Georgia Department of Transportation

McGINNIS FERRY ROAD EXTENSION

Project No. STP-0004-00(456)
Gwinnett County, Georgia
P.I. No. 0004456

Value Engineering Study Report

Preliminary Design Submittal

January 2008

Designer

PBS&J

Value Engineering Consultant

Lewis & Zimmerman Associates, Inc.

Lewis & Zimmerman Associates, Inc.
Taking the Chance out of Change
6110 Executive Boulevard, Suite 512
Rockville, Maryland 20852-3903
301-984-9590 • Fax: 301-984-1369
info@lza.com • www.lza.com

January 31, 2008

Ms. Lisa Myers, Design Review Engineering Manager
Georgia Department of Transportation
No. 2 Capital Square, Room 265
Atlanta, Georgia 30334

re: McGinnis Ferry Road Extension Project
Project No. STP-0004-00(456), Gwinnett County, Georgia
Value Engineering Study Report

Dear Ms. Myers:

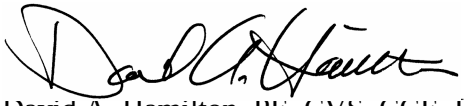
Lewis & Zimmerman Associates, Inc. is pleased to present four copies of the value engineering study report on the referenced project. The objective of the VE study was to identify opportunities to enhance the value and constructability of the project and reduce costs.

The key cost driver on the project is the $22M in new right-of-way, so decisions made on the alignment and typical section have significant implications on the total project cost. The cost of right-of-way must be balanced against that of additional retaining walls, which appears to have been optimized in the current design. Additional alternatives are presented on the section, I-85 bridge design, and lowering of the profile to reduce the amount of fill required.

We appreciate the excellent participation of the GDOT staff and PBS&J design team throughout the study. We would also like to thank Gwinnett County and Moreland Altobelli for their assistance with this contract. Please feel free to call me if you have any questions as you review this report and determine implementation.

Sincerely yours,

LEWIS & ZIMMERMAN ASSOCIATES, INC.



David A. Hamilton, PE, CVS, CCE, LEED®, AP
Vice President/VE Team Leader
Certified Value Specialist No. 910506 - Life

cc: H. Collins, Moreland Altobelli Associates

Enclosures

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EXECUTIVE SUMMARY

INTRODUCTION

This value engineering (VE) study report summarizes the events and results of the VE study conducted by Lewis & Zimmerman Associates, Inc. (LZA) for the Georgia Department of Transportation (GDOT) and Gwinnett County. The subject of the study was the Preliminary Design Submittal for the McGinnis Ferry Road Extension Project located in Gwinnett County. This busy corridor is in need of major improvements to increase the Level of Service in this rapidly developing area. The project is being designed by PBS&J of Atlanta.

The VE Workshop was conducted January 15 – 18, 2008 at the GDOT Central Office under the value engineering guidelines of GDOT, FHWA, and SAVE International. VE team members consisted of a Certified Value Specialist and design and construction professionals.

PROJECT DESCRIPTION

This project is the extension of McGinnis Ferry Road from Satellite Boulevard across I-85 to Lawrenceville-Suwanee Road. The project includes the construction of a major bridge over I-85 and the extension of Northbrook Parkway. Existing McGinnis Ferry Road is a four-lane facility from Peachtree Industrial Boulevard to Satellite Boulevard and serves as a primary east-west arterial from Gwinnett County to south Forsyth County. The roadway ends at Satellite Boulevard where it becomes a rural two-lane winding roadway, ultimately connecting west of the Lawrenceville-Suwanee interchange. The proposed McGinnis Ferry Road extension will extend the existing corridor further to the east over I-85 and will alleviate traffic congestion at the interchanges of I-85 with Lawrenceville-Suwanee Road, Old Peachtree Road, and Sugarloaf Parkway. Alleviating traffic congestion will significantly improve the operating characteristics in this vicinity and will increase safety.

The proposed construction will connect to the existing intersection of McGinnis Ferry Road and Satellite Boulevard, with only minor improvements to Satellite Boulevard and McGinnis Ferry Road. The roadway will continue east where Burnette Road will be widened to four lanes with a 20-ft. raised median and a 16-ft. shoulder (5-ft. sidewalk) on the south side and a 20-ft. shoulder (10-ft. wide mixed-use path) on the north side. From I-85 to the east, McGinnis Ferry Road extension will be on a new alignment using the same typical section. The bridge over I-85 will be constructed to provide future additional laneage on I-85 and for a possible future interchange at the McGinnis Ferry Road extension. The bridge length will accommodate a barrier-separated, high occupancy vehicle (HOV) lane with an exit, four HOV lanes, collector-distributor lanes, and ramps. McGinnis Ferry Road extension will connect to Lawrenceville-Suwanee Road east of Old Peachtree Road. As part of this project, Northbrook Parkway will be extended from its existing northern terminus to the intersection of Old Peachtree Road and Gwinco Boulevard. From this point, Old Peachtree Road will be widened through the intersection with Lawrenceville-Suwanee Road. The typical section for

Northbrook Parkway extension and the widening of Old Peachtree Road will include four, 12-ft. lanes, a 20-ft. raised median, and 16-ft. urban shoulders with 5-ft. sidewalks.

The estimated costs for this project are $54.2M (including mark-ups) for construction and $22M for right-of-way.

CONCERNS AND CONSTRAINTS

Concerns

During the presentation by the representatives from the PBS&J design team on the first day of the VE Workshop, several areas of concern in the development of the project were noted. These items were identified as areas of opportunity to improve value, meet design requirements, satisfy goals, and reduce project risk:

- The right-of-way cost of $22M is a substantial portion of the total project.
- The profile at several locations along the alignment contains considerable fill.
- Bridge requirements at I-85 result in a substantial structure, and the turn lanes will not be used until the local connector roads are constructed along I-85.
- Sidewalks and curb/gutters are being added to several relatively small side streets.

Constraints

Discussions held during the VE study noted several key constraints that must be incorporated in the design and therefore would not be addressed in the study:

- The proposed alignment is generally fixed since other corridors both north and south of this location have been investigated but rejected as being more costly.
- There side streets which tend to fix the roadway profile in a number of locations.
- Traffic projections along McGinnis Ferry Road reinforce the decision for four lanes with a median.

RESULTS

To address the concerns noted above, the VE team conducted a brainstorming session and identified ways to improve the value and constructability of the project. A summary of the key recommendations includes:

Alignment

The alignment appears to be appropriate for this corridor and no significant changes are recommended.

Profile

- Construction cost can be reduced by lowering the profile of the mainline between STA 160+00 and STA 193+00 for a reduction in fill totaling over $700,000.
- A similar cost saving opportunity exists by lowering the profile between STA 115+00 and STA 120+00 for a savings of approximately $70,000 in fill material.
- The profile can also be lowered between STA 209+00 and STA 235+00 for a savings approaching $300,000.
- There is a 325-ft.-long Con/Span® drainage structure and a very large fill between STA 211+00 and STA 214+00. This can be replaced with a shorter bridge structure and a smaller amount of fill for a savings estimated to be at least $260,000.

Section

- Lane width is cost driver since it relates to the amount of right-of-way required on the project. Reducing all lanes from 12 ft. to 11 ft. could save an estimated $1.3M. Another option would be using 11-ft. lanes on the outside lanes of the section adjacent to the curb. This could result in a savings approaching $700,000.
- The retaining walls are a significant portion of the total project cost. However, the analysis of the VE team shows that in the more rural sections of the corridor, purchasing more right-of-way would actually be less expensive than building the extensive retaining walls. Several sections of wall are proposed to be eliminated and replaced with additional right-of-way for a net savings in the range of $80,000.
- Several options are presented to minimize the overall section width of 104 ft. Eliminating the 6-ft.-wide grass mow strip along McGinnis Ferry Road could save an estimated $1.3M. Another option would be to reduce the mow strip from 6 ft. to 2 ft. and reduce the right-of-way from 104 ft. down to 96.5 ft. This concept could save approximately $900,000.
- Right-of-way minimization options could also include changes to the median. Using an 18-ft.-wide median instead of 20 ft. could reduce the project cost by nearly $400,000.
- Using a 24-inch curb/gutter in lieu of the 30-inch could save more than $$400,000 in both construction and right-of-way.

Structures

The bridge structure at I-85 was the primary focus of the VE study since it offers many possibilities for value improvement while maintaining the basic function of spanning over the freeway. The 8-lane structure as designed includes double left-turn lanes that will not be used until the connector lanes are built parallel to the I-85. This raises the possibility of constructing the I-85 bridge in phases over the next several years. Foundations should be installed in one single activity to minimize traffic disruption in the future. Several options are presented in the report including building only a 4- or 6-lane bridge initially or changing the spans to be more uniform. Because of the high dollars associated with the bridge, these options could save anywhere from $1.3M to nearly $3.5M. Phased approaches do defer some of the construction, but this approach will more closely match the traffic demand for adjacent facility tie-ins.

All of the VE suggestions are summarized on the following table and detailed in the Study Results section of the report.

SUMMARY OF VALUE ENGINEERING ALTERNATIVES

PROJECT: **McGINNIS FERRY ROAD EXTENSION -**
Project No. STP-0004-00(017) - Preliminary Submittal
Gwinnett County, Georgia

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS: INITIAL COST SAVINGS	RECURRING COST SAVINGS	TOTAL PW LCC SAVINGS
ALIGNMENT (A)						
A-1	Use right-in right-out at the intersection of Original Peachtree Road and proposed Northbrook Parkway in lieu of cul-de-sac.	DESIGN SUGGESTION				
SECTION (S)						
S-1	Use 11-ft.-wide lanes everywhere in lieu of 12 ft.	$ 1,382,351	$ -	$ 1,382,351		$ 1,382,351
S-2	Use 11-ft.-wide lanes only on the outside lanes of the section. All other lanes are 12-ft.-wide.	$ 691,175	$ -	$ 691,175		$ 691,175
S-3.1	Eliminate the retaining walls and purchase more right-of-way instead.	$ 305,265	$ 224,772	$ 80,493		$ 80,493
S-4	On McGinnis Ferry Rd., eliminate the 6 ft. and 5 ft.-6 in. grass strip; move the 5 ft. concrete sidewalk and multi-use path next to the curb. Reduce right-of-way requirements.	$ 1,388,050	$ -	$ 1,388,050		$ 1,388,050
S-5	Reduce the width of the grass strip from 6 ft. and 5 ft.-6 in. to 2 ft. on McGinnis Ferry Road. Reduce section from 104 ft. to 96.5 ft.	$ 905,250	$ -	$ 905,250		$ 905,250
S-6	Keep the shoulders but eliminate construction of the multiuse path and 5-ft.concrete sidewalk from all roads. Let the developers install the improvements later. No change in section width.	$ 1,236,750	$ -	$ 1,236,750		$ 1,236,750
S-7	Eliminate the 5-ft.concrete sidewalk from all roads, but keep the shoulders and multi-use path. No change in section width.	$ 508,950	$ -	$ 508,950		$ 508,950
S-8	On McGinnis Ferry Rd, use an 18-ft. median in lieu of 20 ft. Reduce roadway section from 104 ft. to 102 ft.	$ 382,548	$ -	$ 382,548		$ 382,548
S-9	Reduce the pavement thickness on all roads except McGinnis. The section appears quite conservative.	DESIGN SUGGESTION				

SUMMARY OF VALUE ENGINEERING ALTERNATIVES

PROJECT: **McGINNIS FERRY ROAD EXTENSION -**
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Gwinnett County, Georgia

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SECTION (S) (continued)						
S-10	Use 24 in. curbs/gutters in lieu of 30 in. Reduce section width from 104 ft. to 102 ft.	$ 1,598,702	$ 1,144,465	$ 454,237		$ 454,237
S-11	Review the unit price of concrete vs. asphalt path. $60/LF should be $20/LF (Estimate correction).	$ 600,000	$ 200,000	$ 400,000		$ 400,000
S-12	On relocated Old Peachtree Road, reduce the grass strip width from 6 ft. to 2 ft.	$ 386,240	$ -	$ 386,240		$ 386,240
PROFILE (P)						
P-1	Lower the profile from STA 160+00 to STA 193+00 to reduce the quantity of borrow required.	$ 868,265	$ 95,705	$ 772,560		$ 772,560
P-2	Lower the profile from STA 115+00 to STA 120+00 to reduce the amount of borrow required.	$ 176,916	$ 107,290	$ 69,626		$ 69,626
P-3	Convert at grade section from STA 211+00 STA 214+00 to bridge and eliminate the Con/Span® culvert.	$ 259,582	$ -	$ 259,582		$ 259,582
P-4	Lower the grade from STA 209+00 to STA 235+00 to reduce the amount of borrow required.	$ 486,130	$ 192,806	$ 293,324		$ 293,324
STRUCTURES (ST)						
ST-1	Only build 4-lane bridge over I-85 in lieu of 8 lanes. Use phased approach, with no turning lanes in first phase.	$ 5,799,432	$ 3,448,638	$ 2,350,794		$ 2,350,794
ST-2	Build 6 lanes in lieu of 8 lanes on I-85 bridge (4 travel lanes + 2 turning lanes) in a phased approach.	$ 5,799,432	$ 4,428,135	$ 1,371,297		$ 1,371,297

SUMMARY OF VALUE ENGINEERING ALTERNATIVES

PROJECT: **McGINNIS FERRY ROAD EXTENSION -**
Project No. STP-0004-00(017) - Preliminary Submittal
Gwinnett County, Georgia

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS: INITIAL COST SAVINGS	PRESENT WORTH OF COST SAVINGS: RECURRING COST SAVINGS	PRESENT WORTH OF COST SAVINGS: TOTAL PW LCC SAVINGS
STRUCTURES (ST) (continued)						
ST-3	Use shorter spans on I-85, but same 425 ft. length of bridge. (101'+111.5'+111.5'+101'). This allows the use of 54-in. bulb tee PSC beams in lieu of Type III PSC beams and 74-in. bulb tee PSC beams. Improves vertical clearance.	$1,588,126	$1,870,480	($282,354)		($282,354)
ST-4	Use 2-span bridge over I-85 with MSE wall abutments and phased approach. (121 ft.+121 ft.)	$5,799,432	$3,638,933	$2,160,499		$2,160,499
ST-5	Use a phased approach on the I-85 bridge. Build a 144-ft. span now, remaining lanes in the future.	$5,799,432	$2,301,631	$3,497,801		$3,497,801
ST-6	Use a 6-lane bridge with shorter, but more uniform spans. (101'+111.5'+111.5'+101')	$7,387,558	$5,862,326	$1,525,232		$1,525,232

STUDY RESULTS

INTRODUCTION

The recommended engineering and construction management suggestions are presented in this section as individual alternatives for specific change. These are in the form of VE alternatives with cost savings or design suggestions without associated cost. Individual comments on the current design are presented with a summary of the original design, a description of the proposed enhancements to the chosen improvement scheme, and if appropriate, a descriptive evaluation of the advantages and disadvantages. Suggested alternatives on the current project are accompanied by a brief narrative to compare the original design and the proposed modifications. Sketches, where appropriate, are also presented.

Examples of improved value include improved constructability, ease of maintenance, minimization of risk, and less disruption roadway operations during construction. Some ideas cannot be quantified in terms of cost with the design information provided; these are presented as design suggestions and are intended to improve the quality of the project.

The summaries of the more favorable improvements to the project are highlighted on the attached Summary of Value Engineering Alternatives. The table is divided into major project elements and is used to divide the results section. The complete documentation of the developed VE alternatives follows the Summary of Value Engineering Alternatives.

RESULTS OF THE STUDY

The value engineering team brainstormed 23 creative ideas that could enhance the value of the project in the areas noted by GDOT as being desirable, such as cost control, safety, durability, ease of operation, expected life, constructability, and traffic improvement. Evaluation of those ideas considered the full range of project value objectives and resulted in the development of a number of recommendations.

The alternatives are presented with the following designations to aid in organization and review.

CATEGORY	PREFIX
Alignment	A
Section	S
Profile	P
Structures	ST

EVALUATION OF ALTERNATIVES

When reviewing the study results, the reader should consider each part of an alternative or design suggestion on its own merit. There may be a tendency to disregard an alternative because of concern about one part of it. Each area within an alternative that is acceptable should be considered for use in the final design, even if the entire alternative is not implemented. Design variations of these alternatives are encouraged.

Cost is a primary basis of comparison for alternative designs, but other project criteria must be considered also when selecting alternatives for further analysis. Negative impacts upon existing traffic is extremely critical and design modifications that impact traffic, right of way, safety, or environment elements should be selected carefully following detailed review.

Comparison cost estimates were prepared for the original design and the alternative design using the project cost estimate or data from the GDOT cost database. A markup of 21% was added to account for project engineering and construction supervision. Right-of-way cost for residential land was assumed to be worth an average of $8/sf.

The various alternatives are "mutually exclusive," so acceptance of one may preclude the acceptance of another. Multiple solutions to a single function were sought. All alternatives or design suggestions were developed independently of each other. However, some of the alternatives are interrelated so acceptance of one element may also be included in other alternatives. The reader should evaluate those alternatives carefully in order to select the combination of ideas with the greatest beneficial impact on the project.

SUMMARY OF VALUE ENGINEERING ALTERNATIVES

PROJECT: **McGINNIS FERRY ROAD EXTENSION -**
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Gwinnett County, Georgia

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S-2	Use 11-ft.-wide lanes only on the outside lanes of the section. All other lanes are 12-ft.-wide.	$ 691,175	$ -	$ 691,175		$ 691,175
S-3.1	Eliminate the retaining walls and purchase more right-of-way instead.	$ 305,265	$ 224,772	$ 80,493		$ 80,493
S-4	On McGinnis Ferry Rd., eliminate the 6 ft. and 5 ft.-6 in. grass strip; move the 5 ft. concrete sidewalk and multi-use path next to the curb. Reduce right-of-way requirements.	$ 1,388,050	$ -	$ 1,388,050		$ 1,388,050
S-5	Reduce the width of the grass strip from 6 ft. and 5 ft.-6 in. to 2 ft. on McGinnis Ferry Road. Reduce section from 104 ft. to 96.5 ft.	$ 905,250	$ -	$ 905,250		$ 905,250
S-6	Keep the shoulders but eliminate construction of the multiuse path and 5-ft.concrete sidewalk from all roads. Let the developers install the improvements later. No change in section width.	$ 1,236,750	$ -	$ 1,236,750		$ 1,236,750
S-7	Eliminate the 5-ft.concrete sidewalk from all roads, but keep the shoulders and multi-use path. No change in section width.	$ 508,950	$ -	$ 508,950		$ 508,950
S-8	On McGinnis Ferry Rd, use an 18-ft. median in lieu of 20 ft. Reduce roadway section from 104 ft. to 102 ft.	$ 382,548	$ -	$ 382,548		$ 382,548
S-9	Reduce the pavement thickness on all roads except McGinnis. The section appears quite conservative.	DESIGN SUGGESTION				

VALUE ENGINEERING ALTERNATIVE

PROJECT:	**McGINNIS FERRY ROAD EXTENSION** **Project No. STP-0004-00(017)** *Gwinnett County, Georgia*	ALTERNATIVE NO.:	**A-1**
DESCRIPTION:	**USE RIGHT-IN RIGHT-OUT ON ORIGINAL OLD PEACHTREE ROAD WITH RELOCATED OLD PEACHTREE ROAD IN LIEU OF CUL-DE-SAC**	SHEET NO.:	**1 of 3**

ORIGINAL DESIGN: (Sketch attached)

Since the current Old Peachtree Road is being relocated, the existing alignment will be capped off with a cul-de-sac.

ALTERNATIVE: (Sketch attached)

Do not provide a cul-de-sac. Instead, connect the existing alignment of Old Peachtree Road with the relocated Old Peachtree Road via a right-in right-out and a raised concrete island. This would be similar to a corner commercial property at an intersection.

ADVANTAGES:

- Provides easy ingress and egress for users of property around the intersection

DISADVANTAGES:

- Slightly increases cost due to additional pavement on relocated Old Peachtree Road

DISCUSSION:

As designed, users around the cul-de-sac would have to make a long detour to get onto relocated Old Peachtree Road or McGinnis Ferry Road. The suggested alternative solves this problem.

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

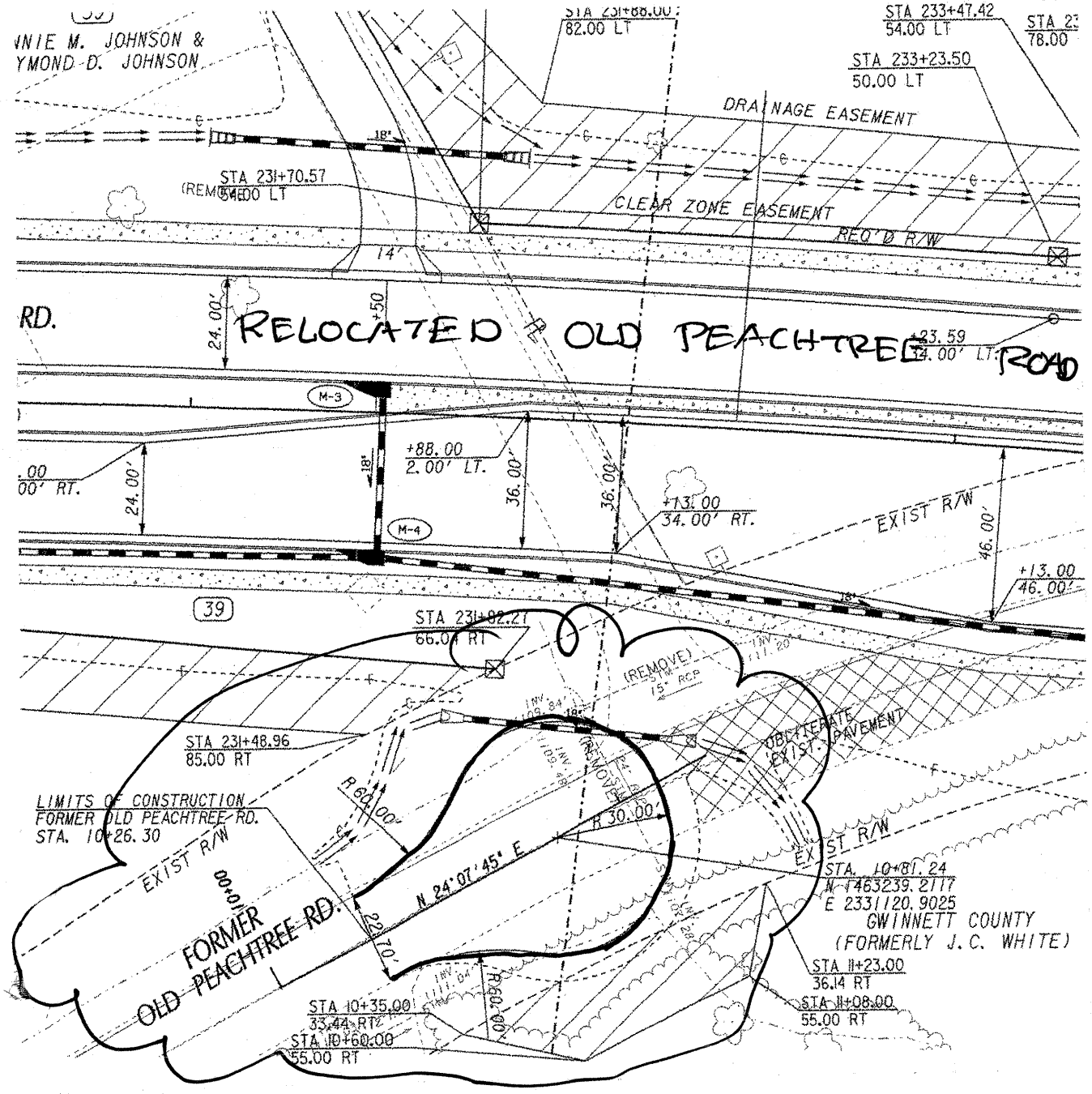
SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~456~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: A-1

ORIGINAL DESIGN ☑ ALTERNATIVE DESIGN ☐ BOTH ☐

SHEET NO.: 2 of 3



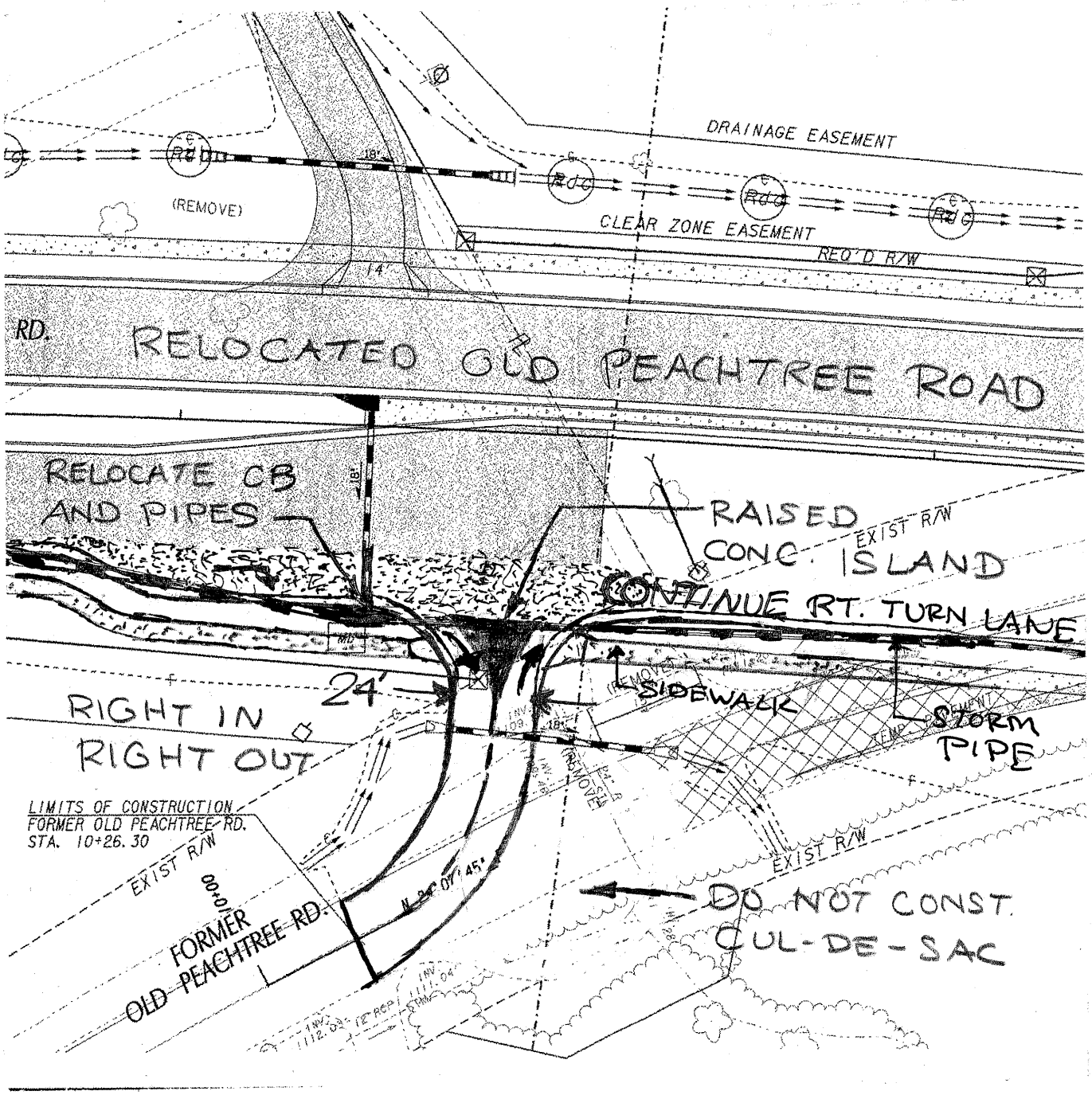
SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~456~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: A-1

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☑ BOTH ☐

SHEET NO.: 3 of 3



VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

ALTERNATIVE NO.: **S-1**

DESCRIPTION: **CHANGE ALL 12-FT.-WIDE THROUGH LANES TO 11 FT. WIDE**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch attached)

Provide 12-ft.-wide through lanes on McGinnis Ferry Road and Northbrook Parkway/Old Peachtree Road.

ALTERNATIVE: (Sketch attached)

Provide 11-ft.-wide through lanes. Keep everything else the same. The required right-of-way will reduce by 4 ft.

ADVANTAGES:

- Reduces cost
- Reduces construction schedule

DISADVANTAGES:

- Perceived loss of safety

DISCUSSION:

There are 11-ft.-wide lanes on interstates in and around Atlanta that are functioning quite well. There is no reason not to have them on local streets.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 1,382,351	—	$ 1,382,351
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 1,382,351	—	$ 1,382,351

SKETCH

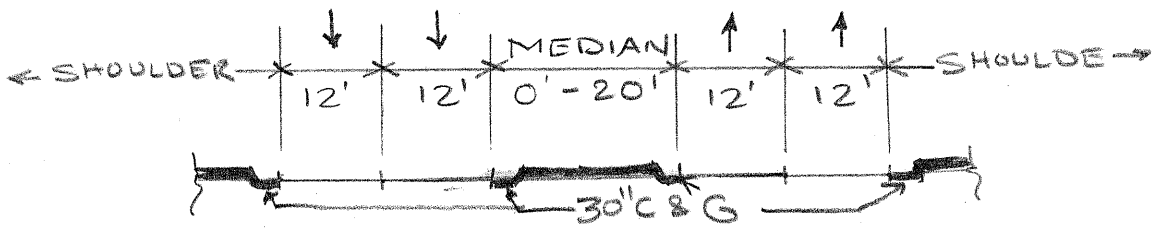
PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~154~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: S-1

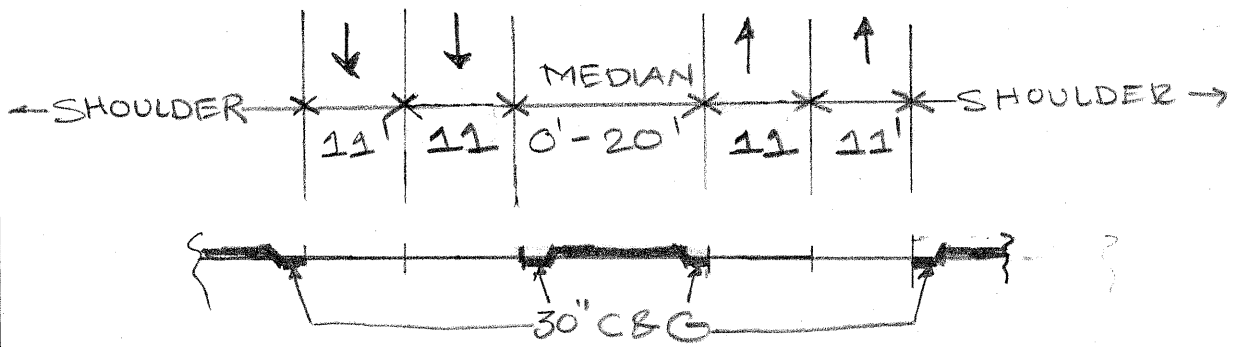
ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☒ BOTH ☐

SHEET NO.: 2 of 4

McGINNIS FERRY RD & NORTHBROOK PKWY/OLD P'TREE



ORIGINAL DESIGN



PROPOSED DESIGN

CALCULATIONS

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~150~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: S-1

SHEET NO.: 3 of 4

12.5 mm A.C → 165 lbs/SY × $\frac{T}{2000\ lbs}$ × $\frac{\$100}{T}$ = $8.25

19 mm A.C. → 330 × 100/2000 = $16.50

25 mm A.C. → 880 × 100/2000 = $44.00

10" G.A.B. $16.00

Bituminous Coat 0.25

ASPHALT PAVEMENT COST :→ 85.00 /SY

McGinnis Ferry Road: (195+02) − (110+02) = 8,500'
Total length of New const.

Sq. yard of A.C. Pavement saved: $\frac{8,500 \times 4}{9}$ = 3,777.7

R/W Area saved: 8,500 × 4 = 34,000 sf

Northbrook Pkwy/Old Peachtree Road: (259+49) − (209+79) = 4,970'
Total length of new road construction

Sq. yard of A.C. Pavement saved: $\frac{4,970 \times 4}{9}$ = 2,208.8

R/W Area saved: 4,970 × 4 = 19,880 sf

Total A.C. Pavement saved = 3,777.7 + 2,208.8 = 5,986.6 SY

Total R/W saved = 34,000 + 19,880 = 53,880 sf

~~Approximately~~ $4/sf on average is used to come up with savings in dollars.

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~456~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: S-1

DESCRIPTION:

SHEET NO.: 4 of 4

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
A.C. Pavements	SY				5,986.6	85	508,866.6
with 21.3% markup							108,388.6
							617,255
R/W	SF				53,880	4	215,520
with 255% markup							549,576
							765,096
Subtotal							
Markup (%) at							
TOTAL							1,382,351

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION** ALTERNATIVE NO.: **S-2**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

DESCRIPTION: **USE 11-FT.-WIDE LANES ON OUTSIDE TRAVEL LANES** SHEET NO.: **1 of 3**

ORIGINAL DESIGN: (Sketch attached)

Provide 12-ft.-wide through lanes on McGinnis Ferry Road and Northbrook Parkway/Old Peachtree Road.

ALTERNATIVE: (Sketch attached)

Use 11-ft.-wide through lanes on the outside lanes. Keep everything else the same. The required right-of-way will reduce by 2 ft.

ADVANTAGES:

- Reduces cost
- Reduces construction schedule

DISADVANTAGES:

- Perceived loss of safety

DISCUSSION:

There are 11-ft.-wide lanes on interstates in and around Atlanta that are functioning quite well. Making outside lanes 11 ft. wide will hardly compromise safety, especially since the driver has 2 additional feet of gutter width to use.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 691,175	—	$ 691,175
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 691,175	—	$ 691,175

SKETCH

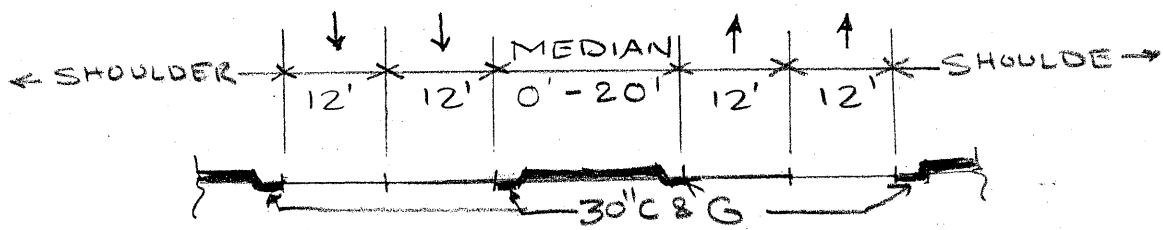
PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~[illegible]~~017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: S-2

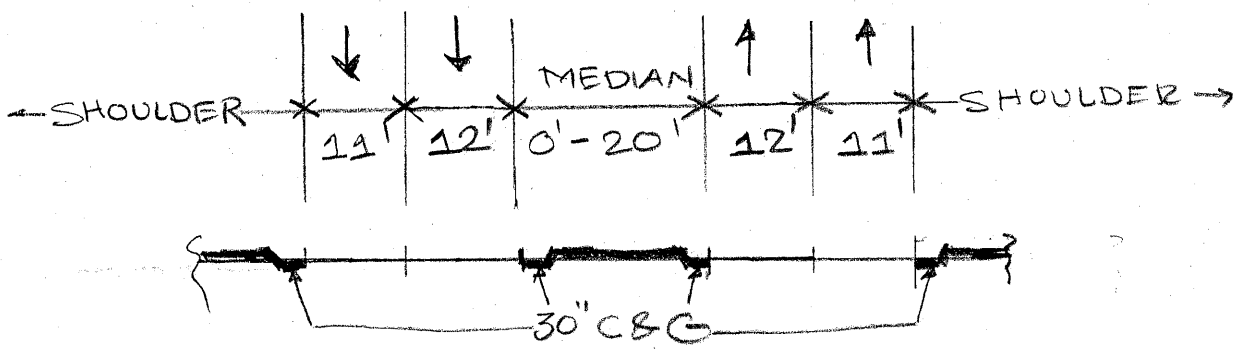
ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☒ BOTH ☐

SHEET NO.: 2 of 3

McGINNIS FERRY RD & NORTHBROOK PKWY/OLD P'TREE



ORIGINAL DESIGN



PROPOSED DESIGN

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~356~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: S-2

DESCRIPTION:

SHEET NO.: 3 of 3

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
See S-1 for explanation of different number							
A.C. Pavement with 21.3% markup	SY				2993.3	85	254,433 54,194 308,627
R/W with 255% markup	SF				26,940	4	107,760 274,788 382,548
Subtotal							
Markup (%) at							
TOTAL							691,175

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

ALTERNATIVE NO.: **S-3.1**

DESCRIPTION: **ELIMINATE PROPOSED RETAINING WALLS AND USE MORE RIGHT-OF-WAY**

SHEET NO.: **1 of 7**

ORIGINAL DESIGN: (Sketch attached)

This project as presently designed has 13 retaining walls to reduce right-of-way impacts.

ALTERNATIVE: (Sketch attached)

Eliminate the requirement for retaining walls that are more expensive than the right-of-way or easement saved.

ADVANTAGES:

- Reduces cost
- Reduces construction schedule

DISADVANTAGES:

- Increases right-of-way cost
- Relocates Church Drive

DISCUSSION:

The project as presently designed uses numerous (13 sites) retaining walls to reduce the amount of right-of-way easement impacts. This alternative proposes to review each site to determine if the retaining walls are justified based on impacts and cost.

After reviewing all 13 walls locations, it was determined that only wall #13 could be eliminated at a cost savings. Wall #13 is along the "new" Gwinnett County Connector.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 305,265	—	$ 305,265
ALTERNATIVE	$ 224,772	—	$ 224,772
SAVINGS	$ 80,493	—	$ 80,493

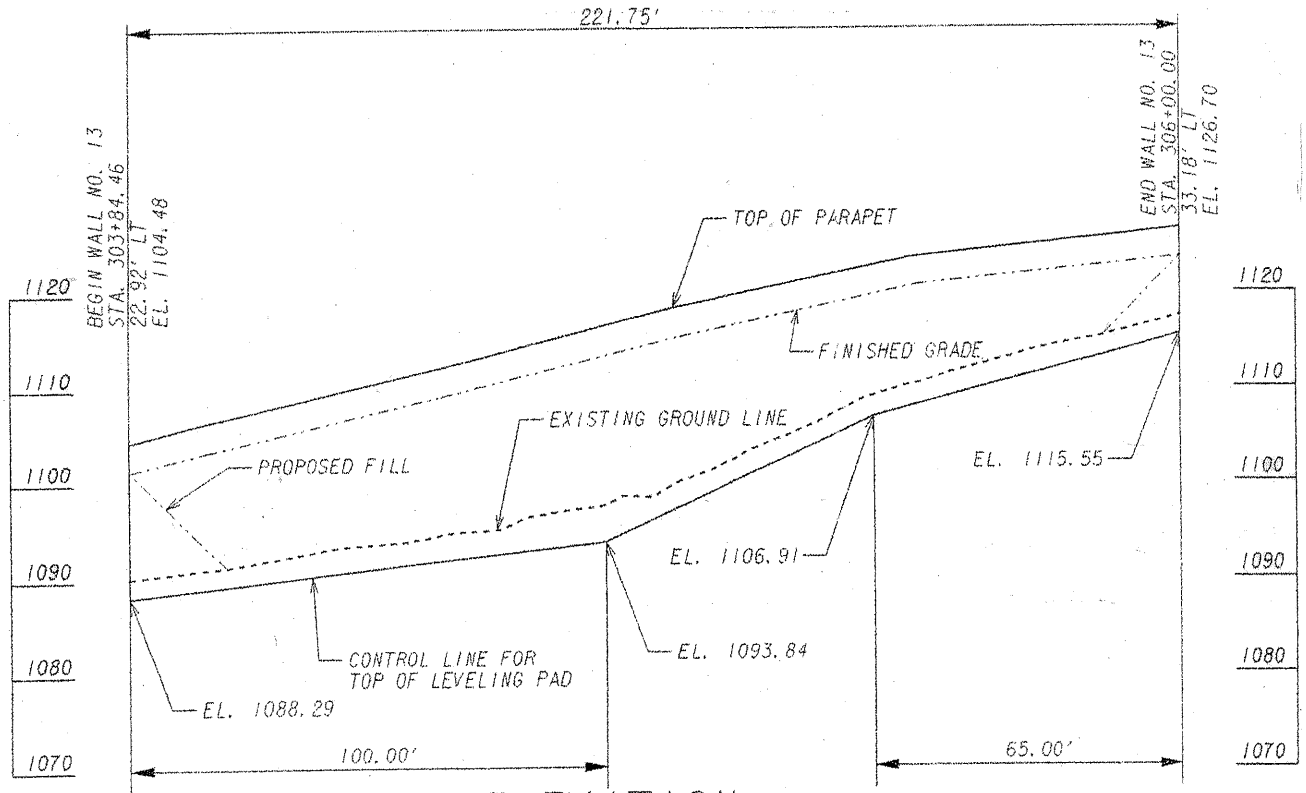
SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~155~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: S-3.1

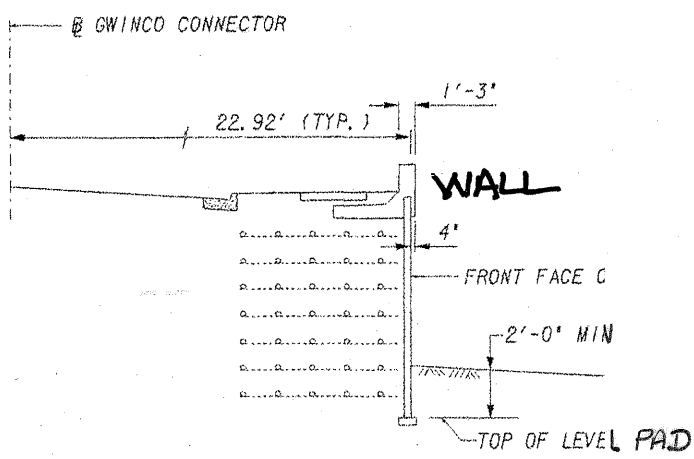
ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☐ BOTH ☐

SHEET NO.: 2 of 7



ELEVATION

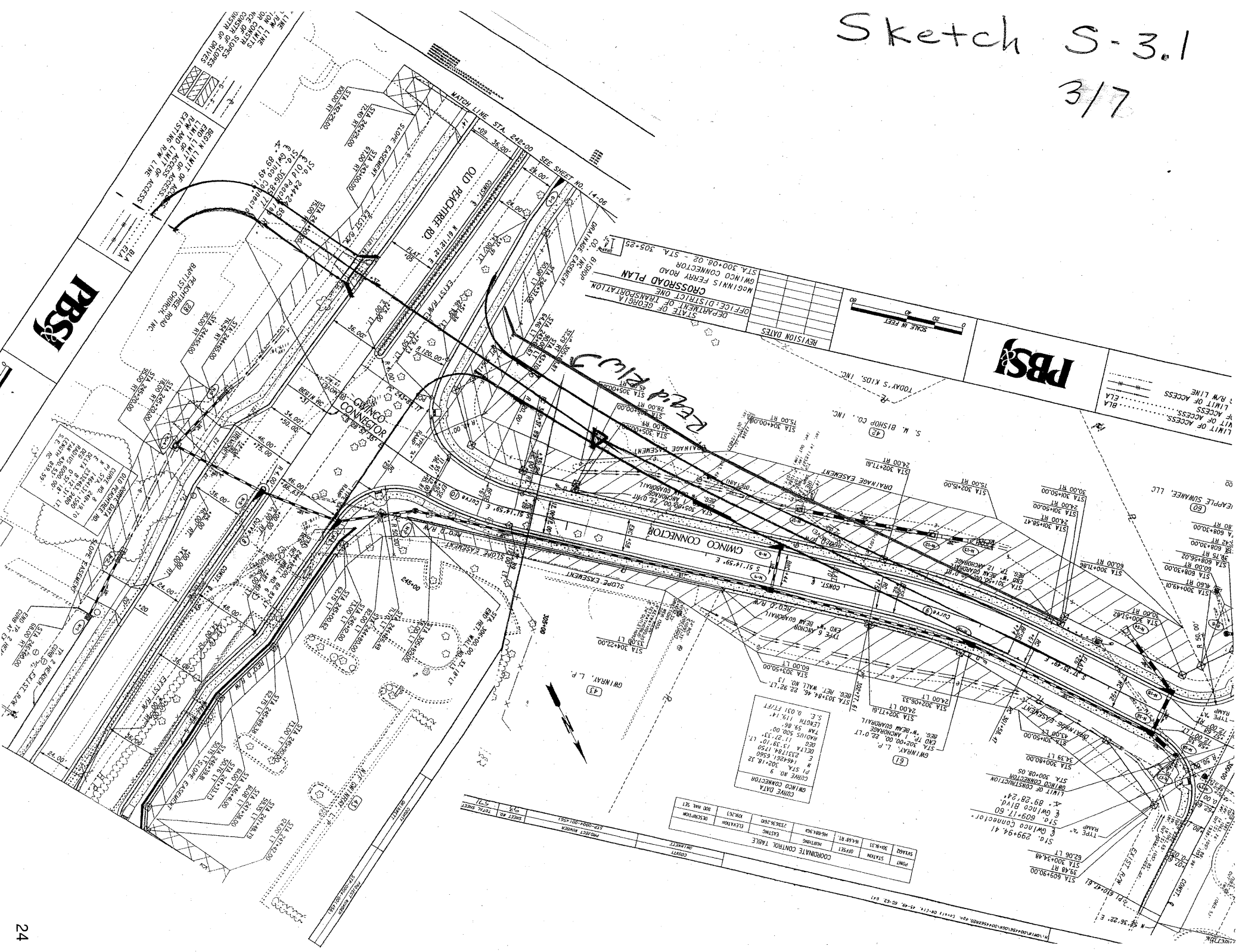
SCALE: 1" = 10'-0" VERT.
1" = 20'-0" HORIZ.
(FRONT FACE OF WALL SHOWN)



SECTION A-A
NO SCALE

Sketch S-3.1

3/7



Calculations

SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~004~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: 3.1

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☐ SHEET NO.: 4 of 7

Locations: Wall #1 justified, saves parking at church.

Wall #2: justified, saves impacts to track/road.

Wall #3: justified, saves Residential displacement.

Wall #4: justified, save existing commerical property & parking.

Wall #5: justified saves existing parking & private drainage system. (Day care)

Wall #6: justified saves existing parking & commerical property and private drainage

Wall #7: justified saves parking / private road for commerical storage facility.

Wall #8: justified saves impacts to cemetery.

Wall #9A&B: jutified saves commerial parking & traffic circulation.

Wall #10A&B: justified saves Commerial parking & major impacts to service station / saves possible ust impact.

Wall #11: justified saves parking to commerial building.

Wall #12: justified saves parking lot for Bank (citizens bank of Gwinnett)

Wall #13: Realign proposed Gwinco Connector to eliminate need for Retain Wall #13.

CALCULATIONS

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: S-3.1

SHEET NO.: 5 of 7

Realign Gwin Co Road to eliminate Retain Wall #13
US: $55/SF fo MSE Wall (from Item Mean Summary)
M.S.E. Wall face (10'-20')

$$\text{Wall Face} = \left[100' \times \left(\frac{16'+23'}{2}\right)\right] + \left[56.75' \times \left(\frac{23'+16'}{2}\right)\right] + \left[65' \times \left(\frac{16'+11'}{2}\right)\right] =$$

Wall #13 = 3934.1 sf

Relocated Church Drive (use #33/SY) to build drive.

$$\frac{22' \text{ wide} \times 180'}{9 \text{ SF/SY}} = 440 \text{ SY}$$

Add'l R/W Required = 10,890 SF

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~056~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: 5-3.1

DESCRIPTION:

SHEET NO.: 6 of 7

PROJECT ITEM		ORIGINAL ESTIMATE			Alt./ PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Savings:							
Wall #13	SF	3934.1	$55	$216,375			
Easement Saved	SF	4500	3.73	$16,785			
Relocate Church Drive							
Drive (two-way)	SY				440	$33	$14,520
Add'l R/W (Com)	SF				10890	$7.46	$81,239
		R/W		16,785	R/W		$81,239
		R/W mkup (1.55)		26,017	R/W mkup (1.55)		$125,926
Constr. Subtotal				$216,375			$14,520
Constr. Markup (%) at .213		(21.3%)		$46,088			$3,093
TOTAL				$305,265			$224,772

621-4062	CONCRETE SIDE BARRIER, TYPE 6B	94.00	1	LF	550.00	550.00
621-4070	CONCRETE SIDE BARRIER, TYPE 7C	1075.00	2	LF	71.10	69.93
621-4071	CONCRETE SIDE BARRIER, TYPE 7C, MODIFIED	943.00	4	LF	322.25	331.11
621-4080	CONCRETE SIDE BARRIER, TYPE 7R	440.00	1	LF	66.30	66.30
621-4082	CONCRETE SIDE BARRIER, TYPE 7T	165.00	3	LF	248.40	265.79
621-4083	CONCRETE SIDE BARRIER, TYPE 7T, MODIFIED	273.00	3	LF	478.50	458.14
621-4085	CONCRETE SIDE BARRIER, TYPE 7W	4720.00	2	LF	42.35	38.19
621-4086	CONCRETE SIDE BARRIER, TYPE 7WS	6618.00	3	LF	61.28	62.82
621-5503	CONCRETE SIDE BARRIER, TYPE 26S	140.00	1	LF	325.00	325.00
621-6001	CONCRETE BARRIER, TP S-1	90585.00	3	LF	65.50	62.18
621-6002	CONCRETE BARRIER, TP S-2	72823.00	6	LF	81.16	73.65
621-6003	CONCRETE BARRIER, TP S-3	28209.00	6	LF	238.05	187.63
621-6004	CONCRETE BARRIER, TP S-3A	250.00	1	LF	300.00	300.00
621-6008	CONCRETE SIDE BARRIER, TP 7-CS	115.00	1	LF	120.80	120.80
621-6012	CONCRETE SIDE BARRIER, TP 7-RS	12850.00	3	LF	79.10	81.90
621-6013	CONCRETE SIDE BARRIER, TP 7-TS	126.00	3	LF	252.66	256.13
621-6200	CONCRETE SIDE BARRIER, TP 2-S	1745.00	1	LF	239.50	239.50
621-6201	CONCRETE SIDE BARRIER, TP 2-SA	4232.00	4	LF	500.98	424.91
621-6202	CONCRETE SIDE BARRIER, TP 2-SB	2413.00	2	LF	505.90	507.63
621-6203	CONCRETE SIDE BARRIER, TP 2-SC	450.00	2	LF	714.80	714.77
621-6210	CONCRETE SIDE BARRIER, TP 6-S	200.00	1	LF	325.00	325.00
621-6211	CONCRETE SIDE BARRIER, TP 6-SA	4900.00	1	LF	265.00	265.00
621-6212	CONCRETE SIDE BARRIER, TP 6-SB	820.00	1	LF	420.00	420.00
621-6500	BARRIER GATE SYSTEM	1.00	1	EA	178000.00	178000.00
624-0201	SOUND BARRIER, TYPE B, 10-20 FT HT	61500.00	1	SF	20.68	20.68
624-0400	SOUND BARRIER, TYPE-	358900.00	3	SF	17.47	18.93
627-1000	MSE WALL FACE, 0 - 10 FT HT, WALL NO -	31405.00	27	SF	55.56	53.69
627-1010	MSE WALL FACE, 10 - 20 FT HT, WALL NO -	136740.00	30	SF	55.55	55.53
627-1020	MSE WALL FACE, 20 - 30 FT HT, WALL NO -	74003.00	15	SF	58.99	57.88
627-1030	MSE WALL FACE, GTR THAN 30 FT HT, WALL NO -	65718.00	4	SF	64.91	70.18
627-1100	COPING A, WALL NO -	5440.00	21	LF	69.86	64.42
627-1120	COPING B, WALL NO -	1622.00	4	LF	250.00	250.00
627-1140	TRAFFIC BARRIER V, WALL NO -	4144.00	8	LF	250.00	250.00

UNIT PRICES

ITEM CODE	ITEM DESCRIPTION	QUANTITY	USE	UM	MEAN	WTD AVG
627-1160	TRAFFIC BARRIER H, WALL NO -	7353.00	12	LF	215.98	201.70
627-1180	ADDITIONAL MSE BACKFILL	9247.00	3	CY	108.89	218.15
631-2463	LED PIXEL CMS, WALK-IN, 3 X 21, 18 IN, TYPE B	13.00	5	EA	99668.19	99642.18
631-8000	TESTING	5.00	5	LS	5382.28	5382.28
632-0003	CHANGEABLE MESSAGE SIGN, PORTABLE, TYPE 3	248.00	45	EA	16394.90	17914.85
633-3500	REMOUNT UNMODIFIED HWY SIGN, SPCL ROADSIDE	15.00	3	EA	1057.00	739.46
634-1150	GRANITE SCULPTURAL ELEMENT	5.00	1	EA	150.00	150.00
634-1200	RIGHT OF WAY MARKERS	4398.00	73	EA	110.50	99.13
635-1000	BARRICADES	2832.00	12	LF	113.87	110.60
636-1014	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 1	128.00	1	SF	20.00	20.00
636-1020	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 3	21229.00	84	SF	18.17	14.93
636-1029	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 3	5030.00	31	SF	17.28	16.00
636-1031	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING TP 6	18.00	1	SF	19.00	19.00
636-1032	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING TP 6	64.00	1	SF	20.80	20.80
636-1033	HIGHWAY SIGNS, TP 1 MATL, REFL SHEETING, TP 9	36975.00	86	SF	22.39	19.36
636-1041	HIGHWAY SIGNS, TP 2 MATL, REFL SHEETING, TP 9	11944.00	41	SF	33.95	30.60

S-3.1

VALUE ENGINEERING ALTERNATIVE

PROJECT:	**McGINNIS FERRY ROAD EXTENSION** **Project No. STP-0004-00(017)** *Gwinnett County, Georgia*	ALTERNATIVE NO.:	**S-4**
DESCRIPTION:	**ELIMINATE 5 FT.-6 IN. AND 6-FT. GRASS STRIPS ON McGINNIS FERRY ROAD AND USE CONCRETE SIDEWALK AND MULTI-USE PATH NEXT TO CURB**	SHEET NO.:	**1 of 3**

ORIGINAL DESIGN: (Sketch attached)

The design includes a 5 ft.-6 in. grass strip between the multi-use path and curb on the north side of McGinnis Ferry Road, and a 6-ft. grass strip between the concrete sidewalk and curb on the south side of McGinnis Ferry Road.

ALTERNATIVE: (Sketch attached)

Eliminate both grass strips. Put the sidewalk and multi-use path next to the curb. Reduce the right-of-way requirement by 5 ft.-5 in. on the north side and by 6 ft. on the south side of McGinnis Ferry Road.

ADVANTAGES:

- Reduces cost
- Reduces construction schedule

DISADVANTAGES:

- Reduces landscape area

DISCUSSION:

Concrete sidewalk is often found next to the curb.

Ten-ft.-wide multi-use path provides plenty of room for pedestrians to be away from the traffic. Strip beyond the sidewalk and path can be beautifully landscaped to compensate for the loss of 5 ft.-6 in. grass strip. Savings in grassing is negligible compared to savings in right-of-way acquisition.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 1,388,050	—	$ 1,388,050
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 1,388,050	—	$ 1,388,050

SKETCH

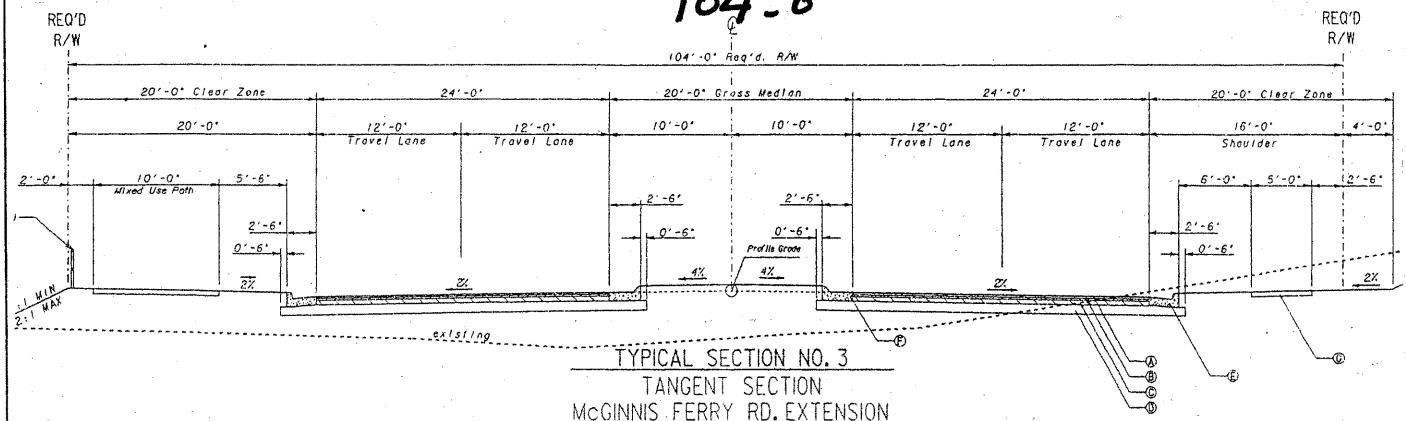
PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: S-4

ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☒ BOTH ☐

SHEET NO.: 2 of 3

104'-0"

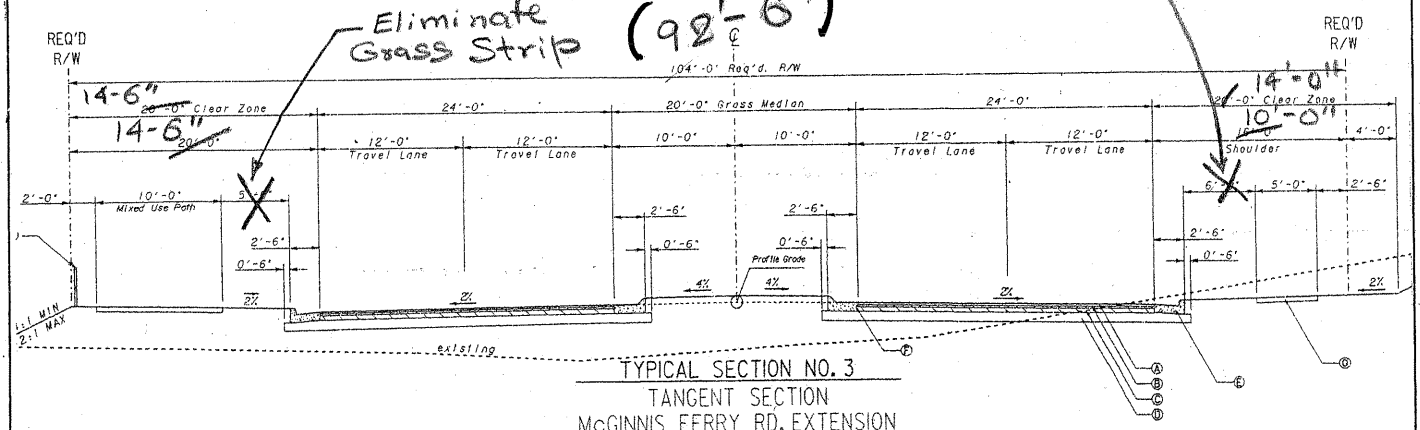


TYPICAL SECTION NO. 3
TANGENT SECTION
McGINNIS FERRY RD. EXTENSION

ORIGINAL DESIGN

Eliminate Grass Strip

Eliminate Grass Strip (92'-6")



TYPICAL SECTION NO. 3
TANGENT SECTION
McGINNIS FERRY RD. EXTENSION

ALTERNATIVE DESIGN

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~855~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: S-4

DESCRIPTION:

SHEET NO.: 3 of 3

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
*See S-1 for explanation of different numbers #							
R/W	SF				97,750	4	391,000
8,500 x [5'-6" + 6'-0"]							997,050
255% markup							1,388,050
Subtotal							
Markup (%) at							
TOTAL							1,388,050

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

ALTERNATIVE NO.: **S-5**

DESCRIPTION: **REDUCE GRASS STRIP ON McGINNIS FERRY ROAD FROM 5 FT.-6 IN. AND 6 FT. TO 2 FT.**

SHEET NO.: **1 of 3**

ORIGINAL DESIGN: (Sketch attached)

The design includes 5 ft.-6 in. grass strip between the multi-use path and curb on the north side of McGinnis Ferry Road, and a 6 ft. grass strip between the concrete sidewalk and curb on the south side of McGinnis Ferry Road.

ALTERNATIVE: (Sketch attached)

Reduce the width of grass strip between the multi-use path and the curb from 5 ft.-6 in. to 2 ft. on the north side and between the concrete sidewalk and the curb from 6 ft. to 2 ft. on the south side of McGinnis Ferry Road.

ADVANTAGES:

- Reduces cost
- Reduces construction schedule

DISADVANTAGES:

- Reduces landscaped area

DISCUSSION:

Two-ft. grass strips between the curb and the path are common in this country. Although the landscape area is slightly reduced, it provides all the benefits that are available with larger grass strips. Substantial savings is realized by implementing this alternative.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 905,250	—	$ 905,250
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 905,250	—	$ 905,250

SKETCH

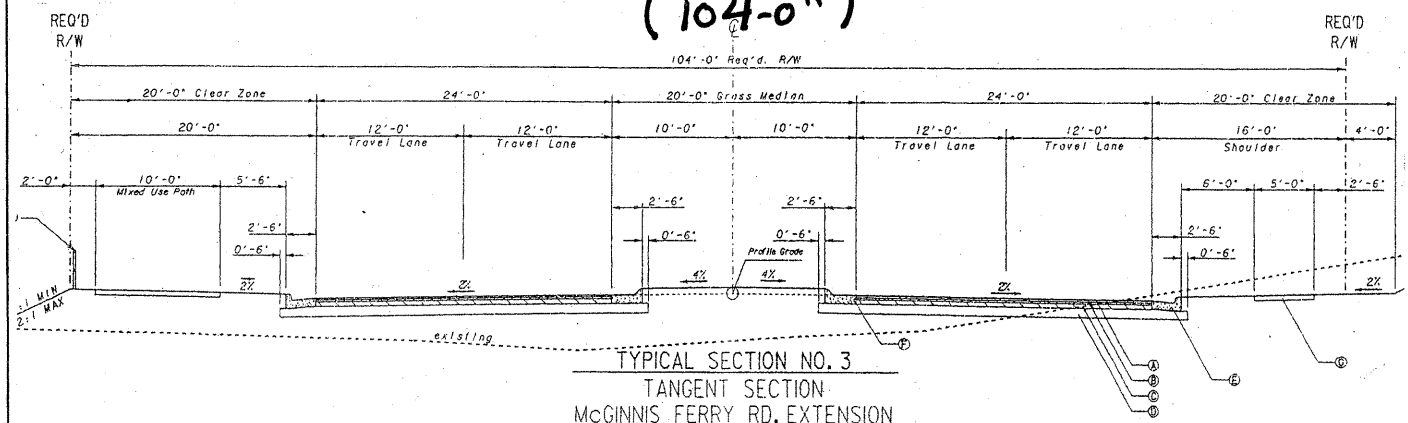
PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: S-5

ORIGINAL DESIGN ☑ ALTERNATIVE DESIGN ☑ BOTH ☐

SHEET NO.: 2 of 3

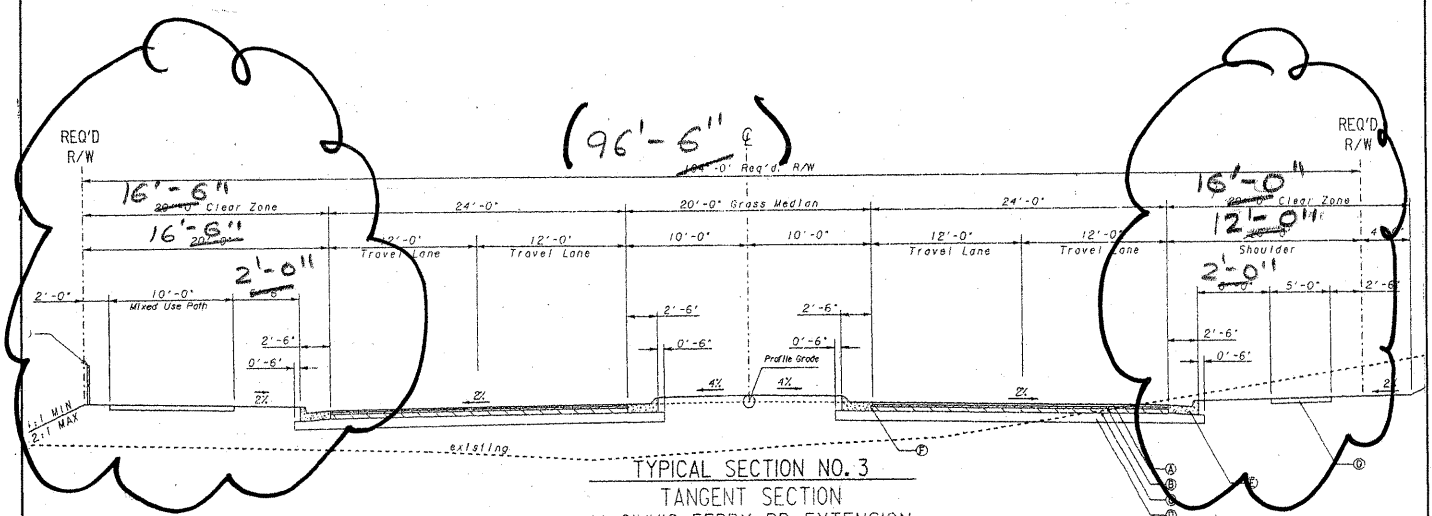
(104'-0")



TYPICAL SECTION NO. 3
TANGENT SECTION
McGINNIS FERRY RD. EXTENSION

ORIGINAL DESIGN

(96'-6" ℄)



TYPICAL SECTION NO. 3
TANGENT SECTION
McGINNIS FERRY RD. EXTENSION

ALTERNATIVE DESIGN

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~050~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: S-5

DESCRIPTION:

SHEET NO.: 3 of 3

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
See S-1 for explanation of different numbers							
R/W	SF				63,750	4	255,000
8,500 [3'-6" + 4'-0"]							
255% markup							650,250
Subtotal							
Markup (%) at							
TOTAL							905,250

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION** ALTERNATIVE NO.: **S-6**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

DESCRIPTION: **KEEP SHOULDERS AND ELIMINATE MULTI-USE PATH AND CONCRETE SIDEWALKS FROM ALL ROAD** SHEET NO.: **1 of 3**

ORIGINAL DESIGN: (Sketch attached)

On McGinnis Ferry Road, 10-ft.-wide multi-use path and 5-ft.-wide concrete sidewalks are provided. For other roads in this project, 5-ft.-wide concrete sidewalks are provided on both sides of the road.

ALTERNATIVE: (Sketch attached)

Eliminate multi-use path and concrete sidewalks from all roads. Keep the shoulders grassed for future construction of multi-use path and concrete sidewalks, since the strips next to the curb will be grassed anyway. Additional costs will be minimal.

ADVANTAGES:

- Reduces cost
- Reduces construction schedule

DISADVANTAGES:

- Loss of amenity

DISCUSSION:

There is hardly any development where the multi-use path and concrete sidewalks is proposed. Eliminating both could save substantial amount of money. Developers could be asked to construct these amenities in the future at their cost.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 1,236,750	—	$ 1,236,750
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 1,236,750	—	$ 1,236,750

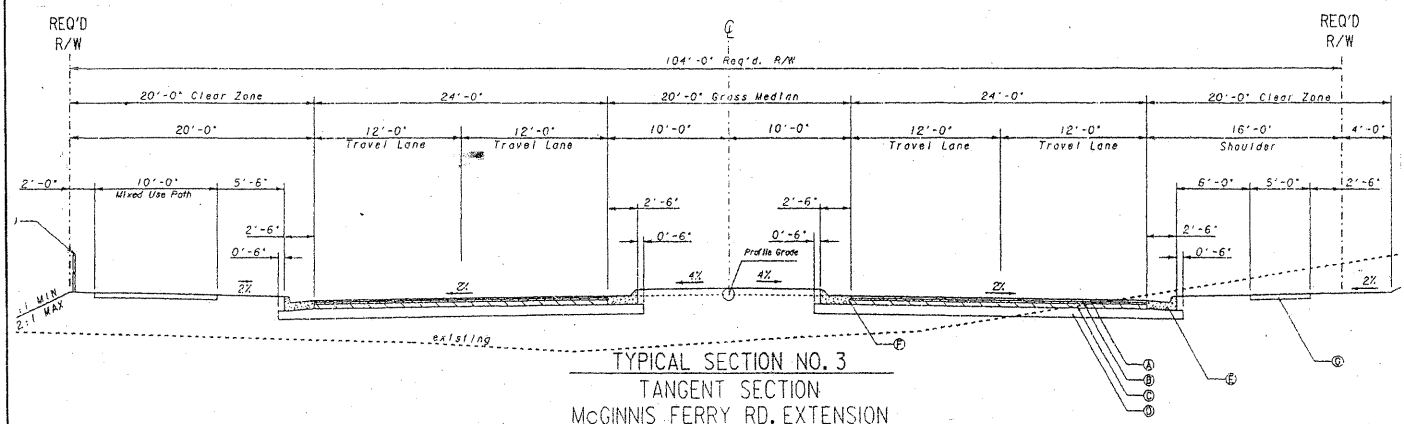
SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~456~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: S-6

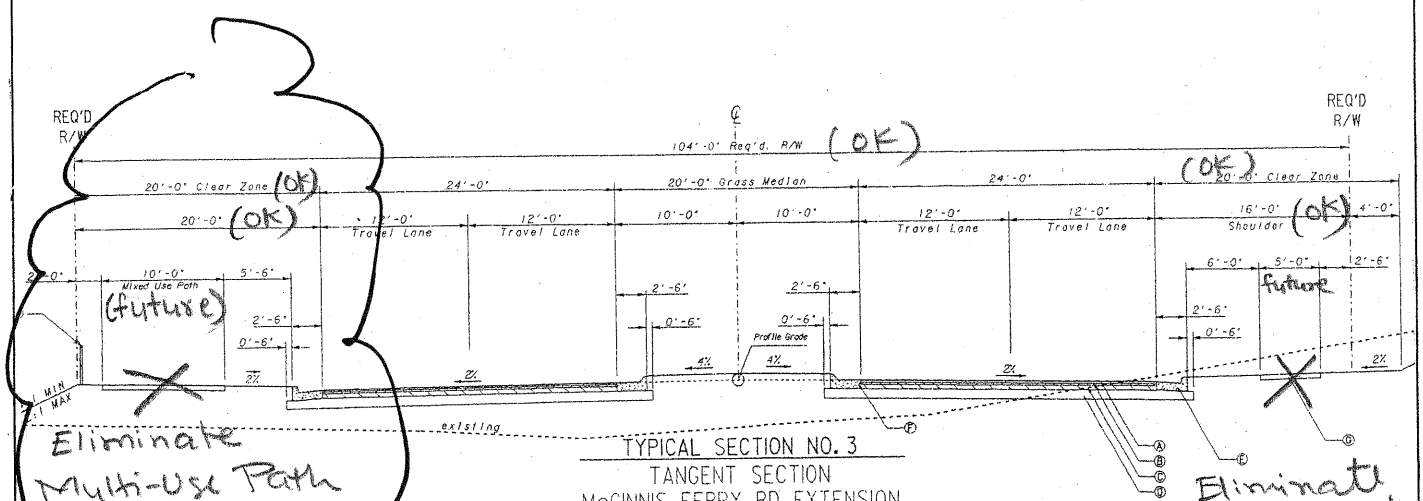
ORIGINAL DESIGN ☑ ALTERNATIVE DESIGN ☑ BOTH ☐

SHEET NO.: 2 of 3



TYPICAL SECTION NO. 3
TANGENT SECTION
McGINNIS FERRY RD. EXTENSION

ORIGINAL DESIGN



TYPICAL SECTION NO. 3
TANGENT SECTION
McGINNIS FERRY RD. EXTENSION

Eliminate Multi-Use Path Keep shoulder

Eliminate conc. sidewalk Keep shoulder

ALTERNATIVE DESIGN

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: S-6

DESCRIPTION:

SHEET NO.: 3 of 3

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Concrete Sidewalk	SY				11,100	37.80	419,580
Multiuse Path	LF				10,000	60.00	600,000
Subtotal							1,019,580
Markup (%) at 21.3%							217,170
TOTAL							1,236,750

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

ALTERNATIVE NO.: **S-7**

DESCRIPTION: **KEEP SHOULDERS AND ELIMINATE 5-FT.-WIDE CONCRETE SIDEWALKS FROM ALL ROAD**

SHEET NO.: **1 of 3**

ORIGINAL DESIGN: (Sketch attached)

On McGinnis Ferry Road, 10-ft.-wide multi-use path and 5-ft.-wide concrete sidewalks are provided. For other roads in this project, 5-ft.-wide concrete sidewalks are provided on both sides of the road.

ALTERNATIVE: (Sketch attached)

Keep multi-use path on McGinnis Ferry Road and shoulders on all roads and south of McGinnis Ferry Road. Remove all concrete sidewalks for future construction.

ADVANTAGES:

- Reduces cost
- Reduces construction schedule

DISADVANTAGES:

- Loss of amenity

DISCUSSION:

There is hardly any development where the proposed roads pass through. Eliminating the concrete sidewalks and letting the developers shoulder the responsibility would save GDOT substantial amount of money.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 508,950	—	$ 508,950
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 508,950	—	$ 508,950

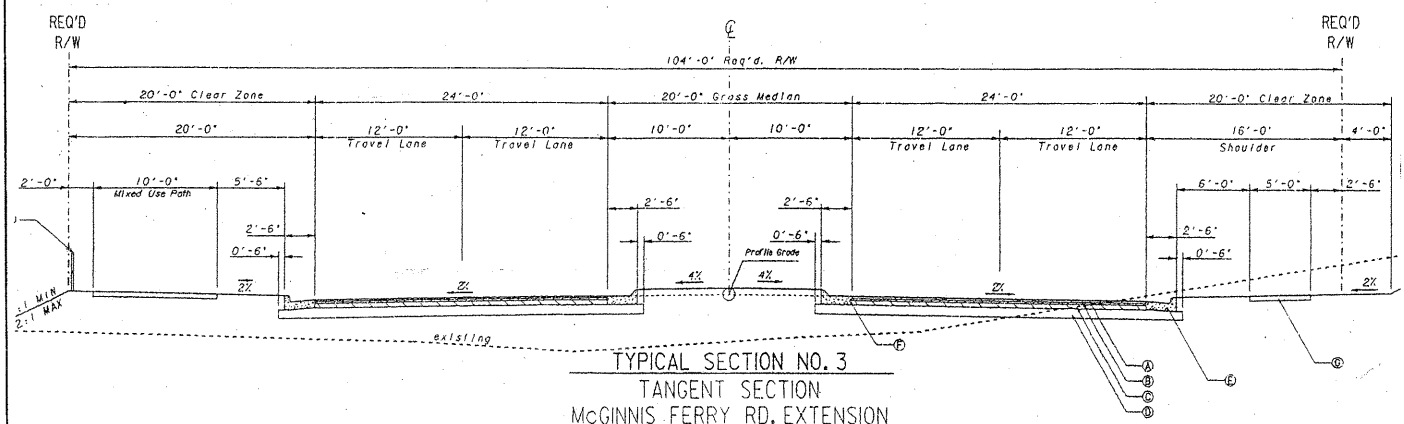
SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~155~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: S-7

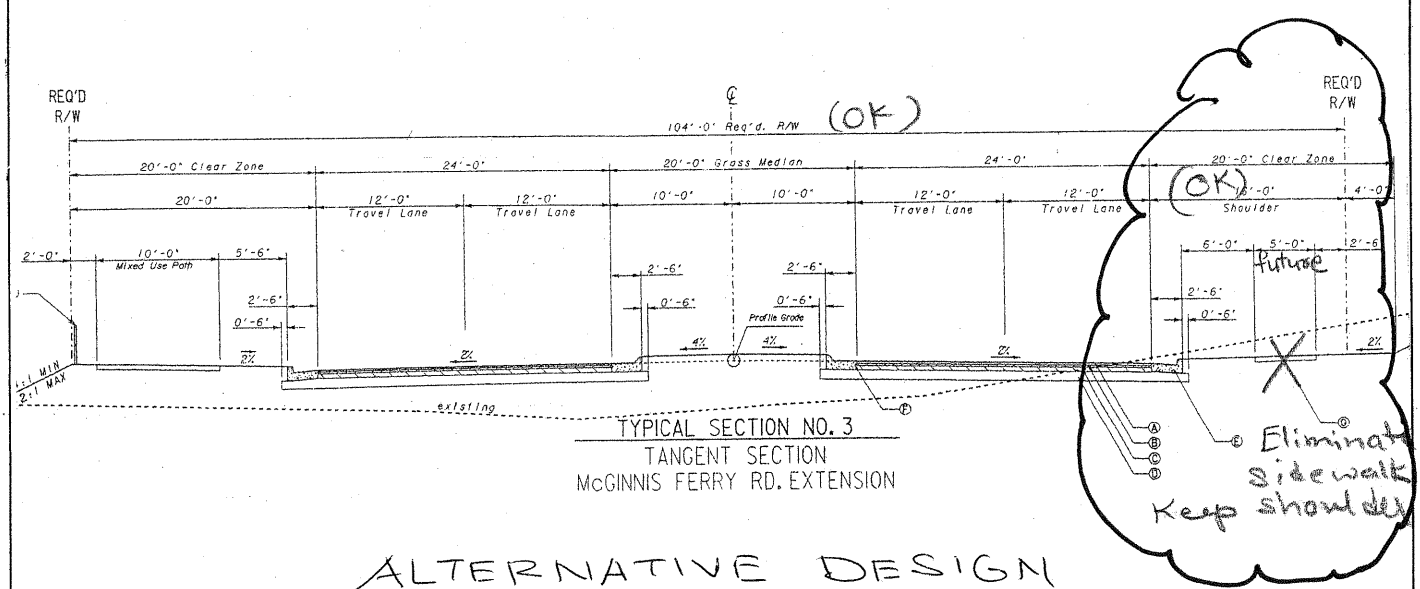
ORIGINAL DESIGN ☑ ALTERNATIVE DESIGN ☑ BOTH ☐

SHEET NO.: 2 of 3



TYPICAL SECTION NO. 3
TANGENT SECTION
McGINNIS FERRY RD. EXTENSION

ORIGINAL DESIGN



TYPICAL SECTION NO. 3
TANGENT SECTION
McGINNIS FERRY RD. EXTENSION

ALTERNATIVE DESIGN

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~456~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: S-7

DESCRIPTION:

SHEET NO.: 3 of 3

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Concrete Sidewalk	SY				11,100	37.80	419,580
Subtotal							419,580
Markup (%) at 21.3 %							89,370
TOTAL							508,950

VALUE ENGINEERING ALTERNATIVE

PROJECT:	**McGINNIS FERRY ROAD EXTENSION** **Project No. STP-0004-00(017)** *Gwinnett County, Georgia*	ALTERNATIVE NO.:	**S-8**
DESCRIPTION:	**USE 18-FT. MEDIAN IN LIEU OF 20-FT. MEDIAN ON McGINNIS FERRY ROAD AND NORTHBROOK/OLD PEACHTREE ROAD**	SHEET NO.:	**1 of 3**

ORIGINAL DESIGN: (Sketch attached)

Provide 20-ft.-wide median, 10 ft. on both sides of center line.

ALTERNATIVE: (Sketch attached)

Reduce 20-ft.-wide median to an 18-ft.-wide median.

ADVANTAGES:

- Reduces cost in right-of-way acquisition

DISADVANTAGES:

- None apparent

DISCUSSION:

Per American Association of State Highway and Transportation Officials (AASHTO) guidelines for Urban Arterials (p.474), 18-ft.-wide medians are allowed. This width is ample for 12-ft.-14-ft. turning lanes, especially when accompanied by eye-brow on the other side of the road. Right-of-way cost is assumed to be approximately $4.00 per square foot (sf).

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 382,548	—	$ 382,548
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 382,548	—	$ 382,548

SKETCH

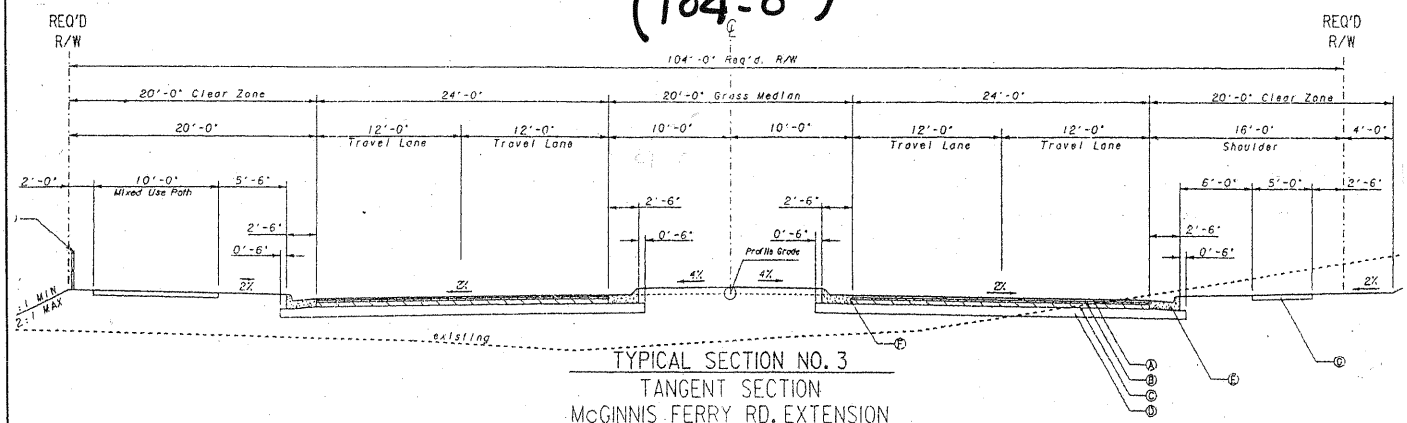
PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: S-8

ORIGINAL DESIGN ☒ ALTERNATIVE DESIGN ☒ BOTH ☐

SHEET NO.: 2 of 3

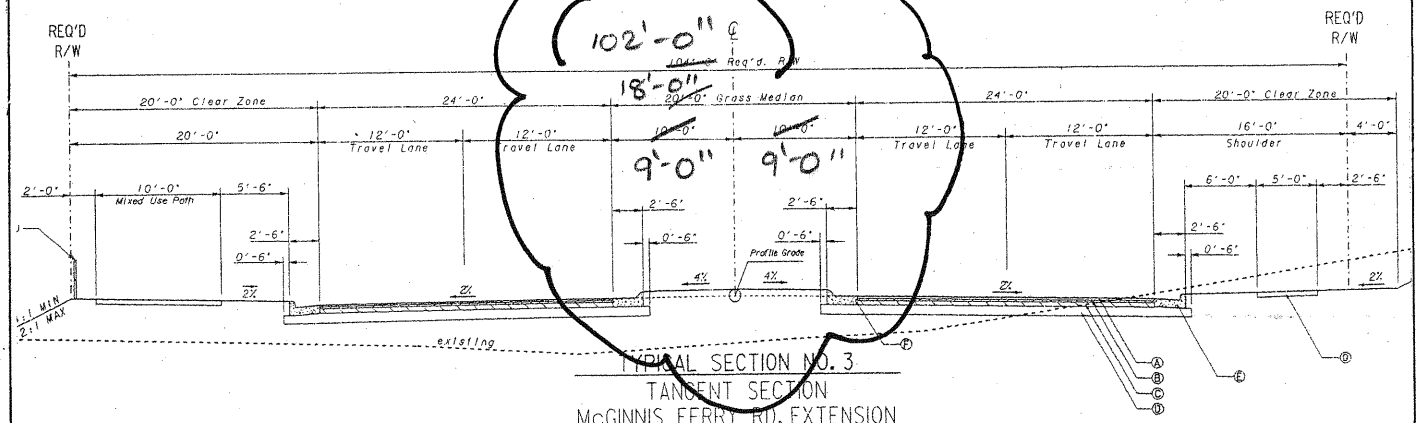
(104'-0")



TYPICAL SECTION NO. 3
TANGENT SECTION
McGINNIS FERRY RD. EXTENSION

ORIGINAL DESIGN

(102'-0")



TYPICAL SECTION NO. 3
TANGENT SECTION
McGINNIS FERRY RD. EXTENSION

ALTERNATIVE DESIGN

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~135~~017), Gwinnett County, GA

ALTERNATIVE NO.: S-8

DESCRIPTION:

SHEET NO.: 3 of 3

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
McGinnis Ferry Rd [(195+02) - (110+02)] x 2 = 17,000 sf	SF				17,000	4	68,000
Northbrook/Old P'tree Rd [(259+49) - (209+79)] x 2 = 9,940 sf	SF				9,940	4	39,760
Subtotal							107,760
Markup (%) at 255%							274,788
TOTAL							382,548

VALUE ENGINEERING ALTERNATIVE

PROJECT:	**McGINNIS FERRY ROAD EXTENSION** **Project No. STP-0004-00(017)** *Gwinnett County, Georgia*	ALTERNATIVE NO.:	**S-9**
DESCRIPTION:	**REDUCE PAVEMENT THICKNESS ON ALL ROADS** **ACCEPT McGINNIS FERRY ROAD**	SHEET NO.:	**1 of 3**

ORIGINAL DESIGN:

The same pavement section is shown for all roads whether it is heavily expected travel on McGinnis Ferry Road, moderately expected traffic on Relocated Old Peachtree Road, or negligible expected load on Gwinnett County Connector.

ALTERNATIVE:

Pavement thickness should be directly correlated to the expected design traffic. Thus, the pavement thickness should be reduced for Relocated Old Peachtree Road and further reduced for other smaller roads.

ADVANTAGES:

- Provides a significant cost savings on materials
- Accelerates construction

DISADVANTAGES:

- None apparent

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

FLEXIBLE PAVEMENT DESIGN ANALYSIS

S-9
2/3

Project: STP-0004-00(456) **County:** Gwinnett
P.I. no.: 0004456
Description: McGinnis Ferry Road Extension

Traffic Data (NOTE: AADTs are one-way)
24-hour Truck Percentage: 10.00%
AADT initial year of design period: 9,000 vpd (2011)
AADT final year of design period: 24,400 vpd (2031)
Mean AADT (one-way): 16,700 vpd

Design Loading

Mean AADT		LDF		Trucks		18-K ESAL		Total Daily Loads
16,700	*	0.70	*	0.100	*	0.95	=	1,112

Total predicted design period loading = 1112 * 20 * 365 = 8,117,600

Design Data
Terminal Serviceability Index: 2.50
Soil Support: 3.00
Regional Factor: 1.80

PROPOSED FLEXIBLE PAVEMENT STRUCTURE

Material	Thickness Inches	Thickness (mm)	Structural Coefficient	Structural Value
12.5 mm SMA	1.50	(38)	0.44	0.66
19 mm Superpave	3.00	(76)	0.44	1.32
25 mm Superpave	0.00	()	0.44	0.00
	8.00	(203)	0.30	2.40
Graded Aggregate Base	10.00	(254)	0.16	1.60

Required SN = 5.82 Proposed SN = 5.98

>>> Proposed pavement is 2.7% Overdesign <<<

Remarks: McGinnis Ferry Road Pavement Design

Prepared by Steven Lindsey, PE January 14, 2008
Date

Recommended _____
State Materials & Research Engineer **Date**

Approved _____
District Engineer **Date**

FLEXIBLE PAVEMENT DESIGN ANALYSIS

S-9
3/3

Project: STP-0004-00(456) **County:** Gwinnett
P.I. no.: 0004456
Description: McGinnis Ferry Road Extension

Traffic Data (NOTE: AADTs are one-way)
24-hour Truck Percentage: 10.00%
AADT initial year of design period: 16,600 vpd (2011)
AADT final year of design period: 25,000 vpd (2031)
Mean AADT (one-way): 20,800 vpd

Design Loading

Mean AADT		LDF		Trucks		18-K ESAL		Total Daily Loads
20,800	*	0.70	*	0.100	*	0.95	=	1,384

Total predicted design period loading = 1384 * 20 * 365 = 10,103,200

Design Data
Terminal Serviceability Index: 2.50
Soil Support: 3.00
Regional Factor: 1.80

PROPOSED FLEXIBLE PAVEMENT STRUCTURE

Material	Thickness Inches	Thickness (mm)	Structural Coefficient	Structural Value
12.5 mm SMA	1.50	(38)	0.44	0.66
19 mm Superpave	3.00	(76)	0.44	1.32
25 mm Superpave	0.00	()	0.44	0.00
	8.00	(203)	0.30	2.40
Graded Aggregate Base	10.00	(254)	0.16	1.60

Required SN = 5.99 Proposed SN = 5.98

>>> Proposed pavement is 0.2% Underdesign <<<

Remarks: Old Peachtree Road/Northbrook Parkway Pavement Design

Prepared by Steven Lindsey, PE January 14, 2008
Date

Recommended _____
State Materials & Research Engineer **Date**

Approved _____
District Engineer **Date**

SUMMARY OF VALUE ENGINEERING ALTERNATIVES

PROJECT: **McGINNIS FERRY ROAD EXTENSION -**
Project No. STP-0004-00(017) - Preliminary Submittal
Gwinnett County, Georgia

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS: INITIAL COST SAVINGS	PRESENT WORTH OF COST SAVINGS: RECURRING COST SAVINGS	PRESENT WORTH OF COST SAVINGS: TOTAL PW LCC SAVINGS
SECTION (S) (continued)						
S-10	Use 24 in. curbs/gutters in lieu of 30 in. Reduce section width from 104 ft. to 102 ft.	$ 1,598,702	$ 1,144,465	$ 454,237		$ 454,237
S-11	Review the unit price of concrete vs. asphalt path. $60/LF should be $20/LF (Estimate correction).	$ 600,000	$ 200,000	$ 400,000		$ 400,000
S-12	On relocated Old Peachtree Road, reduce the grass strip width from 6 ft. to 2 ft.	$ 386,240	$ -	$ 386,240		$ 386,240
PROFILE (P)						
P-1	Lower the profile from STA 160+00 to STA 193+00 to reduce the quantity of borrow required.	$ 868,265	$ 95,705	$ 772,560		$ 772,560
P-2	Lower the profile from STA 115+00 to STA 120+00 to reduce the amount of borrow required.	$ 176,916	$ 107,290	$ 69,626		$ 69,626
P-3	Convert at grade section from STA 211+00 STA 214+00 to bridge and eliminate the Con/Span® culvert.	$ 259,582	$ -	$ 259,582		$ 259,582
P-4	Lower the grade from STA 209+00 to STA 235+00 to reduce the amount of borrow required.	$ 486,130	$ 192,806	$ 293,324		$ 293,324
STRUCTURES (ST)						
ST-1	Only build 4-lane bridge over I-85 in lieu of 8 lanes. Use phased approach, with no turning lanes in first phase.	$ 5,799,432	$ 3,448,638	$ 2,350,794		$ 2,350,794
ST-2	Build 6 lanes in lieu of 8 lanes on I-85 bridge (4 travel lanes + 2 turning lanes) in a phased approach.	$ 5,799,432	$ 4,428,135	$ 1,371,297		$ 1,371,297

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

ALTERNATIVE NO.: **S-10**

DESCRIPTION: **IN LIEU OF 30-INCH CURB AND GUTTER USE A 24-INCH CURB AND GUTTER**

SHEET NO.: **1 of 3**

ORIGINAL DESIGN: (Sketch attached)

8 in. x 30 in. curb and gutter are provided on outside lanes (Type II). 8 in. x 30 in. curb and gutter are provided on inside lanes (Type VII).

ALTERNATIVE: (Sketch attached)

Use Type II, 8 in. x 24 in. curb and gutter on outside lanes and Type VII, 8 in. x 24 in. curb and gutter on inside lanes. This saves one foot of right-of-way on each side for a total of 2 ft. on McGinnis Ferry Road and Northbrook/Old Peachtree Road. Resulting in a right-of-way savings similar to Alternative Number (Alt. No.) S-8.

ADVANTAGES:

- Reduces cost in materials and right-of-way

DISADVANTAGES:

- None apparent

DISCUSSION:

A 24-in. curb and gutter should be sufficient on this roadway.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 1,598,702	—	$ 1,598,702
ALTERNATIVE	$ 1,144,465	—	$ 1,144,465
SAVINGS	$ 454,237	—	$ 454,237

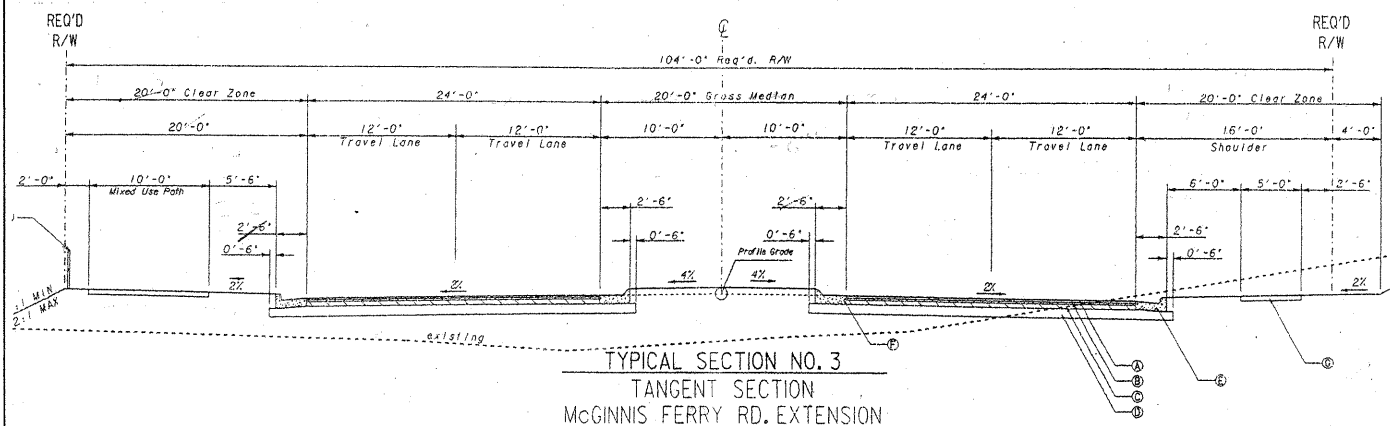
SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~135~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: S-10

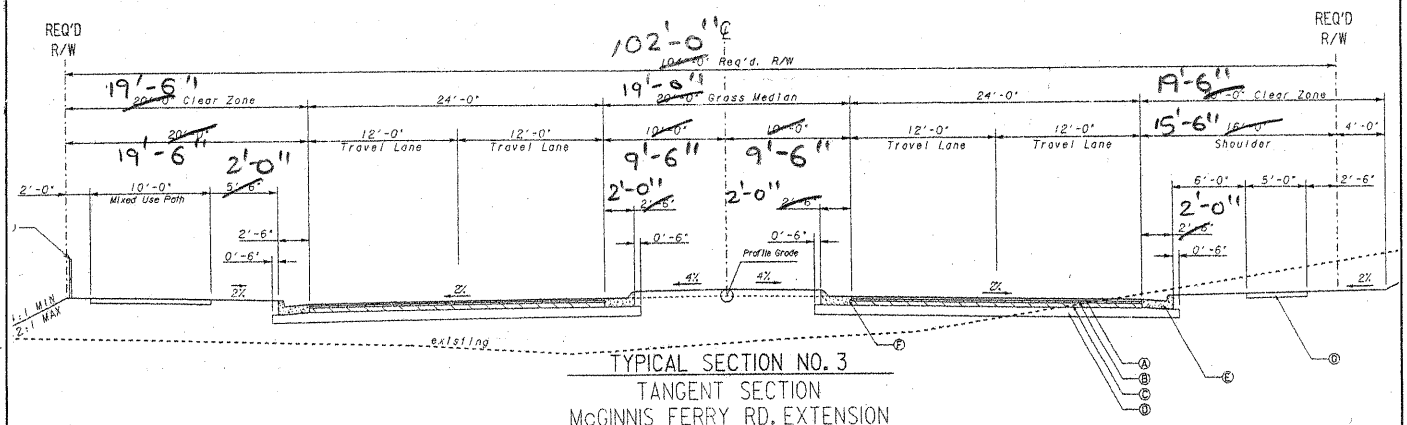
ORIGINAL DESIGN ☑ ALTERNATIVE DESIGN ☑ BOTH ☐

SHEET NO.: 2 of 3



TYPICAL SECTION NO. 3
TANGENT SECTION
McGINNIS FERRY RD. EXTENSION

ORIGINAL DESIGN



TYPICAL SECTION NO. 3
TANGENT SECTION
McGINNIS FERRY RD. EXTENSION

ALTERNATIVE DESIGN

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~017~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: S-10

DESCRIPTION:

SHEET NO.: 3 of 3

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
8"x30" TP. 2, C&G	LF	30,000	17.84	535200			
8"x30" TP. 2 C&G	LF	30,000	15.58	467,400			
				1,002,600			
21.3% markup				213,554			
				1,216,154			
8"x24" TP. 2 C&G	LF				30,000	15.87	476,100
8"x24" TP. 7 C&G	LF				30,000	15.58	467,400
							943,500
21.3% markup							200,965
							1,144,465
R/W Savings (See S-8)				382,548			
Subtotal							
Markup (%) at							
TOTAL				1,598,702			1,144,465

VALUE ENGINEERING ALTERNATIVE

PROJECT:	**McGINNIS FERRY ROAD EXTENSION** **Project No. STP-0004-00(017)** *Gwinnett County, Georgia*	ALTERNATIVE NO.:	**S-11**
DESCRIPTION:	**REVIEW THE UNIT PRICES FOR THE MIXED-USE PATH**	SHEET NO.:	**1 of 2**

ORIGINAL DESIGN: (Sketch attached)

No design has been shown for the 10-ft.-wide mixed-use path on the north side of McGinnis Ferry Road.

ALTERNATIVE: (Sketch attached)

See attached with estimate correction.

ADVANTAGES:

- Reduces cost

DISADVANTAGES:

- None apparent

DISCUSSION:

The unit price for the mixed-use path is given as $60 per linear foot (lf). This is quite excessive when compared to normal mixed-use path costs. It is suggested that this be looked at properly.

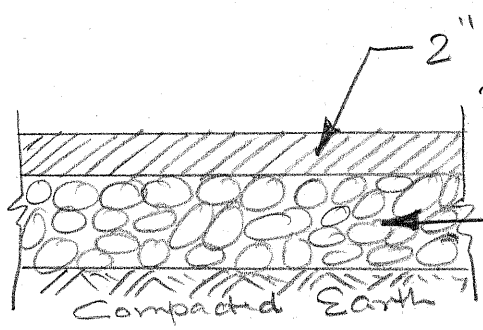
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 600,000	—	$ 600,000
ALTERNATIVE	$ 200,000	—	$ 200,000
SAVINGS	$ 400,000	—	$ 400,000

CALCULATIONS

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~056~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: S-11

SHEET NO.: 2 of 2



Mixed-Use Path
Suggested Typical Section

At $100/Ton, 2" of A.C. costs:

$\frac{220 \times 100}{2000} = \$11/SY.$

10" G.A.B. is given as costing $16/SY.

∴ 4" G.A.B costs: $6.4/SY.

Adding 0.25/SY for Bituminous Coat, the mixed use path will cost $11 + $6.4 + $0.25 = $17.65/SY

or $17.65/9 sf or $19.61/10 sf. say $20/LF.

Thus for 10' wide section, the multi-use path should not cost more than $20 per linear foot.

This results in savings of 10,000 ($60 - 20) = $400,000

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION** ALTERNATIVE NO.: **S-12**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

DESCRIPTION: **REDUCE GRASS STRIP WIDTH FROM 6 FT. TO 2 FT. ON RELOCATED OLD PEACHTREE ROAD** SHEET NO.: **1 of 3**

ORIGINAL DESIGN: (Sketch attached)

Provide 6-ft.-wide grass strip between the concrete sidewalk and back of the curb on both sides of the relocated Old Peachtree Road.

ALTERNATIVE: (Sketch attached)

Provide 2-ft.-wide grass strip between the concrete sidewalk and back of the curb on both sides of the relocated Old Peachtree Road.

ADVANTAGES:

- Reduces cost
- Reduces construction schedule

DISADVANTAGES:

- Reduces landscape area

DISCUSSION:

Traveling northeast on Old Peachtree Road, once you cross Lawrenceville-Suwanee Road, the width of the grass strip between the concrete sidewalk and the back of the curb is only 2 ft. If the same section is adopted, continuity will be maintained in addition to savings in construction time and money. Cost of right-of-way is approximately $4 per sf.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 386,240	—	$ 386,240
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 386,240	—	$ 386,240

SKETCH

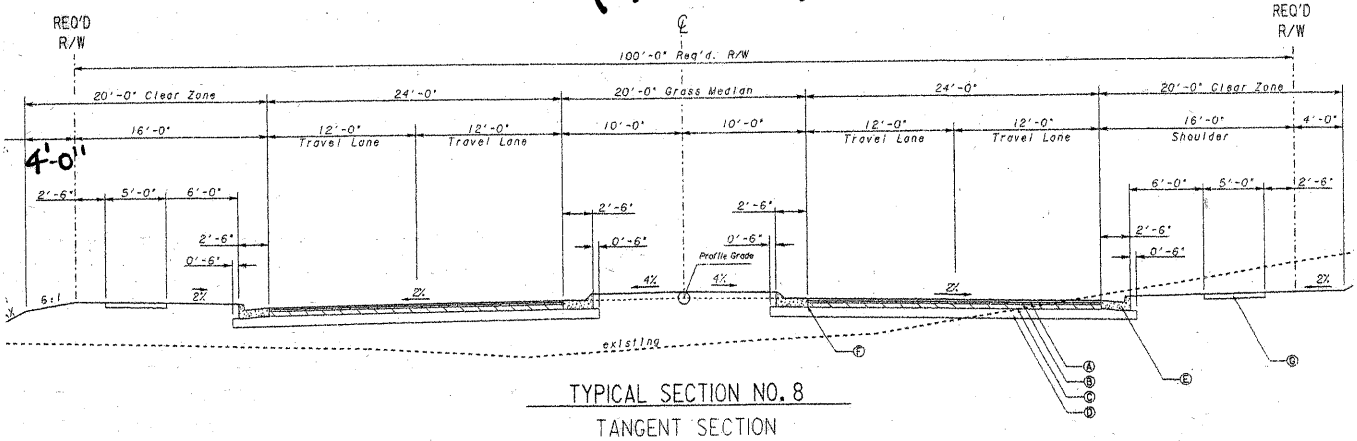
PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~#50~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: S-12

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☑

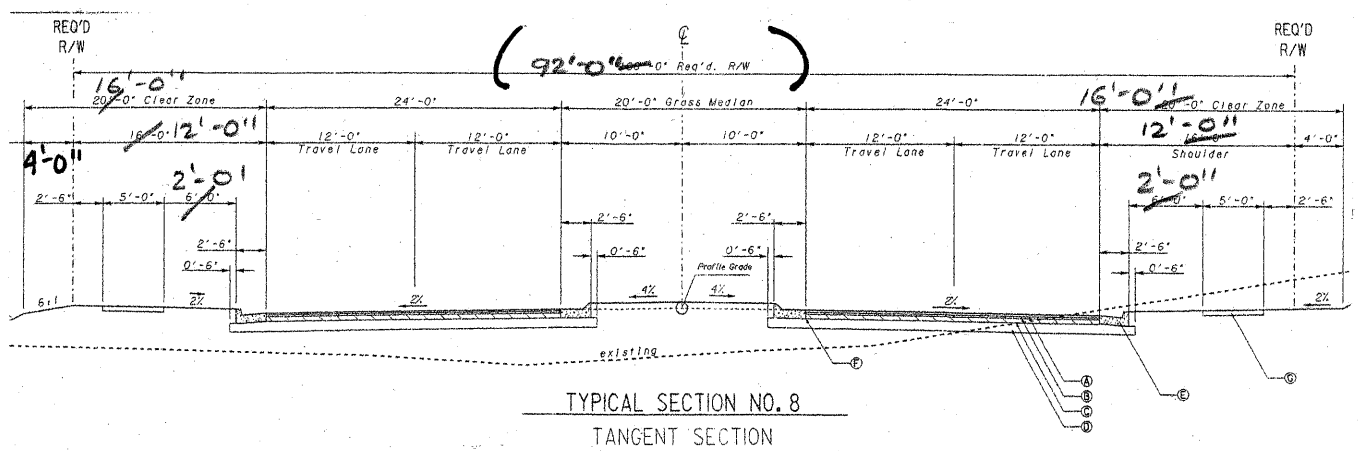
SHEET NO.: 2 of 3

(100'-0")



TYPICAL SECTION NO. 8
TANGENT SECTION
NORTHBROOK PKWY./OLD PEACHTREE RD.

ORIGINAL DESIGN



TYPICAL SECTION NO. 8
TANGENT SECTION
NORTHBROOK PKWY./OLD PEACHTREE RD.

ALTERNATE DESIGN

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~356~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: S-12

DESCRIPTION:

SHEET NO.: 3 of 3

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
259+98.94 - 224+99.75 = 3,494.19 lf Subtracting length of intersections, the grass strip length is 3,400'							
3,400 (6'-2') 2 = 27,200 sf of Right-of-Way	SF				27,200	4	108,800
Subtotal							108,800
Markup (%) at 255 %							277,440
TOTAL							386,240

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION** ALTERNATIVE NO.: **P-1**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

DESCRIPTION: **LOWER PROFILE FROM STA 160+00 TO STA 193+-00** SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (Sketch attached)

The present profile from STA 160+00 to STA 193+00 is mostly in a "fill" condition requiring borrow material.

ALTERNATIVE: (Sketch attached)

Lower the profile grade from STA 160+00 to STA 193+00 to reduce the amount of borrow materials required.

ADVANTAGES:

- Reduces construction cost
- Reduces amount of borrow material required
- Reduces width of required construction easement
- Shortens culvert

DISADVANTAGES:

- Modifies existing profile

DISCUSSION:

This project as presently designed requires 475,000 cy of borrow material to balance the earthwork. Since this portion of McGinnis Ferry Road extension is mostly fill, lowering the profile would reduce the requirement for borrow material.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 868,265	—	$ 868,265
ALTERNATIVE	$ 95,705	—	$ 95,705
SAVINGS	$ 772,560	—	$ 772,560

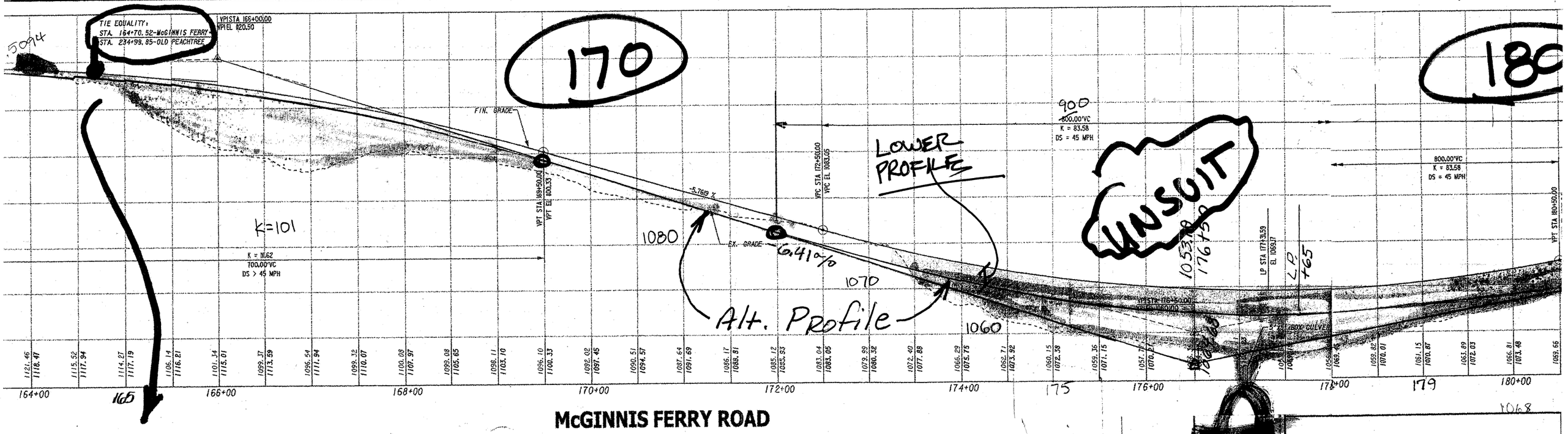
Alt. P-1

Sketch

2 of 5

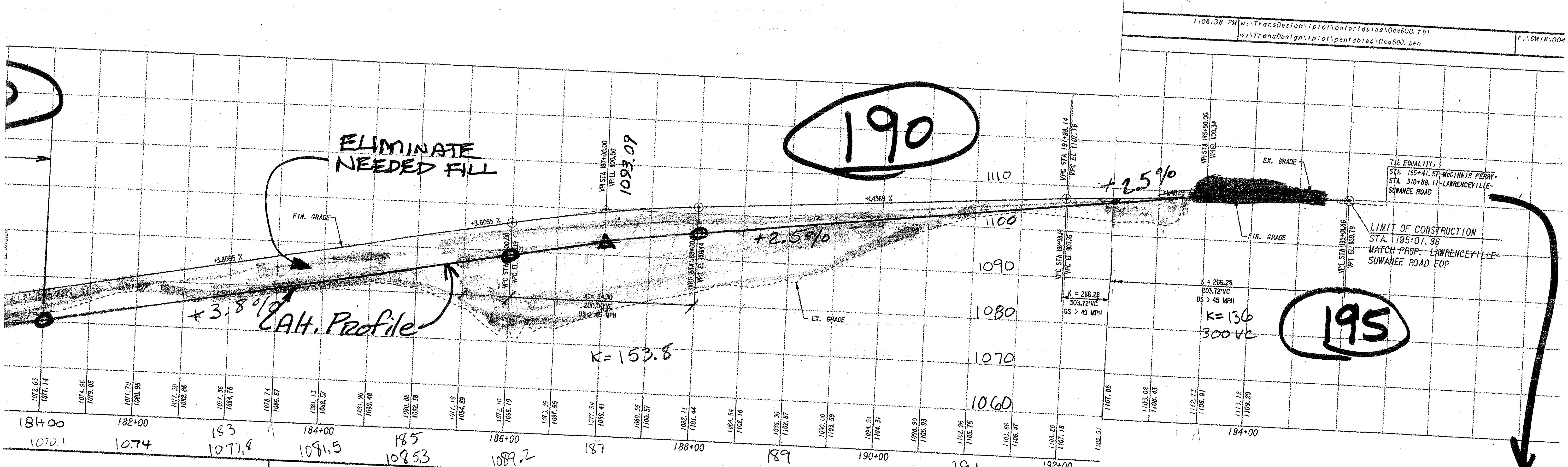
$e = \frac{1}{8} AL$

9:14:05 AM	w:\TransDesign\plot\colortables\0ce600.tbl w:\TransDesign\plot\pentables\0ce600.pen	h:\GWIN\004456\DGN\004456PROI.dgn, Levels ON-(1-64)	COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL
			GWINNETT	STP-0004-00(456)	56	57



Sketch Alt. P-1

3 of 5



45 mph
Crest K = 61
Sag K = 79

PBSJ

H. 0 50 100 150
V. 0 10 20 30
(SCALE IN FEET)

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION

OFFICE: DISTRICT ONE

MAINLINE PROFILE

McGINNIS FERRY ROAD EXT.
McGINNIS FERRY ROAD

DRAWING No. 15-03

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~55~~017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: P-1

SHEET NO.: 4 of 5

Savings on Embankment:
(Calculated from 100ft. X-sections)
= 54,890cy (Neat)

Additional unclassified excavation from Profile change
= 7,890cy (20% shrinkage Factor)

475,000 C.Y. Borrow (from Plans – Neat Quantity?) (Assme Neat Quantity)
−(7,890x.8)c.y. (uncl. excav.)
− 54,890 c.y. (Neat)
413,798 c.y. Borrow P-1

Saving in fill Requirement.
54,890 c.y.
7,890 c.y.
(Neat) 62,780 c.y. ← Saving in Borrow

Save 20LF of culvert Length. @ 177+00 to include in installation
$359,000x2 / 162LF = $4400/LF ← use as unit cost
from Designers ConSpan cost estimate (materials)

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: P-1

DESCRIPTION:

SHEET NO.: 5 of 5

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Saving in Borrow	CY	62780	$10	627,800			
Culvert Length	LF	20	4400	88,000			
Add'l Unc'l. Excav	CY				7890	$10	78,900
Subtotal				715,800			78,900
Markup (%) at .213				152,465			16,805
TOTAL				868,265			95,705

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION** ALTERNATIVE NO.: **P-2**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

DESCRIPTION: **TO REDUCE BORROW AND WALL NUMBER 1, LOWER PROFILE GRADE FROM STA 115+00 TO STA 120+00** SHEET NO.: **1 of 8**

ORIGINAL DESIGN: (Sketch attached)

The present profile from STA 115+00 to STA 120+00± is mostly in "fill" and requires retaining wall number (no.) 1 to avoid a commercial parking lot.

ALTERNATIVE: (Sketch attached)

Lower the grade from STA 115+00 to STA 120+00 in an effort to reduce the size of wall no. 1 and the amount of borrow.

ADVANTAGES:

- Reduces construction cost
- Reduces amount of borrow material required
- Reduces width of required construction easement
- Shortens culvert

DISADVANTAGES:

- None apparent

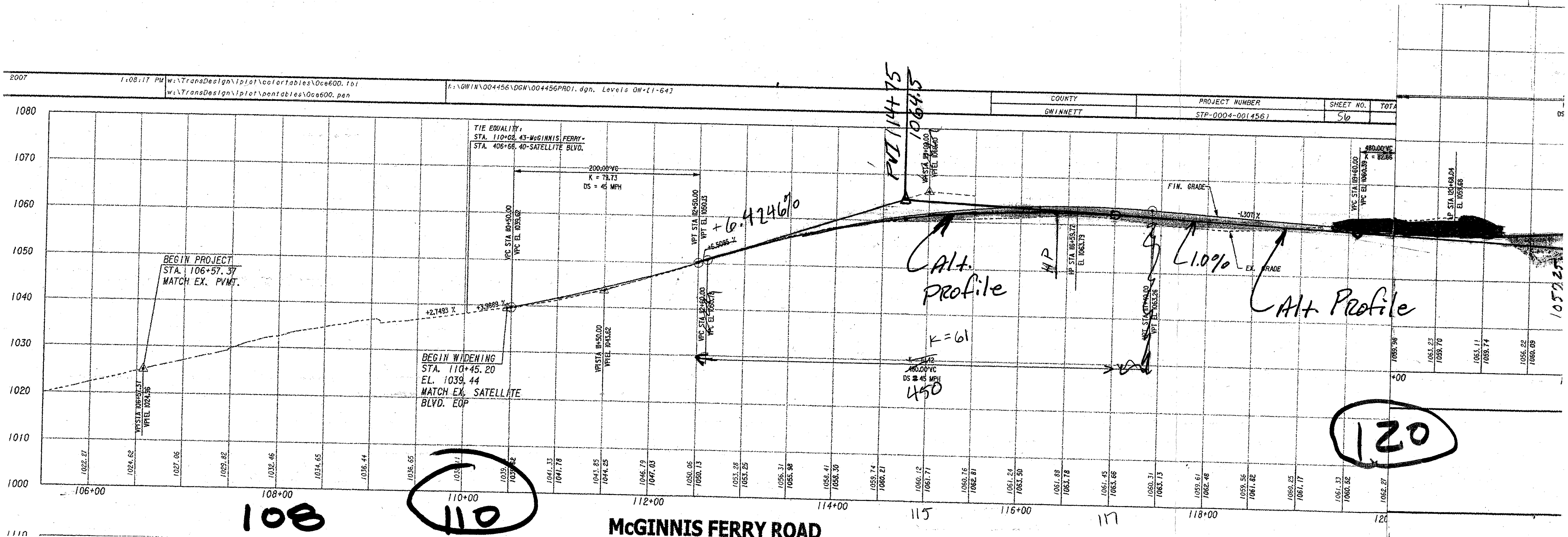
DISCUSSION:

The profile from STA 115+00 to STA 120+00 can only be lowered slightly and still meet speed design for 45 mph and tie into the existing intersection at Satellite Boulevard. However, it can be lowered enough to reduce the size of wall no. 1 and help balance the earthwork.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 176,916	—	$ 176,916
ALTERNATIVE	$ 107,290	—	$ 107,290
SAVINGS	$ 69,626	—	$ 69,626

Sketch P-2

2/8


COUNTY
GWINNETT
PROJECT NUMBER
STP-0004-00(456)
SHEET NO.
56
TIE EQUALITY:
STA. 110+08.43-McGINNIS FERRY
STA. 406+66.40-SATELLITE BLVD.
BEGIN PROJECT
STA. 106+57.37
MATCH EX. PVMT.
BEGIN WIDENING
STA. 110+45.20
EL. 1039.44
MATCH EX. SATELLITE
BLVD. EOP
200.00'VC
K = 79.73
DS = 45 MPH
PVI 114+75
1064.5
+6.4246%
Alt. Profile
Alt. Profile
K=61
450
1.0%
FIN. GRADE
EX. GRADE
HP
106+00
108+00
110+00
112+00
114+00
116+00
118+00
108
110
115
117
120
McGINNIS FERRY ROAD

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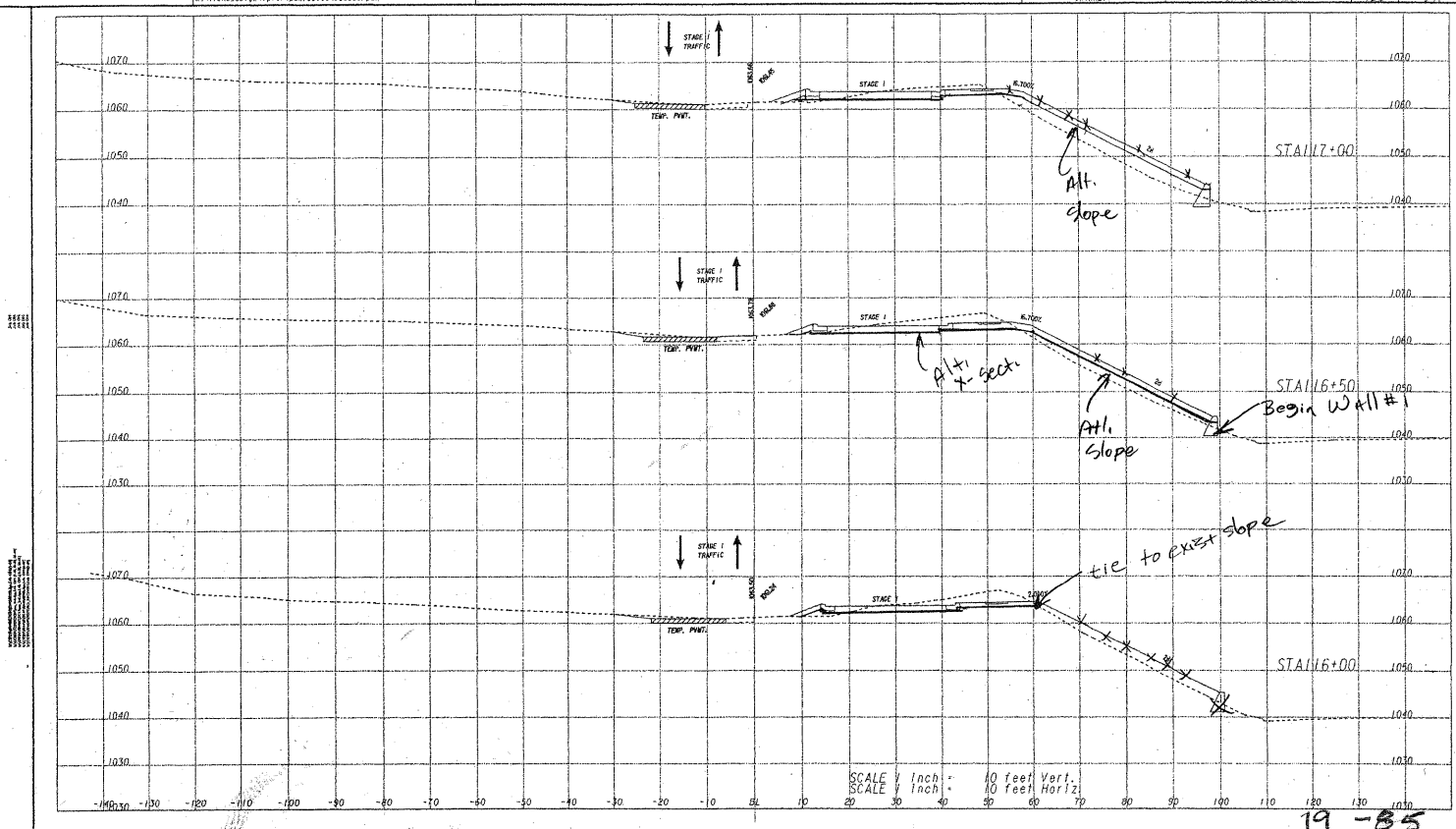
COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GWINNETT	STP-0004-00(456)	165	521



19-85

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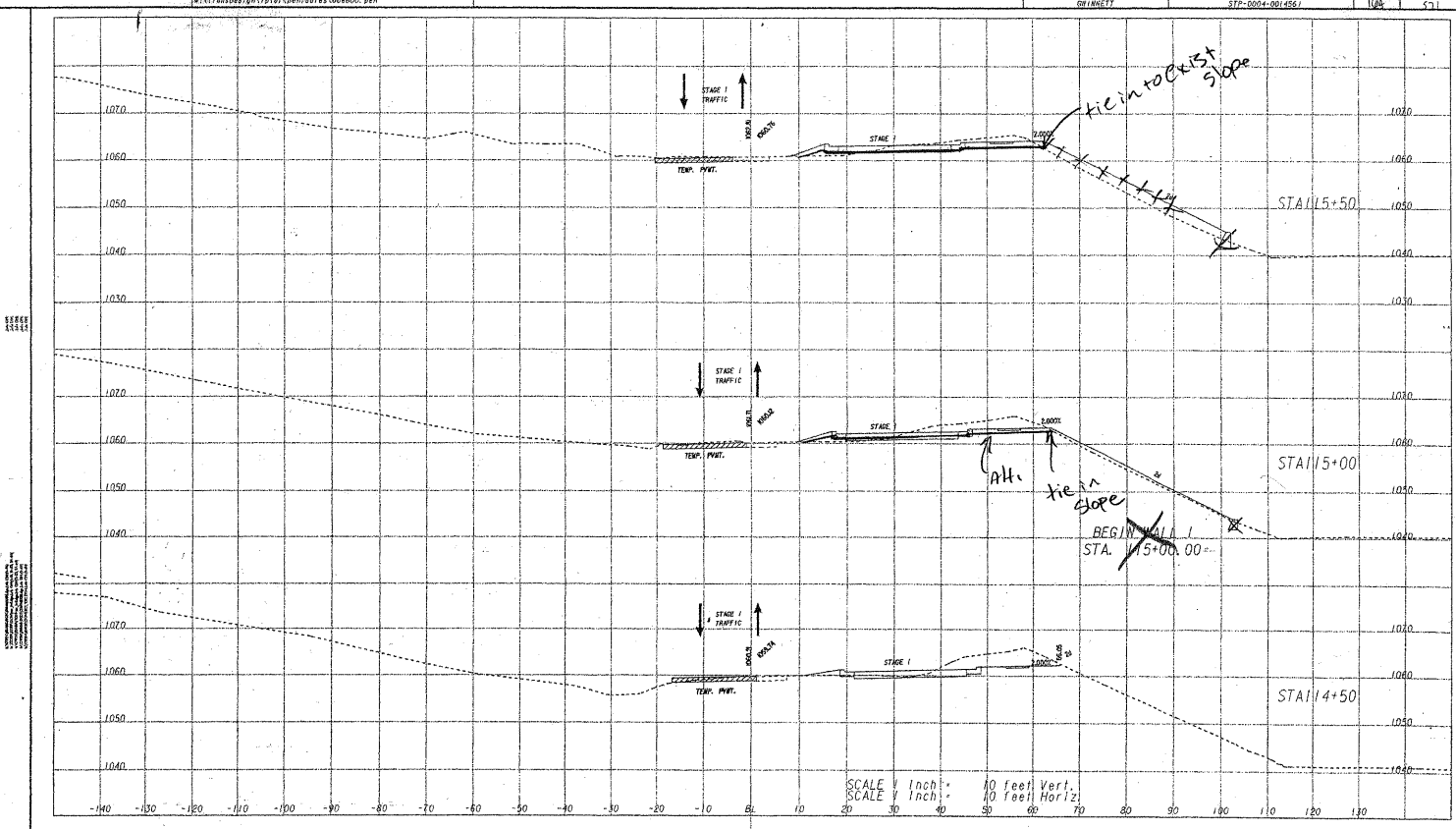
COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GWINNETT	STP-0004-00(456)	164	521



PBS&J

REVISION DATES

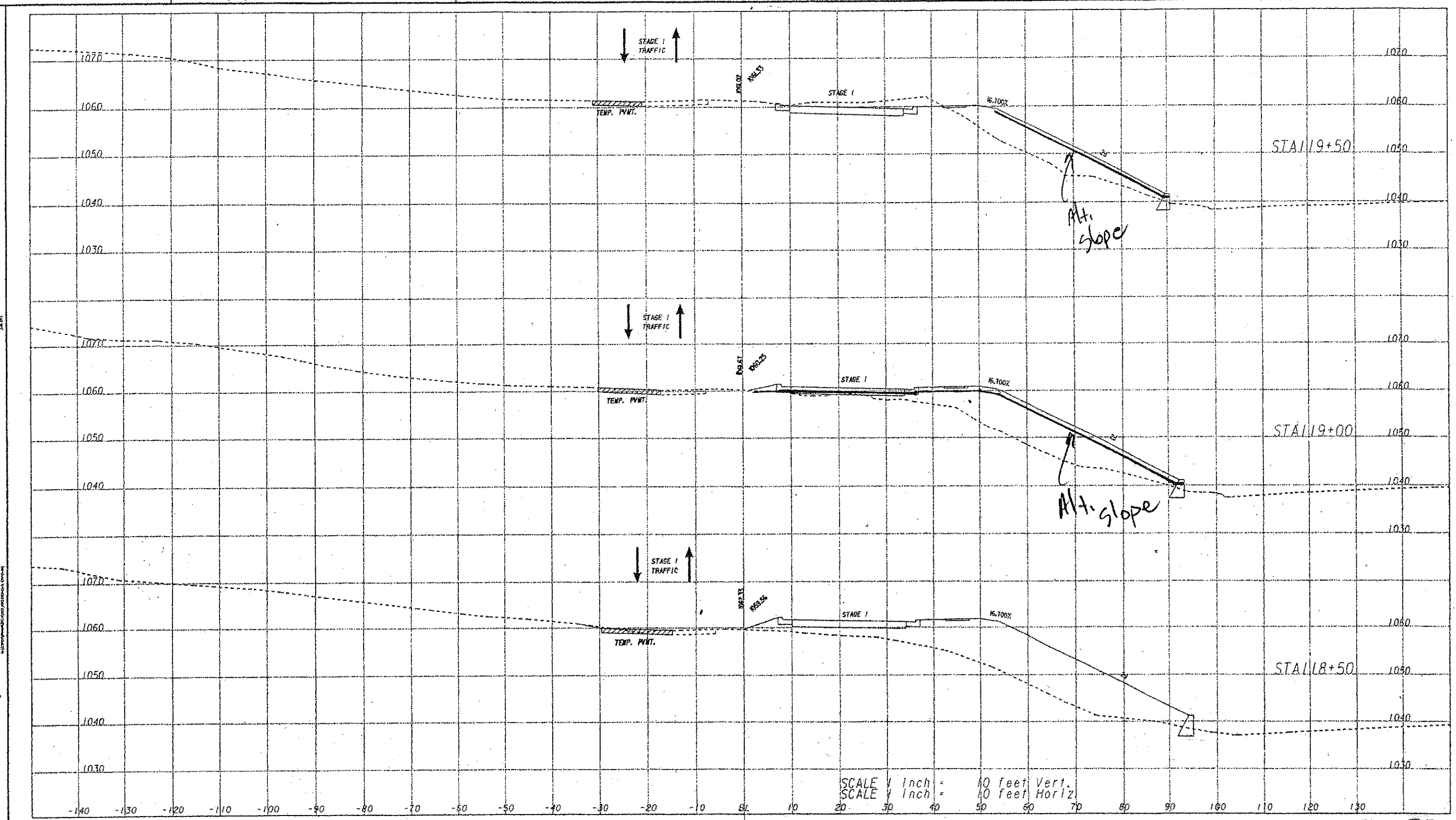
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: DISTRICT ONE

CONSTRUCTION STAGING CROSS SECTIONS

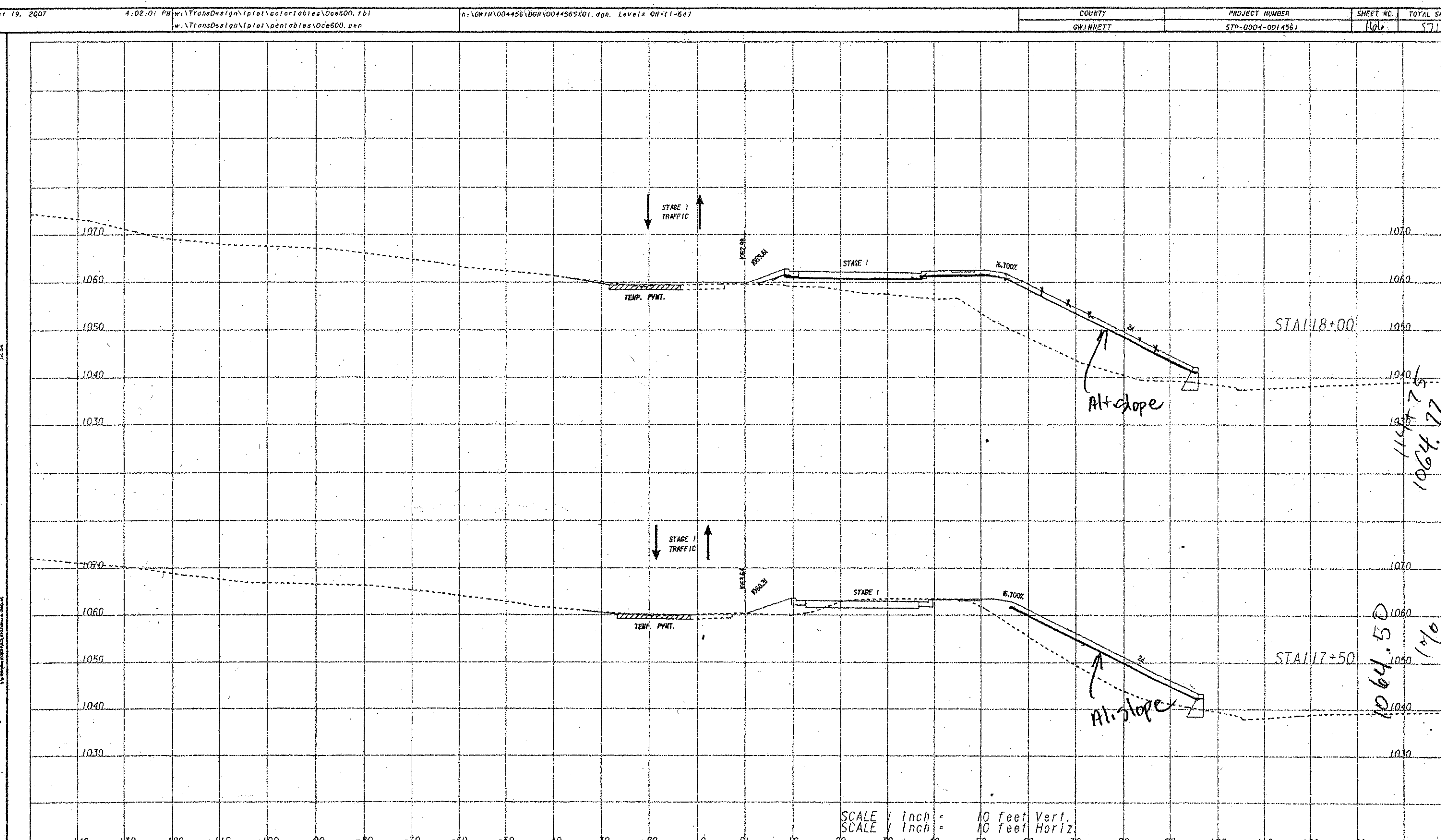
McGINNIS FERRY ROAD
STAGE 1

DRAWING NO. 19-84

Sketch P-2 3/8



19-87



1064.77
1064.50

PBSJ

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: DISTRICT ONE
CONSTRUCTION STAGING
CROSS SECTIONS
McGINNIS FERRY ROAD
STAGE I
DRAWING No. 19-86

Sketch P-2 4/8

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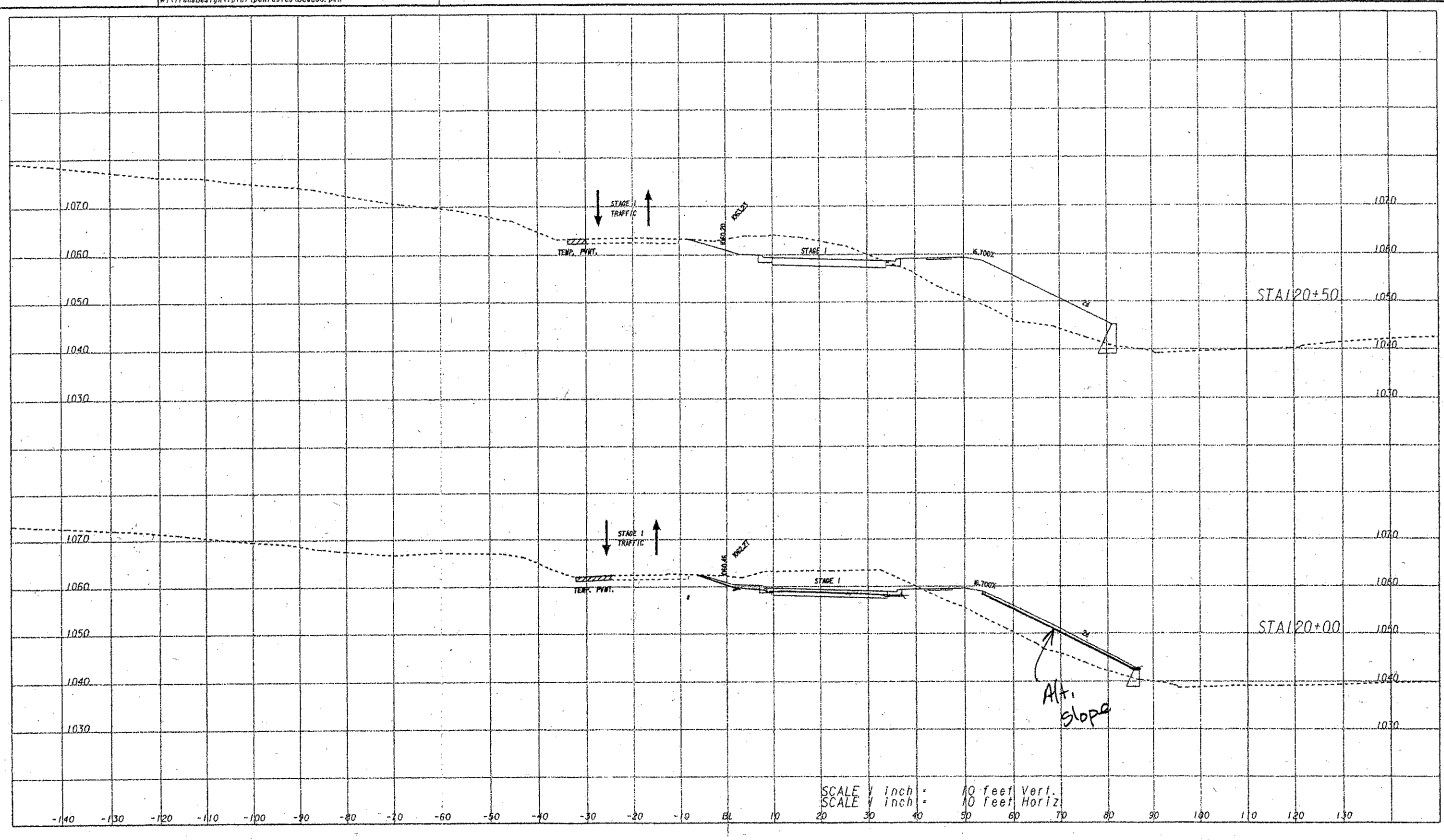
COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GWINNETT	STP-0004-00(456)	108	571



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REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: DISTRICT ONE

CONSTRUCTION STAGING CROSS SECTIONS

McGINNIS FERRY ROAD
STAGE 1

DRAWING NO. 19-88

Sketch P-2 5/8

Sketch P-2 6 of 8

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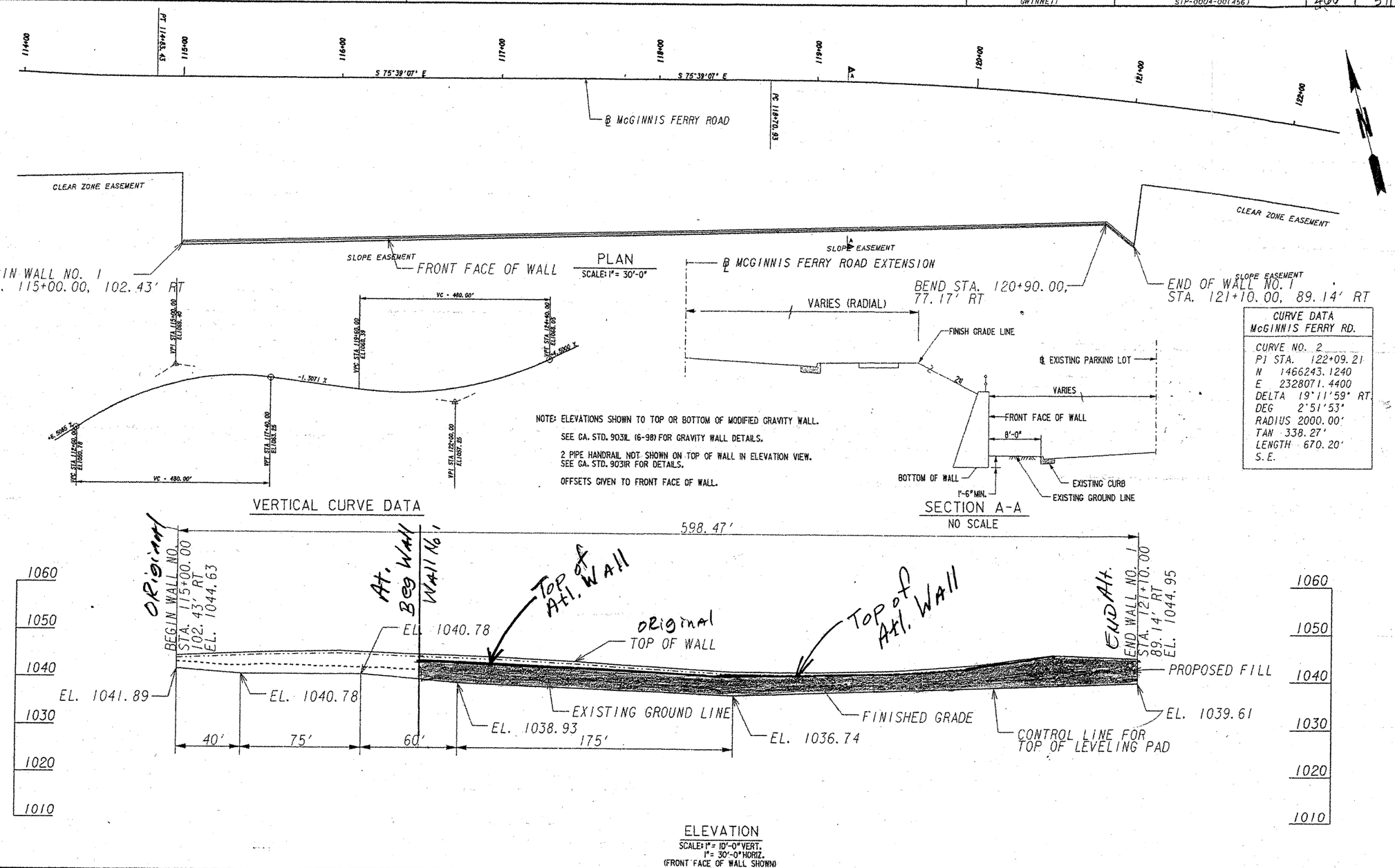
				GWINNETT	STP-0004-00(456)	466	571



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SCALE IN FEET
0 30 60 120

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: DISTRICT ONE

RETAINING WALL ENVELOPES

McGINNIS FERRY ROAD EXT.
WALL NO. 1

DRAWING NO. 31-01

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~455~~), Gwinnett County, Georgia
Preliminary Submittal 017

ALTERNATIVE NO.: P-2

SHEET NO.: 7 of 8

EARTHWORK changes by Lowering grade from STA 115+00 to 120+00

Reduction in borrow = 1,150 C.Y. (neat

increase in unclass excav. 160 C.Y. (neat)

413,798 C.Y. Reduced Borrow from P-1 Alt.
- (160 x .8) C.Y. (uncl. excav.)
- 1,150 C.Y. (neat

412,520 C.Y. BORROW P-1 & P2

on estimate use 1310 C.Y. for ORIGINAL (1150+160)

ORIGINAL WALL No. 1 FACE AREA = 2,950 SF

ALT. WALL No 1 FACE AREA = 1,930 SF

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: P-2

DESCRIPTION:

SHEET NO.: 8 of 8

PROJECT ITEM		ORIGINAL ESTIMATE			Alt./ PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
original							
Wall No 1	SF	2950	$45	$132,750			
Earthwork	CY	1310	$10	13,100			
Alt. Wall No 1	SF				1930	$45	$86,850
Unc. excav.	CY				10	160	1,600
Subtotal				$145,850			$88,450
Markup (%) at 21.3%				31,066			$18,840
TOTAL				$176,916			$107,290

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

ALTERNATIVE NO.: **P-3**

DESCRIPTION: **REPLACE THE FILL AND CON/SPAN® CULVERT AT STA 212+-00 WITH A 300-FT.-LONG BRIDGE**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch attached)

The existing design includes a fill of up to 40 ft. high and a 325-ft.-long CON/SPAN® culvert at STA 212+-00.

ALTERNATIVE: (Sketch attached)

Eliminate the CON/SPAN® culvert and much of the fill material by adding a 300-ft.-long, three-span bridge over the stream.

ADVANTAGES:

- Reduces cost
- Reduces right-of-way cost
- Lessens environmental impacts
- No blockage possible in stream

DISADVANTAGES:

- Requires a bridge
- Requires bridge maintenance

DISCUSSION:

Using a bridge from STA 211+00 to STA 214+00 will reduce the environmental impacts to the stream because no construction will take place in or directly adjacent to the water. The 325-ft.-long CON/SPAN® culvert is extremely costly because of the height of the fill and large side slopes. Additional savings may be realized in right-of-way, but more investigation is needed.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 259,582	—	$ 259,582
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 259,582	—	$ 259,582

SKETCH

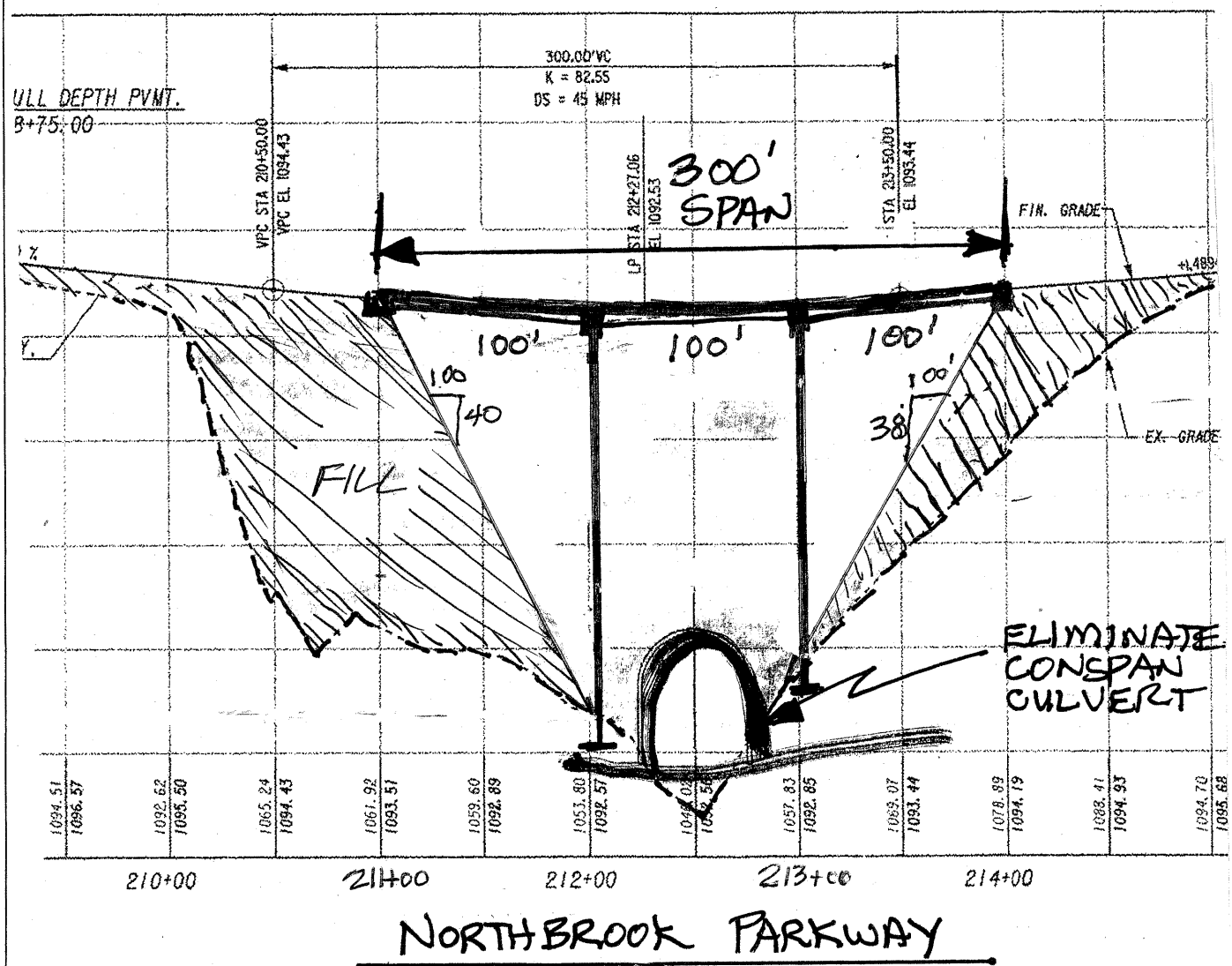
PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~456~~ 017), Gwinnett County, Georgia
Preliminary Submittal

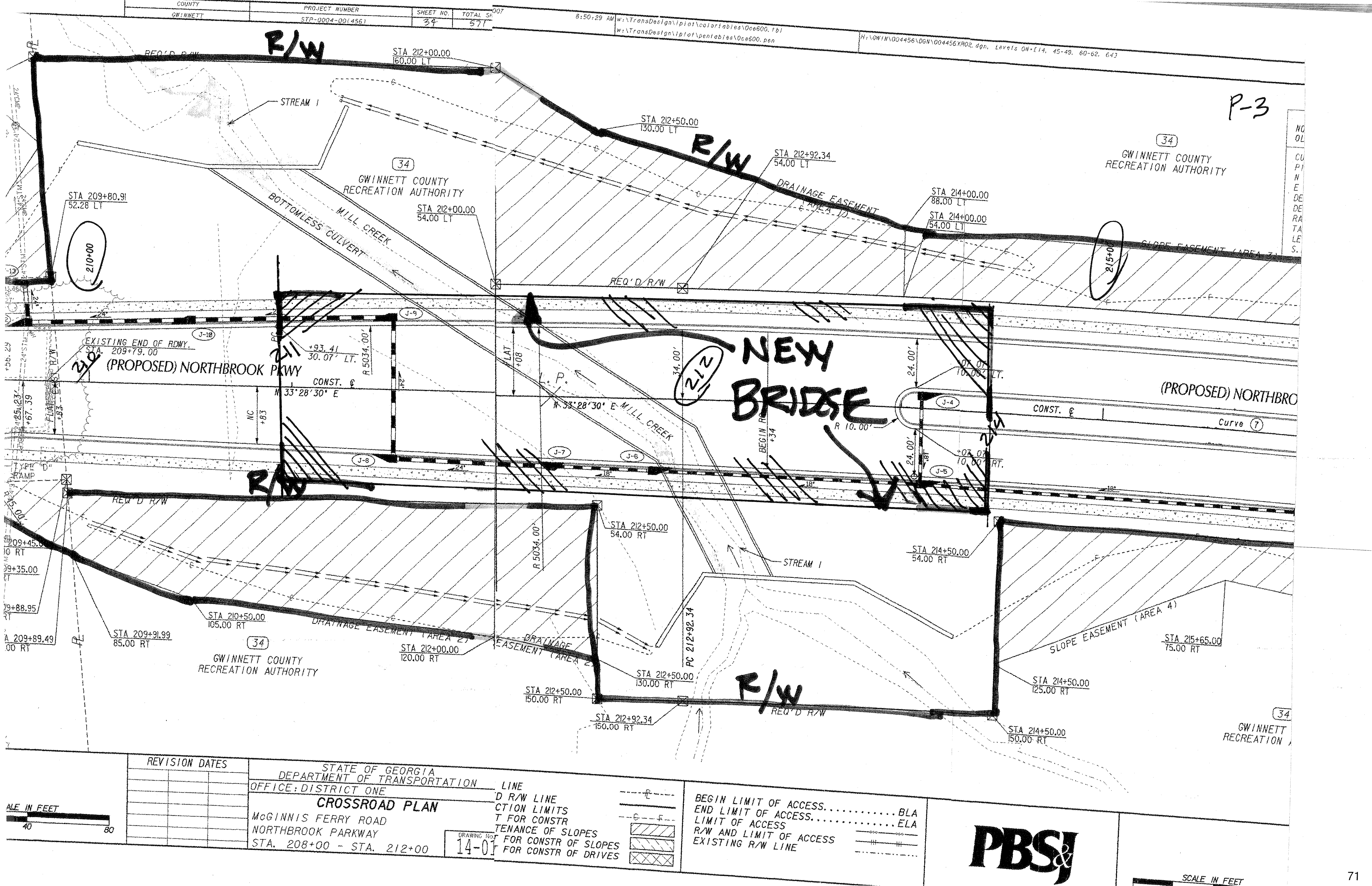
ALTERNATIVE NO.: **P-3**

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☒ BOTH ☐

SHEET NO.: **2 of 3**

ALTERNATIVE DESIGN




COUNTY
GWINNETT
PROJECT NUMBER
STP-0004-00(456)
SHEET NO.
34
TOTAL SHEETS
571
R/W
P-3
NEW BRIDGE
REQ'D R/W
STREAM I
STA 212+00.00 160.00 LT
STA 212+50.00 130.00 LT
STA 212+92.34 54.00 LT
STA 214+00.00 88.00 LT
STA 214+00.00 54.00 LT
STA 209+80.91 52.28 LT
STA 212+00.00 54.00 LT
DRAINAGE EASEMENT (AREA 1)
SLOPE EASEMENT (AREA 3)
GWINNETT COUNTY RECREATION AUTHORITY
BOTTOMLESS CULVERT
MILL CREEK
EXISTING END OF RDWY. STA. 209+79.00
(PROPOSED) NORTHBROOK PKWY
CONST. ℄
N 33°28'30" E
R 5034.00'
R 10.00'
BEGIN
Curve 7
STA 212+50.00 54.00 RT
STA 214+50.00 54.00 RT
STA 210+50.00 105.00 RT
STA 209+91.99 85.00 RT
STA 212+00.00 120.00 RT
DRAINAGE EASEMENT (AREA 2)
STA 212+50.00 130.00 RT
STA 212+50.00 150.00 RT
STA 212+92.34 150.00 RT
PC 212+92.34
STA 214+50.00 125.00 RT
STA 214+50.00 150.00 RT
SLOPE EASEMENT (AREA 4)
STA 215+65.00 75.00 RT
REVISION DATES
STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: DISTRICT ONE
CROSSROAD PLAN
McGINNIS FERRY ROAD
NORTHBROOK PARKWAY
STA. 208+00 - STA. 212+00
DRAWING No. 14-01
BEGIN LIMIT OF ACCESS........... BLA
END LIMIT OF ACCESS........... ELA
LIMIT OF ACCESS
R/W AND LIMIT OF ACCESS
EXISTING R/W LINE
PBSJ
SCALE IN FEET

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION** ALTERNATIVE NO.: **P-3**

Project No. STP-0004-00(~~456~~ 017), Gwinnett County, GA

DESCRIPTION: SHEET NO.: 4 of 4

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Bridge - 300LF x 88ft - 3-Span	SF				26,400	115.00	3,036,000
Less fill material	CY				-125,000	10.00	-1,250,000
Eliminate Conspan Cul-de-sac	LS						-2,000,000
Subtotal							-214,000
Markup (%) at 21.30%							-45,582
TOTAL							-259,582

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

ALTERNATIVE NO.: **P-4**

DESCRIPTION: **TO REDUCE BORROW, LOWER PROFILE GRADE FROM STA 208+-00 TO 234+50**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (Sketch attached)

The profile grades as presently designed produce 475,000 cy of borrow.

ALTERNATIVE: (Sketch attached)

Lower profile grade from STA 208+00 to STA 234+50 to reduce the fill and increase unclass excavation to balance earthwork.

ADVANTAGES:

- Reduces construction cost
- Reduces required fill embankment
- Reduces right-of-way in fill sections
- Reduces borrow

DISADVANTAGES:

- Slightly increases right-of-way short cut section

DISCUSSION:

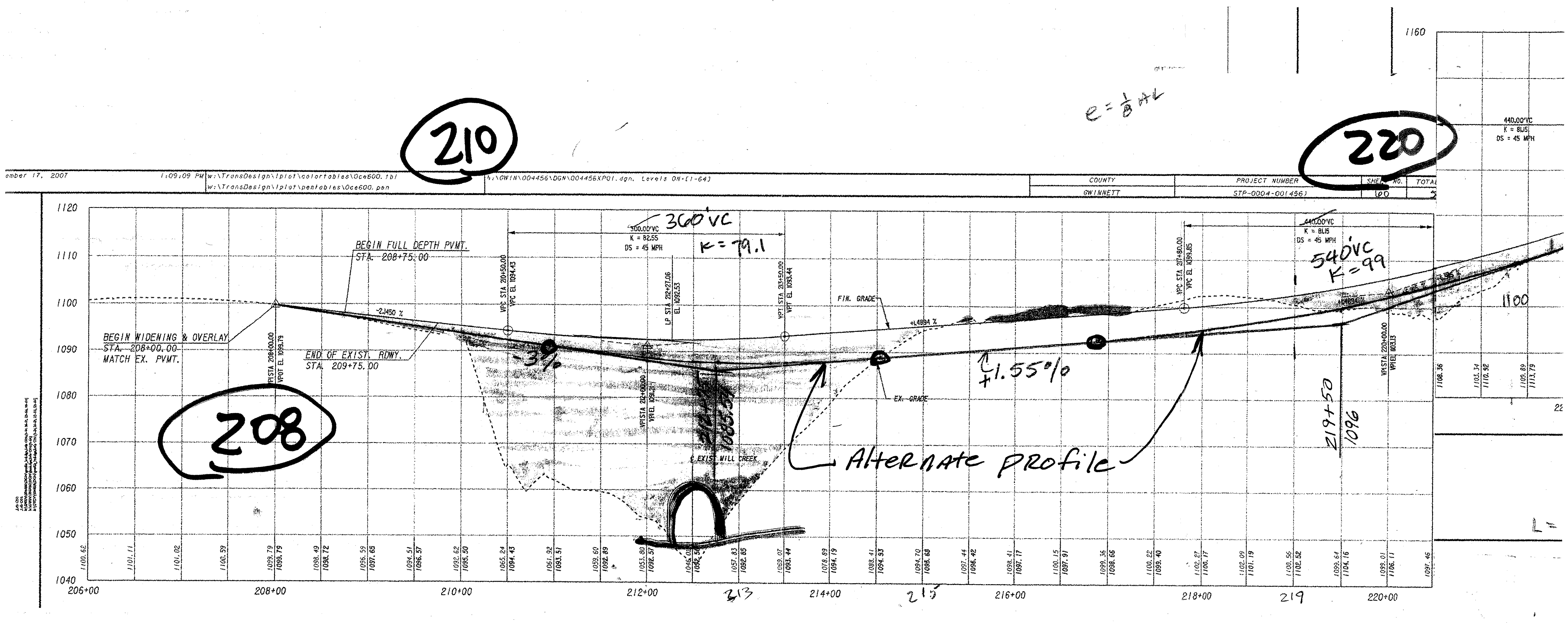
The present earthwork computations results in 475,000 cy of borrow. Lowering the grade in a new location section does not effect any existing development.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 486,130	—	$ 486,130
ALTERNATIVE	$ 192,806	—	$ 192,806
SAVINGS	$ 293,324	—	$ 293,324

Sketch

P-4

2/5



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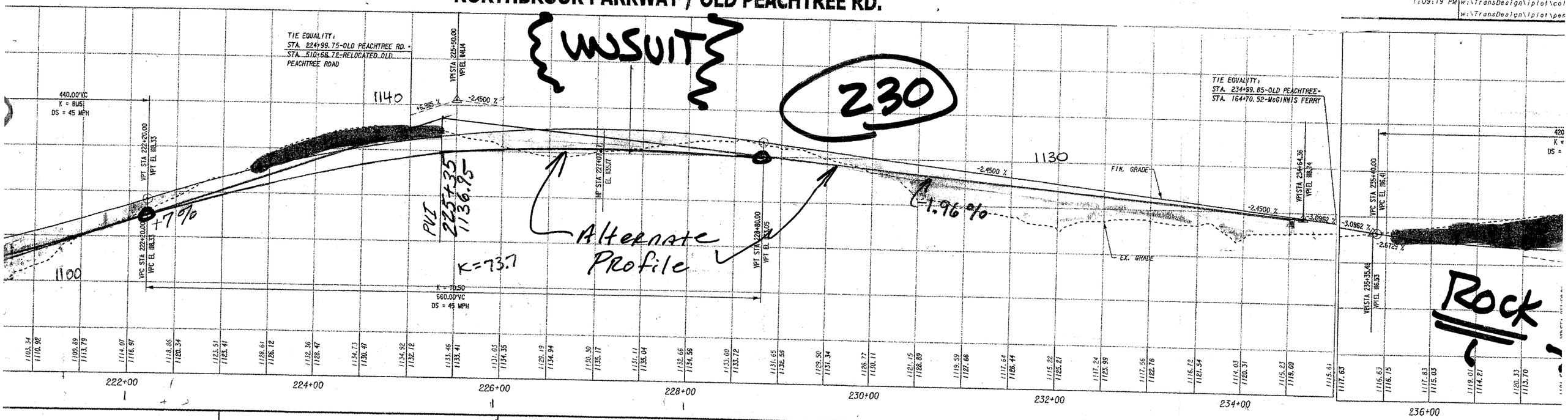
COUNTY
GWINNETT
PROJECT NUMBER
STP-0004-00(456)
SHEET NO.
TOTAL
210
220
208
e = 1/8 AL
1160
1120
1110
1100
1090
1080
1070
1060
1050
1040
206+00
208+00
210+00
212+00
214+00
216+00
218+00
220+00
213
215
219
BEGIN FULL DEPTH PVMT.
STA. 208+75.00
BEGIN WIDENING & OVERLAY
STA. 208+00.00
MATCH EX. PVMT.
END OF EXIST. RDWY.
STA. 209+75.00
-2.1450 %
300.00' VC
K = 82.55
DS = 45 MPH
360' VC
K = 79.1
440.00' VC
K = 81.15
DS = 45 MPH
540' VC
K = 99
FIN. GRADE
EX. GRADE
+1.4894 %
-3%
+1.55%
¢ EXIST. MILL CREEK
Alternate profile
219+50
1096
1100

Sketch P-4

3/5

NORTHBROOK PARKWAY / OLD PEACHTREE RD.



SUIT

230

Alternate Profile

Rock

$K = \frac{L}{A}$

$L = KA$

Crest K=61

Sag K=79

PBS&J

(SCALE IN FEET)

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: DISTRICT ONE

SIDEROAD PROFILE

McGINNIS FERRY ROAD EXT.
NORTHBROOK PARKWAY
OLD PEACHTREE ROAD

DRAWING No. 16-01

CALCULATIONS

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~350~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: P-4

SHEET NO.: 4 of 5

Lowering Profile

Fill embankment saved = 24,900 cy

increased unclass excav. = 15,865 cy

412,520 c.y. Reduced from P-2 (Alt.)
− (15,865 x .8) cy. uncl. excav.
− 24,900 c.y. (Neat)

374,928 c.y. Borrow (P-1, P-2, & P-4)

Savings in Required fill:

24,900 c.y. (neat)
.8 x 15,865 c.y. (skr)

37,592 c.y. (Neat) ← savings in borrow

(should be swelled if plan Borrow quantity has been swelled to determine Borrow Pit Requirement.

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~456~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: P-4

DESCRIPTION:

SHEET NO.: 5 of 5

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Stwings in Borrow	CY	40,765	10	400,765			
Add'l Undi. Excav.					15895	10	158,950
Subtotal				$400,765			$158,900
Markup (%) at 21.3%				$85,365			$33,906
TOTAL				$486,130			$192,806

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

ALTERNATIVE NO.: **ST-1**

DESCRIPTION: **IN LIEU OF EIGHT LANES, BUILD ONLY FOUR LANES AND EXPAND IN THE FUTURE**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch attached)

The current design indicates a 188-ft.-5 in.-wide deck (out-to-out) with 8 lanes and 4 turning lanes.

ALTERNATIVE: (Sketch attached)

Build only a 70-ft.-4 in.-wide deck (out-to-out) with 4 lanes and no turning lanes. Use phased approach.

ADVANTAGES:

- Reduces construction cost
- Reduces construction schedule

DISADVANTAGES:

- Future expansion may increase cost
- May increase accidents

DISCUSSION:

The duration of construction will be reduced and the cost of the project will be lowered. However, constructing a 118-ft.-5 in.-wide deck now may be more economical than expanding the deck at a later date.

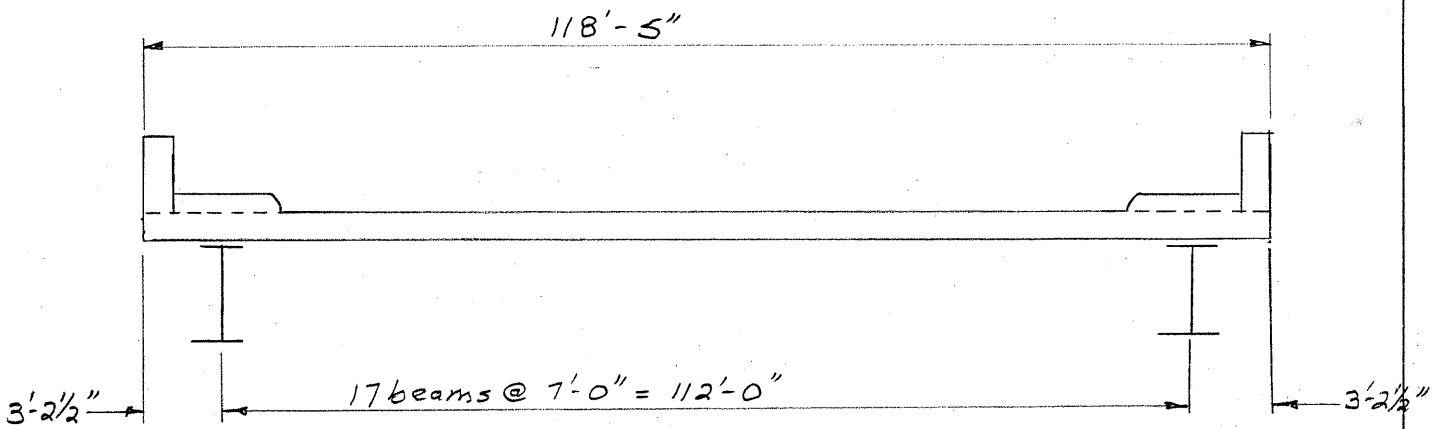
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 5,799,432	—	$ 5,799,432
ALTERNATIVE	$ 3,448,638	—	$ 3,448,638
SAVINGS	$ 2,350,794	—	$ 2,350,794

SKETCH

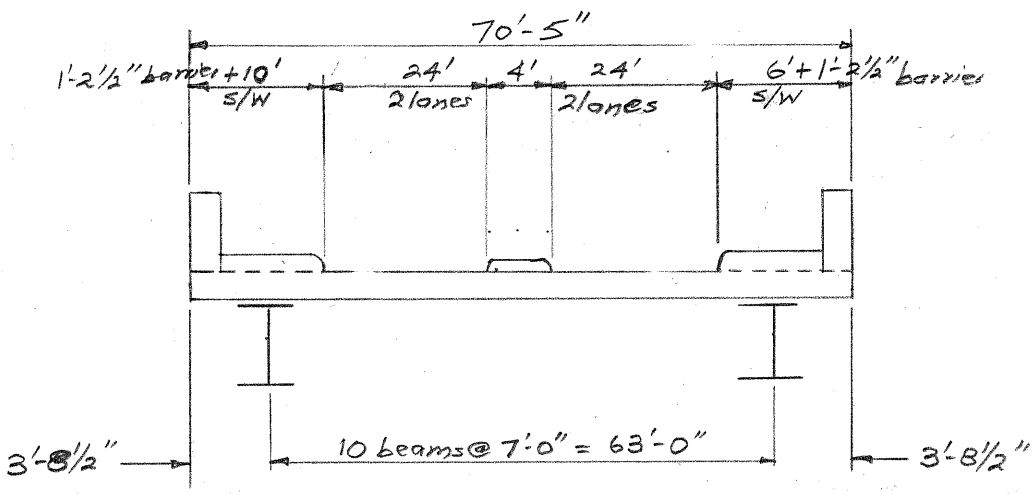
PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~456~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: ST-1

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☑ SHEET NO.: 2 of 4



ORIGINAL DESIGN



ALTERNATIVE

CALCULATIONS

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~356~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: ST-1

SHEET NO.: 3 of 4

Deck Area:

Original Design

Deck Area = 425' * 118.4167'
= 50,327 sq. ft.

Alternative Design

Deck Area = 425' * 70.4167'
= 29,927 sq. ft.

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: ST-1

DESCRIPTION:

SHEET NO.: 4 of 4

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Deck Area	sf.	50,327	95	4,781,065	29,927	95	2,843,065
Subtotal				4,781,065			2,843,065
Markup (%) at 21.3				1,018,367			605,573
TOTAL				5,799,432			3,448,638

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION** ALTERNATIVE NO.: **ST-2**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

DESCRIPTION: **BUILD ONLY FOUR LANES AND TWO TURNING LANES AND EXPAND IN THE FUTURE** SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (Sketch attached)

The current design indicates a 188-ft.-5 in.-wide deck (out-to-out) with 8 lanes and 4 turning lanes.

ALTERNATIVE: (Sketch attached)

Build only a 90-ft.-5 in.-wide deck (out-to-out) with 4 lanes and 2 turning lanes.

ADVANTAGES:

- Reduces cost
- Reduces construction schedule

DISADVANTAGES:

- Future expansion may increase cost

DISCUSSION:

The duration of construction will be reduced and the cost of the project will be lowered. However, constructing a 118-ft.-5 in.-wide deck now may be more economical than expanding the deck at a later date.

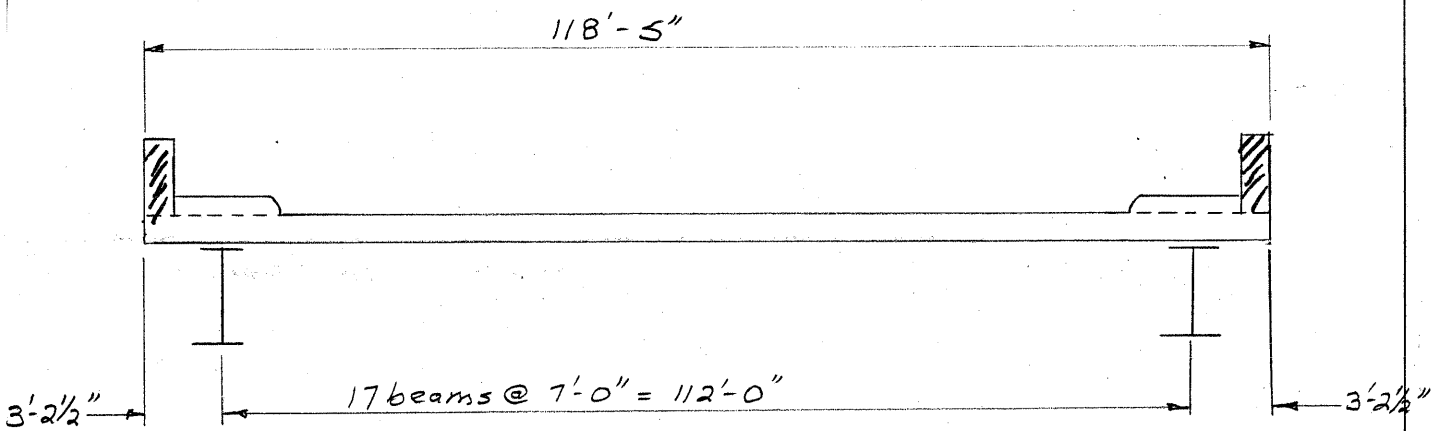
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 5,799,432	—	$ 5,799,432
ALTERNATIVE	$ 4,428,135	—	$ 4,428,135
SAVINGS	$ 1,371,297	—	$ 1,371,297

SKETCH

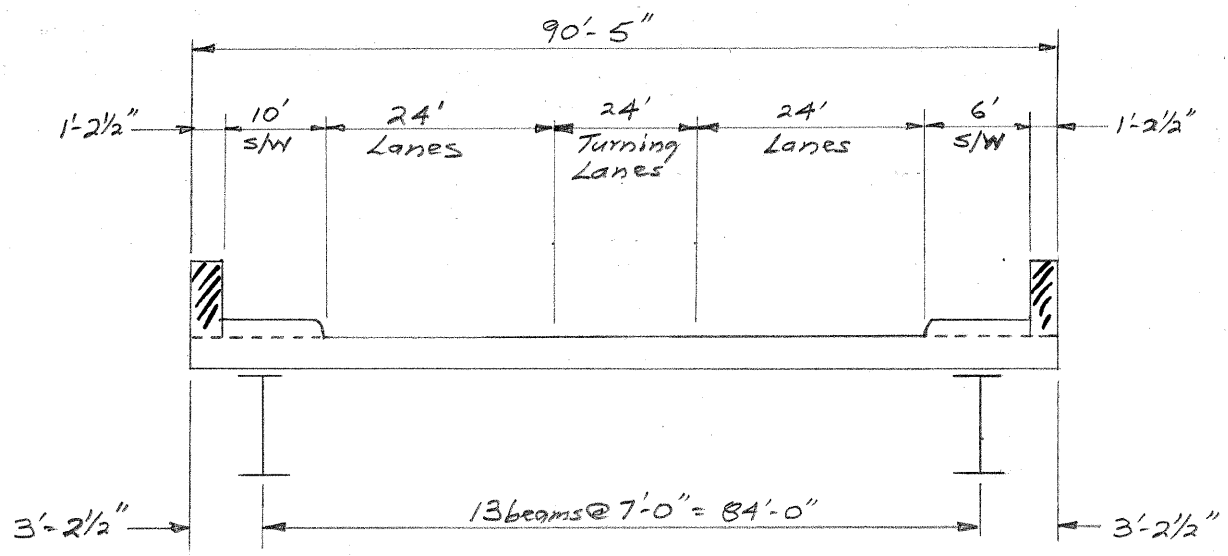
PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~356~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: ST-2

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☑ SHEET NO.: 2 **of** 4



ORIGINAL DESIGN



ALTERNATIVE DESIGN

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: ST-2

SHEET NO.: 3 **of** 4

Deck Area:

Original Design

Deck Area = 425' * 118.4167'
= 50,327 sq. ft.

Alternative Design

Deck Area = 425' * 90.4167'
= 38,427 sq. ft.

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION** ALTERNATIVE NO.: ST-2
Project No. STP-0004-00(~~455~~ 017), Gwinnett County, GA
DESCRIPTION: SHEET NO.: 4 of 4

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Deck Area	sf	50,327	95	4,781,065	38,427	95	3,650,565
Subtotal				4,781,065			3,650,565
Markup (%) at 21.3				1,018,367			777,570
TOTAL				5,799,432			4,428,135

SUMMARY OF VALUE ENGINEERING ALTERNATIVES

PROJECT: **McGINNIS FERRY ROAD EXTENSION -**
Project No. STP-0004-00(017) - Preliminary Submittal
Gwinnett County, Georgia

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS: INITIAL COST SAVINGS	PRESENT WORTH OF COST SAVINGS: RECURRING COST SAVINGS	PRESENT WORTH OF COST SAVINGS: TOTAL PW LCC SAVINGS
STRUCTURES (ST) (continued)						
ST-3	Use shorter spans on I-85, but same 425 ft. length of bridge. (101'+111.5'+111.5'+101'). This allows the use of 54-in. bulb tee PSC beams in lieu of Type III PSC beams and 74-in. bulb tee PSC beams. Improves vertical clearance.	$1,588,126	$1,870,480	($282,354)		($282,354)
ST-4	Use 2-span bridge over I-85 with MSE wall abutments and phased approach. (121 ft.+121 ft.)	$5,799,432	$3,638,933	$2,160,499		$2,160,499
ST-5	Use a phased approach on the I-85 bridge. Build a 144-ft. span now, remaining lanes in the future.	$5,799,432	$2,301,631	$3,497,801		$3,497,801
ST-6	Use a 6-lane bridge with shorter, but more uniform spans. (101'+111.5'+111.5'+101')	$7,387,558	$5,862,326	$1,525,232		$1,525,232

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

ALTERNATIVE NO.: **ST-3**

DESCRIPTION: **USE SHORTER SPANS AND SAME TOTAL BRIDGE LENGTH**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (Sketch attached)

The current design indicates a four-span bridge (55 ft.; 157 ft., 6 in.; 157 ft., 6 in.; 55 ft.) with Type II PSC beams and 74-in. bulb tee PSC beams.

ALTERNATIVE: (Sketch attached)

Use a four-span bridge (101 ft.; 111 ft., 6 in.; 111 ft., 6 in.; 101 ft.) with 54-in. bulb tee PSC beams.

ADVANTAGES:

- Reduces cost
- Improves vertical clearance
- Easy to ship short lighter beams

DISADVANTAGES:

- Increases cost due to M.O.T. on I-85

DISCUSSION:

Even though it will increase the initial cost to implement this alternative, the shipping of shorter lighter beams may be easier. The shallower 54-in. bulb tees will improve the vertical clearance on I-85.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 1,588,126	—	$ 1,588,126
ALTERNATIVE	$ 1,870,480	—	$ 1,870,480
SAVINGS	$ (282,354)	—	$ (282,354)

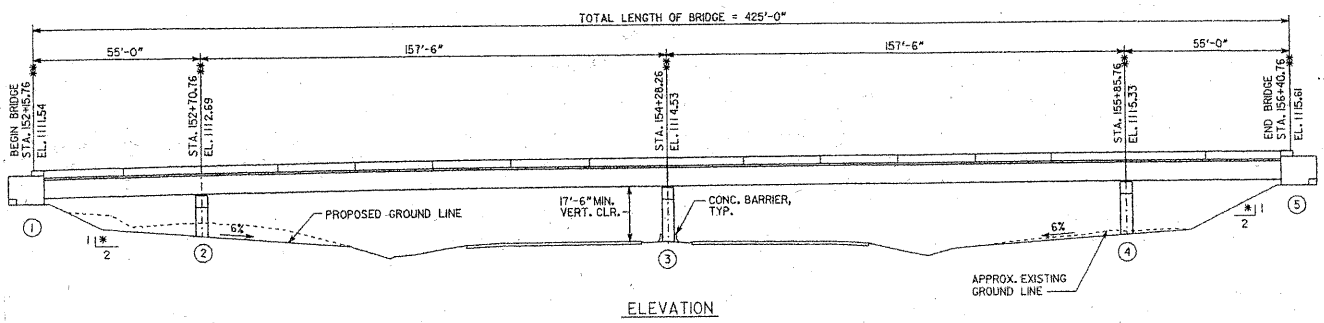
SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: ST-3

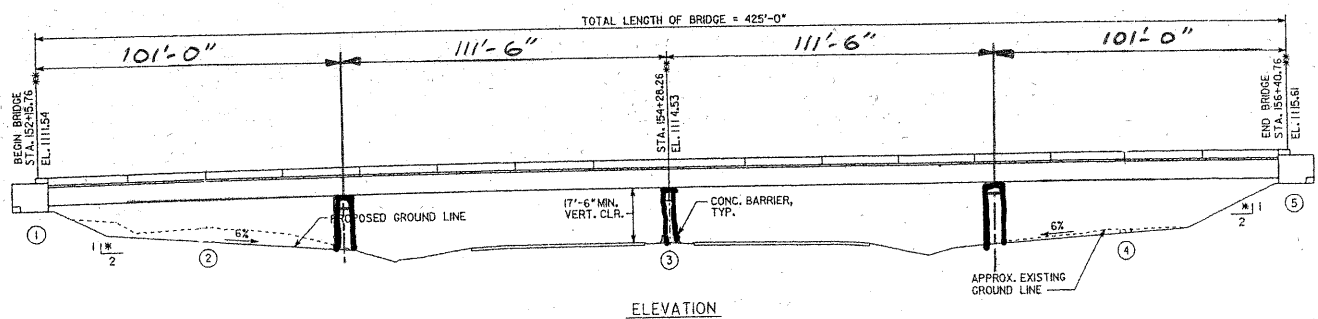
ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☑

SHEET NO.: 2 of 5



ELEVATION

ORIGINAL DESIGN



ELEVATION

ALTERNATIVE DESIGN

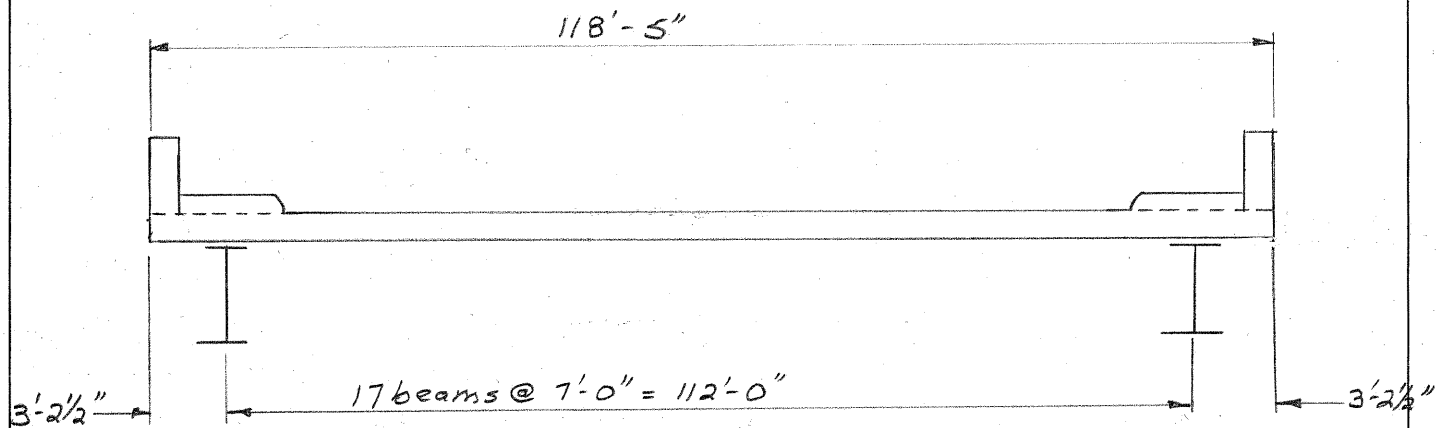
SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~356~~ 017), Gwinnett County, Georgia
Preliminary Submittal

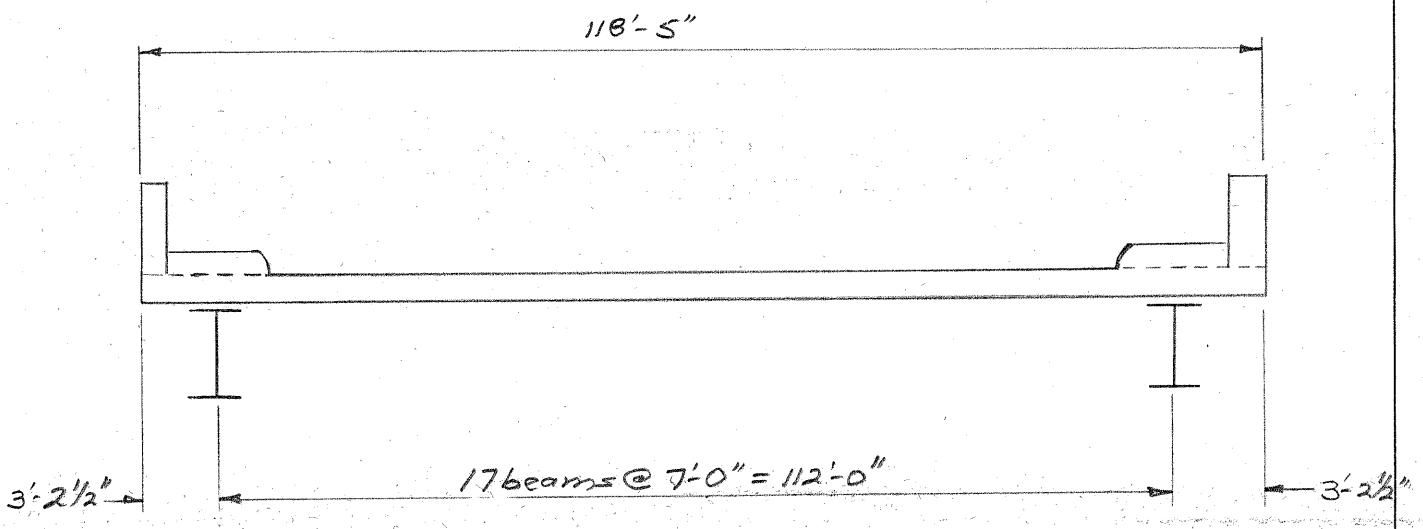
ALTERNATIVE NO.: ST-3

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☑

SHEET NO.: 3 of 5



ORIGINAL DESIGN



ALTERNATIVE DESIGN

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~356~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: ST-3

SHEET NO.: 4 of 5

Beam Lengths:

- Original Design

74" bulb tees = 2 spans * 17 beams * 157.5' = 5355'
Type II PSC beams = 2 spans * 17 beams * 55' = 1870'

- Alternative Design

54" Bulb Tee beams = 2 spans * 17 beams * 101' +
2 spans * 17 beams * 111.5' = 7,225'

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: ST-3

DESCRIPTION:

SHEET NO.: 5 of 5

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
74" Bulb Tees	LF	5355'	197	1,054,935			
Type II Psc beams	LF	1870'	136	254,320			
54" Bulb Tees	LF				7225	214	1,541,150
Subtotal				1,309,255			1,541,150
Markup (%) at 21.30				278,871			329,330
TOTAL				1,588,126			1,870,480

VALUE ENGINEERING ALTERNATIVE

PROJECT:	**McGINNIS FERRY ROAD EXTENSION** **Project No. STP-0004-00(017)** *Gwinnett County, Georgia*	ALTERNATIVE NO.:	**ST-4**
DESCRIPTION:	**USE TWO-SPAN BRIDGE WITH MSE WALL ABUTMENTS**	SHEET NO.:	**1 of 5**

ORIGINAL DESIGN: (Sketch attached)

The current design indicates a four-span bridge (55 ft.; 157 ft., 6 in.; 157 ft., 6 in.; 55 ft.) with Type II PSC beams and 74-in. bulb tee PSC beams.

ALTERNATIVE: (Sketch attached)

Use a two-span bridge (121 ft.; 121 ft.) with 63-in. bulb tee PSC beams. Future expansion of eight lanes is provided for I-85.

ADVANTAGES:

- Reduces construction cost
- Improves vertical clearance
- Easy to ship short lighter beams
- Fewer intermediate bents

DISADVANTAGES:

- Increased number of beams may increase construction schedule
- Future expansion may increase cost

DISCUSSION:

Shorter, lighter beams are easier to ship and the depth of the deck will be reduced, thus improving the vertical clearance.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 5,799,432	—	$ 5,799,432
ALTERNATIVE	$ 3,638,933	—	$ 3,638,933
SAVINGS	$ 2,160,499	—	$ 2,160,499

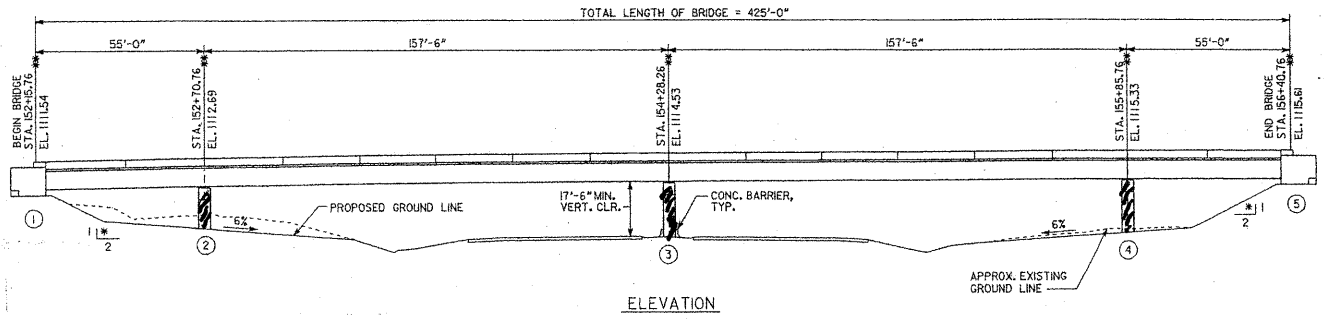
SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: ST-4

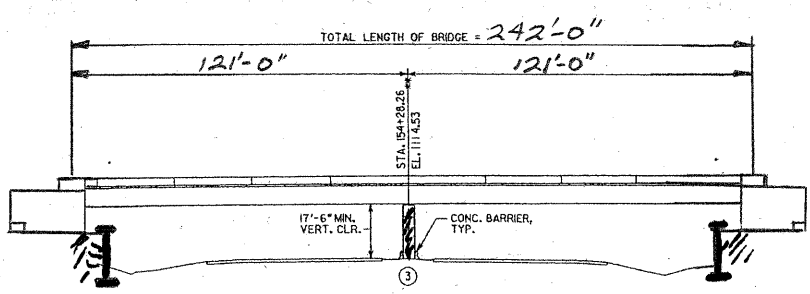
ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☑

SHEET NO.: 2 of 5



ELEVATION

ORIGINAL DESIGN



ELEVATION

ALTERNATIVE DESIGN

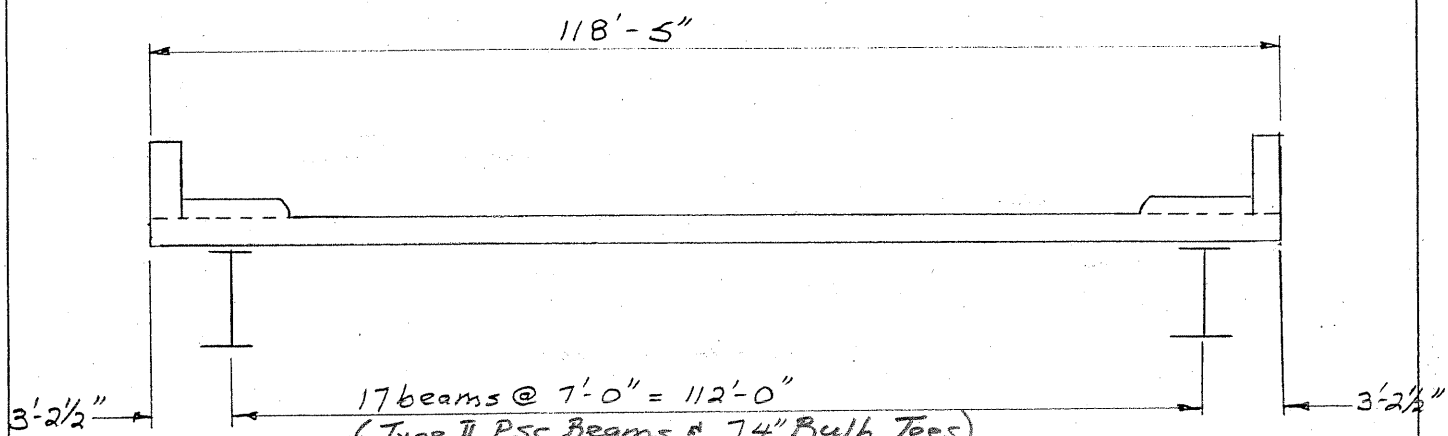
SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~356~~ 017), Gwinnett County, Georgia
Preliminary Submittal

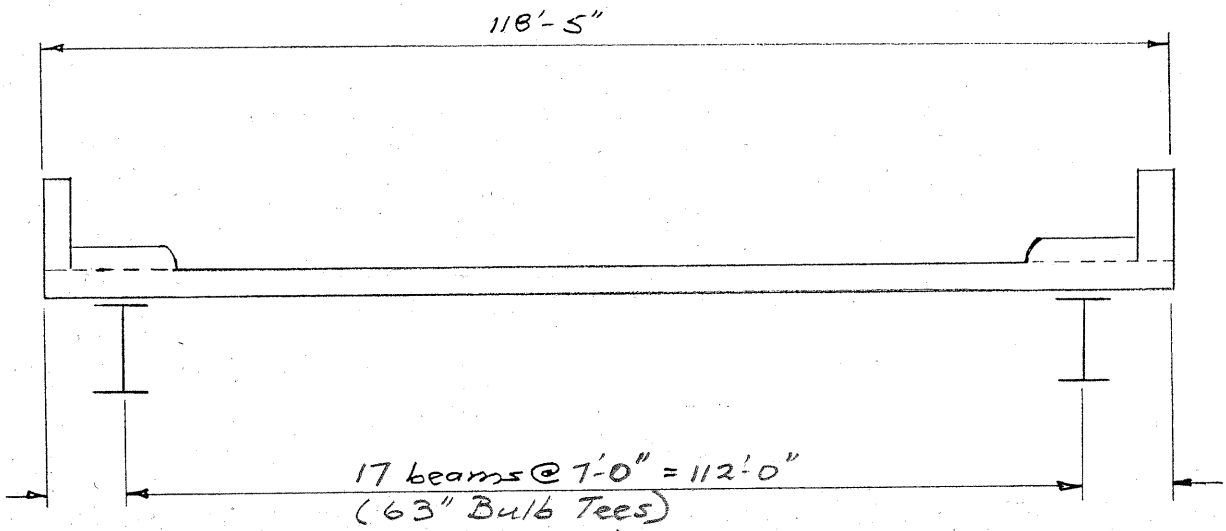
ALTERNATIVE NO.: ST-4

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☑

SHEET NO.: 3 of 5



ORIGINAL DESIGN



ALTERNATIVE DESIGN

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~356~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: ST-4

SHEET NO.: 4 of 5

Deck Area:

Original Design

Deck Area = 425' * 118.4167'
= 50,327 sq. ft.

Alternative Design

Deck Area = 242' * 118.4167'
= 28,657 sq. ft.

MSE Walls = 2 sides * [(15' * 118.4167') + 2(½ * 30 * 13') + (2' * 178.4167)]
= 2 * [1,776.3 sf + 390 sf + 356.8 sf]
= 5,046 sq. ft

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~458~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: ST-4

DESCRIPTION:

SHEET NO.: 5 of 5

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Deck Area	sf.	50,327	95.0	4,781,065	28,657	95.0	2,722,415
MSE Walls	sf.				5046	55.0	277,530
Subtotal				4,781,065			2,999,945
Markup (%) at 21.3				1,018,367			638,988
TOTAL				5,799,432			3,638,933

VALUE ENGINEERING ALTERNATIVE

PROJECT:	**McGINNIS FERRY ROAD EXTENSION** **Project No. STP-0004-00(017)** *Gwinnett County, Georgia*	ALTERNATIVE NO.:	**ST-5**
DESCRIPTION:	**USE A SINGLE-SPAN BRIDGE TO SPAN ONLY THE EXISTING I-85 LANES**	SHEET NO.:	**1 of 5**

ORIGINAL DESIGN: (Sketch attached)

The current design indicates a four-span bridge (55 ft.; 157 ft., 6 in.; 157 ft., 6 in.; 55 ft.) with Type II PSC beams and 74-in. bulb tee PSC beams.

ALTERNATIVE: (Sketch attached)

Use a single-span bridge (144 ft. long) with 74-in. bulb tee PSC beams.

ADVANTAGES:

- Reduces construction cost
- Reduces construction schedule
- Fewer intermediate bents

DISADVANTAGES:

- Future expansion may increase cost

DISCUSSION:

Elimination of intermediate bents will reduce the cost of the project and accelerate construction. However, increasing the length of the bridge in the future may be more costly than expanding the bridge now.

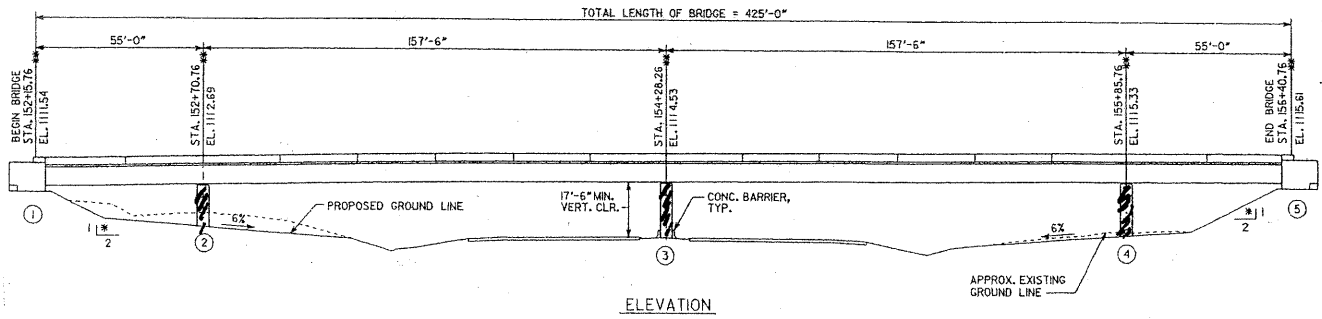
COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 5,799,432	—	$ 5,799,432
ALTERNATIVE	$ 2,310,631	—	$ 2,310,631
SAVINGS	$ 3,497,801	—	$ 3,497,801

SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~456~~ 017), Gwinnett County, Georgia
Preliminary Submittal

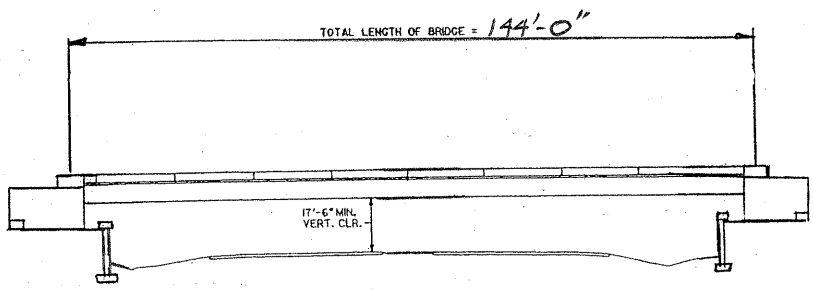
ALTERNATIVE NO.: ST-5

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☑ SHEET NO.: 2 of 5



ELEVATION

ORIGINAL DESIGN



ELEVATION

ALTERNATIVE DESIGN

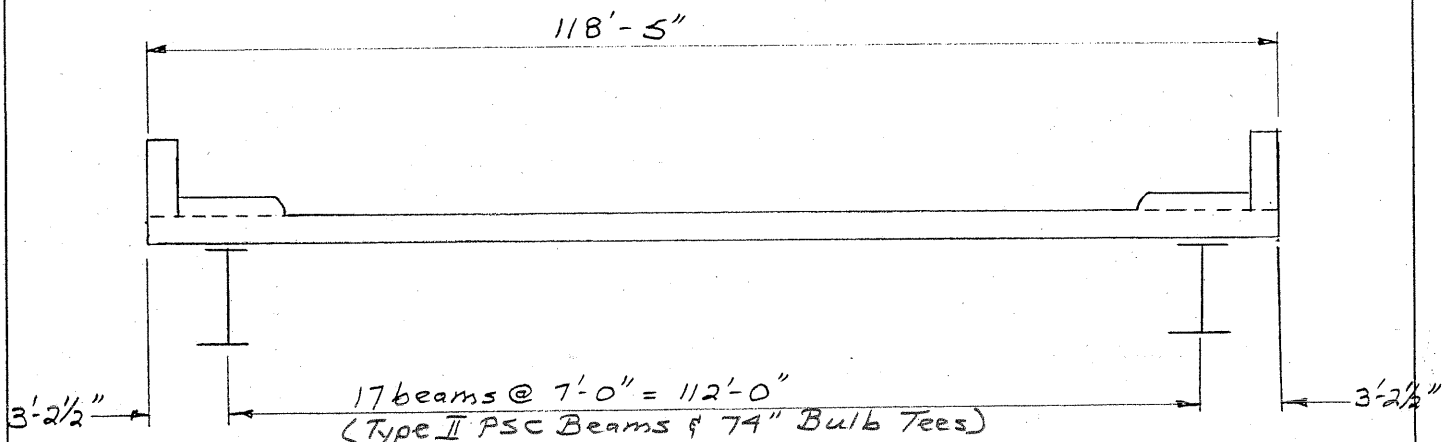
SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, Georgia
Preliminary Submittal

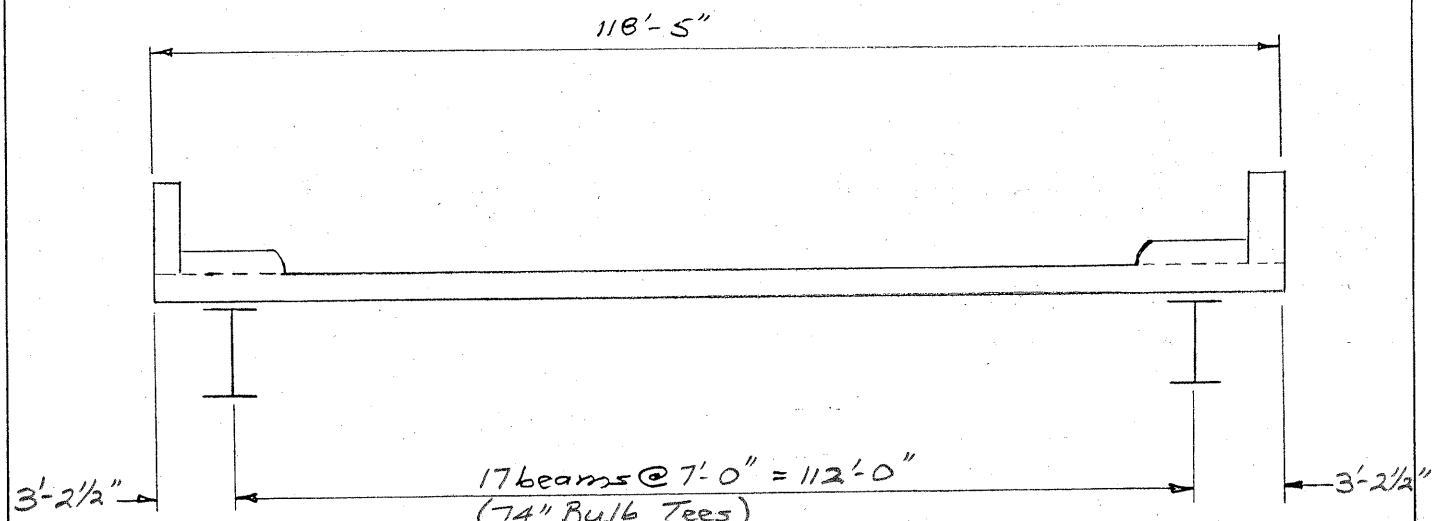
ALTERNATIVE NO.: ST-5

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☑

SHEET NO.: 3 of 5



ORIGINAL DESIGN



ALTERNATIVE DESIGN

CALCULATIONS

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~356~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: ST-5

SHEET NO.: 4 of 5

Deck Area:

Original Design

Deck Area = 425' * 118.4167'
= 50,327 sq. ft.

Alternative Design

Deck Area = 144' * 118.4167'
= 17,052 sq ft

MSE Walls = 2 sides [(15' * 118.4167) + 2 (1/2 * 30' * 13') + (2' * 178.4167)]
= 5,046 sq. ft.

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION** ALTERNATIVE NO.: ST-5
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, GA
DESCRIPTION: SHEET NO.: 5 of 5

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Deck Area	sf.	50,327	95.0	4,781,065	17,052	95.0	1,619,940
MSE Walls	sf.				5,046	55.0	277,530
Subtotal				4,781,065			1,897,470
Markup (%) at 21.3				1,018,367			404,161
TOTAL				5,799,432			2,301,631

VALUE ENGINEERING ALTERNATIVE

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

ALTERNATIVE NO.: **ST-6**

DESCRIPTION: **BUILD ONLY FOUR LANES AND TWO TURNING LANES; USE SHORTER SPANS BUT SAME TOTAL BRIDGE LENGTH**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (Sketch attached)

The current design indicates a 118-ft.-5 in.-wide deck (out-to-out) with eight lanes and four turning lanes; four-span bridge (55 ft.; 157 ft., 6 in.; 157 ft., 6 in.; 55 ft.) with Type II PSC beams and 74 in. Bulb Tee PSC beams.

ALTERNATIVE: (Sketch attached)

Build only a 90-ft.-5 in.-wide deck (out-to-out) with four lanes and two turning lanes and a four-span bridge (101 ft.; 111 ft., 5 in.; 111 ft., 5 in.; 101 ft.).

ADVANTAGES:

- Improves vertical clearance
- Easier to ship short lighter beams
- Reduces cost

DISADVANTAGES:

- Future expansion may increase cost

DISCUSSION:

The duration of construction and project cost will be reduced. However, constructing a 118-ft.-5 in.-wide deck now may be more economical than expanding the deck at a later date.

The shipping of shorter, lighter beams may be easier. The shallower 54-in. bulb tees will improve the vertical clearance on I-85.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 7,387,558	—	
ALTERNATIVE	$ 5,862,326	—	$ 5,862,326
SAVINGS	$ 1,525,232	—	$ 1,525,232

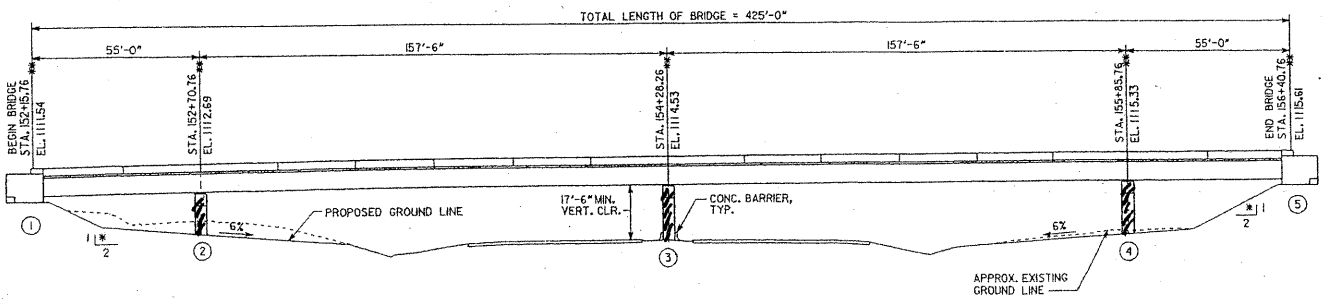
SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~156~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: ST- 6

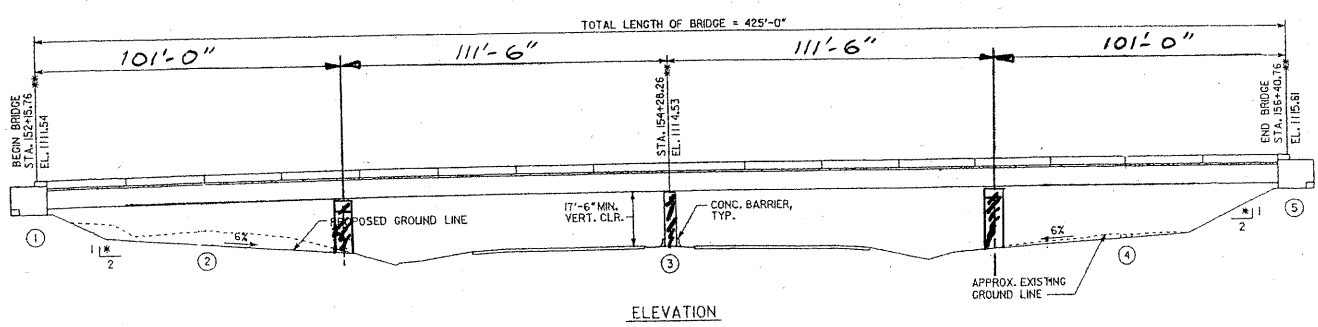
ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☑

SHEET NO.: 2 of 5



ELEVATION

ORIGINAL DESIGN



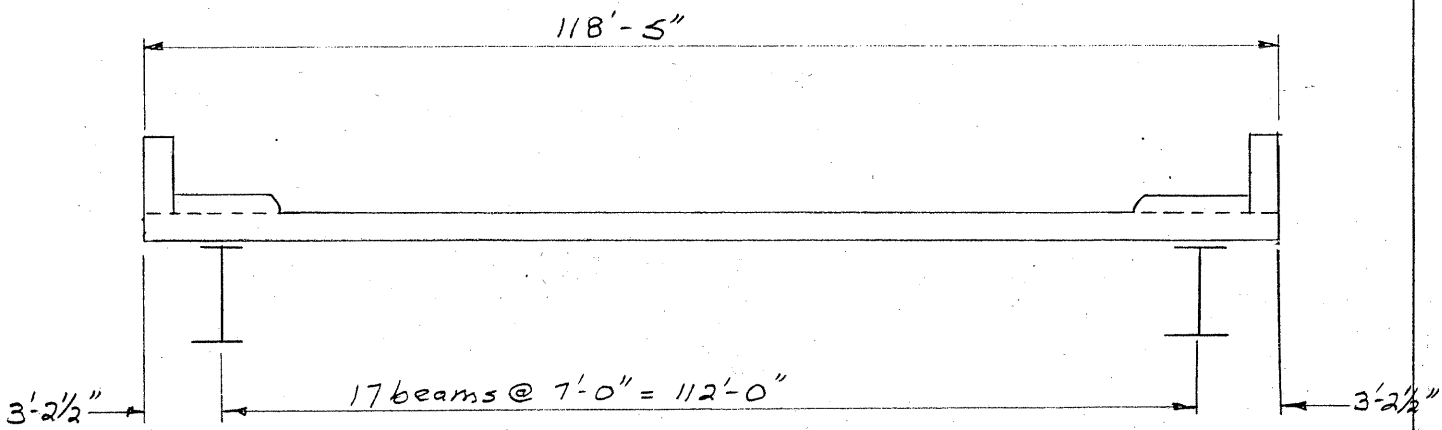
ELEVATION

ALTERNATIVE DESIGN

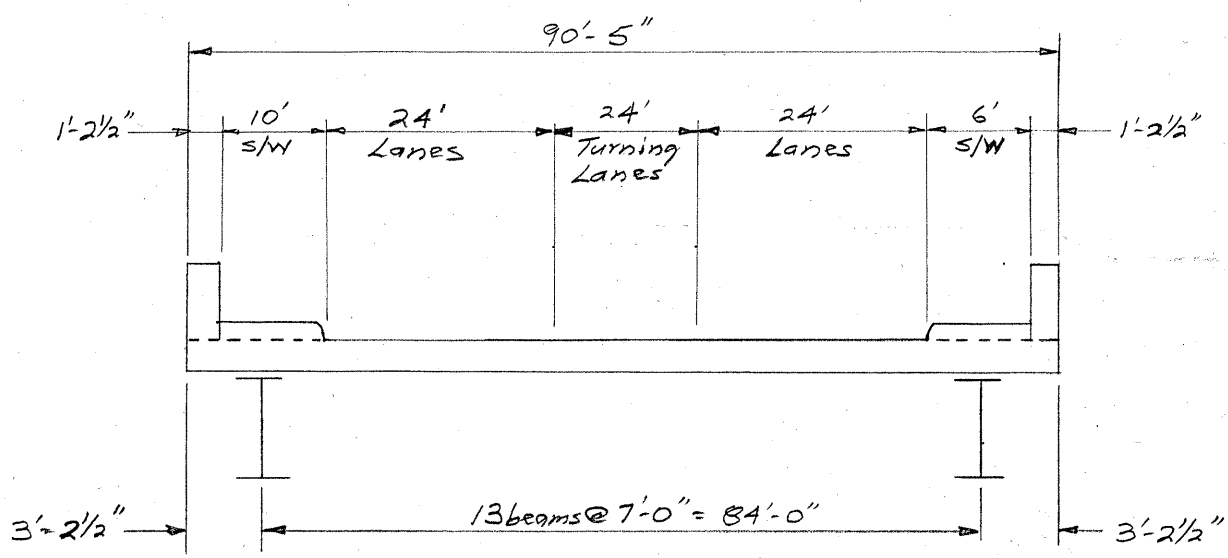
SKETCH

PROJECT: **McGINNIS FERRY ROAD EXTENSION** ALTERNATIVE NO.: ST-6
Project No. STP-0004-00(~~456~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☑ SHEET NO.: 3 **of** 5



ORIGINAL DESIGN



ALTERNATIVE DESIGN

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~355~~ 017), Gwinnett County, Georgia
Preliminary Submittal

ALTERNATIVE NO.: ST-6

SHEET NO.: 4 of 5

Deck Area:

Original Design

Deck Area = 425' * 118.4167'
= 50,327 sq. ft

Alternative Design

Deck Area = 425' * 90.4167'
= 38,427 sq. ft

Beam lengths:

Original Design

74" bulb tees = 2spans * 17 beams * 157.5' = 5,355'

Type II PSC beams = 2spans * 17 beams * 55' = 1,870'

Alternative Design

54" Bulb Tees = 2spans * 13beams * 101'+
2spans * 13beams * 111.5' = 5,525'

COST WORKSHEET

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(~~356~~ 017), Gwinnett County, GA

ALTERNATIVE NO.: ST-6

DESCRIPTION:

SHEET NO.: 5 of 5

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Deck Area	Sf.	50,327	95.0	4,781,065	38,427	95.0	3,650,565
74" Bulb Tees	LF.	5,355'	197	1,054,935			
Type II Psc beams	LF.	1,870'	136	254,320			
54" Bulb Tees	LF.				5,525	214	1,182,350
Subtotal				6,090,320			4,832,915
Markup (%) at 21.3				1,297,238			1,029,411
TOTAL				7,387,558			5,862,326

PROJECT DESCRIPTION

This project is the extension of McGinnis Ferry Road from Satellite Boulevard across I-85 to Lawrenceville-Suwanee Road. The project includes the construction of a new bridge over I-85 and the extension of Northbrook Parkway. Existing McGinnis Ferry Road is a four-lane facility from Peachtree Industrial Boulevard to Satellite Boulevard. This section of roadway serves as a primary east-west arterial from Gwinnett County to south Forsyth County. This roadway ends at Satellite Boulevard where it becomes a rural two-lane-winding roadway, ultimately connecting west of the Lawrenceville-Suwanee interchange. The proposed McGinnis Ferry Road extension will extend the existing corridor further to the east over I-85 and will alleviate traffic congestion at the interchanges of I-85 with Lawrenceville-Suwanee Road, Old Peachtree Road, and Sugarloaf Parkway. Alleviating traffic congestion will significantly improve the operating characteristics in this vicinity and will increase safety.

The proposed construction will connect to the existing intersection of McGinnis Ferry Road and Satellite Boulevard, with only minor improvements to Satellite Boulevard and McGinnis Ferry Road. The roadway will continue east where Burnette Road will be widened to four lanes with a 20 ft. raised median and a 16 ft. shoulder (5-ft. sidewalk) on the south side and a 20 ft. shoulder (10 ft.-wide mixed-use path) on the north side. From I-85 to the east, McGinnis Ferry Road extension will be on new alignment using the same typical section. The bridge over I-85 will be constructed to provide future additional laneage on I-85 and for a possible future interchange at McGinnis Ferry Road extension. The bridge length will accommodate a barrier separated high occupancy vehicle (HOV) lane with exit, four HOV lanes, collector-distributor lanes, and ramps. McGinnis Ferry Road extension will connect to Lawrenceville-Suwanee Road east of Old Peachtree Road. As part of this project, Northbrook Parkway will be .extended from its exiting northern terminus to the intersection of Old Peachtree Road and Gwinco Boulevard. From this point, Old Peachtree Road will be widened through the intersection with Lawrenceville-Suwanee Road. The typical section for Northbrook Parkway extension and the widening of Old Peachtree Road will include four 12-ft. lanes, a 20-ft. raised median, and 16-ft. urban shoulders with 5-ft. sidewalks. Environmental concerns may necessitate a COE 404 Permit and an Environmental Assessment will be prepared. A public hearing open house will be held.

The estimated costs for this project include $54.2M in construction cost and $22.1M in right-of-way.

Key value engineering issues related to minimizing the amount of fill required on the profile.

Location	VPD 2007	VPD 2027
McGinnis Ferry Road	18,000	35,000
Lawrenceville-Suwanee Road	40,000	50,000
Satellite Boulevard	30,000	40,000
Northbrook Parkway/Old Peachtree Road	12,000	40,000

VALUE ANALYSIS AND CONCLUSION

INTRODUCTION

This section describes the value analysis procedures used during the value engineering study on the McGinnis Ferry Road Extension Project located in Gwinnett County. It is followed by separate narratives and conclusions concerning:

- Value Engineering Study Agenda
- Value Engineering Workshop Participants
- Economic Data
- Function Analysis (Project Purpose and Need)
- Creative Idea Listing and Judgment of Ideas

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

PRE-STUDY PREPARATION

Pre-study preparation for the VE effort consisted of scheduling study participants and tasks and gathering necessary project documents from the PBS&J design team. Information relating to alternative analysis and phasing is also very important, as it tends to drive the construction methods. Information relating to the preliminary cost estimate prepared by PBS&J was used as the basis for the comparison/analysis during the VE study.

VALUE ENGINEERING WORKSHOP EFFORT

The VE workshop effort consisted of a 30-hour workshop beginning with an orientation meeting on January 15, 2008 and the final VE Presentation on January 18, 2008. During the workshop, the VE job plan was followed in compliance of FHWA and GDOT guidelines for the conduct of VE studies. The job plan guided the search for alternatives to mitigate or eliminate high cost drivers and potential risk elements. It includes six phases:

- Information Phase
- Function Analysis Phase
- Speculation Phase
- Evaluation Phase
- Development Phase
- Presentation Phase

Value Engineering Study Task Flow Diagram

Preparation Effort

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

→

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

→

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

→

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

Workshop Effort

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

→

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

List Ideas Generated During Function Analysis

→

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

→

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

→

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

→

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

Post-Workshop Effort

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

→

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

→

Final Acceptance
- Redesign by Designer

Information Phase

At the beginning of the study, the decisions that have influenced the project design and proposed construction methods had to be reviewed and understood. For this reason, the PBS&J design team presented information about the project to the VE team on the first day of the VE workshop. Following the presentation meeting, the VE team spent the remainder of the first day reviewing the project documents, discussing the project purpose and need, and identifying the key elements of the project. Throughout the study the following documents were utilized to establish guidelines for action and for determining cost implications for the various alternatives:

- Preliminary Design Submittal - Plan and Profile of the McGinnis Ferry Road Extension, dated December 2007, prepared by PBS&J, Inc.
- Revised Project Concept Report, dated March 1, 2005, prepared by GDOT.
- Project Cost Estimate Report, dated January 14, 2008, prepared by PBS&J, Inc.

Function Identification and Analysis Phase

This VE study phase involves the analysis of the project's functions and the creation and listing of ideas. Function analysis is a means of evaluating a project to see if the expenditures actually perform the requirements of the project, or if there are disproportionate amounts of money spent on support functions. These elements add cost to the final product, but have a relatively low worth to the basic function. This creates a high cost-to-worth ratio and the VE team targets these areas for value improvement. GDOT design criteria was compared to the as designed drawings for general conformance of the typical section.

Speculation Phase

The VE team generated as many ideas as possible to provide the necessary functions within the highway project at a lower total life cycle cost, or to improve the quality of the project. Methods to improve on the maintenance of traffic plan were also discussed. Judgment of the ideas was restricted at this point. The VE team was looking for a large quantity of ideas and free association of ideas. Creative idea worksheets were organized by project elements.

Evaluation Phase

During this phase of the workshop, the VE team judged the ideas generated during the speculation phase in comparison to project objectives established by GDOT. The team evaluated each of the VE ideas for feasibility and incorporation into the project. Advantages and disadvantages of each idea were discussed to find the best ideas for development. Ideas found to be irrelevant or not worthy of additional study were discarded. Those which represented the greatest potential for cost savings or improvement to the project were then developed further to be presented during the presentation phase.

To assist the team in ranking the creative ideas, each of the criteria were discussed, and the following criteria definitions were developed:

- Construction Cost – The initial cost of the material is important and should be considered.
- Safety – Safety is very important and must control all decision making.
- Level of Service – The projected LOS must be achieved to meet the purpose and need.
- Impact Upon Trucks – There is a relatively high percentage of trucks in the area.

- Life Cycle Costs – The costs of operating and maintaining the highway is extremely important. These costs would include labor and materials over the next 30 years.
- Right-of-way Cost – It is important to minimize right-of-way purchase if possible.

The VE team would have liked to develop all the ideas that were generated, but time constraints limited the number of ideas that could be developed. Therefore, each idea was compared with the present design concept in terms of how well it met the design criteria. Advantages and disadvantages were discussed and the ideas were rated on a scale of 1 to 5, with the best ideas rated 5. Ideas rated 4 or 5 were generally developed into written VE alternatives.

Development Phase

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

Presentation Phase

The last phase of the VE team's workshop was to present the recommendations. The presentation was held on January 18, 2008 and included personnel from GDOT, and representatives from the PBS&J design team. During the meeting, a handout was distributed that included a summary listing of the VE study Alternatives and Design Suggestions. These documents were presented to give the attendees an executive summary of the proposals and the key findings of the VE team.

POST STUDY PROCEDURES

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

Following distribution of the VE report and collection of written comments from all parties, a VE implementation phase meeting is typically scheduled. At this time, each VE alternative will be considered discussed, and a final disposition made. During this process, a VE alternative may be accepted as written, rejected for cause, modified to improve the idea, or in some cases, the idea may need further study to establish its' merits.

VALUE ENGINEERING STUDY AGENDA

Lewis & Zimmerman Associates, Inc. (LZA) will facilitate a 30-hour value engineering (VE) study on the Preliminary Design Submittal of the McGinnis Ferry Road Extension, Gwinnett County, Georgia. The Georgia Department of Transportation (GDOT) project management staff and the PBS&J design team will be available to formally present the project at the beginning of the workshop; attend a presentation of the VE alternatives at the conclusion of the VE study; and be available to answer questions during the VE study effort.

The VE study will follow the outline described below and be conducted January 15 – 18, 2008 at the offices of:

GDOT
2 Capital Square, SW
Atlanta, Georgia 30334-9003
Conference Room 264

The point-of-contact is Ms. Lisa Meyers, GDOT Value Engineering Coordinator, who may be reached at 404-651-7468.

VE STUDY AGENDA

Tuesday, January 15, 2008

8:00 am - 9:00 am **VE Team Members Arrive and Review Documents**

9:00 am – 12:00 noon **Owner's/Designer's Presentation**

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

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

1:00 pm - 2:00 pm **Information Phase**

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

Tuesday, January 15, 2008 (continued)

2:00 pm – 3:00 pm **Function Analysis**

The team will identify all project functions required to meet the established purpose and need. Functions will be identified as to basic, required secondary, secondary, or project goals.

3:00 pm - 5:00 pm **Speculation Phase**

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

Wednesday, January 16, 2008

8:00 am - 10:00 am **Speculation Phase (cont.)**

The VE team will continue the brainstorming exercise to capture ideas to improve the project in terms of initial and life cycle cost, technical aspects, schedule, and constructibility issues.

10:00 am – 12:00 noon **Analysis Phase**

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

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

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

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

Thursday, January 17, 2008

8:00 am – 12:00 noon **Development Phase (cont.)**

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

1:00 pm - 5:00 pm **Development Phase (cont.)**

Upon completion of the Development Phase, the VE team leader will prepare the summary worksheets based on the alternatives developed by the VE team. The summary worksheets form the basis of the informal oral presentation to be made to GDOT, local representatives, and the PBS&J design team representatives. The team will review all documentation and prepare for the presentation.

Friday, January 18, 2008

8:00 am - 9:00 am **Development Phase and Preparation for Presentation**

9:00 am – 12:00 noon **Presentation Phase**

Upon completion of the Development Phase, the VE team leader will prepare the summary worksheets based on the alternatives developed by the VE team. The summary worksheets form the basis of the informal oral presentation to be made to GDOT, local representatives, and the design team representatives. The team will review all documentation and prepare for the presentation.

Noon - Adjourn

POST-STUDY PHASE

Upon completion of the value engineering study, the VE team leader will prepare the Value Engineering Study Report and submit it to GDOT. The report will include the following material:

- Project description and design concept of project
- Cost models and graphic function analysis worksheets
- Value engineering alternatives: original design and proposed alternatives, including sketches, design calculations and initial and life cycle estimates
- Potential contract savings (capital construction and life cycle costs)

GDOT and the PBS&J design team will independently review the VE alternatives and classify them as accepted, accepted with modifications, needs further study, or rejected—accompanied by the reasons for rejection. A meeting with all stakeholders will then be convened to decide which VE alternatives to implement.

VE TEAM MEMBERS

David Hamilton, PE, CVS, CCE, LEED® AP	VE Team Leader/Civil	Lewis & Zimmerman Assoc.
Joe Leoni, PE	Highway Design Engineer	ARCADIS
Paresh Parikh, PE	Construction Engineer	Delon Hampton
Molapo Kgabo, PE	Bridge Engineer	HNTB, Inc.

VALUE ENGINEERING WORKSHOP PARTICIPANTS

The VE Team was organized by GDOT and Lewis & Zimmerman Associates, Inc. to provide specific expertise on the unique project elements involved. Team members consisted of a multi-disciplined group with professional design experience and a working knowledge of highway design, construction, environmental permitting, and VE procedures. Members of the team consisted of the following professionals:

VE Team		
David Hamilton, PE, CVS, CCE, LEED® AP	VE Team Leader/Civil	Lewis & Zimmerman Assoc.
Joe Leoni, PE	Highway Design Engineer	ARCADIS, U.S., Inc.
Paresh Parikh, PE	Construction Engineer	Delon Hampton & Associates
Molapo Kgabo, PE	Bridge Engineer	HNTB, Inc.
Project Designer		
Steven Lindsey, PE	Project Manager	PBS&J
GDOT		
Lisa Myers	VE Coordinator	GDOT
Robert Mahoney, PE	Pre-construction Engineer	GDOT –Gainesville District

DESIGNER'S PRESENTATION

An overview of the project was presented on Tuesday, January 15, 2008, by the PBS&J design team. The purpose of this meeting, in addition to being an integral part of the Information Gathering Phase of the VE study, was to bring the VE team up-to-speed regarding the overall project specifics including traffic projections, accident history, drainage elements, construction phasing, local permitting issues, and estimated project cost. Additionally, the meeting afforded the design staff the opportunity to highlight in greater detail, those areas of the project requiring additional or special attention. An attendance list for the meeting is attached.

VALUE ENGINEERING TEAM'S PRESENTATION

A VE presentation was conducted on Friday, January 18, 2008 to review the VE alternatives with the GDOT project management and design staff. The attendees received a copy of the Presentation Outline, and Summary of Value Engineering Alternatives. An attendance list for the meeting is attached.

VE WORKSHOP PARTICIPANTS

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017) Gwinnett County, Georgia
Preliminary Submittal – Value Engineering Study

DATE: **15 – 18 JANUARY 2008**

NAME & E-MAIL (please print)	ORGANIZATION/TITLE	PHONE/FAX
David Hamilton, PE, CVS, CCE, LEED AP em dahamilton@lza.com	Lewis & Zimmerman Associates, Inc. VE Team Leader/Civil	ph 253-925-8741 mob 253-229-7703 fx 253-925-8791
Lisa Myers em lisa.myers@dot.state.ga.us	GDOT – Engineering Services Design Review Engineering Manager	ph 404-651-7468 mob fx 404-463-6131
MOLAPO KGABO em mkgabo@HNTB.com	HNTB Corporation VE Team	ph (404) 946-5740 mob fx (404) 841-2820
Steven Lindsey em SRLINDSEY	PBSJ Design Consultant	ph 770-933-0280 mob 404-798-6544 fx 770-933-1920
Paresh J. Parikh em pparikh@delonhampton	Delon Hampton and Associates VE Team Engineer	ph 404-419-8434 mob fx 404-524-8080
ROBERT W. MAHONEY em ROBERT.MAHONEY@DOT.STATE.GA.US	DISTRICT GDOT-D1 PRECONST. ENG.	ph 770-532-5520 mob fx 770-532-5542
James Magnus em jmagnus@dot.ga.gov	Asst. Const. Eng	ph 404-656-5300 mob fx
RON WISHON em rwishon@dot.ga.gov	ASST. PROJ. REV. ENG GDOT-ENG. SVCS	ph 4)651-7470 mob fx
Wesley Brock em wesley.brock@dot.state.ga.us	GDOT-R/W	ph 4)656-3736 mob fx
Grant Waldrop em gwaldrop@dot.ga.gov	GDOT-Traffic Ops	ph (4) 635-8123 mob fx

VE WORKSHOP PARTICIPANTS

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017), Gwinnett County, Georgia
Preliminary Submittal – Value Engineering Study

DATE: **15 – 18 JANUARY 2008**

NAME & E-MAIL (please print)	ORGANIZATION/TITLE	PHONE/FAX
Christa Wilkinson em christa.wilkinson@dot.state.ga.us	GDOT IOEL	ph 404-699-4450 mob fx
TARA SEABOLT-FOX em tara.seaboltfox@dot.state.ga.US.	GDOT / ROAD DESIGN TEA	ph 404-657-9706 mob fx
Jennifer Rice em Jennifer.Rice@dot.state.ga.us	GDOT/Bridge Design	ph 404-656-5302 mob fx
Joe Leoni em: Joe.Leoni@ARCADIS-US.com	ARCADIS	ph ~~404~~ 770-451-8666 mob fx
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ECONOMIC DATA

Economic criteria used for evaluation were developed by the VE team with information gathered from GDOT. To express costs in a meaningful manner, the VE team alternatives are presented on the basis of discounted present worth. Criteria for the planning project period and interest rates are based on the following parameters:

Year of Analysis:	2008
Construction Dollars Based Upon:	2008
Economic Planning Life:	30 years starting in 2008

Schedule of Work

Right-of-way is scheduled to be complete in 2008, with construction completed in 2011. This allows for a 24–30 month construction duration depending upon award date, shop drawing approval, and material availability.

Total Present Worth

Discussion during the VE study included impacts of 30-year present worth cost for major elements, however no life cycle calculations were completed.

VE Alternatives Mark-up

Cost estimates were prepared for each of the VE alternatives using unit prices contained in the project cost estimate and unit prices in the GDOT cost database. The unit prices contained in the estimate are considered to include all contractor mark-ups, mobilization, overhead, and profit. A markup of 21% was added to account for engineering and construction services, plus inflation.

COST MODEL

The McGinnis Ferry Road Extension Project will greatly improve safety and capacity along the alignment in this busy of area of Gwinnett County while reducing accidents caused by deficiencies in the corridor. To achieve these benefits, a considerable investment in the infrastructure is required, including construction of a four-lane section, raised median, signalized intersections, addition of sidewalks, and acquisition of the needed right-of-way. The total construction cost of the project is estimated at approximately $54.2M, plus right of way in the amount of $22.2M. Since the cost of right of way is a substantial portion of the cost of the required construction, the total width of the section must be reviewed carefully to ensure proper investments are made.

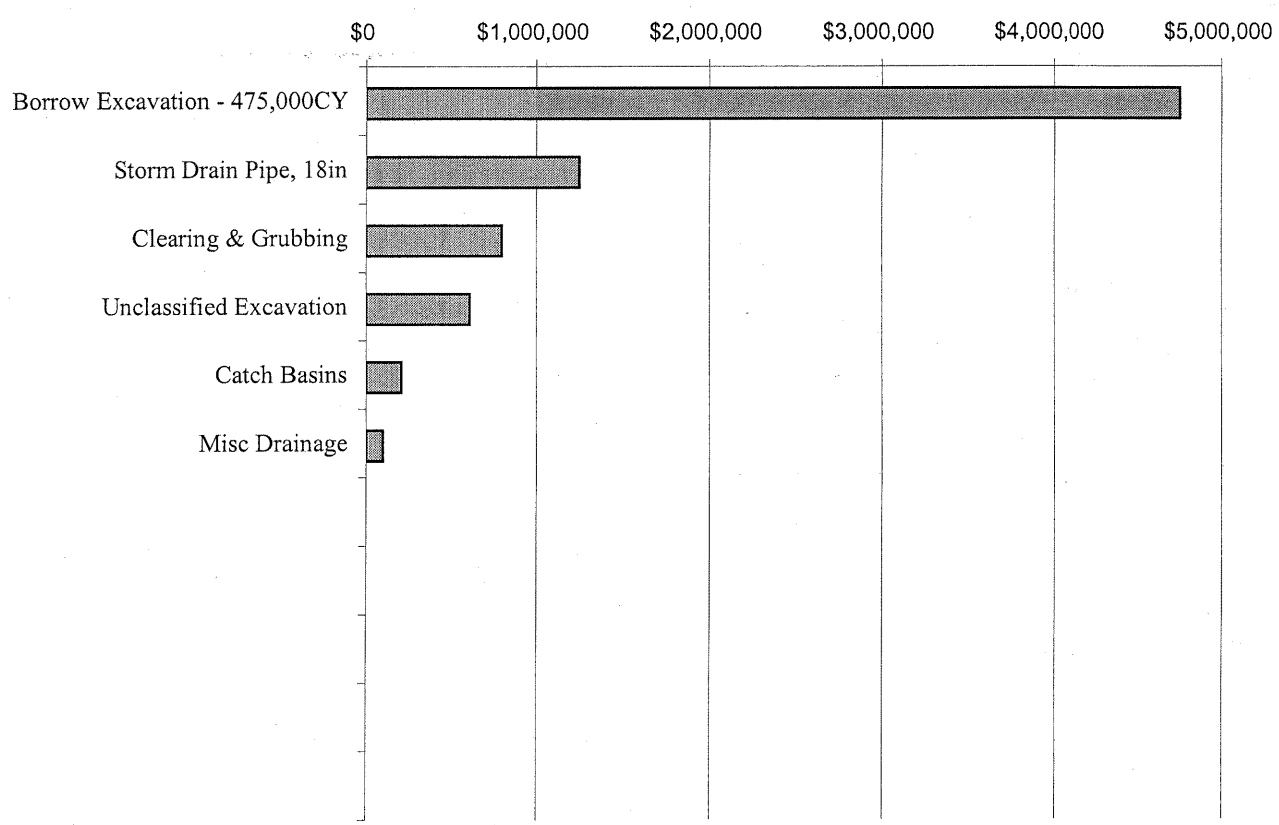
Project Cost

The data used to analyze costs by design element and are presented on the Cost Histogram table. To gain an overview of the total project cost, the Pareto Analysis was prepared. This table presents total project costs by roadway element.

COST HISTOGRAM

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

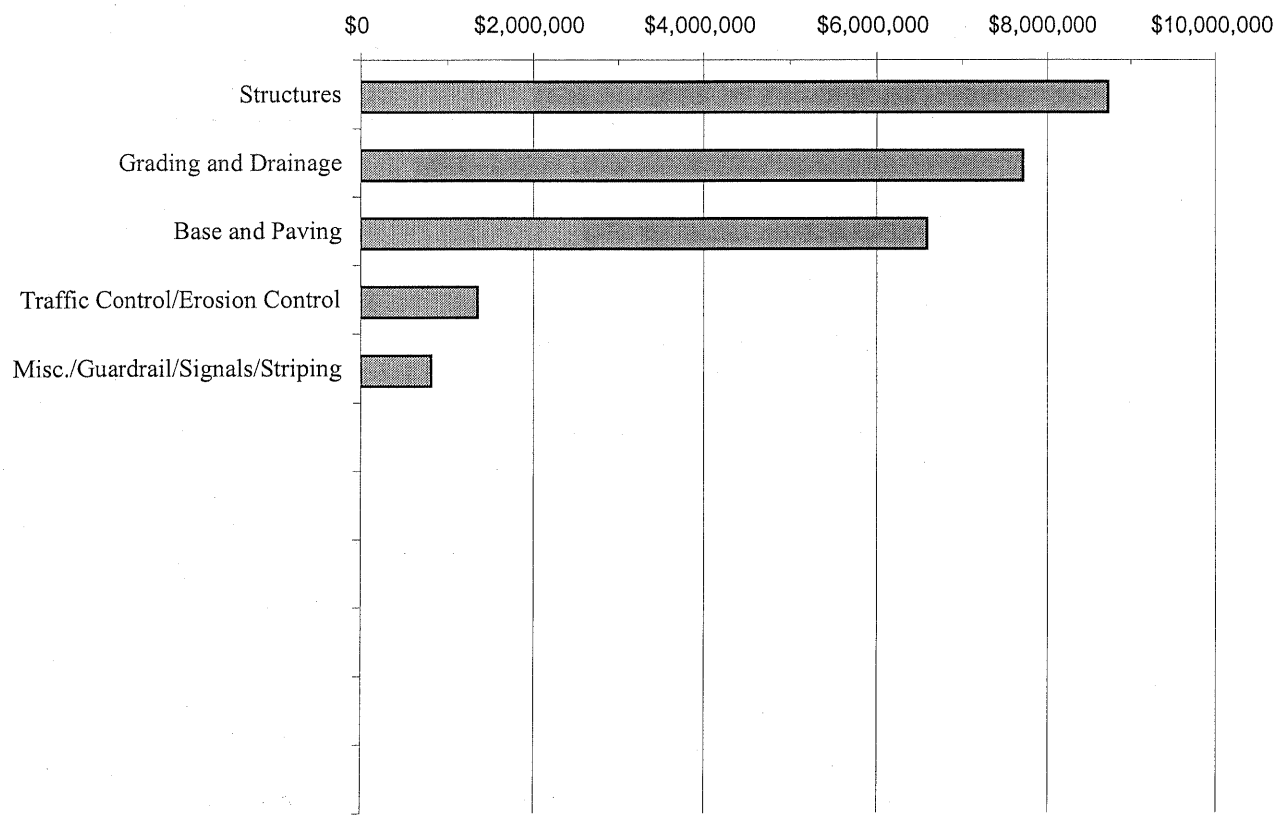
GRADING ONLY		COST	PERCENT	CUM. PERCENT
Borrow Excavation - 475,000CY		4,750,000	61.53%	61.53%
Storm Drain Pipe, 18in	80%	1,247,100	16.15%	77.69%
Clearing & Grubbing		800,000	10.36%	88.05%
Unclassified Excavation		612,500	7.93%	95.98%
Catch Basins		210,000	2.72%	98.70%
Misc Drainage		100,000	1.30%	100.00%
Construction and Right of Way Subtotal		***7,719,600***	100.00%	
E&C Rate (Applied to construction cost only)	10.00%	771,960		
Escalation Rate @ 5% per Year (2 years)	10.25%	870,385		
Right of Way		0		
Reimbursable Utilities		0		
TOTAL CONSTRUCTION		**$ 9,361,945**	Comp Markup:	



COST HISTOGRAM

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

TOTAL PROJECT		COST	PERCENT	CUM. PERCENT
Structures		8,733,000	34.65%	34.65%
Grading and Drainage	80%	7,719,600	30.63%	65.28%
Base and Paving		6,586,315	26.13%	91.42%
Traffic Control/Erosion Control		1,350,000	5.36%	96.78%
Misc./Guardrail/Signals/Striping		812,286	3.22%	100.00%
Construction and Right of Way Subtotal		***25,201,201***	100.00%	
E&C Rate (Applied to construction cost only)	10.00%	2,520,120		
Escalation Rate @ 5% per Year (2 years)	10.25%	2,841,435		
Right of Way		22,181,000		
Reimbursable Utilities		1,500,000		
TOTAL CONSTRUCTION & RIGHT OF WAY		**$ 54,243,757**	Comp Markup:	21.28%



FUNCTION ANALYSIS

Function Analysis of the McGinnis Ferry Road Extension Project was performed to: understand the project purpose and need, define the requirements for each project element, and ensure a complete and thorough understanding by the VE team of the basic function(s), and identify other public goals through the corridor. Random function analysis worksheets for the project elements are attached. Function analysis is a means of evaluating a project to see if the expenditures actually perform the requirements of the project, or if there are disproportionate amounts of money spent on support functions. These support elements add cost to the final product, but may have a relatively low worth to the basic function. This creates a high cost-to-worth ratio.

The function analysis sheets include verb and noun function definition of the element and the VE teams identification of basic or secondary functions. This exercise stimulated the VE team members to think in terms of the areas in which to channel their creative idea development.

The key issues that evolved from the function analysis session were the concurrence of the project needs and purpose. The basic function of the project is to "Increase Capacity," and "Improve LOS." Adding turn lanes, redesigning the intersections, and improving the sight stopping distance will greatly improve safety, reduce delays in this busy Gwinnett County corridor, and help to meet other required project goals.

Other key functions are presented on the Random Function Analysis forms.

The goals as established for the project appear consistent with the functions identified by the VE team. Therefore the function analysis justifies the project need and purpose and will greatly improve driving conditions along this corridor. This project will be a marked improvement in the aesthetics of the corridor and provides added functionality for pedestrians in the area.

RANDOM FUNCTION ANALYSIS

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

SHEET NO.: **1 of 1**

DESCRIPTION	FUNCTION		
	VERB	NOUN	KIND
Total Project Purpose and Need	**Improve**	**LOS**	**B**
	Accommodate	Growth	G
	Move	Cars	HO
	Reduce	Accidents	G
	Increase	**Capacity**	**B**
	Allow	Movements	RS
	Meet	Standards	G
	Improve	Intersections	RS
	Control	Traffic	RS
	Improve	Geometrics	RS
	Relocate	Utilities	RS
	Control	Budget	G
	Meet	Schedule	G
	Protect	Environment	RS
	Minimize	R/W Takes	G
	Manage	Drainage	RS
	Satisfy	Stakeholders	G
	Control	Traffic	RS
	Maximize	Safety	G
	Maintain	Access	RS
	Balance	Cut/Fill	G
	Improve	Corridor	G
	Protect	Historical	G
	Eliminate	Exceptions	RS
	Cross	Streams	RS
	Connect	Corridors	G

Function defined as: Action Verb, Measurable Noun

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

CREATIVE IDEA LISTING AND JUDGMENT OF IDEAS

During the creative phase, numerous ideas, alternative proposals and/or recommendations were generated for the McGinnis Ferry Road Extension Project using conventional brainstorming techniques as recorded on the following pages.

The creative session yielded a total of 23 ideas for further consideration by the team. These ideas were grouped into the following categories with letter prefixes to identify the area of study. For example, Profile ideas have a designation of "P," and Alignment ideas are identified with a prefix of "A."

CATEGORY	PREFIX
Alignment	A
Section	S
Profile	P
Structures	ST

These ideas were discussed between the VE team members to identify the advantages/ disadvantages of each. The VE team compared each of the ideas with the as-designed solution determining whether it improved value, was equal in value, or lessened the value of the presented solution in terms of: Capital Cost, Schedule, Functionality/Safety, Maintainability, Durability and, Life Cycle Costs.

To assist the team in ranking the creative ideas, each of the criteria were discussed, and the following criteria definitions were developed from the statement of project need as presented by GDOT on the first day of the VE study.

- Construction Cost – The initial cost of the material is important and should be considered.
- Safety – Safety is very important and must control all decision making.
- Level of Service – The projected LOS must be achieved to meet the design year projections
- Impact Upon Trucks – There is a reasonably high percentage of trucks in the area
- Life Cycle Costs – The costs of operating and maintaining the highway is extremely important. These costs would include labor and materials over the next 30 years.
- Right-of-way Cost – It is important to minimize right-of-way costs if possible.

The ideas were ranked on a qualitative scale of 1 (poor) to 5 (excellent) on how well the VE team believed the idea met the project purpose and need criteria shown above. The higher rated ideas, with scores of 4 or 5, were then developed into formal alternatives and included in the Study Report. Some ideas were judged to have minimal cost impacts on the project but provided enhancements in the form of improved safety, accident reduction, constructability or potential to save unknown or hidden costs. These were given the designation "DS" which indicates a design suggestion. This designation is also used when an idea increases cost resulting from improving the functionality of the project or system, and is deemed by the VE Team to be of significant value to the owner or designer.

Typically, all ideas rated 4 or 5 are developed by the VE team and included in the Study Report. When this is not the case, an idea was combined with another related idea or discarded, as a result of additional research, which indicated the concept as not being cost-effective or technically feasible. All readers are encouraged to review the Creative Idea Listing and Evaluation worksheets since they may suggest additional ideas that can be applied to the design.

CREATIVE IDEA LISTING

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

SHEET NO.: **1 of 2**

NO.	IDEA DESCRIPTION	RATING
ALIGNMENT (A)		
A-1	Use right-in right-out on the Original Peachtree Road with proposed Northbrook Parkway in lieu of cul-de-sac.	4
A-2	In lieu of cul-de-sac, provide ramps to McGinnis Ferry Road from Burnett Road.	2
SECTION (S)		
S-1	Use all 11-ft.-wide lanes in lieu of 12 ft.	4
S-2	Use 11-ft.-lanes on the outside of the section.	5
S-3	Use more retaining walls to reduce right-of-way costs.	Drop
S-3.1	Eliminate the retaining walls and purchase right-of-way if needed.	4
S-4	Eliminate the 5 ft.-6 in. grass strip; put the 5 ft. concrete sidewalk next to the curb.	4
S-5	Reduce the grass strip width from 5 ft.-6 in. to 2 ft.	5
S-6	Keep the shoulder and eliminate the multiuse path and 5 ft. concrete sidewalk. Let the developers install the improvements.	4
S-7	Eliminate the 5 ft. concrete sidewalk, but keep the shoulders and multi-use path.	4
S-8	Use an 18 ft. median in lieu of 20 ft.	4
S-9	Reduce the pavement thickness on all roads except McGinnis.	5
S-10	Use 24 in. curbs/gutters in lieu of 30 in.	4
S-11	Review the unit price of concrete vs. asphalt path. Numbers show multi-use path is higher.	DS
S-12	On Relocated Old Peachtree Road, reduce the grass strip width from 6 ft. to 2 ft.	4
PROFILE (P)		
P-1	Lower the profile from STA 160+00 to STA 193+00.	5
P-2	Lower the profile from STA 115+00 to STA 120+00.	5
P-3	Convert at grade section at STA 212+00 to bridge and eliminate the culvert.	3
P-4	Lower the grade from STA 209+00 to STA 235+00	4
STRUCTURES (ST)		
ST-1	Only build 4-lane bridge now in lieu of - lane. Use phased approach, w/no turning lanes.	5
ST-2	Build 6-lanes in lieu of 8-lanes on I-85 bridge. (4 lanes + 2 turning lanes)	5

Rating: 1→2 = Not to be developed 3→4 = Varying degrees of development potential 5 = Most likely to be developed
DS = Design suggestion ABD = Already being done

CREATIVE IDEA LISTING

PROJECT: **McGINNIS FERRY ROAD EXTENSION**
Project No. STP-0004-00(017)
Gwinnett County, Georgia

SHEET NO.: **2 of 2**

NO.	IDEA DESCRIPTION	RATING
STRUCTURES (ST) (continued)		
ST-3	Use shorter spans on I-85, but same 425 ft. length of bridge. (101'+111.5'+111.5'+101')	5
ST-4	Use 2-span bridge with MSE wall abutments and phased approach. (121'+121')	4
ST-5	Use a phased approach on the I-85 bridge. Build a 144 ft. span now, remaining in future.	3
ST-6	Use a 6-lane bridge with shorter, but more uniform spans. (101'+111.5'+111.5'+101')	4

Rating: 1→2 = Not to be developed; 3→4 = Varying degrees of development potential; 5 = Most likely to be developed
DS = Design suggestion; ABD = Already being done