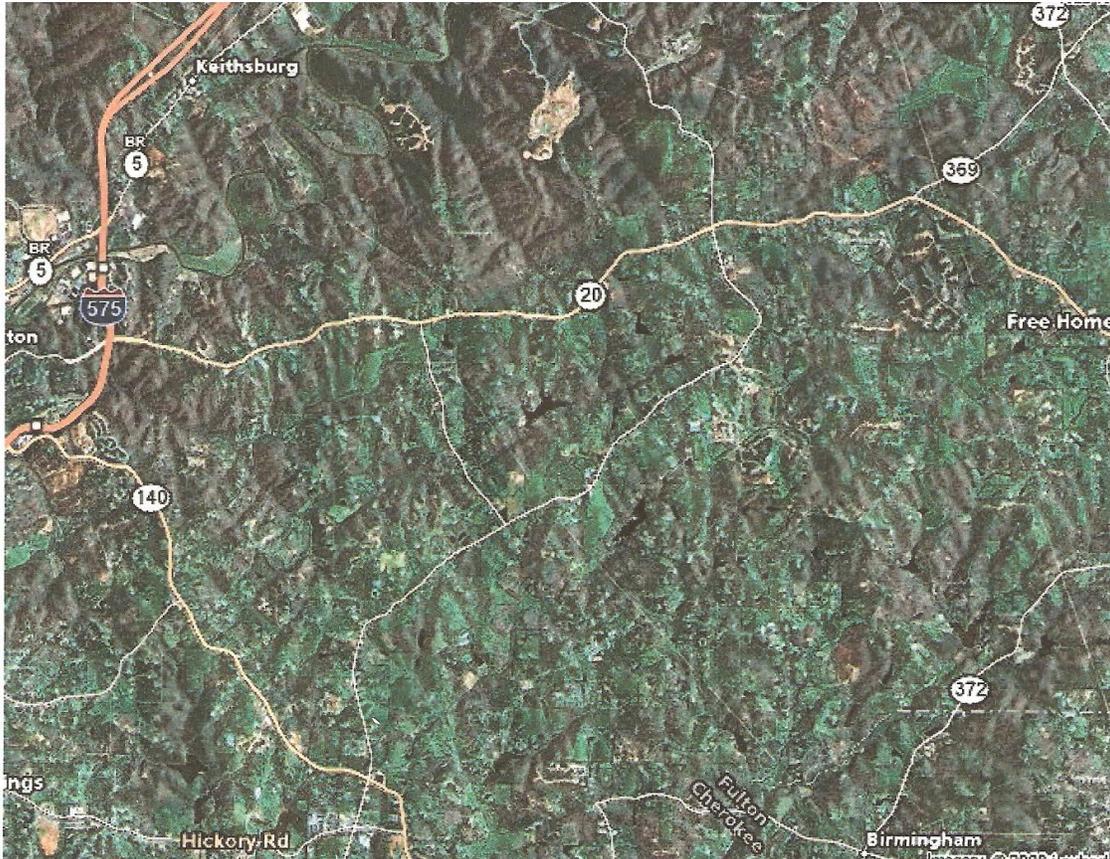


Value Engineering Study Report
CSSTP-0009-00(164) and STP00-0012-01(107)
Widening SR 20 from I-575 to CR 288/Scott Rd. and
Truck Climbing Lanes on SR 20
Cherokee County



Value Management Team



Design Team



November 14, 2008



November 14, 2008

Ms. Lisa Myers
Design Review Engineer Manager/VE Coordinator
Georgia Department of Transportation-Engineering Services
One Georgia Center
600 W. Peachtree Street NW
Atlanta, GA 30308

RE: Submittal of the final Value Engineering Report
Project Nos.: CSSTP-0009-00(164) P.I. 0009-00(164)
Widening SR 20 from I-575 to CR 288/Scott Rd.
And
STP00-0012-01(107) P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County

PBS&J Project Task Order No. 32

Dear Ms. Myers:

Please find enclosed two (2) hard copies and one (1) CD of our final Value Engineering Report for the Widening SR 20 from I-575 to CR 288/Scott Rd. and Truck Climbing Lanes on SR 20.

This Value Engineering Study, which was performed during the period October 28 through October 31, 2008, identified **12 Alternative Ideas** which **are recommended for implementation**. The VE team also identified **one (1) Design Suggestion** which is also recommended for the engineer to consider in his final design. We believe that the **Alternative Ideas** 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 design the disposition of the contents of this report.

On behalf of our VE Team, we thank you very much for this opportunity to work with you and the hard working staff of the Georgia Department of Transportation.

Yours truly,

PBS&J

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

Randy S. Thomas, CVS
Assistant Team Leader

Value Engineering Study Report

CSSTP-0009-00(164) P.I. 0009-00(164)
Widening SR 20 from I-575 to CR 288/Scott Rd.
And
STP00-0012-01(107) P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

INTRODUCTION

This report summarizes the analysis and conclusions by the PBS&J Value Engineering workshop team as they performed a VE study during the period of October 28 – October 31, 2008 in Atlanta, at the offices of the Georgia Department of Transportation. The subjects of the Value Engineering study were projects:

CSSTP-0009-00(164) P.I. 0009-00(164)
Widening SR 20 from I-575 to CR 288/Scott Rd.

And

STP00-0012-01(107) P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County

The concept design for the projects has been prepared by the Georgia Department of Transportation. At the time of the workshop the plans are ready for final field review.

PROJECT DESCRIPTION - Widening SR 20 from I-575 to CR 288/Scott Rd.

This project begins 0.34 miles east of I-575 and ends 0.15 miles east of Scott Road. The proposed roadway consists of 4 lanes; 2 in each direction separated by a 20' raised median, bike lanes, curb and gutters, and 8' sidewalks on both sides. The purpose of the project is to improve east-west traffic safety in this corridor.

PROJECT DESCRIPTION - Truck Climbing Lanes on SR 20

This project is to construct east and west bound truck passing lanes to supplement the existing two lane highway. The project begins 0.23 miles west of Shady lane and ends at 0.28 miles east of Greenwood Court. Construction consists of the addition of a truck passing lane and intersection safety improvements.

The total estimated construction cost is \$10,600,000 and the right-of-way cost is \$17,343,000 and \$585,000 reimbursable utilities, for a total project cost estimated to be \$28,528,000.

This project is rather fully described in the documentation that is located in Tabbed section of this report, entitled ***Project Description***.

PROJECT CONCERNS AND OBJECTIVES

Some of the information from the concept report and the designer's presentation indicated the following important points about the project:

- The project has a number of exceptions to avoid potential historic property
- The truck traffic is significant
- This is a major east-west corridor
- Acquisition of right of way is ongoing
- Further widening and safety improvements are presently under consideration

VALUE ENGINEERING PROCESS

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

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

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

CONCLUSIONS AND RECOMMENDATIONS

During the speculation phase the VE Team identified ***29 Alternative Ideas*** and ***1 Design Suggestion*** that appeared to hold potential for reducing the construction cost, improving the end product and/or reducing the difficulty and time of project construction.

After the evaluation phase was completed, ***12 Alternative Ideas*** remained for further consideration. These Alternative Ideas and the ***1 Design Suggestion*** may be found, in their documented form, in the section of this report entitled ***Study Results***.

The following ***Summary of Alternatives and Design Suggestions*** coupled with the documentation of the developed alternatives should provide the reader with the information required to fully evaluate the merits of each of the alternatives.

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.

Also included here are photographs of the project site taken by the VE Team.

This introductory sheet is followed by a *Summary of Alternatives and Design Suggestions*. 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*.

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation CSSTP-0009-00(164) – P.I. 0009-00(164) Widening SR 20 From I-575 to CR 288/Scott Rd Cherokee County	ALTERNATIVE NO.:	RD-6
DESCRIPTION:	Use a single multi-use trail in-lieu of bike lanes/sidewalks.	SHEET NO.:	1 of 4

Original Design:

The original design calls for bike lanes eastbound and westbound adjacent to the outside travel lane from STA. 997+00 to STA. 1051+00, as well as sidewalks in both directions on the shoulder from STA. 997+00 to STA. 1061+00.

Alternative:

The alternative seeks to remove the bike lane from adjacent to the travel lane and combine the bike traffic with the pedestrian traffic on a single multi-use trail throughout the project.

Opportunities:

- Cost savings for pavement and sidewalk.
- Removes bike traffic proposed adjacent to traffic.

Risks:

- Moderate design impacts.
- Need to provide crosswalk/access to bikes and pedestrians at entry/exit points within the project.

Technical Discussion:

The alternative proposes removing the bike lanes from adjacent to the travel lanes to a single multi-use trail on one side of the project. The pedestrian traffic would be confined to the same multi-use trail as opposed to the proposed design of constructing two-8' sidewalks in both directions. The advantages would be a reduction in full build-up pavement costs, reduction in concrete sidewalk, a reduction in ROW from creating a narrower typical section, as well as improvements in safety by separating the bike lanes from adjacent to the vehicular travel lanes. Additional costs would be incurred providing access to users for both directions in terms of points of entry and exit throughout the project.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 1,690,977	\$ 0	\$ 1,690,977
ALTERNATIVE	\$ 1,280,343	\$ 0	\$ 1,280,343
SAVINGS	\$ 410,633	\$ 0	\$ 410,633

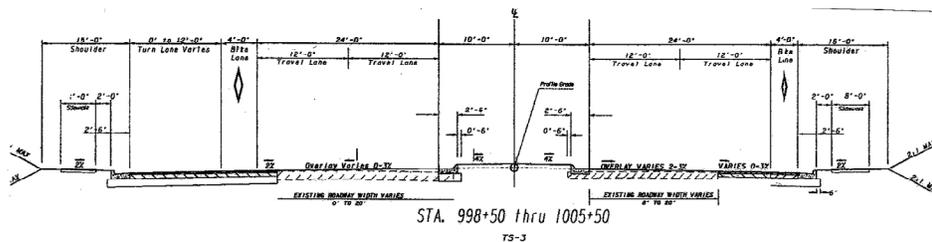
Illustration

PROJECT: **Georgia Department of Transportation
CSSTP-0009-00(164) – P.I. 0009-00(164)
Widening SR 20 From I-575 to CR 288/Scott Rd
Cherokee County**

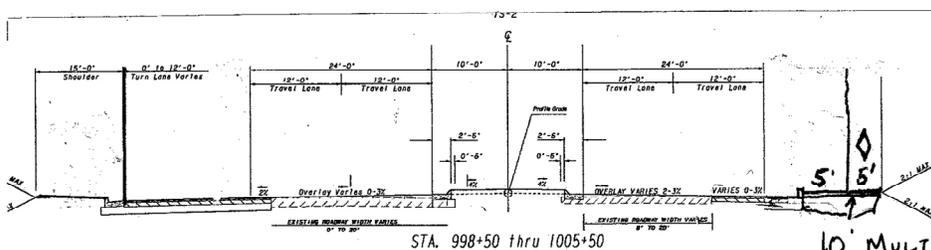
ALTERNATIVE NO.:
RD-6

DESCRIPTION: **Use a single multi-use trail in-lieu of bike lanes/sidewalks.**

SHEET NO.: **2 of 4**



PROPOSED



ALTERNATIVE

10' MULTI-USE
TRAIL -
5' SIDEWALK
+
5' BIKE LANE

Calculations



PROJECT: **Georgia Department of Transportation
CSSTP-0009-00(164) – P.I. 0009-00(164)
Widening SR 20 From I-575 to CR 288/Scott Rd
Cherokee County**

ALTERNATIVE NO.:
RD-6

DESCRIPTION: **Use a single multi-use trail in-lieu of bike
lanes/sidewalks.**

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

ASSUMPTIONS:

Deductions:

-Remove bike lanes from roadway STA. 997+00 to STA. 1051+00= 5400LF x 8' (4' bike lanes x 2).
5,400' x 8'w/9=4800 SY.

-**GAB**= 4,800 SY

-**25.0mm Superpave** @ 400lb/SY= 4800SY x 400/2000lb/SY=960 Tons.

-**19.0mm Superpave** @ 250LB/SY= 4800 SY x 250/2000lb/SY=600 Tons.

-**12.5mm Superpave** @ 150 LB/SY= 4800 SY x 150/2000lb/SY=360 Tons.

-**Concrete Sidewalk**- Existing design calls for 8' concrete sidewalk in both directions from STA. 997+00 to STA. 1061+00 = 6400LF x 16/9= 11,378 SY. Estimate provided shows 7200 SY. Use 10' of concrete sidewalk to construct a single-side multi-use trail. 6,400LF x 10'w/9'=7,111 SY

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation CSSTP-0009-00(164) – P.I. 0009-00(164) Widening SR 20 From I-575 to CR 288/Scott Rd Cherokee County	ALTERNATIVE NO.:	RD-7
DESCRIPTION:	Use 5' sidewalks in-lieu of 8' sidewalks.	SHEET NO.:	1 of 4

Original Design:

The original design calls for the use of 8' sidewalks throughout the project, with 15' shoulders.

Alternative:

The alternative design would utilize 5' sidewalks throughout the project, with 12' shoulders.

Opportunities:

- Reduction in sidewalk costs.
- Reduction in ROW costs from narrower shoulders.

Risks:

- Minimal design impacts.

Technical Discussion:

The alternative seeks to reduce the width of the sidewalks from a proposed 8' width to a standard 5' width throughout the project, resulting in sidewalk cost savings. The proposed shoulder could then be narrowed to 12' from 15', resulting in ROW cost savings. It appears that the cost estimate dated 10/7/2008 assumes use of 5' sidewalks throughout the project as 7,200 SY are set-up, compared to a calculated 11,378 SY using an 8' width as shown in the plan assembly.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 2,752,425	\$ 0	\$ 2,752,425
ALTERNATIVE	\$ 2,014,617	\$ 0	\$ 2,014,617
SAVINGS	\$ 737,809	\$ 0	\$ 737,809

Illustration

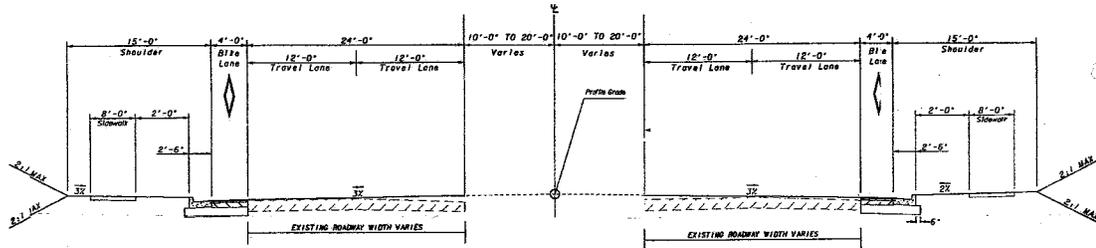


PROJECT: Georgia Department of Transportation
CSSTP-0009-00(164) – P.I. 0009-00(164)
Widening SR 20 From I-575 to CR 288/Scott Rd
Cherokee County

ALTERNATIVE NO.:
RD-7

DESCRIPTION: Use 5' sidewalks and 12' R/W in-lieu of 8' sidewalks and 15' R/W

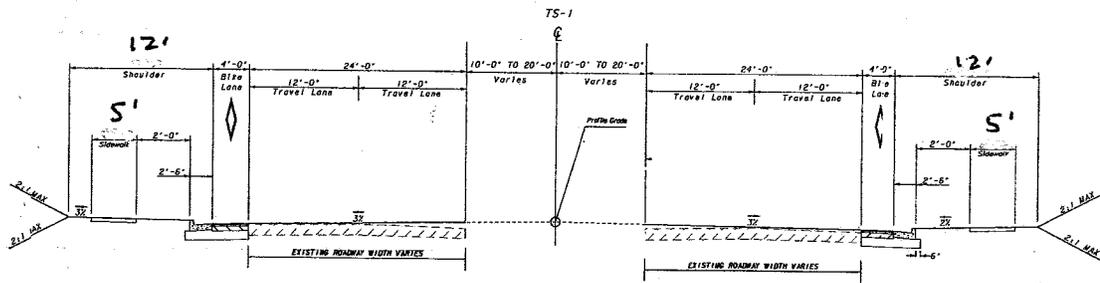
SHEET NO.: 2 of 4



STA. 997+00 thru 998+00

TS-2

PROPOSED



STA. 997+00 thru 998+00

ALTERNATIVE

Calculations



PROJECT: **Georgia Department of Transportation
CSSTP-0009-00(164) – P.I. 0009-00(164)
Widening SR 20 From I-575 to CR 288/Scott Rd
Cherokee County**

ALTERNATIVE NO.:
RD-7

DESCRIPTION: **Use 5' sidewalks in-lieu of 8' sidewalks.**

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

Assumptions: Project limits= STA 997+00 to STA 1061+00= 6,400LF.

Sidewalk proposed for EB and WB= 6,400LF x 2=12,800LF.

12,800LF x 8'w/9=11,378 SY @ \$33.24/SY= **\$378,205 proposed**

12,800 LF x 5'w/9=7,111 SY # \$33.24/SY= **\$236,370 alternative.**

Reduce shoulder width in both directions from 15'w to 12'w.

6,400 LF/side x 2 sides=12,800 LF x 3'/side=38,400SF x 2 sides=76,800SF/43,560SF/AC=**1.763AC ROW Savings.**

Commercial ROW @ \$300,000/AC as per ROW Detail Cost Summary Sheet dated 5/13/2008. ROW costs calculated are based on acreage price with no incidental costs attached.

Note: Estimate provided in concept report has 7,200 SY of 4" concrete sidewalk set-up. This differs from the typical and cross sections in the plan assembly proposing 8' sidewalk widths throughout the project.

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation CSSTP-0009-00(164) – P.I. 0009-00(164) Widening SR 20 From I-575 to CR 288/Scott Rd Cherokee County	ALTERNATIVE NO.:	RD-11
DESCRIPTION:	Use MSE Wall in-lieu of poured in place Ga STD 4948-B Retaining Wall	SHEET NO.:	1 of 4

Original Design:

The original design calls for poured-in-place Ga STD 4948-B retaining wall to the North of SR 20 from Station 1027+00 (L) to Station 1031+50 (L). The average height of the wall is approximately 4' along a length of approximately 450'.

Alternative:

The alternative proposes the use of a MSE wall in lieu of the cast-in-place concrete retaining wall.

The alternative maintains the original design geometry.

Opportunities:

- Cost savings
- Reduced construction time
- GDOT Standard designs readily available
- Improved aesthetics

Risks:

- Minimal redesign effort and cost

Technical Discussion:

MSE walls are acceptable standard GDOT wall types and have demonstrated acceptable performance. They are a common wall type used in the Metro Atlanta area where the current project is located.

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

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 151,196	\$ 0	\$ 151,196
ALTERNATIVE	\$ 121,805	\$ 0	\$ 121,805
SAVINGS	\$ 29,391	\$ 0	\$ 29,391

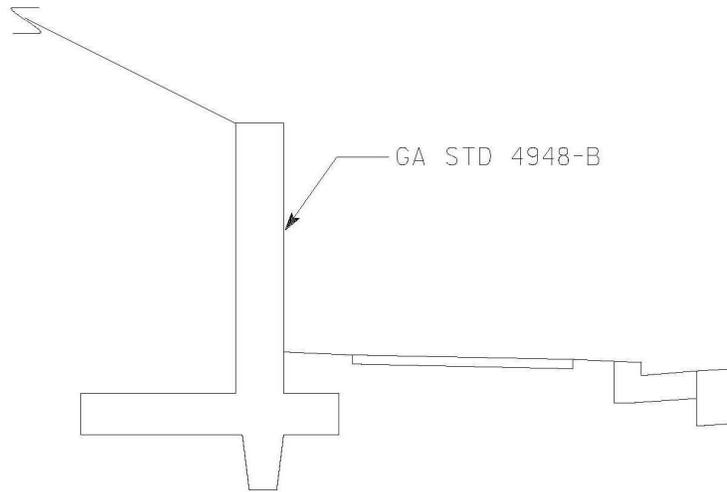
Illustration

PROJECT: **Georgia Department of Transportation
CSSTP-0009-00(164) – P.I. 0009-00(164)
Widening SR 20 From I-575 to CR 288/Scott Rd
Cherokee County**

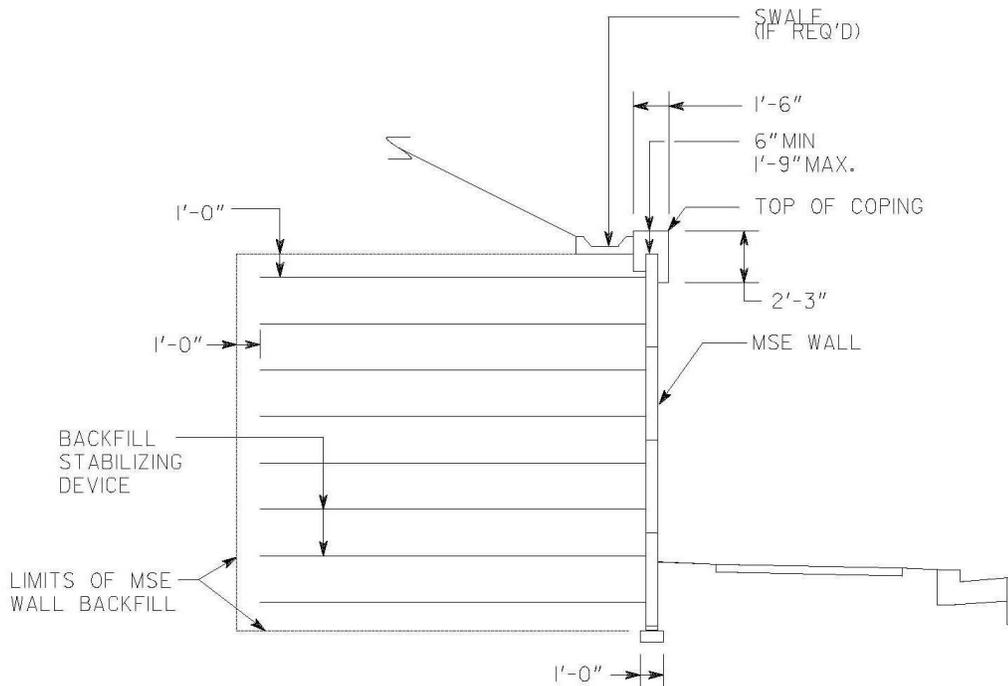
ALTERNATIVE NO.:
RD-11

DESCRIPTION: **Use MSE Wall in-lieu of poured in place GA STD
4948-B Retaining Wall**

SHEET NO.: **2 of 4**



CURRENT DESIGN: GA STD 4948-B



ELEVATION: MSE WALL

Calculations



PROJECT: **Georgia Department of Transportation
CSSTP-0009-00(164) – P.I. 0009-00(164)
Widening SR 20 From I-575 to CR 288/Scott Rd
Cherokee County**

ALTERNATIVE NO.:
RD-11

DESCRIPTION: **Use MSE Wall in-lieu of poured in place GA STD
4948-B Retaining Wall**

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

Current Design – Wall 1 - Cast-in-Place Concrete Retaining Walls – GDOT Standards

Quantities:

Wall No. 1:

Station 1027+00 (L) to Station 1031+50 (L), (average height, 4') = 450 LF, Ga STD 4948-B, Type 2-A

{ Assume 18" thick wall, 12" thick footing, 5.75' wide, with key of 6" X 1' }

Volume of Class B Retaining Wall 1 Concrete = $\{450' * [(1.5' * 4') + (1' * 5.75') + (0.5' * 1')]\} / 27 = 204.16 \text{ CY}$

Total volume of Class B Retaining Wall Concrete = 204.16 CY

Alternate - MSE Wall with Coping

Length of Coping = $1 * 450' = 450 \text{ LF}$

Wall area = $450 * [4'] = 1800 \text{ SF}$

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation CSSTP-0009-00(164) – P.I. 0009-00(164) Widening SR 20 From I-575 to CR 288/Scott Rd Cherokee County	ALTERNATIVE NO.:	RD-12
DESCRIPTION:	Use Modular block Wall in-lieu of poured in place GA STD 4948-B Retaining Wall	SHEET NO.:	1 of 4

Original Design:

The original design calls for poured-in-place GA STD 4948-B retaining wall to the North of SR 20 from Station 1027+00 (L) to Station 1031+50 (L). The average height of the wall is approximately 4' along a length of approximately 450'.

Alternative:

The alternative proposes the use of a Modular Block wall in lieu of the cast-in-place concrete retaining wall.

The alternative maintains the original design geometry.

Opportunities:

- Cost savings
- Reduced construction time
- Manufacturer designs and installs the system
- Improved aesthetics

Risks:

- Minimal or no redesign effort and cost

Technical Discussion:

Modular Block walls have demonstrated acceptable performance and longevity. Performance warranties are also provided by the manufacturers.

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

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 151,196	\$ 0	\$ 151,196
ALTERNATIVE	\$ 56,430	\$ 0	\$ 56,430
SAVINGS	\$ 94,766	\$ 0	\$ 94,766

Illustration

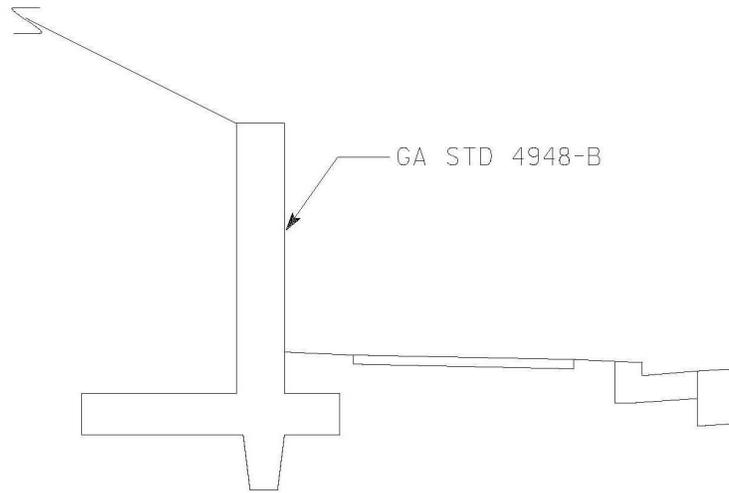


PROJECT: **Georgia Department of Transportation
CSSTP-0009-00(164) – P.I. 0009-00(164)
Widening SR 20 From I-575 to CR 288/Scott Rd
Cherokee County**

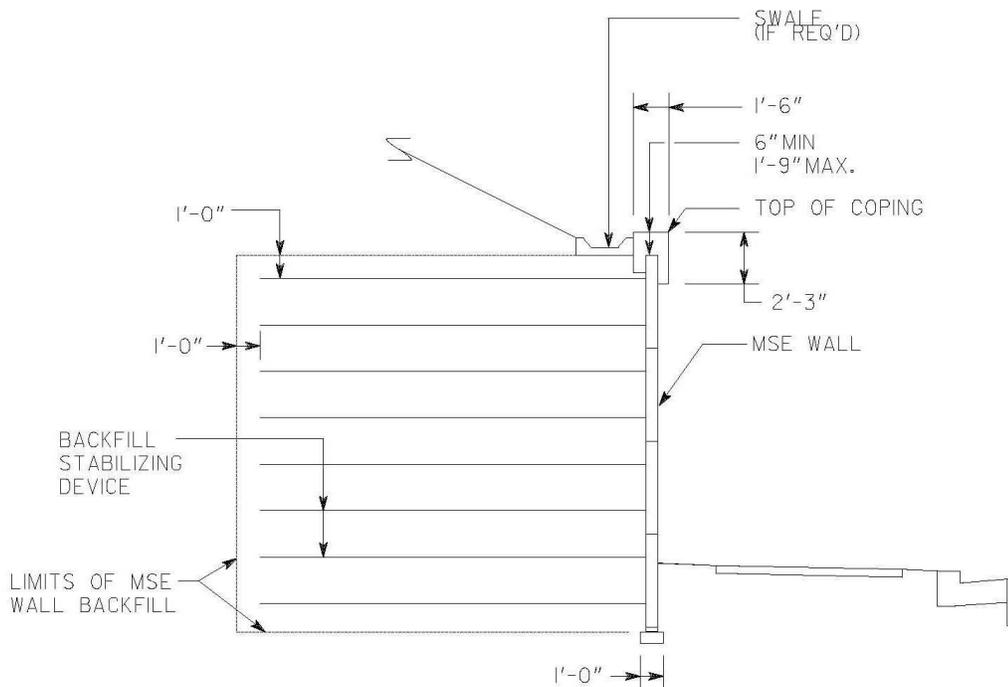
DESCRIPTION: **Use Modular block Wall in-lieu of poured in place
GA STD 4948-B Retaining Wall**

ALTERNATIVE NO.:
RD-12

SHEET NO.: **2 of 4**



CURRENT DESIGN: GA STD 4948-B



ELEVATION: MSE WALL

Calculations



PROJECT: **Georgia Department of Transportation
CSSTP-0009-00(164) – P.I. 0009-00(164)
Widening SR 20 From I-575 to CR 288/Scott Rd
Cherokee County**

ALTERNATIVE NO.:
RD-12

DESCRIPTION: **Use Modular block Wall in-lieu of poured in place
GA STD 4948-B Retaining Wall**

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

Current Design – Wall 1 - Cast-in-Place Concrete Retaining Walls – GDOT Standards

Quantities:

Wall No. 1:

Station 1027+00 (L) to Station 1031+50 (L), (average height, 4') = 450 LF, Ga STD 4948-B, Type 2-A

{ Assume 18" thick wall, 12" thick footing, 5.75' wide, with key of 6" X 1' }

Volume of Class B Retaining Wall 1 Concrete = $\{450' * [(1.5' * 4') + (1' * 5.75') + (0.5' * 1')]\} / 27 = 204.16 \text{ CY}$

Total volume of Class B Retaining Wall Concrete = 204.16 CY

Alternate – Modular Block Wall with Coping

Length of Coping = $1 * 450' = 450 \text{ LF}$

Wall area = $450 * [4'] = 1800 \text{ SF}$

Cost Worksheet



PROJECT:	Georgia Department of Transportation CSSTP-0009-00(164) – P.I. 0009164 Widening SR 20 from I-575 to CR 288/Scott Rd Cherokee County	ALTERNATIVE NO.:
		RD-12
DESCRIPTION:	Use Modular block Wall in-lieu of poured in place GA STD 4948-B Retaining Wall	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
Class B Rtg Wall Concrete	CY	204.16	\$ 673.25	\$137,451	0	\$ 673.25	\$0
Modular Block Walls (4 ft high)	SF	0	\$ 18.00	\$0	1800	\$ 18.00	\$32,400
Coping	LF	0	\$ 42.00	\$0	450	\$ 42.00	\$18,900
Note: Cost per SF of Modular							
Block wall is in place cost as							
provided by manufacturer.							
Sub-total				\$ 137,451			\$ 51,300
Mark-up at 10.00%				\$ 13,745			\$ 5,130
TOTAL				\$ 151,196			\$ 56,430

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP-012-01(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County**

ALTERNATIVE NO.:
TCL-3

DESCRIPTION: **Use bi-directional passing lanes in-lieu of one
westbound truck lane on Section 2**

SHEET NO.: **1 of 6**

Original Design:

The original design calls for addition of one westbound lane throughout the most part of Section 2 from station 2081+50 to station 2169+50.

Alternative:

The alternative is to construct passing lanes in both eastbound and westbound directions at locations where upgrades have significant impact on truck speeds.

Opportunities:

- Reduce construction costs
- Reduce delay for the eastbound direction

Risks:

- Increase delay for the westbound direction

See following pages for continuation

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP-012-01(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County**

ALTERNATIVE NO.:
TCL-3

DESCRIPTION: **Use bi-directional passing lanes in-iieu of one
westbound truck lane on Section 2**

SHEET NO.: **2 of 6**

Technical Discussion:

The vertical profile of Section 2 consists of a series of upgrades and downgrades, rather than just having one distinct upgrade for the westbound direction. A grade analysis shown on the next page indicates that the average upgrade is 2.62% for the eastbound direction and 1.51% for the westbound direction. The eastbound direction has two segments that have upgrades over 4% and one of them is 640-ft long, while the steepest upgrade for the westbound direction is only 3.5% and is only 475-ft long.

A review of the design year design hour traffic further indicates that the PM peak traffic on SR 20 is heavier than the AM peak traffic, and there is not a significant difference between the eastbound and westbound traffic during the PM peak period.

This indicates that, if one single truck lane were to be constructed, the eastbound direction would be a better choice than the westbound direction.

Given the upgrade and downgrade profile and relatively balanced traffic flows on this section of SR 20, an alternative is to construct passing lanes at key locations in both directions, rather than adding one single lane in one direction throughout the entire area.

For comparison purposes, the analysis below assumed adding one passing lane at the steepest upgrade location in each direction. Each passing lane is 1,000-ft long, with a 300-ft taper at the beginning and a 600-ft taper at the end. The width of paved shoulder proposed by the original design will remain on the passing lane section.

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP-012-01(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County**

ALTERNATIVE NO.:
TCL-3

DESCRIPTION: **Use bi-directional passing lanes in-lieu of one
westbound truck lane on Section 2**

SHEET NO.: **3** of **6**

Technical Discussion (continued):

Table 1. Summary of Grade Analysis for Section 2

Station	Eastbound			Westbound		
	Upgrade G (%)	Length L (ft)	G x L	Upgrade G (%)	Length L (ft)	G x L
2081+50						
2084+10	4.1751	260	1,086			
2088+40				1.9813	430	852
2097+40				0.2243	900	202
2103+80	4.0188	640	2,572			
2108+75				2.9091	495	1,440
2116+50				0.4000	775	310
2120+70	2.3143	420	972			
2125+45				3.5389	475	1,681
2134+70	3.1597	925	2,923			
2140+65				2.2718	595	1,352
2146+40	0.5692	575	327			
2152+00	2.1765	560	1,219			
2156+25				0.1321	425	56
2163+75	2.3133	750	1,735			1,139
2169+50				1.9811	575	
Total		4130	10,834		4,670	7,032
Average	2.62			1.51		

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$737,311	\$ 0	\$737,311
ALTERNATIVE	\$228,849	\$ 0	\$228,849
SAVINGS	\$508,462	\$ 0	\$508,462

Illustration

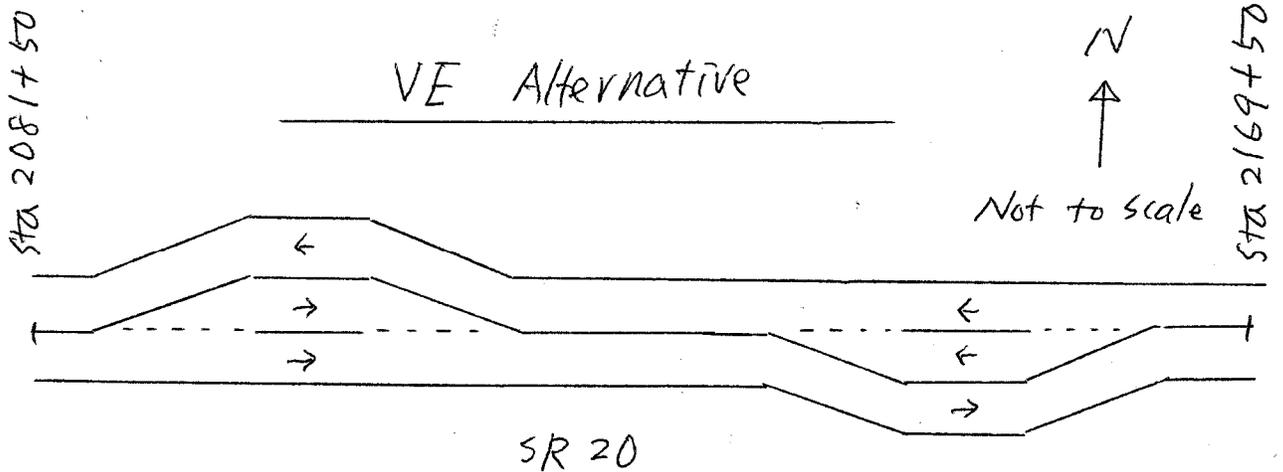
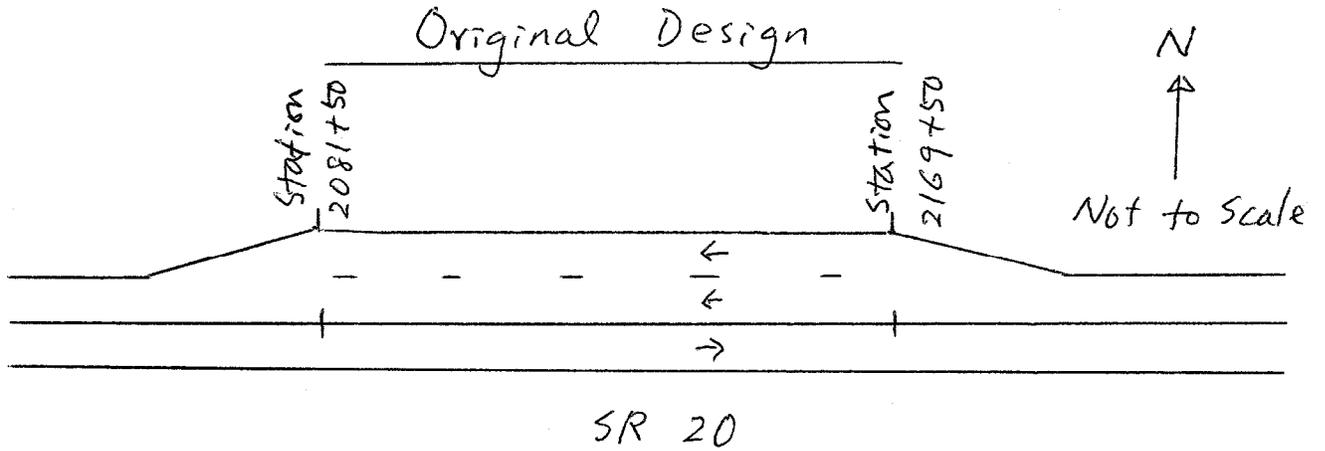


PROJECT: Georgia Department of Transportation
STP-012-01(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County

ALTERNATIVE NO.:
TCL-3

DESCRIPTION: Use bi-directional passing lanes in-lieu of one westbound truck lane on Section 2

SHEET NO.: 4 of 6



Calculations



PROJECT: **Georgia Department of Transportation
STP0-012-1(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County**

ALTERNATIVE NO.:
TCL-3

DESCRIPTION: **Use bi-directional passing lanes in-lieu of one
westbound truck lane on Section 2**

SHEET NO.: **5 of 6**

Original design:

The added westbound truck lane:

Full width section: 8,800-ft long x 12-ft wide = 105,600 SF

Beginning taper: 150-ft long x 12-ft wide x 0.5 = 900 SF

Ending taper: 500-ft long x 12-ft wide x 0.5 = 3,000 SF

Total paved area: 109,500 SF

VE Alternative:

Two passing lanes:

Full width section: 1,000-ft long x 12-ft wide x 2 = 24,000 SF

Beginning taper: 300-ft long x 12-ft wide x 0.5 x 2 = 3,600 SF

Ending taper: 600-ft long x 12-ft wide x 0.5 x 2 = 7,200 SF

Total paved area: 34,800 SF

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP-012-01(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County**

ALTERNATIVE NO.:
TCL- 4

DESCRIPTION: **Delete realignment of Water Tank Road.**

SHEET NO.: 1 of 4

Original Design:

The original design proposes a vertical and horizontal realignment of Water Tank Road (CR267) from STA 85+00 (PI STA @ SR 20) to STA 77+03.80.

Alternative:

The alternative would delete the realignment of Water Tank Road, utilizing the existing vertical and horizontal alignment.

Opportunities:

- Pavement cost savings.
- Reduced construction time.
- Minimize disruption to local traffic patterns.

Risks:

- Moderate design impacts.
- May provide less than desirable intersection geometry.

Technical Discussion:

The realignment of Water Tank Road is being driven by a less than desirable intersection skew at the tie with SR 20, as well as correction of a vertical grade tie on existing Water Tank Road away from the SR 20 intersection tie. The alternative would leave Water Tank Road as-is, with no correction vertically or horizontally. According to the traffic data provided, the critical left turn movement from Water Tank Road onto SR 20 has a 2031 AM DHV of 30 vehicles, with a 2031 PM DHV of 15 vehicles. The vertical grade correction proposed in the original design occurs away from the SR 20 intersection. Thus, the critical vertical grade tie at the intersection of Water Tank Road and SR 20 is not an issue.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 2,497,730	\$ 0	\$ 2,497,730
ALTERNATIVE	\$ 2,429,782	\$ 0	\$ 2,429,782
SAVINGS	\$ 67,948	\$ 0	\$ 67,948

Illustration

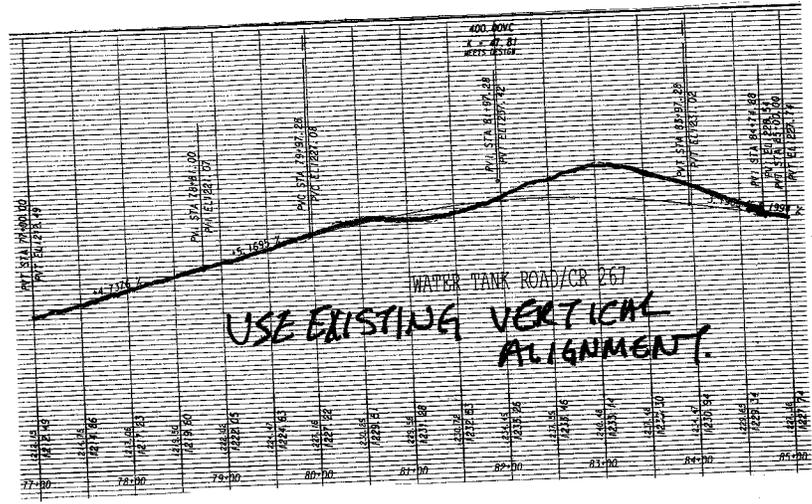
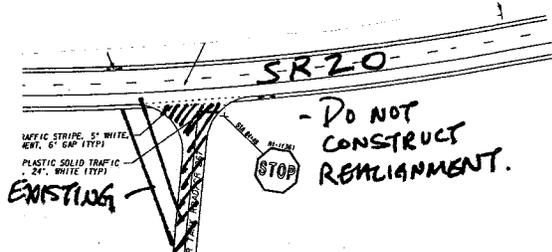


PROJECT: Georgia Department of Transportation
STP-012-01(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County

ALTERNATIVE NO.:
TCL- 4

DESCRIPTION: Delete realignment of Water Tank Road.

SHEET NO.: 2 of 4



Calculations



PROJECT: **Georgia Department of Transportation
STP0-012-1(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County**

ALTERNATIVE NO.:
TCL- 4

DESCRIPTION: **Delete realignment of Water Tank Road.**

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

ASSUMPTIONS:

- Delete relocation of Water Tank Road (CR267) in its entirety.
- Earthwork calculated for project on a lump sum basis. Adoption of this alternative will reduce earthwork and clearing and grubbing quantities.
- ROW costs are assumed as acquired and are not calculated in cost savings.
- Pavement build-up from “*Flexible Pavement Design Analysis*” approved 7/30/2001 for county roads intersecting SR 20:
 - 10”GAB
 - 120LB/SY- 12.5mm Superpave
 - 200LB/SY- 19.0mm Superpave

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation STP-012-01(107) – P.I. 632790 Truck Climbing Lanes on SR 20 Cherokee County	ALTERNATIVE NO.:	TCL-5
DESCRIPTION:	Reduce side road improvements on Cotton Road and Old Orange Mill Road.	SHEET NO.:	1 of 4

Original Design:

The original design calls for vertical grade correction on Cotton Road (CR 195) and Old Orange Mill Road (CR 238). The plans call for protected left turn bays to be constructed on SR 20 for movements onto Cotton Road (CR195) and Old Orange Mill Road (CR 238). The improvements extend 400 LF on Cotton Road (CR 195), and approximately 500 LF on Old Orange Mill Road(CR 238)

Alternative:

The alternative proposes using the existing vertical grade and reducing improvements on Cotton Road (CR 195) and Old Orange Mill Road (CR 238) to as close to the radius return on the side road alignment as possible.

Opportunities:

- Reduction in construction time.
- Cost savings for full depth pavement reconstruction.
- Minimize local traffic pattern disruption.

Risks:

- Minimal design impacts.
- May require design exception for vertical grade ties on side road alignment.

Technical Discussion:

The intersections require a vertical grade correction in the proposed design that extends for approximately 400 LF on the Cotton Road alignment, and approximately 500 LF on the Old Orange Mill Road alignment. The intent of the alternative is to use the existing vertical grade since the correction proposed is slight. As a result, side road work on both alignments would be reduced drastically resulting in full build-up pavement savings, as well as minimizing disruption to local traffic during the construction phase. A result of implementation of the alternative is a less than desirable vertical tie to SR 20, which may require a design exception to implement.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 2,497,730	\$ 0	\$ 2,497,730
ALTERNATIVE	\$ 2,438,657	\$ 0	\$ 2,438,657
SAVINGS	\$ 59,073	\$ 0	\$ 59,073

Illustration

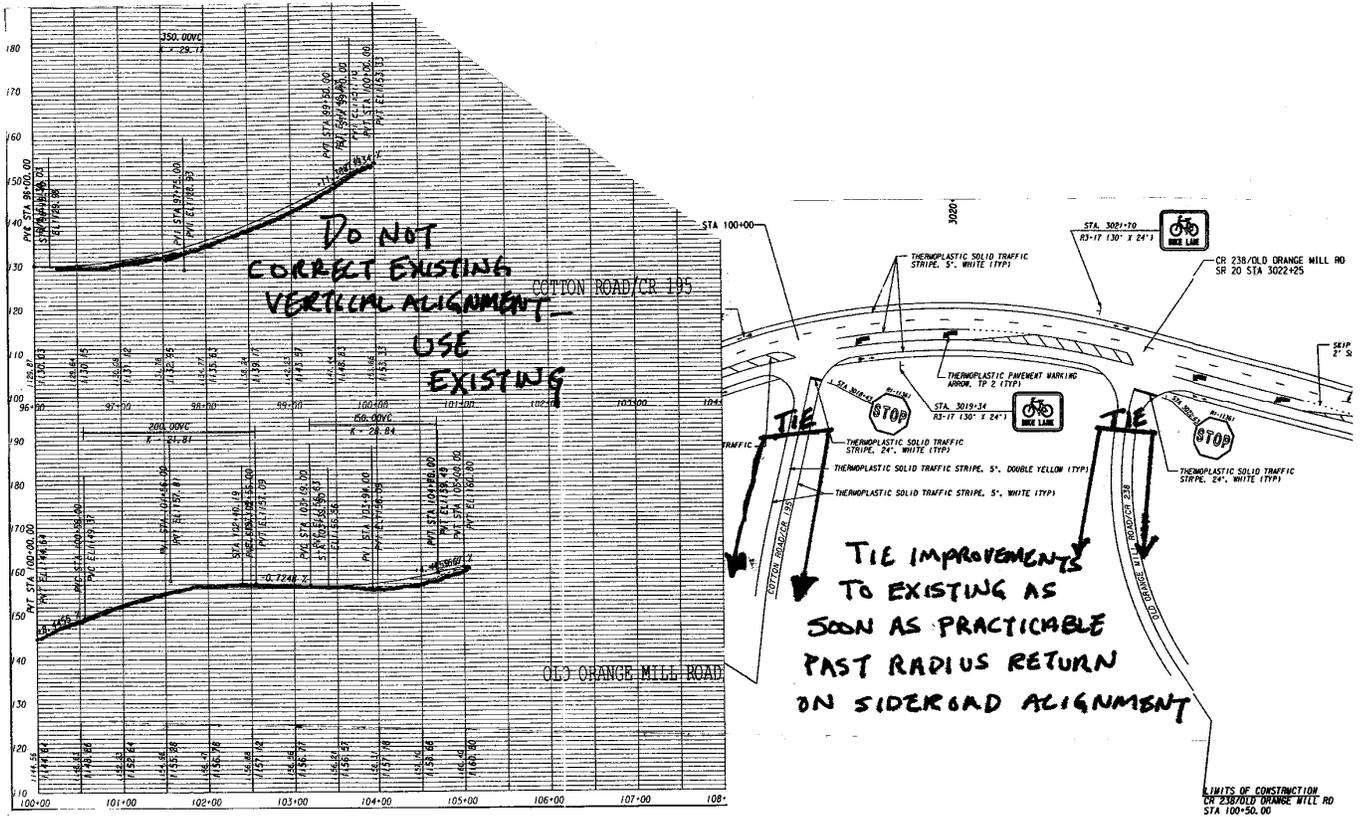


PROJECT: Georgia Department of Transportation
STP-012-01(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County

ALTERNATIVE NO.:
TCL-5

DESCRIPTION: Reduce side road improvements on Cotton Road
and Old Orange Mill Road.

SHEET NO.: 2 of 4



Calculations



PROJECT: Georgia Department of Transportation
STP0-012-1(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County

ALTERNATIVE NO.:
TCL-5

DESCRIPTION: Reduce side road improvements on Cotton Road
and Old Orange Mill Road.

SHEET NO.: 3 of 4

ASSUMPTIONS:

- Reduce length of improvements on Old Orange Mill Road (CR238) and Cotton Road (CR195).
- Earthwork calculated for project on a lump sum basis. Adoption of this alternative will reduce earthwork and clearing and grubbing quantities.
- ROW costs are assumed as acquired and are not calculated in cost savings.
- Pavement build-up from “*Flexible Pavement Design Analysis*” approved 7/30/2001 for county roads intersecting SR 20:

10”GAB

120LB/SY- 12.5mm Superpave

200LB/SY- 19.0mm Superpave

Cotton Road (CR195)

Proposed limits of construction= Cotton Road/SR 20 STA 100+00 (PI) to STA 96+00 = 400LF.

Alternative limits of construction= Cotton Road/SR 20 STA 100+00 (PI) to STA 99+00=100LF.

Average width= 24’ per typical section (TS-8).

300LF saved @ 24’w/9’=800 SY.

800SY @ 120LB/SY/2000=48 tons 12.5mm Superpave.

800SY @ 200LB/SY/2000= 80 tons 19.0mm Superpave.

Old Orange Mill Road (CR238)

Proposed limits of construction=Old Orange Mill Road/SR 20 STA 105+00 (PI) to STA 100+50= 450LF.

Alternative limits of construction= Old Orange Mill Road/SR 20 STA 105+00 (PI) to STA 104+00=100LF.

Average width= 24’ per typical section (TS-8).

350LF saved @ 24’w/9’=933 SY.

933SY @ 120LB/SY/2000=56 tons 12.5mm Superpave.

933SY @ 200LB/SY/2000= 93.3 tons 19.0mm Superpave.

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation STP-012-01(107) – P.I. 632790 Truck Climbing Lanes on SR 20 Cherokee County	ALTERNATIVE NO.:	TCL-7
DESCRIPTION:	Terminate eastbound two-lane section at station 3105 in-lieu of station 3121	SHEET NO.:	1 of 4

Original Design:

The original design calls for adding one eastbound truck climbing lane throughout the most part of Section 3 from station 3068 to station 3121. The ending point of the added truck lane is close to the project limit at station 3126.

Alternative:

The alternative is to terminate the added eastbound truck climbing lane at station 3105, hereby reducing its length by 1,600-ft.

Opportunities:

- Reduce construction costs

Risks:

- Trucks may not be able to attain a desired speed of at least 40 mph (but the AASHTO Green Book pointed out that this may not be practical in many instances because of the unduly long distance needed)

Technical Discussion:

The vertical profile of the added eastbound truck climbing lane consists of a series of steep upgrades, ranging from 5.13% to 6.08%. The steep upgrades end at station 3101, and are followed by a 0.80% upgrade. A 400-ft crest curve is placed between the last steep upgrade and the 0.80% upgrade.

Based on the AASHTO Green Book, at least 200-ft beyond the crest point must be provided to permit trucks to return to the normal lane. Ending the truck climbing lane at station 3105 would provide a 300-ft distance beyond the 400-ft crest curve at the end of the last steep upgrades. The lane reduction taper proposed by the original design will remain for the shortened truck climbing lane.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$562,979	\$ 0	\$562,979
ALTERNATIVE	\$315,637	\$ 0	\$315,637
SAVINGS	\$247,342	\$ 0	\$247,342

Illustration



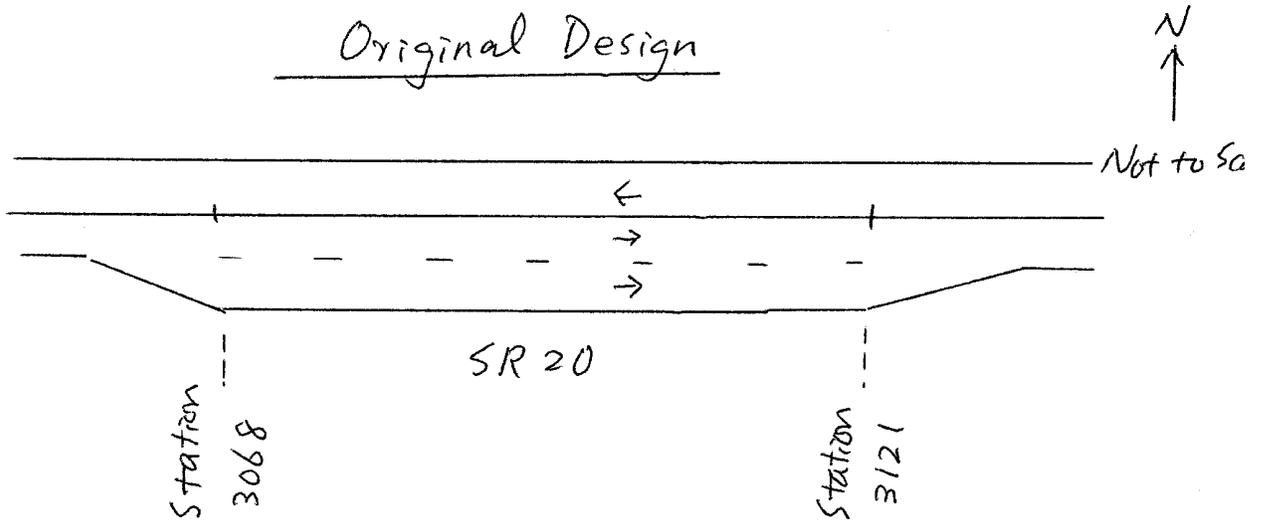
PROJECT: Georgia Department of Transportation
STP-012-01(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County

ALTERNATIVE NO.:
TCL-7

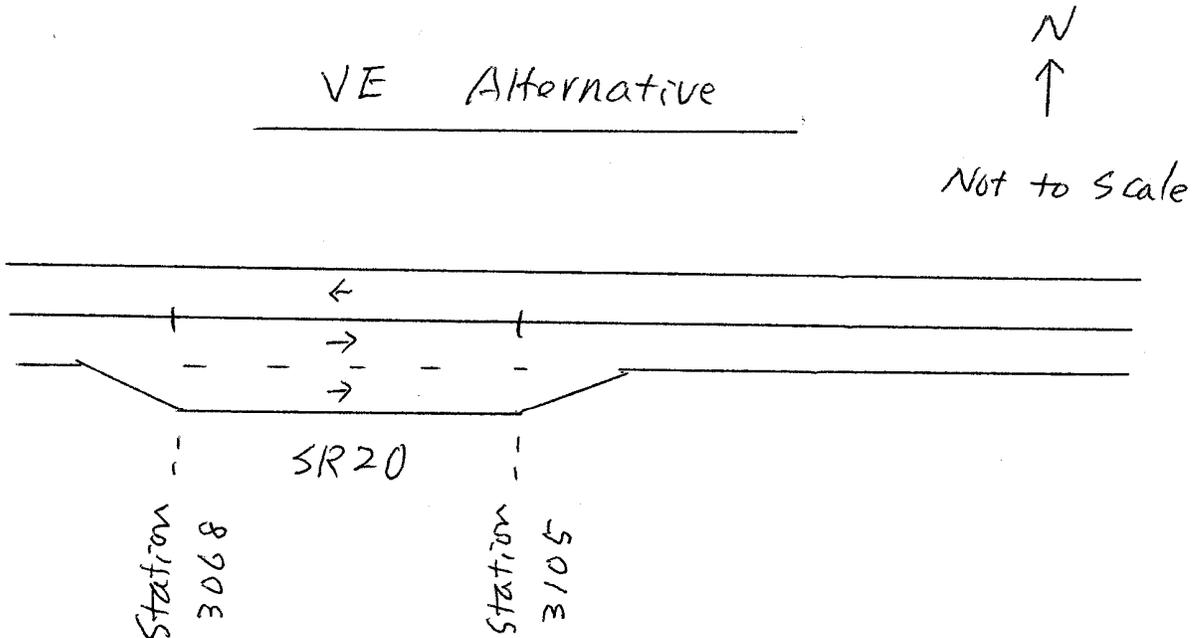
DESCRIPTION: Terminate eastbound two-lane section at station
3105 in-lieu of station 3121

SHEET NO.: 2 of 4

Original Design



VE Alternative



Calculations



PROJECT: **Georgia Department of Transportation
STP0-012-1(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County**

ALTERNATIVE NO.:
TCL-7

DESCRIPTION: **Terminate eastbound two-lane section at station
3105 in-lieu of station 3121**

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

Original design:

The added eastbound truck climbing lane:

Full width section: 5,300-ft long x 12-ft wide = 63,600 SF

Beginning taper: 500-ft long x 12-ft wide x 0.5 = 3,000 SF

Ending taper: 100-ft long x 12-ft wide x 0.5 = 600 SF

Total paved area: 67,200 SF

VE Alternative:

The added eastbound truck climbing lane:

Full width section: 3,700-ft long x 12-ft wide = 44,400 SF

Beginning taper: 500-ft long x 12-ft wide x 0.5 = 3,000 SF

Ending taper: 100-ft long x 12-ft wide x 0.5 = 600 SF

Total paved area: 48,000 SF

Value Analysis Design Suggestion



PROJECT: **Georgia Department of Transportation
STP-012-01(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County**

ALTERNATIVE NO.:
TCL-9

DESCRIPTION: **Coordinate with future urban design to prevent
construction of items which will be obsolete**

SHEET NO.: **1 of 1**

Original Design:

The original design calls for the construction of a new two and three lane rural highway.

Alternative:

The alternative would be to review the future urban highway which is presently under design to try and prevent the construction of roadway elements which may be soon replaced with the upcoming future project.

Opportunities:

- Reduce loss of investments
- Reduce future costs
- Reduce construction time

Risks:

- May delay start of construction
- May increase initial construction cost

Technical Discussion:

Presently the westerly portion of SR 20 is being designed as a new four lane urban section with raised median, curb and gutter. The current speed limit is 45 mph,

This project has been issued to a consultant to design it as an urban section. It appears more reasonable to either design the future project as a five lane highway which could accommodate the currently proposed three lane highway; or, to make improvements under this project that compliment the future urban four lane design. Further, it would be reasonable to recognize the future right of way requirements and incorporate those needs into this project.

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP-012-01(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County**

ALTERNATIVE NO.:
TCL-14

DESCRIPTION: **Use MSE Wall in-lieu of poured in-place GA STD
4948-B Retaining Wall and poured in-place Gravity
Wall**

SHEET NO.: 1 of 4

Original Design:

The original design calls for two stretches of walls:

Wall 1: Poured-in-place GA STD 4948-B retaining wall to the North of SR 20 from Station 2087+00 (L) to Station 2088+00 (L). The average height of the wall is approximately 9' along a length of approximately 100'.

Wall 2: Poured-in-place GA STD 9031-L retaining wall to the East of CR 263 (Beavers Rd.) from Station 71+75 (L) to Station 72+75 (L). The average height of the wall is approximately 4' along a length of approximately 100'.

Alternative:

The alternative proposes the use of MSE walls in-lieu of the cast-in-place concrete retaining walls.

The alternatives maintain the original design geometry.

Opportunities:

- Cost savings
- Reduced construction time
- GDOT Standard designs readily available
- Improved aesthetics

Risks:

- Minimal redesign effort and cost

Technical Discussion:

MSE walls are acceptable standard GDOT wall types and have demonstrated acceptable performance. They are a common wall type used in the Metro Atlanta area where the current project is located.

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

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 120,973	\$ 0	\$ 120,973
ALTERNATIVE	\$ 79,752	\$ 0	\$ 79,752
SAVINGS	\$ 41,221	\$ 0	\$ 41,221

Illustration

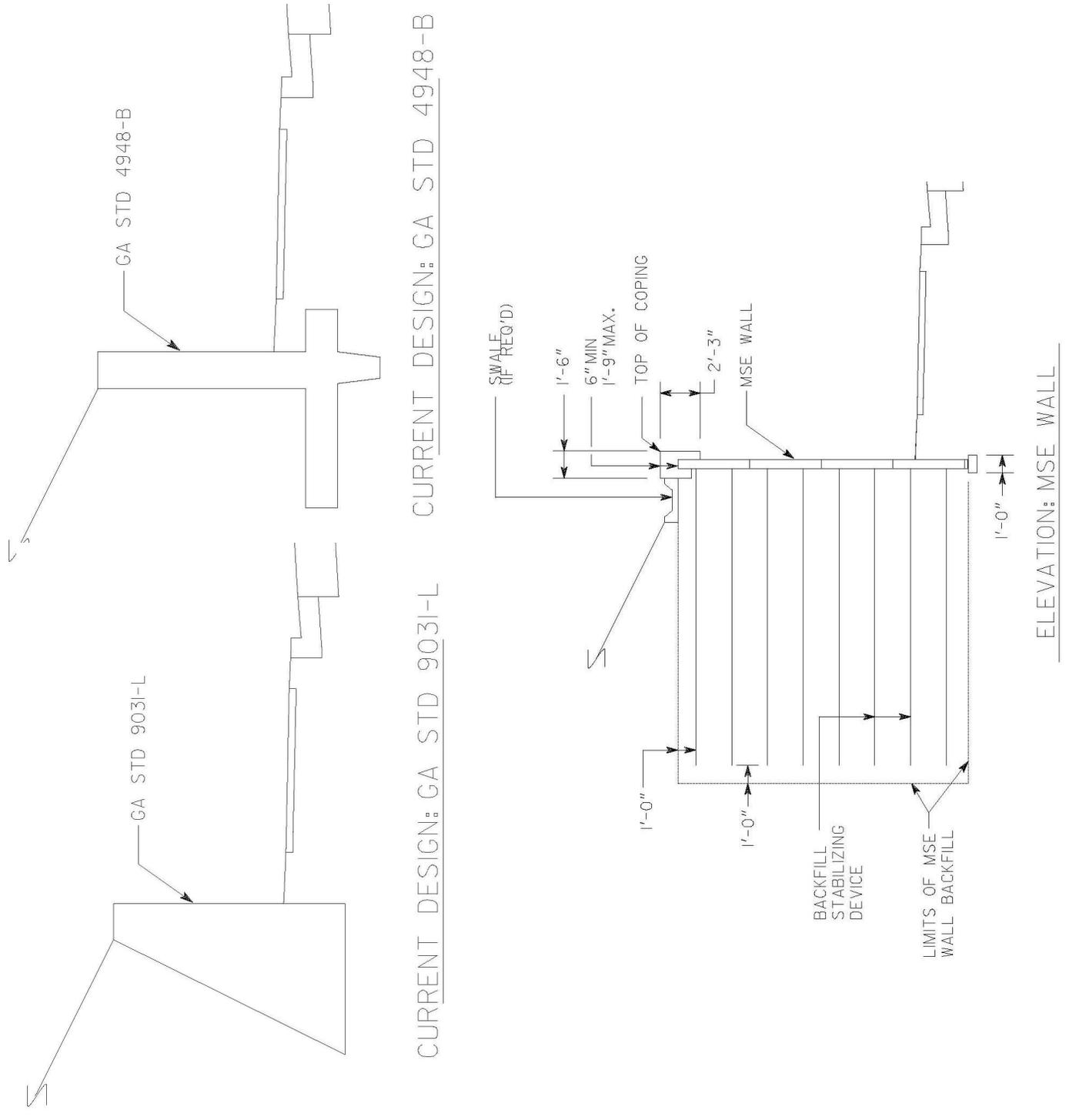


PROJECT: **Georgia Department of Transportation
CSSTP-0009-00(164) – P.I. 0009-00(164)
Widening SR 20 From I-575 to CR 288/Scott Rd
Cherokee County**

DESCRIPTION: **Use MSE Wall in-lieu of poured-in-place GA STD
4948-B Retaining Wall and poured in place Gravity
Wall**

ALTERNATIVE NO.:
TCL-14

SHEET NO.: **2** of **4**



Calculations



PROJECT: **Georgia Department of Transportation
STP0-012-1(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County**

ALTERNATIVE NO.:
TCL-14

DESCRIPTION: **Use MSE Wall in-lieu of poured-in-place GA STD
4948-B Retaining Wall and poured-in-place Gravity
Wall**

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

Current Design – Wall 1 and Wall 2 - Cast-in-Place Concrete Retaining Walls – GDOT Standards

Quantities:

Wall No. 1:

Station 2087+00 (L) to Station 2088+00 (L), (average height, 9') = 100 LF, Ga STD 4948-B, Type 2-C

{ Assume 24" thick wall, 18" thick footing, 9.25' wide, with key of 2' X 1' }

Volume of Class B Retaining Wall 1 Concrete = $\{ 100' * [(2' * 9') + (1.5' * 9.25') + (2' * 1')] \} / 27 = 121.75 \text{ CY}$

Wall No. 2:

Station 71+75 (L) to Station 72+75 (L), (average height, 4' above ground and 1.5' below ground) = 100 LF, Ga STD 9031-L

{ Assume $H=5.5'$, Top width = 8", Base Width = $H/2 + 8" = 3'-5"$, ignore accessories - conservative }

Volume of Class B Retaining Wall 2 Concrete = $\{ 0.5' * 5.5' * [8" + 3.42'] * 100' \} / 27 = 41.60 \text{ CY}$

Total volume of Class B Retaining Wall Concrete = 163.35 CY

Alternate - MSE Walls with Coping

Length of Coping = $2 * 100 = 200 \text{ LF}$

Wall area = $100 * [9' + 4'] = 1300 \text{ SF}$

Cost Worksheet



PROJECT:	Georgia Department of Transportation STP-012-1(107) – P.I. 632790 Truck Climbing Lanes on SR 20 Cherokee County	ALTERNATIVE NO.:	TCL-14
DESCRIPTION:	Use MSE Wall in-lieu of poured-in-place GA STD 4948-B Retaining Wall and poured-in-place Gravity Wall	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		
Class B Rtg Wall Concrete	CY	163.35	\$ 673.25	\$109,975	0	\$ 673.25	\$0		
MSE Walls (10 - 20 ft high)	SF	0	\$ 44.88	\$0	1300	\$ 44.88	\$58,344		
Coping	LF	0	\$ 70.79	\$0	200	\$ 70.79	\$14,158		
Sub-total				\$ 109,975				\$ 72,502	
Mark-up at	10.00%				\$ 10,998				\$ 7,250
TOTAL				\$ 120,973				\$ 79,752	

Estimated Savings: \$41,221

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation STP-012-01(107) – P.I. 632790 Truck Climbing Lanes on SR 20 Cherokee County	ALTERNATIVE NO.:	TCL-15
DESCRIPTION:	Use Modular Block Wall in-lieu of poured-in-place GA STD 4948-B Retaining Wall and poured-in-place Gravity Wall	SHEET NO.:	1 of 4

Original Design:

The original design calls for two stretches of walls:

Wall 1: Poured-in-place GA STD 4948-B retaining wall to the North of SR 20 from Station 2087+00 (L) to Station 2088+00 (L). The average height of the wall is approximately 9' along a length of approximately 100'.

Wall 2: Poured-in-place GA STD 9031-L retaining wall to the East of CR 263 (Beavers Rd.) from Station 71+75 (L) to Station 72+75 (L). The average height of the wall is approximately 4' along a length of approximately 100'.

Alternative:

The alternative proposes the use of Modular Block walls in-lieu of the cast-in-place concrete retaining walls.

The alternatives maintain the original design geometry.

Opportunities:

- Cost savings
- Reduced construction time
- Manufacturer designs and installs the system
- Improved aesthetics

Risks:

- Minimal or no redesign effort and cost

Technical Discussion:

Modular Block walls have demonstrated acceptable performance and longevity. Performance warranties are also provided by the manufacturers.

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

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 120,973	\$ 0	\$ 120,973
ALTERNATIVE	\$ 34,980	\$ 0	\$ 34,980
SAVINGS	\$ 85,993	\$ 0	\$ 85,993

Illustration

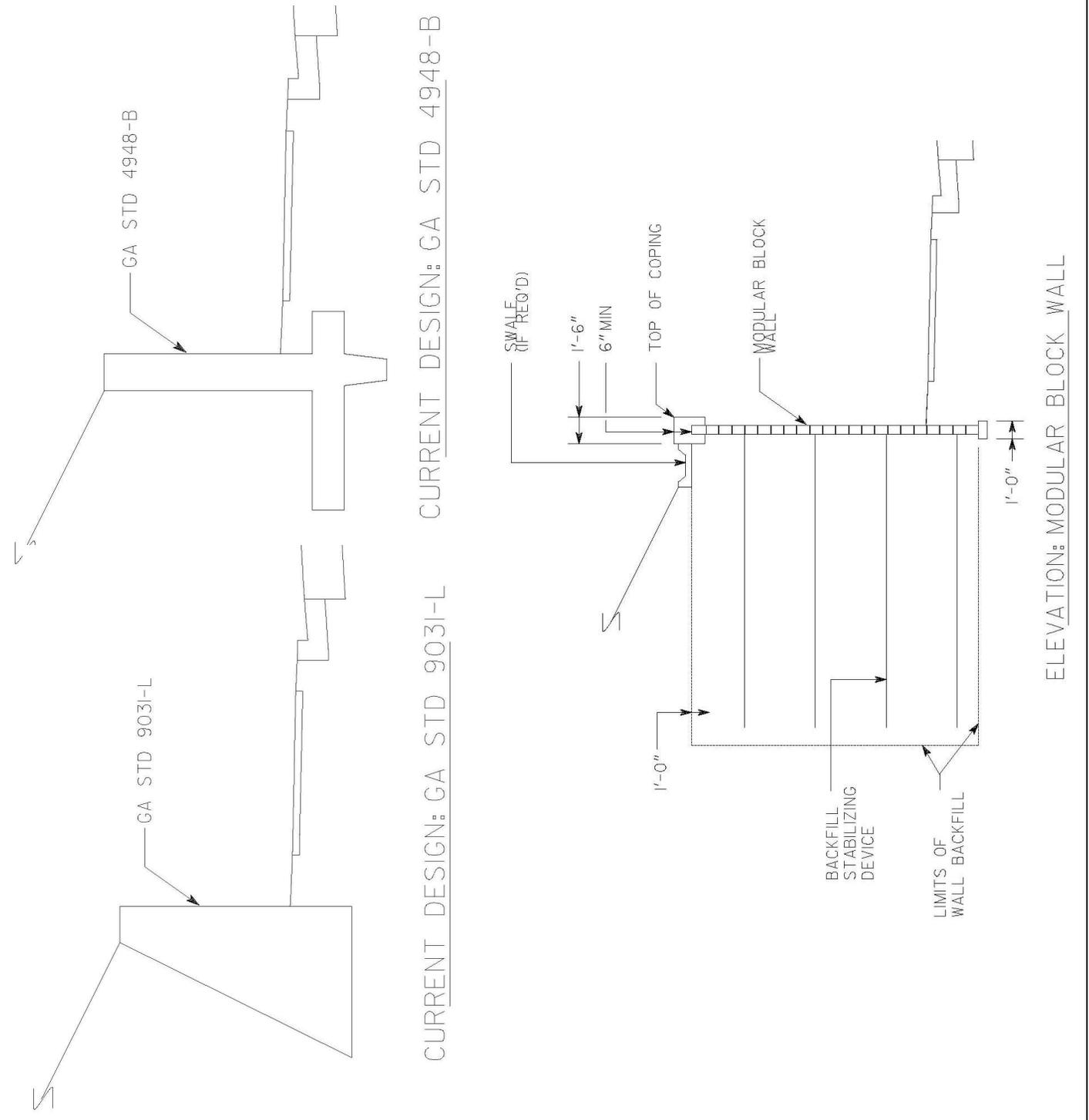


PROJECT: **Georgia Department of Transportation
CSSTP-0009-00(164) – P.I. 0009-00(164)
Widening SR 20 From I-575 to CR 288/Scott Rd
Cherokee County**

ALTERNATIVE NO.:
TCL-15

DESCRIPTION: **Use Modular Block Wall in-lieu of poured-in-place
GA STD 4948-B Retaining Wall and poured-in-place
Gravity Wall**

SHEET NO.: **2** of **4**



Calculations



PROJECT: **Georgia Department of Transportation
STP0-012-1(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County**

ALTERNATIVE NO.:
TCL-15

DESCRIPTION: **Use Modular Block Wall in-lieu of poured in place
GA STD 4948-B Retaining Wall and poured in place
Gravity Wall**

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

Current Design – Wall 1 and Wall 2 - Cast-in-Place Concrete Retaining Walls – GDOT Standards

Quantities:

Wall No. 1:

Station 2087+00 (L) to Station 2088+00 (L), (average height, 9') = 100 LF, Ga STD 4948-B, Type 2-C

{ Assume 24" thick wall, 18" thick footing, 9.25' wide, with key of 2' X 1' }

Volume of Class B Retaining Wall 1 Concrete = $\{ 100' * [(2' * 9') + (1.5' * 9.25') + (2' * 1')] \} / 27 = 121.75 \text{ CY}$

Wall No. 2:

Station 71+75 (L) to Station 72+75 (L), (average height, 4' above ground and 1.5' below ground) = 100 LF, Ga STD 9031-L

{ Assume $H=5.5'$, Top width = 8", Base Width = $H/2 + 8" = 3'-5"$, ignore accessories - conservative }

Volume of Class B Retaining Wall 2 Concrete = $\{ 0.5' * 5.5' * [8" + 3.42'] * 100' \} / 27 = 41.60 \text{ CY}$

Total volume of Class B Retaining Wall Concrete = 163.35 CY

Alternate – Modular Block Walls with Coping

Length of Coping = $2 * 100 = 200 \text{ LF}$

Wall area = $100 * [9' + 4'] = 1300 \text{ SF}$

Cost Worksheet



PROJECT:	Georgia Department of Transportation STP-012-1(107) – P.I. 632790 Truck Climbing Lanes on SR 20 Cherokee County	ALTERNATIVE NO.:	TCL-15
DESCRIPTION:	Use Modular Block Wall in-lieu of poured-in-place GA STD 4948-B Retaining Wall and poured-in-place Gravity Wall	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
Class B Rtg Wall Concrete	CY	163.35	\$ 673.25	\$109,975	0	\$ 673.25	\$0
Modular Block Walls (10 ft high)	SF	0	\$ 18.00	\$0	1300	\$ 18.00	\$23,400
Coping	LF	0	\$ 42.00	\$0	200	\$ 42.00	\$8,400
Note: Cost per SF of Modular							
Block wall is in place cost as							
provided by manufacturer.							
Sub-total				\$ 109,975			\$ 31,800
Mark-up at 10.00%				\$ 10,998			\$ 3,180
TOTAL				\$ 120,973			\$ 34,980

Estimated Savings: \$85,993

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation STP-012-01(107) – P.I. 632790 Truck Climbing Lanes on SR 20 Cherokee County	ALTERNATIVE NO.:	TCL-16
DESCRIPTION:	Delete westbound truck climbing lane on Section 2	SHEET NO.:	1 of 4

Original Design:

The original design calls for adding one westbound truck climbing lane throughout the most part of Section 2 for 8,800-ft from station 2081+50 to station 2169+50.

Alternative:

The alternative is to delete the westbound truck climbing lane entirely.

Opportunities:

- Reduce construction costs

Risks:

- Increase delay and travel time for the westbound direction

Technical Discussion:

The vertical profile of Section 2 consists of a series of upgrades and downgrades, rather than just having one distinct upgrade for the westbound direction. A grade analysis shown under VE Alternative TCL-3 indicates that the average upgrade is 2.62% for the eastbound direction and 1.51% for the westbound direction when considering the upgrade segments only. The average grade is only 0.43% for the eastbound direction and -0.43% (downgrade) for the westbound direction when considering all upgrade and downgrade segments together.

Based on the AASHTO Green Book, a 10 mph or greater of speed reduction for a typical heavy truck is required to warrant a truck climbing lane. Per the AASHTO Green Book Exhibit 3-55, a typical heavy truck would need to travel 2,500-ft on a 4% upgrade to reduce its speed from 45 mph to 35 mph. On a 3% upgrade, a typical heavy truck would reduce its speed from 45 mph to 39 mph after traveling 4,000-ft and would be able to attain the 39 mph speed throughout the rest of the 3% upgrade.

By examining the individual upgrades contained in the grade analysis table, none of them would warrant a truck climbing lane. Furthermore, using the average grades with the total length of 8,800-ft would not warrant a truck climbing lane either.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$737,311	\$ 0	\$737,311
ALTERNATIVE	\$0	\$ 0	\$0
SAVINGS	\$737,311	\$ 0	\$737,311

Illustration

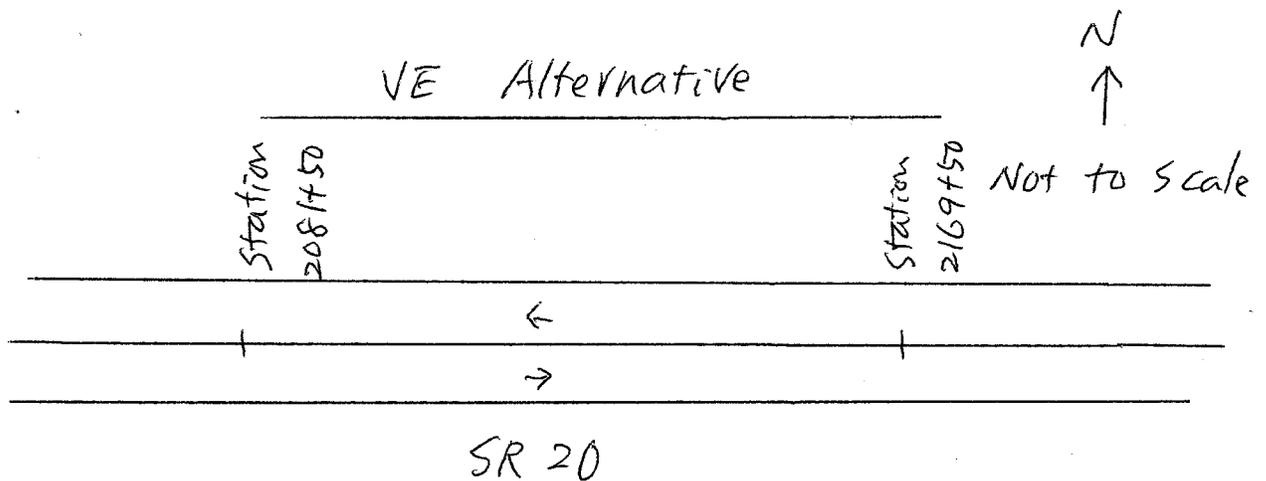
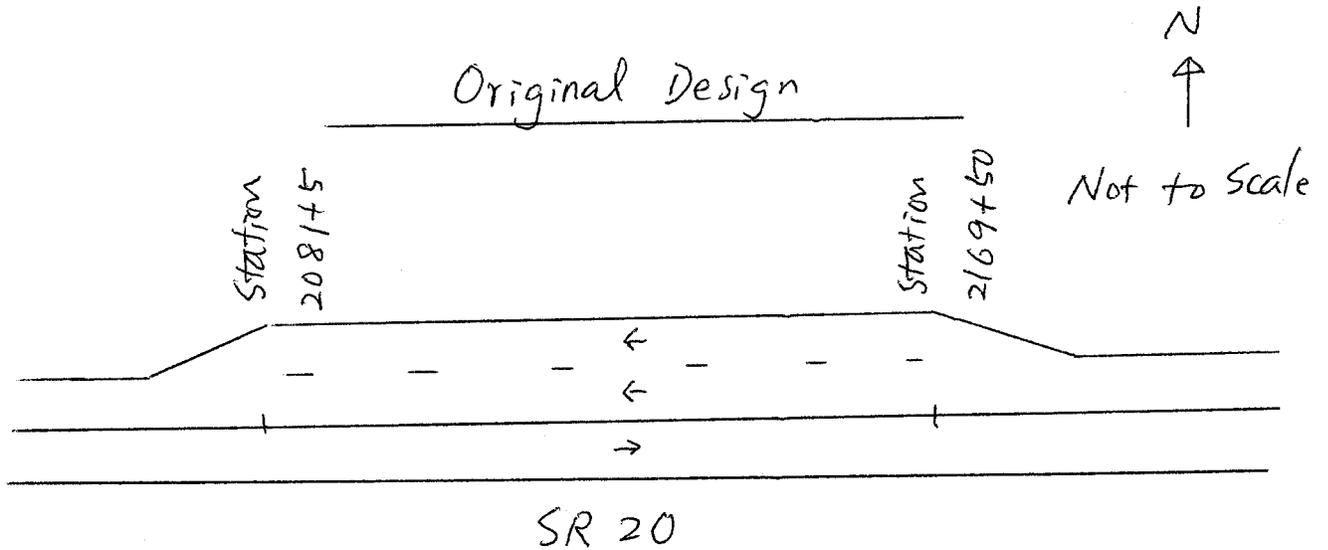


PROJECT: Georgia Department of Transportation
STP-012-01(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County

ALTERNATIVE NO.:
TCL-16

DESCRIPTION: **Delete westbound truck climbing lane on Section 2**

SHEET NO.: 2 of 4



Calculations



PROJECT: **Georgia Department of Transportation
STP0-012-1(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County**

ALTERNATIVE NO.:
TCL-16

DESCRIPTION: **Delete westbound truck climbing lane on Section 2**

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

Original design:

The added westbound truck climbing lane:

Full width section: 8,800-ft long x 12-ft wide = 105,600 SF

Beginning taper: 150-ft long x 12-ft wide x 0.5 = 900 SF

Ending taper: 500-ft long x 12-ft wide x 0.5 = 3,000 SF

Total paved area for the truck climbing lane: 109,500 SF

VE Alternative:

Delete the westbound truck climbing lane:

Total paved area for the truck climbing lane: 0 SF

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation STP-012-01(107) – P.I. 632790 Truck Climbing Lanes on SR 20 Cherokee County	ALTERNATIVE NO.:	TCL-17
DESCRIPTION:	Terminate eastbound two-lane section at station 3105 in-lieu of station 3121	SHEET NO.:	1 of 4

Original Design:

The original design calls for adding one eastbound truck climbing lane throughout the most part of Section 3 from station 3068 to station 3121. The ending point of the added truck lane is close to the project limit at station 3126.

Alternative:

The alternative is to terminate the added eastbound truck climbing lane at station 3105, thereby reducing its length by 1,600-ft.

Opportunities:

- Reduce construction costs

Risks:

- Trucks may not be able to attain a desired speed of at least 40 mph (but the AASHTO Green Book pointed out that this may not be practical in many instances because of the unduly long distance needed)

Technical Discussion:

The vertical profile of the added eastbound truck climbing lane consists of a series of steep upgrades, ranging from 5.13% to 6.08%. The steep upgrades end at station 3101, and are followed by a 0.80% upgrade. A 400-ft crest curve is placed between the last steep upgrade and the 0.80% upgrade.

Based on the AASHTO Green Book, at least 200-ft beyond the crest point must be provided to permit trucks to return to the normal lane. Ending the truck climbing lane at station 3105 would provide a 200-ft distance beyond the 400-ft crest curve at the end of the last steep upgrades. The lane reduction taper proposed by the original design will remain for the shortened truck climbing lane.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$562,979	\$ 0	\$562,979
ALTERNATIVE	\$315,637	\$ 0	\$315,637
SAVINGS	\$247,342	\$ 0	\$247,342

Illustration



PROJECT: Georgia Department of Transportation
STP-012-01(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County

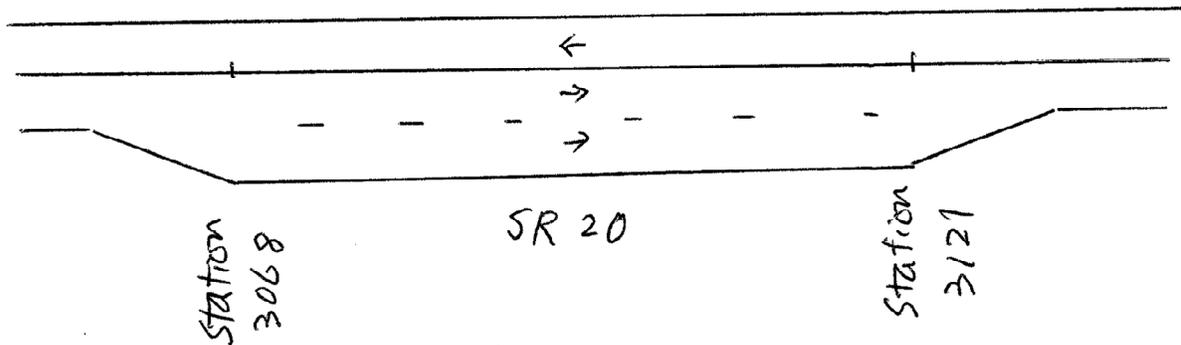
ALTERNATIVE NO.:
TCL-17

DESCRIPTION: Shorten the beginning of the eastbound truck climbing lane on Section 3

SHEET NO.: 2 of 4

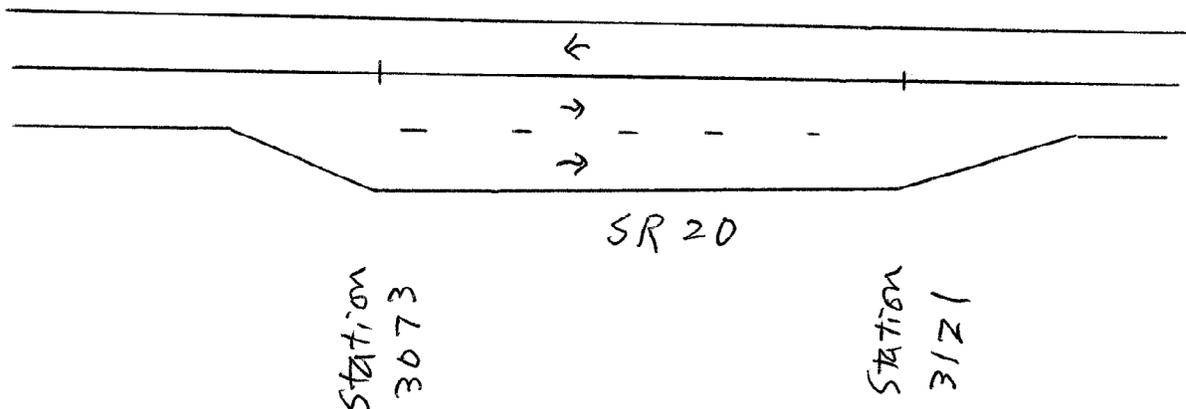
Original Design

N
↑
Not to Scale



VE Alternative

N
↑
Not to Scale



Calculations



PROJECT: **Georgia Department of Transportation
STP0-012-1(107) – P.I. 632790
Truck Climbing Lanes on SR 20
Cherokee County**

ALTERNATIVE NO.:
TCL-17

DESCRIPTION: **Shorten the beginning of the eastbound truck
climbing lane on Section 3**

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

Original design:

The added eastbound truck climbing lane:

Full width section: 5,300-ft long x 12-ft wide = 63,600 SF

Ending taper: 500-ft long x 12-ft wide x 0.5 = 3,000 SF

Beginning taper: 100-ft long x 12-ft wide x 0.5 = 600 SF

Total paved area: 67,200 SF

VE Alternative:

The added eastbound truck climbing lane:

Full width section: 4,800-ft long x 12-ft wide = 57,600 SF

Ending taper: 500-ft long x 12-ft wide x 0.5 = 3,000 SF

Beginning taper: 100-ft long x 12-ft wide x 0.5 = 600 SF

Total paved area: 61,200 SF

Project Description

PROJECT INTRODUCTION

This project is CSSTP-0009-00(164) P.I. 0009-00(164), Widening SR 20 from I-575 to CR 288/Scott Rd. and STP00-0012-01(107) P.I. 632790, Truck Climbing Lanes on SR 20, Cherokee County.

This project begins 0.34 miles east of I-575 and ends 0.15 miles east of Scott Road. The proposed roadway consists of 4 lanes; 2 in each direction separated by a 20' raised median, bike lanes, curb and gutters, and 8' sidewalks on both sides. The purpose of the project is to improve east-west traffic safety in this corridor.

PROJECT DESCRIPTION - Truck Climbing Lanes on SR 20

This project is to construct east and west bound truck passing lanes to supplement the existing two lane highway. The project begins 0.23 miles west of Shady Lane and ends at 0.28 miles east of Greenwood Court. Construction consists of the addition of a passing lane and intersection safety improvements.

The total estimated construction cost is \$10,600,000 and the right-of-way cost is \$17,343,000 and \$585,000 reimbursable utilities, for a total project cost estimated to be \$28,528,000.

This project is rather fully described in the documentation that is located in Tabbed section of this report, entitled *Project Description*.

REPRESENTATIVE DOCUMENTS

- Georgia Department of Transportation
- GDOT Engineering Documents
 - The Concept Validation Report and Plans
 - Construction Cost Estimates
 - Preliminary Right-of-Way Cost Estimate

The VE Team utilized the supplied project materials noted above and the current standard drawings, details and specifications provided by GDOT.

REVISED PROJECT CONCEPT REPORT

Need and Purpose: State Route 20 is a major east – west connector in this area with high traffic volumes and a high percentage of trucks using this section of roadway in eastern Cherokee County. These truck climbing lanes and intersection improvements are needed for safety reason.

Project location: This project consists of three truck climbing lanes on State Route 20. The first lane begins 0.34 miles east of I-575 and ends 0.15 miles east of Scott Road. The second lane begins 0.23 miles west of Shady lane and ends at the intersection of Macedonia Forest Circle. The third section begins at Crystal Springs Road and ends 0.28 miles east of Greenwood Court.

The project also consists of the realignment and reconstruction of intersections on State Route 20 at Old Doss Road, Scott Road, Union Hill Road, Harmony Drive and State Route 369 and the addition of turn lanes at Scott Road, Weaver Circle, and Charles Cobb Lane.

Description of the approved concept:

PDP Classification: Major _____ Minor X

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

Functional Classification: Rural Minor Arterial

U. S. Route Number(s): N/A **State Route Number(s):** 20

Traffic (AADT) as shown in the approved concept:

Current Year: 2004	Design Year: 2024
Site 1: 25000	Site 1: 50000
Site 2: 20000	Site 2: 40000
Site 3: 16000	Site 3: 32000

Proposed features to be revised:

- Proposed Typical Section: 4 - 12ft. lanes with 20 ft. raised median, curb and gutter, 5 ft. sidewalks, and bike lanes
- Proposed Design Speed Mainline 45 mph
- Proposed Maximum grade Mainline 6 % Maximum grade allowable 6 %.
- Proposed Minimum radius for curve 587 Minimum radius allowable 587
- Proposed Maximum degree of curve 9° 45' . Maximum degree allowable 9° 45' .
- Structures:
 - Bridges: N/A
 - Retaining walls: N/A
- Major intersections and interchanges: SR 20/Cummings Hwy and CR 288/ Scott Rd.
- Traffic control during construction: N/A
- Design Exceptions to controlling criteria anticipated:

	UNDETERMINED	YES	NO
HORIZONTAL ALIGNMENT:	()	()	(X)
ROADWAY WIDTH:	()	()	(X)
SHOULDER WIDTH:	()	()	(X)
VERTICAL GRADES:	()	()	(X)

CROSS SLOPES:	()	()	(X)
STOPPING SIGHT DISTANCE:	()	()	(X)
SUPERELEVATION RATES:	()	()	(X)
HORIZONTAL CLEARANCE:	()	()	(X)
SPEED DESIGN:	()	()	(X)
VERTICAL CLEARANCE:	()	()	(X)
BRIDGE WIDTH:	()	()	(X)
BRIDGE STRUCTURAL CAPACITY:	()	()	(X)

- Design Variances: None
- Environmental concerns: None
- Level of environmental analysis:
 - Are Time Savings Procedures appropriate? Yes (X), No (),
 - Categorical exclusion (),
 - Environmental Assessment/Finding of No Significant Impact (FONSI) (), or
 - Environmental Impact Statement (EIS) ().
- Utility involvements: *(Communications, Power, Gas, Petroleum, ITS, Railroads, etc.)*

Describe the revised feature(s) to be approved: This revision will widen the existing two lane road to a proposed four lane road with a required twenty (20) foot raised-median beginning 0.34 miles east of I-575 and ending 0.15 miles east of Scott Road. This portion of the project has been separated from Sites 2 & 3. The new project number and PI# of this section is: CSSTP-0009-00 (164); 0009164, respectively.

Updated traffic data (AADT):

<u>Current Year: 2011</u>	<u>Design Year: 2031</u>
0009164: 25000	0009164: 50000
632790: 20000	632790: 40000

Programmed/Schedule:

0009164 - <u>P.E. 2000</u>	<u>R/W: 2006</u>	<u>Construction: 2008</u>
632790 - <u>P.E. 2000</u>	<u>R/W: 2006</u>	<u>Construction: 2008</u>

Revised cost estimates:

1. Construction cost excluding E&C: 0009164: \$4,000,000
632790: \$6,600,000
2. Right-of-way: 0009164: \$6,800,000
632790: \$10,543,000
3. Utilities: 0009164: N/A
632790: \$585,000 (Reimbursable)

Is the project located in a Non-attainment area?X.....YesNo. The ARC's model update is a 'work in progress' at this time. The plan/model should be adopted sometime in September 2007.

Recommendation: Recommend that the proposed revision to the concept be approved for implementation.

Attachments:

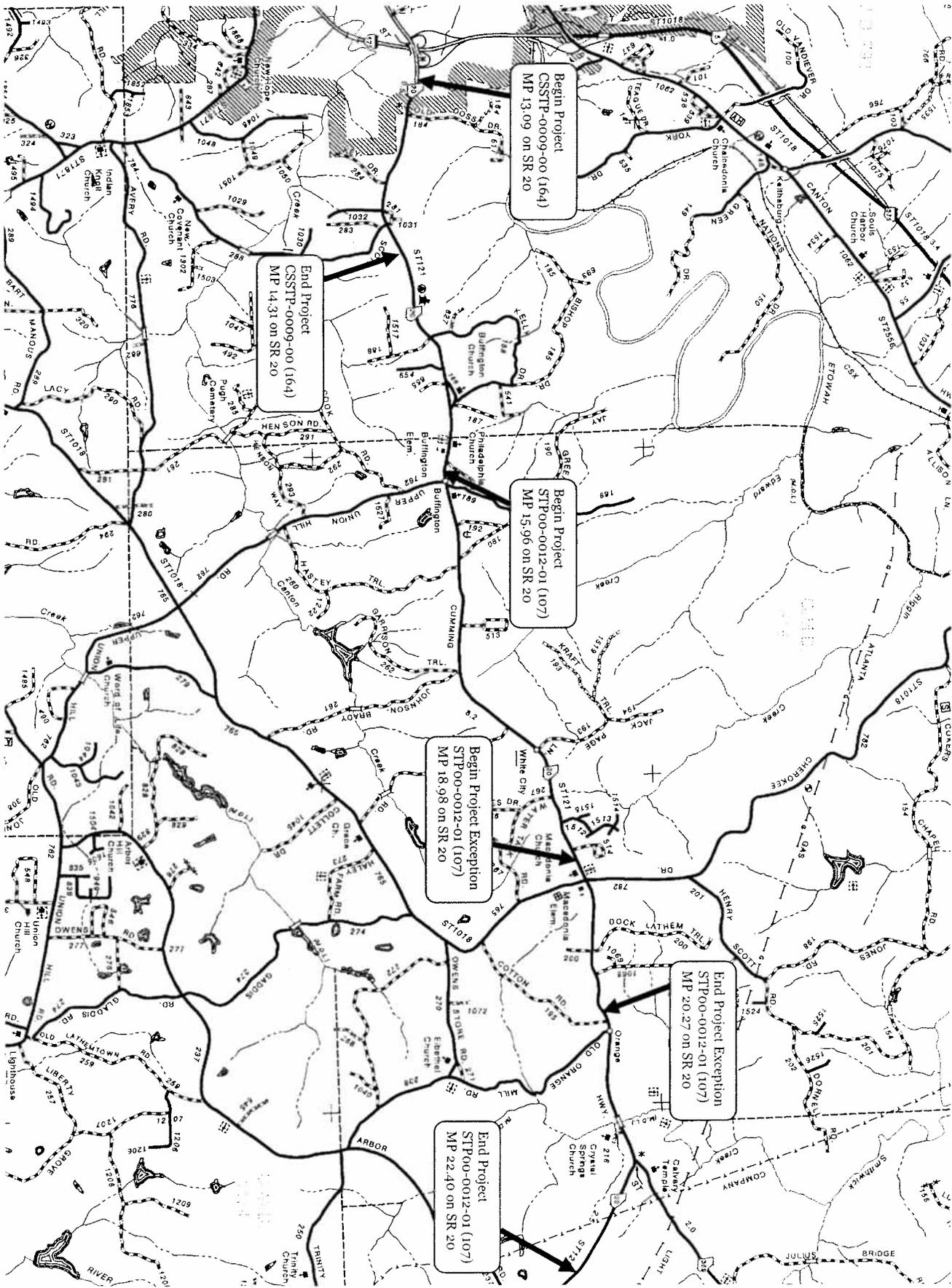
1. Sketch Map,
2. Cost Estimate (0009164) and
3. Typical Section (0009164)

Concur: _____
Director of Preconstruction

Approve: _____
Chief Engineer

SCORING RESULTS AS PER TOPPS 2440-2

Project Number:		County:		PI No.:	
Report Date:		Concept By:			
<input type="checkbox"/> CONCEPT		DOT Office:			
		Consultant:			
Project Type: Choose One From Each Column		<input type="checkbox"/> Major <input type="checkbox"/> Minor	<input type="checkbox"/> Urban <input type="checkbox"/> Rural	<input type="checkbox"/> ATMS <input type="checkbox"/> Bridge <input type="checkbox"/> Building <input type="checkbox"/> Interchange <input type="checkbox"/> Intersection <input type="checkbox"/> Interstate <input type="checkbox"/> New Location <input type="checkbox"/> Widening & Reconstruction <input type="checkbox"/> Miscellaneous	
FOCUS AREAS	SCORE	RESULTS			
Presentation					
Judgement					
Environmental					
Right of Way					
Utility					
Constructability					
Schedule					



PRELIMINARY COST ESTIMATE

DATE: 8-Oct-08
 PROJECT: CSSTP-0009-00 (164), Cherokee County
 P.I. NO.: 0009164

DESCRIPTION: SR 20 FR I-575 to CR 238 (Scott Rd), 4 lane w/20 ft raised median

PROPOSED CONCEPT: 4 lane w/20 ft raised median

EXISTING ROAD: 2 - 12 foot lanes with 10 foot shoulders

TRAFFIC: (2011) Existing: 25,000 (2031) Design: 50,000

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

PROJECT COST

A. RIGHT OF WAY

1. PROPERTY (Land and Easements)	\$2,798,100.00
appx. 0.52 acres @ \$150,000.00 / acre Residential	
appx. 7.08 acres @ \$300,000.00 / acre Commercial	
appx. 3.974 acres @ \$300,000.00 / acre(50%) Easements	
2. DISPLACEMENTS	\$55,000.00
3. IMPROVEMENTS	\$200,000.00
3. OTHER COSTS	\$3,746,900.00
	SUBTOTAL: \$6,800,000.00

B. REIMBURSABLE UTILITIES

1. RAILROAD	N/A
2. TRANSMISSION LINES	N/A
3. SERVICES	N/A
	SUBTOTAL: \$0.00

C. MAJOR STRUCTURES

1. WALLS	\$175,000.00
2. BRIDGE STREAM CROSSINGS	\$0.00
3. BRIDGE OVER/UNDERPASS	\$0.00

4. BOX CULVERTS	\$0.00
SUBTOTAL:	\$175,000.00

D. GRADING AND DRAINAGE

1. EARTHWORK	\$808,000.00
101000 Cu Yds @ \$8.00	
2. DRAINAGE	
a. Storm drain pipes (exc. Box culverts)	\$50,000.00
1000' of 18" cross drain pipe, 12 Flared end sections (18")	
b. Storm drain pipes (exc. Box culverts)	\$20,000.00
200' of 36" cross drain pipe, 2 Flared end sections (36")	
c. Side drain pipes (exc. Box culverts)	\$55,000.00
700' of 18" cross drain pipe, 38 safty end sections (18")	
d. Curb & Gutter	\$352,000.00
22000' @ \$16 /LF	
(Including median) 8"x30" typ7	
e. Drop Inlet GP1	\$10,000.00
e. Concrete Spillway, TP1	\$2,000.00
e. Longitudinal System (incl. Catch Basins)	\$231,000.00
4500' OF 18 PIPE	
19 - basins	
SUBTOTAL:	\$1,528,000.00

E. BASE AND PAVING

1. AGGREGATE BASE	\$390,000.00
appx. 13000 tons @ \$30.00 / ton	
2. ASPHALT PAVING	\$796,000.00
appx. 15920 tons @ \$50.00 / ton	
Rumble Strip	\$4,500.00
4. OTHER Concrete median	\$55,000.00
5500' x 20'= 11000SF	
7 1/2" @ \$45.00 /SY	
1222.2222 SY	
SUBTOTAL:	\$1,245,500.00

F. LUMP ITEMS

1. TRAFFIC CONTROL	\$50,000.00
2. CLEARING AND GRUBBING	\$780,000.00
appx. 156 acres @ \$5,000.00 / acre	
3. LANDSCAPING	\$2,000.00
4. EROSION CONTROL	\$500,000.00
5. DETOURS (Incl. Temp. Bridges)	\$0.00
SUBTOTAL:	\$1,332,000.00

G. MISCELLANEOUS

1. LIGHTING	\$0.00
2. SIGNING - STRIPING	\$512,300.00

3. GUARDRAIL \$75,000.00

4. OTHER

SUBTOTAL: \$587,300.00

H. SPECIAL FEATURES

SUBTOTAL: \$0.00

ESTIMATE SUMMARY

A. RIGHT OF WAY \$6,800,000.00

B. REIMBURSABLE UTILITIES \$0.00

CONSTRUCTION COST SUMMARY

C. MAJOR STRUCTURES \$175,000.00

D. GRADING AND DRAINAGE \$1,528,000.00

E. BASE AND PAVING \$1,245,500.00

F. LUMP ITEMS \$1,332,000.00

G. MISCELLANEOUS \$587,300.00

H. SPECIAL FEATURES \$0.00

SUBTOTAL CONSTRUCTION COST \$4,867,800.00

E & C (10%) \$486,780.00

INFLATION (5% PER YEAR FOR 2 YEARS) \$0.00

TOTAL CONSTRUCTION COST \$5,354,580.00

GRAND TOTAL COST \$12,154,580.00

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 October 28 through October 31, 2008 in Atlanta, Georgia, for the Georgia Department of Transportation. The workshop agenda is presented herein.

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

Les M. Thomas, P.E., CVS-Life	Certified Value Specialist
John Luh, Ph.D., P.E., PTOE, AICP, AVS	Highway and Transportation PE
Kevin Martin, Esq. AVS	Highway Construction Specialist
Greg Hanchar, PE	CSI Bridge Structural Engineer
Ramesh Kalvakaalva, PE	CSI Bridge Structural Engineer
Randy S. Thomas, CVS	Assistant Team Leader

A Site Visit was performed on October 27, 2008.

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

- **Investigation/Information Phase** – during this phase of the VE Team’s work, the team received a briefing from the Georgia Department of Transportation (GDOT) design team and the Georgia Department of Transportation (GDOT) staff. This briefing included discussions of the design intent behind the project, the cost concerns, and the physical project limitations. 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.

- **Analysis Phase** – during this phase the VE Team determined the “**Functions**” of the project. This was accomplished by reviewing the project from the simplest format in asking the questions of “What is the project suppose to do?”, and “How is it suppose 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 project were identified as follows:
 - **Project Objective/Goals**
 - **Improve Safety**
 - **Increase Capacity**
 - **Separate Traffic**
 - **Provide for future growth**
 - **Project Basic Functions**
 - **Additional Traffic Lanes**
 - **Construct Additional Turn Lanes**
 - **Provide Separation of Traffic**
 - **Provide Traffic Safety Controls**
 - **Provide Bike Lanes and Sidewalks**
- **Speculation Phase** - The VE team performed a brainstorming session to identify ideas that might help meet the project objectives:
 - Improve Safety
 - Increase Capacity
 - Reduce construction and life cycle costs
 - Reduce the time of construction

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.

- **Evaluation Phase** – Once the VE Team identified the creative ideas, it was necessary to decide which alternatives should be carried forward. This is the work of the Evaluation or Judgment Phase. The VE 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 ideas that they believed would improve the project by a vote process.

- Following that selection process, the VE Team used 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** – During this phase, the VE Team developed each of the selected design alternatives. This effort included a detailed explanation of the idea with sketches as appropriate to clarify the idea from the original concept, advantages and disadvantages, a technical explanation and an estimation of the cost and resultant savings if implemented. (see the tabbed section – Study Results)
- **Recommendation Phase** – During this phase the VE Team reviews the alternative ideas to confirm which ones are appropriate for the project, have an opportunity for success and which will improve the value of the project if implemented.
- **Presentation Phase** – As noted earlier, the team made an 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 Study. This written report is intended to formalize those findings.

The following **Function – Worth - Cost** Analysis, was utilized to focus the team and stimulate brainstorming; a copy of the **Attendance Sheets** is also attached so that the reader can be informed about who participated in the Study proceedings.

VALUE ENGINEERING STUDY AGENDA

for

Georgia Department of Transportation

CSSTP-0009-00(164) P.I. 0009-00(164)

Widening SR 20 from I-575 to CR 288/Scott Rd.

And

STP00-0012-01(107) P.I. 632790

Truck Climbing Lanes on SR 20

Cherokee County

October 28-31, 2008

Pre-Workshop Activities

VE Team Leader organizes study, coordinates with the Owner and Designer the project objectives and materials necessary. The VE Team receives and reviews all project documents. The team develops a Pareto Chart and/or Cost Model for the project. A member of the VE Team visits the project site.

Day One

9:00-10:30 Design Team Presentation (Information Phase)

- Introduction of participants, owner, designer, and VE team members
- Presentation of the project by the design engineer including:
 - History and background
 - Design Criteria and Constraints
 - Special "U" turn requirements
 - Special needs (schools, businesses, etc.)
 - Sidewalk, bicycle lanes, and or multi-use trails
 - Historical Property protection
 - Current Construction Completion Schedule
 - Project Cost Estimate and Budget Constraints
- Owner Presentation – special requirements, definition of life cycle period and interest rate for life cycle costs
- Review VE Pareto Chart/Cost Model
- Discussion, questions and answers
- Overview of the VE Process and Agenda – Workshop goals & project goals

10:30-12:00 VE Team reviews project (Information Phase)

- Review design team's presentation
- Review agenda and goals of the study

1:00-2:30 Function Analysis Phase

- Analyze Cost Model – Pareto
- Identify basic and secondary functions
- Complete Function Matrix/FAST Diagram

2:30-5:00 Creative Phase

- Brainstorming of alternative ideas

Day Two

8:00-10:00 Evaluation Phase

- Establish criteria for evaluation
- Rank ideas
- Identify “best” ideas for development
- Identify those ideas that will become Design Suggestions
- Develop a cost/worth analysis
- Identify a “champion” for each idea to be developed

10:00-5:00 Development Phase

- Develop alternative ideas design suggestions with assessment of original design and write up new alternatives including:
 - Opportunities & risks
 - Illustrations
 - Calculations
 - Cost worksheets
 - Life cycle cost analysis

Day Three

8:00-5:00 Development Phase

- Continue developing Alternative Ideas
- Continue developing Design Suggestions
- Prepare for presentation to Owners and Designers

Day Four

8:00-9:00 Prepare Presentation

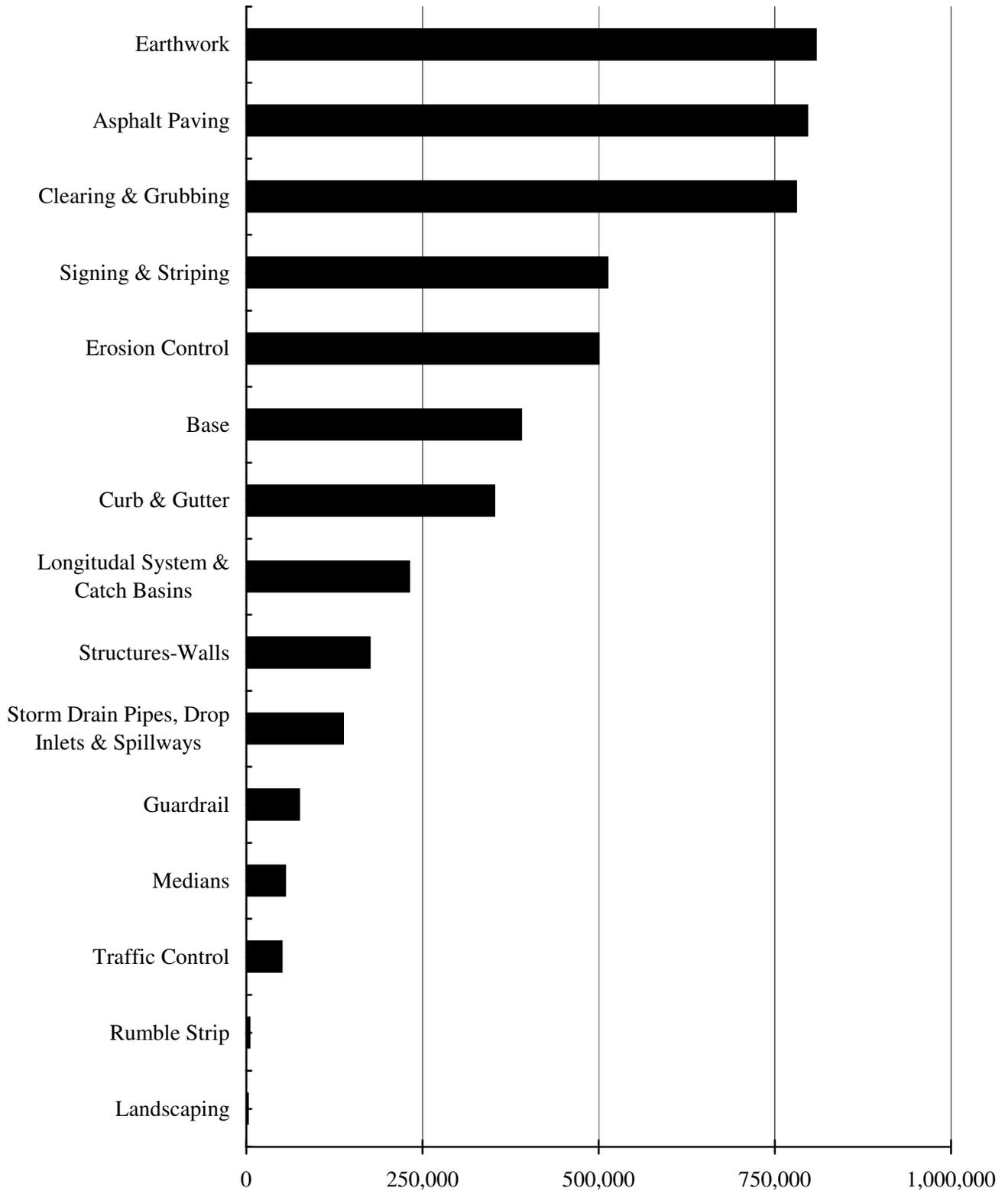
9:00-10:00 VE Team Presentation

PARETO CHART - COST HISTOGRAM

PROJECT: CSSTP-0009-00(164) P.I. 0009-00(164) Widwening SR 20 from I-575 to CR 288/Scott Rd. and STP00-0012-01(107) - P.I. No. 632790 Truck Climbing Lanes on SR 20 Cherokee County, Georgia			
PROJECT ELEMENT	COST	PERCENT	CUM. PERCENT
Earthwork	808,000	16.60%	16.60%
Asphalt Paving	796,000	16.35%	32.95%
Clearing & Grubbing	780,000	16.02%	48.97%
Signing & Striping	512,300	10.52%	59.50%
Erosion Control	500,000	10.27%	69.77%
Base	390,000	8.01%	77.78%
Curb & Gutter	352,000	7.23%	85.01%
Longitudal System & Catch Basins	231,000	4.75%	89.76%
Structures-Walls	175,000	3.60%	93.35%
Storm Drain Pipes, Drop Inlets & Spillways	137,000	2.81%	96.17%
Guardrail	75,000	1.54%	97.71%
Medians	55,000	1.13%	98.84%
Traffic Control	50,000	1.03%	99.87%
Rumble Strip	4,500	0.09%	99.96%
Landscaping	2,000	0.04%	100.00%
Subtotal	\$ 4,867,800	100.00%	
E & C Rate @ 10%	INCL \$ 486,780		
Subtotal =	\$ 5,354,580		
Total Construction Cost =	\$ 5,354,580		
Right-of-Way =	6,800,000		
Reimb. Utilities =	0		
TOTAL	\$ 12,154,580		

Pareto Chart 2

PROJECT: STP00-0012-01(107) - P.I. No. 632790
Cherokee County



DESIGNER PRESENTATION



MEETING PARTICIPANTS

Geogia Department of Transportation		October 28, 2008		
CSSTP-0009-00(164) P.I. 0009-00(164) Widening SR 20 from I-575 to CR 288/Scott Rd. and STP00-0012-01(107) P.I. 632790 Truck Climbing Lanes on SR 20 Cherokee County				
NAME		ORGANIZATION & TITLE	E-MAIL	PHONE
Lisa Myers		GDOT - Engineering Services	lisa.myers@dot.state.ga.us	404-631-1770
Ron Wishon		GDOT - Engineering Services	rwishon@dot.ga.gov	404-631-1753
Kerric Primus		GDOT-D6 Road Design	kprimus@dot.ga.gov	770-387-3625
Joseph Ciavarror		GDOT-D6 Road Design	jciavarro@dot.ga.gov	770-387-3624
David Moore		GDOT-D6 Road Design	dmoore@dot.ga.gov	770-387-3672
Ken Werho		GDOT-Design	kwherho@dot.ga.gov	404-631--1897
James Magnus		GDOT-Construction Office	jmagnus@dot.ga.gov	770-528-3238
Jerry Milligan		GDOT-Roadway	jmilligan@dot.ga.gov	770-986-6157
Galen Barrow		District 6 -Engineering	gbarrow@dot.ga.gov	770-986-1786
Les Thomas, P.E., CVS-Life		PBS&J	lmthomas@pbsj.com	678-677-6420
Randy S. Thomas, CVS		PBS&J	rsthomas@pbsj.com	678-677-6420
Dr. John Luh, AVS		PBS&J	jzluh@pbsj.com	678-677-6420
Kevin Martin, Esq., AVS		PBS&J	klmartin@pbsj.com	205-969-3776
Greg Hanchar, PE		Civil Services Inc.	ghanchar@civilservicesinc.com	628-472-0155

**VE TEAM PRESENTATION
MEETING PARTICIPANTS**

Geogia Department of Transportation		October 31, 2008		
CSSTP-0009-00(164) P.I. 0009-00(164) Widening SR 20 from I-575 to CR 288/Scott Rd. and STP00-0012-01(107) P.I. 632790 Truck Climbing Lanes on SR 20 C County				
NAME		ORGANIZATION & TITLE	E-MAIL	PHONE
Lisa Myers		GDOT - Engineering Services	lisa.myers@dot.ga.gov	404-631-1770
Ron Wishon		GDOT-Engineering Services	rwishon@dot.ga.gov	404-631-1753
Kerric Primus		District 6 - Road Design	kprimus@dot.ga.gov	770-387-3625
Joseph Ciavarror		District 6 - Road Design	jciavarro@dot.ga.gov	770-387-3624
David Moore		District 6 - Road Design	dmoore@dot.ga.gov	770-387-3672
Ken Werho		GDOT-GDOT-Traffic Operations	kwerho@dot.ga.gov	404-635-8144
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