VALUE ENGINEERING CONSTRUCTABILITY STUDY

OF THE

WIDENING AND RECONSTRUCTION OF US 27/SR 1 FROM CR 279/DAMASCUS-HILTON ROAD

PROJECT NUMBER: EDS-27(168) & BRN-072-2(16)
PI NUMBER: 422215 & 431320

ATLANTA, GEORGIA

June 20-21, 2006

Prepared by:
VE GROUP, L.L.C.

In Association With:

Georgia Department of Transportation

VALUE ENGINEERING STUDY
TEAM LEADER

_____

William F. Ventry, P.E., C.V.S.
C.V.S. Registration No. 840603(LIFE)

Date: _____

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I. INTRODUCTION

GENERAL

This Value Engineering report summarizes the results of the Value Engineering study performed by VE GROUP for the Georgia Department of Transportation. The study was performed on June 20-21, 2006.

VALUE ENGINEERING METHODOLOGY

The Value Engineering Team followed the basic Value Engineering procedure for conducting this type of analysis.

This process included the following phases:

1. Investigation
2. Speculation
3. Evaluation/Development
4. Report Preparation

SUMMARY OF RECOMMENDATIONS

It is the recommendation of the Value Engineering Team that the following Value Engineering Alternatives be carried into the Project Development process for the final plans and specifications.

RECOMMENDATION NUMBER 1- CONSTRUCTABILITY

A. INTERSECTION MEDIAN CROSSOVERS

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. ***The Value Engineering Alternative eliminates, consolidates or changes three of the proposed intersections.***

If this recommendation can be implemented, there is a possible savings of ***$ 133,275.***

I. INTRODUCTION

SUMMARY OF RECOMMENDATIONS

RECOMMENDATION NUMBER 2- MATERIALS

A. BRIDGE OVER BLUE CREEK

The Value Engineering Team recommends that the Value Engineering Alternative Number 1 be implemented. ***Value Engineering Alternative No. 1 shortens the proposed bridge.***

If this recommendation can be implemented, there is a possible savings of ***$ 511,552.***

RECOMMENDATION NUMBER 3- MATERIALS

A. BRIDGE OVER BLUE CREEK

The Value Engineering Team recommends that the Value Engineering Alternative Number 2 be implemented. ***Value Engineering Alternative No. 2 uses a pre-cast CONSPAN structure rather than bridge.***

If this recommendation can be implemented, there is a possible savings of ***$ 643,272.***

RECOMMENDATION NUMBER 4- MATERIALS

B. EQUALIZER DRAINAGE PIPES

The Value Engineering Team recommends that the Value Engineering Alternative be implemented***. The Value Engineering Alternative combines the equalizer pipes with the median inlet drain pipes.***

If this recommendation can be implemented, there is a possible savings of ***$ 41,147.***

I. INTRODUCTION

SUMMARY OF RECOMMENDATIONS

RECOMMENDATION NUMBER 5- MATERIALS

C. MEDIAN DRAINS

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. ***Value Engineering Alternative combines the median drop inlets and the cross drains.***

If this recommendation can be implemented, there is a possible savings of ***$ 44,451.***

RECOMMENDATION NUMBER 6- MATERIALS

D. MEDIAN DITCHES

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. ***Value Engineering Alternative eliminates the paved ditches.***

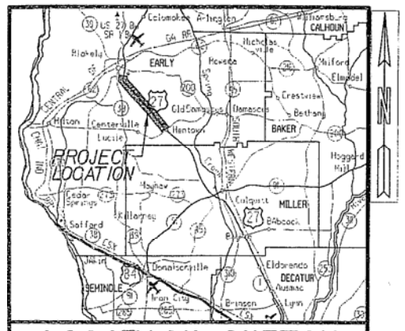
If this recommendation can be implemented, there is a possible savings of ***$ 49,439.***

RECOMMENDATION NUMBER 6- STAGE CONSTRUCTION

A. CROSS DRAINS

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. ***The Value Engineering Alternative revises the staging.***

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.	EDS-27(168)	1	



LOCATION SKETCH

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

PLAN AND PROFILE OF PROPOSED WIDENING & RECONSTRUCTION OF GA SR 1 / US 27 (COLQUITT HIGHWAY) FROM CR 279 TO BLAKELY BYPASS EARLY COUNTY

EDS-27(168) - P.I. NO 422215
BRN-027-2(16) - P.I. NO. 431320

FEDERAL ROUTE # 27
STATE ROUTE # 1

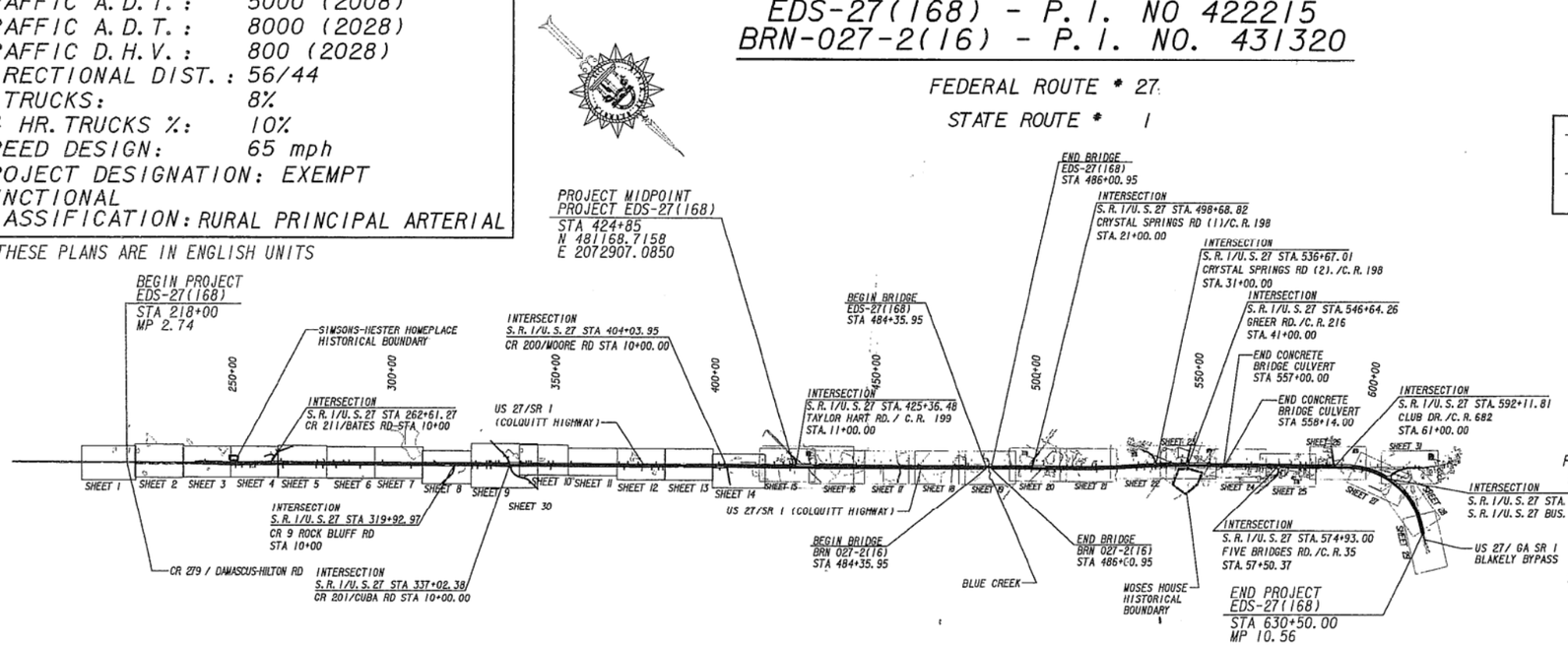
DESIGN DATA:
TRAFFIC A.D.T.: 5000 (2008)
TRAFFIC A.D.T.: 8000 (2028)
TRAFFIC D.H.V.: 800 (2028)
DIRECTIONAL DIST.: 56/44
% TRUCKS: 8%
24 HR. TRUCKS %: 10%
SPEED DESIGN: 65 mph
PROJECT DESIGNATION: EXEMPT
FUNCTIONAL CLASSIFICATION: RURAL PRINCIPAL ARTERIAL

THESE PLANS ARE IN ENGLISH UNITS

SURVEY AND COORDINATE DATA:
HORIZONTAL DATUM - GA COORD. SYSTEM 1985 (NAD 1983)
VERTICAL DATUM - NAVD 1988
COORDINATE ZONE - GEORGIA WEST

LOWE ENGINEERS

Moreland Altobelli Associates, Inc.
2211 Beaver Ruin Road
Suite 190
Norcross, Georgia 30071
Telephone (770) 263-5945



PREPARED BY: _____

RECOMMENDED FOR SUBMISSION BY: _____
TRANSPORTATION ENGINEER

SUBMITTED BY: _____
STATE CONSULTANT DESIGN ENGINEER

LENGTH OF PROJECT	COUNTY NO. 99 EARLY COUNTY	
	EDS-27(168)	BRN-027-2(16)
	MILES	MILES
NET LENGTH OF ROADWAY	7.7759	0.0000
NET LENGTH OF BRIDGES	0.0363	0.0313
NET LENGTH OF PROJECT	7.8125	0.0000
NET LENGTH OF EXCEPTIONS	0.0000	0.0000
GROSS LENGTH OF PROJECT	7.8125	*0.0313

* INCLUDED IN PROJECT EDS-27(168)

THIS PROJECT IS LOCATED 100% IN EARLY COUNTY

SCALE IN FEET

DATE: 8-01-05 CHIEF ENGINEER

PLANS COMPLETED - -	
REVISIONS	

NOTE:
ALL REFERENCES IN THIS DOCUMENT, WHICH INCLUDES ALL PAPERS, WRITINGS, DOCUMENTS, DRAWINGS, OR PHOTOGRAPHS USED, OR TO BE USED IN CONNECTION WITH THIS DOCUMENT, TO " STATE HIGHWAY DEPARTMENT OF GEORGIA ", "STATE HIGHWAY DEPARTMENT ", GEORGIA STATE HIGHWAY DEPARTMENT ", " HIGHWAY DEPARTMENT ", OR " DEPARTMENT " WHEN THE CONTEXT THEREOF MEANS THE STATE HIGHWAY DEPARTMENT OF GEORGIA MEAN, AND SHALL BE DEEMED TO MEAN THE DEPARTMENT OF TRANSPORTATION.

THE DATA, TOGETHER WITH ALL OTHER INFORMATION SHOWN ON THESE PLANS OR IN ANYWAY INDICATED THEREBY, WHETHER BY DRAWINGS OR NOTES, OR IN ANY OTHER MANNER, ARE BASED UPON FIELD INVESTIGATIONS AND ARE BELIEVED TO BE INDICATIVE OF ACTUAL CONDITIONS. HOWEVER, THE SAME ARE SHOWN AS INFORMATION ONLY, ARE NOT GUARANTEED, AND DO NOT BIND THE

III. TEAM MEMBERS AND PROJECT DESCRIPTION

TEAM MEMBERS

NAME	AFFILIATION	EXPERTISE	PHONE
William F. Ventry, P.E., C.V.S.	VE Group	Team Leader	850/627-3900
Bruce Nicholson	VE Group	Construction	850-627-3900
Tom Hartley, P.E., C.V.S.	VE Group	Roadway Design/Traffic	850/627-3900
John Ledbetter, Jr., P.E., R.L.S.	VE Group	Structures	850/627-3900

PROJECT DESCRIPTION

The project consists of the widening and reconstruction of US 27/SR 1 from CR 279/Damascus-Hilton Road to the Blakely Bypass. The project length is 7.9 miles. The proposed typical section consists of the addition of two 12-foot lanes to the existing two 12-foot lanes with a 44 foot depressed grass median. The new lanes will be added on the east side from CR 279/Damascus-Hilton Road to just north of the intersection with CR 198/Crystal Springs Road. From this point, the new horizontal alignment shifts to the west side for the remainder of the project. The existing bridge will be replaced and a parallel twin bridge will be constructed.

IV. INVESTIGATION PHASE

VALUE ENGINEERING STUDY BRIEFING

NAME	AFFILIATION	PHONE
William F. Ventry, P.E., C.V.S.	VE Group	850/627-3900
Bruce Nicholson	VE Group	850/627-3900
Tom Hartley, P.E., C.V.S.	VE Group	850/627-3900
John Ledbetter, Jr., P.E., R.L.S.	VE Group	850/627-3900
Lisa Myers	GDOT	404/651-7468
Abbie Jones	Lowe Engineers	770/857-8403
Gunter Hirschler	Moreland Altobelli	707/263-5945
Karyn Matthews	GDOT	404/656-5404
Nabil Raad	GDOT	404/635-8126
Steve Gasten	GDOT	404/656-5197
Alexis John	GDOT	404/699-6865
Ron Ostercoh	MAAJ	770/263-5945
Marc Mastronardi	GDOT	404/656-5306

STUDY RESOURCES

NAME	AFFILIATION	PHONE
Steve Poole	BRIDGETEK	800/344-2102
Troy Paterson	GDOT	404-656-6845

IV. INVESTIGATION PHASE

The following areas have been identified by the Value Engineering Team as areas of focus and investigation for the Value Engineering process:

I. CONSTRUCTABILITY

A. INTERSECTION MEDIAN CROSSOVERS

II. MATERIALS

A. BRIDGE OVER BLUE CREEK

B. EQUALIZER DRAINAGE PIPES

C. MEDIAN DRAINS

D. MEDIAN DITCHES

III. STAGE CONSTRUCTION

A. CROSS DRAINS

V. SPECULATION PHASE

Ideas generated, utilizing the brainstorming method, for performing the functions of previously identified areas of focus.

I. CONSTRUCTABILITY

A. INTERSECTION MEDIAN CROSSOVERS

- **Eliminate, consolidate or change the proposed intersections.**

II. MATERIALS

A. BRIDGE OVER BLUE CREEK

- **Shorten the proposed bridge.**
- **Use a pre-cast CONSPAN structure rather than bridge.**

B. EQUALIZER DRAINAGE PIPES

- **Combine with median inlets.**

C. MEDIAN DRAINS

- **Combine median drop inlets and cross drains.**

D. MEDIAN DITCHES

- **Eliminate paved ditches.**

III. STAGE CONSTRUCTION

A. CROSS DRAINS

- **Revise staging.**

VI. EVALUATION PHASE

A. ALTERNATIVES

The following alternatives were formulated during the "eliminate and combine" portion of the Evaluation/Development Phase.

I. CONSTRUCTABILITY

A. INTERSECTION MEDIAN CROSSOVERS

Value Engineering Alternative: ***Eliminate, consolidate or change the proposed intersections.***

II. MATERIALS

A. BRIDGE OVER BLUE CREEK

Value Engineering Alternative Number 1: ***Shorten the proposed bridge.***

Value Engineering Alternative Number 2: ***Use a pre-cast CONSPAN structure rather than bridge.***

B. EQUALIZER DRAINAGE PIPES

Value Engineering Alternative: ***Combine with median inlets.***

C. MEDIAN DRAINS

Value Engineering Alternative: ***Combine median drop inlets and cross drains.***

D. MEDIAN DITCHES

Value Engineering Alternative: ***Eliminate paved ditches.***

III. STAGE CONSTRUCTION

A. CROSS DRAINS

Value Engineering Alternative: ***Revise staging.***

VI. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

A. INTERSECTION MEDIAN CROSSOVERS

A. INTERSECTION MEDIAN CROSSOVERS

A.1 CR 198/CRYSTAL SPRINGS ROAD
- **(1) AS PROPOSED**
- **(2) VALUE ENGINEERING ALTERNATIVE**

A.2 CR 9/ROCK BLUFF ROAD
- **(1) AS PROPOSED**
- **(2) VALUE ENGINEERING ALTERNATIVE**

A.3 CR 211/BATES ROAD
- **(1) AS PROPOSED**
- **(2) VALUE ENGINEERING ALTERNATIVE**

II. MATERIALS

A. BRIDGE OVER BLUE CREEK

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE NUMBER 1
(3) VALUE ENGINEERING ALTERNATIVE NUMBER 2

B. EQUALIZER DRAINAGE PIPES

- **(1) AS PROPOSED**
- **(2) VALUE ENGINEERING ALTERNATIVE**

C. MEDIAN DRAINS

- **(1) AS PROPOSED**
- **(2) VALUE ENGINEERING ALTERNATIVE**

C. MEDIAN DITCHES

- **(1) AS PROPOSED**
- **(2) VALUE ENGINEERING ALTERNATIVE**

VI. DEVELOPMENT PHASE

III. STAGE CONSTRUCTION

A. CROSS DRAINS

(1) AS PROPOSED
(2) VALUE ENGINEERING ALTERNATIVE

IV. DESIGN COMMENTS

VII. DEVELOPMENT PHASE

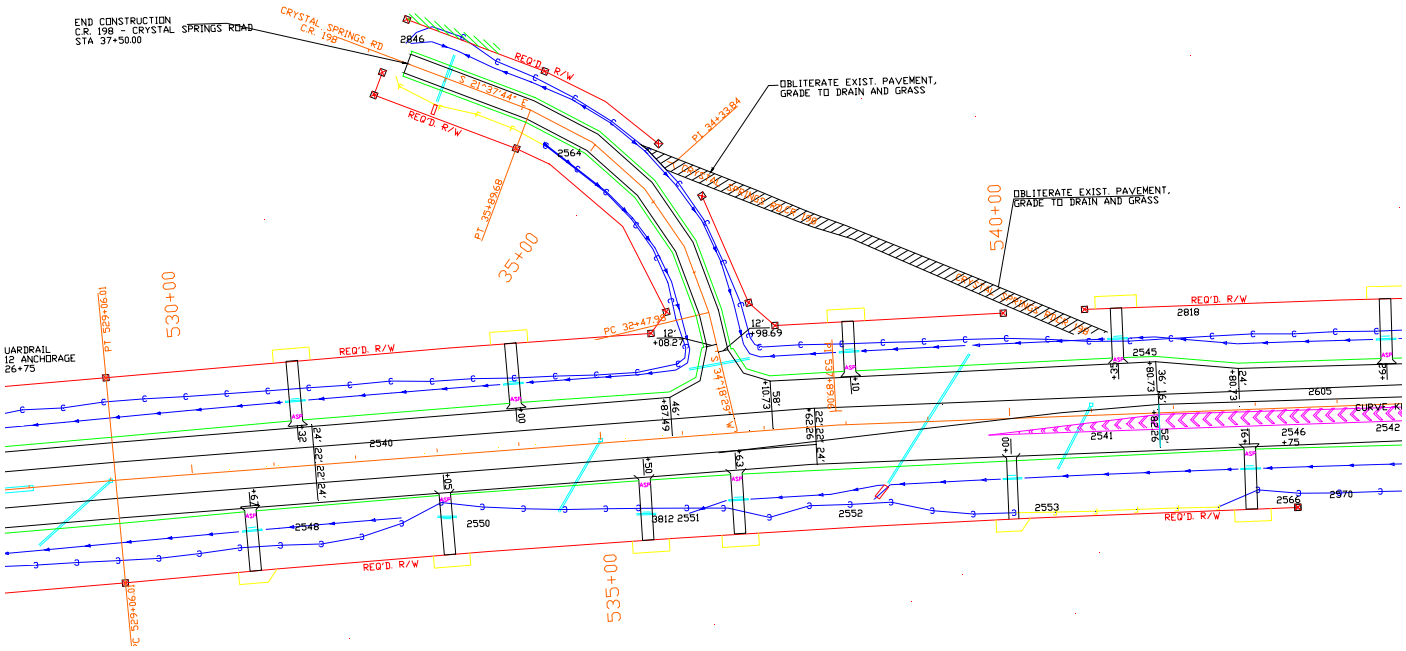
I. CONSTRUCTABILITY

A. INTERSECTION MEDIAN CROSSOVERS

A.1 CR 198/CRYSTAL SPRING ROAD

1. "As Proposed"

The intersection of CR 198/Crystal Springs Rd. is to be realigned to reduce the skew of the intersection. In doing so, the last 650 ft. of the existing road will be shifted to the right to connect to the new alignment. This approach will not have a median opening.



AS PROPOSED CR 198/CRYSTAL SPRINGS ROAD

VII. DEVELOPMENT PHASE

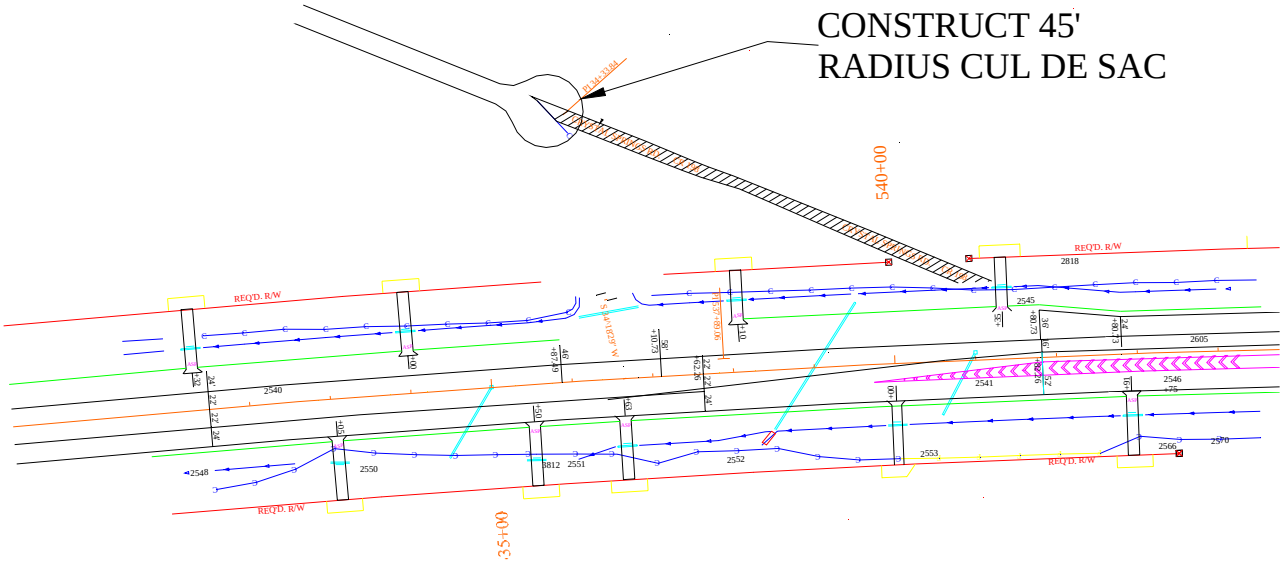
I. CONSTRUCTABILITY

A. INTERSECTION MEDIAN CROSSOVERS

A.1 CR 198/Crystal Springs Road

2. Value Engineering Alternative

The Value Engineering Team recommends modifying the design by cul-de-sacing CR 198. Motorists wanting to access US 27/SR 1 will travel south on CR 198 for about 0.75 of a mile to use the CR 198 intersection with a full median.



VALUE ENGINEERING ALTERNATIVE

I. CONSTRUCTABILITY
A. INTERSECTION MEDIAN CROSSOVERS
A.1 CR 198/CRYSTAL SPRINGS INTERSECTION (N)
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
PAVEMENT	SY	$19.50	1,733.3	$33,800	0.0	$0
EMBANKMENT	CY	$5.90	2,958.6	$17,456	0.0	$0
SUBTOTAL				**$51,256**		**$0**
INFLATION	5.0%			$2,819		$0
TRAFFIC CONTROL/MOT	1.5%			$769		$0
CONTINGENCY	10.0%			$5,126		$0
GRAND TOTAL				**$59,969**		**$0**

POSSIBLE SAVINGS: $59,969

VII. DEVELOPMENT PHASE

I. CONSTRUCTABILITY

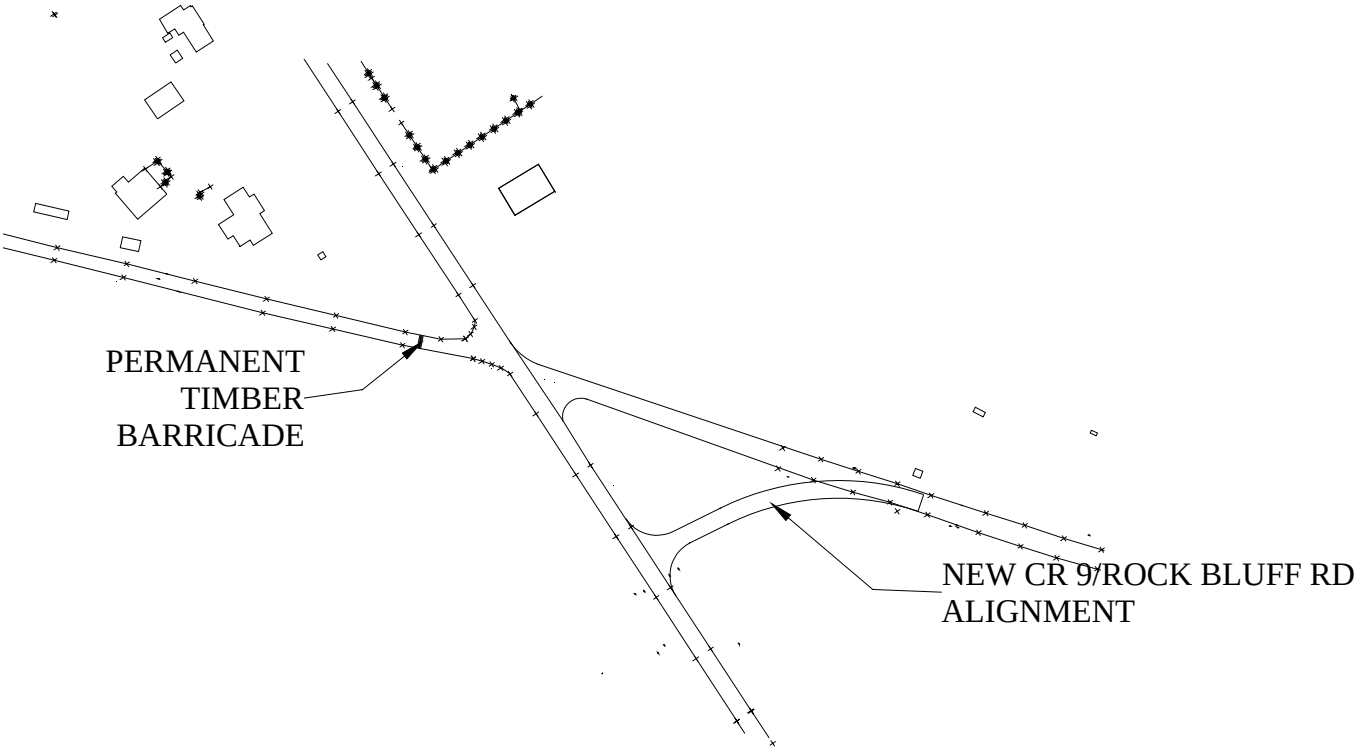
A. INTERSECTION MEDIAN CROSSOVERS

A.2 CR 9/ ROCK BLUFF ROAD

1. "As Proposed"

The intersection of CR 9/Rock Bluff Road east approach is to be realigned to reduce the skew of the intersection. In doing so, the last 550 ft. of the existing road will be shifted to the left to connect to the new alignment. The east approach will have a median opening.

CR 9/Rock Bluff Road west approach is to be barricaded and traffic will be forced to use Cuba Road to access US 27, as shown below:



AS PROPOSED CR 9/ROCK BLUFF ROAD INTERSECTION

VII. DEVELOPMENT PHASE

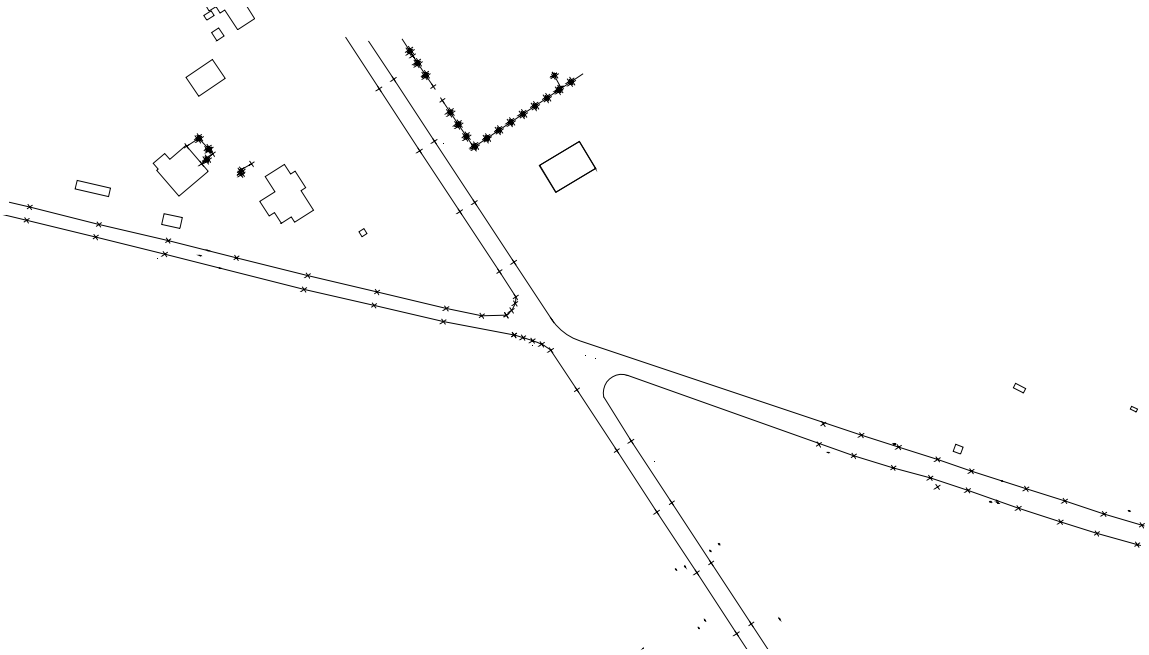
I. CONSTRUCTABILITY

A. INTERSECTION MEDIAN CROSSOVERS

A.2 CR 9/Rock Bluff Road

2. Value Engineering Alternative

The Value Engineering Team recommends modifying the design by allowing both east and west approaches access to US 27/SR 1, with the exception of not providing a median opening and only allowing a right-in/right-out connection. Motorist wanting to make left turns will make U-Turns at either Cuba Road intersection or the median opening located at STA 301+00.



VALUE ENGINEERING ALTERNATIVE

I. CONSTRUCTABILITY
A. INTERSECTION MEDIAN CROSSOVERS
A.2 CR 9/ROCK BLUFF ROAD INTERSECTION
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
PAVEMENT	SY	$19.50	1,333.3	$26,000	0.0	$0
EMBANKMENT	CY	$5.90	2,275.9	$13,428	0.0	$0
PERMANENT TIMBER BARRICADE	LF	$82.50	36.0	$2,970	0.0	$0
SUBTOTAL				**$42,398**		**$0**
INFLATION	5.0%			$2,332		$0
TRAFFIC CONTROL/MOT	1.5%			$636		$0
CONTINGENCY	10.0%			$4,240		$0
GRAND TOTAL				**$49,605**		**$0**

POSSIBLE SAVINGS: $49,605

VII. DEVELOPMENT PHASE

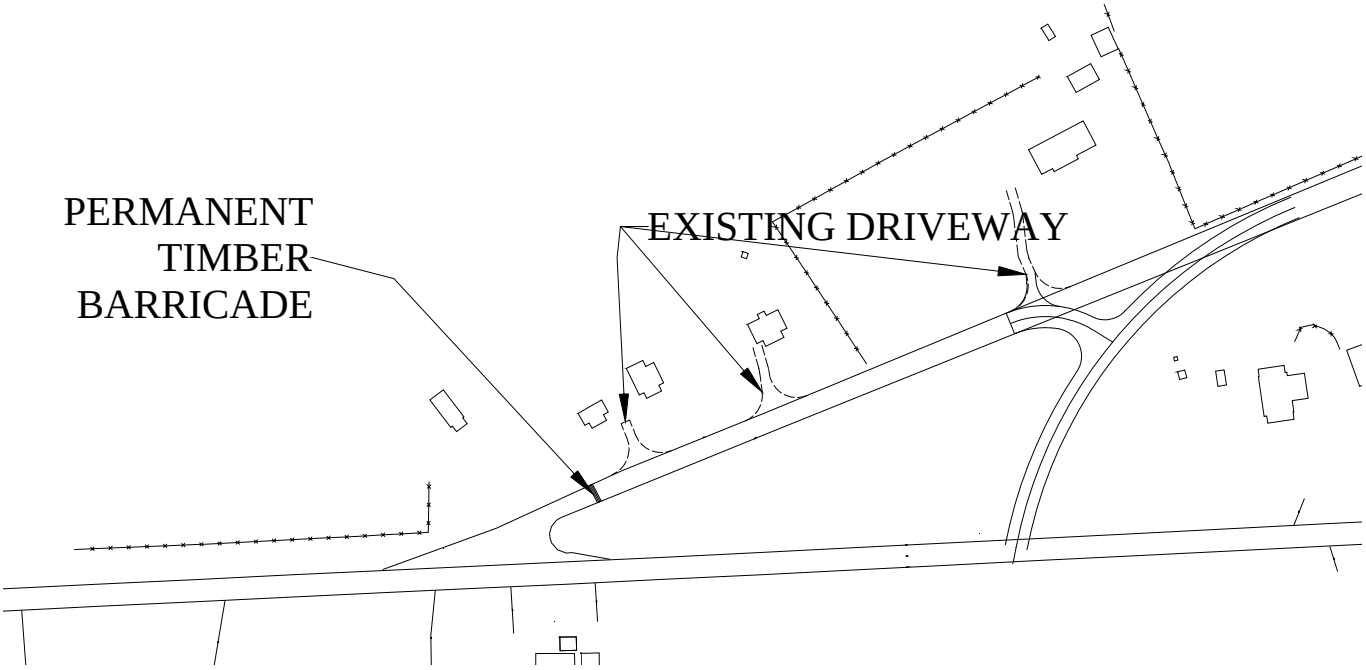
I. CONSTRUCTABILITY

A. INTERSECTION MEDIAN CROSSOVERS

A.3 CR 211/BATES ROAD

1. "As Proposed"

The intersection of CR 211/Bates Rd. is to be realigned to reduce the skew of the intersection. In doing so, the last 800 ft. of the existing road will be barricaded and a connection will be constructed to the new alignment. This isolated section of roadway will service 3 residences along the road, as shown below:



AS PROPOSED CR 211/BATES RD. INTERSECTION

VII. DEVELOPMENT PHASE

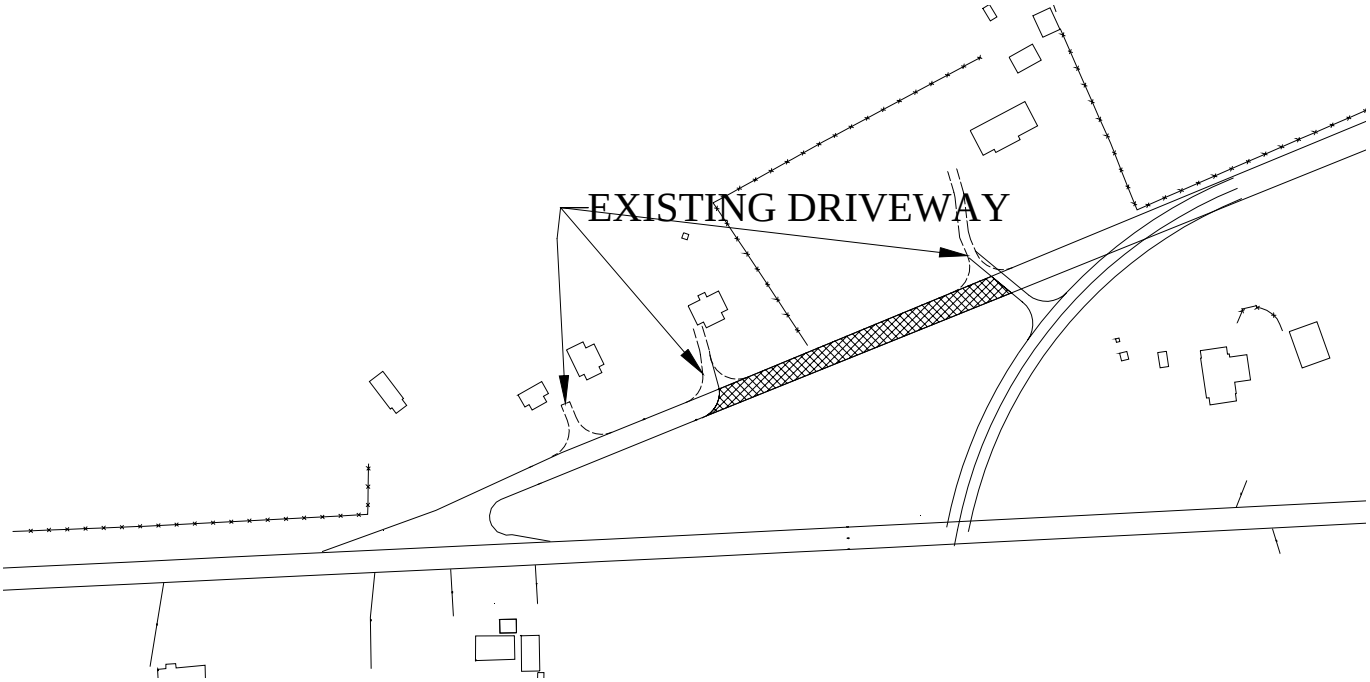
I. CONSTRUCTABILITY

A. INTERSECTION MEDIAN CROSSOVERS

A.3 CR 211/Bates Road

2. Value Engineering Alternative

The Value Engineering Team recommends leaving the existing connection to CR 211 in place to be the two driveways on the Grady Harper property. The existing CR 211 would be obliterated just west of the 2nd driveway just east to the next driveway. This next driveway to the west would be extended to connect to the newly aligned CR 211. The disadvantage of this Value Engineering Alternative is the motorists using the Old CR 211 will now have to drive approximately ¼ mile to the south to do a U-Turn to go north.



VALUE ENGINEERING ALTERNATIVE

I. CONSTRUCTABILITY
A. INTERSECTION MEDIAN CROSSOVERS
A.3 CR 211/BATES ROAD INTERSECTION
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
PAVEMENT	SY	$19.50	581.3	$11,336	0.0	$0
EMBANKMENT	CY	$5.90	992.3	$5,854	0.0	$0
PERMANENT TIMBER BARRICADE	LF	$85.20	36.0	$3,067	0.0	$0
SUBTOTAL				**$20,258**		**$0**
INFLATION	5.0%			$1,114		$0
TRAFFIC CONTROL/MOT	1.5%			$304		$0
CONTINGENCY	10.0%			$2,026		$0
GRAND TOTAL				**$23,701**		**$0**

POSSIBLE SAVINGS: $23,701

VII. DEVELOPMENT PHASE

II. MATERIALS

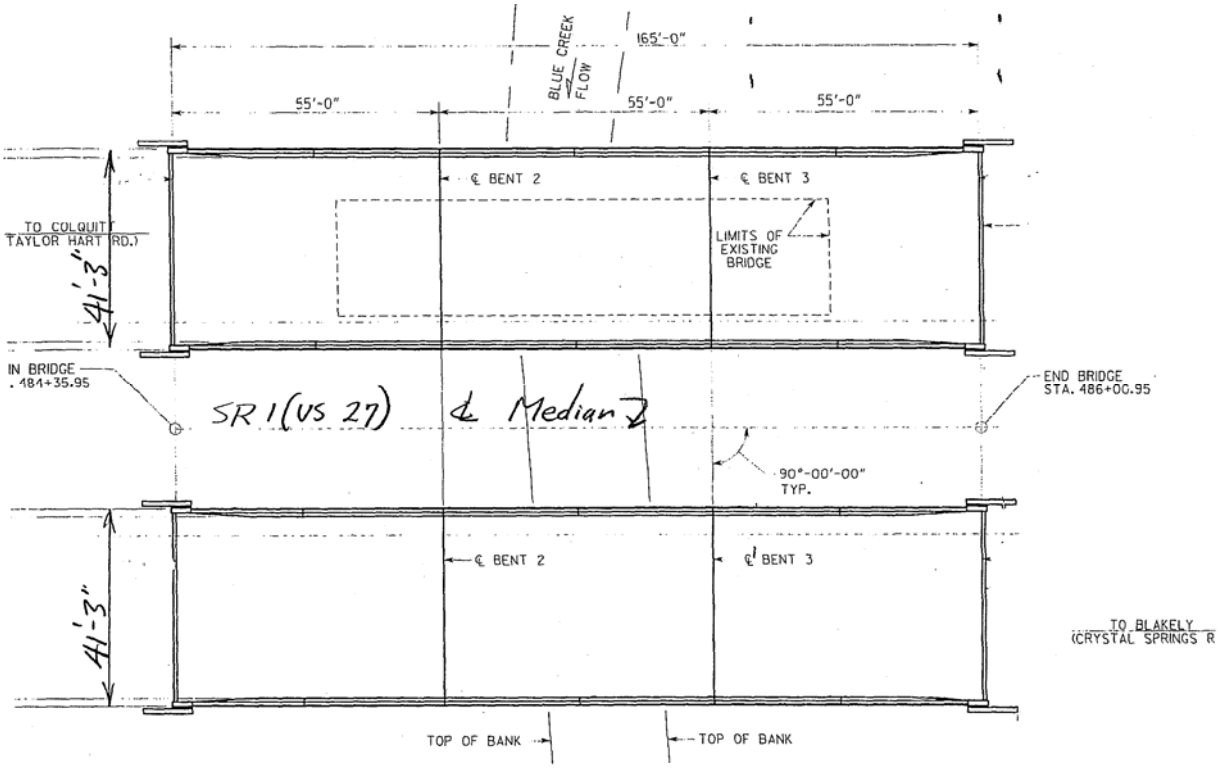
A. BRIDGE OVER BLUE CREEK

1. "As Proposed"

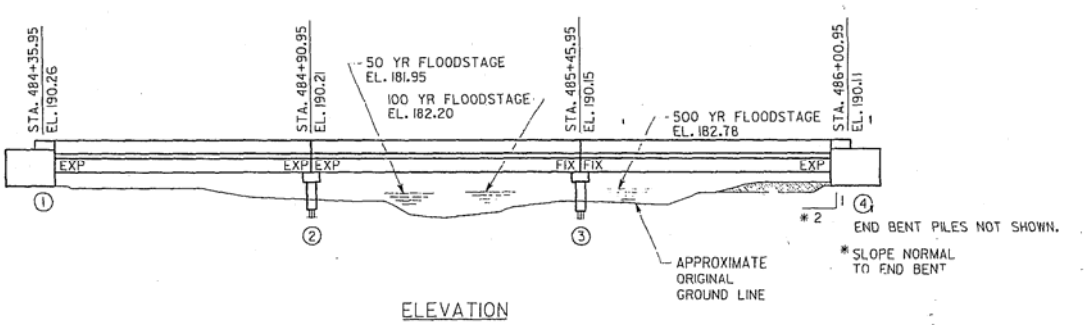
The as-proposed structures over Blue Creek are 3 span (55 ft., 55 ft., and 55 ft.) 165 ft. long dual bridges. The superstructure for each consists of a concrete deck on 6 Type II AASHTO Prestress Concrete Girders. The bridges are 41 ft.-3 in. wide and are approximately 33 ft. apart. The foundation elements for the bridges are steel H piles at both the end bents and interior bents.

The existing structure at the site is 100 ft. long, built in 1934 with 5 spans, each 20 ft. long and 27 ft. wide. The existing bridge generates 1.58 ft. of backwater for the design storm. Bridge Inspection Reports do not indicate any scour at all in the bridge foundations.

VII. DEVELOPMENT PHASE
II. MATERIALS
A. BRIDGE OVER BLUE CREEK
1. "As Proposed"



PLAN



ELEVATION

II Materials-A

AS PROPOSED

VII. DEVELOPMENT PHASE

II. MATERIALS

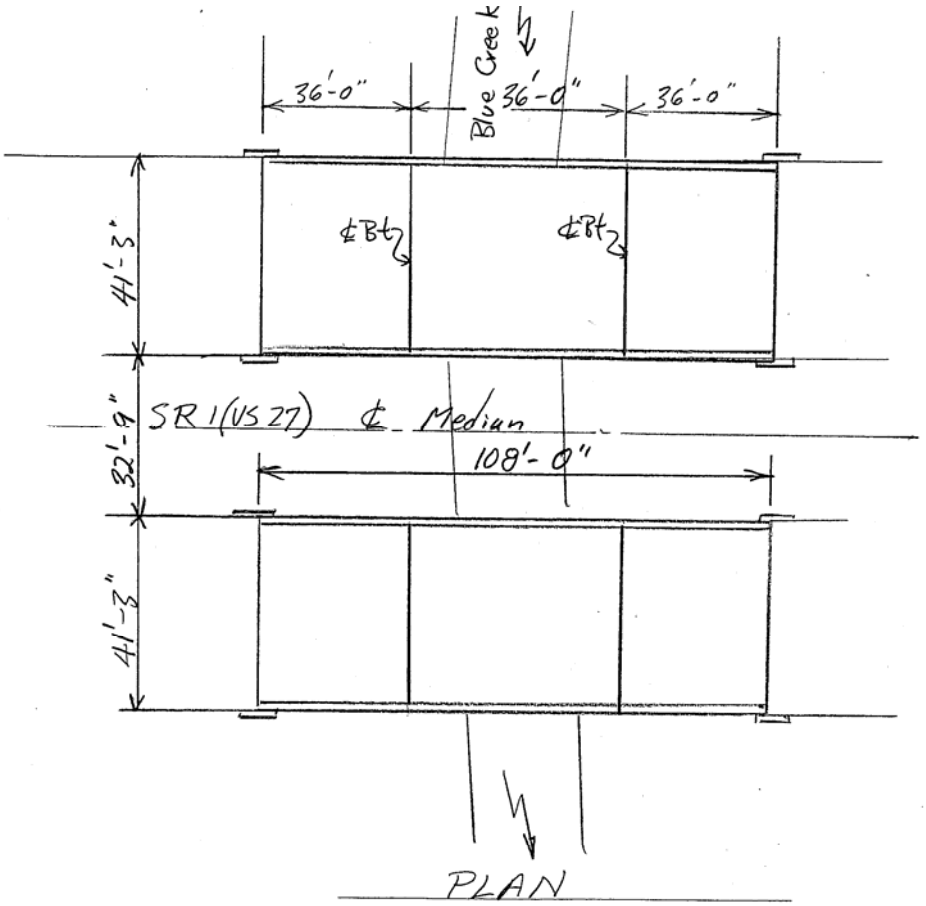
A. BRIDGE OVER BLUE CREEK

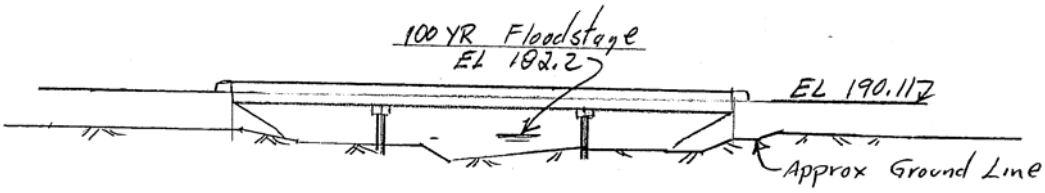
2. Value Engineering Alternative Number 1

This alternate consists of shortening the dual bridges to lengths slightly longer than the existing bridge. These bridges are to be 3-Span (36 ft., 36 ft., and 36 ft.) 108 ft. long. The superstructures are to be of the cast-in-place T-beam type on steel H pile bents.

Although these bridges do not lower the backwater as much as the as-proposed bridges, it is felt that they will improve the backwater condition. A lowering of the existing backwater, along with the fact that the existing bridge has been in place for approximately 70 years, has apparently served its purpose with no adverse effects, and that there is a considerable cost savings, justifies the shortened bridges.

VII. DEVELOPMENT PHASE
II. MATERIALS
A. BRIDGE OVER BLUE CREEK
2. VALUE ENGINEERING ALTERNATIVE NUMBER 1





ELEVATION

II Materials - A
VE #1 Shorten Bridge

II. MATERIALS
A. BRIDGES OVER BLUE CREEK
VALUE ENGINEERING ALTERNATIVE NUMBER 1
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
165 Ft. Long Dual Bridges	SF	$90.00	13613.0	$1,225,170		
108 Ft. Long Dual Bridges	SF	$85.00			8910.0	$757,350
Base and Pavement	SY	$40.00			520.0	$20,800
Borrow	CY	$6.00			1320.0	$7,920
SUBTOTAL				**$1,225,170**		**$786,070**
E&C			10.0%	$122,517	10.0%	$78,607
TRAFFIC CONTROL/MOT			1.5%	$18,378	1.5%	$11,791
INFLATION			5.0%	$61,259	5.0%	$39,304
GRAND TOTAL				**$1,427,323**		**$915,772**

POSSIBLE SAVINGS: $511,552

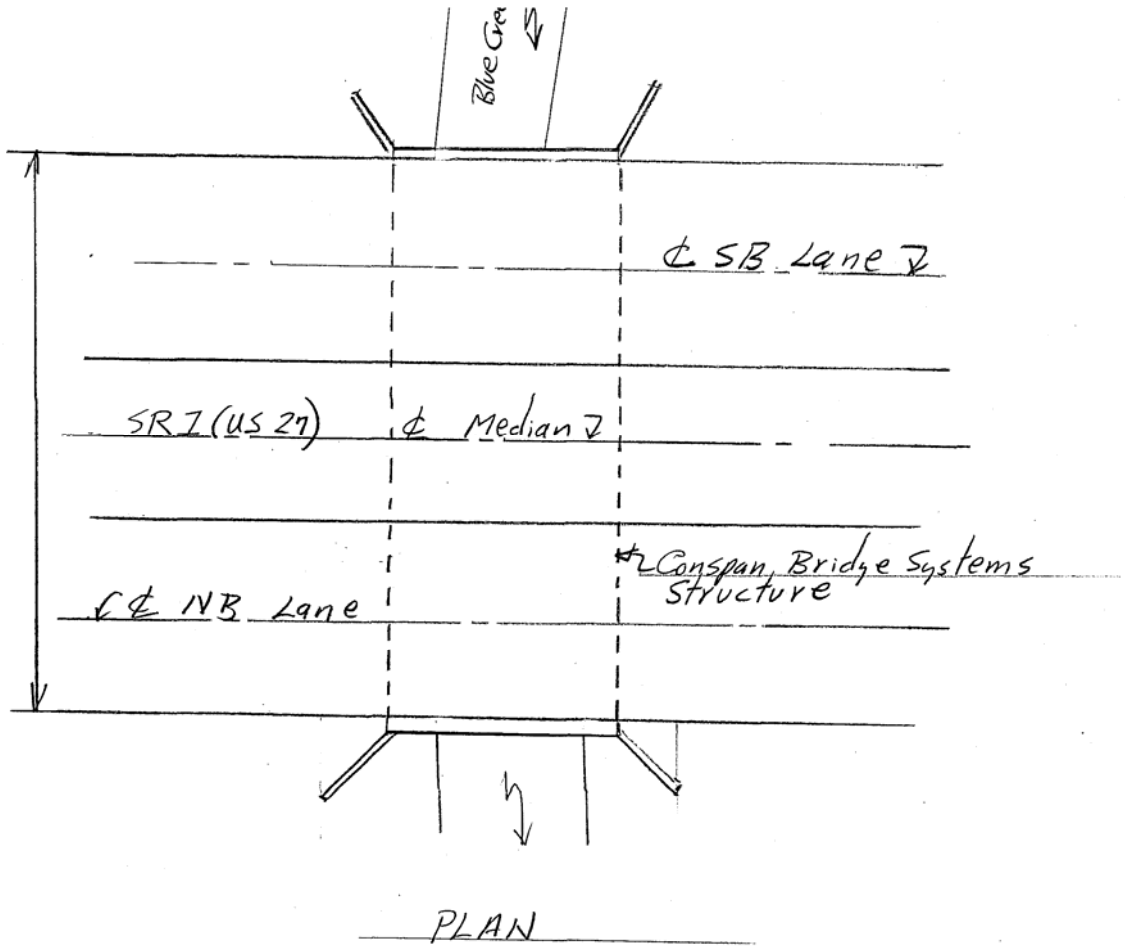
VII. DEVELOPMENT PHASE

II. MATERIALS

A. BRIDGE OVER BLUE CREEK

2. Value Engineering Alternative Number 2

This alternative consists of using a Con/Span Bridge System structure supported by short riser walls and spread footings in-lieu of dual bridges. The Con/Span bridge will consist of units with a 48 ft. span and an 11 ft. rise. These units will provide a waterway opening of 435 sq. ft. This opening exceeds the 7 barrel (6 ft. by 10 ft.) culvert considered in the Hydrologic Study, which met all the design criteria and requirements, but was not the preferred option.



PLAN

ELEVATION

II Materials - A
VE #2 Conspan

Myers, Lisa

From: Poole, Steve [pooles@contechbridge.com]
Sent: Wednesday, June 21, 2006 10:21 PM
To: Myers, Lisa
Subject: US-27 Bridge Over Blue Creek in Early County
Attachments: Bridge11825.pdf; CONSPAN Backfill Specs.pdf

John Ledbetter – Thanks for the call this morning. Based on the site info we discussed, I came up with the attached structure.

- $335,000 Precast Components (30 Arches, 4 Wingwalls, & 2 Headwalls delivered to site, exclusive of taxes)
- $96,000 Foundation: approximately 240 cy of cast-in-place concrete (2.5' x 8.5' strip footing with a 20" x 1'-6" pedestal wall…this places the bottom of footing 4' below flowline, which is below the 3' theoretical scour depth). You should be able to come up with a unit price for this cast-in-place concrete work $350 to $450/cy ??)
- $30,000 Installation: approximately 3 days of crane and crew to set the precast
- $50,000 Contractor Profit??
- Select backfill in the "critical zone" - see attached backfill requirements

This is obviously a quick estimate. The cost for the precast components are pretty accurate based on the structure in the attached PDF. The footing dimensions are based on a 4000 psf soil bearing capacity as we discussed. Everything except the actual precast components are items of work performed by the contractor. You may have a better feel for the work provided by the contractor, so adjust those costs as you see fit.

Please call me if you have any questions.

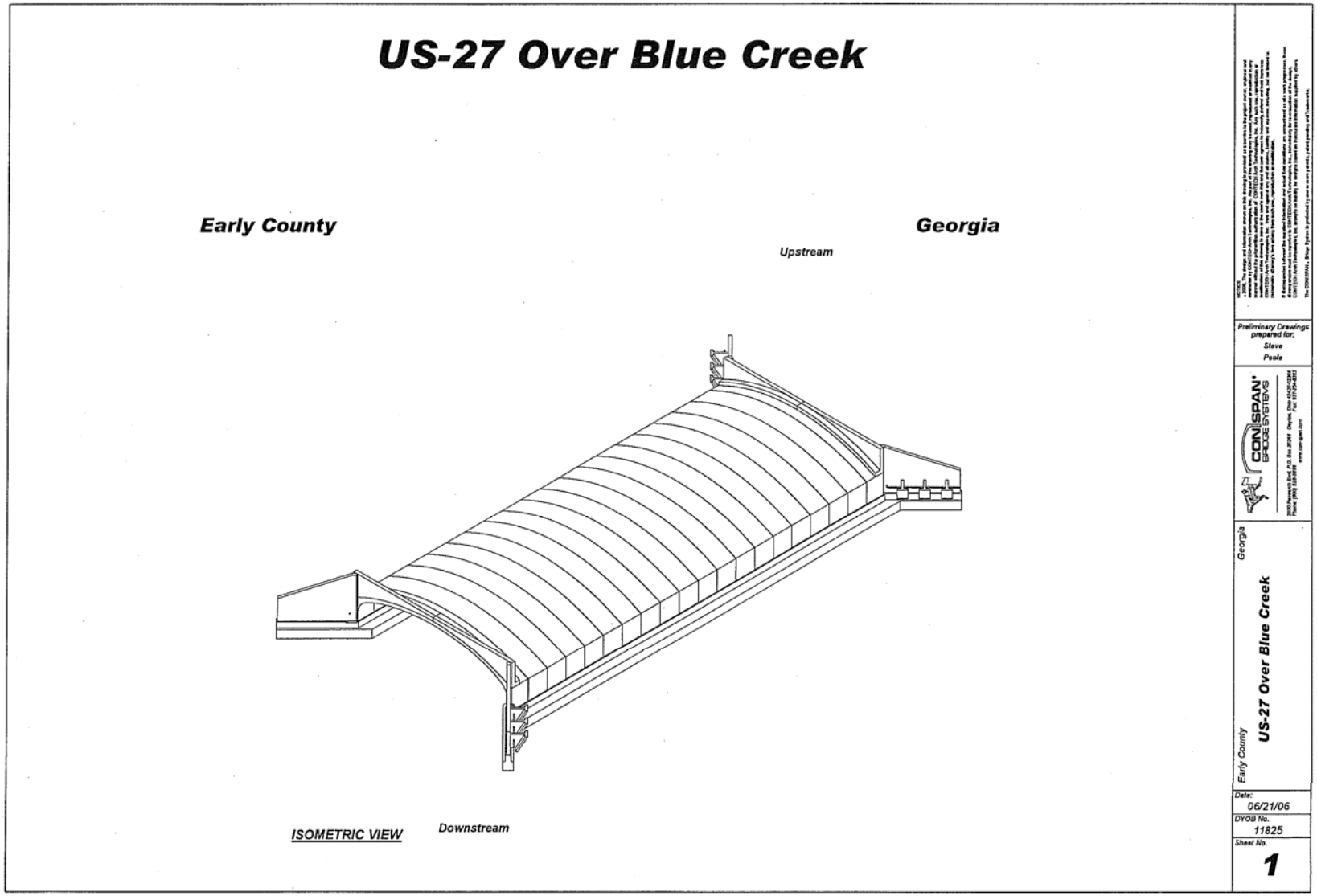
Steve
678-662-9331

Steven T. Poole, P.E.
Region Manager
CONTECH Bridge Solutions Inc.

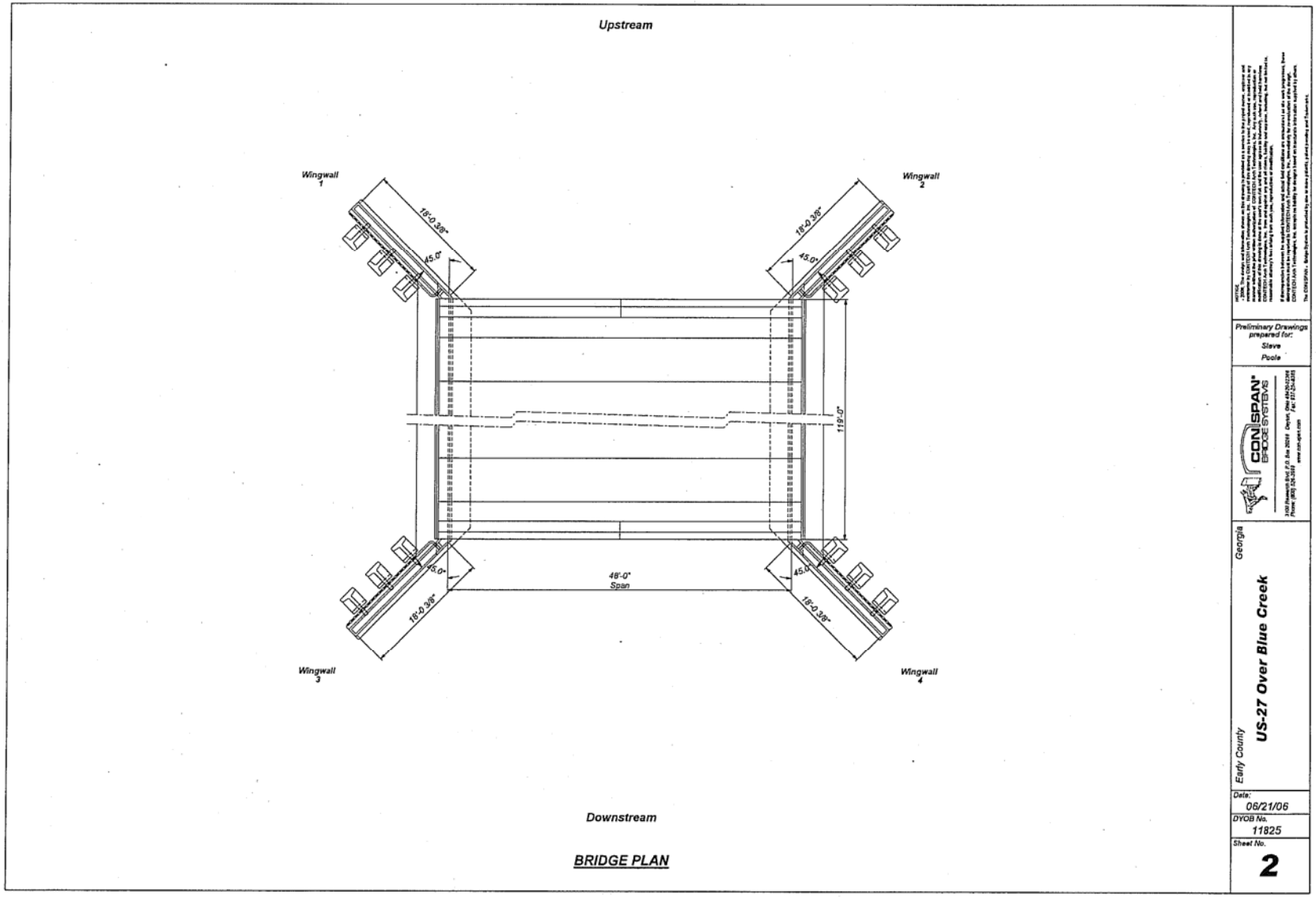
2250 North Druid Hills Road
Suite 231
Atlanta, GA 30329
Phone: 678-662-9331
Fax: 404-633-7711
www.contechbridge.com

PooleS@contechbridge.com

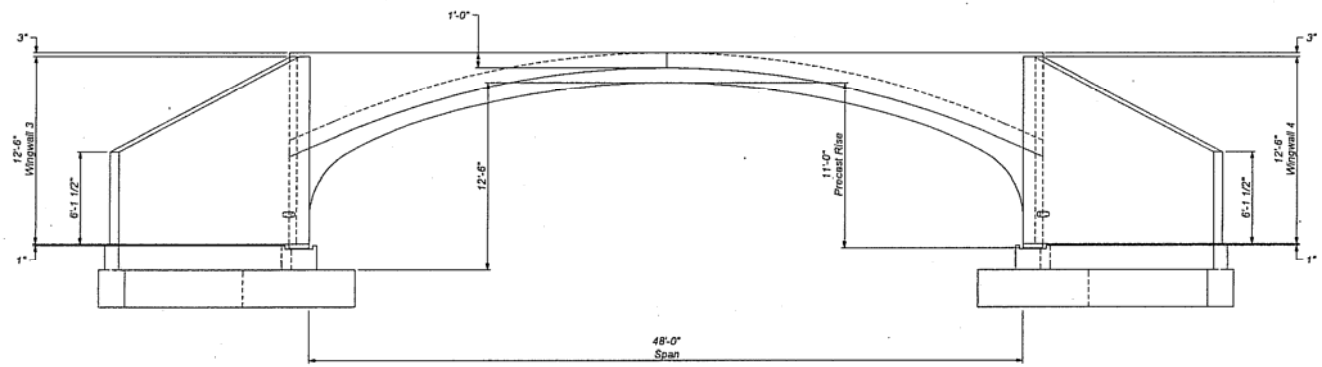
Please note new email address.


US-27 Over Blue Creek
Early County
Georgia
Upstream
ISOMETRIC VIEW
Downstream
Preliminary Drawings prepared for:
Steve
Poole
CONSPAN BRIDGE SYSTEMS
Georgia
Early County
US-27 Over Blue Creek
Date:
06/21/06
DYOB No.
11825
Sheet No.
1

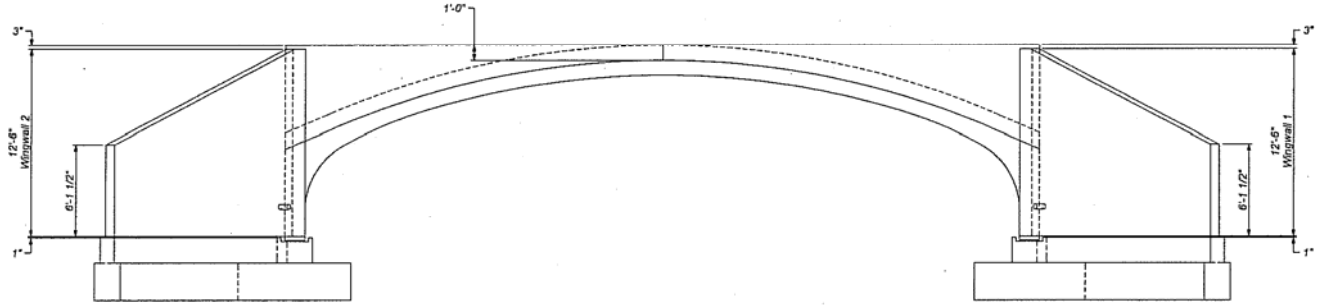
VII. DEVELOPMENT PHASE
II. MATERIALS
A. BRIDGE OVER BLUE CREEK
3. VALUE ENGINEERING ALTERNATIVE NUMBER 2



VII. DEVELOPMENT PHASE
II. MATERIALS
A. BRIDGE OVER BLUE CREEK
3. VALUE ENGINEERING ALTERNATIVE NUMBER 2



DOWNSTREAM END ELEVATION



UPSTREAM END ELEVATION

Preliminary Drawings prepared for:
Steve
Poole

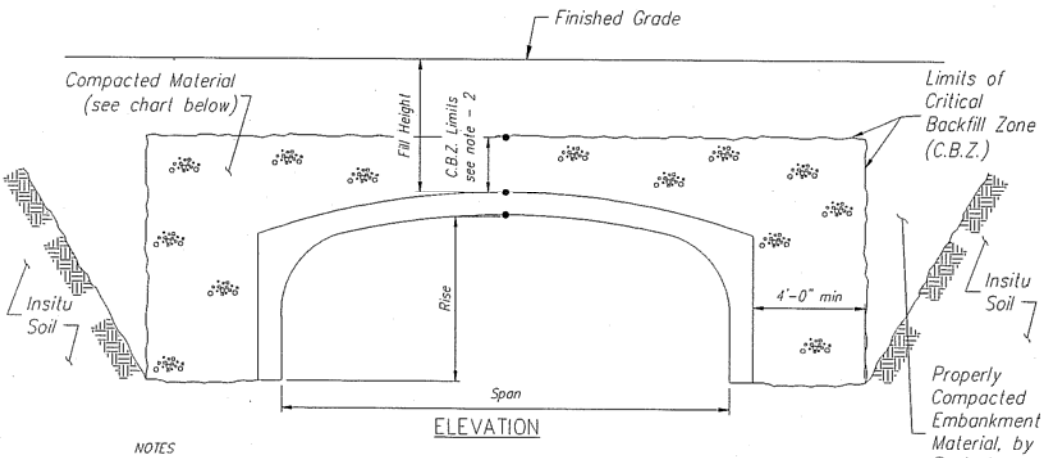
CONSPAN BRIDGE SYSTEMS

Georgia
Early County
US-27 Over Blue Creek

Date: 06/21/06
DYOB No. 11825
Sheet No. 3

Standard Specifications 1

BACKFILL DESCRIPTION								
Group Classification	A-1		A-3	A-2				A-4
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7	
Sieve Analysis, Percent Passing								
No. 10	50 max.							
No. 40	30 max.	50 max.	51 min.					
No. 200	15 max.	25 max.	10 max.	35 max.	35 max.	35 max.	35 max.	36 min.
Characteristics of Fraction Passing No. 40								
Liquid Limit				40 max.	41 min.	40 max.	41 min.	40 max.
Plasticity Index	6 max.		N.P.	10 max.	10 max.	11 min.	11 min.	10 max.
Usual Types of Significant Constituent Materials	Stone Fragments, Gravel & Sand		Fine Sand	Silty or Clayey Gravel and Sand				Silty Soils
General Rating as Subgrade			Excellent to Good					Fair to Poor



ELEVATION

NOTES
1. SEE CON/SPAN SPECIFICATIONS SECTION 15.4 FOR BACKFILL SPECIFICATIONS.
2. FOR FILL HEIGHTS GREATER THAN 2'-0", C.B.Z. LIMIT SHALL BE 2'-0" ABOVE ARCH CROWN. FOR FILL HEIGHTS LESS THAN 2'-0", THE FINISHED GRADE SHALL BE THE BOUNDARY LINE FOR THE C.B.Z.
3. BACKFILLING OPERATIONS WITHIN THE C.B.Z. SHALL BE PERFORMED IN LIFTS OF 8" OR LESS (LOOSE DEPTH).
4. MAXIMUM DRY DENSITY SHALL BE DETERMINED BY AASHTO T-99 OR OTHER APPROVED METHODS.
5. BACKFILL SHALL BE COMPACTED IN LAYERS UNTIL THE DENSITY IS NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY.

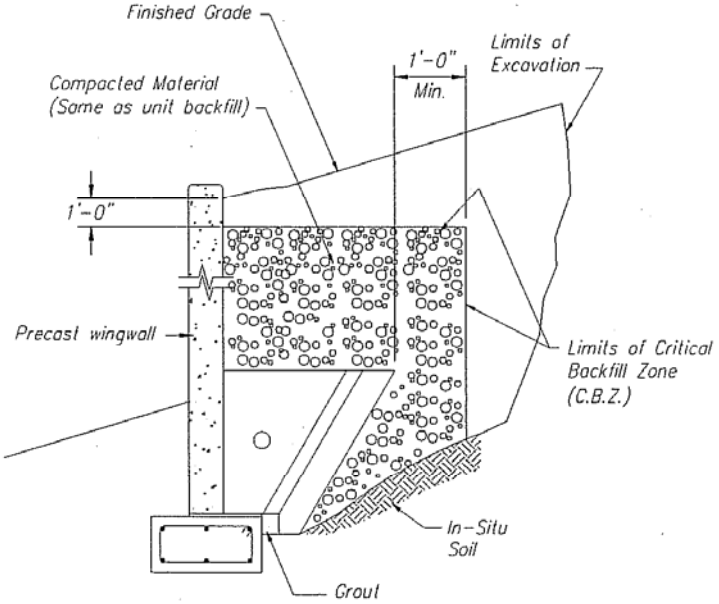
SPAN	FILL HEIGHT	ACCEPTABLE MATERIAL INSIDE C.B.Z.	ACCEPTABLE MATERIAL OUTSIDE C.B.Z.
≤ 24'-0"	≥ 12'-0"	A1, A3	**
≤ 24'-0"	< 12'-0"	A1, A2, A3, A4	**
> 24'-0"	ALL	A1, A3	**

** EMBANKMENT MATERIAL PER PROJECT SPECIFICATIONS

BACKFILL REQUIREMENTS

© 2001 CON/SPAN Bridge Systems

Standard Specifications 2



WINGWALL BACKFILL REQUIREMENTS

II. MATERIALS
A. BRIDGE OVER BLUE CREEK
VALUE ENGINEERING ALTERNATIVE NUMBER 2
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
165 Ft. Long Dual Bridges	SF	$90.00	13613.0	$1,225,170		
Con/Span Arches, 4 Wingwalls, & 2 Headwalls	LF	$3,400.00			120.0	$408,000
Riser Wall	CY	$900.00			30.0	$27,000
Footing	CY	$900.00			107.0	$96,300
Footing Excavation	CY	$45.00			213.0	$9,585
Base and Pavement	SY	$40.00			1503.0	$60,120
Borrow	CY	$6.00			12000.0	$72,000
SUBTOTAL	h			**$1,225,170**		**$673,005**
E&C			10.0%	$122,517	10.0%	$67,301
TRAFFIC CONTROL/MOT			1.5%	$18,378	1.5%	$10,095
INFLATION			5.0%	$61,259	5.0%	$33,650
GRAND TOTAL				**$1,427,323**		**$784,051**

POSSIBLE SAVINGS: $643,272

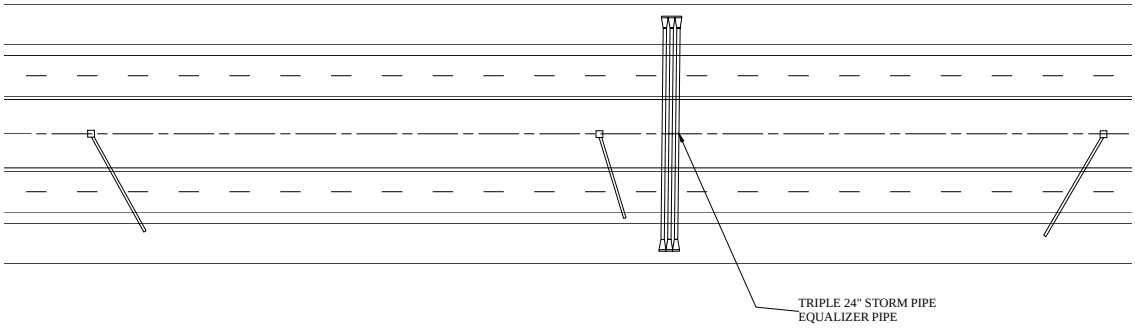
VII. DEVELOPMENT PHASE

II. MATERIALS

B. EQUALIZER DRAINAGE PIPES

1. "As Proposed"

There are two locations on the project where "Equalizer Pipes" are used to equalize the water levels in wetlands on either side of the roadway. STA 246+95 has a Triple 24 in. Storm Pipe configuration and STA 273+76 has Triple 30 in. Storm Pipe configuration as shown below.



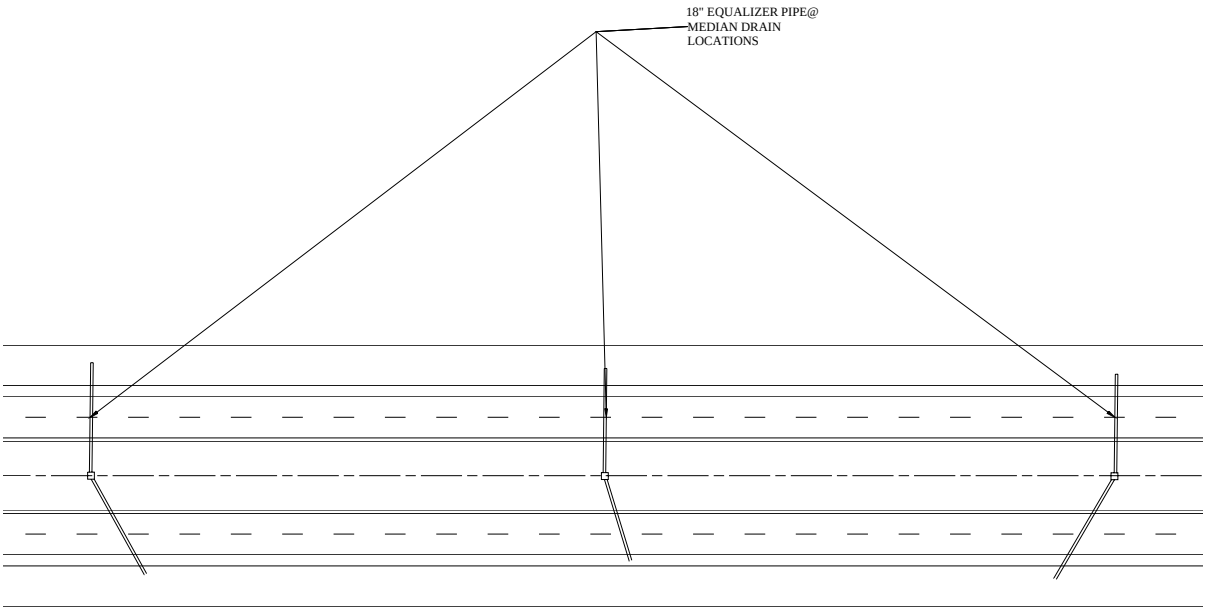
AS PROPOSED PLACEMENT OF EQUALIZER PIPES

II. MATERIALS

B. EQUALIZER DRAINAGE PIPES

2. Value Engineering Alternative

The Value Engineering Team recommends eliminating the Triple 24 in. and Triple 30 in. Equalizer pipes. Their functions would be accomplished by adding an 18 in. pipe to the median drainage inlets to carry the water from one side of the road to the other. The median inlet closest to the Equalizer Pipes and its flanking inlets would serve to drain the median as well as equalize any difference in water elevation on either side of the roadway. With the smaller pipes, it will take longer to equalize the water elevations, but should make no difference in the performance of the median drainage.



VALUE ENGINEERING ALTERNATIVE OF USING MEDIAN DRAINS

II. MATERIALS
B. EQUALIZER DRAINAGE PIPES
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
24 in. PIPE	LF	$41.65	372.0	$15,494	0.0	$0
30 in. PIPE	LF	$47.89	408.0	$19,539	0.0	$0
18 in. PIPE	LF	$35.02	438.0	$15,339	654.0	$22,903
FLARED END SECTION, 24 in.	EA	$533.71	6.0	$3,202	0.0	$0
FLARED END SECTION, 30 in.	EA	$734.46	6.0	$4,407	0.0	$0
FLARED END SECTION, 18 in.	EA	$446.13	6.0	$2,677	12.0	$5,354
DROP INLET, GPI	EA	$1,872.70	2.0	$3,745	2.0	$3,745
DROP INLET, GPI, SPCL DES	EA	$3,100.60	4.0	$12,402	4.0	$12,402
STN DUMPED RIP RAP, TP 3, 18 in.	SY	$49.67	51.0	$2,533	0.0	$0
PLASTIC FILTER FABRIC	SY	$4.59	51.0	$234	0.0	$0
SUBTOTAL				**$79,573**		**$44,404**
INFLATIONS	5.0%			$4,376		$2,442
TRAFFIC CONTROL/MOT	1.5%			$1,194		$666
CONTINGENCY	10.0%			$7,957		$4,440
GRAND TOTAL				**$93,100**		**$51,953**

POSSIBLE SAVINGS: $41,147

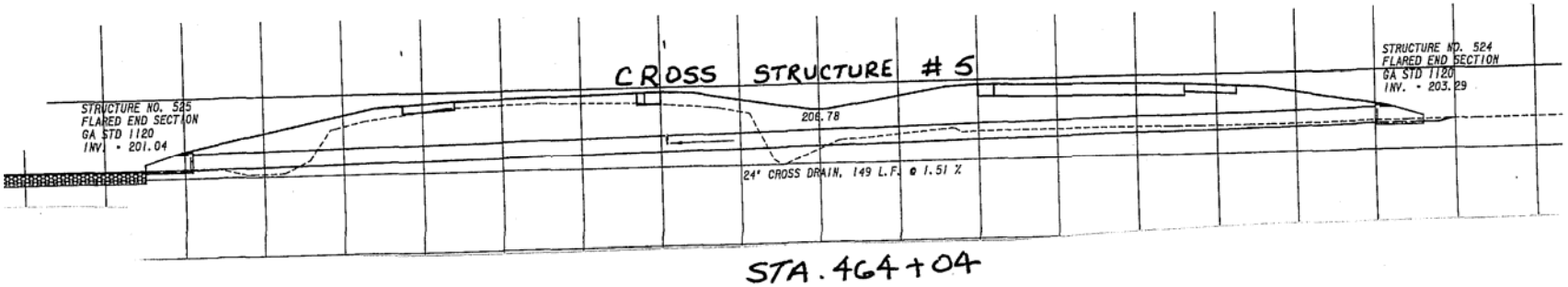
VII. DEVELOPMENT PHASE

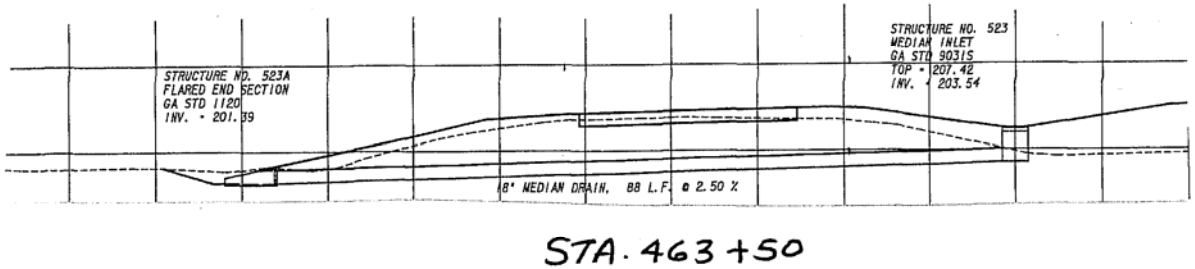
II. MATERIALS

C. MEDIAN DRAINS

1. "As Proposed"

Project EDS-27(168) is a typical four-lane divided roadway with a proposed 44 ft. depressed grass median. Because of the median ditch, storm water runoff must be picked up in the median and conveyed to the outside ditches. This is accomplished by the installation of a median drop inlet (GA STD 9031-S) and usually 18 in. storm drain pipe. There is also a flared end section out the outlet end of this median drain.





AS PROPOSED

TYPICAL MEDIAN DRAINAGE IN CLOSE PROXIMITY TO CROSS DRAIN

VII. DEVELOPMENT PHASE

II. MATERIALS

C. MEDIAN DRAINS

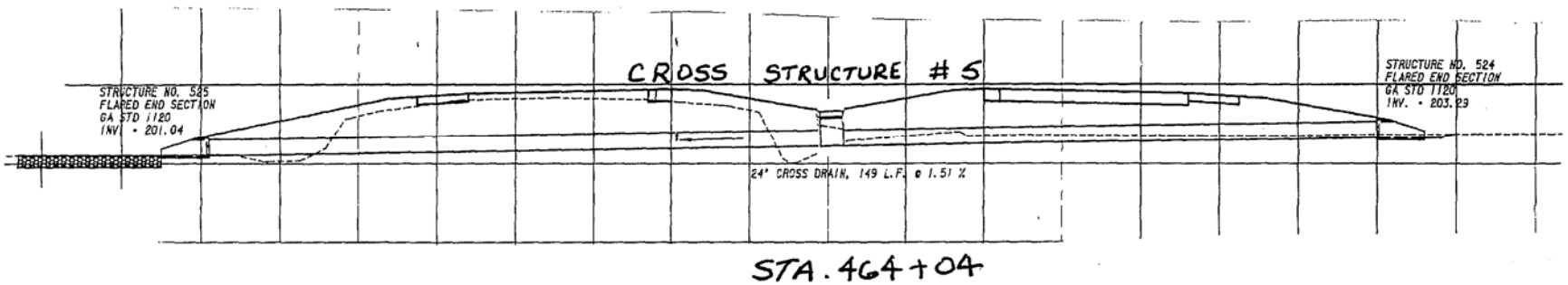
2. Value Engineering Alternative

The value engineering team has identified 12 locations where the proposed median drain could be slightly relocated and combined with a cross drain pipe. The cost of the drop inlet would remain, but the cost of the median drain pipe and flared end section would be eliminated.

Some of the advantages to combining these structures would be the reduced cost for project construction and reduced time to install fewer drainage structures. There would be fewer drainage structures to maintain and fewer outlets to interfere with mowing operations. The outlets of cross drains also have rip rap dissipaters to reduce erosion.

The following is a list of the proposed median drains that should be considered for combining with nearby cross drains. The list includes the proposed length of storm drain pipe. Each line would also have a flared end section.

Structure #	Length of pipe
105	52
118	82
129	64
147	80
168	56
519	82
521	86
523	88
541	81
547	91
571	85
622	85



VE ALTERNATIVE

ADDITION OF MEDIAN DROP INLET TO CROSS DRAIN

II. MATERIALS
C. MEDIAN DRAINS
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
STORM DRAIN PIPE 18 IN, H 1-10	LF	$35.02	932.0	$32,639	0.0	$0
DROP INLET, GP 1	EA	$1,872.70	12.0	$22,472	12.0	$22,472
FLARED END SECTION 18 IN STORM DRAIN	EA	$446.13	12.0	$5,354	0.0	$0
SUBTOTAL				**$60,465**		**$22,472**
INFLATION			5.0%	$3,326	5.0%	$1,236
TRAFFIC CONTROL/MOT			1.5%	$907	1.5%	$337
CONTINGENCY			10.0%	$6,046	10.0%	$2,247
GRAND TOTAL				**$70,744**		**$26,293**

POSSIBLE SAVINGS: $44,451

VII. DEVELOPMENT PHASE

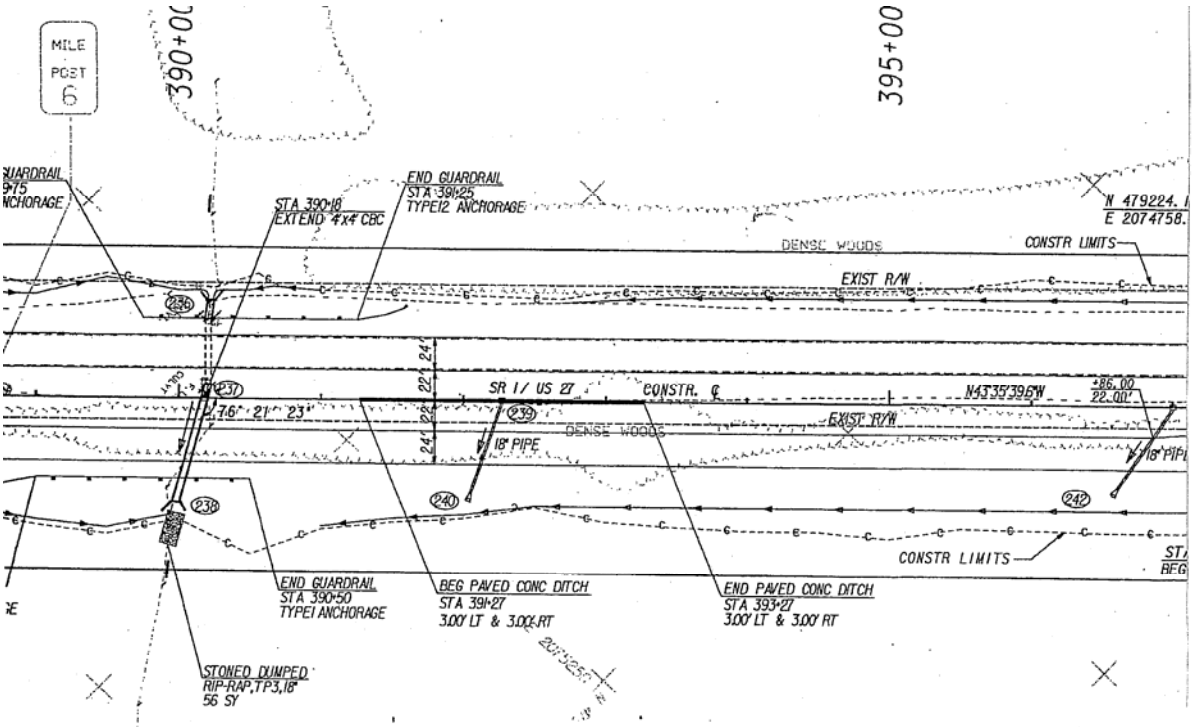
II. MATERIALS

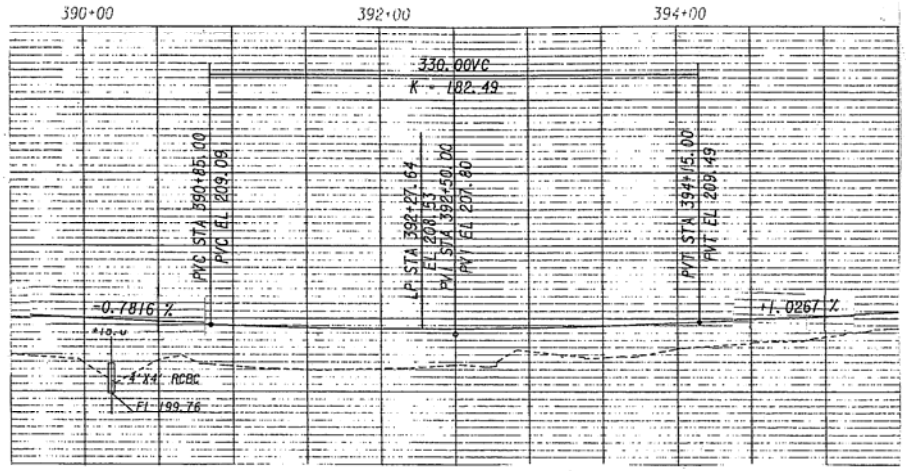
D. MEDIAN DITCHES

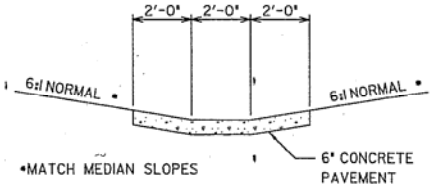
1. "As Proposed"

Project EDS-27 (168) is in an extremely flat area in the State of Georgia. In this 7.8 mile project there are ten sag locations in the median. At each of these sags there is a double weir drop inlet GA STD 9031-S with 97 Ft. of a paved median ditch forward and back. This ditch paving is 6 in. thick rather than the typical 4 in. thickness. The side slopes are to match the front slopes of the median.

VII. DEVELOPMENT PHASE
II. MATERIALS
D. MEDIAN DITCHES
1. "As Proposed"







PAVED MEDIAN DITCH DETAIL

AS PROPOSED

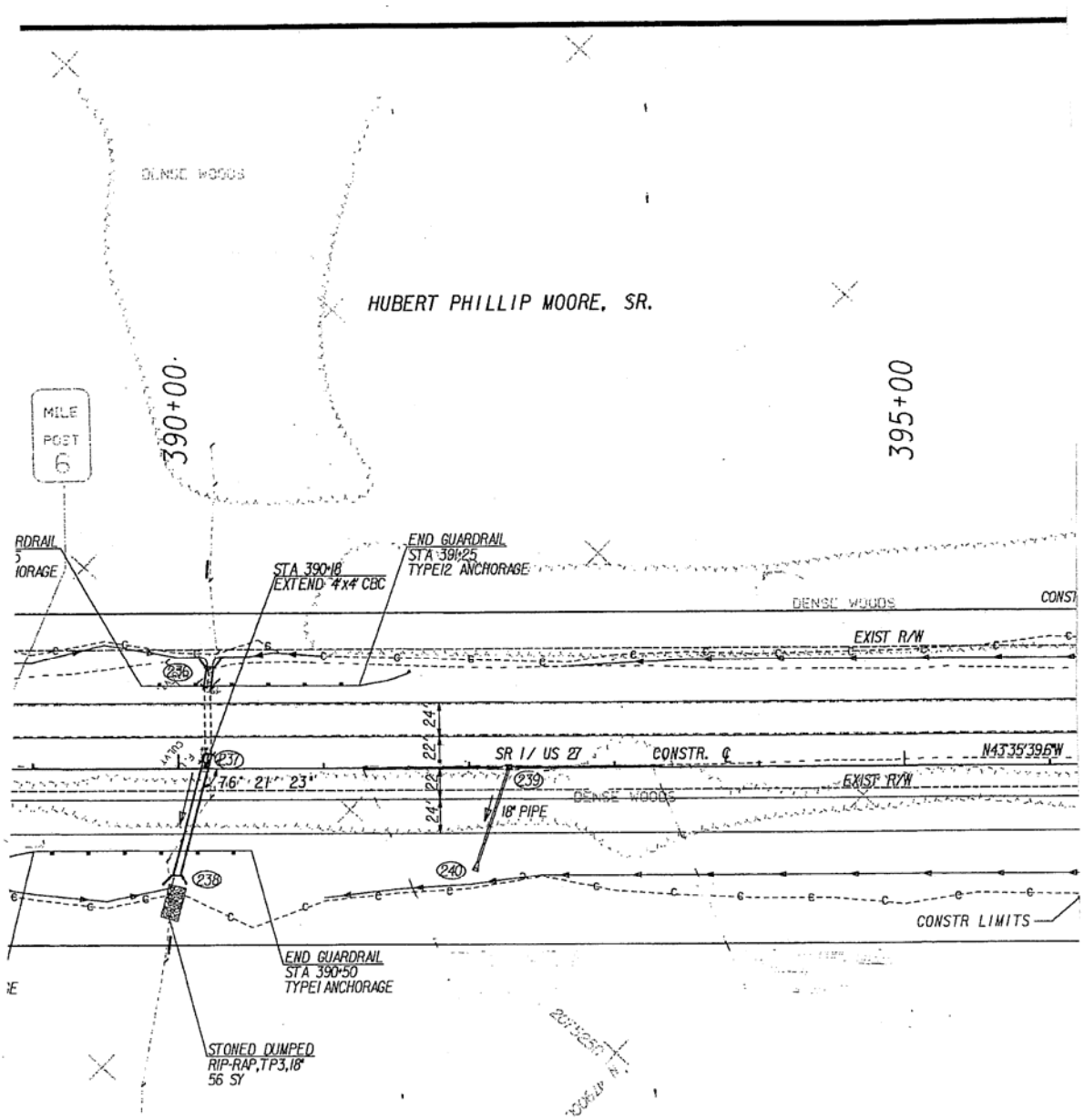
PAVED DITCHES AT SAGS

III. STAGE CONSTRUCTION

D. MEDIAN DITCHES

2. Value Engineering Alternative

The recommendation of the Value Engineering study team is to eliminate the paved ditches at the sag vertical. In each of the ten locations, the grade is less than 2.5% and in fact most are less than 1%. Typically, paved ditches are used to effectively control erosion and are not used until the grade exceeds 5%. No severe erosion is expected with these flat grades and the runoff would be slower in grass than on a concrete surface.



VE ALTERNATIVE

II. MATERIALS
D. MEDIAN DITCHES
VALUE ENGINEERING ALTERNATIVE
COST COMPARISON SHEET

DESCRIPTION	UNITS	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
PAVED MEDIAN DITCHES	SY	$32.68	1293.0	$42,255	0.0	$0
SUBTOTAL				**$42,255**		**$0**
INFLATION			5.0%	$2,324	5.0%	$0
TRAFFIC CONTROL/MOT			1.5%	$634	1.5%	$0
CONTINGENCY			10.0%	$4,226	10.0%	$0
GRAND TOTAL				**$49,439**		**$0**

POSSIBLE SAVINGS: $49,439

VII. DEVELOPMENT PHASE

III. STAGE CONSTRUCTION

A. CROSS DRAINS

1. "As Proposed"

Stage construction is required for this project to build a four-lane roadway while maintaining two lanes of traffic. During the proposed first stage, traffic will be retained on the existing roadway while proposed travel lanes, drainage structures and other roadside features are constructed. The northbound bridge at Blue Creek will also be constructed in this stage.

During Stage 2, traffic will be shifted onto the newly constructed lanes while the other two travel lanes are constructed and drainage structures are completed. The southbound bridge at Blue Creek will be constructed in this stage. At the conclusion of this stage, traffic will be placed in its final configuration.

VII. DEVELOPMENT PHASE

III. STAGE CONSTRUCTION

A. CROSS DRAINS

2. Value Engineering Alternative

The staging, as proposed, is basically well conceived. However, there are some questions about the construction of drainage structures during the two stages. Drainage construction is complicated due to there being multiple lines of pipe at several locations. There are also several locations where the existing flow line is higher than the proposed flow line with the water flow going toward the existing pipe (see Sta 273+76.5). There are also locations where the existing flow line is lower than the proposed flow line with the water flow going toward the proposed pipe (see Sta 375+48.9).

There are several recommendations offered regarding drainage construction during staging. The first is that the second half of the proposed plans have very explicit directions about the method of construction for the drainage structures. This direction needs to be consistent throughout the staging plans.

Secondly, in several locations in the staging plans, the use of temporary drainage structures is mentioned. There should be a pay item created for these locations in order to assure proper drainage control during construction.

Next, a proposed downstream extension should align with the existing drainage structure even if this requires the construction of a median box to skew the pipe in order to end at the proper outlet.

Finally, the contractor should be given the option to open cut the existing roadway, under flagger control, for single lines of pipe. The roadway cut may have to be plated one night if the cut can only be backfilled and plated a second night for concrete curing.

VII. DEVELOPMENT PHASE

IV. DESIGN COMMENTS

1. Separate design firms are completing the plans. There needs to be consistency throughout the plans; i.e. one portion shows the paved shoulders while the other does not.

2. The construction plans indicate 156,366 cubic yards of waste when it should be borrow.

3. Some advance intersection warning signs and destination signs are too close to the intersection. These signs need to be placed sufficiently in advance of the intersection to allow motorists time to make lane changes.

4. Most of this roadway is in a very rural setting and should be posted for 65 MPH rather than 55 MPH.

5. It is recommended that a note be placed on the staging plans that guardrail laps be in the direction of traffic flow as directed by GA Standard 4010 requirements and then reinstalled when traffic is shifted to final location.

6. Note about cross drains on staging plan pages 19-07 to 19-14 is confusing and needs to be reworded. The note on page 19-15 is much clearer.

7. Note # 2 is not on page 2 of staging plans.

8. The earthwork quantities indicate that this project will be a borrow job. In reviewing the cross sections and the staging plans, it appears that there may not be sufficient material available to complete Stage I before the borrow item has to be used. In keeping compliant with the *Standard Specifications,* a supplemental agreement would be required early in the project. The flow chart contained in the Department's policy for method of payment for earthwork shows that if the earthwork is greater than 500,000 cubic yards and suitable for measurement, then unclassified and borrow pay items are to be used. The subject project has approximately 350,000 total yards of earthwork and with the staging, it will be difficult to measure. In discussing this issue with the Construction Office, their recommendation is that the earthwork pay item should be that which is in the best interest of the Department. Therefore, it is recommended that the project manager, Construction Office and the District determine if a grading complete or in-place embankment pay item would be better to use on this project.