Value Engineering Study Report

Georgia Department of Transportation

STP00-0013-01(063) - P.I. No. 132950

SR13/Buford Highway
from Sawnee Avenue to Friendship Road, Gwinnett and Hall Counties

Georgia Department of Transportation

Value Engineering Team

PBSJ

Design Team

MA

July 31, 2009

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
Buford Highway (SR 13) from Sawnee Avenue to Friendship Road
Project No. STP00-0013-01(063) – P.I. No. 132950

Dear Ms. Myers:

Please find enclosed two (2) hard copies and one (1) CD of our final Value Engineering Report for widening of Buford Highway in Gwinnett and Hall County.

This Value Engineering Study, which was performed during the period July 14 through July 17, 2009, identified **29 *Alternative Ideas*** of which **9 *Alternative Ideas* are recommended for implementation**. 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

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

Randy S. Thomas

Randy S. Thomas, CVS
Assistant Team Leader

Value Engineering Study Report

Project No. STP00-0013-01(063)
P.I. No. 132950

Buford Highway (SR 13)
Sawnee Avenue to Friendship Road (SR 347)
Gwinnett/Hall Counties

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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 Value Engineering study during the period of July 14-17, 2009 in Atlanta, at the office of the Georgia Department of Transportation. The subject of the Value Engineering study was Project No. STP00-0013-01(063), P.I. No. 132950, Buford Highway (SR 13) from Sawnee Avenue in Gwinnett County to Friendship Road (SR 347) in Hall County.

The design for the project has been prepared by Moreland Altobelli Associates, Inc. At the time of the workshop, the plans had advanced to the preliminary design level.

PROJECT DESCRIPTION

The proposed project will widen Buford Highway (SR 13) from a rural two-lane to an urban four-lane with twenty foot raised grassed medians, twelve foot right turn lanes at all major intersections and major commercial drives, and sidewalks. The traffic analysis for the design year of 2032 indicates that all major intersections would be at level F unless improvements are made. The project is presently serving a semi-rural area with minor commercial businesses primarily related to boating.

The estimated construction cost for the project is $9,391,146. In addition, Right-of-Way costs are anticipated to be $10,000,000 with reimbursable utilities cost estimated to be $50,000. The projected total cost for the project is $19,441,246.

PROJECT CONCERNS AND OBJECTIVES

- Reduce the current accident rate
- Reduce the potential for future accidents
- Reduce the potential for a decreased level of service
- Reduce the impact of the project to the existing property owners and the environment
- Reduce construction delays and impacts

VALUE ENGINEERING PROCESS

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:

- 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 detailed process of the Value Engineering Study.

OBSERVATIONS

The roadway's adjacent service areas are bounded on all sides by existing features and therefore may only experience minor future growth:

> West - the area is bounded by the existing railroad (there was one crossing which was removed by the realignment of Holiday Road).
>
> This westerly area appears to be almost at build-out with recently completed residential and commercial construction which appears to have occupied the majority of all undeveloped land.
>
> North - The area is bounded by the new Holiday Road.
>
> East - The area is bounded by I-985.
>
> South - the area is bounded to the south by the Gwinnett County school system.

The current cost estimate includes costs for future signals which are not warranted at this time.

The VE Team recognizes that the Counties have eliminated proposed bike lanes as not being needed in this area and the VE Team agrees with that assessment.

CONCLUSIONS AND RECOMMENDATIONS

During the speculation phase the VE Team identified **29 *Alternative Ideas*** 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, ***9 Alternative Ideas*** remained for further development. These Alternative Ideas 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.

Summary of Alternatives & Design Suggestions

PROJECT: **Georgia Department of Transportation**
STP00-0013-01(063) – P.I. No. 132950
Buford Highway
Gwinnett/Hall Counties

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

ALTERNATIVE NUMBER	DESCRIPTION OF ALTERNATIVE	INITIAL COST SAVINGS
	Roadway (RD)	
RD-1	Use 11' lanes on SR 13	$ 952,478
RD-2	Build a 14' flush median on SR 13	$ 2,288,132
RD-4	Use an 11' inside lane and a 12' outside lane on SR 13	$ 476,206
RD-5	Use a 12' urban shoulder on SR 13	$ 1,608,301
RD-6	Use 11' travel lanes on selected side roads	$ 139,717
RD-7	Eliminate gravity wall at Thunder Road	$ 56,845
RD-8	Eliminate signal and median opening at City Hall Street	$ 243,230
RD-9	Eliminate signal and median opening at Ledford Street	$ 241,609
RD-22	Relocate drainage structures C1/C4 to the east	$ 4,218

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.

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 and 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.***

Georgia Department of Transportation
Project STP00-0013-01(063)-P.I. No. 132950
Buford Highway – Gwinnett and Hall Counties

Hwy 13 & Friendship Road

Hwy 13 and Sawnee Road

Looking down City Hall Street

Hwy 13 & City Hall Street

Georgia Department of Transportation
Project STP00-0013-01(063)-P.I. No. 132950
Buford Highway – Gwinnett and Hall Counties

Looking west onto Holiday Road

Historical Property on Hwy 13

Roy Carlson Blvd. & Hwy 13

Thunder Road & Hwy 13

Summary of Alternatives & Design Suggestions

PROJECT: **Georgia Department of Transportation**
STP00-0013-01(063) – P.I. No. 132950
Buford Highway
Gwinnett/Hall Counties

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

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Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-1**
DESCRIPTION:	**Use 11' lanes on SR 13**	SHEET NO.:	**1** of **4**

Original Design:

The original design calls for the construction of 12' travel lanes throughout the project.

Alternative:

The alternative proposes using 11' travel lanes throughout the project.

Opportunities:

- Significant reduction in pavement costs
- Significant reduction in ROW required

Risks:

- Nominal increase in design effort
- Requires an exception to GDOT policy

Technical Discussion:

Reduction of width of travel lanes throughout the project would result in 4' of full build-up widening that would not have to be constructed, resulting in significant cost savings. Although 11' lanes would require an exception to GDOT policy, AASHTO's "Policy on Geometric Design of Highways 2004" states that 11'-0" lanes are permissible. It also states that under interrupted – flow operating conditions at low speeds (45 mph or less), narrower lanes are normally adequate and have some advantages. (See Pages 472-473).

Due to the low speed (45mph), low % trucks (6%), and urban character of the project, 11'-0" lanes should pose no operational issues.

It is also noted that this route is not on the National Highway System, and is not a GRIP route. However, design volumes are significant, in the range of 30,000 VPD.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 14,487,731	$ 0	$ 4,487,731
ALTERNATIVE	$ 13,535,253	$ 0	$ 13,535,253
SAVINGS	$ 952,478	$ 0	$ 952,478

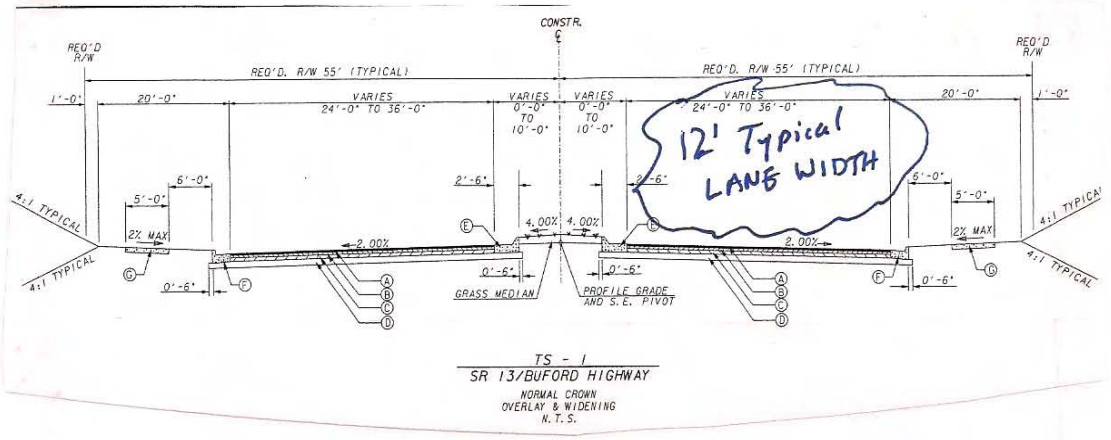
Illustration

PROJECT: **Georgia Department of Transportation**
STP00-0013-01(063) – P.I. No. 132950
Buford Highway
Gwinnett/Hall Counties

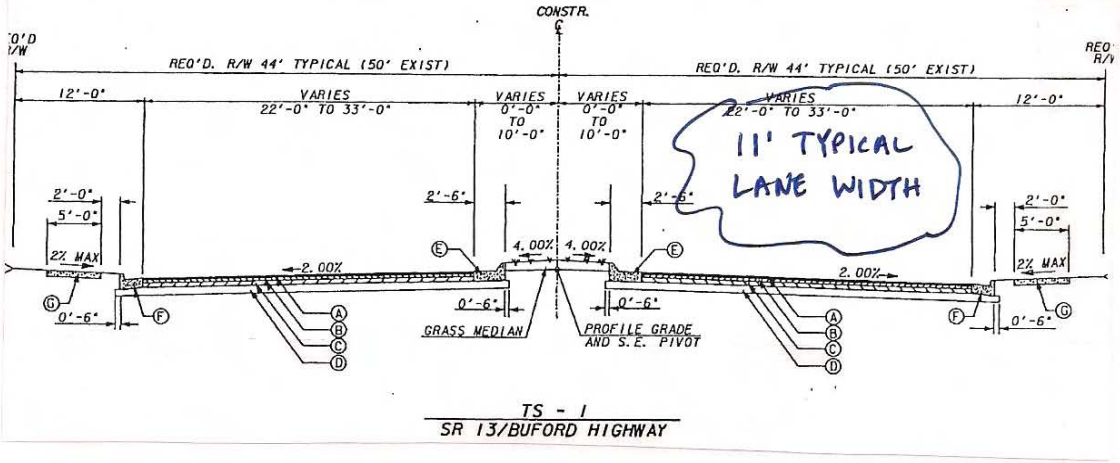
ALTERNATIVE NO.: **RD-1**

DESCRIPTION: **Use 11' travel lanes on SR 13**

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



ORIGINAL DESIGN



ALTERNATIVE DESIGN

Calculations

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-1**
DESCRIPTION:	**Use 11' lanes on SR 13**	SHEET NO.:	**3** of **4**

Project limits = Sta. 186+90 – Sta. 100+75=> 8,615 LF x 2 = 17,230 LF

17,230 LF x 2'w = 34,460 SF/43,560 SF/AC = 0.80 AC ROW reduction.

GAB = 17,230 LF x 2'w/9 = 3,828 SY x 1,400 LB/SY/2,000 = 2,680 tons reduced.

25 mm Superpave = 17,230 LF x 2'w/9 = 3,828 SY x 550 LB/SY/2,000 = 1,053 tons reduced.

19 mm Superpave = 17,230 LF x 2'w/9 = 3,828 SY x 330LB/SY/2000 = 632 tons reduced.

12.5 mm Superpave = 17,230 LF x 2'w/9 = 3,828 SY x 165 LB/SY/2,000 = 316 tons reduced.

Note: ROW burdened cost was derived from the sum of total costs for ROW(Fee Simple, easements, Improvements, relocation, damages, administrative/court costs, and scheduling contingency) divided by the area to arrive at a burdened figure per acre.

Total area ROW required = 11.62 AC

Total ROW costs = $10,044,300

Average burdened cost per acre = $864,620.81

Cost Worksheet

PBSJ

PROJECT: **Georgia Department of Transportation**
STP00-0013-01(063) - P.I. No. 132950
Buford Highway
Gwinnett/Hall Counties

ALTERNATIVE NO.: **RD-1**

DESCRIPTION: **Use 11' lanes on SR 13**

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
310-1101- GAB	TN	47,366	$ 17.76	$ 841,220	44,686	$ 17.76	$ 793,623
402-3121- 25mm Superpave	TN	20,175	$ 60.01	$ 1,210,702	19,122	$ 60.01	$ 1,147,511
402-3190- 19mm Superpave	TN	8,073	$ 68.12	$ 549,933	7,441	$ 68.12	$ 506,881
402-3130- 12.5mm Superpave	TN	8,103	$ 64.41	$ 521,914	7,787	$ 64.41	$ 501,561
ROW-Burdened	AC	11.62	$ 864,621	$ 10,046,896	10.82	$ 864,621	$ 9,355,199
Sub-total				$ 13,170,665			$ 12,304,775
Mark-up at 10.00%				$ 1,317,066			$ 1,230,478
TOTAL				**$ 14,487,731**			**$ 13,535,253**
Estimated Savings:							$952,478

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-2**
DESCRIPTION:	**Build a 14' flush median on SR 13**	SHEET NO.:	**1** of **4**

Original Design:

The original design calls for construction of a 20' raised earthen median, with Type 7 curb and gutter.

Alternative:

The alternative proposes utilizing the existing pavement and constructing a 14' flush median, creating a five lane typical section.

Opportunities:

- Reduced ROW
- Reduced pavement cost
- Improved construction sequencing
- Increased access
- Reduced need for signalization
- Reduction in travel time

Risks:

- Nominal redesign required
- Reduced access control

Technical Discussion:

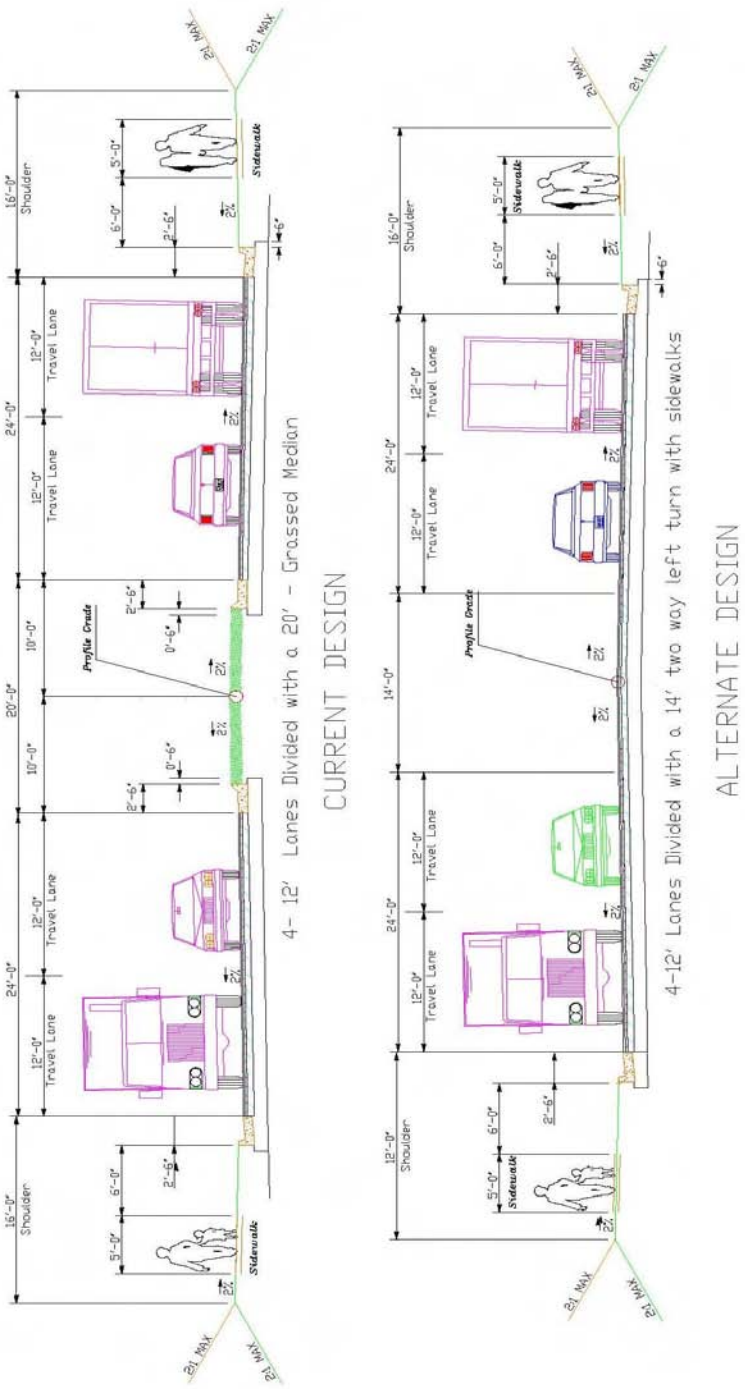
The project area is commercial in nature and low speed so use of a flush median is feasible. The use of a 14' flush median in-lieu of a 20' raised median offers significant opportunities for cost savings including: the salvaging of the existing pavement which appears to be in new condition; reduced right-of-way; reduced environmental impact; reduced construction impacts; and improved access for adjacent users. The potential cost savings should be balanced against any negative impacts to safety and operations that could result. This roadway is not on the NHS nor GRIP systems, but it should be noted that the build year traffic 2012 is projected to be 20,100 vpd and design year traffic 2032 is projected to be 30,100vpd. While no fatalities have been experienced in the last three years, the accident rate is higher than the statewide average.

It should be noted that even if the existing pavement could not be salvaged a significant savings would still be realized.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 15,400,304	$ 0	$ 15,400,304
ALTERNATIVE	$ 13,112,172	$ 0	$ 13,112,172
SAVINGS	$ 2,288,132	$ 0	$ 2,288,132

Illustration

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-2**
DESCRIPTION:	**Build a 14' flush median on SR 13**	SHEET NO.:	**2** of **4**



Calculations

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-2**
DESCRIPTION:	**Build a 14' flush median on SR 13**	SHEET NO.:	**3** of **4**

Assumptions:
Drainage Costs will increase approximately 15% due to an increase in impervious area.
Existing Pavement shall be cut back 1' and overlaid.
An increase of Signing and Striping cost of 50%

Alternative Pavement:
Wearing and Upper Binder- (62'wide x 8615 LF) / (9SF /SY) = 59,347.8 SY => 59,348 SY
Lower Binder- (40'wide x 8615 LF) / (9SF /SY) = 38,288.8 SY => 38,289 SY
Base Layer- (47'wide x 8615 LF) = => 404,905 SF
Superpave 12.5mm = (59,348 SY x 165/2000) = 4,896.2 TN => 4,897 TN
Superpave 19.0mm = (59,348 SY x 330/2000) = 9,792.4 TN => 9,793 TN
Superpave 25.0mm = (38,289 SY x 550/2000) = 10,529.5 TN => 10,530 TN
14" GAB = [(404,905 SF x 1.167 FT) x (135# / CF)] / (2000# / TN) = 31,895.4 TN=> 31,896 TN

Additional Earthwork: assume 1 ft depth = (15FT x 8615FT x 1FT) / (27CF /CY) = 4,786.1 CY => 4786 CY

ROW reduction:
Reduction in width of median from 20' to 14'= 6'.
Overall project length= 8615LF
8615LF x 6'w=51690LF/43560SF/AC=11.62 AC

Note: ROW burdened cost was derived from the sum of total costs for ROW(Fee Simple, easements, Improvements, relocation, damages, administrative/court costs, and scheduling contingency) divided by the area to arrive at a burdened figure per acre.

Total area ROW required= 11.62 AC
Total ROW costs=$10,044,300
Average burdened cost per acre= $ 864,620.81

Cost Worksheet

PBS&J

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) - P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-2**
DESCRIPTION:	**Build a 14' flush median on SR 13**	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
310-1101- GAB	TN	47,366	$ 17.76	$ 841,220	31,896	$17.76	$ 566,473
402-3121- 25mm Superpave	TN	20,175	$ 60.01	$ 1,210,702	10,530	$60.01	$ 631,905
402-3190- 19mm Superpave	TN	8,073	$ 68.12	$ 549,933	9,793	$68.12	$ 667,099
402-3130- 12.5mm Superpave	TN	8,103	$ 64.41	$ 521,914	4,897	$64.41	$ 315,416
Drainage	LS	1	$ 579,849	$ 579,849	1.15	$ 579,849	$ 666,826
ROW-Burdened	AC	11.62	$ 864,621	$ 10,046,896	10.44	$864,621	$ 9,026,643
441-6740- Conc. Curb and Gutter, Type 7	LF	16,750	$ 13.66	$ 228,805	0	$ 13.66	$ -
Signing & Striping	LS	1	$ 20,957	$ 20,957	1.5	$ 20,957	$ 31,436
Unclassified Excavation	CY	0	$ 3.00	$ -	4,786	$ 3.00	$ 14,358
Sub-total				$ 14,000,276			$ 11,920,156
Mark-up at 10%				$ 1,400,028			$ 1,192,016
TOTAL				**$ 15,400,304**			**$ 13,112,172**
Estimated Savings:							$ 2,288,132

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-4**
DESCRIPTION:	**Use an 11' inside lane and a 12' outside lane on SR 13**	SHEET NO.:	**1** of **4**

Original Design:

The original design calls for the construction of 12' travel lanes throughout the project.

Alternative:

The alternative proposes constructing an 11' inside travel lane and a 12' outside travel lane.

Opportunities:

- Reduction in pavement costs
- Reduces required ROW

Risks:

- Minor increase in design effort
- Requires an exception to GDOT policy

Technical Discussion:

Reduction of width of travel lanes throughout the project would result in 2' of full build-up widening that would not have to be constructed, resulting in significant cost savings. Although 11' lanes would require an exception to GDOT policy, AASHTO's "Policy on Geometric Design of Highways 2004" states that 11'-0" lanes are permissible. It also states that under interrupted –flow operating conditions at low speeds (45 mph or less), narrower lanes are normally adequate and have some advantages. (See Pages 472-473). Due to the low speed (45mph), low % trucks and urban character of the project, 11'-0" lanes should pose no operational issues.

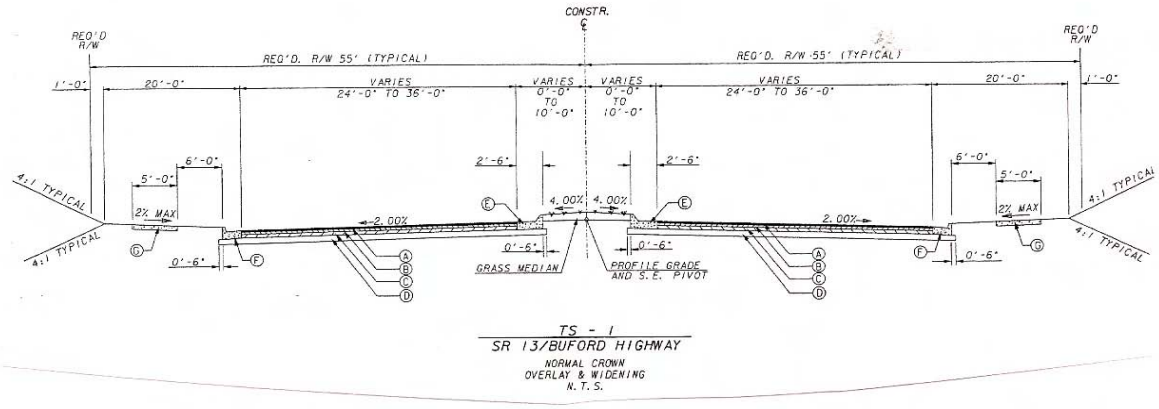
The provision of a 12' outside travel lane would be a compromise from using either 12' or 11' travel lanes only, allowing additional width on the outside travel lanes for the stated 6% truck travel volume.

It is also noted that this route is not on the National Highway System, and is not a GRIP route. However, design volumes are significant, in the range of 30,000 VPD.

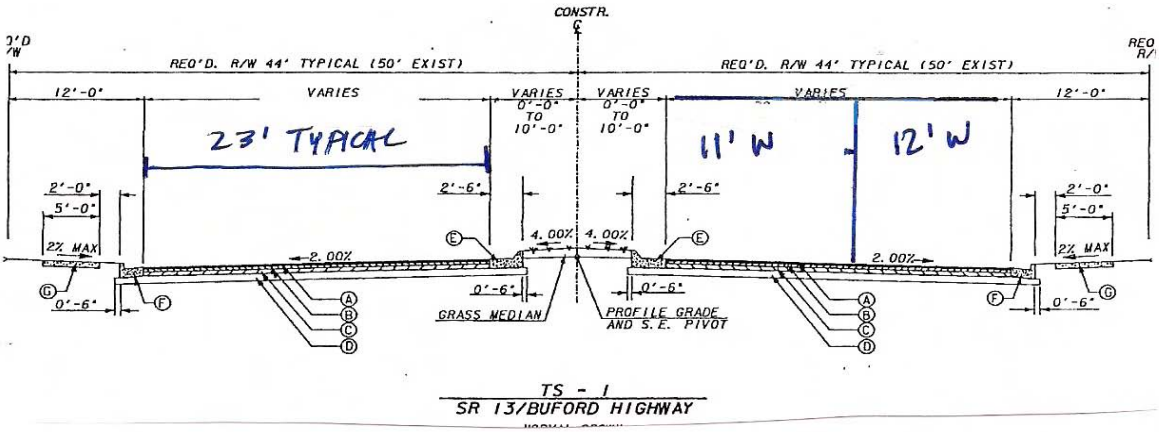
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 14,487,731	$ 0	$ 14,487,731
ALTERNATIVE	$ 14,011,525	$ 0	$ 14,011,525
SAVINGS	$ 476,206	$ 0	$ 476,206

Illustration

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-4**
DESCRIPTION:	**Use an 11' inside lane and a 12' outside lane on SR 13**	SHEET NO.:	**2** of **4**



ORIGINAL DESIGN - 12' TRAVEL LANES TYPICAL



ALTERNATIVE DESIGN - 12' W OUTSIDE / 11' W INSIDE

Calculations

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-4**
DESCRIPTION:	**Use an 11' inside lane and a 12' outside lane on SR 13**	SHEET NO.:	**3** of **4**

Project limits= 186+90-100+75=> 8615 LF x 2 = 17,230 LF

17,230 LF x 1'w17230SF/43560 SF/AC = 0.40 AC. ROW reduction

GAB= 17,230 LF x 1'w/9=1,914 SY x 1,400 LB/SY/2,000= 1,340 tons reduced.

25 mm Superpave=17,230 LF x 1'w/9=1,914 SY x 550 LB/SY/2,000 = 526 tons reduced.

19 mm Superpave=17,230 LF x 1'w/9=1914 SY x 330LB/SY/2,000 = 316 tons reduced.

12.5 mm Superpave=17,230 LF x 1'w/9=1,914 SY x 165 LB/SY/2000 = 158 tons reduced.

,

Note: ROW burdened cost was derived from the sum of total costs for ROW(Fee Simple, easements, Improvements, relocation, damages, administrative/court costs, and scheduling contingency) divided by the area to arrive at a burdened figure per acre.

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Cost Worksheet

PBS&J

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402-3190- 19mm Superpave	TN	8,073	$ 68.12	$ 549,933	7,757	$ 68.12	$ 528,407
402-3130- 12.5mm Superpave	TN	8,103	$ 64.41	$ 521,914	7,945	$ 64.41	$ 511,737
ROW-Burdened	AC	11.62	$ 864,621	$10,046,896	11.22	$ 864,621	$ 9,701,048
Sub-total				$13,170,665			$ 12,737,750
Mark-up at 10.00%				$ 1,317,066			$ 1,273,775
TOTAL				**$14,487,731**			**$ 14,011,525**
Estimated Savings:							$ 476,206

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-5**
DESCRIPTION:	**Use a 12' urban shoulder on SR 13**	SHEET NO.:	**1** of **4**

Original Design:

The original design calls for the construction of 16' wide shoulders throughout the project on SR 13.

Alternative:

The alternative proposes constructing 12' wide shoulders throughout the project on SR 13.

Opportunities:

- Reduction in grading costs.
- Reduction in ROW required

Risks:

- Loss of width for current and future utility location

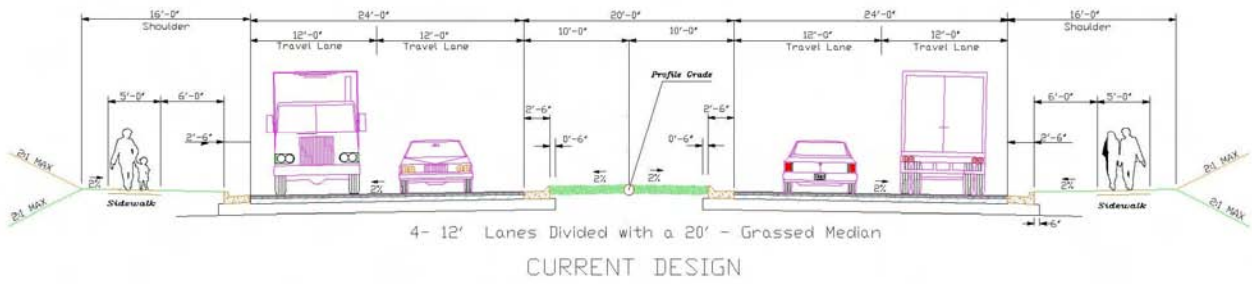
Technical Discussion:

The proposed shoulder width is 16'. This alternative proposes constructing a 12' urban shoulder to reduce the roadway footprint. Reducing the shoulder width will result in significant cost savings for ROW acquisition required and reduce the effort required for grading by reducing area and minimizing area required for slope ties. The 12' section should be adequate for the existing and future utilities.

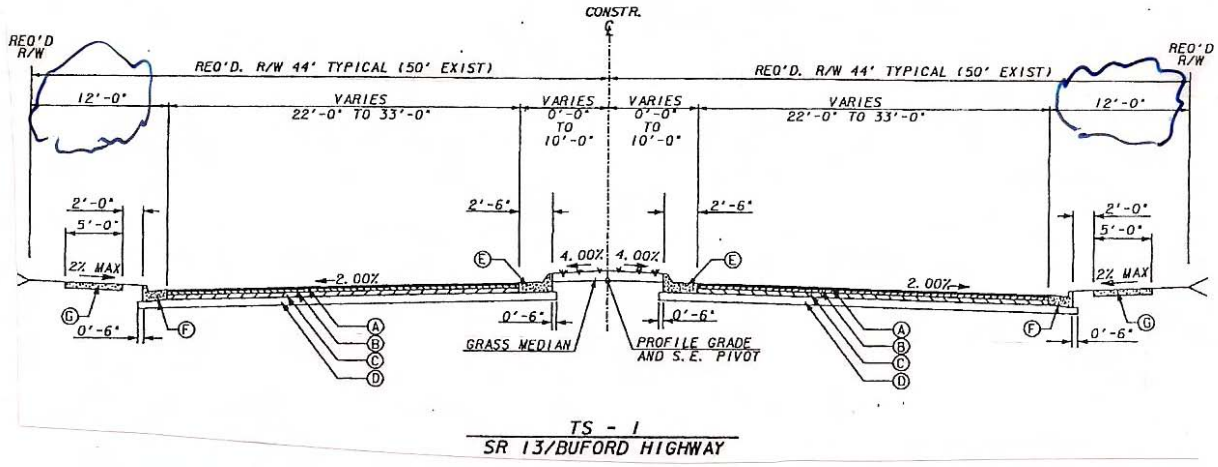
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 12,107,586	$ 0	$ 12,107,586
ALTERNATIVE	$ 10,499,274	$ 0	$ 10,499,274
SAVINGS	$ 1,608,311	$ 0	$ 1,608,311

Illustration

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-5**
DESCRIPTION:	**Use a 12' urban shoulder on SR 13**	SHEET NO.:	**2** of **4**



ORIGINAL DESIGN



ALTERNATIVE DESIGN

Calculations

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-5**
DESCRIPTION:	**Use a 12' urban shoulder on SR 13**	SHEET NO.:	**3** of **4**

Assumption-

Use 12' wide urban shoulder in lieu of proposed 16' shoulder, saving 4' in required ROW on each side throughout the project.

Assume 10% cost savings in grading item due to 8' overall reduction in width required throughout the corridor.

Project limits= 186+90-100+75=> 8615 LF x 2 sides = 17,230 LF

17,230 LF x 4'w = 68,920 SF/43,560 SF/AC = 1.58 AC ROW reduction.

ROW burdened cost was derived from the sum of total costs for ROW(Fee Simple, easements, Improvements, relocation, damages, administrative/court costs, and scheduling contingency) divided by the area to arrive at a burdened figure per acre.

Total area ROW required = 11.62 AC

Total ROW costs = $10,044,300

Average burdened cost per acre= $864,620.81

Cost Worksheet

PBS&J

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) - P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-5**
DESCRIPTION:	**Use a 12' urban shoulder on SR 13**	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
ROW-Burdened	AC	11.62	$ 864,621	$ 10,046,896	10.04	$ 864,621	$ 8,680,795
210-0100- Grading Complete	LS	1	$ 960,000	$ 960,000	0.9	$ 960,000	$ 864,000
Sub-total				$ 11,006,896			$ 9,544,795
Mark-up at	**10.00%**			$ 1,100,690			$ 954,479
TOTAL				**$ 12,107,586**			**$ 10,499,274**
Estimated Savings:							$1,608,311

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-6**
DESCRIPTION:	**Use 11' travel lanes on selected side streets**	SHEET NO.:	**1** of **4**

Original Design:

The original design proposes constructing 12' travel lanes on the side streets of the above project.

Alternative:

The alternative proposes reducing the travel lanes on the side streets to 11'.

Opportunities:

- Reduction in pavement costs
- Slight reduction in ROW required

Risks:

- Narrower travel corridor for side street traffic
- Nominal increase in design costs

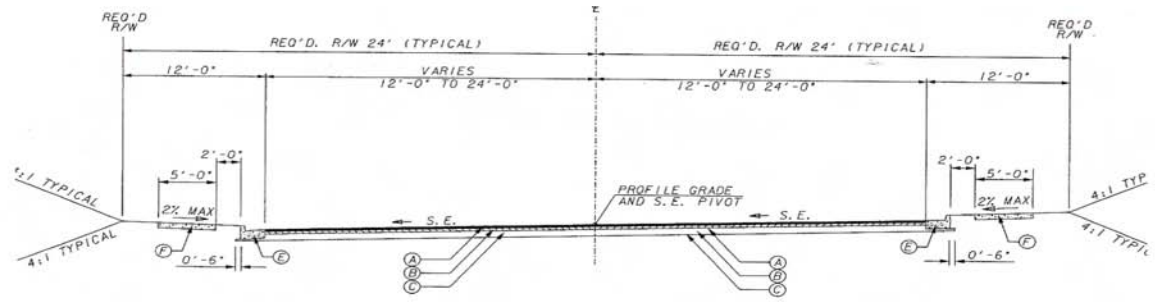
Technical Discussion:

The alternative proposes using an 11' standard width for all side street lane construction on the project. Using 11' lanes for the side streets should pose no operational issues due to lower traffic volumes and very little truck traffic.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 13,155,959	$ 0	$ 3,155,959
ALTERNATIVE	$ 13,016,242	$ 0	$ 3,016,242
SAVINGS	$ 139,717	$ 0	$ 139,717

Illustration

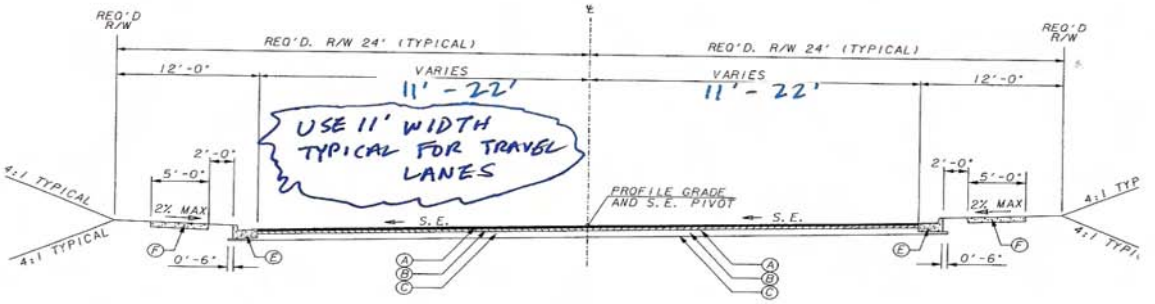
PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-6**
DESCRIPTIO	**Use 11' travel lanes on selected side roads**	SHEET NO.:	**2** of **4**



TS - 3

CITY HALL ST - STA. TO STA.
SUMMER OAK DR - STA. 40+45 TO STA. 41+07.96
RELOCATED THUNDER RD - STA. 50+30 TO STA. 55+77
STA. 59+73 TO STA. 60+55.03
LEFORD RD - STA. 70+46 TO STA. 70+99
STA. 74+76 TO STA. 75+65
HOLIDAY RD - STA. 81+00 TO STA. 84+47.53
CARTER RD - STA. 90+11.85 TO STA. 91+60

ORIGINAL DESIGN



TS - 3

CITY HALL ST - STA. TO STA.
SUMMER OAK DR - STA. 40+45 TO STA. 41+07.96
RELOCATED THUNDER RD - STA. 50+30 TO STA. 55+77
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LEFORD RD - STA. 70+46 TO STA. 70+99
STA. 74+76 TO STA. 75+65
HOLIDAY RD - STA. 81+00 TO STA. 84+47.53
CARTER RD - STA. 90+11.85 TO STA. 91+60

ALTERNATIVE DESIGN
TYPICAL FOR ALL SIDE STREETS

Side Streets/Length: (Avg W=30')

Relocated Thunder Road 1070'x 30'/9 = 3,567 SY
Old Thunder Road Tie 300' x 30'/9 = 1,000 SY
Ledford Road 565'x 30'/9 = 1,883 SY
Holiday Road 460'x 30'/9 = 1,533 SY
City Hall Street 170'x 30'/9=567 SY
Carter Road 160'x 30'/9 = 533 SY
Summer Oak Drive /300'x 30'/9 = 1,000 SY

Overall Length side streets = 3,025' x 2'w reduction/9 = 672SY reduction in side street full depth build-up.

Typical section build-up =

165 LB/SY =>12.5mm Superpave = 672SY x 165/2000=56 ton reduction

220 LB/SY=>19mm Superpave = 672SY x 220/2000=74 ton reduction

10" GAB = 672 SY x 1,000LB/SY/2000 = 336 ton reduction

ROW Area reduced=

6050SF/43560SF/AC = 0.13 AC reduction.

Note: ROW burdened cost was derived from the sum of total costs for ROW(Fee Simple, easements, Improvements, relocation, damages, administrative/court costs, and scheduling contingency) divided by the area to arrive at a burdened figure per acre.

Total area ROW required= 11.62 AC

Total ROW costs=$10,044,300

Average burdened cost per acre= $864,620.81

Cost Worksheet

PBSJ

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) - P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-6**
DESCRIPTION:	**Use 11' travel lanes on side streets**	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
310-1101- GAB	TN	47,366	$ 17.76	$ 841,220	47,030	$ 17.76	$ 835,253
402-3190 - 19mm Superpave	TN	8,073	$ 68.12	$ 549,933	7,999	$ 68.12	$ 544,892
402-3130- 12.5mm Superpave	TN	8,103	$ 64.41	$ 521,914	8,047	$ 64.41	$ 518,307
ROW-Burdened	AC	11.62	$ 864,621	$ 10,046,896	11.49	$ 864,621.00	$ 9,934,495
Sub-total				$ 11,959,963			$ 11,832,947
Mark-up at ####				$ 1,195,996			$ 1,183,295
TOTAL				**$ 13,155,959**			**$ 13,016,242**
Estimated Savings:							$139,717

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-7**
DESCRIPTION:	**Eliminate gravity wall at Thunder Road**	SHEET NO.:	**1** of **3**

Original Design:

The original design calls for the construction of a gravity wall at Thunder Road from approximately Sta. 130+55 to Sta. 131+55.

Alternative:

The alternative proposes not constructing the gravity wall in the above described location.

Opportunities:

- Reduction in costs for concrete
- Reduction in construction effort

Risks:

- May require steeper slope tie

Technical Discussion:

On a field review of the project site, it appears that the gravity wall that is proposed at Thunder Road from Sta. 130+55 to Sta. 131+55 is being installed to prevent encroachment onto bins made of modular concrete blocks at a local landscaping facility. The proposed gravity wall is approximately 100' in length with a maximum height of approximately 5'. The alternative proposes in-lieu of constructing a wall, simply lengthen the slope tie, or move the modular concrete bins.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 258,387	$ 0	$ 258,387
ALTERNATIVE	$ 201,542	$ 0	$ 201,542
SAVINGS	$ 56,845	$ 0	$ 56,845

Calculations

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-7**
DESCRIPTION:	**Eliminate gravity wall at Thunder Road**	SHEET NO.:	**2** of **3**

The original design calls for approximately 450LF of gravity wall to be constructed throughout the project. This alternative seeks to eliminate 100LF. 100/450=0.22=>reduce quantities for gravity walls by 22% for an estimated savings for this alternative.

500-3101-Class A Concrete-Gravity Walls- 850CY x 0.22= Subtract 187 CY= 663 CY

Cost Worksheet

PBSJ

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) - P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-7**
DESCRIPTION:	**Eliminate gravity wall at Thunder Road**	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
500-3101- Class A Concrete-Gravity Walls	CY	850	$ 276.35	$ 234,898	663	$ 276.35	$ 183,220
Sub-total				$ 234,898			$ 183,220
Mark-up at	**10.00%**			$ 23,490			$ 18,322
TOTAL				**$ 258,387**			**$ 201,542**
Estimated Savings:							$56,845

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-8**
DESCRIPTION:	**Eliminate signal and median opening at City Hall Street**	SHEET NO.:	**1** of **4**

Original Design:

The original design provides a full median opening and signalization for the subject intersection.

Alternative:

The alternative would eliminate both the median opening and the signalization at this location.

Opportunities:

- Reduce initial cost and maintenance cost for signalization
- Reduce pavement cost
- Improved access management

Risks:

- Increased U-turn traffic at Roy Carlson Boulevard
- Minimal impact to the designer

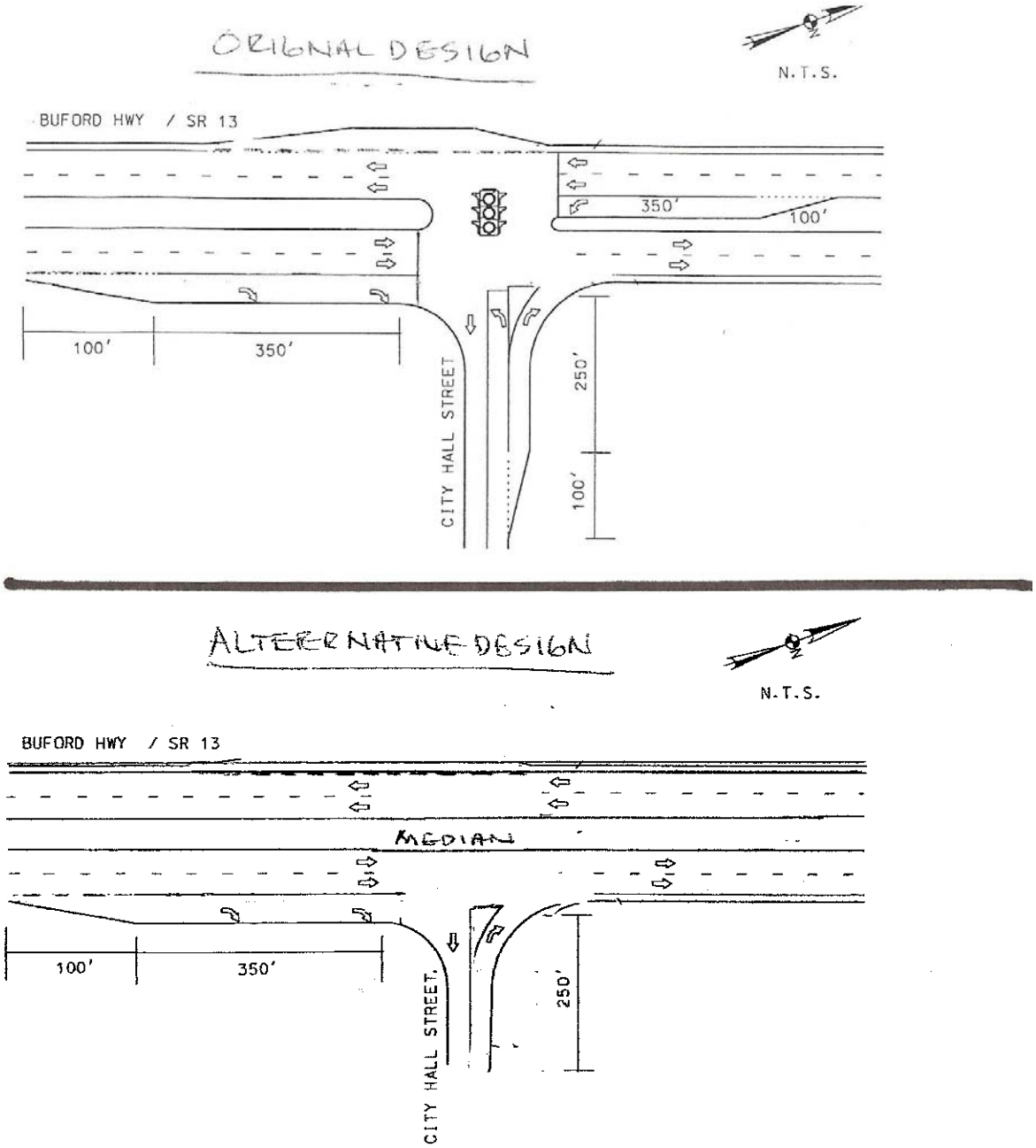
Technical Discussion:

The volumes on City Hall Street are relatively low. Full access to Buford Highway would be available via Manhattan Drive and Roy Carlson Boulevard. Corridor circulation could potentially be improved while still retaining the majority of the savings by introducing a mid-block U-turn.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 251,505	$ 0	$ 251,505
ALTERNATIVE	$ 8,275	$ 0	$ 8,275
SAVINGS	$ 243,230	$ 0	$ 243,230

Illustration

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-8**
DESCRIPTION:	**Eliminate signal and median opening at City Hall Street**	SHEET NO.:	**2** of **4**



Calculations

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-8**
DESCRIPTION:	**Eliminate signal and median opening at City Hall Street**	SHEET NO.:	**3** of **4**

Reduced Area of Paving :

Northbound Left Turn - [(100 / 2) x (12FT)]/ (9 SF / SY)] + [(335) x (12FT)] / (9 SF / SY)] = 513.3 SY
Southbound Left Turn - [(100 / 2) x (12FT)]/ (9 SF / SY)] + [(350) x (12FT)] / (9 SF / SY)] = 533.3 SY
Median Opening - [(160) x (20FT)] / (9 SF / SY)] = 355.6 SY
U-Turn Eyebrow - [(125 / 2) x (12FT)]/ (9 SF / SY)] + [(100) x (12FT)] / (9 SF / SY)] = 216.7 SY

Total => 1619 SY (14,570 SF)

Reduced Area of Base :
Northbound Left Turn - [(100 / 2) x (12FT)]/ (9 SF / SY)] + [(335) x (12FT)] / (9 SF / SY)] = 513.3 SY
Southbound Left Turn - [(100 / 2) x (12FT)]/ (9 SF / SY)] + [(350) x (12FT)] / (9 SF / SY)] = 533.3 SY
Median Opening - [(160) x (15FT)] / (9 SF / SY)] = 266.7 SY
U-Turn Eyebrow - [(125 / 2) x (12FT)]/ (9 SF / SY)] + [(100) x (12FT)] / (9 SF / SY)] = 216.7 SY

Total => 1,530 SY (13,770 SF)

Superpave 12.5mm = (1619 SY x 165/2000) = 133.6 TN => 134 TN

Superpave 19.0mm = (1619 SY x 330/2000) = 267.1 TN => 268 TN

Superpave 25.0mm = (1619 SY x 550/2000) = 445.2 TN => 446 TN

14" GAB = [(13,770 SF x 1.167 FT) x (135# / CF)] / (2000# / TN) = 1,084.7 TN=> 1,085 TN

Additional Curb: 160 LF x 2 Each => 320LF

Additional Earthwork: assume 1 ft depth = (14,570 SF x 1FT) / (27CF /CY) = 539.6 CY => 540 CY

Signal Cost (per each): $778,597 / 5 Each => $155,720 EA

Cost Worksheet

PBS&J

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) - P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-8**
DESCRIPTION:	**Eliminate signal and median opening at City Hall Street**	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
CURB & GUTTER	LF	0		$ -	320	$ 15.79	$ 5,053
EARTHWORK	CY	0	$ 3.00	$ -	540	$ 3.00	$ 1,620
GRASSING	AC	0	$ 850.00	$ -	1	$ 850.00	$ 850
12.5 mm SUPERPAVE	TN	134	$ 64.41	$ 8,631	0	$ 64.41	$ -
19.0 mm SUPERPAVE	TN	268	$ 68.12	$ 18,256	0	$ 68.12	$ -
25.0 mm SUPERPAVE	TN	446	$ 60.01	$ 26,764	0	$ 60.01	$ -
14" GAB	TN	1,085	$ 17.76	$ 19,270	0	$ 17.76	$ -
SIGNALS	EA	1	$ 155,720	$ 155,720	0	$ 155,720	$ -
Sub-total				$ 228,641			$ 7,523
Mark-up at 10%				$ 22,864			$ 752
TOTAL				**$ 251,505**			**$ 8,275**
Estimated Savings:							$243,230

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-9**
DESCRIPTION:	**Eliminate signal and median opening at Ledford Road**	SHEET NO.:	**1** of **4**

Original Design:

The original design provides a full median opening and signalization for the subject intersection.

Alternative:

The alternative would eliminate both the median opening and the signalization at this location and use a right-in-right-out.

Opportunities:

- Reduce initial cost and maintenance cost for signalization
- Reduce pavement cost
- Improve access management

Risks:

- Increased U-turn traffic at Roy Carlson Boulevard and Holiday Road
- Minimal impact to the designer

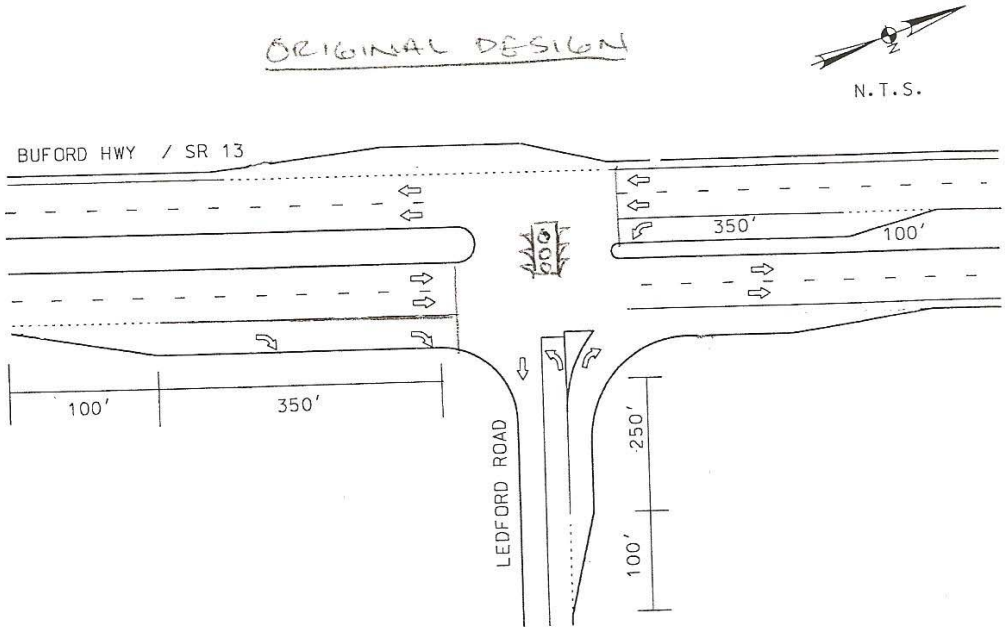
Technical Discussion:

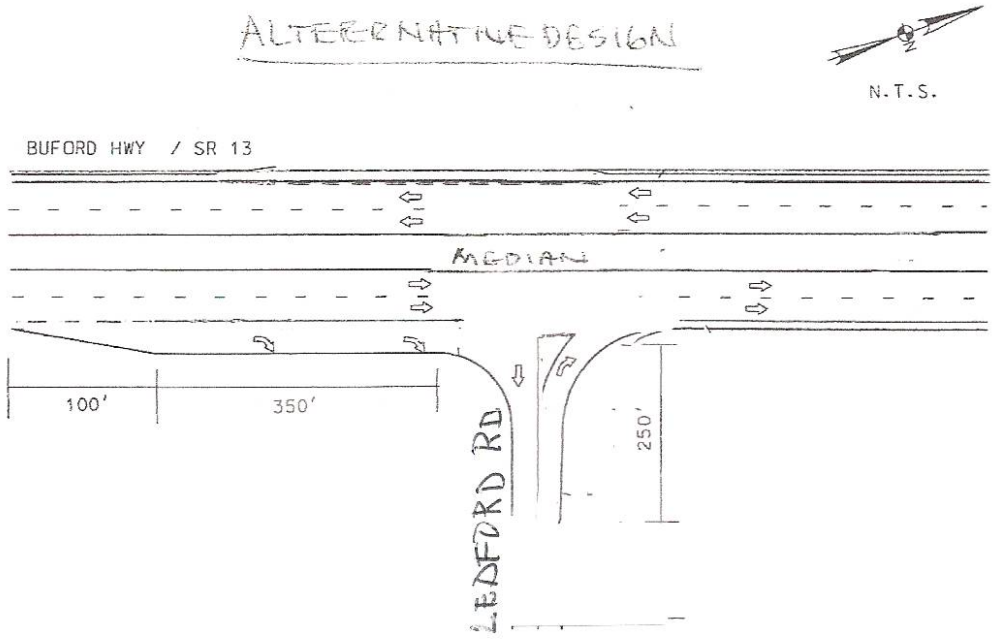
Ledford Road is a short dead end street and the volumes are relatively low. Corridor circulation could potentially be improved while still retaining the majority of the saving by introducing a mid-block U-turn.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 249,488	$ 0	$ 249,488
ALTERNATIVE	$ 7,878	$ 0	$ 7,878
SAVINGS	$ 241,609	$ 0	$ 241,609

Illustration

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-9**
DESCRIPTION:	**Eliminate signal and median opening at Ledford Road**	SHEET NO.:	**2** of **4**





Reduced Area of Asphalt Paving :
Northbound Left Turn - [(100 / 2) x (12FT)]/ (9 SF / SY)] + [(335) x (12FT)] / (9 SF / SY)] = 513.3 SY
Southbound Left Turn - [(100 / 2) x (12FT)]/ (9 SF / SY)] + [(335) x (12FT)] / (9 SF / SY)] = 513.3 SY
Median Opening - [(150) x (20FT)] / (9 SF / SY)] = 333.3 SY
U-Turn Eyebrow - [(125 / 2) x (12FT)]/ (9 SF / SY)] + [(100) x (12FT)] / (9 SF / SY)] = 216.7 SY

Total => 1,577 SY (14,193 SF)

Reduced Area of Base :
Northbound Left Turn - [(100 / 2) x (12FT)]/ (9 SF / SY)] + [(335) x (12FT)] / (9 SF / SY)] = 513.3 SY
Southbound Left Turn - [(100 / 2) x (12FT)]/ (9 SF / SY)] + [(335) x (12FT)] / (9 SF / SY)] = 513.3 SY
Median Opening - [(150) x (15FT)] / (9 SF / SY)] = 250.0 SY
U-Turn Eyebrow - [(125 / 2) x (12FT)]/ (9 SF / SY)] + [(100) x (12FT)] / (9 SF / SY)] = 216.7 SY

Total => 1,494 SY (13,446 SF)

Superpave 12.5mm = (1577 SY x 165/2000) = 130.1 TN => 131 TN

Superpave 19.0mm = (1577 SY x 330/2000) = 260.2 TN => 261 TN

Superpave 25.0mm = (1577 SY x 550/2000) = 433.7 TN => 434 TN

14" GAB = [(13,446 SF x 1.167 FT) x (135# / CF)] / (2000# / TN) = 1059.2 TN=> 1060 TN

Additional Curb: 150 LF x 2 Each => 300LF

Additional Earthwork: assume 1 ft depth = (14,193 SF x 1FT) / (27CF /CY) = 525.7 CY => 525 CY

Signal Cost (per each): $778,597 / 5 Each => $155,720 EA

Cost Worksheet

PBSJ

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) - P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-9**
DESCRIPTION:	**Eliminate signal and median opening at Ledford Road**	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
CURB & GUTTER	LF	0		$ -	300	$ 15.79	$ 4,737
EARTHWORK	CY	0	$ 3.00	$ -	525	$ 3.00	$ 1,575
GRASSING	AC	0	$ 850.00	$ -	1	$ 850.00	$ 850
12.5 mm SUPERPAVE	TN	131	$ 64.41	$ 8,438	0	$ 64.41	$ -
19.0 mm SUPERPAVE	TN	261	$ 68.12	$ 17,779	0	$ 68.12	$ -
25.0 mm SUPERPAVE	TN	434	$ 60.01	$ 26,044	0	$ 60.01	$ -
14" GAB	TN	1,060	$ 17.76	$ 18,826	0	$ 17.76	$ -
SIGNALS	EA	1	$ 155,720	$ 155,720	0	$ 155,720	$ -
Sub-total				$ 226,807			$ 7,162
Mark-up at 10%				$ 22,681			$ 716
TOTAL				**$ 249,488**			**$ 7,878**
Estimated Savings:							$241,609

Value Analysis Design Alternative

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-22**
DESCRIPTION:	**Relocate drainage structure C1 to C4 to the east**	SHEET NO.:	**1** of **4**

Original Design:

The original design proposes crossing the project centerline at ~ Station 129+85

Alternative:

The alternative design would propose relocating this cross drain to ~ Station 130+15.

Opportunities:

- Reduced pipe length
- Reduce fee simple ROW
- Improved access for maintenance by moving the outfall away from the retaining wall and the ROW line.
- Improved roadway side slopes

Risks:

- Minimal impact to the designer

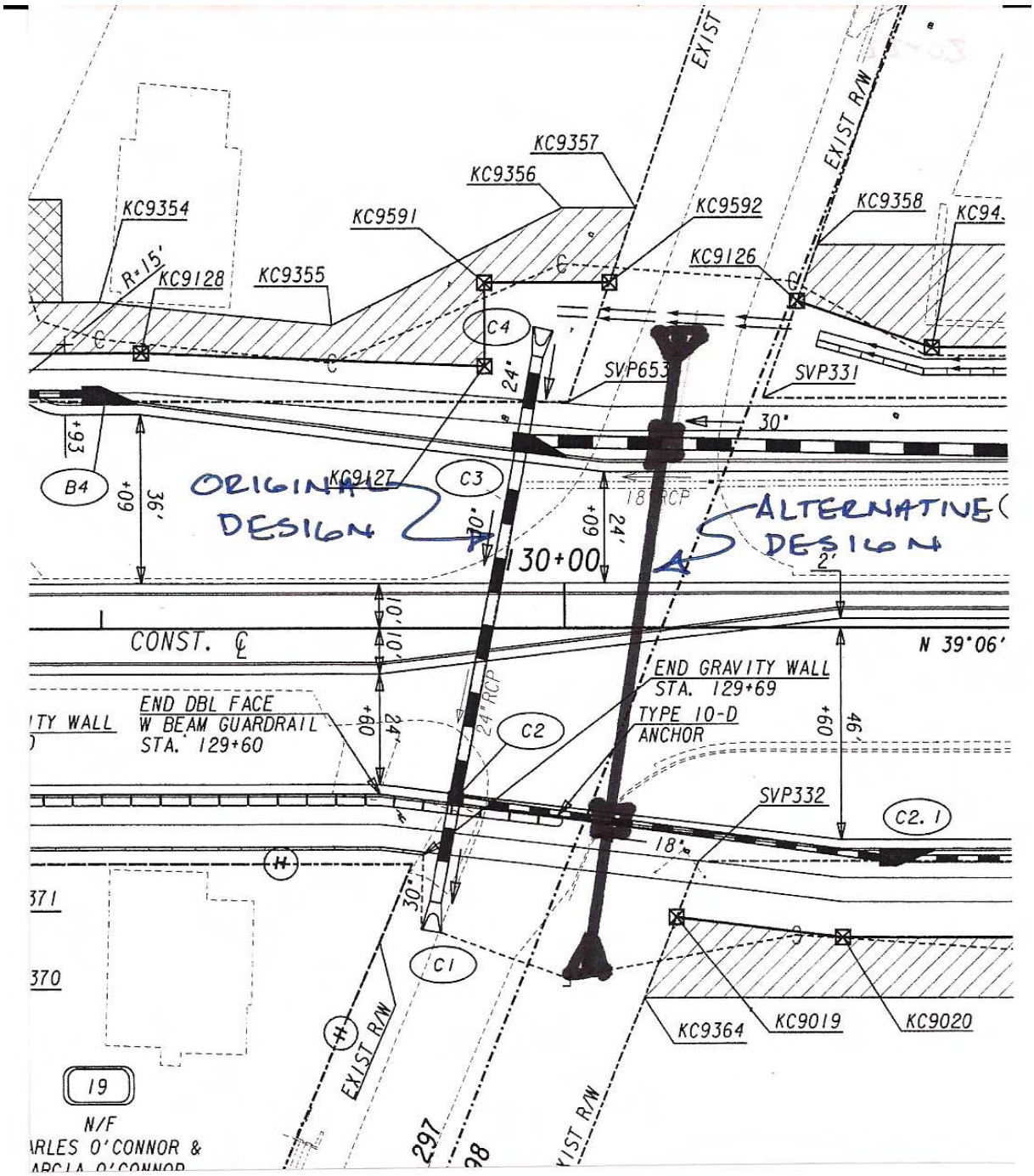
Technical Discussion:

Relocation of this cross drain will allow utilization of the existing roadway ROW for maintenance and provide better access by moving the pipe farther away from the retaining wall and the ROW line on Bryant Road. Relocating the exit end of the pipe to the east side of Bryant Road which has more ROW will better accommodate the outfall ditch. Relocation of the inlet C3 to east of the turn lane taper will reduce bypass and improve the operation of the inlet.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 5,306	$ 0	$ 5,306
ALTERNATIVE	$ 1,088	$ 0	$ 1,088
SAVINGS	$ 4,218	$ 0	$ 4,218

Illustration

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) – P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-22**
DESCRIPTION:	**Relocate drainage structures C1/C4 to the east**	SHEET NO.:	**2** of **4**



18" Storm Drain Pipe – 30 LF

30" Storm Drain Pipe – 30 LF

Right of Way

Residential fee simple: (20 lf x 20'wide) = 400 SF

Net Cost	400 SF x $2.30/SF		= $ 920
Scheduling		55%	= $ 506
Administrative		60%	= $ 552
Total			=$ 1,978

Residential permanent easement: (20 lf x 20'wide) = 400 SF

Net Cost	400 SF x $1.15/SF		= $ 460
Scheduling		55%	= $ 253
Administrative		60%	= $ 276
Total			=$ 989

Cost Worksheet

PBS&J

PROJECT:	**Georgia Department of Transportation** **STP00-0013-01(063) - P.I. No. 132950** **Buford Highway** **Gwinnett/Hall Counties**	ALTERNATIVE NO.:	**RD-22**
DESCRIPTION:	**Eliminate signal and median opening at City Hall Street**	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
18" STORM DRAIN PIPE	LF	30	$ 37.73	$ 1,132	0	$ 37.73	$ -
30" STORM DRAIN PIPE	LF	30	$ 57.12	$ 1,714	0	$ 57.12	$ -
RIGHT OF WAY	LS	1	$ 1,978.00	$ 1,978	1	$ 989.00	$ 989
Sub-total				$ 4,824			$ 989
Mark-up at 10.00%				$ 482			$ 99
TOTAL				**$ 5,306**			**$ 1,088**
Estimated Savings:							$ 4,217.95

PROJECT DESCRIPTION

INTRODUCTION

The subject of the Value Engineering study was Project No. STP00-0013-01(063), P.I. No. 132950, Buford Highway (SR 13) from Sawnee Avenue in Gwinnett County to Friendship Road (SR 347) in Hall County.

The design for the project has been prepared by Moreland Altobelli Associates, Inc. At the time of the workshop, the plans had advanced to the preliminary design level.

PROJECT DESCRIPTION

The proposed project will widen Buford Highway (SR 13) from a rural two-lane to an urban four-lane with twenty foot raised grassed medians, twelve foot right turn lanes at all major intersections and major commercial drives, and sidewalks. The traffic analysis for the design year of 2032 indicates that all major intersections would be at level F unless improvements are made. The project is presently serving a semi-rural area with minor commercial businesses primarily related to boating.

The estimated construction cost for the project is $9,391,146. In addition, Right-of-Way costs are anticipated to be $10,000,000 with reimbursable utilities cost estimated to be $50,000. The projected total cost for the project is $19,441,246.

The need for the project is to increase the capacity, improve safety, and reduce the number of accidents which currently is above the statewide average for similar facilities. This project is needed to accommodate existing and future traffic demands.

REPRESENTATIVE DOCUMENTS

- Georgia Department of Transportation
  - Construction Cost Estimates
  - Preliminary Right-of-Way Cost Estimate
  - Concept Reports
  - Project Location Maps
  - Accident Data

The VE Team utilized the GDOT supplied project materials noted above plus the preliminary plans provided by Moreland Altobelli Associates, Inc.

- Public involvement. A Public Information Open House (PIOH) will be held.
- Local government comments. N/A
- Other projects in the area.
  - GDOT P.I. No. 170735 –SR 347/Friendship Rd widening from I-985 to CR 129.
  - GDOT P.I. No. 162430 –SR 347/Friendship Rd & Thompson Mill Rd from I-985 to SR 211
  - GDOT P.I. No. 0007389 – CR 1293/McEver Rd Intersection Improvements at six locations.
  - GDOT P.I. No. 0003164 –I-85 from SR 316 north to Hamilton Mill Rd for HOV lanes
  - GDOT P.I. No. 110600 –I-85 from I-985 to north of CR 134/Hamilton Mill Rd
  - GDOT P.I. No. 0007849 – SR 20 from SR 324/Gravel Springs Rd to I-85
  - GDOT P.I. No. 0006336 – I-985 from I-85 to Flowery Branch-ATMS Communication
  - GDOT P.I. No. 0007467 – I-985 from Gwinnett County Line to Jesse Jewell Pkwy-Cable Barrier
  - GDOT P.I. No. 0002393 – SR 13 from Sugarloaf Pkwy to SR 20 in Buford
- Other coordination to date: None.
- Railroads – N/A

Scheduling – Responsible Parties' Estimate

- Time to complete the environmental process: 9 Months.
- Time to complete preliminary construction plans: 7 Months.
- Time to complete right-of-way plans: 5 Months.
- Time to complete final construction plans: 8 Months.
- Time to complete to purchase right-of-way: 18 Months.

Other alternates considered:

No-Build Alternate:

The no-build alternate is an alternative in which no action would be taken to improve the existing roadway. Traffic congestion and operational problems would result because the existing two-lane roadways of the area would be inadequate to handle the future (year 2032) traffic volumes.

New Location Alternate:

No other alignment outside the existing corridor would be feasible because of the environmental impacts and cost of placing the project on new alignment. There are no other roadways parallel to this facility that would meet the need and purpose of this project and provide improved local access and mobility to the businesses of Buford and Resthaven.

Asymmetric Widening Alternate:

An asymmetric widening of Buford Highway/SR 13 was considered but rejected, as it would result in more displacements and greater impacts to property. Consequently, the project would have a higher overall right-of-way cost.

Preferred Alternate:

Buford Highway/SR 13 would be widened to utilize the maximum amount of existing right-of-way and impact the minimum number of properties. The road would need to match the planned project GDOT P.I. No. 170735 – SR 347/Friendship Road widening to the north and existing four-lane divided section to the south.

- 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 at this time.
- Environmental concerns: None
- Level of environmental analysis:
  - Are Time Savings Procedures appropriate? Yes ( ), No (x),
  - Categorical exclusion (x), anticipated
  - Environmental Assessment/Finding of No Significant Impact (FONSI) ( ), or
  - Environmental Impact Statement (EIS) ( ).

- Utility involvements:
  - Atlanta Gas Light
  - Atmos Energy
  - AT&T (Bellsouth)
  - Charter Communications
  - City of Buford
  - Georgia Power
  - Hall County
  - Jackson EMC
  - City of Gainesville
  - Gwinnett Department of Water Resources

Project responsibilities:

- Design, City of Buford, Georgia
- Right-of-way Acquisition, City of Buford/ Georgia DOT
- Relocation of Utilities, City of Buford
- Letting to contract, Georgia DOT
- Supervision of construction, Georgia DOT
- Providing material pits, Construction Contractor
- Providing detours, Construction Contractor

Coordination:

- Initial Concept Meeting – See attached minutes of meeting held on August 31, 2007.
- Concept Meeting – See attached minutes of meeting held on October 19, 2007
- P. A. R. meetings, dates and results. N/A
- FEMA, USCG, and/or TVA. – None
- It is anticipated that a VE study will be required for this project.

- Side Streets – The proposed typical section for the side streets would consist of one 12-foot travel lanes in each direction. The proposed section would include 16-foot urban shoulders with curb and gutter and 5-foot sidewalks on both sides.

- Proposed Design Speed
  - Buford Highway/SR 13 45 mph
  - Relocated Thunder Road 35 mph
  - Ledford Road 25 mph
  - Holiday Road 25 mph
  - City Hall Street 25 mph
- Proposed Maximum grade Mainline 3.0 % Maximum allowable grade 6%
- Proposed Maximum grade Side Streets 11.0 % Maximum allowable grade 11%
- Proposed Maximum grade commercial driveway 11 %
- Proposed Minimum radius for curve for Buford Highway/SR 13 8,000 feet
  Minimum radius 643'
- Proposed Minimum radius for curve for side streets:
  - 450' (35 mph) Relocated Thunder Road Minimum allowable radius 340'
  - 250' (25 mph) Holiday Road Minimum allowable radius 144'
  - 3000' (25 mph) Ledford Road Minimum allowable radius 144'
- Proposed Maximum superelevation rate for curve: 4.00% (SR 13 & Relocated Thunder Rd)
- Right-of-way
  - Width SR 13: Varies from 100 to 145 feet.
  - Width Side Streets: Varies from 84 to 105 feet
  - Easements: Temporary (x), Permanent (x), Utility ( ), Other ( ).
  - Type of access control: Full ( ), Partial ( ), By Permit (x), Other ( ).
  - Number of parcels: 55 Number of displacements:
    - Businesses: 5
    - Residences: 4
    - Mobile homes: 0
    - Other: 0
- Structures: There are three culvert extensions in this project.
- Major intersections along the project: Major intersections along the project occur at Sawnee Avenue, City Hall Street, Roy Carlson Blvd, Holiday Road and Friendship Road.
- Traffic control during construction: During construction, traffic on SR 13 will be shifted to either side while widening work is done. Two (2) lanes of traffic will be maintained at all times during construction. Temporary pavement will be utilized to ensure adequate pavement is available for required shifts during widening activities. No onsite or offsite detours are anticipated. Construction will take place at off-peak hours during the day and through the night so as to minimize interference with roadway traffic.

Description of the proposed project:
Project STP-013-1 (63), P.I. No. 132950 consists of the widening of Buford Highway, SR 13 from Sawnee Avenue in Gwinnett County to Friendship Road in Hall County. The project proposes to widen the existing two-lane roadway to provide an urban four-lane divided highway with a 20-foot raised median, 4-foot bike lanes and auxiliary lanes at major intersections. The roadway would have urban shoulders with curb and gutter and 5-foot sidewalks on both sides.

Is the project located in a Non-attainment area? __X__ Yes _____ No. The project is described in the Atlanta Regional Commission's (ARC's) Mobility 2030 Regional Transportation Plan as widening the existing two-lane facility to four-lanes from Thompson Mill Road to Friendship Road. The conforming model's description above is consistent with the proposed project concept.

PDP Classification: Major __X__ Minor _____
Federal Oversight: Full Oversight ( ), Exempt(X), State Funded( ), or Other ( )

Functional Classification: Urban Minor Arterial

U. S. Route Number(s): N/A **State Route Number(s):** SR 13

Traffic (AADT):
Build Year: (2012) 20,100 Design Year: (2032) 30,100

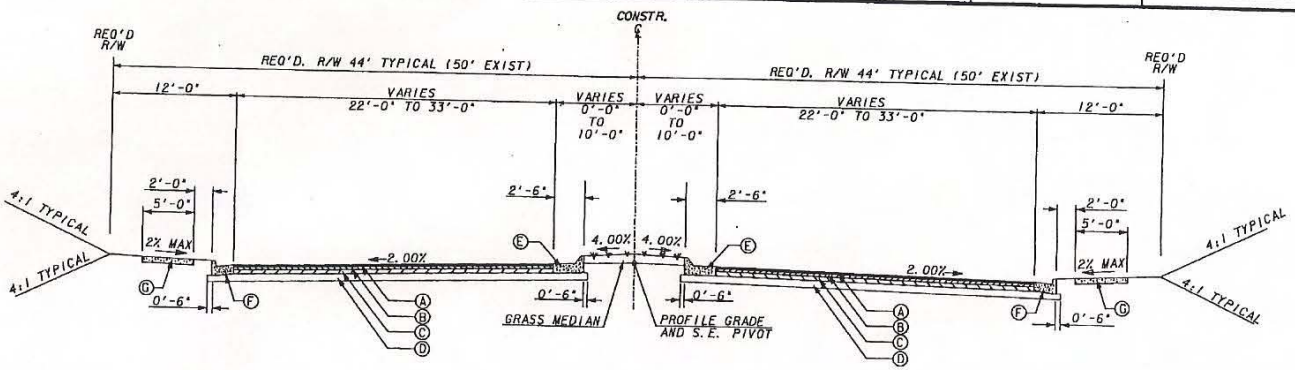
Existing design features:

- Typical Section: Buford Highway from Sawnee Avenue to Friendship Road – Rural and urban roadway sections of variable widths, consisting of two undivided travel lanes and shoulders of variable widths from 0-5 feet of paved and/or grass with curb and gutter at intersections.
- Posted speed 45 mph Minimum radius for curve: Tangent
- Maximum super-elevation rate for curve: N/A
- Maximum grade: 3.0 %
- Width of right of way: varies 80 to 100 ft.
- Major structures: Culverts over streams
- Major intersections along the project: Major intersections along the project occur at Sawnee Avenue, Thunder Road, Holiday Road and Friendship Road.
- Length of existing roadway Buford Highway is approximately 1.53 miles:
  M.P. 22.20 – 22.98 (Gwinnett County)
  M.P. 0.00 – 0.75 (Hall County)

Proposed Design Features:

- Proposed typical section(s):
  - Buford Highway/SR 13 - The proposed typical section includes two 12-foot travel lanes and 4-foot bike lanes in each direction with a 20-foot raised median and auxiliary lanes as necessary. The proposed section would include 16-foot urban shoulders with curb and gutter and 5-foot sidewalks on both sides.

COUNTY	PROJECT NUMBER



TS - 1
SR 13/BUFORD HIGHWAY

NORMAL CROWN
OVERLAY & WIDENING
N. T. S.

NOTES

- SEE ROADWAY PLANS FOR S.E. RATES.

SLOPE CONTROL TABLE		
SLOPE	CUT	FILL
4:1	0-6'	0-10'
3:1	6'-10'	--
2:1*	OVER 10'	OVER 10'

*GUARDRAIL TO BE INSTALLED ADJACENT TO FILL SLOPES GREATER THAN 3:1. SEE PLANS FOR LOCATIONS

REQUIRED PAVEMENT AND CONCRETE ITEMS

- (A) 165 LB/SY ASPHALTIC CONC. 12.5 mm SUPERPAVE
- (B) 330 LB/SY ASPHALTIC CONC. 19.0 mm SUPERPAVE
- (C) 550 LB/SY ASPHALTIC CONC. 25.0 mm SUPERPAVE
- (D) 14" GRADED AGGREGATE BASE COURSE
- (E) 8" x 30" CONCRETE CURB & GUTTER, TYPE 7
- (F) 8" x 30" CONCRETE CURB & GUTTER, TYPE 2
- (G) 4" CONCRETE SIDEWALK

Moreland Altobelli Associates, Inc.
2211 Beaver Ruin Road
Suite 150
Norcross, Georgia 30071
Telephone (770) 263-5945

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN

TYPICAL SECTIONS
BUFORD HIGHWAY

DRAWING NO. 5-01

The ability for this facility to accommodate and distribute traffic between the major traffic generators is the primary purpose of the facility. In order to maintain the design speed and efficiency of the facility, the project proposes to construct a raised median throughout the length of the project. The raised median would help to reduce the number of crashes by restricting left-turns and crossover traffic movements to occur only at median openings. The project would also construct deceleration lanes to separate right turning traffic from through traffic.

An inventory of recent historical crash data from 2003 to 2005 is provided in the table below. The table lists the total number of crashes and injuries coded to Buford Highway within the proposed project termini. No fatalities were recorded during this time period. Accordingly, the crash and injury rates were calculated and shown beside the statewide rates for an urban minor arterial, the assigned functional class of Buford Highway. The crash and injury rates provided are in units of 100 million vehicle miles.

History of Traffic Crashes

Year	No. Of Crashes	Crash Rate	Statewide Rate	No. Of Injuries	Injury Rate	Statewide Rate
2003	51	628	*572*	26	320	*143*
2004	51	617	*490*	17	205	*123*
2005	56	600	*534*	31	332	*135*

The results indicate that Buford Highway exhibits above average crash and injury rates as compared to similar facilities statewide. These crash and injury rates stress the need for proposed improvement on Buford Highway. The proposed improvement would reduce the number of crashes, enhance the safety of motorist's and improve level of service. This improvement would help to reduce the risk of various common crashes, rear-end and angle collisions at intersections.

Other Projects in the Areas

Several projects are planned for this area that will complement the proposed project. These projects are listed below by their Georgia Department of Transportation Project Identification Number:

- GDOT P.I. No. 170735 – SR 347/Friendship Road widening from I-985 to CR 129
- GDOT P.I. No. 162430 – SR 347/Friendship Rd & Thompson Mill Rd from I-985 to SR 211
- GDOT P.I. No. 0007389 – CR 1293/McEver Rd Intersection Improvements at six locations.
- GDOT P.I. No. 0003164 – I-85 from SR 316 north to Hamilton Mill Rd for HOV lanes
- GDOT P.I. No. 110600 – I-85 from I-985 to north of CR 134/Hamilton Mill Rd
- GDOT P.I. No. 0007849 – SR 20 from SR 324/Gravel Springs Rd to I-85
- GDOT P.I. No. 0006336– I-985 from I-85 to Flowery Branch-ATMS Communication/Surveillance
- GDOT P.I. No. 0007467 – I-985 from Gwinnett County line to Jesse Jewell Pkwy-Cable Barrier
- GDOT P.I. No. 0002393 – SR 13 from Sugarloaf Pkwy to SR 20 in Buford

by project STP00-2688-00 (004), P.I. No. 170735. At this location, 58% of the traffic turns onto Friendship Road/SR 347.

Average Daily Traffic Volumes and Level of Service

Buford Highway (SR 13) currently serves as a north-south minor arterial for local and commercial traffic in the area. The industrial and commercial properties, and other land uses adjacent to the roadway have contributed to the current traffic volumes on the existing facility. The 2006 Average Daily Traffic (ADT) of 14,600 vehicles per day (vpd) on Buford Highway within the project area is projected to increase to 20,100 by the build year 2012. This volume is then projected to increase to 30,100 vpd by the year 2032. The 2012 and 2032 traffic volumes would exceed the capacity of a two-lane or three-lane highway.

Levels of Service (LOS) were determined at all of the major intersections along the corridor. The results of the analysis are shown in Table 2. Traffic volumes on the existing roadway are operating at levels of service B to D at peak hours. All the intersections with Buford Highway are unsignalized except Friendship Road. The analyses indicate the need to signalize Sawnee Avenue, City Hall Street and Roy Carlson Blvd with Buford Highway to operate at a good level of service during peak hours for the build year 2012 in addition to the proposed widening and improvements. The analysis also showed that the intersection of Holiday Road with Buford Highway might need to be signalized in the design year 2032 to operate at a good level of service. Prior to installing a traffic signal at any of these intersections, a traffic signal warrant study would be required to determine whether a traffic signal is warranted for signalization.

Projected traffic volumes indicate that the levels of service at the major intersections would decline to F by the 2032 design year if no action is taken. With the proposed design, all of the intersections in the 2032 design year would operate at levels of service "D" or better throughout the project corridor (see Table 2).

Table 2: Summary of Level of Service Analysis Results

Buford Hwy Intersections	Year 2006 Existing			Year 2012 No-Build			Year 2012 Build			Year 2032 No-Build			Year 2032 Build		
	AM	PM	TC*	AM	PM	TC*	AM	PM	TC*	AM	PM	TC*	AM	PM	TC*
Sawnee Ave	D	C	U	F	F	U	B	B	S	F	F	U	C	B	S
City Hall St	C	C	U	C	F	U	A	A	S	F	F	U	A	A	S
Summer Oak Dr	B	C	U	C	F	U	--	--	R	F	F	U	--	--	R
Thunder Rd	C	D	U	F	F	U	--	--	R	F	F	U	--	--	R
Roy Carlson Blvd	C	D	U	E	F	U	B	B	S	E	F	U	C	C	S
Ledford Rd	B	C	U	D	E	U	C	D	U	C	F	U	C	D	U
Holiday Rd	C	C	U	E	F	U	D	D	U	F	F	U	A	B	S
Friendship Rd	C	D	S	F	F	S	C	C	S	F	F	S	D	D	S

* Traffic Control (TC) – S means signalized, U means unsignalized and LOS at these intersections represents the side street LOS, R means that the intersection has been modified to have only right-in and right-out access and was therefore not analyzed.

Safety Improvements

Currently, Buford Highway is classified as an urban minor arterial. As such, the facility serves regional commuter traffic to and from major employment centers of Gwinnett and Hall counties.

Need and Purpose:
The primary purpose of the proposed project is to provide additional capacity along Buford Highway (SR 13) and to preserve the efficient and safe movement of traffic through the project corridor consistent with the functional classification of an urban minor arterial. Traffic analyses conducted along this corridor for future (2032) traffic conditions indicate that all major intersections would operate at failing levels of service during the AM and PM peak hours. The projected traffic volumes (year 2032) result from the continued residential, office and commercial development, and redevelopment of adjacent property, which is consistent with each county's adopted land-use plans and policies along this corridor.

Planning Background and Project History
The proposed widening of Buford Highway between Sawnee Avenue and Friendship Road has long been a priority as part of a larger network of area roadway projects to improve mobility and connectivity between Gwinnett and Hall Counties.

Buford Highway is located west and parallel to I-985 and has seen tremendous growth and development over recent years. The proposed project is recommended for widening in the Atlanta Regional Commission's (ARC) adopted Mobility 2030 Regional Transportation Plan as Project ARC # GW-099C. Also, Buford Highway is designated as a bike route on the ARC bike plan for Gwinnett County.

The current land uses are consistent with the future land use plans. As a result of continued development and re-development of the land areas along the project corridor, projected traffic volumes (year 2030) indicate that a four-lane section is necessary. Detailed analysis concerning existing and future projected traffic volumes along the project corridor is discussed in a subsequent section.

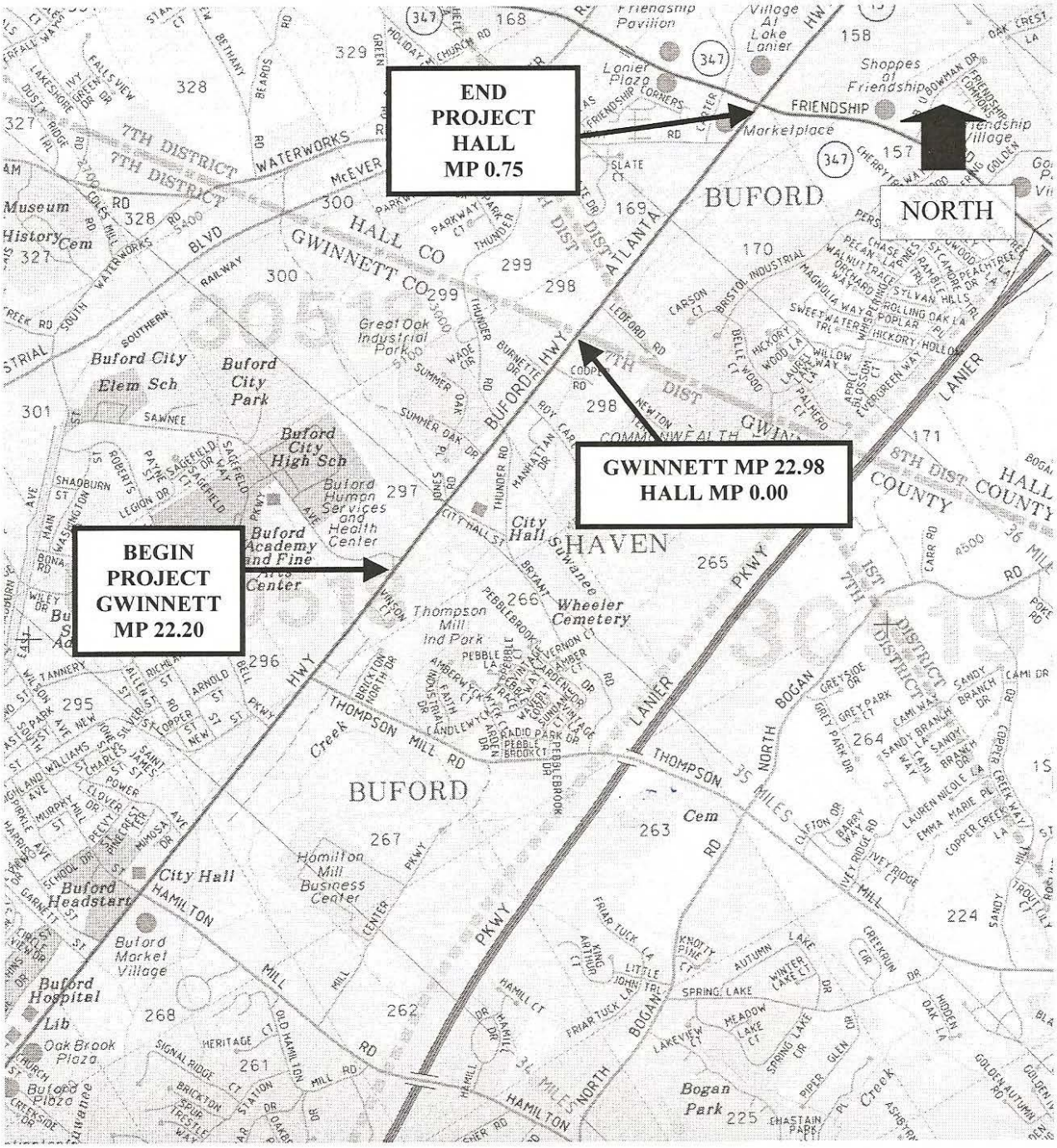
Project Description
The proposed project would widen Buford Highway, an urban minor arterial, from Sawnee Avenue in Gwinnett County to Friendship Road in Hall County. The length of the project is approximately 1.53 miles.

The existing roadway currently consists of two lanes with a variable width, with only a few locations with left turn and right turn lanes along the project length. The proposed project would widen Buford Highway to a 4-lane urban facility with a 20-foot raised median, 4-foot bike lanes, curb and gutter and 5-foot sidewalks on both sides.

Logical Termini
The southern logical terminus of this project would occur at Sawnee Avenue in Gwinnett County where the existing four-lane typical section ends. The widening north from this intersection would accommodate existing and future travel demand. Buford City schools are located along or near Sawnee Avenue. Approximately 15% of the northbound traffic volume on SR 13 turns left onto Sawnee Avenue while 85% of the traffic volumes continue north onto the existing two-lane Buford Highway/SR 13.

The northern logical terminus of this project is the Friendship Road/SR 347. Friendship Road is planned to be widened and reconstructed in Hall County from its existing two lanes to four lanes

Project Location Map
Buford Highway (SR 13) from Sawnee Avenue to Friendship Road (SR 347)



Preliminary Right of Way Cost Estimate

Howard P. Copeland
Right-of-Way Administrator

Date:	July 22, 2008		
Project:	STP-013-0(63); Gwinnett and Hall Counties	**P.I. Number**	132950
Existing/Required R/W:	Varies/Varies	**No. Parcels**	62
Project Termini:	S.R. 13 Buford Highway from Sawnee Ave to Friendship Rd		
Project Description:	S.R. 13 Buford Highway Road Improvements		

Fee Simple:								
Residential								
	27,580	sf	@ $	2.30 /sf =	$	63,434		
Commercial/Industrial								
	87,882	sf	@ $	4.59 /sf =	$	403,378		
Commercial/Retail								
	37,739	sf	@ $	11.48 /sf =	$	433,244		
							$ 900,056	
Permanent Construction Easement:								
Residential								
	39,574	sf	@ $	1.15 /sf =	$	45,510		
Commercial/Industrial								
	219,102	sf	@ $	2.30 /sf =	$	503,935		
Commercial/Retail								
	94,179	sf	@ $	5.74 /sf =	$	540,587		
							$ 1,090,032	
								1,990,088
Improvements:								
2 Residential				=	$	180,000		
6 Commercial/Industrial				=	$	685,000		
0 Commercial/Retail				=	$	0		
								865,000
Relocation:								
2 Residential				=	$	80,000		
5 Commercial/Industrial				=	$	200,000		
0 Commercial/Retail				=	$	0		
								280,000
Damages:								
Proximity -	0	Parcels			$	0		
Consequential -	18	Parcels			$	715,000		
Cost to Cure -	4	Parcels			$	200,000		
								915,000

Net Cost		$	4,050,088
Scheduling Contingency	55%	$	2,227,548
Adm/Court Cost	60%	$	3,766,582
		$	10,044,218

Total Cost

$ 10,044,300

Prepared By : Emory D. Dixon III

Emory D. Dixon III, Cert. No. 2403
Moreland Altobelli Associates, Inc.

Approved : _____
GDOT R/W

Total Estimated Cost: $7,859,482.52

Subtotal Construction Cost	**$7,859,482.52**
E&C Rate 10.0 %	$785,948.25
Inflation Rate 5.0 % @ 3 Years	$1,362,736.03
Total Construction Cost	**$10,008,166.80**
Right Of Way	$10,044,300.00
ReImb. Utilities	$50,000.00
Grand Total Project Cost	**$20,102,466.80**

636-1020	35	SF	16.60	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 3	581.00
636-1029	150	SF	14.66	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 3	2199.00
636-1033	200	SF	20.14	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 9	4028.00
636-1041	30	SF	37.29	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 9	1118.70
636-2070	50	LF	8.76	GALV STEEL POSTS, TP 7	438.00
636-2080	400	LF	11.55	GALV STEEL POSTS, TP 8	4620.00
653-0120	60	EA	72.94	THERMOPLASTIC PVMT MARKING, ARROW, TP 2	4376.40
653-0170	8	EA	88.05	THERMOPLASTIC PVMT MARKING, ARROW, TP 7	704.40
654-1001	100	EA	3.07	RAISED PVMT MARKERS TP 1	307.00
654-1003	800	EA	3.23	RAISED PVMT MARKERS TP 3	2584.00
				Section Sub Total:	**$20,956.50**

Section DRAINAGE

Item Number	Quantity	Units	Unit Price	Item Description	Cost
441-0304	1	EA	1750.00	CONC SPILLWAY, TP 4	1750.00
441-0600	15	CY	842.60	CONC HEADWALLS	12639.00
550-1180	500	LF	37.73	STORM DRAIN PIPE, 18 IN, H 1-10	18865.00
550-1300	750	LF	54.77	STORM DRAIN PIPE, 30 IN, H 1-10	41077.50
550-1301	750	LF	57.12	STORM DRAIN PIPE, 30 IN, H 10-15	42840.00
550-1360	750	LF	65.04	STORM DRAIN PIPE, 36 IN, H 1-10	48780.00
550-1361	600	LF	64.53	STORM DRAIN PIPE, 36 IN, H 10-15	38718.00
550-1420	750	LF	87.36	STORM DRAIN PIPE, 42 IN, H 1-10	65520.00
550-1421	250	LF	101.94	STORM DRAIN PIPE, 42 IN, H 10-15	25485.00
550-1481	100	LF	100.07	STORM DRAIN PIPE, 48 IN, H 10-15	10007.00
550-1482	250	LF	113.03	STORM DRAIN PIPE, 48 IN, H 15-20	28257.50
550-1540	200	LF	113.00	STORM DRAIN PIPE, 54 IN, H 1-10	22600.00
550-1541	100	LF	113.50	STORM DRAIN PIPE, 54 IN, H 10-15	11350.00
550-3618	2	EA	539.72	SAFETY END SECTION 18 IN, SIDE DRAIN, 6:1 SLOPE	1079.44
550-4218	6	EA	616.24	FLARED END SECTION 18 IN, STORM DRAIN	3697.44
550-4224	6	EA	698.66	FLARED END SECTION 24 IN, STORM DRAIN	4191.96
550-4230	4	EA	844.49	FLARED END SECTION 30 IN, STORM DRAIN	3377.96
550-4236	2	EA	1075.94	FLARED END SECTION 36 IN, STORM DRAIN	2151.88
668-1100	60	EA	2481.45	CATCH BASIN, GP 1	148887.00
668-2100	20	EA	2410.48	DROP INLET, GP 1	48209.60
				Section Sub Total:	**$579,484.28**

Section ROADWAY

Item Number	Quantity	Units	Unit Price	Item Description	Cost
210-0100	1	LS	960000.00	GRADING COMPLETE -	960000.00
310-1101	47366	TN	17.76	GR AGGR BASE CRS, INCL MATL	841220.16
402-3121	20175	TN	60.01	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	1210701.75
402-3130	8103	TN	64.41	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	521914.23
402-3190	8073	TN	68.12	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2,INCL BITUM MATL & H LIME	549932.76
413-1000	10938	GL	2.13	BITUM TACK COAT	23297.94
441-0016	2500	SY	41.87	DRIVEWAY CONCRETE, 6 IN TK	104675.00
441-0104	9302	SY	32.12	CONC SIDEWALK, 4 IN	298780.24
441-0740	910	SY	34.13	CONCRETE MEDIAN, 4 IN	31058.30
441-4020	700	SY	44.62	CONC VALLEY GUTTER, 6 IN	31234.00
441-6222	16750	LF	15.79	CONC CURB & GUTTER, 8 IN X 30 IN, TP 2	264482.50
441-6740	16750	LF	13.66	CONC CURB & GUTTER, 8 IN X 30 IN, TP 7	228805.00
621-6012	135	LF	105.00	CONCRETE SIDE BARRIER, TP 7-RS	14175.00
641-5000	2	EA	2120.23	GUARDRAIL ANCHORAGE, SPCL DES	4240.46
641-5001	10	EA	684.10	GUARDRAIL ANCHORAGE, TP 1	6841.00
641-5012	10	EA	1869.18	GUARDRAIL ANCHORAGE, TP 12	18691.80
				Section Sub Total:	**$5,110,050.14**

Estimate Report for file "132950"

Section EROSION CONTROL

Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0232	14	AC	311.88	TEMPORARY GRASSING	4366.32
163-0240	50	TN	165.45	MULCH	8272.50
163-0300	6	EA	1174.43	CONSTRUCTION EXIT	7046.58
163-0531	2	EA	10913.09	CONSTRUCT AND REMOVE SEDIMENT BASIN, TP 1, STA NO -	21826.18
165-0010	2520	LF	0.67	MAINTENANCE OF TEMPORARY SILT FENCE, TP A	1688.40
165-0030	5860	LF	0.74	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	4336.40
165-0060	2	EA	1929.89	MAINTENANCE OF TEMPORARY SEDIMENT BASIN, STA NO -	3859.78
165-0101	6	EA	474.28	MAINTENANCE OF CONSTRUCTION EXIT	2845.68
167-1000	1	EA	483.11	WATER QUALITY MONITORING AND SAMPLING	483.11
167-1500	18	MO	718.48	WATER QUALITY INSPECTIONS	12932.64
171-0010	2520	LF	2.39	TEMPORARY SILT FENCE, TYPE A	6022.80
171-0030	5860	LF	3.61	TEMPORARY SILT FENCE, TYPE C	21154.60
201-1500	1	LS	245000.00	CLEARING & GRUBBING -	245000.00
700-6910	14	AC	792.72	PERMANENT GRASSING	11098.08
700-7000	120	TN	66.74	AGRICULTURAL LIME	8008.80
700-7010	100	GL	22.03	LIQUID LIME	2203.00
700-8000	10	TN	405.48	FERTILIZER MIXED GRADE	4054.80
700-8100	1000	LB	2.36	FERTILIZER NITROGEN CONTENT	2360.00
				Section Sub Total:	**$367,559.67**

Section TRAFFIC SIGNAL INSTALLATION

Item Number	Quantity	Units	Unit Price	Item Description	Cost
639-3004	20	EA	12104.30	STEEL STRAIN POLE, TP IV	242086.00
647-1000	5	LS	100000.00	TRAFFIC SIGNAL INSTALLATION NO -	500000.00
647-2140	2	EA	1189.98	PULL BOX, PB-4	2379.96
647-2150	3	EA	1789.22	PULL BOX, PB-5	5367.66
682-6233	1100	LF	3.07	CONDUIT, NONMETL, TP 3, 2 IN	3377.00
935-1116	3000	LF	1.59	OUTSIDE PLANT FIBER OPTIC CABLE, LOOSE TUBE, SINGLE MODE, 72 FIBER	4770.00
935-1512	300	LF	1.14	OUTSIDE PLANT FIBER OPTIC CABLE, DROP, SINGLE MODE, 12 FIBER	342.00
935-3103	3	EA	596.39	FIBER OPTIC CLOSURE, UNDERGROUND, 24 FIBER	1789.17
935-4010	12	EA	50.78	FIBER OPTIC SPLICE, FUSION	609.36
939-6000	3	EA	5958.50	HUB UNITERRUPTIBLE POWER SUPPLY	17875.50
				Section Sub Total:	**$778,596.65**

Section MAJOR STRUCTURES

Item Number	Quantity	Units	Unit Price	Item Description	Cost
500-3101	500	CY	276.35	CLASS A CONCRETE - CULVERT EXTENTIONS	138175.00
500-3101	850	CY	276.35	CLASS A CONCRETE - GRAVITY WALLS	234897.50
511-1000	60000	LB	0.91	BAR REINF STEEL - CULVERT EXTENTIONS	54600.00
617-0510	1	Lump Sum	287800.00	PERMANENTLY ANCHORED WALL - TIE-BACK WALL	287800.00
				Section Sub Total:	**$715,472.50**

Section MISCELLANEOUS

Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	200000.00	TRAFFIC CONTROL -	200000.00
153-1300	1	EA	77626.78	FIELD ENGINEERS OFFICE TP 3	77626.78
634-1200	100	EA	97.36	RIGHT OF WAY MARKERS	9736.00
				Section Sub Total:	**$287,362.78**

Section SIGNING AND MARKING

Item Number	Quantity	Units	Unit Price	Item Description	Cost

Georgia Department of Transportation

Buford Highway Widening from Sawnee Avenue to Friendship Road
FACT SHEET
June 11, 2009

Project No.: **STP00-0013-01(063)**
P.I. No.: 132950
Gwinnett and Hall Counties

Location: Buford Highway (SR 13) from Sawnee Avenue in Gwinnett County to Friendship Road (SR 347) in Hall County, Georgia.

Purpose: The primary purpose of the proposed project is to provide additional capacity along Buford Highway (SR 13) and to preserve the efficient and safe movement of traffic through the project corridor consistent with the functional classification of an urban minor arterial. Traffic analyses conducted along this corridor for future (2032) traffic conditions indicate that all major intersections would operate at failing levels of service during the AM and PM peak hours without this improvement.

Project Length: 1.53 miles

Traffic Projections (Average Daily Traffic – ADT)

Buford Highway (SR 13)	2006 ADT	2012 ADT	2032 ADT
	14,600	20,100	30,100

Typical Sections:

Existing: The existing typical section along Buford Highway from Sawnee Avenue to Friendship Road includes rural and urban roadway sections with two undivided travel lanes and shoulders of pavement and/or grass with curb and gutter at intersections. Existing right-of-way varies from 80 feet to 100 feet.

Proposed: An urban four-lane divided highway with a 20-foot raised median and auxiliary lanes at major intersections. The roadway would have 20-foot urban shoulders with curb and gutter and 5-foot sidewalks on both sides. Proposed right-of-way would vary from 100 feet to 140 feet. Additionally, a permanent easement may be required beyond the proposed right-of-way. There are no bridges on the proposed project. A 10 ft. x 10 ft. lengthening of an existing box culvert and several lengthened smaller box culverts would occur within the project limits.

Design Speed: Buford Highway (SR 13) Posted: 45 MPH Design: 45 MPH

Project Cost

CST:	$ 9,391,146.00
R/W:	$ 10,000,000.00
UTIL:	$ 50,000.00
TOTAL:	$ 19,441,246.00

Project Schedule

R/W:	Local
CST:	Long Range

Number of Impacted Parcels: 55
Displacements: 3
Estimated Construction Time: 24 months

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VALUE ENGINEERING PROCESS

This report summarizes the analysis and conclusions by the PBS&J Value Engineering team as they performed a VE Study during the period of July 14 through July 17, 2009 in Atlanta, Georgia, for the Georgia Department of Transportation.

INTRODUCTION

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

Les M. Thomas, PE, CVS-Life	Team Leader
Luke Clarke, PE, AVS	Senior Highway Design Engineer
Kevin Martin, Esq. AVS	Highway Construction Specialist
Randy S. Thomas, CVS	Assistant Team Leader

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) staff and Parsons Engineering. 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 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. A FAST diagram was prepared highlighting the projects required functions.

- The important functions of the project were identified as follows:

  - **Project Objective/Goals**

    - **Improve safety**
    - **Improve Level of Service**

  - **Project Basic Functions**

    - **Separate pedestrians**
    - **Improve traffic operations**
    - **Increase capacity**

- **Speculation Phase -** The VE team performed a brainstorming session to identify ideas that might help meet the project objectives:

  - **Improve and control access**
  - **Reduce ROW required**
  - **Reduce and balance earthwork**
  - **Eliminate non-functional work**
  - **Reduce total property taking**

  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
    - Improve value
    - Maintainability
    - Ability to implement the idea
    - General acceptability of the alternatives
    - Constructability
    - Scheduling delays

  Based on these criteria, 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 whose rating was "4" or "5" because of time constraints. If time permitted, the team will develop additional recommendations. 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.

VALUE ENGINEERING STUDY AGENDA

for

Georgia Department of Transportation

STP00-0013-01(063) – P.I. No. 132950

SR13/Buford Highway

From Sawnee Avenue to Friendship Road

Gwinnett and Hall Counties

July 14-17, 2009

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.

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.)
  - Sidewalks, 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
- Visit project site if time permits

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

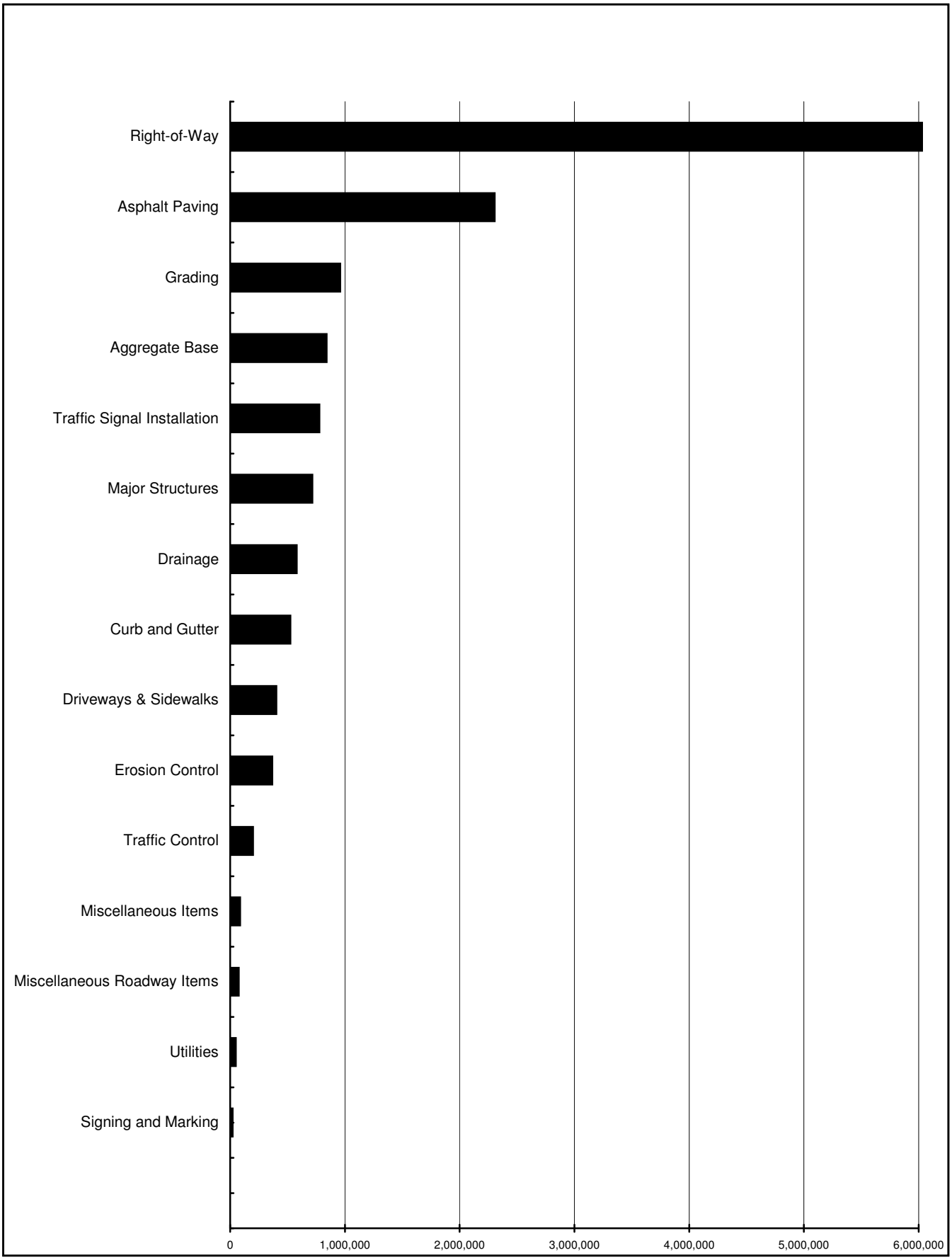
8:00-9:00 Prepare Presentation
9:00-10:00 VE Team Presentation

PARETO CHART - COST HISTOGRAM

PROJECT: **Georgia Department of Transportation**
STP00-0013-01(063) - P.I. No. 132950
Buford Highway (SR 13)
Gwinnett/Hall Counties

PROJECT ELEMENT	COST	PERCENT	CUM. PERCENT
Right-of-Way	10,044,300	55.95%	55.95%
Asphalt Paving	2,305,857	12.84%	68.79%
Grading	960,000	5.35%	74.14%
Aggregate Base	841,220	4.69%	78.82%
Traffic Signal Installation	778,597	4.34%	83.16%
Major Structures	715,473	3.99%	87.14%
Drainage	579,484	3.23%	90.37%
Curb and Gutter	524,522	2.92%	93.29%
Driveways & Sidewalks	403,455	2.25%	95.54%
Erosion Control	367,560	2.05%	97.59%
Traffic Control	200,000	1.11%	98.70%
Miscellaneous Items	87,363	0.49%	99.19%
Miscellaneous Roadway Items	74,995	0.42%	99.60%
Utilities	50,000	0.28%	99.88%
Signing and Marking	20,957	0.12%	100.00%
Construction Cost including ROW & Utilites	**$ 17,953,783**		
Construction Cost less ROW & Utilites	**$ 7,859,483**		
E & C Rate @10%	**$ 785,948**		
Inflation Rate 5% @ 3 Years	**$ 1,362,736.00**		
Total Construction Costs	**$ 10,008,167**		
Right-of-Way	**$ 10,044,300**		
Utilities Reimbursement	**$ 50,000**		
TOTAL	**$ 20,102,467**		

Project: StP00-00113-01(063}
P.I. No. 132950
Gwinnett/Hall Counties



DESIGNER PRESENTATION

MEETING PARTICIPANTS

Geogia Department of Transportation **July 14, 2009**

STP00-0013-01(063) - P.I. No. 132950

Gwinnett/Hall Counties

NAME	ORGANIZATION & TITLE		E-MAIL	PHONE
Lisa Myers	GDOT	GDOT - Engineering Services	lmyers@dot.ga.gov	404-631-1770
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Matt Sanders	GDOT	GDOT-Engineering Services	msanders@dot.ga.gov	404-631-1752
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Neil Kantner	GDOT	District 1 - Design	nkantner@dot.ga.gov	770-532-5522
Kim Coley	GDOT	District 1 - Environmental	kcoley@dot.ga.gov	770-532-5582
Nabil Raad	GDOT	GDOT-Traffic Operations	nraad@dot.ga.gov	404-635-8126
Bryan Kerlin	City of Buford		bkerlin@cityofburford.com	770-945-6761
M J Sheehan	MA	Moreland Altobelli Associates, Inc.	mjsheehan@maai.net	770-763-5945
Chad Havens	MA	Moreland Altobelli Associates, Inc.	chavens@maai.net	770-763-5945

VE TEAM PRESENTATION

MEETING PARTICIPANTS

Georgia Department of Transportation **July 17, 2009**

STP00-0013-01(063) - P.I. No. 139250

Gwinnett/Hall Counties

NAME	ORGANIZATION & TITLE		E-MAIL	PHONE
Matt Sanders	GDOT Keeping Georgia on the Move	GDOT-Engineering Services	msanders@dot.ga.gov	404-631-1752
Les Thomas, PE, CVS	PBS&J	PBS&J	lmthomas@pbsj.com	678-677-6420
Luke Clarke, PE, AVS	PBS&J	PBS&J	lwclarke@pbsj.com	205-746-4615
Kevin Martin, Esq., AVS	PBS&J	PBS&J	klmartin@pbsj.com	205-969-3776
Colin Houppermans	GDOT Keeping Georgia on the Move	District 1 - Design	chouppermans@dot.ga.gov	770-718-5011
Neil Kantner	GDOT Keeping Georgia on the Move	District 1 - Design	nkantner@dot.ga.gov	770-532-5522

CREATIVE IDEA LISTING

PROJECT: **Georgia Department of Transportation**
STP00-0013-01(063) – P.I. No. 132950
Buford Highway
Gwinnett/Hall Counties

SHEET NO.: **1** of **2**

NO.	IDEA DESCRIPTION	RATING
	Roadway (RD)	
RD-1	Use 11' lanes on SR 13	4
RD-2	Build a 14' flush median on SR 13	4
RD-3	Build a 12' flush median on SR 13	2
RD-4	Use an 11' inside lane and a 12' outside lane on SR 13	5
RD-5	Use a 12' urban shoulder on SR 13	5
RD-6	Use an 11' travel lane on selected side roads	5
RD-7	Eliminate gravity wall at Thunder Road	5
RD-8	Eliminate signal and median opening at City Hall Street	5
RD-9	Eliminate signal and median opening at Ledford Street	5
RD-10	Relocate Holiday Road connection 600' south	3
RD-11	Delete Holiday Road tie to SR 13	2
RD-12	Make Ledford Road at existing location a Right-In/Right-Out	2
RD-13	Reduce relocation of Ledford Road	2
RD-14	Make Thunder Road a Right-In/Right-Out at existing location	2
RD-15	Leave Roy Carlson Boulevard as-is	2
RD-16	Make Bryant Road a Right-In/Right-Out	2
RD-17	Make City Hall Street a Right-In/Right-Out	2
RD-18	Make a median opening for Summer Oak Drive	3
RD-19	Use a 20' grassed depressed median	2
RD-20	Provide mid block U turns/ left turns at selected locations	3
RD-21	Make Holiday Road a Right-In/Right-Out	2
RD-22	Relocate drainage structures C1/C4 to the east	5

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

CREATIVE IDEA LISTING

PROJECT: **Georgia Department of Transportation**
STP00-0013-01(063) – P.I. No. 132950
Buford Highway
Gwinnett/Hall Counties

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

NO.	IDEA DESCRIPTION	RATING
	ROADWAY (RD) - continued	
RD-23	Allow U turns at Sawnee Avenue and SR 13	3
RD-24	Provide for future double left on SR 13 to Sawnee Avenue westbound	OBS
RD-25	Eliminate sidewalk on the east side of SR 13	3
RD-26	Use rural/hybrid typical section	2
RD-27	Eliminate bike lanes	ABD
RD-28	Move inlet and eliminate manhole J-3	See RD-22
RD-29	Revise drainage structures at Station 150+60 right	See RD-22

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