

VALUE ENGINEERING STUDY

Project # IMNH0-0285-01(352) PI No. 713300-

I-285 at Bouldercrest Road Interchange
DeKalb County, Georgia

Prepared for:



One Georgia Center
600 West Peachtree NW
Atlanta, Georgia 30308

23 February 2012



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23 February 2012

Mr. Matt Sanders, AVS
Value Engineering Specialist
GDOT - Engineering Services
One Georgia Center - 5th Floor
600 W. Peachtree Street NW
Atlanta, GA 30308

Re: V.E. Workshop – I-285 at Bouldercrest Road Interchange, DeKalb County, GA
Project #: IMNH0-0285-01(352) - PI#: 713300-

Dear Mr. Sanders:

U.S. Cost, Inc. is pleased to submit two (2) hard copies and one (1) CD of the Value Engineering Study Report on the above referenced project. We appreciate the assistance and participation of the GDOT personnel as well as the Parsons Brinckerhoff design team.

This Workshop resulted in the development of thirteen (13) value-enhancing proposals. We hope that incorporation of some of these value improvement alternatives provided herein results in an enhanced project in relation to operations, cost, constructability and long-term performance of the project features.

Please feel free to contact me to discuss any information within this report. We look forward to the next opportunity to be of service to the Georgia Department of Transportation.

Sincerely,

U.S. COST INCORPORATED



Tom Orr, P.E., CVS
V.E. Team Leader

CC: L. Myers, GDOT

VALUE ENGINEERING TEAM STUDY

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VALUE ENGINEERING STUDY

PROJECT DESCRIPTION

This I-285 at Bouldercrest Road Interchange project involves enhancements to an urban interchange and corridor in DeKalb County, Georgia. The improvements involve braided ramps along I-285, replacement of the Bouldercrest Road bridge over I-285, construction of a new Whitehall Forest Connector, and construction of a new Industrial Drive Connector.

Improvements are also included to Bouldercrest Road, Sugar Creek Golf Drive, Industrial Drive, and Continental Way. Project lengths are approximately 1.0 mile on Bouldercrest Road and 2.0 miles along I-285.

The proposed project provides for the reconstruction of the I-285/Bouldercrest Road interchange and includes braided ramps between the I-675/I-285 interchange and the I-285/Bouldercrest Road interchange. On Bouldercrest Road, the project extends north from just north of the South River to just west of the Bouldercrest Road/Constitution Road intersection. On I-285, the project extends from the I-675 southbound exit ramp to just east of Sugar Creek.

The reconstruction of the I-285/Bouldercrest Road interchange will require replacing the existing Bouldercrest Road bridge over I-285 to provide 2 through lanes in each direction and double left-turn lanes in each direction onto I-285. A new connector road (Industrial Drive Connector) will be provided to connect Sugar Creek Golf Drive to Industrial Drive from the median opening on Bouldercrest Road at Sugar Creek Golf Drive. The existing Whitehall Forest Court intersection with Bouldercrest Road is being closed and a new connector road is being constructed to tie Whitehall Forest into Continental Way.

There are seven (7) new structures, including 3 bridges in each direction alongside I-285 on the braided ramps between I-675 and Bouldercrest Road. Also, a new bridge is being constructed on Bouldercrest Road over I-285 to provide eight (8) total lanes.

Project components include:

- Braided ramps in each direction alongside I-285 between I-675 and Bouldercrest Road
- Improvements to Bouldercrest Road, Sugar Creek Golf Drive, Industrial Drive, and Continental Way
- New 8-lane bridge on Bouldercrest Road over I-285
- New Industrial Drive Connector to connect Sugar Creek Golf Drive to Industrial Drive
- New Whitehall Forest Connector to connect Whitehall Forest Court to Continental Way
- R/W acquisition

The project has an estimated cost of approximately \$51,475,000, based on July 2011 estimate. This cost includes construction and R/W acquisition.

VALUE ENGINEERING STUDY

KEY INFORMATION/NOTES

Introduction

U.S. Cost conducted the Value Engineering Team Study on I-285 at Bouldercrest Road Interchange in DeKalb County. The V.E. study was conducted for three and ½ days, 20 - 23 February 2012 at the Georgia Department of Transportation 5th floor Conference Room in Atlanta, GA. The study team was furnished with conceptual documents for use in conducting the VE workshop. The following individuals were members of the V.E. team:

Name	Firm	Discipline
Tom Orr, P.E., CVS	U.S. Cost, Inc.	VE Team Leader (VETL)
Greg Grant, P.E.	RS&H	Bridge/Structures
Chris Haggard, P.E.	Wolverton	Roadway Engineer
Bill Deyo	KEA Group	Construction

Value Engineering Study Process

The Value Engineering Study followed the Value Engineering Job Plan as certified by SAVE International as follows:

- Information Phase (Monday)
- Function Analysis Phase (Monday)
- Creative Phase (Monday)
- Evaluation Phase (Monday)
- Development Phase (Tuesday - Wednesday)
- Presentation Phase (Thursday AM)

Information Phase

The V.E. team was first briefed on the project design by Parsons Brinckerhoff personnel and Georgia DOT representatives in a Design Presentation the morning of the first day of the V.E. Study. The briefing included a review of the design requirements and rationale for the selection and arrangement of the major project features. Discussions regarding alternatives considered, adjacent properties/facilities, and project criteria and constraints were included in the design presentation.

VALUE ENGINEERING STUDY

KEY INFORMATION/NOTES

Project Design Criteria

During the meeting, project design criteria were identified. The following listing identifies the design criteria with which the project must comply:

- AASHTO Design Policies
- FHWA Design Policies
- Environmental Restrictions (EA Requirements TBD)

Project Constraints

Project constraints were mentioned in the V.E. review documents. At this conceptual stage no constraints have been placed on the project and alternatives to project features are feasible. However, upon completion of the Environmental Assessment some constraints may be placed upon the project design.

Function Analysis

As a basic part of the V.E. process, the team conducted a Function Analysis session on the I-285 at Bouldercrest Road Interchange project to identify the needs and goals of the project and facilitate the creative idea session, by addressing functions as opposed to the specific design elements.

The Basic Function of the project is to “*Improve Operations*” by relieving congestion and eliminating a weave location onto and off of I-285. A detailed project function analysis of the characteristics of the project and the project features is presented in the Appendix.

VALUE ENGINEERING STUDY

KEY INFORMATION/NOTES

Risk Analysis

The group identified the following project risk elements or concerns, which may impact the I-285 at Bouldercrest Road Interchange project. This exercise served as a catalyst for the Creative Phase of the study when several ideas were suggested which would mitigate these project risks.

Risk Elements/Concerns

- Truck traffic loss of access
- Ramp intersections lack of separation
- Introducing truck traffic onto Sugar Creek Golf Drive
- Difficulty with vertical separation for overhead ramps “E” and “H”
- Extensive Right-of-Way (R/W) acquisition
- Scope of required improvements based on 2011 reduced traffic counts
- Multiple bridges in braided ramp concept
- New offset of Bouldercrest over I-285 requires significant re-alignment work

Creative Phase

The Creative Phase of the V.E. study was initiated the afternoon of the first day of the study. A total of twenty (20) creative ideas were generated for further investigation by the team. The creative ideas focused on areas of the project which the VE Team felt had the most opportunity for value improvement, including:

- Alternative concepts for eliminating traffic weave location
- Maintaining traffic movements at reduced construction cost
- Maintaining truck access to Continental Way
- Reducing R/W impacts
- Limiting Bouldercrest Road improvements to those required by updated traffic counts
- Reducing number of bridge structures

A listing of all creative ideas on this project is included in the Appendix.

VALUE ENGINEERING STUDY

KEY INFORMATION/NOTES

Alternative Idea Evaluation Criteria

The session participants identified the characteristics for evaluating the V.E. ideas for which alternatives would be the most acceptable for incorporation in the project. The highest ranked ideas would satisfy several of these criteria. The evaluation criteria for V.E. ideas are as follows:

V.E. Idea Evaluation Criteria

- Improves Operations
- Reduces Conflicts
- Reduces Costs
- Reduces Construction Time
- Improves Constructability
- Reduces Environmental Impacts

Evaluation Phase

The ideas generated during the Creative Phase were reviewed and evaluated by the VE session participants during an Analysis/Judgment Phase session at the end of the first study day. The intent of the meeting was to allow the participants an opportunity to discuss and evaluate the ideas. A few of the V.E. ideas were dropped at that time as being conceptually unacceptable. The ranking session consisted of the VE team members assigning a ranking for each idea. The Acceptability ranking was based on how each idea improves the value of the project when considered against the evaluation criteria listed previously. All creative ideas were given a designation of 1-5 on acceptability. This is a time management tool to identify those proposals that have the greatest potential. Approximately thirteen (13) out of the original twenty (20) creative ideas were deemed promising for further investigation and analysis by the V.E. team.

The time management ranking system used by the VE team is as follows:

ACCEPTABILITY OF IDEA

- 5 points - Excellent Idea
- 4 points – Very Good Idea
- 3 points - Good Idea
- 2 points - Fair Idea
- 1 point - Do Not Develop

VALUE ENGINEERING STUDY

KEY INFORMATION/NOTES

Development Phase

The specific proposals found in the body of this report represent the positive results of investigations by the V.E. team on the I-285 at Bouldercrest Road Interchange project. Each proposal represents a quality enhancing or cost saving alternative, which is documented by words, drawings and numbers. The proposal format presents the idea, describes the original design element proposed for change and the proposed change, lists the perceived advantages and disadvantages of the proposed change and supports the idea with a detailed cost estimate for the original and proposed design. Where necessary for clarity, the proposal also includes thumbnail design drawings and supporting engineering calculations.

Presentation Phase

A presentation to the Parsons Brinckerhoff design team and GDOT representatives was conducted 23 February 2012 at 9AM.

Basis of V.E. Cost Savings

The cost information for proposals in this report are based on the cost data prepared by the design team (10/27/11), GDOT Item Mean Summary (Jan. 09, 2012), VE Team member experience, and discussions with vendors/Contractors. Overhead and profit are included in the project cost estimate and the GDOT Item Mean data. Therefore, no additional markups are applied. The savings presented in the proposals is a general order of magnitude (estimate of the potential savings) if the idea were to be accepted. These figures are solely intended to identify the most attractive design solution, and are not prepared to represent a net deduction to the overall project budget. The costs are in 2012 dollars.

Evaluation of Alternatives

When reviewing the value engineering proposals, consider each part of an alternative on its own merit. There may be a tendency to disregard an entire alternative because of a concern about one aspect of it. We encourage partial acceptance of ideas; thus, each aspect of an alternative should be considered for incorporation into the design, even if the entire alternative is not implemented. Variations of these proposed alternatives are encouraged.

Several of these alternatives are either “mutually exclusive” or have overlapping cost savings with other alternatives. These are indicated in the Proposal Summary Table. Items indicated as mutually exclusive indicates that acceptance of one alternative, precludes acceptance of the related proposal. Decision-makers are encouraged to evaluate these alternatives carefully in order to select the combination of alternatives that provides the greatest benefits to the project.

VALUE ENGINEERING STUDY

VALUE ENGINEERING RESULTS

The VE Team generated 20 creative ideas and developed 13 proposals for consideration by GDOT. Brief outlines of the VE proposals are as follows:

Proposal Highlights

R-1.0 - Use a Collector-Distributor System in lieu of Braided Ramps with New Single Bridge on Each Side. The original design includes a braided ramp concept with separate, isolated ramps in order to reduce weaving of exiting vehicles from the three alignments affected by this project: I-285, I-675 and Bouldercrest Road. This approach requires 6 bridges for the braided ramp configuration. Mutually exclusive to R-1.1, Proposal R-1.0 proposes to combine the ramps from I-675 to I-285 and Bouldercrest Road and the Ramp from I-285 to Bouldercrest Road into a combined CD system. This alternative includes a length of CD system that provides a weaving distance that meets or exceeds the minimum length required, and reduces the number of bridge crossings of South River to one combined new bridge on each side of I-285. This alternative will save \$17,306,305 in construction costs and simplifies the construction of the bridges.

R-1.1 - Use a Collector-Distributor (CD) System in lieu of Braided Ramps along each side of I-285 with a single combined bridge widening across South River. The original design includes a braided ramp concept with separate, isolated ramps in order to reduce weaving of exiting vehicles from the three alignments affected by this project: I-285, I-675 and Bouldercrest Road. This approach requires 6 bridges for the braided ramp configuration. Mutually exclusive to R-1.0 above, Proposal R-1.1 proposes to combine the ramps from I-675 to I-285 and Bouldercrest Road and the Ramp from I-285 to Bouldercrest Road into a combined CD system. This alternative includes a length of CD system that provides a weaving distance that meets or exceeds the minimum length required, and reduces the number of bridge crossings of South River to one combined crossing on each side of I-285 created by widening the existing I-285 bridge. This alternative will save \$18,746,269 in construction costs and simplifies bridge construction when compared to the current design.

R-2.0 – Combine Exit Ramps C&E and F&G and use right exit flyover ramps for H&D (2 bridges over the River on each side): The original design includes a braided ramp concept with separate, isolated ramps in order to reduce weaving of exiting vehicles from the three alignments affected by this project: I-285, I-675 and Bouldercrest Road. This approach requires 6 bridges for the braided ramp configuration. Mutually exclusive to both R-1.0 and R-1.1, Proposal R-2.0 proposes to improve the current braided ramp concept by reducing the number of bridges to four (4). This is done by merging the I-675 to Bouldercrest Road exit with the I-285 to Bouldercrest Road exit prior to crossing the South River to eliminate one bridge. Also, merge the Bouldercrest Road to I-675 entrance with the I-285 to I-675 entrance prior to crossing the South River to eliminate one bridge. This would save approximately \$2,436,097.

VALUE ENGINEERING STUDY

VALUE ENGINEERING RESULTS

R-3.0 - Shift new Bouldercrest Bridge West and Stage Construct; eliminate re-alignment work on Bouldercrest Road North of Continental Way and South of I-285. In the current design approach, the existing bridge for Bouldercrest Road over I-285 provides two 12-foot travel lanes and one 12-foot left turn lane each direction and is proposed to remain in place while a new bridge providing two 12-foot lanes and two left-turn lanes in each direction are constructed adjacent to the East side. Due to the offset of the new bridge placement to the East, Bouldercrest Road is realigned to the East both North and South of the interchange area. In R-3.0, it is proposed to stage construction by constructing the Northbound side of the Bouldercrest Road bridge over I-285 first while maintaining traffic on the existing bridge; then shifting traffic to the new structure while demolishing the existing bridge. The new southbound side will then be constructed and final traffic configuration provided. This staged approach minimizes realignment required on Bouldercrest and reduces R/W acquisition. This alternative would save approximately \$3,149,378 (Note: this amount includes the cost savings calculated in R-4.0).

R-4.0 - Eliminate Improvements on Bouldercrest Road North of Continental Way. The current design which includes the new bridge offset to the East requires realignment of Bouldercrest Road to the East to provide the same number of lanes and change degree of curve at Clifton Church Road intersection area. In R-4.0, it is proposed to eliminate realignment of Bouldercrest North of Continental Way and keep existing alignment of Bouldercrest Road in this area. Evaluation of the latest traffic count data appeared to indicate that improvements in this area of Bouldercrest Road are unnecessary. This alternative provides a project cost savings of \$2,506,577.

R-6.0 - Incorporate Dedicated Left Turn Lane into Industrial Drive and Eliminate New Connector and Improvements at Sugar Creek Golf Drive. The current design includes closure of the median opening allowing left turns onto Industrial Drive, thus requiring construction of a new connector between Sugar Creek Golf Drive and Industrial Drive and reconstruction of Sugar Creek Golf Drive to allow for the addition of truck traffic. It is proposed to construct a dedicated left turn lane on Bouldercrest Road at Industrial Drive and eliminate both reconstruction of Sugar Creek Golf Drive and the new connector road. The proposal will save a total of \$436,876 in construction and R/W costs.

R-7.0 - Eliminate Sidewalks along Industrial Drive and Sugar Creek Golf Drive. The current design for improvements on Industrial Drive and Sugar Creek Golf Drive includes new sidewalks where currently none exist. It is proposed to eliminate sidewalks from the improvements along Industrial Drive and Sugar Creek Golf Drive. The proposal will save a total of \$124,550 in construction and R/W costs.

VALUE ENGINEERING STUDY

VALUE ENGINEERING RESULTS

R-10.0 - Realign Ramp “A” to intersect at Continental Way and add Loop Ramp (Ramp F revised) from Bouldercrest to I-285 WB, Reduce the number of lanes on the Bouldercrest bridge replacement over I-285 to eliminate the 2 lane left turn bay. In the current design of the Bouldercrest Road ramp intersection on the North side of I-285, the intersection is close to the intersection with Continental Way and is reconfigured to not allow left turns onto Continental Way (which requires trucks a longer and more circuitous route to gain access to the industrial properties). Proposal R-10.0 moves the ramp intersection to occur at Continental Way with a loop ramp from Bouldercrest Road to I-285 Westbound. This would also allow reduction in the number of lanes on the Bouldercrest bridge. The proposal will save a total of \$27,978.

R-12.0 - Reduce Ramp “E” from 2 Lanes to 1: The current design proposes Ramp “E”, which takes traffic from I-285 East to Bouldercrest, as a two lane ramp. In R-12.0, based on the traffic count of 340 DHV for this ramp, it is proposed to reduce it to a single-lane ramp. This alternative provides a savings of approximately \$483,761.

R-13.0 - Realign Ramp “C” to intersect at Industrial Drive and add Loop Ramp (Ramp B revised) from Bouldercrest to I-285 EB, Reduce the number of lanes on the Bouldercrest bridge replacement over I-285 to eliminate the 2-lane left turn bay. In the current design of the Bouldercrest Road ramp intersection on the South side of I-285, the intersection is close to the intersection with Industrial Drive and is reconfigured to not allow left turns onto Industrial Drive. Proposal R-13.0 moves the ramp intersection to occur at Industrial Drive with a loop ramp from Bouldercrest Road to I-285 Eastbound. This would also allow reduction in the number of lanes on the Bouldercrest Bridge. The proposal will save a total of \$800,601.

R-14.0 - Eliminate Improvements on Continental Way: The current design includes reconstruction of Continental Way outside of Bouldercrest Road R/W limits. The Bouldercrest Road improvements do not appear to warrant reconstruction of Continental Way; thus it is proposed to eliminate reconstruction of Continental Way from the project scope. The proposal will save a total of \$407,799.

VALUE ENGINEERING STUDY

VALUE ENGINEERING RESULTS

R-15.0 - Limit Project Scope to Eastbound I-285 Intersection with Bouldercrest Road, Widen Existing Bridge and Add Whitehall Forest Connector. The current design includes all improvements to correct a weave on I-285, and improvements to Bouldercrest Road based on 2001 traffic counts. Proposal R-15.0 limits the scope to only those required to improve operations on Bouldercrest Road based on the most recent (reduced) traffic counts, which include Bouldercrest Road movements to I-285 East, widening the existing Bouldercrest Road bridge and adding Whitehall Forest Connector. This alternative saves approximately \$50,425,682.

R-15.1 - Limit Project Scope to Braided Ramps, Eastbound I-285 Intersection with Bouldercrest Road, Widen Existing Bridge and Add Whitehall Forest Connector. The current design includes all improvements to correct a weave on I-285, and improvements to Bouldercrest Road based on 2001 traffic counts. Proposal R-15.1 limits the scope to those required to improve operations on Bouldercrest Road based on the most recent (reduced) traffic counts, and constructs the braided ramp concept to correct the weave situation on I-285. Features would include Bouldercrest Road movements to I-285 East, widening the existing Bouldercrest Road bridge, adding Whitehall Forest Connector, and constructing the I-285 braided ramps. This alternative saves approximately \$17,588,633.

SUMMARY OF VALUE ENGINEERING PROPOSALS

**Project # IMNH0-0285-01(352) PI No. 713300-
I-285 AT BOULDERCREST ROAD INTERCHANGE
DEKALB COUNTY, GEORGIA**

IDEA NO.	PROPOSAL DESCRIPTION	CONSTRUCTION SAVINGS	RELATED PROPOSALS
	Note: Brackets mean additional cost		
	ROADWAY (R)		
1.0	Use a Collector-Distributor System in lieu of Braided Ramps with New Single Combined Bridge on Each Side	17,306,305	Mutually exclusive with R-1.1
1.1	Use a Collector-Distributor (CD) System in lieu of Braided Ramps along each side of I-285 with a single combined bridge widening across South River	18,746,269	Mutually exclusive with R-1.0
2.0	Combine Exit Ramps C&E and F&G and use right exit flyover ramps for H&D (2 bridges over the River on each side)	2,436,097	Mutually exclusive with R-1.0 and R-1.1; includes cost savings for R-12.0
3.0	Shift new Bouldercrest Bridge West and Stage Construct; eliminate re-alignment work on Bouldercrest Road North of Continental Way and South of I-285	3,149,378	Includes cost savings for R-4.0
4.0	Eliminate Improvements on Bouldercrest Road North of Continental Way	2,506,577	Cost savings included in R-3.0
6.0	Incorporate Dedicated Left Turn Lane into Industrial Drive and Eliminate New Connector and Improvements at Sugar Creek Golf Drive	436,876	Costs overlap with R-7.0
7.0	Eliminate Sidewalks along Industrial Drive and Sugar Creek Golf Drive	124,550	Costs overlap with R-6.0
10.0	Realign Ramp "A" to intersect at Continental Way and add Loop Ramp (Ramp F revised) from Bouldercrest to I-285 WB, Reduce the number of lanes on the Bouldercrest bridge replacement over I-285 to eliminate the 2 lane left turn bay	27,978	

SUMMARY OF VALUE ENGINEERING PROPOSALS

**Project # IMNH0-0285-01(352) PI No. 713300-
I-285 @ BOULDERCREST ROAD INTERCHANGE
DEKALB COUNTY, GEORGIA**

IDEA NO.	PROPOSAL DESCRIPTION	CONSTRUCTION SAVINGS	RELATED PROPOSALS
	Note: Brackets mean additional cost		
12.0	Reduce Ramp "E" from 2 Lanes to 1	483,761	Mutually exclusive with R-1.0 and R-1.1
13.0	Realign Ramp "C" to intersect at Industrial Drive and add Loop Ramp (Ramp B revised) from Bouldercrest to I-285 EB, Reduce the number of lanes on the Bouldercrest bridge replacement over I-285 to eliminate the 2-lane left turn bay.	800,601	
14.0	Eliminate Improvements on Continental Way	407,799	
15.0	Limit Project Scope to Eastbound I-285 Intersection with Bouldercrest Road, Widen Existing Bridge and Add Whitehall Forest Connector	50,425,682	Mutually exclusive with all other proposals
15.1	Limit Project Scope to Braided Ramps, Eastbound I-285 Intersection with Bouldercrest Road, Widen Existing Bridge and Add Whitehall Forest Connector	17,588,633	Mutually exclusive with all proposals except R-10.0, R-12.0 and R-13.0

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-1.0

PAGE NUMBER: 1 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-
PROJECT TITLE: I-285 @ Bouldercrest Road, DeKalb County

PROPOSAL DESCRIPTION: Use a collector-distributor (CD) system in lieu of a braided ramp system along each side of I-285 with a new single combined bridge across South River.

ORIGINAL DESIGN: The original design provides separate, isolated ramps in order to reduce weaving of exiting vehicles from the three alignments affected by this project: I-285, I-675 and Bouldercrest Road.

These ramps isolate the following movements

On the South side of I-285:

- Ramp C: I-675 NB to Bouldercrest Road
- Ramp D: I-675 NB to I-285 EB
- Ramp E: I-285 EB to Bouldercrest Road

Note:

Ramp D splits away from Ramp C

Ramp E merges with Ramp C prior to Bouldercrest Road

On the North side of I-285:

- Ramp F: Bouldercrest Road to I-675 SB
- Ramp G: I-285 WB to I-675 SB
- Ramp H: Bouldercrest Road to I-285 WB

Note:

Ramp H splits away from Ramp F

Ramp G merges with Ramp F prior to I-675 SB

This configuration requires three separate bridges to carry the individual ramps over South River. In order to not require a fourth bridge, Ramp E and Ramp H cross over Ramp D and Ramp G, respectively, at the South River crossing. This creates a bridge over a bridge over a river condition on both sides of I-285.

	INITIAL COST	OPERATING COST	TOTAL LIFE- CYCLE COST
ORIGINAL DESIGN:	\$ 32,837,049		\$ 32,837,049
PROPOSED CHANGE:	\$ 15,530,744		\$ 15,530,744
SAVINGS:	\$ 17,306,305		\$ 17,306,305

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-1.0

PAGE NUMBER: 2 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

PROPOSED CHANGE: It is proposed to combine the ramps from I-675 to I-285 and Bouldercrest Road and the ramp from I-285 to Bouldercrest Road into a combined CD system. Provide a length of CD system that provides a weaving distance that meets or exceeds the minimum length required. Reduce the number of bridge crossings of South River to one combined bridge on each side of I-285.

On South side of I-285

Two – 12’ lanes will depart from 285 EB and two - 12’ lanes will depart from I-675 NB and combine into one alignment with three – 12’ lanes of traffic.

One lane will merge onto I-285 EB and two lanes will exit toward Bouldercrest Road.

On North side of I-285

Two – 12’ lanes will depart from Bouldercrest Road, combining into one lane, and two - 12’ lanes will depart from I-285 WB and combine into one alignment with three – 12’ lanes of traffic.

Two lanes will merge onto I-675 SB and one lane will exit toward I-285 WB.

The exit points from I-285 will need to be shifted prior to the exit points in the original concept to increase the length allowed for weaving distance.

The bridges over South River will be three-12 foot lanes with 10 foot shoulders on both sides with 1.625 ft “jersey” side barriers on both sides.

(Overall bridge width = 36 ft lanes + 20 ft shoulders + 3.25 side barriers = 59.25 ft)

(Bridge length = length of existing I-285 bridge = 155 ft)

ADVANTAGES/DISADVANTAGES/JUSTIFICATION

PROPOSAL NUMBER:	R-1.0	PAGE NUMBER:	3 of 14
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ADVANTAGES:

- Reduces the number of structures on the project, which in turn:
 - Reduces long term maintenance costs
 - Eliminates obstructions adjacent to the roadway
 - Reduces environmental impact near the River
 - Eliminates the bridge over a bridge condition which simplifies the project
 - Reduces bridge width by not requiring shoulders on each side of dedicated ramp.
 - Reduces bridge complexity by eliminating braided crossing.
 - Eliminates the need for retaining walls and or slope paving at bridge abutments for bridges eliminated.
- Reduces Right-of-Way (R/W) acquisition

DISADVANTAGES:

- Requires careful attention to signing
- Increases length of I-285 EB and WB exit ramps to increase weaving distance

JUSTIFICATION:

There is sufficient distance to provide a combined CD system that allows for the required vehicular movements. The CD system approach provides all required movements and results in a significant reduction in R/W acquisition.

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER: R-1.0	PAGE NUMBER: 4 of 14
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PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Right of Way	1	ACRE	36.627	\$434,000	15,899,156
Earthwork (includes Clearing & Grubbing)	1	LS	1	See Itemized Calculation	1,907,500
Bridges	7	SQ FT	74,303	See Itemized Calculation	7,821,660
Ramps	1	SQ YD	93,100	See Itemized Calculation	7,208,733
SUBTOTAL – COST TO PRIME					\$32,837,049
MARKUP					
TOTAL CONTRACT COST					\$32,837,049

PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Right of Way	1	ACRE	19.395	\$434,000	8,417,607
Earthwork (includes Clearing & Grubbing)	1	LS	1	See Itemized Calculation	930,625
Bridges	7	SQ FT	18367.5	See Itemized Calculation	1,744,913
Ramps	1	SQ YD	57,311	See Itemized Calculation	4,437,599
SUBTOTAL – COST TO PRIME					\$15,530,744
MARKUP					
TOTAL CONTRACT COST					\$15,530,744

Difference [Original-Proposed] **\$17,306,305**

SOURCES

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor (Specify) 7. From GDOT Bridge Design (See calcs.) 8. Other (Specify) |
|---|---|

ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-1.0

PAGE NUMBER: 5 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

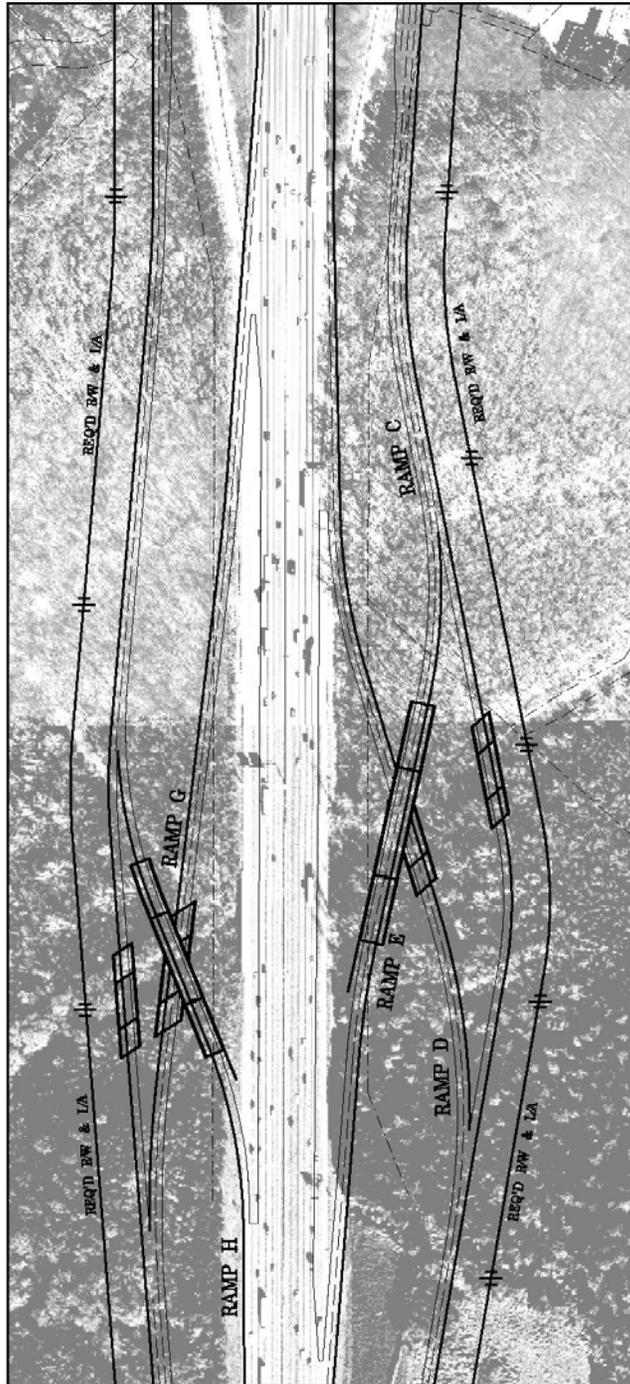


ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-1.0

PAGE NUMBER: 6 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

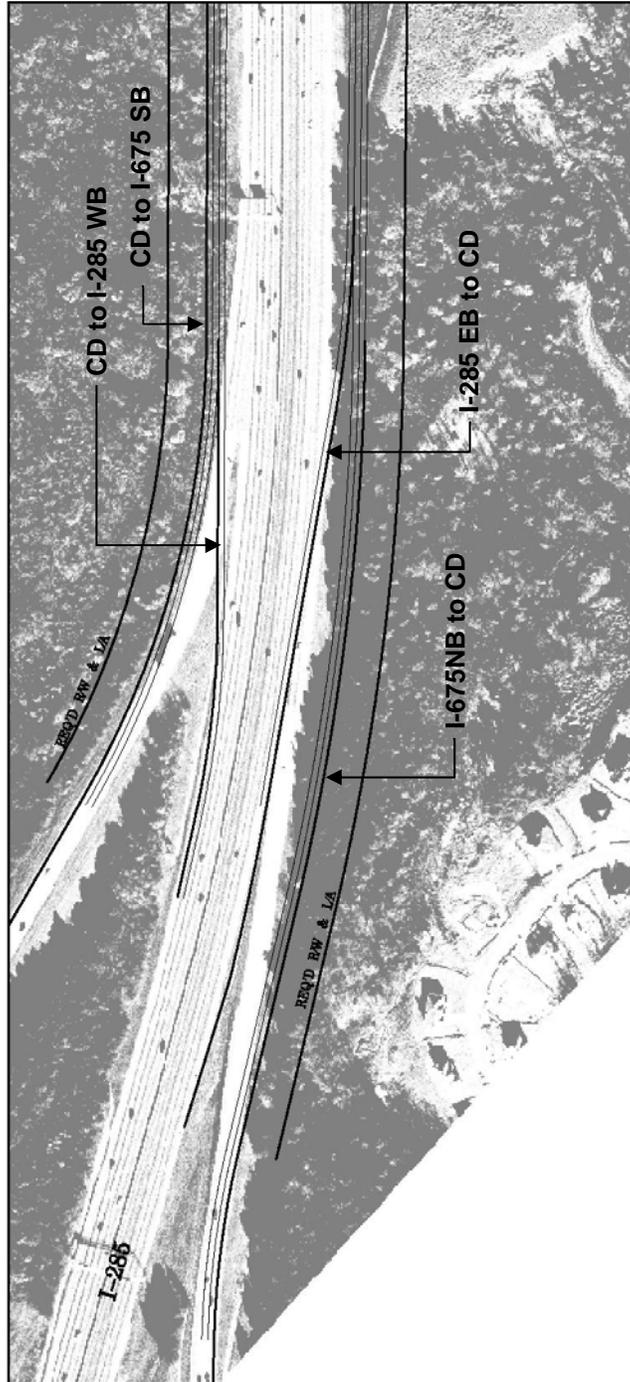


PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-1.0

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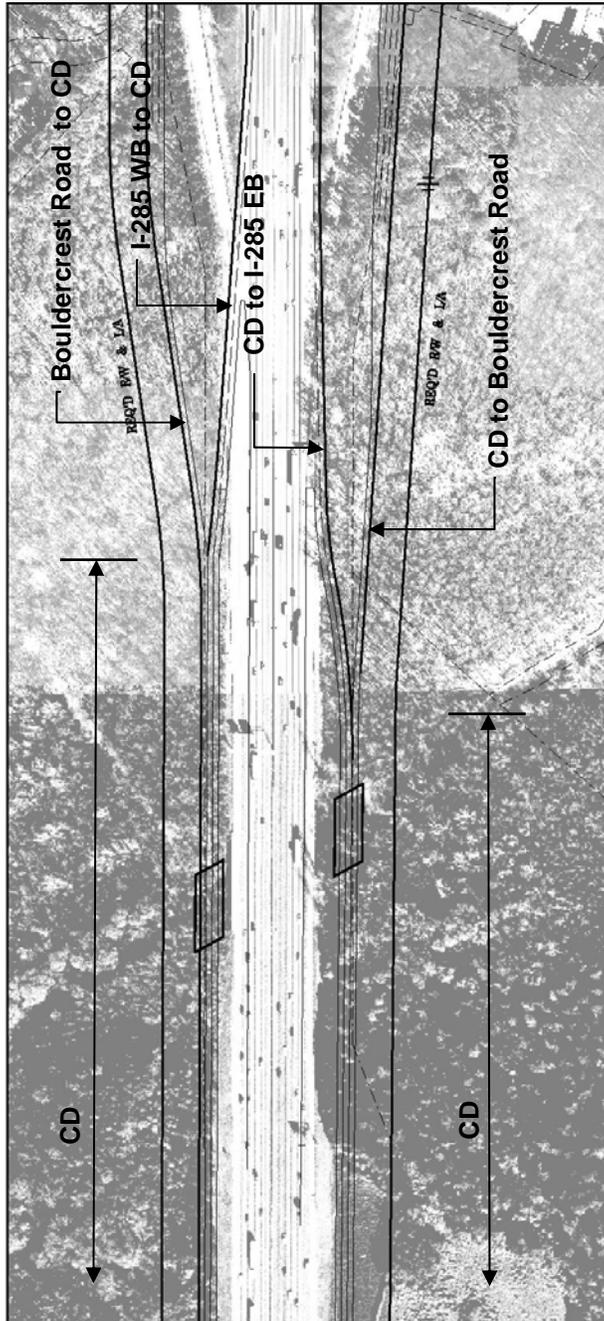


PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-1.0

PAGE NUMBER: 8 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



CALCULATIONS

PROPOSAL NUMBER: R-1.0

PAGE NUMBER: 9 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Original Concept

The following data was provided by the designer in advance of the VE Study:

I-285 at Bouldercrest Road

IMNH0-0285-01(352)

PI #713300

Conceptual Bridge Layout

Bouldercrest Road over I-285

The existing bridge (Bridge ID # 089-148-0) is 249'-0" with concrete slope paving at 2:1. It is assumed that the new bridge will be approximately the same length but have MSE walls at the end bents. The width of the proposed bridge is 124'-0" curb to curb width plus a 6'-0" sidewalk and 1'-2 1/2" from parapet to deck edge on each side of the bridge. This equals a total bridge width of 138'-5" (out to out). The bridge will be 2 spans and have a total length of 250 feet. Spans 1 and 2 will be 125 feet long (72" Bulb Tee Prestressed Concrete Beam).

Ramps

All ramps have 8'-0" left shoulders and 12'-0" right shoulders. Approximate top of bank is at elevation 770. Existing Bridge at I-285 over South River has top of deck elevations at approximately 786. Lower level ramps (C, D, F, and G) will be assumed to be at the same elevation as the existing bridge. Second level ramps (E and H) will be assumed to be 30 ft above lower level ramps. For hydraulic reasons, bridge opening will be assumed to match the existing bridge, which is approximately 200 ft long.

Ramp C Bridge

The Ramp C Bridge carries one 16'-0" lane. When the shoulders are added, this equals a gutter to gutter width of 36'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 39'-3" (out to out). The bridge will be 3 spans and have a total length of 200 feet. Spans 1 and 3 will be 55 feet long (Type II Prestressed Concrete Beam) and Span 2 will be 90 feet long (54" Bulb Tee Prestressed Concrete Beam).

Ramp D Bridge

The Ramp D Bridge carries two 12'-0" lanes. When the shoulders are added, this equals a gutter to gutter width of 44'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 47'-3" (out to out). The bridge will be 3 spans and have a total length of 200 feet. Spans 1 and 3 will be 55 feet long (Type II Prestressed Concrete Beam) and Span 2 will be 90 feet long (54" Bulb Tee Prestressed Concrete Beam).

CALCULATIONS

PROPOSAL NUMBER: R-1.0

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PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Original Concept (con't.)

Ramp E Bridge

The Ramp E Bridge also carries two 12'-0" lanes. When the shoulders are added, this equals a gutter to gutter width of 44'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 47'-3" (out to out). The bridge will be 3 spans and have a total length of 475 feet. Spans 1 and 3 will be 130 feet long (Steel Plate Girder) and Span 2 will be 215 feet long (Steel Plate Girder). The intermediate bents will be single column hammerhead piers in order to avoid conflict with the lower level ramp.

Ramp F Bridge

The Ramp F Bridge carries one 16'-0" lane. When the shoulders are added, this equals a gutter to gutter width of 36'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 39'-3" (out to out). The bridge will be 3 spans and have a total length of 200 feet. Spans 1 and 3 will be 55 feet long (Type II Prestressed Concrete Beam) and Span 2 will be 90 feet long (54" Bulb Tee Prestressed Concrete Beam).

Ramp G Bridge

The Ramp G Bridge carries two 12'-0" lanes. When the shoulders are added, this equals a gutter to gutter width of 44'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 47'-3" (out to out). The bridge will be 3 spans and have a total length of 233 feet. Spans 1 and 3 will be 65 feet long (Type II Prestressed Concrete Beam) and Span 2 will be 103 feet long (54" Bulb Tee Prestressed Concrete Beam).

Ramp H Bridge

The Ramp H Bridge carries one 16'-0" lane. When the shoulders are added, this equals a gutter to gutter width of 36'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 39'-3" (out to out). The bridge will be 3 spans and have a total length of 400 feet. Spans 1 and 3 will be 110 feet long (Steel Plate Girder) and Span 2 will be 180 feet long (Steel Plate Girder). The intermediate bents will be single column hammerhead piers in order to avoid conflict with the lower level ramp.

Retaining Walls

Retaining walls will probably be required on one end of Ramps E and H as shown in the Ramp Location Sketch.

CALCULATIONS

PROPOSAL NUMBER: R-1.0	PAGE NUMBER: 11 of 14
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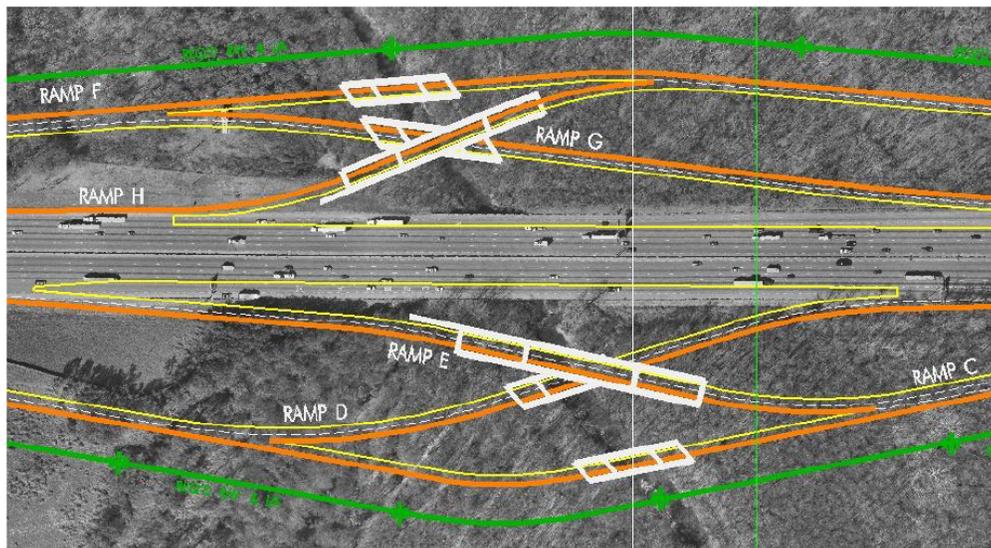
PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

ORIGINAL CONCEPT (con't)

Bridge Summary Table:

Bridge	Total Length (ft)	Out to Out Width (ft)	Span Arrangement and Beam Type	Intermediate Bent Type
Bouldercrest Rd. over I-285	250	138'-5"	Span 1 / 125'-0" / 72" Bulb Tee Span 2 / 125'-0" / 72" Bulb Tee	Multicolumn
Ramp C	200	39'-3"	Span 1 / 55'-0" / Type II Span 2 / 90'-0" / 54" Bulb Tee Span 3 / 55'-0" / Type II	Multicolumn
Ramp D	200	47'-3"	Span 1 / 55'-0" / Type II Span 2 / 90'-0" / 54" Bulb Tee Span 3 / 55'-0" / Type II	Multicolumn
Ramp E	475	47'-3"	Span 1 / 130'-0" / Steel Plate Girder Span 2 / 215'-0" / Steel Plate Girder Span 3 / 130'-0" / Steel Plate Girder	Single Column Hammerhead
Ramp F	200	39'-3"	Span 1 / 55'-0" / Type II Span 2 / 90'-0" / 54" Bulb Tee Span 3 / 55'-0" / Type II	Multicolumn
Ramp G	233	47'-3"	Span 1 / 65'-0" / Type II Span 2 / 103'-0" / 54" Bulb Tee Span 3 / 65'-0" / Type II	Multicolumn
Ramp H	400	39'-3"	Span 1 / 110'-0" / Steel Plate Girder Span 2 / 180'-0" / Steel Plate Girder Span 3 / 110'-0" / Steel Plate Girder	Single Column Hammerhead

Ramp Location Sketch:



CALCULATIONS

PROPOSAL NUMBER: R-1.0

PAGE NUMBER: 12 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Cost Basis for proposed change:

Pavement Section Cost – Concrete Ramps

12" GAB: \$17.97/TN \times 0.675TNS/SY	\$12.13/SY
3" asphalt base course: 3.0 \times (110/2000) \times (\$62.42/TN)	\$10.30/SY
10" concrete pavement	<u>\$55.00/SY</u>
TOTAL	\$77.43/SY

Determination of Bridge Sq. Ft Unit Cost to use

Square foot cost of bridges used in the latest cost estimate is not uniform between bridges. The team asked Bill Duvall, PE, Asst. State Bridge Engineer, for an approximate unit cost to use. Both cost of original and proposed were adjusted by these values.

From: DuVall, Bill [mailto:bduvall@dot.ga.gov]

Sent: Wednesday, February 22, 2012 7:45 AM

To: Grant, Greg

Subject: RE: VE Study

Greg,

I think that 95 \$/SF is reasonable for a concrete bridge over a stream; the price would be less in a rural setting but this should work for your project. However, the data for steel bridges is more limited. I would probably use 115 \$/SF.

Bill

Bill DuVall

Bridge Design

(404) 631-1883

From: Grant, Greg [mailto:Greg.Grant@rsandh.com]

Sent: Tuesday, February 21, 2012 10:34 AM

To: DuVall, Bill

Subject: VE Study

Bill,

Do you have any recent Sq FT cost data for:

- PSC beam bridge over stream
- Steel Bridge Over Stream

Best regards, Greg

R/W COSTS

\$175,000/ACRE \times 1.55 scheduling contingency \times 1.6 admin/court costs = \$434,000/ACRE

CALCULATIONS

PROPOSAL NUMBER: R-1.0	PAGE NUMBER: 13 of 14
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PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Cost of Original Concept

Cost of Bridges: Original Concept					
Bridge	Length	Width	Area	\$/Sq Ft	Cost
Ramp C	200	39.25	7850	\$ 95.00	\$ 745,750
Ramp D	200	47.25	9450	\$ 95.00	\$ 897,750
Ramp E	475	47.25	22443.75	\$ 115.00	\$ 2,581,031
Ramp F	200	39.25	7850	\$ 95.00	\$ 745,750
Ramp G	233	47.25	11009.25	\$ 95.00	\$ 1,045,879
Ramp H	400	39.25	15700	\$ 115.00	\$ 1,805,500
Totals	1708		74303	\$ 105.27	\$ 7,821,660

Cost of Ramps: Original Concept						
Ramp	Lanes	Length (ft)	Width (ft)	Paved Area (SY)	\$/Sq Yd	Cost
Ramp A	1-lane	1,350	26	3,900	\$ 77.43	\$ 301,977
Ramp A	4-lane	400	58	2,578	\$ 77.43	\$ 199,597
Ramp B	1-lane	1,900	26	5,489	\$ 77.43	\$ 425,005
Ramp B	2-lane	1,100	34	4,156	\$ 77.43	\$ 321,765
Ramp C	1-lane	1,000	26	2,889	\$ 77.43	\$ 223,687
Ramp C	2-lane	2,500	34	9,444	\$ 77.43	\$ 731,283
Ramp C	3-lane	850	46	4,344	\$ 77.43	\$ 336,390
Ramp C	4-lane	350	58	2,256	\$ 77.43	\$ 174,648
Ramp D	1-lane	1,800	26	5,200	\$ 77.43	\$ 402,636
Ramp D	2-lane	2,150	34	8,122	\$ 77.43	\$ 628,904
Ramp E	1-lane	1,500	26	4,333	\$ 77.43	\$ 335,530
Ramp E	2-lane	1,850	34	6,989	\$ 77.43	\$ 541,150
Ramp F	1-lane	700	26	2,022	\$ 77.43	\$ 156,581
Ramp F	2-lane	2,200	34	8,311	\$ 77.43	\$ 643,529
Ramp F	3-lane	1,300	46	6,644	\$ 77.43	\$ 514,479
Ramp G	1-lane	1,600	26	4,622	\$ 77.43	\$ 357,899
Ramp G	2-lane	1,900	34	7,178	\$ 77.43	\$ 555,775
Ramp H	1-lane	1,600	26	4,622	\$ 77.43	\$ 357,899
		26,050	Total	93,100	\$ 77.43	\$ 7,208,733

Note: Distances measured from aerial

Earthwork & Clear/Grub	Quantity	Unit	Cost/Unit	Cost
Clearing & Grubbing		Lump		\$ 1,000,000
Unclassified Excavation	250,000	Yd ³	\$ 3.63	\$ 907,500
Total				\$ 1,907,500

Right-of-Way	Quantity	Unit	Cost/Unit	Cost
Northside	17.55	Acre	\$ 434,000	\$ 7,616,959
Southside	19.08	Acre	\$ 434,000	\$ 8,282,197
Total	36.63		\$ 434,000	\$ 15,899,156

Measured in Microstation file

Original Concept Summary				
Description	Quantity	Unit	Cost/Unit	Cost
Bridges	74303	SQ FT	\$ 105.27	\$ 7,821,660
Ramps	93,100	SQ YD	\$ 77.43	\$ 7,208,733
Right of Way	36.63	Acre	\$ 434,000	\$ 15,899,156
Earthwork & Clear/Grub	1	LS	\$ 1,907,500.00	\$ 1,907,500
Totals				\$ 32,837,049

CALCULATIONS

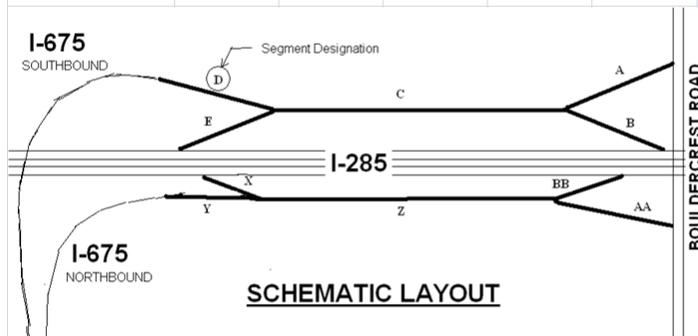
PROPOSAL NUMBER: R-1.0

PAGE NUMBER: 14 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Cost of Proposed Change

Cost of Bridges: Proposed Change					
Bridge	Length	Width	Area	\$/Sq Ft	Cost
Ramp C & E combined	155	59.25	9183.75	\$ 95.00	\$ 872,456
Ramp G & F combined	155	59.25	9183.75	\$ 95.00	\$ 872,456
Totals	310		18367.5	\$ 95.00	\$ 1,744,913



Ramp Segment Designation	Lanes	Length (ft)	Width (ft)	Paved Area (SY)	\$/Sq Yd	Cost
A	3-lane	550	46	2,811	\$ 77.43	\$ 217,664
A	1-lane	850	26	2,456	\$ 77.43	\$ 190,134
B	2-lane	1,000	34	3,778	\$ 77.43	\$ 292,513
C	3-lane	2,300	46	11,756	\$ 77.43	\$ 910,233
D	2-lane	900	34	3,400	\$ 77.43	\$ 263,262
E	1-lane	1,000	26	2,889	\$ 77.43	\$ 223,687
X	1-lane	1,300	26	3,756	\$ 77.43	\$ 290,793
Y	2-lane	1,800	34	6,800	\$ 77.43	\$ 526,524
Z	3-lane	1,700	46	8,689	\$ 77.43	\$ 672,781
AA	1-lane	900	26	2,600	\$ 77.43	\$ 201,318
AA	2.5-lanes	600	40	2,667	\$ 77.43	\$ 206,480
AA	4-lanes	300	58	1,933	\$ 77.43	\$ 149,698
BB	2-lane	1,000	34	3,778	\$ 77.43	\$ 292,513
		14,200	Total	57,311	\$ 77.43	\$ 4,437,599

Note: Distances measured from sketch made in Microstation file

The Combined CD alternate requires less earthwork and no grade separation of ramps over ramps. No cross sections are available. Assume 25% reduction in Earthwork & Clearing & Grubbing

Earthwork & Clear/Grub	Quantity	Unit	Cost/Unit	Cost
Clearing & Grubbing				\$ 250,000
Unclassified Excavation	187,500	Yd ³	\$ 3.63	\$ 680,625
Total				\$ 930,625

Right-of-Way	Quantity	Unit	Cost/Unit	Cost
Northside	8.98	Acre	\$ 434,000	\$ 3,897,033
Southside	10.42	Acre	\$ 434,000	\$ 4,520,574
Total	19.40		\$ 434,000	\$ 8,417,607

Measured in Microstation file

Proposed Change Summary				
Description	Quantity	Unit	Cost/Unit	Cost
Bridges	18367.5	SQ FT	\$ 95.00	\$ 1,744,913
Ramps	57,311	SQ YD	\$ 77.43	\$ 4,437,599
Right of Way	19.40	Acre	\$ 434,000	\$ 8,417,607
Earthwork & Clear/Grub	1	LS	\$ 930,625	\$ 930,625
Totals				\$ 15,530,744

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER:	R-1.1	PAGE NUMBER:	1 of 14
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
PROJECT TITLE:	I-285 @ Bouldercrest Road, DeKalb County

PROPOSAL DESCRIPTION:	Use a collector-distributor (CD) system in lieu of a braided ramp system along each side of I-285 with a single combined bridge widening across South River.
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ORIGINAL DESIGN: The original design using a braided ramp concept provides separate, isolated ramps in order to reduce weaving of exiting vehicles from the three alignments affected by this project: I-285, I-675 and Bouldercrest Road.

These ramps isolate the following movements

On the South side of I-285:

- Ramp C: I-675 NB to Bouldercrest Road
- Ramp D: I-675 NB to I-285 EB
- Ramp E: I-285 EB to Bouldercrest Road

Note:

Ramp D splits away from Ramp C

Ramp E merges with Ramp C prior to Bouldercrest Road

On the North side of I-285:

- Ramp F: Bouldercrest Road to I-675 SB
- Ramp G: I-285 WB to I-675 SB
- Ramp H: Bouldercrest Road to I-285 WB

Note:

Ramp H splits away from Ramp F

Ramp G merges with Ramp F prior to I-675 SB

This braided ramp configuration requires three separate bridges to carry the individual ramps over South River. In order to not require a fourth bridge, Ramp E and Ramp H cross over Ramp D and Ramp G, respectively, at the South River crossing. This creates a bridge over a bridge over a river condition on both sides of I-285.

	INITIAL COST	OPERATING COST	TOTAL LIFE-CYCLE COST
ORIGINAL DESIGN:	\$ 32,837,049		\$ 32,837,049
PROPOSED CHANGE:	\$ 14,090,780		\$ 14,090,780
SAVINGS:	\$ 18,746,269		\$ 18,746,269

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-1.1

PAGE NUMBER: 2 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

PROPOSED CHANGE: It is proposed to combine the ramps from I-675 to I-285 and Bouldercrest Road and the ramp from I-285 to Bouldercrest Road into a combined CD system. Provide a length of CD system that provides a weaving distance that meets or exceeds the minimum length required. Reduce the number of bridge crossings of South River to one combined bridge widening of the existing I-285 bridge on each side of I-285.

On South side of I-285

Two – 12’ lanes will depart from I-285 EB and two - 12’ lanes will depart from I-675 NB and combine into one alignment with three – 12’ lanes of traffic.

One lane will merge onto I-285 EB and two lanes will exit toward Bouldercrest Road.

On North side of I-285

Two – 12’ lanes will depart from Bouldercrest Road, combining into one lane, and two - 12’ lanes will depart from I-285 WB and combine into one alignment with three – 12’ lanes of traffic.

Two lanes will merge onto I-675 SB and one lane will exit toward I-285 WB.

The exit points from I-285 will need to be shifted prior to the exit points in the original concept to increase the length allowed for weaving distance.

The existing bridges over South River on I-285 will be widened by adding three-12 foot lanes with 10 foot shoulders on both sides with 1.625 ft “jersey” side barriers on both sides.

(Overall bridge width = 36 ft lanes + 20 ft shoulders + 3.25 side barriers = 59.25 ft)

(Bridge length = length of existing I-285 bridge = 155 ft)

Barrier separation of the CD system will be required because of the close proximity of the CD system to the existing travel lanes.

ADVANTAGES/DISADVANTAGES/JUSTIFICATION

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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ADVANTAGES:

- Reduces the number of structures on the project, which in turn:
 - Reduces long term maintenance costs
 - Eliminates obstructions adjacent to the roadway
 - Reduces environmental impact near the River
 - Eliminates the bridge over a bridge condition which simplifies the project
 - Reduces bridge width by not requiring shoulders on each side of dedicated ramp.
 - Reduces bridge complexity by eliminating braided crossing
 - Eliminates the need for retaining walls and or slope paving at bridge abutments for bridges eliminated.
- Reduces Right-of-Way (R/W) acquisition

DISADVANTAGES:

- Requires careful attention to signing
- Increases length of I-285 EB and WB exit ramps to increase weaving distance
- Does not allow for future widening of I-285

JUSTIFICATION:

There is sufficient distance to provide a combined CD system that allows for the required vehicular movements. The CD system approach provides all required movements and results in a significant reduction in R/W acquisition.

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER: R-1.1

PAGE NUMBER: 4 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Right of Way	1	ACRE	36.634	\$434,000	15,899,156
Earthwork (includes Clearing & Grubbing)	1	LS	1	See Itemized Calculation	1,907,500
Bridges	7	SQ FT	74,303	See Itemized Calculation	7,821,660
Ramps	1	SQ YD	93,100	See Itemized Calculation	7,208,733
SUBTOTAL – COST TO PRIME					\$32,837,049
MARKUP					
TOTAL CONTRACT COST					\$32,837,049

PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Right of Way	1	ACRE	15.378	\$434,000	6,674,035
Earthwork (includes Clearing & Grubbing)	1	LS	1	See Itemized Calculation	885,250
Bridges	7	SQ FT	18367.5	See Itemized Calculation	2,093,895
Ramps	1	SQ YD	57,311	See Itemized Calculation	4,437,599
SUBTOTAL – COST TO PRIME					\$14,090,780
MARKUP					
TOTAL CONTRACT COST					\$14,090,780

Difference [Original-Proposed] **\$18,746,269**

SOURCES

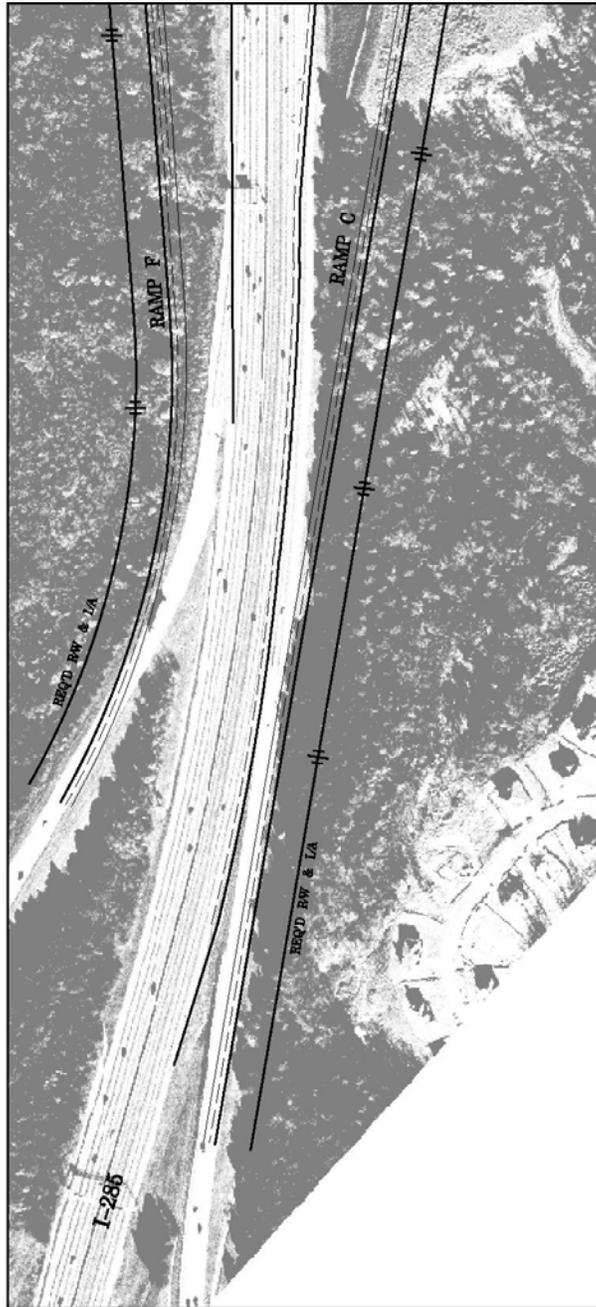
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| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor (Specify) 7. From GDOT Bridge Design (See calcs.) 8. Other (Specify) |
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ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-1.1

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PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

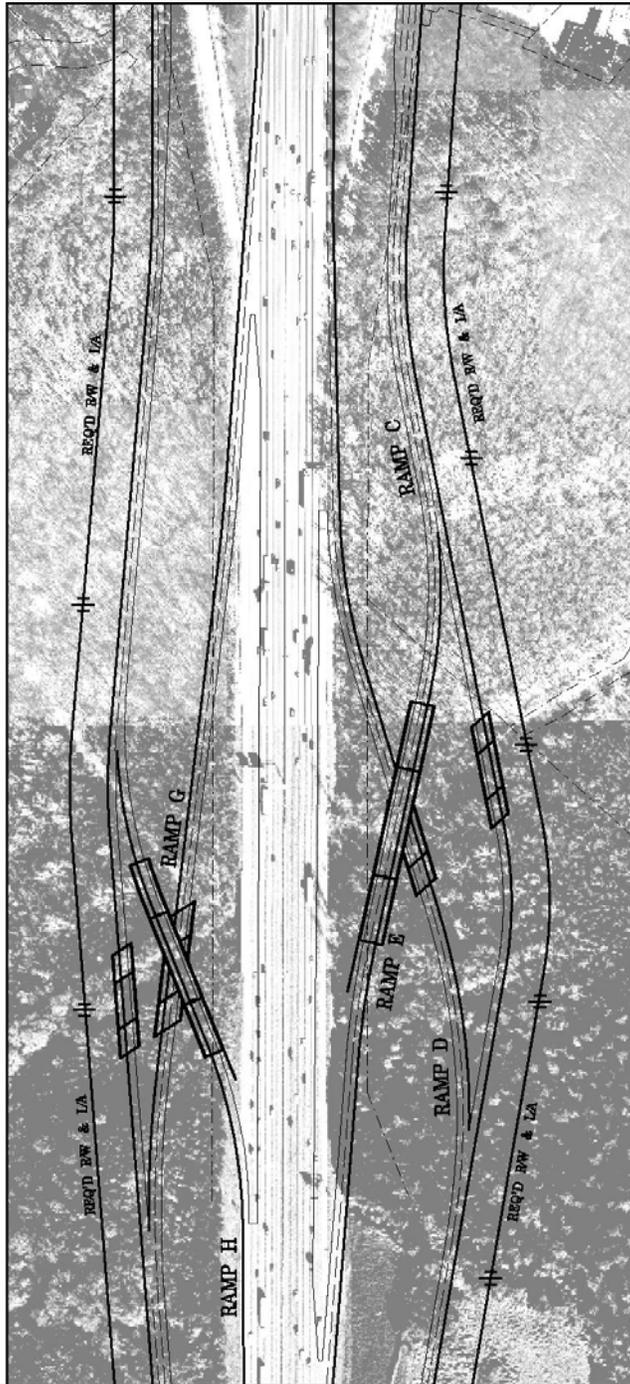


ORIGINAL DESIGN SKETCH/DETAIL

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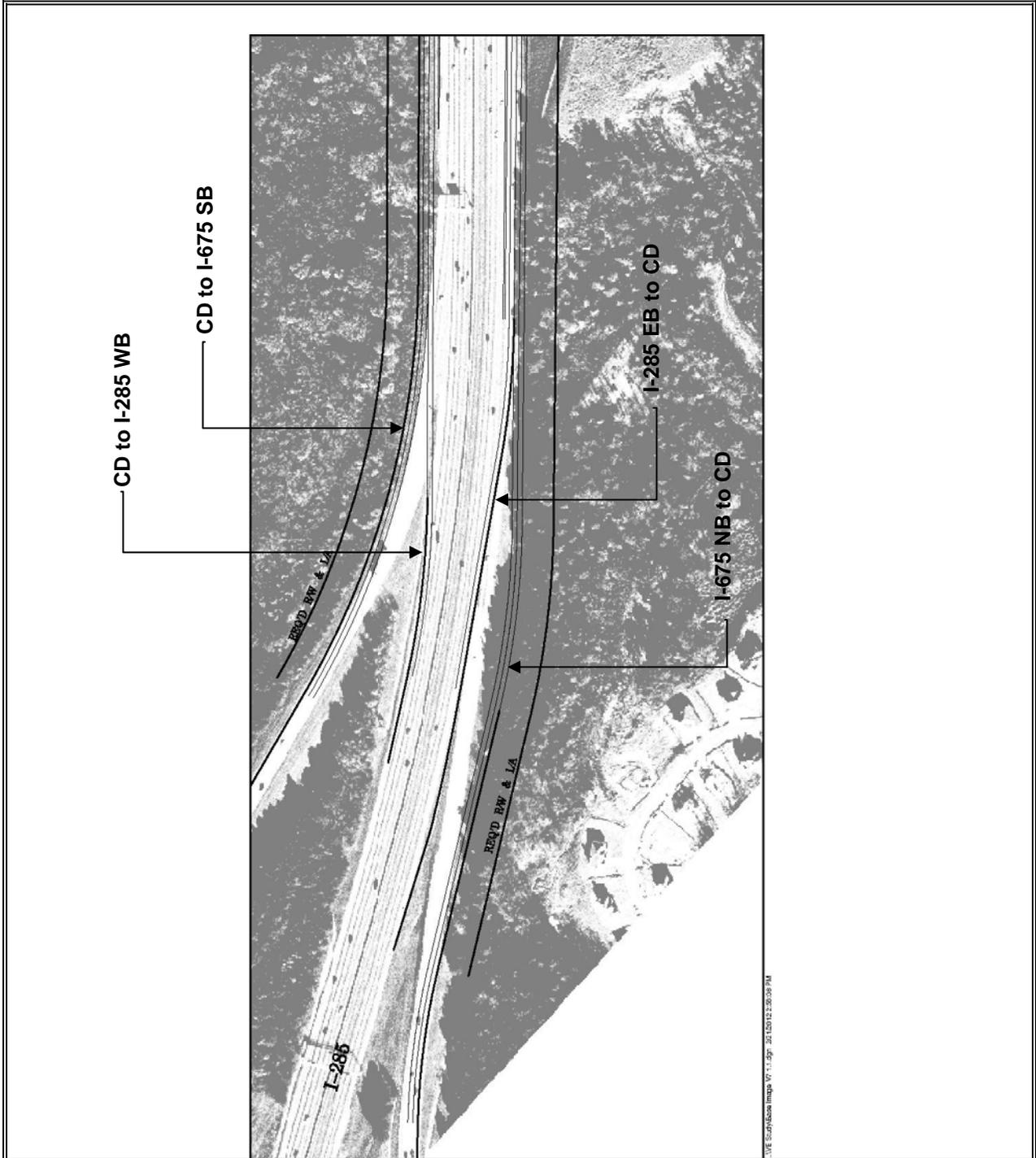


PROPOSED CHANGE SKETCH/DETAIL

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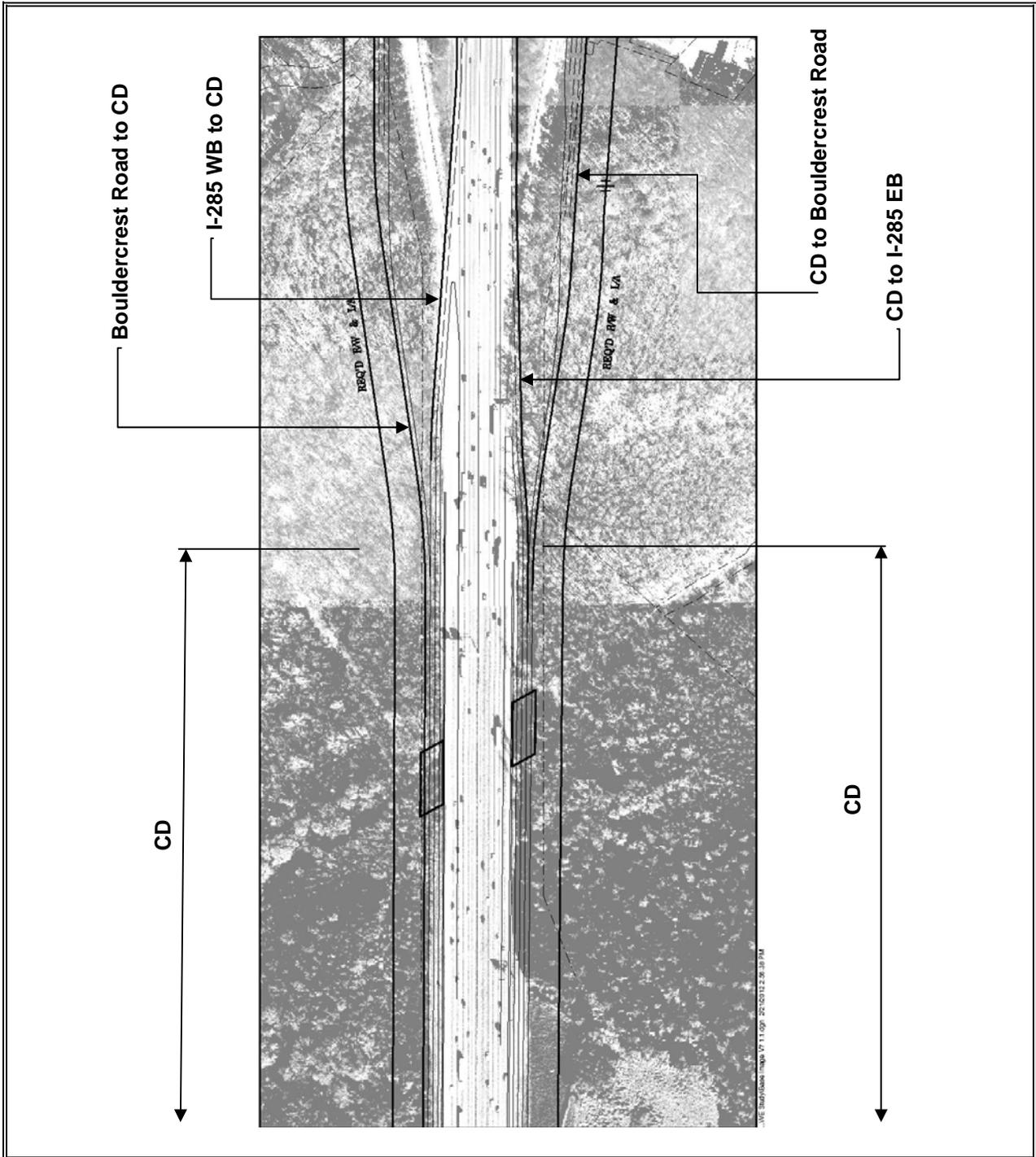


PROPOSED CHANGE SKETCH/DETAIL

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PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



CALCULATIONS

PROPOSAL NUMBER: R-1.1

PAGE NUMBER: 9 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Original Concept

The following data was provided by the designer in advance of the VE Study:

I-285 at Bouldercrest Road

IMNH0-0285-01(352)

PI #713300

Conceptual Bridge Layout

Bouldercrest Road over I-285

The existing bridge (Bridge ID # 089-148-0) is 249'-0" with concrete slope paving at 2:1. It is assumed that the new bridge will be approximately the same length but have MSE walls at the end bents. The width of the proposed bridge is 124'-0" curb to curb width plus a 6'-0" sidewalk and 1'-2 1/2" from parapet to deck edge on each side of the bridge. This equals a total bridge width of 138'-5" (out to out). The bridge will be 2 spans and have a total length of 250 feet. Spans 1 and 2 will be 125 feet long (72" Bulb Tee Prestressed Concrete Beam).

Ramps

All ramps have 8'-0" left shoulders and 12'-0" right shoulders. Approximate top of bank is at elevation 770. Existing Bridge at I-285 over South River has top of deck elevations at approximately 786. Lower level ramps (C, D, F, and G) will be assumed to be at the same elevation as the existing bridge. Second level ramps (E and H) will be assumed to be 30 ft above lower level ramps. For hydraulic reasons, bridge opening will be assumed to match the existing bridge, which is approximately 200 ft long.

Ramp C Bridge

The Ramp C Bridge carries one 16'-0" lane. When the shoulders are added, this equals a gutter to gutter width of 36'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 39'-3" (out to out). The bridge will be 3 spans and have a total length of 200 feet. Spans 1 and 3 will be 55 feet long (Type II Prestressed Concrete Beam) and Span 2 will be 90 feet long (54" Bulb Tee Prestressed Concrete Beam).

Ramp D Bridge

The Ramp D Bridge carries two 12'-0" lanes. When the shoulders are added, this equals a gutter to gutter width of 44'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 47'-3" (out to out). The bridge will be 3 spans and have a total length of 200 feet. Spans 1 and 3 will be 55 feet long (Type II Prestressed Concrete Beam) and Span 2 will be 90 feet long (54" Bulb Tee Prestressed Concrete Beam).

CALCULATIONS

PROPOSAL NUMBER: R-1.1

PAGE NUMBER: 10 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Original Concept (con't.)

Ramp E Bridge

The Ramp E Bridge also carries two 12'-0" lanes. When the shoulders are added, this equals a gutter to gutter width of 44'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 47'-3" (out to out). The bridge will be 3 spans and have a total length of 475 feet. Spans 1 and 3 will be 130 feet long (Steel Plate Girder) and Span 2 will be 215 feet long (Steel Plate Girder). The intermediate bents will be single column hammerhead piers in order to avoid conflict with the lower level ramp.

Ramp F Bridge

The Ramp F Bridge carries one 16'-0" lane. When the shoulders are added, this equals a gutter to gutter width of 36'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 39'-3" (out to out). The bridge will be 3 spans and have a total length of 200 feet. Spans 1 and 3 will be 55 feet long (Type II Prestressed Concrete Beam) and Span 2 will be 90 feet long (54" Bulb Tee Prestressed Concrete Beam).

Ramp G Bridge

The Ramp G Bridge carries two 12'-0" lanes. When the shoulders are added, this equals a gutter to gutter width of 44'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 47'-3" (out to out). The bridge will be 3 spans and have a total length of 233 feet. Spans 1 and 3 will be 65 feet long (Type II Prestressed Concrete Beam) and Span 2 will be 103 feet long (54" Bulb Tee Prestressed Concrete Beam).

Ramp H Bridge

The Ramp H Bridge carries one 16'-0" lane. When the shoulders are added, this equals a gutter to gutter width of 36'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 39'-3" (out to out). The bridge will be 3 spans and have a total length of 400 feet. Spans 1 and 3 will be 110 feet long (Steel Plate Girder) and Span 2 will be 180 feet long (Steel Plate Girder). The intermediate bents will be single column hammerhead piers in order to avoid conflict with the lower level ramp.

Retaining Walls

Retaining walls will probably be required on one end of Ramps E and H as shown in the Ramp Location Sketch.

CALCULATIONS

PROPOSAL NUMBER: R-1.1

PAGE NUMBER: 11 of 14

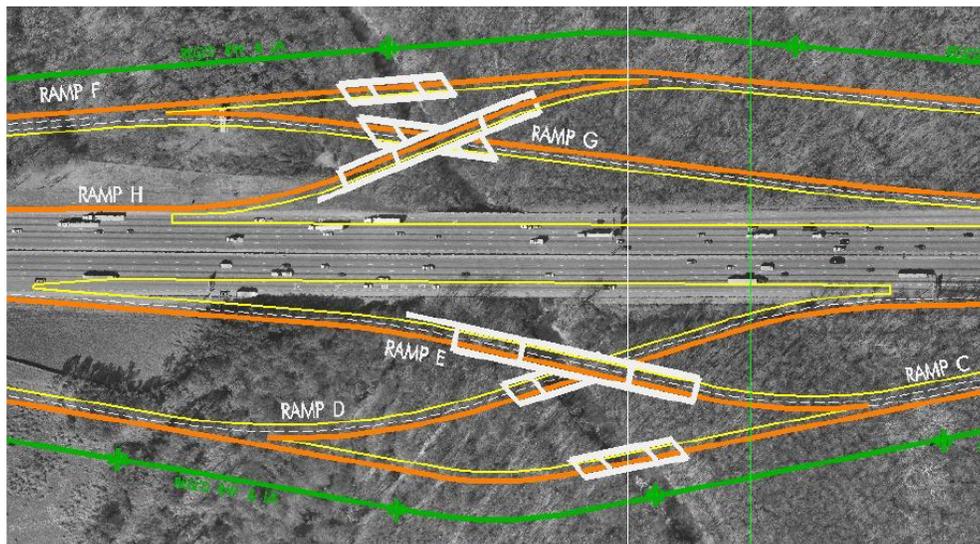
PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Original Concept (con't.)

Bridge Summary Table:

Bridge	Total Length (ft)	Out to Out Width (ft)	Span Arrangement and Beam Type	Intermediate Bent Type
Bouldercrest Rd. over I-285	250	138'-5"	Span 1 / 125'-0" / 72" Bulb Tee Span 2 / 125'-0" / 72" Bulb Tee	Multicolumn
Ramp C	200	39'-3"	Span 1 / 55'-0" / Type II Span 2 / 90'-0" / 54" Bulb Tee Span 3 / 55'-0" / Type II	Multicolumn
Ramp D	200	47'-3"	Span 1 / 55'-0" / Type II Span 2 / 90'-0" / 54" Bulb Tee Span 3 / 55'-0" / Type II	Multicolumn
Ramp E	475	47'-3"	Span 1 / 130'-0" / Steel Plate Girder Span 2 / 215'-0" / Steel Plate Girder Span 3 / 130'-0" / Steel Plate Girder	Single Column Hammerhead
Ramp F	200	39'-3"	Span 1 / 55'-0" / Type II Span 2 / 90'-0" / 54" Bulb Tee Span 3 / 55'-0" / Type II	Multicolumn
Ramp G	233	47'-3"	Span 1 / 65'-0" / Type II Span 2 / 103'-0" / 54" Bulb Tee Span 3 / 65'-0" / Type II	Multicolumn
Ramp H	400	39'-3"	Span 1 / 110'-0" / Steel Plate Girder Span 2 / 180'-0" / Steel Plate Girder Span 3 / 110'-0" / Steel Plate Girder	Single Column Hammerhead

Ramp Location Sketch:



CALCULATIONS

PROPOSAL NUMBER: R-1.1

PAGE NUMBER: 12 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Cost Basis for proposed change:

Pavement Section Cost – Concrete Ramps

12" GAB: \$17.97/TN \times 0.675TNS/SY	\$12.13/SY
3" asphalt base course: 3.0 \times (110/2000) \times (\$62.42/TN)	\$10.30/SY
10" concrete pavement	<u>\$55.00/SY</u>
TOTAL	\$77.43/SY

Determination of Bridge Sq. Ft Unit Cost to use

Square foot cost of bridges used in the latest cost estimate is not uniform between bridges. The team asked Bill Duvall, PE, Asst. State Bridge Engineer, for an approximate unit cost to use. Both cost of original and proposed were adjusted by these values.

From: DuVall, Bill [mailto:bduvall@dot.ga.gov]

Sent: Wednesday, February 22, 2012 7:45 AM

To: Grant, Greg

Subject: RE: VE Study

Greg,

I think that 95 \$/SF is reasonable for a concrete bridge over a stream; the price would be less in a rural setting but this should work for your project. However, the data for steel bridges is more limited. I would probably use 115 \$/SF.

Bill

Bill DuVall

Bridge Design

(404) 631-1883

From: Grant, Greg [mailto:Greg.Grant@rsandh.com]

Sent: Tuesday, February 21, 2012 10:34 AM

To: DuVall, Bill

Subject: VE Study

Bill,

Do you have any recent Sq FT cost data for:

- PSC beam bridge over stream
- Steel Bridge Over Stream

Best regards, Greg

R/W COSTS

\$175,000/ACRE \times 1.55 scheduling contingency \times 1.6 admin/court costs = \$434,000/ACRE

CALCULATIONS

PROPOSAL NUMBER: R-1.1

PAGE NUMBER: 13 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Original Concept						
Cost of Bridges: Original Concept						
Bridge	Length	Width	Area	\$/Sq Ft	Cost	
Ramp C	200	39.25	7850	\$ 95.00	\$ 745,750	
Ramp D	200	47.25	9450	\$ 95.00	\$ 897,750	
Ramp E	475	47.25	22443.75	\$ 115.00	\$ 2,581,031	
Ramp F	200	39.25	7850	\$ 95.00	\$ 745,750	
Ramp G	233	47.25	11009.25	\$ 95.00	\$ 1,045,879	
Ramp H	400	39.25	15700	\$ 115.00	\$ 1,805,500	
Totals	1708		74303	\$ 105.27	\$ 7,821,660	
Cost of Ramps: Original Concept						
Ramp	Lanes	Length (ft)	Width (ft)	Paved Area (SY)	\$/Sq Yd	Cost
Ramp A	1-lane	1,350	26	3,900	\$ 77.43	\$ 301,977
Ramp A	4-lane	400	58	2,578	\$ 77.43	\$ 199,597
Ramp B	1-lane	1,900	26	5,489	\$ 77.43	\$ 425,005
Ramp B	2-lane	1,100	34	4,156	\$ 77.43	\$ 321,765
Ramp C	1-lane	1,000	26	2,889	\$ 77.43	\$ 223,687
Ramp C	2-lane	2,500	34	9,444	\$ 77.43	\$ 731,283
Ramp C	3-lane	850	46	4,344	\$ 77.43	\$ 336,390
Ramp C	4-lane	350	58	2,256	\$ 77.43	\$ 174,648
Ramp D	1-lane	1,800	26	5,200	\$ 77.43	\$ 402,636
Ramp D	2-lane	2,150	34	8,122	\$ 77.43	\$ 628,904
Ramp E	1-lane	1,500	26	4,333	\$ 77.43	\$ 335,530
Ramp E	2-lane	1,850	34	6,989	\$ 77.43	\$ 541,150
Ramp F	1-lane	700	26	2,022	\$ 77.43	\$ 156,581
Ramp F	2-lane	2,200	34	8,311	\$ 77.43	\$ 643,529
Ramp F	3-lane	1,300	46	6,644	\$ 77.43	\$ 514,479
Ramp G	1-lane	1,600	26	4,622	\$ 77.43	\$ 357,899
Ramp G	2-lane	1,900	34	7,178	\$ 77.43	\$ 555,775
Ramp H	1-lane	1,600	26	4,622	\$ 77.43	\$ 357,899
		26,050	Total	93,100	\$ 77.43	\$ 7,208,733
Earthwork & Clear/Grub						
		Quantity	Unit	Cost/Unit	Cost	
Clearing & Grubbing					\$ 1,000,000	
Unclassified Excavation		250,000	Yd ³	\$ 3.63	\$ 907,500	
		Total			\$ 1,907,500	
Right-of-Way						
		Quantity	Unit	Cost/Unit	Cost	
Northside		17.55	Acre	\$ 434,000.00	\$ 7,616,959	
Southside		19.08	Acre	\$ 434,000.00	\$ 8,282,197	
		Total		\$ 434,000.00	\$ 15,899,156	
Measured in Microstation file						
Original Concept Summary						
Description	Quantity	Unit	Cost/Unit	Cost		
Bridges	74303	SQ FT	\$ 105.27	\$ 7,821,660		
Ramps	93,100	SQ YD	\$ 77.43	\$ 7,208,733		
Right of Way	19	Acre	\$ 434,000	\$ 15,899,156		
Earthwork	1	LS	\$ 1,907,500	\$ 1,907,500		
Totals				\$ 32,837,049		

CALCULATIONS

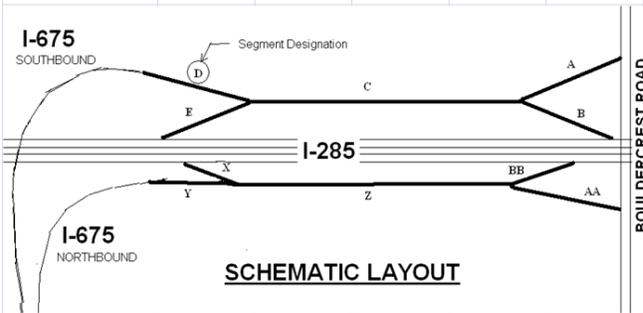
PROPOSAL NUMBER: R-1.1

PAGE NUMBER: 14 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Proposed Change					
Cost of Bridges: Proposed Change					
Bridge	Length	Width	Area	\$/sq Ft	Cost
Ramp C & E combined	155	59.25	9183.75	\$ 114.00	\$ 1,046,948
Ramp G & F combined	155	59.25	9183.75	\$ 114.00	\$ 1,046,948
					\$ -
					\$ -
					\$ -
					\$ -
Totals	310		18367.5	\$ 114.00	\$ 2,093,895

Use \$95/sq ft x 1.2 factor for widening an existing bridge = \$114/sq ft



Ramp Segment Designation	Lanes	Length (ft)	Width (ft)	Paved Area (SY)	\$/sq Yd	Cost
A	3-lane	550	46	2,811	\$ 77.43	\$ 217,664
A	1-lane	850	26	2,456	\$ 77.43	\$ 190,134
B	2-lane	1,000	34	3,778	\$ 77.43	\$ 292,513
C	3-lane	2,300	46	11,756	\$ 77.43	\$ 910,233
D	2-lane	900	34	3,400	\$ 77.43	\$ 263,262
E	1-lane	1,000	26	2,889	\$ 77.43	\$ 223,687
X	1-lane	1,300	26	3,756	\$ 77.43	\$ 290,793
Y	2-lane	1,800	34	6,800	\$ 77.43	\$ 526,524
Z	3-lane	1,700	46	8,689	\$ 77.43	\$ 672,781
AA	1-lane	900	26	2,600	\$ 77.43	\$ 201,318
AA	2.5-lanes	600	40	2,667	\$ 77.43	\$ 206,480
AA	4-lanes	300	58	1,933	\$ 77.43	\$ 149,698
BB	2-lane	1,000	34	3,778	\$ 77.43	\$ 292,513
		14,200	Total	57,311	\$ 77.43	\$ 4,437,599

Note: Distances measured from sketch made in Microstation file

The Combined CD alternate requires less earthwork and no grade separation of ramps over ramps.

No cross sections are available. Assume 30% reduction in Earthwork & Clearing & Grubbing

Earthwork & Clear/Grub	Quantity	Unit	Cost/Unit	Cost
Clearing & Grubbing				\$ 250,000
Unclassified Excavation	175,000	Yd ³	\$ 3.63	\$ 635,250
Total				\$ 885,250

Right-of-Way	Quantity	Unit	Cost/Unit	Cost
Northside	7.72	Acre	\$ 434,000	\$ 3,349,053
Southside	7.66	Acre	\$ 434,000	\$ 3,324,982
Total	15.38		\$ 434,000	\$ 6,674,035

Measured in Microstation file

Proposed Change Summary				
Description	Quantity	Unit	Cost/Unit	Cost
Bridges	18367.5	SQ FT	\$ 114.00	\$ 2,093,895
Ramps	57,311	SQ YD	\$ 77.43	\$ 4,437,599
Right of Way	15.38	Acre	\$ 434,000	\$ 6,674,035
Earthwork	1	LS	\$ 885,250	\$ 885,250
Totals				\$ 14,090,780

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 1 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-
PROJECT TITLE: I-285 @ Bouldercrest Road, DeKalb County

PROPOSAL DESCRIPTION: Combine exit ramps C&E and F&G and use left exit flyover ramps for H&D (2 bridges over the river on each side).

ORIGINAL DESIGN: The original design using a braided ramp concept provides separate, isolated ramps in order to reduce weaving of exiting vehicles from the three alignments affected by this project: I-285, I-675 and Bouldercrest Road.

These ramps isolate the following movements

On the South side of I-285:

- Ramp C: I-675 NB to Bouldercrest Road
- Ramp D: I-675 NB to I-285 EB
- Ramp E: I-285 EB to Bouldercrest Road

Note:

Ramp D splits away from Ramp C

Ramp E merges with Ramp C prior to Bouldercrest Road

On the North side of I-285:

- Ramp F: Bouldercrest Road to I-675 SB
- Ramp G: I-285 WB to I-675 SB
- Ramp H: Bouldercrest Road to I-285 WB

Note:

Ramp H splits away from Ramp F

Ramp G merges with Ramp F prior to I-675 SB

This braided ramp configuration required three separate bridges to carry the individual ramps over South River. In order to not require a fourth bridge, Ramp E and Ramp H cross over Ramp D and Ramp G, respectively, at the South River crossing. This creates a bridge over a bridge over a river condition on both sides of I-285.

	INITIAL COST	OPERATING COST	TOTAL LIFE- CYCLE COST
ORIGINAL DESIGN:	\$ 32,837,049		\$ 32,837,049
PROPOSED CHANGE:	\$ 30,400,952		\$ 30,400,952
SAVINGS:	\$ 2,436,097		\$ 2,436,097

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 2 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

PROPOSED CHANGE: It is proposed to merge the I-675 NB to Bouldercrest Road exit with the I-285 to Bouldercrest Road exit prior to crossing the South River to eliminate one bridge. Also, merge the Bouldercrest Road to I-675 SB entrance with the I-285 WB to I-675 SB entrance prior to crossing the South River to eliminate one bridge.

On South side of I-285

One – 12' lane will depart from I-285 EB and two - 12' lanes will depart from I-675 NB.

The left lane from I-675 will have a left exit that will join the single lane exiting I-285 and continue to Bouldercrest Road using a flyover over the two lanes that leave I-675 and merge onto I-285 EB.

On North side of I-285

Two – 12' lanes will depart from Bouldercrest Road and two - 12' lanes will depart from I-285 WB.

The left lane entering from Bouldercrest Road will join the two lanes exiting I-285 and will continue towards I-675 S. The right lane entering from Bouldercrest Road will continue to I-285 WB by a flyover bridge.

The two lane bridges over South River will be two-12 foot lanes with 10 foot shoulders on both sides with 1.625 ft “jersey” side barriers on both sides.

(Overall bridge width = 24 ft lanes + 20 ft shoulders + 3.25 side barriers = 47.25 ft)

(Bridge length = length of existing I-285 bridge = 155 ft)

The one lane bridge over South River will be one-16 foot lane with 10 foot shoulders on both sides with 1.625 ft “jersey” side barriers on both sides.

(Overall bridge width = 16 ft lanes + 20 ft shoulders + 3.25 side barriers = 43.25 ft)

(Bridge length = length of existing I-285 bridge = 155 ft)

ADVANTAGES/DISADVANTAGES/JUSTIFICATION

PROPOSAL NUMBER:	R-2.0	PAGE NUMBER:	3 of 14
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ADVANTAGES:

- Reduces the number of structures on the project, which in turn reduces long term maintenance costs
- Reduces environmental impact near the River
- Provides cost savings

DISADVANTAGES:

- Requires careful attention to signing

JUSTIFICATION:

There is sufficient distance to combine ramp movements that allow for the required vehicular movements. The proposed alternative provides for all vehicle movements while eliminating two bridges and providing a value added savings to the project.

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 4 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Bridges	7	SQ FT	74303	See Calcs	7,821,660
Ramps	1	SQ YD	93,100	See Calcs	7,208,733
Right of Way	1	ACRE	36.63	434,000	15,899,156
Earthwork & Clear/Grub	1	LS	1	See Calcs	1,907,500
SUBTOTAL – COST TO PRIME					\$32,837,049
MARKUP					
TOTAL CONTRACT COST					\$32,837,049

PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Bridges	7	SQ FT	54,803	See Calcs	5,893,160
Ramps	1	SQ YD	86,544	See Calcs	6,701,136
Right of Way	1	ACRE	36.63	434,000	15,899,156
Earthwork & Clear/Grub	1	LS	1	See Calcs	1,907,500
SUBTOTAL – COST TO PRIME					\$30,400,952
MARKUP					
TOTAL CONTRACT COST					\$30,400,952

Difference [Original-Proposed] **\$2,436,097**

SOURCES

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor (Specify) 7. From GDOT Bridge Design (See calcs.) 8. Other (Specify) |
|---|---|

ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 5 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

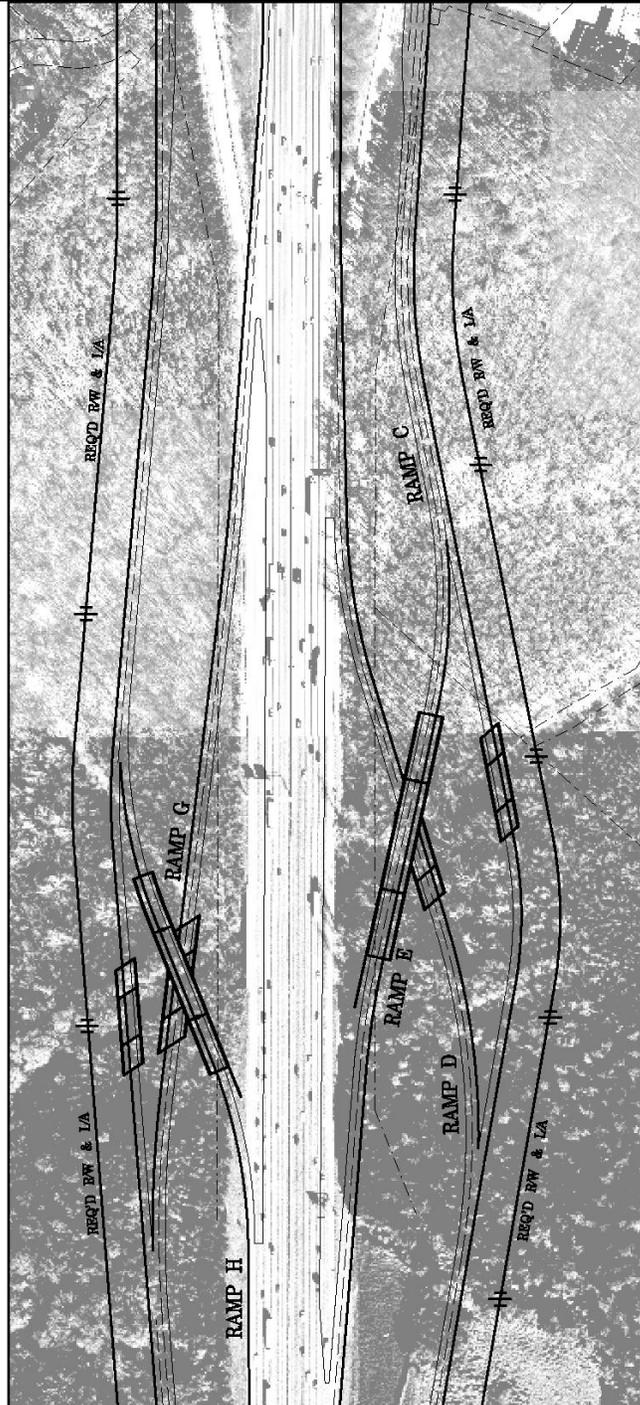


ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 6 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

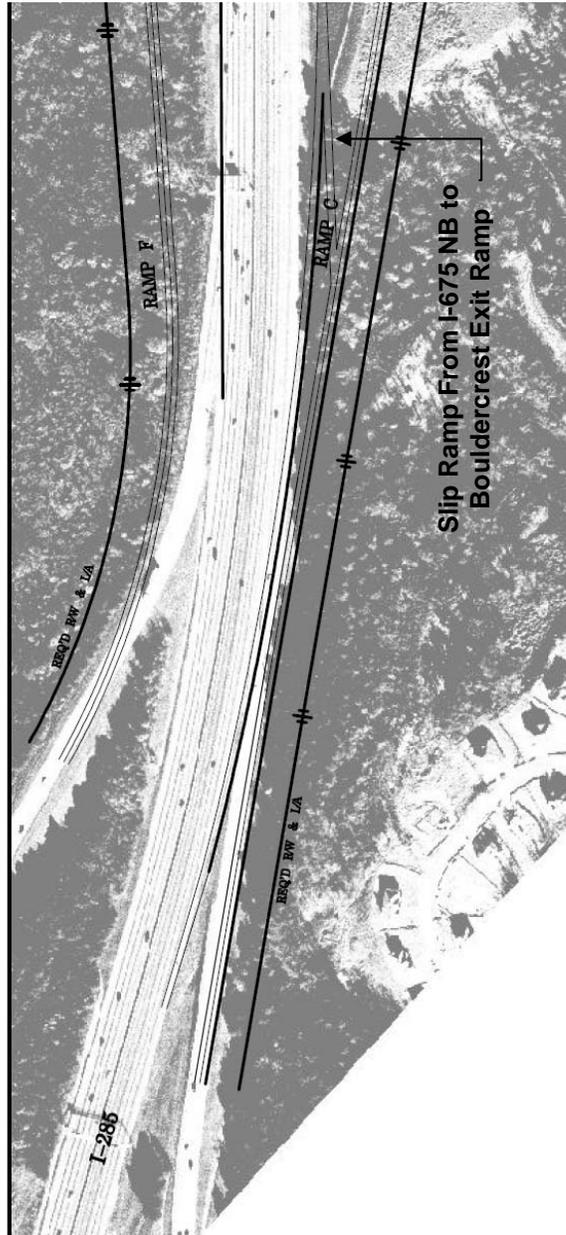


PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 7 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



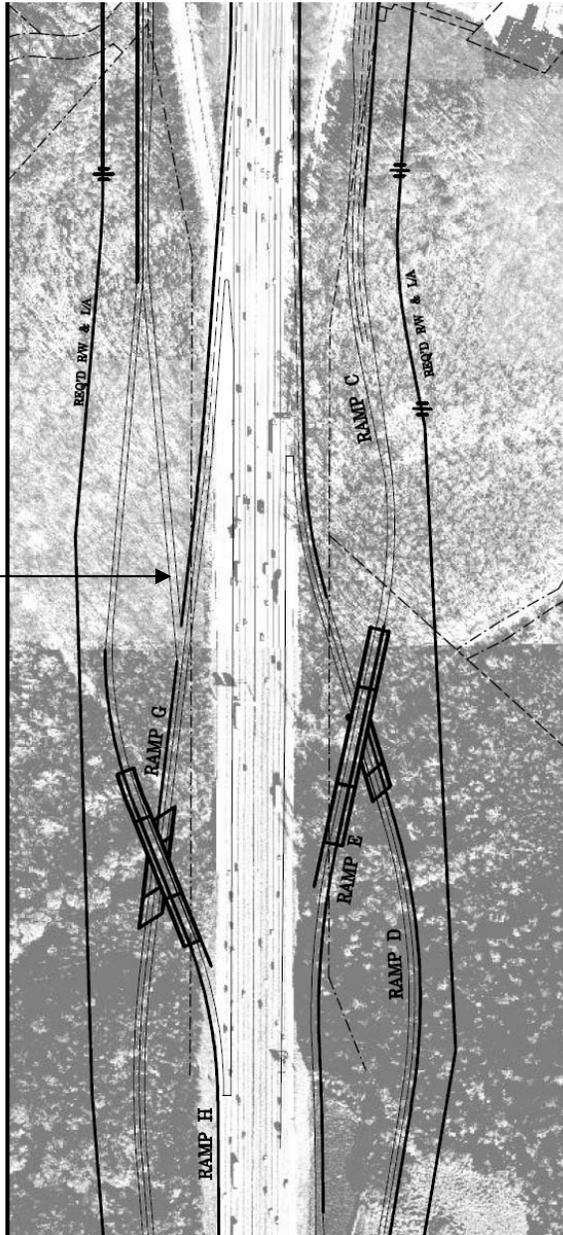
PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 8 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Slip Ramp From Bouldercrest
Road to I-675 SB



CALCULATIONS

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 9 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Original Concept

The following data was provided by the designer in advance of the VE Study:

I-285 at Bouldercrest Road

IMNH0-0285-01(352)

PI #713300

Conceptual Bridge Layout

Bouldercrest Road over I-285

The existing bridge (Bridge ID # 089-148-0) is 249'-0" with concrete slope paving at 2:1. It is assumed that the new bridge will be approximately the same length but have MSE walls at the end bents. The width of the proposed bridge is 124'-0" curb to curb width plus a 6'-0" sidewalk and 1'-2 1/2" from parapet to deck edge on each side of the bridge. This equals a total bridge width of 138'-5" (out to out). The bridge will be 2 spans and have a total length of 250 feet. Spans 1 and 2 will be 125 feet long (72" Bulb Tee Prestressed Concrete Beam).

Ramps

All ramps have 8'-0" left shoulders and 12'-0" right shoulders. Approximate top of bank is at elevation 770. Existing Bridge at I-285 over South River has top of deck elevations at approximately 786. Lower level ramps (C, D, F, and G) will be assumed to be at the same elevation as the existing bridge. Second level ramps (E and H) will be assumed to be 30 ft above lower level ramps. For hydraulic reasons, bridge opening will be assumed to match the existing bridge, which is approximately 200 ft long.

Ramp C Bridge

The Ramp C Bridge carries one 16'-0" lane. When the shoulders are added, this equals a gutter to gutter width of 36'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 39'-3" (out to out). The bridge will be 3 spans and have a total length of 200 feet. Spans 1 and 3 will be 55 feet long (Type II Prestressed Concrete Beam) and Span 2 will be 90 feet long (54" Bulb Tee Prestressed Concrete Beam).

Ramp D Bridge

The Ramp D Bridge carries two 12'-0" lanes. When the shoulders are added, this equals a gutter to gutter width of 44'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 47'-3" (out to out). The bridge will be 3 spans and have a total length of 200 feet. Spans 1 and 3 will be 55 feet long (Type II Prestressed Concrete Beam) and Span 2 will be 90 feet long (54" Bulb Tee Prestressed Concrete Beam).

CALCULATIONS

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 10 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Original Concept (con't.)

Ramp E Bridge

The Ramp E Bridge also carries two 12'-0" lanes. When the shoulders are added, this equals a gutter to gutter width of 44'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 47'-3" (out to out). The bridge will be 3 spans and have a total length of 475 feet. Spans 1 and 3 will be 130 feet long (Steel Plate Girder) and Span 2 will be 215 feet long (Steel Plate Girder). The intermediate bents will be single column hammerhead piers in order to avoid conflict with the lower level ramp.

Ramp F Bridge

The Ramp F Bridge carries one 16'-0" lane. When the shoulders are added, this equals a gutter to gutter width of 36'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 39'-3" (out to out). The bridge will be 3 spans and have a total length of 200 feet. Spans 1 and 3 will be 55 feet long (Type II Prestressed Concrete Beam) and Span 2 will be 90 feet long (54" Bulb Tee Prestressed Concrete Beam).

Ramp G Bridge

The Ramp G Bridge carries two 12'-0" lanes. When the shoulders are added, this equals a gutter to gutter width of 44'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 47'-3" (out to out). The bridge will be 3 spans and have a total length of 233 feet. Spans 1 and 3 will be 65 feet long (Type II Prestressed Concrete Beam) and Span 2 will be 103 feet long (54" Bulb Tee Prestressed Concrete Beam).

Ramp H Bridge

The Ramp H Bridge carries one 16'-0" lane. When the shoulders are added, this equals a gutter to gutter width of 36'-0". With a 1'-7 1/2" distance from jersey barrier gutter line to deck edge, this results in a total bridge width of 39'-3" (out to out). The bridge will be 3 spans and have a total length of 400 feet. Spans 1 and 3 will be 110 feet long (Steel Plate Girder) and Span 2 will be 180 feet long (Steel Plate Girder). The intermediate bents will be single column hammerhead piers in order to avoid conflict with the lower level ramp.

Retaining Walls

Retaining walls will probably be required on one end of Ramps E and H as shown in the Ramp Location Sketch.

CALCULATIONS

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 11 of 14

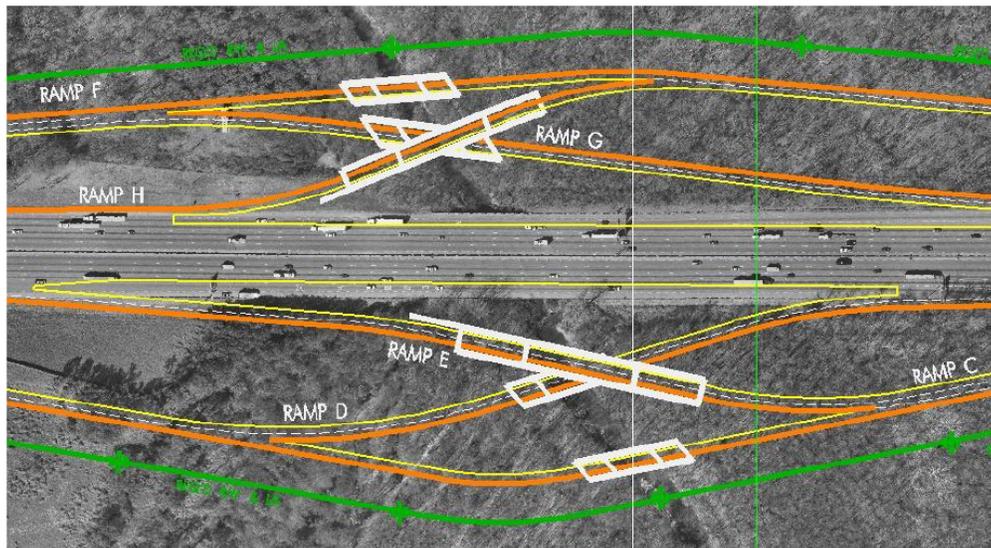
PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Original Concept (con't.)

Bridge Summary Table:

Bridge	Total Length (ft)	Out to Out Width (ft)	Span Arrangement and Beam Type	Intermediate Bent Type
Bouldercrest Rd. over I-285	250	138'-5"	Span 1 / 125'-0" / 72" Bulb Tee Span 2 / 125'-0" / 72" Bulb Tee	Multicolumn
Ramp C	200	39'-3"	Span 1 / 55'-0" / Type II Span 2 / 90'-0" / 54" Bulb Tee Span 3 / 55'-0" / Type II	Multicolumn
Ramp D	200	47'-3"	Span 1 / 55'-0" / Type II Span 2 / 90'-0" / 54" Bulb Tee Span 3 / 55'-0" / Type II	Multicolumn
Ramp E	475	47'-3"	Span 1 / 130'-0" / Steel Plate Girder Span 2 / 215'-0" / Steel Plate Girder Span 3 / 130'-0" / Steel Plate Girder	Single Column Hammerhead
Ramp F	200	39'-3"	Span 1 / 55'-0" / Type II Span 2 / 90'-0" / 54" Bulb Tee Span 3 / 55'-0" / Type II	Multicolumn
Ramp G	233	47'-3"	Span 1 / 65'-0" / Type II Span 2 / 103'-0" / 54" Bulb Tee Span 3 / 65'-0" / Type II	Multicolumn
Ramp H	400	39'-3"	Span 1 / 110'-0" / Steel Plate Girder Span 2 / 180'-0" / Steel Plate Girder Span 3 / 110'-0" / Steel Plate Girder	Single Column Hammerhead

Ramp Location Sketch:



CALCULATIONS

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 12 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Cost Basis for proposed change:

Pavement Section Cost – Concrete Ramps

12" GAB: \$17.97/TN \times 0.675TNS/SY	\$12.13/SY
3" asphalt base course: 3.0 \times (110/2000) \times (\$62.42/TN)	\$10.30/SY
10" concrete pavement	<u>\$55.00/SY</u>
TOTAL	\$77.43/SY

Determination of Bridge Sq. Ft Unit Cost to use

Square foot cost of bridges used in the latest cost estimate is not uniform between bridges. The team asked Bill Duvall, PE, Asst. State Bridge Engineer, for an approximate unit cost to use. Both cost of original and proposed were adjusted by these values.

From: DuVall, Bill [mailto:bduvall@dot.ga.gov]

Sent: Wednesday, February 22, 2012 7:45 AM

To: Grant, Greg

Subject: RE: VE Study

Greg,

I think that 95 \$/SF is reasonable for a concrete bridge over a stream; the price would be less in a rural setting but this should work for your project. However, the data for steel bridges is more limited. I would probably use 115 \$/SF.

Bill

Bill DuVall

Bridge Design

(404) 631-1883

From: Grant, Greg [mailto:Greg.Grant@rsandh.com]

Sent: Tuesday, February 21, 2012 10:34 AM

To: DuVall, Bill

Subject: VE Study

Bill,

Do you have any recent Sq FT cost data for:

- PSC beam bridge over stream
- Steel Bridge Over Stream

Best regards, Greg

R/W COSTS

\$175,000/ACRE \times 1.55 scheduling contingency \times 1.6 admin/court costs = \$434,000/ACRE

CALCULATIONS

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 13 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Cost of Bridges: Original Concept					
Bridge	Length	Width	Area	\$/Sq Ft	Cost
Ramp C	200	39.25	7850	\$ 95.00	\$ 745,750
Ramp D	200	47.25	9450	\$ 95.00	\$ 897,750
Ramp E	475	47.25	22443.75	\$ 115.00	\$ 2,581,031
Ramp F	200	39.25	7850	\$ 95.00	\$ 745,750
Ramp G	233	47.25	11009.25	\$ 95.00	\$ 1,045,879
Ramp H	400	39.25	15700	\$ 115.00	\$ 1,805,500
Totals	1708		74303	\$ 105.27	\$ 7,821,660

Cost of Ramps: Original Concept						
Ramp	Lanes	Length	Width	Paved Area	\$/Sq Yd	Cost
		(ft)	(ft)	(SY)		
Ramp A	1-lane	1,350	26	3,900	\$ 77.43	\$ 301,977
Ramp A	4-lane	400	58	2,578	\$ 77.43	\$ 199,597
Ramp B	1-lane	1,900	26	5,489	\$ 77.43	\$ 425,005
Ramp B	2-lane	1,100	34	4,156	\$ 77.43	\$ 321,765
Ramp C	1-lane	1,000	26	2,889	\$ 77.43	\$ 223,687
Ramp C	2-lane	2,500	34	9,444	\$ 77.43	\$ 731,283
Ramp C	3-lane	850	46	4,344	\$ 77.43	\$ 336,390
Ramp C	4-lane	350	58	2,256	\$ 77.43	\$ 174,648
Ramp D	1-lane	1,800	26	5,200	\$ 77.43	\$ 402,636
Ramp D	2-lane	2,150	34	8,122	\$ 77.43	\$ 628,904
Ramp E	1-lane	1,500	26	4,333	\$ 77.43	\$ 335,530
Ramp E	2-lane	1,850	34	6,989	\$ 77.43	\$ 541,150
Ramp F	1-lane	700	26	2,022	\$ 77.43	\$ 156,581
Ramp F	2-lane	2,200	34	8,311	\$ 77.43	\$ 643,529
Ramp F	3-lane	1,300	46	6,644	\$ 77.43	\$ 514,479
Ramp G	1-lane	1,600	26	4,622	\$ 77.43	\$ 357,899
Ramp G	2-lane	1,900	34	7,178	\$ 77.43	\$ 555,775
Ramp H	1-lane	1,600	26	4,622	\$ 77.43	\$ 357,899
			Total	93,100	\$ 77.43	\$ 7,208,733

Note: Distances measured from aerial

Earthwork & Clear/Grub	Quantity	Unit	Cost/Unit	Cost
Clearing & Grubbing		Lump		\$ 1,000,000
Unclassified Excavation	250,000	Yd ³	\$ 3.63	\$ 907,500
Total				\$ 1,907,500

Right-of-Way	Quantity	Unit	Cost/Unit	Cost
Northside	17.55	Acre	\$ 434,000	\$ 7,616,959
Southside	19.08	Acre	\$ 434,000	\$ 8,282,197
Total	36.63		\$ 434,000	\$ 15,899,156

Measured in Microstation file

Original Concept Summary				
Description	Quantity	Unit	Cost/Unit	Cost
Bridges	74303	SQ FT	\$ 105.27	\$ 7,821,660
Ramps	93,100	SQ YD	\$ 77.43	\$ 7,208,733
Right of Way	36.63	Acre	\$ 434,000	\$ 15,899,156
Earthwork & Clear/Grub	1	LS	\$ 1,907,500	\$ 1,907,500
Totals				\$ 32,837,049

CALCULATIONS

PROPOSAL NUMBER: R-2.0

PAGE NUMBER: 14 of 14

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Cost of Bridges:		Proposed Change			
Bridge	Length	Width	Area	\$/Sq Ft	Cost
Ramp C				\$ 95.00	\$ -
Ramp D	200	47.25	9450	\$ 95.00	\$ 897,750
Ramp E	475	39.25	18643.75	\$ 115.00	\$ 2,144,031
Ramp F				\$ 95.00	\$ -
Ramp G	233	47.25	11009.25	\$ 95.00	\$ 1,045,879
Ramp H	400	39.25	15700	\$ 115.00	\$ 1,805,500
Totals	1308		54803	\$ 107.53	\$ 5,893,160

Ramp E reduced to 1-lane (16 ft)

Cost of Ramps:		Proposed Change					
Ramp	Lanes	Length (ft)	Width (ft)	Paved Area (SY)	\$/Sq Yd	Cost	
Ramp A	1-lane	1,350	26	3,900	\$ 77.43	\$ 301,977	
Ramp A	4-lane	400	58	2,578	\$ 77.43	\$ 199,597	
Ramp B	1-lane	1,900	26	5,489	\$ 77.43	\$ 425,005	
Ramp B	2-lane	1,100	34	4,156	\$ 77.43	\$ 321,765	
Ramp C	1-lane			0	\$ 77.43	\$ -	
Ramp C	2-lane	2,500	34	9,444	\$ 77.43	\$ 731,283	
Ramp C	3-lane	850	46	4,344	\$ 77.43	\$ 336,390	
Ramp C	4-lane	350	58	2,256	\$ 77.43	\$ 174,648	
Ramp D	1-lane	1,800	26	5,200	\$ 77.43	\$ 402,636	
Ramp D	2-lane	2,150	34	8,122	\$ 77.43	\$ 628,904	
Ramp E	1-lane	1,500	26	4,333	\$ 77.43	\$ 335,530	
Ramp E	1-lane	1,850	26	5,344	\$ 77.43	\$ 413,820	
Ramp F	1-lane			0	\$ 77.43	\$ -	
Ramp F	2-lane	2,200	34	8,311	\$ 77.43	\$ 643,529	
Ramp F	3-lane	1,300	46	6,644	\$ 77.43	\$ 514,479	
Ramp G	1-lane	1,600	26	4,622	\$ 77.43	\$ 357,899	
Ramp G	2-lane	1,900	34	7,178	\$ 77.43	\$ 555,775	
Ramp H	1-lane	1,600	26	4,622	\$ 77.43	\$ 357,899	
				Total	86,544	\$ 77.43	\$ 6,701,136

Note: Distances measured from sketch made in Microstation file

Ramp E reduced to 1-lane (16 ft)

Assume: No appreciable affect on R/W or Earthwork

Earthwork & Clear/Grub	Quantity	Unit	Cost/Unit	Cost
Clearing & Grubbing		Lump		\$ 1,000,000
Unclassified Excavation	250,000	Yd ³	\$ 3.63	\$ 907,500
Total				\$ 1,907,500

Right-of-Way	Quantity	Unit	Cost/Unit	Cost
Northside	17.55	Acre	\$ 434,000	\$ 7,616,959
Southside	19.08	Acre	\$ 434,000	\$ 8,282,197
Total	36.63		\$ 434,000	\$ 15,899,156

Measured in Microstation file

Proposed Change Summary

Description	Quantity	Unit	Cost/Unit	Cost
Bridges	54803	SQ FT	\$ 107.53	\$ 5,893,160
Ramps	86,544	SQ YD	\$ 77.43	\$ 6,701,136
Right of Way	36.63	Acre	\$ 434,000	\$ 15,899,156
Earthwork & Clear/Grub	1	LS	\$ 1,907,500	\$ 1,907,500
Totals				\$ 30,400,952

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-3.0

PAGE NUMBER: 1 of 6

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-
PROJECT TITLE: I-285 @ Bouldercrest Road, DeKalb County

PROPOSAL DESCRIPTION: Shift new Bouldercrest bridge alignment West and utilize stage construction for the new bridge over I-285 (Northbound side first).

ORIGINAL DESIGN: The existing bridge over I-285 provides two 12-foot lanes in each direction and is proposed to remain in place while a new bridge providing two 12-foot lanes and two left-turn lanes in each direction are constructed adjacent to the East side. Due to the offset of the new bridge placement to the East, Bouldercrest Road is realigned to the East both North and South of the interchange area.

PROPOSED CHANGE: Stage construction will be utilized by constructing the Northbound side of the Bouldercrest Road bridge over I-285 first while maintaining traffic on the existing bridge; then shifting traffic to the new structure while demolishing the existing bridge. The new southbound side will then be constructed and final traffic configuration provided. Existing traffic on Bouldercrest Road will be maintained on existing roadway throughout with minor widening in the transition area. Approach roadway to the bridge over I-285 will be widened to provide a transition from the existing four-lane section to the eight-lane section (four through lanes and four left turn lanes) on the new bridge. Bouldercrest widening South of the new bridge will be lessened by retaining the existing roadway as the new Southbound side; Northbound will be reconstructed as planned to accommodate I-285 entrance ramp realignment.

JUSTIFICATION: This staged approach minimizes realignment required on Bouldercrest Road and allows existing roadway to remain uninterrupted (with minor traffic shifts on the roadway) while new structure is constructed. Reduction in R/W required along Bouldercrest Road is realized and community impacts lessened.

ADVANTAGES:

- Reduces R/W requirements
- Reduces required realignment
- Reduces traffic impacts/delays

DISADVANTAGES:

- None apparent

	INITIAL COST	OPERATING COST	TOTAL LIFE-CYCLE COST
ORIGINAL DESIGN:	\$ 3,149,378		\$ 3,149,378
PROPOSED CHANGE:	\$ 0		\$ 0
SAVINGS:	\$ 3,149,378		\$ 3,149,378

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER:	R-3.0	PAGE NUMBER:	2 of 6
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
New Work N of Continental Way	1				
PAVEMENT	1	SY	21173	41.45	877,621
CONC. MEDIAN	1	SY	4339	33.64	145,964
CURB & GUTTER	1	LF	10,200	14.09	143,718
SIDEWALK	1	SY	2,845	23.78	67,654
R/W	1	AC	2.93	434,000	1,271,620
New Work S. of I-285 Eliminated					
PAVEMENT	1	SY	3200	41.45	132,640
R/W	1	AC	1.1	434,000	477,400
CURB & GUTTER	1	LF	1200	14.09	16,908
SIDEWALK	1	SY	666.67	23.78	15,853
SUBTOTAL – COST TO PRIME					
MARKUP					--
TOTAL CONTRACT COST					\$3,149,378

PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
ELIMINATE PROPOSED NEW WORK SHOWN ABOVE					
SUBTOTAL – COST TO PRIME					0.00
MARKUP					--
TOTAL CONTRACT COST					0.00

Difference [Original-Proposed] **\$3,149,378**

SOURCES

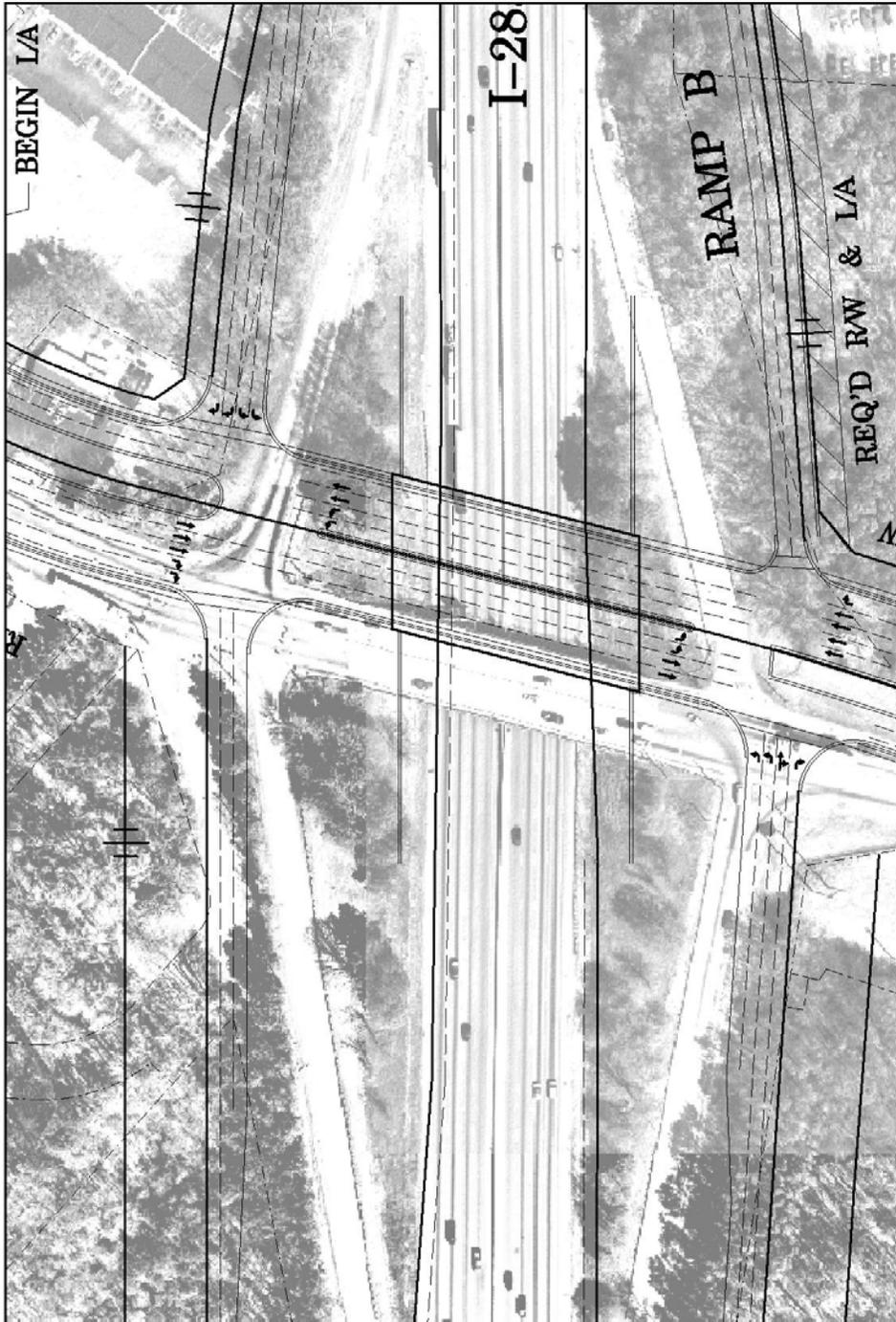
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| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor (Specify) 7. From GDOT Bridge Design (See calcs.) 8 Other (Specify) |
|---|--|

ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-3.0

PAGE NUMBER: 3 of 6

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

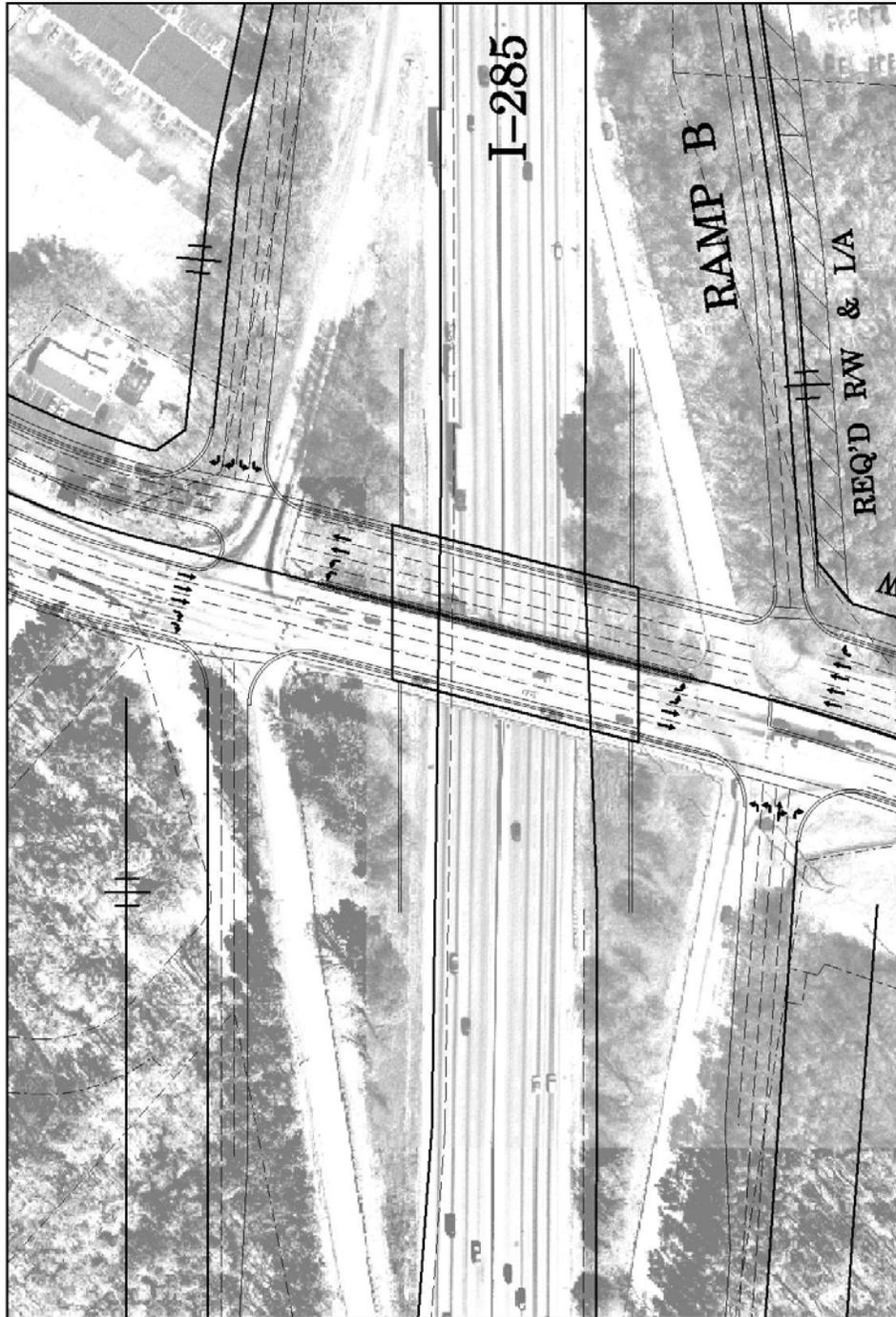


PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-3.0

PAGE NUMBER: 4 of 6

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



CALCULATIONS

PROPOSAL NUMBER: R-3.0

PAGE NUMBER: 5 of 6

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Quantities North of Continental Way

Northern transition (350' long)

28' w. to 40' w. SB, 28' w. NB Conc. Median 0' to 10' w.	Pvmt: $62' \times 350' / 9 = 2,411$ SY Conc. Median: $5' \times 350' / 9 = 195$ SY Curb & gutter: $350' \times 4 = 1,400$ LF Sidewalk: $350' \times 5' \times 2 / 9 = 390$ SY
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North of Constitution Road Intersection (150' long)

52' w. SB, 28' w. NB Conc. Median 10' w.	Pvmt: $80' \times 150' / 9 = 1,335$ SY Conc. Median: $10' \times 150' / 9 = 167$ SY Curb & gutter: $150' \times 4 = 600$ LF Sidewalk: $150' \times 5' \times 2 / 9 = 167$ SY
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Transition Area to Constitution Road Intersection (525' long)

28' w. SB, 52' w. NB Conc. Median 15' w.	Pvmt: $80' \times 525' / 9 = 4,667$ SY Conc. Median: $15' \times 525' / 9 = 875$ SY Curb & gutter: $525' \times 4 = 2,100$ LF Sidewalk: $525' \times 5' \times 2 / 9 = 585$ SY
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Transition Area North of Clifton Church Road (250' long)

28' w. SB, 40' w. NB Conc. Median 15' w.	Pvmt: $68' \times 250' / 9 = 1,890$ SY Conc. Median: $15' \times 250' / 9 = 417$ SY Curb & gutter: $250' \times 4 = 1,000$ LF Sidewalk: $250' \times 5' \times 2 / 9 = 278$ SY
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Clifton Church Road North to Lane Drop (375' long)

52' w. SB, 28' w. NB Conc. Median 5' w.	Pvmt: $80' \times 375' / 9 = 3,335$ SY Conc. Median: $5' \times 375' / 9 = 210$ SY Curb & gutter: $375' \times 4 = 1,500$ LF Sidewalk: $375' \times 5' \times 2 / 9 = 420$ SY
--	--

THESE SAVINGS DO NOT INCLUDE A SIGNIFICANT AMOUNT OF TRAFFIC CONTROL ITEMS THAT WOULD BE REALIZED.

CALCULATIONS

PROPOSAL NUMBER: R-3.0

PAGE NUMBER: 6 of 6

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Quantities North of Continental Way (con't.)

Bouldercrest Lane to Clifton Church Road (550' long)

28' w. SB, 52' w. NB Conc. Median avg. 15' w.	Pvmt: $80' \times 550' / 9 = 4,890$ SY Conc. Median: $15' \times 550' / 9 = 920$ SY Curb & gutter: $550' \times 4 = 2,200$ LF Sidewalk: $550' \times 5' \times 2 / 9 = 615$ SY
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Continental Way to Bouldercrest Lane (350' long)

40' w. SB, 28' w. NB Conc. Median 40' w.	Pvmt: $68' \times 350' / 9 = 2,645$ SY Conc. Median: $40' \times 350' / 9 = 1,555$ SY Curb & gutter: $350' \times 4 = 1,400$ LF Sidewalk: $350' \times 5' \times 2 / 9 = 390$ SY
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Total Quantities North of Continental Way:

Pavement: 21,173 SY
 Concrete Median: 4,339
 Curb & Gutter: 10,200 LF
 Sidewalk: 2,845 SY
 R/W: $2,550 \text{ LF} \times 50' \text{ w. (avg.)} = 127,500 \text{ SF} / 43560 \text{ SF/acre} = 2.93 \text{ acres}$

WORK ELIMINATED SOUTH OF I-285:

PAVEMENT: $1200 \text{ LF} \times 24 \text{ FT WIDE} / 9 = 3200 \text{ SY}$
 R/W: $1200 \text{ LF} \times 40 \text{ FT WIDE} = 1.1 \text{ AC}$
 CURB & GUTTER: 1200 LF
 SIDEWALK: $1200 \text{ LF} \times 5 / 9 = 666.67 \text{ SY}$

Pavement Section Cost – Local Roads

12" GAB: $\$17.97/\text{TN} \times 0.675 \text{ TNS}/\text{SY}$	\$12.13/SY
5" asphalt base course: $5.0 \times (110/2000) \times (\$62.42/\text{TN})$	\$17.17/SY
2" asphalt binder course: $2.0 \times (110/2000) \times (\$61.77/\text{TN})$	\$ 6.80/SY
1-1/2" asphalt surface course: $1.5 \times (110/2000) \times (\$64.83/\text{TN})$	<u>\$ 5.35/SY</u>
TOTAL	\$41.45/SY

R/W COSTS

$\$175,000/\text{ACRE} \times 1.55 \text{ scheduling contingency} \times 1.6 \text{ admin/court costs} = \$434,000/\text{ACRE}$

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER:	R-4.0	PAGE NUMBER:	1 of 6
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
PROJECT TITLE:	I-285 @ Bouldercrest Road, DeKalb County

PROPOSAL DESCRIPTION:	Eliminate improvements on Bouldercrest North of Continental Way.
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ORIGINAL DESIGN: The current design which includes the new bridge offset to the East requires realignment of Bouldercrest Road to the East to provide the same number of lanes and change degree of curve at Clifton Church Road intersection area.

PROPOSED CHANGE: It is proposed to eliminate realignment of Bouldercrest North of Continental Way. Keep existing alignment of Bouldercrest Road in this area. This proposal works in conjunction with Proposal 3.0 which shifts the new bridge to the West and thus would not require realignment of Bouldercrest in these areas.

JUSTIFICATION: Based on traffic study from 2001, the existing roadway provides acceptable LOS of D or better in design year according to GDOT traffic provided. Updated traffic counts provided during the study were actually less than the 2001 counts, which would result in improved LOS over that computed in 2001, and improving the capacity along Bouldercrest would now seem unnecessary. Eliminating the improvements along Bouldercrest North of Continental Way lessens project R/W acquisition needed and reduces community impact.

ADVANTAGES:

- Reduces R/W impacts
- Reduces community impact
- Maintains acceptable LOS
- Eliminates unnecessary work

DISADVANTAGES:

- Eliminates proposed lengthening of deceleration lane at Constitution Road

	INITIAL COST	OPERATING COST	TOTAL LIFE-CYCLE COST
ORIGINAL DESIGN:	\$ 2,506,577		\$ 2,506,577
PROPOSED CHANGE:	\$ 0		\$ 0
SAVINGS:	\$ 2,506,577		\$ 2,506,577

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER:	R-4.0	PAGE NUMBER:	2 of 6
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
New work N. of Continental Way					
Asphalt pavement	1	SY	21,173	41.45	877,621
Concrete median	1	SY	4,339	33.64	145,964
Curb & gutter	1	LF	10,200	14.09	143,718
Concrete Sidewalk	1	SY	2,845	23.78	\$67,654
R/W Acquisition	1	AC	2.93	434,000	1,271,620
SUBTOTAL – COST TO PRIME					\$2,506,577
				MARKUP	Incl.
TOTAL CONTRACT COST					\$2,506,577

PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Eliminate work N. of Continental Way					
SUBTOTAL – COST TO PRIME					0.00
				MARKUP	--
TOTAL CONTRACT COST					0.00

Difference [Original-Proposed] **\$2,506,577**

SOURCES

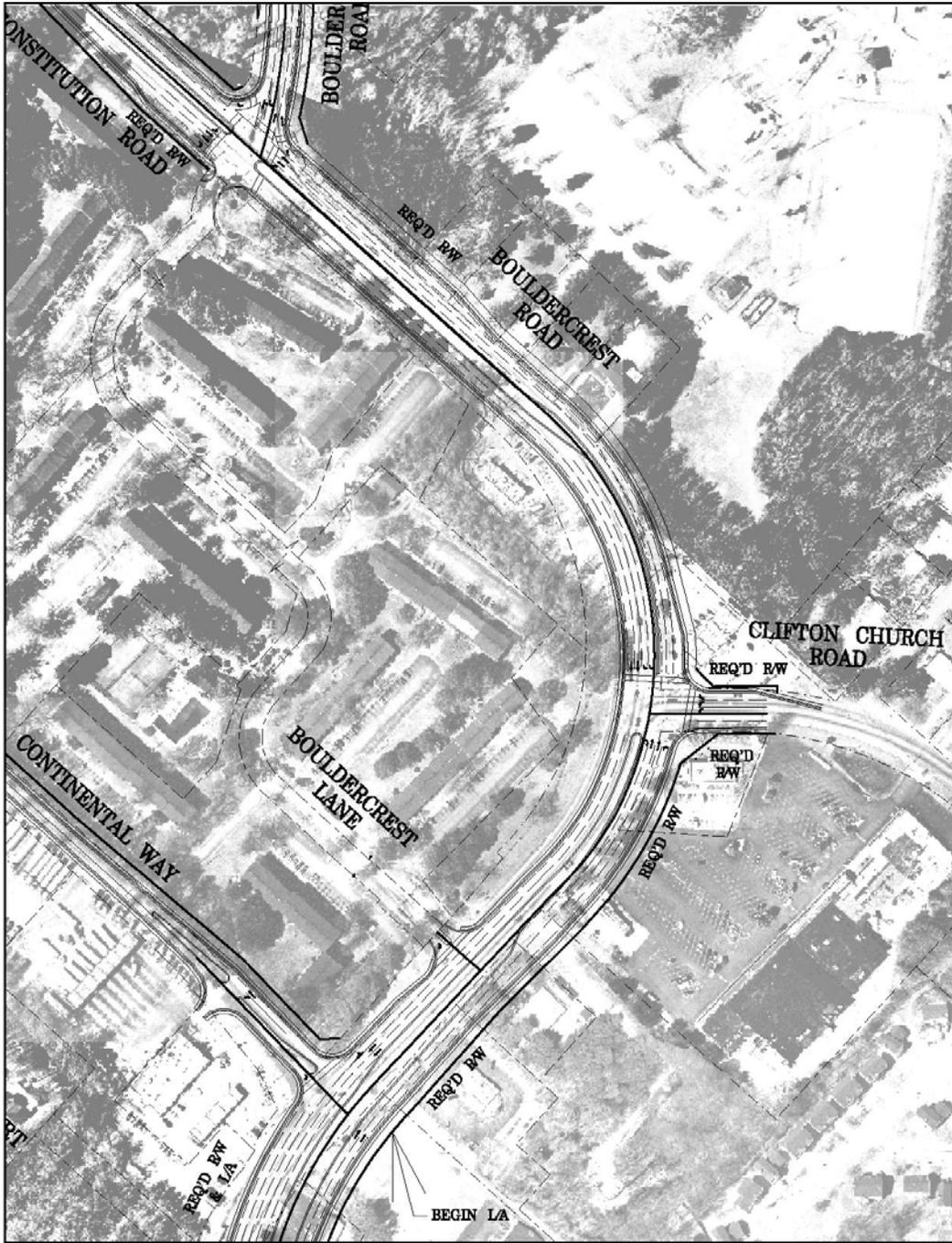
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|---|---|

ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-4.0

PAGE NUMBER: 3 of 6

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

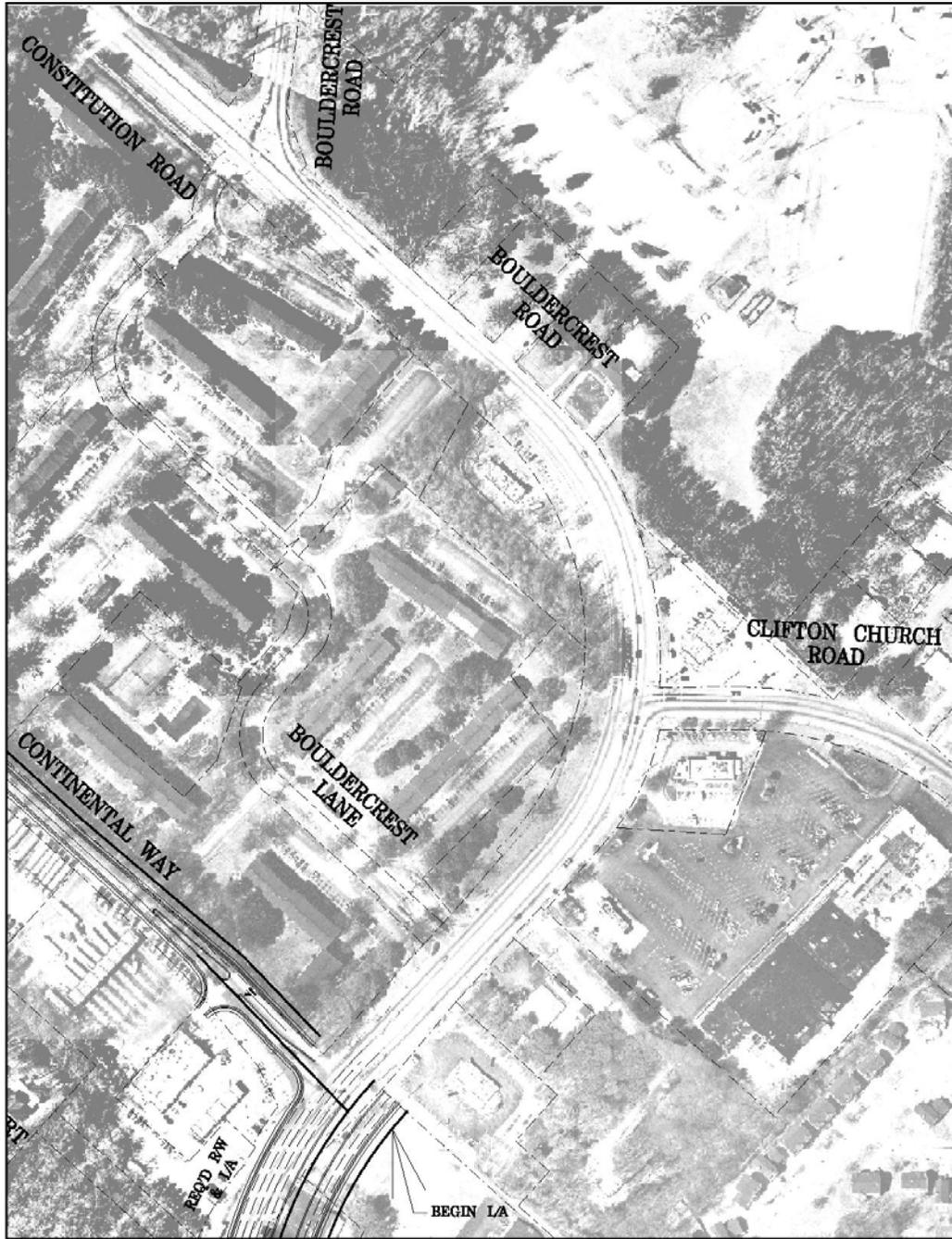


PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-4.0

PAGE NUMBER: 4 of 6

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



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CALCULATIONS

PROPOSAL NUMBER: R-4.0

PAGE NUMBER: 5 of 6

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Quantities North of Continental Way

Northern transition (350' long)

28' w. to 40' w. SB, 28' w. NB Conc. Median 0' to 10' w.	Pvmt: $62' \times 350' / 9 = 2,411$ SY Conc. Median: $5' \times 350' / 9 = 195$ SY Curb & gutter: $350' \times 4 = 1,400$ LF Sidewalk: $350' \times 5' \times 2 / 9 = 390$ SY
---	--

North of Constitution Road Intersection (150' long)

52' w. SB, 28' w. NB Conc. Median 10' w.	Pvmt: $80' \times 150' / 9 = 1,335$ SY Conc. Median: $10' \times 150' / 9 = 167$ SY Curb & gutter: $150' \times 4 = 600$ LF Sidewalk: $150' \times 5' \times 2 / 9 = 167$ SY
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Transition Area to Constitution Road Intersection (525' long)

28' w. SB, 52' w. NB Conc. Median 15' w.	Pvmt: $80' \times 525' / 9 = 4,667$ SY Conc. Median: $15' \times 525' / 9 = 875$ SY Curb & gutter: $525' \times 4 = 2,100$ LF Sidewalk: $525' \times 5' \times 2 / 9 = 585$ SY
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Transition Area North of Clifton Church Road (250' long)

28' w. SB, 40' w. NB Conc. Median 15' w.	Pvmt: $68' \times 250' / 9 = 1,890$ SY Conc. Median: $15' \times 250' / 9 = 417$ SY Curb & gutter: $250' \times 4 = 1,000$ LF Sidewalk: $250' \times 5' \times 2 / 9 = 278$ SY
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Clifton Church Road North to Lane Drop (375' long)

52' w. SB, 28' w. NB Conc. Median 5' w.	Pvmt: $80' \times 375' / 9 = 3,335$ SY Conc. Median: $5' \times 375' / 9 = 210$ SY Curb & gutter: $375' \times 4 = 1,500$ LF Sidewalk: $375' \times 5' \times 2 / 9 = 420$ SY
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CALCULATIONS

PROPOSAL NUMBER: R-4.0

PAGE NUMBER: 6 of 6

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Quantities North of Continental Way (con't.)

Bouldercrest Lane to Clifton Church Road (550' long)

28' w. SB, 52' w. NB Conc. Median avg. 15' w.	Pvmt: $80' \times 550' / 9 = 4,890$ SY Conc. Median: $15' \times 550' / 9 = 920$ SY Curb & gutter: $550' \times 4 = 2,200$ LF Sidewalk: $550' \times 5' \times 2 / 9 = 615$ SY
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Continental Way to Bouldercrest Lane (350' long)

40' w. SB, 28' w. NB Conc. Median 40' w.	Pvmt: $68' \times 350' / 9 = 2,645$ SY Conc. Median: $40' \times 350' / 9 = 1,555$ SY Curb & gutter: $350' \times 4 = 1,400$ LF Sidewalk: $350' \times 5' \times 2 / 9 = 390$ SY
---	---

Total Quantities:

Pavement: 21,173 SY

Concrete Median: 4,339

Curb & Gutter: 10,200 LF

Sidewalk: 2,845 SY

R/W: $2,550 \text{ LF} \times 50' \text{ w. (avg.)} = 127,500 \text{ SF} / 43560 \text{ SF/acre} = 2.93 \text{ acres}$

Pavement Section Cost – Local Roads

12" GAB: $\$17.97/\text{TN} \times 0.675 \text{ TNS/SY}$	\$12.13/SY
5" asphalt base course: $5.0 \times (110/2000) \times (\$62.42/\text{TN})$	\$17.17/SY
2" asphalt binder course: $2.0 \times (110/2000) \times (\$61.77/\text{TN})$	\$ 6.80/SY
1-1/2" asphalt surface course: $1.5 \times (110/2000) \times (\$64.83/\text{TN})$	<u>\$ 5.35/SY</u>
TOTAL	\$41.45/SY

R/W COSTS

$\$175,000/\text{ACRE} \times 1.55 \text{ scheduling contingency} \times 1.6 \text{ admin/court costs} = \$434,000/\text{ACRE}$

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER R-6.0

PAGE NUMBER: 1 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-
PROJECT TITLE: I-285 @ Bouldercrest Road, DeKalb County

PROPOSAL DESCRIPTION: Incorporate dedicated left turn lane on Bouldercrest Road at Industrial Drive and eliminate improvements at Sugar Creek Golf Drive.

ORIGINAL DESIGN: The current design includes elimination of the allowed left turn lane onto Industrial Drive, construction of a new connector between Sugar Creek Golf Drive and Industrial Drive and reconstruction of Sugar Creek Golf Drive to allow for the addition of truck traffic to Sugar Creek Golf Drive.

PROPOSED CHANGE: It is proposed to incorporate a dedicated left turn lane on Bouldercrest Road Southbound at Industrial Drive and eliminate both reconstruction of Sugar Creek Golf Drive and the new connector road.

JUSTIFICATION: Based on the total design hourly volume of the new Sugar Creek Drive entrance being only 40 vehicles per hour from the interstate (which would include the vehicles utilizing it both for access to Industrial Drive and the Golf Course), this low volume should not cause back-up of traffic into the off-ramp intersection. Thus, the left turn to Industrial Drive could be incorporated and would not require the currently planned improvements to Sugar Creek Golf Drive and construction of the connector. This alternative provides access to parcels along Industrial Drive and reduces both R/W impacts South of Industrial Drive and traffic impacts to Sugar Creek Golf Drive.

ADVANTAGES:

- Provides access to Industrial Drive
- Reduces R/W impacts
- Reduces truck traffic impacts to recently reconstructed Sugar Creek Golf Drive

DISADVANTAGES:

- None apparent

	INITIAL COST	OPERATING COST	TOTAL LIFE- CYCLE COST
ORIGINAL DESIGN:	\$ 436,876		\$ 436,876
PROPOSED CHANGE:	\$ 0		\$ 0
SAVINGS:	\$ 436,876		\$ 436,876

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER: R-6.0	PAGE NUMBER: 2 of 5
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PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
PAVEMENT	1	SY	3,333	41.45	138,153
SIDEWALK	1	SY	1,389	23.78	33,030
CURB & GUTTER	1	LF	2,500	14.09	35,225
STRIPING	1	LM	0.94	1,400	1,316
R/W COSTS	1	AC	0.528	434,000	229,152
SUBTOTAL – COST TO PRIME					\$436,876
MARKUP					--
TOTAL CONTRACT COST					\$436,876

PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Delete improvements at Golf Drive (Maintain current left turn)					
SUBTOTAL – COST TO PRIME					0.00
MARKUP					--
TOTAL CONTRACT COST					0.00

Difference [Original-Proposed] **\$436,876**

SOURCES

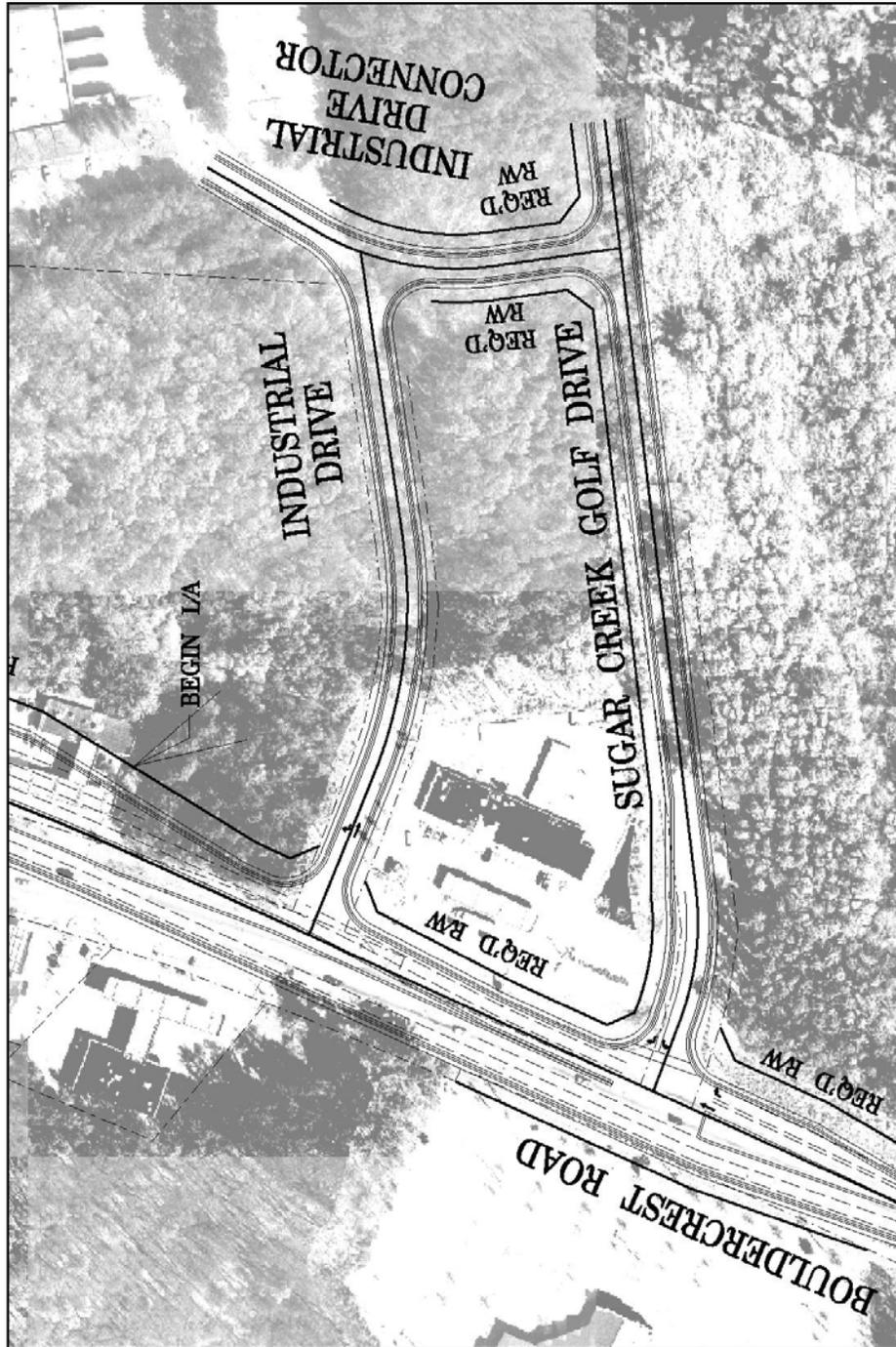
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| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor (Specify) 7. From GDOT Bridge Design (See calcs.) 8. Other (Specify) |
|---|---|

ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-6.0

PAGE NUMBER: 3 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

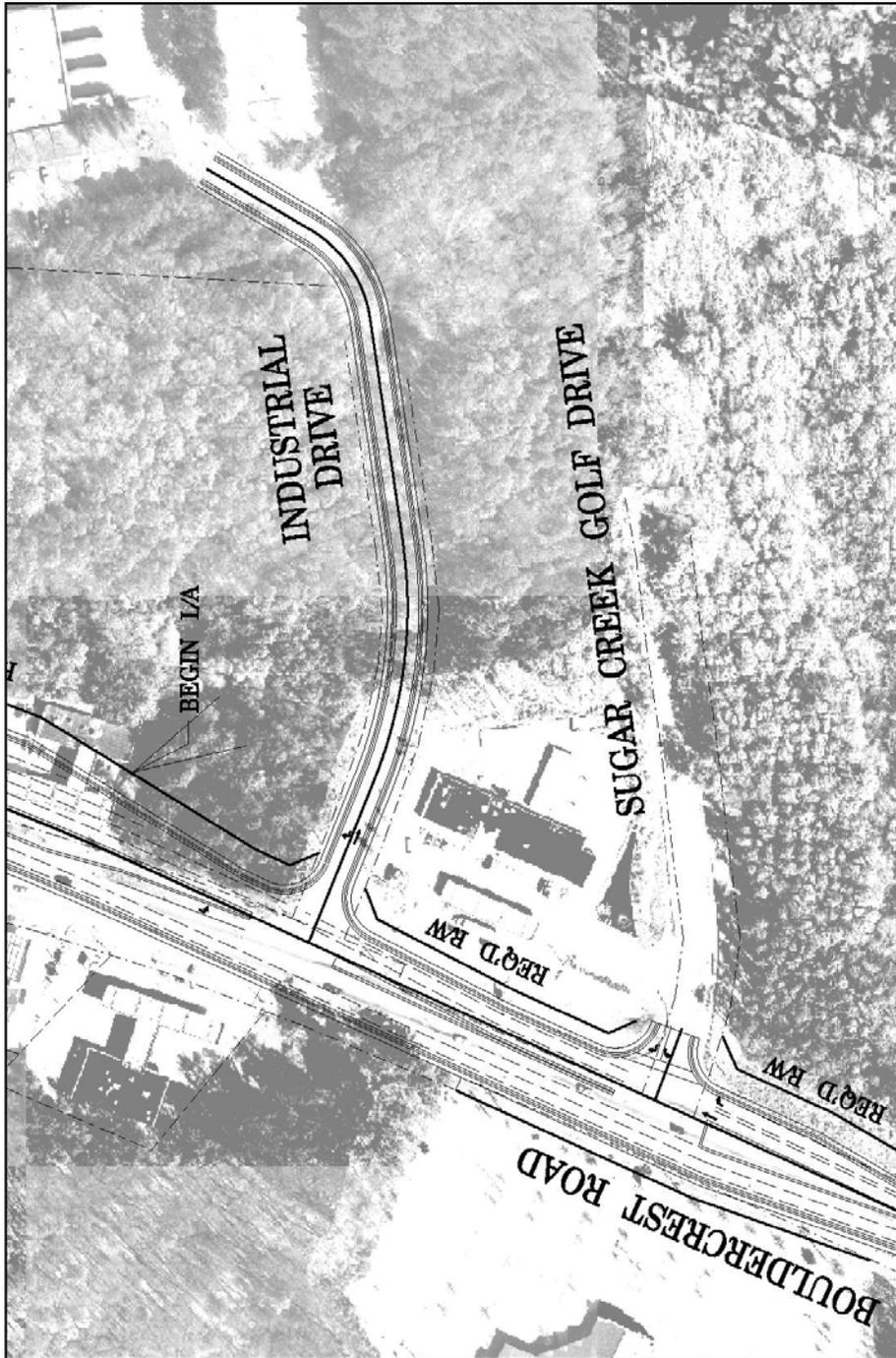


PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-6.0

PAGE NUMBER: 4 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



CALCULATIONS

PROPOSAL NUMBER: R-6.0

PAGE NUMBER: 5 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Pavement Section Cost – Local Roads

12" GAB: \$17.97/TN x 0.675 TNS/SY	\$12.13/SY
5" asphalt base course: 5.0 x (110/2000) x (\$62.42/TN)	\$17.17/SY
2" asphalt binder course: 2.0 x (110/2000) x (\$61.77/TN)	\$ 6.80/SY
1-1/2" asphalt surface course: 1.5 x (110/2000) x (\$64.83/TN)	<u>\$ 5.35/SY</u>
TOTAL	\$41.45/SY

PAVEMENT

1250 LF x 24 FT = 30,000 SF = 3,333 SY

SIDEWALKS

2500 LF x 5 FT = 12,500 SF = 1389 SY

CURB & GUTTER

2500 LF

STRIPING

2500 LF x 2 LANES = 5000 LF/5280 = 0.94 MILE

R/W AQUISITION

800' x 10' + 200' x 75' = 23,000 SF / 43,560 = 0.528 ACRES

R/W COSTS

\$175,000/ACRE x 1.55 scheduling contingency x 1.6 admin/court costs = \$434,000/ACRE

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-7.0

PAGE NUMBER: 1 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-
PROJECT TITLE: I-285 @ Bouldercrest Road, DeKalb County

PROPOSAL DESCRIPTION: Eliminate sidewalks along Industrial Drive and Sugar Creek Golf Drive.

ORIGINAL DESIGN: The current design for improvements on Industrial Drive and Sugar Creek Golf Drive includes new sidewalks where currently none exist.

PROPOSED CHANGE: It is proposed to eliminate sidewalks from the improvements along Industrial Drive and Sugar Creek Golf Drive.

JUSTIFICATION: These roads will have either heavy trucks or golfers in their vehicles and sidewalks appear to be unnecessary.

ADVANTAGES:

- Eliminates unnecessary features
- Reduces R/W impacts

DISADVANTAGES:

- None apparent

	INITIAL COST	OPERATING COST	TOTAL LIFE-CYCLE COST
ORIGINAL DESIGN:	\$ 124,550		\$ 124,550
PROPOSED CHANGE:	\$ 0		\$ 0
SAVINGS:	\$ 124,550		\$ 124,550

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER:	R-7.0	PAGE NUMBER:	2 of 5
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Sidewalk	1	SY	2500	23.78	59,450
R/W	1	AC	0.15	434,000	65,100
SUBTOTAL – COST TO PRIME					\$124,550
MARKUP					--
TOTAL CONTRACT COST					\$124,550

PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Eliminate sidewalks					
SUBTOTAL – COST TO PRIME					0.00
MARKUP					--
TOTAL CONTRACT COST					0.00

Difference [Original-Proposed] **\$124,550**

SOURCES

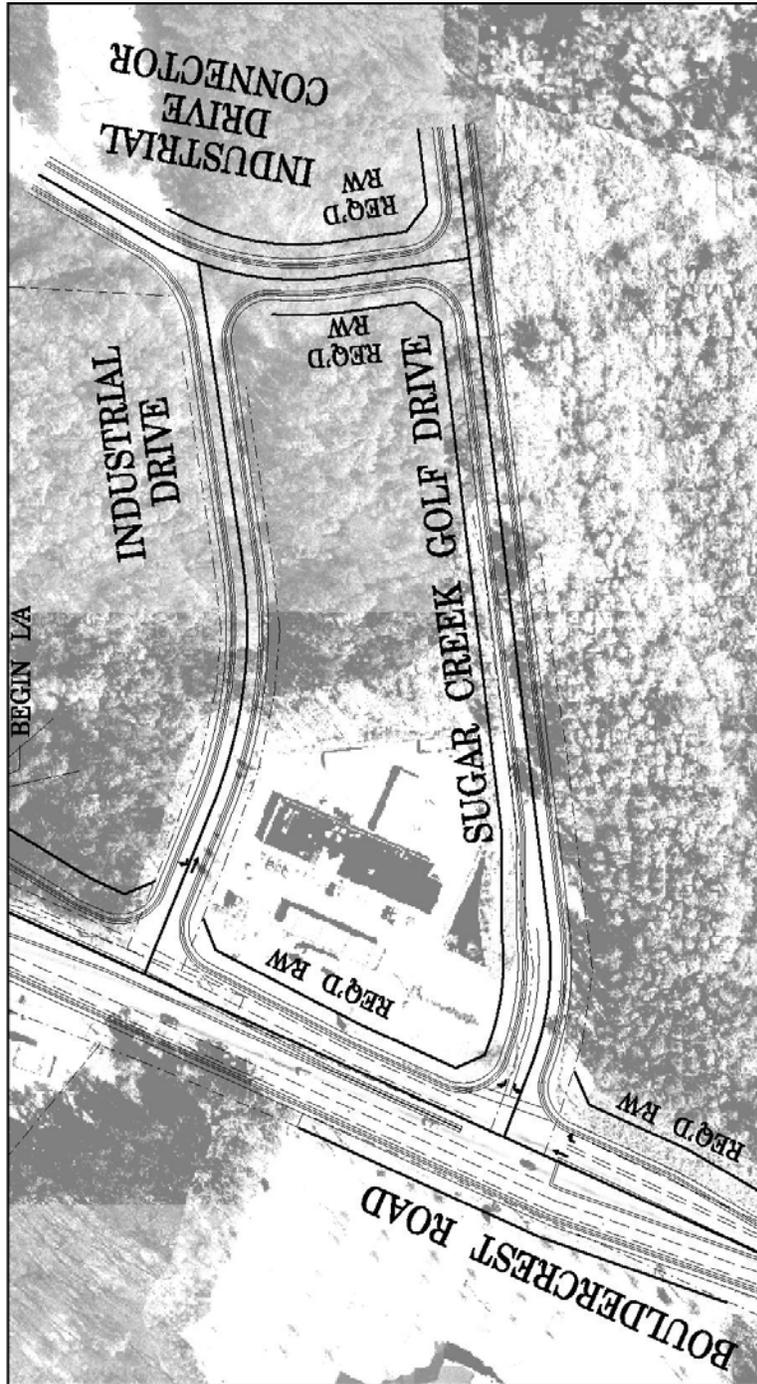
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| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor (Specify) 7. From GDOT Bridge Design (See calcs.) 8. Other (Specify) |
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ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-7.0

PAGE NUMBER: 3 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

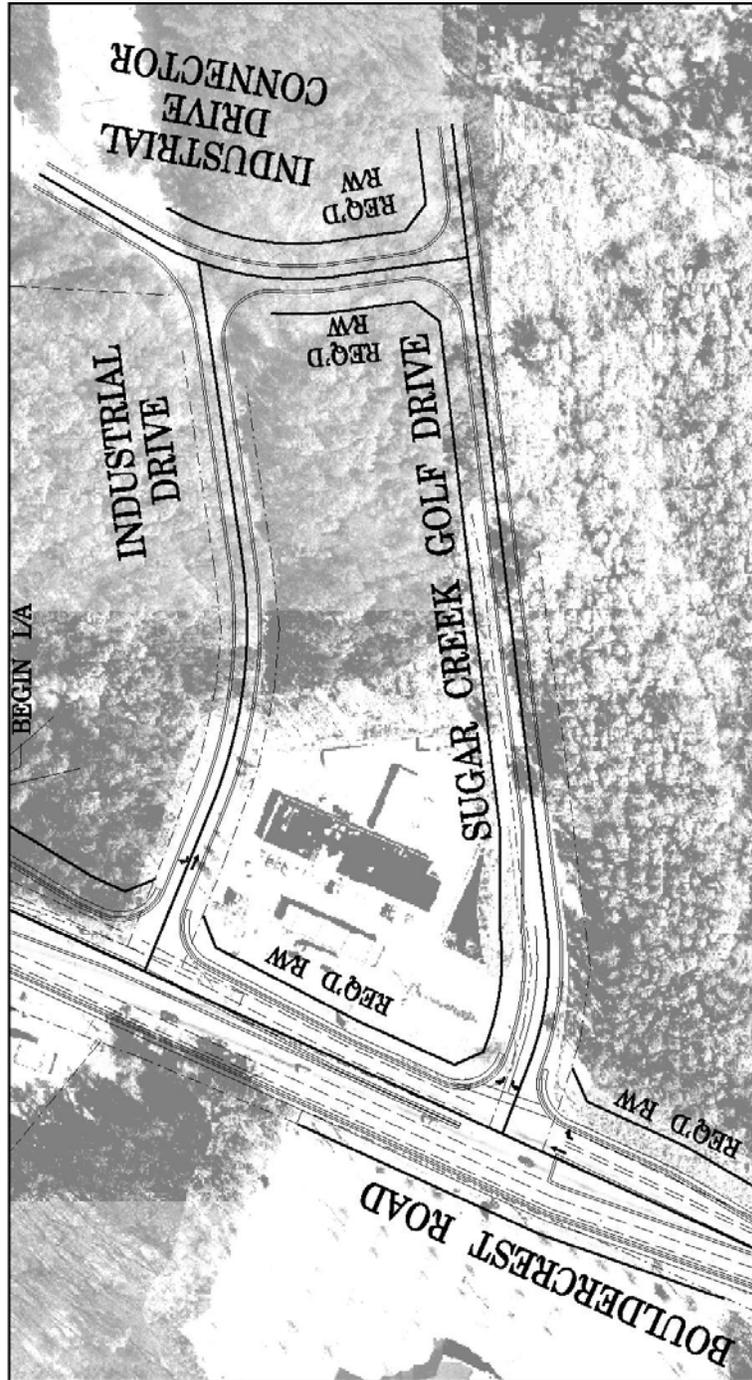


PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-7.0

PAGE NUMBER: 4 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



CALCULATIONS

PROPOSAL NUMBER: R-7.0

PAGE NUMBER: 5 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

QUANTITY CALCS

$2250 \text{ LF} \times 2 \text{ SIDES} \times 5 \text{ FT} / 9 \text{ SF/SY} = 22,500 \text{ SF} / 9 \text{ SF/SY} = 2500 \text{ SY}$

$\text{R/W: } 1,300 \text{ LF} \times 5' \text{ wide} = 6,500 \text{ SF} / 43560 = 0.15 \text{ AC}$

R/W COSTS

$\$175,000/\text{ACRE} \times 1.55 \text{ scheduling contingency} \times 1.6 \text{ admin/court costs} = \$434,000/\text{ACRE}$

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-10.0

PAGE NUMBER: 1 of 9

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-
PROJECT TITLE: I-285 @ Bouldercrest Road, DeKalb County

PROPOSAL DESCRIPTION: Realign Ramp “A” to intersect at Continental Way and add Loop Ramp (Ramp F revised) from Bouldercrest to I-285 WB. Reduce the number of lanes on the Bouldercrest bridge replacement over I-285 to eliminate the 2 lane left turn bay.

ORIGINAL DESIGN:

Ramp A

At present, the existing Ramp A is a single lane exit that splits to a right turn and left turn lane. The original design retains the diamond interchange configuration and makes the following changes:

The original design Ramp A departure angle from Bouldercrest Road looking back station along Ramp A is set to be at least 70 degrees skewed to Bouldercrest Road.

The original design adds two additional turn lanes as follows:

- I-285 WB to Bouldercrest Road: One additional left turn and one additional right turn.

Continental Way at Bouldercrest Road

Because the intersection of Continental Way with Bouldercrest is within the minimum distance for a median opening to a ramp radius return (660 ft minimum required, 250 ft actual), the intersection is retained, but a raised median is added and Continental Way is made into a right-in, right-out.

Bridge over I-285

The new bridge proposed for Bouldercrest over I-285 has two left turn lanes for the movement from Bouldercrest Road NB to Ramp F.

Bouldercrest Road at Ramp F

Ramp F is a dual lane ramp that tapers to one lane and serves to allow traffic from Bouldercrest to access I-675 SB or I-285 WB.

	INITIAL COST	OPERATING COST	TOTAL LIFE- CYCLE COST
ORIGINAL DESIGN:	\$ 0		\$ 0
PROPOSED CHANGE:	\$ (27,978)		\$ (27,978)
SAVINGS:	\$ 27,978		\$ 27,978

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-10.0

PAGE NUMBER: 2 of 9

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

PROPOSED CHANGE:

Ramp A

The Proposed Change realigns Ramp A to intersect with Continental Way, increasing the distance of the intersection from I-285. Traffic from Ramp A is allowed through the intersection to Continental Way and allowing the intersection to maintain lefts from Bouldercrest Road NB onto Continental Way.

Ramp F- Revised

A Loop Ramp (Ramp F revised) allows access to I-285 WB and I-675 SB. A dedicated right turn is added for NB Bouldercrest Road.

Bouldercrest Road over I-285

Adding the Loop Ramp eliminates the need for dual lefts onto the Original Concept Ramp F.

ADVANTAGES/DISADVANTAGES/JUSTIFICATION

PROPOSAL NUMBER:	R-10.0	PAGE NUMBER:	3 of 9
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ADVANTAGES:

- Reduces the bridge width requirements
- Eliminates conflicts requiring signalization phasing
- Allows direct access to Continental Way from both directions

DISADVANTAGES:

- Introduces the possibility of wrong way movements, requiring careful attention to signing

JUSTIFICATION:

Issues with the Original Concept:

Making Continental Way into a right-in, right-out causes several undesirable issues. It requires trucks currently accessing Continental Way at Bouldercrest to continue on Bouldercrest to the point the road name changes to Constitution Road in order to access the commercial properties in the area.

This adds additional truck travel time and introduces more truck volume in front of the apartment complex and other residential properties along Bouldercrest near the intersection with Clifton Church Road. The Original Design has an adverse impact on the commercial property (Truck Center) at the corner of Bouldercrest & Continental by making it a right-in, right-out.

Advantages of the Proposed Concept:

The proposed concept solves the issues related to eliminating access to Continental Way from NB Bouldercrest Road. It also removes left turns off of the proposed Bouldercrest over I-285 bridge which reduces bridge width requirements and removes conflicting movements on Northbound and Southbound Bouldercrest Road.

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER:	R-10.0	PAGE NUMBER:	4 of 9
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
SUBTOTAL – COST TO PRIME					
MARKUP					--
TOTAL CONTRACT COST					

PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Bridges	7	SQ FT	6,000	(95.00)	(570,000)
Ramps	1	SQ YD	1,493.33	77.43	115,629
Roadway	1	SQ YD	2,933	(41.45)	(121,587)
Right of Way	1	Acres	1.26	434,000	547,980
SUBTOTAL – COST TO PRIME					(\$27,978)
MARKUP					
TOTAL CONTRACT COST					(\$27,978)

Difference [Original-Proposed] **\$27,978**

SOURCES

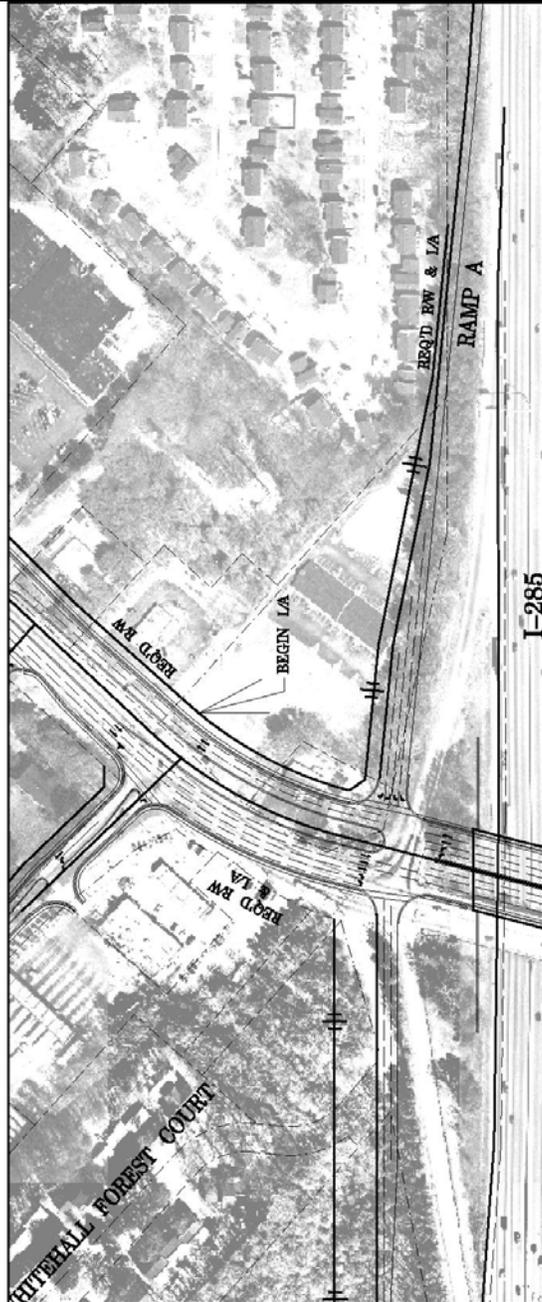
- | | |
|---|---|
| <ul style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 4. Means Estimating Manual | <ul style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor (Specify) 7. GDOT Office of Bridge Design |
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ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-10.0

PAGE NUMBER: 5 of 9

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

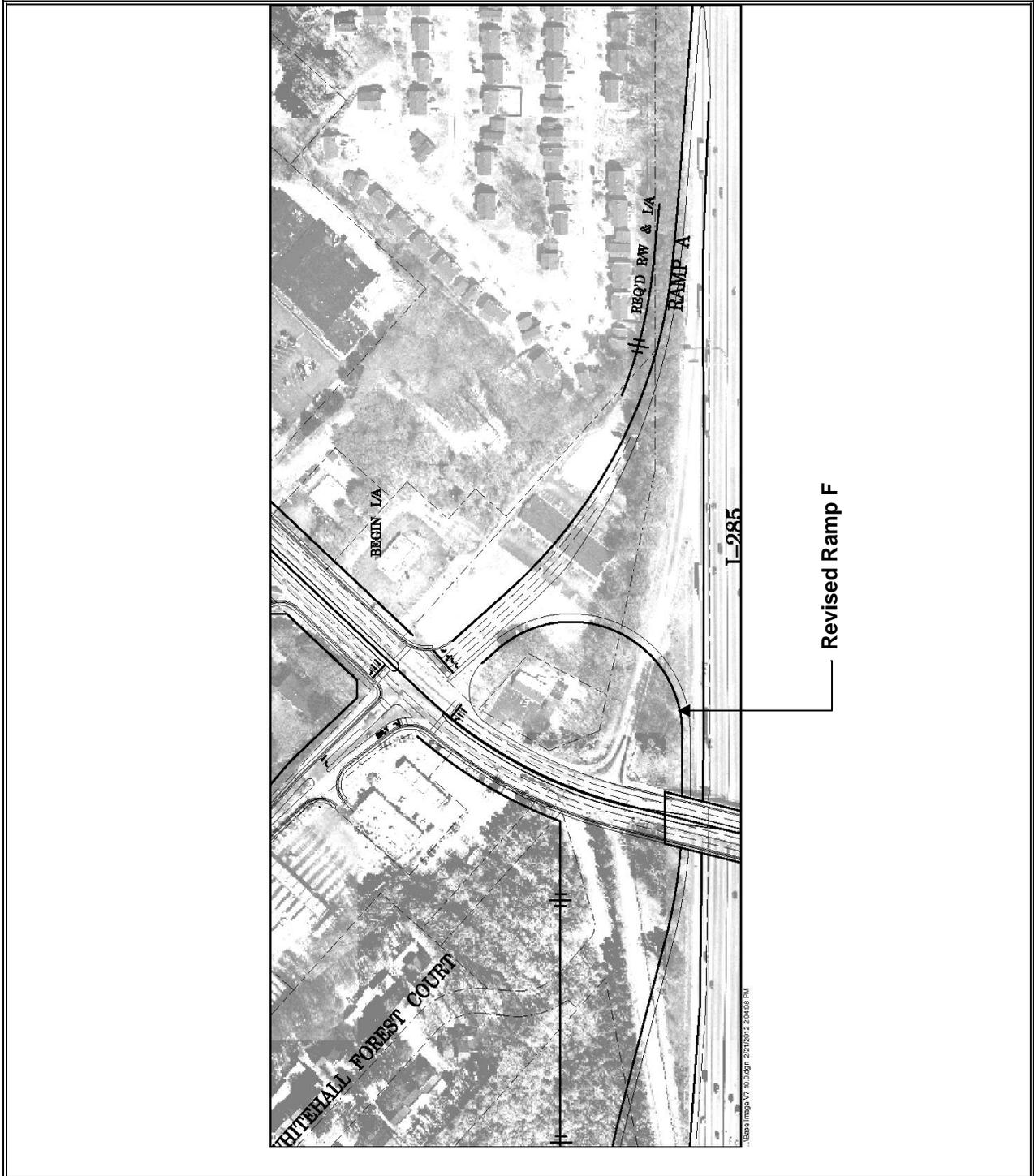


PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-10.0

PAGE NUMBER: 6 of 9

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



CALCULATIONS

PROPOSAL NUMBER: R-10.0

PAGE NUMBER: 7 of 9

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Cost Basis for proposed change:

Pavement Section Cost – Concrete Ramps

12" GAB: \$17.97/TN \times 0.675TNS/SY	\$12.13/SY
3" asphalt base course: 3.0 \times (110/2000) \times (\$62.42/TN)	\$10.30/SY
10" concrete pavement	<u>\$55.00/SY</u>
TOTAL	\$77.43/SY

Pavement Section Cost – Local Roads

12" GAB: \$17.97/TN \times 0.675TNS/SY	\$12.13/SY
5" asphalt base course: 5.0 \times (110/2000) \times (\$62.42/TN)	\$17.17/SY
2" asphalt binder course: 2.0 \times (110/2000) \times (\$61.77/TN)	\$ 6.80/SY
1-1/2" asphalt surface course: 1.5 \times (110/2000) \times (\$64.83/TN)	<u>\$ 5.35/SY</u>
TOTAL	\$41.45/SY

Determination of Bridge Sq. Ft Unit Cost to use

Square foot cost of bridges used in the latest cost estimate is not uniform between bridges. The team asked Bill Duvall, PE, Asst. State Bridge Engineer, for an approximate unit cost to use. Both cost of original and proposed were adjusted by these values.

From: DuVall, Bill [mailto:bduvall@dot.ga.gov]
Sent: Wednesday, February 22, 2012 7:45 AM
To: Grant, Greg
Subject: RE: VE Study

Greg,

I think that 95 \$/SF is reasonable for a concrete bridge over a stream; the price would be less in a rural setting but this should work for your project. However, the data for steel bridges is more limited. I would probably use 115 \$/SF.

Bill

Bill DuVall
Bridge Design
(404) 631-1883

From: Grant, Greg [mailto:Greg.Grant@rsandh.com]
Sent: Tuesday, February 21, 2012 10:34 AM
To: DuVall, Bill
Subject: VE Study

Bill,

Do you have any recent Sq FT cost data for:

- PSC beam bridge over stream
- Steel Bridge Over Stream

Best regards,
Greg

CALCULATIONS

PROPOSAL NUMBER: R-10.0

PAGE NUMBER: 8 of 9

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

R/W COSTS

$\$175,000/\text{ACRE} \times 1.55 \text{ scheduling contingency} \times 1.6 \text{ admin/court costs} = \$434,000/\text{ACRE}$

Calculate the cost of the proposed change by looking only at the additional costs and new savings.

Additional costs are:

- Cost of additional R/W to add the loop ramp and move Ramp A.
- Savings of R/W on West side of Bouldercrest due to Ramp B loop is closer to I-285
- Cost of Loop Ramp B from leaving Bouldercrest Road to the point it passes beneath Bouldercrest Road Bridge
- Savings by replacing Bouldercrest Road Bridge, but with a bridge 24 feet (2 -12 ft turn lanes) narrower than the original design

CALCULATIONS

PROPOSAL NUMBER: R-10.0

PAGE NUMBER: 9 of 9

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Cost of Bridges: Proposed Change					
Bridge	Length	Width	Area	\$/Sq Ft	Cost
Bouldercrest over I-285	250	-24	-6000	\$ 95.00	\$ (570,000)
Totals	250		-6000	\$ 95.00	\$ (570,000)

Cost of Ramps: Proposed Change						
Ramp	Lanes	Length	Width	Paved Area	\$/Sq Yd	Cost
		(ft)	(ft)	(SY)		
Ramp F	1-Lane	-700	12	-933	\$ 77.43	\$ (72,268)
Ramp F - Loop Portion	1-Lane	840	26	2,427	\$ 77.43	\$ 187,897
Total		840		1,493	\$ 77.43	\$ 115,629

Note: Distances measured from sketch made in Microstation file
 Ramp E reduced to 1-lane (16 ft), 700 foot of ramp removed on the west side

Right-of-Way	Quantity	Unit	Cost/Unit	Cost
R/W not required on the W side of Bouldercrest	-0.99	Acre	\$ 434,000	\$ (428,421)
Additional R/W	2.25	Acre	\$ 434,000	\$ 976,400
Total	1.26		\$ 434,000	\$ 547,980

Measured in Microstation file

Cost of Roadway: Proposed Change						
Roadway	Lanes	Length	Width	Paved Area	\$/Sq Yd	Cost
		(ft)	(ft)	(SY)		
Bouldercrest	1-Lane	2,200	12	2,933	\$ (41.45)	\$ (121,587)
Total		2,200		2,933	\$ (41.45)	\$ (121,587)

Represents savings by not having to pave the 24 feet at the bridge tapering to 0 ft along Bouldercrest on both sides of the bridge.

Proposed Change Summary				
Description	Quantity	Unit	Cost/Unit	Cost
Bridges	-6000	SQ FT	\$ 95.00	\$ (570,000)
Ramps	1,493	SQ YD	\$ 77.43	\$ 115,629
Roadway	2,933	SQ YD	\$ (41.45)	\$ (121,587)
Right of Way	1.26	Acres	\$ 434,000	\$ 547,980
Totals				\$ (27,978)

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-12.0	PAGE NUMBER: 1 of 5
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
PROJECT TITLE:	I-285 @ Bouldercrest Road, DeKalb County

PROPOSAL DESCRIPTION: Reduce Ramp “E” from two lanes to one lane.
--

ORIGINAL DESIGN: The current design proposes Ramp “E”, which takes traffic from I-285 East to Bouldercrest Road, as a two lane ramp.

PROPOSED CHANGE: It is proposed to reduce Ramp “E” to one lane.

JUSTIFICATION: The updated traffic data provided during the workshop indicated Ramp “E” to have a design traffic of 340 DHV which would be adequately handled by a single lane ramp. This revision reduces the amount of impervious surfaces constructed in the project and removes unnecessary features.

ADVANTAGES:

- Reduction of bridge area required
- Reduction of embankment, base and paving required
- Reduction of impervious surface area
- Provides acceptable LOS

DISADVANTAGES:

- None apparent

	INITIAL COST	OPERATING COST	TOTAL LIFE-CYCLE COST
ORIGINAL DESIGN:	\$ 2,563,172		\$ 2,563,172
PROPOSED CHANGE:	\$ 2,079,411		\$ 2,079,411
SAVINGS:	\$ 483,761		\$ 483,761

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER:	R-12.0	PAGE NUMBER:	2 of 5
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Ramp E Bridge (22482.89 SF)	1	SF	22482.89	90.58	2,036,500
RAMP E PAVEMENT	1	SY	3733.33	77.43	289,072
APPROACH SLABS	1	SF	2640	90.00	237,600
SUBTOTAL – COST TO PRIME					\$2,563,172
MARKUP					--
TOTAL CONTRACT COST					\$2,563,172

PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Ramp E Bridge (18643.75 SF)	1	SF	18682.89	90.58	1,692,296
Ramp E Pavement	1	SY	2488.89	77.43	192,715
Approach Slabs	1	SF	2160	90.00	194,400
SUBTOTAL – COST TO PRIME					\$2,079,411
MARKUP					--
TOTAL CONTRACT COST					\$2,079,411

Difference [Original-Proposed] **\$483,761**

SOURCES

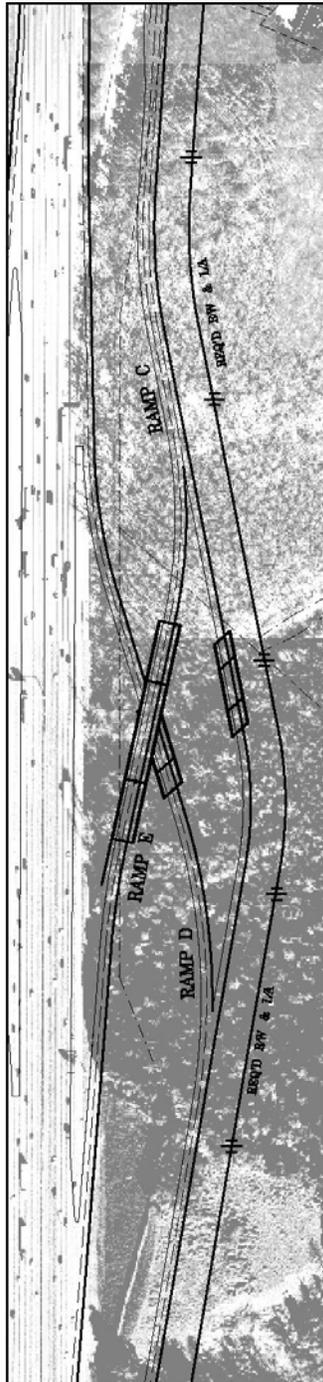
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| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor (Specify) 7. From GDOT Bridge Design (See calcs.) 8. Other (Specify) |
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ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-12.0

PAGE NUMBER: 3 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



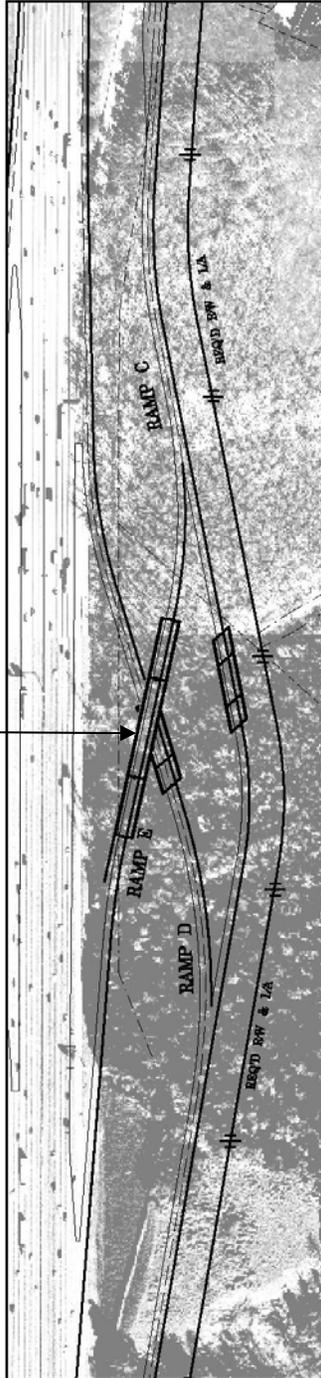
PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-12.0

PAGE NUMBER: 4 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

1-lane
Ramp "E"



CALCULATIONS

PROPOSAL NUMBER: R-12.0

PAGE NUMBER: 5 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Pavement Section Cost – Concrete Ramps

12" GAB: $\$17.97/\text{TN} \times 0.675 \text{ TNS}/\text{SY}$	\$12.13/SY
3" asphalt base course: $3.0 \times (110/2000) \times (\$62.42/\text{TN})$	\$10.30/SY
10" concrete pavement	<u>\$55.00/SY</u>
TOTAL	\$77.43/SY

QUANTITY SAVINGS:

475 lf RAMP E bridge X 8 ft. wide = 3800 SF

Approach slab= 2 X 30ft. x 8 ft.= 480 sf

Conc. Pavement = 1400 lf X 8 ft = 11200 sf / 9 = 1244.44 SY

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-13.0

PAGE NUMBER: 1 of 8

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-
PROJECT TITLE: I-285 @ Bouldercrest Road, DeKalb County

PROPOSAL DESCRIPTION: Realign Ramp “C” to intersect at Industrial Drive and add Loop Ramp (Ramp B revised) from Bouldercrest to I-285 EB, Reduce the number of lanes on the Bouldercrest bridge replacement over I-285 to eliminate the 2 lane left turn bay.

ORIGINAL DESIGN:

Ramp C

At present, the existing Ramp C is a single lane ramp that splits to a right turn and left turn lane at Bouldercrest Road. The original design retains the diamond interchange configuration and makes the following changes:

The original design Ramp C approach angle to Bouldercrest Road is set to be at least 70 degrees skewed to Bouldercrest Road.

The original design adds two additional turn lanes as follows:

- I-285 EB to Bouldercrest Road: One additional left turn and one additional right turn.

Industrial Drive at Bouldercrest Road

Industrial Drive is within the minimum distance for a median opening to a ramp radius return (660 ft minimum required, 400 ft actual), the intersection is retained, but a raised median is added and Industrial Drive is made into a right-in, right-out.

Bridge over I-285

The new bridge proposed for Bouldercrest over I-285 has two left turn lanes for the movement from Bouldercrest Road NB to Ramp F.

	INITIAL COST	OPERATING COST	TOTAL LIFE- CYCLE COST
ORIGINAL DESIGN:	\$ 0		\$ 0
PROPOSED CHANGE:	\$ (800,601)		(\$ 800,601)
SAVINGS:	\$ 800,601		\$ 800,601

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-13.0

PAGE NUMBER: 2 of 8

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

PROPOSED CHANGE:

Ramp C

The proposed change realigns Ramp C to intersect with the realigned Industrial Drive, increasing the distance of the intersection from I-285. Traffic from Ramp C is allowed through the intersection to Industrial Drive and allowing the intersection to maintain lefts from Bouldercrest Road SB onto Industrial Drive.

Ramp B- Revised

A Loop Ramp (Ramp B revised) allows access to I-285. A dedicated right turn is added for SB Bouldercrest Road to Ramp B-revised. Removes 1600 LF retaining wall from current Ramp B design.

Bouldercrest Road over I-285

Adding the Loop Ramp eliminates the need for dual lefts onto the Original Concept Ramp B.

ADVANTAGES/DISADVANTAGES/JUSTIFICATION

PROPOSAL NUMBER:	R-13.0	PAGE NUMBER:	3 of 8
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ADVANTAGES:

- Reduces the bridge width requirements
- Eliminates conflicts requiring signalization phasing
- Eliminates retaining wall
- Reduces R/W acquisition

DISADVANTAGES:

- Introduces the possibility of wrong way movements, requiring careful attention to signing

JUSTIFICATION:

Issues with the Original Concept:

Making Industrial Drive into a right-in, right-out causes several undesirable issues. It requires trucks currently accessing Industrial Drive at Bouldercrest to continue on Bouldercrest to the Sugar Creek Golf Drive in order to access the commercial properties in the area.

This adds additional truck travel time and introduces more truck volume on Sugar Creek Golf Drive which requires reconstruction of the roadway.

Advantages of the Proposed Concept:

The proposed concept solves the issues related to eliminating access to Industrial Drive from SB Bouldercrest Road. It also removes left turns off of the proposed Bouldercrest over I-285 bridge which reduces bridge width requirements and removes conflicting movements on northbound and southbound Bouldercrest Road.

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER:	R-13.0	PAGE NUMBER:	4 of 8
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
SUBTOTAL – COST TO PRIME					0.00
MARKUP					--
TOTAL CONTRACT COST					0.00

PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST*	TOTAL COST
Bridges	7	SQ FT	6,000	(95.00)	(570,000)
Ramps	1	SQ YD	3,178	(77.43)	(246,055)
Roadway	1	SQ YD	2,933	(41.45)	(121,587)
Wall	1	SQ FT	24,245	(40.00)	(969,800)
Right of Way	1	LS	1	1,106,841	1,106,841
SUBTOTAL – COST TO PRIME					(\$800,601)
MARKUP					
TOTAL CONTRACT COST					(\$800,601)

Difference [Original-Proposed] **\$800,601**
 *(negative = savings)

SOURCES

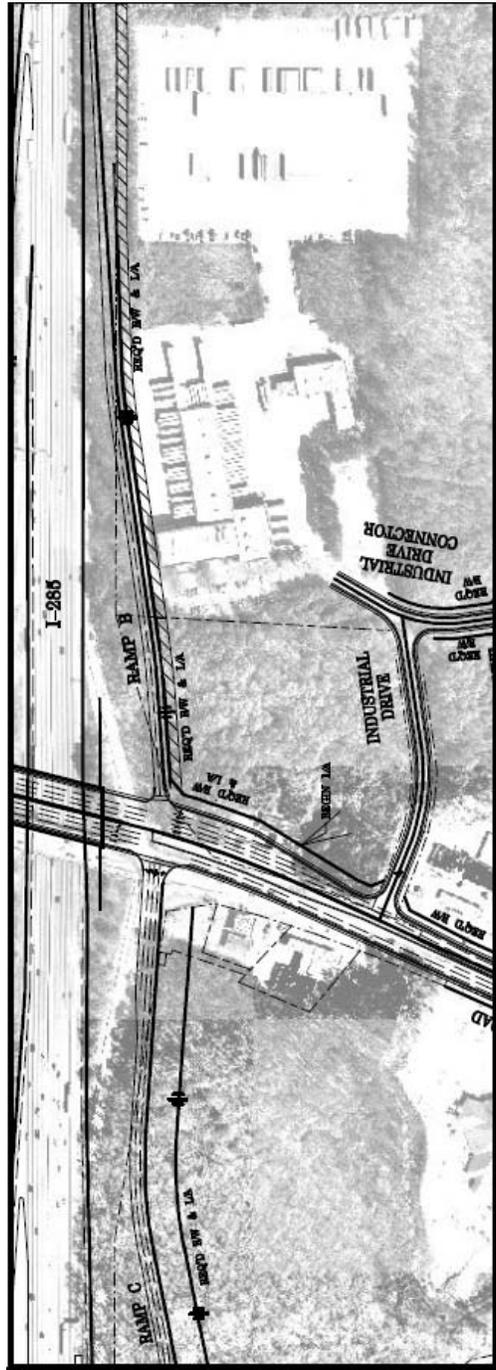
- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor (Specify) 7. From GDOT Bridge Design (See calcs.) 8 Other (Specify) |
|---|--|

ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-13.0

PAGE NUMBER: 5 of 8

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

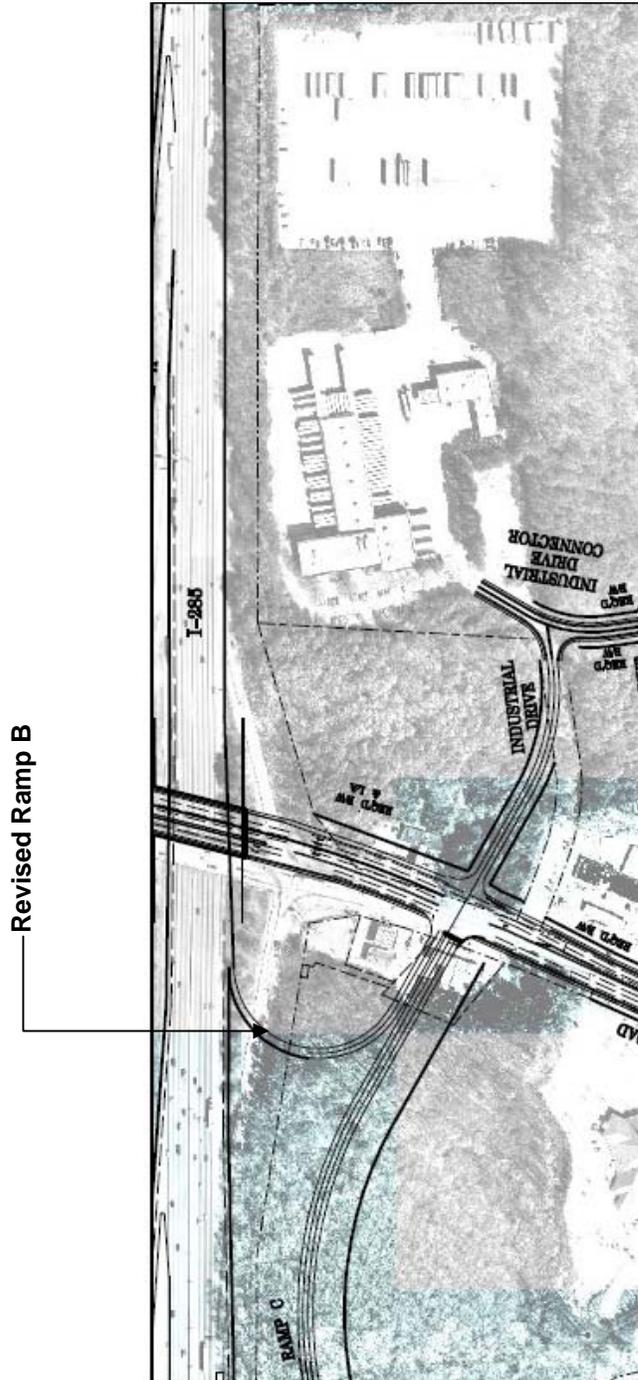


PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-13.0

PAGE NUMBER: 6 of 8

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



CALCULATIONS

PROPOSAL NUMBER: R-13.0

PAGE NUMBER: 7 of 8

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Cost Basis for proposed change:

Pavement Section Cost – Concrete Ramps

12" GAB: \$17.97/TNx0.675TNS/SY	\$12.13/SY
3" asphalt base course: 3.0x(110/2000)x(\$62.42/TN)	\$10.30/SY
10" concrete pavement	\$55.00/SY
TOTAL	\$77.43/SY

Pavement Section Cost – Local Roads

12" GAB: \$17.97/TNx0.675TNS/SY	\$12.13/SY
5" asphalt base course: 5.0x(110/2000)x(\$62.42/TN)	\$17.17/SY
2" asphalt binder course: 2.0x(110/2000)x(\$61.77/TN)	\$ 6.80/SY
1-1/2" asphalt surface course: 1.5x(110/2000)x(\$64.83/TN)	\$ 5.35/SY
TOTAL	\$41.45/SY

Determination of Bridge Sq. Ft Unit Cost to use

Square foot cost of bridges used in the latest cost estimate is not uniform between bridges. The team asked Bill Duvall, PE, Asst. State Bridge Engineer, for an approximate unit cost to use. Both cost of original and proposed were adjusted by these values.

From: DuVall, Bill [mailto:bduvall@dot.ga.gov]

Sent: Wednesday, February 22, 2012 7:45 AM

To: Grant, Greg

Subject: RE: VE Study

Greg,

I think that 95 \$/SF is reasonable for a concrete bridge over a stream; the price would be less in a rural setting but this should work for your project. However, the data for steel bridges is more limited. I would probably use 115 \$/SF.

Bill

Bill DuVall

Bridge Design

(404) 631-1883

From: Grant, Greg [mailto:Greg.Grant@rsandh.com]

Sent: Tuesday, February 21, 2012 10:34 AM

To: DuVall, Bill

Subject: VE Study

Bill,

Do you have any recent Sq FT cost data for:

- PSC beam bridge over stream
- Steel Bridge Over Stream

Best regards, Greg

R/W COSTS

\$175,000/ACRE x 1.55 scheduling contingency x 1.6 admin/court costs = \$434,000/ACRE

CALCULATIONS

PROPOSAL NUMBER: R-13.0

PAGE NUMBER: 8 of 8

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Cost of Bridges:		Proposed Change				
Bridge	Length	Width	Area	\$/Sq Ft	Cost	
Bouldercrest over I-285	250	-24	-6000	\$ 95.00	\$ (570,000)	
Totals	250		-6000	\$ 95.00	\$ (570,000)	

Cost of Ramps:		Proposed Change				
Ramp	Lanes	Length (ft)	Width (ft)	Paved Area (SY)	\$/Sq Yd	Cost
Ramp B	1-Lane	-2,200	26	-6,356	\$ 77.43	\$ (492,111)
Ramp B - Loop Portion	1-Lane	1,100	26	3,178	\$ 77.43	\$ 246,055
Total		1,100		3,178	\$ (77.43)	\$ (246,055)

Note: Distances measured from sketch made in Microstation file
 Ramp E reduced to 1-lane (16 ft), 700 foot of ramp removed on the west side

Cost of Roadway:		Proposed Change				
Roadway	Lanes	Length (ft)	Width (ft)	Paved Area (SY)	\$/Sq Yd	Cost
Bouldercrest	1-Lane	2,200	12	2,933	\$ (41.45)	\$ (121,587)
Total		2,200		2,933	\$ (41.45)	\$ (121,587)

Represents savings by not having to pave the 24 feet at the bridge tapering to 0 ft along Bouldercrest on both sides of the bridge.

Right-of-Way	Quantity	Unit	Cost/Unit	Cost
Take for property on west of Bouldercrest	1	EA	\$ 250,000.00	\$ 250,000.00
R/W not required on the E side of Bouldercrest	-2.46	Acre	\$ 434,000	\$ (1,066,070)
Additional R/W required on the East side includes additional required for Industrial Way	4.43	Acre	\$ 434,000	\$ 1,922,911
Total				\$ 1,106,841

Measured in Microstation file

Cost of Retaining Wall:		Proposed Change		
Wall	Wall Type	Area (sq ft)	\$/Sq Ft	Cost
Along Ramp B	MSE	24,245	\$ (40.00)	\$ (969,800)
Total		24,245		\$ (969,800)

Represents savings by removal of 1,600 LF of retaining wall along current Ramp B.

Proposed Change Summary				
Description	Quantity	Unit	Cost/Unit	Cost
Bridges	-6000	SQ FT	\$ 95.00	\$ (570,000)
Ramps	3,178	SQ YD	\$ (77.43)	\$ (246,055)
Roadway	2,933	SQ YD	\$ (41.45)	\$ (121,587)
Wall	24,245	SQ FT	\$ (40.00)	\$ (969,800)
Right of Way	1.00	LS	\$ 1,106,841	\$ 1,106,841
Totals				\$ (800,601)

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER: R-14.0

PAGE NUMBER: 1 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-
PROJECT TITLE: I-285 @ Bouldercrest Road, DeKalb County

PROPOSAL DESCRIPTION: Eliminate improvements on Continental Way.

ORIGINAL DESIGN: The current design includes reconstruction of Continental Way outside of Bouldercrest Road R/W limits.

PROPOSED CHANGE: It is proposed to eliminate reconstruction of Continental Way from the project scope.

JUSTIFICATION: Continental Way provides access to truck stop and adjacent properties. Based on updated traffic count of 5,380 ADT for Continental Way, the Bouldercrest Road improvements do not warrant reconstruction of Continental Way.

ADVANTAGES:

- Eliminates unnecessary work
- Reduces R/W impacts
- Reduces community impacts

DISADVANTAGES:

- None apparent

	INITIAL COST	OPERATING COST	TOTAL LIFE-CYCLE COST
ORIGINAL DESIGN:	\$ 407,799		\$ 407,799
PROPOSED CHANGE:	\$ 0		\$ 0
SAVINGS:	\$ 407,799		\$ 407,799

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER:	R-14.0	PAGE NUMBER:	2 of 5
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
SIDEWALK	1	SY	1333.33	23.78	31,707
PAVEMENT	1	SY	3200	41.45	132,640
STRIPING	1	LM	0.94	1399.71	1,316
R/W	1	AC	0.48	434,000	208,320
CURB & GUTTER	1	LF	2400	14.09	33,816
SUBTOTAL – COST TO PRIME					\$407,799
MARKUP					--
TOTAL CONTRACT COST					\$407,799

PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
Eliminate reconstruction of Continental Way					
SUBTOTAL – COST TO PRIME					0.00
MARKUP					1.34
TOTAL CONTRACT COST					0.00

Difference [Original-Proposed] **\$407,799**

SOURCES

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor (Specify) 7. Other (Specify) |
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ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-14.0

PAGE NUMBER: 3 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-14.0

PAGE NUMBER: 4 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



CALCULATIONS

PROPOSAL NUMBER: R-14.0

PAGE NUMBER: 5 of 5

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

Pavement Section Cost – Local Roads

12" GAB: $\$17.97/\text{TN} \times 0.675 \text{ TNS}/\text{SY}$	\$12.13/SY
5" asphalt base course: $5.0 \times (110/2000) \times (\$62.42/\text{TN})$	\$17.17/SY
2" asphalt binder course: $2.0 \times (110/2000) \times (\$61.77/\text{TN})$	\$ 6.80/SY
1-1/2" asphalt surface course: $1.5 \times (110/2000) \times (\$64.83/\text{TN})$	<u>\$ 5.35/SY</u>
TOTAL	\$41.45/SY

PAVEMENT

1200 LF @ 24 FT. = 3200 SY

SIDEWALKS

2400 LF x 5 FT = 1333.33 SY

CURB & GUTTER

2400 LF

STRIPING

0.94 MILE

R/W

1400 LF X 15 FT WIDE = 21,000 SF/43,560 = 0.48 AC

R/W COSTS

$\$175,000/\text{ACRE} \times 1.55 \text{ scheduling contingency} \times 1.6 \text{ admin/court costs} = \$434,000/\text{ACRE}$

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER:	R-15.0	PAGE NUMBER:	1 of 7
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
PROJECT TITLE:	I-285 @ Bouldercrest Road, DeKalb County

PROPOSAL DESCRIPTION:	Limit project scope to Eastbound I-285 intersection with Bouldercrest, widen existing bridge and add Whitehall Forest Connector.
------------------------------	--

ORIGINAL DESIGN: The original design provides separate, isolated ramps in order to reduce weaving of exiting traffic from three systems affected: I-285, I-675, and Bouldercrest Road. This configuration uses multiple bridges to isolate ramp movements and braid traffic in an effort to improve operations along I-285 between I-675 and Bouldercrest Road. Bouldercrest Road also undergoes total reconstruction to provide truck traffic circulation due to ramp modifications and R/W provisions.

PROPOSED CHANGE: It is proposed to limit the scope to focus on only those improvements necessary to improve operations on Bouldercrest Road. A traffic study showed that the only movements along Bouldercrest needing improvement are those to travel onto I-285 Eastbound. Thus, a revised scope will include widening of the existing Bouldercrest bridge over I-285 with a structure providing dual left turns in the Southbound direction and adequate capacity for through traffic growth. Also, construction of a Whitehall Forest Connector will be required off of Continental Way.

JUSTIFICATION: The proposed change improves the operations at the intersection of the I-285 EB entrance and exit ramps at Bouldercrest Road. This reduced scope eliminates work along Bouldercrest Road that is not necessary based on latest traffic study.

ADVANTAGES:

- Improves operations on Bouldercrest
- Provides significant cost savings
- Eliminates unnecessary project features

DISADVANTAGES:

- Leaves existing weave condition on I-285

	INITIAL COST	OPERATING COST	TOTAL LIFE-CYCLE COST
ORIGINAL DESIGN:	\$ 51,474,211		\$ 51,474,211
PROPOSED CHANGE:	\$ 1,048,529		\$ 1,048,529
SAVINGS:	\$ 50,425,682		\$ 50,425,682

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER:	R-15.0	PAGE NUMBER:	2 of 7
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
ROAD AND BRIDGE CONSTR.	1	LS	1	26,242,211	26,242,211
R/W	1	LS	1	25,232,000	25,232,000
SUBTOTAL – COST TO PRIME					\$51,474,211
MARKUP					--
TOTAL CONTRACT COST					\$51,474,211

PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
BRIDGE WIDENING	1	SF	6000	114	684,000
RAMP PAVEMENT	1	SY	800	77.43	61,944
ASPHALT PAVEMENT	1	SY	7300	41.45	302,585
SUBTOTAL – COST TO PRIME					\$1,048,529
MARKUP					--
TOTAL CONTRACT COST					\$1,048,529

Difference [Original-Proposed] **\$50,425,682**

SOURCES

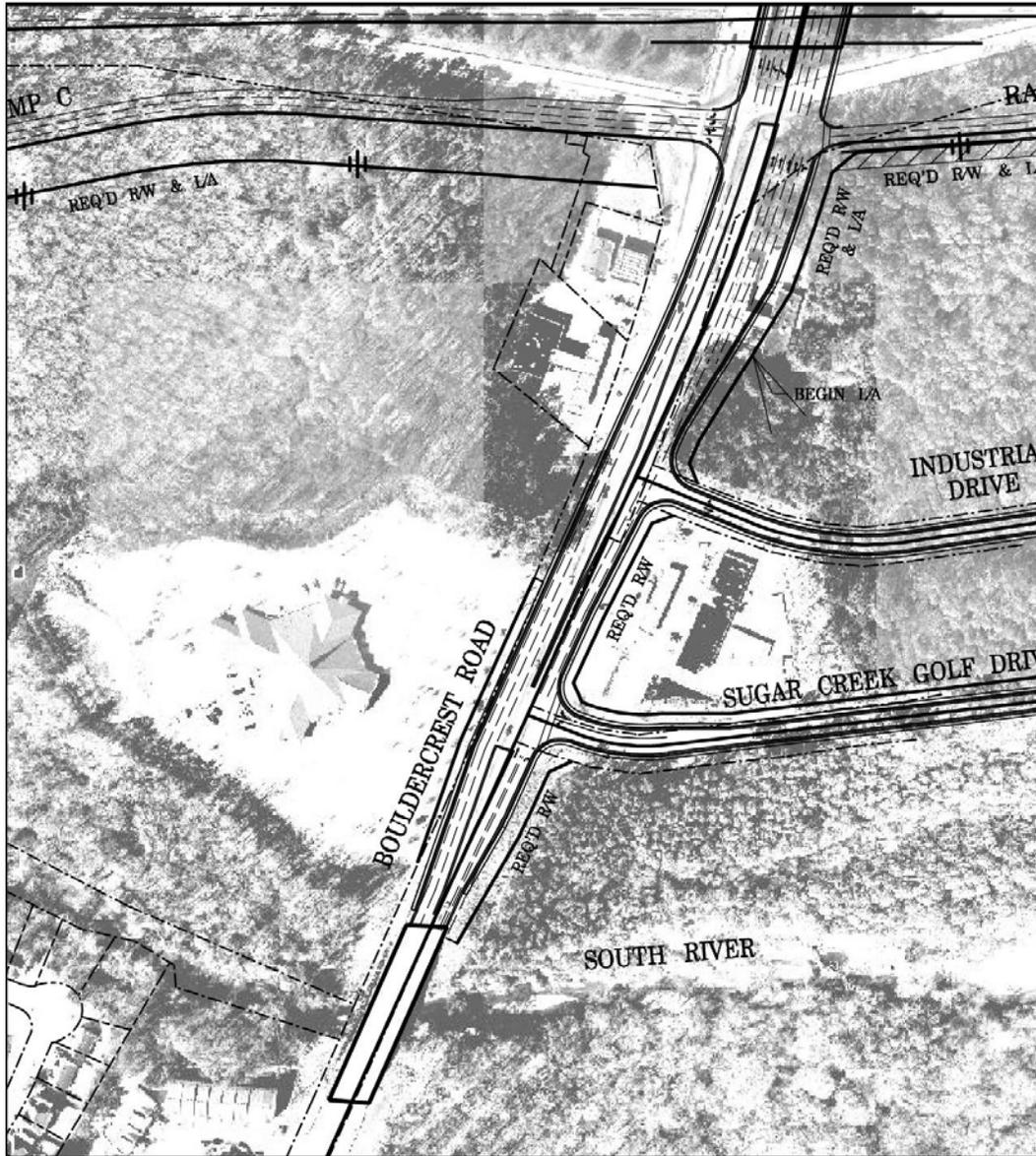
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| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor (Specify) 7. Other (Specify) |
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ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-15.0

PAGE NUMBER: 3 of 7

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

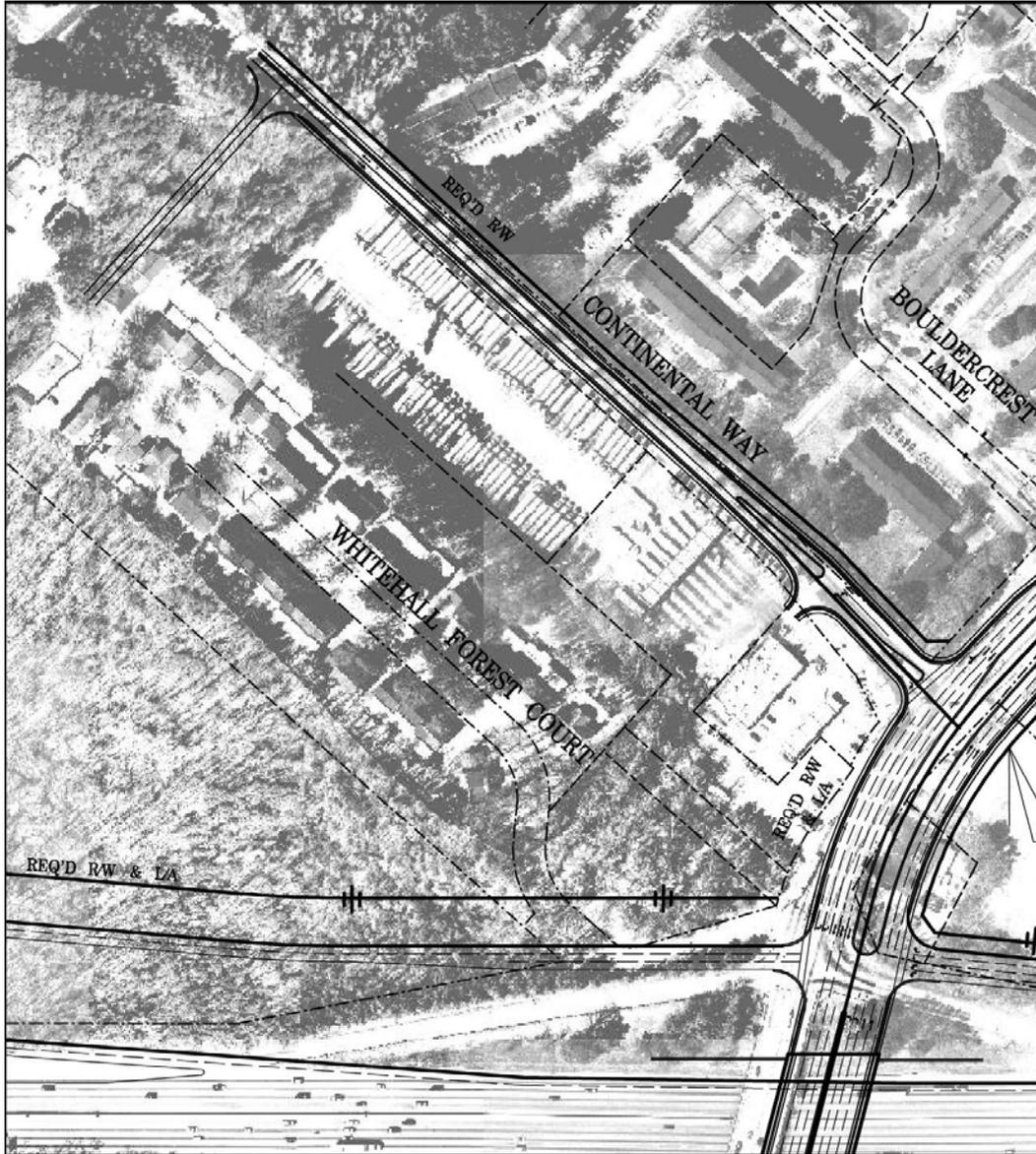


ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-15.0

PAGE NUMBER: 4 of 7

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

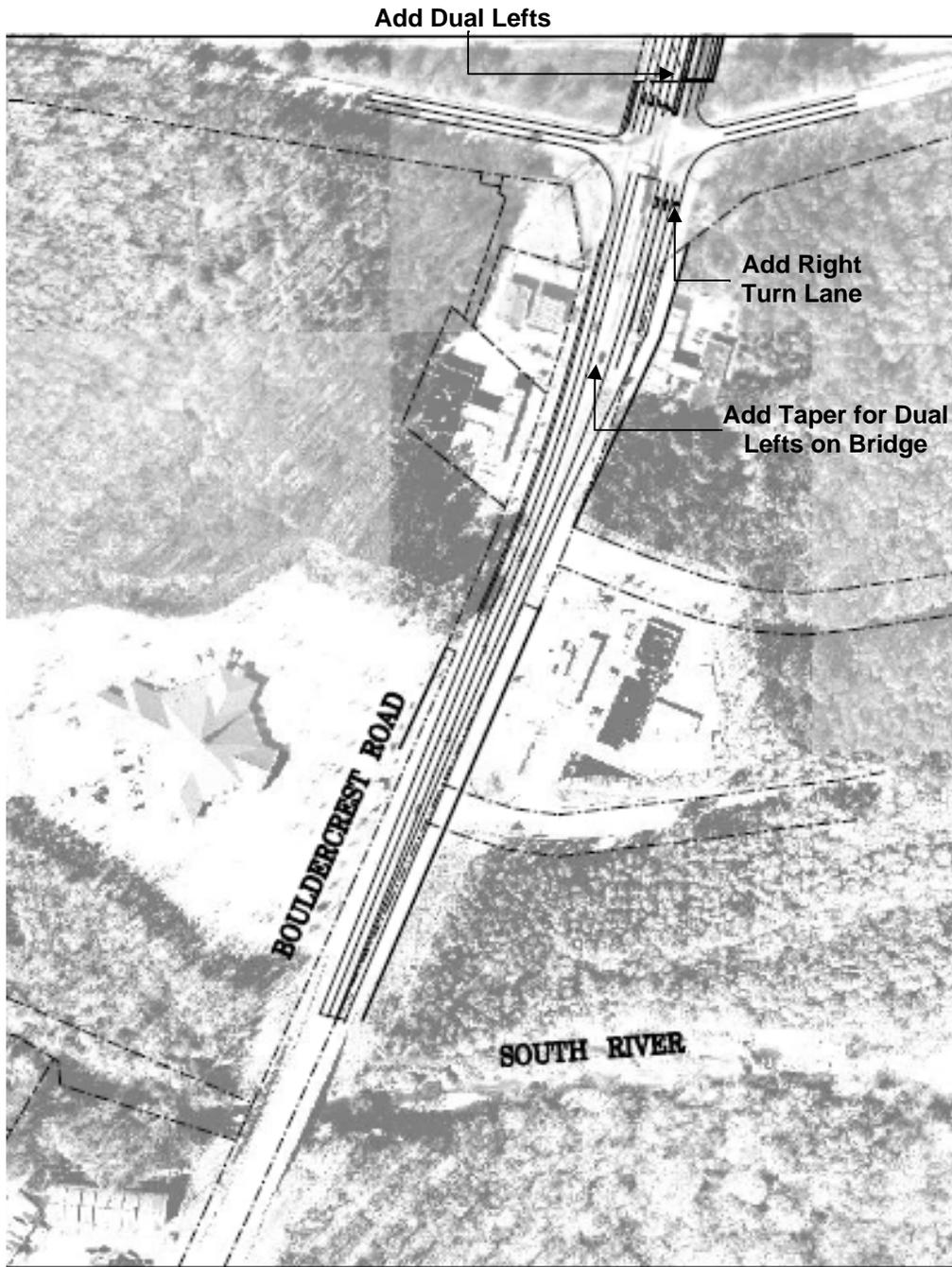


PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-15.0

PAGE NUMBER: 5 of 7

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

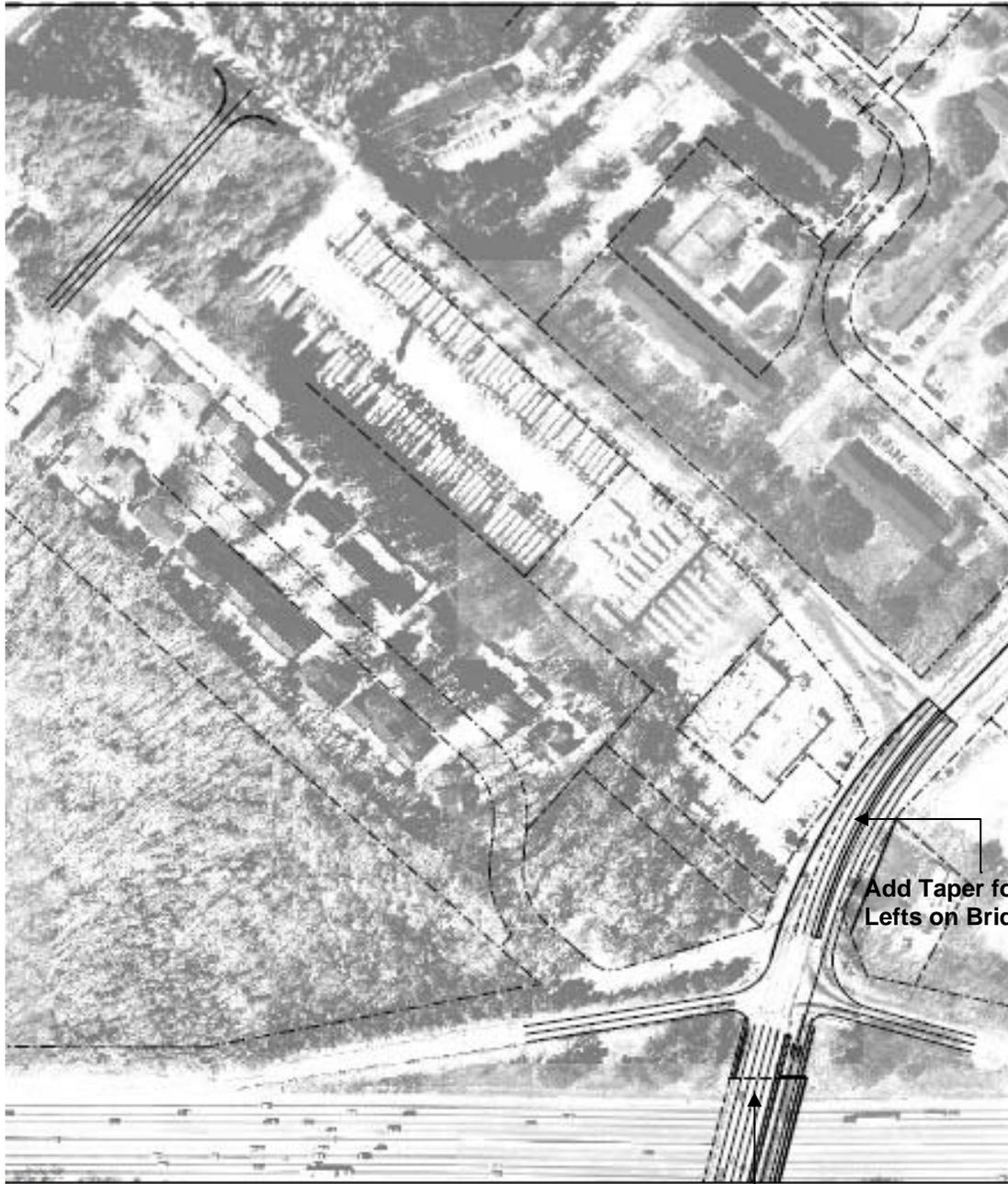


PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-15.0

PAGE NUMBER: 6 of 7

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



CALCULATIONS

PROPOSAL NUMBER: R-15.0

PAGE NUMBER: 7 of 7

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

ORIGINAL DESIGN:

\$51,474,211. (from project cost estimates)

PROPOSED DESIGN:

BRIDGE WIDENING:

Keep only Bouldercrest bridge WIDENING to provide 2-left turn lanes (24 ft x 250 lf = 6000 SF)

RAMP WIDENING:

Ramp B widens by 12' X 600 lf = 7200 sf/9=800 SY

ROADWAY WIDENING:

Roadway transition on Bouldercrest = 2400 LF total X 24 ft = 57,600/9=6400 sy

NEW WHITEHALL FOREST:

Keep Whitehall Forest Connector 402.5 LF X 20 FT = 8100/9=900 SY

Pavement Section Cost – Local Roads

12" GAB: \$17.97/TNx0.675TNS/SY	\$12.13/SY
5" asphalt base course: 5.0x(110/2000)x(\$62.42/TN)	\$17.17/SY
2" asphalt binder course: 2.0x(110/2000)x(\$61.77/TN)	\$ 6.80/SY
1-1/2" asphalt surface course: 1.5x(110/2000)x(\$64.83/TN)	<u>\$ 5.35/SY</u>
TOTAL	\$41.45/SY

Pavement Section Cost – Concrete Ramps

12" GAB: \$17.97/TNx0.675TNS/SY	\$12.13/SY
3" asphalt base course: 3.0x(110/2000)x(\$62.42/TN)	\$10.30/SY
10" concrete pavement	<u>\$55.00/SY</u>
TOTAL	\$77.43/SY

Bridge Widening (20% premium on new): \$95/SF x 1.20 = \$114.00/SF

VALUE ENGINEERING PROPOSAL

PROPOSAL NUMBER:	R-15.1	PAGE NUMBER:	1 of 7
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
PROJECT TITLE:	I-285 @ Bouldercrest Road, DeKalb County

PROPOSAL DESCRIPTION:	Limit Project Scope to Braided Ramps, Eastbound I-285 Intersection with Bouldercrest Road, Widen Existing Bridge and Add Whitehall Forest Corridor
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ORIGINAL DESIGN: The original design provides separate, isolated ramps in order to reduce weaving of exiting traffic from three systems affected: I-285, I-675, and Bouldercrest Road. This configuration uses multiple bridges to isolate ramp movements and braid traffic in an effort to improve operations along I-285 between I-675 and Bouldercrest Road. Bouldercrest Road also undergoes total reconstruction to provide truck traffic circulation due to ramp modifications and limited access R/W provisions.

PROPOSED CHANGE: It is proposed to limit the scope to focus on only those improvements necessary to improve operations on Bouldercrest and improve the current weaving condition on I-285. A traffic study showed that the only movements along Bouldercrest needing improvement are those to travel onto I-285 Eastbound. Thus, a revised scope will include widening of the existing Bouldercrest bridge over I-285 with a structure providing dual left turns in the Southbound direction and adequate capacity for through traffic growth. Also, construction of a Whitehall Forest Connector will be required off of Continental Way. The braided ramp approach is included in this scope to improve the weaving along I-285.

JUSTIFICATION: This proposal improves both the weaving problem at I-675 exit ramp with the on-ramp to Bouldercrest Road, and also improves the movements from Bouldercrest Road to Eastbound I-285. This reduced scope eliminates work along Bouldercrest Road that is not necessary based on latest traffic study.

ADVANTAGES:

- Improves weave on I-285
- Improves operations on Bouldercrest
- Eliminates unnecessary project features

DISADVANTAGES:

- None recognized

	INITIAL COST	OPERATING COST	TOTAL LIFE-CYCLE COST
ORIGINAL DESIGN:	\$ 51,474,211		\$ 51,474,211
PROPOSED CHANGE:	\$ 33,885,578		\$ 33,885,578
SAVINGS:	\$ 17,588,633		\$ 17,588,633

COST ESTIMATING WORKSHEET

PROPOSAL NUMBER:	R-15.1	PAGE NUMBER:	2 of 7
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PROJECT #/PI #:	IMNH0-0285-01(352) / 713300-
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ORIGINAL DESIGN

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
ROAD AND BRIDGE CONSTR.	1	LS	1	26,242,211	26,242,211
R/W	1	LS	1	25,232,000	25,232,000
SUBTOTAL – COST TO PRIME					\$51,474,211
MARKUP					--
TOTAL CONTRACT COST					\$51,474,211

PROPOSED CHANGE

ITEM	SOURCE CODE	U/M	QTY	UNIT COST	TOTAL COST
BRIDGE WIDENING	1	SF	6000	114	684,000
CONC RAMP PAVEMENT	1	SY	800	77.43	61,944
ASPHALT PAVEMENT	1	SY	7300	41.45	302,585
BRAIDED RAMPS & R/W (from R-1.0)	8				32,837,049
SUBTOTAL – COST TO PRIME					\$33,885,578
MARKUP					--
TOTAL CONTRACT COST					\$33,885,578

Difference [Original-Proposed] **\$17,588,633**

SOURCES

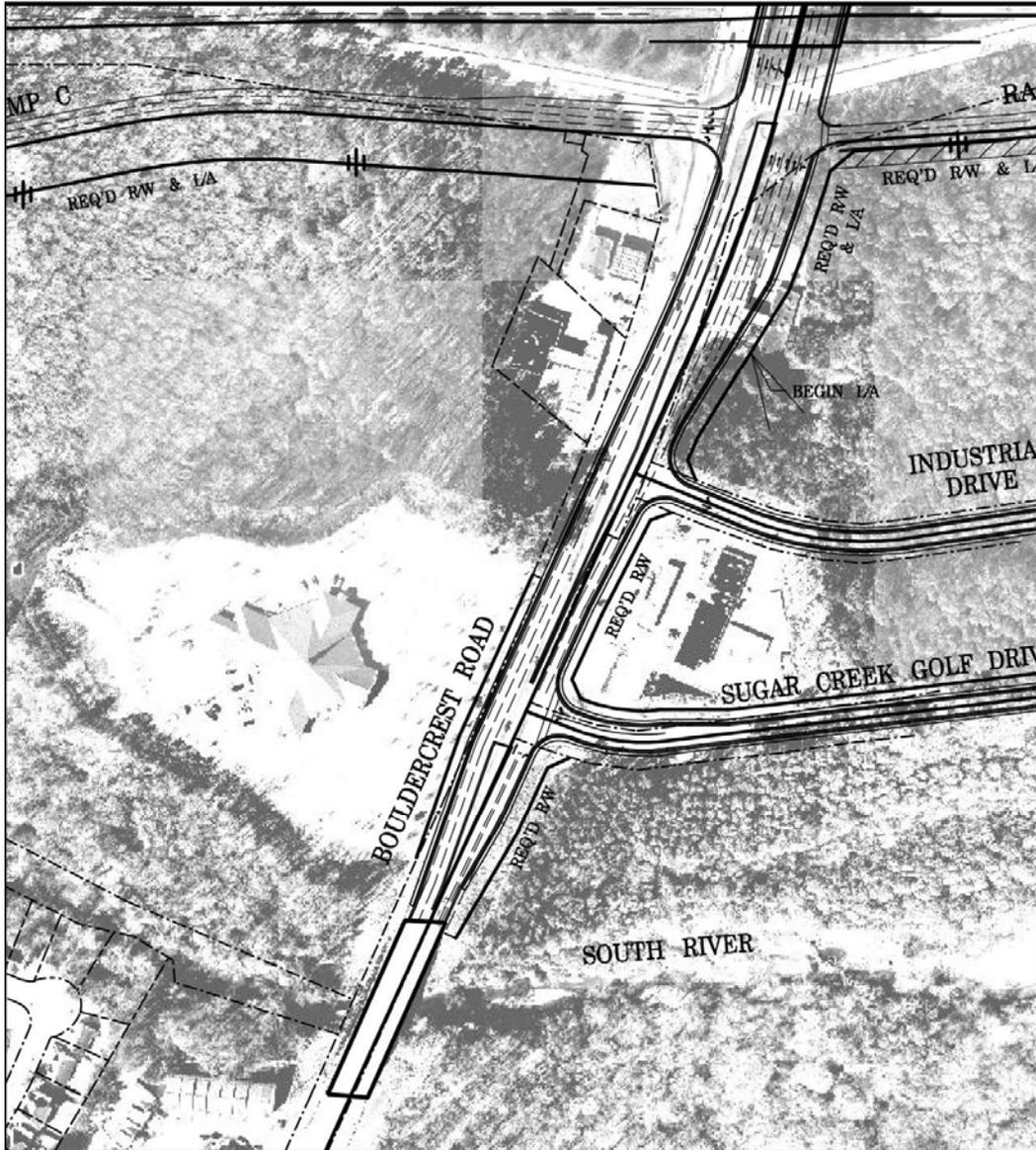
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|---|---|
| <ol style="list-style-type: none"> 1. Project Cost Estimate 2. USC Estimate Database 3. GDOT Item Mean Summary 4. Means Estimating Manual | <ol style="list-style-type: none"> 5. Richardson's Estimating Manual 6. Vendor (Specify) 7. From GDOT Bridge Design (See calcs.) 8. Other (See calcs in Proposal R-1.0) |
|---|---|

ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-15.1

PAGE NUMBER: 3 of 7

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



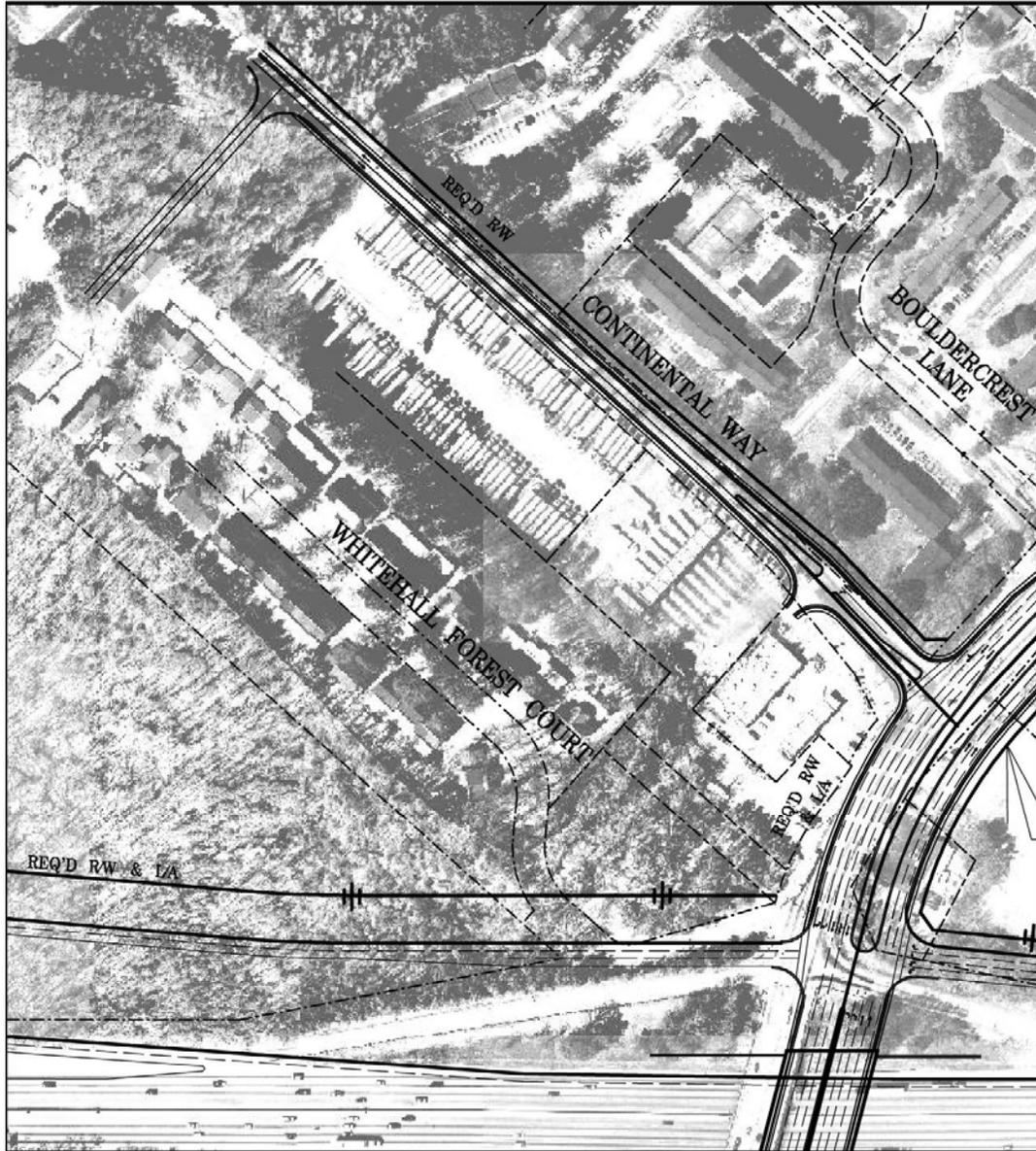
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ORIGINAL DESIGN SKETCH/DETAIL

PROPOSAL NUMBER: R-15.1

PAGE NUMBER: 4 of 7

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

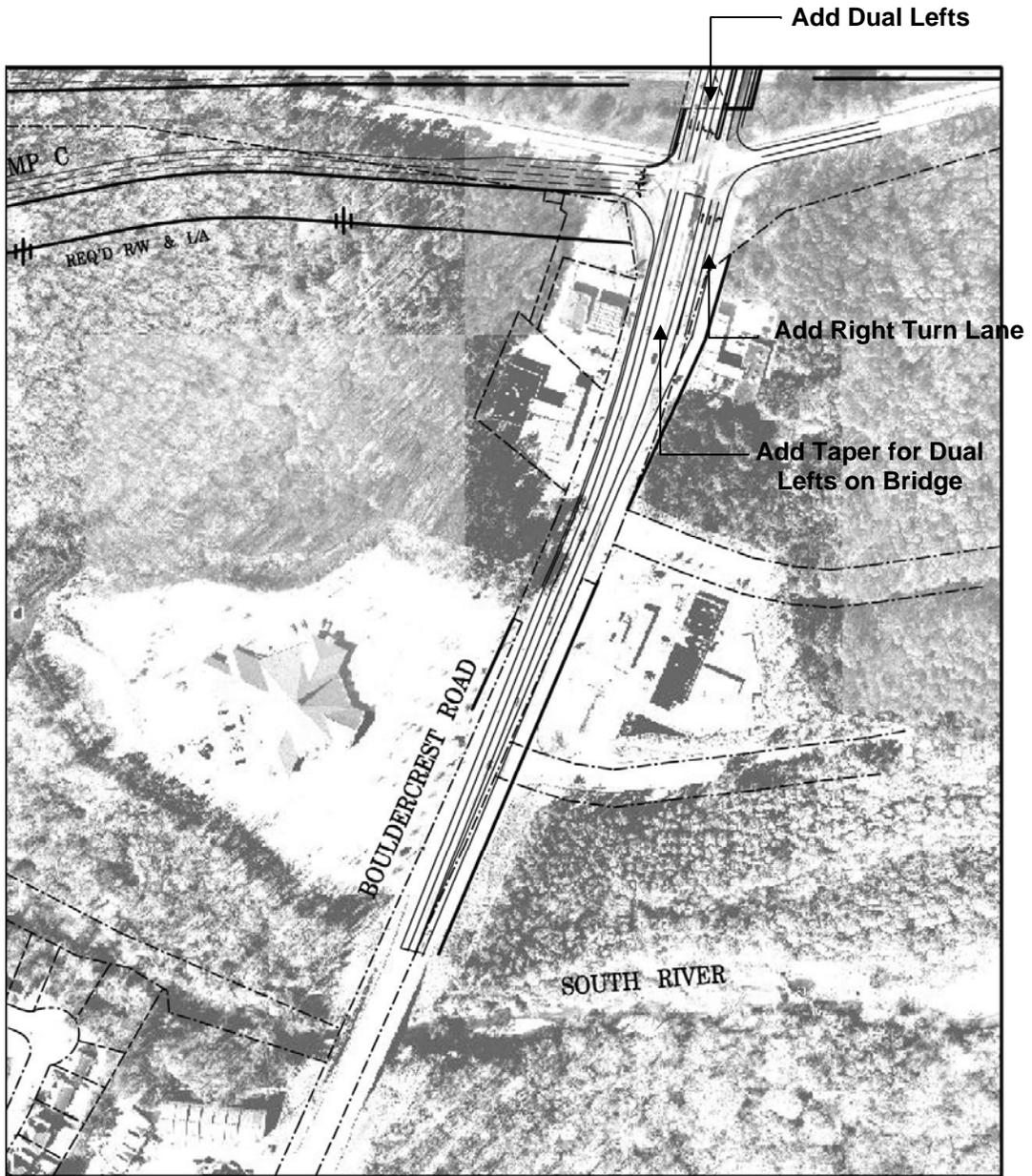


PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-15.1

PAGE NUMBER: 5 of 7

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

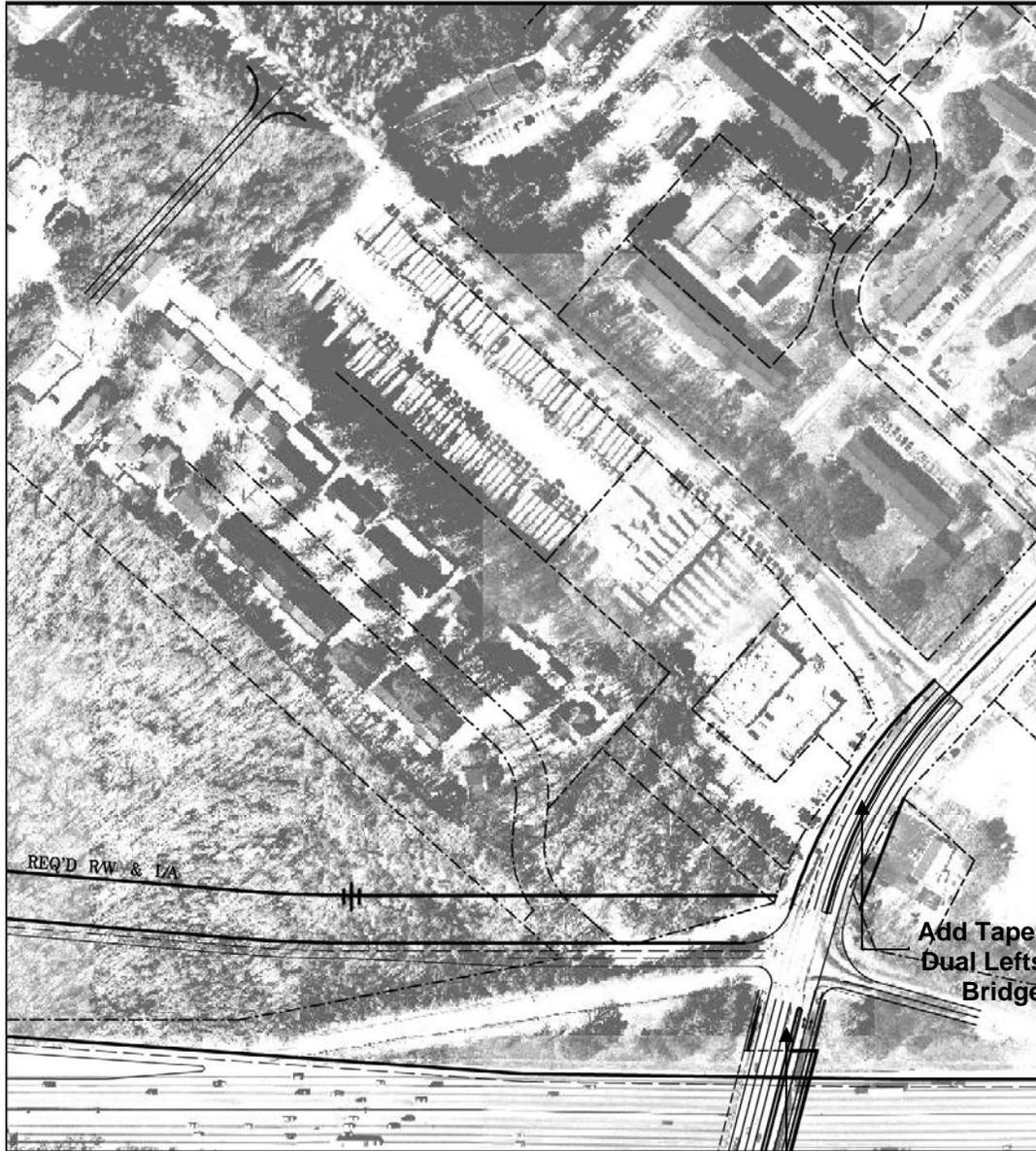


PROPOSED CHANGE SKETCH/DETAIL

PROPOSAL NUMBER: R-15.1

PAGE NUMBER: 6 of 7

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-



Add Dual
Lefts

Add Taper for
Dual Lefts on
Bridge

CALCULATIONS

PROPOSAL NUMBER: R-15.1

PAGE NUMBER: 7 of 7

PROJECT #/PI #: IMNH0-0285-01(352) / 713300-

PROPOSED DESIGN:

BRIDGE WIDENING:

Keep only Bouldercrest bridge WIDENING to provide 2-left turn lanes (24 ft x 250 lf = 6000 SF)

RAMP WIDENING:

Ramp B widens by 12' X 600 lf = 7200 sf/9=800 SY

ROADWAY WIDENING:

Roadway transition on Bouldercrest = 2400 LF total X 24 ft = 57,600/9=6400 sy

NEW WHITEHALL FOREST:

Keep Whitehall Forest Connector 402.5 LF X 20 FT = 8100/9=900 SY

Pavement Section Cost – Local Roads

12" GAB: \$17.97/TN x 0.675 TNS/SY	\$12.13/SY
5" asphalt base course: 5.0 x (110/2000) x (\$62.42/TN)	\$17.17/SY
2" asphalt binder course: 2.0 x (110/2000) x (\$61.77/TN)	\$ 6.80/SY
1-1/2" asphalt surface course: 1.5 x (110/2000) x (\$64.83/TN)	<u>\$ 5.35/SY</u>
TOTAL	\$41.45/SY

Pavement Section Cost – Concrete Ramps

12" GAB: \$17.97/TN x 0.675 TNS/SY	\$12.13/SY
3" asphalt base course: 3.0 x (110/2000) x (\$62.42/TN)	\$10.30/SY
10" concrete pavement	<u>\$55.00/SY</u>
TOTAL	\$77.43/SY

Bridge widening cost: (20% premium over new) \$95/SF x 1.20 = \$114/SF

VE STUDY SIGN-IN SHEET

Project No.: IMNH0-0285-01(352) County: DeKalb PI No.: 713300- Date: February 20-23, 2012

Days

	FIRST LAST	NAME	GDOT OFFICE OR COMPANY NAME	PHONE NUMBER	EMAIL ADDRESS
✓	○	Lisa L. Myers	Engineering Services	404-631-1770	lmyers@dot.ga.gov
✓	✓	Matt Sanders	Engineering Services	404-631-1752	msanders@dot.ga.gov
✓	○	Melissa Harper	Construction	404-631-1971	mharper@dot.ga.gov
✓	○	Ken Werho	Traffic Operations	404-635-8144	kwerho@dot.ga.gov
✓	○	Bill DuVall	Bridge Design	404-631-1883	bduvall@dot.ga.gov
✓	✓	Jeremy Busby	Program Delivery	404-631-1154	jbusby@dot.ga.gov
✓	✓	Lyn Clements	Bridge Design	404-631-1849	lclements@dot.ga.gov
✓	○	Funmi Adesesan	Environmental Services	404-631-1190	oadesesan@dot.ga.gov
✓	○	Chris Barrow	Traffic Operations	TBA	cpbarrow@dot.ga.gov
✓	✓	Tom Orr	U.S. Cost	770-481-1638	torr@uscost.com
✓	✓	Bill Deyo	KEA Group	850-499-7147	bdeyo@keagroup.com
✓	✓	Chris Haggard	Wolverton & Associates	770-447-8999	chris.haggard@wolverton-assoc.com
✓	✓	Greg Grant	RS&H, Inc.	678-528-7229	greg.grant@rsandh.com
✓	○	Jonathan Reid	Parsons Brinkerhoff	404-364-5225	reid@pbworld.com
○	✓	Robert Moses	Parsons Brinkerhoff	404-364-2674	moses@pbworld.com

Check all that attended
 = Did Not Attend
 14 Attended Project Overview (Day 1)
 8 Attended Project Presentation (Day 4)

VALUE ENGINEERING STUDY

FUNCTION ANALYSIS

The following functions for the I-285 at Bouldercrest Road Interchange project were identified during discussions with the VE participants on the first day of the study. These two-word functions consist of an active verb, and a quantifiable (measurable) noun. The functions represent the proposed capital improvement expenditures of the project, and assist the V.E. team in becoming familiar with the needs and long-term goals for the project. The Basic Function of the project is to “Improve Operations”. The following are considered by the V.E. team to be Secondary and Supporting Functions.

Verb	Noun		Verb	Noun
Reduce	Conflicts		Retain	Earth
Increase	Capacity		Re-establish	Vegetation
Correct	Deficiencies		Separate	Grades
Control	Traffic		Support	Vehicles
Reduce	Delays		Award	Contract
Support	Commerce		Direct	Traffic
Span	River		Separate	Lanes
Span	Interstate		Control	Erosion
Maintain	Vehicle Movements		Drain	Site
Maintain	Access		Convey	Drainage
Allow	Interstate Expansion		Install	Signals
Purchase	ROW		Install	Signage

VALUE ENGINEERING STUDY

COST MODEL / DISTRIBUTION

Project # IMNH0-0285-01(352) PI No. 713300-

**I-285 @ Bouldercrest Road Interchange
DeKalb County, Georgia**

ITEM	COST \$	% OF TOTAL
RIGHT-OF-WAY	25,232,000	49.02%
ASPHALT CONCRETE PAVING	8,251,585	16.03%
BRIDGES/STRUCTURES	8,040,574	15.62%
AGGREGATE BASE COURSE	1,619,649	3.15%
CLEARING AND GRUBBING	1,340,096	2.60%
DRAINAGE SYSTEM	1,333,551	2.59%
EARTHWORK	1,275,291	2.48%
CONCRETE SLABS/APRONS/MEDIANS	844,174	1.64%
RETAINING WALLS	783,956	1.52%
TRAFFIC CONTROL	783,589	1.52%
GRASSING/EROSION CONTROL	457,820	0.89%
DEMOLITION	335,024	0.65%
SIGNAGE/MARKING	332,439	0.65%
GUARDRAILS	303,869	0.59%
SIDEWALKS	257,454	0.50%
SIGNALS	188,478	0.37%
CURB & GUTTER	94,670	0.18%
*TOTAL - PROJECT	51,474,218	100.00%

*Does not include Engrg & Inspection, Fuel Adjustment or Liquid AC Adjustment

VALUE ENGINEERING STUDY

BRAINSTORMING OR SPECULATION IDEAS

PROJECT TITLE: I-285 AT BOULDERCREST ROAD INTERCHANGE

PROJECT LOCATION: DEKALB COUNTY, GEORGIA

NO.	IDEA	RANK
	ROADWAY (R)	
1.0	Use a Collector-Distributor System in lieu of Braided Ramps with New Single Bridge on Each Side	5
1.1	Use a Collector-Distributor (CD) System in lieu of Braided Ramps along each side of I-285 with a single combined bridge widening across South River	4
2.0	Combine Exit Ramps C&E and F&G and use right exit flyover ramps for H&D (2 bridges over the River on each side)	4
3.0	Shift new Bouldercrest Bridge West and Stage Construct; eliminate re-alignment work on Bouldercrest Road North of Continental Way and South of I-285	4
3.1	Build one new 4-lane bridge to the East and re-use existing bridge for Southbound traffic	3
4.0	Eliminate Improvements on Bouldercrest Road North of Continental Way	4
4.1	Eliminate improvements on Bouldercrest Road North of Clifton Church Road	With 4.0
5.0	Reduce median width on Bouldercrest Road from I-285 to Clifton Church Road	3
6.0	Incorporate Dedicated Left Turn Lane into Industrial Drive and Eliminate New Connector and Improvements at Sugar Creek Golf Drive	4
7.0	Eliminate Sidewalks along Industrial Drive and Sugar Creek Golf Drive	5
8.0	Re-align Bouldercrest Road in vicinity of Clifton Church Road	With 4.0
9.0	Use Divergin Diamond Interchange in lieu of Standard Diamond	2
10.0	Realign Ramp "A" to intersect at Continental Way and add Loop Ramp (Ramp F revised) from Bouldercrest to I-285 WB, Reduce the number of lanes on the Bouldercrest bridge replacement over I-285 to eliminate the 2 lane left turn bay	5
11.0	Install two 2-lane Roundabouts at Ramp Intersections	2
12.0	Reduce Ramp "E" from 2 Lanes to 1	5

VALUE ENGINEERING STUDY

BRAINSTORMING OR SPECULATION IDEAS

PROJECT TITLE: I-285 AT BOULDERCREST ROAD INTERCHANGE

PROJECT LOCATION: DEKALB COUNTY, GEORGIA

NO.	IDEA	RANK
	ROADWAY (R)	
13.0	Realign Ramp “C” to intersect at Industrial Drive and add Loop Ramp (Ramp B revised) from Bouldercrest to I-285 EB, Reduce the number of lanes on the Bouldercrest bridge replacement over I-285 to eliminate the 2-lane left turn bay.	4
14.0	Eliminate Improvements on Continental Way	4
15.0	Limit Project Scope to Eastbound I-285 Intersection with Bouldercrest Road, Widen Existing Bridge and Add Whitehall Forest Connector	4
15.1	Limit Project Scope to Braided Ramps, Eastbound I-285 Intersection with Bouldercrest Road, Widen Existing Bridge and Add Whitehall Forest Connector	4
16.0	Reduce lane width on local roads from 12’ to 11’	2

VALUE ENGINEERING WORKSHOP AGENDA

For GEORGIA DEPARTMENT OF TRANSPORTATION

**Project #: IMNH0-0285-01(352) - PI#: 713300-
I-285 @ Bouldercrest Road Interchange**

28 HOUR - V.E. STUDY
20-23 February 2012

The value engineering workshop for the subject project will be conducted for 3-1/2 days from 20-23 February 2012, **in the Engineering Services Conference Room (5CR1L2) on the 5th floor of the GDOT General Office Facility located at 600 W. Peachtree Street NW, Atlanta GA 30308; POC – Matt Sanders @ (404)631-1752 voice**

Pre-workshop Activities

The V.E. Team Leader coordinates logistics with GDOT, and confirms project objectives and any unique requests, and develops a cost model for the project. The V.E. Team receives and reviews all project documents.

MONDAY
0800 - 0900

V.E. Team Introduction Phase

Tom Orr, P.E., CVS
Team Leader, U.S. Cost, Inc.
(V.E. Team Only)

The VETL will review previous events along with activities planned for the week and outline several areas which may be investigated by the V.E. team.

The team members will discuss their initial impression and understanding of the project with other team members based on their pre-study review of the project plans, cost estimates, and available calculations. The V.E. Team Leader will provide cost models, and cost bar graphs to help the team identify the high-cost features of the project.

0900 - 1100

Project Design Briefing

V.E. Team; A/E, GDOT

The A/E project design manager will discuss the project constraints/requirements and the proposed design solution(s) in detail. The V.E. team members will ask questions as appropriate to completely understand the project requirements and the proposed design solution (both alternatives considered and those recommended by the design team).

MONDAY (CONTINUED)

1100 - 1200 **Function Analysis Phase** V.E. Team

The V.E. team will discuss the required functions of the project. The project cost model will be analyzed to identify functions provided by all project features.

1200 - 1300 **Lunch**

1300 - 1600 **Creative Phase** V.E. Team

The V.E. team will creatively review, Brainstorm, and tabulate possible design alternatives for the project. While the designer's solution will serve as the "baseline", the team will identify alternatives not in the recommended solution, but deserving of further investigation. Each project feature will be carefully analyzed with the basic questions in mind:

What is the system/item?

What does it do (what is its basic function)?

What must it do?

What does it cost?

What is the item worth?

What else will do the same, or a better job?

What does that alternative cost?

During the creative phase, the team will not judge the ideas. The essential requirements for the project, however, must always be considered.

1600 - 1700 **Analysis Phase** V.E. Team

During this phase, all of the ideas or alternatives will be ranked according to their potential for life-cycle (25-year) cost reduction and the potential for acceptance by GDOT, Engineering Designers, and other appropriate parties.

TUESDAY

0800 - 1700 **Development Phase** V.E. Team

During the development phase, each team member will gather information and prepare written proposals for those ideas assigned to him/her. These may require additional discussions with the designer, GDOT representatives, outside contractors and suppliers, and other specialists to fully define the alternative. The team members will prepare sketches, perform calculations and develop other data to support each proposal. In addition, each team

member will prepare estimates of costs for each alternative as originally designed, and as proposed by the V.E. team.

WEDNESDAY

0800 - 1200 **Development Phase** V.E. Team

1200 - 1300 Lunch

1300 - 1700 **Development Phase & Quality Review** V.E. Team

THURSDAY

0800 – 0900 **Prepare for Presentation** V.E. Team

0900 – 1000 **V.E. Presentation** V.E. Team Members, Design Team & GDOT Reps

The Value Engineering Team will present the proposals developed in the course of the study to the design team representatives and any participating stakeholders. The intent of the presentation is to give a clear understanding of the basis of the proposals rather than to reach a conclusion as to their acceptability. A summary table of results will be distributed at the presentation. The formal V.E. Reports will be issued within 8 business days of the workshop conclusion.

1000 – 1200 **V.E. Team Wrap-up & Final QC/QA** V.E. Team Members only

The Value Engineering Team will have a wrap-up session consisting of a final review of proposals to ensure consistency and clarity of content.

NOTES: LAPTOP COMPUTERS ARE REQUIRED FOR VE DEVELOPMENT

1. V.E. team members should bring to the workshop any technical and pricing reference manuals which may be used during the study. These may include design handbooks, code documents, estimating price guides, and related documents. Calculators, pencils, sketch paper, scales, and other similar items will also be useful.
2. It is critical that outside telephone calls and other interruptions of the study team members be held to an absolute minimum during the week to allow for efficient, uninterrupted concentration on the Value Engineering Study.
3. Questions concerning the proposed study should be directed to Tom Orr at (770)481-1638 or torr@uscost.com.