

Value Engineering Study Report

Project No. STP00-2688-00(004)

*Widening and Reconstruction of SR 347 from I-985 to McEver Road
Hall County*



Value Management Team



Design Team



January 31, 2009



January 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
Project No.: STP00-2688-00(004)
P.I. No.: 170735
SR 347 – Widening and Reconstruction from I-985 to McEver Rd.
Hall County

Dear Ms. Myers:

Please find enclosed two (2) hard copies and one (1) CD of our final Value Engineering Report for widening and reconstruction of SR 347 from I-985 to McEver Road.

This Value Engineering Study, which was performed during the period January 13 through January 16, 2009, identified **39 Alternative Ideas** of which **11 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

A handwritten signature in black ink that reads "Les M. Thomas".

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

A handwritten signature in black ink that reads "Randy S. Thomas".

Randy S. Thomas, CVS
Assistant Team Leader

Value Engineering Study Report

Project No. STP00-2688-00(004)

P.I. No. 170735

***Widening and Reconstruction of SR 347 from I-985 to McEver Road
Hall 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 January 13– January 16, 2009 in Atlanta, at the office of the Georgia Department of Transportation. The subject of the Value Engineering study was Project STP00-2688-00(004) - P.I. No. 170735, the widening and reconstruction of SR 347 from I-985 to CR1293/McEver Rd. The concept design for the project has been prepared by Georgia Department of Transportation (GDOT) – District 1.

PROJECT DESCRIPTION

This project is located in Hall County. The project consists of widening and reconstruction of SR 347 easterly from I-985 to McEver Road for a total of 1.70 miles. It currently consists of two 12' lanes. The functional classification of this section is rural connector. The speed limit along this portion is 45 -50 mph. The traffic (AADT) for the year 2010 is 32,550 vehicles per day. Truck traffic is 5%. There are two main intersections along the project: one at SR 13 and the other at McEver Road. A bridge structure crosses over the Norfolk & Southern Railroad. The existing pavement is in poor condition. Level 3 and 4 distresses were observed throughout the project limits. Analysis of cores showed 4 out of 5 specimens revealed cracks that ran full-depth. The facility operates at operates at a level-of-service (LOS) "E".

In order to improve travel conditions in this highly congested area, GDOT's recommendations are to provide a four lane urban roadway section with by a 20' raised median and 20' shoulders with curb and gutter and sidewalks. Design Speed will be 45 mph. Based on pavement conditions, they are recommending full-depth reconstruction for the entire project area. The proposed project also calls for widening of the bridge that crosses over the Norfolk & Southern Railroad.

There are no environmental concerns. The roadway is to remain open to traffic during construction.

The estimated construction cost for this project is \$15,717,650, the Right-of-Way cost is \$6,723,833, with Reimbursable Utilities cost of \$160,000, the total project cost projected at \$22,601,483.

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:

- It is necessary to improve traffic conditions in this highly congested area.
- The failure of the pavement calls for full depth reconstruction for the entire project area.
- Use of retaining walls at three locations should cut down on Right-of-Way acquisitions.
- There are no environmental concerns.
- Improvement of LOS to "B" from current LOS of "E" is needed.
- Majority of accidents have been rear end collisions with most incidents happening at the SR347/McEver intersection.

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 detail process of the Value Engineering Study.

CONCLUSIONS AND RECOMMENDATIONS

During the speculation phase the VE Team identified 39 *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, *11 Alternative Ideas* remained for further consideration. 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**
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County

SHEET NO.: 1 of 1

ALTERNATIVE NUMBER	DESCRIPTION OF ALTERNATIVE	INITIAL COST SAVINGS
ROADWAY (RD)		
RD-8	Reduce Right-of-Way @ SR 13 and SR 347	\$260,613
RD-9	Reduce ties @ SR 347 and McEver Rd.	\$93,467
RD-10	Reduce Right-of-Way and Construction Easement for Parcels 4, 7, and 8	\$316,569
RD-11	Reduce Right-of-Way and Construction Easement for Parcel #11	\$1,125,349
RD-12	Reduce Right-of-Way and Construction Easement for Parcel #12	\$284,831
RD-13	Reduce Right-of-Way and Construction Easement for Parcel #15 and 16	\$230,172
RD-20	Use two way left turn lanes	\$527,964
RD-26	Utilize existing profile grade line; Construct no corrections to existing facility	\$248,783
RD-32	Delete sidewalks on the west portion of the project	\$1,695,714
BRIDGE (BR)		
BR-1	Eliminate widening by reducing median width and no parapet construction	\$570,656
BR-2	Eliminate widening by reducing median width and parapet construction	\$475,766

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.

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*.

**Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Bridge over Norfolk & Southern Railroad**

Hall County



**Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction**

Hall County



Summary of Alternatives & Design Suggestions



PROJECT: **Georgia Department of Transportation**
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County

SHEET NO.: 1 of 1

ALTERNATIVE NUMBER	DESCRIPTION OF ALTERNATIVE	INITIAL COST SAVINGS
ROADWAY (RD)		
RD-8	Reduce Right-of-Way @ SR 13 and SR 347	\$260,613
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Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-8

DESCRIPTION: **Reduce Right of Way at SR 13 and SR 347**

SHEET NO.: **1** of **8**

Original Design:

The original design calls for the R/W acquisition for Parcels 19, 35, and 36 to construct the project. The estimated impact costs are as follows:

Parcel 19 ~ \$334,414

Parcel 35 ~ \$36,630

Parcel 36 ~ \$221,279

Alternative:

The proposed alternative reduces the right of way area being acquired and purchased.

Opportunities:

- Reduction in right of way acquisition and cost
- Further revision of right of way and easement areas may yield in greater savings than shown

Risks:

- Future Cost of acquiring R/W

Technical Discussion:

It appears reasonable to reduce the proposed acquisitions without adversely affecting the design or the project functional requirements.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 541,555	\$ 0	\$ 541,555
ALTERNATIVE	\$ 280,942	\$ 0	\$ 280,942
SAVINGS	\$ 260,613	\$ 0	\$ 260,613

Illustration

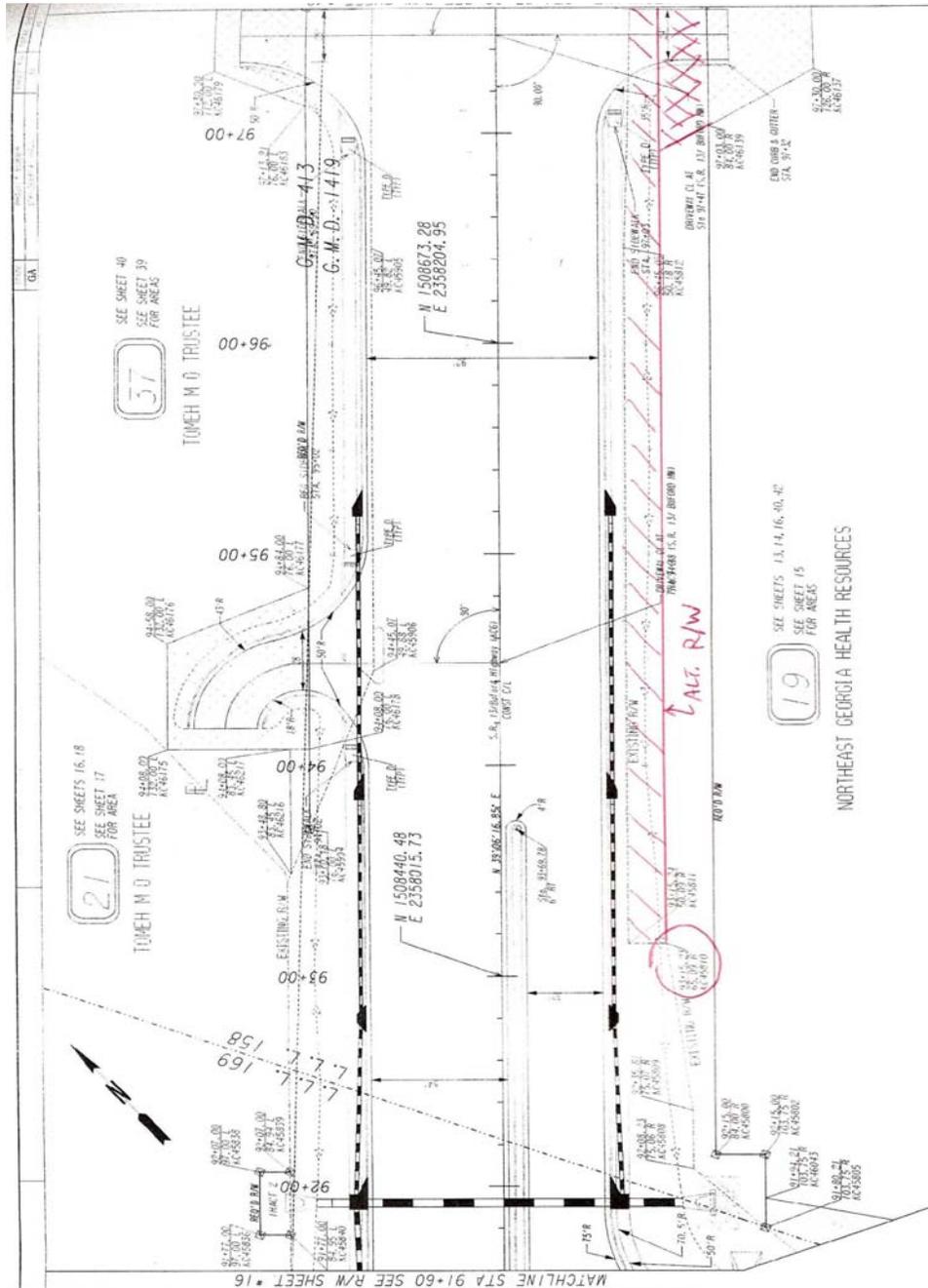


PROJECT: Georgia Department of Transportation
 STP00-2688-00 (004) – P.I. No. 170735
 SR 347 - Widening and Reconstruction
 Hall County

ALTERNATIVE NO.:
RD-8

DESCRIPTION: Reduce Right of Way at SR 13 and SR 347

SHEET NO.: 2 of 8



NOTE: Alternative R/W & Easement for Parcel 19

Illustration

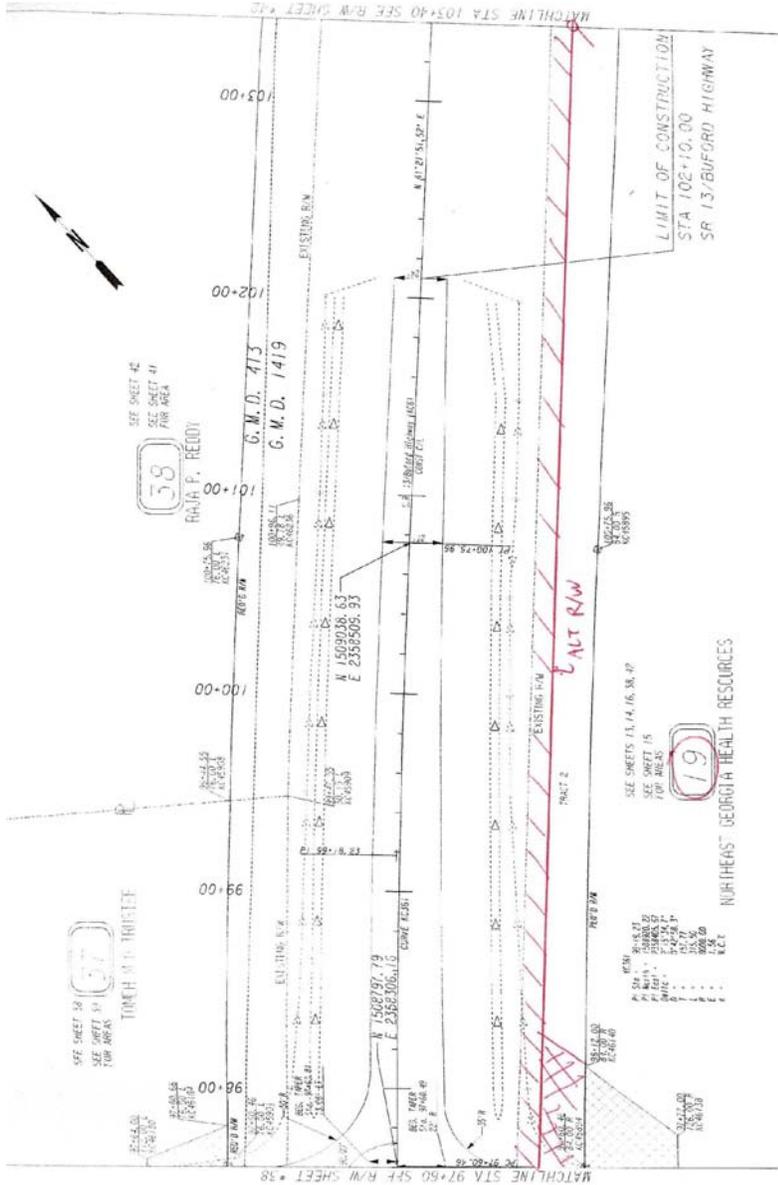


PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-8

DESCRIPTION: **Reduce Right of Way at SR 13 and SR 347**

SHEET NO.: **3** of **8**



NOTE: Alternative R/W & Easement for Parcel 19

Illustration

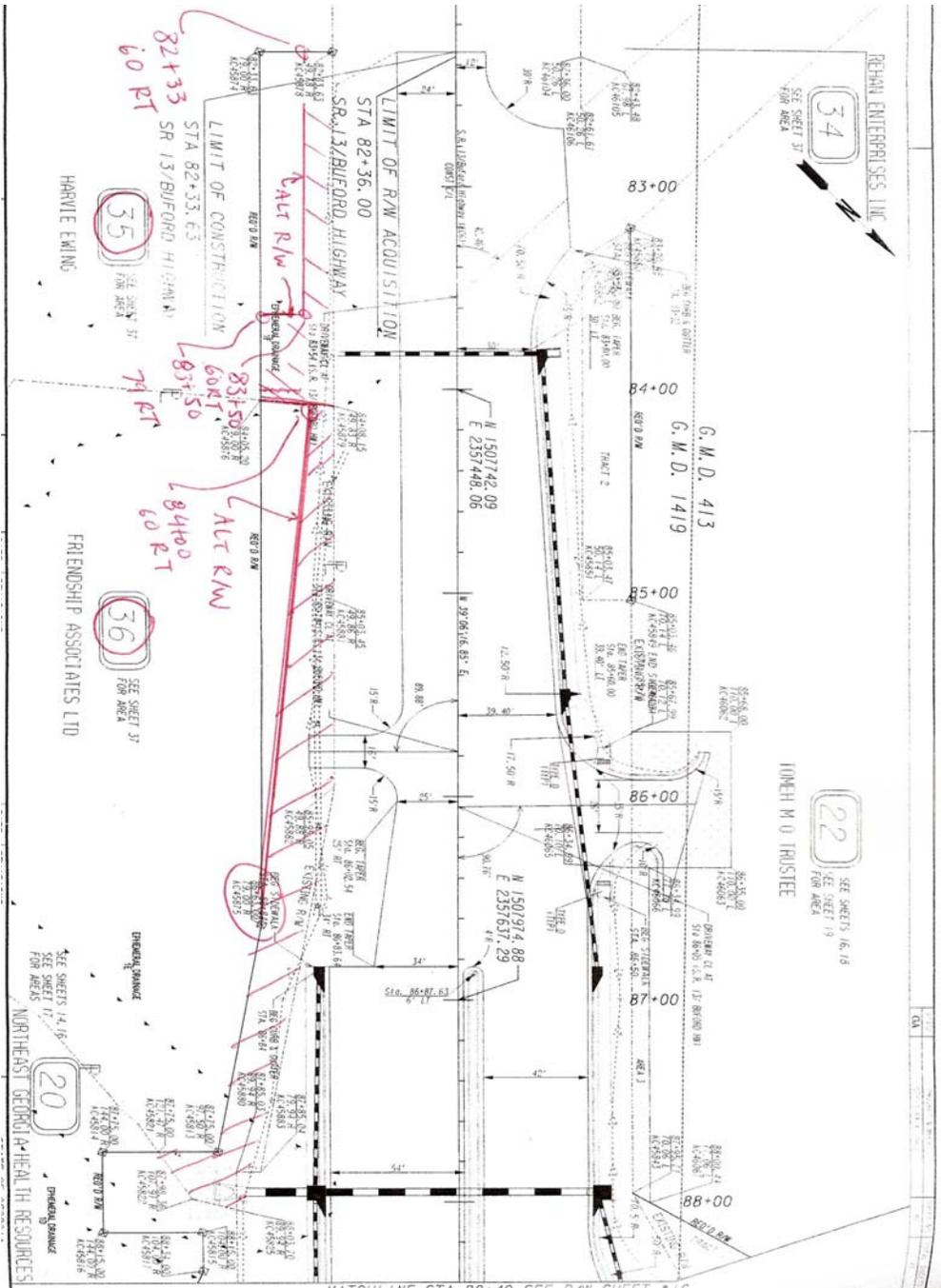


PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-8

DESCRIPTION: **Reduce Right of Way at SR 13 and SR 347**

SHEET NO.: **5** of **8**



NOTE: Alternative R/W & Easement for Parcel 35 & 36

Calculations



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-8

DESCRIPTION: **Reduce Right of Way at SR 13 and SR 347**

SHEET NO.: **6 of 8**

ALTERNATIVE R/W – COST CALCULATIONS

Parcel 19 R/W Tract 2: (Station & Offsets off SR 13)

Existing R/W ~ Sta. 93+15, 50' RT. To Sta. 105+90, 50' RT

Alternative R/W ~ Sta. 93+15, 65' RT. To Sta. 105+90, 65' RT

Alternative R/W Area ~ $(65-50) \times (10590 - 9315) = 19,125$ SQ FT (0.44 ACRES)

NOTE: This is in addition to the current design R/W of 0.030 ACRES for Tract 1.

Total = $0.44 + 0.03 = 0.47$ ACRES

Did not account for R/W for Rdwy drainage outlet at Sta. 92+00 (SR 13)

Parcel 19 Easement: (Station & Offsets off SR 13)

Current Design easement / RW tie stations ~ Sta. 98+12, 84' RT. To Sta. 97+03, 84' RT

Alternative easement / RW tie stations ~ Sta. 98+12, 65' RT. To Sta. 97+03, 65' RT

Alternative Easement Area ~ $(84-64) \times (9812-9703) = 2071$ SQ FT (0.05 ACRES)

NOTE: This is in addition to the current design easement of 0.514 ACRES

Total = $0.514 + 0.05 = 0.564$ ACRES

Parcel 35 R/W: (Station & Offsets off SR 13)

Area No. 1

Existing R/W ~ Sta. 82+33, 50' RT. To Sta. 84+08, 50' RT

Alternative R/W ~ Sta. 82+33, 60' RT. To Sta. 84+08, 60' RT

Alternative R/W Area ~ $(60-50) \times (8408-8233) = 1,750$ SQ FT (0.04 ACRES)

Area No. 2 (At Drainage structure)

Existing R/W ~ Sta. 83+50, 60' RT. To Sta. 84+00, 60' RT

Alternative R/W ~ Sta. 83+50, 79' RT. To Sta. 84+00, 79' RT

Alternative R/W Area ~ $(79-60) \times (8400-8350) = 950$ SQ FT (0.022 ACRES)

Total = $0.022 + 0.04 = 0.062$ ACRES

Calculations



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-8

DESCRIPTION: **Reduce Right of Way at SR 13 and SR 347.**

SHEET NO.: **7** of **8**

ALTERNATIVE R/W – COST CALCULATIONS

Parcel 36 R/W: (Station & Offsets off SR 13)

Alternative R/W ~ Sta. 84+05, 79' RT To Sta. 86+63, 79' RT

Alternative R/W ~ Sta. 84+00, 60' RT To Sta. 86+63, 79' RT

Alternative R/W Area ~ $0.5 \times (79-60) \times (8663-8400) = 2,498.50$ SQ FT (0.057 ACRES)

Existing R/W Area = 0.116 ACRES

Total = $0.116 - 0.057 = 0.059$ ACRES

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-9

DESCRIPTION: **Reduce ties at SR 347 and McEver Road**

SHEET NO.: **1 of 4**

Original Design:

The original design calls for overlay/improvements on McEver Road from the tie at the intersection with SR 347 from STA 50+00 to STA 55+50.

Alternative:

The alternative proposes reducing the overlay/improvements on McEver Road from the intersection tie with SR 347 at STA 50+00 to STA 52+70 at the radius return of the right in-right out entrance to the boat business. The alternative proposes keeping open drainage on McEver, deleting the raised concrete median and proposed curb and gutter adjacent to the inside lane in both directions.

Opportunities:

- Reduced pavement costs
- Slight reduction in MOT costs

Risks:

- Minor design impacts

Technical Discussion:

The intent of the alternative is to limit the improvements/overlay on the north side of McEver Road. The proposed design appears to overlay McEver Road on the north side to the end of all tapers, tying to existing pavement at STA 55+50. The alternative seeks to end the overlay at STA 52+70, which is the outside of the radius return of the right-in, right-out that currently exists and serves as ingress/egress to a boat business. The alternative seeks to maintain the open drainage system currently on McEver, deleting the proposed 44' wide raised concrete median and the curb and gutter proposed on both sides of the inside travel lanes.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 3,120,007	\$ 0	\$ 3,120,007
ALTERNATIVE	\$ 3,026,540	\$ 0	\$ 3,026,540
SAVINGS	\$ 93,467	\$ 0	\$ 93,467

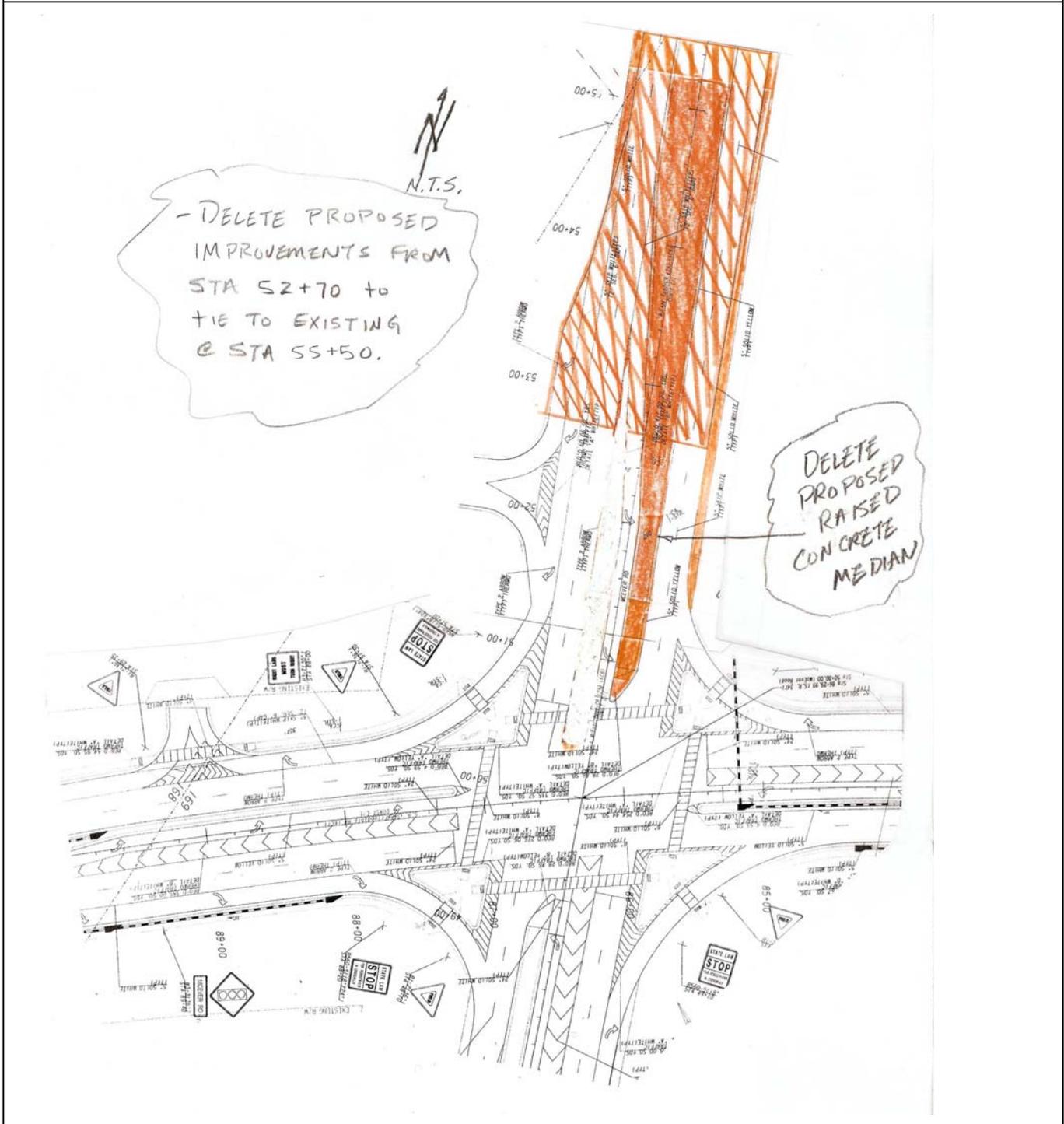
Illustration

PROJECT: Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County

ALTERNATIVE NO.:
RD-9

DESCRIPTION: Reduce ties at SR 347 and McEver Road

SHEET NO.: 2 of 4



Calculations



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-9

DESCRIPTION: **Reduce ties at SR 347 and McEver Road**

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

ASSUMPTIONS:

Overlay:

-Limit proposed improvements on McEver Road to STA 50+00 to STA 52+70, delete overlay from STA 52+70 to STA 55+50.

-270LF eliminate overlay only of 12.5mm Superpave @ 165LB/SY.

-Width is variable from 100' w at tie STA 55+50 to 120' w at STA 52+70, average width used=110'.

-270LF x 110'w/9=3300SY x 165/2000=**272.25 tons saved**.

4" Concrete Median:

Median limits STA 50+70-STA 55+00.

Width varies, 44' full, 20' reduced, use 30' average width.

430LF x 30'w/9= **1433 SY saved**

30" Type 2 Curb and Gutter:

Inside only, approximately STA 50+70 to STA 55+00

430LF x 2 sides= **860LF total saved**

Cost Worksheet



PROJECT:	Georgia Department of Transportation STP000-2688-00(004) - P.I. No. 170735 SR 347 -Widening and Reconstruction Hall County	ALTERNATIVE NO.:	RD-9
DESCRIPTION:	Reduce ties at SR 347 and McEver 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
402-3130 12.5mm Superpave	TN	9,000	\$ 68.66	\$ 617,940	8,728	\$ 68.66	\$ 599,264
441-0740 Concrete Median, 4"	SY	56,000	\$ 34.32	\$ 1,921,920	54,567	\$ 34.32	\$ 1,872,739
441-6022 Conc Curb & Gutter Ty	LF	14,900	\$ 19.90	\$ 296,510	14,040	\$ 19.90	\$ 279,396
Sub-total				\$ 2,836,370			\$ 2,751,400
Mark-up at 10.00%				\$ 283,637			\$ 275,140
TOTAL				\$ 3,120,007			\$ 3,026,540

Estimated Savings: \$93,467

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation STP00-2688-00 (004) – P.I. No. 170735 SR 347 - Widening and Reconstruction Hall County	ALTERNATIVE NO.:	RD-10
DESCRIPTION:	Reduce ROW and Construction Easement for Parcels 4, 7 and 8	SHEET NO.:	1 of 4

Original Design:

The original design calls for ROW acquisition and construction easement for Parcels 4, 7 and 8 on the south side of SR 347.

Alternative:

The alternative is to delete the continuous right-in and right-out lane on the south side of SR 347 from Countrywide Village (sta. 21+70) to Bristol Industry Way (sta. 29+19).

Opportunities:

- Reduce R/W acquisition
- Reduce construction easement
- Reduce R/W costs
- Eliminate weaving operations

Risks:

- Vehicles exiting and entering driveways to and from the thru lane with higher speed traffic

Technical Discussion:

It generally would be desirable to provide a deceleration bay to allow motorists entering a driveway to pull off the thru lane and decelerate before turning onto the driveway. Similarly an acceleration bay would allow motorists exiting a driveway to accelerate before merging into the thru lane. When the spacing between two driveways is too short to accommodate an acceleration bay for the first driveway and a separate deceleration bay for the second driveway, a continuous right-in and right-out lane is generally provided, which is the case herein.

The provision of a continuous right-in and right-out lane, however, introduces a new problem, which is weaving operation on a short weaving section. This problem could be severe when both the mainline traffic volumes on the thru lanes and the weaving traffic volumes entering and exiting driveways are heavy. The deletion of this continuous right-in and right-out lane will not only eliminate the weaving problem but also almost entirely eliminate the need to acquire ROW and construction easement on the 3 subject parcels.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 6,208,307	\$ 0	\$ 6,208,307
ALTERNATIVE	\$ 5,891,738	\$ 0	\$ 5,891,738
SAVINGS	\$ 316,569	\$ 0	\$ 316,569

Illustration

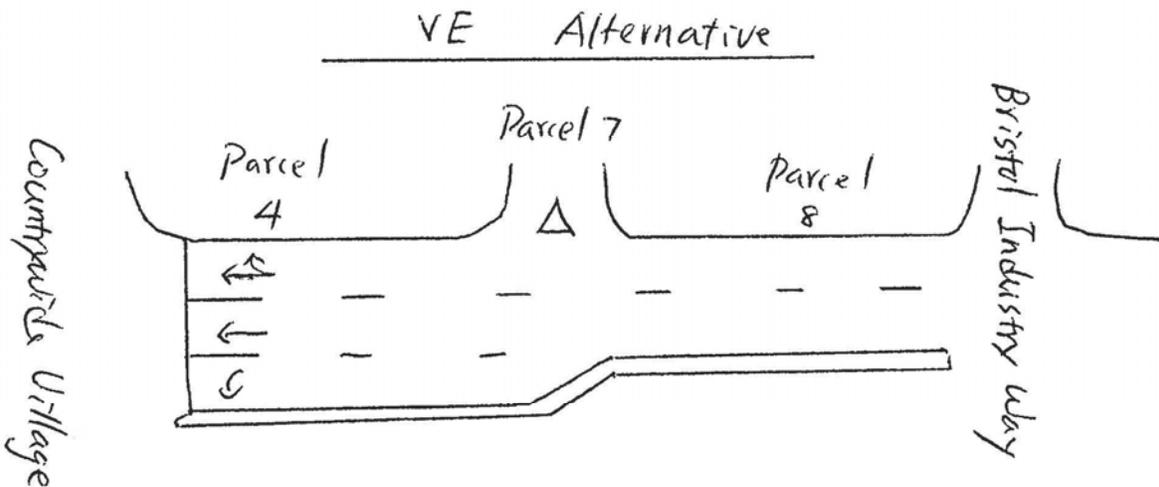
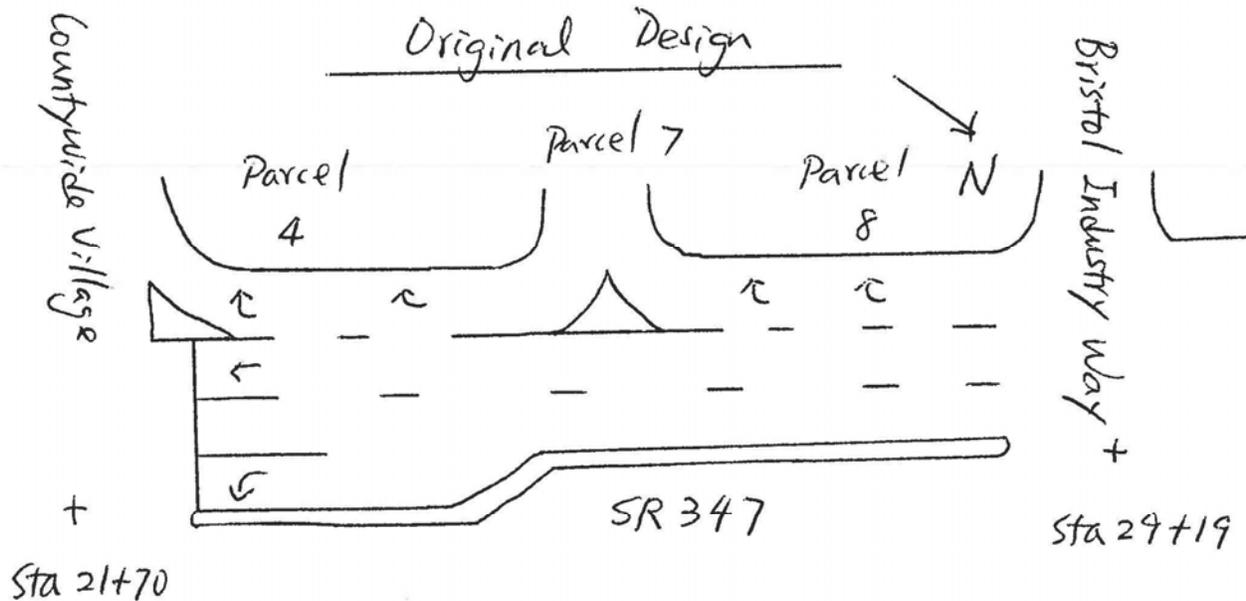


PROJECT: Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County

ALTERNATIVE NO.:
RD-10

DESCRIPTION: Reduce ROW and Construction Easement for Parcels 4,
7 and 8

SHEET NO.: 2 of 4



Calculations



PROJECT: Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County

ALTERNATIVE NO.:
RD-10

DESCRIPTION: Reduce ROW and Construction Easement for Parcels 4, 7 and
8

SHEET NO.: 3 of 4

Original Design

Pavement area for the continuous right-in and right-out lane to be deleted:

sta 22+20 to sta 28+60 (640-ft x 12-ft = 7,680 SF)

Cost Worksheet



PROJECT:	Georgia Department of Transportation STP000-2688-00(004) - P.I. No. 170735 SR 347 -Widening and Reconstruction Hall County	ALTERNATIVE NO.:	RD-10
DESCRIPTION:	Reduce ROW and Construction Easement for Parcels 4, 7, and 8	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, inc mat'l	TN	71,200	\$ 18.23	\$ 1,297,976	70,773	\$ 18.23	\$ 1,290,192
402-3121- 25mm Superpave	TN	42,000	\$ 64.41	\$ 2,705,220	41,671	\$ 64.41	\$ 2,684,029
402-3190- 19mm Superpave	TN	12,000	\$ 64.57	\$ 774,840	11,906	\$ 64.57	\$ 768,770
402-3130- 12.5mm Superpave	TN	9,000	\$ 68.66	\$ 617,940	8,930	\$ 68.66	\$ 613,134
ROW cost Parcel 4	Lump	1	\$ 69,987	\$ 69,987	0	\$ 69,987	\$ -
ROW cost Parcel 7	Lump	1	\$ 66,410	\$ 66,410	0	\$ 66,410	\$ -
ROW cost Parcel 8	Lump	1	\$ 111,542	\$ 111,542	0	\$ 111,542	\$ -
Sub-total				\$ 5,643,915			\$ 5,356,125
Mark-up at 10.00%				\$ 564,392			\$ 535,613
TOTAL				\$ 6,208,307			\$ 5,891,738

Estimated Savings: \$316,569

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation STP00-2688-00 (004) – P.I. No. 170735 SR 347 - Widening and Reconstruction Hall County	ALTERNATIVE NO.:	RD-11
DESCRIPTION:	Reduce ROW and Construction Easement for Parcel 11	SHEET NO.:	1 of 4

Original Design:

The original design calls for ROW acquisition and construction easement for Parcel 11 on the south side of SR 347.

Alternative:

The alternative is to delete the continuous right-in and right-out lane on the south side of SR 347 from Bristol Industry Way (sta 29+19) to the driveway at sta 31+71.

Opportunities:

- Reduce R/W acquisition
- Reduce construction easement
- Reduce R/W costs
- Eliminate weaving operations

Risks:

- Vehicles exiting and entering driveways to and from the thru lane with higher speed traffic

Technical Discussion:

It generally would be desirable to provide a deceleration bay to allow motorists entering a driveway to pull off the thru lane and decelerate before turning onto the driveway. Similarly an acceleration bay would allow motorists exiting a driveway to accelerate before merging into the thru lane. When the spacing between two driveways is too short to accommodate an acceleration bay for the first driveway and a separate deceleration bay for the second driveway, a continuous right-in and right-out lane is generally provided, which is the case herein.

The provision of a continuous right-in and right-out lane, however, introduces a new problem, which is weaving operation on a short weaving section. This problem could be severe when both the mainline traffic volumes on the thru lanes and the weaving traffic volumes entering and exiting driveways are heavy. The deletion of this continuous right-in and right-out lane will not only eliminate the weaving problem but also almost entirely eliminate the need to acquire ROW and construction easement on the subject parcel.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 7,049,262	\$ 0	\$ 7,049,262
ALTERNATIVE	\$ 5,923,913	\$ 0	\$ 5,923,913
SAVINGS	\$ 1,125,349	\$ 0	\$ 1,125,349

Illustration

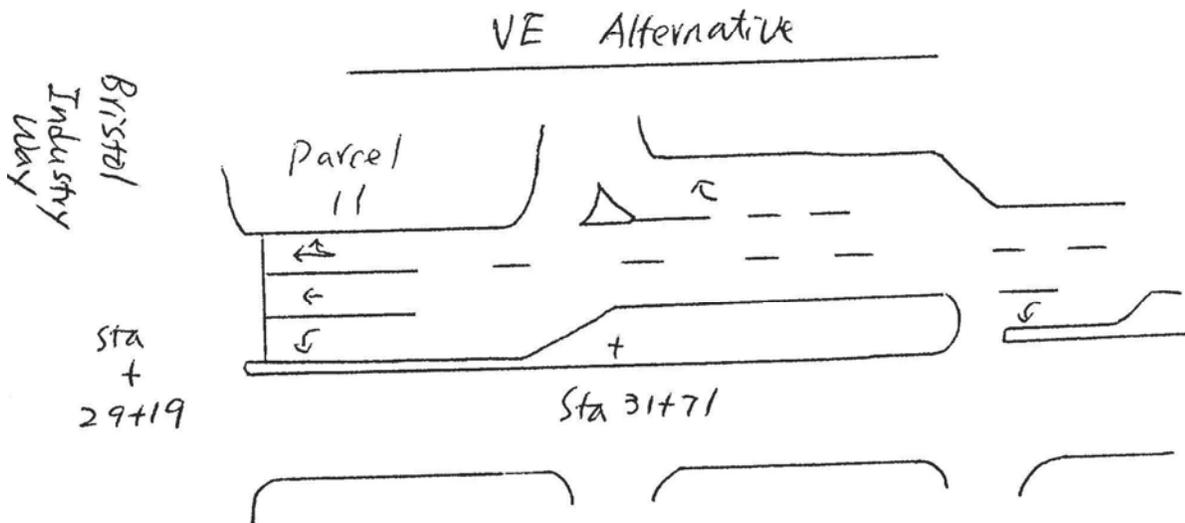
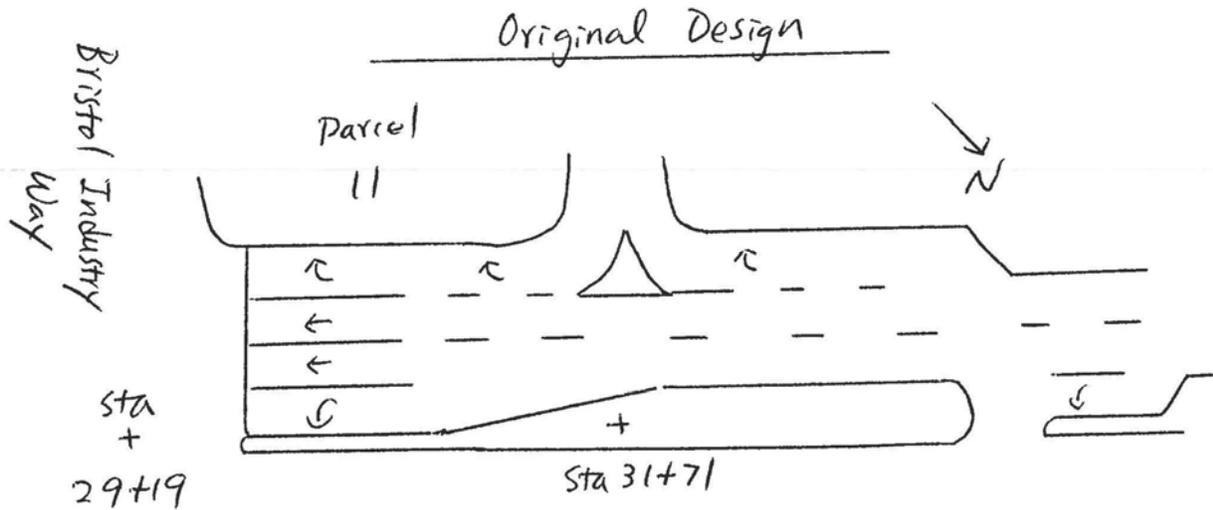


PROJECT: Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County

ALTERNATIVE NO.:
RD-11

DESCRIPTION: Reduce ROW and Construction Easement for Parcel 11

SHEET NO.: 2 of 4



Calculations



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-11

DESCRIPTION: **Reduce ROW and Construction Easement for Parcel 11**

SHEET NO.: **3 of 4**

Original Design

Pavement area for the continuous right-in and right-out lane to be deleted:

Sta 29+70 to sta 31+40 (170-ft x 12-ft = 2,040 SF)

Cost Worksheet



PROJECT:	Georgia Department of Transportation STP000-2688-00(004) - P.I. No. 170735 SR 347 -Widening and Reconstruction Hall County	ALTERNATIVE NO.:	RD-11
DESCRIPTION:	Reduce ROW and Construction Easement for Parcel 11.	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, inc mat'l	TN	71,200	18.23	\$ 1,297,976	71,086	18.23	\$1,295,898
402-3121- 25mm Superpave	TN	42,000	64.41	\$ 2,705,220	41,913	64.41	\$2,699,616
402-3190- 19mm Superpave	TN	12,000	64.57	\$ 774,840	11,975	64.57	\$ 773,226
402-3130- 12.5mm Superpave	TN	9,000	68.66	\$ 617,940	8,981	68.66	\$ 616,635
				\$ -			\$ -
ROW cost Parcel 11	Lump	1	1,012,444.00	\$ 1,012,444	0	1,012,444.00	\$ -

Note: The ROW savings were taken from the ROW cost estimates provided to the VE Team. The ROW costs for Parcel 11 seem questionable as they show a ROW taking of 1.271 acres while the roadway plans show only a small portion of the SW corner of the SR 347 and Bristol Industrial Way intersection as being taken.

Sub-total				\$ 6,408,420			\$5,385,375
Mark-up at 10.00%				\$ 640,842			\$ 538,538
TOTAL				\$ 7,049,262			\$5,923,913

Estimated Savings:	\$1,125,349
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Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-12

DESCRIPTION: **Reduce ROW and Construction Easement for Parcel 12** SHEET NO.: **1 of 4**

Original Design:

The original design calls for ROW acquisition and construction easement for Parcel 12 on the north side of SR 347.

Alternative:

The alternative is to delete the continuous right-in and right-out lane on the north side of SR 347 from Bristol Industry Way (sta 29+19) to B. V. Bowman Drive (sta 33+98).

Opportunities:

- Reduce R/W acquisition
- Reduce construction easement
- Reduce R/W costs
- Eliminate weaving operations

Risks:

- Vehicles exiting and entering driveways to and from the thru lane with higher speed traffic

Technical Discussion:

It generally would be desirable to provide a deceleration bay to allow motorists entering a driveway to pull off the thru lane and decelerate before turning onto the driveway. Similarly an acceleration bay would allow motorists exiting a driveway to accelerate before merging into the thru lane. When the spacing between two driveways is too short to accommodate an acceleration bay for the first driveway and a separate deceleration bay for the second driveway, a continuous right-in and right-out lane is generally provided, which is the case herein.

The provision of a continuous right-in and right-out lane, however, introduces a new problem, which is weaving operation on a short weaving section. This problem could be severe when both the mainline traffic volumes on the thru lanes and the weaving traffic volumes entering and exiting driveways are heavy. The deletion of this continuous right-in and right-out lane will not only eliminate the weaving problem but also almost entirely eliminate the need to acquire ROW and construction easement on the subject parcel.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 6,192,300	\$ 0	\$ 6,192,300
ALTERNATIVE	\$ 5,907,469	\$ 0	\$ 5,907,469
SAVINGS	\$ 284,831	\$ 0	\$ 284,831

Illustration

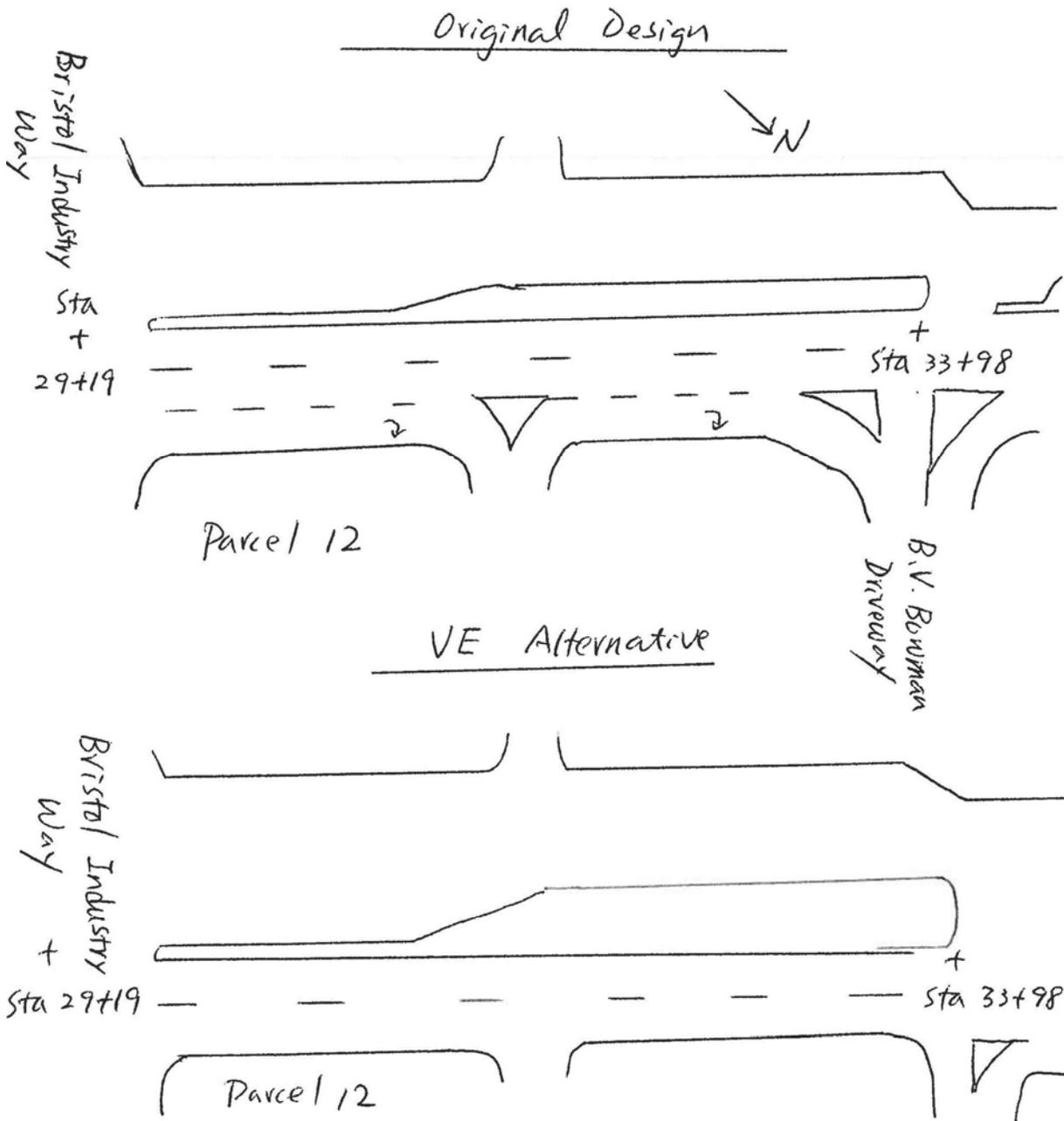


PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-12

DESCRIPTION: **Reduce ROW and Construction Easement for Parcel
12**

SHEET NO.: **2 of 4**



Calculations



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-12

DESCRIPTION: **Reduce ROW and Construction Easement for Parcel 12**

SHEET NO.: **3 of 4**

Original Design

Pavement area for the continuous right-in and right-out lane to be deleted:

Sta 29+70 to sta 33+80 (410-ft x 12-ft = 4,920 SF)

Cost Worksheet



PROJECT:	Georgia Department of Transportation STP000-2688-00(004) - P.I. No. 170735 SR 347 -Widening and Reconstruction Hall County	ALTERNATIVE NO.:	RD-12
DESCRIPTION:	Reduce ROW and Construction Easement for Parcel 12.	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, inc mat'l	TN	71,200	\$ 18.23	\$ 1,297,976	70,926	\$ 18.23	\$ 1,292,981
402-3121- 25mm Superpave	TN	42,000	\$ 64.41	\$ 2,705,220	41,789	\$ 64.41	\$ 2,691,629
402-3190- 19mm Superpave	TN	12,000	\$ 64.57	\$ 774,840	11,940	\$ 64.57	\$ 770,966
402-3130- 12.5mm Superpave	TN	9,000	\$ 68.66	\$ 617,940	8,955	\$ 68.66	\$ 614,850
ROW Parcel #12	LUMP	1	\$ 233,388	\$ 233,388	0	\$ 233,388	\$ -
Sub-total				\$ 5,629,364			\$ 5,370,427
Mark-up at 10.00%				\$ 562,936			\$ 537,043
TOTAL				\$ 6,192,300			\$ 5,907,469

Estimated Savings: \$284,831

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation STP00-2688-00 (004) – P.I. No. 170735 SR 347 - Widening and Reconstruction Hall County	ALTERNATIVE NO.:	RD-13
DESCRIPTION:	Reduce ROW and Construction Easement for Parcels 15 and 16	SHEET NO.:	1 of 4

Original Design:

The original design calls for ROW acquisition and construction easement for Parcels 15 and 16 on the north side of SR 347.

Alternative:

The alternative is to delete the continuous right-in and right-out lane on the north side of SR 347 from B. V. Bowman Drive (sta 33+98) to the driveway at sta 42+05.

Opportunities:

- Reduce R/W acquisition
- Reduce construction easement
- Reduce R/W costs
- Eliminate weaving operations

Risks:

- Vehicles exiting and entering driveways to and from the thru lane with higher speed traffic

Technical Discussion:

It generally would be desirable to provide a deceleration bay to allow motorists entering a driveway to pull off the thru lane and decelerate before turning onto the driveway. Similarly an acceleration bay would allow motorists exiting a driveway to accelerate before merging into the thru lane. When the spacing between two driveways is too short to accommodate an acceleration bay for the first driveway and a separate deceleration bay for the second driveway, a continuous right-in and right-out lane is generally provided, which is the case herein.

The provision of a continuous right-in and right-out lane, however, introduces a new problem, which is weaving operation on a short weaving section. This problem could be severe when both the mainline traffic volumes on the thru lanes and the weaving traffic volumes entering and exiting driveways are heavy. The deletion of this continuous right-in and right-out lane will not only eliminate the weaving problem but also almost entirely eliminate the need to acquire ROW and construction easement on the subject parcel.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 6,112,385	\$ 0	\$ 6,112,385
ALTERNATIVE	\$ 5,882,213	\$ 0	\$ 5,882,213
SAVINGS	\$ 230,172	\$ 0	\$ 230,172

Illustration

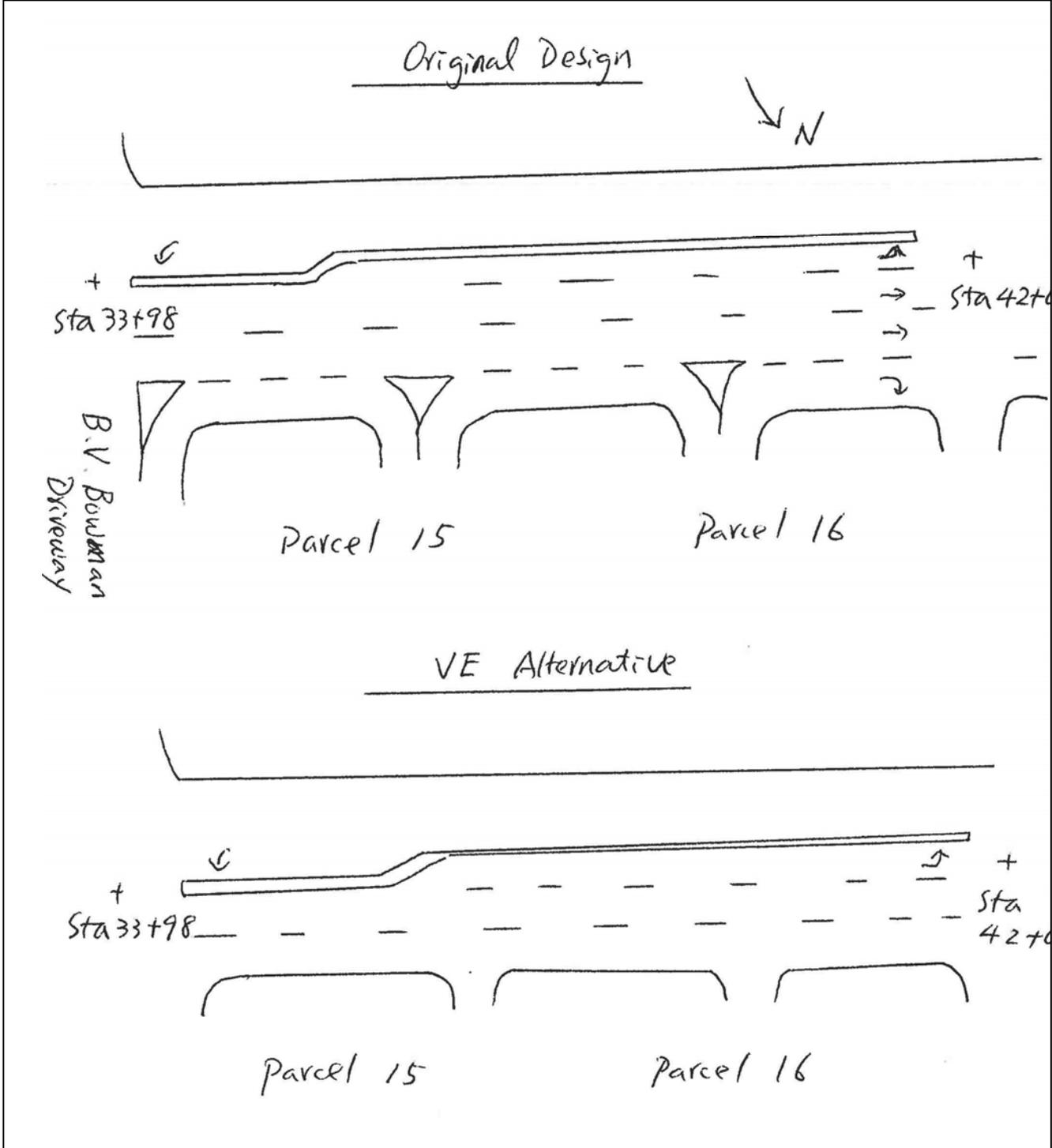


PROJECT: Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County

ALTERNATIVE NO.:
RD-20

DESCRIPTION: Use a two-way left turn lane

SHEET NO.: 2 of 4



Calculations



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-13

DESCRIPTION: **Reduce ROW and Construction Easement for Parcels 15
and 16**

SHEET NO.: **3 of 4**

Original Design

Pavement area for the continuous right-in and right-out lane to be deleted:

Sta 34+20 to sta 42+00 (780-ft x 12-ft = 9,360 SF)

Cost Worksheet



PROJECT:	Georgia Department of Transportation STP000-2688-00(004) - P.I. No. 170735 SR 347 -Widening and Reconstruction Hall County	ALTERNATIVE NO.:	RD-13
DESCRIPTION:	Reduce ROW and Construction Easement for Parcels 15 and 16.	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, inc mat'l	TN	71,200	\$ 18.23	\$ 1,297,976	70,680	\$ 18.23	\$ 1,288,496
402-3121- 25mm Superpave	TN	42,000	\$ 64.41	\$ 2,705,220	41,600	\$ 64.41	\$ 2,679,456
402-3190- 19mm Superpave	TN	12,000	\$ 64.57	\$ 774,840	11,886	\$ 64.57	\$ 767,479
402-3130- 12.5mm Superpave	TN	9,000	\$ 68.66	\$ 617,940	8,914	\$ 68.66	\$ 612,035
				\$ -			\$ -
ROW cost Parcel 15	Lump	1	\$ 63,013	\$ 63,013	0	\$ 63,013	\$ -
ROW cost Parcel 16	Lump	1	\$ 97,725	\$ 97,725	0	\$ 97,725	\$ -
Sub-total				\$ 5,556,714			\$ 5,347,467
Mark-up at	10.00%			\$ 555,671			\$ 534,747
TOTAL				\$ 6,112,385			\$ 5,882,213

Estimated Savings: \$230,172

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-20

DESCRIPTION: **Use a two-way left turn lane**

SHEET NO.: **1 of 4**

Original Design:

The original design calls for a 20-ft raised median.

Alternative:

The alternative is to use a 14-ft two-way left turn lane.

Opportunities:

- Reduce R/W acquisition
- Enhance access to abutting properties

Risks:

- Require change of the design

Technical Discussion:

The section of SR 347 from the I-985 southbound ramps to McEver Road is about 7,400-ft long, which consists of 5 signalized intersections and 4 additional median openings. Among which, 4 signalized intersections and 3 median openings are located on the 4,500-ft long eastern section from I-985 to SR 13. The average spacing for median openings (including intersections) on this eastern section is about 750-ft. With the placement of left turn bays in the median area to accommodate left turn traffic at median openings, the majority part of the concrete median becomes a traffic separator. Only a few short sections remain as a 20-ft wide median. The benefits of using medians to smoothen traffic flows would gradually diminish when spacing of median openings reduces.

A two-way left turn lane would still provide a separation of opposing traffic. It would also enhance the access to adjoining properties, which is one of the primary functions for this section of SR 347 from I-985 to SR 13 due to the commercial developments along SR 347. The elimination of the concrete median also eliminates the need for U-turns.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 2,932,545	\$ 0	\$ 2,932,545
ALTERNATIVE	\$ 2,404,582	\$ 0	\$ 2,404,582
SAVINGS	\$ 527,964	\$ 0	\$ 527,964

Illustration



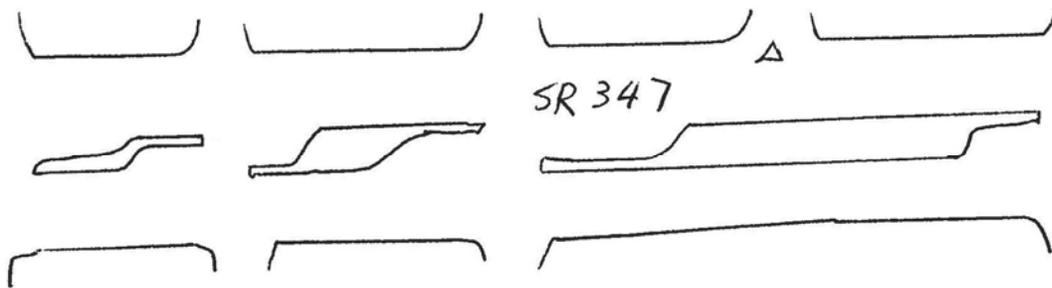
PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-20

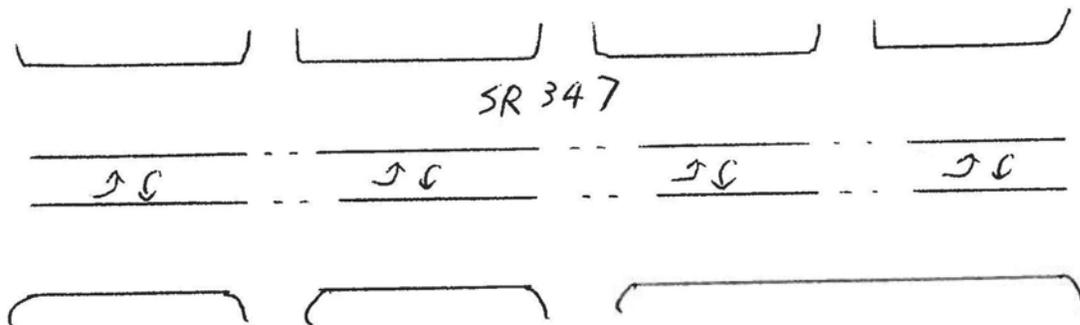
DESCRIPTION: **Use a two-way left turn lane**

SHEET NO.: **2 of 4**

Original Design



VE Alternative



Calculations



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-20

DESCRIPTION: **Use a two-way left turn lane**

SHEET NO.: **3 of 4**

Project area with median: sta 12+20 to sta 92+40 = 8,020-ft

Original Design:

R/W space for the median: sta 12+20 to sta 18+80 (260-ft x 32-ft + 100-ft x (30-ft + 26-ft) / 2
+ 300-ft x (26-ft + 20-ft) / 2 = 19,520 SF
Sta 18+80 to sta 92+40 (7,360-ft x 20-ft = 147,200 SF) Total = 166,720 SF
= 8,020-ft long x 20-ft wide = 160,400 SF

Concrete median area : sta 18+80 to sta 21+10 (230-ft x 3-ft = 690 SF)
Sta 22+30 to sta 28+70 (640-ft x 3-ft = 1,920 SF)
Sta 29+70 to sta 32+20 (250-ft x 3-ft = 750 SF)
Sta 34+20 to sta 41+55 (735-ft x 3-ft = 2,205 SF)
Sta 42+60 to sta 49+60 (700-ft x 3-ft = 2,100 SF)
Sta 50+50 to sta 56+60 (610-ft x 3-ft = 1,830 SF)
Sta 58+40 to sta 60+40 (200-ft x 3-ft = 600 SF)
Sta 65+20 to sta 67+60 (240-ft x 3-ft = 720 SF)
Sta 69+00 to sta 71+25 (225-ft x 3-ft = 675 SF)
Sta 83+00 to sta 85+50 (250-ft x 3-ft = 750 SF)
Sta 87+20 to sta 89+60 (240-ft x 3-ft = 720 SF) **total = 12,960 SF**

Grass median area:

sta 12+20 to sta 18+80 [260-ft x 15-ft + 100-ft x (15ft + 27ft) / 2 + 200-ft x 27ft + 100-ft x (17ft + 5ft) / 2
= 12,500 SF]
Sta 32+20 to sta 34+00 (80-ft x 15-ft / 2 + 100-ft x 15-ft = 2,100 SF)
Sta 60+40 to sta 65+20 [200-ft x (3-ft + 15-ft) / 2 + 180-ft x 15-ft + 100-ft x 15-ft / 2 = 4,575 SF]
Sta 71+25 to sta 83+00 [100-ft x (3-ft + 15-ft) / 2 + 875-ft x 15-ft + 200-ft x 15-ft / 2 = 14,175 SF]
Sta 89+60 to sta 92+40 (200-ft x (3-ft + 15-ft) / 2 + 80-ft x 15-ft = 3,000 SF) **Total = 36,350 SF**

Type 7 curb & gutter: sta 12+20 to sta 18+80 (660-ft x 2 sides = 1,320-ft)
Sta 32+20 to sta 34+00 (180-ft x 2 sides = 360-ft)
Sta 60+40 to sta 65+20 (480-ft x 2 sides = 960-ft)
Sta 71+25 to sta 83+00 (1,175-ft x 2 sides = 2,350-ft)
Sta 89+60 to sta 92+40 (280-ft x 2 sides = 560-ft) **Total = 5,550-ft**

Type 7 curb and gutter area = 5,550-ft x 2.5-ft = 13,875 SF

Pavement area = 166,720 SF – 12,960 SF – 36,350 SF – 13,875 SF = 103,535 SF

VE Alternative:

R/W space for the 14-ft two-way left turn lane = 8,020-ft long x 14-ft wide = 112,280 SF
Pavement area for the 14-ft two-way left turn lane = 112,280 SF

Cost Worksheet



PROJECT:	Georgia Department of Transportation STP000-2688-00(004) - P.I. No. 170735 SR 347 -Widening and Reconstruction Hall County	ALTERNATIVE NO.:	RD-20
DESCRIPTION:	Use a two-way left turn lane	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
Concrete Median-4"	SY	56,000	\$ 34	\$ 1,921,920	43,040	\$ 34	\$ 1,477,133
Type 7 Curb and Gutter	LF	11,900	\$ 17	\$ 207,060	6,350	\$ 17	\$ 110,490
GAB -10" Inc. Mat'l	TN	5,752	\$ 18	\$ 104,859	6,238	\$ 18	\$ 113,719
12.5mm Superpave	TN	949	\$ 69	\$ 65,158	4,803	\$ 69	\$ 329,774
19.mm Superpave	TN	1,265	\$ 65	\$ 81,681	1,372	\$ 65	\$ 88,590
25.0mm Superpave	TN	4,429	\$ 64	\$ 285,272	1,029	\$ 64	\$ 66,278
Sub-total				\$ 2,665,950			\$ 2,185,983
Mark-up at 10.00%				\$ 266,595			\$ 218,598
TOTAL				\$ 2,932,545			\$ 2,404,582
Estimated Savings:							\$527,964

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation STP00-2688-00 (004) – P.I. No. 170735 SR 347 - Widening and Reconstruction Hall County	ALTERNATIVE NO.:	RD-26
DESCRIPTION:	Utilize existing profile grade line; Construct no corrections to existing vertically.	SHEET NO.:	1 of 4

Original Design:

The original design calls for a deviation throughout the project from the existing profile grade line to the proposed profile grade line. The majority of the proposed profile grade line is above the existing profile grade line.

Alternative:

The alternative seeks to utilize the existing profile grade line to minimize build-up necessary to construct the proposed finish grade.

Opportunities:

- Reduction in fill and pavement build-up costs
- May be able to utilize portions of existing pavement

Risks:

- Moderate design impacts.
- May require design exception to maintain existing vertical alignment at proposed speed.

Technical Discussion:

The intent of the alternative is to utilize the existing profile grade line, as opposed to the projects proposed design, which shows a number of substantial vertical corrections. The proposed project speed design is a 45mph urban section, with a 7% max grade, giving more opportunity to utilize the original profile grade line in lieu of correction. The proposed design finds that the condition of the existing pavement is sufficiently poor to warrant full depth rehabilitation. A visual inspection onsite indicated that the pavement condition appeared to be poor on the east end of the project from I-985 to SR-13. The pavement from SR 13 to the west end of the project at McEver Road appeared to be in better condition. It would be beneficial to determine if the proposed improvements could be built with a portion of the project utilizing full depth rehabilitation, while determining if any portion of the existing pavement may be incorporated into the proposed design.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 2,487,827	\$ 0	\$ 2,487,827
ALTERNATIVE	\$ 2,239,044	\$ 0	\$ 2,239,044
SAVINGS	\$ 248,783	\$ 0	\$ 248,783

Illustration

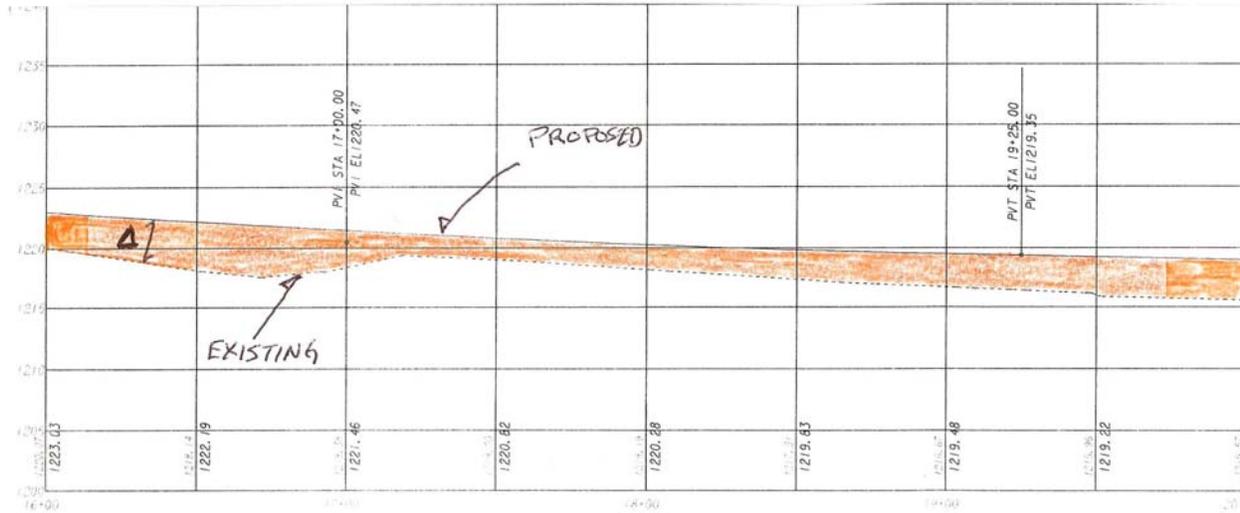


PROJECT: Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County

ALTERNATIVE NO.:
RD-26

DESCRIPTION: Utilize existing profile grade line; Construct no corrections to existing vertically.

SHEET NO.: 2 of 4



REPRESENTATIVE SECTION STA 16+00 - STA 20+00

- Delete / MINIMIZE SHADED AREA BY REDUCING / ELIMINATING CHANGES TO EXISTING PROFILE GRADE LINE.

RD26-2 HALL COUNTY TO#35

Calculations



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-26

DESCRIPTION: **Utilize existing profile grade line; Construct no
corrections to existing vertically.**

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

ASSUMPTIONS:

- Construct project using existing PGL to minimize cut/fill throughout the project.

- A cost estimate savings of 10% of grading costs are estimated to be saved throughout the project by reducing fill to correct sags, as well as reducing cut to remove crests at or near the PVC.

- Construction phasing should benefit by reducing vertical differential between existing pavement utilized by traffic and outside widening taking place adjacent to traffic during the construction process.

Value Analysis Design Alternative



PROJECT:	Georgia Department of Transportation STP00-2688-00 (004) – P.I. No. 170735 SR 347 - Widening and Reconstruction Hall County	ALTERNATIVE NO.:	RD-32
DESCRIPTION:	Delete sidewalks on the west portion of the project	SHEET NO.:	1 of 4

Original Design:

The original design calls for construction of 5' sidewalks on the north and south sides of the roadway from STA 12+66 to STA 92+33.

Alternative:

The alternative proposes constructing the sidewalk on the north and south sides of the roadway from STA 12+66 to approximate STA 45+00, deleting construction of the proposed sidewalks from STA 45+00 to STA 92+33.

Opportunities:

- Reduction in sidewalk pavement costs
- Reduction in R.O.W. required

Risks:

- Minor design impacts
- Lack of future corridor for pedestrian traffic

Technical Discussion:

The intent of the alternative is to provide pedestrian access to the eastern portion of the project that has developed commercially, has existing sidewalk, and existing pedestrian crosswalk access. The portion to be constructed in the alternative begins at the eastern end of the project at STA 12+66 and continues to approximate STA 45+00. The proposed portion of the sidewalk from STA 45+00 to the western limits of the sidewalk construction at STA 92+33 would be deleted. Although it is anticipated that the western portion of the project will be developed commercially over time, the current needs for pedestrian traffic on the project are limited to the stationing provided above. The alternative would save the unit cost of constructing the sidewalk in the proposed deleted areas, and the urban shoulders may be narrowed to reduce the footprint of the proposed widening, resulting in R.O.W cost savings for proposed acquisitions, as well as required easements.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 7,769,926	\$ 0	\$ 7,769,926
ALTERNATIVE	\$ 6,074,212	\$ 0	\$ 6,074,212
SAVINGS	\$ 1,695,714	\$ 0	\$ 1,695,714

Illustration

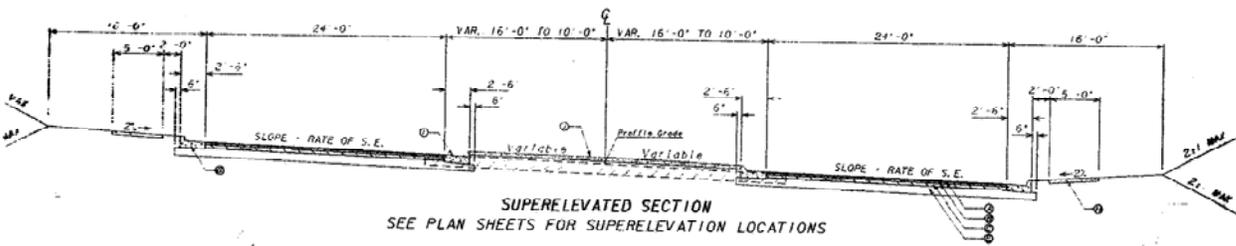
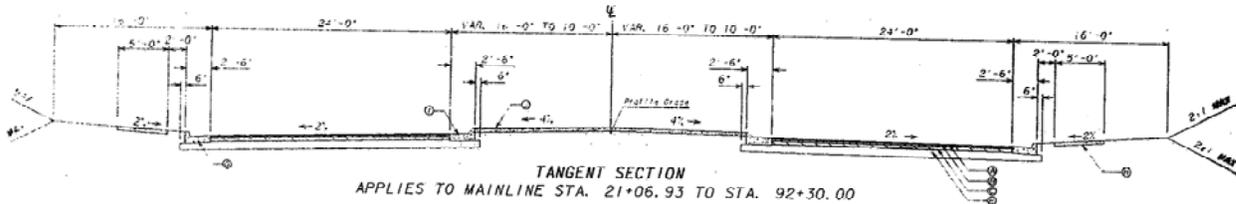


PROJECT: Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County

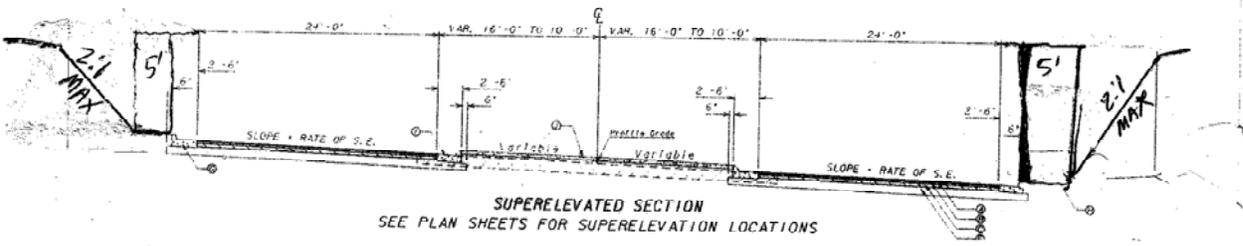
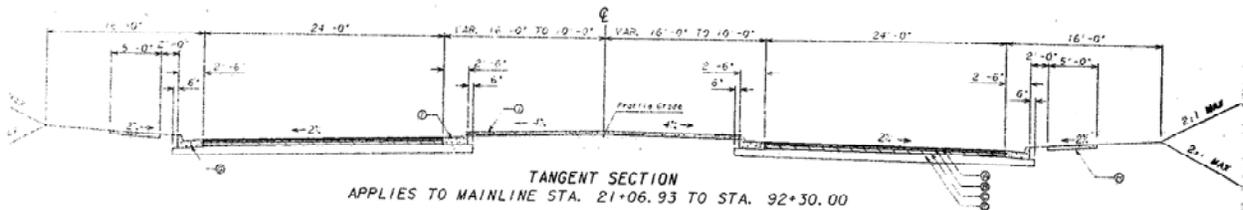
ALTERNATIVE NO.:
RD-32

DESCRIPTION: Delete sidewalks on the west portion of the project

SHEET NO.: 2 of 4



ORIGINAL DESIGN



ALTERNATIVE DESIGN

Calculations



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
RD-32

DESCRIPTION: **Delete sidewalks on the west portion of the project.**

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

ASSUMPTIONS:

-Delete sidewalks in EB and WB lanes from STA 45+00 to STA 92+33.

-STA 92+33-STA 45+00= 4733LF x 10'w/9=5,259 SY saved

-ROW savings estimated at 20% by narrowing 16' urban shoulders to tie slopes behind curb and gutter, allowing a 5' utility strip. ROW costs estimated are completely burdened, and the 20% savings estimated accounts for an estimate in reduction in number of parcels to be acquired, as well as a reduction in the parcel size to be acquired. If the future needs of the sidewalk are deemed warranted, the urban shoulder profile could be constructed at 16', without constructing the concrete sidewalk in the current project. Using this analysis, the ROW costs would remain unchanged, and the savings generated by the alternative would consist of the reduction in concrete sidewalk. This option leaves open the possibility of sidewalk construction on the western end of the project, while satisfying the current project functional requirement of constructing sidewalk on the eastern end of the project, where the area is currently commercially developed.

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
BR-1

DESCRIPTION: **Eliminate widening by reducing median width and no
parapet construction**

SHEET NO.: **1** of **4**

Original Design:

The original design was to widen the existing three span, 185 ft. long by 75.25 ft. wide bridge to accommodate placing two 6 ft. sidewalks and a 15 ft. median and provide two 28 ft wide travel way on the bridge. The final widened bridge width would be 86.42 ft. The widening would require additions to the deck, beams, end bents, intermediate bents and end fills.

Alternative:

The proposed alternative eliminates the need to widen the existing bridge by reducing the median width from 15 ft to 4.00 ft. along the length of the bridge. The fence would be attached to the outside of bridge face of existing barriers. The staging of the bridge construction has been revised to utilize one location for temporary barrier. See illustration for details.

Opportunities:

- Reduction in bridge construction cost and duration

Risks:

- Existing bridge superstructure and substructure components need to be analyzed for new composite dead loads and checked for structural adequacy

Technical Discussion:

The existing bridge components seem to have adequate structural capacity to carry the new composite dead loads from the proposed sidewalks and median.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 647,832	\$ 0	\$ 647,832
ALTERNATIVE	\$ 77,176	\$ 0	\$ 77,176
SAVINGS	\$ 570,656	\$ 0	\$ 570,656

Calculations



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
BR-1

DESCRIPTION: **Eliminate widening by reducing median width and no
parapet construction**

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

ALTERNATIVE DESIGN – COST CALCULATIONS

Superstr Concrete, CL AA (500-1006):

Sidewalks ~ $0.5 \times 6 \times 185 \times 2 / 27 = 41$ CY

Median ~ $4.00 \times 0.5 \times 185 / 27 = 14$ CY

Total = $41 + 14 = 55$ CY

CH LK Fence, Zc Coat, 6 ft , 9 GA (643-1152):

$185 \times 2 = 370$ LF

NOTE:

There will be an elimination of Precast Concrete Median Barrier Method 1 and a reduction of linear foot for Precast Concrete Median Barrier Method 2. The current cost estimate list different pay items.

Precast Concrete Median Barrier Method 1 (620-0100): Reduction 185 LF

Precast Concrete Median Barrier Method 2 (620-0200): Elimination $185 \times 2 = 370$ LF

Cost Worksheet



PROJECT:	Georgia Department of Transportation STP000-2688-00(004) - P.I. No. 170735 SR 347 -Widening and Reconstruction Hall County	ALTERNATIVE NO.:	BR-1
DESCRIPTION:	Eliminate widening by reducing median width and no parapet construction	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
211-0200	CY	59	\$ 36.00	\$ 2,124	0		\$ -
441-0004	SY	80	\$ 48.00	\$ 3,840	0		\$ -
500-0100	SY	1,439	\$ 4.00	\$ 5,756	0		\$ -
500-1006	CY	187	\$ 835.00	\$ 156,145	55	\$ 835.00	\$ 45,925
500-2110	LF	389	\$ 196.00	\$ 76,244	0		\$ -
500-3002	CY	169	\$ 400.00	\$ 67,600	0		\$ -
507-9003	LF	363	\$ 142.00	\$ 51,537	0		\$ -
520-1104	LF	935	\$ 48.00	\$ 44,880	0		\$ -
520-1147	LF	1,700	\$ 65.00	\$ 110,500	0		\$ -
520-4104	EA	1	\$ 1.00	\$ 1	0		\$ -
520-4147	EA	1	\$ 1.00	\$ 1	0		\$ -
522-1000	LS	1	\$ 10,000.00	\$ 10,000	0	\$ -	\$ -
643-1152	LF	370	\$ 45.00	\$ 16,650	370	\$ 45.00	\$ 16,650
620-0100	LF	370	\$ 41.00	\$ 15,170	185	\$ 41.00	\$ 7,585
620-0200	LF	370	\$ 77.00	\$ 28,490	0	\$ 77.00	\$ -
Sub-total				\$ 588,938			\$ 70,160
Mark-up at 10.00%				\$ 58,894			\$ 7,016
TOTAL				\$ 647,832			\$ 77,176

Estimated Savings: \$570,656

Value Analysis Design Alternative



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
BR-2

DESCRIPTION: **Eliminate widening by reducing median width and
parapet construction**

SHEET NO.: **1** of **4**

Original Design:

The original design was to widen the existing three span, 185 ft. long by 75.25 ft. wide bridge to accommodate placing two 6 ft. sidewalks and a 15 ft. median and to provide two 28 ft wide travel way on the bridge. The widening would require additions to the deck, beams, end bents and intermediate bents. The final widened bridge width would be 86.42 ft.

Alternative:

The proposed alternative eliminates the need to widen the existing bridge by reducing the median width from 15 ft to 4.83 ft. along the length of the bridge. Removal and reconstruction of existing slab overhang for both sides of the bridge will be required to construct the new parapet. The staging of the bridge construction has been revised to utilize one location for temporary barrier. See illustration for details.

Opportunities:

- Reduction in bridge construction cost and duration

Risks:

- Existing bridge superstructure and substructure components need to be analyzed for new composite dead loads and checked for structural adequacy

Technical Discussion:

The existing bridge components seem to have adequate structural capacity to carry the new composite dead loads from the proposed parapets, sidewalks and median.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 647,832	\$ 0	\$ 647,832
ALTERNATIVE	\$ 172,066	\$ 0	\$ 172,066
SAVINGS	\$ 475,766	\$ 0	\$ 475,766

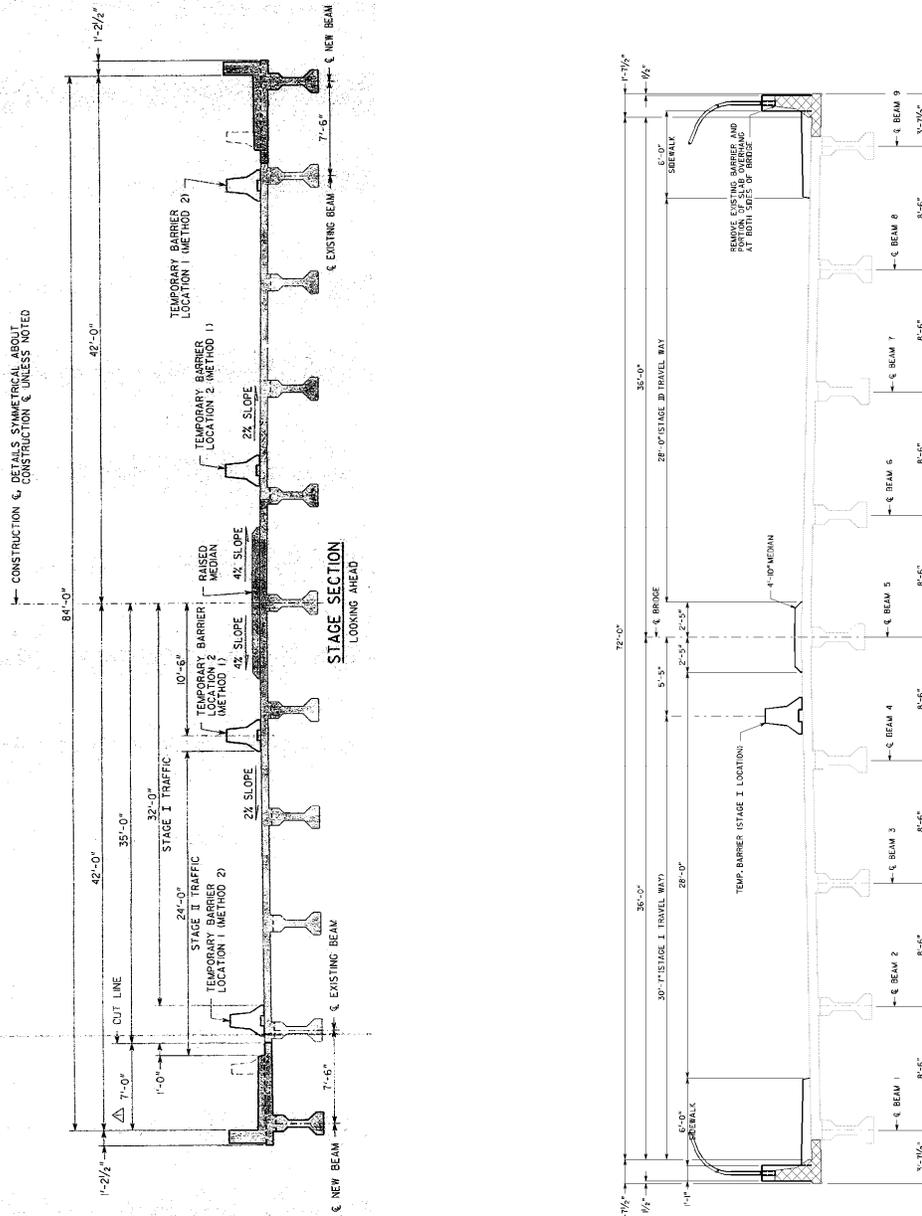
Illustration

PROJECT: Georgia Department of Transportation
 STP00-2688-00 (004) – P.I. No. 170735
 SR 347 - Widening and Reconstruction
 Hall County

ALTERNATIVE NO.:
BR-2

DESCRIPTION: Eliminate widening by reduce median width and parapet construction

SHEET NO.: 2 of 4



NOTE: Current Design shown on left side of illustration. Alternative is shown on right side.

Calculations



PROJECT: **Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

ALTERNATIVE NO.:
BR-2

DESCRIPTION: **Eliminate widening by reducing median width and
parapet construction**

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

ALTERNATIVE DESIGN – COST CALCULATIONS

Superstr Concrete, CL AA (500-1006):

Slab ~ $(8.125 / 12) \times 2.9583 \times 185 \times 2 / 27 = 9$ CY

Sidewalks ~ $0.5 \times 6 \times 185 \times 2 / 27 = 41$ CY

Median ~ $4.83 \times 0.5 \times 185 / 27 = 17$ CY

Total = $9 + 41 + 17 = 62$ CY

Concrete Parapet, Spcl Design (500-2110): Quantity taken from current design quantities

CH LK Fence, Zc Coat, 6 ft , 9 GA (643-1152):

$185 \times 2 = 370$ LF

NOTE:

There will be an elimination of Precast Concrete Median Barrier Method 1 and a reduction of linear foot for Precast Concrete Median Barrier Method 2. The current cost estimate list different pay items.

Precast Concrete Median Barrier Method 1 (620-0100): Reduction 185 LF

Precast Concrete Median Barrier Method 2 (620-0200): Elimination $185 \times 2 = 370$ LF

Cost Worksheet



PROJECT:	Georgia Department of Transportation STP000-2688-00(004) - P.I. No. 170735 SR 347 -Widening and Reconstruction Hall County	ALTERNATIVE NO.:	BR-2
DESCRIPTION:	Eliminate widening by reducing median width and parapet construction	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
211-0200	CY	59	\$ 36.00	\$ 2,124	0		\$ -
441-0004	SY	80	\$ 48.00	\$ 3,840	0		\$ -
500-0100	SY	1,439	\$ 4.00	\$ 5,756	0		\$ -
500-1006	CY	187	\$ 835.00	\$ 156,145	67	\$ 835.00	\$ 55,945
500-2110	LF	389	\$ 196.00	\$ 76,244	389	\$ 196.00	\$ 76,244
500-3002	CY	169	\$ 400.00	\$ 67,600	0		\$ -
507-9003	LF	363	\$ 142.00	\$ 51,537	0		\$ -
520-1104	LF	935	\$ 48.00	\$ 44,880	0		\$ -
520-1147	LF	1,700	\$ 65.00	\$ 110,500	0		\$ -
520-4104	EA	1	\$ 1.00	\$ 1	0		\$ -
520-4147	EA	1	\$ 1.00	\$ 1	0		\$ -
522-1000	LS	1	\$ 10,000.00	\$ 10,000	0	\$ -	\$ -
643-1152	LF	370	\$ 45.00	\$ 16,650	370	\$ 45.00	\$ 16,650
620-0100	LF	370	\$ 41.00	\$ 15,170	185	\$ 41.00	\$ 7,585
620-0200	LF	370	\$ 77.00	\$ 28,490	0	\$ 77.00	\$ -
Sub-total				\$ 588,938			\$ 156,424
Mark-up at 10.00%				\$ 58,894			\$ 15,642
TOTAL				\$ 647,832			\$ 172,066

Estimated Savings: \$475,766

Project Description

PROJECT DESCRIPTION

PROJECT INTRODUCTION

This Project No. is STP002688-00(004). This project is located in Hall County. This project consists of widening and reconstruction of SR 347 from I-985 to McEver Road for a total of 1.70 miles. It currently consists of two 12' lanes. The functional classification of this section is rural connector. The speed limit along this portion is 45 - 50 mph. The traffic (AADT) for the year 2010 is 32,550. Truck traffic is 5%. There are two main intersections along the project: one at SR 13 and the other at McEver Road. A bridge structure crosses over the Norfolk & Southern Railroad. The existing pavement is in poor condition. Level 3 and 4 distresses were observed throughout the project limits. Analysis of cores showed 4 out of 5 specimens revealed cracks that ran full-depth. The facility operates at operates at a level-of-service (LOS) "E".

In order to improve travel conditions in this highly congested area, GDOT's recommendation are to provide four lane urban roadway section divided by a 20' raised median with 20' shoulders, curb and gutter, and sidewalks. Design Speed will be 45 mph. Based on pavement conditions, they are recommending full-depth reconstruction for the entire project. The proposed project provides for widening of the bridge that crosses over the Norfolk & Southern Railroad.

There are no environmental concerns. The roadway is to remain open to traffic during construction.

The estimated construction cost for this project is \$15,717,650, a Right-of-Way cost of \$6,723,833, and Reimbursable Utilities cost of \$160,000 for a total project cost projected at \$22,601,483.

REPRESENTATIVE DOCUMENTS

- Georgia Department of Transportation
 - Half size plan set (3 volumes)
 - Construction Cost Estimates
 - Preliminary Right-of-Way Cost Estimate
 - Concept Report
 - Pavement Evaluation Summary
 - Soil Survey Summery
 - Bridge plans
 - Traffic Analysis

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



Department of Transportation

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November 10, 2004

CONCEPT TEAM MEETING MINUTES

STP-2688 (4), Hall County
SR 347 from I-985 to McEver Road
P.I. 170735

Date of Meeting: November 4, 2004

Location: District One Office

Attendees: See attachment

The Concept Team Meeting was held to present and review the proposed concept for the widening and reconstruction of SR 347 from a two (2) lane section to a four (4) lane section with a raised median from I-985 to McEver Road.

Russell McMurry began the meeting by team member introductions. The concept report sequence was followed as Mr. McMurry discussed each section. The concept layouts were reviewed by all team members.

The following are generalized comments made by team members:

Currently conflicting traffic movements occur at the Publix Supermarket intersection and the McDonald's driveway. Consideration during design should be given to trying to correct or alleviate this problem.

The existing need of a right turn lane on Bristol Industrial Blvd. and a traffic signal at the intersection was discussed. Also a continuous right turn lane from Bristol Industrial Blvd to the I-985 south bound ramp was suggested.

The topo along the section from SR 13 to the railroad should be updated and a median break provided in the area between Carter Road and the railroad as required.

Detailed analysis of project impact upon the surrounding area will be determined through environmental review.

Need and Purpose

The Phase I widening of the Friendship Rd/SR 347 is necessary to improve travel conditions and accessibility to the heavily traveled Lake Sidney Lanier recreational area. This segment of roadway is presently experiencing high levels of congestion. Increased traffic resulting from planned residential and commercial development is expected to further degrade existing conditions. Improvement of the facility will also improve conditions presently contributing to rising crash rates. This phase of the project is desirable as soon as possible.

The Phase II improvements along the remainder of the facility, from McEver Road to Lake Lanier can be delayed however, as travel along this segment of roadway is expected to maintain acceptable levels of service through 2033. The Office of Planning along with the District 1 Office recommends separating Phase II and establishing it as a separate project.

Crashes from M.P. 0.00 to 2.48; A total of 2.48 miles

Year	2000		2001		2002	
	SR 347	Statewide	SR 347	Statewide	SR 347	Statewide
Crashes	16		16		37	
Crashes Per 100 MVMT	127	188	160	180	463	195
Injuries	4		8		9	
Injuries Per 100 MVMT	32	62	80	62	113	68
Fatalities	0		0		0	
Fatalities Per 100 MVMT	0	2.53	0	2.29	0	2.37

(MVMT: Million Vehicle Miles Traveled)

Most of the crashes recorded during this time period in the phase two area were also rear end collisions. During 2002, the crash rates rose tremendously and almost all incidents occurred at the McEver Road intersection between milepoints 2.46 and 2.48. Improvements at this intersection will be coordinated as part of the proposed widening project and should assist in alleviating the present congestion leading to crashes.

Community Issues

This project is located in Hall County, Georgia which under the 2000 census was identified as having a population of 139,277. Like much of metropolitan Atlanta, this is a rapidly growing residential and commercial area. Hall County's population has risen 46% since the 1990 census count of 95,428. Of the population sampled in 2000, 19.6% were Hispanic and 7.3% were Black. Approximately 12% of the population was recorded as living below the poverty level.

Phase I:

Within the census block covering the phase one portion of the project, there are 3,169 residents according to the 2000 census. Of these residents, 4.17% are Hispanic and 3.19% are Black. Approximately 16% of these residents possess a household income less than \$20,000.

Environmental concerns in phase one include nearby residential communities.

Phase II:

Within the census blocks covering the phase two portion of the project, there are 3,348 residents according to the 2000 census. Of these residents, 1.67% are Hispanic and 1.08% are Black. Approximately 9% of these residents possess a household income less than \$20,000.00.

Environmental concerns in phase two include Lake Sidney Lanier.

Travel Demand and Operational Characteristics

According to 2002 traffic counts, the AADT along the phase one portion of the improvement from I-985 to McEver Road was 19,900 vehicles. The facility operates at LOS E. By the 2013 date of anticipated construction completion, this facility will have an estimated AADT of 24,300 and a failing level of service. With the proposed improvement however, the facility will operate at LOS B in 2013. By 2033, the improved facility will have an estimated AADT of 36,000 and operate at LOS D.

Traffic counts from 2002 along phase two of the improvement from McEver Road to Lake Lanier record an AADT of 3,400. The facility operates at LOS B. By 2033, this portion of the facility will have an estimated AADT of 6,100 vehicles. At this rate, the facility will maintain LOS B.

Safety

Phase I (I-985 to McEver Road)

During 2000, 2001, and 2002, crash rates were reported along the phase one segment of the proposed project. In 2000, there were 20 crashes with 5 injuries and 0 fatalities. In 2001, there were 13 crashes with 2 injuries and 0 fatalities. In 2002, there were 22 crashes with 10 injuries and 0 fatalities. Following are comparable statewide averages:

Crashes from M.P. 2.48 to 4.34; A total of 1.86 miles

Year	2000		2001		2002	
	SR 347	Statewide	SR 347	Statewide	SR 347	Statewide
Crashes	20		13		22	
Crashes Per 100 MVMT	75	188	48	180	83	195
Injuries	5		2		10	
Injuries Per 100 MVMT	19	62	7	62	38	68
Fatalities	0		0		0	
Fatalities Per 100 MVMT	0	2.53	0	2.29	0	2.37

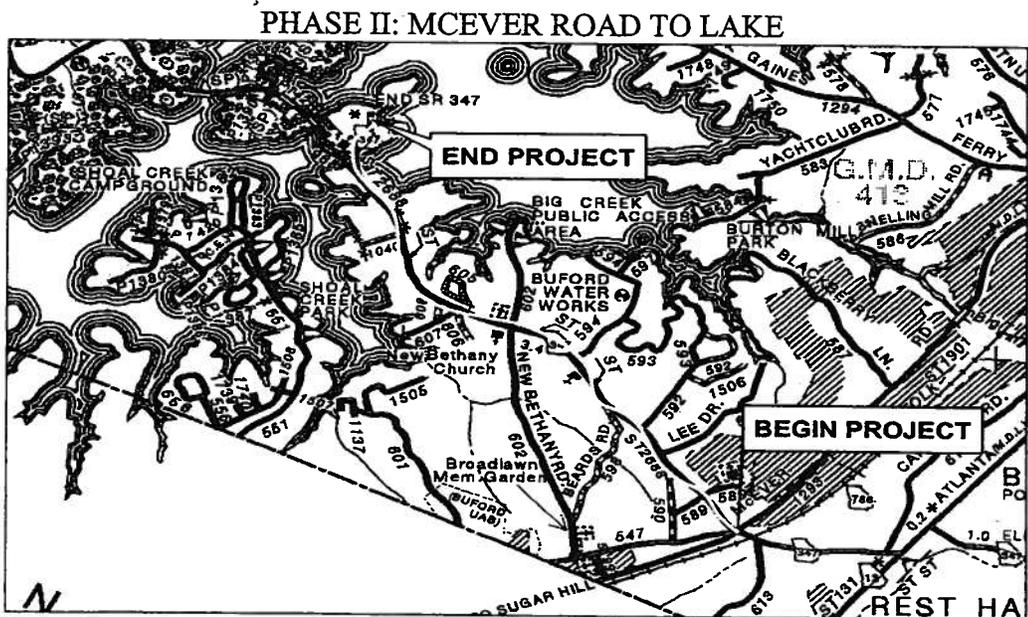
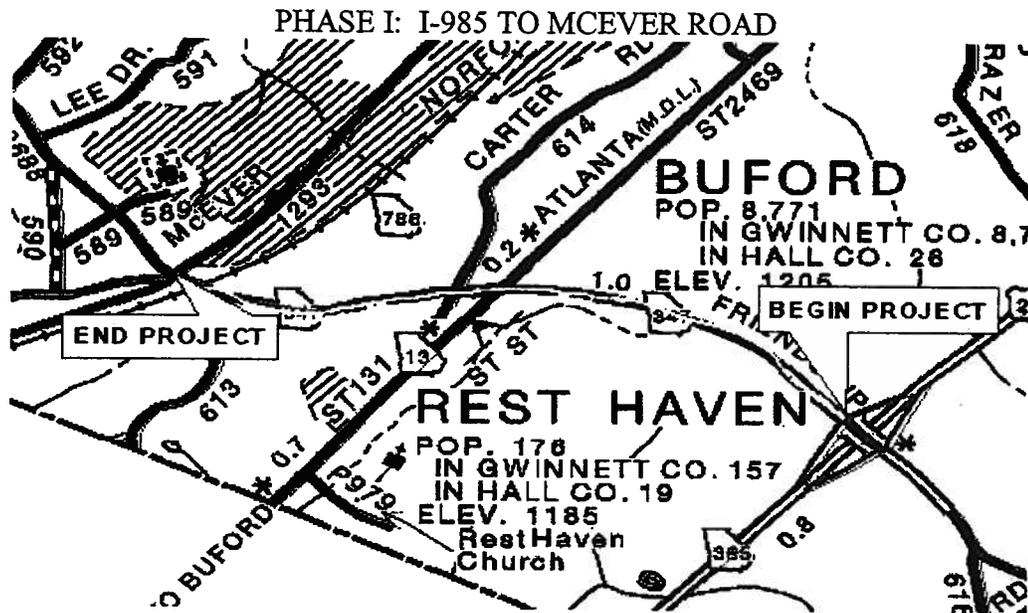
(MVMT: Million Vehicle Miles Traveled)

Most of the crashes recorded during this time period were rear end collisions. These type incidents are perhaps indicative of the high levels of congestion along the facility.

Phase II (McEver Road to Lake Lanier)

During 2000, 2001, and 2002 high crash rates were also reported along the phase two segment of the proposed project. In 2000, there were 16 crashes with 4 injuries and 0 fatalities. In 2001, there were 16 crashes with 8 injuries and 0 fatalities. In 2002, there were 37 crashes with 9 injuries and 0 fatalities. Following are comparable statewide averages:

The Department proposes to construct the widening in two phases. The first phase would consist of widening Friendship Road/SR 347 from I-985 to McEver Road. The second phase would consist of widening the facility from McEver Road to Lake Lanier. The proposed construction phases are logical as phase one is the more congested portion with immediate need for improvement, while phase two widening could be delayed and perform equally as well as the improved phase one portion.



NEED AND PURPOSE STATEMENT
STP-2688(4), PI 170735
Hall County
SR 347/Friendship Road from I-985 to Lake (Phase 2 – Lanes 3&4)

Background

The widening of SR 347/ Friendship Road first entered the Department's construction work program in 1986 upon request from the State Highway Engineer. At that time, the project was identified under PI 170730 as a widening and paving project from I-985 to the Holiday Marina. The purpose of the project was to provide for the projected future traffic accessing the heavily traveled Lake Lanier recreational area. The project's purpose also includes the correction of geometric deficiencies along the segment closest to the Lake. In 1993, this project was broken into two phases. The first phase remained under PI 170730 and consisted of grading, drainage, and base and paving in preparation for future widening. It also included construction of a bridge over the Southern Railway. The second phase was listed under PI 170735 and consisted of widening Friendship Road/SR 347 from 2 to 4 lanes from I-985 to Lake Lanier. The project is presently scheduled for right of way acquisition in 2009 and construction in 2011.

To satisfy federal air quality and planning requirements, this project was submitted to the Atlanta Regional Commission for the purpose of air quality modeling in the spring of 2004. It is also presently included in the Gainesville-Hall Metropolitan Planning Organization's Draft Long Range Transportation Plan. The plan is scheduled for adoption in December of 2004.

Other projects in the area include the following:

- PI 0001821, McEver Road Widening from SR 347 to CR 537/Jim Crow Road
- PI 162430, SR 347/ Friendship & Thompson Mill Road Widening from I-985 to SR 211
- PI 132950, SR 13-Buford/Atlanta highway from Thompson Mill Road to SR 347

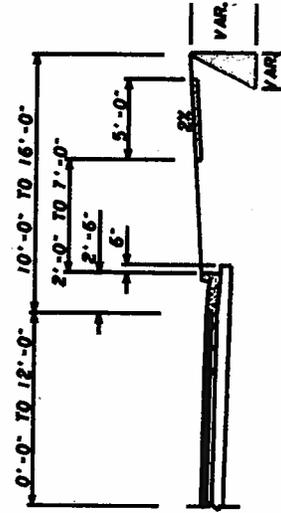
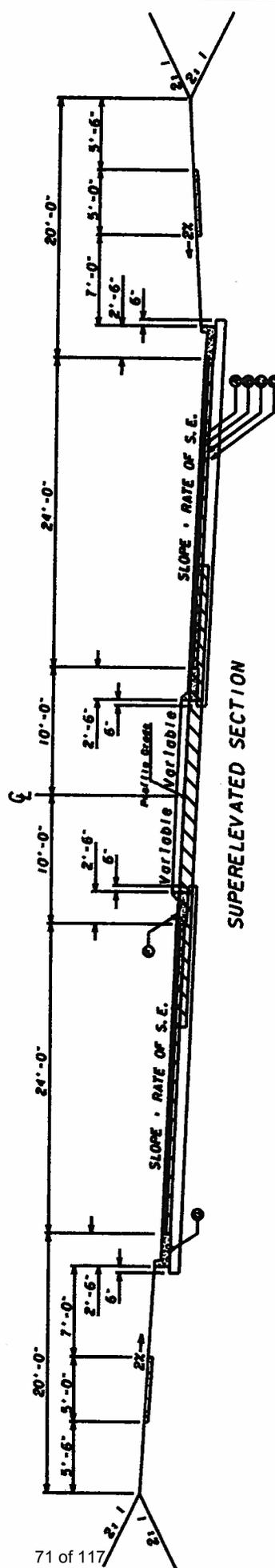
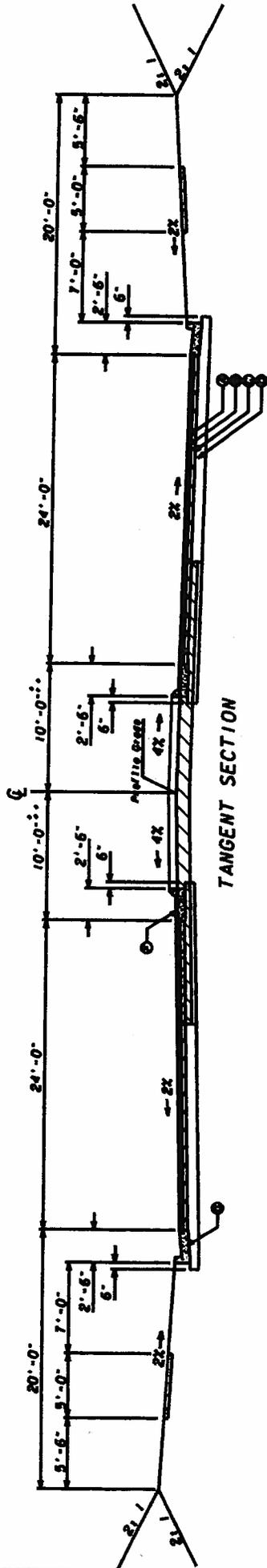
Existing Roadway Characteristics

Friendship Road/SR 347 within the proposed project limits is functionally classified as a rural major collector. It currently consists of two lanes that are typically 12 feet in width from I-985 to North Water Works Road and 11 feet from North Water Works Road to the gate of Lake Lanier. The rural type roadway has variable width grass shoulders. The speed limit along this portion of the facility varies from 45 to 50 mph. The landscape is classified as "rolling terrain". The section of roadway along the proposed improvement is along a school bus route. It is not along a state bike route.

Proposed Improvements

The project consists of widening Friendship Road/SR 347 from 2 to 4 lanes from I-985 to Lake Lanier. It also includes reconstruction/rehabilitation of the intersection at McEver Road. The project termini are logical as the project would provide the necessary access to Lake Lanier to the west and tie into the existing four lanes at I-985/SR 365 to the east.

TYPICAL SECTIONS



SEE PLAN SHEETS FOR LOCATION

SEE PLAN SHEETS FOR LOCATION

PRELIMINARY COST ESTIMATE

PROJECT NUMBER: STP-2688(4)

COUNTY: Hall

DATE: August 2004

ESTIMATED LETTING DATE: 2006

PREPARED BY: Attaway

PROJECT LENGTH: 1.706

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

PROJECT COST			
A. RIGHT-OF-WAY: GDOT			
1. PROPERTY (LAND & EASEMENT)		\$	-
2. DISPLACEMENTS; RES: , BUS:		\$	-
3. OTHER COST (ADM./COST, INFLATION)		\$	-
SUBTOTAL: A		\$	-
B. REIMBURSABLE UTILITIES: LGPA			
1. RAILROAD		\$	
2. TRANSMISSION LINES		\$	-
3. SERVICES		\$	-
SUBTOTAL: B		\$	-
C. CONSTRUCTION:			
1. MAJOR STRUCTURES			
a. BRIDGES			
Modify Existing Bridge over RR		\$	150,000
		\$	-
SUBTOTAL: C-1.a		\$	150,000
b. OTHER			
Side Barrier Walls	725 LF Type 6A and 600 LF Type 6B	\$	295,000
Retaining Wall, Class B	50 CY	\$	15,000
Bridge Culverts (0)		\$	-
SUBTOTAL: C-1.b		\$	310,000
SUBTOTAL: C-1		\$	460,000
2. GRADING AND DRAINAGE:			
a. EARTHWORK			
Grading Complete		\$	350,000
b. DRAINAGE			
1) Curb and Gutter	15780 LF Type2 and 14694 LF Type 7	\$	304,740
2) Longitudinal System	3000 LF 18" / 1700 LF 24" / 700 LF 36"	\$	290,000
49 - 1033 CB's / 18 1034 CB's / 5 D.I.'s / 2 J.B's		\$	
SUBTOTAL: C-2.b		\$	594,740
SUBTOTAL: C-2		\$	944,740

PRELIMINARY COST ESTIMATE

PROJECT NUMBER: STP-2688(4)

COUNTY: Hall

DATE: August 2004

ESTIMATED LETTING DATE: 2006

PREPARED BY: Attaway

PROJECT LENGTH: 1.706

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

PROJECT COST				
3. BASE AND PAVING:				
a. AGGREGATE BASE	22,000 - tons @	\$13.39	\$	\$294,580.00
b. ASPHALT PAVING (Mainline):				
Aggr Surface Crs	1,000 - tons @	\$15.81	\$	\$15,810.00
Leveling	750 - tons @	\$35.95	\$	\$26,962.50
Surface - Superpave	6,000 - tons @	\$35.09	\$	\$210,540.00
Binder - SMA	- - tons @	\$56.90	\$	
Binder - Superpave	6,900 - tons @	\$36.22	\$	\$249,918.00
Base - Superpave	24,200 - tons @	\$34.52	\$	\$835,384.00
Pavement Reinf. Fabric Strips	-		\$	
SUBTOTAL: C-3.b			\$	1,338,615
c. CONCRETE PAVING				
-			\$	-
d. OTHER (Tack Coat)	2300 Gals		\$	2,001
SUBTOTAL: C-3			\$	1,635,196
4. LUMP ITEMS				
a. SIGNAL INSTALLATION	4 intersections		\$	367,200
b. CLEARING AND GRUBBING				
-			\$	-
c. LANDSCAPING				
-			\$	-
d. EROSION CONTROL				
-			\$	400,000
e. TRAFFIC CONTROL				
-			\$	150,000
SUBTOTAL: C-4			\$	917,200
5. MISCELLANEOUS:				
a. LIGHTING				
-			\$	-
b. SIGNING - MARKING				
-			\$	75,000
c. GUARDRAIL				
Single-Faced			\$	-
Double-Faced			\$	-
Anchors			\$	-
SUBTOTAL: C-5.c			\$	75,000
d. SIDEWALK				
8600SY			\$	180,600
e. MEDIAN PVMT / DRWY CONC				
7130 SY / 100 SY			\$	193,445
f. MOVABLE BARRIER SECTION				
-			\$	
g. CONC VALLEY GUTTER				
1600 SY 8" / 62 SY 6"			\$	62,722
h. CL A CONC / CL B CONC / SAWED JTS				
-			\$	5,000
i. R/W MARKERS				
-			\$	-
j. REMOVAL				
Concrete Paving			\$	-
Bridges			\$	-
SUBTOTAL: C-5.j			\$	-
k. ATMS Conduit				
-			\$	-
l. OTHER				
-			\$	-
SUBTOTAL: C-5			\$ \$	516,767.00

PRELIMINARY COST ESTIMATE

PROJECT NUMBER: STP-2688(4)

COUNTY: Hall

DATE: August 2004

ESTIMATED LETTING DATE: 2006

PREPARED BY: Attaway

PROJECT LENGTH: 1.706

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

PROJECT COST		
6. SPECIAL FEATURES		
SUBTOTAL: C-6		\$
SUMMARY		
A. RIGHT-OF-WAY	GDOT	\$ -
B. REIMBURSABLE UTILITIES	LGPA	\$ -
C. CONSTRUCTION		
1. MAJOR STRUCTURES		\$ 460,000
2. GRADING AND DRAINAGE		\$ 944,740
3. BASE AND PAVING		\$ 1,635,196
4. LUMP ITEMS		\$ 917,200
5. MISCELLANEOUS		\$ 516,767
6. SPECIAL FEATURES		\$ -
SUBTOTAL CONSTRUCTION COST		\$ 4,473,903
E. & C. (10%)		\$ 447,390
INFLATION (5% PER YEAR)		\$ \$476,471
NUMBER OF YEARS	2	
TOTAL CONSTRUCTION COST		\$ 5,397,763
GRAND TOTAL PROJECT COST		\$ 5,397,763

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					

Project Concept Report page 3
Project Number: STP-2688(4)
P. I. Number: 170735
County: Hall

Need and Purpose:

See attachment 3

Description of the proposed project: The project begins at the west end of the bridge on State Route 347 over I-985 at mile log 3.935 and ends at mile log 2.239 west of the SR 347/McEver Road intersection. The total length is 1.70 miles. This project provides an urban roadway section consisting of two lanes in each direction, divided by a 20 foot raised median. By using retaining walls at 3 locations, additional rights of way will not be necessary for the construction of this project. There is a significant drop in traffic volumes at the west end of this project. The traffic projections show a drop from 29,000 ADT to 19,600 ADT for the design year. Also, with the base year traffic volumes decreasing from 18,300 ADT to 12,000 ADT the median guidelines require that the section from McEver Road to the Lake Lanier Islands be constructed as a five lane (flush median) roadway section. This section of roadway is recommended to be constructed as a separate project at a later date.

Is the project located in a Non-attainment area? X Yes No.

PDP Classification: Major Minor X

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

Functional Classification: Rural Collector

U. S. Route Number(s): None **State Route Number(s):** 347

Traffic (AADT):

Current Year: (2010) 32,550 Design Year: (2030) 49,850

Existing design features:

- Typical Section: Two lane rural section with variable width grass shoulders
- Posted speed 45 mph Minimum radius for curve: 1145'

- Maximum grade: Mainline = 4.7%; Side Street = 4%; Driveway = 12%
- Width of right of way: Min 130 ft.
- Major structures: Bridge over RR
- Major interchanges or intersections along the project: (1) SR 13 (2) McEver Road

Proposed Design Features:

- Proposed typical section: Divided Four Lane (20' raised median) with 20' shoulders, curb and gutter and sidewalks
- Proposed Design Speed Mainline 45 mph
- Proposed Maximum grade Mainline 4.7 %Maximum grade allowable 7 %.
- Proposed Maximum grade Side St 4 %Maximum grade allowable 10 %.
- Proposed Maximum grade driveway 12% Commercial
- Proposed Minimum radius for curve 1145 Minimum radius allowable 600
- Proposed Maximum degree of curve 5 Maximum degree allowable 9.5
- Right of way
 - Width Existing
 - Easements: Temporary (), Permanent (), Utility (), Other (X) none.
 - Type of access control: Full (), Partial (), By Permit (X), Other ()
 - Number of parcels: 0 Number of displacements:
 - Business: ---
 - Residences: ---
 - Mobile homes: ---
 - Other: ---
- Structures:
 - Bridges: Bridge widening over RR
 - Retaining walls: Type 6A & 6B Concrete Side Barrier Walls
- Major intersections and interchanges: (1) SR 13 (2) McEver Road
- Traffic control during construction: Roadway to remain open to traffic during construction.
- Design Exceptions to controlling criteria anticipated:

	<u>UNDETERMINED</u>	<u>YES</u>	<u>NO</u>
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)

Project Concept Report page 5
Project Number: STP-2688 (4)
P. I. Number: 170735
County: Hall

- Design Variances: Median width across bridge
- Environmental concerns: None
- Level of environmental analysis:
 - Are Time Savings Procedures appropriate? Yes (X), No (),
 - Categorical exclusion (X),
 - Environmental Assessment/Finding of No Significant Impact (FONSI) (), or
 - Environmental Impact Statement (EIS) ().
- Utility involvements:
 - Atlanta Gas Light
 - Atmos Energy
 - Bellsouth
 - Charter Communications
 - City of Buford
 - City of Gainesville
 - Georgia Power
 - Hall County
 - Jackson EMC

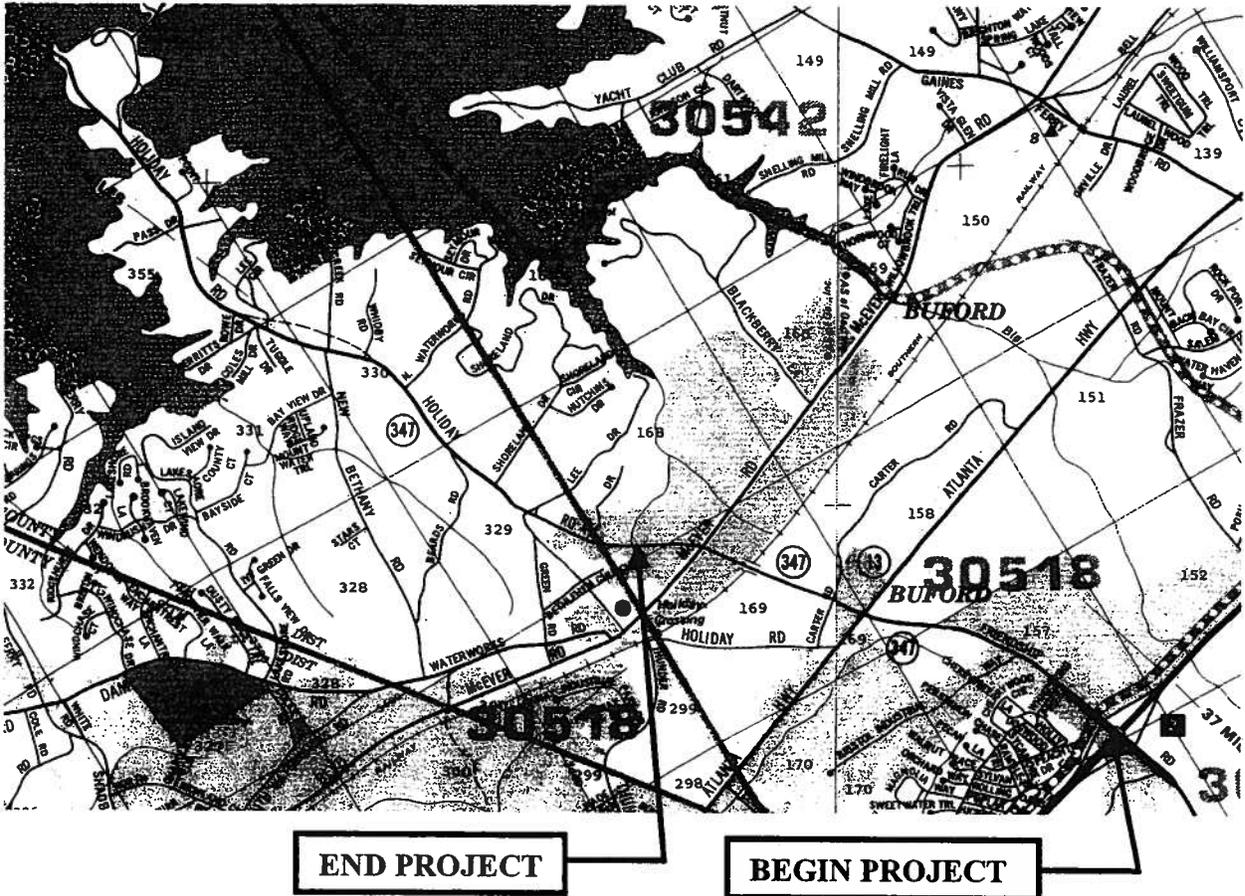
Project responsibilities:

- Design - GDOT
- Right of Way Acquisition - None
- Relocation of Utilities – None
- Letting to contract - GDOT
- Supervision of construction - GDOT
- Providing material pits - Contractor
- Providing detours – N/A

Coordination

- Concept meeting date and brief summary. November 4, 2004 (Minutes attached)
- Public involvement. To be scheduled: Public Information Open House, Public Hearing Open House
- Local government comments. None
- Other projects in the area:
 - P.I. 001821, McEver Road widening
 - P.I. 162430, SR 347 – Friendship/Thompson Mill Road widening I-985 to SR211
 - P.I. 132950, SR 13 – Buford/Atlanta Highway from Thompson Mill to SR 347
- Other coordination to date. None
- Railroad Coordination: Norfolk Southern

Project Concept Report page 2
Project Number: STP-2688(4)
P. I. Number: 170735
County: Hall



LOCATION SKETCH
PROJECT NUMBER: STP-2688(4) P.I. NO.: 170735

DESCRIPTION:
Widening and Reconstruction of SR 347 from I-95 to McEver Road

DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA

District One

PROJECT CONCEPT REPORT

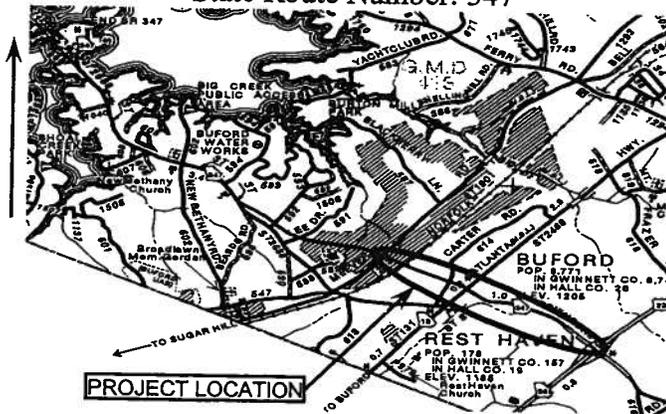
Project Number: STP-2688(4)

County: Hall

P. I. Number: 170735

Federal Route Number: None

State Route Number: 347



Recommendation for approval:

DATE 11-16-2004

Russell R. McMurtry
Project Manager

DATE 11-16-2004

[Signature]
Office Head/District Engineer

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

DATE _____

_____ State Transportation Planning Administrator

DATE _____

_____ State Transportation Financial Management Administrator

DATE _____

_____ State Environmental/Location Engineer

DATE _____

_____ State Traffic Safety & Design Engineer

DATE _____

_____ Project Review Engineer

DATE _____

_____ State Bridge and Structural Design Engineer

STP-2688(4) Hall
February 21, 2005

Environmental concerns include requiring a Categorical Exclusion be prepared; a public information open house has been held; time saving procedures are appropriate.

The estimated costs for these projects are:

STP-2688(4) Hall - Phase 1

	<u>PROPOSED</u>	<u>APPROVED</u>	<u>FUNDING</u>	<u>PROG DATE</u>
Construction (includes E&C and inflation)	\$5,398,000	\$5,398,000	Q24	2013
Right-of-Way & Utilities*	-0-	-0-		

Proposed New Project - Phase 2

	<u>PROPOSED</u>	<u>APPROVED</u>	<u>FUNDING</u>	<u>PROG DATE</u>
Construction (includes E&C and inflation)	\$9,104,000	\$9,104,000	Q24	LR(Proposed)
Right-of-Way	\$2,120,000	\$2,120,000		
Utilities*	LGPA	LGPA		

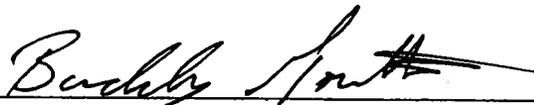
*Hall County signed LGPA 7-10-98 for utilities/cities signed 6-20-89 for utilities.

I recommend these project concepts be approved.

MBP:JDQ/cj

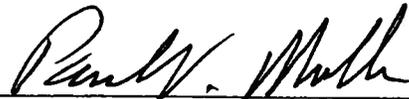
Attachment

CONCUR



Buddy Gratton, P.E., Director of Preconstruction

APPROVE

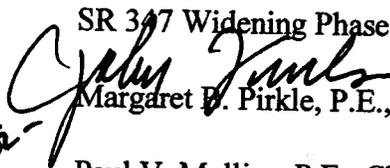


Paul V. Mullins, P.E., Chief Engineer

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

INTERDEPARTMENT CORRESPONDENCE

FILE STP-2688(4) Hall County **OFFICE** Preconstruction
P.I. No. 170735
SR 347 Widening Phases 1 and 2 **DATE** February 21, 2005

FROM  Margaret E. Pirkle, P.E., Assistant Director of Preconstruction

TO  Paul V. Mullins, P.E., Chief Engineer

SUBJECT PROJECT CONCEPT REPORT

This project is the widening and reconstruction of SR 347/Friendship Road from I-985 to Lake Lanier in two phases. Phase 1 will consist of widening Friendship Road/SR 347 from I-985 to McEver Road for a total of 1.70 miles. Phase 2 will consist of widening the facility from McEver Road to Lake Lanier for a total of 2.40 miles. State Route 347 within the project limits is functionally classified as a rural major collector. It currently consists of two lanes that are typically 12' in width from I-985 to North Water Works Road and 11' from North Water Works Road to the gate at Lake Lanier. The speed limit along this portion varies from 45 to 50 MPH. According to 2002 traffic counts, the AADT along Phase 1 was 19,900 VPD. The facility operates at level-of-service (LOS) "E." By the year 2013, this facility will have an estimated 24,300 VPD and a failing level of service. With the proposed improvements, the facility will operate at LOS "B" in 2013. Traffic counts from 2002 along Phase 2 of the improvements record an AADT of 3,400. The facility operates at LOS "B." By 2033, this portion of the facility will have an estimated 6,100 VPD. At this rate, the facility will maintain LOS "B." Phase 1 widening of Friendship Road/SR 347 is necessary to improve travel conditions and accessibility to the heavily traveled Lake Sidney Lanier Recreation area. The Phase 2 improvements can be delayed as travel along this segment is expected to maintain acceptable levels of service through 2033.

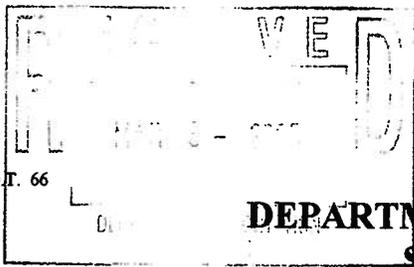
STP-2688(4) Hall - I-985 to McEver Road, Phase 1

The proposed construction will provide an urban roadway section consisting of two lanes in each direction divided by a 20' raised median. By using retaining walls at 3 locations, additional rights-of-way will not be necessary for the construction of this project.

It is requested that another project be programmed for upgrading the section of SR 347 from McEver Road to its terminus as Lake Lanier Islands Park entrance.

Proposed new Project # - McEver Road to Lake Lanier, Phase 2

The proposed construction will provide a five lane (flush median) roadway section for the entire length.



To: Don ✓ Russell ✓
Neil ✓
ORIGINAL TO GENERAL FILES
cc: Jeff Jacques
Brent Cook
Teri Pope

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

INTERDEPARTMENT CORRESPONDENCE

FILE STP-2688(4) Hall County **OFFICE** Preconstruction
P. I. No. 170735
SR 377 Widening Phases 1 and 2 **DATE** March 1, 2005
FROM *John Finkle* Margaret E. Finkle, P.E., Assistant Director of Preconstruction
TO *Fo* SEE DISTRIBUTION

SUBJECT PROJECT CONCEPT REPORT APPROVAL

Attached for your files is the approval for subject project.

MBP/cj

Attachment

DISTRIBUTION:

- David Mulling
- Harvey Keepler
- Ken Thompson
- Jamie Simpson
- Michael Henry
- Keith Golden
- Joe Palladi (file copy)
- Paul Liles
- Babs Abubakari
- Russell McMurry
- BOARD MEMBER

Project Concept Report page 6
Project Number: STP-2688 (4)
P. I. Number: 170735
County: Hall

Scheduling – Responsible Parties’ Estimate

- Time to complete the environmental process: 18 Months.
- Time to complete preliminary construction plans: 12 Months.
- Time to complete right of way plans: N/A.
- Time to complete the Section 404 Permit: N/A
- Time to complete final construction plans: 6 Months.
- Time to complete to purchase right of way: N/A
- List other major items that will affect the project schedule: None

Other alternates considered: No Build

Comments: None

Attachments:

1. Cost Estimate
2. Typical sections
3. Need and Purpose
4. Concept Team Meeting Minutes
5. Conforming plan’s network schematics showing thru lanes
6. Capacity Analysis

Estimate Report for file "170735"

Section A. ROADWAY					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	308990.37	TRAFFIC CONTROL -	308990.37
153-1300	1	EA	78357.60	FIELD ENGINEERS OFFICE TP 3	78357.60
207-0203	1	CY	60.38	FOUND BKFILL MATL, TP II	60.38
210-0100	1	LS	2461661.09	GRADING COMPLETE -	2461661.09
310-1101	71200	TN	18.23	GR AGGR BASE CRS, INCL MATL	1297976.00
318-3000	1000	TN	18.96	AGGR SURF CRS	18960.00
402-3121	42000	TN	64.41	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	2705220.00
402-3130	9000	TN	68.66	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	617940.00
402-3190	12000	TN	64.57	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	774840.00
413-1000	4400	GL	2.08	BITUM TACK COAT	9152.00
433-1100	560	SY	82.83	REINF CONC APPROACH SLAB, INCL CURB	46384.80
441-0018	1	SY	52.55	DRIVEWAY CONCRETE, 8 IN TK	52.55
441-0104	9079	SY	37.42	CONC SIDEWALK, 4 IN	339736.18
441-0204	1	SY	32.53	PLAIN CONC DITCH PAVING, 4 IN	32.53
441-0301	1	EA	1868.62	CONC SPILLWAY, TP 1	1868.62
441-0740	56000	SY	34.32	CONCRETE MEDIAN, 4 IN	1921920.00
441-0754	11500	SY	50.93	CONCRETE MEDIAN, 7 1/2 IN	585695.00
441-5002	1	LF	21.27	CONCRETE HEADER CURB, 6 IN, TP 2	21.27
441-6022	14900	LF	19.90	CONC CURB & GUTTER, 6 IN X 30 IN, TP 2	296510.00
441-6720	11900	LF	17.40	CONC CURB & GUTTER, 6 IN X 30 IN, TP 7	207060.00
444-1000	20100	LF	7.58	SAWED JOINTS IN EXIST PAVEMENTS - PCC	152358.00
500-3201	225	CY	613.29	CLASS B CONCRETE, RETAINING WALL	137990.25
500-3800	1	CY	914.02	CLASS A CONCRETE, INCL REINF STEEL	914.02
500-3900	1	CY	929.68	CLASS B CONCRETE, INCL REINF STEEL	929.68
550-1180	10070	LF	43.43	STORM DRAIN PIPE, 18 IN, H 1-10	437340.10
550-1181	459	LF	41.15	STORM DRAIN PIPE, 18 IN, H 10-15	18887.85
550-1182	1	LF	73.35	STORM DRAIN PIPE, 18 IN, H 15-20	73.35
550-1240	1420	LF	54.80	STORM DRAIN PIPE, 24 IN, H 1-10	77816.00
550-1241	559	LF	51.56	STORM DRAIN PIPE, 24 IN, H 10-15	28822.04
550-1242	1	LF	63.54	STORM DRAIN PIPE, 24 IN, H 15-20	63.54
550-1300	1	LF	73.92	STORM DRAIN PIPE, 30 IN, H 1-10	73.92
550-1302	1	LF	78.03	STORM DRAIN PIPE, 30 IN, H 15-20	78.03
550-1360	585	LF	86.15	STORM DRAIN PIPE, 36 IN, H 1-10	50397.75
550-1361	1	LF	103.97	STORM DRAIN PIPE, 36 IN, H 10-15	103.97
550-1362	40	LF	72.24	STORM DRAIN PIPE, 36 IN, H 15-20	2889.60
550-1363	99	LF	80.93	STORM DRAIN PIPE, 36 IN, H 20-25	8012.07
550-1420	108	LF	87.35	STORM DRAIN PIPE, 42 IN, H 1-10	9433.80
550-1421	1	LF	84.41	STORM DRAIN PIPE, 42 IN, H 10-15	84.41
550-1422	25	LF	90.29	STORM DRAIN PIPE, 42 IN, H 15-20	2257.25
550-1423	29	LF	93.23	STORM DRAIN PIPE, 42 IN, H 20-25	2703.67
550-1480	146	LF	141.26	STORM DRAIN PIPE, 48 IN, H 1-10	20623.96
550-1540	86	LF	149.16	STORM DRAIN PIPE, 54 IN, H 1-10	12827.76
550-1541	46	LF	113.50	STORM DRAIN PIPE, 54 IN, H 10-15	5221.00
550-1600	43	LF	215.37	STORM DRAIN PIPE, 60 IN, H 1-10	9260.91
550-3318	1	EA	604.31	SAFETY END SECTION 18 IN, STORM DRAIN, 4:1 SLOPE	604.31
550-4118	2	EA	439.97	FLARED END SECTION 18 IN, SIDE DRAIN	879.94
550-4124	5	EA	425.89	FLARED END SECTION 24 IN, SIDE DRAIN	2129.45
550-4236	3	EA	1281.45	FLARED END SECTION 36 IN, STORM DRAIN	3844.35
550-4242	2	EA	1362.13	FLARED END SECTION 42 IN, STORM DRAIN	2724.26
550-4248	3	EA	2200.00	FLARED END SECTION 48 IN, STORM DRAIN	6600.00
570-1000	1	LS	8918.55	CONSTR, MAINT & REMOVE DETOUR DRAINAGE STR, NO -	8918.55
603-2012	1	SY	54.91	STN DUMPED RIP RAP, TP 1, 12 IN	54.91
603-2180	500	SY	40.82	STN DUMPED RIP RAP, TP 3, 12 IN	20410.00
603-7000	500	SY	4.98	PLASTIC FILTER FABRIC	2490.00
611-9000	1	EA	853.46	CAPPING MINOR STRUCTURE	853.46
622-1033	920	LF	1.00	PRECAST CONCRETE MEDIAN BARRIER, METHOD 3	920.00
622-1050	370	LF	1.00	PRECAST CONCRETE MEDIAN BARRIER, METHOD 4	370.00

634-1200	100	EA	105.83	RIGHT OF WAY MARKERS	10583.00
641-1100	84	LF	53.27	GUARDRAIL, TP T	4474.68
641-1200	3100	LF	18.24	GUARDRAIL, TP W	56544.00
641-5001	3	EA	647.31	GUARDRAIL ANCHORAGE, TP 1	1941.93
641-5012	4	EA	1815.35	GUARDRAIL ANCHORAGE, TP 12	7261.40
643-1171	1	LF	12.70	CH LK FENCE, ZC COAT, 8 FT, 9 GA	12.70
668-1100	66	EA	2668.28	CATCH BASIN, GP 1	176106.48
668-1110	38	LF	251.11	CATCH BASIN, GP 1, ADDL DEPTH	9542.18
668-1200	2	EA	5606.73	CATCH BASIN, GP 2	11213.46
668-1210	2	LF	357.13	CATCH BASIN, GP 2, ADDL DEPTH	714.26
668-2100	1	EA	4358.32	DROP INLET, GP 1	4358.32
668-2110	2	LF	327.37	DROP INLET, GP 1, ADDL DEPTH	654.74
668-2200	1	EA	4637.33	DROP INLET, GP 2	4637.33
668-2210	1	LF	372.43	DROP INLET, GP 2, ADDL DEPTH	372.43
668-5000	9	EA	2243.84	JUNCTION BOX	20194.56
668-7018	1	EA	1398.16	DRAIN INLET, 18 IN	1398.16
668-8011	1	SF	44.31	SAFETY GRATE, TP 1	44.31
700-6910	10	AC	987.28	PERMANENT GRASSING	9872.80
700-7000	20	TN	61.37	AGRICULTURAL LIME	1227.40
700-7010	25	GL	20.24	LIQUID LIME	506.00
700-8000	6	TN	350.95	FERTILIZER MIXED GRADE	2105.70
700-8100	500	LB	2.25	FERTILIZER NITROGEN CONTENT	1125.00
Section Sub Total:					\$13,027,291.39

Section B. BRIDGE					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
500-1006	1	LS	607414.00	SUPERSTR CONCRETE, CL AA, BR NO -	607414.00
500-2100	1	LF	54.62	CONCRETE BARRIER	54.62
500-3101	1	CY	598.54	CLASS A CONCRETE	598.54
501-2100	1	LB	3.05	STR STEEL, SWAYBRACING	3.05
501-3000	1	LS	2.44	STR STEEL, BR NO -	2.44
507-9030	1	LF	199.96	PSC BEAMS, AASHTO, BULB TEE, 54 IN, BR NO -	199.96
511-1000	1	LB	0.95	BAR REINF STEEL	0.95
511-3000	1	LS	0.96	SUPERSTR REINF STEEL, BR NO -	0.96
520-1151	1	LF	75.89	PILING IN PLACE, STEEL H, HP 14 X 89	75.89
520-4218	1	EA	1143.45	LOAD TEST, PSC, 18 IN SQ	1143.45
Section Sub Total:					\$609,493.86

Section C. SIGNING AND MARKING					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
636-1029	1800	SF	16.52	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 3	29736.00
636-1032	500	SF	38.38	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING TP 6	19190.00
636-1041	500	SF	30.43	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 9	15215.00
636-1072	500	SF	20.37	HIGHWAY SIGNS, ALUM EXTRUDED PANELS, REFL SHEETING, TP 3	10185.00
636-1077	500	SF	30.12	HIGHWAY SIGNS, ALUM EXTRUDED PANELS, REFL SHEETING, TP 9	15060.00
636-2070	1500	LF	9.23	GALV STEEL POSTS, TP 7	13845.00
636-2080	1500	LF	11.12	GALV STEEL POSTS, TP 8	16680.00
636-2090	1	LF	8.48	GALV STEEL POSTS, TP 9	8.48
636-5010	1	EA	44.05	DELINEATOR, TP 1	44.05
636-5100	2	EA	183.98	MILEPOST SIGNS	367.96
639-3003	16	EA	6543.11	STEEL STRAIN POLE, TP III	104689.76
647-1000	4	LS	48653.95	TRAFFIC SIGNAL INSTALLATION NO -	194615.80
653-0110	2	EA	69.57	THERMOPLASTIC PVMT MARKING, ARROW, TP 1	139.14
653-0120	20	EA	70.45	THERMOPLASTIC PVMT MARKING, ARROW, TP 2	1409.00
653-0170	130	EA	82.96	THERMOPLASTIC PVMT MARKING, ARROW, TP 7	10784.80
653-0210	12	EA	106.69	THERMOPLASTIC PVMT MARKING, WORD, TP 1	1280.28
653-1501	32111	LF	0.63	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN,	20229.93

				WHITE	
653-1502	11683	LF	0.63	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	7360.29
653-1704	1000	LF	5.33	THERMOPLASTIC SOLID TRAF STRIPE, 24 IN, WHITE	5330.00
653-1804	1	LF	1.86	THERMOPLASTIC SOLID TRAF STRIPE, 8 IN, WHITE	1.86
653-3501	10000	GLF	0.54	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	5400.00
653-6004	20000	SY	2.70	THERMOPLASTIC TRAF STRIPING, WHITE	54000.00
653-6006	20000	SY	3.32	THERMOPLASTIC TRAF STRIPING, YELLOW	66400.00
654-1001	1	EA	3.64	RAISED PVMT MARKERS TP 1	3.64
654-1002	1	EA	3.43	RAISED PVMT MARKERS TP 2	3.43
656-5000	1	EA	1100.00	REMOVE EXIST TRAF MARKINGS -	1100.00
Section Sub Total:					\$593,079.42

Section D. EROSION CONTROL					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
162-1300	1	EA	1057.05	EROSION CONTROL CHECK DAM, TP -	1057.05
163-0232	10	AC	604.06	TEMPORARY GRASSING	6040.60
163-0240	82	TN	180.48	MULCH	14799.36
163-0300	1	EA	2465.64	CONSTRUCTION EXIT	2465.64
163-0501	1	EA	856.85	CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 1	856.85
163-0520	1	LF	17.18	CONSTRUCT AND REMOVE TEMPORARY PIPE SLOPE DRAIN	17.18
163-0521	1	EA	214.41	CONSTRUCT AND REMOVE TEMPORARY DITCH CHECKS	214.41
163-0522	87	EA	292.86	CONSTRUCT AND REMOVE TEMPORARY DITCH CHECKS - TYPE A SILT FENCE	25478.82
163-0523	1	EA	250.00	CONSTRUCT AND REMOVE TEMPORARY DITCH CHECKS - TYPE C SILT FENCE	250.00
163-0530	790	LF	3.83	CONSTRUCT AND REMOVE BALED STRAW EROSION CHECK	3025.70
163-0550	110	EA	210.99	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	23208.90
165-0010	20300	LF	1.05	MAINTENANCE OF TEMPORARY SILT FENCE, TP A	21315.00
165-0030	2100	LF	1.91	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	4011.00
165-0040	87	EA	83.42	MAINTENANCE OF EROSION CONTROL CHECKDAMS/DITCH CHECKS	7257.54
165-0070	800	LF	2.25	MAINTENANCE OF BALED STRAW EROSION CHECK	1800.00
165-0085	1	EA	256.48	MAINTENANCE OF SILT CONTROL GATE, TP 1	256.48
165-0101	1	EA	659.48	MAINTENANCE OF CONSTRUCTION EXIT	659.48
165-0105	110	EA	90.49	MAINTENANCE OF INLET SEDIMENT TRAP	9953.90
167-1000	1	EA	1352.63	WATER QUALITY MONITORING AND SAMPLING	1352.63
167-1500	1	MO	1051.37	WATER QUALITY INSPECTIONS	1051.37
171-0010	20300	LF	2.10	TEMPORARY SILT FENCE, TYPE A	42630.00
171-0030	2100	LF	4.11	TEMPORARY SILT FENCE, TYPE C	8631.00
700-7000	1	TN	61.37	AGRICULTURAL LIME	61.37
700-7010	1	GL	20.24	LIQUID LIME	20.24
700-8000	1	TN	350.95	FERTILIZER MIXED GRADE	350.95
700-8100	1	LB	2.25	FERTILIZER NITROGEN CONTENT	2.25
716-2000	13500	SY	0.98	EROSION CONTROL MATS, SLOPES	13230.00
Section Sub Total:					\$189,997.72

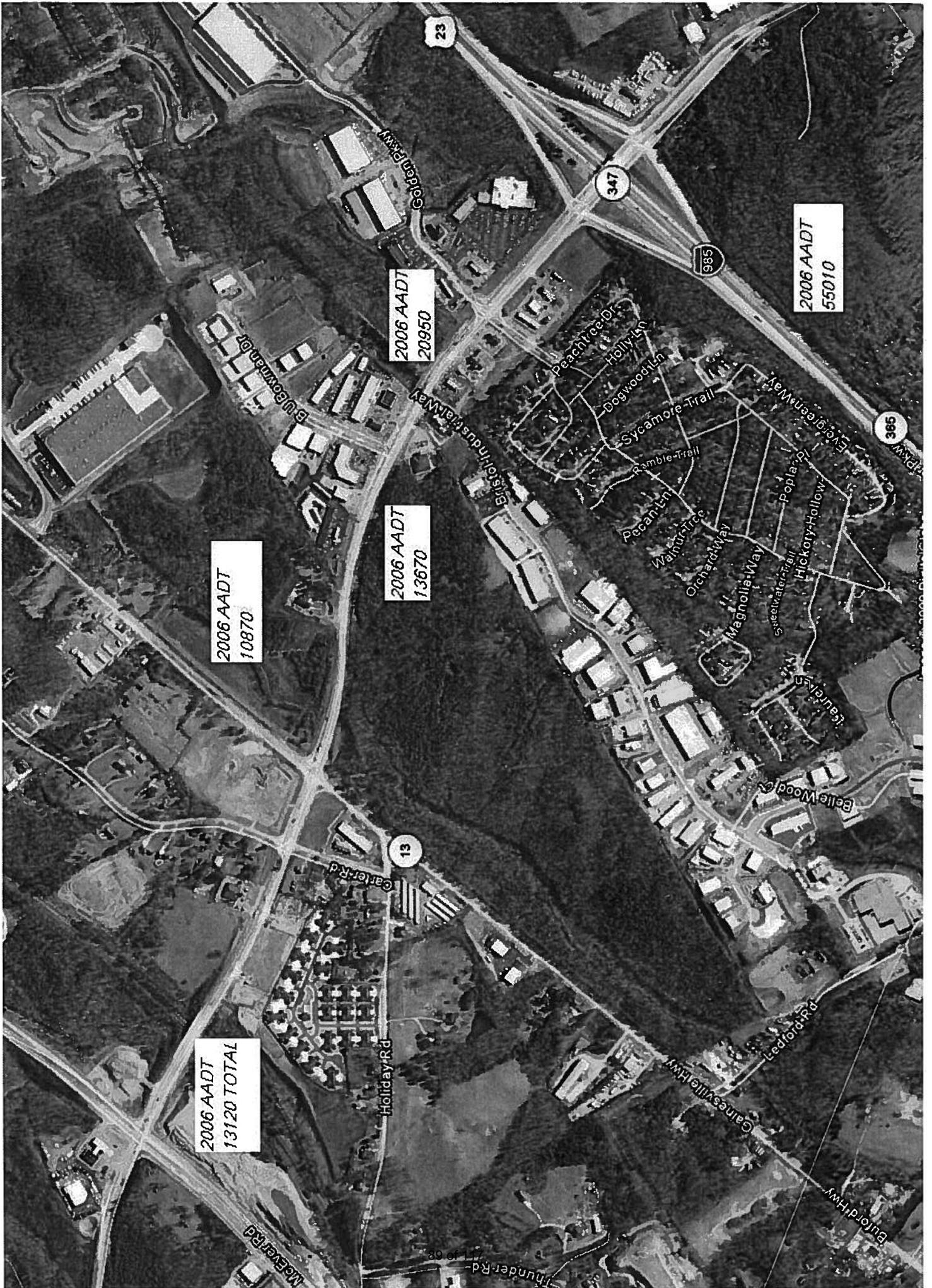
Total Estimated Cost: \$14,419,862.39

Subtotal Construction Cost \$14,419,862.39

E&C Rate 9.0 % \$1,297,787.62

Inflation Rate 0.0 % @ 0 Years \$0.00

Total Construction Cost	\$15,717,650.01
Right Of Way	\$6,723,833.00
ReImb. Utilities	\$160,000.00
	<hr/>
Grand Total Project Cost	\$22,601,483.01



2006 AADT
13120 TOTAL

2006 AADT
10870

2006 AADT
13670

2006 AADT
20950

2006 AADT
55010

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

District One

PROJECT CONCEPT REPORT

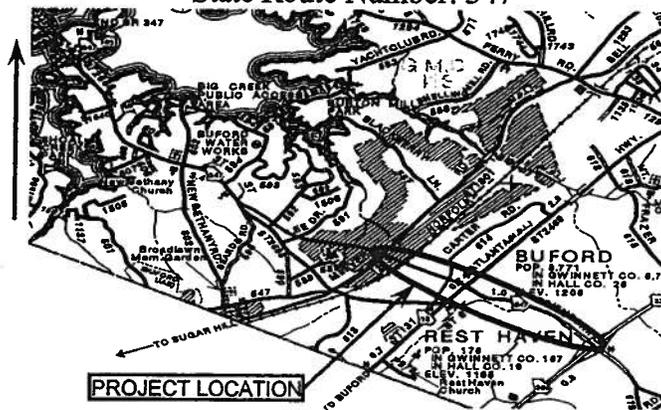
Project Number: STP-2688(4)

County: Hall

P. I. Number: 170735

Federal Route Number: None

State Route Number: 347



Recommendation for approval:

DATE 11-16-2004

Russell R. McMurtry
Project Manager

DATE 11-16-2004

[Signature]
Office Head/District Engineer

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

DATE _____

State Transportation Planning Administrator

DATE 11-22-04

[Signature]
State Transportation Financial Management Administrator

DATE _____

State Environmental/Location Engineer

DATE _____

State Traffic Safety & Design Engineer

DATE _____

Project Review Engineer

DATE _____

State Bridge and Structural Design Engineer

RECEIVED
AUG 27 2007
GAINESVILLE
STATE OF GEORGIA

DEPARTMENT OF TRANSPORTATION

STATE OF GEORGIA

INTERDEPARTMENTAL CORRESPONDENCE

FILE STP-2688 (4) Hall
PI No. 170735

OFFICE Materials and Research
DATE August 24, 2007

FROM  Georgene M. Geary, P. E., State Materials and Research Engineer

TO Russell McMurry, P. E., District Engineer, Gainesville
Attention: Neil Kantner

SUBJECT Pavement Evaluation Summary
SR 347 / Friendship Road From I-985 to CR 1293 / McEver Road

As requested, we have prepared a pavement evaluation summary for the
aforementioned site. The results of this work are attached.

If additional information is needed, please contact Steve Pahno of the
Pavement Management Branch at 404-363-7620.

GMG: JTR: AJJ: RBF

Attachments:

Pavement Evaluation Summary
Full-Depth Designs

Copy: file
Sheila Hines, State Bituminous Construction Engineer, Forest Park
Brandon Kirby, Area Engineer, Gainesville

PAVEMENT EVALUATION SUMMARY

For
STP-2688 (4) Hall County
PI No. 170735

1. LOCATION / DESCRIPTION

This project is for the widening and road improvements of SR 347 / Friendship Road and SR 13 / Atlanta Highway. The project is located in Hall County within the following station limits:

Station to Station

9+36± to 99+55±
 82+33± to 93+73±

Location

SR 347 / Friendship Road
 SR 13 / Atlanta Highway

2. PAVEMENT CONDITION SUMMARY

The existing pavement is in poor condition. On both roadways, level 3 and 4 distresses were observed throughout the project limits. Analysis of the cores revealed that cracks in 4 out of 5 specimens ran full-depth. Furthermore, the project typicals allow pavement retainment for only 400 feet of SR 13 / Atlanta Highway. Based on these conditions, we recommend full-depth reconstruction for the entire project.

3. FULL-DEPTH SECTIONS

The following full-depth pavement options are recommended for use on this project:

SR 347 / Friendship Road				
PAY ITEM NUMBER	MATERIAL	COURSE	THICKNESS	SPREAD RATE
402-4510	12.5 mm Superpave Poly-Mod	Surface	1.5 inches	165 lbs/yd ²
402-3190	19 mm Superpave	Binder	2 inches	220 lbs/yd ²
402-3121	25 mm Superpave	Asphalt Base	7 inches	770 lbs/yd ²
310-1101	Graded Aggregate Base	Base	12 inches	N/A

SR 13 / Atlanta Highway				
PAY ITEM NUMBER	MATERIAL	COURSE	THICKNESS	SPREAD RATE
402-4510	12.5 mm Superpave Poly-Mod	Surface	1.5 inches	165 lbs/yd ²
402-3190	19 mm Superpave	Binder	2 inches	220 lbs/yd ²
402-3121	25 mm Superpave	Asphalt Base	5 inches	550 lbs/yd ²
310-1101	Graded Aggregate Base	Base	12 inches	N/A

4. PAVEMENT DISTRESSES

Except for the following, no other distresses were encountered during the field investigation of this project:

Rutting Rutting measurements averaged 1/8 inch throughout the project.

Load Cracking Level 3 and 4 load cracking was observed throughout the project.

Block/ Transverse Cracking Level 2 and 3 block/transverse cracking was observed throughout the project.

5. CORES

Cores were recovered from 5 locations in the travel lanes of this project to determine the thicknesses of the existing pavement sections. Results of this work are presented in the table below:

Core Number	Location	Mile Post	Core Length	Underlying Material
1	SR 347 Eastbound	2.507±	6½ inches	GAB
2	SR 347 Westbound	2.837±	7¼ inches	GAB
3	SR 347 Westbound	3.139±	7¼ inches	GAB
4	SR 347 Eastbound	3.386±	5½ inches	GAB
5	SR 347 Eastbound	3.613±	6¼ inches	GAB

6. COPACES

For 2006, the average COPACES rating for this section of SR 347 was 82.

7. OTHER INFORMATION

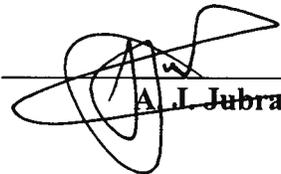
- The final Soil Survey Summary was prepared by the Geotechnical Engineering Bureau on July 14, 2005. The attached designs use the design values recommend in this report.
- The recommended full-depth pavement designs are attached.
- We have discussed this project with personnel at the District Office, and they concur that full-depth reconstruction is the preferred rehabilitation treatment for this project.

8. RECOMMENDATIONS

- Full-depth reconstruction is recommended based on the pavement's poor condition.

Reported By: Ryan B. Finley

Reviewed By:


A. J. Jubran, P. E.

FLEXIBLE PAVEMENT DESIGN ANALYSIS

Project: STP-2688 (4) Hall County

PI No.: 170735

Description: SR 347 / Friendship Rd from I-985 to CR 1293 / McEver Road

Traffic Data (NOTE: AADTs are one-way)

24-Hour Truck Percentage: 5.00%

AADT Initial Year of Design Period: 16,275 vpd (2010)

AADT Final Year of Design Period: 24,925 vpd (2030)

Mean AADT (one-way): 20,600 vpd

Design Loading

Mean AADT		LDF		Trucks		18-K ESAL		Total Loadings
20,600	*	0.80	*	0.050	*	1.06	=	874

Total predicted design period loading = 874 * 20 * 365 = 6,380,200

Design Data

Terminal Serviceability Index: 2.50

Soil Support: 2.50

Regional Factor: 2.00

PROPOSED FLEXIBLE PAVEMENT STRUCTURE

Material	Thickness Inches	Thickness (mm)	Structural Coefficient	Structural Value
12.5 mm Superpave (Polymer-Modified)	1.50	(38)	0.44	0.66
19 mm Superpave	2.00	(51)	0.44	0.88
25 mm Superpave	1.00	(25)	0.44	0.44
	6.00	(152)	0.30	1.80
Graded Aggregate Base	12.00	(305)	0.16	1.92

Required SN = 6.05

Proposed SN = 5.70

>>>Proposed Pavement is 5.8% Underdesigned <<<

Remarks: SR 347 / Friendship Road Reconstruction

Prepared By: Ryan B. Finley July 12, 2007

Recommended By:  Date
8-28-07
Office Head Date

Approved By:  Date
8/3/07
State Pavement Engineer Date

FLEXIBLE PAVEMENT DESIGN ANALYSIS

Project: STP-2688 (4) Hall County

PI No.: 170735

Description: SR 347 / Friendship Rd from I-985 to CR 1293 / McEver Road

Traffic Data (NOTE: AADTs are one-way)

24-Hour Truck Percentage: 5.00%

AA DT Initial Year of Design Period: 7,600 vpd (2010)

AA DT Final Year of Design Period: 11,300 vpd (2030)

Mean AA DT (one-way): 9,450 vpd

Design Loading

Mean AA DT	LDF	Trucks	18-K ESAL		Total Loadings
9,450	* 0.80	* 0.050	* 1.06	=	402

Total predicted design period loading = 402 * 20 * 365 = 2,934,600

Design Data

Terminal Serviceability Index: 2.50

Soil Support: 2.50

Regional Factor: 2.00

PROPOSED FLEXIBLE PAVEMENT STRUCTURE

Material	Thickness		Structural Coefficient	Structural Value
	Inches	(mm)		
12.5 mm Superpave (Polymer-Modified)	1.50	(38)	0.44	0.66
19 mm Superpave	2.00	(51)	0.44	0.88
25 mm Superpave	1.00	(25)	0.44	0.44
	4.00	(102)	0.30	1.20
Graded Aggregate Base	12.00	(305)	0.16	1.92

Required SN = 5.45

Proposed SN = 5.10

>>>Proposed Pavement is 6.5% Underdesigned <<<

Remarks: Atlanta Highway / SR 13 Reconstruction

Prepared By: Ryan B. Finley July 12, 2007

Recommended By: *Bill R. McManis* Date 8-28-07
Office Head Date

Approved By: *[Signature]* Date 8/3/07
State Pavement Engineer Date

SOIL SURVEY SUMMARY

For

STP-2688-(4), Hall County

PI No. 170735

- 1. Location / Description** This project is for the widening of SR 347/Freindship Rd. The project begins at Station 9+63.00 and continues west to Station 99+55.00. The project lies north of Rest Haven in Hall County.
- 2. Geology** This project will be geologically sited in the Metagraywacke Formation of the Micaschist Physiographic Region of the Piedmont Province.
- 3. Rock** None observed.
- 4. Removal** No material requiring removal was encountered.
- 5. Waste** None of the materials found on this project will require wasting.
- 6. Subgrade Materials** No additional subgrade material will be required for this project.
- 7. Pavement Design Values** We recommend the following values for use in the pavement design calculations for this project:

Soil Support Value = 2.5

Regional Factor = 2.0

Subgrade Reaction, k = 130 pci

Graded aggregate base is the only base material recommended for use on this project.

- 8. Slopes** Maximum 2:1 slopes will be safe for this project. However, embankment and cut slopes that are greater than 35 feet high will require construction of a berm in accordance with the attached detail at the following locations:

Station to Station

75+00-77+00

75+50-77+00

79+50-82+50

Location

Right

Left

Right, Left

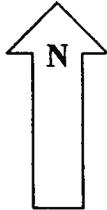
- 9. Groundwater** Groundwater was not observed on the project at the time of the investigation.

- 10. Shrinkage** We recommend an average shrinkage factor of 20% for use in the earthwork calculations for this project.
- 11. Culverts** We recommend that a 12-inch blanket of Type II Foundation Backfill material be placed under the barrel of all culverts and 46-inch diameter and larger cross-drains on this project.
- 12. Corrosion** Reference should be made to the attached "Pipe Culvert Materials Recommendations" for materials allowable by the Laboratory corrosion test.
- 13. Bench Detail** Where new fills are to be placed on existing slopes steeper than 3:1, the existing slope should be benched in accordance with the attached detail.
- 14. Pavement Design** We recommend the use of a minimum 10 inches of graded aggregate base in the pavement section for this project. However, this depth of base material may be slightly reduced on side streets with low-volume traffic.
- 15. Serrated Slopes** Serrated slopes will not be required on this project.
- 16. Special Problems** Several residences are located very close to the construction limits of this project. Vibrations from construction may cause some concern with property owners. We recommend that the Project Engineer contact the Geotechnical Engineering Bureau prior to construction to evaluate the need for crack surveys and vibration monitoring.

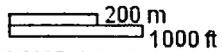
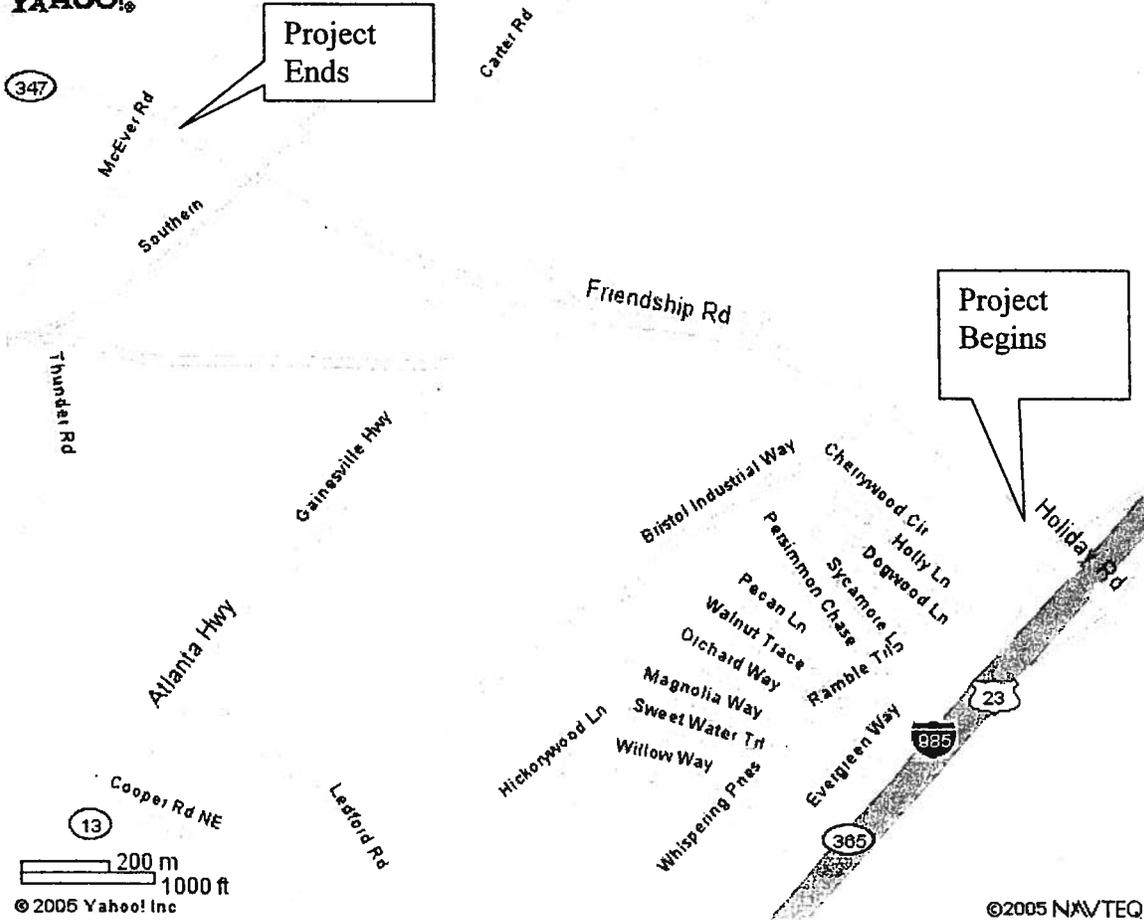
Reported By Ian Douglas Rish, EIT

Reviewed By Tom Sawyer, P.E.

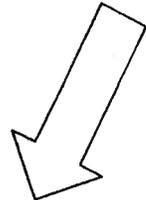
STP-2688(4)
SR347 Friendship Rd from
I-985 to CR 1293 McEver Rd



YAHOO!



© 2005 Yahoo! Inc
To Rest Haven



©2005 NAVTEQ

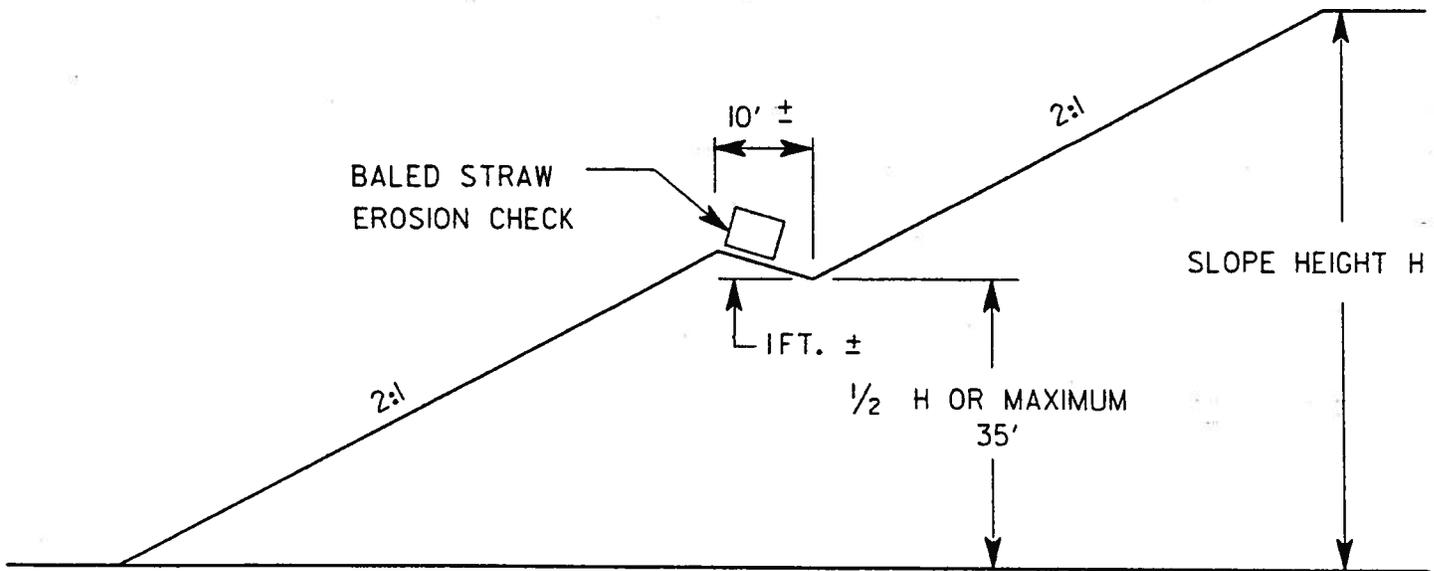
Pipe Culvert Material Alternates For Piedmont/Blue Ridge Region

TYPE OF PIPE INSTALLATION		CONCRETE	CORRUGATED STEEL AASHTO M-36		CORRU-GATED ALUMINUM AASHTO M-196	PLASTIC			
			ALUMINUM COATED (TYPE 2) CORR. STEEL	PLAIN ZINC COATED	PLAIN UNCOATED ALUMINUM	CORR. POLY- ETHYLENE AASHTO M-252	CORR. POLY- ETHYLENE SMOOTHED LINED AASHTO M-294 TYPE "S"	POLY VINYL CHLORIDE (PVC) PROFILE WALL AASHTO M-304	
STORM DRAIN	LONGITUDINAL INTERSTATE AND TRAVEL BEARING	X							
	LONGITUDINAL NON- INTERSTATE AND NON- TRAVEL BEARING	X	X		X		X	X	
	CROSS GRADE DRAIN	ADT < 250	X	X	X	X		X	X
		250 < ADT < 1500	X	X*		X			
		ADT > 1500	X						
	CROSS GRADE DRAIN	ADT < 250		X	X	X		X	X
		ADT > 250				X			
	SIDE DRAIN		X	X	X	X		X	X
PERMANENT SLOPE DRAIN			X	X	X		X	X	
PERFORATED UNDERDRAIN			X	X	X	X	X		

* This type pipe can be used if the addition of Type "B" Coating (AASHTO M-190, Half Bituminous Coated with Paved Invert) is utilized.

NOTES:

1. Allowable materials are indicated by an "X".
2. Structural requirements of storm drain pipe will be in accordance with Georgia Standard 1030-D or 1030-P, whichever is applicable, and the Standard Specifications.



NOTES:

1. FOR SLOPE HEIGHTS LESS THAN 70 FT. BUT GREATER THAN 35 FT., A BERM SHOULD BE CONSTRUCTED AT APPROX. $\frac{1}{2}$ THE SLOPE HEIGHT. FOR SLOPE HEIGHTS GREATER THAN 70 FT., CONSTRUCT A BERM EVERY 35 FT.
2. THE BERM SHOULD BE SLOPED TO DRAIN AND SHOULD BE CONNECTED TO CONCRETE FLUMES TO REMOVE WATER FROM SLOPE.
3. A DRAINAGE DITCH SHOULD BE CONSTRUCTED AT THE TOP OF CUT SLOPES WHERE WATER DRAINS TOWARDS SLOPE.

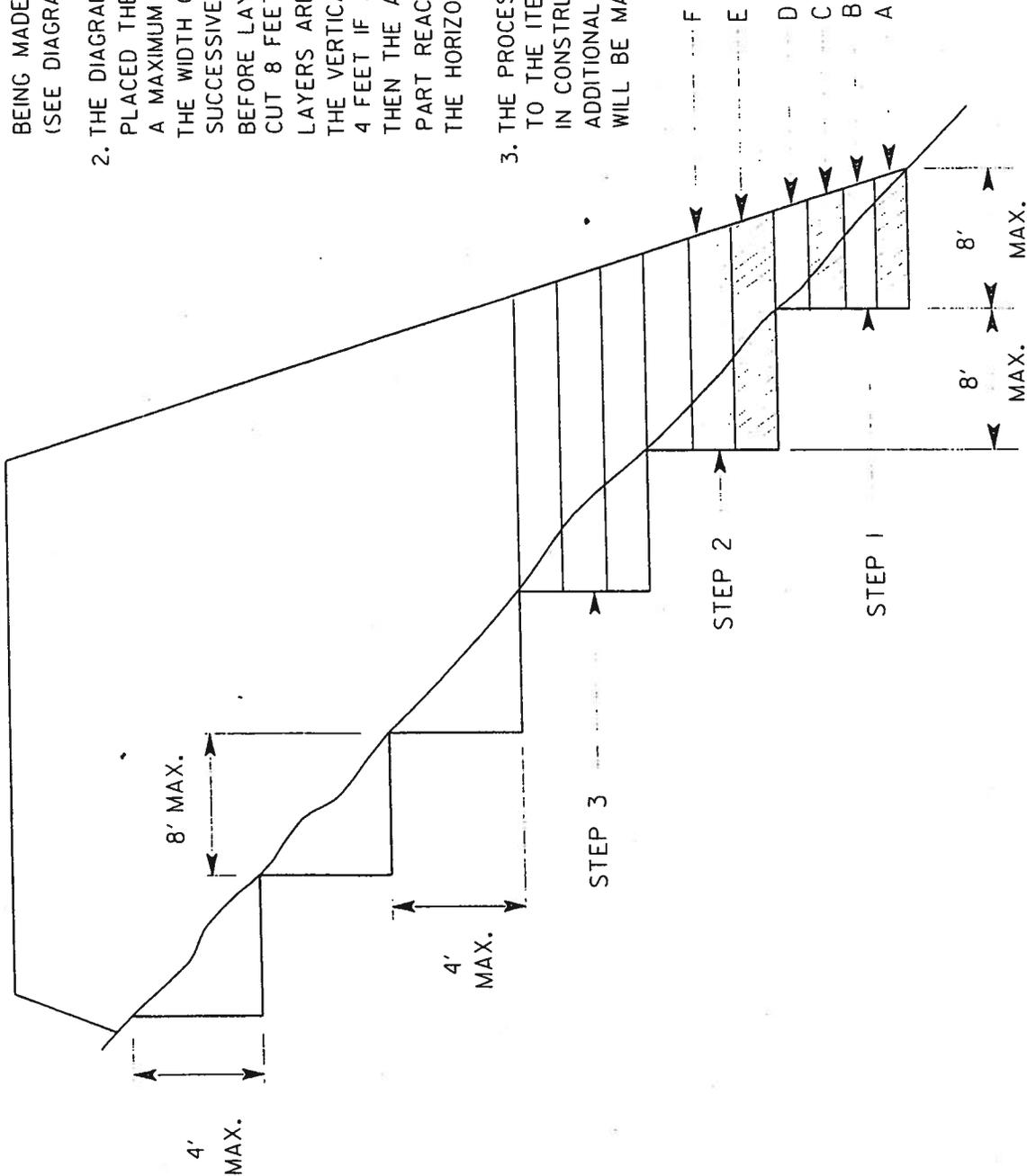
BERM DETAIL FOR CUTS OR FILLS OVER 35 FEET

NO SCALE

1. WHERE THE EMBANKMENT IS TO BE PLACED ON A HILLSIDE OR ANOTHER EXISTING EMBANKMENT HAVING A SLOPE OF 3 TO 1 OR STEEPER, THE FOUNDATION MUST BE BENCHED WHILE THE EMBANKMENT IS BEING MADE.
(SEE DIAGRAM AT LEFT.)

2. THE DIAGRAM SHOWS THAT BEFORE LAYER "A" IS PLACED THE FIRST STEP (D) IS CUT INTO THE SLOPE A MAXIMUM DISTANCE OF ABOUT 8 FEET (ABOUT $\frac{3}{4}$ THE WIDTH OF THE TYPICAL D-8 BULLDOZER BLADE). SUCCESSIVE LAYERS B, C, AND D ARE THEN PLACED BEFORE LAYER "E" IS PLACED, THE SECOND STEP IS CUT 8 FEET INTO THE SLOPE AND SUCCESSIVE LAYERS ARE AGAIN PLACED. IF IT IS ANTICIPATED THAT THE VERTICAL PART OF THE STEP WILL EXCEED 4 FEET IF A 8 FEET HORIZONTAL CUT IS MADE, THEN THE ACTUAL CUT STOPS WHEN THE VERTICAL PART REACHES A MAXIMUM OF 4 FEET ALLOWING THE HORIZONTAL DISTANCE TO VARY.

3. THE PROCESS OF BENCHING IS CONSIDERED INCIDENTAL TO THE ITEM OF UNCLASSIFIED EXCAVATION AND BORROW IN CONSTRUCTION OF THE EMBANKMENT AND NO ADDITIONAL MEASUREMENT OF QUANTITY OR PAYMENT WILL BE MADE FOR BENCHING.



BENCHING DETAIL

NO SCALE

Value Engineering Process

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 January 13 through 16, 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, P.E., CVS-Life	Certified Value Specialist
Donn Digamon., P.E	Senior Bridge Structural Engineer
Kevin Martin, Esq. AVS	Highway Construction Specialist
John Luh, Ph.D., P.E., PTOE, AICP, AVS	Highway and Transportation PE
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 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 supposed to do?”, and “How is it supposed to accomplish this purpose? In the Value Engineering vernacular, the answers to these questions are cast in the form of active verbs and measurable nouns. These verb/noun pairs form the basis of the function analysis which distinguishes a Value Engineering effort from a potentially damaging cost cutting exercise.

- The important functions of the project were identified as follows:
 - **Project Objective/Goals**
 - **Improve Level of Service**
 - **Improve safety**
 - **Accommodate economic growth**
 - **Maintain reasonable schedule**
 - **Reduce construction costs**
 - **Project Basic Functions**
 - **Separate traffic**
 - **Increase capacity**
 - **Reduce conflicts**
 - **Improve pavement**
- **Speculation Phase** - The VE team performed a brainstorming session to identify ideas that might help meet the project objectives:
 - **Add travel lanes**
 - **Reduce Right of Way taking**
 - **Eliminate widening of bridge**

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.

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

Project No. STP00-2688-00(004)

P.I. No. 170735

Widening and Reconstruction of SR 347 from I-985 to McEver Road

Hall County

January 13-16 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
- VE team site visit if time allows

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

FUNCTION ANALYSIS AND COST-WORTH



Georgia Department of Transportation
 STP00-2688-00(004) – P.I. No. 170735
 SR 347 Widening and Reconstruction – Hall County

SHEET NO.: 1 of 2

NO.	ELEMENT	FUNCTION			COST (000)	WORTH (000)	COMMENTS
		VERB	NOUN	KIND			
1	OVERALL PROJECT	Increase	Traffic Capacity	B	22,601	19000`	C/W = 1.18
		Reduce	Congestion	B			
		Enhance	Safety	S			
2	RIGHT-OF-WAY	Accommodate	Widening	B	6,724	4,900	C/W=1.37
		Facilitate	Utilities	RS			
3	ASPHALT CONCRETE PAVING	Create	Lanes	B	4,126	3,500	C/W=1.17
		Increase	Capacity	B			
4	MEDIANS	Enhance	Safety	S	2,509	2,000	C/W=1.0
5	GRADING	Prepare	Site	S	2,462	2,000	C/W=1.0
6	BASE	Support	Loads	S	1,298	1,298	C/W=1.0
7	DRAINAGE	Route	Stormwater	S	966	966	C/W=1.0
8	BRIDGE	Cross	Railroad	B	609	300	C/W=2.0
		Separate	Traffic	S			

Function defined as: Action Verb
 Measurable Noun

Kind: B = Basic HO = Higher Order
 S = Secondary LO = Lower Order
 RS = Required Secondary

Cost/Worth Ratio =
 (Total Cost ÷ Basic Worth)

FUNCTION ANALYSIS AND COST-WORTH



Georgia Department of Transportation
 STP00-2688-00(004) – P.I. No. 170735
 SR 347 Widening and Reconstruction – Hall County

SHEET NO.: 2 of 2

NO.	ELEMENT	FUNCTION			COST (000)	WORTH (000)	COMMENTS
		VERB	NOUN	KIND			
9	SIGNING & MARKING	Enhance	Safety	S	593	593	CW=1.0
10	CURB & GUTTER			S	504	504	C/W=1.0
11	MISCELLANEOUS ROADWAY ITEMS	Improve	Roadway	S	377	377	CW=1.0
12	SIDEWALKS & DRIVEWAYS	Separate	Pedestrian Traffic	S	340	100	C/W=3.4
13	TRAFFIC CONTROL	Facilitate	Safe Construction	S	309	309	C/W=1.0
14	EROSION CONTROL	Stabilize	Earthwork	S	190	190	CW=1.0
		Stabilize	Earthwork	S			
15	REIMBURSABLE UTILITIES	Access	Site	S	160	160	C/W=1.0
		Reduce	Maintenance	S			
15	RETAINING WALLS	Reduce	ROW Taking	S	138	138	C/W=1.0
		Stabilize	Earthwork	S			

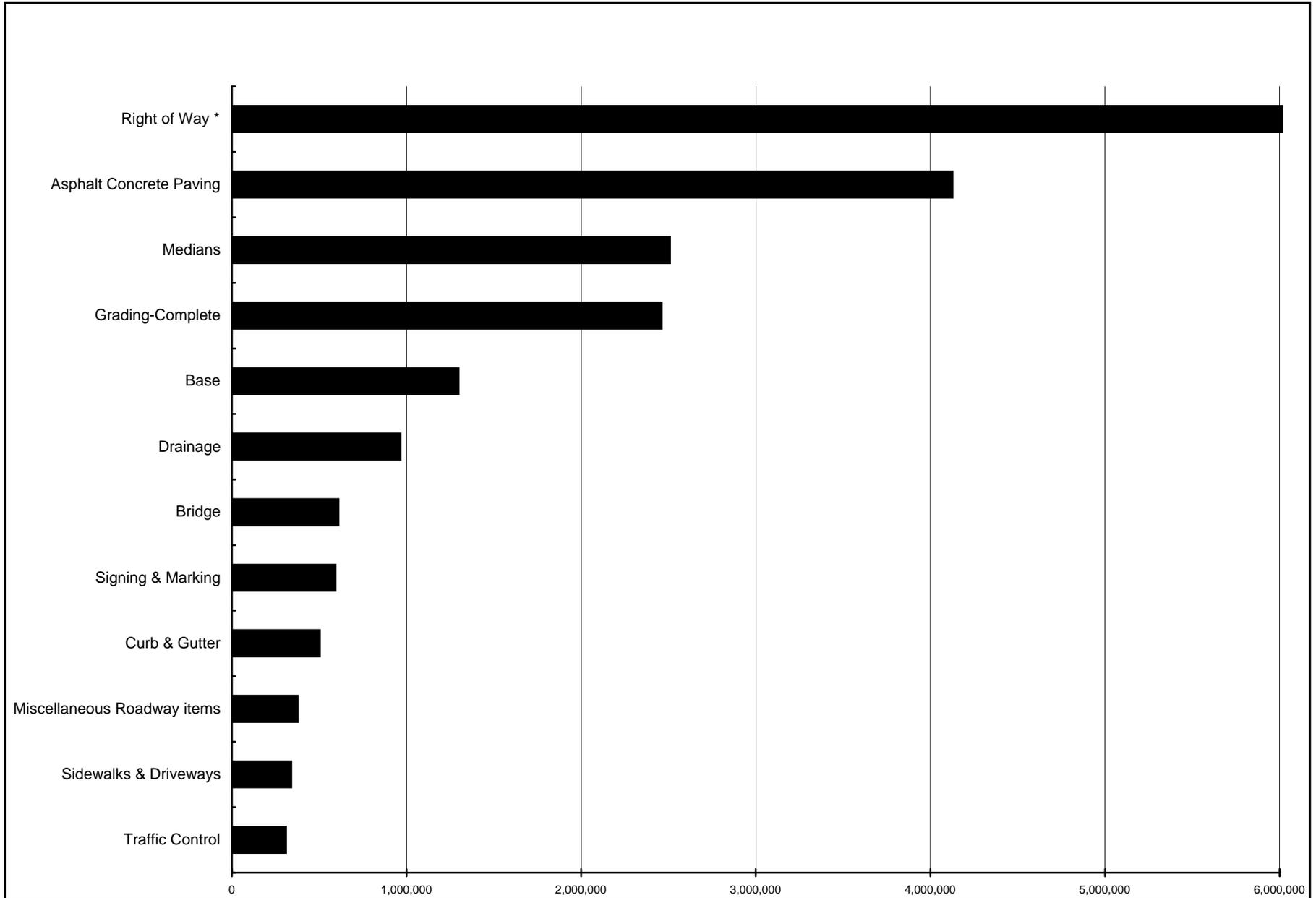
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Kind: B = Basic
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Cost/Worth Ratio =
 (Total Cost ÷ Basic Worth)

Project: STP00-2688-00(004)
P.I. No.:170735
Hall County



DESIGNER PRESENTATION



MEETING PARTICIPANTS

Geogia Department of Transportation		January 13, 2009		
STP00-2688-00(04) - P.I. No.: 170735 - Hall County				
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VE TEAM PRESENTATION

Georgia Department of Transportation		January 16, 2009		
STP00-2688-00(04) - P.I. No.: 170735 - Hall County				
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John Luh, P.E.		PBS&J	jzjuh@pbsj.com	678-247-2606

CREATIVE IDEA LISTING



**PROJECT: Georgia Department of Transportation
STP00-2688-00 (004) – P.I. No. 170735
SR 347 - Widening and Reconstruction
Hall County**

SHEET NO.: 1 of 2

NO.	IDEA DESCRIPTION	RATING
ROADWAY (RD)		
RD-1	Delete sidewalks	2
RD-2	Reduce concrete median width	2
RD-3	Reduce Right-of-Way acquisition	2
RD-4	Use 11' inside lane	3
RD-5	Reduce Right-of-Way costs	2
RD-6	Salvage more of the existing use overlay	3
RD-7	Reduce Right-of-Way at SR 13 by shortening ties	3
RD-8	Reduce Right-of-Way @SR 13 and SR 347	5
RD-9	Reduce ties @SR 347 and McEver	5
RD-10	Reduce Right-of-Way and Construction Easement for Parcel 4, 7, and 8	4
RD-11	Reduce Right-of-Way and Construction Easement for Parcel #11	4
RD-12	Reduce Right-of-Way and Construction Easement for Parcel #12	4
RD-13	Reduce Right-of-Way and Construction Easement for Parcel #15 and 16	4
RD-14	Reduce Right-of-Way Parcel #36	2
RD-15	Reduce Right-of-Way Parcel #8	2
RD-16	Reduce Right-of-Way Parcel #29	2
RD-17	Reduce Right-of-Way Parcel #19	2
RD-18	Reduce Right-of-Way Parcel #34	2
RD-19	Eliminate selected right-in and right-out	3
RD-20	Use two way left turn lanes in-lieu of concrete median	4
RD-21	Construct sidewalks on one side of proposed roadway only	2
RD-22	Construct one multi use trail; delete sidewalks	2

**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**

CREATIVE IDEA LISTING



PROJECT: Georgia Department of Transportation
HPP00-0000-00(345) – P.I. No. 0000345
SR 307 - New Overpass over Port Authority Rail Line
Chatham County

SHEET NO.: **2 of 2**

NO.	IDEA DESCRIPTION	RATING
ROADWAY (RD)		
RD-23	Eliminate the future 2 nd left turn space on cross street alignments	2
RD-24	Segregate widening to the side one side of existing roadway	2
RD-25	Shift roadway alignment to the north @ Sta 63+00 to Sta 71+00	3
RD-26	Utilize existing profile grade line ; construct no corrections to existing facility vertically	4
RD-27	Place sidewalks on Right-of-Way at existing grade	2
RD-28	Eliminate median opening/u-turn @ Sta 50+00	3
RD-29	Construct full build-up pavement on top of existing	2
RD-30	Reduce western termini	2
RD-31	Reduce tie-in limits @ SR 347 and McEver	2
RD-32	Delete sidewalks on the west portion of the project	4
RD-33	Delay construction of sidewalks	2
BRIDGE(BR)		
BR-1	Eliminate widening by reducing median width and no parapet construction	4
BR-2	Eliminating widening by reducing median width and parapet construction	4
BR-3	Construct separate pedestrian bridge structure in-lieu of proposed widening	2
BR-4	Widen existing bridge using existing substructure	2
BR-5	Isolate bridge widening to one side as opposed to both sides	2
BR-6	Attach fence to existing barrier. Construct sidewalks and reduce the width of median	2

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