

VALUE ENGINEERING REPORT

**I-75 Resurfacing
Bartow and Gordon Counties
PI No. M004324**

December 19, 2011

OWNER:



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

VALUE ENGINEERING CONSULTANT:



AMEC E&I, Inc.
3200 Town Point Drive NW, Suite 100
Kennesaw, GA 30144

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Bartow and Gordon Counties
State Project No. M004324

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EXECUTIVE SUMMARY

Executive Summary

VALUE ENGINEERING STUDY

**I-75 Resurfacing
GDOT Project No. M004324
Bartow / Gordon Counties
December 19, 2011**

Introduction

This report presents the results of a value engineering (VE) study on the resurfacing of I-75 in Bartow and Gordon Counties in Northwest Georgia. The study took place December 13, 2011, at the Georgia DOT General Office in Atlanta, using a three person VE team.

The project improvements include milling, inlay and resurfacing of I-75 from the SR 61 overpass at MP 293.40, north to the SR 156 overpass at MP 315.10, a distance of 21.7 miles (114,576 feet). The project will also include a surface course of 1.5 inch of Porous European Mix (PEM). In addition to the mainline pavement work, the asphalt ramps will be milled and inlayed. The current traffic volumes are 57,990 – 67,990 vehicle per day (VPD). Throughout the project area, I-75 is a predominantly a 6-lane section.

Major contract work items include asphalt paving, milling, traffic control, pavement markings and rumble strips. The total estimated project cost is \$32,270,493 and includes a 5% E&C contingency of \$1,536,690. There are no right-of-way or utility modification costs.

The construction documents are complete. They are not conventional full scale drawings but letter size documents typical of a maintenance resurfacing contract and include typical sections, mile log descriptions, general notes, reduced scale GDOT standards and details and special provisions. The project is scheduled for letting in March 2012.

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

Since this is a major interstate resurfacing project, there can be no modifications to either the horizontal or vertical alignments. Also, the VE team was informed that the surface course shall be PEM, not OGFC. There are no other constraints to the VE analysis and no environmental or political commitments or issues.

Results Obtained

The team generated 19 creative ideas with all of them being identified for additional evaluation as possible recommendations or design considerations. The VE team developed 6 independent recommendations and 1 design consideration. A detailed write-up of each recommendation is contained in the respective portion of this report. A summary of the recommendations follows.

Recommendation Summary

Rec. AM-1: Reduce the mainline and ramp milling and SMA inlay depth.

The original design proposes a 2 inch depth for milling and inlay of the mainline and ramps. This recommendation would reduce the depth from 2 inches to 1.5 inches.

The potential savings is \$3,240,000.

Rec. AM-2: Reduce the PEM shoulder overlap.

The current design proposes a shoulder overlap of the PEM surface course of 12 / 18 inches for the left / right shoulders respectively.

This recommendation would reduce the overlap to 6 / 12 inches.

The potential savings is \$175,000.

Rec. AS-1: Eliminate the shoulder milling and Superpave inlay.

The original design proposes a 2 inch depth for milling and inlay of the shoulders. The primary reason is to combine the rehab cycles for the mainline and shoulders.

This recommendation would eliminate the shoulder milling and inlay. It would not affect the PEM surface course or the rumble strip installation.

The potential savings is \$6,000,000.

Rec. AM-1: Reduce the shoulder milling and Superpave inlay depth.

The original design proposes a 2 inch depth for milling and inlay for the shoulders.

This recommendation would reduce the depth from 2 inches to 1.5 inches.

The potential savings is \$1,362,000.

Rec. C-1: Allow weekend daytime work and lane closings

The current documents allow work hours from 7:00 PM to 6:00 AM Monday through Sunday; no weekend daytime hours.

This recommendation would allow weekend daytime work hours from 7:00 PM Friday to 6:00 AM Monday.

The potential savings is \$640,000.

Rec. C-10: Use orange protective fence to delineate the ESA.

The current documents describe the ESA and work restrictions.
This recommendation would use orange protective fencing to provide positive delineation.

The potential cost increase is \$5,300.

Design Consideration Summary

Rec. B-1; Design Consideration: Use separate items for milling.

The current design uses only a single item for the milling; variable depth.
This design consideration is to use separate items including a constant depth, 2 inches to obtain better pricing.

I-75 Resurfacing; Bartow / Gordon Counties

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						
AM-1	Reduce the milling and SMA inlay from 2 to 1.5 inches on the mainline and ramps	\$3,240,000	\$0	\$3,240,000	N/A	\$3,240,000
AM-2	Reduce PEM overlaps on shoulders from 12/18 to 6/12 (left / right shoulders)	\$175,000	\$0	\$175,000	N/A	\$175,000
AS-1	Eliminate shoulder mill and inlay	\$6,000,000	\$0	\$6,000,000	N/A	\$6,000,000
AS-2	Reduce the milling and Superpave inlay from 2 to 1.5 inches on the shoulders	\$1,362,000	\$0	\$1,362,000	N/A	\$1,362,000
C-1	Allow weekend daytime work	\$640,000	\$0	\$640,000	N/A	\$640,000
C-10	Use orange protective fencing for ESA	\$0	\$5,300	(\$5,300)	N/A	(\$5,300)
DESIGN CONSIDERATION						
B-1	Use separate items for milling	\$0	\$0	\$0	N/A	\$0

STUDY IDENTIFICATION

Study Identification

Project: I-75 Resurfacing Bartow and Gordon Counties	Date: December 13, 2011
Location of Study: GDOT General Offices; Atlanta, Georgia	

VE Team Members

Name:	Title:	Organization:	Telephone:
Jeff VanDyke, PE	Roadway Design Engineer	RS & H	678-528-7234
Greg Mayo, PE	Construction Engineer	Stantec	678-764-1646
George Obaranec, PE, CVS	VE Team Facilitator	AMEC	770-421-3346

Project Description

The project improvements include milling, inlay and resurfacing of I-75 from the SR 61 overpass at MP 293.40, north to the SR 156 overpass at MP 315.10, a distance of 21.7 miles (114,576 feet). The project will also include a surface course of 1.5 inch of Porous European Mix (PEM). In addition to the mainline pavement work, the asphalt ramps will be milled and inlaid. The current traffic volumes are 57,990 – 67,990 vehicle per day (VPD). Throughout the project area, I-75 is a predominantly a 6-lane section.

Major contract work items include asphalt paving, milling, traffic control, pavement markings and rumble strips. The total estimated project cost is \$32,270,493 and includes a 5% E&C contingency of \$1,536,690. There are no right-of-way or utility modification costs.

Project Briefing

The VE team received a project briefing by Mr. E. Reid Mathews, GDOT Project Manager. The following comments were presented:

- This project is required due to the deterioration of the riding surface. It is at a point that the surface course is beginning to unravel and show signs of failure.
- This project involves milling and resurfacing only; no other maintenance or repair work, e.g., guide rail, drainage, earthwork.
- Some ramps are also scheduled for mill and inlay, as described in the construction documents.
- The actual profile will be increased by 0.5 inches however the bridge clearances have been verified and are adequate.

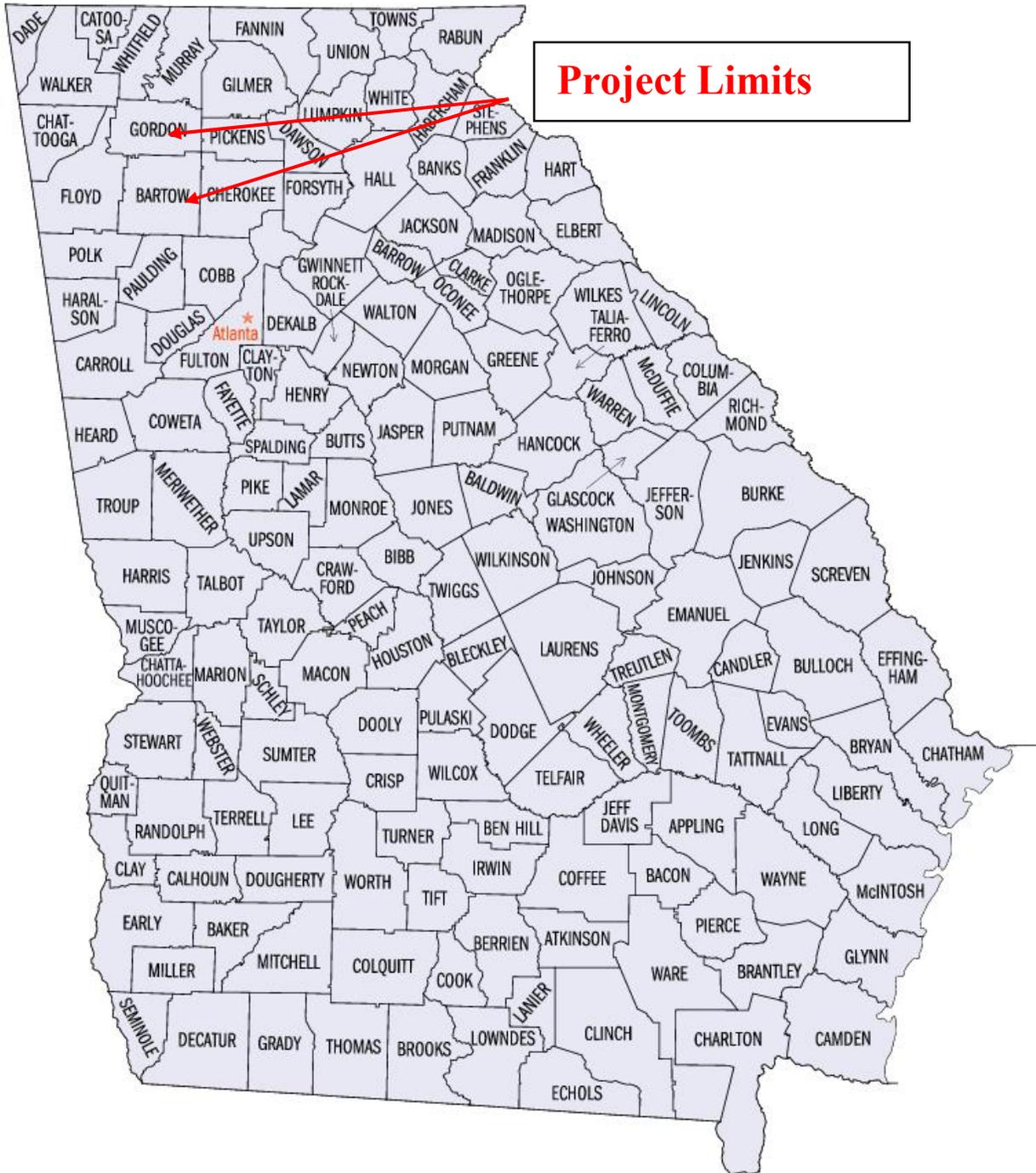
- The lab recommends using Porous European Mix (PEM) rather than Open Graded Friction Course (OGFC) for the surface course.
- At Exit 293, Tennessee Yellow-eyed Grass, which is considered an endangered plant, is within the interchange area. The limits are considered and Environmentally Sensitive Area (ESA) are shall not be disturbed.
- This contract is scheduled for March, 2012 letting.

Project Conditions and Constraints

The VE team was presented with several conditions / constraints to consider when developing their recommendations. The constraints were;

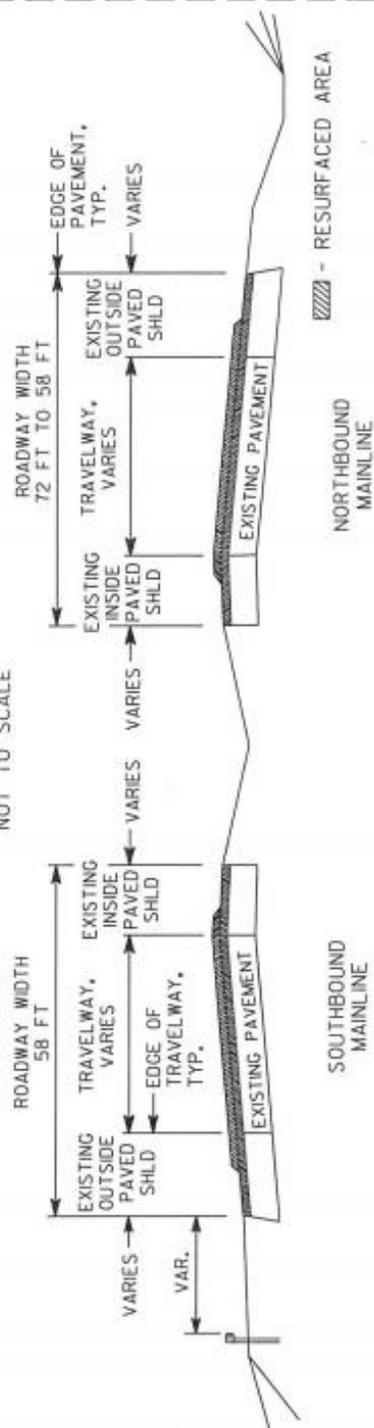
- No modifications to the vertical or horizontal alignment
- Use PEM rather than OGFC for the surface course
- Do not include work other than mill and resurface

Project Location Map



MAINLINE TYPICAL SECTION

NOT TO SCALE



THIS TYPICAL SECTION APPLIES FROM:
 LOG 0.000 TO LOG 21,856

THIS TYPICAL SECTION APPLIES FROM:
 LOG 0.000 TO LOG 21,767

(EXCEPT FOR RESURFACING EXCEPTIONS SHOWN IN LOG SHEETS)

1. MILL MAINLINE VARIABLE DEPTH (2 3/4 INCH DEPTH TO REMOVE EXISTING RIDING SURFACE AND 2 INCH UNDERLAYER), THEN INLAY WITH 220 LBS PER SQUARE YARD RECYCLED ASPHALTIC CONCRETE 12.5 mm SMA, GP 2 ONLY, INCL POLYMER-MODIFIED BITUM MATL & H LIME
2. MILL INSIDE AND OUTSIDE SHOULDERS VARIABLE DEPTH (2 INCH DEPTH, TYP) THEN INLAY SHOULDERS WITH 220 LBS PER SQUARE YARD 12.5 mm SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME
3. SURFACE MAINLINE, EXTENDING 12 INCHES ONTO INSIDE SHOULDER AND 18 INCHES ONTO OUTSIDE SHOULDER, WITH 135 LBS PER SQUARE YARD ASPH CONC 12.5 mm PEM, GP 2 ONLY, INCL POLYMER-MODIFIED BITUM MATL & H LIME
4. PLACE INDENTATION RUMBLE STRIPS, GROUND-IN-PLACE (CONTINUOUS), ON INSIDE AND OUTSIDE SHOULDERS,
5. RESTRIPE ROADWAY AS EXISTING.

VE RECOMMENDATIONS

DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 Resurfacing
Bartow / Gordon Counties**

IDEA No.: AM-1	Sheet No.: 1 of 3	CREATIVE IDEA: Reduce milling and SMA inlay from 2 inches to 1.5 inches on mainline and ramps
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Comp By: GTM Date: 12/13/2011 Checked By: GAO Date: 12/14/11

Original Concept: The original design provides for 2 inch milling and inlay of SMA on the I-75 mainline and ramps.

Proposed Change: Reduce the mill and inlay depth from 2 inches to 1.5 inches.

Justification: Since there is no difference in the final depth of the asphalt, a thinner mill and inlay depth can be used without any sacrifice to total pavement depth of structural integrity. The actual minimum layer depth can be as thin as 1.25 inches. This recommendation would not affect the PEM surface course thickness. The ramp areas were not included in the calculation but will only add to the overall cost reduction.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$3,240,000		
Proposed	\$0		
Savings	\$3,240,000		\$3,240,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$3,240,000

CALCULATIONS

Project: I-75 Resurfacing; Bartow / Gordon Counties

Idea No.: AM-1
Client: GDOT
Sheet 3 of 3

Length of mainline – 21.856 miles = 115,399.68 ft

6 lanes wide; $6 \times 12 = 72$ ft

Total mainline area; $115,399.68 \times 72$ ft = 8,308,777 sq ft = 923,197.44 sq yds

Asphalt reduction:

$(220 - 165) \text{ \#/sy} \times 923,197.44 \text{ sy} (1 \text{ Ton} / 2,000\#) = 25,387.93 \text{ Tons}$

USE 25,388 Tons

Milling Cost reduction from 2.75 in depth to 2.25 inch depth

$\$4.01 / 2.75 \text{ in} = \$ X / 2.25 \text{ in}; X = \3.28

$\$4.01 - \$3.28 = \mathbf{\$0.73 \text{ per SY}}$

DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 Resurfacing
Bartow / Gordon Counties**

IDEA No.: AM-2	Sheet No.: 1 of 3	CREATIVE IDEA: Reduce PEM overlap on shoulders
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Comp By: JJV Date: 12/13/2011 Checked By: GAO Date: 12/14/11

Original Concept: The original design provides for the PEM surface course overlap onto the shoulders of 12 inches for the left shoulder and 18 inches for the right shoulder.

Proposed Change: Reduce the PEM surface course overlap to 6 inches for the left shoulder and 12 inches for the right shoulder.

Justification: The PEM surface course overlap dimensions are standard procedures for resurfacing projects however there is no specific detail or guideline addressing this. The purpose of the overlap is to eliminate the seam above the lane line joint between the shoulder and mainline pavement. The narrower dimensions address this function.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$175,000		
Proposed	\$0		
Savings	\$175,000		\$175,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$175,000

COST WORKSHEET

Project: I-75 Resurfacing; Bartow / Gordon Counties

Idea No.: AM-2
Client: GDOT
Sheet 2 of 3

CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
Item	Unit	No. Units	Cost/Unit	Total Cost	No. Units	Cost/Unit	Total Cost
Original Design:							
Asphalt - PEM	Ton	1,731	\$96.38	\$166,834			
VE Design:							
Asphalt - PEM	Ton				0		\$0
SUBTOTAL				\$166,834			\$0
Markup @ 5%				\$8,342			
TOTAL				\$175,176			
TOTAL ROUNDED				\$175,000			\$0

CALCULATIONS

Project: I-75 Resurfacing; Bartow / Gordon Counties

Idea No.: AM-2
Client: GDOT
Sheet 3 of 3

Length of mainline – 21.856 miles = 115,399.68 ft
PEM width reduction: 6 in left + 6 inch right = 12 inch total; 1 foot

Total area; $115,399.68 \times 1 \text{ ft} = 115,399.68 \text{ sq ft} = 12,822 \text{ sq yds}$
PEM thickness; 135 #/SY; 1.25 in

Asphalt reduction:

$135 \text{ \#/sy} \times 12,822 \text{ sy} (1 \text{ Ton} / 2,000\#) \times 2 \text{ directions} = 1,730.98 \text{ Tons}$

USE 1,731 Tons

DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 Resurfacing
Bartow / Gordon Counties**

IDEA No.: AS-1	Sheet No.: 1 of 3	CREATIVE IDEA: Eliminate milling and Superpave inlay on shoulders
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Comp By: JJV Date: 12/13/2011 Checked By: GAO Date: 12/14/11

Original Concept: The original design provides for 2 inch milling and Superpave inlay on the I-75 shoulders

Proposed Change: Eliminate the mill and Superpave inlay on the shoulders.

Justification: Based on comments and information received during the information phase, the shoulders are in generally good condition. The reason for performing the mill and inlay on the shoulders is to get the mainline and shoulder rehab cycles on the same time frame. The shoulders do not require any improvements and typically do not deteriorate at the same rate as the mainline. It is not mandatory that their repair cycles be in the same time frame.

This recommendation would not affect the PEM surface course thickness on the shoulders or the rumble strip installation.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$6,000,000		
Proposed	\$0		
Savings	\$6,000,000		\$6,000,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$6,000,000

COST WORKSHEET

Project: I-75 Resurfacing; Bartow / Gordon Counties					Idea No.: AS-1		
					Client: GDOT Sheet 2 of 3		
CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
Item	Unit	No. Units	Cost/Unit	Total Cost	No. Units	Cost/Unit	Total Cost
Original Design:							
Asphalt - Superpave	Ton	53,084	\$71.22	\$3,780,665			
Milling	SY	482,582	4.01	\$1,935,154			
VE Design:							
Asphalt - Superpave	Ton				0		\$0
Milling	SY				0		\$0
SUBTOTAL				\$5,715,819			\$0
Markup @ 5%				\$285,791			
TOTAL				\$6,001,610			
TOTAL ROUNDED				\$6,000,000			\$0

CALCULATIONS

Project: I-75 Resurfacing; Bartow / Gordon Counties

Idea No.: AS-1
Client: GDOT
Sheet 3 of 3

Superpave quantity is all for the shoulder work;
Therefore, eliminate all Superpave – \$3,780,665

Reduction in milling; shoulder area
 $53,084 \text{ tons} \times 2,000 \text{ \#/ton} (X \text{ SY} / 220 \text{ \#} / \text{sy})$
 $X = 482,582 \text{ SY}$

DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 Resurfacing
Bartow / Gordon Counties**

IDEA No.: AS-2	Sheet No.: 1 of 3	CREATIVE IDEA: Reduce milling and Superpave inlay from 2 inches to 1.5 inches on shoulders
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Comp By: GTM Date: 12/13/2011 Checked By: GAO Date: 12/14/11

Original Concept: The original design provides for 2 inch milling and Superpave inlay on the shoulders.

Proposed Change: Reduce the mill and inlay depth from 2 inches to 1.5 inches.

Justification: Since there is no difference in the final depth of the asphalt, a thinner mill and inlay depth can be used without any sacrifice to total pavement depth or structural integrity. The actual minimum layer depth can be as thin as 1.25 inches.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$1,362,000		
Proposed	\$0		
Savings	\$1,362,000		\$1,362,000
FUTURE COST: – Savings		N/A	N/A
TOTAL PRESENT WORTH SAVINGS			\$1,362,000

COST WORKSHEET

Project: I-75 Resurfacing; Bartow / Gordon Counties					Idea No.: AS-2		
					Client: GDOT		
					Sheet 2 of 3		
CONSTRUCTION ELEMENT		ORIGINAL ESTIMATE			NEW ESTIMATE		
Item	Unit	No. Units	Cost/Unit	Total Cost	No. Units	Cost/Unit	Total Cost
Original Design:							
Asphalt - Superpave	Ton	13,271	\$71.22	\$945,161			
Milling	SY	482,582	0.73	\$352,284			
VE Design:							
Asphalt - Superpave	Ton				0		\$0
Milling	SY				0		\$0
SUBTOTAL				\$1,297,445			\$0
Markup @ 5%				\$64,872			
TOTAL				\$1,362,317			
TOTAL ROUNDED				\$1,362,000			\$0

CALCULATIONS

Project: I-75 Resurfacing; Bartow / Gordon Counties

Idea No.: AS-2
Client: GDOT
Sheet 3 of 3

Shoulder area

$53,084 \text{ tons} \times 2,000 \text{ \#/ton} (X \text{ SY} / 220 \text{ \#} / \text{sy}); X = 482,582 \text{ SY}$

Asphalt reduction:

$(220 - 165) \text{ \#/sy} \times 482,582 \text{ sy} (1 \text{ Ton} / 2,000\#) = \mathbf{13,271 \text{ Tons}}$

Milling Cost reduction from 2.75 in depth to 2.25 inch depth

$\$4.01 / 2.75 \text{ in} = \$ X / 2.25 \text{ in}; X = \3.28

$\$4.01 - \$3.28 = \mathbf{\$0.73 \text{ per SY}}$

DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 Resurfacing; M004324
Bartow / Gordon Counties**

IDEA No.: C-1	Sheet No.: 1 of 2	CREATIVE IDEA: Allow weekend daytime work hours
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Comp By: GTM Date: 12/13/11 Checked By: GAO Date: 12/14/11

Original Concept: The construction documents allow work hours from 7:00 PM to 6:00 AM Monday through Sunday; no weekend daytime hours.

Proposed Change: Allow weekend daytime work hours from 7:00 Friday to 6:00 AM Monday.

Justification: Allowing full weekend hours will shorten the project duration and allow the contractor a larger work area. We estimate that the overall project duration will be reduced from 40 weeks to 30 weeks. Recent resurfacing projects in downtown Atlanta where traffic concerns are heavier have allowed daytime weekend work hours and lane closures.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	\$640,000		
Proposed	0		
Savings	\$640,000		\$640,000
FUTURE COST: – Savings			
TOTAL PRESENT WORTH SAVINGS			\$640,000

CALCULATIONS

Project: I-75 Resurfacing; M004324
Bartow / Gordon Counties

Idea No.: C 1
Client: GDOT
Sheet 2 of 2

Original

May 1, 2012 to February 28, 2013

10 months @ 4 weeks/month = 40 weeks

7:00 pm to 6:00 am = 11 hours/day

11 hours/day \times 7 days = 77 hours/week

77 hours/week \times 40 weeks = 3080 hours

Proposed

May 1, 2012 to February 28, 2013

40 weeks

Also allow 6:00 am to 7:00 pm Saturday & Sunday
+ 26 hours/week

77 hours + 26 hours = 103 hours/week

$3080 \text{ hours} / 103 \text{ hours/week} = 29.9 \text{ weeks} \approx 30 \text{ weeks}$

Traffic Control \$ 2,528,056.56 @ 40 weeks = \$63,201.41/week

WZ Law Enforcement \$ 36,800.00 @ 40 weeks = \$920.00/week

Savings \$64,121.41 \times 10 weeks = \$641,214.10 \$64,121.41/week

DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 Resurfacing; M004324
Bartow / Gordon Counties**

IDEA No.: C-10	Sheet No.: 1 of 3	CREATIVE IDEA: Use orange protective fencing to delineate the Environmentally Sensitive Area (ESA)
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Comp By: GAO Date: 12/13/11 Checked By: GTM Date: 12/13/11

Original Concept: The construction documents (Special Provision 107) outline the restrictions around the environmentally sensitive area (ESA) however there is no specific direction or accommodation to delineate or protect the ESA.

Proposed Change: Use orange protective fencing to delineate the ESA.

Justification: Outlining the ESA rather than just warning the contractor to stay out of it will provide a more positive delineation and barrier to the contractor. A sketch depicting this area should also be developed and included in the construction documents.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	0		
Proposed	5,300		
Savings	(5,300)		
FUTURE COST: – Savings			
TOTAL PRESENT WORTH SAVINGS			(5,300)

CALCULATIONS

Project: I-75 Resurfacing; M004324
Bartow / Gordon Counties

Idea No.: C-10
Client: GDOT
Sheet: 3 of 3

Assume 2,000 lf of orange protective fencing

DEVELOPMENT AND RECOMMENDATION PHASE

**Project: I-75 Resurfacing; M004324
Bartow / Gordon Counties**

IDEA No.: B-1	Sheet No.: 1 of 1	CREATIVE IDEA: Design Consideration Use separate items for milling
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Comp By: GAO Date: 12/13/11 Checked By: GTM Date: 12/13/11

Original Concept: The construction documents only have 1 item for milling at variable depth.

Proposed Change: Use as a minimum, 2 items for milling; 1) constant depth at 2 inches and 2) variable depth.

Justification: Better cost options and pricing will be obtained if 2, or more, items are used for milling. This is especially useful on a project such as this where most of the milling is expected to be at a constant depth, say 2 inches. If there are areas of uncertainty, the additional items can address them, rather than only 1 item of variable depth for all the milling.

COST SUMMARY	INITIAL COST	FUTURE COST	TOTAL L. C. COST SAVINGS
Original	0		
Proposed	0		
Savings	0		
FUTURE COST: – Savings			
TOTAL PRESENT WORTH SAVINGS			0

APPENDIX

Sources

Approving/Authorizing Persons

Name:	Position:	Telephone:
E. Reid Mathews	GDOT Project Manager	404-631-1390
Ron Wishon	Engineering Services	404-631-1753

Personal Contacts

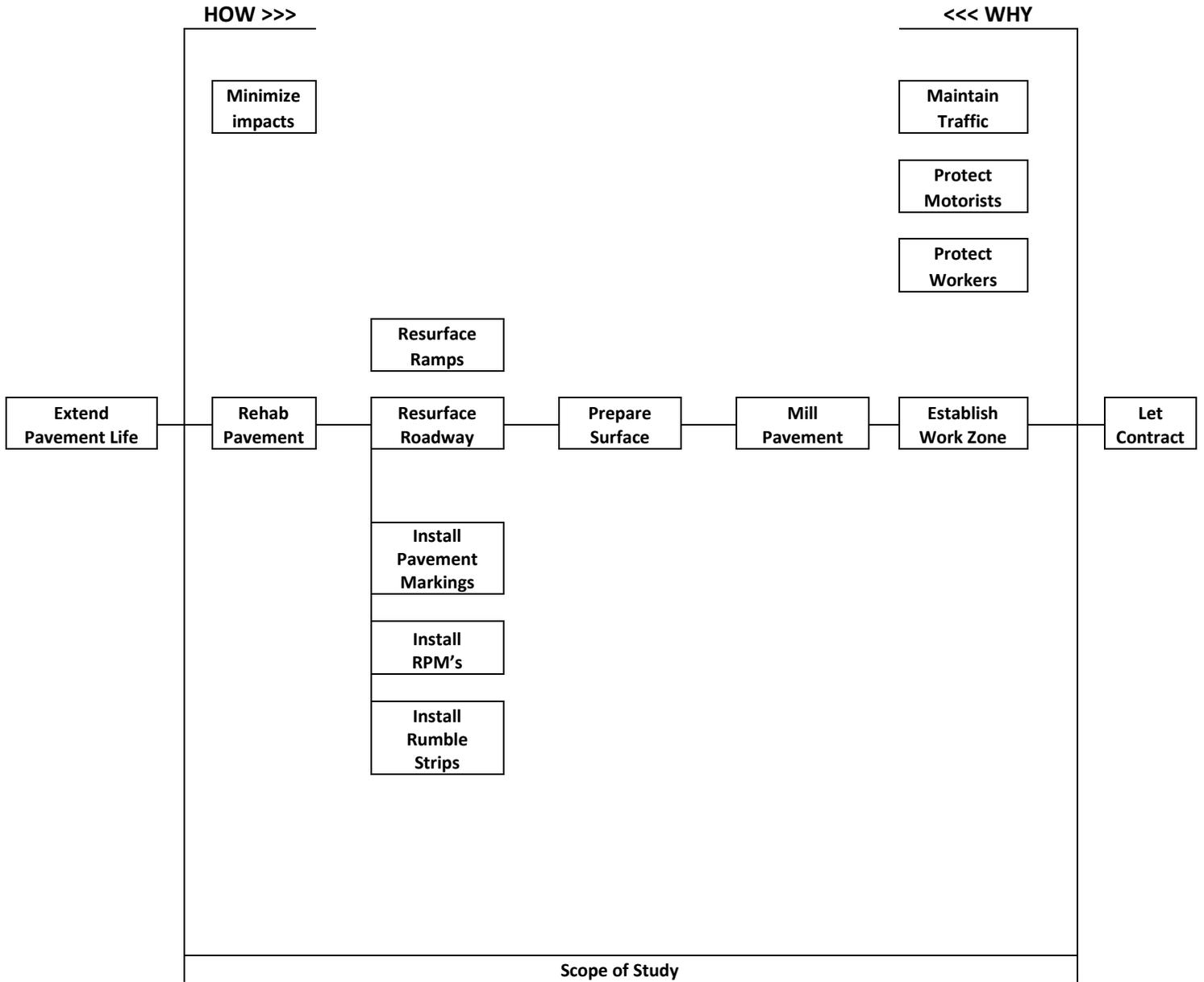
Name:	Telephone:	Notes:

Documents/Abstracts

Reference:	Reference:
Construction Documents – letter size typical sections, mile log, general notes, details, standards and special provisions.	Resurfacing Construction Cost Estimate 8/4/11

FAST DIAGRAM

I-75 Resurfacing



INFORMATION PHASE – FUNCTION ANALYSIS

Project: I-75 Resurfacing; Bartow / Gordon Counties

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
AM	Asphalt Paving - Mainline	support	vehicles	\$20,884,578	68.0%	Yes
		improve	surface			
		extend	pavement life			
		drain	runoff			
		reduce	spray			
AS	Asphalt Paving – Shoulder	match	mainline cycle			
		upgrade	rumble strips			
		emergency	area			
		drain	runoff			
		transition	pavement			
B	Milling	prepare	surface	\$6,088,916	19.8%	Yes
		remove	pavement			
		recycle	material			
		provide	seam (consistent depth)			

INFORMATION PHASE – FUNCTION ANALYSIS

Project: I-75 Resurfacing; Bartow / Gordon Counties

ITEM No.	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
		Verb	Noun	Cost	% of Total	Worth/Save
C	Traffic Control	maintain	traffic	\$2,545,257	8.3%	Yes
		stage	construction			
		protect	workers			
		protect	motorist			
		restrict	work hours			
		reduce	impacts			
D	Traffic Control – Law Enforcement	enforce	speed limit	\$640,000	2.08%	Yes
		increase	awareness			
E	Pavement Markings	inform	motorists	\$415,688	1.35%	No
		display	information			
		control	traffic			
		delineate	lanes			
F	Rumble Strips	delineate	edge	\$129,800	0.42%	No
		alert	motorists			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
AM	Asphalt Paving- Mainline		
AM-1	Reduce SMA mill / resurface from 2 inches to 1.5 inches		✓
AM-2	Reduce PEM shoulder overlap from 12/18 to 6/12		✓
AM-3	Include additional items for misc / unforeseen work	Combined with idea B-1	✓
AS	Asphalt Paving – Shoulder		
AS-1	Eliminate shoulder mill and inlay		✓
AS-2	Reduce 2-inch mill / inlay to 1.5-inch		✓
B	Milling		
B-1	Separate milling items	See idea AM-3	✓
✓ - Considered for further development; X – To be dropped; DC - Design Consideration – to be addressed as part of final construction documents			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
C	Traffic Control		
C-1	Allow daytime weekend work		✓
C-2	Allow double lane closings		DC
C-3	Allow off-peak daytime single lane closing		DC
C-4	Eliminate restrictions for ramp and shoulder work		DC
C-5	Incorporate incentives / early finish		DC
C-6	Increase liquidated damages		DC
C-7	Use area / district office instead of field trailer	Already incorporated	X
C-8	Allow daytime work; no restrictions		DC
C-9	Use alternate bidding / early finish option		DC
C-10	Use orange fence to delineate ESA		✓
✓ - Considered for further development; X – To be dropped; DC - Design Consideration – to be addressed as part of final construction documents			

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
D	Traffic Control – Law Enforcement		
D-1	Reduce amount of man-hours	Standard amount based on percentage	X
D-2	Buy enforcement vehicle	Eliminated due to cost error in estimate	X
D-3	Use speed limit display machine		DC
E	Pavement Markings		
F	Rumble Strips		
G	Raised Pavement Markers		
H	Traffic Loops		
✓- Considered for further development; X – To be dropped; DC - Design Consideration – to be addressed as part of final construction documents			

VE STUDY SIGN-IN SHEET

Project No.: N/A County: Bartow/Gordon PI No.: M004324 Date: December 13, 2011

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10. Attended Project Overview (1- Day Study)