Mountain Parkway Extension (KY 9009)/ US 460/KY 114 Programming Study

Wolfe, Morgan, Magoffin, and Floyd Counties

FINAL REPORT
September 2010

Kentucky UNBRIDLED SPIRIT

KENTUCKY TRANSPORTATION CABINET

ENGINEERS PLANNERS ECONOMISTS
WilburSmith ASSOCIATES

MOUNTAIN PARKWAY EXTENSION (KY 9009)/US 460/KY 114 PROGRAMMING STUDY

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I. INTRODUCTION

A. Purpose of Study

The Kentucky Transportation Cabinet (KYTC) has undertaken this programming study for the widening of the Mountain Parkway Extension (KY 9009), US 460, and KY 114 to four lanes from near the KY 15 interchange at Campton in Wolfe County to near KY 404 west of Prestonsburg in Floyd County.

The primary purpose of this study is to:

- Compile the findings from previous studies, plans, and environmental documents;
- Evaluate previously proposed projects;
- Identify new projects;
- Evaluate practical solutions;
- Update or create cost estimates for all projects and potential cost savings for practical solutions; and
- Combine all of this information into a single document.

This study is not intended to make recommendations, but to provide adequate information for KYTC to make an informed decision about how best to move forward with the widening of the Mountain Parkway Extension (KY 9009), US 460, and KY 114.

This study also explores options for financing proposed projects, including tolling.

B. Previous Studies

The following studies have been developed by the KYTC for the Mountain Parkway Extension/US 460/KY 114 Corridor. These documents were utilized for the completion of this programming study.

- *Interchange Feasibility Study, Bert T. Combs Mountain Parkway, I-64 to US 460*, Kentucky Transportation Cabinet Division of Planning, April 1994
- *Interchange Feasibility Study, Bert T. Combs Mountain Parkway, I-64 to US 460 Phase II*, Kentucky Transportation Cabinet Division of Transportation Planning, June 1995
- *Advance Planning Study: Mountain Parkway, US 460 & KY 114 – Campton to Prestonsburg – Wolfe, Morgan, Magoffin, & Floyd Counties, Corridor ID 16,* prepared for Kentucky Transportation Cabinet Division of Transportation Planning by Wilbur Smith Associates, August 1998
- *Mountain Parkway Extension Study – KY 9009, Campton to Salyersville – Wolfe-Morgan-Magoffin Counties, Item Number 10-126.00*, prepared for Kentucky Transportation Cabinet Division of Design by Balke Engineers, September 1998

These documents can be found on the enclosed DVD entitled “Previous Studies”.

Design plans and environmental documents have also been completed for various Corridor Segments and are discussed in those Corridor Segment chapters.

C. Corridor Segments

For the purpose of this study, the Mountain Parkway Extension (KY 9009)/US 460/KY 114 Corridor is divided into the following “Corridor Segments” that are considered as Sections of Independent Utility (SIUs). The Corridor Segments are displayed on **Figure 1** in **Appendix A.**

- Segment 1A (Campton Safety Project currently under construction)
  - KY 9009, MP 42.4 - MP 45.8, Wolfe County
- Segment 1B (Campton to Helechawa)
  - KY 9009, MP 45.8 - MP 56.6, Wolfe County
- Segment 2A (Helechawa to Salyersville)
  - KY 9009, MP 56.6 - MP 57.7, Wolfe County
  - KY 9009, MP 57.7 - MP 63.1, Morgan County
  - KY 9009, MP 63.1 - MP 73.6, Magoffin County
- Segment 2B (Salyersville)
  - KY 9009, MP 73.6 - MP 75.6, Magoffin
  - US 460, MP 12.5 - MP 14.6, Magoffin County
  - KY 114, MP 0.0 - MP 0.3, Magoffin County
- Segment 3 (Salyersville to KY 404 near Prestonsburg)
  - KY 114, MP 0.3 - MP 5.0, Magoffin County
  - KY 114, MP 0.0 - MP 9.4, Floyd County

D. Report Organization

Each Corridor Segment has a unique project development history and requires a different level of effort within this study and in future phases of project development. This programming study report addresses each Corridor Segment in a separate chapter, as follows:

- **Chapter II** – Corridor Segment 1A (Campton Safety Project currently under construction)
- **Chapter III** – Corridor Segment 1B (Campton to Helechawa)
- **Chapter IV** – Corridor Segment 2A (Helechawa to Salyersville)
- **Chapter V** – Corridor Segment 2B (Salyersville)
- **Chapter VI** – Corridor Segment 3 (Salyersville to KY 404 near Prestonsburg)

Chapter VII provides a summary of key findings for each Corridor Segment. The final chapter, **Chapter VIII**, addresses options for financing proposed projects.

E. Purpose and Need

The respective Purpose and Need statements for each Corridor Segment are presented in Chapters II through VI. The proposed improvements for each Corridor Segment stand alone as Sections of Independent Utility; however, when combined, they also meet a greater regional need. The Purpose and Need for the proposed improvement of the overall Mountain Parkway Extension/US 460/KY 114 Corridor is discussed in this section.

Appalachian Regional Commission

In 1964, an Appalachian Regional Commission (ARC), appointed by the President of the United States, reported that the Appalachian Region had not experienced significant economic development largely because these regions had remained isolated due to inadequate roads. The Interstate System had passed by most of the region, and better roads had not been built in the region because of the rough terrain and associated high costs of construction that were hard to justify due to the relatively low populations served.

The ARC was eventually established as a permanent body by Congress by the 1965 Appalachian Development Act, which also established the Appalachian Development Highway System (ADHS). The ADHS was intended to provide regional access and connectivity to help stimulate economic development for the Appalachian Region. The need for the ADHS, then,

was based on poor regional access because of inadequate highway connectivity, mobility, and safety due to deficiencies in roadway geometrics and systems connectivity, particularly connectivity to the Interstate System.

The Mountain Parkway (KY 9000), Mountain Parkway Extension (KY 9009), US 460, and KY 114 are all part of the ADHS. The Mountain Parkway is part of Appalachian Corridor I, and the Mountain Parkway Extension, US 460 at Salyersville, and KY 114 are designated as Appalachian Corridor R. Hence, the overall purpose for improvements to those routes is tied to the goals of the ADHS.

Preliminary Purpose and Need Statement

Improvements to the Mountain Parkway Extension, US 460, and KY 114 will help improve highway access, connectivity, mobility, and safety from I-64 to other Appalachian Corridors, including Appalachian Corridors I (KY 15), B (US 23), F (US 25E/US 119), G (US 119), and Q (US 460), as well as the many communities and rural areas of this depressed region in Southeastern Kentucky.

The need for the improvement is based on the following characteristics and deficiencies, which are discussed in more detail for each Corridor Segment in Chapters II through VI.

- The presence of highway deficiencies, including:
  - Substandard roadway geometry
  - Functionally obsolete bridge structures
  - Maneuverability and passing limitations
- An estimated increase in future traffic and truck traffic volumes
- The presence of high crash locations
- High unemployment and poverty rates in Eastern Kentucky

II. CORRIDOR SEGMENT 1A (CAMPTON)

A. Project Location

Corridor Segment 1A lies along the Mountain Parkway Extension (KY 9009) from just west of the KY 15 interchange in Campton (milepoint 42.4) to just west of the KY 191 interchange (milepoint 45.8) in Wolfe County, Kentucky (a distance of 3.4 miles). The Corridor Segments defined for this study are displayed on **Figure 1** in **Appendix A**.

B. Project History

A design-build project is currently underway to address two KYTC projects in the vicinity of the Campton exit, first, to improve the KY 15 interchange at Campton (Exit 43) and, second, to widen a portion of KY 9009 just east of the exit. These projects are designated as KYTC Item No. 10-139.00 and Item No. 10-8503.00, respectively.

C. Purpose and Need

The purpose of this project was documented in the Clean Water Act, Section 404 permit application as follows:

The purpose of the project is to begin fulfilling the long range plan of widening the Mountain Parkway from KY 15S to Prestonsburg. The project will also:

- Facilitate safe and efficient movement of people and goods along this section of the Parkway by:
  - Providing an eastbound ramp from KY 15S onto the eastbound Mountain Parkway;
  - Separating opposing traffic with a median barrier;
  - Providing a safer movement for the westbound ramp from KY 15S to westbound Mountain Parkway, and
  - Widening the parkway to provide capacity for the future roadway system.
- Correct the structural deficiencies of the Swift Camp Creek Bridge which will require a road closure to reconstruct the bridge without the widening project.
- Provide additional stormwater runoff protection for the City of Campton water supply.

D. Environmental Clearance

Corridor Segment 1A is a state funded project. Environmental clearance was received based on an Environmental Overview approved October 11, 2007. A complete environmental assessment was not undertaken for this project.

E. Analysis/Findings

Corridor Segment 1A is the first portion of the Mountain Parkway Extension corridor to be improved. It is presented for informational purposes only in this programming study report in order to provide complete documentation for the study corridor. No independent analysis or additional work was undertaken for this segment as part of this study.

Upon completion, the design-build project underway at Campton is estimated to cost $46 million dollars for design, right-of-way, utility relocation, and construction.

III. CORRIDOR SEGMENT 1B (CAMPTON TO HELECHAWA)

A. Project Location

Corridor Segment 1B is the portion of the Mountain Parkway Extension (KY 9009) from just west of the KY 191 interchange (milepoint 45.8) in Campton to just west of the KY 205 interchange in Helechawa (milepoint 56.6), in Wolfe County, Kentucky (a distance of 10.8 miles). Corridor Segments are displayed on **Figure 1** in **Appendix A**.

B. Project History

This Corridor Segment was examined in some of the previous studies mentioned in **Section D** of **Chapter I** and located on the enclosed DVD entitled "Previous Studies." No preliminary design work has been completed for improvements or widening of any portion of Corridor Segment 1B. "Planning level" improvements were proposed along this Corridor Segment as part of the *Mountain Parkway Extension Study – KY 9009, Campton to Salyersville – Wolfe-Morgan-Magoffin Counties, Item Number 10-126.00*, prepared for the Kentucky Transportation Cabinet, Division of Design, by Balke Engineers, September 1998.

NOTE: The scope of this study sought to avoid duplication of any previous work. Where possible, the information and results from previous documents are presented. These were done at different times and with different levels of effort and/or assumptions used for analyses. Therefore, the level of detail may vary, and there may be differences and/or inconsistencies in the information presented, such as traffic forecasts and crash data, between the different segments discussed in this report. Attempts have been made to update or clarify information and/or enhance the preliminary purpose and need statements, when deemed practical and feasible, in this current study.

C. Existing Conditions

Geometric Characteristics

Corridor Segment 1B of the Mountain Parkway Extension is a two-lane fully controlled access facility consisting of 12 foot lanes and 10 foot paved shoulders. The posted speed limit is 55 mph. There are passing lanes in some areas with severe vertical grades for the direction of traffic climbing the uphill grade.

The *Mountain Parkway Extension Study*, completed in 1998, concluded that 8 of the 16 horizontal curves (50 percent) on the existing Mountain Parkway in Segment 1B fail to meet current standards for a 60 mph design speed. Furthermore, the study determined that all 16 horizontal curves in the project corridor fail to meet the current minimum superelevation rate, and 21 other roadway segments between Campton and Salyersville have grade deficiencies which limit sight distances to below current standards (specific locations not identified in the study report). In addition, Interchange Feasibility Studies completed by KYTC in 1994 and 1995 concluded that two interchanges in Corridor Segment 1B (the KY 191 interchange at Exit 46 and the KY 1010 interchange at Exit 53) required modification to meet existing traffic demand and design standards and to function with a four-lane, divided highway.

These studies also found that one new interchange is warranted to provide better local access to the Mountain Parkway at KY 1419 (milepoint 55.4).

The *Mountain Parkway Extension Study* documented seven (7) bridge structures on the existing Mountain Parkway in Corridor Segment 1B. None were found to be structurally deficient, but three of these structures were found to be functionally obsolete. All seven were recommended for replacement.

The structures along the study corridor are nearing their design life expectancy and do not meet current standards for a four-lane facility.

Existing Traffic Volumes and Level of Service (Year 2009)

According to KYTC traffic count data, traffic volumes along Corridor Segment 1B range from 3,790 vehicles per day (vpd) to 4,380 vpd, as shown in **Figure 1** in **Appendix A**.

Level of Service (LOS) is a qualitative measure of highway traffic conditions, as defined in the 2000 Highway Capacity Manual (HCM), published by the Transportation Research Board (TRB). Individual levels of service characterize these conditions in terms of speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined and given letter designations from A to F, with LOS A as the best condition, representing free flow conditions and with LOS F representing severe congestion and/or time delays. Typically, a minimum of LOS D is considered acceptable in urban areas and LOS C is considered acceptable in rural areas.

Several inputs are required to determine LOS, including highway class, terrain, hourly volume, truck percentage, directional distribution, number of lanes, lane width, shoulders, percent no-passing, number of access points, and speed. Of these factors, highway class, hourly volume, and percent no-passing had the greatest impact on LOS for this Corridor Segment. LOS was calculated as part of this programming study using the most current KYTC traffic count data.

In Corridor Segment 1B, LOS ranges from B to C along the two-lane sections with no truck climbing lanes. Truck lanes are present at some locations along the corridor. The presence of truck climbing lanes generally improves LOS one letter grade.

Estimated No-Build Future Traffic and Level of Service (Year 2030)

No-Build future traffic was estimated as part of this programming study using historic traffic volumes, previous traffic forecasts for the corridor, and Kentucky Statewide Model results. No significant changes to the roadway were assumed. A modest growth rate of one percent compounded annually was used and is a balance between previous forecasts and model results for this study.

No-Build future traffic volumes are estimated to range from 4,600 vpd to 5,900 vpd. The increase in traffic is expected to have minimum impact on LOS in Corridor Segment 1B. LOS will remain B to C in 2030.

Estimated Future Traffic with Improvement (Year 2030)

Future traffic was estimated for this Corridor Segment, assuming a four-lane widening, using the Kentucky Statewide Travel Demand Model to estimate trip generation, attraction, and diversion. Future daily traffic volumes are estimated to range from 5,200 vpd to 6,000 vpd.

Crash Analysis

Crash analysis is done using a methodology developed by the Kentucky Transportation Center (KTC) which locates roadway "segments" based on traffic volumes and geometric characteristics to identify crash concentrations. It also determines the location of 0.1-mile "spots" which demonstrate high crash frequencies. Each segment or spot is assigned a critical rate factor (CRF) based on formulas published by the KTC.

The CRF is one measure of the safety of a road. It compares the crash rate on the road under study to the average crash rate for other roads of the same functional classification throughout the state. If the CRF is 1.00 or greater, it is assumed that crashes are happening due to circumstances that cannot be attributed to random occurrence. In such cases, the spot or segment should be studied in more detail to ascertain if there are remedial actions that could be taken to improve the overall safety of the facility.

Two locations were identified in the September 1998 *Mountain Parkway Extension Study* at the KY 205 and KY 30 interchanges. To update the crash analysis on the Mountain Parkway Extension for this current study, historic vehicle crash records were acquired from the Kentucky State Police-maintained Collision Analysis database for reported incidents occurring between January 1, 2004 and October 12, 2009. The results of this updated crash analysis are discussed in the following sections.

Reported Crashes

During the 5-year, 9-month analysis period, 11 crashes were reported along Corridor Segment 1B. Of these 11 crashes, three (3) resulted in injuries and eight (8) were non-injury crashes. The majority of crashes in this segment were single vehicle collisions; four (4) crashes involved a collision with an animal; and three (3) involved collisions with objects along the roadway.

Throughout the study, concerns were raised by the project team about frequent collisions with wildlife and the need to address this problem in future phases of project development. Crash data should be monitored in the future to determine if collisions with animals are a recurring problem in certain locations.

Crash Segments and Spots

Analysts divided this portion of the project into KTC-defined crash segments; dividing segments for analysis where the traffic volume or geometric characteristics (e.g., number of lanes) change. For Segment 1B, two segments were identified for analysis. These segments join at the KY 1010 underpass. **Table III-1** summarizes the results for both segments, with each well below the Critical Rate Factor of 1.00 (i.e., there were no "high crash segments" in Corridor Segment 1B for the most recent study period).

Table III-1 – Crash Segments

Route	Location		Length	ADT	Crashes				Critical Rate Factor (CRF)
	Begin MP	End MP			Fatal	Injury	Property Damage Only	Total	
KY 9009	46.223	53.284	7.061	3,790	0	1	6	7	**0.05**
KY 9009	53.284	56.600	3.316	4,380	0	2	2	4	**0.04**

Crash spots are defined where numerous crashes occur within close proximity. By definition, spots are 0.1-mile in length. No high crash spots were identified in Corridor Segment 1B. Since no high crash locations were identified in the current study, it is assumed that the crashes occurred randomly and were probably not due to any roadway deficiencies. Therefore, no further analysis was made of roadway geometrics or conditions.

D. Purpose and Need

The preliminary purpose and need for improvements to Corridor Segment 1B has been derived from the 1998 *Mountain Parkway Extension Study* and supplemented by the results of previous studies and this programming study.

Purpose

As documented in the September 1998 *Mountain Parkway Extension Study* developed by Balke Engineers, the purpose is to address roadway deficiencies and the future effects of a projected substantial increase in traffic volumes by:

- Eliminating substandard horizontal and vertical curves;
- Physically separating opposing traffic;
- Eliminating no-passing zones; and
- Providing additional roadway capacity.

Since the Mountain Parkway Extension is part of the KYTC State Primary System and the Appalachian Development Highway System, the project should also support and satisfy KYTC strategic goals and plans, as well as ARC goals, to:

- Take care of the existing transportation system and make it work better.
- Increase capacity and safety.
- Create opportunities for future economic growth and competitiveness by the following:
  - Address lack of sufficient transportation infrastructure and major highway system linkage in the economically disadvantaged East Kentucky region.
  - Improve the routes that make up the Ashland to London Corridor.
- Support the overall quality of life in Kentucky by the following:
  - Improve access to jobs and services for residents of Eastern Kentucky.
  - Improve the movement of goods and materials into and out of this portion of Eastern Kentucky.

Need

The need for the proposed project is based on the following characteristics and deficiencies, as documented in the 1998 *Mountain Parkway Extension Study* for Segment 1B of the Mountain Parkway Extension between Campton and Helechawa, and as supplemented by data collection, research, and analysis undertaken as part of the current study:

- The presence of highway deficiencies, including:
  - Substandard roadway geometry
  - Functionally obsolete bridge structures
  - Maneuverability/passing limitations
- An estimated increase in future traffic, as follows:
  - An approximately 74% increase was projected for the design year in the September 1998 Mountain Parkway Extension Study developed by Balke Engineers: 3,600-4,600 in 1997 vs. 6,260-8,020 in 2025.

- Revised forecasts in this study estimate an approximately 21% to 35% increase between 2009 and 2030: 3,790-4,380 vpd in 2009 vs. 4,600-5,900 vpd for the no-build alternative in 2030.

- An estimated increase in future truck traffic volumes, as follows:
  - The daily truck volume would increase from a range of 500-640 in 1997 to 870-1,120 in 2025, based on 14% trucks, as assumed in the 1998 *Mountain Parkway Extension Study*.
  - Based on 2009 KYTC traffic data, trucks comprised approximately 17% of the ADT on this Corridor Segment when this study began. According to Statewide Model assumptions by the KYTC, this is expected to increase to approximately 24% by 2030. Therefore, the daily truck volume would increase from a range of 645 to 745 in 2009 to about 1,100 to 1,400 trucks per day in 2030
- Declining levels of service, as follows:
  - A level of service analysis for the 1998 *Mountain Parkway Extension Study* indicated that the LOS in 1998 ranged from LOS C to LOS D, and that this would decline to LOS D to F in 2025.
  - An updated LOS analysis for the current study indicates a less dramatic decrease, with a LOS B to C along various portions of the Corridor Segment in 2009 versus an overall LOS C in 2030.
- The presence of high crash locations, as follows:
  - Two locations were identified in the September 1998 *Mountain Parkway Extension Study* at the KY 205 and KY 30 interchanges.
  - However, no high crash segments or spots were identified on KY 9009 during the study period (January 1, 2004 to October 12, 2009) of the updated crash analysis for this programming study.
- High unemployment and poverty rates in Eastern Kentucky.

E. Environmental Overview

No environmental work had been completed for potential improvement/widening of Corridor Segment 1B prior to this programming study. As part of the Programming Study, environmental data for this segment was collected from existing databases and field-verified. Environmental features are shown on **Figure III-1**. The following sections summarize the findings.

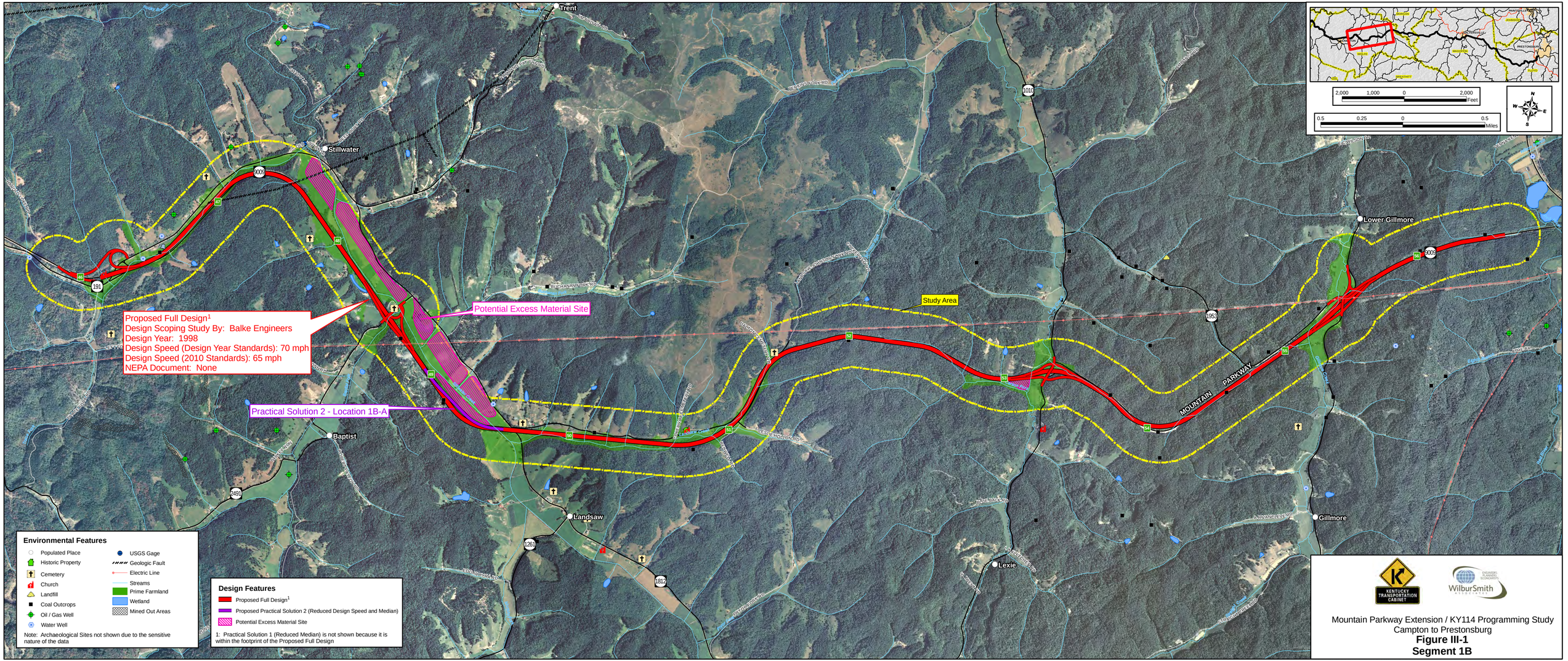
Natural and Manmade Water Features

Natural and manmade water features considered as part of this analysis are divided into five (5) categories: water resources, surface water, lakes/ponds, wetlands, and floodplains.

Water Resources

A limited number of manmade water resources (infrastructure) are located within the study area. A summary is provided below:

- There are three (3) known water wells in the study area. The three wells are primarily used for domestic purposes.
- There are no water tanks associated with the pipelines found in the study area.
- There are 6.6 miles of water pipelines associated with residential and commercial sites in the study area. These pipelines are owned and maintained by the Campton Water Plant. The material used for all of these pipelines is polyvinyl chloride (PVC).


Trent
Stillwater
Baptist
Landsaw
Lexie
Gillmore
Lower Gillmore
MOUNTAIN PARKWAY
Study Area
Potential Excess Material Site
Practical Solution 2 - Location 1B-A
Proposed Full Design[1]
Design Scoping Study By: Balke Engineers
Design Year: 1998
Design Speed (Design Year Standards): 70 mph
Design Speed (2010 Standards): 65 mph
NEPA Document: None
2,000 1,000 0 2,000 Feet
0.5 0.25 0 0.5 Miles
N
W
E
S
Environmental Features
Populated Place
Historic Property
Cemetery
Church
Landfill
Coal Outcrops
Oil / Gas Well
Water Well
USGS Gage
Geologic Fault
Electric Line
Streams
Prime Farmland
Wetland
Mined Out Areas
Note: Archaeological Sites not shown due to the sensitive nature of the data
Design Features
Proposed Full Design[1]
Proposed Practical Solution 2 (Reduced Design Speed and Median)
Potential Excess Material Site
1: Practical Solution 1 (Reduced Median) is not shown because it is within the footprint of the Proposed Full Design
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Campton to Prestonsburg
Figure III-1
Segment 1B

Surface Water

The entire study area is located within the watershed of the Red River. The Red River eventually drains into the Kentucky River where Clark, Estill, and Madison counties converge approximately 87 nautical miles from the study area. The Red River does not enter the study area, but it runs along the Morgan-Wolfe County Line and is as close as 125 feet to the community of Helechawa in Wolfe County at the easternmost study boundary.

Numerous perennial streams are present in the study area, although none are large enough to be classified as rivers. Perennial streams are streams that maintain a constant flow of water during periods of normal rainfall.

The study area has numerous unnamed smaller streams that are intermittent (i.e., do not constantly carry water). Long periods without significant rainfalls diminish the influence of groundwater to these channels. There are a total of 17.2 miles of perennial and intermittent streams found within the study area. The three largest streams are Stillwater Creek, Lacy Creek, and Gillmore Creek:

- Stillwater Creek flows for 12.0 miles in its entirety and 2.2 miles in the study area.
- Lacy Creek flows for 7.3 miles in its entirety and 0.5 miles in the study area.
- Gillmore Creek flows for 7.2 miles in its entirety and 1.0 mile in the study area.

Other notable streams include, but are not limited to Baptist Fork, Carson Creek, and Landsaw Creek. Ephemeral streams are also evident throughout the study area. These small stream channels only have flowing waters during and shortly after a significant rainfall or snowmelt.

There are no Wild and Scenic Rivers, no Coldwater Habitat streams, and no streams considered to be Exceptional Waters within the study area.

Lakes/ Ponds

Aerial photography, the United States Geological Survey (USGS) topographic maps, and an on-site assessment confirm that a number of ponds are present within and surrounding the study area. Many of the ponds are manmade and are associated with farming practices within the area. Data from the National Hydrology Dataset (NHD), a data collection of inland waters for the United States, also reveals the presence of ponds. This data does not show any lakes, reservoirs, or impounded rivers.

Wetlands

Data obtained from the National Wetlands Inventory (NWI) and the United States Fish & Wildlife Service (USFWS) locate four (4) wetland areas within the study area totaling 1.6 acres. The NWI database lists wetlands in three major categories: Palustrine, Riverine and Lacustrine classification.

Palustrine wetlands are systems that commonly include all non-tidal wetlands dominated by trees, shrubs, emergents, mosses and lichens while possessing salinity values of less than 0.5 parts per thousand (ppt). Such wetland areas are generally less than twenty (20) acres in size, exhibit a shoreline that is not wave-formed or bedrock laden, and have a low water depth of less than two (2) meters (6.6 feet) at its deepest point.

- Riverine wetlands are associated with free-flowing bodies of water such as unimpounded rivers and streams not dominated by vegetation. Typical Riverine communities include sand bars, mud flats, and gravel/cobble bars.
- Lacustrine wetlands associated with open water bodies such as lakes, reservoirs, and impounded rivers.

Of the four (4) wetlands in the study area, all are classified as Palustrine and all four are also classified by the acronym PUBHh, which indicates the following characteristics:

- (P) Palustrine;
- (UB) Unconsolidated Bottom;
- (H) Permanently Flooded; and
- (h) Diked/Impounded.

In this part of Kentucky, this classification is typically for small ponds that are primarily used as a water supply for livestock, but it can also be used for recreational activities, such as fishing and swimming.

The NWI data is over 30 years old; therefore, it is possible (and aerial photography and field reconnaissance indicate) that several farm ponds have been built since the creation of this data and are not identified in this environmental summary.

A more detailed delineation of any unmapped wetlands as well as the ones previously mapped will be required once improvement alternatives are developed in the next phase of project development.

Floodplains

The Federal Emergency Management Agency (FEMA) Q-3 digital data for Kentucky floodplains are digital datasets that are available on a county-by-county basis. "Zone A" flood zones are areas inundated by 100-year flooding. "Zone X" flood zones are areas inundated by a 500-year flooding; 100-year flood, with average depths of less than one (1) foot or with drainage areas less than one (1) square mile; and areas protected by levees from 100-year flood. The area of Wolfe County that Corridor Segment 1B is located in has not been mapped by FEMA and, therefore, no classified "Zone A" floodplains or "Zone X" floodplains are known to exist within the study area.

Biotic Communities

The Kentucky State Nature Preserves Commission (KSNPC) monitors a number of species in Wolfe County. Several of these have been determined, under the Endangered Species Act of 1973 and the Kentucky Rare Plant Recognition Act, as being threatened or endangered. KSNPC data for the study area is discussed in the following subsections.

Floral Communities

According to data requested from the KSNPC, there are no known instances of threatened or endangered floral species occurring within a one-mile buffer. However, located within a five mile buffer is the White-Haired Goldenrod (*Solidago albopilosa*), which is federally threatened and KSNPC threatened. This plant occurs in sandstone rockhouses and ledges along clifflines and is known only to exist in the Red River Gorge area of Kentucky.

Faunal Communities

According to the KSNPC, within a one-mile buffer of the study area, there is one occurrence of a faunal threatened or endangered specie. The Northern Brook Lamprey (*Ichthyomyzon fossor*, KSNPC-threatened) requires a habitat of small to medium-size upland streams where adults of the species live in sand-gravel bottoms of clean riffles and raceways (Burr and Warren 1986, Page and Burr 1991). They require a habitat of mixed sand, silt, and debris in quiet water.

Within a five-mile buffer, there are two records showing the existence of threatened or endangered species. One is the American Brook Lamprey (*Lampetra appendix*) which is found in raceways, riffles, and flowing margins of permanently flowing streams and rivers with gravel, sand and sediment bottoms (Burr and Warren 1986). The other is the Elktoe Mussell (*Alasmidonta marginata*, KSNPC threatened and a federal species of management concern) which requires a habitat in the gravel, rock, and sandy areas of permanently flowing medium-sized or small streams.

The KSNPC provided threatened or endangered data for mammals and birds that occur within a 10-mile buffer. The mammals include Rafinesque's big-eared bat (*Corynorhinus rafinesquii*, federal species of management concern and KSNPC special concern), Virginia big-eared bat (*Corynorhinus townsendii virginianus*, federally listed endangered and KSNPC endangered), Gray myotis (*Myotis grisescens*, federally listed endangered and KSNPC threatened), Eastern small-footed myotis (*Myotis leibii*, federal species of management concern and KSNPC threatened), and Indiana myotis (*Myotis sodalis*, federally listed endangered and KSNPC endangered).

Threatened or endangered birds within in the 10-mile buffer include the Sharp-shinned Hawk (Accipiter striatus, KSNPC special concern) which can be found in a variety of habitats from semi-open farmland to woodland openings and borders. This species typically nests in areas of extensive forest, especially areas with some evergreen trees. Henslow's Sparrow (*Ammodramus henslowii*, KSNPC special concern and federal species of management concern) is associated with fallow hayfields, ungrazed pastures with scattered small trees, and tall weeds, grassland, and brushland.

Social, Economic and Environmental Justice Concerns

Social and Economic Locations

There is one church located in the study area. The Landsaw Church located on KY 3033 is listed as a historic site with the Kentucky Heritage Council (see Historic and Archaeological Sites subsection).

Family cemeteries in this part of Kentucky are very common. Five (5) cemeteries were identified within the study area and are described below from west to east:

- One is located just off KY 191, 0.75 miles east of Exit 46 on the Mountain Parkway;
- Another cemetery is located near the end of Mountain Parkway Service Road #1;
- The Centers-Rose Cemetery is located near the KY 2491 underpass of the Mountain Parkway. Of the five (5) cemeteries in the study area, this one has the closest proximity to the existing Mountain Parkway;
- Another cemetery is located near the intersection of KY 3033 and KY 1812; and
- There is a cemetery near the intersection of KY 3033 and Dalton Cemetery Road.

There are no schools within the study area of this Corridor Segment.

Environmental Justice

A 1994 Executive Order directed each Federal agency to make Environmental Justice (EJ) part of its mission. For transportation projects, there are three fundamental EJ principles: (1) avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations; (2) ensure the full and fair participation by all potentially affected communities in the transportation decision-making process; and (3) prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

The Kentucky River Area Development District (KRADD) completed an Environmental Justice and Community Impacts Report for the study corridor. The full report is shown in Appendix B. KRADD conducted an extensive review of data obtained for Wolfe County from the U.S. Census Bureau for income, race and age. KRADD then held discussions with local officials and completed field reconnaissance.

KRADD concluded that, while a small minority population concentration was identified within the study area, a disproportionate effect on minority population is not expected. KRADD also concluded that disproportionate impacts to persons over the age of 65 are not anticipated.

High concentrations of persons who live below the poverty level and have disabilities are reported in the study area and Wolfe County. The percentage is considerably higher than the state and national average. Discussions with local officials and a field review led to the conclusion that no concentration of individuals below the poverty level or persons with disabilities would likely be disproportionately affected by this project.

EJ populations should be further investigated in subsequent phases of this project to identify and document any demographic and/or socioeconomic changes that may have occurred in the project area.

Historic and Archaeological Sites

Data requests from the Kentucky Heritage Council (KHC) and the Office of State Archaeology (OSA), revealed the presence of one historic property and three (3) archaeological sites within the study area. These two state agencies maintain and update inventories of historic structures and archaeological sites and nominate properties to the National Register of Historic Places.

Historic Sites

Within the study area there is one historic property listed with the Kentucky Heritage Council (KHC). The site is known as the Landsaw Church which has a site identification code of WO22. The church's status as being eligible for the National Register of Historic Places is currently undetermined. No Historic Districts are present within the study area.

Archaeological Sites

There are three (3) archaeological sites officially recorded within the study area. Evidence of Native American habitation was found at two (2) of these sites while the remaining site is

listed as a historic farm. Locations of the archaeological sites are not shown in this overview due to the sensitive nature of the data.

Following is a description of each site:

- Site 15Wo147 is listed as a site of Native American open habitation without burial mounds. Over the years, the site has been disturbed by agricultural cultivation, but it is unknown exactly how much. It is currently an open field still being used for agriculture practices. During the time of Native American habitation, the site was forested. It is considered an inventory site and does not presently meet National Register criteria.
- Site 15Wo148 is also listed as a site of Native American open habitation without burial mounds. This site has also been disturbed by years of agricultural cultivation, and it is unknown exactly how much. It, too, is currently an open field being used for agriculture. It is considered an inventory site and does not presently meet National Register criteria.
- Site 15Wo149 is listed as a historic farm and residence. As with the two archaeological sites listed above, the site has been disturbed by current agricultural practices. The site's National Register status has not been assessed.

Prime and Unique Farmlands

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when acceptable farming methods and proper management, including water management, are applied.

Data acquired from the Soil Survey Geographic (SSURGO) Data Base is soil mapping data provided by the US Department of Agriculture, Natural Resources Conservation Service (NRCS). This database revealed that there are 593.1 acres of farmland within the study area that would be considered "prime" due to soil conditions, representing approximately 22.1% of the 2,686 acres in the study area. Of this total, 505 acres (18.8%) are considered prime if drained and protected from flooding or not frequently flooded. These areas are primarily along streams or on nearby terraces.

The soil type that comprises the largest acreage is type ShF (Shelocta-Gilpin Complex), which covers 1,456 acres (54%) of the total acreage in the study area. This soil type is found on steep slopes of 25% to 65%, usually forested, and not considered "prime."

Monitored Sites

The Environmental Protection Agency (EPA) monitors and regulates facilities that release, create, or maintain hazardous pollutants that could have an environmentally damaging effect on land, water, and air. Monitoring and regulation ensures proper management of potential hazards to human health or the environment. A review of the databases and data source information revealed no monitored sites within the study area.

Further review revealed no presence of monitored underground storage tanks (UST). This includes a tank and any underground piping connected to the tank that has at least 10 percent of its combined volume of petroleum or other hazardous substances underground. It is possible

that there are some USTs being used for farming purposes that are undocumented and are not being monitored.

Additional Concerns

Data based on the *Geologic Map of Kentucky* compiled by the Kentucky Geologic Survey revealed that a geologic fault line 0.75 miles in length exists in the study area. This fault is located near the community of Stillwater in Wolfe County, which lies about three miles east of Campton.

Coal outcrops exist throughout the study area. These outcrops are normally thin seams of coal and are not conducive or profitable for large scale mining.

An overhead electric transmission line crosses the study area at three locations. In the western end of the study area, it crosses near the intersection of KY 1812 and Buchanan Fork Road. In the central section, it crosses near where KY 3033 and Landsaw-Johnson Fork Road merge. In the eastern end, it crosses near the intersection of KY 1953 and KY 1419.

Data from the Kentucky Division of Oil and Gas Conservation showed one oil well with a depth of 1243 feet. It is located on a hillside just off KY 191, 0.5 miles from Exit 46 on the Mountain Parkway. The permitted date on this well was November of 1981. It is listed in the database as dry and abandoned.

F. Geotechnical Overview

No geotechnical analysis had been completed for potential improvements or widening within Corridor Segment 1B prior to this programming study. Therefore, a geotechnical overview was completed for Corridor Segment 1B as part of this programming study. The full report can be found in **Appendix C** and is summarized below.

The most significant geotechnical challenges identified are as follows:

- Slope stability: Stability of major cuts into hillsides would require close scrutiny before and during construction to minimize risk of failure due to groundwater seepage, unfavorably jointed bedrock, and layers of weak materials.
- Unidentified coal mines: While not anticipated, there is some unquantifiable risk of new alignments intersecting undocumented mine activity in the study area.
- Water, oil and gas wells: Avoidance of routes that would pass in close proximity to water, oil, and/or gas wells is strongly recommended.

The depth to bedrock will be relatively shallow in the area, except at roadway embankment fills. Deeper cuts will extend into bedrock and may require potentially mixed face (i.e., soil/rock) slope designs and/or special consideration for mitigating localized weathered rock.

Where shale is more prevalent, ripping by larger equipment may be feasible. We anticipate that areas comprised mostly of limestone will require blasting to allow efficient excavation.

It appears that likely alternatives for new additional travel lanes will involve construction of structures over stream crossings. While construction of these structures may be adversely impacted by shallow groundwater or weak bearing soils, the long-term impact of corrosion should also be considered.

Concerns over corrosion can likely be mitigated by a complete geotechnical exploration and incorporating corrosion resistance measures into the design of structures.

When considering alternatives, the relocation of the roadway centerline to minimize cut slopes will be preferred. Minimizing the Mountain Parkway Extension's median width will also tend to limit excavation volume and high cuts.

While cut slopes in competent bedrock is generally anticipated to be adequate at 0.5H:1V with periodic benches, it should be remembered that other issues may impact the final construction cost, including rockfall protection barriers (or flattened slopes to ensure rockfall mitigation) and locally flatter slopes where weathered rock zones or adversely dipping discontinuities are found.

G. Analysis/Findings

This portion of the report provides a summary of proposed Mountain Parkway Extension projects in Corridor Segment 1B; potential practical solution options; cost estimates by phase; proposed construction sections; and priority sections for programming. Also included are proposed locations for consideration as waste areas and proposed locations for bifurcated sections and their potential cost savings.

Proposed Projects

Table III-2 outlines the design assumptions for three design options evaluated for this Corridor Segment, as follows:

- Full Design
- Reduced Median (Practical Solution 1)
- Reduced Design Speed and Reduced Median (Practical Solution 2)

Table III-2 – Design Assumptions

	Segment 1B		
	Mountain Parkway (Campton to Helechawa)		
	Full Design	Practical Design 1	Practical Design 2
	KYTC 1998 Design	Reduced Median	Reduced Design Speed & Median
Design Controls			
Classification	Rural Parkway	Rural Parkway	Rural Parkway
Terrain	Mountainous	Mountainous	Mountainous
Design Speed (Design Year Standards)	70 mph	70 mph	60 mph
Design Speed (2010 Standards)	65 mph	65 mph	60 mph
Access Control	Full Control	Full Control	Full Control
ADT (Existing 2009)	3,790 vpd to 4,380 vpd		
ADT (Future No-Build 2030)	4,600 vpd to 5,900 vpd		
ADT (Future With Improvement 2030)	5,200 vpd to 6,000 vpd		
Typical Section			
Lanes	Four 12-ft Lanes	Four 12-ft Lanes	Four 12-ft Lanes
Outside Shoulder	12 ft (10 ft Paved)	12 ft (10 ft Paved)	12 ft (10 ft Paved)
Median	40 ft Depressed	14 ft Flush with Barrier	14 ft Flush with Barrier
Alignment			
emax	8%	8%	6%
Min. Radius	1,480 ft	1,480 ft	1,330 ft
Max Grade	6%	6%	7%
Vertical Clearance	16 ft	16 ft	16 ft
Existing Roadway Segment Length	10.8 miles	10.8 miles	10.8 miles
Proposed Design Segment Length	10.8 miles	10.8 miles	10.8 miles

Figure III-1, previously shown, depicts proposed design options for this Corridor Segment and potential storage areas for excess material within the study area boundary. There will be approximately 1.2 million cubic yards of excess earthwork with the full design in Corridor Segment 1B. The areas identified within the study area boundary could store approximately 18% of this excess material.

The 1998 Mountain Parkway Extension Study cites a 70 mph design speed for this segment. Because standards change over time, the geometrics used in this study do not meet today's requirements for a 70 mph Freeway. Based on the Freeway guidelines listed in the 2004 version of AASHTO's *A Policy on Geometric Design of Highways and Streets*, this alignment would have a 65 mph design speed. If a 70 mph design speed is required, portions of the proposed alignment must be updated.

Potential Bifurcated Sections

Corridor Segments were evaluated for opportunities to achieve cost savings by bifurcating the horizontal and vertical alignments. Analysis was performed by realigning the horizontal and vertical alignments on the mountain side of the alignment

The vertical alignment was raised to better follow the vertical terrain, thus, minimizing the depth of required excavation. Because of the narrow width of the median, it was necessary to shift the horizontal alignment, thereby providing the minimum slope and median width necessary to achieve the elevation change. The results varied.

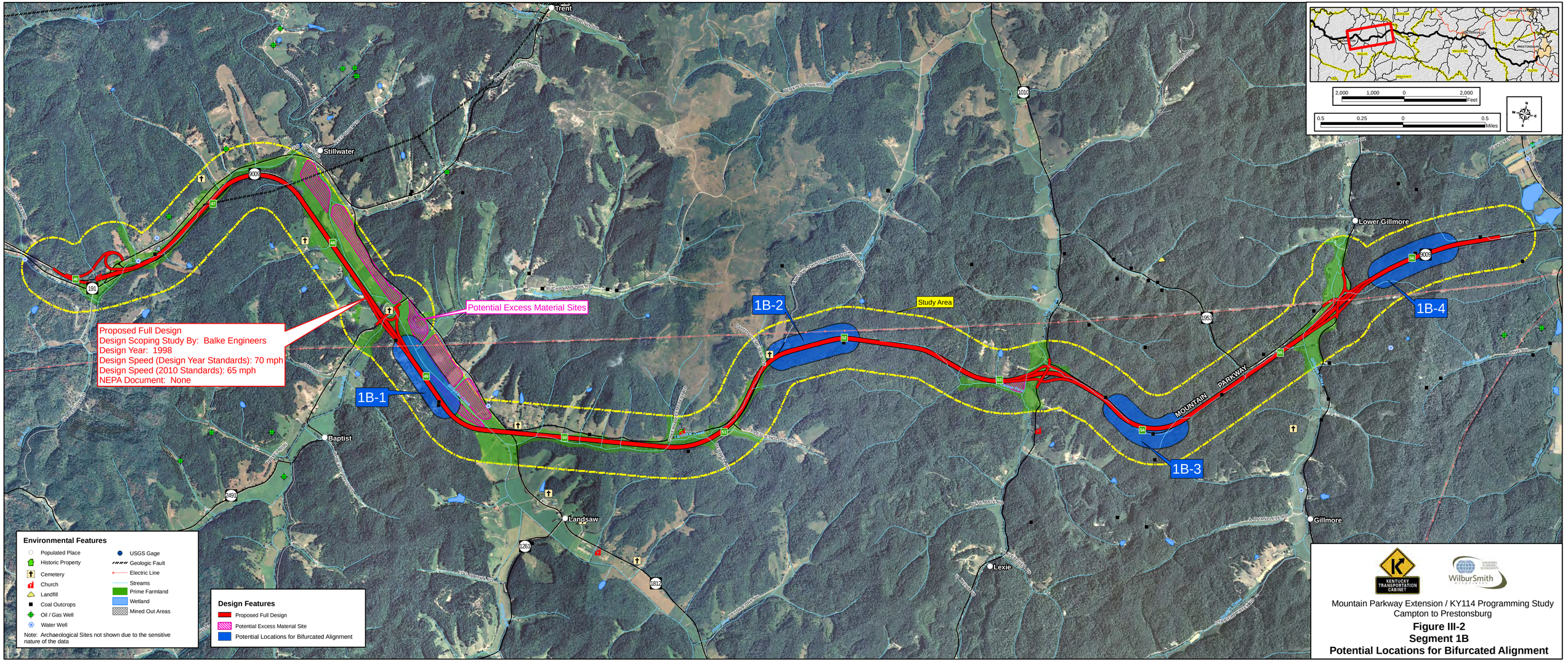
Where the full 40-foot median was evaluated, the width of the median allowed for significant elevation change without requiring a horizontal shift. However, where the 14-foot wide median was evaluated, a significant horizontal shift is required, thus, resulting in the loss of any earthwork gained by raising the roadway elevation due to the necessity of shifting the roadway laterally into the mountainside. Therefore, because of the narrow median width provided in the reduced typical section (Practical Solution 1 and Practical Solution 2), it is not practical to adjust vertical alignment in deep cut areas since it would result in no significant cost savings. However, if the wider 40-foot median becomes the preferred typical section, there are locations where the profile elevation of the mountain side of the alignment can be raised.

Potential areas for bifurcation and potential construction cost savings have been identified for Corridor Segment 1B. Detailed information on these areas is presented in **Table III-3** and the locations are shown in **Figure III-2**

Table III-3 – Potential Bifurcated Sections

Segment/ Bifurcated Section	**Begin MP**	**End MP**	**Length**	**Construction Cost Savings**
Segment 1B	**-**	**-**	**-**	**$3,600,000 (3%)**
Bifurcated Section 1B-1[1]	48.8	49.2	0.4	$900,000
Bifurcated Section 1B-2[1]	51.6	52.0	0.4	$1,500,000
Bifurcated Section 1B-3[1]	53.8	54.2	0.4	$700,000
Bifurcated Section 1B-4[1]	55.8	56.2	0.4	$500,000

[1] Raised the profile elevation of the mountain side alignment


Proposed Full Design
Design Scoping Study By: Balke Engineers
Design Year: 1998
Design Speed (Design Year Standards): 70 mph
Design Speed (2010 Standards): 65 mph
NEPA Document: None
Potential Excess Material Sites
Study Area
1B-1
1B-2
1B-3
1B-4
MOUNTAIN PARKWAY
Trent
Stillwater
Baptist
Landsaw
Lexie
Gillmore
Lower Gillmore
Environmental Features
Populated Place
Historic Property
Cemetery
Church
Landfill
Coal Outcrops
Oil / Gas Well
Water Well
USGS Gage
Geologic Fault
Electric Line
Streams
Prime Farmland
Wetland
Mined Out Areas
Note: Archaeological Sites not shown due to the sensitive nature of the data
Design Features
Proposed Full Design
Potential Excess Material Site
Potential Locations for Bifurcated Alignment
2,000 1,000 0 2,000 Feet
0.5 0.25 0 0.5 Miles
KENTUCKY TRANSPORTATION CABINET
WilburSmith ASSOCIATES
Mountain Parkway Extension / KY114 Programming Study
Campton to Prestonsburg
Figure III-2
Segment 1B
Potential Locations for Bifurcated Alignment

H. Project Costs and Priorities

In some cases and to varying degrees, cost estimates were developed in previous studies. For this study, previous estimates were inflated to current dollars using a 2.5% annual inflation factor, as decided by the Project Team, and new cost estimates were developed if no previous estimate had been completed. **Table III-4** presents Corridor Segment 1B cost estimates. However, these are subject to change in future phases of project development.

Proposed Construction Sections and Priorities

Construction sections were defined and prioritized for the entire Mountain Parkway Extension/US 460/KY 114 corridor. Proposed construction sections are shown on **Figure 2** in **Appendix A**.

Corridor Segment 2A is proposed for construction in four sections, ranging in estimated costs (for the full design) from 30.2 to 34.9 million dollars.

Table 1 in **Appendix A** identifies priorities for the construction sections identified for the Mountain Parkway Extension/US 460/KY 114 corridor

As shown, Corridor Segment 1B construction sections 1B-4, 1B-3, 1B-2, and 1B-1 are KYTC Highway District 10 Priorities 8, 9, 10, and 11, respectively.

Table III-4 – Cost Estimates

	Segment 1B Cost (Millions) (2010 Dollars)[3]					
	Full Design		Practical Design 1		Practical Design 2	
Phase	KYTC 1998 Scoping Study[1]	Bifurcated Alignment[2]	Reduced Median[2]	Bifurcated Alignment[2]	Reduced Median & Reduced Design Speed[2]	Bifurcated Alignment[2]
Construction Cost	$113.1	$109.5	$106.4	NA	$104.1	NA
Design Cost	$11.3	$11.0	$10.6	NA	$10.4	NA
Utility Cost	$1.2	$1.2	$1.2	NA	$1.2	NA
Right-of-Way Cost	$5.8	$5.8	$5.8	NA	$5.8	NA
Total Cost	**$131.5**	**$127.5**	**$124.0**	NA	**$121.5**	NA
Proposed Design Segment Length (M	*10.8*	*10.8*	*10.8*	NA	*10.8*	NA
Construction Cost Per Mile	$10.5	$10.1	$9.8	NA	$9.6	NA
Total Cost Per Mile	$12.2	$11.8	$11.5	NA	$11.3	NA

[1] 2.5% Annual Inflation Rate Applied
[2] Planning Level Cost Estimate
[3] Phase costs may not equal total due to rounding

IV. CORRIDOR SEGMENT 2A (HELECHAWA TO SALYERSVILLE)

A. Project Location

Corridor Segment 2A is the portion of the Mountain Parkway Extension (KY 9009) from Milepoint (MP) 56.6 just west of the KY 205 interchange in Helechawa to MP 73.6 just west of Salyersville in Wolfe, Morgan and Magoffin Counties (17.0 miles). The locations of all Corridor Segments are shown on **Figure 1** in **Appendix A**.

B. Project History

Corridor Segment 2A was examined in some of the previous studies mentioned in **Section D** of **Chapter I** and located on the enclosed DVD entitled "Previous Studies." Preliminary design plans to widen this section of the Mountain Parkway Extension were completed by KYTC with assistance from JWA-HMB Indiana in 1999. Those plans were updated by KYTC with assistance from ENTRAN in 2007. Special emphasis was given to incorporating the information from the recently completed *Environmental Assessment, Mountain Parkway Extension (KY 9009) from Helechawa to Salyersville – Wolfe, Morgan and Magoffin Counties, Item Number 10-126.01*, Kentucky Transportation Cabinet, Division of Environmental Analysis, September 2008, hereinafter referred to as the *2008 EA*.

NOTE: The scope of this study sought to avoid duplication of any previous work. Where possible, the information and results from previous documents are presented. These were done at different times and with different levels of effort and/or assumptions used for analyses. Therefore, the level of detail may vary, and there may be differences and/or inconsistencies in the information presented, such as traffic forecasts and crash data, between the different segments discussed in this report. Attempts have been made to update or clarify information and/or enhance the preliminary purpose and need statements, when deemed practical and feasible, in this current study.

C. Existing Conditions

Geometric Characteristics

Corridor Segment 2A of the Mountain Parkway Extension is a two-lane fully controlled access facility consisting of 12 foot lanes and 10 paved shoulders. The posted speed limit is 55 mph. In some locations having severe vertical grades, there are passing lanes for the direction of traffic that is climbing the uphill grade.

An analysis of geometric deficiencies was prepared for the Kentucky Transportation Cabinet, Division of Design, as part of the *Mountain Parkway Extension Study – KY 9009, Campton to Salyersville – Wolfe-Morgan-Magoffin Counties, Item Number 10-126.00*, by Balke Engineers in September 1998, hereinafter referred to as the 1998 Mountain Parkway Extension study. This study concluded that 25 of the 39 horizontal curves (64 percent) located on the existing Mountain Parkway in Corridor Segment 2A fail to meet current standards for a 60 mph design speed. Furthermore, the study determined that 38 of the 39 horizontal curves in the project corridor fail to meet the current minimum superelevation rate, and 21 other roadway segments between Campton and Salyersville have grade deficiencies which limit sight distance to below current standards (specific locations not identified in the previous study).

In addition, Interchange Feasibility Studies completed by KYTC in 1994 and 1995 concluded that three interchanges on the Mountain Parkway between Helechawa and Salyersville required modification to meet existing traffic demand and design standards, and to function with a four-lane, divided highway (the KY 205 interchange at Helechawa, the KY 134 interchange near Adele, and the KY 30 interchange west of Salyersville). These studies also found that two new interchanges were warranted to provide better local access to the Mountain Parkway, one at KY 134 (near Hager) and one at Middle Fork Road (near Gullet).

The 1998 *Mountain Parkway Extension Study* also documented 17 bridge structures located on the existing Mountain Parkway in Segment 2A. The structures along the study corridor are nearing their design life expectancy and do not meet current standards for a four lane facility. However, none of the structures were found to be structurally deficient. Four of these structures were determined to be functionally obsolete, and all 17 were recommended for replacement.

Existing Traffic Volumes and Level of Service (Year 2009)

Traffic volumes along Corridor Segment 2A range from 4,380 vehicles per day (vpd) to 6,650 vpd, as shown in **Figure 1** in **Appendix A**.

The Level of Service (LOS) is a qualitative measure of highway traffic conditions, as defined in the 2000 Highway Capacity Manual (HCM), published by the Transportation Research Board (TRB). Individual levels of service characterize these conditions in terms of speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined and given letter designations from A to F, with LOS A as the best condition, representing free flow conditions, and with LOS F representing severe congestion and/or time delays. Typically, a minimum of LOS D is considered acceptable in urban areas and LOS C is considered acceptable in rural areas.

Several inputs are required to determine LOS including highway class, terrain, hourly volume, truck percentage, directional distribution, number of lanes, lane width, shoulders, percent no-passing, number of access points, speed. Of these factors, highway class, hourly volume, and percent no-passing had the greatest impact on LOS for this Corridor Segment.

In Corridor Segment 2A LOS ranges from B to C along the two-lane sections. Truck climbing lanes are present at some locations throughout the corridor. The presence of truck climbing lanes generally improves LOS one letter grade.

Estimated No-Build Future Traffic and Level of Service (Year 2030)

No-Build future traffic was estimated using historic traffic volumes, previous traffic forecasts for the corridor, and Kentucky Statewide Model results. No significant changes to the roadway were assumed. A modest growth rate of one percent compounded annually was used and is a balance between previous forecasts and model results for this study.

No-Build future traffic volumes range from 5,900 vpd to 8,100 vpd. LOS remained between B to C with slight increases as a result of truck climbing lanes.

Estimated Future Traffic with Improvement (Year 2030)

Future traffic was estimated for this Corridor Segment, assuming a four-lane widening, using the Kentucky Statewide Travel Demand Model to estimate trip generation, attraction, and diversion. Future daily traffic volumes are estimated to range from 6,200 vpd to 9,100 vpd.

Crash Analysis

Crash analysis is done using a methodology developed by the Kentucky Transportation Center (KTC) which locates roadway "segments" based on traffic volumes and geometric characteristics to identify crash concentrations. The analysis also breaks down the roadway into 0.1-mile "spots" to determine if any of those spot locations demonstrate high crash frequencies. Each segment or spot is assigned a critical rate factor (CRF) based on formulas published by the KTC. The CRF is one measure of the safety of a road that compares the crash rate of the road under study to the average crash rate for other roads of the same functional classification throughout the state.

If the CRF is 1.00 or greater, it is assumed that crashes are happening due to circumstances that cannot be attributed to random occurrence. If this is the case, the spot or segment should be studied in more detail to ascertain if there are remedial actions that could be taken to improve the overall safety of the facility.

The *2008 EA* for this Corridor Segment identified two high crash locations on the Mountain Parkway Extension, as follows:

- KY 205 interchange (MP 56.9-57.0), which had a CRF of 1.013, including 5 "property damage only" crashes and one injury crash; and
- KY 30 interchange (MP 71.4-71.8), which had a CRF of 1.103, including 11 "property damage only" crashes, four injury crashes, and one fatality.

To update the crash analysis on the Mountain Parkway Extension for this current study, historic vehicle crash records were acquired from the Kentucky State Police-maintained Collision Analysis database for reported incidents occurring between January 1, 2004 and October 12, 2009. The results of this updated crash analysis are discussed in the following sections.

Reported Crashes

During the 5-year, 9-month analysis period, 45 crashes were reported along Corridor Segment 2A. Of these 45 crashes, 3 resulted in fatalities, 14 resulted in injuries, and the remainder were non-injuries. Thirty-one (31) of the crashes in Segment 2A were single vehicle collisions, involving collisions with animals or other objects along the roadway. Two head-on crashes were also reported, both resulting in fatalities.

Throughout the study, concerns were raised by the project team about frequent collisions with wildlife and the need to address this problem in future phases of project development. Crash data should be monitored in the future to determine if collisions with animals are a recurring problem in certain locations.

Crash Segments

Analysts divided this portion of the project into KTC-defined crash segments; dividing segments for analysis where the traffic volume or geometric characteristics (e.g., number of lanes) change. For Segment 2A, five segments were identified for the updated analysis.

Table IV-1 summarizes the results for all of these segments, and all were found to be well below the Critical Rate Factor of 1.00 (i.e., no "high crash segments" were identified in Corridor Segment 2A during the 2009 crash analysis update).

Table IV-1 – Crash Segments

Route	Location		Length	ADT	Crashes				Critical Rate Factor (CRF)
	Begin MP	End MP			Fatal	Injury	Property Damage Only	Total	
KY 9009	56.600	57.188	0.588	4,380	0	0	4	4	**0.19**
KY 9009	57.188	57.681	0.493	4,550	0	0	1	1	**0.05**
KY 9009	57.681	63.084	5.403	5,640	0	4	1	5	**0.03**
KY 9009	63.084	71.740	8.656	5,640	2	4	15	21	**0.08**
KY 9009	71.740	73.600	1.860	6,650	1	6	7	14	**0.18**

Crash Spots

Crash spots are defined where numerous crashes occur within close proximity. By definition, spots are 0.1-mile in length.

During the updated 2009 crash analysis, no high crash spot locations were found. However, one potential high crash spot with a CRF of 0.80 was identified in Segment 2A at the KY 30 interchange (milepoint 71.680 to milepoint 71.780). There were six (6) crashes at this spot during the analysis period, with none of these involving injuries or fatalities. The interchange ramp acceleration and deceleration lengths are deficient at this location and there is a deficient curve on the Mountain Parkway at this location. However, the CRF falls below the 1.00 threshold, indicating that the crashes are not occurring other than randomly at present. Crash data should be monitored at this location. This is especially true since this was identified as a high crash location in the *2008 EA*.

D. Purpose and Need

The preliminary purpose and need for improvements to Corridor Segment 2A was derived from the *Environmental Assessment, Mountain Parkway Extension (KY 9009) from Helechawa to Salyersville – Wolfe, Morgan and Magoffin Counties, Item Number 10-126.01*, Kentucky Transportation Cabinet, Division of Environmental Analysis, September 2008. The previous purpose and need statement has been supplemented based on the results of this study, as follows:

Purpose

As documented in the *2008 EA*, the purpose of the proposed improvement to this segment of the Mountain Parkway Extension is to address roadway deficiencies and the future effects of a projected substantial increase in traffic volumes by:

- Eliminating substandard horizontal and vertical curves;
- Upgrading substandard interchanges at KY 205, KY 134, and KY 30;
- Constructing new interchanges to improve local access at KY 134 (at Hager) and Middle Fork Road;
- Providing additional roadway capacity;
- Physically separating opposing traffic; and
- Eliminating no-passing zones.

Since the Mountain Parkway Extension is part of the KYTC State Primary System and the Appalachian Development Highway System, the project should also support and satisfy KYTC strategic goals and plans, as well as ARC goals, to:

- Take care of the existing transportation system and make it work better.
- Increase capacity and safety.
- Create opportunities for future economic growth and competitiveness by the following:
  - Address lack of sufficient transportation infrastructure and major highway system linkage in the economically disadvantaged East Kentucky region.
- Support the overall quality of life in Kentucky by the following:
  - Improve access to jobs and services for residents of Eastern Kentucky.
  - Improve the movement of goods and materials into and out of this portion of Eastern Kentucky.

Need

The need for the proposed project is based on the following characteristics and deficiencies, as documented in the 1998 *Mountain Parkway Extension Study* and the *2008 EA* for Corridor Segment 2A of the Mountain Parkway Extension between Helechawa and Salyersville, and as supplemented by data collection, research, and analysis during the current study:

- Highway deficiencies, including:
  - Substandard roadway geometry
  - Functionally obsolete bridge structures
  - Maneuverability/passing limitations
- Increased future traffic
  - An approximately 55% increase was projected for the design year in the *2008 EA*: 4,350-6,700 in 2008 vs. 6,300-10,300 in 2030.
  - Revised forecasts in this study estimate an approximately 4% to 22% increase between 2009 and 2030: 4,380-6,650 vpd in 2009 vs. 5,900-8,100 vpd for the no-build alternative in 2030.
- Increased truck traffic
  - The daily truck volume would increase from a range of 750-1,120 in 2008, based on 16.7-17.6% trucks, as assumed in the *2008 EA,* to 1,430-2,490 in 2030, based on an increase to 22.8-24.2% trucks, as assumed in the *2008 EA*.
  - Based on 2009 KYTC traffic data, trucks comprised approximately 17.5% of the ADT on this Corridor Segment when the study began. According to Statewide Model assumptions by the KYTC, this is expected to increase to approximately 24% by 2030. Therefore, the daily truck volume would increase from a range of 775 to 1,165 in 2009 to about 1,415 to 1,655 trucks per day in 2030.
- Declining levels of service, as follows:
  - The level of service analysis done for the *2008 EA* indicated a LOS B on this segment in 2008, but this would decline to LOS C to D in 2030.
  - An updated LOS analysis for the current study indicates a LOS B to C in 2009 along this Corridor Segment. There is a slight decrease in the future, but the LOS still remains within the ranges for LOS B to C in 2030.
- High crash rates
  - Two high crash locations were identified in the 2008 EA on this segment of the Mountain Parkway Extension at the KY 205 and KY 30 interchanges.
  - However, no high crash segments or spots were found during the study period for the updated crash analysis undertaken for the current study.
- High unemployment and poverty rates in Eastern Kentucky.

E. Environmental Overview

As mentioned previously, proposed improvements within Corridor Segment 2A have progressed to Preliminary Design Plans. The following entitled Environmental Assessment (EA) has been approved for this project: *Environmental Assessment, Mountain Parkway Extension (KY 9009) from Helechawa to Salyersville – Wolfe, Morgan and Magoffin Counties, Item Number 10-126.01*, Kentucky Transportation Cabinet, Division of Environmental Analysis, September 2008. This document can be found on the enclosed CD entitled "Environmental Assessment, Mountain Parkway Extension from Helechawa to Salyersville, 1998." A FONSI was in progress at the time of the current study.

The following discussion summarizes the findings in the EA. Environmental features, as presented in the EA, are shown on **Figure IV-1**.

Impacts are discussed for Alternatives 1, 2, 3, and 4 shown in **Figure IV-2** (from the *2008 EA*, page 12).

Air Quality

An air quality analysis was completed in 2008 for the 16.3-mile Mountain Parkway Extension project, based on projected traffic volumes for the 2030 design year. Because of low future traffic volumes, minimal analyses were required by state and federal standards.

The region is in attainment for particulate matter, sulfur dioxide, nitrogen dioxide, and ozone. Carbon monoxide levels for the 2030 build scenario will not produce a projected violation of the one-hour or eight-hour standards. The project qualifies as having a lower potential for meaningful Mobile Source Air Toxics (MSAT) effects.

Minimal air quality impacts are expected from any of the four alternatives.

Noise

Twelve noise receptors were identified along the corridor and modeled according to 23 CFR 772 in a noise analysis for the project. The twelve receptors represent 28 single family residences and two churches.

None of the sites are predicted to experience sound-level impacts under the 2008 or 2030 No Build scenarios. Three of the twelve receptors, representing eight total single family residences, are projected to experience sound-level impacts over the 67 dBA threshold in the 2030 Build scenario.

Noise abatement measures were considered for the three receptors predicted to experience sound-level impacts. Traffic management, noise buffering, and alignment changes were determined to be impractical because of the limited number of residences experiencing noise impacts, increased costs, and additional environmental impacts that would result from implementation of these measures. Noise walls were also considered at three locations but did not meet KYTC's criteria for reasonableness.

The final decision on the implementation of noise abatement measures will be made by KYTC after the completion of project design and the public involvement process.

Minimal noise impacts are expected from each of the four alternatives.

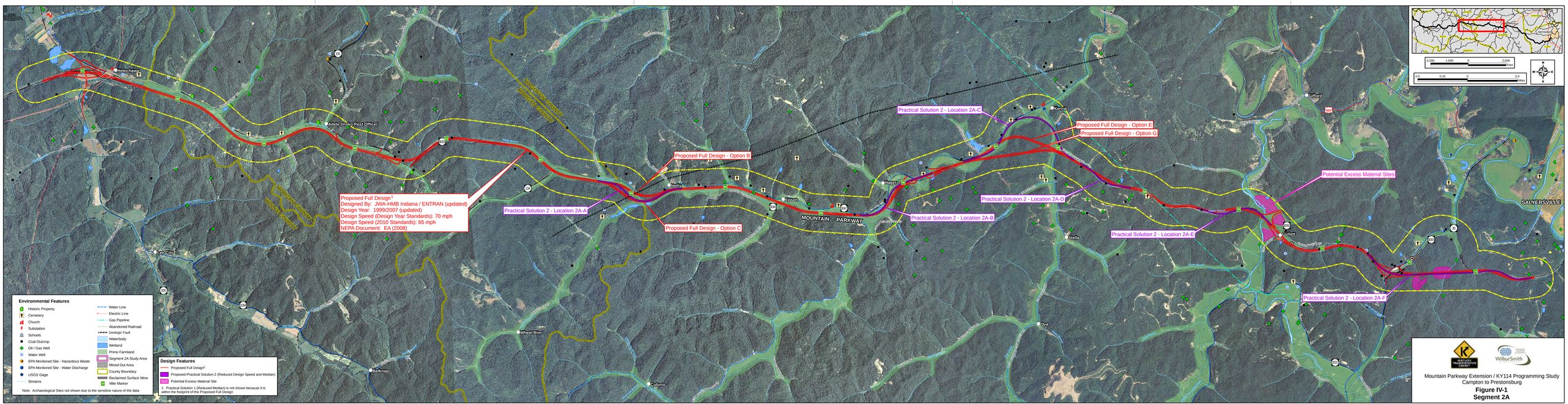
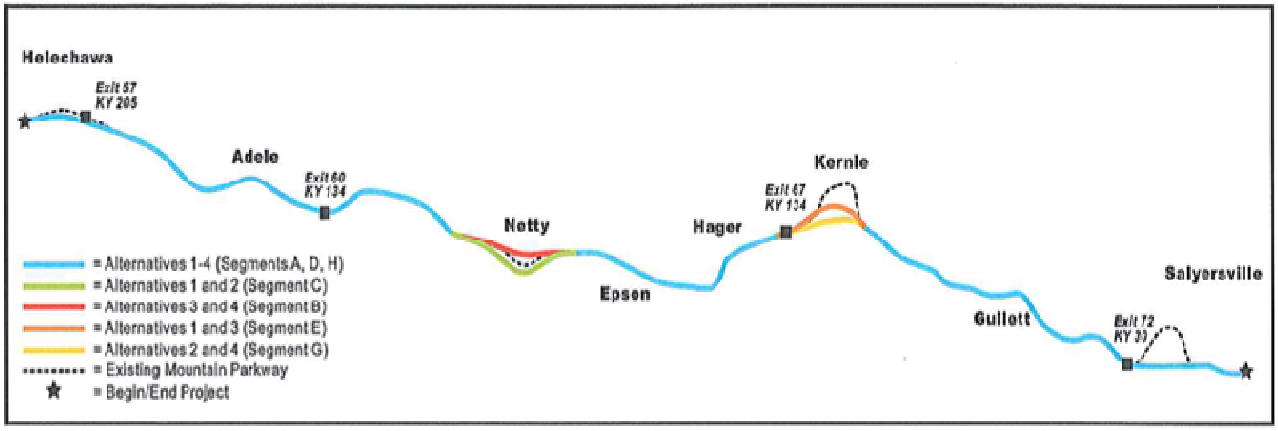

Proposed Full Design[1]
Designed By: JWA-HMB Indiana / ENTRAN (updated)
Design Year: 1999/2007 (updated)
Design Speed (Design Year Standards): 70 mph
Design Speed (2010 Standards): 65 mph
NEPA Document: EA (2008)
Practical Solution 2 - Location 2A-A
Proposed Full Design - Option B
Proposed Full Design - Option C
Practical Solution 2 - Location 2A-C
Proposed Full Design - Option E
Proposed Full Design - Option G
Practical Solution 2 - Location 2A-D
Practical Solution 2 - Location 2A-B
Practical Solution 2 - Location 2A-E
Practical Solution 2 - Location 2A-F
Potential Excess Material Sites
MOUNTAIN PARKWAY
Helechawa
Adele (Inskip Post Office)
Lee City
Wheel Rim
Belknap
Cutuno
Netby
Epson
Magoffin
Stella
Ova
Gullett
Gifford
Kremlin
SALYERSVILLE
Environmental Features
Historic Property
Cemetery
Church
Substation
Schools
Coal Outcrop
Oil / Gas Well
Water Well
EPA Monitored Site - Hazardous Waste
EPA Monitored Site - Water Discharge
USGS Gage
Streams
Water Line
Electric Line
Gas Pipeline
Abandoned Railroad
Geologic Fault
Waterbody
Wetland
Prime Farmland
Segment 2A Study Area
Mined Out Area
County Boundary
Reclaimed Surface Mine
Mile Marker
Note: Archaeological Sites not shown due to the sensitive nature of the data
Design Features
Proposed Full Design[1]
Proposed Practical Solution 2 (Reduced Design Speed and Median)
Potential Excess Material Site
1: Practical Solution 1 (Reduced Median) is not shown because it is within the footprint of the Proposed Full Design
2,000 1,000 0 2,000 Feet
0.5 0.25 0 0.5 Miles
N
W E
S
KENTUCKY TRANSPORTATION CABINET
WilburSmith ASSOCIATES
Mountain Parkway Extension / KY114 Programming Study
Campton to Prestonsburg
Figure IV-1
Segment 2A

Figure IV-2 – "Schematic Diagram of Build Alternatives 1-4"



Source: *Environmental Assessment, Mountain Parkway Extension (KY 9009) from Helechawa to Salyersville – Wolfe, Morgan and Magoffin Counties, Item Number 10-126.01*, Kentucky Transportation Cabinet, Division of Environmental Analysis, September 2008, Figure 1, pg. 12.

Natural and Manmade Water Features

Natural and manmade water features considered as part of this analysis are divided into four (4) categories: groundwater, surface streams, floodplains, and wetlands.

Groundwater

Based on information received from the Kentucky Environmental and Public Protection Cabinet Division of Water, there are no aquifers, karst areas, public water supplies, or wellhead protection areas in the project area. Consequently, local water supplies are obtained through private wells.

Groundwater resources in the vicinity are generally abundant along larger surface streams and limited in uplands. Groundwater availability in alluvium associated with major surface streams is adequate for a minimum domestic supply. Water obtained from most dug wells is soft to moderately hard and contains noticeable amounts of iron. Water availability from the Breathitt formation is adequate for domestic supply in valley bottoms, but limited elsewhere. Most of the water obtained from drilled wells in the Breathitt formation is extremely hard and contains noticeable amounts of iron.

There is a minor potential for groundwater impacts from construction of any alternative: increases in turbidity and dissolved solids during construction or seepage due to spilled fuel, lubricants, or other pollutant materials. These impacts will be minimized through the use of standard erosion control measures and other mitigations. The possibility for catastrophic toxic spills (fuels, solvents, or hazardous wastes) during facility operation also exists; improved facility safety and the absence of karst features in the vicinity reduce the probability of this occurring and impacting water resources.

Surface Streams

The project is located in the Red River/Hazel Green watershed of the Upper Kentucky sub-basin and in the Johnson Creek, Middle Fork Licking River, and Licking River Headwaters watersheds of the Licking sub-basin.

Major streams in the project corridor include the Red River, State Road Fork, Johnson Creek, Cow Creek, and Middle Fork Licking River. According to the Kentucky Environmental and Public Protection Cabinet Division of Water, no Outstanding State Resource Waters, Wild River, Exceptional Waters, or Special Use Waters are located in the project area. No unique or high-quality stream segments or associated high-quality riparian habitats were noted during the field surveys. No stream segments within any of the proposed alignments were considered critical on a local or regional basis. Overall, water quality and biological data from the streams sampled reflect moderate to good water quality, indicative of rural streams with relatively minor disturbances from residential, commercial, or agricultural activities. Most streams in the project corridor exist in bottomland areas along the Mountain Parkway and have been previously impacted by road construction or residential/agricultural activities, or they occur in adjacent mountainous areas and exhibit steep gradients, narrow stream widths, wide and generally undisturbed riparian corridors, and few roadway or residential/agricultural impacts.

Project impacts to surface streams will include short term impacts, long term impacts due to culvert placement, long term impacts due to rechanneling, and impacts due to bridge construction.

- Construction of the proposed project is expected to impact 30,952 to 31,054 linear feet of USGS-blueline or ephemeral streams, depending on the alignment. Short term water quality impacts during construction may include temporary increases in dissolved solids, nutrients, settleable solids, suspended solids, acidity, or turbidity, and destruction/displacement of aquatic fauna.
- Culverts are proposed for all streams crossed by the project except the Red River, Johnson Creek, and Middle Fork Licking River. Channel impacts due to culvert placement and associated fills are expected to impact 26,208 to 26,325 linear feet of surface streams. Stream impacts due to culvert placement involve the permanent replacement of natural stream bottom habitat with a concrete structure. Although culvert placements will result in generally minor impacts, Gardner Fork will experience a moderate impact due to the length of the impact (839 feet) and higher quality of the existing stream channel.
- Each alternative requires channel realignments at five or six locations along Johnson Creek. Individual channel changes range from 411 to 1,361 feet in length and will result in a net loss of 614 to 675 linear feet of channel length, depending on the selected alternative.
- New bridges or extension/widening of existing bridges will occur at multiple locations:
  - Four bridges at one location along Red River;
  - One bridge at one location along State Road Fork;
  - Eighteen bridges at nine locations along Johnson Creek; and
  - Three bridges at two locations along Middle Fork Licking River.

Overall, construction is not expected to result in long term impacts to streams. Disturbance from construction activities may result, but impacts are expected to be minor. Stream bottoms and banks closely approximating existing conditions are expected to become re-established a few years after construction.

Floodplains

According to Federal Emergency Management Agency (FEMA) floodplain data, 100-year floodplain areas occur along Johnson Creek and Middle Fork Licking River. Floodplains

also exist along the Red River and State Road Fork in the KY 205 interchange area, although no FEMA mapping exists for this area.

Each alternative crosses 30.2 to 30.5 acres of floodplain along Johnson Creek and Middle Fork Licking River. Acres of impact are undetermined along the Red River and State Road Fork due to the availability of mapping.

Wetlands

Ecological studies conducted for the project identified 67 wetlands along the project corridor. Fourteen National Wetlands Inventory (NWI) mapped wetlands were identified within or adjacent to the corridor; three were field-verified as wetlands while the remaining eleven were determined to be non-wetland. None of the project area wetlands are considered to be characteristically unique, extensive, or high quality. Most are small (less than 0.3 acres) and are of limited value with isolated features sustained by highway runoff. Eleven larger (0.3 to 2.5 acres) moderate-value wetlands were identified in toe-of-slope and bottomland areas.

Of the 67 wetlands identified, 43 to 47 would be impacted by the project, depending on the alternative alignment, and 19 are entirely outside the alignments. The area of wetland impact ranges between 11.3 to 11.7 total acres, depending on the alternative selected.

Terrestrial Habitats

The project will result in permanent conversion of approximately 384 to 404 acres of terrestrial ecological habitat (new land area) to roadway right-of-way, depending on the alternative selected. Of the new land required for right-of-way, approximately 80% consists of wooded habitat; the remaining area is primarily residential, commercial, agricultural, and oldfield land use types. The project may displace/eliminate fauna within the project limits and may disrupt animal travel patterns. Disturbances are considered minor overall due to the limited extent of habitats impacted relative to the vast amount of habitat available in the project vicinity.

Threatened and Endangered Species

The U.S. Fish and Wildlife Service lists four endangered species known to occur, or potentially occurring in the project area: Indiana bat (*Myotis soldalis*), Virginia big-eared bat (*Corynorhinus townsendii virginianus*), gray bat (*Myotis grisescens*), and white-haired goldenrod (*Solidago albopilosa)*.

No caves were observed in the project area; therefore, the project is not expected to impact preferred gray bat habitat or preferred winter habitat for the Virginia big-eared bat or gray bat. One small rock outcrop/cliffline near the KY 205 interchange could potentially provide winter habitat for the Indiana bat. Extensive amounts of forest and riparian corridors exist in the corridor that could serve as summer habitat for the Indiana bat and Virginia big-eared bat.

One small area of potential habitat for the white-haired goldenrod was identified near the KY 205 interchange.

Appropriate measures should be taken to avoid, minimize, or mitigate construction impacts to these habitats.

Two state threatened species – Northern brook lamprey (*Ichthyomyzon fossor*) and American brook lamprey (*Lampetra appendix*) – are known to exist within project corridor drainage areas. These habitats are not expected to be directly impacted by the project.

Cultural and Historic Resources

A 2001 cultural historic survey for the project identified 22 sites greater than 50 years of age from west of KY 134 at Adele to west of KY 7 near Salyersville. None of the sites were listed on the National Register of Historic Places or were determined to be eligible for listing. No prehistoric or historic archaeological sites were identified. The State Historic Preservation Office (SHPO) reviewed and concurred with these findings.

A supplemental study in 2008 of the KY 205 interchange area identified five additional sites. Three were determined ineligible for the National Register; insufficient information was available to determine eligibility of the remaining two. The SHPO concluded that neither of the two undetermined sites will be negatively impacted by the project. No prehistoric or historic archaeological sites were identified.

The project will have no effects on cultural historic resources. The previous coordination with the SHPO and the public hearing for the *2008 EA* have satisfied the requirements of the Section 106 consultation process.

Socioeconomics

Community characteristics considered as part of this analysis are divided into four (4) categories: land use, population demographics, community resources and property impacts, and farmlands.

Land Use

Over 75% of the land area in Wolfe, Morgan, and Magoffin Counties is covered by woodland. Primary non-woodland land uses in the project area include existing right-of-way, agricultural pastureland/cropland, and scattered residential areas. Commercial uses in the project area are sparse, comprised of locally-oriented service and retail establishments around the KY 205 interchange. At this time, no county-wide zoning or land use plans exist for Wolfe, Morgan, or Magoffin Counties.

Population Demographics

County populations exhibit slow growth for Wolfe, Morgan, and Magoffin Counties. The 2007 populations were 6,900 persons, 14,600 persons, and 13,500 persons, respectively. An estimated 128 persons reside within 0.10-mile of the project corridor. Year 2000 Census data show extremely low minority concentrations and a low percentage of persons with high school diplomas or Bachelor's degrees compared to statewide averages.

The three counties in the study area exhibit high unemployment and slow economic growth. Personal income levels and median home values are substantially below statewide averages.

Overall, the project is not expected to have any long term adverse impacts on employment, income, or business activity in the local or regional economy. Some long term positive economic benefits are expected due to improved accessibility, travel safety, and travel

efficiency along the Mountain Parkway. However, the project is not likely to spur widespread development along the Parkway, change regional traffic patterns, or cause a shift in physical or socioeconomic characteristics.

The project was also evaluated in accordance with Executive Order 12898, which requires federal agencies to achieve environmental justice (fair treatment of people of all races, incomes, and cultures) by identifying and addressing disproportionately effects. Based on this analysis, the project is not expected to result in disproportionately high or adverse human health or environmental effects on minority or low income populations.

Community Resources and Property Impacts

The proposed Mountain Parkway Extension project is located immediately adjacent to the rural, undefined, unincorporated communities of Helechawa, Adele, Netty, Epson, Hager, and Gullett. Resources in these communities are summarized below, along with project impacts.

- Four churches – Helechawa Community Church, Country Side Community Church, Zion United Baptist Church, and Lake Front Church of God – are located in the project area. No new right-of-way from any of these churches will be required. Access will not be adversely affected.
- One park-and-ride lot is located northeast of the KY 205 interchange; it will not be directly impacted by the project or experience an adverse effect to its access.
- Six of seven family cemeteries along the project corridor will not be affected by the project. The seventh cemetery, just west of Middle Fork Road, is 0.47 acres in size and contains 37 marked graves dating to the twentieth century. Approximately 0.10 acres of this cemetery will be crossed by any of the four alternatives.
- No other community resources (e.g. schools, libraries, parks, and emergency service facilities) are located within the immediate project area.

Depending on the alternative selected for construction, the project is expected to result in the relocation of 13 to 18 residences and the acquisition of 386 to 404 acres of new right-of-way. These impacts are evenly distributed along the 16.3-mile project corridor, and are not anticipated to adversely affect any specific community.

The improvement of the Mountain Parkway will benefit local and regional community accessibility through improved roadway linkages and safety. The project will not physically bisect or dislocate any existing development, community structure, or social group.

Farmlands

Coordination with the U.S. Department of Agriculture and the National Resource Conservation Services (NRCS) offices in Morgan and Magoffin Counties identified 43.5 to 45.2 acres of prime farmlands located within the corridors for each alternative. The total land area presently in active agricultural use within each alternative corridor ranges from 14.6 to 15.5 acres. Total site assessment scores fall below the threshold for additional study.

Based on NRCS point values, the proposed project impacts on farmland would not be substantially adverse, and the protection of farmland should not, in itself, override the need for the project.

Hazardous Materials

A database search revealed two potential hazardous materials sites near the project area, both near the KY 205 interchange but beyond the project corridor for any of the alternatives. Visual inspections identified seven other potential sites near the KY 205 interchange, also beyond the range of the project corridor. No Phase II investigations are necessary.

Field investigations identified one abandoned surface mine south of the existing Mountain Parkway and approximately 1,600 feet east of KY 30. The site is recovering since it exhibits extensive shrub and groundcover growth. Coordination with the Kentucky Department of Surface Mining, the Kentucky Department of Natural Resources, and the U.S. Department of the Interior, Office of Surface Mining indicated no records for this site. The upper reaches of this mine will be crossed by all project alternatives, and embankment placement is currently expected at the site during construction. Construction should not have any adverse effects on adjacent surface waters or require special mitigations.

One capped oil well (with some seepage) was observed in a valley bottom near Gardner Fork. The well will not be impacted by any project alternatives.

Summary of Environmental Impacts

Table IV-2, recreated from the EA, summarizes impacts for each of the four alternatives within Corridor Segment 2A.

Table IV-2 – Impact Summary

Impact Category	Alternative 1	Alternative 2
Estimated Area Required		
Total Area (within construction limits)	558.6 acres	569.0 acres
Existing right-of-way	172.4 acres	164.8 acres
New Net Area Required	386.2 acres	404.2 acres
Air Quality	Minor	Minor
Noise	Design year noise impacts at Analysis Sites 3 and 4; no noise walls or other mitigation warranted	Design year noise impacts at Analysis Sites 3 and 4; no noise walls or other mitigation warranted
Water Quality and Surface Streams		
Total Stream Crossings/Channel Impacts	125/31,450 feet	125/31,348 feet
USGS Blueline Crossings/Impacts	42/16,406 feet	41/16,037 feet
Non-USGS Ephemeral Crossings/Impacts	83/15,044 feet	84/15,311 feet
Channel Impacts Due to Culverts/Pipes	26,310 feet	26,208 feet
Channel Impacts Due to Bridges	None Expected	None Expected
Channel Impacts Due to Rechanneling	5,140 feet	5,140 feet
New Channel to be Constructed	4,465 feet	4,465 feet
Net Impacts Due to Rechanneling	675 feet	675 feet
Major Aquifers, Public Water Supply Wells and Wellhead Protection Area	None	None
FEMA 100 -Year Floodplain	30.5 acres	30.2 acres
Wetlands		
Number of Wetlands Impacted	47	44
Total Impact Area	11.7 acres	11.3 acres
High Quality or Unique	None	None

Table IV-2 – Impact Summary (continued)

Impact Category	Alternative 1	Alternative 2
Terrestrial Habitats		
Residential/Commercial	6.8 acres	6.1 acres
Agricultural (Cropland/Pastureland)	14.6 acres	15.5 acres
Woodlands	315.6 acres	330.4 acres
Oldfields/Newfields/Other Open Habitats	37.5 acres	40.9 acres
Federal Endangered Species		
Indiana Bat	315.6 acres woodland and <0.1 acre rock outcrop/cliffline	330.4 acres woodland and <0.1 acre rock outcrop/cliffline
Gray Bat	None Observed	None Observed
Virginia Big-Eared Bat	315.6 acres woodland	330.4 acres woodland
White-haired Goldenrod	<0.1 acre rock outcrop/cliffline	<0.1 acre rock outcrop/cliffline
Cultural Resources		
Archaeology Sites	None	None
NRHP-eligible Cultural Historic Sites	None	None
Socioeconomics		
Residential Displacements (Takes)	5	5
Residential Relocations	10	8
Commercial Displacements/Relocations	0	0
Barns/Outbuildings	11	11
Public/Emergency Facilities	0	0
Cemeteries	1 (0.10 acre)	1 (0.10 acre)
Prime Farmland (NRCS designation)	44.3 acres	45.2 acres
Environmental Justice	None Expected	None Expected
UST/Hazardous Materials Sites	None	None
Visual/Aesthetics	None	None
Construction Activities		
Air/Noise Impacts	Minor	Minor
Maintenance of Traffic Issues	Minor	Minor
Preliminary Earthwork (cubic yards)	+ 11.6 million (excess)	+ 14.3 million (excess)
Preliminary Cost Estimates (2007 dollars)	$145.6 million	$155.2 million
Indirect and Cumulative Impacts	Minimal	Minimal
Section 4(f)/Section 6(f) Impacts	None	None
Estimated Area Required		
Total Area (within construction limits)	561.4 acres	566.6 acres
Existing right-of-way	174.9 acres	167.2 acres
New Net Area Required	386.5 acres	399.4 acres
Air Quality	Minor	Minor
Noise	Design year noise impacts at Analysis Sites 3 and 4; no noise walls or other mitigation warranted	Design year noise impacts at Analysis Sites 3 and 4; no noise walls or other mitigation warranted

Table IV-2 – Impact Summary (continued)

Impact Category (continued)	Alternative 1	Alternative 2
Water Quality and Surface Streams		
Total Crossings/Channel Impacts	124/31,054 feet	124/30,952 feet
USGS Blueline Crossings/Impacts	41/16,178 feet	40/15,809 feet
Non-USGS Ephemeral Crossings/Impacts	83/14,876 feet	84/15,143 feet
Channel Impacts Due to Culverts/Pipes	26,325 feet	26,223 feet
Channel Impacts Due to Bridges	None Expected	None Expected
Channel Impacts Due to Rechanneling	4,729 feet	4,729 feet
New Channel to be Constructed	4,115 feet	4,115 feet
Net Impacts Due to Rechanneling	614 feet	614 feet
Major Aquifers, Public Water Supply Wells and Wellhead Protection Area	None	None
FEMA 100 -Year Floodplain	30.5 acres	30.2 acres
Wetlands		
Number of Wetlands Impacted	46	43
Total Impact Area	11.7 acres	11.3 acres
High Quality or Unique	None	None
Terrestrial Habitats		
Residential/Commercial	7.0 acres	6.3 acres
Agricultural (Cropland/Pastureland)	14.6 acres	15.5 acres
Woodlands	312.5 acres	327.5 acres
Oldfields/Newfields/Other Open Habitat	40.7 acres	38.8 acres
Federal Endangered Species		
Indiana Bat	312.5 acres woodland and <0.1 acre rock outcrop/cliffline	327.5 acres woodland and <0.1 acre rock outcrop/cliffline
Gray Bat	None Observed	None Observed
Virginia Big-Eared Bat	312.5 acres woodland	327.5 acres woodland
White-haired Goldenrod	<0.1 acre rock utcrop/cliffline	<0.1 acre rock outcrop/cliffline
Cultural Resources		
Archaeology Sites	None	None
NRHP-eligible Cultural Historic Sites	None	None
Socioeconomics		
Residential Displacements (Takes)	5	5
Residential Relocations	13	11
Commercial Displacements/Relocations	0	0
Barns/Outbuildings	15	15
Public/Emergency Facilities	0	0
Cemeteries	1 (0.10 acre)	1 (0.10 acre)
Prime Farmland (NRCS designation)	43.5 acres	44.4 acres
Environmental Justice	None Expected	None Expected
UST/Hazardous Materials Sites	None	None
Visual/Aesthetics	None	None
Construction Activities		
Air/Noise Impacts	Minor	Minor
Maintenance of Traffic Issues	Minor	Minor
Preliminary Earthwork (cubic yards)	+ 12.7 million (excess)	+ 15.4 million (excess)
Preliminary Cost Estimates (2007 $)	$149.0 million	$157.8 million
Indirect and Cumulative Impacts	Minimal	Minimal
Section 4(f)/Section 6(f) Impacts	None	None

F. Analysis/Findings

The following section provides a summary of proposed Mountain Parkway Extension projects in Corridor Segment 2A; potential practical solution options; cost estimates by phase; proposed construction sections; and priority sections for programming. Also included are proposed locations for consideration as waste areas and proposed locations for bifurcated sections and their potential cost savings.

Proposed Projects

Three design options were evaluated for this Corridor Segment, as follows:

- Full Design
- Reduced Median (Practical Solution 1)
- Reduced Design Speed and Reduced Median (Practical Solution 2)

Table IV-3 outlines the design assumptions for each design option.

Table IV-3 – Design Assumptions

	Segment 2A		
	Mountain Parkway (Helechawa to Salyersville)		
	Full Design	Practical Design 1	Practical Design 2
	KYTC 1999 & 2007 Design	Reduced Median	Reduced Design Speed & Median
Design Controls			
Classification	Rural Parkway	Rural Parkway	Rural Parkway
Terrain	Mountainous	Mountainous	Mountainous
Design Speed (Design Year Standards)	70 mph	70 mph	60 mph
Design Speed (2010 Standards)	65 mph	65 mph	60 mph
Access Control	Full Control	Full Control	Full Control
ADT (Existing 2009)	4,380 vpd to 6,650 vpd		
ADT (Future No-Build 2030)	5,900 vpd to 8,100 vpd		
ADT (Future With Improvement 2030)	6,200 vpd to 9,100 vpd		
Typical Section			
Lanes	Four 12-ft Lanes	Four 12-ft Lanes	Four 12-ft Lanes
Outside Shoulder	12 ft (10 ft Paved)	12 ft (10 ft Paved)	12 ft (10 ft Paved)
Median	40 ft Depressed	14 ft Flush with Barrier	14 ft Flush with Barrier
Alignment			
emax	8%	8%	6%
Min. Radius	1,480 ft	1,480 ft	1,330 ft
Max Grade	6%	6%	7%
Vertical Clearance	16 ft	16 ft	16 ft
Existing Roadway Segment Length	17.0 miles	17.0 miles	17.0 miles
Proposed Design Segment Length	16.22 miles	16.22 miles	16.22 miles

The *2008 EA* cites a 70 mph design speed for this segment. Because standards change over time, the geometrics used in this study do not meet today's requirements for a 70 mph Freeway. Based on the Freeway guidelines listed in the 2004 version of AASHTO's *A Policy on Geometric Design of Highways and Streets*, this alignment would have a 65 mph design speed. If a 70 mph design speed is required, portions of the proposed alignment must be updated.

Figure IV-1, previously shown in this chapter, depicts the proposed design options for this Corridor Segment and identifies potential storage areas for excess material within the study area boundary.

There will be approximately 7.1 million cubic yards of excess earthwork with the full design in Corridor Segment 2A. The areas identified within the study area boundary could store approximately 24% of this excess material.

Potential Bifurcated Sections

Corridor Segments were evaluated for opportunities to achieve cost savings by bifurcating the horizontal and vertical alignments. Analysis was performed by realigning the horizontal and vertical alignments on the mountain side of the alignment.

The vertical alignment was raised to better follow the vertical terrain, thus, minimizing the depth of required excavation. Because of the narrow width of the median, it was necessary to shift the horizontal alignment, thereby providing the minimum slope and median width necessary to achieve the elevation change. The results varied. Where the full 40-foot median was evaluated, the width of the median allowed for significant elevation change without requiring a horizontal shift. However, where the 14-foot wide median was evaluated, a significant horizontal shift is required, thus, resulting in the loss of any earthwork gained by raising the roadway elevation due to the necessity of shifting the roadway laterally into the mountainside.

Therefore, because of the narrow median width provided in the reduced typical section (Practical Solution 1 and Practical Solution 2), it is not practical to adjust vertical alignment in deep cut areas since it would result in no significant cost savings. However, if the wider 40-foot median becomes the preferred typical section, there are locations where the profile elevation of the mountain side of the alignment can be raised.

Potential areas for bifurcation and potential construction cost savings for Corridor Segment 2A are shown in **Table IV-4**. These locations are illustrated in **Figure IV-3**.

Table IV-4 – Potential Bifurcated Sections

Segment/ Bifurcated Section	**Begin MP**	**End MP**	**Length**	**Construction Cost Savings**
Segment 2A	**-**	**-**	**-**	**$12,700,000 (6%)**
Bifurcated Section 2A-1[1]	58.2	59.0	0.8	$3,800,000
Bifurcated Section 2A-2[1]	62.7	63.5	0.8	$1,500,000
Bifurcated Section 2A-3[1]	65.5	68.2	2.7	$2,900,000
Bifurcated Section 2A-4[1]	69.2	69.8	0.6	$2,700,000
Bifurcated Section 2A-5[1]	71.2	73.0	1.8	$1,800,000

[1] Raised the profile elevation of the mountain side alignment

G. Project Costs and Priorities

Cost estimates, in some cases and to varying degrees, were developed in previous studies. Previous cost estimates were inflated to current dollars using a 2.5% annual inflation factor. Cost estimates were created where no estimate had been completed previously.

Table IV-5 presents a summary of Corridor Segment 2A cost estimates. Cost estimates are subject to change in future phases of project development.

Table IV-5 – Cost Estimates

Phase	Segment 2A Cost (Millions) (2010 Dollars)[3]					
	Full Design		Practical Design 1		Practical Design 2	
	KYTC 2007 Design[1]	Bifurcated Alignment[2]	Reduced Median[2]	Bifurcated Alignment[2]	Reduced Median & Reduced Design Speed[2]	Bifurcated Alignment[2]
Construction Cost	$207.0	$194.3	$184.2	NA	$165.6	NA
Design Cost	$10.3	$9.7	$9.2	NA	$8.3	NA
Utility Cost	$1.8	$1.8	$1.8	NA	$1.8	NA
Right-of-Way Cost	$14.5	$14.5	$14.5	NA	$14.5	NA
Total Cost	**$233.6**	**$220.3**	**$209.7**	NA	**$190.2**	NA
Proposed Design Segment Lenth (Miles)	*16.22*	*16.22*	*16.22*	NA	*16.22*	NA
Construction Cost Per Mile	$12.8	$12.0	$11.4	NA	$10.2	NA
Total Cost Per Mile	$14.4	$13.6	$12.9	NA	$11.7	NA

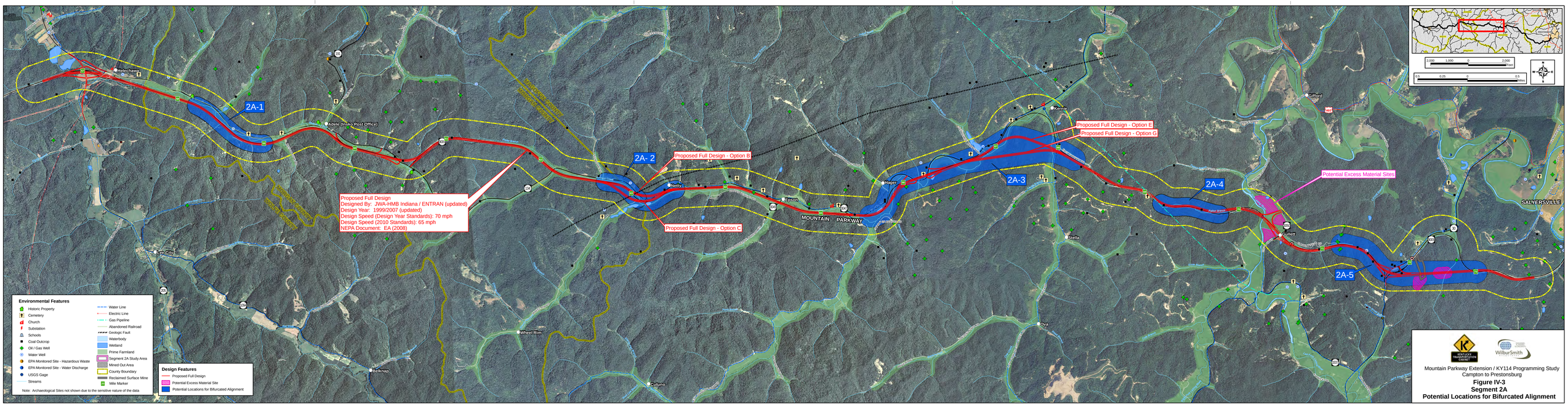
[1] 2.5% Annual Inflation Rate Applied
[2] Planning Level Cost Estimate
[3]Phase costs may not equal total due to rounding

Proposed Construction Sections and Priorities

Construction sections and priority sections were identified for the entire Mountain Parkway Extension/US 460/KY 114 corridor. Proposed construction sections are shown on **Figure 2** in **Appendix A**. As shown, Corridor Segment 2A is proposed for construction in six sections, ranging in costs (for the full design) from 18.7 to 52.4 million dollars.

Table 1 in **Appendix A** identifies the priority sections for the Mountain Parkway Extension/US 460/KY 114 corridor.

As shown, construction sections 2A-3, 2A-2, 2A-6, 2A-5, 2A-4, and 2A-1 have been designated by KYTC Highway District 10 as priorities 2, 3, 4, 5, 6, and 7, respectively.



Mountain Parkway Extension / KY114 Programming Study
Campton to Prestonsburg

Figure IV-3
Segment 2A
Potential Locations for Bifurcated Alignment

V. CORRIDOR SEGMENT 2B (SALYERSVILLE)

A. Project Location

Corridor Segment 2B includes portions of the Mountain Parkway Extension (KY 9009), from just west of Salyersville (milepoint 73.6) to the end of the Parkway (milepoint 75.6), US 460, from the end of the Parkway (milepoint 12.5) to the US 460/KY 114 intersection (milepoint 14.6), and KY 114 from the US 460/KY 114 intersection (milepoint 0.0) to 0.3 miles east (milepoint 0.3), in Magoffin County, Kentucky (4.4 total miles). The locations of all Corridor Segments are displayed on **Figure 1** in **Appendix A**.

B. Project History

This Corridor Segment was examined in some of the previous studies mentioned in **Section C** of **Chapter I** and located on the enclosed CD entitled "Previous Studies." Preliminary design plans were completed in 1999 by KYTC with assistance from ENTRAN for a new route to connect the Mountain Parkway with KY 114 south of the existing US 460 route. Preliminary design plans were completed in 2004 by KYTC with assistance from ENTRAN for a new route that would also connect the Mountain Parkway with KY 114 south of the existing US 460 route, but that was located closer to the existing alignment. Much of the information on this project was taken from Year 2000 Environmental Assessment (EA) documentation (hereinafter referred to as the 2000 EA) incorporated into the *KY 114 Finding of No Significant Impact (FONSI), Improvements from Bert T. Combs Mountain Parkway and KY 114 at Salyersville (Magoffin County) to just West of the US 23 Interchange in Prestonsburg (Floyd County, Item Number 12-001.00,* Kentucky Transportation Cabinet, Division of Environmental Analysis, March 2003, hereinafter referred to as the *2003 EA/FONSI*.

NOTE: The scope of this study sought to avoid duplication of any previous work. Where possible, the information and results from previous documents are presented. These were done at different times and with different levels of effort and/or assumptions used for analyses. Therefore, the level of detail may vary, and there may be differences and/or inconsistencies in the information presented, such as traffic forecasts and crash data, between the different segments discussed in this report. Attempts have been made to update or clarify information and/or enhance the preliminary purpose and need statements, when deemed practical and feasible, in this current study.

C. Existing Conditions

Geometric Characteristics

Corridor Segment 2B of the Mountain Parkway Extension is a two-lane fully controlled access facility consisting of 12 foot lanes and 10 foot paved shoulders. The posted speed limit is 55 mph. There is a climbing lane located on each side of the ridge between KY 7 and US 460. The Mountain Parkway Extension includes a partial cloverleaf interchange at KY 7 and currently terminates near the signalized Y-intersection at US 460.

Existing US 460 in Corridor Segment 2B (through Salyersville) consists of two 12 foot lanes and a 12 foot center turn lane used to access numerous businesses along this portion of the corridor. The posted speed limit at Salyersville is 45 mph and there is a traffic signal at the KY 9009/US 460 intersection.

East of the US 460 junction, existing KY 114 has two 12 foot lanes and 10 foot paved shoulders. Existing KY 114 has numerous access points along the length of the corridor. The posted speed limit along KY 114 is 55 mph.

The 2000 EA concluded that this section was substandard for the proposed design speed. The 2000 EA also identified four (4) new bridges that would need to be constructed over the Licking River and Burning Fork. In addition, bridges related to interchanges and intersections with the Mountain Parkway, KY 7, KY 1888, ramps for US 460, and various approaches would be required.

Existing Traffic Volumes and Level of Service (Year 2009)

Traffic volumes along the portion of Mountain Parkway Extension in Corridor Segment 2B range from 6,650 vehicles per day (vpd) to 8,790 vpd. Volumes along US 460 in Corridor Segment 2B range from 12,000 vpd to 15,300 vpd. The volume along the short section (0.3 miles) of KY 114 east of the US 460/KY 114 intersection is 6,470 vpd. Traffic volumes are shown on **Figure 1** in **Appendix A**.

The Level of Service (LOS) is a qualitative measure of highway traffic conditions, as defined in the 2000 Highway Capacity Manual (HCM), published by the Transportation Research Board (TRB). Individual levels of service characterize these conditions in terms of speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined and given letter designations from A to F, with LOS A as the best condition, representing free flow conditions, and with LOS F representing severe congestion and/or time delays. Typically, a minimum of LOS D is considered acceptable in urban areas, and LOS C is considered acceptable in rural areas.

Several inputs are required to determine LOS including highway class, terrain, hourly volume, truck percentage, directional distribution, number of lanes, lane width, shoulders, percent no-passing, number of access points, and speed. Of these factors, highway class, hourly volume, and percent no-passing had the greatest impact on LOS for this Corridor Segment.

On this segment of the Mountain Parkway, LOS ranges from C to D along the two-lane sections. Truck lanes are present at the western terminus of this segment. The presence of truck climbing lanes generally improves LOS one letter grade. US 460 is a three-lane section through Salyersville with LOS measuring between C and E. The location with LOS E occurs between MP 12.486 and MP 14.041 and is a result of the increased volume and the high number of access points along the section. The short section of KY 114 operates at LOS C.

Estimated No-Build Future Traffic and Level of Service (Year 2030)

No-Build future traffic was estimated using historic traffic volumes, previous traffic forecasts for the corridor, and Kentucky Statewide Model results. No significant changes to the roadway were assumed. A modest growth rate of one percent compounded annually was used and is a balance between previous forecasts and model results from this study.

No-Build future traffic volumes along the Mountain Parkway range from 8,100 vpd to 10,700 vpd. The increase in traffic results in LOS D with slight improvement as a result of truck climbing lanes. No-Build future traffic volumes along US 460 range from 14,600 vpd to 18,700 vpd. LOS ranges between D and E. The No-Build future traffic volume along KY 114 is 7,900 vpd resulting in LOS C, similar to existing results.

Estimated Future Traffic with Improvement (Year 2030)

Future traffic was estimated for this Corridor Segment, assuming a four-lane widening, using the Kentucky Statewide Travel Demand Model to estimate trip generation, attraction, and diversion. Future daily traffic volumes along US 460 are estimated to range from 16,400 vpd to 21,000 vpd in this Corridor Segment.

Crash Analysis

Crash analysis is done using a methodology developed by the Kentucky Transportation Center (KTC) which locates roadway "segments" based on traffic volumes and geometric characteristics to identify crash concentrations. The analysis also breaks down the roadway into 0.1-mile "spots" to determine if any of those spot locations demonstrate high crash frequencies. Each segment or spot is assigned a critical rate factor (CRF) based on formulas published by the KTC. The CRF is one measure of the safety of a road that compares the crash rate of the road under study to the average crash rate for other roads of the same functional classification throughout the state.

If the CRF is 1.00 or greater, it is assumed that crashes are happening due to circumstances that cannot be attributed to random occurrence. If this is the case, the spot or segment should be studied in more detail to ascertain if there are remedial actions that could be taken to improve the overall safety of the facility.

To update the crash analysis on the Mountain Parkway Extension for this current study, historic vehicle crash records were acquired from the Kentucky State Police-maintained Collision Analysis database for reported incidents occurring between January 1, 2004 and October 12, 2009. The results of this updated crash analysis are discussed in the following sections.

Reported Crashes

During the 5-year, 9-month period, 100 crashes were reported along Corridor Segment 2B. Of these, three resulted in fatalities, 36 resulted in injuries, and 61 were non-injury crashes.

The majority of crashes occurred on the two-mile section of US 460 in Salyersville. Common crash types for this crash analysis segment were rear end (one vehicle impacts the rear end of another which may be stopped or moving) and angle (one vehicle making a turning movement to/from a cross road or driveway) crashes. These types of crashes are consistent with the more highly developed setting of this portion of the corridor. Single vehicle collisions with animals or other objects along the roadway were also common.

Throughout the study, concerns were raised by the project team about frequent collisions with wildlife and the need to address this problem in future phases of project development. Crash data should be monitored in the future to determine if collisions with animals are a recurring problem in certain locations.

Crash Segments

Using KTC-defined guidelines, analysts divided Corridor Segment 2B into six crash analysis segments. **Table V-1** summarizes the results for these crash segments, one of which is above the 1.00 threshold (highlighted in red).

The section of US 460 between the Mountain Parkway and Pine Point Road intersection in Salyersville exhibits a CRF of 1.02, meaning crashes are probably happening along this section of roadway due to circumstances beyond random occurrence. This section of the roadway is lined with commercial businesses and serves the highest traffic volumes along the 50-mile project corridor. Spot improvements or access control measures could help reduce the number of vehicle crashes.

Table V-1 – Crash Segments

Route	Location		Length	ADT	Crashes				Critical Rate Factor (CRF)
	Begin MP	End MP			Fatal	Injury	Property Damage Only	Total	
KY 9009	73.600	74.763	1.163	6,650	1	1	2	4	**0.08**
KY 9009	74.763	75.627	0.864	8,790	1	3	4	8	**0.16**
US 460	12.486	12.967	0.481	15,300	0	20	31	51	**1.02**
US 460	12.967	14.041	1.074	14,500	1	9	15	25	**0.26**
US 460	14.041	14.566	0.525	12,000	0	0	7	7	**0.16**
KY 114	0.000	0.300	0.300	6,470	0	3	2	5	**0.29**

Crash Spots

Crash spots are defined where numerous crashes occur within close proximity. By definition, spots are 0.1-mile in length.

Two crash spots at or above the 1.00 threshold fall within Segment 2B, as shown in **Table V-2** below. Both spots fall within the high crash segment identified above, just east of the Mountain Parkway Extension/US 460 junction. The closely spaced access/egress points for high traffic businesses on either side of the street (fast food restaurants, gas stations, etc.) likely contribute to the high number of rear end and angle type collisions.

Table V-2 – Crash Spots in Segment 2B

Route	Location		ADT	Crashes				Critical Rate Factor (CRF)
	Begin MP	End MP		Fatal	Injury	PDO	Total	
US 460	12.518	12.618	15,300	0	4	14	18	**1.29**
US 460	12.650	12.750	15,300	0	5	9	14	**1.00**

D. Purpose and Need

The purpose and need for improvements to Corridor Segment 2A was derived from the *KY 114 Finding of No Significant Impact (FONSI), Improvements from Bert T. Combs Mountain Parkway and KY 114 at Salyersville (Magoffin County) to just West of the US 23 Interchange in Prestonsburg (Floyd County, Item Number 12-001.00,* Kentucky Transportation Cabinet, Division of Environmental Analysis, March 2003. The previous purpose and need statement has been supplemented based on the results of this study, as follows:

Purpose

As documented in the *2003 EA/FONSI*, the primary purpose of the proposed improvement to this segment of the Mountain Parkway Extension is to upgrade the critically deficient substandard highway facility to current AASHTO design guidelines to provide needed capacity and safety.

Other goals are to:

- Improve systems connectivity to and from the Mountain Parkway to US 23 at Prestonsburg to enable the Mountain Parkway/KY 114 corridor to serve its primary purpose as a major regional arterial, rather than as a local access road for homes and businesses; and
- Improve level of service.

Since the Mountain Parkway Extension is part of the KYTC State Primary System and the Appalachian Development Highway System, the project should also support and satisfy KYTC strategic goals and plans, as well as ARC goals, to:

- Take care of the existing transportation system and make it work better.
- Increase capacity and safety.
- Create opportunities for future economic growth and competitiveness by the following:
  - Address lack of sufficient transportation infrastructure and major highway system linkage in the economically disadvantaged East Kentucky region.
- Support the overall quality of life in Kentucky by the following:
  - Improve access to jobs and services for residents of Eastern Kentucky.
  - Improve the movement of goods and materials into and out of this portion of Eastern Kentucky.

Need

The need for the proposed project is based on the following characteristics and deficiencies, as documented in the 1998 *Mountain Parkway Extension Study* and the *2003 EA*/FONSI for Segment 2B of the Mountain Parkway Extension between Helechawa and Salyersville, and as supplemented by data collection, research, and analysis during the current study:

- Roadway congestion along existing route in Salyersville
- Highway deficiencies along existing route, including:
  - Substandard roadway geometry
  - Maneuverability/turning limitations due to numerous access points to local businesses/services
- Increased future traffic
  - 1998 traffic volumes were provided in the *2003 EA/FONSI*, but no future traffic volumes were documented for Segments 2B and 3.
  - No-Build forecasts were developed for this segment in the current programming study, showing an approximately 22% increase between 2009 and 2030, as follows:
    - KY 9009: 6,650 vpd to 8,790 vpd in 2009 vs. 8,100 vpd to 10,700 vpd in 2030
    - US 460: 12,000 vpd to 15,300 vpd in 2009 vs. 14,600 vpd to 18,700 vpd in 2030
    - KY 114: 6,470 vpd in 2009 vs. 7,900 vpd in 2030
- Increased truck traffic
  - No truck percentages or future traffic volumes were documented in the *2003 EA/FONSI*, so future estimates of truck traffic were not available from that source.
  - Based on 2009 KYTC traffic data, truck percentages were approximately 16.9% of the ADT on the portion of KY 9009, 7.9% on US 460 at Salyersville, and 13.9% on the portion of KY 114 included in Segment 2B. According to Statewide Model assumptions by the KYTC, this is expected to increase to approximately 23.3%, 10.8%, and 19.0%, respectively by 2030. Therefore, the daily truck volume for the entire length of Segment 2B would increase from a range of approximately 900 to 1,500 in 2009 to about 1,500 to 2,500 trucks per day in 2030, an increase of approximately 67% over the next two decades.

- Declining levels of service on existing route
  - Future traffic volume forecasts were not documented in the *2003 EA/FONSI,* but the LOS was discussed. The overall route (both US 460 and KY 114) was said to operate at LOS E in 1998 between Salyersville and Prestonsburg, but this was expected to decline to LOS F in 2020.
  - The LOS was updated as part of this programming study, which shows declines in LOS between 2009 and 2030 for two sections of Segment 2B if no improvements are made, as follows:
    - KY 9009: LOS C to D in 2009 vs. LOS D in 2030
    - US 460: LOS C to E in 2009 vs. LOS D to E in 2030
    - KY 114: LOS C in both 2009 and 2030
- High crash rates
  - No crash data or high crash locations were documented for KY 9009, US 460, or KY 114 within Corridor Segment 2B in the *2003 EA/FONSI*, although safety was indicated as one of the purposes of the proposed project.
  - One high crash segment and two high crash spots were identified during the study period for the updated crash analysis undertaken for the current study.
- High unemployment and poverty rates in Eastern Kentucky

E. Environmental Overview

The 1999 design in Corridor Segment 2B was originally included (with Segment 3 - KY 114 from Salyersville to KY 404 near Prestonsburg) in the *KY 114 Finding of No Significant Impact (FONSI), Improvements from Bert T. Combs Mountain Parkway and KY 114 at Salyersville (Magoffin County) to just West of the US 23 Interchange in Prestonsburg (Floyd County, Item Number 12-001.00,* Kentucky Transportation Cabinet, Division of Environmental Analysis, March 2003. This document can be found on the enclosed CD entitled "FONSI, KY 114 from Mountain Parkway/KY 114 at Salyersville to just West of the US 23 Interchange in Prestonsburg, 2003." This environmental document is no longer current, so updates may be needed during future project development efforts.

The Segment 2B study area was shaped by the 1999 design, the 2004 design and consideration of an improvement to the existing US 460 route in this area, which is discussed later in this chapter. However, no formal environmental documentation had been completed for the 2004 design in Corridor Segment 2B. Therefore, a data search and field review was undertaken to identify potential environmental issues for this segment. Issues not discussed in this chapter were thought to be adequately covered in the *2003 EA/FONSI*. The *2003 EA/FONSI*, which included a portion of the Corridor Segment 2B area (for the 1999 design) and Corridor Segment 3, is summarized in **Chapter VI, Section E. Environmental Overview**.

Environmental features were mapped for design options within the Corridor Segment 2B study area, as shown on **Figures V-1, V-2,** and **V-3**. The following summarizes additional or updated features in the Segment 2B study area.

Natural and Manmade Water Features

Water Resources

There are 6.4 miles of water line in the study area, with 4.6 miles owned and maintained by the Magoffin County Water District and 1.8 miles by Salyersville Water Works.

There are 1.9 miles of sewer line in the study area, owned by Salyersville Water Works.

Study Area

1999 Design
Designed By: ENTRAN
Design Year: 1999
Design Speed (Design Year Standards): 65 MPH
Design Speed (2010 Standards): 65 MPH
NEPA Document: FONSI (2003)

2,000 1,000 0 2,000 Feet

0.5 0.25 0 0.5 Miles

N W E S

Environmental Features

- Populated Place
- Historic Property
- National Register Properties
- School
- Manufacturing Establishment
- Cemetery
- Church
- Tiredump
- Landfill
- Underground Storage Tank
- Coal Outcrops
- Oil / Gas Well
- Lift Station
- Water Meter
- Water Pump
- Water Tank
- Public Water Source
- Permitted Water Withdrawal
- Water Well
- EPA Monitored Site - Hazardous Waste
- EPA Monitored Site - Water Discharge
- EPA Monitored Site - Toxic Release
- Water Line
- Sewer Line
- Electric Line
- Gas Pipeline
- Geologic Faults
- Local Park
- Prime Farmland
- Wetland
- Floodplain
- Segment 2B Study Area
- 20 Mile Marker

Note: Archaeological Sites not shown due to the sensitive nature of the data

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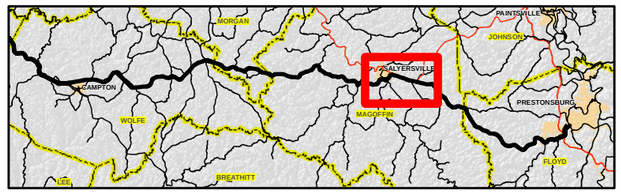
Campton to Prestonsburg

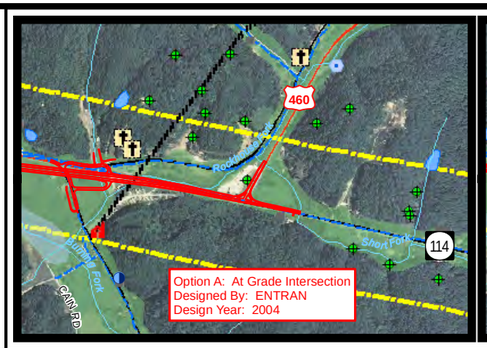
Figure V-1
Segment 2B (1999 Design)



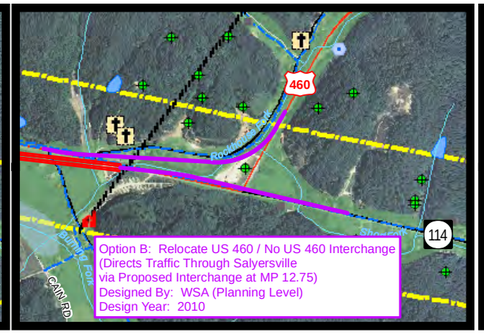
2,000 1,000 0 2,000 Feet

0.5 0.25 0 0.5 Miles

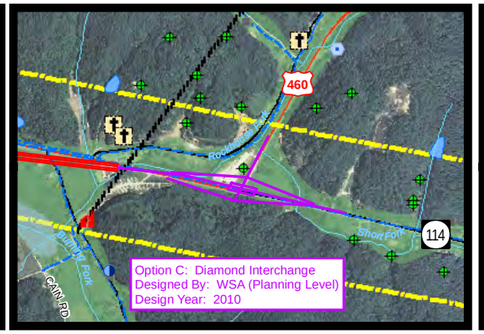
N W E S



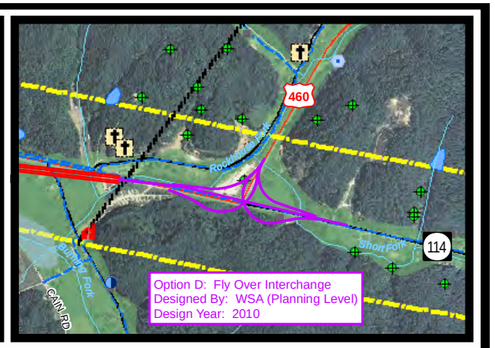
Option A: At Grade Intersection
Designed By: ENTRAN
Design Year: 2004



Option B: Relocate US 460 / No US 460 Interchange
(Directs Traffic Through Salyersville
via Proposed Interchange at MP 12.75)
Designed By: WSA (Planning Level)
Design Year: 2010



Option C: Diamond Interchange
Designed By: WSA (Planning Level)
Design Year: 2010

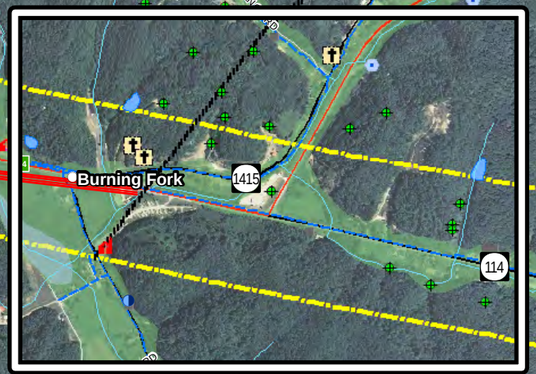


Option D: Fly Over Interchange
Designed By: WSA (Planning Level)
Design Year: 2010

KY 7 Interchange & Tie-Into Segment 2A
Designed By: WSA (Planning Level)
Design Year: 2010
Design Speed: 65 MPH
NEPA Document: N/A

Study Area

"Modified" 2004 Bypass
Designed By: ENTRAN
Design Year: 2004
Design Speed (Design Year Standards): 65 MPH
Design Speed (2010 Standards): 65 MPH
NEPA Document: N/A



Mason

Environmental Features

- Populated Place
- Historic Property
- National Register Properties
- School
- Manufacturing Establishment
- Cemetery
- Church
- Tiredump
- Landfill
- Underground Storage Tank
- Coal Outcrops
- Oil / Gas Well
- Lift Station
- Water Meter
- Water Pump
- Water Tank
- Public Water Source
- Permitted Water Withdrawal
- Water Well
- EPA Monitored Site - Hazardous Waste
- EPA Monitored Site - Water Discharge
- EPA Monitored Site - Toxic Release
- Water Line
- Sewer Line
- Electric Line
- Gas Pipeline
- Geologic Faults
- Local Park
- Prime Farmland
- Wetland
- Floodplain
- Segment 2B Study Area
- Mile Marker

Note: Archaeological Sites not shown due to the sensitive nature of the data

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Figure V-2
Segment 2B (2004 Design)

KY 7 Interchange & Tie-Into Segment 2A
Designed By: WSA (Planning Level)
Design Year: 2010
Design Speed: 65 MPH
NEPA Document: N/A

"Through Salyersville"
Designed By: WSA (Planning Level)
Design Year: 2010
Design Speed: 45 MPH
NEPA Document: N/A

Study Area

Burning Fork

Mason

2,000 1,000 0 2,000 Feet

0.5 0.25 0 0.5 Miles

N W E S

Environmental Features

- Populated Place
- Historic Property
- National Register Properties
- School
- Manufacturing Establishment
- Cemetery
- Church
- Tiredump
- Landfill
- Underground Storage Tank
- Coal Outcrops
- Oil / Gas Well
- Lift Station
- Water Meter
- Water Pump
- Water Tank
- Public Water Source
- Permitted Water Withdrawal
- Water Well
- EPA Monitored Site - Hazardous Waste
- EPA Monitored Site - Water Discharge
- EPA Monitored Site - Toxic Release
- Water Line
- Sewer Line
- Electric Line
- Gas Pipeline
- Geologic Faults
- Local Park
- Prime Farmland
- Wetland
- Floodplain
- Segment 2B Study Area
- Mile Marker

Note: Archaeological Sites not shown due to the sensitive nature of the data

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Campton to Prestonsburg

Figure V-3
Segment 2B ("Through Salyersville")

Surface Water

There are 6.9 miles of streams in the study area, as follows:

- 1.0 miles Licking River
- 2.4 miles Burning Fork
- 0.8 miles Oxier Branch
- 0.7 miles Rockhouse Fork
- 0.4 miles Short Fork
- 0.3 miles Lick Branch
- 0.2 miles Prater Branch
- 1.1 miles of unnamed streams

Lakes/ Ponds

There are no lakes in the Corridor Segment 2B Study Area. There are six (6) ponds in the study area (see *Wetlands* section below)

Wetlands

There are six (6) wetland areas in the Corridor Segment 2B study area. All are *Palustrine* wetlands, which are systems that commonly include all non-tidal wetlands dominated by trees, shrubs, emergents, mosses and lichens. They are generally less than twenty (20) acres in size, exhibit a shoreline that is not wave-formed or bedrock laden, and a low water depth of less than two (2) meters (6.6 feet) at its deepest point.
The total wetland acreage is 5.2 acres, as follows:

- PUBHh – 3.9 acres
  (P) Palustrine
  (UB) Unconsolidated Bottom
  (H) Permanently Flooded
  (h) Diked/Impounded
- PUBHx – 1.3 acres
  (P) Palustrine
  (UB) Unconsolidated Bottom
  (H) Permanently Flooded
  (x) Excavated

Floodplains

There are 189.9 acres of floodplains in the study area. "Zone A" flood zones are areas inundated by 100-year flooding for which Base Flood Elevations (BFE) have not been determined. "Zone AE" flood zones are areas inundated by 100-year flooding for which Base Flood Elevations (BFE) have been determined. In the study area there are 36.1 acres of "Zone A" flood zones. There are 153.8 acres of "Zone AE" flood zones.

Social, Economic and Environmental Justice Concerns

Social and Economic Locations

The following five (5) churches are located in the Corridor Segment 2B study area:

- Burning Fork Community Church
- Freewill Baptist Church
- Mouth of Rockhouse Church
- St. Luke Catholic Church
- New Life Worship Center

The following two (2) schools are located in the study area:

- Herald Whitaker Middle School
- Magoffin County High School

Five (5) cemeteries are located in the study area, as follows:

- Rockhouse Cemetery
- Names not known on remaining four (4) cemeteries.

Environmental Justice

A 1994 Executive Order directed every Federal agency to make Environmental Justice (EJ) part of its mission. Regarding transportation projects, there are three fundamental EJ principles: (1) avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations; (2) ensure the full and fair participation by all potentially affected communities in the transportation decision-making process; and (3) prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

The Big Sandy Area Development District (BSADD) completed an *Environmental Justice and Community Impacts Report* for Corridor Segment 2B and Corridor Segment 3. The full report is shown in **Appendix D**. BSADD conducted an extensive review of data obtained for Floyd and Magoffin Counties from the U.S. Census Bureau for income, race and age. The ADD then held discussions with local officials and completed field reconnaissance.

BSADD concluded that there is no apparent adverse effect on any minority segment of the populations in the affected census tracts of Corridor Segment 2B. Population data does not evidence a possibility of the project being detrimental to any minority group.

While the affected census tracts have populations well above the state average for persons living below the poverty level, the affected tracts in each county are actually slightly lower than their respective county averages; therefore, it is not deemed likely this project would have any negative impact on this population segment.

There are population groups in the affected tracts of each county that exceed the county and/or state averages for populations 65 or older. However, they are not significantly higher in numbers than those countywide or statewide, and those populations are not expected to experience any adverse effects from this proposed project.

There are significantly higher-than-average concentrations of persons claiming disability status within the affected census tracts of Corridor Segments 2B; however, the percentage of the population that claimed disability is comparable to the surrounding counties, and is, in the case of Magoffin County, not enough above the mean to warrant closer examination.

Efforts were made to identify any high concentrations of a specific population. While elements of some population groups were found to have elevated percentages, they were not determined to be in need of closer scrutiny, either because of the actual numbers, or similar demographic profiles to surrounding groups, tracts or counties.

EJ populations should be further investigated in subsequent phases of this project to identify and document any demographic and/or socioeconomic changes that may have occurred in the project area.

Historic and Archaeological Sites

Historic Sites

No historic sites within Corridor Segment 2B are listed with the Kentucky Heritage Council. There are also no properties within Corridor Segment 2B listed with the National Register of Historic Places.

Archaeological Sites

There are 12 archaeological sites listed with the Office of State Archaeology, as follows:

- 6 Euro-American sites
- 3 Native American sites
- 3 both Euro-American and Native American sites

Prime and Unique Farmlands

There are 388.6 acres of prime and unique farmland in the Corridor Segment 2B study area, as follows:

- 327.9 acres prime farmland
- 56.9 acres of prime farmland where protected from flooding or not frequently flooded during the growing season
- 3.8 acres of prime farmland where drained and protected from flooding or not frequently flooded during the growing season

Monitored Sites

There is one (1) Hazardous Waste Site known to exist in the Corridor Segment 2B study area. It is the Salyersville Somerset Oil Station.

Two (2) Water Discharge Sites were identified in the study area, as follows:

- Salyersville Sewer
- Parkway Sunoco

Additional Concerns

The following additional features were identified in the *2003 EA/FONSI* for the Corridor Segment 2B study area:

- Geologic Fault (0.4 miles)
- Overhead Transmission Line (0.4 miles)
- 1 Rock Quarry
- 1 Landfill listed as 'Grade School'
- 1 Tire dump (inspected in 1997, possibly gone)
- 19 Oil and Gas Wells
  - Nine (9) are Natural Gas Producing Wells
  - Five (5) are Oil Producing Wells
  - Three (3) are Dry & Abandoned
  - Two (2) have a terminated permit and are abandoned
- Coal Outcrops throughout the study area

F. Analysis/Findings

The following section provides a summary of proposed Mountain Parkway Extension and US 460/ KY 114 projects in Corridor Segment 2B; a potential practical solution option; cost estimates by phase; proposed construction sections; and priority sections for programming. Also included are proposed locations for consideration as waste areas.

Proposed Projects

To meet the purpose and need, as well as the other goals of the project, the key solution proposed in the 1999 design, the 2003 EA/FONSI, and a subsequent 2004 design (to address local public input) was to separate local access trips and long-distance through movements at Salyersville.

For the current study, three design options ("Full Design 1," "Full Design 2," and "Practical Design 1") were examined for Corridor Segment 2B, as follows:

- The original 1999 design, shown in **Figure V-1** in a previous section of this chapter, is considered "Full Design 1."
- The 2004 design with a new connection to the Mountain Parkway Extension (Segment 2A terminus), shown in **Figure V-2**, is considered "Full Design 2."
- A third option was developed for this study to improve existing US 460 "through Salyersville," shown in **Figure V-3**, is considered "Practical Solution 1."

Table V-3 outlines the design assumptions for each design option.

Table V-3 – Design Assumptions

	Segment 2B		
	US 460 (Salyersville)		
	Full Design 1	Full Design 2	Practical Design 1
	KYTC 1999 Design	KYTC 2004 Design Plus New Connection to Segment 2A	"Through Salyersville"
Design Controls			
Classification	Rural Arterial	Rural Arterial	Urban Arterial
Terrain	Rolling	Rolling	Level
Design Speed (Design Year Standards)	65 mph	65 mph	45 mph
Design Speed (2010 Standards)	65 mph	65 mph	45 mph
Access Control	Full Control	Full Control	Partial Control
ADT (Existing 2009)	KY 9009 6,650 vpd to 8,790 vpd, US 460 12,000 vpd to 15,300 vpd, KY 114 6470 vpd		
ADT (Future No-Build 2030)	KY 9009 8,100 vpd to 10,700 vpd, US 460 14,600 vpd to 18,700 vpd, KY 114 7,900 vpd		
ADT (Future With Improvement 2030)	US 460 16,400 vpd to 21,000 vpd		
Typical Section			
Lanes	Four 12-ft Lanes	Four 12-ft Lanes	Four 12-ft Lanes
Outside Shoulder	12 ft (10 ft Paved)	12 ft (10 ft Paved)	Curb & Gutter, 5 ft berm & 5 ft sidewalk
Median	40 ft Depressed	40 ft Depressed	14 ft Raised with Turn Lanes as Needed
Alignment			
emax	8%	8%	4%
Min. Radius	1,485 ft	1,485 ft	711 ft
Max Grade	4%	4%	6%
Vertical Clearance	16 ft	16 ft	16 ft
Existing Roadway Segment Length	5.6 miles	4.4 miles	4.4 miles
Proposed Design Segment Length	5.3 miles	4.3 miles	4.4 miles

The Programming Study Project Team determined that the third option, "Practical Design 1," does not meet the Purpose and Need for this Corridor Segment since it primarily improves local access and does not adequately enhance regional mobility and systems connectivity between the Mountain Parkway and US 23. The proposed "Practical Design 1" improvement to existing US 460 is potentially beneficial to the local area and is worthy of future consideration as a separate project, but not as part of this overall corridor improvement in lieu of a new route south of the existing alignment to provide regional systems connectivity from KY 114 to the Mountain Parkway Extension (KY 9009), as provided by the other design options.

There will be approximately 150 thousand cubic yards of excess earthwork with the full design in Corridor Segment 1B. The areas identified within the study area boundary could store less than 1% of this excess material.

G. Project Costs and Priorities

Cost estimates, in some cases and to varying degrees, were developed in previous studies. Previous cost estimates were inflated to current dollars using a 2.5% annual inflation factor. Cost estimates were created where no estimate had been completed previously. Cost estimates are subject to change in future phases of project development.

Table V-4 presents a summary of Corridor Segment 2B cost estimates.

As mentioned previously, the Programming Study Project Team determined that Practical Design 1 does not meet the Purpose and Need for Corridor Segment 2B. Therefore, the total cost for Corridor Segment 2B for the purposes of this study range from approximately $106 million to $140.3 million.

Table V-4 – Cost Estimates

Phase	Segment 2B (Millions) (2010 Dollars)[3]		
	Full Design 1	Full Design 2	Practical Design 1
	KYTC 1999 Design[1]	KYTC 2004 Design	"Through Salyersville"
Construction Cost	$119.8	$87.0	$45.5
Design Cost	$6.0	$6.1	$4.6
Utility Cost	$1.4	$1.5	$2.7
Right-of-Way Cost	$13.0	$11.4	$4.7
Total Cost	**$140.3**	**$106.0**	**$57.4**
Proposed Design Segment Length (Miles)	*5.30*	*4.30*	*4.40*
Construction Cost Per Mile	$22.6	$20.2	$10.3
Total Cost Per Mile	$26.5	$24.7	$13.1

[1] 2.5% Annual Inflation Rate Applied
[2] Planning Level Cost Estimate
[3] Phase costs may not equal total due to rounding

Proposed Construction and Priority Sections

Construction sections and priority sections were identified for the entire Mountain Parkway Extension/US 460/KY 114 corridor. Proposed construction sections are shown on **Figure 2** in **Appendix A**. Corridor Segment 2B is proposed for construction in one section.

Table 1 in **Appendix A** presents the priority sections for the Mountain Parkway Extension/US 460/KY 114 corridor. As shown, "Full Design 2" (the 2004 Design) for Corridor Segment 2B is Priority 1 for KYTC Highway Districts 10 and 12.

VI. CORRIDOR SEGMENT 3 (SALYERSVILLE TO KY 404 NEAR PRESTONSBURG)

A. Project Location

Corridor Segment 3 is the portion of KY 114 from the US 460/KY 114 intersection in Salyersville (milepoint 0.3) to just west of KY 404 near Prestonsburg (milepoint 9.4), in Magoffin and Floyd Counties, in Kentucky (a distance of 14.1 miles). Corridor Segments are displayed on **Figure 1** in **Appendix A**.

B. Project History

This Corridor Segment was examined in some of the previous studies mentioned in **Section C** of **Chapter I** and located on the enclosed CD entitled "Previous Studies." Preliminary design plans to widen KY 114 within Corridor Segment 3 to four lanes were completed in 1999 by KYTC with assistance from ENTRAN.

NOTE: The scope of this study sought to avoid duplication of any previous work. Where possible, the information and results from previous documents are presented. These were done at different times and with different levels of effort and/or assumptions used for analyses. Therefore, the level of detail may vary, and there may be differences and/or inconsistencies in the information presented, such as traffic forecasts and crash data, between the different segments discussed in this report. Attempts have been made to update or clarify information and/or enhance the preliminary purpose and need statements, when deemed practical and feasible, in this current study.

C. Existing Conditions

Geometric Characteristics

From just east of the US 460/KY 114 junction in Magoffin County to near KY 404 in Floyd County, existing KY 114 has two 12 foot lanes with 10 to 12 feet paved shoulders. The last 0.4 mile (just west of KY 404) has already been widened to four lanes. Existing KY 114 has numerous access points along the length of the corridor. The posted speed limit in the corridor is currently 55 mph. In some locations with severe vertical grades, there are passing lanes for the direction of traffic climbing the uphill grade.

An Environmental Assessment (EA) was completed in 2000 and Finding of No Significant Impact (FONSI) in 2003 for KY 114 improvements from the Mountain Parkway at Salyersville to just west of the US 23 Interchange in Prestonsburg. This EA concluded that the existing horizontal alignment does not meet current standards for a 60 mph design speed. The existing road has many sharp curves which limit sight distances and contribute to an undesirable condition for this two-lane arterial. Passing opportunities are restricted due to curves, traffic volumes, numerous entrances, and heavy truck traffic throughout the project corridor. The existing roadway has a maximum grade of 6.37% and includes grades that are too steep for a 60 mph design speed at Ivyton.

The EA identified 22 bridges that would have to be constructed over the Licking River, Burning Fork, and Middle Creek. In addition, bridges related to interchanges and intersections with various approaches will be required. One bridge would be required for the CSX railroad crossing at Ivyton.

Existing Traffic Volumes and Level of Service (Year 2009)

Traffic volumes along KY 114 range from 5,370 vehicles per day (vpd) to 6,470 along the first 11.5 miles of Corridor Segment 3 in Magoffin and Floyd Counties. The remaining 2.6 miles of KY 114 carries 11,900 vpd.

The Level of Service (LOS) is a qualitative measure of highway traffic conditions, as defined in the 2000 Highway Capacity Manual (HCM), published by the Transportation Research Board (TRB). Individual levels of service characterize these conditions in terms of speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined and given letter designations from A to F, with LOS A as the best condition, representing free flow conditions, and with LOS F representing severe congestion and/or time delays. Typically, a minimum of LOS D is considered acceptable in urban areas and LOS C is considered acceptable in rural areas.

Several inputs are required to determine LOS including highway class, terrain, hourly volume, truck percentage, directional distribution, number of lanes, lane width, shoulders, percent no-passing, number of access points, speed. Of these factors, highway class, hourly volume, and percent no-passing had the greatest impact on LOS for this Corridor Segment.

On Corridor Segment 3, LOS is primarily C, but is D to E along the last 2.4 miles of the two-lane section near Prestonsburg. The 0.2 mile four-lane section (just west of KY 404) at the eastern end of Corridor Segment 3, which is not the focus of this study, operates at LOS A. The LOS E is a result of the significant increase in traffic near Prestonsburg, when compared to other rural segments, and the lack of passing opportunities. Truck climbing lanes are present throughout the corridor. The presence of truck climbing lanes generally improves LOS one letter grade.

Estimated No-Build Future Traffic and Level of Service (Year 2030)

No-Build future traffic was estimated using historic traffic volumes, previous traffic forecasts for the corridor, and Kentucky Statewide Model results. No significant changes to the roadway were assumed. A modest growth rate of one percent compounded annually was used and is a balance between previous forecasts and model results from this study.

No-Build future traffic volumes for the first 11.5 miles of KY 114 in Corridor Segment 3 range from 5,600 vpd to 7,900. The remaining 2.6 miles of KY 114 is expected to carry 14,500 vpd in the future. The increase in traffic is expected to have minimum impact on LOS for the two-lane segment. The 0.2 mile four-lane section just west of KY 404, which is not the focus of this study, is expected to decrease to LOS B.

Estimated Future Traffic with Improvement (Year 2030)

Future traffic was estimated for this Corridor Segment, assuming a four-lane widening, using the Kentucky Statewide Travel Demand Model to estimate trip generation, attraction, and diversion. Future daily traffic volumes along KY 114 are estimated to range from 7,300 vpd to 16,300 vpd.

Crash Analysis

Crash analysis is done using a methodology developed by the Kentucky Transportation Center (KTC) which locates roadway “segments” based on traffic volumes and geometric characteristics to identify crash concentrations. The analysis also breaks down the roadway into 0.1-mile “spots” to determine if any of those spot locations demonstrate high crash

frequencies. Each segment or spot is assigned a critical rate factor (CRF) based on formulas published by the KTC. The CRF is one measure of the safety of a road that compares the crash rate of the road under study to the average crash rate for other roads of the same functional classification throughout the state.

If the CRF is 1.00 or greater, it is assumed that crashes are happening due to circumstances that cannot be attributed to random occurrence. If this is the case, the spot or segment should be studied in more detail to ascertain if there are remedial actions that could be taken to improve the overall safety of the facility.

To update the crash analysis on the Mountain Parkway Extension for this current study, historic vehicle crash records were acquired from the Kentucky State Police-maintained Collision Analysis database for reported incidents occurring between January 1, 2004 and October 12, 2009. The results of this updated crash analysis are discussed in the following sections.

Reported Crashes

During the 5-year 9-month analysis period, 207 crashes were reported along Corridor Segment 3. Of these crashes, eight resulted in fatalities, 64 resulted in injuries, and 135 were non-injury crashes.

The majority of crashes in this segment were single vehicle collisions, making up 55% of the reported crashes. Several rear end (one vehicle impacts the rear end of another which may be stopped or moving) and angle (one vehicle making a turning movement to/from a cross road or driveway) type crashes were also reported, representing 18% and 13% of reported crashes, respectively. Eight head-on collisions were reported on this segment, representing two fatalities and four additional injury collisions.

Throughout the study, concerns were raised by the project team about frequent collisions with wildlife and the need to address this problem in future phases of project development. Crash data should be monitored in the future to determine if collisions with animals are a recurring problem in certain locations.

Crash Segments

Analysts divided this portion of the project into KTC-defined crash segments; dividing segments for analysis where the traffic volume or geometric characteristics (e.g., number of lanes) change. Six crash segments were identified within Corridor Segment 3. **Table VI-1** below summarizes the results for these crash segments, one of which is above the 1.00 threshold (highlighted in red).

Table VI-1 – Crash Segments

Route	Location			ADT	Crashes				Critical Rate Factor (CRF)
	County	Begin MP	End MP		Fatal	Injury	Property Damage Only	Total	
KY 114	Magoffin	0.300	2.758	6,470	0	8	21	29	0.30
KY 114	Magoffin	2.758	5.026	5,370	0	6	15	21	0.27
KY 114	Floyd	0.000	0.280	5,370	0	5	13	18	**1.25**
KY 114	Floyd	0.280	6.817	5,920	4	25	44	73	0.34
KY 114	Floyd	6.817	9.114	11,900	3	13	32	48	0.30
KY 114	Floyd	9.114	9.567	11,900	1	7	10	18	0.81

The section of KY 114 between the Magoffin-Floyd county line (milepoint 0.000) and the KY 1427 (milepoint 0.280) intersection exhibits a CRF of 1.25, indicating that crashes are probably happening along this section of roadway due to circumstances beyond random occurrence. This section of the roadway lies in a curve with multiple driveways and entrances approaching the intersection. There is a deficient curve along the Mountain Parkway Extension within this high crash segment.

Two segments (highlighted in orange) do not have a CRF > 1.00, but they appear to have a relatively high incidence of fatalities and injuries.

Crash Spots

Crash spots are defined where numerous crashes occur within close proximity. By definition, spots are 0.1-mile in length.

Four crash spots at or above the 1.00 threshold fall within Segment 3, as shown in **Table VI-2** (highlighted in red).

The first high crash spot (milepoint 4.860 to 4.960 in Magoffin County) is adjacent to the west of the high crash segment. The second high crash spot (milepoint 0.000 to 0.100 in Floyd County), which has the highest CRF, falls within the high crash segment discussed in the previous section. There are no horizontal deficiencies along this portion of KY 9009. There are multiple entrances within these two spot locations.

The third high crash spot (milepoint 0.201 to 0.301 in Floyd County) is adjacent to the east of the high crash segment. This location includes the KY 1427 intersection and multiple entrances. There is a deficient curve on KY 9009 within this spot location.

The fourth spot (milepoint 9.472 to milepoint 9.572 in Floyd County) appears to have a relatively high incidence of fatalities and injuries (highlighted in orange). This location includes the KY 404 intersection. There is a deficient curve along KY 9009 at this location.

Table VI-2 – Crash Spots

Route	Location			ADT	Crashes				Critical Rate Factor (CRF)
	County	Begin MP	End MP		Fatal	Injury	Property Damage Only	Total	
KY 114	Magoffin	4.860	4.960	5,370	0	1	6	7	**1.02**
KY 114	Floyd	0.000	0.100	5,370	0	2	8	10	**1.46**
KY 114	Floyd	0.201	0.301	5,490	0	2	5	7	**1.01**
KY 114	Floyd	9.472	9.572	11,900	1	5	2	8	**1.06**

D. Purpose and Need

The preliminary purpose and need for improvements to Corridor Segment 2A was derived from the *KY 114 Finding of No Significant Impact (FONSI), Improvements from Bert T. Combs Mountain Parkway and KY 114 at Salyersville (Magoffin County) to just West of the US 23 Interchange in Prestonsburg (Floyd County, Item Number 12-001.00,* Kentucky Transportation Cabinet, Division of Environmental Analysis, March 2003. The previous purpose and need statement has been supplemented based on the results of this study, as follows:

Purpose

As documented in the *2003 EA/FONSI*, the primary purpose of the proposed improvement to this segment of the Mountain Parkway Extension is to upgrade the critically deficient substandard highway facility to current AASHTO design guidelines to provide needed capacity and safety. Other project goals are to:

- Improve systems connectivity to and from the Mountain Parkway to US 23 at Prestonsburg to enable the Mountain Parkway/KY 114 corridor to serve its primary purpose as a major regional arterial, rather than as a local access road for homes and businesses;
- Improve Level of Service (LOS) to meet forecasted traffic volumes

Need

The need for the proposed project is based on the following characteristics and deficiencies, as documented in the *2003 EA/FONSI* for KY 114 between Salyersville and Prestonsburg, and as supplemented by data collection, research, and analysis during the current study:

- Highway deficiencies, including:
  - Substandard roadway geometry
    - Steep grades at Ivyton
    - Numerous sharp horizontal curves
    - Limited sight distance
  - Functionally obsolete bridge structures
  - Maneuverability/passing limitations
  - Problem due to combination of bridge over CSX RR and a cross slope exceeding design criteria
- Increased future traffic
  - 1998 traffic volumes were provided in the *2003 EA/FONSI*, but no future traffic volumes were documented for Segments 2B and 3.
  - Traffic forecasts developed for this current programming study indicate an approximately 4% increase to 22% increase between 2009 and 2030: 5,370-11,900 vpd in 2009 vs. 5,600-14,500 vpd for the no-build alternative in 2030. The 4% increase is for a 2,6-mile section just east of the US 460/KY114 junction in Magoffin County, but forecasts indicate an approximately 22% increase in traffic for most of this Corridor Segment over the next two decades.
- Increased truck traffic
  - No truck percentages or future traffic volumes were documented in the 2003 EA/FONSI, so future estimates of truck traffic were not available from that source.
  - Based on 2009 KYTC traffic data, trucks comprised approximately 13.9% of the ADT on this Corridor Segment in Magoffin County and 16.5% in Floyd County when the study began. According to Statewide Model assumptions by the KYTC, this is expected to increase to approximately 19.0% and 22.6%, respectively, by 2030. Therefore, the daily truck volume would increase from a range of 750 to 1,960 trucks per day in 2009 to about 1,060 to 3,280 trucks per day in 2030, an increase ranging from 41% to 67%.
- Declining levels of service
  - Future traffic volume forecasts were not documented in the *2003 EA/FONSI,* but the LOS was discussed. KY 114 was said to operate at LOS E in 1998 between Salyersville and Prestonsburg, but this was expected to decline to LOS F in 2020.

- An updated analysis indicates LOS C to E along the two-lane portion of KY 114 between Salyersville and Prestonsburg in 2009. Increased future traffic is expected to have minimum impact on LOS in 2030 for this section.

- High crash rates
  - While high crash locations may have existed, no crash data or high crash locations were documented for KY 9009, US 460, and KY 114 in the *2003 EA/FONSI*, although safety was indicated as one of the purposes of the project.
  - One high crash segment and four high crash spots were found during the study period for the updated crash analysis undertaken for the current study.

Since the Mountain Parkway Extension is part of the KYTC State Primary System and the Appalachian Development Highway System, the project should also support and satisfy KYTC strategic goals and plans, as well as ARC goals, to:

- Take care of the existing transportation system and make it work better.
- Increase capacity and safety.
- Create opportunities for future economic growth and competitiveness by the following:
  - Address lack of sufficient transportation infrastructure and major highway system linkage in the economically disadvantaged East Kentucky region.
- Support the overall quality of life in Kentucky by the following:
  - Improve access to jobs and services for residents of Eastern Kentucky.
  - Improve the movement of goods and materials into and out of this portion of Eastern Kentucky.

E. Environmental Overview

Segment 3 improvements were designed by ENTRAN in 1999. Segment 3 (along with Segment 2B) was included in the following environmental document, which is no longer current: *KY 114 Finding of No Significant Impact (FONSI), Improvements from Bert T. Combs Mountain Parkway and KY 114 at Salyersville (Magoffin County) to just West of the US 23 Interchange in Prestonsburg (Floyd County, Item Number 12-001.00,* Kentucky Transportation Cabinet, Division of Environmental Analysis, March 2003.

The following summarizes the environmental features discussed in the 2003 environmental documents, covering Segments 2B and 3 of the study area. The discussion in the EA/FONSI was not presented in such a way that one can easily discern the features and concerns in Corridor Segment 2B vs. Corridor Segment 3, so the overall summary of both Corridor Segments is presented here. With the exception of the ***Environmental Justice*** subsection, data from the *2003 EA/FONSI* is summarized as presented, i.e., no updates have been made.

Environmental features in Corridor Segment 3 are shown on **Figure VI-1**.

Socioeconomics

Community characteristics considered as part of this analysis are divided into four (4) categories: land use, farmlands, population demographics, and relocations/displacements.

Land Use

Land use along the existing KY 114 corridor is primarily scattered residential and undeveloped land with forested hillsides, some open pasture, small cemeteries, and limited

intermittent agricultural fields. A total of 1,005 acres of right-of-way make up Corridor Segments 2B and 3.

Farmland Impacts

The rugged terrain of Floyd and Magoffin Counties has limited the agricultural production of the area. Farmland accounts for 4% of the total land area of Floyd County and 23% of the total land area of Magoffin County. The average farm size is just over 100 acres.

The project is not expected to have significant impacts to agricultural resources. Coordination with the Magoffin County National Resource Conservation Service (NRCS) office indicates that the Selected Alternative with temporary connectors will impact 8.0 acres of prime and unique farmlands but no statewide or local importance farmlands. The Floyd County NRCS indicates that the preferred alignment will impact 25.9 acres of prime and unique farmlands and 151.7 acres of statewide or local importance farmland. Higher numbers in Floyd County reflect areas used for both existing roadway and forested areas, which would not be practical to farm.

Population Demographics

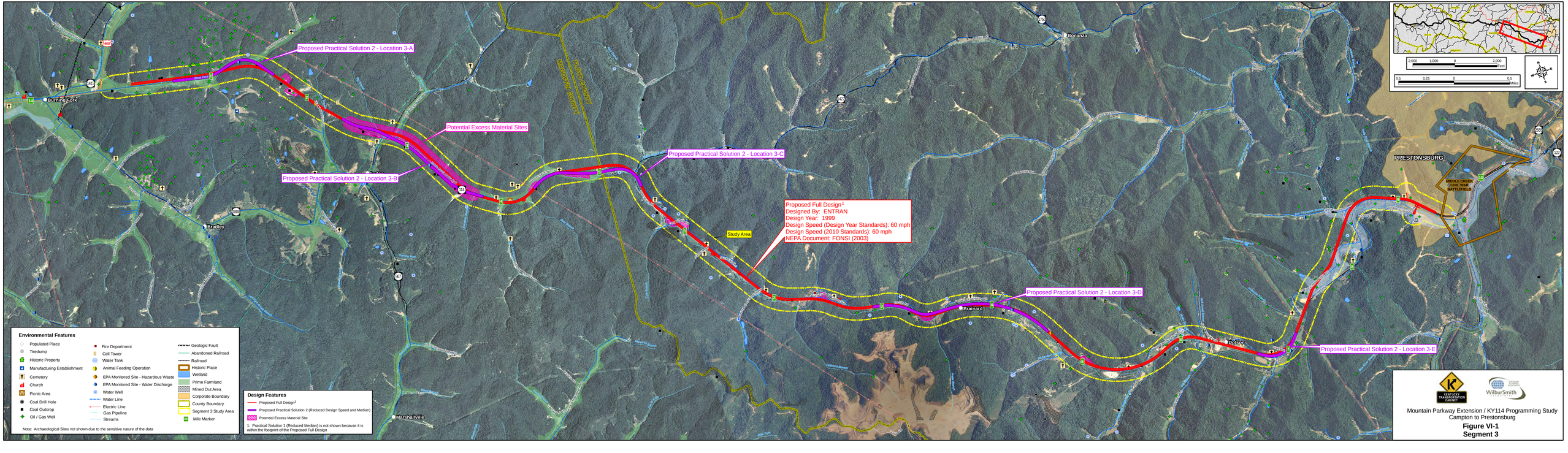
Appalachian Kentucky has long been a pocket of persistent poverty. Floyd County, with a 1990 population of 43,500 persons (projected to decrease), has a 30% poverty rate. The city of Prestonsburg affords opportunities for employment; however, the county has areas of severe poverty beyond the city. Floyd County is surrounded by some of the poorest counties in the state. One of these, Magoffin County, had a 1990 population of 13,000 with a 42% poverty rate. Minorities make up less than 1% of the population in each county.

Residential Properties

There will be 129 residential displacements for this segment of the project. Sixty-one (61)of these structures are conventional homes with permanent foundations, 58 are mobile homes, and ten are apartment units. Relocations will affect no minorities, approximately five (5) disabled individuals, and up to 36 households with elderly residents. The displacements appear to be dispersed randomly throughout the project corridor and will not have a disproportionate effect on the elderly.

Along the corridor, there are six small clusters of four to seven homes each that will be disrupted by the project. There will be no significant divisive impacts for such groups.

It is expected that the majority of displaced families will want to relocate to the general vicinity within Floyd, Magoffin, or Johnson Counties. The 2001 *Community Impact Assessment* for the project identified an average of 95 single-family homes available for sale in Floyd County and 130 single-family homes in nearby Johnson County, but a limited number of homes are available in Magoffin County. Conversations with a Magoffin County realtor indicated that there are typically 12 or fewer homes on the market at a time, with very little new home construction; rental home occupancy is normally 100%. The collective housing market of these counties appears to be sufficient to meet the housing demand that this project will generate, with the possible exception of the numerous mobile home relocations. Affordable housing for the majority of the displaced should be in the $25,000 to $100,000 range; less than ten displaced households should require relocation into homes valued at over $100,000. Last Resort Housing may be needed to assist 10-12 of the displaced households.


Proposed Practical Solution 2 - Location 3-A
Potential Excess Material Sites
Proposed Practical Solution 2 - Location 3-B
Proposed Practical Solution 2 - Location 3-C
Proposed Full Design[1]
Designed By: ENTRAN
Design Year: 1999
Design Speed (Design Year Standards): 60 mph
Design Speed (2010 Standards): 60 mph
NEPA Document: FONSI (2003)
Study Area
Proposed Practical Solution 2 - Location 3-D
Proposed Practical Solution 2 - Location 3-E
Burning Fork
Bradley
Marshallville
Bonanza
Brainard
Dotson
PRESTONSBURG
MIDDLE CREEK CIVIL WAR BATTLEFIELD
Rock Creek
Dragon Creek
Middle Creek
Abbott Creek
Jake Fork
Environmental Features
Populated Place
Tiredump
Historic Property
Manufacturing Establishment
Cemetery
Church
Picnic Area
Coal Drill Hole
Coal Outcrop
Oil / Gas Well
Fire Department
Cell Tower
Water Tank
Animal Feeding Operation
EPA Monitored Site - Hazardous Waste
EPA Monitored Site - Water Discharge
Water Well
Water Line
Electric Line
Gas Pipeline
Streams
Geologic Fault
Abandoned Railroad
Railroad
Historic Place
Wetland
Prime Farmland
Mined Out Area
Corporate Boundary
County Boundary
Segment 3 Study Area
Mile Marker
Note: Archaeological Sites not shown due to the sensitive nature of the data
Design Features
Proposed Full Design[1]
Proposed Practical Solution 2 (Reduced Design Speed and Median)
Potential Excess Material Site
1: Practical Solution 1 (Reduced Median) is not shown because it is within the footprint of the Proposed Full Design
2,000 1,000 0 2,000 Feet
0.5 0.25 0 0.5 Miles
KENTUCKY TRANSPORTATION CABINET
WilburSmith ASSOCIATES
Mountain Parkway Extension / KY114 Programming Study
Campton to Prestonsburg
Figure VI-1
Segment 3

Commercial Properties

Segments 2B and 3 of the project will also require the acquisition of an estimated 20 small- to medium-sized businesses. The majority of business owners contacted expressed a desire to relocate within the same general vicinity, or at least within the same county. Three of the 20 businesses are operated out of or adjacent to the proprietor's home.

Profitability of these small businesses is somewhat dependent on the exposure provided by their current KY 114 roadside location and access. The larger businesses will require three or more acres to successfully relocate; the facility needs for many of these larger businesses may require building new facilities instead of moving into available commercial structures.

Other Community Facilities

This project will require the acquisition of one church along existing KY 114: Big Lick Pentecostal Church. The Seventh Day Adventist Church (Jack Arnett Branch) is immediately adjacent to the improvements.

- The Big Lick Pentecostal Church is located on the south side of KY 114 about 2.5 miles west of the Magoffin-Floyd County line following KY 114. Conversations with the minister indicate that the members would likely prefer to relocate the church building nearby; there is a possibility the church could acquire the adjacent lot to the south, if access were provided.
- The Seventh Day Adventist Church is located on the north side of KY 114 in Floyd County, about 6.5 miles beyond the Magoffin county line. It will not be displaced, but the right-of-way limits are very close to the church and adjacent Prater cemetery. During the construction phase of the project, this church should be avoided by constructing a retaining wall to minimize encroachment onto the parcel. Parking and access should be maintained.

The project will also create minor impacts on the Charles Clark Elementary School property, located on the south side of KY 114 near the eastern project terminus. A portion of the entrance to the school will have to be shifted approximately 118 feet east of its existing location and a new bridge structure will be constructed over Middle Creek.

A total of 12 small cemeteries were identified in the immediate vicinity of this project. Nine cemeteries are in the proposed right-of-way, with six of these appearing to be in or near the construction limits. A grave house associated with the Prater Cemetery has been determined potentially eligible for the National Register of Historic Places. The grave house is not in the proposed right-of-way. The affected cemeteries are recommended for avoidance or relocation.

Air Quality Impacts

Magoffin and Floyd Counties are currently in attainment for all transportation-related pollutants (CO, HC, NOx, particulates). Construction of the new KY 114 alignment is not expected to add to the pollutant burden of nearby nonattainment areas or to alter Magoffin or Floyd County's attainment status. Existing and projected carbon monoxide concentrations are below the one-hour and eight-hour standards.

Noise Impacts

Results of the noise impacts analysis for the project show a redistribution of the highway noise impacts throughout the corridor, but with no increase in the overall number or severity of impacts when compared to the No-Build Alternative. Traffic management, alteration of the horizontal and vertical alignments, noise buffer zone acquisition, and barrier wall installation are not regarded as viable noise abatement solutions. The final decision on the implementation of noise abatement measures will be made by KYTC after the completion of project design and the public involvement process.

Water Quality Impacts

Water quality issues considered as part of this analysis are divided into three (3) categories: stream impacts, wetlands, and floodplains.

Stream Impacts

The project area lies within the Licking River and Big Sandy River drainage basins. The area is characterized by narrow, serpentine valleys and mountains with sharp crested ridges. KY 114 follows the stream valleys for most of the project length, following the Burning Fork, Short Fork, and Middle Creek valleys.

The project includes 31 stream crossings, of which eight involve stream relocations totaling 6,430 linear feet. This includes:

- Eight stream crossings in the Licking River drainage area, including Licking River, Burning Fork, and six intermittent streams
- 23 stream crossings in the Big Sandy drainage area, including Arnett Branch and eight crossings of Middle Creek, in addition to 14 intermittent streams

Twenty-seven of the stream crossings will require a culvert or pipe. The US Fish and Wildlife Service (USFWS) stresses the importance of avoiding impacts related to erosion and sedimentation in streams. The application of best management practices and similar erosion control measures recommended by the USFWS and Kentucky Department of Fish and Wildlife Resources (KDFWR) during construction activities are suggested to prevent excessive sedimentation. If all these recommendations are implemented, no permanent impacts to water quality are anticipated from construction.

Based on the length of each of the eight proposed channel changes, each will require a Water Quality Certification and at least five may require an individual permit.

One pond in a horse pasture will also be impacted by the project. No wild or scenic rivers are crossed by this segment of the project.

Wetlands

The project will impact six jurisdictional wetlands totaling 2.70 acres. Wildlife habitat provided by these wetlands is fair to good in quality but offers limited resources due to the small size and proximity to KY 114 and residential development. Because of the size and isolated nature of these wetlands, wetland impacts are minimal for this project. A Section 404 Nationwide 26 permit from the US Army Corps of Engineers will be required.

Floodplains

An estimated total length of 7,750 feet of the improved corridor is within the 100-year floodplain (Zone A). Floodplains are associated with the Licking River, Burning Fork, and Middle Creek. Coordination with FEMA and/or the Kentucky Division of Water for "No Rise Certification" should be completed before proceeding to construction.

Threatened and Endangered Species

Coordination with the USFWS, KDFWR, and the Kentucky State Nature Preserves Commission (KSNPC) indicate no federally listed species impacts. Three plant species were observed during field work and are listed by the KSNPC: state endangered American Chestnut (*Castanea dentata*), state endangered rattlesnake root (*Prenanthes alba*), and state species of concern butternut (*Juglans cinerea*). No biological assessments are recommended for the project.

Hazardous Materials and Underground Storage Tanks

Coordination was undertaken with the Environmental Protection Agency, Local Emergency Planning Commissions, County Department of Emergency Services, and the Heath Departments of Magoffin and Floyd Counties to identify hazardous materials spills within the project area. There are no known municipal landfills of federal Superfund sites along this segment of KY 114. One RCRA facility (Dowell Schlumberger, Inc.) is located near the project limits; only a small portion of this property will be acquired for right-of-way so no RCRA impacts are anticipated.

Three underground storage tank (USTs) sites were identified along existing KY 114 in the project area, as follows:

- Parkway Connection at 6290 W Mountain Parkway has four active USTs that fall beyond the right-of-way limits. The gas pumps fall within the proposed right-of-way.
- Dotson's Market (also known as Price's Midnight Market or Sloan's Market) at 11400 W Mountain Parkway has six active USTs. The USTs, gas pumps, and building fall within the proposed right-of-way limits at this location. Contamination previously occurred at this site due to a leak from one of the product lines. The leak was detected in 1988 and was subsequently repaired. Phase II site investigation revealed that there is no hydrocarbon-impacted soil within the top eight feet of roadbed soils.
- Compton's Market at 6264 W Mountain Parkway contains two inactive UST sites. The USTs, gas pumps, and building fall within the proposed right-of-way limits at this location.

Historic and Archaeological Sites

Historic Sites

A Cultural Resources Survey was completed for the project and identified one potentially eligible property for the National Register of Historic Places. The Prater cemetery was in use from 1923 to 1943 and contains a grave house, a small, tin-roofed frame structure positioned over two graves. The project avoids any impact to the cemetery and grave house.

Archaeological Sites

The *2003 EA/FONSI* lists 32 archaeological sites (5 NRHP eligible) occurring in Corridor Segments 2B and 3 (and the section already widened to four lanes near Prestonsburg).

Environmental Justice

A 1994 Executive Order directed every Federal agency to make Environmental Justice (EJ) part of its mission. Regarding transportation projects, there are three fundamental EJ principles: (1) avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations; (2) ensure the full and fair participation by all potentially affected communities in the transportation decision-making process; and (3) prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

The Big Sandy Area Development District (BSADD) completed an *Environmental Justice and Community Impacts Report* for Corridor Segment 2B and Corridor Segment 3. The full report is shown in **Appendix D**. BSADD conducted an extensive review of data obtained for Floyd and Magoffin Counties from the U.S. Census Bureau for income, race and age. The ADD then held discussions with local officials and completed field reconnaissance.

BSADD concluded that there is no apparent adverse effect on any minority segment of the populations of the affected census tracts. Population data for each minority group does not evidence a possibility of the project being detrimental to any minority group.

While the affected census tracts have populations well above the state average for persons living below the poverty level, the affected tracts in each county are actually slightly lower than their respective county averages; therefore, it is not deemed likely this project would have any negative impact on this population segment.

There are population groups in the affected tracts of each county that exceed the county and/or state averages for populations 65 or older. However, they are not significantly higher in numbers than those countywide or statewide, and those populations are not expected to experience any adverse effects from this proposed project.

There are significantly higher-than-average concentrations of persons claiming disability status within the affected census tracts of Segments 3; however, the percentage of the population within these census tracts that claimed disability is comparable to the surrounding counties in this region, and is, in the case of Floyd County, actually lower than the county-wide average; and, for Magoffin County, not enough above the mean to warrant closer examination.

Efforts were made to identify any high concentrations of a specific population. While elements of some population groups were found to have elevated percentages, they were not determined to be in need of closer scrutiny, either because of the actual numbers, or similar demographic profiles to surrounding groups, tracts or counties.

EJ populations should be further investigated in subsequent phases of this project to identify and document any demographic and/or socioeconomic changes that may have occurred in the project area.

F. Analysis/Findings

The following section provides a summary of proposed KY 114 projects; potential practical solution options; cost estimates by phase; proposed construction sections; and priority sections for programming. Also included are proposed locations for consideration as waste areas and proposed locations for bifurcated sections and their potential cost savings.

Proposed Projects

Three design options were evaluated for this Corridor Segment, as follows:

- Full Design
- Reduced Median (Practical Solution 1)
- Reduced Design Speed and Reduced Median (Practical Solution 2)

Table VI-3 outlines the design assumptions for each design option.

Table VI-3 – Design Assumptions

	Segment 3 KY 114 (Salyersville to KY 404 near Prestonsburg)		
	Full Design (KYTC 1999 Design)	Practical Design 1 (Reduced Median)	Practical Design 2 (Reduced Design Speed & Median)
Design Controls			
Classification	Rural Arterial	Rural Arterial	Rural Arterial
Terrain	Mountainous	Mountainous	Mountainous
Design Speed (Design Year Standards)	60 mph	60 mph	55 mph
Design Speed (2010 Standards)	60 mph	60 mph	55 mph
Access Control	Partial Control	Partial Control	Partial Control
ADT (Existing 2009)	5,370 vpd to 11,900 vpd		
ADT (Future No-Build 2030)	5,600 vpd to 14,500 vpd		
ADT (Future With Improvement 2030)	7,300 vpd to 16,300 vpd		
Typical Section			
Lanes	Four 12-ft Lanes	Four 12-ft Lanes	Four 12-ft Lanes
Outside Shoulder	12 ft (10 ft Paved)	12 ft (10 ft Paved)	12 ft (10 ft Paved)
Median	40 ft Depressed and 14 ft Flush	14 ft Flush with Barrier or Center Turn Lane	14 ft Flush with Barrier or Center Turn Lane
Alignment			
emax	6%	6%	6%
Min. Radius	1,340 ft	1,340 ft	1,065 ft
Max Grade	6%	6%	6%
Vertical Clearance	16 ft	16 ft	16 ft
Existing Roadway Segment Length	14.1 miles	14.1 miles	14.1 miles
Proposed Design Segment Length	13.9 miles	13.9 miles	13.9 miles

Figure VI-1, previously shown, depicts the proposed design options for this Corridor Segment and identifies potential storage areas for excess material within the study area boundary. There will be approximately 5.4 million cubic yards of excess earthwork with the full design in Corridor Segment 1B. The areas identified within the study area boundary could store approximately 15% of this excess material.

Potential Bifurcated Sections

Corridor segments were evaluated for opportunities to achieve cost savings by bifurcating the horizontal and vertical alignments. Analysis was performed by realigning the horizontal and vertical alignments on the mountain side of the alignment. The vertical alignment was raised to better follow the vertical terrain, thus, minimizing the depth of required excavation. Because of the narrow width of the median, it was necessary to shift the horizontal alignment, thereby providing the minimum slope and median width necessary to achieve the elevation change. The results varied. Where the full 40-foot median was evaluated, the width of the median allowed for significant elevation change without requiring a horizontal shift. However, where the 14-foot

wide median was evaluated, a significant horizontal shift is required, thus, resulting in the loss of any earthwork gained by raising the roadway elevation due to the necessity of shifting the roadway laterally into the mountainside.

Therefore, because of the narrow median width provided in the reduced typical section (Practical Solution 1 and Practical Solution 2), it is not practical to adjust vertical alignment in deep cut areas since it would result in no significant cost savings. However, if the wider 40-foot median becomes the preferred typical section, there are locations where the profile elevation of the mountain side of the alignment can be raised.

In addition, one location in Corridor Segment 3 was identified where separating the horizontal alignments of the eastbound and westbound lanes could provide significant cost savings. In the area between milepoint 2.0 and milepoint 4.0 in Magoffin County, the existing roadway alignment would remain and serve as the eastbound lanes of traffic. The westbound alignment could be shifted away from the existing roadway to the opposite side of Middle Creek. Matching the existing vertical terrain of the westbound alignment would allow for significant reduction of earthwork. Potential areas for bifurcation and potential construction cost savings for Corridor Segment 3 are shown in **Table VI-4**. These locations are illustrated in **Figure VI-2**.

Table VI-4 – Potential Bifurcated Sections

Segment/ Bifurcated Section	**Begin MP**	**End MP**	**Length**	**Construction Cost Savings**
Segment 3	**-**	**-**	**-**	**$21,500,000 (12%)**
Bifurcated Section 3-1[1]	1.0	2.2	1.2	$3,900,000
Bifurcated Section 3-2[2]	2.5	4.0	1.5	$8,400,000
Bifurcated Section 3-3[1]	4.5	0.3	0.8	$2,200,000
Bifurcated Section 3-4[1]	2.4	2.8	0.4	$1,600,000
Bifurcated Section 3-5[1]	3.7	4.2	0.5	$2,700,000
Bifurcated Section 3-6[1]	7.5	8.6	1.1	$2,700,000

[1] Raised the profile elevation of the mountain side alignment.
[2] The WB alignment was shifted away from the existing roadway to the opposite side of Middle Creek.

G. Project Costs and Priorities

Cost estimates, in some cases and to varying degrees, were developed in previous studies. Previous cost estimates were inflated to current dollars using a 2.5% annual inflation factor. Cost estimates were created where no estimate had been completed previously. Cost estimates are subject to change in future phases of project development. **Table VI-5** presents a summary of Corridor Segment 1B cost estimates.

Table VI-5 – Cost Estimates

	Segment 3 (Millions) (2010 Dollars)[3]					
	Full Design		**Practical Design 1**		**Practical Design 2**	
Phase	**KYTC 1999 Design[1]**	**Bifurcated Alignment[2]**	**Reduced Median[2]**	**Bifurcated Alignment[2]**	**Reduced Median & Reduced Design Speed[2]**	**Bifurcated Alignment[2]**
Construction Cost	$185.9	$164.4	$172.8	$164.4	$154.3	$145.9
Design Cost	$9.3	$8.2	$8.6	$8.2	$7.7	$7.3
Utility Cost	$6.2	$6.2	$6.2	$6.2	$6.2	$6.2
Right-of-Way Cost	$32.9	$32.9	$32.9	$32.9	$32.9	$32.9
Total Cost	**$234.2**	**$211.6**	**$220.6**	**$211.7**	**$201.0**	**$192.2**
Proposed Design Segment Length (Miles)	*13.90*	*13.90*	*13.90*	*13.90*	*13.90*	*13.90*
Construction Cost Per Mile	$13.4	$11.8	$12.4	$11.8	$11.1	$10.5
Total Cost Per Mile	$16.9	$15.2	$15.9	$15.2	$14.5	$13.8

[1] 2.5% Annual Inflation Rate; [2] Planning Level Cost Estimate; [3] Phase costs may not equal total due to rounding


Environmental Features
Populated Place
Tiredump
Historic Property
Manufacturing Establishment
Cemetery
Church
Picnic Area
Coal Drill Hole
Coal Outcrop
Oil / Gas Well
Fire Department
Cell Tower
Water Tank
Animal Feeding Operation
EPA Monitored Site - Hazardous Waste
EPA Monitored Site - Water Discharge
Water Well
Water Line
Electric Line
Gas Pipeline
Streams
Geologic Fault
Abandoned Railroad
Railroad
Historic Place
Wetland
Prime Farmland
Mined Out Area
Corporate Boundary
County Boundary
Segment 3 Study Area
Mile Marker
Note: Archaeological Sites not shown due to the sensitive nature of the data
Design Features
Proposed Full Design
Potential Excess Material Site
Potential Locations for Bifurcated Alignment
Potential Excess Material Sites
Proposed Full Design
Designed By: ENTRAN
Design Year: 1999
Design Speed (Design Year Standards): 60 mph
Design Speed (2010 Standards): 60 mph
NEPA Document: FONSI (2003)
Study Area
3-1
3-2
3-3
3-4
3-5
3-6
Burning Fork
Ivyton
Bradley
Bonanza
Dotson
Marshallville
PRESTONSBURG
MIDDLE CREEK CIVIL WAR BATTLEFIELD
Mountain Parkway Extension / KY114 Programming Study
Campton to Prestonsburg
Figure VI-2
Segment 3
Potential Locations for Bifurcated Alignment

Proposed Construction and Priority Sections

Construction sections and priority sections were identified for the entire Mountain Parkway Extension/US 460/KY 114 corridor. Proposed construction sections are shown on **Figure 2** in **Appendix A**. Corridor Segment 3 is proposed for construction in six sections, ranging in costs (for the full design) from 26.5 to 56.9 million dollars.

Table 1 in **Appendix A** presents the priority sections for the Mountain Parkway Extension/US 460/KY 114 corridor. As shown, Corridor Segment 3 Construction Sections 3-6, 3-5, 3-4, 3-3, 3-2, and 3-1 are KYTC Highway District 12 Priorities 2, 3, 4, 5, 6, and 7, respectively.

VII. Summary of Corridor Segments

A. Purpose of Programming Study

This study is not intended to make recommendations, but to provide adequate information so the KYTC can make an informed programming decision about how to move forward with the widening of the Mountain Parkway Extension, US 460, and KY 114 in Wolfe, Morgan, Magoffin, and Floyd counties.

This chapter provides an overall summary of the key findings presented in previous chapters for each Corridor Segment.

B. Corridor Segments

As previously mentioned, for the purpose of this study, the Mountain Parkway Extension (KY 9009)/US 460/KY 114 corridor is divided into the following "Corridor Segments" that are currently considered as Sections of Independent Utility (SIUs).

- Segment 1A (Campton Safety Project currently under construction)
  - KY 9009, MP 42.4 - MP 45.8, Wolfe County
- Segment 1B (Campton to Helechawa)
  - KY 9009, MP 45.8 - MP 56.6, Wolfe County
- Segment 2A (Helechawa to Salyersville)
  - KY 9009, MP 56.6 - MP 57.7, Wolfe County
  - KY 9009, MP 57.7 - MP 63.1, Morgan County
  - KY 9009, MP 63.1 - MP 73.6, Magoffin County
- Segment 2B (Salyersville)
  - KY 9009, MP 73.6 - MP 75.6, Magoffin
  - US 460, MP 12.5 - MP 14.6, Magoffin County
  - KY 114, MP 0.0 - MP 0.3, Magoffin County
- Segment 3 (Salyersville to KY 404 near Prestonsburg)
  - KY 114, MP 0.3 - MP 5.0, Magoffin County
  - KY 114, MP 0.0 - MP 9.4, Floyd County

Corridor Segments are displayed on **Figure 1** in **Appendix A**.

C. Purpose and Need

The potential widening of the Mountain Parkway Extension (KY 9009), US 460, and KY 114 between Campton and KY 404 near Prestonsburg involves a number of individual projects. The proposed improvement to each Corridor Segment can stand on its own merit with a unique Purpose and Need, as presented in **Chapters II through VI** of this report. However, as discussed in **Chapter I**, while each Corridor Segment is considered a Section of Independent Utility, the overall improvement of the corridor also meets a greater regional need.

D. Design Assumptions

Various design options were evaluated for each Corridor Segment, as presented in those individual chapters. All design assumptions (and costs) for the Mountain Parkway Extension (KY 9009)/US 460/KY 114 Corridor are shown in **Table 2** in **Appendix A**.

As mentioned previously, concerns about frequent collisions with wildlife should be addressed in future phases of project development. However, cost estimates to provide special design features for wildlife crossings, barriers, or other measures to address this problem are not included in this study report.

E. Estimated Costs

Cost estimates, in some cases and to varying degrees, were developed in previous studies. Previous cost estimates were inflated to current dollars using a 2.5% annual inflation factor. Cost estimates were created where no estimate had been completed previously. Cost estimates are subject to change in future phases of project development.

Proposed improvements for the Mountain Parkway Extension (KY 9009)/US 460/KY 114 Corridor range in total costs from $620 to $742 Million, as shown in **Table VII-1**.

This does not include Corridor Segment 1A which is currently under construction. This also does not include "Practical Solution 1" along the existing route through Salyersville for Corridor Segment 2B, which the Project Team determined does not meet the Purpose and Need for this Corridor Segment, as discussed in **Chapter V**.

Table VII-1 – Cost Estimates

Corridor Segment	Length (Existing Roadway)	Cost Range
Corridor Segment 1A (Campton)	3.8 miles	$46 Million (Project Under Construction)
Corridor Segment 1B (Campton to Helechawa)	10.8 miles	$122 - $132 Million
Corridor Segment 2A (Helechawa to Salyersville)	17.0 miles	$191 - $234 Million
Corridor Segment 2B (Salyersville)	4.3 miles to 5.6 miles	$106 - $141 Million
Corridor Segment 3 (Salyersville to KY 404 near Prestonsburg)	14.1 miles	$201 - $235 Million

Detailed costs for each Corridor Segment by design option are shown in **Table 2** in **Appendix A**.

Costs shown in **Table VII-1** above and **Table 2** in **Appendix A** do not reflect potential cost savings that could result from bifurcation, which is discussed, where applicable, within each Corridor Segment chapter.

F. Proposed Construction and Priority Sections

Proposed construction sections and priority sections for the Mountain Parkway Extension/US 460/KY 114 corridor are shown on **Figure 2** in **Appendix A**.

Table 1 in **Appendix A** identifies the priority sections set by the Scoping Study Project Team for the Mountain Parkway Extension/US 460/KY 114 corridor. As shown, the priorities by construction section are as follows:

KYTC Highway District 10

1. Construction Section 2B
2. Construction Section 2A-3
3. Construction Section 2A-2
4. Construction Section 2A-6
5. Construction Section 2A-5
6. Construction Section 2A-4
7. Construction Section 2A-1
8. Construction Section 1B-4
9. Construction Section 1B-3
10. Construction Section 1B-2
11. Construction Section 1B-1

KYTC Highway District 12

1. Construction Section 2B
2. Construction Section 3-6
3. Construction Section 3-5
4. Construction Section 3-4
5. Construction Section 3-3
6. Construction Section 3-2
7. Construction Section 3-1

VIII. Funding Options

This programming study included an exploration of options for financing proposed improvements, including tolling, to help defray the costs of the proposed widening of the Mountain Parkway Extension/US 460/KY 114 Corridor between Campton and Prestonsburg. This chapter presents a brief discussion of funding options for the proposed improvements to the corridor, including the results of a preliminary planning-level analysis to determine the approximate level of funds that might be generated from tolls.

A. Potential Funding Sources

Traditional revenue sources from the Federal Highway Trust Fund (HTF) apportionments and allocations that may be considered for funding proposed projects in the Mountain Parkway Extension/KY 114 study corridor include the following:

- National Highway System (NHS)
- Surface Transportation Program (STP) Funds
- Appalachian Development Highway System (ADHS) Funds
- Highway Safety Improvement Program Funds
- Bridge Replacement and Rehabilitation (BR) Program Funds
- Highways for LIFE
- Transportation, Community and System Preservation (TCSP) Funds
- Grant Anticipation Revenue Vehicles (GARVEE)
- Transportation Infrastructure Finance and Innovation Act (TIFIA) Funds

Potential revenue sources from the Commonwealth of Kentucky budgetary process that may be considered for funding proposed projects in the study corridor include the following:

- State Road Fund
- State General Funds
- State Bonds

KYTC options for providing the matching funds for federal funding include monies from the State Road Fund and General Fund, or the state may use Toll Credits. Under the provisions of 23 U.S.C. §120(j), as amended by sections 1116 and 1905 of SAFETEA-LU, toll credits may be used towards the 20 percent non-federal matching share for programs authorized by 23 U.S.C. with the exception of the Emergency Relief and the Appalachian Development Highway System programs. KYTC currently uses approved toll credits to cover the entire non-Federal share of the project which results in 100 percent of the cost of the project being borne by Federal funds.

Other options that may offer potential funding for the study corridor in the future include:

- Establish a Transportation Authority or Infrastructure Authority (with the authority for imposing taxes or fees)
- Pursue Federal Legislation for Designation and Special Earmarked Funding as a High Priority Corridor

B. Tolling Analysis

One traditional source of funding is the use of State Bonds, which could perhaps be repaid in part by revenues from tolls collected from users of an improved Mountain Parkway Extension/KY 114 corridor. To explore this option further, additional analysis was requested by

the KYTC to provide a sketch-level estimate of the potential revenues that might be collected from tolls.

For this analysis, the corridor was divided into two tolling sections:

- Tolling Section 1 – Campton to Salyersville; and
- Tolling Section 2 – Salyersville to Prestonsburg.

Methodology and Assumptions

The KYTC statewide travel demand model was used by WSA to analyze trip diversions and develop traffic forecasts to assess toll revenue potential. An updated version of the model was developed and calibrated by KYTC to base year 2009 traffic. No independent data collection was involved for origins and destinations (ODs) or value-of-time in relation to willingness to pay to use the highway. These are the key assumptions used in this analysis:

- Tolling Section 1 will be improved to become a 4-lane divided highway – 2 lanes in each direction with an average travel speed assumed to be 65 mph.
- Tolling Section 2 will be improved to become a 4-lane divided highway – 2 lanes in each direction with an average travel speed assumed to be 60 mph
- Tolls will be electronically collected in both directions and are based on miles traveled.
- 2016 is assumed to be the year when all roadway improvements are completed and tolling will start.
- Year 2030 is used as the future traffic and revenue forecast year (the last year in the statewide model.
- All estimates are in constant 2009 dollars, i.e., no inflationary adjustments were made.
- No refinement was made during the analysis to the truck percentages. In the KYTC statewide model, the truck percentage is about 6.4%. Truck tolls were assumed to be 4 times the car rates.
- The same toll rates will be in effect at all hours of the day (i.e., no time-of-day variations).
- US Bureau of Census Household Income and Household Hours Worked data were used to develop a Value-Of-Time (VOT) table at the traffic zone level. The average VOT for the analysis was $0.20/minute for all vehicles.

Toll Rates

A toll sensitivity analyses was used to determine the “optimal” toll rate. “Optimal” can be defined in different ways:

- If the goal is to maximize the revenue, then whichever rate produces the highest revenue will be the optimal.
- If the goal is to maximize the throughput of traffic on the toll facility, a balanced revenue with the highest possible traffic is considered as the optimal.

To balance the revenue versus the traffic served in 2016, the optimal rates used were $0.07/mile for Tolling Section 1 and $0.10/mile for Tolling Section 2, based on the sensitivity analysis. In 2030, the optimal rates are recommended to be $0.10/mile for Tolling Section 1 and $0.15/mile for Tolling Section 2.

Bonding Scenarios

Potential bonding revenues for each scenario were estimated for two different financial structures. These financial structures are described as follows:

- Standard Toll Revenue Bonds, Gross Revenue Pledge - Under this arrangement, it is assumed that debt would be secured by the revenue generated by tolling the Mountain Parkway after toll collection operation and maintenance expenses are paid (but before roadway operation and maintenance expenses are paid). That is, the Commonwealth of Kentucky would be required to maintain the roadway at its own expense.
- General Obligation Bonds, Gross Revenue Pledge - This financial structure assumes that debt issued for the project is backed by the full faith and credit of the Commonwealth of Kentucky. This arrangement would result in the higher bonding capacity of the two financial structures. Tolling revenues would be used to cover tolling collection costs and to help defray the cost of the bonds. Similar to the structure discussed previously, the Commonwealth of Kentucky would still be required to maintain the roadway as a separate expense.

The assumptions for the parameters for the calculation of the bonding capacity estimates are shown in **Table VII-1**.

Table VII-1. Bonding Capacity Calculation Parameters

Type of Assumption	Standard Toll Revenue Bonds	General Obligation Bonds
Coverage Ratio	1.75	1.25
Interest Rate	5%	4%
Percentage of Net Proceeds Available for Construction Costs	87.5%	87.5%

Preliminary Estimate of Toll Revenues

Based on the analysis for these two bonding scenarios, the estimated Toll Revenue Pledge to help defray the cost of roadway improvements along the Mountain Parkway Extension/US 460//KY 114 corridor are shown in **Table VII-2**.

Table VII-2. Toll Revenue Pledge

Tolling Section(s)	Standard Toll Revenue Bonds ($ Million)*	General Obligation Bonds ($ Million)*
Tolling Section 1 Only	12.3	19.8
Tolling Sections 1 and 2 (Combined)	30.6	49.4

** These revenues are preliminary estimates for planning purposes only. They consider toll collection and enforcement, but they do not consider roadway operations and maintenance costs, which would be borne by the Commonwealth of Kentucky. A more detailed tolling analysis would be needed if a decision is made to pursue toll collection along this corridor.*