

VALUE ENGINEERING MOD 1 TRAINING REPORT

Turner Hill/Rockland Road Widening

Project No. STP-0006-00(891)

DeKalb County

PI No. 0006891

March 11, 2009

OWNER:



Georgia Department of Transportation
600 West Peachtree Street
Atlanta, GA 30308
(404.631.1770)

VALUE ENGINEERING
MOD 1 INSTRUCTOR:



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3200 Town Point Drive NW, Suite 100
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Project No. STP-0006-00(891)
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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

VALUE ENGINEERING MOD 1 TRAINING REPORT

Turner Hill/Rockland Road Widening

Project No. MSL00-0006-00(891)

DeKalb County

PI No. 0006891

March 11, 2009

Introduction

This report summarizes the results of a value engineering (VE) study for roadway improvements the Turner Hill/Rockland Road widening project in DeKalb County. The study was conducted as part of the Mod 1 training session held for select GDOT staff on February 23 to 27, 2009.

This project consists of widening Turner Hill Road from just south of the Hayden Quarry Road intersection to 1500 ft west of the McDaniel Mill Road intersection, a distance of 1.10 miles. Rockland Road and McDaniel Mill Road will be realigned at their intersections to provide a ninety degree intersection angle and the horizontal and vertical alignments will be designed to meet the 35mph design speed.

The proposed project will provide 2 – 12 ft lanes in each direction separated by a 24 ft raised, grassed median and include sidewalks, drainage, lighting and landscaping. This corridor serves as an important north-south connection in this part of DeKalb County with the tremendous amount of residential growth, this area will experience high pedestrian volumes. The total estimated project cost is \$18,454,776 including \$8,787,185 for R/W. On Monday, February 23, 2009, the design team gave an overview of the project to the VE team and on Friday, February 27, 2009, the VE Team presented their recommendations.

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

VE-11

DEVELOPMENT PHASE - EXECUTIVE SUMMARY	
Project: STP-0006-00(891), P.I. No. 0006891, DeKalb County	Team: One
Location: Turner Hill/Rockland Road Widening	Date: 2-23 to 2-27

This project consists of widening of Turner Hill Road from just south of the Hayden Quarry Road intersection to 1500' westward of the McDaniel Mill Road intersection in DeKalb County for a total of 1.40 miles. The Basic Function of this project is to increase capacity.

The VE Team identified 11 areas of opportunity for the project improvement and cost savings.

- Reduce the lane width from 12' to 11'.
- Reduce the median width from 24' to 16'
- Reduce Shoulder Width
- Eliminate Median
- Shorten Length of Project
- Minimize Pavement Structure
- Eliminate Lighting
- Delay Project
- Eliminate Multiuse Path
- Utilize Asphalt for multiuse path
- Eliminate signal at Star Magnolia

The implementation of the recommendations has a potential cost savings of \$4,062,000 or 22 % of the project cost.

VE-10

DEVELOPMENT PHASE – SUMMARY OF COST SAVINGS						
Project: STP-0006-00(891), P.I. No. 0006891, DeKalb County					Team No.: One	
Location: Turner Hill/Rockland Road Widening					Date: 2-23 to 2-27	
Idea No.	Creative Idea Description	Original Initial Cost	Proposed Initial Cost	Initial Cost Savings	Future Savings	Total Life Cycle Savings
A-1	Reduce Lane Width	\$3,533,000	\$3,407,000	\$126,000		
A-2	Reduce Median Width	\$5,188,000.00	\$5,027,000.00	\$161,000		
A-3	Reduce Shoulder Width	\$3,885,000	\$2,765,000	\$1,120,000		
A-5	Eliminate Median	\$6,705,000	\$5,675,000	\$1,030,000		
A-6	Shorten Length of Project	\$4,808,000	\$4,619,000	\$189,000		
B-1	Minimize Pavement Structure	\$3,432,000	\$2,620,000	\$812,000		
E-2	Eliminate Lighting	\$700,000	\$0	\$700,000		
G-2	Delay Project	\$424,100	\$0	\$424,100		
I-1	Eliminate Multiuse Path	\$393,000	\$276,000	\$117,000		
I-3	Utilize Asphalt for Multiuse Path	\$393,000	\$270,000	\$123,000		
J-1	Eliminate Signal @ Star Magnolia	\$316,620	\$211,080	\$106,000		

STUDY IDENTIFICATION

VE-1

STUDY IDENTIFICATION

Project: Turner Hill/Rockland Road Widening Roadway Improvements	Dates: February 23 – 27, 2009
Location: GDOT HQ – Atlanta, 4 th Floor; Conducted as part of Module 1 Training	

VE Team Members

Name:	Position:	Organization:	Telephone:
Nicoe Alexander	Design Group Manager	GDOT – Office of Urban Design	404-631-1717
Andy Casey	Assistant State Road Design Engineer	GDOT – Office of Road Design	404-631-1604
Jill Franks	Assistant Design Group Manager	GDOT – Office of Urban Design	404-631-1726
Jack Muirhead	Assistant Design Group Manager	GDOT – Office of Bridge Design	404-631-1877
Albert Shelby	Design Group Manager	GDOT – Office of Urban Design	404-631-1675

Project Description:

This project consists of widening of Turner Hill Road from just south of the Hayden Quarry Road intersection to 1500' westward of the McDaniel Mill Road intersection in DeKalb County for a total of 1.40 miles. The proposed project will provide two, 12' lanes in each direction separated by a 24' raised grassed median. The shoulders will be 16' on the west side and 22' on the east side. The 16' shoulder will contain curb & gutter, a 5' sidewalk and a 6' planting strip. The 22' shoulder will contain curb & gutter, a 10' sidewalk and a 6' planting strip. Landscaping, pedestrian lighting and street lighting will be included in the project. Rockland Road and McDaniel Mill Road will be realigned at their intersections to provide at least a 70 degree intersection angle and the horizontal and vertical alignments will be designed to meet 35 mph speed design. The project will also include new traffic signals at Turner Hill Road and Forest Lake Parkway and Turner Hill Road and Star Magnolia Drive.

Project Constraints:

1. Wetland Mitigation Site
2. FEMA Regulated Stream Crossing
3. Church and Cemetery
4. Historical Property – The Bailey House

**Figure 1
Project Vicinity Map**



County Map of Georgia

VE RECOMMENDATIONS

VE-9

DEVELOPMENT AND RECOMMENDATION PHASE			
Project: STP-0006-00(891), P.I. No. 0006891, DeKalb County			
Idea No.: A-1	Sheet No.: 1 of 3	CREATIVE IDEA: Reduce Lane Widths from 12' to 11'	
Comp By: AS	Date: 2-25-09	Checked By: CAC	Date: 2-26-09
<p><u>Original Concept:</u> The original concept has four 12-foot lanes from sta. 131+92 to 178+67. In addition it also includes 11-foot lanes from sta. 104+25 to 113+92.</p> <p><u>Proposed Change:</u> It is recommended to reduce the lane widths from 12' to 11' from sta. 131+92 to 178+67.</p> <p><u>Justification:</u> The base and design year ADT volumes and 6% trucks are not substantial enough to warrant 12' lanes in this area. 11' lanes would accommodate the traffic without a significant loss in LOS. This idea would reduce earthwork and right-of-way impacts while maintaining an acceptable LOS.</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<u>INITIAL COST:</u> Original	\$3,533,000		
Proposed	\$3,407,000		
Savings	\$126,000		
<u>FUTURE COST:</u> Savings			\$126,000
TOTAL PRESENT WORTH SAVINGS			\$126,000

VE-9C

CALCULATIONS						
Project: STP-0006-00(891), P.I. No. 0006891, DeKalb County					Idea No.: A-1 Client: GDOT Sheet of : 3 of 3	
STA. 131+92 TO 178+67						
LENGT H:	4675					
12' LANES WIDTH = 48'		224400	SF	24933.33	SY	
11' LANES WIDTH = 44'		205700	SF	22855.56	SY	
		<u>12' lanes</u>			<u>11' lanes</u>	
12.5 mm	165 lb/sy	2057.00	TN		1885.58	TN
19 mm	440 lb/sy	5485.33	TN		5028.22	TN
25 mm	660 lb/sy	8228.00	TN		7542.33	TN
GAB	12"	16372.8 9	TN		15008.48	TN
BTC		2992.00	GAL		2742.67	GAL
5300	171.42	5128.58	\$66.98	\$343,512.51		
10631	457.11	10173.8 9	\$90.02	\$915,853.48		
15562	685.67	14876.3 3	\$59.90	\$891,092.37		
55838	1364.41	54473.5 9	\$22.76	\$1,239,818.97		
8005	249.33	7755.67	\$2.13	\$16,519.57		
				\$3,406,796.89		

VE-9

DEVELOPMENT AND RECOMMENDATION PHASE			
Project: STP-0006-00(891), P.I. No. 0006891, DeKalb County			
Idea No.: A-2	Sheet No.: 1 of 3	CREATIVE IDEA: Reduce the median width from 24-ft to 16-ft.	
Comp By: AS Date: 2-26-09 Checked By: CAC Date: 2-26-09			
<p>Original Concept: Original proposal has a 24-foot raised grassed median. The speed design is 35 mph. The Base 2010 ADT = 16,500; Design 2030 ADT = 23,700.</p> <p>Proposed Change: Reduce the raised median from 24-foot grassed to 16-foot grassed.</p> <p>Justification: For the base and design year ADT volumes for this roadway classification, The GDOT Design Policy Manual for arterial medians (section 6.8.2) calls for a 5-lane section. If the median is retained due to the positive safety value of the median, the footprint of the median should be minimized to decrease earthwork and right-of-way requirements. This has been successfully accomplished by GDOT on other arterial routes in other counties and cities with much higher traffic volumes.</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	\$5,188,000		
Proposed	\$5,027,000		
Savings	\$161,000		
FUTURE COST: Savings			
TOTAL PRESENT WORTH SAVINGS			\$161,000

VE-9C

CALCULATIONS	
Project: STP-0006-00(891), P.I. No. 0006891, DeKalb County	Idea No.: A-2 Client: GDOT Sheet of : 3 of 3
<p>Reduction of the median from 24-ft to 16-ft is an 8' reduction of the footprint, a 33% reduction of width.</p> <p><u>Earthwork</u> Reduction of the median reduces the earthwork in the area of stations 124+50 to 125+00; 131+50 to 138+00 and 146+00 to 149+00; for approximately 1000' of impact to the largest areas of cut and fill. Approximately saving 33% of the earthwork costs, or 33% * $\\$1,100,000.00 = \underline{\\$36,300.00}$.</p> <p><u>Right-of-Way</u> Eliminating the 8' of median width for the 1000' reduces 8000 sf of ROW $8000 \text{ sf} * \\$15.50/\text{sf} = \underline{\\$124,000.00}$.</p> <p>Since the median is grassed, there will be a slight savings in grassing quantities, as well as some savings in median pavement and type 7 curb and gutter, but not appreciable.</p> <p>Total savings: Grading Complete: $\\$1,100,000.00 - \\$36,300.00 = \\$1,063,700.00$ – new lump sum Right-of-Way: $\\$4,087,063.00 - \\$124,000.00 = \\$3,963,063.00$ – new price</p> <p>TOTAL PRICE SAVINGS: <u>\\$160,300.00</u></p>	

VE-9

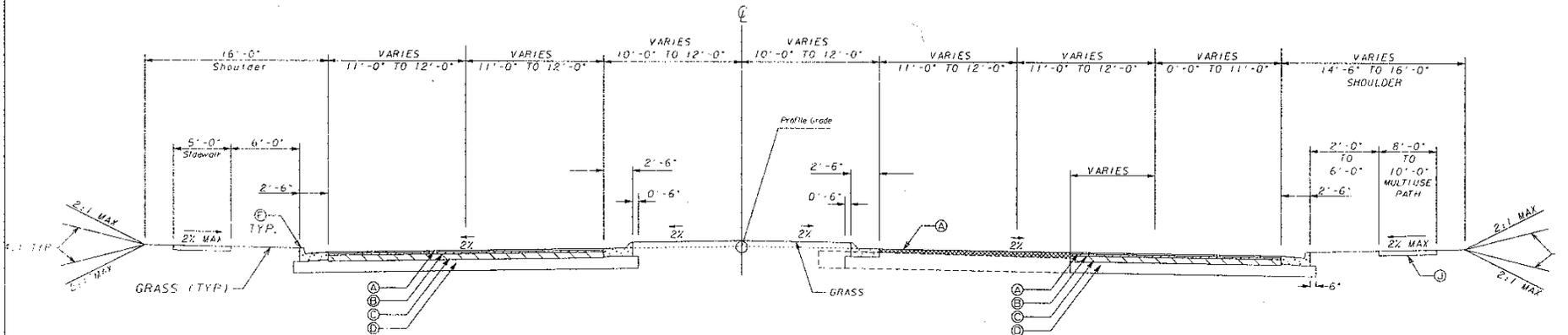
DEVELOPMENT AND RECOMMENDATION PHASE			
Project: STP-0006-00(891), P.I. No. 0006891, DeKalb County			
Idea No.: A-3	Sheet No.: 1 of 4	CREATIVE IDEA: Reduce Shoulder Width	
Comp By: CAC		Date: 2-25-09	Checked By: Date: 2-26-09
<p>Original Concept: The original typical section includes a 16' wide shoulder on the westside and a 22' wide shoulder on the east side of Turner hill Road</p> <p>Proposed Change: It is recommended that the westside shoulder width be reduced from a 16' to a 12' and the eastside shoulder width be reduced from a 22' to a 12'.</p> <p>Justification: The larger shoulder width is not a requirement but rather a preference. By decreasing the shoulder width, the cost of earthwork and r/w decreases while maintaining the basic function of the shoulder. This proposal assumes that the 10' multi-use path and lighting is eliminated or the width reduced from the project.</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	\$3,885,000		
Proposed	\$2,765,000		
Savings	\$1,120,000		
FUTURE COST: Savings			
TOTAL PRESENT WORTH SAVINGS			\$1,120,000

IDEA: A-3

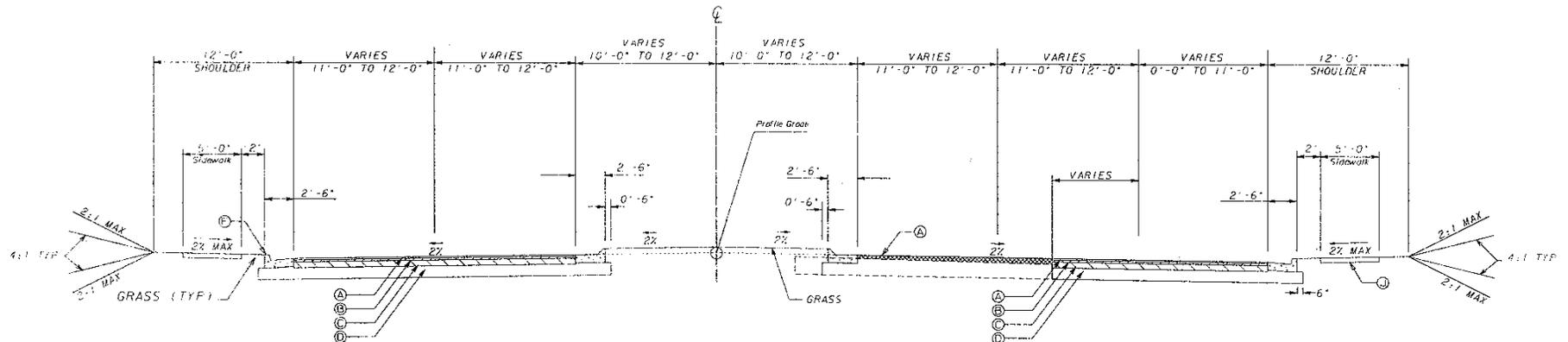
STP-0006-00(891) P.I.No 000689)

DeKalb

ORIGINAL CONCEPT



PROPOSED CONCEPT



A-3-1

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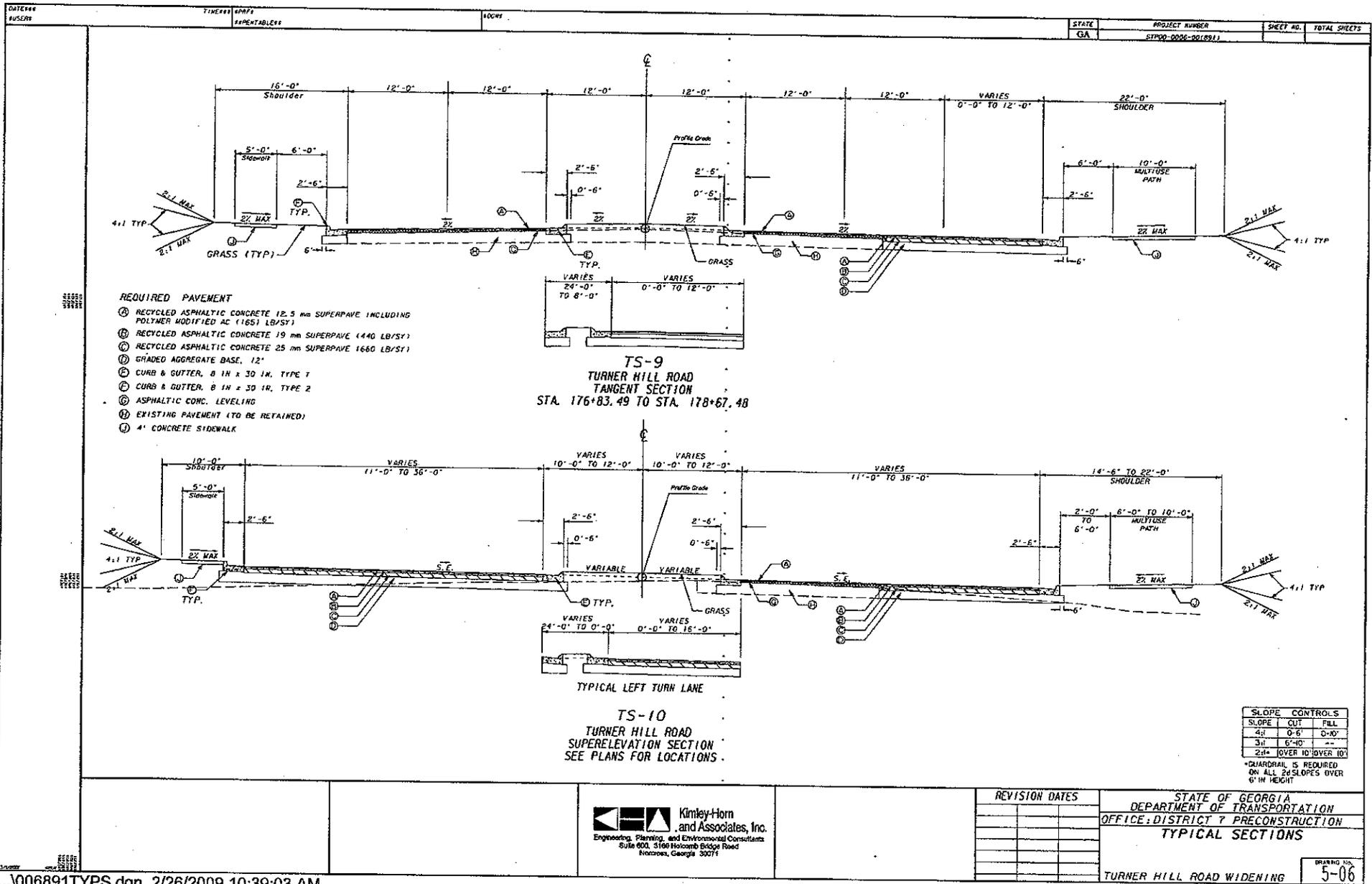
VE-9C

CALCULATIONS	
Project: STP-0006-00(891), P.I. No. 0006891, DeKalb County	Idea No. : A-3 Client: GDOT Sheet 4 of 4
Original Concept: Earthwork – Grading Complete = LS = \$1,100,000 Required Right of Way = 285,008 sf = \$2,885,103 = \$10.12/sf (avg. cost)	
Proposed Concept: Earthwork – Grading Complete Estimate approx. 15% reduction in the amount of earthwork. $\$1,100,000 * (0.85) = \$935,000$	
<u>Required Right of Way with reduction in Shoulder Width</u> Length = 7443' Westside Shoulder Reduction = 16'-12' = 4' Eastside Shoulder Reduction = 22'-12' = 10' Reduction in Required Right of Way = $7443' * 14' = 104,202$ sf Total Required Right of Way = $285,008$ sf – $104,202 = 180,806$ sf $180,806 * \$10.12/\text{sf} = \$1,829,757$	

VE-9

DEVELOPMENT AND RECOMMENDATION PHASE			
Project: STP-0006-00(891), P.I. No. 0006891, DeKalb County			
Idea No.: A-5	Sheet No.: 1-4	CREATIVE IDEA: Eliminate median	
Comp By: AS	Date: 2-26-09	Checked By:	Date: 2-26-09
<p>Original Concept: Original proposal has a 24-foot raised grassed median. The speed design is 35 mph. The Base 2010 ADT = 16,500; Design 2030 ADT = 23,700.</p> <p>Proposed Change: Eliminate the raised median and have a four lane section, widening at the intersections for turn lanes.</p> <p>Justification: For the base and design year ADT volumes for this roadway classification, The GDOT Design Policy Manual for arterial medians (section 6.8.2) calls for a 5-lane section. Because this project has very limited driveways, the two-way left turn lane (TWLTL) is only required as a left turn lane at the intersections (signalized and un-signalized locations). Therefore in the areas between intersections, a 4-lane undivided section significantly reduces the borrow earthwork and the right-of-way requirements while maintaining an acceptable LOS.</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	\$6,705,000		
Proposed	\$5,675,000		
Savings	\$1,030,000		
FUTURE COST: Savings			
TOTAL PRESENT WORTH SAVINGS			\$1,030,000

IDEA: A-5



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SKETCH A-5-1

**Kimley-Horn
and Associates, Inc.**
Engineering, Planning, and Environmental Consultants
Suite 600, 5166 Holcomb Bridge Road
Norcross, Georgia 30071

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: DISTRICT 7 PRECONSTRUCTION
TYPICAL SECTIONS

TURNER HILL ROAD WIDENING

DRAWING NO.
5-06

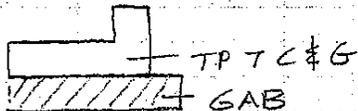
PROJECT: TURNER HILL ROAD WIDENING
P.I. 0006891

IDEA A-5: ELIMINATE MEDIAN

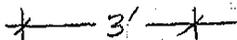
TP 7 C&G KHA: 10704 LF @ \$13.68 = \$146,430.72
 GDOT: measured using complex shapes in microstation
 246.756 - median #1
 2997.271 - median #2
 2049.9157 - median #3
 2649.25 - median #4
 2198.06 - median #5
 10141.2527 @ \$13.68 = \$138,732.34

Elimination of median saves **\$146,430.72** for C&G TP 7

GAB under median KHA: 10704 LF x 3 FT = 32112 SF
 = 3568 SY GAB



3568 SY @ \$22.76 = \$81,207.68



Elimination of median saves **\$81,207.68** for GAB under C&G

Concrete median, 6 IN (for areas less than 6' to pave in median that cannot be grassed)

KHA: 1165 SY @ \$56.65 = **\$65997.25**

EARTHWORK

This is a grading complete job so earthwork volumes were not provided. Currently earthwork is a Lump Sum of \$1,000,000.00

Eliminating the median significantly reduces the earthwork in the area of stations 124+50 to 125+00 = 50'
 131+50 to 138+00 = 650'
 146+00 to 149+00 = 300'

For a total of 1000' of the largest areas of cut and fill. Approximately 30% of the overall earthwork could be avoided for a savings of 30% x \$1,000,000.00 = **\$330,000.00**

ROW

Eliminating the median saves ROW costs in the same areas as the reduced earthwork, for 1000' ROW would be pulled in by 24' for a 24000 SF savings in ROW.

No. 937 811E
Engineer's Computation Pad



IDEA: A-5

A-5-4

PROJECT: TURNER HILL ROAD WIDENING
P.I. 0006891

IDEA: A-5: ELIMINATE MEDIAN

ROW (cont.)

24,000 SF of ROW savings @ \$15.50/sf = \$372000.00

LIFE CYCLE COSTS OF MEDIAN GRASS MAINTENANCE

Elimination of the grassed median eliminates future maintenance costs by the county.

- Area to maintain = 1556.71 = median #1
- 14304.82 = median #2
- 7315.39 = median #3
- 11549.24 = median #4
- 6137.60 = median #5
- 40863.76 SF = .9 ACRES

Every 3 week maintenance = 17 visits per year @ \$100/visit = \$1700/year x 20 year life cycle = \$34,000

TOTAL SAVINGS

TP 7 C&G	=	\$146,430.72	
GAB	=	\$81,207.68	
Median	=	\$65,997.25	
Earthwork	=	\$330,000.00	
ROW	=	\$372,000.00	
Life Cycle	=	\$34,000.00	
		\$1,029,635.65	TOTAL

No. 937 811E
Engineer's Computation Pad



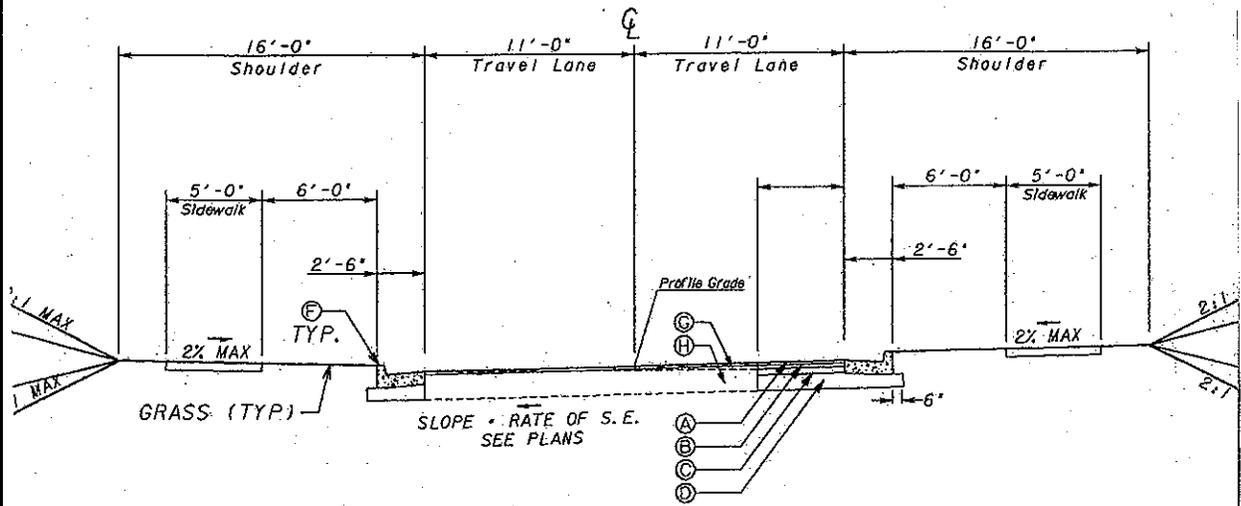
VE-9

DEVELOPMENT AND RECOMMENDATION PHASE			
Project: STP-0006-00(891), P.I. No. 0006891, DeKalb County			
Idea No.: A-6	Sheet No.: 1 of 6	CREATIVE IDEA: Shorten Length of Project	
Comp By: NA		Date: 2-25-09	Checked By: Date: 2-26-09
<p>Original Concept: The project proposes to begin approximately 1500' west of McDaniel Mill Road at STA 104+25.</p> <p>Proposed Change: It is recommended to begin project approximately 700' west of McDaniel Mill Road at STA 112+00, thus reducing the project length by 775'</p> <p>Justification: Begin shortening the project length, you can reduce the amount of paving & earthwork. The traffic analysis shows that the logical termini is McDaniel Mill Road. The traffic drops along Rockland Road from 18,700 vpd to 11,800 vpd from the west side of McDaniel Mill Road to the east side of McDaniel Mill Road. Also, the project ties into the existing grade at STA 112+00. A horizontal curve can be added to tie into the existing alignment. Although earthwork calculations were not performed, there will be some added savings with this elimination of the pavement section.</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	\$ 4,808,000		
Proposed	\$ 4,619,000		
Savings	\$ 189,000		
FUTURE COST: Savings			\$ 189,000
TOTAL PRESENT WORTH SAVINGS			\$189,000

SKETCH

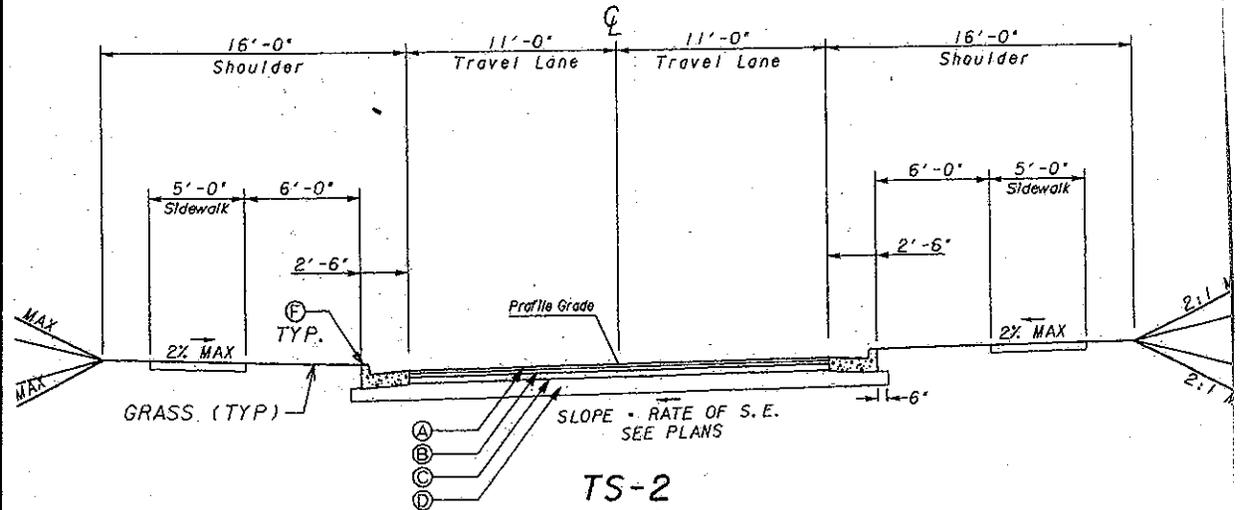
Project: STP00-0006-00(891), Dekalb Co.: Turner Hill Widening

Idea No.: A-6 - 1
Client: Dekalb/GDOT
Sheet 2 of 6



SUPER ELEVATED SECTION

TS-1
ROCKLAND ROAD
SUPERELEVATION SECTION
STA. 104+25.00 TO STA. 106+50.00 (+/-)

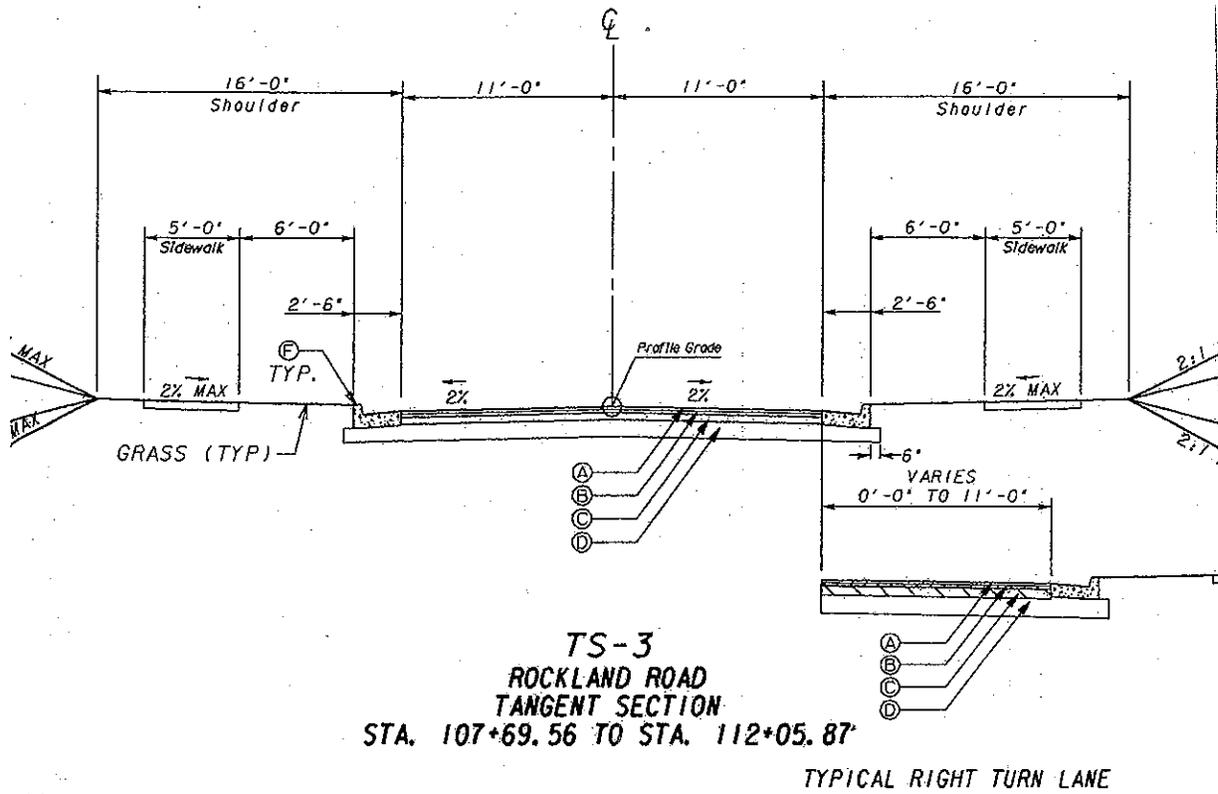


TS-2
ROCKLAND ROAD
SUPERELEVATION SECTION
STA. 106+50.00 (+/-) TO STA. 107+69.56

SKETCH

Project: STP00-0006-00(891), Dekalb Co.: Turner Hill Widening

Idea No.: A-6-Z
Client: Dekalb/GDOT
Sheet 3 of 6



CALCULATIONS

Project: STP00-0006-00(891), Dekalb Co.: Turner Hill Widening

Idea No.: A-6-4
Client: Dekalb/GDOT
Sheet 5 of 6:

GAB to TN

$$55838 \text{ SY} @ 12" = 55838 \text{ SY} \left(\frac{9 \text{ sf}}{\text{SY}} \right) \times 12" \left(\frac{146}{12"} \right) = 502542 \text{ cf}$$

$$801 \text{ SY} @ 4" = 801 \text{ SY} \left(\frac{9 \text{ sf}}{\text{SY}} \right) \times 4" \left(\frac{18}{12"} \right) = 2403 \text{ cf}$$

$$\underline{504945 \text{ cf}}$$

$$504945 \text{ cf} \left(\frac{150 \text{ lb}}{\text{cf}} \right) = 75,741,750 \text{ lb} \left(\frac{1 \text{ TN}}{2000 \text{ lb}} \right) = 37870.9 \text{ TN}$$

$$\text{GAB} = 37871 \text{ TN}$$

STA 104+25 - 106+50

$$L = 225' \quad 4500 \text{ sf} \left(\frac{165 \text{ lb}}{\text{SY}} \right) \left(\frac{1 \text{ SY}}{9 \text{ sf}} \right) = 82500 \text{ lb} \approx 41.25 \text{ TN}$$

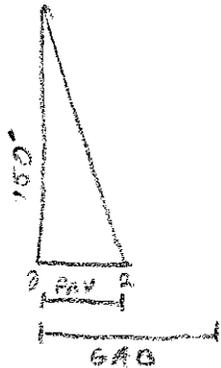
$$W = 20'$$

$$A = \frac{1}{2} ($$

$$A = 4500 \text{ sf}$$

$$t = 1.5"$$

STA 105+00 - 106+50



$$A_1 = \frac{1}{2} (150)(2) = 150 \text{ sf} \approx 16.7 \text{ SY}$$

$$A_{\text{GAB}} = \frac{1}{2} (150)(2) = 150 \text{ sf} \approx 16.7 \text{ SY}$$

$$\text{TN}_{12.5} = 16.7 \text{ SY} \left(\frac{165 \text{ lb}}{\text{SY}} \right) \left(\frac{1 \text{ TN}}{2000 \text{ lb}} \right) = 1.38 \text{ TN}$$

$$\text{TN}_{19} = 16.7 \text{ SY} \left(\frac{440 \text{ lb}}{\text{SY}} \right) \left(\frac{1 \text{ TN}}{2000 \text{ lb}} \right) = 3.67 \text{ TN}$$

$$\text{TN}_{25} = 16.7 \text{ SY} \left(\frac{660 \text{ lb}}{\text{SY}} \right) \left(\frac{1 \text{ TN}}{2000 \text{ lb}} \right) = 5.51 \text{ TN}$$

$$\text{GAB} = 2(225' \times 3') + 150 \text{ sf} = 1500 \text{ sf} = 166.7 \text{ SY}$$



GAB

$$1350 \text{ sf} + A_1 = 1500 \text{ sf}$$

CALCULATIONS

Project: STP00-0006-00(891), Dekalb Co.: Turner Hill
Widening

Idea No.: A-6-3
Client: Dekalb/GDOT
Sheet 6 of 6:

STA 106+50 + 112+00

$$L = 550'$$

$$A_{GAB} = 550' \times 28' = 15400 \text{ sf} \approx 1711.1 \text{ SY}$$

$$W_1 = 22'$$

$$A_1 = 550' \times 22' = 12100 \text{ sf} \approx 1344.4 \text{ SY}$$

$$W_2 = 28'$$

$$TN_{12.5} = 1344.4 \text{ SY} (165 \text{ lb/SY}) (1 \text{ TN}/2000 \text{ lb}) = 110.9 \text{ TN}$$

$$TN_{19} = 1344.4 \text{ SY} (440 \text{ lb/SY}) (1 \text{ TN}/2000 \text{ lb}) = 295.8 \text{ TN}$$

$$TN_{25} = 1344.4 \text{ SY} (660 \text{ lb/SY}) (1 \text{ TN}/2000 \text{ lb}) = 443.7 \text{ TN}$$

C & G Type 2

STA 104+25 to 112+00

$$L = 775'$$

$$C \& G = 2(775) = 1550 \text{ LF}$$

Totals

$$12.5 = 1.38 + 110.9 = 112.3 \approx 112 \text{ TN}$$

$$19 = 3.67 + 295.8 = 299.5 \approx 300 \text{ TN}$$

$$25 = 5.51 + 443.7 = 449.21 \approx 449 \text{ TN}$$

$$GAB = 161.7 + 1344.4 = 1511.1 \approx 1511 \text{ SY}$$

$$C \& G = 1550 \text{ LF}$$

$$\text{Catch Basin} = \# \text{ of Catch Basins Saved} = 8 \text{ EA}$$

$$P_{18in} = \text{Sys A} = 510 \text{ LF}$$

$$\text{Sidewalk} = 775'(2)(5w) = 861 \text{ SY}$$

VE-9

DEVELOPMENT AND RECOMMENDATION PHASE			
Project: STP-0006-00(891), P.I. No. 0006891, DeKalb County			
Idea No.: B-1	Sheet No.: 1 of 4	CREATIVE IDEA: Minimize Pavement Structure	
Comp By: CAC	Date: 2-25-09	Checked By:	Date: 2-26-09
<p>Original Concept: The original pavement design utilized 11 ½” of Recycled Asphalt on top of a 12” layer of Graded Aggregate Base.</p> <p>Proposed Change: It is recommended to utilize 9 ½” of Recycled Asphalt on top of 10” of Graded Aggregate Base.</p> <p>Justification: The original pavement structure is overdesigned by 10.2%. According to the Pavement Design Manual, “...Projects with urban shoulders, curb and gutter, shall be designed between 0 to 5% under designed.” The proposed pavement design has a structural number of 5.08 and the roadway has a required structural number of 5.44. Therefore the proposed pavement structure would be 6.7% under designed. However, the proposed design is well above the minimum for State Route pavement structures. In addition, this is an off system roadway with a low percentage of trucks (6%) thus making it a good candidate for a reduced design structure. Reducing the pavement structure would provide cost savings while providing an adequate design.</p> <p>Note: Polymer Modified Asphalt was used on both the Surface Course and the intermediate course and on this route it is not needed and it being eliminated will provide additional savings</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	\$3,432,000		
Proposed	\$2,620,000		
Savings	\$812,000		
FUTURE COST: Savings			\$812,000
TOTAL PRESENT WORTH SAVINGS			\$ 812,000

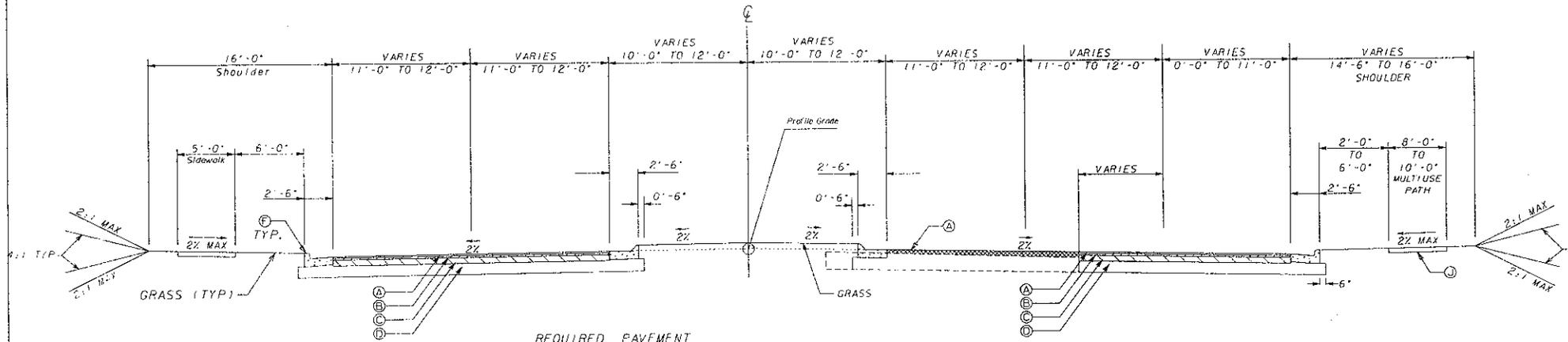
IDEA: B-1

STP-0006-00(891)

P.I. No. 0006891

DeKalb

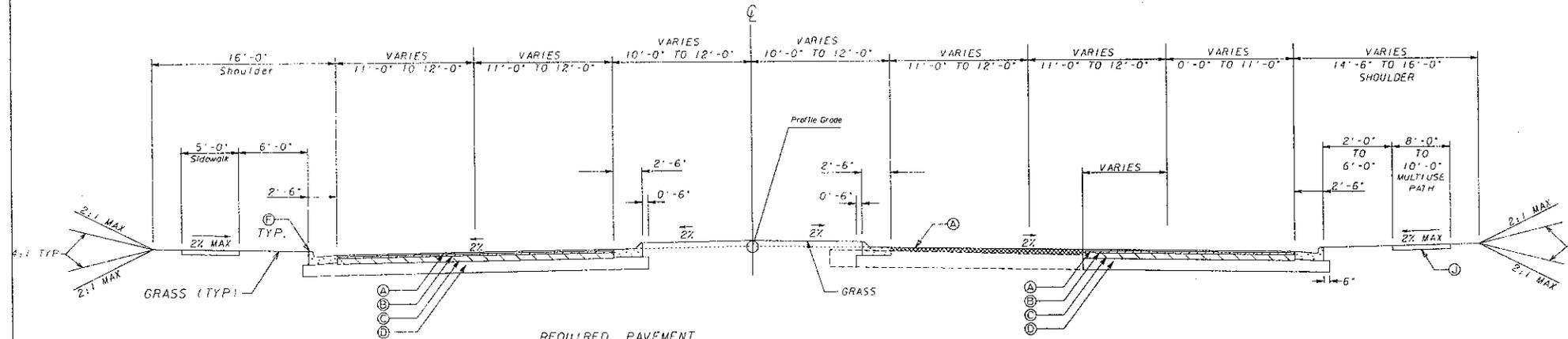
ORIGINAL CONCEPT



REQUIRED PAVEMENT

- Ⓐ 1 1/2" RECYCLED ASPHALTIC CONCRETE 12.5 mm SUPERPAVE INCLUDING POLYMER MODIFIED AC (165) LB/SY
- Ⓑ 4" RECYCLED ASPHALTIC CONCRETE 19 mm SUPERPAVE (440 LB/SY)
- Ⓒ 6" RECYCLED ASPHALTIC CONCRETE 25 mm SUPERPAVE (860 LB/SY)
- Ⓓ GRADED AGGREGATE BASE, 12"

PROPOSED CONCEPT



REQUIRED PAVEMENT

- Ⓐ 1 1/2" RECYCLED ASPHALTIC CONCRETE 12.5 mm SUPERPAVE (165) LB/SY
- Ⓑ 3" RECYCLED ASPHALTIC CONCRETE 19 mm SUPERPAVE (330 LB/SY)
- Ⓒ 5" RECYCLED ASPHALTIC CONCRETE 25 mm SUPERPAVE (550 LB/SY)
- Ⓓ GRADED AGGREGATE BASE, 10"

B-1-1

VE-9C

CALCULATIONS

Project: STP-0006-00(891), P.I. No. 0006891, DeKalb County

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

Area of Full Depth Pavement – 48,500 sy

Note: The area of Full Depth Pavement was determined by using the provided Detailed Estimate Report. No additional calculation was made to determine the area of pavement or the area of GAB.

ORIGINAL CONCEPT:

1 ½” – 12.5 mm Poly Mod – 165 lbs/sy * 48,500 sy = 8,002,500 lbs = 4001 tons

*4001 tn * \$66.98/tn = \$268,000*

4” – 19 mm PolyMod – 440 lbs/sy * 48,500 sy = 21,340,000 lbs = 10,670 tons

*10,670 tn * 90.02/tn = \$961,000*

6” – 25 mm Superpave – 660 lbs/sy * 48,500 sy = 32,010,000 lbs = 16,005 tons

*15,562 tn * 59.90/tn = \$932,000*

12” GAB = 55,838 sy

*55,838 tn * 22.76/sy = \$1,271,000*

PROPOSED CONCEPT:

1 ½” – 12.5 mm Poly Mod – 165 lbs/sy * 48,500 sy = 8,002,500 lbs = 4001 tons

*4001 tn * \$66.98/tn = \$268,000*

3” – 19 mm PolyMod – 330 lbs/sy * 48,500 sy = 16,005,000 lbs = 8,003 tons

*8,003 tn * \$90.02 = \$720,000*

5” – 25 mm Superpave – 550 lbs/sy * 48,500 sy = 26,675,000 lbs = 13,338 tons

*9,533 tn * \$59.90/tn = \$571,000*

10” GAB = 55,838 sy

*55,838 sy * \$19.00/sy = \$1,061,000*

SEE ALSO CALCULATION B-1-2 & B-1-3

FLEXIBLE PAVEMENT DESIGN ANALYSIS

Project: STP00-0006-00(891)

County: DeKalb

P.I. no.: 0006891

Description: Turner Hill/Rockland Road Widening

Traffic Data (NOTE: AADTs are one-way)

24-hour Truck Percentage: 6.00%

AADT initial year of design period: 9,200 vpd (2010)

AADT final year of design period: 11,850 vpd (2030)

Mean AADT (one-way): 10,525 vpd

Design Loading

Mean AADT	LDL	Trucks	18-K ESAL	Total Daily Loads
10,525	* 0.70	* 0.060	* 0.73	= 324

Total predicted design period loading = 324 * 20 * 365 = 2,365,200

Design Data

Terminal Serviceability Index: 2.50

Soil Support: 2.00

Regional Factor: 1.60

PROPOSED FLEXIBLE PAVEMENT STRUCTURE

Material	Thickness Inches	(mm)	Structural Coefficient	Structural Value
12.5 mm Superpave	1.50	(38)	0.44	0.66
19 mm Superpave	3.00	(76)	0.44	1.32
	1.00	(25)	0.30	0.30
25 mm Superpave	6.00	(152)	0.30	1.80
Graded Aggregate Base	12.00	(305)	0.16	1.92
Required SN = 5.44			Proposed SN = 6.00	

>>> Proposed pavement is 10.2% Overdesign <<<

Remarks: Original Concept/Design

Prepared by Andy Casey February 25, 2009
Date

Recommended State Road Design Engineer Date

Approved State Pavement Engineer Date

VE-9

DEVELOPMENT AND RECOMMENDATION PHASE			
Project: STP-0006-00(89), P.I. No. 0006891, DeKalb County			
Idea No.: E-2	Sheet No.: 1 of 1	CREATIVE IDEA: Eliminate Lighting	
Comp By: JTM Date: 2-25-09 Checked By: CAC Date: 2-26-09			
<p><u>Original Concept:</u></p> <p>Lighting, which includes roadway and pedestrian, is proposed throughout the project.</p> <p><u>Proposed Change:</u></p> <p>It is recommended that both the roadway and pedestrian lighting be eliminated from this project.</p> <p><u>Justification:</u></p> <p>The lighting for this project is not needed to satisfy the basic need and purpose. This is added for aesthetics only.</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<u>INITIAL COST:</u> Original	\$700,000		
Proposed	\$ 0		
Savings	\$700,000		
<u>FUTURE COST:</u> Savings			
TOTAL PRESENT WORTH SAVINGS			\$700,000

VE-9

DEVELOPMENT AND RECOMMENDATION PHASE			
Project: STP-0006-00(89), P.I. No. 0006891, DeKalb County			
Idea No.: G-2	Sheet No.: 1 of 2	CREATIVE IDEA: Delay Project	
Comp By: JTM	Date: 2-26-2009	Checked By: Team	Date: 2-26-09
<p><u>Original Concept:</u></p> <p>In order to reduce impacts to a wetland mitigation site, Type 2A, Type 2B, and type 2C concrete side barrier is utilized along the west side of Turner Hill Road.</p> <p><u>Proposed Change:</u></p> <p>It is recommended that the project be delayed. until after the proposed development is constructed .</p> <p><u>Justification:</u></p> <p>If the project is delayed, allowing the proposed development to be constructed, thus eliminate the need to avoid the wetlands, removes the need to construct the concrete barrier retaining walls. This in effect results saving in construction cost and time.</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<u>INITIAL COST:</u> Original	424,100		
Proposed	0		
Savings	\$424,100		
<u>FUTURE COST:</u> Savings			\$424,100
TOTAL PRESENT WORTH SAVINGS			\$424,100

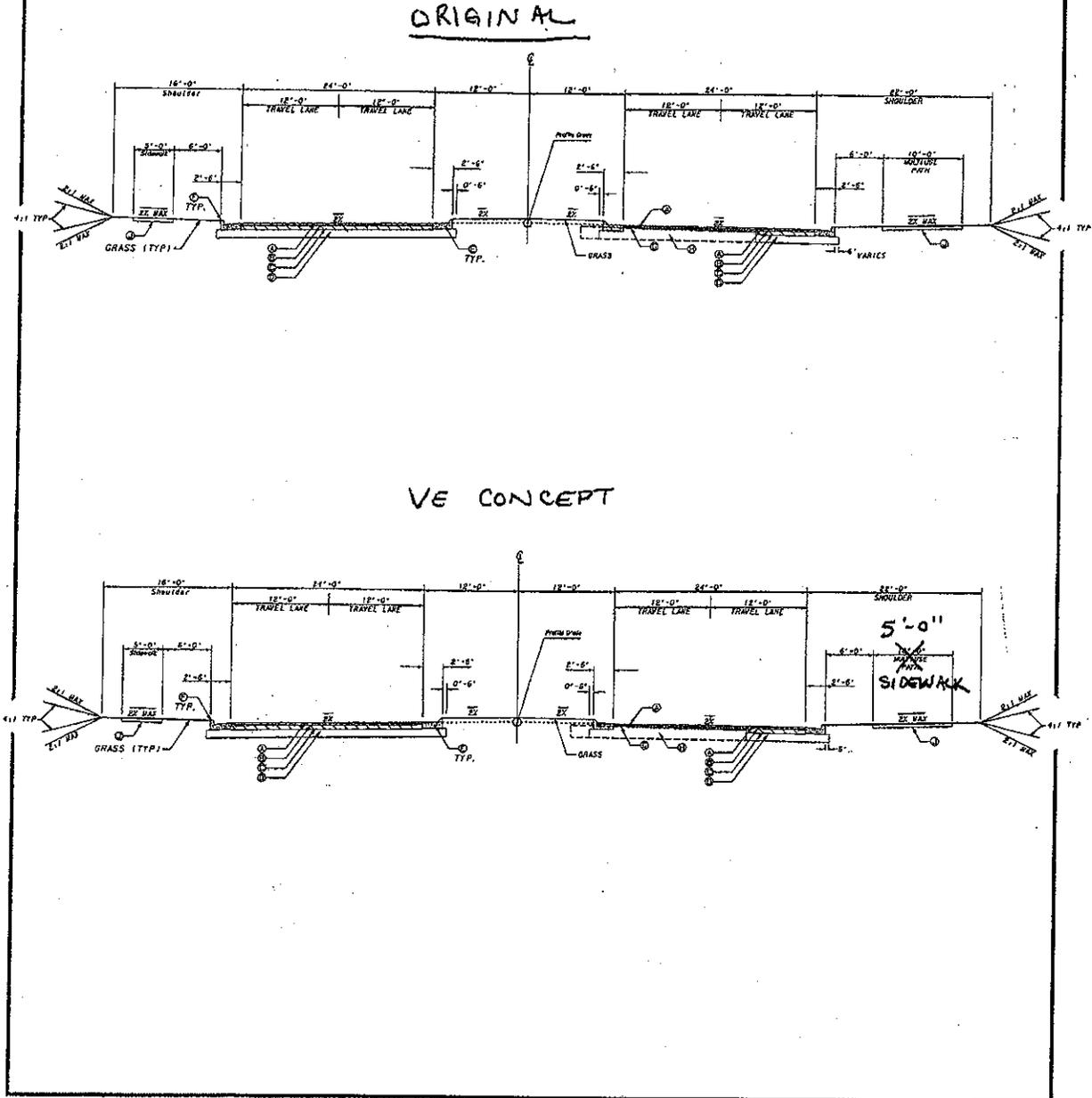
VE-9

DEVELOPMENT AND RECOMMENDATION PHASE			
Project: STP-0006-00(891); PI 0006891; Turner Hill/Rockdale Road Widening			
Idea No.: I-1	Sheet No.: 1 of 4	CREATIVE IDEA: Eliminate Multiuse Path	
Comp By: J.L.F.	Date: 2-26-09	Checked By:	Date: 2-26-09
<u>Original Concept:</u>			
The proposed project calls for a 10' concrete multiuse path starting at Station 20+90 RT on McDaniel Mill Road. The path continues west toward Turner Hill Road turns north and continued north on Turner Hill Road ending at Station 178+32.			
<u>Proposed Change:</u>			
It is recommended that the 10' wide concrete multiuse path width be minimized to a 5' concrete sidewalk.			
<u>Justification:</u>			
The 10' multiuse path on this project is proposed to connect to a future multiuse path on McDaniel Mill Road. The construction of a 5' concrete sidewalk would still allow direct access to the future McDaniel Mill Road multiuse path and still provide pedestrian walkway along the project corridor. This change would reduce the construction cost of the pedestrian walkway. In addition, the path is not part of the basic Need and Purpose for the project.			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<u>INITIAL COST:</u> Original	\$393,000		
Proposed	\$276,000		
Savings	\$117,000		
<u>FUTURE COST:</u> Savings			
TOTAL PRESENT WORTH SAVINGS			\$117,000

SKETCH

Project: STP-0006-00(891); PI 0006891; Turner Hill/
Rockdale Road Widening

Idea No.: I-1
Client: DeKalb Co/GDOT
Sheet 2 of 4



I-1-1

VE-9C

CALCULATIONS	
Project: STP-0006-00(891); PI 0006891; Turner Hill/Rockdale Road Widening	Idea No.: I-1 Client: GDOT Sheet 4 of 4
<p>Length of 10' multiuse path along McDaniel: Sta. 20+90 to 26+00 = 510' Sta. 26+40 to 29+50 = 310'</p> <p>Length of 10' multiuse path along Turner Hill Road Sta. 118+10 to 126+42 = 732' Sta. 126+50 to 140+33 = 1383' Sta. 140+30 to 140+86 the path tapers to 5' wide = 280SF = 31 sq. yd. Sta. 142+23 to 166+51 = 2428' Sta. 167+28 to 175+03 = 775' Sta. 175+98 to 178+32 = 234</p> <p>Total length of 10' multiuse path = 6372' 6372' x 10' = 63720 sq. ft. = 7080 sq. yd. Taper of the path at 140+30 = 31 sq. yd.</p> <p>Total sq. yd. of 10' multiuse path = 7111 sq. yd.</p> <p>Reduce path to 5' wide: 6372' x 5' = 31868 sq. ft. = 3540 sq. yd. Taper of the path at 140+30 = 31 sq. yd.</p> <p>Total sq. yd of reduction = 3571 sq. yd.</p> <p>Total sq. yd. of concrete sidewalk = 11987 sq. yd. Total sq. yd of reduction = 3571 sq. yd.</p> <p>11987 sq. yd. – 3571 sq. yd. = 8416 sq. yd.</p> <p><u>8416 sq yd of concrete sidewalk, 4" to remain</u></p>	

VE-9

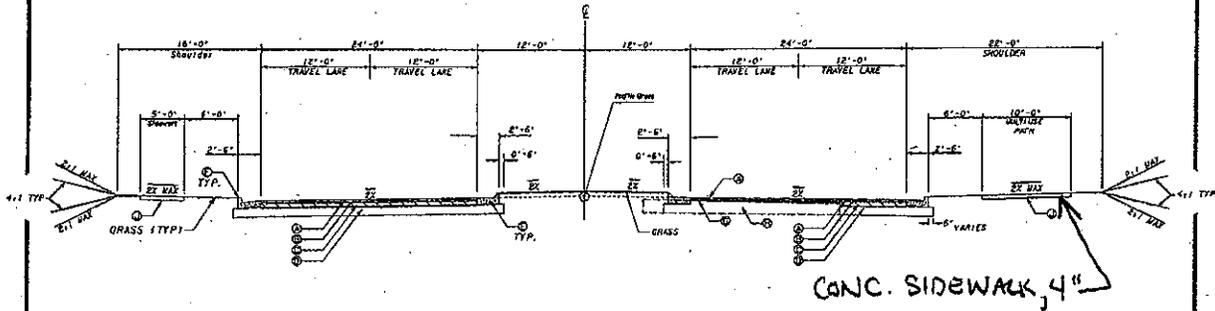
DEVELOPMENT AND RECOMMENDATION PHASE			
Project: STP-0006-00(891); PI 0006891; Turner Hill/Rockdale Road Widening			
Idea No.: I-3	Sheet No.: 1 of 4	CREATIVE IDEA: Utilize Asphalt for Multiuse Path	
Comp By: J.F. Date: 2-26-09		Checked By: Date: 2-26-09	
<p><u>Original Concept:</u> The proposed project calls for a 10' wide concrete multiuse path starting at Station 20+90 on McDaniel Mill Road. The path continues west toward Turner Hill Road then turns North and continues North on Turner Hill Road ending at Station 178+32. The current design has the path being constructed with 4" of PCC.</p> <p><u>Proposed Change:</u> It is recommended that the multiuse path be constructed of 4" – 9.5 mm asphaltic concrete instead of 4" of portland cement concrete sidewalk</p> <p><u>Justification:</u> The 10' multiuse path on this project is proposed to connect to a future multiuse path on McDaniel Road. The construction of a 10' asphalt multiuse path will reduce the cost of the project but still allow the same use of the 10' multiuse path. This change would reduce construction cost of the sidewalk and construction time.</p>			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
<u>INITIAL COST:</u> Original	\$393,000		
Proposed	\$270,000		
Savings	\$123,000		
<u>FUTURE COST:</u> Savings			
TOTAL PRESENT WORTH SAVINGS			\$123,000

SKETCH

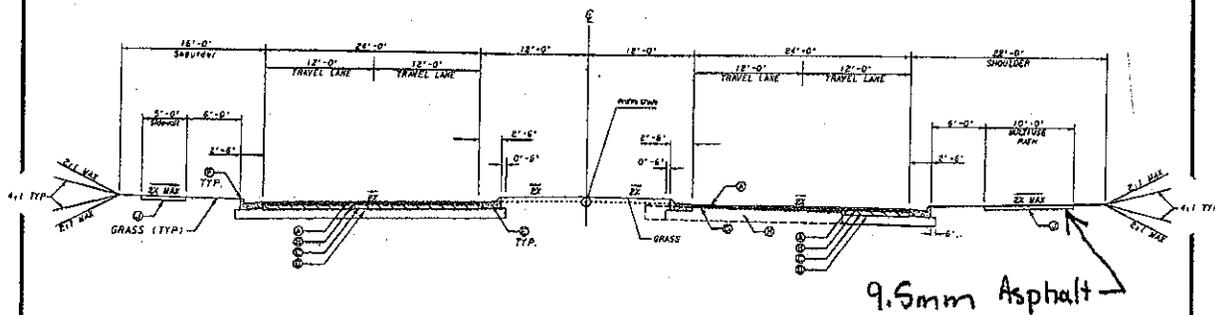
Project: STP-0006-00(891); PI 0006891; Turner Hill/
Rockdale Road Widening

Idea No.: I-3
Client: DeKalb Co/GDOT
Sheet 2 of 4

ORIGINAL



VE CONCEPT



I-3-1

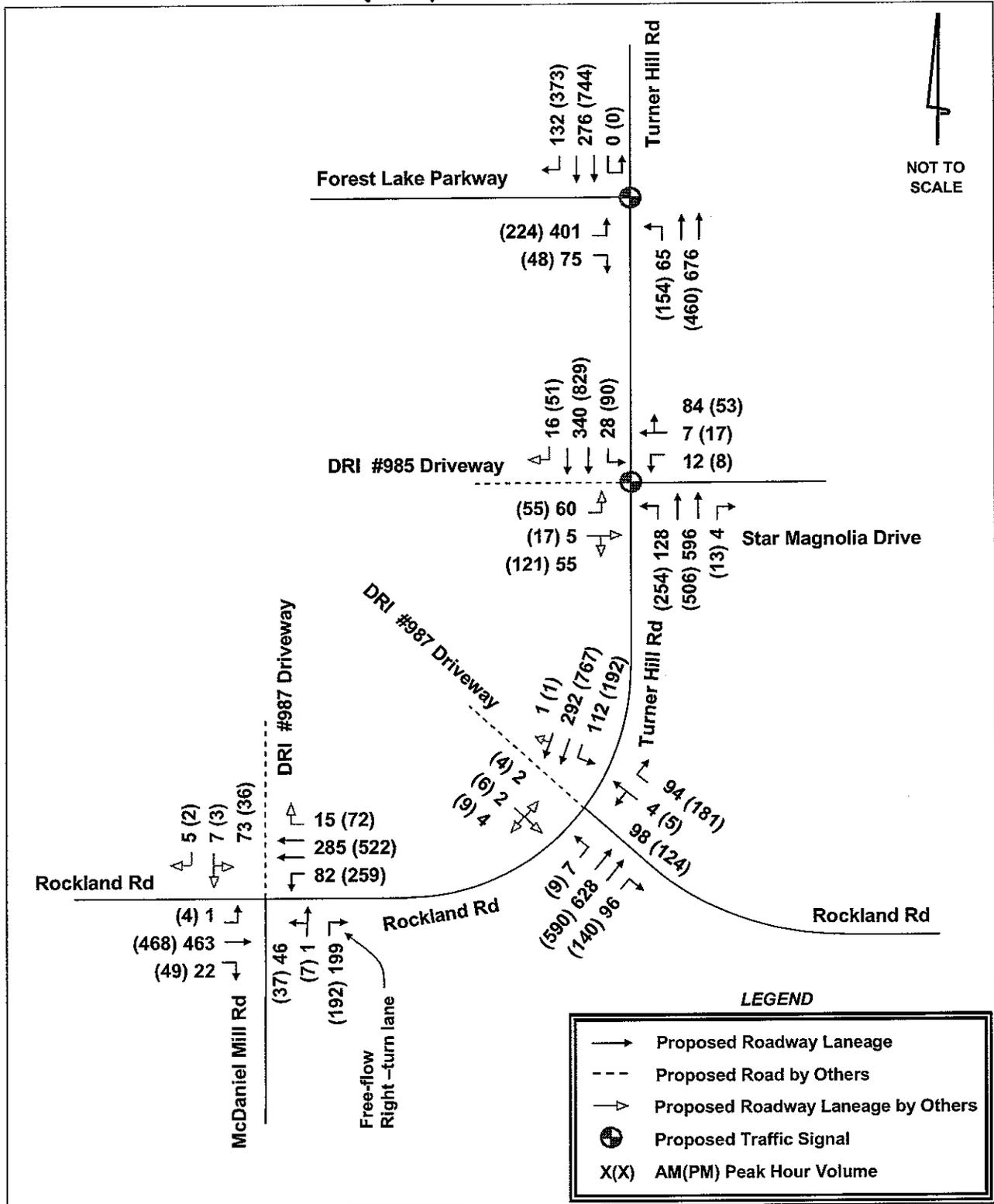
VE-9C

CALCULATIONS	
Project: STP-0006-00(891); PI 0006891; Turner Hill/Rockdale Road Widening	Idea No.: I-3 Client: GDOT Sheet 4 of 4
<p>Length of 5' concrete sidewalk to remain on West side of road:</p> <p>Sta. 104+25 to 117+46 = 1321' Sta. 118+40 to 141+14 = 2274' + 45' of curved section = 45' + 45' of curved section = 45' Sta. 142+13 to 152+48 = 1035' Sta. 152+90 to 166+58 = 1368' Sta. 167+22 to 176+16 = 894' Sta. 176+70 to 178+50 = 180' Total length = 7162'</p> <p>Total 5' concrete sidewalk to remain on West side = 7162' x 5' = 35810 sq. ft. = 3979 sq. yd.</p> <p>Length of 5' concrete sidewalk to remain on East side of road:</p> <p>Sta. 104+25 to 107+62 = 337' Sta. 108+12 to 117+14 = 902' Sta. 25+28 to 29+25 = 397' Total length = 1636'</p> <p>Total 5' concrete sidewalk to remain on East side = 1636' x 5' = 8180 sq. ft. = 909 sq. yd.</p> <p>Total 5' concrete sidewalk to remain on West side = 7162' x 5' = 35810 sq. ft. = 3979 sq. yd. Total 5' concrete sidewalk to remain on East side = 1636' x 5' = 8180 sq. ft. = 909 sq. yd. Total 5' concrete sidewalk to remain = 4888 sq. yd.</p> <p>Original total quantity = 11987 sq. yd. 5' concrete sidewalk to remain = 4888 sq. yd. 11987 sq. yd. - 4888 sq. yd. = 7099 sq. yd to be convert to asphaltic concrete. Assume 9.5 mm asphaltic concrete multiuse path thickness to be 4 inches = (440 lbs/sq. yd.) (7099 sq. yd) x (440 lbs/sq. yd) x (ton/2000 lbs) = 1562 tons</p>	

VE-9

DEVELOPMENT AND RECOMMENDATION PHASE			
Project: STP00-0006-00(891), DeKalb Co.: Turner Hill Widening			
Idea No.: J-1	Sheet No.: 1 of	CREATIVE IDEA: Eliminate Signal @ Star Magnolia Dr.	
Comp By: Nicoe Alexander Date: 2/26/09 Checked By: Team 1 Date: 2/26/09			
Original Concept: The project proposes two new signal installations			
Proposed Change: It is recommended to remove the signal at the Turner Hill Road/Star Magnolia Dr. intersection be removed.			
Justification: The design proposes to install the signal at this location with the DRI driveway forming the fourth leg of the intersection. This future development is proposed and will not be constructed prior to the letting of this project. Although a signal may be needed after this development, it is not warranted as part of this project. This intersection has an acceptable LOS in the base year without the proposed signal and future development.			
LIFE CYCLE COST SUMMARY	INITIAL Project Cost	FUTURE Project Cost	TOTAL Present Worth Cost
INITIAL COST: Original	\$ 316,620		
Proposed	\$ 211,080		
Savings	\$ 105,540		
FUTURE COST: Savings			\$106,000
TOTAL PRESENT WORTH SAVINGS			\$106,000

SKETCH



	<p>2010 Base Year Peak Hour Conditions</p>	<p>Turner Hill Road Widening</p>	<p>Figure 4</p>
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TWO-WAY STOP CONTROL SUMMARY

Analyst: Nicoe Alexander
 Agency/Co.: GDOT
 Date Performed: 2/26/2009
 Analysis Time Period: AM
 Intersection: Turner Hill Rd @ Star Magnolia
 Jurisdiction: Dekalb Co.
 Units: U. S. Customary
 Analysis Year: 2010
 Project ID: STP00-0006-00(891)
 East/West Street: Star Magnolia Dr.
 North/South Street: Turner Hill Rd
 Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Northbound			Southbound		
		1 L	2 T	3 R	4 L	5 T	6 R
Volume		596	4		28	340	
Peak-Hour Factor, PHF		0.95	0.95		0.95	0.95	
Hourly Flow Rate, HFR		627	4		29	357	
Percent Heavy Vehicles		--	--		6	--	--
Median Type/Storage		Undivided			/		
RT Channelized?							
Lanes		2	0		1	2	
Configuration		T	TR		L	T	
Upstream Signal?		No				No	

Minor Street:	Approach Movement	Westbound			Eastbound		
		7 L	8 T	9 R	10 L	11 T	12 R
Volume		12		84			
Peak Hour Factor, PHF		0.95		0.95			
Hourly Flow Rate, HFR		12		88			
Percent Heavy Vehicles		0		0			
Percent Grade (%)			2			2	
Flared Approach: Exists?/Storage					/		/
Lanes		1		1			
Configuration		L		R			

Delay, Queue Length, and Level of Service

Approach Movement	NB 1	SB 4	Westbound			Eastbound		
			7 L	8 R	9 L	10 L	11 T	12 R
Lane Config		L		L		R		
v (vph)		29		12		88		
C(m) (vph)		921		288		686		
v/c		0.03		0.04		0.13		
95% queue length		0.10		0.13		0.44		
Control Delay		9.0		18.0		11.0		
LOS		A		C		B		
Approach Delay					11.9			
Approach LOS					B			

TWO-WAY STOP CONTROL SUMMARY

Analyst: Nicoe Alexander
 Agency/Co.: GDOT
 Date Performed: 2/26/2009
 Analysis Time Period:
 Intersection: Turner Hill Rd @ Star Magnolia
 Jurisdiction: Dekalb Co.
 Units: U. S. Customary
 Analysis Year: 2010
 Project ID: STP00-0006-00(891)
 East/West Street: Star Magnolia Dr.
 North/South Street: Turner Hill Rd
 Intersection Orientation: NS Study period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street:	Approach Movement	Northbound			Southbound		
		1 L	2 T	3 R	4 L	5 T	6 R
Volume		506	13		90	829	
Peak-Hour Factor, PHF		0.95	0.95		0.95	0.95	
Hourly Flow Rate, HFR		532	13		94	872	
Percent Heavy Vehicles		--	--		6	--	--
Median Type/Storage		Undivided			/		
RT Channelized?							
Lanes		2	0		1	2	
Configuration		T	TR		L	T	
Upstream Signal?		No			No		

Minor Street:	Approach Movement	Westbound			Eastbound		
		7 L	8 T	9 R	10 L	11 T	12 R
Volume		8		53			
Peak Hour Factor, PHF		0.95		0.95			
Hourly Flow Rate, HFR		8		55			
Percent Heavy Vehicles		0		0			
Percent Grade (%)			2			2	
Flared Approach: Exists?/Storage		/			/		
Lanes		1		1			
Configuration		L		R			

Delay, Queue Length, and Level of Service

Approach Movement	NB 1	SB 4 L	Westbound			Eastbound		
			7 L	8	9 R	10	11	12
Lane Config								
v (vph)		94	8		55			
C(m) (vph)		993	173		732			
v/c		0.09	0.05		0.08			
95% queue length		0.31	0.14		0.24			
Control Delay		9.0	26.8		10.3			
LOS		A	D		B			
Approach Delay				12.4				
Approach LOS				B				

APPENDIX

VE-2

INFORMATION PHASE – SOURCES STP-0006-00(891), P.I. No. 0006891, DeKalb County

Approving/Authorizing Persons

Name:	Position:	Telephone:
Gerald M. Ross, P.E.	GDOT – Chief Engineer	404-631-1004

Personal Contacts

Name/Org.:	Telephone:	Notes:
Jerry Brooks, Kimley-Horn	678-502-1864	
Kevin Ergle, Kimley-Horn	678-533-3930	
Steven Lindsey, PBS&J	770-933-0280	
Melvin Waldrep, GDOT-D7	770-986-1297	
Mac Cranford, GDOT-D7	770-986-1113	
Troy Patterson, Eng. Services		Req. and rec'd item estimates

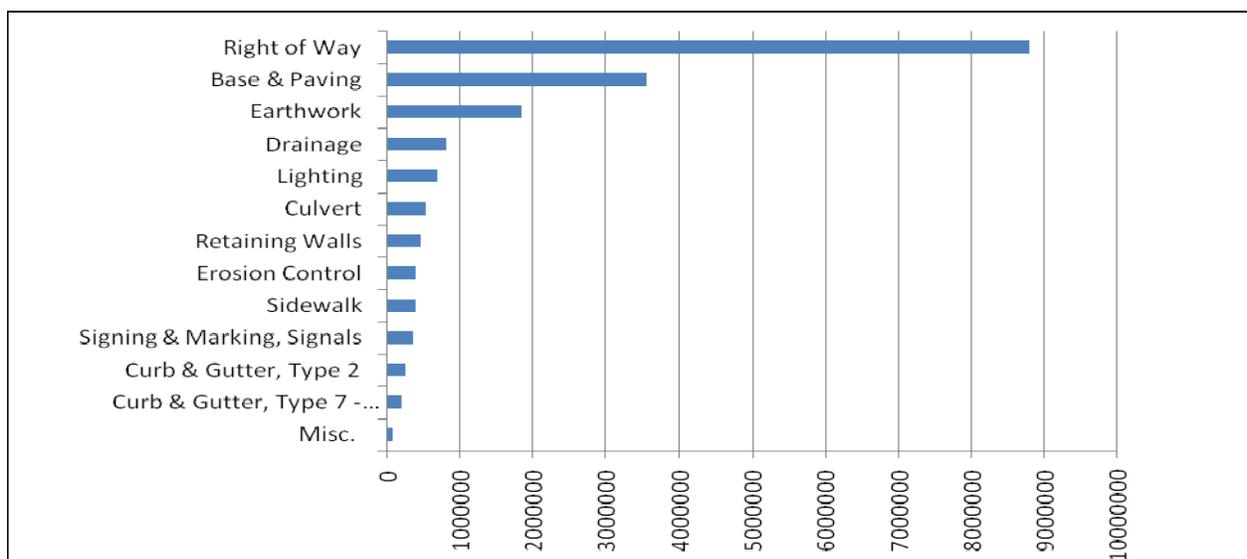
Documents/Abstracts

Reference:	Notes:
Preliminary Construction Plans	
Environmental Commitments	
Hydraulic Study	
Culvert Design Plans	
Detailed Cost Estimate	
Concept Report	
Traffic Analysis Report	
Electronic Microstation Files	

VE-3

INFORMATION PHASE – COST MODEL STP-0006-00(891), P.I. No. 0006891, DeKalb County

Item	Description	\$ Amount	% of Total Project
A	Right of Way	8,787,185	47.60
B	Base & Paving	3,557,470	19.30
C	Earthwork/Clearing and Grubbing	1,850,000	10.00
80% Cost Line			
D	Drainage	817,545	4.40
E	Lighting	700,000	3.80
F	Culvert	535,766	2.90
G	Retaining Walls	471,111	2.60
H	Erosion Control	409,000	2.20
I	Sidewalk	393,413	2.10
J	Signing & Marking, Signals	367,106	2.00
K	Curb & Gutter, Type 2	260,180	1.40
L	Curb & Gutter, Type 7 – Median Paving	212,000	1.10
M	Misc.	94,000	0.50
	TOTAL	18,454,776	100.00



VE-4

INFORMATION PHASE – FUNCTION ANALYSIS						
Project: STP-0006-00(891), P.I. No. 0006891, DeKalb County						
Project Function: Increase Capacity						
ITEM	DESCRIPTION	FUNCTION		INITIAL DOLLARS		
No.		Verb	Noun	Cost	Worth	Comments
A	Right of Way	Protect	Project	8,787,185	5,000,000	Reduce Footprint
B	Base & Paving	Carry	Traffic	3,557,470	2,500,000	Reduce Section Reduce Width
C	Earthwork/Clearing and Grubbing	Shapes	Project	1,850,000	1,000,000	Lower Profile
D	Drainage	Remove	Water	817,545	700,000	Reduce Section
E	Lighting	Illuminates	Project	700,000	0	Remove Lighting
F	Culvert	Provide	Crossing	535,766	500,000	Simpler Design (Similar Shapes)
G	Retaining Walls	Protects Support	Wetlands Roadway	471,111	62,000	Delay Project
H	Erosion Control	Filters	Runoff	409,000	350,000	Reduce Footprint
I	Sidewalk	Directs	Pedestrian	393,413	262,000	Reduce Width
J	Signing & Marking/Signals	Informs	Motorist	367,106	305,000	Remove Signal
K	Curb & Gutter, Type 2	Channels	Flow	260,180	260,180	No Change
L	Curb & Gutter, Type 7/Median Paving	Separates	Traffic	212,000	0	Remove Median

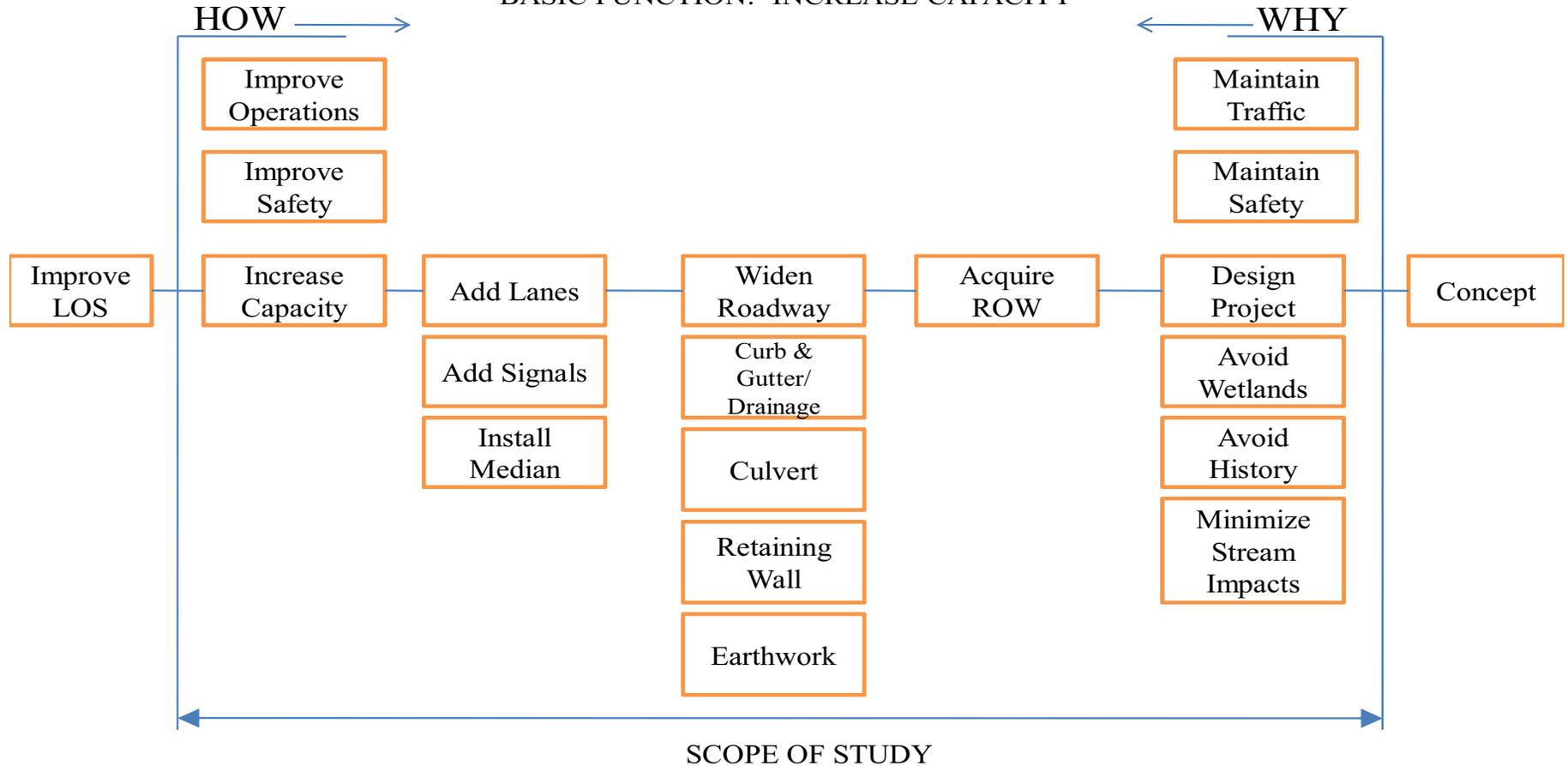
VE-5

INVESTIGATION PHASE - FAST DIAGRAM

TURNER HILL / ROCKLAND ROAD WIDENING

P.I. 0006891, DEKALB COUNTY

BASIC FUNCTION: INCREASE CAPACITY



VE-6 & 7 STP-0006-00(891), P.I. No. 0006891, DeKalb County

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
A-1	Reduce Lane Width	Reduces pavement cost, earthwork & R/W costs.	8
A-2	Reduce Median Width	Reduces pavement cost, earthwork & R/W costs.	9
A-3	Reduce Shoulder Width	Reduces earthwork & R/W costs.	9
A-4	Reduce Number of Lanes	Reduces pavement cost, earthwork, R/W costs & construction time. Lower LOS	5
A-5	Eliminate Median	Reduces pavement cost, earthwork, R/W costs & construction time. Lower LOS and safety.	6
A-6	Shorten Length of Project	Reduces pavement cost, earthwork, R/W costs & construction time.	8
A-7	Profile Grade Change	Reduces earthwork cost, construction time	3
B-1	Minimize Pavement Structure	Reduces pavement cost, reduce construction time.	9
B-2	Reduce Lane Width	Reduces pavement cost, earthwork & R/W costs.	8
B-3	Reduce Number of Lanes	Reduces pavement cost, earthwork, R/W costs & construction time. Lower LOS	5
B-4	Reduce Median Width	Reduces pavement cost, earthwork & R/W costs.	9
B-5	Reduce Paved Shoulder Width	Reduces pavement cost, earthwork & R/W costs.	9
B-6	Shorten Length of Project	Reduces pavement cost, earthwork, R/W costs & construction time.	8
B-7	Utilize Geogrid to reduce pavement Structure	Reduces pavement cost, reduce construction time.	6

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
B-8	Eliminate Turn Lanes	Reduces pavement cost, earthwork, R/W cost.	6
B-9	Utilize Alternate materials (Concrete)	Increases initial cost, construction time, staging issues.	3
B-10	Eliminate U-Turn eyebrows	Reduces pavement cost, R/W cost & construction time. Restricts U-turn movements at intersections.	3
B-11	Eliminate Driveways	Reduces construction cost.	3
C-1	Change Front/Back Slopes	Reduces earthwork, increases cost for guardrail.	3
C-2	Profile Grade Change	Reduces earthwork cost, construction time	3
C-3	Reduce Lane Width	Reduces pavement cost, earthwork & R/W costs.	8
C-4	Reduce Shoulder Width	Reduces earthwork & R/W costs.	9
C-5	Reduce Median Width	Reduces pavement cost, earthwork & R/W costs.	9
C-6	Shorten Length of Project	Reduces pavement cost, earthwork, R/W costs & construction time.	8
D-1	Utilize Ditches	Increases Footprint & R/W Cost.	2
D-2	Reduce the amount of Longitudinal Pipes	Reduces Cost.	5
D-3	Profile Grade Change	Reduces earthwork cost, construction time	3
E-1	Combine Ped/Roadway Light Structures	Reduces construction costs, reduces r/w costs	6
E-2	Eliminate Lighting	Reduces construction costs, reduces r/w costs	8
E-3	Utilize Solar Lighting	Initially increase cost, reduction in future use cost.	4

CREATIVE PHASE Creative Idea Listing		JUDGMENT PHASE Idea Evaluation	
No.	CREATIVE IDEA	COMMENTS	IDEA RATING
F-1	Utilize Bridge in lieu of culvert	Possible increase initial cost, environmentally sensitive.	6
F-2	Utilize Straight Box culvert	Reduces construction costs.	7
G1	Reduce Footprint	Reduces Construction Cost, reduces Construction time, possible environmental impacts.	3
G2	Delay project	Eliminates need to avoid wetlands and removes need for walls.	2
G3	Profile Grade Change	Reduces earthwork cost, construction time	3
I1	Eliminate Multiuse Path	Reduces Construction Cost, Continues to provide sidewalk.	8
I2	Eliminate Sidewalk	Reduces Construction Cost, Does not provide Pedestrian walkway.	3
I3	Utilize Asphalt for Sidewalks	Possible reduction in Cost, construction time.	7
J1	Eliminate signals	Reduces costs; Decrease LOS	6
J3	Eliminate Photo detection	Reduction in Construction Cost	7
L1	Flush median	Reduces pavement cost, earthwork & R/W costs.	9
L2	Eliminate median	Reduces pavement cost, earthwork, R/W costs & construction time. Lower LOS and safety.	6