

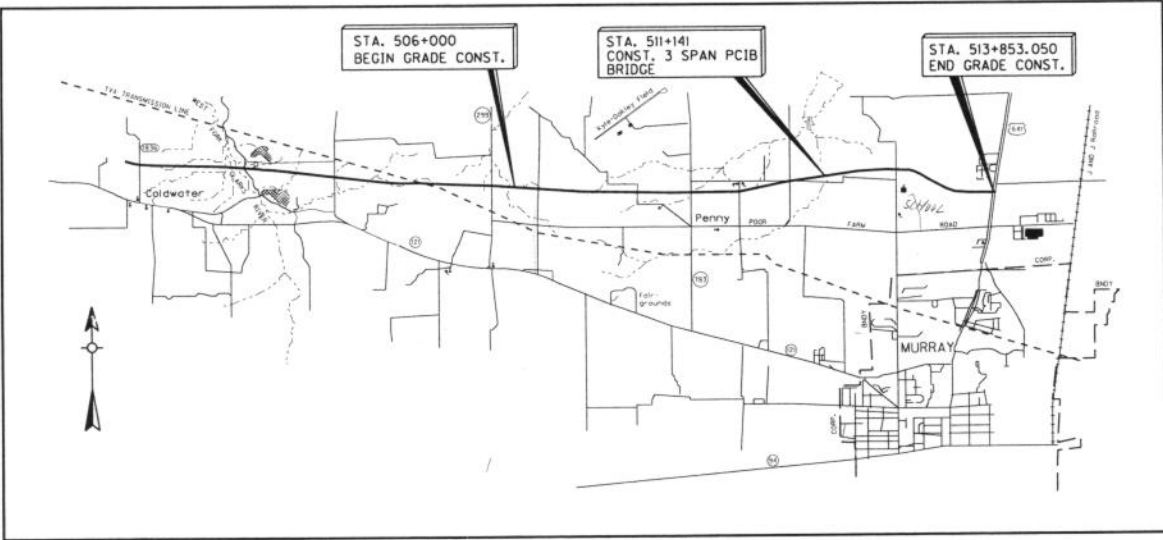
COMMONWEALTH OF KENTUCKY  
DEPARTMENT OF HIGHWAYS

PLANS OF  
PROPOSED PROJECT  
**CALLOWAY COUNTY**

GRADE - DRAIN AND INCIDENTAL SURFACING PLANS

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	LAYOUT SHEET
2	TYPICAL SECTIONS-SUMMARY OF QUANTITIES
3	PLAN AND PROFILE SHEETS
	UTILITY PLAN SHEETS
	RIGHT OF WAY SUMMARY SHEETS
	RIGHT OF WAY STRIP MAP SHEETS
	DETAIL SHEETS
	REFERENCE SHEETS
	SOIL PROFILE SHEETS
	PIPE DRAINAGE SHEETS
	CROSS SECTION SHEETS
SHEETS NOT INCLUDED IN TOTAL SHEETS	
TOTAL BRIDGE SHEETS	

STANDARD DRAWINGS	
NUMBER	DESCRIPTION
RDB-002-06	RDX-210-01
RBB-003-01	RDX-220-02
RBC-001-06	RFW-001-03
RBE-205-01	RFW-005-03
RBH-001-07	RC5-001-05
RBH-002-05	RC5-002-03
RBH-003-04	RCX-001-03
RBH-004	RCX-005-03
RBH-006-05	RCX-100-03
RBH-001-10	RCX-105-04
RBH-005-09	RPM-100-07
RBR-010-04	RPM-110-03
RBR-015-03	RPM-140-02
RBR-016-03	TSC-200-06
RBC-020	TSC-265
RBR-025-02	TSC-201-08
RBR-030-02	TSC-202-07
RBR-031-05	TSC-250-04
RBR-036	TSC-260-10
RBR-005-07	TSC-261-07
RDB-165	TSC-300-06
RDB-160	TSC-301
RDB-280-03	TSC-302
RDB-281-03	RDH-020-02
RDB-282-02	RDH-110-01
RDB-283-02	RDH-120-01
RDB-400-03	RDH-210-02
RDB-410-04	RDH-212-01
RDB-420-03	RDH-214-02
RDB-001-04	RDH-216-01
RDB-040-03	RDH-310-03
RDI-001-05	RDH-320-03
RDI-002	RDH-130-03
RDI-003	RDH-340-04
RDI-004	RDH-342-03
RDI-016	
RDI-021-06	
RDI-025-02	
RDI-045	
RDI-100-02	
RDI-120-02	
RDP-00-04	
RDP-005-03	
RDP-006-02	
RDP-010-06	
RDX-060-02	
RDX-150-03	
RDX-200-01	



THIS PROJECT IS A PARTIALLY CONTROLLED ACCESS HIGHWAY. ACCESS SHALL BE PROVIDED ONLY WHERE SPECIFICALLY INDICATED ON PLANS.

METRIC

DESIGN CRITERIA	
CLASS OF HIGHWAY	ARTERIAL
TYPE OF TERRAIN	ROLLING
DESIGN SPEED	
REQUIRED NPSD	160m Min 210m Des
REQUIRED PSD	N/A
LEVEL OF SERVICE	
ADT PRESENT ( 1993 )	1900
ADT FUTURE ( 2015 )	3000
D V	
T V	32:1
GEOGRAPHIC COORDINATES	
LATITUDE	88 DEGREES 21 MINUTES NORTH
LONGITUDE	36 DEGREES 39 MINUTES WEST
DESIGNED	
% RESTRICTED SD	
LEVEL OF SERVICE	
MAX. DISTANCE W/O PASSING	



LAYOUT MAP

GROSS LENGTH		NET LENGTH		GROSS LENGTH		NET LENGTH	
BRIDGES	NOT INCLUDED	BRIDGES	NOT INCLUDED	BRIDGES	NOT INCLUDED	BRIDGES	NOT INCLUDED
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

KENTUCKY DEPARTMENT OF HIGHWAYS	
CALLOWAY COUNTY	
PROJECT: FD 04 018 8515 01SD	
NUMBER: _____	
LETTING DATE: _____	
DESIGNED BY: _____	T.E.B.M. FOR PRE-CONSTRUCTION
_____	_____
_____	_____
_____	_____
PLAN CHECKED: _____	DIRECTOR OF TRAFFIC
_____	_____
PLAN APPROVED: _____	CHEF ENGINEER
_____	_____
PLAN APPROVED: _____	DIRECTOR OF DESIGN
_____	_____
_____	STATE HIGHWAY ENGINEER
APPROVED: _____	
F.H.W.A. DIVISION ADMINISTRATOR	

## Value Engineering – Study Identification

Project: FD04 018 8515 015 D IV Team: #4  
 Location: Calloway Co. Date: April

### VE TEAM MEMBERS

Name	Title	Organization	Telephone
Jason Coe		Operations	
Mike Calebs		Construction	
Darrin Eldridge		Design	
Brent Weddington		Design	
Steve Farmer		Operations	
Hope Roark		Construction	
Chuck Berger		Design	

### PROJECT DESCRIPTION

Length: <u>7.853 km</u>	Cost: <u>\$14,700,000</u>	Type of Funds: <u>NH</u>
Design Speed: <u>100 km/hr</u>	Projected Traffic: <u>ADT 3600</u>	
Projected Award Date:		
Major Project Elements: Bridge Embankment		

### ROUTE CONDITION / GEOMETRY

Adjacent Segments:	Overall Route:

## Investigation Phase - Sources

Date: April 26, 1999 thru April 30, 1999 Team: #4

### AUTHORIZING PERSONS

Name	Position	Telephone
Robert Semones	C.O. V.E.	
Joette Fields	C.O. V.E.	

### PERSONAL CONTACTS

Contacts	Telephone	Notes
Ray Adams Ken Larry Blevins Dexter Newman Ted Calvert		

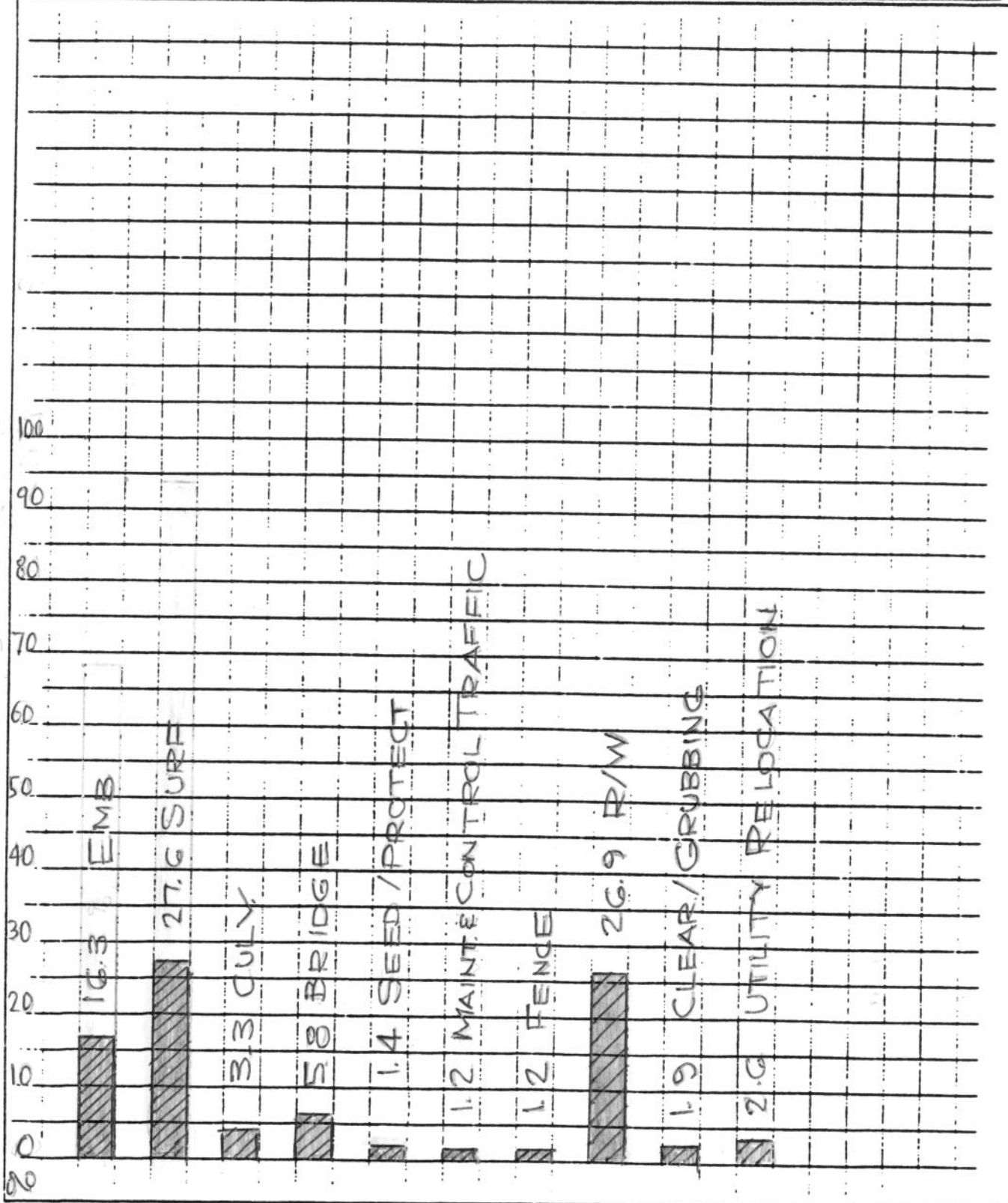
### DOCUMENTS / ABSTRACTS

References	Notes
Plan, X-Sections	
Design Manual	Checked ADT
Standard Drawings	

# Investigation Phase - Cost Model

Date: 4-27-99

Team: 4



**Investigation Phase - Function Analysis**

Project: FD04 018 8515 015D Team No. #4  
 Overall Project Function: Build Road Date: April 27, 1999

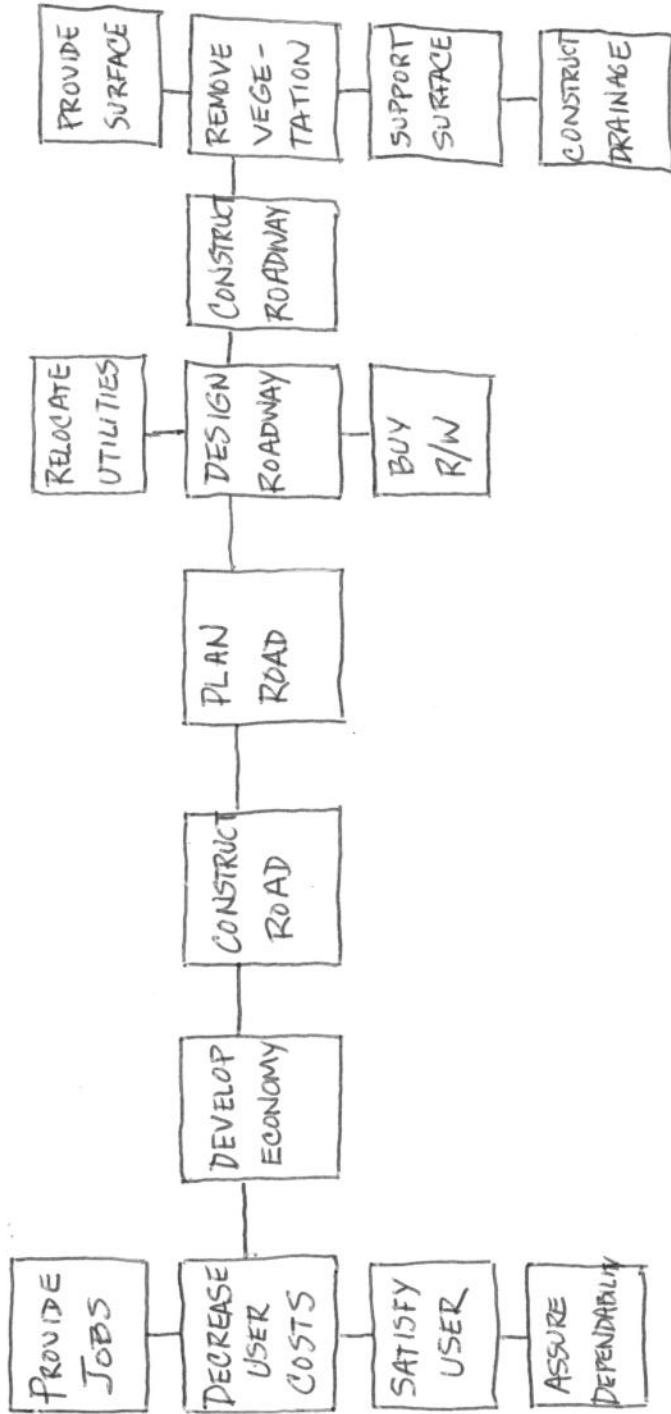
ITEM #	Description	FUNCTION		Cost	Worth	Comments
		Verb	Noun			
	Asphalt Pavement	Surface	Road	\$5,750,000	\$5,000,000	
	R/W	Purchase	R/W	\$5,000,000	\$5,600,000	Lower Pmnt. Design due to ADT
	Embankment	Support	Surface	\$3,400,000	\$2,000,000	
	Bridges	Span	Stream	\$1,200,000	\$1,200,000	
	Culverts	Span	Stream	\$681,000	\$550,000	Replace Sm Culvert w/ pipe
	Utilities	Relocate	Utilities	\$550,000	\$550,000	
	Clearing & Grubbing	Remove	Vegetation	\$400,000	\$150,000	
	Seed & Protect	Provide	Vegetation	\$288,000	\$288,000	
	Maintain & Control Traffic	Maintain	Traffic	\$250,000	\$150,000	
	Drainage Pipe	Provide	Drainage	\$194,000	\$180,000	

\* Cost to Worth Ratio. If C/W is greater than 1, we need to V.E.

# Investigation Phase - FAST Diagram

Date: \_\_\_\_\_

Team: 4



# Speculation Phase – Brainstorming

Date: 4-27-99Team: #4

Item: \_\_\_\_\_

Function: \_\_\_\_\_

- Do Nothing
- 2 Lane Initial, 4 Lane Ultimate
- 4 Lane with barrier wall
- Replace culvert with multiple pipes
- Earth Median
- Silt Check Type II Instead of Silt Trap Type A
- Surface mix more suitable for ADT
- Eliminate Stripping
- Reduce Clearing & Grubbing
- Reduce Chip Seal on Shoulder
- Use Rock Refill
- Precast Box Culvert
- Redesign MOT (Detour?)
- Change Skew on Large Culvert
- Combine Culvert
- Lower Profile Grade @ Intersections

Item: \_\_\_\_\_

Function: \_\_\_\_\_

- Eliminate Pipes
- Single Span Bridge
- Combine Twin Structures
- Eliminate Anti-Strip Add
- Change Inside Slopes to 6:1



## Evaluation Phase

Date: <u>April 28, 1999</u>		Team No. <u>#4</u>		
IDEA #	CREATIVE IDEA LISTING	IDEA EVALUATION		IDEA RATING
		Advantages	Disadvantages	
1	Earth Median	Less Cost, Aesthetically Ease of Maintenance Cost Savings, Saves Time	Harder to Construct Less Stability Scheduling Constraints	
2	Eliminate Roadbed Seeding	Cost Savings, Safety Ease of Construction	Less User Friendly	
3	Redesign MOT	Cost Savings	Ease of Maintenance Safety	
4	Eliminate Drainage Pipes	Cost Savings, Constructability Time Savings	Ease of Maintenance Aesthetically	
5	Change Box Culvert			





## VALUE ENGINEERING RECOMMENDATION

FORM 20 DEC 1996

PROJECT: F004 018 8515 015 D Sec. IV

Page 1 of

LOCATION: Calloway Co.

STUDY DATE: April 26 thru April 30

IDENTIFICATION NUMBER:

FUNCTION OF COMPONENT BEING CHANGED: Convey Water

DESCRIPTIVE TITLE OF RECOMMENDATION: Eliminate Box Culverts. Replace with Concrete Pipes

ORIGINAL DESIGN:

Installation of 3600mm x 2100mm box culvert @ sta. 506+087.

RECOMMENDED CHANGE:

Replace box culvert w/ three 1800mm reinforced concrete pipe.

SUMMARY OF COST ANALYSIS			
	First Cost	O & M Costs (Present Worth)	Total LC Cost (Present Worth)
ORIGINAL DESIGN	\$170	\$4.7	<del>\$174.7</del>
RECOMMENDED DESIGN	\$97.7	<del>\$</del> 9.7	<del>\$</del> 107.4
ESTIMATED SAVINGS OR (COST)			67.3

## VALUE ENGINEERING RECOMMENDATION

IDENTIFICATION NUMBER:

Page of

### ADVANTAGES:

Cost Savings.  
Time Savings.  
Ease of Construction

### DISADVANTAGES:

Ease of Maintenance  
Less Aesthically Pleasing

### JUSTIFICATION:

By replacing the box culvert w/ the concrete pipe there will be a substantial cost savings. Construction time will be shortened due to the ease of installation of the pipe.







# VALUE ENGINEERING RECOMMENDATION

FORM: 30 DEC. 1996

## COST ESTIMATE - O & M (LIFE CYCLE) COST

IDENTIFICATION NUMBER: \_\_\_\_\_

Page      of     

PRESENT WORTH METHOD

LIFE CYCLE PERIOD (YEARS) = 25

ANNUAL PERCENTAGE RATE = 4

Dollars in table are \$ times 1,000

Initial Costs				Original Design PW \$		Recommnd Design PW \$
Box Culvert				\$170		
Conc. Pipes				<del>\$170</del>		\$97.7
<b>Sub Totals of Initial Costs PW \$</b>						
Later Costs Single Expenditure	In The Yr	PW Factor	Original Design		Recommended Design	
			Est \$	PW \$	Est \$	PW \$
Regrout pipes	10	0.6756			\$0.5	\$0.3
<b>Sub Total of Single Expenditure Costs PW \$</b>						
Later Costs Annual Expense	For How Many Yrs	PW Factor	Original Design		Recommended Design	
			Est \$	PW \$	Est \$	PW \$
Annual Maintenance	25	15.622	\$0.3	\$4.7		
" "	25	15.622			\$0.6	\$9.4
<b>Sub Totals of Annual Expense Costs PW \$</b>				\$4.7		\$9.4
<b>Totals PW \$ for Original &amp; Recommended</b>				174.7		\$107.4
<b>Total PW \$ Savings (or Added Cost) for Recommended Design</b>						\$67.3