

# Value Engineering Study Report Project –STP-165-1(60) DeKalb County



## *Snarfinger Road, P.I. #721820*

*Preserve Roadway Integrity – Serviceability – Safety*

Value Management Team:

**PBS&J**

Design Team:  
**The LPA Group**

March 19, 2007



March 19, 2007

Ms. Lisa Myers  
Design Review Engineer Manager  
**Georgia Department of Transportation**  
#2 Capitol Square, Room 266  
Atlanta, GA 30334

RE: Submittal of the final Value Engineering Report  
STP-165-1(60) Snapfinger Road, Dekalb County  
PI No.: 721820  
PBS&J Project Task Order No. 5

Dear Ms. Myers:

Please find enclosed four (4) hard copies and a CD of our final Value Engineering Report for the Snapfinger Road Improvement, Dekalb County, as referenced above.

This Value Engineering Study, which was performed during the period March 5 through March 8, 2007, identified **8 Alternative Ideas** of which **6 are recommended for implementation**. The VE Team also identified **4 Design Suggestion Ideas** which is recommended for the Engineer to consider in his final design. We believe that the **6 Alternative Ideas** recommended, may have a significant positive affect on the project.

We trust that you will find this report to be in proper order. It should be noted that the results of this workshop are volatile in that they can be overcome by the events that accompany the expeditious continuance of the design process. Accordingly, we encourage an equally expeditious implementation meeting to design the disposition of the contents of this report.

On behalf of our VE Team, we thank you very much for this opportunity to work with you and the hard working staff of the Georgia Department of Transportation.

Yours truly,

**PBS&J**

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

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

# *Value Engineering Study Report*

## *STP-165-1(60) - Snapfinger Road DeKalb County, Georgia*

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## *Executive Summary*

# *Executive Summary*

## **INTRODUCTION**

This report summarizes the analysis and conclusions by the PBS&J Value Engineering workshop team as they performed a VE Study during the period of March 5 through 8, 2007 in Atlanta, Georgia for the Georgia Department of Transportation. The subject of the Value Engineering study was **STP-165-1(60) –Snapfinger Road**. The design is being performed by The LPA Group.

## **PROJECT DESCRIPTION**

The project is to widen 1.78 miles of the existing Snapfinger Road from Wesley Chapel Road to just southeast of Flat Shoals Parkway, Dekalb County, Georgia. Snapfinger Road will be widened from two lanes to four lanes with a raised median, bike lanes, curb and gutter and sidewalks.

The expected cost of this construction including right of way purchase is approximately \$25,562,000 dollars. More information about this project may be found in the tabbed section of this report entitled ***Project Description***.

## **VALUE ENGINEERING PROCESS**

The Value Engineering Team followed the Seven Step Value Engineering job plan as promulgated by Georgia Department of Transportation. This Seven Step Job Plan includes the following:

- Investigation
- Analysis
- Speculation
- Evaluation
- Development
- Recommendation
- Presentation

This report is a component of the Presentation Phase. As part of the VE workshop in Atlanta, the team made an informal presentation of their results on the last morning of the workshop. This report is intended to formalize the workshop results and set the stage for a formal implementation meeting in which alternatives and design suggestions will typically be accepted, accepted with modifications, or rejected for cause. The worksheet that follows, along with the formally developed alternatives and design suggestions can be used as a “score sheet” for the implementation meeting. It is also included in this report to identify, on a summary basis, the results of the workshop. The reader is encouraged to visit the tabbed section of this report entitled ***Study Results*** for a review of the details of the developed alternatives. The tabbed section ***Project Description*** includes information about the project itself and the tabbed section ***Value Engineering Process*** presents the detail process of the Value Engineering Study.

## **THE STUDY RESULTS**

During the speculation phase the VE Team identified **8 *Alternative Ideas*** that appeared to hold potential for reducing the construction cost, improving the end product and/or reducing the difficulty and time of project construction.

After the evaluation phase was completed, **6 *Alternative Ideas*** and **4 *Design Suggestions*** remained for further consideration. These Alternative Ideas and Design Suggestions may be found, in their documented form, in the section of this report entitled ***Study Results***. The following ***Summary of Alternatives and Design Suggestions*** coupled with the documentation of the developed alternatives should provide the reader with the information required to fully evaluate the merits of each of the alternatives.

March 8, 2007

SUMMARY OF ALTERNATIVES & DESIGN SUGGESTIONS

FINAL DISPOSITION

Georgia Department of Transportation  
 STP-165-1(60) Snapfinger Road  
 P.I. Number: 721820 DeKalb County

Alternative Number	Description of Alternative	Initial Cost Savings	Implemented Cost Savings/Disposition	FINAL DISPOSITION
AP-1	Remove bike lanes from travel lane areas and relocate with the sidewalks as 8' multi-use paths.	\$255,759.00		
AP-2	Selectively retain the existing pavement between Sta. 17+00 to Sta. 29+00	\$227,801.00		
AP-4	Re-align Thompson Mill Rd to align with new subdivision entrance	DS		DS
AP-5	Delete Pebble Dr. to Snapfinger Road access using a cul-de-sac	\$127,676.00		DS
AP-6	Widen Pebble Drive to Huntsman Bend	DS		DS
AP-7	Decrease all travel and turn lanes to 11' width; and use 17' medians.			
AP-8	Delete Post Office Drive.	\$1,858,387.00		
AP-9	From Sta. 10+00 to approximately Sta. 26+00, retain existing roadway as is and add multi-use paths for pedestrians and bikes.	\$446,020.00		
AP-10	From Sta. 83+00 to Wesley Chapel Road, re-align new roadway to existing Southwesterly R/W. Provide intersection opening for existing shopping center and post office at easterly property line of Snapfinger Plaza.	\$1,788,396.00		DS
SW-1	Delineate the probable locations for under drains. Stipulate conditions under which under drains would be used.			DS

## *Study Results*

# *Study Results*

## **Introduction**

This section includes the study results presented in the form of fully developed value engineering alternatives that include descriptions of the original design, description of the alternative design configurations, comments on the technical justifications, opportunities and risks associated with the alternatives, sketches, calculations and technical justification for these alternatives. For the most part, these fully developed alternatives represent an array of choices that clearly could have an impact on the eventual cost and performance of the finished project.

The documented alternatives also include Design Suggestions. As their name implies, these are short write-ups making note of VE perspectives on technical issues and sharing some thoughts for consideration as the design moves forward.

This introductory sheet is followed by a *Summary of Alternatives & Design Suggestions* table which provides the reader with the listing of the developed alternatives and design suggestions and an indication of their potential cost impact on the project. This table may also be used as a “score sheet” during an implementation meeting if desired. It should be noted that the alternatives that are included, which have cost estimates attached are not necessarily representative of the final cost outcome for each alternative. Some of these alternatives have components that are mutually exclusive so they may not be added together.

The users of this report are asked to consider these alternatives and design suggestions as a smorgasbord of choices for selection and use as the project moves forward..

## **Cost Calculations**

The cost calculations are intended only as a guide to the approximate results that might be expected from implementation of the alternatives. They should be helpful in making clear choices as to the pursuit of individual alternatives.

The composite mark-up of 10% for the construction cost comparisons was derived from the cost estimate for the project. This estimate can be found in the section of this report entitled *Project Description*.





March 8, 2007

SUMMARY OF ALTERNATIVES & DESIGN SUGGESTIONS

FINAL DISPOSITION

Georgia Department of Transportation  
 STP-165-1(60) Snapfinger Road  
 P.I. Number: 721820 DeKalb County

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AP-5	Delete Pebble Dr. to Snapfinger Road access using a cul-de-sac	\$127,676.00		DS
AP-6	Widen Pebble Drive to Huntsman Bend	DS		DS
AP-7	Decrease all travel and turn lanes to 11' width, and use 17' medians.			
AP-8	Delete Post Office Drive.	\$1,858,387.00		
AP-9	From Sta. 10+00 to approximately Sta. 26+00, retain existing roadway as is and add multi-use paths for pedestrians and bikes.	\$446,020.00		
AP-10	From Sta. 83+00 to Wesley Chapel Road, re-align new roadway to existing Southwesterly R/W. Provide intersection opening for existing shopping center and post office at easterly property line of Snapfinger Plaza.	\$1,788,396.00		DS
SW-1	Delineate the probable locations for under drains. Stipulate conditions under which under drains would be used.			DS

# Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION <b>Project No.: STP-165-1(60) –DeKalb County– P.I. Number:</b> <b>721820</b>	ALTERNATIVE NO.: AP-1
<b>Snapfinger Road</b>	
DESCRIPTION: <b>REMOVE BIKE LANES FROM TRAVEL LANES AND LOCATE WITH SIDEWALKS FOR A MULTI-USE 8’ PATH</b>	SHEET NO.: 1 of 5

**Original Design:**

The original design calls for the construction of 4 foot bike lanes, adjacent to the travel lanes, in both directions of Snapfinger Road.

**Alternative:**

This alternative design suggests to create an 8’ multi-use trails for pedestrians and bicyclist behind the new curbs. The shoulders would be increased from 12 foot to 15 foot to provide adequate space for the trails.

**Opportunities:**

- Reduce project construction time
- Reduce project costs
- Reduce motorists delays
- Extend the life of the pavement
- Increase SAFETY

**Risks:**

- Will require minor project redesign
- May delay project start for redesign time.

**Technical Discussion:**

The multi-use trails are in use in various portions of Dekalb county now. The multi-use trails offer flexibility in locations within new and or existing R/W and can be connected to other trails without being limited to the roadway. There are no bike lanes at either end of the project that would conflict with this alternative .

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 6,494,581	\$ 0	\$ 6,494,581
ALTERNATIVE	\$ 6,238,822	\$ 0	\$ 6,238,822
SAVINGS	\$ 255,759	\$ 0	\$ 255,759

# Illustrations



PROJECT: **STP-165-1(60) – Georgia Department of Transportation**  
**P.I. Number: 721820 Dekalb County**

ALTERNATIVE NO.:  
**AP 1**

DESCRIPTION: **REMOVE BIKE LANES FROM TRAVEL LANES AND  
LOCATE THEM WITH THE SIDEWALKS AS A MULTI-USE  
8' WIDE PATH**

SHEET NO.: 2 of 5



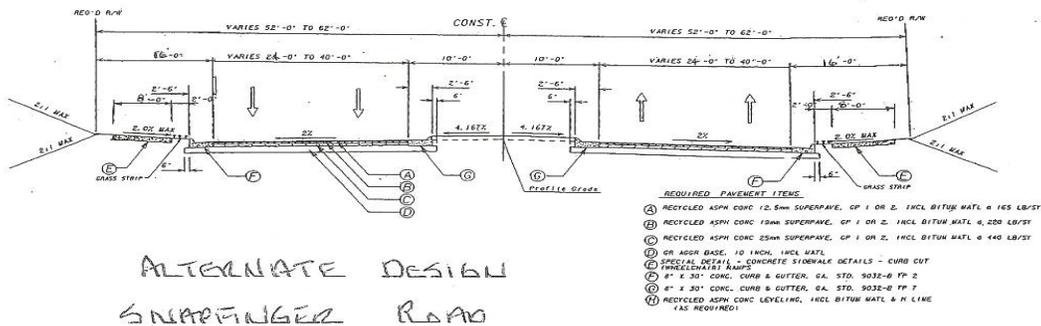
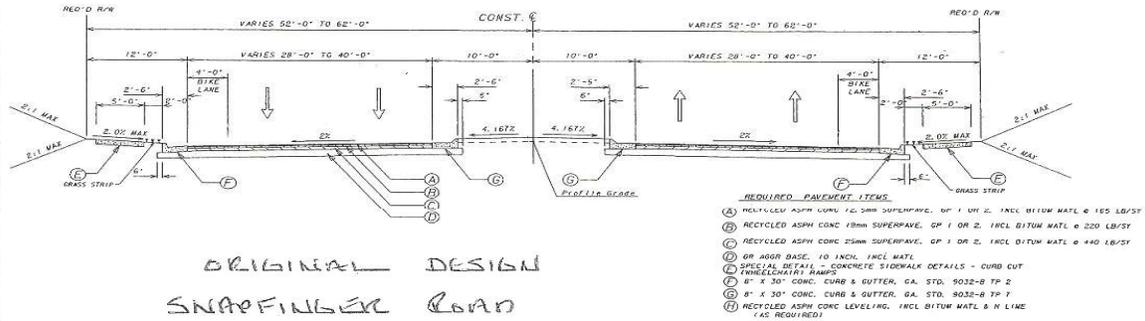
# Illustrations

**PBSJ**

PROJECT: STP-165-1(60) - Georgia Department of Transportation  
 P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP-1

DESCRIPTION: REMOVE BIKE LANES FROM TRAVEL LANES SHEET NO.: 3 of 5  
 LOCATE WITH SIDEWALKS FOR A MULTI-PURPOSE PARK



# Calculations



PROJECT: STP-165-1(60) - Georgia Department of Transportation  
P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP-1

DESCRIPTION: REMOVE BIKE LANES FROM TRAVEL LANES  
LOCATE WITH SIDEWALKS FOR A MULTI PURPOSE PATH

SHEET NO.: 4 of 5

BEGIN BIKE LANE - STA 9+92

END BIKE LANE - STA 106+18

TOTAL BIKE LANE LENGTH 9626 l.f.

TOTAL AREA OF BIKE LANES  $9626 \times 2 \times 4 \div 9 = 8556.54$

## TYPICAL SECTION - ROADWAY PAVEMENT

12.5 mm 165 #/yd<sup>2</sup>

19 mm 220 #/yd<sup>2</sup>

25 mm 440 #/yd<sup>2</sup>

GAB 10" DEPTH

## REDUCED QUANTITIES

12.5mm SUPERPAVE  $8556 \times 165 \div 2000 = 705 T$

19 mm SUPERPAVE  $8556 \times 220 \div 2000 = 941 T$

25mm SUPERPAVE  $8556 \times 440 \div 2000 = 1882 T$

GAB  $= 8556.54$

INSTALLATION OF MULTI-USE TRAIL WILL  
REQUIRE INCREASING THE WIDTH OF THE PROPOSED  
SIDEWALK FROM 5 FEET TO 8 FEET.

## INCREASED SIDEWALK QUANTITY

$9626 \text{ l.f.} \times 2 \times 3 \div 9 = 6417.54$

ELIMINATION OF BIKE LANES WOULD ELIMINATE  
NEED FOR STRIPING AND SYMBOLS.



# Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION

ALTERNATIVE NO.:

**Project No.: STP-165-1(60) –DeKalb County– P.I. Number:  
721820 Snapfinger Road**

**AP-2**

DESCRIPTION: **SELECTIVELY RETAIN EXISTING PAVEMENT FROM  
STA. 17+00 TO STA 29+00 NORTH BOUND**

SHEET NO.: 1 of 5

## Original Design:

The original design calls for the construction of full depth pavement from Sta 17+00 to the project termini at Sta 106+18. The existing pavement of Snapfinger Road located in the proposed north bound lanes between Sta 17+00 and Sta 29+00, is at an elevation lower than the proposed new grade.

## Alternative:

This alternative design suggests to install an asphaltic concrete leveling course to raise the grade of the existing pavement on Snapfinger Road to the elevation of the proposed recycled asphalt 19mm Superpave. At this time, the recycled 12.5 Superpave could be placed as originally designed.

## Opportunities:

- Reduce project construction time
- Reduce project costs
- Reduce motorists delays

## Risks:

- Will require minimal redesign
- Will combine typical section construction – full depth and overlay

## Technical Discussion:

A review of pavement appears to indicate a satisfactory pavement condition. Retaining the existing pavement and leveling would result in a satisfactory pavement. Additionally, the contract proposes retaining the existing and overlaying the project from Sta 6+41 to Sta 17+00.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 7,124,920	\$ 0	\$ 7,124,920
ALTERNATIVE	\$ 6,897,119	\$ 0	\$ 6,897,119
SAVINGS	\$ 227,801	\$ 0	\$ 227,801

# Illustrations

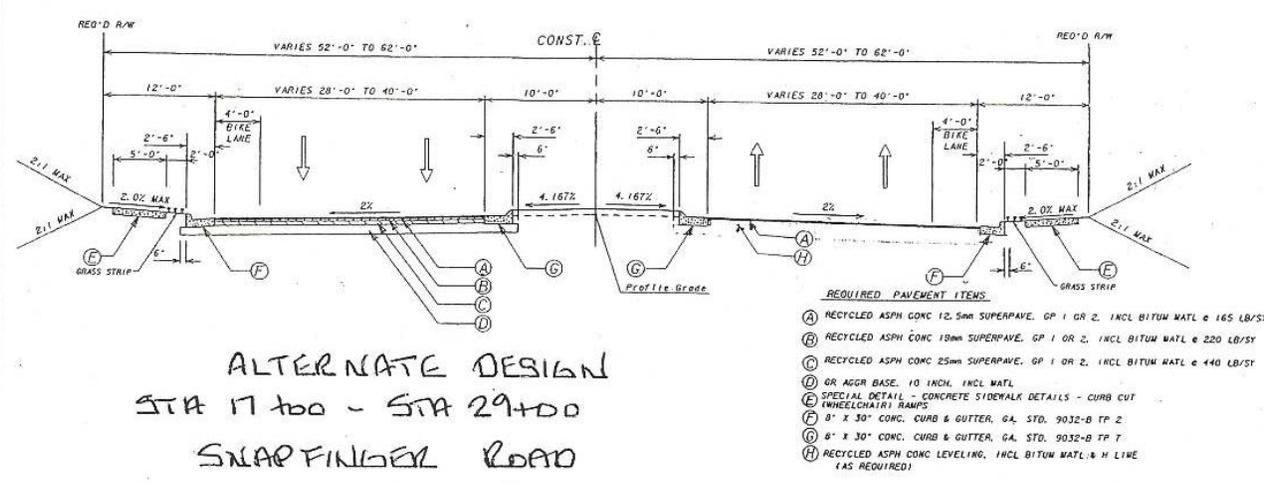
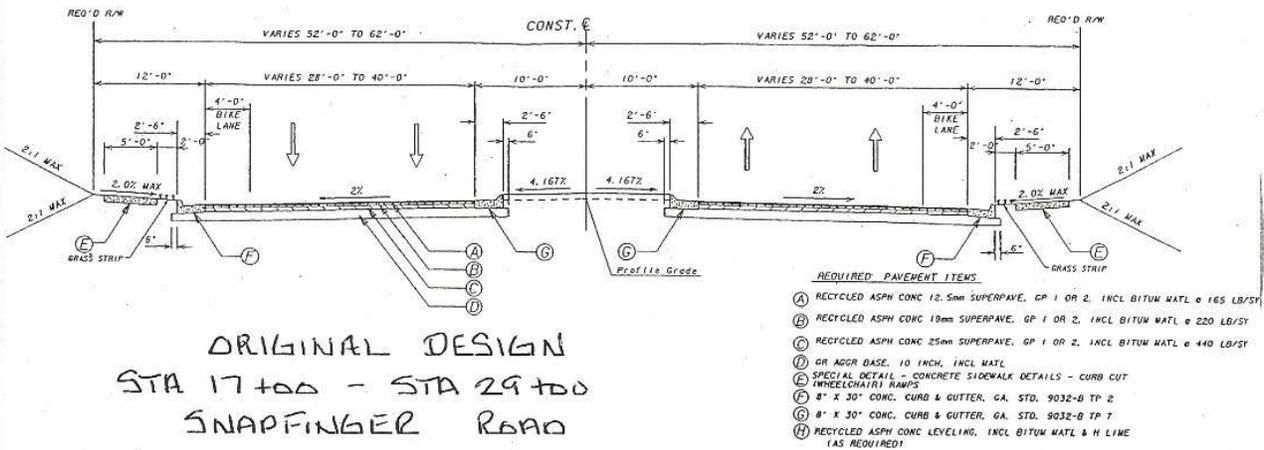


PROJECT: STP-165-1(60) – Georgia Department of Transportation  
 P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP-2

DESCRIPTION: SELECTIVELY KEEP EXISTING PAVEMENT FROM STA 17+00 TO STA 29+00 N/S

SHEET NO.: 2 of 5



# Calculations



PROJECT: STP-165-1(60) - Georgia Department of Transportation  
 P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP-2

DESCRIPTION: SELECTIVELY KEEP EXISTING  
 PAVEMENT FROM STA 17+00 TO STA 29+00 N/B

SHEET NO.: 3 of 5

## ELEVATION DIFFERENCE FROM EXISTING TO PROPOSED

STA	DIFF
17+00	1.03
+50	1.32
18+00	1.22
+50	1.23
19+00	1.18
+50	.86
20+00	.59
+50	.84
21+00	.42
+50	.37
22+00	.16
+50	.12
23+00	.18
+50	.17
24+00	.13
+50	.03
25+00	0
+50	.29
26+00	.69
+50	.98
27+00	.89
+50	.96
28+00	.94
+50	1.42
29+00	.73
TOTAL	16.73
AVE	0.67

AVERAGE LEVELING DEPTH BETWEEN

$$\text{STA 17+00 AND STA 29+00} = 0.67$$

REDUCE DEPTH OF LEVELING TO  
 TOP OF 19MM SUPERPAVE

$$0.67 - 0.12 = 0.55$$

AVE LEVELING DEPTH 0.55'

STA 17+00 - STA 29+00

$$1200 \text{ I.F.} \times 28 \text{ F} = 33600 \text{ SF}$$

$$= 3733.54$$

QUANTITY OF LEVELING INCREASE

$$0.55 \text{ ft depth} = 60 \text{ lb/4d}^2$$

$$3733.54 \times 60 \text{ lb/4d}^2 \div 2000 = 112 \text{ TN}$$

# Calculations



PROJECT: STP-165-1(60) - Georgia Department of Transportation  
P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP.2

DESCRIPTION: SELECTIVELY KEEP EXISTING PAVEMENT FROM STA 17+00 TO STA 29+00 NB

SHEET NO.: 4 of 5

CONSTRUCTION OF FULL DEPTH PAVEMENT SECTION WOULD REQUIRE REMOVAL OF EXISTING ASPHALT BY MILLING

AVERAGE MILLING COST IS \$1.00 PER SQ YD PER INCH DEPTH. PRICE TO REMOVE 1 1/2" OF EXISTING PAVEMENT = \$7.50 / YD<sup>2</sup>

STA 17+00 - STA 29+00 NORTHBOUND

$$1200 \times 28 = 9$$

$$= 3133 \text{ YD}^2$$

REDUCED  
BASE AND PAVEMENT QUANTITIES

GRAB

$$= 3133 \text{ YD}^2$$

$$25 \text{ mm SUPERPAVE } 3133 \times 440 = 2000$$

$$= \underline{821 \text{ TN}}$$

$$19 \text{ mm SUPERPAVE } 3133 \times 220 = 2000$$

$$= \underline{410 \text{ TN}}$$

$$\text{MILL ASPHALT PAVT - 1 1/2" DEPTH}$$

$$= \underline{3133 \text{ YD}^2}$$

$$3133 \times \$7.50 = \underline{\$21997}$$

DEDUCT FROM GRABINGS COMPLETE

# COST WORKSHEET



PROJECT: **STP-165-1(60) Dekalb County**

ALTERNATIVE NO.: **AP-2**

P.I. Number: **721820**

SHEET NO.: **5 of 5**

DESCRIPTION: **SELECTIVELY KEEP EXISTING PAVEMENT FROM STA 17+00 TO STA 29+00 NB**

CONSTRUCTION ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/UNIT	TOTAL	NO. OF UNITS	COST/UNIT	TOTAL
210-0100 GRADING COMPLETE	LS	1	1600.000	1600.000	1	1512.003	1512.003
310-5100 GR AGGR BASE CRS 10 IN	SY	85400	18.00	1537200	81667	18.00	1470.006
402-1812 RECYCLED ASPH CONC LEVELING	TN	4000	100.00	400.000	4112	100.00	411.200
402-3121 RECYCLED ASPH CONC 25mm	TN	18800	100.00	1880.000	17979	100.00	1797.900
402-3190 RECYCLED ASPH CONC 19mm	TN	10600	100.00	1060.000	10190	100.00	1019.000
<b>Sub-total</b>				<b>6477200</b>			<b>6270109</b>
<b>Mark-up at</b>				<b>697720</b>			<b>627010</b>
<b>TOTAL</b>				<b>7174920</b>			<b>6897119</b>

# Value Analysis Design Suggestion



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION

**Project No.: STP-165-1(60) –DeKalb County– P.I. Number:  
721820 Snapfinger Road.**

ALTERNATIVE NO.:

**AP-4**

DESCRIPTION: **ADJUST THE PROPOSED LOCATION OF THOMPSON  
MILL RD TO COINCIDE WITH THE NEW SUBDIVISION  
ENTRANCE ROAD ON THE NORTHWEST SIDE OF  
SNAPFINGER RD.**

SHEET NO.: 1 of 1

## Original Design:

The original design calls for the relocation of the intersection of Thompson Mill Rd and Snapfinger Road to the northwest to properly align with the new vertical alignment of Snapfinger Road, and to maintain adequate separation from the Pebble Dr. intersection.

## Alternative:

At the time of the original design, the property to the northwest was listed as “historical” and development was unanticipated. Since then the property has been taken off the historical list and a developer has constructed a new subdivision with a main entrance road. It is suggested that the designer locate that intersection and consider adjusting the proposed location of Thomson Mill Rd. to give a smooth intersection. Additionally, since the property is no longer “untouchable” consideration could be given to lessening the proposed impact to the east side residential homes and balance the land acquisition to both sides of the road.

## Opportunities:

- Improved safety
- Reduce impact to existing residences
- Save relocation of existing utilities
- Reduce duration of construction
- Reduce project cost

## Risks:

- Requires a significant redesign
- May delay start of the project
- May disturb local residences

# Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION <b>Project No.: STP-165-1(60) –DeKalb County– P.I. Number: 721820 Snapfinger Road</b>	ALTERNATIVE NO.: AP-5
DESCRIPTION: <b>DELETE PEBBLE DRIVE ACCESS TO SNAPFINGER ROAD USING A CUL-DE-SAC</b>	SHEET NO.: 1 of 6

**Original Design:**

The original design calls for Pebble to access Snapfinger Road with an improved alignment creating a 90 degree intersection. The new intersection would align with the existing Sterling Forest Drive.

**Alternative:**

This alternative design suggests using the existing alignment of Pebble Drive but eliminating direct access to Snapfinger Road. A cul-de-sac would be constructed at the end of the road. Access to Snapfinger Road will be via Huntsman Bend.

**Opportunities:**

- Reduce project construction time
- Reduce project costs
- Reduce motorists delays

**Risks:**

- No direct access to Snapfinger Road
- Possible project delay for redesign
- Redesign additional costs

**Technical Discussion:**

The existing Pebble Drive has a pavement width from 12’- 14’. Realignment and widening of Pebble Drive will not encompass the entire length. A potential problem could exist with traffic when the road narrows from the newly constructed 24’ width to the existing 12’ – 14’ width.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 7,302,295	\$ 0	\$ 7,302,295
ALTERNATIVE	\$ 7,174,619	\$ 0	\$ 7,174,619
SAVINGS	\$ 127,676	\$ 0	\$ 127,676



PROJECT: STP-165-1(60) - Georgia Department of Transportation  
P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP-5

DESCRIPTION: DELETE PEBBLE DR TO SHAPPINGER  
ROAD ACCESS USING A CUL-DE-SAC

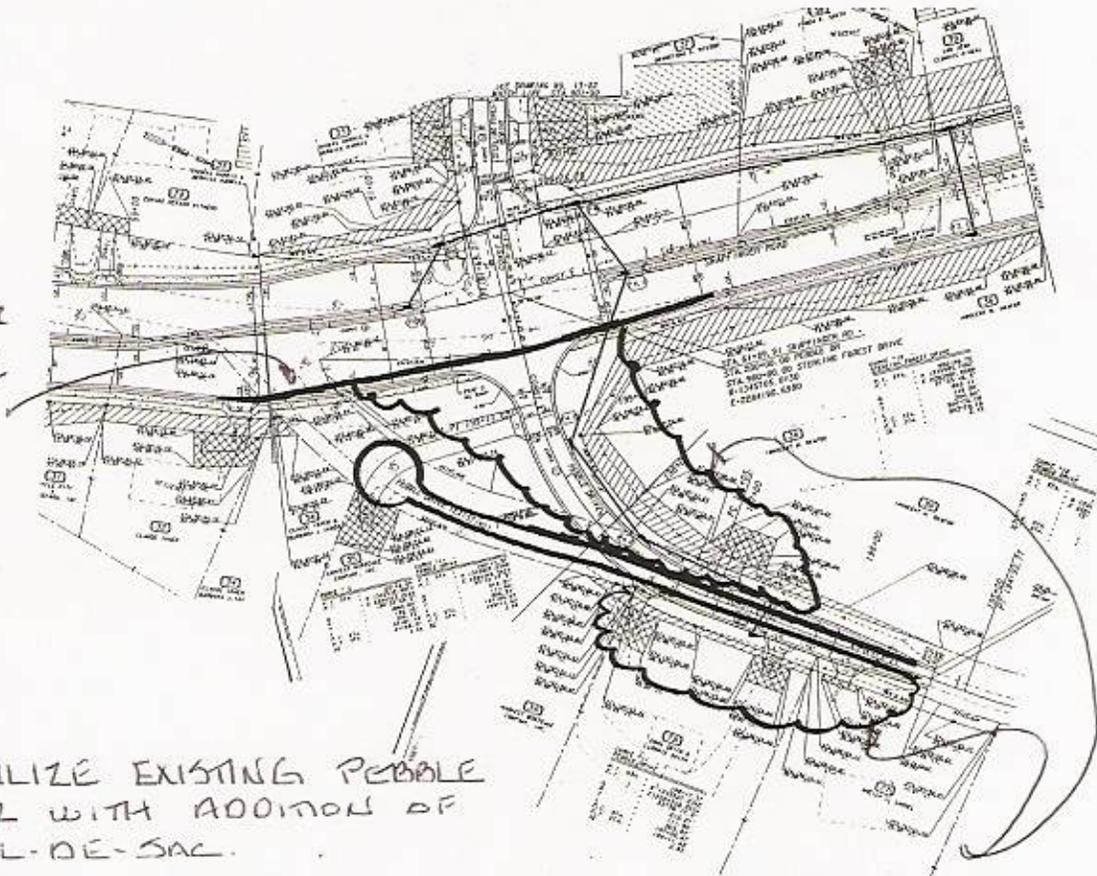
SHEET NO.: 3 of 6

CURB &  
GUTTER

UTILIZE EXISTING PEBBLE  
DR OR WITH ADDITION OF  
CUL-DE-SAC.

DELETE

ALTERNATE DESIGN - PEBBLE DRIVE



PROJECT: STP-165-1(60) - Georgia Department of Transportation  
P.I. Number: 721820 DeKalb County

ALTERNATIVE NO.: AP-5

DESCRIPTION: DELETE PEBBLE DRIVE TO SWAPPINGER ROAD ACCESS USING A GUL-OR-SAC SHEET NO.: 4 of 6

REDUCED QUANTITIES

DRIVEWAY QUANTITIES - SHEET 06-02

12.5mm SUPERPAVE 13 TN

GR AGGR BASE 6 IN 116 SY

CONC VALLEY GUTTER 8 IN 97 SY

DRAINAGE QUANTITIES - SHEET 06-07

18" STORM DRAIN 373 l.f.

STR 4.1 - STR 4.2 - STR 4.3  
- STR 4.4 - STR 4.5

CATCH BASIN GP.1 4 EA

STR 4.2, STR 4.3, STR 4.4,  
STR 4.5

PAVEMENT QUANTITIES - PEBBLE DRIVE

STA 195+20 - STA 199+72

STA 195+20 - STA 196+00

$$80 \times \frac{12+24}{2} \div 9 = 133 \text{ yd}^2$$

STA 196+00 - STA 199+72

$$372 \times 24 \div 9 = 992 \text{ yd}^2$$

TOTAL 1125 yd<sup>2</sup>

12.5mm SUPERPAVE  $1125 \times 165 \div 2000 =$  92 TN

19mm SUPERPAVE  $1125 \times 220 \div 2000 =$  123 TN

25mm SUPERPAVE  $1125 \times 440 \div 2000 =$  247 TN

GR AGGR BASE 10 IN  $=$  1125 yd<sup>2</sup>

CURB & GUTTER  $452 \text{ l.f.} \times 2 =$  904 l.f.

DESCRIPTION: DELETE PEBBLE DRIVE TO SNAPPINGER ROAD ACCESS USING A CUL-DE-SAC SHEET NO.: 5 of 6

ELIMINATE DECEL LANE - SNAPPINGER ROAD

STA 58+89 - STA 61+35

STA 58+89 - STA 59+86

$$97 \times \frac{12+0}{2} \div 9 = 644d^2$$

STA 59+86 - STA 61+35

$$149 \times 12 \div 9 = 1984d^2$$

$$\underline{2624d^2}$$

$$12.5 \text{ mm SUPERPAVE } 262 \times 165 \div 2000 = \underline{21 \text{ TN}}$$

$$19 \text{ mm SUPERPAVE } 262 \times 220 \div 2000 = \underline{28 \text{ TN}}$$

$$25 \text{ mm SUPERPAVE } 262 \times 440 \div 2000 = \underline{57 \text{ TN}}$$

$$\text{GAL AGGR BASE 10 IN } = \underline{2624d^2}$$

ADDITION OF CUL-DE-SAC - PEBBLE DR

$$\text{Radius} = 30 \text{ ft}$$

$$\text{AREA} = \pi R^2$$

$$= 3.14 \times (30)^2 = 3144d^2$$

$$12.5 \text{ mm } 314 \times 165 \div 2000 = 25 \text{ TN}$$

$$19 \text{ mm } 314 \times 220 \div 2000 = 34 \text{ TN}$$

$$25 \text{ mm } 314 \times 440 \div 2000 = 69 \text{ TN}$$

$$\text{GAB } 10 \text{ IN } = 3144d^2$$



# Value Analysis Design Suggestion



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION

**Project No.: STP-165-1(60) –DeKalb County– P.I. Number:  
721820 Snapfinger Road**

ALTERNATIVE NO.:

**AP-6**

DESCRIPTION: **EXTEND WIDENING OF PEBBLE DRIVE TO WONDER  
VALLEY TRAI**

SHEET NO.:

1 of 1

## Original Design:

The original design calls for the relocation and widening of the “one” lane Pebble Rd. with Snapfinger Road. The original design only calls for the widening of the first 450 feet +/- of the one lane Pebble Road. Thereby creating a situation where you have a 24’ road decreasing to just 12. Pebble Rd. continues on another 400 feet where it then intersects to Wonder Valley Trail.

## Alternative:

The VE Team suggests that the project be amended to extend the widening of the 12’ Pebble Road to its intersection with Wonder Valley Trail.

## Opportunities:

- Improved Safety
- Increase Capacity

## Risks:

- Requires a minor redesign
- May delay start of project
- May disturb local residences
- Requires modification of project scope

# Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION <b>Project No.: STP-165-1(60) –DeKalb County– P.I. Number: 721820</b>	ALTERNATIVE NO.: AP-7
<b>Snapfinger Road</b>	
DESCRIPTION: <b>DECREASE ALL LANE WIDTHS, MEDIAN WIDTH, AND BIKE LANE WIDTHS</b>	SHEET NO.: 1 of 6

**Original Design:**

The original design calls for 12’ travel and turning lanes, 20’ raised median, and 4’ bike lanes.

**Alternative:**

This alternative design suggests to use 11’ travel and turning lanes, 17’ raised median, and 3’ bike lanes.

**Opportunities:**

- Reduce project construction time
- Reduce initial cost
- Reduce right-of-way costs

**Risks:**

- Moderate redesign needed
- Requires design variance for lane width reductions from G.DOT.

**Technical Discussion:**

The design alternative accomplishes the same function as the original design at a reduced cost. The AASHTO Manual for Geometric Design of Highways and Streets (Chapter 7, Urban Arterials) states that narrower lane widths are adequate and have some advantages such as more lanes can be provided in areas with restricted right-of-way, shorter pedestrian crossing times because of reduced crossing distances, and more economical to construct. The 17’ median also meets AASHTO criteria of providing a 6’ median separator between turning lane and the opposing traffic lane. The AASHTO Guide for the development of bicycle facilities recommends that a 5’ wide bike lane measured from the face of the curb to the bike lane strip is sufficient where a 2’ wide concrete gutter pan exists given that a minimum of 3’ of rideable surface is provided.

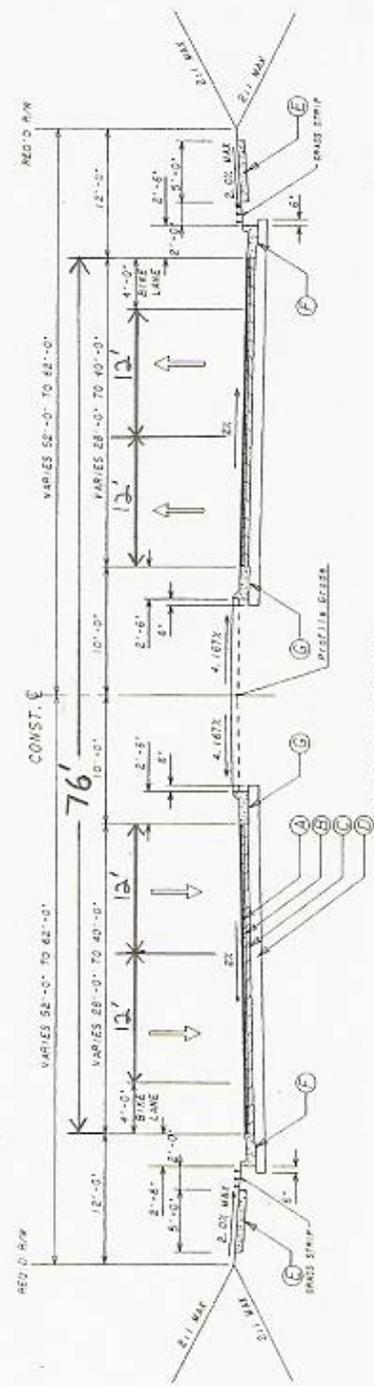
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 19,688,735	\$ 0	\$ 19,688,735
ALTERNATIVE	\$ 17,830,348	\$ 0	\$ 17,830,348
SAVINGS	\$ 1,858,387	\$ 0	\$ 1,858,387

PROJECT: STP-165-1(60) – Georgia Department of Transportation  
 P.I. Number: 721820 Dekalb County

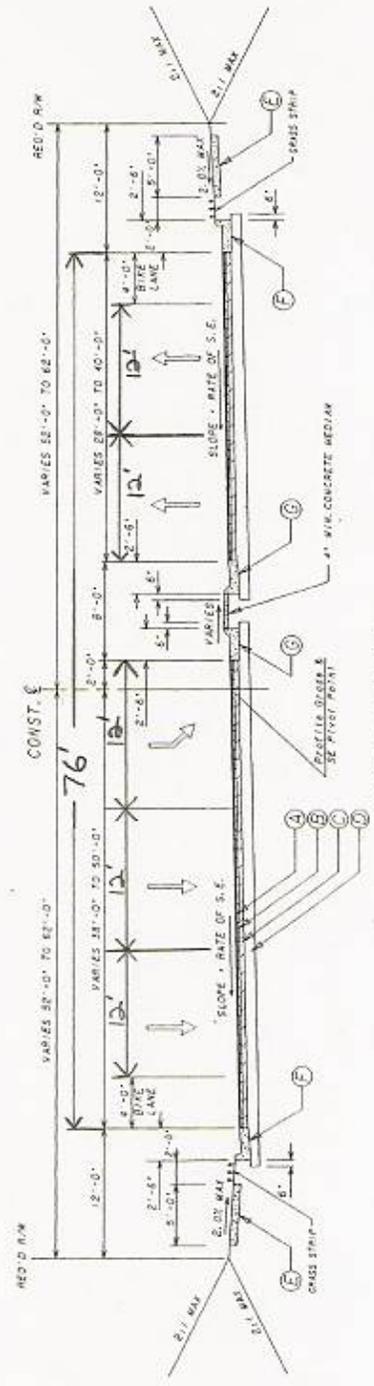
ALTERNATIVE NO.: AP-7

DESCRIPTION:

SHEET NO.: 2 of 6



TYPICAL SECTION  
 FULL MEDIAN TANGENT SECTION



TYPICAL SECTION  
 MEDIAN TURN LANE TANGENT/SUPERELEVATED SECTION

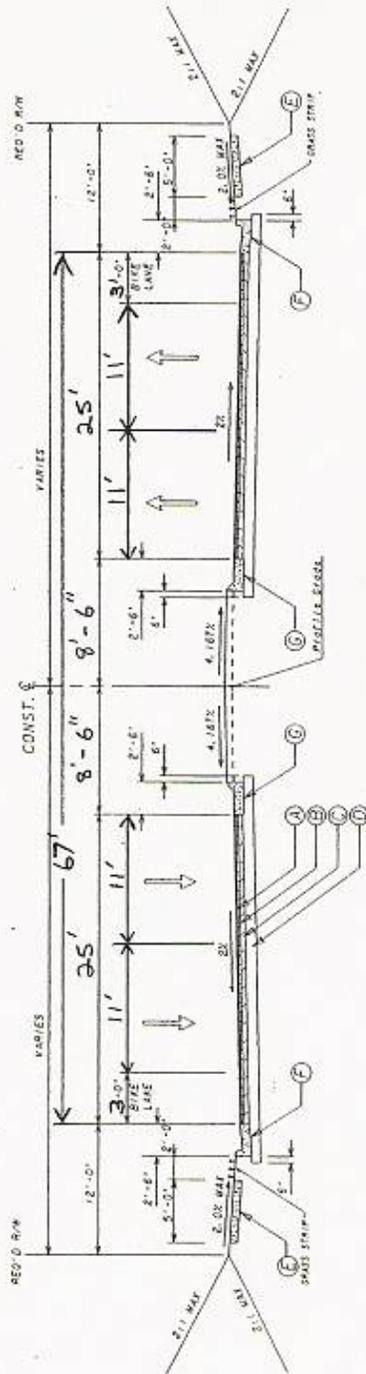
ORIGINAL DESIGN

PROJECT: STP-165-1(60) – Georgia Department of Transportation  
 P.I. Number: 721820 Dekalb County

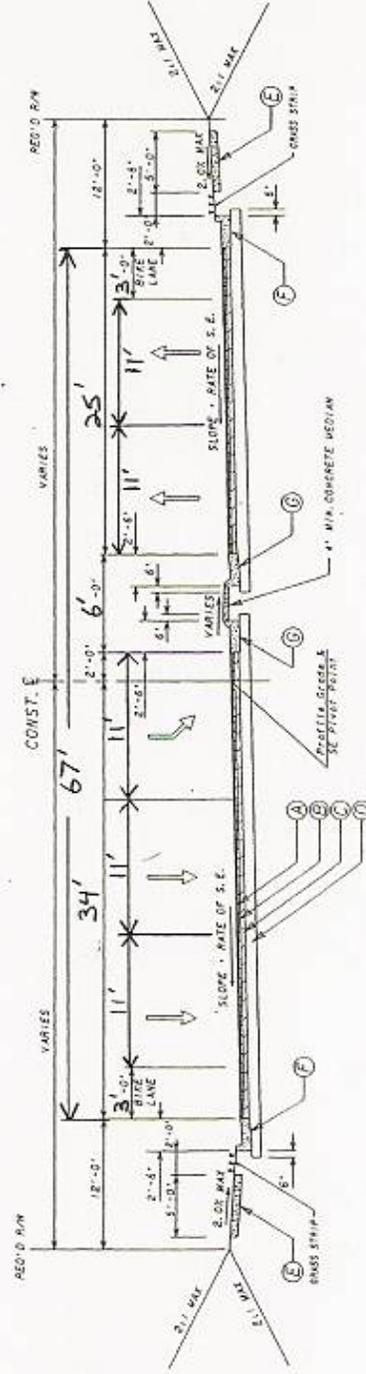
ALTERNATIVE NO.: AP-7

DESCRIPTION:

SHEET NO.: 3 of 6



TYPICAL SECTION  
 FULL MEDIAN TANGENT SECTION



TYPICAL SECTION  
 MEDIAN TURN LANE TANGENT/SUPERELEVATED SECTION

ALTERNATIVE

PROJECT: STP-165-1(60) - Georgia Department of Transportation  
P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP-7

DESCRIPTION: DECREASE ALL LANE WIDTHS, MEDIAN WIDTH,  
AND BIKE LANE WIDTH.

SHEET NO.: 4 of 6

ASSUMPTIONS: IN A FULL MEDIAN TYPICAL SECTION PAVEMENT WIDTH IS REDUCED BY A TOTAL OF 6-FT. ( $28' - 25' = 3' \times 2 \text{ SIDES} = 6' \text{ TOTAL}$ ). IN A MEDIAN TURN LANE SECTION PAVEMENT WIDTH IS REDUCED BY MORE THAN 6-FT. BUT WE WILL USE AN AVERAGE OF 6-FT. FOR ALL PAVEMENT REDUCTION CALCULATIONS.

GRADED AGGREGATE BASE COURSE, 10-INCH

$$\text{LENGTH OF PROJECT} = 106 + 18.00 - 6 + 41.00 = 9977'$$

$$9977' \times 6' = 59,862 \text{ SF} \times \frac{1 \text{ SY}}{9 \text{ SF}} = 6651 \text{ SY}$$

$$85400 \text{ SY} - 6651 \text{ SY} = \boxed{78,749 \text{ SY}}$$

RECYCLED ASPH. CONC, 25 MM SUPERPAVE

$$6651 \text{ SY} \times 440 \text{ LB/SY} \times \frac{1 \text{ TN}}{2000 \text{ LB}} = 1463 \text{ TN}$$

$$18800 \text{ TN} - 1463 \text{ TN} = \boxed{17,337 \text{ TN}}$$

RECYCLED ASPH. CONC, 19 MM SUPERPAVE

$$6651 \text{ SY} \times 220 \text{ LB/SY} \times \frac{1 \text{ TN}}{2000 \text{ LB}} = 732 \text{ TN}$$

$$10600 \text{ TN} - 732 \text{ TN} = \boxed{9868 \text{ TN}}$$

RECYCLED ASPH. CONC, 12.5 MM SUPERPAVE

$$6651 \text{ SY} \times 165 \text{ LB/SY} \times \frac{1 \text{ TN}}{2000 \text{ LB}} = 549 \text{ TN}$$

$$9400 \text{ TN} - 549 \text{ TN} = \boxed{8851 \text{ TN}}$$

GRADING COMPLETE

BY REDUCING ALL LANE WIDTHS, MEDIAN WIDTH, AND BIKE LANE WIDTH  
ASSUME EARTHWORK WILL BE REDUCED BY 10%.

$$\$1,600,000 - 10\% = \boxed{\$1,440,000}$$

SHEET 1 OF 2

PROJECT: STP-165-1(60) - Georgia Department of Transportation  
P.I. Number: 721820 DeKalb County

ALTERNATIVE NO.: AP-7

DESCRIPTION: DECREASE ALL LANE WIDTHS, MEDIAN WIDTH,  
AND BIKE LANE WIDTH.

SHEET NO.: 5 of 6

CONCRETE MEDIAN, 4 IN.

ORIGINAL CONCRETE MEDIAN IS  $8' - 2.5' - 2.5' = 3'$  OF CONCRETE, 4 IN.

ALTERNATE CONCRETE MEDIAN IS  $17'$  MEDIAN -  $11'$  TURN LANE =  $6' - 2.5' - 2.5' = 1'$  OF  
CONCRETE, 4 IN.

REDUCE CONCRETE MEDIAN QUANTITY BY 66.67%

$$\frac{3' - 1'}{3'} \times 100 = 66.67\%$$

$$\frac{\text{ORIGINAL}}{1950 \text{ SY}} - 66.67\% = \boxed{617 \text{ SY}}$$

RIGHT OF WAY.

BY REDUCING ALL LANE WIDTHS, MEDIAN WIDTH, AND BIKE LANE WIDTH  
ASSUME ROW COST WILL BE REDUCE BY 10.7%

$$\$10,798,400 - 10.7\% = \boxed{\$9,718,560}$$



# Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
**Project No.: STP-165-1(60) –DeKalb County– P.I. Number:**  
**721820 Snapfinger Road.**

ALTERNATIVE NO.:  
 AP-8

DESCRIPTION: **RELOCATE POST OFFICE DRIVE ACCESS POINT**

SHEET NO.: 1 of 6

**Original Design:**

The original design calls for the construction of Post Office Drive to provide a new access point to Snapfinger Plaza and Golden Glide.

**Alternative:**

This alternative design suggests relocating the Post Office Drive access point and shifting the proposed median opening to the northwest approximately 320’ to the proposed driveway for Snapfinger Plaza. The driveway entrance to existing Snapfinger Road will also have to be shifted to line up with the new median opening.

**Opportunities:**

- Reduce project construction time
- Reduce project costs
- Reduce Right-of-Way costs

**Risks:**

- Reduce left turn storage from Snapfinger Road to Wesley Chapel Road
- Requires moderate redesign

**Technical Discussion:**

The design alternative accomplishes the same function as the original design at a reduced cost. It doesn’t appear that a traffic study was performed to indicate that a third access point to Snapfinger Plaza is warranted. Also, the traffic diagrams indicate that a large percentage of traffic from Snapfinger Road to Wesley Chapel Road either go through or right so reducing the left turn storage lane to accommodate the shift in the median opening should not significantly affect the capacity of the Snapfinger Road/Wesley Chapel Road intersection.

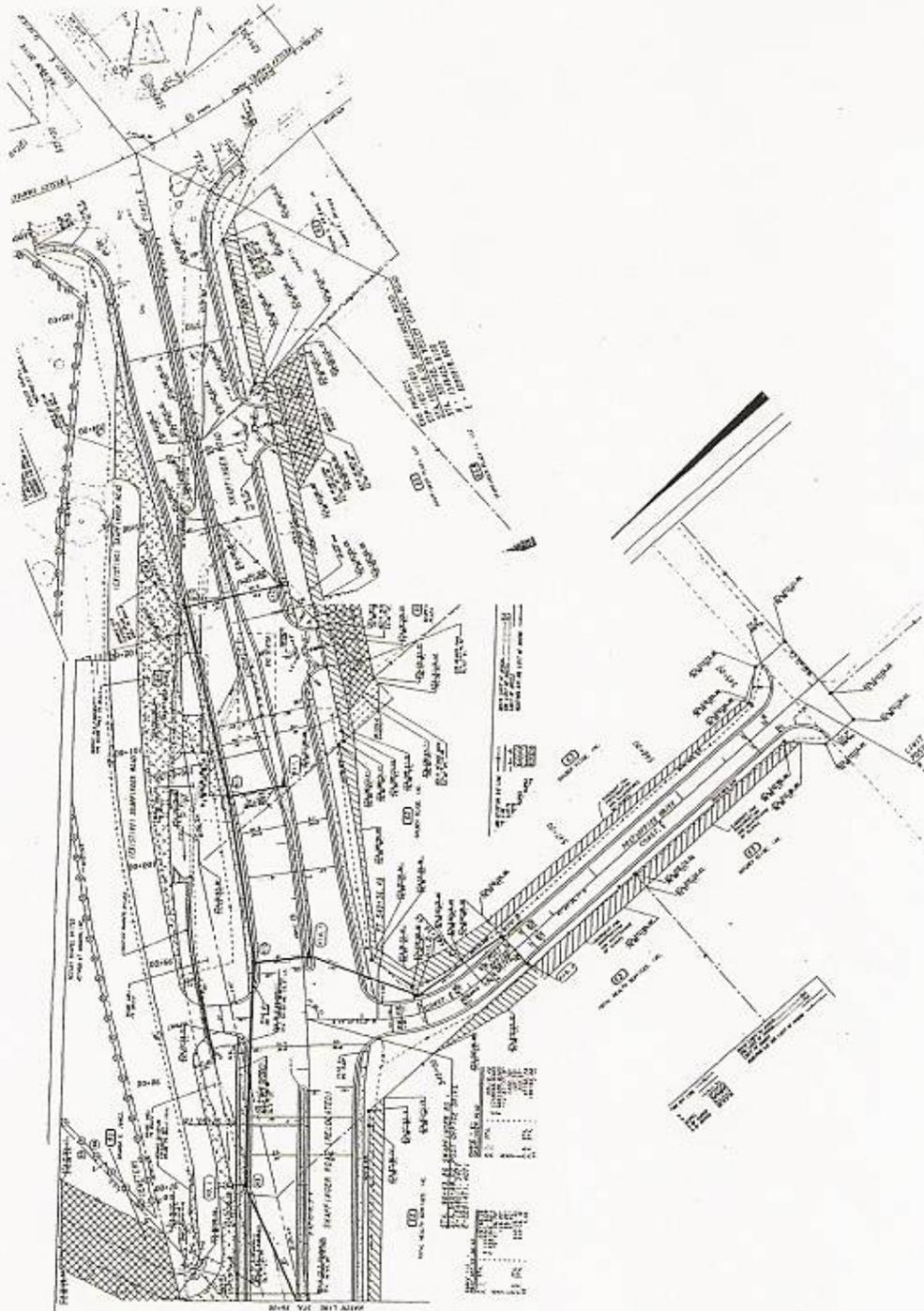
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 446,020	\$ 0	\$ 446,020
ALTERNATIVE	\$ 0	\$ 0	\$ 0
SAVINGS	\$ 446,020	\$ 0	\$ 446,020

PROJECT: STP-165-1(60) – Georgia Department of Transportation  
P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP-8

DESCRIPTION: DELETE POST OFFICE DRIVE

SHEET NO.: 2 of 6



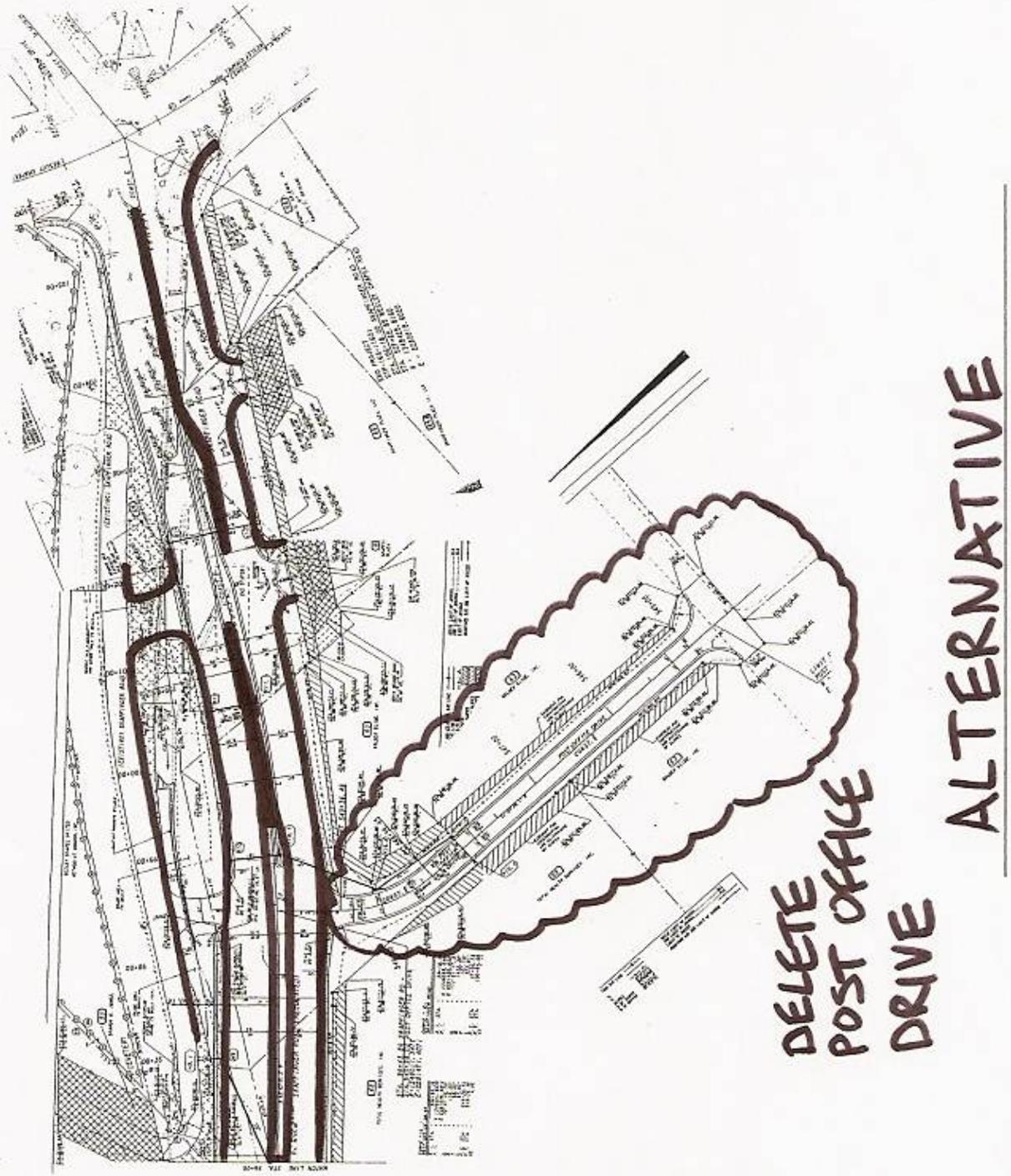
ORIGINAL DESIGN

PROJECT: STP-165-1(60) – Georgia Department of Transportation  
P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP-8

DESCRIPTION: DELETE POST OFFICE DRIVE

SHEET NO.: 3 of 6



DELETE  
POST OFFICE  
DRIVE

ALTERNATIVE

PROJECT: STP-165-1(60) - Georgia Department of Transportation  
P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP-8

DESCRIPTION: DELETE POST OFFICE DRIVE

SHEET NO.: 4 of 6

LIMITS OF CONSTRUCTION FOR POST OFFICE DRIVE  
STA 544+67 TO STA 549+50 → L = 483 FT.

GRADED AGGREGATE BASE COURSE, 10 INCH

$$483' \times 30' = 14490 \text{ SF} \times 1.37/9 \text{ SF} = \boxed{1610 \text{ SY}}$$

RECYCLED ASPHALT CONCRETE 25 MM SUPERPAVE

$$483' \times 24' = 11592 \text{ SF} \times 1.57/9 \text{ SF} \times 440 \text{ LB/SY} \times 1 \text{ TN}/2000 \text{ LB} \\ = \boxed{283 \text{ TN}}$$

RECYCLED ASPHALT CONCRETE 19 MM SUPERPAVE

$$483' \times 24' = 11592 \text{ SF} \times 1.57/9 \text{ SF} \times 220 \text{ LB/SY} \times 1 \text{ TN}/2000 \text{ LB} \\ = \boxed{142 \text{ TN}}$$

RECYCLED ASPHALT CONCRETE 12.5 MM SUPERPAVE

$$483' \times 24' = 11592 \text{ SF} \times 1.57/9 \text{ SF} \times 165 \text{ LB/SY} \times 1 \text{ TN}/2000 \text{ LB} \\ = \boxed{106 \text{ TN}}$$

GRADING COMPLETE

ASSUME 2% OF EARTHWORK IS FOR CONSTRUCTING POST OFFICE DRIVE.

$$\$1,600,000 \times 0.02 = \boxed{\$32,000}$$

SHEET 1 OF 2

PROJECT: STP-165-1(60) - Georgia Department of Transportation  
P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP-8

DESCRIPTION: DELETE POST OFFICE DRIVE

SHEET NO.: 5 of 6

CONCRETE CURB & GUTTER, 8 IN X 30 IN, TP 2

$$483' \times 2 = \boxed{966 \text{ LF}}$$

CATCH BASIN, GP 1

$$\boxed{3 \text{ EA.}}$$

STORM DRAIN PIPE, 18 IN, H 1-10

$$99' + 91' + 32' = \boxed{222 \text{ LF}}$$

RIGHT OF WAY

$$483' \times 50' = 24,150 \text{ SF}$$

$$= 0.55 \text{ ACRES}$$

SAY  $\boxed{0.60 \text{ ACRES}}$  COMMERCIAL LAND

$$483' \times 20' = 9660 \text{ SF}$$

$$= 0.22 \text{ ACRES}$$

SAY  $\boxed{0.25 \text{ ACRES}}$  PCE

COST

$$0.60 \text{ ACRES} \times \$125,000/\text{ACRE} = \$75,000$$

$$0.25 \text{ ACRES} \times \$62,500/\text{ACRE} = \$15,625$$

$$\text{NET COST} = \$90,625$$

$$\text{TIME LAG ADJUST. 100\%} = \$90,625$$

$$\text{ADM/COURT COST 45\%} = \$81,562.5$$

$$\text{INFLATION FACTOR 10\%} = \$26,281.25$$

$$\text{TOTAL COST} = \boxed{\$289,094}$$

SHEET 2 OF 2



# Value Analysis Design Alternative



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION <b>Project No.: STP-165-1(60) –DeKalb County– P.I. Number: 721820 Snapfinger Road.</b>	ALTERNATIVE NO.:  AP-9
DESCRIPTION: <b>RETAIN EXISTING ROADWAY FROM STA 6+41 TO STA 26+56</b>	SHEET NO.: 1 of 8

**Original Design:**

The original design calls for the construction of a four lane divided roadway with a 20' raised median from Flat Shoals Parkway to Wesley Chapel Road.

**Alternative:**

This alternative design suggests to retain the existing roadway from Flat Shoals Parkway to south of Riders Trail which consists of four lanes with a flush median and rural type shoulders.

**Opportunities:**

- Reduce project construction time
- Reduce project costs

**Risks:**

- Reduces capacity for pedestrians and bikes
- Requires moderate redesign

**Technical Discussion:**

The purpose of this project is to widen the two lane section of Snapfinger Road to improve safety and operation. The existing section of Snapfinger Road from Flat Shoals Parkway to south of Riders Trail is currently a four-lane road with a flush median. Retaining this section accomplishes the same function as the original design without the enhancements of a raised median, bike lanes, and sidewalk. Transitioning from the existing four-lane rural section can be accomplished as shown in the illustration.

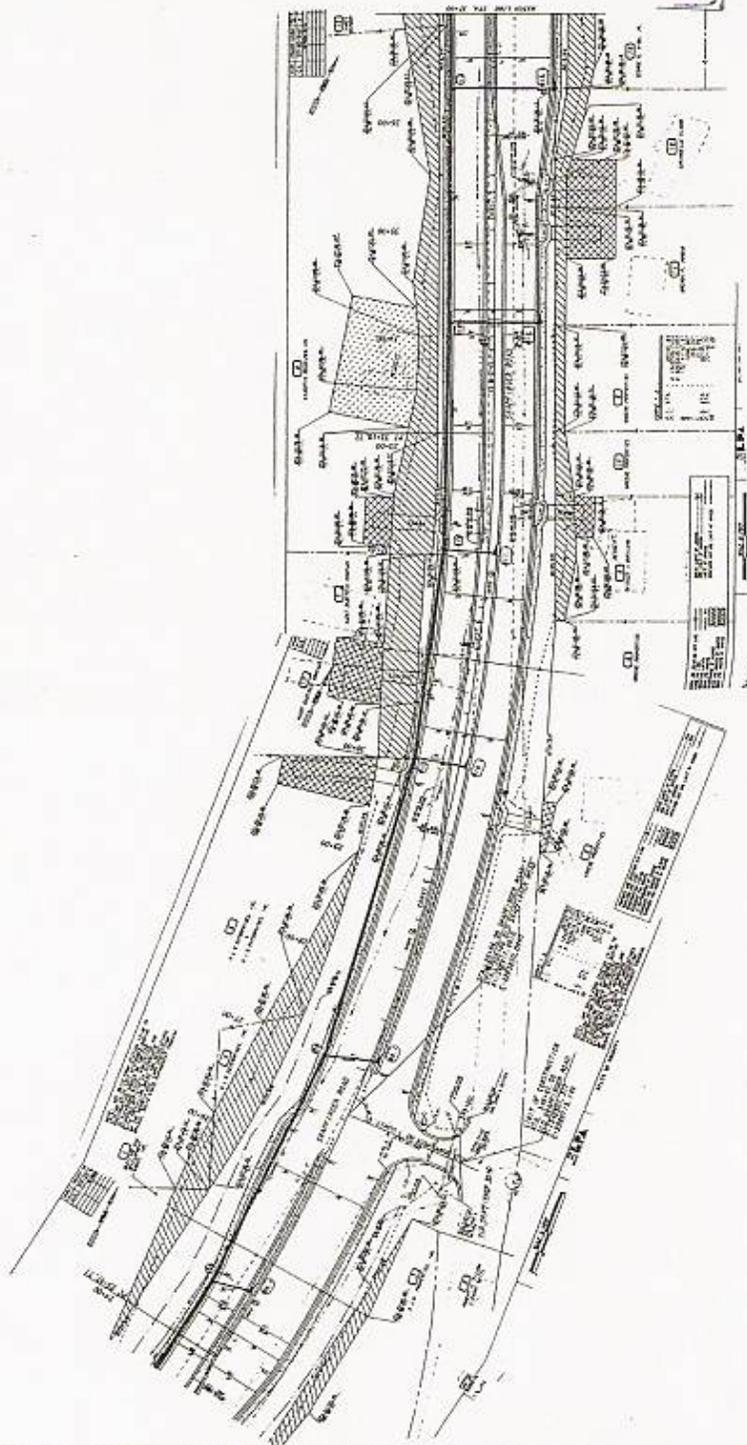
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	\$ 1,788,396		\$ 1,788,396
ALTERNATIVE	\$ 0	\$ 0	\$ 0
SAVINGS	\$ 1,788,396	\$ 0	\$ 1,788,396

PROJECT: STP-165-1(60) – Georgia Department of Transportation  
P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP-9

DESCRIPTION: RETAIN EXISTING ROADWAY FROM  
STA 6+41 TO STA. 26+56

SHEET NO.: 2 of 8



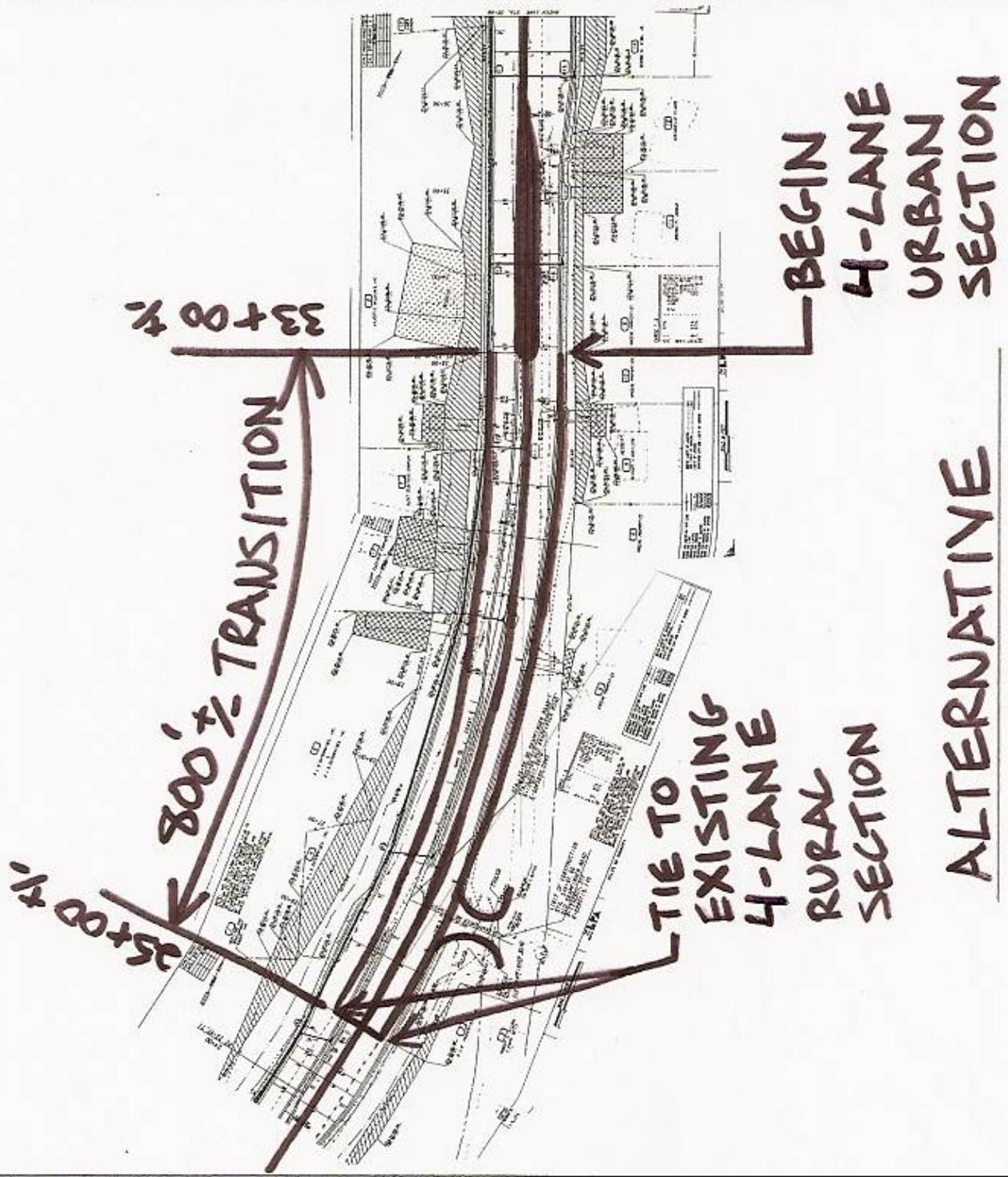
ORIGINAL DESIGN

PROJECT: STP-165-1(60) – Georgia Department of Transportation  
P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP-9

DESCRIPTION: RETAIN EXISTING ROADWAY FROM  
STA. 6+41 TO STA. 26+56

SHEET NO.: 3 of 8



PROJECT: STP-165-1(60) - Georgia Department of Transportation  
P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: AP-9

DESCRIPTION: RETAIN EXISTING ROADWAY - STA 6+41 - STA 26+56  
SNAP FINGER ROAD  
STA 6+41 TO STA 26+56  
STA 6+41 TO STA 17+00 - OVERLAY  
STA 17+00 TO STA 26+56 - FULL DEPTH CONSTRUCTION

SHEET NO.: 4 of 8

STA 6+41 - STA 12+15

$$574 \times 65^* = 37310 \text{ SQ FT} = 4145 \text{ SQ YD}$$

STA 12+15 - STA 17+00

$$485 \times 72^* = 34920 \text{ SQ FT} = 3880 \text{ SQ YD}$$

STA 17+00 - STA 26+56

$$956 \times 70^* = 66920 \text{ SQ FT} = 7435 \text{ SQ YD}$$

### PAYEMENT QUANTITIES

STA 6+41 - STA 17+00

$$12.5 \text{ mm } 8025 \text{ YD}^2 \times 165 \#/\text{YD}^2 \div 2000 = 662 \text{ TN}$$

STA 17+00 - STA 26+56

$$12.5 \text{ mm } 7435 \text{ YD}^2 \times 165 \#/\text{YD}^2 \div 2000 = 613 \text{ TN}$$

$$19 \text{ mm } 7435 \text{ YD}^2 \times 220 \#/\text{YD}^2 \div 2000 = 817 \text{ TN}$$

$$25 \text{ mm } 7435 \text{ YD}^2 \times 440 \#/\text{YD}^2 \div 2000 = 1635 \text{ TN}$$

$$\text{GRAB - 16" TIK} = 7435 \text{ YD}^2$$

\* AVERAGE WIDTH THROUGH SECTION

SHEET 1 OF 3

PROJECT: STP-165-1(60) - Georgia Department of Transportation  
P.I. Number: 721820 DeKalb County

ALTERNATIVE NO.: AP-9

DESCRIPTION: RETAIN EXISTING ROADWAY STA 6+41 - STA 26+56 SHEET NO.: 5 of 8

CONC. SIDEWALK

STA 6+41 - STA 8+26	$185 \times 5 \div 9 =$	102 yd <sup>2</sup>
STA 8+26 - STA 9+92	$166 \times 2 \times 5 \div 9 =$	184 yd <sup>2</sup>
STA 9+92 - STA 26+56	$1664 \times 2 \times 5 \div 9 =$	<u>1848 yd<sup>2</sup></u>
	TOTAL	2134 yd <sup>2</sup>

CONC CURB & GUTTER TP 2

STA 6+41 - STA 8+26	=	185 lf
STA 9+92 - STA 26+56 = 1664 x 2	=	<u>3328 lf</u>
	TOTAL =	3513 lf

CONC CURB & GUTTER TP 1

STA 12+11 - STA 26+56 = 1445 x 2	=	2890 lf
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DRAINAGE

SYSTEM A

18" STORM DRAIN	=	169 lf
24" STORM DRAIN	=	96 lf
CATCH BASINS	=	4 EA
DROP INLET	=	1 EA
24" FES	=	1 EA

PROJECT: STP-165-1(60) - Georgia Department of Transportation  
P.I. Number: 721820 Dekalb County

ALTERNATIVE NO.: A0.9

DESCRIPTION: RETAIN EXISTING ROADWAY, STA 6+41 - STA 26+56

SHEET NO.: 6 of 8

DRAINAGE (CONT'D)

SYSTEM B - B-1 to B-9

18" STORM DRAIN

868 LF

24" STORM DRAIN

55 LF

30" STORM DRAIN

186 LF

36" STORM DRAIN

711 LF

CATCH BASIN

12 EA

HEADWALL - ALL CONC INCL REINF STEEL

537 CU YD





# Value Analysis Design Suggestion



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION  
**Project No.: STP-165-1(60) –DeKalb County– P.I. Number:  
721820 Snapfinger Road.**

ALTERNATIVE NO.:  
**AP-10**

DESCRIPTION: **FROM STA. 83+00 +/- TO WESLEY CHAPEL ROAD  
INTERSECTION, USE EXISTING HORIZONTAL  
ALIGNMENT AND WIDEN AS NECESSARY TO THE  
NORTH EAST**

SHEET NO.: 1 of 3

## Original Design:

The original design provides for the re-alignment of Snapfinger Road with Wesley Chapel Road to achieve a more perpendicular intersection.

## Alternative:

At the time of the original design, improvements to Wesley Chapel Road were only proposed. They are now complete and the existing intersection is now new and **provides the same functions** (except for sidewalks and bike paths **as the proposed new intersection design**. (Note that the newly constructed Wesley Chapel Road **does not provide for bike travel lanes**). The VE Team suggests that consideration be given to maintaining the current alignment of the newly constructed intersection, and relocating Post Office Dr onto the Snapfinger Plaza at the southwesterly corner of the property or not constructing at all as there exists an access in both directions out of the Plaza now.

## Opportunities:

- Reduce the project costs
- Reduce the project construction time
- Reduce inconvenience to users
- Reduce property acquisitions

## Risks:

- Requires a minor re-design
- May delay start of the project
- May require the added cost of soil boring

# Illustrations



PROJECT: **STP-165-1(60) – Georgia Department of Transportation**  
**P.I. Number: 721820 Dekalb County**

ALTERNATIVE NO.:  
**AP 10**

DESCRIPTION: **FROM STA. 83+00 +/- TO WESLEY CHAPEL ROAD INTERSECTION, USE EXISTING HORIZONTAL ALIGNMENT AND WIDEN AS NECESSARY TO THE NORTH EAST**

SHEET NO.: 2 of 3



# Illustrations



PROJECT: **STP-165-1(60) – Georgia Department of Transportation**  
**P.I. Number: 721820 Dekalb County**

ALTERNATIVE NO.:  
**AP 10**

DESCRIPTION: **FROM STA. 83+00 +/- TO WESLEY CHAPEL ROAD INTERSECTION, USE EXISTING HORIZONTAL ALIGNMENT AND WIDEN AS NECESSARY TO THE NORTH EAST**

SHEET NO.: 3 of 3



# Value Analysis Design Suggestion



PROJECT: GEORGIA DEPARTMENT OF TRANSPORTATION

**Project No.: STP-165-1(60) –DeKalb County– P.I. Number:  
721820 Snapfinger Road**

ALTERNATIVE NO.:

**SW-1**

DESCRIPTION: **DELINEATE THE PROBABLE LOCATIONS FOR UNDER  
DRAINS AND SPECIFIC CONDITIONS FOR WHICH A  
CHANGE ORDER WOULD BE ISSUED TO PROVIDE  
ADDITIONAL UNDER DRAINS**

SHEET NO.:

1 of 1

## Original Design:

The original design provides for the installation of up to 10,000 feet of under drains at the direction of the engineer.

## Alternative:

The VE Team suggests that the project documents be amended to define where under drains are required. The 10,000 feet represents under draining more than half of the project on both sides of the road and a budget amount of approximately \$200,000.

## Opportunities:

- Reduce the opportunity of a major change order
- Reduce the risk for extending the project construction time

## Risks:

- Requires a minor re-design
- May delay start of the project
- May require the added cost of soil boring

## Technical:

The VE Team recognizes the fact that sometimes an undefined quantity and its budgeted amount can be easily converted to another pay Item by a simple field directive or by a minor change order because the money is “available”. Whereas, if additional monies are not readily available and would require an appropriation from somewhere else, then a change order naturally becomes more difficult, hence better project financial control.

## *Project Description*

## **PROJECT DESCRIPTION**

The project is to widen 1.78 miles of the existing Snapfinger Road from Wesley Chapel Road to just southeast of Flat Shoals Parkway, Dekalb County, Georgia. Snapfinger Road, which presently varies from five to two and back to five lanes, will be modified to have a total of four main travel lanes plus a raised median with turn lanes, two bike lanes, curb and gutters, and two sidewalks. This project is fully described in the documentation that follows.

The expected cost of this construction including right of way purchase is approximately \$25,562,000 dollars. This cost estimate is included in the first document noted below as part of the enclosures in this report section.

Please see the following enclosed documents

- Georgia Department of Transportation
  - The Concept Plan of Proposed STP-165-1(60) Snapfinger Road, Dekalb County, Georgia; PI No.: 721820
  - Construction Cost Estimate

The VE Team utilized the supplied project materials noted above, along with the design products from THE LPA GROUP INCORPORATED and the GDOT current standard drawings, details and specifications during the VE Study.

The documents are on PDF #2

## Estimate Report for file "STP-165-1(60)\_2007-01-28"

Section ROADWAY ITEMS					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
150-1000	1	LS	1000000.00	TRAFFIC CONTROL -	1000000.00
150-5010	11	EA	12000.00	TRAFFIC CONTROL, PORTABLE IMPACT ATTENUATOR	132000.00
153-1300	1	EA	75000.00	FIELD ENGINEERS OFFICE TP 3	75000.00
207-0203	640	CY	60.00	FOUND BKFFILL MATL, TP II	38400.00
210-0100	1	LS	1600000.00	GRADING COMPLETE -	1600000.00
310-5060	6000	SY	15.00	GR AGGR BASE CRS, 6 INCH, INCL MATL	90000.00
310-5100	85400	SY	18.00	GR AGGR BASE CRS, 10 INCH, INCL MATL	1537200.00
318-3000	1000	TN	20.00	AGGR SURF CRS	20000.00
402-1812	4000	TN	100.00	RECYCLED ASPH CONC LEVELING, INCL BITUM MATL & H LIME	400000.00
402-3121	18800	TN	100.00	RECYCLED ASPH CONC 25 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	1880000.00
402-3130	9400	TN	100.00	RECYCLED ASPH CONC 12.5 MM SUPERPAVE, GP 2 ONLY, INCL BITUM MATL & H LIME	940000.00
402-3190	10600	TN	100.00	RECYCLED ASPH CONC 19 MM SUPERPAVE, GP 1 OR 2, INCL BITUM MATL & H LIME	1060000.00
413-1000	3650	GL	2.00	BITUM TACK COAT	7300.00
432-5010	11800	SY	3.00	MILL ASPH CONC PVMT, VARIABLE DEPTH	35400.00
441-0016	700	SY	50.00	DRIVEWAY CONCRETE, 6 IN TK	35000.00
441-0104	10500	SY	45.00	CONC SIDEWALK, 4 IN	472500.00
441-0740	1850	SY	45.00	CONCRETE MEDIAN, 4 IN	83250.00
441-4030	2000	SY	50.00	CONC VALLEY GUTTER, 8 IN	100000.00
441-6222	27800	LF	20.00	CONC CURB & GUTTER, 8 IN X 30 IN, TP 2	556000.00
441-6740	16500	LF	20.00	CONC CURB & GUTTER, 8 IN X 30 IN, TP 7	330000.00
446-1100	1000	LF	6.00	PVMT REINF FABRIC STRIPS, TP 2, 18 INCH WIDTH	6000.00
500-3200	100	CY	550.00	CLASS B CONCRETE	55000.00
500-3800	19	CY	1000.00	CLASS A CONCRETE, INCL REINF STEEL	19000.00
500-9999	40	CY	250.00	CLASS B CONC, BASE OR PVMT WIDENING	10000.00
515-2020	175	LF	40.00	GALV STEEL PIPE HANDRAIL, 2 IN, ROUND	7000.00
550-1180	4950	LF	45.00	STORM DRAIN PIPE, 18 IN, H 1-10	222750.00
550-1240	2800	LF	55.00	STORM DRAIN PIPE, 24 IN, H 1-10	154000.00
550-1300	1410	LF	70.00	STORM DRAIN PIPE, 30 IN, H 1-10	98700.00
550-1360	1850	LF	85.00	STORM DRAIN PIPE, 36 IN, H 1-10	157250.00
550-1480	650	LF	135.00	STORM DRAIN PIPE, 48 IN, H 1-10	87750.00
550-2180	110	LF	40.00	SIDE DRAIN PIPE, 18 IN, H 1-10	4400.00
550-4118	6	EA	600.00	FLARED END SECTION 18 IN, SIDE DRAIN	3600.00
550-4218	1	EA	700.00	FLARED END SECTION 18 IN, STORM DRAIN	700.00
550-4224	3	EA	900.00	FLARED END SECTION 24 IN, STORM DRAIN	2700.00
550-4230	1	EA	950.00	FLARED END SECTION 30 IN, STORM DRAIN	950.00
573-2006	10000	LF	20.00	UNDDR PIPE INCL DRAINAGE AGGR, 6 IN	200000.00
611-8000	2	EA	2000.00	ADJUST CATCH BASIN TO GRADE	4000.00
620-0100	1700	LF	40.00	TEMPORARY BARRIER, METHOD NO. 1	68000.00
621-4082	30	LF	300.00	CONCRETE SIDE BARRIER, TYPE 7T	9000.00
634-1200	167	EA	115.00	RIGHT OF WAY MARKERS	19205.00
641-1100	250	LF	60.00	GUARDRAIL, TP T	15000.00
641-1200	710	LF	20.00	GUARDRAIL, TP W	14200.00
641-5001	5	EA	650.00	GUARDRAIL ANCHORAGE, TP 1	3250.00
641-5006	2	EA	650.00	GUARDRAIL ANCHORAGE, TP 6	1300.00
641-5012	2	EA	2000.00	GUARDRAIL ANCHORAGE, TP 12	4000.00
668-1100	101	EA	2500.00	CATCH BASIN, GP 1	252500.00
668-1110	180	LF	250.00	CATCH BASIN, GP 1, ADDL DEPTH	45000.00
668-2100	9	EA	4500.00	DROP INLET, GP 1	40500.00
668-2110	9	LF	300.00	DROP INLET, GP 1, ADDL DEPTH	2700.00
668-4300	4	EA	2500.00	STORM SEWER MANHOLE, TP 1	10000.00
668-4311	4	LF	300.00	STORM SEWER MANHOLE, TP 1, ADDL DEPTH, CL 1	1200.00
668-5000	1	EA	2000.00	JUNCTION BOX	2000.00
<b>Section Sub Total:</b>					<b>\$11,913,705.00</b>

Section PERMANENT EROSION CONTROL					
Item Number	Quantity	Units	Unit Price	Item Description	Cost

603-2182	170	SY	50.00	STN DUMPED RIP RAP, TP 3, 24 IN	8500.00
603-7000	170	SY	5.00	PLASTIC FILTER FABRIC	850.00
700-6910	34	AC	1000.00	PERMANENT GRASSING	34000.00
700-7000	51	TN	60.00	AGRICULTURAL LIME	3060.00
700-7010	130	GL	20.00	LIQUID LIME	2600.00
700-8000	30	TN	350.00	FERTILIZER MIXED GRADE	10500.00
700-8100	2600	LB	2.50	FERTILIZER NITROGEN CONTENT	6500.00
716-2000	5000	SY	1.50	EROSION CONTROL MATS, SLOPES	7500.00
<b>Section Sub Total:</b>					<b>\$73,510.00</b>

<b>Section TEMPORARY EROSION CONTROL</b>					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
163-0232	17	AC	600.00	TEMPORARY GRASSING	10200.00
163-0240	160	TN	200.00	MULCH	32000.00
163-0300	4	EA	3000.00	CONSTRUCTION EXIT	12000.00
163-0503	3	EA	600.00	CONSTRUCT AND REMOVE SILT CONTROL GATE, TP 3	1800.00
163-0520	1000	LF	20.00	CONSTRUCT AND REMOVE TEMPORARY PIPE SLOPE DRAIN	20000.00
163-0530	1700	LF	5.00	CONSTRUCT AND REMOVE BALED STRAW EROSION CHECK	8500.00
163-0550	112	EA	300.00	CONSTRUCT AND REMOVE INLET SEDIMENT TRAP	33600.00
165-0010	7900	LF	1.00	MAINTENANCE OF TEMPORARY SILT FENCE, TP A	7900.00
165-0030	860	LF	2.00	MAINTENANCE OF TEMPORARY SILT FENCE, TP C	1720.00
165-0070	850	LF	2.50	MAINTENANCE OF BALED STRAW EROSION CHECK	2125.00
165-0087	1	EA	225.00	MAINTENANCE OF SILT CONTROL GATE, TP 3	225.00
165-0101	4	EA	700.00	MAINTENANCE OF CONSTRUCTION EXIT	2800.00
165-0105	56	EA	150.00	MAINTENANCE OF INLET SEDIMENT TRAP	8400.00
167-1000	2	EA	1400.00	WATER QUALITY MONITORING AND SAMPLING	2800.00
167-1500	24	MO	1100.00	WATER QUALITY INSPECTIONS	26400.00
171-0010	15800	LF	2.00	TEMPORARY SILT FENCE, TYPE A	31600.00
171-0030	1715	LF	4.00	TEMPORARY SILT FENCE, TYPE C	6860.00
<b>Section Sub Total:</b>					<b>\$208,930.00</b>

<b>Section SIGNING &amp; MARKING</b>					
Item Number	Quantity	Units	Unit Price	Item Description	Cost
636-1020	520	SF	16.00	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 3	8320.00
636-1033	450	SF	20.00	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 9	9000.00
636-2070	1430	LF	9.00	GALV STEEL POSTS, TP 7	12870.00
636-2090	240	LF	9.00	GALV STEEL POSTS, TP 9	2160.00
639-2001	200	LF	2.50	STEEL WIRE STRAND CABLE, 1/4 IN	500.00
639-4004	4	EA	7000.00	STRAIN POLE, TP IV	28000.00
652-0094	60	EA	50.00	PAVEMENT MARKING, SYMBOL, TP 4	3000.00
652-0110	60	EA	45.00	PAVEMENT MARKING, ARROW, TP 1	2700.00
652-5301	17900	LF	0.60	SOLID TRAF STRIPE, 6 IN, WHITE	10740.00
652-6301	2900	GLF	0.25	SKIP TRAF STRIPE, 6 IN, WHITE	725.00
653-0120	72	EA	75.00	THERMOPLASTIC PVMT MARKING, ARROW, TP 2	5400.00
653-0170	17	EA	85.00	THERMOPLASTIC PVMT MARKING, ARROW, TP 7	1445.00
653-0210	5	EA	125.00	THERMOPLASTIC PVMT MARKING, WORD, TP 1	625.00
653-1501	32300	LF	0.70	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, WHITE	22610.00
653-1502	25600	LF	0.70	THERMOPLASTIC SOLID TRAF STRIPE, 5 IN, YELLOW	17920.00
653-1704	480	LF	6.00	THERMOPLASTIC SOLID TRAF STRIPE, 24 IN, WHITE	2880.00
653-1804	4000	LF	2.00	THERMOPLASTIC SOLID TRAF STRIPE, 8 IN, WHITE	8000.00
653-3501	26100	GLF	0.50	THERMOPLASTIC SKIP TRAF STRIPE, 5 IN, WHITE	13050.00

653-6004	1100	SY	3.00	THERMOPLASTIC TRAF STRIPING, WHITE	3300.00
653-6006	350	SY	3.50	THERMOPLASTIC TRAF STRIPING, YELLOW	1225.00
654-1001	250	EA	4.00	RAISED PVMT MARKERS TP 1	1000.00
654-1003	100	EA	4.00	RAISED PVMT MARKERS TP 3	400.00
<b>Section Sub Total:</b>					<b>\$155,870.00</b>

<b>Section SIGNAL</b>					
<b>Item Number</b>	<b>Quantity</b>	<b>Units</b>	<b>Unit Price</b>	<b>Item Description</b>	<b>Cost</b>
615-1200	70	LF	25.00	DIRECTIONAL BORE - 4 IN	1750.00
615-1200	310	LF	25.00	DIRECTIONAL BORE - 5 IN	7750.00
636-1041	130	SF	35.00	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 9	4550.00
639-2001	1350	LF	2.50	STEEL WIRE STRAND CABLE, 1/4 IN	3375.00
639-4004	12	EA	7000.00	STRAIN POLE, TP IV	84000.00
647-1000	1	LS	125000.00	TRAFFIC SIGNAL INSTALLATION NO - 2	125000.00
647-1000	1	LS	125000.00	TRAFFIC SIGNAL INSTALLATION NO - 3	125000.00
647-1000	1	LS	125000.00	TRAFFIC SIGNAL INSTALLATION NO - 1	125000.00
682-6233	560	LF	6.50	CONDUIT, NONMETL, TP 3, 2 IN	3640.00
<b>Section Sub Total:</b>					<b>\$480,065.00</b>

**Total Estimated Cost: \$12,832,080.00**

<b>Subtotal Construction Cost</b>	<b>\$12,832,080.00</b>
E&C Rate 10.0 %	\$1,283,208.00
Inflation Rate 5 % @ 2 Years	\$1,446,817.02
<b>Total Construction Cost</b>	<b>\$15,562,105.02</b>
Right Of Way	\$0.00
ReImb. Utilities	\$0.00
<b>Grand Total Project Cost</b>	<b>\$15,562,105.02</b>

# *Value Engineering Process*

# **VALUE ENGINEERING PROCESS**

## **Introduction**

This report summarizes the analysis and conclusions by the PBS&J Value Engineering team as they performed a VE Study during the period of March 5-8, 2007 in Atlanta, Georgia, for the Georgia Department of Transportation.

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

Les Thomas, P.E., CVS-Life	Certified Value Specialist
Chris Carbutto, P.E.	Highway Design Engineer
Gary King	Highway Construction Specialist

The Value Engineering Team followed the Seven Step Value Engineering job plan as promulgated by SAVE International. This Seven Step job plan includes the following:

- **Investigation/Information Phase** – during this phase of the VE Team’s work, the team received a briefing from the designers and project delivery team representatives of the Georgia Department of Transportation (GDOT). This briefing included discussions of the design intent behind the project, the cost concerns, and was followed by a tour of the existing facilities. In the working session that followed, the VE Team developed cost models from the cost data provided by the designers and familiarized themselves with the construction drawings and other data that was available to the team. Some of the representative project information (concept report, cost estimate, and special provisions) may be found in the tabbed section of this report entitled *Project Description*. Following this current narrative the reader will also find a cost model done in the Pareto fashion, i.e., identifying the highest costs down to the lowest costs for the larger construction cost elements. This cost model, developed by the VE Team, was used by the VE Team to help focus their week of work. The headings on the Pareto Chart also were used as headings for creative phase activities.
- **Analysis Phase** – during this phase the VE Team determined the “**Functions**” of the project. This was accomplished by reviewing the project from the simplest format in asking the questions of “What is the project suppose to do?”, and “How is it suppose to accomplish this purpose? In the Value Engineering vernacular, the answers to these questions are cast in the form of active verbs and measurable nouns. These verb/noun pairs form the basis of the function analysis which distinguishes a Value Engineering effort from a potentially damaging cost cutting exercise.

- The important functions of the project were identified as follows:
  - **Project Objective/Goals**
    - **Improve Safety**
    - **Improve Line-of-Sight**
    - **Increase Capacity**
    - **Separate Traffic**
    - **Provide for near future growth**
  - **Project Basic Functions**
    - **Construct Additional Traffic Lanes**
    - **Construction Additional Turn Lanes**
    - **Build New Bridge**
    - **Provide Raised Median**
    - **Route Stormwater**
    - **Direct Traffic**
- **Speculation Phase** - The VE team performed a brainstorming session to identify ideas that might help meet the project objectives:
  - Improve Operations
  - Improve Safety
  - Increase Capacity
  - Reduce construction and life cycle costs
  - Reduce the time of construction

This brainstorming session initially identified numerous ideas that were then evaluated in the Judgment phase. The reader will find the creative worksheets enclosed. These same work sheets were also used to record the results of the Judgment/Evaluation Phase.

- **Evaluation Phase** – Once the VE Team identified the creative ideas, it was necessary to decide which alternatives should be carried forward. This is the work of the Evaluation or Judgment Phase. The VE Team reflected back on the project constraints and objectives shared with the team by the owner’s representatives, in the kick-off meeting on the first day of the workshop. From that guidance, the team selected ideas that they believed would improve the project by a vote process.

- Following that selection process, the VE Team used the following values as measures of whether or not an alternative had enough merit to be carried forward in the VE process:
  - Construction Cost Savings
  - Maintainability
  - Ability to Implement the Idea
  - General Acceptability of the Alternatives
  - Constructability

Based on these measurement sticks, the VE Team evaluated the alternatives and graded them from 5 (Excellent) down to 1 (Poor). Other notes about the alternatives are annotated at the bottom of the enclosed creative and evaluation sheets.

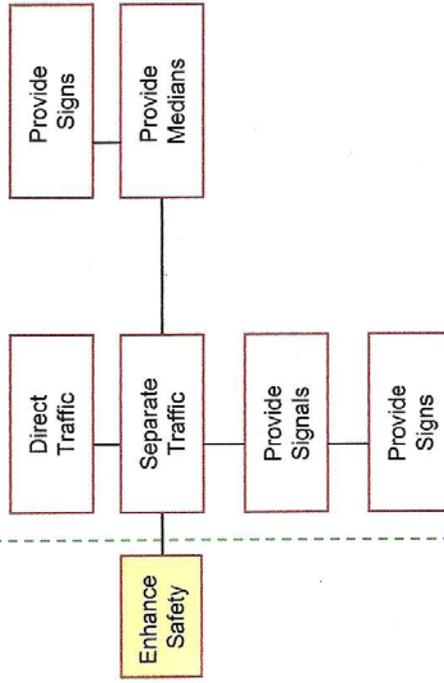
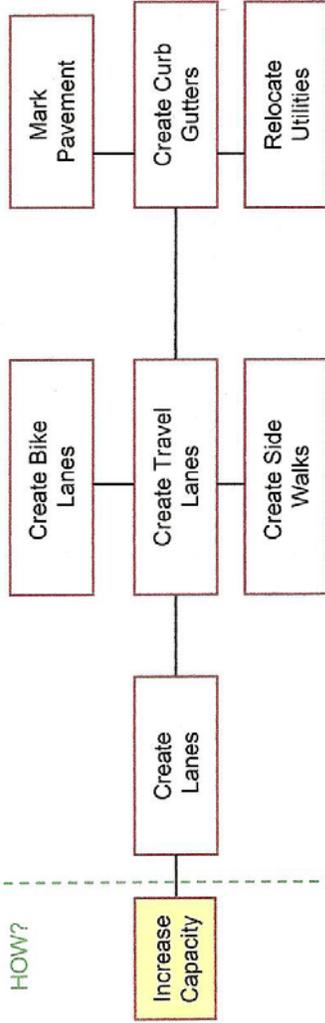
- **Development Phase** – During this phase, the VE Team developed each of the selected design alternatives. This effort included a detailed explanation of the idea with sketches as appropriate to clarify the idea from the original concept, advantages and disadvantages, a technical explanation and an estimation of the cost and resultant savings if implemented. (see the tabbed section – Study Results)
- **Recommendation Phase** – During this phase the VE Team reviews the alternative ideas to confirm which ones are appropriate for the project, have an opportunity for success and which will improve the value of the project if implemented.
- **Presentation Phase** – As noted earlier, the team made an informal “out-briefing” on the last day of the workshop, designed to inform the Owners and the Designers of the initial findings of the VE Study. This written report is intended to formalize those findings.

The following FAST Diagram and **Function – Worth - Cost** Analysis, were utilized to focus the team and stimulate brainstorming; a copy of the **Attendance Sheets** is also attached so that the reader can be informed about who participated in the Study proceedings.

# FAST DIAGRAM

← WHY?

→ HOW?



Function analysis and cost-worth



PROJECT: **STP-165-1(60) – Georgia Department of Transportation**  
**P.I. Number: 721820 Dekalb County, Snapfinger Road**

SHEET NO.: **1**  
of 2

NO.	ELEMENT	FUNCTION			COST (000)	WORTH (000)	COMMENTS
		VERB	Noun	KIND			
	<b>(EW) EARTHWORK</b>	<b>Create</b>	<b>elevation</b>	<b>B</b>	<b>\$1,600</b>	<b>\$900</b>	<b>C/W Ratio = 1.8</b>
		Support	Alignment	B			
		Level	Ground	S			
		Avoid	Flooding	RS			
		Connect	Points	B			
		Disturb	Land	U			
		<b>Enhance</b>	<b>Development and Commerce</b>	<b>HO</b>			
	<b>(SW) Stormwater</b>	<b>Protect</b>	<b>Traffic</b>	<b>RS</b>	<b>\$1,500</b>	<b>\$1,100</b>	<b>C/W Ratio = 1.4</b>
		Divert	Runoff	RS			
		Reduce	Runoff	RS			
		Filter	Runoff	RS			
		Route	Ground water	S	200	50	<b>C/W Ratio = 4</b>

Function defined as: **Action Verb**  
**Measurable Noun**

Kind: B = Basic  
S = Secondary  
RS = Required Secondary

HO = Higher Order  
LO = Lower Order  
U = Unwanted

Function analysis and cost-worth



PROJECT: **STP-165-1(60) – Georgia Department of Transportation**  
**P.I. Number: 721820 Dekalb County**

SHEET NO.: **2**

NO.	ELEMENT	FUNCTION			COST (000)	WORTH (000)	COMMENTS
		VERB	Noun	KIND			
	<b>(CI) CONCRETE ITEMS</b>	<b>Direct</b>	<b>Traffic</b>	<b>S</b>	<b>\$1,100</b>	<b>\$900</b>	<b>C/W Ratio = 1.2</b>
		Facilitate	Driveway Access	RS	54	54	C/W Ratio = 1.0
		Accommodate	Pedestrians	RS	472	472	C/W Ratio = 1.0
		Contain	Traffic	S			
		Contain	Drainage	S			
	<b>(AP) ASPHALT PAVEMENT</b>	<b>Create</b>	<b>Lanes</b>	<b>B</b>	<b>\$7,600</b>	<b>\$4,000</b>	<b>C/W Ratio = 1.9</b>
		Create	Bike Lanes	B	1,100	300	C/W Ratio = 3.6
		Shed	Water	RS			
		Route	traffic	HO			
		Limit	Access	HO			
		Improve	Connectivity	HO			
		Enhance	Safety	HO			

Function defined as: **Action Verb** Kind: B = Basic HO = Higher Order  
 Cost/Worth Ratio = **Measurable Noun** S = Secondary LO = Lower Order (Total  
 Cost ÷ Basic Worth) RS = Required Secondary

# CREATIVE IDEA LIST and EVALUATION



<b>PROJECT: STP-165-1(60) – Georgia Department of Transportation</b> <b>P.I. Number: 721820 Dekalb County - Snapfinger Road</b>		<b>SHEET NO.:</b> 1 of 1
NO.	IDEA DESCRIPTION	RATING
<b>(EW) Earthwork</b>		
<b>EW-1</b>	From Sta. 10+00 to approx. 20+00 use guard rails and steep slopes to reduce fill.	2
<b>(AP) Asphalt Pavement</b>		
<b>AP-1</b>	Remove bike lanes from travel lane areas and relocate with the sidewalks as 8' multi-use paths.	5
<b>AP-2</b>	Selectively retain the existing pavement between Sta. 17+00 to Sta. 29+00	4
<b>AP-3</b>	Maintain current Snapfinger Lake Road at existing location.	1
<b>AP-4</b>	Re-align Thompson Mill Rd to align with new subdivision entrance road.	DS
<b>AP-5</b>	Delete Pebble Dr. to Snapfinger Road access using a cul-de-sac	5
<b>AP-6</b>	Widen Pebble Drive to Huntsman Bend	DS
<b>AP-7</b>	Decrease all travel and turn lanes to 11' width; and use 17' medians.	5
<b>AP- 8</b>	Delete Post Office Drive.	5
<b>AP-9</b>	From Sta. 10+00 to approximately Sta. 26+00, retain existing roadway as is and add multi-use paths for pedestrians and bikes.	5
<b>AP-10</b>	From Sta. 83+00 to Wesley Chapel Road, re-align new roadway to existing Southwesterly R/W. Provide Intersection opening for existing shopping center and post office at easterly property line of Snapfinger Plaza.	DS
<b>(SW) Stormwater</b>		
<b>SW-1</b>	Delineate the probable locations for under drains. Stipulate conditions under which under drains would be used.	DS
<b>Rating: 1→2 = Generally not acceptable; 3 = Little Opportunity for Positive Change; 4→5 = Most likely to be Developed;</b> <b>DS = Design Suggestion; ABD = Already Being Done</b>		

