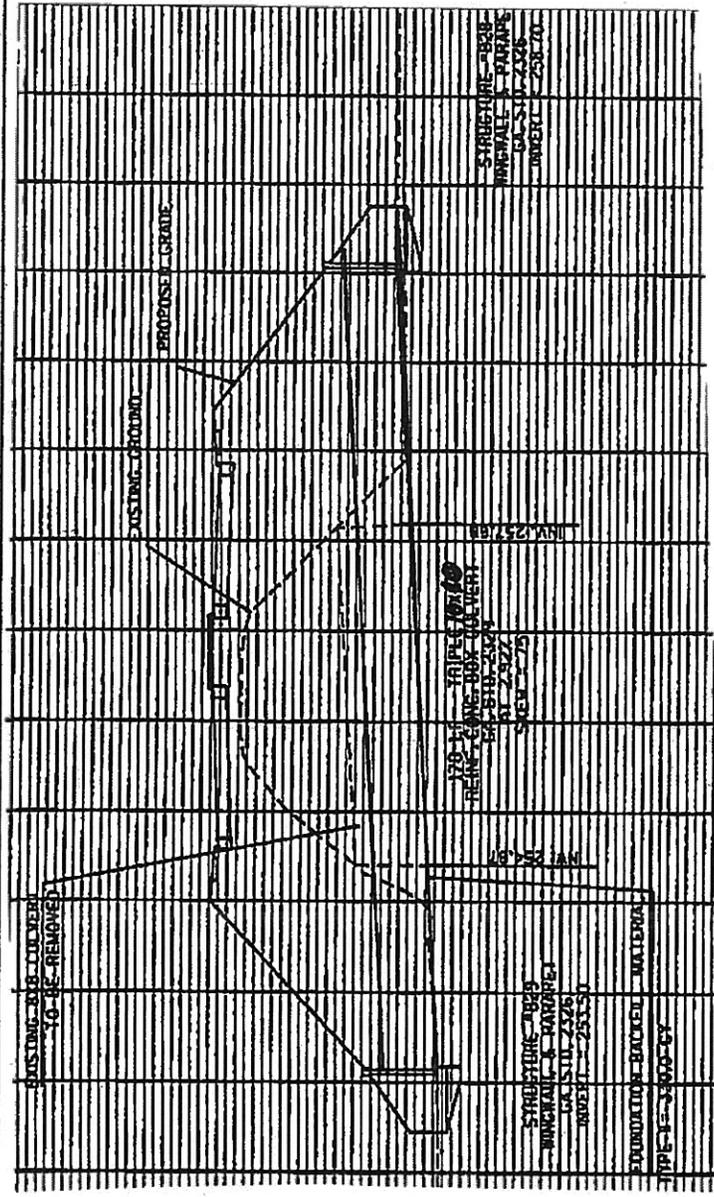
PROJECT: **STP -7063 (1) - Georgia Department of Transportation**

ALTERNATIVE NO.: **25**

P.I. Number: **250470 Columbia County**

DESCRIPTION: **TRIPLE 10'x10' BOX CULVERT @ WYNNGATE TRB.** SHEET NO.: **2** of **5**

ORIGINAL DESIGN



CROSS SECTION

ORIGINAL DESIGN

GEORGIA DEPARTMENT OF TRANSPORTATION  
 SUBMITTED BY

PROFILE

# Illustrations

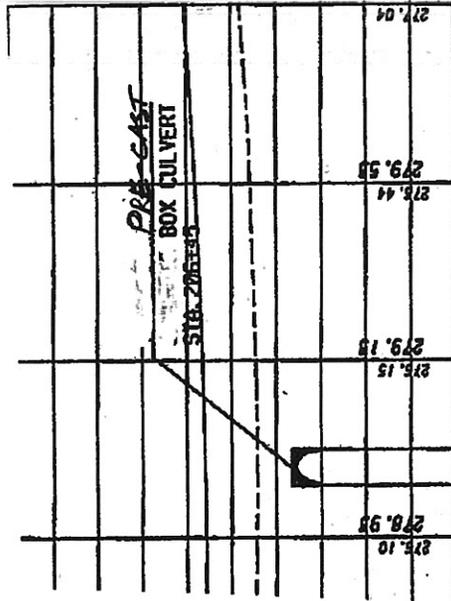
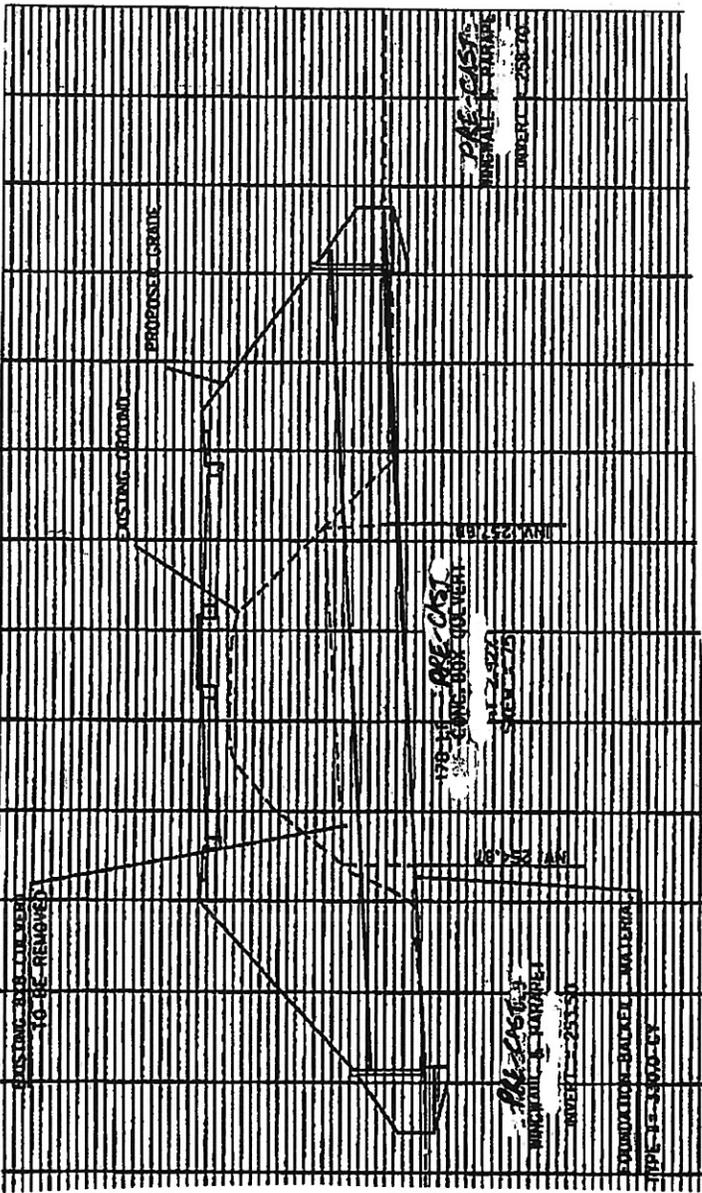
**PBSJ**

PROJECT: STP -7063 (1) - Georgia Department of Transportation  
 P.I. Number: 250470 Columbia County

ALTERNATIVE NO.: 25

DESCRIPTION: TRIPLE 10x10' BOX CULVERT @ WYNNGATE TRB. SHEET NO.: 3 of 5

ALTERNATIVE DESIGN



GEORGIA DEPARTMENT OF TRANSPORTATION	DATE
DESIGNED BY	

PROFILE

CROSS SECTION

ALTERNATIVE

# Calculations

**PBSJ**

PROJECT: STP -7063 (1) -- Georgia Department of Transportation

ALTERNATIVE NO.:

P.I. Number: 250470 Columbia County

25

DESCRIPTION: TRIPLE BOX CULVERT @ WYNGATE TRIBUTARY

SHEET NO.: 4 of 5

ORIGINAL DESIGN

GA STD. 2327 - TRIPLE 10x10 BOX CULVERT, CLASS A CONCRETE:

155' LF, VOL OF CONC OF BOX =  $155' \times 4.238 \text{ CY/FT}$   
 $= \boxed{656.89 \text{ CY}}$

TOTAL WINGWALLS + PARAPETS =  $\boxed{51.66 \text{ CY}}$

CONSPAN / PR-CAST CULVERT

ASSUME 15" END WALLS AND 12" SLAB THK.

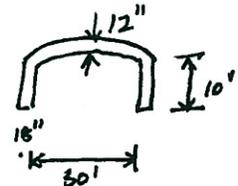
VOL OF CLASS "AA" SPCL CONC. [ $\geq 4000 \text{ PSI}$ ]:

@ WINGWALLS =  $(\frac{1}{2} \times 18 \times 7.5 + 18 \times 4) \times \frac{8}{12} \times 4 \times \frac{1}{27}$   
 $= \boxed{13.78 \text{ CY}}$



FOR BOX CULVERT =  $[2 \times (15 \times 10) + 30 \times 1 \times 1.25] \times 155 \times \frac{1}{27}$   
 $= \boxed{387.5 \text{ CY}}$

CURVE FACTOR



NOTE: APRONS & FOUNDATION REQUIREMENTS ARE ASSUMED TO BE THE SAME - CONSERVATIVE.



# Value Analysis Design Alternative



PROJECT: **STP -7063 (1) – Georgia Department of Transportation**  
**P.I. Number: 250470 Columbia County**

ALTERNATIVE NO.:  
**31**

DESCRIPTION: **ELIMINATE SIDEWALKS ON SIDE STREETS**

SHEET NO.: **1 of 4**

**Original Design:**

- The original proposes to construct sidewalks on many of the side streets.

**Alternative:**

- The alternative proposes to delete sidewalks on minor side streets. These sidewalks do not tie-in to any existing sidewalks and terminate at construction end.

**Opportunities:**

- Eliminate non-pervious material decreasing runoff
- Reduced construction time
- Reduced construction cost
- Added planting areas

**Risks:**

- Should not be implemented if sidewalks affect pedestrian safety

**Technical Discussion:**

The calculation sheet details the candidates for deletion – should be balanced in view of local requirements imposed on developers – i.e., to provide sidewalks approaching schools, etc.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 1,147,624	\$	\$ 1,147,624
ALTERNATIVE	\$ 1,113,202	\$	\$ 1,113,202
SAVINGS	\$ 34,421	\$	\$ 34,421

# Illustrations

**PBSJ**

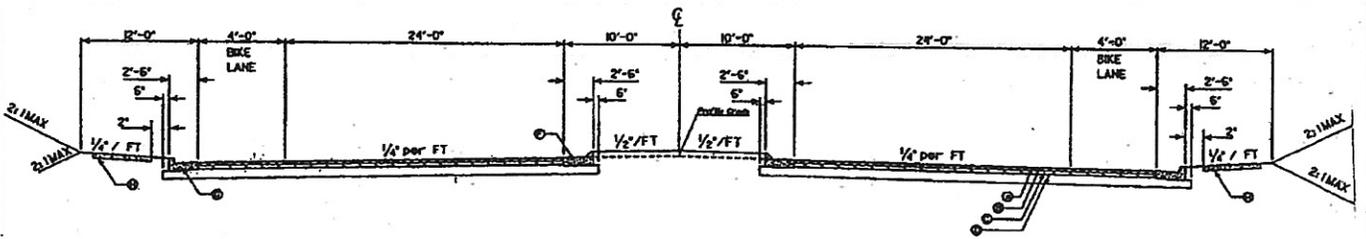
PROJECT: **STP -7063 (1) – Georgia Department of Transportation**  
P.I. Number: **250470 Columbia County**

ALTERNATIVE NO.:

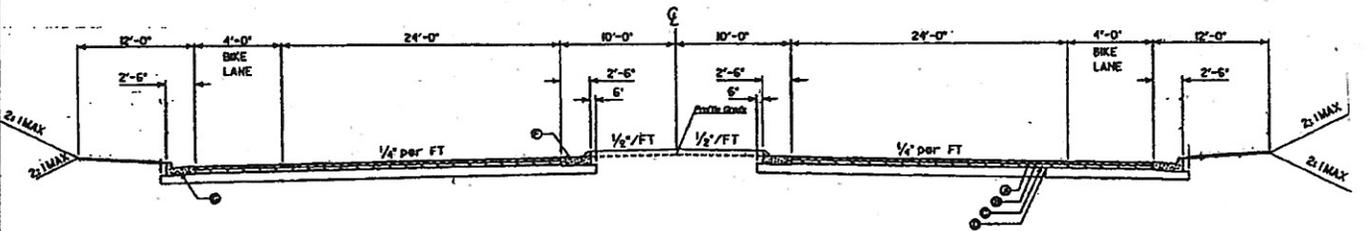
31  
of 4

DESCRIPTION:

SHEET NO.: 2



TYPICAL SECTION INCLUDING SIDEWALKS



TYPICAL SECTION WITH NO SIDEWALKS

# Calculations



PROJECT: STP -7063 (1) -- Georgia Department of Transportation

ALTERNATIVE NO.:

P.I. Number: 250470 Columbia County

31

DESCRIPTION:

SHEET NO.: 3 of 4

## OPTION 2

### ELIMINATION OF SIDEWALKS ON MINOR INTERSECTING STREETS

1) JAMAICA CT	366 lf
2) COLUMBIA IND	1760 lf
3) WINDTREE PL	344 lf
4) LANTERN LN	164 lf
5) McCORMICK RD	1000 lf
6) CLARK POINTE CIR	792 lf
7) FOREST GLEN CT	132 lf
8) STAGE COACH WAY	256 lf
9) WEST WINGATE WAY	168 lf
10) MURRAY CT	138 lf
11) MURRAY DR	446 lf
12) OLD PLANTATION RD	600 lf
13) CHERYL DR	1652 lf
14) STEPHENS RD	362 lf

TOTAL 7586 lf = 843 50 40

# COST WORKSHEET



PROJECT:	STP -7063 (1) -- Georgia D.O.T.				ALTERNATIVE NO.:		
							31
DESCRIPTION: TOTAL / PARTIAL ELIMINATION OF SIDEWALKS					SHEET NO.:		4 of 4
CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/UNIT	TOTAL	NO. OF UNITS	COST/UNIT	TOTAL
OPTION 2							
441-0104 CONC SIDEWALK	54	28106	37.12	1043294.72	27263	37.12	1012002.50
				1043294.72			1012002.50
Sub-total				1043294.72			1012002.50
Mark-up at 10.00%				104329.47			101200.25
TOTAL				1,147,624.19			113202.75

## ***Project Description***

## **PROJECT DESCRIPTION**

This project is rather fully described in the documentation that follows. It should be noted that the expected cost of this construction is \$28.53 million.

Please see the following enclosed documents

- Georgia Department of Transportation
  - Revised Project Concept Report Approval
  - Revised Project Concept Report
    - Design Exception Request
    - Need and Purpose
    - Regional Plan
    - Location Map
    - Preliminary Plans Cost Estimate
    - Approved Design Exception Request

D.O.T. 66

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

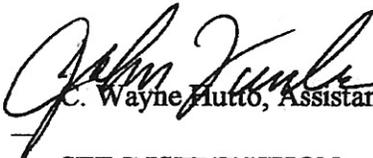
**INTERDEPARTMENT CORRESPONDENCE**

ORIGINAL TO GENERAL FILES

**RECEIVED**

JUL - 2 2002

**Office of Consultant Design**

**FILE** STP-7063(1) Columbia County **OFFICE** Preconstruction  
P. I. No. 250470  
**DATE** July 1, 2002  
**FROM**  C. Wayne Hutto, Assistant Director of Preconstruction  
**TO** SEE DISTRIBUTION

**SUBJECT REVISED PROJECT CONCEPT REPORT APPROVAL**

Attached for your files is the approval for subject project.

CWH/cj

Attachment

**DISTRIBUTION:**

David Mulling  
Harvey Keeper  
Jerry Hobbs  
Herman Griffin  
Michael Henry  
Phillip Allen  
Marta Rosen  
Ben Buchan  
Mike Thomas  
BOARD MEMBER

D.O.T. 66

DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE *STP-2063(1), Columbia County*  
*P. I. 250470*

OFFICE *Consultant Design*

DATE *June 13, 2002*

FROM *James B. Buchan*  
*James B. Buchan, P.E., State Consultant Design Engineer*

TO *Wayne Hutto, P.E., Assistant Director of Preconstruction*

SUBJECT **Revised Project Concept Report**

Attached is the original copy of the revised Concept Report for your further handling for approval in accordance with the Plan Development Process (PDP).

The revision to the concept consists of replacement of an existing drainage structure. It is desired to replace an existing culvert located at Reed Creek with a bridge rather than a culvert. The bridge is selected in order to reduce current downstream erosion and prevent the existing overtopping for the 25-year storm and to achieve roadway clearance.

The revised concept as presented herein and submitted for approval is consistent with that which is included in the Regional Transportation Improvement Program (RTP) and/or the State Transportation Improvement Program (STIP).

DATE *6-18-02*

*Marta Rosen*  
State Transportation Planning Administrator

*JDW*  
JBB:JDW

*Distribution: David Mulling, w/attachment*  
*Harvey Keepler, w/attachment*  
*Phillip Allen, w/attachment*  
*Marta Rosen, w/attachment*  
*Herman Griffin, w/attachment*  
*Michael Thomas, w/attachment*  
*Paul Liles, w/attachment*

# REVISED PROJECT CONCEPT REPORT

## Need and Purpose:

The proposed improvement is to widen Old Petersburg Road from Baston Road to Old Evans Road and extend it on new location to Washington Road (SR-104). The existing two lane facility is proposed for improvement to four through lanes with bike lanes, sidewalks, and a 20 foot raised median with turn lanes as necessary. The western terminus, Washington Road (SR-104), serves as a major traffic distribution point. The eastern terminus adjoins STP-7063(2), the widening of Old Petersburg Road from Baston Road to east of Pleasant Home Road at River Watch Parkway. From Pleasant Home Road, River Watch Parkway proceeds southeasterly toward downtown Augusta as a four-lane divided highway. Old Petersburg Road is functionally classified as an urban principal arterial.

River Watch Parkway/Old Petersburg Road is a major commuter route between rapidly growing Columbia County and employment and service sectors of Augusta-Richmond County. Land-use along Old Petersburg Road is primarily residential with commercial nodes located at Old Evans Road and Baston Road. The U.S. Census Bureau estimates that between 1990 and 2000, Columbia County's population increased 35.2% from 66,031 in 1990 to 89,288 in 2000. Retail opportunities are increasing in support of the explosive residential growth. Columbia County's rapid growth is expected to continue and will only exacerbate travel conditions on Columbia County's once rural roadways.

## Description:

Widen the existing section of Old Petersburg Road from near Baston Road to Old Evans Road. From this point, the route would follow Old Evans Road to Columbia Industrial Boulevard and then extend westward on new location to Washington Road (SR-104) at its intersection with Towne Center Drive (Hereford Farm Road Extension). A new bridge would be constructed to separate the new roadway from the CSX Railroad. By the Year 2024, design traffic is forecasted to be 36,500 vehicles per day (vpd).

## Function:

This project would distribute traffic at Washington Road and to Belair Road by way of Towne Center Drive, an existing five-lane facility. In addition, this project would provide cross-county traffic movement to I-20 by direct linkage to Hereford Farm Road. With the linkage to Old Petersburg/River Watch Parkway, Hereford Farm Road would supplement I-20 and Columbia Road (SR-232) in serving cross-county travel demand.

**OTHER PROJECTS WITHIN AREA**

PROJECT NUMBERS	DESCRIPTION	PROGRAMMING
STP-2120(4) PI# 245200	Realign North Belair with Belair Road and widen from Washington Road (SR 104) to Fury's Ferry Road (SR 28)	CST 2005
STP-7062(1) PI# 250600	Widen Flowing Wells Road from Wheeler Road to Washington Road (SR 104)	CST in FY 2004
STP-076-1(32) PI# 231710	Widen & reconstruct with raised median Washington Road (SR 104), from Flowing Wells to Halali Farm	CST in Long Range

**REGIONAL PLAN**

During 1999, the ARTS 2020 Plan was amended to reflect travel conditions in the year 2025. The proposed project is included in the ARTS Adopted 2025 Plan. The proposed improvement is included in the FY 2003-2005 ARTS Transportation Improvement Program (TIP) and the FY 2004-2006 Tier 2 Element for construction in FY 2006. The transportation study is a comprehensive, cooperative, and continuing transportation planning process conducted by the local governments and the Georgia Department of Transportation in cooperation with the U.S. Department of Transportation.

**Project Location:** Old Petersburg Road in Columbia County, Georgia, from Baston Road (MP 2.63) to Old Evans Road (MP 0.60 on Old Petersburg Road, MP 1.25 on Old Evans Road). From this point, the project will follow Old Evans Road to Columbia Industrial Boulevard (MP 0.65) and then extend westward on new location and tie into Washington Road at its intersection with Towne Center Drive (MP 4.09 on Washington Road). The project length is 2.5 miles.

**Description of the approved concept:** The approved concept is to widen the existing Old Petersburg Road from Baston Road to Old Evans Road. From this point, the project will follow Old Evans Road to Columbia Industrial Boulevard and then extend westward on new location and tie into Washington Road at its intersection with Towne Center Drive. The approved typical section is four lanes (two lanes in each direction) with 4-foot bike lanes, curb and gutter, sidewalks, and a 20-foot raised median. The minimum width of right of way is 100 feet. The approved concept also includes a bridge over the CSX Railroad.

**PDP Classification:** Major X                      Minor \_\_\_\_\_

**Federal Oversight:** Full Oversight ( ),    Exempt ( X ),    State Funded ( ),    Other ( )

**Functional Classification:** Urban Arterial

**U. S. Route Number(s):** N/A                                      **State Route Number(s):** N/A





# Preliminary Plans Cost Estimate

**Project No.:** STP-7063(1)  
**County:** Columbia  
**Date:** 5-Jun-02  
**Description:** Old Petersburg Road Widening and Reconstruction  
**Comments:** Preliminary Plans Cost Estimate

**Existing Roadway:** Two 12' Lanes with variable width graded shoulder

<b>Traffic:</b>	<b>Initial Design Year</b> 23750 (2001)	<b>Final Design Year</b> 41500 (2021)
-----------------	--	--

- ( ) Programming Process
- ( ) Concept Development
- (x) During Project Development

## Project Costs:

<b>Right-of-way</b>	As of 3-22-99 Revised Concept	1	lump sum	\$ 11,100,000.00	\$	11,100,000.00
<b>Utilities</b>	As of Date: 27-Mar-02	1	lump sum	\$ 836,992.56	\$	836,992.56

## Construction Costs

### A. Major Structures

Bridge over CSX	1	lump sum	\$ 1,018,000.00	\$	1,018,000.00
Bridge over Reed Creek	1	lump sum	\$ 1,500,000.00	\$	1,500,000.00
9 Retaining Walls	170	Cu. Yd. @	\$ 375.00	\$	63,750.00
Sound Barrier	9900	Sq. Ft. @	\$ 18.60	\$	184,140.00
Concrete Side Barrier	550	Lin. Ft. @	\$ 184.00	\$	101,200.00
<b>Triple 10'X10' Box Culvert Alternative @ Wyngate Tributary</b>					
Concrete	710	Cu. Yd. @	\$ 400.00	\$	284,000.00
Bar Reinf. Steel	14800	lb @	\$ 0.62	\$	9,176.00
Foundation Backfill	285	Cu. Yd. @	\$ 40.00	\$	11,400.00
<b>SUBTOTAL</b>					<b>\$ 3,171,666.00</b>

### B. Grading & Earthwork

Borrow	540080	Cu. Yd. @	\$ 3.00	\$	1,620,240.00
Excavation	90136	Cu. Yd. @	\$ 3.00	\$	270,408.00
<b>SUBTOTAL</b>					<b>\$ 1,890,648.00</b>

### C. Drainage

#### 1 Longitudinal System

15 inch	Concrete Pipe	11654	Lin. Ft. @	\$ 33.00	\$	384,582.00
18 inch	Concrete Pipe	5388	Lin. Ft. @	\$ 33.00	\$	177,804.00
24 inch	Concrete Pipe	4970	Lin. Ft. @	\$ 36.00	\$	178,920.00
30 inch	Concrete Pipe	2436	Lin. Ft. @	\$ 50.00	\$	121,800.00
36 inch	Concrete Pipe	952	Lin. Ft. @	\$ 53.00	\$	50,456.00
42 inch	Concrete Pipe	3040	Lin. Ft. @	\$ 63.00	\$	191,520.00
48 inch	Concrete Pipe	312	Lin. Ft. @	\$ 85.00	\$	26,520.00
15 inch	F.E.S.	17	EA @	\$ 400.00	\$	6,800.00
18 inch	F.E.S.	32	EA @	\$ 500.00	\$	16,000.00
24 inch	F.E.S.	7	EA @	\$ 500.00	\$	3,500.00

36 inch F.E.S.	4	EA @	\$	800.00	\$	3,200.00
<b>2 Side Drain</b>						
18 inch Concrete Pipe	364	Lin. Ft. @	\$	22.00	\$	8,008.00
24 inch Concrete Pipe	136	Lin. Ft. @	\$	30.00	\$	4,080.00
<b>3 Slope Drain</b>						
15 inch CMP	430	Lin. Ft. @	\$	23.00	\$	9,890.00
<b>4 Drainage Structures</b>						
Catch Basins, GP1	232	EA @	\$	1,800.00	\$	417,600.00
Catch Basins, GP2	4	EA @	\$	1,900.00	\$	7,600.00
Drop Inlets	10	EA @	\$	1,600.00	\$	16,000.00
Storm Sewer Manhole	30	EA @	\$	1,500.00	\$	45,000.00
Outlet Control Structure	2	EA @	\$	1,600.00	\$	3,200.00
Additional Depth	445	Lin. Ft. @	\$	200.00	\$	89,000.00
<b>5 Other Items</b>						
Rip Rap	300	Sq. Yd. @	\$	40.00	\$	12,000.00
Filter Fabric	300	Sq. Yd. @	\$	3.00	\$	900.00
<b>SUBTOTAL</b>					\$	<b>1,774,380.00</b>

**D. Base & Paving**

<b>1 Asphalt Paving</b>						
12.mm Asph Conc	19510	Tons @	\$	45.00	\$	877,950.00
19 mm Asph Conc	24700	Tons @	\$	45.00	\$	1,111,500.00
25 mm Asph Conc	34250	Tons @	\$	38.00	\$	1,301,500.00
Leveling	2600	Tons @	\$	40.00	\$	104,000.00
Tack Coat	28622	Gal @	\$	1.00	\$	28,622.00
<b>2 Graded Aggregate Base</b>						
10 inch Graded Aggregate	120745	Tons @	\$	11.00	\$	1,328,195.00
<b>SUBTOTAL</b>					\$	<b>4,751,767.00</b>

**E. Concrete Work**

<b>1 Concrete Median</b>						
Approach Slabs	600	Sq. Yd. @	\$	115.00	\$	69,000.00
Valley Gutter 6 inch	2300	Sq. Yd. @	\$	34.00	\$	78,200.00
Driveway Concrete	1000	Sq. Yd. @	\$	28.00	\$	28,000.00
Conc Spillway	1	ea @	\$	1,300.00	\$	1,300.00
Conc Curb Curb & Gutter TP 2	63300	Lin. Ft. @	\$	15.20	\$	962,160.00
Conc Curb Curb & Gutter TP 7	34500	Lin. Ft. @	\$	15.40	\$	531,300.00
Concrete Sidewalk 4 inch	35587	Sq. Yd. @	\$	36.84	\$	1,311,025.08
Concrete Headwall	13.5	Cu. Yd. @	\$	675.00	\$	9,112.50
Class B Conc., Base/Pvmt W	3000	Sq. Yd. @	\$	144.00	\$	432,000.00
<b>SUBTOTAL</b>					\$	<b>4,602,832.58</b>



## Construction Cost Summary

	<i>Right of Way</i>	\$	11,100,000
	<i>Utilities</i>	\$	836,993
<b>A.</b>	<b>Major Structures</b>	\$	3,171,666
<b>B.</b>	<b>Grading &amp; Earthwork</b>	\$	1,890,648
<b>C.</b>	<b>Drainage</b>	\$	1,774,380
<b>D.</b>	<b>Base &amp; Paving</b>	\$	4,751,767
<b>E.</b>	<b>Concrete Work</b>	\$	4,602,833
<b>F.</b>	<b>Signing &amp; Striping</b>	\$	252,145
<b>G.</b>	<b>Traffic Signals</b>	\$	1,080,000
<b>H.</b>	<b>Guardrail</b>	\$	100,000
<b>I.</b>	<b>Traffic Control</b>	\$	400,000
<b>J.</b>	<b>Clearing &amp; Grubbing</b>	\$	527,000
<b>K.</b>	<b>Grassing/Landscaping</b>	\$	229,500
<b>L.</b>	<b>Erosion Control</b>	\$	800,000
<b>M.</b>	<b>Miscellaneous</b>	\$	163,039
	<b>SUBTOTAL ROADWAY ITEMS</b>	\$	<b>19,742,978</b>
	years inflation                      3 @                      5%		<b>3,111,987</b>
	<b>10% E &amp; C</b>	\$	<b>2,285,496</b>
	<b>TOTAL CONSTRUCTION ESTIMATE</b>	\$	<b>25,140,461</b>

DEPARTMENT OF TRANSPORTATION

STATE OF GEORGIA

RECEIVED

OCT 30  
Joe

Office of Consultant

INTERDEPARTMENT CORRESPONDENCE

**FILE** STP-7063(1) Columbia County  
PI No.: 250470

**OFFICE** Atlanta, Georgia

**DATE** October 30, 2002

**FROM** David Mulling, Project Review Engineer *MSL*

**TO** James B. Buchan, State Consultant Design Engineer

**SUBJECT** DESIGN EXCEPTION REQUEST

Attached is the approved Design Exception request for the above referenced project.

MSL

c: Mark Lawing

DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA



INTERDEPARTMENT CORRESPONDENCE

FILE STP-7063(1) Columbia County  
Widening and Reconstruction of  
Old Petersburg Road/Old Evans Road  
P. I. Number 250470

OFFICE Atlanta, Georgia

DATE October 18, 2002

*James B. Buchan*  
FROM James B. Buchan, P. E., State Consultant Design Engineer  
TO David Mulling, P. E., Project Review Engineer

**SUBJECT Design Exception Request**

The approved concept for the above referenced project is for widening and improvements to Old Petersburg Road. The typical section is a four-lane (two 12 foot lanes in each direction) roadway with bike lanes and a 20 foot raised median. The roadway will have urban shoulders which includes curb and gutter and sidewalks. Right-of-way is to be purchased by the Department. The area is primarily residential but has several strip center type businesses, apartment complexes and industrial businesses.

The posted speed limit is 45 mph along Old Petersburg through the project limits. The design speed for the project is 45 mph. The posted speed limit for Blue Ridge Drive is 30 mph and the design speed is 35 mph. The posted speed for Old Evans Road is 45 mph and the design speed is 45 mph. The posted speed limit for Sydney Street is 25 mph and the design speed is 25 mph. The posted speed limit for Clark Pointe Circle is 35 mph and the design speed is 35 mph.

Copies of the location map, plan sheets, profile sheets, cost estimates, traffic diagrams and accident history are attached to this letter.

The four design exceptions are as follows:

- 1) The first design exception requested is for the vertical crest curve on Blue Ridge Drive. The proposed road has a vertical curve with a K value of 17, which is less than the minimum K value (29) required by AASHTO guidelines for 35 mph. The proposed vertical curve matches existing conditions and meets the speed design criteria (minimum K = 12) for 25 mph.

Existing Blue Ridge Drive is a side street that currently ties into Old Evans Road at a three-way intersection. The proposed alignment will create a four-way

intersection between Old Petersburg Road and Old Evans Road/Blue Ridge Drive. The proposed vertical alignment of Old Evans Road/ Blue Ridge Drive is constrained on one end where it ties to the cross slope of Old Petersburg Road (See the attached profile sheets 10-10 and 10-11). It then projects to match the existing profile on Blue Ridge Drive. The realignment of the vertical curve to satisfy the AASHTO required K value would result in increased right of way cost and relocation of 4 to 5 residences. Also, the excavation of the existing road would create difficulties in staging the construction with the addition of another detour. Finally this would require extensive excavation into the existing road.

The design exception can be mitigated by reducing the posted speed limit to 25 mph for this section of Blue Ridge Drive.

- 2) The second design exception requested is for the superelevation in a horizontal curve on Old Evans Road/Blue Ridge Drive at the intersection of Old Petersburg Road. The proposed superelevation (1.4%) is less than the AASHTO guideline required super elevation (3.6%).

The proposed horizontal curve on Old Evans Road/Blue Ridge Drive intersects through Old Petersburg Road. The proposed vertical alignment of Old Petersburg Road is sloping upward at 1.4% through the Old Evans Road/Blue Ridge Drive alignment. In order to match the cross slope of Old Petersburg Road, the superelevation on the horizontal curve of Old Evans Road/Blue Ridge Drive is proposed to be reversed at -1.4%. If the AASHTO required 3.6% superelevation rate is held through the intersection then both the Old Petersburg Road and the Old Evans/Blue Ridge vertical alignments would need to be revised. This would cause increased fill quantities and widened construction limits. The result would escalate right of way cost, including 2 to 3 residential displacements, acquisition of an apartment complex building, significant parking area loss for a grocery store, and larger easement for construction and maintenance of slope areas due to increased fill quantities. Please refer to the attached plan sheets 8-11, 8-12, 8-13, 8-43, and 8-44.

It should be noted that the Old Petersburg Road/Old Evans Road/Blue Ridge Drive intersection will be signalized. This will mitigate the effects of having the reversed superelevation.

- 3) The third design exception requested is for the vertical crest and sag curves on Sydney Street. The proposed road has a sag vertical curve with a K value (6) that is less than the minimum K value (26) required by AASHTO guidelines. The sag vertical curve falls below any of the criteria listed in the Green Book. The proposed profile closely matches existing conditions and the Sydney Street

approach (the sag vertical curve) to Old Evans Road is a stop condition. See the attached profile sheet 10-12.

Existing Sydney Street is a side street that currently ties into Old Evans Road. The existing vertical alignment of Sydney Street has a grade of 14.2 %. It would require an extensive realignment of the existing road in order to meet minimum requirements for the vertical curve. This would result in increased right of way cost and the relocation of one residence. The five-year accident data from January 1997 to January 2002 does not indicate any accidents at the intersection of Old Evans Road and Sydney Street due to the existing vertical alignment conditions. Therefore, the intersection of Sydney Street and Old Evans Road is currently operating satisfactorily and safely.

The design exception can be mitigated by reducing the posted speed limit to 20 mph for this section of Sydney Street.

- 4) The fourth design exception requested is for the vertical crest and sag curves on Clark Pointe Circle. The proposed road has a crest vertical curve with a K value (21) that is less than the minimum K value (29) required by AASHTO guidelines. The proposed road also has a sag vertical curve with a K value (39) that is less than the minimum K value (49) required by AASHTO guidelines. The proposed profile attempts to match the existing profile which has a steep grade between 13% and 14%. To closely match this condition, and to best fit the profile, a grade of 15% is proposed. This meets the maximum allowable grade for local roads and streets given in the Green Book. In order to meet the K values for 35 mph, there will be additional property impacts involved, including the entrance to Cactus Trail Circle. The volume and cost of earthwork will also be greatly increased. By striving to obtain a flatter grade, the construction limits along Clark Pointe Circle would be pushed further back and would encroach on an existing horizontal curve that has a radius of 231ft. This existing horizontal curve does not meet the Green Book requirements for minimum radius for 35 mph. The curve would require re-alignment or another design exception. In the two year traffic study, there were 8 recorded accidents at the Old Petersburg Road/Clark Pointe Circle intersection. However, the Clark Pointe Circle approach to Old Petersburg Road will be a signalized stop condition which will make for a more controlled traffic movement. For further detail, see the attached profile sheet 10-16.

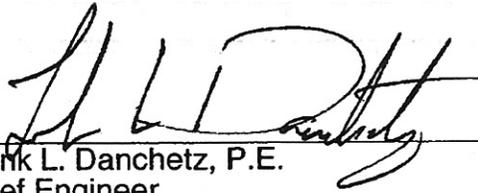
The design exception can be mitigated by reducing the posted speed limit to 25 mph for this section of Clark Pointe Circle.

David Mulling  
October 18, 2002  
Page Four

It is requested that these design exceptions be approved. If there are any questions, contact Joe Wheeler at (404)657-9759.

*ms jdw*  
JBB:EJF:jdw  
Attachment

APPROVED:

  
\_\_\_\_\_  
Frank L. Danchetz, P.E.  
Chief Engineer

# *Value Engineering Process*

# ***VALUE ENGINEERING PROCESS***

## **INTRODUCTION**

This report summarizes the analysis and conclusions by the PBS&J Value Engineering team as they performed a VE study during the period of January 22 - 25, 2007 in Atlanta, Georgia for the Georgia Department of Transportation.

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

Les Thomas, P.E., CVS-Life, PBS&J	Certified Value Specialist/VE Team Leader
Chris Carbutto, P.E., PBS&J	Highway Design Engineer
Ramesh Kalvakaalva, P.E., CSI	Structures Engineer
Gary King, PBS&J	Highway Construction Specialist

The Value Engineering team followed the six step Value Engineering job plan as promulgated by SAVE International. This six step job plan includes the following:

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

- **Preserve Roadway Integrity**
  - **Preserve Roadway Serviceability, and**
  - **Preserve Roadway Safety**
- **Project Basic Functions**
  - **Enhance Travel Experience**
  - **Improve Roadway Surface**
  - **Meet AASHTO/GDOT Standards**
  - **Correct Bridge Clearance**
- **Creative/Brainstorming Phase** – The VE team performed a brainstorming session to identify ideas that might help meet the project objectives:
  - Reduce construction and life cycle costs
  - Improve roadway operations
  - Reduce the time of construction
  - Clarify risks and opportunities associated with the project and acts to mitigate risks and to act on opportunities.

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

- **Judgment/Evaluation Phase** – Once the team identified the creative ideas, it was necessary to decide which alternatives should be carried forward. This is the work of the Judgment or Evaluation Phase. The team reflected back on the project constraints and objectives shared with the team by the owner's representatives, in the kick-off meeting on the first day of the workshop. From that guidance, the team selected the following values as measures of whether or not an alternative had enough merit to be carried forward in the VE process:
  - Construction Cost Savings
  - Maintainability
  - Ability to Implement the Idea
  - General Acceptability of the Alternatives
  - Constructability

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

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

- **Presentation Phase** – As noted earlier, the team made a final, informal out-briefing on the last day of the workshop, designed to inform the Owners and the Designers of the initial findings of the VE workshop. This written report is intended to formalize those findings.

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

Item Description	Item Number	Quantity	Units	Unit Price	Cost	PERCENT	CUM. PERCENT
BORROW EXCAV, INCL MATL	2006-0002	498,288	CY	\$6.31	\$3,144,197.28	12.12%	12.12%
RECYCLED ASPH CONC 25 MM SUPERPAVE,	402-3143	34,250	TN	\$89.13	\$3,052,702.50	11.77%	23.89%
GR AGGR BASE CRS, INCL MATL	310-1101	138,180	TN	\$17.17	\$2,372,550.60	9.15%	33.04%
CONST BRIDGE TO BOTTOM OF CAP	543-1100	1	LS	\$1,500,000.00	\$1,500,000.00	5.78%	38.82%
RECYCLED ASPH CONC 19 MM SUPERPAVE,	402-3112	27,805	TN	\$47.91	\$1,332,137.55	5.14%	43.96%
RECYCLED ASPH CONC 12.5 MM SUPERPAVE,	402-3113	19,510	TN	\$67.71	\$1,321,022.10	5.09%	49.05%
CONC SIDEWALK, 4 IN	441-0104	28,106	sy	\$37.12	\$1,043,294.72	4.02%	53.07%
CONST OF BRIDGE TO BOTTOM OF CAP	543-1100	1	LS	\$1,018,000.00	\$1,018,000.00	3.92%	57.00%
CLEARING & GRUBBING -	201-1500	1	LS	\$1,000,000.00	\$1,000,000.00	3.86%	60.86%
CONC CURB & GUTTER: 12 IN X 30 IN TP 2	441-6725	63,300	LF	\$12.20	\$772,260.00	2.98%	63.83%
TRAFFIC SIGNAL INSTALLATION NO-	647-1000	1	LS	\$750,000.00	\$750,000.00	2.89%	66.72%
STORM DRAIN PIPE 18 IN H 1-10	550-1180	16,931	LF	\$41.02	\$694,509.62	2.68%	69.40%
CONC CURB & GUTTER 12 IN X 30 IN TP 7	441-6730	34,500	LF	\$16.30	\$562,350.00	2.17%	71.57%
DRIVEWAY CONCRETE 6 IN THICK	441-0016	13,836	SY	\$39.88	\$551,779.68	2.13%	73.70%
TRAFFIC CONTROL -	150-1000	1	LS	\$500,000.00	\$500,000.00	1.93%	75.63%
CATCH BASIN GP 1	668-1100	203	EA	\$2,277.92	\$462,417.76	1.78%	77.41%
CLASS A CONCRETE RETAINING WALL	500-3107	1,018	CY	\$442.98	\$450,953.64	1.74%	79.15%
<b>RECYCLED ASPH CONC 9.5 MM SUPERPAVE,</b>	<b>402-3110</b>	<b>7,509</b>	<b>TN</b>	<b>\$57.29</b>	<b>\$430,190.61</b>	<b>1.66%</b>	<b>80.81%</b>
CONC HEADWALLS	500-3101	710	CY	\$578.66	\$410,848.60	1.58%	82.39%
CONCRETE MEDIAN 6 IN	441-0748	9,554	SY	\$38.26	\$365,536.04	1.41%	83.80%
STORM DRAIN PIPE 42 IN H 1-10	550-1420	2,789	IF	\$117.83	\$328,627.87	1.27%	85.07%
DRIVEWAY CONCRETE, 8 IN THICK	441-0018	7,509	SY	\$41.96	\$315,077.64	1.21%	86.28%
CONSTRUCTION EXIT	163-0300	100	EA	\$2,872.37	\$287,237.00	1.11%	87.39%
STORM DRAIN PIPE 24 IN H 1-10	550-1240	4,157	LF	\$53.78	\$223,563.46	0.86%	88.25%
SOUND BARRIER, TYPE B. 0-10 FT HT	624-0101	10,674	SF	\$20.74	\$221,378.76	0.85%	89.10%
RECYCLED ASPH CONC LEVELING, INCL MATL	402-1811	2,600	TN	\$72.70	\$189,020.00	0.73%	89.83%
MULCH	163-6240	1,012	TN	\$183.84	\$186,046.08	0.72%	90.55%
DROP INLET GP 1	668-2100	41	EA	\$4,470.97	\$183,309.77	0.71%	91.26%
STORM DRAIN PIPE, 30 IN. H 1-10	550-1300	2,287	LF	\$65.92	\$150,759.04	0.58%	91.84%
GUARDRAIL TP W	641-1200	6,501	LF	\$18.54	\$120,528.54	0.46%	92.30%
CHECK	163-0530	28,190	LF	\$3.67	\$103,457.30	0.40%	92.70%
REINF CONC APPROACH SIAB	433-1000	760	sy	\$135.15	\$102,714.00	0.40%	93.10%
CONC VALLEY GUTTER 6 IN	441-4020	2,300	SY	\$38.30	\$88,090.00	0.34%	93.44%
CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	163-0550	284	EA	\$308.76	\$87,687.84	0.34%	93.78%
FIELD ENGINEERS OFFICE TP 3	153-1300	1	EA	\$75,272.56	\$75,272.56	0.29%	94.07%
STORM SEWER MANHOLE, TP 1	668-4300	32	EA	\$2,213.53	\$70,832.96	0.27%	94.34%
MAINTENANCE OF CONSTRUCTION EXIT	165-0101	100	EA	\$660.01	\$66,001.00	0.25%	94.59%
BAR REINF	511-1000	69,210	LB	\$0.95	\$65,749.50	0.25%	94.85%
CLASS B CONC BASE OR PVMT WIDENING	500-9999	273	CY	\$196.43	\$53,625.39	0.21%	95.05%
STORM DRAIN PIPE, 36 IN. H 1-10	550-1360	678	LF	\$77.97	\$52,863.66	0.20%	95.26%
BITUM TACK COAT	413-1000	28,622	GL	\$1.84	\$52,664.48	0.20%	95.46%
CATCH BASIN, GP 1, AODI DEPTH	668-1110	205	LF	\$234.95	\$48,164.75	0.19%	95.65%
CONCRETE SIDE BARRIER TYPE 2	621-4020	200	Lf	\$239.25	\$47,850.00	0.18%	95.83%
PERMANENT GRASSING	700-6910	48	AC	\$906.91	\$43,531.68	0.17%	96.00%
TEMPORARY SILT FENCE TYPE C	171-0030	11,090	LF	\$3.84	\$42,585.60	0.16%	96.16%
GHY OF WAY MARKERS	634-1200	400	EA	\$104.82	\$41,928.00	0.16%	96.32%
THERMO TRAFIC STRIPE 5" W	653-1501	64,830	LF	\$0.63	\$40,842.90	0.16%	96.48%
THERMO TRAFIC STRIPE 5" Y	653-1502	53,195	LF	\$0.69	\$36,704.55	0.14%	96.62%
STORM DRAIN PIPE, 48 IN. H 1-10	550-1480	253	Lf	\$130.46	\$33,006.38	0.13%	96.75%
CHECK	165-0070	14,095	LF	\$2.29	\$32,277.55	0.12%	96.87%
MAINTENANCE OF INLET SEDIMENT TRAP	165-0105	284	EA	\$110.84	\$31,478.56	0.12%	97.00%
GALV STEEL POSTS, TP 4	636-2040	4,214	LF	\$7.40	\$31,183.60	0.12%	97.12%
GUARDRAIL ANCHORAGE TP 12	641-5012	16	EA	\$1,871.80	\$29,948.80	0.12%	97.23%
GUARDRAIL TP T	641-1100	535	Lf	\$51.47	\$27,536.45	0.11%	97.34%

Project: STP-7063(1) -- Georgia Department of Transportation

Pareto Costs

**DRSI**

Description	Code	Quantity	Unit	Rate	Total Cost	Percentage	Cumulative
FOUND BKFILL TPII	207-0203	539	CY	\$50.55	\$27,246.45	0.11%	97.44%
STORMDRAIN PIPE 18 IN H 10-15	550-1181	675	LF	\$38.95	\$26,291.25	0.10%	97.54%
EROSION CONTROL MATS SLOPES	716-2000	22,760	SY	\$1.15	\$26,174.00	0.10%	97.65%
CONCRETE SIDE BARRIER TYPE 7R	621-4080	350	Lf	\$68.00	\$23,800.00	0.09%	97.74%
REINF CONC APPROACH SLAB	433-1000	171	SY	\$135.15	\$23,110.65	0.09%	97.83%
STORM DRAIN PIPE. 36 IN. H 10-15	550-1361	234	LF	\$93.97	\$21,988.98	0.08%	97.91%
CONC HEADWALLS	441-0600	23	CY	\$900.00	\$20,700.00	0.08%	97.99%
SOUND BARRIER TYPE 8, 0-10 FT HT	624-0101	990	SF	\$20.74	\$20,532.60	0.08%	98.07%
CONSTRUCT AND REMOVE TEMP PIPE SLOPE DRAIN	163-6501	22	EA	\$924.07	\$20,329.54	0.08%	98.15%
THERMO TRAFIC STRIPE 5" W	653-3501	39,960	GIF	\$0.48	\$19,180.80	0.07%	98.22%
STORM DRAIN PIPE 18 IN H 20-25	550-1183	389	LF	\$47.72	\$18,563.08	0.07%	98.29%
FERTILIZER MIXED GRADE	700-8000	53	TN	\$348.14	\$18,451.42	0.07%	98.37%
FLAIRED END SECTION 18 IN STORM DRAIN	550-4218	25	EA	\$678.07	\$16,951.75	0.07%	98.43%
CHECKS	163-0520	1,025	LF	\$16.16	\$16,564.00	0.06%	98.49%
TEMP GRASSING	163-0232	28	AC	\$571.97	\$16,015.16	0.06%	98.56%
SLOPE DRAIN PIPE, 15 IN	576-1015	430	LF	\$35.11	\$15,097.30	0.06%	98.61%
STORM DRAIN PIPE. 42 IN. H 20-25	550-1423	147	LF	\$100.00	\$14,700.00	0.06%	98.67%
HIGHWAY SIGNS, TP 1 Man. RER. SHEETING TP6	636-1031	530	SF	\$26.99	\$14,304.70	0.06%	98.73%
STN DUMPED RIP RAP TP 1 24 IN	603-2024	255	SY	\$53.68	\$13,688.40	0.05%	98.78%
CONSTRUCT AND REMOVE SILT CONTROL	163-0521	66	EA	\$198.82	\$13,122.12	0.05%	98.83%
STN DUMPED RIP RAP TP 3 24 IN	603-2182	248	SY	\$48.61	\$12,055.28	0.05%	98.88%
STORM SEWER MANHOIE, TP 1, ADDI DEPTH, 1.2	668-4312	44	LF	\$271.43	\$11,942.92	0.05%	98.92%
SOLID TRAF STRIPE. 6 IN. WHITE	652-5301	22,690	LF	\$0.52	\$11,798.80	0.05%	98.97%
GUARDRAIL ANCHORAGE TP 1	641-5001	19	EA	\$617.35	\$11,729.65	0.05%	99.01%
THERMOPLASTIC PVMT MARKING, ARROW, TP 2	653-0120	161	EA	\$72.67	\$11,699.87	0.05%	99.06%
	651-1054	2,395	LF	\$4.82	\$11,543.90	0.04%	99.10%
STORM SEWER MANHOIE, TP I, ADDI DEPTH, 1.1	668-4311	36	LF	\$294.92	\$10,617.12	0.04%	99.14%
SIDE DRAIN PIPE 18 IN H 1-10	550-2180	364	LF	\$28.99	\$10,552.36	0.04%	99.18%
STORM DRAIN PIPE, 18 IN, H 15-20	550-1182	204	LF	\$50.48	\$10,297.92	0.04%	99.22%
MAINTENANCE OF TEMP SILT FENCE TPC	165-0030	5,545	LF	\$1.83	\$10,147.35	0.04%	99.26%
STORM DRAIN PIPE 24 IN H 10-15	550-1241	190	LF	\$52.14	\$9,906.60	0.04%	99.30%
TEMP SILT FENCE	171-0010	5,490	LF	\$1.80	\$9,882.00	0.04%	99.34%
DROP INLET GP 1 ADDL DEPTH	668-2110	36	Lf	\$267.06	\$9,614.16	0.04%	99.38%
THERMO TRAFIC STRIPE 24	653-1704	1,750	LF	\$5.02	\$8,785.00	0.03%	99.41%
CONSTRUCT AND REMOVE SEDUNEBT BASIN TP1	163-6531	1	EA	\$8,070.58	\$8,070.58	0.03%	99.44%
STORM DRAIN PIPE 30 IN H 10-15	550-1301	109	LF	\$73.18	\$7,976.62	0.03%	99.47%
DROP INLET GP 2	668-2200	2	EA	\$3,725.62	\$7,451.24	0.03%	99.50%
PLAINN CONC DITCH PAVING, 4 IN	441-0204	208	SY	\$33.76	\$7,022.08	0.03%	99.53%
MAINTENANCE OF SILT CONTROL GATE TP 1	165-0085	22	EA	\$313.22	\$6,890.84	0.03%	99.55%
HIGHWAY SIGNS, TP 1 MATI., REFI. SHEETING, TP3	636-1020	439	Sf	\$15.31	\$6,721.09	0.03%	99.58%
GALV STEEL POSTS TP 3	636-2030	1,062	LF	\$6.28	\$6,669.36	0.03%	99.61%
DROP INLET: GP 2. ADDL DEPTH	668-2210	17	Lf	\$337.50	\$5,737.50	0.02%	99.63%
THERMO TRAFIC STRIPE 8"	653-6004	2,020	SY	\$2.79	\$5,635.80	0.02%	99.65%
STORM DRAIN PIPE 48 IN H 15-20	550-1482	50	LF	\$112.00	\$5,600.00	0.02%	99.67%
FIELD FENCE SPCL DESIGN	643-0155	550	LF	\$10.00	\$5,500.00	0.02%	99.69%
THERMO TRAFIC STRIPE 8"	653-6006	1,655	51	\$3.21	\$5,312.55	0.02%	99.71%
MAINT OF EROSION CHECK DAMS DITCH CHECKS	165-0040	66	EA	\$79.16	\$5,224.56	0.02%	99.73%
STN DUMPEORIP RAP, IP 3 18 IN	603-2181	113	SY	\$45.10	\$5,096.30	0.02%	99.75%
FERTILIZER NITROGEN. CONTENT	700-8100	2,410	L8	\$2.04	\$4,916.40	0.02%	99.77%
SIDE DRAIN PIPE. 24 IN. H 1-10	550-2240	136	LF	\$35.23	\$4,791.28	0.02%	99.79%
PREFORMED PLASTIC SOLID PVMT MKG 5' Y TP PB	6S1-60S4	930	LF	\$4.69	\$4,361.70	0.02%	99.81%
STORM DRAIN PIPE. 42 IN. H 10-15	SSO-1421	44	LF	\$93.60	\$4,118.40	0.02%	99.82%
PREFORMED PLASTIC SKP PVMT MKG 5' Y TP PB	651-3054	1,130	GIF	\$3.63	\$4,101.90	0.02%	99.84%
THERMO TRAFIC STRIPE 8"	653-1804	1,975	LF	\$1.99	\$3,930.25	0.02%	99.85%
FLAIRED END SECTION 24 IN. STORM DRAIN	550-4224	4	EA	\$882.93	\$3,531.72	0.01%	99.87%
STORM SEWER MANHOLE. TP 2	668-4400	1	fA	\$3,498.39	\$3,498.39	0.01%	99.88%
PLASTIC FILTER FABRIC	603-7000	635	SY	\$4.83	\$3,067.05	0.01%	99.89%

**Project: STP-7063(1) -- Georgia Department of Transportation**

**Pareto Costs**

**DRSJ**

RAISED PVMT MARKERS TP 3	654-1003	800	EA	\$3.78	\$3,024.00	0.01%	99.90%
AGRICULTURAL LIME	700-7000	48	TN	\$58.05	\$2,786.40	0.01%	99.92%
FLAIRED END SECTION 30 IN. STORM DRAIN	550-4230	3	EA	\$909.32	\$2,727.96	0.01%	99.93%
MAINTENANCE OF TEMP SILT FENCE TP A	165-0010	2,745	LF	\$0.93	\$2,552.85	0.01%	99.94%
LIQUID LIME	700-7010	121	GI	\$19.30	\$2,335.30	0.01%	99.94%
CONC SPILLWAY TP 3	441-0303	1	EA	\$2,142.06	\$2,142.06	0.01%	99.95%
RECONSTR STORM SEW MANHOLE TYPE 1	611-3030	1	EA	\$1,768.60	\$1,768.60	0.01%	99.96%
RAISED PVMT MARKERS TP 1	654-1001	360	EA	\$3.64	\$1,310.40	0.01%	99.96%
MAINTENANCE OF TEMP SEDIMENTS BASIN	165-0060	1	EA	\$1,213.72	\$1,213.72	0.00%	99.97%
STORM SEWER MANHOLE, TP 2., AODI DEPTH, CL1	668-4411	3	LF	\$384.40	\$1,153.20	0.00%	99.97%
T'HERMOPLASTIC PVMT MARKING, ARROW, TP	653-0170	14	EA	\$80.60	\$1,128.40	0.00%	99.98%
T'HERMOPLASTIC PVMT MARKING, WORD	653-0210	10	EA	\$108.18	\$1,081.80	0.00%	99.98%
SOLID TRAFFIC STRIPE. 5 IN WHITE	652-5451	3,855	LF	\$0.26	\$1,002.30	0.00%	99.99%
BITUMINOUS TREATED ROVING WATERWAYS	715-2200	490	SY	\$1.95	\$955.50	0.00%	99.99%
STN DUMPED RIP RAP, IP 1 18IN	603-2018	19	SY	\$48.11	\$914.09	0.00%	99.99%
T'HERMOPLASTIC PVMT MARKING, ARROW, TP	653-0110	12	EA	\$70.04	\$840.48	0.00%	100.00%
T'HERMOPLASTIC PVMT MARKING, ARROW, TP 3	653-0130	8	EA	\$100.32	\$802.56	0.00%	100.00%
THERMO TRAFIC STRIPE 5" Y	653-3502	190	GIF	\$0.36	\$68.40	0.00%	100.00%

Subtotal \$ 25,936,715 100.00%

INCL \$ 2,593,672

INCL

INCL \$ -

INCL \$ -

INCL \$ -

INCL \$ -

TOTAL \$ 28,530,387 Comp Mark-up: 10%

E & C Rate (10.%)

General Conditions @

G.C. OH & Profit @

Design Contingency @

Escalation @

Construction Phasing @

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# Function Analysis System Technique

HOW →

← WHY

INCREASE CAPACITY

IMPROVE INTERSECTION — [ PROVIDE SIGNS  
ADD TURN-LANE  
ALIGN 90 DEGREES ]

ADD LANE

[ PROVIDE PAVING  
CONTROL TURNING  
ROUTE DRAINAGE ]

IMPROVE SIGHT

— [ DECREASE CURVES ]

PROVIDE BIKE PATH

[ PROVIDE CONDUITS  
PROVIDE CURB & GUTTERS ]

IMPROVE SAFETY

SEPERATE GRADES — BUILD BRIDGE

DEFINE ROADWAY

SEPERATE TRAFFIC

[ PROVIDE STRIPING  
PROVIDE MEDIANS ]

ILLUMINATE SITE  
PROVIDE WARNINGS

PROVIDE BARRIERS

PROVIDE HC-ACCESS

CUT CURB

# CREATIVE IDEA LISTING & EVALUATION



PROJECT: **STP -7063 (1) – Georgia Department of Transportation** SHEET NO.: **1 of 2**  
**P.I. Number: 250470 Columbia County**

NO.	IDEA DESCRIPTION	RATING
1	Construct 5 lanes, no median	1
2	Eliminate the bike lanes	1
3	Eliminate one bike lane	1
4	At the RR crossing, route the bike lanes and adjacent to the roadway, decrease the bridge width.	1
5	Delete the median from the RR bridge	2
6	Use multi-use trail in stead of a side walk and bike lane	4
7	Delete curb and gutter	1
8	Delete 2 foot planting strip	1
9	Reduce Gutter width from 30” to 24”	DS
10	Use Header curb in stead of curb and gutter	1
11	Use concrete paving in stead of asphaltic concrete	1
12	Optimize Pavement Design – Evaluate design to reduce the number of layers	DS
13	Retaining Walls: For fill walls - move closer to roadway; Delete watt at Sta 98+60 Town Center Road	4
14	Eliminate noise barrier	1
15	Modify material for noise barrier	4
16	Disconnect Industrial Blvd. from Parkway Overpass; <u>or</u> route connection to be at existing grade at either the east or west end of the overpass.	5
17	Extend the RR crossing bridge to the east and reroute Industrial Blvd. to eliminate fill	4
18	Extend the RR crossing bridge east, west, and reroute Industrial Blvd. to eliminate fill	1
19	Cross RR at Grade	4
20	Delete relocation of Lynnwood Avenue	4
21	Use Alternative Alignment tying in to Washington Road to the east of planned location	1
22	Increase Vertical Curves to reduce fill	DS
23	Use “Con-span” in lieu of bridge at Reed Creek	4

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



