

VALUE ENGINEERING REPORT

Sardis Road Connector
STP00-0003-00(626), PI No. 0003626
Hall County

June 24, 2011

PROJECT SPONSOR:



Hall County
Department of Public Works & Utilities
300 Henry Ward Way
Gainesville, GA 30501

OWNER:



Georgia Department of Transportation
600 West Peachtree Street
Atlanta, GA 30308

VALUE ENGINEERING CONSULTANT:



MACTEC Engineering and Consulting, Inc.
3200 Town Point Drive NW, Suite 100
Kennesaw, GA 30144

TABLE OF CONTENTS

VALUE ENGINEERING STUDY

Sardis Road Connector
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Executive Summary.....	1
Introduction	1
Considerations	1
Results Obtained.....	2
Summary of Recommendations	2
Summary of Potential Cost Savings.....	7
Study Identification	9
VE Team Members.....	9
Project Description	9
Conditions/Constraints	9
Project Briefing	10
Project Vicinity Map	11
Value Engineering Recommendations	12
Appendix	
Sources	80
Cost Model	81
Fast Diagram	82
Function Analysis.....	83
Creative Ideas / Idea Evaluation.....	87
VE Study Sign-in Sheet.....	93

EXECUTIVE SUMMARY

Executive Summary

VALUE ENGINEERING STUDY

STP00-0003-00(626), PI No. 0003626
Sardis Road Connector – Hall County
June 13-16, 2011

Introduction

This report presents the results of a value engineering (VE) study conducted on the preliminary design for the Sardis Road Connector. This project consists of widening and reconstructing several existing local roads in addition to portions of the project requiring alignment on new location. The proposed 3.4 mile connector route starts at the Sardis Road / Chestatee Road intersection and extends north to SR 60. The proposed roadway will consist of a four-lane divided facility with urban shoulders, a closed drainage system and a 20-foot wide raised concrete median. The connector will also have multi-use paths on both sides of the road.

Major contract work items include roadway grading, asphalt pavement, raised concrete median, curb and gutter, and concrete multi-use paths. The total estimated project cost including right-of-way (R/W) is \$40.7 million. Preliminary engineering and R/W costs are being paid for by Hall County. Project construction costs are being paid for by GDOT. The study took place June 13-16, 2011, at the Georgia DOT Headquarters Office in Atlanta using a three person VE team.

This report presents the Team's recommendations and all back-up information, for consideration by the decision-makers. This **Executive Summary** includes a brief description of each recommendation. The **Study Identification** section contains information about the project and the team. The **Recommendations** section presents a more detailed description and support information about each recommendation. The **Appendix** includes a complete record of the Team's activities and findings. The reader is encouraged to review all sections of the report in order to obtain a complete understanding of the VE process.

Considerations

The VE team was presented with several considerations / constraints to deal with when developing their recommendations. The constraints were; concentrate on the preferred alignment and do not revisit any of the other alignment variations, do not increase the amount of R/W required to construct the project, and do not increase the project's impact on the adjacent historical sites.

Current project status: The Project Concept Report has been prepared and submitted to GDOT for approval. Work is underway on the draft Environmental Assessment with approval scheduled for 2012. Right-of-way acquisition has been scheduled for 2012 with construction scheduled for 2015.

Results Obtained

The VE team focused their efforts on the high cost items of the project. Through the use of functional analysis and “brain storming” techniques, the team generated 38 ideas with 23 being identified for additional evaluation as possible recommendations or design suggestions. The VE team developed 9 independent recommendations and 6 alternative recommendations.

Implementation of the 9 independent recommendations has the potential to reduce the project cost by approximately \$5.07 to \$5.45 million. A detailed write-up of each recommendation is contained in the respective portion of this report. A summary of the recommendations follows.

Recommendation Highlights

Idea # A-1: Roll / lower the vertical profile between Station 163 and Station 187 to lower the large embankment, reduce the culvert length at stream #7 & reduce R/W impacts.

The original design profile utilizes a constant uphill gradient between Station 163 and Station 183. This profile results in a large cut section between Station 167 & 174, a large fill section between Station 174 & 180, and another cut section between Station 181 & 187. This concept requires several relocations and impacts Stream #6 and Stream #7.

This recommendation revises the vertical profile by adding a sag vertical curve and to reduce the fill height from Station 174 to Station 180 by up to 26 feet. This concept allows for more balanced fill and cut slopes, reduces culvert pipe length, reduces stream impacts, and reduces some easement areas.

The total potential savings if accepted is \$507,000.

Idea # A-1.1: Alternative to Idea A-1 Roll / lower the vertical profile between Station 163 and Station 187 and construct MSE walls to further reduce embankment, R/W, and stream impacts.

The original design profile utilizes a constant uphill gradient between Station 163 and Station 183. This profile results in a large cut section between Station 167 & 174, a large fill section between Station 174 & 180, and another cut section between Station 181 & 187. This concept requires several relocations and impacts Stream #6 and Stream #7.

This recommendation revises the vertical profile by adding a sag vertical curve and to reduce the fill height from Station 174 to Station 180 by up to 26 feet. It also adds MSE walls between Station 175 and Station 179 to further reduce stream and relocation impacts. This concept allows for more balanced fill and cut slopes and reduces culvert pipe length.

The total potential savings if accepted is \$1,493,000.

Idea # B-1: Eliminate the asphalt pavement section from under the raised concrete median.

The original design proposes a roadway typical section of 4-12-foot lanes with a 20-foot raised concrete median. The original concept places full-depth pavement (9 ½ inches of asphalt over 12 inches of GAB) over the entire 68-foot typical section width.

This recommendation would replace the full-depth pavement below the concrete median with a 6-inch lift of GAB. This concept will result in significant cost savings while providing a stable foundation for the concrete median.

The total potential savings if accepted is \$776,000.

Idea # B-1.1: Alternative to Idea B-1 Reduce the thickness of the asphalt pavement section under the raised concrete median.

The original design proposes a roadway typical section of 4-12-foot lanes with a 20-foot raised concrete median. The original concept places full-depth pavement (9 ½ inches of asphalt over 12 inches of GAB) over the entire 68-foot typical section width.

This recommendation would replace the full-depth pavement below the concrete median with a reduced thickness pavement section of 4 inches of asphalt over 6 inches of GAB. Eliminating full-depth pavement from below the proposed concrete median and substituting an alternate, suitable base will result in significant cost savings and provide a stable foundation for the concrete median.

The total potential savings if accepted is \$479,000.

Idea # B-3: Reduce the thickness of the asphalt pavement for the right and left turn lanes to 4 inches of asphalt over 6 inches of GAB course.

The original design proposes a roadway typical section of 4-12-foot lanes with a 20-foot raised concrete median. The original concept places full-depth pavement (9 ½ inches of asphalt over 12 inches of GAB) over the entire 68-foot typical section width and for all other pavement sections throughout the entire project.

This recommendation would use a reduced pavement section of 4 inches of asphalt on 6 inches of GAB in non-mainline areas; such as, turn lanes and side roads. Traffic volumes on the turn lanes and side roads are significantly less than the mainline through lanes allowing for a reduced thickness pavement section.

The total potential savings if accepted is \$459,000.

Idea # B-4: Reduce the width of the through traffic lanes on Sardis Road Connector from 12 feet to 11 feet.

The original design proposes a roadway typical section of 4-12-foot lanes with a 20-foot raised concrete median.

This recommendation would reduce the width of the through travel lanes from 12 feet to 11 feet. This concept is applicable to both the original 4-lane divided roadway design and the VE team's 5-lane alternative Idea B-5. The traffic volumes (2035 – 18,020 ADT) and truck percentages (4%) are low for a 4-lane divided facility, thereby allowing a lane width reduction.

The total potential savings if accepted is \$440,000.

Idea # B-5: Construct a 5-lane roadway consisting of four, 12-foot lanes and a 14-foot center lane in-lieu-of the current 4-lane divided roadway.

The original design proposes a roadway typical section of 4-12-foot lanes with a 20-foot raised concrete median.

This recommendation would construct a 5-lane roadway with four, 12-foot lanes and one, 14-foot center turn lane in-lieu-of the original 4-12-foot lanes with a 20-foot raised concrete median. A 5-lane roadway will accommodate the anticipated future traffic on this route. This concept reduces the footprint of the typical section saving pavement, earthwork, and R/W cost.

The total potential savings if accepted is \$1,618,000.

Idea # B-5.1: Alternative to Idea B-5 Construct a 5-lane roadway consisting of four, 11-foot lanes, a 16-foot center turn lane, and dual 4-foot bike lanes.

The original design proposes a roadway typical section of two, 4-12-foot lanes with a 20-foot raised concrete median.

This recommendation would construct a 5-lane roadway with four, 11-foot lanes, one, 16-foot center turn lane, and dual 4-foot bike lanes in-lieu-of the original 4-12-foot lanes with a 20-foot raised concrete median. This concept is also 68 feet wide. Placing the bike lanes on the roadway is similar to the placement of bike lanes on other facilities throughout the area. Constructing the center lane 16-feet wide would allow for the placement of a raised concrete median at a future date if traffic or access conditions warrant closing the median.

The total potential savings if accepted is \$1,340,000.

Idea # B-8: Revise / modify the Mount Vernon Road approach to SR 60.

The current design reconstructs the Mount Vernon Road approach to SR 60 with full width widening, dual left-turn lanes, and a raised concrete median.

It is recommended that this location incorporate space saving features including eliminating the raised median, using a single left turn lane, shortening the NB transitions and combining the SB through and right turn lanes on the Mount Vernon Road approach to the SR 60 intersection. Implementing these changes would reduce the project's impact on the Corinth Baptist Church and the Historic Cemetery.

The total potential savings if accepted is \$385,000.

Idea # B-9: Construct a 4-Lane / 2-Lane Sardis Road Connector based on project traffic volumes.

The current design concept is to construct the full length of the Sardis Road Connector 4-lane divided roadway.

It is recommended that the Sardis Road Connector be constructed in two segments. The segment between the south end of the project and Sardis Road would remain a 4-lane divided roadway while the section north of Sardis Road would be constructed as a 2-lane roadway. The March 15, 2010, Traffic Forecast memorandum indicates that Segment D (Southers Road to SR 60) would have a 2035 design year ADT of 9,840 and operate at a level of service of "C" in the 2-lane option making this split roadway concept viable. There are substantial construction and right of way cost savings to be realized by constructing a split roadway section.

The total potential savings if accepted is \$5,246,000.

Idea # E-1: Construct a 16-foot raised concrete median in-lieu-of a 20-foot raised concrete median.

The original design proposes a roadway typical section with a 20-foot raised concrete median.

This recommendation would construct a 16-foot raised concrete median in-lieu-of a 20-foot raised concrete median. This concept provides the same function and median openings as the original design.

The total potential savings if accepted is \$743,000.

Idea # E-1.1: Alternative to Idea E-1 Construct a raised grass median in-lieu-of a raised concrete median in areas where the median is 20 feet wide.

The original design proposes a roadway typical section with a 20-foot raised concrete median.

This recommendation would construct a raised grass median in-lieu-of a 20-foot raised concrete median in areas where the median is 20 feet wide. Changing the type of raised median does not change the function of the median.

The total potential savings if accepted is \$682,000.

Idea # G-1: Construct a single 10-foot concrete multi-use path on one side and a 5-foot concrete sidewalk on the other side.

The original design for the Sardis Road connector includes the construction of 10-foot concrete multi-use paths on both side of the new roadway.

This recommendation would construct a single 10-foot concrete multi-use path on one side of the roadway and a standard 5-foot concrete sidewalk on the opposite side. This concept does not preclude widening the 5-foot sidewalk side to provide additional multi-use capacity in the future if warranted.

The total potential savings if accepted is \$184,000.

Idea # G-1.1: Alternative to Idea G-1 Construct dual 8-foot concrete multi-use paths in-lieu-of dual 10-foot concrete multi-use paths.

The original design for the Sardis Road connector includes the construction of 10-foot concrete multi-use paths on both side of the new roadway.

This recommendation would construct 8-foot concrete multi-use paths on both sides of the new roadway.

The total potential savings if accepted is \$148,000.

Idea # G-1.2: Alternative to Idea G1 Construct a single 8-foot concrete multi-use path on one side and a 5-foot concrete sidewalk on the other side.

The original design for the Sardis Road connector includes the construction of 10-foot concrete multi-use paths on both side of the new roadway.

This recommendation would construct a single 8-foot concrete multi-use path on one side of the roadway and a standard 5-foot concrete sidewalk on the opposite side. With nearly half the project on new alignment, the VE team assumed that pedestrian traffic would be very light.

The total potential savings if accepted is \$258,000.

**Project - Sardis Road Connector – Hall County
SUMMARY OF POTENTIAL COST SAVINGS**

ITEM No.	CREATIVE IDEA DESCRIPTION	ORIGINAL INITIAL COST	PROPOSED INITIAL COST	INITIAL COST SAVINGS	FUTURE SAVINGS	TOTAL LIFE CYCLE SAVINGS
RECOMMENDATIONS						
A-1	Roll / lower the vertical profile between Station 163 and Station 187 to lower the large embankment, reduce the culvert length at stream #7, & reduce R/W impacts.	\$507,000	\$0	\$507,000	N/A	\$507,000
A1.1	<u>Alternative to Idea A-1</u> Roll / lower the vertical profile between Station 163 and Station 187 and construct MSE walls to further reduce embankment, R/W, and stream impacts.	\$2,847,000	\$1,354,000	\$1,493,000	N/A	\$1,493,000
B-1	Eliminate the asphalt pavement section from under the raised concrete median.	\$874,000	\$98,000	\$776,000	N/A	\$776,000
B-1.1	<u>Alternative to Idea B-1</u> Reduce the thickness of the asphalt pavement section under the raised concrete median.	\$861,000	\$382,000	\$479,000	N/A	\$479,000
B-3	Reduce the thickness of the asphalt pavement for the right and left turn lanes to 4 inches of asphalt over 6 inches of GAB.	\$826,000	\$367,000	\$459,000	N/A	\$459,000
B-4	Reduce the width of the through traffic lanes on Sardis Road Connector from 12 feet to 11 feet.	\$440,000	\$0	\$440,000	N/A	\$440,000
B-5	Construct a 5-lane roadway consisting of four, 12-foot lanes and a 14-foot center lane in-lieu-of the current 4-lane divided roadway.	\$1,618,000	\$0	\$1,618,000	N/A	\$1,618,000

**Project - Sardis Road Connector – Hall County
SUMMARY OF POTENTIAL COST SAVINGS**

ITEM No.	CREATIVE IDEA DESCRIPTION	ORIGINAL INITIAL COST	PROPOSED INITIAL COST	INITIAL COST SAVINGS	FUTURE SAVINGS	TOTAL LIFE CYCLE SAVINGS
B-5.1	<u>Alternative to Idea B-5</u> Construct a 5-lane roadway consisting of four, 11-foot lanes, a 16-foot center turn lane, and dual 4-foot bike lanes.	\$1,709,000	\$369,000	\$1,340,000	N/A	\$1,340,000
B-8	Revise / modify the Mount Vernon Road approach to SR 60.	\$385,000	\$0	\$385,000	N/A	\$385,000
B-9	Construct a 4-Lane / 2-Lane Sardis Road Connector based on project traffic volumes.	\$5,246,000	\$0	\$5,246,000	N/A	\$5,246,000
E-1	Construct a 16-foot raised concrete median in-lieu-of a 20-foot raised concrete median.	\$1,402,000	\$659,000	\$743,000	N/A	\$743,000
E-1.1	<u>Alternative to Idea E-1</u> Construct a raised grass median in-lieu-of a raised concrete median in areas where the median is 20 feet wide.	\$817,000	\$135,000	\$682,000	N/A	\$682,000
G-1	Construct a single 10-foot concrete multi-use path on one side and a 5-foot concrete sidewalk on the other side.	\$738,000	\$554,000	\$184,000	N/A	\$184,000
G-1.1	<u>Alternative to Idea G-1</u> Construct dual 8-foot concrete multi-use paths in-lieu-of dual 10-foot concrete multi-use paths.	\$738,000	\$590,000	\$148,000	N/A	\$148,000
G-1.2	<u>Alternative to Idea G1</u> Construct a single 8-foot concrete multi-use path on one side and a 5-foot concrete sidewalk on the other side.	\$738,000	\$480,000	\$258,000	N/A	\$258,000

STUDY IDENTIFICATION

Study Identification

Project: Sardis Road Connector	Date: June 13-16, 2011
Location: Hall County	

VE Team Members

Name:	Title:	Organization:	Telephone:
George Obaranec	Design, Construction	MACTEC	770-421-3346
Lenor Bromberg	Design, Environment	KEA	678-904-8591
Keith Borkenhagen	VE Team Facilitator	MACTEC	623-556-1875

Project Description

This project consists of a new connector roadway and will include widening and reconstructing several existing local roads in addition to portions of the project requiring alignment on new location. The proposed 3.4 mile Sardis Road Connector route starts at the Sardis Road / Chestatee Road intersection and extends north to SR 60. The proposed roadway will consist of a four-lane divided facility with urban shoulders, a closed drainage system and a 20-foot wide raised concrete median. The connector will also have multi-use paths on both sides of the road.

Major contract work items include roadway grading, asphalt pavement, raised concrete median, curb and gutter, and concrete multi-use paths. The total estimated project cost including right-of-way (R/W) is \$40.7 million. Preliminary engineering and R/W costs are being paid for by Hall County. Project construction costs are being paid for by GDOT.

Conditions / Constraints

The VE team was presented with the following considerations / constraints:

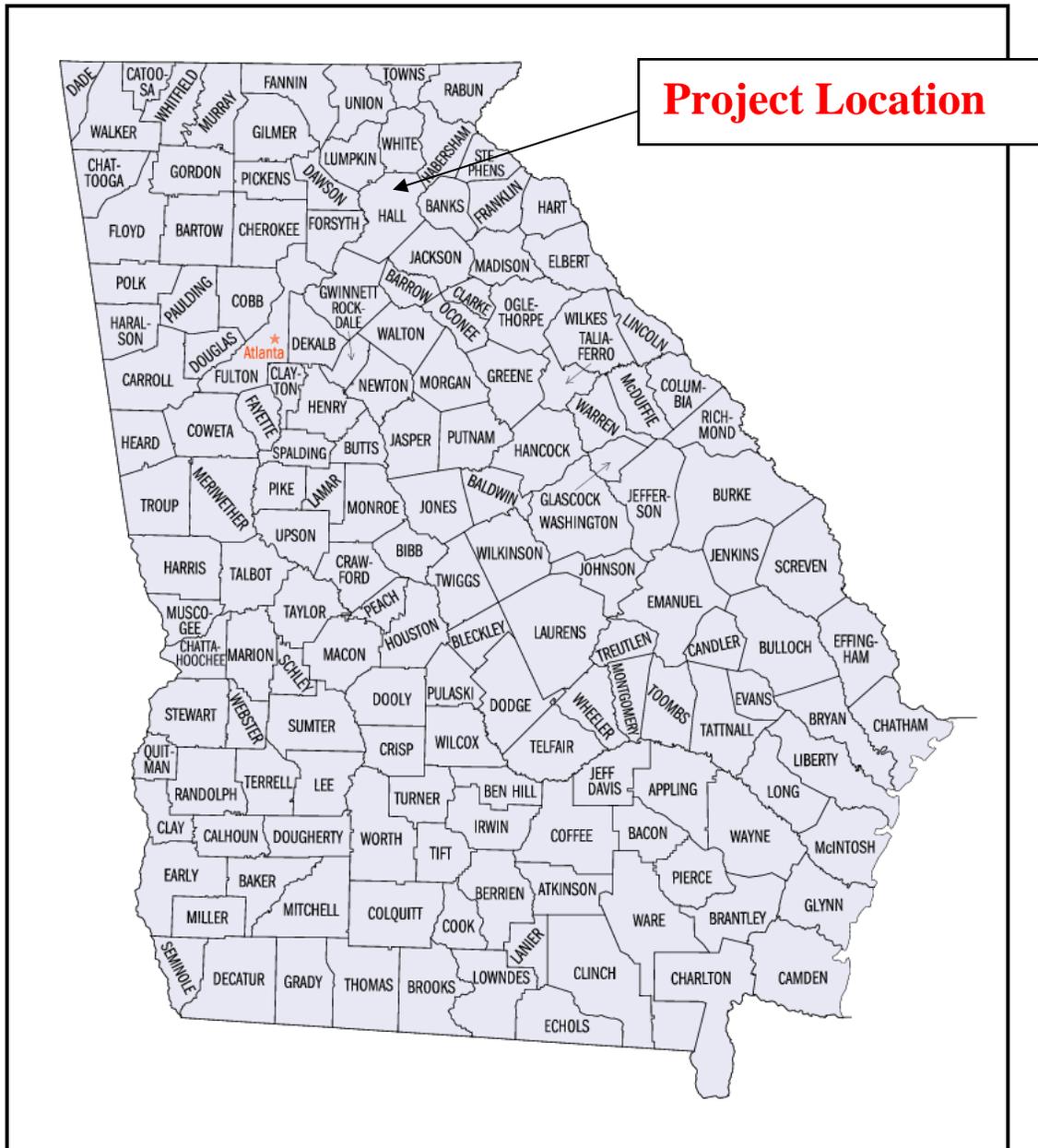
- concentrate on the preferred alignment and do not revisit any of the other alignment variations,
- do not increase the amount of R/W required to construct the project, and
- do not increase the project's impact on adjacent historical sites.

Project Briefing

The VE team received a project briefing by Geoffrey Donald of PB Americas, Inc. and Neil Kantner, GDOT Gainesville District Office. The following comments were presented:

- This project was started back in 2000. Several alternative route locations have been developed and reviewed. The project has had public input and has also been presented in a Hall County long Range Planning Meeting. The project has strong local support.
- Hall County has recently asked the State to update the project plans. A project concept report has been prepared and submitted to GDOT for approval.
- The County and public favor Alternative 7 for the location of the connector route which is the alignment that was studied by the VE Team.
- The Sardis Road Connector will be a new road. About half the project will follow existing local streets while the other half of the project will be on new alignment. The project starts near the Sardis Road / Chestatee Road intersection near SR 53 and extends north to SR 60.
- The proposed project will consist of a four-lane divided road with a raised concrete median. The project is approximately 3.4 miles long. The project also has 10' wide concrete multi-use paths on both sides of the project. This project is on the Hall County bike route system.
- The connector route ties into SR 60 across from Mount Vernon Road. The Mount Vernon Road approach to SR 60 is being widened and passes between the Corinth Baptist Church and its historic cemetery. The church property is being affected by the project but not the cemetery.
- The project has an estimated construction cost of \$16.7 million and an R/W cost of \$24 million. Hall County is funding the Preliminary Engineering and R/W costs of the project and GDOT is funding the construction cost of the project.
- There are several small stream crossings on the project. A large fill is being constructed over Streams # 7 and #6. Environmental Mitigation payouts are required for the Stream impacts.

Project Vicinity Map



County Map of Georgia

VE RECOMMENDATIONS

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.: A-1	Sheet No.: 1 of 7	CREATIVE IDEA: Roll / lower the vertical profile between Station 163 and Station 187 to lower the large embankment, reduce the culvert length at stream #7, & reduce R/W impacts.
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Comp By: L.B. Date: 6/15/2011 Checked By: K.B. Date: 6/16/2011

Original Concept: The original design profile utilizes a 5.7342% and 2.9789% gradient between Station 163 and Station 183. This profile results in a large (up to 35 feet) cut section between Station 167 & 174, a large fill section between Station 174 & 180 (up to 75+ feet), and another cut section (up to 30 feet) between Station 181 & 187. The large fill section requires a 548-foot long drainage pipe to accommodate Stream #7. The fill limits also impact Stream #6.

Proposed Change: This recommendation utilizes the same 5.7342% upgrade with a 2.9789% downgrade and 7.8665% upgrade to add a sag vertical curve and reduce the fill height between Station 174 and Station 180 by up to 26 feet.

Justification:

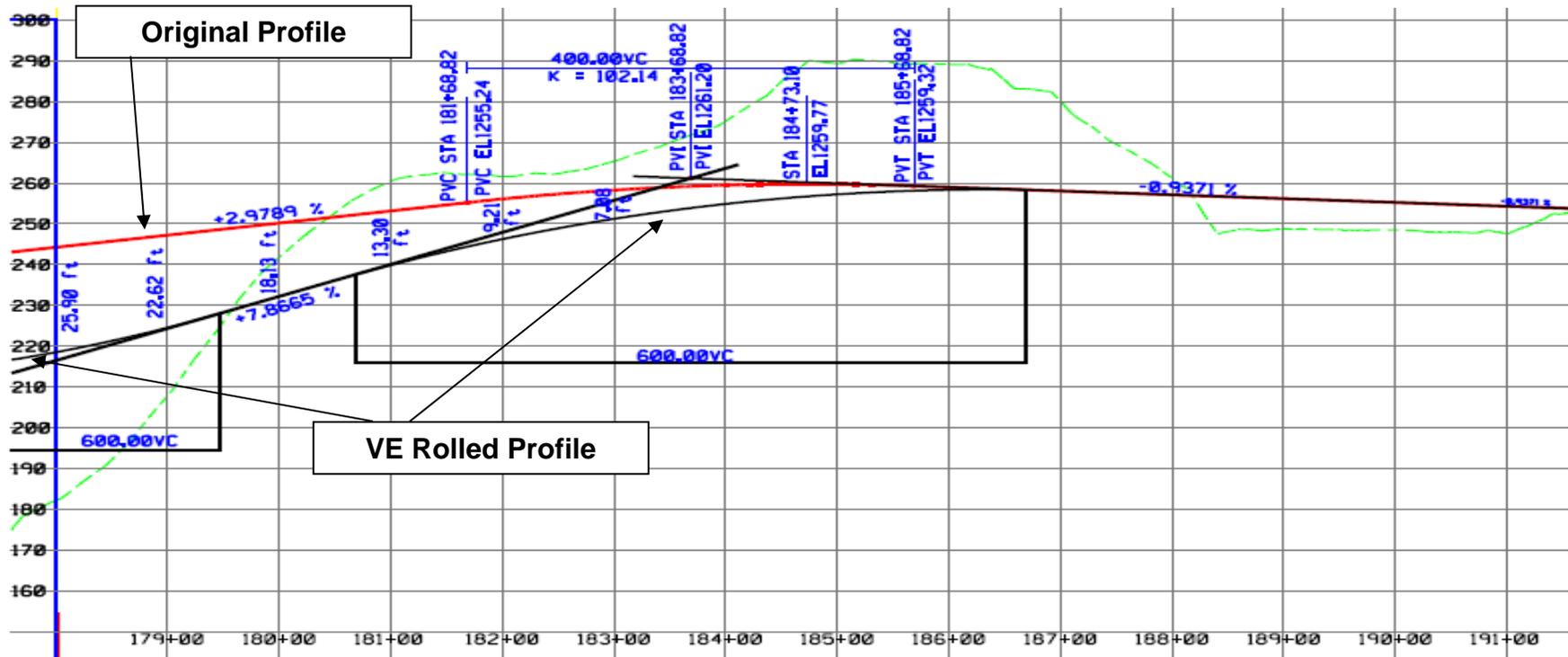
This concept rolls the vertical profile between Station 163 and Station 187. It places a vertical curve between Station 166 & 172, a vertical sag curve between Station 173+45 & 179 +50, and a vertical curve between Station 180+70 & 186+70. Rolling the profile allows the roadway to be lowered approximately 26 feet through the large fill between Station 174 & 180. This concept allows for more balanced fill and cut slopes, reduces culvert pipe length, reduces stream impacts, and reduces some easement areas and conforms to the 45 mph design speed.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$507,000		
Proposed	\$0		
Savings	\$507,000		\$507,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$507,000

SKETCH

Project: Sardis Road Connector

Idea No.: A-1
 Client: Hall County / GDOT
 Sheet 3 of 7



VE Rolled Profile Concept

COST WORKSHEET

Project: Sardis Road Connector

Idea No.: A-1
Client: Hall County / GDOT
Sheet 4 of 7

CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
Item	Unit	No. Units	Cost/Unit	Total Cost	No. Units	Cost/Unit	Total Cost
Original Design:							
Earthwork Reduction	CY	90,307	\$4.50	\$406,383			
R/W Easements Reduction	Acre	0.8262	\$43,400	\$35,858			
Culvert Pipe Reduction	LF	179	\$44.44	\$7,955			
Env Mitigation Reduction	LF	249	\$247.90	\$56,904			
VE Design:							
Earthwork	CY				0		\$0
R/W Easements	Acre				0		\$0
Culvert Pipe	LF				0		\$0
Env Mitigation	LF				0		\$0
SUBTOTAL				\$507,100			\$0
TOTAL ROUNDED				\$507,000			\$0

CALCULATIONS

Project: Sardis Road Connector

Idea No.: A-1
 Client: Hall County / GDOT
 Sheet 5 of 7

**Earthwork
 Revisions:**

Station	Length (ft)	Area cut (sf)	Area fill (sf)	Volume cut (cy)	Volume fill (cy)
167+50	100	(842.00)	0.00	(3118.52)	0.00
172+00	100	1819.00	0.00	6737.04	0.00
173+00	100	2722.00	0.00	10081.48	0.00
174+00	100	2442.00	(158.00)	9044.44	(585.19)
175+00	100	0.00	(4653.00)	0.00	(17233.33)
176+00	100	0.00	(7664.00)	0.00	(28385.19)
177+00	100	0.00	(8473.00)	0.00	(31381.48)
178+00	100	0.00	(8268.00)	0.00	(30622.22)
179+00	100	0.00	(4693.00)	0.00	(17381.48)
180+00	100	1037.00	(987.00)	3840.74	(3655.56)
181+00	100	1675.00	0.00	6203.70	0.00
182+00	100	1143.00	(312.00)	4233.33	(1155.56)
183+00	100	1003.00	(174.00)	3714.81	(644.44)
Total volumes				40737.04	(131044.44)

<i>Additional cut</i>	<i>Reduction in fill</i>
Balance	(90307.41)
less cy of fill required	90307.41
cost per cy*	\$4.50
savings	\$406,383.33

Missing fill quantity from earthwork calculations:	377086 \$1,696,887.00
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CALCULATIONS

Project: Sardis Road Connector

Idea No.: A-1
 Client: Hall County / GDOT
 Sheet 6 of 7

**Easement
 revisions:**

Station	Length (ft)	Left (ft)	Right (ft)	Left Area (sf)	Right Area (sf)
167+50	100	(13.00)	(20.00)	(1300.00)	(2000.00)
172+00	100	14.50	13.00	1450.00	1300.00
173+00	100	33.00	24.00	3300.00	2400.00
174+00	100	49.80	14.10	4980.00	1410.00
175+00	100	(42.90)	(48.70)	(4290.00)	(4870.00)
176+00	100	(48.00)	(51.80)	(4800.00)	(5180.00)
177+00	100	(28.60)	(46.80)	(2860.00)	(4680.00)
178+00	100	(45.40)	(31.90)	(4540.00)	(3190.00)
179+00	100	(57.00)	(41.40)	(5700.00)	(4140.00)
180+00	100	(5.50)	(15.30)	(550.00)	(1530.00)
181+00	100	23.40	9.70	2340.00	970.00
182+00	100	21.00	(43.00)	2100.00	(4300.00)
183+00	100	7.80	(30.90)	780.00	(3090.00)
Total Areas				(9090.00)	(26900.00)

Less Easement Less Easement

Total sf	35990.00
Total acres	0.826216713
Easement cost per acre	\$43,400.00
Savings	\$35,857.81

CALCULATIONS

Project: Sardis Road Connector

Idea No.: A-1
 Client: Hall County / GDOT
 Sheet 7 of 7

Pipe culvert:

Existing pipe length		548	feet of pipe
Proposed pipe length		369	feet of pipe
		179	pipe savings
		\$44.44	cost per lf
		\$7,954.76	savings

Environmental Mitigation:

Total stream impacts		1190	lf
Total cost for mitigation		\$295,000.00	
Cost per linear foot		\$247.90	
Reduction in impacts (stream 6)		70	lf
Reduction in impacts (stream 7)		179	lf
Savings in mitigation cost		\$56,903.95	

Total saving	\$507,099.85
Rounded	\$507,100.00

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.: A-1.1	Sheet No.: 1 of 6	CREATIVE IDEA: <u>Alternative to Idea A-1</u> Roll / lower the vertical profile between Station 163 and Station 187 and construct MSE walls to further reduce embankment, R/W, and stream impacts.
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Comp By: L.M.B. Date: 6/14/2011 Checked By: K.B. Date: 6/18/2011

Original Concept:

The original design profile utilizes a 5.7342% and 2.9789% upgrade between Station 163 and Station 183. This profile results in a large (up to 35 feet) cut section between Station 167 & 174, a large fill section between Station 174 & 180 (up to 75+ feet), and another cut section (up to 30 feet) between Station 181 & 187. The large fill section requires a 548-foot long drainage pipe to accommodate Stream #7. The fill limits also impact Stream #6.

Proposed Change:

This recommendation would add MSE walls through the reduced fill area provided by rolling the vertical profile as proposed in Alternative Idea A-1. The MSE walls would be used from Station 175 to Station 179.

Justification:

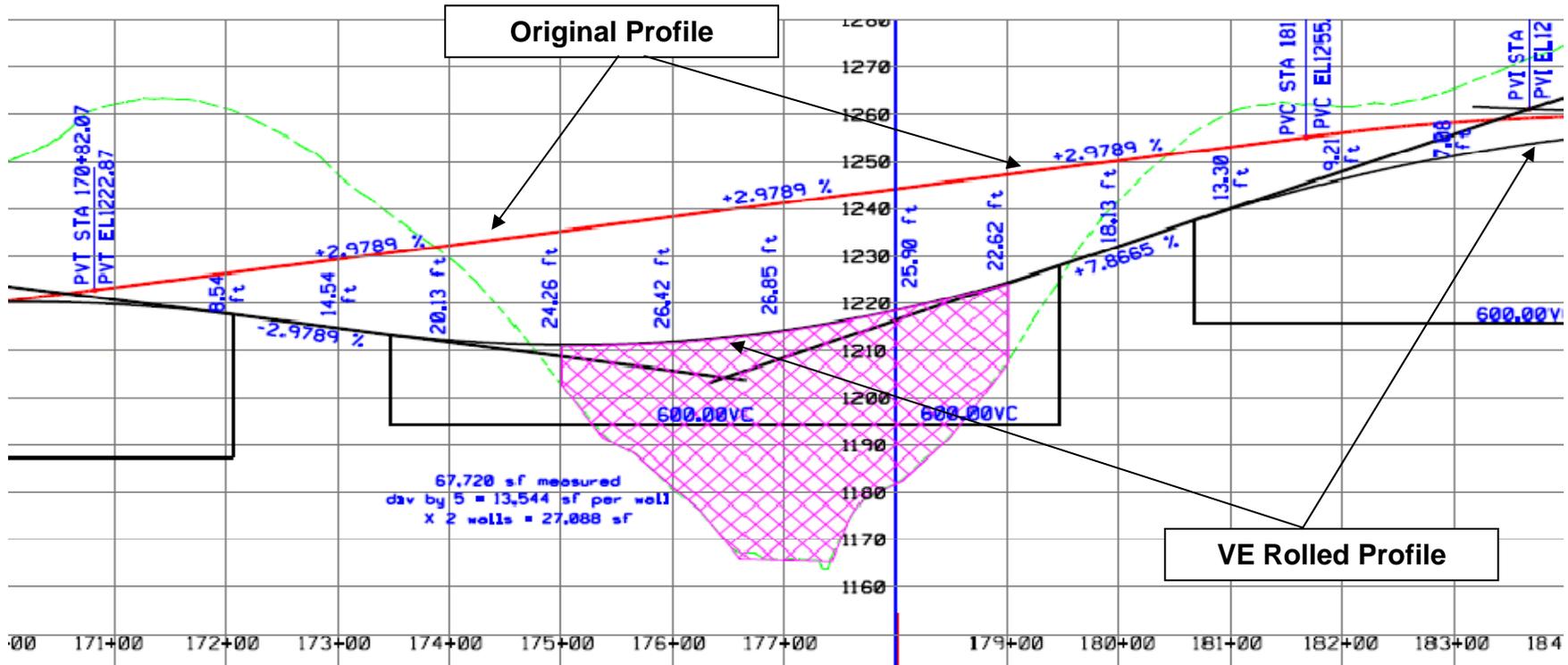
The roadway profile, as described in Idea A-1, would be lowered up to 26 feet by introducing a sage vertical curve by utilizing a 2.9789% downgrade and 7.8665% upgrade from Station 174 to Station 180. Reducing the fill height by 26 feet allows for construction of MSE walls through the fill section further reducing impacts, saving R/W relocations, allows for more balanced fill and cut slopes, reduces culvert pipe length, and reduces stream impacts. The MSE wall would vary from 5-50 feet in height and be 400 feet long.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$2,847,000		
Proposed	\$1,354,000		
Savings	\$1,493,000		\$1,493,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$1,493,000

SKETCH

Project: Sardis Road Connector

Idea No.: A-1.1
 Client: Hall County / GDOT
 Sheet 2 of 6



Lower VE Rolled Profile Concept with MSE Walls

CALCULATIONS

Project: Sardis Road Connector

Idea No.: A-1.1
 Client: Hall County / GDOT
 Sheet 4 of 6

Savings from Idea A-1:

Earthwork	\$ 406,383.33
Easement	\$ 35,857.81

Earthwork Revisions:

Station	Length (ft)	Area cut (sf)	Area fill (sf)	Volume cut (cy)	Volume fill (cy)
175+00	100	0.00	(275.00)	0.00	(1018.52)
176+00	100	0.00	(2390.00)	0.00	(8851.85)
177+00	100	0.00	(3960.00)	0.00	(14666.67)
178+00	100	0.00	(3213.00)	0.00	(11900.00)
179+00	100	0.00	(481.00)	0.00	(1781.48)
Total volumes				0.00	(38218.52)

<i>Additional cut</i>	<i>Reduction in fill</i>
Balance	(38218.52)
less cy of fill	
required	38218.52
cost per cy*	\$4.50
savings	\$171,983.33

CALCULATIONS

Project: Sardis Road Connector

Idea No.: A-1.1
 Client: Hall County / GDOT
 Sheet 5 of 6

Easement revisions:

Station	Length (ft)	Left (ft)	Right (ft)	Left Area (sf)	Right Area (sf)
175+00	100	0.00	(40.70)	0.00	(4070.00)
176+00	100	(39.00)	(97.00)	(3900.00)	(9700.00)
177+00	100	(77.00)	(90.00)	(7700.00)	(9000.00)
178+00	100	(89.00)	(66.00)	(8900.00)	(6600.00)
179+00	100	(26.00)	(31.00)	(2600.00)	(3100.00)
Total Areas				(23100.00)	(32470.00)

	Less
Less Easement	Easement
Total sf	55570.00
Total acres	1.275711662
Easement cost	
per acre	\$43,400.00
Savings	\$55,365.89

Displacement avoidance:

	3	homes		
Site improvements			\$550,601.33	each
Relocation			\$99,200.00	each
Damages			\$29,234.82	each
Total			\$679,036.16	each
Total savings			\$2,037,108.47	

CALCULATIONS

Project: Sardis Road Connector

Idea No.: A-1.1
Client: Hall County / GDOT
Sheet 6 of 6

Pipe culvert:

Existing pipe length		548	feet of pipe
Proposed pipe length		126	feet of pipe
		422	pipe savings
		\$44.44	cost per lf
		\$18,753.68	savings

Environmental Mitigation:

Total stream impacts		1190	lf
Total cost for mitigation		\$295,000.00	
Cost per linear foot		\$247.90	
Reduction in impacts (stream 6)		70	lf
Reduction in impacts (stream 7)		422	lf
Savings in mitigation cost		\$ 121,966.39	

GRAND TOTAL SAVINGS:

Savings	\$2,847,419.00
Costs	\$1,354,400.00
Total Savings	\$1,493,019.00
Rounded	\$1,493,000.00

MSE Walls:

Wall height would vary from 7 feet to 50 feet high	
Wall area approx. (sf)	13544
Two walls (sf)	27088
Use cost per sf	\$50.00
Total cost for two MSE walls	\$1,354,400.00

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.:
B-1

Sheet No.:
1 of 4

CREATIVE IDEA:

Eliminate the asphalt pavement section from under the raised concrete median.

Comp By: G.A.O. Date: 6/14/2011 Checked By: K.B. Date: 6/19/2011

Original Concept:

The original design proposes to construct full-depth pavement (9 ½ inches of asphalt over 12 inches of GAB) across the entire 68-foot roadway width integral with the concrete median constructed placed on top

Proposed Change:

This recommendation would replace the full-depth pavement below the concrete median with a 6-inches of GAB.

Justification:

Eliminating full-depth pavement from below the proposed concrete median and substituting an alternate, suitable base of 6 inches of GAB will result in significant cost savings and provide a stable foundation for the concrete median although the anchoring methods (driven dowels) will have to be analyzed. There will also be a reduction in the excavation required. It appears that the construction staging schemes can be accommodated without the full width pavement required. If there are instances at cross-over points requiring finished travelling surfaces, temporary pavement at those locations only can be constructed to facilitate staging traffic.

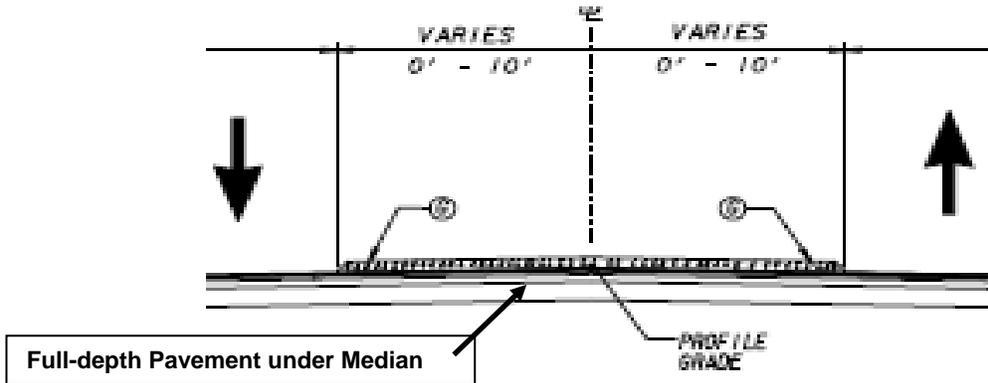
COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$874,000		
Proposed	\$98,000		
Savings	\$776,000		\$776,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$776,000

SKETCH

Project: Sardis Road Connector

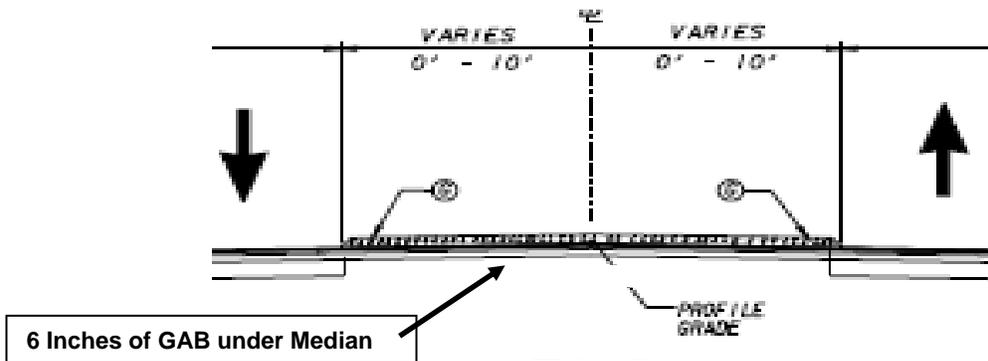
Idea No.: B-1
Client: Hall County / GDOT
Sheet 2 of 4

Original Median Design



TS-3
TANGENT SECTION
SARDIS ROAD CONNECTOR

VE Median Design



TS-3
TANGENT SECTION
SARDIS ROAD CONNECTOR

CALCULATIONS

Project: Sardis Road Connector

Idea No.: B-1
Client: Hall County / GDOT
Sheet 4 of 4

Original Design:

Plan quantity of concrete median:

From estimate – 23,906 SY

Full depth pavement cost:

Asphalt pavement; Sardis Road Connector: 9.5 in asphalt / 12 inch GAB

$$(9.5 / 12 \text{ ft}) (150 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.059375 \text{ ton} / \text{SF}$$

$$(12 / 12 \text{ ft}) (135 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.0675 \text{ ton} / \text{SF}$$

Cost per SY

$$(0.059375 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$52 / \text{ton}) + (0.0675 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$13.50 / \text{ton}) = \\ \$27.79 + \$8.20 = \$35.99 / \text{SY} \quad \text{USE: } \mathbf{\$36 \text{ per SY}}$$

VE Design:

Place 6 inches of GAB course under the Sardis Road Connector median

Cost of 6 inch GAB course

$$(6 / 12 \text{ ft}) (135 \# / \text{CF}) (1 \text{ ton} / 2000\#) = 0.03375 \text{ ton} / \text{SF}$$

$$0.03375 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$13.50 / \text{ton} = \mathbf{\$4.10 \text{ per SY}}$$

Reduced excavation area; (assume 1 foot less thick):

$$23,906 \text{ SY} (1 \text{ ft}) (1 \text{ YD} / 3 \text{ ft}) = 7,968 \text{ CY}$$

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.: B-1.1	Sheet No.: 1 of 4	CREATIVE IDEA: <u>Alternative to Idea B-1</u> Reduce the thickness of the asphalt pavement section under the raised concrete median.
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Comp By: G.A.O. Date: 6/14/2011 Checked By: K.B. Date: 6/19/2011

Original Concept:

The original design proposed to construct the full-depth pavement (9 ½ inches of asphalt over 12 inches of GAB course) across the entire 68-foot roadway width integral with the concrete median constructed placed on top.

Proposed Change:

This recommendation would replace the full-depth pavement below the concrete median with a reduced thickness pavement section. This concept suggests a pavement section of 4 inches of asphalt over 6 inches of GAB.

Justification:

Eliminating full-depth pavement from below the proposed concrete median and substituting an alternate, suitable base will result in significant cost savings and provide a stable foundation for the concrete median.

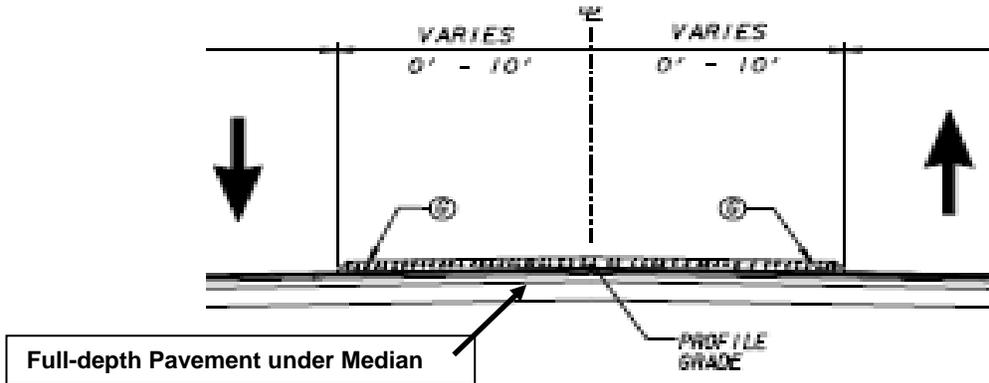
COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$861,000		
Proposed	\$382,000		
Savings	\$479,000		\$479,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$479,000

SKETCH

Project: Sardis Road Connector

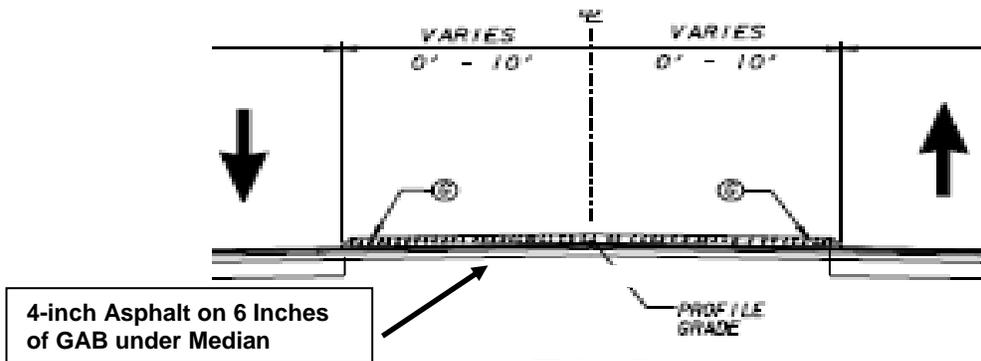
Idea No.: B-1.1
Client: Hall County / GDOT
Sheet 2 of 4

Original Median Design



TS-3
TANGENT SECTION
SARDIS ROAD CONNECTOR

VE Median Design



TS-3
TANGENT SECTION
SARDIS ROAD CONNECTOR

CALCULATIONS

Project: Sardis Road Connector

Idea No.: B-1.1
Client: Hall County / GDOT
Sheet 4 of 4

Original Design:

Plan quantity of concrete median:

From estimate – 23,906 SY

Full depth pavement cost:

Asphalt pavement; Sardis Road Connector: 9.5 in asphalt / 12 inch GAB

$$(9.5 / 12 \text{ ft}) (150 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.059375 \text{ ton} / \text{SF}$$

$$(12 / 12 \text{ ft}) (135 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.0675 \text{ ton} / \text{SF}$$

Cost per SY

$$(0.059375 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$52 / \text{ton}) + (0.0675 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$13.50 / \text{ton}) = \\ \$27.79 + \$8.20 = \$35.99 / \text{SY} \quad \text{USE: } \$36 \text{ per SY}$$

VE Design:

Reduced depth pavement cost:

Asphalt pavement; Sardis Road Connector: 4 in asphalt / 6 inch GAB

$$(4 / 12 \text{ ft}) (150 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.025 \text{ ton} / \text{SF}$$

$$(6 / 12 \text{ ft}) (135 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.03375 \text{ ton} / \text{SF}$$

Cost per SY

$$(0.25 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$52 / \text{ton}) + (0.03375 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$13.50 / \text{ton}) = \\ \$11.17 + \$4.10 = \$15.27 / \text{SY} \quad \text{USE: } \$16 \text{ per SY}$$

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.:
B-3

Sheet No.:
1 of 7

CREATIVE IDEA: Reduce the thickness of the asphalt pavement for the right and left turn lanes to 4 inches of asphalt over 6 inches of GAB course.

Comp By: G.A.O. Date: 6/14/2011 Checked By: K.B. Date: 6/19/2011

Original Concept:

The original design proposed to construct the full-depth pavement (9 ½ inches of asphalt over 12 inches of GAB) across the entire 68-foot roadway width integral with the concrete median constructed placed on top.

Proposed Change:

This recommendation would use a reduced pavement section (4 inches of asphalt on 6 inches of GAB) in non-mainline areas; such as turn lanes and side roads.

Justification:

The current plans show constructing full-depth (9 ½ inches of asphalt on 12 inches of GAB) pavement throughout the entire project. At the turn lanes, the traffic volumes are significantly reduced, thereby allowing for a reduced thickness pavement section. In the 2035 design year DHV for the 94 (AM / PM Peak) turn movements along the connector route, 50 turn movements are less than 40, 36 turn movements are between 70 – 200, and 8 are greater than 200. See attached 2035 traffic counts for the Sardis Road Connector intersections.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$826,000		
Proposed	\$367,000		
Savings	\$459,000		\$459,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$459,000

CALCULATIONS

Project: Sardis Road Connector

Idea No.: B-3
Client: Hall County / GDOT
Sheet 3 of 7

Full depth pavement cost:

Asphalt pavement; Sardis Road Connector: 9.5 in asphalt / 12 inch GAB

$$(9.5 / 12 \text{ ft}) (150 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.059375 \text{ ton} / \text{SF}$$

$$(12 / 12 \text{ ft}) (135 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.0675 \text{ ton} / \text{SF}$$

Cost per SY

$$(0.059375 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$52 / \text{ton}) + (0.0675 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$13.50 / \text{ton}) = \\ \$27.79 + \$8.20 = \$35.99 / \text{SY} \quad \text{USE: } \mathbf{\$36 \text{ per SY}}$$

Reduced depth pavement cost:

Asphalt pavement; Sardis Road Connector: 4 in asphalt / 6 inch GAB

$$(4 / 12 \text{ ft}) (150 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.025 \text{ ton} / \text{SF}$$

$$(6 / 12 \text{ ft}) (135 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.03375 \text{ ton} / \text{SF}$$

Cost per SY

$$(0.025 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$52 / \text{ton}) + (0.03375 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$13.50 / \text{ton}) = \\ \$11.17 + \$4.10 = \$15.27 / \text{SY} \quad \text{USE: } \mathbf{\$16 \text{ per SY}}$$

CALCULATIONS

Project: Sardis Road Connector

Idea No.: B-3
Client: Hall County / GDOT
Sheet 4 of 7

Sardis Road Connector Turn Lanes

NB RT @ Sardis Road 200 ft x 12 ft = 2,400 SF
SB LT @ Sardis Road 350 ft x 12 ft = 4,200 SF
SB RT @ Fran Mar Drive 300 ft x 12 ft = 3,600 SF
NB RT @ Chestatee High School Entrance 450 ft x 12 ft = 6,750 SF
SB LT @ Chestatee High School Entrance 400 ft x 12 ft = 4,800 SF
SB RT @ Fran Mar Drive 200 ft x 12 ft = 2,400 SF
NB RT @ Brackett Drive 200 ft x 12 ft = 2,400 SF
NR UT @ Brackett Drive 450 ft x 12 ft = 6,750 SF
SB LT @ Brackett Drive 200 ft x 12 ft = 2,400 SF
NB LT @ Ladd Drive 200 ft x 12 ft = 2,400 SF
SB UT @ Ladd Drive 200 ft x 12 ft = 2,400 SF
NB LT @ Sardis Road 550 ft X 12 ft = 6,600 SF
NB RT @ Sardis Road 300 ft x 12 ft = 3,600 SF
SB RT @ Sardis Road 300 ft x 12 ft = 3,600 SF
SB LT @ Sardis Road 500 ft x 12 ft = 6,000 SF
NB RT @ Chimney Rock Lane 300 ft x 12 ft = 3,600 SF
SB RT @ Hidden Hollow Drive 250 ft x 12 ft = 3,000 SF
SB UT @ Chimney Rock Drive 650 ft x 12 ft = 7,800SF
NB RT @ Windsor Trail 250 ft x 12 ft = 3,000 SF
SB LT @ Windsor Trail 450 ft x 12 ft = 6,750 SF
NB UT @ Southers Road 450 ft x 12 ft = 6,750 SF
NB RT @ Southers Road 250 ft x 12 ft = 3,000 SF
SB LT @ Southers Road 450 ft x 12 ft = 6,750 SF
NB LT @ Woodlane Road 550 ft x 12 ft = 6,600 SF
SB UT @ Woodlane Road 550 ft x 12 ft = 6,600 SF
SB RT @ Woodlane Road 200 ft x 12 ft = 2,400 SF
NB RT @ SR 60 350 ft x 12 ft = 4,200 SF
NB LT @ SR 60 450 ft x 12 ft = 6,750 SF
SB Mount Vernon Road @ SR 60 250 ft x 24 ft = 3,000 SF

Total Turn Lane Area:

102,000 SF / 9 = **11,333 SY**

Cross Road Area:

Sardis Rd 22 ft x 1,000 ft, + Chestatee & Fran-Mar 22 ft x 800 ft, + Brackett Dr 22 ft x 300 ft +
Ladd Dr 22 ft x 500 ft, + Sardis Rd 22 ft x 1,200 ft, + Chimney Rock 22 ft x 300 ft, + Hidden Hollow 22 ft
x 300 ft + Southers Rd, 22 ft x 200 ft + Woodlane Rd 11 ft x 300 ft

Total Cross Road Area:

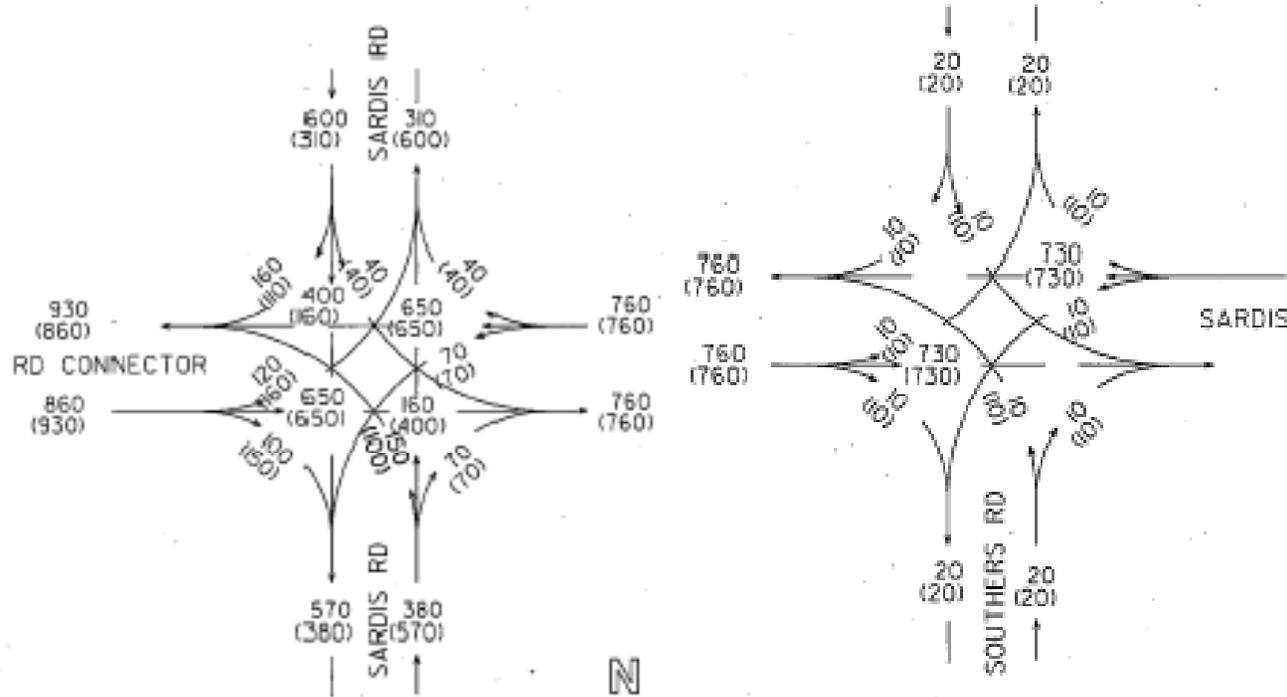
104,500 SF / 9 = **11,611 SY**

CALCULATIONS

Project: Sardis Road Connector

Idea No.: B-3
Sheet 6 of 7

2035 Traffic Counts

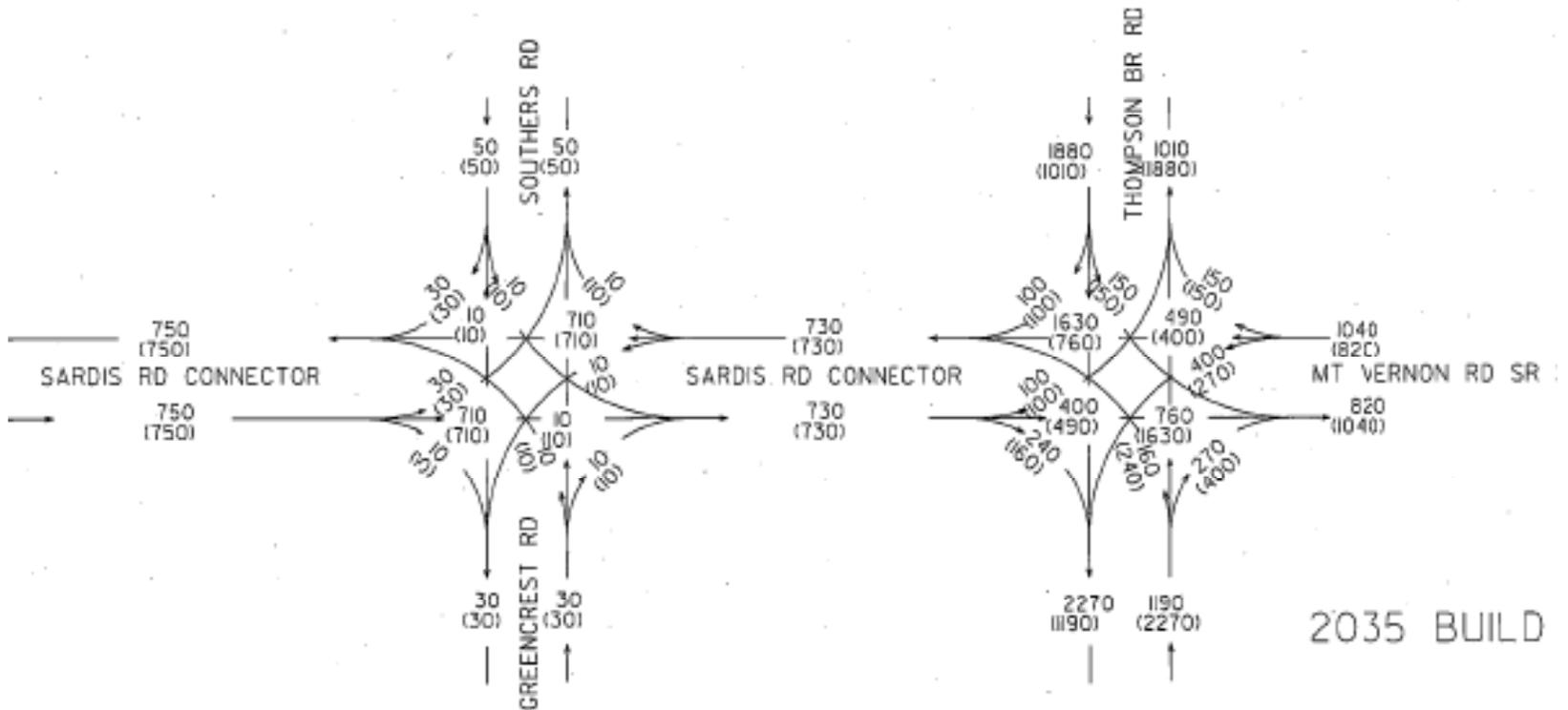


CALCULATIONS

Project: Sardis Road Connector

Idea No.: B-3
Sheet 7 of 7

2035 Traffic Counts



DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.:
B-4

Sheet No.:
1 of 3

CREATIVE IDEA:

Reduce the width of the through traffic lanes on Sardis Road Connector from 12 feet to 11 feet.

Comp By: G.A.O. Date: 6/14/2011 Checked By: K.B. Date: 6/19/2011

Original Concept:

The original design proposes a roadway typical section of 4-12-foot lanes with a 20-foot raised concrete median. This design results in a typical section width of 68 feet. The original concept places the full-depth pavement (9 ½ inches of asphalt pavement over 12 inches of GAB) over the entire 68-foot section width, including underneath the concrete median.

Proposed Change:

This recommendation would reduce the width of the through travel lanes from 12 feet to 11 feet. This concept is applicable to both the original 4-lane divided roadway design and the VE team’s 5-lane alternative Idea B-5.

Justification:

The traffic volumes (2035 – 18,020 ADT) and truck percentages (4%) are rather low for a 4-lane divided facility, thereby allowing a lane width reduction. This will save in pavement costs, earthwork and right of way throughout the project, while providing the same function.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$440,000		
Proposed	\$0		
Savings	\$440,000		\$440,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$440,000

CALCULATIONS

Project: Sardis Road Connector

Idea No.: B-4
Client: Hall County / GDOT
Sheet 3 of 3

Original Design:

Full depth pavement cost:

Asphalt pavement; Sardis Road Connector: 9.5 in asphalt / 12 inch GAB

$$(9.5 \text{ in} / 12 \text{ ft}) \times (150 \text{ \#} / \text{CF}) \times (1 \text{ ton} / 2,000 \text{ \#}) = 0.059375 \text{ ton} / \text{SF}$$

$$(12 \text{ in} / 12 \text{ ft}) \times (135 \text{ \#} / \text{CF}) \times (1 \text{ ton} / 2,000 \text{ \#}) = 0.0675 \text{ ton} / \text{SF}$$

$$\text{Cost} / \text{SY} = (0.059375 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$52 / \text{ton} + (0.0675 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$13.50 / \text{ton}) = \$27.79 + \$8.20 = \$35.99 / \text{SY} \quad \text{Use } \mathbf{\$36 / SY}$$

Project Start at Station 28+59.34 Project End at Station 208+50.00

Project length = 17,990 ft

Pavement Reduction = 4 @ 12 ft – 4@11ft = 48 ft – 44 ft = 4ft

$$4 \text{ ft} \times 17,990 \text{ ft} = 71,963 \text{ SF} / 9 = \mathbf{7,996 \text{ SY}}$$

Reduced excavation; (assume 2 foot average depth):

$$71,963 \text{ SF} \times 2 \text{ ft} = 143,926 \text{ CF} / 27 = \mathbf{5,331 \text{ CY}}$$

R/W Reduction: $71,963 \text{ SF} / 43,560 = \mathbf{1.652 \text{ Acres}}$

R/W Costs / Acre

$$\$35,000 \times 1.55 = \$54,250 \times 1.60 = \mathbf{\$86,800 / Acre}$$

VE Design:

Reduction of 4 feet of roadway template footprint

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.: B-5	Sheet No.: 1 of 4	CREATIVE IDEA: Construct a 5-lane roadway consisting of four, 12-foot lanes and a 14-foot center lane in-lieu-of the current 4-lane divided roadway.
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Comp By: G.O. Date: 6/14/2011 Checked By: K.B. Date: 6/14/2011

Original Concept:

The original design proposes a roadway typical section of 4-12-foot lanes with a 20-foot raised concrete median. This design results in a typical section width of 68 feet. The original concept places the full-depth pavement (9 ½ inches of asphalt pavement over 12 inches of GAB) over the entire 68-foot section width, including underneath the concrete median.

Proposed Change:

This recommendation would construct a 5-lane roadway with four, 12-foot lanes and one, 14-foot center lane.

Justification:

The original typical section is 68 feet wide and provides for 4-12-foot lanes and a 20-foot raised concrete median. The VE team's 5-lane typical section is 62 feet wide and provides four, 12-foot lanes and one 14-foot center lane. A 5-lane roadway will accommodate the anticipated future traffic on this route. This concept reduces the footprint of the typical section saving pavement, earthwork, borrow, and R/W cost.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$1,618,000		
Proposed	\$0		
Savings	\$1,618,000		\$1,618,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$1,618,000

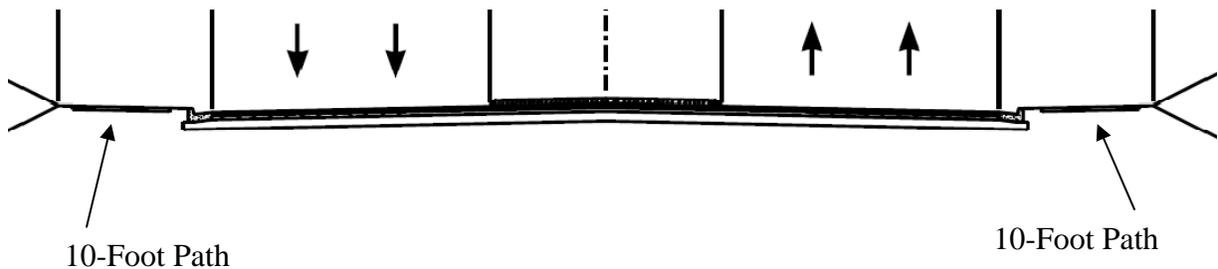
SKETCH

Project: Sardis Road Connector

Idea No.: B-5
Client: Hall County / GDOT
Sheet 2 of 4

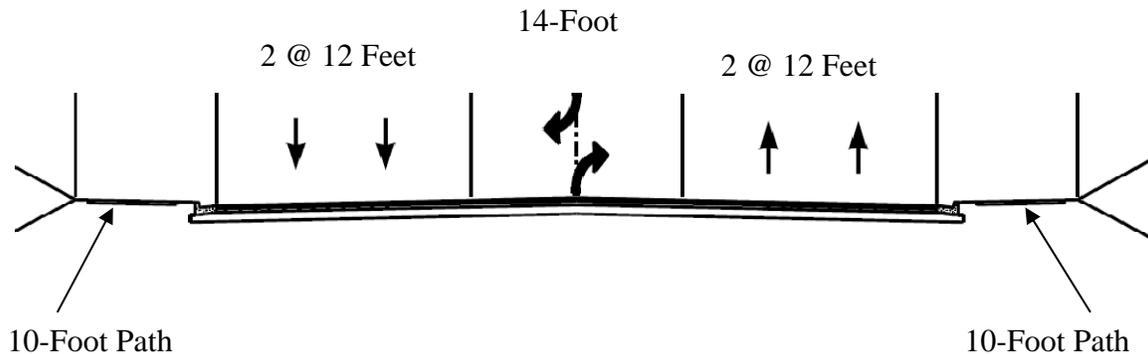
Original Sardis Road Typical Section

Urban Curb & Gutter Roadway with Four 12-Foot Lanes & 20-Foot Raised Median
Includes 10-Foot Multi-Use Paths on Both Sides of the Road
Edge of Pavement to Edge of Pavement = **68 Feet**



VE Sardis Road Typical Section

Urban Curb & Gutter Roadway with
Four 12-Foot Lanes & a 14-Foot Center Turn Lane
Includes 10-Foot Multi-Use Paths on Both Sides of the Road
Edge of Pavement to Edge of Pavement = **62 Feet**



CALCULATIONS

Project: Sardis Road Connector

Idea No.: B-5
Client: Hall County / GDOT
Sheet 4 of 4

Original Design:

Raised Concrete Median **23,906 SY** @ \$40.60 = \$970,754

Pavement cost: 9.5 in asphalt over 12 in GAB

$$(9.5 \text{ in} / 12 \text{ ft}) \times (150 \# / \text{CF}) \times (1 \text{ ton} / 2,000 \#) = 0.059375 \text{ ton} / \text{SF}$$

$$(12 \text{ in} / 12 \text{ ft}) \times (135 \# / \text{CF}) \times (1 \text{ ton} / 2,000 \#) = 0.0675 \text{ ton} / \text{SF}$$

$$\text{Cost} / \text{SY} = (0.059375 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$52 / \text{ton} + (0.0675 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$13.50 / \text{ton}) = \$27.79 + \$8.20 = \$35.99 / \text{SY} \quad \text{Use } \mathbf{\$36 / SY}$$

Project Start at Station 28+59.34 Project End at Station 208+50.00

Project length = 17,990 ft

Pavement Reduction = 68 ft – 62 ft = 6 ft

$$6 \text{ ft} \times 17,990 \text{ ft} = 107,940 \text{ SF} / 9 = \mathbf{11,993 SY}$$

R/W Reduction: 107,940 SY / 43,560 = 2.478 Acres

R/W Costs / Acre

$$\$35,000 \times 1.55 = \$54,250 \times 1.60 = \$86,800 / \text{Acre}$$

VE Design:

No Raised Concrete Median

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.:
B-5.1

Sheet No.:
1 of 4

CREATIVE IDEA: Alternative to Idea B-5 Construct a 5-lane roadway consisting of four, 11-foot lanes, a 16-foot center turn lane, and dual 4-foot bike lanes.

Comp By: G.O. Date: 6/14/2011 Checked By: K.B. Date: 6/14/2011

Original Concept:

The original design proposes a roadway typical section of 4-12-foot lanes with a 20-foot raised concrete median. This design results in a typical section width of 68 feet. The original concept places the full-depth pavement (9 ½ inches of asphalt pavement over 12 inches of GAB) over the entire 68-foot section width, including underneath the concrete median.

Proposed Change:

This recommendation would construct a 5-lane roadway with four, 11-foot lanes, one, 16-foot center lane, and dual 4-foot bike lanes.

Justification:

The original typical section is 68 feet wide and provides for 4-12-foot lanes and a 20-foot raised concrete median. The VE team's typical 5-lane section is also 68 feet wide and provides four, 11-foot lanes, one 16-foot center lane, and dual 4-foot bike lanes. Placing the bike lanes on the roadway is similar to the placement of bike lanes on other facilities throughout the area. This concept eliminates the need for the dual multi-use paths and the raised concrete median. A 5-lane roadway will accommodate the anticipated future traffic on this route. Constructing the center lane 16-feet wide would allow for the placement of a raised concrete median at a future date if warranted or desirable due to development or access control.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$1,709,000		
Proposed	\$369,000		
Savings	\$1,340,000		\$1,340,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$1,340,000

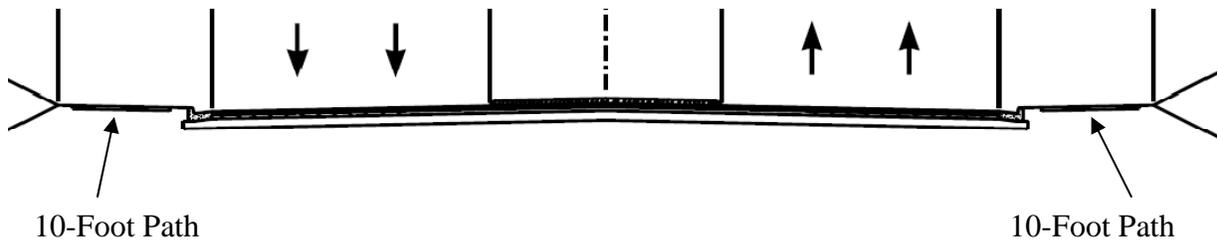
SKETCH

Project: Sardis Road Connector

Idea No.: B-5.1
Client: Hall County / GDOT
Sheet 2 of 4

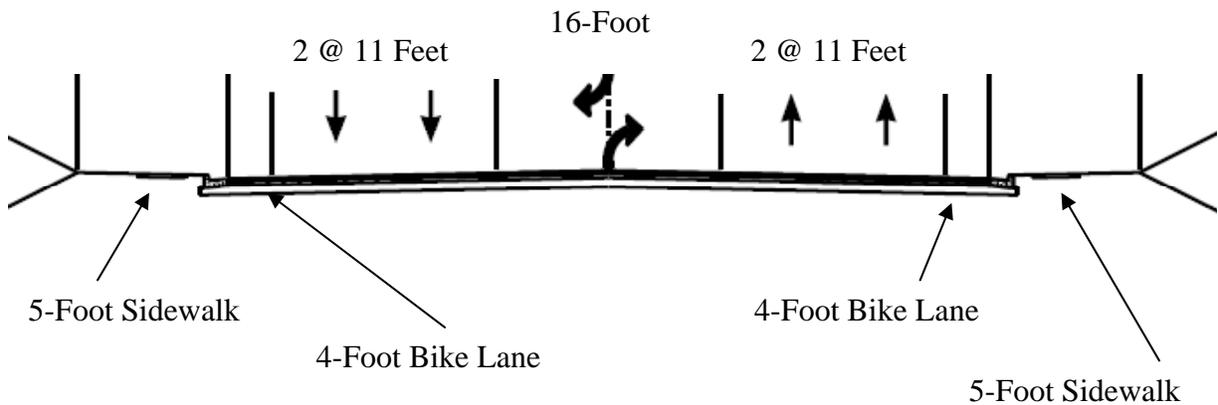
Original Sardis Road Typical Section

Urban Curb & Gutter Roadway with Four 12-Foot Lanes & 20-Foot Raised Median
Includes 10-Foot Multi-Use Paths on Both Sides of the Road
Edge of Pavement to Edge of Pavement = **68 Feet**



VE Sardis Road Typical Section

Urban Curb & Gutter Roadway with
Four 11-Foot Lanes, a 16-Foot Center Turn Lane, & Dual 4-Foot Bike Lanes
Includes 5-Foot Sidewalks on Both Sides of the Road
Edge of Pavement to Edge of Pavement = **68 Feet**



CALCULATIONS

Project: Sardis Road Connector

Idea No.: B-5.1
Client: Hall County / GDOT
Sheet 4 of 4

Original Design:

Raised Concrete Median

$$23,906 \text{ SY} @ \$40.60 = \$970,754$$

Project Start at Station 28+59.34 Project End at Station 208+50.00

Project length = 17,990 ft

Assume 1,324 ft of cross roads @ intersections

Use a sidewalk length of 16,666 ft

$$\text{Dual 10-foot paths} \quad 2 \times 10 \text{ ft} \times 16,666 \text{ ft} = 333,320 \text{ SF} / 9 = 37,035 \text{ CY}$$

VE Design:

No Raised Concrete Median

$$\text{Dual 5-foot sidewalks} \quad 2 \times 5 \text{ ft} \times 16,666 \text{ ft} = 166,667 \text{ SF} / 9 = 18,518 \text{ CY}$$

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.: B-8	Sheet No.: 1 of 4	CREATIVE IDEA: Revise / modify the Mount Vernon Road approach to SR 60.
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Comp By: G.A.O. Date: 6/14/2011 Checked By: K.B. Date: 6/19/2011

Original Concept: The current design reconstructs the Mount Vernon Road approach to SR 60 with full width widening, dual left-turn lanes, and a raised concrete median.

Proposed Change: It is recommended that this location incorporate space saving features including eliminating the raised median, using a single left turn lane, shortening the NB transitions and combining the SB through and right turn lanes on the Mount Vernon Road approach to the SR 60 intersection.

Justification: The Mount Vernon Road approach to the SR 60 intersection incorporates several roadway design elements that can be reviewed and potentially redesigned to narrow and shorten the project impacts. This is an especially sensitive area with an adjoining cemetery, church and Kroger entrance. Any reductions in impacts will be beneficial to the overall right of way and project costs. The existing road is only a 2 lane facility, with no specific long range plans for expansion or widening. Consideration should be given to:

- Eliminating the raised median: - this will reduce the overall width of the impacts and can be readily incorporated.
- Using a single left-turn lane: - this will be dictated by the traffic volumes and signal timing but the left turn projections appear high since the approach roadway is only a single lane and there is an alternate entrance to the Kroger shopping mall.
- Shortening the NB transition: - using a 45 mph design speed, this transition can be reduced and the project limits shortened.
- Combining the SB through and right-turn lanes: - it is desirable to have a dedicated right turn lane however, since this is a single lane road, the additional lane can be a shared one. Final traffic volumes and operation will dictate.

Implementing these changes would reduce the project's impact on the Corinth Baptist Church and the Historic Cemetery.

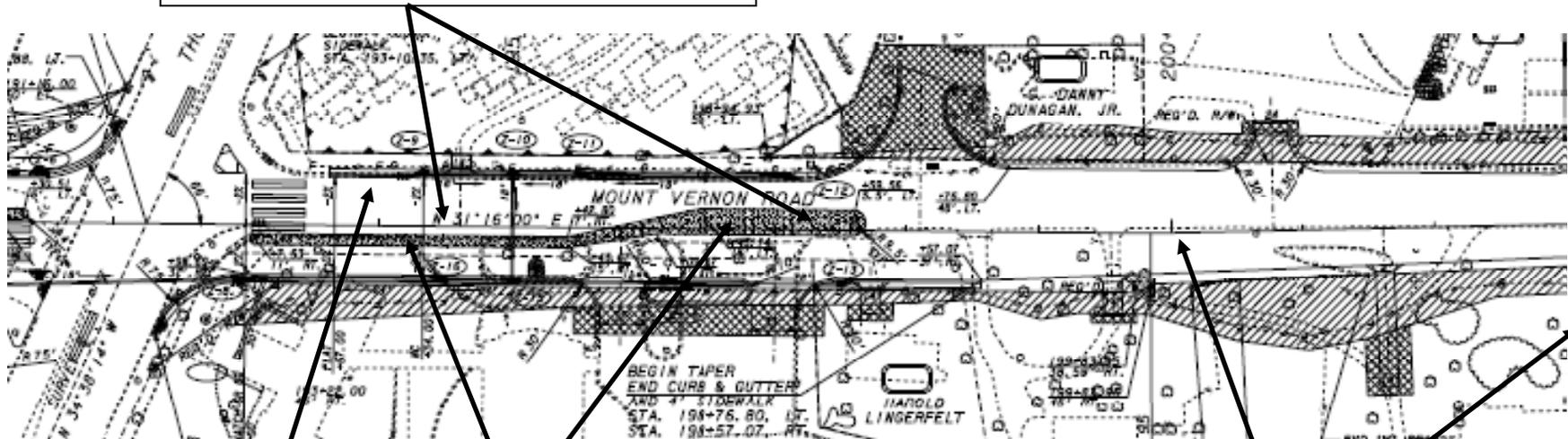
COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$385,000		
Proposed	\$0		
Savings	\$385,000		\$385,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$385,000

SKETCH

Project: Sardis Road Connector

Idea No.: B-8
Client: Hall County / GDOT
Sheet 2 of 4

Use Longer Storage Single Left Turn Lane



Combine SB Through / Right Turn Lane

Eliminate Concrete Median

Shorten NB Transition (End near Station 204+50)

CALCULATIONS

Project: Sardis Road Connector

Idea No.: B-8
Client: Hall County / GDOT
Sheet 4 of 4

Original Design:

Full depth pavement cost:

Asphalt pavement; Sardis Road Connector: 9.5 in asphalt / 12 inch GAB

$$(9.5 \text{ in} / 12 \text{ ft}) \times (150 \# / \text{CF}) \times (1 \text{ ton} / 2,000 \#) = 0.059375 \text{ ton} / \text{SF}$$

$$(12 \text{ in} / 12 \text{ ft}) \times (135 \# / \text{CF}) \times (1 \text{ ton} / 2,000 \#) = 0.0675 \text{ ton} / \text{SF}$$

$$\text{Cost} / \text{SY} = (0.059375 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$52 / \text{ton}) + (0.0675 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$13.50 / \text{ton}) = \$27.79 + \$8.20 = \$35.99 / \text{SY} \quad \text{Use } \mathbf{\$36 / SY}$$

Current length of Mount Vernon Road approach to SR 60 Station 193 – 208+50 = 1,550 ft

Reduce typical section between Station 193 – 204+50 = 1,100 ft

Assume average roadway width of 1 ½ lanes = 18 ft

$$1,100 \text{ ft} \times 18 \text{ ft} = 19,800 \text{ SF} / 9 = \mathbf{2,200 \text{ SY}}$$

Eliminate Raised Concrete Median

$$(160 \text{ ft} \times 20 \text{ ft}) + (280 \text{ ft} \times 8 \text{ ft}) = 5,440 \text{ SF} / 9 = 605 \text{ SY} @ \$40.60 = \$24,563$$

Reduction in full-depth pavement under concrete median

$$605 \text{ SY} @ \$36.00 = \$21,780$$

R/W Reduction: 19,800 SF / 43,560 = **0.455 Acres**

Commercial R/W Costs / Acre

$$\$230,000 \times 1.55 = \$365,000 \times 1.60 = \mathbf{\$570,400 / Acre}$$

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.: B-9	Sheet No.: 1 of 4	CREATIVE IDEA: Construct a 4-Lane / 2-Lane Sardis Road Connector based on project traffic volumes.
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Comp By: G.A.O. Date: 6/14/2011 Checked By: K.B. Date: 6/19/2011

Original Concept: The current design concept is to construct the Sardis Road Connector as a full-width, 4 lane divided roadway.

Proposed Change: It is recommended that the Sardis Road Connector be constructed in two segments. The segment between the south end of the project and Sardis Road (Station 95+11) would remain a 4-lane divided roadway while the section north of Sardis Road would be constructed as a 2-lane roadway.

Justification: As outlined in the March 15, 2010, Traffic Forecast memorandum, Segment D between Southerns Road and SR 60 under the 2-lane scenario would have a 2035 design year ADT of 9,840 and operate at a level of service of “C” making this split roadway concept viable. In addition, reviewing the internet and county roadway map, there do not appear to be any significant generators between Sardis Road and SR 60 thereby making the Sardis Road intersection a logical transition point to a 2 lane section. The area to the east is bounded by Lake Lanier and mostly built-out and the area to the west has numerous streams and would be difficult for a substantial traffic generator.

An updated traffic analysis / forecast should be performed to further analyze this concept. Based on information presented at the design briefing, the traffic projections are already scheduled to be discussed and potentially re-analyzed.

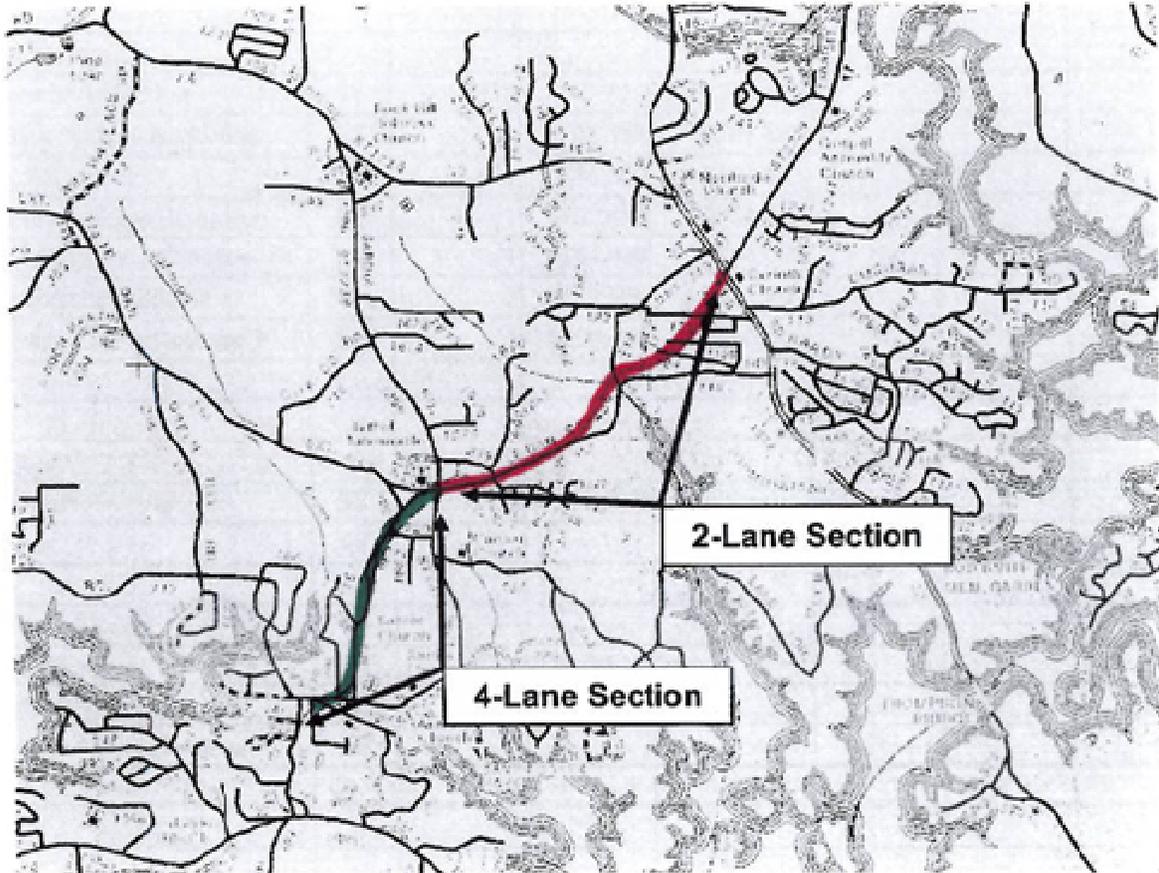
There are substantial construction and right of way cost savings to be realized by constructing a split roadway section. If conditions in the future warrant a full 4-lane section, the County can work with the developers to negotiate and incorporate the right of way and select roadway improvements as part of the development.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$5,246,000		
Proposed	\$0		
Savings	\$5,246,000		\$5,246,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$5,246,000

SKETCH

Project: Sardis Road Connector

Idea No.: B-9
Client: GDOT
Sheet 2 of 4



COST WORKSHEET

Project: Sardis Road Connector

Idea No.: B-9
Client: Hall County / GDOT
Sheet 3 of 4

CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
Item	Unit	No. Units	Cost/Unit	Total Cost	No. Units	Cost/Unit	Total Cost
Original Design:							
Pavement Reduction	SY	49,378	\$36	\$1,777,608			
Unclass / C & G Reduction	LS	1	\$303,855	\$303,855			
R/W Reduction	Acre	4.637	\$86,800	\$402,492			
Concrete Median Reduction	LS	1	\$582,452	\$582,452			
Env. Mitigation Reduction	LS	1	\$64,000	\$64,000			
Displacement Reduction	Each	3	\$638,600	\$1,915,800			
Drainage / Miscellaneous	LS	1	\$200,000	\$200,000			
VE Design:							
Pavement	SY				0		\$0
Unclass / C & G	LS				0		\$0
R/W	Acre				0		\$0
Concrete Median	LS				0		\$0
Env. Mitigation	LS				0		\$0
Displacement	Each				0		\$0
Drainage / Miscellaneous	LS				0		\$0
SUBTOTAL				\$5,246,207			\$0
TOTAL ROUNDED				\$5,246,000			\$0

CALCULATIONS

Project: Sardis Road Connector

Idea No.: B-9

Client: Hall County / GDOT

Sheet 4 of 4

Full depth pavement cost:

Asphalt pavement; Sardis Road Connector: 9.5 in asphalt / 12 inch GAB

$$(9.5 / 12 \text{ ft}) (150 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.059375 \text{ ton} / \text{SF}$$

$$(12 / 12 \text{ ft}) (135 \# / \text{CF}) (1 \text{ ton} / 2000 \#) = 0.0675 \text{ ton} / \text{SF}$$

Cost per SY

$$(0.059375 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$52 / \text{ton}) + (0.0675 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$13.50 / \text{ton}) = \\ \$27.79 + \$8.20 = \$35.99 / \text{SY} \quad \text{USE: } \mathbf{\$36 \text{ per SY}}$$

Total roadway area reduction: Station 99+00 to 200+00 = 10,100 ft

Reduced width (24 + 20) = 44 feet

$$10,100 \text{ ft} \times 44 \text{ ft} = 444,400 \text{ SF} = \mathbf{49,378 \text{ SY}}$$

Reduced R/W area – from 100 ft to 80 ft; 20 ft reduction

$$10,100 \text{ ft} \times 20 \text{ ft} = 202,000 \text{ SF} = \mathbf{4.637 \text{ Acres}}$$

Right of way cost

$$\$35,000 \times 1.55 = \$54,250 \times 1.60 = \$86,800$$

Reduced earthwork: assume a 20% reduction

Unclassified excavation and Clearing and Grubbing: $\$1,069,275 + \$450,000 = \$1,519,275$

$$\$1,519,275 \times 0.20 = \mathbf{\$303,855}$$

Assume 3 fewer displacements; ½ ac. Lots; \$200,000 improvements; \$40,000 per displacement

$$\text{Cost per displacement: } (\$35,000 \times 0.5) + 200,000 + 40,000 = 257,500$$

$$\$257,500 \times 1.55 = \$399,125 \times 1.6 = \$638,600 \text{ per displacement}$$

Reduced concrete median; Assume 60% total reduction

$$\$970,754 \times 0.60 = \$582,452$$

Reduced mitigation cost: assume 20% reduction

$$\$320,000 \times 0.20 = \$64,000$$

Reduced Drainage, erosion control and miscellaneous items; assume 20% reduction

$$\text{Approx total cost} - \$1,000,000 \times 0.20 = \$200,000$$

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.: E-1	Sheet No.: 1 of 4	CREATIVE IDEA: Construct a 16-foot raised concrete median in-lieu-of a 20-foot raised concrete median.
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Comp By: G.O. Date: 6/14/2011 Checked By: K.B. Date: 6/15/2011

Original Concept:

The original design proposes a roadway typical section of 4-12-foot lanes with a 20-foot raised concrete median. This design results in a typical section width of 68 feet. The original concept places the full-depth pavement (9 ½ inches of asphalt pavement over 12 inches of GAB) over the entire 68-foot section width, including underneath the concrete median.

Proposed Change:

This recommendation would construct a 16-foot raised concrete median in-lieu-of a 20-foot raised concrete median.

Justification:

Reducing the 20-foot raised concrete median to a 16-foot raised concrete median does not change the function of the median. The same median openings would be maintained with the narrower median as in the original design. This concept reduces the width of the roadway footprint by 4 feet saving R/W cost, full-depth pavement, concrete median, and excavation / borrow costs.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$1,402,000		
Proposed	\$659,000		
Savings	\$743,000		\$743,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$743,000

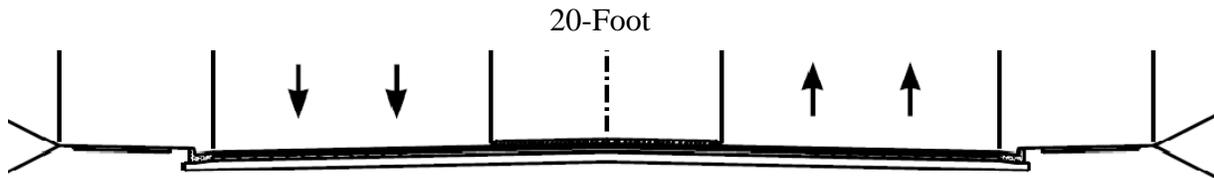
SKETCH

Project: Sardis Road Connector

Idea No.: E-1
Client: Hall County / GDOT
Sheet 2 of 4

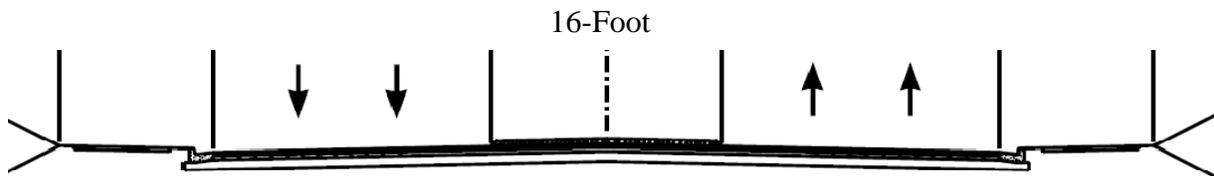
Original Sardis Road Typical Section

Urban Curb & Gutter Roadway with 4-12-foot lanes with a 20-foot raised concrete median
Includes 10-Foot Multi-Use Paths on Both Sides of the Road
Edge of Pavement to Edge of Pavement = **68 Feet**



VE Sardis Road Typical Section

Urban Curb & Gutter Roadway with Four 12-Foot Lanes & 16-Foot Raised Median
Includes 10-Foot Multi-Use Paths on Both Sides of the Road
Edge of Pavement to Edge of Pavement = **64 Feet**



CALCULATIONS

Project: Sardis Road Connector

Idea No.: E-1
Client: Hall County / GDOT
Sheet 4 of 4

Original Design:

Project Start at Station 28+59.34 Project End at Station 208+50.00
Project length = 17,990 ft

Raised Concrete Median (plan quantity)
23,906 SY @ \$40.60 = \$970,754

VE Design:

Raised Concrete Median Reduction

Project length = 17,990 ft Assume 740 ft of cross roads openings
 $23,906 \text{ SY} - 4 \text{ ft} \times (17,990 \text{ ft} - 740 \text{ ft}) / 9 = 23,906 \text{ SY} - 7,667 \text{ SY} = 16,239 \text{ SY} @ \$40.60 =$
\$659,303

Full-depth pavement reduction

$$4 \text{ ft} \times 17,990 \text{ ft} = 71,960 \text{ SF} / 9 = 7,996 \text{ SY}$$

Pavement cost: 9.5 in asphalt over 12 in GAB

$$(9.5 \text{ in} / 12 \text{ ft}) \times (150 \# / \text{CF}) \times (1 \text{ ton} / 2,000 \#) = 0.059375 \text{ ton} / \text{SF}$$

$$(12 \text{ in} / 12 \text{ ft}) \times (135 \# / \text{CF}) \times (1 \text{ ton} / 2,000 \#) = 0.0675 \text{ ton} / \text{SF}$$

Cost / SY = $(0.059375 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$52 / \text{ton} + (0.0675 \text{ ton} / \text{SF} \times 9 \text{ SF} / \text{SY} \times \$13.50 / \text{ton}) = \$27.79 + \$8.20 = \$35.99 / \text{SY}$ Use **\$36 / SY**

R/W Reduction

$$4 \text{ ft} \times 17,990 \text{ ft} = 71,960 \text{ SF} / 43,560 = 1.652 \text{ Acres}$$

R/W Costs / Acre

$$\$35,000 \times 1.55 = \$54,250 \times 1.60 = \$86,800 / \text{Acre}$$

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.:
E-1.1

Sheet No.:
1 of 4

CREATIVE IDEA:

Construct a raised grass median in-lieu-of a raised concrete median in areas where the median is 20 feet wide.

Comp By: G.O. Date: 6/14/2011 Checked By: K.B. Date: 6/14/2011

Original Concept:

The original design proposes a roadway typical section of 4-12-foot lanes with a 20-foot raised concrete median. This design results in a typical section width of 68 feet. The original concept places the full-depth pavement (9 ½ inches of asphalt pavement over 12 inches of GAB) over the entire 68-foot section width, including underneath the concrete median.

Proposed Change:

This recommendation would construct a raised grass median in-lieu-of a 20-foot raised concrete median in areas where the median is 20 feet wide.

Justification:

Changing the type of raised median does not change the function of the median. The same median openings would be maintained with the raised grass median as in the original design. This concept reduces the amount of full-depth pavement and raised concrete median. Constructing grass medians would also allow the County to landscape these portions of the roadway reducing the project's impact on the local communities.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$817,000		
Proposed	\$135,000		
Savings	\$682,000		\$682,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$682,000

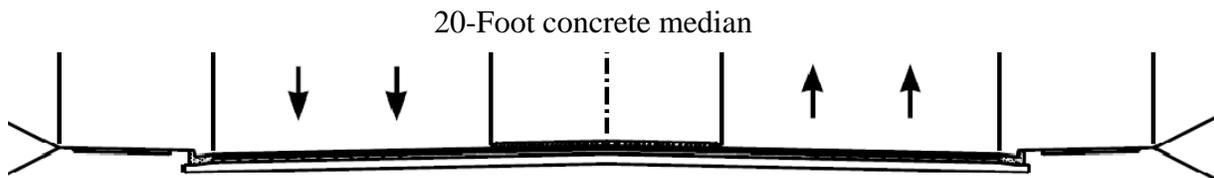
SKETCH

Project: Sardis Road Connector

Idea No.: E-1.1
Client: Hall County / GDOT
Sheet 2 of 4

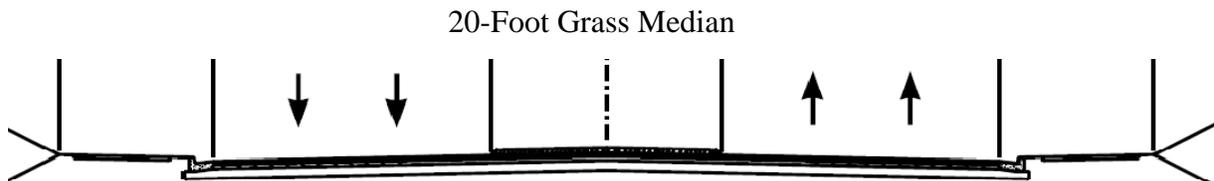
Original Sardis Road Typical Section

Urban Curb & Gutter Roadway with 4-12-foot lanes with a 20-foot raised concrete median
Includes 10-Foot Multi-Use Paths on Both Sides of the Road
Edge of Pavement to Edge of Pavement = **68 Feet**



VE Sardis Road Typical Section

Urban Curb & Gutter Roadway with Four 12-Foot Lanes & 20-Foot Raised Grass Median
Includes 10-Foot Multi-Use Paths on Both Sides of the Road
Edge of Pavement to Edge of Pavement = **68 Feet**



CALCULATIONS

Project: Sardis Road Connector

Idea No.: E-1.1
Client: Hall County / GDOT
Sheet 4 of 4

20-foot raised median areas:

Station 58 – 73 + 1,500 ft Station 127 – 142 = 1,500 ft
Station 154 – 162 = 800 ft Station 174 – 185 = 1,000 ft
Total length = 4,800 ft

Original Design:

Reduction in Raised Concrete Median

20 ft x 4,800 ft = 96,000 SF / 9 = 10,667 SY @ \$40.60 = \$433,080

Reduction in full-depth pavement under concrete median

10,667 SY @ \$36.00 = \$384,012

VE Design:

Raised Grass Median

Additional Curb & Gutter

4,800 ft x 2 = 9,600 ft @ \$10.10 = \$96,960

Additional Earthwork (unclassified excavation)

96,000 SF x 1 ft = 96,000 CF / 27 = 3,556 CY @ \$1.63 = \$5,796

Seeding, mulch, etc.

10,667 SY @ \$3.00 = \$32,001

Pavement cost: 9.5 in asphalt over 12 in GAB

(9.5 in / 12 ft) x (150 # / CF) x (1 ton / 2,000 #) = 0.059375 ton / SF

(12 in / 12 ft) x (135 # / CF) x (1 ton / 2,000 #) = 0.0675 ton / SF

Cost / SY = (0.059375 ton / SF x 9 SF / SY x \$52 / ton + (0.0675 ton / SF x 9 SF / SY x \$13.50 / ton) = \$27.79 + \$8.20 = \$35.99 / SY **Use \$36 / SY**

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.: G-1	Sheet No.: 1 of 4	CREATIVE IDEA: Construct a single 10-foot concrete multi-use path on one side and a 5-foot concrete sidewalk on the other side.
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Comp By: G.O. Date: 6/14/2011 Checked By: K.B. Date: 6/14/2011

Original Concept:

The original design for upgrading Sardis Road includes the construction of 10-foot concrete multi-use paths on both side of the new roadway.

Proposed Change:

This recommendation would construct a single 10-foot concrete multi-use path on one side of the roadway and a standard 5-foot concrete sidewalk on the opposite side.

Justification:

The project is located in a corridor where the majority of the land use is designated as Suburban Medium Density and Rural Median Density residential development. With nearly half the project being on new alignment, the VE team assumed that pedestrian traffic would be very light. A single multi-use path should be adequate to carry two-way bicycle traffic and a small amount of pedestrian traffic with the remaining pedestrian traffic using the sidewalk on the opposite side of the road. This concept does not preclude widening the 5-foot sidewalk side to provide additional multi-use capacity in the future if demand so warrants.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$738,000		
Proposed	\$554,000		
Savings	\$184,000		\$184,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$184,000

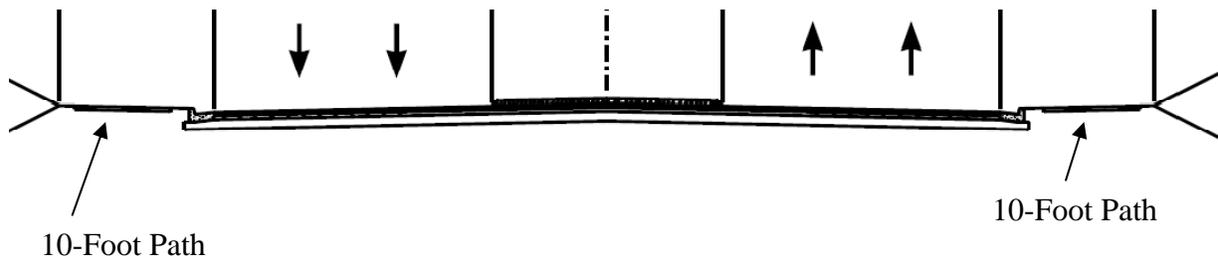
SKETCH

Project: Sardis Road Connector

Idea No.: G-1
Client: Hall County / GDOT
Sheet 2 of 4

Original Sardis Road Typical Section

Urban Curb & Gutter Roadway 4-12-foot lanes with a 20-foot raised concrete median
Includes 10-Foot Multi-Use Paths on Both Sides of the Road
Edge of Pavement to Edge of Pavement = 68 Feet



VE Sardis Road Typical Section

Includes One 10-Foot Multi-Use Path and One 5-Foot Sidewalk



CALCULATIONS

Project: Sardis Road Connector

Idea No.: G-1
Client: Hall County / GDOT
Sheet 4 of 4

Original Design:

Project Start at Station 28+59.34 Project End at Station 208+50.00

Project length = 17,990 ft

Assume 1,324 ft of cross roads @ intersections

Use a sidewalk length of 16,666 ft

Dual 10-foot concrete multi-use paths

$$2 \times 10 \text{ ft} \times 16,666 \text{ ft} = 333,320 \text{ SF} / 9 = 37,035 \text{ CY}$$

VE Design:

Single 10-foot concrete multi-use path + one 5-foot sidewalk

$$(10 \text{ ft} \times 16,666 \text{ ft}) + (5 \text{ ft} \times 16,666 \text{ ft}) = 249,990 \text{ SF} / 9 = 27,777 \text{ CY}$$

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.:
G-1.1

Sheet No.:
1 of 4

CREATIVE IDEA: Alternative to Idea G-1
Construct dual 8-foot concrete multi-use paths in-lieu-of dual 10-foot concrete multi-use paths.

Comp By: G.O. Date: 6/14/2011 Checked By: K.B. Date: 6/14/2011

Original Concept:

The original design for upgrading Sardis Road includes the construction of 10-foot concrete multi-use paths on both side of the new roadway.

Proposed Change:

This recommendation would construct dual 8-foot concrete multi-use paths in-lieu-of dual 10-foot multi-use paths.

Justification:

The project is located in a corridor where the majority of the land use is designated as Suburban Medium Density and Rural Median Density residential development. With nearly half the project being on new alignment, the VE team assumed that pedestrian traffic would be very light. Dual 8-foot multi-use paths should provide adequate space to accommodate both bicycle and pedestrian traffic.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$738,000		
Proposed	\$590,000		
Savings	\$148,000		\$148,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$148,000

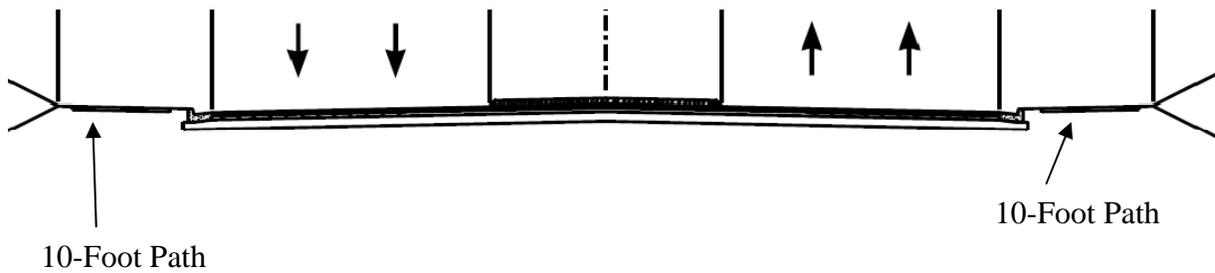
SKETCH

Project: Sardis Road Connector

Idea No.: G-1.1
Client: Hall County / GDOT
Sheet 2 of 4

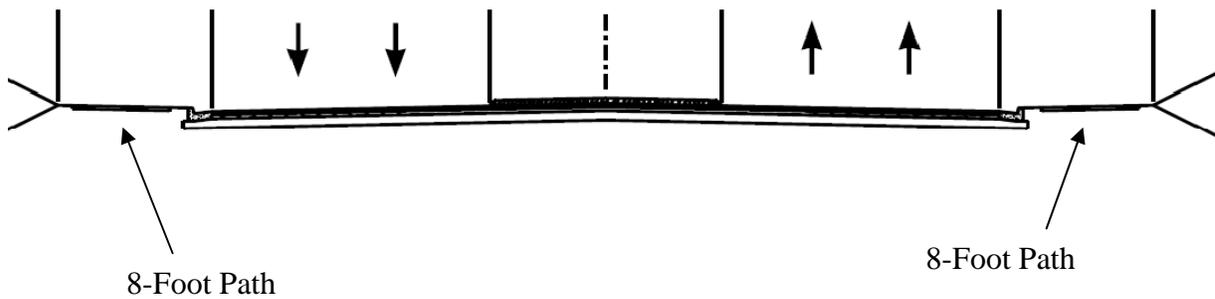
Original Sardis Road Typical Section

Urban Curb & Gutter Roadway 4-12-foot lanes with a 20-foot raised concrete median
Includes 10-Foot Multi-Use Paths on Both Sides of the Road
Edge of Pavement to Edge of Pavement = 68 Feet



VE Sardis Road Typical Section

Includes 8-Foot Multi-Use Paths on Both Sides of the Road



CALCULATIONS

Project: Sardis Road Connector

Idea No.: G-1.1
Client: Hall County / GDOT
Sheet 4 of 4

Original Design:

Project Start at Station 28+59.34 Project End at Station 208+50.00

Project length = 17,990 ft

Assume 1,324 ft of cross roads @ intersections

Use a sidewalk length of 16,666 ft

Dual 10-foot concrete multi-use paths

$$2 \times 10 \text{ ft} \times 16,666 \text{ ft} = 333,320 \text{ SF} / 9 = 37,035 \text{ CY}$$

VE Design:

Dual 8-foot concrete multi-use paths

$$2 \times 8 \text{ ft} \times 16,666 \text{ ft} = 266,656 \text{ SF} / 9 = 29,628 \text{ CY}$$

DEVELOPMENT AND RECOMMENDATION PHASE

Project: Sardis Road Connector – Hall County

IDEA No.: G-1.2	Sheet No.: 1 of 4	CREATIVE IDEA: <u>Alternative to Idea G1</u> Construct a single 8-foot concrete multi-use path on one side and a 5-foot concrete sidewalk on the other side.
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Comp By: G.O. Date: 6/14/2011 Checked By: K.B. Date: 6/14/2011

Original Concept:

The original design for upgrading Sardis Road includes the construction of 10-foot concrete multi-use paths on both side of the new roadway.

Proposed Change:

This recommendation would construct a single 8-foot concrete multi-use path on one side of the roadway and a standard 5-foot concrete sidewalk on the opposite side.

Justification:

The project is located in a corridor where the majority of the land use is designated as Suburban Medium Density and Rural Median Density residential development. With nearly half the project being on new alignment, the VE team assumed that pedestrian traffic would be very light. A single multi-use path should be adequate to carry two-way bicycle traffic and a small amount of pedestrian traffic since additional pedestrian traffic would also be able to use the sidewalk on the opposite side of the road.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$738,000		
Proposed	\$480,000		
Savings	\$258,000		\$258,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$258,000

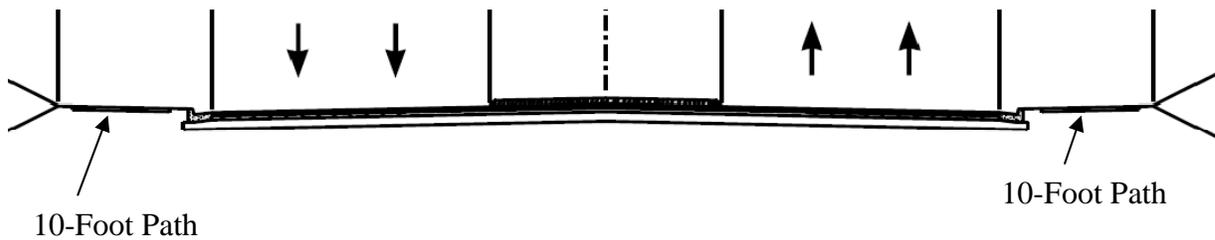
SKETCH

Project: Sardis Road Connector

Idea No.: G-1.2
Client: Hall County / GDOT
Sheet 2 of 4

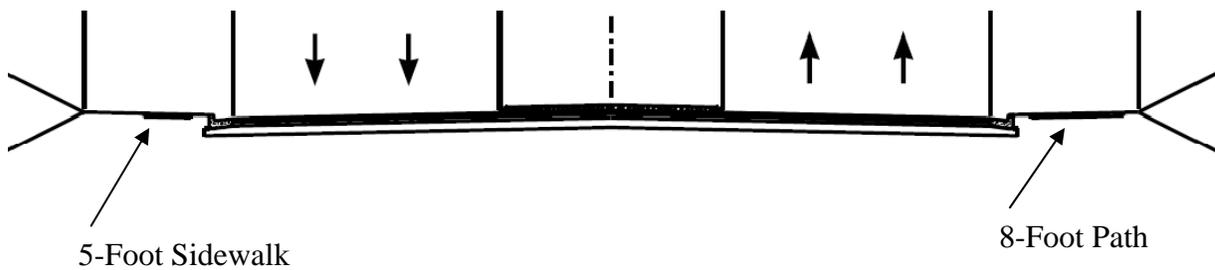
Original Sardis Road Typical Section

Urban Curb & Gutter Roadway 4-12-foot lanes with a 20-foot raised concrete median
Includes 10-Foot Multi-Use Paths on Both Sides of the Road
Edge of Pavement to Edge of Pavement = 68 Feet



VE Sardis Road Typical Section

Includes One 8-Foot Multi-Use Path and One 5-Foot Sidewalk



CALCULATIONS

Project: Sardis Road Connector

Idea No.: G-1.2
Client: Hall County / GDOT
Sheet 4 of 4

Original Design:

Project Start at Station 28+59.34 Project End at Station 208+50.00

Project length = 17,990 ft

Assume 1,324 ft of cross roads @ intersections

Use a sidewalk length of 16,666 ft

Dual 10-foot concrete multi-use paths

$$2 \times 10 \text{ ft} \times 16,666 \text{ ft} = 333,320 \text{ SF} / 9 = 37,035 \text{ CY}$$

VE Design:

Single 8-foot concrete multi-use path + one 5-foot sidewalk

$$(8 \text{ ft} \times 16,666 \text{ ft}) + (5 \text{ ft} \times 16,666 \text{ ft}) = 216,658 \text{ SF} / 9 = 24,073 \text{ CY}$$

Sources

Approving/Authorizing Persons

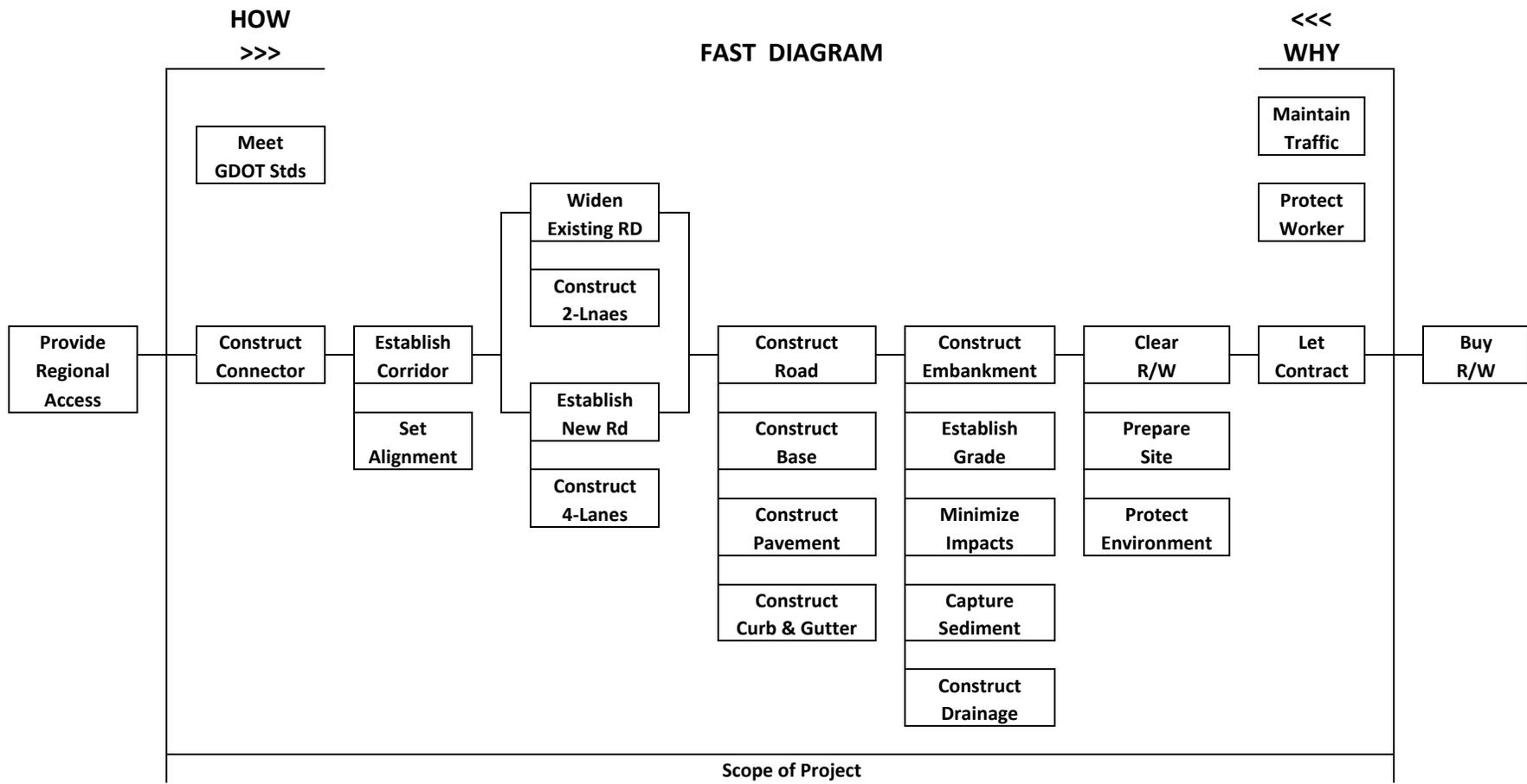
Name:	Position:	Telephone:
Jody Woodall	Hall County	770-531-6800
Brandon Kirby	Project Manager	687-343-0816
Ron Wishon	Engineering Services	404-631-1753

Personal Contacts

Name:	Telephone:	Notes:
Neil Kantner	770-532-5522	Preliminary Design Briefing
Geoffrey Donald	404-364-2656	Preliminary Design Briefing
Geoffrey Donald	404-364-2656	Cost for excavation / borrow, alignment of Hidden Hollow intersection, stream impacts

Documents/Abstracts

Reference:	Reference:
Project Construction Cost Estimate	Preliminary Project Concept Report
Project R/W Cost Estimate	CAD Files of Vertical Profile
Preliminary Environmental Assessment	CAD Files of Horizontal Profile
Preliminary Traffic Data	Preliminary Signing Plans
Project Profile Plans	200:1 Scale Project Layout of Alternates
Preliminary Construction Staging Plans	Project Typical Sections



INFORMATION PHASE – FUNCTION ANALYSIS

Project: Sardis Road Connector

Function: Construct Connector

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
A	Right of Way	Store	Project	\$24,000,000	58.9%	Yes
		Facilitate	Construction			
		Avoid	Impacts			
		Access	Schools			
B	Pavement / Base Course	Construct	Riding Surface	\$9,083,000	22.3%	Yes
		Construct	Access			
		Increase	Level of Service			
		Construct	Route Connectivity			
		Reconstruct	Intersections			
		Construct	Full-width Sect.			
C	Miscellaneous	Construct	Project	\$1,199,000	2.9%	No
D	Unclassified Excavation	Establish	Grade	\$1,069,000	2.6%	Yes
		Construct	Embankments			
		Minimize	Impacts			

INFORMATION PHASE – FUNCTION ANALYSIS

Project: Sardis Road Connector

Function: Construct Connector

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
E	Concrete Median	Separate	Traffic	\$971,000	2.4%	Yes
		Restrict	Left Turns			
		Stage	Paving			
		Accommodate	Left Turns			
		Comply with	GDOT Policy			
		Store	Pedestrians			
F	Closed Drainage System	Convey	Water	\$807,000	2.0%	Yes
		Drain	Roadway			
		Comply with	GDOT Policy			
		Construct	Urban Section			
		Simplify Future	Water Treatment			
		Allow	Point Discharge			
G	Concrete Sidewalk	Accommodate	Pedestrians	\$738,000	1.8%	Yes
		Accommodate	Bicycles			
		Accommodate	Multi-use Trail			
		Allow	Access			

INFORMATION PHASE – FUNCTION ANALYSIS

Project: Sardis Road Connector

Function: Construct Connector

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
H	Utilities	Provide	Service	\$503,000	1.2%	No
		Accommodate	Construction			
I	Clearing & Grubbing	Clear	R/W	\$450,000	1.1%	No
		Prepare	Site			
		Remove	Material			
J	Temp Ditch Checks / Sediment Basin	Capture	Sediment	\$413,000	1.0%	
		Minimize	Erosion			
K	Concrete Curb & Gutter	Convey	Water	\$326,000	0.8%	
		Reduce	R/W			
		Access	Driveways			
L	Environmental Mitigation	Pay	Damages	\$320,000	0.8%	
		Equate	Damages			
		Project	Trade-off			

INFORMATION PHASE – FUNCTION ANALYSIS

Project: Sardis Road Connector

Function: Construct Connector

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
M	Driveway Concrete	Access	Property	\$305,000	0.7%	
		Control R/W	Impacts			
N	Traffic Signals	Direct	Traffic	\$286,000	0.6%	
		Protect	Pedestrians			
		Accommodate	Turns			
		Manage	Traffic			
O	Traffic Control	Stage	Construction	\$178,000	0.4%	
		Protect	Workers			
		Protect	Public			
		Maintain	Traffic			
P	Guardrail	Protect	Public	\$90,000	0.2%	
		Contain	Vehicles			
		Steepen	Slopes			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
A	Right of Way		
A-1	Roll the vertical alignment in the deep cut and high fill areas to reduce the size of the embankment / fill slopes.	Reduce fill height, Reduce culvert length, Reduce stream impacts	✓
A-2	Reduce the width of the median from 20 feet to 16 feet.	See Idea E-1	X
A-3	Reduce the shoulder width from 16 feet to 12 feet.	Not practical with bump outs and guardrail	X
A-4	Construct a single multi-use trail on one side and a standard sidewalk on the other side.	See Idea G-1	X
A-5	Revise / move the location of the Sardis Road / SR 60 intersection.	Reduce impact on Church	DS
A-6	Reduce the through pavement lane width from 12 feet to 11 feet.	See Idea B-4	X
A-7	Reduce the width of the multi-use trails from 10 feet to 8 feet.	See Idea G-2	X
B	Pavement / Base Course		
B-1	Eliminate the full depth pavement section under the raised concrete median.	Pavement not needed under concrete median, Reduce cost	✓
✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
B-2	Reduce the thickness of the Asphalt Pavement under the raised concrete median to that necessary to facilitate only construction staging.	Full depth pavement not needed under concrete median, Reduce cost	✓
B-3	Reduce the Asphalt Pavement thickness for the right and left turn lanes.	Full depth pavement not needed at turn lanes, Reduce cost	✓
B-4	Reduce lane widths form 12 feet to 11 feet.	Light traffic allows reduction, Reduce cost	✓
B-5	Construct a 5-lane roadway in-lieu-of a divided 4-lane roadway.	Reduce pavement section size, eliminate concrete median	✓
B-6	Redesign the Hidden Hollow Drive / Chimney Rock Lane intersection so they are directly opposite each other.	Eliminate split intersection	✓
B-7	Reduce the skew of the Chestatee High School Entrance with Sardis Road to improve the left turn movement from the school entrance.	Improve entrance / exit from School	✓
B-8	Reduce / modify the number / length of the turn lanes on the Mount Vernon Road approach to SR 60.	Reduce impacts to Church	✓
D	Unclassified Excavation		
D-1	Add quantities for road excavation and embankment.	Designer provided information	X
✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
D-2	Roll the vertical grade and drop the design speed to 35 MPH through the deep cut and high fill area (Station 165 to SR 60).	Reduce cut and fill heights	DS
D-3	Construct a combination MSE wall / earth slope between Station 175 and Station 180 to reduce R/W take and shorten the culvert (reduce stream impact).	Reduce stream impacts, Reduce embankment size	✓
D-4	Construct a bridge over stream #7 to reduce stream impacts and the size of the fill section.	Reduce stream impacts, Reduce embankment size	✓
D-5	Reduce the size of the embankment at Station 175 – 180 by using soil nails and increasing the slope to 1:1.	Maintenance concerns	X
E	Concrete Median		
E-1	Reduce the median width from 20 feet to 16 feet.	Reduce cost,	✓
E-2	Construct a raised grass / decorative stone median in areas where the median is 20 feet wide.	Reduce costs, possible maintenance issues	✓
E-3	Eliminate the concrete median and construct a 5-lane roadway section.	See Idea B-5	X
✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
F	Closed Drainage Section		
F-1	Verify connecting the drain outlet directly into the box culvert at Station 145.	Normal practice	X
F-2	Verify the capacity of the 30-inch pipe to carry the water from Stream 6 & 7 under the large fill (548 feet long).	Reduce stream impacts	✓
F-3	Verify how Streams 6 & 7 will be combined on the north side of the large fill.	Reduce stream impacts	✓
F-4	Realign the 30-inch pipe under the large fill to make it perpendicular to the roadway.	See Idea D-3	X
F-5	Analyze the drainage capacity of the 30-inch culvert under Garden Boulevard to carry the flow coming from the 30-inch and 24-inch pipes under the large fill.	See Idea F-2	X
F-6	Construct a shorter box culvert with MSE retaining walls to carry Stream 7 under the large fill at Station 177.	See Idea D-3	X
G	Concrete Sidewalk		
G-1	Construct a single 10-foot concrete multi-use path on one side and a 5-foot concrete sidewalk on the other side.	Meets requirements, Reduce cost	✓
✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
G-2	Construct dual 8-foot concrete multi-use paths in-lieu-of dual 10-foot concrete multi-use paths.	Meets requirements, Reduce cost	✓
G-3	Construct a single 8-foot concrete multi-use path on one side and a 5-foot concrete sidewalk on the other side.	Meets requirements, Reduce cost	✓
G-4	Construct the multi-use paths with Asphalt pavement.	Maintenance Issues, Policy concerns	X
B-5.1	Use the same 68-foot typical section pavement width, but construct a 5-lane roadway (4 @11' + 16' center lane) with dual 4-foot bike lanes.	Simplify pavement section, reduce cost, put bikes on roadway	✓
K	Concrete Curb and Gutter		
K-1	Verify the amount of curb and gutter on the project	Possible cost estimate change	DS
L	Environmental Mitigation		
L-1	Modify the 30-inch pipe / fill section to reduce its impact on the streams.	See Idea F-2 and D-3	X
L-2	Modify the fill impacts to Streams 6 & 7 on the north side of the fill area.	See Idea F-3	X
✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
N	Traffic Signals		
N-1	Add signals at the school crossings to allow pedestrians to cross Sardis Road.	Provide for pedestrian crossing	DS
✓ = Will be considered further; X = will be dropped; DS = Design suggestion –written for consideration by design team			

VE STUDY SIGN-IN SHEET

Project No.: STP00-0003-00(626)

County: Hall

PI No.: 0003626

Date: June 13-16, 2011

Days		NAME	EMPLOYEE ID NO.	DOT OFFICE OR COMPANY	PHONE NUMBER	EMAIL ADDRESS
FIRST	LAST					
<input type="radio"/>	<input checked="" type="checkbox"/>	Lisa L. Myers		Engineering Services	404-631-1770	lmyers@dot.ga.gov
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Matt Sanders		Engineering Services	404-631-1752	msanders@dot.ga.gov
<input type="radio"/>	<input type="radio"/>	James K. Magnus		Construction	404-631-1971	jmagnus@dot.ga.gov
<input checked="" type="checkbox"/>	<input type="radio"/>	Ken Werho		Traffic Operations	404-635-8144	kwerho@dot.ga.gov
<input type="radio"/>	<input checked="" type="checkbox"/>	Ron Wishon		Engineering Services	404-631-1753	rwishon@dot.ga.gov
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Keith Borkenhagen		MACTEC	623-556-1875	kborkenhagen@msn.com
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Lenor Bromberg		KEA Group	404.805.8244	lbromberg@keagroup.com
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	GEORGE OBARANIZ		MACTEC / AMEC	770 421 3346	GADBARANIZ@MACTEC.COM
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Geoffrey Donald		PB Americas Inc	404 364 2656	dougl@pbworld.com
<input checked="" type="checkbox"/>	<input type="radio"/>	ROGER PALMER		PB AMERICAS, INC.	404364.2656	rpalmer@pbworld.com
<input checked="" type="checkbox"/>	<input type="radio"/>	Neil Kantner		GDOT, Gainesville	770-532-5522	nkantner@dot.ga.gov
<input checked="" type="checkbox"/>	<input type="radio"/>	Melissa Harper		GDOT Construction	404-631-1971	mharper@dot.ga.gov
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	JODY WOODALL		HALL COUNTY	770-531-6800	JWOODALL@HALLCOUNTY.ORG
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Brandon Kirby		OPA	678 343 0816	bkirby@dot.ga.gov
<input type="radio"/>	<input checked="" type="checkbox"/>	BLAIR REYNOLDS		HALL COUNTY	770 531-6800	BREYNOLDS@HALLCOUNTY.ORG
<input type="radio"/>	<input checked="" type="checkbox"/>	Jack McGinnis		KEA Group	404-275-2076	mcginnis.jack@gmail.com

Check all that attended
 = Did Not Attend
 Attended Project Overview (Day 1)
 Attended Project Presentation (Day 4)