Georgia Department of Transportation
District 4

STP-0000-00(543/544/545/546) and STP-032-2(28)

WIDENING OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS

P. I. Nos. 0000543/544/545/546 and 431780
Brooks and Colquitt Counties, Georgia

Value Engineering Study Report

September 2006

Design Team

Columbia Engineering, Inc.;
Cranston, Robertson & Whitehurst, P.C.; Street Smarts; and
Wolverton & Associates, Inc.

Value Engineering Consultant

Lewis & Zimmerman Associates, Inc.

Lewis & Zimmerman Associates, Inc.
Taking the Chance out of Change
6110 Executive Boulevard, Suite 512
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October 12, 2006

Ms. Lisa L. Myers
Design Review Engineer Manager
State of Georgia Department of Transportation, General Office
No. 2 Capitol Square, Room 266
Atlanta, Georgia 30334-1002

re: Widening State Route 133 from Troupville Road to the East Moultrie Bypass Projects
Brooks and Colquitt Counties, Georgia
Value Engineering Study Report

Dear Ms. Myers:

Lewis & Zimmerman Associates, Inc. is pleased to submit four hard copies and one electronic copy of the referenced report.

The project widens SR 133 in Brooks and Colquitt Counties, Georgia to improve safety and system efficiency for motorists traveling from Valdosta and Moultrie. This project is on the Governor's Road Improvement Program (GRIP) to help promote economic and business development within the corridor.

The value engineering effort focused on identifying opportunities to improve the value of the project in terms of the following: (1) promoting development and accommodate growth, (2) continuing the GRIP, (3) improving safety, and (4) potentially reducing capital cost.

We wish to take this opportunity to thank you and the State of Georgia Department of Transportation for your hospitality and the four design teams for providing the project information. Please let us know if you have any questions about the contents of this report.

Sincerely,

LEWIS & ZIMMERMAN ASSOCIATES, INC.

Luis M. Venegas, PE, CVS, LEED® AP
Vice President

Attachment

TABLE OF CONTENTS

EXECUTIVE SUMMARY

INTRODUCTION

This value engineering (VE) study report summarizes the events of the VE study conducted by Lewis & Zimmerman Associates, Inc. (LZA) for the State of Georgia Department of Transportation (GDOT), Atlanta, Georgia. The subject of the study was the project entitled Widening of State Route (SR) 133 from west of Valdosta to the East Moultrie Bypass (SR 35), known as Project Nos. STP-0000-00(543/544/545/ 546) and STP-032-2(28), P. I. Nos. 0000543/544/545/546 and 431780.

The project is in located Brooks and Colquitt Counties in Georgia and is being designed by Cranston, Robertson & Whitehurst, P.C., Columbia Engineering, Inc., Street Smarts, and Wolverton & Associates Inc. The VE workshop was conducted September 27 – 29, 2006 in GDOT offices in Atlanta.

PROJECT DESCRIPTION

This VE workshop studied five projects that will widen SR 133 between Valdosta and Moultrie. The overall widening of SR 133 and includes four projects between Moultrie and Albany. The southern terminus of the five projects will tie into the existing four-lane section of SR 133 near Troupville Road (CR 276) in Brooks County, and the northern terminus of these projects will tie into the existing through lane section at the East Moultrie Bypass (SR 35) in Colquitt County. These projects are not on a route designated in the GDOT Statewide Bicycle and Pedestrian Plan or a local bike plan.

The following table provides further description of the five projects that composed this VE study.

Contract	County	Proposed Scope	Termini	LOS
543	Brooks	Widen SR 133 from two to four lanes with turn lanes as needed	Troupville Road (CR 276) and Pauline Church Road (CR 10)	A
544			Pauline Church Road and Old Quitman Road (CR 1)	
545	Brooks/ Colquitt		Old Quitman Road and Old Berlin Road (CR 256)	
546	Colquitt		Old Berlin Road and Hawthorne Road (CR 388)	
28		Add a 20-foot raised concrete median to the existing four-lane section of SR 133	Hawthorne Road and the East Moultrie Bypass (SR 35)	N/A

The collective, probable cost of construction for all five contracts is $115,262,227 and is based on the *Preliminary Cost Estimates* dated December 2005 and February 2006, per the table below.

Contract No.	Construction Cost Subtotal	Inflation	Engineering & Construction	Right-of-Way	Reimbursable Utilities	Total
543	$14,040,519	$3,025,820	$1,706,634	$2,062,500	$1,352,500	$22,187,972
544	$12,265,842	$2,643,366	$1,490,921	$1,250,000	$577,500	$18,227,628
545	$21,929,928	$4,726,037	$2,665,596	$2,750,001	$2,512,500	$34,584,062
546	$17,746,439	$3,824,469	$2,157,091	$2,000,000	$15,000	$25,742,999
28	$10,156,208	$1,041,011	$1,119,722	$2,022,624	$180,000	$14,519,565
TOTALS	**$76,138,936**	**$15,260,703**	**$9,139,964**	**$10,085,125**	**4,637,500**	**$115,262,228**

CONCERNS AND OBJECTIVES

The purpose of these projects is to improve safety and system efficiency for motorists traveling from Valdosta and Moultrie. The project is also on the Governor's Road Improvement Program (GRIP) whose goal is to help promote economic and business development within the corridor.

One concern is that the traffic counts don't seem to warrant the $115,000,000 cost for this portion of the SR 133 corridor. Therefore, the value engineering effort focused on identifying opportunities to improve the value of the project in terms the following: (1) promoting development and accommodate growth; (2) continuing the GRIP; (3) improving safety by improving traffic operations, accommodating special events and maintaining route continuity; and (4) potentially reducing capital cost.

HIGHLIGHTS OF THE STUDY

Several alternatives address limiting the improvements that should be undertaken by these projects based on the amount of traffic. Collectively these alternatives represent a potential savings over $76,000,000:

- Alternative 543-1 limits the improvements through the City of Troupville to save nearly $8,275,000;
- Alternative 544-1 constructs only 1.45 miles of improvements within the City of Morven and saves about $11,600,000;
- Alternative 545-1 improves only the intersections of SR 133 with SR 333 (Moultrie Highway) and SR 256 (Old Berlin Road) and potentially saves $32,900,000; and
- Alternative 546-1 improves SR 133 through the City of Berlin and the eastern side of Moultrie to save almost $23,500,000.

The current design calls for a four-lane, divided roadway with closely-spaced media openings. The design's median spacing meets GDOT's minimum criteria. However, consider eliminating non-essential media openings to improve safety and operational efficiencies as described in Alternatives 543-3/4/5, 544-3/4/5, 545-2/3/4, 546-2/3/4, and 28-2/3. These Alternatives identify specific locations and estimate a combined savings of about $419,600.

While GDOT prefers to use concrete medians for maintenance purposes, a grassed median may be appropriate in some areas. The following alternatives propose using a grassed median to more aesthetically blend with the rural settings and to provide more porous surfaces for storm water absorption and dissipation: Alternatives 543-7, 545-8, 546-6, and 28-5. The combined potential initial savings of these alternatives totals over $5,400,000. In addition, these alternatives also yielded collective life-cycle cost savings over a 35-year period of almost $3,000,000.

This roadway is classified as a rural minor arterial and the proposed projects are not on a route designated in the GDOT Statewide Bicycle and Pedestrian Plan or a local bike plan. Therefore, the sidewalks on both sides of the facility—other than through city business districts—appear to unwarranted. Alternatives 543-6, 546-5, and 28-4 recommend retaining the current shoulder profiles but eliminate the concrete walking surface of the sidewalks except as specifically noted. Initial savings for this material reduction is collectively about $1,240,000. There is also potential life-cycle cost savings of almost $698,000 for this approach.

To reduce the footprint of the facility within each segment, the VE team explored the possibility of using a 5-lane road section through the areas having a posted speed limit of 45 miles per hour (mph). These alternatives are nos. 543-9 (savings about $1,650,000), 544-7 (savings close to $900,000), 546-8 (savings rounded to $82,000), and 28-7 (savings nearly $955,000).

Alternative No. 545-7 reduces the median section from 44 feet to 32 feet to reduce the abutting wetlands impact. Not only would savings be achieved, but this approach would provide a smoother transition from the 55 mph zone to the 45 mph.

Summary of Potential Cost Savings tables follow this narrative and outline all of alternatives and design suggestion developed by the VE team. Some of the alternatives are mutually exclusive or interrelated so that addition of all project cost savings does not equal total savings for the project. A full listing of all of the ideas considered by the VE team can be found on the *Creative Idea Listing* worksheets in the Value Analysis and Conclusion Section of this report.

SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Georgia Department of Transportation, District 4
Preliminary Design Stage

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	INITIAL COST SAVINGS	RECURRING COST SAVINGS	TOTAL PW LCC SAVINGS
				PRESENT WORTH OF COST SAVINGS		
CONTRACT 543						
543-1	Construct only the first 3.70 miles of SR 133 through Troupville	$22,141,169	$13,868,544	$8,272,625		$8,272,625
543-3/4/5	Selectively eliminate median cuts, left turn lanes and U-turn bump outs	$10,504,702	$10,408,223	$96,479		$96,479
543-6	Eliminate sidewalks (concrete only)	$435,226	$4,696	$430,530	$240,716	$671,246
543-7	Use a grass median in lieu of a concrete median	$691,348	$9,243	$682,105	$378,617	$1,060,722
543-8	Minimize the extent of side road improvements	DESIGN SUGGESTION				
543-9	Use a five-lane section through Troupville from Augusta Drive to Fellowship Home Lane	$3,595,323	$1,942,617	$1,652,706		$1,652,706
CONTRACT 544						
544-1	Construct only 1.45 miles of SR 133 from Lawson Pond Road to Old Quitman Road through the town of Morven	$18,228,150	$6,676,665	$11,551,485		$11,551,485
544-3/4/5	Selectively eliminate median cuts, left turn lanes and U-turn bump outs	$7,949,791	$7,901,711	$48,080		$48,080
544-7	Use a five-lane section through Morven from Old Quitman Road to Lawson Pond Road	$2,107,837	$1,207,775	$900,062		$900,062
544-8	Cul-de-sac Hitch road and eliminate intersection with SR 133	$0	$26,648	($26,648)		($26,648)
544-9	Use arch span structures in lieu of multi-cell box culverts	$918,684	$708,663	$210,021		$210,021
544-10	Complete mainline railroad crossing prior to closing other city railroad crossings	DESIGN SUGGESTION				

SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Georgia Department of Transportation, District 4
Preliminary Design Stage

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS: INITIAL COST SAVINGS	PRESENT WORTH OF COST SAVINGS: RECURRING COST SAVINGS	PRESENT WORTH OF COST SAVINGS: TOTAL PW LCC SAVINGS
CONTRACT 545						
545-1	Improve only two intersections: SR 133/SR 333 and SR 133/SR 256	$34,571,635	$1,673,452	$32,898,183		$32,898,183
545-2/3/4	Selectively eliminate median cuts, left turn lanes and bump outs	$14,054,365	$13,744,334	$310,031		$310,031
545-6	Use arch span structures in lieu of multi-cell box culverts	$960,396	$922,599	$37,797		$37,797
545-7	Use a 32-foot median section in lieu of 44-foot median section to minimize wetlands impact near Berlin	$457,957	$417,334	$40,623		$40,623
545-8	Use a grass median in lieu of a concrete median	$1,016,196	$14,584	$1,001,612	$555,519	$1,557,131
CONTRACT 546						
546-1	Construct SR 133 through Berlin and the Eastern portion of Moultrie only	$25,743,764	$2,244,327	$23,499,437		$23,499,437
546-2/3/4	Selectively eliminate median cuts, left turn lanes and bump outs	$12,876,629	$12,908,930	($32,301)		($32,301)
546-5	Eliminate sidewalks (concrete only)	$112,620	$1,169	$111,451	$58,464	$169,915
546-6	Use a grass median in lieu of a concrete median	$2,895,156	$18,670	$2,876,486	$1,626,963	$4,503,449
546-8	Use a five-lane section through the City of Berlin and Eastern Moultrie	$618,786	$536,528	$82,258		$82,258
546-9	Use arch span structures in lieu of multi-cell box culverts	$432,640	$668,550	($235,910)		($235,910)
546-10	Signalize South Vanderberg Drive entrance to airport (Spence Field)	$0	$200,565	($200,565)		($200,565)
CONTRACT 28						
28-2/3	Selectively eliminate median cuts	$909,600	$912,026	($2,426)		($2,426)
28-4	Eliminate sidewalks (concrete only)	$714,339	$7,728	$706,611	407,524	$1,114,135
28-5	Use a grass median in lieu of a concrete median	$909,600	$12,195	$897,405	$513,518	$1,410,923
28-7	Use a five-lane section through East Moultrie from South Vanderberg Drive to the East Moultrie Byass (SR 35)	$4,825,518	$3,871,382	$954,136		$954,136
28-8	Provide new intersection at Quail Run and Sanderson Farms chicken plant and eliminate old Moultrie-Adel Road/SR 133 intersection	$0	$464,032	($464,032)		($464,032)

STUDY RESULTS

INTRODUCTION

The results of a VE study represent the benefits that can be realized on the project by the owner, users and designer. The results will directly affect the project design and will require coordination among the designer, the user and the owner to determine the ultimate acceptance of each alternative.

The creative ideas are organized according to the order in which they were originally generated by the VE team during their function analysis creative sessions.

RESULTS OF THE STUDY

The VE team generated numerous ideas for change during the Function Analysis and Creative phases of the VE Job Plan. The evaluation of these ideas was based upon their potential for capital cost savings, probability of acceptance, availability of information to properly develop an idea, compliance with perceived quality, adherence to universally accepted standards and procedures, life cycle cost efficiency, safety, maintainability, constructibility and soundness of the idea.

Of the ideas generated, continued research and development of these ideas yielded 27 alternatives for change with an impact on project costs and two design suggestions that will enhance the value of the project in terms of long term maintenance and improved constructability. All of these alternatives and design suggestions are presented in detail following this narrative.

EVALUATION OF ALTERNATIVES

Once the aforementioned ideas are developed, it is important to consider each part of an individual alternative on its own merit. There is a tendency to disregard an alternative because of concern about one portion of it. Separate consideration should be given to each of the areas within an alternative that are acceptable and those parts should be considered in the final design, even if the entire alternative is not implemented.

Cost is the primary basis of comparison for alternative designs. To ensure that costs are comparable within the alternatives proposed by the VE team, the designer's cost estimates, where possible, is to be used as the pricing basis. Where appropriate, the impact of energy costs, replacement costs, and effect on operations and maintenance should be shown within each alternative.

Some of the alternatives are interrelated, so acceptance of one may preclude the acceptance of another. The reader should evaluate those alternatives carefully to select the ideas with the greatest beneficial impact to the project.

SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Georgia Department of Transportation, District 4
Preliminary Design Stage

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS: INITIAL COST SAVINGS	PRESENT WORTH OF COST SAVINGS: RECURRING COST SAVINGS	PRESENT WORTH OF COST SAVINGS: TOTAL PW LCC SAVINGS
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28-2/3	Selectively eliminate median cuts	$909,600	$912,026	($2,426)		($2,426)
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28-7	Use a five-lane section through East Moultrie from South Vanderberg Drive to the East Moultrie Byass (SR 35)	$4,825,518	$3,871,382	$954,136		$954,136
28-8	Provide new intersection at Quail Run and Sanderson Farms chicken plant and eliminate old Moultrie-Adel Road/SR 133 intersection	$0	$464,032	($464,032)		($464,032)

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **543-1**

DESCRIPTION: **CONSTRUCT ONLY THE FIRST 3.70 MILES OF SR 133 THROUGH TROUPVILLE**

SHEET NO.: **1 of 3**

ORIGINAL DESIGN:

The current design calls for four-lane widening and reconstruction of State Route (SR) 133 from Troupville Road to Pauline Church Road in Brooks County with intermittent turning lanes, curb and gutters, and sidewalks. The total length of this project is 33,785 feet or about 6.4 miles.

ALTERNATIVE:

Provide the new widening and reconstruction of SR 133 from Troupville Road to Fellowship Lane for a total length of 19,600 feet or about 3.7 miles. Perform no other improvements from this point northwest along SR 133.

ADVANTAGES:

- Substantially reduces construction cost
- Reduces construction period
- Improves sustainable design

DISADVANTAGES:

- LOS remains the same beyond improved area
- Challenges the Governor's Road Improvement Program (GRIP) criteria

DISCUSSION:

Demographically, traffic is not expected to increase significantly, negating the need for a four-lane highway throughout the project limits; especially in the sparsely populated rural areas. In fact, SR 133 is classified as a rural minor arterial facility.

This alternative does alleviate the safety and level of service concerns in Troupville as traffic exists or enters U.S. Intestate 75 (I-75) about 1/3 of a mile southeast of town. The addition of curb and gutters and sidewalks will promote pedestrian circulation though town thereby generating interest for potential commercial improvements and further development.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 22,141,169**	**—**	**$ 22,141,169**
ALTERNATIVE	**$ 13,868,544**	**—**	**$ 13,868,544**
SAVINGS	**$ 8,272,625**	**—**	**$ 8,272,625**

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 543-1

DESCRIPTION:

SHEET NO.: 2 of 3

As suggested, 3.7 miles out of 6.4 miles should be developed into 4-line highway with curb & gutter and sidewalks along with a majority of drainage work.

Percentage of roadway cost : $\frac{3.7}{6.4} \times 100 = 57.81\ \%$

% of Drainage : Eighty percent of cost : 80 %

% of Earthwork : 57.81 %

% of Lumpsump Items (curb, gutter, sidewalk etc.) : 90 %

Temporary & Permanent Erosion Control : 70 %

Striping : 57.81 %

Miscellaneous : 57.81 %

R/W Acquisition : 57.81 %

Reimbursable Utilities : 57.81 %

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 543-1

DESCRIPTION

SHEET NO.: 3 of 3

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Permanent Roadway	Mile	6.40	1,300,000	8,320,000			
Permanent Roadway (57.81%)	Mile				3.70	1,300,000	4,809,792
Drainage	Mile	6.40	300,000	1,920,000			
Drainage (80.00%)	Mile				5.12	300,000	1,536,000
Earthwork	Mile	6.40	284,242	1,819,149			
Earthwork (57.81%)	Mile				3.70	284,242	1,051,650
Lump Sum Items	Mile	6.40	128,543	822,675			
Lump Sum Items (90%)	Mile				5.76	128,543	740,408
Temporary Erosion Control	Mile	6.40	103,065	659,616			
Temporary Erosion Control (70%)	Mile				4.48	103,065	461,731
Permanent Erosion Control	Mile	6.40	35,914	229,850			
Permanent Erosion Control (70%)	Mile				4.48	35,914	160,895
Striping	Mile	6.40	21,680	138,752			
Striping (57.81%)	Mile				3.70	21,680	80,213
Miscellaneous	Mile	6.40	14,847	95,021			
Miscellaneous (57.81%)	Mile				3.70	14,847	54,932
Subtotal				14,005,062			8,895,620
Composite Markup at 33.71%				4,721,107			2,998,713
Total Construction				18,726,169			11,894,333
Right of Way Costs (M/U Incl.)		6.40	322,266	2,062,500	3.70	322,266	1,192,331
Reimbursable Utilities		6.40	211,328	1,352,500	3.70	211,328	781,880
	Sub-total			22,141,169			13,868,544
Mark-up at				INCL.			INCL.
	TOTAL			22,141,169			13,868,544

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **543-3/4/5**

DESCRIPTION: **SELECTIVELY ELIMINATE MEDIAN CUTS, LEFT TURN LANES AND U-TURN BUMP OUTS**

SHEET NO.: **1 of 6**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for a four-lane divided roadway with closely-spaced media openings.

ALTERNATIVE: (Sketch attached)

Consider eliminating non-essential media openings to improve safety and operational efficiencies at the following locations:

STATION (STA) 818+00;
STA 797+00; and
STA 712+00 (not shown on the plans).

ADVANTAGES:

- Reduces initial cost
- Reduces the number of conflict points
- Improves safety
- Improves traffic operations

DISADVANTAGES:

- Increases circuitous routing for local residents
- Most likely will increase the occurrence of illegal crossovers
- Could increase public opposition

DISCUSSION:

While this approach will inconvenience local residents somewhat, it does not preclude crossovers at more appropriate locations—increasing safety along this stretch of SR 133. In addition, operational efficiencies are achieved with less median openings allowing for a more continuous flow of traffic; especially during peak travel times.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 10,504,702**	**—**	**$ 10,504,702**
ALTERNATIVE	**$ 10,408,223**	**—**	**$ 10,408,223**
SAVINGS	**$ 96,479**	**—**	**$ 96,479**

STEVEN M. YOUNG

MICHAEL HUGHES & SHARON SMITH

DARYL P & DEBRA A JONES

SUSAN HARDING M.D., N. COURT CLINIC OF TROUPVILLE

SUSAN HARDING M.D., N. COURT CLINIC OF TROUPVILLE

STREAM BUFFER ZONE

STREAM #2

D-2A W/L #1

D-2A W/L #1

811+00 812+00 813+00 814+00 815+00 816+00 817+00 818+00 819+00 820+00 821+00 822+00 822+00 823+00 824+00 825+00 826+00 827+00

EXIST. R/W

EXIST. R/W

EXIST. R/W

EXIST. R/W

Eliminate Pav't

KC10023

+18 END 2.6%

+56 P.C. 2%

+93 P.T. 0.0%

+10 P.C. 2%

2.6%

2%

FLAT

2%

2%

S 46°59'24.3" E

PT 812+73.17

D-3A W/L #1

D-3A W/L #1

SIMPSON PROPERTIES LLC.

STREAM BUFFER ZONE

STREAM #2

MARVIN Y. & ELIZABETH CHARLENE BOYD

rve Data
- KC10023
- 32°10'42.4" (RT)
- 986.4357
- 1920.7403
- 139.4178
- 3420.0000

STA - 803+38.87
- 314498.4660
- 2547438.9300
- 2.6%

STREET SMARTS
Planning • Transportation Engineering • Surveying

3090 Premiere Parkway
Suite 200
Duluth, Georgia 30097
Phone: 770-813-0882
Fax: 770-813-0688

SCALE IN FEET
0 50 100 200

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPOR

OFFICE:

MAINLINE PLAN

SR 133 WIDENING
FROM TROUPEVILLE ROAD (CR276)
TO PAULINE CHURCH ROAD (CR 10

682-554 7/30/06

PROPERTY AND EXISTING R/W LINE ----P----
REQUIRED R/W LINE
CONSTRUCTION LIMITS ----C----F---
EASEMENT FOR CONSTR & MAINTENANCE OF SLOPES
EASEMENT FOR CONSTR OF SLOPES
EASEMENT FOR CONSTR OF DRIVES

PROJECT NUMBER	COUNTY
STP-0000-00(543)	BROOKS

5:32:22 PM	I:\600\682-554 sr133 preliminary plans\roadway\dgn\000543CP23.dgn	543 - 3/4/5	COUNTY
		Sheet 3 of 6	BROOKS

NATCO LLC

NATCO LLC

JOHNNIE H. & DAWN A. CROWDER

JERRY & KIMBERLY NEWMAN

NORMAN W. SIMPSON (FAMILY TRUST)

F.G. & JOHN L. ELDRIDGE

D-5A W/L*5

D-4A W/L*4

HERITAGE DRIVE

CEMETARY

EXIST. R/W

STATE ROUTE 133

KC10023

KC10071

LL 60
LL 79

790+00 791+00 792+00 793+00 794+00 795+00 796+00 797+00 798+00 799+00 800+00 801+00 802+00 803+00 804+00

270+00

PC 793+52.43

PC 270+37.46

PI 273+83.94

PI 272+83.

N 3°12'35.6" E

N 3°12'36.2" E

N 11°44'20.3" E

Curve Data
N = KC10271
Δ = 14°31'44.0" (LT)
T = 43.3406
L = 86.2162
E = 2.7512
R = 340.0000
PI STA = 270+80.80
Y = 2547654.9979
N = 314307.8633
SE = NC

Curve Data
N = KC10023
Δ = 32°10'42.4" (RT)
T = 986.4357
L = 1920.7403
E = 139.4178
R = 3420.0000
PI STA = 803+38.87
N = 314498.4660
E = 2547438.9300
SE = 2.6%

Curve Data
N = KC10023
Δ = 32°10'42.4" (RT)
T = 986.4357
L = 1920.7403
E = 139.4178
R = 3420.0000
PI STA = 803+38.87
N = 314498.4660
E = 2547438.9300
SE = 2.6%

STATE OF GE
DEPARTMENT OF TR

OFFICE:

MAINLINE
SR 133 WIDENING
FROM TROUPEVILLE ROAD
TO PAULINE CHURCH ROAD

682-554

R/W LINE

SLOPES

CONSTR OF DRIVES

REVISION DATES

REVISION DATES

STREET SMARTS
Planning • Transportation Engineering • Surveying
3090 Premiere Parkway
Suite 200
Duluth, Georgia 30097
Phone: 770-813-0882
Fax: 770-813-0688

SCALE IN FEET
0 50 100 200

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 543 - 3/4/5

DESCRIPTION:

SHEET NO.: 4 of 6

Close Median Opening @ Sta 818+00

Deleted Pavement

$$\text{Area} = \frac{(0+12')}{2}(180'+100') + (390'+300')(12') + (90')(20')$$

$$= (11760\ ft^2) = (1307\ yd^2)$$

Added Concrete Median

(Same as Deleted Pavement) = $1307\ yd^2$

Bump Outs Deleted Pav't = $180' \times 8' \times 2 \div 9 = (320\ yd^2)$

Close Median Opening @ Sta. 797+00

Deleted Pavement (Median Opening)

$$\text{Area} = (6')(180'+100') + (400'+300')(12') + (90')(20') = (11880\ ft^2)$$

$$= (1320\ yd^2)$$

Delete Pavement (Bump Out)

Area = $320\ yd^2$ (See Above)

Added Concrete Median = $1320\ yd^2$ (Same As Pav't)

Total Delete Pavement = $(3267\ yd^2)$

Total Added Concrete Median = $2627\ yd^2$

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 543 - 3/4/5

DESCRIPTION:

SHEET NO.: 5 of 6

Calculate Pavement Quantities

Aggregate Base = $(3267\ yd^2) \times (1350\ \#/yd^2) \div 2000\ \#/ton$
$= (2205\ tons)$

Surface Course = $(3267\ yd^2) \times (165\ \#/yd^2) \div 2000\ \#/ton$
$= (270\ tons)$

Binder Course = $(3267\ yd^2)(220\ \#/yd^2) \div 2000\ \#/ton$
$= (359\ tons)$

Base Course = $(3267\ yd^2)(660\ \#/yd^2) \div 2000\ \#/ton$
$= (1078\ tons)$

Tack Coat = $(3267\ yd^2)(4\ gal/100\ yd^2) = (130\ gal)$

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 543-3/4/5

DESCRIPTION

SHEET NO.: 6 of 6

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Aggregate Base (1,350#/SY)	TN	160,561	16	2,568,976	158,356	16	2,533,696
Surface (165#/SY)	TN	21,015	60	1,260,900	20,745	60	1,244,700
Binder (220#/SY)	TN	26,493	60	1,589,580	26,134	60	1,568,040
Base (660#/SY)	TN	26,493	60	1,589,580	25,415	60	1,524,900
Leveling (800#/SY)	TN	5,122	60	307,320	5,122	60	307,320
Tack Coat (4gal/CSY)	GAL	22,926	1	22,926	22,796	1	22,796
Concrete Median	SY	20,682	25	517,050	23,309	25	582,725
	Sub-total			7,856,332			7,784,177
Mark-up at	**33.71%**			2,648,370			2,624,046
	TOTAL			10,504,702			10,408,223

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **543-6**

DESCRIPTION: **ELIMINATE SIDEWALKS (CONCRETE ONLY)**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for a typical 16-foot shoulder section consisting of a 2.50-foot curb and gutter portion, a 6-foot grass strip, a 5-foot wide x 4-inch thick concrete sidewalk, and 2.50-foot grass strip.

ALTERNATIVE: (Sketch attached)

Maintain the proposed profile and the 16-foot shoulder section but eliminate the concrete sidewalk, leaving grass.

ADVANTAGES:

- Reduces material cost
- Provides for additional storm water run-off absorption
- Reduces concrete maintenance

DISADVANTAGES:

- Increases grass maintenance/replacement
- No hard walking surface

DISCUSSION:

The sidewalks are currently located at disconnected residential areas with no commercial property destinations. Further, the road is functionally classified as a rural minor arterial and the project is not on a route designated in the GDOT Statewide Bicycle and Pedestrian Plan or a local bike plan.

However, retaining the proposed profile will facilitate installation of concrete sidewalks if the need arises in the future.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 435,226**	**$ 250,609**	**$ 685,835**
ALTERNATIVE	**$ 4,696**	**$ 9,893**	**$ 14,589**
SAVINGS	**$ 430,530**	**$ 240,716**	**$ 671,246**

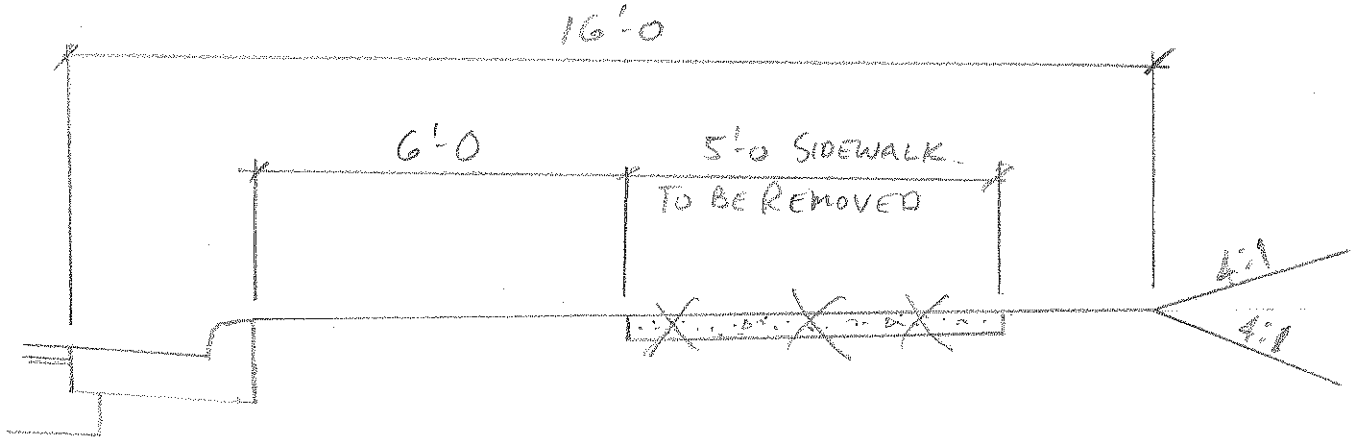
SKETCHES

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 543-6

☑ AS DESIGNED ☑ ALTERNATIVE

SHEET NO.: 2 of 5



TYPICAL SIDE WALK PROFILE

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 543-6

DESCRIPTION: ELIMINATE SIDEWALKS (CONCRETE ONLY)

SHEET NO.: 3 of 5

- ORIGINAL COST ESTMATE QUANTITY OF SIDEWALK = 10,500 SY
- ADD'L FILL ⇒ 10,500 SY × (4"/12) (1'/27) = 129.6 CY
- ADD'L MAINTENANCE AREA ⇒ 10,500 SY ÷ 4840 SY/ACRE = 2.17 ACRE
- ADD'L GRASS + FERTILIZER + LIME ⇒ (ORIGINAL GRASS QUANT. = 81 ACRE)

  GRASS = 800 $/ACRE

  LIME = 21 $/GAL (202 G/81 A) = 52.37 $/A

  FERTIL. = 60 $/T (162 T/81 A) = 120.00 $/A

  275 $/T (73 T/81 A) = 247.84 $/A

  2 $/# (4048 #/81 A) = 99.95 $/A

  1,320 $/ACRE × 2.17 ACRE = $2,865

- ADD'L MAINTENANCE ⇒

MOWING COST PROVIDED BY GDOT: MOWING - TIFTON ⇒ $1,047 PER MILE PER YEAR.

TYPICAL SECTION ⇒ 24' + 40' + 24' = 88'

AREA ⇒ 5260 FT/m × 88' ÷ 43,560 SF/ACRE = 10.63 ACRE/MILE

UNIT COST ⇒ $1047 / 10.63 = $98.53 PER ACRE PER YEAR

× 2.17 ACRE

$213.91 $/YR

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 543-6

DESCRIPTION

SHEET NO.: 4 of 5

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
4" Concrete Sidewalk	SY	10,500	31	325,500			
Additional Borrow	CY				129.60	5	648
Additional Grass / Fertilizer	AC				2.17	1,320	2,864
	Sub-total			325,500			3,512
Mark-up at	33.71%			109,726			1,184
	TOTAL			435,226			4,696

LIFE CYCLE COST WORKSHEET

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543/544/545/546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, GA Dept. of Transportation, Dist. 4
Preliminary Design Stage

ALTERNATIVE NO. 543-6

SHEET NO. 5 of 5

LIFE CYCLE PERIOD: 35 **years**

INTEREST RATE: 2.15% **ESCALATION RATE:** 0.00%

						ORIGINAL	PROPOSED
A.		**INITIAL COST**				435,226	4,696
		Useful Life (Years)					
					INITIAL COST SAVINGS		430,530
B.		**RECURRENT COSTS (Annual Expenditures)**					
		1. Maintenance: For concrete sidewalks - assume ½% of initial cost for minor repairs				2,176	
		2. Maintenance: Addition mowing for grass median - see calculation sheet					214
		3.					
					Total Annual Costs	2,176	214
		(An effective rate of 2.15% with 0.00% Interest and 0.00% Escal.)			**Present Worth Factor**	24.4205	24.4205
					Present Worth of RECURRENT COSTS	53,142	5,221
C.		**SINGLE EXPENDITURES**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
ORIG	PROP	< Put "x" in appropriate box (original design or proposed design)					
x		**1.** Assume replacement of ⅓ of the sidewalks every 12 years	12	143,625	0.7747	111,267	-
x		**2.** Assume replacement of ⅓ of the sidewalks every 12 years	24	143,625	0.6002	86,200	-
	x	**3.** Assume replacement of ½ of the grass medians every 10 years	10	2,348	0.8084	-	1,898
	x	**4.** Assume replacement of ½ of the grass medians every 10 years	20	2,348	0.6535	-	1,534
	x	**5.** Assume replacement of ½ of the grass medians every 10 years	30	2,348	0.5283	-	1,240
		6.			1.0000	-	-
		7.			1.0000	-	-
D.		**SALVAGE VALUE**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
		1.			1.0000	-	-
		2.			1.0000	-	-
					Present Worth of SINGLE EXPENDITURES	197,467	4,672
E.		**Total Recurrent Costs & Single Expenditures (B + C)**				250,609	9,893
					RECURRENT COSTS & SINGLE EXPENDITURES SAVINGS		240,716
					TOTAL PRESENT WORTH COST (A + D)	685,835	14,589
					TOTAL LIFE CYCLE SAVINGS		**671,246**

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **543-7**

DESCRIPTION: **USE A GRASS MEDIAN IN LIEU OF A CONCRETE MEDIAN**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for a typical 20-foot concrete median section consisting of a 2.50-foot curb and gutter, a 14-foot concrete median, and 2.50-foot curb and gutter.

ALTERNATIVE: (Sketch attached)

Maintain the proposed profile and the 20-foot median section but replace the concrete median with a grass median.

ADVANTAGES:

- Reduces material cost
- Provides for additional storm water run-off absorption
- Reduces concrete maintenance

DISADVANTAGES:

- Increases grass maintenance/replacement

DISCUSSION:

The introduction of the grass median is more in keeping with the aesthetic concept of a rural minor arterial roadway and with locations having historic significance to maintain the view sheds.

Grass medians would maintain a true “typical” median section throughout the project in the rural/open portions of the project.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 691,348**	**$ 398,088**	**$ 1,089,436**
ALTERNATIVE	**$ 9,243**	**$ 19,471**	**$ 28,714**
SAVINGS	**$ 682,105**	**$ 378,617**	**$ 1,060,722**

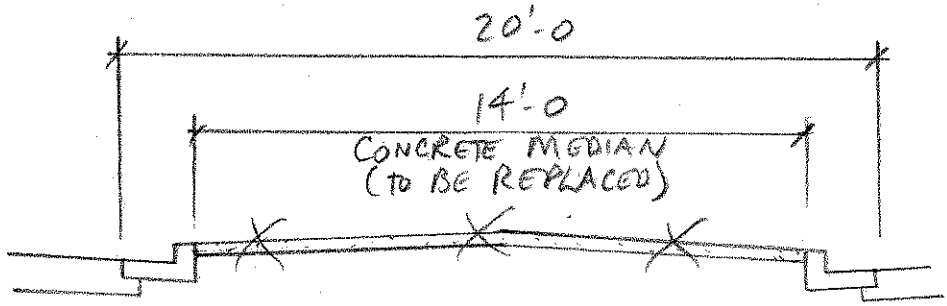
SKETCHES

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 543-7

☑ AS DESIGNED ☑ ALTERNATIVE

SHEET NO.: 2 of 5



TYPICAL MEDIAN SECTION

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 543-7

DESCRIPTION: USE GRASS MEDIAN IN LIEU OF CONCRETE

SHEET NO.: 3 of 5

- ORIGINAL COST ESTIMATE QUANTITY OF MEDIAN = 20,682 SY
- ADD'L FILL => 20,682 SY x (4"/12) (1'/27) = 255.3 CY
- ADD'L MAINTENANCE AREA => 20,682 SY ÷ 4840 SY/ACRE = 4.27 ACRE
- ADD'L GRASS & FERTILIZER => (ORIGINAL GRASS QUANTITY = 81 ACRES)

- GRASS =	800 $/A		
- LIME =	21 $/CAL	(202 CAL/81 A) =	52.37 $/A
	60 $/T	(162 T/81 A) =	120.0
- FERTIL. =	275 $/T	(73 T/81 A) =	247.84
	2 $/#	(4043 #/81 A) =	99.95
			1,320 $/ACRE

- ADD'L MAINTENANCE

MOWING COST PROVIDED BY GDOT: MOWING - TIFTON => $1,047 PER MILE PER YEAR.

TYPICAL SECTION => 24' + 40' + 24' = 88'

AREA => 5280 FT/m x 88' ÷ 43,560 SF/ACRE = 10.63 ACRE/MILE

UNIT COST => $1,047 / 10.63 = $98.53 PER ACRE PER YEAR

x 4.27 ACRE

$420.72 PER YR

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 543-7

DESCRIPTION

SHEET NO.: 4 of 5

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
4" Concrete Median	SY	20,682	25	517,050			
Additional Borrow	CY				255.30	5	1,277
Additional Grass / Fertilizer	AC				4.27	1,320	5,636
	Sub-total			517,050			6,913
Mark-up at	**33.71%**			174,298			2,330
	TOTAL			691,348			9,243

LIFE CYCLE COST WORKSHEET

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543/544/545/546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, GA Dept. of Transportation, Dist. 4
Preliminary Design Stage

ALTERNATIVE NO. 543-7

SHEET NO. 5 of 5

LIFE CYCLE PERIOD: 35 **years**

INTEREST RATE: 2.15% **ESCALATION RATE:** 0.00%

						ORIGINAL	PROPOSED
A.		**INITIAL COST**				691,348	9,243
		Useful Life (Years)					
					INITIAL COST SAVINGS		682,105
B.		**RECURRENT COSTS (Annual Expenditures)**					
		1. Maintenance: For concrete sidewalks - assume ½% of initial cost for minor repairs				3,457	
		2. Maintenance: Addition mowing for grass median - see calculation sheet					421
		3.					
					Total Annual Costs	3,457	421
		(An effective rate of 2.15% with 0.00% Interest and 0.00% Escal.)			**Present Worth Factor**	24.4205	24.4205
					Present Worth of RECURRENT COSTS	84,415	10,274
C.		**SINGLE EXPENDITURES**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
ORIG	PROP	< Put "x" in appropriate box (original design or proposed design)					
x		**1.** Assume replacement of ⅓ of the sidewalks every 12 years	12	228,145	0.7747	176,746	-
x		**2.** Assume replacement of ⅓ of the sidewalks every 12 years	24	228,145	0.6002	136,927	-
	x	**3.** Assume replacement of ½ of the grass medians every 10 years	10	4,622	0.8084	-	3,736
	x	**4.** Assume replacement of ½ of the grass medians every 10 years	20	4,622	0.6535	-	3,020
	x	**5.** Assume replacement of ½ of the grass medians every 10 years	30	4,622	0.5283	-	2,441
		6.			1.0000	-	-
		7.			1.0000	-	-
D.		**SALVAGE VALUE**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
		1.			1.0000	-	-
		2.			1.0000	-	-
					Present Worth of SINGLE EXPENDITURES	313,673	9,197
E.		**Total Recurrent Costs & Single Expenditures (B + C)**				398,088	19,471
					RECURRENT COSTS & SINGLE EXPENDITURES SAVINGS		378,617
					TOTAL PRESENT WORTH COST (A + D)	1,089,436	28,714
					TOTAL LIFE CYCLE SAVINGS		**1,060,722**

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **543-8**

DESCRIPTION: **MINIMIZE THE EXTENT OF SIDE ROAD IMPROVEMENTS**

SHEET NO.: **1 of 1**

ORIGINAL DESIGN:

The furnished design drawings seem to indicate that the side roads are to undergo improvements: widening, reconstruction, and assumed tapering to meet existing conditions. However, the drawings stop short of the termini of side road improvements.

ALTERNATIVE:

Shorten the extension of side road improvements to approximately 100 feet beyond intersection improvements and/or limits of geometry improvements.

ADVANTAGES:

- Could reduce initial cost
- Could shorten construction period
- Reduces material costs

DISADVANTAGES:

- Loss of immediate improvement

DISCUSSION:

The drawings are at the early stage of preliminary design, but the improvements to the side roads are inconclusive in some locations—either incomplete or extend beyond the drawing. These areas should be clarified as the design progresses: West Drive, Noble Oaks Drive, and Justin Road.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN			
ALTERNATIVE	DESIGN SUGGESTION		
SAVINGS			

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **543-9**

DESCRIPTION: **USE A FIVE-LANE SECTION THROUGH TROUPVILLE FROM AUGUSTA DRIVE TO FELLOWSHIP HOME LANE**

SHEET NO.: **1 of 6**

ORIGINAL DESIGN: (Sketch attached)

The original design includes a 20-foot raised median through the town of Troupville. Speed is to be posted at 45 miles per hour (mph).

ALTERNATIVE: (Sketch attached)

Using the 45 mph speed limit criterion, use a five-lane flush section through Troupville.

ADVANTAGES:

- Decreases cost
- Speeds construction
- Decreases right of way costs
- Allows unrestricted left turns through Troupville
- Improves business access throughout Troupville

DISADVANTAGES:

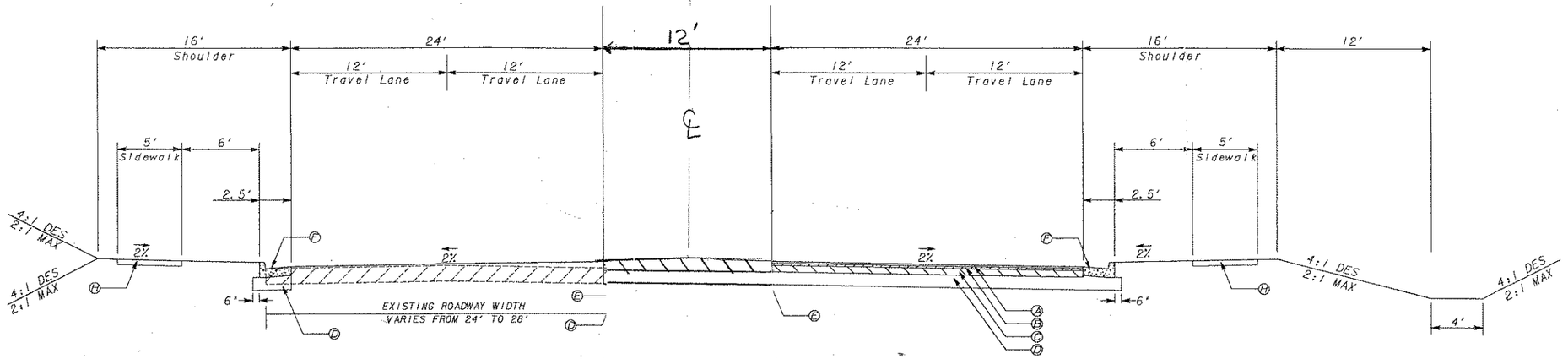
- Slightly decreases safety, but still within GDOT standards
- Eliminates control of left turns

DISCUSSION:

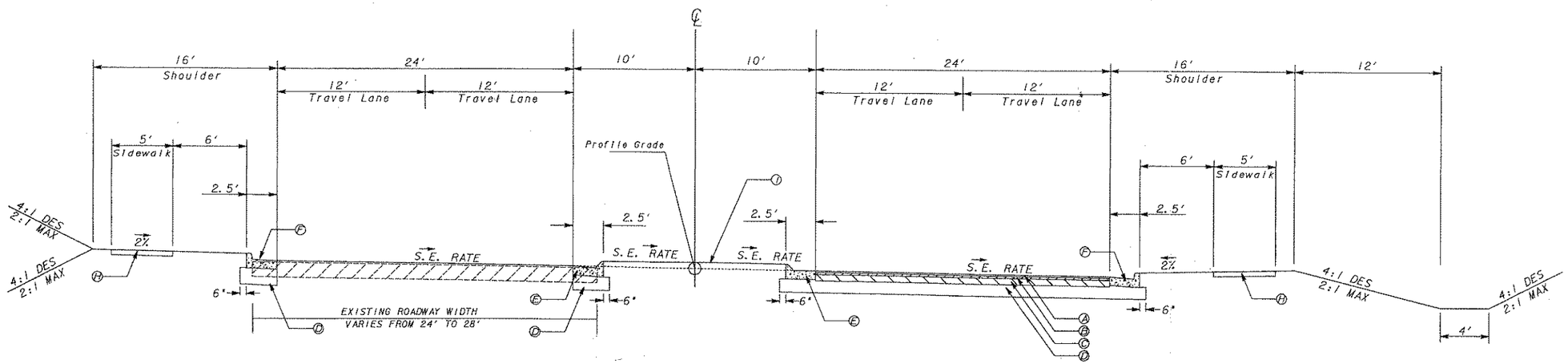
GDOT standards allow a five-lane section within a 45 mph speed limit zone; however, this does reduce safety somewhat.

The original design includes a four-lane divided section but has numerous median openings to allow for left turns. Using the five-lane section allows for unrestricted left turns—this may further please the businesses along this route as it improves access.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 3,595,323**	**—**	**$ 3,595,323**
ALTERNATIVE	**$ 1,942,617**	**—**	**$ 1,942,617**
SAVINGS	**$ 1,652,706**	**—**	**$ 1,652,706**



Proposed Alternate
5 Lane Section (Flush)



Original Section
Raised Median

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 543-9

DESCRIPTION:

SHEET NO.: 3 of 6

Total length under consideration (Augusta Road to Fellowship Home Lane) is:

Sta 778+29 − 656+40 = 12,189 ft = 2.3 mi

Items:
- Concrete Median – Eliminate
- Curb & Gutter – Eliminate (In Median)
- AC Pavement – Add 12'
- GAB – Add
- Stripe, Dbl Yellow – Add
- Right of Way – Decrease

Quantities:

Concrete Median

① Augusta Dr to Justin Rd
$(2(5.5\text{ft} \cdot 300\text{ft}) + 50\text{ft} \cdot 100\text{ft}) \frac{\text{SY}}{9\text{ft}^2} = 922\ \text{SY}$

② Justin Rd to Ridgeland Dr.
$[2(400\text{ft} \cdot 5.5\text{ft}) + 130\text{ft} \cdot 180\text{ft}] \cdot \frac{\text{SY}}{9\text{ft}^2} = 3089\ \text{SY}$

③ Ridgeland Dr. to Cedar Hill Drive
$[2(260\text{ft} \cdot 5.5\text{ft}) + 40\text{ft} \cdot 100\text{ft}] \cdot \frac{\text{SY}}{9\text{ft}^2} = 762\ \text{SY}$

④ Cedar Hill Drive to Old Home Place
$[2(300\text{ft} \cdot 5.5\text{ft}) + 100\text{ft} \cdot 320\text{ft}] \cdot \frac{\text{SY}}{9\text{ft}^2} = 3922\ \text{SY}$

⑤ Old Home Place to Noble Oaks Dr.
$[2(300\text{ft} \cdot 5.5\text{ft}) + 100\text{ft} \cdot 270\text{ft}] \cdot \frac{\text{SY}}{9\text{ft}^2} = 3,367\ \text{SY}$

⑥ Noble Oaks Dr to Brookview Dr.
$[2(250\text{ft} \cdot 5.5\text{ft}) + 100\text{ft} \cdot 5.5\text{ft}] \cdot \frac{\text{SY}}{9\text{ft}^2} = 3,300\ \text{SY}$

⑦ Brookview Dr to West Dr.
$[2(400\text{ft} \cdot 5.5\text{ft}) + 780\text{ft} \cdot 180\text{ft}] \cdot \frac{\text{SY}}{9\text{ft}^2} = 16,089\ \text{SY}$

⑧ West Dr to Pinebrook Dr.
$600\text{ft} \cdot 5.5\text{ft}) \frac{\text{SY}}{9\text{ft}^2} = 367\ \text{SY}$

⑨ Pinebrooke Dr. to Sta. 683+00
$[2(400\text{ft} \cdot 5.5\text{ft}) + 1900\text{ft} \cdot 600\text{ft}] \cdot \frac{\text{SY}}{9\text{ft}^2} = 13,156\ \text{SY}$

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 543-9

DESCRIPTION:

SHEET NO.: 4 of 6

Quantities (Continued)

(10) Concrete Median (Continued)

Sta 683+00 to Cates Rd

$[2(400ft \cdot 5.5ft) + 190ft \cdot 200ft] \cdot \frac{SY}{9ft^2} = 4711\ SY$

(11) Cates Rd to Fellowship Home Lane

$[2(400ft \cdot 5.5ft) + 180ft \cdot 250ft] \frac{SY}{9ft^2} = 5489\ SY$

Total Concrete Median Eliminated = 61,263 SY

Curb & Gutter

(1) $300ft \cdot 4 + 2 \cdot 50ft + 2 \cdot 100ft = 1500\ LF$

(2) $400ft \cdot 4 + 2 \cdot (130ft + 180ft) = 2220\ LF$

(3) $260ft \cdot 4 + 2 \cdot (40ft + 100ft) = 1320\ LF$

(4) $300ft \cdot 4 + 2(100ft + 320ft) = 2040\ LF$

(5) $300ft \cdot 4 + 2(100ft + 270ft) = 1940\ LF$

(6) $250ft \cdot 4 + 2(100ft + 5.5ft) = 1211\ LF$

(7) $400ft \cdot 4 + 2(780ft + 180ft) = 3520\ LF$

(8) $600ft \cdot 2 = 1200\ LF$

(9) $400ft \cdot 4 + 2 \cdot (190ft + 600ft) = 3180\ LF$

(10) $400ft \cdot 4 + 2(190ft + 200ft) = 2380\ LF$

(11) $400ft \cdot 4 + 2(180ft + 250ft) = 2460\ LF$

Total Curb & Gutter Eliminated = 22,971 LF

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 543-9

DESCRIPTION:

SHEET NO.: 5 of 6

Quantities (Continued)

AC Pavement (Added)
1045 lb/SY

$12\,ft \cdot 12{,}189\,ft \cdot \frac{SY}{9\,ft^2} = 16{,}252\,SY$

$1045\,lb/SY \cdot 16{,}252\,SY \cdot \frac{TN}{2000\,lb}$
$= 8{,}492\,TN$

GAB (Added)
1350 lb/SY

$1350\,lb/SY \cdot 16{,}252\,SY \cdot \frac{TN}{2000\,lb}$
$= 10{,}970\,TN$

Stripe (Added)
$4 \cdot 12{,}189\,ft = 48{,}756\,LF$

Right of Way
Original $112\,ft \cdot 12{,}189\,ft \cdot \frac{Acre}{43{,}560\,ft^2} = 31.3\,Acre$

Alternate $(112\,ft - 8\,ft) \cdot 12{,}189\,ft \cdot \frac{Acre}{43{,}560\,ft^2} = 29.1\,Acre$

Ø Takes Eliminated

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 543-9

DESCRIPTION

SHEET NO.: 6 of 6

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
4" Concrete Median	SY	61,263	25	1,531,575			
Curb and Gutter	LF	22,971	15	344,565			
AC Pavement	TN				8,492	60	509,520
GAB	TN				10,970	16	175,520
Striping (Yellow)	LF				48756.00	0.25	12,189
Construction Subtotal				1,876,140			697,229
Composite Markup at 33.71%				632,447			235,036
Construction Total				2,508,587			932,265
Right of Way	AC	31.30	10,000	313,000	29.10	10,000	291,000
Composite Markup at 247.20%				773,736			719,352
ROW Total				1,086,736			1,010,352
Sub-total				3,595,323			1,942,617
Mark-up at				INCL.			INCL.
TOTAL				3,595,323			1,942,617

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **544-1**

DESCRIPTION: **CONSTRUCT ONLY 1.45 MILES OF SR 133 FROM LAWSON POND ROAD TO OLD QUITMAN ROAD THROUGH MORVEN**

SHEET NO.: **1 of 3**

ORIGINAL DESIGN:

The current design calls for the four-lane widening and reconstruction of State Route (SR) 133 from Pauline Church Road in Troupville Road to Old Quitman Road in Brooks County with intermittent turning lanes, curb and gutters and sidewalks. The total length of this project is about 5.45 miles.

ALTERNATIVE:

Widen and reconstruct SR 133 from Lawson Pond Road at Station (STA) 248+55 to old Quitman Road at STA 171+88 for a distance of about 1.45 miles. Perform no other improvements northwest or southeast of this segment on SR 133.

ADVANTAGES:

- Substantially reduces construction cost
- Reduces construction period
- Improves sustainable design

DISADVANTAGES:

- LOS remains the same beyond improved area
- Loss of immediate improvement
- Challenges the Governor's Road Improvement Program (GRIP) criteria

DISCUSSION:

Demographically, traffic is not expected to increase greatly in this area, especially in the sparsely-populated rural areas. In fact, SR 133 is classified as a rural minor arterial facility.

This alternative meets the original intent through Morven and alleviates safety and level of service concerns. The addition of curb and gutters and sidewalks will promote pedestrian circulation though town, generating interest for potential commercial improvements and further development.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 18,228,150**	**—**	**$ 18,228,150**
ALTERNATIVE	**$ 6,676,665**	**—**	**$ 6,676,665**
SAVINGS	**$ 11,551,485**	**—**	**$ 11,551,485**

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 544-1

DESCRIPTION:

SHEET NO.: 2 of 3

As suggested, 1.45 miles out of 5.45 miles should be developed into 4-lane highway with curb & gutter and sidewalks along with a majority of drainage work.

Percentage of roadway : $\frac{1.45}{5.45} \times 100 = 26.62\ \%$ of total roadway cost

Drainage : 80 % of cost

Earthwork : 26.62 %

Lump Sump Items (Curb, gutter & sidewalk etc.) : 90 %

Temp. & Permanent Erosion Control : 70 %

Striping : 26.62 %

Miscellaneous : 26.62 %

R/W Acquisition : 26.62 %

Reimbursable Utilities : 26.62 %

Guardrail & Box Culverts aren't expected in the proposed 1.45 mile construction of SR 133

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 544-1

DESCRIPTION

SHEET NO.: 3 of 3

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Permanent Roadway	Mile	5.45	1,293,170	7,047,777			
Permanent Roadway (57.81%)	Mile				1.45	1,293,170	1,875,097
Drainage	Mile	5.45	253,982	1,384,202			
Drainage (80.00%)	Mile				4.36	253,982	1,107,362
Earthwork	Mile	5.45	219,083	1,194,002			
Earthwork (57.81%)	Mile				1.45	219,083	317,670
Lump Sum Items	Mile	5.45	115,197	627,824			
Lump Sum Items (90%)	Mile				4.90	115,197	564,465
Temporary Erosion Control	Mile	5.45	145,698	794,054			
Temporary Erosion Control (70%)	Mile				3.81	145,698	555,109
Permanent Erosion Control	Mile	5.45	43,652	237,903			
Permanent Erosion Control (70%)	Mile				3.81	43,652	166,314
Striping	Mile	5.45	27,444	149,570			
Striping (57.81%)	Mile				1.45	27,444	39,794
Miscellaneous	Mile	5.45	2,722	14,835			
Miscellaneous (57.81%)	Mile				1.45	2,722	3,947
Guardrail (0.00%)	Mile	5.45	23,596	128,598			
Box Culvert (0.00%)	LS	1.00		687,072			
Subtotal				12,265,837			4,629,758
Composite Markup at 33.71%				4,134,814			1,560,691
Total Construction				16,400,650			6,190,449
Right of Way Costs (M/U Incl.)		5.45	229,358	1,250,000	1.45	229,358	332,569
Reimbursable Utilities		5.45	105,963	577,500	1.45	105,963	153,647
	Sub-total			18,228,150			6,676,665
Mark-up at				INCL.			INCL.
	TOTAL			18,228,150			6,676,665

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **544-3/4/5**

DESCRIPTION: **SELECTIVELY ELIMINATE MEDIAN CUTS, LEFT TURN LANES AND U-TURN BUMP OUTS**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for a four-lane divided roadway with closely-spaced media openings.

ALTERNATIVE: (Sketch attached)

Consider eliminating non-essential media openings to improve safety and operational efficiencies at STA 184+00.

ADVANTAGES:

- Reduces initial cost
- Reduces the number of conflict points
- Improves safety
- Improves traffic operations

DISADVANTAGES:

- Increases circuitous routing for local residents
- Most likely will increase the occurrence of illegal crossovers
- Could increase public opposition

DISCUSSION:

While this approach will inconvenience local residents somewhat, it does not preclude crossovers at more appropriate locations—increasing safety along this stretch of SR 133. In addition, operational efficiencies are achieved with less median openings allowing for a more continuous flow of traffic; especially during peak travel times.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 7,949,791**	**—**	**$ 7,949,791**
ALTERNATIVE	**$ 7,901,711**	**—**	**$ 7,901,711**
SAVINGS	**$ 48,080**	**—**	**$ 48,080**

544 - 3/4/5

Sheet No. 2 of 4

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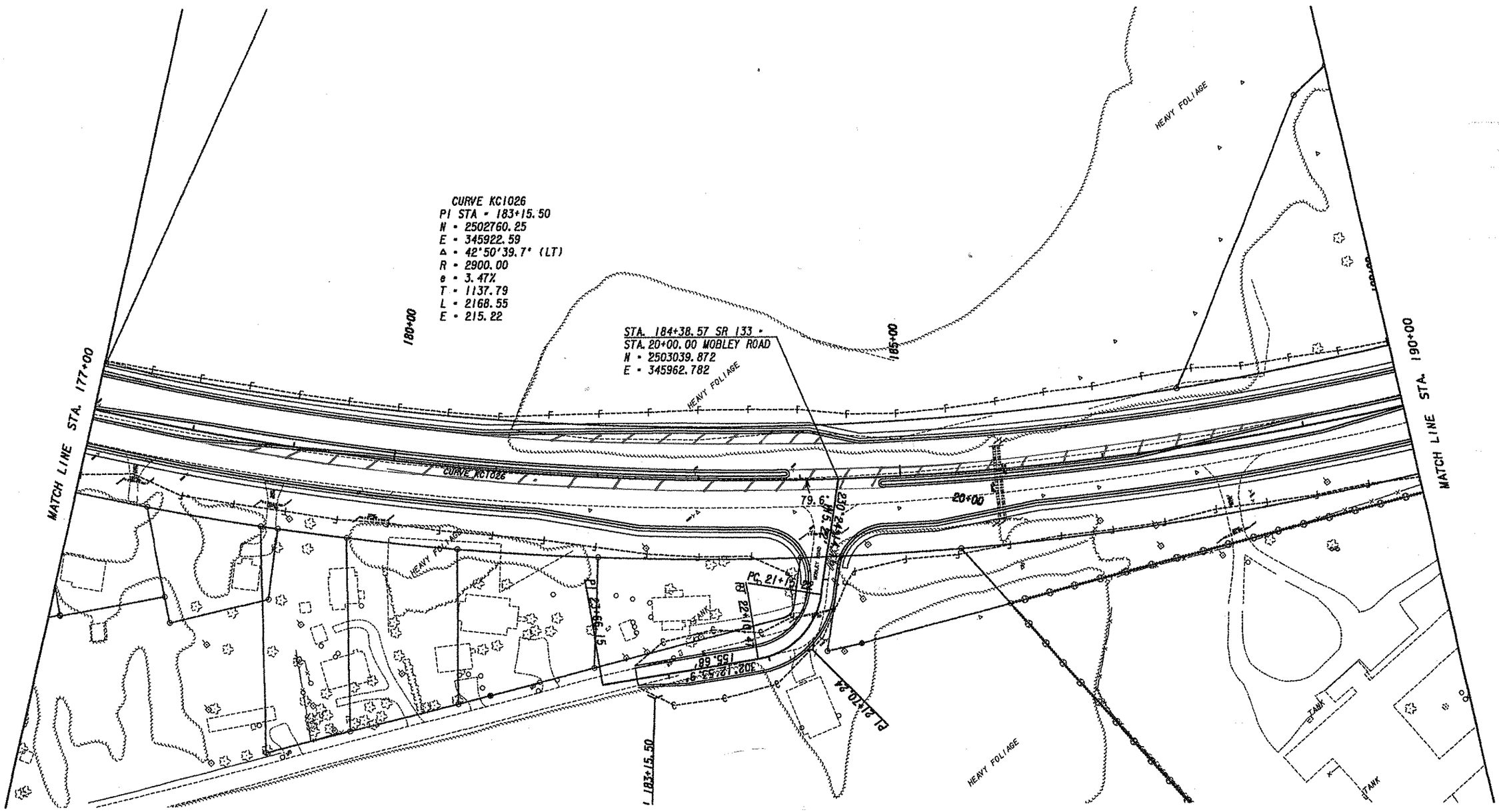


Wolverton & Associates

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE:

MAINLINE PLAN

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 544 - 3/4/5

DESCRIPTION:

SHEET NO.: 3 of 4

Close Median Opening @ Sta. 184+00

Deleted Median Pavement

Area = (6')(180'+180') + (12')(400'+250') + (90')(20')

= (11,760 ft²) = (1307 yd²)

Deleted Bump Out Pavement

Area = (8')(360') = 2880 ft² = (320 yd²)

Added Concrete Median

(Same as Deleted Median Pavement)

= 1307 yd²

Total Delete Pavement = 1627 yd²

Aggregate Base = (1627 yd²)(1350 #/yd²) ÷ 2000 #/ton = (1098 tons)

Surface Course = (1627 yd²)(165 #/yd²) ÷ (2000 #/ton) = (134 tons)

Binder Course = (1627)(220)/2000 = (179 tons)

Base Course = (1627)(660)/2000 = (537 tons)

Tack Coat = (1627 yd²)(4 gal/100 yd²) = (65 gal)

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 544-3/4/5

DESCRIPTION

SHEET NO.: 4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Aggregate Base (1,350#/SY)	TN	127,041	16	2,032,656	125,943	16	2,015,088
Surface (165#/SY)	TN	17,555	60	1,053,300	17,421	60	1,045,260
Binder (220#/SY)	TN	10,481	60	628,860	10,302	60	618,120
Base (660#/SY)	TN	31,443	60	1,886,580	30,906	60	1,854,360
Tack Coat (4gal/CSY)	GAL	19,151	1.00	19,151	19,086	1.00	19,086
Concrete Median	SY	13,000	25	325,000	14,307	25	357,675
	Sub-total			5,945,547			5,909,589
Mark-up at	**33.71%**			2,004,244			1,992,122
	TOTAL			7,949,791			7,901,711

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **544-7**

DESCRIPTION: **USE A FIVE-LANE SECTION THROUGH MORVEN FROM OLD QUITMAN ROAD TO LAWSON POND ROAD**

ORIGINAL DESIGN: (Sketch attached)

The original design includes a 20-foot raised median through the town of Morven. Speed is to be posted at 45 miles per hour (mph).

ALTERNATIVE: (Sketch attached)

Using the 45 mph speed limit criterion, use a five-lane flush section through Troupville.

ADVANTAGES:

- Decreases cost
- Speeds construction
- Decreases right of way costs
- Allows unrestricted left turns through Morven
- Allows business access throughout Morven

DISADVANTAGES:

- Decreases safety, but still within GDOT standards
- Eliminates control of left turns

DISCUSSION:

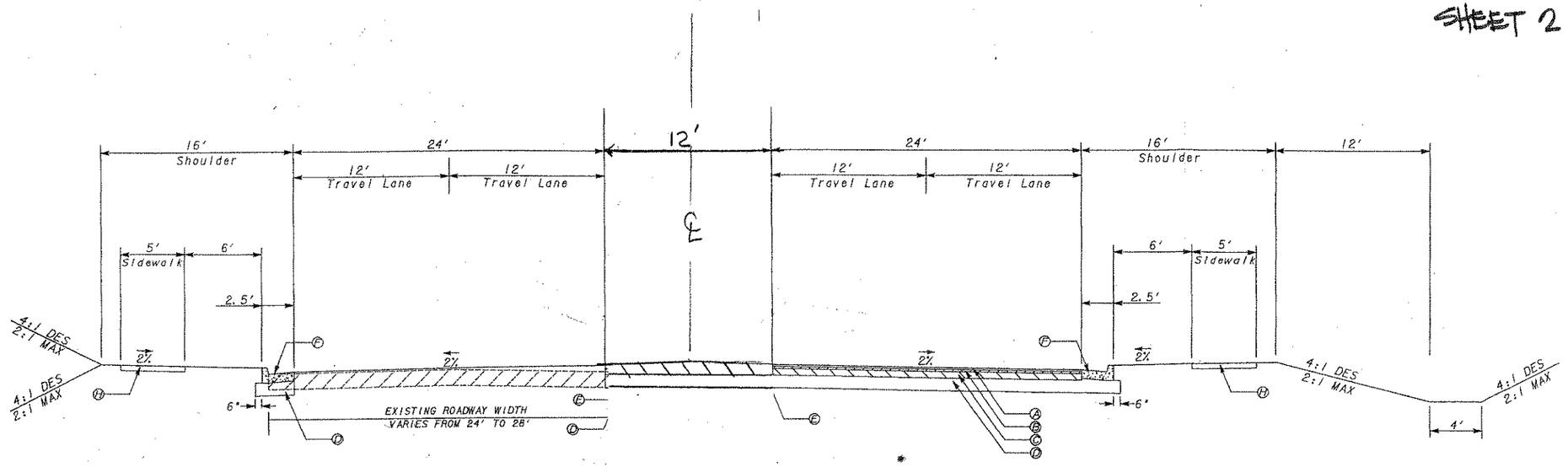
GDOT standards allow a five-lane section within a 45 mph speed limit zone; however, this does reduce safety somewhat.

The original design includes a four-lane divided section but has numerous median openings to allow for left turns. Using the five-lane section allows for unrestricted left turns—this may further please the businesses along this route as it improves access.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 2,107,837**	**—**	**$ 2,107,837**
ALTERNATIVE	**$ 1,207,775**	**—**	**$ 1,207,775**
SAVINGS	**$ 900,062**	**—**	**$ 900,062**

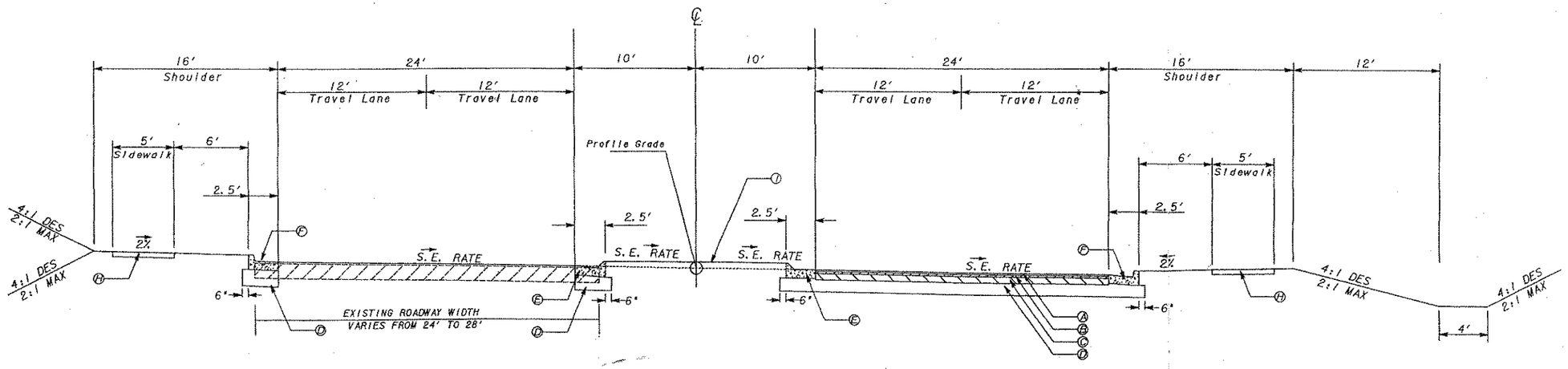
544-7

SHEET 2 OF 5



Proposed Alternate

5 Lane Section (Flush)



Original Section

Raised Median

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 544-7

DESCRIPTION:

SHEET NO.: 3 of 5

Total length under consideration (Old Quitman Road to Lawson Pond Rd)
Sta 172+35 to 248+10 = 7,575 LF

Items:

Concrete Median

① Old Quitman to Mobley Rd
$[2 \cdot (400\,ft \cdot 5.5\,ft) + (180\,ft \cdot 180\,ft)] \cdot \frac{SY}{9\,ft^2}$ = 4089 SY

② Mobley Rd + Willaford
$[2 \cdot (250\,ft \cdot 5.5\,ft) + (190\,ft \cdot 190\,ft)] \cdot \frac{SY}{9\,ft^2}$ = 4317 SY

③ Willaford Rd + Albany St.
$[2 \cdot (250\,ft \cdot 5.5\,ft) + (190\,ft \cdot 190\,ft)] \cdot \frac{SY}{9\,ft^2}$ = 4317 SY

④ Albany to SR 76 = 4317 SY

⑤ SR 76 to Campground Rd = 4089 SY

⑥ Campground Rd to Lawson Pond Rd
$[2 \cdot (375\,ft \cdot 5.5\,ft) + 450\,ft \cdot 270\,ft] \cdot \frac{SY}{9\,ft^2}$ = 13,958 SY

Total = 35,087 SY

Curb & Gutter

① $4 \cdot 400\,ft + 2 \cdot 180\,ft + 2 \cdot 180\,ft$ = 2,320 LF
② $4 \cdot 250\,ft + 4 \cdot 190\,ft$ = 1760 LF
③ $4 \cdot 250\,ft + 4 \cdot 190\,ft$ = 1760 LF
④ = 1760 LF
⑤ $4 \cdot 400\,ft + 4 \cdot 180\,ft$ = 2320 LF
⑥ $4 \cdot 375\,ft + 2 \cdot 450\,ft + 2 \cdot 270\,ft$ = 2940 LF

Total = 12,860 LF

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 544-7

DESCRIPTION:

SHEET NO.: 4 of 5

Quantities (Continued)

AC Pavement

$12\,ft \cdot 7575\,LF \cdot \frac{SY}{9\,ft^2} = 10{,}100\,SY$

$104\,5\,lb/SY \cdot 10{,}100\,SY \cdot \frac{TN}{2000\,lb} = 5277\,TN$

GAB

$1350\,lb/SY \cdot 10{,}100\,SY \cdot \frac{TN}{2000\,lb} = 6818\,TN$

Striping

$4 \cdot 7575\,LF = 30{,}300\,LF$

Right of Way

Original $112\,ft \cdot 7575\,ft \cdot \frac{Acre}{43{,}560\,ft^2} = 19.5\,Acre$

Alternate $(112 - 8\,ft)\,7575\,ft \cdot \frac{Acre}{43560\,ft^2} = 18.1\,Acre$

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 544-7

DESCRIPTION

SHEET NO.: 5 of 5

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
4" Concrete Median	SY	35,087	25	877,175			
Curb and Gutter	LF	12,860	15	192,900			
AC Pavement	TN				5,277	60	316,620
GAB	TN				6,818	16	109,088
Striping (Yellow)	LF				30,300	0.25	7,575
Construction Subtotal				1,070,075			433,283
Composite Markup at 33.71%				360,722			146,060
Construction Total				1,430,797			579,343
Right of Way	AC	19.50	10,000	195,000	18.10	10,000	181,000
Composite Markup at 247.20%				482,040			447,432
ROW Total				677,040			628,432
Sub-total				2,107,837			1,207,775
Mark-up at				INCL.			INCL.
TOTAL				2,107,837			1,207,775

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **544-8**

DESCRIPTION: **CUL-DE-SAC HITCH STREET AND ELIMINATE THE INTERSECTION WITH SR 133**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch attached)

The intersection of Hitch Street and SR 133 already exists and the current design improves the turning radii.

ALTERNATIVE: (Sketch attached)

Since the traffic count in this area is very low, close this intersection by removing the existing pavement and constructing a cul-de-sac at Hitch Street.

ADVANTAGES:

- Increases safety on SR 133 by eliminating two intersections within 700 feet of each other: Hitch Street and Lawson Pond Road
- Improves through traffic on SR 133
- Improves overall operations within the immediate area of the two intersections

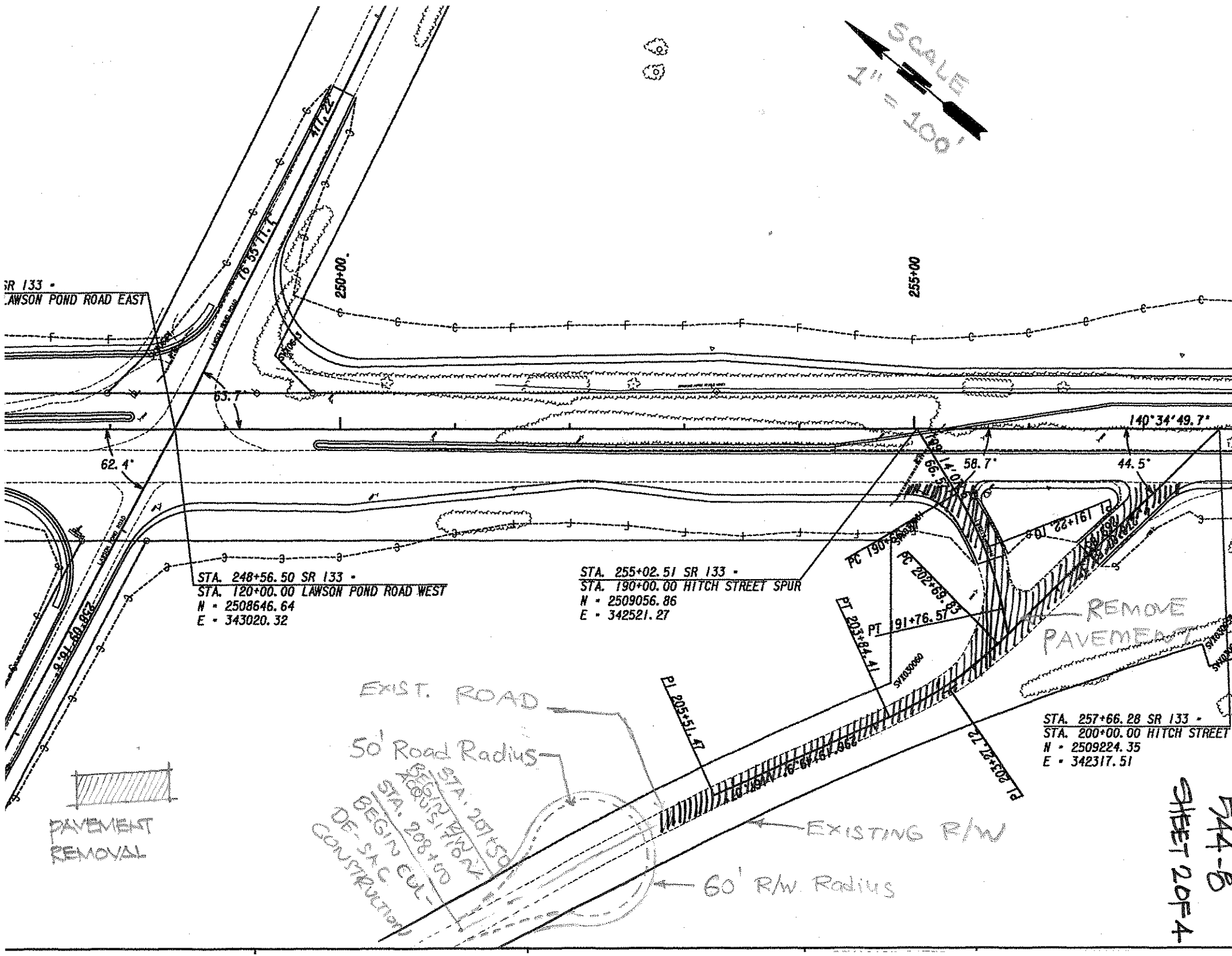
DISADVANTAGES:

- Drivers traveling east on SR 133 from Hitch Street will have to use the Lawson Pond Road intersection
- Additional right-of-way needs to be acquired on both sides of Hitch Street

DISCUSSION:

The close proximity of two intersections presents a safety and operational deficiency that is easily corrected by using a cul-de-sac at Hitch Street and eliminating this extremely skewed intersection.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 0	—	$ 0
ALTERNATIVE	$ 26,648	—	$ 26,648
SAVINGS	$ (26,648)	—	$ (26,648)



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SHEET 2 OF 4

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: P44-8

DESCRIPTION:

SHEET NO.: 3 of 4

R/W to be acquired : $\frac{\pi d^2}{4}$ − l x b

60' Radius
120' diameter : $\frac{\pi \times 120^2}{4} - 120 \times 60$ (Existing R/W)

= 4114 sf = 0.0944 ac
Say 0.1 Acre

Perm. roadway to be constructed : πr^2
50' Radius : $\pi \times 50^2$
= 7,854 sf
= 872.66 SY

Demolish existing pavement and grass it. : 300 x 20 + (230 + 170) 24
= 15,600 sf
= 1733.3 SY

Eliminate Right turning lane at SR 133 designed to go to Hitch Street : $\frac{1}{2} \times 100 \times 12 + 200 \times 12$
= 3000 sf
= 333.3 SY

Eliminate pavement to be constructed on the Hitch Street (Triangle portion) : (230 + 170) 12
= 4800 sf = 533.3 SY

Net pavement to be constructed = 872.66 − 333.3 − 533.3
= 6 SY negligible

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 544-8

DESCRIPTION

SHEET NO.: 4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Demolish Existing Pavement & Grass	SY				1733.30	10	17,333
Composite Markup at 33.71%							5,843
Construction Total							23,176
Right of Way	AC				0.10	10,000	1,000
Composite Markup at 247.20%							2,472
ROW Total							3,472
Sub-total							26,648
Mark-up at							INCL.
TOTAL							26,648

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **544-9**

DESCRIPTION: **USE ARCH SPAN STRUCTURES IN LIEU OF MULTI-CELL BOX CULVERTS**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for the use of multi-cell concrete box culverts to span over two creeks:

Triple 8-foot x 7-foot culvert at Jones Creek; and
Quintuple 7-foot x 6-foot culvert at Downing Creek.

ALTERNATIVE: (Sketch attached)

Use single span, prefabricated structures in lieu of the multi-cell concrete box culverts.

ADVANTAGES:

- Minimizes construction time
- Minimizes maintenance of traffic time
- Increases stream flow capacity by reducing stream blockage
- Reduces debris build-up
- Reduces initial cost

DISADVANTAGES:

- None apparent

DISCUSSION:

The existing structures are +50 years old and warrant replacement. Although the hydraulic report has not been updated, the terrain is relatively flat and has the possibility of flooding. Removing mid-stream obstructions will improve the flow and potentially help avoid flooding. Furthermore, the maintenance associated with debris removal is minimized.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 918,684**	**—**	**$ 918,684**
ALTERNATIVE	**$ 708,663**	**—**	**$ 708,663**
SAVINGS	**$ 210,021**	**—**	**$ 210,021**

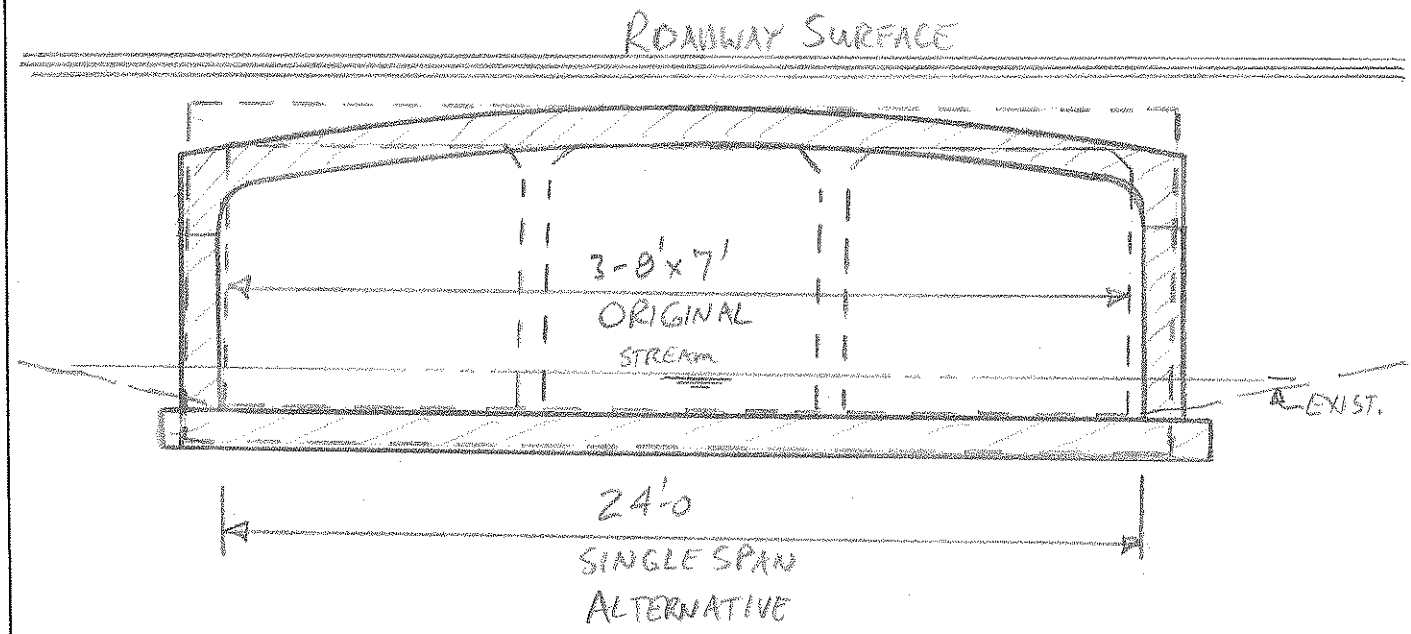
SKETCHES

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 544-9

☑ AS DESIGNED ☑ ALTERNATIVE

SHEET NO.: 2 of 5



TYPICAL SECTION
(JONES CR 4)

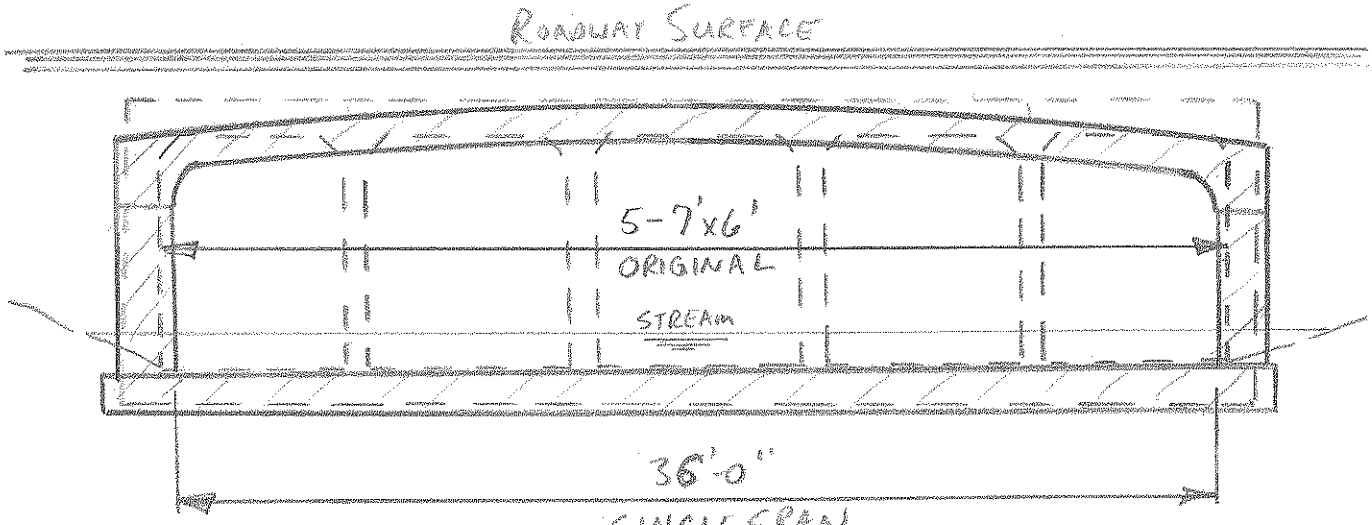
SKETCHES

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 544-9

☑ AS DESIGNED ☑ ALTERNATIVE

SHEET NO.: 3 of 5



TYPICAL SECTION
(DOWNING CRK)

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 544-9

DESCRIPTION:

SHEET NO.: 4 of 5

- ARCH QUANTITIES =>

WIDTH ① = 26'
② = 38'

LENGTH = (10' + 24' + H6') 2 = 100'

AREA ① = 2,600 SF

② = 3,800 SF

STRUCTURE COST => CONTECH CONC. ARCH 24' OPENING x 100' = $180,000

36' OPENING x 100' = $ 350,000

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 544-9

DESCRIPTION

SHEET NO.: 5 of 5

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Box Culverts	LS	1	687,072	687,072			
Arch Spans							
24-foot Span	EA				1	180,000	180,000
35-foot Span	EA				1	350,000	350,000
Sub-total				687,072			530,000
Mark-up at 33.71%				231,612			178,663
TOTAL				918,684			708,663

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **544-10**

DESCRIPTION: **COMPLETE MAINLINE RAILROAD CROSSING PRIOR TO CLOSING OTHER CITY RAILROAD CROSSINGS**

SHEET NO.: **1 of 1**

ORIGINAL DESIGN:

The current design widens SR 133 through the City of Morven and includes an at-grade railroad crossing in the center of the city. The actual construction work for the railroad intersection will be undertaken by the railroad through a force account agreement with GDOT.

ALTERNATIVE:

Assure the SR 133 railroad intersection is completed and operational prior to allowing the railroad to close five other railroad crossing within the City of Morven.

ADVANTAGES:

- Assures vehicular flow of SR 133 traffic
- Assures timely completion of the mainline work
- Minimizes traveling public's inconvenience
- Precludes simultaneous multiple railroad crossing closures

DISADVANTAGES:

- Increases necessary coordination effort with the railroad

DISCUSSION:

An agreement has already been reached between the railroad and the City of Morven to allow the railroad to close five inner-city railroad crossings in exchange for the new widened SR 133 railroad crossing. In order properly coordinate the railroad crossing closures, ensure that the railroad completes the work on the widened mainline intersection prior to allowing them to close the agreed-to five other city railroad crossings.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN			
ALTERNATIVE	**DESIGN SUGGESTION**		
SAVINGS			

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **545-1**

DESCRIPTION: **IMPROVE ONLY TWO INTERSECTIONS: ST 133/SR 333 AND SR 133/SR 256**

SHEET NO.: **1 of 3**

ORIGINAL DESIGN:

The current design calls for the four-lane widening and reconstruction of State Route (SR) 133 from Old Quitman Road to Old Berlin Road with intermittent turning lanes and curb and gutters on both sides of the raised median road for a length of about 9.60 miles. Another 0.4 miles of improvements are associated with SR 333 (Moultrie Highway) and SR 256 (Old Berlin Road), realizing a total of about 10.0 miles of improvements.

ALTERNATIVE:

Perform no improvements on of this segment on SR 133 with the exception of the intersections at SR 333 and SR 256. Additionally, do not provide curb and gutters or sidewalks at these intersections.

ADVANTAGES:

- Reduces construction cost
- Reduces construction period
- Improves sustainable design
- Improves only where necessary

DISADVANTAGES:

- LOS remains the same beyond improved area
- Loss of immediate improvement
- Challenges the Governor's Road Improvement Program (GRIP) criteria

DISCUSSION:

Demographically, traffic is not expected to increase greatly, negating the need for a four-lane highway throughout the project limits—especially in the sparsely populated rural areas. In fact, SR 133 is classification as a rural minor arterial facility.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 34,571,635**	**—**	**$ 34,571,635**
ALTERNATIVE	**$ 1,673,452**	**—**	**$ 1,673,452**
SAVINGS	**$ 32,898,183**	**—**	**$ 32,898,183**

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 545-1

DESCRIPTION:

SHEET NO.: 2 of 3

The two roads SR-333 & SR-256 that need to be improved in order to have a perpendicular intersection with SR-133, are two lanes. Each improvement is 1000' in length. Thus, the total improvement length is 2,000'. Add about 640' in improvements on SR-133 on both sides of the intersection. So, total improvement length is 2,640' or 0.5 mile.

Percentage of Roadway cost : $\frac{0.5}{10} \times 100 = 5\%$

Earthwork : 5 %

Drainage : 5 %

Lump Sump : 5 %

Temp. & Perm. Erosion Control : 5 %

Striping : 5 %

PJSC : 5 %

Guardrail : 0 %

Box Culverts : 0 %

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 545-1

DESCRIPTION

SHEET NO.: 3 of 3

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Permanent Roadway	Mile	10.00	1,339,697	13,396,970			
Permanent Roadway (57.81%)	Mile				0.50	1,339,697	669,849
Drainage	Mile	10.00	147,740	1,477,400			
Drainage (80.00%)	Mile				0.50	147,740	73,870
Earthwork	Mile	10.00	315,150	3,151,500			
Earthwork (57.81%)	Mile				0.50	315,150	157,575
Lump Sum Items	Mile	10.00	103,323	1,033,230			
Lump Sum Items (90%)	Mile				0.50	103,323	51,662
Temporary Erosion Control	Mile	10.00	140,250	1,402,500			
Temporary Erosion Control (70%)	Mile				0.50	140,250	70,125
Permanent Erosion Control	Mile	10.00	46,142	461,420			
Permanent Erosion Control (70%)	Mile				0.50	46,142	23,071
Striping	Mile	10.00	15,553	155,530			
Striping (57.81%)	Mile				0.50	15,553	7,777
Miscellaneous	Mile	10.00	1,676	16,760			
Miscellaneous (57.81%)	Mile				0.50	1,676	838
Guardrail (0.00%)	Mile	10.00	7,512	75,120			
Box Culvert (0.00%)	LS	2.00	374,749	749,497			
Subtotal				21,919,927			1,054,766
Composite Markup at 33.71%				7,389,207			355,561
Total Construction				29,309,134			1,410,327
Right of Way Costs (M/U Incl.)		10.00	275,000	2,750,001	0.50	275,000	137,500
Reimbursable Utilities		10.00	251,250	2,512,500	0.50	251,250	125,625
Sub-total				34,571,635			1,673,452
Mark-up at				INCL.			INCL.
TOTAL				34,571,635			1,673,452

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **545-2/3/4**

DESCRIPTION: **SELECTIVELY ELIMINATE MEDIAN CUTS, LEFT TURN LANES AND U-TURN BUMP OUTS**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for a four-lane divided roadway with closely spaced media openings.

ALTERNATIVE: (Sketch attached)

Consider eliminating non-essential media openings to improve safety and operational efficiencies at the following locations:

700 feet south of Old Berlin Road (SR 256); and
1,450 feet north of Rock Hill Road.

ADVANTAGES:

- Reduces initial cost
- Reduces the number of conflict points
- Improves safety
- Improves traffic operations

DISADVANTAGES:

- Increases circuitous routing for local residents
- Most likely will increase the occurrence of illegal crossovers
- Could increase public opposition

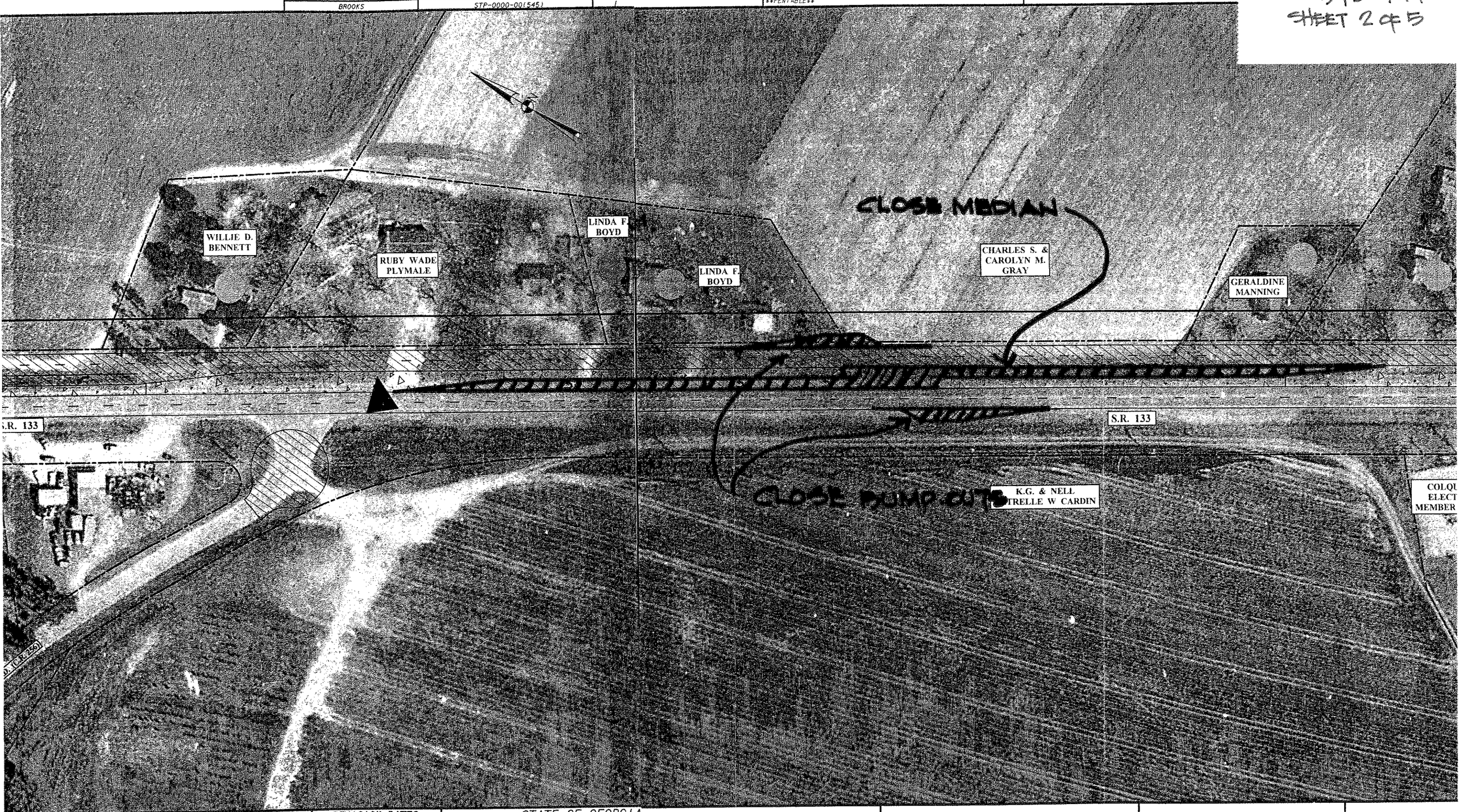
DISCUSSION:

While this approach will inconvenience local residents somewhat, it does not preclude crossovers at more appropriate locations—increasing safety along this stretch of SR 133. In addition, operational efficiencies are achieved with less median openings, allowing for a more continuous flow of traffic—especially during peak travel times.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 14,054,365**	**—**	**$ 14,054,365**
ALTERNATIVE	**$ 13,744,334**	**—**	**$ 13,744,334**
SAVINGS	**$ 310,031**	**—**	**$ 310,031**

COUNTY	PROJECT NUMBER	SHEET NO.	TIME$$	PRF	DGN
BROOKS	STP-0000-00(545)			$$PENTABLE$$	

545-2/3/4
SHEET 2 of 5



Associates
Land Surveyors

100 0 100 200 300FT.
SCALE: 1" = 100'

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPOR
OFFICE: CONSULTANT DESIGN
SR 133
OLD QUILTMAN ROAD TO OLD B

Wolverton & Associates
Consulting Engineers • Land Surveyors

100 0 100
SCALE: 1"

TIMESS	SPRFS	SIGNS	COUNTY	PROJECT NUMBER	SHEET
	EXPENTABLES		COLQUITT	STP-0000-00(545)	17

E45-2/3/4
SHEET 3 OF 5

JAMES S. GAY

W/L # 47

GENE & WINIFRED GAY

GENE & WINIFRED GAY

JOHN RANDALL DEWITT

S.R. 13

S.R. 133

JAMES S. GAY

CLOSE MEDIAN

HOWARD & MARY GAY

HOWARD & MARY GAY

DAVID & SHARON WELLS

Wolverton & Associates
Consulting Engineers • Land Surveyors

Wolverton & Associates
Consulting Engineers • Land Surveyors

50 0 50 100 300FT.
SCALE: 1" = 100'

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CONSULTANT DESIGN
SR 133
OLD QUILTMAN ROAD TO OLD BERLIN ROAD
DRAWING No.

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 545 - 2/3/4

DESCRIPTION:

SHEET NO.: 4 of 5

Close Median Opening @ Old Berlin Road area
Deleted Median Pavement

Area = (6')(120'+120') + (12')(790') + (20')(90')
= (12,720 ft²) = (1413 yd²)

Deleted Bump Out Pavement

Area = (8')(160') x 2 = (2560 ft²) = (284 yd²)

Added Concrete Median
(same as Deleted Median Pavement)
= 1413 yd²

Close Median Opening @ Rock Hill Road area
Deleted Median Pavement

Area = (14')(420')(2) + (28')(480'+480') + (44')(70')
= (41720 ft²) = (4636 yd²)

Pavement Quantity Total = (6333 yd²)

Pavement Quantities

Aggregate Base = (6333 yd²)(1350 #/yd²) ÷ 2000 #/ton = (4275 ton)
Surface Course = (6333 yd²)(165 #/yd²) ÷ 2000 #/ton = (522 tons)
Binder Course = (6333 yd²)(220 #/yd²) ÷ 2000 #/ton = (697 tons)
Base Course = (6333 yd²)(660 #/yd²) ÷ 2000 #/ton = (2090 tons)
Tack Coat = (6333 yd²)(4 gal/100 yd²) = (253 gal)

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 545-2/3/4

DESCRIPTION

SHEET NO.: 5 of 5

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Aggregate Base (1,350#/SY)	TN	194,249	16	3,107,984	189,974	16	3,039,584
Surface (165#/SY)	TN	30,044	60	1,802,640	29,522	60	1,771,320
Binder (220#/SY)	TN	32,051	60	1,923,060	31,354	60	1,881,240
Base (660#/SY)	TN	48,077	60	2,884,620	45,987	60	2,759,220
Tack Coat (4gal/CSY)	GAL	32,776	1.00	32,776	32,523	1.00	32,523
Concrete Median	SY	30,400	25	760,000	31,813	25	795,325
	Sub-total			10,511,080			10,279,212
Mark-up at	**33.71%**			3,543,285			3,465,122
	TOTAL			14,054,365			13,744,334

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **545-6**

DESCRIPTION: **USE ARCH SPAN STRUCTURES IN LIEU OF MULTI-CELL BOX CULVERTS**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for the use of multi-cell concrete box culverts to span over three creeks:

Quintuple 10-foot x 5-foot culvert at Stream No. 55;
Triple 8-foot x 5-foot culvert at Stream No. 50; and
Double 9-foot x 5-foot culvert at Stream No. 32.

ALTERNATIVE: (Sketch attached)

Use single span, prefabricated structures in lieu of the multi-cell concrete box culverts.

ADVANTAGES:

- Minimizes construction time
- Minimizes maintenance of traffic time
- Increases stream flow capacity by reducing stream blockage
- Reduces debris build-up
- Reduces initial cost

DISADVANTAGES:

- None apparent

DISCUSSION:

The existing structures are +50 years old and warrant replacement. Although the hydraulic report has not been updated, the terrain is relatively flat and has the possibility of flooding. Removing mid-stream obstructions will improve the flow and potentially help avoid flooding. Furthermore, the maintenance associated with debris removal is minimized.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 960,396**	**—**	**$ 960,396**
ALTERNATIVE	**$ 922,599**	**—**	**$ 922,599**
SAVINGS	**$ 37,797**	**—**	**$ 37,797**

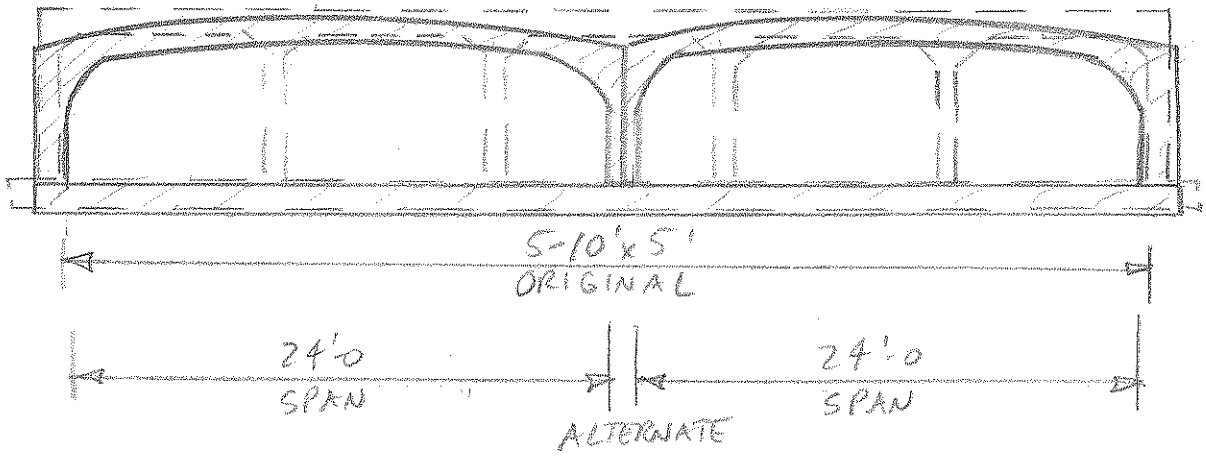
SKETCHES

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 545-6

☑ AS DESIGNED ☑ ALTERNATIVE

SHEET NO.: 2 of 5



TYPICAL SECTION
(@ STREAM # 55)

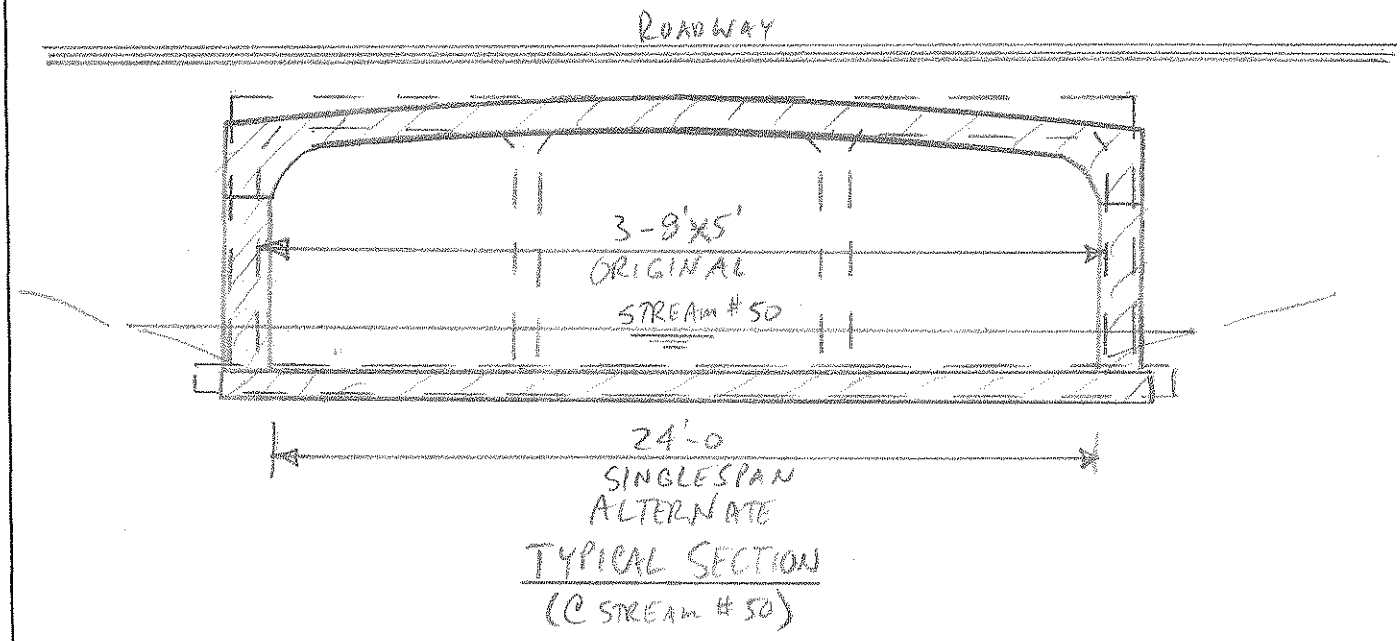
SKETCHES

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

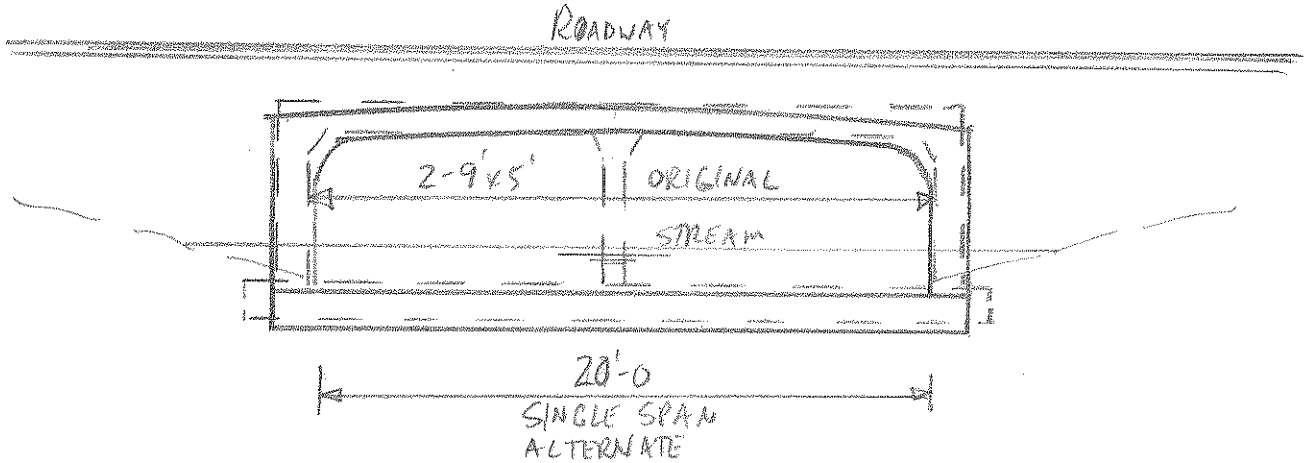
ALTERNATIVE NO.: 545-6

☑ AS DESIGNED ☑ ALTERNATIVE

SHEET NO.: 3 of 5



TYPICAL SECTION
(@ STREAM #50)



TYPICAL SECTION
(@ STREAM #32)

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 545-6

DESCRIPTION:

SHEET NO.: 4 of 5

ARCH QUANTITIES ⇒

WIDTH ① = 50'
② = 26'
③ = 22'

LENGTH = ①② (10' + 24' + 12') 2 = 100'

③ (10' + 24' + 22') 2 = 112'

AREA ① = 5,000 SF
② = 2,600 SF
③ = 2,464 SF

STRUCTURE COST ⇒ CONTECH CONC ARCH ⇒ 2- 24' SPANS = $360,000

24' SPAN = $180,000
20' SPAN = $150,000

BOX CULVERT COST ADJ. ⇒ FROM ORIGINAL COST ESTIMATE = $ 749,497

REMOVE 4'x4' @ OKAPILCO CRK = (4/40) 749,497 = -31,229

$ 718,268

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 545-6

DESCRIPTION

SHEET NO.: 5 of 5

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Box Culverts	LS	1	718,268	718,268			
Arch Spans							
Two - 24-foot Span	EA				2	180,000	360,000
24-foot Span	EA				1	180,000	180,000
20-foot Span	EA				1	150,000	150,000
Sub-total				718,268			690,000
Mark-up at 33.71%				242,128			232,599
TOTAL				960,396			922,599

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **545-7**

DESCRIPTION: **USE A 32-FOOT MEDIAN SECTION IN LIEU OF 44-FOOT MEDIAN SECTION TO MINIMIZE WETLANDS IMPACTS NEAR BERLIN**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch Attached)

The current design calls for the four-lane widening and reconstruction of State Route (SR) 133 from Old Quitman Road to Old Berlin Road with intermittent turning lanes and curb and gutters on both sides of the typical 44-foot raised median.

ALTERNATIVE: (Sketch Attached)

Use a 32-foot median section from mile mark 12.2 to 14.0 in order to mitigate several acres of wetland impacts.

ADVANTAGES:

- Reduces wetlands impacts
- Reduces material quantities
- Improves sustainable design
- Reduces right-of-way takes
- Provides a natural transition between the 22-foot and 44-foot median sections

DISADVANTAGES:

- None apparent

DISCUSSION:

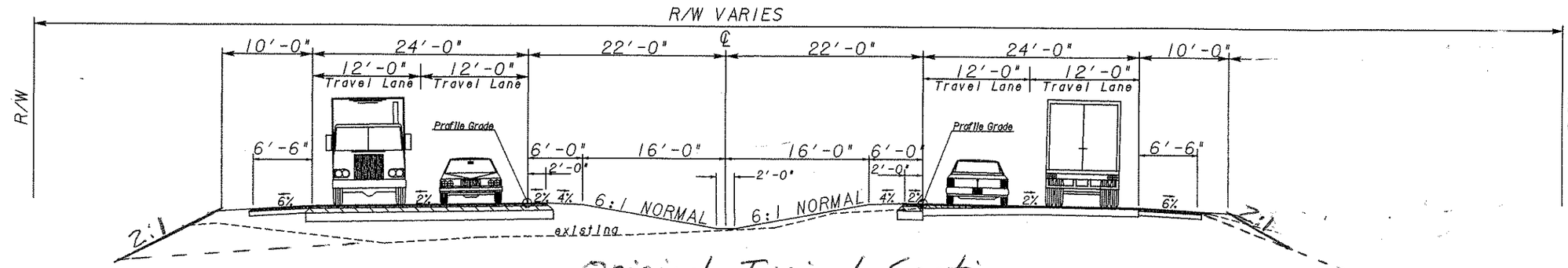
The precedent for using a 32-foot median section was set on adjacent projects in the SR 133 corridor. The typical section through the town of Berlin is a 22-foot median and the remainder of this project is a 44-foot median section.

Just north of the town of Berlin are several acres of wetlands abutting SR 133. The use of the narrower 32-foot median section will help mitigate the wetlands impacts and provide for a smoother transition from the 44-foot section to the 22-foot median section in Berlin.

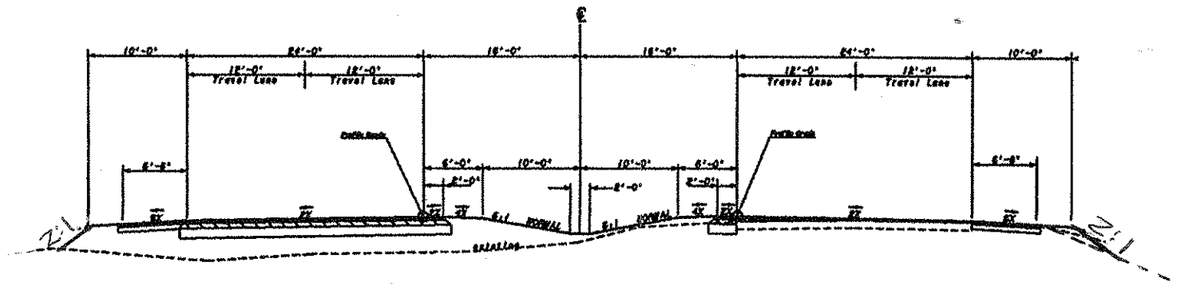
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 457,957**	**—**	**$ 457,957**
ALTERNATIVE	**$ 417,334**	**—**	**$ 417,334**
SAVINGS	**$ 40,623**	**—**	**$ 40,623**

BROOKS/COLQUITT STP-0000-00(545)

545-7
SHEET 2 OF 4



Original Typical Section
(44' Median)



Proposed Typical Section
(32' Median)

Wolverton & Associates
Consulting Engineers + Land Surveyors
3740 Davinci Parkway Suite 100 Duluth, Georgia 30097
Phone (770) 447-9566 Fax (770) 447-9575

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CONSULTANT DESIGN

TYPICAL SECTIONS

PROJECT: STP-0000-00(545)
COUNTY: BROOKS & COLQUITT

DRAWING No.

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 545-7

DESCRIPTION:

SHEET NO.: 3 of 4

TOTAL LENGTH UNDER CONSIDERATION =>

(14.0m - 13.2m) 5280'/m = 4,224 LF

R.O.W.

ORIGINAL = 136' x 4,224' (1/43,560) = 13.19 ACRE

ALTERNATE = (136'-12') 4,224 (1/43,560) = 12.02 ACRE

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 545-7

DESCRIPTION

SHEET NO.: 4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Right-of-Way	AC	13.19	10,000	131,900	12.02	10,000	120,200
Sub-total				131,900			120,200
Mark-up at	**247.20%**			326,057			297,134
TOTAL				457,957			417,334

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **545-8**

DESCRIPTION: **USE A GRASS MEDIAN IN LIEU OF A CONCRETE MEDIAN**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for a typical 20-foot concrete median section consisting of a 2.5-foot curb and gutter, a 14-foot concrete median, and 2.5-foot curb and gutter.

ALTERNATIVE: (Sketch attached)

Maintain the proposed profile and the 20-foot median section, but replace the concrete median with grass.

ADVANTAGES:

- Reduces material cost
- Provides for additional storm water run-off absorption
- Reduces concrete maintenance
- Improves sustainable design

DISADVANTAGES:

- Increases grass maintenance/replacement

DISCUSSION:

The introduction of the grass median is more in keeping with the aesthetic concept of a rural minor arterial roadway with locations having historic significance to maintain the view sheds.

Grass medians would maintain a true “typical” median section throughout the project in the rural/open portions of the project.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 1,016,196**	**$ 585,141**	**$ 1,601,337**
ALTERNATIVE	**$ 14,584**	**$ 29,622**	**$ 44,206**
SAVINGS	**$ 1,001,612**	**$ 555,519**	**$ 1,557,131**

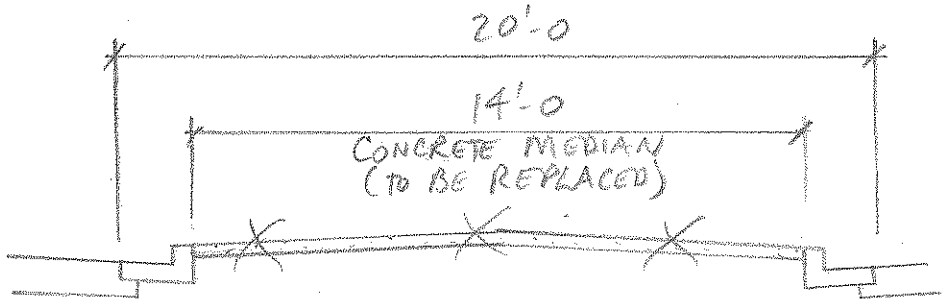
SKETCHES

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 545-8

☑ AS DESIGNED ☑ ALTERNATIVE

SHEET NO.: 2 of 5



TYPICAL MEDIAN SECTION

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 545-8

DESCRIPTION: USE GRASS MEDIAN IN LIEU OF CONCRETE

SHEET NO.: 3 of 5

- ORIGINAL COST ESTIMATE QUANTITY OF MEDIAN = 30,400 SY
- ADD'L FILL => 30,400 SY x (4"/12) (1/27) = 375.3 CY
- ADD'L MAINTENANCE AREA => 30,400 SY ÷ 4840 SY/ACRE = 6.28 ACRE
- ADD'L GRASS & FERTILIZER => (ORIGINAL GRASS QUANTITY = 176 ACRES)

- GRASS =	300 $/A			
- LIME =	21 $/GAL	(440 G/176A) =	52.50	$/A
	60 $/T	(3.25 T/176 A) =	110.80	
- FERTIL. =	275 $/T	(176 T/176A) =	275.0	
	2 $/#	(17,590 #/176 A) =	199.9	
			1,438	$/ACRE

- ADD'L MAINTENANCE

MOWING COST PROVIDED BY GDOT: MOWING - TIFTON => $1,047 PER MILE PER YEAR.
TYPICAL SECTION => 24' + 40' + 24' = 88'
AREA => 5260 FT/m x 88' ÷ 43,560 SF/ACRE = 10.63 ACRE/MILE

UNIT COST => $1,047 / 10.63 = $98.53 PER ACRE PER YEAR

x 6.28 ACRE

$618.76 PER YR

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 545-8

DESCRIPTION

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
4" Concrete Median	SY	30,400	25	760,000			
Additional Borrow	CY				375.30	5	1,877
Additional Grass / Fertilizer	AC				6.28	1,438	9,031
	Sub-total			760,000			10,907
Mark-up at	**33.71%**			256,196			3,677
	TOTAL			1,016,196			14,584

LIFE CYCLE COST WORKSHEET

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543/544/545/546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, GA Dept. of Transportation, Dist. 4
Preliminary Design Stage

ALTERNATIVE NO. 545-8

SHEET NO. 5 of 5

LIFE CYCLE PERIOD: 35 **years**

INTEREST RATE: 2.15% **ESCALATION RATE:** 0.00%

						ORIGINAL	PROPOSED
A.		**INITIAL COST**				1,016,196	14,584
		Useful Life (Years)					
					INITIAL COST SAVINGS		1,001,612
B.		**RECURRENT COSTS (Annual Expenditures)**					
		1. Maintenance: For concrete sidewalks - assume ½% of initial cost for minor repairs				5,081	
		2. Maintenance: Addition mowing for grass median - see calculation sheet					619
		3.					
					Total Annual Costs	5,081	619
		(An effective rate of 2.15% with 0.00% Interest and 0.00% Escal.)			**Present Worth Factor**	24.4205	24.4205
					Present Worth of RECURRENT COSTS	124,080	15,110
C.		**SINGLE EXPENDITURES**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
ORIG	PROP	< Put "x" in appropriate box (original design or proposed design)					
x		**1.** Assume replacement of ⅓ of the sidewalks every 12 years	12	335,345	0.7747	259,795	-
x		**2.** Assume replacement of ⅓ of the sidewalks every 12 years	24	335,345	0.6002	201,266	-
	x	**3.** Assume replacement of ½ of the grass medians every 10 years	10	7,292	0.8084	-	5,895
	x	**4.** Assume replacement of ½ of the grass medians every 10 years	20	7,292	0.6535	-	4,765
	x	**5.** Assume replacement of ½ of the grass medians every 10 years	30	7,292	0.5283	-	3,852
		6.			1.0000	-	-
		7.			1.0000	-	-
D.		**SALVAGE VALUE**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
		1.			1.0000	-	-
		2.			1.0000	-	-
					Present Worth of SINGLE EXPENDITURES	461,061	14,512
E.		**Total Recurrent Costs & Single Expenditures (B + C)**				585,141	29,622
					RECURRENT COSTS & SINGLE EXPENDITURES SAVINGS		555,519
					TOTAL PRESENT WORTH COST (A + D)	1,601,337	44,206
					TOTAL LIFE CYCLE SAVINGS		**1,557,131**

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **546-1**

DESCRIPTION: **CONSTRUCT SR 133 THROUGH BERLIN AND THE EASTERN PORTION OF MOULTRIE ONLY**

SHEET NO.: **1 of 3**

ORIGINAL DESIGN:

The current design calls for the four-lane widening and reconstruction of State Route (SR) 133 from Old Berlin Road to Hawthorne Road in eastern Moultrie with intermittent turning lanes, curb and gutters, and sidewalks. The total length of this project is about 7.77 miles.

ALTERNATIVE:

Provide the new widening and reconstruction of SR 133 in the town of Berlin from Canon Road to Langford Street (0.16 miles) and in the eastern portion of Moultrie from Edmonson Road to Hawthorne Road (0.15 miles). Perform no other improvements northwest or southeast of these segments on SR 133.

ADVANTAGES:

- Substantially reduces construction cost
- Reduces construction period
- Improves sustainable design

DISADVANTAGES:

- LOS remains the same beyond improved area
- Loss of immediate improvement
- Challenges the Governor's Road Improvement Program (GRIP) criteria

DISCUSSION:

Demographically, traffic is not expected to increase greatly, negating the need for a four-lane highway throughout the project limits—especially in the sparsely populated rural areas. In fact, SR 133 is classified as a rural minor arterial facility.

As with the original design, this alternative will still alleviate the safety and level of service concerns in Berlin and eastern Moultrie. The addition of curb and gutters and sidewalks will still promote pedestrian circulation though town, potentially generating interest for commercial improvements and further development.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 25,743,764**	**—**	**$ 25,743,764**
ALTERNATIVE	**$ 2,244,327**	**—**	**$ 2,244,327**
SAVINGS	**$ 23,499,437**	**—**	**$ 23,499,437**

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 546-1

DESCRIPTION:

SHEET NO.: 2 of 3

As suggested a total of only 0.32 miles [0.16 + 0.15] should be developed into a 4-lane highway as depicted on the drawings.

Percentage of Roadway Cost : $\frac{0.31}{7.77} = 4\%$

Drainage: 12-13 % of total drainage cost

Earthwork: 12-13 % of total earthwork cost

Lump sump: 2/3 of cost [includes curb, gutter, sidewalk etc.]

Temp. Erosion Control: 12-13 %

Perm. Erosion Control: 12-13 %

striping : 4 %

misc. : 4 %

Guardrail : 0 %
Box culverts : 0 %
} For sections thru the city, we do not have any guard rails or box culverts

R/W Acquisition : 4 %

Reimbursable Utilities : 4 %

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 546-1

DESCRIPTION

SHEET NO.: 3 of 3

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Permanent Roadway	Mile	7.77	1,539,855	11,964,673			
Permanent Roadway (57.81%)	Mile				0.31	1,539,855	477,355
Drainage	Mile	7.77	207,964	1,615,880			
Drainage (80.00%)	Mile				1.00	207,964	207,964
Earthwork	Mile	7.77	179,665	1,395,997			
Earthwork (57.81%)	Mile				1.00	179,665	179,665
Lump Sum Items	Mile	7.77	107,902	838,399			
Lump Sum Items (90%)	Mile				5.20	107,902	561,090
Temporary Erosion Control	Mile	7.77	148,056	1,150,395			
Temporary Erosion Control (70%)	Mile				1.00	148,056	148,056
Permanent Erosion Control	Mile	7.77	38,878	302,082			
Permanent Erosion Control (70%)	Mile				1.00	38,878	38,878
Striping	Mile	7.77	15,074	117,125			
Striping (57.81%)	Mile				0.31	15,074	4,673
Miscellaneous	Mile	7.77	2,249	17,475			
Miscellaneous (57.81%)	Mile				0.31	2,249	697
Guardrail (0.00%)	Mile	7.77	2,683	20,847			
Box Culvert (0.00%)	LS	1.00	323,566	323,566			
Subtotal				17,746,439			1,618,379
Composite Markup at 33.71%				5,982,325			545,555
Total Construction				23,728,764			2,163,934
Right of Way Costs (M/U Incl.)		7.77	257,400	2,000,000	0.31	257,400	79,794
Reimbursable Utilities		7.77	1,931	15,000	0.31	1,931	598
Sub-total				25,743,764			2,244,327
Mark-up at				INCL.			INCL.
TOTAL				25,743,764			2,244,327

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **546-2/3/4**

DESCRIPTION: **SELECTIVELY ELIMINATE MEDIAN CUTS, LEFT TURN LANES AND U-TURN BUMP OUTS**

SHEET NO.: **1 of 9**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for a four-lane divided roadway with closely spaced media openings.

ALTERNATIVE: (Sketch attached)

Consider eliminating non-essential media openings to improve safety and operational efficiencies at the following locations:

1,400-feet south of Culbertson Road;
1,300-feet south of Jerusalem Church Road;
1,300-feet south of Stripling Road;
3,200-feet south of Perry Road; and
1,300-feet north of Wesley Chapel Road.

ADVANTAGES:

- Reduces the number of conflict points
- Improves safety
- Improves traffic operations

DISADVANTAGES:

- Increases circuitous routing for local residents
- Most likely will increase the occurrence of illegal crossovers
- Could increase public opposition
- Adds cost *

DISCUSSION:

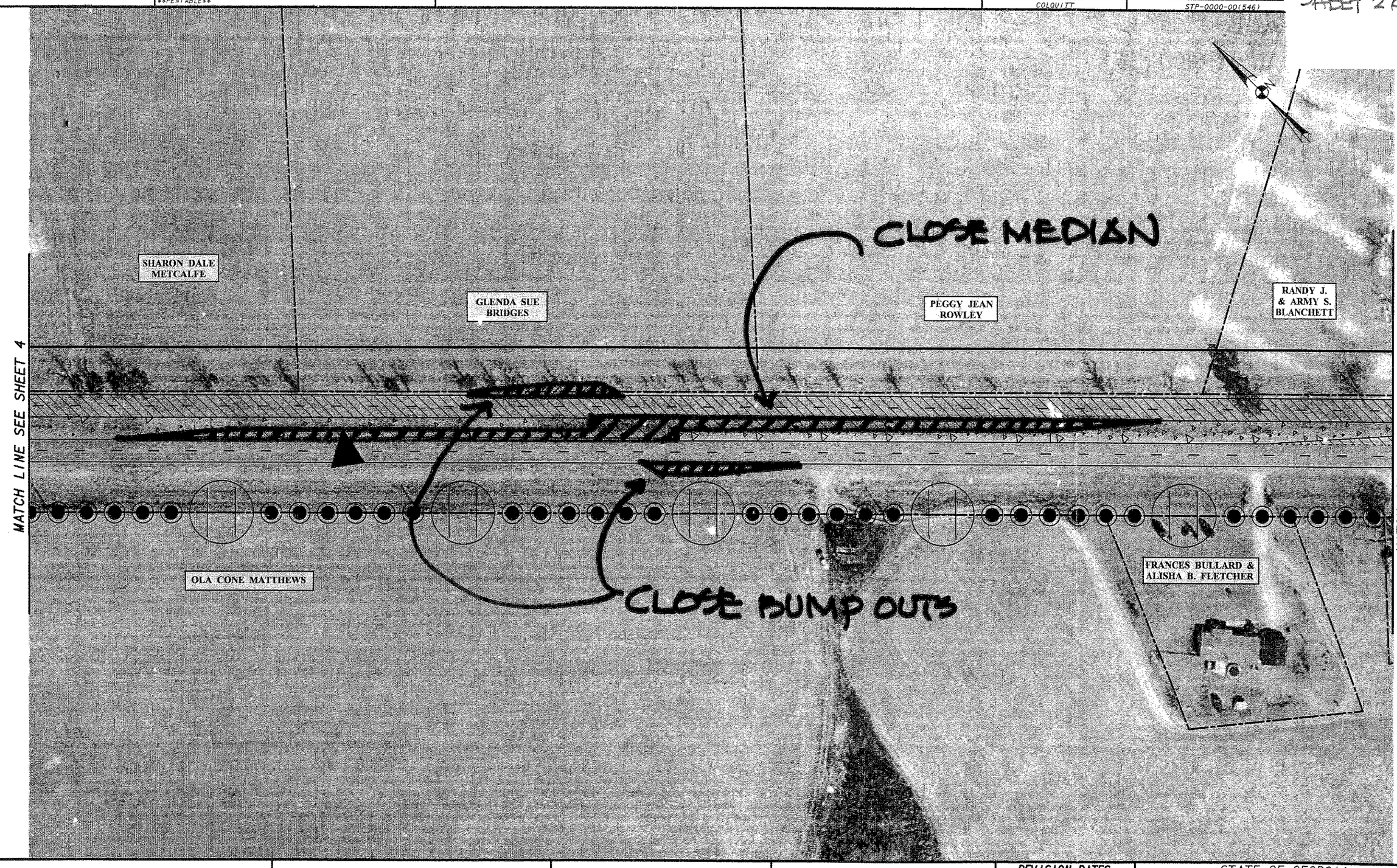
While this approach will inconvenience local residents somewhat, it does not preclude crossovers at more appropriate locations—increasing safety along this stretch of SR 133. In addition, operational efficiencies are achieved with less median openings, allowing for a more continuous flow of traffic—especially during peak travel times.

**Note: The unit cost for the concrete median for this project was set at $50.00/SY per the designer's estimate and was used for these calculations. However, all other projects in this corridor, 543, 544, 545, and 28, use a unit cost of $25.00/SY for the concrete median.*

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 12,876,629**	**—**	**$ 12,876,629**
ALTERNATIVE	**$ 12,908,930**	**—**	**$ 12,908,930**
SAVINGS	**$ (32,301)**	**—**	**$ (32,301)**

DATETIME$$$ TIME$$$ PRF DGN
$USER$ $$PENTABLE$$

COUNTY	PROJECT NUMBER
COLQUITT	STP-0000-00(546)



Wolverton & Associates
Consulting Engineers • Land Surveyors
6140 Sugarloaf Parkway - Suite 100 - Duluth, Georgia 30097
Phone: (770) 447-9600 Fax: (770) 447-9070
www.wolverton-assoc.com

100 0 50 100 200 300FT.
SCALE: 1" = 100'

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CONSULTANT DESIGN
SR 133
OLD BERLIN ROAD TO HAWTHORNE ROAD

COUNTY	PROJECT NUMBER	SHEET NO.
COLQUITT	STP-0000-00(546)	6

TIME$$$ PRF $$PENTABLE$$ DGN

546-2/3/4
SHEET 3 OF 9

LAVON STRIPLING

LAVON STRIPLING

STREAM BUFFER ZONE

W/L # 91

W/L # 4C30

℄ CLOSE MEDIAN

QUADRUP... 8' X 3'

PATRICIA MAY SANGSTI

H-39 MATTHEWS FARMSTEAD

H-39 MATTHEWS FARMSTEAD

28
8.5
36.0 cm

STREAM # 92

N

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CONSULTANT DESIGN

SR 133
OLD BERLIN ROAD TO HAWTHORNE R(

DRAWI

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Phone (770) 447-0900 - Fax (770) 447-9070
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SCALE: 1" = 100'

REVISION DATES		

OFF

OLD

546-2/3/4
SHEET 4 of 9

$ESS	PRF	DGN	COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL
	$$PENTABLE$$		COLQUITT	STP-0000-00(546)	10	

MRS. ROY E. STRIPLING

LAWSON LANE & DEBRA S. WHITLEY

MRS. ROY E. STRIPLING

CLOSE MEDIAN

MILE 27

7.5 TRAFFIC

S.R. 133

CLOSE BUMP OUTS

MOLLY C. STRIPLING

MOLLY C. STRIPLING

MOLLY C. STRIPL

Wolverton & Associates
Consulting Engineers + Land Surveyors
5145 Peachtree Parkway Suite 120 Duluth, Georgia 30097
Phone: (770) 447-2666 Fax: (770) 447-9070
www.wolverton-assoc.com

100 0 50 100 300FT.
+00+ -200-
SCALE: 1" = 100'

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CONSULTANT DESIGN
SR 133
OLD BERLIN ROAD TO HAWTHORNE RO

546 - 2/3/4
SHEET 5 OF 9

COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL	TIME$$$ PRF $$PENTABLE$$	DGN
COLQUITT	STP-0000-00(546)	18			

H-80 BARBER PROPERTY

BERLIN FARMS, LLC

CLOSE MEDIAN

W/L # 74

W/L # 74

H-80 BARBER PROPERTY

BERLIN FARMS, LLC

CLOSE DUMP OUT

DEMISHIA E. CROFT

MARY M. THOMPKINS

100 0 100 200 300FT.
SCALE: 1" = 100'

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CONSULTANT DESIGN
SR 133
OLD BERLIN ROAD TO HAWTHORNE R

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5745 Bagwell Parkway Suite 100 Duluth, Georgia 30097
Phone: (770) 447-9400 • Fax: (770) 447-9470
www.wolverton-assoc.com

100 0 50 100
SCALE: 1" =

COUNTY	PROJECT NUMBER	SHEET NO.
COLQUITT	STP-0000-00(546)	21

TIME$$$	PRF	DGN
	$$PENTABLE$$	

546-2/3/4
SHEET 6 OF 9

W/L #73

JAMES WATSON HART

CLOSE MEDIAN

CLOSE BUMP OUTS

MILE 24 4.5 SOUTH

KIRT GOLDMAN JR. & GOLDMAN HALL CARDIN

REVISION DATES			

300FT.

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CONSULTANT DESIGN

SR 133
OLD BERLIN ROAD TO HAWTHORNE ROA

DRAWING N

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Phone: (770) 447-9292 Fax: (770) 447-9673
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100 0 50 100 200 300FT.
SCALE: 1" = 100'

REVISION DATES			

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 546 - 2/3/4

DESCRIPTION:

SHEET NO.: 7 of 9

Close Median Opening @ Culbertson Road Area

Delete Median Pavement

$Area = (6')(120')(2) + (12')(400' + 400') + (24')(80') = 12960\ ft^2$

$= (1440\ yd^2)$

Delete Bump out Pavement

$Area = (8')(160' + 160') = 2560\ ft^2 = (284\ yd^2)$

Added Concrete Median

= (Delete Median Pav't) = $1440\ yd^2$

Close Median Opening @ Jerusalem Church Rd area

Delete Median Pavement

$Area = (6')(120')(2) + (12')(350')(2) + (24')(90') = (12{,}000\ ft^2)$

$= (1333\ yd^2)$

Added Concrete Median

= (Deleted Median Pav't) = $1333\ yd^2$

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 546 - 2/3/4

DESCRIPTION:

SHEET NO.: 8 of 9

Close Median Openings @ Stripling Rd area; Perry Rd area; and Wesley Chapel Rd area

Deleted Median Pavement

$$\text{Area} = 3 \times [(6')(180'+180') + (12')(400'+400') + (24')(90')]$$

$$= -41{,}760\ ft^2 = -4640\ yd^2$$

Deleted Bump Out Pavement

$$\text{Area} = (8')(160') \times 5 = -6400\ ft^2 = -711\ yd^2$$

Added Concrete Median

Area = (Deleted Median Pav't for 2 of 3 locations)

$$= 4640\ yd^2 \times 2/3 = +3093\ yd^2$$

Total Deleted Pav't = $-5351\ yd^2$

Pav't Quantities

Aggregate Base = $(-3093\ yd^2)(1350\ \#/yd^2) \div 2000 = -2088$ tons
Surface Course = $(-3093\ yd^2)(165\ \#/yd^2) \div 2000 = -255$ tons
Binder Course = $(-3093\ yd^2)(220\ \#/yd^2) \div 2000 = -340$ tons
Base Course = $(-3093\ yd^2)(660\ \#/yd^2) \div 2000 = -1021$ tons
Tack Coat = $(-3093\ yd^2)(4\ gal/100\ yd^2) = -124$ gal

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 546-2/3/4

DESCRIPTION

SHEET NO.: 9 of 9

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Aggregate Base (1,350#/SY)	TN	179,463	16	2,871,408	177,375	16	2,838,000
Surface (165#/SY)	TN	22,209	60	1,332,540	21,954	60	1,317,240
Binder (220#/SY)	TN	14,806	60	888,360	14,466	60	867,960
Base (660#/SY)	TN	39,108	60	2,346,480	38,087	60	2,285,220
Tack Coat (4gal/CSY)	GAL	26,228	1.00	26,228	26,104	1.00	26,104
Concrete Median*	SY	43,305	50	2,165,250	46,398	50	2,319,900
Sub-total				9,630,266			9,654,424
Mark-up at 33.71%				3,246,363			3,254,506
TOTAL				12,876,629			12,908,930

**Note:* *The unit cost for the concrete median for this project was set at $50.00 / SY per the designer's estimate and was used for these calculations. However, all other projects in this corridor, 543, 544, 545, and 28, use a unit cost of $25.00 / SY for the concrete median.*

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **546-5**

DESCRIPTION: **ELIMINATE SIDEWALKS (CONCRETE ONLY)**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for a typical 16-foot shoulder section consisting of a 2.5-foot curb and gutter portion, a 6-foot grass strip, a 5-foot wide x 4-inch thick concrete sidewalk, and 2.5-foot grass strip.

ALTERNATIVE: (Sketch attached)

Maintain the proposed profile and the 16-foot shoulder section but eliminate the concrete sidewalk.

ADVANTAGES:

- Reduces material cost
- Provides for additional storm water run-off absorption
- Reduces concrete maintenance
- Improves sustainable design

DISADVANTAGES:

- Increases grass maintenance/replacement
- Eliminates hard walking surface

DISCUSSION:

The sidewalks are currently located at disconnected residential areas with no commercial property destinations. The road is functionally classified as a rural minor arterial and the project is not on a route designated in the GDOT Statewide Bicycle and Pedestrian Plan or a local bike plan.

Retaining the proposed profile will facilitate installation of concrete sidewalks if the need arises in the future.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 112,620**	**$ 64,848**	**$ 177,468**
ALTERNATIVE	**$ 1,169**	**$ 6,384**	**$ 7,553**
SAVINGS	**$ 111,451**	**$ 58,464**	**$ 169,915**

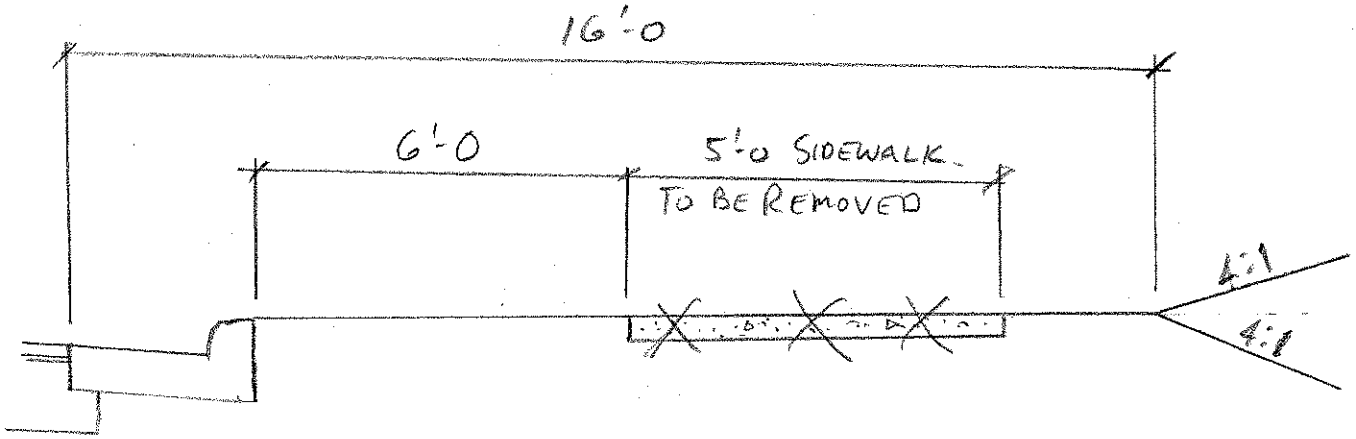
SKETCHES

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 546-5

☑ AS DESIGNED ☑ ALTERNATIVE

SHEET NO.: 2 of 5



TYPICAL SIDEWALK PROFILE

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 546-5

DESCRIPTION: ELIMINATE SIDEWALKS (CONCRETE ONLY)

SHEET NO.: 3 of 5

- ORIGINAL COST ESTMATE QUANTITY OF SIDEWALK = 2,717 SY
- ADD'L FILL ⇒ 2,717 SY × (4"/12) (1'/27) = 33.54 CY
- ADD'L MAINTENANCE AREA ⇒ 2,717 SY ÷ 4840 SY/ACRE = 0.56 ACRE
- ADD'L GRASS + FERTILIZER + LIME ⇒ (ORIGINAL GRASS QUANT. = 93 ACRE)

GRASS =	800 $/ACRE		
LIME =	21 $/GAL	(75 G/93A)	= 16.94
FERTIL. =	60 $/T	(2785/93A)	= 179.35
	275 $/T	(56.T/93A)	= 165.59
	2 $/#	(4632 #/93A)	= 99.61
			1,261.5 $/ACRE

- ADD'L MAINTENANCE ⇒ 1,261.5 $/ACRE × 0.56 ACRE = 706.43

MOWING COST PROVIDED BY GDOT: MOWING - TIFTON ⇒ $1,047 PER MILE PER YEAR.

TYPICAL SECTION ⇒ 24' + 40' + 24' = 88'

AREA ⇒ 5280 FT/m × 88' ÷ 43,560 SF/ACRE = 10.63 ACRE/MILE

UNIT COST ⇒ $1,047 / 10.63 = $98.53 PER ACRE PER YEAR

× 0.56 ACRES

$55.18 PER YR

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 546-5

DESCRIPTION

SHEET NO.: 4 of 5

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
4" Concrete Sidewalk	SY	2,717	31	84,227			
Additional Borrow	CY				33.54	5	168
Additional Grass / Fertilizer	AC				0.56	1,262	706
	Sub-total			84,227			874
Mark-up at	**33.71%**			28,393			295
	TOTAL			112,620			1,169

LIFE CYCLE COST WORKSHEET

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543/544/545/546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, GA Dept. of Transportation, Dist. 4
Preliminary Design Stage

ALTERNATIVE NO. 546-5

SHEET NO. 5 of 5

LIFE CYCLE PERIOD: 35 **years**

INTEREST RATE: 2.15% **ESCALATION RATE:** 0.00%

						ORIGINAL	PROPOSED
A.		**INITIAL COST**				112,620	1,169
		Useful Life (Years)					
					INITIAL COST SAVINGS		111,451
B.		**RECURRENT COSTS (Annual Expenditures)**					
		1. Maintenance: For concrete sidewalks - assume ½% of initial cost for minor repairs				563	
		2. Maintenance: Addition mowing for grass median - see calculation sheet					214
		3.					
					Total Annual Costs	563	214
		(An effective rate of 2.15% with 0.00% Interest and 0.00% Escal.)			**Present Worth Factor**	24.4205	24.4205
					Present Worth of RECURRENT COSTS	13,751	5,221
C.		**SINGLE EXPENDITURES**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
ORIG	PROP	< Put "x" in appropriate box (original design or proposed design)					
x		**1.** Assume replacement of ⅓ of the sidewalks every 12 years	12	37,165	0.7747	28,792	-
x		**2.** Assume replacement of ⅓ of the sidewalks every 12 years	24	37,165	0.6002	22,305	-
	x	**3.** Assume replacement of ½ of the grass medians every 10 years	10	585	0.8084	-	472
	x	**4.** Assume replacement of ½ of the grass medians every 10 years	20	585	0.6535	-	382
	x	**5.** Assume replacement of ½ of the grass medians every 10 years	30	585	0.5283	-	309
		6.			1.0000	-	-
		7.			1.0000	-	-
D.		**SALVAGE VALUE**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
		1.			1.0000	-	-
		2.			1.0000	-	-
					Present Worth of SINGLE EXPENDITURES	51,097	1,163
E.		**Total Recurrent Costs & Single Expenditures (B + C)**				64,848	6,384
					RECURRENT COSTS & SINGLE EXPENDITURES SAVINGS		58,464
					TOTAL PRESENT WORTH COST (A + D)	177,468	7,553
					TOTAL LIFE CYCLE SAVINGS		**169,915**

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **546-6**

DESCRIPTION: **USE A GRASS MEDIAN IN LIEU OF A CONCRETE MEDIAN**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for a typical 20-foot concrete median section consisting of a 2.5-foot curb and gutter, a 14-foot concrete median and 2.5-foot curb and gutter.

ALTERNATIVE: (Sketch attached)

Maintain the proposed profile and the 20-foot median section but replace the concrete median with grass.

ADVANTAGES:

- Reduces material cost *
- Provides for additional storm water run-off absorption
- Reduces concrete maintenance
- Improves sustainable design

DISADVANTAGES:

- Increases grass maintenance/replacement

DISCUSSION:

The introduction of the grass median is more in keeping with the aesthetic concept of a rural minor arterial roadway with locations having historic significance to maintain the view sheds.

Grass medians would maintain a true "typical" median section throughout the project in the rural/open portions of the project.

**Note: The unit cost for the concrete median for this project was set at $50.00/SY per the designer's estimate and was used for these calculations. However, all other projects in this corridor, 543, 544, 545, and 28, use a unit cost of $25.00/SY for the concrete median.*

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 2,895,156**	**$ 1,667,075**	**$ 4,562,231**
ALTERNATIVE	**$ 18,670**	**$ 40,121**	**$ 58,782**
SAVINGS	**$ 2,876,486**	**$ 1,626,963**	**$ 4,503,449**

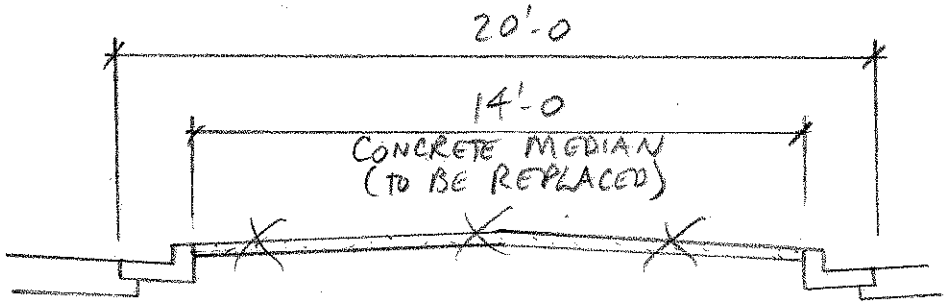
SKETCHES

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 546-6

☑ AS DESIGNED ☑ ALTERNATIVE

SHEET NO.: 2 of 5



TYPICAL MEDIAN SECTION

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 546-6

DESCRIPTION: USE GRASS MEDIAN IN LIEU OF CONCRETE

SHEET NO.: 3 of 5

- ORIGINAL COST ESTIMATE QUANTITY OF MEDIAN = 43,305 SY
- ADD'L FILL => 43,305 SY x (4"/12) (1'/27) = 534.6 CY
- ADD'L MAINTENANCE AREA => 43,305 SY ÷ 4840 SY/ACRE = 8.95 ACRE
- ADD'L GRASS + FERTILIZER => (ORIGINAL GRASS QUANTITY = 93 ACRES)

- GRASS =	800 $/A		
- LIME =	21 $/GAL	(75 G/93A) =	16.94
	60 $/T	(278 T/93 A) =	179.35
- FERTIL. =	275 $/T	(56 T/93A) =	165.59
	2 $/#	(4632 #/93A) =	99.61
			1,261.5 $/ACRE

- ADD'L MAINTENANCE

MOWING COST PROVIDED BY GDOT: MOWING - TIFTON => $1,047 PER MILE PER YEAR.

TYPICAL SECTION => 24' + 40' + 24' = 88'

AREA => 5280 FT/m x 88' ÷ 43,560 SF/ACRE = 10.63 ACRE/MILE

UNIT COST => $1,047 / 10.63 = $98.53 PER ACRE PER YEAR

x 8.95 ACRE

$881.84 PER YR

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 546-6

DESCRIPTION

SHEET NO.: 4 of 5

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
4" Concrete Median*	SY	43,305	50	2,165,250			
Additional Borrow	CY				534.60	5	2,673
Additional Grass / Fertilizer	AC				8.95	1,262	11,290
**Note: The unit cost for the concrete median for this project was set at $50.00 / SY per the designer's estimate and was used for these calculations. However, all other projects in this corridor, 543, 544, 545, and 28, use a unit cost of $25.00 / SY for the concrete median.*							
	Sub-total			2,165,250			13,963
Mark-up at	**33.71%**			729,906			4,707
	TOTAL			2,895,156			18,670

LIFE CYCLE COST WORKSHEET

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543/544/545/546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, GA Dept. of Transportation, Dist. 4
Preliminary Design Stage

ALTERNATIVE NO. 546-6

SHEET NO. 5 of 5

LIFE CYCLE PERIOD: 35 **years**

INTEREST RATE: 2.15% **ESCALATION RATE:** 0.00%

						ORIGINAL	PROPOSED
A.		**INITIAL COST**				2,895,156	18,670
		Useful Life (Years)					
					INITIAL COST SAVINGS		2,876,486
B.		**RECURRENT COSTS (Annual Expenditures)**					
		1. Maintenance: For concrete sidewalks - assume ½% of initial cost for minor repairs				14,476	
		2. Maintenance: Addition mowing for grass median - see calculation sheet					882
		3.					
					Total Annual Costs	14,476	882
		(An effective rate of 2.15% with 0.00% Interest and 0.00% Escal.)			**Present Worth Factor**	24.4205	24.4205
					Present Worth of RECURRENT COSTS	353,505	21,535
C.		**SINGLE EXPENDITURES**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
ORIG	PROP	< Put "x" in appropriate box (original design or proposed design)					
x		**1.** Assume replacement of ⅓ of the sidewalks every 12 years	12	955,401	0.7747	740,160	-
x		**2.** Assume replacement of ⅓ of the sidewalks every 12 years	24	955,401	0.6002	573,410	-
	x	**3.** Assume replacement of ½ of the grass medians every 10 years	10	9,335	0.8084	-	7,546
	x	**4.** Assume replacement of ½ of the grass medians every 10 years	20	9,335	0.6535	-	6,100
	x	**5.** Assume replacement of ½ of the grass medians every 10 years	30	9,335	0.5283	-	4,931
		6.			1.0000	-	-
		7.			1.0000	-	-
D.		**SALVAGE VALUE**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
		1.			1.0000	-	-
		2.			1.0000	-	-
					Present Worth of SINGLE EXPENDITURES	1,313,570	18,577
E.		**Total Recurrent Costs & Single Expenditures (B + C)**				1,667,075	40,112
					RECURRENT COSTS & SINGLE EXPENDITURES SAVINGS		1,626,963
					TOTAL PRESENT WORTH COST (A + D)	4,562,231	58,782
					TOTAL LIFE CYCLE SAVINGS		**4,503,449**

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **546-8**

DESCRIPTION: **USE A FIVE-LANE SECTION THROUGH THE CITY OF BERLIN AND EASTERN MOULTRIE**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch attached)

The original design includes a 20-foot raised median through the town of Berlin and Eastern Moultrie. Speed is to be posted at 45 miles per hour (mph).

ALTERNATIVE: (Sketch attached)

Using the 45 mph speed limit criterion, use a five-lane flush section through Berlin and Eastern Moultrie.

ADVANTAGES:

- Decreases cost *
- Speeds construction
- Decreases right of way costs
- Allows unrestricted left turns through Berlin and Eastern Moultrie

DISADVANTAGES:

- Slightly decreases safety, but still within GDOT standards
- Eliminates control of left turns

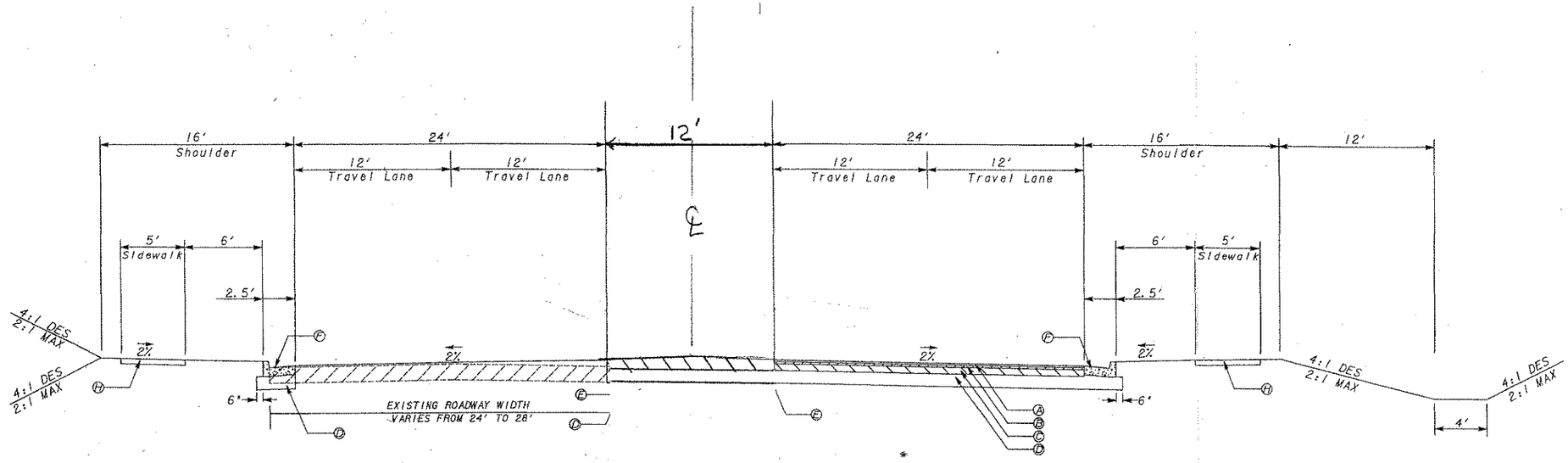
DISCUSSION:

GDOT standards allow a five-lane section within a 45 mph speed limit zone; however, this does reduce safety somewhat.

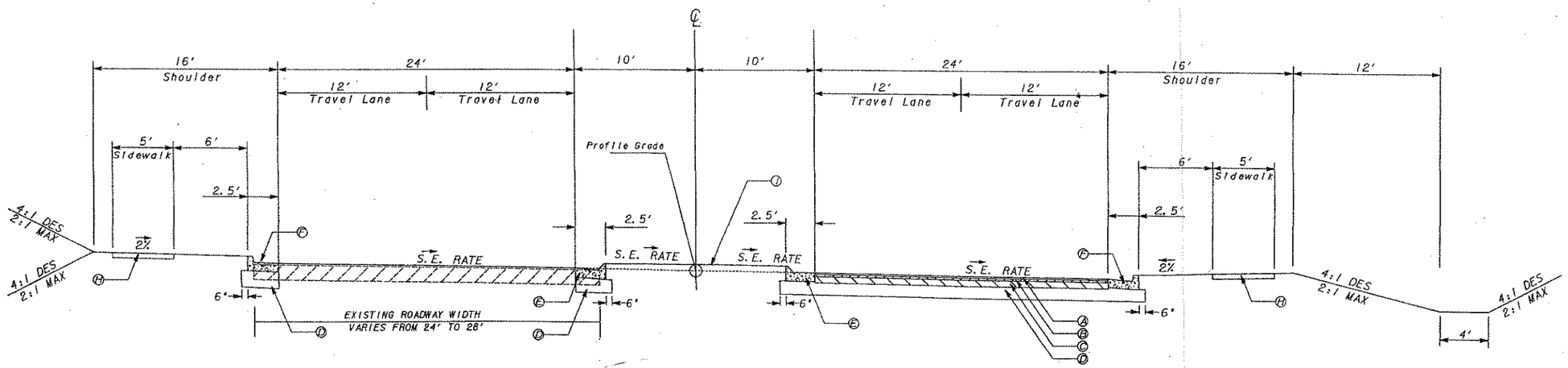
The original design includes a four-lane divided section but has numerous median openings to allow for left turns. Using the five-lane section allows for unrestricted left turns—this may further please the businesses along this route as it improves access.

**Note: The unit cost for the concrete median for this project was set at $50.00/SY per the designer's estimate and was used for these calculations. However, all other projects in this corridor, 543, 544, 545, and 28, use a unit cost of $25.00/SY for the concrete median.*

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 618,786**	**—**	**$ 618,786**
ALTERNATIVE	**$ 536,528**	**—**	**$ 536,528**
SAVINGS	**$ 82,258**	**—**	**$ 82,258**



Proposed Alternate
5 Lane Section (Flush)



Original Section
Raised Median

ALT. NO. 2
546-8
SHT. NO. 2 OF 4

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 546-8

DESCRIPTION:

SHEET NO.: 3 of 4

TOTAL LENGTH UNDER CONSIDERATION (S. VANDERBERG DR. TO EDMONSON DR.)
STA 0+00 TO 16+20
(LANGFORD ST. TO CANTON RD)

ITEMS:

CONCRETE MEDIAN

① 0+90 TO 3+50 => 310' x 8' (1/9) = 275.6 SY

② 3+50 TO 13+20 => 970' x 15' (1/9) = 1,616.7 SY

③ 16+20 TO 13+20 => 300' x 8' (1/9) = 266.7 SY

④ LANGFORD TO ASHLEY => 700' x 8' (1/9) = 622.2 SY

⑤ ASHLEY TO CANTON => 730' x 9' (1/9) = 648.9 SY

TOTAL = 3,430 SY

CURB & GUTTER

L = (310' + 970' + 300' + 700' + 730') 2 = 6,020 LF

AC PAVEMENT

(310' + 300' + 700' + 730') 12' (1/9) = 2,720 SY x 1045 #/SY (1/2000) = 1,421 TN

(970') 20' (1/9) = 2,156 SY x 1045 #/SY (1/2000) = 1,127 TN

2,548 TN

GAB

4,876 SY x 1350 #/SY (1/2000) = 3,292 TON

STRIPE

(310' + 970' + 300' + 700' + 730') 4 = 12,040 LF (3,010')

ROW ORIGINAL => 112' x 3,010' (1/43,560) = 7.74 ACRE

ALTERNATE => (112' - 8') 3010' (1/43,560) = 7.19 ACRE

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 546-8

DESCRIPTION

SHEET NO.: 4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
4" Concrete Median*	SY	3,430	50	171,500			
Curb and Gutter	LF	6,020	15	90,300			
AC Pavement	TN				2,648	60	158,880
GAB	TN				3,292	16	52,672
Striping (Yellow)	LF				12040.00	0.25	3,010
Construction Subtotal				261,800			214,562
Composite Markup at 33.71%				88,253			72,329
Construction Total				350,053			286,891
Right of Way	AC	7.74	10,000	77,400	7.19	10,000	71,900
Composite Markup at 247.20%				191,333			177,737
ROW Total				268,733			249,637

**Note: The unit cost for the concrete median for this project was set at $50.00 / SY per the designer's estimate and was used for these calculations. However, all other projects in this corridor, 543, 544, 545, and 28, use a unit cost of $25.00 / SY for the concrete median.*

	Sub-total				618,786			536,528
Mark-up at					INCL.			INCL.
	TOTAL				618,786			536,528

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **546-9**

DESCRIPTION: **USE ARCH SPAN STRUCTURES IN LIEU OF MULTI-CELL BOX CULVERTS**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for the use of multi-cell concrete box culverts to span over two creeks:

Quintuple 8-foot x 3-foot culvert at Stream No. 92; and
Triple 8-foot x 3-foot culvert at Stream No. 83.

ALTERNATIVE: (Sketch attached)

Use single span, prefabricated structures in lieu of the multi-cell concrete box culverts.

ADVANTAGES:

- Minimizes construction time
- Minimizes maintenance of traffic time
- Increases stream flow capacity by reducing stream blockage
- Reduces debris build-up

DISADVANTAGES:

- Increases initial cost

DISCUSSION:

The existing structures are +50 years old and warrant replacement. Although the hydraulic report has not been updated, the terrain is relatively flat and there is the possibility of flooding. Removing mid-stream obstructions will improve the flow and potentially help avoid flooding. Furthermore, the maintenance associated with debris removal is minimized.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 432,640**	**—**	**$ 432,640**
ALTERNATIVE	**$ 668,550**	**—**	**$ 668,550**
SAVINGS	**$ (235,910)**	**—**	**$ (235,910)**

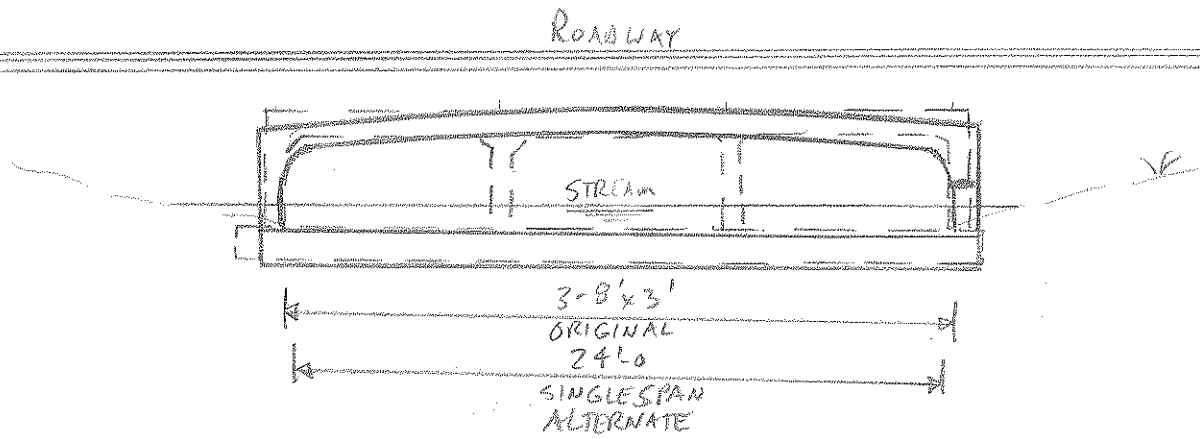
SKETCHES

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

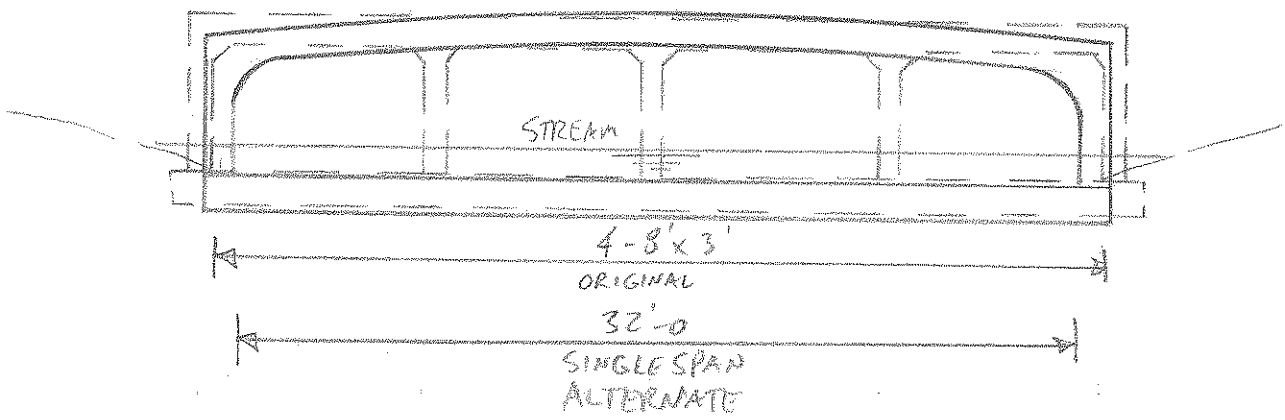
ALTERNATIVE NO.: 546-9

☑ AS DESIGNED ☑ ALTERNATIVE

SHEET NO.: 2 of 4



TYPICAL SECTION
(@ STREAM #93)



TYPICAL SECTION
(@ STREAM #92)

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 546-9

DESCRIPTION:

SHEET NO.: 3 of ~~4~~

ARCH QUANTITIES =>

WIDTH ① = 26'
② = 34'

LENGTH = (10' + 24' + 12') 2 = 100'

AREA ① = 2,600 SF
② = 3,400 SF

ARCH STRUCTURE COST => CONTECH CONC. ARCH => 24' SPAN = $230,000

32' SPAN = $320,00

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 546-9

DESCRIPTION

SHEET NO.: 4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Box Culverts	LS	1	323,566	323,566			
Arch Spans							
32-foot Span	EA				1	320,000	320,000
24-foot Span	EA				1	180,000	180,000
Sub-total				323,566			500,000
Mark-up at 33.71%				109,074			168,550
TOTAL				432,640			668,550

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **546-10**

DESCRIPTION: **SIGNALIZE SOUTH VANDERBERG DRIVE ENTRANCE TO AIRPORT (SPENCE FIELD)**

SHEET NO.: **1 of 3**

ORIGINAL DESIGN: (Sketch attached)

The current design does not call for a signalized intersection at South Vanderberg Drive and SR 133. This is the entrance to the Spence Field airport.

ALTERNATIVE:

Provide a signalized intersection at South Vanderberg Drive and SR 133. No further improvements are necessary.

ADVANTAGES:

- Increases safety
- Improves facility operations
- Minimizes the potential for accidents
- Improves time management – especially during yearly special events

DISADVANTAGES:

- Increases initial cost

DISCUSSION:

This intersection is the main entrance to Spence Field and all associated airport functions. The airport is also the site of the annual Sunbelt Agricultural Exposition. This is a farm show with more than 1,200 agricultural technology exhibitors, and it typically attracts more than 10,000 visitors over a three-day period. Additionally, other yearly events are held at the airport like the Calico Arts and Crafts Show and the Jerry Kelly Automotive Swap Meet.

Furthermore, the facility's speed drops from 55 to 45 mph just 0.5 miles south of this intersection. The accident rate in this location is higher than at most other intersections throughout the corridor. As such, a signalize intersection would improve safety and allow for better traffic flow.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 0**	**—**	**$ 0**
ALTERNATIVE	**$ 200,565**	**—**	**$ 200,565**
SAVINGS	**$ (200,565)**	**—**	**$ (200,565)**

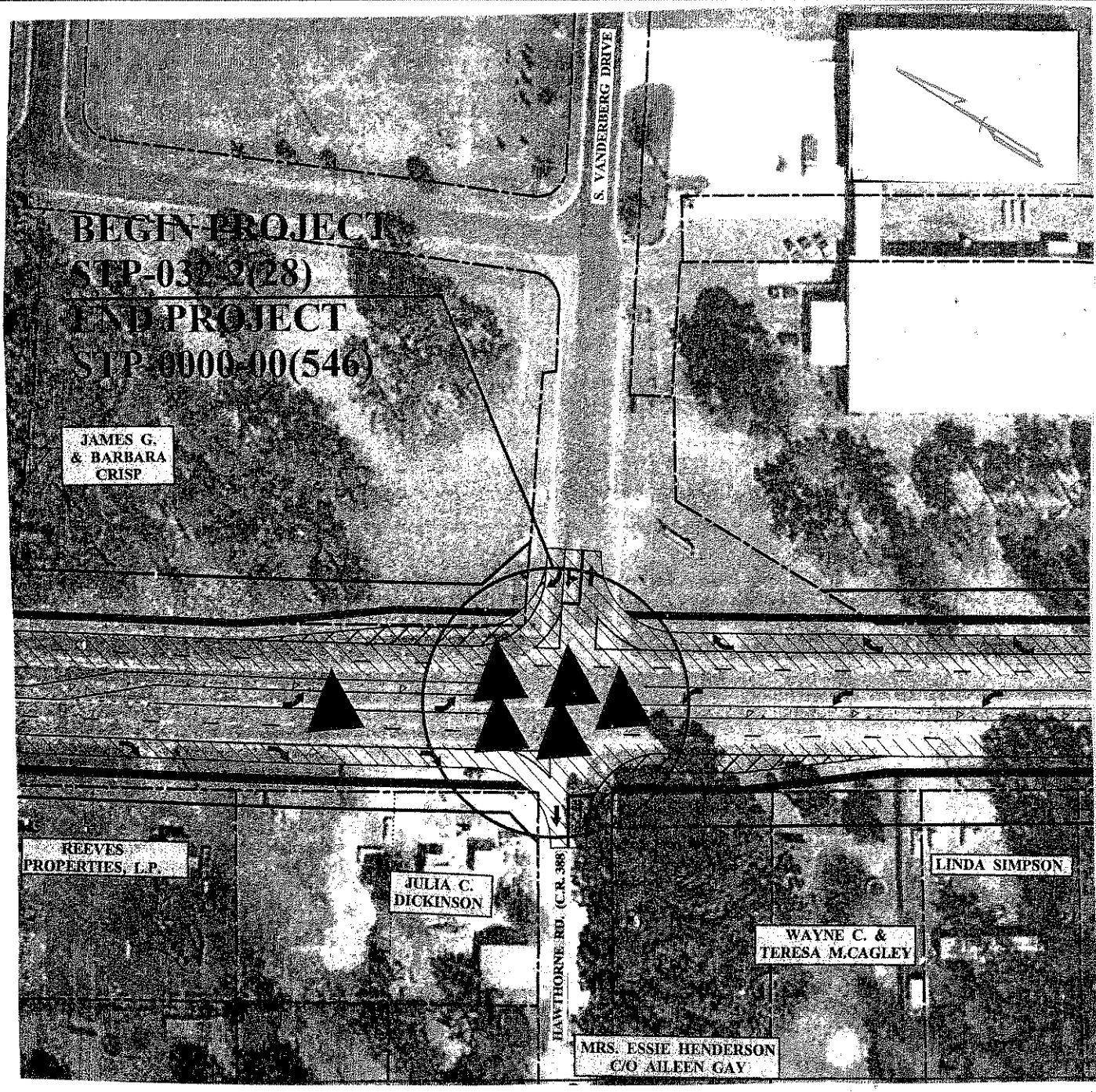
SKETCHES

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 546-10

☑ AS DESIGNED ☐ ALTERNATIVE

SHEET NO.: 2 of 3



COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 546-10

DESCRIPTION

SHEET NO.: 3 of 3

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Traffic Signal	EA				1	150,000	150,000
Sub-total							150,000
Mark-up at 33.71%							50,565
TOTAL							200,565

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **28-2/3**

DESCRIPTION: **SELECTIVELY ELIMINATE MEDIAN CUTS**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for a four-lane divided roadway with closely-spaced media openings.

ALTERNATIVE: (Sketch attached)

Consider eliminating non-essential media openings to improve safety and operational efficiencies at the following locations:

SE 24th Street; and
SE 25th Street.

ADVANTAGES:

- Reduces the number of conflict points
- Improves safety
- Improves traffic operations

DISADVANTAGES:

- Increases circuitous routing for local residents
- Most likely increases the occurrence of illegal crossovers
- Could increase public opposition

DISCUSSION:

This alternative does not preclude crossovers at more appropriate locations, and should increase safety along this stretch of SR 133. In addition, operational efficiencies are achieved with fewer median openings allowing for a more continuous flow of traffic—especially during peak travel times.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 909,600**	**—**	**$ 909,600**
ALTERNATIVE	**$ 912,026**	**—**	**$ 912,026**
SAVINGS	**$ (2,426)**	**—**	**$ (2,426)**

DATETIME$$$	TIME$$$	PRF	DGN	COUNTY	PROJECT NUMBER
$USER$		$$PENTABLE$$		COLQUITT	STP-032-2(28)

END PROJECT
CSSFT-0007-00(477)

SOMABHAI R. & LAXMIBEN S. PATEL

ROBERT HUTSON

DEWEY MERCER DBA JOHNNY'S AUTO SALES

MOULTRIE CHEVROLET CADILLAC

KEN ISAACS

S.E. 24TH. ST.

25TH. STREET S.E.

S.R. 133

MATCH LINE SEE SHEET 3

MATCH LINE SEE SHEET 4

ROBERT W. HUTSON JR.

DR.WILLIAM H. SMITH

LONNIE H. HOLLAND III, DIANE BASS LIFE ESTATE

DAVID W. DURHAM, DONALD L. EDWARDS

26TH. STREET S.E.

DEBRA LYNN HART

HOYT H. & GRACE C. LACEY

RANDALL LEE & JEANETTE KELLEY

Wolverton & Associates
Consulting Engineers + Land Surveyors
6145 Sugarloaf Parkway - Suite 100 - Duluth, Georgia 30097
Phone: (770) 447-8000 - Fax: (770) 447-9609
www.wolverton-assoc.com

100 0 100 200 300FT.
SCALE: 1" = 100'

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: CONSULTANT DESIGN

SR 133
HAWTHORNE ROAD TO SR 35 (E. MOULTRIE BYPASS)

DRAWING No.

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 28-213

DESCRIPTION:

SHEET NO.: 3 of 4

Extend Concrete Median to Close Median Opening between 24th & 25th Streets

Concrete Median

Area = (8')(90') = 720 ft^2 = 80 SY

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 28-2/3

DESCRIPTION

SHEET NO.: 4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Concrete Median	SY	30,000	25	750,000	30,080	25	752,000
		Sub-total		750,000			752,000
Mark-up at		**21.28%**		159,600			160,026
		TOTAL		909,600			912,026

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **28-4**

DESCRIPTION: **ELIMINATE SIDEWALKS (CONCRETE ONLY)**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for a typical 16-foot shoulder section consisting of a 2.5-foot curb and gutter portion, a 6-foot grass strip, a 5-foot-wide x 4-inch-thick concrete sidewalk, and 2.5-foot grass strip.

ALTERNATIVE: (Sketch attached)

Maintain the proposed profile and the 16-foot shoulder section but eliminate the concrete sidewalk.

ADVANTAGES:

- Reduces material cost
- Provides for additional storm water run-off absorption
- Reduces concrete maintenance
- Improves sustainable design

DISADVANTAGES:

- Increases grass maintenance/replacement
- Eliminates hard walking surface

DISCUSSION:

The sidewalks are currently located at disconnected residential areas with no commercial property destinations. The road is functionally classified as a rural minor arterial and the project is not on a route designated in the GDOT Statewide Bicycle and Pedestrian Plan or a local bike plan.

However, retaining the proposed profile will facilitate installation of concrete sidewalks if the need arises in the future.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 714,339**	**$ 425,256**	**$ 1,139,595**
ALTERNATIVE	**$ 7,728**	**$ 17,732**	**$ 25,460**
SAVINGS	**$ 706,611**	**$ 407,524**	**$ 1,114,135**

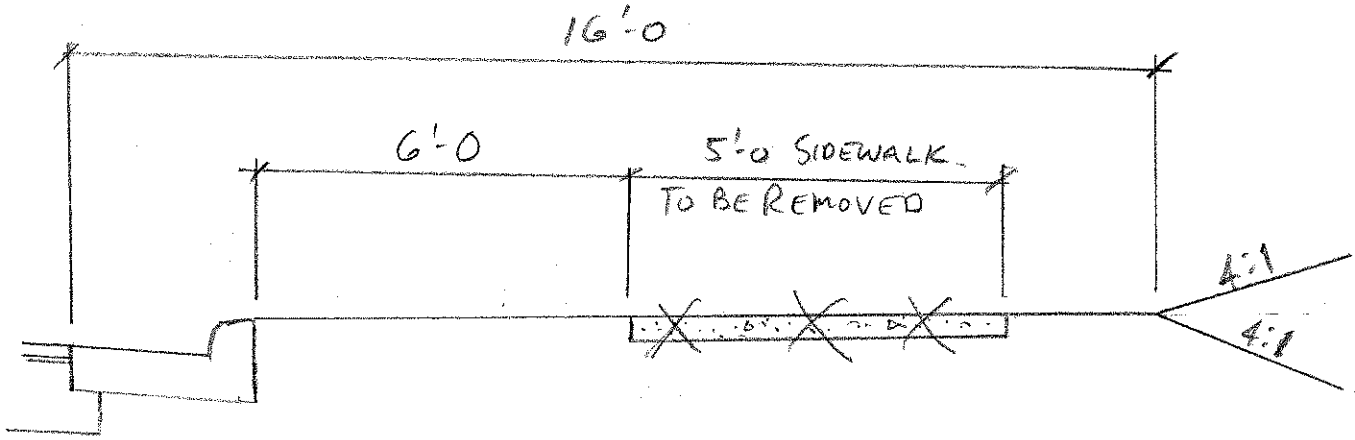
SKETCHES

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 28-4

☑ AS DESIGNED ☑ ALTERNATIVE

SHEET NO.: 2 of 5



TYPICAL SIDEWALK PROFILE

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 28-4

DESCRIPTION: ELIMINATE SIDEWALKS (CONCRETE ONLY)

SHEET NO.: 3 of 5

- ORIGINAL COST ESTIMATE QUANTITY OF SIDEWALK = 19,000 SY
- ADD'L FILL ⇒ 19,000 SY × (4"/12) (1/27) = 234.6 CY
- ADD'L MAINTENANCE AREA ⇒ 19,000 SY ÷ 4840 SY/ACRE = 3.93 ACRE
- ADD'L GRASS + FERTILIZER + LIME ⇒ (ORIGINAL GRASS QUANT. = 55 ACRE)

GRASS =	800 $/ACRE		
LIME =	21 $/GAL	(1380 G/55A)	= 52.69
FERTIL. =	60 $/T	(110 T/55A)	= 120.0
	225 $/T	(50 T/55A)	= 250.0
	2 $/#	(2758 #/55A)	= 100.29
			1,323 $/ACRE

- ADD'L MAINTENANCE ⇒ 1,323 $/ACRE × 3.93 ACRE = $5,199.3

MOWING COST PROVIDED BY GDOT: MOWING - TIFTON ⇒ $1,047 PER MILE PER YEAR.

TYPICAL SECTION ⇒ 24' + 40' + 24' = 88'

AREA ⇒ 5260 FT/M × 88' ÷ 43,560 SF/ACRE = 10.63 ACRE/MILE

UNIT COST ⇒ $1,047 / 10.63 = $98.53 PER ACRE PER YEAR

× 3.93 ACRE

387.22 $/YR

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 28-4

DESCRIPTION

SHEET NO.: 4 of 5

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
4" Concrete Sidewalk	SY	19,000	31	589,000			
Additional Borrow	CY				234.60	5	1,173
Additional Grass / Fertilizer	AC				3.93	1,323	5,199
	Sub-total			589,000			6,372
Mark-up at	**21.28%**			125,339			1,356
	TOTAL			714,339			7,728

LIFE CYCLE COST WORKSHEET

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543/544/545/546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, GA Dept. of Transportation, Dist. 4
Preliminary Design Stage

ALTERNATIVE NO. 28-4

SHEET NO. 5 of 5

LIFE CYCLE PERIOD: 35 **years**

INTEREST RATE: 1.95% **ESCALATION RATE:** 0.00%

						ORIGINAL	PROPOSED
A.		**INITIAL COST**				714,339	7,728
		Useful Life (Years)					
					INITIAL COST SAVINGS		706,611
B.		**RECURRENT COSTS (Annual Expenditures)**					
		1. Maintenance: For concrete sidewalks - assume ½% of initial cost for minor repairs				3,572	
		2. Maintenance: Addition mowing for grass median - see calculation sheet					387
		3.					
					Total Annual Costs	3,572	387
		(An effective rate of 1.95% with 0.00% Interest and 0.00% Escal.)			**Present Worth Factor**	25.1958	25.1958
					Present Worth of RECURRENT COSTS	89,992	9,756
C.		**SINGLE EXPENDITURES**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
ORIG	PROP	< Put "x" in appropriate box (original design or proposed design)					
x		**1.** Assume replacement of ⅓ of the sidewalks every 12 years	12	235,732	0.7931	186,970	-
x		**2.** Assume replacement of ⅓ of the sidewalks every 12 years	24	235,732	0.6291	148,294	-
	x	**3.** Assume replacement of ½ of the grass medians every 10 years	10	3,864	0.8244	-	3,185
	x	**4.** Assume replacement of ½ of the grass medians every 10 years	20	3,864	0.6796	-	2,626
	x	**5.** Assume replacement of ½ of the grass medians every 10 years	30	3,864	0.5603	-	2,165
		6.			1.0000	-	-
		7.			1.0000	-	-
D.		**SALVAGE VALUE**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
		1.			1.0000	-	-
		2.			1.0000	-	-
					Present Worth of SINGLE EXPENDITURES	335,264	7,976
E.		**Total Recurrent Costs & Single Expenditures (B + C)**				425,256	17,732
					RECURRENT COSTS & SINGLE EXPENDITURES SAVINGS		407,524
					TOTAL PRESENT WORTH COST (A + D)	1,139,595	25,460
					TOTAL LIFE CYCLE SAVINGS		**1,114,135**

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **28-5**

DESCRIPTION: **USE A GRASS MEDIAN IN LIEU OF A CONCRETE MEDIAN**

ORIGINAL DESIGN: (Sketch attached)

The current design calls for a typical 20-foot concrete median section consisting of a 2.5-foot curb and gutter, a 14-foot concrete median, and 2.5-foot curb and gutter.

ALTERNATIVE: (Sketch attached)

Maintain the proposed profile and the 20-foot median section but replace the concrete median with grass.

ADVANTAGES:

- Reduces material cost
- Provides for additional storm water run-off absorption
- Reduces concrete maintenance
- Improves sustainable design

DISADVANTAGES:

- Increases grass maintenance/replacement

DISCUSSION:

The introduction of the grass median is more in keeping with the aesthetic concept of a rural minor arterial roadway with locations having historic significance to maintain the view sheds.

Grass medians would maintain a true “typical” median section throughout the project in the rural/open portions of the project.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 909,600**	**$ 541,497**	**$ 1,451,097**
ALTERNATIVE	**$ 12,195**	**$ 27,979**	**$ 40,174**
SAVINGS	**$ 897,405**	**$ 513,518**	**$ 1,410,923**

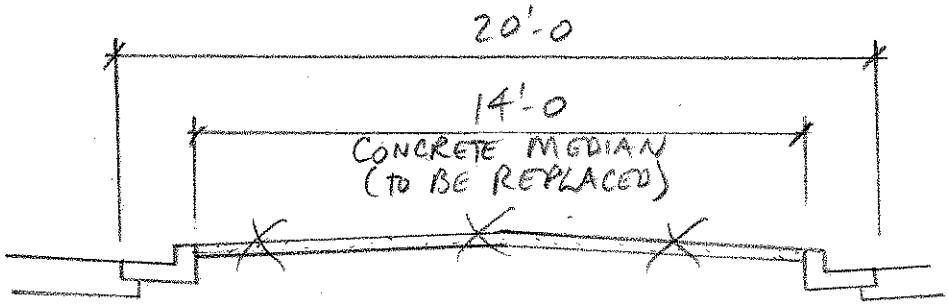
SKETCHES

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 28-5

☑ AS DESIGNED ☑ ALTERNATIVE

SHEET NO.: 2 of 5



TYPICAL MEDIAN SECTION

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 28-5

DESCRIPTION: USE GRASS MEDIAN IN LIEU OF CONCRETE

SHEET NO.: 3 of 5

- ORIGINAL COST ESTIMATE QUANTITY OF MEDIAN = 30,000 SY
- ADD'L FILL => 30,000 SY x (4"/12) (1'/27) = 370.4 CY
- ADD'L MAINTENANCE AREA => 30,000 SY ÷ 4840 SY/ACRE = 6.2 ACRE
- ADD'L GRASS + FERTILIZER => (ORIGINAL GRASS QUANTITY = 55 ACRES)

- GRASS =	800 $/A		
- LIME =	21 $/GAL	(138 G/55 A) =	52.69
	60 $/T	(110 T/55 A) =	120.0
- FERTIL. =	275 $/T	(50 T/55 A) =	250.0
	2 $/#	(2758 #/55 A) =	100.29
			1,323 $/ACRE

- ADD'L MAINTENANCE

MOWING COST PROVIDED BY GDOT: MOWING - TIFTON => $1,047 PER MILE PER YEAR.

TYPICAL SECTION => 24' + 40' + 24' = 88'

AREA => 5280 FT/m x 88' ÷ 43,560 SF/ACRE = 10.63 ACRE/MILE

UNIT COST => $1,047 / 10.63 = $98.53 PER ACRE PER YEAR

x 6.2 ACRE

$ 610.89 PER YR

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 28-5

DESCRIPTION

SHEET NO.: 4 of 5

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
4" Concrete Median	SY	30,000	25	750,000			
Additional Borrow	CY				370.40	5	1,852
Additional Grass / Fertilizer	AC				6.20	1,323	8,203
	Sub-total			750,000			10,055
Mark-up at	**21.28%**			159,600			2,140
	TOTAL			909,600			12,195

LIFE CYCLE COST WORKSHEET

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543/544/545/546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, GA Dept. of Transportation, Dist. 4
Preliminary Design Stage

ALTERNATIVE NO. 28-5

SHEET NO. 5 of 5

LIFE CYCLE PERIOD: 35 **years**

INTEREST RATE: 1.95% **ESCALATION RATE:** 0.00%

						ORIGINAL	PROPOSED
A.		**INITIAL COST**				909,600	12,195
		Useful Life (Years)					
					INITIAL COST SAVINGS		897,405
B.		**RECURRENT COSTS (Annual Expenditures)**					
		1. Maintenance: For concrete sidewalks - assume ½% of initial cost for minor repairs				4,548	
		2. Maintenance: Addition mowing for grass median - see calculation sheet					611
		3.					
					Total Annual Costs	4,548	611
		(An effective rate of 1.95% with 0.00% Interest and 0.00% Escal.)			**Present Worth Factor**	25.1958	25.1958
					Present Worth of RECURRENT COSTS	114,590	15,392
C.		**SINGLE EXPENDITURES**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
ORIG	PROP	< Put "x" in appropriate box (original design or proposed design)					
x		**1.** Assume replacement of ⅓ of the sidewalks every 12 years	12	300,168	0.7931	238,077	-
x		**2.** Assume replacement of ⅓ of the sidewalks every 12 years	24	300,168	0.6291	188,830	-
	x	**3.** Assume replacement of ½ of the grass medians every 10 years	10	6,098	0.8244	-	5,027
	x	**4.** Assume replacement of ½ of the grass medians every 10 years	20	6,098	0.6796	-	4,144
	x	**5.** Assume replacement of ½ of the grass medians every 10 years	30	6,098	0.5603	-	3,416
		6.			1.0000	-	-
		7.			1.0000	-	-
D.		**SALVAGE VALUE**	**Year**	**Amount**	**PW factor**	**Present Worth**	**Present Worth**
		1.			1.0000	-	-
		2.			1.0000	-	-
					Present Worth of SINGLE EXPENDITURES	426,907	12,587
E.		**Total Recurrent Costs & Single Expenditures (B + C)**				541,497	27,979
					RECURRENT COSTS & SINGLE EXPENDITURES SAVINGS		513,518
					TOTAL PRESENT WORTH COST (A + D)	1,451,097	40,174
					TOTAL LIFE CYCLE SAVINGS		**1,410,923**

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **28-7**

DESCRIPTION: **USE A FIVE-LANE SECTION THROUGH MOULTRIE FROM SOUTH VANDERBERG DRIVE TO THE EAST MOULTRIE BYPASS (SR 35)**

SHEET NO.: **1 of 6**

ORIGINAL DESIGN: (Sketch attached)

The original design includes a 20-foot raised median through the town of Moultrie. Speed is to be posted at 45 miles per hour (mph).

ALTERNATIVE: (Sketch attached)

Using the 45 mph speed limit criterion, use a five-lane flush section through Moultrie.

ADVANTAGES:

- Decreases cost
- Speeds construction
- Decreases right of way costs
- Allows unrestricted left turns through Moultrie

DISADVANTAGES:

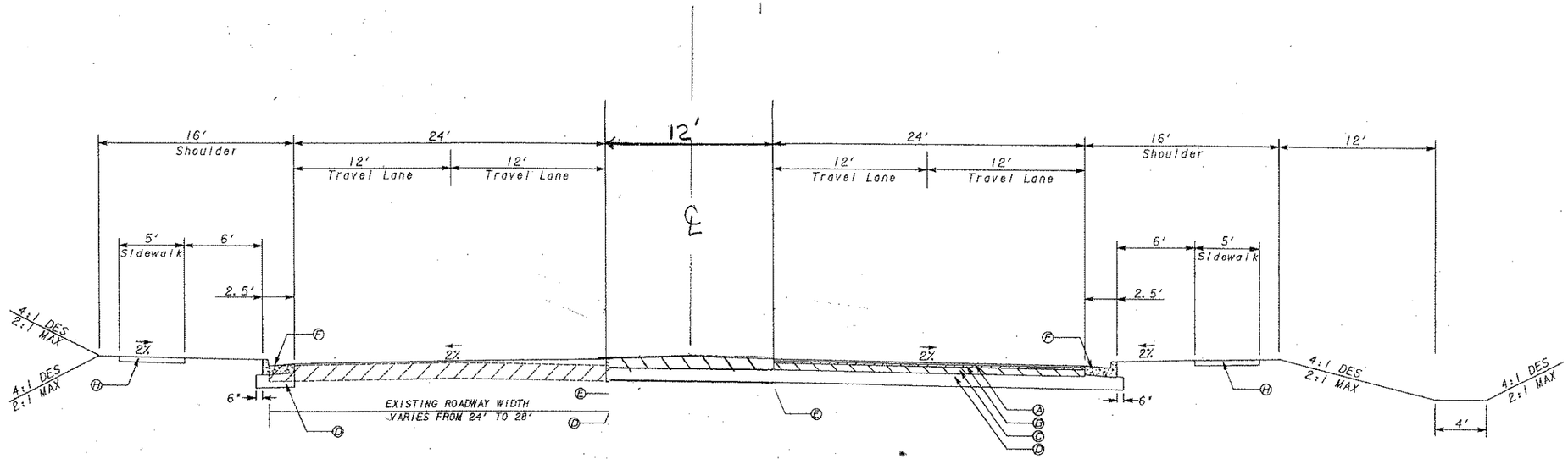
- Slightly decreases safety, but still within GDOT standards
- Eliminates control of left turns

DISCUSSION:

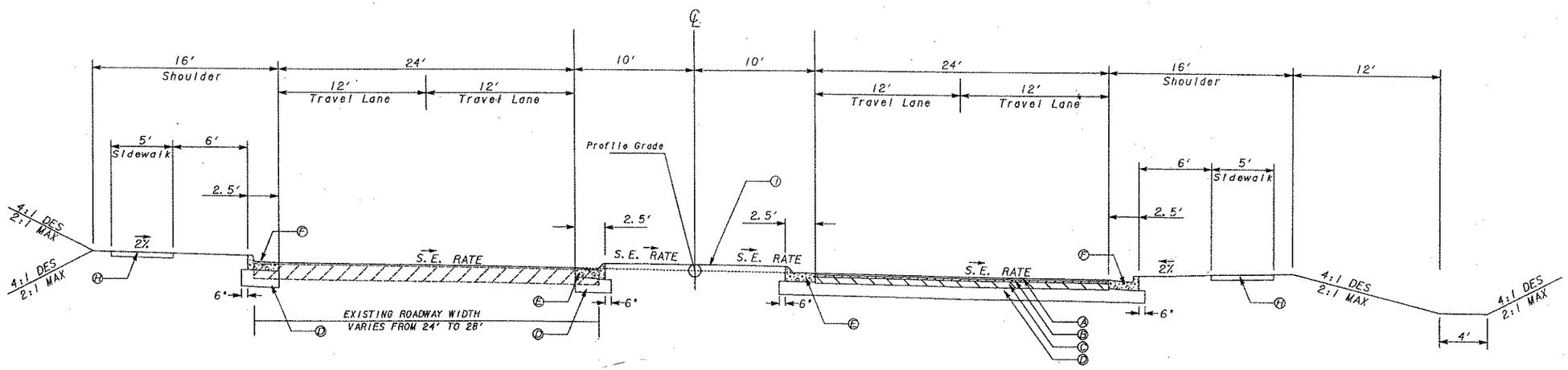
GDOT standards allow a five-lane section within a 45 mph speed limit zone; however, it will reduce safety somewhat.

The original design includes for a four-lane divided section with median openings to allow left turns. The five-lane section allows for unrestricted left turns to meet the desire for left turns at almost every street and business establishment.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 4,825,518**	**—**	**$ 4,825,518**
ALTERNATIVE	**$ 3,871,382**	**—**	**$ 3,871,382**
SAVINGS	**$ 954,136**	**—**	**$ 954,136**



Proposed Alternate
5 Lane Section (Flush)



Original Section
Raised Median

ALT. No.:
28-7

SHT. No. 2 OF 6

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 28-7

DESCRIPTION:

SHEET NO.: 3 of 6

Total Length Under Consideration (South Vanderberg Dr to SR 35) is :

Mile Post 10.2 to 14.8 = 4.6mi = 24,288LF

Quantities :

Concrete Median

① S. Vanderberg to Dean Matthews

$[2 \cdot (210ft \cdot 5.5ft) + 60ft \cdot 100ft] \cdot \frac{SY}{9ft^2} = 923\ SY$

② Dean Matthews to Miller

$[2 \cdot (250ft \cdot 5.5ft) + 190ft \cdot 250ft] \cdot \frac{SY}{9ft^2} = 5583\ SY$

③ Miller to East of Railroad St.

$(985ft \cdot 5.5ft + 300ft \cdot 5.5ft + 120ft \cdot 5.5ft) \frac{SY}{9ft^2} = 859\ SY$

④ East of Railroad St

$550ft \cdot 5.5ft \ \frac{SY}{9ft^2} = 336\ SY$

⑤ Railroad St. to Williams' Property Crossover

$= 336\ SY$

⑥ Williams Property to Sunset Body Shop

$[2 \cdot (250ft \cdot 5.5ft) + 190ft \cdot 210ft] \frac{SY}{9ft^2} = 4739\ SY$

⑦ Sunset Body Shop to Bozeman Crossover

$[2 \cdot (250ft \cdot 5.5ft) + 190ft \cdot 190ft] \frac{SY}{9ft^2} = 4317\ SY$

⑧ Bozeman to Cruz Crossover

$[2 \cdot (250ft \cdot 5.5ft) + 190ft \cdot 190ft] \cdot \frac{SY}{9ft^2} = 4317\ SY$

⑨ Cruz Crossover to SR35

$\frac{SY}{9ft^2}[180ft(980ft + 475ft) + 5.5ft(550ft + 530ft + 535ft + 550ft + 550ft + 600ft + 600ft + 720ft + 880ft + 600ft + 750ft + 770ft + 740ft + 750ft + 625ft + 610ft + 670ft) + (400ft \cdot 6ft) + 300ft \cdot 5.5ft$

$= 36,291\ SY$

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 2&7

DESCRIPTION:

SHEET NO.: 4 of 6

Quantities (Continued)

Concrete Median:

Total = 55,701 SY

Curb & Gutter

① 4 · 210ft + 2 · 60ft 2 · 100ft = 1160 LF

② 4 · 250ft + 2 · 190ft + 2 · 250ft = 1880LF

③ 2 · 985ft + 2 · 300ft + 2 · 120ft = 2910 LF

④ 2 · 550ft = 1100 LF

⑤ = 1100LF

⑥ 4 · 250ft + 2 · 190ft + 2 · 210 ft = 1800LF

⑦ 4 · 250ft + 4 · 190ft = 1760LF

⑧ 4 · 250ft + 4 · 190ft = 1760LF

⑨ 2 · 11,030ft + 2 · 980ft + 2 · 475ft + 2 · 400ft + 2 · 300ft
= 26,370LF

Total = 39,740LF

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 28-7

DESCRIPTION:

SHEET NO.: 5 of 6

AC Pavement
1045 lb/sy

$12\,ft \cdot 24{,}288\,ft \cdot \frac{sy}{9\,ft^2} = 32{,}384\,sy$

$1045\,lb/sy \cdot 32{,}384\,sy \cdot \frac{TN}{2000\,lb}$

$= 16{,}921\,TN$

GAB
1350 lb/sy

$1350\,lb/sy \cdot 32{,}384\,sy \cdot \frac{TN}{2000\,lb}$

$= 21{,}859\,TN$

Stripe

$4 \cdot 24{,}288\,ft = 97{,}152\,LF$

Right of Way

Original

$112\,ft \cdot 24{,}288\,ft \cdot \frac{Acre}{43560\,ft^2} = 62.4\,Acre$

Alternate

$(112\,ft - 8\,ft) \cdot 24{,}288\,ft \cdot \frac{Acre}{43560\,ft^2} = 58.0\,Acre$

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 28-7

DESCRIPTION

SHEET NO.: 6 of 6

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
4" Concrete Median	SY	55,701	25	1,392,525			
Curb and Gutter	LF	39,740	15	596,100			
AC Pavement	TN				16,921	60	1,015,260
GAB	TN				21,859	16	349,744
Striping (Yellow)	LF				97,152	0.25	24,288
Construction Subtotal				1,988,625			1,389,292
Composite Markup at 33.71%				670,365			468,330
Construction Total				2,658,990			1,857,622
Right of Way	AC	62.40	10,000	624,000	58.00	10,000	580,000
Composite Markup at 247.20%				1,542,528			1,433,760
ROW Total				2,166,528			2,013,760
Sub-total				4,825,518			3,871,382
Mark-up at				INCL.			INCL.
TOTAL				4,825,518			3,871,382

VALUE ENGINEERING ALTERNATIVE

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO.: **28-8**

DESCRIPTION: **PROVIDE NEW INTERSECTION AT QUAIL RUN AND SANDERSON FARMS CHICKEN PLANT AND ELIMINATE THE OLD MOULTRIE-ADEL ROAD/SR 133 INTERSECTION**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch attached)

The current design reconfigures the Old Moultrie-Adel Road and SR 133 intersection and introduces a new traffic signal at this location. Quail Run is currently a cul-de-sac residential street.

The reconfiguration of Old Moultrie-Adel Road and SR 133 intersection is being constructed as a fast track "Safety Project" outside the purview of this project.

ALTERNATIVE: (Sketch attached)

Extend Quail Run to the south to tie into SR 133 at the location where a new road has been constructed for access to the Sanderson Farms Chicken Plant west of SR 133. There is a signal at this location that will be modified to accommodate the intended reconfiguration. Demolish the recently-constructed, reconfigured intersection of Old Moultrie-Adel Road and SR 133 and construct a cul-de-sac.

ADVANTAGES:

- Eliminates an unsafe, skewed intersection
- Reduces the number of conflict points
- Improves safety
- Improves traffic operations
- Decreases the number of traffic signals in close proximity

DISADVANTAGES:

- Increases circuitous routing for local residents
- Increases initial cost

DISCUSSION:

It is understood that a "Safety Project" will be executed to reconfigure the Old Moultrie-Adel Road/SR 133 intersection and provide a new signal. This safety project is intended to address a high level of accidents at this skewed intersection.

The alternative eliminates access to SR 133 at Old Moultrie-Adel Road but provide access via Quail Run. While increasing the project cost by almost $465,000, it will greatly enhance safety and provide operational efficiencies.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	**$ 0**	**—**	**$ 0**
ALTERNATIVE	**$ 464,032**	**—**	**$ 464,032**
SAVINGS	**$ (464,032)**	**—**	**$ (464,032)**

1" = 20'

BEGIN PROJECT
CSSFT-0007-00(477)

31st. ST. SE

OLD MOULTRIE - ADEL ROAD

30st. ST. SE

DRIVE

QUAIL RUN

Extend Quail Run to meet with new road at Chicken plant.
New portion of Quail Run and upgraded portion to be 24feet with curb & gutter.

EXISTING SIGNAL

WAYNE FRIER HOME CENTER

Demolish recently construted roadway, and traffic signal from "Safety Project". Construct Cul-De-Sac.

MILE 33

PATRICIA YEARTY

JIMMY MOXLEY

EXISTING SIGNAL

S.R. 133

AVENUE

RUBY STRIPLIN UPTON

M.H. ROTHWELL

REGENCY VILLAGE

JENKINS FAMILY PROPERTIES

JERRY FRAZIER JR.

PLYMEL PROPERTIES LLC

POND # 113

THOMAS W. ROWELL

ETHEL MCCULLAR

ITENDRAKUMAR A.
VASUDEV A. PATEL

CALCULATIONS

PROJECT: **STP-0000-00(543)/(544)/(545)/(546) and STP-032-2(28), PI Nos. 0000543 / 544 / 545 / 546 and 431780, WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Brooks and Colquitt Counties, Georgia Dept. of Transportation, District 4
Preliminary Design Stage

ALTERNATIVE NO.: 28-8

DESCRIPTION:

SHEET NO.: 3 of 4

Total length of Quail Run as proposed is 1350 ft. Total length of existing is 850ft.

Items:
Curb & Gutter
Pavement
Signal

Curb & Gutter:
L = 1350ft · 2 = 2700ft — Alternate

L = 314ft ——— New Cul-de-Sac L = 3014ft

Pavement:

12.5mm	SuperPave	165 lb/sy, $60/TN	12.5mm Super Pave	165 lb/sy
19 mm	Super Pave	220 lb/sy, $60/TN	Leveling	200 lb/sy
25 mm	~	660 lb/sy $60/TN	Rehab.	365 lb/sy

@ $60/TN

Full Depth AC = 1045 lb/sy, $60/TN

$$\left[(1350ft - 850ft) \cdot 24ft + \pi (60ft)^2\right] \cdot \frac{1\,sy}{9\,ft^2} \cdot 1045\,lb/sy \cdot \frac{TN}{2000\,lb} = 1152\,TN$$

(Qual Run; Cul-de-Sac)

Quail Run (Full Depth) & Cul-de-Sac

$$850ft \cdot 24ft \cdot \frac{1\,sy}{9\,ft} \cdot 365\,lb/sy \cdot \frac{1\,TN}{2000\,lb} = 414\,TN$$

Quail Run (Overlay)

GAB: 1350 lb/sy

$$\left[1350ft \cdot 25ft + \pi (50.5ft)^2\right] \cdot \frac{1\,sy}{9\,ft^2} \cdot 1350\,lb/sy \cdot \frac{TN}{2000\,lb} = 3132\,TN$$

Traffic Signal:
New $150,000
Modify $100,000

Right of Way:

$$\text{Quail Run} = \frac{(540ft + 230ft)}{2} \cdot 200ft \cdot \frac{Acre}{43{,}560\,ft^2} = 1.8\,Acre$$

$$\text{Intersection} = \frac{450ft \cdot 270ft}{2} \cdot \frac{1\,Acre}{43{,}560\,ft^2} = 1.4\,Acre$$

COST WORKSHEET

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

ALTERNATIVE NO: 28-8

DESCRIPTION

SHEET NO.: 4 of 4

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Curb and Gutter	LF				3,134	15	47,010
Pavement (Full Depth)	TN				1,152	60	69,120
Pavement (Rehab / Overlay)	TN				414	60	24,840
Traffic Signal (Removal)	EA				1	10,000	10,000
Traffic Signal (Modify)	EA				1	100,000	100,000
Demolition of Roadway	LS				1	30,000	30,000
GAB	TN				3,132	16	50,112
Construction Subtotal							331,082
Composite Markup at 21.28%							70,454
Construction Total							401,536
Quail Run Right-of-Way	AC				1.80	10,000	18,000
Composite Markup at 247.20%							44,496
Right-of-Way Total							62,496
Sub-total							464,032
Mark-up at	**21.28%**						INCL.
	TOTAL						464,032

PROJECT DESCRIPTION

NEED AND PURPOSE

History

State Route (SR) 133 is a major north-south corridor in South Georgia and provides a vital connection between Valdosta on the south with Albany to the north. For its entire length between Valdosta and Albany, SR 133 is identified for eventual widening due to its inclusion on the Governor's Road Improvement Program (GRIP). The GRIP was initiated in the 1980s to address the importance of stimulating economic growth via an improved transportation network. SR 133 was recently added to the GRIP by the State Legislature and approved by the Governor.

Demographics

Contract	County	Population Growth 1990 – 2000	County Census Tract	Minority Populations* - 2000	Poverty Level (per U.S. Census) - 1999
543 544 545	Brooks	6.8% = 10,282 people	9903	25.0% vs.34.9% for the State	23. 4% vs. 13.0% for the State
546 28	Colquitt	4.8% = 42,053	9704, 9706, and 9707	30.8%, 23.2%, and 33% (respectively) vs.34.9% for the State	19.8% vs. 13.0% for the State

**Note: The U. S. Census defines a minority population as Black/African-American, Hispanic/Latino, Asian/Pacific Islander, or American Indian/Alaska Native.*

Traffic

Contract	Traffic Volume in Vehicles per Day (VPD) 2005	Level of Service (LOS)	Traffic Volume in Build Year 2010	LOS*	Traffic Volume in Design Year 2030	LOS*
543	9,025	D	10,140	D	14,990	E
544	4,102	B	5,425	C	8,075	C
545	3,994	B	5,150	C	7,725	C
546	4,211	B	5,450	C	8,125	C
28	12,332	A	13,600	A	20,200	A

**Note: LOS for the design and build represents a LOS level under a "no build" scenario.*

Accidents

Overall crash rates along this section of SR 133 are below the statewide averages for this type of road which is functionally classified as a rural minor arterial. Analysis of the most current accident data that was available (years 2000, 2001, and 2002) shows that most of the accidents that occurred on the roadway itself were angle-intersect, sideswipe, and rear-end type accidents.

PROPOSED SCOPE OF WORK

The projects are not on a route designated in the GDOT Statewide Bicycle and Pedestrian Plan or a local bike plan. There are nine projects that will widen SR 133 between Albany and Valdosta. More specifically, there are five projects on this state route between Valdosta and Moultrie and four projects between Moultrie and Albany—the five projects associated with this value engineering report. The proposed limits of the five projects (P. I. Nos. 0000543, 0000544, 0000545, 0000546, and 431780) between Valdosta and Moultrie have logical termini: the southern terminus of these projects will tie into the existing four lane section of SR 133 near Troupeville Road (CR 276) in Brooks County and the northern terminus of these projects will tie into the existing through lane section at the East Moultrie Bypass (SR 35) in Colquitt County.

Contract	County	Proposed Scope	Termini	LOS
543	Brooks	Widen SR 133 from two to four lanes with turn lanes as needed	Troupeville Road (CR 276) and Pauline Church Road (CR 10)	A
544			Pauline Church Road and Old Quitman Road (CR 1)	
545	Brooks/Colquitt		Old Quitman Road and Old Berlin Road (CR 256)	
546	Colquitt		Old Berlin Road and Hawthorne Road (CR 388)	
28		Add a 20-foot raised concrete median to the existing four-lane section of SR 133	Hawthorne Road and the East Moultrie Bypass (SR 35)	N/A

Description of the Proposed Projects:

1. STP-0000-00(543) in Brooks County is proposed to improve 6.68 miles of SR 133 from Troupeville Road (Brooks County Mile Post 0.71) to Pauline Church Road (Brooks County Mile Post 7.39) where it ties to Project STP-0000-00(544). The project begins 0.57 miles outside the Valdosta City Limits at Troupeville Road where it ties in to an existing 20-foot raised median typical section. This 20-foot raised median typical section includes a rural shoulder and is maintained to Ridgeland Road. At Ridgeland Road the rural shoulder transitions to an urban shoulder including curb and gutter and sidewalks, but maintains the same 20-foot raised concrete median. This urban 20-foot raised median typical section is maintained through the densely populated area which ends at Fellowship Lane. At Fellowship Lane the 20-foot raised median transitions to the standard GRIP 44-foot depressed median typical section and maintains this typical section for the remainder of the project which terminates at Pauline Church Road. The widening of the existing roadway shifts from one side to the other in a number of places in order to minimize right-of-way impacts. SR 133 will be posted at 45 miles per hour (mph) from Troupeville Road to Fellowship Lane and 55 mph from Fellowship Lane to Pauline Church Road.

2. STP-0000-00(544) in Brooks County is proposed to improve 5.58 miles of SR 133 from Pauline Church Road where it ties to Project STP-0000-00(543), to Old Quitman Road (Brooks County Mile Post 12.97) where it ties to Project STP-0000-00(545). Improvements consist of widening the existing two-lane SR 133 to a four-lane roadway with turn lanes as needed. The project begins at Pauline Church Road with a 44-foot depressed median typical section. The widening of the existing roadway shifts from one side to the other in a number of places to avoid historic resources and cemeteries, and to minimize right-of-way impacts. The 44-foot depressed median typical section is maintained to a point approximately 2,300 feet north of Rizer Road (CR 4). At this point the median tapers down to a 32-foot depressed median which is maintained for approximately 5,000 feet to minimize impacts to the adjacent wetlands. Once through the wetland area the proposed median tapers back out to the 44-foot depressed median

typical section which is maintained up to Lawson Pond Road. At Lawson Pond Road the typical section tapers down to a 20-foot raised median section in order to maintain the existing SR 133 alignment through the city of Morven while minimizing right-of-way impacts and maintaining the existing 45 mph speed limit. This 20-foot median typical section is maintained for the remainder of the project which terminates at Old Quitman Road.

3. STP-0000-00(545) in Brooks and Colquitt Counties is proposed to improve 9.63 miles of SR 133 from Old Quitman Road, where it ties to Project STP-0000-00(544), to Old Berlin Road (Colquitt County MP 2.44), where it ties to Project STP-0000-00(546). Improvements consist of widening the existing two-lane SR 133 to a four-lane roadway with turn lanes as needed. The project begins at Old Quitman Road with a 44-foot depressed median typical section which transitions from a 20-foot raised median just outside of Morven city limits in Project STP-0000-00(544). The widening of the existing roadway shifts from one side to the other in a number of places to avoid historic resources and property displacements. The proposed 44-foot depressed median section transitions to a 24-foot raised, typical grassed median section, shifting to symmetrical widening in order to avoid impacts to historic properties from Moultrie Highway (SR 333) to Hempstead Church Road. The 24-foot raised grassed median typical section becomes a 24-foot raised concrete median at Hempstead Church Road and the widening shifts from symmetrical to widening to the east. The 24-foot raised concrete median typical section is maintained for the remainder of the project which terminates at Old Berlin Road.

4. STP-0000-00(546) in Colquitt County is proposed to improve 7.64 miles of SR 133 from Old Berlin Road where it ties to Project STP-0000-00(545) to Hawthorne Road (Colquitt County Mile Post 10.08) where it ties to Project STP-032-2(28). Improvements consist of widening the existing two-lane SR 133 to a four-lane roadway with turn lanes as needed. The widening of the existing roadway shifts from one side to the other in a number of places to avoid historic resources and to minimize right-of-way impacts. The project begins at the realigned Old Berlin Road and SR 133 intersection at a posted speed of 55 mph with a 24-foot raised concrete median typical section which is maintained to Cannon Road where the posted speed changes to 45 mph and the typical section tapers down to a 20-foot raised concrete median typical section in order to maintain the existing SR 133 alignment through the city of Berlin while minimizing right-of-way impacts. This 20-foot concrete median typical section is maintained to approximately 1,700 feet north of the intersection with Langford Street where the typical section transitions out to a 24-foot raised concrete median and the posted speed changes to 55 mph. Approximately 600 feet south of Leo's Lane, the typical section changes to a 24-foot raised grassed median typical section which is maintained for approximately three miles changing back to a 24-foot raised concrete median typical section at approximately 1,300 feet south of Stripling Road. This 24-foot grassed median is proposed in order to minimize the visual effect the roadway has on the historic resources within the three miles. The 24-foot raised concrete median typical section is maintained from approximately 1,300 feet south of Stripling Road to Edmondson Road where the posted speed changes to 45 mph and the typical section tapers down to a 20-foot raised concrete median through the remainder of the project which terminates at Hawthorne Road.

5. STP-032-2(28) in Colquitt County is proposed to improve 4.55 miles of SR 133 from Hawthorne Road where it ties to Project STP-0000-00(546), to the East Moultrie Bypass (Colquitt County Mile Post 14.63). Improvements consist of adding a 20-foot raised concrete median, curb and gutter, and sidewalks to the existing four-lane SR 133 with turn lanes as needed. The addition of the 20-foot raised median will eliminate conflicting left turn movements which will provide for a safer road through this densely populated area. The widening of the existing roadway shifts from one side to the other in a number of places to avoid historic resources and property impacts.

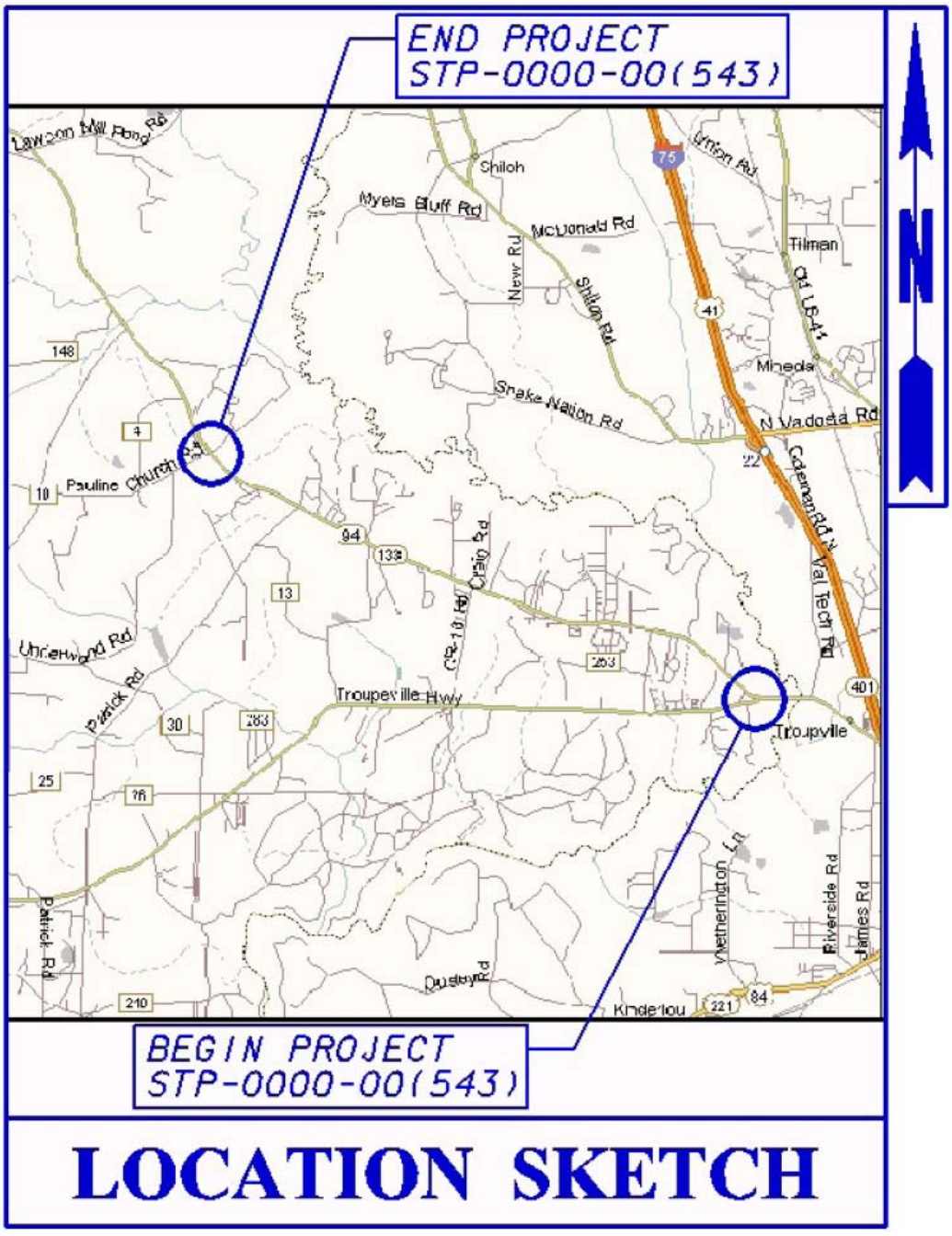
Improvements to all four of the five projects consist of widening the existing two-lane SR 133 to a four-lane roadway with turn lanes as needed and the fifth project adds a 20-foot raised concrete median, curb

and gutter, and sidewalks to the existing four-lane SR 133 with turn lanes as needed.

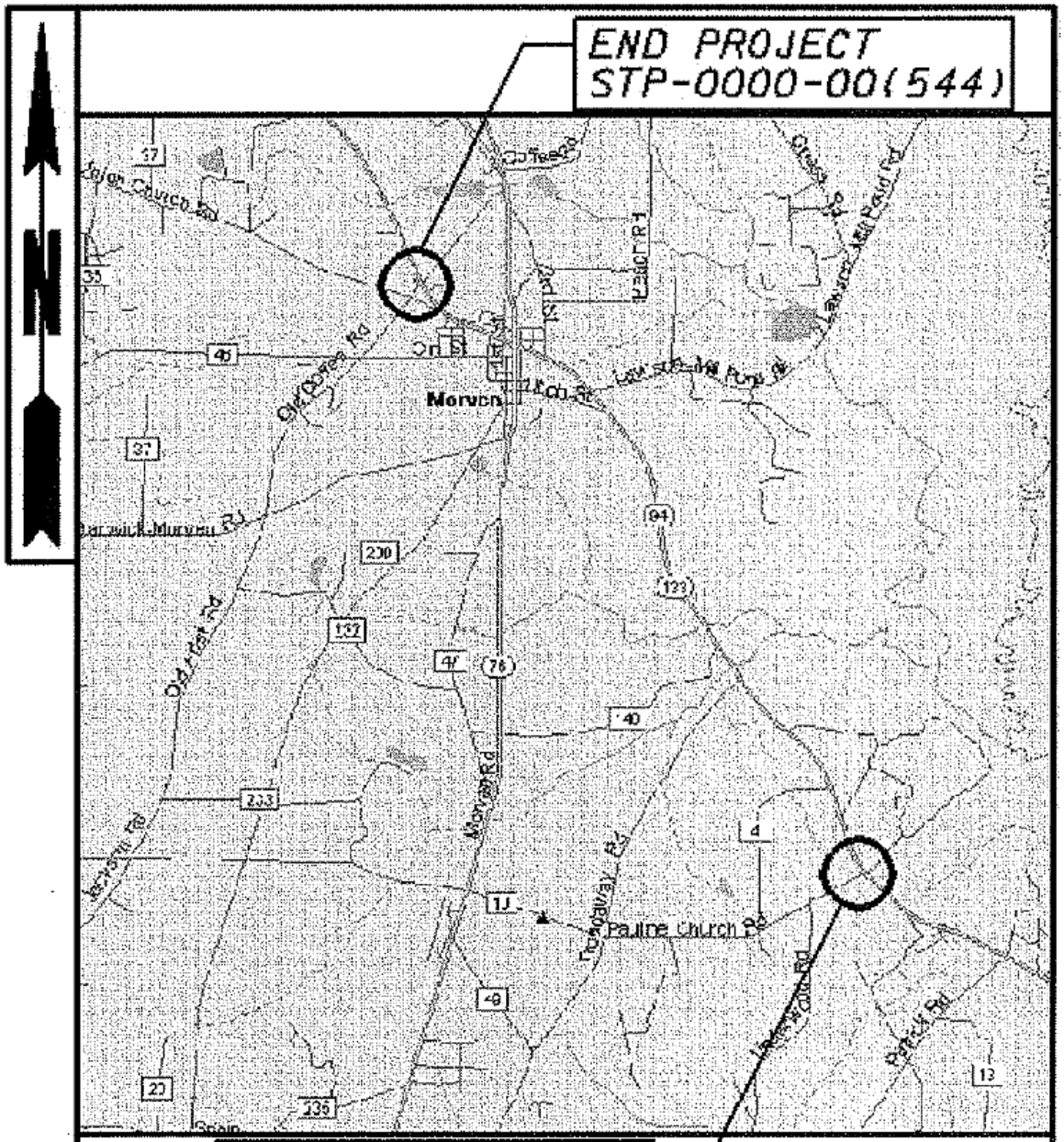
PROJECT COSTS

The collective, projected cost of construction for all five contracts is $115,262,227 and is based on the *Preliminary Cost Estimates* prepared by Wolverton & Associates, Inc. and dated December, 2005; December 1, 2005; February 2006; December 2005; and December 12, 2005, respectively. This total figure includes inflation based on 5.00% per annum for four years for Contracts 543, 544, 545 and 546 and 5.00% per annum for two years for Contract 28. It also includes engineering and construction, preliminary right-of-way, and reimbursable utilities as illustrated in the following table.

Contract No.	Construction Cost Subtotal	Inflation	Engineering & Construction	Right-of-Way	Reimbursable Utilities	Total
543	$14,040,519	$3,025,820	$1,706,634	$2,062,500	$1,352,500	$22,187,972
544	$12,265,842	$2,643,366	$1,490,921	$1,250,000	$577,500	$18,227,628
545	$21,929,928	$4,726,037	$2,665,596	$2,750,001	$2,512,500	$34,584,062
546	$17,746,439	$3,824,469	$2,157,091	$2,000,000	$15,000	$25,742,999
28	$10,156,208	$1,041,011	$1,119,722	$2,022,624	$180,000	$14,519,565
TOTAL	$76,138,936	$15,260,703	$9,139,964	$10,085,125	4,637,500	$115,262,228



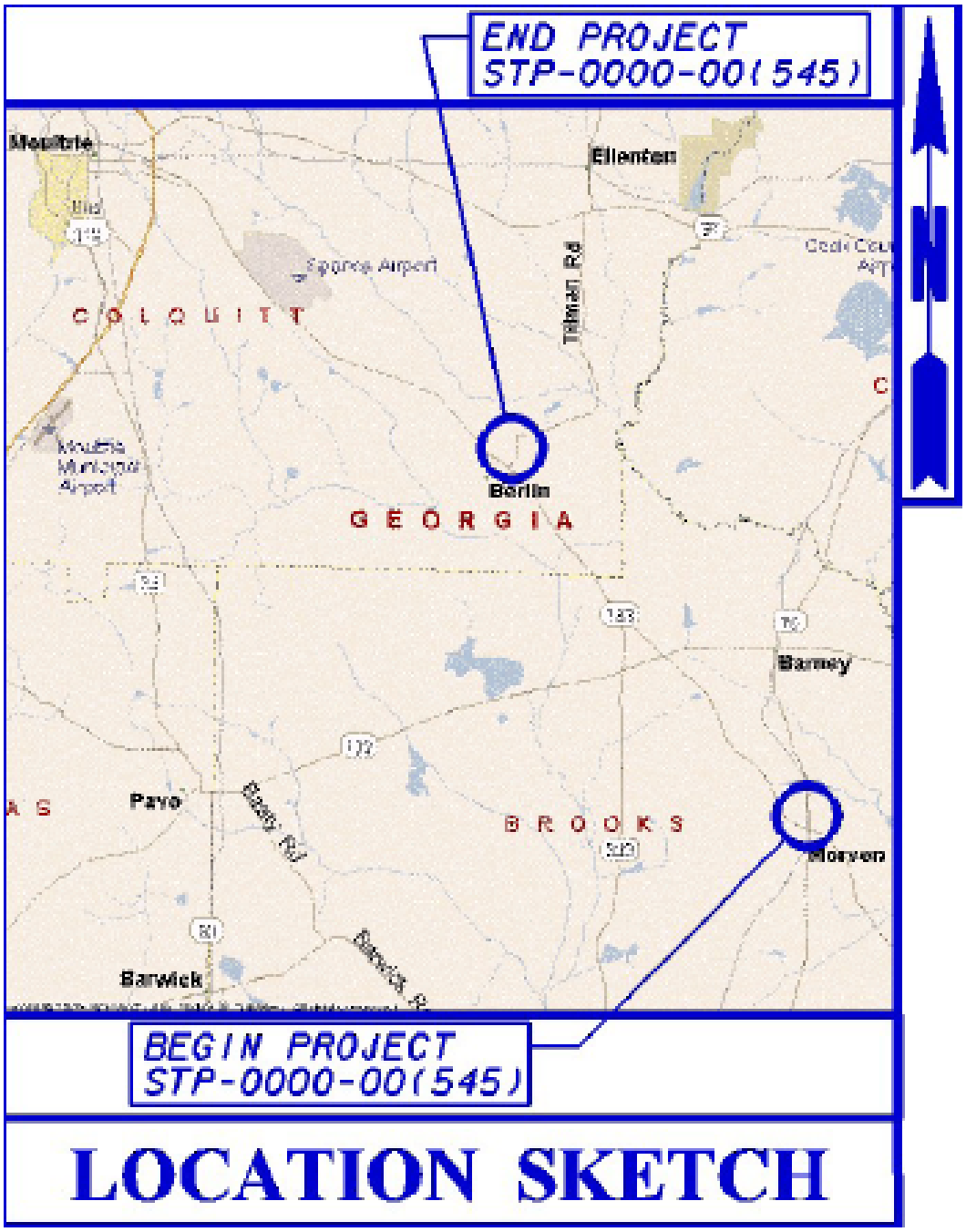
Project: STP-0000-00(543) **PI No.:** 0000543
Description: Widening of SR 133 from **Troupeville Road (CR 276) to Pauline Church Road (CR10)**



LOCATION SKETCH

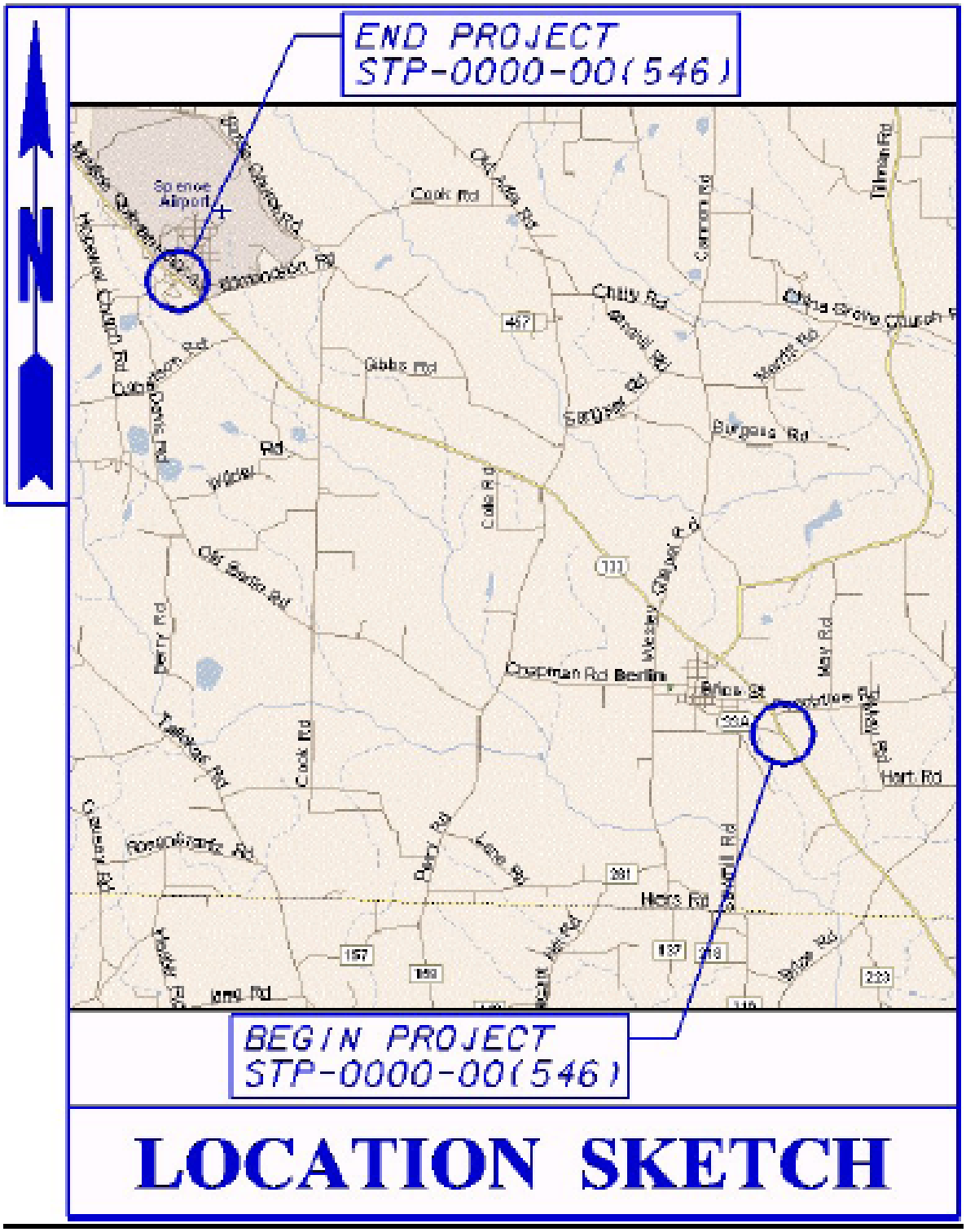
Project: STP-0000-00(544) **PI No.:** 0000544

Description: Widening of SR 133 from Pauline Church Road (CR10) to Old Quitman Road (CR 1)

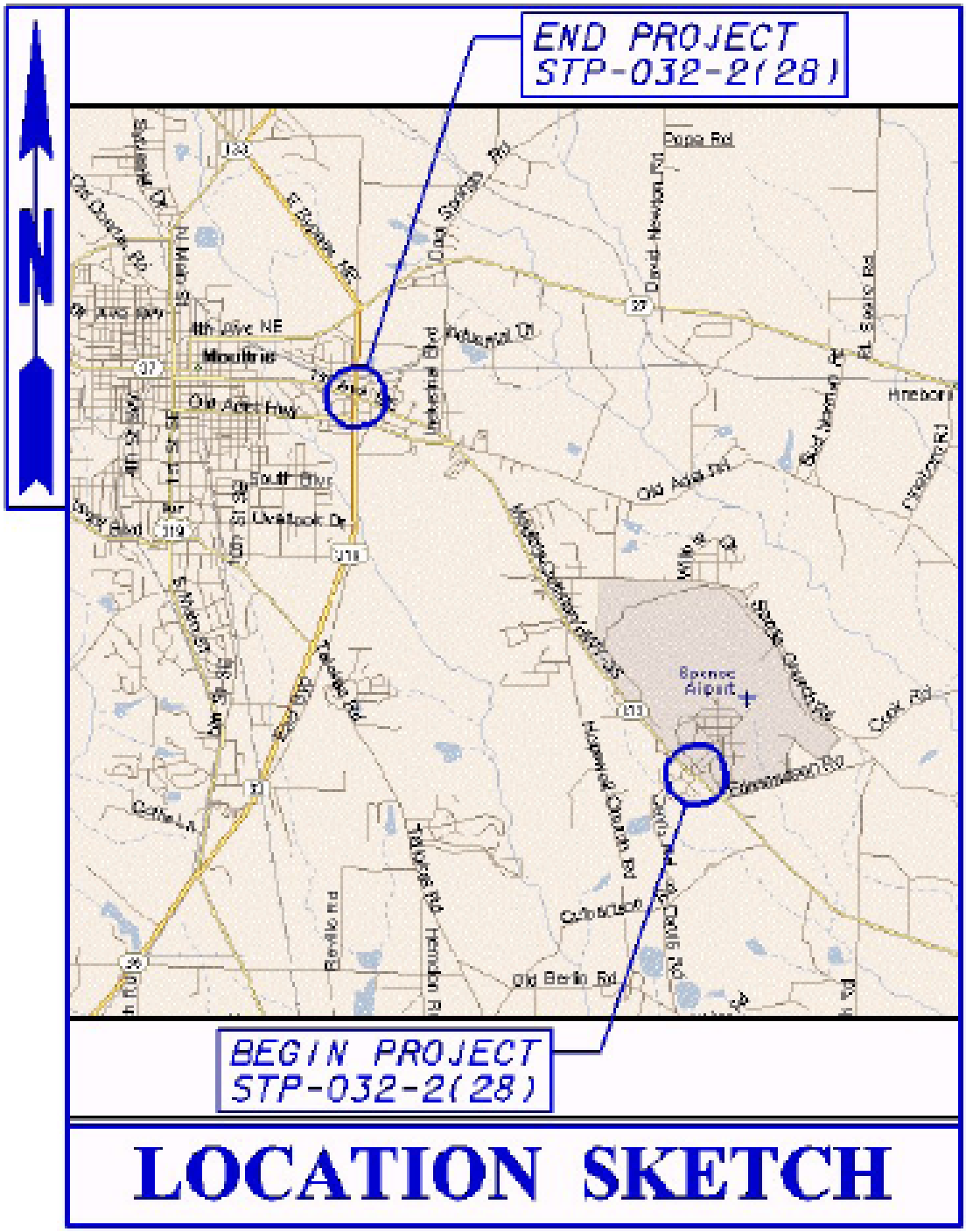


LOCATION SKETCH

Project: STP-0000-00(545) **PI No.:** 0000545
Description: Widening of SR 133 from Old Quitman Road (CR 1) to Old Berlin Road (CR 256)



Project: STP-0000-00(546) **PI No.:** 0000546
Description: Widening of SR 133 from Old Berlin Road (CR 256) to Hawthorne Road (CR 388)



Project: STP-032-2(28) **PI No.:** 431780
Description: Widening of SR 133 from Hawthorne Road (CR 388) to E. Moultrie Bypass (SR35)

VALUE ANALYSIS AND CONCLUSIONS

GENERAL

This section describes the value analysis procedure used during the value engineering study. It is followed by separate narratives and conclusions concerning:

- Value Engineering Workshop Participants
- Economic Data
- Cost Estimate Summary and Cost Histograms
- Function Analysis
- Creative Idea Listing and Judgment of Ideas

A systematic approach was used in the VE study and the key procedures involved were organized into three distinct parts: 1) preparation; 2) VE workshop; and 3) post-study. A Task Flow Diagram that outlines each of the procedures included in the VE study is attached for reference.

PREPARATION EFFORT

Pre-study preparation for the VE effort consisted of scheduling study participants and tasks, gathering necessary background information on the facility, compiling project cost data into a graphic cost histogram, and preparing workshop materials. Information relating to the design, construction, and operation of the facility is important as it forms the basis of comparison for the study effort. Information relating to funding, project planning operating needs, basis of cost, soil conditions, and construction of the facility was also a part of the analysis.

VALUE ENGINEERING WORKSHOP EFFORT

The VE workshop was a three-day effort (see attached agenda). During the workshop, the VE job plan was followed. The job plan guided the search for high cost areas in the project and included procedures for developing alternative solutions for consideration. It includes six phases:

- Information Phase
- Function Identification and Analysis Phase
- Speculation Phase
- Evaluation Phase
- Development Phase
- Presentation Phase *(Not conducted)*

Information Phase

At the beginning of the study, the conditions and decisions that have influenced the development of the project must be reviewed and understood. For this reason, the development manager presented information about the

Value Engineering Study Task Flow Diagram

Preparation Effort

Coordination Project
- Verify Schedule
- Suggest Format for Designer Presentation
- Outline Project Responsibilities
- Outline Needed Background Data
- Define *Project Value Objectives*
- Identify Project Constraints

→

Prepare for Workshop
- Collect Project Data
- Distribute Data to Team Members
- Team Members Become Familiar with Project

→

Construct Cost Models
- Construct Cost Models
- Construct Graphic Function Analysis
- Outline High Cost Areas

→

LCC Model
- Roadway
- Bridges
- MOT
- Energy
- User Impact

Workshop Effort

Information Phase
- Introduction by VETL
- Project Description and Presentation by Designer
- Outline Owner Requirements
- Review Project Data
- Visit Project Site (Alt.)

→

Function Identification and Analysis Phase
- Analyze Project Costs and Energy Usage
- Perform Function Analysis and FAST Diagram
- Identify High Cost and Energy Areas
- Calculate Cost/Worth Ratios
- Identify Paradigms

List Ideas Generated During Function Analysis

→

Speculation Phase
- Introduction by VETL
- Creative Idea Listing:
  - Quantity of ideas
  - Association of Ideas
- Brainstorm
- Do Creative Thinking
  - Group Thinking
  - Individual Thinking
- Use Checklist for Ideas

→

Evaluation Phase
- Eliminate Impractical Ideas
- Rank Ideas with Advantages/ Disadvantages
- Evaluate Alternatives
  (Include Non-Economic considerations: Safety, Reliability, Environment, Aesthetics, O&M, etc.)
- Select Best Ideas for Implementation

→

Development Phase
- Develop Proposed Alternatives
- Prepare Alternative Design Sketches
- Estimate Costs
- Perform Life Cycle Comparison
  - Initial Cost
  - Redesign Cost
  - O&M Cost
  - LCC Cost

→

Presentation Phase
- Summarize Findings
- Present VE Ideas to Owner/ User/Designer
- Oral Presentation

Post-Workshop Effort

VE Study Report
- Develop Implementation VE Report
- Designer Prepares Responses to VE Report
- Owner Evaluates Recommendations

→

Implementation Phase
- Participate in Implementation Meeting with Owner/User/ Designer/ VE Team, as needed
- Prepare Final VE Report

→

Final Acceptance
- Redesign by Designer

project to the VE team on first day of the session. Following the presentation, the VE team discussed the project using the following documents:

- **Approved Project Concept Report** prepared by the Department of Transportation, State of Georgia, Office of Preconstruction for the SR 133 Widening from Troupville Road/CR 276 to Pauline Church Road/CR 10, Project Number STP-0000-00(543), P. I. No. 0000543, Brooks County, dated March 23, 2006;
- **Half Size Drawings of Plan and Profile** of proposed SR 133 Widening from Troupville Road (CR 276) to Pauline Church Road (CR 10), Federal Aid Project, Georgia D.O.T. P. I. No. STP-0000-00(453), Federal Route N/A, State Route No. 133, prepared by Street Smarts, dated July 30, 2006;
- **Approved Project Concept Report** prepared by the Department of Transportation, State of Georgia, Office of Preconstruction for the SR 133 Widening from Pauline Church Road/CR 10 to Old Quitman Road/CR 1, Project Number STP-0000-00(544), P. I. No. 0000544, Brooks County, dated March 23, 2006;
- **Half Size Drawings of Plan and Profile** of proposed S.R. 133 from C.R. 10 to CR 1, Governor's Road Improvement Program Project, STP-0000-00(544), Brooks County, State Route 133, P. I. No. 0000544 prepared by Wolverton & Associates, undated;
- **Approved Project Concept Report** prepared by the Department of Transportation, State of Georgia, Office of Preconstruction for the SR 133 Widening from Old Quitman Road/CR 1 to Old Berlin Road/CR 256, Project Number STP-0000-00(545), P. I. No. 0000545, Brooks-Colquitt Counties, dated March 23, 2006;
- **Half Size Drawings of Plan and Profile** of proposed S.R. 133 Widening from Old Quitman Road to Old Berlin Road, STP-0000-00(545), Brooks County, P. I. No. 0000545, Federal Route No. N/A, State Route 133, prepared by Wolverton & Associates, print date September 19, 2006;
- **Approved Project Concept Report** prepared by the Department of Transportation, State of Georgia, Office of Preconstruction for the SR 133 Widening from Old Berlin Road/CR 256 to Hawthorne Road/CR 388, Project Number STP-0000-00(546), P. I. No. 0000546, Colquitt County, dated March 23, 2006;
- **Half Size Drawings of Plan and Profile** of proposed S.R. 133 Widening from Old Berlin Road to Hawthorne Road, STP-0000-00(546), Colquitt County, P. I. No. 0000546, Federal Route No. N/A, State Route No. S.R. 133, prepared by Wolverton & Associates, print date September 19, 2006;
- **Approved Project Concept Report** prepared by the Department of Transportation, State of Georgia, Office of Preconstruction for the SR 133 Widening from Hawthorne Road to SR 35 (E. Moultrie Bypass), Project Number STP-032-2(28), P. I. No. 431780, Colquitt County, dated March 23, 2006;
- **Half Size Drawings of Plan and Profile** of proposed SR 133 Widening from Hawthorne Road to SR 35 (E. Moultrie Bypass) Colquitt County, STP-032-2(28), Federal Route No. N/A, State Route No. 133, Georgia D.O.T. P.I. No. 431780, prepared by Columbia Engineering, print date September 19, 2006;
- **1:200 Scale Aerial of SR133 GRIP Corridor from Valdosta to Moultrie, STP-0000-00(543)**, P.I. # 0000543, Brooks County, Troupville Road (CR 276) to Pauline Church Road (CR 10), prepared by Woverton & Associates, print date September 25, 2006;
- **1:200 Scale Aerial of SR133 GRIP Corridor from Valdosta to Moultrie, STP-0000-00(544)**, P.I. # 0000544, Brooks County, Pauline Church Road (CR 10) to Old Quitman Road (CR 1), prepared by Woverton & Associates, print date September 25, 2006;
- **1:200 Scale Aerial of SR133 GRIP Corridor from Valdosta to Moultrie, STP-0000-00(545)**, P.I. # 0000545, Brooks and Colquitt Counties, Old Quitman Road (CR 1) to Old Berlin Road (CR 256), prepared by Woverton & Associates, print date September 25, 2006;

- **1:200 Scale Aerial of SR133 GRIP Corridor from Valdosta to Moultrie, STP-0000-00(546)**, P.I. # 0000546, Colquitt County, Old Berlin Road (CR 256) to Hawthorne Road (CR 388), prepared by Woverton & Associates, print date September 25, 2006;
- **1:200 Scale Aerial of SR133 GRIP Corridor from Valdosta to Moultrie, STP-032-2(28)**, P.I. # 431780, Colquitt County, Troupville Road (CR 276) to Pauline Church Road (CR 10), prepared by Woverton & Associates, print date September 25, 2006;
- **Engineering Service Let Status** for 0000543 run date of June 12, 2006;
- **Engineering Service Let Status** for 0000544 run date of June 12, 2006;
- **Engineering Service Let Status** for 0000545 run date of June 12, 2006;
- **Engineering Service Let Status** for 0000546 run date of June 12, 2006;
- **Engineering Service Let Status** for 431720 run date of June 12, 2006;
- **General Highway Map,** Brooks County, Georgia; prepared by the Department of Transportation, Division of Planning and Programming, Planning Data Services in cooperation with the U.S. Department of Transportation, Federal highway Administration; dated 1987; and
- **General Highway Map,** Colquitt County, Georgia; prepared by the Department of Transportation, Division of Planning and Programming, Planning Data Services in cooperation with the U.S. Department of Transportation, Federal highway Administration; dated 1981.

Function Identification and Analysis Phase

Based on historical and background data, a cost model and graphic function analysis were developed for this project by major construction elements. They were used to distribute costs by project element; serve as a basis for alternative functional categorization; and to assign worth to the categories, where worth is the least cost to provide the required function, as determined by the VE team. The VE team identified the functions of the various project elements and subsystems by using random function generation techniques resulting in the attached Random Function Analysis worksheet and/or Function Analysis Systems Technique (F.A.S.T.) diagram.

Speculation Phase

This VE study phase involved the creation and listing of ideas. Creative idea worksheets were organized by project element. During this phase, the VE team developed as many ideas as possible to provide the necessary functions within the project at a lower cost to the owner, or to improve the quality of the project. Judgment of the ideas was restricted at this point. The VE team was looking for a large quantity of ideas and association of ideas.

GDOT representatives may wish to review the creative list since it may contain ideas that can be further evaluated for potential use in the design.

Evaluation Phase

During this phase of the workshop, the VE team judged the ideas generated during the speculation phase. Advantages and disadvantages of each idea were discussed to find the best ideas for development. Ideas found to be irrelevant or not worthy of additional study were discarded. Those that represented the greatest potential for cost savings or improvement to the project were then developed further.

The VE team would like to develop all ideas, but time constraints usually limit the number that can be developed. Therefore, each idea was compared with the present schematic design concepts, in terms of how well it met the design intent. Advantages and disadvantages were discussed, and each team member rated the ideas on a scale of zero to five, with the best ideas rated five. Total scores were summed for each idea and

only highly-rated ideas were developed into alternatives. In cases where there was little cost impact, but an improvement to the project was anticipated, the designation DS, for design suggestion, was used. The design team should review this listing for possible incorporation of ideas into the project.

The creative listing was re-evaluated frequently during the process of developing alternatives. As the relationship between creative ideas became more clearly defined, their importance and ratings may have changed, or they may have been combined into a single alternative. For these reasons, some of the originally high-rated items may not have been developed into alternatives.

Development Phase

During the development phase, each highly rated idea was expanded into a workable solution. The development consisted of a description of the alternative, life cycle cost comparisons, where applicable, and a descriptive evaluation of the advantages and disadvantages of the proposed alternatives. Each alternative was written with a brief narrative to compare the original design to the proposed change. Sketches and design calculations, where appropriate, were also prepared in this part of the study. The VE alternatives are included in the section entitled *Study Results*.

Presentation Phase

The last phase of the VE study is to present the findings of the study. GDOT conducts the presentation internally upon receipt of the report. The VE alternatives were screened by the VE team before draft copies of the *Summary of Potential Cost Savings* worksheets were provided to GDOT representatives. The VE alternatives were arranged in the same order as the idea listing sheets to facilitate cross-referencing.

POST-WORKSHOP EFFORT

The post-study portion of the VE study includes the preparation of this Value Engineering Study Report. Personnel from GDOT and the design firms will analyze each alternative and prepare a short response, recommending either incorporating the alternative into the project, offering modifications before implementation, or presenting reasons for rejection. Lewis & Zimmerman Associates, Inc. is available at your convenience as you review the alternatives. Please do not hesitate to call on us for clarification or further information as you consider an implementation approach.

VALUE ENGINEERING STUDY AGENDA

Lewis & Zimmerman Associates, Inc. (LZA) will conduct a 24-hour Value Engineering (VE) study on the **STP-0000-00(543) / (544) / (545) / (546) and STP-032-2(28), P. I. Nos. 0000543 / 0000544 / 0000545 / 0000546 and 431780, Widening and Reconstruction of State Route (SR) 133 from Troupeville Road to the East Moultrie Bypass** projects located in Brooks and Colquitt Counties, Georgia. It is expected the owner, the Georgia Department of Transportation (GDOT) and the design team of Wolverton & Associates (W&A) will be available to make a formal presentation concerning the project at the beginning of the workshop and be available to answer questions during the VE study effort.

VE Study Agenda

The VE study will follow the outline described below and be conducted September 27 - 29, 2006. The study will be conducted in Room 344, Planning Design Room in GDOT's General Office located at No. 2 Capitol Square Street, Atlanta, Georgia 30334. The point-of-contact is Ms. Lisa L. Myers, Design Review Engineer Manager, who can be reached at 404-651-7468.

Wednesday, September 27th

9:00 am – 9:15 am **General Introduction of all Parties and review of the VE Process**

9:15 am - 11:15 am **Owner's / Designer's Presentation**

GDOT is to present information concerning the project including, but not necessarily limited to: rationale for design; criteria for specific areas of study; project constraints and the reasons for design decisions.

11:15 am - 12:00 noon **Commence Function Analysis Phase**

The VE team will continue their familiarization with the cost models and project data for each area of study. The cost model(s) will be refined, as necessary; define the function of each project element or system in the cost model, select the primary or basic functions, and determine the worth, or least cost, to provide the function. Cost / worth or value index ratios will be calculated, and high cost / low worth areas for study identified. In addition, the VE team will continue defining the function of each element / system to gain a thorough understanding of the project's needs and requirements.

12:00 noon - 1:00 pm **Lunch**

1:00 pm - 5:00 pm **Conclude the Function Analysis Phase and Commence the Creative Phase**

The VE team will conduct a brainstorming session and list as many ideas as possible for consideration. The aim is to obtain a large quantity of ideas through free association, by eliminating roadblocks to creativity and deferring judgment.

Thursday, September 28th

8:30 am - 10:00 am **Conclude Creative Phase and Complete Evaluation / Analytical Phase**

Thursday, September 28th (Continued)

The VE team will analyze the ideas listed in the creative phase and select the best ideas for further development.

10:00 am - 12:00 noon **Development Phase**

VE team will develop creative ideas into alternate design solutions. Initial and life cycle cost estimates comparing original and proposed alternatives will be prepared. Selected alternatives for change will be developed and supported with sketches, calculations and written substantiation.

12:00 noon - 1:00 pm **Lunch**

1:00 pm - 5:00 pm **Continue Development Phase**

Friday, September 29th

8:30 am - 12:00 am **Continue Development Phase**

12:00 noon - 1:00 pm **Lunch**

1:00 pm - 4:00 pm **Conclude Development Phase and Commence Summary Worksheets**

Upon completion of the Development Phase, the VE facilitator will commence preparation of the summary worksheets based on the alternatives developed by the VE team. The summary work sheets form the basis of the informal oral presentation.

4:00 – 5:00 pm **Finalize Summary Worksheets**

The VE team will provide draft copies of the *Summary of Potential Cost Savings* worksheets to GDOT representatives and be available to clarify any points.

VALUE ENGINEERING WORKSHOP PARTICIPANTS

The VE team was organized to provide specific expertise on the unique project elements involved. Team members consisted of a multidisciplinary group with professional design experience and a working knowledge of VE procedures. The VE team included the following professionals:

Keith Strickland, PE	Transportation Engineer	HNTB
Lawrence D. Prescott, PE	Structural/Bridge Engineer	HNTB
Jeffery G. Dingle, PE	Construction Specialist	Delon Hampton and Associates
Paresh Parikh, PE	Transportation Engineer	Delon Hampton and Associates
Luis M. Venegas, PE, CVS	Value Engineering Facilitator	Lewis & Zimmerman Assoc.

OWNER'S/DESIGNER'S PRESENTATION

GDOT along with the three design consultant firms presented an overview of the projects on Wednesday, September 27, 2006. The purpose of this meeting was to bring the VE team up-to-speed regarding the overall project. Additionally, the meeting afforded the design team the opportunity to highlight in greater detail, those areas of the project requiring additional or special attention.

VALUE ENGINEERING TEAM'S FINAL PRESENTATION

The VE team did not conduct a final, oral presentation on Friday, September 29, 2006 to GDOT; however, copies of the draft *Summary of Potential Cost Savings* worksheets were provided for interim use by GDOT personnel.

A copy of the meeting participants is attached for reference.

VALUE ENGINEERING ATTENDEES

MEETING PARTICIPANTS

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

DATE: **SEPTEMBER 27 - 29, 2006**

NAME & E-MAIL (PLEASE PRINT)	ORGANIZATION/TITLE	PHONE/FAX
James (Mag) Magnus, CPESC	State of Georgia Department of Transportation (GDOT) Office of Construction	ph: 404-656-5306 cell:
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Karyn M. Matthews, EIT	GDOT Office of Consultant Design, Program Delivery	ph: 404-656-5404 cell:
em: karyn.matthews@dot.state.ga.us	Assistant Project Manager	fx: 404-657-6136
Gerald (Jerry) A. Milligan	GDOT, Office of Right of Way	ph: 770-986-1541 cell:
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John (Jack) T. Muirhead	GDOT, Office of Bridge Design	ph: 404-656-5197 cell:
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Lisa L. Myers	GDOT, General Office	ph: 404-651-7468 cell:
em: lisa.myers@dot.state.ga.us	Design Review Engineer Manager, Value Engineering Coordinator	fx: 404-463-6131
Nabil Raad	GDOT, Office of Traffic Safety and Design	ph: 404-635-8126 cell:
em: m.nabil.raad@dot.state.ga.us	Traffic Operations Design Review and Concept Engineer	fx: 404-635-8116
Paul Cook, PE	Columbia Engineering, Inc.	ph: 770-925-0357 cell: 404-394-7222
em: pcook@columbia-enineering.com	Vice President / Project Manager	fx:
James (Jim) B. Cranford, Jr., PE	Cranston, Robertson & Whitehurst, P.C.	ph: 706-722-1588 cell: 706-799-5717
em: jbcranford@crwpc.com	Vice President / Project Manager	fx: 706-722-8379
William Dial, PE	Street Smarts	ph: 770-813-0882 cell:
em: williamd@streetsmarts.us	Project Manager	fx: 770-813-0688
Joseph (Joe) R. Macrina, PE	Wolverton & Associates, Inc.	ph: 770-447-8999 cell: 404-291-4201
em: joe.macrina@woverton-assoc.com	Vice President / Project Manager	fx: 770-447-9070

VALUE ENGINEERING ATTENDEES

MEETING PARTICIPANTS

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

DATE: **SEPTEMBER 27 - 29, 2006**

NAME & E-MAIL (PLEASE PRINT)	ORGANIZATION/TITLE	PHONE/FAX
Mario V. Macrina, PE em: joe.macrina@woverton-assoc.com	Wolverton & Associates, Inc. Transportation Department	ph: 770-447-8999 cell: fx: 770-447-9070
Jeffery G. Dingle, PE em: jdingle@delonhampton.com	Delon Hampton & Associates, Chartered Vice President, Southern Regional Office/ Construction Specialist and Transportation Engineer	ph: 404-524-8030 cell: 404-427-0155 fx: 404-524-2575
Paresh J. Parikh, PE em: pparikh@delonhampton.com	Delon Hampton & Associates, Chartered Manager, Engineering Services/ Transportation Engineer	ph: 404-524-8030 cell: fx: 404-524-2575
Lawrence (Larry) Prescott, Jr., PE em: lprescott@hntb.com	HNTB Corporation Director of Structural Engineering	ph: 404-946-5743 cell: 770-231-8579 fx: 404-841-2820
Keith Strickland, PE em: kstrckland@hntb.com	HNTB Corporation Director of Traffic Engineering	ph: 404-946-5744 cell: fx: 404-841-2820
Luis M. Venegas, PE, CVS-Life, LEED® AP em: lvenegas@lza.com	Lewis & Zimmerman Associates, Inc. VE Facilitator	ph: 770-992-3032 cell: 678-488-4287 fx: 770-435-2666
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ECONOMIC DATA

The VE team developed economic criteria used for evaluation with information gathered from the State of Georgia Department of Transportation and the Wolverton & Associates, Inc. design team. To express costs in a meaningful manner, the VE team alternatives are presented on the basis of discounted present worth. Criteria for planning project period interest rates are based on the following parameters:

Year of Analysis:	**2006**
Construction Start Up:	**2008** (28) and **2010** (for 543, 544, 545, and 546)
Construction Duration:	±**24** Months per Contract (between 2010 - 2012)
Economic Planning Life: Economic Planning Life:	**35** years for Pavement **50** years for Bridges
Discount Rate / Interest:	**1.95%** (for 28) and **2.15%** (for 543, 544, 545, and 546) (Interpolated from the latest United States Office of Management and Budget Circular A-94)
Inflation / Escalation Rate:	**5.00%** per annum (Per GDOT)
Uniform Present Worth (UPW) Factor:	**26.6408** for 35 years **34.2385** for 50 years
Composite Mark-Up (Construction) for 543, 544, 545, and 546 *(Composed of: Inflation at 21.55% based 5.00% per annum for four years, and Engineering and Construction at 10.00 %.)*	**33.71%** (1.3371)
Composite Mark-Up (Construction) for (28): *(Composed of: Inflation at 10.25% based 5.00% per annum for two years, and Engineering and Construction at 10.00 %.)*	**21.28%** (1.3371)
Composite Mark-Up (Right-of-Way): *(Composed of: Scheduling Contingency at 55.00%; Administration / Court Costs at 60.00%; and Inflation Factor at 40.00 %.)*	**247.20%** (2.4720)

COST ESTIMATE SUMMARY AND COST HISTOGRAMS

The VE team prepared several cost models for the project that is included following this page. The cost models are arranged in the Pareto Charting/Cost Histogram format to aid in identifying high cost areas and are based on *Preliminary Cost Estimates* prepared by Wolverton & Associates, Inc. As can be expected, judgments at this stage of the study are based on experience and intuition rather than facts, which are not uncovered until well along in the analysis of function. As a result of these qualified hypotheses, there appears to be a potential for initial savings in the following areas:

- Pavement Roadway;
- Drainage;
- Earthwork;
- Temporary Erosion Control; and
- Lump Items.

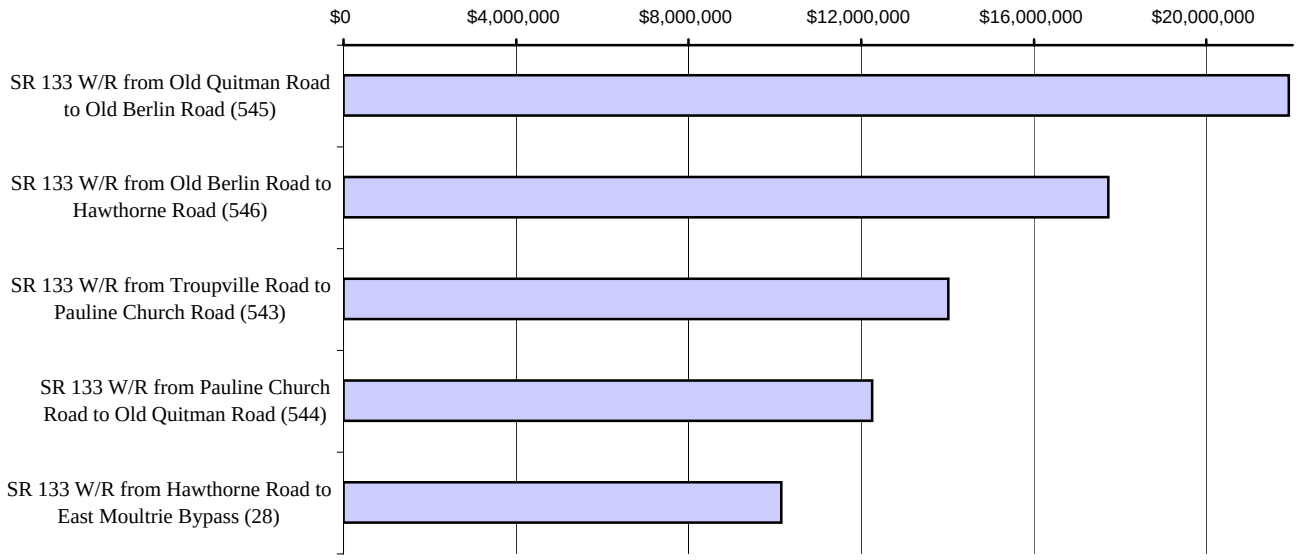
DESIGNER'S COST ESTIMATE

The cost estimates, as described above, contained sufficiently detailed information to perform a VE when considering the current, preliminary level of design.

COST HISTOGRAM

Project: **STP-0000-00(543)/(544)/(545)/(546)/ and STP-032-2(28), P.I. Nos. 0000543/544/545/546 & 431720**
WIDENING AND RECONSTRUCTION OF SR 133
Preliminary Development Stage

TOTAL - BY PROJECTS		COST	PERCENT	CUM. PERCENT
SR 133 W/R from Old Quitman Road to Old Berlin Road (545)		21,929,928	28.80%	28.80%
SR 133 W/R from Old Berlin Road to Hawthorne Road (546)		17,746,439	23.31%	52.11%
SR 133 W/R from Troupville Road to Pauline Church Road (543)		14,040,519	18.44%	70.55%
SR 133 W/R from Pauline Church Road to Old Quitman Road (544)		12,265,842	16.11%	86.66%
SR 133 W/R from Hawthorne Road to East Moultrie Bypass (28)		10,156,208	13.34%	100.00%
Construction Subtotal		**$ 76,138,936**	**100.00%**	
Inflation at 5.00% per annum for 4 years 543, 544, 545, 546	21.55%	$ 14,219,690		
Inflation at 5.00% per annum for 2 years for 28	10.25%	$ 1,041,011		
Engineering and Construction @	10.00%	$ 9,139,964	**Construction**	
Construction Total		**$ 100,539,601**	Mark-Up:	32.05%
Net Right-of-Way (543)		$ 594,038		
Net Right-of-Way (544)		$ 360,023		
Net Right-of-Way (545)		$ 792,051		
Net Right-of-Way (546)		$ 576,037		
Net Right-of-Way (28)		$ 582,553		
Net Right of Way Subtotal		**$ 2,904,702**		
Right-of-Way Scheduling Contingency	55.00%	$ 1,597,586		
Right-of-Way Administration / Court Costs	60.00%	$ 2,701,373		
Right-of-Way Inflation Factor	40.00%	$ 2,881,464	**ROW**	
Right of Way Total		**$ 10,085,125**	Mark-Up:	247.20%
Reimbursable Utilities (543)		$ 1,352,500		
Reimbursable Utilities (544)		$ 577,500		
Reimbursable Utilities (545)		$ 2,512,500		
Reimbursable Utilities (546)		$ 15,000		
Reimbursable Utilities (28)		$ 180,000		
Reimbursable Utilities Total		**$ 4,637,500**		
GRAND TOTAL		**$ 115,262,227**		

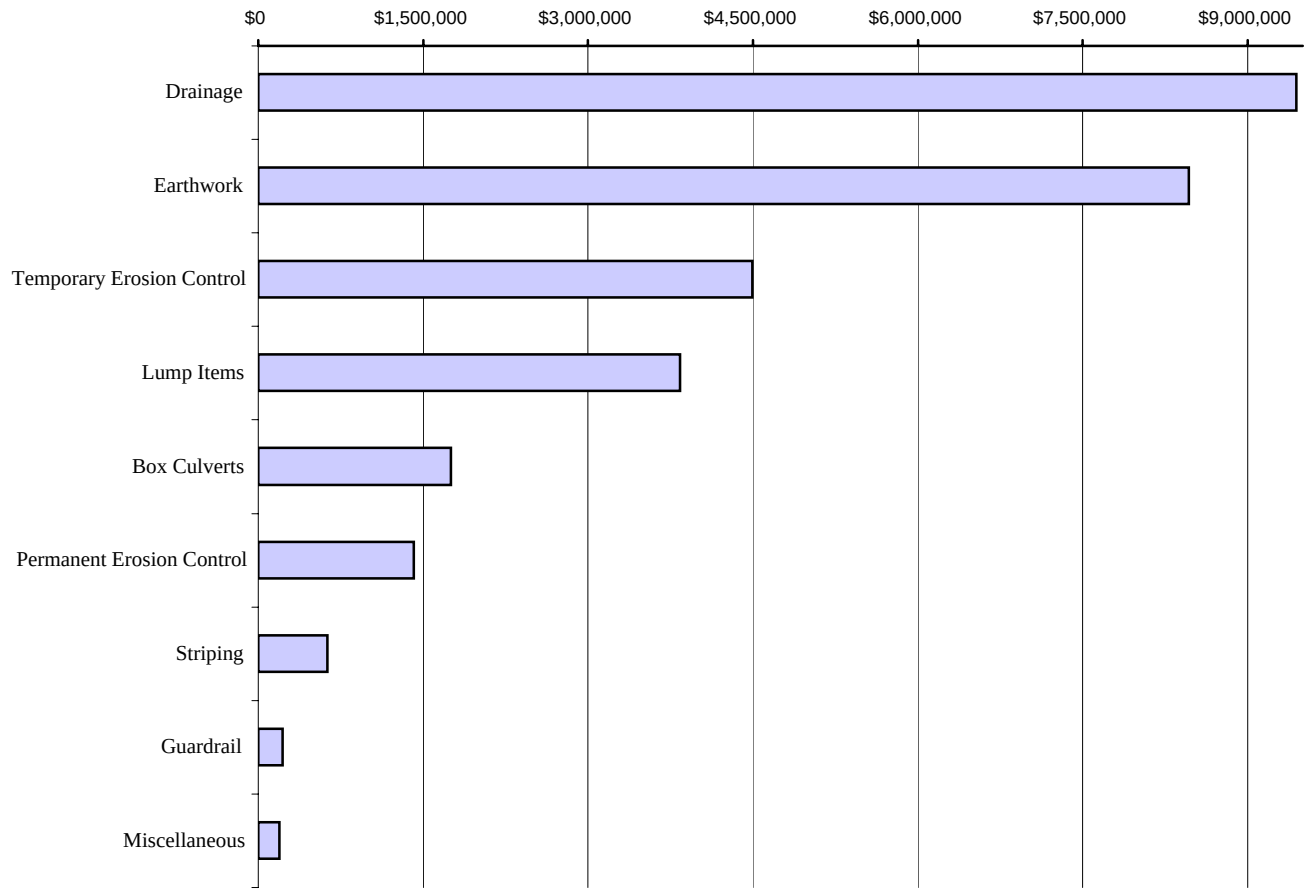


Costs in graph are not marked-up.

COST HISTOGRAM

Project: **STP-0000-00(543)/(544)/(545)/(546)/ and STP-032-2(28), P.I. Nos. 0000543/544/545/546 & 431720**
WIDENING AND RECONSTRUCTION OF SR 133
Preliminary Development Stage

TOTAL - BY CONSTRUCTION ELEMENTS	COST	PERCENT	CUM. PERCENT
Permanent Roadway	45,639,885	59.94%	59.94%
Drainage	9,448,122	12.41%	72.35%
Earthwork	8,470,000	11.12%	83.48%
Temporary Erosion Control	4,501,182	5.91%	89.39%
Lump Items	3,844,771	5.05%	94.44%
Box Culverts	1,760,135	2.31%	96.75%
Permanent Erosion Control	1,419,952	1.86%	98.61%
Striping	635,255	0.83%	99.45%
Guardrail	224,568	0.29%	99.74%
Miscellaneous	195,066	0.26%	100.00%
Construction Subtotal	**$ 76,138,936**	**100.00%**	



Costs in graph are not marked-up.

FUNCTION ANALYSIS

A function analysis was performed to: (1) define the requirements for each project element, and (2) to ensure a complete and thorough understanding by the VE team of the basic function(s) needed to attain a given requirement. *Random Function Analysis* worksheets for the project are attached. This part of the function analysis stimulated the VE team members to think in terms of the areas in which to channel their creative idea development.

Function Analysis is a means of evaluating a project to see if the expenditures actually perform the requirements of the project, or if there are disproportionate amounts of money spent on support functions. These elements add cost to the final product, but have a relatively low worth to the basic function.

In addition to the random function analysis, the VE Facilitator worked with members of the study team to develop a Function Analysis System Technique (F.A.S.T.) diagram for each phase. The F.A.S.T. diagrams were used to show the flow of function within the phases. It helps to confirm the project is addressing those issues that have been voiced by the owner as being important. The diagrams were generated by asking the key question: "What is the most important function to be accomplished by this phase?" The answer is characterized by a verb/noun pair. In turn, another question is asked: "Why?" The answer is again listed in a verb/noun pair, and the process continued from left to right. The flow of functions from right to left will answer the question "How?"

This F.A.S.T. diagram notes the critical function paths and identifies the project's basic functions as **PROMOTE/DEVELOPMENT** and **ACCOMMODATE/GROWTH** by **Continuing/G.R.I.P.** by **Improving/Traffic Operations**, **Accommodating/Special Events** and **Maintaining/Route Continuity**. The F.A.S.T. diagram is included at the end of this section of the report.

RANDOM FUNCTION ANALYSIS

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

SHEET NO.: **1 of 1**

DESCRIPTION	FUNCTION		
	VERB	NOUN	KIND
Widening and Reconstruction of SR 133 Troupville Road to the East Moultrie Bypass	Improve	Safety	RS
	Improve	**Level of Service**	**B**
	Increase	Capacity	S
	Move	Goods / People	HO
	Widen	Facility	RS
	Facilitate	Turning Movements	RS
	Reconstruct	Intersections	RS
	Span	Streams	RS
	Accommodate	Growth	
	Promote	Development	
	Accommodate	Special Events	
	Spread	Infrastructure Funding	
	Correct	Deficiencies	
	Manage	Storm Water	
	Maintain	Route Continuity	

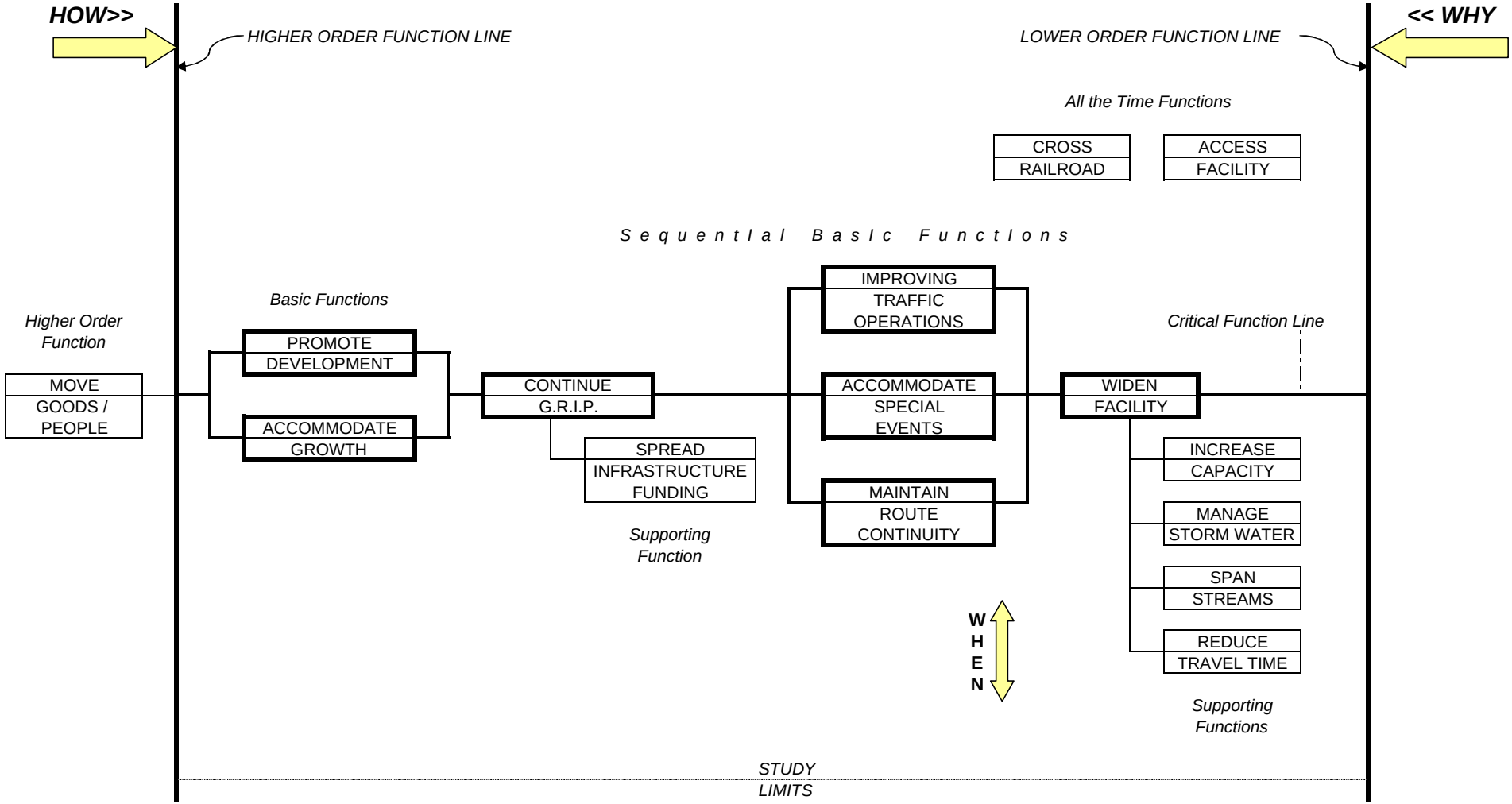
Function defined as: Action Verb, Measurable Noun

Kind: B = Basic; S = Secondary; RS = Required Secondary; HO = Higher Order; LO = Lower Order; O = Objective; G = Goal; U = Unwanted

FUNCTION ANALYSIS SYSTEMS TECHNIQUE (F. A. S. T.)

WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS

Georgia Department of Transportation, District 4



CREATIVE IDEA LISTING AND JUDGMENT OF IDEAS

During the speculation phase, numerous ideas, alternative proposals, and/or recommendations were generated using conventional brainstorming techniques as recorded on the following pages. These ideas were then discussed and the advantages/disadvantages of each listed. The VE design team compared each of the ideas with the concept solution determining whether it improved value, was equal in value, or lessened the value of the solution.

The ideas were then ranked on a scale of 1 to 5 on how well the VE design team believed the idea met necessary criteria and program needs. The higher rated ideas were then developed into formal alternatives and included in the VE workshop. Some ideas were judged to have minimal cost impacts on the project but provided enhancements in the form of improved operations, efficiency, constructibility or potential to save unknown or hidden costs. These were given the designation "DS" which indicates a design suggestions. This designation is also used when an idea is difficult to price but improves the functionality of the project or system, and is deemed to be of significant value to the owner, user, operator or designer.

Typically, all ideas rate 4 or above are included in the Study Report. When this is not the case, an idea was combined with another related idea or discarded, as a result of additional research that indicated the concept as not being cost-effective or technically feasible.

All readers are encouraged to review the *Creative Idea Listing and Evaluation* worksheets since they may suggest additional ideas that can be applied to the design.

CREATIVE IDEA LISTING

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

SHEET NO.: **1 of 3**

NO.	IDEA DESCIRPTION	RATING
STP-0000-00(543), PI No. 0000543, Widen SR 133 from Troupville Road (CR 276) to Pauline Church Road (CR 10) (543-x)		
543-1	Only build the first three miles of the SR 133 through Troupville	5
543-2	Selectively minimize access in Troupville	3+
543-3	Selectively close median openings (Combine with No. 543-4 and 543-5)	4
543-4	Minimize the number of U-turn bump outs (Combine with No. 543-3 and 543-5)	4
543-5	Minimize the number of left turn lanes at median openings (Combine with No. 543-3 and 543-4)	4
543-6	Eliminate sidewalks (concrete only)	5
543-7	Use grassed medians	5
543-8	Minimize the extent of side road improvements beyond actual need	4
543-9	Use a five-lane section through Troupville	5
STP-0000-00(544), PI No. 0000544, Widen SR 133 from Pauline Church Road (CR 10) to Old Quitman Road (CR 1) (544-x)		
544-1	Only build the portion through Morven	5
544-2	Selectively minimize access in Morven	3+
544-3	Selectively close median openings (Combine with No. 544-4 and 544-5)	4
544-4	Minimize the number of U-turn bump outs (Combine with No. 544-3 and 544-5)	4
544-5	Minimize the number of left turn lanes at median openings (Combine with No. 544-3 and 544-4)	4
544-6	Minimize the extent of side road improvements beyond actual need	4
544-7	Use a five-lane section through Morven	5
544-8	Eliminate intersection by using a cul-de-sac at Hitch Street	4
544-9	Use arched span structures at Downing and Jones Creeks	4
544-10	Assure mainline railroad crossing is complete prior to closing five other city railroad crossings	DS

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

CREATIVE IDEA LISTING

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

SHEET NO.: **2 of 3**

NO.	IDEA DESCIRPTION	RATING
STP-0000-00(545), PI No. 0000545, Widen SR 133 from Old Quitman Road (CR 1) to Old Berlin Road (CR 256) (545-x)		
545-1	Only improve the intersections at SR 133 / SR 333 and SR 133 / CR 256	5
545-2	Selectively close median openings (Combine with No. 545-3 and 543-4)	4
545-3	Minimize the number of U-turn bump outs (Combine with No. 543-2 and 543-4)	4
545-4	Minimize the number of left turn lanes at median openings (Combine with No. 543-2 and 543-3)	4
545-5	Minimize the extent of side road improvements beyond actual need	4
545-6	Use arched span structures at stream crossings	4
545-7	Use a 32-foot median section to minimize wetlands impact	5
545-8	Use grassed medians	5
STP-0000-00(546), PI No. 0000546, Widen SR 133 from Old Berlin Road (CR 256) to Hawthorne Road (CR 388) (546-x)		
546-1	Only build portions of through Berlin and eastern Moultrie	5
546-2	Selectively close median openings (Combine with No. 546-3 and 546-4)	4
546-3	Minimize the number of U-turn bump outs (Combine with No. 546-2 and 546-4)	4
546-4	Minimize the number of left turn lanes at median openings (Combine with No. 546-2 and 546-3)	4
546-5	Eliminate sidewalks (concrete only)	5
546-6	Use grassed medians	5
546-7	Minimize the extent of side road improvements beyond actual need	4
546-8	Use a five-lane section through Berlin and eastern Moultrie	5
546-9	Use arched span structures at stream crossings	4
546-10	Signalize South Vanderberg Drive entrance to the airport (Spence Field)	4

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

CREATIVE IDEA LISTING

PROJECT: **WIDENING AND RECONSTRUCTION OF SR 133 FROM TROUPVILLE ROAD TO THE EAST MOULTRIE BYPASS**
Preliminary Design Stage

SHEET NO.: **3 of 3**

NO.	IDEA DESCIRPTION	RATING
STP-032-2(28), PI No. 431720, Widen SR 133 from Hawthorne Road (CR 388) to the East Moultrie Bypass (SR 35) (28-x)		
28-1	Selectively minimize access in Moultrie	3+
28-2	Selectively close median openings (Combine with No. 28-3)	4
28-3	Minimize the number of U-turn bump outs (Combine with No. 28-2)	4
28-4	Eliminate sidewalks (concrete only) outside city limits	5
28-5	Use grassed medians outside city limits	5
28-6	Minimize the extent of side road improvements beyond actual need	4
28-7	Use a five-lane section through Moultrie	5
28-8	Connect new intersection at the Sanderson Farms Chicken Plant with Quail Run to eliminate the Old Moultrie – Adel Road / S. E. 5th Avenue intersection and signal	5

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