

VE #201205 New Circle Road Rehabilitation and Reconstruction of KY4/US-60 Interchange Projects



Items #7-113.00 & #7-279.00
Fayette County, Kentucky

Value Engineering Study Report



Study Dates: December 10-14, 2012
Final Report Date: Pending

Kentucky Transportation Cabinet
Division of Highway Design
200 Mero Street
Frankfort, KY 40622

Contact: Renee L. Hoekstra, CVS
(623) 266-3943



January 2013



"Partnering, Public Information & Value Specialists"

January 4, 2013

Mr. Brent Sweger
Kentucky Transportation Cabinet
Division of Professional Services
200 Mero Street
Frankfort, KY 40622

Re: New Circle Road Rehabilitation and Reconstruction of KY4/US-60 Interchange Projects
Items #7-113.00 and #7-279.00
Fayette County, Kentucky
Draft Value Engineering Study Report

Dear Brent:

Transmitted herewith is the pdf copy of the Draft Value Engineering Study Report for the above referenced project. A single hard copy will be delivered to your office.

RHA appreciates your assistance and cooperation. Should you have any questions please telephone me at (623) 266-3943.

Sincerely,

RH & ASSOCIATES, INC.

Renee L. Hoekstra, CVS
President

6677 W. Thunderbird Rd., Suite K-183, Glendale, Arizona 85306
(623) 266-3943 (800) 480-1401 (623) 266-3611 Fax
www.rhpartnering.com



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

Table of Contents

Introduction

Value Methodology	1
Report Content	2

Executive Summary

Background	4
Project Constraints	4
Project Descriptions.....	4
Summary of Proposals	5
VE Recommendations.....	6
Risk Analysis	8
Team Observations	8
Function Analysis	8
VE Study Team	8
Certification.....	8
VE Punch List.....	9

Project Description

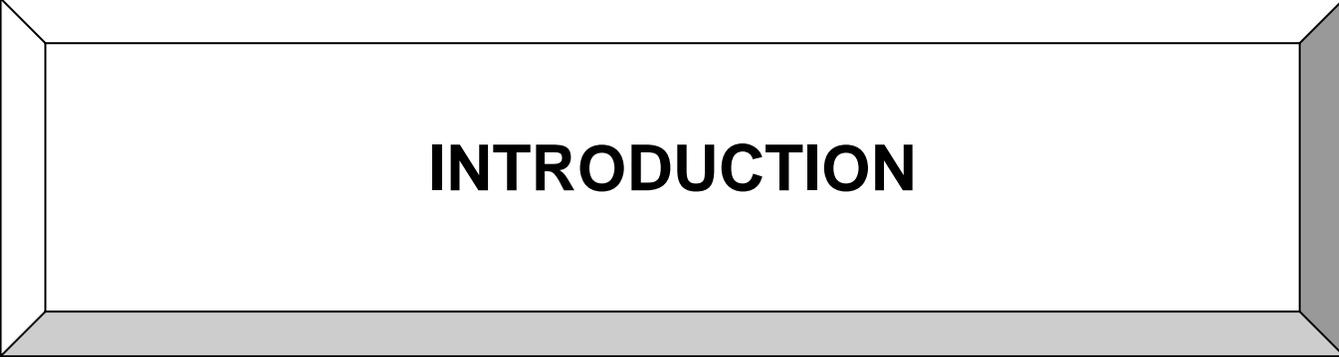
Introduction.....	11
Item #7-113.00	11
Item #7-279.00	13

VE Recommendations and Design Suggestions

Introduction.....	17
KY4/US60 (Versailles) Interchange Project.....	18
New Circle Road Widening	42
Leestown Road Interchange	102
Old Frankfort Pike Road Interchange	133

Appendices

A - Study Participants.....	156
B - Pareto Cost Models	159
C - Function Analysis.....	162
D - Creative Idea List and Evaluation	165
E - Supporting Data	172
Team Observations	173
Risk Registry	175



INTRODUCTION



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

Introduction

The value methodology (Synonyms: value analysis, value engineering and value management) is a function-oriented, systematic, team approach to add customer value to a program, facility, system, or service. Improvements like performance, quality, initial and life cycle cost are paramount in the value methodology. The value engineering workshop was conducted in accordance with the methodology as established by SAVE International, the value society, and was structured using the Job Plan as outlined below:

Value Methodology

- **Pre-Study**
 - Identify team members
 - Define workshop location
 - Review project documentation
 - Prepare for the study (workshop)
- **Value Study (Workshop) Job Plan**
 - *Information Phase*
 - Gather, organize and analyze data,
 - Define costs and cost models,
 - Define the problem/purpose of the study,
 - Define study scope, define project goals and workshop goals
 - Complete a risk analysis
 - *Function Analysis Phase*
 - Define and evaluate functions
 - Define needs versus wants
 - *Creative Phase*
 - What else will perform the functions?
 - Is this function required?
 - *Evaluation Phase*
 - Rank and rate the ideas to select
 - Refine the best ideas for further development
 - *Development Phase*
 - Develop the best ideas into VE Alternatives with support and justification
 - *Presentation/Implementation*
 - VE team presents results
 - Prepare and issue the report
 - Report implementation ideas
- **Post Study**
 - Implement approved alternatives
 - Monitor status



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

Report Content

The report provides the outcomes associated with this VE workshop and includes both projects as a combined approach. The report includes the following sections:

Introduction – This section outlines the VE process and explains the content of the report.

Executive Summary – An overview which includes the VE process, the VE punch list which is to be used during the implementation meeting, a list of the VE study team members and the certification is included.

Project Description – This section describes each of the projects in more detail for the reader to gain a better understanding of the two projects under study. Vicinity maps and photographs, where appropriate, are included showing where each of the projects are located.

VE Recommendations and Design Suggestions – Each completed alternative and design suggestion has a separate workbook and is divided by the four separate projects. Each workbook contains the following information:

- Baseline Alternative
- Proposed Alternative
- Benefits and Risks/Challenges of the Proposed Alternative
- Discussion and Justification
- Implementation Requirements
- Detailed Cost Estimate
- Life Cycle Cost Analysis, as needed
- Drawings and/or Sketches for the Baseline and the Proposed Alternative, as needed

Appendices

- A – Study Participants
- B – Pareto Cost Models
- C – Function Analysis
- D - Creative List and Evaluation
- E – Supporting Data
 - i. Team Observations
 - ii. Risk Registry



EXECUTIVE SUMMARY



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

Executive Summary

Background

A Value Engineering (VE) study was conducted during December 10-14, 2012 for the Kentucky Transportation Cabinet (KYTC) for two projects. These projects included New Circle Road Rehabilitation and KY4/US-60 Interchange, Items #7-113.00 and #7-279.00 respectively, as described below. The decision makers identified the project goals as improving safety, reducing congestion and facilitating existing commerce and future growth in the area.

The workshop objectives were identified at the start of the workshop; to assure the efficient use of funds, both capital and life cycle costs, and to ensure the best value is attained while meeting the project goals and performance attributes. The VE team identified the following goals and opportunities for the workshop:

- Evaluate solutions for Versailles Interchange, Issue 4 (left hand turn from outbound Versailles Road to Outer Loop New Circle Road)
- Transition of the bike path on Leestown Road across New Circle Road
- Maintenance of traffic during construction on New Circle Road – all driving lanes
- Use the preferred alternatives as the baseline for purposes of this study (Alternative 1 with DCD at Leestown and modified Diamond at Old Frankfort Pike)
- Meet project budgets
- Improve safety
- Improve capacity
- Minimize right-of-way impacts
- Address the new access needs at the Leestown crossing
- Address the impacts to drainage retention at Leestown Road north of New Circle Road

Project Constraints

The decision makers/stakeholders identified the project constraints for the VE team at the start of the VE study as:

- Must meet the schedule requirements which is to let the New Circle Road project by September, 2013
- Meet budget requirements on all four projects (New Circle Road, Old Frankfort Pike Interchange, Leestown Road Interchange, and KY4/US60 Interchange (Versailles))
- Cannot have an impact to Calumet Farms (4f Property)

Project Descriptions

The VE study includes two projects. The overall purpose of these projects is to improve traffic flow by providing a safer and more efficient roadway while enhancing inbound and outbound traffic movements to greater Lexington.

The first project is **KYTC #7-113 – New Circle Road rehabilitation and widening from Versailles Road to near Georgetown Road**. The KYTC Project Manager is Joshua Samples and the design consultant is HDR Engineering, Inc. The New Circle Road improvements must be let by September of 2013 to meet the schedule desired by the Cabinet. This would include all of the improvements to new Circle Road as well as the widening or replacement of four bridge



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

structures. The two interchanges that are related to this project include the Old Frankfort Pike Interchange and the Leestown Road Interchange. Old Frankfort Interchange is anticipated to be let for construction in the Fall of 2013 either as part of the New Circle Improvements or as a separate project. This will be around the same time as the New Circle Improvements because improvements to the bridge at Old Frankfort are needed to allow New Circle to be widened (bridge clearance issues). The Leestown Road Interchange project is scheduled for letting in the Spring/Summer of 2014.

The project ties into the Versailles Road Interchange and will widen New Circle Road to a 6-lane section for approximately 3½ miles to just short of Georgetown Road where New Circle Road has already been widened to 6 lanes. This project will widen New Circle Road to 3-lanes in each direction with a median barrier wall. With this widening, the interchanges at Old Frankfort Pike and Leestown Road will be reconfigured. The Old Frankfort interchange will be rebuilt as a diamond interchange with left turn lanes to New Circle Road and more spacing between the access ramps and the connection to Duncan Machinery Road. The Leestown Road Interchange will be rebuilt as a DCD interchange similar to Harrodsburg Road at New Circle.

The second project is **KYTC #7-279 – Reconstruction of KY 4/US 60 (Versailles Road) Interchange**. The KYTC Project Manager is Joshua Samples and the design consultant is Qk4, Inc. The project will reconfigure the New Circle Road/Versailles Road interchange to provide greater efficiency by eliminating the weaving movements under and on New Circle Road. It is desirable to provide continuous traffic flow movements and avoid signals if possible.

The reconfiguration will include bridging New Circle Road over inbound Versailles Road traffic going to the inner loop of New Circle over Versailles Road. This eliminates the weaving movements under the bridge and on the bridge. Other minor improvements and ramp changes will also be included with all improvements fitting within the existing right-of-way. Consideration of the Historic importance of the Calumet Farms (a 4f property), and the general emphasis on the heritage of the area should be maintained as a consideration for all parts of the design.

Although this project is separate from the New Circle Road Improvements, it is contiguous and will be completed in a very similar time frame. The design of KYTC#7-279 shall take into account the needs of the New Circle Road project as well as the ability for New Circle Road to be widened in the future to 6 lanes through the Versailles Interchange.

Summary of Results

The VE team brainstormed a total of 88 ideas. The ideas were generated in four different categories, related to the four identified projects. The four projects were the KY4/US60 (Versailles) Interchange, the New Circle Road Improvements, the Leestown Road Interchange, and the Old Frankfort Pike Interchange having 19, 31, 16, and 12 ideas respectively. An additional 10 ideas were more general in nature that could apply to any or all of the four projects.

Of the 88 ideas, twenty two (22) ideas were identified for further development into VE proposals, including cost impacts. Twenty One (21) Design Suggestions, without any cost impact, were identified with eight (8) Design Suggestions written to provide additional information for KYTC and the designer to consider. The description and further discussion of these are included in the VE workbooks section of this report. The following represents the alternatives developed



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

and the cost impact, as necessary. The following table shows the alternatives developed and the cost impacts. The costs shown in parenthesis represent an additional cost to the project. Those shown as positive numbers represent a savings.

SUMMARY OF RESULTS

No.	Description	Initial Cost Savings (Add)	O&M	Total Life Cycle Cost
Project 7-279 KY4/US60 (Versailles) Interchange				
1	Install a traffic signal on Versailles Road to eliminate Issue 4 - left turn lane conflicts	(167,500)	\$0	(\$167,500)
2	Build a westbound median ramp to the south bound outer loop	\$980,175	\$0	\$980,175
3	Eliminate direct left turn at Ramp F-1 and provide a U-turn opportunity downstream	(\$45,410)	\$0	(\$45,410)
4	Increase the radius on Ramp A	(\$158,670)	\$0	(\$158,670)
5	Eliminate the proposed Ramp D	\$169,110	\$0	\$169,110
Project 7-113 - New Circle Road Widening				
1	Use a single span bridge at Alexandria and eliminate the piers	\$789,009	\$24,000	\$813,009
2	Widen both the bridges and roadway to one side in lieu of symmetric widening	\$3,237,252	\$0	\$3,237,252
3	Salvage the superstructure of the Norfolk/Southern bridge	\$2,317,754	(\$388,000)	\$1,929,754
4	Raise the existing bridge at Old Frankfort Pike (jack superstructure at abutment) to achieve the vertical clearance for New Circle Road bridge	\$7,612,748	\$0	\$7,612,748
5	Reduce the inside shoulder width from 10 feet to 4 feet	\$4,009,159	\$0	\$4,009,159
6	Add Variable Message Signs (VMS) on the mainline and the associated roads crossing New Circle Road, to aid in congestion control	(\$660,000)	\$0	(\$660,000)
7	Use "wire walls" - which is a modified MSE wall in lieu of reinforced concrete walls in fill areas	\$594,000	\$0	\$594,000
8	Use an integral retaining wall and sound wall design using soldier piles	(\$1,679,700)	\$0	(\$1,679,700)
9	Install stabilized embankment at Station 278+00 to eliminate the box extension and eliminate the easement acquisition	\$330,124	\$0	\$330,124



**Value Engineering Study
 Kentucky Transportation Cabinet
 New Circle Road Rehab & KY4/US-60 Interchange
 Items #7-113.00 and #7-279.00
 Fayette County**

No.	Description	Initial Cost Savings (Add)	O&M	Total Life Cycle Cost
10	Eliminate the Norfolk/Southern Bridge from the design to eliminate the risk to the schedule	\$4,235,420	\$0	\$4,235,420
DS1	Eliminate the development of detailed traffic control plans by the designer and develop Performance Specifications for the contractor to develop the formal plans			
DS2	Accelerate the Norfolk/Southern railroad bridge design and coordination			
DS3	Keep the Norfolk/Southern bridge in the design but delay construction in the specifications			
Project 7-113 - Leestown Road Interchange				
1	Reduce lane widths on Leestown Road under New Circle Road	\$47,672	\$0	\$47,672
2	Reduce Leestown Road to two lanes westbound at the outer loop entrance ramp	\$42,350	\$0	\$42,350
3	Make southbound New Circle Road a dual left turn from Ramp F to Leestown Road	(\$18,603)	\$0	(\$18,603)
4	Extend the right turn only lane on eastbound Leestown Road	(\$9,130)	\$0	(\$9,130)
DS1	Close access to Leestown Road at Station 92+00 on both sides of the road			
DS2	Use high mast lighting in the interchange to reduce maintenance impacts			
DS3	Keep the location of the bike lane design for Leestown Road at Interchange as designed			
Project 7-113 - Old Frankfort Pike Road Interchange				
1	Realign Ramp B further away from Duncan Machinery Drive	\$14,518	\$0	\$14,518
2	No improvements provided out to Enterprise Drive, west of New Circle Road	\$463,499	\$0	\$463,499
3	Stripe a second lane on Old Frankfort Pike outside of the ramp terminals to feed the left-turn lanes on the bridge over New Circle Road	\$0	\$0	\$0
DS1	Use roundabouts for the Old Frankfort Pike interchange			
DS2	Use high mast lighting at the interchange to			



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

	reduce maintenance impacts			
--	----------------------------	--	--	--

Risk Analysis

A formal risk analysis was completed on this project to identify any potential risks that might negatively or positively impact the project. The Team identified 7 potential risks. The team then rated and ranked the identified risks. A risk registry was completed and is included in Appendix E, the support data section of this report.

Team Observations

Upon completion of the project presentation, the team discussed the various elements of the project including the project information they had reviewed prior to the workshop and the information that was provided during the presentation. These observations can be found in Appendix E.

Function Analysis

Function definition and analysis is the heart of Value Engineering. It is the primary activity that separates VE from all other “improvement” programs. The objective of this phase is to ensure the entire team agrees upon the purposes for the project elements. Furthermore, this phase assists with development of the most beneficial areas for continuing the study. The data supporting the function analysis can be found in Appendix C.

The VE team identified the functions using active verbs and measurable nouns. This process allowed the team to truly understand all of the functions associated with the project. The basic function was defined as *Reduce Congestion*. A Function Analysis Systems Technique (FAST) diagram was completed and is included in Appendix C.

VE Study Team

Renee Hoekstra, CVS, RH & Associates, Inc. – VE Team Leader
Mike Bonar, AVS, RH & Associates, Inc. – Assistant Team Leader/Technical Recorder
Brent Sweger, P.E., AVS, Kentucky Transportation Cabinet – VE Coordinator
Albert Zimmerman, P.E., Qk4, Inc. – Highway Specialist
Jeremy Lukat, Qk4, Inc. – Traffic Specialist
Kenneth Ott, AEI – Structural Specialist
Steve James, AEI – Highway Specialist
Brian Aldridge, Stantec – Traffic Specialist

Certification

This is to verify that the Value Engineering Study was conducted in accordance with standard value engineering principles and practices.

Renee L. Hoekstra, CVS
RH & Associates, Inc.

VALUE ENGINEERING PUNCH LIST										
ITEM NO.	7-113 & 7-279		PROJECT COUNTY: Fayette			DATE OF STUDY: 12/17-12/21, 2012		VE # 201205		
VE Alternative Number	VE Team Top Pick	Description	Activity (Y,N,UC-Date)	Implemented Life Cycle Cost Savings	Original Cost	Alternative Cost	Initial Cost Saving	Life Cycle Cost Savings (Total Present Worth)	FHWA Categories	Remarks
Item #7-113 & 7-279										
Project 7-279 KY4/US60 (Versailles) Interchange										
1		Install a traffic signal on Versailles Road to eliminate Issue 4 - left turn lane conflicts			\$0	\$167,500	(\$167,500)	\$0		
2		Build a westbound median ramp to the south bound outer loop			\$4,394,675	\$3,414,500	\$980,175	\$0		
3		Eliminate direct left turn at Ramp F-1 and provide a U-turn opportunity downstream			\$0	\$45,410	(\$45,410)	\$0		
4		Eliminate left turns out at Berberich Drive/Lakeside Drive			\$0	\$158,670	(\$158,670)	\$0		
5		Eliminate the proposed Ramp D			\$233,775	\$64,665	\$169,110	\$0		
Project 7-113 - New Circle Road Widening										
1		Use a single span bridge at Alexandria and eliminate the piers			\$1,900,000	\$1,110,990	\$789,010	\$24,000		
2		Widen both the bridges and roadway to one side in lieu of symmetric widening			\$24,936,344	\$21,699,092	\$3,237,252	\$0		
3		Salvage the superstructure of the Norfolk/Southern bridge			\$3,990,000	\$1,562,246	\$2,427,754	-\$388,000		
4		Raise the existing bridge at Old Frankfort Pike (jack superstructure at abutment) to achieve the vertical clearance for New Circle Road bridge			\$7,712,748	\$100,000	\$7,612,748	\$0		
5		Reduce the inside shoulder width from 10 feet to 4 feet			\$28,516,288	\$24,507,129	\$4,009,159	\$0		
6		Add Variable Message Signs (VMS) on the mainline and the associated roads crossing New Circle Road, to aid in congestion control			\$0	\$385,000	(\$385,000)	\$0		
7		Use "wire walls" - which is a modified MSE wall in lieu of reinforced concrete walls in fill areas			\$2,079,000	\$1,485,000	\$594,000	\$0		
8		Use an integral retaining wall and sound wall design using soldier piles			\$5,720,300	\$7,400,000	(\$1,679,700)	\$0		
9		Install stabilized embankment at Station 278+00 to eliminate the box extension and eliminate the easement acquisition			\$332,000	\$1,676	\$330,124	\$0		
10		Eliminate the Norfolk/Southern Bridge from the design to eliminate the risk to the schedule			\$4,235,420	\$0	\$4,235,420	\$0		
Project 7-113 - Leestown Road Interchange										
1		Reduce lane widths on Leestown Road under New Circle Road			\$2,240,017	\$2,192,345	\$47,672	\$0		
2		Reduce Leestown Road to two lanes westbound at the outer loop entrance ramp			\$2,258,609	\$2,216,258	\$42,351	\$0		
3		Make southbound New Circle Road a dual left turn from Ramp F to Leestown Road			\$0	\$18,603	(\$18,603)	\$0		
4		Extend the right turn only lane on eastbound Leestown Road			\$9,606	\$18,736	(\$9,130)	\$0		
Project 7-113 - Old Frankfort Pike Road Interchange										
1		Realign Ramp B further away from Duncan Machinery Drive			\$27,779	\$13,261	\$14,518	\$0		
2		No improvements provided out to Enterprise Drive, west of New Circle Road			\$463,499	\$0	\$463,499	\$0		
3		Stripe a second lane on Old Frankfort Pike outside of the ramp terminals to feed the left-turn lanes on the bridge over New Circle Road			\$0	\$0	\$0	\$0		
Design Suggestions Item #7-113 & 7-249										
Project 7-113 - New Circle Road Widening										
DS1		control plans by the designer and develop Performance Specifications for the contractor to develop the formal plans								
DS2		Accelerate the Norfolk/Southern railroad bridge design and coordination								
DS3		Keep the Norfolk/Southern bridge in the design but delay construction in the specifications								
Project 7-113 - Leestown Road Interchange										
DS1		Close access to Leestown Road at Station 92+00 on both sides of the road								
DS2		Use high mast lighting in the interchange to reduce maintenance impacts								
DS3		Keep the location of the bike lane design for Leestown Road at Interchange as designed								
Project 7-113 - Old Frankfort Pike Interchange										
DS1		Use roundabouts for the Old Frankfort Pike interchange								
DS2		Use high mast lighting at the interchange to reduce maintenance impacts								
					Saf 0	Ops 0	Env 0	Con 0	Oth 0	

PROJECT DESCRIPTION



Value Engineering Study Kentucky Transportation Cabinet New Circle Road Rehab & KY4/US-60 Interchange Items #7-113.00 and #7-279.00 Fayette County

Introduction

The VE study includes two contiguous projects. The first project is KYTC #7-113.00 – New Circle Road rehabilitation and widening from Versailles Road to near Georgetown Road being designed by HDR. The second project is KYTC #7-279.00 – Reconstruction of KY 4/US 60 (Versailles Road) Interchange being designed by Qk4, Inc.

The overall purpose of these projects is to improve traffic flow on New Circle Road by evaluating capacity and assessing deficiencies. Currently, New Circle Road operates at an undesirable Level of Service (LOS), especially during the AM and PM rush hours. The goal is to have a safer and more efficient roadway while enhancing inbound and outbound traffic movements to greater Lexington.

Item # 7-113.00 – New Circle Road Rehab & Widening from Versailles Road to near Georgetown Road Project

The KYTC Project Manager is Joshua Samples and the design consultant is HDR Engineering, Inc. The New Circle Road improvements must be let by September of 2013 to meet the schedule desired by the Cabinet. This would include all the improvements to new Circle Road as well as the widening or replacement of four bridge structures. The two interchanges that are related to this project include Old Frankfort Pike and Leestown Road. The Old Frankfort Pike Interchange is anticipated to be let for construction in the Fall of 2013 either as part of the New Circle Improvements or as a separate project. This will need to be around the same time as the New Circle Road Improvements because improvements to the bridge at Old Frankfort Pike are needed to allow New Circle Road to be widened (bridge clearance issues). The Leestown Road Interchange project is scheduled for letting in the Spring/Summer of 2014.

The project ties into the KY/US60 (Versailles Road) Interchange and will widen New Circle Road to a 6-lane section for approximately 3.4 miles to just short of Georgetown Road where New Circle Road has already been widened to 6 lanes. This project will widen New Circle Road to 3-lanes in each direction with a median barrier wall.

The recommended preferred alternative includes widening Old Circle Road to 6 lanes by building new lanes on the inside of the existing pavement, replacing the existing depressed grass median. As part of the Phase I Design, HDR was required to evaluate future improvements to New Circle Road (KY 4) and the Interchanges of Old Frankfort Pike and Leestown Road (The Interchanges) to the extent that New Circle Road will operate at a desirable Level of Services in the future Design Year.





**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**



With this widening, the interchanges at Old Frankfort Pike and Leestown Road will be reconfigured. The Old Frankfort interchange will be rebuilt as a diamond interchange with left turn lanes to New Circle Road and more spacing between the access ramps and the connection to Duncan Machinery Road. This will reduce the congestion caused from the existing condition where multiple access points and turning movements are too close together.

The Leestown Road Interchange will be rebuilt as a Double Crossover Diamond (DCD) interchange similar to Harrodsburg Road at New Circle Road. A DCD is a diamond interchange which operates in a non-traditional manner by moving through and left turn vehicles between ramp intersections on the left side of the roadway. This eliminates the need for the left turn traffic signal phase. The basic geometric design footprint is very similar to the traditional diamond interchange. As such, the proposed DCD is able to utilize the basic alignment of the existing northbound and southbound entrance and exit ramps.

The DCD design will accommodate left-turning movements by crossing traffic to the left side of the roadway at the signalized ramp terminal intersections. Two-phase traffic signals installed at each crossover will operate off of one controller. Once on the left side of the arterial roadway, vehicles can turn left onto limited-access entrance ramps without stopping and without conflicting with through traffic. By reducing the number of conflict points and reducing congestion, the rear end, sideswipe, and angle crashes typically associated with a congested diamond interchange should be reduced.

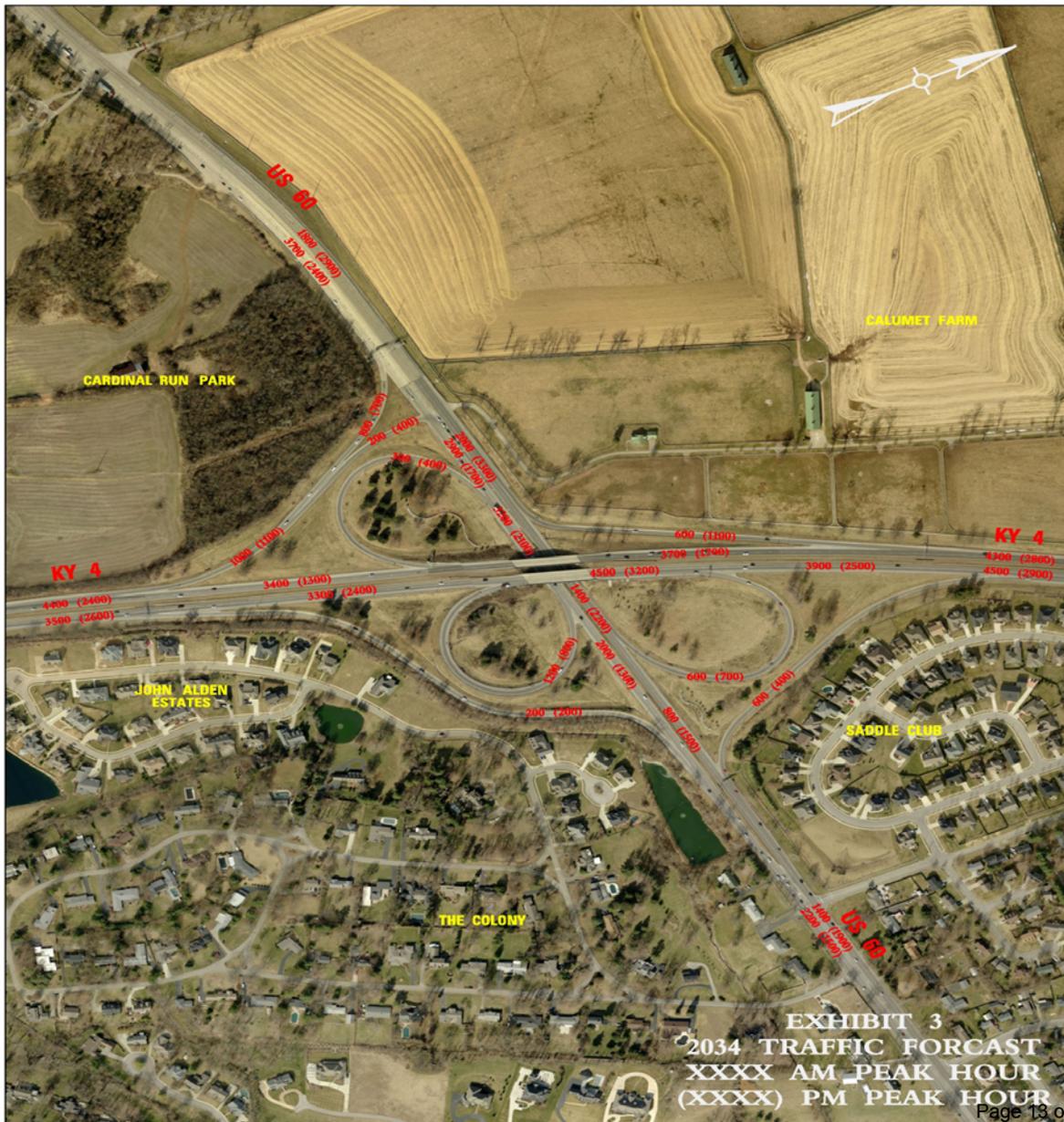


**Value Engineering Study
 Kentucky Transportation Cabinet
 New Circle Road Rehab & KY4/US-60 Interchange
 Items #7-113.00 and #7-279.00
 Fayette County**

Item # 7-279.00 – Reconstruction of KY 4/US-60 (Versailles Road) Interchange

The KYTC Project Manager is Joshua Samples and the design consultant is Qk4, Inc. The Versailles Road Interchange improvements are anticipated to have final design complete by Fall of 2013 and be let in the Spring of 2014.

As mentioned, the overall purpose of these projects is to improve traffic flow on New Circle Road by evaluating capacity and assessing deficiencies. Currently, New Circle Road operates at an undesirable Level of Service (LOS), especially during the AM and PM rush hours. An additional goal for this project is to improve traffic flow and safety on Versailles. It is also currently operating at an undesirable LOS and has approximately the same amount of traffic as New Circle Road at this location (both are currently over 50,000 vehicles per day (VPD) and expected to both be over 62,000 VPD in year 2034).





**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

Qk4 was asked to develop and evaluate interchange alternatives that will address the weaving deficiencies as well as other geometric deficiencies. They were also required to evaluate improvements to the interchange that will have an immediate improvement to the operation of the interchange at current traffic counts but will “dovetail” with future “ultimate” improvements to the interchange as well as to the New Circle Road Improvement Project (Item No. 7-113.00). The goal of the immediate Improvements would be achieved within the existing right-of-way or with minimal right-of-way acquisition.

As part of the scoping for this project, the Cabinet requested that Qk4 look at a variety of alternatives to address four specific issues as well as overall geometrics. The four critical issues/deficiencies are shown in the Exhibit 1 (below) and are described as follows:

Issue 1 – Weaving on New Circle Road (NCR) - Inner Loop - vehicles entering from eastbound (EB) Versailles Road to NCR, and vehicles exiting NCR to westbound (WB) Versailles Road.

Issue 2 –Weaving on EB Versailles Road – vehicles entering from NCR Outer Loop to EB Versailles Road and vehicles exiting EB Versailles Road to NCR Inner Loop.

Issue 3 – Addressing the acceleration taper onto WB Versailles Road from the NCR Inner Loop Ramp.

Issue 4 - Addressing safety for left turning vehicles from WB Versailles Road turning onto NCR Outer Loop across EB Versailles Road.





**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

There is also a desire to avoid the installation of traffic signals at this location and, instead, design the necessary improvements to keep all movements free-flowing at this Interchange. That is based on the perception that a traffic signal may interrupt the flow of traffic on Versailles as well as on other nearby roadways.

Consideration of the Historic importance of the Calumet Farms (a 4f property), and the general emphasis on the heritage of the area should be maintained as a consideration.

Although this project is separate from the New Circle Road Improvements, it is contiguous and will be completed in a very similar time frame. The design of KYTC#7-279 shall take into account the needs of the New Circle Road project as well as the ability for New Circle Road to be widened to 6 lanes through the Versailles Interchange in the future.

The alternative that was recommended at the time of this study will accomplish these goals by reconfiguring the New Circle Road/Versailles Road interchange to eliminate the weaving movements under and on New Circle Road. The reconfiguration will include bridging inbound Versailles Road traffic going to the inner loop of New Circle over Versailles Road. This eliminates the weaving movements under the bridge and on the bridge. Other minor improvements and ramp changes will also be included with all improvements fitting within the existing right of way. This alternative was considered as the **baseline solution** for the VE team.



**VE RECOMMENDATIONS &
DESIGN SUGGESTIONS**



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

VE Recommendations & Design Suggestions

Introduction

The VE study evaluated the 88 ideas that were brainstormed during the Creative Phase for Items #7-113.00 and #7-279.00. The twenty two (22) completed Alternatives are located in this section of the report. The alternatives developed included, as needed, the following information:

- Baseline Alternative
- Proposed Alternative
- Benefits and Risks/Challenges of the Proposed Alternative
- Discussion and Justification
- Implementation Requirements
- Detailed Cost Estimate
- Life Cycle Cost Analysis
- Drawings and/or Sketches for the Baseline and the Proposed Alternative

Additionally, eight (8) Design Suggestions were developed to provide some additional design direction to the design team. These are also included in this section of the report.

Results of the Study

The team developed the Alternatives based on the four separate projects. Each project is listed separately with the Alternatives and the corresponding design suggestions which include:

- KY4/US60 (Versailles) Interchange
- New Circle Road Widening (including the four bridges)
- Leestown Road Interchange
- Old Frankfort Pike Road Interchange



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

KY4/US60 (Versailles) Interchange Project



VALUE ENGINEERING PROPOSAL 1
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Install a traffic signal on Versailles Road to eliminate Issue 4 - left turn lane conflicts				
FUNCTION: Improve Geometrics				
BASELINE ASSUMPTION:				
The left turn from westbound Versailles Road to southbound New Circle Road ramp is currently an uncontrolled movement. This left turn must yield to through traffic on eastbound Versailles Road. The remainder of the movements for this interchange are free-flowing.				
PROPOSED ALTERNATIVE:				
The proposed alternative would add a signal at this location to allow a protected movement from westbound Versailles Road left onto the southbound New Circle Road ramp. Traffic on westbound Versailles Road would remain free-flowing while traffic on eastbound Versailles Road would stop periodically while the left turn phase is green.				
BENEFITS		RISKS/CHALLENGES		
<ul style="list-style-type: none"> Left turns would be protected 		<ul style="list-style-type: none"> Rear-end accidents could increase along eastbound Versailles Road 		
<ul style="list-style-type: none"> Queues from the left turn movement would be shortened and not back into the through lanes onto westbound Versailles Road 		<ul style="list-style-type: none"> Congestion of the through lanes on eastbound Versailles Road would increase 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> Would introduce a signal into a mostly free-flow interchange 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> Additional maintenance 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> Public might not be in favor of a signal at this interchange 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> Providing power to the signal which would add cost to the signal installation 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> Would have to widen eastbound Versailles Road to keep v/c ratio at or below a one (1) 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
COST SUMMARY		Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:		\$ -	\$ -	\$ -
PROPOSED ALTERNATIVE:		\$ 167,500	\$ -	\$ 167,500
TOTAL (Baseline less Proposed)		\$ (167,500)	\$ -	\$ (167,500)
				COST



VALUE ENGINEERING PROPOSAL 1
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Install a traffic signal on Versailles Road to eliminate Issue 4 - left turn lane conflicts

DISCUSSION/JUSTIFICATION:

As proposed, the left turn from westbound Versailles Road to the southbound New Circle Road ramp has a v/c ratio of over two (2) in the 2034 design hour. Queue lengths from this turn movement will reach 25 cars in this future year, while the proposed storage length can accommodate approximately 20 vehicles.

The addition of a signal at this location would push the eastbound Versailles Road approach over a v/c ratio of one (1). A third eastbound lane would need to be extended through this intersection to keep v/c ratios for all signalized movements under one (1). To accommodate this third lane, a taper would need to be added to accommodate the eastbound Versailles Road to southbound New Circle Road ramp movement, which currently splits a lane off of westbound Versailles Road. This third lane would then continue through this signalized intersection and split off to the eastbound Versailles Road to northbound New Circle Road ramp. With this configuration the intersection would operate at a reasonable v/c ratio of 0.85-0.90 and the westbound left turn queue would fit in the storage provided.

IMPLEMENTATION CONSIDERATIONS:

As stated above, the addition of a signal at this location would trigger the need for a third eastbound through lane causing changes to the geometric design of ramp approaches.

A signal in this location would increase congestion and signal density along Versailles Road.

Public perception would most likely be negative concerning the addition of a signal at this interchange which is otherwise free-flowing.

Utilities may need to be added to this location to power the proposed signal.

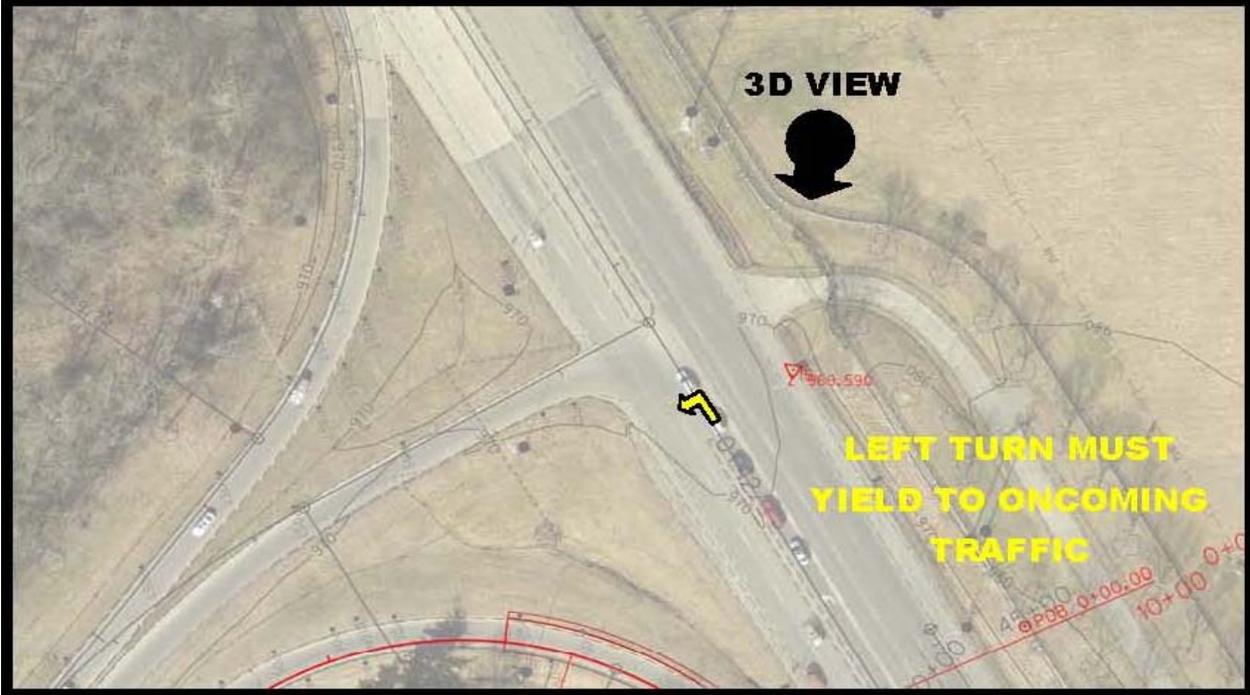
(FLUCG operates and maintains all signals in Fayette County.)



VALUE ENGINEERING PROPOSAL 1
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Install a traffic signal on Versailles Road to eliminate Issue 4 - left turn lane conflicts

SKETCH OF BASELINE ASSUMPTION

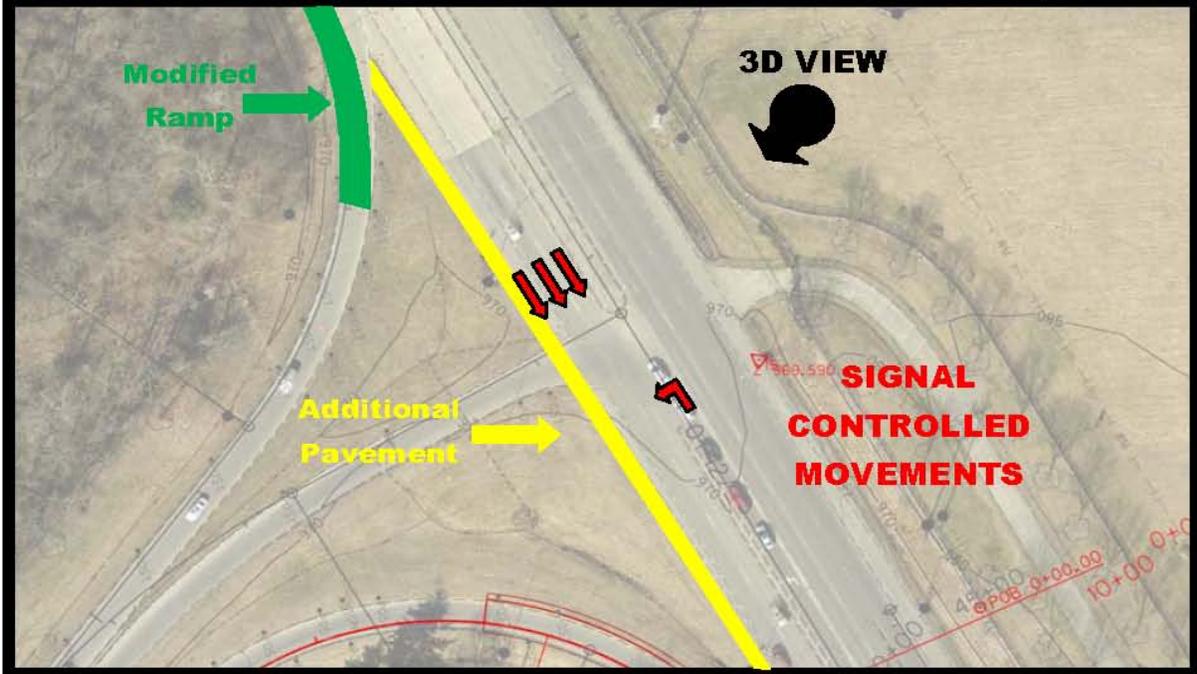




VALUE ENGINEERING PROPOSAL 1
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Install a traffic signal on Versailles Road to eliminate Issue 4 - left turn lane conflicts

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 2
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Build a westbound median ramp to the southbound outer loop				
FUNCTION:		Improve Geometrics		
BASELINE ASSUMPTION:				
<p>Four issues were identified in the documents and the baseline design addresses Issues 1 & 2; a) Issue 1 – Weaving on New Circle Road (NCR) - Inner Loop - vehicles entering from eastbound Versailles Road to New Circle Road, and vehicles exiting New Circle Road to westbound Versailles Road. b) Issue 2 – Weaving on eastbound Versailles Road – vehicles entering from New Circle Road outer loop to eastbound Versailles Road and vehicles exiting eastbound Versailles Road to New Circle Road inner loop. These are addressed by eliminating loop Ramp G by constructing a flyover. Ramp E is shifted to pass under the bridge in the area of spill-thru slope using soil nailing and is swung out wide in the existing loop Ramp G area to allow room for the new Ramp G flyover to swing out wide to reduce the skew before flying over Versailles Road (US 60) eastbound and westbound to merge with Ramp B. Ramp D is realigned to accommodate the merge with Ramp E traffic.</p>				
PROPOSED ALTERNATIVE:				
<p>Add a median ramp in US 60 with a flyover over US 60 westbound only. Ramp E remains as proposed in spill-thru so the eastbound through lanes can be shifted over 12 ft. under the bridge and the current inside through lane under the bridge will become the median ramp lane. Ramp D no longer needs to be realigned.</p>				
BENEFITS		RISKS/CHALLENGES		
<ul style="list-style-type: none"> Through lanes as well as Ramp E remains along a tangent parallel to the existing US 60 		<ul style="list-style-type: none"> Existing 16-ft median needs to widen from 19 ft. to 35 ft. to fit a 25 ft ramp with proper clearances 		
<ul style="list-style-type: none"> Reduces flyover bridge length 		<ul style="list-style-type: none"> Median ramp construction must be performed with traffic on both sides 		
<ul style="list-style-type: none"> Eliminates Ramp D modifications 		<ul style="list-style-type: none"> Crash cushion details will be needed to protect the innermost eastbound through lane from hitting the beginning of the ramp wall 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
COST SUMMARY		Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:		\$ 4,394,675	\$ -	\$ 4,394,675
PROPOSED ALTERNATIVE:		\$ 3,414,500	\$ -	\$ 3,414,500
TOTAL (Baseline less Proposed)		\$ 980,175	\$ -	\$ 980,175
				SAVINGS



VALUE ENGINEERING PROPOSAL 2
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Build a westbound median ramp to the southbound outer loop

DISCUSSION/JUSTIFICATION:

This alternate reduces the length of the flyover bridge and eliminates the need to reconstruct and realign Ramp D to accommodate the merger with Ramp E since Ramp E no longer swings out wide into the area formerly occupied by loop Ramp G. This plan assumes a 25-ft. clear Ramp G flyover width (15 ft. lane, 4 ft. inside shoulder, and 6 ft. outside shoulder. This proposed new Ramp G is to be constructed using reinforced earth walls. New Jersey barrier with moment slab is mounted on the top of the wall and a New Jersey barrier shape is used along the base of the wall where parallel to through traffic each way. Allowing for 2 ft. clearance from barrier shape to driving lane plus 3 ft. for distance from inside the barrier face on the ramp to inside barrier face at the bottom of the wall, requires a total width of 35 ft. from edge of the driving lanes between eastbound and westbound traffic. Since the existing median is 16 ft., the median in the vicinity of the ramp will need to be widened a total of 19 ft. 12 ft. of this is acquired by using 12 ft. of the existing inner eastbound lane. The remaining 7 ft. is obtained by shifting the through lanes out 7 ft. or by reducing the shoulder width under the bridge from 12 ft. to 5 ft., or a combination of both. The bridge is a 200-ft., 2-span bridge using steel curved girders. This proposal uses a single column hammer head intermediate pier with the beams integral with the pier cap to minimize clearance issues and to allow the cap to cantilever over the driving lanes with the pier column placed just behind the New Jersey barrier. Using an 8% ramp and a 3.67% downgrade of US 60, 11.67 ft. of height can be achieved every 100 ft. For 16 ft. clearance and 7 ft. total bridge depth, 23 ft. can be achieved with a 200-ft. long ramp. The ramp length as depicted by the yellow line in the proposed alternative sketch is 380 ft. long. For this case, the ramp slope needs to be 2.4% to achieve the 23 ft. clearance.

IMPLEMENTATION CONSIDERATIONS:

Revise the Maintenance of Traffic Plan to accommodate construction in the midel of Versailles Road (US60).



VALUE ENGINEERING PROPOSAL 2
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Build a westbound median ramp to the southbound outer loop

SKETCH OF BASELINE ASSUMPTION

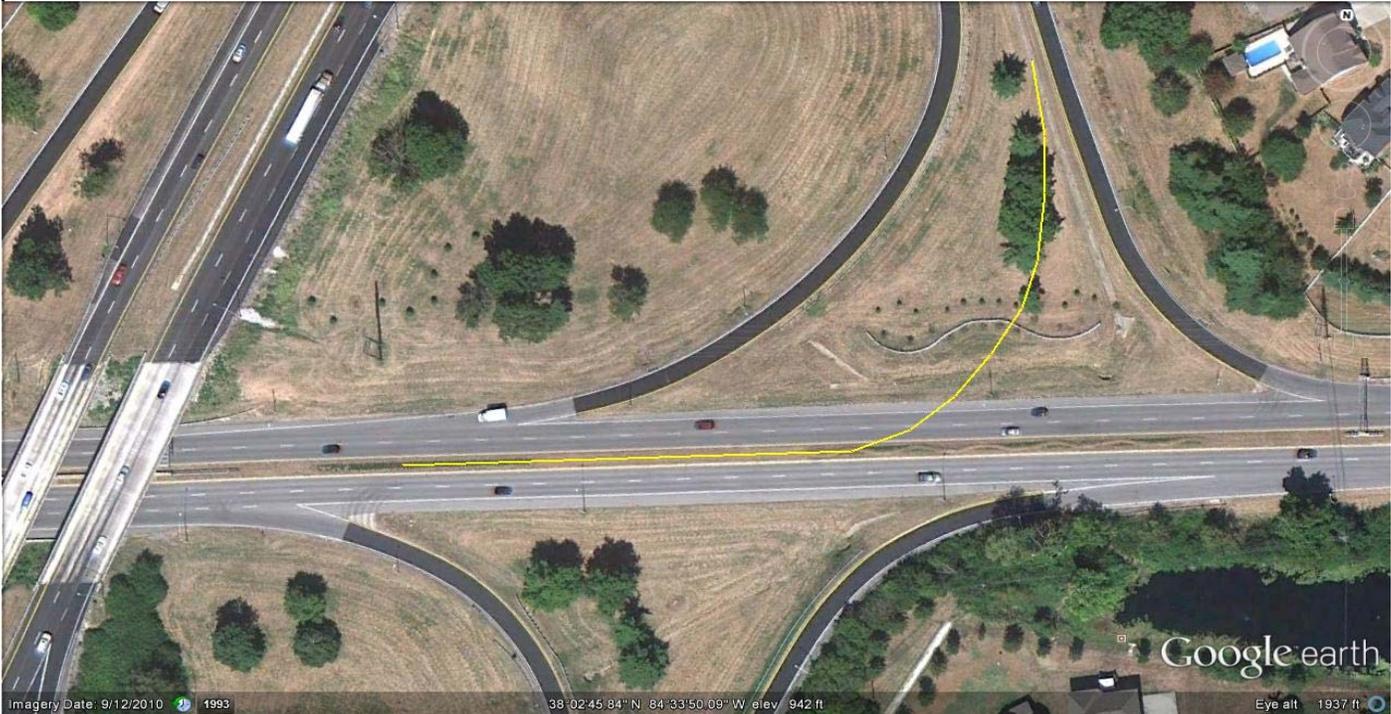




VALUE ENGINEERING PROPOSAL 2
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Build a westbound median ramp to the southbound outer loop

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 3
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Eliminate direct left turn to Ramp F-1 and provide U-turn opportunity downstream			
FUNCTION: Improve Geometrics			
BASELINE ASSUMPTION:			
The original design provides a direct left turn opportunity to ramp F-1 from westbound US60.			
PROPOSED ALTERNATIVE:			
Construct a U-turn location to the west of the interchange.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Increases turning lane storage length with potential for lengthening as the needs change 		<ul style="list-style-type: none"> Unconventional U-turn design may be confusing for drivers 	
<ul style="list-style-type: none"> Removes potential spillover from the turning lane into westbound through lanes 		<ul style="list-style-type: none"> Additional right-of-way required for U-turn 	
<ul style="list-style-type: none"> Simplifies decision-making for drivers when looking for a gap to make a turn 		<ul style="list-style-type: none"> Additional signage will be required 	
<ul style="list-style-type: none"> Removes potential signal from the interchange area 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ -	\$ -
PROPOSED ALTERNATIVE:		\$ 45,410	\$ -
TOTAL (Baseline less Proposed)		\$ (45,410)	\$ -
		COST	



VALUE ENGINEERING PROPOSAL 3
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Eliminate direct left turn to Ramp F-1 and provide U-turn opportunity downstream

DISCUSSION/JUSTIFICATION:

The simulation using the 2034 forecasted numbers shows that the queue of traffic waiting to turn left onto Ramp F-1 spills out of the turning lane into the through lanes. This will cause conflicts that may lead to operational problems and rear-end crashes. By moving the turning location farther to the west, a much longer turning lane can be developed to store the queued vehicles.

The most logical location is at the median opening that currently exists for the service entrance to the park property. It is approximately 1,100 feet from the existing left turn location. The advantage of this location is that it is a relatively short travel distance and will not impact a heavily utilized access point (causing conflicts with exiting drivers).

Construction of a loon to the outside of US60 is recommended to allow U-turning vehicles. This will allow drivers to make the movement across traffic independent of completing the U-turn and accelerating, creating a safe condition. Some right-of-way will be needed for the loon.

IMPLEMENTATION CONSIDERATIONS:

The U-turn location should be positioned just far enough to develop a sufficient turning lane so as to minimize the distance drivers have to travel.

This alternative can be implemented immediately as part of the project or could be deferred as a future phase. Additionally, both a direct left turn to the ramp plus a downstream loon could be implemented in tandem to allow for drivers to access the loon when a long queue exists at the direct left location.

A directional median opening could be built for each direction of US60 to allow for indirect left turn access via U-turns for the drivers coming from the neighborhood, college and youth camp.



VALUE ENGINEERING PROPOSAL 3
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Eliminate direct left turn to Ramp F-1 and provide U-turn opportunity downstream

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 4
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Increase the radius on Ramp A																			
FUNCTION: Improve Geometrics																			
BASELINE ASSUMPTION:																			
The current radius is 180 ft.																			
PROPOSED ALTERNATIVE:																			
Increase the existing 180-ft. radius to 300 ft. and add a retaining wall to avoid impacts to Calumet Farm.																			
BENEFITS		RISKS/CHALLENGES																	
<ul style="list-style-type: none"> Reduces accident risk 		<ul style="list-style-type: none"> Adds to project cost 																	
<ul style="list-style-type: none"> Increases acceleration speed onto US60 		<ul style="list-style-type: none"> 																	
<ul style="list-style-type: none"> Increases driver comfort 		<ul style="list-style-type: none"> 																	
<ul style="list-style-type: none"> No affect to Calumet's white fence 		<ul style="list-style-type: none"> 																	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 																	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 																	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 																	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 																	
<table border="1"> <thead> <tr> <th>COST SUMMARY</th> <th>Initial Costs</th> <th>O&M Costs</th> <th>Total Life Cycle Cost</th> </tr> </thead> <tbody> <tr> <td>BASELINE ASSUMPTION:</td> <td>\$ -</td> <td>\$ -</td> <td>\$ -</td> </tr> <tr> <td>PROPOSED ALTERNATIVE:</td> <td>\$ 158,670</td> <td>\$ -</td> <td>\$ 158,670</td> </tr> <tr> <td>TOTAL (Baseline less Proposed)</td> <td>\$ (158,670)</td> <td>\$ -</td> <td>\$ (158,670)</td> </tr> </tbody> </table>				COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost	BASELINE ASSUMPTION:	\$ -	\$ -	\$ -	PROPOSED ALTERNATIVE:	\$ 158,670	\$ -	\$ 158,670	TOTAL (Baseline less Proposed)	\$ (158,670)	\$ -	\$ (158,670)
COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost																
BASELINE ASSUMPTION:	\$ -	\$ -	\$ -																
PROPOSED ALTERNATIVE:	\$ 158,670	\$ -	\$ 158,670																
TOTAL (Baseline less Proposed)	\$ (158,670)	\$ -	\$ (158,670)																
			COST																



VALUE ENGINEERING PROPOSAL 4
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Increase the radius on Ramp A

DISCUSSION/JUSTIFICATION:

The radius on the existing Ramp A has a high accident rate, as presented by the design team, caused by not making the turn and running through the radius. The radius can be increased from 180 ft. to 300 ft. The new design speed increases from 25mph to 30mph. In addition to providing a safer and more driver comfortable radius, the acceleration speed onto US60 would increase. The overall goal of this alternative is to increase safety on the ramp. However, it will be important to install a retaining wall in this location to avoid any right-of-way impacts to Calumet Farms.

IMPLEMENTATION CONSIDERATIONS:

However, it will be important to install a retaining wall in this location to avoid any right-of-way impacts to Calumet Farm.



VALUE ENGINEERING PROPOSAL 4
Project 7-279 KY4/US60 (Versailles) Interchange

New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE:	Increase the radius on Ramp A
---------------	-------------------------------

Assumptions

Interest/Discount Rate(%):	3%	Economic Life (yrs):	20
-----------------------------------	----	-----------------------------	----

LIFE CYCLE COST ANALYSIS

Increase the existing 180-ft. radius to 300 ft. and add			Baseline Assumption		Proposed Alternative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1						
2	Increases acceleration speed onto US60					
3						
4						
5						

Total Salvage & Replacement Costs

Annual Costs (pres worth calculated over 20 yrs)			Baseline Assumption		Proposed Alternative	
Item	Description		Est Cost	Pres Worth	Est Cost	Pres Worth
1						
2						
3						
4						
5						

Total Annual Costs

SUMMARY	Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)		

RESULTS (Proposed less baseline)

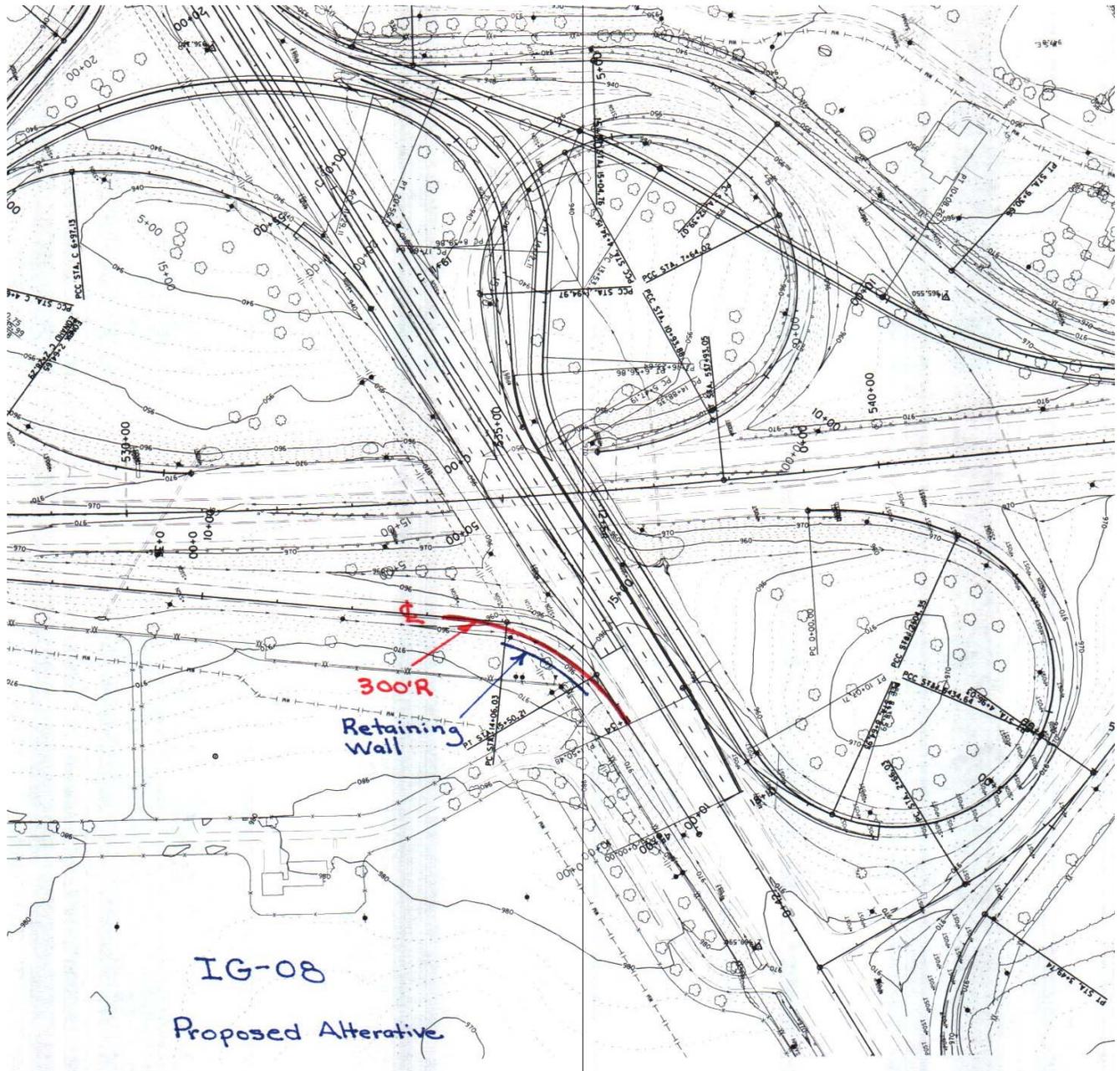
Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.



VALUE ENGINEERING PROPOSAL 4
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Increase the radius on Ramp A

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 5
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Eliminate the proposed Ramp D																							
FUNCTION: Improve Geometrics																							
BASELINE ASSUMPTION:																							
Reconstruct the existing Ramp D, carrying the northbound New Circle Road exit to eastbound Versailles Road, on the new alignment.																							
PROPOSED ALTERNATIVE:																							
Eliminate the proposed Ramp D from the beginning to approximate Station 17+00.																							
BENEFITS		RISKS/CHALLENGES																					
<ul style="list-style-type: none"> • Cost reduction 		<ul style="list-style-type: none"> • The horizontal alignment of existing Ramp D has sharper curves than the proposed alignment. 																					
<ul style="list-style-type: none"> • Traffic control for the existing Ramp G should be less complicated 		<ul style="list-style-type: none"> • 																					
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																					
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																					
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																					
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																					
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																					
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																					
<table border="1"> <thead> <tr> <th colspan="2">COST SUMMARY</th> <th>Initial Costs</th> <th>O&M Costs</th> <th>Total Life Cycle Cost</th> </tr> </thead> <tbody> <tr> <td colspan="2">BASELINE ASSUMPTION:</td> <td>\$ 233,775</td> <td>\$ -</td> <td>\$ 233,775</td> </tr> <tr> <td colspan="2">PROPOSED ALTERNATIVE:</td> <td>\$ 64,665</td> <td>\$ -</td> <td>\$ 64,665</td> </tr> <tr> <td colspan="2">TOTAL (Baseline less Proposed)</td> <td>\$ 169,110</td> <td>\$ -</td> <td>\$ 169,110</td> </tr> </tbody> </table>				COST SUMMARY		Initial Costs	O&M Costs	Total Life Cycle Cost	BASELINE ASSUMPTION:		\$ 233,775	\$ -	\$ 233,775	PROPOSED ALTERNATIVE:		\$ 64,665	\$ -	\$ 64,665	TOTAL (Baseline less Proposed)		\$ 169,110	\$ -	\$ 169,110
COST SUMMARY		Initial Costs	O&M Costs	Total Life Cycle Cost																			
BASELINE ASSUMPTION:		\$ 233,775	\$ -	\$ 233,775																			
PROPOSED ALTERNATIVE:		\$ 64,665	\$ -	\$ 64,665																			
TOTAL (Baseline less Proposed)		\$ 169,110	\$ -	\$ 169,110																			
SAVINGS																							



VALUE ENGINEERING PROPOSAL 5
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Eliminate the proposed Ramp D

DISCUSSION/JUSTIFICATION:

The proposed Ramp D can be eliminated from approximately Stations 5+00 to 17+00. The existing Ramp D can remain in use at approximately Station 17+00, where it can tie to the proposed Ramp D. Existing Ramp D, proposed Ramp D, and proposed Ramp E, Ramp E is from southbound New Circle Road to eastbound Versailles Road, are at the same approximate elevation at this point and the grades would need little adjustment to tie. The horizontal alignments of the ramps tie at this same approximate location. Traffic control could be less difficult by not crossing existing Ramp G twice. Construction costs will be reduced by eliminating 1,200-ft. of ramp roadway. The existing horizontal alignment has a curve with a smaller radius than the proposed alignment, but it is adequate.

IMPLEMENTATION CONSIDERATIONS:

None apparent



VALUE ENGINEERING PROPOSAL 5
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Eliminate the proposed Ramp D								
DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost \$	TOTAL \$	Qty	Unit Cost \$	TOTAL \$
Pavement		SY	2381	75.00	178,575	715	75.00	53,625
Excavation		CY	4600	12.00	55,200	920	12.00	11,040
					233,775			64,665
(BASELINE LESS PROPOSED)								169,110

*Note: Costs are rounded to nearest thousand dollars.

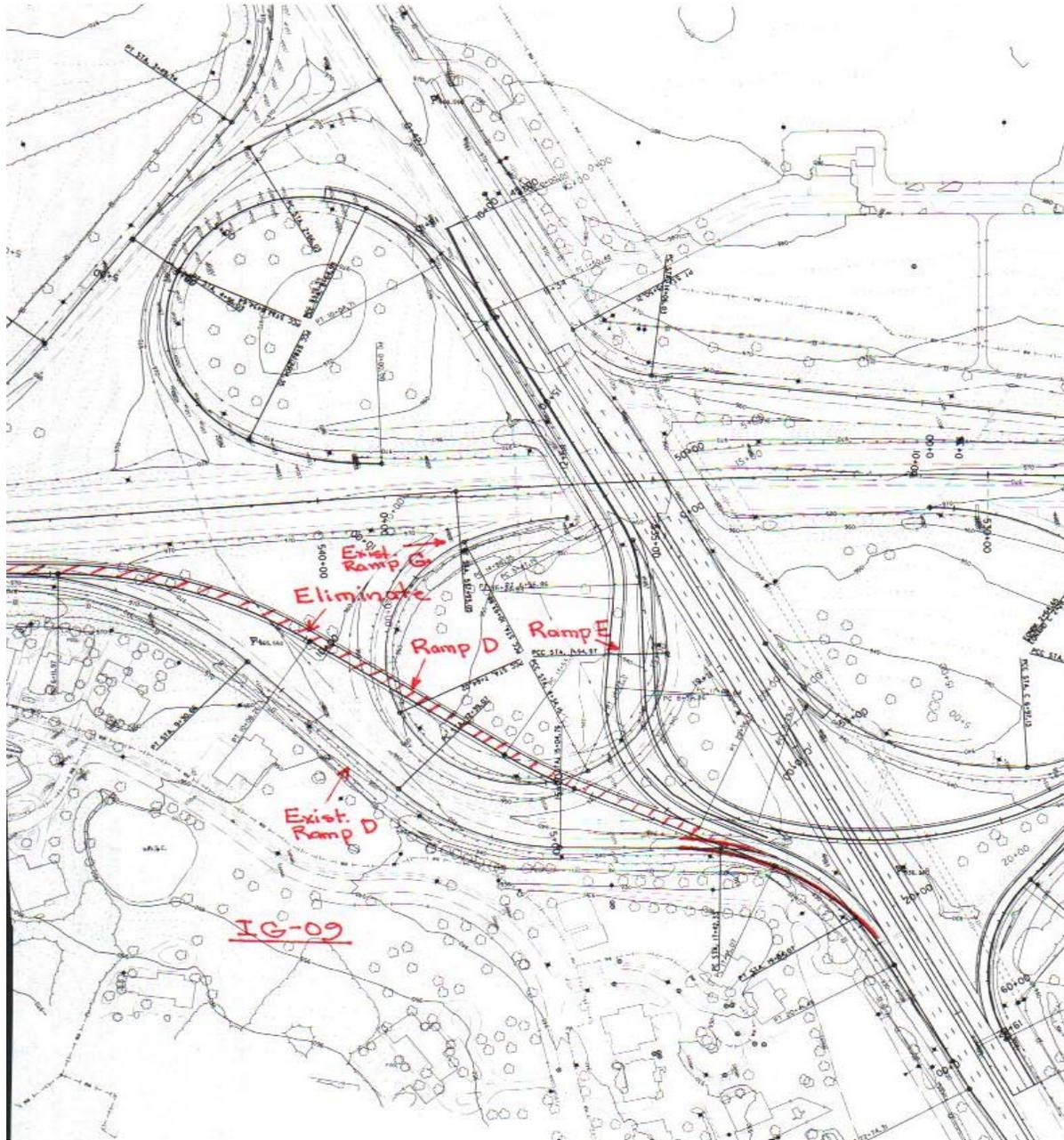
SAVINGS



VALUE ENGINEERING PROPOSAL 5
Project 7-279 KY4/US60 (Versailles) Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Eliminate the proposed Ramp D

SKETCH OF PROPOSED ALTERNATIVE





**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

New Circle Road Widening



VALUE ENGINEERING PROPOSAL 1
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Use a single span bridge at Alexandria and eliminate the piers			
FUNCTION: Span Space			
BASELINE ASSUMPTION:			
The current design is a 153-ft., 3-span 45-ft.-65-ft.-40-ft. spread box beam bridge using fourteen, 27-inch deep x 48-inch wide box beams spaced at 8'-8" on center. Out to out bridge width is 121'-8" and minimum vertical clearance is 15.39-ft.			
PROPOSED ALTERNATIVE:			
Change the current design to an 84-ft., single-span spread box beam bridge using fourteen, 33-inch deep x 48-inch wide box beams also spaced at 8'-8" on center with the same 121'-8" out to out bridge width. The minimum vertical clearance will be reduced by 6-inches to 14.89-ft. which is more than the 14'-6" clearance required for this class of road, with very little truck traffic. Also, this increases the horizontal clearance provided by the baseline design of the proposed bridge.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Eliminates two intermediate piers 		<ul style="list-style-type: none"> The 6 inches of reduced clearance needs to be checked to ensure that the grade on New Circle Road needs to be raised 	
<ul style="list-style-type: none"> Eliminates 69 ft. of bridge which reduces the superstructure cost 		<ul style="list-style-type: none"> Abutments need to be designed to retain some earth pressure 	
<ul style="list-style-type: none"> Lower cost due to less bridge 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Reduces future maintenance costs 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:	\$	1,900,000	\$ 60,000
PROPOSED ALTERNATIVE:	\$	1,110,990	\$ 36,000
TOTAL (Baseline less Proposed)	\$	789,009	\$ 24,000
			SAVINGS



VALUE ENGINEERING PROPOSAL 1
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Use a single span bridge at Alexandria and eliminate the piers

DISCUSSION/JUSTIFICATION:

The proposed 153-ft., 3-span bridge is longer than the existing 3-span bridge so that the end bents could be constructed without interfering with and removing the existing abutments. Our proposed 84-ft., single span bridge uses 33-inch deep box beams to span the 84 ft. as opposed to the current 27-inch deep box beams that have a maximum center span of 65 ft. Our proposed abutments are placed approximately halfway between the existing piers and abutments so as not to disturb either as well. We estimate that our proposed abutments will cost no more than the currently proposed piers and end bents while shortening the total bridge length by 69 ft. The current in-place cost of 27-inch spread box beams is \$275 per foot and \$293 per foot for the 33-inch spread box beams--only 6% more. The existing bridge, as drawn on the plans, has a 14'-6" clearance which is adequate for this class of road with very little truck traffic. The current proposed bridge shows 15.39 ft. of clearance. Our proposal to increase the beam depth by 6 inches still allows a vertical clearance of 14.89 ft., which is more than the existing clearance. Reducing the bridge length will not only reduce the cost to construct but will also reduce the cost of future maintenance, such as a future overlay.

IMPLEMENTATION CONSIDERATIONS:

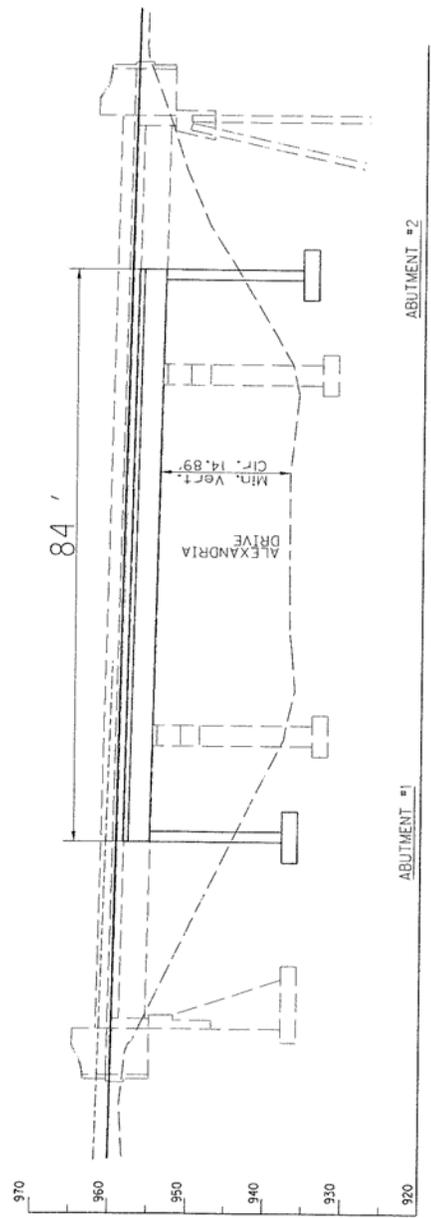
The abutments need to be designed to resist earth pressure, but since they are being placed partially up the spill-through slope, the size of footers, rebar, etc. will be significantly reduced when compared to full height walls that would be placed in the same location as the existing piers. In this case, since the piers are being offset, the piers need to be removed to just below grade so the existing footings can remain in-place. The same is true for the existing end bent structures. Since our proposed bridge is shorter than the existing bridge and the existing bridge will remain in place during phase 1 construction, it will be necessary to provide temporary sheeting to keep the approach fill being placed behind the new abutments from spilling underneath the existing bridge. As an alternative, a common solution is to construct the new approach embankment using MSE or wire wall construction that allows the embankment to be constructed with near vertical side slopes. No concrete panels or other hard facing is required for this type of construction and phase 2 embankment can simply be constructed up against the wire wall with no other special considerations.



VALUE ENGINEERING PROPOSAL 1
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Use a single span bridge at Alexandria and eliminate the piers

SKETCH OF PROPOSED ALTERNATIVE



ELEVATION

84' Single Span SB33-48 Box Beam Bridge
Continuous For Live Load (125% of HL93)
0° Skew, 118'-8" Spans @ Bridge

SS-01 Single Span Alexandria Bridge



VALUE ENGINEERING PROPOSAL 10
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Eliminate the Norfolk/Southern bridge from the design to eliminate the risk to the schedule																			
FUNCTION: Miscellaneous																			
BASELINE ASSUMPTION:																			
The baseline assumption would include the replacement of the Norfolk/Southern bridge in the New Circle Road widening project. The widening of New Circle Road would continue approximately 1,200 feet past the Norfolk/Southern bridge.																			
PROPOSED ALTERNATIVE:																			
The proposed alternative would eliminate the Norfolk/Southern bridge replacement from this project along with the proposed mainline widening to the north of the project. This section of the project would then be included with the proposed New Circle Road widening project to the northeast.																			
BENEFITS		RISKS/CHALLENGES																	
<ul style="list-style-type: none"> • Agreements with Norfolk/Southern would not delay the rest of the project 		<ul style="list-style-type: none"> • This section could be further delayed, leaving a gap between the two projects 																	
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • Could cause backups affecting the Leestown Road interchange 																	
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																	
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																	
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																	
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																	
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																	
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																	
<table border="1"> <thead> <tr> <th>COST SUMMARY</th> <th>Initial Costs</th> <th>O&M Costs</th> <th>Total Life Cycle Cost</th> </tr> </thead> <tbody> <tr> <td>BASELINE ASSUMPTION:</td> <td>\$ 4,235,420</td> <td>\$ -</td> <td>\$ 4,235,420</td> </tr> <tr> <td>PROPOSED ALTERNATIVE:</td> <td>\$ -</td> <td>\$ -</td> <td>\$ -</td> </tr> <tr> <td>TOTAL (Baseline less Proposed)</td> <td>\$ 4,235,420</td> <td>\$ -</td> <td>\$ 4,235,420</td> </tr> </tbody> </table>				COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost	BASELINE ASSUMPTION:	\$ 4,235,420	\$ -	\$ 4,235,420	PROPOSED ALTERNATIVE:	\$ -	\$ -	\$ -	TOTAL (Baseline less Proposed)	\$ 4,235,420	\$ -	\$ 4,235,420
COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost																
BASELINE ASSUMPTION:	\$ 4,235,420	\$ -	\$ 4,235,420																
PROPOSED ALTERNATIVE:	\$ -	\$ -	\$ -																
TOTAL (Baseline less Proposed)	\$ 4,235,420	\$ -	\$ 4,235,420																
			SAVINGS																



VALUE ENGINEERING PROPOSAL 10
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Eliminate the Norfolk/Southern bridge from the design to eliminate the risk to the schedule

DISCUSSION/JUSTIFICATION:

The proposed alternate would eliminate the northernmost part of the project by tapering the mainline design from six lanes to four lanes south of the bridge, keeping the existing Norfolk and Southern bridge in place, and keeping the current four lane section of New Circle Road north of the Norfolk/Southern bridge.

During the risk assessment, the project and VE team identified the probability of this occurring as Likely and the Severity of the occurrence as Substantial, giving this a risk rating of Extremely High in occurrence. Additionally, it was identified that the potential impact to the schedule could be 6 to 12 months in length and the team recommended that this risk be mitigated. If negotiations look like they may drag on, this alternative would allow construction to begin on the remainder of the project without delay.

This section that is being dropped from the project would most likely need to be picked up by the New Circle Road project to the north, but the reduction in budget may allow for other improvements along New Circle Road.

IMPLEMENTATION CONSIDERATIONS:

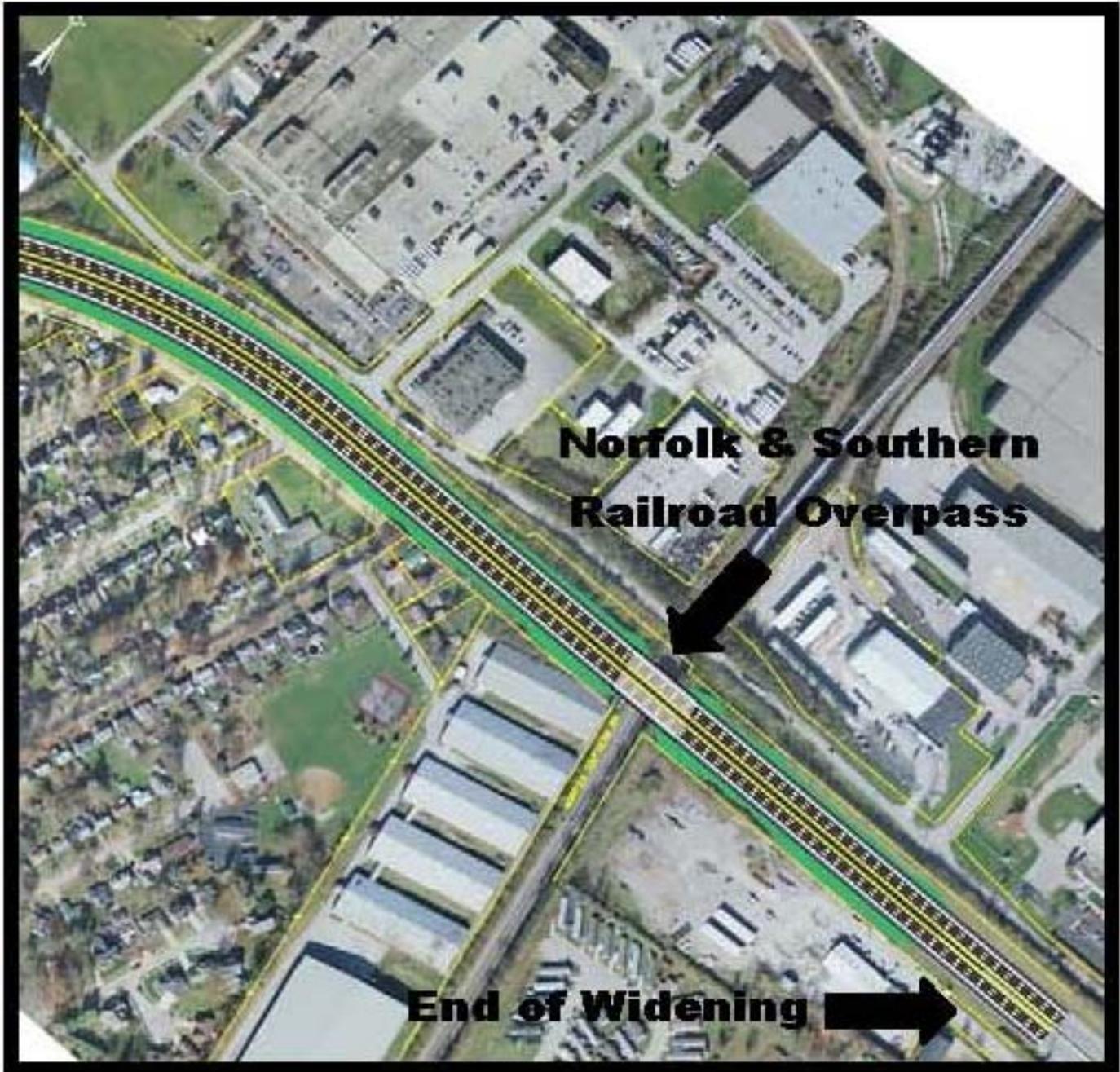
This project could potentially leave a short term gap with a four-lane cross section between the six-lane design of this project and the six-lane design of the project northeast of this project, which is currently in Phase II design.



VALUE ENGINEERING PROPOSAL 10
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Eliminate the Norfolk/Southern bridge from the design to eliminate the risk to the schedule

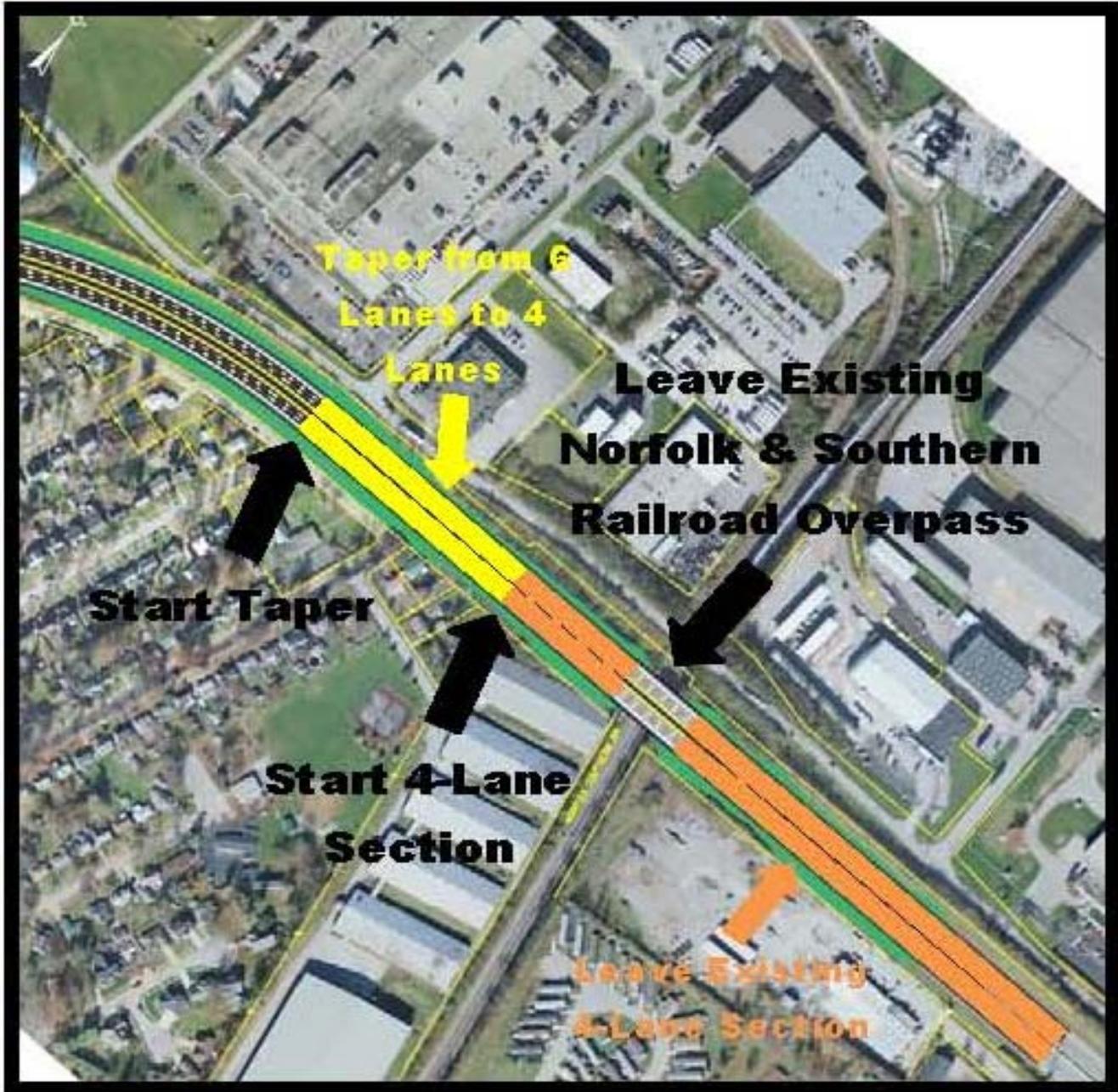
SKETCH OF BASELINE ASSUMPTION





TITLE: Eliminate the Norfolk/Southern bridge from the design to eliminate the risk to the schedule

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 2
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Widen both the bridges and roadway to one side in lieu of symmetric widening			
FUNCTION:		SPAN SPACE	
BASELINE ASSUMPTION:			
The current design is based on Alignment 1, which shows a symmetric widening of the roadway based on the centerline of the existing freeway.			
PROPOSED ALTERNATIVE:			
This alternative would shift the 6-lane roadway section slightly to align with the existing edge of pavement and the edge of the existing structures. The average centerline offset would be 6 ft. rather than 0 ft. (centered).			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Faster construction/shorter duration 		<ul style="list-style-type: none"> Future widening to 8 lanes could be more difficult 	
<ul style="list-style-type: none"> Reduces maintenance of traffic costs 		<ul style="list-style-type: none"> Determining the optimal alignment shift may be difficult due to varying offsets of structures 	
<ul style="list-style-type: none"> Reduces structure modification costs 		<ul style="list-style-type: none"> May still require a three phase traffic control maintenance of traffic sequence 	
<ul style="list-style-type: none"> Reduces roadway pavement costs 		<ul style="list-style-type: none"> Reduces clear zone from baseline in some areas 	
<ul style="list-style-type: none"> Can reduce noise by shifting to the north, noise source "NO CLOSER". Possibly reduce or delete noise walls 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Takes advantage of existing right-of-way 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Will make it easier to achieve maximum overlay by matching grade 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Will provide increased improvements if the lane widths or shoulders are reduced 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ 24,936,344	\$ -
PROPOSED ALTERNATIVE:		\$ 21,699,092	\$ -
TOTAL (Baseline less Proposed)		\$ 3,237,252	\$ -
		SAVINGS	



VALUE ENGINEERING PROPOSAL 2
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Widen both the bridges and roadway to one side in lieu of symmetric widening

DISCUSSION/JUSTIFICATION:

The benefits sought are to avoid widening both sides of the roadway and structure and potentially gain economies of scale for the construction and reduce maintenance of traffic costs by having fewer traffic control changes. The concept is to try to reduce costs by achieving a higher level of efficiency of construction, both for roadway and bridge widening improvements. If minor or no work will be required on one side of the roadway/bridge widening, then the construction activities on the side that is widened can be done with one set up, achieving greater production and less disruption to traffic. This should result in a reduction in earthwork and pavement section cost due to greater efficiency, if not less earthwork. It might enable the existing structures at Leestown Road and Norfolk Southern to be salvaged, and all the south abutments or south side of the abutments could be extended or salvaged. There is also an opportunity for the contractor to reduce the number of traffic control changes or allow them to have more room for median improvements, reducing maintenance of traffic and the traveling public dissatisfaction.

IMPLEMENTATION CONSIDERATIONS:

It will be critical to determine if there is a consistent offset that will work for the roadway and the structures. The offset design should be at a consistent offset from the centerline. A fairly detailed evaluation of the centerline shift at several locations is needed to see if this idea has the potential to achieve the desired benefits. After reviewing 19 cross sections, it appears that a 6-foot shift would allow for effective transitioning from Station 228+00 (Versailles Road Interchange) to the Leestown Road bridge.



VALUE ENGINEERING PROPOSAL 2
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Widen both the bridges and roadway to one side in lieu of symmetric widening								
DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
		Description	Unit	Qty	Unit Cost \$	TOTAL \$	Qty	Unit Cost \$
Paving - Asphalt base only		Ton	141440	53.05	7,503,392	141440	50.00	7,072,000
Roadway - Excavation		CUYD	182958	8.00	1,463,664	155514	7.20	1,119,703
Roadway - Guardrail		LF	6500	16.69	108,485	7000	16.69	116,830
Roadway - Clearing and grubbing		LS	1	132,000.00	132,000	0.8	132,000.00	105,600
Roadway - Maintain and control traffic		LS	1	188,000.00	188,000	0.8	188,000.00	150,400
Roadway - Remove structure		LS	1	1,200,000.00	1,200,000	0.7	1,200,000.00	840,000
Retaining walls		CY	740	286.00	211,640	592	286.00	169,312
Bridge at Alexandria Drive		LS	1	1,900,000.00	1,900,000	0.75	1,900,000.00	1,425,000
Bridge at RJ Corman (Sta. 277)		LS	1	2,590,000.00	2,590,000	0.75	2,590,000.00	1,942,500
Bridge at Old Frankfort Pike Leestown Road		LS	1	2,320,000.00	2,320,000	1	2,320,000.00	2,320,000
Bridge at RJ Corman (Sta. 317+50)		LS	1	2,830,000.00	2,830,000	0.75	2,830,000.00	2,122,500
Bridge at Leestown Road		LS	1	2,560,000.00	2,560,000	1	2,560,000.00	2,560,000
Town Branch Creek Box		LS	1	190,000.00	190,000	1	190,000.00	190,000
Mobilization - New Circle Road, Old Frankfort Pike, and Leestown Road		LS	1	1,739,163.00	1,739,163	0.9	1,739,163.00	1,565,247
					24,936,344			21,699,092
(BASELINE LESS PROPOSED)								3,237,252

*Note: Costs are rounded to nearest thousand dollars.

SAVINGS



VALUE ENGINEERING PROPOSAL 2
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

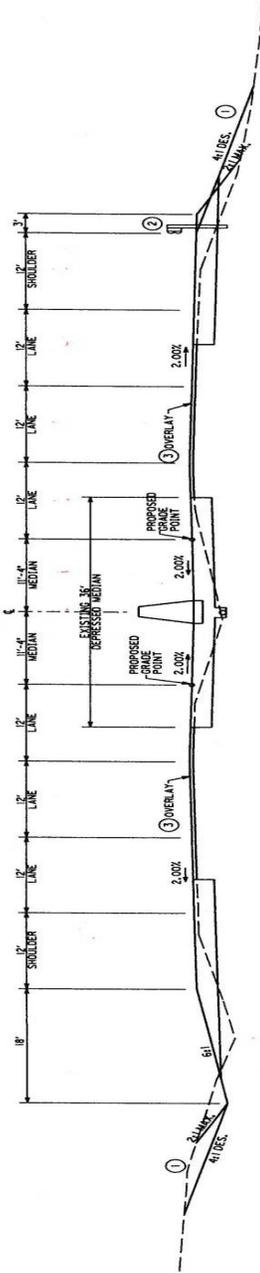
TITLE: Widen both the bridges and roadway to one side in lieu of symmetric widening

SKETCH OF BASELINE ASSUMPTION

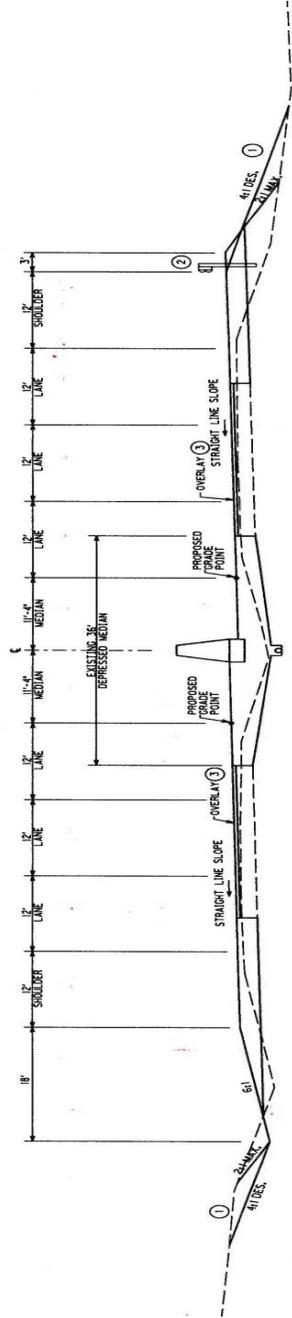
COUNTY OF	ITEM NO.	SHEET NO.
FAYETTE	7-113.00	2

TYPICAL SECTIONS

ALTERNATE 1
STA. 226+00 TO STA. 327+22



**NORMAL SECTION
 NEW CIRCLE ROAD**



**SUPERLEVATED SECTION
 NEW CIRCLE ROAD**

- ① SEE CROSS SECTIONS FOR SLOPES OUTSIDE THE LIMITS OF THE SHOULDER.
- ② SHOULDERS SHALL BE WIDENED TO WHERE GUARDRAIL IS TO BE INSTALLED.
- ③ THERE ARE TWO OPTIONS FOR THE DEPRESSED MEDIAN. OPTION ONE IS TO PROVIDE AN OVERLAY OVER THE EXISTING PAVEMENT. OPTION TWO IS TO FULL DEPTH PAVEMENT AND REPLACE WITH FULL DEPTH PAVEMENT.

Typical section for Alternate 1



VALUE ENGINEERING PROPOSAL 2
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Widen both the bridges and roadway to one side in lieu of symmetric widening

SKETCH OF PROPOSED ALTERNATIVE

VE Proposal SS-02

Evaluation of benefits from shifting New Circle Road construction centerline.

Alternative 1 Proposed outside to outside width: 6 lanes at 12 feet and a 22.67 foot 94.67 feet

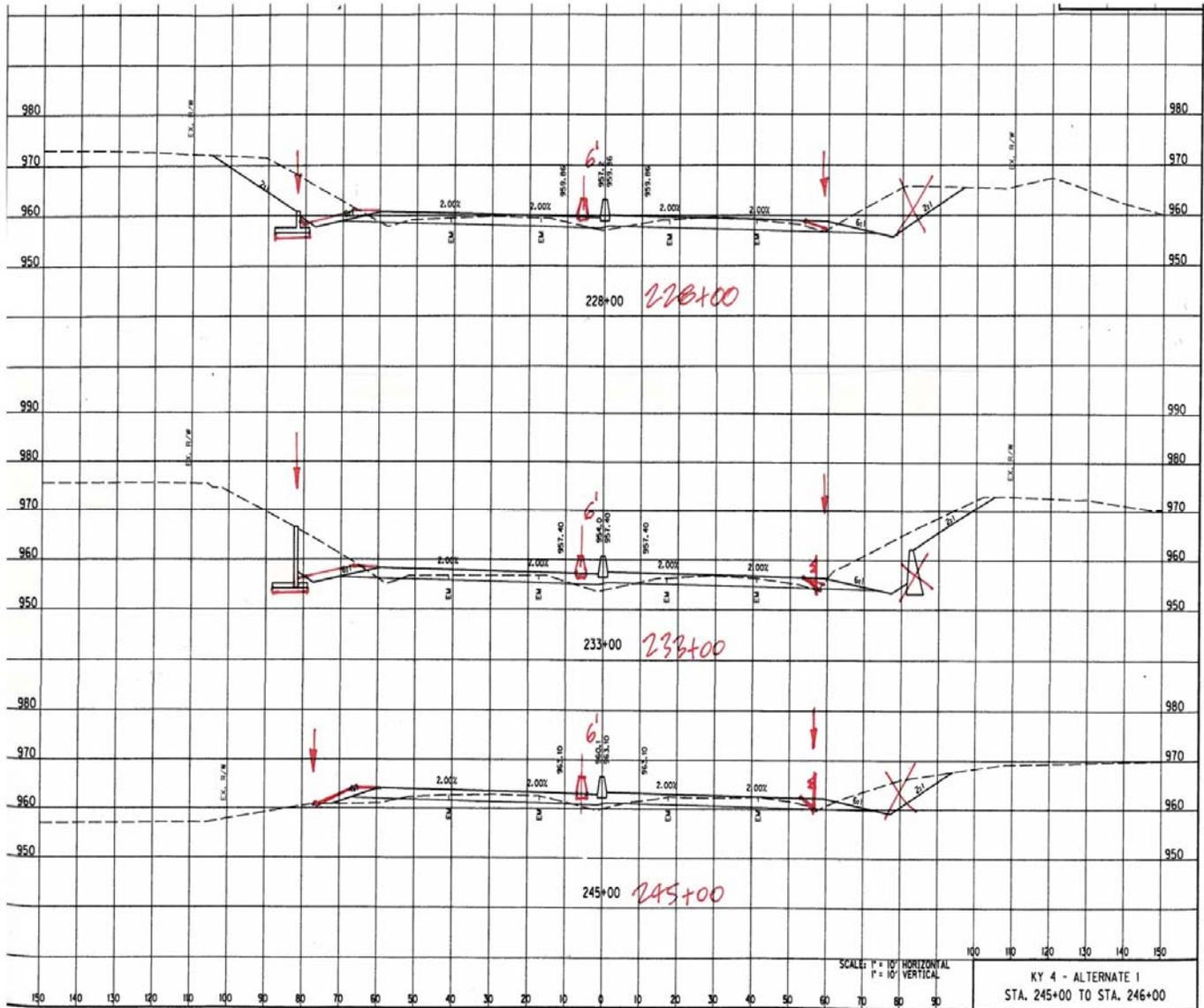
Station	Offsets	Offsets	Offsets	Offsets	Offsets	Offsets	Offsets	
	ALT. 1 Proposed	SS-02 Proposed	Existing edge of	Construction	Existing edge of	SS-02 Proposed	ALT. 1 Proposed	Comments
	outer lane north	outer lane North	Existing edge of	Centerline	pavement	outer lane south	outer lane south	
			Centerline	Centerline	south			
228+00	-47.33	-53.34	-42	6	41	41.33	47.33	Will increase cut on north side
233+00	-47.33	-53.34	-42	6	41	41.33	47.33	Would eliminate cut and retaining walls on south side. Guardrail?
245+00	-47.33	-53.34	-42	6	42	41.33	47.33	Cut on east side could be eliminated
250+00	-47.33	-53.34	-42	6	41	41.33	47.33	Alexandria Drive Bridge - Assumed south side of bridge is 48 feet based on guradrail Topo - would have 6 foot shoulder on South side
270+00	-47.33	-53.34	-41	6	41	41.33	47.33	less earthwork on east side
277+00	-47.33	-53.34	-41	6	41	41.33	47.33	RJ Corman Railroad Bridge - Assumed south side of bridge is 47 feet based on guradrail Topo - would have 6 foot shoulder here. Need eccentric widening to north anyway for ramp . Old Frankfort Pike Bridge - If this bridge was salvaged (VE Prop. SS-07), then offset would be a problem. If it is replaced, abutments are moved, therefore no problem.
293+50	-47.33	-53.34	-41	6	41	41.33	47.33	North abutment is approximately 58 feet left
300+00	-47.33	-53.34	-42	6	41	41.33	47.33	South abutment is approximately 53 feet right
315+00	-47.33	-53.34	-42	6	41	41.33	47.33	Will save a lot of fill on south
317+50	-47.33	-53.34	-42	6	41	41.33	47.33	RJ Corman Railroad Bridge - Assumed south side of bridge is 47 feet based on guradrail Topo - would have 6 foot shoulder on south here.
328+00	-47.33	-47.67	-47	0.33	47	47	47.33	Take advantage of wider pavement from previous ramps
330+00	-47.33	-47.67	-47	0.33	47	47	47.33	Take advantage of wider pavement from previous ramps
340+00	-47.33	-50.67	-44	3.33	44	44	47.33	Existing section narrows here.
342+00	-47.33	-50.67	-37	3.33	35	44	47.33	Leestown Road Bridge will be replaced so centered or 6 foot offset will work either way. The centered alignment here already takes advantage of the existing south edge of pavement.
357+00	-47.33	-47.67	-35	0.33	47	47	47.33	
370+00	-47.33	-53.34	-34	6	34	41.33	47.33	Norfolk-Southern Railroad - This structure can be left in place. Widen to the north only. Eliminate the Retaining walls on the south side.
385+00	-47.33	-53.34	-41	6	40	41.33	47.33	Centered would also work well here, the earthwork rofile matches, it is just MOT savings
390+00	-47.33	-53.34	-36	6	35	41.33	47.33	
394+00	-47.33	-47.34	-37	0	35	47.33	47.33	Will need to tie into the existing barrier on this end which is centered.



VALUE ENGINEERING PROPOSAL 2
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Widen both the bridges and roadway to one side in lieu of symmetric widening

SKETCH OF PROPOSED ALTERNATIVE

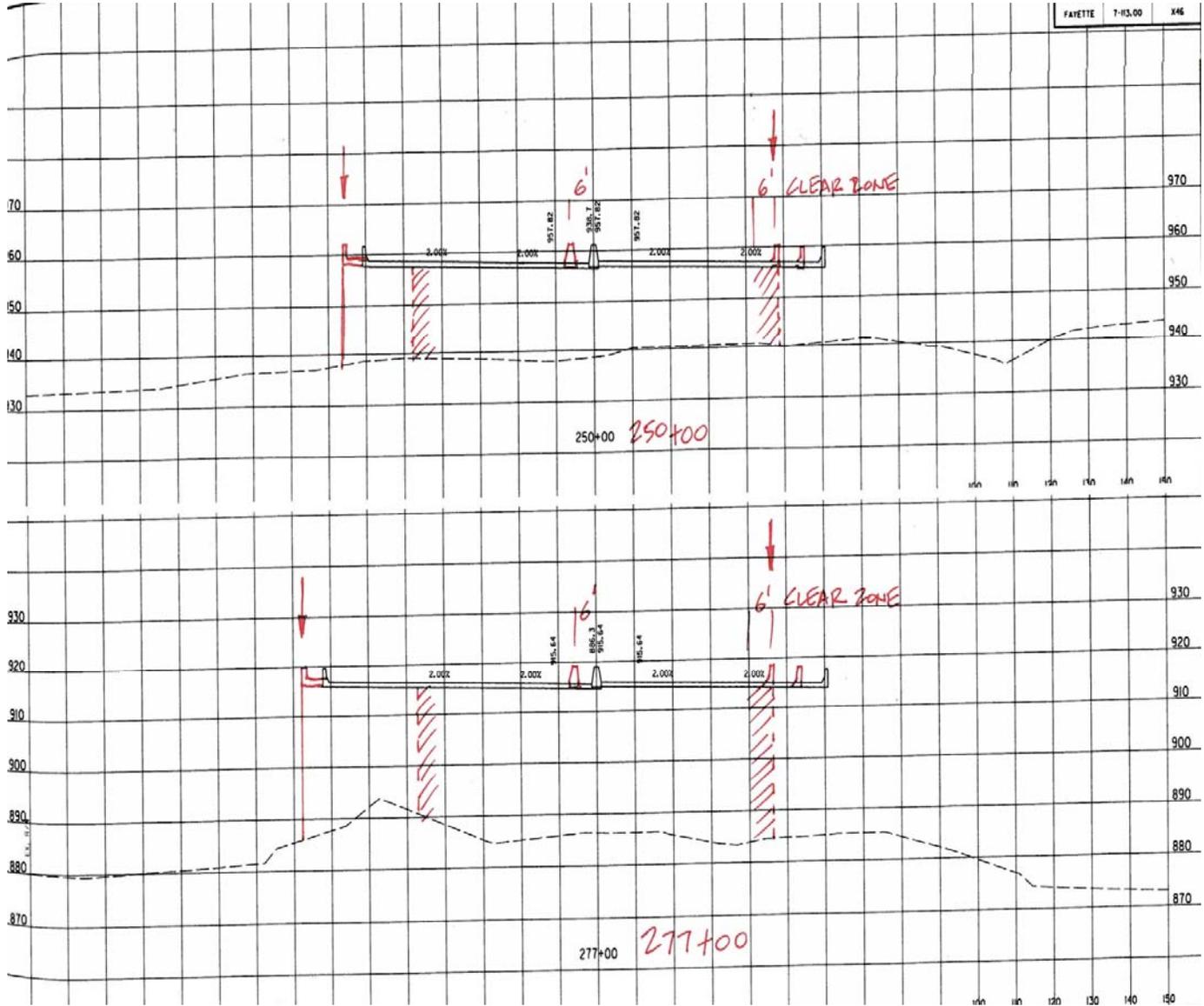




VALUE ENGINEERING PROPOSAL 2
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Widen both the bridges and roadway to one side in lieu of symmetric widening

SKETCH OF PROPOSED ALTERNATIVE

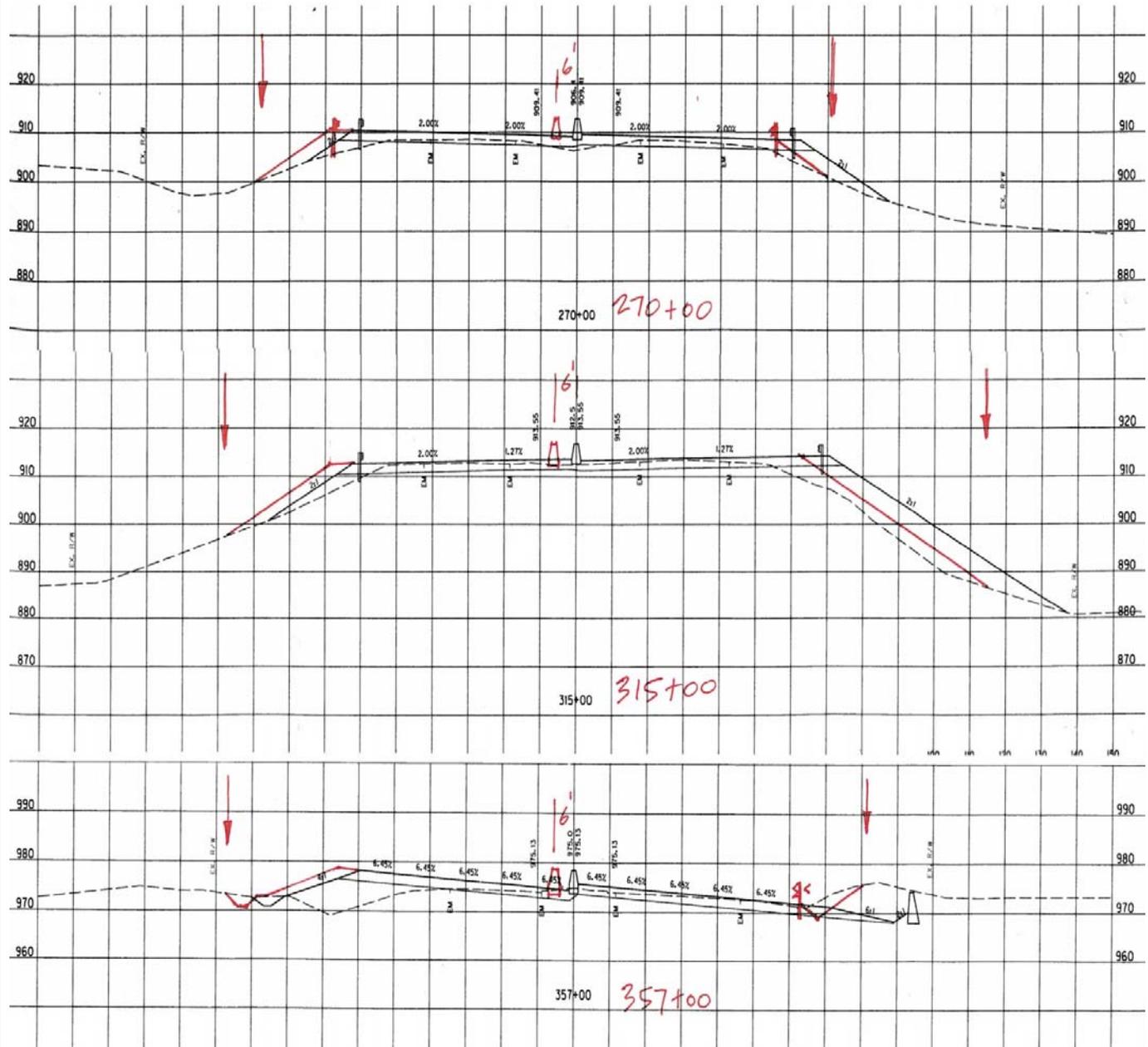




VALUE ENGINEERING PROPOSAL 2
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Widen both the bridges and roadway to one side in lieu of symmetric widening

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 3
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Salvage the superstructure of the Norfolk/Southern bridge			
FUNCTION: Span Space			
BASELINE ASSUMPTION:			
Remove the existing bridge completely and construct a new 218-ft., 3-span, 55-ft.-90-ft.-70-ft. spread box beam bridge using 13 ~ 42-inch deep x 48-inch wide box beams spaced at 8'-2" on center. Out to out bridge width is 129'-8".			
PROPOSED ALTERNATIVE:			
Widen the existing twin bridges.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> • Simplifies maintenance of traffic 		<ul style="list-style-type: none"> • Handling longitudinal construction joints between old and new bridge structures 	
<ul style="list-style-type: none"> • Square footage of new bridge constructed is reduced by half 		<ul style="list-style-type: none"> • Constructing the middle widening has about 8 ft. width to work in and the adjacent traffic lanes on both sides of the existing bridges will need to be closed during construction 	
<ul style="list-style-type: none"> • Provides additional clearance over the railroad 		<ul style="list-style-type: none"> • Stair stepping of abutments and piers and whether or not to tie the bridge slab together between old and new construction 	
<ul style="list-style-type: none"> • Reduces construction time to build the bridge 		<ul style="list-style-type: none"> • Life expectancy of the existing bridge and whether additional rehabilitation work should be done, such as replacing the existing slab 	
<ul style="list-style-type: none"> • Expedites railroad approval 		<ul style="list-style-type: none"> • 	
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 	
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 	
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ 3,880,000	\$ -
PROPOSED ALTERNATIVE:		\$ 1,562,246	\$ 388,000
TOTAL (Baseline less Proposed)		\$ 2,317,754	\$ (388,000)
		SAVINGS	



VALUE ENGINEERING PROPOSAL 3
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Salvage the superstructure of the Norfolk/Southern bridge

DISCUSSION/JUSTIFICATION:

By leaving the existing twin bridges in-place and constructing the bridge widening as required for the widening of New Circle Road, this will reduce the amount of the new bridge structure in half, reducing the cost for this bridge roughly by half. It will also reduce time to construct this bridge and make maintenance of traffic much easier. The approach is to widen the existing bridges by removing the existing barrier walls and then widening 22 ft. to the right (inside loop), 8 ft. in the middle between the existing twin bridges and then 28 ft. to the left (outside loop). Each of the existing twin bridges are 35 ft. wide after removal of the concrete bridge railing. The right widening will require 3 beam lines, the middle, 1 beam line, and the left widening of 4 beam lines. Since the existing maximum span is 80 ft. (center span), 33-inch deep spread box beams can be used, increasing clearance by 9-inches. The new substructures will be stair stepped similarly to the existing twin bridges and at 90-degrees to centerline, also similar to the existing bridges. In affect, the bridge widenings are not skewed even though the railroad below is skewed to KY4.

IMPLEMENTATION CONSIDERATIONS:

Possible reduction to single lane of traffic in each direction during the middle widening.



VALUE ENGINEERING PROPOSAL 3
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Salvage the superstructure of the Norfolk/Southern bridge								
DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost \$	TOTAL \$	Qty	Unit Cost \$	TOTAL \$
Bridge removal		LS	1	200,000.00	200,000			
218-ft., 3-span bridge		SF	28267	130.19	3,680,000			
3 phases of bridge widening - right 200'x22', middle 200'x8', and left 200'x30'		SF				12000	130.19	1,562,246
					3,880,000			1,562,246
(BASELINE LESS PROPOSED)								2,317,754

*Note: Costs are rounded to nearest thousand dollars.

SAVINGS



VALUE ENGINEERING PROPOSAL 3

Project 7-113 - New Circle Road Widening

New Circle Road Rehab & KY4/US-60 Interchange Projects

Items #7-113.00 & #7-279.00

Fayette County

TITLE:	Salvage the superstructure of the Norfolk/Southern bridge
---------------	---

Assumptions

Interest/Discount Rate(%):	3%	Economic Life (yrs):	75
-----------------------------------	----	-----------------------------	----

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alternative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1	Rehab the existing bridges	20			700,000	387,573
2						
3						
4						
5						

Total Salvage & Replacement Costs **700,000** **387,573**

Annual Costs (pres worth calculated over 75 yrs)			Baseline Assumption		Proposed Alternative	
Item	Description		Est Cost	Pres Worth	Est Cost	Pres Worth
1						
2						
3						
4						
5						

Total Annual Costs

SUMMARY		Baseline Present Worth	Proposed Present Worth
Total Present Worth (salvage+annual pres worth)			388,000

RESULTS (Proposed less baseline)

Notes: 1) Total Present Worth is rounded to the nearest thousand dollars, 2) Initial costs are covered in the Detail sheet.



VALUE ENGINEERING PROPOSAL 4
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Raise the existing bridge at Old Frankfort Pike Road (jack superstructure at abutment) to achieve the vertical clearance for New Circle Road bridge			
FUNCTION: Span Space			
BASELINE ASSUMPTION:			
The current design is to construct a 4-span 48'-104'-104'-60' Type 4 PCI Beam Bridge at a 40-degree skew right. Out to out bridge width is 67 ft. and the existing bridge is removed after the new bridge is constructed.			
PROPOSED ALTERNATIVE:			
Jack this existing bridge to achieve vertical clearance at the haunched portion of the girders and eliminate the additional interchange work.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Eliminates the need to construct a new bridge at this time 		<ul style="list-style-type: none"> Does not address current traffic problems during rush hour traffic by widening for additional turn lanes 	
<ul style="list-style-type: none"> Eliminates doing any work along Old Frankfort Pike Road interchange at this time 		<ul style="list-style-type: none"> Accounting for the 45-degree skew, the 75 ft. center to center pier distance allows for 50 ft. clear between face of piers. For 3 lanes, this allows 14 ft. total for both shoulders combined 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> May need to close the interchange for a short duration 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ 7,712,748	\$ -
PROPOSED ALTERNATIVE:		\$ 100,000	\$ -
TOTAL (Baseline less Proposed)		\$ 7,612,748	\$ -

SAVINGS



VALUE ENGINEERING PROPOSAL 4
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Raise the existing bridge at Old Frankfort Pike Road (jack superstructure at abutment) to achieve the vertical clearance for New Circle Road bridge

DISCUSSION/JUSTIFICATION:

The current thought appears to be that the existing bridge must be replaced due to lack of clearance, which promotes the approach to go ahead and improve the interchange as well as Old Frankfort Pike Road. However, if this alternate shows that horizontal and vertical clearances can be achieved by jacking the existing bridge, and the bridge has a sufficiency rating of 68.3 and has significant life left, delaying work at this interchange and along Old Frankfort Pike Road may be feasible.

Jacking of this type of structure has been common in Kentucky and should be straight forward. However, fitting the proposed 3 lanes under the existing bridge will require narrowing of the proposed shoulders from 12 ft. on the outside and 10 ft. on the inside, to 10 ft. on the outside and 4 ft. on the inside. This conforms with the New Circle Road Proposal 5 which proposes to narrow the shoulders throughout to 10 ft. and 4 ft. This type of bridge is the simplest to jack and should be done with a manifold system so that all jacks are equally raised at both piers and both abutments at the same time. Wing walls will need modifications as well as abutments and piers once the bridge has been raised to achieve required clearance over New Circle Road. Approach roadway work will also be required to raise the approaches to match the new bridge elevation.

IMPLEMENTATION CONSIDERATIONS:

Old Frankfort Pike Road will need to be closed to traffic during most of this work but this work should be able to be accomplished within one week.



VALUE ENGINEERING PROPOSAL 5
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Reduce the inside shoulder width from 10 ft. to 4 ft.			
FUNCTION: IMPROVE THROUGHPUT			
BASELINE ASSUMPTION:			
The existing design is a 10 ft. inside shoulder with a concrete median barrier on the centerline.			
PROPOSED ALTERNATIVE:			
The proposal is to reduce the inside shoulder to 4 ft. keeping the concrete median barrier on the centerline.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Reduces outside widening 		<ul style="list-style-type: none"> Reduces surface water spread width 	
<ul style="list-style-type: none"> Reduces cost 		<ul style="list-style-type: none"> Eliminates refuge for stopped/disabled vehicles 	
<ul style="list-style-type: none"> Eliminates some retaining walls 		<ul style="list-style-type: none"> Would not match inside shoulder of the adjacent project (Georgetown Road end) 	
<ul style="list-style-type: none"> Reduces new impervious area 		<ul style="list-style-type: none"> AASHTO recommends a 10-ft. shoulder 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ 28,516,288	\$ -
PROPOSED ALTERNATIVE:		\$ 24,507,129	\$ -
TOTAL (Baseline less Proposed)		\$ 4,009,159	\$ -
		SAVINGS	



VALUE ENGINEERING PROPOSAL 5
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Reduce the inside shoulder width from 10 ft. to 4 ft.

DISCUSSION/JUSTIFICATION:

The KYTC Design Manual shows that a 10 ft. inside shoulder be utilized on 6-lane facilities; however, some interstates, carrying more traffic than New Circle Road, have a 4 ft. inside shoulder width. Examples would be I-65 in downtown Louisville, I-64 in Charleston, West Virginia and I-26 in South Carolina just outside of Charleston. The typical section used on this section most likely will be carried all the way to Richmond Road (approximately 13 miles) and a narrower template will create a greater cost savings. If and when New Circle Road needs to be widened to 8 lanes, additional width to bring the inside shoulder to 10 ft. could be included. A future widening project of that magnitude will have a substantial impact anyway and increasing the inside shoulder will have minimal additional impacts.

IMPLEMENTATION CONSIDERATIONS:

A narrower inside shoulder width would necessitate a new look at the Temporary Traffic Control Plan. Preliminary evaluation by the VE team determined that maintaining 2 lanes in each direction is feasible. A design exception would be required.



VALUE ENGINEERING PROPOSAL 5
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Reduce the inside shoulder width from 10 ft. to 4 ft.								
DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
		Description	%	Unit	Qty	Unit Cost \$	TOTAL \$	Qty
CL 3 Asphalt surface		TON	15022	78.65	1,181,480	13370	78.65	1,051,551
CL 3 Asphalt base		TON	141440	53.05	7,503,392	120225	53.05	6,377,936
Drainage blanket		TON	48895	38.44	1,879,524	40580	38.44	1,559,895
DGA base		TON	133906	18.10	2,423,699	97750	18.10	1,769,275
Fabric-Geotextile TY IV		SY	218502	1.34	292,793	181360	1.34	243,022
Roadway excavation		CY	182958	8.00	1,463,664	152960	8.00	1,223,680
Concrete -Class B		CY	740	286.13	211,736	150	286.13	42,920
Bridge over Alexandria Drive		LS	1	1,900,000.00	1,900,000	1	1,697,220.00	1,697,220
Bridge over CSX/Corman R/R 1		LS	1	2,590,000.00	2,590,000	1	2,353,560.00	2,353,560
Bridge over CSX/Corman R/R 2		LS	1	2,830,000.00	2,830,000	1	2,556,190.00	2,556,190
Bridge over Leestown Road		LS	1	2,560,000.00	2,560,000	1	2,304,500.00	2,304,500
Bridge over Norfolk Southern R/R		LS	1	3,680,000.00	3,680,000	1	3,327,380.00	3,327,380
					28,516,288			24,507,129
(BASELINE LESS PROPOSED)								4,009,159

*Note: Costs are rounded to nearest thousand dollars.

SAVINGS



VALUE ENGINEERING PROPOSAL 5
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

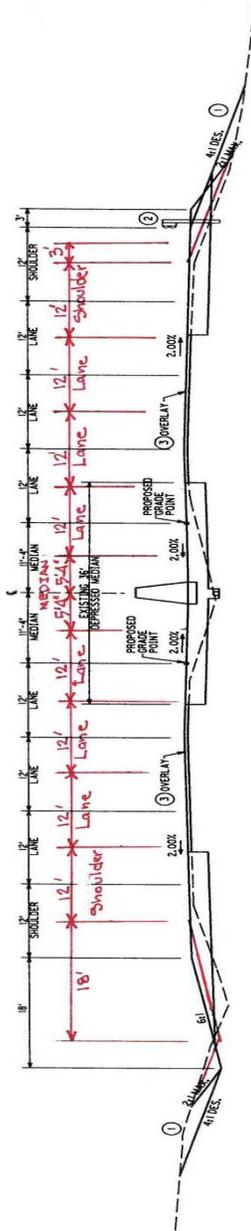
TITLE: Reduce the inside shoulder width from 10 ft. to 4 ft.

SKETCH OF PROPOSED ALTERNATIVE

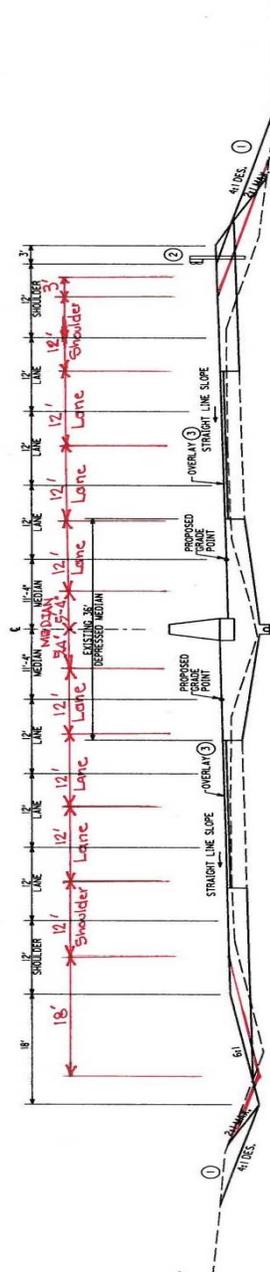
COUNTY OF	ITEM NO.	SHEET NO.
FAYETTE	7-113.00	2

TYPICAL SECTIONS
IT-01

ALTERNATE 1
STA. 226 + 00 TO STA. 327 + 22



NORMAL SECTION
NEW CIRCLE ROAD



SUPERELEVATED SECTION
NEW CIRCLE ROAD

- ① SEE CROSS SECTIONS FOR SLOPES OUTSIDE THE LIMITS OF THE SHOULDER.
- ② SHOULDER SHALL BE WIDENED 3' WHERE GUARDRAIL IS TO BE INSTALLED.
- ③ THERE ARE TWO OPTIONS FOR THE EXISTING PAVEMENT. OPTION ONE IS TO PROVIDE AN OVERLAY OPTION TWO IS TO REMOVE EXISTING PAVEMENT AND REPLACE WITH FULL DEPTH PAVEMENT.



VALUE ENGINEERING PROPOSAL 6
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Add Variable Message Signs (VMS) on the mainline and the associated roads crossing New Circle Road, to aid in congestion control			
FUNCTION: Improve Throughput			
BASELINE ASSUMPTION:			
The current design of New Circle Road (KY 4) does not include any plans for the addition of Variable Message Signs (VMS).			
PROPOSED ALTERNATIVE:			
The proposed alternative would add Variable Message Signs along New Circle Road (KY 4) and on Versailles Road and Leestown Road in various locations to inform drivers of real-time traffic conditions at the interchange and along the corridor.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Ability to convey real-time information to the travelling public to reduce frustration 		<ul style="list-style-type: none"> Determine operational ownership 	
<ul style="list-style-type: none"> Improves incident management 		<ul style="list-style-type: none"> Determine maintenance responsibility 	
<ul style="list-style-type: none"> Provides additional traveler information 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Provides Public Service Announcements 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Reduces congestion 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ -	\$ -
PROPOSED ALTERNATIVE:		\$ 660,000	\$ -
TOTAL (Baseline less Proposed)		\$ (660,000)	\$ -
		COST	



VALUE ENGINEERING PROPOSAL 6
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Add Variable Message Signs (VMS) on the mainline and the associated roads crossing New Circle Road, to aid in congestion control

DISCUSSION/JUSTIFICATION:

Variable Message Signs aid in communicating with the traveling public. The following real-time information can be conveyed using various messages:

- Information on incidents
- Traffic diversions
- Notice of roadwork
- Adverse weather and roadway conditions
- Public Service Announcements
- Amber Alerts
- Driver safety campaigns
- Special event information

Congestion along the corridor can be reduced by informing motorists of incidents or areas of congestion which can then be avoided by using alternative routes.

Variable Message Signs can be installed in a number of ways; on structures spanning the roadway using a truss system, pole mounted, or fixed to an existing structure such as a bridge. For a message sign spanning New Circle Road, a truss mounted overhead sign would be the best option. Pole mounted signs would provide information to eastbound motorists on Versailles Road and Leestown Road as they approach New Circle Road.

IMPLEMENTATION CONSIDERATIONS:

The operation and maintenance of the proposed variable message signs would be best served by the City of Lexington. Lexington's Traffic Management Center monitors traffic conditions throughout the city, giving them the information they would need to update messages as needed.

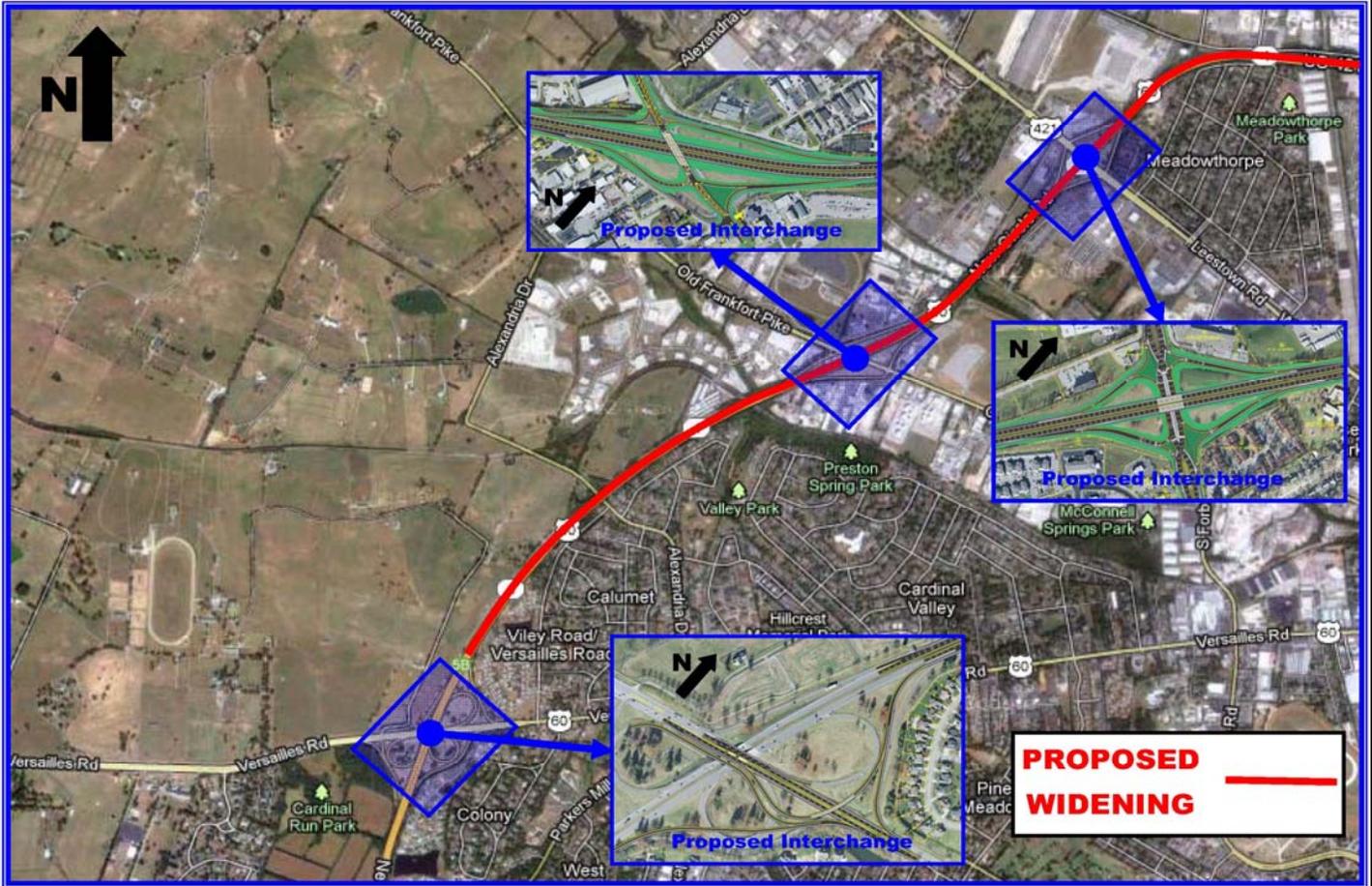


VALUE ENGINEERING PROPOSAL 6
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE:

Add Variable Message Signs (VMS) on the mainline and the associated roads crossing New Circle Road, to aid in congestion control

SKETCH OF BASELINE ASSUMPTION





VALUE ENGINEERING PROPOSAL 6
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Add Variable Message Signs (VMS) on the mainline and the associated roads crossing New Circle Road, to aid in congestion control

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 7
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Use "wire walls" - which is a modified MSE wall in lieu of reinforced concrete walls in fill areas			
FUNCTION: Retain Earth			
BASELINE ASSUMPTION:			
The baseline design uses reinforced concrete walls and concrete gravity walls in both fill areas and cut areas throughout New Circle Road.			
PROPOSED ALTERNATIVE:			
Install "wire wall" retaining walls.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> The face of the walls can be vegetated to create a natural, aesthetically pleasing look 		<ul style="list-style-type: none"> Not used by KYTC yet for permanent wall construction so there may be opposition 	
<ul style="list-style-type: none"> Eliminates concrete facing or modular blocks and thus the potential for cracks opening up between panels due to differential settlement 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Lower cost 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ 2,079,000	\$ -
PROPOSED ALTERNATIVE:		\$ 1,485,000	\$ -
TOTAL (Baseline less Proposed)		\$ 594,000	\$ -

SAVINGS



VALUE ENGINEERING PROPOSAL 7
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Use "wire walls" - which is a modified MSE wall in lieu of reinforced concrete walls in fill areas

DISCUSSION/JUSTIFICATION:

This type of MSE wall construction has been used on KYTC projects for temporary construction where the proposed road widening is higher than the existing so as to eliminate the need for stay-in-place sheeting or other methods. It has been used to prevent the new embankment slope from spilling onto the existing roadway. This is used due to low cost and the Phase 2 embankment can simply be placed next to the wire wall reinforced embankment without removal of the wire wall. There are several options for the finished face which can simply show the rock backfill or can vegetated.

Best suited for fill conditions but can be used in cut locations. In cut locations enough material needs to be removed based on required length of reinforcing.

IMPLEMENTATION CONSIDERATIONS:

From http://www.triconprecast.com/wire_wall_system.htm

Tricon's Permanent Wire Walls, are frequently built in areas where a Mechanically Stabilized Earth (MSE) wall is required but a concrete fascia is either not needed or not desired. "Our Permanent Wire Wall System is designed for a 75-year service life minimum and is comprised of standard hot-dipped galvanized Retained Soil Wall System™ soil reinforcement mats attached to special hot-dipped galvanized permanent wire wall facing mats. The facing mats are backed with galvanized ¼" hardware cloth prior to placing the specified backfill material. Backfill material for the permanent wire walls typically consist of crushed rock for the first 2' behind the facing mat with a specified compacted material beyond."



VALUE ENGINEERING PROPOSAL 7
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE:		Use "wire walls" - which is a modified MSE wall in lieu of reinforced concrete walls in fill areas						
DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost \$	TOTAL \$	Qty	Unit Cost \$	TOTAL \$
Versailles Interchange ramp retaining walls		SF	29700	70.00	2,079,000	29700	50.00	1,485,000
					2,079,000			1,485,000
(BASELINE LESS PROPOSED)								594,000

*Note: Costs are rounded to nearest thousand dollars.

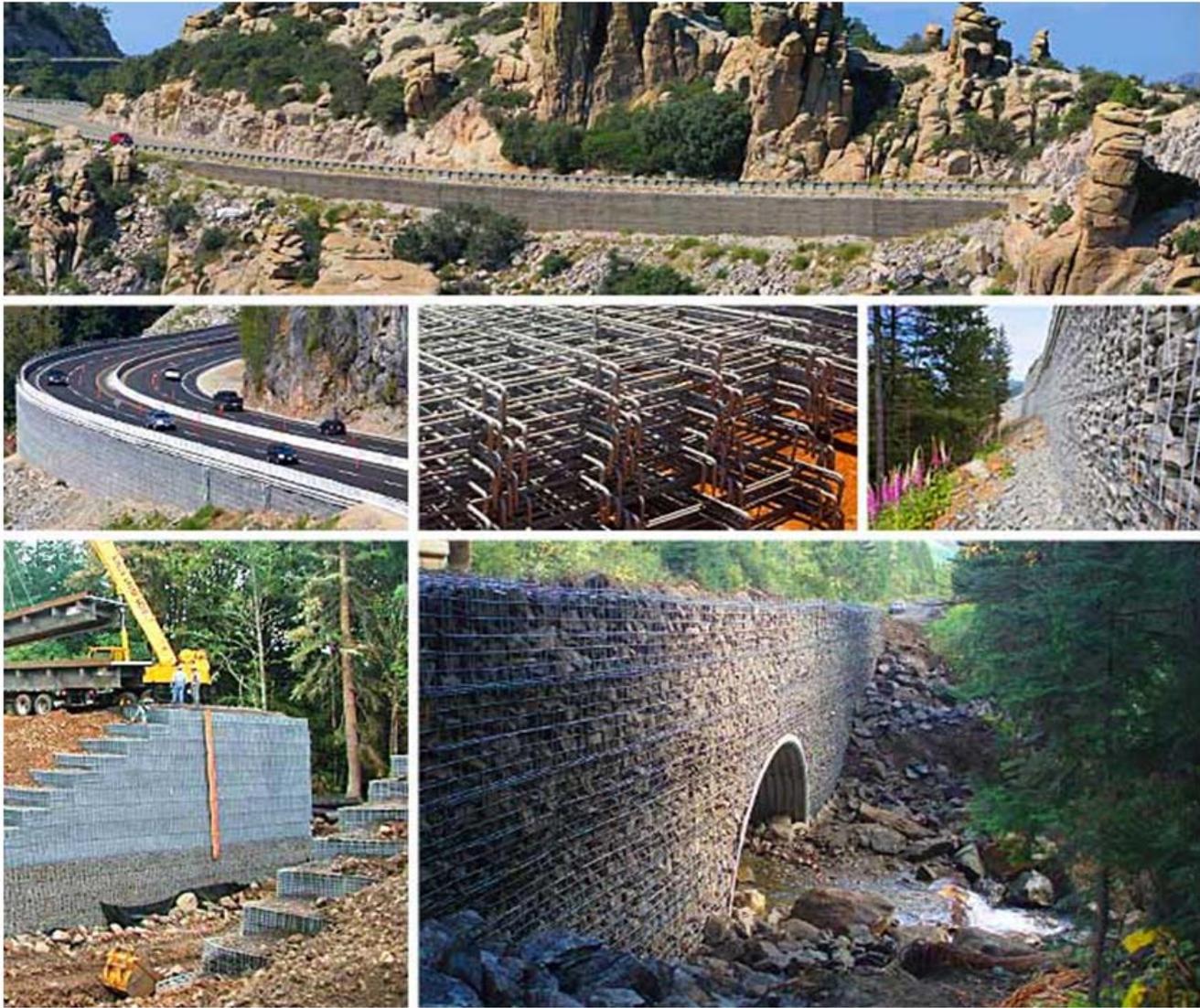
SAVINGS



VALUE ENGINEERING PROPOSAL 7
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Use "wire walls" - which is a modified MSE wall in lieu of reinforced concrete walls in fill areas

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 8
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Use an integral retaining wall and sound wall design using soldier piles				
FUNCTION:		Retain Earth		
BASELINE ASSUMPTION:				
For the baseline it was assumed that a noise wall averaging 16 ft. in height would be installed near the right-of-way line along the inside of New Circle Road near the dense residential areas. These noise walls would be installed separately of the planned retaining walls that are being used to keep construction within the limits of the existing right-of-way.				
PROPOSED ALTERNATIVE:				
The proposed alternate would integrate the proposed noise walls with the proposed retaining walls in areas where both are needed. Newer construction methods allow retaining wall panels to be slid into place, between piles, under noise wall panels.				
BENEFITS		RISKS/CHALLENGES		
<ul style="list-style-type: none"> Both walls would be integrated, meaning the footings for the retaining wall would not be needed 		<ul style="list-style-type: none"> Costs for this method may be higher than for standard noise walls 		
<ul style="list-style-type: none"> Construction could be held tighter to the right-of-way lines without offset walls 		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> Noise and retaining wall finishes can be matched 		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 		
COST SUMMARY		Initial Costs	O&M Costs	Total Life Cycle Cost
BASELINE ASSUMPTION:		\$ 5,720,300	\$ -	\$ 5,720,300
PROPOSED ALTERNATIVE:		\$ 7,400,000	\$ -	\$ 7,400,000
TOTAL (Baseline less Proposed)		\$ (1,679,700)	\$ -	\$ (1,679,700)
				COST



VALUE ENGINEERING PROPOSAL 8
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Use an integral retaining wall and sound wall design using soldier piles

DISCUSSION/JUSTIFICATION:

The integrated noise/retaining walls would eliminate the need for separate footers for the retaining walls as they would be supported between piles set for the noise panels. This system would narrow construction by removing the offset between the retaining wall and the noise wall in areas where both are present. Using this system, the finishes of the retaining wall panels could be matched to the finish of the noise wall panels making the wall more aesthetically appealing.

It was estimated that three sections of noise walls would be constructed with the baseline totaling 11,600 linear feet of noise wall at an average height of 16 ft. It is expected the baseline noise wall would be constructed behind the retaining walls where possible, lowering the noise wall square footage by the square footage of the retaining walls (9,000 sf). The total baseline noise wall would encompass 176,000 sf.

No independent retaining walls would be needed with the proposed alternate. The total square footage of this combined wall would be 185,000 sf.

IMPLEMENTATION CONSIDERATIONS:

Costs would need to be verified for this system to ensure it does not surpass the traditional pile/panel constructed noise wall. A cost of \$30 per square foot was used to estimate cost for the existing and proposed noise wall.



VALUE ENGINEERING PROPOSAL 8
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Use an integral retaining wall and sound wall design using soldier piles								
DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost \$	TOTAL \$	Qty	Unit Cost \$	TOTAL \$
Retaining wall		SF	8500	51.80	440,300			
Noise wall		SF	176000	30.00	5,280,000			
Noise/Retaining wall						185000	40.00	7,400,000
					5,720,300			7,400,000
(BASELINE LESS PROPOSED)								(1,679,700)

*Note: Costs are rounded to nearest thousand dollars.

COST



VALUE ENGINEERING PROPOSAL 8

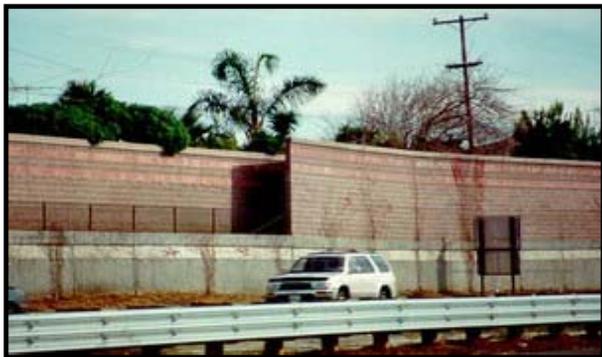
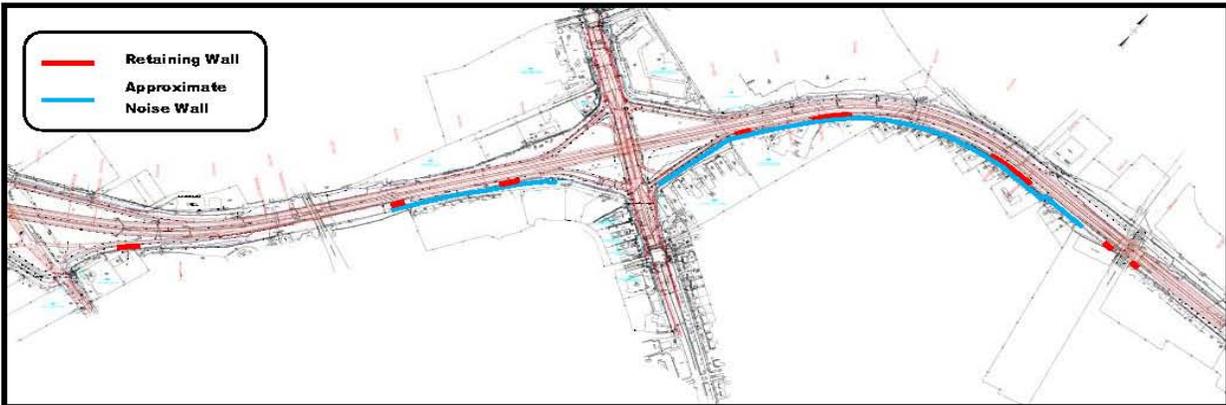
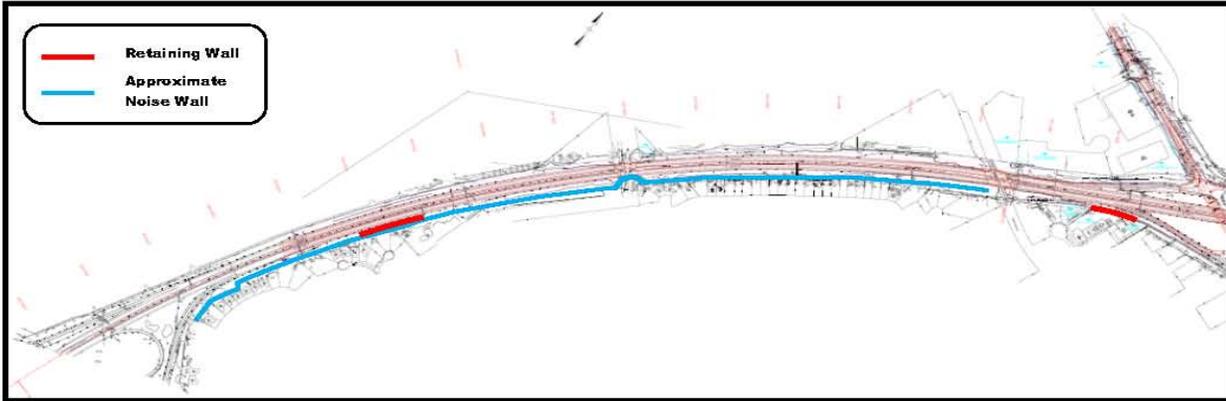
Project 7-113 - New Circle Road Widening

New Circle Road Rehab & KY4/US-60 Interchange Projects

Fayette County

TITLE: Use an integral retaining wall and sound wall design using soldier piles

SKETCH OF BASELINE ASSUMPTION





VALUE ENGINEERING PROPOSAL 8
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Use an integral retaining wall and sound wall design using soldier piles

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 09
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Install stabilized embankment at Station 278+00 to eliminate the box extension and eliminate the easement acquisition			
FUNCTION:		RETAIN EARTH	
BASELINE ASSUMPTION:			
A 25 ft. extension of the existing Double 14x10 Box Culvert (outlet end) just north of CSX Railroad is proposed in the current design. A Permanent Drainage Easement is required on Parcel 4 (Morrison Properties) and Parcel 5 (LM Asphalt).			
PROPOSED ALTERNATIVE:			
Install stabilized embankment or a retaining wall to eliminate the need for the box culvert extension and property impacts.			
BENEFITS		RISKS/CHALLENGES	
• No acquisition delays		• Having to maintain a steeper slope	
• No stream impacts		•	
• Eliminates right-of-way purchase		•	
•		•	
•		•	
•		•	
•		•	
•		•	
•		•	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ 332,000	\$ -
PROPOSED ALTERNATIVE:		\$ 1,876	\$ -
TOTAL (Baseline less Proposed)		\$ 330,124	\$ -
		SAVINGS	



VALUE ENGINEERING PROPOSAL 09
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE:	Install stabilized embankment at Station 278+00 to eliminate the box extension and eliminate the easement acquisition
DISCUSSION/JUSTIFICATION:	<p>Extending a double 14x10 box culvert that is 248 ft. long by 25 ft. wide for the widened typical section using 2:1 side slopes can be avoided by increasing the proposed side slope to 1.75:1. Embankment stabilization will be required; however, no property acquisition is necessary. When developing this option, the existing RCBC was plotted on the cross section at Station 278+00 using the flow line information shown on the manuscript. The RCBC is above the existing ground line shown on the cross section; therefore, the existing condition is not as severe as it appears.</p> <p>There will be significant savings by not needing to purchase a drainage easement. This cost is not reflected in the cost estimate because the right-of-way was not included in the project estimate.</p>
IMPLEMENTATION CONSIDERATIONS:	<p>When constructing the widening, the contractor should use Geotechnical material for 50 ft. either side of the culvert to increase the recommended 2:1 side slope to 1.75:1.</p>



VALUE ENGINEERING PROPOSAL 09
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE:		Install stabilized embankment at Station 278+00 to eliminate the box extension and eliminate the easement acquisition						
DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost \$	TOTAL \$	Qty	Unit Cost \$	TOTAL \$
Wolf Run Creek Dbl 14 x 10 RCBC		LS	1	332,000.00	332,000			
Fabric-Geotextile Type IV						1400	1.34	1,876
					332,000			1,876
(BASELINE LESS PROPOSED)								330,124

*Note: Costs are rounded to nearest thousand dollars.

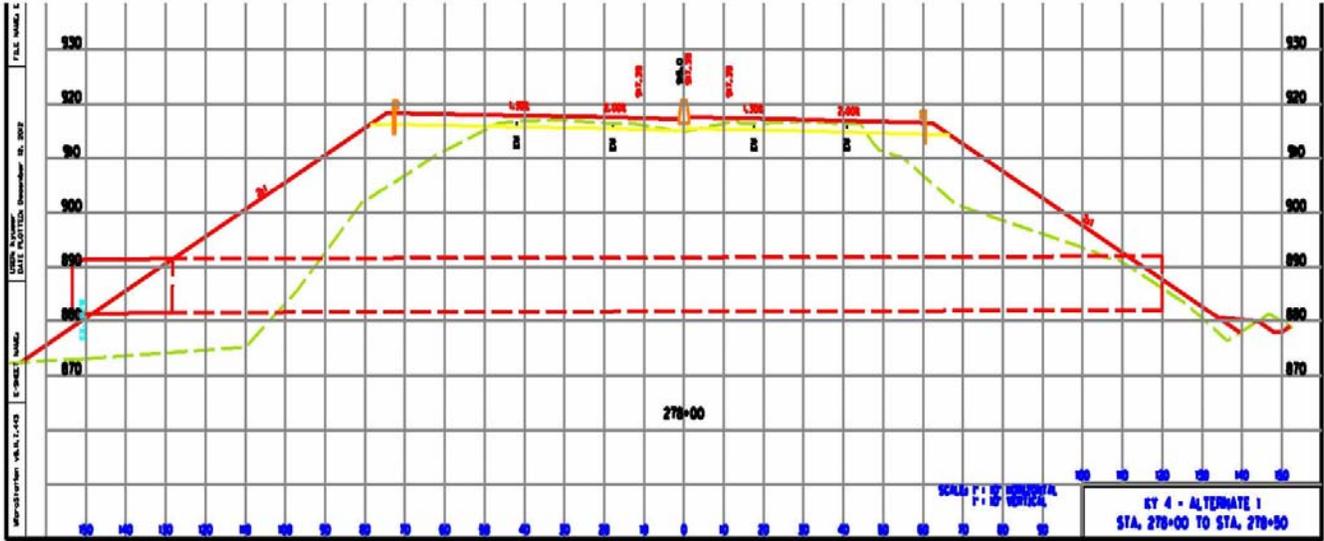
SAVINGS



VALUE ENGINEERING PROPOSAL 09
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Install stabilized embankment at Station 278+00 to eliminate the box extension and eliminate the easement acquisition

SKETCH OF BASELINE ASSUMPTION



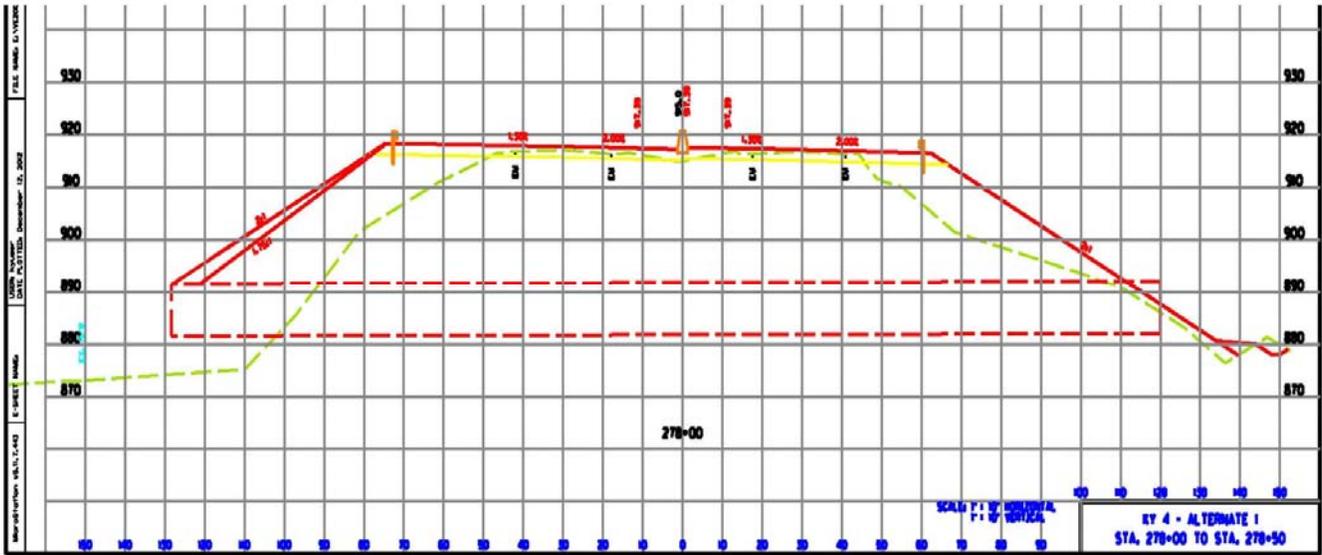


VALUE ENGINEERING PROPOSAL 09
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE:

Install stabilized embankment at Station 278+00 to eliminate the box extension and eliminate the easement acquisition

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL DS1
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Eliminate the development of detailed traffic control plans by the designer and develop performance specifications for the contractor to develop the formal plans	
FUNCTION: MAINTENANCE OF TRAFFIC	
BASELINE ASSUMPTION:	
The baseline is for the traffic control plans to be developed by the design team.	
PROPOSED ALTERNATIVE:	
Establish a performance specification that would provide specific direction to the contractor for doing the final development of the traffic control plans.	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> Eliminates traffic control plans that are often not used by the contractor 	<ul style="list-style-type: none"> Not a process that has been used in Kentucky
<ul style="list-style-type: none"> Reduces costs for design team 	<ul style="list-style-type: none"> Ensuring that the performance specification is followed by the contractor
<ul style="list-style-type: none"> Provides for the actual approach to traffic control by the successful bidder 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

DESIGN SUGGESTION



VALUE ENGINEERING PROPOSAL DS1
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Eliminate the development of detailed traffic control plans by the designer and develop performance specifications for the contractor to develop the formal plans

DISCUSSION/JUSTIFICATION:

It is traditional for agencies to have the traffic control plans developed by the design engineer or internal staff. However, most contractors after the project has been bid, changes the traffic control plans to meet the needs of how the project will be constructed. KYTC has the ability to write a performance specification for the contractor to follow outlining the requirements of the traffic control plan but allowing the successful bidder to approach the project that best fits their construction approach and methods. This will also reduce some of the time necessary for both the designer to provide the traffic control plans and the review and approval of the plans.

IMPLEMENTATION CONSIDERATIONS:

A performance specification that meets with the agency's approval will need to be written.



VALUE ENGINEERING PROPOSAL DS2
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Accelerate the Norfolk/Southern railroad bridge design and coordination	
FUNCTION: Miscellaneous	
BASELINE ASSUMPTION:	
Current approach is a typical design for the replacement of the bridge carrying New Circle Road over the Norfolk/Southern rail line.	
PROPOSED ALTERNATIVE:	
Accelerate the bridge design for the Norfolk/Southern and reduce the allowable review times for KYTC and Norfolk/Southern.	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> Reduces the risk to project schedule 	<ul style="list-style-type: none"> Concerns with the potential challenges of completing the bridge design and the alignment changes
<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Requiring a rush may impact the quality control reviews
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

DESIGN SUGGESTION

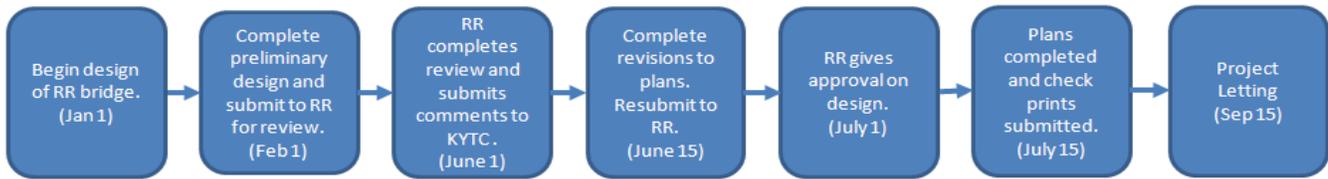


VALUE ENGINEERING PROPOSAL DS2
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Accelerate the Norfolk/Southern railroad bridge design and coordination

DISCUSSION/JUSTIFICATION:

The project team and the VE team identified this railroad bridge as a potentially large risk for meeting the critical path on the schedule of completing the design plans in time for a September 2013 construction letting. During the risk assessment, the VE team identified the probability of this occurring as Likely and the Severity of the occurrence as Substantial, giving this a risk rating of Extremely High in occurrence. Additionally, it was identified that the potential impact to the schedule could be 6 to 12 months in length and the team recommended that this risk be mitigated. One mitigation opportunity is to recommend that the design of the Norfolk Southern bridge begin immediately so that a preliminary design can be sent to railroad company for their first review as soon as possible to account for the uncertainty in the amount of time they will take to provide comments back to KYTC. The schedule below demonstrates how tight the timeframe is between now and the letting date.



IMPLEMENTATION CONSIDERATIONS:

Determine who will provide the design for the bridge and what the potential impacts will be to accelerate the schedule.



VALUE ENGINEERING PROPOSAL DS4
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Keep the Norfolk/Southern bridge in the design, but delay the construction in the specifications	
FUNCTION: Miscellaneous	
BASELINE ASSUMPTION:	
The current design includes the Norfolk/Southern bridge in the design plans.	
PROPOSED ALTERNATIVE:	
The proposed alternate supports the design approach of keeping the bridge within the current design; however, add a special note to delay the construction.	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> Helps to meet the September bid letting schedule 	<ul style="list-style-type: none"> Making sure that the contractors understand the change in the specification
•	•
•	•
•	•
•	•
•	•
•	•
•	•

DESIGN SUGGESTION



VALUE ENGINEERING PROPOSAL DS4
Project 7-113 - New Circle Road Widening
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Keep the Norfolk/Southern bridge in the design, but delay the construction in the specifications

DISCUSSION/JUSTIFICATION:

The current constraint is to meet the bid letting date of September 2013. During the risk assessment, the VE team identified the probability of this occurring as Likely and the Severity of the occurrence as Substantial, giving this a risk rating of Extremely High in occurrence. Additionally, it was identified that the potential impact to the schedule could be 6 to 12 months in length and the team recommended that this risk be mitigated. This option would allow the bridge work to continue as is normal in the design process and reduce this potential risk. This proposal suggest that a special note be written to provide specific direction to the contractor's bidding the work that the Norfolk/ Southern bridge portion of the project cannot be constructed until a specified date within the contract. This would ensure that during bid time, the best possible prices can still be realized, but provides a cushion for the design to be finalized and approved by the railroad.

IMPLEMENTATION CONSIDERATIONS:

It is recommended that the design be completed to be included with the bid documents to ensure appropriate information is available to the contractors bidding the work.



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

Leestown Road Interchange



VALUE ENGINEERING PROPOSAL 1
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Reduce lane widths on Leestown Road under New Circle			
FUNCTION: Improve Geometrics (A)			
BASELINE ASSUMPTION:			
The baseline alternative includes 14-ft. wide lanes on Leestown Road through the crossover intersections at the Double Crossover Diamond (DCD) interchange that are maintained under New Circle Road.			
PROPOSED ALTERNATIVE:			
The proposed alternative is to transition from 14-ft. wide lanes to 12-ft. wide lanes on Leestown Road under New Circle Road.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Narrower lanes typically reduce speed 		<ul style="list-style-type: none"> None apparent 	
<ul style="list-style-type: none"> Potentially reduces cost 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Can provide additional width for shoulder or a wider pedestrian accommodation 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Could allow for more perpendicular crossover intersections 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Improves maintenance activities 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ 2,240,017	\$ -
PROPOSED ALTERNATIVE:		\$ 2,192,345	\$ -
TOTAL (Baseline less Proposed)		\$ 47,672	\$ -
		SAVINGS	



VALUE ENGINEERING PROPOSAL 1
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Reduce lane widths on Leestown Road under New Circle

DISCUSSION/JUSTIFICATION:

The baseline alternative for Leestown Road (US421) is to reconfigure the existing diamond interchange to a Double Crossover Diamond (DCD) interchange. The proposed configuration includes 14-ft. wide lanes through the crossover intersections at the DCD that are maintained through the interchange, for a total width of 49 ft. (3-14 ft. wide lanes, a 2 ft. wide gutter, and a 5 ft. wide bicycle lane). The typical section includes curb and gutter with pedestrian facilities located in the middle of Leestown Road.

The proposed modification is to transition the 14-ft. wide lanes to 12 ft. beneath New Circle Road. This allows three options for consideration:

1. Move the outside curb and gutter in 6 ft. on each side and maintain a 36-ft. wide traveled way with 2 ft. gutter on the outside and 5-ft. bicycle lane on the inside for a total width of 44 ft.
2. Maintain the outside curb and gutter in the baseline location and provide a 6-ft. outside shoulder on each side. This could assist with future maintenance activities and snow and ice removal.
3. Maintain the outside curb and gutter in the baseline location and provide a wider median and pedestrian facility. As proposed in the baseline condition, the total width of the pedestrian facility in the center of Leestown Road is less than 17 ft. wide. Assuming the proposed bridge carrying New Circle Road over Leestown Road will include a center row of piers, as the existing bridge does, the usable width of the pedestrian facility would be reduced.

A cost savings could be realized with Option 1 only.

IMPLEMENTATION CONSIDERATIONS:

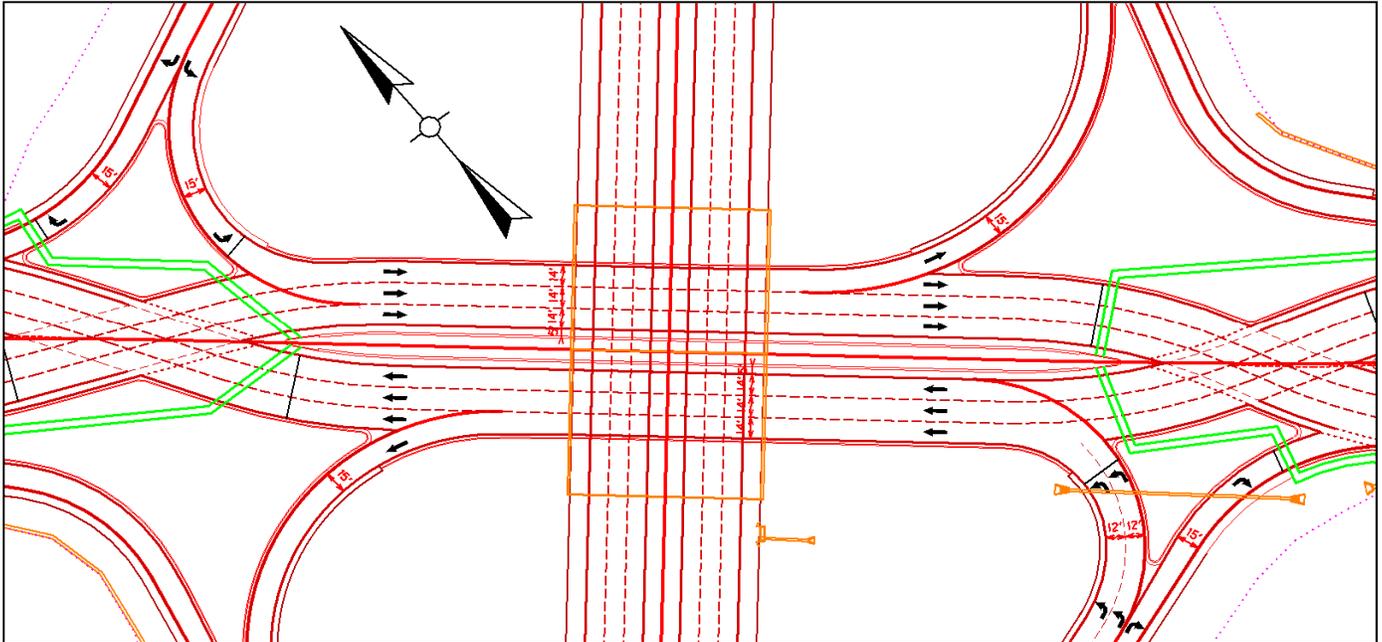
None apparent



VALUE ENGINEERING PROPOSAL 1
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Reduce lane widths on Leestown Road under New Circle

SKETCH OF BASELINE ASSUMPTION

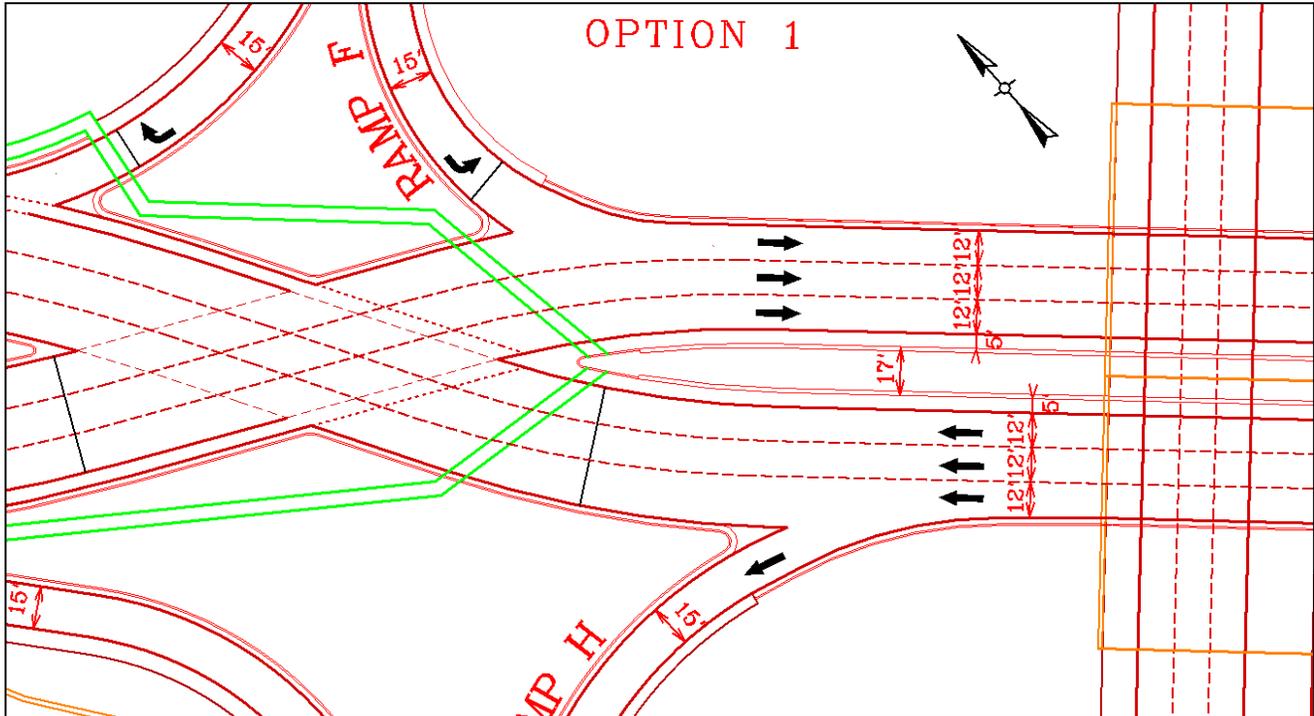




VALUE ENGINEERING PROPOSAL 1
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Reduce lane widths on Leestown Road under New Circle

SKETCH OF PROPOSED ALTERNATIVE

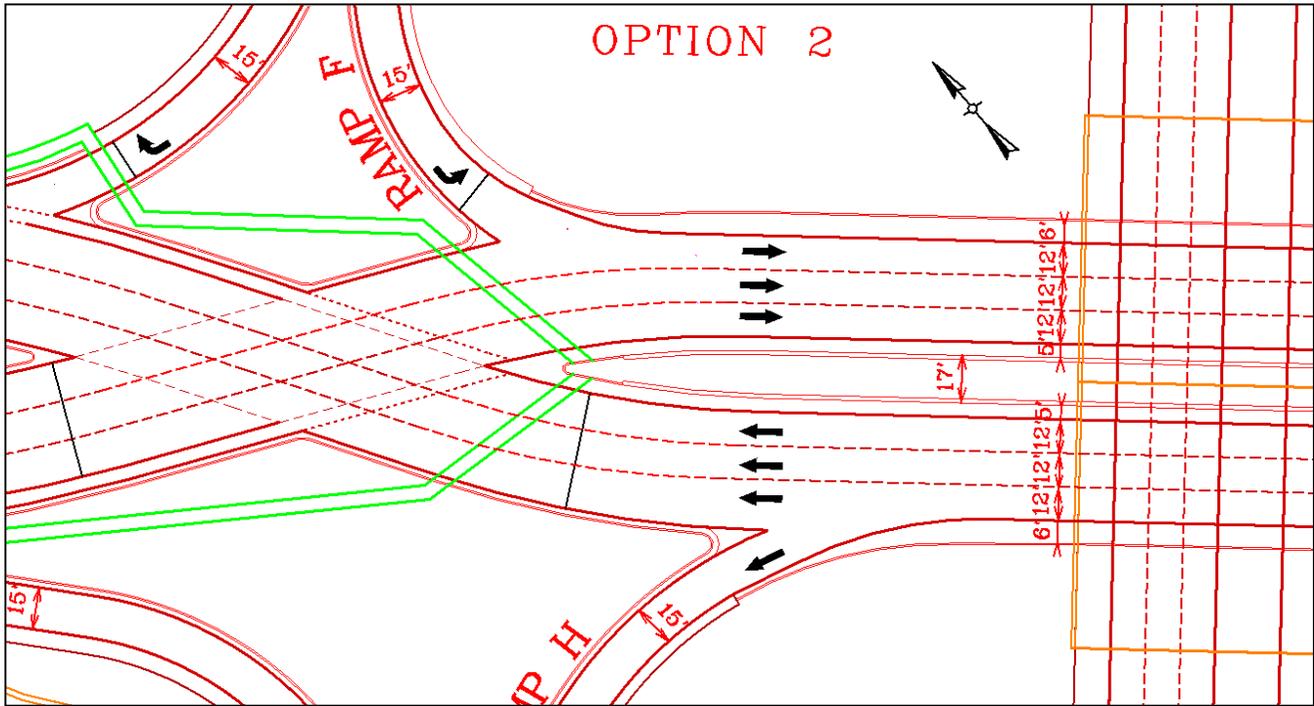




VALUE ENGINEERING PROPOSAL 1
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Reduce lane widths on Leestown Road under New Circle

SKETCH OF PROPOSED ALTERNATIVE

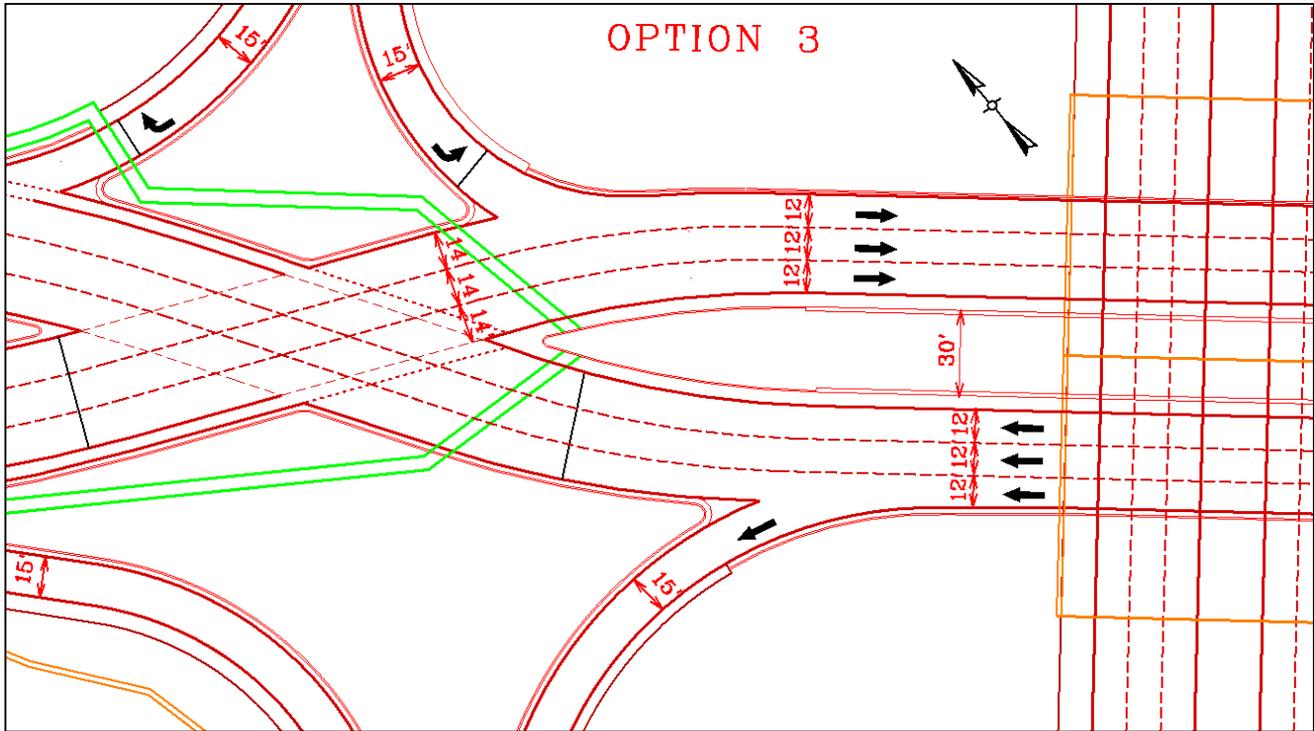




VALUE ENGINEERING PROPOSAL 1
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Reduce lane widths on Leestown Road under New Circle

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 2
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Reduce Leestown Road to two lanes westbound at the outer loop entrance ramp			
FUNCTION: Improve Geometrics (A)			
BASELINE ASSUMPTION:			
The baseline alternative includes three westbound lanes through the proposed Double Crossover Diamond (DCD) interchange at New Circle Road with a lane drop downstream at Votech Road/Business Entrance.			
PROPOSED ALTERNATIVE:			
The proposed alternative is to drop the left westbound lane on Leestown Road at the entrance ramp to the outer loop of New Circle Road as a left-turn only.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Will be simpler to sign the lane drop than with the baseline alternative 		<ul style="list-style-type: none"> Future demand may necessitate an additional through lane 	
<ul style="list-style-type: none"> Reduces cost 		<ul style="list-style-type: none"> The proposed lane drop will require additional signage 	
<ul style="list-style-type: none"> Simpler for a driver to understand 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Eliminates the need for a through lane to merge west of New Circle Road 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ 2,258,609	\$ -
PROPOSED ALTERNATIVE:		\$ 2,216,259	\$ -
TOTAL (Baseline less Proposed)		\$ 42,350	\$ -
		SAVINGS	



VALUE ENGINEERING PROPOSAL 2
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Reduce Leestown Road to two lanes westbound at the outer loop entrance ramp

DISCUSSION/JUSTIFICATION:

The baseline alternative for Leestown Road (US421) is to reconfigure the existing diamond interchange to a Double Crossover Diamond (DCD) interchange. It includes three lanes in each direction through the limits of the interchange. In the westbound direction, the outside lane drops at the business entrance (entrance to UPS) approximately 700 ft. downstream from the New Circle Road outer loop crossover intersection. This lane drop will be relatively difficult to sign adequately given the proximity to New Circle Road, the geometry of the DCD, and the inability to utilize overhead signage.

The proposed modification is to drop the left westbound through lane at the outer loop crossover intersection (at Ramp H) as a left turn only for access onto southbound New Circle Road. Two lanes would be carried through the crossover intersection and separate left-turn and right-turn lanes are developed upstream of the Leestown Road intersection with Votek Drive/Business Entrance. This would provide the same capacity at the Votek Drive/Business Entrance intersection.

IMPLEMENTATION CONSIDERATIONS:

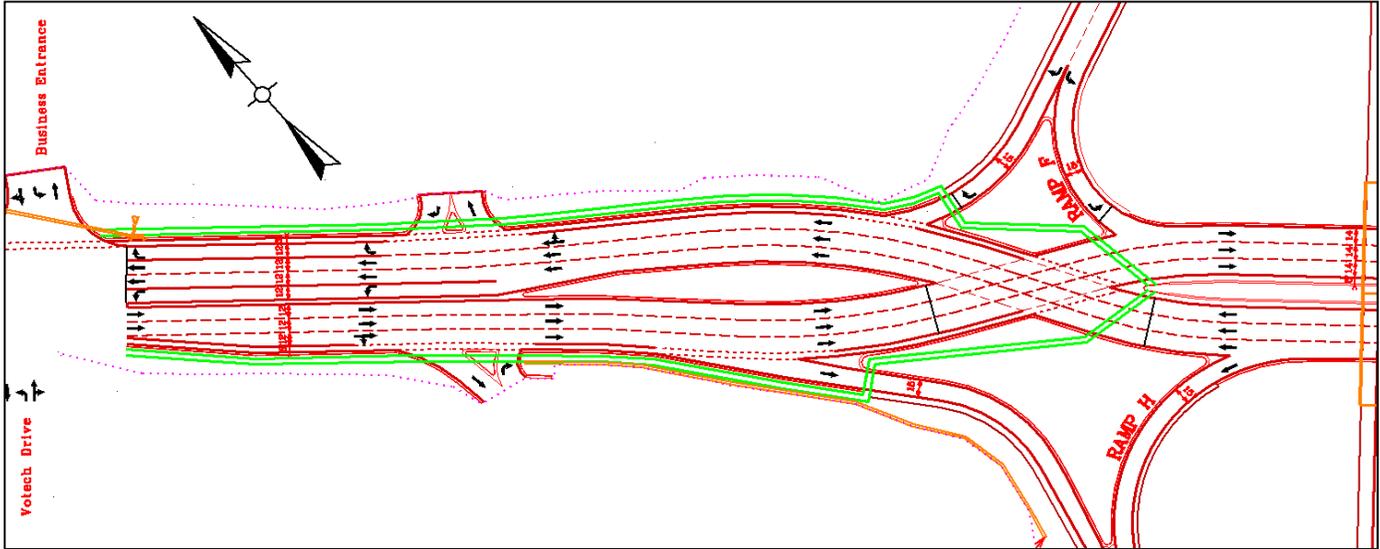
A cursory evaluation of the outer loop crossover intersection suggests some operational concerns in the 2034 design year PM peak. Therefore, further evaluation would be necessary to determine the viability of the proposed modification. The proposed modification would allow continuing the third westbound through lane with a minor widening of the median.



VALUE ENGINEERING PROPOSAL 2
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Reduce Leestown Road to two lanes westbound at the outer loop entrance ramp

SKETCH OF BASELINE ASSUMPTION

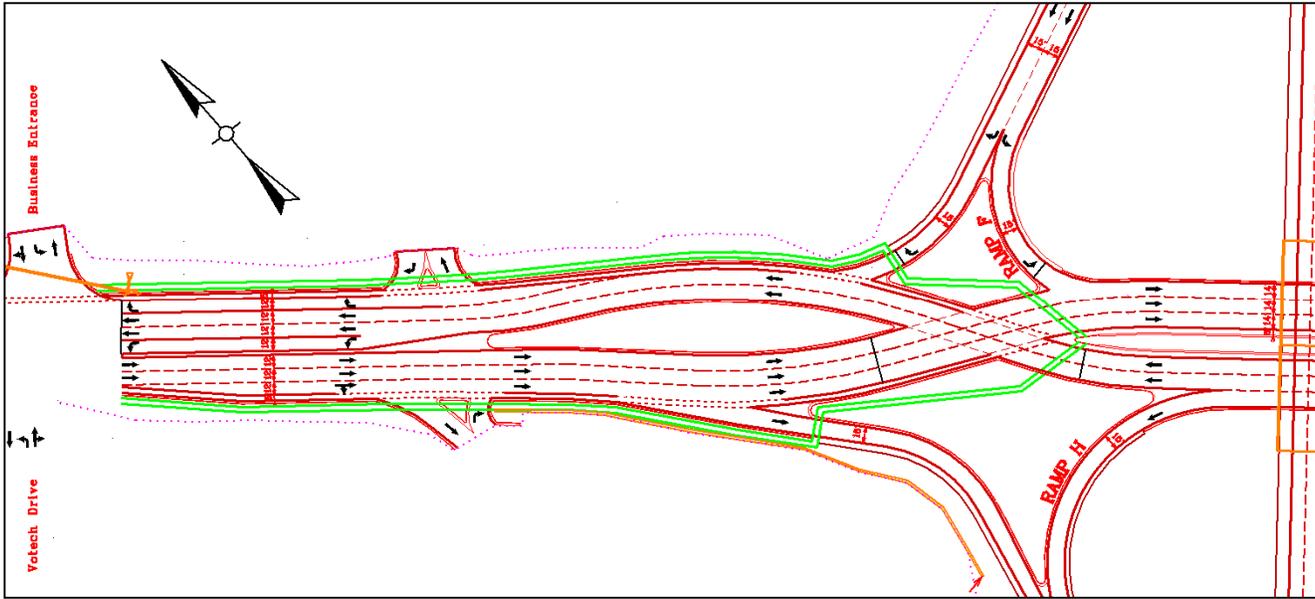




VALUE ENGINEERING PROPOSAL 2
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Reduce Leestown Road to two lanes westbound at the outer loop entrance ramp

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 3
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Make southbound New Circle Road a dual left turn from Ramp F to Leestown Road			
FUNCTION: Improve Geometrics (A)			
BASELINE ASSUMPTION:			
The original design calls for a single left turn lane on Ramp F (southbound New Circle Road exit ramp).			
PROPOSED ALTERNATIVE:			
Construct a dual left turn lane on Ramp F.			
BENEFITS		RISKS/CHALLENGES	
• Adds capacity to the left turn movement		• Need to move utility poles	
• Adds queue storage		•	
•		•	
•		•	
•		•	
•		•	
•		•	
•		•	
•		•	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ -	\$ -
PROPOSED ALTERNATIVE:		\$ 18,603	\$ -
TOTAL (Baseline less Proposed)		\$ (18,603)	\$ -
		COST	



VALUE ENGINEERING PROPOSAL 3
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Make southbound New Circle Road a dual left turn from Ramp F to Leestown Road

DISCUSSION/JUSTIFICATION:

Turning movement counts from another consultant study, indicate that the base year and future year volumes for this movement may be under predicted. Using design hour volumes of 230 (AM) and 390 (PM) and a growth factor of 1.5% annually, the 2034 forecast for the southbound ramp left-turn are 325 (AM) and 550 (PM). With these higher numbers, it is worthwhile to build an additional turning lane to account for future growth now, rather than coming back in the future.

The additional lane will help shorten queue lengths on the ramp and slightly reduce delays for drivers.

IMPLEMENTATION CONSIDERATIONS:

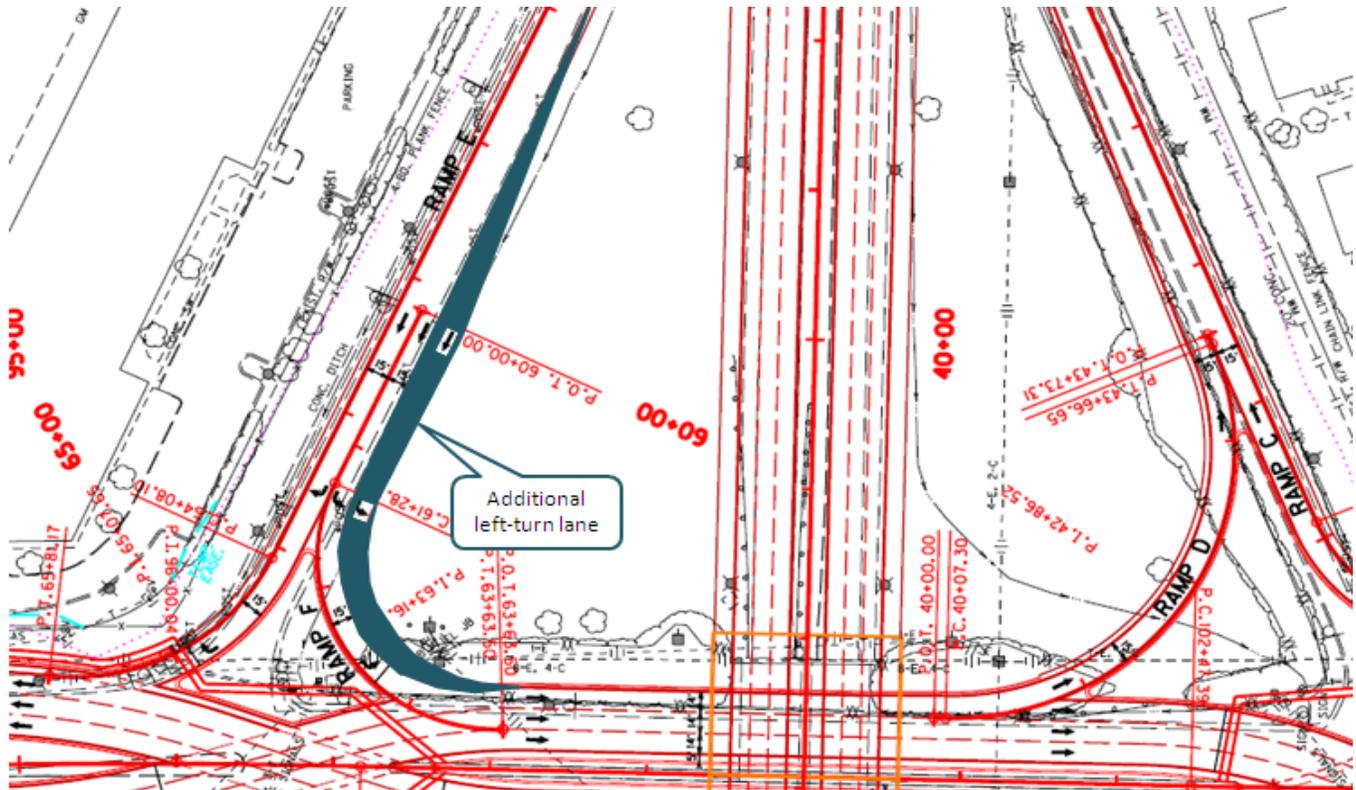
This will require moving two transmission line poles, which may have already been required to accommodate the signal pole in the original design.



VALUE ENGINEERING PROPOSAL 3
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Make southbound New Circle Road a dual left turn from Ramp F to Leestown Road

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 4
Project 7-113 - Leestown Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Extend the right turn only lane on eastbound Leestown Road			
FUNCTION: Improve Geometrics (A)			
BASELINE ASSUMPTION:			
The current design drops the right turn lane on inbound (eastbound) Leestown Road at Louie Place (an existing right in/right out).			
PROPOSED ALTERNATIVE:			
The proposal extends the right turn lane approximately 450 ft. to the entrance to Kroger (across from Boiling Springs Drive).			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Lengthens the taper for the lane drop 		<ul style="list-style-type: none"> Bike lane geometry 	
<ul style="list-style-type: none"> Places the lane drop at a more logical location 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ 9,606	\$ -
PROPOSED ALTERNATIVE:		\$ 18,736	\$ -
TOTAL (Baseline less Proposed)		\$ (9,130)	\$ -
COST			



VALUE ENGINEERING PROPOSAL 4
Project 7-113 - Leestown Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Extend the right turn only lane on eastbound Leestown Road

DISCUSSION/JUSTIFICATION:

There were concerns with the right turn lane drop at Louis Place because more traffic goes to Kroger just 450 ft. to the east. The team also suggested that for Access Management purposes, the existing right in/right out entrance Right Station 116+00 (Louie Place) be closed (Idea IGA-07). During the study of these recommendations, several alternatives were developed. (1) Widen to get 2 through lanes to Station 116+00 with a right lane in only to Louis Place (prohibit the right out movement). (2) Leave it the same because the bike lane works better. (3) Keep the same design but close access to Louie Place. The bike lane would drop at Louie Place. The team has a slight preference for the third alternative.

IMPLEMENTATION CONSIDERATIONS:

Take the bike lane marking and signing into account during the design. Operation of through traffic that must transition from 3 lanes at the end of the DCD to 1 lane at Kroger (approximately 1075 ft.) may cause congestion.



VALUE ENGINEERING PROPOSAL 4
Project 7-113 - Leestown Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Extend the right turn only lane on eastbound Leestown Road								
DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost \$	TOTAL \$	Qty	Unit Cost \$	TOTAL \$
CL 3 Asphalt surface 0.38A PG64-22		TON	16	82.11	1,314	25	82.11	2,053
CL 3 Asphalt base 1.00D PG64-22		TON	110	60.82	6,690	175	60.82	10,644
DGA Base		TON	80	20.03	1,602	125	20.03	2,504
Standard curb and gutter (additional)		LF		26.00		136	26.00	3,536
					9,606			18,736
(BASELINE LESS PROPOSED)								(9,130)

*Note: Costs are rounded to nearest thousand dollars.

COST



VALUE ENGINEERING PROPOSAL 4
Project 7-113 - Leestown Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Extend the right turn only lane on eastbound Leestown Road

SKETCH OF BASELINE ASSUMPTION





VALUE ENGINEERING PROPOSAL 4
Project 7-113 - Leestown Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Extend the right turn only lane on eastbound Leestown Road

SKETCH OF PROPOSED ALTERNATIVE 1

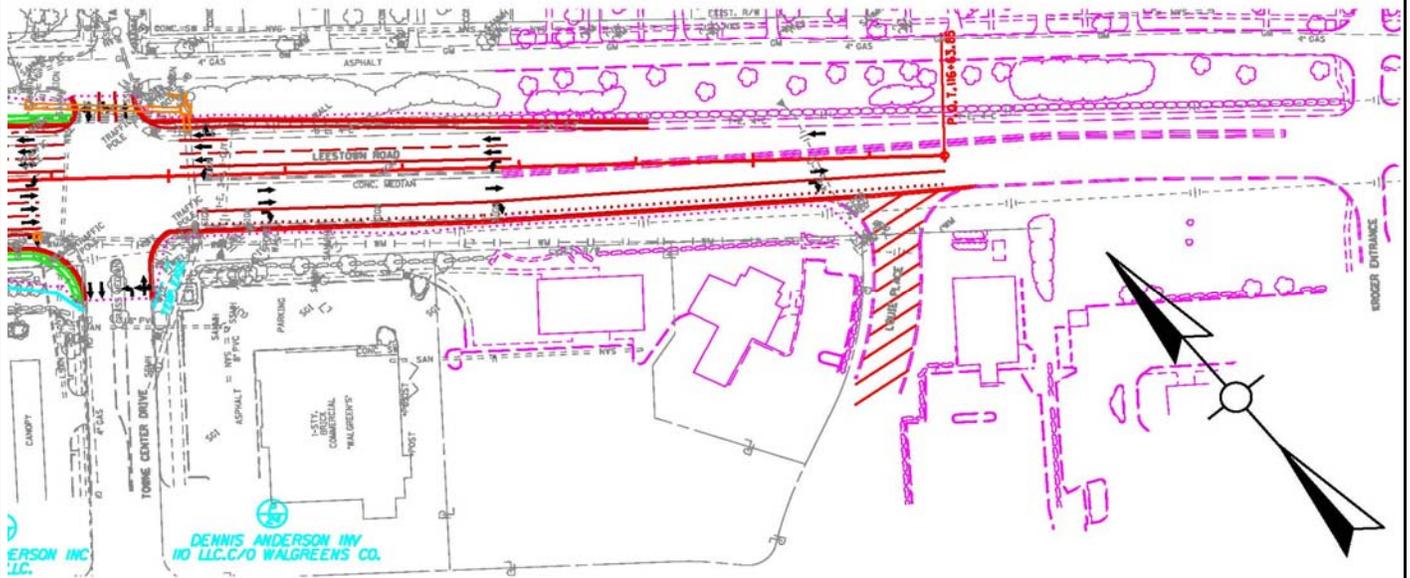




VALUE ENGINEERING PROPOSAL 4
Project 7-113 - Leestown Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Extend the right turn only lane on eastbound Leestown Road

SKETCH OF PROPOSED ALTERNATIVE 3





VALUE ENGINEERING PROPOSAL DS1
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Close access to Leestown Road at Station 92+00 on both sides of the road	
FUNCTION: Improve Geometrics (A)	
BASELINE ASSUMPTION:	
The original design shows a right-in/right-out access point on both sides of the highway.	
PROPOSED ALTERNATIVE:	
Close both access points.	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> Eliminates the conflict points within the functional area of the interchange 	<ul style="list-style-type: none"> May be difficult to convince property owners of this change
<ul style="list-style-type: none"> Potential traffic flow and safety advantages 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

DESIGN SUGGESTION



VALUE ENGINEERING PROPOSAL DS1
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Close access to Leestown Road at Station 92+00 on both sides of the road

DISCUSSION/JUSTIFICATION:

In order to avoid traffic backups, minimize driver confusion, and maximize safety and traffic operational efficiency, in the vicinity of the interchange ramps, there must be adequate spacing of access points and cross roads. When retrofitting an existing area such as the Leestown Road interchange, there are challenges with getting the desirable access spacing.

NCHRP 420 presents guidelines for spacing of different access types within interchange areas. For the first right-in/right-out access next to an exit ramp, it is recommended to have 750 ft. in a fully urban area or 990 ft. in a suburban/urban area. The access to ACS is currently designed to be approximately 300 ft. It is recommended to remove this access point and provide access to this business solely from the signalized access drive located at approximately Station 89+00. The proposed location of the driveway tie-in is near the rear of the property which is desirable.

NCHRP 420 also recommends the distance between the last access and the taper for the on-ramp to be 990 ft. in a fully urban area or 1320 ft. in a suburban/urban area. Leestown Center Way ties into Leestown Road only 100 ft. from the ramp taper. Since the properties served by this have safe access from Opportunity Way, it is recommended to close the right-in/right-out access to remove conflicts between turning vehicles and vehicles accessing the ramp.

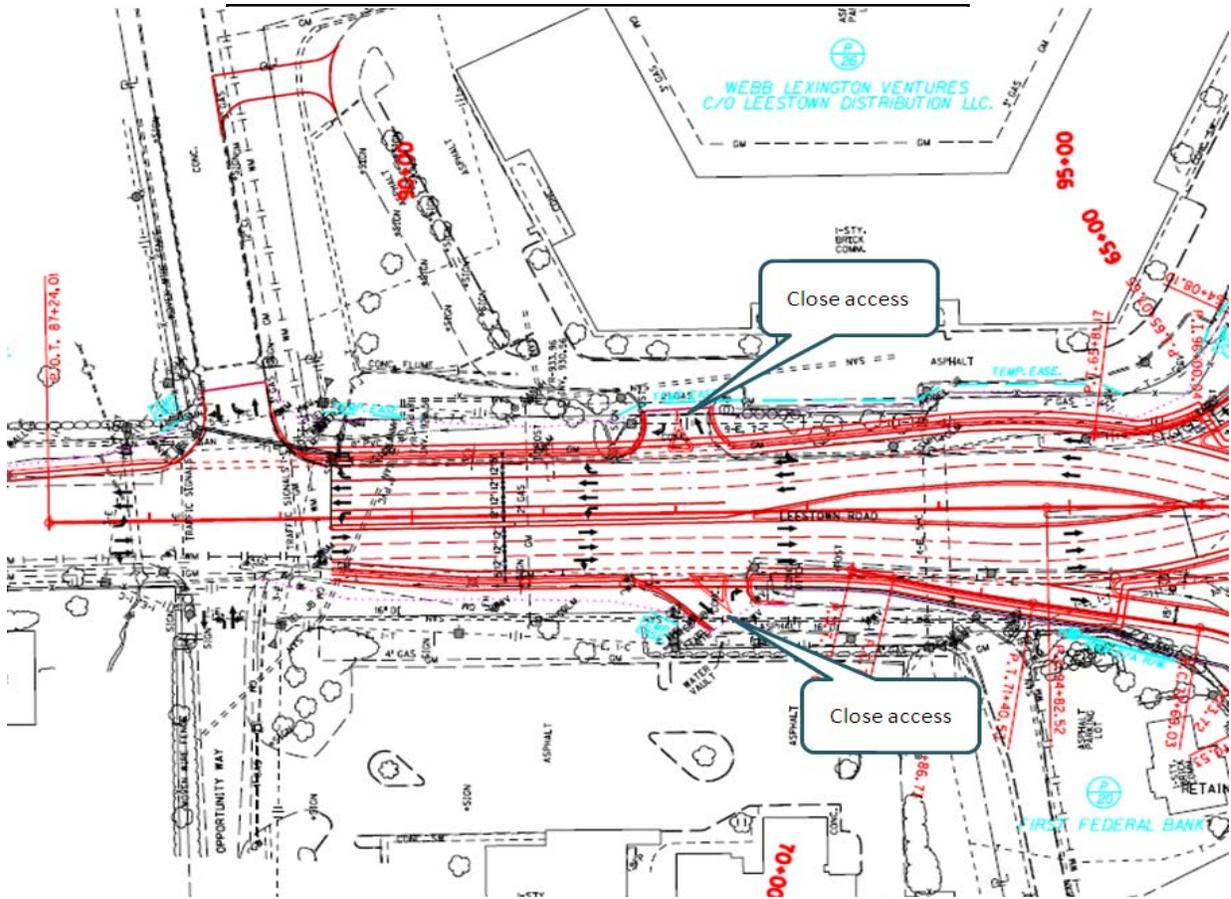
IMPLEMENTATION CONSIDERATIONS:

None apparent



VALUE ENGINEERING PROPOSAL DS1
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Close access to Leestown Road at Station 92+00 on both sides of the road





VALUE ENGINEERING PROPOSAL DS2
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Use high mast lighting in the interchange to reduce maintenance impacts	
FUNCTION: Improve Geometrics (A)	
BASELINE ASSUMPTION:	
The baseline alternative does not specify the type of lighting to be used at the proposed Double Crossover Diamond (DCD) interchange at Leestown Road (US421) at New Circle Road (KY4). The existing lighting is conventional.	
PROPOSED ALTERNATIVE:	
The proposed design suggestion is to utilize high mast lighting at the DCD.	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> Reduces construction cost 	<ul style="list-style-type: none"> There is typically some public opposition to high mast lighting where neighborhoods are nearby
<ul style="list-style-type: none"> Reduces long-term maintenance costs 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> Will be simpler to light the DCD than conventional lighting as fewer poles are required 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

DESIGN SUGGESTION



VALUE ENGINEERING PROPOSAL DS2
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Use high mast lighting in the interchange to reduce maintenance impacts

DISCUSSION/JUSTIFICATION:

The baseline alternative for Leestown Road (US 421) is to reconfigure the existing diamond interchange to a Double Crossover Diamond (DCD) interchange. The type of lighting to be used at the interchange has not been specified, but the existing interchange is lit with conventional fixtures.

The proposed design suggestion is to utilize high mast lighting at the Leestown Road DCD. High mast lighting typically is 15 to 20 percent less expensive to construct than conventional lighting. Assuming the existing circuitry will be replaced with the project, high mast will be less expensive to install than new conventional lighting. Given the age of the existing wiring and conduit along New Circle Road, that assumption appears reasonable.

High mast lighting simplifies long-term maintenance as lamps can be replaced away from traffic and no specialized equipment is required. Conventional lighting would require the use of a bucket truck occupying the shoulder in order to replace lamps, potentially requiring lane closures.

The use of 80' high mast poles with full cut-off optics can minimize adverse public reaction.

IMPLEMENTATION CONSIDERATIONS:

Public opposition is possible.



VALUE ENGINEERING PROPOSAL DS3
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Keep the location of the bike lane design for Leestown Road at the interchange as designed	
FUNCTION: Miscellaneous	
BASELINE ASSUMPTION:	
The original design calls for a bicycle lane that must transition across the right turn lane.	
PROPOSED ALTERNATIVE:	
Supports the original design.	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> • Allows for continuity of a bicycle lane through the corridor 	<ul style="list-style-type: none"> • May be slightly confusing for drivers
<ul style="list-style-type: none"> • Works with the proposed lane drop configuration 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •

DESIGN SUGGESTION



VALUE ENGINEERING PROPOSAL DS3
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Keep the location of the bike lane design for Leestown Road at the interchange as designed

DISCUSSION/JUSTIFICATION:

There was a question by the project team about the best way to accommodate the bicycle lane through the east side of the US421 interchange. The VE team consulted with the KYTC Pedestrian and Bicycle Coordinator and determined that the proposed design is valid. The team also looked at another option in which the bicycle lane stays between the second and third lanes throughout the interchange area but determined the proposed design is the better option.

IMPLEMENTATION CONSIDERATIONS:

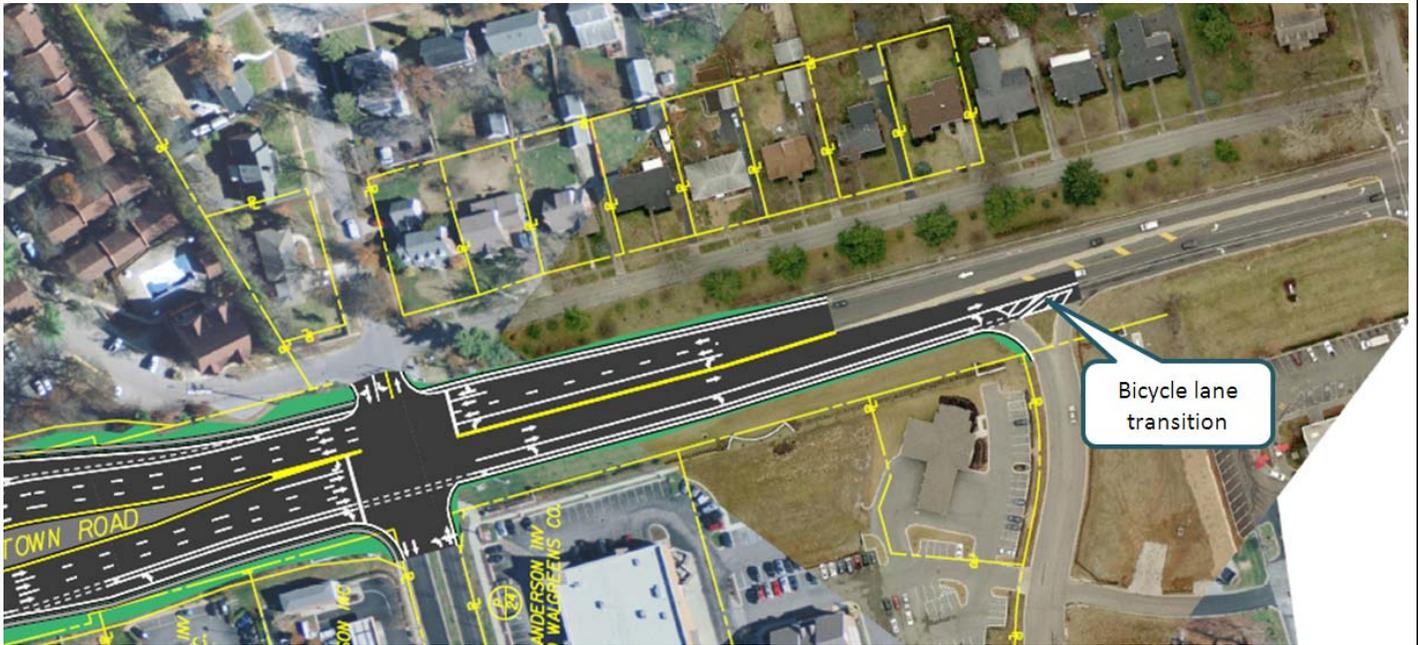
None apparent



VALUE ENGINEERING PROPOSAL DS3
Project 7-113 - Leestown Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Keep the location of the bike lane design for Leestown Road at the interchange as designed

SKETCH OF BASELINE ASSUMPTION





**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

Old Frankfort Pike Road Interchange



VALUE ENGINEERING PROPOSAL 1
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Realign Ramp B further away from Duncan Machinery Drive			
FUNCTION: Improve Geometrics (B)			
BASELINE ASSUMPTION:			
Construct a proposed ramp (Ramp B) from westbound Old Frankfort Pike Road to the inner loop (northbound) New Circle Road. The ramp begins across from Duncan Machinery Drive and ties to proposed Ramp C using a 150 ft. radius.			
PROPOSED ALTERNATIVE:			
Realign Ramp B so that the full width ramp is 150 ft. from Duncan Machinery Drive. The radius is reduced to 75 ft.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Removes the ramp taper from the intersection 		<ul style="list-style-type: none"> None apparent 	
<ul style="list-style-type: none"> Slows traffic to merge with Ramp C 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ 27,779	\$ -
PROPOSED ALTERNATIVE:		\$ 13,261	\$ -
TOTAL (Baseline less Proposed)		\$ 14,518	\$ -
		SAVINGS	



VALUE ENGINEERING PROPOSAL 1
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Realign Ramp B further away from Duncan Machinery Drive

DISCUSSION/JUSTIFICATION:

There is a concern with the exiting traffic from Duncan Machinery Drive trying to go northbound on New Circle Road merging with Old Frankfort Pike Road traffic who would be accelerating to get on the ramp. Using the 150-ft. radius creates a free flow right turn that is more rural than urban in character. Since the remainder of the proposed interchange is more urban in nature, this change creates some consistency with the new interchange. Per Green Book, "...close spacing between adjacent ramp terminals and access connections creates operational problems on the crossroad that affect traffic on the ramp..." The revised radius is 75 ft. which is still be acceptable for trucks. The taper will be reduced from 150 ft. to 100 ft.

In determining the pavement costs, pavement depth assumptions include: 1.25" Surface; 8.75" Base; 4" Drainage Blanket and 4" DGA.

IMPLEMENTATION CONSIDERATIONS:

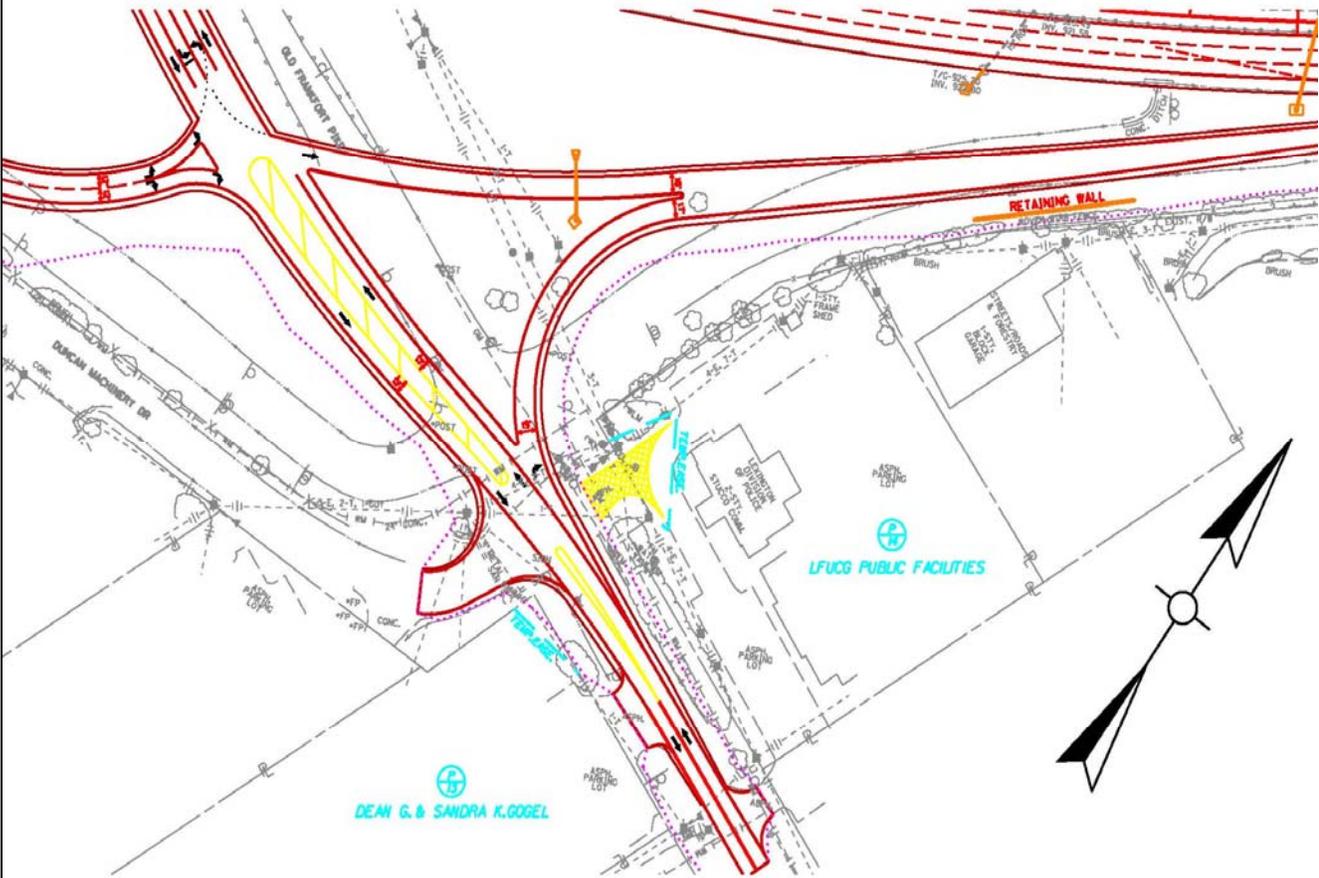
None apparent



VALUE ENGINEERING PROPOSAL 1
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Realign Ramp B further away from Duncan Machinery Drive

SKETCH OF BASELINE ASSUMPTION

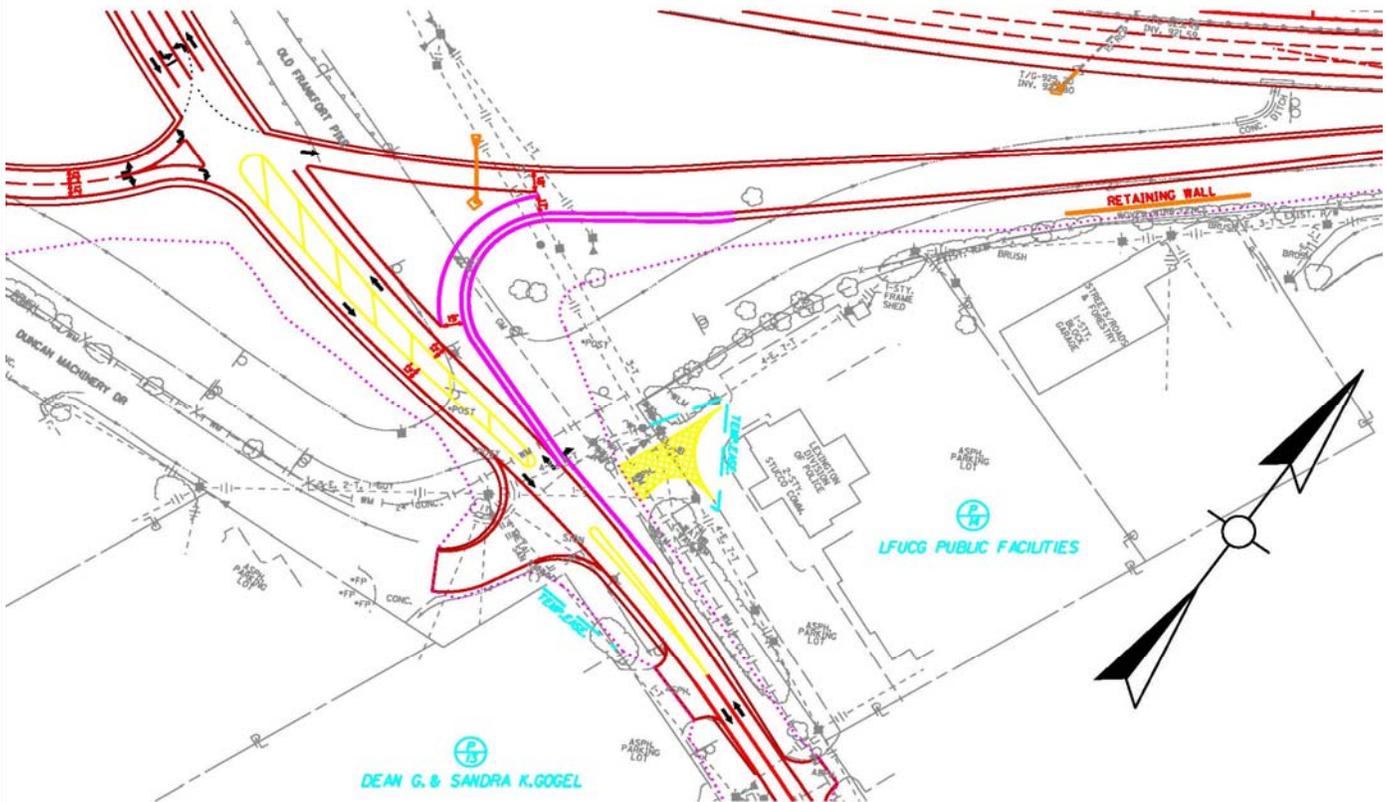




VALUE ENGINEERING PROPOSAL 1
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Realign Ramp B further away from Duncan Machinery Drive

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 2
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: No improvements provided out to Enterprise Drive west of New Circle Road			
FUNCTION: Improve Geometrics (B)			
BASELINE ASSUMPTION:			
The baseline alternative includes intersection improvements on Old Frankfort Pike Road at the Enterprise Drive/Frankfort Court intersection, including the addition of a second left turn lane onto southbound Enterprise Drive.			
PROPOSED ALTERNATIVE:			
The proposed alternative is to eliminate all improvements on Old Frankfort Pike Road west of New Circle Road beyond the tie-down point for the proposed realignment of Old Frankfort Pike Road over New Circle Road.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Minimizes cost 		<ul style="list-style-type: none"> Left-turn demand onto Enterprise Drive could increase should additional development occur 	
<ul style="list-style-type: none"> Reduces construction limits and driver inconvenience during construction 		<ul style="list-style-type: none"> Reduces additional storage that was proposed 	
•		•	
•		•	
•		•	
•		•	
•		•	
•		•	
•		•	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ 463,499	\$ -
PROPOSED ALTERNATIVE:		\$ -	\$ -
TOTAL (Baseline less Proposed)		\$ 463,499	\$ -
		SAVINGS	



VALUE ENGINEERING PROPOSAL 2
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: No improvements provided out to Enterprise Drive west of New Circle Road

DISCUSSION/JUSTIFICATION:

The baseline alternative includes modifications to the Enterprise Drive/Old Frankfort Court intersection with Old Frankfort Pike Road. The only modification that would result in increased capacity is the addition of a second westbound left turn lane onto southbound Enterprise Drive. The existing (2011) left turn volume is 210 vehicles per hour (VPH) in the AM peak and 100 VPH in the PM. Even though the areas along Enterprise Drive are largely built out, the left turn movement is forecast to increase to 300 VPH in the AM (nearly a 50 percent increase) and 130 VPH in the PM (a 30 percent increase).

The proposed alternative would tie the Old Frankfort Pike Road improvements at the New Circle Road interchange into the existing Old Frankfort Pike Road near Station 41+00. No improvements would be extended to the west, and the intersection with Enterprise Drive/Old Frankfort Court would remain as-is.

The design year (2034) traffic forecasts developed for the project were utilized to create a traffic simulation model in Synchro version 7. The results of the cursory Synchro analysis indicate a single westbound left turn lane should be able to accommodate the design year traffic demand. With no improvements, the intersection would operate at level of service (LOS) C in both the AM and PM peaks in the 2034 design year. Maximum queue lengths in the westbound through lane would be approximately 150 ft. in the AM and 500 ft. in the PM. In the single left turn lane, the maximum queue lengths would be approximately 300 ft. in the AM and 75 ft. in the PM. Average queue lengths would be significantly less.

It is assumed the baseline alternative included new full-depth pavement within the limits of all improvements along Old Frankfort Pike Road.

IMPLEMENTATION CONSIDERATIONS:

None apparent



VALUE ENGINEERING PROPOSAL 2
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: No improvements provided out to Enterprise Drive west of New Circle Road

SKETCH OF BASELINE ASSUMPTION

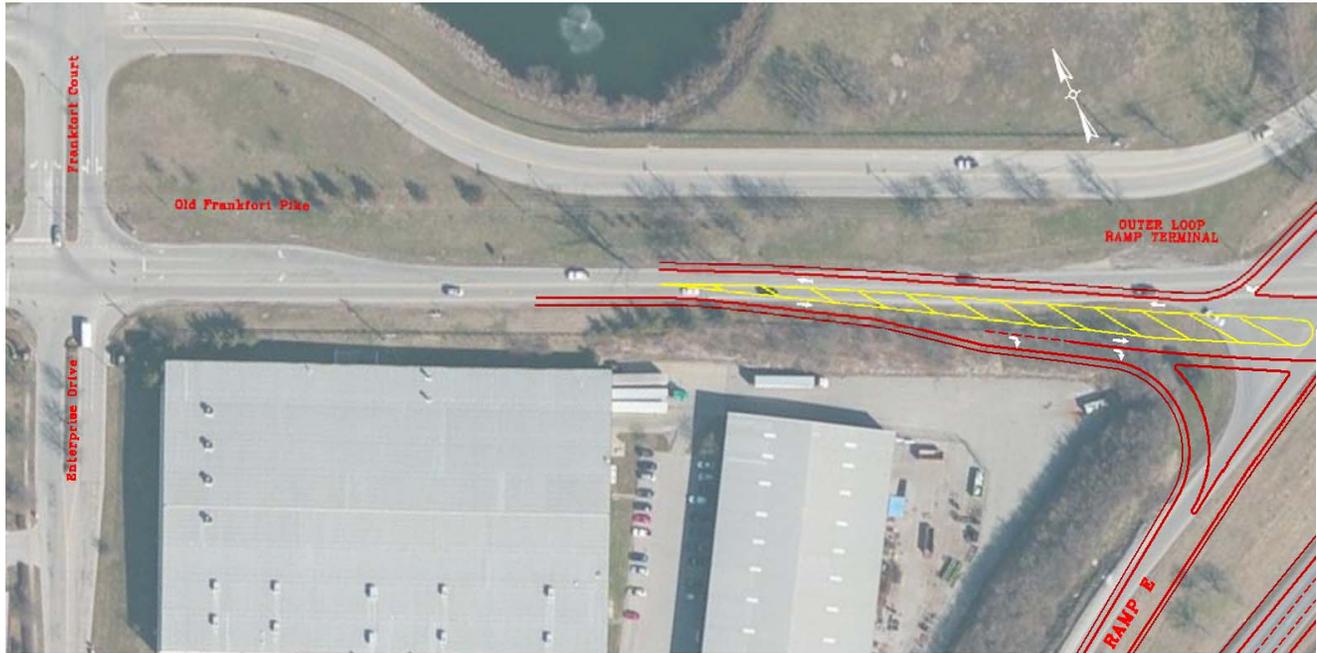




VALUE ENGINEERING PROPOSAL 2
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: No improvements provided out to Enterprise Drive west of New Circle Road

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL 3
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Stripe a second lane on Old Frankfort Pike Road outside the ramp terminals to feed the left-turn lanes on the bridge over New Circle Road			
FUNCTION: Improve Geometrics (B)			
BASELINE ASSUMPTION:			
The baseline alternative includes a four-lane bridge carrying Old Frankfort Pike Road over New Circle Road. This includes a single through lane per direction and a full left-turn lane that begins at the ramp terminal. A single lane feeds the ramp terminals from northbound and southbound Old Frankfort Pike Road. A 24-ft. striped, flush median is provided outside the ramp terminals to maintain through lane alignment.			
PROPOSED ALTERNATIVE:			
The proposed alternative is to restripe part of the flush median outside the ramp terminals to accommodate an additional lane on both northbound and southbound Old Frankfort Pike Road. The additional lane will connect to the left-turn lanes on the bridge over New Circle Road.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Provides additional storage for left-turning vehicles from Old Frankfort Pike Road to New Circle Road 		<ul style="list-style-type: none"> Additional signage will be required 	
<ul style="list-style-type: none"> Minimizes queue lengths on Old Frankfort Pike Road 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Maximizes the use of already proposed pavement 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ -	\$ -
PROPOSED ALTERNATIVE:		\$ -	\$ -
TOTAL (Baseline less Proposed)		\$ -	\$ -
NO CHANGE			



VALUE ENGINEERING PROPOSAL 3
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Stripe a second lane on Old Frankfort Pike Road outside the ramp terminals to feed the left-turn lanes on the bridge over New Circle Road

DISCUSSION/JUSTIFICATION:

The traffic Measures of Effectiveness (MOE's) provided for the proposed baseline configuration of the improved diamond interchange at Old Frankfort Pike Road shows a maximum queue length of 850 ft. on the westbound Old Frankfort Pike approach at the New Circle Road inner loop ramp terminal during the PM peak in the 2034 design year and a 450' queue in the eastbound direction at the outer loop ramp terminal. The existing (2011) left-turn volume from westbound Old Frankfort Pike Road to the outer loop of New Circle Road is 300 vehicles per hour (VPH) during the PM peak and is forecasted to increase to 410 VPH by 2034. The existing left-turn volume from eastbound Old Frankfort Pike Road to the inner loop of New Circle Road is 260 VPH and is forecasted to increase to 280 VPH in 2034. The corresponding through movements on Old Frankfort Pike Road are anticipated to increase as well.

The proposed alternative would provide additional storage for left-turning vehicles outside the New Circle Road ramp terminals by restriping the flush median proposed in the baseline alternative. Over 450' of additional storage can be provided in the eastbound direction and over 200' in the westbound direction. The additional lane will increase throughput and improve operational efficiency of the traffic signals proposed at each ramp terminal. A cursory evaluation of the proposed concept was performed using Synchro Version 7 and found the westbound queue could be reduced by over 50%.

It is assumed the baseline alternative included full-depth pavement in the flush median on Old Frankfort Pike road and the proposed traffic signals would include two signal heads per approach. Therefore, there is no additional cost for this proposed alternative.

IMPLEMENTATION CONSIDERATIONS:

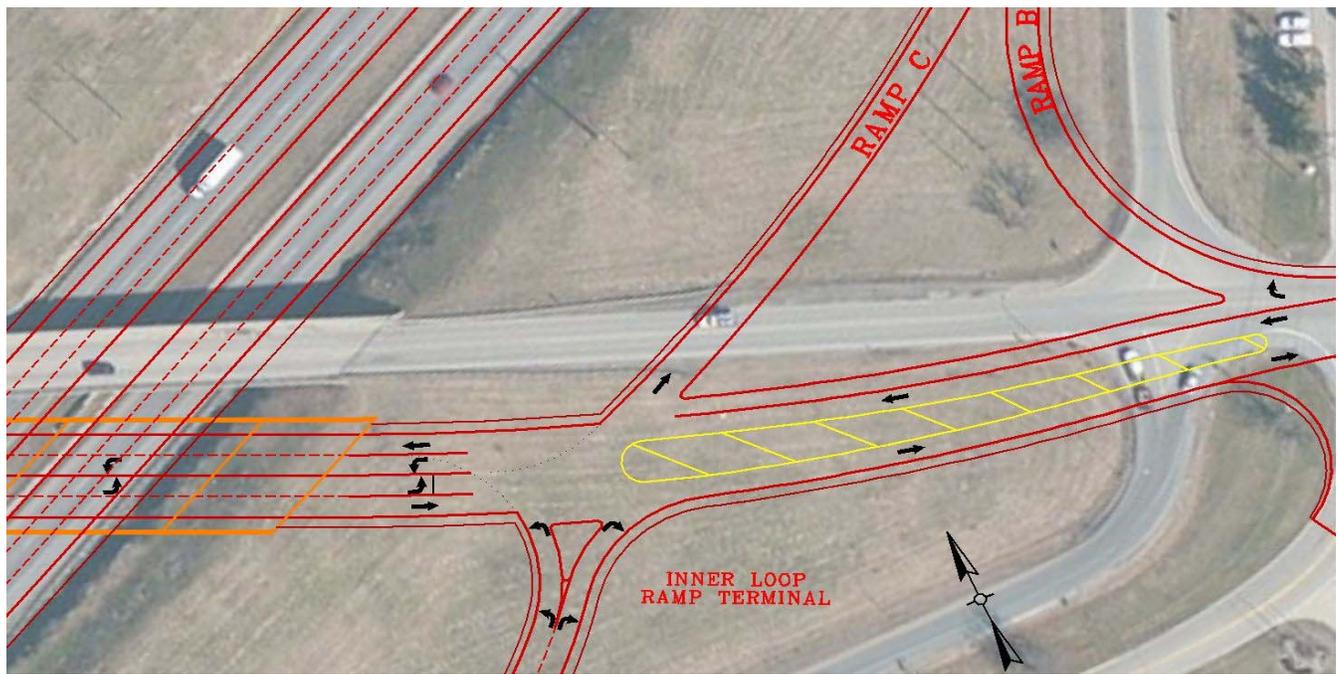
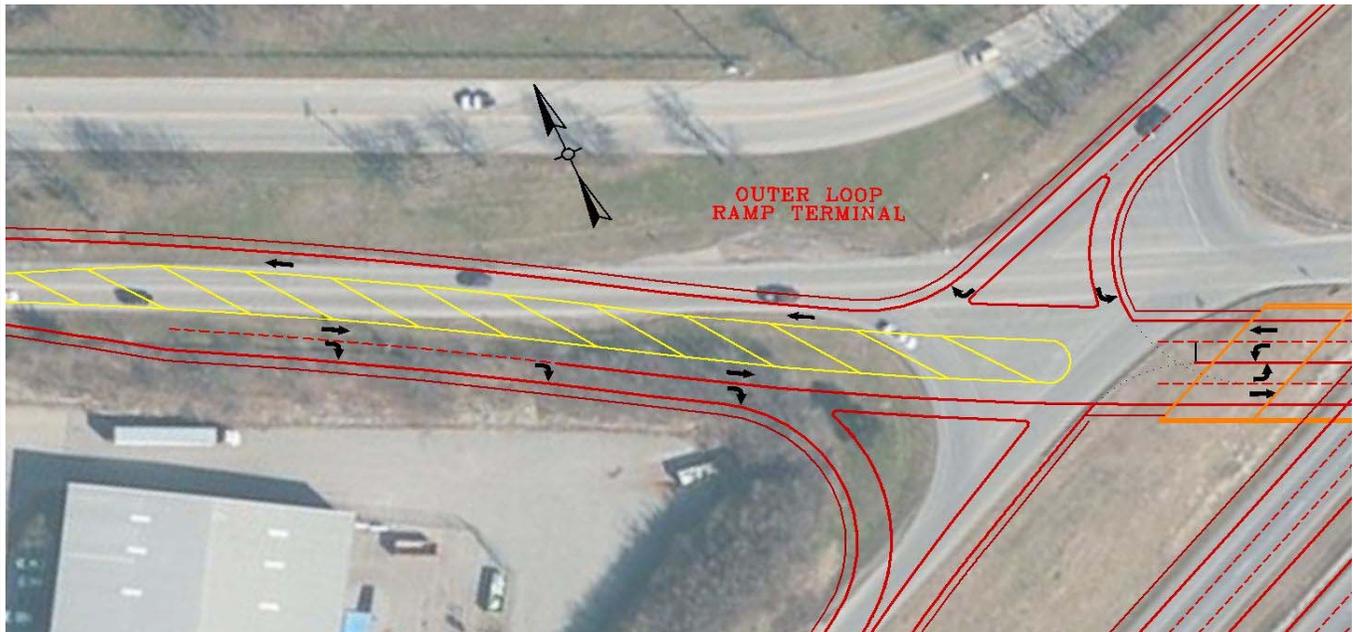
Additional signage will be required to notify drivers that the left-turn lane storage begins upstream of the ramp terminals.



VALUE ENGINEERING PROPOSAL 3
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Stripe a second lane on Old Frankfort Pike Road outside the ramp terminals to feed the left-turn lanes on the bridge over New Circle Road

SKETCH OF BASELINE ASSUMPTION



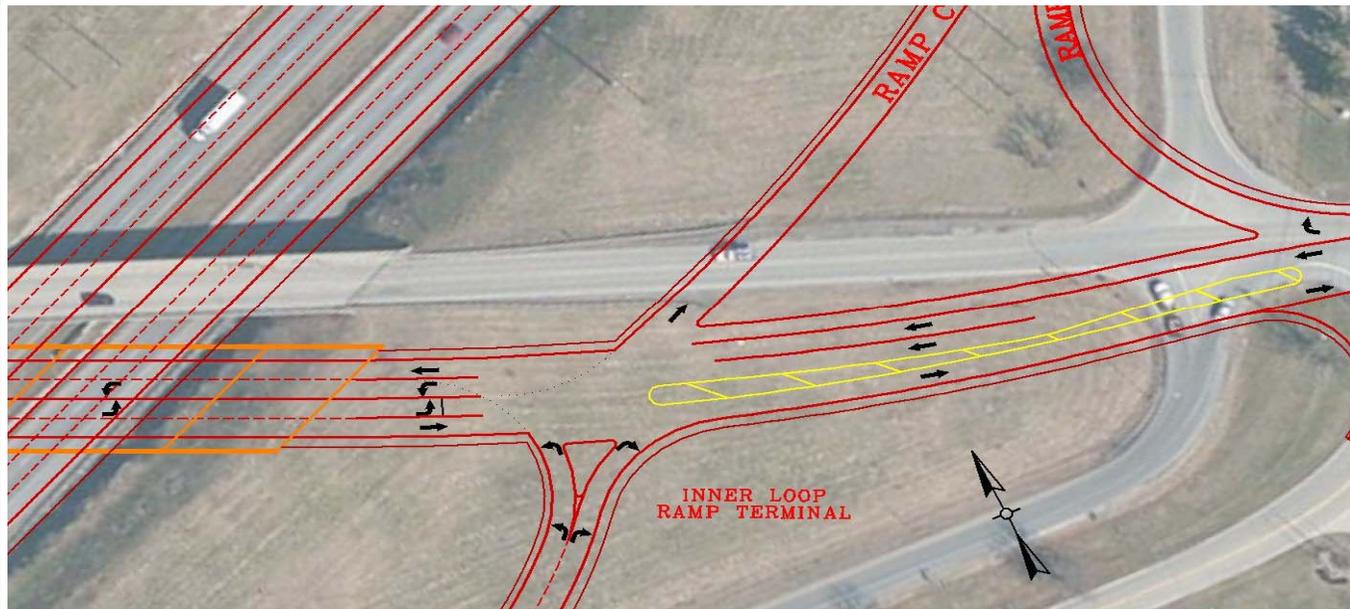
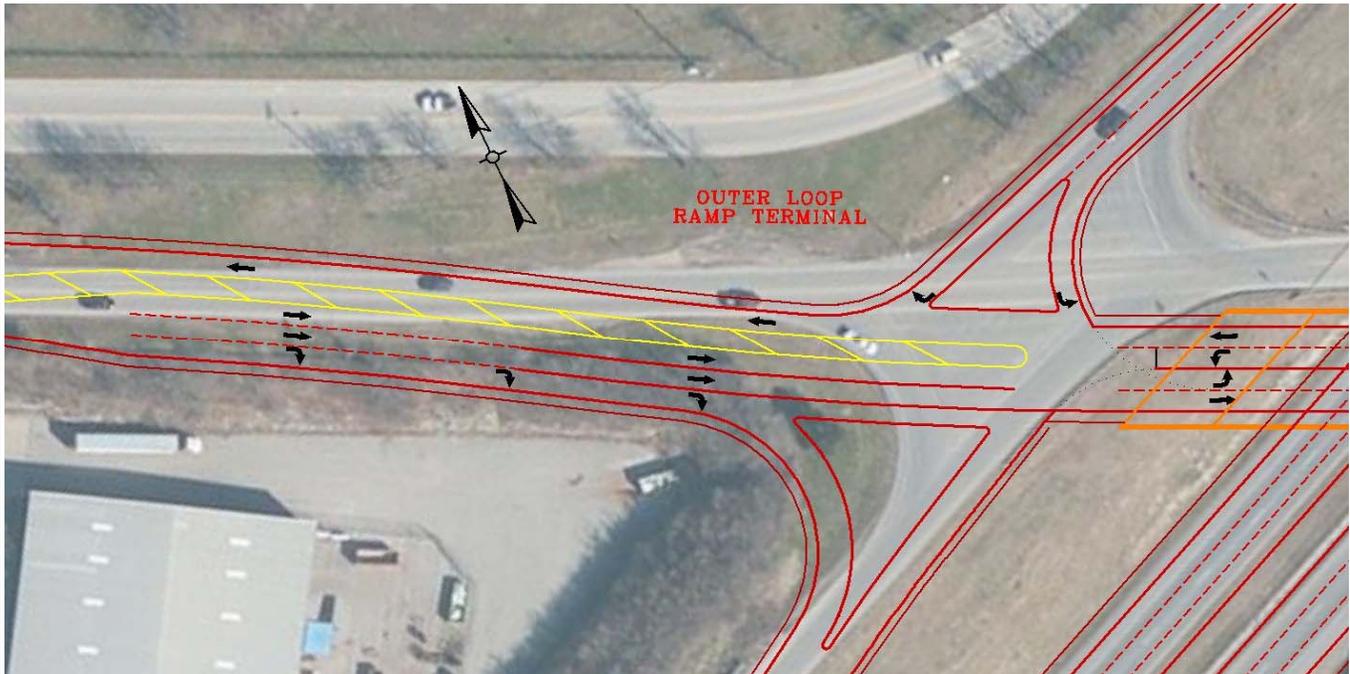


VALUE ENGINEERING PROPOSAL 3
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE:

Stripe a second lane on Old Frankfort Pike Road outside the ramp terminals to feed the left-turn lanes on the bridge over New Circle Road

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL DS1
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Use roundabouts for the Old Frankfort Pike Road interchange	
FUNCTION: Improve Geometrics (B)	
BASELINE ASSUMPTION:	
The original design uses a conventional unsignalized intersection design for each of the ramp terminals.	
PROPOSED ALTERNATIVE:	
Use a roundabout at each ramp terminal.	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> • Controls speeds through the interchange 	<ul style="list-style-type: none"> • Possible additional right-of-way
<ul style="list-style-type: none"> • Provides safer conditions 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • Quality traffic operations 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •

DESIGN SUGGESTION



VALUE ENGINEERING PROPOSAL DS1
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Use roundabouts for the Old Frankfort Pike Road interchange

DISCUSSION/JUSTIFICATION:

The project team originally examined using roundabouts in three different configurations, each with a two-lane bridge over New Circle Road. This limited the roundabout capacity greatly.

This VE alternative creates a new configuration that keeps the four-lane bridge but adds additional lanes to the roundabouts to better address the turning movement needs.

This does very little to change the cost of the project because the bridge would still be four lanes wide and the roundabouts would be approximately in the same location as the proposed conventional intersection. The roundabout inscribed (outside) diameter would be approximately 180 ft. on the northbound terminal and 150 ft. on the southbound terminal.

Preliminary analysis using Highway Capacity Software shows very good operations in the peak (design) hour using the 2034 forecast turning movements. Delays and queue lengths appear acceptable with this design. For the southbound ramp terminal, maximum queue lengths are shown to be less than 200 feet . For northbound ramp terminal, maximum queue lengths are shown to be less than 100 feet. Lower speeds and low queues may allow for easier judgment of gaps for drivers exiting from Duncan Machinery Drive.

IMPLEMENTATION CONSIDERATIONS:

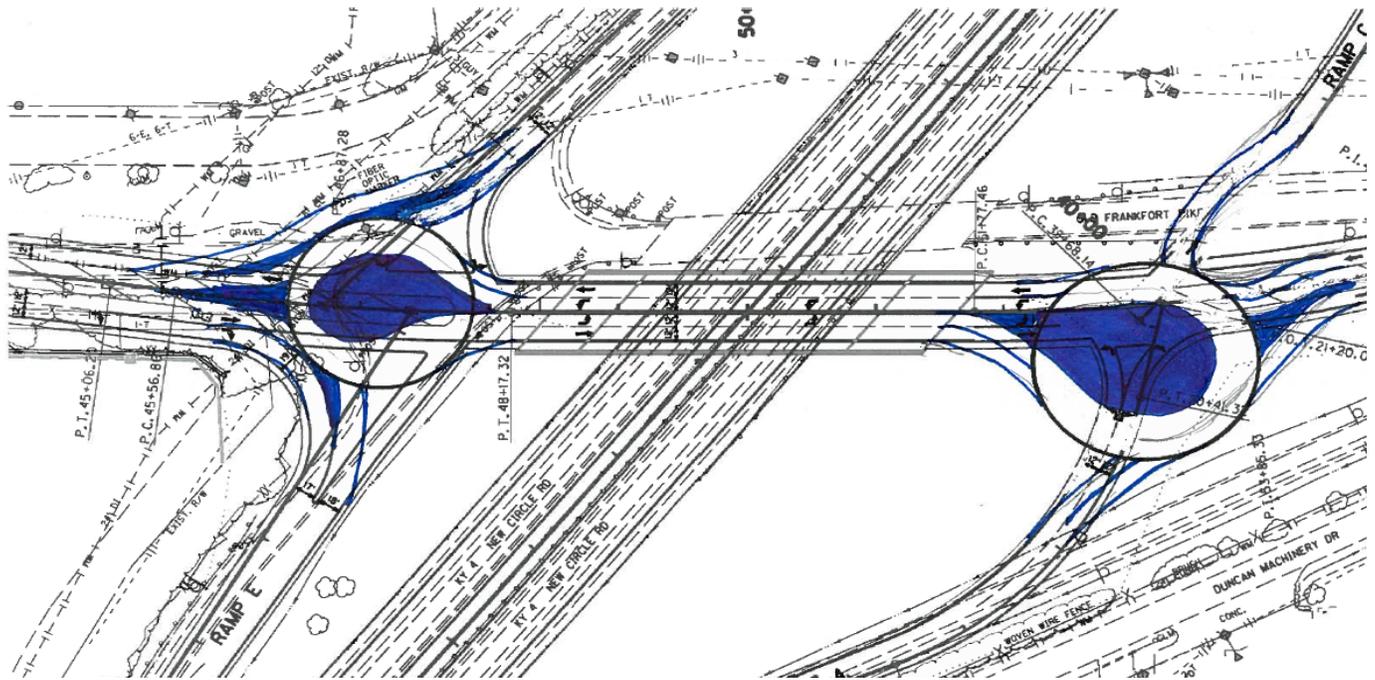
None apparent.



VALUE ENGINEERING PROPOSAL DS1
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Use roundabouts for the Old Frankfort Pike Road interchange

SKETCH OF PROPOSED ALTERNATIVE

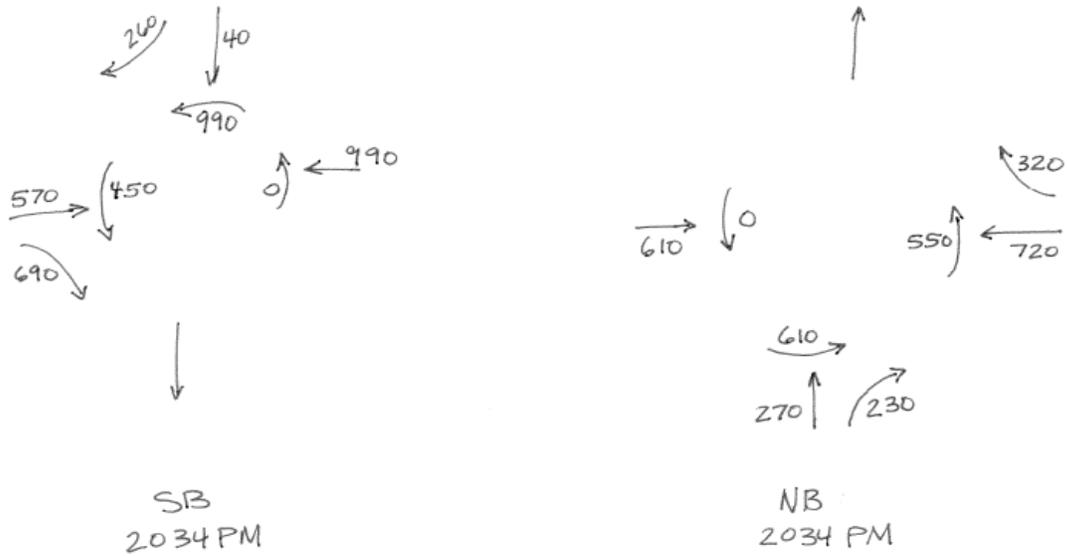




VALUE ENGINEERING PROPOSAL DS1
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Use roundabouts for the Old Frankfort Pike Road interchange

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL DS2
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 & #7-279.00
Fayette County

TITLE: Use high mast lighting in the interchange to reduce maintenance impacts	
FUNCTION: Improve Geometrics (B)	
BASELINE ASSUMPTION:	
The baseline alternative does not specify the type of lighting to be used at the proposed diamond interchange at Old Frankfort Pike Road (KY 1681) at New Circle Road (KY 4). The existing lighting is conventional.	
PROPOSED ALTERNATIVE:	
The proposed design suggestion is to utilize high mast lighting at the interchange.	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> Reduces construction cost 	<ul style="list-style-type: none"> There is typically some public opposition to high mast lighting where neighborhoods are nearby
<ul style="list-style-type: none"> Reduces long-term maintenance costs 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> Will be simpler to light than conventional lighting as fewer poles are required 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

DESIGN SUGGESTION



VALUE ENGINEERING PROPOSAL DS2
Project 7-113 - Old Frankfort Pike Road Interchange
New Circle Road Rehab & KY4/US-60 Interchange Projects
Fayette County

TITLE: Use high mast lighting in the interchange to reduce maintenance impacts

DISCUSSION/JUSTIFICATION:

The baseline alternative for Old Frankfort Pike Road (KY 1681) is to reconstruct the existing diamond interchange to an improved diamond interchange. The type of lighting to be used at the interchange has not been specified, but the existing interchange is lit with conventional fixtures.

The proposed design suggestion is to utilize high mast lighting at the Old Frankfort Pike Road interchange. High mast lighting typically is 15 to 20 percent less expensive to construct than conventional lighting. Assuming the existing circuitry will be replaced with the project, high mast will be less expensive to install than new conventional lighting. Given the age of the existing wiring and conduit along New Circle Road, that assumption appears reasonable.

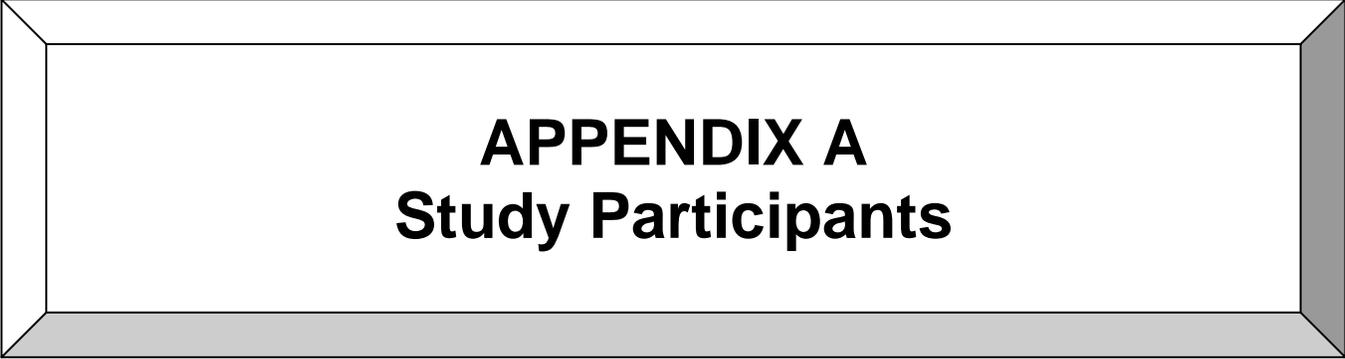
High mast lighting simplifies long-term maintenance as lamps can be replaced away from traffic and no specialized equipment is required. Conventional lighting would require the use of a bucket truck occupying the shoulder in order to replace lamps, potentially requiring lane closures.

The use of 80' high mast poles with full cut-off optics can minimize adverse public reaction.

IMPLEMENTATION CONSIDERATIONS:

Public opposition is possible.

APPENDICES



APPENDIX A
Study Participants

VE STUDY ATTENDEES
KY-4 and US-60
Items #7-0113.00 & #7-0279.00
Fayette County

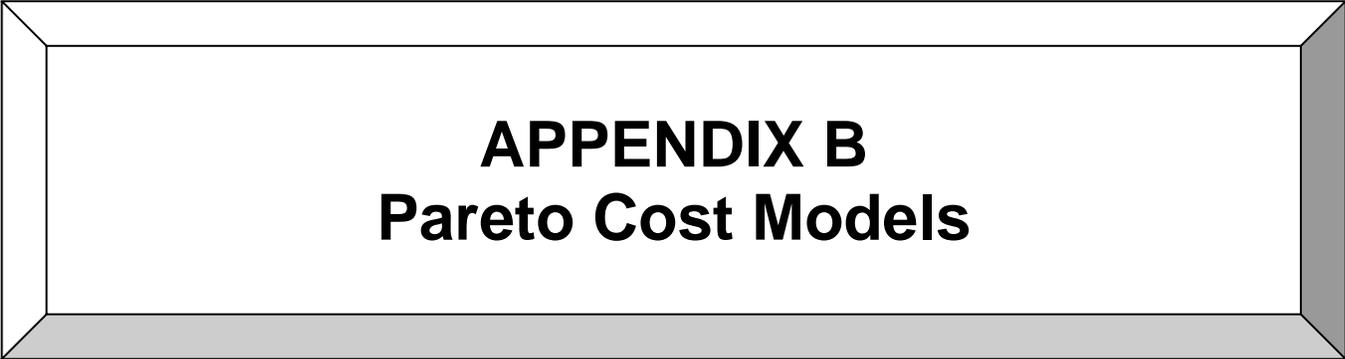


December 2012					NAME	ORGANIZATION	POSITION	TELEPHONE		CELL	
10	11	12	13	14				E-MAIL			
X	X	X	X	X	Renee Hoekstra	RH & Associates, Inc.	VE Team Leader	623	266-3943	623	764-7490
								rhpartnering@earthlink.net			
X	X	X	X	X	Mike Bonar	RH & Associates, Inc.	Assistant Team Leader/ Technical Recorder	602	889-4448	480	773-8533
								mbonar@entellus.com			
X					Boday Borres	KYTC	KYTC - Transportation Engineering Branch Manager	502	564-3280	502	229-5737
								boday.borres@ky.gov			
X	X	X	X	X	Brent Sweger	KYTC	KYTC - VE Coordinator	502	564-9900	410	693-5822
								brent.sweger@ky.gov			
X	X	X	X	X	Kenneth Ott	AEI	Structural Specialist	270	651-7220	270	282-3271
								kott@aei.cc			
X	X	X	X	X	Steve James	AEI	Highway Specialist	270	651-7220	270	282-3271
								sjames@aei.cc			
X	X	X	X	X	Jeremy Lukat	Qk4	Traffic Specialist	502	797-7555		
								jlukat@qk4.com			
X	X	X	X	X	Albert Zimmerman	Qk4	Highway Specialist	502	585-2222	502	741-2822
								azimmerman@qk4.com			
X	X	X	X	X	Brian Aldridge	Stantec	Traffic Specialist	502	212-5000	859	559-1416
								brian.aldridge@stantec.com			
X				X	Taylor Kelly	Qk4	Project Engineer				

VE STUDY ATTENDEES
KY-4 and US-60
Items #7-0113.00 & #7-0279.00
Fayette County



December 2012					NAME	ORGANIZATION	POSITION	TELEPHONE	CELL		
10	11	12	13	14				E-MAIL			
X				X	Ben Eclenen	HDR	Project Manager				
X				X	Joshua Samples	KYTC	D7 Design Project Manager				
X				X	Jim Guinn	HDR	Project Engineer				
X					Glen Kelly	Qk4	Project Manager				
					Keith Caudill	KYTC	Location Engineer				
					Brad Eldridge	KYTC	Hwy Design Roadway (Location)				
					Jeff Kasper	KYTC	Hwy Design Director				
				X	Mary Murray	FHWA	Transportation Engineer /Project Manager				
					Kevin Damon	KYTC	DSHE				



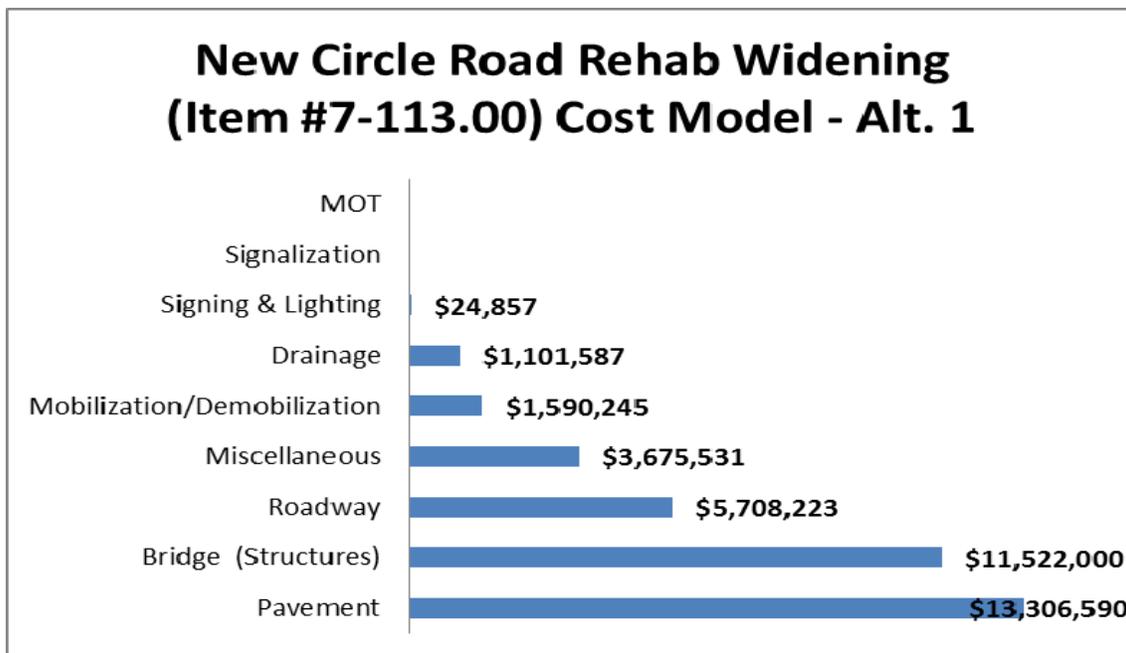
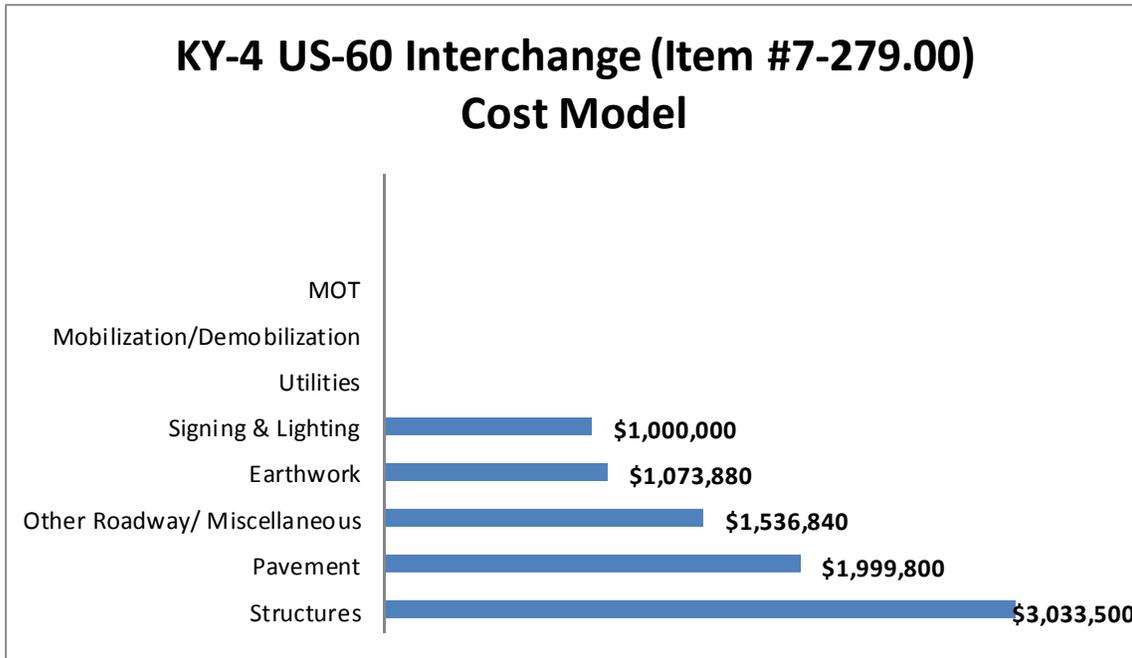
APPENDIX B
Pareto Cost Models



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

Appendix B – Cost Models

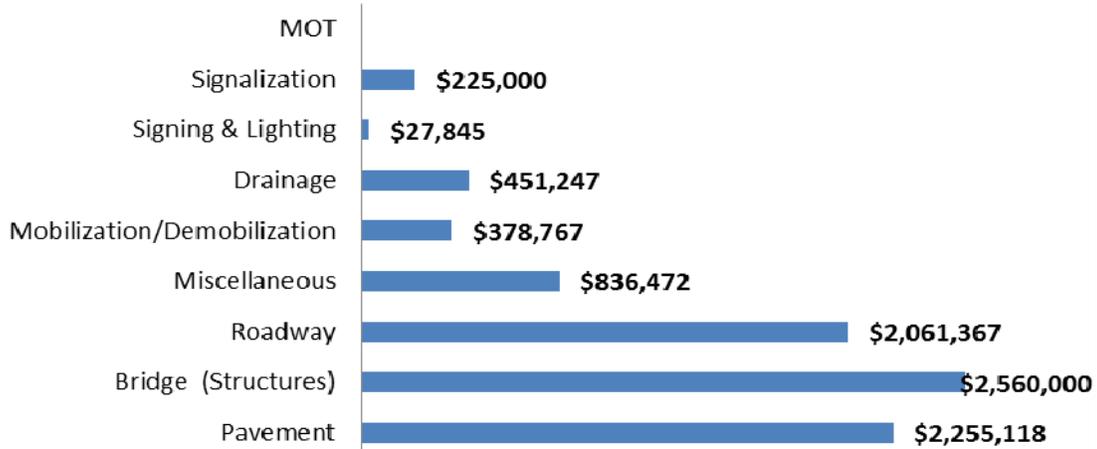
The team studied two projects; however, these were reviewed as four different projects. All four projects have separate cost models that were completed. These are shown on the next several pages:



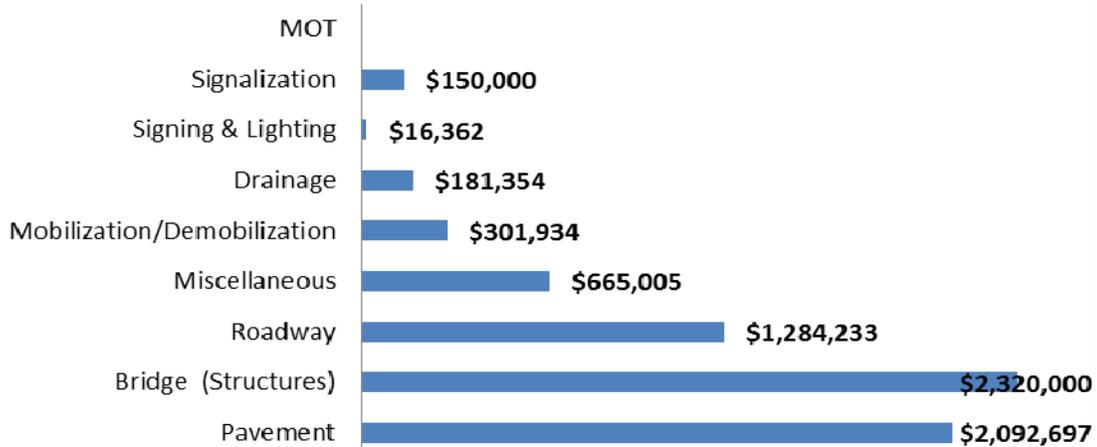


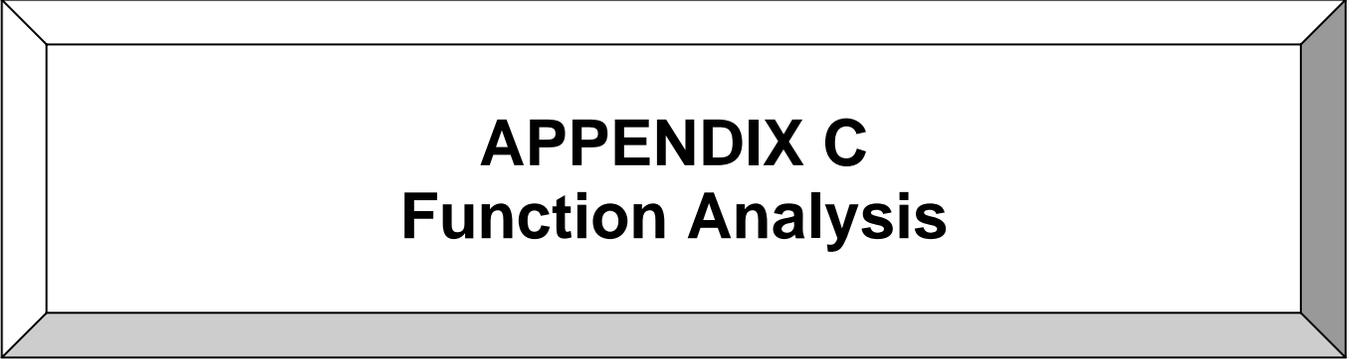
**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

**Leestown Road TI DCD (Item #7-113.00)
Cost Model**



**Old Frankfurt Road TI (Item #7-113.00)
Cost Model**





APPENDIX C
Function Analysis



**Value Engineering Study
 Kentucky Transportation Cabinet
 New Circle Road Rehab & KY4/US-60 Interchange
 Items #7-113.00 and #7-279.00
 Fayette County**

Appendix C – Function Analysis

Function definition and analysis is the heart of Value Engineering. It is the primary activity that separates VE from all other “improvement” programs. The objective of this phase is to ensure the entire team agrees upon the purposes for the project elements. Furthermore, this phase assists with development of the most beneficial areas for continuing study.

The VE team identified the functions of the projects based on the entire corridor using active verbs and measurable nouns. This process allowed the team to truly understand all of the functions associated with the project.

Function	Classification
<i>Improve Mobility</i>	<i>Higher Order</i>
Reduce Congestion	Basic
Move Traffic	Secondary
Accommodate Bikes & Peds	Secondary
Control Traffic	Secondary
Reduce Noise	Secondary
Minimize Impacts	Secondary
Accommodate Trucks	Secondary
Minimize ROW	Secondary
Avoid Calumet	Secondary
Accommodate Emergency Vehicles	Secondary
Illuminate Space	Secondary
Eliminate Weaves	Secondary
Reduce Conflicts	Secondary
Control Access	Secondary
Accommodate Access	Secondary
Span Space	Secondary
Support Load	Secondary
Retain Earth	Secondary
Improve Geometrics	Secondary
Accommodate Railroad	Secondary
Accommodate Utilities	Secondary
Accommodate Drainage	Secondary
Maintain Traffic	Secondary



Value Engineering Study Kentucky Transportation Cabinet New Circle Road Rehab & KY4/US-60 Interchange Items #7-113.00 and #7-279.00 Fayette County

Maintain Budget	Secondary
Accommodate Adjacencies	Secondary
Maintain Schedule	Secondary
Design Project	Secondary
Construct Project	Secondary

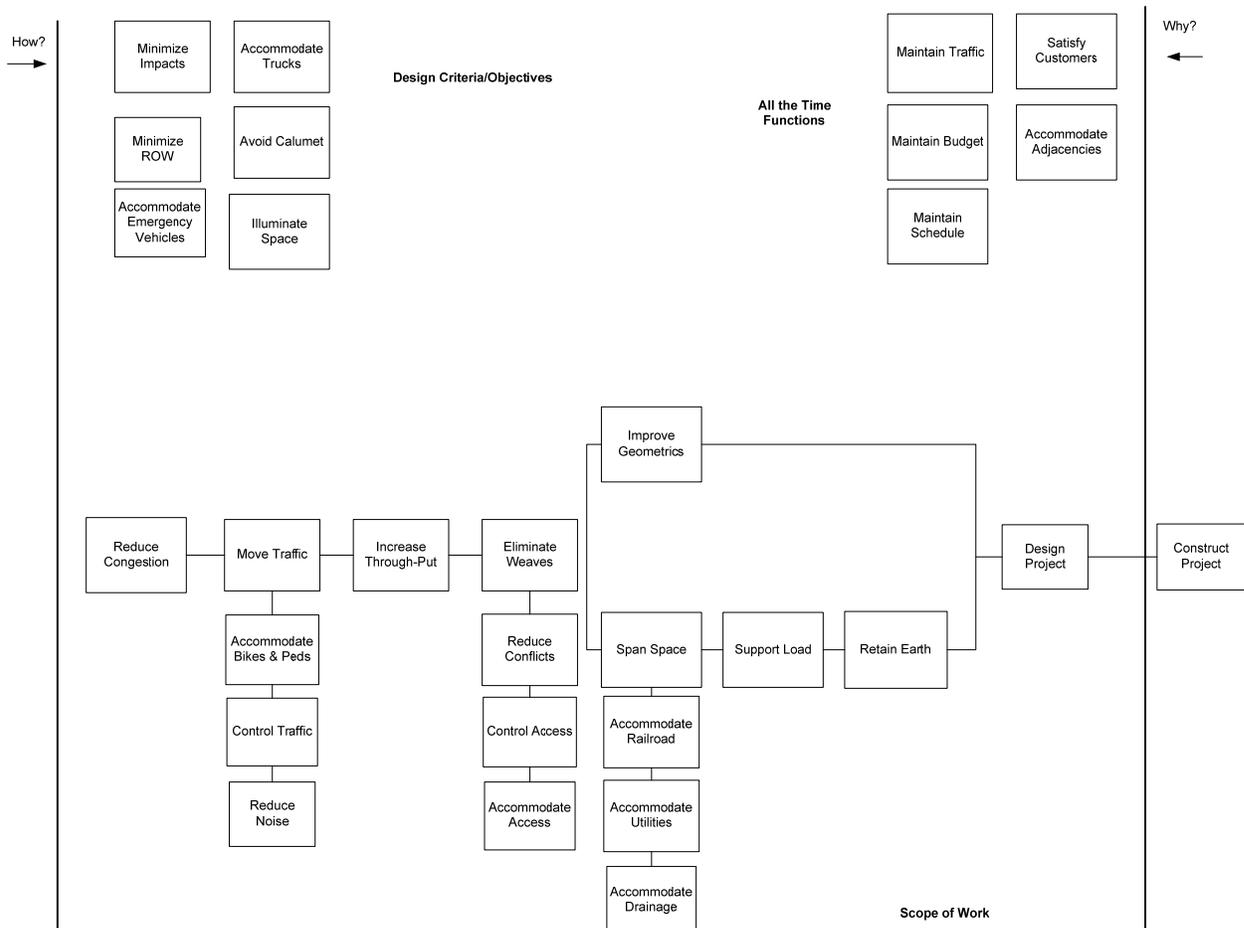
The definitions of the classifications are:

Higher Order Function defines the problem (study) goal and is outside the scope of the study.

Basic Function defines a performance feature that *must* be obtained to satisfy only user's needs not desires. It answers the question, "What must it do?".

Secondary Functions defines required performance features other than those that must be accomplished. These are the user's desires and answers the question, "What else do we want or does it do?".

The following represents the Function Analysis Systems Technique (FAST) Diagram completed for this project.





APPENDIX D
Creative Idea List & Evaluation



**Value Engineering Study
 Kentucky Transportation Cabinet
 New Circle Road Rehab & KY4/US-60 Interchange
 Items #7-113.00 and #7-279.00
 Fayette County**

Appendix D – Creative List and Evaluation Process

Creative Idea List

The list of ideas and comments that resulted from the study is included in this appendix. Some of the ideas were selected for further development as represented in the previous section.

Performance Attributes

The project manager and design teams helped to define the key performance attributes for the VE team members to use for evaluation. The following key attributes were used to score the ideas (see below):

- Increase Capacity
- Meet Schedule – New Circle Road Widening
- Maintenance of Traffic – Temporary during construction
- Maintainability – Long Term Impacts

Additional, the team completed a compared comparison matrix of the performance attributes to determine the level of importance.

PERFORMANCE CRITERIA MATRIX												 RH & Associates, Inc.	
KY4 & US60 Projects (7-133 & 7-279)												TOTAL	%
Increase Capacity	A	a	a	a								3.0	50%
Meet Schedule	B	b	b									2.0	33%
Maintenance of Traffic	C	c/d										0.5	8%
Maintainability	D											0.5	8%
	E												0%
	F												0%
	G												0%
	H												0%
	I												0%
a	More Important								J				0%
a/b	Equal Importance								K				0%
												6.0	100%



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

Evaluation Process

To aid in the evaluation of the ideas, the team scored the ideas using a nominal group technique keeping in mind the goals, constraints and the performance attributes developed for the project. Each of the four projects was evaluated separately.

Group Nominal Technique Evaluation Results Score

The prioritization for further development and documentation is as follows:

Score =

- 3-5 – Number of votes meeting the criteria (Workbook)
- 0-1 – Number of votes meeting the criteria (No workbook)
- DS – Design Suggestion (No workbook)
- DS* – Design Suggestion (Workbook)
- FF – Fatal Flaw
- ABC – Already Been Considered
- OS – Outside Scope

The creative idea list represents all of the ideas and includes scoring for the ideas that were rated using the group nominal technique.



Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 and #7-279.00
Fayette County

Creative Idea List

No.	Description	Comments	Score
Project 7-279 - Versailles Interchange			
IG	IMPROVE GEOMETRICS		
IG-01	Install a traffic signal on Versailles Road to eliminate Issue 4 - left turn lane conflicts		3
IG-02	Build a westbound median ramp to the south bound outer loop		3
IG-03	Build new flyover for W Bound Versailles to the S Bound New Circle road by following south side of ramp G and tying into existing ramp.		3
IG-04	Eliminate direct left turn at Ramp F-1 and provide a U-turn opportunity downstream		4
IG-05	Duplicate the ramp G concept on both sides	Would require right-of-way acquisition from Calumet Farms	FF
IG-06	Build a flyover for northbound Versailles to westbound New Circle Road		0
IG-07	Build a ramp for southbound outer loop to eastbound US 60 and the northbound inner Loop to westbound US 60		0
IG-08	Increase the radius on Ramp A		3
IG-09	Eliminate the proposed Ramp D		5
IG-10	Maintain the existing Ramp B - Versailles Road Interchange		5
IG-11	Use a Collector Distributor (C/D) road to eliminate the weave on eastbound Versailles and eliminate the fly over		0
IG-12	Use a Collector Distributor (C/D) road to eliminate the weave on north bound New Circle Road and eliminate the fly over		0
IG-13	Eliminate the left turn on Ramp F		0
IG-14	Build a ramp in the median for eastbound US 60 to the southbound outer loop which eliminates the left turn conflicts (Issue 4)		0
IG-15	Install a ramp in median of eastbound US 60 to the northbound inner loop which replaces the proposed fly over ramp		0
IG-16	Convert the proposed interchange to a Single Point Urban Interchange (SPUI)	Issue with adding signals to the project impacting throughput	1
IG-17	Use a gravity wall in lieu of a soil nail wall		0
MT	MAINTENANCE OF TRAFFIC		
MT-01	Install a temporary signal at station 21+00 onto Versailles to allow the closure of Ramp G		2
MT-02	Allow for a temporary closure of Ramp B to accommodate the necessary grade adjustment of Ramp G		DS*



Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 and #7-279.00
Fayette County

Creative Idea List

No.	Description	Comments	Score
Project 7-113 - New Circle Road Widening			
SS	SPAN SPACE		
SS-01	Use a single span bridge at Alexandria and eliminate the piers		4
SS-02	Widen both the bridges and roadway to one side in lieu of symmetric widening		4
SS-03	Use pre-stressed concrete hybrid beam for the Norfolk/Southern bridge in lieu of the box beams		0
SS-04	Salvage the superstructure of the Norfolk/Southern bridge		3
SS-05	Consider using Alternative Bridge Construction (ABC) for the four smaller bridges and possibly for the two new interchanges		0
SS-06	Replace superstructure only on Old Frankfort Pike Bridge		0
SS-07	Raise the existing bridge at Old Frankfort Pike (jack superstructure at abutment) to achieve the vertical clearance for New Circle Road bridge	Review the report for any issues	6
IT	IMPROVE THROUGHPUT		
IT-01	Reduce the inside shoulder width from 10 feet to 4 feet		2
IT-02	Consider the increased runoff due to paving the median		DS
IT-03	Include ramp meters		0
IT-04	Add Variable Message Signs (VMS) on the mainline and the associated roads crossing New Circle Road, to aid in congestion control	Address operation and maintenance of facilities	6
IT-05	Use open graded pavement to reduce runoff and noise		0
IT-06	Include truck restrictions that would not allow them to use inner lane		DS
RE	RETAIN EARTH		
RE-01	On the northwest side of Alexandria, purchase parcel #2 in lieu of using retaining walls		1
RE-02	Use "wire walls" - which is a modified MSE wall in lieu of reinforced concrete walls in fill areas	Develop, time permitting	2
RE-03	Use "Keystone" or "crib lock" walls in lieu of reinforced concrete walls in fill areas		W/ RE-03
RE-04	Use soil nail walls in lieu of reinforced concrete walls in cut areas		W/ RE-03
RE-05	Install sound walls first to limit construction noise		DS
RE-06	Use geotechnical investigation/reports to evaluate areas where existing geotechnical conditions would allow for elimination of some of the retaining walls		2
RE-07	Investigate the FHWA "windows and doors" program to see if window replacement can be done in lieu of providing noise walls		0



Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 and #7-279.00
Fayette County

Creative Idea List

No.	Description	Comments	Score
RE-08	Use an integral retaining wall and sound wall design using soldier piles		5
RE-09	Install stabilized embankment at Station 278+00 to eliminate the box extension and eliminate the easement acquisition		6
RE-10	Install a retaining wall at Station 278+00 to eliminate the box extension and eliminate the easement acquisition		W/ RE-9
RE-11	Use channel lining in any flatly sloped ditches in lieu of paving		DS
MOT	MAINTENANCE OF TRAFFIC		
MOT-01	Lower the grade on New Circle Road through the Old Frankfort Pike Interchange in lieu of replacing the existing bridge		0
MOT-02	Allow for lane closures during non-peak hours and weekend closures during construction in lieu of maintaining 2 lanes of traffic being open at all times		DS
MOT-03	Build all bridges first, prior to beginning roadway construction		ABD
MOT-04	Build medians first		DS
MOT-05	Build to the outside on one side of New Circle Road first		0
MOT-06	Build one side of New Circle Road in its entirety and then swap traffic to build the other side		DS*
MOT-07	Eliminate the development of detailed traffic control plans by the designer and develop Performance Specifications for the contractor to develop the formal plans		DS*
	Project 7-113 - Leestown Interchange		
IGA	IMPROVE GEOMETRICS (A)		
IGA-01	Reduce lane widths on Leestown Road under New Circle Road		3
IGA-02	Make cross-over intersections closer to 50 degree intersections and change reverse curvature to reduce speed		DS*
IGA-03	Reduce Leestown Road to two lanes westbound at the outer loop entrance ramp		2
IGA -04	Use a shared use path in lieu of bike lanes		1
IGA-05	Make southbound New Circle Road a dual left turn from Ramp F to Leestown Road		3
IGA-06	Extend the right turn only lane on eastbound Leestown Road		5
IGA-07	Close access to Leestown Road at Station 116+00		0
IGA-08	Close access to Leestown Road at Station 92+00 on both sides of the road		DS*
IGA-09	Use high mast lighting in the interchange to reduce maintenance impacts		DS*
IGA-10	Provide three lanes under the bridge, with the third lane an exit to Ramp H only		2



Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 and #7-279.00
Fayette County

Creative Idea List

No.	Description	Comments	Score
IGA-11	Improve Leestown Road south and carry full lanes past the Kroger Shopping Center entrance, eliminate the new interchange		3
IGA-12	Place a bicycle lane between the 1st and 2nd travel lanes through the interchange		0
IGA-13	Use thermoplastic marking in lieu of paint		DS
IGA-14	Install a retaining wall on the southwest quadrant of the interchange to avoid right-of-way impacts		0
IGA-15	Install Auxilliary lanes between Leestown Road and Old Frankfort Pike Road on both sides of New Circle Road		0
IGA-16	Provide pedestrian access to Leestown Middle School		0
Project 7-113 - Old Frankfort Pike Interchange			
IGB	IMPROVE GEOMETRICS (B)		
IGB-01	Realign Ramp B further away from Duncan Machinery Drive		3
IGB-02	Provide for a right turn out at Duncan Machinery Drive and provide for a U-Turn to the east		0
IGB-03	Build the bridge east of the existing Old Frankfort Pike Road bridge		0
IGB-04	Build the bridge on the same alignment of the existing bridge using part width construction		4
IGB-05	Use roundabouts for the Old Frankfort Pike interchange		1
IGB-06	Realign Old Frankfort Pike to the north to accommodate a new frontage road along the south side. This will eliminate access challenges with corporate and industrial development		0
IGB-07	Eliminate gore striped pavement in Old Frankfort Pike on both sides of the Old Circle Interchange		0
IGB-08	No improvements provided out to Enterprise Drive, west of New Circle Road	Review the traffic models for potential back-up issues on to the ramp	5
IGB-09	Place a roundabout at Enterprise Drive		1
IGB-10	Stripe a second lane on Old Frankfort Pike outside of the ramp terminals to feed the left-turn lanes on the bridge over New Circle Road		3
IGB-11	Use high mast lighting at the interchange to reduce maintenance impacts		DS*
IGB-12	Eliminate end spans by constructing short walls on the existing rock outcropping on both ends of the abutment		1
Project 7-113 and 7-279 - All Project Components			



Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange Projects
Items #7-113.00 and #7-279.00
Fayette County

Creative Idea List

No.	Description	Comments	Score
M	Miscellaneous		
M-01	Accelerate the Norfolk/Southern railroad bridge design and coordination		DS*
M-02	Eliminate the Norfolk/Southern Bridge from the design to eliminate the risk to the schedule		3
M-03	Get Norfolk and Southern Involved now to understand the design and the impact requirements for the schedule		W/M-01
M-04	Send Preliminary Plans to the utility companies to give them heads up and explain the deadline		DS
M-05	Keep the location of the bike lane design for Leestown Road at Interchange as designed		DS*
M-06	Begin the subsurface utility exploration as soon as possible		DS
M-07	Begin the geotechnical investigation as soon as possible.		DS
M-08	Extend the expansion work for the lanes and bridges on New Circle Road through the Interchange at KY4 and US 60		
M-09	Accommodate the future expansion needs of the New Circle Road and Versailles Interchange		DS
M-10	Ensure that the truck turning radii has been accommodated at all locations		DS
M-11	Keep the Norfolk/Southern bridge in the design but delay construction in the specifications		DS*

APPENDIX E

Supporting Data



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

Appendix E – Supporting Data

Team Observations

The VE team identified observations, concerns and opportunities to be addressed during the creative generation of potential ideas and alternatives. The following is a list of the VE team's observations:

- There seems to be quite a few retaining walls proposed
- Maintenance of Traffic (MOT) is not in the cost estimate for Versailles and it seemed to be very low for New Circle Road
- The schedule is critical for New Circle Road. However, the construction time/duration has not been defined. It is estimated it will be two years
- Right-of-way is not as big of an impact at the interchanges
- There can be no impact to Calumet Farms
- The left turn issue on the Versailles Interchange (The identified Issue 4)
- The design team identified pavement condition problems which potentially leads to MOT concerns during construction
- Noise issues were identified meaning noise walls will be required
- Not sure if the construction work hours for the contractors will be limited
- There is a need to replace bridges on two of the interchanges due either their inability to support the load and/or clearance
- There is a desire to accommodate bicycle traffic through the Leestown interchange
- The project would like to avoid using traffic signals on Versailles Road
- The new entrance proposed at Old Frankfort Pike Road goes through a retention area and needs to be mitigated
- It is a goal of maintenance to remove as much curb on ramps as possible
- There appears to be competing interests on Versailles Road interchange; increased capacity is desired however they want reduced speeds
- The New Circle Road project is currently slated to use state funds
- The sight distance issue at the Versailles Road interchange is a perception issue, there is not a problem
- The goal is to match existing conditions
- There seems to be some focus on project phasing and the available funding
- There is a need to accommodate how New Circle Road will be able to be widened to 3 lanes and 3 lanes at the Versailles Road interchange in the future
- There are additional Impacts due to the railroad
- Not sure if the pedestrian path at the CSX bridge has identified which side it needs to be located
- There are access concerns on the east side if Leestown Road
- There are some geometric concerns with use a Double Crossover Diamond (DCD)
- There are a couple of access management Issues with the right-in and right-out to the middle school and industrial/office complex on Leestown Road
- There is some concern as to whether drainage has been adequately addressed (Peak flows in current pipes and also potential water quality issue)
- City of Lexington really likes the DCD interchange concept



**Value Engineering Study
Kentucky Transportation Cabinet
New Circle Road Rehab & KY4/US-60 Interchange
Items #7-113.00 and #7-279.00
Fayette County**

- The schedule has been accelerated. The design would normally be about one year and it looks like it will be about 6 months. The utility coordination will be very tight.
- The costs for removal of structures seems high
- We are not clear on the cost for the pavement – was the assumption for the pavement to remove all the 4 inch and placing back a new 12 inch section? This will raise the pavement about 6 inches. This may not be a problem but was identified as a concern
- The interchange costs seem acceptable
- MOT cost estimates are not adequate

Risk Registry

During the kick-off meeting, the project team identified the risk elements related to the overall project success. The group then rated and ranked the risks defining the probability and the severity of the risk if the risk occurred.. The following risk registry summarizes those discussions.

The VE team brainstormed opportunities for mitigating the identified risks and identified potential ideas and alternatives. These are included as ideas on the creative idea list.

Risk Matrix

Probability of Occurrence		Highly Likely	Likely	Possible	Unlikely	Very unlikely	MATRIX KEY			
		> 70%	51 - 70%	21 - 50%	5 - 20%	< 5%				
Severity of Impact		Catastrophic	Substantial	Moderate	Marginal	Negligible				
		100	50	20	5	1				
Risk Rating		Extremely High		High		Moderate		Low		
		Red (50- 100)		Orange (15 - 49)		Yellow (3 - 14)		Green (0 - 2.9)		

Identify the Risk		Assign the Risk	Classify the Risk			Quantify	Quantify	Risk Response	
Risk ID	Description of Risk	Who does the risk affect?	Probability of Impact %	Severity of Impact (numeric)	Risk Rating	\$\$ Impact	Schedule Impact	Avoid? Mitigate? Accept? Transfer?	Plan of action and risk champion/owner.
Identify the Risk									
1.1	Norfolk/Southern Railroad - plan review and permit	Construction schedule	51%	50	100.0	\$ -	6 mo to 1year	Mitigate	
1.2	KU overhead line and the utility wanting to do their own work	Construction	75%	50	250.0	Change orders	Extend Construction	Mitigate	
1.3	Versailles underground AT&T Line	Construction			0.0	Change orders	Extend Construction	Avoid	
1.4	American water company. If we need to relocate the 24" waterline if it can't be avoided	Construction			0.0	Change orders	Extend Construction	Avoid	
1.5	Escalating bid costs and the budget	Construction Budget	21%	5	5.0			Accept	
1.6	Issue #4 at the interchange, changes are made but it does not eliminate the impacts with the left turn	Future design & impacts to freeflow traffic	75%	50	250.0	n/a	n/a	Mitigate	
1.7					0.0				
1.8					0.0				