I-285@ CR 4519/Atlanta Road

GDOT Project Number: STP00-0222-01(001), P.I. No. 752300

Cobb County Project No. D4100

Cobb County, Georgia

Value Engineering Study Report

June 2009

Designer

PBS&J®

Value Engineering Consultant

an ARCADIS company

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David A. Jackson, P.E.
Special Projects Engineer
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1890 County Services Parkway
Marietta, Georgia 30127

re: Project No.STP00-0222-01(001), Cobb, P.I. No. 752300
I-285 @ CR 4519/Atlanta Road
Value Engineering Study Report

Date:
June 17, 2009

Contact:
Howard Greenfield

Phone:
301.984.9590 x 20

Email:
hgreenfield@lza.com

Our ref:
MY096701.0000

Dear Mr. Jackson:

Lewis & Zimmerman Associates, Inc. is pleased to submit two hard copies and one electronic copy of the referenced value engineering (VE) study report that documents the VE study conducted June 1 – 5, 2009. The objective of the VE effort was to identify opportunities to reduce costs and enhance the value of the project.

The VE workshop team developed nine ideas that will yield significant project cost savings for the preferred interchange alternative. Of particular interest are the alternatives to raise the Atlanta Road profile east of I-285 to avoid having to move the Colonial Gas Pipeline and only build part of the new bridges over I-285 until needed. The latter can also be employed if Alternative 4 is ultimately selected.

As part of the VE team's work, we evaluated the benefits and costs of the two viable alternatives for the interchange. From a cost/benefit point of view, Alternative 4 appears to provide almost equivalent project benefits at a reduced cost and should be considered for implementation. The team also presents opportunities to save costs for this alternative.

Please do not hesitate to call upon us if you or any of the reviewers have questions regarding the information presented in this report.

Sincerely yours,

LEWIS & ZIMMERMAN ASSOCIATES, INC.
an ARCADIS company

Howard B. Greenfield, PE, CVS
Vice President

Attachment

cc: Lisa Myers, AVS – GDOT

TABLE OF CONTENTS

EXECUTIVE SUMMARY

INTRODUCTION

This value engineering (VE) study report documents the events and results of the VE study conducted by Lewis & Zimmerman Associates, Inc. (LZA), an ARCADIS company, for the Cobb County, Georgia Department of Transportation. The subject of the study was the STP00-0222-01(001), County Cobb, P.I. Number: 752300, I-285 @ CR4519/Atlanta Road interchange project being designed by PBS&J, Inc. for the County. The study was conducted June 1 – 5, 2009, at the Georgia Department of Transportation's (GDOT), the eventual project owner, Atlanta headquarters office using conceptual drawings dated 5/11/2009 prepared by PBS&J, Cobb County's design consultant.

Comprising the VE team were a highway engineer, bridge engineer, constructability specialist and a Certified Value Specialist (CVS) team leader from LZA. The team used the following VE Job Plan to guide its deliberations.

- Information Gathering Phase (with a site visit)
- Function Identification and Analysis Phase
- Creative Idea Generation Phase
- Evaluation/Judgment Phase
- Alternative Development Phase
- Presentation Phase

PROJECT DESCRIPTION

This project expands the existing I-285 @ Atlanta Road interchange to enhance the level of service of the diamond ramps to and from I-285 and Atlanta Road. Atlanta Road east of the interchange has two lanes in each direction and west of the interchange has three lanes in each direction. However, the bridge over I-285 consists of two, two-lane bridges separated by about 30 ft. The third lanes on the west side of the bridge are part of the diamond ramps. Atlanta Road left turn movements to the ramps cause vehicle backups on the bridge and beyond, which limits the ability of all vehicles to travel through the area.

The preferred alternative, labeled Alternative 2, selected for improving highway operations through year 2030 includes rebuilding the bridge over I-285 with three eastbound lanes, a 40-ft-wide raised concrete median that narrows to provide two through westbound lanes and a left turn lane to the southbound I-285 ramp. The new bridge will have four spans to allow I-285 to be expanded from four lanes in each direction to 10 lanes in each direction, five collector-distributor lanes under the exterior bridge spans and five through lanes under the interior spans. The outside lane in the eastbound direction will expand to two lanes and form a loop for the northbound I-285 on-ramp. Before the loop goes under the outer span of the bridge it will re-compress to one lane.

The northbound I-285 off-ramp to Atlanta Road will start south of the existing ramp, diverge from I-285 and bridge over the CSX railroad while curving northeast before the loop ramp to connect to Atlanta Road. A signalized intersection will be provided. To accommodate the two ramps, a warehouse building and a truck stop will have to be acquired.

The Atlanta Road westbound to I-285 northbound ramp will consist of a slip ramp from Atlanta Road connecting to the loop ramp from eastbound Atlanta Road before merging into one lane. This lane will continue as an I-285 auxiliary lane connecting to the exit ramp to East Paces Ferry Road to the north.

The I-285 southbound exit and entry ramps will be diamond ramps that intersect Atlanta Road at a signalized intersection. The new southbound entry ramp will require the widening of the existing I-285 bridge over the CSX railroad. The exit ramp will be attached to an I-285 auxiliary lane starting at the end of the southbound entry ramp from East Paces Ferry Road. To prepare for the expansion of I-285 and accommodate the new auxiliary lanes, the existing Orchard Road bridge to the north of Atlanta Road will be replaced with a new four-span bridge.

The project is estimated to cost $21.9 million for construction and $11.6 million for right-of-way. No construction start date has been established.

In addition to Alternative 2, there is an Alternative 4 which also appears to be viable. This alternative creates a compressed diamond interchange with a new four-span, six-lane bridge for Atlanta Road over I-285 and the diamond ramps. The auxiliary lanes between this interchange and the East Paces Ferry Road interchange remain, as well as the Orchard Bridge Replacement. This alternative has a construction cost of $18.6 million and a right-of-way cost of $11.1 million.

CONCERNS AND OBJECTIVES

This project presents several challenges. The Colonial Gas Pipeline must be lowered to allow construction of the loop ramp, a deep culvert under I-285 must be extended, a civil war historic site must be preserved, the CSX railroad must be bridged, traffic on Atlanta Road must be maintained during construction and extensive sound walls must be provided to meet community requirements. Based on information provided to the VE team, it is believed that the construction cost of both alternatives will grow about $8.5 million. This is to account for higher than estimated bridge costs, the costs for an expanded amount of noise barriers, the cost of mechanically stabilized earth walls along the Atlanta Road bridge abutments, and the costs for lowering the Colonial Gas Pipeline. In addition, although there is a preferred design alternative for the interchange, Alternative 4 provides almost the equivalent functionality at a cost of about $3.8 million less, so the question arises as to which alternative provides the best value for the project.

With this background, the VE team was tasked with two objectives. First, identify specific opportunities for saving costs on both alternatives without sacrificing functionality. Second, evaluate the two alternatives to determine their costs and benefits which can be used by the County and GDOT in selecting a concept to carry into final design.

RESULTS OF THE STUDY

First the VE team generated nine ideas for reducing cost and one design suggestion for improving the safety of Alternative 2 and four ideas for reducing the costs of Alternative 4. All of these alternatives are summarized on the following Summary of Potential Cost Savings table and detailed in the Study Results section of the report. Second, the team engaged in a scientific decision-making process to compute the cost/benefit ratios for the two alternatives to assist Cobb County and GDOT in analyzing the interchange alternatives and selecting a concept to take into final design. The narrative below highlights those ideas with the greatest potential impact on the project and the results of the alternative evaluations.

For both alternatives, the proposed bridges over I-285 consist of four spans to accommodate an expanded I-285 which will occur sometime in the future. VE Alternative Numbers (Alt. Nos.) B2-1, B2-6 and A4-2 suggest that the bridges be constructed to accommodate the initial I-285 configuration of five lanes in each direction (including the new auxiliary lanes) with the ability to add the additional spans at a later date when I-285 is expanded. This saves the initial cost and the cost of maintenance, and avoids reducing the useful life of these spans of the bridges that do not provide any current improvements for I-285 traffic.

In Alt. No. H2-6 for Alternate 2, the east side of the Atlanta Road bridge profile is raised so that the loop ramp to I-285 northbound can be raised and the Colonial Pipeline is allowed to remain in its current location. Moving the Colonial Pipeline is estimated to cost about $2 million dollars, entail considerable construction risk and necessitate close coordination with the utility. This option avoids all of this. Alt. No. B2-3 suggests that the median on the bridge can be reduced by 14 ft to save significant costs while still accommodating Atlanta Road to the east and west of the bridge.

In Alt. No. A4-1 for Alternate 4, the VE team explores the potential to save the warehouse by providing a signalized intersection with Atlanta Road and Brownwood Lane on the other side of Atlanta Road. Although restricted access to the properties south of Atlanta Road is reduced from 1,000 ft to about 800 feet from the end of the exit ramp from I-285 northbound, this is deemed a reasonable distance. It also provides maximum access to Brownwood Lane and the properties to the north of Atlanta Road. Over $3 million in right-of-way cost can be saved as well as the retention of three business entities housed in the warehouse.

After generating alternatives with the potential to reduce project costs, the VE team compared the costs and benefits for Alternatives 2 and 4. The scientific decision-making process used consisted of the following steps:

1. Identifying non-economic criteria for evaluating the benefits that would be accrued by building each alternative;
2. Prioritizing or assigning relative weights to the criteria;
3. Evaluating how well each alternative meets each criterion on a scale of 1 to 10, with 10 indicating almost perfectly;
4. Multiplying the evaluation rating number times the weight of the criterion and summing the results to attain a total weighted criteria score, or benefit indicator;
5. Identifying the cost of the alternative; and
6. Determining the cost to attain a criteria point.

The alternative with the lowest cost/criteria point provides the best value. The results of this effort are shown below.

TABLE 1 – CRITERIA WEIGHTING MATRIX

	B	C	D	E	F	G	H	I	Evaluation Criteria	Score	Weighting factor
A	A 3	A 3	A 2	A 1	A 2	A 2	A 3	A 3	Level of Service at Northbound Ramp Terminals	19	25
B	B 3	B 2	B 1	B 2	B 2	B 3	B 3		Level of Service at Southbound Ramp Terminals	16	21
C	C 2	C 1	C 2	C 2	C 2	C 3			Ability to Accommodate Future I-285 Expansion	12	16
D	E 3	F 3	G 2	H 1	D 1				Acquisition Requirements (Displacements & Impacts)	1	1
E	E 2	E 2	E 3	E 2					Community Preference	12	16
F	F 1	F 1	F 3						Delta Safety - Potential for Collisions	8	11
G	G 1	I 1							Vehicle Operations	3	4
H	H 2								Constructability	3	4
I									Access to Brownwood Lane	1	1
											100

TABLE – ALTERNATIVE EVALUATION MATRIX

Evaluation Criteria	Weight	Alternative 2		Alternative 4	
		Rating	Score	Rating	Score
Level of Service at Northbound Ramp Terminals	25	7	175	8	200
Level of Service at Southbound Ramp Terminals	21	9	189	8	168
Ability to Accommodate Future I-285 Expansion	16	3	48	8	128
Acquisition Requirements (Displacements & Impacts)	1	3	3	7	7
Community Preference	16	9	144	6	96
Delta Safety - Potential for Collisions	11	8	88	6	66
Vehicle Operations	4	7	28	5	20
Constructability	4	4	16	8	32
Access to Brownwood Lane	1	7	7	4	4
Total Weighted Criteria		698.00		721.00	
Construction Cost (estimated)		$33,500,000		$29,700,000	
Value Ratio (cost/criteria point)		**$ 47,994**		**$ 41,193**	

The results of this analysis indicate that from a functionality standpoint, the two concepts are approximately equal. However, from a cost/benefit perspective, Alternative 4 provides the better value because the cost of construction plus right-of-way is $3.8 million less than Alternative 2.

SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County

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
BRIDGES IN ALTERNATE 2						
B2-1	Build Atlanta Road Bridge over I-285 as three spans with the capability of being expanded to four spans when I-285 is expanded to 10 lanes in each direction	$4,599,287	$3,713,684	$885,603		$885,603
B2-2	Use mechanically stabilized earth walls for Ramp C Bridge over CSX Railroad and eliminate end spans	$665,665	$659,470	$6,195		$6,195
B2-3	Reduce the median width on the Atlanta Road Bridge over I-295 by 14 ft and the approach roadway on either side of the bridge	$561,668	$0	$561,668		$561,668
B2-6	Build Orchard Road Bridge over I-285 as two spans with the capability of being expanded to four spans when I-285 is expanded to 10 lanes in each direction	$1,260,721	$936,382	$324,339		$324,339
B2-7	Use 5 ft-6 in wide sidewalks for the Atlanta Road Bridge and Orchard Road Bridge over I-285	$5,872,020	$5,653,109	$218,911		$218,911
B2-8	Take the sidewalk off the eastbound side of the Atlanta Road Bridge over I-285	$4,704,638	$4,508,572	$196,066		$196,066
HIGHWAY WORK IN ALTERNATE 2						
H2-4.1	Make Ramp D a one-lane ramp in lieu of a partial two-lane ramp	$45,070	$0	$45,070		$45,070
H2-4.2	Extend two lanes of Ramp D as far as possible	DESIGN SUGGESTION				
H2-5	Use fill between I-285 and west side of Ramp C in lieu of a mechanical stablized earth wall at about station 208+50	$4,484,700	$4,158,504	$326,196		$326,196
H2-6	Raise the Atlanta Road profile on the east side of the bridge to allow the future I-285 lanes to go under the bridge without lowering the Colonial Pipeline	$2,200,000	$594,000	$1,606,000		$1,606,000

SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County

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
ALL WORK IN ALTERNATE 4						
A4-1	Save the warehouse by providing access at a signalized intersection with Brownwood Lane	$3,782,000	$127,074	$3,654,926		$3,654,926
A4-2	Build Atlanta Road Bridge over I-285 as two spans with the capability of being expanded to four spans when I-285 is expanded to 10 lanes in each direction	$4,599,287	$2,962,479	$1,636,808		$1,636,808
A4-3	Use part of existing northbound exit ramp to Atlanta Road for new exit ramp	$241,697	$17,116	$224,581		$224,581

STUDY RESULTS

INTRODUCTION

The results of this value engineering study portray the benefits that can be realized by Cobb County, GDOT and the users. The results will directly affect the project's design and require coordination amongst the Cobb County and GDOT project teams to determine the disposition of each alternative.

During the VE workshop, many ideas for potential value enhancement were conceived and evaluated by the team for technical merit, applicability to the project, implementability considering the project's status, and the ability to meet Cobb County and GDOT's project value objectives. Research performed on those ideas considered to have the potential to enhance the value of the project resulted in the development of individual alternatives identifying specific changes to the project as a whole, or individual elements that comprise the project. These may be in the form of VE alternatives (accompanied by cost estimates) or design suggestions (without cost estimates). For each alternative developed, the following information is provided:

- A summary of the original design,
- A description of the proposed change to the project,
- Sketches and design calculations, if appropriate,
- A capital cost comparison and life cycle discounted present worth cost comparison of the alternative and original design (where appropriate),
- An evaluation of the advantages and disadvantages of the alternative, and
- A brief narrative to compare the original design and the proposed change and provide a rationale for implementing the change into the project.

The capital cost comparisons used unit quantities contained in the project cost estimate prepared by the designers, whenever possible. If prices were not available, cost databases from GDOT and team members were consulted. Each design suggestion contains the same information as the VE alternatives, except that no cost information is included. Design suggestions are presented to bring attention to areas of the design that, in the opinion of the VE team, should be changed for reasons other than cost. Examples of these reasons may include improve circulation, reduce maintenance, improve constructability, improve safety, and reduce project risk. In addition, some ideas cannot be quantified in terms of cost with the design information provided; these are also presented as design suggestions and are intended to improve the quality of the project.

Each alternative or design suggestion developed is identified with an alternative number (Alt. No.) that can be tracked through the value engineering process, thus facilitating referencing among the Creative Idea Listing and Evaluation worksheets, the alternatives, and the Summary of Potential Cost Savings table. The Alt. No. contains one of the following letter prefixes indicating the project element being addressed:

Alternative 2 - Bridge	=	B2
Alternative 2 - Highway	=	H2
Alternative 4 - All	=	A4

Summaries of the alternatives and design suggestions are provided on the Summary of Potential Cost Savings table. The table is divided into project elements for the reviewer's convenience and is used to divide the results section. The complete documentation of the developed alternatives and design suggestions follows the Summary of Potential Cost Savings tables.

KEY ISSUES

This project presents several challenges including:

- The Colonial Gas Pipeline must be lowered to allow construction of the loop ramp;
- A deep culvert under I-285 must be extended;
- A civil war historic site must be preserved;
- The CSX Railroad must be bridged;
- Traffic on Atlanta Road must be maintained during construction; and
- Extensive sound walls must be provided to meet community requirements.

Based on information provided to the VE team, it is also believed that the construction cost of both alternatives will grow about $8.5 million. This is to account for higher than estimated bridge costs, the costs for an expanded amount of noise barriers, the cost of mechanically stabilized earth walls along the Atlanta Road bridge abutments, and the costs for lowering the Colonial Gas Pipeline.

In addition, although there is a preferred design alternative for the interchange, another alternative, labeled Alternative 4, provides almost the equivalent functionality at a cost of about $3.8 million less, so the question arises which alternative provides the best value for the project.

STUDY OBJECTIVES

In developing and constructing the project, Cobb County and GDOT must ensure it receives the optimum value for the funds they expend. To aid in this goal, this VE session was engaged with the specific objective of identifying alternatives for change that will reduce project costs and/or enhance the functionality of the current concept. A second objective of the study was to evaluate the costs and benefits of the two interchange alternatives to assist the County and GDOT in selecting a concept for final design.

RESULTS OF THE STUDY

The VE team generated nine ideas for reducing cost and one design suggestion for improving the safety of Alternative 2 and four ideas for reducing the costs of Alternative 4. All of the alternatives are detailed this section of the report. The narrative below highlights the alternatives that would provide the greatest impact to the current design alternatives.

For both alternatives, the proposed bridges over I-285 consist of four spans to accommodate an expanded I-285 which will occur sometime in the future. VE Alternative Numbers (Alt. Nos.) B2-1, B2-6 and A4-2 suggest that the bridges be constructed to accommodate the initial I-285 configuration of five lanes in each direction (including the new auxiliary lanes) with the ability to add the additional spans at a later date when I-285 is expanded. This saves the initial cost and the

cost of maintenance, and avoids reducing the useful life of these spans of the bridges that do not provide any current improvements for I-285 traffic.

In Alt. No. H2-6 for Alternate 2, the east side of the Atlanta Road bridge profile is raised so that the loop ramp to I-285 northbound can be raised and the Colonial Pipeline is allowed to remain in its current location. Moving the Colonial Pipeline is estimated to cost about $2 million dollars, entail considerable construction risk and necessitate close coordination with the utility. This option avoids all of this. Alt. No. B2-3 suggests that the median on the bridge can be reduced by 14 ft to save significant costs while still accommodating Atlanta Road to the east and west of the bridge.

In Alt. No. A4-1 for Alternate 4, the VE team explores the potential to save the warehouse by providing a signalized intersection with Atlanta Road and Brownwood Lane on the other side of Atlanta Road. Although restricted access to the properties south of Atlanta Road is reduced from 1,000 ft to about 800 feet from the end of the exit ramp from I-285 northbound, this is deemed a reasonable distance. It also provides maximum access to Brownwood Lane and the properties to the north of Atlanta Road. Over $3 million in right-of-way cost can be saved as well as the retention of three business entities housed in the warehouse.

Benefit and Cost Analysis of Design Alternatives 2 and 4

After generating alternatives with the potential to reduce project costs, the VE team compared the costs and benefits for Alternatives 2 and 4. The scientific decision-making process used to accomplish this consisted of the following steps:

1. Identifying non-economic criteria for evaluating the benefits that would be accrued by building each alternative;
2. Prioritizing or assigning relative weights to the criteria;
3. Evaluating how well each alternative meets each criterion on a scale of 1 to 10, with 10 indicating almost perfectly and 1 indicating non-compliance;
4. Multiplying the evaluation rating number times the weight of the criterion and summing the results to attain a total weighted criteria score, or benefit indicator;
5. Identifying the cost of the alternative; and
6. Determining the cost to attain a criteria point.

The alternative with the lowest cost/criteria point provides the best value. The results of this effort are shown below.

TABLE 1 – CRITERIA WEIGHTING MATRIX

	B	C	D	E	F	G	H	I	Evaluation Criteria	Score	Weighting factor
A	A 3	A 3	A 2	A 1	A 2	A 2	A 3	A 3	Level of Service at Northbound Ramp Terminals	19	25
	B	B 3	B 2	B 1	B 2	B 2	B 3	B 3	Level of Service at Southbound Ramp Terminals	16	21
		C	C 2	C 1	C 2	C 2	C 2	C 3	Ability to Accommodate Future I-285 Expansion	12	16
			D	E 3	F 3	G 2	H 1	D 1	Acquisition Requirements (Displacements & Impacts)	1	1
				E	E 2	E 2	E 3	E 2	Community Preference	12	16
					F	F 1	F 1	F 3	Delta Safety - Potential for Collisions	8	11
						G	G 1	I 1	Vehicle Operations	3	4
							H	H 2	Constructability	3	4
								I	Access to Brownwood Lane	1	1
											100

The methodology for completing the weighting of the criteria is as follows.

KEY

Evaluation Criteria are used to compare the alternatives
Score is the total number of points accummulated for each criterion
Weighting factor is the relative numerical value of each criterion

Ranking

1 = Slightly more important than the other criterion it is being compared with
2 = Somewhere between the extremes of importance
3 = Much more important than the other criterion it is being compared with

INSTRUCTIONS

Step 1: Compare each criterion with each other criterion at intersecting boxes.
Step 2: Select which criterion is more important and to what degree, using the 1-3 ranking system.
Step 3: Enter the letter of the chosen criterion in the left side of the appropriate box and its numerical ranking in the right side of the box.
Step 4: Weighting factors are calculated for you.

TABLE – ALTERNATIVE EVALUATION MATRIX

Evaluation Criteria	Weight	Alternative 2		Alternative 4	
		Rating	Score	Rating	Score
Level of Service at Northbound Ramp Terminals	25	7	175	8	200
Level of Service at Southbound Ramp Terminals	21	9	189	8	168
Ability to Accommodate Future I-285 Expansion	16	3	48	8	128
Acquisition Requirements (Displacements & Impacts)	1	3	3	7	7
Community Preference	16	9	144	6	96
Delta Safety - Potential for Collisions	11	8	88	6	66
Vehicle Operations	4	7	28	5	20
Constructability	4	4	16	8	32
Access to Brownwood Lane	1	7	7	4	4
Total Weighted Criteria		698.00		721.00	
Construction Cost (estimated)		$33,500,000		$29,700,000	
Value Ratio (cost/criteria point)		**$ 47,994**		**$ 41,193**	

The results of this analysis indicate that from a functionality standpoint, the two concepts are approximately equal, Total Weight Criteria equals 698 for Alternative 2 versus 721 for Alternative 4. However, from a cost/benefit perspective, Alternative 4 provides the better value because the cost of construction plus right-of-way is $3.8 million less than Alternative 2.

EVALUATION OF ALTERNATIVES AND DESIGN SUGGESTIONS

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

All alternatives and design suggestions were developed independently of each other to provide a broad range of options to consider for implementation. Therefore, some are mutually exclusive, so acceptance of one may preclude the acceptance of another. In addition, some of the alternatives may be interrelated, so acceptance of one or more may not yield the total of the cost savings shown for each alternative. Design suggestions could also be interrelated, thus precluding a part of one or more suggestions from being implemented if another design suggestion is also implemented.

All alternatives should be carefully reviewed in order to select the combination of ideas with the greatest beneficial impact on the project. Once this has been accomplished, the total cost savings resulting from the VE study can be calculated based on implementing a revised, all-inclusive design solution.

SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County

ALT. NO.	DESCRIPTION	ORIGINAL COST	ALTERNATIVE COST	PRESENT WORTH OF COST SAVINGS: INITIAL COST SAVINGS	RECURRING COST SAVINGS	TOTAL PW LCC SAVINGS
BRIDGES IN ALTERNATE 2						
B2-1	Build Atlanta Road Bridge over I-285 as three spans with the capability of being expanded to four spans when I-285 is expanded to 10 lanes in each direction	$4,599,287	$3,713,684	$885,603		$885,603
B2-2	Use mechanically stabilized earth walls for Ramp C Bridge over CSX Railroad and eliminate end spans	$665,665	$659,470	$6,195		$6,195
B2-3	Reduce the median width on the Atlanta Road Bridge over I-295 by 14 ft and the approach roadway on either side of the bridge	$561,668	$0	$561,668		$561,668
B2-6	Build Orchard Road Bridge over I-285 as two spans with the capability of being expanded to four spans when I-285 is expanded to 10 lanes in each direction	$1,260,721	$936,382	$324,339		$324,339
B2-7	Use 5 ft-6 in wide sidewalks for the Atlanta Road Bridge and Orchard Road Bridge over I-285	$5,872,020	$5,653,109	$218,911		$218,911
B2-8	Take the sidewalk off the eastbound side of the Atlanta Road Bridge over I-285	$4,704,638	$4,508,572	$196,066		$196,066
HIGHWAY WORK IN ALTERNATE 2						
H2-4.1	Make Ramp D a one-lane ramp in lieu of a partial two-lane ramp	$45,070	$0	$45,070		$45,070
H2-4.2	Extend two lanes of Ramp D as far as possible	DESIGN SUGGESTION				
H2-5	Use fill between I-285 and west side of Ramp C in lieu of a mechanical stablized earth wall at about station 208+50	$4,484,700	$4,158,504	$326,196		$326,196
H2-6	Raise the Atlanta Road profile on the east side of the bridge to allow the future I-285 lanes to go under the bridge without lowering the Colonial Pipeline	$2,200,000	$594,000	$1,606,000		$1,606,000

VALUE ENGINEERING ALTERNATIVE

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **B2-1**

DESCRIPTION: **BUILD ATLANTA ROAD BRIDGE OVER I-285 SO THAT IT CAN BE EXPANDED LATER**

ORIGINAL DESIGN: (sketch attached)

The original design for the Atlanta Road bridge over I-285 is a 504.4-ft-long, prestressed concrete beam bridge and 118.42 ft wide. The bridge spans over eight lanes on I-285, proposed Ramp D and future expansion lanes including five collector-distributor and five through lanes in each direction.

ALTERNATIVE: (sketch attached)

Provide a 384.4 ft-long-bridge that will span over the eight lanes existing lanes of I-285 and proposed Ramp D without the future five southbound collector-distributor lanes. In the future, the proposed end bent will be converted to an intermediate bent to accommodate additional lanes. Mechanically stabilized earth (MSE) walls will be used along the temporary end bent to retain soil.

ADVANTAGES:

- Fewer intermediate bents
- Reduces construction time
- Reduces initial cost
- Reduces maintenance costs
- Does not reduce the useful life of the span not built

DISADVANTAGES:

- Future expansion may be more costly because of maintenance of traffic issues and having to tie into the existing structure

DISCUSSION:

The use of earth-fill and shortening of the bridge will reduce the cost of construction by $885,603. Time of construction will also be reduced. The benefit to this approach is that it is unknown when or if I-285 will be expanded to ten lanes in each direction. If the probability of this occurring is greater than 10 years, then constructing extra structure that will provide no benefit for traffic operations for 10 or more years does not provide good value. In fact, constructing the extra span now costs more because it must be inspected and maintained and its useful life will be reduced.

This cost analysis is based on a bridge cost of $70/sf. However, it is believed that the bridge will more likely cost $95/sf, especially considering that the bridge will have to be constructed in phases, which will have to be tied together. If the actual bridge cost is closer to $95/sf, then the cost savings could increase to about $1.276 million.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 4,599,287	—	$ 4,599,287
ALTERNATIVE	$ 3,713,685	—	$ 3,713,685
SAVINGS	$ 885,602	—	$ 885,602

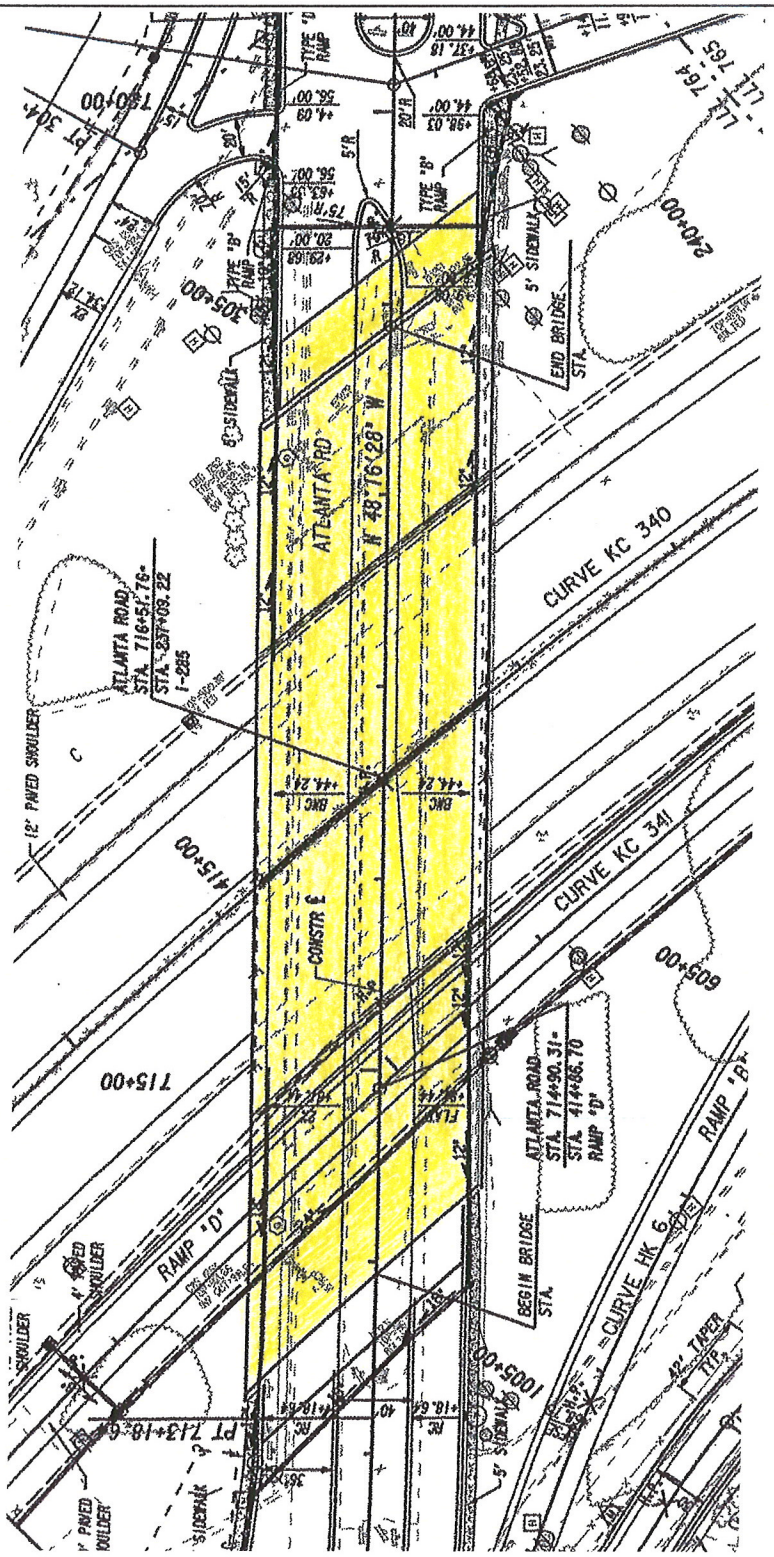
SKETCH

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: 132-1

ORIGINAL DESIGN ☑ ALTERNATIVE DESIGN ☐ BOTH ☐

SHEET NO.: 2 of 6



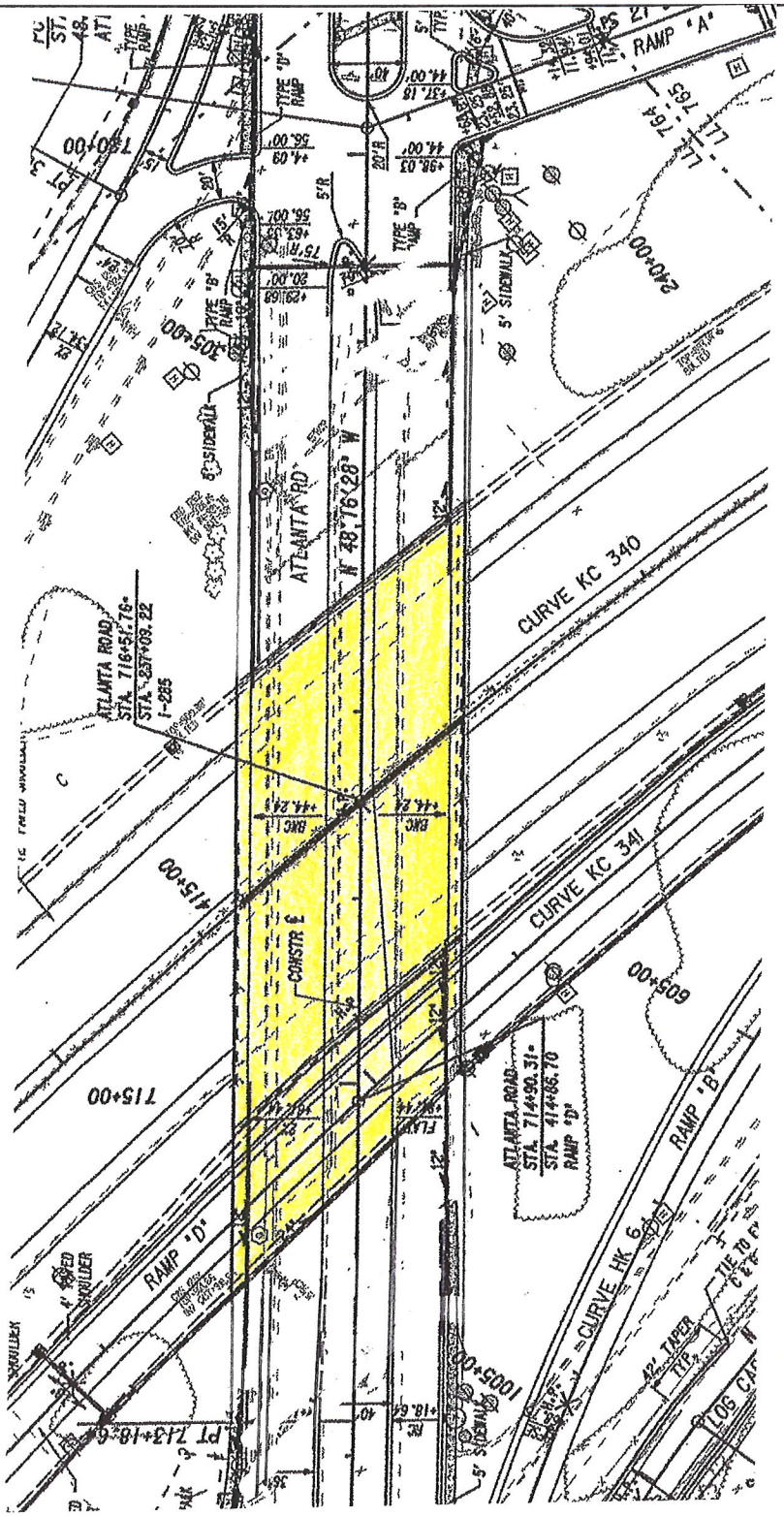
ORIGINAL DESIGN

SKETCH

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: B2-1

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☑ BOTH ☐ SHEET NO.: 3 of 6



ALTERNATIVE DESIGN

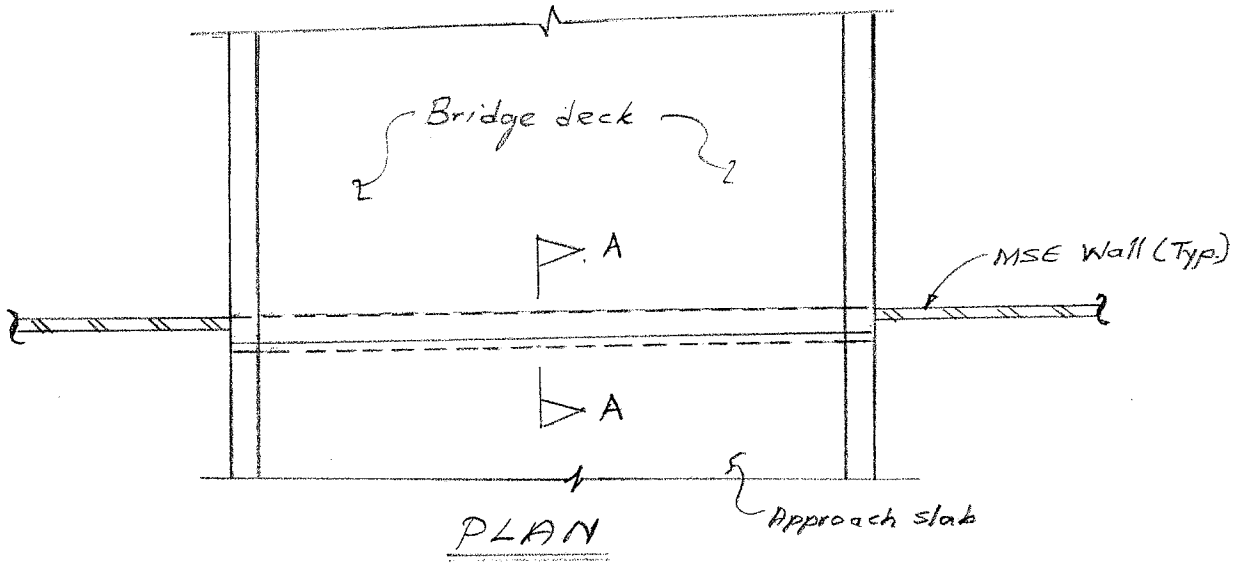
SKETCH

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

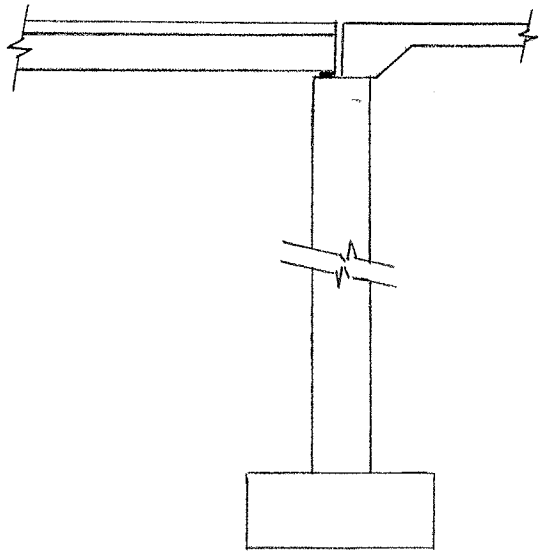
ALTERNATIVE NO.: B2-1

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☑ BOTH ☐

SHEET NO.: 4 of 6



PLAN



SECTION A-A

CALCULATIONS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: B2+1

SHEET NO.: 5 of 6

Original Design

Deck surface = 504.4 * 118.42'
= 59,731 sf.

Alternative Design

Deck surface = 384.4' * 118.42'
= 45,521 sf.

Pavement = 1/9 * 120' * 116'
= 1,547 SY

MSE Walls = 2 ea * 1/2 * 120' * 19'
= 2,280 sf

COST WORKSHEET

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **B2-1**

SHEET NO.: **6 of 6**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Deck surface	SF	59,731	70.00	4,181,170	45,521	70.00	3,186,470
Pavement	SF				1,547	55.80	86,323
MSE Walls	SY				2,280	45.30	103,284
Subtotal				4,181,170			3,376,077
Markup (%) at 10.0%				418,117			337,608
TOTAL				4,599,287			3,713,685

VALUE ENGINEERING ALTERNATIVE

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **B2-2**

DESCRIPTION: **USE MECHANICALLY STABILIZED EARTH WALLS FOR THE CSX BRIDGE AND SHORTEN THE BRIDGE**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (sketch attached)

The original CSX Railroad bridge structure is a three-span bridge, 260 ft long and 33.25 ft wide.

ALTERNATIVE: (sketch attached)

Provide a 60 ft long single-span bridge with mechanically stabilized earth (MSE) walls along the end bents.

ADVANTAGES:

- Eliminates intermediate bents
- Reduces construction time
- Reduces cost
- Less bridge to maintain over its life span

DISADVANTAGES:

- None apparent

DISCUSSION:

The end bents will be placed closer to the railroad tracks and will be aligned with the centerline of the railroad tracks. The use of earth fill will reduce the construction cost by $6,195 and there will also be a reduction in construction time. Long-term maintenance of the bridge structure is significantly reduced. Given that the bridge crosses a railroad, providing sloped end sections provides no visual value.

This cost savings is based on a bridge cost of $70/sf. However, it is believed that the bridge cost will more likely be $95/sf. If this is the case, the cost savings increases to about $47,000.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 665,665	—	$ 665,665
ALTERNATIVE	$ 659,470	—	$ 659,470
SAVINGS	$ 6,195	—	$ 6,195

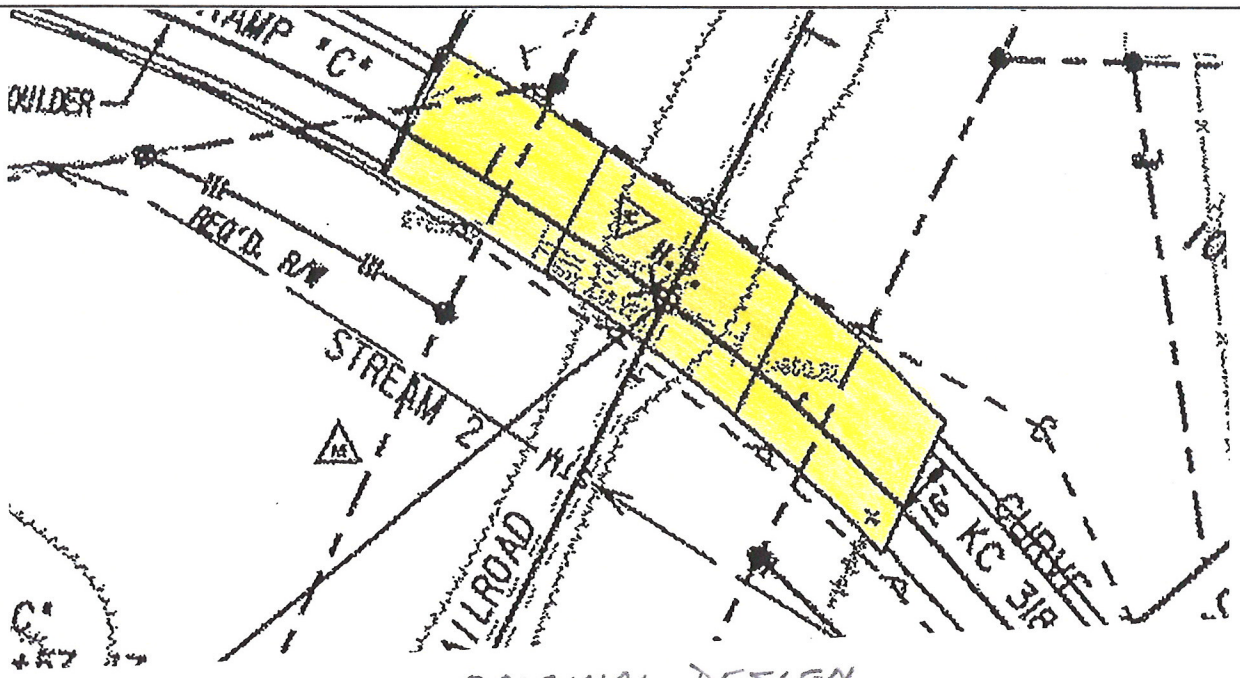
SKETCH

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

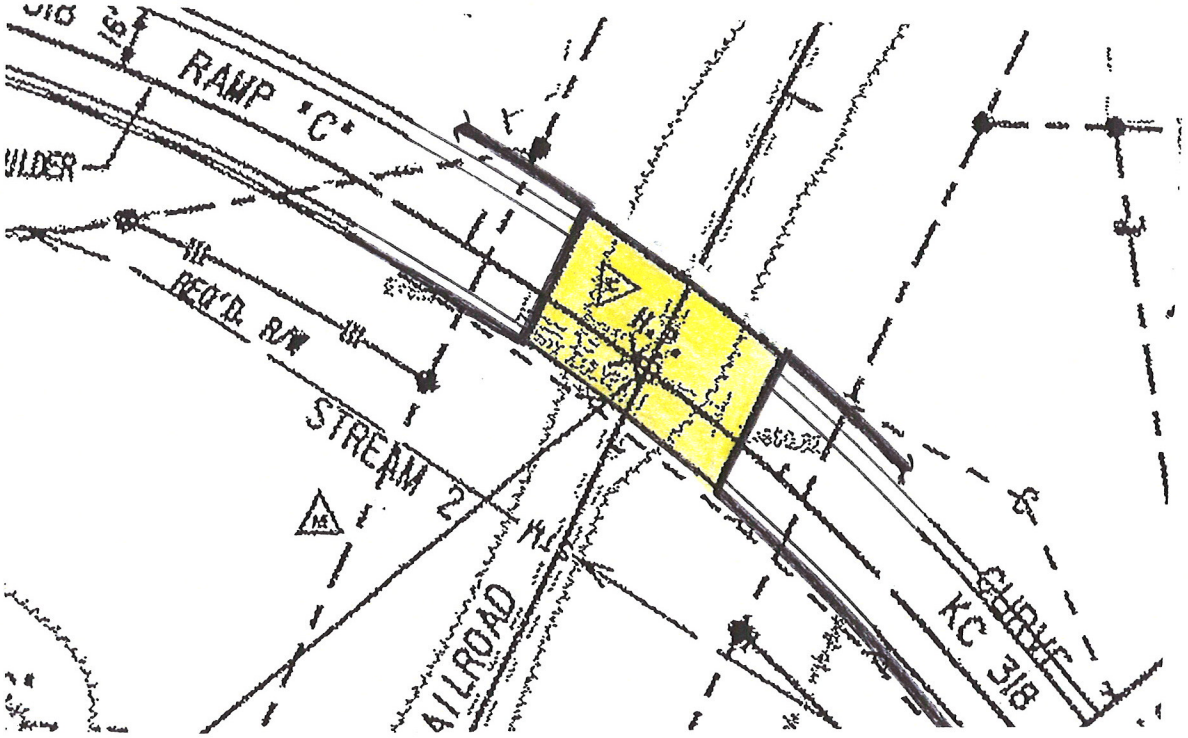
ALTERNATIVE NO.: B2-2

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☑

SHEET NO.: 2 of 4



ORIGINAL DESIGN



ALTERNATIVE DESIGN

CALCULATIONS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: B2-2

SHEET NO.: 3 of 4

Original Design

Deck surface = 260'* 33.25'
= 8,645 sf.

Alternative Design

Deck surface = 60'* 33.25'
= 1,995 sf.

MSE Walls = 2 sides *[33.25'* 20' ave. height + 200'* 20' av. ht.]
= 9,330 sf.

Pavement = 1/9 * 200'* 30'
= 667 S.Y.

COST WORKSHEET

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **B2-2**

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 surface	SF	8,645	70.00	605,150	1,995	70.00	139,650
Pavement	SY				9,330	45.30	422,649
MSE Walls	SY				667	55.80	37,219
Subtotal				605,150			599,518
Markup (%) at 10.0%				60,515			59,952
TOTAL				665,665			659,470

VALUE ENGINEERING ALTERNATIVE

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **B2-3**

DESCRIPTION: **REDUCE THE MEDIAN WIDTH ON THE ATLANTA ROAD BRIDGE OVER I-285 BY 14 FT AND THE ROADWAY ON EACH APPROACH**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN:

The current design uses a 40 ft median on Atlanta Road and across the bridge over I-285.

ALTERNATIVE: (sketch attached)

Narrow the median by 14 ft to 26 ft across the bridge and narrow the approach roadway median by 8 ft to 14 ft, mostly on the east end of the project.

ADVANTAGES:

- Reduces the bridge cost
- Saves right-of-way along Atlanta Road
- Reduces the amount of bridge to be maintained

DISADVANTAGES:

- None apparent

DISCUSSION:

The current design uses a 40-ft-wide median through most of the project. By narrowing the median by 14 ft to a 26 ft median across the bridge and to 14 ft at the left turn lane nose, the lanes at the intersection of Atlanta Road and Pine Street would require realigning to reduce the median by 8 ft in this area. There is sufficient length on Atlanta Road to reduce the median by another 6 ft to a (8 ft plus 6 ft) 14 ft reduction before Ramp A. This saves significant bridge costs and the shift would also save a small strip of right-of-way.

Note that $70/sf is used for the bridge cost. Current prices for bridge construction are about $95/sf. Also, given the fact that the bridge will have to be constructed in multiple phases, the $95/sf is more realistic. If the $95/sf is the actual cost, then the cost savings will increase by 35 percent.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 561,668	—	$ 561,668
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 561,668	—	$ 561,668

SKETCH

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: B2-3

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☒ BOTH ☐

SHEET NO.: 2 of 5

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN

SIGNING AND MARKING PLANS

I-285 @ CR 4519/ATLANTA RD

PBS&J

SCALE IN FEET
0 50 100 200

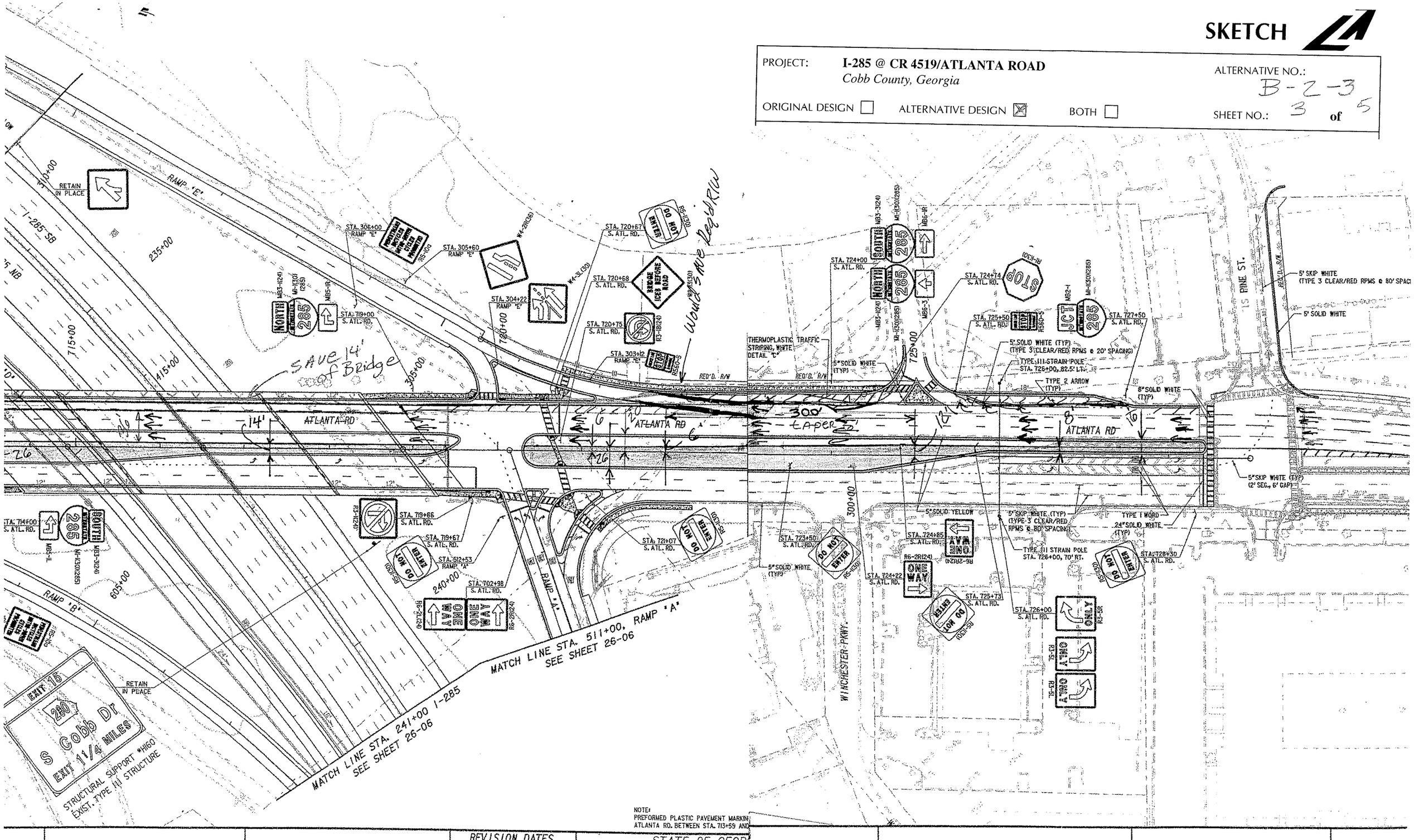
SKETCH

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: B-2-3

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☒ BOTH ☐

SHEET NO.: 3 of 5



NOTE:
PREFORMED PLASTIC PAVEMENT MARKIN
ATLANTA RD. BETWEEN STA. 713+59 AND

PBS&J

SCALE IN FEET

REVISION DATES

STATE OF GEORG
DEPARTMENT OF TRANSP
OFFICE: URBAN DESIGN
SIGNING AND MARKI

PBS&J

25

CALCULATIONS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: B2-3

SHEET NO.: 4 of 5

Bridge Length = 504.4' Save 14' of Br. Width

Bridge Savings:

Area = (14' x 504.4') = 7,061.60 sy

R/W Saved:

300' x 5' = 1,500 sf

COST WORKSHEET

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **B2-3**

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
Original cost savings							
Bridge saved	SF	7,062	70.00	494,312			
Right-of-Way saved	SF	1,500	5.75	8,625			
MSE Walls	SY						
Right-of-Way Subtotal				8,625			
Right-of-Way markup (1.48)				12,765			
Construction Subtotal				491,162			
Markup (%) at 10.0%				49,116			
TOTAL				561,668			

VALUE ENGINEERING ALTERNATIVE

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **B2-6**

DESCRIPTION: **BUILD ORCHARD ROAD BRIDGE OVER 10 LANES OF I-285 NOW AND ALLOW FOR AN EXTENSION LATER**

ORIGINAL DESIGN: (sketch attached)

The original design for the Orchard Street bridge over I-285 is a 370-ft-long bridge and 44.42 ft wide. The bridge spans over 10 proposed lanes for I-285 and 10 future collector-distributor lanes.

ALTERNATIVE: (sketch attached)

Provide a 220-ft-long bridge that will span over 10, I-285 lanes without the future lanes. In the future, the proposed end bents will be converted to intermediate bents to accommodate additional lanes. Mechanically stabilized earth walls will be used along the end bents to retain soil

ADVANTAGES:

- Fewer intermediate bents
- Reduces construction time
- Reduces cost
- Reduces bridge maintenance costs
- Eliminates the reduction in useful life for the spans not constructed at this time

DISADVANTAGES:

- Future expansion will be more costly because of additional maintenance of traffic costs

DISCUSSION:

Shortening the bridge will reduce the construction cost by $324,339. The benefit to this approach is that it is unknown when or if I-285 will be expanded to ten lanes in each direction. If the probability of this occurring is greater than 10 years, then constructing extra structure that will provide no benefit for traffic operations for 10 or more years does not provide good value. In fact, constructing the extra span now costs more because it must be inspected and maintained and its useful life will be reduced.

This cost analysis is based on a bridge cost of $70/sf. It is believed that the bridge cost will be about $95/sf. If this is the case, then the cost savings will increase to about $505,000.

This alternative can also be implemented if Alternative 4 for the interchange is adopted as the final design.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 1,260,721	—	$ 1,260,721
ALTERNATIVE	$ 936,382	—	$ 936,382
SAVINGS	$ 324,339	—	$ 324,339

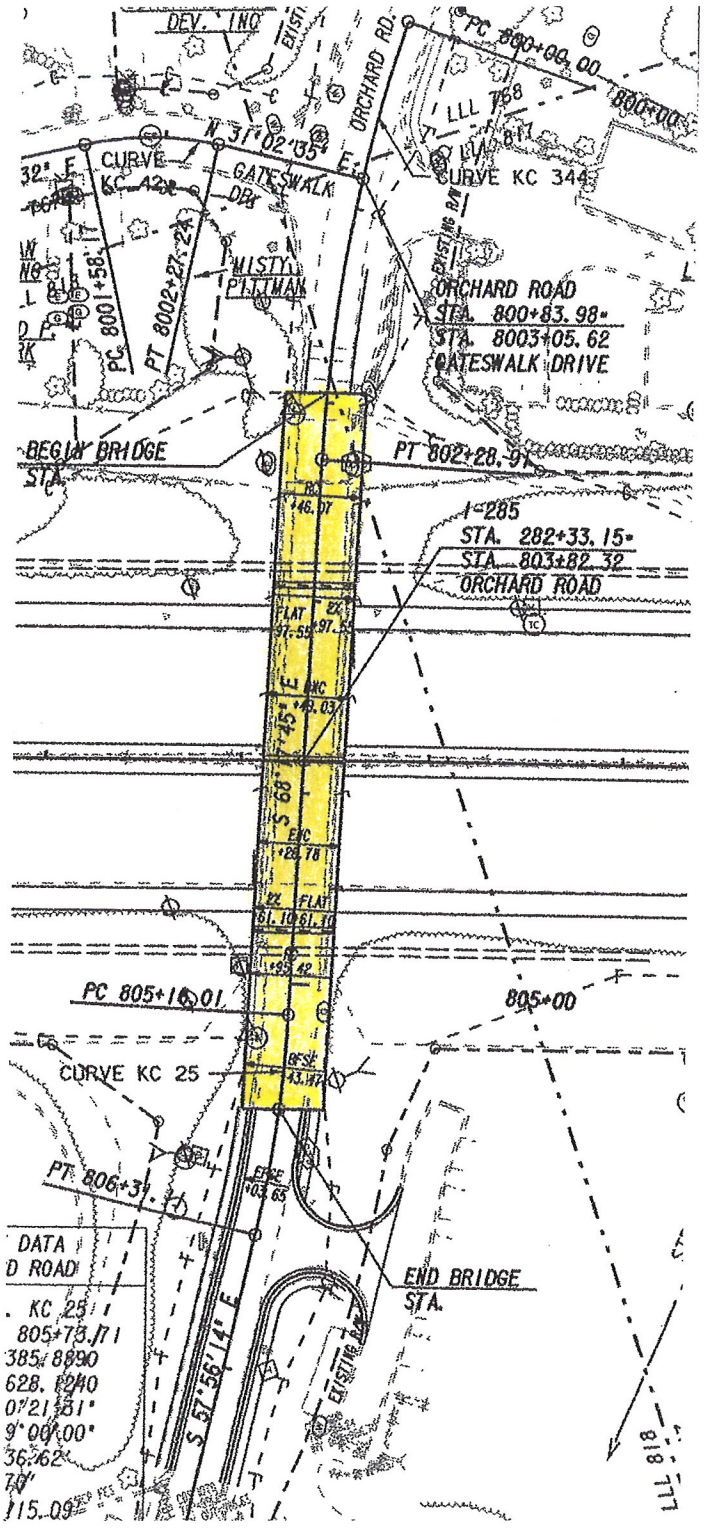
SKETCH

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: B2-6

ORIGINAL DESIGN ☑ ALTERNATIVE DESIGN ☐ BOTH ☐

SHEET NO.: 2 of 6



ORIGINAL DESIGN

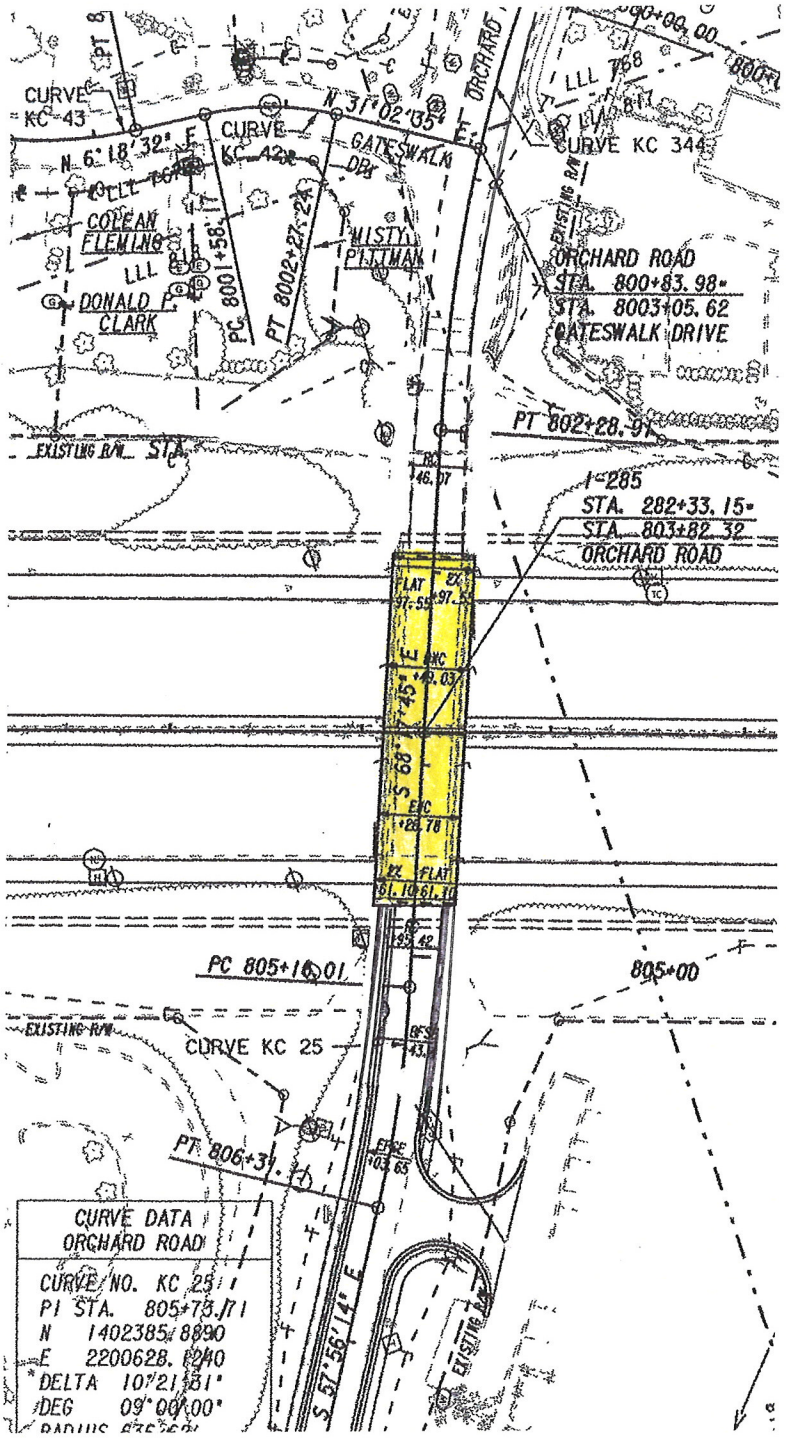
SKETCH

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: B2-6

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☑ BOTH ☐

SHEET NO.: 3 of 6



ALTERNATIVE DESIGN

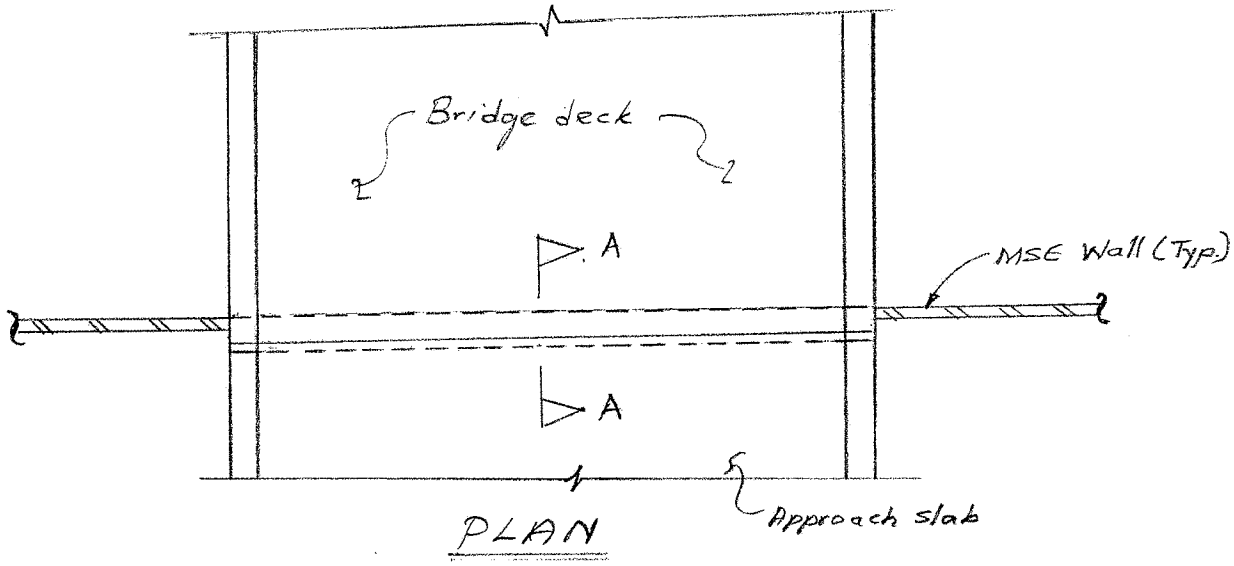
SKETCH

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

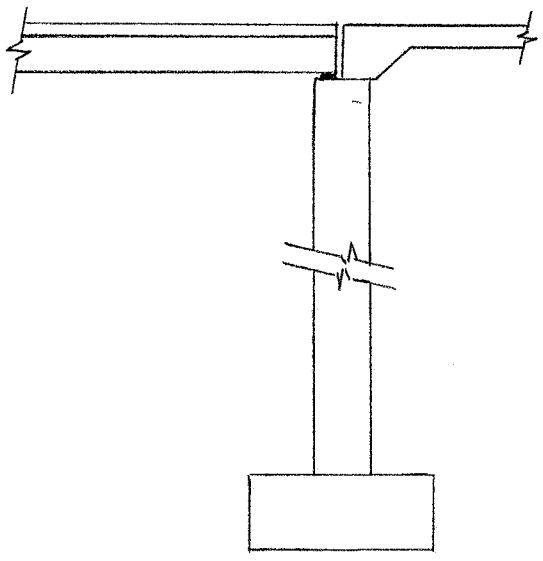
ALTERNATIVE NO.: B2-6

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☑ BOTH ☐

SHEET NO.: 4 of 6



PLAN



SECTION A-A

CALCULATIONS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: B2-6

SHEET NO.: 5 of 6

Original Design

Deck surface = 370' * 44.25'
= 16,373 sf

Alternative Design

Deck surface = 220' * 44.25'
= 9,735 sf

Pavement = 1/9 * 41' * 150'
= 683 SY.

MSE Walls = 2 eq * 1/2 * 150' * 19'
= 2,850 sf.

COST WORKSHEET

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **B2-6**

SHEET NO.: **6 of 6**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Deck surface	SF	16,373	70.00	1,146,110	9,772	70.00	684,040
Pavement	SY				683	55.80	38,111
MSE Wall	SF				2,850	45.30	129,105
Subtotal				1,146,110			851,256
Markup (%) at 10.0%				114,611			85,126
TOTAL				1,260,721			936,382

VALUE ENGINEERING ALTERNATIVE

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **B2-7**

DESCRIPTION: **USE 5-FT 6 IN-WIDE SIDEWALKS IN LIEU OF 6-FT AND 8-FT-WIDE SIDEWALKS ON THE BRIDGES**

SHEET NO.: **1 of 2**

ORIGINAL DESIGN: (sketch attached)

The Atlanta Road Bridge over I-285 is designed with 6-ft-wide sidewalks on both sides. The Orchard Road Bridge over I-285 is designed with 8-ft-wide sidewalks on both sides.

ALTERNATIVE: (sketch attached)

Use 5-ft 6-in-wide sidewalks on both sides

ADVANTAGES:

- Saves costs
- Matches new bridge width policy

DISADVANTAGES:

- None apparent

DISCUSSION:

The new bridge width policy calls for 5-ft 6-in-wide sidewalks, which will mate with a 5-ft-wide sidewalk and 6-in-wide curb on either end of the bridge. The reduction in sidewalk width reduces the width of each bridge and saves costs.

Note that bridge costs are shown as $70/sf. It is believed that the costs today are about $95/sf. If this is accurate, then the cost savings will go up about 35 percent.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 5,872,020	—	$ 5,872,020
ALTERNATIVE	$ 5,653,109	—	$ 5,653,109
SAVINGS	$ 228,911	—	$ 228,911

COST WORKSHEET

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **B2-7**

SHEET NO.: **2 of 2**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Atlanta Road Bridge over I-285	SF	59,760	70.00	4,183,200	59,255	70.00	4,147,850
Orchard Road Bridge over I-285	SF	16,500	70.00	1,155,000	14,162	70.00	991,340
Subtotal				5,338,200			5,139,190
Markup (%) at 10.0%				533,820			513,919
TOTAL				5,872,020			5,653,109

VALUE ENGINEERING ALTERNATIVE

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **B2-8**

DESCRIPTION: **TAKE THE SIDEWALK OFF OF THE EASTBOUND SIDE OF THE ATLANTA ROAD BRIDGE OVER I-285 AND NARROW THE BRIDGE**

SHEET NO.: **1 of 6**

ORIGINAL DESIGN: (sketch attached)

The typical roadway section includes 12-ft-wide shoulders on either side of Atlanta Road with a 5-ft-wide sidewalk.

ALTERNATIVE: (sketch attached)

Retain 12-ft-wide shoulder on the westbound side of Atlanta Road, and eliminate 5 ft sidewalk from eastbound side and make it a 10-ft-wide rural shoulder. Eliminate the sidewalk on the eastbound side of the Atlanta Road bridge over I-285.

ADVANTAGES:

- Enhances pedestrian safety
- Saves costs of paving, concrete and bridge

DISADVANTAGES:

- No access for pedestrians on the eastbound side

DISCUSSION:

Pedestrian safety was primary reason for eliminating the sidewalk along the eastbound side of Atlanta Road. For example, the proposed loop Ramp D and continuous flow of traffic do not allow for safe pedestrian travel at this location. Removing the proposed sidewalk here should encourage walking along the westbound side of the road avoiding a dangerous vehicle crossing.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 4,704,638	—	$ 4,704,638
ALTERNATIVE	$ 4,508,571	—	$ 4,508,571
SAVINGS	$ 196,067	—	$ 196,067

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STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	STP00-0222-01(001)		

ALT. NO.
B-28
Sht. 2 of 6

MATCH LINE STA. 212+00 RAMP "C"
SEE SHEET 26-05

MATCH LINE STA. 405+00 RAMP "D"
SEE SHEET 26-05

MATCH LINE STA. 710+00
SEE SHEET 26-02

Dangerous Crossing — free-flow ramp

Take out sidewalk

CSX RAILROAD

EXISTING R/W

RESET SIGN, LUMP (SIGN REMOVED FROM NB EXIT RAMP)

REMOUNT LOGO FROM EXISTING SIGN ON NB EXIT RAMP

SEE SPECIAL DELINEATOR DETAIL ON THIS SHEET (TYP)

TYPE II STRAIN POLE STA. 213+89, RAMP "C", 52' LT.

TYPE III STRAIN POLE STA. 213+89, RAMP "C", 18' RT.

5"SOLID YELLOW

5"SOLID WHITE (TYP) (TYPE 3 CLEAR/RED RPMS @ 20' SPACING)

5"SOLID WHITE

5"SKIP WHITE (TYP) (TYPE S, CLEAR/RED RPMS @ 80' SPACING)

5"SKIP YELLOW (TYPE I YELLOW RPMS @ 80' SPACING)

24"SOLID WHITE (TYP)

8"SOLID WHITE (TYP)

5"SKIP WHITE (TYP) (2' SEG., 6' GAP)

STA. 697+69.22, ATLANTA ROAD TIE TO EXISTING PAVEMENT MARKINGS

THERMOPLASTIC TRAFFIC STRIPING, WHITE DETAIL "A"

THERMOPLASTIC TRAFFIC STRIPING, YELLOW DETAIL "A"

THERMOPLASTIC TRAFFIC STRIPING, YELLOW DETAIL "B"

5"SOLID DOUBLE YELLOW (TYP) (2 EA. TYPE I YELLOW RPMS @ 80' SPACING)

THERMOPLASTIC TRAFFIC STRIPING, WHITE DETAIL "A" (TYPE 3 CLEAR/RED RPMS @ 80' SPACING ON EACH BORDER

TYPE 7 POST
TYPE 1A (YELLOW) DELINEATOR

SPECIAL DELINEATOR REQUIRED AT FOLLOWING STATIONS:
RAMP "D"
401+06 402+21
401+49 402+63
401+92 403+06
401+35 403+49
401+78 403+92

TYPE I WORD (TYP)
TYPE I ARROW (TYP)

TYPE III STRAIN POLE STA. 709+09, 79' LT.

TYPE III STRAIN POLE STA. 709+09, 69' RT.

TYPE I ARROW (BIKE LANE)
5"SOLID WHITE PAINT (TYP)
6"SOLID WHITE PAINT (TYP)

RAMP "C"
RAMP "D"
ATLANTA RD.
LOG CABIN DRIVE
IVY RIDGE DRIVE
BROWNWOOD DR.

PBS&J

REVISION DATES		

SCALE IN FEET

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN

SIGNING AND MARKING PLANS

I-285 @ CR 4519/ATLANTA RD. | DRAWING No. 26-01

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STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	STP00-0222-01(001)		

ALT. NO. B2-8
Sht 3 of 6

Dangerous Crossing — Free-flow ramp

Take out Sidewalk

MATCH LINE STA. 233+00 I-285 SEE SHEET 26-05

MATCH LINE STA. 710+00 SEE SHEET 26-01

MATCH LINE STA. 723+00 SEE SHEET 26-03

MATCH LINE STA. 511+00, RAMP "A" SEE SHEET 26-06

MATCH LINE STA. 241+00 I-285 SEE SHEET 26-06

I-285 SB

I-285 NB

ATLANTA RD

RAMP "E"

RAMP "D"

RAMP "B"

RAMP "A"

LOG CABIN DRIVE

RETAIN IN PLACE

STA. 600+00

STA. 605+00

STA. 715+00

STA. 235+00

STA. 415+00

STA. 1005+00

STA. 240+00

STA. 305+00

STA. 720+00

RED'D. R/W

STA. 601+37 RAMP "B"

STA. 603+25 RAMP "B"

STA. 712+38 S. ATL. RD.

STA. 713+00 S. ATL. RD.

STA. 714+00 S. ATL. RD.

STA. 719+00 S. ATL. RD.

STA. 719+66 S. ATL. RD.

STA. 719+67 S. ATL. RD.

STA. 720+07 S. ATL. RD.

STA. 720+57 S. ATL. RD.

STA. 720+68 S. ATL. RD.

STA. 720+75 S. ATL. RD.

STA. 1005+37 LOG CABIN DR.

STA. 1005+28 LOG CABIN DR.

STA. 306+00 RAMP "E"

STA. 305+60 RAMP "E"

STA. 304+22 RAMP "E"

STA. 303+12 RAMP "E"

STA. 512+53 RAMP "A"

STA. 702+98 S. ATL. RD.

EXIT 15
260
S Cobb Dr
EXIT 1 1/4 MILES

STRUCTURAL SUPPORT *H160
EXIST. TYPE III STRUCTURE

NOTE:
PREFORMED PLASTIC PAVEMENT MARKINGS SHALL BE USED ON SOUTH ATLANTA RD. BETWEEN STA. 713+59 AND STA. 719+24.

PBS&J

SCALE IN FEET

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN
SIGNING AND MARKING PLANS

SKETCH

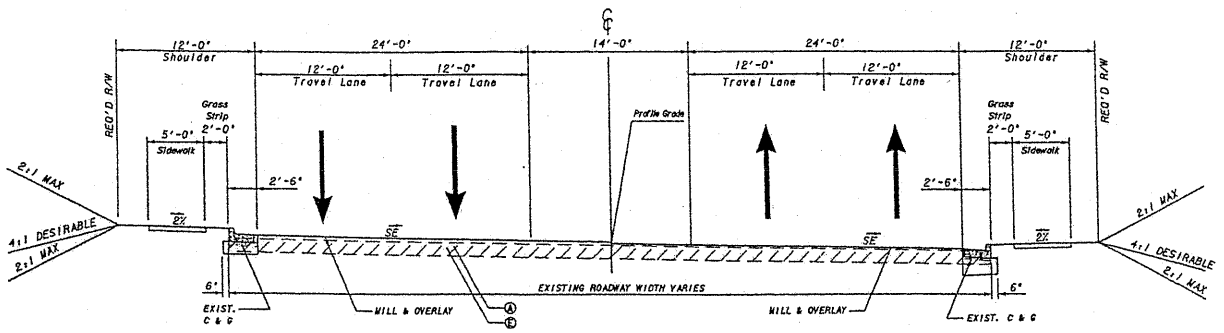
PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: B2-8

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☒

SHEET NO.: 4 of 6

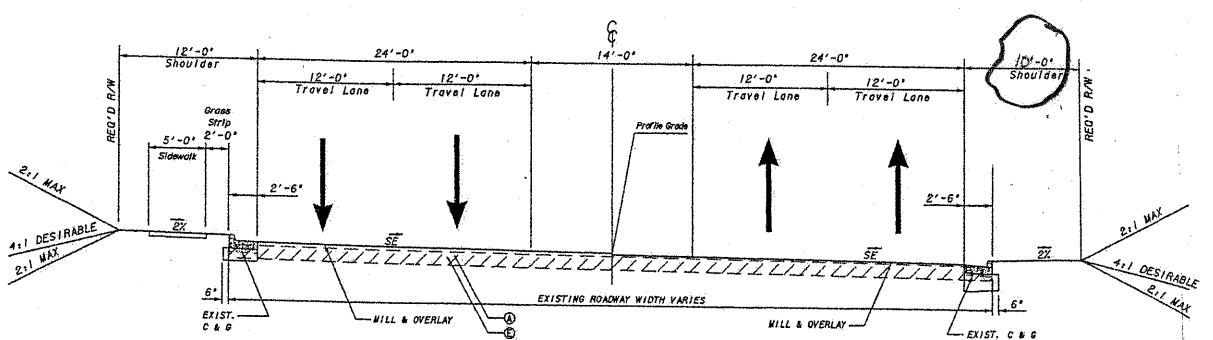
Original Design



SUPER ELEVATION SECTION
ATLANTA ROAD
STA. 691+67.80 TO STA. 700+00.00

Alternative Design

- illustrates hybrid shoulders
westbound travel maintains urban shoulder, while eastbound travel changes to a rural shoulder.



SUPER ELEVATION SECTION
ATLANTA ROAD
STA. 691+67.80 TO STA. 700+00.00

CALCULATIONS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: B2-8

SHEET NO.: 5 of 6

Begin Sidewalk 698+00
End Sidewalk 724+50 = 2650' sidewalk

less

(1947')(5') = 9735 sf ÷ 9 = 1081.67 (1082 sy)

(sidewalk distances)	
140'	85'
250'	225'
242'	160'
10'	~~2447~~
385'	
320'	1947'
~~500~~	
130'	

(original estimate) 2800 sy - 1082 sy (alternate estimate) = 1718 sy of 4" cmc sidewalk

Shoulder

5'-6" now grassed

(2447')(5.5') = 13458.5 sf ÷ 9 = 1495.39 sy = (1496 sy)

1496 sy x .0002066107 ac / 1 sy = .309 ac permanent grassing

Bridge

(orig.) 504.4 x 118.42 = 59731.048 sf

504.4 x (118.42 - 4) =

(alt) 504.4 x (114.42) = 57713.448 sf

(orig.) (59731.048 sf)(*70) = $4,181,173.36

(alt.) (57713.448 sf)(*70) = $4,039,941.36

COST WORKSHEET

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **B2-8**

SHEET NO.: **6 of 6**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Concrete Sidewalk	SY	2,800	34.18	95,704	1,718	34.18	58,721
Bridge	SF	59,732	70.00	4,181,240	57,714	70.00	4,039,980
Subtotal				4,276,944			4,098,701
Markup (%) at 10.0%				427,694			409,870
TOTAL				4,704,638			4,508,571

VALUE ENGINEERING ALTERNATIVE

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **H2-4.1**

DESCRIPTION: **MAKE RAMP D A SINGLE LANE LOOP RAMP**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (sketch attached)

The current design proposes Ramp D to be two lanes at the beginning of the ramp for approximately 800 ft and then tapering to a single lane.

ALTERNATIVE: (sketch attached)

The alternate design proposes a single lane for loop Ramp D.

ADVANTAGES:

- Less construction cost
- Better vehicle operation with a single 18 ft lane
- Enhances safety – avoids adjacent traffic around a two-lane ramp and avoids expanding and contracting the number of travel lanes around a tight turn

DISADVANTAGES:

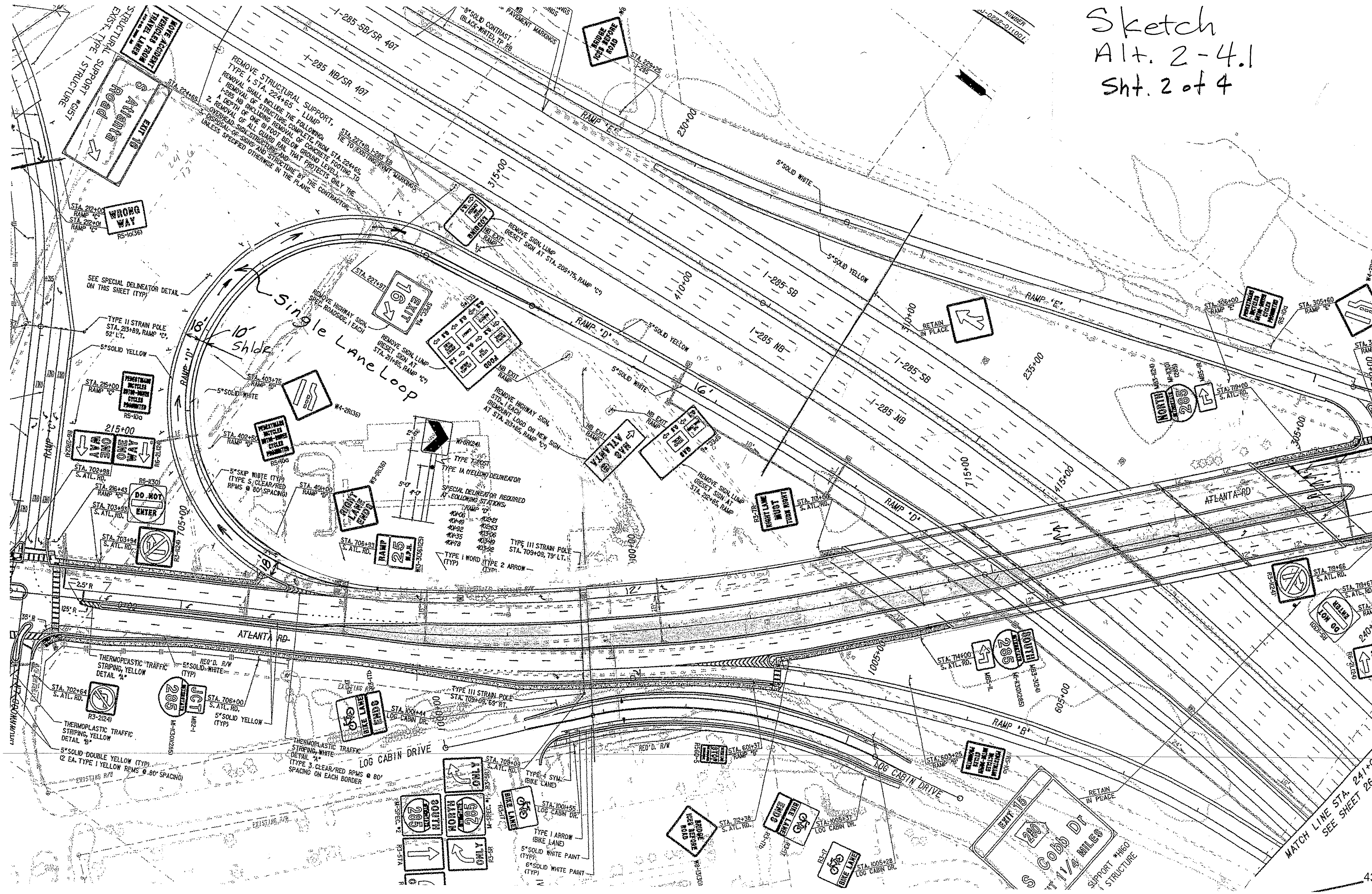
- Slightly less ramp capacity

DISCUSSION:

The single-lane loop ramp would be 18 ft wide because of the 202-ft radius. A two-lane loop ramp with a short radius of 202 ft will not operate very efficiently. Two-lane loop ramps should have good geometrics to operate effectively. The current design has the Ramp D exit going from a single lane to two lanes merging back to a single lane in 800 ft. Vehicles speeding up in a two-lane section and then being required to remerge into one lane on a tight curve does not present a safe situation.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 45,069	—	$ 45,069
ALTERNATIVE	$ 0	—	$ 0
SAVINGS	$ 45,069	—	$ 45,069

Sketch
Alt. 2-4.1
Sht. 2 of 4



CALCULATIONS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: H-24.1

SHEET NO.: 3 of 4

Original Costs Saved:

Pavement Area: (24' − 18') = 6'
(24' Lane Ramp; 18' Single Lane)

$\frac{(6' \times 1{,}100')}{9\ sf/sy} = \frac{6{,}600\ sf}{9\ sf/sy} = 734\ s.y.$

Pavement Section Cost: $55.82/sy
(includes Asphalt & GAB)

COST WORKSHEET

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **H2-4.1**

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
Pavement Saved	SY	734	55.82	40,972			
Subtotal				40,972			
Markup (%) at 10.0%				4,097			
TOTAL				45,069			

VALUE ENGINEERING ALTERNATIVE

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **H2-4.2**

DESCRIPTION: **EXTEND THE TWO-LANE PORTION OF RAMP D**

SHEET NO.: **1 of 2**

ORIGINAL DESIGN: (sketch attached)

The current design has an 800 ft, two-lane section of loop Ramp D before merging to a single lane.

ALTERNATIVE: (sketch attached)

Extend the two-lane section of Ramp D an additional 900 ft to end in a "straight" alignment of Ramp D.

ADVANTAGES:

- Ramp capacity would increase with two lanes extended for 900 ft
- Two-lane to one-lane merge would be moved from the loop portion of the ramp to a "straight-away"

DISADVANTAGES:

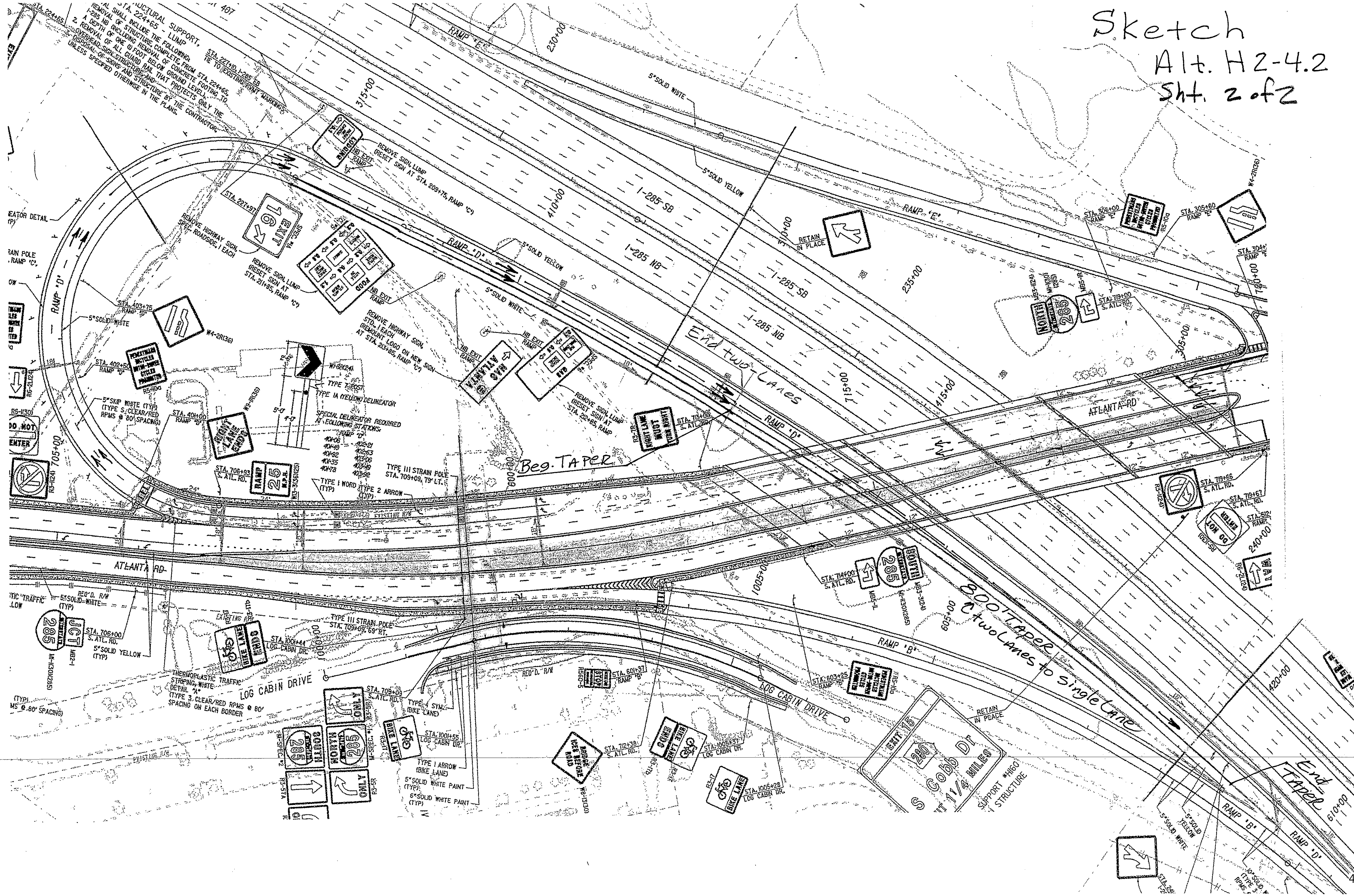
- Slightly more roadway cost (increase travel lanes from 20 ft to 24 ft)

DISCUSSION:

The current design proposes a two-lane loop (Ramp D). However, the two-lane section ends in the middle of the loop ramp and thus traffic would not merge very efficiently in the tight curve. It is recommended to extend the two-lane section an additional 900 ft and provide an 800 ft merge taper section "down" to one lane for Ramp D and before the merge with Ramp B. This would move the two-lane Ramp D end to 600 ft beyond the end of the loop portion of Ramp D. The cost for this improvement would be minimal since the actual increase in ramp width would only be an additional 4 ft (from 20 ft to 24 ft).

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

Sketch
Alt. H2-4.2
Sht. 2 of 2



VALUE ENGINEERING ALTERNATIVE

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **H2-5**

DESCRIPTION: **USE FILL BETWEEN I-285 AND THE WEST SIDE OF RAMP C IN LIEU OF MECHANICALLY STABILIZED EARTH WALL**

SHEET NO.: **1 of 5**

ORIGINAL DESIGN: (sketch attached)

The Ramp C cross-sections show the mechanically stabilized earth (MSE) retaining walls between Sta. 208+00 and Sta. 209+50 on both sides of the bridge.

ALTERNATIVE: (sketch attached)

Stop the retaining wall under the bridge and tie to the embankment on the west side, tying into the ditch that is shown.

ADVANTAGES:

- Saves costs
- Avoids having to install and maintain MSE walls

DISADVANTAGES:

- None apparent

DISCUSSION:

In the cross-section at Sta 208+00, the retaining wall shown is reflective of plan sheet 13-06. However, beyond 208+00, the cross-sections depict the retaining wall on both sides. This cannot be the case because of the ditch shown on the west side of the ramp.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 4,484,700	—	$ 4,484,700
ALTERNATIVE	$ 4,158,505	—	$ 4,158,505
SAVINGS	$ 326,195	—	$ 326,195

ALT. NO. H2-5 Sht. 2 of 5

CURVE DATA RAMP "C"

CURVE NO. KC 318
PI STA. 210+57.49
N 1396750.9680
E 2199401.3150
DELTA 62°39'58"
DEG 09°32'58"
RADIUS 600.00'
TAN 366.41'
LENGTH 657.89'
S.E. 0.08'/'
V 45 MPH

CURVE DATA RAMP "E"

CURVE NO. KC 320
PI STA. 312+98.60
N 1397459.8120
E 2199102.6610
DELTA 12°04'46"
DEG 05°50'
RADIUS 1850.00'
TAN 195.74'
LENGTH 390.03'
S.E. 0.046'/'
V 45 MPH

WALTON COMMUNITIES, LLC

CSX RAILROAD
STA. 1000+00.00

COLONIAL PIPE LINE CO.
C/O JOHN SAPP

PACIFIC VININGS WEST LLC

LLL 749
LLL 764
LLL 763

ASHTON ATLANTA RESIDENTIAL, LLC

COLONIAL PIPE LINE CO.

EXISTING R/W

CSX RAILROAD

I-285/SR 407
STA. 223+40.78-
STA. 1003+41.18
CSX RAILROAD

S 71°10'29" E

1000+00

225+00

230+00

PC 311+02.86

10' PAVED SHOULDER

4' PAVED SHOULDER

12' PAVED SHOULDER

CURVE KC 320

RAMP "E"

S 7°18'36" E

I-285 SB/SR 407

I-285 SB

I-285 NB/SR 407

I-285 NB

CURVE KC 313

PC 231+91.12

315+00

320+00

410+00

MATCH LINE STA. 220+00 I-285
SEE SHEET 13-05

MATCH LINE STA. 233+00 I-285
SEE SHEET 13-03

CURVE KC 318

RAMP "C"

STREAM 2

CSX RAILROAD

CURVE KC 341

RAMP "D"

N 11°28'34" W

CURVE KC 343

PT 407+06.65

PC 408+18.65

ESTHER LEWYN

PILOT TRAVEL CENTERS, LLC

MATCH LINE STA. 212+00 RAMP "C"
SEE SHEET 13-02

MATCH LINE STA. 405+00 RAMP "D"
SEE SHEET 13-02

MATCH LINE STA. 1008+00
CSX R.R.

@ RAMP "C"
STA. 210+57.17-
STA. 1005+78.64
CSX RAILROAD

Retaining Wall is shown on cross-sections. However it is not shown on the plans

Alternative No: H2-5

PROPERTY LINE
REQUIRED R/W LINE
CONSTRUCTION LIMITS
EASEMENT FOR CONSTR & MAINTENANCE OF SLOPES
EASEMENT FOR CONSTR OF SLOPES
EASEMENT FOR CONSTR OF DRIVES

BEGIN LIMIT OF ACCESS.....BLA
END LIMIT OF ACCESS.....ELA
LIMIT OF ACCESS
R/W AND LIMIT OF ACCESS
EXISTING R/W LINE

PBS&J

SCALE IN FEET

REVISION DATES

STATE OF GEORG
DEPARTMENT OF TRANSP
OFFICE: URBAN DESIGN
MAINLINE PL
I-285 @ CR 4519/ATLANTA
STA. 220+00 TO STA. 233+

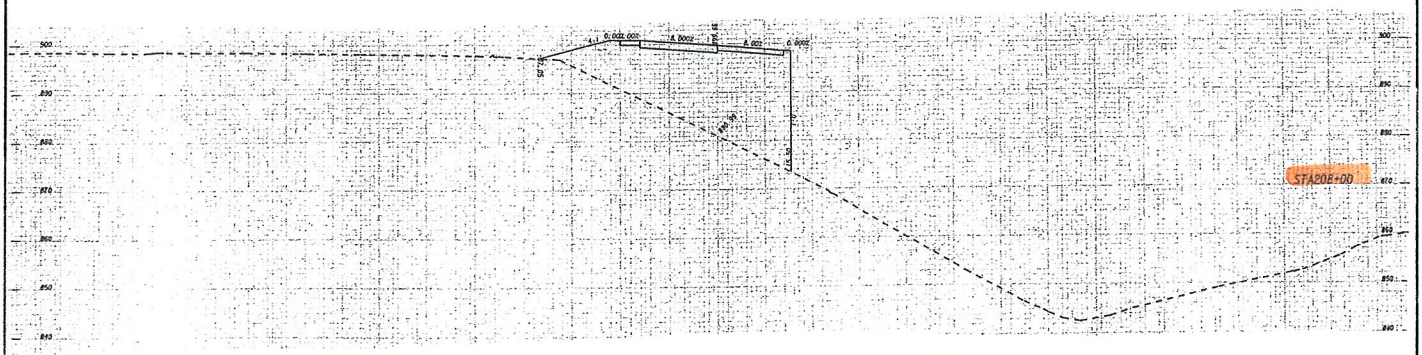
SKETCH

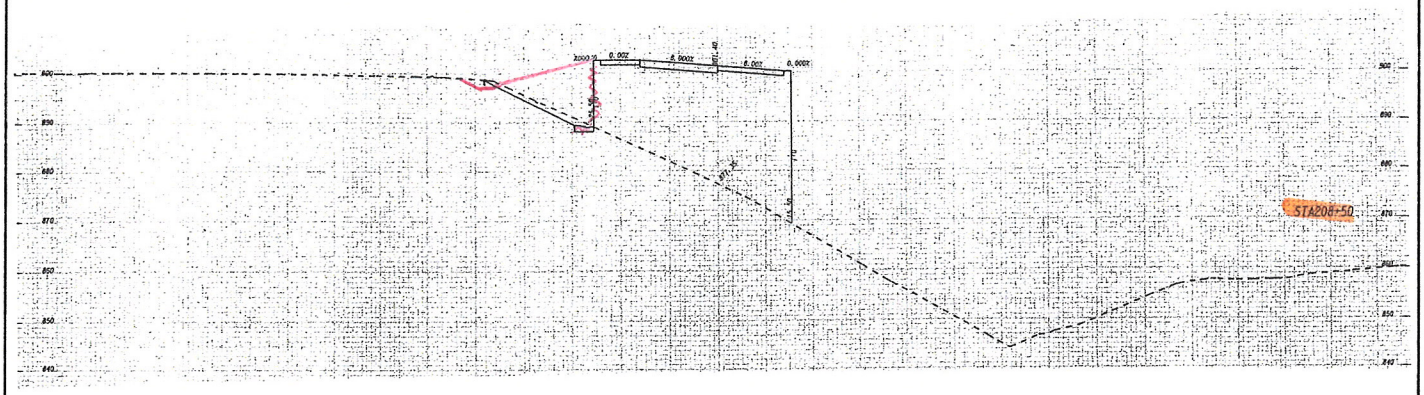
PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

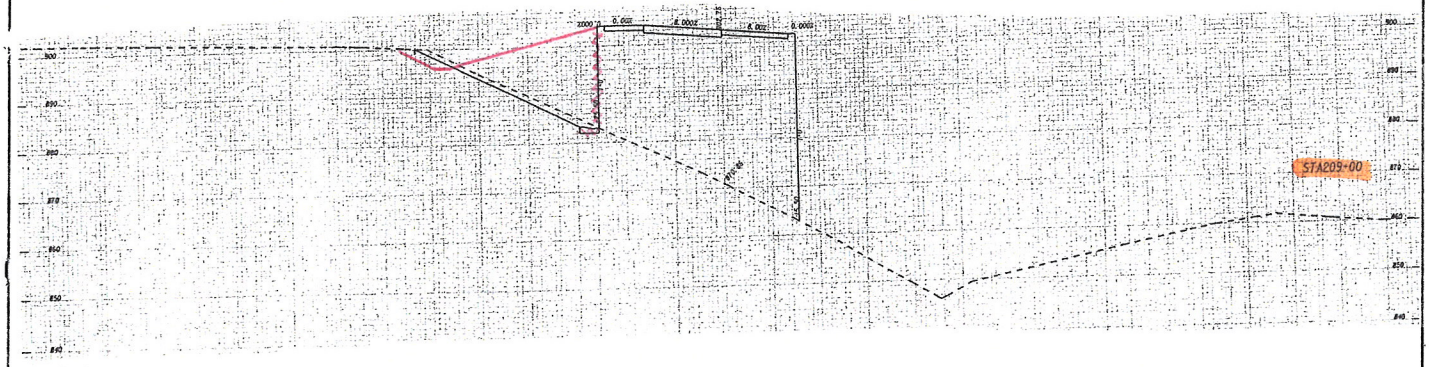
ALTERNATIVE NO.: A2-5

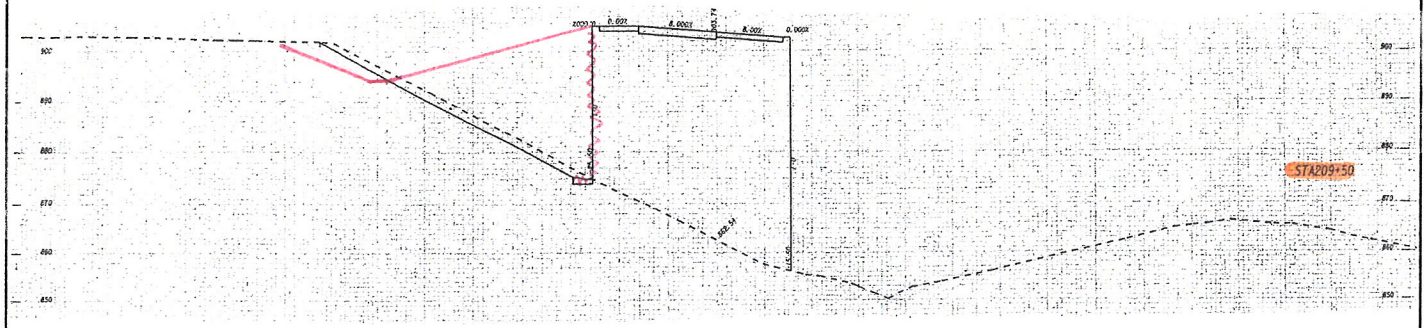
ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☐ BOTH ☒

SHEET NO.: 3 of 5









CALCULATIONS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: H2-5

SHEET NO.: 4 of 5

208+50 → $V = \frac{1}{3}bh$
$= \frac{1}{3}(13.5)(19.5)$
$= 87.75 cf \downarrow 15.69 cy$

209+00 → $V = \frac{1}{3}bh$
$= \frac{1}{3}(21)(29)$
$= 203 cf \downarrow 7.52 cy$

209+50 → $V = \frac{1}{3}bh$
$= \frac{1}{3}(31)(41)$
$= 423.67 cf \downarrow 15.69 cy$

38.9 cy

Wall height on east-side

13.5'

21'

31'

65.5' (height ranges)
× 100' (length)

6550 sf

COST WORKSHEET

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **H2-5**

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
Found Backfill	CY				39	4.45	174
MSE Walls	SF	90,000	45.30	4,077,000	83,450	45.30	3,780,285
Subtotal				4,077,000			3,780,459
Markup (%) at 10.0%				407,700			378,046
TOTAL				4,484,700			4,158,505

VALUE ENGINEERING ALTERNATIVE

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County

ALTERNATIVE NO.: **H2-6**

DESCRIPTION: **RAISE THE ATLANTA ROAD BRIDGE OVER I-285 TO AVOID HAVING TO LOWER THE COLONIAL PIPELINE**

SHEET NO.: **1 of 11**

ORIGINAL DESIGN: (Sketch attached)

The new Atlanta Road Bridge over I-285 is designed to closely match the existing profile of the existing bridge. When I-285 is expanded to 10 lanes in each direction, the new 5-lane collector-distributor (CD) northbound section on the outside of the existing roadway will have to be constructed lower than the existing lanes in order to go under the new bridge. This will necessitate lowering the existing Colonial Pipeline to obtain cover over the pipes.

ALTERNATIVE: (Sketch attached)

Raise the Atlanta Road Bridge profile on the east side sufficiently so that the new northbound I-285 CD lanes will be above the existing pipeline. Build the new CD lanes with a bifurcated median barrier so that the west side of the new lanes is higher than the east side of the existing lanes and high enough to provide adequate cover over the existing Colonial Pipeline. Raise the profiles of Ramps B and D to match the profile of Atlanta Road and the profile of Ramp D to also provide sufficient cover over the Colonial Pipeline.

ADVANTAGES:

- Saves costs
- Avoids having to lower the Colonial Pipeline
- Reduces the earth cut for Ramp D
- Simplifies construction and saves time
- Avoids coordination with Colonial Pipeline company

DISADVANTAGES:

- When reconstructing Atlanta Road east of the bridge, in Phase I it will be necessary to install steel sheet piling on both sides of the existing roadway so that vehicles can ride above the existing grade on both sides until the grades on both sides are raised
- Requires some additional fill on Ramp B where it meets Atlanta Road
- Must provide temporary ramps during construction

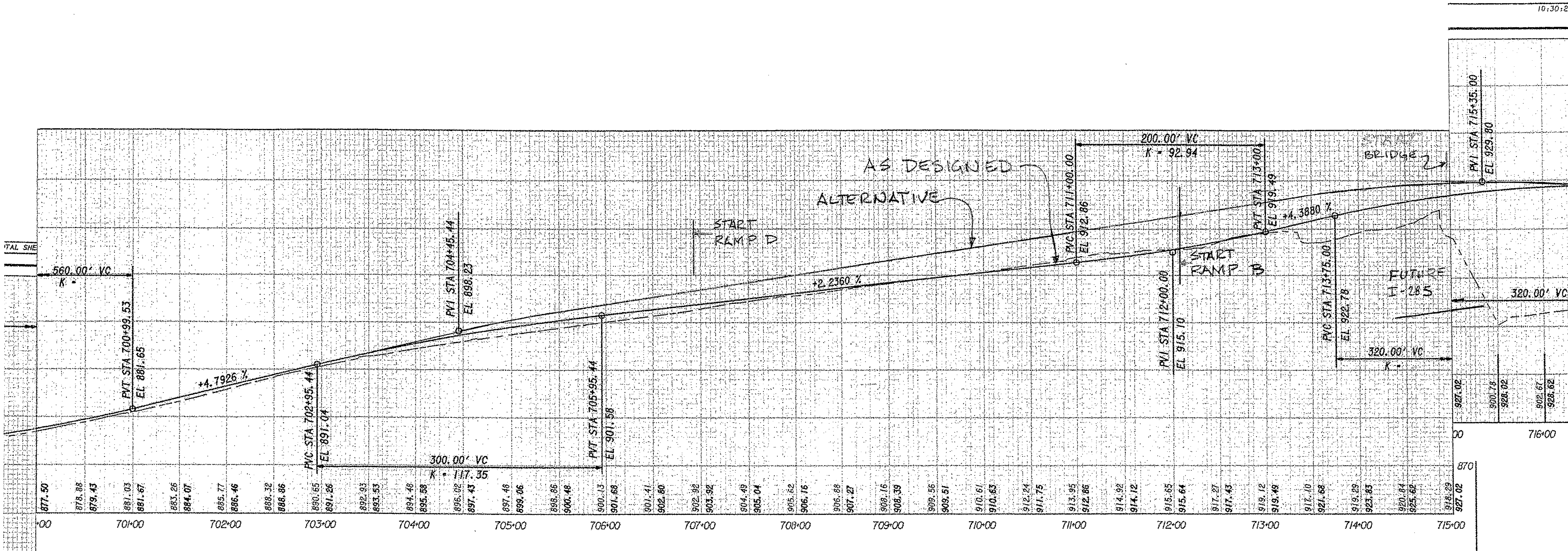
DISCUSSION:

It is anticipated that it will cost about $2 million to lower the Colonial Pipeline so that the new Ramp D and future I-285 CD lanes can be constructed with sufficient clearance under the Atlanta Road Bridge. By adjusting the Atlanta Road Bridge profile east of the center pier so that Ramp D and the future I-285 CD lanes can be constructed with adequate clearance over the pipeline, then the pipeline can remain in place and significant costs and construction time can be saved.

This alternative will necessitate staging the Atlanta Road construction and making accommodations for raising the road east of the bridge. Included in this is the addition of sheet piling between the existing eastbound and westbound lanes of Atlanta Road. It is believed that the amount of extra fill material for Ramp B will be offset by the reduction in cut material for Ramp D.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 2,200,000	—	$ 2,200,000
ALTERNATIVE	$ 594,000	—	$ 594,000
SAVINGS	$ 1,706,000	—	$ 1,706,000

ALT. NO.
H2-6
Sht. 2 of 11



REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN

MAINLINE PROFILE

I-285 @ CR 4519/ATLANTA RD.
CR 4519/ATLANTA RD.
STA 685+87.44 TO STA 715+00.00

PBS&J

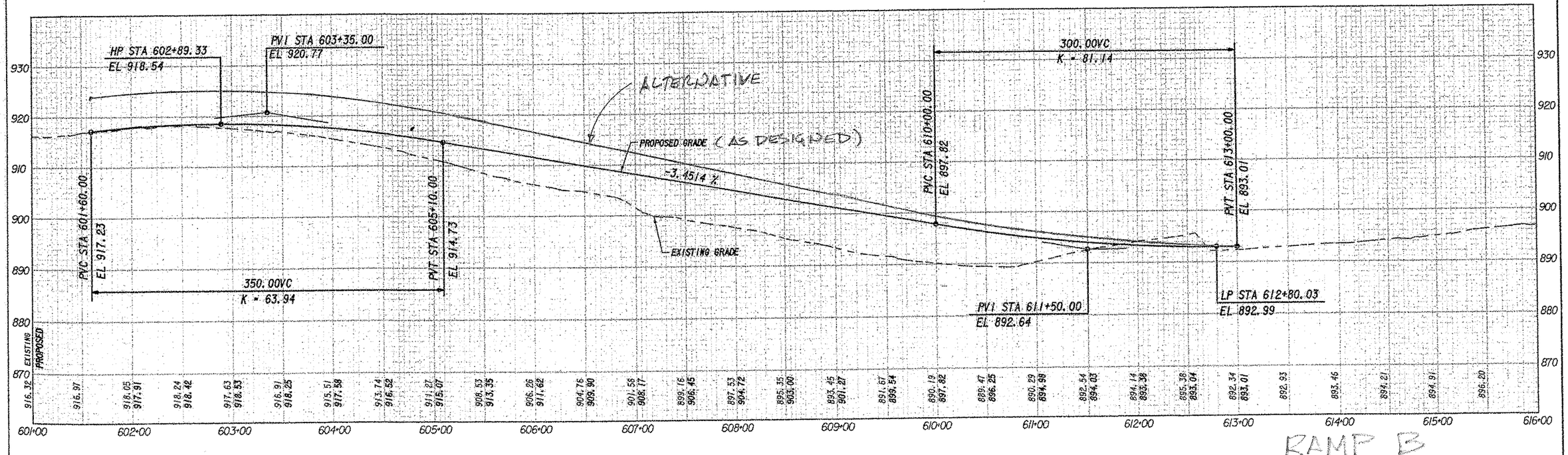
DRAWING No. 16-01

ATLANTA ROAD

08-MAY-2009 10:31
USER:13494
10:31:52 AM
W:\TransDesign\IPLOT\colortables\OCE600.tbl
W:\TransDesign\IPLOT\pentables\HP5si_hs.pen
h:\COBB\1285_ATL RD\DGN\752300PR_RAMPB.DGN[1-64]

COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
COBB	STP00-0222-01(001)		

ALT. NO. 2-6
SHT 3 of 11



RAMP B

PBS&J

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

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN

MAINLINE PROFILE

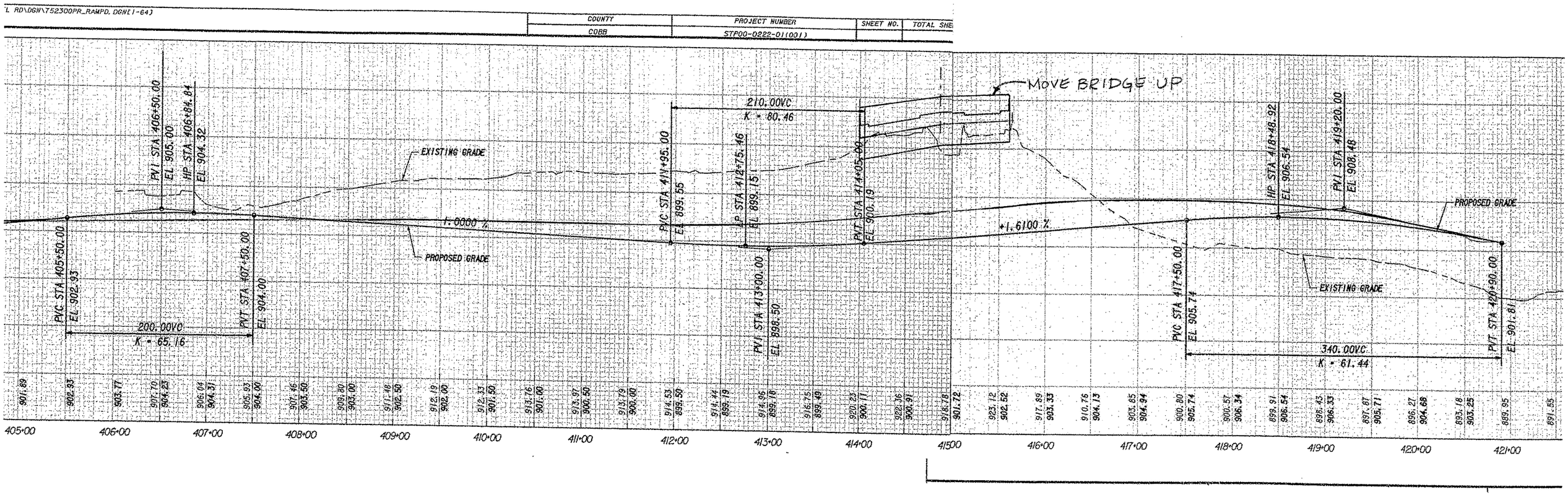
I-285 @ CR 4519/ATLANTA RD.
RAMP "B"
STA 601+60.00 TO STA 613+00.00

DRAWING No. 16-01

ALT. NO.
H2-G
SHT. 4 of 11

L RD\DGN\752300PR_RAMPD. DGN(1-64)

COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHE
COBB	STP00-0222-01(001)		

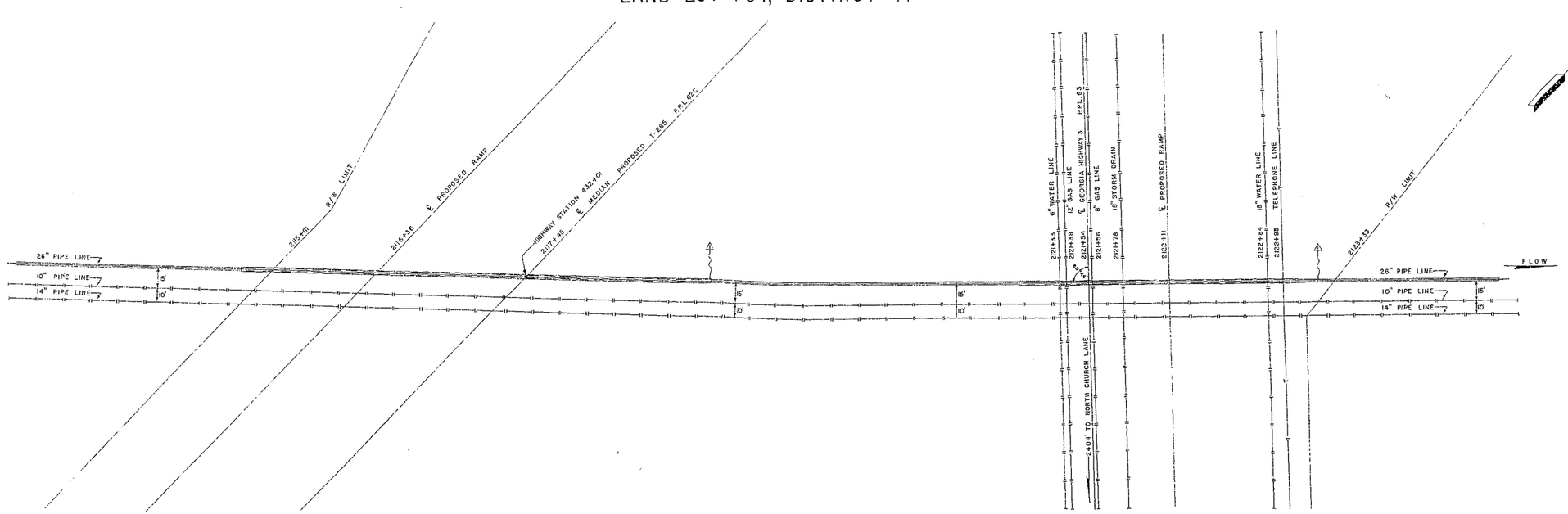


RAMP D
PROFILE

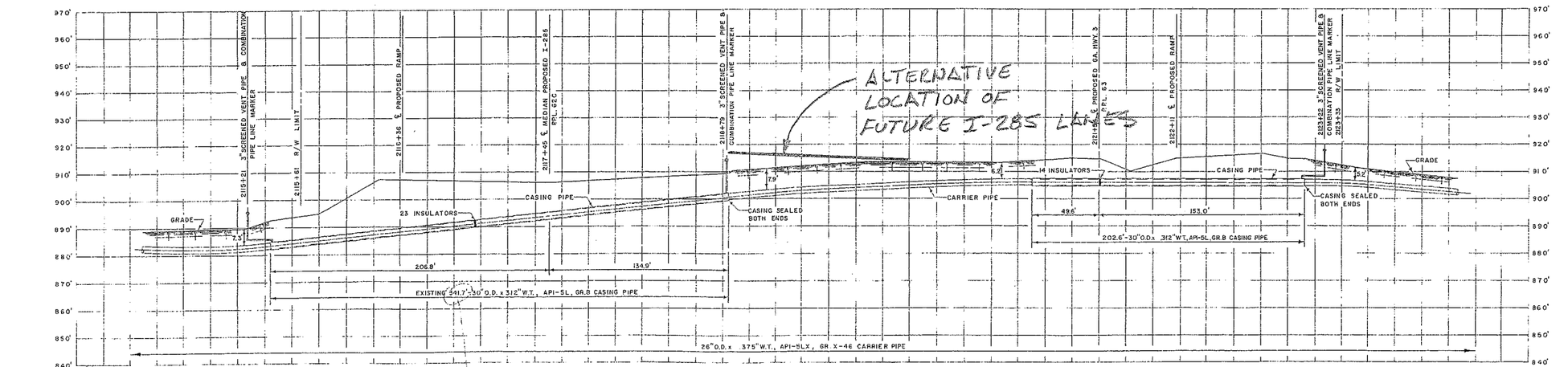
ALT. NO. H2-6

Sht. 5 of 11

COBB COUNTY, GEORGIA
LAND LOT 764, DISTRICT 17



PLAN
SCALE: 1"=40'



PROFILE
SCALE: HORIZ. 1"=40'
VERT: 1"=20'

55.4' V.P., 3" STD. BLK.
57 INSULATORS
4 CRADLES
4 SEALS

REFERENCES:
ALIGNMENT MAP NO. D-117.10
CONSTRUCTION DWG NO. D-TC-RX-5
FIELD BOOK NO. F6-B-09
PAGES 16, 17, 18, 19, 20, 21 & 22

331.7'

SECTION 6-B BREMEN TO DORAVILLE

PLANTATION PIPE LINE COMPANY
ATLANTA, GEORGIA

26" PIPE LINE
CROSSING PPL-62-C INTERSTATE HWY. 285
COBB COUNTY, GEORGIA

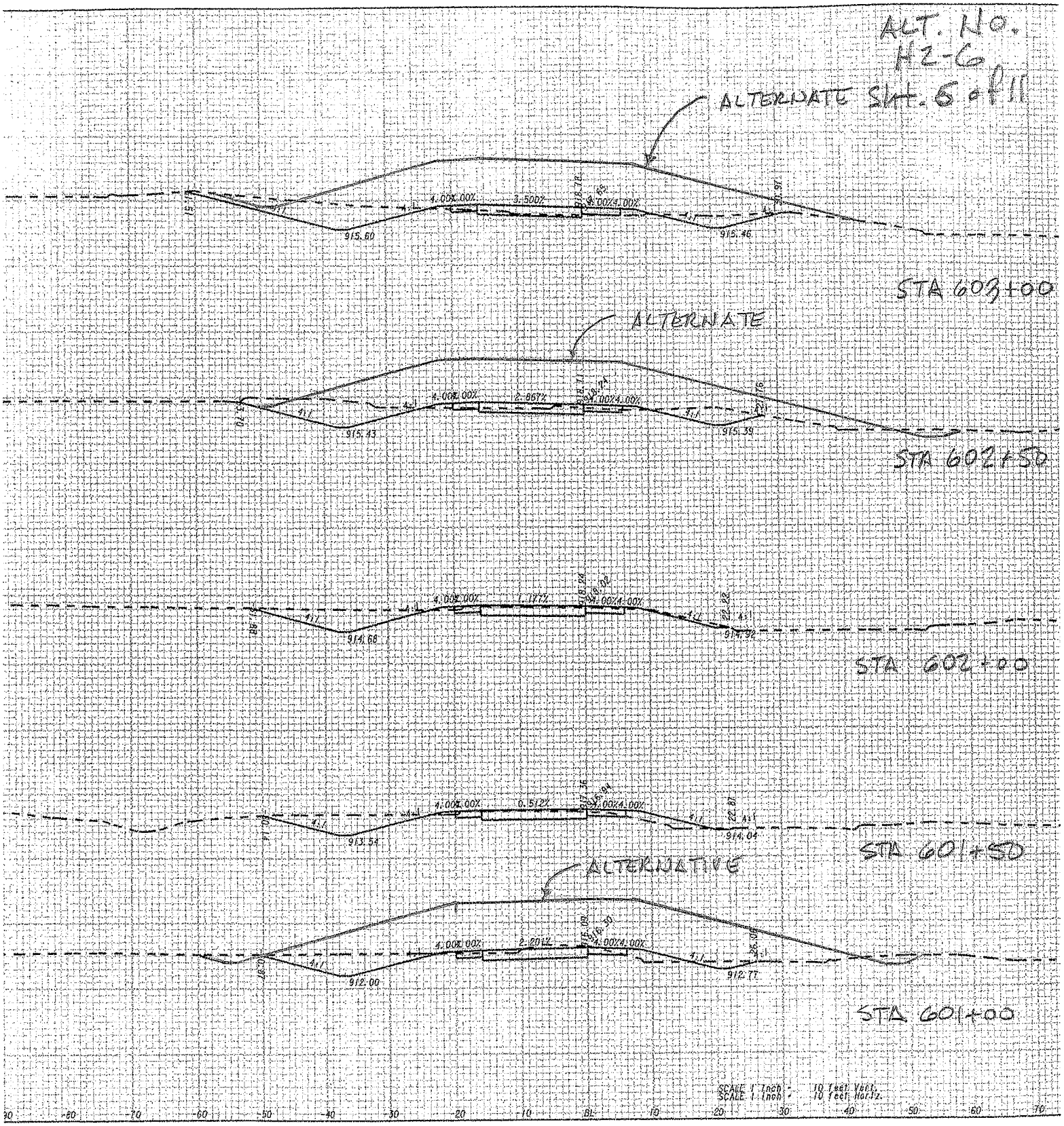
NO.	DATE	DRAWN	CHECKED	DESCRIPTION	APP.
2	10-16-75	EALEY		CHANGED SHEET NUMBER	
1	4-9-74	WTB	[illegible]	No. Changed From D-6-217.10	

REVISIONS

SCALE SHOWN DATE 11-19-68
DRAWN F. B. B. D. TRACED
CHECKED [illegible]
APPROVED
APPROVED

D-217.10-2
SHEET 2 OF 3

ALT. NO. H2-6



RAMP B

PBS&J

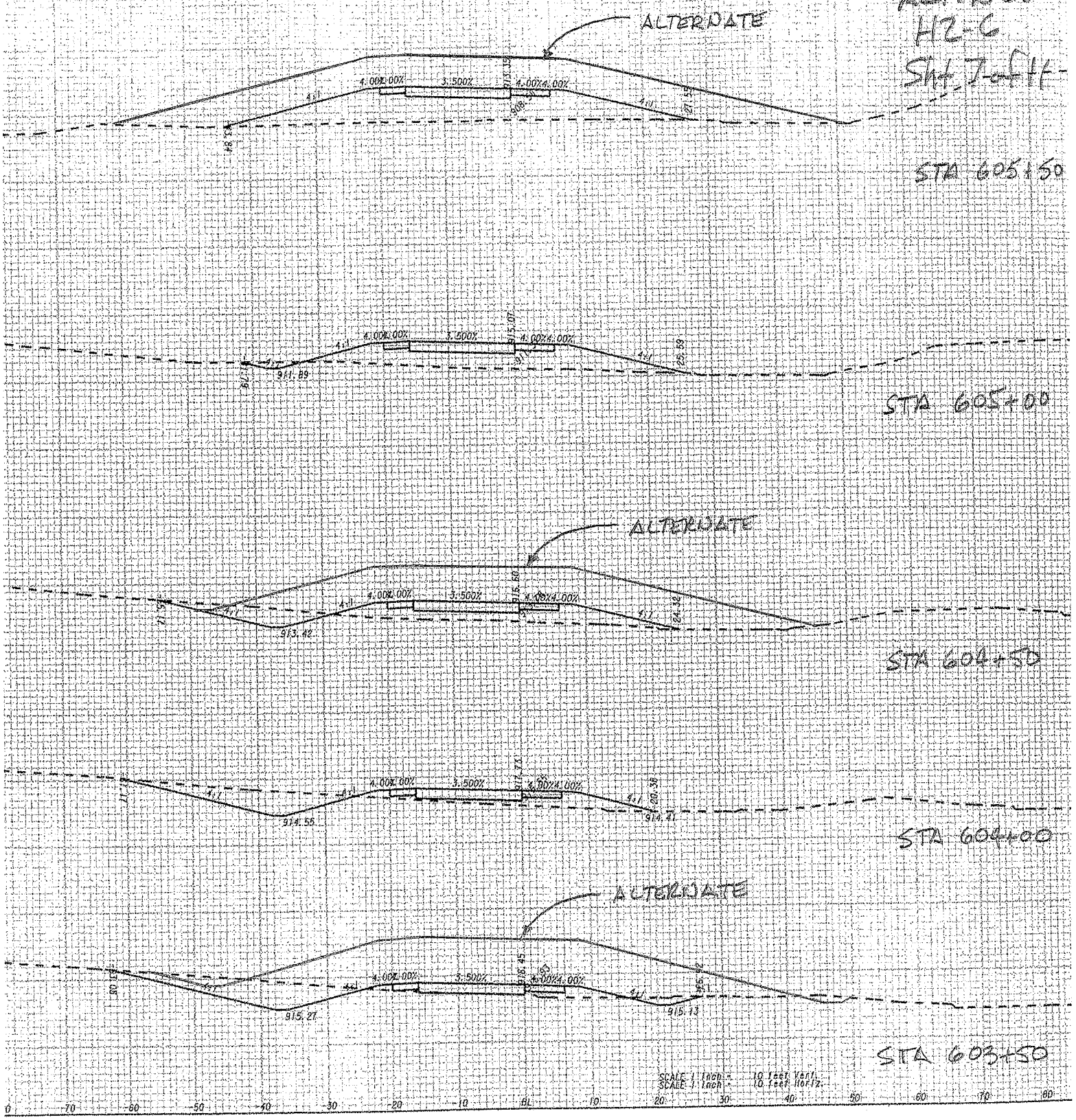
H. 0 10 20 30
V. 0 10 20 30

REVIS

H:\COBB\1285_ATL RD\DGN\752300XS_RAMPB.DGN[I-64]

COUNTY
COBB

ACT. NO.
HZ-C
Sht 7 of 11



RAMP B

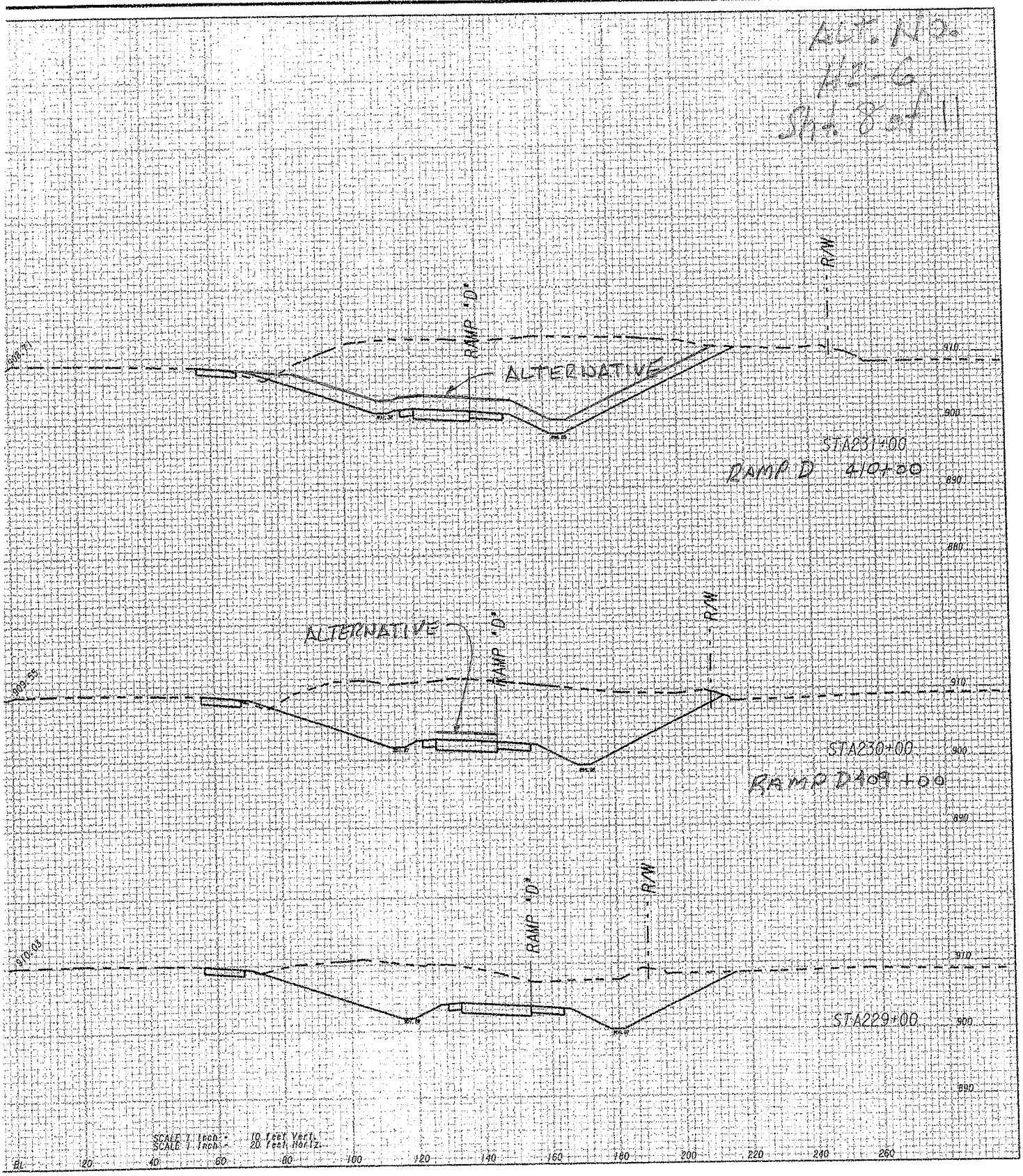
PBS&J

REVISION DATE

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

COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
COBB	STP00-0222-01(001)		

ALT. NO. 2
EE-6
Sht. 8 of 11



RAMP D

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN

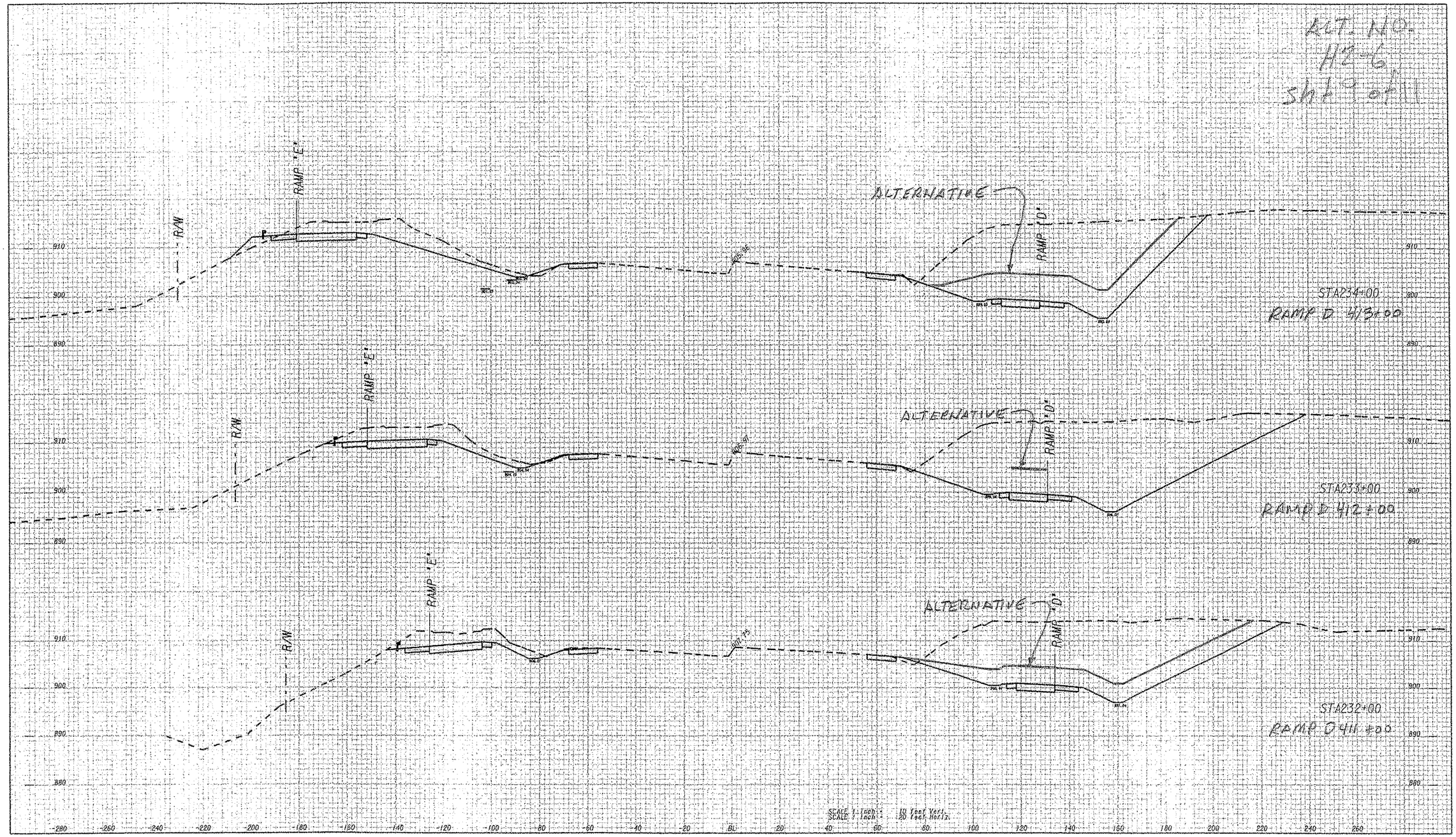
EARTHWORK CROSS SECTIONS

I-285 @ CR 4519/ATLANTA RD.

DRAWING No. 23-

COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
COBB	STP00-0222-01(001)		

ALT. HP-6
HP-6
sht 2 of 2



RAMP D

PBS&J

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

REVISION DATES		

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN

EARTHWORK CROSS SECTIONS

I-285 @ CR 4519/ATLANTA RD.

DRAWING No. 23-

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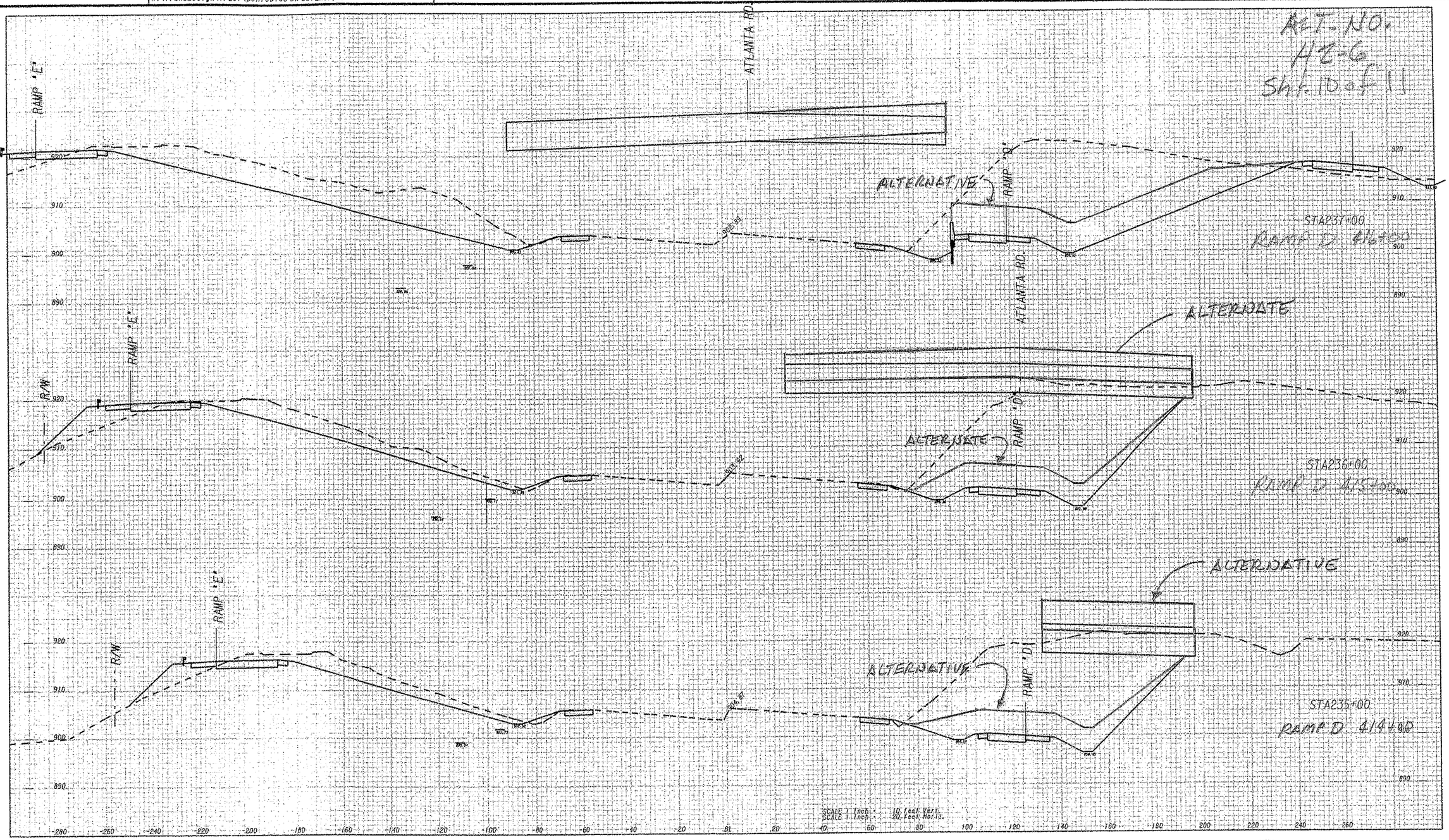
COUNTY	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
COBB	STP00-0222-01(001)		

RET. NO. HE-6
Sht. 10 of 11



RAMP D

PBS&J

(SCALE IN FEET)

REVISION DATES

STATE OF GEORGIA
DEPARTMENT OF TRANSPORTATION
OFFICE: URBAN DESIGN

EARTHWORK CROSS SECTIONS

I-285 @ CR 4519/ATLANTA RD.

DRAWING No. 23-

COST WORKSHEET

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County

ALTERNATIVE NO. **H2-6**

SHEET NO. **11 of 11**

CONSTRUCTION ITEM		ORIGINAL ESTMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Lower the Colonial Pipeline	LS	1	2,000,000	2,000,000			
Sheet Piling	SF				21,600	25.00	540,000
Sub-total				2,000,000			540,000
Mark-up at 10.00%				200,000			54,000
TOTAL				2,200,000			594,000

SUMMARY OF POTENTIAL COST SAVINGS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County

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
ALL WORK IN ALTERNATE 4						
A4-1	Save the warehouse by providing access at a signalized intersection with Brownwood Lane	$3,782,000	$127,074	$3,654,926		$3,654,926
A4-2	Build Atlanta Road Bridge over I-285 as two spans with the capability of being expanded to four spans when I-285 is expanded to 10 lanes in each direction	$4,599,287	$2,962,479	$1,636,808		$1,636,808
A4-3	Use part of existing northbound exit ramp to Atlanta Road for new exit ramp	$241,697	$17,116	$224,581		$224,581

VALUE ENGINEERING ALTERNATIVE

PROJECT:	**I-285 @ CR 4519/ATLANTA ROAD** ***Cobb County***	ALTERNATIVE NO.:	**A4-1**
DESCRIPTION:	**ALTERNATIVE DESIGN 4 - SAVE WAREHOUSE BY RETAINING DRIVE ACCESS (AT INTERSECTION WITH ATLANTA ROAD/BROWNWOOD LANE)**	SHEET NO.:	**1 of 4**

ORIGINAL DESIGN: (Sketch attached)

The current design extends the limits of access in the interchange's southeast quadrant past the driveway for City Electric Supply.

ALTERNATIVE: (Sketch attached)

Provide access to City Electric Supply by retaining its existing drive and provide a median opening for a signalized intersection on Atlanta Road and Brownwood Lane.

ADVANTAGES:

- Saves right-of-way cost
- Drive could also provide access to future surplus right-of-way property
- Provides unlimited access for Brownwood Lane to Atlanta Road

DISADVANTAGES:

- Provides only 800 ft of access from northbound exit ramp right turn gore (1000 ft is desirable)

DISCUSSION:

Retaining the access to this property would save significant right-of-way costs. The current median opening is spaced 1,100 ft from the northbound ramp terminal median opening.

The proposed median opening with a signalized intersection for the driveway and Brownwood Lane on the opposite side of Atlanta Road would be about 800 ft from the ramp terminal median opening. This is slightly less than the recommended 1,000 ft spacing, but still acceptable for traffic signal spacing.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 3,782,000	—	$ 3,782,000
ALTERNATIVE	$ 127,073	—	$ 127,073
SAVINGS	$ 3,654,927	—	$ 3,654,927

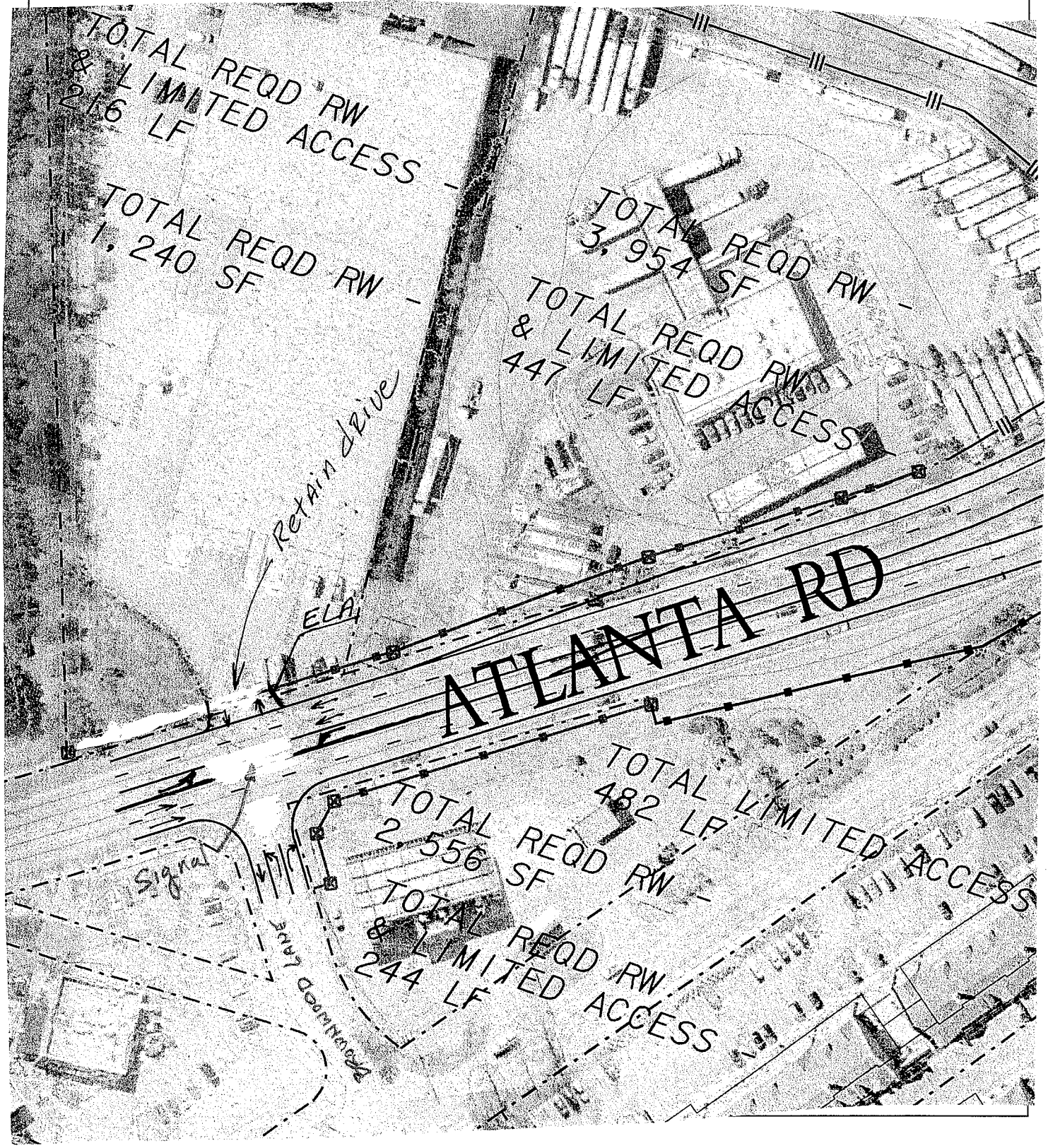
SKETCH

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: A-4-1

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☒ BOTH ☐

SHEET NO.: 2 of 4



CALCULATIONS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: A4-1

SHEET NO.: 3 of 4

SAVE ACCESS (Alternate Design 4) to WAREHOUSE

R/W Saved by retaining drive to City Electric / Total Supply (Esther Lewyn).

$3,810,000 × .4 (40%) = $1,509,000 ± ←
↑ Improvements from GDOT R/W Estimate
↑ for this property.

Relocation Cost Saved $25,000.

Alt. Cost for two left turn Lanes at Median Openings (for overlay)

$\left(14' \times \left(300' + \frac{100'}{2}\right) \times 2 \text{ Lanes}\right) / 9 \text{ sf/sy} = 1089 \text{ s.y.}$

Overlay Pavement Cost:

$165 \text{ Lbs/sy} \times \frac{T}{2{,}000 \text{ Lbs}} \times \$65.01/T = \$5.07/\text{sy}$ ←
↑ from GDOT estimate

COST WORKSHEET

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **A4-1**

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
Right-of-Way saved	EA	1	1,500,000.00	1,500,000			
Right-of-Way relocation	EA	1	25,000.00	25,000			
Signal	LS				1	110,000.00	110,000
Overlay for two left-turn lanes	SY				1,089	5.07	5,521
Right-of-Way Subtotal				1,525,000			
Right-of-Way markup (1.48)				2,257,000			
Construction Subtotal							115,521
Markup (%) at 10.0%							11,552
TOTAL				3,782,000			127,073

VALUE ENGINEERING ALTERNATIVE

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **A4-2**

DESCRIPTION: **BUILD ATLANTA ROAD BRIDGE SO THAT IT CAN BE LENGTHENED AT BOTH ENDS IN THE FUTURE**

SHEET NO.: **1 of 6**

ORIGINAL DESIGN: (sketch attached)

The original design for the Atlanta Road bridge over I-285 is a 504.4-ft-long, prestressed concrete beam bridge and 118.42 ft wide. The bridge spans over eight lanes on I-285, proposed Ramp D and future expansion lanes including five collector-distributor and five through lanes in each direction.

ALTERNATIVE: (sketch attached)

Provide a shorter bridge that will span over eight lanes only without the future lanes. The total length of the bridge will be about 250 ft. In the future, the proposed end bents will be converted to intermediate bents to accommodate additional lanes. Mechanically stabilized earth walls will be used along the end bents to retain soil.

ADVANTAGES:

- Fewer intermediate bents
- Reduces construction time
- Reduces cost

DISADVANTAGES:

- Future expansion will be more costly because of maintenance of traffic requirements

DISCUSSION:

A shorter bridge will reduce the construction cost by $1,636,808. The benefit to this approach is that it is unknown when or if I-285 will be expanded to ten lanes in each direction. If the probability of this occurring is greater than 10 years, then constructing extra structure that will provide no benefit for traffic operations for 10 or more years does not provide good value. In fact, constructing the extra span now costs more because it must be inspected and maintained and its useful life will be reduced.

The cost analysis is based on a bridge cost of $70/sf. However, it is believed that the bridge cost will more likely by $95/sf, especially considering that the bridge will have to be constructed in phases, which will have to be tied together. If the actual bridge is closer to $95/sf, then the cost savings could increase to about $2.465 million.

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 4,599,287	—	$ 4,599,287
ALTERNATIVE	$ 2,962,479	—	$ 2,962,479
SAVINGS	$ 1,636,808	—	$ 1,636,808

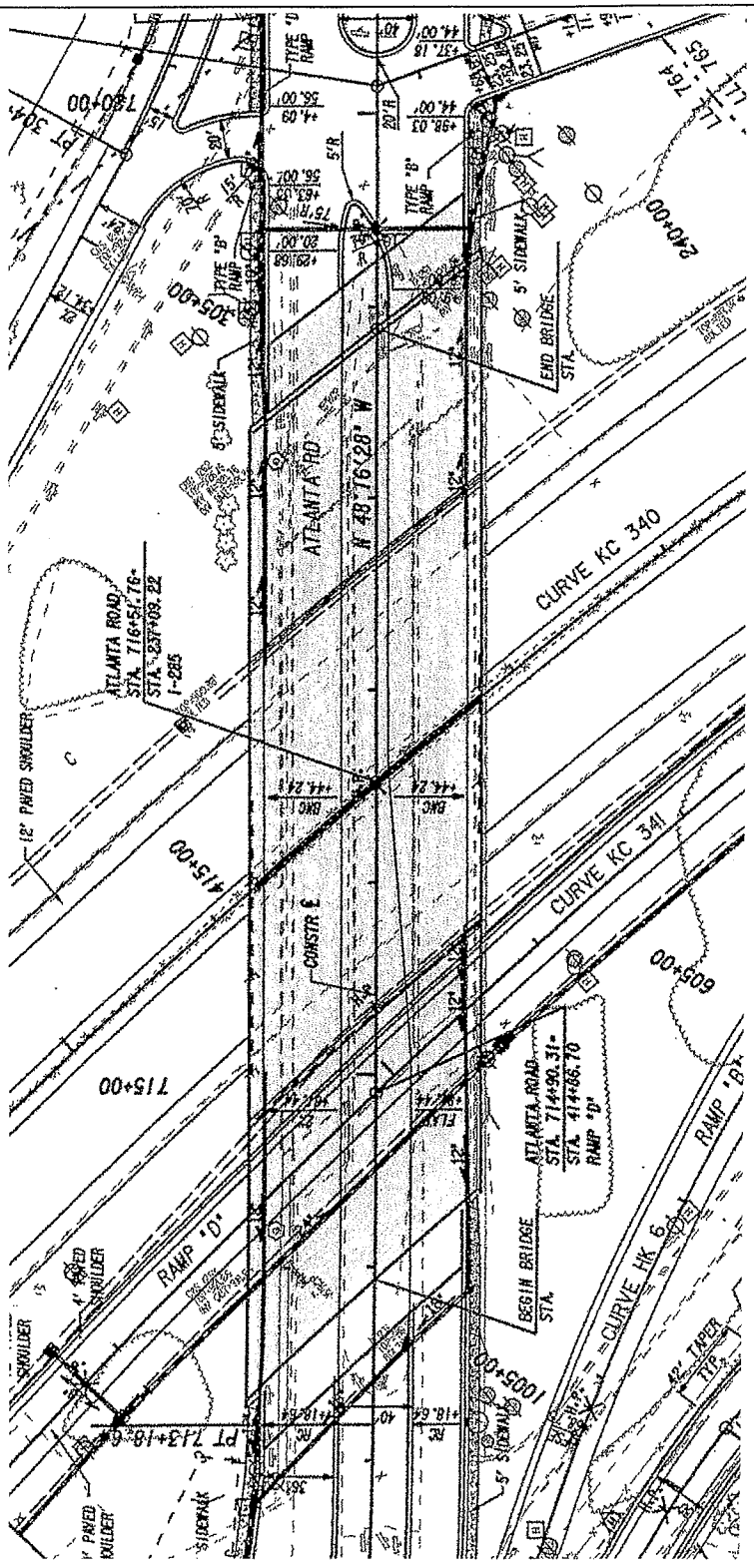
SKETCH

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: A4-2

ORIGINAL DESIGN ☑ ALTERNATIVE DESIGN ☐ BOTH ☐

SHEET NO.: 2 of 6



ORIGINAL DESIGN

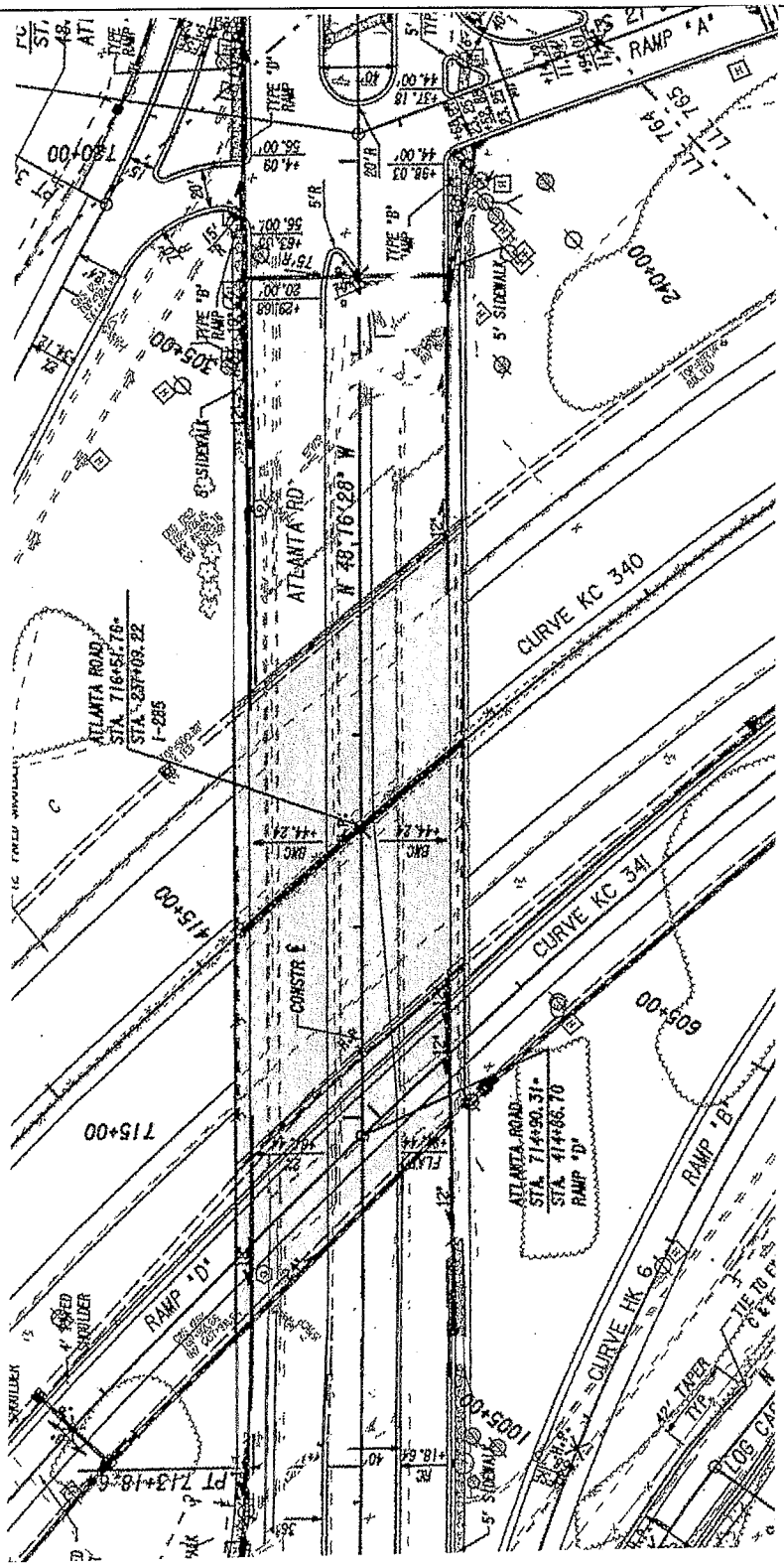
SKETCH

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: A4-2

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☑ BOTH ☐

SHEET NO.: 3 of 6



ALTERNATIVE DESIGN

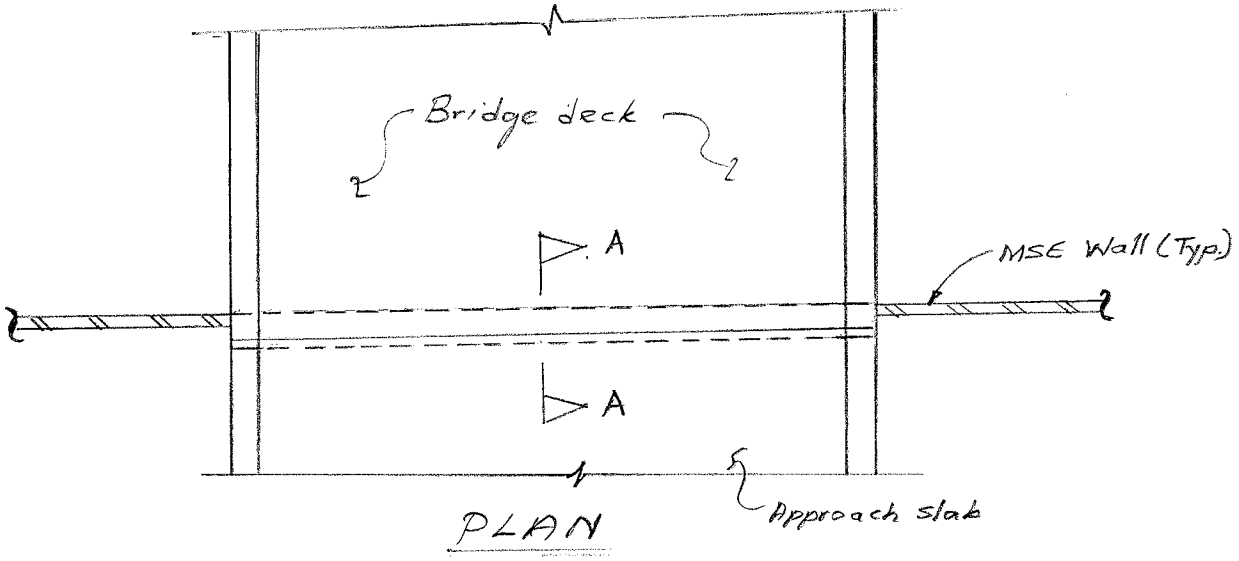
SKETCH

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

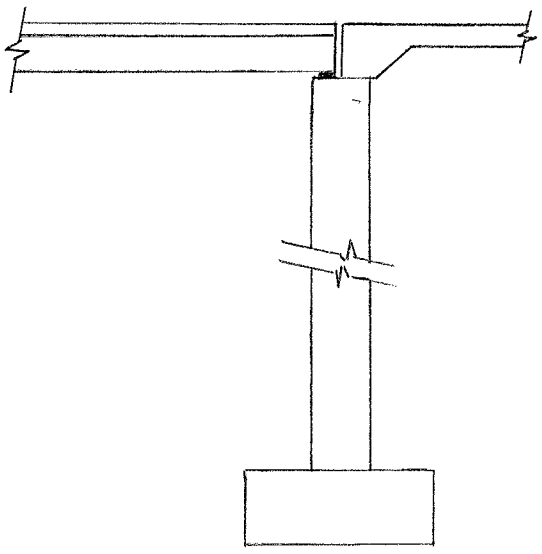
ALTERNATIVE NO.: A4-2

ORIGINAL DESIGN ☐ ALTERNATIVE DESIGN ☑ BOTH ☐

SHEET NO.: 4 of 6



PLAN



SECTION A-A

CALCULATIONS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: A4-2

SHEET NO.: 5 of 6

Original Design

Deck surface = 504.4' * 118.42'
= 59,731 sf.

Alternative Design

Deck surface = 250' * 118.4167'
= 29,604 sf.

Pavement = 1/9 * 254.40' * 116'
= 3,279 sy.

MSE Walls = 4 ea * 1/2 * 254.40' * 19'
= 9,667 sf

COST WORKSHEET

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **A4-2**

SHEET NO.: **6 of 6**

PROJECT ITEM		ORIGINAL ESTIMATE			PROPOSED ESTIMATE		
ITEM	UNITS	NO. OF UNITS	COST/ UNIT	TOTAL	NO. OF UNITS	COST/ UNIT	TOTAL
Deck surface	SF	59,731	70.00	4,181,170	29,604	70.00	2,072,280
Pavement	SY				3,279	55.80	182,968
MSE Walls	SF				9,667	45.30	437,915
Subtotal				4,181,170			2,693,163
Markup (%) at 10.0%				418,117			269,316
TOTAL				4,599,287			2,962,479

VALUE ENGINEERING ALTERNATIVE

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **A4-3**

DESCRIPTION: **RETAIN A PORTION OF THE EXISTING NORTHBOUND EXIT RAMP TO ATLANTA ROAD**

SHEET NO.: **1 of 4**

ORIGINAL DESIGN: (sketch attached)

The current design for Design Alternate 4 proposes to completely rebuild the northbound exit ramp to Atlanta Road.

ALTERNATIVE: (sketch attached)

Retain the deceleration and gore portion of the existing northbound exit ramp.

ADVANTAGES:

- Reduces construction cost
- Saves widening I-285 bridge over CSX right-of-way for the northbound exit ramp

DISADVANTAGES:

- Slightly shorter deceleration lane

DISCUSSION:

The existing deceleration lane for the northbound exit ramp is and acceptable design and could be retained. Save this portion of the ramp since it will be replaced under the future expansion of I-285 anyway. Any redesign of the ramp in the vicinity of I-285 will be obsolete in the future. The portion to be retained is concrete pavement

COST SUMMARY	INITIAL COST	PRESENT WORTH RECURRING COSTS	PRESENT WORTH LIFE-CYCLE COST
ORIGINAL DESIGN	$ 241,696	—	$ 241,696
ALTERNATIVE	$ 17,116	—	$ 17,116
SAVINGS	$ 224,580	—	$ 224,580

Sketch Alt. 4-3
Sht. 2 of 4

Retain exist. Ramp to this point.

Begin building "new" RAMP.

Do not Rebuild this portion of "new Ramp.

TOTAL REQD RW & LIMITED ACCESS - 216 LF

TOTAL REQD RW - 1,240 SF

TOTAL REQD RW - 3,954 SF

TOTAL REQD RW & LIMITED ACCESS - 447 LF

ATLANTA RD

TOTAL LIMITED ACCESS

CALCULATIONS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: A 4-3

SHEET NO.: 3 of 4

Costs Saved if portion of the NB Exit Ramp is Saved/Retained.

Pavement Area: $\frac{(550' \times \frac{40'}{2}) + (200' \times 16') + (200' \times 18')}{9 sf/sy} =$

$= 1,980$ s.y

Unit Price for full-depth Ramp Pavement

(12.5mm mix) $(165 Lbs/sy \times \frac{T}{2000 lbs} \times \$65.01/Tn) = \$5.36/sy$

(19mm mix) $(220 Lbs/sy \times \frac{T}{2000 lbs} \times \$65.42/Tn) = \$7.20/sy$

(25mm mix) $(880 Lbs/sy \times \frac{T}{2000 Lbs} \times \$62.07/Tn) = \$27.31/sy$

10" (GAB) $= \$15.95/sy$

(Pavement section) Total $= \$55.82/sy$

Bridge (I-285) Widening over CSX R/R Saved:

$12' \times 130' = 1,560$ s.f. of bridge saved.

Alt. Cost to overlay Retained portion of Ramp (Retain Concrete portion) (if necessary)

$\frac{(500' \times \frac{40'}{2}) + (16 \times 250')}{9 sf/sy} = 1,556$ sy

COST WORKSHEET

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

ALTERNATIVE NO.: **A4-3**

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
Northbound exit ramp costs saved							
Pavement saved	SY	1,980	55.82	110,524			
Bridge saved	SF	1,560	70.00	109,200			
Overlay and preparation	SY				1,556	10.00	15,560
Subtotal				219,724			15,560
Markup (%) at	**10.0%**			21,972			1,556
TOTAL				241,696			17,116

PROJECT DESCRIPTION

The STP00-0222-01(001) I-285 @ CR 4519/Atlanta Road project in Cobb County expands the existing I-285 @ Atlanta Road interchange to enhance the level of service of the diamond ramps to and from I-285 and Atlanta Road. Atlanta Road east of the interchange has two lanes in each direction and west of the interchange has three lanes in each direction. However, the bridge over I-285 consists of two, two-lane bridges separated by about 30 ft. The third lanes on the west side of the bridge are part of the diamond ramps. Atlanta Road left turn movements to the ramps cause vehicle backups on the bridge and beyond, which limits the ability of all vehicles to travel through the area. Congestion in the area also results in higher than average collisions.

The preferred alternative for improving interchange operations through year 2030, labeled Alternative 2, rebuilds the bridge over I-285 with three eastbound lanes, a 40-ft-wide raised concrete median that narrows to provide two through westbound lanes and a left turn lane to the southbound I-285 ramp. The new bridge will have four spans to allow I-285 to be expanded from four lanes in each direction to 10 lanes in each direction, five collector-distributor lanes under the exterior bridge spans and five through lanes under the interior spans. The outside lane in the eastbound direction will expand to two lanes and form a loop for the northbound I-285 on-ramp. Before the loop goes under the outer span of the new Atlanta Road bridge it will re-compress to one lane.

The northbound I-285 off-ramp to Atlanta Road will start south of the existing ramp, diverge from I-285 and bridge over the CSX railroad while curving northeast before the loop ramp to connect to Atlanta Road with one dedicated right turn lane and two left turn lanes. A signalized intersection will be provided. To accommodate the two ramps, a warehouse building and a truck stop will have to be acquired. Opposing the ramp terminal will be Brownwood Lane with right-in/right-out movements to westbound Atlanta Road and a left turn into Brownwood Lane from a left turn lane on eastbound Atlanta Road; the left turn from Brownwood Lane to Atlanta Road will be prohibited.

The Atlanta Road westbound to I-285 northbound ramp will consist of a slip ramp from Atlanta Road connecting to the loop ramp from eastbound Atlanta Road before merging into one lane. This lane will continue as an I-285 auxiliary lane to connecting to the exit ramp to East Paces Ferry Road to the north. To allow for the new slip ramp, a portion of Log Cabin Drive will be moved slightly to the southeast

The new I-285 southbound entry ramp will start as two lanes, one a slip ramp from eastbound Atlanta Road and one a short connection for the left turns from westbound Atlanta Road. The two lanes will merge into one lane before connecting with I-285, requiring the widening of the existing I-285 bridge over the CSX railroad.

The southbound exit ramp will be attached to a new I-285 auxiliary lane starting at the end of the southbound entry ramp from East Paces Ferry Road to the north. At the signalized intersection with Atlanta Road, there will be two dedicated right turn lanes separated by an island and two left turn lanes. To prepare for the expansion of I-285 and accommodate the new auxiliary lanes, the existing Orchard Road bridge to the north of Atlanta Road will be replaced with a new four-span bridge.

Traffic will be detoured to allow the existing bridge to be demolished and the new bridge constructed.

Five-foot-wide sidewalks will be constructed on both sides of Atlanta Road for the length of the project. Noise walls will be provided along most of the reconstructed portions of I-285. Mechanically stabilized earth retaining walls will be used to limit the extent of the construction where necessary.

The project is estimated to cost $21.9 million for construction and $11.6 million for right-of-way. No construction start date has been established.

In addition to Alternative 2, there is an Alternative 4 which also appears to be viable. This alternative builds creates a compressed diamond interchange with a new four-span, six-lane bridge for Atlanta Road over I-285 and diamond ramps. The auxiliary lanes between this interchange and the East Paces Ferry Road interchange remain as well as the Orchard Bridge Replacement. This alternative has a construction cost of $18.6 million and a right-of-way cost of $11.1 million including restricting access to Atlanta Road for 1,000 feet from the northbound exit ramp off I-285 merge point with Atlanta Road.

Concept drawings for the two alternatives follow.

www.aaadi.com

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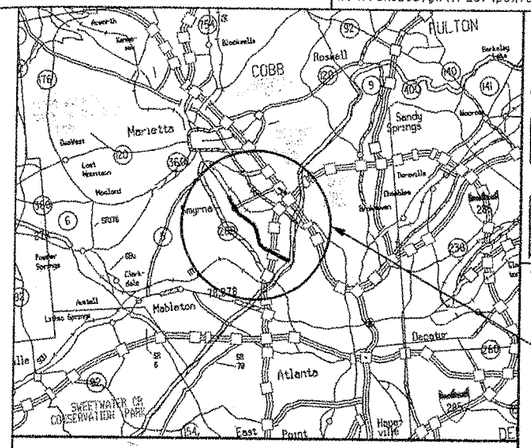
GRWCOV

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA	STP00-0222-01(001)		

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

PLAN AND PROFILE OF PROPOSED
I-285 @ CR 4519/ATLANTA ROAD
COBB COUNTY
FEDERAL AID PROJECT

FEDERAL ROUTE * 285
STATE ROUTE * 407
P.I.NO. 752300



LOCATION SKETCH

DESIGN DATA: AASHTO 2004
TRAFFIC A.D.T.: (2012)
TRAFFIC A.D.T.: (2032)
TRAFFIC D.H.V.: (2032)
DIRECTIONAL DIST:
% TRUCKS:
24 HR.TRUCKS %:
SPEED DESIGN:

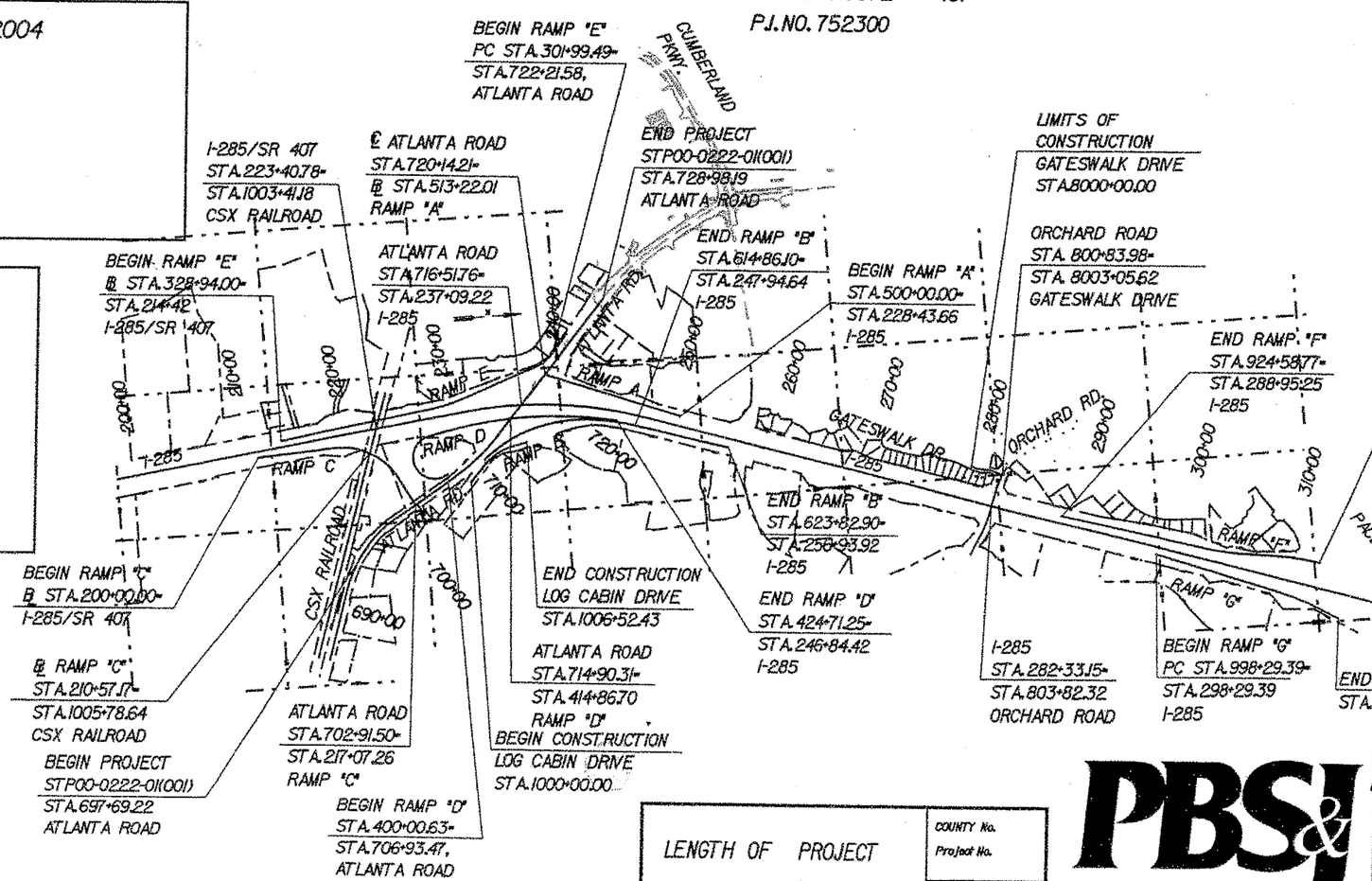
LOCATION & DESIGN APPROVAL DATE:

FUNCTIONAL CLASS:

THIS PROJECT IS 100% IN COBB COUNTY AND IS 100% IN CONG.DIST.NO.11.

PROJECT DESIGNATION:
DESIGNED IN ENGLISH UNITS.

THIS PROJECT HAS BEEN PREPARED USING THE HORIZONTAL GEORGIA COORDINATE SYSTEM OF 1964 (NAD 1983)/94 WEST ZONE, AND THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.



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PREPARED BY: _____
DESIGN

RECOMMENDED FOR SUBMISSION BY: _____
DESIGN

SUBMITTED BY: _____
STATE DESIGN ENGINEER

DATE CHIEF ENGINEER

LENGTH OF PROJECT	COUNTY No. / Project No. / MILES
NET LENGTH OF ROADWAY	
NET LENGTH OF BRIDGES	
NET LENGTH OF PROJECT	
NET LENGTH OF EXCEPTIONS	
GROSS LENGTH OF PROJECT	

PBS&J

SCALE IN FEET
0 1000 2000 4000

PLANS COMPLETED	- -
REVISIONS	

THE DATA, TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS OR IN ANYWAY INDICATED THEREBY, WHETHER BY DRAWINGS OR NOTES, OR IN ANY OTHER MANNER, ARE BASED UPON FIELD INVESTIGATIONS AND ARE BELIEVED TO BE INDICATIVE OF ACTUAL CONDITIONS. HOWEVER, THE SAME ARE SHOWN AS INFORMATION ONLY, ARE NOT GUARANTEED, AND DO NOT BIND THE DEPARTMENT OF TRANSPORTATION IN ANY WAY. THE ATTENTION OF BIDDER IS SPECIFICALLY DIRECTED TO SUBSECTIONS 102.04, 102.05, AND 104.03 OF THE SPECIFICATIONS.

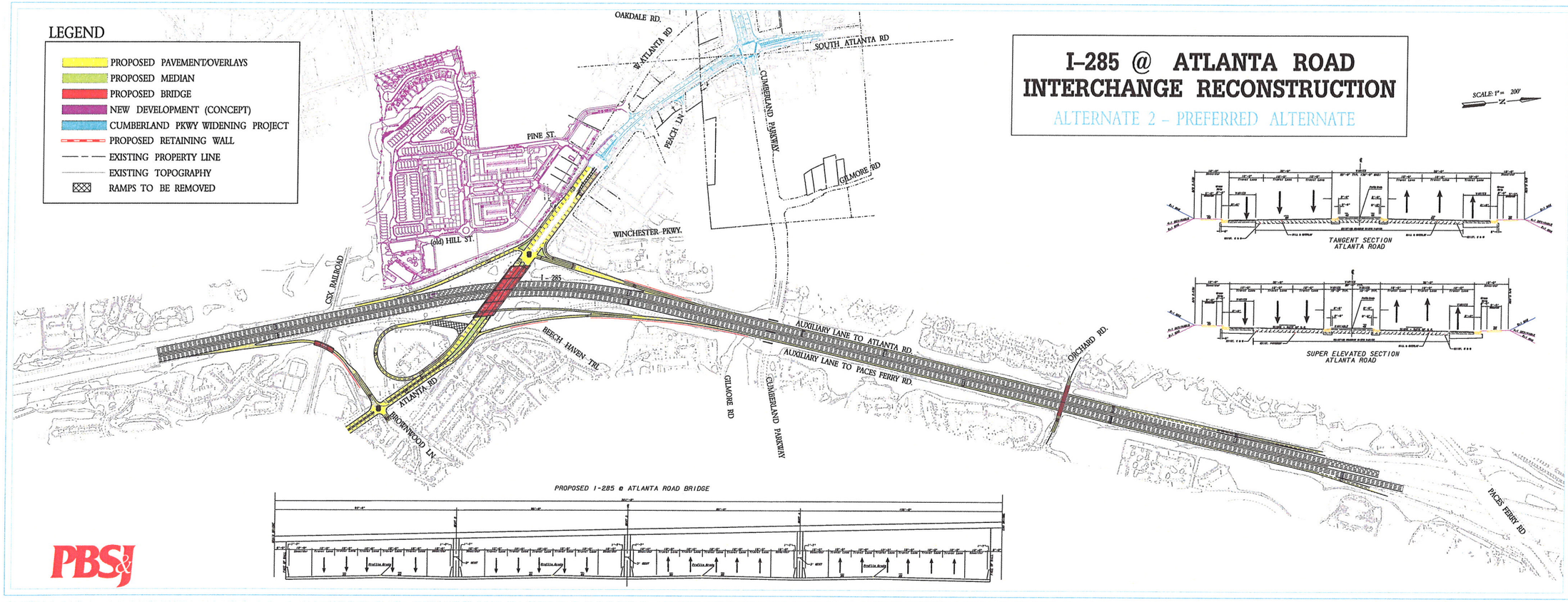
I-285 @ ATLANTA ROAD INTERCHANGE RECONSTRUCTION

ALTERNATE 2 – PREFERRED ALTERNATE

SCALE: 1" = 200'

LEGEND

- PROPOSED PAVEMENT/OVERLAYS
- PROPOSED MEDIAN
- PROPOSED BRIDGE
- NEW DEVELOPMENT (CONCEPT)
- CUMBERLAND PKWY WIDENING PROJECT
- PROPOSED RETAINING WALL
- EXISTING PROPERTY LINE
- EXISTING TOPOGRAPHY
- RAMPS TO BE REMOVED



TANGENT SECTION
ATLANTA ROAD

SUPER ELEVATED SECTION
ATLANTA ROAD

PROPOSED I-285 @ ATLANTA ROAD BRIDGE

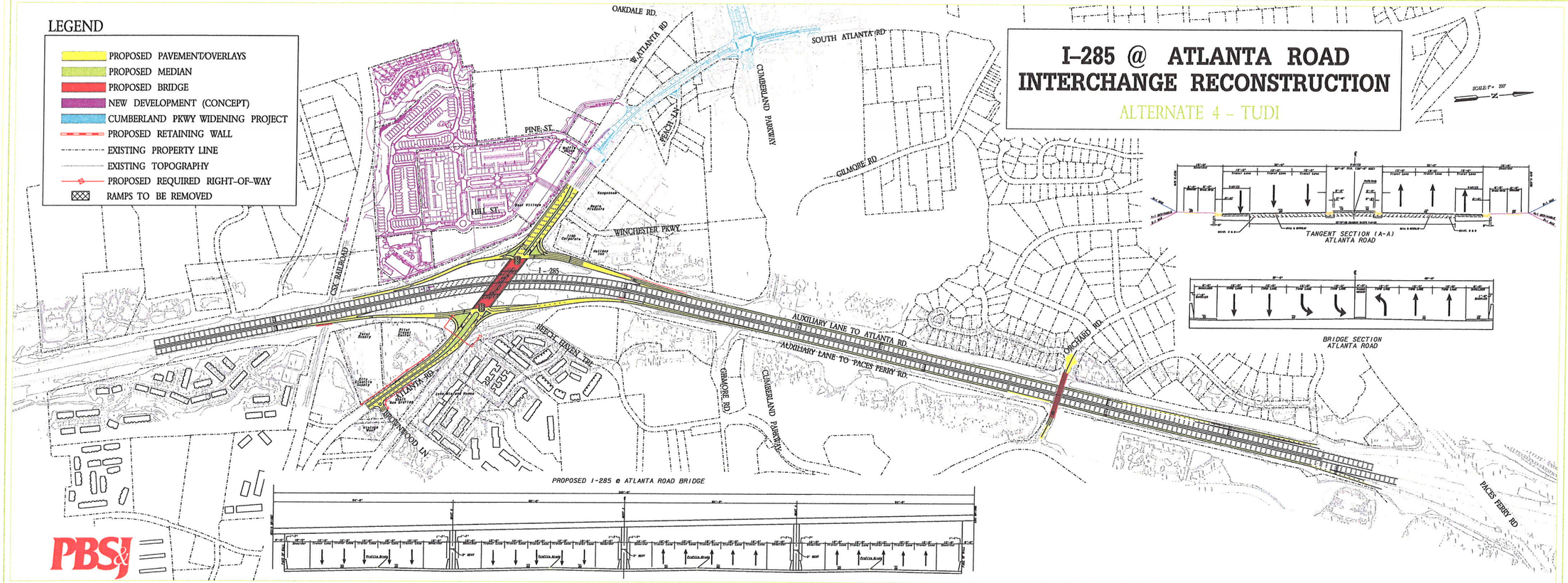
PBS&J

I-285 @ ATLANTA ROAD INTERCHANGE RECONSTRUCTION

ALTERNATE 4 - TUDI

LEGEND

- PROPOSED PAVEMENT/OVERLAYS
- PROPOSED MEDIAN
- PROPOSED BRIDGE
- NEW DEVELOPMENT (CONCEPT)
- CUMBERLAND PKWY WIDENING PROJECT
- PROPOSED RETAINING WALL
- EXISTING PROPERTY LINE
- EXISTING TOPOGRAPHY
- PROPOSED REQUIRED RIGHT-OF-WAY
- RAMPS TO BE REMOVED



TANGENT SECTION (A-A)
ATLANTA ROAD

BRIDGE SECTION
ATLANTA ROAD

PROPOSED I-285 @ ATLANTA ROAD BRIDGE

PBS&J

VALUE ANALYSIS AND CONCLUSIONS

GENERAL

This section describes the value analysis (VA) procedure used during the VE study on the I-285 @ CR 4519/Atlanta Road interchange reconstruction facilitated by Lewis & Zimmerman Associates, Inc., for Cobb County, Georgia. The workshop was performed June 1 – 4, 2009, in GDOT's Central Office in Atlanta, Georgia. PBS&J, Inc. has been selected by Cobb County to assist with the development of the project and has provided information for the VE team to use as the basis of the study.

A systematic approach was used in the VE study, which is divided into three parts: (1) Preparation Effort, (2) Workshop Effort, and (3) Post-Workshop Effort. A task flow diagram outlining each of the procedures included in the VE study is attached for reference.

Following this description of the VA procedure, separate narratives and supporting documentation identify the following:

- VE workshop participants
- Economic data
- Cost model
- Function analysis
- Creative ideas and evaluations

PREPARATION EFFORT

Preparation for the workshop consisted of scheduling workshop participants and tasks and gathering necessary project documents for team members to review before attending the workshop. These documents, listed below, were used as the basis for generating VE alternatives and for determining the cost implications of the selected VE alternatives:

- Project Concept Report, Project Number: STP00-0222-01(001), County Cobb, P.I. Number: 752300 I-285 @ CR4519/Atlanta Road, prepared by PBS&J Inc.
- Plan and Profile of Proposed I-285 @ CR 4519/Atlanta Road Cobb County, dated 5/11/09, prepared by PBS&J, Inc.
- Interchange Modification Report South Atlanta Road at I-285 Cobb County, Georgia, dated June 2007, prepared by PBS&J, Inc.
- Estimate Report for File "Atlanta Road_I-285_2008-06-01_2008_09-04," prepared by PBS&J, dated 9/4/2008
- Soil Survey Summary for I-285 @ Atlanta Road Interchange Cobb County, Georgia, dated December 10, 2008, prepared by S&ME, Inc. for PBS&J, Inc.
- Preliminary – Right of Way Cost Estimate, prepared by GDOT

Information relating to the project's purpose and need, owner concerns, project stakeholder concerns, design criteria, project constraints, funding sources and availability, regulatory agency approval requirements, and the project's schedule and costs is very important as it provides the VE team with insight about how the project has progressed to its current state.

Project cost information provided by the designers is used by the VE team as the basis for a comparative analysis with similar projects. To prepare for this exercise, the VE team leader used the cost estimate prepared by PBS&J to develop a cost model for the project. The model was used to distribute the total project cost among the various elements or functions of the project. The VE team used this model to identify the high-cost elements or functions that drive the project and the elements or functions providing little or no value so that the team could focus on reducing or eliminating their impact.

VALUE ENGINEERING WORKSHOP EFFORT

The VE workshop was a 3-1/2-day effort beginning with an orientation/kickoff meeting on Monday, June 1, 2009, and concluding with the final VE Presentation on Thursday, June 4, 2009. During the workshop, the VE Job Plan was followed in compliance with Federal Highway Administration guidelines for conducting a VE study. The Job Plan guided the search for alternatives to mitigate or eliminate high-cost drivers, secondary functions providing little or no value, and potential project risks. Alternatives to specifically address the owner's project concerns and enhance value by improving operations, reducing maintenance requirements, enhancing constructability, and providing missing functions were also considered. The Job Plan includes six phases:

- Information Phase
- Function Identification and Analysis Phase
- Creative/Speculation Phase
- Evaluation Phase
- Development Phase
- Presentation Phase

Information Phase

At the beginning of the study, the decisions that have influenced the project's design and proposed construction methods have to be reviewed and understood. For this reason, the workshop began with a presentation of the project by PBS&J, Inc. to the team. The presentation highlighted the information provided in the documentation reviewed by the VE team before the workshop and expanded on it to include a history of the project's development and any underlying influences that caused the design to develop to its current state. During this presentation, VE team members were given the opportunity to ask questions and obtain clarification about the information provided.

Function Identification and Analysis Phase

Having gained some information on the project, the VE team proceeded to define the functions provided by the project, identifying the costs to provide these functions, and determining whether the value provided by the functions has been optimized. 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. Elements performing support functions add cost to the project but have a relatively low worth to the basic function.

Function is defined as the intended use of a physical or process element. The team attempted to identify functions in the simplest manner using measurable noun/verb word combinations. To accomplish this, the team first looked at the project in its entirety and randomly listed its functions, which were recorded on Random Function Analysis Worksheets (provided in the Function Identification and Analysis section). Then the individual function(s) of the major components of the project depicted on the cost model were identified.

After identifying the functions, the team classified the functions according to the following:

Abbreviation	Type of Function	Definition
HO	Higher Order	The primary reason the project is being considered or project goal.
B	Basic	A function the must occur for the project to meet its higher order functions.
S	Secondary	A function that occurs because of the concept or process selected and may or may not be necessary.
R/S	Required Secondary	A secondary function that may not be necessary to perform the basic function but must be included to satisfy other requirements or the project cannot proceed.
G	Goal	Secondary goal of the project.
O	Objective	Criteria to be met.
LO	Lower Order	A function that serves as a project input.

Higher order and basic functions provide value, while secondary functions tend to reduce value. The goal of the next job phase is to reduce the impact of secondary functions and thereby enhance project value.

To further clarify the impact of the various functions, the team assigned costs to provide the functions or group of functions indicated by a specific project element using the cost estimate and cost model(s). Where possible, they seek to find the lowest cost, or worth, to perform the function. This is accomplished using published data from other sources or team knowledge obtained from working on other similar projects to establish cost goals and then comparing them to the current costs. By identifying the cost and worth of a function or group of functions, cost/worth ratios were calculated. Cost/worth ratios greater than one indicated that less than optimum value was being provided. Those project functions or elements with high cost/worth ratios became prime targets for value improvement.

As well as looking at areas with high cost/worth ratios, the team used the cost model(s) previously prepared to seek out the areas where most of the project funds are being applied. Because of the absolute magnitude of these high-cost elements or functions, they also became initial targets for value enhancement.

Overall, these exercises stimulated the VE team members to focus on apparently low value areas and initially channel their creative idea development in these places.

Creative/Speculation Phase

This VE study phase involved the creation and listing of ideas. Starting with the functions or project elements with high cost/worth ratios, a high absolute cost compared to other elements in the project, and secondary functions providing little or no value and using the classic brainstorming technique, the VE team began to generate as many ideas as possible to provide the necessary functions at a lower total life cycle cost, or to improve the quality of the project. Ideas for improving operation and maintenance, reducing project risk, and simplifying constructability were also encouraged. At this stage of the process, the VE team was looking for a large quantity of ideas and free association of ideas. A Creative Idea Listing worksheet was generated and organized by the function or project element being addressed.

GDOT and the PBS&J team may wish to review these creative lists since they may contain ideas that were not pursued by the VE team but can be further evaluated for potential use in the design.

Evaluation Phase

Since the goal of the Creative/Speculation Phase was to conceive as many ideas as possible without regard for technical merit or applicability to the project goals, the Evaluation Phase focused on identifying those ideas that do respond to the project value objectives and are worthy of additional research and development before being presented to the owner. The selection process consisted of the VE team evaluating the ideas originated during the Creative/Speculation Phase based on Cobb County and GDOT's value objectives identified through conversations. Based on the team's understanding of the owner's value objectives, each idea was compared with the present design concept, and the advantages and disadvantages of each idea were discussed.

How well an idea met the design criteria was also reviewed. Based on the results of these reviews, the VE team rated the idea by consensus using a scale of 1 to 5, with 5 or 4 indicating an idea with the greatest potential to be technically sound and provide cost savings or improvements in other areas of the project, 3 indicating an idea that provides marginal value but could be used if the project was having budget problems, 2 indicating an idea with a major technical flaw, and 1 indicating an idea that does not respond to project requirements. Generally, ideas rated 4 and 5 are pursued in the next phase and presented to the owner during the Presentation Phase.

The team also used the designation "DS" to indicate a design suggestion, which is an idea that may not have specific quantifiable cost savings but may reduce project risk, improve constructability, help to minimize claims, enhance operability, ease maintenance, reduce schedule time, or enhance project value in other ways. Design suggestions could also increase a project's cost but provide value in areas not currently addressed. These are also developed in the next phase of the VA process.

Development Phase

In this phase, each highly rated idea was expanded into a workable solution designated as a VE alternative. The development consisted of describing the current design and the alternative solution, preparing a life cycle cost comparison where applicable, describing the advantages and disadvantages of the proposed alternative solution, and writing a brief narrative to compare the original design to the proposed change and provide a rationale for implementing the idea into the design. Sketches and design

calculations, where appropriate, were also prepared in this part of the study. The VE alternatives are included in the Study Results section of this report.

Design suggestions include the same information as the alternatives except that no cost analysis is performed. They also are included in the Study Results section.

Presentation Phase

The goals of the last phase of the workshop were to summarize the results of the study, to prepare draft Summary of Potential Cost Saving worksheets to hand out at the presentation, and to present the key VE alternatives and design suggestions to Cobb County and GDOT. The presentation was held on Thursday, June 4, 2009, at GDOT's Central Office in Atlanta, GA. The purpose of the meeting was to provide the attendees with an overview of the suggestions for value enhancement resulting from the VE study and afford them the opportunity to ask questions to clarify specific aspects of the alternatives presented. Procedures for implementing the results of the study were discussed, and arrangements were made for the reviewers of the VE report to contact the VE team in order to obtain further clarifications, if necessary. Draft copies of the Summary of Potential Cost Savings worksheets were given to Cobb County and GDOT to facilitate a timely review and speedy implementation of the selected ideas.

POST-WORKSHOP EFFORT

The post-workshop portion of the VE study consisted of the preparation of this VE Study Report. Personnel from Cobb County, GDOT and the PBS&J design team will analyze each alternative and prepare a short response, recommending incorporation of 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.

Upon completing their reviews, the County, the owner and designer will meet and, by consensus, select VE alternatives and design suggestions to incorporate into the project.

VALUE ENGINEERING WORKSHOP PARTICIPANTS

The VE team was organized to provide specific expertise in the unique project elements involved with the I-285 @ CR 4519/Atlanta Road Interchange Reconstruction project. The multidisciplinary team comprised professionals with highway and bridge planning, design and construction experience and a working knowledge of VE procedures. The following lists the VE team members:

Participant	Specialization	Affiliation
Molapo Kgabo, PE	Bridge Engineering	HNTB Corporation
Vinique Word	Cost/Constructability	Delon Hampton & Associates
Joseph Leoni, PE	Highway Engineer	ARCADIS US, Inc.
Howard B. Greenfield, PE, CVS	VE Team Leader	Lewis & Zimmerman Associates

DESIGNER'S PRESENTATION

An overview of the project was presented on Monday, June 1, 2009, by representatives from Cobb County, GDOT and the PBS&J design team. The purpose of this meeting, in addition to being an integral part of the Information Phase of the VE study, was to bring the VE team "up to speed" regarding the overall project specifics. Additionally, the meeting afforded the owner and design team 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 FORMAL PRESENTATION

A formal presentation was conducted by the VE team on Thursday, June 4, 2009, at GDOT's Central Office, in Atlanta, GA to review VE alternatives with the owner and representatives from Cobb County. Copies of the Draft Summary of Potential Cost Savings worksheets were provided to the attendees. An attendance list for the meeting is attached.

VE STUDY SIGN-IN SHEET

Project No.: STP00-0222-01(001) County: Cobb PI No.: 752300 Date: June 1-4, 2009

	NAME	EMPLOYEE ID NO.	DOT OFFICE OR COMPANY	PHONE NUMBER	EMAIL ADDRESS
✓	Lisa L. Myers	00244168	Engineering Services	404-631-1770	lmyers@dot.ga.gov
	James K. Magnus	00208161	Construction	404-631-1971	jmagnus@dot.ga.gov
✓	Matt Sanders	00284154	Engineering Services	404-631-1752	msanders@dot.ga.gov
✓	MOLAPO KGABO		HNTB	404-946-5700	mkgabo@HNTB.com
✓	Vinique Word		Delon Hampton + Assoc.	404-419-8438	vword@delonhampton.com
✓	HOWARD GREENFIELD		LEWIS & ZIMMERMAN	301-984-9590	hgreenfield@lza.com
	SCOTT DUBORD		PBS&J	770-933-0280	smdobord@pbsj.com
✓	Joe Leoni		ARCADIS	770-431-8660	joe.leoni@ARCADIS-US.com
	Doug Franks	00809138	Bridge Design	404-631-1917	dfranks@dot.ga.gov
	LARRY BOWMAN	00901426	OEL	404-699-4441	lbowman@dot.ga.gov
✓	MARCELA COLL	00832509	URBAN Design	404-631-1692	mcoll@dot.ga.gov
	ALBERT WELCH	00354150	URBAN	4/631-1690	AWELCH@DOT.GA.GOV
	Aisha Rawland	00924988	Urban	4/631-1695	arawland@dot.ga.gov
✓	DAVID JACKSON		COBB DOT	7-528-1660	david.jackson@cobbcounty.org
✓	Derrell Richards	00255879	GDOT	4-631-1705	drichardson@dot.ga.gov
	Ben Buchan	00200360	GDOT	4-631-1700	bbuchan@dot.ga.gov
	SEBASTIAN O-NEBLITT	00207144	GDOT A2/D7	7-528-3238	SNeblitt@dot.ga.gov
	Dale H. FERRIS	00731411	GDOT A2/D7/Constr.	7-528-3238	DFerris@dot.ga.gov.

N. Raad 00729514 Traffic OP. 4-6358726 hraad@dot.ga.gov.

VE STUDY SIGN-IN SHEET

Project No.: STP00-0222-01(001) County: Cobb PI No.: 752300 Date: June 1-4, 2009

NAME	EMPLOYEE ID NO.	DOT OFFICE OR COMPANY	PHONE NUMBER	EMAIL ADDRESS
LATOYA JOHNSON		FHWA	404 562 4280	latoya.johnson@fhwa.dot.gov

P.2

ECONOMIC DATA

The comparisons of life cycle costs between the VE alternatives and the current design solutions were performed on the basis of discounted present worth. To accomplish this, the VE team developed economic criteria to use in its calculations based on information gathered from Cobb County, GDOT and the design team. The following parameters were used when calculating discounted present worth:

Year of Analysis:	2009
Construction Start Date:	unknown at this time
Construction Completion Date:	unknown at this time
Planning Period (n):	20

When computing capital costs, direct material, labor and equipment costs are marked up using a 10% for Engineering and Construction Administration.

COST MODEL

The VE team prepared the attached cost model for the project prior to the workshop. The cost model is arranged in the Pareto Charting/Cost Histogram format to aid in identifying high cost areas. As can be expected, judgments at this stage of the study are based on experience and intuition rather than facts, which are not uncovered until well along in the analysis of function. As a result of these qualified hypotheses, there appears to be a potential for initial savings in the following areas:

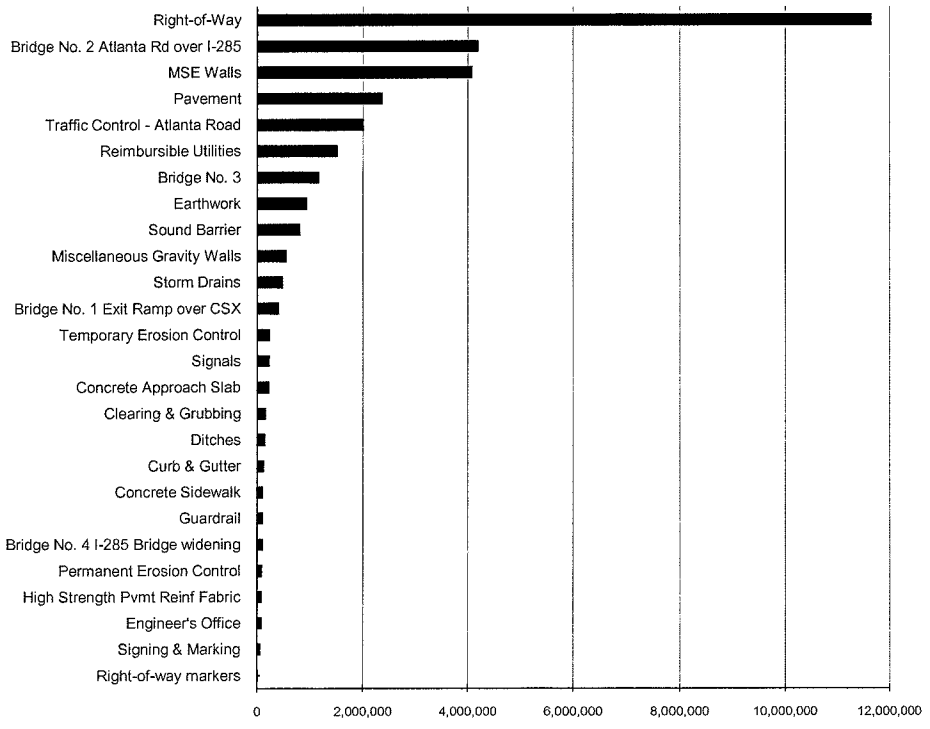
- Bridges
- Right-of-Way
- Alternative Concept

COST HISTOGRAM

PROJECT: STP00-0222-01(001) I-285 @ CR 4519/Atlanta Road

PROJECT ELEMENT	COST	PERCENT	CUM. PERCENT
Right-of-Way	11,645,100	36.76%	36.76%
Bridge No. 2 Atlanta Rd over I-285	4,183,200	13.21%	49.97%
MSE Walls	4,077,000	12.87%	62.84%
Pavement	2,362,722	7.46%	70.29%
Traffic Control - Atlanta Road	2,000,000	6.31%	76.61%
Reimbursible Utilities	1,500,000	4.74%	81.34%
Bridge No. 3	1,155,000	3.65%	84.99%
Earthwork	929,500	2.93%	87.92%
Sound Barrier	800,000	2.53%	90.45%
Miscellaneous Gravity Walls	540,000	1.70%	92.15%
Storm Drains	469,188	1.48%	93.63%
Bridge No. 1 Exit Ramp over CSX	403,200	1.27%	94.91%
Temporary Erosion Control	222,651	0.70%	95.61%
Signals	220,000	0.69%	96.30%
Concrete Approach Slab	215,053	0.68%	96.98%
Clearing & Grubbing	150,000	0.47%	97.46%
Ditches	138,880	0.44%	97.90%
Curb & Gutter	113,078	0.36%	98.25%
Concrete Sidewalk	95,704	0.30%	98.55%
Guardrail	94,842	0.30%	98.85%
Bridge No. 4 I-285 Bridge widening	93,800	0.30%	99.15%
Permanent Erosion Control	75,050	0.24%	99.39%
High Strength Pvmt Reinf Fabric	73,200	0.23%	99.62%
Engineer's Office	67,523	0.21%	99.83%
Signing & Marking	48,269	0.15%	99.98%
Right-of-way markers	5,234	0.02%	100.00%
Subtotal	$ 31,678,194	100.00%	
Engineering & Construction @ 10.00%	$ 1,853,309		
TOTAL	$ 33,531,503	Comp Mark-up:	10%

76.6%



FUNCTION ANALYSIS

A function analysis of the project was prepared to (1) understand the project purpose and need, (2) define the requirements for each project element, (3) ensure a complete and thorough understanding by the VE team of the basic function(s) needed to attain the given project purpose and need, (4) identify other public goals, and (5) identify secondary functions that should be addressed by the VE team. The Random Function Analysis worksheet completed by the team for the project in its entirety and the various elements follow.

RANDOM FUNCTION ANALYSIS

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

SHEET NO.: **1 of 1**

DESCRIPTION		FUNCTION		
		VERB	NOUN	KIND
Total Project Purpose and Need $30.1 M	$26.6 M	Alleviate	Traffic Congestion	HO
		Increase	Level of Service	B
		Increase	Ramp Capacity	B
		Increase	Storage Capacity	B
		Enhance	Safety	HO
Right-of-Way	$11.6M	Create	Space	S
I-285 Bridge		Increase	Capacity	S
		Allow	Future Growth	S
Retaining Walls		Reduce	Right-of-Way Requirements	S

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 EVALUATION OF IDEAS

During the Creative/Speculation Phase, numerous ideas were generated for the project using conventional brainstorming techniques. These ideas were recorded and are shown with their corresponding ranking on the attached Creative Idea Listing Worksheets. For the convenience of tracking an idea through the VA process, the ideas were grouped into the following project elements and numbered according to the order in which they were conceived. The following letter prefixes were used to identify the project elements.

PROJECT ELEMENTS	PREFIX
Bridge – Alternate 2	B2
Highway – Alternate 2	H2
All Alternate 4	A4

Creative Idea Evaluation

The ideas were then ranked on a qualitative scale of 1 to 5 on how well the VE team believed the idea met the project purpose and need criteria. To assist the team in evaluating the creative ideas, the advantages and disadvantages of each new idea compared to the existing design solution were discussed based on the owner's value objectives for the project. The following are the top value objectives for this project:

- Saves costs
- Improves functionality
- Improves safety
- Ability to accommodate future I-285 expansion
- Effect on Colonial Pipeline

After discussing each idea, the team evaluated the ideas by consensus. This produced 20 ideas rated 4 or 5 to research and develop into formal VE alternatives to be included in the Study Results section of the report. Highly rated ideas that were not developed further may have been combined with another related idea or discarded as a result of additional research indicating the concept as not being cost effective or technically feasible. The reader is encouraged to review the Creative Idea Listing and Evaluation worksheet since it may suggest additional ideas that can be applied to the design.

CREATIVE IDEA LISTING

PROJECT: **I-285 @ CR 4519/ATLANTA ROAD**
Cobb County, Georgia

SHEET NO.: **1 of 1**

NO.	IDEA DESCRIPTION	RATING
	ALTERNATIVE 4 (A4)	
A4-1	Save warehouse by providing access	4
A4-2	Build Atlanta Road Bridge	4
A4-3	Use part of the existing northbound exit ramp to Atlanta Road	4
A4-4	Use part of the existing entrance ramp to I-285 northbound	2
	HIGHWAY ALTERNATIVE 2 (H)	
H-1	Do not build auxiliary lanes now	2
H-2	Provide an access road between Atlanta Road and Cumberland Parkway	2
H-3	Reduce the size of the curb and gutter pan from 30 in to 24 in	4
H-4.1	Make Ramp D a one-lane ramp	4
H-4.2	Extend two lanes of Ramp D as far as possible	DS
H-5	Use fill between I-285 and the west side of Ramp C in lieu of mechanically stabilized earth wall	4
H-6	Raise the Atlanta Road Bridge to avoid lowering the colonial pipe line	4
	BRIDGES ALTERNATIVE 2 (B)	
B-1	Build Atlanta Bridge over I-285 so that it can be expanded later	4
B-2	Use MSE walls for CSX Bridge and shorten bridge	5
B-3	Reduce the median width to 14 ft on Atlanta Road Bridge over I-285 and the roadway on each side	4
B-4	Reduce the lane widths on Atlanta Road Bridge and approaches	2
B-5	Reduce the lane widths on Orchard Road Bridge	2
B-6	Build Orchard Road Bridge over 10 lanes now and allow for an extension later	4
B-7	Use 5-ft 6-in-wide sidewalks	4
B-8	Take the sidewalk off of the eastbound side of the bridge and narrow the bridge	4
	GENERAL (G)	
G-1	Use a single-point urban diamond interchange	2

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