VALUE ENGINEERING SUMMARY
OF THE
I-75 WIDENING
SCOTT-GRANT COUNTIES
FROM CORINTH TO WILLIAMSTOWN
ITEM NOS. 6-72.11 & 6-72.20
FRANKFORT, KENTUCKY

MAY 18-22, 1998

Prepared by:
Ventry Engineering

In Association With:

Kentucky Transportation Cabinet

PROJECT MANAGER

William F. Ventry

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

TEAM LEADER

Joseph J. Waits, P.E., C.V.S.
C.V.S. No. 25475 (LIFE)

Date: 28 May 1998

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I. EXECUTIVE SUMMARY

INTRODUCTION

This Value Engineering report summarizes the results of the Value Engineering study performed by Ventry Engineering for the Kentucky Transportation Cabinet. The study was performed during the week of May 18-22, 1998 in Frankfort, Kentucky.

The subject of the study was the reconstruction, rehabilitation and widening of I-75 in Scott and Grant Counties.

PROJECT DESCRIPTION

The project reconstructs and widens a 26.4 km segment of I-75, located in Scott and Grant Counties, from the vicinity of Sadieville to Williamstown, Kentucky. A travel lane will be constructed on the median side of the mainline roadway in both directions. Overpass bridges and other structures will be replaced or reconstructed, and drainage structures will be upgraded or replaced as required. The interchange at KY 330 will be reconstructed to meet current standards and operations criteria.

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. Analysis
4. Development
5. Presentation
6. Report Preparation

Evaluation criteria identified as a basis for the comparison of alternatives included the following:

- Function Performance
- Customer Satisfaction
- Quality
- Maintainability
- Cost

RESULTS

The following areas of focus were analyzed by the Value Engineering team and from these areas the following Value Engineering alternatives were developed and are recommended for Implementation:

BRIDGES

BRIDGE AT EAGLE CREEK ROAD

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative proposes a 3-span new bridge at Eagle Creek in lieu of a 4-span structure.

If this recommendation can be implemented, there is a possible savings of $393,880.

BRIDGES AT STONEWALL ROAD

The Value Engineering Team recommends that Value Engineering Alternative No. 2, be implemented. This alternative proposes a 1-span, 37 m structure at Stonewall Road in lieu of a 3-span, 56 m concrete structure.

If this recommendation can be implemented, there is a possible savings of $170,172.

WAGON BOXES AT N. RAYS FORK ROAD

The Value Engineering Team recommends that Value Engineering Alternative No. 2 be implemented. This alternative proposes a prestressed precast box beam bridge at North Rays Fork Road in lieu of replacing the Wagon Boxes with two 3-span bridges.

If this recommendation can be implemented, there is a possible savings of $1,033,224.

Alternative No. 1 to close N. Fork Road was developed for KTC consideration and review. However, the team believes that public perception and customer satisfaction may be a problem for implementation. In view of the potential savings of $1,464,224, KTC may wish to further investigate the item.

BRIDGES AT KY 330, KEIFER, MASONS SCHOOL, AND SIPPLE ROADS

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative proposes to use 1-span bridges and partial height abutments on spread footings at KY 330, Keifer, Mason School, and Sipple Roads, in lieu of 1-span bridges with full height abutments.

If this recommendation can be implemented, there is a possible savings of $275,491.

BRIDGES AT HEEKIN AND CHERRY ROADS

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative proposes to replace bridges at Heekin and Cherry Grove Road in lieu of "Jacking" the bridges to a new profile grade.

If this recommendation can be implemented, there is a possible cost addition of $409,000, but in the opinion of the Value Engineering team adds value to the project.

BRIDGES AT POKEBERRY ROAD

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative proposes to replace the Wagon Boxes at Pokeberry Road with two 1-span prestressed precast box beam bridges in lieu of two 3-span bridges.

If this recommendation can be implemented, there is a possible savings of $843,960.

MAINTENANCE OF TRAFFIC

PHASED CONSTRUCTION

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative proposes to phase construction to eliminate maintaining traffic adjacent to work areas.
If this recommendation can be implemented, there is a possible savings of $6,360,000.

KTC FURNISHED TCBW

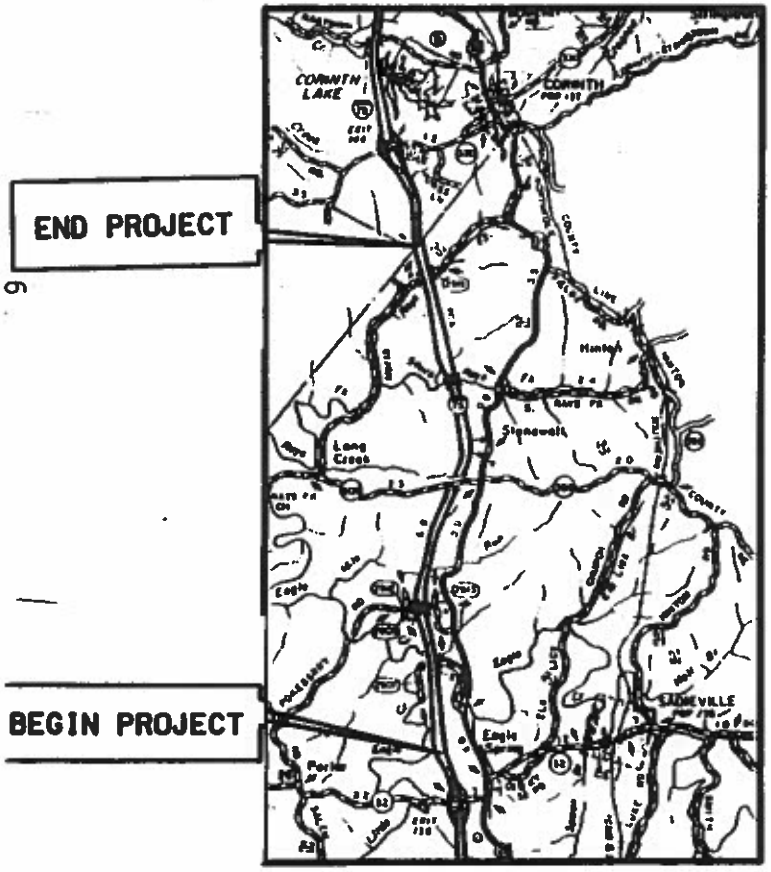
The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative utilizes state owned temporary barrier wall units in lieu of contractor' furnished units.

If this recommendation can be implemented, there is a possible savings of $2,502,000.

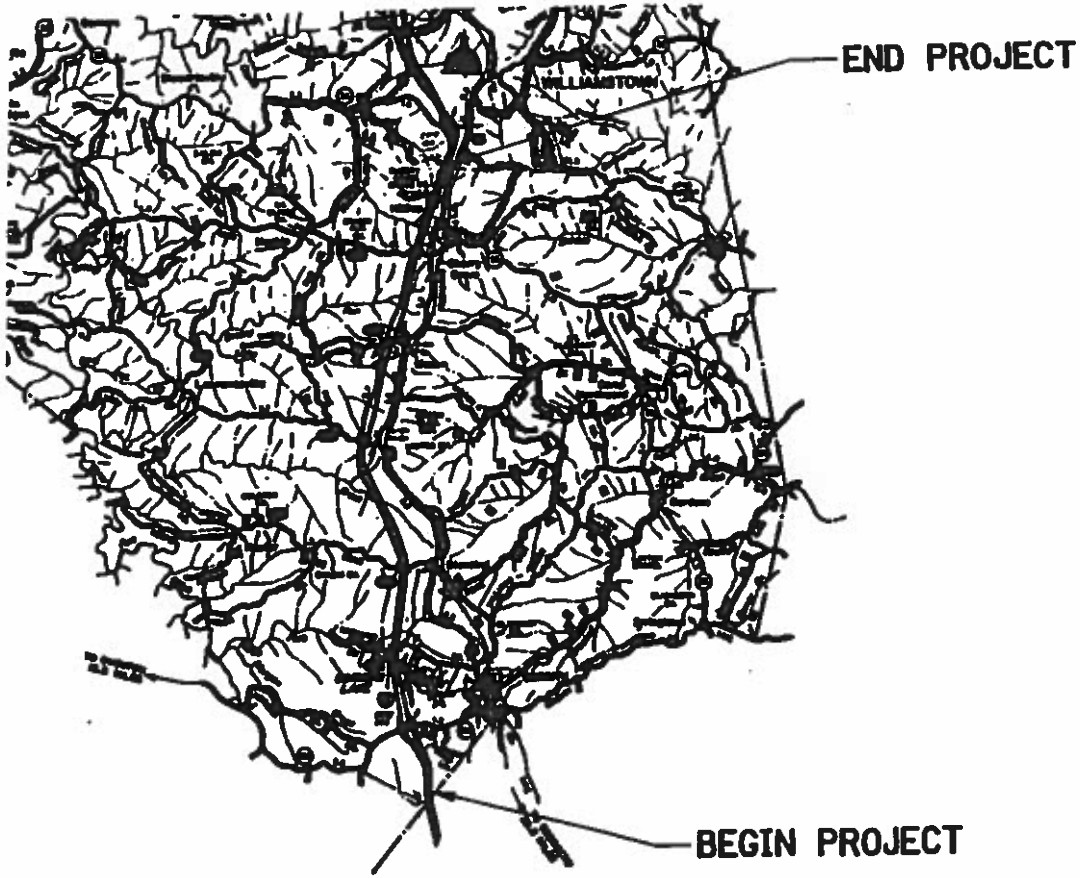
TOTAL WORKSHOP POTENTIAL SAVINGS: $11,990,000

II. LOCATION OF PROJECT

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS



South



North

III. TEAM MEMBERS AND PROJECT DESCRIPTION

TEAM MEMBERS

NAME	AFFILIATION	EXPERTISE	PHONE
William F. Ventry, P.E., C.V.S.	Ventry Engineering	Project Manager	850/627-3900
Joseph J. Waits, P.E., C.V.S.	Ventry Engineering	Team Leader	850/627-3900
Don Keenan	Ventry Engineering	Structures	850/627-3900
Bob Churchill	Ventry Engineering	Roadway	850/627-3900
Ron Klusza	Ventry Engineering	Traffic	850/627-3900
Stuart Goodpaster	KTC/Bridge Design, CO	Bridge Design	502-564-4560
Paul Sanders	KTC/CO, D-4	Construction	502-766-5033
Jeff Jasper	KTC/Design, CO	Design	502-564-3280

PROJECT DESCRIPTION

Length	26.4 km
Construction cost	$61,127,995
Design speed	120 km/hr
Projected letting date	
Task at hand	Reconstruct and Widen a 26.4 km segment of I-75 From the vicinity of Sadieville to Williamstown, Kentucky, in Scott and Grant Counties, Item No. 6-72.11, 6-72.20, 6-72.21

The project consists of the widening and rehabilitation of a 26.4 km segment of I-75 in Grant and Scott Counties. The southern project terminus is the previously widened section at the KY 32 Interchange near Sadieville. The project extends northward to a point just north of Cherry Grove Cross Road, in Grant county. The project begins in a bifurcated section and extends approximately 500 meters to a roadway with a common centerline. The common section extends approximately 2000 meters before reaching another bifurcated section. The project is divided into two design packages, one for the southern section which extends to KY 330, and one for the northern section which picks up south of KY 330 Interchange and extends to the northern terminus above Cherry Grove Cross Road

Typically, widening of the existing facility will be accomplished by constructing a travel lane on the median side of the mainline roadway in both directions of travel. The new travel lanes will be separated by a median in the bifurcated sections and a median barrier wall in the constant width sections.

Slope stability in this area has presented a problem in the past, due to the Eden Shale geologic formation. Most of the existing fill slopes have undergone corrective measures since original placement, and the design will take into consideration these particular problem factors.

The KY 330 interchange with I-75 will be reconstructed to meet current standards and operational criteria.

The widening to three lanes in both directions of travel, will required overpass bridges to be reconstructed or replaced and underpass culverts ("Wagon Boxes") either extended or replaced at several locations.

Drainage structures throughout the project will be analyzed and dealt with in the appropriate manner.

IV. INVESTIGATION PHASE

I-75 WIDENING
SCOTT-GRANT COUNTIES
V.E. STUDY BRIEFING
MAY 18, 1998

NAME	AFFILIATION	PHONE
Joe Waits, P.E., CVS	Ventry Engineering	850-627-3900
Bob Churchill	Ventry Engineering	850-627-3900
Glen Hardin	American Consulting Eng.	606-233-2100
Martin Van Meter	American Consulting Eng.	606-233-2100
Daryl Carter	American Consulting Eng.	606-233-2100
Greg Sharp	American Consulting Eng.	606-233-2100
Paul Sanders	KTC- Construction D-4	502-766-5033
Jeff Jasper	KTC-CO Design	502-564-3280
Ron Klusza	Ventry Engineering	805-259-4349
Stuart Goodpaster	Bridge Design- CO	502-564-4560
I.J. Blankenship	D-7 Design Engr.	606-246-2355
Don Keenan	Ventry Engineering	850-627-3900
Chuck Craycraft	H. W. Lochner	606-278-0528
Jerry Leslie	H. W. Lochner	606-278-0528
Daryl Greer	KTC- Hwy Design	502-564-3280
Janet R. Coffey	KTC- Operations	502-564-4556
Joette Fields	KTC- Hwy Design	502-564-3280
Robert Semones	KTC- Hwy Design	502-564-3280
Jack Conway	KTC- CO Geotech Branch	502-564-2374
Ed Thompson	KTC- Dist 6 Traffic	606-341-2700
Larry Trenkamp	KTC- District 6 Construction	606-341-2700
Keith Caudill	KTC- District 7 Design	606-246-2355
Randy Turner	KTC- District 7 Design	606-246-2355

Daryl Greer, KTC VE Coordinator, opened the meeting with an introduction of attendees and a general overview of the project and the goals and objectives of the VE study. He introduced Joe Waits, Team Leader, Ventry Engineering, who explained the VE process the team responsibilities for the week-long study. He emphasized that the team would work to add "value" to the project by reducing costs where possible, and at the same time maintaining project quality. He further emphasized that the team would attempt to coordinate potential ideas with the design team throughout the study, and encouraged designer participation during the study.

Glen Harden, American Consulting Engineers, briefed the group on their design of the southern portion of the project.

- There are two alternates proposed. Alternate #1 shifts the alignment 1 m to the inside and Alternate shifts the alignment 3.6 m to the inside. Alternate #2 is desired, although the cost may be + 800K. There is a possibility that the savings in construction time may make up the difference.

- 1:3 slopes are preferred.

- The guidelines are that traffic downtime be limited to 30 minutes, which presents problems in bridge removal etc.. 1/2 bridge removal (sawing) technique may be used to work within the downtime guideline.

- Two sets of two "Wagon Box" type culverts are to be extended or replaced by bridges, with analysis to determine preferred approach.

Jerry Leslie, H. W. Lochner, briefed the group on the Northern segment of the project.

- The alignment shift selected as the optimum is 1.5 m.

- Either Sipple or Keifer Road must remain open.

- Roadway "dips" are to replaced by geometric grade.

- Cuts are 70-80% shale. Shale embankments turn to clay when exposed, presenting some problems. Proposing 8" lifts with sheepsfoot roller.

- Some ROW required @ Sipple Road and Ky 330.

- Generally proposing 1-span bridges, Mod. Type IV., with exceptions at Sipple and Ragstown.

- Replace Ragstown Rd. Wagon Boxes with bridges.

- Maintain Ky 330 and Sipple Road Traffic.

The group was then taken to the project site and observed the roadway and structures throughout the project. Daryl Greer and the design team explained the various features of the project.

PERSONS CONTACTED

NAME	AFFILIATION	PHONE
Paul Sneksen	KTC- Design	502-564-3280
Rocky Adams	Judy Construction	606-234-6900
Kenny Reynolds	Scottys Construction	502-781-3998
Phil Swanson	Matsuda Bridge Co.	502-955-9669
Nasby Stroop	KTC	606-246-2047
Gary Sharp	KTC	502-564-3280
Leo Frank Jr.	KTC	502-564-4560
Bill McKinney	KTC- Bridge Design	502-564-4560
Dale Carpenter	KTC- Bridge Design	502-564-4560
Greg Sharp	American Consultants	606-233-2100
Jerry Leslie	Lochner Consultants	606-278-0528
Steve Moore	KTC	502-564-3210
Frank Duncan	KTC	502-246-2355

BIBLIOGRAPHY

DATE	TITLE
1 May 1998	Project Plans
31 Mar 1998	Aerial Photographs
ND	Existing Structures/Microfilm
Apr, 1998	Cost Estimates
ND	Structure Sizes/Costs
9 Feb 1998	Mainline Traffic Forecasts
9 Feb 1998	Ky 330/Ky 608 Traffic Forecasts
21 Apr 1998	Line and Grade Minutes
1998	Documentation/Correspondence
20 May 1998	Interstate Widening Pvmt. Des. Cat.
1997	VE Study/Pavement Design
1994	AASHTO/Geo. Des. of Hwys/Streets
18 May 1998	Standard Dwgs
11 Jul 1996	Bridge Design Guidance
21 May 1998	Pavement Cond. Eval. Form
21 May 1998	Unit Bid Prices for KTC, 1997

FUNCTION ANALYSIS WORKSHEET, INVESTIGATION PHASE
PROJECT: I-75 WIDENING; SCOTT-GRANT COUNTIES
DATE: MAY 18-22, 1998

(SOUTHERN SEGMENT)

ITEM	FUNCT. VERB	FUNCT. NOUN	TYPE	COST	WORTH	VALUE INDEX
Surfacing	Support	Load	B	14.7	12.0	1.23
Bridges	Span	Obstacles	B	3.8	3.0	1.27
Roadway Excavation	Establish	Grades	B	3.5	3.0	1.17
Drainage Structures	Removes	Water	B	2.0	2.0	1.0
Maintenance of Traffic	Control	Traffic	B	No Data		

(NORTHERN SEGMENT)

ITEM	FUNCT. VERB	FUNCT. NOUN	TYPE	COST	WORTH	VALUE INDEX
Surfacing	Support	Load	B	13.5	11.0	1.23
Bridges	Span	Obstacles	B	2.7	2.25	1.27
Roadway Excavation	Establish	Grades	B	8.0	6.8	1.17
Drainage Structures	Removes	Water	B	.129	.129	1.0
Maintenance of Traffic	Control	Traffic	B	No Data		

INVESTIGATION

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

A. Bridges

B. Maintenance of Traffic

C. Surfacing

D. Roadway Excavation

IV. SPECULATION PHASE

SPECULATION

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

A. BRIDGES

- **Use 3-span new bridge at Eagle Creek**
- **Use 2-span bridge at Stonewall**
- **Use 1-span bridge with retaining walls at Stonewall**
- **Use 1-span bridge without retaining walls at Stonewall**
- **Close North Ray Fork Road**
- **Use 1-span with abutments/spread footings at Ky 330, Keifer, Masons school and Sipple Road**
- **Replace bridges at Heekin/Cherry Roads**
- **Use 1-span bridge at Pokeberry**
- **Use 1-span bridge at North Ray Fork**

B. MAINTENANCE OF TRAFFIC

- **Use phased construction to eliminate traffic from work area**
- **Use KTC Furnished TCBW**
- **Use 4-lane structure on KY 330 over I-75**
- **Divert traffic behind median piers**

C. SURFACING

- **Use a .9 m shift in the bifurcated section.**

VI. EVALUATION PHASE

VI.(A) ALTERNATIVES

ALTERNATIVES

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

A. BRIDGES

1. BRIDGE AT EAGLE CREEK ROAD

Value Engineering Alternative- Use 3-span new bridge at Eagle Creek Road

2. BRIDGE AT STONEWALL ROAD

Value Engineering Alternative No. 1- Use 1-span Bridge With Retaining Walls at Stonewall Road

Value Engineering Alternative No. 2- Use 1-span Bridge Without Retaining Walls at Stonewall

3. WAGON BOXES AT N. RAYS FORK ROAD

Value Engineering Alternative No. 1- Close N. Ray Fork Road

Value Engineering Alternative No. 2- Use 1-span Bridge at North Rays Fork Road

4. BRIDGES AT KY 330, KEIFER, MASONS SCHOOL, SIPPLE ROADS

Value Engineering Alternative- Use 1-span With Abutments/Spread Footings at Ky 330, Keifer, Masons School, and Sipple Roads

5. BRIDGES AT HEEKIN AND CHERRY ROADS

Value Engineering Alternative- Replace bridges at Heekin/Cherry Roads

6. BRIDGES AT POKEBERRY ROAD

Value Engineering Alternative- Use 1-span bridge at Pokeberry Road

B. MAINTENANCE OF TRAFFIC

1. PHASED CONSTRUCTION

Value Engineering Alternative- Phased construction to eliminate traffic from work area

2. TEMPORARY CONCRETE BARRIER WALLS

Value Engineering Alternative- Use KTC Furnished TCBW

C. DESIGN COMMENTS

1. **Use 4-lane Structure on KY 330 Over I-75**
2. **Divert Traffic Behind Median Piers**
3. **Use a 0.9 m shift in the bifurcated section**

VI.(B) ADVANTAGES AND DISADVANTAGES

EVALUATION

The following Advantages and Disadvantages were developed for the Value Engineering Alternatives previously generated during the speculation phase. It also includes the Advantages and Disadvantages for the As Proposed.

A. BRIDGES

1. BRIDGE AT EAGLE CREEK ROAD

"As Proposed"- Replace the existing bridge with a 4-span bridge

Advantages

- Uses existing substructure

Disadvantages

- Requires re-hab
- Doesn't meet current standards

Value Engineering Alternate - Use a 3-span new bridge at Eagle Creek Road

Advantages

- Fewer substructures
- New substructure
- More economical
- Faster construction
- Longer design life

Disadvantages

- None Noted

Conclusion:
Continue Development

2. BRIDGE AT STONEWALL ROAD

"As Proposed"- Use a 3-span replacement bridge at Stonewall Road

Advantages

- None noted

Disadvantages

- Longer construction
- Cost more

Value Engineering Alternative No. 1, Use a 1-span bridge with retaining walls at Stonewall Road

Advantages

- Fewer substructures
- Reduces cost
- Faster construction
- Less maintenance

Disadvantages

- Grade adjustment

Conclusion:
Continue Development

Value Engineering Alternative No. 2 - Use a 1-span bridge without retaining walls at Stonewall

Advantages

- Fewer substructures
- Less cost
- Faster construction time
- Less maintenance

Disadvantages

- Grade adjustment

Conclusion:
Continue Development

3. WAGON BOXES AT N. RAYS FORK ROAD

"As Proposed"- Use a 3-span bridge (assumed) at North Rays Fork Road to replace Wagon Boxes.

Advantages

- None noted

Disadvantages

- More substructures
- Higher maintenance cost
- Higher cost

Value Engineering Alternative No. 1 - Close North Ray Fork Road and fill wagon boxes

Advantages

- Reduces cost
- Reduces construction time

Disadvantages

- Cuts off established route
- Public may not support

Conclusion:
Continue Development

Value Engineering Alternative No. 2 - Use a 1-span bridge at N. Rays Fork Road

Advantages

- Lower cost
- Less maintenance
- Fewer substructure

Disadvantages

- None noted

Conclusion:
Continue Development

4. BRIDGES AT KY 330, KEIFER, MASONS SCHOOL, AND SIPPLE ROADS

"As Proposed"- Use a 1-span full-height abutment replacement bridge at Ky 330, Keifer, Mason School and Sipple Roads

Advantages

- Shorter bridge

Disadvantages

- Higher cost

Value Engineering Alternative - Use a 1-span bridge with partial height abutments/spread footings at Ky 330, Keifer, Masons School and Sipple roads

Advantages

- Reduces cost
- Less construction time

Disadvantages

- Grade adjustment

Conclusion:
Continue Development

5. BRIDGES AT HEEKIN AND CHERRY ROADS

"As Proposed"- "Jack" bridges at Heekin/Cherry Roads

Advantages

- May be lower cost
- Quicker construction
- Less traffic interference

Disadvantages

- Less design life
- More maintenance
- Requires pier protection

Value Engineering Alternative - Replace bridges at Heekin/Cherry roads

Advantages

- Longer service life
- Less maintenance
- Higher design load
- Meets clear zone

Disadvantages

- Higher cost
- Longer construction time
- Disrupts local traffic

Conclusion:
Continue Development

6. BRIDGES AT POKEBERRY ROAD

"As Proposed"- Use a 3-span bridge (assumed) at Pokeberry Road to replace wagon box.

Advantages

- None noted

Disadvantages

- More substructures
- Higher maintenance cost
- Higher cost

Value Engineering Alternative - Use a 1-span bridge at Pokeberry Road

Advantages

- Lower cost
- Less maintenance
- Fewer substructure

Disadvantages

- None noted

Conclusion:
Continue Development

B. MAINTENANCE OF TRAFFIC

1. PHASED CONSTRUCTION

"As proposed"- Maintain traffic flow with minimum delay within the construction area of both the Northbound and Southbound Lanes.

Advantages

- None noted

Disadvantages

- More costly
- Reduction in travel width
- Increased construction time
- User travel delay

Value Engineering Alternative - Phased construction to eliminate traffic from the construction area

Advantages

- Less travel delay
- Ease of Construction
- Faster Construction
- More shoulder

Disadvantages

- Crossover cost
- Ramps

Conclusion:
Continue Development

2. TEMPORARY CONCRETE BARRIER WALLS

"As Proposed"- USE Contractor furnished temporary concrete median barrier walls (TCBW) along the length of the project.

Advantages

- None noted

Disadvantages

- High cost
- Does not use material on hand

Value Engineering Alternative - Use KTC furnished TCBW

Advantages

- Reduces cost
- Utilizes stockpiled material

Disadvantages

- None noted

Conclusion:
Continue Development

VII. DEVELOPMENT PHASE

VII.(A) BRIDGES

VII.(A)(1) BRIDGE AT EAGLE CREEK ROAD

VII.(A)(1)(a) AS PROPOSED

"As Proposed"

The consultant's proposal is to build a new four span structure in the median of I-75 at the Eagle Creek Road. Traffic will be routed onto the new median bridge. The existing superstructure will be replaced and tied into the new median widening. The proposed bridge will be Type IV, PPC beams.

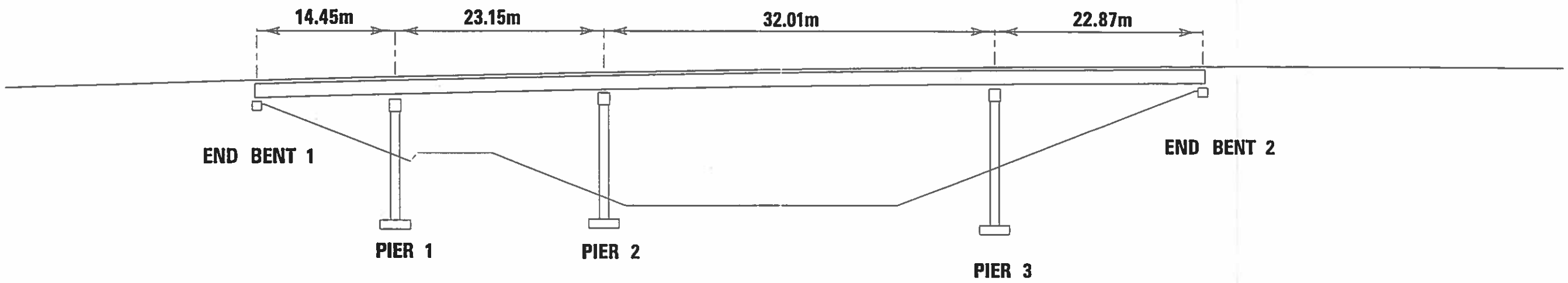
Advantages

- Uses existing substructure

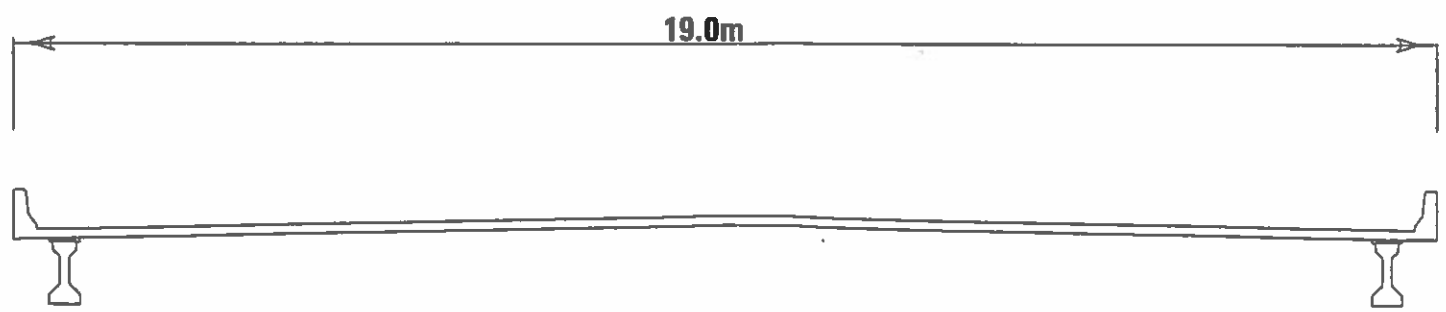
Disadvantages

- Requires re-hab
- Doesn't meet current standards

AS PROPOSED ALTERNATIVE
FOUR SPAN PCI BEAM BRIDGE
I–75 OVER EAGLE CREEK



ELEVATION



TYPICAL DECK SECTION

AS PROPOSED

VII.(A)(1)(b) VALUE ENGINEERING ALTERNATIVE

Value Engineering Alternative - Use a 3-span Bridge at Eagle Creek

The VE proposed bridge is a 3-span bridge with spans of 23 m - 32 m - 23 m utilizing Type IV, PPC beams. MSE walls that are parallel to Eagle Creek Road will be used at the south end of the bridge.

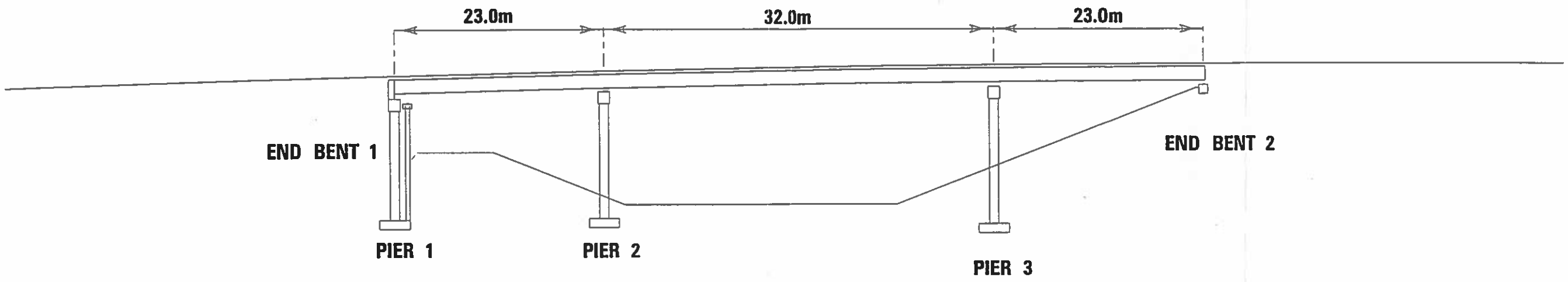
Advantages

- **Fewer substructures**
- **New substructure**
- **More economical**
- **Faster construction**
- **Longer design life**

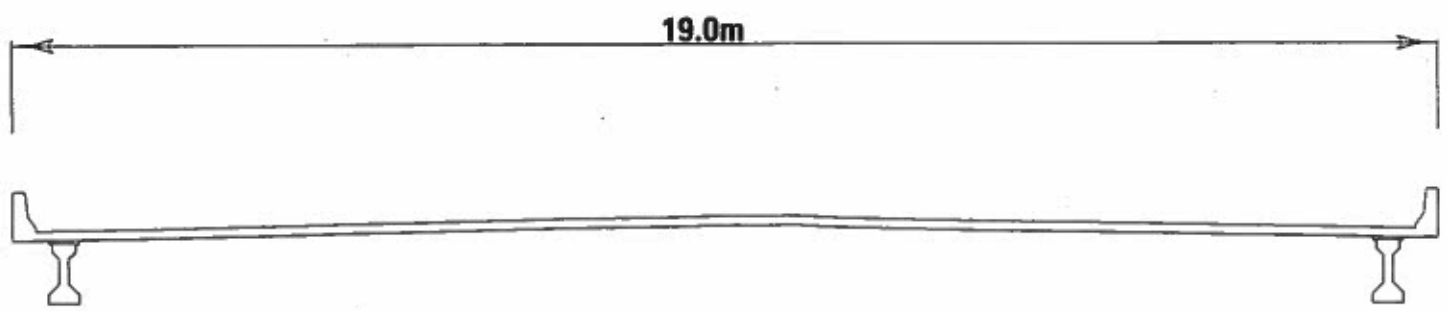
Disadvantages

- **None Noted**

VE ALTERNATIVE
THREE SPAN PCI BEAM BRIDGE
I–75 OVER EAGLE CREEK



ELEVATION



TYPICAL DECK SECTION

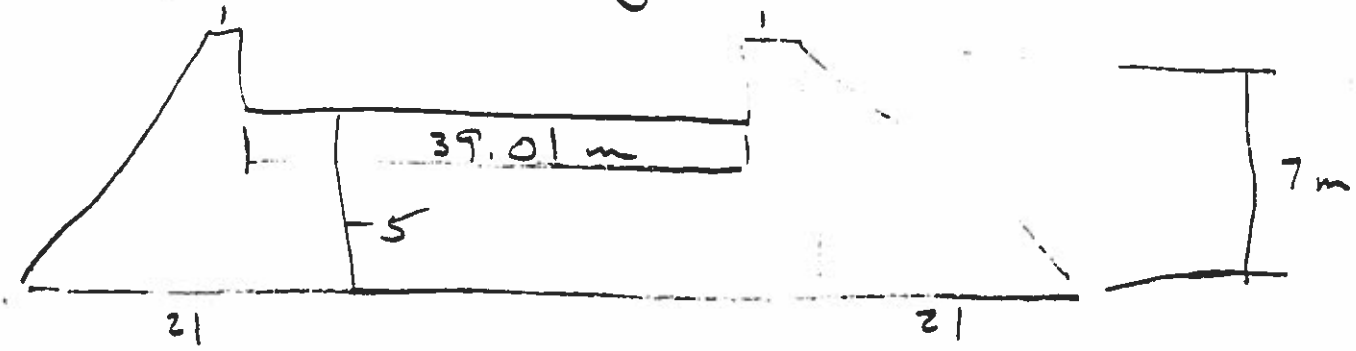
VALUE ENGINEERING
ALTERNATIVE

VALUE ENGINEERING ALTERNATIVE
EAGLE CREEK ROAD
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
DUAL BRIDGES 4 SPAN BRIDGE (93MX19M)	$ 750/M^2	3,534M^2	$ 2,660,000	0	0
DUAL BRIDGES 3 SPAN BRIDGE (78X19M)	$ 750/M^2	0	0	2,964M^2	$ 2,223,000
MSE WALLS	$ 220/M^2	0	0	196M^2	$ 43,120
TOTAL			$ 2,660,000		$ 2,266,120

Possible Savings $393,880

wall @ Eagle Creek



$7 \times 5 = 35$

$\frac{1}{2} \times 7 \times 21 \times 2 = 147$

$1 \times 7 \times 2 = 14$

$196\ m^2$

VII.(A)(2) BRIDGE AT STONEWALL ROAD

VII.(A)(2)(a) AS PROPOSED

"As Proposed"

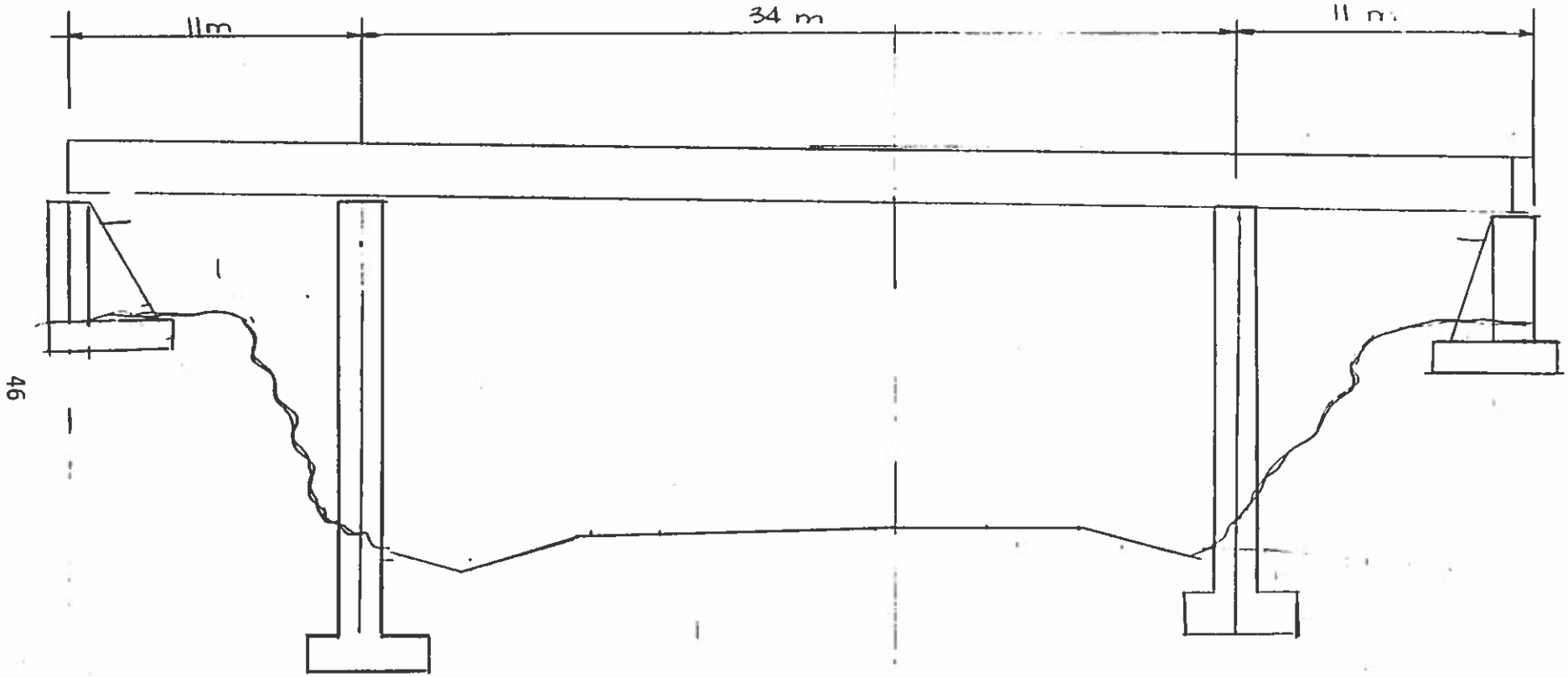
The existing bridge at Stonewall Road is 3-span, 56 m x 96 m, crossing I-75 with walls at abutments.

Advantages

- None noted

Disadvantages

- Longer construction
- Cost more



L.S PROPOSED

NORTH OR SOUTH BOUND LANE

AS PROPOSED

VII.(A)(2)(b) VALUE ENGINEERING ALTERNATIVES

Value Engineering Alternative No.1 - Use a 1-span Bridge w/ Retaining Walls at Stonewall Road

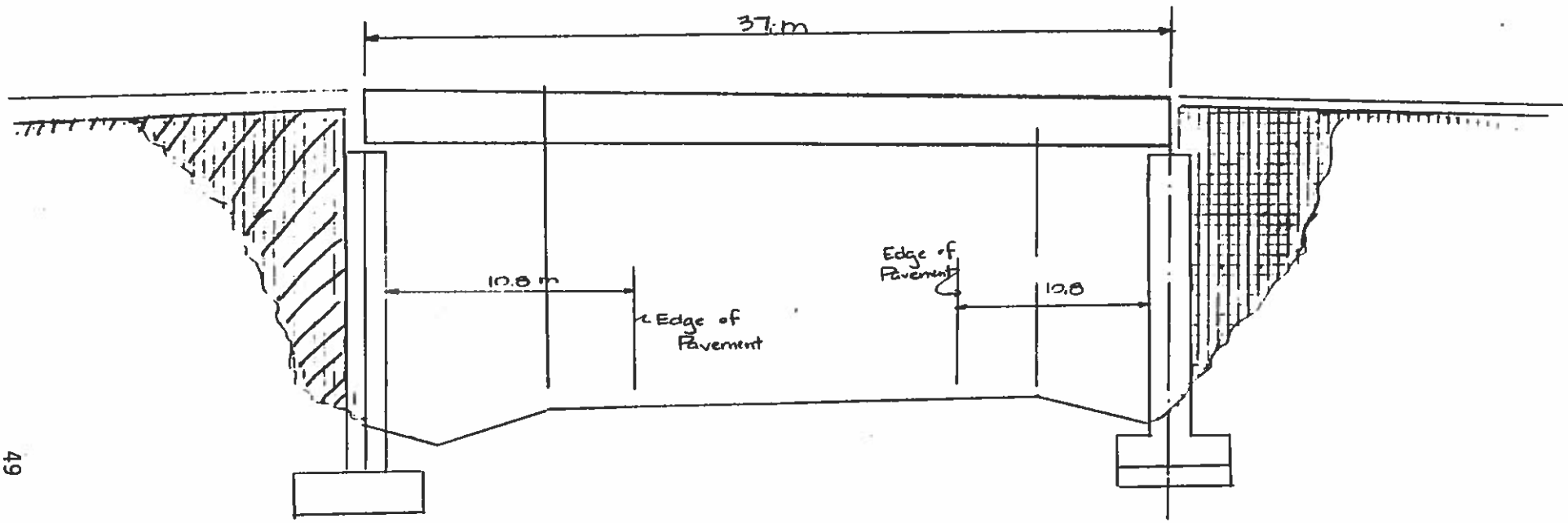
Use the same bridge length as the as proposed bridge (56 m), and use a 1-span steel bridge on full depth wall abutments.

Advantages

- Fewer substructures
- Reduces cost
- Faster construction
- Less maintenance

Disadvantages

- Grade adjustment



1. BACKFILL

VALUE ENGINEERING PROPOSAL BRIDGE # 2

VALUE ENGINEERING
ALTERNATIVE NO. 1

VALUE ENGINEERING ALTERNATIVE NO. 1
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
PCI SUPERSTRUCTURE	$ 516/SM	1,075.2SM	$ 554,803	0	0
STEEL SUPERSTRUCTURE	$ 780/SM	0	0	1,075.2SM	$ 838,656
PIERS	$ 45,200	4	$ 180,800	0	0
GRADE CHANGE (WASTE PROJ.)	0	0	0	0	0
TOTAL			$ 735,603		$ 838,656

Possible Cost Increase **$103,053**

Value Engineering Alternative No. 2 - Use 1-span Bridge Without Retaining Walls at Stonewall Road

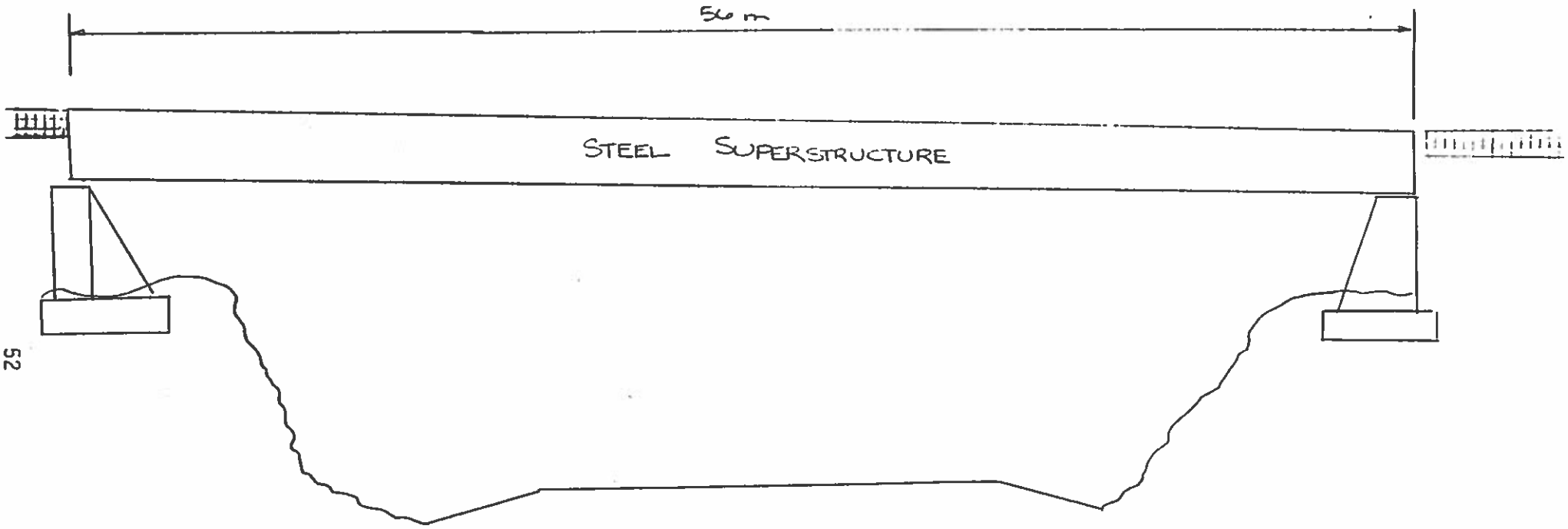
Use a 1-span bridge at Stonewall Road (Ky 806) over I-75. Bridge abutments are estimated to be stub abutments on a rock fill. Fill will be 30' from edge of pavement at each end of the bridge, therefore clearance zone requirements will be met.

Advantages

- Fewer substructures
- Less cost
- Faster construction time
- Less maintenance

Disadvantages

- Grade adjustment



VALUE ENGINEERING PROPOSAL BRIDGE

VALUE ENGINEERING
ALTERNATIVE NO. 2

VALUE ENGINEERING ALTERNATIVE NO. 2
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
PCI BEAMS (TYPE VI)	$ 377	560	$ 211,120	0	0
PCI BEAMS (TYPE IV) MOD	$ 427	0	0	370	$ 157,990
PIERS	$ 54,260	4	$ 217,042	0	0
ABUTMENT ADDITION	0	0	0		$ 100,000
TOTAL			$ 428,162		$ 257,990

Possible Savings $170,172

VII.(A)(3) WAGON BOXES AT NORTH RAYS FORK ROAD

VII.(A)(3)(a) AS PROPOSED

"As Proposed"

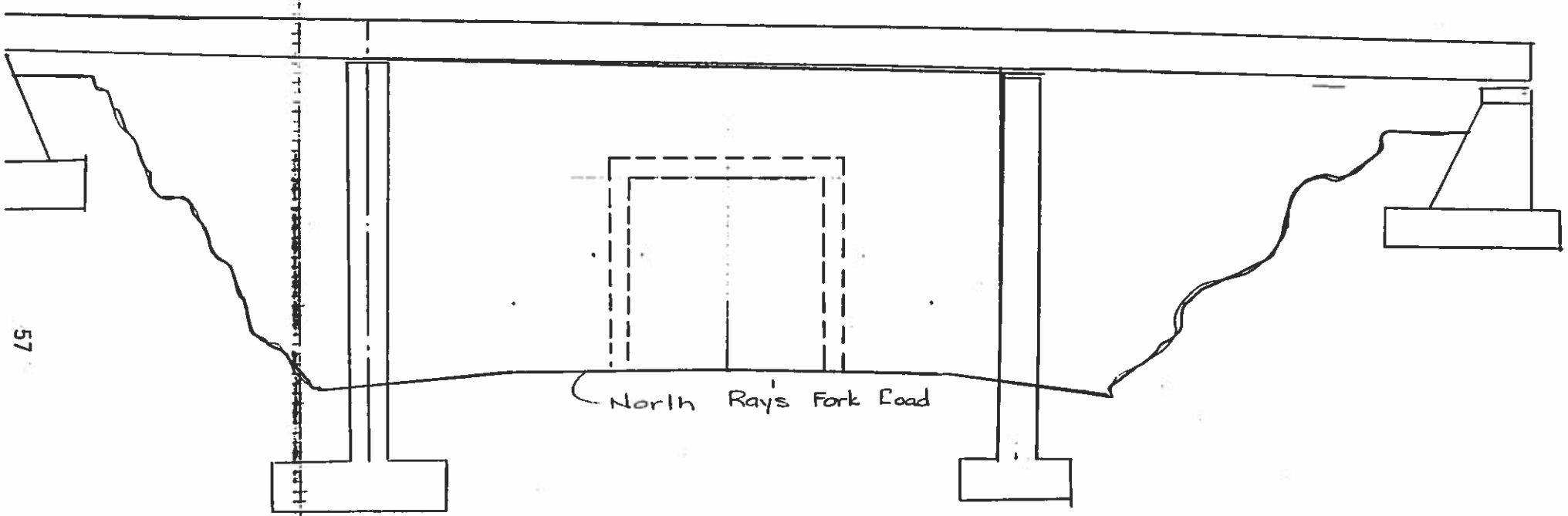
Replace existing 14' x 14' Wagon Boxes at North Rays Fork Road with two 3-span bridges.

Advantages

- None noted

Disadvantages

- More substructures
- Higher maintenance cost
- Higher cost



AS PROPOSED

3 SPAN BRIDGE @ NORTH RAY'S FORK ROAD

AS PROPOSED

VII.(A)(3)(b) VALUE ENGINEERING ALTERNATIVES

Value Engineering Alternative No. 1 - Close N. Rays Fork Road

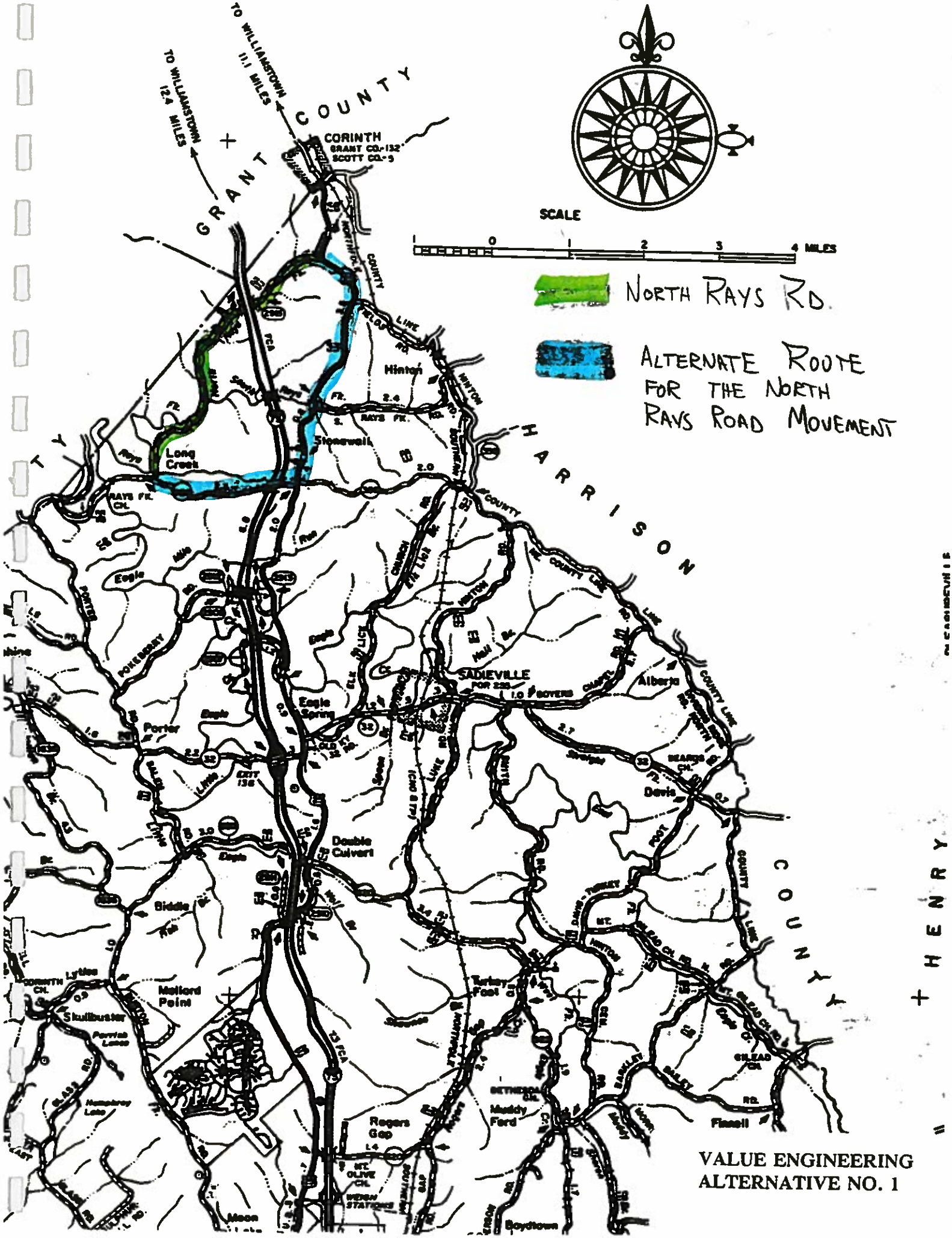
The VE recommendation is to close N. Ray Fork Road and not build a bridge to replace the Wagon Boxes. This would cut off the road where I-75 crosses over it. Vehicles wanting to make the north/south movement on this road would have to take Ky 608 to US 25 to complete the same movement. The existing Wagon Boxes would be filled.

Advantages

- Reduces cost
- Reduces construction time

Disadvantages

- Cuts off established route
- Public may not support



VALUE ENGINEERING ALTERNATIVE NO. 1

VALUE ENGINEERING ALTERNATIVE NO. 1
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
BRIDGE SB @ N. RAYS FORK	$ 783,694	1	$ 783,694	0	0
BRIDGE NB @ N. RAYS FORK	$ 780,530	1	$ 780,530	0	0
BACKFILL WAGON BOXES	$ 100,000	0	0	1	$ 100,000
TOTAL			$ 1,564,224		$ 100,000

Possible Savings $1,464,224

Value Engineering Alternative No. 2 - Use a 1-span Bridge at N. Rays Fork Road

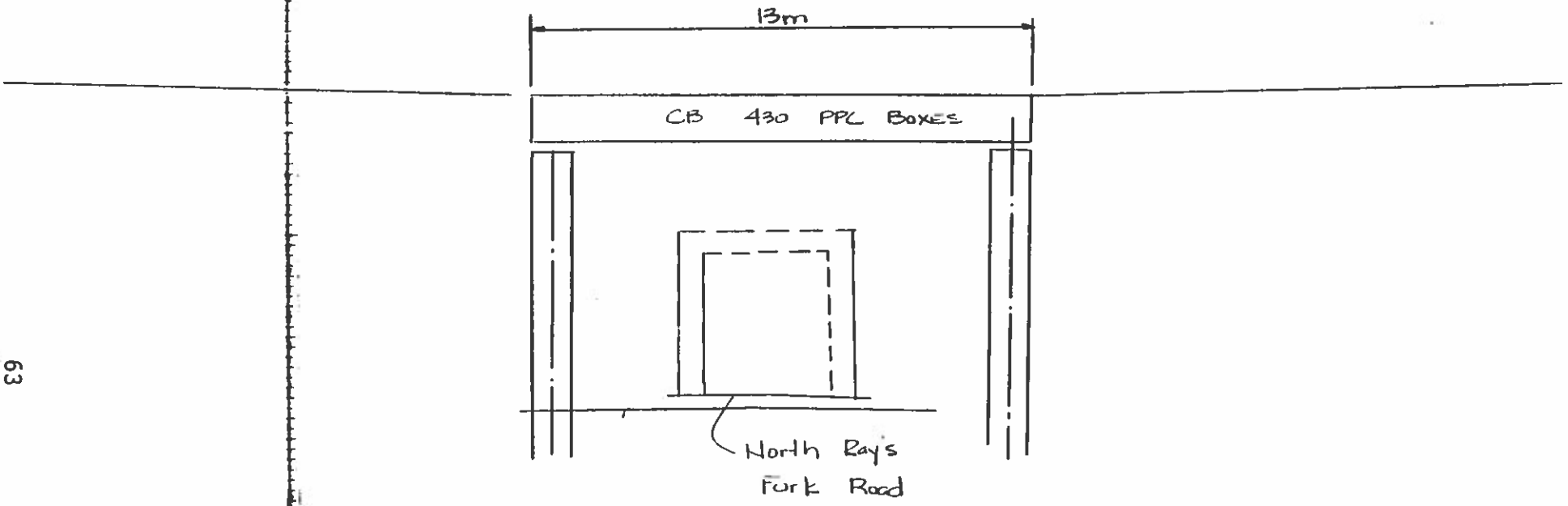
Replace 14' x 14' Wagon Boxes at North Rays Fork Road with two 13 m x 19 m CB 430 prestressed precast box beam bridges. For the purposes of this study, assume that a 13 m x 19 m bridge will be sufficient.

Advantages

- Lower cost
- Less maintenance
- Fewer substructure

Disadvantages

- None noted



VALUE ENGINEERING PROPOSAL #BRIDGE 2

13m x 19m PPC BOX BRIDGE

@ NORTH RAY'S FORK

VALUE ENGINEERING ALTERNATIVE NO. 2

VALUE ENGINEERING ALTERNATIVE NO. 2
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
BRIDGE SB @ N. RAYS FORK	$ 783,694	1	$ 783,694	0	0
BRIDGE NB @ N. RAYS FORK	$ 780,530	1	$ 780,530	0	0
CB 430 BOX BRIDGE (13MX19M)	$ 265,500	0	0	2	$ 531,000
TOTAL			$ 1,564,224		$ 531,000

Possible Savings $1,033,224

VII.(A)(4) BRIDGES AT KY 330, KEIFER ROAD, MASONS SCHOOL ROAD AND SIPPLE ROAD

VII.(A)(4)(a) AS PROPOSED

"As Proposed"

The consultant's proposal is to use a single span bridge with full height abutments at KY 330, Keifer Road, Mason School Road, and Sipple Road. The spans are as follows:

KY 330	NB 32.6 ; SB 32.4
Keefer Road	NB 32.2 ; SB 32.3
Mason School	NB 32.7 ; SB 33.3
Sipple Road	NB 36.8 ; SB 35.7

Advantages

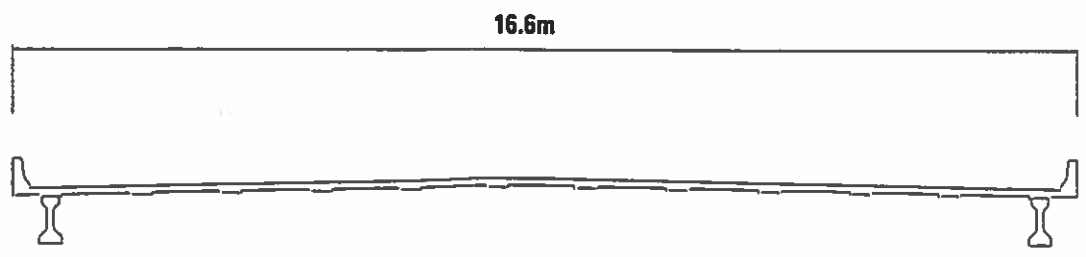
- Shorter bridge

Disadvantages

- Higher cost

AS PROPOSED ALTERNATIVE
SINGLE SPAN PCI BEAM BRIDGE
W/FULL HEIGHT ABUTMENTS
KY 330 OVER I–75

ELEVATION



TYPICAL DECK SECTION

VII.(A)(4)(b) VALUE ENGINEERING ALTERNATIVE

Value Engineering Alternative - Use 1-span w/ Abutments And Spread Footings

The VE proposal is to use single span bridges and partial height abutments on spread footings at KY 330, Keifer Road, Mason School Road, and Sipple Road. The spans will vary depending upon the location. Modified Type IV beams will be used.

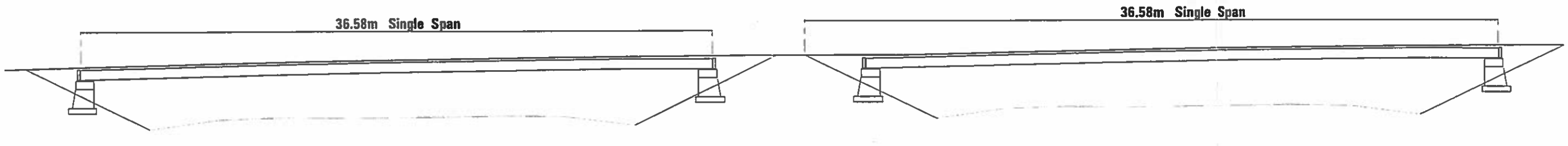
Advantages

- Reduces cost
- Less construction time

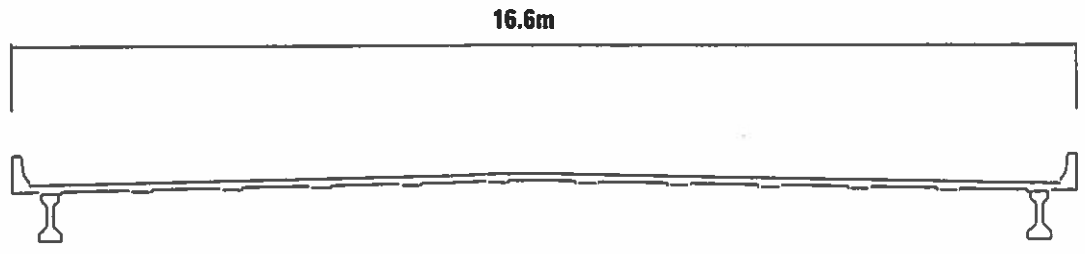
Disadvantages

- Grade adjustment

VE ALTERNATIVE
SINGLE SPAN PCI BEAM BRIDGE
W/FULL HEIGHT ABUTMENTS
KY 330 OVER I–75

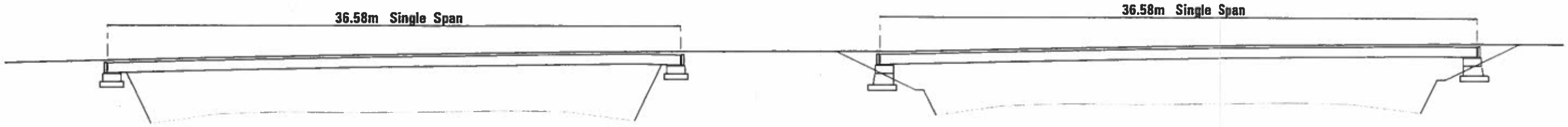


ELEVATION

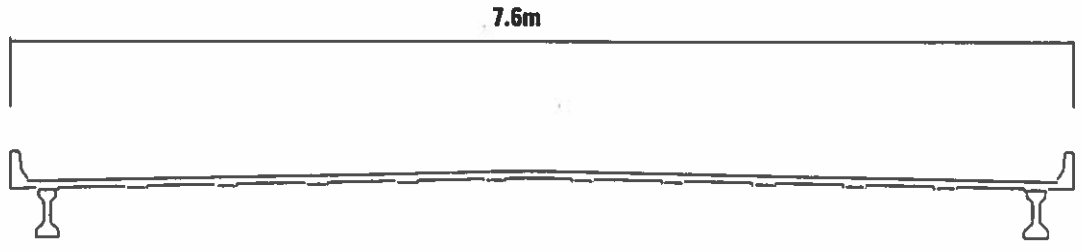


TYPICAL DECK SECTION

VE ALTERNATIVE
SINGLE SPAN PCI BEAM BRIDGE
W/FULL HEIGHT ABUTMENTS
KEEFER RD. OVER I–75

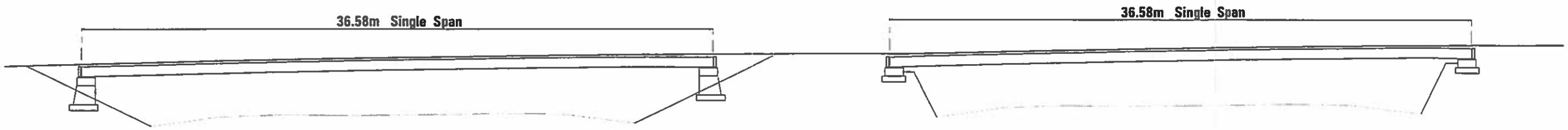


ELEVATION

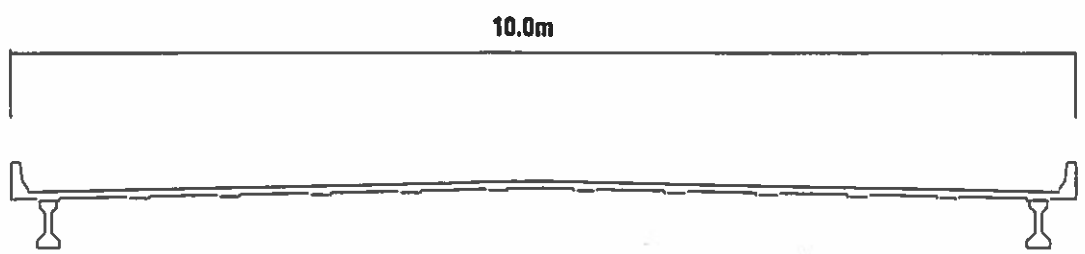


TYPICAL DECK SECTION

VE ALTERNATIVE
SINGLE SPAN PCI BEAM BRIDGE
W/FULL HEIGHT ABUTMENTS
MASON SCHOOL RD. OVER I–75

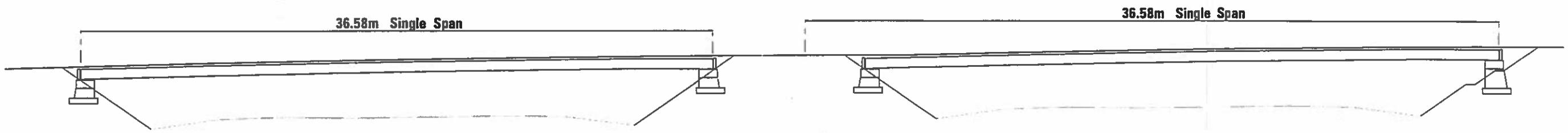


ELEVATION

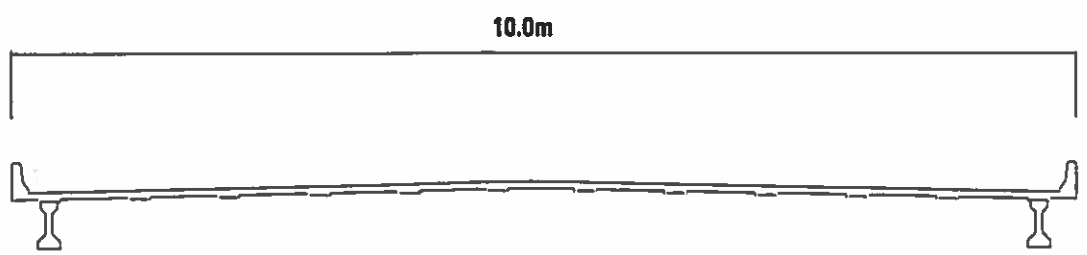


TYPICAL DECK SECTION

VE ALTERNATIVE
SINGLE SPAN PCI BEAM BRIDGE
W/FULL HEIGHT ABUTMENTS
SIPPLE RD. OVER I–75



ELEVATION



TYPICAL DECK SECTION

VALUE ENGINEERING ALTERNATIVE
KY 330/I-75
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
SINGLE SPAN BRIDGE (32.6X16.6)(32.4X16.6)	$ 750/M^2	1,079M^2	$ 809,000	0	0
SINGLE SPAN BRIDGE (36.58X16.6)(36.58X16.6)	$ 750/M^2	0	0	1,214.46M^2	$ 910,845
CONC. FOR FULL HEIGHT ABUTMENTS	$ 390/M^3	498M^3	$ 194,220	0	0
REINFORCED CONC. SLOPE WALL	$ 36/M^2	0	0	332M^2	$ 11,952
TOTAL			$ 1,003,220		$ 922.797

Possible Savings $80,423

VALUE ENGINEERING ALTERNATIVE
KEEFER ROAD/I-75
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
SINGLE SPAN BRIDGE (32.2X7.6)(32.3X7.6)	$ 750/M^2	490.2M^2	$ 368.000	0	0
SINGLE SPAN BRIDGE (36.58X7.6)(36.58X7.6)	$ 750/M^2	0	0	556.01M^2	$ 417,000
CONC. FOR FULL HEIGHT ABUTMENTS	$ 390/M^3	228M^3	$ 88,920	0	0
REINFORCED CONC. SLOPE WALL	$ 36/M^2	0	0	152M^2	$ 5,472
TOTAL			$ 456,920		$ 422,472

Possible Savings $34,448

VALUE ENGINEERING ALTERNATIVE
MASON SCHOOL ROAD/I-75
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
SINGLE SPAN BRIDGE (32.7X10)(33.3X10)	$ 750/M^2	660M^2	$ 495,000	0	0
SINGLE SPAN BRIDGE (36.58X10)(36.58X10)	$ 750/M^2	0	0	731.6M^2	$ 548,700
CONC. FOR FULL HEIGHT ABUTMENTS	$ 390/M^3	300M^3	$ 117,000	0	0
REINFORCED CONC. SLOPE WALL	$ 36/M^2	0	0	200M^2	$ 7,200
TOTAL			$ 612,000		$ 555,900

Possible Savings $56,100

VALUE ENGINEERING ALTERNATIVE
SIPPLE ROAD/I-75
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
SINGLE SPAN BRIDGE (36.8X10)(35.7X10)	$ 800/M^2	725M^2	$ 580,000	0	0
SINGLE SPAN BRIDGE (36.58X10)(36.58X10)	$ 800/M^2	0	0	731.6M^2	$ 585,280
CONC. FOR FULL HEIGHT ABUTMENTS	$ 390/M^3	300M^3	$ 117,000	0	0
REINFORCED CONC. SLOPE WALL	$ 36/M^2	0	0	200M^2	$ 7,200
TOTAL			$ 697,000		$ 592,480

Possible Savings $104,520

34' L-A

KY 330

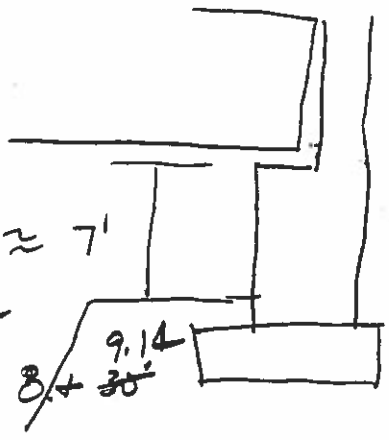
As Proposed Br.
Single Span NB 32.6 m w/Full ht. Abu
SB 32.4 m "

VE Proposal
widt (30 + 36 + 30) = 96 ÷ Sin 82° 14' 31" = 96.89
.9908
L = 96.89 + 33 + 33 = 162.89'

120 - 96.89 = 23.11' ÷ 2 = 11.55'

11.55' - 3' - 3.42 = 5.13' x ~~20~~ = 10.26'

Use 120' Single Span Bridge on Spread footings



42. 4.2
30 + 36 + 14

.81 + 4.2 + 19.8 + ~~30~~

3' + 8 + 3 - 4' = 4.27m

33.95 + 4.27 = 38.22m = 125.36

76.44

KY 330
Conc. for full height abutments
390 /m^3 cost of conc.

1.5 m × 16.6 m × 5m = 124.5 m^3

Keefer Rd
Conc. for full height abutments

1.5 × 7.6 × 5 m = 57 m^3

Mason School Rd /I-75

1.5 × 10 × 5 m = 75 m^3

Sipple Rd /I-75

1.5 × 10 × 5 = 75 m^3

VII.(A)(5) BRIDGE AT HEEKIN AND CHERRY GROVE ROADS

VII.(A)(5)(a) AS PROPOSED

"As Proposed"

The consultant's proposal is to "jack" the existing bridges at Heekin and Cherry Grove Roads. The existing substructures would be modified. The abutments may be of some concern regarding the additional .46 m to .76 m height of backwall. A special detail could be used to keep the earth load from being transferred to the abutment.

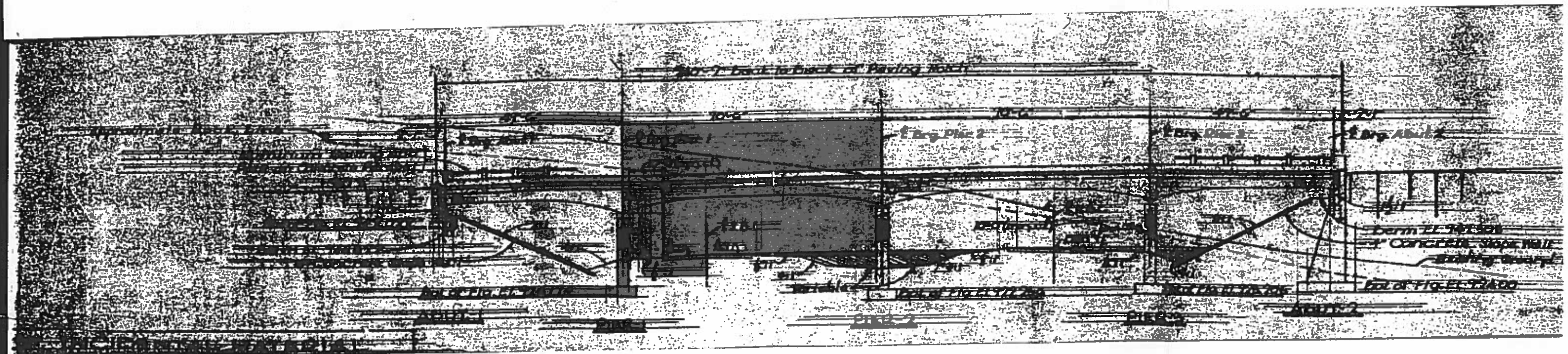
Advantages

- May be lower cost
- Quicker construction
- Less traffic interference

Disadvantages

- Less design life
- More maintenance
- Requires pier protection

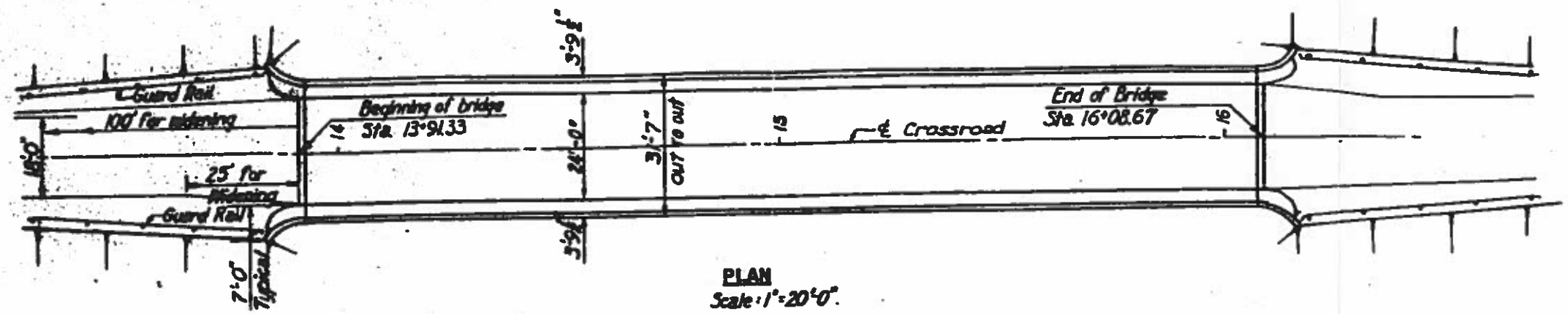
Jack approximately 0.76 m
& modify substructures



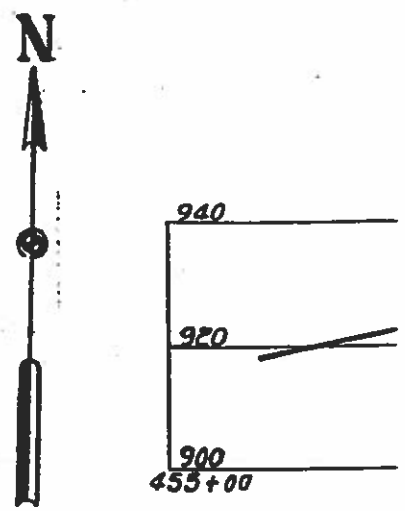
Elevation
Heekin Rd. / I-75
As-Proposed

AS PROPOSED

Jack approximately 0.46 m
& modify sub structures

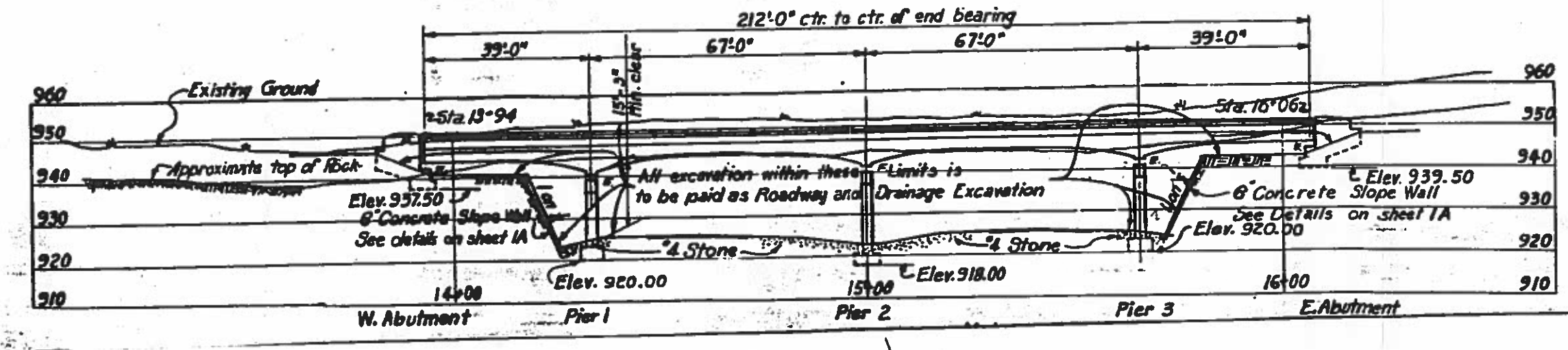


PLAN
Scale: 1"=20'-0".



To P.V.I. Sta. 12+00
Elev. 944.42

+1.05 %



Elevation
Cherry Grove Rd./I-75
As-Proposed

AS PROPOSED

VII.(A)(5)(b) VALUE ENGINEERING ALTERNATIVE

Value Engineering Alternative - Replace Bridges at Heekin and Cherry Grove Road

The VE proposal is to replace the existing bridges at Heekin Road and Cherry Grove Road. The proposed bridges will be two spans with 66" modified Type IV PPC girders with spans of approximately 38.2 m. The abutments will be on spread footings. All substructures will be skewed and parallel to I-75.

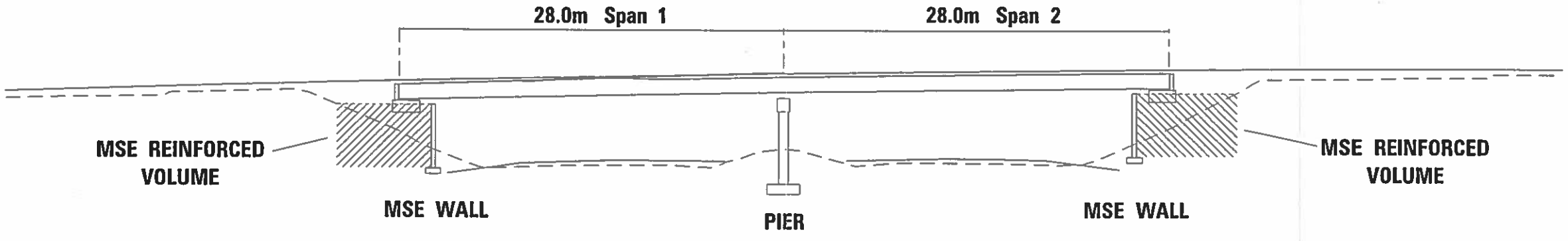
Advantages

- Longer service life
- Less maintenance
- Higher design load
- Meets clear zone

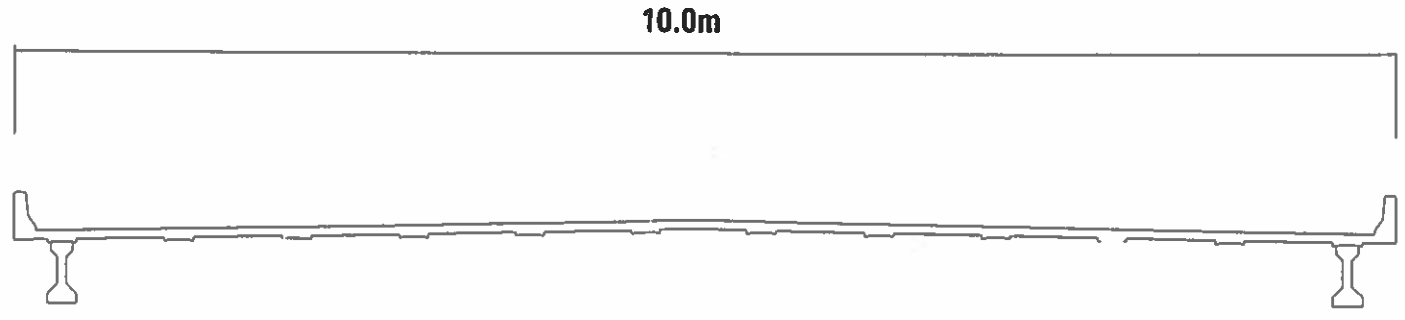
Disadvantages

- Higher cost
- Longer construction time
- Disrupts local traffic

VALUE ENGINEERING ALTERNATIVE
2 SPAN PCI BEAM BRIDGE W/MSE WALLS
KY 2937 (HEEKIN ROAD) OVER I–75

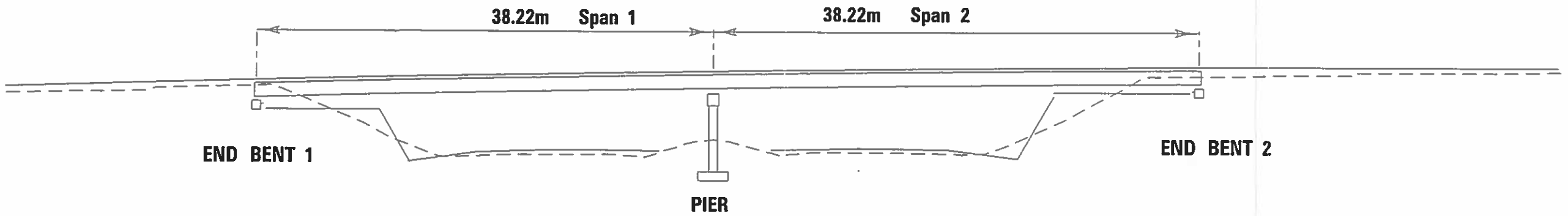


ELEVATION

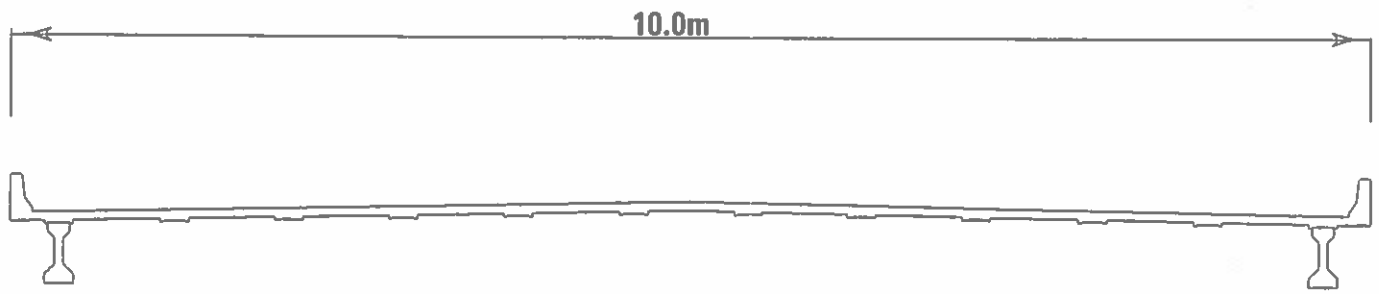


TYPICAL DECK SECTION

VALUE ENGINEERING ALTERNATIVE
2 SPAN PCI BEAM BRIDGE
CHERRY GROVE ROAD OVER I–75



ELEVATION



TYPICAL DECK SECTION

VALUE ENGINEERING ALTERNATIVE
HEEKIN ROAD W/MSE WALLS
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
HEEKIN RD. JACKING- INCLUDES EB & PIER MOD. (QUOTE FROM KTC C.O.)	$ 200,000	1	$ 200,000	0	0
2 SPAN BRIDGE REPLACE 10MX71.78M	$ 750/M^2	0	0	717.8M^2	$ 538,350
MSE WALLS	$ 220/M^2	0	0	324M^2	$ 71,280
TOTAL			$ 200,000		$ 609,630

Possible Cost Increase $409,630

VALUE ENGINEERING ALTERNATIVE
CHERRY GROVE ROAD
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
CHERRY GROVE JACKING - INCLUDES EB & PIER MOD. (QUOTE FROM KTC C.O.)	$ 200,000	1	$ 200,000	0	0
2 SPAN BRIDGE REPLACE 10MX76.44M	$ 750/M^2	0	0	764.40M^2	$ 573.300
TOTAL			$ 200,000		$ 573,300

Possible Cost Increase $373,300

Hoekin Rd Bridge Length

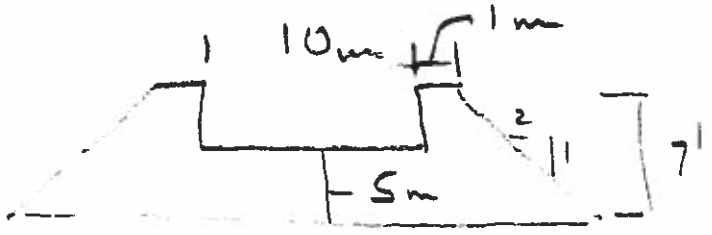
24.81 m (81.397') ℄ I-25 to outside edge travel Lane

84.29 = 84/sin 85°13'50"

87.15'
84.29'
2.86'/2 = 1.43 = .44 m

.81 + 4.2 + 19.8 + 9.14 + .44 = 34.39 + 1.5
35.89

Heekin Rd
Retaining Wall Area



$5 \times 10 = 50\ m^2$

$1 \times 7 \times 2 = 14\ m^2$

$.5 \times 7 \times 14 \times 2 = \underline{98\ m^2}$

$162\ m^2 \times 2 = 324\ m^2$

COUNTY * HOPKINS-MUHLENBERG 02
PROJECT NO. * FD08 054 9001 042-044 ETC
24 ROAD * WESTERN KENTUCKY PARKWAY
TYPE * AC OVERLAY EDGE DR & GRARDRAIL

TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS
UNIT TABULATION OF BIDDERS

DATE 04-21-95

LENGTH OF PROJECT * 03.500 MILES
TIME FOR COMPLETION * 140 WORKING DAYS.
PROJECT CODE * 950118

1	ROAD BUILDERS, INC.	$ 2,948,571.72.	4		$
2	THE KY STONE CO W/O/S BEAZER E	$ 3,132,346.42.	5		$
3	THE ROGERS GROUP	$ 3,919,434.51.	6		$

ITEM #	ITEM DESCRIPTION	QUANTITY	UNIT	$ UNIT BID	$ UNIT BID	$ UNIT BID	$ UNIT BID	$ UNIT BID	$ UNIT BID
1	REM EPOXY BIT FOREIGN OVERLAY	1784.000	SQ YD	15.0000	15.3000	15.0000	26760		
2	BLAST CLEANING	1983.000	SQ YD	4.0000	4.0800	4.0000	7932		
3	EPOXY SAND SLURRY	199.000	SQ YD	25.0000	25.5000	25.0000	4975		
4	RECONSTRUCT BRIDGE RAIL	1129.000	LIN FT	75.0000	76.5000	100.0000	84675	410,117	
5	EXPAN JOINT REPLACE - 1"	415.000	LIN FT	400.0000	408.0000	400.0000	166000		
6	ARMORED EDGE FOR CONC	235.000	LIN FT	225.0000	229.5000	225.0000	52875		
7	CONCRETE OVERLAY-LATEX	64.500	CU YD						
8	CONC OVERLAY-PORTLAND CEMENT	89.200	CU YD	750.0000	765.0000	750.0000	66900		
→ 9	JACK & SUPPORT BRIDGE SPANS	1.000	LP SUM	130000.0000	132600.0000	180000.0000			
10	ROADWAY EXCAVATION	8560.000	CU YD	7.7500	7.9100	7.7500			
11	EMBANKMENT IN PLACE	641.000	CU YD	11.0000	11.2200	11.0000			
12	DITCHING	0.500	MILE	12000.0000	12240.0000	12000.0000			
13	BACKFILLING UNDERCUT	3348.000	CU YD	23.0000	26.5200	24.0000			
14	CONCRETE-CLASS A	79.820	CU YD	500.0000	510.0000	500.0000			
15	STEEL REINFORCEMENT	858.000	LB	1.8000	1.8400	1.8000			
16	GUARDRAIL-STEEL W BEAM-S FACE	10962.500	LIN FT	8.7000	9.5400	11.7800			
17	GUARDRAIL-STEEL W BEAM-D FACE	400.000	LIN FT	13.0000	15.3000	18.8900			
18	GUARDRAIL TERMINAL SECT NO 1	4.000	EACH	30.0000	35.7000	44.0800			
19	GUARDRAIL END TREAT TYPE 1	4.000	EACH	2900.0000	3075.3000	3797.1800			
20	GUARDRAIL END TREATMENT TY 2A	9.000	EACH	320.0000	346.8000	428.2100			
21	GUARDRAIL END TREATMENT TYPE 4	5.000	EACH	450.0000	510.0000	629.7200			
22	REMOVE GUARDRAIL END TREATMENT	28.000	EACH	100.0000	153.0000	188.9100			
23	GUARDRAIL CON TO BR END TYPE A	6.000	EACH	450.0000	433.5000	535.2600			
24	GUARDRAIL CON TO BR END TYPE B	1.000	EACH	600.0000	1428.0000	1763.2000			
25	GUARDRAIL CON TO BR END TYPE C	4.000	EACH	500.0000	561.0000	692.6900			
26	GUARDRAIL CON TO BR END TY A-1	3.000	EACH	150.0000	142.8000	176.3200			
27	GR CON TO SHLD BR PIER TY A	2.000	EACH	500.0000	586.5000	724.1700			
28	GR CON TO SHLD BR PIER TY A-1	2.000	EACH	100.0000	219.3000	270.7800			
29	REMOVING GUARDRAIL	9824.500	LIN FT	0.7500	0.7600	0.9400			
30	REMOVE GUARDRAIL CON TO BR END	4.000	EACH	50.0000	76.5000	94.4600			
31	CRASH CUSHION TYPE IX	2.000	EACH	5800.0000	6120.0000	7556.5800			
32	CRASH CUSHION TYPE IX-A	2.000	EACH	5300.0000	5559.0000	6863.8900			
33	FLASHING ARROW	2.000	EACH	6000.0000	4400.0000	9571.6700			

ADDITIONAL NOTES FOR JACKING AND SUPPORTING BRIDGE SPANS

Muhlenberg County
Henry Oats Road
KY 2692 over Western KY Parkway

The lump sum bid for "Jacking and Supporting Bridge Spans" shall include all cost associated with performing the following tasks:

A. Supplying the jacking and supporting equipment and personnel necessary to jack this bridge.

B. Remove concrete at the abutments and placing new class AA concrete as detailed for the pedestals, backwall, sheer key and wings.

C. Supplying the styrofoam block for the abutment wings as detailed.

D. Placing class AA concrete at the piers as detailed for the pedestals.

E. Supplying all Grade 60 steel reinforcement and any drilling and grouting necessary as detailed.

F. Supplying and installing shoe assemblies to support the bridge while concrete work is being done.

G. Cleaning and painting the existing bearing devices.

H. Designing and submitting for approval a detailed jacking and supporting plan. This plan shall provide for a jacking scheme that will limit the load in the jacks to the load range specified. The contractor shall include a plan for supporting each beam for every 1/4" interval of lift. The contractor shall also consider the placement of the shoe assemblies immediately after the total 15" lift is complete and before any jacking and supporting equipment is removed.

I. Any other incidental cost to raise and alter the bridge as detailed.

BEVELED EDGES

All exposed edges shall be beveled 7/8" unless otherwise shown.

DIMENSIONS

Dimensions are for a normal temperature of 60 degrees fahrenheit. Layout dimensions are horizontal measurements.

SAWCUTTING EXISTING CONCRETE

Prior to removal of the existing concrete masonry, cut the surface with a concrete saw to a depth of one inch to facilitate a neat line. The cost of cutting concrete shall be included in the lump sum bid for Jacking and Supporting Bridge Spans.

EXISTING REINFORCING STEEL

The cost of cutting, bending and cleaning existing reinforcing steel is to be incidental to the lump sum bid for Jacking and Supporting Bridge Spans.

BONDING CONCRETE TO PREVIOUSLY POURED CONCRETE

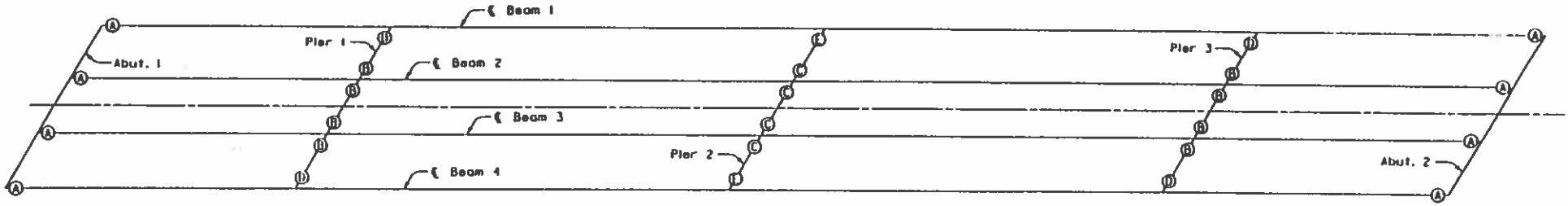
Concrete shall be bonded to previously poured concrete where shown on the plans with a two-component epoxy resin system comforming to Section 833 of the specifications. The cost of this work, including all labor, tools and materials is to be incidental to the lump sum bid for Jacking and Supporting Bridge Spans.

DAMAGE TO THE STRUCTURE

The contractor is responsible for any and all damage to the structure during reconstruction, even to the replacement of the entire structure and removal of the fallen structure at his expense, should it be allowed to fall due to his actions.

REMOVAL OF EXISTING REINFORCED CONCRETE

This work includes removing the reinforced concrete as shown on the plans and disposing of this material off the right-of-way. The cost of this work shall be included in the lump sum bid for Jacking and Supporting Bridge Spans.

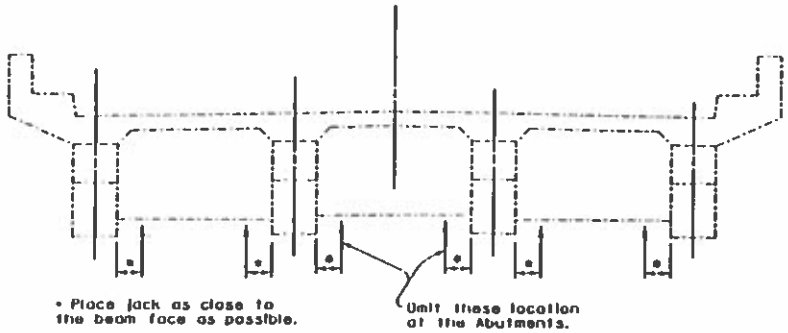


JACKING PLAN

DL Load Range

A	18.9k →	23.4k
B	39.3k →	47.6k
C	41.8k →	50.9k
D	86.3k →	107.5k
E	92.7k →	115.7k

NOTE: The contractor may jack along the ℄ of the beams adjacent the existing bearing if the engineer feels that ample clearance will be maintained around the jack and the free edge of the concrete beam and cap. this cannot be done at pier 2.



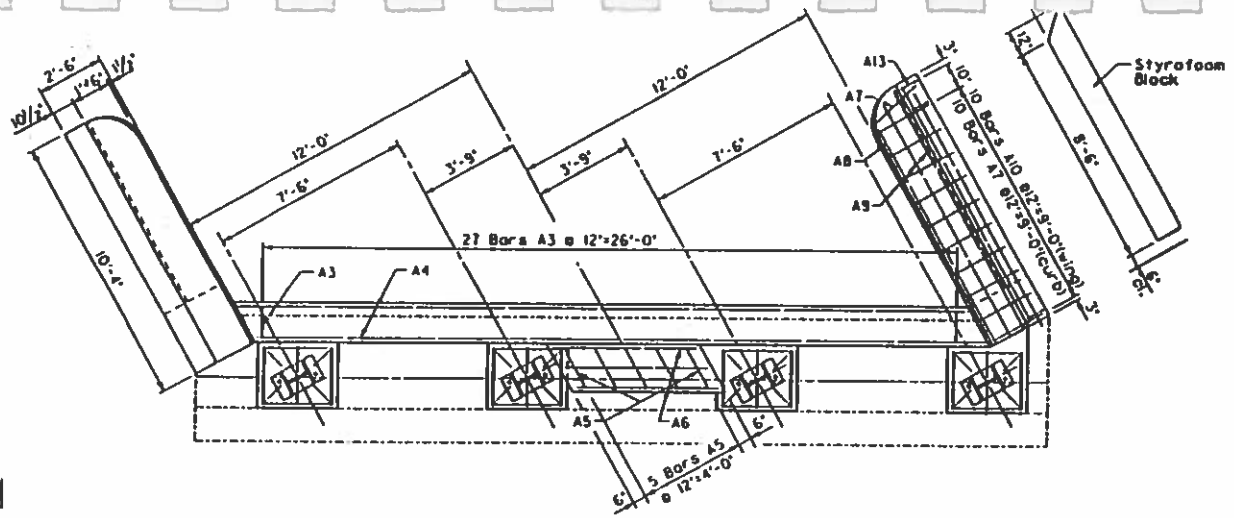
TYPICAL SECTION
Showing Jacking Location

Sheet 1

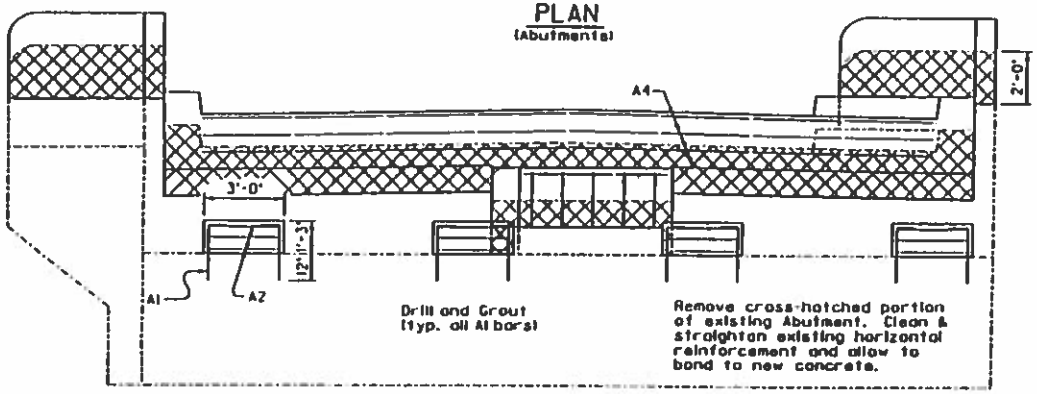
Henry Oates Road over Western Ky. Parkway

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT
COUNTY OF
MUHLENBERG
WESTERN KENTUCKY PARKWAY
ROAD
STATION

CONSTRUCTION PROJECT NO.	MAINTENANCE PROJECT NO.	DRAWING NO.
02-WAR-1995	B1	23709

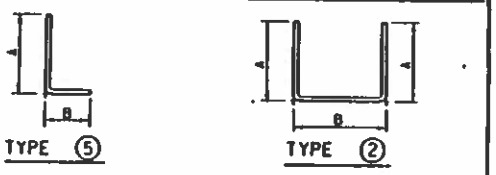


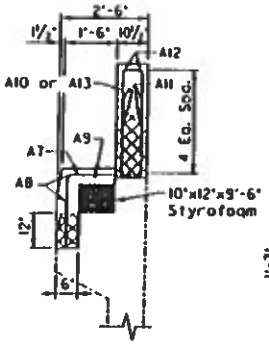
PLAN
(Abutments)



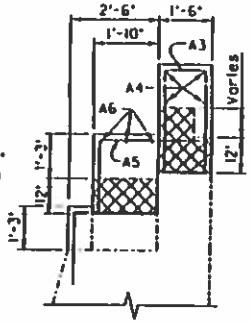
ELEVATION
(Showing Pedestal and Wing Treatment @ Abutments)

A1@	5	64	4	3	0	Pedestal	2	1½	1	0
A2@	2	48	4	6	10	Pedestal	2	2½	2	8
A3@	2	54	4	6	10	Backwall	2	11½	1	2
A4@	Str	16	4	27	0	Backwall				
A5@	5	10	4	5	0	Key	3	0½	2	1
A6@	Str	6	4	5	4	Key				
A7@	5	44	4	4	2	Curb	2	2½	2	1
A8@	Str	8	4	9	0	Curb				
A9@	Str	4	4	9	10	Curb				
A10@	2	40	4	6	7	Wing	3	0½	0	7½
A11@	Str	16	4	10	0	Wing				
A12@	Str	4	4	8	3	Wing				
A13@	2	4	4	5	1	Wing	1	3½	0	7½

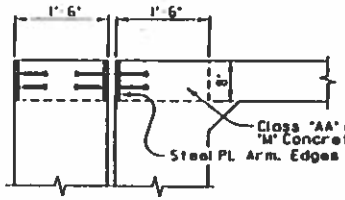




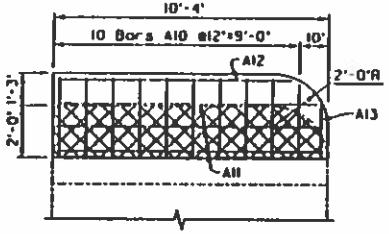
WING SECTION



CAP SECTION



ARMORED EDGE AND NEOPRENE JOINT DETAIL



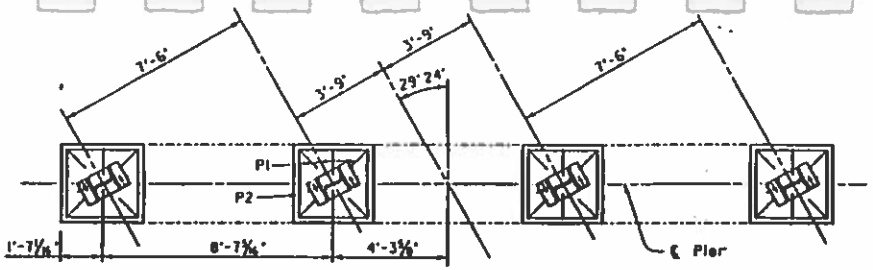
WING

Sheet 2

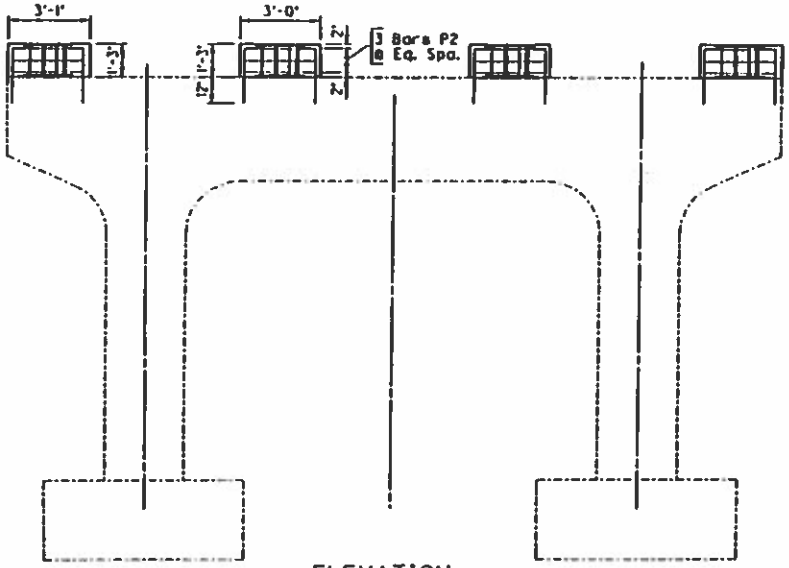
Henry Oates Road over Western Ky. Parkway

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT
COUNTY OF
MUHLENBERG
WESTERN KENTUCKY PARKWAY
ROAD
STATION

CONSTRUCTION PROJECT NO.	MAINTENANCE PROJECT NO.	DRAWING NO.
02-MAR-1995	PCI	23789



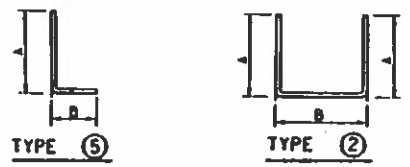
PLAN OF CAP

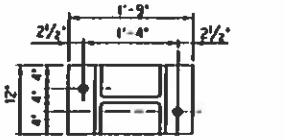


ELEVATION

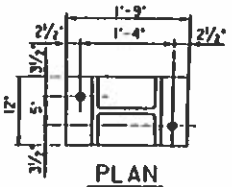
Showing Typical Pedestal Treatment @ Piers

MARK	TYPE	NO.	SIZE FT.	SIZE IN.	LOCATION	FT.	IN.	FT.	IN.
P1a	5	96	4	3	0	Pedestal	2	1⅝	1	0
P2a	2	72	4	7	4	Pedestal	2	5⅛	2	8

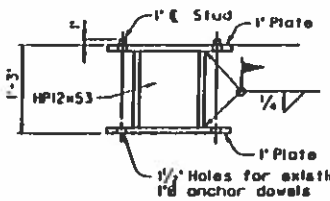




PLAN



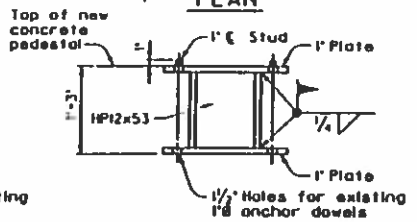
PLAN



ELEVATION

@ Pier 2

FIXED SHOE ASSEMBLY

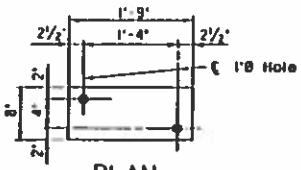


ELEVATION

@ Abutments & Piers 1 & 3

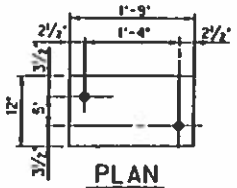
EXPANSION SHOE ASSEMBLY

NOTE: These Shoe Assemblies are to be placed between the existing bearing lower plate and the bearing device. Notice that the 1"ø stud match the existing lower plate.



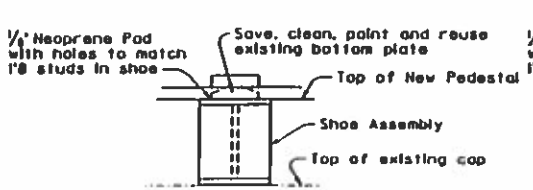
PLAN

⅛" Neoprene Pad
for Fixed Shoes (4)

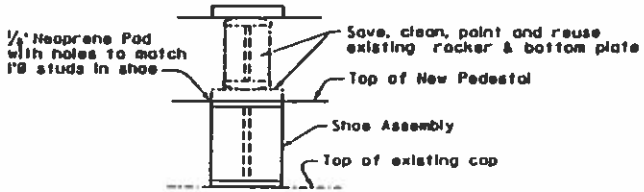


PLAN

⅛" Neoprene Pad
for Expansion Shoes (16)



FIXED SHOE



EXPANSION SHOE

Sheet 3

Henry Oates Road over Western Ky. Parkway

COMMONWEALTH OF KENTUCKY
DEPARTMENT OF HIGHWAYS
FRANKFORT
COUNTY OF
MUHLENBERG
WESTERN KENTUCKY PARKWAY
ROAD
STATION

CONSTRUCTION PROJECT NO.	MAINTENANCE PROJECT NO.	DRAWING NO.
02-MAR-1995	NJ1	23789

66

VII.(A)(6) WAGON BOXES AT POKEBERRY ROAD

VII.(A)(6)(a) AS PROPOSED

"As Proposed"

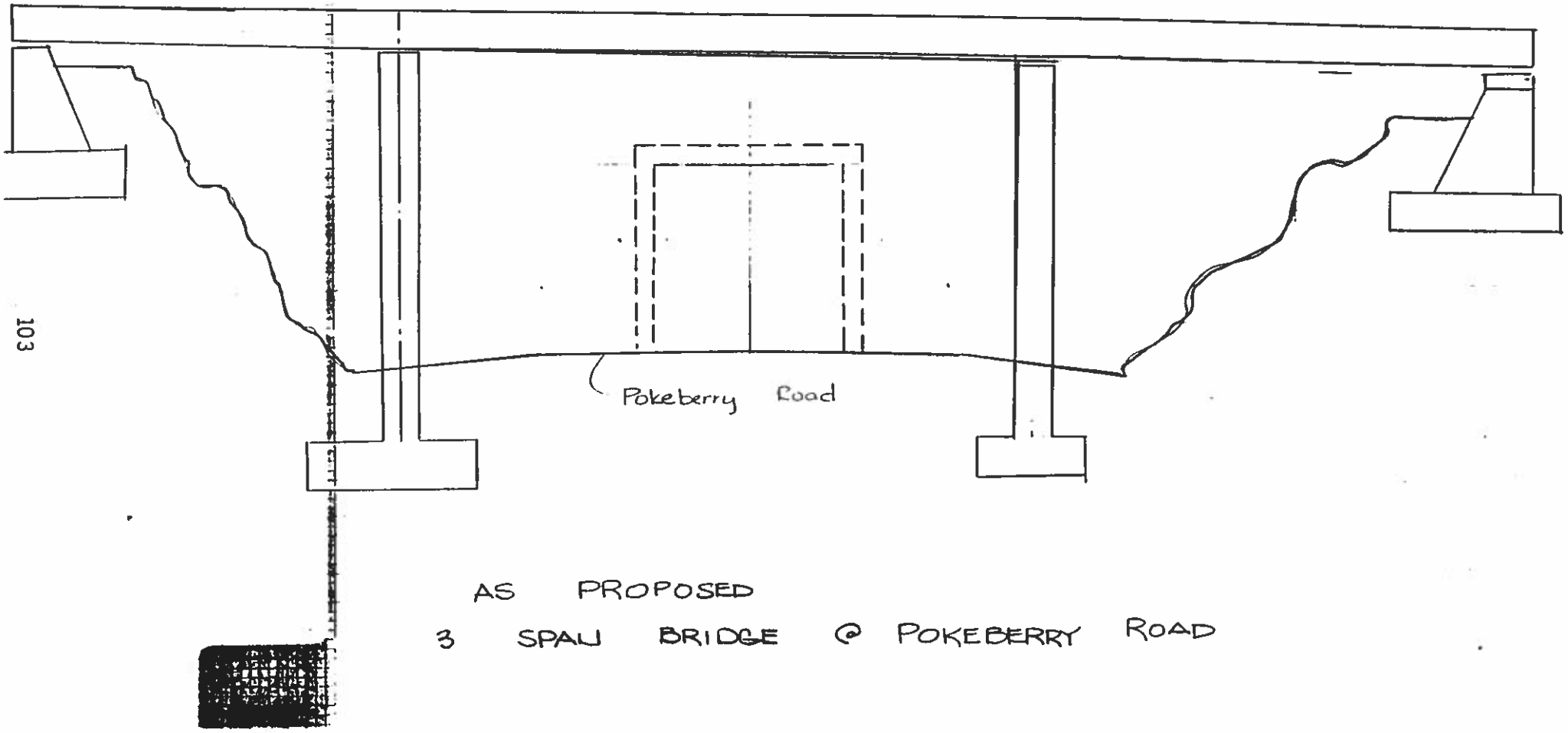
Replace 14' x 14' Wagon Boxes at Pokeberry Road with two 3-span bridges.

Advantages

- None noted

Disadvantages

- More substructures
- Higher maintenance cost
- Higher cost



AS PROPOSED

3 SPAN BRIDGE @ POKEBERRY ROAD

AS PROPOSED

VII.(A)(6)(b) VALUE ENGINEERING ALTERNATIVE

Value Engineering Alternative - Use a 1-span bridge at Pokeberry Road

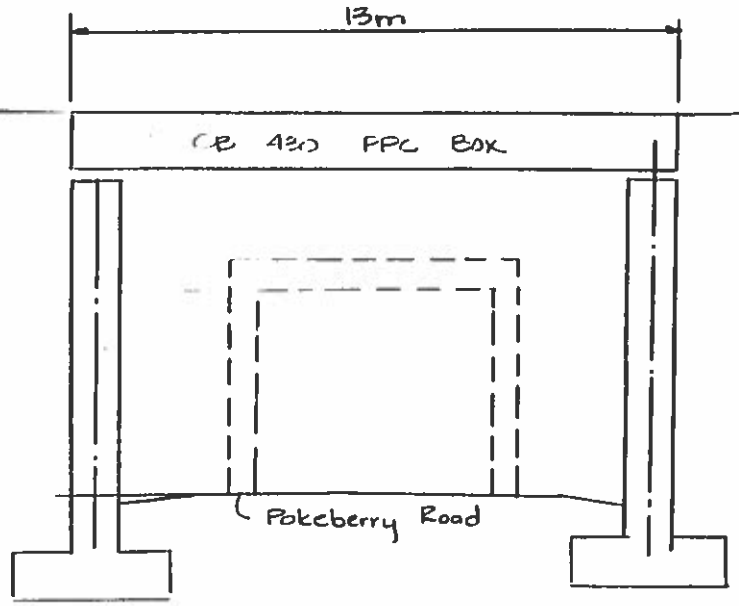
Replace 14' x 14' Wagon Boxes at Pokeberry Road with single span 13 m x 19 m CB 430 prestressed precast box beam bridge. For the purpose of this study assume a 13 m long x 19 m long bridge will be sufficient.

Advantages

- Lower cost
- Less maintenance
- Fewer substructure

Disadvantages

- None noted



VALUE ENGINEERING PROPOSAL BRIDGE

$13^m \times 19^m$ PPC BOX BRIDGE

VALUE ENGINEERING ALTERNATIVE

VALUE ENGINEERING ALTERNATIVE
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
3 SPAN BRIDGE NB	$ 605,475	1	$ 605,475	0	0
3 SPAN BRIDGE SB	$ 769,121	1	$ 769,121	0	0
CB 430 BOX BRIDGE 13MX19M	$ 265,500	0	0	2	$ 531,000
TOTAL			$ 1,374,596		$ 531.000

Possible Savings $843,960

VII.(B) MAINTENANCE OF TRAFFIC

VII.(B)(1) PHASED CONSTRUCTION TO ELIMINATE TRAFFIC

VII.(B)(1)(a) AS PROPOSED

"As Proposed"

Construction would occur while maintaining traffic adjacent to the construction area, northbound and southbound, for the duration of the construction project.

Rehabilitation/reconstruction of Ky 608 (Stonewall Road), Ky 330, Sipple Road, Heekin Pike and Cherry Grove Cross Road, will be accomplished while maintaining traffic on-site.

Reconstruction of Ragtown Road, Keefer Road and Mason School Road will require closures and detours locally. The last two will not be closed concurrently since one is the detour for the other.

Advantages

- None noted

Disadvantages

- More costly
- Reduction in travel width
- Increased construction time

VII.(B)(1)(b) VALUE ENGINEERING ALTERNATIVE

Value Engineering Alternative - Phased Construction to Eliminate Traffic From Work Area

PHASE I

Shift southbound traffic outward, place TCBW on median edge of existing roadway, and construct SB improvements in the median.

Construct both new bridges at Sipple road on the new alignment and remove existing SB bridge.

Reconstruct the SB bridge at Keefer Road. Construct cross-overs south of Eagle Creek and north of Cherry Grove Cross Road in common median area.

Protect remaining SB bridge piers and bents and modify alignment to fit 4 lanes with TCBW through remaining bridges.

Shift NB traffic onto new SB construction and provide temporary ramp crossovers to serve KY 330 NB off/on.

PHASE II

Rehabilitate or reconstruct all northbound improvements. Local traffic handling during bridge work will be the same as the proposed project, however, no I-75 traffic will be on the northbound side under bridges.

Place TCBW on new northbound section to create roadways for NB and SB in Phase III.

PHASE III

Remove NB ramp cross-overs at Ky 330. Shift all I-75 traffic onto NB new roadways.

Construct temporary SB ramp cross-overs for Ky 330.

Rehabilitate and/or construct all remaining improvements to SB I-75 roadways and bridges and remove SB TCBW.

Return SB traffic to southbound roadway.

Remove all remaining TCBW (NB) and place final overlays and stripe as necessary.

Advantages

- Less travel delay
- Ease of Construction
- Faster Construction

Disadvantages

- Cross-over cost
- Ramps

VALUE ENGINEERING PROPOSAL

PROJECT	OWNER	NUMBER
I-75 - GRANT - SCOTT CO. Item # 6-72.11 & 6-72.20	KYTC	MOT / ROADWAY #1
		DATE MAY 18-22
STUDY ITEM Phased Construction	FUNCTION MAINTAIN TRAFFIC	

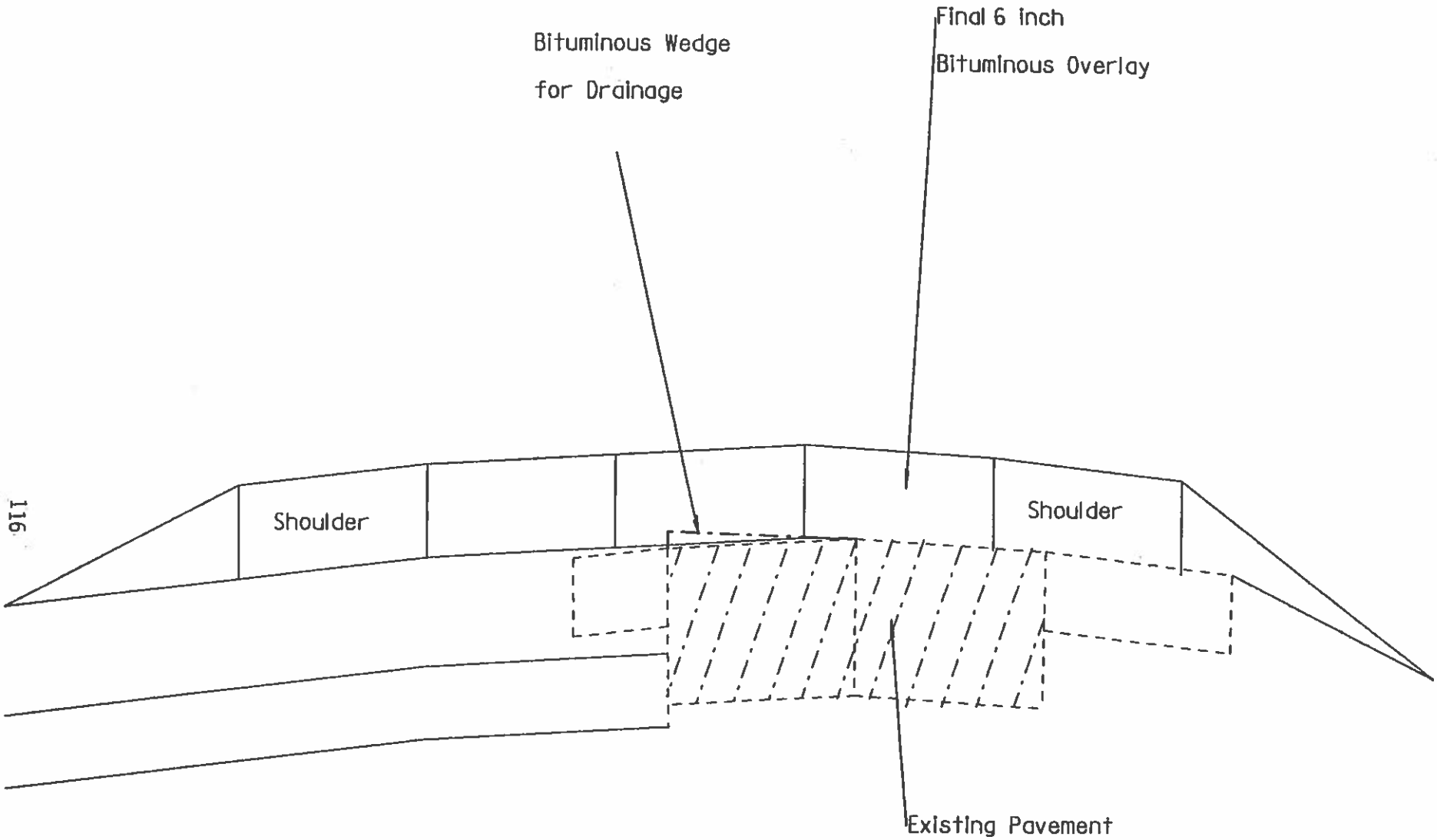
SKETCH OF VALUE ENGINEERING RECOMMENDATION

Phase 1

Phase 2

Phase 3

DEVELOPED BY: R.G. Churchill & Associates


Bituminous Wedge
for Drainage
Final 6 inch
Bituminous Overlay
Shoulder
Shoulder
Existing Pavement

PROJECT COST

DESCRIPTION	AMERICAN	LOCHNER	TOTAL	%	V.E.
BRIDGES AND CULVERTS	5.93	2.88	8.81	80%	7.05
ROADWAY EXCAVATION	3.52	7.97	11.49	90%	10.34
ROADWAY SECTION INC. SURFACING	14.66	13.48	28.14	90%	25.33
INCIDENTALS	6.25	6.43	12.68	95%	12.05
TOTALS	30.37	30.76	61.13	90%	54.77

* All costs in $ million

PHASE 1	INITIAL SB CONST.	=	30% OF PROJECT
PHASE 2	ENTIRE NB CONST.	=	50% OF PROJECT
PHASE 3	FINAL SB CONST. & STRIPE	=	20% OF PROJECT

VALUE ENGINEERING ALTERNATIVE
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
REHAB/RECONSTRUCT BRIDGES AND CULVERTS	$ 8,810,000	1	$ 8,810,000	1	$ 7,050,000
ROADWAY EXCAVATION	$11,490,000	1	$11,490,000	1	$ 10,340,000
STRUCTURAL SECTION INC. SURFACING	$28,140,000	1	$28,140,000	1	$ 25,330,000
INCIDENTALS	$12,680,000	1	$12.680,000	1	$ 12,050,000
TOTAL			$61,130,000		$ 54,770,000

Possible Savings $6,360,000

VII.(B)(2) USE KTC FURNISHED TCBW

VII.(B)(2)(a) AS PROPOSED

"As Proposed"

The as proposed design consists of using new temporary concrete median barrier walls (TCBW) along the length of the project. The TCBW will be contractor furnished.

Advantages

. None noted

Disadvantages

. High cost
. Does not use material in on hand

VII.(B)(2)(b) VALUE ENGINEERING ALTERNATIVE

Value Engineering Alternative - Use KTC Furnished TCBW

Use the temporary barrier walls which the KTC has stockpiled at various locations. The contractor will pick up the units at locations designated in the contract.

Advantages

- Reduces cost
- Utilizes stockpiled material

Disadvantages

- None noted

VALUE ENGINEERING ALTERNATIVE
COST COMPARISON

DESCRIPTION	UNIT COST	PROP'D QTY.	PROP'D COST	V.E. QTY.	V.E. COST
TEMPORARY CONC. MEDIAN BARRIER WALL (CONTRACTOR FURNISH)	$ 95.10/M	52,800M	$ 5,021,280	0	0
TEMPORARY CONC. MEDIAN BARRIER INSTALL. (STATE OWNED)	$ 40.21/M	0	0	52,800M	$ 396,000
TEMPORARY CONC. MEDIAN BARRIER WALL RELOCATION	$ 15.00/M	0	0	26,400M	$ 396,000
TOTAL			$ 5,021,088		$ 2,519,088

Possible Savings $2,502,000

VII.(C) DESIGN COMMENTS

DESIGN COMMENT

NUMBER 1

The Value Engineering team recommends that consideration be given to replacing KY 330 structures over I-75 northbound and southbound with 4-lane structures rather than 3-lane structures. Although projected traffic does not justify this recommendation, the team believes that traffic projections do not necessarily represent local on/off trips between I-75 and local service facilities or future development in the interchange area. Four lanes would provide a through lane in the event left turning vehicles back up into the other through lane.

NUMBER 2

The Value Engineering team examined the possibility of diversion of traffic behind median piers. A schematic presentation assumes the initial removal of the median end span of an overpass over I-75 and the permanent pavement available for diverting traffic behind median pier in order to facilitate the removal of the remainder of said structure for .939 m shift, 1.5 m shift, and 3.6 m shift. In some cases additional temporary pavement will be required. The .939 meter shift will require construction of median barrier as a later phase.

NUMBER 3

The Value Engineering team was concerned about the 3.6 m shift of the grade point on the proposed typical. The problem with that large a shift is that the existing pavement would not be completely utilized. This would increase the pavement and surfacing cost since more full depth pavement would be required.

After doing research, it is evident that the designer has previously considered this point. At the PLG, two alternates were presented: A 1 m shift (This is essentially the Value Engineering suggestion) and a 3.6 m shift. The project team evaluated the pros/cons and price estimates of both alternates. The 3.6 shift alternate was chosen by the project team and the most desirable alternate because of the reduced earthwork. The 3.6 m shift allows all earthwork to be done interior to I-75. The extra pavement expense of this alternate (as compared to the 1 m shift) is offset by the lower excavation cost and lower MOT difficulty.

The Value Engineering team accepts the recommendation of the project team, but would like to make a design comment. If the Value Engineering MOT proposal is utilized, it may be beneficial to revisit a 1 m shift alternate. With the traffic removed from the Interstate, the justification for using the 3.6 m shift is reduced. The 1 m shift may present the better value if the MOT is not an issue.

VIII. SUMMARY OF RECOMMENDATIONS

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 further development.

BRIDGES

Recommendation Number 1-Bridge at Eagle Creek Road

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative proposes a 3-span new bridge at Eagle Creek in lieu of a 4-span structure.

If this recommendation can be implemented, there is a possible savings of $393,880.

Recommendation Number 2-Bridges at Stonewall Road

The Value Engineering Team recommends that Value Engineering Alternative No. 2, be implemented. This alternative proposes a 1-span, 37 m structure at Stonewall Road in lieu of a 3-span, 56 m concrete structure.

If this recommendation can be implemented, there is a possible savings of $170,172.

(Alternative No. 2 for Stonewall Road is recommended over Alternative No. 1 for Stonewall Road, which would add cost to the project)

Recommendation Number 3-Wagon Boxes at N. Rays Fork Road

The Value Engineering Team recommends that Value Engineering Alternative No. 2 be implemented. This alternative proposes to use a prestressed precast box beam bridge at North Rays Fork Road in lieu of replacing the Wagon Boxes with two 3-span bridges.

If this recommendation can be implemented, there is a possible savings of $1,033,224.

(Alternative No. 2 for N. Rays Fork Road is recommended over Alternative No. 1 for N. Rays Fork Road, which may have customer satisfaction and public perception problems)

Recommendation Number 4-Bridges at KY 330, Keifer, Masons School and Sipple Roads

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative proposes to use 1-span bridges and partial height abutments on spread footings at KY 330, Keifer, Mason School, and Sipple Roads, in lieu of 1-span bridges with full height abutments.

If this recommendation can be implemented, there is a possible savings of $275,491.

Recommendation Number 5-Bridge at Heekin and Cherry Roads

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative proposes to replace bridges at Heekin and Cherry Grove Road in lieu of "Jacking" the bridges to a new profile grade.

If this recommendation can be implemented, there is a possible cost addition of $409,000, but in the opinion of the Value Engineering team adds value to the project.

Recommendation Number 6-Bridges at Pokeberry Road

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative proposes to replace the Wagon Boxes at Pokeberry Road with two 1-span prestressed precast box beam bridges in lieu of two 3-span bridges.

If this recommendation can be implemented, there is a possible savings of $843,960.

MAINTENANCE OF TRAFFIC

Recommendation Number 7-Phased Construction

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative proposes to phase construction to eliminate maintaining traffic adjacent to work areas.
If this recommendation can be implemented, there is a possible savings of $6,360,000.

Recommendation Number 8-KTC Furnished TCBW

The Value Engineering Team recommends that the Value Engineering Alternative be implemented. This alternative utilizes state owned temporary barrier wall units in lieu of contractor' furnished units.

If this recommendation can be implemented, there is a possible savings of $2,502,000.

I-75 WIDENING; SCOTT-GRANT COUNTIES
V.E. STUDY PRESENTATION
MAY 22, 1998

NAME	AFFILIATION	PHONE
Joe Waits, P.E., CVS	Ventry Engineering	850-627-3900
Bob Churchill	Ventry Engineering	850-627-3900
Glen Hardin	American Consulting Eng.	606-233-2100
Martin Van Meter	American Consulting Eng.	626-233-2100
Ananias Calvin III	Div. of Highway Dsn	502-564-3280
Gary Sharp	Div. of Highway Dsn	502-564-3280
Paul Sanders	KTC- Construction D-4	502-766-5033
Jeff Jasper	KTC-CO Design	502-564-3280
Ron Klusza	Ventry Engineering	805-259-4349
Stuart Goodpaster	Bridge Design- CO	502-564-4560
Michael Carpenter	Div. of Hwy. Des.	502-564-3280
Don Keenan	Ventry Engineering	850-627
Chuck Craycraft	H. W. Lochner	606-278-0528
Daryll Greer	KTC- Hwy Design	502-564-3280
Janet R. Coffey	KTC- Operations	502-564-4556
Joette Fields	KTC- Hyw Design	502-564-3280
Robert Semones	KTC- Hyw Design	502-564-3280
Sianak Shafaghi	Div. of Hwy. Des.	502-564-3280
George Hoffman	Dist. 6 Pre constr.	606-341-2700
Tina Keeler	Audits	502-564-4555
Rita Jones	Audits	502-564-4555
Randy Turner	KTC- District 7 Design	606-246-2355
Greg Sharp	American Conslt. Engrs.	606-233-2100
Richard Thomas	Highway Design	502-564-4280
Steve Halloran	KTC- Construction	502-564-4780

Daryl Greer, Value Engineering Coordinator, welcomed participants to the Value Engineering Presentation and introduced Joe Waits, Team Leader, Ventry Engineering. Joe introduced the team and gave an overview of the team's activities during the week. The team presented ten proposals and two design comments to the group.

BRIDGES:

Eagle Creek	
Alt. - 3-Span Bridge at Eagle Creek,	D. Keenan
Stonewall Road	
Alt. #1- 1-span at Stonewall,	S. Goodpaster
Alt. #2- 1-span at Stonewall,	S. Goodpaster
Wagon Boxes at N. Rays Fork Rd.	
Alt. #1- Close N Rays Fork Rd.,	J. Jasper
Alt. #2- 1- Span at Rays Fork,	S. Goodpaster
Bridges at KY 330/Keifer/Masons School/Sipple	
Alt. - Replace Bridges, Heekin/Cherry,	D. Keenan
Bridges a Heeken/Cherry Roads	
Alt. - 1-span Bridge at Pokeberry,	D. Keenan
Wagon Boxes at Pokeberry Road	
Alt. - 1-span at N. Rays Fork,	S. Goodpaster
MAINT. OF TRAFFIC:	
Alt. - Phased Construction,	R. Klusza
Alt. - State Furnished TCBW	P. Sanders
DESIGN COMMENTS	B. Churchill

General questions and answers followed each proposal to clarify the team's ideas. There was some concern expressed that the "MSE" type construction might not be appropriate in flood prone areas due to erosion. The questionable areas would have to be investigated. The possibility of multiple projects was discussed if the team's phased construction proposal was accepted. The team believes there is a possibility of several separate packages, which the design team would have to investigate for feasibility.

At the conclusion, Daryl Greer thanked all participants, and Joe Waits expressed appreciation to the design team and Daryl Greer and his staff for the strong support throughout the workshop.

The meeting ended at 12:30 pm.