

## 1.0 INTRODUCTION

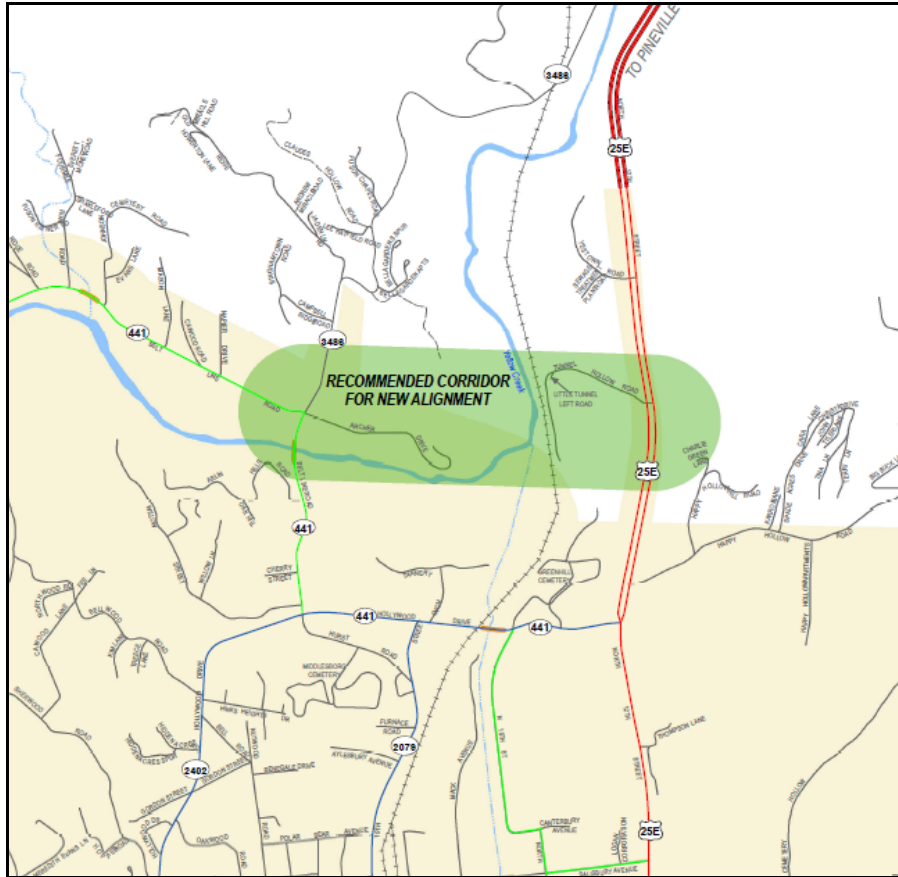
### 1.1 Study Purpose

The purpose of the Belt Line Road Extension Programming Study is to identify and evaluate the feasibility of a potential corridor for construction of a new route from the junction of KY 441, KY 3486, and Archer Drive to US 25E in Middlesboro, Bell County. KY 441 begins at KY 74 west of Middlesboro and forms a loop around the north side of the city known as Belt Line Road. At the Archer Drive/KY 3486 intersection, instead of continuing directly to US 25E, KY 441 turns south and then east, passing through residential and commercial areas before intersecting with US 25E.

This study is intended to help define a corridor and purpose for the project and lay the groundwork for meeting Federal requirements regarding consideration of environmental issues, as defined in the National Environmental Policy Act (NEPA). This report provides a general introduction and description of the project, including the beginning and ending points of the project corridor; documents the planning study process; identifies project goals and objectives; provides an overview of environmental concerns, geotechnical issues, and existing and projected traffic information for the study area; summarizes the input of the project team members and resource agencies; and identifies a recommended alternative.

### 1.2 Project Location

The proposed highway project is located in northeastern Middlesboro, in Bell County, beginning at the intersection of KY 441, KY 3486, and Archer Drive and continuing east to US 25E as shown in [Appendix A, Exhibit 1](#) (reproduced in [Figure 1](#) below).



**Figure 1: Project Location**

The study area for the corridor includes the existing routes of KY 441, KY 3486, US 25E, Archer Drive and Tunnel Hollow Road. Located in the southeastern corner of the state, Middlesboro borders Virginia to the southeast and Tennessee to the south. Bell County is located in the Cumberland Valley area of the state. Middlesboro is Bell County’s largest city. The Cumberland Gap National Historical Park and Pine Mountain State Resort Park are located within minutes of Middlesboro.

### 1.3 Termini and Length

The project is identified in *Kentucky’s FY2010-FY2012 Enacted Biennial Highway Plan* as “construct a new route from KY441 to US 25E in Middlesboro.” The project location is shown graphically in [Appendix A, Exhibit 1](#). The western terminus is Milepoint 3.827 at the KY 441 / KY 3486 / Archer Drive intersection, and the eastern terminus of the proposed corridor is near the Tunnel Hollow

Road / US 25E intersection. The eastern terminus of existing KY 441 is Milepoint 4.897 at the US 25E intersection. The proposed corridor is approximately 0.8-mile in length.

#### 1.4 Project Goals and Objectives

The following goals and objectives were established for this project:

- Improve access between US 25E and western Middlesboro, and provide alternate access to such attractions as the Southeast Kentucky Community and Technical College, the Appalachian Regional Healthcare Hospital, the Middlesboro-Bell County Airport, the Middlesboro Middle School, the Middlesboro Country Club, and residential areas;
- Alleviate congestion in the commercial area along existing KY 441 between 19<sup>th</sup> Street and US 25E, which includes a Wal-Mart and several smaller retail stores; and
- Improve safety for the traveling public in the project area.

#### 1.5 Programming and Schedule

The project addressed in this study was listed in *Kentucky's FY2010-FY2012 Enacted Biennial Highway Plan* as Item Number 11-110.00, with a description of "construct new route from KY 441 to US 25E in Middlesboro." The *Biennial Highway Plan* includes State Construction (SP) funds in the amount of \$400,000 for the Design phase in 2010, \$620,000 for the Right-of-Way phase and \$490,000 for the Utilities phase in 2011, and \$6,400,000 for the Construction phase in 2012. The total amount for all phases listed in the *Biennial Highway Plan* is \$7,910,000. Additional *Biennial Highway Plan* information for this and other projects programmed for Bell County is included in [Appendix B, Table 1](#).

## 2.0 STUDY AREA CHARACTERISTICS

Characteristics of the study area and the major highway network are identified in the following sections. These characteristics include transportation facilities, traffic and geometric data, bridges, crash data, and other *Biennial Highway Plan* projects in the study area. Features of the existing highway routes were obtained from the KYTC Highway Information System (HIS) database and verified during field visits where possible. Maps and tables containing this data can be found in [Appendix A](#) and [Appendix B](#), respectively. Photos of the project area can be found in [Appendix C](#).

### 2.1 Highway Systems

Data for the highway systems within the study area is summarized in [Appendix B, Table 2](#). Information provided includes the Functional Classification, State Highway System, National Truck Network, National Highway System, and Truck Weight Class. Scenic Byway and Bike Route Systems are also listed for the corridor routes. The following is a summary of significant highway systems information:

- State maintained roads in Kentucky are classified into four categories under the state system, ranging from Supplemental Road to State Primary. KY 441 is classified as a State Secondary Route and US 25E is classified as a State Primary Route.
- State-maintained roads are assigned to one of twelve functional classification categories. KY 441 is functionally classified as an Urban Minor Arterial from KY 2402/Hurst Road to US 25E, and as an Urban Collector in the remainder of the study area. US 25E is functionally classified as an Urban Principal Arterial.
- US 25E is on the Defense Highway Network.
- US 25E is on the National Highway System (NHS). The NHS, a system of nationally important roads, was established in the Intermodal Surface

Transportation Efficiency Act (ISTEA). It includes the Interstate Highway System and other significant principal arterial roads important to the nation's economy, defense, and mobility.

- The National Truck Network includes routes that have been specifically designated for use by trucks with increased dimensions (widths of 102 inches, heights of 13 ½ feet, and trailers up to 53 feet long, not to exceed two 28-foot trailers per truck). US 25E is on the National Truck Network and KY 441 is not.
- The Kentucky Revised Statutes require weight limits on the state-maintained highway system. With the exception of permits for over-dimensional or over-gross-vehicle-weight-classification-limit vehicles issued by the Kentucky Transportation Cabinet, Division of Motor Carriers, there are three weight classification limits:
  - AAA – 80,000 pounds gross vehicle weight;
  - AA – 62,000 pounds gross vehicle weight; and
  - A – 44,000 pounds gross vehicle weight.

The Truck Weight Classification is A for KY 441, and AAA for US 25E.

- US 25E in Bell County is designated as a Coal Haul route and is on the Extended Weight system. No portion of KY 441 is designated as a Coal Haul route or is on the Extended Weight System.
- US 25E in Bell County forms a portion of the Wilderness Road Heritage Highway Scenic Byway System.
- A segment of the Southern Lakes Bicycle Tour is located north of the study area, starting at the US 25E / US 119 intersection and proceeding north along US 25E to the US 25E / KY 92 intersection.

## 2.2 Existing Geometric Characteristics

KY 441 is a two-lane highway with a posted speed limit of 35 MPH in the project area. There are no truck lanes or passing lanes, but there is a two-way left-turn lane from approximately 19<sup>th</sup> Street (KY 2079) to US 25E. Lane widths range

from 9 to 12 feet, and paved shoulder widths range from 0 to 2 feet. There is a curb-and-gutter section from approximately 15<sup>th</sup> Street (CS 2004) to US 25E.



**Figure 2: KY 441 near Wal-Mart**



**Figure 3: KY 441 near Hurst Road**

US 25E is a four-lane divided highway with a posted speed limit of 55 miles per hour (MPH) except for a few sections where the speed limit is reduced to 45 MPH. Typical lane widths are 12 feet. Shoulder widths range from 0 to 10 feet and vary in composition.



**Figure 5: US 25E at KY 441**

Posted speed limits for various routes within the study area are shown graphically in [Appendix A, Exhibit 2](#).

### 2.3 Bridges

Bridge data for KY 441 is listed in [Appendix B, Table 3](#). Bridges can be rated as structurally deficient and/or functionally obsolete. None of the bridges located on the existing corridor route are listed as structurally deficient. One bridge, B00124, is functionally obsolete. A bridge with a sufficiency rating less than 50.0 is considered to be eligible for replacement with federal funds under the Federal-Aid Highway Bridge Replacement and Rehabilitation Program.

### 2.4 Crash Analysis

Crash data from the Kentucky State Police along KY 441 from the Archer Drive intersection to the US 25E intersection was initially examined for a four-year period from January 1, 2000 through December 31, 2003, and was subsequently examined for a three-year period from January 1, 2008 through December 31, 2010. This data was used to calculate crash rates for both one-tenth-mile spots and for longer segments of roadway. The longer segments were chosen based on changes in traffic volumes and roadway characteristics. The calculated crash rates were then compared to statewide critical crash rates based on the type of roadway (in this case, either two-lane urban or three-lane urban), using the methodology outlined in the Kentucky Transportation Center's *Analysis of Traffic Crash Data in Kentucky (1998-2003 & 2005-2009)*. The ratio of the actual crash rate to the critical crash rate is called the critical rate factor (CRF). A CRF of 1.00 or higher indicates that there is a high probability that crashes at a particular location are not occurring simply due to random chance.

During the initial analysis of crash data for the 2000-2003 time period, one 0.1-mile spot was identified with a CRF between 0.90 and 1.00. This spot was located at the KY 441 / KY 2402 / Hurst Road intersection. However, this location was not identified as a high-crash location in the analysis of more recent crash data for the 2008-2010 time period. Information on 0.1-mile spot calculations for the 2000-2003 data is included in [Appendix B, Table 4a](#).

For the subsequent analysis of the 2008-2010 crash data, KY 441 was broken into two segments, one beginning at Archer Drive and ending at Hurst Road, and the other beginning at Hurst Road and ending at US 25E. The segment between Archer Drive and Hurst Road has a two-lane cross-section and carries less than half the volume of the segment between Hurst Road and US 25E, which consists mostly of a three-lane cross-section. A total of 46 crashes were recorded during the analysis period, but neither segment was found to have a CRF above 0.90. Critical rate factors were then calculated for 0.1-mile spot locations along KY 441 between Archer Drive and US 25E. Two locations having CRF's above 0.90 were identified:

- A 0.1-mile spot along KY 441 near the KY 3486/Archer Drive intersection had a CRF of 0.99. Five crashes were recorded at this location during the analysis period. Three of these crashes were single-vehicle collisions; there was also one sideswipe collision and one collision involving an opposing left-turn. KY 441 makes a 90-degree turn at its intersection with KY 3486 and Archer Drive; the Archer Drive and KY 3486 approaches are stop-controlled. Three injuries occurred as a result of the opposing left-turn collision, but the remaining crashes were non-injury collisions. A photograph of this location is provided in [Figure 5](#) below.
- The 0.1-mile spot along KY 441 near the US 25E intersection had a CRF of 2.43. About two-thirds of crashes at this location were rear-end and angle collisions. Based on the distribution of crash types, it is likely that the combination of traffic congestion and closely-spaced intersections is contributing to the high crash rate at this location. The collisions at this location were primarily non-injury, with only one injury collision being recorded during the analysis period. A photograph of this location is provided in [Figure 6](#) below.



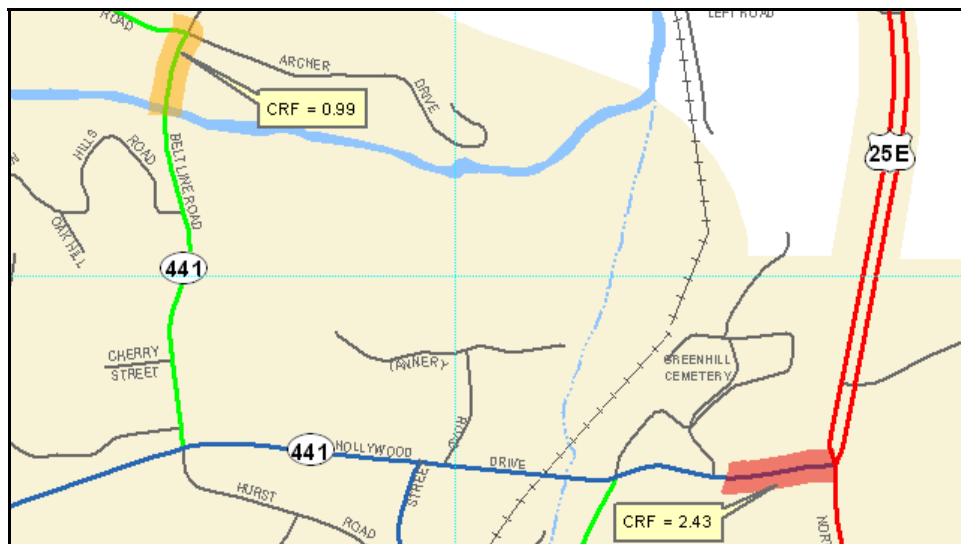


**Figure 5: KY 441 at KY 3486 & Archer Drive**



**Figure 6: KY 441 at US 25E**

The locations of the 0.1-mile spots discussed above are mapped in [Appendix A, Exhibit 3](#) and in [Figure 7](#) below. The location and manner of collision for each individual crash along the KY 441 corridor between Archer Drive and US 25E is also mapped in [Appendix A, Exhibit 3](#). Additional information on 0.1-mile spot calculations for the 2008-2010 data is included in [Appendix B, Table 4b](#).



**Figure 7: 0.1-Mile Spots with CRF > 0.90**

## 2.5 Traffic and Level of Service

Recent traffic count data was obtained from the Division of Planning for KY 441, plus select intersecting routes, from just west of the Archer Drive/KY 3486 intersection to the US 25E intersection. These traffic counts were used to estimate existing (Year 2011) Average Daily Traffic volumes. Default truck percentages based on similar functional classification were assumed for locations where truck percentages were needed for Volume to Capacity and Level of Service (LOS) calculations but where actual classification counts were not available. Turning movement counts at intersections along KY 441 from 19<sup>th</sup> Street (KY 2079) to US 25E were obtained from Highway District 11. These turning movement counts, along with trip generation rates from the Institute of Transportation Engineers *Trip Generation* manual, were used to estimate the amount of traffic on KY 441 that would be diverted to the proposed extension of Belt Line Road from KY 3486 / Archer Drive to US 25E and to re-calculate traffic volumes on segments of existing KY 441 from KY 3486/Archer Drive to US 25E under the build scenario. Traffic volumes and truck percentages for Year 2011 under both the build (with construction of the Belt Line Road Extension) and no-build (without construction of the Belt Line Road Extension) scenarios are provided in [Appendix A, Exhibit 4](#) and in [Figure 8](#) below.

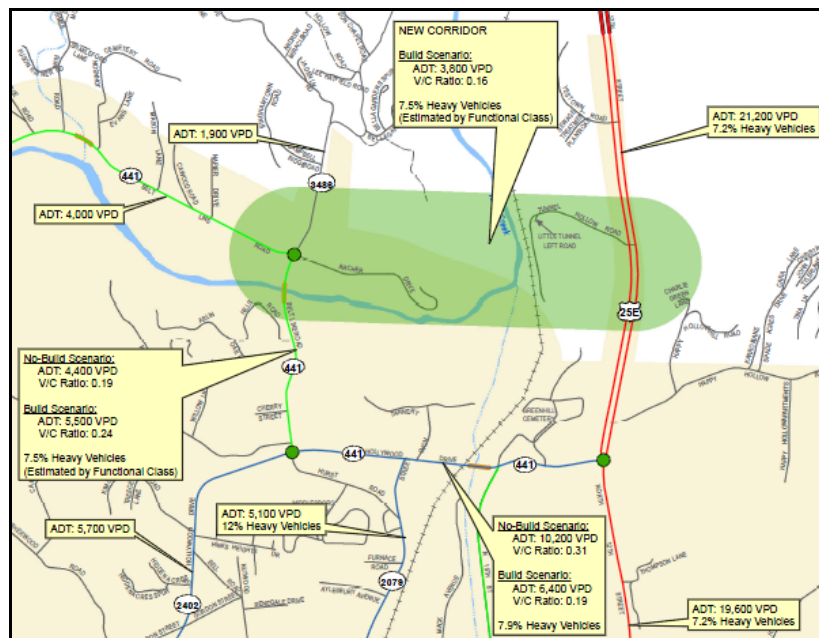
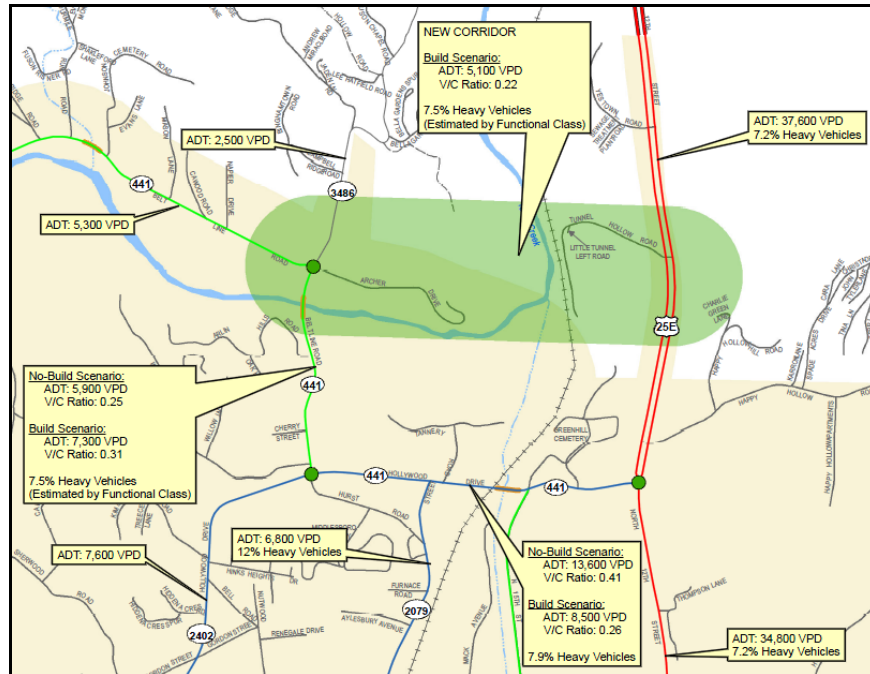


Figure 8: 2011 Traffic Volumes & V/C Ratios

Traffic volumes for both the build and no-build scenario were then projected to Year 2040 using assumed annual growth rates based on an analysis of both statewide and area-specific historical growth rates. Traffic volumes for Year 2040 under both the build and no-build scenarios are provided in [Appendix A, Exhibit 5](#) and in [Figure 9](#) below.



**Figure 9: 2040 Traffic Volumes & V/C Ratios**

Due to the low free-flow speeds on KY 441, Level of Service could not be calculated using the two-lane methodologies presented in the *Highway Capacity Manual 2000*. Therefore, Volume to Capacity (V/C) ratios were chosen as an alternate measure of congestion and were calculated for segments of existing KY 441 under both the build and no-build scenarios in Year 2011 and Year 2040. V/C ratios were also calculated for the proposed Belt Line Road extension in Year 2011 and Year 2040, assuming a two-lane cross-section. Under the no-build scenario, the highest V/C ratio would be 0.41, in Year 2040, on the section of existing KY 441 from KY 2402/Hurst Road to US 25E. This is considered to be a low level of congestion, but the V/C measure assumes uninterrupted traffic flow and doesn't take into consideration the effects of delays at intersections. The V/C ratio is expected to be reduced by approximately 40% for this portion of

existing KY 441 under the build scenario for Year 2011 and Year 2040. The V/C ratios are provided in [Appendix A, Exhibit 4](#) and [Figure 8](#) above for Year 2011, and in [Appendix A, Exhibit 5](#) and [Figure 9](#) above for Year 2040.

Turning movement counts for Year 2011 were used to calculate existing Levels of Service at each of the four major intersections along KY 441 between 19<sup>th</sup> Street (KY 2079) and US 25E:

- 19<sup>th</sup> Street (KY 2079);
- 15<sup>th</sup> Street (CS 2004);
- Greenhill Cemetery Road / Wal-Mart Entrance; and
- US 25E

Turning movement volumes for these intersections were also estimated for the Year 2011 build scenario (with construction of the Belt Line Road Extension) as well as the Year 2040 build scenario and no-build scenario (without construction of the Belt Line Road Extension) using similar procedures to those that were used to estimate Average Daily Traffic volumes for existing sections of KY 441. These projected turning movement volumes were used in conjunction with Highway Capacity Software to calculate Levels of Service (LOS) at each of the four intersections listed above under both the build and no-build scenarios for Year 2011 and Year 2040. For this analysis, it was assumed that traffic signal timings would be adjusted to better accommodate the new traffic volumes, but that no other improvements would be made at these intersections. The results of this analysis are shown in [Appendix A, Exhibit 6](#) and [Figure 10](#) below for Year 2011, and in [Appendix A, Exhibit 7](#) and [Figure 11](#) below for Year 2040.

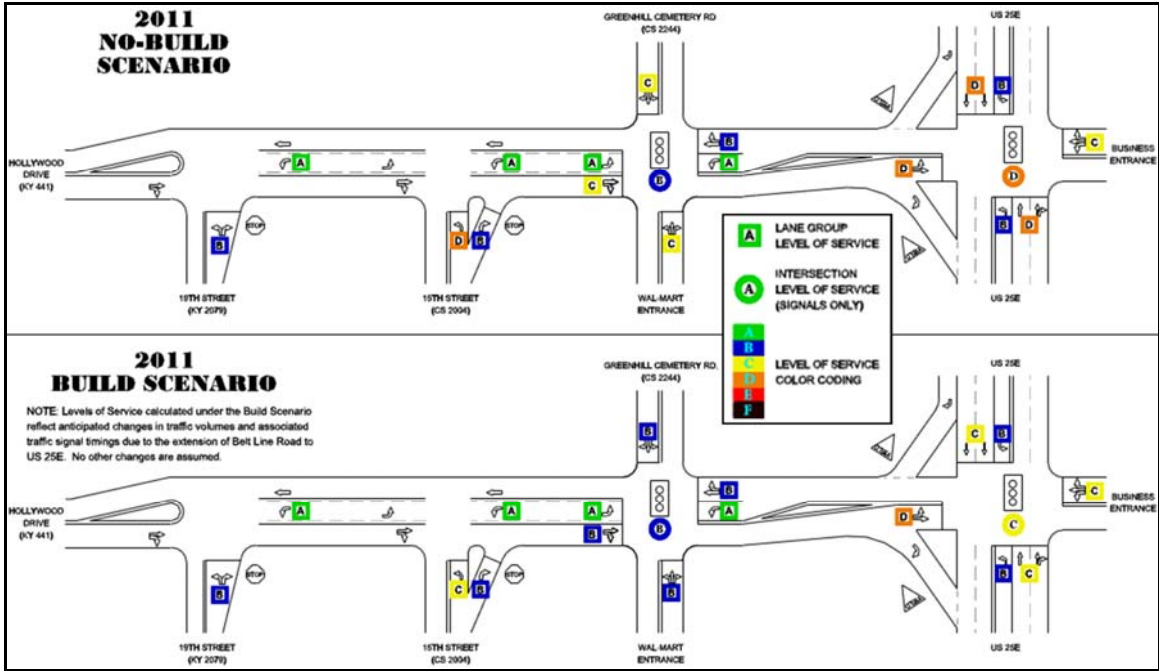


Figure 10: 2011 Intersection Levels of Service

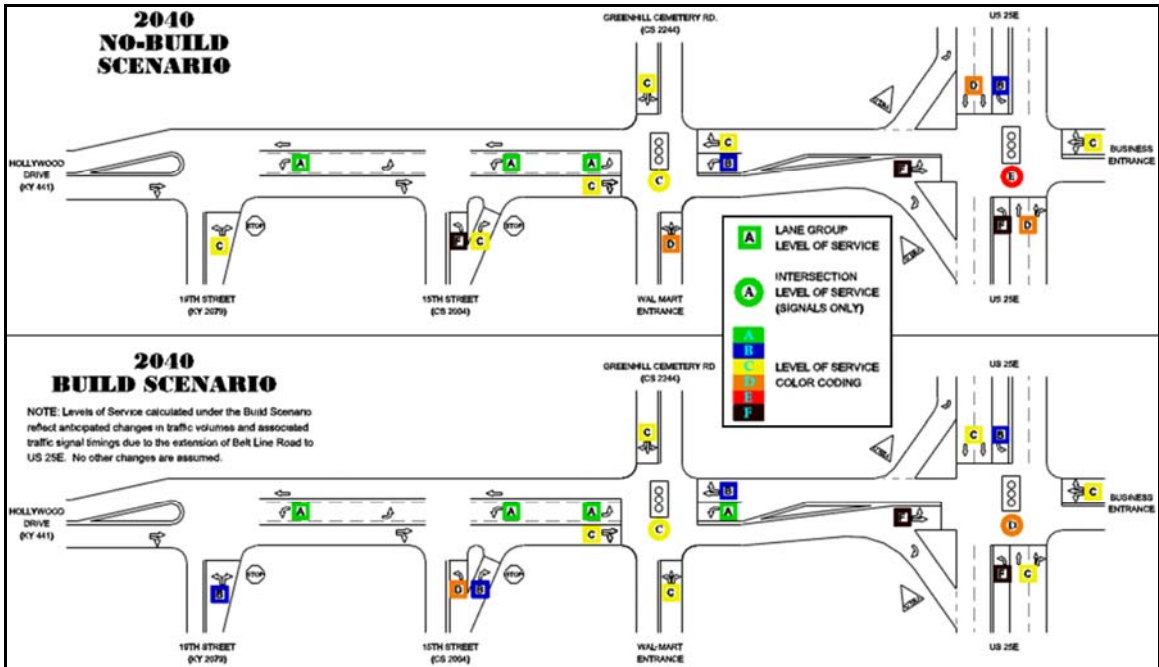
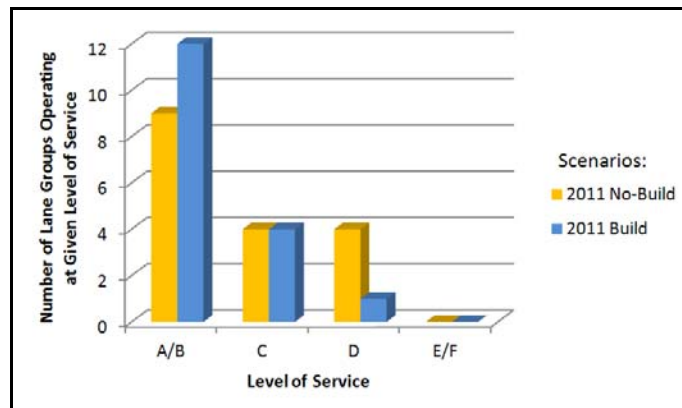


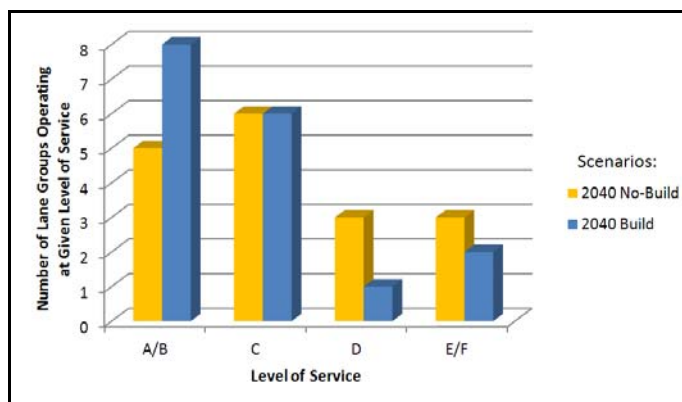
Figure 11: 2040 Intersection Levels of Service

Figure 12 and Figure 13 below contain charts which were prepared to provide a summary of the operating conditions for the four intersections along existing KY 441 near Wal-Mart (19<sup>th</sup> Street, 15<sup>th</sup> Street, Greenhill Cemetery Road / Wal-Mart

Entrance, and US 25E) under both the build scenario (with construction of the Belt Line Road Extension) and the no-build scenario (without construction of the Belt Line Road Extension) for two analysis years (2011 and 2040). These charts summarize the information contained in [Appendix A, Exhibit 6](#); [Appendix A, Exhibit 7](#); [Figure 10](#); and [Figure 11](#). The numbers in the charts represent the total number of lane groups at all four intersections along existing KY 441 near Wal-Mart that would be expected to operate at a given Level of Service under each scenario. An examination of the chart for the 2040 analysis year reveals that while some congestion is anticipated in Year 2040 for the portion of KY 441 between near Wal-Mart even under the build scenario, the number of lane groups operating at LOS A or B is expected to increase from five to eight, and the number of lane groups operating at LOS D, E, or F is expected to decline from six to three, with the construction of the Belt Line Road Extension. These charts are also provided in [Appendix A, Exhibit 8](#).



**Figure 12: 2011 Levels of Service Under Various Scenarios**



**Figure 13: 2040 Levels of Service Under Various Scenarios**



### 2.6 Improvements Listed in the Biennial Highway Plan

Eight Bell County projects are listed in *Kentucky's FY2010-FY2012 Enacted Biennial Highway Plan*. Information for these projects is included in [Appendix B, Table 1](#). With the exception of the Belt Line Road extension project itself (Item No. 11-110.00), none of the projects are located in the immediate project area.

## 3.0 ENVIRONMENTAL & SOCIOECONOMIC CONSIDERATIONS

### 3.1 Environmental Footprint

The Division of Planning developed an Environmental Footprint which is provided in [Appendix A, Exhibit 9](#). Environmental impacts are not anticipated with the No-Build Option. Environmental impacts for the Build Option will need to be examined in greater detail during the Design phase, but will likely include impacts to wetlands. Other environmental and socioeconomic issues are discussed below.

### 3.2 Socioeconomic Impacts

The build option would improve regional access for existing industry, truck traffic, and higher education. A new or improved roadway would enhance travel efficiency for area residents, commuters and through traffic by reducing travel times, increasing capacity, and improving connectivity. The build option would provide a more efficient means of transporting raw and finished materials to and from industrial sites.

### 3.3 Relocations

Low numbers of residential or commercial relocations are anticipated for the build option. Actual numbers of relocations would be determined during future design phases.

### 3.4 Environmental Justice

An Environmental Justice & Community Impacts Report was prepared by the Cumberland Valley Area Development District (CVADD) and is included in [Appendix D](#) of this report. The findings of the Environmental Justice & Community Impacts report are summarized in this section.

Following a comprehensive review of demographic data from the U.S. Census Bureau, discussions with local officials regarding community features, and field observations, the Cumberland Valley Area Development District staff concluded that a defined Environmental Justice community does not exist within the study area for the proposed construction of a new route from KY 441 to US 25E in Middlesboro.

Analysis of racial composition data resulted in two Census Block Groups being identified in and around the study area that contained a percentage of minorities exceeding national and/or state averages. Following a comprehensive review of Census Block data and discussions with local officials, no minority concentrations were discovered within or surrounding the immediate study area.

The percentages of persons in the study area below the poverty level are quite high; however, discussions with local officials and a field review led to the conclusion that no concentration of individuals below the poverty level will be disproportionately affected by this project. Community leaders have expressed support for the proposed project and anticipate that it will provide an economic benefit by improving access and reducing congestion.

Age analysis indicates that the distribution of elderly residents in the study area slightly exceeds the national and state averages, but no specific concentrations of elderly residents were discovered during the compilation of this report.



CVADD staff will continue to monitor the progress of this project and reevaluate the Environmental Justice Review to document any demographic and/or socioeconomic changes that may occur in and around the study area throughout the development of the project.

#### 4.0 GEOTECHNICAL CONSIDERATIONS

Geotechnical characteristics and potential issues in the area have been identified and summarized in the following paragraphs, and will require further consideration throughout future phases of this project. A Geotechnical Overview was prepared by the Kentucky Transportation Cabinet Geotechnical Branch and is included in [Appendix E](#) with other resource agency coordination documents.

The project study area is situated within the Middlesboro Basin. The Middlesboro North Geologic Quadrangle map indicates that the study area is underlain by Quaternary Alluvium. The Alluvium thickness ranges from 0-30 feet. The bedrock Formation within the study area is Mingo and Hance Formations. These formations contain Sandstone, Shale, Siltstone, Underclay and Coal. Faults are located throughout the Middlesboro Basin, which are considered an “Impact Structure.” These occur in a circular pattern as shown on the geologic map in the Geotechnical Branch’s report in [Appendix E](#). Most of the faults can be avoided by locating any new alignments in the alluvium and as embankment sections. The bedrock within the area of the basin is highly fractured, folded and deformed. The geologic map in [Appendix E](#) indicates the dip of the bedrock in the Basin to range from 9 degrees to 90 degrees and the dip direction varies greatly throughout the study area.

The geotechnical comments and concerns for the study area are as follows:

- Foundations in alluvium for a bridge over Yellow Creek may require deep foundation types (piles or drilled shafts) if the alluvium is greater than 20 feet thick. A structure over Yellow Creek would be located within 500 feet

- of a mapped fault and approximately within two miles of the Rocky Face Fault (not shown on Map). The structure should be designed accordingly.
- In areas where the bedrock dips into a cut section, cut slopes will need to be evacuated along the bedding plane from the ditch line to the top of the ground line. This may require extra right of way in areas where the dip is less than 26 degrees.
  - Coal mines (surface or underground) are not anticipated to be encountered.
  - The Geotechnical Branch recommends all cut sections be kept to a minimum if possible to reduce the amount of bedrock exposed by adjusting the grades or alignments. An alignment to be considered is shown on the geologic map in [Appendix E](#).

## 5.0 CABINET AND PUBLIC INVOLVEMENT ACTIVITIES

Through the course of this study the Kentucky Transportation Cabinet Central Office personnel have met with personnel from Highway District 11 and sent an Agency Coordination letter to representatives of federal, state and local agencies, and other special interest groups who were given an opportunity to provide input on the proposed project. Minutes for the project team meetings are included in [Appendix F](#). Responses from resource agencies and other communications are included in [Appendix E](#).

### 5.1 Project Team Meetings

An initial project team meeting was held on July 13, 2004, at the Kentucky Transportation Cabinet (KYTC) Department of Highways District 11 Office in Manchester, Kentucky. The purpose of the meeting was to discuss the purpose, goals, objectives, and issues of the proposed project, and to review data on existing conditions for the study area. Participants at the meeting included representatives from Highway District 11 and the KYTC Division of Planning. A second project team meeting was conducted on June 17, 2010 to update and

clarify information for the final report. This meeting was also held at the Highway District 11 Office in Manchester and included representatives from Highway District 11 and the KYTC Division of Planning. Minutes for the project team meetings are included in [Appendix F](#).

### 5.2 Resource Agency Coordination

Many local, state, and federal resource agencies, with diverse areas of public responsibility, were included in the planning process. Input was solicited from these agencies through written requests. Each agency was sent a copy of the project purpose and goals statement, existing and future traffic data, and a project location map. This section summarizes the input received from these agencies. The letter that was sent to the agencies requesting their input, along with the agencies' responses, are included in [Appendix E](#).

- **Local Comments:** The City of Middlesboro supports the project. The project will enhance economic opportunities through improved access, increased capacity, reducing delays, improving emergency response times, creating a safe facility for the driving public, and decreasing coal truck traffic on Cumberland Avenue in downtown Middlesboro. [Note: KY 441 is not currently on the coal-haul route system.]
- **State Comments:**
  - **Kentucky Department of Highways, Division of Materials, Geotechnical Branch** - Provided comments which were listed in Section 4.0. Their report on geotechnical considerations for this project is contained in [Appendix E](#).
  - **Kentucky Department of Agriculture** - Has no specific concerns or issues concerning the project.
  - **Kentucky Airport Zoning Commission** - Has reviewed the proposed project area and found that it will have no hazardous effect to air navigation. However, if construction equipment used on this project exceeds 200 feet in height, a permit will have to be

obtained through the Kentucky Airport Zoning Commission. An attachment describing their jurisdiction was included.

- **Kentucky Department of Military Affairs** – Have no issues or concerns that impact their agency.
- **Kentucky Justice and Public Safety Cabinet, Department of Vehicle Enforcement** - Sees neither negative impact nor specific concerns.
- **Kentucky Environmental and Public Protection Cabinet** – Has no permitted/bonded areas within the boundaries of this project.
- **Kentucky Environmental and Public Protection Cabinet, Department for Environmental Protection, Division for Air Quality** – Gave standard comments for air quality regulation.
- **Kentucky Environmental and Public Protection Cabinet, Division of Conservation** – There are no agricultural districts established in the project area, therefore no land enrolled in Agricultural District Program to be mitigated. They would like to see the issue of the loss of farmland addressed. Both prime farmland and farmland of statewide importance could be impacted by this project. They recommend that best management practices (BMPs) be utilized to prevent non-point source water pollution.
- **Kentucky Environmental and Public Protection Cabinet, Department for Natural Resources** – The **Division of Forestry** has looked at the project from two access points. The current impediments are six-plus residences, Little Yellow Creek and the railroad parallel to the creek. The creek runs through an uninhabited flood plain north of an industrial area. There are residences located east and west of the proposed route. A hill protrudes southeasterly in the flood plain. The creek has characteristics of a drainage canal rather than of natural origin, with poor aesthetic quality (rock walls and joining grasslands). They do not envision additional detrimental impacts to Yellow Creek with the

proposed road, since the new bridge will traverse the railroad and creek and not functionally impact the flood plain. The **Division of Oil and Gas Conservation** states that the project is located in an area of known oil and gas exploration activity. Oil and gas wells may be encountered in this area and the oil and gas operators may need to be contacted in order to work out any possible impact. The Kentucky Geological Survey can provide map overlays with the wells plotted.

- **University of Kentucky, Kentucky Geological Survey** – Geologic concerns for the study include: Physiographic Region, Middlesboro Impact Structure, Karst Potential, Landslide Potential, Unconsolidated Sediments, Resource Conflicts, Materials Suitability, Fault Potential, and Earthquake Zone.
- **Kentucky Commerce Cabinet, Department of Parks** – The project will not directly impact any of their facilities.
- **Kentucky Commerce Cabinet, Department of Tourism** – Since no known historical sites or sensitive wildlife and natural resource areas exist in the project area, it does not appear that this project will negatively impact activities related to the Department of Tourism.
- **Kentucky Commerce Cabinet, Department of Fish and Wildlife Resources** – Provided a list of federal and state threatened and endangered species that are known to occur in the study area, and provided recommendations for minimizing impacts to the species. Noted that the project may impact wetland habitats, and provided recommendations for working within waterways and wetland habitats.
- **Kentucky Cabinet for Health and Family Services** – Does not anticipate any significant impact to their offices or daily operations due to this project.

- **Federal Comments:**
  - **United States Department of Health & Human Services** – While they have no project specific comments to offer at this time, they do recommend that the topics listed below be considered during the NEPA process along with other necessary topics, and addressed if appropriate: Air Quality, Water Quality/Quantity, Wetlands and Flood Plains, Hazardous Materials/Wastes, Non-Hazardous Solid Waste/Other Materials, Noise, Occupational Health and Safety, Land Use and Housing, and Environmental Justice.
  - **United States Department of Homeland Security/United States Coast Guard** – Have reviewed the information provided and determined that the project will not involve a waterway under the jurisdiction of the Coast Guard, therefore a bridge permit is not required.
  - **United States Department of Agriculture, Natural Resources Conservation Service (NRCS)** – Are concerned with potential impacts that the project might have upon prime farmland soils and additional farmlands of statewide importance. If federal dollars are to be used to convert important farmlands from agricultural uses to non-agricultural uses a form will need to be submitted to the local NRCS office.

### 5.3 Public Involvement

The only public involvement for this study was sending letters to resource agencies as part of the resource agency coordination process. Further public involvement will be required during the Design Phase, and the details will be determined by the Design project team.

## 6.0 PROJECT TEAM RECOMMENDATIONS

### 6.1 Options Considered

Two preliminary build options and a no-build option were initially considered. One of the build options would follow a new corridor from the KY 441 / KY 3486 / Archer Drive intersection and would intersect with US 25E north of the existing KY 441 / US 25E intersection. The other build option would approximately follow the existing alignment and would intersect US 25E at the existing US 25E / KY 441 intersection. The existing corridor build option was eliminated from consideration, however, for the following reasons:

- Revising the two 90-degree curves on the existing KY 441 alignment at the Hurst Road / KY 2402 intersection and at the Archer Drive / KY 3486 intersection would involve significant floodplain impacts. Revising the curve at the Hurst Road / KY 2402 intersection would also involve impacts to a large industrial site, in addition to the floodplain impacts.
- Widening KY 441 enough to provide adequate capacity in the area near Wal-Mart (between 19<sup>th</sup> Street and US 25E) would be impractical due to the limited width available for construction between the two commercial areas on either side of KY 441.
- Following the existing alignment would involve construction over a longer distance (approximately 1.1-miles for the existing corridor option compared to 0.8-mile for the new corridor option).

The final build option considered for the KY 441 study was identified and refined through the study process. Corridor needs and input from local officials and resource agencies were considered in the corridor development process. The resulting build option is a new two-lane facility, which would be an extension of Belt Line Road from the Archer Drive / KY 441 / KY 3486 intersection to US 25E near the Tunnel Hollow Road intersection north of Middlesboro. The new facility's primary function should be to serve through traffic, and control of access to the new facility is recommended to reduce the potential for degradation of

traffic flow and safety due to future roadside development. The location of the corridor for the final build option is shown in [Appendix A, Exhibit 1](#).

There were four important considerations in recommending a preferred option:

- Meet the project goals as determined from the study process
- Public support
- Cost to construct
- Traffic volumes

The no-build option was evaluated by the project team. The benefits of the no-build option include no expenditure of funds, except for routine maintenance; no impact to environmental resources; no impact to farms; and no residential or commercial relocations. In spite of these benefits, however, a conclusion was reached that without some corridor improvements, the project goals that relate to congestion, safety, and regional access and mobility could not be met for the following reasons:

- The existing route currently experiences some congestion in the area between 19<sup>th</sup> Street (KY 2079) and US 25E, with several lane groups (primarily on intersecting routes) operating at Level of Service C and D based on Year 2011 traffic volumes. It is anticipated that extending Belt Line Road to US 25E would reduce existing traffic volumes on KY 441 sufficiently to improve current Levels of Service (LOS) to LOS B or higher for most lane groups, including an increase in Level of Service from LOS D to LOS C for the US 25E/KY 441 intersection.
- Traffic volumes are expected to increase significantly by Year 2040, resulting in lower Levels of Service for several lane groups under the no-build scenario. In particular, the left-turn movement from 15<sup>th</sup> Street (CS 2004) is expected to operate at LOS F, and the US 25E/KY 441 intersection is expected to operate at LOS E. It is anticipated that extending Belt Line Road to US 25E would reduce existing traffic volumes on KY 441 sufficiently to enable both the left-turn movement from 15<sup>th</sup> Street and the US 25E/KY 441 intersection to operate at LOS D. In

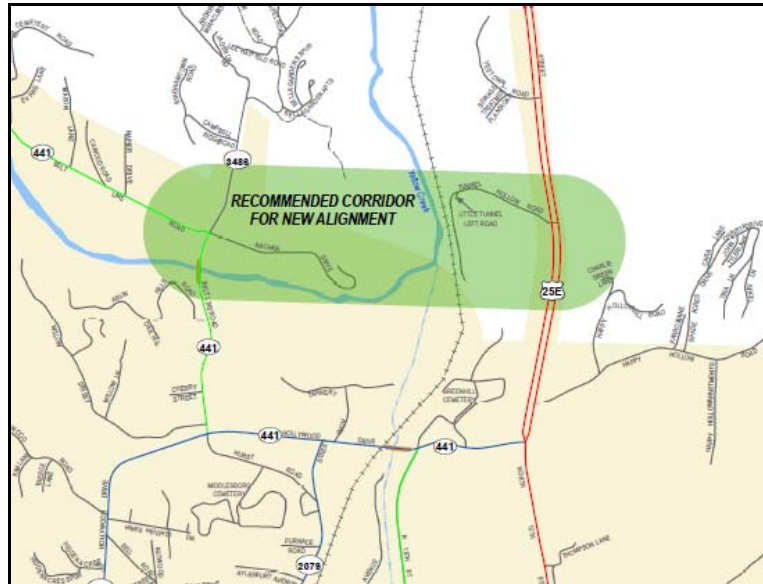


addition, the number of lane groups operating at LOS A or B is expected to increase by 60% under the build scenario versus the no-build scenario in Year 2040.

- The build option would allow motorists traveling between US 25E and existing Belt Line Road to avoid traveling through several intersections and two ninety-degree turns, including two locations which were identified as having high crash rates. The build option would also reduce travel distance by as much as 50% for vehicles traveling to or from points to the north along US 25E. This reduced exposure would be expected to improve safety for the traveling public in the project area. Reduced congestion at the high-crash spot along KY 441 near the US 25E intersection would likely reduce the crash rate at this location, and changes to the intersection of KY 441, KY 3486, and Archer Drive resulting from the extension of Belt Line Road would be expected to improve safety at that high-crash location as well.
- The build option would improve access to western Middlesboro, which can be accessed via Belt Line Road, by reducing the distance required for vehicles to travel from US 25E to Belt Line Road and by allowing vehicles traveling to western Middlesboro to bypass congested intersections along KY 441 near and at the US 25E intersection. This would reduce delays for through traffic traveling to western Middlesboro, as well as for the residual traffic that would continue to use KY 441 between KY 2402/Hurst Road and US 25E.
- The no-build option would do nothing to improve access between US 25E and western Middlesboro, to decrease delays, or to improve safety, all of which were listed as project goals.

The project team therefore recommended the build option to alleviate congestion, improve safety, and provide improved access to western Middlesboro. The recommended corridor begins at the intersection of Archer Drive, KY 441, and KY 3486, and continues east to US 25E near the Tunnel Hollow Road intersection, crossing the CSX railroad tracks and Yellow Creek. The

approximate location of this new corridor is shown in [Appendix A, Exhibit 1](#) and in [Figure 14](#) below.



**Figure 14: Recommended Corridor**

Probable design criteria for the new route include the following characteristics:

- Functional Classification of Rural Major Collector
- Approximate length of 0.8-mile.
- Design Speed of 45 Miles Per Hour
- Typical Section consisting of two 12-foot lanes with 8-foot shoulders
- Turn lanes at the US 25E intersection and others as required

## 6.2 Estimated Costs

Cost estimates for the recommended build option were prepared by Highway District 11 in 2010 and are summarized below.

Phase	Estimated Cost (Year 2010 Dollars)
Design	\$775,000
Right-of-Way	\$750,000
Utilities	\$375,000
Construction	\$4,700,000
Total	\$6,600,000

### 6.3 Project Development Considerations

Below is a summary of important findings that will need to be addressed in the next phase of project development:

- Further fieldwork and coordination with the United States Fish and Wildlife Service will be necessary in future project phases to determine if the federally listed endangered Indiana bat, gray bat, fanshell mussel, clubshell mussel and rough pigtoe (mussel) and the federally threatened bald eagle and Eggert's sunflower exist within right of way limits, and the potential for adverse impacts.
- For streams and wetlands, analyze specific impacts in future project phases, evaluate avoidance and minimization options, and determine permitting and, if appropriate, mitigation requirements.
- Historic and archaeological surveys will need to be conducted to determine/confirm the presence of historic or archaeological sites and potential to avoid or minimize project impacts.
- Environmentally sensitive sites, parks and exemplary natural areas will need to be considered in future project phase decisions.
- Determine whether Section 4(f) or Section 6(f) evaluations will be necessary for future project phases.
- Determine numbers of residential and commercial relocations and farmland impacts.
- For potential hazardous materials and underground storage tank sites, confirm presence at facilities such as service stations, automobile repair shops, and auto salvage yards and assess avoidance and mitigation options.
- Modeling of potential air and noise impacts will be necessary in future project phases to determine if mitigation considerations are necessary.

#### 6.4 Construction Considerations

A number of issues were identified through the course of this study that should be considered in the future construction phase of this project. Potential construction issues related to the recommended corridor include:

- Erosion Control: Measures to control erosion and sedimentation during and after construction activities should be utilized. The construction of this project will initially increase the amount of sediment that ground and surface water sources receive. There will also be an increase in sheet-flow pollution when this project is completed. Careful consideration must be given to erosion control methods to minimize the amount of pollution that reaches surface and ground water.
- Floodplains: The construction of this project may impact floodplains in the project area, including those floodplains associated with Bennetts Creek/Yellow Creek and Little Yellow Creek. Floodplains in the project area are shown in the Environmental Footprint, which is included as [Appendix A, Exhibit 9](#), and on several maps published by the Federal Emergency Management Agency (FEMA):
  - Flood Insurance Rate Map (FIRM) Number 21013C0239D provides coverage of the likely new corridor alignment and a portion of the existing KY 441 alignment, while FIRM Number 21013C0352D provides coverage of the remaining portion of the existing KY 441 alignment within the project area. FIRMette maps portraying the portions of these FIRM maps near the project area are included as [Appendix A, Exhibit 10](#) and [Appendix A, Exhibit 11](#).
  - Flood Boundary and Floodway Map Community-Panel Number 215190 0005 provides coverage of the project area within the City of Middlesboro, while Community-Panel Number 210010 0020 provides coverage of the project area within the unincorporated area of Bell County.

Detailed hydraulic analysis must be performed to maintain current flood stages without increasing them by more than one foot in uninhabited

areas. The construction of this project must not increase the flood hazard within the project corridor or drainage area.

- Air Quality: Construction period air quality impacts need to be evaluated to examine the potential short-term effects of site preparation, demolition, materials storage, and other construction activities to determine if any appropriate mitigation commitments are to be incorporated into the plans.
- Environmentally Sensitive Areas: A number of environmentally sensitive areas will be encountered during the construction of this project. When construction activities are being performed in these areas, every precaution should be taken to minimize the disturbance to these areas.

## 7.0 CONTACT INFORMATION

Written comments may be addressed to:

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