

Kentucky Transportation Cabinet Value Engineering Study

Mountain Parkway Item No. 10-166.00 Magoffin County

Value Engineering Study Report



Study Dates: May 23-25, 2016

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



**Contact: Renee L. Hoekstra, CVS
(602) 493-1947
June 2016**



Guiding Teams – Building Success

June 14, 2016

Mr. Marshall Carrier, P.E.
Project Manager
Kentucky Transportation Cabinet
Division of Highway Design
200 Mero Street
Frankfort, KY 40622
Marshall.Carrier@ky.gov

Re: Mountain Parkway Item No. 10-166.00, Magoffin County
Final Value Engineering Study Report

Dear Mr. Carrier:

Transmitted herewith is the pdf copy of the Final Value Engineering Study Report for the above referenced project. The printed copies will be sent to Shawn Russell, as per the KYTC value engineering requirements.

RHA appreciates your assistance and cooperation. Should you have any questions please contact us at (602) 493-1947.

Sincerely,

RHA, LLC

Renee L. Hoekstra, CVS
Managing Partner
Renee@TeamRHA.com

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**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County**

Table of Contents

Introduction

Value Methodology	1
Report Contents	2

Executive Summary

Background	3
Project Description.....	3
Project Goals	3
Workshop Objectives.....	3
Project Constraints	4
Summary of Results	4
Team Observations	7
Function Analysis	7
VE Study Team	7
Certification	8
VE Punch List.....	9

Project Description

introduction.....	12
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VE Proposed Alternatives & Design Suggestions

Introduction.....	14
Move Traffic.....	15
Span Space.....	42
Ensure Constructability.....	55
Miscellaneous.....	86

Appendices

A - Study Participants	91
B - Pareto Cost Models.....	94
C - Function Analysis.....	95
D - Creative Idea List and Evaluation.....	97
E - Supporting Data	
Team Observations	102
List of Abbreviations	103



INTRODUCTION



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin 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
Mountain Parkway Item No. 10-166.00
Magoffin County**

Report Contents

The report provides the outcomes associated with this VE workshop and includes the following sections:

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

Executive Summary – This section is an overview that includes project background, summary of results, a list of the VE study team members, and the VE punch list.

VE Recommendations and Design Suggestions – Each completed alternative and design suggestion has a separate workbook and is divided by function and project section, where applicable. Each workbook contains the following information:

- Baseline Assumption
- 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. Cost Estimate Comments
 - iii. List of Standard KYTC VE Report Abbreviations



EXECUTIVE SUMMARY



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County**

Executive Summary

Background

A Value Engineering (VE) study was conducted for the Mountain Parkway Item No. 10-166.00 project during May 23-25, 2016 for the Kentucky Transportation Cabinet (KYTC).

Project Description

This project involves the widening of the Bert T. Combs Mountain Parkway (K 9009) from Mile Post 75.3 to 75.6 with a bridge replacement over Burning Fork and the widening of US 460 through Salyersville beginning at the Mountain Parkway and continuing east approximately 2.1 miles to the KY 114 intersection.

The existing Mountain Parkway roadway facility, through the project limits, includes two twelve-foot lanes and four-foot paved shoulders. The clear width of the existing Mountain Parkway Bridge over Burning Fork is approximately 34 feet. The posted speed limit is 55 mph. Through the project limits, existing US 460 has three, twelve-foot lanes (two travel lanes and a continuous two-way left turn lane). The posted speed limit of US 460 is 35 mph west of the Mountain Parkway and US 460 intersection, is 45 mph between the Mountain Parkway and Old Burning Fork Road and is 55 mph east of Old Burning Fork Road. A frontage road currently serves the businesses located along the south side of US 460 from MP 12.65 to 13.0, and there are no sidewalks along the project.

Project Goals

The decision makers identified the project goals as:

- Bid letting June 24, 2016
- Substantial completion of construction by August 31, 2019
- Continued economic growth in the region
- Maintain business viability

Workshop Objectives

The workshop objectives were identified at the start of the workshop to ensure the best value is attained while meeting the project goals and performance attributes. The VE team identified the following objectives for the workshop:

- Focus on bidable and constructable contract documents
- Identify any potential non-mitigated risks
- When developing the alternatives, focus on "Implementation," how the change would impact the current package related to the bid letting



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County**

Project Constraints

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

- The project elements identified in the Tiger Grant Proposal are required
- Funding must be obligated for the Tiger Grant by June 2016
- Right of Way is already all obtained. The costs for Right of Way are extremely high.
- Environmental documentation is complete
- Political/Social commitments made to the community

Summary of Results

The VE team brainstormed a total of 56 ideas. Of the 56 ideas, twelve (12) ideas were identified for further development into VE proposed alternatives, including cost impacts, as appropriate. There were eighteen (18) Design Comments and six (6) Design Suggestions for KYTC and the designers to consider. The description and further discussion of these are included in the VE workbooks section of this report and the creative idea list. The following table shows the proposed 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 Proposals				
No.	Description	Initial Cost Savings / (Add)	O&M	Total Life Cycle Cost
MT	Move Traffic			
MT-03	Use Jointed plane concrete (JPC) at signal locations on the mainline	(\$337,657)	\$435,000	\$97,343
MT-04	Install lane separation to the intersection to avoid U-turns before intersection	(\$12,000)	\$0	(\$12,000)
MT-08	Add mid-block pedestrian crossings between traffic signals	(\$8,867)	\$0	(\$8,867)
MT-15	Use stamped concrete in the median in lieu of asphalt	(\$322,552)	\$0	(\$322,552)
SS	Span Space			
SS-02	Place a sleeper slab for the bridge approach	(\$110,000)	\$0	(\$110,000)
SS-03	Use layers of geo-grid at approaches	(\$20,656)	\$0	(\$20,656)
SS-04	Consider precast for culverts	(\$453,873)	\$0	(\$453,873)



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County**

EC	Ensure Constructability			
EC-02	Identify a potential disincentive for failure to maintain entrances and add asphalt for driveways	(\$56,000)	\$0	(\$56,000)
EC-17	Offer an early completion bonus	(\$450,000)	\$0	(\$450,000)
EC-20	Eliminate closure pour	(\$20,656)	\$0	(\$20,656)
M	Miscellaneous			
M-04	Add fence between shared use path and road in front of high school	(\$28,000)	\$0	(\$28,000)
M-08	Add right out for high school mainline	(\$36,154)	\$0	(\$36,154)

Design Suggestions	
No.	Description
MT	Move Traffic
MT-02	Manage speed zone
MT-09	Add permanent business access signage
EC	Ensure Constructability
EC-03	Identify a community outreach incentive to promote positive contract behavior related to access and notifications
EC-04	At the bridge, complete paving portion prior to installation of wall
EC-06	Have joint preconstruction public meeting to introduce contractor
EC-09	Utility phasing plans need to be included with other plans for construction phasing
EC-21	Revise temporary barrier detail on bridge

Design Comments	
No.	Description
MT	Move Traffic
MT-12	Add joint adhesive asphalt wherever two surface mats tie together to alleviate long term joint problems
MT-13	Add bollards to the shared use path at intersections to keep vehicles off the path
MT-16	Move edge drain away from guard rail post as shown in some sections to eliminate posts through the asphalt



**Value Engineering Study
 Kentucky Transportation Cabinet
 Mountain Parkway Item No. 10-166.00
 Magoffin County**

SS	Span Space
SS-05	Some of the culverts have been oversized, exceeding current design requirements, these should be sized to meet the design requirements
EC	Ensure Constructability
EC-05	There is a discrepancy between the MOT and bridge sheets regarding the use temporary barrier on the existing bridge
EC-13	The culvert at 3964 +0764 shows that the phasing approach doesn't work, doesn't line up
EC-14	Culvert at 3964 +0764; there is a note to remove temporary pipe, note not found where it states to install or what size (this needs to be referenced both in the roadway and structures plans, currently only in the roadway plans) - Also see EC-13
EC-15	Septic tank treatment - the plans need to identify if and how many are in the project and add bid item
EC-16	Water well treatment - the plans need to identify if and how many are in the project and add bid item
EC-18	Finalize DBE goal
M	Miscellaneous
M-01	Add a painted centerline on the asphalt shared path
M-02	Add a painted "stop ahead" on the asphalt on the shared use path, at intersections
M-03	Add truncated domes at intersections for shared use paths
M-05	In-laid pavement markers need a special note. This is listed in general notes and the proposal
M-06	Use lighted/reflective pavement crosswalk markers to improve visibility of crosswalks
M-07	Accommodate pedestrians at the new high school during construction
M-09	Note 40 on the utility plans should eliminate the Owner telling the Contractor how to sequence work (for all utilities)
M-10	Realign sidewalks to ensure they line up
M-11	Special Note 2E Roadbed Stabilization at bridge ends – The note is included in the proposal but bid items are not included. (Geotextile Fabric Type III, Backfill Undercut, Etc.)



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County**

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 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” processes. 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 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 *Increase Level of Service*.

VE Study Team

Name	Organization	Role
Renee Hoekstra	RHA, LLC	Team Leader
Barb Hummell	RHA, LLC	Assistant Team Leader
Darren Back	KYTC	Roadway
Dana Robbins	FHWA	Transportation
Steve Gunnell	KYTC	Construction & Maintenance - TEBM
Mike Spain	KYTC	Constructability
Shawn Russell	KYTC	Value Engineering Coordinator
Brent Sweger	KYTC	Manager, Quality Assurance - TEBM
Anthony Norman	KYTC	Lessons Learned Coordinator
Mike Lawler	Stantec	Structures
Tim Layson	HMB	Construction



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County**

Certification

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

A handwritten signature in blue ink, which appears to read 'Renee L. Hoekstra'. The signature is fluid and cursive, written in a professional style.

Renee L. Hoekstra, CVS®
RHA, LLC

VALUE ENGINEERING PUNCH LIST

ITEM NO. **10-166.00**

PROJECT COUNTY: **Magoffin**

DATE OF STUDY: **May 23-25, 2016**

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
Move Traffic										
MT-03		Use jointed plain concrete at mainline approaches to signalized intersections			\$930,164	\$1,267,821	(\$337,657)	\$435,000		
MT-04		Install lane separation from median to intersection to avoid U-turns before intersection			\$0	\$12,000	(\$12,000)	\$0		
MT-08		Add mid-block pedestrian crossings between traffic signals			\$0	\$8,867	(\$8,867)	\$0		
MT-15		Use stamped concrete in raised median in lieu of asphalt			\$135,095	\$457,647	(\$322,552)	\$0		
Span Space										
SS-02		Place a sleeper slab for the bridge approach			\$0	\$110,000	(\$110,000)	\$0		
SS-03		Use GRS treatment at Burning Fork Bridge end (Sta.3934+37.58)			\$12,878	\$33,534	(\$20,656)	\$0		
SS-04		Consider precast for culverts			\$725,657	\$1,179,530	(\$453,873)	\$0		
Ensure Constructability										
EC-02		Identify a potential disincentive for failure to maintain entrances			\$0	\$56,000	(\$56,000)	\$0		
EC-17		Offer an early completion bonus			\$0	\$450,000	(\$450,000)	\$0		
EC-20		Eliminate closure pour			\$12,878	\$33,534	(\$20,656)	\$0		
Miscellaneous										
M-04		Add fence between shared use path and road in front of high school			\$0	\$28,000	(\$28,000)	\$0		
M-08		Add right-out for high school to mainline			\$0	\$36,154	(\$36,154)	\$0		
Design Suggestions										
MT-02DS		Manage speed zones								
MT-09DS		Add permanent business access signage								
EC-03DS		Provide a community outreach incentive to promote positive contractor behaviors								
EC-04DS		At the bridge, complete the paving portion prior to installation of the wall								

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
EC-06DS		Hold a joint preconstruction public meeting to introduce contractor								
EC-09DS		Phase utility construction with roadway construction								
EC-21DS		Revise temporary barrier detail on bridge								
Design Comments										
MT-12		Add joint adhesive asphalt wherever two surface mats tie together to alleviate long term joint problems								
MT-13		Add bollards to the shared use path at intersections to keep vehicles off the path								
MT-16		Move edge drain away from guard rail post as shown in some sections to eliminate posts through the asphalt								
SS-05		Some of the culverts have been oversized, exceeding current design requirements, these should be sized to meet the design requirements								
EC-05		There is a discrepancy between the MOT and bridge sheets regarding the use temporary barrier on the existing bridge								
EC-14		Culvert at 3964 +0764; there is a note to remove temporary pipe, note not found where it states to install or what size (this needs to be referenced both in the roadway and structures plans, currently only in the roadway plans) - Also see EC-13								
EC-15		Septic tank treatment - the plans need to identify if and how many are in the project and add bid item								
EC-16		Water well treatment - the plans need to identify if and how many are in the project and add bid item								
EC-21		Finalize DBE goal								
M-01		Add a painted centerline on the asphalt shared path								
M-02		Add a painted "stop ahead" on the asphalt on the shared use path, at intersections								
M-03		Add truncated domes at intersections for shared use paths								
M-05		In-laid pavement markers need a special note. This is listed in general notes and the proposal								
M-06		Use lighted/reflective pavement crosswalk markers to improve visibility of crosswalks								
M-07		Accommodate pedestrians at the new high school during construction								
M-09		Note 40 on the utility plans should eliminate the Owner telling the Contractor how to sequence work (for all utilities)								

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
M-10		Realign sidewalks to ensure they line up								
M-11		Special Note 2E Roadbed Stabilization at bridge ends – The note is included in the proposal but bid items are not included. (Geotextile Fabric Type III, Backfill Undercut, Etc.)								



PROJECT DESCRIPTION



Value Engineering Study Kentucky Transportation Cabinet Mountain Parkway 10-166.00 Project Magoffin County

Introduction

The VE study consisted of Segment 10-166.00 in Magoffin County. This project involves the widening of the Bert T. Combs Mountain Parkway (K 9009) from Mile Post 75.3 to 75.6 with a bridge replacement over Burning Fork and the widening of US 460 through Salyersville beginning at the Mountain Parkway and continuing east approximately 2.1 miles to the KY 114 intersection.



The purpose of this project centers on the need to improve safety on this section of US 460 and to improve system linkage for more efficient regional travel. The primary needs for the project include:

- **Safety** – There were 79 traffic accidents from January 2007 to December 2011.
- **System Linkage** – This project is part of the Commonwealth of Kentucky's long range plans to improve the transportation network between central and eastern Kentucky. This facility is the connecting link in a system-wide improvement, which includes widening the Mountain Parkway to a four-lane divided highway from Campton to Salyersville and widening KY 114 to a four lane divided highway from Salyersville to Prestonburg as an extension of the Mountain Parkway.
- **Future Traffic Demand** – Traffic along US 460 in the project area was predicted to increase from existing (2013) levels of 11,910 vehicles per day average daily traffic, ADT) to 13,290 ADT by year 2035. Based on the 2010 Mountain Parkway Extension Programming Study, traffic is expected to increase to 21,000 ADT by year 2030 with these additions.

This alignment begins at Mile Post 75.3 of the Mountain Parkway where the project ties into a proposed four lane section scheduled for construction prior to this project. The alignment proceeds east crossing over the Burning Fork branch of the Licking River with a new structure then onto the intersection with US 460. From the intersection east, this alignment proceeds along the centerline of existing US 460. Partially controlled access will be implemented along US 460 with the use of a raised median, curb and gutter and frontage/backage roads. The minimum distance between median openings is 1,880 feet. A frontage road paralleling US 460 to the south and a backage road to the north will be used to maintain access to business and residents along this section of the corridor. U-Turns will be accommodated along this section with the use of shoulder turnouts. Approximately 0.90 miles west of the KY 114 intersection, curb and gutter is replaced by standard, paved shoulders. From this point eastward, the alignment follows the centerline of existing US 460 closely. The intersection of US 460 and KY 114 is proposed to be reconfigured to accommodate the widened roadway to the west, however, the alignment terminates to the east of the KY 114 intersection by tapering into the existing two lane section.



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway 10-166.00 Project
Magoffin County**

Maintenance of Traffic

Traffic on this project is proposed to be maintained using part width construction. The combination of new and existing lanes will be used to maintain a minimum of two, eleven-foot travel lanes at all times. Maintaining access to adjacent properties will be of the utmost priority for all phases of construction

The bridge on the project will be constructed using a phased construction plan where part of the existing bridge will be demolished to make room for the construction of the initial phase of the new bridge. During this, two ten-foot lanes will be maintained at all times on the existing bridge. For the final phase of demolition of the existing bridge and construction of the new bridge, two, ten-foot lanes will be maintained at all times on the initial construction of the new bridge.

Bicycle and Pedestrian Facilities

The project team agreed to propose bicycle and pedestrian facilities throughout this project. As a result, a shared-use bicycle and pedestrian path has been included along the northern portions of the US 460 from the intersection with the Mountain Parkway to approximately 0.90 miles west of the KY 114 intersection. The multi-use path then crosses to the south side of US 460. The path is proposed to be extended to the eastern project terminus, where the future KY 114 Reconstruction will extend it to the Dawkins Trail. Additionally, sidewalks are present along the south side of US 460 and/or the frontage road over this same section of roadway.

Impact to Streams

This section will impact eight unique USGS blue line surface streams a total of approximately 1,800 linear feet. No exceptionally unique or high quality stream segments or associated riparian corridors were noted within the project impact area. No wetland habitats were noted with the project impact area.

Minimization of impacts to the stream will be accomplished by replacing drainage structures in the same general location of existing structures and by limiting modification of the channel upstream and downstream. Proposed channel changes will mimic the existing stream in width, slope and meandering. Temporary erosion control measures will be put in place before construction to minimize erosion during construction. Permanent erosion control devices will be included as part of the final construction plans.



**VE RECOMMENDATIONS &
DESIGN SUGGESTIONS**



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway 10-166.00 Project
Magoffin County**

VE Proposed Alternatives & Design Suggestions

Introduction

The VE study evaluated the 56 ideas that were brainstormed during the Creative Phase. The twelve (12) completed Alternatives are located in this section of the report. The alternatives developed included, as needed, the following information:

- Baseline Assumption
- 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, six (6) Design Suggestions were developed to provide some additional design direction to the design team. These are also included in this section of the report. The identified Design Comments can be found on the creative idea list in Appendix D.



VALUE ENGINEERING PROPOSAL MT-02DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Manage speed zones	
FUNCTION: Increase Safety	
BASELINE ASSUMPTION:	
US 460, as it enters this section, reduces its speed from 70 mph to 45 mph. Currently there are just speed limit signs to notify motorists that the speed limit has decreased through the "Restaurant Row" portion of the parkway.	
PROPOSED ALTERNATIVE:	
Use rumble strips, signage, and speed detection to make motorists aware that they are entering a speed zone and to reduce their speed.	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> Improves safety 	<ul style="list-style-type: none"> Increased maintenance
<ul style="list-style-type: none"> Makes drivers more aware of a speed limit change 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> 	<ul style="list-style-type: none">
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DESIGN SUGGESTION



VALUE ENGINEERING PROPOSAL MT-02DS

Kentucky Transportation Cabinet

Mountain Parkway Item No. 10-166.00

TITLE: Manage speed zones

DISCUSSION/JUSTIFICATION:

As a driver enters the area known as "Restaurant Row" the speed limit of US 460 drops from 70 mph to 45 mph. This a major speed transition in such a short space. Currently, there are speed limit signs to notify the motorists of the change in speed. This proposal suggests adding speed rumble strips, signage, and speed detection devices to reduce the drivers speed. This is needed because of the major speed change in this location and the fact that there will be traffic signals and vehicles entering and exiting using a right-in or right-out. Therefore, these speed reduction devices will help make this area safer by alerting motorists of their speeds, so they are able to safely reduce their speeds.

There are three major ways that are suggested to reduce speeds for this portion of US 460, in addition to the already existing methods. They will all be located in and before the speed transition zones. There are transition zones in advance of the restaurant row portion to the east and west.

The three major speed reduction methods are:

Speed Rumble Strips: These should be constructed inside of the speed transition zone and be spaced following AASTHO guidelines. As the distance to the new speed limit area decreases the spacing of the rumble strips should decrease. The rumble strips are meant to give the driver audio and motion indicators that they may driving too fast and need to slow down. Ensure that drainage is a consideration when being designed.

Signage: Warning signs should provide notification that the motorist is coming into a speed zone prior to the actual speed transition zone. The sign location and design should follow KYTC standards and AASHTO guidance. There should also be similar sign that states that the driver is leaving the speed zone.

Speed Detection Device: A speed detection device should be located in the middle to the beginning of the speed transition zone. The speed detection device will detect if a vehicle is traveling at the speed limit. If the vehicle is traveling at the speed limit then everything is normal. If a driver is not driving at the speed limit then it will light up a sign that will give the driver a visual warning that they are driving too fast and need to slow down. It will give the drivers a visual clue by lighting up a speed limit. This speed detection device and its sign should be installed and maintained in accordance to the manufacturer, KYTC (For the Sign), and ASSHTO guidance.

IMPLEMENTATION CONSIDERATIONS:

As necessary, this would need to be included in the design plans, but could be added by addendum.



VALUE ENGINEERING PROPOSAL MT-03
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Use jointed plain concrete at mainline approaches to signalized intersections			
FUNCTION: Move Traffic			
BASELINE ASSUMPTION:			
A mix of overlay of existing roadway and full depth construction on mainline approaches to signalized intersections. Overlay includes 1.5" of milling, leveling and wedging PG 64-22, 3" CL 3 ASPH BASE 1.00D PG76-22, and 1.25" CL 3 ASPH SURF 0.38B PG 76-22. The full depth construction includes 12" Crushed Stone Base, 4" CL 3 ASPH BASE 1.00D PG64-22, 3.75" ASPH BASE 1.00D PG 76-22, and 1.25" 3 ASPH SURF 0.38B PG 76-22.			
PROPOSED ALTERNATIVE:			
12" Crushed Stone Base and 12" Jointed Plained Concrete in advance on signalized intersections for mainline through lanes. Each of the four signalized intersections have two main line approaches resulting in eight JPC approaches.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Prevents ruts caused by tractor trailers stopped at signals 		<ul style="list-style-type: none"> Maintenance of Traffic phase considerations 	
<ul style="list-style-type: none"> Reduces maintenance at approaches 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Improved life 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> No softening or deterioration due to oil drippings 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Good light reflectivity which enhances safety for pedestrians and vehicles at night and during inclement weather 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> A durable and skid resistant surface 		<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:		\$ 495,164	\$ 435,000
PROPOSED ALTERNATIVE:		\$ 1,267,821	\$ -
TOTAL (Baseline less Proposed)		\$ (772,657)	\$ 435,000
		COST	



VALUE ENGINEERING PROPOSAL MT-03

Kentucky Transportation Cabinet

Mountain Parkway Item No. 10-166.00

TITLE: Use jointed plane concrete at mainline approaches to signalized intersections

DISCUSSION/JUSTIFICATION:

The addition of JPC 12IN pavement will significantly increase life span of approaches at signalized intersections on this project. KYTC currently administers a program to inlay JPC at intersections where rutting of asphalt pavement has been significant. The rutting on intersection approaches is routinely traced to heavy truck traffic that must typically stop at signalized intersections. The heavy truck stopping and turning movements stress the pavement surface severely along the approaches. The pavement within the junction of the intersection also may receive nearly twice the traffic as the pavement on the approaching roadways. This portion of the Mountain Parkway will aid in the effort to open up Eastern Kentucky up to much-needed commerce that is expected to include heavy truck traffic. Travellers are accustomed to smooth roadways on a majority of the four-lane roadways across the United States. The amount of truck traffic stopping at the signalized intersections will begin to create rutting which will change the rideability as well as increase the burden for KYTC Maintenance to maintain smooth roadways.

This project would also provide the best cost for JPC at these mainline approaches when compared to the cost to install JPC under traffic through a maintenance contract a few years later when rutting develops. Closing or impacting the roads and intersections creates costly traffic delays and disruptions to local businesses. Rutting under these conditions is considered inevitable. The existing US 460 signalized intersection already has a history of rutting due to signal and down hill grade. Assuming same unit prices for milling and replacing the proposed asphalt pavement are used when ruts develop on the approaches, estimates show \$295K maintenance cost. Two cycles would nearly amount to the additional cost of using JPC. The assumption could also be made that the approach would eventually be replaced with a JPC inlay.

IMPLEMENTATION CONSIDERATIONS:

MOT may change slightly. Significant changes to MOT may warrant a 24 or 48 hour JPC mix. Often overlaying the existing pavement is the easiest way to avoid undercuts. Undercuts were not considered for these calculations; however, if unsuitable material is encountered the cost of installing JPC could increase. To keep calculations simple 12" CSB was used; however, it is likely 9" CSB may work just as well.



VALUE ENGINEERING PROPOSAL MT-03
Kentucky Transportation Cabinet

Mountain Parkway Item No. 10-166.00

TITLE: Use jointed plain concrete at mainline approaches to signalized intersections

Assumptions

Interest/Discount Rate(%): 3.5% **Economic Life (yrs):** 20

LIFE CYCLE COST ANALYSIS

Salvage & Replacement Costs			Baseline Assumption		Proposed Alternative	
Item	Description	Yr	Est Cost	Pres Worth	Est Cost	Pres Worth
1	Rehabilitation due to rutting	6	295,000	239,983		
2	Rehabilitation due to rutting	12	295,000	195,226		
3						
4						
5						

Total A durable and skid resistant surface **590,000** **435,209**

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)	435,000	

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 MT-03
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Use jointed plain concrete at mainline approaches to signalized intersections

SKETCH OF PROPOSED ALTERNATIVE

Proposed quantity for four approaches including overlay section calculated separately

		Depth (in)	Width (ft)	Length (ft)	Factor	Quantity	Total Quantity
Overlay	Milling	1.5	22	450	110	90.75	363
	Asph Base 64	3	22	450	110	181.5	726
	Asph Surf	1.25	22	450	110	75.625	302.5
Full Depth	CSB	12	2	450	115	69	276
	Asph Base 64	7.75	2	450	110	42.625	170.5
	Asph Base 76	3	2	450	110	16.5	66
	Asph Surf	1.25	2	450	110	6.875	27.5

Proposed quantity for four approaches without overlay section

	Depth (in)	Width (ft)	Length (ft)	Factor	Quantity	Total Quantity
CSB	12	24	450	115	828	3312
Asph Base 64	7.75	24	450	110	511.5	2046
Asph Base 76	3	24	450	110	198	792
Asph Surf	1.25	24	450	110	82.5	330

Proposed quantity for eight approaches combined from above totals

Milling	363
CSB	3588
Asph Base 64	2942.5
Asph Base 76	858
Asph Surf	660

*Four approaches estimated to include 22' width of overlay and 2' of full depth.

*Additional four approaches calculated at full depth.



VALUE ENGINEERING PROPOSAL MT-03
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Use jointed plain concrete at mainline approaches to signalized intersections

SKETCH OF PROPOSED ALTERNATIVE

Alternative quantity for eight new JPC approaches

	Depth (in)	Width (ft)	Length (ft)	Factor	Quantity	Total Quantity
CSB	12	24	450	115	828	6624
JPC		24	450		1200	9600
Excavation	21.25	22	450		649.3056	2597.22

*Excavation added to account for overlay section.



VALUE ENGINEERING PROPOSAL MT-04
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Install traffic separator to the intersection to avoid U-turns before intersection
DISCUSSION/JUSTIFICATION: The current design shows the median barrier stops approximately 450 feet from the intersection stop bar. This break at this point will provide an opportunity for unsignalized movement within or near signalized intersection. This is undesirable and can increase the number of conflict points. Users may also effectively U-turn too soon, reducing the use of the proper geometry that the makes U-turning safe, especially for larger vehicles. A Standard Barrier Median Type 4 is recommended at these locations.
IMPLEMENTATION CONSIDERATIONS: Through lane widths will need to be reduced slightly to maintain a turning lane width of 12-feet with installation of 2-foot wide Standard Barrier Median Type 4. If the reduction of turning lane width is undesirable, Lane Separator Curb offers another effective solution. The Shur-Curb product can be either bolted or epoxied to roadway. Delineators on these types of curbs can recover from several hits and each delineator can easily be replaced when warranted.



VALUE ENGINEERING PROPOSAL MT-08
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Add mid-block pedestrian crossings between traffic signals			
FUNCTION: Move Traffic			
BASELINE ASSUMPTION:			
In the current design, the only designated locations for pedestrians and bicycles to cross Mountain Parkway are at the four traffic signals.			
PROPOSED ALTERNATIVE:			
Strategically add several mid-block pedestrian crossings between signal locations.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Reduces backtracking and provides shorter distances for pedestrians/bicycles to travel 		<ul style="list-style-type: none"> Misperception that unsignalized crossings reduce safety or increase agency liability 	
<ul style="list-style-type: none"> Improves accessibility to businesses and school along the corridor 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Important to make a functional pedestrian environment 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Raised median provides for two staged crossings 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Increases designated crossing locations 		<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:	\$	8,867	\$ -
TOTAL (Baseline less Proposed)	\$	(8,867)	\$ -

COST



VALUE ENGINEERING PROPOSAL MT-08
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE:	Add mid-block pedestrian crossings between traffic signals
DISCUSSION/JUSTIFICATION:	
<p>There are long distances separating crosswalks, currently only located at signalized intersections. Distances range from 1/3 to 2/3 of a mile. Research has shown that pedestrians will tend to take the shortest route possible unless there is a reasonable designated route within close proximity. Normally, it is best to space crossings between 300 and 800 feet apart.</p> <p>There are several opportunities for intermediate crossings along the corridor, especially in the western, more commercially developed portion. The subsequent diagrams show four possible locations that may make sense for natural pedestrian routes.</p> <p>Cutting through the raised median allows for an accessible and protected (refuge) area that pedestrians can make a two staged crossing.</p>	
IMPLEMENTATION CONSIDERATIONS:	
<p>The locations should be selected based on predicted travel patterns by pedestrians and at spacings that are reasonably short to minimize backtracking of the route. ADA ramp accommodations will be necessary. Whether to use crosswalk markings needs to be discussed and decided. Information will need to be added to the design plans, related to striping.</p> <p>Signalization or flashing beacons are not necessary but may be considered.</p>	



TITLE: Add mid-block pedestrian crossings between traffic signals

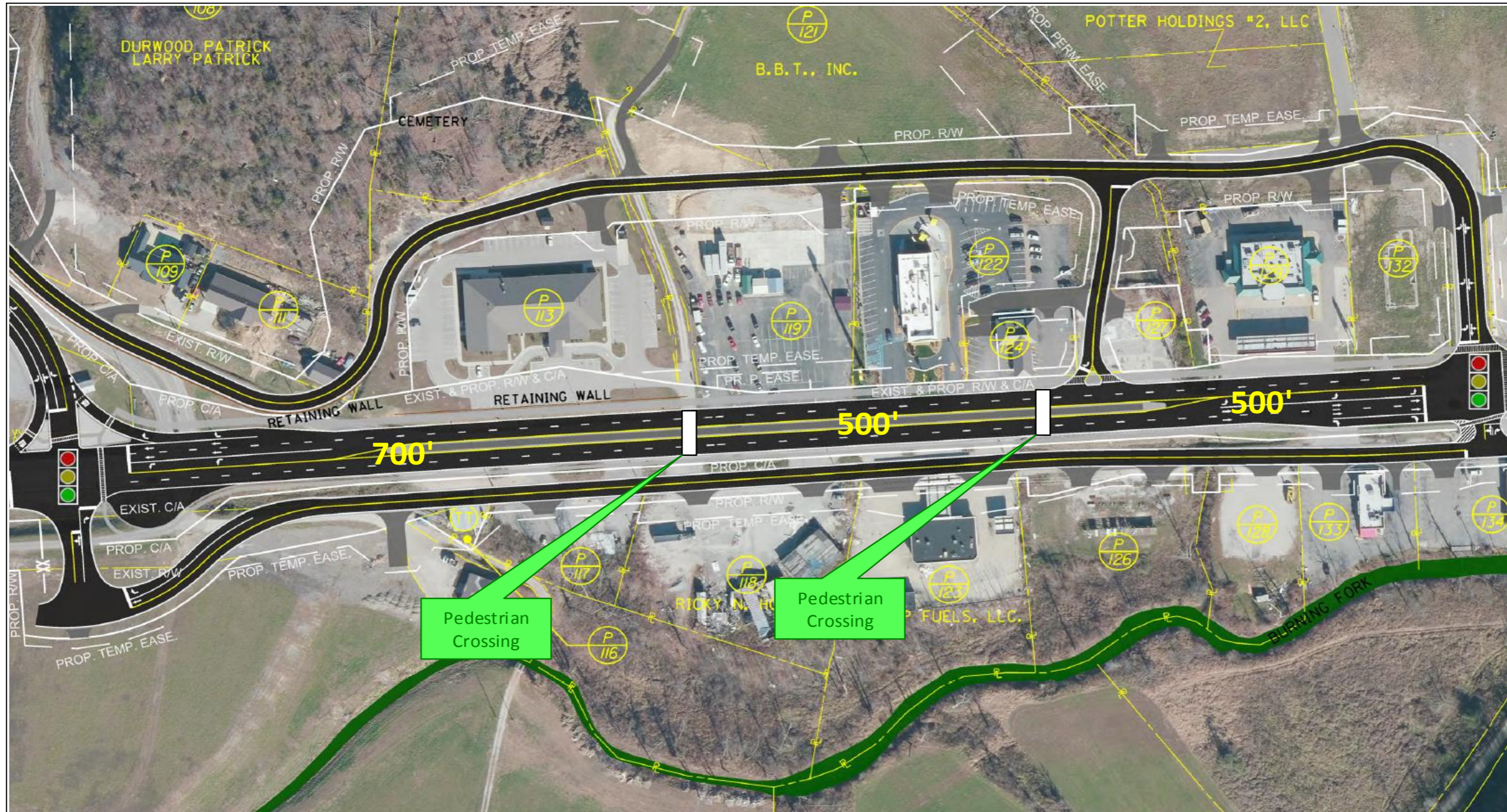
SKETCH OF PROPOSED ASSUMPTION





TITLE: Add mid-block pedestrian crossings between traffic signals

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL MT-09DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Add permanent business access signage	
FUNCTION: Move Traffic	
BASELINE ASSUMPTION:	
There are no signs or other methods to show motorists how to access the local businesses. Currently, the businesses in restaurant row have access to the parkway. In the new alignment, businesses are connected to frontage and backage roads that connect to the parkway via signalized and right in and right out intersections.	
PROPOSED ALTERNATIVE:	
The proposed alternative is to place local business signs that show motorists what local businesses are accessible from the intersections.	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> • Reduces confusion with drivers 	<ul style="list-style-type: none"> • Needs to be maintained and updated
<ul style="list-style-type: none"> • Promotes economic growth 	<ul style="list-style-type: none"> • Every business would like a sign
<ul style="list-style-type: none"> • More satisfied business owners 	<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 MT-09DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE:	Add permanent business access signage
DISCUSSION/JUSTIFICATION:	
<p>The current layout of the road has each business having access to US 460. The new alignment of the road has every business being accessed from a frontage or backage road. This change in access will be confusing to motorists since they can get confused on which intersection to use in order to get to the business they want to go to. The signs will show the motorists which businesses can be accessed by the upcoming intersection. This will provide drivers direction and reduce their confusion. When drivers are confused and unsure of where to go, the chance of a crash increases, since the driver will be distracted and may drive in an unsafe manner while seaching for the business they wish to visit. In addition, the signs will help advertise the business and bring in more customers.</p>	
IMPLEMENTATION CONSIDERATIONS:	
<p>In the existing right of way and before the intersection, yet after the traffic signal sign, there should be a sign showing what businesses are accessible from the upcoming intersection. The sign should be local business signs and follow KYTC and ASSHTO Standards. The placement of the signs should not block any sight distance from the any intersection including the right in right out intersections.</p>	



VALUE ENGINEERING PROPOSAL MT-09DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Add permanent business access signage

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL MT-15
Kentucky Transportation Cabinet Mountain
Parkway Item No. 10-166.00

TITLE: Use stamped concrete in raised median in lieu of asphalt																			
FUNCTION: Move Traffic																			
BASELINE ASSUMPTION: The raised median, which is estimated at 8,110 LF and included in the roadway plans, is PG64-22 asphalt on 4" of crushed stone base.																			
PROPOSED ALTERNATIVE: This VE proposal is to replace the asphalt median with a stamped concrete median.																			
BENEFITS		RISKS/CHALLENGES																	
• Improves aesthetics		• Construction may be more difficult because of curing time																	
• Improves durability		• Substantial cost																	
•		•																	
•		•																	
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<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>\$ 135,095</td> <td>\$ -</td> <td>\$ 135,095</td> </tr> <tr> <td>PROPOSED ALTERNATIVE:</td> <td>\$ 457,647</td> <td>\$ -</td> <td>\$ 457,647</td> </tr> <tr> <td>TOTAL (Baseline less Proposed)</td> <td>\$ (322,552)</td> <td>\$ -</td> <td>\$ (322,552)</td> </tr> </tbody> </table>				COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost	BASELINE ASSUMPTION:	\$ 135,095	\$ -	\$ 135,095	PROPOSED ALTERNATIVE:	\$ 457,647	\$ -	\$ 457,647	TOTAL (Baseline less Proposed)	\$ (322,552)	\$ -	\$ (322,552)
COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost																
BASELINE ASSUMPTION:	\$ 135,095	\$ -	\$ 135,095																
PROPOSED ALTERNATIVE:	\$ 457,647	\$ -	\$ 457,647																
TOTAL (Baseline less Proposed)	\$ (322,552)	\$ -	\$ (322,552)																
			COST																



VALUE ENGINEERING PROPOSAL MT-15
Kentucky Transportation Cabinet Mountain
Parkway Item No. 10-166.00

TITLE: Use stamped concrete in raised median in lieu of asphalt

DISCUSSION/JUSTIFICATION:

The justification for using a stamped concrete median in lieu of an asphalt median are improved aesthetics and better durability. This provides an improved visual for the community and will help to provide an area identity for this segment of the parkway.

IMPLEMENTATION CONSIDERATIONS:

Implementation considerations include substantial added cost, the need to modify plan sheets, and possibly added construction time to allow the concrete to cure. The cost to improve aesthetics does not warrant the benefit gained and is not recommended.



VALUE ENGINEERING PROPOSAL MT-15

Kentucky Transportation Cabinet

Mountain Parkway Item No. 10-166.00

TITLE: Use stamped concrete in raised median in lieu of asphalt								
DESIGN ELEMENT	Markup	BASELINE ASSUMPTION				PROPOSED ALTERNATIVE		
Description	%	Unit	Qty	Unit Cost \$	TOTAL \$	Qty	Unit Cost \$	TOTAL \$
The raised median, which is estimated at 8,110 LF and included in the roadway plans, is PG64-22 asphalt on 4" of crushed stone base		Ton	892	95.00	84,740			
Asphalt Median - 4" crushed stone base		Ton	1865	27.00	50,355			
Stamped concrete median		SY				8110	56.43	457,647
					135,095			457,647
(BASELINE LESS PROPOSED)								(322,552)

*Note: Costs are rounded to nearest thousand dollars.

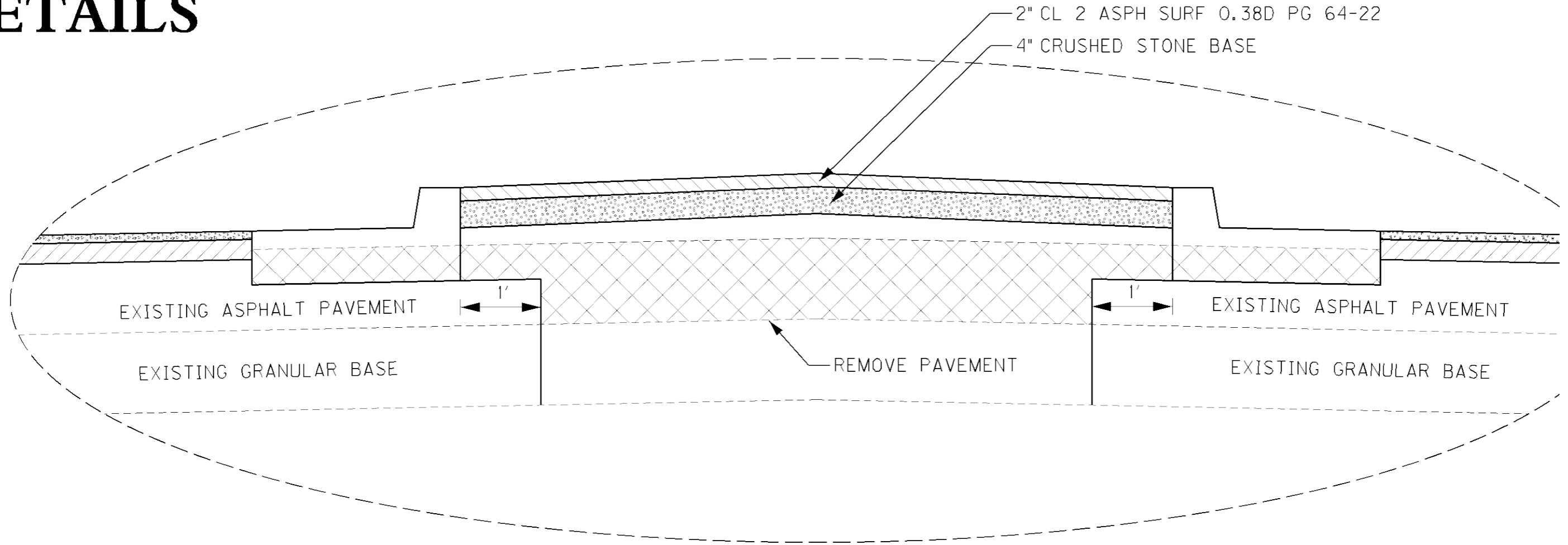
COST



TITLE: Use stamped concrete in raised median in lieu of asphalt

SKETCH OF BASELINE ASSUMPTION

DETAILS



DETAIL "J"



TITLE: Use stamped concrete in raised median in lieu of asphalt

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL MT-18
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Improve intersection at Burning Fork Connector and south frontage road			
FUNCTION: Move Traffic			
BASELINE ASSUMPTION:			
The current intersection has both sides of the south frontage road tee-ing into Burning Fork Connector.			
PROPOSED ALTERNATIVE:			
Change Burning Fork Connector to curve eastward and tie in continuously with the east side of the south frontage road and tee the west side of the frontage road into the Connector.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Provides for smooth traffic flow to and from new high school and the signal during peak hours 		<ul style="list-style-type: none"> During peak school traffic, traffic coming from west may have difficulty getting to Parkway 	
<ul style="list-style-type: none"> Allows for larger queues directly served by the traffic signal 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Easier for drivers to understand 		<ul style="list-style-type: none"> 	
<ul style="list-style-type: none"> Reduces risk of vehicles coming from the Parkway being blocked by queued traffic 		<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			



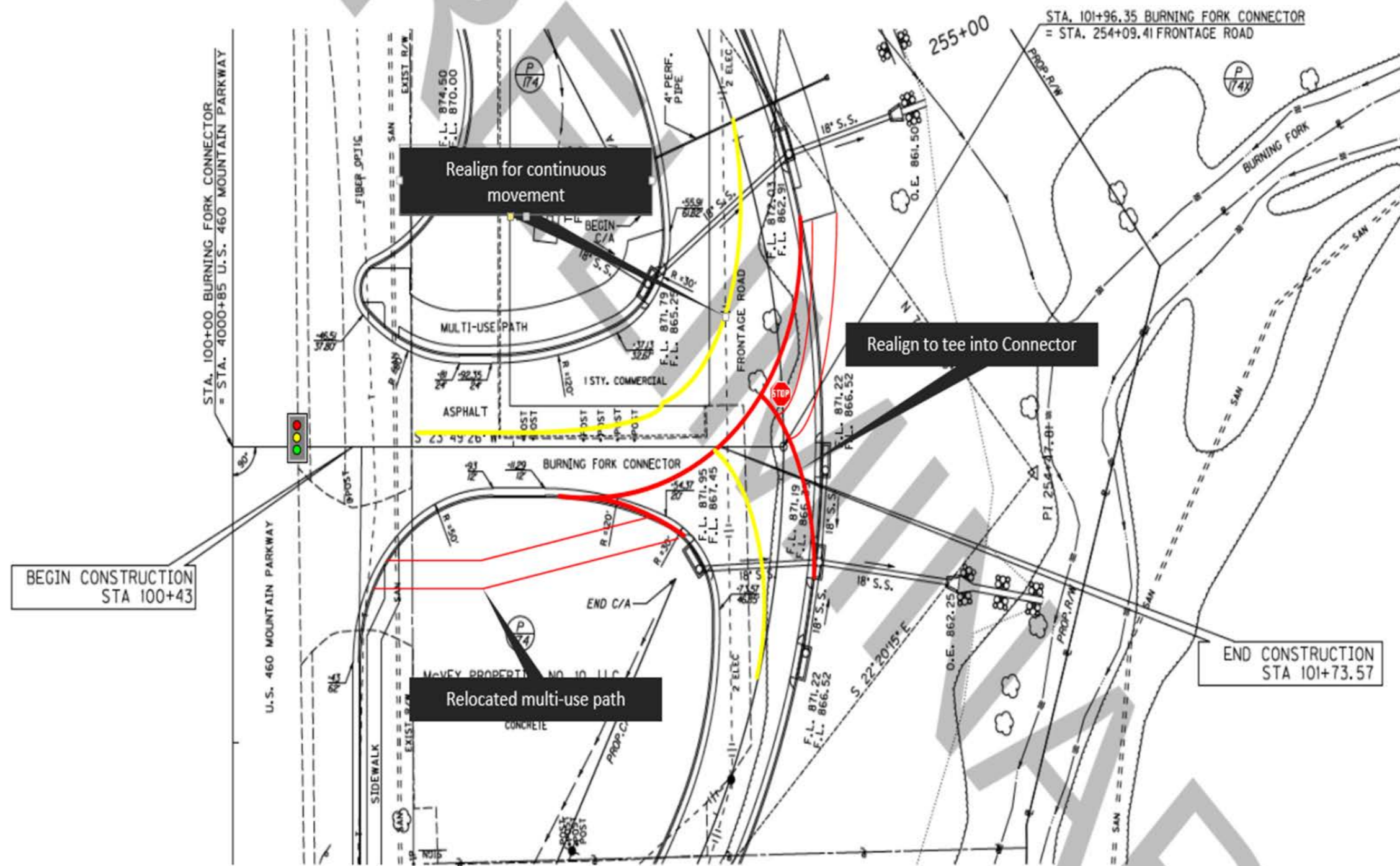
VALUE ENGINEERING PROPOSAL MT-18
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Improve intersection at Burning Fork Connector and south frontage road
DISCUSSION/JUSTIFICATION: During peak school traffic periods, it will be important to facilitate efficient ingress and egress from the Parkway to the school. The current configuration will likely cause large backups coming from the school at the subject intersection because of the need to stop at the stop sign before proceeding to the traffic signal. By making the Connector and frontage road to the east continuous, the heavy movement of traffic coming from the school (east) will be able to more efficiently flow through the signal. The west leg of the frontage road will tee into the Connector and use a stop control. During off peaks, vehicles coming from the west should be able to find gaps to approach the Parkway intersection. During school times, drivers will be better served to go to the signalized intersection to the west to access the Parkway.
IMPLEMENTATION CONSIDERATIONS: Turning movements for the reconfigured intersection should be checked with the appropriate design vehicle. It appears that this change can be done without disruption to the current utility design and without purchasing new right-of-way. Additionally, the shared-use path will need to cross the Parkway on the west side of the intersection so that it is aligned to cross the frontage road at the stop sign. There appears to be no change in cost from the baseline to the proposed alternative.



TITLE: Improve intersection at Burning Fork Connector and south frontage road

SKETCH OF PROPOSED ASSUMPTION





VALUE ENGINEERING PROPOSAL SS-02

Kentucky Transportation Cabinet

Mountain Parkway Item No. 10-166.00

TITLE: Place a sleeper slab for the bridge approach

DISCUSSION/JUSTIFICATION:

Over the past 15 years, there has been a tremendous amount of settlement at the end of bridges in District 10. This settlement creates a bump at the bridge end and requires asphalt maintenance on an annual basis. The approach slab bridges across any settlement that may occur and eliminates the bump. Asphalt pavement is placed on the slab ensuring a smooth transition onto the bridge. Research for the bump at the end of the bridge is currently underway. The study, Bridge End Settlement Evaluation and Prediction (SPR-14-436), utilizes available data for settlement at bridge ends to evaluate the best solution.

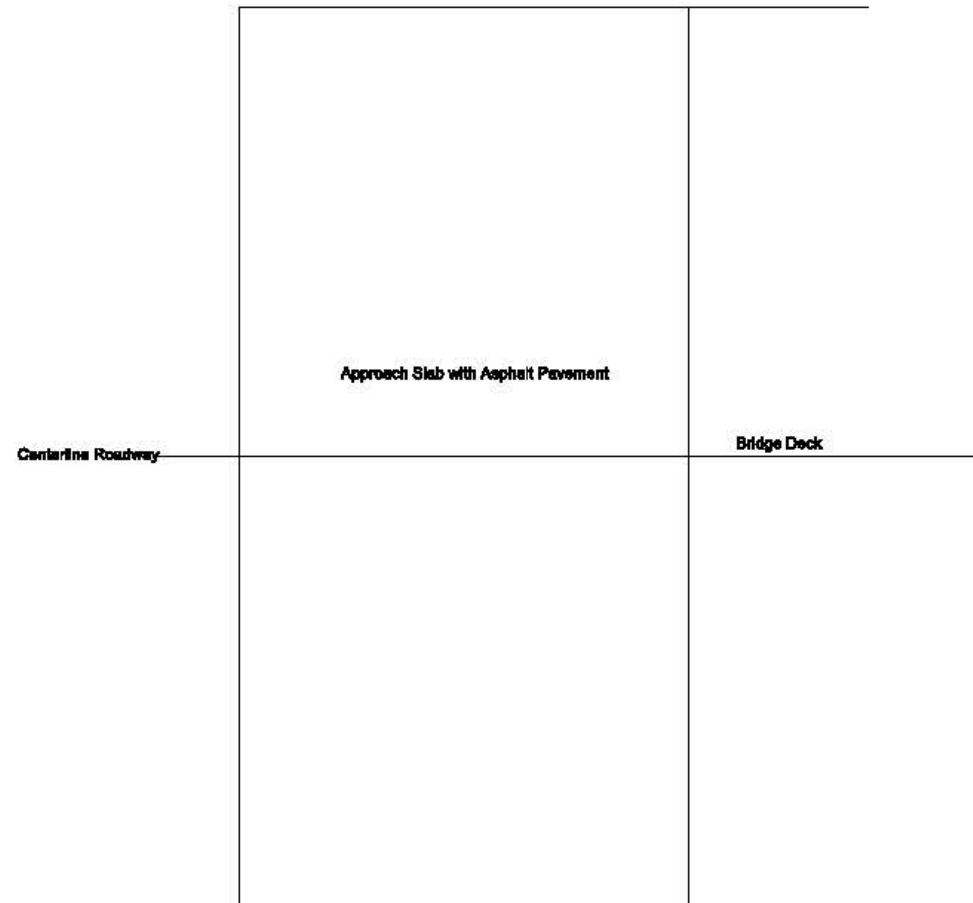
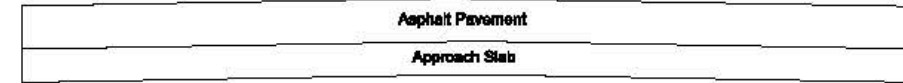
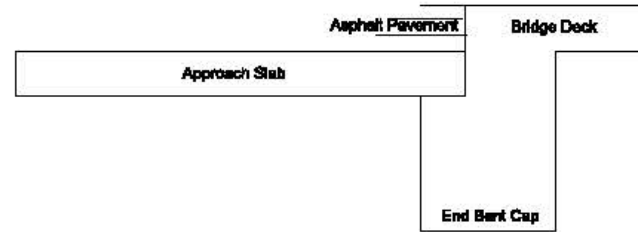
IMPLEMENTATION CONSIDERATIONS:

The approach slab will need to be designed and added to the bridge plans.



TITLE: Place a sleeper slab for the bridge approach

SKETCH OF PROPOSED ALTERNATIVE



Estimated Quantities

	A.S. #1	A.S. #2	Unit
Class AA Concrete	125	125	C.Y.
Steel Reinforcement	20686	20688	lbs

Bid Quantities

	A.S. #1	A.S. #2	Unit
Approach Slab	250	250	S.Y.



VALUE ENGINEERING PROPOSAL SS-03
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Use GRS treatment at Burning Fork Bridge end (Sta. 3934+37.58)			
FUNCTION: Span Space			
BASELINE ASSUMPTION:			
Currently the end of bridges at End Bents 1 and 2 have structural granular backfill.			
PROPOSED ALTERNATIVE:			
Add geotextile fabric and geogrid to the structural granular backfill at End Bents 1 and 2.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Helps alleviate the "bump" at end of bridge 		<ul style="list-style-type: none"> Increases construction time 	
<ul style="list-style-type: none"> Decreases future maintenance costs (future cost of wedging) 		<ul style="list-style-type: none"> More difficult to construct than baseline situation 	
•		•	
•		•	
•		•	
•		•	
•		•	
•		•	
•		•	
•		•	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:	\$	12,878	\$ -
PROPOSED ALTERNATIVE:	\$	33,534	\$ -
TOTAL (Baseline less Proposed)	\$	(20,656)	\$ -
COST			



VALUE ENGINEERING PROPOSAL SS-03
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Use GRS treatment at Burning Fork Bridge end (Sta. 3934+37.58)

DISCUSSION/JUSTIFICATION:

There needs to be a proactive approach to eliminate the "bump" at the ends of the bridge due to settlement of structural granular backfill. One approach used in District 10 in the past is to use reinforced backfill to minimize the granular backfill settlement. This alternate adds additional Structural Granular Backfill and Geotextile Fabric Type IV to the baseline condition. The proposed detail also adds Elasticized EPS membrane and High Strength Geotextile Fabric. The high strength geotextile fabric is placed at 1' lifts for the entire height of the end bent.

Elimination of the bump will reduce the long term maintenance costs for District 10 by alleviating the need to continually fix the edge of pavement.

IMPLEMENTATION CONSIDERATIONS:

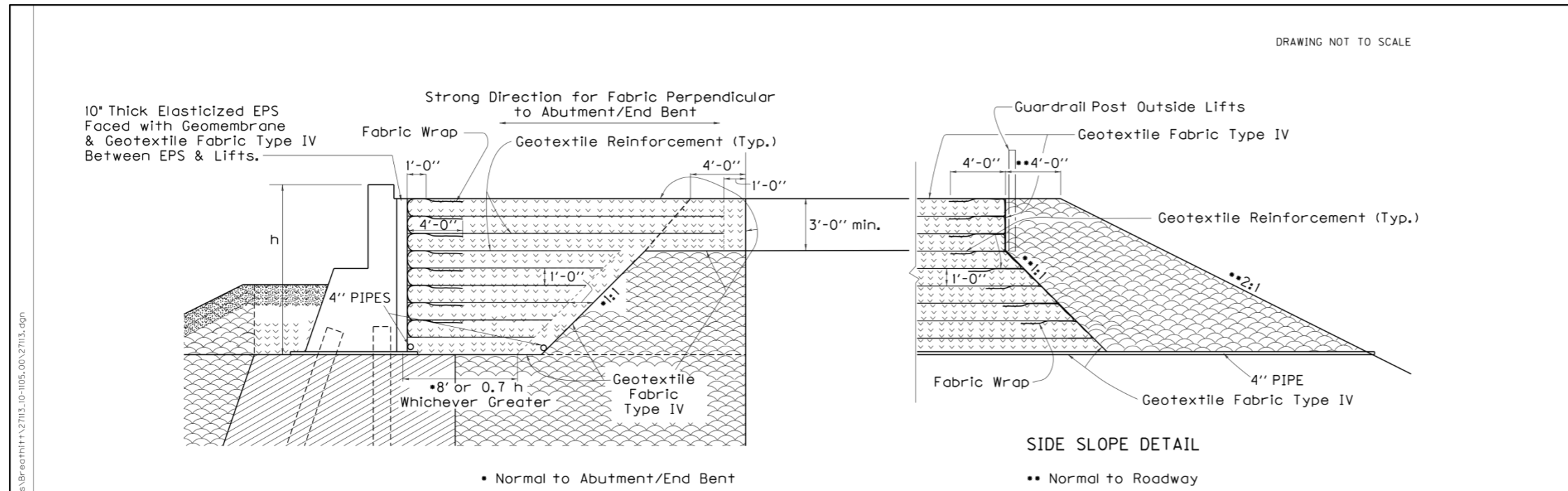
Alternate will cause modifications to plans and cost estimate.



VALUE ENGINEERING PROPOSAL SS-03
Kentucky Transportation Cabinet
Mountain Parkway 10-166.00 Project

TITLE: Use GRS Treatment at Burning Fork Bridge end (Sta. 3934+37.58)

SKETCH OF PROPOSED ALTERNATIVE



NOTES

- Use with current Standard Drawings RGX-100 and RGX-105 except where the Special Note for Treatment of End Bent or Abutment Backfills Using Geotextile Reinforced Backfill and Elastic Inclusion directs otherwise.
- The strong direction for the fabric shall be placed perpendicular to the End Bent/Abutment.
- Granular Backfill shall be crushed stone meeting the following gradation:

Sieve Size	Percent Passing
1 1/2 inch	100%
No. 4	0 - 25%
No. 8	0 - 5%
- Geotextile Reinforcement shall be Type V High Strength Geotextile Fabric except that it shall have a minimum ultimate strength of 1350 lb/ft and a minimum strength at 2% strain of 380 lb/ft when tested by ASTM D 4595.
- Geotextile Reinforcement shall wrap around to enclose the backfill material on three sides (at the end bent/abutment and on the side slopes).
- Compact Granular Backfill using a suitable compactor until there is no visible sign of further compression. A minimum of four passes shall be applied per lift.
- Hand operated compaction equipment such as lightweight mechanical tampers, vibratory plates, or rollers are required within 3 feet of the back of the end bent/abutment.

LEGEND

- GRANULAR PILE CORE OR COHESIVE PILE CORE
- GRANULAR BACKFILL
- EMBANKMENT (GRANULAR, ROCK OR SOIL PER PLANS)

**KENTUCKY
DEPARTMENT OF HIGHWAYS**

**TREATMENT OF END BENT
OR ABUTMENT BACKFILLS
USING GEOTEXTILE REINFORCEMENT
AND ELASTIC INCLUSION**

ITEM NUMBER	PREPARED BY	SHEET NO.
		DRAWING NO.

REVISION	DATE

DATE: February 2016 CHECKED BY: DESIGNED BY: DETAILED BY:

**Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS**

COUNTY

ROUTE CROSSING

GRS TREATMENT OF END BENTS

FILE NAME: H:\Archives\Breadth\2713-10-105-00\2713.dgn
 USER: GARY, NEWTON
 DATE PLOTTED: 17-FEB-2016
 E-SHEET NAME: 2713-52
 MicroStation v8.11.1.180



VALUE ENGINEERING PROPOSAL SS-04
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Consider precast for culverts
DISCUSSION/JUSTIFICATION: Precast culverts can be installed under roadways in a fraction of the time that it takes to cast them in place. This allows the MOT to progress through phasing at a faster pace allowing project completion at an earlier time and reducing the impact on the traveling public.
IMPLEMENTATION CONSIDERATIONS: This work will include changing structure plans to the appropriate size precast culverts. The costs are much higher than a cast in place approach, however, costs provided are material costs only and do not reflect contractor's installation time or traffic impacts. At a minimum, the plans and specifications should not limit the contractor from more than one means and method.



TRANSPORTATION CABINET

Frankfort, Kentucky 40622
www.transportation.ky.gov/

Steven L. Beshear
Governor

Michael W. Hancock, P.E.
Secretary

MEMORANDUM

To: Approved Culvert Precasters
Kentucky Association of Highway Contractors
KYTC Division of Materials

FROM: Jeremiah Littleton, PE, Division of Construction *JL*

DATE: 26 September 2012

SUBJECT: Kentucky Table 1, Precast Box Culvert Steel Requirements

In order to expedite the approval of precast box culvert designs and guarantee the quality design equivalent to a KYHL-93 cast-in-place culvert design, Kentucky Table 1 may be used. The table provides the minimum required steel area for each designated location in precast box culverts. Fabrication may begin on designs meeting the requirements of Kentucky Table 1 without approved shop drawings at the risk and expense of the fabricator. Please note the attached design parameters, including steel strengths and haunch sizes.

For box culverts with fill heights between the values listed in the table, the more conservative steel values from either above or below the specified fill height will govern. This is not an exhaustive listing of box culvert sizes or fill heights. For fill heights exceeding Kentucky Table 1, designs differing from the default parameters, and/or design load requirements other than KYHL-93, a design stamped by a Professional Engineer, licensed in the Commonwealth of Kentucky, or a design verified by the inputs of FHWA BOXCAR version 3.1 will be required. Again, the default design values are listed in the attachment.

Equivalent steel areas are in units of square inches per foot of length. Lengths and spacing of reinforcements listed are in units of inches. The fabricator is required to advise the Division of Materials prior to initiation of fabrication. The following KY Table 1 will replace all previous versions of KY Table 3 and addendums.

Happy casting.

Attachments



Default Configuration (page 1)

Default Parameters

Data Directory:

SI Unit File Customary US Unit File

Section Length

ft

Box Beam Size

SPAN \leq 7 ft SPAN $>$ 7 ft

Top Slab Thickness	(Span/12 + 1) in.	(Span/12 + 0) in.
Bottom Slab Thickness	(Span/12 + 1) in.	(Span/12 + 0) in.
Sidewall Thickness	(Span/12 + 1) in.	(Span/12 + 0) in.
Horizontal Haunch Length	(Span/12 + 1) in.	(Span/12 + 0) in.
Vertical Haunch Length	(Span/12 + 1) in.	(Span/12 + 0) in.

Clear Concrete Covers

Top Slab Outside Face	2	in.	(MINIMUM DEPTH OF FILL $<$ 2 ft)
Top Slab Outside Face	1	in.	(MINIMUM DEPTH OF FILL $>=$ 2 ft)
Bottom Slab Outside Face	1	in.	
Sidewall Outside Face	1	in.	
Top Slab Inside Face	1	in.	
Bottom Slab Inside Face	1	in.	
Sidewall Inside Face	1	in.	

Material Properties

Main Reinforcement Yield Strength	65000	psi
Design Concrete Strength	6000	psi
Concrete Unit Weight	150	pcf
Stirrup Reinforcement Developable Yield Stress	60000	psi
Total Service Stress Limit	100	%

Reinforcement Type:

Default Configuration (page 2)

Strength Reduction Factors

Design Code:

Design Code:

Flexure:

Shear:

Crack Width (CHBDC Only):

Reinforcement Diameter

	Diameter	Maximum Spacing
Sidewall Outside (AS1)	(0.05 * Sidewall Thickness + 0) in.	4 in.
Top Inside (AS2)	(0.05 * Top Slab Thickness + 0) in.	4 in.
Bottom Inside (AS3)	(0.05 * Bottom Slab Thickness + 0) in.	4 in.
Sidewall Inside (AS4)	(0.05 * Sidewall Thickness + 0) in.	4 in.
Top Outside (AS7)	(0.05 * Top Slab Thickness + 0) in.	4 in.
Bottom Outside (AS8)	(0.05 * Bottom Slab Thickness + 0) in.	4 in.

Soil Load Data

Soil Unit Weight: pcf

Minimum Lateral Pressure Coefficient:

Maximum Lateral Pressure Coefficient:

Vertical Arching Factor:

Boxcar - Default (page 3) | Interstate/Tandem

Live Load Data

Live Load Type (Max 2)	Magnitude (M)	Footprint
<input checked="" type="checkbox"/> HS-Series	25	By Code
<input checked="" type="checkbox"/> Interstate/Tandem	80	By Code
<input type="checkbox"/> Cooper Series	80	By Code
<input type="checkbox"/> CHBDC Truck	140	By Code
<input type="checkbox"/> Tandem/Tridem	140	By Code
<input type="checkbox"/> Other	16	By Code
<input type="checkbox"/> None		

Direction of Traffic: To Span

Impact Factor Options:

Impact Factor (User Def):

Lane Load: lb/ft

Live Load Distribution Factor (LLDF):

LLDF:

Fluid Loads

Depth of Fluid: ft

Fluid Unit Weight: pcf

Surberon Loads

Uniform Vertical: lb/ft

Lateral - Top of Culvert (LLTC): lb/ft

Lateral - Bottom of Culvert (LLBC): lb/ft

Interstate/Tandem Truck Wheel Layout



VALUE ENGINEERING PROPOSAL EC-02

Kentucky Transportation Cabinet

Mountain Parkway Item No. 10-166.00

TITLE: Identify a potential disincentive for failure to maintain entrances																			
FUNCTION: Ensure Constructability																			
BASELINE ASSUMPTION:																			
The contractor is told to maintain entrances with a minimum of four inches of crush stone base. There are no disincentives to ensure this is completed in a timely fashion.																			
PROPOSED ALTERNATIVE:																			
Provide notes to ensure the contractor maintains all entrances with appropriate disincentives.																			
BENEFITS		RISKS/CHALLENGES																	
<ul style="list-style-type: none"> • Accessibility will be more likely 		<ul style="list-style-type: none"> • This will need to be tracked by the Resident Engineer 																	
<ul style="list-style-type: none"> • Stakeholders through this route will be more certain their access will be maintained 		<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"> • 																	
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<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>\$ 56,000</td> <td>\$ -</td> <td>\$ 56,000</td> </tr> <tr> <td>TOTAL (Baseline less Proposed)</td> <td>\$ (56,000)</td> <td>\$ -</td> <td>\$ (56,000)</td> </tr> </tbody> </table>				COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost	BASELINE ASSUMPTION:	\$ -	\$ -	\$ -	PROPOSED ALTERNATIVE:	\$ 56,000	\$ -	\$ 56,000	TOTAL (Baseline less Proposed)	\$ (56,000)	\$ -	\$ (56,000)
COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost																
BASELINE ASSUMPTION:	\$ -	\$ -	\$ -																
PROPOSED ALTERNATIVE:	\$ 56,000	\$ -	\$ 56,000																
TOTAL (Baseline less Proposed)	\$ (56,000)	\$ -	\$ (56,000)																
COST																			



VALUE ENGINEERING PROPOSAL EC-02

Kentucky Transportation Cabinet

Mountain Parkway Item No. 10-166.00

TITLE: Identify a potential disincentive for failure to maintain entrances

DISCUSSION/JUSTIFICATION:

The contract has multiple disincentives to ensure the contractor keeps the mainline, approaches, frontage roads and backroads open. Some entrances may be in a temporary condition through two construction seasons. However, there is no disincentive to keep entrances open. Additionally, there is no limit to the amount of work area identified in the plans so there could be numerous entrances impacted at the same time. Many times the contractor will perform work at an entrance and then wait until there is a complaint to do any additional work. Businesses could be greatly impacted should the contractor fail to keep the entrances in good condition. This would provide a pro-active approach to the restoration of the entrances. Providing a four-inch asphalt base to restore entrances and reduce maintenance during construction as well as accommodate large trucks that will be using the entrances.

IMPLEMENTATION CONSIDERATIONS:

Notes will need to be added to include a disincentive for failure to maintain entrances. Need to add additional asphalt quantity.



VALUE ENGINEERING PROPOSAL EC-03DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Provide a community outreach incentive to promote positive contractor behaviors	
FUNCTION: Ensure Constructability	
BASELINE ASSUMPTION:	
There is no incentive in the project for community outreach.	
PROPOSED ALTERNATIVE:	
Introduce a community outreach incentive into the project to promote positive contractor behaviors related to business and community impacts.	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> Promotes positive behaviors by rewarding those behaviors 	<ul style="list-style-type: none"> Additional cost
<ul style="list-style-type: none"> Engages the business community in the construction process 	<ul style="list-style-type: none"> This has not been done before in KYTC
<ul style="list-style-type: none"> Helps to educate the business community 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> May help to increase competition 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> Improves transparency 	<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 EC-03DS

Kentucky Transportation Cabinet

Mountain Parkway Item No. 10-166.00

TITLE: Provide a community outreach incentive to promote positive contractor behaviors

DISCUSSION/JUSTIFICATION:

Several agencies have begun using a Community Advisory Board (CAB) with projects that are high impacts on the business community. This CAB is usually comprised of residents and business representatives from the community adjacent to the project and serves as the voices for the community during construction. The CAB member's role is to review and evaluate the performance of contractor as it relates to minimizing impacts to the community. CAB members will make a recommendation to KYTC whether to award a quarterly incentive to the contractor for going 'above and beyond' the contract specifications. With this segment of the parkway and the concerns of impact on the businesses due to construction, this may give the businesses a deeper level of comfort and an opportunity to get involved. This program has also served as a way for the businesses to better understand construction and that it can be difficult at times and it's not because the contractor or KYTC is not doing their jobs. This program has proven to be very effective with other agencies.

The size of the bonus should be aligned with the size of the project and the level of effort KYTC would like the contractor to expend in this effort. A sample is provided in the attachments.

IMPLEMENTATION CONSIDERATIONS:

KYTC would need to develop the specification and expectations tied to this incentive and develop the roles and responsibilities for the CAB. The incentive will need to be determined and if there is budget available.



VALUE ENGINEERING PROPOSAL EC-03DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Provide a community outreach incentive to promote positive contractor behaviors

**SAMPLE ABOVE & BEYOND REPORT FROM
CONTRACTOR TO CAB**

KIEWIT WESTERN
ABOVE & BEYOND
The Specifications
For The
LS-1 Project

- Debie stood in the parking lot at Tango's Store(After Hours) from 7:30pm to 8:30pm to make sure "no left hand turn signs" were posted and barricades were set up to provide easy access to customers going into the business.
- Kiewit assisted Eddie the owner of the Tango Store stating they have no water. Kiewit checked various valves and finally found a water service valve on the side of the store had been turned off by someone. (Not Kiewit related) Kiewit turned the water service back on.
- Kiewit provided as needed water trucks to parcels (to minimize dust control issues) which were not their responsibility.
- Kiewit extended several water shutdown times from 8pm to 10pm to help minimize the impact to businesses that stayed open after 8pm and eliminate any damage to their systems.
- Kiewit coordinating with apartment complexes to minimize a schedule water shutdown to the residents and eliminate any damage to boiler systems.
- Kiewit provided Port a Potty's to bar owners located on Camelback so they could stay open through the water shutdowns.
- Kiewit staff picking up trash & all shopping carts on a regular basis at the temporary bus stops and coordinating with 1-800-THE CART to pick up carts at a location designated primarily to house the carts that were retrieved.
- SRP sent a letter to Jim McEvoy's neighborhood stating it was their responsibility to repair their private irrigation which was located between Georgia & Denton off 19th Ave. Kiewit saw the problem & repaired the neighborhood private irrigation at no cost to them.



VALUE ENGINEERING PROPOSAL EC-03DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Provide a community outreach incentive to promote positive contractor behaviors

PROPOSED ALTERNATIVE

Line Section 1 C A B Quarterly Incentive Distribution		Available Incentive: \$241,181 / 10 QTR's = \$24,118.10 Per Qtr Earned Thru Q10: \$239,553.03											
3-Nov-08	2006	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
		Q1										Q4	
Public Outreach		N/A	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	95%
Contractor Response		90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Traffic Management		N/A	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	95%
Property Restoration		N/A	90%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Monthly Rating		N/A	90.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Quarterly Incentive		\$24,118.10										\$24,118.10	
												\$24,118.10	
	2007	Q5										Q8	
Public Outreach		100%	100%	100%	100%	75%	95%	95%	90%	90%	90%	90%	95%
Contractor Response		100%	100%	100%	100%	75%	95%	95%	90%	90%	90%	90%	95%
Traffic Management		100%	95%	100%	100%	75%	95%	95%	90%	90%	90%	90%	95%
Property Restoration		100%	95%	100%	100%	75%	95%	95%	90%	90%	90%	90%	95%
Monthly Rating		100.0%	100.0%	100.0%	100.0%	75.0%	95.0%	95.0%	90.0%	90.0%	90.0%	90.0%	95.0%
Quarterly Incentive		\$24,118.10										\$21,706.29	
												\$21,706.29	
	2008	Q9										Q10	
Public Outreach		90%	90%	95%	90%	N/A	N/A	95%	95%				
Contractor Response		95%	95%	95%	95%	N/A	N/A	100%	100%				
Traffic Management		90%	90%	90%	90%	N/A	N/A	95%	95%				
Property Restoration		90%	95%	95%	90%	N/A	N/A	100%	100%				
Monthly Rating		90.0%	95.0%	95.0%	90.0%	N/A	N/A	100.0%	100.0%				
Quarterly Incentive		\$22,912.20										\$30,931.46	
												\$30,931.46	

Available Incentive	\$241,181
Incentive Earned	\$208,621.57 (through Q9)
Funds Available	\$32,559.43
Rating for Q10	95%
Funds to be Distributed	\$30,931.46
Incentive Not Awarded	\$1,027.97



VALUE ENGINEERING PROPOSAL EC-04DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: At the bridge, complete the paving portion prior to installation of the wall	
FUNCTION: Ensure Constructability	
BASELINE ASSUMPTION:	
The current approach shows that the temporary barrier could end up being placed on existing ground and an area that has not been paved	
PROPOSED ALTERNATIVE:	
Add a note to better clarify the sequencing of this work.	
BENEFITS:	
RISKS/CHALLENGES:	
<ul style="list-style-type: none"> • Clarifies phased construction 	<ul style="list-style-type: none"> • None apparent
<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"> •
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<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 EC-04DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: At the bridge, complete the paving portion prior to installation of the wall
DISCUSSION/JUSTIFICATION: This suggestion proposes that a note be added to the plans. If this work is sequenced as shown, it assumes the work will be done later, resulting in the barrier having to be removed in order to pave and there would be no protection for traffic from the drop off at bridge end. Add note to MOT that the right side STA 3031+50 - 3033+50, in the location of temporary barrier, that the right side will need to be widened and paved up to the elevation of the existing pavement prior to setting temporary barrier wall and crash cushion.
IMPLEMENTATION CONSIDERATIONS: This would consist of adding a note to the Maintenance of Traffic (MOT) Phase 1.



VALUE ENGINEERING PROPOSAL EC-06DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Hold a joint preconstruction public meeting to introduce contractor	
FUNCTION: Ensure Constructability	
BASELINE ASSUMPTION: There is no requirement to hold a preconstruction meeting with the community.	
PROPOSED ALTERNATIVE: Have the contractor participate in a preconstruction meeting with the community.	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> Introduces the contractor and staff to the community 	<ul style="list-style-type: none"> This has not been done before in KYTC
<ul style="list-style-type: none"> Lets the business community know construction is about to start 	<ul style="list-style-type: none"> May bring up issues
<ul style="list-style-type: none"> Helps to educate the business community 	<ul style="list-style-type: none">
<ul style="list-style-type: none"> May help to relieve some of the community's anxiety 	<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 EC-06DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Hold a joint preconstruction public meeting to introduce contractor

DISCUSSION/JUSTIFICATION:

This preconstruction meeting is for the community and businesses. There will be much anxiety and concerns from the businesses and potentially the community about the impacts of the project. This will provide an opportunity to have an "open house" type meeting. The goal of the meeting is not to ask or gain input from the community, as it was during the design phase. The goal is now to introduce and inform the community. It is a great opportunity to continue to show that KYTC is interested in the community enough to begin the project with this meeting and introduce the contractor and share some of the construction approaches (in layman's terms) to help relieve some of the perceived concerns.

The contractor's key project management team, along with the job superintendent, consultant, and KYTC, should be in attendance since they will be on the site full time. This is a good time to discuss communication of concerns and provide the project "hot line" number if there is going to be one. Holding this meeting can help to keep project issues and concerns at the project level and keep community members from escalating their issues up to management because they know who they can talk to and have had a chance to meet them. This will make the public feel more comfortable about sharing their concerns with the team.

Additionally, a pre-construction information handout should be available at the meeting and should include, at a minimum, the following information:

- o Name of contractor
- o 24-hour hotline number
- o Brief description of project
- o Names of project manager and superintendent (contractor)
- o Name of resident engineer
- o Construction schedule including anticipated work hours
- o Traffic regulations including lane restrictions

IMPLEMENTATION CONSIDERATIONS:

KYTC would need to add verbiage to their specification:

"The Contractor shall participate in a construction kickoff meeting with the Agency and property owners and tenants along the alignment. For that meeting, the Contractor shall be prepared to address community concerns and provide information on its construction approach and emergency plan."



VALUE ENGINEERING PROPOSAL EC-09DS

Kentucky Transportation Cabinet

Mountain Parkway Item No. 10-166.00

TITLE: Phase utility construction with roadway construction	
FUNCTION: Ensure Construction	
BASELINE ASSUMPTION:	
Currently, the proposal package includes separate utility relocation and roadway construction phasing. The contractor will be expected to combine these concepts into a complete construction phasing plan.	
PROPOSED ALTERNATIVE:	
It would be in the best interest of the project to combine the phasing of roadway and utility construction in order to minimize the risk of claims.	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> • Less unknowns for bidders 	<ul style="list-style-type: none"> • Time to coordinate between utility designer/roadway designer
<ul style="list-style-type: none"> • More holistic construction plan 	<ul style="list-style-type: none"> • Plans may need to be changed to accommodate any changes in phasing
<ul style="list-style-type: none"> • Minimizes the opportunity for risk due to claims from Utility Conflict/Delay 	<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 EC-09DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Phase utility construction with roadway construction
DISCUSSION/JUSTIFICATION: The contractor may not have time to combine the separate phasing plans into a single plan prior to bidding. This results in potential unknowns and will increase the cost of the project up front. There is also a risk that some of the construction will not be able to be phased together as designed. This will result in change orders or possibly delay claims. To minimize this risk, the project should have all aspects of construction phased together.
IMPLEMENTATION CONSIDERATIONS: Roadway Designer and Utility Designer would have to coordinate to combine phasing of utilities and roadway construction. There would be additional design costs and time associated with implementing this.



VALUE ENGINEERING PROPOSAL EC-17
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Offer an early completion bonus			
FUNCTION: Ensure Constructability			
BASELINE ASSUMPTION:			
There is no early completion bonus included in the proposal, therefore no incentive to complete the project prior to the project completion date.			
PROPOSED ALTERNATIVE:			
The VE team proposes to include an early completion bonus in the contract to give the contractor an incentive to complete the project prior to the completion date.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Reduces impacts to the traveling public 		<ul style="list-style-type: none"> May encourage the contractor to work during utility relocations which may cause conflicts 	
<ul style="list-style-type: none"> Reduces impacts to business owners 		<ul style="list-style-type: none"> This proposal may limit competition because smaller contractors may not be able to expedite work 	
<ul style="list-style-type: none"> Reduces the amount of time KYTC/GEC is required to perform CEI services 		<ul style="list-style-type: none"> Overhead utility work not completed on time will result in a possible claim or delay impacting the bonus 	
<ul style="list-style-type: none"> Increases contractor competition reducing overall project 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"> 	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:		\$ -	\$ -
PROPOSED ALTERNATIVE:		\$ 450,000	\$ -
TOTAL (Baseline less Proposed)		\$ (450,000)	\$ -
			\$ (450,000)

COST



VALUE ENGINEERING PROPOSAL EC-17
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Offer an early completion bonus

DISCUSSION/JUSTIFICATION:

Including an incentive to the contractor for early completion would include a contract provision which compensates the contractor a certain amount of money for each day the identified critical work is completed ahead of schedule. This VE proposal suggests a change to the contract proposal. Currently, the proposal requires that the contractor complete the project by 8/31/2019. An early completion bonus would give the contractor an incentive to look for innovative ways to manage the work so that the project is completed earlier than the specified project completion date. An earlier completion date would result in less delay for the traveling public, less impacts to the business, and less overhead and CEI costs.

Because this project includes complicated utility work, the completion date is difficult to ascertain. If the current project completion date is generous, the contractor may get the bonus without really expediting work. It will be important to ascertain what would constitute a realistic (not overly generous) project schedule before this could be implemented. Specific other elements need to be taken into account including the completion of the aerial utility work and paving windows due to cold weather.

A cost was looked at that simulated the liquidated damages clause. \$5000 per day for a maximum of 90 days was used. This approach and early incentive is flexible and another method of calculation can be determined.

IMPLEMENTATION CONSIDERATIONS:

This proposal to add an early completion bonus would require a change to the project proposal and would require KYTC to provide a detailed discussion of this change at the mandatory pre-bid meeting to be held on June 8, 2016. However, prior to implementing an early completion date, KYTC should ensure that the current completion date is not overly generous to the point that that contractor would achieve the bonus without any extra effort.



VALUE ENGINEERING PROPOSAL EC-20
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Eliminate closure pour																			
FUNCTION: Ensure Constructability																			
BASELINE ASSUMPTION:																			
There is a 4' closure pour of bridge deck between beams 6 and 7.																			
PROPOSED ALTERNATIVE:																			
During Phase 2, build the closure pour section as an overhang.																			
BENEFITS		RISKS/CHALLENGES																	
<ul style="list-style-type: none"> • Less joints in bridge deck 		<ul style="list-style-type: none"> • Increases the need for additional reinforcement 																	
<ul style="list-style-type: none"> • Less deck pours 		<ul style="list-style-type: none"> • More congestion of reinforcement at phased construction joint 																	
<ul style="list-style-type: none"> • May be easier to construct 		<ul style="list-style-type: none"> • More overhang brackets 																	
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • Locating rail for screed machine may be difficult (on top of temporary rail) 																	
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																	
<ul style="list-style-type: none"> • 		<ul style="list-style-type: none"> • 																	
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<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>\$ 12,878</td> <td>\$ -</td> <td>\$ 12,878</td> </tr> <tr> <td>PROPOSED ALTERNATIVE:</td> <td>\$ 33,534</td> <td>\$ -</td> <td>\$ 33,534</td> </tr> <tr> <td>TOTAL (Baseline less Proposed)</td> <td>\$ (20,656)</td> <td>\$ -</td> <td>\$ (20,656)</td> </tr> </tbody> </table>				COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost	BASELINE ASSUMPTION:	\$ 12,878	\$ -	\$ 12,878	PROPOSED ALTERNATIVE:	\$ 33,534	\$ -	\$ 33,534	TOTAL (Baseline less Proposed)	\$ (20,656)	\$ -	\$ (20,656)
COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost																
BASELINE ASSUMPTION:	\$ 12,878	\$ -	\$ 12,878																
PROPOSED ALTERNATIVE:	\$ 33,534	\$ -	\$ 33,534																
TOTAL (Baseline less Proposed)	\$ (20,656)	\$ -	\$ (20,656)																
			COST																



VALUE ENGINEERING PROPOSAL EC-20

Kentucky Transportation Cabinet

Mountain Parkway Item No. 10-166.00

TITLE: Eliminate closure pour

DISCUSSION/JUSTIFICATION:

The plans show a 4' closure pour of the deck as the last part of Phase 2 construction. This closure pour will be difficult to form and will add a longitudinal cold joint the entire length of the bridge. An alternate to this closure pour is to place this area as part of the Phase 2 deck pour. Overhang brackets and forms could be used, similar to those shown for Phase 1. There are several issues that may make this alternate difficult. The first issue being the congestion of the overhang brackets used during Phase 1. The plans do not state if the temporary brackets (Phase 1) are needed only for the pouring of Phase 1 or are needed after the concrete has cured. If the brackets are needed after the concrete has cured, additional transverse ("drop-in bars") reinforcement that are lapped with the #6 transverse bars could be added (if reinforcement shown in plans does not work for this overhang length). The other issue with eliminating the closure pour is space and location for the screed machine rail. On past construction projects the screed rail was placed on top of the temporary barrier wall.

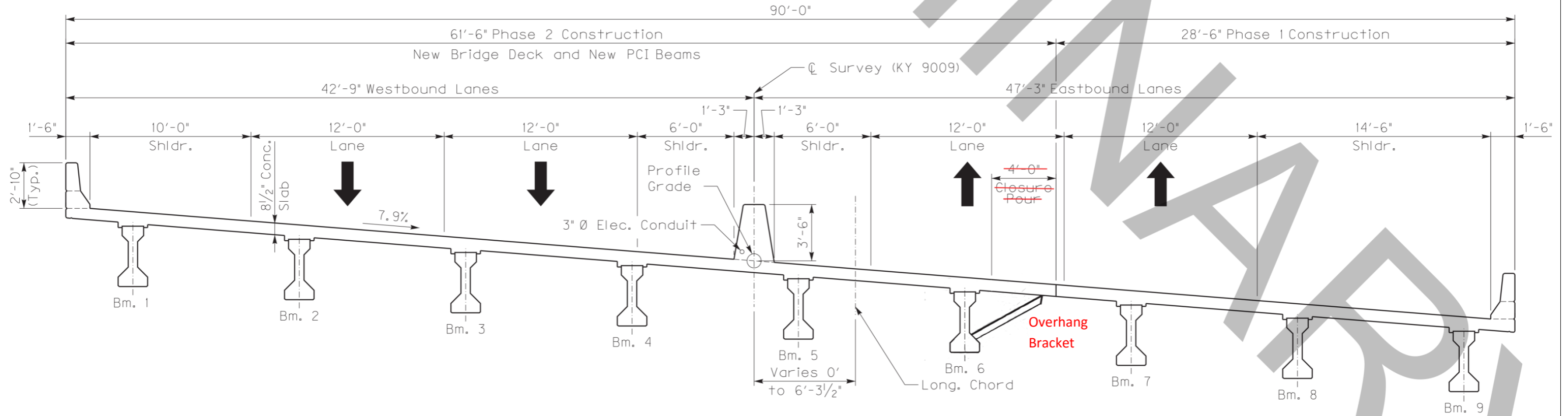
IMPLEMENTATION CONSIDERATIONS:

Alternate will cause modifications to plans and cost estimate. Costs represent material costs only and not contractors time to complete the work.



TITLE: Eliminate closure pour

SKETCH OF PROPOSED ALTERNATIVE



PHASE 2 CONSTRUCTION / FINAL TRAFFIC



VALUE ENGINEERING PROPOSAL EC-21DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Revise temporary barrier detail on bridge	
FUNCTION: Ensure Constructability	
BASELINE ASSUMPTION:	
The temporary barrier detail utilizes a 1-1/8" diameter (2" hole in new deck) every 4' for length of bridge.	
PROPOSED ALTERNATIVE:	
Use KYTC Standard Drawing RBM-120 for box beam stiffening of temporary concrete barrier	
BENEFITS	RISKS/CHALLENGES
<ul style="list-style-type: none"> Eliminates holes in the new deck that allows water and de-icing agents into the concrete 	<ul style="list-style-type: none"> None apparent
<ul style="list-style-type: none"> Less construction time, do not have to drill holes every 4' 	<ul style="list-style-type: none"> Ensure deflection
<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> May not be as secure as bolted
<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">
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<ul style="list-style-type: none"> 	<ul style="list-style-type: none">

DESIGN SUGGESTION



VALUE ENGINEERING PROPOSAL EC-21DS

Kentucky Transportation Cabinet

Mountain Parkway Item No. 10-166.00

TITLE: Revise temporary barrier detail on bridge

DISCUSSION/JUSTIFICATION:

The existing plans shows that the temporary barrier is connected to the deck with 1 1/8" diameter bolts with 2" holes in the deck that is spaced every 4'. KYTC has a standard drawing, RBM-120 that shows a stiffened temporary barrier. Other slight modifications (plate/angle attached with bolts using mechanical couplers already in place of deck and timber) could be used to ensure that the barrier will not slide off the deck. By using the details shown on the Standard Drawing, this would eliminate the holes in the new deck and not allow water and de-icing agents into the new deck.

IMPLEMENTATION CONSIDERATIONS:

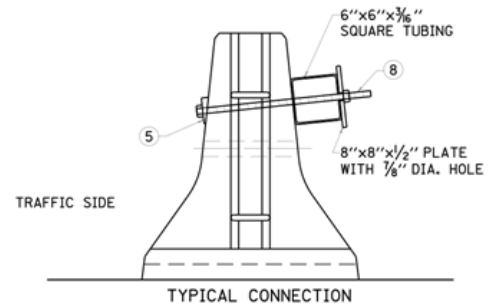
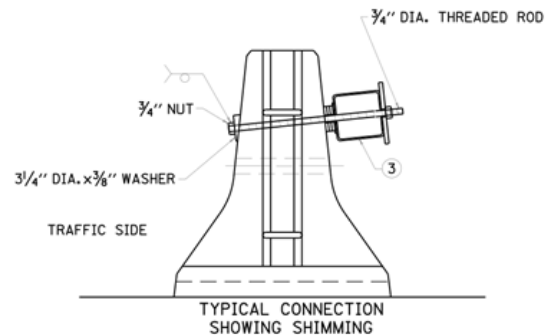
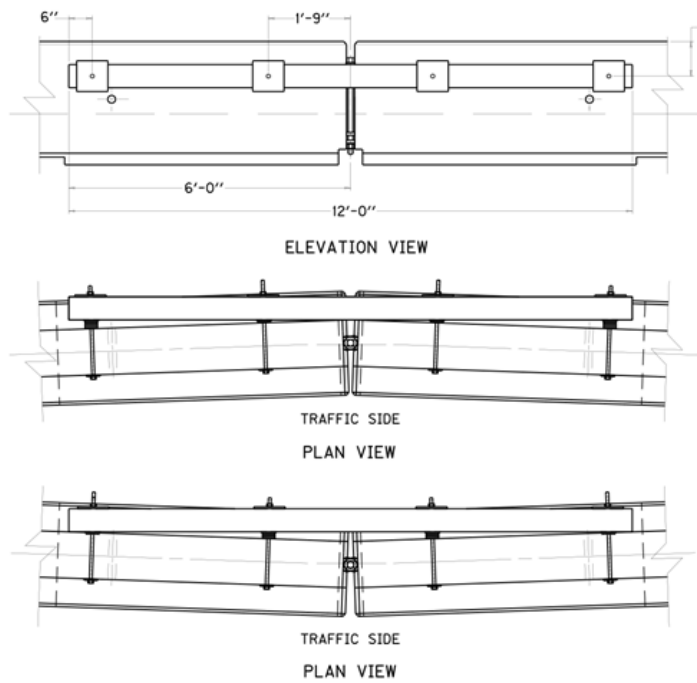
Alternate will cause modifications to plans.



VALUE ENGINEERING PROPOSAL EC-21DS
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Revise temporary barrier detail on bridge

SKETCH OF PROPOSED ALTERNATIVE



~ NOTES ~

1. STIFFENED BARRIER WALL IS REQUIRED IN WORK ZONES WHEN BARRIER WALL IS LOCATED WITHIN 3'-0" OF BRIDGE DECK EDGE PARALLEL TO THE DIRECTION OF TRAFFIC. MAY ALSO BE USED IN OTHER TEMPORARY SITUATIONS WHERE SUBSTANTIAL DROP OFFS EXIST.
2. STIFFENER SHALL BE INSTALLED WHEN BARRIER IS SET AND BEFORE TRAFFIC IS LET NEAR IT.
3. SQUARE TUBING SHALL BE 50 GRADE STRUCTURAL STEEL.
4. WHEN BARRIERS ARE PLACED ON A RADIUS, THE AREA BETWEEN THE SQUARE TUBING AND BARRIER WALL SHALL BE SHIMMED AS SHOWN ABOVE.
5. BEVEL WASHER TO BE PARALLEL WITH PLANE OF BARRIER AND BOLT HEAD. (TYP.)
6. ALL MATERIALS, LABOR INVOLVED WITH THIS PROCESS TO BE INCIDENTAL TO CONCRETE BARRIER WALL TYPE 9T.
7. SHIM SHALL CONSIST OF ONE SQUARE PLATE (4" NEAR JOINT, 8" NEAR END OF BEAMS) 3/8" THICK WITH AS MANY 3/4" DIA. x 3/8" THICK WASHERS AS NEEDED.
8. ROD PERPENDICULAR TO BARRIER WALL SURFACE. (TYP.)

FOR TEMPORARY USE ONLY.
 USE WITH CUR. STD. DWG.
 RBM-115

KENTUCKY
 DEPARTMENT OF HIGHWAYS

**BOX BEAM STIFFENING
 OF TEMPORARY
 CONCRETE BARRIER**

APPROVED: *J. H. [Signature]* 04-15-08
 DATE

008



VALUE ENGINEERING PROPOSAL M-04
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Add fence between shared use path and road in front of high school			
FUNCTION: Miscellaneous			
BASELINE ASSUMPTION:			
In between the shared-use path and Mountain Parkway, there is no barrier to prevent people from crossing the parkway.			
PROPOSED ALTERNATIVE:			
The proposed alternative is to build barriers that will channel pedestrians to use the crosswalks.			
BENEFITS		RISKS/CHALLENGES	
<ul style="list-style-type: none"> Channels pedestrians to crosswalks 		<ul style="list-style-type: none"> Will require maintenance 	
<ul style="list-style-type: none"> Increases safety 		<ul style="list-style-type: none"> May be viewed by public as not aesthetically pleasing 	
<ul style="list-style-type: none"> Aesthetically pleasing 		<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"> 	
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<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 	
COST SUMMARY		Initial Costs	O&M Costs
BASELINE ASSUMPTION:	\$	-	\$ -
PROPOSED ALTERNATIVE:	\$	28,000	\$ -
TOTAL (Baseline less Proposed)	\$	(28,000)	\$ -
			COST



VALUE ENGINEERING PROPOSAL M-04
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00

TITLE: Add fence between shared use path and road in front of high school

DISCUSSION/JUSTIFICATION:

There is currently no barrier between the shared-use path and the roadway at the high school. This is dangerous especially in front of the high school, since students could cross US 460 in order to go home and/or visit the local businesses. This could result in students getting hit while they are crossing US 460. In addition to the front of the high school, this could be a safety issue for some of the local business like Wendy's, Subway, and McDonald's and other business that generate pedestrian traffic from customers and workers. The new high school will generate pedestrian traffic in the area of the project since there will be students walking to and from school, and to the local businesses.

Therefore, the fences are to encourage people to cross at the cross walks, which would be safe place for them to cross. In addition, it would be good to build fences in front of businesses that generate pedestrians, since customers and workers could try to cross US 460 to get to them.

The location for these barriers would be in front of the high school and could be in front of the businesses that have the potential to generate pedestrian traffic. The suggested barrier is a wooden fence or another aesthetically pleasing barrier that fits in with the surroundings.

IMPLEMENTATION CONSIDERATIONS:

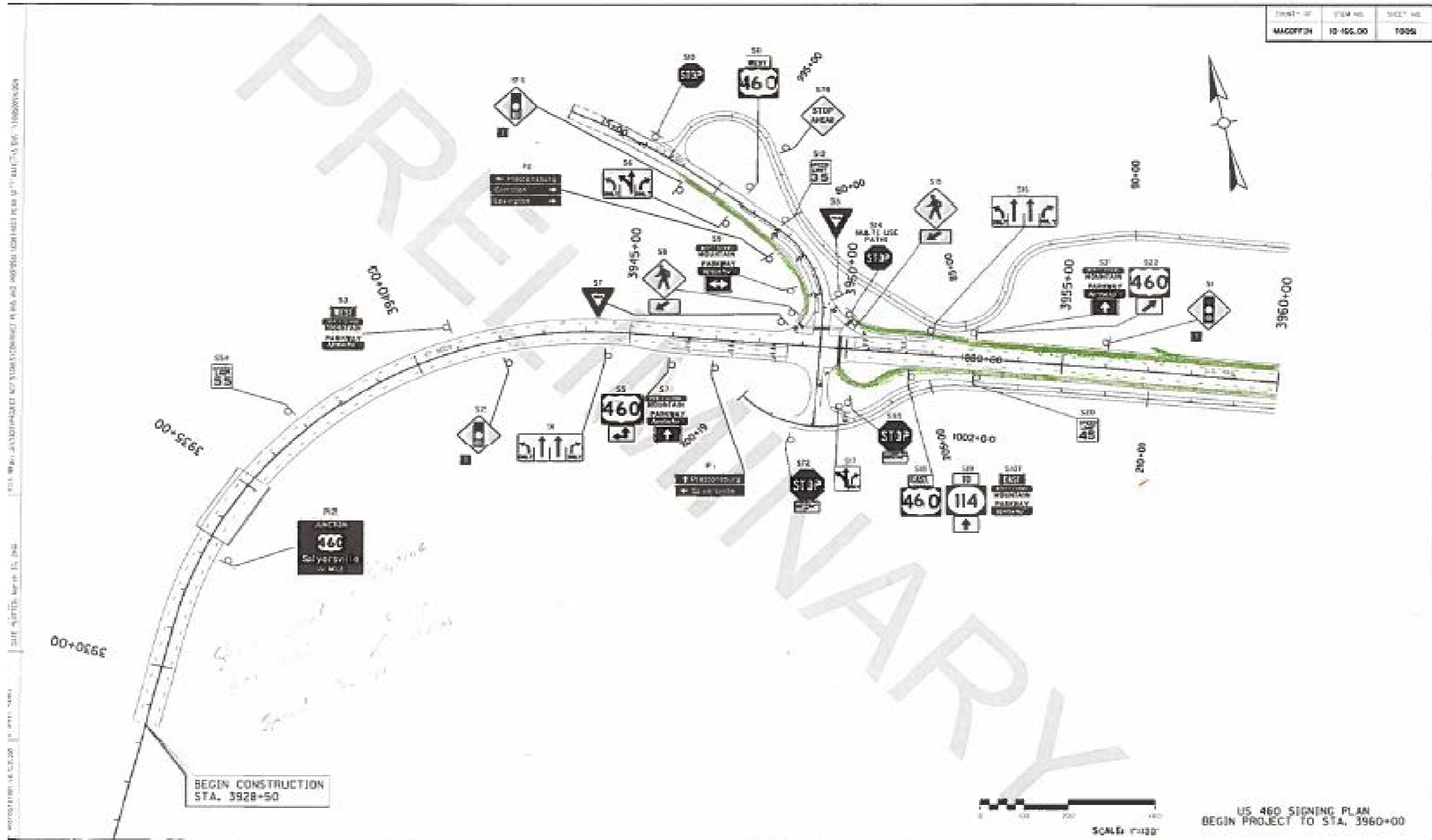
The fences can be built within the existing right of way, since they are being built in between US 460 and the shared-use path. The major concern would be if the utilities would be impacted by the fence poles, and they do not affect the utilities. This is a concern more for the underground utilities then the above ground utilities. The pole placement is important because it should not affect the underground utilities. In addition, the fence should be built to protect the pedestrians from vehicles that go off the road and the fence should be aesthetically pleasing.

On the attached layouts, the orange line along the shared-use path channels the students from the high school to the crosswalk, which is the main area proposed. The cost has been calculated based on this approach only. The red line along the sidewalk and shared-use path does the same thing yet it is for the restaurant area of the project. This area is heavily suggested to have a fence like the high school has. The green areas are important areas to have a fence since it keeps pedestrians from crossing and it channelizes them to cross at crosswalks. The blue areas are suggested areas for a fence, yet are not required. The fence should be a woven wire type 1 fence with wooden planks added to the top, middle and bottom on the side facing the parkway or another material that is aesthetically pleasing and mixes well with the context of the area. The installation of the fence should follow section 721 of Kentucky's standard specification for Road and Bridge Construction. If these fences are added to the plans, then there should be a special supplemental note identifying where these fences are to be used. This will ensure that the contractor does not confuse this fence with the installation of regular woven wire type 1 fence.



TITLE: Add fence between shared use path and road in front of high school

SKETCH OF PROPOSED ALTERNATIVE

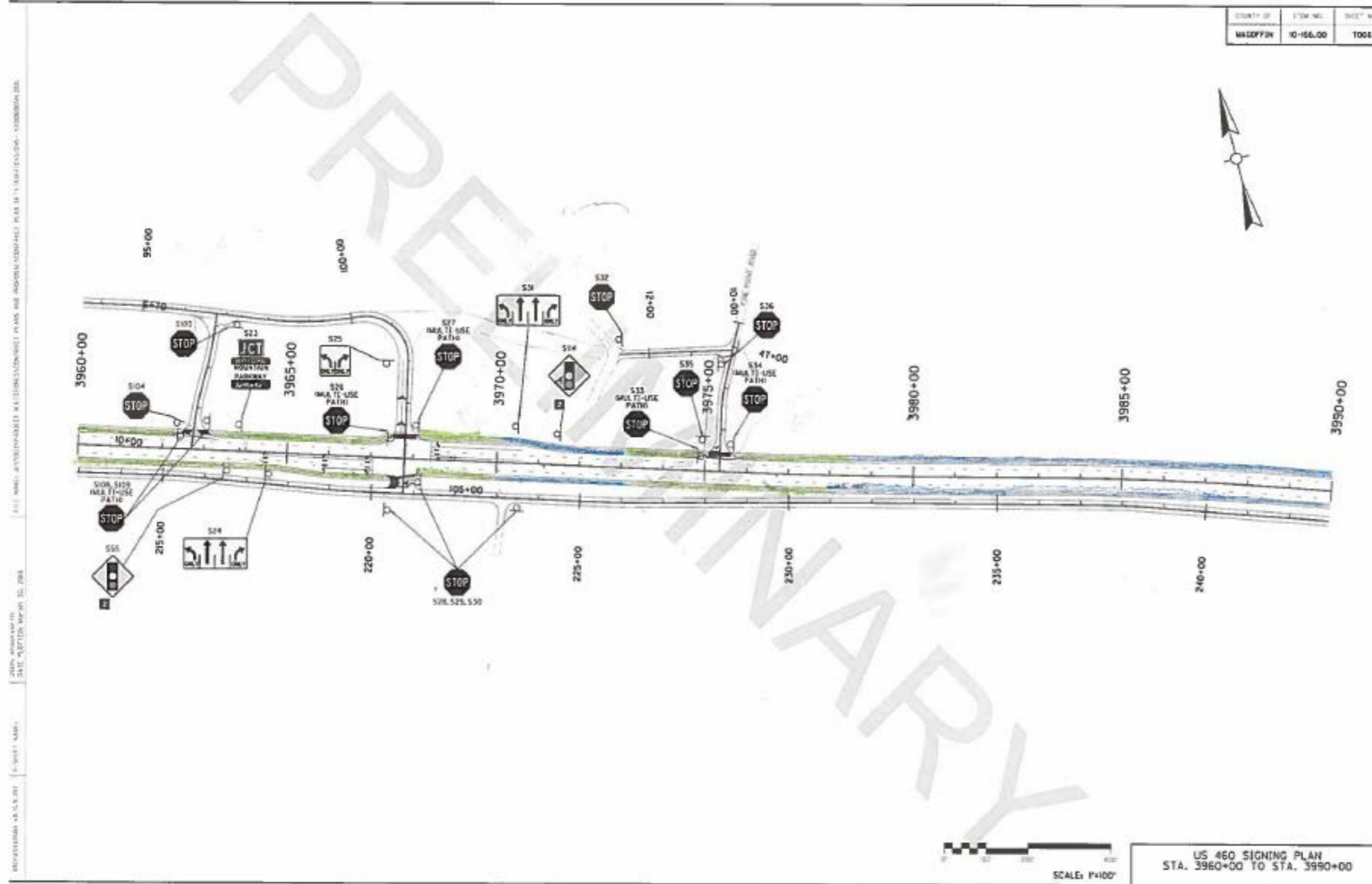




VALUE ENGINEERING PROPOSAL M-04
Kentucky Transportation Cabinet
Mountain Parkway 10-166.00 Project

TITLE: Add fence between shared use path and road in front of high school

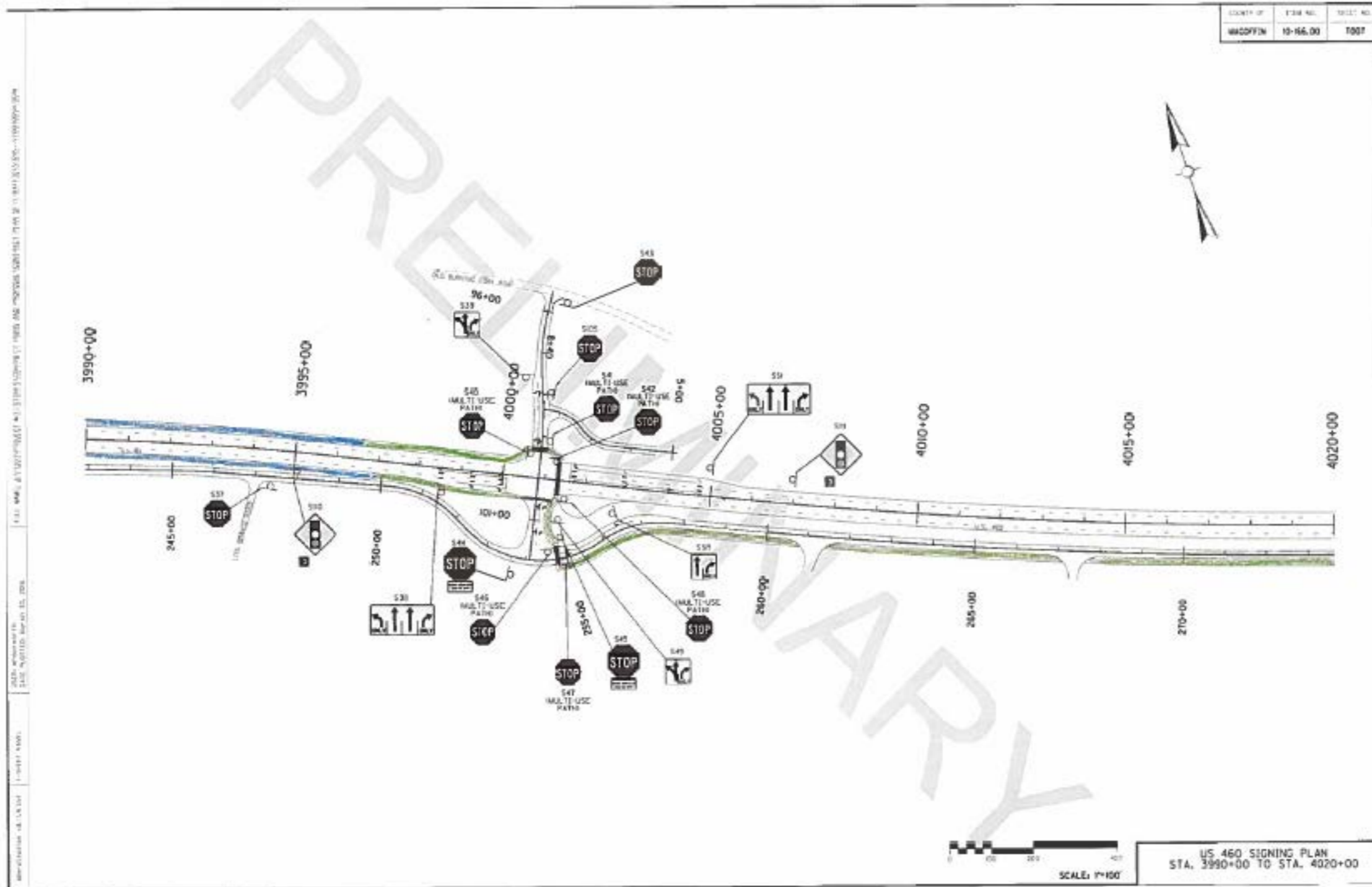
SKETCH OF PROPOSED ALTERNATIVE





TITLE: Add fence between shared use path and road in front of high school

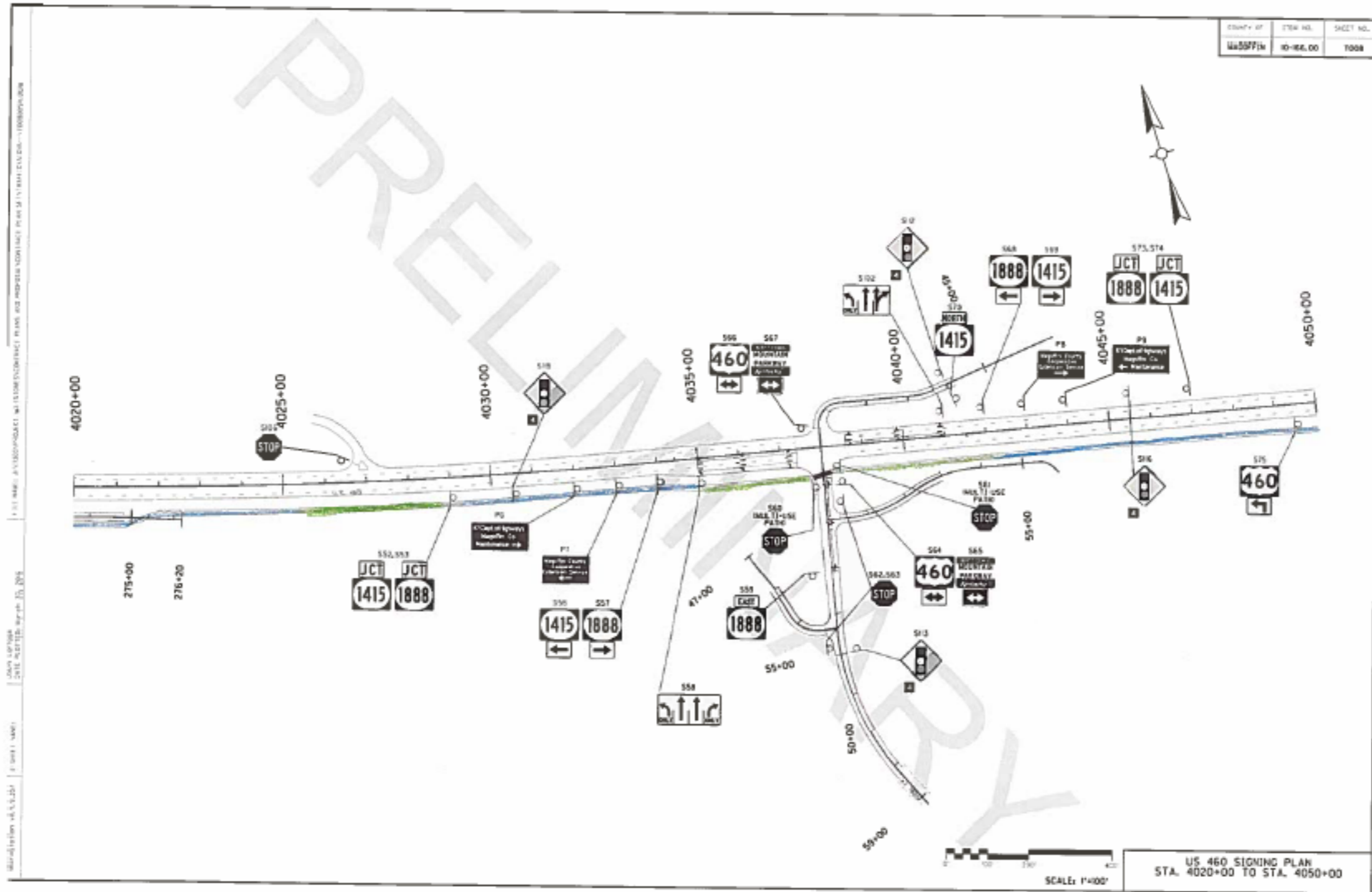
SKETCH OF PROPOSED ALTERNATIVE





TITLE: Add fence between shared use path and road in front of high school

SKETCH OF PROPOSED ALTERNATIVE

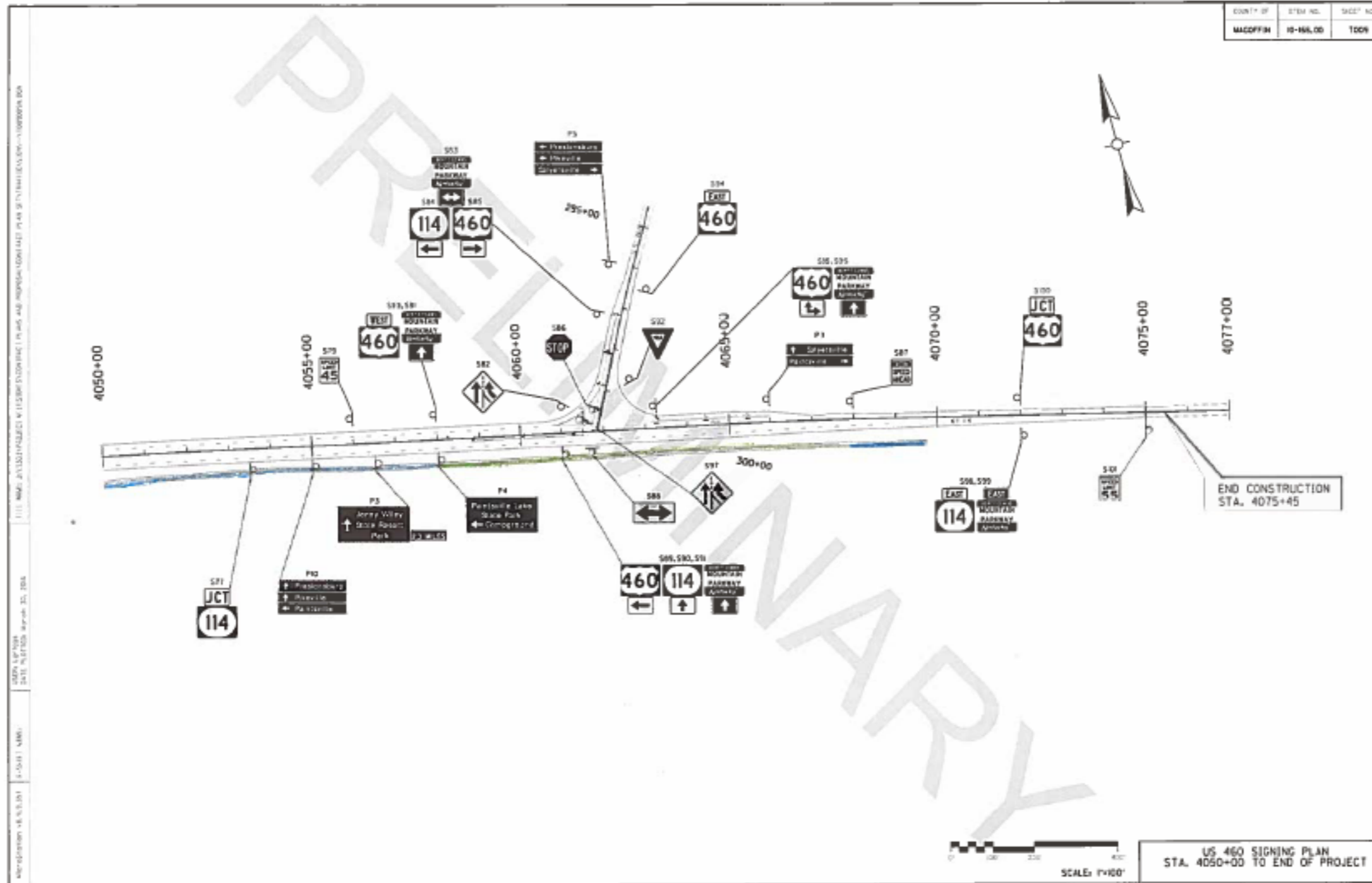




VALUE ENGINEERING PROPOSAL M-04
Kentucky Transportation Cabinet
Mountain Parkway 10-166.00 Project

TITLE: Add fence between shared use path and road in front of high school

SKETCH OF PROPOSED ALTERNATIVE





VALUE ENGINEERING PROPOSAL M-08
Kentucky Transportation Cabinet
Mountain Parkway 10-166.00 Project

TITLE: Add right-out for high school to mainline																			
FUNCTION: Miscellaneous																			
BASELINE ASSUMPTION:																			
Currently all traffic coming to and from the new high school will have one exit point on to mainline US 460.																			
PROPOSED ALTERNATIVE:																			
Add an additional exit point for the high school traffic to be able to transport students from the school. Add a gate for the school to be able to control when this is open and closed to eliminate normal traffic from using the exit and to eliminate additional traffic going by the school grounds.																			
BENEFITS		RISKS/CHALLENGES																	
<ul style="list-style-type: none"> Reduces time needed for school traffic to clear 		<ul style="list-style-type: none"> Potential increase in traffic in front of school 																	
<ul style="list-style-type: none"> Reduces school traffic impacts to the mainline and Burning Fork approach 		<ul style="list-style-type: none"> 																	
<ul style="list-style-type: none"> 		<ul style="list-style-type: none"> 																	
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COST SUMMARY	Initial Costs	O&M Costs	Total Life Cycle Cost																
BASELINE ASSUMPTION:	\$ -	\$ -	\$ -																
PROPOSED ALTERNATIVE:	\$ 36,154	\$ -	\$ 36,154																
TOTAL (Baseline less Proposed)	\$ (36,154)	\$ -	\$ (36,154)																

COST



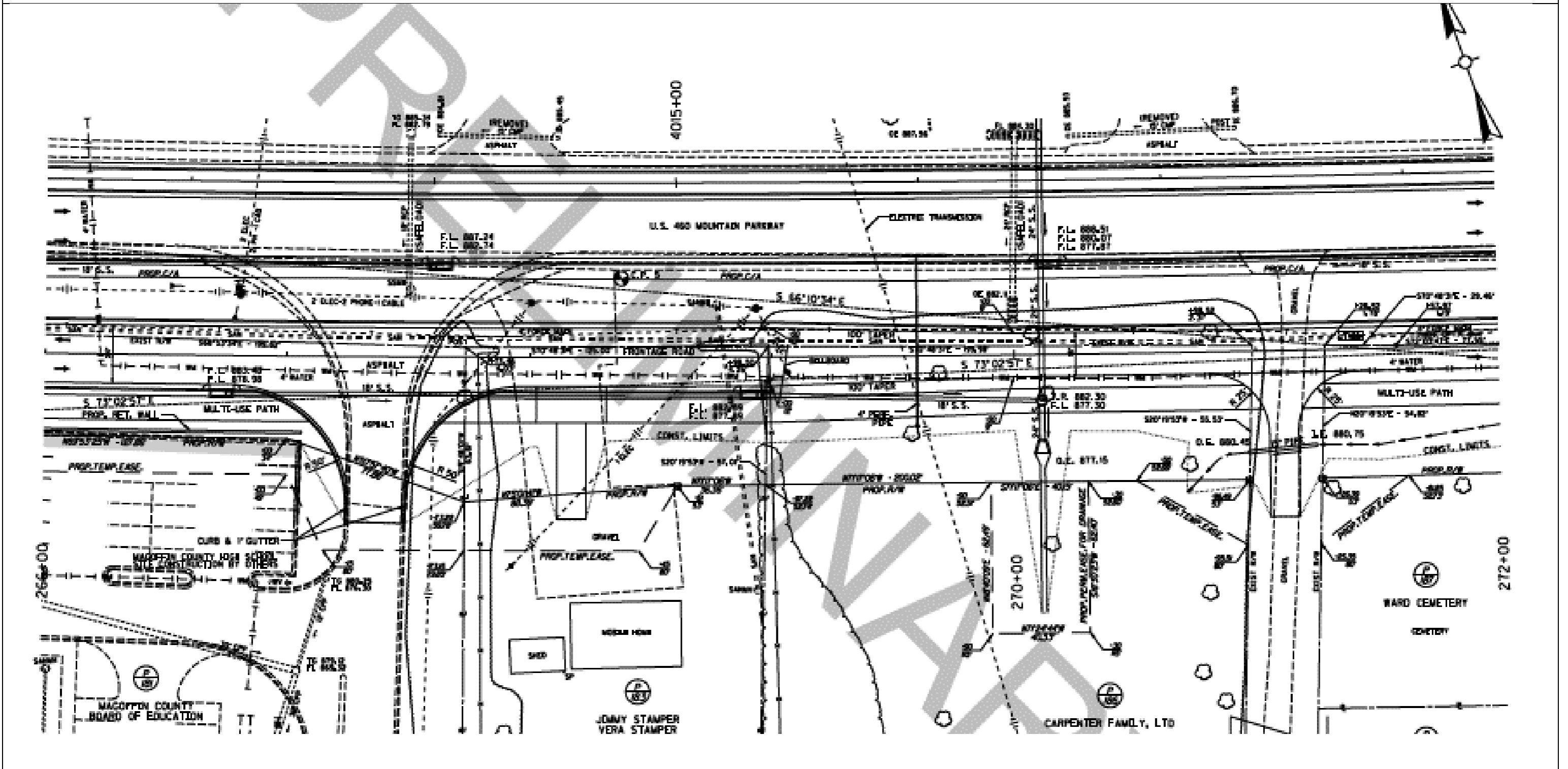
VALUE ENGINEERING PROPOSAL M-08
Kentucky Transportation Cabinet
Mountain Parkway 10-166.00 Project

TITLE:	Add right-out for high school to mainline
DISCUSSION/JUSTIFICATION:	
<p>The new Magoffin County High School traffic will be forced to use only one exit point. The frontage road they will use is in close proximity to the mainline and therefore will provide a minimal amount of storage for vehicles accessing the mainline. During dismissal, the queues with buses trying to access both east and west will impact mainline for a greater period of time. With the additional exit, buses and cars traveling east will be provided access to the mainline without utilizing Burning Fork road and should reduce the length of time the buses and cars to have impact on mainline traffic. This will greatly reduce impact the frontage road and Burning Fork Rd in the morning, afternoon, and during school events.</p> <p>The proposed change is to provide a Right-out only access to the east of the high school and eliminate the dead end. The challenge that this may pose is that it is likely that others will use the access point in lieu to avoid having to use the the light at the intersection. There would be a need to sign the roadway stating 'Local Traffic Only' and/or there may be a need to limit the access of large trucks to keep traffic in front of the school to a minimum.</p>	
IMPLEMENTATION CONSIDERATIONS:	
<p>Providing an exit to the mainline in line with the exit onto the frontage road will require additional costs in re-design, additional asphalt, and additional drainage structures.</p>	



TITLE: Add right-out for high school to mainline

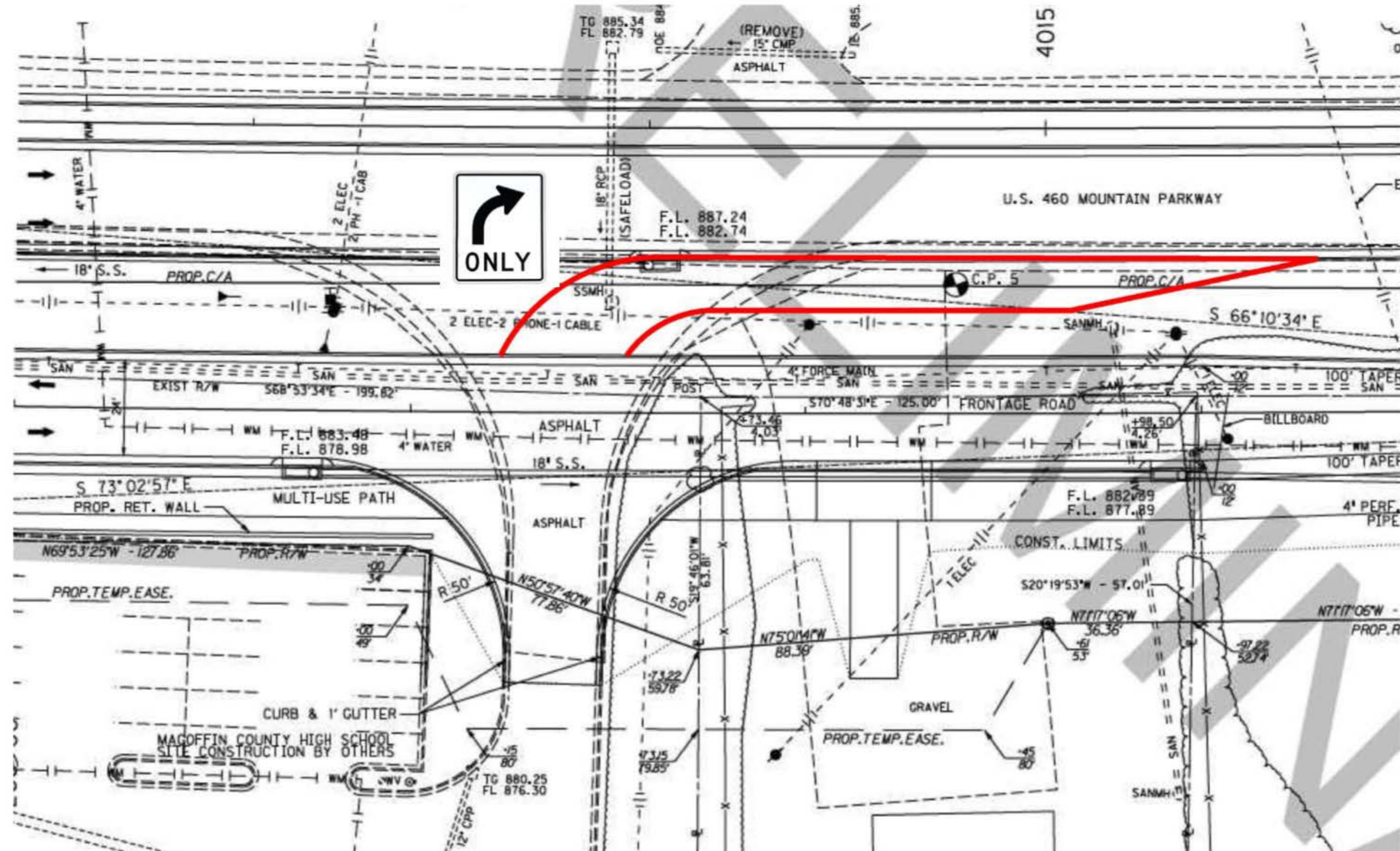
SKETCH OF BASELINE ASSUMPTION





TITLE: Add right-out for high school to mainline

SKETCH OF PROPOSED ALTERNATIVE





APPENDICES



APPENDIX A
Study Participants

VALUE ENGINEERING STUDY ATTENDEES
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County
May 23 - 25, 2016

May			Name	Organization	Position	Office Phone Cell Phone	Email
23	24	25					
✓	✓	✓	Renee Hoekstra, CVS	RHA, LLC	VE Team Leader	Off (602) 493-1947 Cell (623) 764-7490	Renee@TeamRHA.com
✓	✓	✓	Barb Hummell, AVS	RHA, LLC	Assistant Team Leader	Off (602) 493-1947 Cell (623) 210-6052	Barb@TeamRHA.com
✓	✓	✓	Darren Back	KYTC	Roadway	Off: (606)666-8841	darren.back@ky.gov
✓	✓	✓	Dana Robbins	FHWA	Transportation	Off: (502)223-6757	dana.robbins@dot.gov
✓	✓	✓	Steve Gunnell	KYTC	Construction & Maintenance TEBM	Off: (606)666-8841	steve.gunnell@ky.gov
✓	✓	✓	Mike Spain	KYTC	Constructability	Off: (270)746-7898 Cell: (270)893-3318	mike.spain@ky.gov
✓	✓	✓	Shawn Russell	KYTC	Value Engineering Coordinator	Off: (502)782-4926	shawn.russell@ky.gov
✓	✓	✓	Tim Layson	HMB	Construction	Off: (859)233-2100 Cell: (502)229-6418	tlayson@hmbpe.com
✓	✓	✓	Mike Lawler	Stantec	Structures	Off: (859)333-5663 Cell: (502)229-6418	mike.lawler@stantec.com
✓	✓	✓	Anthony Norman	KYTC	Lessons Learned Coordinator	Off:(502)782-4928	anthony.norman@ky.gov

VALUE ENGINEERING STUDY ATTENDEES
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County
May 23 - 25, 2016

May			Name	Organization	Position	Office Phone Cell Phone	Email
23	24	25					
✓	✓	✓	Brent Sweger	KYTC	Manager, Quality Assurance	Off: (502)782-4912	brent.sweger@ky.gov
✓		✓	Marshall Carrier, P.E.	KYTC	Project Manager	Off: (502)782-4872	marshall.carrier@ky.gov
✓		✓	Glen Kelly	QK4/GEC	GEC	Off: (502)693-6278	gkelly@qk4.com
✓		✓	David Kratt	QK4	GEC	Off: (502) 435-0382	dkratt@qk4.com
✓		✓	Jerry Cottingham	EA Partners.com	Design Consultant	Off: (859) 296-9889	jcottingham@eapartners.com
✓			Steve Farmer	Stantec/GEC	Utility Relocation	Off: (859) 233-2100	steve.farmer@stantec.com
✓		✓	Eric Hackworth	EA Partners.com	Design Consultant	Off: (859) 296-9889	ehackworth@eapartners.com
		✓	David Whitworth	FHWA	Team Leader	Off: (502) 223-6741	david.whitworth@dot.gov
		✓	Andy Barber	KYTC	DSHE	Off: (502) 551-4828	andy.barber@ky.gov
		✓	Dave Waldner	KYTC	Director Environmental	Off: (502) 564-7250	david.waldner@ky.gov
		✓	Paul Looney	KYTC	DSHE	Off: (502) 782-4897	paul.looney@ky.gov

VALUE ENGINEERING STUDY ATTENDEES
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County
May 23 - 25, 2016

May			Name	Organization	Position	Office Phone Cell Phone	Email
23	24	25					
		✓	Aric Skaggs	KYTC	D-10 - TEBM	Off: (606) 666-8841	aric.skaggs@ky.gov
		✓	Rachel Mills	KYTC	Director Construction Procurement	Off: (502) 782-5152	rachel.mills@ky.gov
		✓	Corbett Caudill	KYTC	Chief District Engineer -D- 10	Off: (606) 666-4841	corbett.caudill@ky.gov
		✓	Boday Borres	FHWA	Structures Engineer	Off: (502) 223-6763	boday.borres@dot.gov
		✓	Tim Adams	HDR	Construction Oversight	Off: (859) 317-3105	tim.adams@hdrinc.com
		✓	Patty Dunway	KYTC	State Highway Engineer	Off: (270) 401-5353	patty.dunway@ky.gov



APPENDIX B
Pareto Cost Models



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County**

Appendix B – Cost Model

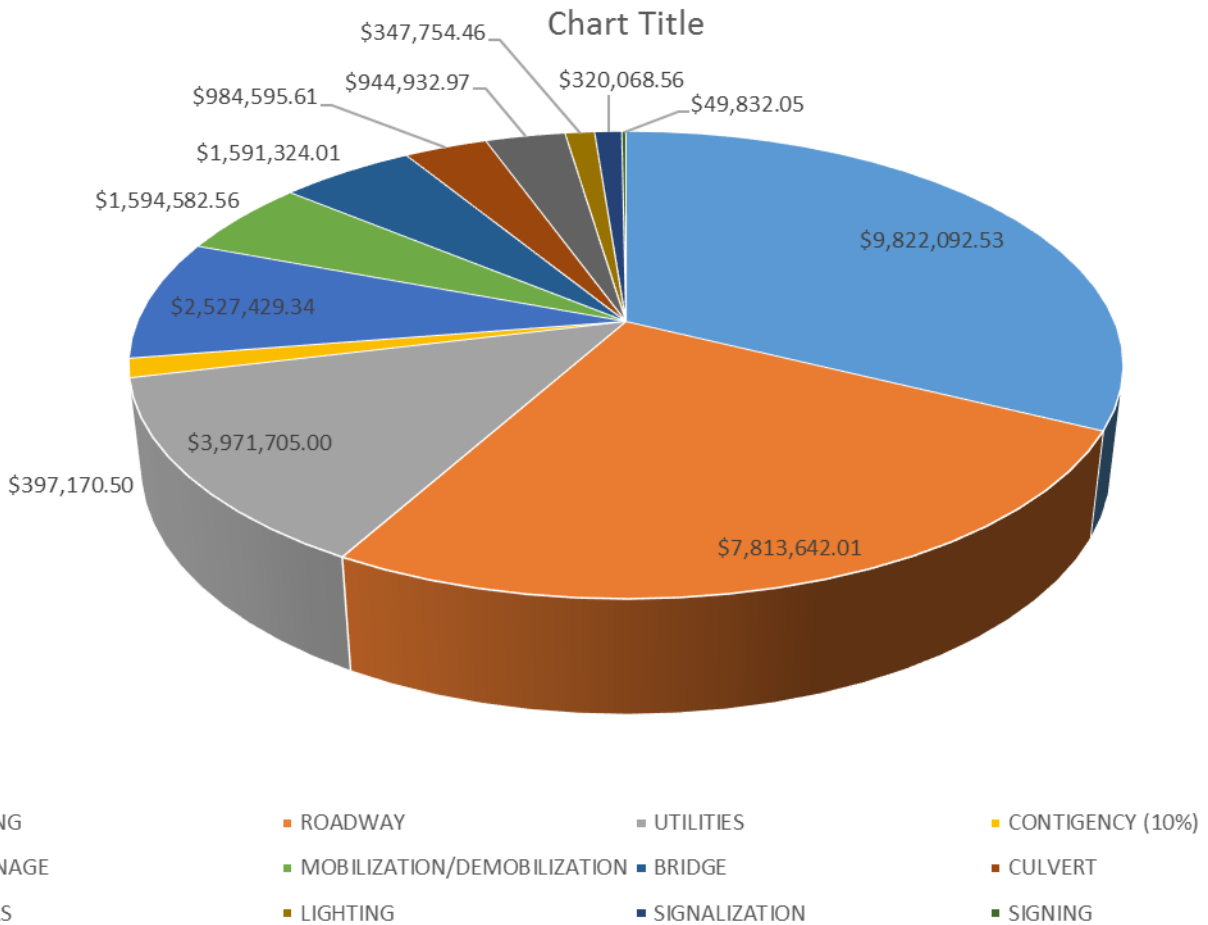
The team reviewed and discussed the project’s cost model (below). The VE team identified the following cost estimate comments:

- Granular Embankment item shows as a bid item and in the earthwork information
- Add Type II Geotextile Fabric at Burning Fork Bridge

MOUNTAIN PARKWAY ITEM NO. 10-166.00 COST MODEL

Total Cost: \$33,239,410

80% = \$26,591,528 (Paving, Roadway, Bridge, Utilities, Drainage, Mobilization)





APPENDIX C
Function Analysis



**Value Engineering Study
 Kentucky Transportation Cabinet
 Mountain Parkway Item No. 10-166.00
 Magoffin 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 project based using active verbs and measurable nouns. This process allowed the team to truly understand all of the functions associated with the project.

FUNCTION	CLASSIFICATION
Increase Level of Service	Basic
Grow Economy	Higher Order
Move Traffic	Secondary
Access Businesses	Secondary
Convey Water	Secondary
Move Sewage	Secondary
Span Space	Secondary
Maintain Connectivity	Secondary
Relocate Utilities	Secondary
Control Road Users	Secondary
Limit Access	Secondary
Promote Competition	Secondary
Accommodate Pedestrians	Secondary
Accommodate Bikes	Secondary
Reduce Conflicts	Secondary
Increase Capacity	Secondary
Notify Users	Secondary



Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County

Illuminate Road	Secondary
Phase Construction	Secondary
Retain Earth	Secondary
Separate Traffic	Secondary
Salvage Pavement	Secondary
Minimize Cost	Secondary
Meet Schedule	Secondary
Clear Right-of-Way	Secondary
Reduce Maintenance	Secondary
Ensure Constructability	Secondary
Increase Safety	All the Time

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?".

A Function Analysis Systems Technique (FAST) diagram was not completed.



APPENDIX D
Creative Idea List & Evaluation



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin 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 decision maker/stakeholders identified and defined the following performance attributes as a means to aid the team in evaluating the ideas:

- Schedule – Bid letting 6/16/16
- Bidability/Constructability
 - Quality of documents
 - Ease of construction
 - Promotes competition
- Accessibility (short term)
 - Business access during construction
 - Utilities maintained during construction
- Mainline Operations (long term)
 - Connectivity
 - Through-put
- Local Operations (long term)
 - Business access
 - Pedestrian/Bikeway access

Evaluation Process

To aid in the evaluation of the ideas, the team scored the ideas using a group nominal technique using the project goals and the performance attributes as their guide. All ideas that received a rating (1-7) were further developed.

The creative idea list represents all of the ideas and includes scoring for the ideas that were rated using the value index.



**Value Engineering Study
 Kentucky Transportation Cabinet
 Mountain Parkway Item No. 10-166.00
 Magoffin County**

Value Relationship		Value Index = $\frac{\text{Function}}{\text{Cost}}$ = $\frac{F}{C}$					
Rating							
5.	Great Opportunity	F C--	F+ C-	F++ C	F++ C-	F++ C--	F++ C+
4.	Good Opportunity	F- C--	F C-	F+ C	F+ C-	F+ C+	F++(*) C++
3.	Moderate Value	F-- C--	F- C-	F++(*) C++			
2.	Poor Value	F-- C	F-- C--	F C+	F C++		
1.	Unacceptable Impacts/Fatal Flaw						

*Is the Function improved to the point that it overcomes the high cost?

VALUE CUE KEY – MAGNITUDE OF CHANGE

- F = No impact to function
- F- = Small negative impact to function
- F-- = Large negative impact to function
- F+ = Small increase in function
- F++ = Large increase in function

- C = No impact to cost
- C- = Small decrease in cost
- C-- = Large decrease in cost
- C+ = Small increase in cost
- C++ = Large increase in cost



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County**

Creative Idea List

No.	Description	Score
MT	Move Traffic	
MT-01	Add rumble strips at transitions for reduced speed	w/MT-02
MT-02	Manage speed zone	DS
MT-03	Use Jointed plane concrete (JPC) at signal locations on the mainline	6
MT-04	Install traffic separation to the intersection to avoid U-turns before intersection	6
MT-05	Install lane separators from end of median to intersection to avoid U-turns before intersection	w/MT-04
MT-06	Remove public access at Station 396+00 and Station 396+5 near McDonalds	FF
MT-07	Remove public access at Station 397+5 Pine Point Road up to where it connects, extend backage road	FF
MT-08	Add mid-block pedestrian crossings between traffic signals	1
MT-09	Add permanent business access signage	DS
MT-10	Eliminate portion of backage road - furthest west - eliminate western-most access point	
MT-11	Rework western-most tie-in to frontage road, south side	FF
MT-12	Add joint adhesive asphalt wherever two surface mats tie together to alleviate long term joint problems	DC
MT-13	Add bollards to the shared use path at intersections to keep vehicles off the path	DC
MT-14	Use only curb in the median in lieu of curb and gutter pan	
MT-15	Use stamped concrete in the median in lieu of asphalt	3
MT-16	Move edge drain away from guard rail post as shown in some sections to eliminate posts through the asphalt	DC
MT-17	Add right-turn lanes or deceleration lanes for right-in only on mainline	FF
MT-18	Improve intersection at Burning Fork & frontage road	
MT-19	Connect frontage road from Caudill property to Cain property	FF
SS	Span Space	
SS-01	Ensure thru barrier deck drains on bridge	ABC
SS-02	Place a sleeper slab for the bridge approach	2
SS-03	Use layers of geo-grid at approaches	6
SS-04	Consider precast for culverts	7
SS-05	Some of the culverts have been oversized, exceeding current design requirements, these should be sized to meet the design requirements	DC
EC	Ensure Constructability	
EC-01	Identify or clarify the amount of work that can be open at any one time (Note 2 MOT R159)	w/EC-02
EC-02	Identify a potential disincentive for failure to maintain entrances	4



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County**

Creative Idea List

No.	Description	Score
EC-03	Provide a community outreach incentive to promote positive contractor behaviors	DS
EC-04	At the bridge, complete paving portion prior to installation of wall	DS
EC-05	There is a discrepancy between the MOT and bridge sheets regarding the use temporary barrier on the existing bridge	DC
EC-06	Hold a joint preconstruction public meeting to introduce contractor	DS
EC-07	Eliminate overhang bracket for Phase 1 and 32 - add extra bars	
EC-08	Eliminate overhang bracket by adding/shifting beam line	
EC-09	Utility phasing plans need to be included with other plans for construction phasing	DS
EC-10	Install new culverts offset from the existing culverts	
EC-11	Remove entire 4045+00 culvert in lieu of leaving a portion to tie into	
EC-12	Use frontage road for mainline traffic to allow the contractor to work on both sides, not under traffic	
EC-13	The culvert at 3964 +0764 shows that the phasing approach doesn't work, doesn't line up	w/EC-14
EC-14	Culvert at 3964+0764; there is a note to remove temporary pipe, note not found where it states to install or what size (this needs to be referenced both in the roadway and structures plans, currently only in the roadway plans) - Also see EC-13	DC
EC-15	Septic tank treatment - the plans need to identify if and how many are in the project and add bid item	DC
EC-16	Water well treatment - the plans need to identify if and how many are in the project and add bid item	DC
EC-17	Early completion bonus	1
EC-18	Finalize DBE goal	DC
EC-19	Use concrete in lieu of asphalt to increase competition	
EC-20	Eliminate closure pour	3
EC-21	Revise temporary barrier detail on bridge	DS
M	Miscellaneous	
M-01	Add a painted centerline on the asphalt shared path	DC
M-02	Add a painted "stop ahead" on the asphalt on the shared use path, at intersections	DC
M-03	Add truncated domes at intersections for shared use paths	DC
M-04	Add fence between shared use path and road in front of high school	2
M-05	In-laid pavement markers need a special note. This is listed in general notes and the proposal	DC
M-06	Use lighted/reflective pavement crosswalk markers to improve visibility of crosswalks	DC
M-07	Accommodate pedestrians at the new high school during construction	DC
M-08	Add right-out for high school to mainline	1



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County**

Creative Idea List

No.	Description	Score
M-09	Note 40 on the utility plans should eliminate the Owner telling the Contractor how to sequence work (for all utilities)	DC
M-10	Realign sidewalks to ensure they line up	DC
M-11	Special Note 2E Roadbed Stabilization at bridge ends – The note is included in the proposal but bid items are not included. (Geotextile Fabric Type III, Backfill Undercut, Etc.)	DC



APPENDIX E
Supporting Data



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin 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:

- The design is showing that they are trying to salvage existing pavement as much as possible
- This is a very thorough design
- Didn't see that there was any stipulation on the limitations to how much work the contractor can have open at one time
- There does not appear to be a plan for pedestrian access during construction
- KYTC is relying on the aerial utility work to be done by the utility companies
- Concerned with whether or not the budget as contingency to cover unknown utilities
- Lift station equipment is owner supplied; this could lead to some claim situations with the contractor
- Some asbestos pipes might be underground
- There may be some opportunities to look at median flexibility
- All right-of-way is purchased
- At public access turns on the mainline, there are no right turn lanes to alleviate slowing in the right lane
- There are some concerns with the speed limit step down from 70 mph to 45 mph and whether this has been addressed adequately
- KYTC will be responsible for maintenance of backage and frontage roads



**Value Engineering Study
Kentucky Transportation Cabinet
Mountain Parkway Item No. 10-166.00
Magoffin County**

Standard KYTC VE Report Abbreviations

List of Common Abbreviations

AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ADD	Area Development District
ADT	Average Daily Traffic
CRF	Critical Rate Factor
CSB	Crushed Stone Base
CY	Cubic Yard
DES	Design Executive Summary
DGA	Dense Graded Aggregate
DHV	Design Hour Volume
EA	Each
FHWA	Federal Highway Administration
FT	Foot or Feet
IJS	Interchange Justification Study
KTC	Kentucky Transportation Center
KYTC	Kentucky Transportation Cabinet
LF	Linear Feet
LOS	Level of Service
LS	Lump Sum
MI	Mile
MOU	Memorandum of Understanding
MP	Milepoint
MPO	Metropolitan Planning Organization
MSE	Mechanically Stabilized Earth
NHS	National Highway System
PD	Project Development
PDP	Project Delivery and Preservation
PL&G	Preliminary Line and Grade
RCBC	Reinforced Concrete Box Culvert
ROW	Right-of-Way
SYP	Six Year Plan
TRB	Transportation Research Board
V/C	Volume to Capacity Ratio
VE	Value Engineering
VPH	Vehicles per Hour