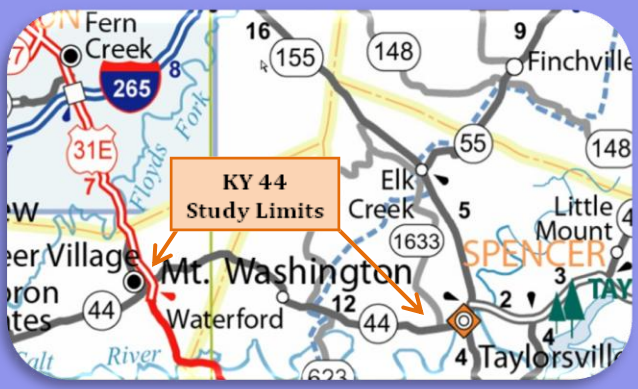
Final Report
October, 2012

KY 44 Corridor Study

US 31E to KY 1633
Bullitt & Spencer Counties

Item No. 5-396.00

A Summary of Findings & Recommendations



Prepared by:
Division of Planning & KYTC District 5
Kentucky Transportation Cabinet

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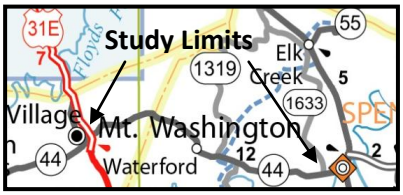
EXECUTIVE SUMMARY

KY 44 CORRIDOR STUDY
US 31E to KY 1633 (Bullitt & Spencer Counties)

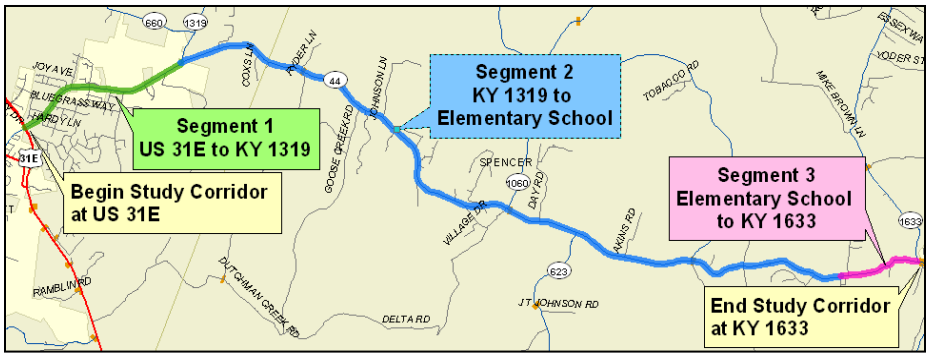
The KY 44 Corridor Study was conducted as a continuation to the planning studies undertaken by the Kentucky Transportation Cabinet (KYTC) from Shepherdsville in Bullitt County (Item 5-150.00) and extending eastward. The current planning study (Item 5-396.00) investigated the roadway conditions from US 31E in Mt. Washington to KY 1633 just west of Taylorsville.



KY 44 is a major highway corridor in Bullitt and Spencer counties. These counties have seen a notable growth in population (23% in Bullitt County and 45% in Spencer County) as well as traffic in the period 2000-2010. The goal of the planning study was to identify improvements to provide a safe roadway to this growing corridor.

PROJECT SCENARIO

US 31E, at the west end of the study corridor, connects to Gene Snyder Freeway to the north which leads to the City of Louisville. A traffic volume of 10,000 Average Daily Traffic (ADT) is noticed near US 31E on KY 44 (2009 data) and is projected to increase to 24,500 ADT in 2035. A Level of Service F indicating breakdown flow, is projected in 2035 if the current road conditions remain same in that section. To the east of the study corridor, KY 44 leads to Taylorsville Lake State Park which is a major recreational attraction with a 1,200 acres park and sits on 3,050 acre lake. There has been notable growth in recreational traffic on KY 44 in the study area due to the State Park.



EXISTING CONDITIONS

KY 44 is a 2-lane roadway with narrow shoulders in the study area. The west end of the study near US 31E has an elementary school, a high school, businesses and residences in Mt. Washington. Rear end crashes are high on KY 44 near US 31E. The terrain is fairly level between US 31E and KY 1319.

From KY 1319 going eastward, the terrain is rolling with several sharp curves and steep grades. There are no passing or climbing lanes. Intersections at the highway crossings at KY 1060, KY 1251 and KY 623 have inadequate sight distance, poor intersection geometry and some steep grades. There are multiple span concrete tee beam bridges east of the intersections at KY 1060 (on Plum Creek) and KY 1251 (on Elk Creek). Both the bridges are functionally deficient. There is a two span concrete culvert at Dutchman Creek which is also designated as a bridge. The bridges are not structurally deficient. The narrow width at the bridges is a concern particularly with recreational vehicles, trucks and farm equipment. There are several locations with high crash history. The common types of crashes from KY 1319 to KY 1633 are roadway departure crashes.

THE STUDY METHODOLOGY

Existing roadway information was collected from the KYTC's Division of Planning, Highway Information Systems (HIS) data. Additional project information was derived from archived plans and site visits. The study was divided into three segments, considering ongoing design projects in Segment 1 & 3. Segment 1 was defined between US 31E and KY 1319 where Item 5-347.50 has completed Phase I Design. Segment 2 was studied from KY 1319 to the beginning of the three lane section in front of Spencer County Elementary School. Segment 3 was defined from the end of Segment 2 to KY 1633 where Item 5-395.00 has completed Phase I and Phase II Design. Segment 2 falls in between Segments 1 & 3 which are in various stages of design as mentioned above. For consistency of design along the corridor, recommendations for Segment 2 will take into consideration, the proposed design in Segment 1 and Segment 3 on either sides of the segment. Therefore, all the three segments were included in a combined planning study under Item No. 5-396.00.

THE PROJECT TEAM

The project team consisted of KYTC Division of Planning Central Office staff, KYTC District 5 staff and KIPDA Transportation Planning staff. The project team's tasks were to evaluate the roadway conditions, analyze the current and future traffic, conduct periodic meetings to share information, gather input, develop a Draft Purpose and Need statement and to propose recommendations. The project team developed alternates with input from local Officials, stakeholders, and the public. The team had three meetings during the course of the study.

PUBLIC INVOLVEMENT

The project team considered public opinion to be very important, as the public are the users of the roadway on a daily basis and are best informed about the roadway conditions. Public input was requested during the study. Two Public Meetings were conducted which are documented separately in Public Meeting folders. The project team met the local Officials and stakeholders two times in formal meetings, initially to inform about the proposed study and later when the

alternates were developed. Public, Senators, Judge Executives, Mayors and stakeholders such as representatives of the schools, police, and fire departments of Bullitt and Spencer counties participated in the study and provided feedback.

DRAFT PURPOSE AND NEED STATEMENT

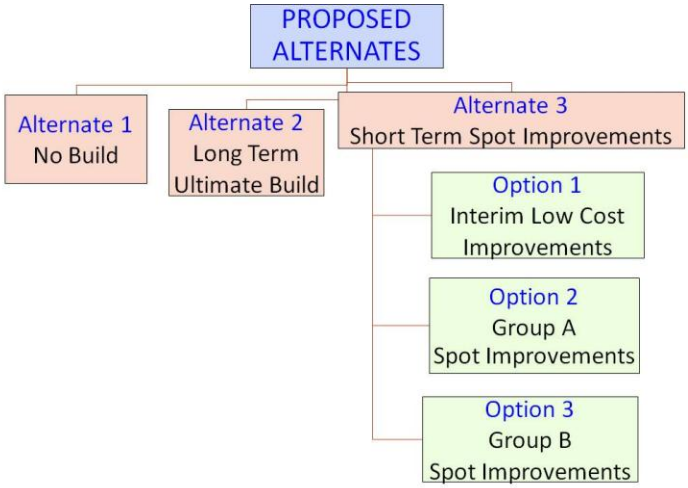
The purpose of the project is to improve the safety of the road and to provide adequate transportation linkage between the Cities of Mt. Washington and Taylorsville. Improvements to the study corridor were considered because of crash concerns, less than standard roadway geometry, and the need to provide an adequate transportation system for schools, commuters, emergency services and recreational traffic traveling to Taylorsville Lake State Park.

ENVIRONMENTAL OVERVIEW, GEOTECHNICAL REVIEW AND RESOURCE AGENCY INPUT

The Environmental Overview, which included addressing potential Environmental Justice issues, was completed by HMB Consultants Inc., as a separate study for the KYTC. The KYTC Division of Structural Design, Geotechnical Branch conducted a geotechnical review for the project. Selected State and Federal agencies were contacted to derive their input for the planning study.

ALTERNATES CONSIDERED

Alternates were developed considering the study purpose and need to improve the safety of the corridor. Three types of alternates were developed and presented to the public.



A. Alternate 1 - No Build Alternate

This alternate assumes that no new roadway improvements are undertaken. The benefits of this alternate are that the property, the environment and cost will be preserved. The disadvantage of selecting this alternate is that the safety issues identified by the study will not be addressed.

B. Alternate 2 - Long Term Ultimate Build Alternate

This alternate proposes a long term ultimate solution to KY 44 by upgrading the roadway to current geometric standards. Exhibit ES-1 shows the proposed Long Term Ultimate Build alternate. For Segment 1, recommendations outlined in the Phase I Design of Item 5-347.50 will be followed. Typical sections and alignment were defined in 5-347.50. A five-lane curb-and-gutter section is proposed from US 31E for 0.6 mile, then a three lane curb-and-gutter section for 0.3 mile. From that point to the end of the segment, a 2-lane rural section is proposed. Proposed speed varies from 45-55 mph.

In Segment 2, the project team proposed that the roadway will remain on the existing alignment where feasible. Realignments will be necessary at some locations to improve geometry. The proposed typical section consists of two 11 foot lanes and 8 foot shoulders (6 foot paved). Proposed design speed is 55 mph. Intersections will be improved. Climbing lanes & passing lanes may be added as needed depending on the proposed grades and turn lanes will be added. In Segment 3, recommendations of Item 5-395.00 will be followed. Alignment and typical section (22 foot pavement and 6 foot shoulders) were defined in 5-395.00. The proposed design speed is 45 mph.

C. Alternate 3 – Short Term Spot Improvements

No spot improvements were considered for Segment 1 as roadway improvements for this segment were identified in the Phase 1 Design under Item 5-347.50. Segment 3 is scheduled for construction in the near future and therefore, no spot improvements were considered. Three types of Short Term Spot Improvements were proposed for Segment 2 and are described below.

a. Alternate 3, Option 1 – Interim Low Cost Improvements

Some cost effective solutions that can improve safety are the interim low cost improvements such as center line and edge line rumble strips, chevrons around curves, reflectors on guardrails to improve night time visibility, cutting back slopes and installing high friction surfaces. District funds and highway safety improvement funds such as HSIP can be used to implement interim low cost improvements. Exhibit ES-2 shows some possible interim low cost improvements.

b. Alternate 3, Option 2 – Group A Spot Improvements

There are some locations in Segment 2 where the geometry does not meet the current design standards. There are several vertical grades that are substandard. Upon analysis of the crashes, many crashes were identified where roadway geometry does not meet current standards. Six of these locations were identified as Group A spot improvements. They are defined as projects in locations where roadway geometry is below current design standards and crash rate is higher (close to and more than 1.0). See Exhibit ES-3 for Group A projects.

c. Alternate 3, Option 3 – Group B Spot Improvements

At the public meetings and in the completed surveys, other locations that had driving concerns were discussed. The project team investigated the locations for the cause of

the concerns. The project team identified six locations with geometry problems and crash history and named them as Group B Spot Improvements. The crash and geometry concerns were less severe than Group A project locations. See Exhibit ES-4 for Group B projects. Cost estimates for all alternates are summarized in Table ES-1.

RECOMMENDATIONS

The Phase I Design for Segment 1 between US 31E and KY 1319 has recommended a five lane curb and gutter section at the west end of the study changing over to a three lane typical section ending just east of Parkland Trace. Considering the high traffic volumes and the large number of rear end crashes that currently occur and increase in projected traffic volume, these typical sections are appropriate for this section and are recommended. The Phase I Design also recommends an improved two lane section starting near Parkland Trace and ending at KY 1319 which will further improve safety in that section. It is recommended that Segment 1 continue with the advancement into Final Design.

Estimated cost to construct the Ultimate Build roadway for the 7.5 mile long Segment 2 from KY 1319 to the Spencer Elementary School is nearly $71 million. As this is a significant amount to obtain funding, it is recommended that the roadway improvements should be phased. The most immediate and cost effective solution that can improve the safety of this segment is the interim low cost improvements. As identified, improving safety around sharp curves and installing edge rumble strips are some recommendations which are low cost and are effective in reducing crashes and in most cases can be completed using available maintenance and HSIP funds.

The next recommendation for Segment 2 is to undertake some of the spot improvement projects. The projects were grouped in two categories and their ranking was decided considering their geometry, crash history and public input. It is recommended these improvements should be designed keeping in mind the ultimate roadway section proposed in this study. In some cases, two spot improvement projects may be combined if they are close to each other and it may be desirable to design them at the same time. Combining two projects in this way will be more cost effective. When Segment 2 is programmed to build the ultimate build section, the typical section proposed in this study is recommended. The typical section proposes a two lane roadway with shoulders considering the truck and recreational traffic on this segment and also can accommodate bike traffic.

For Segment 3, the recommendations identified in Item 5-395.00 may be followed. Segment 3, which is from the east end of the three lane roadway in front of Spencer County Elementary School to KY 1633 was in the right-of-way acquisition stage at the time this study was conducted. The two lane roadway follows a new alignment and would improve the safety in this section with the new roadway geometry.

EXHIBIT ES-1: ALTERNATE 2 - LONG TERM ULTIMATE BUILD ALTERNATE

SEGMENT 1
US 31E TO KY 1319

SEGMENT 2
KY 1319 TO SPENCER COUNTY ELEMENTARY SCHOOL

2-LANE RURAL TYPICAL SECTION

8' Shoulder (6' paved) | Two 11 Foot Travel Lanes | 8' Shoulder (6' paved)

Segment 2 - Proposed Ultimate Build Alternate
- Rebuild on existing alignment
- Realign at some locations
- Bridge Replacements to match new roadway
- Intersections, Turn Lanes, Climbing Lanes

PROPOSED ALTERNATES

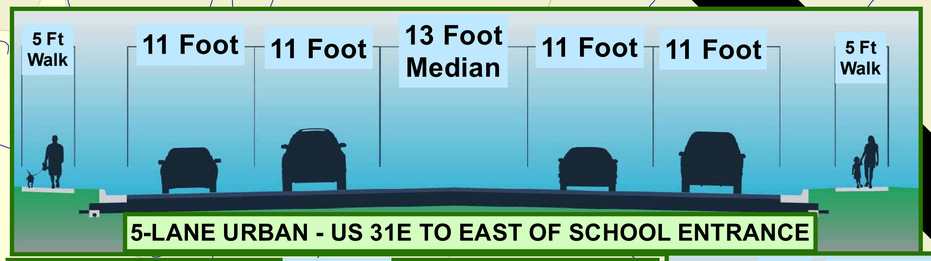
- Alternate 1 No Build
- Alternate 2 Long Term Ultimate Build Alternate
- Alternate 3 Short Term Spot Improvements
  - Option 1 Interim Low Cost Improvements
  - Option 2 Group A Spot Improvements
  - Option 3 Group B Spot Improvements

Possible Realignment Areas

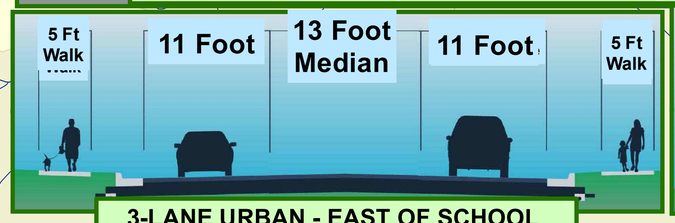
2-LANE RURAL PARKLAND TR. APPROX TO KY 1319

5-LANE URBAN US 31E TO EAST OF SCHOOL ENT.

3-LANE URBAN EAST OF SCHOOL ENT. TO PARKLAND TR. APPROX.



5-LANE URBAN - US 31E TO EAST OF SCHOOL ENTRANCE



3-LANE URBAN - EAST OF SCHOOL ENTRANCE TO PARKLAND TR. APPROX.

2-LANE RURAL - PARKLAND TR. APPROX. TO KY 1319

SEGMENT 3

2-LANE RURAL TYPICAL SECTION

SUMMARY OF ESTIMATED COSTS

SEGMENT 1 - $17,706,000
SEGMENT 2 - $70,550,000
SEGMENT 3 - $5,755,000
TOTAL COST - $94,011,000

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EXHIBIT ES-2: ALTERNATE 3, OPTION 1 - INTERIM LOW COST IMPROVEMENTS

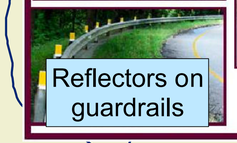
ESTIMATED COST - $500,000

INTERIM LOW COST IMPROVEMENTS
(Possible Treatment locations are shown here)

* Edge Line Rumble Strips
* Chevrons on posts
* Cutback Hills
* Tree Trimming/Removal
* High Friction Surfaces
* Reflectors on guardrail


TREE TRIMMING


Rumble Strips

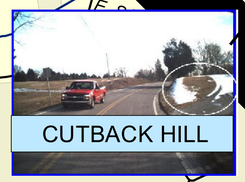

Reflectors on guardrails


Chevrons

LOW COST IMPROVEMENTS

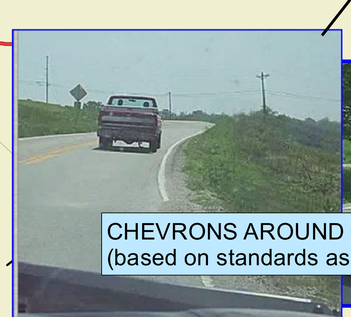
PROPOSED ALTERNATES

- Alternate 1 No Build
- Alternate 2 Long Term Ultimate Build Alternate
- Alternate 3 Short Term Spot Improvements
  - **Option 1 Interim Low Cost Improvements**
  - Option 2 Group A Spot Improvements
  - Option 3 Group B Spot Improvements


CUTBACK HILL


CHEVRONS AROUND CURVES


REFLECTORS ON GUARDRAIL


CHEVRONS AROUND CURVES
(based on standards as needed)


HIGH FRICTION SURFACE
(Hunters Trace Curve)


TREE TRIMMING
CUTBACK HILL

Interstate
Parkway
US Highway
State Road
Local Road
Bridge (Line)

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EXHIBIT ES-3: ALTERNATE 3, OPTION 2 - GROUP A SPOT IMPROVEMENTS

Estimated Cost - $3,830,000

Spot A1
East of Cedar Lake Dr to County Line
- **Roadway Geometry Improvements**

Estimated Cost - $1,480,000

Spot A2 (Dutchman Creek Area)
- **Improve West Horizontal Curve**
- **Intersection Improvements (Eliminate Skew on Side Roads & Align)**
- **Replace Bridge at Dutchman Creek**

Estimated Cost - $4,760,000

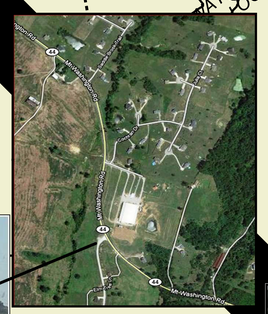
Spot A3 (Cochran Dr and East)
Intersection Improvements
at Cochran Dr/Julia Ct
- **Add Left & Right Turn Lanes to Cochran Dr**

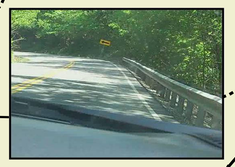
East of Cochran Dr Intersection
- **Roadway Geometry Improvements**

Estimated Cost - $2,380,000

Spot A4 (Junction KY 623 and East)
Jct KY 623 - Intersection Improvements
- **Improve Turning Radius, Sight Distance etc.**

Other Work:
- **Replace Box Culvert (Possible Left Turn Lane to KY 623)**
- **Improve East Horizontal Curve**





Estimated Cost - $4,760,000

Spot A5
(Jct KY 1251 to Curve after Hunter's Trace Rd.)
Jct KY 1251- Intersection Improvements
- **Improve Turning Radii, Sight Distance etc.**
- **Add Truck Climbing Lane West of KY 1251**

East of Bridge at KY 1251
- **Roadway Geometry Improvements**

Estimated Cost - $18,800,000

Spot A6 (Stumps Lane to Turnpike Ave.)
Minor Widening and Rumble Strips
- **Widen pavement by 5 feet**
- **Install Center Line & Edge Line Rumble Strips**

PROPOSED ALTERNATES
- Alternate 1 No Build
- Alternate 2 Long Term Ultimate Build Alternate
- Alternate 3 Short Term Spot Improvements
  - Option 1 Interim Low Cost Improvements
  - **Option 2 Group A Spot Improvements**
  - Option 3 Group B Spot Improvements

State Roadway System
- Rural Principal Arterial
- Rural Minor Arterial
- Rural Major Collector
- Rural Minor Collector
- Urban Principal Arterial
- Urban Minor Arterial Street
- Urban Collector Street
- Local Road

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EXHIBIT ES-4: ALTERNATE 3, OPTION 3 - GROUP B SPOT IMPROVEMENTS

ESTIMATED COST - $2,040,000

Spot B1 (MP 0.70 to 0.95 Approx.)
- Roadway Geometry Improvements
- Add Truck Climbing Lane based on grade

ESTIMATED COST - $2,380,000

Spot B2 (Village Dr/Hickory Woods Dr area)
Curve East of Village Dr
- Roadway Geometry Improvements
- Village Dr Realignment

Hickory Woods Dr Intersection
- Add Left Turn Lane at Hickory Woods Dr

ESTIMATED COST - $4,890,000

Spot B3 (Junction KY 1060 and Eastwards)
Junction KY 1060 - Intersection Improvement
- Improve Turning Radii, Sight distance etc.
- Possible Left Turn Lane to KY 1060

Waterford Park after KY 1060 Bridge
- Add Left Turn Lane to the Park
- Add Truck Climbing Lane after Waterford Park Entrance going East

ESTIMATED COST - $3,970,000

Spot B4 (Akins Rd area)
Akins Rd
- Improve West Horizontal Curve
- Add Left Turn Lane/Bypass Lane at Akins Rd
- Flatten grade around MP 5.00

ESTIMATED COST - $2,380,000

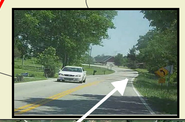
Spot B5
Carl Monroe Rd./Benett Spur area
- Roadway Geometry Improvements

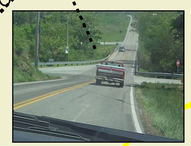
ESTIMATED COST - $6,010,000

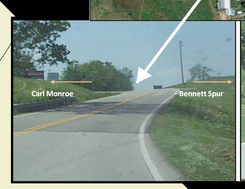
Spot B6 (River Heights Blvd area)
- Realign to eliminate multiple curves
- Add Right Turn Lane & Left Turn Lane at River Hts Blvd.

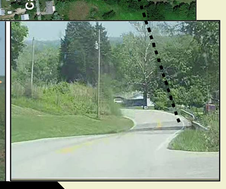
PROPOSED ALTERNATES
- Alternate 1 No Build
- Alternate 2 Long Term Ultimate Build Alternate
- Alternate 3 Short Term Spot Improvements
  - Option 1 Interim Low Cost Improvements
  - Option 2 Group A Spot Improvements
  - Option 3 Group B Spot Improvements










State Roadway System
- Rural Principal Arterial
- Rural Minor Arterial
- Rural Major Collector
- Rural Minor Collector
- Urban Principal Arterial
- Urban Minor Arterial Street
- Urban Collector Street
- Local Road

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Table ES-1: Summary of Cost Estimates

ALTERNATE 1: No Build Alternate - $0

ALTERNATE 2: Long Term Ultimate Build Alternate

Segment	Brief Description	Phase Cost ($)				Total Cost ($)
		Design	Right-of-Way	Utilities	Constr	
1	US 31E to KY 1319	$3,000,000	$2,300,000	$1,606,000	$10,800,000	$17,706,000
2	KY 1319 to Spencer Co. Elem. School	$10,150,000	$8,270,000	$7,020,000	$45,110,000	$70,550,000
3	Spencer Co. Elem. School to KY 1633	$700,000	$355,000	$700,000	$4,000,000	$5,755,000
Total		$13,850,000	$10,925,000	$9,326,000	$59,910,000	$94,011,000

ALTERNATE 3: Short Term Spot Improvements

Option 1 : Interim Low Cost Spot Improvements

Shoulder layback, tyregrip, cutback trees, reflectors on guardrail, chevrons, edge line rumble strips	$500,000

Option 2: Group A Spot Improvements

Spot	Location	Phase Cost ($)				Total Cost ($)
		Design	Right-of-Way	Utilities	Constr	
A1	East of Cedar Lake to County Line	$560,000	$460,000	$410,000	$2,400,000	$3,830,000
A2	Dutchman Creek Area	$220,000	$160,000	$150,000	$950,000	$1,480,000
A3	Cochran Dr and East	$690,000	$570,000	$500,000	$3,000,000	$4,760,000
A4	KY 623 and East	$350,000	$280,000	$250,000	$1,500,000	$2,380,000
A5	KY 1251 and Hunter's Trace Area	$690,000	$570,000	$500,000	$3,000,000	$4,760,000
A6	Stumps Lane to Turnpike Ave.	$2,700,000	$2,200,000	$2,000,000	$11,900,000	$18,800,000
Total		$5,210,000	$4,240,000	$3,810,000	$22,750,000	$36,010,000

Option 3: Group B Spot Improvements

Spot	Location	Phase Cost ($)				Total Cost ($)
		Design	Right-of-Way	Utilities	Constr	
B1	MP 0.70 to MP 0.95	$290,000	$240,000	$210,000	$1,300,000	$2,040,000
B2	Waterford Loop to Hickory Woods Dr	$350,000	$280,000	$250,000	$1,500,000	$2,380,000
B3	KY 1060 and East	$760,000	$460,000	$410,000	$3,260,000	$4,890,000
B4	Akins Rd area	$580,000	$470,000	$420,000	$2,500,000	$3,970,000
B5	Carl Monroe Rd/Bennett Spur Area	$350,000	$280,000	$250,000	$1,500,000	$2,380,000
B6	River Heights Blvd Area	$870,000	$710,000	$630,000	$3,800,000	$6,010,000
Total		$3,200,000	$2,440,000	$2,170,000	$13,860,000	$21,670,000

I INTRODUCTION

The Kentucky State Data Center at the University of Louisville reports that Spencer County has grown 45% in the period from 2000-2010 and Bullitt County has grown 21% in the same period. Within the study limits, KY 44 connects the City of Mt. Washington in Bullitt County to the City of Taylorsville in Spencer County. KY 44 is also known by other names such as Old Mill Rd., Mt. Washington Rd. and Taylorsville Rd in the study area. KY 44 is a major highway corridor leading to Taylorsville Lake State Park just east of the study area. The Park is a prime recreational attraction spread over 1,200 acres and sits on 3,050 acre Taylorsville Lake.

Major growth in residential development has spread along the corridor. Along with the population growth, traffic volumes have also increased. The Traffic Forecast report conducted for the study area by the Division of Planning, Kentucky Transportation Cabinet (KYTC) used an exponential annual growth rate ranging from 3.5% to 5% to forecast future traffic on KY 44.

Photo No.1 – KY 44 and KY 1251 intersection

There has been notable growth in recreational traffic traveling on KY 44 towards Taylorsville Lake State park. Truck traffic has also grown according to the traveling public. The current roadway, which was built in 1932, has several horizontal and vertical curve deficiencies. There are many locations with a high crash history.

In June 2005, the Kentucky Transportation Cabinet, Division of Planning completed a study on the KY 44 highway, west of US 31E in Mt. Washington to Shepherdsville (Item 5-150.00). As a continuation, the current planning study investigates improvements east of Mt. Washington at US 31E to KY 1633, just west of Taylorsville.

A. Study Objectives

The objectives of the planning study were to analyze the existing conditions and transportation problems, to estimate future travel conditions and to identify and evaluate improvement alternatives for KY 44 from Mt. Washington to Taylorsville. The goals of the study were to improve the safety of the roadway and to provide adequate transportation linkage between the two cities.

The study was established to investigate roadway improvements ranging from short term solutions to an ultimate build alternative for the corridor. It was decided by the project team to involve the public, stakeholders and local officials to gather their input in developing the alternates for the study. Other resource agencies' input was also solicited.

B. Study Location and Length

The study area is located just outside the limits of the Louisville Urban Area boundary. The west end of the corridor begins at US 31E in Bullitt County. US 31E connects to Interstate 265 (Gene Snyder Freeway) to the north which leads to the City of Louisville. The east end of the study terminates at KY 1633 in Spencer County. Figure 1 below shows the study area location. Exhibit 1 in Appendix A shows the study corridor and major highway crossings.

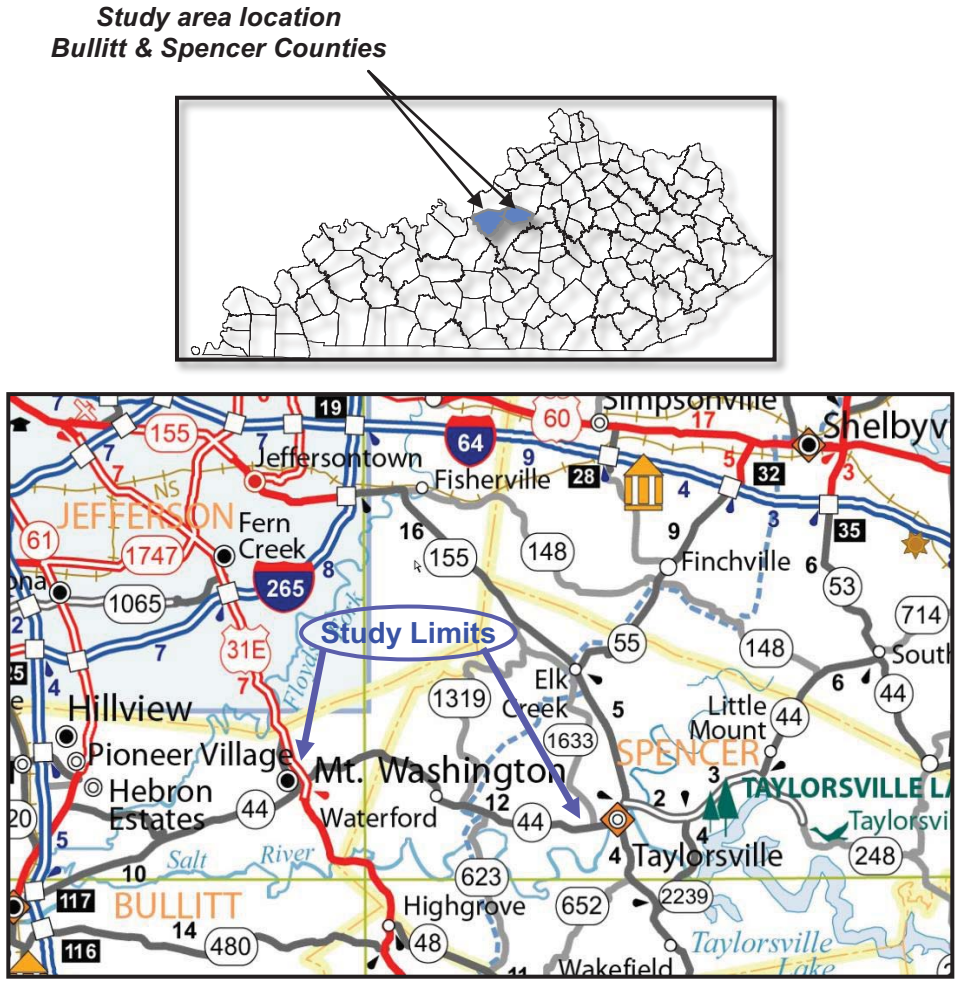


Figure 1: Study area location

The length of the project is 11.5 miles. Approximately 3.1 miles of the 11.5 miles of the study corridor is in Bullitt County and 8.4 miles is in Spencer County.

C. Study Limits and Segments

The study was limited to the section of KY 44 highway from US 31E in Mt. Washington to KY 1633 just west of Taylorsville. Figure 2 below shows the study limits and segments. Exhibit 2 in Appendix A shows the study limits and segments in greater detail. The following is a brief description of the limits of each segment:

- *Segment 1*: This segment extends from US 31E to KY 1319 (also known as King's Church Road) and has a project Item No. 5-347.50. At the time of this study, Phase I Design was completed for this segment. No funds are available for future phases for this segment. Only, funding for the planning study is available.
- *Segment 2*: This segment extends from KY 1319 to the beginning of the three lane section at Spencer County Elementary School. No funds are available for future phases for this segment at the time of this report. Only funding for the planning study is available.
- *Segment 3:* This segment extends from the three lane section at Spencer County Elementary School to KY 1633. Item 5-395.00 is a KYTC project covering this segment. The project has completed Phase I and Phase II Design. At the time of the study, the project was in the right-of-way acquisition stage.

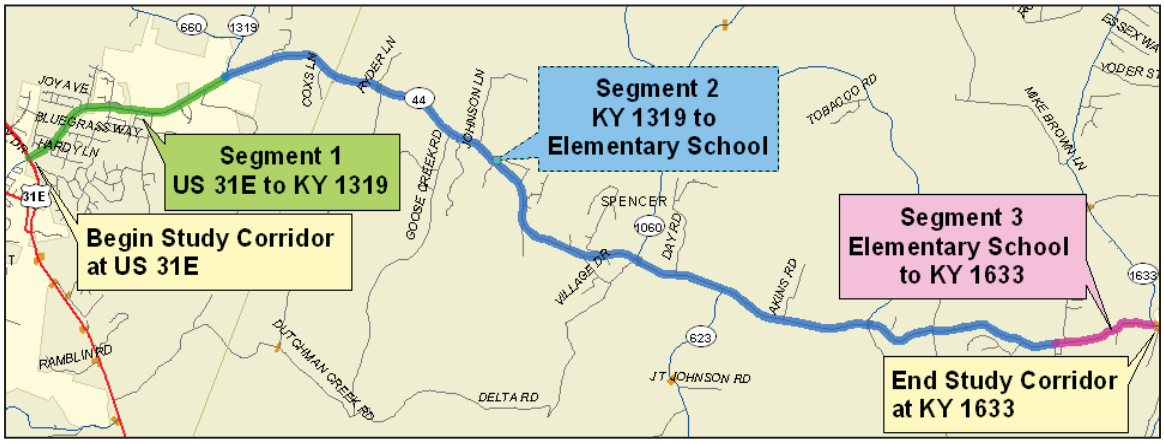


Figure 2: Study Limits and Segments

Segment 2 falls in between Segments 1 & 3 which are in various stages of design as mentioned above. For consistency of design along the corridor, recommendations for Segment 2 will take into consideration, the proposed design in Segment 1 and Segment 3 on either sides of the segment. Therefore, all the three segments were included in a combined planning study under Item No. 5-396.00. Also, an Environmental Overview was completed for future improvements to KY 44 for the corridor in October 2008 and is available separately. The route log for KY 44 for study limits is shown in Appendix B.

D. Programmed Highway Improvements

Funds for the current planning study from US 31E to KY 1633 were authorized in 2007 under Item No. 5-396.00. Funding for the Design phase for Segment 1 was authorized in 2007 and a Phase 1 Design has been completed under Item #5-347.50. There is no funding authorized for any other phases of Segment 1 & 2. Funding for the Design phase of Segment 3 was authorized in 2007 under Item #5-395.00. Right of Way and utility phases were funded in 2011. Table 1 shows the funding for all segments.

Table 1: Funding for all segments (P–Planning, D–Design, U–Utilities, R–Right of Way)

Funds for the Planning Study Item 5-396.00 (all segments)

District	Item Number	Phase	Route	County	Requested Amount	Authorization Date
5	396	P	KY 44	SPENCER BULLITT	$300,000.00	6/11/2007

Funds for the Design phase of Segment 1 (US 31E to KY 1319)

District	Item Number	Phase	Route	County	Requested Amount	Authorization Date
5	347.5	D	KY-44	BULLITT	$1,200,000.00	3/21/2007

Funds for the phases of Segment 3 (Spencer Co. Elementary School to KY 1633)

District	Item Number	Phase	Route	County	Requested Amount	Authorization Date
5	395	D	KY-44	SPENCER	$500,000.00	1/8/2007
5	395	U	KY-44	SPENCER	$695,000.00	6/23/2011
5	395	R	KY-44	SPENCER	$355,000.00	5/9/2011
5	395	D	KY-44	SPENCER	$200,000.00	3/1/2011

II EXISTING CONDITIONS

Exhibit 3 in Appendix A is an aerial map of the study area. Some existing roadway conditions of KY 44 in the study area are identified in the following sections. Included are roadway data and characteristics, bridge data, traffic volumes, Level of Service, composite adequacy rating, volume to service flow ratio, and crash analysis.

A. Roadway Data

Data for the existing roadway characteristics was obtained from the Division of Planning's Highway Information System (HIS) database. Archived old plans were also studied for existing conditions. The KY 44 study corridor is a two lane undivided highway for the major part. A segment in front of Spencer County Elementary School towards the east end of the study has three lanes. The following is a summary of information derived from available sources:

State System:
State-maintained roads in Kentucky are classified into six types under the State System, ranging from Supplemental Road to State Primary. In the study area, KY 44 is classified as a State Secondary route.

The National Truck Network (NTN):
The roads in the NTN are those roads specifically designated for use by commercial trucks with increased dimensions (102 inches wide; 13 feet, six (6) inches high; semi-trailers up to 53 feet long; trailers up to 28 feet long – not to exceed two (2) trailers per truck). In the study area, KY 44 is not on the NTN network.

The National Highway System (NHS):
The NHS includes the Interstate highway system and other significant principal arterial roads. In the study area, KY 44 is not on the NHS.

Truck Weight Classification:
The KYTC, Division of Motor Carriers specifies three weight classification limits: 1) AAA – 80,000 lbs. gross vehicle weight; 2) AA – 62,000 lbs. gross vehicle weight; and 3) A – 44,000 lbs. gross vehicle weight. In the study area, the weight classification limit on KY 44 is AAA.

Functional Class:
The functional class of the three segments on KY 44 are listed in the Table 2 below. Exhibit 4 in Appendix A shows the mile point locations within the study area.

Table 2: Study mile points and Functional Class

	Segment 1	**Segment 2**		**Segment 3**
Mile Point	23.255-25.276	25.276-26.286	0 - 7.500	7.500 - 8.451
County	Bullitt	Bullitt	Spencer	Spencer
Functional Class	Urban principal arterial ends 24.550, then rural minor arterial	Rural minor arterial	Rural minor arterial	Rural minor arterial

KY 44 is not on a Scenic Highway and is also not on a Coal Haul Route in the study area.

B. Roadway Characteristics

KY 44 is a two lane undivided roadway with narrow shoulders. Some areas are level while other areas are rolling. The roadway was originally built in 1932. The roadway is characterized by several horizontal curves and vertical grades. Sight distance, both horizontal and vertical, is limited at several locations.

The roadway is bituminous pavement and has the following characteristics:

Table 3: Roadway Characteristics

	Segment 1 (US 31E to KY 1319)	Segment 2 (KY 1319 to Spencer Co. Elem. School)	Segment 3 (Spencer Co. Elem School to KY 1633)
County	Bullitt	Bullitt & Spencer	Spencer
Mile Point	23.255-25.276	25.276-26.286 (Bullitt) 0 - 7.500 (Spencer)	7.500 - 8.451
Total Lanes	2	2	2-3
Lane Width	10 ft - 12 ft	10 ft	10 ft
Shoulder Width	4 ft	3 ft	3 ft
Posted Speed	35 - 55 mph	55 mph	35 - 45 mph

Horizontal and Vertical Curves:

The roadway was built in 1932. The present day design standards places several horizontal curves (18) in grade class C (5.5-8.4 degrees) or worse as shown in Table 4.

Photo No. 2 – Horizontal curve east of Hunters Trace Rd

vicinity of the poor vertical grade does not meet the current standards which compounds the driving problems in these areas. Exhibit 5 in Appendix A shows the locations where horizontal curves and vertical grades are below current standards. Exhibit 6 in Appendix A is a topographic map of the study area.

Several vertical curves (16) in the study area are at or below grade class D (4.5-6.4%) as seen in Table 5 below. The vertical curves do not meet the current standards for the sight distance for the design speed of the roadway. In some cases, the horizontal curvature in the

Photo No. 3 – Vertical grade just west of Coxs Lane

Table 4: Horizontal curves in the study area

Route	County	Begin MP	End MP	Grade Class	Degree of Curvature
KY 0044	Bullitt	25.216	25.306	A	2.6
KY 0044	Bullitt	25.306	25.678	A	0.1
KY 0044	Bullitt	25.678	25.776	A	3
KY 0044	Bullitt	25.776	25.98	A	0.2
KY 0044	Bullitt	25.98	26.081	**D**	**9.8**
KY 0044	Bullitt	26.081	26.168	A	0
KY 0044	Bullitt	26.168	26.286	B	4.1
KY 0044	Spencer	0	0.137	A	0.4
KY 0044	Spencer	0.137	0.275	A	2
KY 0044	Spencer	0.275	0.322	A	0
KY 0044	Spencer	0.322	0.398	**C**	**7.8**
KY 0044	Spencer	0.398	0.472	A	0.3
KY 0044	Spencer	0.472	0.614	A	3.1
KY 0044	Spencer	0.614	0.717	A	0
KY 0044	Spencer	0.717	0.884	**C**	**6.8**
KY 0044	Spencer	0.884	1.067	A	0
KY 0044	Spencer	1.067	1.119	B	3.9
KY 0044	Spencer	1.119	1.207	A	0
KY 0044	Spencer	1.207	1.32	B	4.4
KY 0044	Spencer	1.32	1.386	A	0
KY 0044	Spencer	1.386	1.521	B	3.7
KY 0044	Spencer	1.521	1.588	A	0
KY 0044	Spencer	1.588	1.684	A	1.7
KY 0044	Spencer	1.684	1.935	A	0
KY 0044	Spencer	1.935	2.038	**C**	**5.7**
KY 0044	Spencer	2.038	2.091	A	0
KY 0044	Spencer	2.091	2.198	B	3.9
KY 0044	Spencer	2.198	2.237	A	0
KY 0044	Spencer	2.237	2.422	**C**	**6**
KY 0044	Spencer	2.422	2.499	A	0.9
KY 0044	Spencer	2.499	2.57	**D**	**8.8**
KY 0044	Spencer	2.57	2.634	B	4.2
KY 0044	Spencer	2.634	2.962	A	0.1
KY 0044	Spencer	2.962	3.115	B	4.3
KY 0044	Spencer	3.115	3.265	A	0
KY 0044	Spencer	3.265	3.437	B	4.4
KY 0044	Spencer	3.437	3.671	A	0.1
KY 0044	Spencer	3.671	3.834	B	3.8

Grade Class	Degree of Curvature (degrees)
C	5.5-8.4
D	8.5-13.9
E	14.0-27.9
F	28+

Highlighted in red are grade class C or greater horizontal curves. For rural arterial roads, at 55 mph speed, assuming 6% superelevation, grade class C or higher is not recommended for new construction.

Continued… Table 4: Horizontal curves

Route	County	Begin MP	End MP	Grade Class	Degree of Curvature
KY 0044	Spencer	3.834	4.01	A	2.5
KY 0044	Spencer	4.01	4.281	A	0
KY 0044	Spencer	4.281	4.342	A	0
KY 0044	Spencer	4.342	4.458	A	3.4
KY 0044	Spencer	4.458	4.634	A	0.5
KY 0044	Spencer	4.634	4.776	B	4.6
KY 0044	Spencer	4.776	5.286	A	0
KY 0044	Spencer	5.286	5.388	B	4.2
KY 0044	Spencer	5.388	5.564	A	0
KY 0044	Spencer	5.564	5.63	B	4.1
KY 0044	Spencer	5.63	5.666	A	0
KY 0044	Spencer	5.666	5.742	A	0
KY 0044	Spencer	5.742	5.869	**C**	**6.4**
KY 0044	Spencer	5.869	5.929	A	0
KY 0044	Spencer	5.929	6.04	**E**	**14**
KY 0044	Spencer	6.04	6.09	A	0
KY 0044	Spencer	6.09	6.204	B	3.6
KY 0044	Spencer	6.204	6.271	A	0
KY 0044	Spencer	6.271	6.327	**C**	**6.2**
KY 0044	Spencer	6.327	6.382	A	0
KY 0044	Spencer	6.382	6.433	**C**	**6.1**
KY 0044	Spencer	6.433	6.728	A	0.1
KY 0044	Spencer	6.728	6.838	**C**	**7.4**
KY 0044	Spencer	6.838	6.973	A	0.3
KY 0044	Spencer	6.973	7.04	**C**	**5.7**
KY 0044	Spencer	7.04	7.093	A	0
KY 0044	Spencer	7.093	7.172	B	5.4
KY 0044	Spencer	7.172	7.234	A	0
KY 0044	Spencer	7.234	7.338	**C**	**7.8**
KY 0044	Spencer	7.338	7.445	A	1.8
KY 0044	Spencer	7.445	7.835	A	0.1
KY 0044	Spencer	7.835	7.909	**C**	**7.5**
KY 0044	Spencer	7.909	7.957	A	0
KY 0044	Spencer	7.957	8.032	**C**	**7**
KY 0044	Spencer	8.032	8.103	**D**	**13.7**
KY 0044	Spencer	8.103	8.17	**E**	**21**
KY 0044	Spencer	8.17	8.245	**C**	**6.4**
KY 0044	Spencer	8.245	8.318	B	5.4
KY 0044	Spencer	8.318	8.397	A	0
KY 0044	Spencer	8.397	8.496	A	0

Table 5: Vertical grades in the study area

Route	County	Begin	End	Grade Class
KY 0044	Bullitt	23.195	23.255	A
KY 0044	Bullitt	23.255	23.335	A
KY 0044	Bullitt	23.335	23.545	B
KY 0044	Bullitt	23.545	23.705	B
KY 0044	Bullitt	23.705	24.205	B
KY 0044	Bullitt	24.205	24.385	A
KY 0044	Bullitt	24.385	24.615	B
KY 0044	Bullitt	24.615	24.765	B
KY 0044	Spencer	0	0.073	B
KY 0044	Spencer	0.073	0.12	**E**
KY 0044	Spencer	0.12	0.48	**D**
KY 0044	Spencer	0.48	0.82	**E**
KY 0044	Spencer	0.82	1.18	C
KY 0044	Spencer	1.18	1.31	D
KY 0044	Spencer	1.31	1.41	**E**
KY 0044	Spencer	1.41	1.73	C
KY 0044	Spencer	1.73	1.85	B
KY 0044	Spencer	1.85	2.18	C
KY 0044	Spencer	2.18	2.39	B
KY 0044	Spencer	2.39	2.67	**E**
KY 0044	Spencer	2.67	2.85	C
KY 0044	Spencer	2.85	2.94	B
KY 0044	Spencer	2.94	3.09	**E**
KY 0044	Spencer	3.09	3.21	C
KY 0044	Spencer	3.21	3.32	B
KY 0044	Spencer	3.32	3.41	C
KY 0044	Spencer	3.41	3.51	**E**
KY 0044	Spencer	3.51	3.62	A
KY 0044	Spencer	3.62	3.79	**E**
KY 0044	Spencer	3.79	3.95	B
KY 0044	Spencer	3.95	4.09	B
KY 0044	Spencer	4.09	4.18	B
KY 0044	Spencer	4.18	4.38	C
KY 0044	Spencer	4.38	4.502	B
KY 0044	Spencer	4.502	4.68	B
KY 0044	Spencer	4.68	4.99	C
KY 0044	Spencer	4.99	5.1	C
KY 0044	Spencer	5.1	5.27	C

Route	County	Begin	End	Grade Class
KY 0044	Spencer	5.1	5.27	C
KY 0044	Spencer	5.27	5.34	B
KY 0044	Spencer	5.34	5.43	C
KY 0044	Spencer	5.43	5.73	**E**
KY 0044	Spencer	5.73	5.8	B
KY 0044	Spencer	5.8	6.23	**D**
KY 0044	Spencer	6.23	6.35	B
KY 0044	Spencer	6.35	6.42	**E**
KY 0044	Spencer	6.42	6.49	**D**
KY 0044	Spencer	6.49	6.62	**E**
KY 0044	Spencer	6.62	6.69	**E**
KY 0044	Spencer	6.69	6.88	B
KY 0044	Spencer	6.88	7.06	B
KY 0044	Spencer	7.06	7.21	C
KY 0044	Spencer	7.21	7.3	B
KY 0044	Spencer	7.3	7.46	**D**
KY 0044	Spencer	7.46	7.65	C
KY 0044	Spencer	7.65	7.7	B
KY 0044	Spencer	7.7	7.8	C
KY 0044	Spencer	7.8	7.88	C
KY 0044	Spencer	7.88	8.05	**D**
KY 0044	Spencer	8.05	8.14	B
KY 0044	Spencer	8.14	8.19	C
KY 0044	Spencer	8.19	8.27	B
KY 0044	Spencer	8.27	8.54	B

Grade Class	Grade
D	4.5 to 6.4%
E	6.5 to 8.4%
F	8.5 +

Highlighted in red are grade class D or higher grades.

For rural arterial roads, maximum recommended vertical percent grade on rolling terrain is 5% for a speed of 55 mph.

C. Bridges

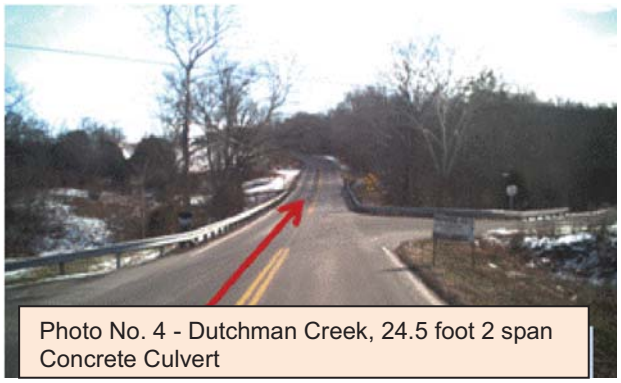


Photo No. 4 - Dutchman Creek, 24.5 foot 2 span Concrete Culvert

There are three structures within the study limits that are classified as bridges. These are located approximately at MP 0.4, Dutchman Creek; at MP 3.5, Plum Creek and at MP 5.7, Elk Creek in Spencer County. All three creeks are classified as Blueline streams. Wetland impacts are likely at two locations along the streams at Plum Creek and Elk Creek. Table 6 is a summary of these bridges derived from Bridge Inspection Reports. The bridge at Dutchman Creek is not structurally deficient or functionally obsolete. The bridges at Plum Creek and Elk Creek are not structurally deficient, however, they are functionally obsolete. A bridge structure with a Sufficiency Rating below 50.0 is considered for possible replacement by the Transportation Cabinet using federal bridge funds. Based on this, none of the bridges are eligible for replacement at this time.

A fatal crash was recorded at the Dutchman Creek culvert in 2007. The narrow bridge, the geometry of the roadway in this section combined with intersecting roadways (one of them being at a skew) are some of the contributing factors for crashes in this area.

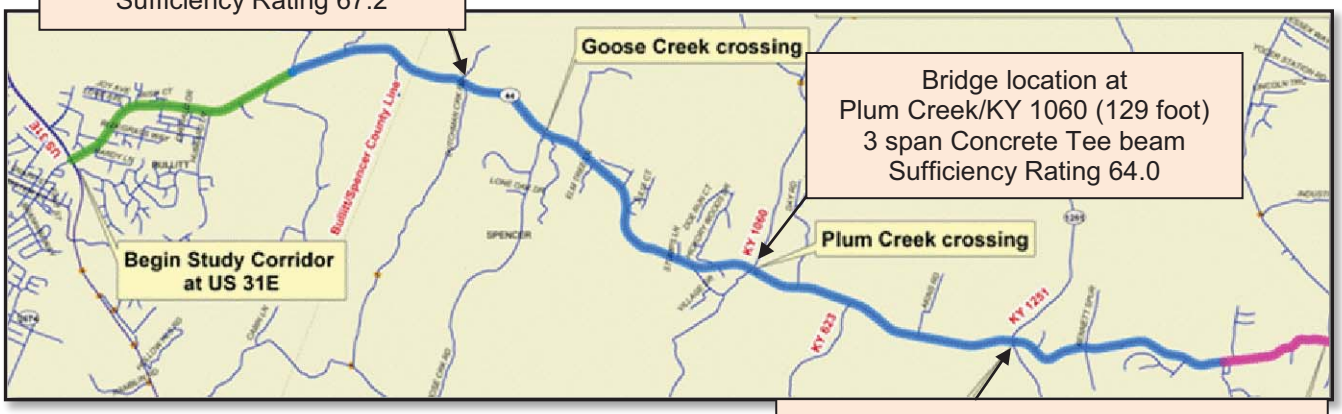


Figure 3: Bridge locations in the study area

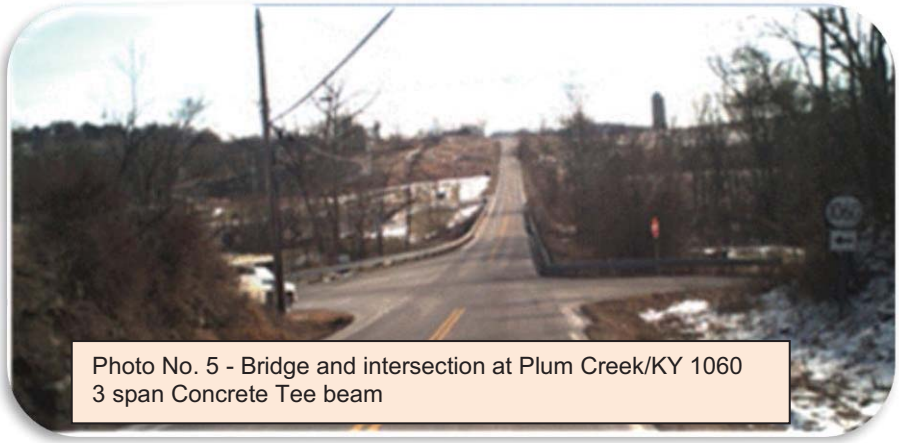


Photo No. 5 - Bridge and intersection at Plum Creek/KY 1060
3 span Concrete Tee beam

Photo No. 6 - Bridge and approaches at Elk Creek/KY 1251

Table 6: KY 44 study area bridge structures

Bridge	Structure #	Structure	Mile Point*	Sufficiency Rating	Functionally Obsolete	Structurally Deficient
Dutchman Creek	108B00009N	Concrete Culvert	0.418	67.20	No	No
KY 1060, Plum Creek	108B00008N	3 span Concrete Tee Beam	3.532	64.60	Yes	
KY 1251, Elk Creek	108B00007N	4 span Concrete Tee Beam	5.732	74.60	Yes	

** mile points are in Spencer county*

The common concern expressed by some of the drivers about the bridges was that they are too narrow. With an increase in recreational traffic and heavy vehicles, the narrow bridges are a concern. The right turn from Waterford Loop to KY 44 going east was mentioned as a problem by drivers. Similar problems exist at the Elk Creek bridge. The turning maneuver from Murray Road onto KY 44 (where Elk Creek bridge exists) traveling east is very difficult. The turning radius and sight distance are inadequate at these locations.

Another concern is the steep grades at some of the bridge locations. There are steep grades (Class E) on either sides of the Plum Creek bridge. There are no climbing lanes currently. Also, there is a park entrance to Waterford Park immediately at the east end of the bridge which has seen some crashes. Waterford Park is classified as a 4(f) and a 6(f) resource. Plum Creek is in a floodplain in the project area. A small area at Elk Creek is in a floodplain. Bridge inventory and inspection reports for the three bridges are attached in Appendix C.

D. Traffic Volumes and Level of Service

Traffic Volumes: A traffic forecast report was developed for the study corridor by the Division of Planning, KYTC in December 2009. The forecast report provided current year traffic volumes in 2009, predicted growth rates for future traffic and also provided truck traffic percentages for the corridor. 2009 traffic volumes and projected 2035 traffic volumes are shown in Exhibit 7 in Appendix A. Forecasted traffic volume growth rates varied from 3.5% to 5%.

The traffic volumes are the highest at the beginning of the study area in Mt. Washington between US 31E and Hubbard Lane. 2009 Average Daily Traffic (ADT) in this segment is in the range of 10,000-12,000. This segment has businesses, residences, Bullitt East High School and Old Mill Elementary School. US 31E at the west end of this segment connects to Gene Snyder Freeway to the north. The forecasted 2035 ADT in this segment is in the range of 24,500-29,400. The next segment from Hubbard Lane to KY 1319 has a 2009 ADT volume of 7000. The traffic volume falls eastwards on KY 44 from KY 1319. Between KY 1319 and KY 1633, 2009 traffic volumes are in the range of 3150-4700.

Truck Volumes: Based on the traffic forecast report, 2009 truck percentages varied from 8.6% to 11.9%. Truck percent growth rates varied from 1% to 1.5%. The truck growth rates correspond to 4% to 6.1% truck volume rates along KY 44.

Level of Service: 2009 traffic volumes and projected 2035 traffic volumes were used to determine Levels of Service. The Highway Capacity Software (HCS) 2000 was used to compute Levels of Service (LOS). According to the methodology there are two classes of roadways: Class I highways include higher speed primary arterials while Class II highways are lower speed that serve as access routes to Class I facilities. KY 44 in the study area is a Class I highway. LOS D is considered acceptable in urban areas and LOS C is considered acceptable in rural areas.

> Level of Service is a qualitative measure of highway traffic conditions. Level of Service is based on speeds, travel time and roadway geometry among other parameters. There are six (6) levels of service from A to F. LOS F is a breakdown in flow conditions while LOS A is a free flow condition.

LOS analysis for 2009 traffic volumes and projected LOS for 2035 traffic, assuming no roadway improvements, was performed. Exhibit 7 in Appendix A shows the current and 2035 LOS along different sections. Appendix D contains the HCS analysis for various segments.

In Mt. Washington, between US 31E and KY 1319, all segments were operating at LOS D in 2009. If no roadway improvements are made, a LOS F can be expected between US 31E and Hubbard Lane in 2035. The high traffic volumes seen currently and forecasted traffic growth will degrade the traffic conditions to breakdown flow if no improvements

are made in this segment. From Hubbard Lane to KY 1319, if no roadway improvements are in place, in 2035, a LOS E is expected.

Between KY 1319 and KY 1633, for 2009 traffic, a LOS C was calculated. If no improvements are undertaken, LOS D can be expected by 2035 in this segment.

E. Composite Adequacy Rating

Composite Adequacy Rating compares a particular roadway section to other Kentucky roads in the same functional class. Exhibit 8 in Appendix A shows the rating for various segments of KY 44 in the study area. Based on these ratings, it can be noted that the roadway in the study area falls in the lower 25% of roads of similar functional class in the state.

Composite Adequacy Rating is calculated by individual functional class and based upon three roadway components (safety, service, and condition) with each component comprised of several measures. The rating scores 100 as a perfect, or near perfect, highway. For example, a road section with a composite adequacy percentile of 75.0 means that 25% of the roads are rated better in that functional class.

Table 7: Composite Adequacy Rating Percentile

From Mile Point	To Mile Point	County	Composite Adequacy Rating Percentile
23.255	24.55	Bullitt	12.58
24.55	26.286/County line	Bullitt	19.51
0	8.451	Spencer	23.40

F. Volume to Service Flow Ratio

Volume to Service Flow (VSF) ratio is a measure of congestion. Exhibit 9 in Appendix A shows the VSF values for various segments of KY 44 in the study area. VSF for the roadway in the study corridor does not exceed 0.39. There are currently no congestion issues.

VSF is the ratio of a facility's actual vehicular traffic volume to its theoretical maximum potential vehicular traffic volume. The closer the VSF ratio is to 1.0, the closer the roadway is to capacity. Generally, a ratio higher than 0.70 indicates traffic volumes are approaching congested conditions.

G. Crash Analysis

Safety on KY 44 in the project study area was investigated by conducting a crash analysis. The crash analysis is helpful in identifying roadway sections with abnormally high crash rates. Crash data was obtained from Kentucky State Police database and analyzed. Historical crash data was collected for a period from 2006 to 2010.

> The CRF is the ratio of the actual crash rate on a segment of highway for a given time period as compared to the average crash rate for other similar roads in Kentucky. A CRF greater than 1.00 indicates the segment of roadway has a statistically significant number of crashes and they may not be occurring at random.

The Critical Rate Factor (CRF) methodology procedure of Kentucky Transportation Center was utilized. The CRF is the ratio of the actual crash rate compared to the critical crash rate for roads of similar functional class in Kentucky. The critical crash rate is determined by a statistical calculation based on the average crash rate for roads of similar functional class in Kentucky. A CRF greater than or equal to 1.00 indicates a segment or spot where crashes may not be occurring randomly, with a probability of 0.995. Crash rates were computed for various sections on KY 44 in the study corridor. As seen in Table 8, there are four segments with CRF close to or exceeding 1.00. Exhibit 10 in Appendix A shows the CRF of Sections on KY 44.

Table 8: Critical Rate Factor of Sections

County	Mile point	AADT	Functional Class Rate	Total No. Accidents	Section Length (miles)	Critical Accident Rate	Total Accident Rate	Critical Rate Factor
Bullitt	23.255-23.280	12000	314	16	0.025	1263	4871	3.86
Bullitt	23.280-23.385	12000	314	9	0.105	739	652	0.88
Bullitt	23.385-24.135	11000	314	42	0.75	471	465	0.99
Bullitt	24.135-24.550	11000	314	1	0.415	528	20	0.04
Bullitt	24.550-25.276	7000	213	10	0.726	381	180	0.47
Bullitt	25.276-26.286	4000	213	18	1.01	403	407	1.01
Spencer	0.000-3.510	4000	213	38	3.51	312	247	0.79
Spencer	3.510-4.335	3500	213	3	0.825	440	95	0.22
Spencer	4.335-7.440	3150	213	30	3.105	333	280	0.84
Spencer	7.440-7.740	3150	213	3	0.3	631	290	0.46
Spencer	7.740-8.400	4700	213	16	0.66	432	471	1.09
Spencer	8.400-8.451	4700	213	1	0.051	1137	381	0.33

A tenth mile crash analysis was conducted. There were several locations with CRF more than 1. These are shown in Exhibit 11 in Appendix A. One spot in Mt. Washington near US 31E had a CRF over 2.0. The curve at Green Acre Dr. at the east end of the study area had also a CRF over 2.0. Exhibit 12, 13, 14 shows the crashes in the study area in different formats. Figures 4 & 5 show the crash type by percentage in both the counties in the study area.

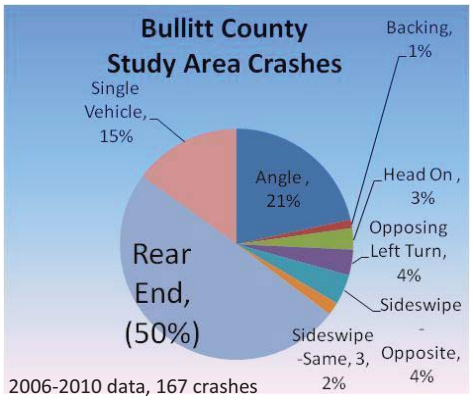


Figure 4: US 31E to County line crashes

Some Crash Observations:

Rear end crashes were the majority of crashes at the west end of the study area between US 31E and the County line. From the County line to the east end of the study area, the majority of crashes were single vehicle crashes. There were two fatal crashes in the study area located at MP 0.418 at Dutchman Creek bridge and MP 8.417 at the east end of the study. More details of the crashes are discussed in the project descriptions in Section IX.

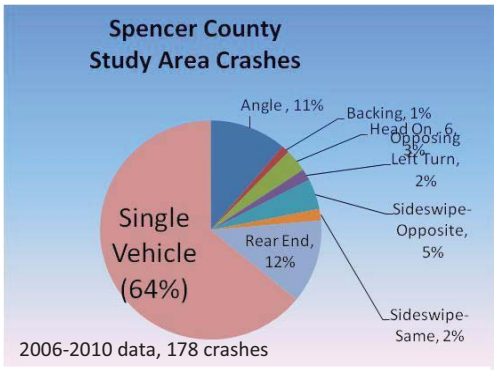


Figure 5: County line to KY 1633 crashes

III THE STUDY METHODOLOGY

Data collection and its identification was the first step in the study for the corridor. Existing data was collected from Division of Planning Highway Information Systems (HIS) data. Additional project information was derived from old plans. Project video was obtained by driving the project in both directions. A project team was assembled. Study feedback was derived from local Officials, stakeholders and the public.

A. Project Team and Study Goals

The project team included the KYTC Division of Planning staff, KYTC District 5 staff and KIPDA Transportation Planning staff. All project team meetings were held at the KYTC District 5 Office in Louisville. The project team's tasks were to evaluate the roadway conditions, analyze the current and future traffic, conduct periodic meetings and propose recommendations. The project team developed a Draft Purpose and Need which is outlined in Section IV. The project team identified a number of alternates with the input of local Officials, stakeholders, and the public by conducting meetings with them at the preliminary study stage and later when the alternates were developed.

The goals for the KY 44 study were as follows:

- Improve safety along the KY 44 Corridor.

- Provide alternatives to improve the geometrics of the roadway to current design standards meeting current and future traffic growth and providing opportunities to pass.
- Provide a roadway that can accommodate recreational vehicles and commercial vehicles.

B. Public Involvement

Public opinion was considered very critical in developing roadway improvements to the KY 44 corridor. The project team decided to involve the public as they are the users of the roadway on a daily basis and are best informed of the roadway conditions.

Public input was requested throughout the study process. Project information was posted on the KYTC Division of Planning website. Project feedback was also solicited by mail.

Public Meetings and Local Officials and Stakeholders Meetings:

Local Officials, stakeholders and the public were engaged throughout the study. The project team met the local Officials and stakeholders in formal meetings initially to inform about the proposed study and later when the alternates were developed. As the study is in two counties, Senators, County Judge Executives, Mayors of Bullitt and Spencer counties were some of the public Officials who participated. Stakeholders such as representatives from schools, police and fire departments and other local government agencies such as County Economic Development, County Road Department participated in meetings and provided input. Attendees at these meetings and meeting minutes are attached in Appendix E.

Closely following the local Officials and Stakeholders Meetings, Public Meetings were conducted. The meetings were advertised in local newspapers of both counties and posted on the KYTC website. Variable message signs were placed at strategic locations along KY 44 for the first meeting, informing the public about the meeting. However, variable message signs were not available for the second meeting. At the first Public Meeting, survey forms were provided and several completed surveys were received at the meeting and following the meeting. After the alternates were developed, a second Public Meeting was conducted. The public was given an opportunity to prioritize the short term alternates. Section III.C below lists the dates these meetings were held with a brief description of these meetings. Public Meeting folders were developed for the two public meetings and are available separately.

C. Study Meetings

Three types of meetings were conducted as part of the study – Project Team meetings, Local Officials and Stakeholders Meetings and Public Meetings. The study involved three Project Team meetings, two Local Officials and Stakeholders meetings and two Public Meetings. Meeting minutes can be seen in Appendix E. A summary of the major topics discussed at each meeting follows:

March 2, 2010, 1st Project Team Meeting:
After initial project information was collected and exhibits developed, a project team meeting was conducted. The team decided that the study limits would extend from US 31E to KY 1633. Existing conditions were discussed. Project scope was discussed and a purpose and need statement was drafted. The Environmental Overview report completed in 2008 by HMB Consultants was discussed. Public involvement, proposed geometry standards and project schedule were discussed.

May 7, 2010, 1st Local Officials and Stakeholders Meeting:
Judge Executives, Mayors of both the counties, Magistrates, City Commissioners, some land owners, representative from schools, KIPDA planning and KYTC staff participated. The study and the project team were introduced. Existing conditions, project scope and the Draft Purpose and Need statement of the study were presented. Suggestions for roadway improvements were taken. Questions about forthcoming projects were answered. Several locations with driving concerns were identified and brought to the attention of the project team at this meeting.

August 19, 2010, 1st Public Information Meeting:
This meeting was held to inform public of the planning study and request their input for improving the KY 44 Corridor within the project limits. Survey forms were completed by the public. The project team interacted with the public and their suggestions for improvements were documented.

September 7, 2011, 2nd Project Team Meeting:
Using the input gathered from Local Officials' and Stakeholders' Meeting and Public Meetings, possible improvement alternates to the corridor were developed and were discussed at a second project team meeting by the project team. A no build alternate, Long Term Ultimate Build alternate and Short Term Spot Improvements were discussed. Interim Low Cost Improvements and Spot Improvements were discussed. At the end of the meeting, it was decided that the proposed alternates should be presented to local Officials and stakeholders and the public.

November 14, 2011, 2nd Local Officials and Stakeholders Meeting and 2nd Public Meeting:
These meetings were conducted on the same day at two different times. At these meetings, the proposed improvement alternates were presented. Ranking sheets for Short Term Spot Improvements were distributed. All attendees were requested to prioritize the projects and provide their feedback.

December 16, 2011, 3rd Project Team Meeting:
The project team met for a third time after the 2nd Local Officials & Stakeholders meeting and 2nd Public Meeting to review prioritization from those meetings. That information was combined with other factors such as roadway geometric

deficiencies and crashes. Final project prioritization was chosen by the project team considering all the above factors.

IV DRAFT PURPOSE AND NEED STATEMENT

The project team drafted a Purpose and Need statement at the 1st Project Team meeting. The purpose of the project is to improve the safety of the road and to provide adequate transportation linkage between the Cities of Mt. Washington and Taylorsville.

Improvements to the study corridor were considered because of crash concerns, less than standard roadway geometry, and the need to provide an adequate transportation system for schools, commuters, emergency services and recreational traffic traveling to Taylorsville Lake State Park.

V ENVIRONMENTAL OVERVIEW

Environmental Overview

An Environmental Overview was prepared for the Transportation Cabinet by HMB Consultants. The findings were summarized in a report titled "Environmental Overview for Future Improvements to KY 44", October 2008 and is attached to this report as Appendix F. Potential environmental impacts to farmland, Section 6(f) and 4(f) resources, Cultural and Historic sites, Aquatic and Terrestrial resources were covered in the report. Environmental Justice was covered under socioeconomic impacts. Responses from some State agencies commenting on proposed improvements were attached in the report.

Land Use: Agricultural land use is widespread; however, residential development is ongoing and replacing farming activities. Some commercial land use change is occurring, but is located primarily in the area just east of Mt. Washington.

Farmland: Half of the comprehensive project corridor is situated on land that is classified as prime and unique farmland.

Economic Data: Some major manufacturers are present in Bullitt County. No major manufacturers are identified in Spencer County.

Social Institutions: Cemeteries, Churches and Schools exist within the study corridor.

Section 6(f) Resources: Waterford Community Park is the only possible site that has received Land and Water Conservation Fund monies that could be affected.

Section 4(f) Resources: Waterford Community Park is a Public park in Spencer County. Any right of way acquisition of the property will be considered a Section 4(f) impact.

Cultural/Historic Resources: The potential for eighteen sites that are eligible for the National Register of Historic places exists throughout the corridor.

Archaeological Resources: A total of two previously identified archaeological surveys and 52 potentially historic sites are located within this project area.

Floodplain Encroachment: Two Zone A floodplain areas along Plum Creek and Elk Creek exists just west of the City of Taylorsville.

Stream Crossings: The project has potential to cross approximately six perennial streams. These are Little Dutchman Creek, Dutchman Creek, Goose Creek, Plum Creek, Elk Creek and Pond Creek.

Wetlands: It appears that 20 - 24 wetlands classified as PUBHh are located within or adjacent to the project corridor.

Threatened and Endangered Species: The federally listed endangered Indiana bat is identified as occurring in both counties within the project area. Potential summer roosting and foraging habitat occurs throughout the corridor within forested habitats. The Gray bat is also listed as occurring in both counties in the project area. Potential summer foraging habitat exists in the project area especially along the perennial stream corridors. No caves were identified within the project area. It is unlikely that freshwater mussels would be found in the area streams due to lack of suitable habitat. The area streams lack depth, riffles and pools and other features that typically support freshwater mussel populations. Running Buffalo Clover is listed as potentially occurring in Spencer County only. The Glade Cress has been found in areas near US 31E in the westernmost portion of the corridor and was observed historically in Spencer County.

Karst Features/Sinkholes: The project areas are located in low to moderate risk areas for Karst features. An area in the middle of the project corridor features a large sinkhole just south of existing KY 44.

Hazardous Materials and Underground Storage Tanks (UST's): An active gasoline/convenience store with three UST's exists near the western terminus. One possible site might exist in the Spencer County. There were some 55 gallon

drums found at two residences. The drums carried a product "Line X" at one of the residences.

Air Quality: Bullitt County is located within the Louisville Air Quality Control Region, and has been designated as a non-attainment area for the Ozone 8-hour standard and for PM-2.5. Spencer County is considered in attainment for all transportation-related pollutants.

Traffic Noise: Future traffic noise levels in the study area could approach or exceed regulatory thresholds for which noise abatement considerations are appropriate at individual receivers. A traffic noise analysis, including a cost analysis of noise barriers and other forms of abatement considerations for impacted receivers could be necessary for residential and church facilities in the project area.

Environmental Justice: Low income neighborhoods, family clusters or evidence of socially interdependent communities might exist within two areas of the project corridor. One area is located within the Waterford Loop and the other is the Stumps Mobile Home Park on Stumps Lane. Site visits indicated that between 50 and 60 homes exist south of KY 44 within and surrounding the Waterford Loop and an estimated 25% to 30% of these homes appear to be occupied by low-income residents.

VI GEOTECHNICAL OVERVIEW

The KYTC Division of Structural Design, Geotechnical Branch conducted a geotechnical review. The complete review is attached in Appendix G. A summary of the review follows.

The study area is within the Outer Blue Grass Physiographic Region of Kentucky. This Region is known to contain carbonate units able to produce sinkholes, caves, sinking streams and springs. Geologic mapping indicates the project traverses across multiple rock formations including the Laurel Dolomite; Osgood and Brassfield Formations; Saluda Dolomite, Bardstown Member, and Rowland Member of the Drakes Formation; Grant Lake Limestone; Calloway Creek Limestone and Clays Ferry Formation. These rock formations range in composition from limestone/dolomite with minor amounts of shale, interbedded limestone and clay shale varying from 40% to 90% limestone, to highly erodible clay shale with minor dolomite.

Geotechnical Concerns:
1) Alluvium and lacustrine deposits consisting of silt, clay, gravel and sand are found in valleys along the creeks and rivers. Lacustrine deposits are considered highly erodible and may require slope protection for cut sections and around any

structures. Due to anticipated depths of these deposits (0-70'+), bridge piers located in these areas may need to be founded on drilled shafts or piles.

2) The Osgood Formation, found west of the Bullitt/Spencer County Line, consists of erodible clay shale. This shale has very poor engineering characteristics and may result in flatter than normal cut slopes and fills. Osgood Formation shale is not desirable for embankment construction and embankments should be constructed out of durable material if available.

3) The project is located in an area of low to moderate karst potential. Numerous sinkholes in the Laurel Dolomite Formation have been identified on the geologic map. Sinkholes, caves and variable rocklines are also common in the upper part of the Calloway Creek Limestone, the upper part of the Saluda Dolomite Member and near the contact of the Bardstown and Rowland Members of the Drakes Formation. Springs and wet hillside conditions may be encountered at the base of the Laurel Dolomite. Springs and seeps are likely in the lower parts of the Saluda Dolomite and Rowland Members.

4) Abandoned and operating quarries may be found in the Calloway Creek Limestone and Saluda Dolomite and Rowland Members of the Drakes Formation.

5) This project is in a classified seismic zone 2, which is defined as an area of moderate earthquake damage due to earthquake activity.

VII RESOURCE AGENCY INPUT COORDINATION

Selected federal, state and local agencies were contacted as part of the planning study to derive their input on the proposed improvements. Each of the agencies received a set of maps showing the project limits, some existing conditions and proposed improvements. Responses from agencies are attached in Appendix H. The following is a summary of responses received from some agencies:

Cabinet for Economic Development, Commonwealth of Kentucky, February 17, 2012

The Cabinet did not see any negative impact on the industrial sites in both the counties. In fact, they see potential positive impacts by improving safety and functionality of the roadway as it will improve truck access to both communities.

Division for Air Quality, Kentucky Energy and Environment Cabinet, Department for Environmental Protection, Commonwealth of Kentucky, March 6, 2012

Kentucky Division for Air Quality Regulations 401 KAR 63:010 and 401 KAR 63:005 apply to the proposed project.

The project must meet the conformity requirements of the Clean Air Act as amended and the transportation planning provisions of Title 40 of United States Code and be complaint with applicable local government regulations.

Kentucky Department of Fish & Wildlife Resources (KDFWR), Tourism, Arts, and Heritage Cabinet, February 20, 2012

Federally endangered Indiana bat (Myotis sodaJis), Fanshell (Cyprogenia stegaria), Clubshell (Pleurobema clava), and Pink Mucket (Lampsilis abrupta) are known to occur within close proximity to the project site. Additionally, both the western and eastern ends of the project (from the beginning of the study corridor to Goose Creek Rd and Bennett Spur to the end of the study corridor) fall within known maternity summer habitat for the Indiana bat according to the U.S. Fish and Wildlife Service Kentucky Field Office (USFWS KFO). The proposed project has the potential to impact wetland habitats. If impacts cannot be avoided, mitigation should be properly designed and proposed to offset the losses. KDFWR will recommend, at a minimum, a 2: 1 mitigation ratio for any permanent loss or degradation of wetland habitats.

Additionally, the KDFWR recommends measures for any work that may occur within a stream to help reduce impacts to the aquatic environment. To minimize indirect impacts to aquatic resources, strict erosion control measures should be developed and implemented prior to construction to minimize siltation into streams and storm water drainage systems located within the project area.

Kentucky Geological Survey, University of Kentucky, March 12, 2012

There is a low to medium probability of karst developments along the corridor with greater potential at each end of the route and lesser potential in the center. They are not aware of any site specific issues in the area, such as caves. The Silurian Osgood Formation is exposed near the intersection of KY-1319. This shale-rich unit may contain low-durability material that is susceptible to slides.

Kentucky State Nature Preserves Commission, February 28, 2012

The Commission is concerned about possible impacts to a rare plant that is known to occur along the proposed construction corridor. Kentucky gladecress (Leaveriworthia exigua var. laciniata) is a globally rare plant and one of only two plants endemic to the state and recorded from this area.

United States Department of Agriculture, Natural Resources Conservation Service (NRCS), March 14, 2012

Based upon the information provided, Kentucky NRCS does not anticipate the proposed actions will affect WRP easements, GRP easements or PL-566 watershed structures. NRCS is not aware of any plans or activities related to our agency in the defined project area. The current defined project area may impact prime farmland soils and farmlands of statewide importance. NRCS recommends further investigation into the impacts on the soils.

Tourism, Arts and Heritage Cabinet, Kentucky Heritage Council, The State Historic Preservation Office, March 9, 2012

Ensure compliance with relevant state and federal regulations regarding cultural resources. These may include any or all of the following: the Advisory Council on Historic Preservation's Rules and regulations for the Protection of Historic and Cultural Properties (36CRF, Part 800) pursuant to the National Historic Preservation Act of 1966; the National Environmental Policy Act of 1969; Executive Order 11593, Kentucky Antiquities Act; Kentucky Cave Protection Act; and graves protection legislation. Need to determine if properties eligible for listing in the National Register of Historic Places are affected by this project, need to determine the area of potential effect (APE) for both archaeological and cultural historic resources, coordinate with the Division of Environmental Analysis at KYTC.

Department of the Army, U.S. Army Engineer District, Louisville, Corps of Engineers, March 21, 2012

The following "waters of the U.S." may be located within the project area: Pond Run Creek, Elk Creek, Plum Creek, Goose Creek, Dutchman Creek, Little Dutchman Creek and any other stream channels (perennial, intermittent ephemeral) and/or hydrologically connected lakes exhibiting an OHWM and any adjacent wetlands within the proposed project area. A delineation of "waters of the U.S." should be completed if the proposed project would impact "waters of the U.S.," including wetlands.

This project may necessitate the discharge of dredged or fill material into "waters of the U.S.", including jurisdictional wetlands, and a DA permit application should be submitted for review.

Kentucky State Police (KSP), February 13, 2012

KSP does not perceive any problems as it pertains to commercial vehicle enforcement.

Kentucky Energy and Environment Cabinet, Department for Environmental Protection, March 14, 2012

The Energy and Environment Cabinet serves as the state clearinghouse for review of environmental documents generated pursuant to the National Environmental Policy Act (NEPA). Within the Cabinet, the Commissioner's Office in the Department for Environmental Protection coordinates the review for Kentucky state agencies. They distributed copies to various offices and the following comments were received from the Division of Water, the Division of Air Quality and the Division of Waste Management.

Division of Water comments:

Compliance & Technical Assistance Branch: No comments

Water Quality Branch: Best management practices shall be utilized to reduce runoff from the project area into adjacent surface waters.

Watershed Management: The contractor(s) constructing the project may need a groundwater protection plan depending on the onsite activities. Any water well or monitoring well in the construction area will need to be properly abandoned by a certified water well or monitoring well driller before any construction occurs on the well location.
No comments from Water Withdrawal Permitting, Floodplain Section or Water Management Planning.
Enforcement Branch: No objection.

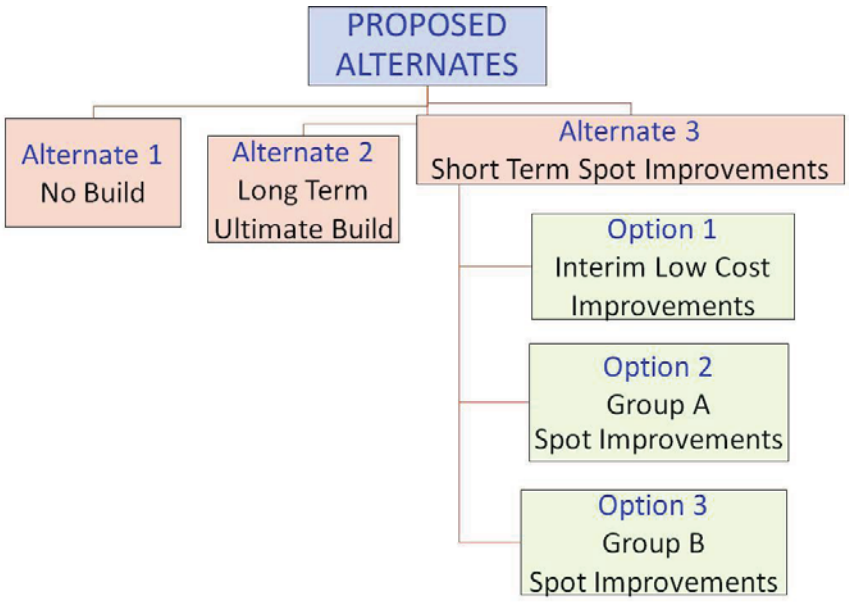
Division of Waste Management comments:
All solid waste generated by this project must be disposed at a permitted facility. If underground storage tanks are encountered, they must be properly addressed. If asbestos, lead paint or other contaminants are encountered during this project, they must be properly addressed.

VIII ALTERNATE DEVELOPMENT

As mentioned earlier, public input was received on the roadway conditions of KY 44. The roadway geometry was analyzed for conformity to current standards. Crash history was obtained and analyzed. Alternates were developed by the project team. After discussions, the team presented the alternates to the public and local Officials. The public were given an opportunity to rank the spot improvement projects. The project team met for a third time and discussed the rankings and combined the rankings with the technical data to finalize the priorities.

IX ALTERNATES CONSIDERED

Three types of alternates were developed by the project team and presented to the public. These are shown in the following flow chart.



A. Alternate 1 - No Build Alternate

This alternate assumes that no new improvements are made to KY 44 in the study area. The current roadway will remain in place with no changes. The benefits of this alternate are that the property, environment and cost will be preserved. The disadvantage of choosing this alternate is that the safety issues identified by the study will not be addressed.

B. Alternate 2 - Long Term Ultimate Build Alternate

This alternate proposes a long term solution by upgrading the roadway to current geometric standards. Figure 6 shows the Long Term Ultimate Build Alternate for KY 44 with the proposed typical sections. The Environmental Overview report, the geotechnical review and resource agencies input detail elements along the corridor to be considered during the design of this alternate. They were summarized in Section V-VII in this report; complete reports are attached in the Appendix. The ultimate build for all the three sections is explained here:

Segment 1:

Segment 1 of the study extends from US 31E in Mt. Washington to KY 1319. The preferred alignment for this segment was selected in the Phase 1 Design under Item 5-347.50. The project team proposed to retain the design recommended by Item 5-347.50 as the Long Term Ultimate Build for Segment 1. The following is the partial description of the selected typical section according to the Design Executive Summary of Item 5-347.50:

> *Three typical sections are utilized on this project. A 5-lane curb-and-gutter section is implemented from the beginning of the project to just east of the entrances to Bullitt East High School and Old Mill Elementary School, where it narrows to a 3-lane curb-and-gutter section that runs to the church entrance east of Parkland Trace. From this point, until the end of the project, a 2-lane rural section is implemented with widening for turning lanes at crossroads.*

The proposed design speed is 45 mph in the 5-lane/3-lane urban section and is 55 mph in the 2-lane rural section.

Segment 2:

Segment 2 of the study extends from KY 1319 in Bullitt County to the beginning of the new roadway section of KY 44 at the Spencer County Elementary School in Spencer County. As Segment 2 is forecasted to carry significant truck traffic and recreation traffic and also considering accommodation for bike lanes, it is proposed that the typical section should have two 11 foot lanes and 8 foot shoulders (6 foot paved) for this segment. Segment 2 is proposed to be designed for a 55 mph design speed. The

roadway is proposed to be rebuilt on the existing alignment where feasible. Realignments will be necessary at some locations to improve geometry (See Figure 6).

As part of the ultimate build, horizontal curves and vertical grades are proposed to be improved. Intersections at KY 1060, KY 623, and KY 1251 will be improved. Climbing lanes will be added where required depending on the proposed final grades and after analysis based on KYTC Highway Design Manual and AASHTO guidelines. Preliminary analysis of the existing grades shows that critical length of grade is exceeded at several locations. Turn lanes will be added. Providing sidewalks where necessary will be considered as part of this alternate.

Segment 2 has three bridges located at Dutchman Creek Road, at Plum Creek near KY 1060 and at Elk Creek near KY 1251. The bridges are not structurally deficient. The Plum Creek and Elk Creek bridges are functionally deficient. It was proposed that all the bridges will be replaced and not widened as part of the Ultimate Build Alternate. Widening of the bridges was not recommended considering the age of the structures which were built in 1932. The bridge typical section will match the roadway.

The Environmental Overview, the geotechnical review and resource agencies input attached in the appendix, discuss possible impacts during the roadway realignment. For example: realignment in the area between the County line and Dutchman Creek area may encounter two locations that have some form of hazardous materials requiring environmental investigation. There are abandoned oil/gas wells along KY 44 just east of Cochran Dr. to be considered during the roadway realignment in that area. Realignment in the area of Stumps Lane and Waterford Loop should be aware of the Environmental Justice concerns and address negative impact to low-income population groups.

Plum Creek crosses KY 44 just east of KY 1060. Plum Creek is in the flood plain. Bridge replacement at this location to provide a wider bridge with shoulders should consider this impact during design. At the east end of the bridge, there is Waterford Park which is an 18 acre park with amenities that include picnic shelters, soccer and softball fields and a 0.45 mile walking track. It is a designated 4(f) and 6(f) resource. Roadway widening and adding a left turn lane to the park may require acquisition of the Park property. However, any impacts to the property should follow the rules defined by federal 4(f) and 6(f) statutes.

There is a large sinkhole area just east of Plum Creek on KY 44. There are several sites along the corridor that have the potential to be eligible for the National Register of Historic places. The Environmental Overview document lists some of these locations.

The streams at Little Dutchman Creek, Dutchman Creek, Goose Creek, Plum Creek, Elk Creek and Pond Creek are Blueline streams, perennial in nature. When bridges and culverts at these locations are widened or the roadway realigned, impacts to water

quality, channel changes, plant and animal habitat are possible. Permits will be required to perform work in the streams.

Wetlands exist along the study corridor. There are two wetlands that occur at Plum Creek and Elk Creek that could be impacted by bridge and roadway widening in those areas. Impacts to the wetlands would require mitigation. Displacement of residential homes and impacts to farmland can be anticipated at each of the locations where realignment of the roadway is proposed. There are churches, schools and cemeteries along the corridor that could be impacted.

Segment 3:

Segment 3 extends from the beginning of the new roadway section at Spencer County Elementary School to KY 1633. This segment was in the Right-of-Way acquisition stage (Item 5-395.00) at the time this study was conducted. The project team proposed to retain the design recommended by Item 5-395.00 as the Long Term Ultimate Build for Segment 3. The design speed on Segment 3 is 45 mph. The typical section for this segment is 22 foot pavement and 6 foot shoulders.

C. Alternate 3 – Short Term Spot Improvements

Roadway improvements for Segment 1 were identified in Phase I Design under Item 5-347.50. Spot improvements were not proposed for Segment 1. Segment 3 is scheduled for construction in the near future. Therefore, no spot improvements were considered for Segment 3. Short term spot improvements for Segment 2 are described below.

a. Alternate 3, Option 1 – Interim Low Cost Improvements

Roadway departure crashes, “cross-over lane” type crashes and crashes in low light conditions are some of the major type of crashes in Segment 2. Low cost roadway improvements can be helpful in the interim, until major improvements are implemented. Edge line and center line rumble strips and chevrons around sharp curves may be helpful in reducing some of the roadway departure and “cross-over lane” type crashes. Edge line rumble strips will be considered for installation when resurfacing is scheduled. The current roadway does not have the width required to provide center line rumble strips. Reflectors on guardrail can improve night time visibility and may improve safety on narrow bridges. Where sight distance is obstructed by slopes and trees, cutting back slopes and tree trimming/removal are proposed as interim solutions. KYTC District 5 will identify the locations for these improvements and undertake them with District funds. Some low cost improvements will also be eligible for Highway Safety funds such as HSIP. For example: A high friction surface treatment is scheduled to be applied to the sharp curve east of Hunters Trace Rd which is one of the high crash locations within the study area using HSIP funds. Figure 7 shows some locations and possible low cost treatments.

b. Alternate 3, Option 2 – Group A Spot Improvements

As mentioned earlier in this report, there are several locations where the horizontal geometry does not meet current roadway design standards. There are several vertical grades that are steep in grade exceeding recommended limits of geometric standards. Upon analysis of the crashes, roadway with less than standard roadway geometry recorded many crashes. The majority of the crashes studied were roadway departure crashes. One of the reasons is due to the driver losing vehicle control around sharp curves. In some cases, the driver was avoiding a vehicle in the opposite direction that had encroached into the lane. Six locations in Segment 2 had a high crash rate (CRF ≥ 1). These were identified as Group A spot improvements. Group A spot improvements are defined as projects in locations where roadway geometry is below current design standards and the crash rate is high (CRF ≥ 1). Figure 8 shows the projects identified as Group A Spot Improvements. Group A Improvements are described in detail in Figure 9.

c. Alternate 3, Option 3 – Group B Spot Improvements

At the public meetings and in the completed surveys, the public, local Officials and stakeholders mentioned other locations not covered by the Group A Spot Improvements that are areas of concern. The project team investigated the locations for the cause. Roadway geometry and crash history were analyzed. The project team identified six locations with geometry problems and crash history and named them as Group B Spot Improvements. Compared to Group A Spot Improvements, projects identified as Group B Spot Improvements had less severe crash history and geometry concerns. Figure 10 shows the projects identified as Group B Spot Improvements. Each of the Group B Spot Improvements is described in Figure 11. During design, a Group B Spot Improvement may be combined with an adjacent Group A Spot Improvement.

If the spot improvements receive funding to move forward, they will be designed keeping the ultimate roadway section in consideration. These improvements will have environmental impacts mentioned earlier in Section IXB and covered in greater detail in the Environmental Overview document. Geotechnical review and other agencies' input are attached in the Appendix of this report.

X COST ESTIMATION

After the alternates were identified, preliminary cost estimates were developed. For Segment 1, cost estimates for Design, Right of Way, Utility relocation and Construction were developed in Item 5-347.50 which were used in this study to get a combined estimate. For Segment 2, preliminary cost estimate was developed for all the alternates and for all the phases. For Segment 3, cost estimates were developed under Item 5-395.00. The estimate was used to get a combined estimate for all the segments. A summary of cost estimates can be seen in Table 9.

Table 9: Summary of Cost Estimates

ALTERNATE 1: No Build Alternate - $0

ALTERNATE 2: Long Term Ultimate Build Alternate

Segment	Brief Description	Phase Cost ($)				Total Cost ($)
		Design	Right-of-Way	Utilities	Constr	
1	US 31E to KY 1319	$3,000,000	$2,300,000	$1,606,000	$10,800,000	$17,706,000
2	KY 1319 to Spencer Co. Elem. School	$10,150,000	$8,270,000	$7,020,000	$45,110,000	$70,550,000
3	Spencer Co. Elem. School to KY 1633	$700,000	$355,000	$700,000	$4,000,000	$5,755,000
Total		$13,850,000	$10,925,000	$9,326,000	$59,910,000	$94,011,000

ALTERNATE 3: Short Term Spot Improvements

Option 1 : Interim Low Cost Spot Improvements

Shoulder layback, tyregrip, cutback trees, reflectors on guardrail, chevrons, edge line rumble strips	$500,000

Option 2: Group A Spot Improvements

Spot	Location	Phase Cost ($)				Total Cost ($)
		Design	Right-of-Way	Utilities	Constr	
A1	East of Cedar Lake to County Line	$560,000	$460,000	$410,000	$2,400,000	$3,830,000
A2	Dutchman Creek Area	$220,000	$160,000	$150,000	$950,000	$1,480,000
A3	Cochran Dr and East	$690,000	$570,000	$500,000	$3,000,000	$4,760,000
A4	KY 623 and East	$350,000	$280,000	$250,000	$1,500,000	$2,380,000
A5	KY 1251 and Hunter's Trace Area	$690,000	$570,000	$500,000	$3,000,000	$4,760,000
A6	Stumps Lane to Turnpike Ave.	$2,700,000	$2,200,000	$2,000,000	$11,900,000	$18,800,000
Total		$5,210,000	$4,240,000	$3,810,000	$22,750,000	$36,010,000

Option 3: Group B Spot Improvements

Spot	Location	Phase Cost ($)				Total Cost ($)
		Design	Right-of-Way	Utilities	Constr	
B1	MP 0.70 to MP 0.95	$290,000	$240,000	$210,000	$1,300,000	$2,040,000
B2	Waterford Loop to Hickory Woods Dr	$350,000	$280,000	$250,000	$1,500,000	$2,380,000
B3	KY 1060 and East	$760,000	$460,000	$410,000	$3,260,000	$4,890,000
B4	Akins Rd area	$580,000	$470,000	$420,000	$2,500,000	$3,970,000
B5	Carl Monroe Rd/Bennett Spur Area	$350,000	$280,000	$250,000	$1,500,000	$2,380,000
B6	River Heights Blvd Area	$870,000	$710,000	$630,000	$3,800,000	$6,010,000
Total		$3,200,000	$2,440,000	$2,170,000	$13,860,000	$21,670,000

ALTERNATE 2 - LONG TERM ULTIMATE BUILD ALTERNATE

PROPOSED ALTERNATES

- Alternate 1 No Build
- **Alternate 2 Long Term Ultimate Build Alternate**
- Alternate 3 Short Term Spot Improvements

SUMMARY OF ESTIMATED COSTS

SEGMENT 1	$17,706,000
SEGMENT 2	$70,550,000
SEGMENT 3	$5,755,000
TOTAL COST	$94,011,000

SEGMENT 1
US 31E TO KY 1319

SEGMENT 2
KY 1319 TO SPENCER COUNTY ELEMENTARY SCHOOL

2-LANE RURAL TYPICAL SECTION

SEGMENT 2 - ESTIMATED COST - $70,550,000			
Design	$10,150,000	Right of Way	$8,270,000
Utilities	$7,020,000	Construction	$45,110,000

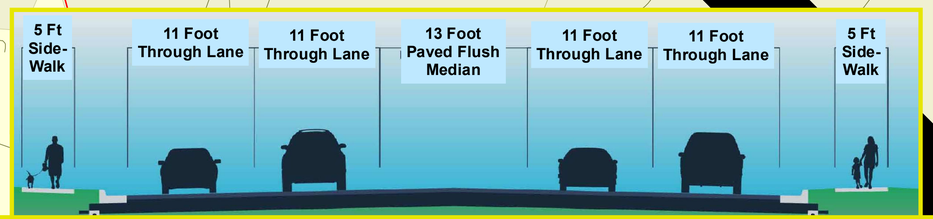
Segment 2 - Proposed Ultimate Build Alternate
- Rebuild on existing alignment, Realign at some locations
- 11 foot lanes, 8 foot shoulders (6 foot paved)
- Bridge Replacements to match new roadway
- Intersection Improvements, Turn Lanes, Climbing Lanes

Possible Realignment Areas

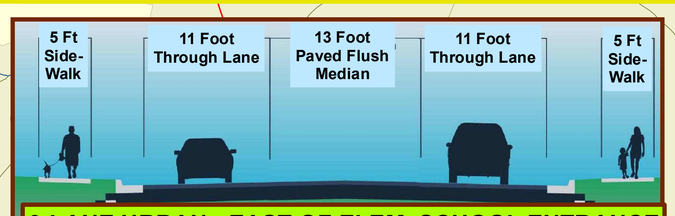
2-LANE RURAL PARKLAND TR. APPROX. TO KY 1319

5-LANE URBAN US 31E TO EASTOF ELEM. SCHOOL ENTRANCE

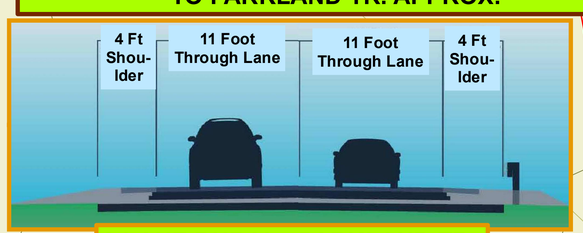
3-LANE URBAN EAST OF ELEM. SCHOOL ENTRANCE TO PARKLAND TR. APPROX.



5-LANE URBAN TYPICAL SECTION - US 31E TO EAST OF ELEM. SCHOOL ENTRANCE



3-LANE URBAN - EAST OF ELEM. SCHOOL ENTRANCE TO PARKLAND TR. APPROX.



2-LANE RURAL - PARKLAND TR. APPROX. TO KY 1319

SEGMENT 1 - ESTIMATED COST - $17,706,000			
Design	$3,000,000	Right of Way	$2,300,000
Utilities	$1,606,000	Construction	$10,800,000

SEGMENT 3

2-LANE RURAL TYPICAL SECTION

SEGMENT 3 - ESTIMATED COST - $5,755,000			
Design	$700,000	Right of Way	$355,000
Utilities	$700,000	Construction	$4,000,000

NOT TO SCALE

KENTUCKY TRANSPORTATION CABINET

FIGURE 6
ALTERNATE 2
LONG TERM ULTIMATE BUILD ALTERNATE

ALTERNATE 3, OPTION 1 - INTERIM LOW COST IMPROVEMENTS

ESTIMATED COST - $500,000

INTERIM LOW COST IMPROVEMENTS
(Possible Treatment locations are shown here)

* Edge Line Rumble Strips
* Chevrons on posts
* Cutback Hills
* Tree Trimming/Removal
* High Friction Surfaces
* Reflectors on guardrail

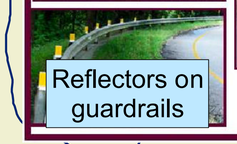

TREE TRIMMING

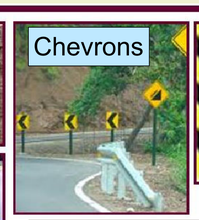

CUTBACK HILL


CHEVRONS AROUND CURVES


CHEVRONS AROUND CURVES
(based on standards as needed)


Rumble Strips


Reflectors on guardrails


Chevrons

LOW COST IMPROVEMENTS


REFLECTORS ON GUARDRAIL


HIGH FRICTION SURFACE
(Hunters Trace Curve)


TREE TRIMMING
CUTBACK HILL

PROPOSED ALTERNATES

- Alternate 1 No Build
- Alternate 2 Long Term Ultimate Build Alternate
- Alternate 3 Short Term Spot Improvements
  - **Option 1 Interim Low Cost Improvements**
  - Option 2 Group A Spot Improvements
  - Option 3 Group B Spot Improvements

Interstate
Parkway
US Highway
State Road
Local Road
Bridge (Line)

NOT TO SCALE

KENTUCKY TRANSPORTATION CABINET

FIGURE 7
ALTERNATE 3, OPTION 1
INTERIM LOW COST IMPROVEMENTS

ALTERNATE 3, OPTION 2 - GROUP A SPOT IMPROVEMENTS

ESTIMATED COST - $3,830,000

Spot A1
East of Cedar Lake Dr to County Line
- Roadway Geometry Improvements

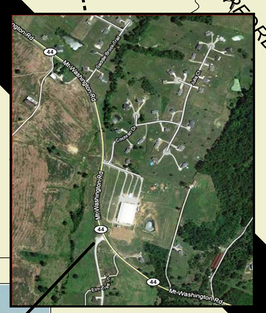
ESTIMATED COST - $1,480,000

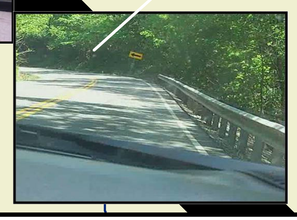
Spot A2 (Dutchman Creek Area)
- Improve West Horizontal Curve
- Intersection Improvements (Eliminate Skew on Side Roads & Align)
- Replace Bridge at Dutchman Creek

ESTIMATED COST - $4,760,000

Spot A3 (Cochran Dr and East)
Intersection Improvements
at Cochran Dr/Julia Ct
- Add Left & Right Turn Lanes to Cochran Dr

East of Cochran Dr Intersection
- Roadway Geometry Improvements





ESTIMATED COST - $2,380,000

Spot A4 (Junction KY 623 and East)
Jct KY 623 - Intersection Improvements
- Improve Turning Radius, Sight Distance etc.

Other Work:
- Replace Box Culvert
  (Possible Left Turn Lane to KY 623
- Improve East Horizontal Curve

ESTIMATED COST - $4,760,000

Spot A5
(Jct KY 1251 to Curve after Hunter's Trace Rd.)
Jct KY 1251- Intersection Improvements
- Improve Turning Radii, Sight Distance etc.
- Add Truck Climbing Lane West of KY 1251

East of Bridge at KY 1251
- Roadway Geometry Improvements

ESTIMATED COST - $18,800,000

Spot A6 (Stumps Lane to Turnpike Ave.)
Minor Widening and Rumble Strips
- Widen pavement by 5 feet
- Install Center Line & Edge Line Rumble Strips

PROPOSED ALTERNATES

- Alternate 1 No Build
- Alternate 2 Long Term Ultimate Build Alternate
- Alternate 3 Short Term Spot Improvements
  - Option 1 Interim Low Cost Improvements
  - **Option 2 Group A Spot Improvements**
  - Option 3 Group B Spot Improvements

Interstate
Parkway
US Highway
State Road
Local Road
Bridge (Line)

NOT TO SCALE

KENTUCKY TRANSPORTATION CABINET

FIGURE 8
ALTERNATE 3, OPTION 2
GROUP A
SPOT IMPROVEMENTS

Figure 9. Group A Spot Improvements – Projects and Description

Spot A1

all photos looking east

Spot A1 - East of Cedar Lake Dr. to Bullitt/Spencer County line

Existing Conditions and Issues:

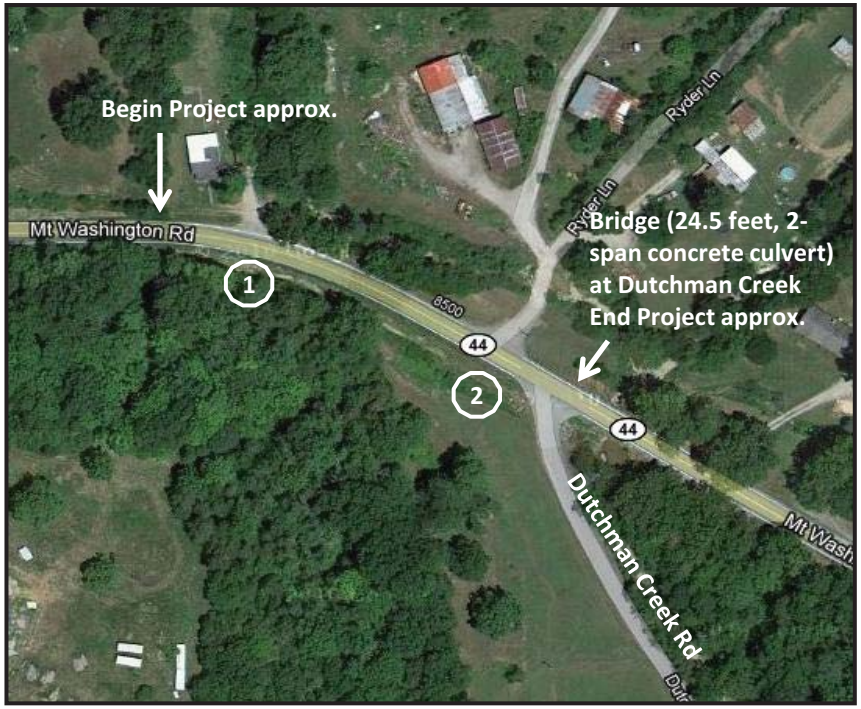
Roadway departure crashes are the common types of crashes in this segment. There is a vertical grade with inadequate sight distance at the beginning of the project. This is followed by a 9.9 degree horizontal curve to the right, just west of Coxs Lane. Another 8 degree curvature horizontal curve to the left exists at the County line. Both the curves do not meet the current geometry standards for the design speed. There are two sections with CRF more than 1.0. The first section just before Coxs lane has a CRF of 1.09. The second high crash section is at the County line with a CRF of 1.31. The types of crashes on the segment were roadway departure crashes (7), rear end crashes (2), angle crashes (2), head - on crashes (2) recorded between Oct 2006 and Oct 2010. The Environmental Overview document mentions that there is a possibility of two hazardous materials/underground storage sites located between the County line and Dutchman Creek area.

Planning Cost Estimate	
Design	$ 560,000.00
ROW	$ 460,000.00
Utility	$ 410,000.00
Construction	$ 2,400,000.00
Total	**$ 3,830,000.00**

Proposed Project:

The spot improvement project, Spot A1, proposes improvements to the roadway geometry for this section. Some realignment is necessary to achieve the proposed improvements. The realignment eliminates existing multiple curves and will be designed during Phase 1 Design keeping the ultimate design in consideration for this segment.

Spot A2



all photos looking east

Spot A2 – Dutchman Creek area

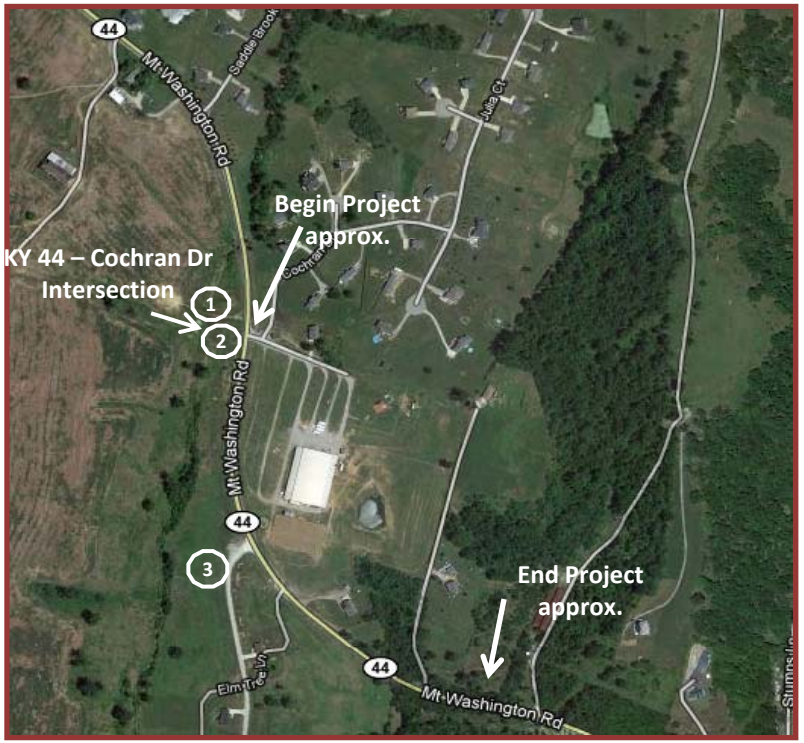
Existing Conditions and Issues:

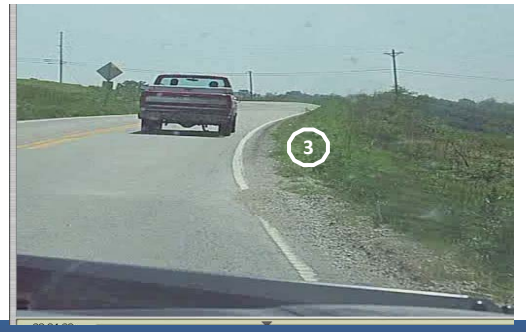
One fatal crash was recorded at the bridge at Dutchman Creek in November, 2007. The head-on crash occurred at the guardrail of the bridge. The operator of the first vehicle reported having lost control while negotiating the curve on a wet roadway. The curve to the right, just west of the bridge has a 7.8 degree curvature. To the east of the horizontal curve, Ryder Lane intersects on the north side. Within 60 feet of Ryder Lane, Dutchman Creek Rd. intersects KY 44 at a skewed angle on the south side. The horizontal curve to the bridge is a high crash location with a CRF of 1.31. Six of the seven crashes recorded from October 2006-2010 were roadway departure crashes. One of the crashes was a head-on crash. The Environmental Overview document mentions a possibility of two hazardous materials/underground storage sites located between the County line and Dutchman Creek area.

Proposed Project:

The spot improvement project, Spot A2, recommends improvements to the geometry of the roadway by correcting the horizontal curve. The offset intersections of Ryder Lane and Dutchman Creek Rd. with KY 44 will be corrected to form a common intersection. The skewed angle of Dutchman Creek Rd. will be eliminated such that the road intersects KY 44 at a right angle. Also, the bridge at Dutchman Creek will be replaced to provide a wider bridge.

Planning Cost Estimate	
Design	$ 220,000.00
ROW	$ 160,000.00
Utility	$ 150,000.00
Construction	$ 950,000.00
Total	**$ 1,480,000.00**





all photos looking east on KY 44

Spot A3 – Cochran Drive and East improvements

Existing Conditions and Issues:

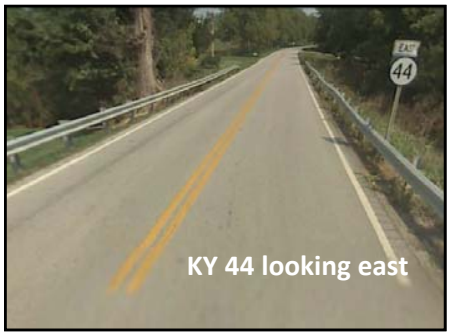
The project begins just before Cochran Dr. at MP 2.30 approximately. Local Planning contacts mention that the Jewell Farm-Cochran Hill area located 6.7 miles west of Taylorsville is the proposed sight of 400 to 450 new residential lots in addition to 10 acres of land zoned for industrial purposes. Continuing east on KY 44 after Cochran Dr., a 4 degree curve to the right is followed by a 6 degree curve to the left with a short tangent in between. Then a 8.8 degree curve to the left follows with a very short tangent (300 ft approx.) in between. This is followed by a 4 degree curve to the right. The series of horizontal curves combined with vertical grades that do not meet current geometric standards is possibly causing many crashes, mainly roadway departure crashes. A CRF of 1.03 is noticed in this area. According to the Environmental Overview document, it appears that there are two gas wells located within the limits of this project.

Proposed Project:

Considering the possible business growth in the Cochran Dr. area, turn lanes are proposed at Cochran Dr. Geometry improvements are proposed for the segment to correct the existing deficiencies. Some realignment may be necessary to accommodate the new geometry.

Planning Cost Estimate	
Design	$ 690,000.00
ROW	$ 570,000.00
Utility	$ 500,000.00
Construction	$ 3,000,000.00
Total	**$ 4,760,000.00**

Spot A4



Spot A4 – KY 623 and east curve

Existing Conditions and Issues:

The project begins at the junction of KY 623 and KY 44. Angle crashes have been recorded at the intersection of KY 44 and KY 623. Preliminary analysis shows that a left turn lane to KY 623 on KY 44 going west is necessary. A more detailed turn lane analysis using turning movement counts will be conducted during future phases of the project. The geometry of the intersection will be investigated for improvements for sight distance and turning radii.

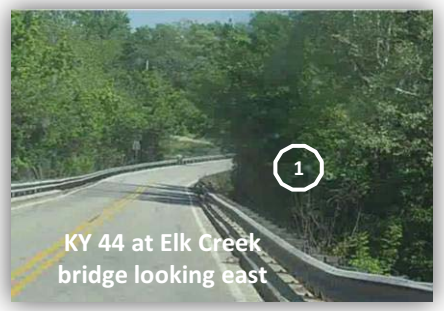
To the east of the intersection, there is a 8' x 7' culvert with guardrail present on both sides making this section very narrow with no shoulders. A horizontal curve with a radius of 1400 ft approximately exists just east of the culvert. Two roadway departure crashes and two rear end crashes were recorded in the curve. The geometry of this segment should be investigated in more detail.

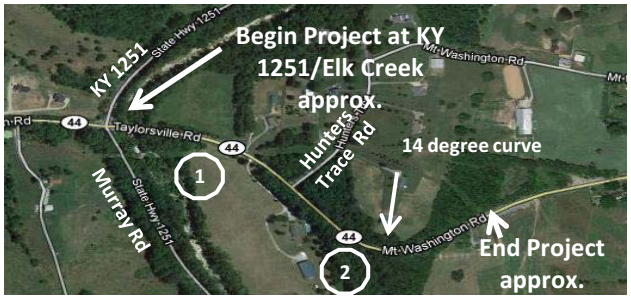
Planning Cost Estimate	
Design	$ 350,000.00
ROW	$ 280,000.00
Utility	$ 250,000.00
Construction	$ 1,500,000.00
Total	**$ 2,380,000.00**

Proposed Project:

Spot Improvement project, Spot A4, proposes intersection improvements such as turning radius, sight distance, turn lanes etc. at KY 623. The box culvert will be replaced and a wider structure with provision for shoulders is proposed.
The geometry of the east horizontal curve will be investigated for improvements.

Spot A5





Spot A5 – KY 1251 & Hunter's Trace area

Existing Conditions and Issues:

The sight distance and turning radius from Murray Rd to east KY 44 was mentioned as a problem by the Public. Elk Creek runs north-south just east of the intersection. The bridge on Elk Creek is a 4-span Concrete Tee Beam. The width of the bridge is narrow without any shoulders and was also mentioned by the public as a major concern while traveling alongside trucks and recreational vehicles. The vertical grade on KY 44 going west of the bridge is 8%. A six degree horizontal curve begins at the east end of the bridge. Traveling east on KY 44, in the vicinity of Hunters Trace Rd., there is a segment with a high crash history. The CRF of this segment is 1.17. Past Hunters Trace Rd., going east on KY 44, there is a horizontal curve with a 14 degree curvature. This curve is one of highest crash locations in the study area with a CRF of 1.75. Ten crashes were recorded between October 2006 and October 2010 in the curve. Vegetation blocks sight distance of traffic flow.

Proposed Project:

This project proposes intersection improvements for turning radius, sight distance etc. at Murray Rd - KY 44 – KY 1251 intersection. A truck climbing lane west of KY 1251 is proposed. Recommendations include improving geometry (horizontal and vertical) east of the bridge to the curve after Hunter's Trace Rd. Realignment of the roadway will be necessary to provide the improved geometry. A high friction surface at the Hunters Trace curve (mile point 5.6 to 6.2) is being scheduled at the time of this report until geometry improvements can be funded.

Planning Cost Estimate		
Design	$	690,000.00
ROW	$	570,000.00
Utility	$	500,000.00
Construction	$	3,000,000.00
Total	**$**	**4,760,000.00**

Spot A6

Center Line Rumble Strips

Edge Line Rumble Strips

Spot A6 – Stumps Lane to Turnpike Avenue
Minor Widening and Rumble Strips

Existing Conditions and Issues:

The Roadway Departure Plan maintained by KYTC Traffic Operations has identified sections on KY 44 that have exhibited several lane departure crashes and lane crossover crashes. Edge line rumble strips will be helpful in alerting drivers and may reduce lane departure crashes. Center line rumble strips can be helpful in reducing lane crossover crashes.

Current roadway pavement width is 20 feet approximately. Edge line rumble strips can be installed on a roadway with minimum width of 20 feet. Center line rumble strips can be installed on a roadway with a minimum width of 25 feet.

Planning Cost Estimate	
Design	$ 2,700,000.00
ROW	$ 2,200,000.00
Utility	$ 2,000,000.00
Construction	$ 11,900,000.00
Total	**$ 18,800,000.00**

Proposed Project:

Spot improvement project, Spot A6, proposes minor widening to add five feet of pavement. With the additional width available, center line and edge line rumble strips can be provided. This will also require grading for a new ditch and most likely have right-of-way and utility impacts.

The estimated cost of the project is $18,800,000 which is high compared to other spot improvements. If this project progresses, then other spot improvements that fall within the project limits may also be completed at the same time.

ALTERNATE 3, OPTION 3 - GROUP B SPOT IMPROVEMENTS

PROPOSED ALTERNATES

- Alternate 1 No Build
- Alternate 2 Long Term Ultimate Build Alternate
- Alternate 3 Short Term Spot Improvements
  - Option 1 Interim Low Cost Improvements
  - Option 2 Group A Spot Improvements
  - **Option 3 Group B Spot Improvements**

ESTIMATED COST - $2,040,000

Spot B1 (MP 0.70 to 0.95 Approx.)
- Roadway Geometry Improvements
- Add Truck Climbing Lane based on grade

ESTIMATED COST - $2,380,000

Spot B2 (Waterford Loop/Hickory Woods Dr area)
Curve East of Waterford Loop
- Roadway Geometry Improvements
- Waterford Loop Realignment

Hickory Woods Dr Intersection
- Add Left Turn Lane at Hickory Woods Dr

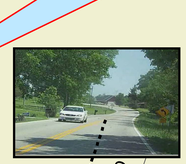
ESTIMATED COST - $4,890,000

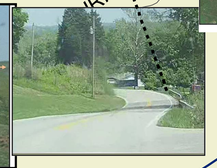
Spot B3 (Junction KY 1060 and Eastwards)
Junction KY 1060 - Intersection Improvement
- Improve Turning Radii, Sight distance etc.
- Possible Left Turn Lane to KY 1060

Waterford Park after KY 1060 Bridge
- Add Left Turn Lane to the Park
- Add Truck Climbing Lane after Waterford Park Entrance going East

ESTIMATED COST - $3,970,000

Spot B4 (Akins Rd area)
Akins Rd
- Improve West Horizontal Curve
- Add Left Turn Lane/Bypass Lane at Akins Rd





ESTIMATED COST - $2,380,000

Spot B5 (Carl Monroe Rd./Benett Spur area)
- Roadway Geometry Improvements

ESTIMATED COST - $6,010,000

Spot B6 (River Heights Blvd area)
- Realign to eliminate multiple curves
- Add Right Turn Lane & Left Turn Lane at River Hts Blvd.

Interstate
Parkway
US Highway
State Road
Local Road
Bridge (Line)

NOT TO SCALE

KENTUCKY TRANSPORTATION CABINET

FIGURE 10
ALTERNATE 3, OPTION 3
GROUP B
SPOT IMPROVEMENTS

Figure 11. Group B Spot Improvements – Projects and Description

Spot B1

Spot B1 – MP 0.70 to 0.95 (Spencer Co.), east of Dutchman Creek Rd.

Existing Conditions and Issues:

This section is approximately midway between Dutchman Creek Rd. and Goose Creek Rd. The horizontal curve has a 6.8 degree curvature. This section has seen some roadway departure crashes. The vertical grade is approximately a 7.2% downgrade on the west side heading towards Dutchman Creek. According to the Environmental Overview document, one site in this area has the potential to be eligible for listing in the National Register for Historic places.

Proposed Project:

Spot improvement project, Spot B1, proposes to improve the roadway geometry in this section. The vertical grade and horizontal curvature will be improved to meet current roadway geometry standards. Preliminary analysis of existing grades approaching the curve on the east side indicate the need for a climbing lane. Depending on the final grades, a truck climbing lane may be added on the west side.

Planning Cost Estimate	
Design	$ 290,000.00
ROW	$ 240,000.00
Utility	$ 210,000.00
Construction	$ 1,300,000.00
Total	**$ 2,040,000.00**

Spot B2

Waterford Loop to Hickory Woods Dr.

Planning Cost Estimate	
Design	$ 350,000.00
ROW	$ 280,000.00
Utility	$ 250,000.00
Construction	$ 1,500,000.00
Total	**$ 2,380,000.00**

Existing Conditions and Issues:

The roadway has geometry concerns. The roadway has a advisory speed sign for 45 mph speed. The horizontal curve is nearly 5 degrees. The vertical grade is approximately 4.8% in the curve. Waterford Loop intersects KY 44 at a skewed angle and therefore sight distance concerns exist.

The Environmental Overview document reports that environmental justice issues for low-income populations might exist in the community of Waterford and Stumps Lane. One site in this area has the potential to be eligible for listing in the National Register for Historic places according to the Environmental Overview document.

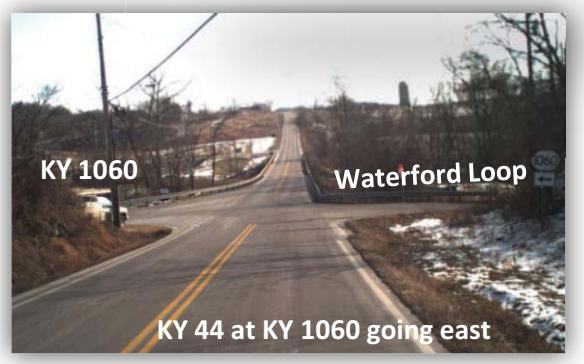
Hickory Woods Dr. on the north side of KY 44 leads to a residential neighborhood with nearly 70 homes.

Proposed Project:

Spot improvement project, Spot B2, proposes to improve the roadway geometry for this segment. As part of the realignment, the environmental justice issues in the Waterford and Stumps Lane should be taken into consideration. The alignment of Waterford Loop will be improved to intersect KY 44 at a right angle. A left turn lane/bypass lane at Hickory Woods Lane is proposed.

Spot B3

KY 44 at KY 1060 and Eastwards



Planning Cost Estimate	
Design	$ 760,000.00
ROW	$ 460,000.00
Utility	$ 410,000.00
Construction	$ 3,260,000.00
Total	**$ 4,890,000.00**

Existing Conditions and Issues:

This segment begins at the intersection of KY 44 - KY 1060 - Waterford Loop. The common problem mentioned regarding this location is that the sight distance and turning radius at the intersection needs improvements.

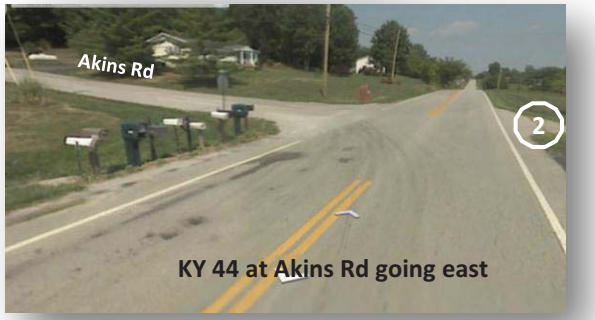
Plum Creek crosses KY 44 within 200 feet from the intersection. The bridge at Plum Creek is a 3-span Concrete T-Beam bridge. This bridge was mentioned by the public as a narrow bridge and causes hazardous conditions to travel alongside trucks and RV's. The bridge has no shoulders and is classified as functionally deficient. Currently, the Sufficiency Rating of the bridge is 64.60. The bridge is not classified as structurally deficient.

Waterford Park is located on the north side of KY 44 within 200 feet of the east end of the bridge. The intersection at the park entrance and KY 44 has recorded rear end crashes. Traveling east, there is grade of 7.4%.

Proposed Project:

Intersection improvements such as turning radius, sight distance etc., are recommended at the KY 44 – KY 1060 – Waterford Loop intersection. Based on preliminary analysis, a left turn lane to KY 1060 is needed. The recommendations include adding a left turn lane to Waterford Park and a truck climbing lane after the park going east. Waterford Community Park is classified as a 6(f) resource as well as a 4(f) resource. However, the proposed improvements may not require acquisition of the park property.

Spot B4



Spot B4 – Akins Rd area

Existing Conditions and Issues:

The curve approaching Akins Rd. has a 45 mph advisory speed sign. The radius of the curve has a 5 degree curvature. Angle crashes were recorded at the intersection of KY 44 and Akins Rd.

Proposed Project:

Spot B4 project proposes improving the west horizontal curve. Recommendations also include adding a left turn lane/bypass lane to Akins Rd.

Planning Cost Estimate	
Design	$ 580,000.00
ROW	$ 470,000.00
Utility	$ 420,000.00
Construction	$ 2,500,000.00
Total	**$ 3,970,000.00**

Spot B5

Spot B5 – Carl Monroe Rd/Bennett Spur area

Existing Conditions and Issues:

This location is just east of Hunters Trace curve which is one of the high crash areas in the study area. There are two horizontal curves on either sides of the intersection with a very short tangent in between them. Each of the curves has a 6 degree curvature. Also, the vertical grade in this area contributes to poor sight distance.

Planning Cost Estimate	
Design	$ 350,000.00
ROW	$ 280,000.00
Utility	$ 250,000.00
Construction	$ 1,500,000.00
Total	**$ 2,380,000.00**

Proposed Project:

The proposed project will improve the roadway geometry at this location by correcting the horizontal and vertical curvature and bring them to current geometric standards.

Spot B6 - River Heights Blvd. area

Existing Conditions and Issues:

The crashes and geometry of this roadway section were investigated. There is an 8 degree curve to the right at the beginning of this segment. This is followed by a two 6 degree curves approaching River Heights Blvd. A 8 degree curve exists to the east of River Heights Blvd. Multiple curves which are in close proximity with substandard geometry are likely contributing to these crashes. The crashes recorded in this section are roadway departure crashes.

Proposed Project:

The proposed project will improve the roadway geometry in this area. Realigning the roadway and eliminating multiple curves is recommended. A new alignment that connects the roadway at either end by smoother geometry is proposed.

Also, considering the residential development in the River Heights Development, a right turn lane and a left turn lane at River Heights Blvd. are proposed.

Planning Cost Estimate	
Design	$ 870,000.00
ROW	$ 710,000.00
Utility	$ 630,000.00
Construction	$ 3,800,000.00
Total	**$ 6,010,000.00**

XI PROJECT PRIORITIZATION FOR SHORT TERM SPOT IMPROVEMENTS

After the project team identified the spot improvements, the projects were presented at the Public Meeting and at the Local Officials and Stakeholders Meeting. At these meetings, the public, local Officials and stakeholders were given the opportunity to rank the projects. Table 10 shows the ranking summary from the two meetings. After the meetings were conducted, the project team met to finalize the ranking for the projects. The project team considered the ranking of the public, local Officials and stakeholders. Other factors were also discussed by the project team. These include analysis of existing roadway geometry, current design standards, crash history of the location and funding possibility. The project team finalized the ranking of the Group A Spot Improvement projects which are summarized in Table 10 and Figure 12.

Table 10: Group A Spot Improvements Ranking

Spot Improvement	Approximate Location	Rank assigned by local officials, Stakeholders & Public	Final Ranking
Spot A1	East of Cedar Lake Dr to County Line	5	3
Spot A2	Dutchman Creek area	2	2
Spot A3	Cochran Drive and east	4	4
Spot A4	KY 623 and east curve	3	5
Spot A5	KY 1251 and Hunters Trace curve	1	1
Spot A6	Stumps Lane to Turnpike Avenue	6	6

The project team agreed that Spot A5 (Hunter's Trace Rd. area) should be ranked #1 because of poor roadway geometry and high crash rate. The ranking for Spot A5 matched the Officials and public's ranking. Spot A2 was ranked #2 by both Groups and it is a project in the Dutchman Creek area where a fatal crash occurred. Spot A1 was ranked #3 by the project team compared to rank #5 of the other group because of higher crash history and greater roadway geometry concerns. Spot A1 and A2 are close to each other and most likely would be designed at the same time.

Spot A6 was ranked last by both the Groups. Spot A6 improvement recommends minor widening from Stumps Lane to Turnpike Avenue. If Spot A6 project is started, other spot improvement projects along this segment will be considered at the same time.

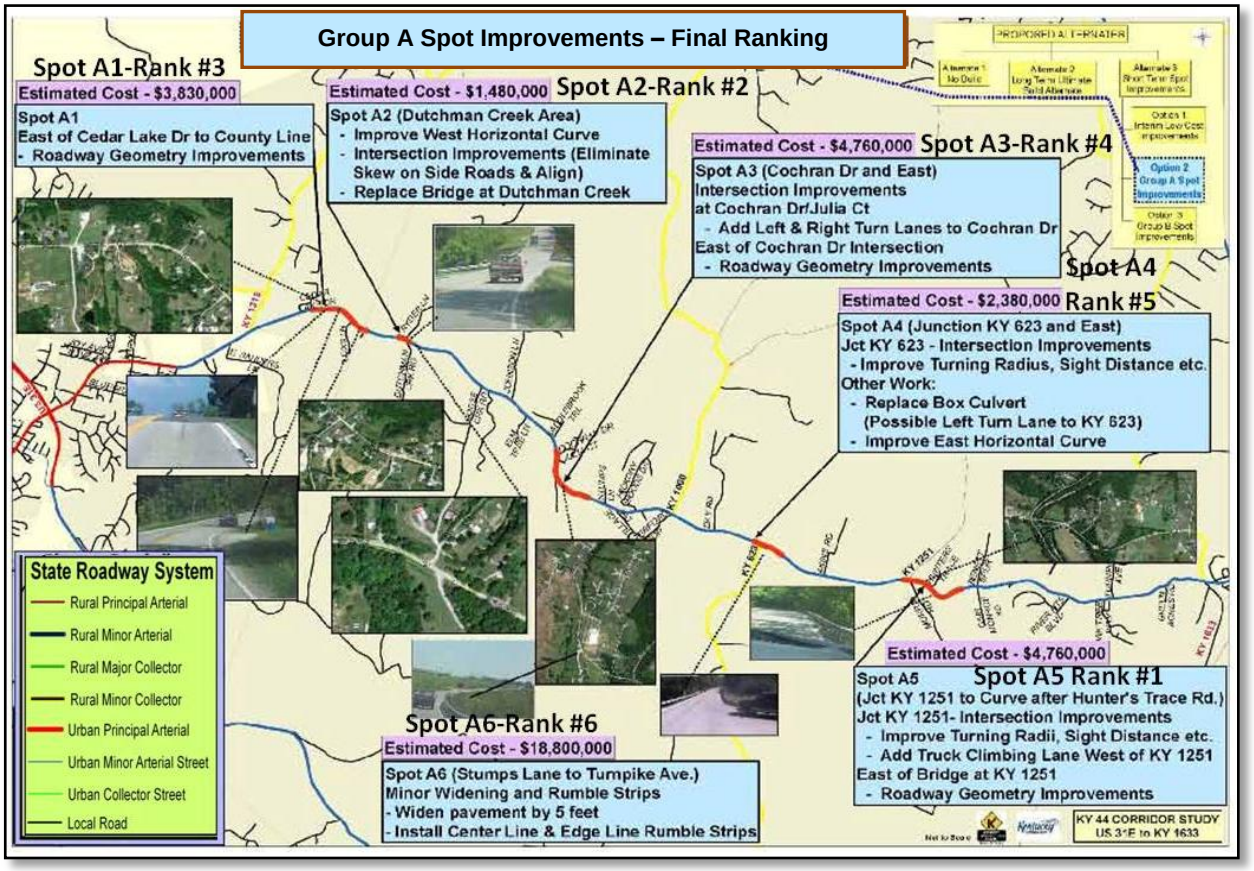


Figure 12: Group A Spot Improvements – Final Ranking

The ranking of Group B Spot Improvements are summarized in Table 11 and Figure 13.

Table 11: Group B Spot Improvements Ranking

Spot Improvement	Approximate Location	Rank assigned by local officials, Stakeholders & Public	Final Ranking
Spot B1	MP 0.70-0.95, east of Dutchman Creek	4	4
Spot B2	Waterford Loop to Hickory Woods Dr	3	2
Spot B3	KY 44 at KY 1060 and eastwards	2	3
Spot B4	Akins Road area	6	5
Spot B5	Carl Monroe Rd/Bennett Spur area	4	6
Spot B6	River Heights Blvd area	1	1

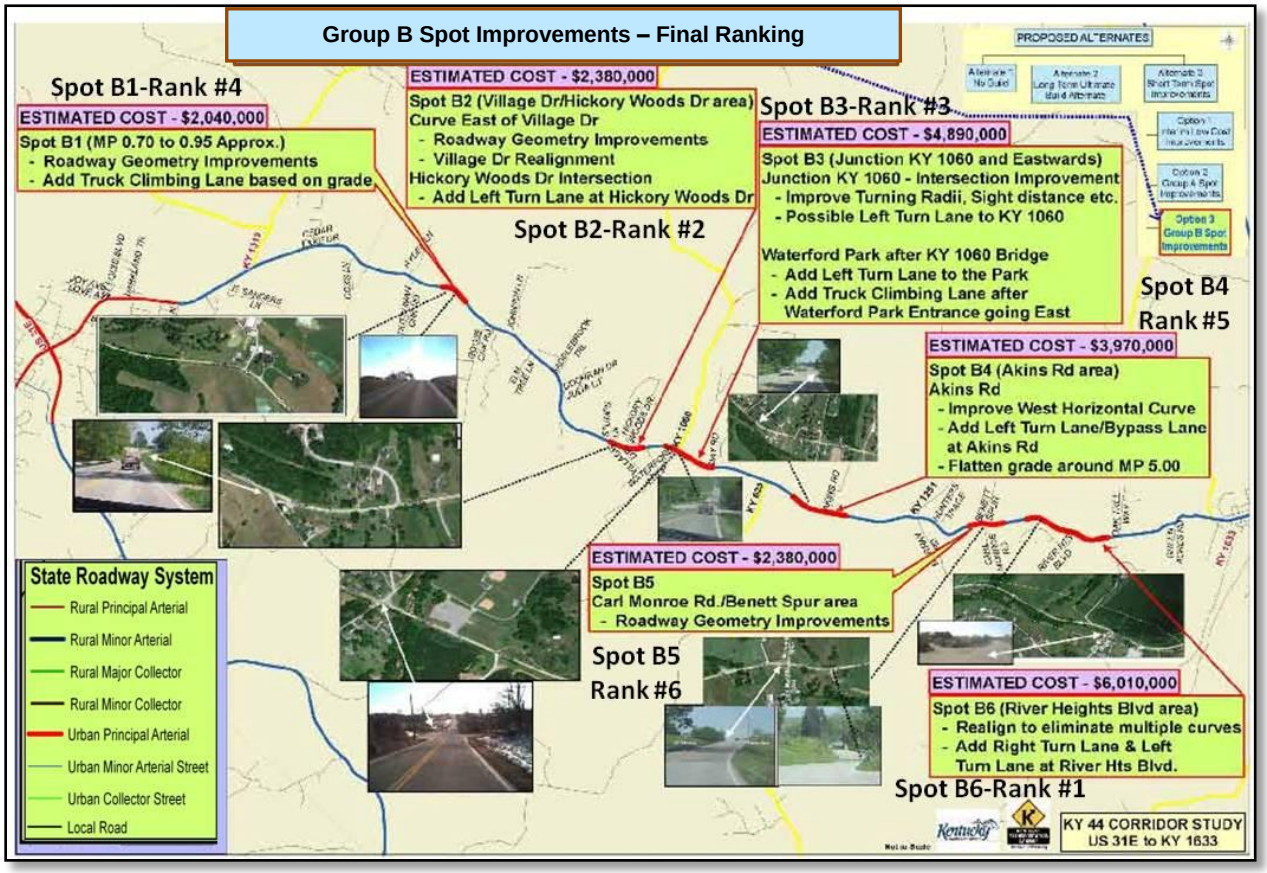


Figure 13: Group B Spot Improvements – Final Ranking

XII RECOMMENDATIONS

The population in Bullitt & Spencer counties has been on the increase. There is growth in recreational traffic traveling to Taylorsville Lake State Park. Traffic volumes are projected to reach nearly 24,500 ADT in 2035 at the west end of the study. Truck volumes are projected to range between 12%-16% in 2035. There are several high crash areas and inadequate roadway geometry. Taking all these into consideration, KY 44 roadway improvements are recommended.

The Phase I Design for Segment 1 between US 31E and KY 1319 has recommended a five lane curb and gutter section at the west end of the study changing over to a three lane typical section ending at Parkland Trace. Considering the high traffic volumes and the large number of rear end crashes that currently occur and increase in projected traffic volume, these typical sections are appropriate for this section and are recommended. The Phase I Design also recommends an improved two lane section from Parkland Trace to KY 1319 which will further improve safety in that section. It is recommended that Segment 1 continue with the advancement into Final Design.

Estimated cost to construct the ultimate build roadway for the 7.5 mile long Segment 2 from KY 1319 to the Spencer Elementary School is nearly $71 million. As this is a significant amount to obtain funding, it is recommended that the roadway improvements should be phased. The most immediate and cost effective solution that can improve the safety of this segment is the interim low cost improvements. The most common crashes in this segment are the roadway departure crashes occurring due to lane cross-over or drivers losing vehicle control around the curves. As identified, improving safety around sharp curves and installing edge rumble strips are some recommendations which are low cost and are effective in reducing crashes and in most cases can be completed using available maintenance and HSIP funds.

The next recommendation for Segment 2 is to consider some of the spot improvement projects. The final ranking identified in this report may be used to determine the order of priority for these projects. For example: Spot A5 is the sharp curve east of Hunters Trace Rd. It is ranked as the highest priority project to improve the roadway geometry in this high crash location. The projects and their ranking were based on a number of factors and public input as identified in the study and would improve safety in those areas. In some cases, two or more projects may be combined irrespective of the ranking or grouping for design purposes or cost effectiveness and also considering the funding priorities. For example, Spot A5 east of Hunters Trace may be combined with Spot B5 at Carl Monroe road for the above mentioned reasons.

It is recommended that spot improvement projects should be designed keeping in mind the ultimate roadway section proposed in this study. The current design standards for the lane and shoulder widths, roadway curvature, sight distance, grades etc. should be followed.

If Segment 2 is programmed for funding for the ultimate build section, the typical section proposed in Section IXB is recommended. The typical section proposes a two lane roadway with shoulders considering the truck and recreational traffic on this segment. Also, the shoulders can accommodate bike traffic. The ultimate build will include truck climbing lanes and turning lanes where needed and improve intersections. The east end of the new roadway will transition to the recently completed three lane section in front of Spencer County Elementary School.

Segment 3 from the east end of the three lane roadway in front of Spencer County Elementary School to KY 1633 was in the right-of-way acquisition stage at the time this study was conducted. The two lane roadway follows a new alignment and would improve the safety in this section with the new roadway geometry. The recommendations identified in Item 5-395.00 are appropriate for Segment 3. During the study, sidewalks were requested to be included in the upcoming construction project for Item 5-395.00. It is recommended that sidewalks should be considered when funding is available in this segment.

XIII ACKNOWLEDGEMENTS & CONTACTS

Several individuals contributed to the completion of this study. The time, effort, and knowledge shared by the following participants is greatly appreciated:

- Every member of the District 5 staff who actively participated in the team meetings, Public Meetings and provided cost estimates. Their experience in various aspects of highway projects was a big asset.
- Randall Embry and Andy Rush from KIPDA for their participation in the study.
- Central Office, Division of Planning staff for their guidance and participation in the study.

Additional information regarding the KY 44 Corridor Study can be obtained by contacting the following KYTC Division of Planning staff members:

- Srinivasa Gutti, P.E. Project Manager
- Jill Asher, P.E. Team Leader
- Steve Ross, P.E. Branch Manager
- Keith Damron, P.E. Director

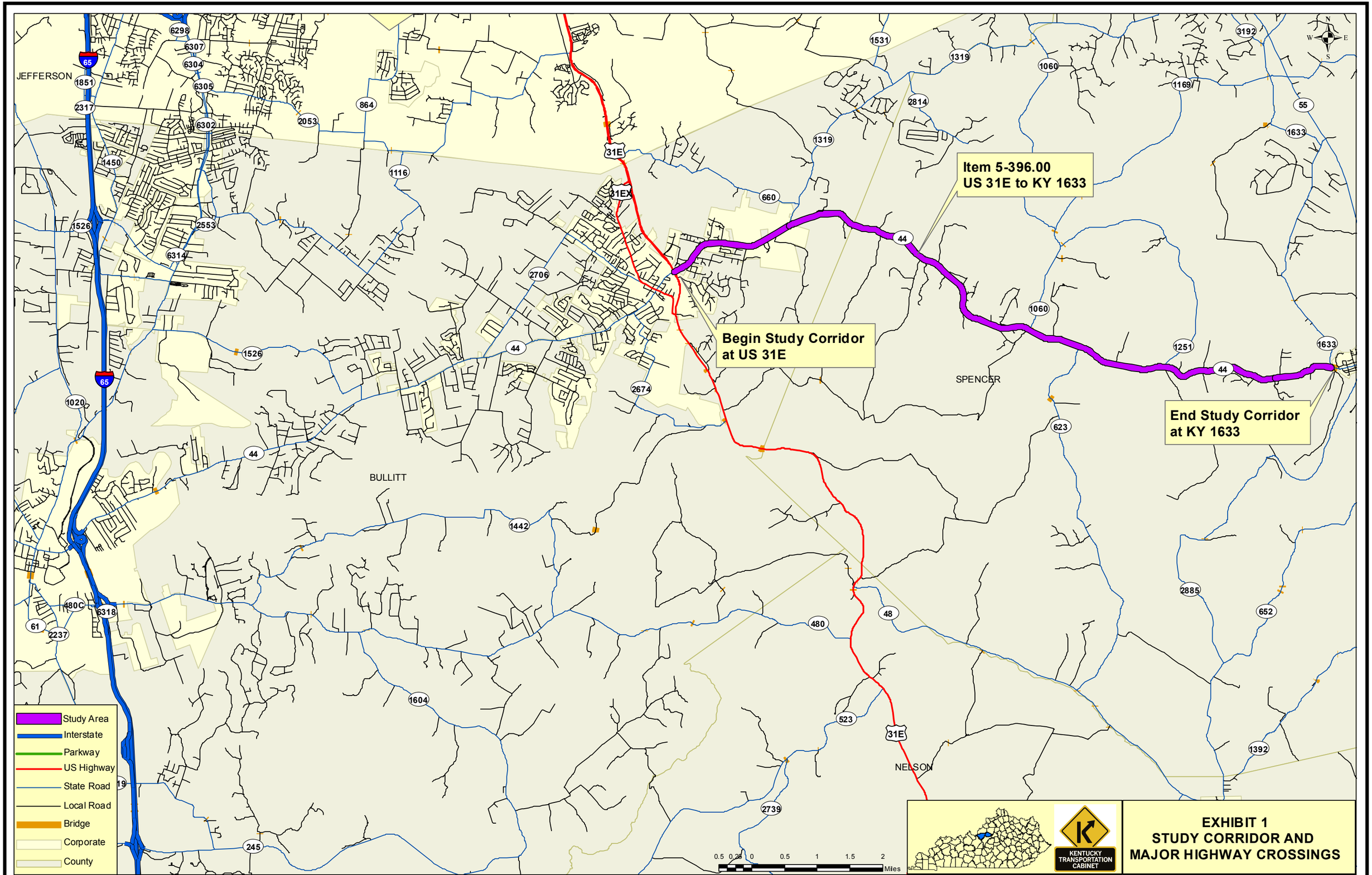
The following address and phone number can be used to reach these individuals:

Division of Planning
200 Mero Street, 5th Floor
Kentucky Transportation Cabinet
Frankfort, KY 40622

Ph: (502) 564-7183

Appendix A

Exhibits


Item 5-396.00
US 31E to KY 1633
Begin Study Corridor
at US 31E
End Study Corridor
at KY 1633
JEFFERSON
BULLITT
SPENCER
NELSON
31E
31EX
65
44
1526
1020
480C
61
6318
2237
245
1604
1442
2674
2706
2739
523
480
48
660
1116
864
2053
1319
1531
1060
1169
2814
3192
55
1633
1251
623
2885
652
1392
6298
6307
6304
6305
6302
6314
1851
2317
1450
2553
Study Area
Interstate
Parkway
US Highway
State Road
Local Road
Bridge
Corporate
County
0.5 0.25 0 0.5 1 1.5 2
Miles
KENTUCKY TRANSPORTATION CABINET
EXHIBIT 1
STUDY CORRIDOR AND
MAJOR HIGHWAY CROSSINGS

Segment 1
(Item 5-347.50)
US 31E to KY 1319

Item 5-396.00
US 31E to KY 1633
Segments 1-3

Segment 2
KY 1319 to
Elementary School

Segment 3
(Item 5-395.00)
Elementary School
to KY 1633

Mt. Washington

Taylorsville

Begin Study Corridor
at US 31E

End Study Corridor
at KY 1633

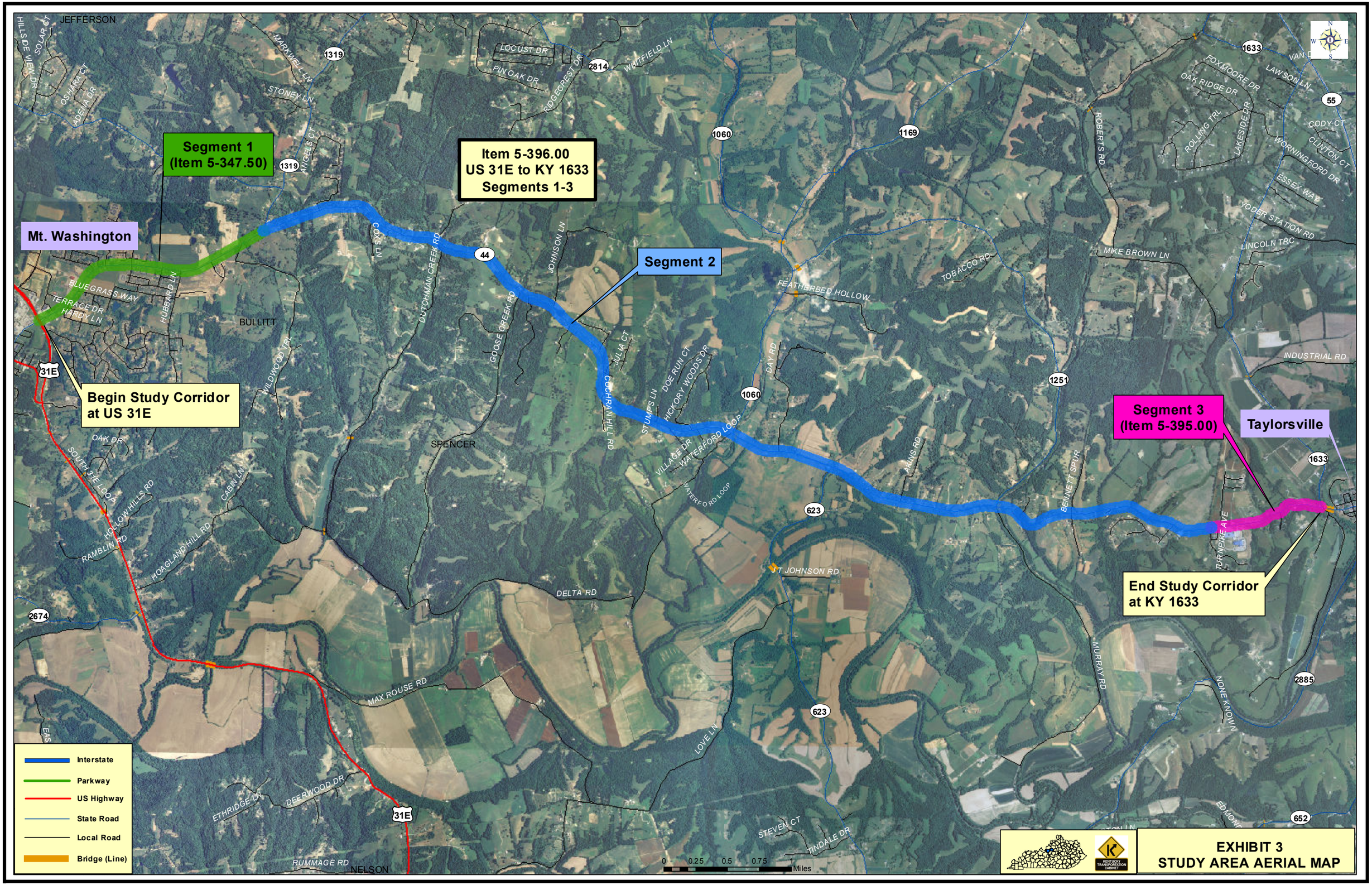
JEFFERSON
BULLITT
SPENCER
Bullitt/Spencer County Line
MARKWELL LN
EAST WILLIAMS LN
ACE CT
DEACON TRCE
CARRIAGE TRCE
HILLSIDE VIEW DR
SOLAR CT
OSHARA CT
ADENA DR
LOCUST DR
PIN OAK DR
RIDGECREST DR
MASTERS LN
WHITFIELD LN
LOVE AVE
IRISH CT
CROWN CT
BLUEGRASS WAY
TERRACE DR
HARDY LN
HUBBARD LN
COX LN
DUTCHMAN CREEK RD
GOOSE CREEK RD
JOHNSON LN
ELM TREE LN
WILDWOOD TRL
JULIA CT
COCHRAN HILL RD
STUMPS LN
DOE RUN CT
HICKORY WOODS DR
VILLAGE DR
WATERFORD LOOP
DAY RD
FEATHERBED HOLLOW
TOBACCO RD
AKINS RD
BENNETT SPUR
MURRAY RD
NONE KNOWN
ROBERTS RD
MIKE BROWN LN
FOXMOORE DR
OAK RIDGE DR
ROLLING TRL
LAKESIDE DR
VAN DYKE AVE
LAWSON LN
CODY CT
CLINTON CT
WORNINGFORD DR
ESSEX WAY
YODER STATION RD
LINCOLN TRC
INDUSTRIAL RD
OAK DR
SOUTH 31E LOOP
HOLLOW HILLS RD
RAMBLIN RD
CABIN LN
HOAGLAND HILL RD
DELTA RD
J T JOHNSON RD
MAX ROUSE RD
LOVE LN
ETHRIDGE LN
DEERWOOD DR
1319
2814
1060
1169
44
1060
623
623
1251
1633
55
2674
2885
31E
31E

Interstate
Parkway
US Highway
State Road
Local Road
Bridge (Line)

0 0.25 0.5 0.75 1 Miles

KENTUCKY TRANSPORTATION CABINET

EXHIBIT 2
STUDY LIMITS AND SEGMENTS


Segment 1
(Item 5-347.50)
Item 5-396.00
US 31E to KY 1633
Segments 1-3
Segment 2
Segment 3
(Item 5-395.00)
Mt. Washington
Begin Study Corridor
at US 31E
End Study Corridor
at KY 1633
Taylorsville
JEFFERSON
BULLITT
SPENCER
NELSON
HILLSIDE VIEW DR
SOLAR CT
OSHARA CT
ADENA DR
MARKWELL LN
STONEY LN
ANGELS CT
LOCUST DR
PIN OAK DR
RIDGECREST DR
WHITFIELD LN
COX LN
DUTCHMAN CREEK RD
JOHNSON LN
GOOSE CREEK RD
JULIA CT
COCHRAN HILL RD
STUMPS LN
DOE RUN CT
HICKORY WOODS DR
VILLAGE DR
WATERFORD LOOP
AKINS RD
DAY RD
FEATHERBED HOLLOW
TOBACCO RD
ROBERTS RD
MIKE BROWN LN
FOXMOORE DR
OAK RIDGE DR
ROLLING TRL
LAKESIDE DR
LAWSON LN
VAN D
CODY CT
CLINTON CT
WORNINGFORD DR
ESSEX WAY
YODER STATION RD
LINCOLN TRC
INDUSTRIAL RD
BENNETT SPUR
TURNPIKE AVE
MURRAY RD
NONE KNOWN
EDMONTON LN
JT JOHNSON RD
DELTA RD
MAX ROUSE RD
LOVE LN
STEVEN CT
TINDALE DR
ETHRIDGE LN
DEERWOOD DR
RUMMAGE RD
BLUEGRASS WAY
TERRACE DR
HARDY LN
HUBBARD LN
WILDWOOD TRL
OAK DR
SOUTH 31E LOOP
HOLLOW HILLS RD
RAMBLIN RD
CABIN LN
HOAGLAND HILL RD
1319
2814
1060
1169
1633
55
44
1251
623
2674
2885
652
31E
Interstate
Parkway
US Highway
State Road
Local Road
Bridge (Line)
0 0.25 0.5 0.75 1 Miles
KENTUCKY TRANSPORTATION CABINET
EXHIBIT 3
STUDY AREA AERIAL MAP

Begin Study Corridor at US 31E MP 23.255

End Study Corridor at KY 1633 MP 8.451

JEFFERSON

SPENCER

NELSON

Interstate
Parkway
US Highway
State Road
Local Road
Bridge (Line)
Milepoint

0 0.25 0.5 0.75 1 Miles

EXHIBIT 4
STUDY AREA MILE POINT MAP

EXHIBIT 5
LOCATIONS WHERE HORIZONTAL AND VERTICAL CURVES ARE BELOW CURRENT STANDARDS

Mt. Washington

Begin Study Corridor at US 31E

End Study Corridor at KY 1633

Taylorsville

JEFFERSON

SPENCER

BULLITT

Bullitt/Spencer County Line

MARKWELL LN
EAST WILLIAMS LN
ACE CT
DEACON TRCE
CARRIAGE TRCE
SOLAR CT
OSHARA CT
ADENA DR
STONEY LN
ANGELS CT
LOCUST DR
PIN OAK DR
RIDGECREST DR
MASTERS LN
WHITFIELD LN
COX LN
DUTCHMAN CREEK
JOHNSON LN
GOOSE CREEK RD
ELM TREE LN
JULIA CT
HILLCREST RD
STUMPS LN
DOE RUN CT
HICKORY WOODS DR
LOOP
VILLAGE DR
WATERFORD
DAY RD
FEATHERBED HOLLOW
TOBACCO RD
AKINS RD
BENNETT SPUR
WATER ST
ROBERTS RD
FOXMOORE DR
OAK RIDGE DR
ROLLING TRL
LAKESIDE DR
LAWSON LN
VAN DYKE AVE
CODY CT
CLINTON CT
WORNINGFORD DR
ESSEX WAY
YODER STATION RD
LINCOLN TRC
MIKE BROWN LN
INDUSTRIAL RD
MURRAY RD
NONE KNOWN
JT JOHNSON RD
DELTA RD
LOVE LN
MAX ROUSE RD
RAMBLIN RD
HOAGLAND HILL RD
HOLLOW HILLS RD
CABIN LN
SOUTH 31E LOOP
OAK DR
BLUEGRASS WAY
TERRACE DR
HARDY LN
EMERALD DR
HUBBARD LN
CROWN CT

660
1319
2814
1060
1169
55
1633
1251
44
623
2674
2885
31E

N
W
E
S

0 0.25 0.5 0.75 1 Miles

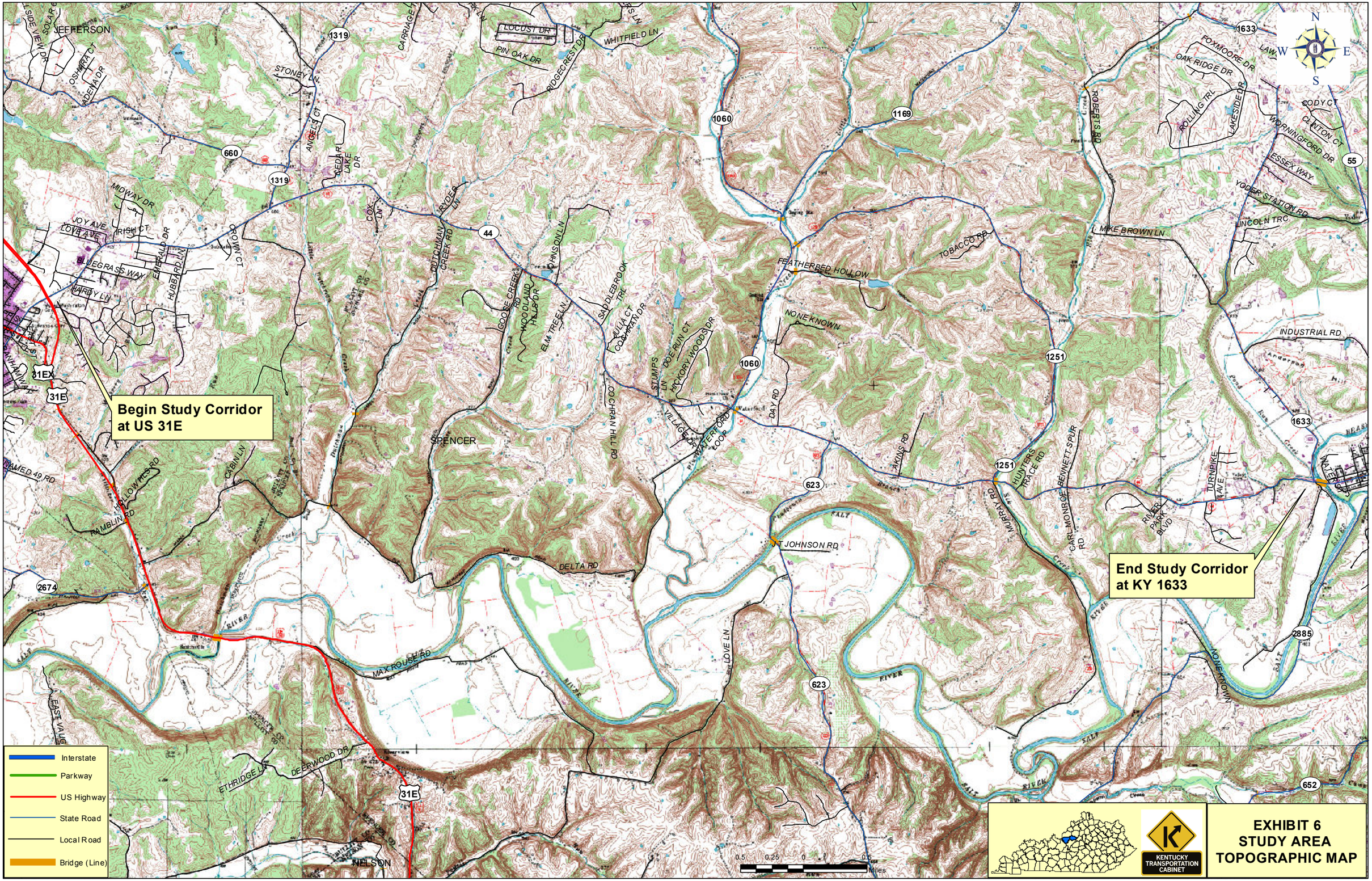
Division of Planning HIS data

- Interstate
- Parkway
- US Highway
- State Road
- Local Road
- Bridge (Line)

Geometry below current standards

- Vertical Grades
- Horizontal Curves

KENTUCKY TRANSPORTATION CABINET


Begin Study Corridor at US 31E
End Study Corridor at KY 1633
JEFFERSON
SPENCER
NELSON
Interstate
Parkway
US Highway
State Road
Local Road
Bridge (Line)
0.5 0.25 0 0.5 Miles
KENTUCKY TRANSPORTATION CABINET
EXHIBIT 6
STUDY AREA
TOPOGRAPHIC MAP

2009 ADT - 12,000
2009 LOS - D
2035 ADT - 29,400
2035 LOS - F

2009 ADT - 4,000
2009 LOS - C
2035 ADT - 11,090
20359 LOS - D

2009 ADT - 7,000
2009 LOS - D
2035 ADT - 17,000
2035 LOS - E

2009 ADT - 10,000
2009 LOS - D
2035 ADT - 24,500
2035 LOS - F

2009 ADT - 4,700
2009 LOS - C
2035 ADT - 13,000
2035 LOS - D

2009 ADT - 3,500
2009 LOS - C
2035 ADT - 11,000
2035 LOS - D

2009 ADT - 3,150
2009 LOS - C
2035 ADT - 11,210
2035 LOS - D

ADT - AVERAGE DAILY TRAFFIC
LOS - LEVEL OF SERVICE

- Interstate
- Parkway
- US Highway
- State Road
- Local Road
- Bridge (Line)

2035 Level of Service analysis assuming existing conditions remain.

0 0.25 0.5 0.75 1 Miles

KENTUCKY TRANSPORTATION CABINET

EXHIBIT 7
CURRENT AND PROJECTED AVERAGE DAILY TRAFFIC AND LEVEL OF SERVICE

Composite Adequacy Rating
19.51 Percentile

Composite Adequacy Rating
12.58 Percentile

Begin Study Corridor
at US 31E
MP 23.255

Composite Adequacy Rating
23.40 Percentile

End Study Corridor
at KY 1633
MP 8.451

JEFFERSON
BULLITT
SPENCER

MARKWELL LN
EAST WILLIAMS LN
ACE CT
DEACON TRCE
CARRIAGE TRCE
SOLAR CT
OSHARA CT
ADENA DR
STONEY LN
ANGEL CT
LOCUST DR
PIN OAK DR
RIDGECREST DR
MASTERS LN
WHITFIELD LN
ST LOUIS BLVD
JOY AVE
LOVE AVE
IRISH CT
HARDY LN
COXS LN
DUTCHMAN CREEK RD
GOOSE CREEK RD
JOHNSON LN
ELM TREE LN
JULIA CT
COCHRAN HILL RD
STUMPS LN
DOE RUN CT
HICKORY WOODS DR
VILLAGE DR
WATERFORD LOOP
DAY RD
FEATHERBED HOLLOW
TOBACCO RD
ROBERTS RD
FOXMOORE DR
OAK RIDGE DR
ROLLING TRL
LAKESIDE DR
LAWSON LN
WORNINGFORD DR
ESSEX WAY
YODER STATION RD
LINCOLN TRC
MIKE BROWN LN
INDUSTRIAL RD
HOUGH RUN RD
HOLLOW HILLS RD
RAMBLIN RD
CABIN LN
HOAGLAND HILL RD
DELTA RD
MAX ROUSE RD
DOEWOOD LN
DEERWOOD DR
LOVE LN
AKINS RD
BENNETT SPUR
T JOHNSON RD
MURRAY RD
NONE KNOWN

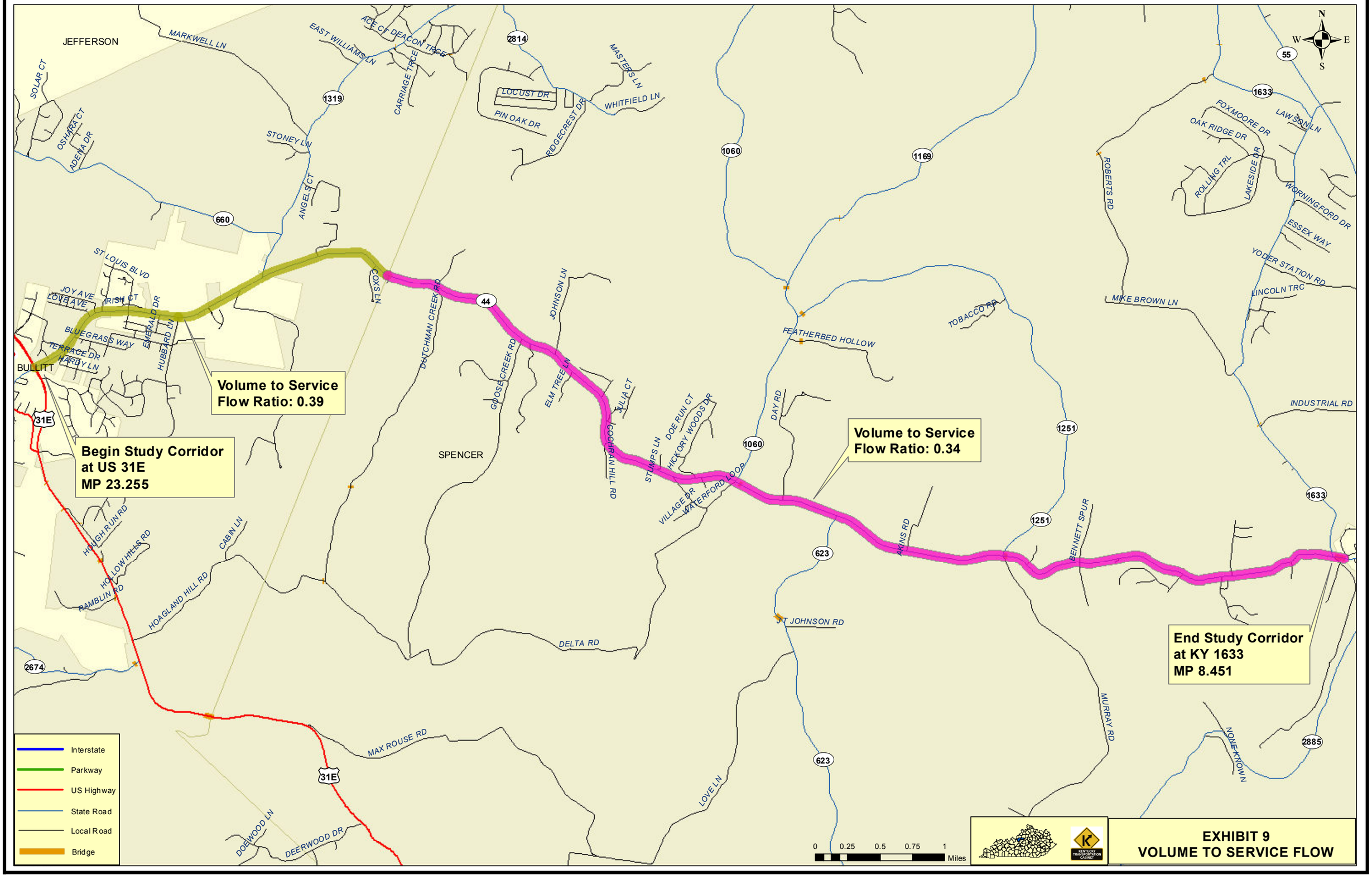
660
1319
2814
1060
1169
55
1633
44
31E
1251
623
2674
2885

Interstate
Parkway
US Highway
State Road
Local Road
Bridge

0 0.25 0.5 0.75 1 Miles

KENTUCKY TRANSPORTATION CABINET

EXHIBIT 8
COMPOSITE ADEQUACY RATING


Volume to Service Flow Ratio: 0.39
Begin Study Corridor at US 31E MP 23.255
Volume to Service Flow Ratio: 0.34
End Study Corridor at KY 1633 MP 8.451
JEFFERSON
BULLITT
SPENCER
MARKWELL LN
EAST WILLIAMS LN
ACE CT
DEACON TRCE
CARRIAGE TRCE
SOLAR CT
OSHARA CT
ADENA DR
STONEY LN
ANGEL CT
LOCUST DR
PIN OAK DR
RIDGECREST DR
MASTERS LN
WHITFIELD LN
ST LOUIS BLVD
JOY AVE
LOVE AVE
IRISH CT
EMERALD DR
BLUEGRASS WAY
TERRACE DR
HARDY LN
HUBBARD LN
COX LN
DUTCHMAN CREEK RD
GOOSE CREEK RD
JOHNSON LN
ELM TREE LN
JULIA CT
COCHRAN HILL RD
STUMPS LN
DOE RUN CT
HICKORY WOODS DR
VILLAGE DR
WATERFORD LOOP
DAY RD
FEATHERBED HOLLOW
TOBACCO RD
ROBERTS RD
FOXMOORE DR
OAK RIDGE DR
ROLLING TRL
LAKESIDE DR
LAWSON LN
WORNINGFORD DR
ESSEX WAY
YODER STATION RD
LINCOLN TRC
MIKE BROWN LN
INDUSTRIAL RD
AKINS RD
BENNETT SPUR
MURRAY RD
NONE KNOWN
J T JOHNSON RD
DELTA RD
LOVE LN
MAX ROUSE RD
HOUGH RUN RD
HOLLOW HILLS RD
RAMBLIN RD
CABIN LN
HOAGLAND HILL RD
DOEWOOD LN
DEERWOOD DR
660
1319
2814
1060
1169
55
1633
44
31E
1251
623
2674
2885
N
W
E
S
Interstate
Parkway
US Highway
State Road
Local Road
Bridge
0 0.25 0.5 0.75 1
Miles
KENTUCKY TRANSPORTATION CABINET
EXHIBIT 9
VOLUME TO SERVICE FLOW

Begin Study Corridor
at US 31E
MP 23.255

CRF 1.01

CRF 0.47

CRF 0.99

CRF 0.04

CRF 0.88

CRF 3.86

CRF 0.79

CRF 0.22

CRF 0.84

CRF 1.09

CRF 0.46

CRF 0.33

End Study Corridor
at KY 1633
MP 8.451

JEFFERSON
BULLITT
SPENCER

MARKWELL LN
SOLAR CT
OSHARA CT
ADENA DR
STONEY LN
ANGELS CT
CARRIAGE TRCE
LOCUST DR
PIN OAK DR
RIDGECREST DR
MASTERS LN
WHITFIELD LN
COX'S LN
RYDER LN
JOHNSON LN
GOOSE CREEK RD
WOODLAND HILLS DR
ELM TREE LN
JULIA CT
DOE RUN CT
HICKORY WOODS DR
COCHRAN HILL RD
DAY RD
TOBACCO RD
FEATHERBED HOLLOW
ROBERTS RD
FOXMOORE DR
OAK RIDGE DR
ROLLING TRL
LAKESIDE DR
LAWSON LN
CODY CT
CLINTON CT
WORNINGFORD DR
ESSEX WAY
YODER STATION RD
MIKE BROWN LN
INDUSTRIAL RD
WATERFRONT
AXINS RD
BENNETT SPUR
MURRAY RD
J T JOHNSON RD
DELTA RD
LOVE LN
TINDALE DR
NONE KNOWN
LEE STEVENS RD
MAX ROUSE RD
DEERWOOD DR
SOUTH 31E LOOP
HOLLOW HILLS RD
RAMBLIN RD
CABIN LN
HOAGLAND HILL RD
DUTCHMAN CREEK RD
PINE VIEW CT
WILDWOOD TRL

660
1319
2814
1060
1169
1633
55
44
31E
31EX
2674
623
1251
2885

N
W
E
S

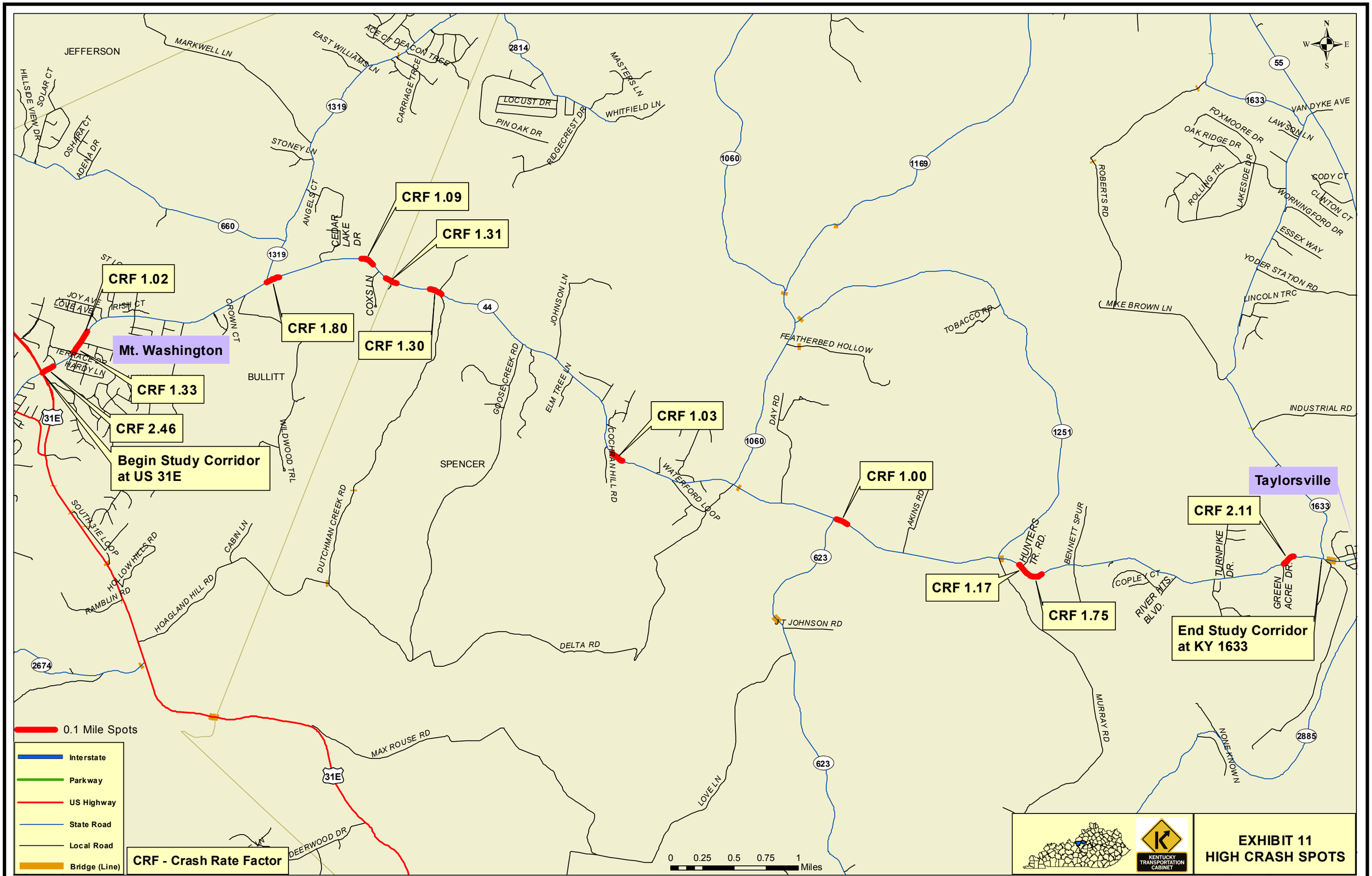
0 0.25 0.5 0.75 1 Miles

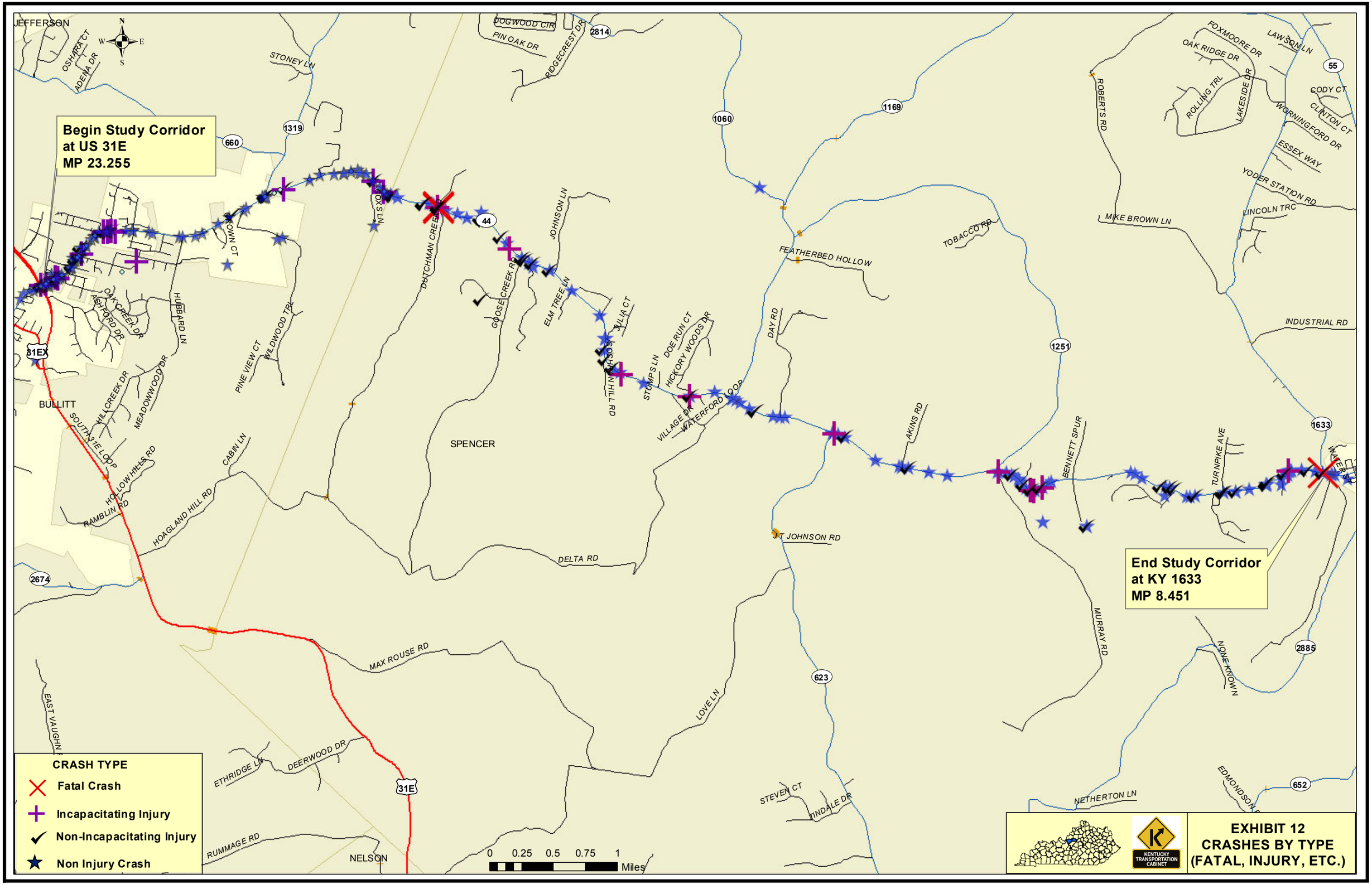
Interstate
Parkway
US Highway
State Road
Local Road

Crash Rate Factor
0.00 to 0.50
0.50 to 1.00
over 1.00

CRF - Crash Rate Factor

EXHIBIT 10
CRASH RATE FACTOR
OF SECTIONS


CRF 1.02
CRF 1.80
CRF 1.09
CRF 1.31
CRF 1.30
CRF 1.33
CRF 2.46
CRF 1.03
CRF 1.00
CRF 1.17
CRF 1.75
CRF 2.11
Mt. Washington
Begin Study Corridor at US 31E
Taylorsville
End Study Corridor at KY 1633
JEFFERSON
BULLITT
SPENCER
MARKWELL LN
EAST WILLIAMS LN
ACE CT
DEACON TRCE
CARRIAGE TRCE
LOCUST DR
PIN OAK DR
RIDGECREST DR
MASTERS LN
WHITFIELD LN
HILLSIDE VIEW DR
SOLAR CT
OSHARA CT
ADENA DR
STONEY LN
ANGEL CT
CEDAR LAKE DR
COXS LN
JOY AVE
LOVE AVE
IRISH CT
CROWN CT
TERRACE DR
HARDY LN
WILDWOOD TRL
GOOSE CREEK RD
JOHNSON LN
ELM TREE LN
COCHRAN HILL RD
WATERFORD LOOP
DAY RD
FEATHERBED HOLLOW
TOBACCO RD
ROBERTS RD
MIKE BROWN LN
FOXMOORE DR
OAK RIDGE DR
ROLLING TRL
LAKESIDE DR
LAWSON LN
VAN DYKE AVE
CODY CT
CLINTON CT
WORNINGFORD DR
ESSEX WAY
YODER STATION RD
LINCOLN TRC
INDUSTRIAL RD
SOUTH 31E LOOP
HOLLOWHILLS RD
RAMBLIN RD
CABIN LN
HOAGLAND HILL RD
DUTCHMAN CREEK RD
DELTA RD
JOHNSON RD
AKINS RD
HUNTERS TR. RD.
BENNETT SPUR
COPLEY CT
RIVER HTS. BLVD.
TURNPIKE DR.
GREEN ACRE DR.
MURRAY RD
NONE KNOWN
MAX ROUSE RD
LOVE LN
DEERWOOD DR
2814
1319
660
44
1060
1169
55
1633
623
1251
2674
2885
31E
0.1 Mile Spots
Interstate
Parkway
US Highway
State Road
Local Road
Bridge (Line)
CRF - Crash Rate Factor
0 0.25 0.5 0.75 1 Miles
KENTUCKY TRANSPORTATION CABINET
EXHIBIT 11
HIGH CRASH SPOTS


Begin Study Corridor
at US 31E
MP 23.255
End Study Corridor
at KY 1633
MP 8.451
JEFFERSON
BULLITT
SPENCER
NELSON
OSHARA CT
ADENA DR
STONEY LN
DOGWOOD CIR
PIN OAK DR
RIDGECREST DR
2814
660
1319
1060
1169
55
FOXMOORE DR
OAK RIDGE DR
ROLLING TRL
LAKESIDE DR
LAWSON LN
CODY CT
CLINTON CT
WORNINGFORD DR
ESSEX WAY
YODER STATION RD
LINCOLN TRC
ROBERTS RD
MIKE BROWN LN
INDUSTRIAL RD
1633
BROWN CT
COX LN
DUTCHMAN CREEK RD
44
JOHNSON LN
GOOSE CREEK RD
ELM TREE LN
JULIA CT
COCHRAN HILL RD
STUMPS LN
DOE RUN CT
HICKORY WOODS DR
VILLAGE DR
WATERFORD LOOP
DAY RD
TOBACCO RD
FEATHERBED HOLLOW
1251
AKINS RD
BENNETT SPUR
TURNPIKE AVE
OAK CREEK DR
ASHFORD DR
HUBBARD LN
PINE VIEW CT
WILDWOOD TRL
31EX
HILLCREEK DR
MEADOWWOOD DR
SOUTH 31E LOOP
HOLLOW HILLS RD
CABIN LN
RAMBLIN RD
HOAGLAND HILL RD
DELTA RD
2674
MAX ROUSE RD
EAST VAUGHN
ETHRIDGE LN
DEERWOOD DR
31E
RUMMAGE RD
LOVE LN
623
J T JOHNSON RD
STEVEN CT
TINDALE DR
MURRAY RD
NONE KNOWN
2885
NETHERTON LN
652
EDMONDSON
CRASH TYPE
Fatal Crash
Incapacitating Injury
Non-Incapacitating Injury
Non Injury Crash
0 0.25 0.5 0.75 1
Miles
KENTUCKY TRANSPORTATION CABINET
EXHIBIT 12
CRASHES BY TYPE
(FATAL, INJURY, ETC.)

JEFFERSON

N
W E
S

Bullitt County
Study Area Crashes

Manner of Collision

- Rear End
- Angle
- Single Vehicle
- Backing
- Head On
- Opposing Left Turn
- Sideswipe - Opposite Direction
- Sideswipe - Same Direction

BULLITT

SPENCER

660

1319

44

31E

ANGELS CT

CEDAR LAKE DR

COXS LN

MIDWAY DR

JOY AVE

LOVE AVE

IRISH CT

EMERALD DR

HUBBARD LN

CROWN CT

BLUEGRASS WAY

HARDY LN

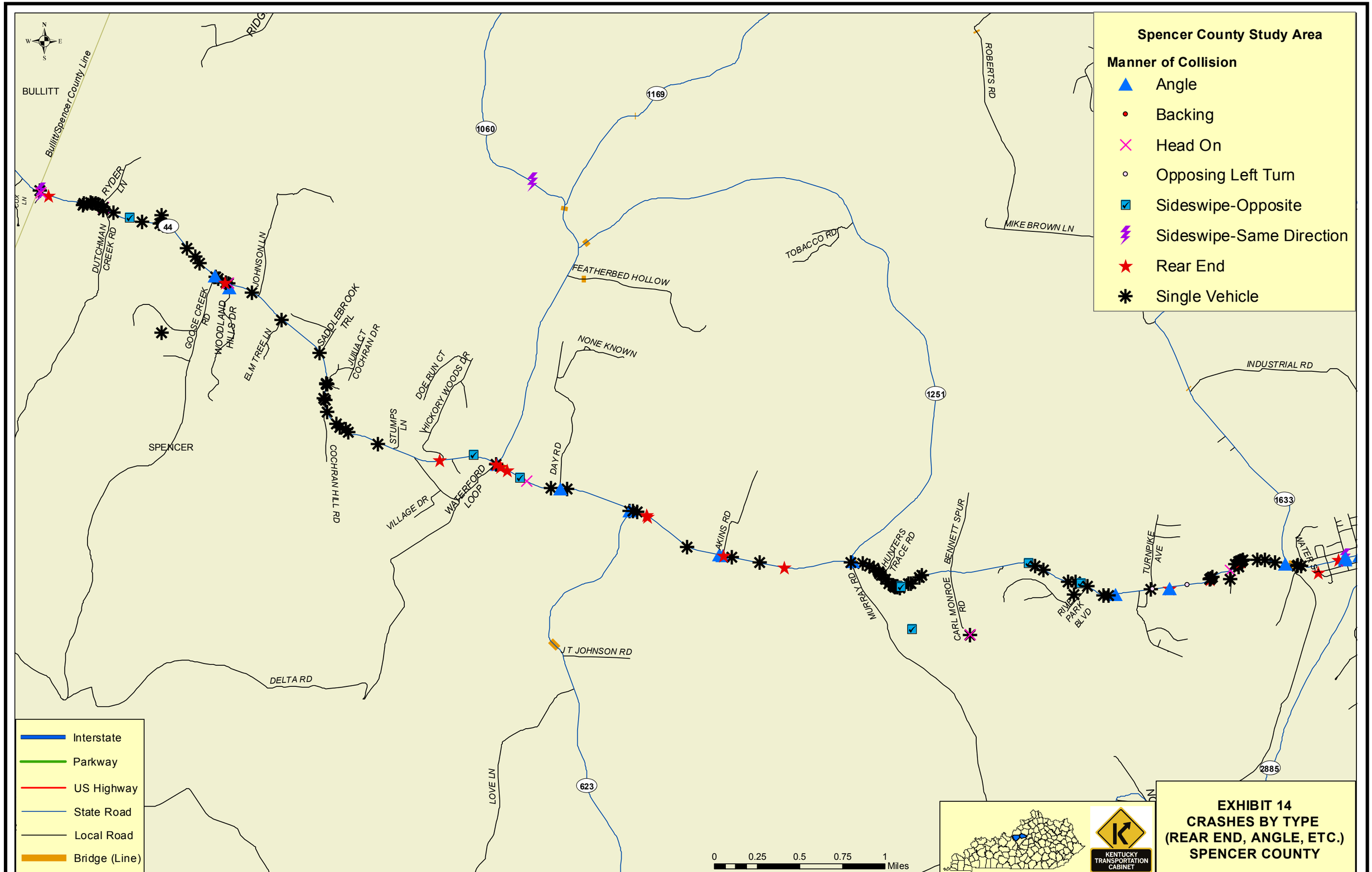
EAST ST

- Interstate
- Parkway
- US Highway
- State Road
- Local Road
- Bridge (Line)

0.25 0.125 0 0.25 Miles

KENTUCKY TRANSPORTATION CABINET

EXHIBIT 13
CRASHES BY TYPE
(REAR END, ANGLE, ETC.)
BULLITT COUNTY


Spencer County Study Area
Manner of Collision
Angle
Backing
Head On
Opposing Left Turn
Sideswipe-Opposite
Sideswipe-Same Direction
Rear End
Single Vehicle
BULLITT
Bullitt/Spencer County Line
SPENCER
RYDER LN
DUTCHMAN CREEK RD
GOOSE CREEK RD
WOODLAND HILLS DR
JOHNSON LN
ELM TREE LN
SADDLEBROOK TRL
JULIA CT
COCHRAN DR
DOE RUN CT
HICKORY WOODS DR
STUMPS LN
COCHRAN HILL RD
VILLAGE DR
WATERFORD LOOP
DAY RD
FEATHERBED HOLLOW
NONE KNOWN
TOBACCO RD
ROBERTS RD
MIKE BROWN LN
INDUSTRIAL RD
AKINS RD
HUNTERS TRACE RD
BENNETT SPUR
MURRAY RD
CARL MONROE RD
RIVER PARK BLVD
TURNPIKE AVE
WATER ST
J T JOHNSON RD
DELTA RD
LOVE LN
1060
1169
1251
1633
2885
623
44
Interstate
Parkway
US Highway
State Road
Local Road
Bridge (Line)
0 0.25 0.5 0.75 1 Miles
KENTUCKY TRANSPORTATION CABINET
EXHIBIT 14
CRASHES BY TYPE
(REAR END, ANGLE, ETC.)
SPENCER COUNTY

Appendix B

Route Log

Route Log

County Name	Route	Begin MP	Description
Bullitt	015-KY-0044 -000	23.255	US 31E
Bullitt	015-KY-0044 -000	23.523	HARDY LANE
Bullitt	015-KY-0044 -000	23.536	EAST BROOKEPOINTE DR
Bullitt	015-KY-0044 -000	23.543	PRIMROSE DRIVE
Bullitt	015-KY-0044 -000	23.645	BLUEGRASS WAY
Bullitt	015-KY-0044 -000	23.852	LOVE AVENUE
Bullitt	015-KY-0044 -000	23.898	JOY AVENUE
Bullitt	015-KY-0044 -000	23.952	CORNELL AVENUE
Bullitt	015-KY-0044 -000	24.157	WINNING COLORS DRIVE
Bullitt	015-KY-0044 -000	24.401	EMERALD DRIVE
Bullitt	015-KY-0044 -000	24.55	HUBBARD LANE
Bullitt	015-KY-0044 -000	25.082	EAST SANDERS LANE
Bullitt	015-KY-0044 -000	25.276	KY 1319
Bullitt	015-KY-0044 -000	25.712	CEDAR LAKE DRIVE
Bullitt	015-KY-0044 -000	26.175	COXS LANE
Bullitt	015-KY-0044 -000	26.286	BULLITT - SPENCER COUNTY LINE
Spencer	108-KY-0044 -000	0	BULLITT - SPENCER COUNTY LINE
Spencer	108-KY-0044 -000	0.4	DUTCHMAN CREEK ROAD
Spencer	108-KY-0044 -000	0.418	DUTCHMAN CREEK CULVERT - B00009
Spencer	108-KY-0044 -000	1.202	GOOSE CREEK ROAD
Spencer	108-KY-0044 -000	1.298	WOODLAND HILLS DRIVE
Spencer	108-KY-0044 -000	1.557	JOHNSON LANE
Spencer	108-KY-0044 -000	2.051	SADDLEBROOK ROAD
Spencer	108-KY-0044 -000	3.001	WATERFORD LOOP
Spencer	108-KY-0044 -000	3.18	HICKORY WOODS DRIVE
Spencer	108-KY-0044 -000	3.51	WATERFORD LOOP/KY 1060
Spencer	108-KY-0044 -000	3.532	PLUM CREEK BRIDGE - B00008
Spencer	108-KY-0044 -000	3.91	DAY ROAD
Spencer	108-KY-0044 -000	4.335	KY 623
Spencer	108-KY-0044 -000	4.961	AKINS ROAD
Spencer	108-KY-0044 -000	5.727	MURRAY ROAD/KY 1251
Spencer	108-KY-0044 -000	5.73	MURRAY ROAD
Spencer	108-KY-0044 -000	5.732	ELK CREEK BRIDGE - B00007
Spencer	108-KY-0044 -000	6.384	CARL MONROE ROAD/BENNETT SPUR
Spencer	108-KY-0044 -000	6.691	BOSTON BRANCH COURT
Spencer	108-KY-0044 -000	8.451	KY 1633

Appendix C

Bridge Inventory and Inspection Reports

NATIONAL BRIDGE INVENTORY

KENTUCKY INVENTORY AND APPRAISAL REPORT

(8) STRUCTURE NUMBER: 108B00009N

*****IDENTIFICATION*****

(1) STATENAME:	**KENTUCKY**
(5) INVENTORY ROUTE (ON/UNDER):	**131000440**
(2) DISTRICT AGENCY DISTRICT:	**5**
(3) COUNTY CODE: **108**	(4) PLACECODE: **0000**
(6) FEATURES INTERSECTED:	**DUTCHMAN CREEK**
(9) LOCATION:	**.5 MI.E.-BULLITT CO LINE**
(11) MILE POINT:	**0.42**
(7) FACILITY CARRIED:	**KY-44**
(12) BASE HIGHWAY NETWORK:	**On**
(13) LRS INVENTORY ROUTE & SUBROUTE:	**KY0044_00000**
(16) LATITUDE:	**38.060920182 N DEGREES**
(17) LONGITUDE:	**-85.479325219 W DEGREES**
(98) BORDER BRIDGE STATECODE **-**	%SHARED:
(99) BORDER BRIDGE STRUCTURE NUMBER:	

*****STRUCTURE TYPE AND MATERIAL*****

(43) STRUCTURE TYPE MAIN:	**119 - Concrete Culvert**
(44) STRUCTURE TYPE APPR:	**!-2 -Not Coded**
(45) NUMBER OF SPANS IN MAIN UNIT:	**2**
(46) NUMBER OF APPROACH SPANS:	**0**
(107) DECK STRUCTURE TYPE	**N - Not Applicable**
(108) WEARING SURFACE/PROTECTIVE SYSTEM	
(108A) TYPE OF WEARING SURFACE:	**N - Not Applicable**
(108B) TYPE OF MEMBRANE:	**N - Not Applicable**
(108C) TYPE OF DECK PROTECTION:	**N - Not Applicable**

*****AGE AND SERVICE*****

(27) YEAR BUILT:	**1932**
(106) YEAR RECONSTRUCTED:	**0**
(42A) TYPE OF SERVICE-ON:	**1 - Highway**
(42B) TYPE OF SERVICE-UNDER	**5 - Waterway**
(28) LANES ON STRUCTURE: **2**	UNDER STRUCTURE: **0**
(29) AVERAGE DAILY TRAFFIC: **3170**	
(30) YEAR OF ADT: **2009**	(109) TRUCK ADT%: **7**
(19) BYPASS DETOUR LENGTH:	**11.8 mi.**

*****GEOMETRIC DATA*****

(48) LENGTH OF MAXIMUM SPAN:	**11.7 ft.**
(49) STRUCTURE LENGTH:	**24.5 ft.**
(50) CURB OR SIDE WALK LEFT: **0.0 ft.**	RIGHT: **0.0 ft.**
(51) BRIDGE ROADWAY WIDTH CURB TO CURB:	**0.0 ft.**
(52) DECK WIDTH OUT TO OUT:	**0.0 ft.**
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS):	**23.0**
(33) BRIDGE MEDIAN:	**No**
(34) SKEW: **30**	STRUCTURED FLARED: **No**
(10) INVENTORY ROUTE MIN VERT CLEAR:	**100.0 ft.**
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR:	**22.9 ft.**
(53) MIN VERT CLEAR OVER BRIDGE RDWY:	**99.99 ft.**
(54) MIN VER UNDER CLEAR REF: **N**	**(b) 0 ft.**
(55) MIN LAT UNDER CLEAR RT REF: **N**	**(b) 0 ft.**
(56) MIN LAT UNDER CLEAR LEFT:	**0 ft.**

*****NAVIGATION DATA*****

(38) NAVIGATION CONTROL	**0 - No navigation control on waterway**
(111) PIER PROTECTION:	**- Not Coded**
(39) NAVIGATION VERTICAL CLEARENCE:	**0.0 ft.**
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEARENCE:	**ft.**
(40) NAVIGATION HORIZONTAL CLEARENCE:	**0.0 ft.**
SUFFICIENCY RATING:	**67.20**
STATUS:	**0 - Not Deficient**

*****CLASSIFICATION*****

(112) NBIS BRIDGE LENGTH:	**Yes**
(104) HIGHWAY SYSTEM:	**0 - Inventory Route is not on the NHS**
(26) FUNCTIONAL CLASS	**06 - Minor Arterial**
(100) STRAHNET HIGHWAY:	**0 - The inventory route is not a STRAHNET route**
(101) PARALLEL STRU	**N - No parallel structure exists**
(103) TEMPORARY STRUCTURE:	**Not Applicable**
(102) DIRECTION OF T	**2 - 2-way traffic**
(105) FEDERAL LANDS HIGHWAYS:	**0 - Not applicable**
(110) DESIGNATED NATIONAL NETWORK:	**0 - The inventory route is not part of the national network for trucks**
(20) TOLL:	**3 - On Free Road**
(21) MAINTAIN:	**1 - State Highway Agency**
(22) OWNER:	**01 - State Highway Agency**
(37) HISTORICAL SIGNIFICANCE:	**5 - Bridge is not eligible for the National Register of Historic Places**

*****CONDITION*****

(58) DECK:	**N**
(59) SUPERSTRUCTURE:	**N**
(60) SUBSTRUCTURE:	**N**
(61) CHANNEL AND CHANNEL PROTECTION:	**6**
(62) CULVERTS:	**6**

*****LOAD RATING AND POSTING*****

(31) DESIGN LOAD:	**2 - H 15**
(63) OPERATING RATING METHOD:	**1 - Load Factor**
(64) OPERATING RATING:	**~~#COMPUTATION~~**
(65) INVENTORY RATING METHOD:	**1 - Load Factor**
(66) INVENTORY RATING:	**15.0 Tons**
(70) BRIDGE POSTING:	**1 - 30.0 - 39.9% below**
(41) STRUCTURE OPEN, POSTED OR CLOSED:	**A - Open, no restriction**

*****APPRAISAL*****

(67) STRUCTURAL EVALUATION:	**4**
(68) DECK GEOMETRY:	**N**
(69) UNDERCLEARENCE, VERTICAL & HORIZONTAL:	**N**
(71) WATERWAY ADEQUACY:	**8**
(36) TRAFFIC SAFETY FEATURES:	**1111**
(113) SCOUR CRITICAL BRIDGES:	**8**

*****PROPOSED IMPROVEMENTS*****

(75) TYPE OF WORK:	
(76) LENGTH OF STRUCTURE IMPROVEMENT:	**0 ft.**
(94) BRIDGE IMPROVEMENT COST:	**$0.00**
(95) ROADWAY IMPROVEMENT COST:	**$0.00**
(96) TOTAL PROJECTION COST:	**$0.00**
(97) YEAR OF IMPROVEMENT COST ESTIMATE:	**2000**
(114) FUTURE ADT:	**4723**
(115) YEAR OF FUTURE ADT:	**2029**

*****INSPECTIONS*****

(90 INSPECTION DATE:	**5/13/2009**
(92) CRITICAL FEATURE INSPECTION:	
(92A) FRACTURE CRITICAL DETAIL:	**N**
(92B) UNDERWATER INSPECTION:	**N**
(92C) OTHER SPECIAL INSP:	**N**
(91) FREQUENCY:	**24 months**
(93) CFI DATE:	
(93A):	**1/1/1901**
(93B):	**1/1/1901**
(93C):	**1/1/1901**

108B00009N

KYTC Bridge Inspection Report

Summary:
Inspection Date: 5/13/2009
Inspector: DDUDGEON (76)
Primary Type: Standard (24 Months)

Types of Inspections Performed:

National Bridge Inventory:	Y
Element:	Y
Fracture Critical:	N
Underwater:	N
Other Special:	N

Inspector Signature:

District Review Date: 6/22/2009
District Reviewer: RBECKORT (22)

IDENTIFICATION

Bridge ID (8):	108B00009N MAP BRIDGE	**District Number:**	5
Route Carried (7):	KY-44	**County (3):**	108 Spencer
Mile Point:	0.418	**Feature Intersected (6):**	DUTCHMAN CREEK
Location (9):	.5 MI.E.-BULLITT CO LINE	**Road Name:**	MT WASHINGTON RD
Structure Description:	24.5 Foot - 2 Span Concrete Culvert (includes frame culverts)		

NBI CONDITION

Deck (58):	N
Superstructure (59):	N
Substructure (60):	N
Culverts (62):	6
Channel/Protection (61):	6

SCHEDULE TAB

Schedule:	Required (Y/N)	Last Date		Frequency	Next Date
NBI (90):		5/13/2009	**(91):**	24 mos	5/13/2011
Fracture Critical (92A):	N	**(93A):** 1/1/1901	**(92A):**	mos	1/1/1901
Underwater (92B):	N	**(93B):** 1/1/1901	**(92B):**	mos	1/1/1901
Other Special (92C):	N	**(93C):** 1/1/1901	**(92C):**	mos	1/1/1901
Elemental:	NA			24 mos	5/13/2011

Load Rating and Posting

Truck Type	Typ I	Typ II	Typ III	Typ IV	Gross
Recomm. Posting:	-1	-1	-1	-1	-1
Field Posting:	-1	-1	-1	-1	-1

Posting Status (41): A Open, no restriction
Signs Posted: **Cardinal:** N **Non-Cardinal:** N

WATERWAY

Scour Critical (113):	8
Observed 113 Rating:	6
Waterway Adeq. (71):	8

DECK/WEARING SURFACE

Deck Type (107): N N/A (NBI)
Wearing Surface/Protective System (108): **Type:** N **Membrane:** N **Protection:** N
Traffic Safety Features (36): **Bridge Rail:** 1 **Transition:** 1 **Appr. Rail:** 1 **Rail Ends:** 1
Overlay: N
Overlay Type: -1
Overlay Thickness: -1.00

Vertical Clearances

Minimum Vertical Overclearance (53):	99.99
Minimum Vertical Underclearance (54):	0.00
Maximum Vertical Clearance (10):	99.99
Minimum Vertical Clearance:	

Sufficiency Ratings

SR: 67.20 **SD/FO:** 0 Not Deficient

Element Condition State Data

Elm/Env	Description	Units	Total Qty.	Qty. CS1	Qty. CS2	Qty. CS3	Qty. CS4	Qty. CS5
241/1	Concrete Culvert	LF	76.00	67.00	7.00	2.00	0.00	0.00
500/1	RC Culv Wing	LF	42.00	40.00	2.00	0.00	0.00	0.00
501/1	RC Culv Head	LF	48.00	4.00	40.00	4.00	0.00	0.00

108B00009N

KYTC Bridge Inspection Report

Summary:

Inspection Date: 5/13/2009
Inspector: DDUDGEON (76)
Primary Type: Standard (24 Months)

Types of Inspections Performed:

National Bridge Inventory:	Y
Element:	Y
Fracture Critical:	N
Underwater:	N
Other Special:	N

Element Condition State Data

Str Unit	Elm/Env	Description	Description
1	241/1	Concrete Culvert	Channel needs cleaning and realignment at the inlet. Banks are eroded at the outlet exposing tree roots. Barrel has cracks, efflorescence and deterioration. Concrete is spalled at end of barrels.
1	500/1	RC Culv Wing	
1	501/1	RC Culv Head	The top of both headwalls is spalled and ravelig with exposed resteel. The roadway shoulder is eroded behind the southeast wing to within 1 foot of the guardrail.

BRIDGE.Notes

Work Candidates

Inspector Candidates:

Candidate ID:	Status	Priority	Assigned	Action	Elem	Date Recommended

NATIONAL BRIDGE INVENTORY

KENTUCKY INVENTORY AND APPRAISAL REPORT

(8) STRUCTURE NUMBER: 108B00008N

*****IDENTIFICATION*****

(1) STATENAME:	**KENTUCKY**
(5) INVENTORY ROUTE (ON/UNDER):	**131000440**
(2) DISTRICT AGENCY DISTRICT:	**5**
(3) COUNTY CODE: **108**	(4) PLACECODE: **0000**
(6) FEATURES INTERSECTED:	**PLUM CREEK**
(9) LOCATION:	**.05 MI EAST OF JCT KY 106**
(11) MILE POINT:	**3.55**
(7) FACILITY CARRIED:	**KY-44**
(12) BASE HIGHWAY NETWORK:	**On**
(13) LRS INVENTORY ROUTE & SUBROUTE:	**KY0044_00000**
(16) LATITUDE:	**38.038815808 N DEGREES**
(17) LONGITUDE:	**-85.436688282 W DEGREES**
(98) BORDER BRIDGE STATECODE **-**	%SHARED:
(99) BORDER BRIDGE STRUCTURE NUMBER:	

*****STRUCTURE TYPE AND MATERIAL*****

(43) STRUCTURE TYPE MAIN:	**104 - Concrete Tee Beam**
(44) STRUCTURE TYPE APPR:	**!-2 -Not Coded**
(45) NUMBER OF SPANS IN MAIN UNIT:	**3**
(46) NUMBER OF APPROACH SPANS:	**0**
(107) DECK STRUCTURE TYPE	**1 - Concrete Cast-in-Place**
(108) WEARING SURFACE/PROTECTIVE SYSTEM	
(108A) TYPE OF WEARING SURFACE:	**3 - Monolithic Concrete**
(108B) TYPE OF MEMBRANE:	**0 - None**
(108C) TYPE OF DECK PROTECTION:	**0 - None**

*****AGE AND SERVICE*****

(27) YEAR BUILT:	**1932**
(106) YEAR RECONSTRUCTED:	**0**
(42A) TYPE OF SERVICE-ON:	**1 - Highway**
(42B) TYPE OF SERVICE-UNDER	**5 - Waterway**
(28) LANES ON STRUCTURE: **2**	UNDER STRUCTURE: **0**
(29) AVERAGE DAILY TRAFFIC: **3170**	
(30) YEAR OF ADT: **2009**	(109) TRUCK ADT%: **7**
(19) BYPASS DETOUR LENGTH:	**11.8 mi.**

*****GEOMETRIC DATA*****

(48) LENGTH OF MAXIMUM SPAN:	**40.0 ft.**
(49) STRUCTURE LENGTH:	**129.0 ft.**
(50) CURB OR SIDE WALK LEFT: **1.0 ft.**	RIGHT: **1.0 ft.**
(51) BRIDGE ROADWAY WIDTH CURB TO CURB:	**19.0 ft.**
(52) DECK WIDTH OUT TO OUT:	**22.0 ft.**
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS):	**24.0**
(33) BRIDGE MEDIAN:	**No**
(34) SKEW: **0**	STRUCTURED FLARED: **No**
(10) INVENTORY ROUTE MIN VERT CLEAR:	**100.0 ft.**
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR:	**18.9 ft.**
(53) MIN VERT CLEAR OVER BRIDGE RDWY:	**99.99 ft.**
(54) MIN VER UNDER CLEAR REF: **N**	**(b) 0 ft.**
(55) MIN LAT UNDER CLEAR RT REF: **N**	**(b) 0 ft.**
(56) MIN LAT UNDER CLEAR LEFT:	**0 ft.**

*****NAVIGATION DATA*****

(38) NAVIGATION CONTROL	**0 - No navigation control on waterway**
(111) PIER PROTECTION:	**- Not Coded**
(39) NAVIGATION VERTICAL CLEARENCE:	**0.0 ft.**
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEARENCE:	**ft.**
(40) NAVIGATION HORIZONTAL CLEARENCE:	**0.0 ft.**
SUFFICIENCY RATING:	**64.60**
STATUS:	**2 - Functionally Obsolete**

*****CLASSIFICATION*****

(112) NBIS BRIDGE LENGTH:	**Yes**
(104) HIGHWAY SYSTEM:	**0 - Inventory Route is not on the NHS**
(26) FUNCTIONAL CLASS	**06 - Minor Arterial**
(100) STRAHNET HIGHWAY:	**0 - The inventory route is not a STRAHNET route**
(101) PARALLEL STRU	**N - No parallel structure exists**
(103) TEMPORARY STRUCTURE:	**Not Applicable**
(102) DIRECTION OF T	**2 - 2-way traffic**
(105) FEDERAL LANDS HIGHWAYS:	**0 - Not applicable**
(110) DESIGNATED NATIONAL NETWORK:	**0 - The inventory route is not part of the national network for trucks**
(20) TOLL:	**3 - On Free Road**
(21) MAINTAIN:	**1 - State Highway Agency**
(22) OWNER:	**01 - State Highway Agency**
(37) HISTORICAL SIGNIFICANCE:	**5 - Bridge is not eligible for the National Register of Historic Places**

*****CONDITION*****

(58) DECK:	**5**
(59) SUPERSTRUCTURE:	**5**
(60) SUBSTRUCTURE:	**6**
(61) CHANNEL AND CHANNEL PROTECTION:	**7**
(62) CULVERTS:	**N**

*****LOAD RATING AND POSTING*****

(31) DESIGN LOAD:	**2 - H 15**
(63) OPERATING RATING METHOD:	**2 - Allowable Stress**
(64) OPERATING RATING:	**~~#COMPUTATION~~**
(65) INVENTORY RATING METHOD:	**2 - Allowable Stress**
(66) INVENTORY RATING:	**38.0 Tons**
(70) BRIDGE POSTING:	**5 - Equal to or above the legal loads**
(41) STRUCTURE OPEN, POSTED OR CLOSED:	**A - Open, no restriction**

*****APPRAISAL*****

(67) STRUCTURAL EVALUATION:	**5**
(68) DECK GEOMETRY:	**2**
(69) UNDERCLEARENCE, VERTICAL & HORIZONTAL:	**N**
(71) WATERWAY ADEQUACY:	**9**
(36) TRAFFIC SAFETY FEATURES:	**0111**
(113) SCOUR CRITICAL BRIDGES:	**4**

*****PROPOSED IMPROVEMENTS*****

(75) TYPE OF WORK:	**341**
(76) LENGTH OF STRUCTURE IMPROVEMENT:	**12.8 ft.**
(94) BRIDGE IMPROVEMENT COST:	**$355,000.00**
(95) ROADWAY IMPROVEMENT COST:	**$0.00**
(96) TOTAL PROJECTION COST:	**$354,000.00**
(97) YEAR OF IMPROVEMENT COST ESTIMATE:	**1994**
(114) FUTURE ADT:	**4723**
(115) YEAR OF FUTURE ADT:	**2029**

*****INSPECTIONS*****

(90 INSPECTION DATE:	**5/13/2009**
(92) CRITICAL FEATURE INSPECTION:	
(92A) FRACTURE CRITICAL DETAIL:	**N**
(92B) UNDERWATER INSPECTION:	**N**
(92C) OTHER SPECIAL INSP:	**N**
(91) FREQUENCY:	**24 months**
(93) CFI DATE:	
(93A):	**1/1/1901**
(93B):	**1/1/1901**
(93C):	**1/1/1901**

108B00008N

KYTC Bridge Inspection Report

Summary:
Inspection Date: 5/13/2009
Inspector: DDUDGEON (76)
Primary Type: Standard (24 Months)

Types of Inspections Performed:

National Bridge Inventory:	Y
Element:	Y
Fracture Critical:	N
Underwater:	N
Other Special:	N

Inspector Signature:

District Review Date: 6/22/2009
District Reviewer: RBECKORT (22)

IDENTIFICATION

Bridge ID (8):	108B00008N MAP BRIDGE	**District Number:**	5
Route Carried (7):	KY-44	**County (3):**	108 Spencer
Mile Point:	3.554	**Feature Intersected (6):**	PLUM CREEK
Location (9):	.05 MI EAST OF JCT KY 106	**Road Name:**	MT WASHINGTON RD
Structure Description:	129 Foot - 3 Span Concrete Tee Beam		

NBI CONDITION

Deck (58):	5
Superstructure (59):	5
Substructure (60):	6
Culverts (62):	N
Channel/Protection (61):	7

SCHEDULE TAB

Schedule:	Required (Y/N)	Last Date		Frequency	Next Date
NBI (90):		5/13/2009	**(91):**	24 mos	5/13/2011
Fracture Critical (92A):	N	**(93A):** 1/1/1901	**(92A):**	mos	1/1/1901
Underwater (92B):	N	**(93B):** 1/1/1901	**(92B):**	mos	1/1/1901
Other Special (92C):	N	**(93C):** 1/1/1901	**(92C):**	mos	1/1/1901
Elemental:	NA			24 mos	5/13/2011

Load Rating and Posting

Truck Type	Typ I	Typ II	Typ III	Typ IV	Gross
Recomm. Posting:	35	36	41	58	
Field Posting:	-1	-1	-1	-1	-1

Posting Status (41): A Open, no restriction
Signs Posted: **Cardinal:** N **Non-Cardinal:** N

WATERWAY

Scour Critical (113):	4
Observed 113 Rating:	4
Waterway Adeq. (71):	9

DECK/WEARING SURFACE

Deck Type (107):	1 Concrete-Cast-In-Place								
Wearing Surface/Protective System (108):		**Type:**	3	**Membrane:**	0	**Protection:**	0		
Traffic Safety Features (36):		**Bridge Rail:**	0	**Transition:**	1	**Appr. Rail:**	1	**Rail Ends:**	1
Overlay:	Y								
Overlay Type:	Latex								
Overlay Thickness:	-1.00								

Vertical Clearances

Minimum Vertical Overclearance (53):	99.99
Minimum Vertical Underclearance (54):	0.00
Maximum Vertical Clearance (10):	99.99
Minimum Vertical Clearance:	

Sufficiency Ratings

SR: 64.60 **SD/FO:** 2 Functionally Obsolete

Element Condition State Data

Elm/Env	Description	Units	Total Qty.	Qty. CS1	Qty. CS2	Qty. CS3	Qty. CS4	Qty. CS5
110/1	R/Conc Open Girder	LF	486.00	474.00	0.00	12.00	0.00	0.00
205/1	R/Conc Column	EA	4.00	0.00	4.00	0.00	0.00	0.00
215/1	R/Conc Abutment	LF	50.00	38.00	6.00	6.00	0.00	0.00

108B00008N

KYTC Bridge Inspection Report

Summary:

Inspection Date: 5/13/2009
Inspector: DDUDGEON (76)
Primary Type: Standard (24 Months)

Types of Inspections Performed:

National Bridge Inventory:	Y
Element:	Y
Fracture Critical:	N
Underwater:	N
Other Special:	N

Element Condition State Data

Elm/Env	Description	Units	Total Qty.	Qty. CS1	Qty. CS2	Qty. CS3	Qty. CS4	Qty. CS5
22/1	P Conc Deck/Rigid Ov	SF	2,064.00	0.00	2,064.00	0.00	0.00	0.00
234/1	R/Conc Cap	LF	42.00	0.00	21.00	21.00	0.00	0.00
301/1	Pourable Joint Seal	LF	44.00	37.00	0.00	7.00	0.00	0.00
334/1	Metal Rail Coated	LF	258.00	42.00	216.00	0.00	0.00	0.00
359/1	Soffit Smart Flag	EA	1.00	1.00	0.00	0.00	0.00	0.00
503/1	RC Curb	LF	258.00	241.00	17.00	0.00	0.00	0.00
611/1	Embankment Erosion	EA	1.00	0.00	1.00	0.00	0.00	0.00

Element Condition State Data

Str Unit	Elm/Env	Description	Description
1	110/1	R/Conc Open Girder	Beams and endwalls are deteriorating at the joints and under the drains---some spalls with resteel exposed with section loss.
1	205/1	R/Conc Column	Channel runs deep along pier 2. Debris trapped at the upstream end of pier 2 has caused some localized souring.
1	215/1	R/Conc Abutment	The abutments have some cracks and spalling with exposed resteel. Worse area is at pier 2 on the south end.
1	22/1	P Conc Deck/Rigid Ov	Deck was overlaid 07/2000. The overlay has some map cracks and has been patched (2 footprint sized patches) in both lanes approximately 10' from the east abutment.
1	234/1	R/Conc Cap	The pier caps are deteriorated and spalled and have resteel exposed with section loss.
1	301/1	Pourable Joint Seal	About 7' collectively of joint material has failed and the joints now leak.
1	334/1	Metal Rail Coated	Most of the metal railing is rusting.
1	359/1	Soffit Smart Flag	Bottom of deck has some cracks and spalls with efflorescence and some full depth deterioration.
1	503/1	RC Curb	Curbs have some cracking and minor spalling.
1	611/1	Embankment Erosion	There is erosion at the northeast corner of abutment 2 which continues down the slope to the pier.

BRIDGE.Notes

Work Candidates

Inspector Candidates:

Candidate ID:	Status	Priority	Assigned	Action	Elem	Date Recommended

NATIONAL BRIDGE INVENTORY

KENTUCKY INVENTORY AND APPRAISAL REPORT

(8) STRUCTURE NUMBER: 108B00007N

*****IDENTIFICATION*****

(1) STATENAME:	**KENTUCKY**
(5) INVENTORY ROUTE (ON/UNDER):	**131000440**
(2) DISTRICT AGENCY DISTRICT:	**5**
(3) COUNTY CODE: **108**	(4) PLACECODE: **0000**
(6) FEATURES INTERSECTED:	**ELK CREEK**
(9) LOCATION:	**.05 MI EAST OF JCT KY 125**
(11) MILE POINT:	**5.75**
(7) FACILITY CARRIED:	**KY-44**
(12) BASE HIGHWAY NETWORK:	**On**
(13) LRS INVENTORY ROUTE & SUBROUTE:	**KY0044_00000**
(16) LATITUDE:	**38.030629954 N DEGREES**
(17) LONGITUDE:	**-85.398947157 W DEGREES**
(98) BORDER BRIDGE STATECODE **-**	%SHARED:
(99) BORDER BRIDGE STRUCTURE NUMBER:	

*****STRUCTURE TYPE AND MATERIAL*****

(43) STRUCTURE TYPE MAIN:	**104 - Concrete Tee Beam**
(44) STRUCTURE TYPE APPR:	**!-2 -Not Coded**
(45) NUMBER OF SPANS IN MAIN UNIT:	**4**
(46) NUMBER OF APPROACH SPANS:	**0**
(107) DECK STRUCTURE TYPE	**1 - Concrete Cast-in-Place**
(108) WEARING SURFACE/PROTECTIVE SYSTEM	
(108A) TYPE OF WEARING SURFACE:	**3 - Monolithic Concrete**
(108B) TYPE OF MEMBRANE:	**0 - None**
(108C) TYPE OF DECK PROTECTION:	**0 - None**

*****AGE AND SERVICE*****

(27) YEAR BUILT:	**1932**
(106) YEAR RECONSTRUCTED:	**0**
(42A) TYPE OF SERVICE-ON:	**1 - Highway**
(42B) TYPE OF SERVICE-UNDER	**5 - Waterway**
(28) LANES ON STRUCTURE: **2**	UNDER STRUCTURE: **0**
(29) AVERAGE DAILY TRAFFIC: **4680**	
(30) YEAR OF ADT: **2009**	(109) TRUCK ADT%: **7**
(19) BYPASS DETOUR LENGTH:	**11.8 mi.**

*****GEOMETRIC DATA*****

(48) LENGTH OF MAXIMUM SPAN:	**36.0 ft.**
(49) STRUCTURE LENGTH:	**155.8 ft.**
(50) CURB OR SIDE WALK LEFT: **0.0 ft.**	RIGHT: **0.0 ft.**
(51) BRIDGE ROADWAY WIDTH CURB TO CURB:	**19.0 ft.**
(52) DECK WIDTH OUT TO OUT:	**22.3 ft.**
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS):	**20.0**
(33) BRIDGE MEDIAN:	**No**
(34) SKEW: **0**	STRUCTURED FLARED: **No**
(10) INVENTORY ROUTE MIN VERT CLEAR:	**100.0 ft.**
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR:	**18.9 ft.**
(53) MIN VERT CLEAR OVER BRIDGE RDWY:	**99.99 ft.**
(54) MIN VER UNDER CLEAR REF: **N**	**(b) 0 ft.**
(55) MIN LAT UNDER CLEAR RT REF: **N**	**(b) 0 ft.**
(56) MIN LAT UNDER CLEAR LEFT:	**0 ft.**

*****NAVIGATION DATA*****

(38) NAVIGATION CONTROL	**0 - No navigation control on waterway**
(111) PIER PROTECTION:	**- Not Coded**
(39) NAVIGATION VERTICAL CLEARENCE:	**0.0 ft.**
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEARENCE:	**ft.**
(40) NAVIGATION HORIZONTAL CLEARENCE:	**0.0 ft.**
SUFFICIENCY RATING:	**74.60**
STATUS:	**2 - Functionally Obsolete**

*****CLASSIFICATION*****

(112) NBIS BRIDGE LENGTH:	**Yes**
(104) HIGHWAY SYSTEM:	**0 - Inventory Route is not on the NHS**
(26) FUNCTIONAL CLASS	**06 - Minor Arterial**
(100) STRAHNET HIGHWAY:	**0 - The inventory route is not a STRAHNET route**
(101) PARALLEL STRU	**N - No parallel structure exists**
(103) TEMPORARY STRUCTURE:	**Not Applicable**
(102) DIRECTION OF T	**2 - 2-way traffic**
(105) FEDERAL LANDS HIGHWAYS:	**0 - Not applicable**
(110) DESIGNATED NATIONAL NETWORK:	**0 - The inventory route is not part of the national network for trucks**
(20) TOLL:	**3 - On Free Road**
(21) MAINTAIN:	**1 - State Highway Agency**
(22) OWNER:	**01 - State Highway Agency**
(37) HISTORICAL SIGNIFICANCE:	**5 - Bridge is not eligible for the National Register of Historic Places**

*****CONDITION*****

(58) DECK:	**7**
(59) SUPERSTRUCTURE:	**6**
(60) SUBSTRUCTURE:	**6**
(61) CHANNEL AND CHANNEL PROTECTION:	**7**
(62) CULVERTS:	**N**

*****LOAD RATING AND POSTING*****

(31) DESIGN LOAD:	**2 - H 15**
(63) OPERATING RATING METHOD:	**2 - Allowable Stress**
(64) OPERATING RATING:	**~~#COMPUTATION~~**
(65) INVENTORY RATING METHOD:	**2 - Allowable Stress**
(66) INVENTORY RATING:	**42.0 Tons**
(70) BRIDGE POSTING:	**5 - Equal to or above the legal loads**
(41) STRUCTURE OPEN, POSTED OR CLOSED:	**A - Open, no restriction**

*****APPRAISAL*****

(67) STRUCTURAL EVALUATION:	**6**
(68) DECK GEOMETRY:	**2**
(69) UNDERCLEARENCE, VERTICAL & HORIZONTAL:	**N**
(71) WATERWAY ADEQUACY:	**9**
(36) TRAFFIC SAFETY FEATURES:	**0011**
(113) SCOUR CRITICAL BRIDGES:	**8**

*****PROPOSED IMPROVEMENTS*****

(75) TYPE OF WORK:	**341**
(76) LENGTH OF STRUCTURE IMPROVEMENT:	**15.7 ft.**
(94) BRIDGE IMPROVEMENT COST:	**$435,000.00**
(95) ROADWAY IMPROVEMENT COST:	**$0.00**
(96) TOTAL PROJECTION COST:	**$434,000.00**
(97) YEAR OF IMPROVEMENT COST ESTIMATE:	**1994**
(114) FUTURE ADT:	**6973**
(115) YEAR OF FUTURE ADT:	**2029**

*****INSPECTIONS*****

(90 INSPECTION DATE:	**5/20/2009**
(92) CRITICAL FEATURE INSPECTION:	
(92A) FRACTURE CRITICAL DETAIL:	**N**
(92B) UNDERWATER INSPECTION:	**N**
(92C) OTHER SPECIAL INSP:	**N**
(91) FREQUENCY:	**24 months**
(93) CFI DATE:	
(93A):	**1/1/1901**
(93B):	**1/1/1901**
(93C):	**1/1/1901**

108B00007N

KYTC Bridge Inspection Report

Summary:
Inspection Date: 5/20/2009
Inspector: DDUDGEON (76)
Primary Type: Standard (24 Months)

Types of Inspections Performed:

National Bridge Inventory:	Y
Element:	Y
Fracture Critical:	N
Underwater:	N
Other Special:	N

Inspector Signature:

District Review Date: 6/22/2009
District Reviewer: RBECKORT (22)

IDENTIFICATION

Bridge ID (8):	108B00007N MAP BRIDGE	**District Number:**	5
Route Carried (7):	KY-44	**County (3):**	108 Spencer
Mile Point:	5.751	**Feature Intersected (6):**	ELK CREEK
Location (9):	.05 MI EAST OF JCT KY 125	**Road Name:**	MT WASHINGTON RD
Structure Description:	155.84 Foot - 4 Span Concrete Tee Beam		

NBI CONDITION

Deck (58):	7
Superstructure (59):	6
Substructure (60):	6
Culverts (62):	N
Channel/Protection (61):	7

SCHEDULE TAB

Schedule:	Required (Y/N)	Last Date		Frequency	Next Date
NBI (90):		5/20/2009	**(91):**	24 mos	5/20/2011
Fracture Critical (92A):	N	**(93A):** 1/1/1901	**(92A):**	mos	1/1/1901
Underwater (92B):	N	**(93B):** 1/1/1901	**(92B):**	mos	1/1/1901
Other Special (92C):	N	**(93C):** 1/1/1901	**(92C):**	mos	1/1/1901
Elemental:	NA			24 mos	5/20/2011

Load Rating and Posting

Truck Type	Typ I	Typ II	Typ III	Typ IV	Gross
Recomm. Posting:	37	38	43	66	
Field Posting:	-1	-1	-1	-1	-1

Posting Status (41): A Open, no restriction
Signs Posted: **Cardinal:** N **Non-Cardinal:** N

WATERWAY

Scour Critical (113):	8
Observed 113 Rating:	8
Waterway Adeq. (71):	9

DECK/WEARING SURFACE

Deck Type (107):	1 Concrete-Cast-In-Place								
Wearing Surface/Protective System (108):		**Type:**	3	**Membrane:**	0	**Protection:**	0		
Traffic Safety Features (36):		**Bridge Rail:**	0	**Transition:**	0	**Appr. Rail:**	1	**Rail Ends:**	1
Overlay:	Y								
Overlay Type:	Latex								
Overlay Thickness:	-1.00								

Vertical Clearances

Minimum Vertical Overclearance (53):	99.99
Minimum Vertical Underclearance (54):	0.00
Maximum Vertical Clearance (10):	99.99
Minimum Vertical Clearance:	

Sufficiency Ratings

SR: 74.60 **SD/FO:** 2 Functionally Obsolete

Element Condition State Data

Elm/Env	Description	Units	Total Qty.	Qty. CS1	Qty. CS2	Qty. CS3	Qty. CS4	Qty. CS5
110/1	R/Conc Open Girder	LF	624.00	556.00	59.00	9.00	0.00	0.00
205/1	R/Conc Column	EA	6.00	1.00	3.00	2.00	0.00	0.00
215/1	R/Conc Abutment	LF	50.00	18.00	27.00	5.00	0.00	0.00

108B00007N

KYTC Bridge Inspection Report

Summary:

Inspection Date: 5/20/2009
Inspector: DDUDGEON (76)
Primary Type: Standard (24 Months)

Types of Inspections Performed:

National Bridge Inventory:	Y
Element:	Y
Fracture Critical:	N
Underwater:	N
Other Special:	N

Element Condition State Data

Elm/Env	Description	Units	Total Qty.	Qty. CS1	Qty. CS2	Qty. CS3	Qty. CS4	Qty. CS5
22/1	P Conc Deck/Rigid Ov	SF	2,964.00	2,964.00	0.00	0.00	0.00	0.00
234/1	R/Conc Cap	LF	63.00	5.00	41.00	17.00	0.00	0.00
301/1	Pourable Joint Seal	LF	66.00	22.00	44.00	0.00	0.00	0.00
334/1	Metal Rail Coated	LF	312.00	312.00	0.00	0.00	0.00	0.00
359/1	Soffit Smart Flag	EA	1.00	0.00	1.00	0.00	0.00	0.00
503/1	RC Curb	LF	312.00	267.00	45.00	0.00	0.00	0.00

Element Condition State Data

Str Unit	Elm/Env	Description	Description
1	110/1	R/Conc Open Girder	Minor deterioration at drains. Minor cracking and small amounts of stirrup bars exposed. Beams and endwalls deteriorated at joints, some spalls with resteel exposed.
1	205/1	R/Conc Column	Column at pier 2 has crack with efflorescence. A couple of columns have spalls with exposed re-steel.
1	215/1	R/Conc Abutment	Abutments are cracked and deteriorating. Some embankment erosion under abutment caps.
1	22/1	P Conc Deck/Rigid Ov	Deck has recent latex overlay.
1	234/1	R/Conc Cap	Pier caps are deteriorating with some spalls and exposed resteel.
1	301/1	Pourable Joint Seal	Joints leak.
1	334/1	Metal Rail Coated	
1	359/1	Soffit Smart Flag	The bottom of the deck has areas of full depth deterioration, worse near joints. Overhangs have moderate deterioration with some exposed steel.
1	503/1	RC Curb	Curbs have several patch areas, but still have several remaining spalls.

BRIDGE.Notes

Work Candidates

Inspector Candidates:

Candidate ID:	Status	Priority	Assigned	Action	Elem	Date Recommended

Appendix D

HCS Runs

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	4/30/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 23.255 TO MP 23.280
Jurisdiction	D-5
Analysis Year	2009
Description	KY 1319 to Bulitt-Spencer County Line

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	12.0	ft	% Trucks and buses	12	%
Segment length	0.0	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	80	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	1128	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.940	
Two-way flow rate,(note-1) vp	1347	pc/h
Highest directional split proportion (note-2)	768	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	2.6	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	56.9	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	44.5	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1253	pc/h
Highest directional split proportion (note-2)	714	
Base percent time-spent-following, BPTSF	66.8	%
Adj.for directional distribution and no-passing zones, fd/np	9.1	
Percent time-spent-following, PTSF	75.8	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.42	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	4/30/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 23.280 TO MP 23.385
Jurisdiction	D-5
Analysis Year	2009
Description	KY 1319 to Bulitt-Spencer County Line

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	12.0	ft	% Trucks and buses	12	%
Segment length	0.1	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	80	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	1128	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.940	
Two-way flow rate,(note-1) vp	1347	pc/h
Highest directional split proportion (note-2)	768	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	2.6	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	56.9	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	44.5	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1253	pc/h
Highest directional split proportion (note-2)	714	
Base percent time-spent-following, BPTSF	66.8	%
Adj.for directional distribution and no-passing zones, fd/np	9.1	
Percent time-spent-following, PTSF	75.8	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.42	
Peak 15-min vehicle-miles of travel, VMT15	31	veh-mi
Peak-hour vehicle-miles of travel, VMT60	113	veh-mi
Peak 15-min total travel time, TT15	0.7	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	4/30/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 23.385 TO MP 24.135
Jurisdiction	D-5
Analysis Year	2009
Description	KY 1319 to Bulitt-Spencer County Line

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	12	%
Segment length	0.8	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	80	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	940	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.940	
Two-way flow rate,(note-1) vp	1195	pc/h
Highest directional split proportion (note-2)	681	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	55.8	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	44.6	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1111	pc/h
Highest directional split proportion (note-2)	633	
Base percent time-spent-following, BPTSF	62.3	%
Adj.for directional distribution and no-passing zones, fd/np	10.6	
Percent time-spent-following, PTSF	72.9	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.37	
Peak 15-min vehicle-miles of travel, VMT15	209	veh-mi
Peak-hour vehicle-miles of travel, VMT60	752	veh-mi
Peak 15-min total travel time, TT15	4.7	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	4/30/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 24.135 TO MP 24.55
Jurisdiction	D-5
Analysis Year	2009
Description	KY 1319 to Bulitt-Spencer County Line

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	12	%
Segment length	0.4	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	80	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	940	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.940	
Two-way flow rate,(note-1) vp	1195	pc/h
Highest directional split proportion (note-2)	681	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	55.8	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	44.6	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1111	pc/h
Highest directional split proportion (note-2)	633	
Base percent time-spent-following, BPTSF	62.3	%
Adj.for directional distribution and no-passing zones, fd/np	10.6	
Percent time-spent-following, PTSF	72.9	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.37	
Peak 15-min vehicle-miles of travel, VMT15	104	veh-mi
Peak-hour vehicle-miles of travel, VMT60	376	veh-mi
Peak 15-min total travel time, TT15	2.3	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	4/30/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 24.55 TO MP 25.276
Jurisdiction	D-5
Analysis Year	2009
Description	US 31E to KY 1633

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	86	%
Segment length	0.7	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	4	/mi
Up/down		%			

Two-way hourly volume, V	833	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.697	
Two-way flow rate,(note-1) vp	1341	pc/h
Highest directional split proportion (note-2)	764	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	1.0	mi/h
Free-flow speed, FFS	55.3	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	43.0	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	985	pc/h
Highest directional split proportion (note-2)	561	
Base percent time-spent-following, BPTSF	57.9	%
Adj.for directional distribution and no-passing zones, fd/np	12.6	
Percent time-spent-following, PTSF	70.6	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.42	
Peak 15-min vehicle-miles of travel, VMT15	162	veh-mi
Peak-hour vehicle-miles of travel, VMT60	583	veh-mi
Peak 15-min total travel time, TT15	3.8	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/12/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 25.276 TO MP 26.286
Jurisdiction	D-5
Analysis Year	2009
Description	US 31E to KY 1633

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	9	%
Segment length	1.0	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	80	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	476	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.953	
Two-way flow rate,(note-1) vp	597	pc/h
Highest directional split proportion (note-2)	340	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	55.8	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	49.3	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	563	pc/h
Highest directional split proportion (note-2)	321	
Base percent time-spent-following, BPTSF	39.0	%
Adj.for directional distribution and no-passing zones, fd/np	20.2	
Percent time-spent-following, PTSF	59.3	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.19	
Peak 15-min vehicle-miles of travel, VMT15	132	veh-mi
Peak-hour vehicle-miles of travel, VMT60	476	veh-mi
Peak 15-min total travel time, TT15	2.7	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/13/2010
Analysis Time Period	26 Years
Highway	KY 44
From/To	MP 0 TO MP 3.510
Jurisdiction	D-5
Analysis Year	2009
Description	from Bullitt-Spencer County line to KY 1060

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	9	%
Segment length	3.5	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	93	%
Grade: Length		mi	Access points/mi	5	/mi
Up/down		%			

Two-way hourly volume, V	476	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.953	
Two-way flow rate,(note-1) vp	597	pc/h
Highest directional split proportion (note-2)	340	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	1.3	mi/h
Free-flow speed, FFS	55.0	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	48.5	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	563	pc/h
Highest directional split proportion (note-2)	321	
Base percent time-spent-following, BPTSF	39.0	%
Adj.for directional distribution and no-passing zones, fd/np	20.8	
Percent time-spent-following, PTSF	59.8	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.19	
Peak 15-min vehicle-miles of travel, VMT15	463	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1666	veh-mi
Peak 15-min total travel time, TT15	9.5	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/13/2010
Analysis Time Period	26 Years
Highway	KY 44
From/To	MP 3.51TO MP 4.335
Jurisdiction	D-5
Analysis Year	2009
Description	from KY 1060 to KY 623

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	11	%
Segment length	0.8	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	93	%
Grade: Length		mi	Access points/mi	5	/mi
Up/down		%			

Two-way hourly volume, V	417	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.944	
Two-way flow rate,(note-1) vp	528	pc/h
Highest directional split proportion (note-2)	301	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	1.3	mi/h
Free-flow speed, FFS	55.0	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	49.1	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	493	pc/h
Highest directional split proportion (note-2)	281	
Base percent time-spent-following, BPTSF	35.2	%
Adj.for directional distribution and no-passing zones, fd/np	21.6	
Percent time-spent-following, PTSF	56.8	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.17	
Peak 15-min vehicle-miles of travel, VMT15	93	veh-mi
Peak-hour vehicle-miles of travel, VMT60	334	veh-mi
Peak 15-min total travel time, TT15	1.9	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/13/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 4.335 TO MP 7.44
Jurisdiction	D-5
Analysis Year	2009
Description	from KY 623 to 0.3 mile before Middle School

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	11	%
Segment length	3.1	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	375	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.944	
Two-way flow rate,(note-1) vp	474	pc/h
Highest directional split proportion (note-2)	270	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	55.8	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	50.2	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.77	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	541	pc/h
Highest directional split proportion (note-2)	308	
Base percent time-spent-following, BPTSF	37.8	%
Adj.for directional distribution and no-passing zones, fd/np	21.3	
Percent time-spent-following, PTSF	59.2	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.15	
Peak 15-min vehicle-miles of travel, VMT15	323	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1162	veh-mi
Peak 15-min total travel time, TT15	6.4	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/13/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 7.44 TO MP 7.74
Jurisdiction	D-5
Analysis Year	2009
Description	from 0.3 mile before Middle School to Middle School

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	11	%
Segment length	0.3	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	375	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.944	
Two-way flow rate,(note-1) vp	474	pc/h
Highest directional split proportion (note-2)	270	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	55.8	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	50.2	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.77	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	541	pc/h
Highest directional split proportion (note-2)	308	
Base percent time-spent-following, BPTSF	37.8	%
Adj.for directional distribution and no-passing zones, fd/np	21.3	
Percent time-spent-following, PTSF	59.2	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.15	
Peak 15-min vehicle-miles of travel, VMT15	31	veh-mi
Peak-hour vehicle-miles of travel, VMT60	113	veh-mi
Peak 15-min total travel time, TT15	0.6	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/13/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 7.74 TO MP 8.4
Jurisdiction	D-5
Analysis Year	2009
Description	from Middle School to MP 8.4

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	11	%
Segment length	0.7	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	93	%
Grade: Length		mi	Access points/mi	6	/mi
Up/down		%			

Two-way hourly volume, V	559	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.944	
Two-way flow rate,(note-1) vp	707	pc/h
Highest directional split proportion (note-2)	403	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	1.5	mi/h
Free-flow speed, FFS	44.8	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	37.4	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	661	pc/h
Highest directional split proportion (note-2)	377	
Base percent time-spent-following, BPTSF	44.1	%
Adj.for directional distribution and no-passing zones, fd/np	18.5	
Percent time-spent-following, PTSF	62.6	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.22	
Peak 15-min vehicle-miles of travel, VMT15	109	veh-mi
Peak-hour vehicle-miles of travel, VMT60	391	veh-mi
Peak 15-min total travel time, TT15	2.9	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

Phone: Fax:
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Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/13/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 8.4 TO MP 8.451
Jurisdiction	D-5
Analysis Year	2009
Description	from MP 8.4 to KY 1633

Input Data

Highway class	Class 2				
Shoulder width	0.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	10	%
Segment length	0.1	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	93	%
Grade: Length		mi	Access points/mi	6	/mi
Up/down		%			

Two-way hourly volume, V	559	veh/h
Directional split	57 / 43	%

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.949	
Two-way flow rate,(note-1) vp	704	pc/h
Highest directional split proportion (note-2)	401	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	5.3	mi/h
Adj. for access points, fA	1.5	mi/h
Free-flow speed, FFS	43.2	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	35.8	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	661	pc/h
Highest directional split proportion (note-2)	377	
Base percent time-spent-following, BPTSF	44.1	%
Adj.for directional distribution and no-passing zones, fd/np	18.5	
Percent time-spent-following, PTSF	62.6	%

Level of Service and Other Performance Measures

Level of service, LOS	C	
Volume to capacity ratio, v/c	0.22	
Peak 15-min vehicle-miles of travel, VMT15	16	veh-mi
Peak-hour vehicle-miles of travel, VMT60	56	veh-mi
Peak 15-min total travel time, TT15	0.4	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	4/30/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 23.255 TO MP 23.280
Jurisdiction	D-5
Analysis Year	2035
Description	KY 1319 to Bulitt-Spencer County Line

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	12.0	ft	% Trucks and buses	16	%
Segment length	0.0	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	80	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	3123	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.923	
Two-way flow rate,(note-1) vp	3799	pc/h
Highest directional split proportion (note-2)	2165	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	2.6	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	56.9	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	25.5	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1253	pc/h
Highest directional split proportion (note-2)	714	
Base percent time-spent-following, BPTSF	66.8	%
Adj.for directional distribution and no-passing zones, fd/np	9.1	
Percent time-spent-following, PTSF	75.8	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.42	
Peak 15-min vehicle-miles of travel, VMT15	31	veh-mi
Peak-hour vehicle-miles of travel, VMT60	113	veh-mi
Peak 15-min total travel time, TT15	0.7	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

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Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	4/30/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 23.280 TO MP 23.385
Jurisdiction	D-5
Analysis Year	2035
Description	KY 1319 to Bulitt-Spencer County Line

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	12.0	ft	% Trucks and buses	16	%
Segment length	0.1	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	80	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	3123	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.923	
Two-way flow rate,(note-1) vp	3799	pc/h
Highest directional split proportion (note-2)	2165	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	2.6	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	56.9	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	25.5	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	3470	pc/h
Highest directional split proportion (note-2)	1978	
Base percent time-spent-following, BPTSF	95.3	%
Adj.for directional distribution and no-passing zones, fd/np	1.8	
Percent time-spent-following, PTSF	97.1	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.19	
Peak 15-min vehicle-miles of travel, VMT15	87	veh-mi
Peak-hour vehicle-miles of travel, VMT60	312	veh-mi
Peak 15-min total travel time, TT15	3.4	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	4/30/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 23.385 TO MP 24.135
Jurisdiction	D-5
Analysis Year	2035
Description	KY 1319 to Bulitt-Spencer County Line

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	16	%
Segment length	0.8	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	80	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	2602	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.923	
Two-way flow rate,(note-1) vp	3166	pc/h
Highest directional split proportion (note-2)	1805	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	55.8	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	29.3	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	2891	pc/h
Highest directional split proportion (note-2)	1648	
Base percent time-spent-following, BPTSF	92.1	%
Adj.for directional distribution and no-passing zones, fd/np	2.0	
Percent time-spent-following, PTSF	94.1	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	0.99	
Peak 15-min vehicle-miles of travel, VMT15	578	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2082	veh-mi
Peak 15-min total travel time, TT15	19.7	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Phone: Fax:
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Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	4/30/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 24.135 TO MP 24.55
Jurisdiction	D-5
Analysis Year	2035
Description	KY 1319 to Bulitt-Spencer County Line

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	16	%
Segment length	0.4	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	80	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	2950	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.923	
Two-way flow rate,(note-1) vp	3589	pc/h
Highest directional split proportion (note-2)	2046	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	55.8	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	26.0	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	3278	pc/h
Highest directional split proportion (note-2)	1868	
Base percent time-spent-following, BPTSF	94.4	%
Adj.for directional distribution and no-passing zones, fd/np	1.8	
Percent time-spent-following, PTSF	96.2	%

Level of Service and Other Performance Measures

Level of service, LOS	F	
Volume to capacity ratio, v/c	1.12	
Peak 15-min vehicle-miles of travel, VMT15	328	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1180	veh-mi
Peak 15-min total travel time, TT15	12.6	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	4/30/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 24.55 TO MP 25.276
Jurisdiction	D-5
Analysis Year	2035
Description	US 31E to KY 1633

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	11	%
Segment length	0.7	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	4	/mi
Up/down		%			

Two-way hourly volume, V	1631	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.944	
Two-way flow rate,(note-1) vp	1939	pc/h
Highest directional split proportion (note-2)	1105	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	1.0	mi/h
Free-flow speed, FFS	55.3	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	38.4	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1812	pc/h
Highest directional split proportion (note-2)	1033	
Base percent time-spent-following, BPTSF	79.7	%
Adj.for directional distribution and no-passing zones, fd/np	5.5	
Percent time-spent-following, PTSF	85.2	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.61	
Peak 15-min vehicle-miles of travel, VMT15	317	veh-mi
Peak-hour vehicle-miles of travel, VMT60	1142	veh-mi
Peak 15-min total travel time, TT15	8.3	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

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Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/12/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 25.276 TO MP 26.286
Jurisdiction	D-5
Analysis Year	2035
Description	KY 1319 to Bulitt-Spencer County Line

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	11	%
Segment length	1.0	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	80	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	932	veh/h
Directional split	57 / 43	%

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.944	
Two-way flow rate,(note-1) vp	1179	pc/h
Highest directional split proportion (note-2)	672	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	55.8	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	44.8	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1102	pc/h
Highest directional split proportion (note-2)	628	
Base percent time-spent-following, BPTSF	62.0	%
Adj.for directional distribution and no-passing zones, fd/np	10.7	
Percent time-spent-following, PTSF	72.7	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.37	
Peak 15-min vehicle-miles of travel, VMT15	259	veh-mi
Peak-hour vehicle-miles of travel, VMT60	932	veh-mi
Peak 15-min total travel time, TT15	5.8	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

Phone: Fax:
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Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/13/2010
Analysis Time Period	26 Years
Highway	KY 44
From/To	MP 0 TO MP 3.510
Jurisdiction	D-5
Analysis Year	2035
Description	from Bullitt-Spencer County line to KY 1060

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	12	%
Segment length	3.5	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	93	%
Grade: Length		mi	Access points/mi	5	/mi
Up/down		%			

Two-way hourly volume, V	932		veh/h
Directional split	57	/ 43	%

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.940	
Two-way flow rate,(note-1) vp	1185	pc/h
Highest directional split proportion (note-2)	675	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	1.3	mi/h
Free-flow speed, FFS	55.0	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	44.0	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1102	pc/h
Highest directional split proportion (note-2)	628	
Base percent time-spent-following, BPTSF	62.0	%
Adj.for directional distribution and no-passing zones, fd/np	11.1	
Percent time-spent-following, PTSF	73.2	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.37	
Peak 15-min vehicle-miles of travel, VMT15	906	veh-mi
Peak-hour vehicle-miles of travel, VMT60	3262	veh-mi
Peak 15-min total travel time, TT15	20.6	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

HCS+: Two-Lane Highways Release 5.3

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Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/13/2010
Analysis Time Period	26 Years
Highway	KY 44
From/To	MP 3.51TO MP 4.335
Jurisdiction	D-5
Analysis Year	2035
Description	from KY 1060 to KY 623

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	13	%
Segment length	0.8	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	93	%
Grade: Length		mi	Access points/mi	5	/mi
Up/down		%			

Two-way hourly volume, V	924		veh/h
Directional split	57 /	43	%

Average Travel Speed

Grade adjustment factor, fG	0.93	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.935	
Two-way flow rate,(note-1) vp	1180	pc/h
Highest directional split proportion (note-2)	673	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	1.3	mi/h
Free-flow speed, FFS	55.0	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	44.0	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1092	pc/h
Highest directional split proportion (note-2)	622	
Base percent time-spent-following, BPTSF	61.7	%
Adj.for directional distribution and no-passing zones, fd/np	11.2	
Percent time-spent-following, PTSF	72.9	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.37	
Peak 15-min vehicle-miles of travel, VMT15	205	veh-mi
Peak-hour vehicle-miles of travel, VMT60	739	veh-mi
Peak 15-min total travel time, TT15	4.7	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/13/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 4.335 TO MP 7.44
Jurisdiction	D-5
Analysis Year	2035
Description	from KY 623 to 0.3 mile before Middle School

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	13	%
Segment length	3.1	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	942	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.935	
Two-way flow rate,(note-1) vp	1130	pc/h
Highest directional split proportion (note-2)	644	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	55.8	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	45.1	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1113	pc/h
Highest directional split proportion (note-2)	634	
Base percent time-spent-following, BPTSF	62.4	%
Adj.for directional distribution and no-passing zones, fd/np	11.2	
Percent time-spent-following, PTSF	73.6	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.35	
Peak 15-min vehicle-miles of travel, VMT15	811	veh-mi
Peak-hour vehicle-miles of travel, VMT60	2920	veh-mi
Peak 15-min total travel time, TT15	18.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

HCS+: Two-Lane Highways Release 5.3

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/13/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 7.44 TO MP 7.74
Jurisdiction	D-5
Analysis Year	2035
Description	from 0.3 mile before Middle School to Middle School

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	13	%
Segment length	0.3	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	100	%
Grade: Length		mi	Access points/mi	2	/mi
Up/down		%			

Two-way hourly volume, V	942		veh/h
Directional split	57	/ 43	%

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.935	
Two-way flow rate,(note-1) vp	1130	pc/h
Highest directional split proportion (note-2)	644	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	0.5	mi/h
Free-flow speed, FFS	55.8	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	45.1	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	0.94	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1113	pc/h
Highest directional split proportion (note-2)	634	
Base percent time-spent-following, BPTSF	62.4	%
Adj.for directional distribution and no-passing zones, fd/np	11.2	
Percent time-spent-following, PTSF	73.6	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.35	
Peak 15-min vehicle-miles of travel, VMT15	79	veh-mi
Peak-hour vehicle-miles of travel, VMT60	283	veh-mi
Peak 15-min total travel time, TT15	1.8	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/13/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 7.74 TO MP 8.4
Jurisdiction	D-5
Analysis Year	2035
Description	from Middle School to MP 8.4

Input Data

Highway class	Class 2				
Shoulder width	3.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	13	%
Segment length	0.7	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	93	%
Grade: Length		mi	Access points/mi	6	/mi
Up/down		%			

Two-way hourly volume, V	1096	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.935	
Two-way flow rate,(note-1) vp	1315	pc/h
Highest directional split proportion (note-2)	750	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	3.7	mi/h
Adj. for access points, fA	1.5	mi/h
Free-flow speed, FFS	44.8	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	32.7	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1218	pc/h
Highest directional split proportion (note-2)	694	
Base percent time-spent-following, BPTSF	65.7	%
Adj.for directional distribution and no-passing zones, fd/np	9.9	
Percent time-spent-following, PTSF	75.6	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.41	
Peak 15-min vehicle-miles of travel, VMT15	213	veh-mi
Peak-hour vehicle-miles of travel, VMT60	767	veh-mi
Peak 15-min total travel time, TT15	6.5	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

* These items have been entered or edited to override calculated value

Phone: Fax:
E-Mail:

Two-Way Two-Lane Highway Segment Analysis

Analyst	SG
Agency/Co.	KYTC Planning
Date Performed	1/13/2010
Analysis Time Period	26 Year
Highway	KY 44
From/To	MP 8.4 TO MP 8.451
Jurisdiction	D-5
Analysis Year	2035
Description	from MP 8.4 to KY 1633

Input Data

Highway class	Class 2				
Shoulder width	0.0	ft	Peak-hour factor, PHF	0.90	
Lane width	10.0	ft	% Trucks and buses	12	%
Segment length	0.1	mi	% Recreational vehicles	4	%
Terrain type	Rolling		% No-passing zones	93	%
Grade: Length		mi	Access points/mi	6	/mi
Up/down		%			

Two-way hourly volume, V	1096	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	0.99	
PCE for trucks, ET	1.5*	
PCE for RVs, ER	1.1*	
Heavy-vehicle adjustment factor,	0.940	
Two-way flow rate,(note-1) vp	1309	pc/h
Highest directional split proportion (note-2)	746	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	50.0	mi/h
Adj. for lane and shoulder width, fLS	5.3	mi/h
Adj. for access points, fA	1.5	mi/h
Free-flow speed, FFS	43.2	mi/h
Adjustment for no-passing zones, fnp	1.9*	mi/h
Average travel speed, ATS	31.1	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0*	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1218	pc/h
Highest directional split proportion (note-2)	694	
Base percent time-spent-following, BPTSF	65.7	%
Adj.for directional distribution and no-passing zones, fd/np	9.9	
Percent time-spent-following, PTSF	75.6	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.41	
Peak 15-min vehicle-miles of travel, VMT15	30	veh-mi
Peak-hour vehicle-miles of travel, VMT60	110	veh-mi
Peak 15-min total travel time, TT15	1.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

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Appendix E

Project Team Minutes

Meeting Minutes
1st Project Team Meeting
KY 44 Corridor Study (US 31E to KY 1633)

Meeting Date: **March 2, 2010**
Meeting Location: **District 5, Design Conference Room**

The meeting began around 10 a.m. local time. Meeting agenda and project maps were distributed. The following were in attendance:

Randall Embry	KIPDA Transportation Planning
Andy Rush	KIPDA Transportation Planning
Tom Hall	KYTC District 5 Planning
Brian Meade	KYTC District 5 Project Development
Jeff Schaefer	KYTC District 5 Environmental
Ricardo Policicchio	KYTC District 5 Design
Kyle Cooper	KYTC District 5 Planning
Todd Reeb	KYTC District 5 Maintenance
Tonya Higdon	KYTC Central Office Division of Planning
Jill Asher	KYTC Central Office Division of Planning
Sreenu Gutti	KYTC Central Office Division of Planning

A Power Point presentation explaining the existing conditions of the Study corridor was started. Some ongoing and completed studies on this corridor were discussed. Item 5-150.01 from I-65 to US 31E (Phase 1 Study), Item 5-347.50 study from US 31E to KY 1319 and Item 5-395.00 from Oak Tree Way to KY 1633 are active projects in the corridor. Phase I Study for Item 5-347.50 is completed, a part of this study is moving towards Phase II Design. Item 5-395.00 has completed Phase I Study and moving towards Phase II Design.

Project Termini

The Project Maps developed for this meeting show the study extending from KY 1319 to Oak Tree Way. However, the Project Team decided that the Project termini for the current study should extend from US 31E to KY 1633. The "Ultimate Design Build" for the complete segment would be evaluated in the current study. The Project maps will be updated to reflect this change.

Item 5-395.00, which is a separate project at the east end, begins at the east entrance of Spencer County Elementary. The current study will include the segment of KY 44 between Oak Tree Way and the east entrance of the School. Some of the suggested improvements for this segment were construction of sidewalks, and improvements to Signage and Pavement Markings for the School Traffic. These improvements will be considered in the current Study.

Project Description (for limits between KY 1319 to Oak Tree Way)

Existing Conditions

The Highway is classified as Rural Principal Arterial. The roadway is undivided with two lanes 10 feet wide and 3 feet shoulders. The project is split in two counties – Bullitt County on the west and Spencer County on the east.

Environmental Overview

An Environmental Overview (EO) for the segment between US 31E and KY 1633 was completed in October 2008 by HMB Consultants. Environmental Justice is included in the same study. The Project Team was informed about the major land marks such as Churches, Park, Wetlands, Stream crossings, and Highway crossings, along the Corridor. Wetlands exist along Plum Creek and Elk Creek. The USGS map showing the EO landmarks will be corrected so that the "Wetland" label does not point to Sinkhole.

Adequacy Rating and Volume-Service Flow

The Adequacy Rating is in the range of the 20^{th} to 24^{th} percentile. This means that nearly 80% of the roads in this classification are rated better than this roadway. The Volume-Service Flow ratio is about 0.35 at the present time which is not very high.

Average Daily Traffic (ADT) Volumes and Level of Service (LOS)

The current (2009) ADT is in the range of 3000-4000 with a LOS C. Based on growth rate predicted in the Traffic Forecast study, future ADT in 2035 is in the range of 11,000-11,200 with a LOS D.

Crash Data

Kentucky State Police crash data from October 2006 to Oct 2009 was obtained and analyzed. Based on Kentucky Transportation Center (KTC) methods, segmental Crash Rate Factor (CRF) was calculated. The section with highest CRF (1.01) was between KY 1319 and the County line. Majority of the study area had CRF in the range 0.79-0.84. High Crash Rate Spots (tenth mile) were investigated by KTC methods. The junction of KY 1319 and KY 44 had a CRF of 2.04. The horizontal curve at Hunter's Trace had the highest CRF of 2.14. It was pointed out by District 5 staff that this spot is a common area of concern. A HSIP project is looking at improvements at this location. Improvements include ditches, high friction pavement course, and safety headwalls under the HSIP project. At JCT 1060, sight distance improvements similar to the improvements at JCT KY 1633 need to be investigated. Intersection of KY 44 and Akins road is another high crash location. The type of crashes will be analyzed and tabulated.

Roadway Geometry

Archived plans for the length of the Study were investigated for roadway geometry deficiencies. Several locations with roadway geometry not meeting the design standards were found. It seems that more number of crashes have occurred at such locations. Further analysis of crash data type will be conducted and summarized.

Photos of high CRF locations along the Project Corridor were shown to the Project Team. Photos of Junctions to major highways were also shown. Preliminary investigation of these

Junctions shows that the intersections can be improved by providing turn lanes, lighting, improving sight distance and turning radii.

Problems with the existing roadway
The existing roadway has a number of geometric deficiencies and several locations with high crash rate. There is a need for turn lanes and lighting at some locations. Future traffic (2035) LOS D is undesirable.

Identifying Project Purpose and Need
The Project Team agreed that the primary objective of the Study is to improve safety of the Corridor. Improving capacity, improving safety of the intersections, assessing safety of bridge structures, and improving connectivity for commuters, EMS, police and school buses are other purposes of this Study. The Project Team was informed that recreational traffic in Taylorsville is expected to increase.

Project Scope
The Study will investigate the "Ultimate Build" for the Corridor from US 31E to KY 1633. The Study will also investigate intermediate solutions and some low-cost transportation projects that can be implemented quickly to address traffic and safety concerns.

Public Involvement
The Project Team discussed the need for Public Involvement. The Team was informed that there was a very high public participation for prior projects in the area. All meetings involving Local Officials and the public will be combined meetings for Bullitt and Spencer counties. Such meetings will be conducted in Spencer County as a major part of the Study is in that area.

Proposed Geometry Standards
The "Ultimate Build" alternate will be studied based on the current Design Standards of KYTC. If spot improvements such as horizontal curve revisions are considered, then 11-foot lanes will be used. If shoulders are improved, 10' shoulders with 4' paved shoulders shall be provided. Clear Zone requirements will be considered.

Project Schedule
A schedule for the Study will be worked out in the near future. The first Local Officials meeting may be held in two months.

Meeting Minutes
1st Local Officials and Stake Holder's Meeting
KY 44 Corridor Study (US 31E to KY 1633)

Meeting Date: **May 7, 2010**
Meeting Location: **Spencer County Fiscal Court meeting room, Taylorsville**

The meeting started just after 10 a.m. local time. Attendees were requested to "Sign-In". Project handouts which included the meeting agenda were distributed. The following were in attendance:

Billy Shepherd	Bullitt County Judge Executive's Office
John Riley	Spencer County
David Henry	Spencer County
Annette King	Spencer County Economics Office
Beverly Bentley Ingram	City Commissioner
Joetta Calhoun	Mayor, City of Mt. Washington
David E Goodlet	Spencer County Magistrate
Hobert Judd	Spencer County
Paul David Jewell	Land Owner
Don Pay	Mayor, City of Taylorsville
Pam Mason	Land Owner
Ronald G. Mason	Land Owner
Bill Drury	Magistrate
Karen Curtsinger	Spencer County Judge Executive's Office
Brett Beam	Spencer County Schools
Richard Travelstead	
Randall Embry	KIPDA Transportation Planning
Andy Rush	KIPDA Transportation Planning
Tom Hall	KYTC District 5 Project Development
Brian Meade	KYTC District 5 Branch Manager
Jeff Schaefer	KYTC District 5 Environmental
Ricardo Policicchio	KYTC District 5 Design
Dane Blackburn	KYTC District 5
Scott Thomson	KYTC Central Office Division of Planning
Steve Ross	KYTC Central Office Division of Planning
Tonya Higdon	KYTC Central Office Division of Planning
Jill Asher	KYTC Central Office Division of Planning
Sreenu Gutti	KYTC Central Office Division of Planning

A Power Point presentation was started. It was explained to the group that the meeting is an informational presentation of the Study. Other items on the agenda included discussing existing conditions, possible recommendations, project goals, project scope, public involvement, and future steps of the Study.

Current Projects in the Study Area
The typical processes involved in major transportation projects consist of a planning study, Phase I Design, Phase II Design, Right of Way Acquisition, Utility Relocation and Construction. Projects in the vicinity of the Study corridor on KY 44 are in one of the phases mentioned above. A project from I-65 to US 31E is in Phase I Design. A project from US 31E to KY 1319 has completed Phase I Design. A project from the east end of the Spencer County Elementary School to KY 1633 is advancing to Phase II Design. The current study will begin at US 31E and end at KY 1633.

Brian Meade, KYTC District 5 Branch Manager, presented an update of these projects. On the first segment from I-65 to US 31E, spot improvement projects at three intersections on KY 44 with Bells Mill Road, Bogard/Lloyd Lane, Armstrong/Fisher Lane are currently in Phase II Design. On the second project from US 31E to KY 1319, a five-lane roadway at the west end changing over to a two-lane roadway at the east end has been proposed in Phase I Design. Currently, further design is concentrated in the area of the High School and Middle Schools. The project is in need of Right of Way and Utility funds to be approved by the Legislature to progress onto future phases. The project at the east end of the Study area beginning approximately at the end of the three lane section in front of the School was designed for 45 mph speed in Phase I Design. This project is going into Phase II Design. It is a State bonded project and currently geotechnical work is progressing.

Project Limits and Existing Conditions
The project limits for the current Study is between US 31E and KY 1633. KY 1060, KY 623 and KY 1251 are State Highway crossings along the Corridor. Major stream crossings are Dutchman Creek, Goose Creek, Plum Creek and Elk Creek. The existing roadway is classified as an Urban Principal Arterial in the Mt. Washington urban area and a Rural Minor Arterial for the rest of the project. The roadway is two lanes in the Study area except for three lane section in front of Spencer Elementary School. The lane width is 12 ft in the urban area of Mt. Washington and 10 ft for the rest of the project. Posted speed varies from 35 mph to 55 mph.

Environmental Overview
The Environmental Overview (EO) was completed by HMB Consultants for the Transportation Cabinet in October, 2008. The report assessed potential impacts to human and natural environments anticipated due to proposed projects along the corridor. Environmental Justice was completed as part of the EO. An exhibit showing major landmarks along the Study area which could possibly be impacted was shown. These included stream crossings, churches, parks, cemeteries, schools and wetlands. The group was informed that impacts to wetlands would require mitigation and work done along the streams would require federal permits. Waterford Park was built with federal funds and therefore any potential impacts to the park should be addressed accordingly. The EO also lists several historical, cultural and potential archaeological properties along the corridor.

Existing Roadway Characteristics
The existing roadway geometry along with other commonly used roadway characteristics such as Adequacy Ratings, Volume to Service Flow, Average Daily Traffic, Crashes and Level of Service were discussed.

Roadway Geometry

The current roadway was built 80 years ago (1930). Available archived plans were analyzed for areas to identify where the roadway geometry does not meet the current standards. Several locations with roadway geometry not meeting the current design standards for horizontal and vertical geometry were found.

Composite Adequacy Rating

The Composite Adequacy Rating (AR) is a combination score based on safety, service and pavement condition of the roadway. The score can range from 1 to 100 and is used to compare with other roadways in the same classification. The AR for the Study area is in the range of the 12 – 23 percentile, approximately. An AR of 23 percentile means that 77% of the roads in this classification have a better AR than this roadway.

Average Daily Traffic (ADT) Volumes and Level of Service (LOS)

The current (2009) ADT and future ADT in 2035 were presented. The Transportation Cabinet completed a traffic forecast study in February 2010. Growth rates predicted in the traffic forecast study were used to calculate future ADT.

Level of Service is a measure of service provided by the roadway to the traffic demand. LOS is ranked from A to F. LOS A means that the roadway is in a free flow condition and LOS F means that the roadway is in a breakdown condition. The segment from US 31E to KY 1319 performs at LOS D for 2009 ADT and between LOS E-F for 2035 ADT. The segment from KY 1319 to KY 1633 performs at LOS C for 2009 ADT and LOS D for 2035 ADT.

Crash Analysis

Crash Distribution

Kentucky State Police crash data from October 2006 – October 2009 was obtained for the Study area and analyzed. Fatal, injury and property damage only crashes were shown in map format to the meeting attendees. For the segment from KY 1319 to KY 1633, nearly one third of these crashes are injury crashes and two thirds were property damage only crashes. There was one fatal accident at Dutchman Creek Road. Other areas with a high density of crashes were highlighted.

Major Crash Types

The majority of crashes to the west of KY 1319 were rear end crashes. To the east of KY 1319 extending to the end of the Study area, major crash types were vehicles running off the roadway, crashes with fixed objects and angle collisions.

Correlation between Crashes and Road Geometry

Crash locations were compared with the locations where the geometry of the roadway was not at the current standards. It was noted that crashes occurred at the locations where geometry is not at the current standards.

Critical Rate Factor

Critical Rate Factor (CRF) is a measure of safety of the roadway. In simple terms, a CRF more than 1.0 identifies a location where crashes are most likely not occurring randomly. The Study area was divided into several segments based on posted speed limit change,

lane width change, ADT change etc. The study area had few segments with a low CRF (0.0 to 0.5). The Majority of the Study area segments have a CRF close to 1.0. Three segments: one at the junction with US 31E, the second at the junction with KY 1319, and the third in the Green Acres area at the end of the projects have a CRF greater than 1.0.

High Accident Spots were shown as an exhibit to the attending Group. These spots are located near US 31E, KY 1319, just before Cox's Lane, at Dutchman Creek Road, just before Goose Creek Road, just before Village Drive, at Akins Road and KY 44, and the curve near Hunter's Trace, and at Green Acres Road.

Project Snapshots

Several pictures of the Study area were shown.

KY 1319 – KY 44 Intersection: This intersection has seen several rear end crashes in the past three years. Preliminary design for the intersection improvements and for addition of turn lanes has been completed.

Dutchman Creek Road - KY 44 Intersection: The intersection of Dutchman Creek Road/Ryder Lane and KY 44 has multiple issues. This is an offset intersection located at the end of the bridge. There is a sharp horizontal curve at the east end of the bridge. This location is also signed as a deer crossing area. There has been a single fatal crash at this location.

KY 1251 – KY 44 Intersection: The junction of these two State Highways is located at the west end of the bridge. A sharp horizontal curve exists approximately at the east end of the bridge. Vegetation along the bridge reduces sight distance.

State Highway Junctions with KY 44: Some general recommendations for the major highway junctions such as KY 1060, KY 1251, KY 623 with KY 44 were made. Need for right and left turn lanes will be investigated. The intersections may also benefit from geometry improvements for added sight distance and providing greater turning radii. Lighting may provide additional visibility in low light and night conditions.

High Crash Location on KY 44 past Hunter's Trace: A sharp horizontal curve exists just east of Hunter's Trace on KY 44. Multiple crashes were reported at this intersection. KYTC District 5 is investigating surface improvements to the roadway using Highway Safety Improvement Program (HSIP) funds.

Akins Road Intersection with KY 44: This intersection has seen several property damage crashes. Some of these crashes were angle crashes. There are no turn lanes currently at this intersection**.**

High Crash Segment at the End of the Study Area: The segment of the study area east of the three lane section in front of Spencer County Elementary School is a high crash segment. Preliminary design for improvements in this segment has been completed and the project is proceeding to Phase II Design.

Project Goals
The Study will investigate improving the safety of the roadway and bridge structures. Improving capacity, improving safety of the intersections, and improving connectivity for commuters, EMS, police and school buses are other goals of this Study.

Project Scope
The Study will investigate the "Ultimate Build" for the Corridor from US 31E to KY 1633. The Ultimate Build alternate will recommend that the roadway should be upgraded to meet current design standards for geometry, lane and shoulder widths, and meet clear zone requirements. For example – the existing roadway currently has 10 foot wide lanes. Current design guidelines suggest that the KY 44 Study Corridor should have 12 foot wide lanes. The Ultimate Build alternate will recommend that lane width should be increased to 11 foot for the current roadway.

The Study will also investigate intermediate recommendations at a few locations. The intermediate recommendations may be spot improvements such as geometry improvements or turn lane additions.

Public Involvement & Other Meetings
The Project Team discussed the need for Public involvement. Two public meetings are proposed. One of the meetings will be conducted in the coming two months as a "Project Informational Meeting". The second public meeting will be conducted after the Project Team and Local Officials Meetings discuss the Study alternates. Public Surveys will be conducted and a Project website will be developed as part of public involvement.

The Project Team comprised of Transportation Cabinet Central Office Planning representatives Team, District 5 representatives and KIPDA representatives will meet at various stages to make decisions on the Study. The Project Team will also meet with Local Officials and Stake Holder's from time to time to provide updates on the progress of the Study and gather input.

Other Issues Discussed
KY 44 – Akins Road intersection is one of the major crash areas with a majority of angle crashes. One of the attendees informed the Group that drivers drive very fast in this area. The Study will investigate intersection improvements. Possible recommendations for the intersection could be turn lanes and lighting.

Input was requested from the Group about possible days in the week that are good for a Public meeting. It was agreed that Tuesday is the best day in the week for a Public meeting and that it will be held in the evening.

The Taylorsville Lake State park is attracting a lot of recreational traffic. The City is moving towards increasing the tourism. It was recommended that roads leading to the Lake should be aesthetically developed so that they draw the Public's attention to the area's attraction.

There was a discussion about inclusion of sidewalks and bike trails in the design project from the Spencer County Elementary School to KY 1633. A guard rail separation between side walk traffic and roadway traffic with lighting was suggested by meeting attendees. Senior citizens

want to see more mobility features. Increased development due to additional homes, location of Schools, and proximity to the City of Taylorsville might also indicate a need for sidewalks and bikeways. District 5 Officials informed that although the design project does not include sidewalks or bikeways currently due to steep grades and high costs, the District will look into the possibility of including them in the design.

A concern was raised about a potentially dangerous horizontal curve at the intersection of Waterford Loop and KY 44. Also, the narrow width of the bridge at KY 1251 had caused problems for vehicles carrying wide loads and farm equipment. The attendees were informed that the Study will investigate if the bridge structures will need to be replaced. New bridge structures are built conforming to current standards for lane width and shoulders.

The meeting concluded about 11.30 am.

Meeting Minutes
2nd Project Team Meeting
KY 44 Corridor Study (US 31E to KY 1633)

Meeting Date: **September 7, 2011**
Meeting Location: **District 5, Conference Room**

The meeting began around 9 a.m. local time. Presentation Handouts and Proposed Alternate maps were distributed. The following were in attendance:

Randall Embry	KIPDA Transportation Planning
Andy Rush	KIPDA Transportation Planning
Tom Hall	KYTC District 5 Planning
Dane Blackburn	KYTC District 5 Planning
Chris Poe	KYTC District 5 Project Development & Preservation
Paul Davis	KYTC District 5 Project Development
Brian Meade	KYTC District 5 Project Development
Jeff Schaefer	KYTC District 5 Environmental
Steve Ross	KYTC Central Office Division of Planning
Jill Asher	KYTC Central Office Division of Planning
Sreenu Gutti	KYTC Central Office Division of Planning

There were three topics on the agenda for the meeting – Study Recap, Proposed Alternates and Next Steps. A few slides from previous meetings showing Study Limits, Existing Conditions and Study Data were shown. Also presented were: Purpose and Need drafted by the Project Team during their first meeting and slides showing crash type and distribution. The Team was also reminded that a Local Officials/Stake Holder's meeting and a Public Meeting were held as part of the Study so far.

Proposed Alternates
As decided by the Project Team during the 1st meeting, three alternates were presented – No Build Alternate, Long Term Ultimate Build Alternate and Short Term Spot Improvements.

Alternate 1 - No Build Alternate – The benefits of this Alternate are property, environment and cost will be preserved. The disadvantage of choosing this Alternate is that the Safety issues identified by the Study Purpose and Need statement will not be addressed.

Alternate 2 - Long Term Ultimate Build Alternate - Segment 1 of the Study extends from US 31E in Mt. Washington to KY 1319. For this segment, Phase 1 Design has been completed under Item 5-347.50 and a preferred alternate has been chosen. The Team agreed that the recommendations of 5-347.50 would be the Long Term Ultimate Build for Segment 1.

Segment 3 of the Study Area is in the Right-of-Way acquisition stage (Item 5-395.00) at this time. The Team agreed that the recommendations under Item 5-395.00 would be the Long Term Ultimate Build for Segment 3. The Design Speed on Segment 3 is 45 mph.

The recommendations for Long Term Ultimate Build for Segment 2 (KY 1319 to beginning of 5-395.00) was discussed. As Segment 2 is forecasted to carry significant truck traffic and recreation traffic and also considering accommodation for bike lanes, it was proposed that the typical should be two 11 feet lanes and 8 feet shoulders (6 feet paved) for this Segment. Design Speed for Segment 2 will be 55 mph.

There was a discussion that shoulders on Segment 1 (4 feet wide, 2 feet paved) and Segment 3 (6 feet all paved on left and 4 feet paved on the right) were narrower. District 5 Design Team will investigate to see if the Design Plans on Segment 1 can be changed to show wider shoulders.

Segment 2 has three bridges located near Dutchman Creek Road, KY 1060 & KY 1251. Currently, these are functionally deficient and not structurally deficient. Many concerns were raised by motorists during the Public Meeting and Surveys regarding the narrow bridges without shoulders and guardrail being too close to the road. The age of the bridges was discussed and it was recommended that it should be listed in the report. The Project Team recommended that all the bridges will be replaced, not widened as part of the Ultimate Build Alternate. Widening of the bridges was not recommended considering the age of the structures. After the meeting, the bridge inventory reports were checked. All the three structures were built in 1932.

The proposed alignment for Segment 2 was discussed. As previously agreed, Segment 2 will be rebuilt on the existing alignment for the major part. Realignments will be necessary at some locations to improve geometry. As part of the Ultimate Build, horizontal curves and vertical grades are proposed to be improved. Intersections at KY 1060, KY 623, KY 1251 will be improved. Climbing lanes & passing lanes may be added depending on the proposed grades. Turn lanes will be added. Providing sidewalks where necessary will be considered as part of this alternate.

Alternate 3 – Short Term Spot Improvements

The Project Team agreed that there will not be any proposed Short Term Spot Improvements in Segment 1 & 3 where Design Projects have already determined the necessary improvements. Segment 2 improvements were discussed and are described below.

Option 1 – Interim Low Cost Improvements – Considering the number of roadway departure crashes, "cross-over lane" type crashes and crashes in low light conditions, some low cost interim solutions were discussed. Edge line rumble strips, Chevrons, other solutions to improve night time visibility of guardrail (guardrail delineators) and sharp curves were discussed. Where sight distance is obstructed by slopes and trees, cutting back slopes and tree trimming/removal were suggested as interim solutions.

The current resurfacing schedule for this segment was reviewed. The last resurfacing on this segment varied between 1992 and 2003. Chris Poe informed that D5 will be meeting this month to determine resurfacing needs for 2012. Edge line rumble strips can be considered for installation during next resurfacing. Chris also informed that it may be possible to fund the projects with HSIP funding. However, they have not been successful getting HSIP funding for paving to install rumble strips. It may require to combine Federal HSIP funding and State FD05 funding.

The Team was informed that Office of Traffic Operations, KYTC provided a listing of sections that could benefit through HSIP from low cost improvements which were based on some common crashes occurring on this segment. The table showing suggested low cost improvements will be provided to Brian as requested.

Option 2 – High Priority Spot Improvements – These are improvements in high crash locations (CRF $\geq$ 1) and areas adjacent to them. The following were discussed and agreed by the Project Team.

The Team agreed to combine Spot H1 & H2 as they are close to each other. The combined improvement will be Spot H1.

Spot H1 (previous Spot H1 & H2) - Curve west of Coxs Lane to county line approx.: Improve geometry beginning vertical grade around MP 26.00 to the end of the curve at county line.

Spot H2 (previous H3) – Dutchman Creek Road area: Improve west horizontal curve (include truck climbing lane as needed), improve intersection (eliminate skew on side roads & align, sight distance etc.) and replace bridge ("widen" bridge has been changed to "replace" bridge consistent with the decision of the Project Team).

Spot H3 (previous H4) – Intersection and curve after Cochran Dr.: Add a left turn lane and a right turn lane to Cochran Dr., improve geometry (horizontal and vertical) after Cochran Dr.

Spot H4 (previous H5) – Jct KY 623: Intersection improvements such as turning radius, sight distance etc., replace box culvert and improve east horizontal curve. A left turn lane to KY 623 may be added based on traffic counts and analysis. The crash map will be updated to show the correct number of crashes at this junction and at Akins Rd.

Spot H5 (previous H6) – Jct KY 1251 to horizontal curve after Hunter's Trace Rd.: Intersection improvements such as turning radius, sight distance etc. and truck climbing lane west of KY 1251 are recommended. Recommendations include improving geometry (horizontal and vertical) east of the bridge to the curve after Hunter's Trace curve.

Spot H6 – The Team decided to add this improvement keeping in mind the "cross-over lane" type crashes. Center line rumble strips may be helpful in alerting the motorists in such types of crashes. Current roadway pavement width is 20 feet wide approximately. Center line rumble strips can be installed on a roadway with a minimum width of 25 feet. Therefore, Spot H6 improvement recommends minor widening to add 5 feet pavement and installing center line and edge line rumble strips. This will also require grading of the new ditch and most likely some Right-of-Way and Utility impacts.

Option 3 – Low Priority Spot Improvements

Spot L1 - Improve geometry (horizontal and vertical) and add a truck climbing lane as needed.

Spot L2 – Curve east of Village Dr: Improve geometry (horizontal and vertical) and add a left turn lane/bypass lane at Hickory Woods lane. Realigning Village Dr. has been added after the meeting.

Spot L3 – Jct KY 1060: Intersection improvements such as turning radius, sight distance etc are recommended. A left turn lane to KY 1060 may be needed based on traffic counts and analysis. The turn lane addition may require a wider bridge to accommodate the geometry. However, the bridge replacement may not be eligible for federal funding if it does not have a structural deficiency. Current Sufficiency Rating of the bridge is 64.60. The recommendations include adding a left turn lane to Waterford Park and a truck climbing lane after the park going east. Intersection lighting is not recommended as there is not a major history of night time crashes.

Spot L4 – Akins Rd area: Improve west horizontal curve, add a left turn lane/bypass lane to Akins Rd and flatten grade around MP 5.00.

Spot L5 – Carl Monroe Rd./Bennett Spur area: Improve geometry (horizontal and vertical).

Spot L6 – River Heights Blvd. area - Realign eliminating multiple curves on either sides of River Hts Blvd. Also, add a right turn lane and a left turn lane at River Hts Blvd.

Providing additional climbing lanes/passing lanes at other locations within the study limits was not recommended other than the ones covered by Spot Improvements.

D5 Planning will coordinate the cost estimates for the Alternates. Estimated completion of cost estimates will be late October. Sreenu will deliver the updated Alternates to D5. Sreenu also mentioned that a 2nd Local Officials/Stakeholder's meeting and a Public Meeting will be scheduled for early November. The Team agreed that both meetings will be scheduled on the same day. Sreenu requested Randall Embry's help in coordinating a date for these meetings.

Prioritization of the Spot Improvements was discussed. The Team agreed that Public will be given an opportunity to prioritize at the Public Meeting. Their input will be used in addition to crash history and geometry for final prioritization by the Team after the Public Meeting.

End of Meeting Minutes.

Meeting Minutes
2nd Local Officials & Stakeholders Meeting
KY 44 Corridor Study (US 31E to KY 1633)

Meeting Date: **November 14, 2011**
Meeting Location: **Spencer County Fiscal Court**

The meeting began around 2 pm local time. Project Brochure and Ranking Sheets for Spot Improvements were distributed. The following were in attendance:

Bill Karrer	Judge-Executive, Spencer County
Mike Moody	Magistrate, Spencer County
Jerry Davis	Magistrate, Spencer County
Chuck Adams	Superintendent, Spencer County Schools
Hobert Judd	Magistrate, Spencer County
Don Pay	Mayor, City of Taylorsville
Jennifer Decker	Field Representative, US Senator Rand Paul
Robert Fouts	Economic Development, Bullitt County
Brad Montell	State Representative
Paul Hornback	Senator
Beverly Bentley Ingram	City Commissioner, City of Taylorsville
Buddy Stump	Spencer County Sheriff
Roy Daugherty	Mt. Washington Police Chief
Randall Embry	KIPDA
Tom Hall	KYTC District 5 Planning
Brian Meade	KYTC District 5 Project Development
Steve Ross	KYTC Central Office Division of Planning
Jill Asher	KYTC Central Office Division of Planning
Tonya Higdon	KYTC Central Office Division of Planning
Mikael Pelfrey	KYTC Central Office Division of Planning
Sreenu Gutti	KYTC Central Office Division of Planning

A PowerPoint presentation was shown. There were four topics on the agenda for the meeting – Study Limits & Existing conditions, Study Purpose & Need, Proposed Alternates and Next Steps. Three types of Proposed Alternates were presented – No Build Alternate, Long Term Ultimate Build Alternate and Short Term Spot Improvements. The Short Term Spot Improvements included the following – Interim Low Cost Improvements, Group A Spot Improvements and Group B Spot Improvements. Each of the Alternates were explained in detail to the group.

The group was informed that a Public Meeting was scheduled for later that evening at the Spencer County Elementary School. They were also informed that the Public would be requested to rank the Short Term Spot Improvements at that meeting.

A question was asked why Segment 3 does not have any sidewalks while Segment 1 is showing sidewalks. Also, would the Cabinet consider an urban section with curb & gutter and sidewalk

for Segment 3? Brian Meade explained that there is no funding available for sidewalks and curb and gutter in Segment 3. Bond program only provided for a certain amount of dollars. Brian explained that the steep hill is the significant expense for sidewalks. It was discussed that the preferred side for sidewalks is the school side.

Another question was asked how the cost estimates are done when a Short Term Spot Improvement such as A6 (from Stumps Lane to TurnPike Avenue) encompasses two other projects discussed? It was explained that cost estimates are done assuming each spot improvement to be a stand-alone project. However, each Spot Improvement that goes through Design will consider other improvements necessary along that Corridor.

Village Drive shown in Spot B2 will be renamed as Waterford Loop.

Another question was asked that if spot improvements are selected for Design and Construction, what happens to the areas in between them. It was explained that HES, HSIP funding can be used for safety improvement projects in such areas.

Study exhibits were available to view during the meeting. After the meeting, the Project Team was available to answer questions.

End of Meeting Minutes.

Meeting Minutes
3rd Project Team Meeting
KY 44 Corridor Study (US 31E to KY 1633)

Meeting Date: **December 16, 2011**
Meeting Location: **District 5, Conference Room**

The meeting began around 9.30 a.m. local time. The following were in attendance:

Dane Blackburn	KYTC District 5 Planning
Jeff Schaefer	KYTC District 5 Environmental
Randall Embry	KIPDA Transportation Planning
Andy Rush	KIPDA Transportation Planning
Tom Hall	KYTC District 5 Planning
Brian Meade	KYTC District 5 Project Development
Paul Davis	KYTC District 5 Project Development
Steve Ross	KYTC Central Office Division of Planning
Jill Asher	KYTC Central Office Division of Planning
Sreenu Gutti	KYTC Central Office Division of Planning

There were three topics on the agenda for the meeting – Study Progress, Project Prioritization and Next Steps. Study Limits and Study Purpose were shown at the beginning of the meeting. Proposed Alternates (chart) considered were shown. It was explained that the items of discussion for the meeting would primarily be Short Term Spot Improvements as decisions required on the other Alternates were finalized in previous meetings. Ranking maps of Group A and Group B Spot Improvements which were tallied after Local Official & Stakeholders meetings and Public Meeting, were presented to the Team.

Study Progress: The progress of the Study since the last meeting was explained. The second Local Officials & Stakeholders meeting and the Public meeting were conducted on November 14th. A brief description of these meetings was presented to the Team. At these meetings, proposed Alternates were presented. Attendees at these meetings were requested to prioritize the Group A and Group B Spot Improvements. After the meeting, prioritization of the Spot Improvements was compiled and rankings were determined.

Project Prioritization: It was explained to the Team that the prioritization from the Local Officials & Stakeholders meeting and Public meetings along with crash data and geometry data may be considered in the final prioritization of the Spot Improvement projects.

A detailed discussion of the Spot Improvement projects followed starting with Group A Spot Improvements. Sreenu explained each of the projects from Spot A1 to Spot A6 in detail using PowerPoint presentation. For each project, an aerial view, photos, geometry data, crash data, estimated cost and proposed recommendations were shown. Each of the attendees also had a copy of the rankings from the Local Officials & Stakeholder's meeting and Public Meeting.

A question was asked: what was the difference between Group A & B Spot Improvements and how it can be explained? Sreenu explained that the Group A projects are in locations where roadway geometry is below current standards and crash rate is higher (CRF > 1). Group B projects were identified based on Public, Stakeholders and Officials input and have relatively fewer geometry and crash concerns. To the question how it will be explained, Sreenu said that the Study Report will explain the difference in detail.

Andy asked a question that some of the Spot Improvement projects seem to be overlapping. Sreenu informed that the same question was asked at the Officials and Stakeholders meeting. A project such as Spot A6 may include improvements suggested by Spot B2-B6, A4 & A5 projects. Brian confirmed that if Spot A6 is designed, other projects along that corridor will be considered for design. Dane explained that cost estimates were developed considering each project as an individual project.

The following table shows the rankings for Group A Spot Improvements.

Spot Improvement	Rank assigned by Local Officials, Stakeholders & Public combined	Rank assigned by Project Team*
Spot A1	5	3
Spot A2	2	2
Spot A3	4	4
Spot A4	3	5
Spot A5	1	1
Spot A6	6	6

* Project Team ranking is based on geometry, high crash rate and considered the ranking of Local Officials, Stakeholders & Public

The Team agreed that Spot A5 (Hunter's Trace Rd. area) should be ranked #1 because of poor roadway geometry and high crash rate. The ranking for Spot A5 matched the Officials and Public's ranking. Spot A2 was ranked #2 by both Groups and it is in the Dutchman Creek area where a fatal crash had occurred. Spot A1 was ranked #3 by the Project Team. Spot A1 and A2 are close to each other and most likely would be designed at the same time, if they move forward.

Spot A6 was ranked last by both the Groups. Spot A6 improvement recommends minor widening from Stumps Lane to Turnpike Avenue. Sreenu informed that the maps are missing a text label for Turnpike Ave. (which is just west of Spencer County Elementary School) which will be added. Along with minor widening of Spot A6, other geometric improvements recommended by Spot B2-B6, Spot A4 and Spot A5 will likely be considered which will increase the cost of Spot A6 to exceed $18 million. There was some concern about programming a project costing more than $18 million.

The following rankings for Group B Spot Improvements were finalized by the Project Team.

Spot Improvement	Rank assigned by Local Officials, Stakeholders & Public combined	Rank assigned by Project Team
Spot B1	4	4
Spot B2	3	2
Spot B3	2	3
Spot B4	6	5
Spot B5	4	6
Spot B6	1	1

The Team agreed that Spot B6 should be ranked #1 and it matched the ranking of the Local Officials and Public. Spot B6 connects to the new roadway section west of the Spencer County Elementary School. The rankings of the other projects matched closely by the two groups.

Next Steps: Sreenu informed the Team about the next steps for the Study. As major decisions have been made, no additional Team meetings are planned. Future correspondence on the Study will be through e-mail. Selected resource agencies will be contacted and informed about the Study and their input will be requested. A Public Meeting folder for the 2nd Public Meeting will be developed. Draft Study Report will be started.

The meeting ended around 11 am.

End of Meeting Minutes.

Appendix F

Environmental Overview

Environmental Overview for Future Improvements to KY 44

from US 31 E in Mount Washington to KY 1633 at Pond and Brashears Creeks in Spencer County

Item No. 5-396.00

(including Item No. 5-347.50 in Bullitt County and Item No. 5-395.00 in Spencer County).

October 2008

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FIGURES

TABLES

Project Exhibits (also included in Appendix C)

APPENDICES

ENVIRONMENTAL OVERVIEW

EXECUTIVE SUMMARY

This report presents an overview of impacts to the human and natural environments anticipated for three proposed projects within Bullitt and Spencer Counties. The project corridors are located between the eastern limits of Mount Washington in Bullitt County, and an area just west of Taylorsville in Spencer County. Each of the three projects has a Kentucky Transportation Cabinet project item number. Item Number 5-347.50 is located in Bullitt County between Mount Washington and the Bullitt County/Spencer County line. Item Number 5-395.00 is located in Spencer County just west of Taylorsville, and Item Number 5-396.00 is the comprehensive project corridor, including the two other projects included in this overview, beginning at the western limits of Item Number 5-347.50 and ending along the eastern terminus of Item Number 5-395.00. The entire corridor considered in this environmental overview includes an area of 1000 feet on either side of the existing KY 44. These three proposed projects are described in Section 1, Project Corridor Descriptions, and shown as Project Exhibits on pages 2 and 3. These maps are also included as Exhibits 1A and 1B beginning on page 51.

Field surveys, record searches and contacts with resource agencies, government representatives and the general public have identified environmental issues and sensitive areas within a defined project corridor. The project corridor concerns that were investigated include:

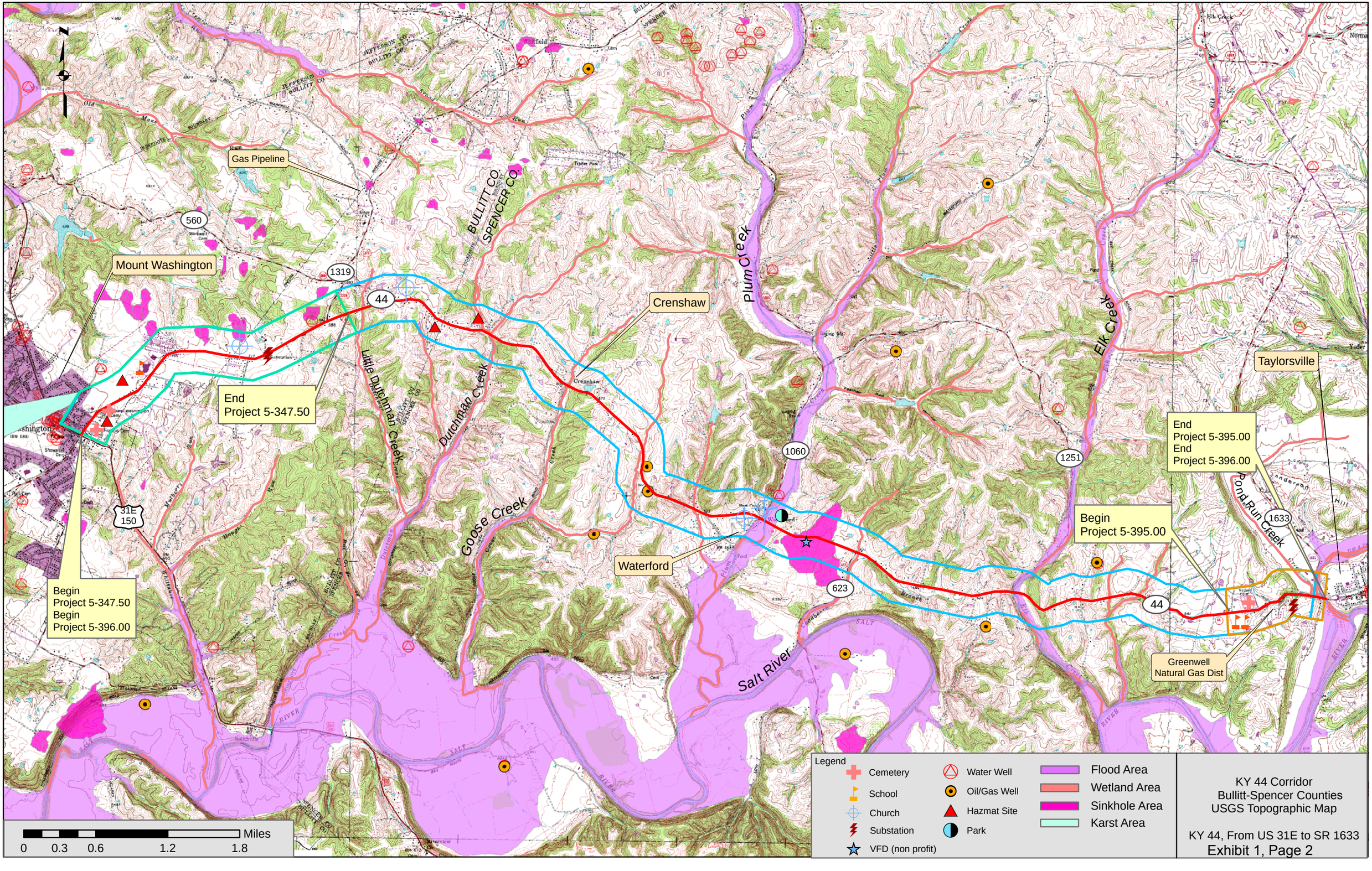
- Socioeconomic and community impacts.
- Environmental justice concerns.
- Culturally sensitive areas including churches, parks, cemeteries and schools.
- Cultural historic sites.
- Archaeological resources.
- Potential threatened and endangered species.
- Stream crossings, wetlands and sinkholes.
- Underground storage tanks and hazardous materials.
- Noise and air impacts.
- Hazardous Materials.
- Aquatic Impacts.
- Terrestrial Impacts.

The methodology used to collect information contained in this environmental overview is included record searches, literature reviews, and field reconnaissance. Early coordination with appropriate resource agencies was undertaken. Cultural historic and archaeological resource overviews were conducted, and they are discussed in the text of this report, but will be submitted separately.

Improvements to, or construction of, a new KY 44 facility would enhance regional access for travelers, workers, tourists, and transporters of raw materials, finished products and agricultural products. Beneficial impacts include anticipated opportunities for industry, tourism, higher education and agricultural activities. Impacts are summarized for the human and natural environments in this executive summary, and results specific to each proposed action are provided in sections respective to each environmental concern.

- **The Human Environment**

Residential, non-profit and commercial relocations are expected in future design phases. Predominant land use in the project area is agricultural, and potential impacts to


Gas Pipeline
Mount Washington
560
1319
44
End
Project 5-347.50
Crenshaw
Plum Creek
Elk Creek
Taylorsville
BULLITT CO
SPENCER CO
Little Dutchman Creek
Dutchman Creek
Goose Creek
1060
1251
End
Project 5-395.00
End
Project 5-396.00
Pond Run Creek
1633
Begin
Project 5-395.00
31E
150
Begin
Project 5-347.50
Begin
Project 5-396.00
Waterford
623
44
Salt River
Greenwell
Natural Gas Dist
0 0.3 0.6 1.2 1.8 Miles
Legend
Cemetery
School
Church
Substation
VFD (non profit)
Water Well
Oil/Gas Well
Hazmat Site
Park
Flood Area
Wetland Area
Sinkhole Area
Karst Area
KY 44 Corridor
Bullitt-Spencer Counties
USGS Topographic Map
KY 44, From US 31E to SR 1633
Exhibit 1, Page 2

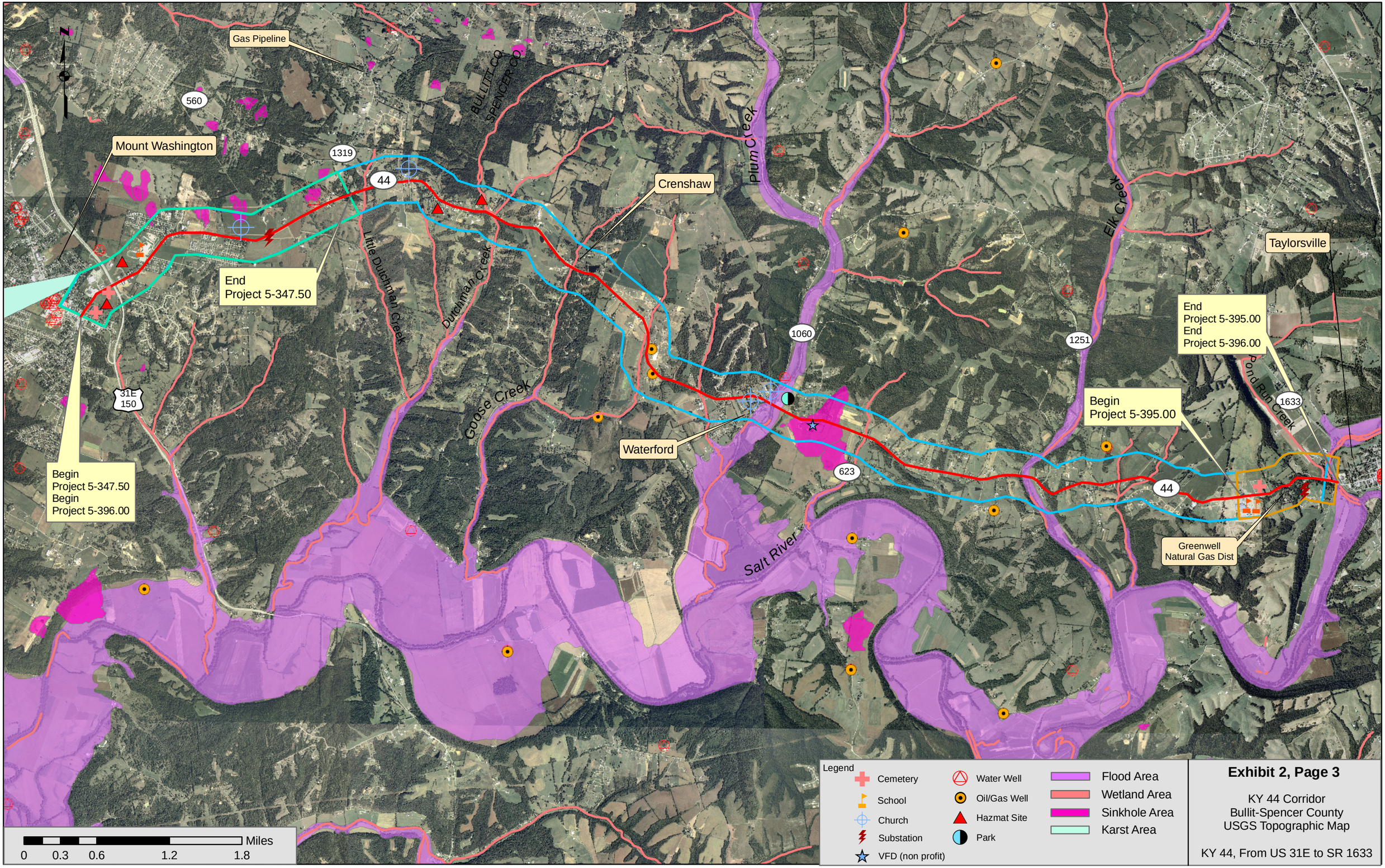


Exhibit 2, Page 3

KY 44 Corridor
Bullit-Spencer County
USGS Topographic Map

KY 44, From US 31E to SR 1633

farmlands rated as prime, unique, or of statewide importance will occur. Most of the farmland impacts will be located in the areas outside the city limits of Mount Washington and Taylorsville.

Several historic sites that are listed or potentially eligible for the National Register of Historic Places are located throughout the project corridors. Care will be taken to avoid these resources as alternatives are developed. If historic sites are unavoidable and federal funding is utilized, a Section 4(f) evaluation will be required. In addition to potential historic impacts, Section 4(f) could be required if the Waterford Park is impacted. Section 6(f) impacts appear to be avoided unless the project shifts northward in the Waterford area.

Areas within the project corridors are likely to include archaeological resources. These resources have been identified within the separately submitted archaeological overview.

Utilities in the area with the potential to be relocated include water lines, telephone and cable lines, sewer lines and electric power lines. Cellular towers, utilities, utility transfer stations and water towers also are located within or near the project corridor.

Service stations, former and existing automobile repair shops, and a truck sales company occur in the project corridors and could contain potential hazardous materials and underground storage tank sites. Further consideration will be necessary to confirm the presence of these sites and reasonable efforts will be made to assess avoidance and mitigation options.

- **The Natural Environment**

The project corridor would cross six streams requiring the widening of, or replacement of existing bridges and culverts. Impacts on these streams and their associated floodplains will require evaluation and appropriate mitigation measures.

Most wetlands appear to be avoided by any of the future projects. The project includes two areas along streams (Plum Creek and Elk Creek) where wetland impacts cannot be avoided. Impacts on these wetlands will require evaluation and appropriate mitigation measures.

I. Project Corridor Descriptions

This environmental overview addressed the potential environmental impacts associated with three proposed projects; the general project corridor (*State Item No. 5-396.00*) and two projects within the general project corridor (State *Item Nos. 5-347.50,* located within Bullitt County, *and 5.395.00,* located within Spencer County). This environmental overview identifies potential concerns within the defined project corridors based upon available data and information sources. The projects could bring changes to the local communities including improvements in vehicular access, safety conditions, convenience, emergency response times, and reduce driving times. In addition, the projects could enhance the future quality of life and the economic vitality for residents within the area based on local and regional development efforts. Each area of environmental study will address anticipated impacts within the larger corridor and within each of the two specific project corridors. Following are descriptions of each of the three project corridors (See pages 2 and 3 and Project Figures beginning on Page 51).

A. Project Corridors

Item No. 5-396.00 This is the full project corridor which includes the two smaller projects. The comprehensive project area's termini (endpoints) are in Bullitt County at the intersection of KY 44 with US 31E/US 150 in Mount Washington, and at the junction of KY 44 with KY 1633 (Elk Creek Road) at Brashear's Creek at the Taylorsville City Limits in Spencer County, a distance of approximately 11.5 miles. The environmental footprint extends 1000 feet in either direction from the existing Kentucky 44.

Item No. 5-347.50 This project begins at the intersection of US 31E and KY 44 in Mount Washington and travels to the east between milepoints 23.4 and 25.5. Its approximate distance is 2.2 miles. The environmental footprint extends 1000 feet in either direction from the existing Kentucky 44. It remains entirely in Bullitt County.

Item No. 5-395.00 This project is located in Spencer County just west of Taylorsville. It begins at milepoint 7.4, near Oak Tree Way, and travels eastward to its terminus near milepoint 8.5 at KY 1633. It does not include the bridge over Brashears Creek. The environmental footprint extends 1000 feet in either direction from the existing Kentucky 44.

The project corridor will intersect or junction with several state and federal highways. Table 1, below, displays these roadways within the respective counties:

Table 1: Major Roadways (by County) that Intersect or Junction with KY 44 within and adjacent to the Project Corridor

Bullitt	
US 31E/US 150	KY 1319
Spencer	
KY 1060	KY 623
KY 1251	KY 1633
KY 2885	KY 55

B. Land Use

The corridor is located mainly in areas that are a blend of residential, commercial and agricultural land uses. New neighborhoods are being constructed in both counties, and in areas between the termini. Agricultural land, in accordance with United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) guidance, includes fallow farmland, golf courses, and forested areas, which could still be used as farmland. The respective project areas' land uses are estimated and described in the following paragraphs and in Table 2 on the following page.

Item No. 5-347.50 It is estimated that approximately 1500 people are living in or will soon locate to the eastern portion of Bullitt County. It is estimated that at least half of the land use in this corridor is residential, and that the percentage of commercial and residential land uses will increase in the future.

Item No. 5-395.00 Several new neighborhoods are being constructed just west of Taylorsville and adjacent to the project corridor. The newer homes typically are listed from between $100,000 to $150,000 and higher. Almost half of this corridor is in use as residential and the percentage is continuing to increase. An area just west of the Valley Cemetery and across from two public schools is being converted from agricultural to

residential/commercial land use. Land use conversion to primarily residential and some commercial applications is anticipated to continue in the future.

Item No. 5-396.00 Agricultural land use is still widespread in the corridor, but residential development is ongoing and replacing farming activities. Tracts of land in planned neighborhoods between one acre and ten acres are for sale throughout the project area as part of the conversion to residential land use. Some commercial land use change is occurring, but is located primarily in the area just east of Mount Washington in Bullitt County. Land use conversion, primarily from agricultural to residential, is anticipated to continue throughout the project area in the future, but not as rapidly as Item Nos. 5-347.50 and 5-395.00.

Table 2, below, approximates the current land uses within each project corridor.

Table 2: Land Use Percentages of the Project Areas

Project Corridor	Percentage of Agricultural Land Use	Percentage of Residential Land Use	Percentage of Commercial Land Use
Item 5-347.50	25%	50%	25%
Item 5-395.00	50%	40%	10%
Item 5-396.00	75%	20%	5%

II. Existing Roadway Conditions

KY 44 is mainly a two-lane roadway within the project corridor. The exception is a small, four-lane portion between its intersection with US 31E and eastward approximately 100 yards where it transitions to a two-lane highway as it approaches Hardy Lane and Bullitt East High School. Table 3, below, provides the existing conditions of KY 44 throughout the project corridor.

Table 3: Features of Existing KY 44

Roadway Feature	KY 44 Bullitt County	KY 44 Spencer County
Average Right of Way Width	60 feet	60 feet
State System	State Secondary	State Secondary
Functional Classification	Urban Principal Arterial, then Rural Minor Arterial	Rural Minor Arterial
National Highway System	No	No
Truck Weight Class	AAA (80,000 pound gross weight limit)	AAA (80,000 pound gross weight limit)
Lanes (Total lanes and dimensions	4 lanes, then 2 beginning as 12 feet wide, transitioning to 10 feet wide.	2 lanes, 10 feet wide, transitioning to 12 feet wide.
Speed Limit	45, 55 miles per hour	55, 45 miles per hour
Shoulders	3-feet, Combination	3-feet, Combination
Terrain	Rolling	Rolling
Percent Sight Distance*	NA	0

*** Percent Passing Sight Distance is the percent of segment length (estimated to the nearest 10 percent) which has available passing sight distance (as measured from the driver's eye to the road surface) of at least 1,500 feet.**

The Kentucky State Police Division of Data provided crash information for the project corridor. Information was provided for a four-year period between December 15, 2003 and December 15, 2007. A total of 230 crashes were reported by various law enforcement agencies and compiled at the KY State Police Division of Data for the four-year period. The details of the crashes are listed below.

Table 4: Bullitt County Crashes on KY 44 from the Intersection with US 31E to the Spencer County Line.

Total Crashes	114
Property Damage Only	82
Injury Collisions	32 (Total injured = 41)
Fatal Collisions	0

Table 5: Spencer County Crashes on KY 44 from the Bullitt County Line to the junction with KY 1633.

Total Crashes	116
Property Damage Only	83
Injury Collisions	31 (Total injured = 44)
Fatal Collisions	2 (Total Fatalities = 2)

Many of the crashes occurred at intersections and junctions along KY 44, but collisions were also recorded throughout the project corridor. As alternatives are developed a safety analysis to determine critical rate factors will be developed to determine if safety is a component of each project's purpose and need.

III. Potential Environmental Impacts

Table 6: Summary of Potential Environmental Impacts by Project

Study Area	5-347.50 Impacts	5-395.00 Impacts	5-396.00 Impacts
Stream Crossings	No blueline stream crossings are anticipated in the project corridor for Item No. 5-347.50.	The project corridor for Item No. 5-395.00 would require one blueline stream crossing; Pond Run Creek.	Blueline Streams – Little Dutchman Creek, Dutchman Creek, Goose Creek, Plum Creek, Elk Creek, and 4 unnamed blueline stream tributaries within the project area would be crossed.
Floodplain Encroachment	No impacts to floodplains were identified within this project corridor.	One area is located at the eastern terminus where Brashears Creek meets Pond Creek.	One area is located at Plum Creek near Waterford on both sides of the project. The second is a less extensive area at Elk Creek.
Springs	No impacts to springs are anticipated.		
Water Wells	A review of Kentucky Geological Society maps indicates wells are evident within the project corridors. As alternatives are identified, care will be taken to locate, and if possible, avoid wells.		
Caves	No caves were apparent within or near the project area.		
Ponds	Several ponds exist throughout the proposed corridors. None are used for domestic water supplies.		

Study Area	5-347.50 Impacts	5-395.00 Impacts	5-396.00 Impacts
Jurisdictional Wetlands	Wetlands are not likely to be impacted.		2 wetlands could be impacted by the project. These wetlands are located along the project streams and are riparian in nature. Other wetlands were identified near the project corridor, but are avoided.
Threatened and Endangered Species	Indiana and gray bats are not likely to be identified within the project corridor. It is not likely that any mussels will be found in the corridor. Running buffalo clover could exist within the project corridor.		The federally endangered Indiana bat and gray bat could occur in the project areas, but only two trees that were suitable for habitat were located. The two shagbark hickory trees were located in subdivisions, but not in heavily forested areas. Running buffalo clover could exist within the project corridor. Although mussels have been identified in both counties, no habitat appeared to be suitable in any of the project streams.
Natural Areas	No natural areas exist within or adjacent to the project corridor.		
Wild and Scenic Rivers	No wild and scenic river has been identified in the project area.		

Study Area	5-347.50 Impacts	5-395.00 Impacts	5-396.00 Impacts
Socioeconomic	It is estimated that 10 to 15 relocations could occur in Item No. 5-347.50. No Environmental Justice concerns are apparent.	It is estimated that 5 to 7 residential and 2 to 5 commercial relocations could result. No Environmental Justice concerns are apparent.	It is estimated that 15 to 20 residential and 2 to 5 commercial relocations could occur. Environmental Justice concerns associated with low-income houses might occur in or near the Waterford area and on Stumps Lane within Item No.5-396.00. If federal funds become available for this project, field trips and a more detailed search of data could be required for build alternatives
Farmland	Farmland impacts would be low for this project, which is experiencing a rapid conversion to urban land uses.		The greatest potential for impacts to farmland exists on this project due to its larger project area and the rural characteristics of its land use.
Environmental Justice	No Environmental Justice issues are apparent.		Environmental justice issues for low-income populations might exist in the project area of Item No. 5-396.00 along Stumps Lane and in the community of Waterford, both in Spencer County. No minority community impacts would occur.

Study Area	5-347.50 Impacts	5-395.00 Impacts	5-396.00 Impacts
Cultural/Historic Resources	No sites that are eligible for the National Register of Historic places exist throughout the corridor.	The potential for 9 sites that are eligible for the National Register of Historic places exists throughout the corridor. The impacts will depend upon the selection of and final design of an alignment. Section 106 will be required because the project will involve permitting from the U.S. Army Corps of Engineers. If federal funding is utilized, Section 4(f) resources could be impacted.	The potential for 18 sites that are eligible for the National Register of Historic places exists throughout the corridor. These sites include the 9 sites identified with Project 5-395.00 in Spencer County. The impacts will depend upon the selection of and final design of an alignment. Section 106 will be required because the project will involve permitting from the U.S. Army Corps of Engineers. If federal funding is utilized, Section 4(f) resources could be impacted.
Archaeological Resources	The project corridor features moderate to high probability for historic archaeological resources. A total of 2 previously identified archaeological surveys and 11 potentially historic sites are located within this project area. Further archaeological investigation is recommended for the project. If federal funding is utilized, Section 4(f) resources could be impacted.	The project corridor features moderate to high probability for historic archaeological resources. A total of 1 previously recorded archaeological site and 10 potentially historic sites are located within this project area. Further archaeological investigation is recommended for the project. If federal funding is utilized, Section 4(f) resources could be impacted.	The project corridor features moderate to high probability for historic archaeological resources. A total of two previously identified archaeological surveys and 52 potentially historic sites are located within this project area. Further archaeological investigation is recommended for the project. If federal funding is utilized, Section 4(f) resources could be impacted.
Hazardous Materials/ Underground Storage Tank Sites	It appears that one site might be located within Item No. 5-347.50.	It appears that one site could be located in Item No. 5-395.00	It appears that no more than three sites would be located in Item No. 5-396.00.

Study Area	5-347.50 Impacts	5-395.00 Impacts	5-396.00 Impacts
Air Quality	No major air quality impacts are predicted, but if federal funds are utilized, Bullitt County is located within the Louisville Air Quality Control Region, and has been designated as a non-attainment area for the Ozone 8-hour standard and for PM-2.5 (Particulate Matter < 2.5u). Coordination with the EPA and other agencies would be required.	No air quality impacts or issues are anticipated for this project. A baseline analysis would still be required if federal funds are utilized.	No major air quality impacts are predicted, but if federal funds are utilized, Bullitt County is located within the Louisville Air Quality Control Region, and has been designated as a non-attainment area for the Ozone 8-hour standard and for PM-2.5 (Particulate Matter < 2.5u). Coordination with the EPA and other agencies would be required.
Traffic Noise	No major noise impacts are anticipated, but if federal funds become available noise mitigation analyses could become necessary. Project 5-347.50 would involve improvements in an area that is heavily represented by residential land use.	The project corridor has been and is undergoing land use conversions to residential areas. As alternatives are developed, noise mitigation analyses might be required.	
Oil/Gas Wells	No oil or gas wells are located within the project corridor.		Two wells are located within the limits of Item No. 5-396.00 between Crenshaw and Waterford. No other oil or gas wells are located within any of the project corridors.

A. Socioeconomic/Environmental Justice

A review of census information, economic data, and a windshield survey were conducted to determine socioeconomic and environmental justice concerns. Discussions with local government representatives and field trips provided useful information. General socioeconomic data within Spencer and Bullitt Counties will be provided in this section, and specific areas will be addressed in the subsections below.

Table 7: Historic Population Growths and Rankings

Kentucky Top Counties Ranked by Rate of Population Growth, 1990-2000		
Rank	**County**	**Percentage of Growth**
1.	**Spencer County**	**73. 0%**
2.	Boone County	49.3%
3.	Gallatin County	45.9%
4.	Grant County	42.2%
5.	Oldham County	38.8%
6.	Scott County	38.5%
7.	Shelby County	34.3%
8.	Trimble County	33.4%
9.	Anderson County	31.2%
10.	Menifee County	28.8%
11.	**Bullitt County**	**28.7%**

Bullitt County and Spencer County are two of the fastest growing counties in Kentucky. Table 4, at the right, ranks the rate of population growth of Kentucky's counties. Spencer County's population increased by 73.00 % for the highest ranking, while Bullitt County's population increased by 28.74 % for the eleventh highest ranking of Kentucky's 120 counties. Spencer County has a lower population than Bullitt County. This means that an increase of 1000 people in Spencer County causes a 6.0 % growth while the same increase of 1000 people in Bullitt County reflects a 1.4% growth.

Socioeconomic Summary of Bullitt County

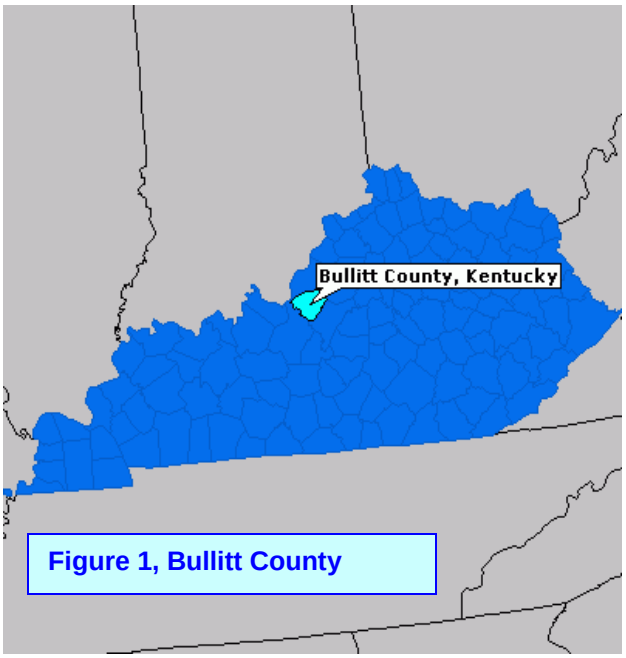


Figure 1, Bullitt County

Bullitt County has 299.1 square miles in land area and a population density of 243.6 people per square mile. In the last three decades of the 1900s the population of Bullitt County increased by 134.7%. The U.S. Census data indicate that 99.2% of the population reported only one race, with 0.4% of these reporting African-American. The population of this county is 0.6% Hispanic (of any race). The average household size in the county is 2.75 persons compared to an average family size of 3.07 persons statewide.

In 2006 manufacturing was the largest of 20 major sectors. It had an average wage per job of $39,827. Per capita income grew by 8.0% between 1995 and 2005 (adjusted for inflation).

Table 8: Bullitt County Socioeconomic Data Summary

People & Income Overview	**Value**	**Industry Overview (2006)** (By Place of Work)	**Value**
2006 Population	72,851	Covered Employment	13,721
Growth percentage since 1990	53.2%	Average wage per job	$29,210
Households (2000)	22,171	Manufacturing - Percentage of all jobs in County	19.1%
Labor Force (persons) (2006)	36,964	Average wage per job	$39,827
2006 Unemployment Rate percentage	6.0	Transportation & Warehousing – Percentage of all jobs in Bullitt County	0.5%
Per Capita Personal Income (2005)	$24,693	Average wage per job	$42,350
Median Household Income (2004)	$49,055	Health Care, Social Assist. - Percentage of all jobs in County	5.3%
Poverty Rate (2004)	10.4	Average wage per job	$30,172
H.S. Diploma or More - Percentage of Adults 25+ (2000)	76.0	Finance and Insurance - Percentage of all jobs in County	1.9%
Bachelor's Degree or Higher – Percentage of Adults 25+ (2000)	9.2	Average wage per job	$34,536

Socioeconomic Summary of Spencer County

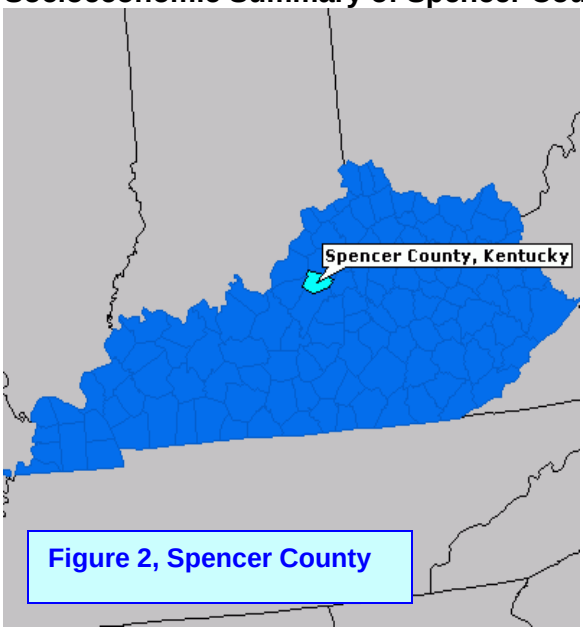


Figure 2, Spencer County

Spencer County has 185.9 square miles in land area and a population density of 88.6 people per square mile. In the last three decades of the 1900s Spencer County's population increased by 114.4%. The U.S. Census data indicate that 99.2% of the population reported only one race, with 1.1% of these reporting African-American. The population of this county is 1.1% Hispanic (of any race). The average county household size is 2.74 persons compared to an average family size of 3.08 persons statewide.

In 2006 health care and social assistance was the largest of 20 major sectors. It had an average wage per job of $23,961. Per capita income grew by 6.1% between 1995 and 2005 (adjusted for inflation).

Table 9: Spencer County Socioeconomic Data Summary

People & Income Overview	**Value**	**2006 Industry Overview (2006)** By Place of Work	**Value**
2006 Population	16,475	Covered Employment	1,641
Growth percentage since 1990	142.2%	Average wage per job	$26,146
Households (2000)	4,251	Manufacturing – Percentage of all jobs in County	1.3%
2006 Labor Force (persons)	8,478	Average wage per job	$34,538
2006 Unemployment Rate percentage	6.1	Transportation & Warehousing – Percentage of all jobs in County	1.4%
Per Capita Personal Income (2005)	$22,833	Average wage per job	$39,824
Median Household Income (2004)	$53,806	Health Care, Social Assist. – Percentage of all jobs in County	15.1%
Poverty Rate (2004)	9.3	Average wage per job	$23,961
H.S. Diploma or More - Percentage of Adults 25+ (2000)	75.4	Finance and Insurance - Percentage all jobs in County	3.4%
Bachelor's Degree or More – Percentage of Adults 25+ (2000)	11.1	Average wage per job	$32,690

Temporary impacts such as increased dust and noise will occur as a result of the project's construction phase. Traffic will be maintained throughout the construction process. Any inconveniences will be short term and minor. Long-term benefits include improved safety and travel conditions and an anticipated reduction in emergency response times.

Table 10: Population Projections, 2005 – 2030 for Bullitt and Spencer Counties

Area	2010	2020	2030
Bullitt	19,130	21,166	23,111
Spencer	12,765	14,066	15,339

Table 10, above, includes population projections for the counties. Bullitt and Spencer Counties are predicted to continue increasing in population at rates that are consistent with recent growth trends.

If no-build alternates are selected for the projects, the population trends should continue along the projected growth rates as illustrated above. If a build alternative is selected, the impacts to population trends are not anticipated to differ measurably.

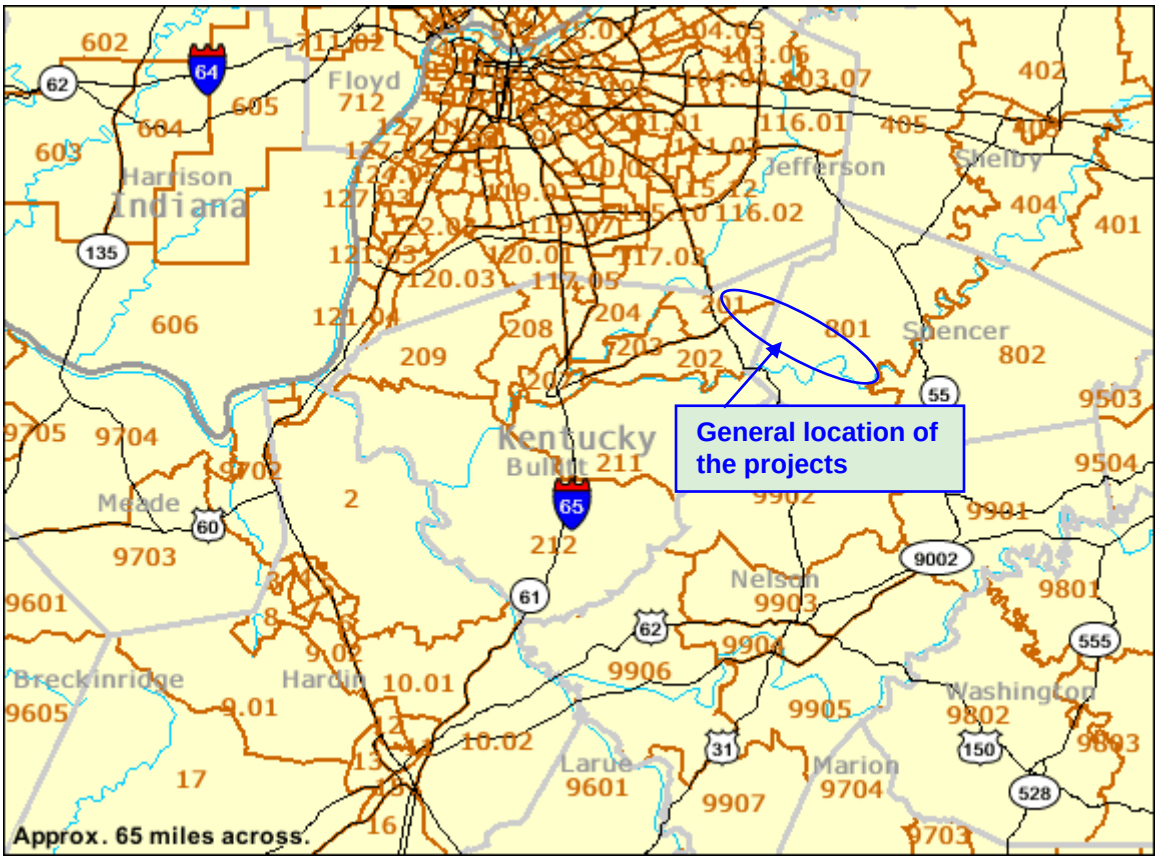


Figure 3 – Project Area and Corresponding U.S. Census Tracts (Tracts are shown as the brown numbers).

1. Population by Race

U.S. Census 2002 figures were reviewed to determine the racial balance of the communities within the project area of study, and the results were compared against the racial characteristics of Kentucky (See Table 11 below).

Table 11: Population Percentages by Race, 2002 for Kentucky and Project Area Counties

Racial Composition	Kentucky	Bullitt County	Spencer County
White	90.1	96.1	96.8
Black	7.3	2.7	2.6
Asian, Pacific Islander	0.1	0.3	0.1
American Indian	0.25	0.2	0.0
Hispanic Origin	1.5	0.8	1.1

Census tracts were reviewed for each county within the study area to determine the areas populated by minority races. Reviews of the tracts and field visits have determined that no minority neighborhoods or communities will be displaced or segmented by the corridors that are currently being considered for this project.

Item No. 5-396.00 One area (Census Tract 801, Block Group 2, Group 2049) reported 14 people residing within its boundaries. A total of 6 of the 14 residents are African American, while the remaining 8 are Caucasian. Field visits and reviews of aerial maps indicate that the homes within Group 2049 are located approximately 800 to 1000 feet north of the existing KY 44. It is unlikely that relocations would occur within this area unless the project corridor shifts to the north. In addition, the Waterford Park, which was partially funded with Land, Water and Conservation Funds (LWCF) is located immediately east of Group 2049. The other areas within Census Tract 801 reported no minority communities.

Field visits and examinations of U.S. Census data indicated that high percentages of minority residents do not exist within or near the two smaller project corridors.

Item No. 5-395.00

- **Bullitt County Census Tract 201** was reviewed to determine which Blocks are included within the project area. Blocks 4001 and 4002 of Block Group 4 include the project area. It was revealed that 98.4 percent of the inhabitants within the tract were white in 2000. Reviews of the Census Data and field visits have indicated that no minority communities or disproportionate numbers of minorities will be relocated by this project.

Item No. 5-347.50

- **Spencer County Census Tract 801** was reviewed to determine the area which coincides with the project corridor. The project is located entirely within Census

Tract 801, and 98.4% of the inhabitants within this area are white. Only Block 2049 reported a higher ratio of minority residents. A total of 14 people loved within this Block, which is located between Plum Creek Road and Plum Creek to the north of KY 44 and the Waterford Loop Road. The Census Data indicated that 6 of the 14 residents are African American. The homes are located on the outer area of the northern limits of the project corridor and would not likely be relocated.

Potential impacts associated with the reconstruction of a highway appear to be low. If minority or ethnic communities are affected, all efforts will be made to design a roadway that will avoid relocating, dividing or otherwise disrupting minority communities.

The projects are not anticipated to cause racial balances to change if a Build Alternative is developed and selected for any of the three projects. The project would not displace or divide disproportionate numbers of minority or ethnic populations. Therefore, no environmental justice concerns appear to exist within the project corridor.

2. Poverty Rate Estimates

Census data were gathered for each of the counties within the project corridors. Poverty levels have improved for both Bullitt and Spencer Counties. The total population is the population for which poverty status is determined. Therefore, the total in this table should not be expected to match the total population in the population growth topic. The charts and tables indicate that the collective poverty rates have measurably declined in both counties, and almost categorically within each age group. Only one age group within Bullitt County did not decline. The 12- to 17-year-old category remained at 1.1 percent. The charts provide a visual comparison of the poverty rates for 1990 and 2000 and the tables provide the population totals next to the percentages for each decade.

The U.S. Census Bureau does not provide block level data for poverty status. The rapid growth rates in each county within the areas that comprise the environmental footprint have likely changed the 2000 census data. The influx of newly constructed homes would decrease the already low percentage residents living at or below the poverty levels. The field trips indicated that only two areas exist for the potential for clusters of low-income residents. The specific information is included on Pages 22 and 23.

The following pages provide comparisons of the project area, Bullitt County, Spencer County and Census Block poverty rates:

Table 12: Bullitt County

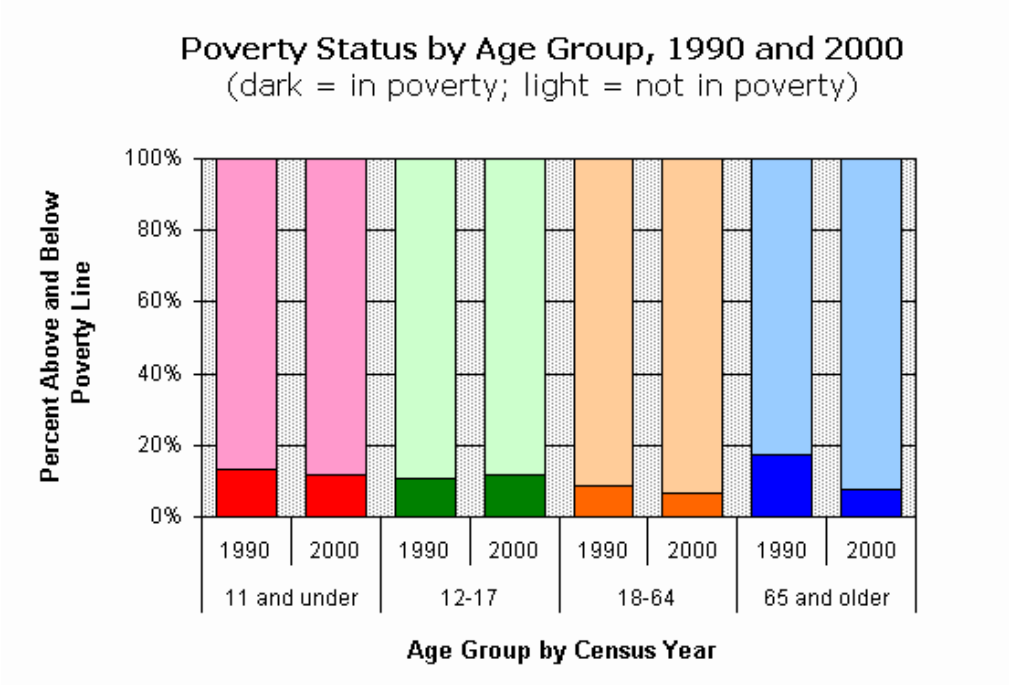


Table 13: Bullitt County Comparison of Poverty by Age, 1990 and 2000				
	1990		2000	
	Number	Percent	Number	Percent
Total Population	**47,332**	**100.00%**	**60,807**	**100.00%**
In Poverty	4,917	10.4%	4,806	7.9%
Not in Poverty	42,415	89.6%	56,001	92.1%
11 Years and Under	**8,861**	**18.72%**	**10,869**	**17.87%**
In Poverty	1,179	2.5%	1,251	2.2%
Not in Poverty	7,682	16.2%	9,618	15.8%
12 to 17 Years	**4,945**	**10.45%**	**5,538**	**9.11%**
In Poverty	522	1.1%	637	1.1%
Not in Poverty	4,423	9.3%	4,901	8.1%
18 to 64 Years	**30,315**	**64.05%**	**39,737**	**65.35%**
In Poverty	2,657	5.6%	2,564	4.2%
Not in Poverty	27,658	58.4%	37,173	61.1%
65 Years and Above	**3,211**	**6.78%**	**4,663**	**7.67%**
In Poverty	559	1.2%	354	0.6%
Not in Poverty	2,652	5.6%	4,309	7.1%

Table 14: Block Group 4, Census Tract 201, Bullitt County Poverty Status

	1999 Totals
Total:	**1,548**
Income in 1999 below poverty level:	**0**
Under 5 years	0
5 years	0
6 to 11 years	0
12 to 17 years	0
18 to 64 years	0
65 to 74 years	0
75 years and over	0
Income in 1999 at or above poverty level:	**1,548**
Under 5 years	98
5 years	0
6 to 11 years	127
12 to 17 years	193
18 to 64 years	1,042
65 to 74 years	73
75 years and over	15

Table 15: Spencer County

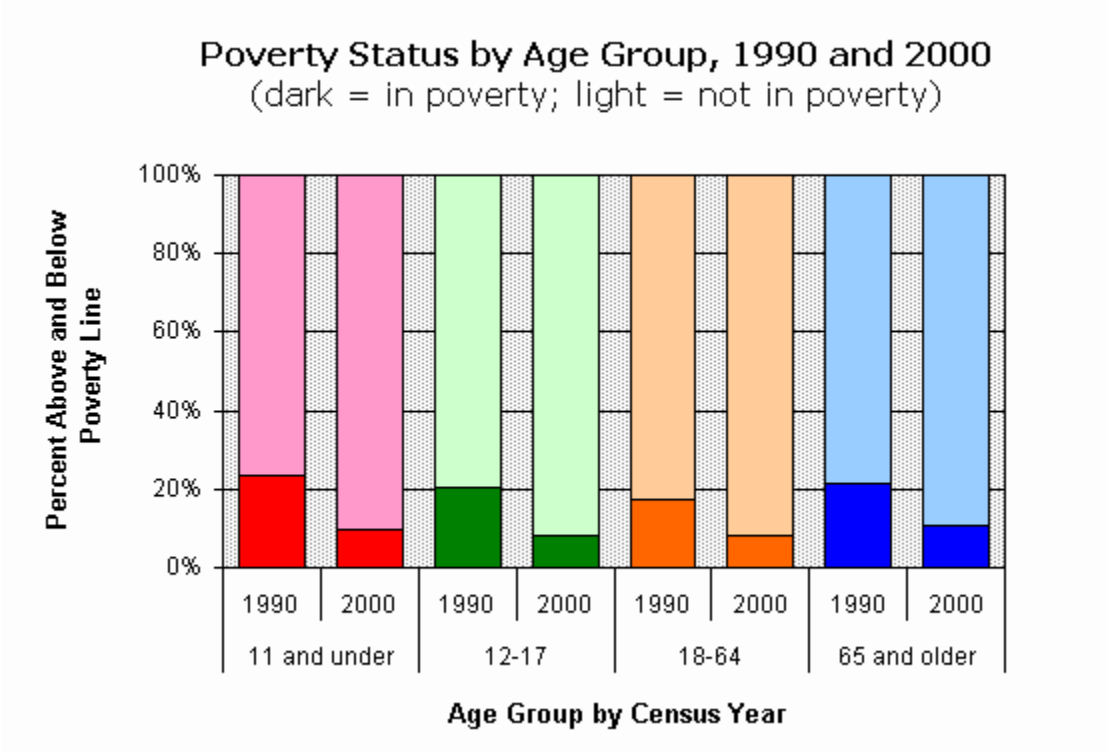


Table 16: Spencer County, Comparison of Poverty by Age, 1990 and 2000				
	1990		2000	
	Number	Percent	Number	Percent
Total Population	**6,731**	**100.00%**	**11,597**	**100.00%**
In Poverty	1,292	19.2%	1,015	8.8%
Not in Poverty	5,439	80.8%	10,582	91.3%
11 Years and Under	**1,220**	**18.13%**	**2,072**	**17.87%**
In Poverty	288	4.3%	206	1.8%
Not in Poverty	932	13.9%	1,866	16.1%
12 to 17 Years	**635**	**9.43%**	**1,071**	**9.24%**
In Poverty	131	2.0%	89	0.8%
Not in Poverty	504	7.5%	982	8.5%
18 to 64 Years	**4,108**	**61.03%**	**7,489**	**64.58%**
In Poverty	709	10.5%	619	5.3%
Not in Poverty	3,399	50.5%	6,870	59.2%
65 Years and Above	**768**	**11.41%**	**965**	**8.32%**
In Poverty	164	2.4%	101	0.9%
Not in Poverty	604	9.0%	864	7.5%

Table 17: Block Group 2, Census Tract 801, Spencer County Poverty Status

	Block Group 2, Census Tract 801, Spencer County, Kentucky
Total:	**3,038**
Income in 1999 below poverty level:	**121**
Under 5 years	6
5 years	0
6 to 11 years	0
12 to 17 years	5
18 to 64 years	73
65 to 74 years	27
75 years and over	10
Income in 1999 at or above poverty level:	**2,917**
Under 5 years	281
5 years	74
6 to 11 years	302
12 to 17 years	277
18 to 64 years	1,827
65 to 74 years	98
75 years and over	58

Figure 4 - Stumps Mobile Home Park in Spencer County

Item No. 5-396.00 Field trips and reviews of U.S. Census data have indicated that low income neighborhoods, family clusters or evidence of socially interdependent communities might exist within two areas of the project corridor. As projects develop, these areas will be further investigated in socioeconomic baseline studies and conceptual stage relocation reports. As alternatives are developed these analyses will assist in indicating Environmental Justice issues are evident, and if the project would affect the areas directly (relocations) or indirectly (community divisions). One area is located within the Waterford Loop and the other is the Stumps mobile home park (See Figure 4, left) on Stumps Lane, north KY 44 and west of Waterford (See Figure 5 on next page). Field trips indicated that between 50 and 60 homes exist south of KY 44 within and surrounding the Waterford Loop, and an estimated 25 to 30% of these homes appear to be occupied by low-income residents. If environmental justice issues are determined to be of concern, care should be taken to avoid relocating and segmenting neighborhoods or communities that support these residents.

The majority of homes within the project area do not appear to be of low-income neighborhoods, and reviews of census data and conversations with local officials indicated that no low-income concerns exist within this area. Most individuals that would meet conditions indicating existence at or below the poverty level are located within or near the limits of the cities. The potential impacts associated with the reconstruction of sections of KY 44 appear to avoid causing disproportional impacts to low income neighborhoods, and no environmental justice issues appear to exist within the corridor.

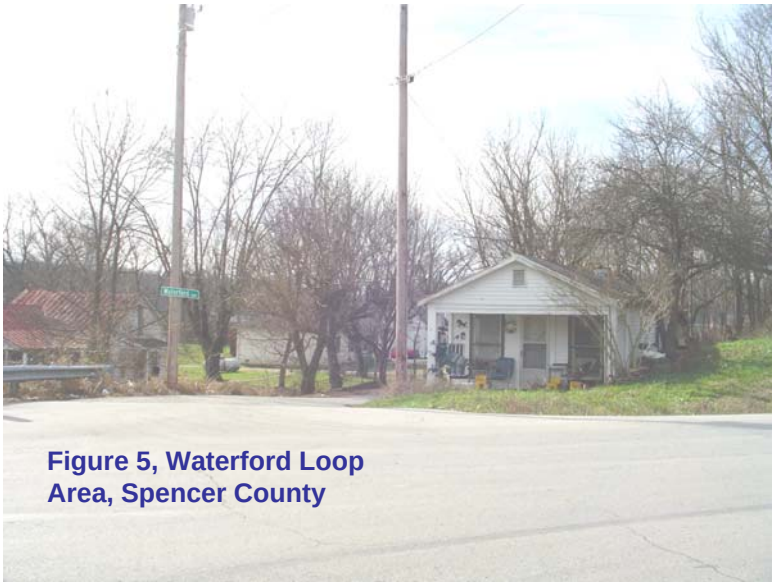


Figure 5, Waterford Loop Area, Spencer County

Item No. 5-347.50 No neighborhoods are located within the project corridor that would result in disproportionate impacts to low-income families. No environmental justice concerns area evident within the project.

Item No. 5-395.00 No neighborhoods are located within the project corridor that would result in disproportionate impacts to low-income families. No environmental justice concerns area evident within the project.

B. Economic Data

1. Major Manufacturers by County

The purpose of identifying and listing manufacturing statistics is to establish relationships between population patterns, commuting patterns, income distributions and employment conditions within the respective counties and the labor market areas. Data sources were reviewed for Spencer County, and no major manufacturers were identified within Spencer County. Table 18 on the following page lists the major manufacturing firms for Bullitt County, and their corresponding products, total number of employees and the year of establishment:

Table 18: Bullitt County Manufacturing Firms

Firm	Product(s)/Service(s)	Employees	Year Established
Clermont			
Jim Beam Brands Co	Dried grain, vodka & bourbon whiskey distillation; cordial cocktails	425	1934
Lebanon Junction			
MAC Manufacturing Co Inc	Automatic barrel filling devices, stencils, lifts & materials handling equipment; robots, pick and place units, and turntables	22	1957
Publishers Printing Co	Printing publications or magazines	862	1991
Mt. Washington			
Smith's Laminating Shop Inc	Custom laminated cabinets	31	2005
Shepherdsville			
AEC One Stop Group Inc	Home entertainment product distribution and fulfillment center	100	2003
Best Buy Stores L P	Computer products repair center	550	2006
Bluegrass Pallets Co	Wood pallets	21	1967
Bullitt County Stone Co	Crushed limestone	30	1967
Dri-View Manufacturing	Custom assembling, packaging & mailing service, warehousing and fulfillment services	53	2004
Genco	Distribution center; third party logistics	45	2004
Gordon Food Service	Foodservice distribution center	275	2006
GSI Commerce Solutions Inc	Electronic commerce fulfillment & distribution	300	2004
Linens N Things Inc (LNT)	Distribution center	260	2002
Monarch Hardware Manufacturing	Exit hardware	56	1965
Piccola Manufacturing Co	Materials handling equipment, specialty conveyors & prototypes; custom steel, stainless steel & aluminum fabricating & robotic welding	45	1950
Publishers Printing Co	Offset & lithographic printing, typesetting, saddle stitch & perfect binding	846	1866
Quality Stone & Ready Mix Inc	Crushed limestone & ready-mixed concrete	33	1965
Standard Publishing & Printing	Commercial offset & lithographic printing	26	1987
Union Tools Inc	Distribution of lawn and garden tools (non-motorized), light assembly	80	2002
Zappos.com	Fulfillment center; footwear, handbags, apparel and accessories	440	2006

Source: Kentucky Cabinet for Economic Development (8/21/2007).

2. Labor Force Market

The counties within this study area and the defined labor market areas indicate that a high number of the area population will be available for existing and future labor. Following are maps that identify the labor market areas (LMA) for both counties.

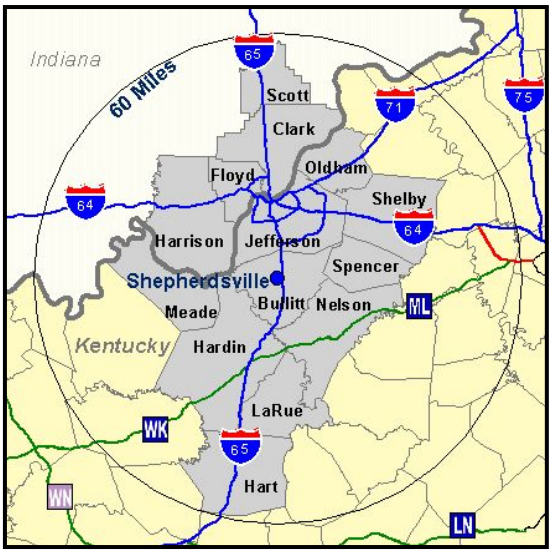


Figure 6: Bullitt County Labor Market Area

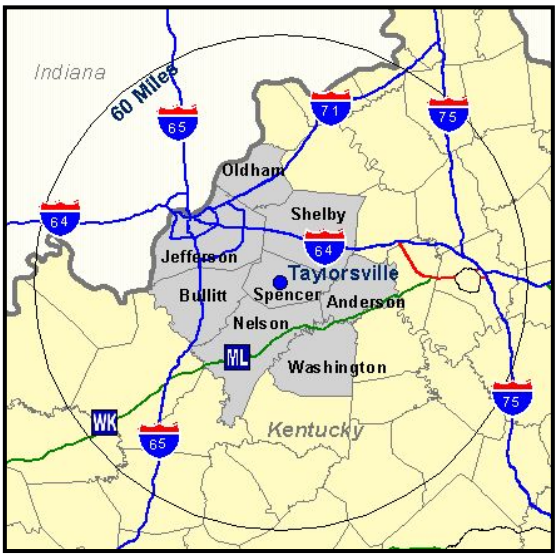


Figure 7: Spencer County Labor Market Area

Table 19, below, illustrates the conditions of labor forces for each of the counties and their respective labor market areas (LMA). Each county and its corresponding LMA is illustrated above.

TABLE 19: Labor Characteristics for Each County and LMA*

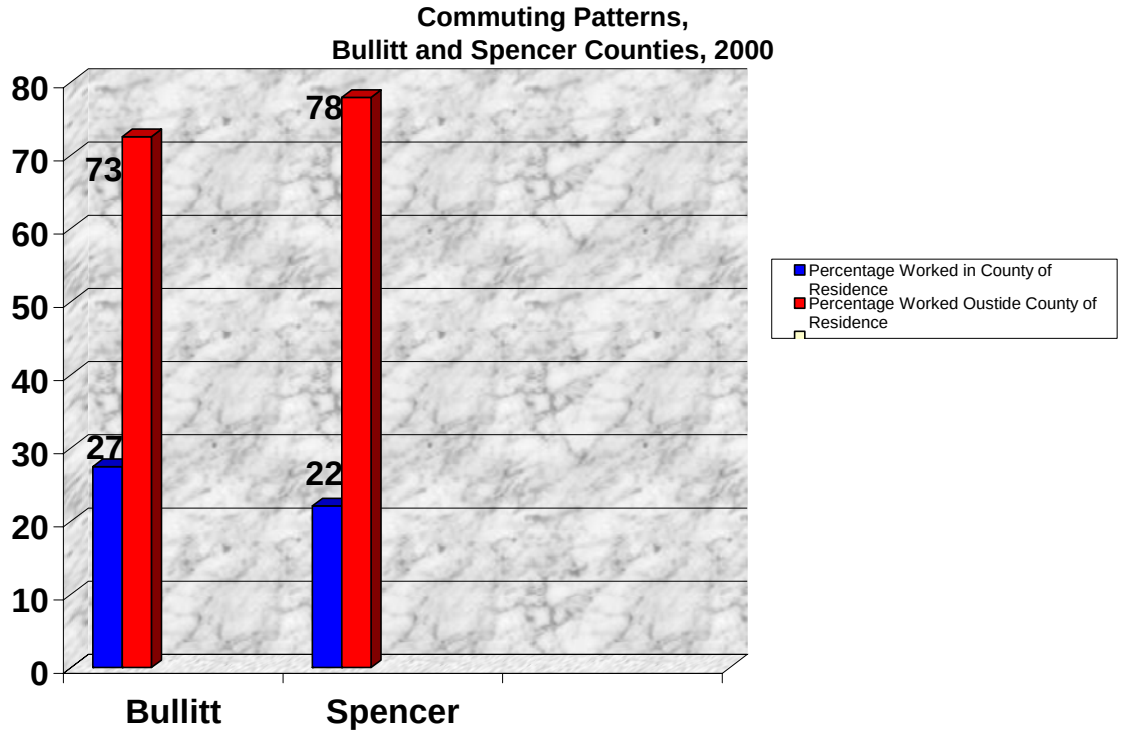
(* LMA totals overlap. Several counties are included in each LMA.)

	Bullitt County		Labor Market Area	
	2002	Nov. 2003	2002	Nov. 2003
Civilian Labor Force	7,958	7,753	43,144	43,299
Employed	7,527	7,415	40,311	40,944
Unemployed	431	338	2,833	2,355
Unemployment Rate (%)	5.4	4.4	6.6	5.4
	Spencer County		Labor Market Area	
	2002	Nov. 2003	2002	Nov. 2003
Civilian Labor Force	4,689	4,669	41,306	41,815
Employed	4,430	4,501	39,090	40,057
Unemployed	259	168	2,216	1,758
Unemployment Rate (%)	5.5	3.6	5.4	4.2
Unemployment Rate (%)	7.3	6.1	6.7	4.6
Unemployment Rate (%)	5.1	4.0	6.0	4.4

3. Commuting Patterns

Table 17, below, illustrates data that report the number of commuters who work within their respective counties and the total number of commuters who work outside their respective counties. It has been estimated that over 70 percent of the residents commute out of Bullitt and Spencer Counties to worksites.

Table 20 – Commuting Pattern Percentages of Residents and Employees, 2000



C. FARMLAND

Build Alternatives will affect farmland and if federal funds are used to assist in financing proposed projects, Land Evaluation Site Assessments (LESA) will be conducted in coordination with the United States Department of Agriculture (USDA), Natural Resources Conservation Services (NRCS) offices for Bullitt and Spencer Counties for each Build Alternative as appropriate. The no-build alternate, if selected, would have no effects farmland. Improvements to crossroads will be necessary to provide safe and efficient access between the county seats and the improved KY 44. This could cause small additional losses of farmland.

Soils that are indicated (See Figure 8, following page) in green colors are of statewide importance and/or rated as prime farmland. Soils that are indicated in red and orange colors are not prime farmland or of state importance. Field trips and reviews of the USDA Web Soil Survey maps indicate that 50 to 60 percent of the project corridor is located within farmland that would be considered to have prime or unique

characteristics; however the projects would be primarily improvements to the existing roadway, and not a new facility. This would minimize impacts to farmland within the project corridor area. A Land Evaluation Summary Assessment form will be filled out once build alternatives are developed. The map includes a wider corridor to display a pattern of the soils in relation to the existing roadway.

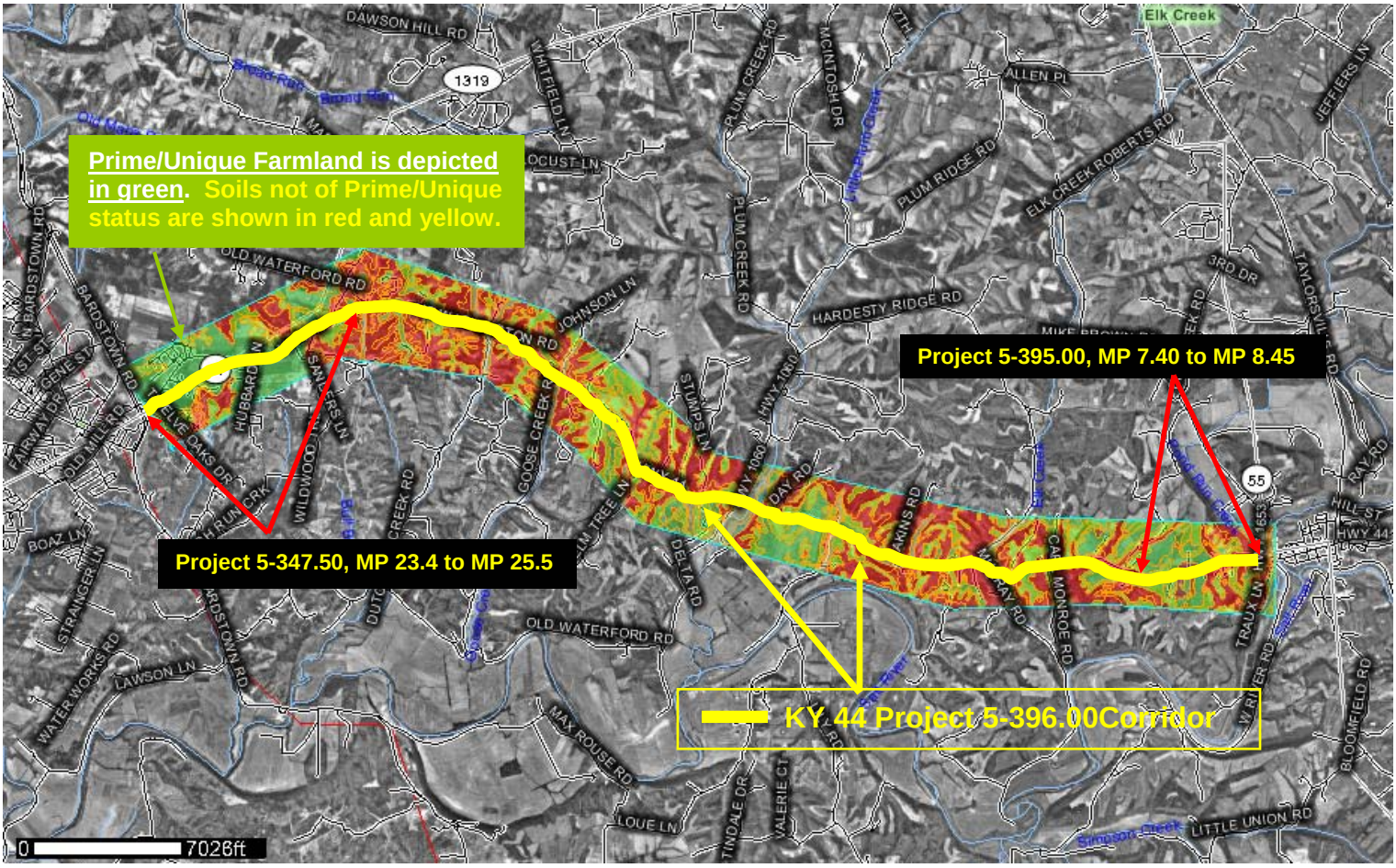


Figure 8, KY 44 Project and Farmland Soils

Item No. 5-396.00 Half of the comprehensive project corridor is situated on land that is classified as prime and unique farmland. An expanded view of the soils beyond the project corridor has been provided to indicate that the avoidance of prime and unique farmland is unavoidable. In addition, the project corridor would be mainly situated atop and along existing KY 44, which would minimize the amount excavations in comparison with a new highway.

Item No. 5-395.00 the Spencer County project, will also be located within an area of the overall project corridor that is mainly prime and unique farmland. Land use in this area is also changing. Several roadways have been constructed to accommodate new neighborhoods. In addition, a sign advertising parcels for sale was noted just west of the cemetery and across the street from the schools. Care will be taken to minimize impacts to areas where active farming is still prevalent.

Item No. 5-347.50, Much of the area within the western portion of the project in Bullitt County is experiencing a transition from agricultural to commercial and residential land use Farmland within the Bullitt County project is mainly prime and unique farmland, however most of the land is in transition to residential and commercial land uses. The roadway improvements will not impact farmland losses as greatly as a new highway or road, but care should be taken to minimize impacts especially where farming activities are still evident.

- Farmland Preservation Under Kentucky's Farmland Preservation Program, the Purchase of Agricultural Conservation Easement (PACE) Corporation has been authorized to purchase agricultural conservation easements. These easements are to ensure that lands currently in agricultural use will continue to remain available for agriculture and not be converted to other uses. Since 1994, PACE has purchased conservation agreements with 75 farms totaling 16,238 acres. In addition, 19 easements on 3,069 acres have been donated to the program. Another 512 applications are pending for a total of 101,000 acres.

In the project area, three conservation easements have been purchased in Bullitt County. No conservation easements have been purchased in Spencer County. The easements in Bullitt County are not located within the project corridor area. The entire corridor does not appear to have the potential to impact conservation easements purchased by PACE.

D. Section 4(f) and Section 6(f) Resources

1. Section 6(f) Resources The project area was reviewed and inspected for outdoor recreational land and water areas, and facilities that w ere established with assistance from grants-in-aid from the Land and Water Conservation Fund (LWCF). The National Park Service and the Kentucky Department for Local Government administer these funds to local jurisdictions. Counties and cities in the project area have received funds for parks, swimming pools, boat ramps, tennis courts, and baseball fields (see Table 18 below for a breakdown of the number of Section 6(f) resources by county).

Table 21: Section 6(f) Resources

County	Number of Section 6(f) Resources within the Project Corridor	Section 6(f) Resources Potentially Affected
Bullitt	15	0
Spencer	6	1

Properties acquired or developed with LWCF assistance are prohibited by Section 6(f) of the Land and Water Conservation Fund Act from conversion to other than public outdoor recreation use without approval of the National Park Service. This approval can only occur after all practical alternatives have been

considered. When LWCF facilities are impacted through either partial or total acquisitions, the property acquired must be replaced with property that is of equal, or greater, fair market value, and the land must be used for similar purposes.

Item No. 5-396.00 While several recreational facilities within the project counties have received LWCF monies, only the Waterford Community Park near Taylorsville had the potential to be affected. The Waterford Community Park contains softball fields, basketball, a tot lot, walking trails, and picnic area. Any widening on the north side of KY 44 in front of the park would acquire property from a Section 6(f) resource, but it is not anticipated that the 6(f) portions of the property would be acquired. The Kentucky Transportation Cabinet contacted the Governors Office for Local Development (GOLD). GOLD conducted an archival research of the property and determined that if the existing roadway is widened to the north, no impacts would be realized to portions of the park that were funded with LWCF monies and no Section 6(f) impacts should occur to this park. If future Build Alternatives are selected in this area of the project corridor, further coordination with GOLD will be required to determine the locations of the LWCF portions of the park. Alternatives on the south side of the existing roadway would not likely require property acquisition from the park.

Item No. 5-347.50 The Bullitt County project will not impact any Section 6(f) resources.

Item No. 5-395.00 The Spencer County project will not impact any Section 6(f) resources.

2. Section 4(f) Resources If Federal Transportation funds are used as part of the financing of any of the three project corridors, It is national law that special effort be made to preserve public park and recreation lands, wildlife and waterfowl refuges, and historic sites. In the Transportation Act of 1966, a special provision was included to provide protection to these resources. This provision, known as Section 4(f), stipulates that the Federal Highway Administration (FHWA) will not approve any program or project, which requires the use of any publicly owned park, recreation area, or wildlife or waterfowl refuge, or any land from an historic site of national, state, or local significance, unless: (1) no feasible and prudent alternate is present, and (2) all possible avenues of avoidance or minimization are explored and implemented.

Item No. 5-347.50 – Bullitt County Project Corridor. Section 4(f) resource impacts were not identified within this corridor. No impacts are anticipated.

Item No. 5-395.00 – Spencer County Project Corridor. Section 4(f) resources are likely, and are associated with historic and archaeological sites that are listed on, or are eligible for the NRHP. No other resources were located within the corridor.

Item No. 5-396.00 – General Project Corridor. Section 4(f) resource impacts are likely and are associated with properties that are eligible for, or listed, on the

National Register of Historic Places. These resources include historic and archaeological sites. One other resources were located within this corridor, the Waterford Community Park, is a public park. If right of way requires acquisition of part or all of this property, a Section 4(f) impact will occur.

E. Aesthetics/Visual Impacts

It is anticipated that the project will have only a minimal visual impact on the area communities such as Mount Washington, Waterford and Taylorsville. The aesthetic quality of a community is composed of visual resources such as those physical features that make up the landscape, including land, water, vegetation, and man-made features (e.g., buildings, roadways, and structures). Visual impacts affect communities from two perspectives:

1) the view from the road, and
2) the view of the road.

Item Nos. 5-396.00, 5-347.50 and 5-396.00 – The project is expected to have only minor visual effects on the area. The project corridor is not part of the Kentucky Scenic Byway system. No corridor features, scenic areas or recognized areas of beauty should be acquired within the project corridor. The most noticeable visual impact of the project will be the removal of existing vegetation. This will affect nearby residents. To minimize visual impacts, efforts should be made to only clear vegetation necessary for construction, proper sight distances, and horizontal clearance requirements. Re-vegetation with native flora would minimize the visual impacts of the project construction.

Potential visual effects on several historic properties within Item No. 5-395.00, the Taylorsville project corridor, and Item No. 5-396.00, the Bullitt/Spencer project corridor, could be mitigated with appropriate landscaping.

If no-build alternates are selected, no visual changes will occur in the area. If Build Alternatives are selected, the improved roadways will be located in areas that have been occupied by the existing KY 44. Indirect and cumulative impacts could include highway commercial development (i.e. gas stations, restaurants, hotels) at intersections and junctions, and improvements to KY 44 could induce additional development along the existing corridor – primarily close to the city limits of Mount Washington and Taylorsville. However, some development is occurring throughout the entire project corridor and the projects could accelerate these activities.

F. Pedestrian and Bicycle Facilities

KYTC will consider the need for bicycle facilities and pedestrian walkways as required by the Kentucky Pedestrian and Bicycle Travel Policy (July 2002). The considerations will be for Item **No. 5-347.50** in Bullitt County, Item No. **5-395.00** in Spencer County, and for the entire project corridor (**Item No. 5-396.00**).

Item No. 5-396.00, Bullitt/Spencer Counties Project Corridor – Little bicycle traffic and no bicycle facilities exist within the entire project area. If a Build Alternative is selected, no facilities would be constructed for the entire project corridor. The new highway should still improve conditions for bicyclists by providing wider, paved shoulders or sidewalks as part of the improved roadway sections.

Item No. 5-347.50, Bullitt County – A portion of the KY 44 section in Bullitt County is urban in nature. Wider lanes exist in the area immediately east of the intersection with US 31E and a sidewalk is featured in this urban area between the intersection and the Buillitt East High and the Old Mill Elementary schools. The project lanes transition from 12 to 10-foot in width and to a rural facility just past the schools, and no bicycle facilities or pedestrian walkways exist within the remaining project area along KY 44. The concentration of homes and the high school in the area indicate that some pedestrian and bicycle traffic is likely to occur in this area, especially during school hours. Coordination with local officials should determine if the need for additions of or improvements to these facilities are needed within the project corridor.

Item No. 5-395.00, Spencer County – This project features no bicycle or pedestrian facilities. Due to the primarily rural nature of the project corridor it is anticipated that there will be little pedestrian traffic and there might not be a need for pedestrian walkways as part of the project. Schools and a subdivision exist on the south side of existing KY 44, but no sidewalks are featured along the roadway. Sidewalks might not be necessary in this area because the homes are not located along the roadway. If an urban curb and gutter typical section is used in this section, sidewalks would likely be included. Coordination with local officials should determine if the need for additions of or improvements to these facilities are needed within the project corridor.

G. Social Institutions, Non-profit Organizations

The project corridor features various public institutions including a volunteer fire department, three cemeteries, four churches and four public schools. Descriptions of these areas of interest and their locations in relation to the projects are provided on the following pages.

Item No. 5-396.00, the General Project Corridor –

Cemeteries – A cemetery associated with the Plum Creek Baptist Church was identified near the community of Waterford. It is located just north of KY 44 behind the church building and just west of Plum Creek.

Figure 9, Plum Creek Cemetery

Figure 10, Plum Creek Baptist Church

Churches – A total of four churches exist within the entire project corridor. The First Assembly of God is located in the Item **No. 5-347.50** project section.

The Plum Creek Baptist Church, as seen above, is located in the community of Waterford and is associated with the cemetery mentioned in the previous section.

The Waterford Church of Christ, below, is located just west of the Plum Creek Baptist Church. It is located just north of the Waterford community.

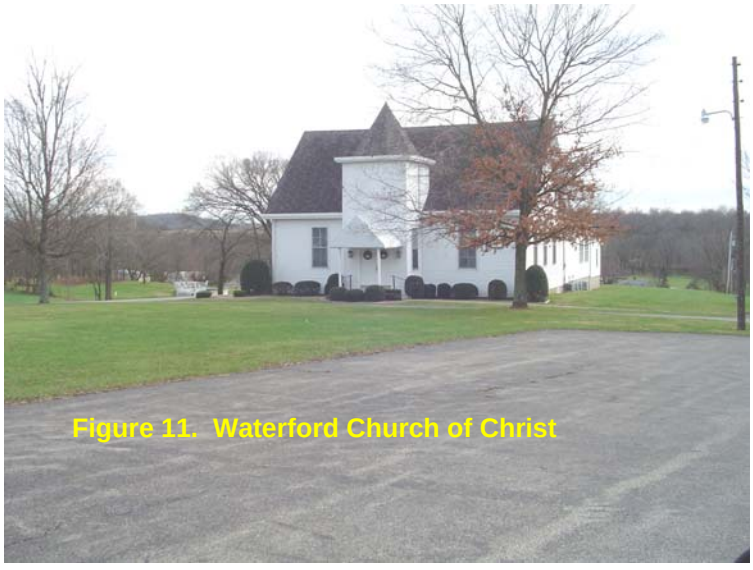


Figure 11. Waterford Church of Christ

A Jehovah's Witnesses Kingdom Hall, below, is located just north of KY 44 in Bullitt County near Milepoint 25.7 at Cedar Lake Drive.

Figure 12, Kingdom Hall, Jehovah's Witnesses

Non-profit Organizations

The Spencer County Fire District, Station 3 building is located on the south side of existing KY 44 (5101 Mount Washington Road). It is a volunteer fire fighting operation. Interruption of services to area residents should be avoided if relocation is necessary.

Figure 13, Spencer County Fire District, Station No. 3

Item No. 5-347.50, Bullitt County

Cemeteries - The Saint Francis and Mount Washington Cemeteries are located within the project corridor on the south side of existing KY 44. It is unlikely that either of these cemeteries will be included as right-of-way for the project build alternatives. Care will be taken to avoid these sites if the corridor shifts or if alignments must be considered in the most southern areas of the corridor.

Schools - The Bullitt East High School is located just north of the project corridor between Milepoints 23.5 and 23.7. It is unlikely that the high school would be relocated by this project. Located immediately adjacent to Bullitt East High School is Old Mill Elementary School.

Figure 14, Bullitt East High School

Churches – The First Assembly of God (below) is located just north of the existing KY 44 near milepoint 24.4. The building is located off the road at a distance that should allow avoidance of relocation.

Figure 15, First Assembly of God Property, Bullitt County

Item No. 5-395.00, Spencer County

Cemeteries – The Valley Cemetery is located on the northern edge of the project corridor along the existing KY 44 roadway at approximately Milepoint 7.9. Care should be taken in this area to avoid the cemetery if possible.

Figure 16, Spencer County Elementary and Middle Schools and Valley Cemetery

Schools – The Spencer County Middle and Elementary Schools are located on the south side of the existing KY 44 just past the Cemetery between milepoints 7.6 and 7.8.

Every effort will be made to avoid affecting or relocating these institutions. No other non-profit or social institutions are evident within this project corridor. As alternatives are developed, corridor-specific assessments will be required as part of the socioeconomic/conceptual state relocation report to identify specific impacts and mitigation measures if they cannot be avoided.

H. CULTURAL AND HISTORIC RESOURCES

1. Historic Resources

Information about the historic cultural resources Bullitt and Spencer Counties was compiled from the Kentucky Heritage Council (which is considered the State Historic Preservation Officer or SHPO) site files, National Register of Historic Places, and County planning documents. In March 2008, Cultural Resource Analysts, Inc. (CRAI) completed the fieldwork for the cultural historic overview survey of the KY 44 corridor between KY 1633 in Taylorsville and US 31E Bypass in Mt. Washington in Spencer and Bullitt Counties, Kentucky (5-347.50, 3-395.00, and 5-396.00). The map is included in the exhibits, which begin on page 51, as Figures 2A and 2B. The purpose of this survey was to identify cultural historic resources within this corridor, particularly those that appear potentially eligible for listing in the National Register of Historic Places. This survey report will be used as a planning study to guide the development of future transportation improvements in this area.

Prior to initiating fieldwork (January, February and March 2008), a search of records maintained by the SHPO was conducted to determine if previously recorded cultural historic sites were located in the area of potential effect. This inquiry indicated that 47 individual sites (Sites 1, 3, 4, 6, 8, 21-25, 30, 37-39, 41, 42, 44, 48, 52, 56, 58-74, 78, 82, 84, 87, 88, 90, 91, 116, 118, and 125) located within the area of potential effect had been previously documented. Four of these sites had been determined eligible for listing in the National Register of Historic Places according to the records of the Kentucky Heritage Council (Sites 38 [SP-64], 39 [SP-63], 42 [SP-62], and 52 [SP-61]). One of these sites is no longer extant (Site 42 [SP-62]). Another 7 previously identified historic sites are also no longer extant (Sites 23 [SP-T-2], 24 [SP-T-3], 59 [SP-W-2], 66 [SP-45], 67 [SP-46], 84 [SP-47], and 90 [SP-348]). Additionally, one previously identified historic site, Site 48 (SP-337), was indicated as the Foreman School #2, a former one-room school converted to a residence. As indicated on the mapping supplied by the Kentucky Heritage Council during the records review, this site is an American Bungalow that does not resemble the Foreman School #2 as pictured on the survey form. During the field survey, 78 previously unidentified individual historic sites (Sites 2, 5, 7, 9-20, 26-29, 31-36, 40, 43, 45-47, 49-51, 53-55, 57, 75-77, 79-81, 83, 85, 86, 89, 92-115, 117, and 119-124) were documented. Included in the survey were numerous barns that appeared to be over 50 years of age and examples of Ranch houses which may or may not be over 50 years of age. Ranch houses were built utilizing similar massing, fenestration, and materials during the third quarter of the twentieth century, thereby making the determination of exact age difficult. With the commonality of the Ranch type in both Spencer and Bullitt Counties, only exemplary examples would be eligible for listing in the National Register of Historic Places. During the survey, no Ranch-style houses appeared to meet the threshold standard for potential eligibility for listing in the National Register of Historic Places. A cemetery (Site 86) was indicated along the south side of KY 44 in Spencer County on a historic topographic map. This cemetery was not located during the overview survey, but its supposed approximate location is included on the report mapping. As a result of this survey, 15 sites were identified as potentially eligible for the National Register of Historic Places (Sites 1, 4, 6, 21, 22, 30, 32, 37, 44, 53, 54, 56, 63, 71, and 91). Final determinations of eligibility and National Register of Historic Places boundaries cannot be determined, however, until each site has been examined more closely and site-specific archival research has been completed. The totals of the sites are included in the table below:

Table 22: Cultural Historic Sites with Potential for Eligibility on the National Register of Historic Places, by Project Corridors*

Project No.	Total Number of Eligible Sites within Project Corridor
Item No. 347.50	0
Item No. 395.00	9
Item No. 396.00	18

***Please refer to Exhibits 2A and 2B at the back of the report to see locations of the sites.**

A final determination of eligibility for the National Register sites will require additional research, photography, physical examination of the structures, and evaluation of these sites relative to the integrity standards established by similar properties in the counties under consideration, which are currently listed on the National Register, and consultation with the SHPO.

If any historic property listed or eligible for listing on the National Register is used for a federally funded transportation project, a Section 4(f) evaluation must be conducted. Under Section 4(f) of the Department of Transportation Act of 1966. A federally funded highway project can be approved only after a determination is made that no prudent and feasible alternative exists to using property from historic sites. If a historic property will be affected, avoidance alternates and mitigation measures must be considered.

2. Archaeological Resources

The study corridor consists primarily of dissected and undissected uplands, with lesser amounts of hillsides and alluvial landforms. Based on an assessment of the association between landforms and soils, it is considered likely that significant prehistoric archaeological sites could be discovered on any of the terraces or floodplains of the Salt River and its tributaries, particularly the larger tributaries (i.e., Brashears Creek, Elk Creek, Plum Creek). The upland areas are also considered to have the potential to contain archaeological sites, but these landforms are less likely to hold significant deposits because of disturbances (i.e., agricultural plowing, development) and erosion. The steep sideslopes and hillsides are considered to have low potential to contain archaeological sites, but it is possible that prehistoric caves, rockshelters, or historic cemeteries could be present. However, previous research in Bullitt and Spencer Counties suggests that cave and rockshelter sites are not often found in the region.

A review of historic maps suggested the locations of 52 potential historic sites, at least 10 of which potentially date to the nineteenth century. Most of the sites are located within the entire study corridor, Item No. 5-396.00.

Item No. 5-347.50 – A total of 10 potentially historic archaeological sites are located within Item 5-347.50.

Item No. 5-395.00 – A total of six potentially historic archaeological sites and one known site are located within Item No. 5-395.00.

I**tem No. 5-396.00 –** The investigation revealed that two known sites are located within Item No. 5-396.00. These sites are more likely to contain significant archaeological deposits and are therefore more likely to be considered eligible for the NRHP. In addition, at least 7 cemeteries, 9 churches, and 6 schools are present within the study corridor. These sites could potentially be considered eligible for the NRHP because they represent site types that have not been researched extensively in Kentucky.

When alignments within a corridor are developed, an archaeological survey will be conducted to identify archaeological sites. It should be noted that additional archaeological sites could be present within each corridor, but they might not be documented at this time.

I. AQUATIC AND TERRESTRIAL RESOURCES

1. Watersheds

The project area is located within the Salt River Basin, which includes all three project areas. In addition, there are nearly 9,375 miles of streams in the watershed as indicated on the 1:24,000 scale topographic maps of the area. The watershed is bounded on the north and west by the Ohio River, on the east by the drainage divide with the Kentucky River Basin, on the south by the drainage divide with the Green and Tradewater Basin. The general topography ranges from nearly flat along alluvial plains to gently rolling

pastures to hilly, steeply sloping hillsides in upland areas. The elevation of land surface ranges from slightly less than 400 feet to more than 1,200 feet above mean sea level. The 15 counties that comprise the watershed include Anderson, Boyle, Bullitt, Casey, Hardin, Henry, Larue, Marion, Jefferson, Mercer, Nelson, Oldham, Shelby, Spencer, and Washington. Major population centers in the watershed include Louisville and Jefferson County, Bardstown, Fort Knox, LaGrange, Shelbyville, Taylorsville, and many other smaller communities.

Item No. 5-396.00 – Construction of the three projects will not impact the Salt River. A total of six named streams within the basin will be crossed if a build alternative is selected for Item No. 5-396.00, but mitigation measures will ensure that impacts are minimal. The perennial streams are Little Dutchman Creek, Dutchman Creek, Goose Creek, Plum Creek, and Elk Creek.

Item No. 5-347.50 – the Bullitt County project, will not cross a named stream.

Item No. 5-395.00 – the Spencer County project, would cross Pond Creek. Mussels on the USFWS list of endangered, threatened and candidate species were located downstream of this crossing area Brashears Creek and the Salt River (see page 42).

2. Floodplain Encroachment

The Federal Emergency Management Agency (FEMA) was website was reviewed for information regarding floodplains within the proposed corridors. No published floodplain information is available for the project area in Bullitt County. Published information was searched to identify potential floodplain encroachments within Spencer County. The corridor crosses three known floodplain zones within Spencer County. All floodplains crossed are listed as 100-year flood areas with no flood hazard factors determined (Zone A areas). Maps of the areas where the 100-year Floodplain coincides with the project area are included in Figure 1, Appendix B. The locations of the floodplains in this figure are illustrated in purple shading.

Item No. 5-396.00, the Project Corridor – Two Zone A floodplain areas along Plum Creek and Elk Creek, and the potential to cross Pond Run Creek exists just west of the City of Taylorsville on the northern edge of the project corridor. Additional floodplain zones likely exist along streams in Bullitt County, but these zones are not mapped. Zone A floodplains could exist along Dutchmans and Little Dutchmans Creek, located along the boundary with Spencer County. The project could also cross the edge of Brashears Creek at the Taylorsville city limits. This area is located at the confluence of Pond Run Creek and Brashears Creek.

Some floodplain impacts (i.e. loss of riparian vegetation, disturbance of habitat, potential for increased sedimentation in the stream, etc) would be expected during construction if this corridor were selected. Fills and/or cuts in the floodplains during construction may limit the buffering capacity of flood control for that area.

Item No. 5-347.50, Bullitt County – It does not appear that any impacts to floodplains would likely be associated with this project. The project is located within an area that is

mostly developed, and no streams were evident in the area that appeared to have floodplain encroachments.

Item No. 5-395.00, Spencer County – This project is located adjacent to the Brashears Creek 100-year floodplain. The eastern terminus at KY 1633 does not appear to encroach upon the floodplain, but as alternatives are developed, further coordination with FEMA is recommended to ensure that impacts are avoided or minimized. The floodplain exhibits are included in Exhibits 1 and 2, pages 2 and 3.

3. Stream Crossings

The project area would involve crossing six named streams within the **Item No. 5-396.00** corridor. Impacts to these areas may range from water quality issues to channel changes to removal of plant and animal habitat. Bridges, culverts, and other structures will need to be constructed or widened and updated for the project areas. No crossings are anticipated for the **Item No. 5-347.50** corridor in Bullitt County. **Item No. 5-395.00** in Spencer County would cross Pond Creek.

Perennial (water is always present in perennial streams) and intermittent (water is present except in late summer and fall in intermittent streams) stream crossings occur throughout the study corridor. The project area has the potential to cross approximately 6 perennial streams (these streams currently have some structure, bridge or culvert, spanning them) and several intermittent streams. The perennial streams are Little Dutchman Creek, Dutchman Creek, Goose Creek, Plum Creek Elk Creek and Pond Creek. An area south of the confluence of Pond and Brashears Creeks and the KY 44 bridge into Taylorsville is an area where several species of mussels as identified in Tables 23 and 24 on Pages 40 and 41, have been cited in this area. The project does not appear to impact this area. If the corridor shifts to the south from the existing KY 44 bridge over Brashears Creek, the Environmental Coordinator in the KYTC District 5 office should be contacted.

Ephemeral stream (water rarely is present except during and immediately after a rain event) crossings could not be determined from viewing topographic maps and field visits. The amount of actual stream crossings will likely be reduced when alignments are selected within the corridor. Potential for channel changes exists as well with construction in this corridor. Various impacts to streams and creeks will likely require permits and potential stream restoration/mitigation. Ephemeral streams will be investigated once alignments are determined.

4. Outstanding and Exceptional Water Resources

The environmental footprint area is situated within the Salt River Basin. A review of the KY Environmental and Public Protection Cabinet website indicated that no Wild and Scenic rivers have been identified within the project area. In addition no Special Use waters, Exceptional Waters, Reference Reach or Federally Designated Waters or Streams are situated within the footprint area.

5. Wetlands

Wetlands were identified by conducting field visits and using National Wetland Inventory (NWI) maps for Bullitt and Spencer Counties. The maps included the Mt. Washington, Waterford and Taylorsville quadrangles. It appears that between 20 and 24 wetlands

classified as PUBHh were located within or adjacent to the project corridor. PUBHh wetlands are palustrine and have unconsolidated bottoms with over 25% of the cover of particles being greater than 6 to 7 centimeters. Their vegetative cover is less than 30 percent. These wetlands are permanently flooded, diked or impounded and can be fish or agricultural ponds.

Item No. 5-396.00 – General Project Corridor – Field visits and reviews of NWI maps revealed approximately fifteen to seventeen riverine wetlands, which occur along the streams that are crossed by the existing KY 44 and the studied 2000-foot wide corridor. No forested wetlands, emergent wetlands or lacustrine (lake) wetlands were observed or identified within the project corridor. A total of two riverine wetlands were identified along Plum Creek and Elk Creek. Upon selection of alignments within this project, many of the wetlands could be avoided. Actual totals of wetlands impacts cannot be addressed until final alignments are selected. Best judgment should be used when designing alignments to avoid impacting wetlands. If this is not possible, mitigation may be an option to compensate for the impacts.

Item No. 5-347.50, Bullitt County – Reviews of NWI maps indicated that an estimated 15 to 20 wetlands are located near the project area. Over half these wetlands are ponds and all of the wetlands are located on the edges or outside of the project corridor.

Item No. 5-395.00, Spencer County – No jurisdictional wetlands exist within the project corridor.

6. Federal and State Threatened and Endangered Species

The data summarized in this analysis represents known occurrences of federal threatened and endangered species within both corridor options. Information came from coordination with the United States Fish and Wildlife Service (USFWS) in Frankfort, Kentucky. In addition the Kentucky Department of Fish and Wildlife Resources and the KY State Nature Preserves provided information identifying species of concern that might exist within Bullitt and Spencer Counties. Initial data was also gathered from county records displayed on the USFWS website. This information is very general and does not necessarily imply that a specific number of impacts would occur within a corridor. The following paragraphs list and briefly describe the federally threatened and endangered species that can occur within the project's corridors.

Table 23 - Endangered, Threatened, & Candidate Species in Bullitt County

Group	Species	Common name	Legal* Status	Known** Potential
Mammals	*Myotis grisescens*	gray bat	E	K
	Myotis sodalis	Indiana bat	E	K
Mussels	*Pleurobema clava*	clubshell	E	K
	Plethobasus cooperianus	orangefoot pimpleback	E	K
	Pleurobema plenum	rough pigtoe	E	P

Table 23, Continued

Group	Species	Common name	Legal* Status	Known** Potential
	Potamilus capax	**fat pocketbook**	**E**	**P**
	Cyprogenia stegaria	**fanshell**	**E**	**P**
	Epioblasma torulosa rangiana	**Northern riffleshell**	**E**	**P**
	Lampsilis abrupta	**pink mucket**	**E**	**P**
	Plethobasus cyphyus	**sheepnose**	**C**	**P**
	Obovaria retusa	**ring pink**	**E**	**P**

***E – Endangered Species, T – Threatened Species, C – Candidate Species**
**** - K – Known to exist in county, P – Potential to exist in county.**

Table 24 - Endangered, Threatened, & Candidate Species in Spencer County

Group	Species	Common name	Legal* Status	Known** Potential
Mammals	***Myotis sodalis***	**Indiana bat**	**E**	**K**
	Myotis grisescens	**gray bat**	**E**	**K**
Mussels	***Pleurobema clava***	**clubshell**	**E**	**K**
	Cyprogenia stegaria	**fanshell**	**E**	**K**
	Epioblasma torulosa rangiana	**Northern riffleshell**	**E**	**K**
	Lampsilis abrupta	**pink mucket**	**E**	**K**
Plants	***Trifolium stoloniferum***	**running buffalo clover**	**E**	**P**

- **Indiana Bat**

Item No. 5-347.50, Item No. 5-395.00, & Item No. 5-396.00 – The federally endangered Indiana bat (*Myotis sodalis*) is a medium-sized bat, 3.5 inches in length, with dark gray to brownish-black fur (Slone and Wethington, 2001). Typical winter habitats for the Indiana bat include limestone caves with stable temperatures of 39 to 46 degrees F. During summer months, maternity colonies roost under loose bark in floodplain and riparian forests. Indiana bats forage along streams or other bodies of water near forests, as well as in the canopy of upland and bottomland forests. The Indiana bat is listed as occurring in Bullitt and Spencer Counties.

The project corridors feature no forested areas suitable for habitat since no contiguous tracts of forest exist. A total of two roosting trees were located in an area north of the existing KY 44 near Cedar Lake Road (within the **Item No. 5-396.00** project corridor). Both were hickory trees located in a developed residential area.

The project crosses several large streams, but no stands of suitable tree specimens were identified within the 2000-foot wide study corridor for any of the three project areas.

- **Gray Bat** The gray bat (*Myotis grisescens*, federally endangered) is a medium-sized bat, 3-4 inches in length, with gray fur which is sometimes russet in summer. Gray bats roost, breed, rear young, and hibernate in caves year round. They migrate between summer and winter caves and will use transient or stopover caves along the way (Slone and Wethington, 2001).

Item No. 5-347.50 – the Bullitt County project. The gray bat is listed as occurring in Bullitt County, but no streams are located within the project area. No suitable habitat for Gray bats exists within this corridor. Most of the project corridor in Bullitt County is clear of riparian zones from residential and commercial development or in association with development activities. Less karst topography occurs in this area of Bullitt County than in the footprint area in Spencer County.

Item No. 5-395.00 and Item No. 5-396.00 – The Gray bat is listed as occurring in Spencer County. Field visits to identify suitable habitat in the area were conducted, and none were found within the corridor. Therefore it is not likely to be encountered in Item No. 5-395.00, and is not likely to occur within the Bullitt County section of Item No. 5-396.00.

- **Mussel Species**

Area streams that were identified in the field trips and map reviews include Little Dutchman Creek, Dutchman Creek, Goose Creek, an unnamed tributary of Goose Creek, an unnamed tributary of Plum Creek, Plum Creek, Elk Creek and two unnamed tributaries, Chadbourne Branch and two unnamed tributaries, and Pond Creek and an unnamed tributary. It is unlikely that mussels would be located in these streams due to unsuitable habitat. The streams lacked depth, riffle pools and other features that typically support the aquatic habitat suitable for sustaining mussel populations. Surrounding land uses including residential development, culverts under the existing roadway, and agricultural activities contribute to the lack of suitable mussel habitat for any of the projects. As alternatives are developed, care will be taken to avoid this area. Additional studies and efforts to identify mussels would be conducted in the analyses of project alternatives to locate and either avoid or mitigate potential effects to these species.

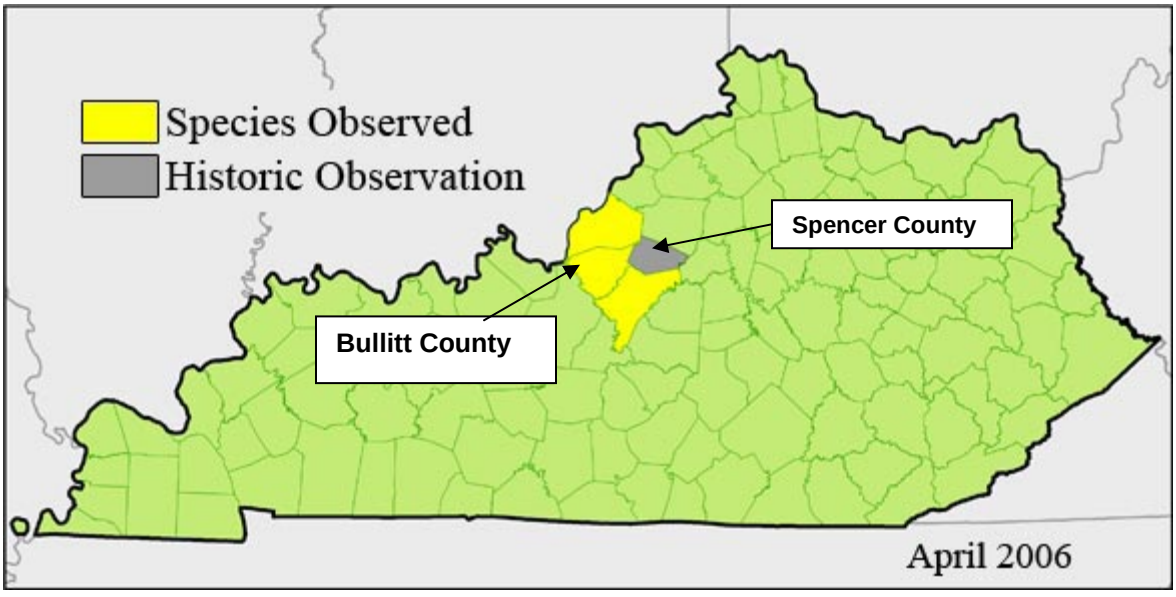
Although several mussels were identified that are listed on the USFWS list of threatened or endangered species (included in Tables 23 and 24, pages 40 and 41) no suitable mussel habitats appear to exist within the project corridors of **Item No. 5-347.50, Item No. 5-395.00 or Item No. 5-396.00.** Even though no mussel species are likely to be identified within the project corridor, several mussel species have been identified in Brashears Creek and the Salt River which is adjacent to Item **No. 5-395.00 and Item No. 5-396.00.** As alternatives are developed further investigation of all project streams and Brashears Creek and the Salt River could be conducted to confirm that mussels do not exist within project alternative corridors.

Item No. 5-395.00, & Item No. 5-396.00 – Running buffalo clover is a perennial clover and is listed as potentially existing only in Spencer County. The leaves are light green and the flowers are white and approximately 0.05 inches long. Flowering occurs in April and May. Habitats vary for this species, ranging from stream banks and low, moist forests to successional areas in mesic forests. Running buffalo clover grows in areas with filtered light. It is found in areas with moderate periodic disturbances such as light grazing, animal trails, footpaths, dirt roads or occasional mowing. Due to the rural nature of portions the project corridor, potential habitat for running buffalo clover is present. The project could disturb some potential habitat through construction activities and paving. As alternatives are developed, field visits could be required to determine if running buffalo clover exists within the proposed rights of way.

The U.S. Fish and Wildlife Services, the Kentucky Department of Fish and Wildlife Resources (KDFWR) Fish and Wildlife Information System (FWIS) and the Kentucky State Nature Preserves Commission (KSNPC) County Report of Monitored Species were consulted for lists of state and federal threatened and endangered species that could occur within the environmental footprint. Sensitivity will be shown to these species when considering alternatives. See Appendix A, Figure 1 for a list of state and federal threatened and endangered species that occur within the corresponding counties.

Item No. 5-346.50 and 5.396.00 – KY glade cress *(Leavenworthia exigua var. laciniata)* This plant is about 2-4 inches in height. Small white to lilac colored flowers with four petals appear usually beginning in mid to late March. It is believed that glade cress formerly grew in bison trails and wallows, especially since some of the main bison trails (such as State Road 480) and mineral licks in the region are located here in close association with the range of glade cress. With the bison gone, these tiny plants have become associated with other hoofed animals, primarily cattle.

Figure 17, Known Kentucky Occurrences of KY Glade Cress



Glade cress grows on areas of flat soil, usually the thin soils and gravel around the dolomite rock outcrops that are unique to this area. It is also found in lawns and pastures where moist bare soil is predominant in the spring.

Glade cress has been identified in areas near US 31E in Bullitt County and was observed historically in Spencer County; therefore efforts to locate this plant within the project corridor will be made during the terrestrial baseline analysis. According to the Kentucky State Nature Preserves website, "exotic pest plants are a threat to this species and should be removed. Avoid creating access to the site through trail or road construction. Timber removal within the project area could be beneficial and even necessary to maintain the open character of the habitat for this species. Hand removal of trees in the vicinity of the population is crucial to avoid impacts from timber operations."

7. Natural Areas

Natural areas are defined as land or water units where natural conditions are maintained to the greatest extent possible. Natural conditions usually result from allowing ordinary physical and biological processes to operate with a minimum of human intervention. No natural areas exist within or near the project corridors. No impacts will occur and no mitigation measures will be required for Item No. **5-396.00**, Item No. **5-395.00**, or Item No. **5-347.50**.

8. Karst Features/Sinkholes

Kentucky Geological Survey map data were reviewed for the project corridor for Karst potential. The map indicates that the project areas are located in low to moderate risk areas for Karst features. Most sinkholes appear to be avoided by Item No. 5-347.50 in Bullitt County and by 5-395.00 in Spencer County.

Item No. 5-396.00 – the main project corridor – An area in the middle of the project corridor features a large sinkhole just south of existing KY 44. Care should be taken to avoid this feature if future projects are developed within this area. No other sinkholes in or near the comprehensive project corridor were identified, other than the ones discussed in the project corridors below.

Item No. 5-347.50 – The Bullitt County project corridor is located within an area that is considered to have medium probability for Karst features to occur. All of the identified sinkholes, approximately two dozen, are located north of the project, and are outside the project corridor.

Item No. 5-395.00 – The Spencer County project corridor is also located within an area that is considered to have medium probability for Karst features. Field trips and maps identified no sinkholes within the project area.

J. Hazardous Materials and Underground Storage Tanks

A national record database search (conducted by FirstSearch Technology Corporation) and a windshield survey of the project area were conducted (December 2007) to identify any sites with hazardous materials or underground storage tanks. The records search identified sites on the Resource Conservation and Recovery Act (RCRA) Notifiers' list of hazardous waste generators, sites on the Comprehensive Environmental Response, Compensation, and Liability Act Information System of potential Superfund sites, or sites with incidents involving hazardous materials. Below are descriptions of sites within the project corridor that might have hazardous materials and/or underground storage tanks.

Item No. 5-347.50 – Bullitt County

BP/Fivestar An active gasoline/convenience store exists near the western terminus. This site includes three USTs for automobile fuels. Further ESA Phase I investigation will be required if project alternatives include the potential for removal of these tanks.

Item No. 5-395.00 – Spencer County

Jewell's Truck Sales

No USTs or hazardous materials were identified within this project corridor, but one possible site might exist at a truck/implement sales company located on the south side of the existing KY 44 just prior to the western terminus. As project alternatives are developed, it is recommended that a more detailed inspection of this site be conducted.

Item No. 5-396.00 – General Project Corridor

Figure 18, Residential Site 1 with barrels containing isocyanates.

Residential Site 1

This site, located on the south side of KY 44 and just east of Cox's Lane, was not detected in the database search. The field trip revealed several 55-gallon drums of a material including some barrels with a substance identified as "Line-X" with the identified chemical name, "isocyanate" on the barrel. According to the National Institute for Occupational Safety and Health (NIOSH) website, isocyanates are a family of highly reactive, low molecular weight chemicals. Isocyanates are widely used in the manufacture of flexible and rigid foams, fibers, coatings such as paints and varnishes, and elastomers, and are increasingly used in the automobile industry, in automobile body repair, and in building insulation materials.

This site also featured two rusted 55 gallon drums that were toppled and resting along a small ditch below the driveway. The materials within the drums were not evident and no unusual odors or colors were noticed in the immediate vicinity of the barrels. The owner of the site was removing the barrels from the ditch during the field trip.

Every effort will be made to avoid all sites during the design process. If this site must be included in the right of way limits of the project, Phase II hazardous materials investigations are recommended.

J & D's Pub

This site is located on the south side of KY 44 in Bullitt County, approximately 0.2 miles east of Cedar Lake Drive and 0.6 miles west of the Spencer County line. It appears to have a repair facility that either might or might not be active behind the tavern. If project alignments are considered that might impact or acquire this site, further investigations are recommended. The site was not identified in the database search.

Residential Site 2

The site is located on the north side of KY 44 across from Dutchmans Creek Road near Ryder Lane. It appears to be either a residential or commercial automotive repair shop. No USTs were evident and the site did not appear in the database search. Some 55 gallon drums were noticed in the area, and one was rusted and toppled on its side. If the project area would include an alternative on this site, a Phase I ESA investigation should be conducted.

Figure 19, Residential Site 2

K. Air Quality

Air quality concerns routinely exist for most types of highway improvements. For the KY 44 project corridor, air quality issues are of particular concern relative to where the corridors fall in proximity to sensitive land uses, such as population centers in Mount Washington and Taylorsville. If Federal funding becomes available, Mobile Source Air Toxics (MSATs) analysis will be required.

Bullitt County is located within the Louisville Air Quality Control Region, and has been designated as a non-attainment area for the Ozone 8-hour standard and for PM-2.5 (Particulate Matter < 2.5u). Coordination with the EPA and other agencies will be required.

Spencer County is considered in attainment for all transportation-related pollutants (carbon monoxide (CO), hydrocarbons (HC), nitrogen oxides (NOx), and particulates).

Table 23, below, includes data extracted from the KYTC Highway Information website's Traffic Count Information field that displays the ranges of Vehicles per Day (VPD) for each of the project counties:

TABLE 25: Range of Existing (2003 Figures)
Vehicles per Day for Project Counties*

Area	Vehicles Per Day
Bullitt County	3,220 to 19,500
Spencer County	3,220 to 12,100

***Source – Kentucky Transportation Cabinet, Highway Information System website**

For the KY 44 corridor, maximum future traffic volumes will be determined for the respective projects if federal funding is activated (2030 projections). It is anticipated that as population increase continues into 2030 that the improvements will generate more traffic. These projections will be used to model future air quality impacts within the project corridor. At this time, it does not appear that future levels of transportation-related pollutants are expected to impact the attainment status of Spencer County or add to the pollutant burden in Bullitt County. More site-specific air quality analysis and

computer modeling will be conducted when alternatives are developed. No air quality mitigation is expected to be necessary for this project.

If the no-build alternate is selected, future impacts to air quality will not occur. Secondary and cumulative impacts include the potential for additional air impacts if industrial and commercial businesses move into available sites within the project region.

L. Traffic Noise

KY 44 carries normal volumes of traffic and the existing receptors are already accustomed to some level of traffic noise. The majority of the corridor has roadways crossing it, and depending on the alignments developed, noise levels could increase for some receptors as the roadway is moved closer but may decrease for other receptors as the roadway moves away from them. In addition, the corridor along KY 44 will require the relocation of some residences and commercial facilities. For the relocated individuals and/or families, traffic noise will not be an issue.

There are several neighborhoods throughout the project area, and a site-specific traffic noise analysis and computer modeling might be conducted as alternates are developed. Future traffic noise levels in the study area could approach or exceed regulatory thresholds for which noise abatement considerations are appropriate at individual receivers (e.g., for residences 67 dBA and commercial facilities 72 dBA). A traffic noise analysis, including a cost analysis of noise barriers and other forms of abatement considerations for impacted receivers could be necessary for residential and church facilities in the project area. Cultural resources that would be considered sensitive receivers might be assessed by computer modeling once alternates have been developed. Every effort will be made to avoid or minimize noise impacts to cultural resources.

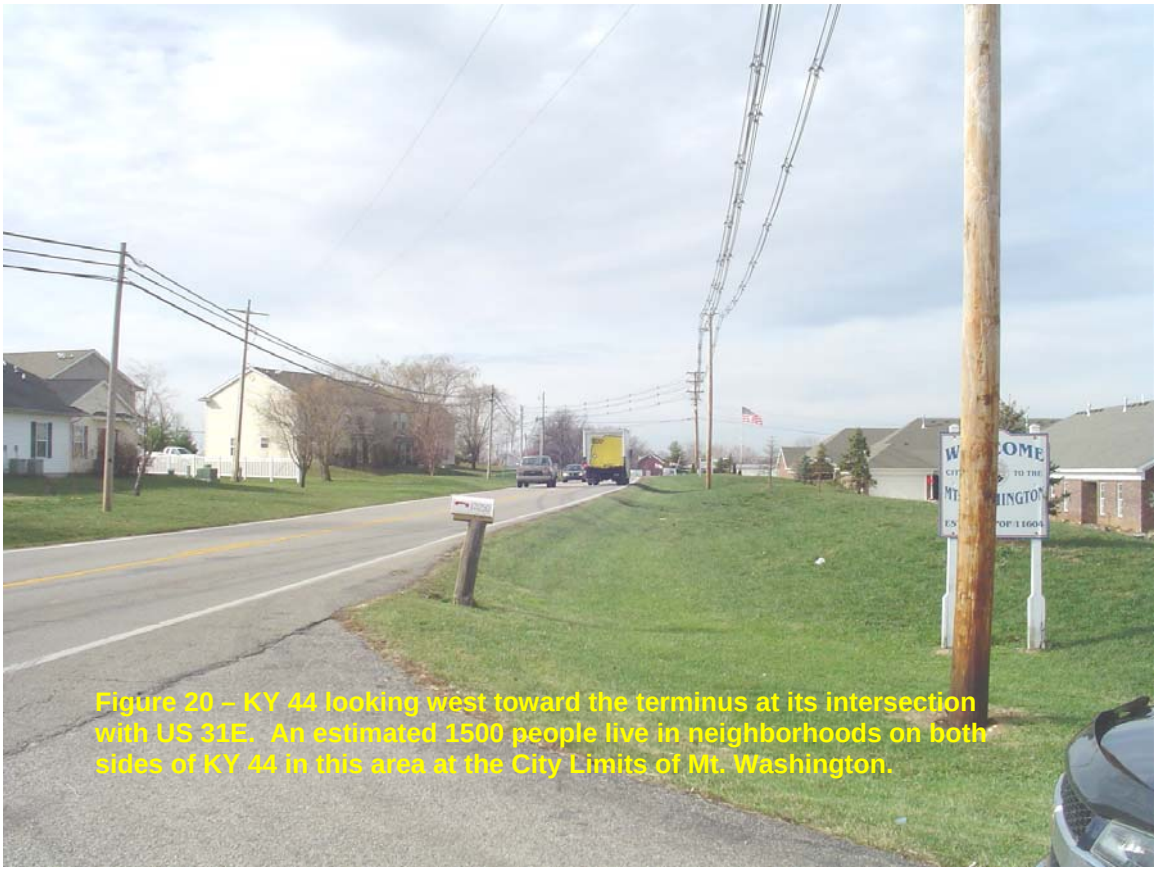


Figure 20 – KY 44 looking west toward the terminus at its intersection with US 31E. An estimated 1500 people live in neighborhoods on both sides of KY 44 in this area at the City Limits of Mt. Washington.

Once alternatives have been developed, computer modeling would assess each alternate's predicted impact on the area noise environment. Receptor sites would be selected that are representative of residences, businesses, churches, parks, and other areas of development along the project corridor.

M. Construction

Potential construction impacts from the projects are expected to be minimal, of short-term duration, and with no adverse environmental impacts. Traffic will be maintained at all times. A maintenance-of-traffic plan would be prepared during the design phase for Item Nos. **5-347.50 and 5-395.00**, and for any projects that might be developed between these areas as part of Item No. **5-396.00**. The KYTC Division of Environmental Analysis and the KYTC Division of Highway Design would coordinate construction commitments in the design notes. The Contractor would be required to follow all requirements as outlined by KYTC.

APPENDIX A

Federal and State Threatened and Endangered Species Lists by Agency

1. Federal Threatened and Endangered Species reported by USFWS as having potential to occur within the project corridors.

Species Common Name	Species Scientific Name	Listed Status
Mammals		
Indiana Bat	*Myotis sodalis*	Endangered
Gray Bat	*Myotis grisescens*	Endangered
Plants		
Running Buffalo Clover	*Trifolium stoloniferum*	Endangered
Mussels		
clubshell	*Pleurobema clava*	Endangered
fanshell	*Cyprogenia stegaria*	Endangered
Northern riffleshell	*Epioblasma torulosa rangiana*	Endangered
pink mucket	*Lampsilis abrupta*	Endangered
orangefoot pimpleback	*Plethobasus cooperianus*	Endangered
rough pigtoe	*Pleurobema plenum*	Endangered
fat pocketbook	*Potamilus capax*	Endangered
Sheepnose	*Plethobasus cyphyus*	Candidate
ring pink	*Obovaria retusa*	Endangered

2. Federal-listed threatened or endangered species reported from quadrangles within the project area. Information obtained from Kentucky Department of Fish and Wildlife Resources (KDFWR) website.

Taxonomic Group	Species	KDFWR Status*	Quadrangle
Birds	*Ardea herodias* (Great Blue Heron)	S	Waterford
	Vireo bellii (Bell's vireo)	S	Waterford
Bivalves	*Pleurobema clava* (Clubshell)	E	Waterford, Taylorsville
	Cyprogenia stegaria (Fanshell)	E	Waterford
	Epioblasma torulosa rangiana (Northern Riffleshell)	E	Waterford
	Lampsillis abrupta (Pink Mucket)	E	Waterford
	Toxolasma lividus (Purple Lilliput)	E	Waterford
	Pleurobema rubrum (Pyramid Pigtoe)	E	Waterford
	Simpsonaias ambigua (Salamander Mussel)	T	Mount Washington, Waterford
	Epioblasma triqueta (Snuffbox)	E	Waterford
Mammals	*Myotis sodalis* (Indiana bat)	E	Mount Washington

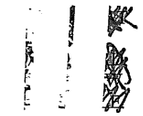
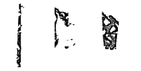
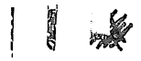
*** E = Endangered T = Threatened S = Special Concern**

3. Kentucky State Nature Preserves Commission (KSNPC)

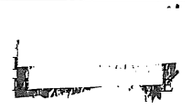
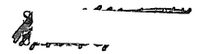
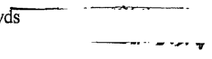
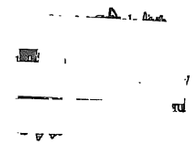
Standard Occurrence Report
KSNPC Federally Listed Elements within a 5-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
Extant in Kentucky																		
Freshwater Mussels																		
IMBIV10020*038	*Cyprogenia stegaria*	Fanshell	G1	S1	E	LE		Y	1982-06-07	S	X	Spencer	Waterford	380108N	0852838W	05140102110 - Salt River (Mount Washington - Smithville)		Medium to large streams and rivers with moderate to strong current in coarse sand and gravel and depth ranging from shallow to deep (Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967, Johnson 1980, Gordon and Layzer 1989).
IMBIV10020*054	*Cyprogenia stegaria*	Fanshell	G1	S1	E	LE		Y	1979-10-20	M	X	Spencer	Waterford	380124N	0852554W	05140102110 - Salt River (Mount Washington - Smithville) 05140102140 - Plumb Creek (Waterford - Wilsonville)		
IMBIV10020*155	*Cyprogenia stegaria*	Fanshell	G1	S1	E	LE		Y	2005-05-25	S	X	Spencer	Taylorsville	380436N	0851916W	05140102100 - Brashears Creek		
IMBIV16184*017	*Epioblasma torulosa rangiana*	Northern Riffleshell	G2T2	S1	E	LE		Y	1982-06-07	S	X	Spencer	Waterford	380108N	0852838W	05140102110 - S River (Mount Washington - Smithville)		Riffles or shoals with current and substrate of sand and/or gravel in small to moderate-size rivers (Clarke 1981, Watters 1987).
IMBIV21110*022	*Lampsilis abrupta*	Pink Mucket	G2	S1	E	LE		Y	1982-10-02	M	X	Spencer	Waterford	380123N	0852554W	05140102110 - Salt River (Mount Washington - Smithville) 05140102140 - Plumb Creek (Waterford - Wilsonville)		Large rivers in habitats ranging from silt to boulders, but apparently more commonly from gravel and cobble. Collected from shallow and deep water with current velocity ranging from zero to swift (Ahlstedt 1983, Bogan and Parmalee 1983, Buchanan 1980), but never standing pools of water (Lauritsen 1987).

Standard Occurrence Report
KSNPC Federally Listed Elements within a 5-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV31030*060	*Obovaria retusa*	Ring Pink	G1	S1	E	LE		Y	1998-09-24	S	X	Bullitt	Samuels	375941N	0853332W	05140102110 - Salt River (Mount Washington - Smithville)		
IMBIV35060*007	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1978-07-04	M	H	Jefferson	Jeffersontown Waterford Fisherville Mount Washington	380758N	0853106W	05140102190 - Floyds Fork (Fern Creek - Jeffersontown) 05140102180 - Floyds Fork (La Grange)		This species is an inhabitant of small streams and rivers (Goodrich and Van Der Schalie 1944; Ortmann 1919,1925), although in Kentucky it is known from moderately large rivers. Often deeply buried in the substrate and consequently difficult to find (Watters 1987).
IMBIV35060*015	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1900-Pre	S	X	Spencer	Waterford	380108N	0852836W	05140102110 - Salt River (Mount Washington - Smithville)		
IMBIV35060*016	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1983-08-03	M	X	Spencer	Taylorsville	380313N	0851918W	05140102040 - Salt River (Van Buren) 05140102100 - Brashears Creek		
IMBIV35060*017	*Pleurobema clava*	Clubshell	G2	S1	E	LE			1983-02-19	M	X	Spencer	Taylorsville	380213N	0852025W	05140102100 - Brashears Creek 05140102040 - Salt River (Van Buren) 05140102110 - Salt River (Mount Washington - Smithville)		
IMBIV35060*023	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1982-04-23	M	X	Spencer	Taylorsville	380202N	0852108W	05140102100 - Brashears Creek 05140102110 - Salt River (Mount Washington - Smithville) 05140102040 - Salt River (Van Buren)		
IMBIV35060*024	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	2005-05-25	S	X	Spencer	Taylorsville	380436N	0851916W	05140102100 - Brashears Creek		

Standard Occurrence Report
KSNPC Federally Listed Elements within a 5-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV35060*025	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1983-08-04	S	X	Spencer	Taylorsville	380355N	0851745W	05140102100 - Brashears Creek		This species is an inhabitant of small streams and rivers (Goodrich and Van Der Schalie 1944; Ortmann 1919,1925), although in Kentucky it is known from moderately large rivers. Often deeply buried in the substrate and consequently difficult to find (Watters 1987).
IMBIV35060*026	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1983-08-27	M	X	Spencer	Taylorsville	380459N	0851732W	05140102100 - Brashears Creek		
IMBIV35060*032	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1980-07-19	M	X	Spencer	Waterford	380125N	0852553W	05140102140 - Plumb Creek (Waterford - Wilsonville) 05140102110 - Salt River (Mount Washington - Smithville)		
Mammals																		
AMACC01100*073	*Myotis sodalis*	Indiana Bat	G2	S1S2	E	LE		Y	1988-06	S	E	Jefferson	Mount Washington	380505N	0853321W	05140102190 - Floyds Fork (Fern Creek - Jeffersontown)		Indiana bats use primarily caves for hibernacula, although they are occasionally found in old mine portals.
AMACC01100*163	*Myotis sodalis*	Indiana Bat	G2	S1S2	E	LE		Y	2005-05-26	S	E	Spencer	Taylorsville	380434N	0851920W	05140102100 - Brashears Creek		

Extirpated from Kentucky

Freshwater Mussels

Standard Occurrence Report
KSNPC Federally Listed Elements within a 5-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV47050*008	*Villosa fabalis*	Rayed Bean	G1G2	SX	X	C		Y	1983-08-03	M	X	Spencer	Taylorsville	380312N	0851918W	05140102100 - Brashears Creek 05140102040 - Salt River (Van Buren)	[redacted]	Occurs in small to medium-size rivers where it lives deeply buried in sand and gravel bound together by the roots of aquatic vegetation (Bogan and Parmalee 1983; Ortmann 1925, 1926; Parmalee 1967; Stansbery 1976). This small mussel is easy to overlook because of the habitat occupied.
IMBIV47050*009	*Villosa fabalis*	Rayed Bean	G1G2	SX	X	C		Y	1983-08-04	S	X	Spencer	Taylorsville	380355N	0851745W	05140102100 - Brashears Creek	[redacted]	

Standard Occurrence Report
KSNPC Monitored Aquatic Elements within a 5-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
Extant in Kentucky																		
Freshwater Mussels																		
IMBIV10020*038	*Cyprogenia stegaria*	Fanshell	G1	S1	E	LE		Y	1982-06-07	S	X	Spencer	Waterford	380108N	0852838W	05140102110 - S[illegible] River (Mount Washington - Smithville)		Medium to large streams and rivers with moderate to strong current in coarse sand and gravel and depth ranging from shallow to deep (Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967, Johnson 1980, Gordon and Layzer 1989).
IMBIV10020*054	*Cyprogenia stegaria*	Fanshell	G1	S1	E	LE		Y	1979-10-20	M	X	Spencer	Waterford	380124N	0852554W	05140102110 - Salt River (Mount Washington - Smithville) 05140102140 - Plumb Creek (Waterford - Wilsonville)		
IMBIV10020*155	*Cyprogenia stegaria*	Fanshell	G1	S1	E	LE		Y	2005-05-25	S	X	Spencer	Taylorsville	380436N	0851916W	05140102100 - Brashears Creek		
IMBIV16184*017	*Epioblasma torulosa rangiana*	Northern Riffleshell	G2T2	S1	E	LE		Y	1982-06-07	S	X	Spencer	Waterford	380108N	0852838W	05140102110 - Salt River (Mount Washington - Smithville)		Riffles or shoals with current and substrate of sand and/or gravel in small to moderate-size rivers (Clarke 1981, Watters 1987).
IMBIV16190*044	*Epioblasma triquetra*	Snuffbox	G3	S1	E	SOMC		Y	1982-06-07	S	F	Spencer	Waterford	380108N	0852838W	05140102110 - Salt River (Mount Washington - Smithville)		Occurs in medium-sized streams to large rivers generally on mud, rocky, gravel, or sand substrates in flowing water (Baker 1928, Buchanan 1980, Johnson 1978, Murrary and Leonard 1962, Parmalee 1967). Often deeply buried in substrate and overlooked by collectors.

Standard Occurrence Report
KSNPC Monitored Aquatic Elements within a 5-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV21110*022	*Lampsilis abrupta*	Pink Mucket	G2	S1	E	LE		Y	1982-10-02	M	X	Spencer	Waterford	380123N	0852554W	05140102110 - Salt River (Mount Washington - Smithville) 05140102140 - Plumb Creek (Waterford - Wilsonville)		Large rivers in habitats ranging from silt to boulders, but apparently more commonly from gravel and cobble. Collected from shallow and deep water with current velocity ranging from zero to swift (Ahlstedt 1983, Bogan and Parmalee 1983, Buchanan 1980), but never standing pools of water (Lauritsen 1987).
IMBIV31030*060	*Obovaria retusa*	Ring Pink	G1	S1	E	LE		Y	1998-09-24	S	X	Bullitt	Samuels	375941N	0853332W	05140102110 - Salt River (Mount Washington - Smithville)		
IMBIV35060*007	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1978-07-04	M	H	Jefferson	Jeffersontown Waterford Fisherville Mount Washington	380758N	0853106W	05140102190 - Floyds Fork (Fern Creek - Jeffersontown) 05140102180 - Floyds Fork (La Grange)		This species is an inhabitant of small streams and rivers (Goodrich and Van Der Schalie 1944; Ortmann 1919,1925), although in Kentucky it is known from moderately large rivers. Often deeply buried in the substrate and consequently difficult to find (Watters 1987).
IMBIV35060*015	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1900-Pre	S	X	Spencer	Waterford	380108N	0852836W	05140102110 - Salt River (Mount Washington - Smithville)		
IMBIV35060*016	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1983-08-03	M	X	Spencer	Taylorsville	380313N	0851918W	05140102040 - Salt River (Van Buren) 05140102100 - Brashears Creek		

Standard Occurrence Report
KSNPC Monitored Aquatic Elements within a 5-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV35060*017	*Pleurobema clava*	Clubshell	G2	S1	E	LE			1983-02-19	M	X	Spencer	Taylorsville	380213N	0852025W	05140102100 - Brashears Creek 05140102040 - Salt River (Van Buren) 05140102110 - Salt River (Mount Washington - Smithville)		This species is an inhabitant of small streams and rivers (Goodrich and Van Der Schalie 1944; Ortmann 1919,1925), although in Kentucky it is known from moderately large rivers. Often deeply buried in the substrate and consequently difficult to find (Watters 1987).
IMBIV35060*023	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1982-04-23	M	X	Spencer	Taylorsville	380202N	0852108W	05140102100 - Brashears Creek 05140102110 - Salt River (Mount Washington - Smithville) 05140102040 - Salt River (Van Buren)		
IMBIV35060*024	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	2005-05-25	S	X	Spencer	Taylorsville	380436N	0851916W	05140102100 - Brashears Creek		
IMBIV35060*025	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1983-08-04	S	X	Spencer	Taylorsville	380355N	0851745W	05140102100 - Brashears Creek		
IMBIV35060*026	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1983-08-27	M	X	Spencer	Taylorsville	380459N	0851732W	05140102100 - Brashears Creek		
IMBIV35060*032	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1980-07-19	M	X	Spencer	Waterford	380125N	0852553W	05140102140 - Plumb Creek (Waterford - Wilsonville) 05140102110 - Salt River (Mount Washington - Smithville)		

Standard Occurrence Report
KSNPC Monitored Aquatic Elements within a 5-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV35250*023	*Pleurobema rubrum*	Pyramid Pigtoe	G2	S1	E	SOMC		Y	1982-06-07	S	X	Spencer	Waterford	380108N	0852838W	05140102110 - Salt River (Mount Washington - Smithville)		Inhabits medium to large rivers and usually occurs in sand or gravel bottoms in deep waters (Ahlstedt 1984, Murray and Leonard 1962, Parmalee et al. 1982).
IMBIV35250*028	*Pleurobema rubrum*	Pyramid Pigtoe	G2	S1	E	SOMC		Y	1982-10-02	M	X	Spencer	Waterford	380123N	0852554W	05140102140 - Plumb Creek (Waterford - Wilsonville) 05140102110 - Salt River (Mount Washington - Smithville)		
IMBIV41010*007	*Simpsonaias ambigua*	Salamander Mussel	G3	S2S3	T	SOMC		Y	1980-07-21	G	F	Bullitt Spencer Jefferson Nelson	Mount Washington Samuels Waterford Fairfield	380048N	0853041W	05140102110 - Salt River (Mount Washington - Smithville) 05140102160 - Cedar Creek (Cedar Grove) 05140102190 - Floyds Fork (Fern Creek - Jeffersontown) 05140102140 - Plumb Creek (Waterford - Wilsonville) 05140102150 - Cox Creek (Fairfield)		Often found buried in substrate such as soft mud and/or gravel, and/or under flat stones in shallow water in small streams where the current may be swift (Baker 1928, Buchanan 1980, Goodrich and Van Der Schalie 1944).
IMBIV41010*009	*Simpsonaias ambigua*	Salamander Mussel	G3	S2S3	T	SOMC		Y	1982-06-07	S	F	Spencer	Waterford	380108N	0852838W	05140102110 - Salt River (Mount Washington - Smithville)		

Standard Occurrence Report
KSNPC Monitored Aquatic Elements within a 5-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV43030*029	*Toxolasma lividus*	Purple Lilliput	G2	S1	E	SOMC		Y	1982-06-07	S	X	Spencer	Waterford	380108N	0852838W	05140102110 - Salt River (Mount Washington - Smithville)	E	Small to medium-sized streams (Goodrich and Van Der Schalie 1944, Parmalee 1967, Stansbery 1976, Lauritsen 1987). Parmalee (1967) reported its occurrence on mud but related that sand or fine gravel beds in shallow running water was the preferred habitat.

Extirpated from Kentucky

Freshwater Mussels

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV47050*008	*Villosa fabalis*	Rayed Bean	G1G2	SX	X	C		Y	1983-08-03	M	X	Spencer	Taylorsville	380312N	0851918W	05140102100 - Brashears Creek 05140102040 - Salt River (Van Buren)		Occurs in small to medium-size rivers where it lives deeply buried in sand and gravel bound together by the roots of aquatic vegetation (Bogan and Parmalee 1983; Ortmann 1925, 1926; Parmalee 1967; Stansbery 1976). This small mussel is easy to overlook because of the habitat occupied.
IMBIV47050*009	*Villosa fabalis*	Rayed Bean	G1G2	SX	X	C		Y	1983-08-04	S	X	Spencer	Taylorsville	380355N	0851745W	05140102100 - Brashears Creek		

Standard Occurrence Report
KSNPC Monitored Birds and Mammals within a 10-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
Extant in Kentucky																		
Breeding Birds																		
ABPBX96010*002	*Chondestes grammacus*	Lark Sparrow	G5	S2S3B	T			Y	1937-05-15	M	H	Bullitt	Samuels	375824N	0853221W	05140102150 - Cox Creek (Fairfield)		Open situations with scattered bushes and trees, prairie, forest edge, cultivated areas, orchards, fields with bushy borders, and savanna (B83COM01NA).
Mammals																		
AMACC01040*116	*Myotis grisescens*	Gray Myotis	G3	S2	T	LE		Y	2005-07-26	S	E	Nelson	Samuels	375447N	0853010W	05140102150 - Cox Creek (Fairfield)		
AMACC01100*073	*Myotis sodalis*	Indiana Bat	G2	S1S2	E	LE		Y	1988-06	S	E	Jefferson	Mount Washington	380505N	0853321W	05140102190 - Floyds Fork (Fern Creek - Jeffersontown)		Indiana bats use primarily caves for hibernacula, although they are occasionally found in old mine portals.
AMACC01100*163	*Myotis sodalis*	Indiana Bat	G2	S1S2	E	LE		Y	2005-05-26	S	E	Spencer	Taylorsville	380434N	0851920W	05140102100 - Brashears Creek		
AMACC01100*188	*Myotis sodalis*	Indiana Bat	G2	S1S2	E	LE		Y	2005-07-27	S	E	Nelson	Samuels	375507N	0853125W	05140102150 - Co Creek (Fairfield)		

SENSITIVE ELEMENTS: Locational information for sensitive plants, animals, and natural communities, if released by the Kentucky State Nature Preserves Commission, may not be released in any document or correspondence. Please refer to the Data License Agreement for a full description of rights and restrictions.

Extant in Kentucky

Mammals

Standard Occurrence Report

KSNPC Monitored Birds and Mammals within a 10-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS		HABITAT
AMACC01040*044	*Myotis grisescens*	Gray Myotis	G3	S2	T	LE			1984-02-13	M	H	Bullitt	Brooks Shepherdsville	CONTACT KSNPC	CONTACT KSNPC	05140102170 - Salt River (Shepards[illegible] 05140102190 - Floyds Fork (Fern Creek - Jeffersontown)		NT-	Gray bats use primarily caves throughout the year, although they move from one cave to another seasonally. Males and young of the year use different caves in summer than females.

Standard Occurrence Report
KSNPC Monitored Elements within a 1-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

DR# 08-119_1mi

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
Extant in Kentucky																		
Vascular Plants																		
PDBRA1L042*030	*Leavenworthia exigua var. laciniata*	Kentucky Gladecress	G4T1T2	S1S2	E	SOMC		Y	2004-04-23	S	D	Bullitt	Mount Washington	380410N	0853038W	05140102190 - Floyds Fork (Fern Creek - Jeffersontown)		In full sun on flat-bedded outcrops of Silurian limestone or dolomite in shallow soils of glades, rock oucrops, pastures and lawns.
PDBRA1L042*038	*Leavenworthia exigua var. laciniata*	Kentucky Gladecress	G4T1T2	S1S2	E	SOMC		Y	1994-04-02	S	D	Bullitt	Mount Washington	380310N	0853117W	05140102110 - Salt River (Mount Washington - Smithville)		
PDBRA1L042*039	*Leavenworthia exigua var. laciniata*	Kentucky Gladecress	G4T1T2	S1S2	E	SOMC		Y	1994-04-02	S	X	Bullitt	Mount Washington	380252N	0853204W	05140102110 - Salt River (Mount Washington - Smithville)		
PDBRA1L042*040	*Leavenworthia exigua var. laciniata*	Kentucky Gladecress	G4T1T2	S1S2	E	SOMC		Y	1994-04-02	S	F	Bullitt	Mount Washington	380219N	0853309W	05140102110 - Salt River (Mount Washington - Smithville)		
PDBRA1L042*046	*Leavenworthia exigua var. laciniata*	Kentucky Gladecress	G4T1T2	S1S2	E	SOMC		Y	1994-04-04	S	F	Bullitt	Mount Washington	380341N	0853020W	05140102110 - Salt River (Mount Washington - Smithville)		
PDBRA1L042*049	*Leavenworthia exigua var. laciniata*	Kentucky Gladecress	G4T1T2	S1S2	E	SOMC		Y	1983-04-04	S	X	Bullitt Spencer	Waterford	380346N	0852913W	05140102110 - Salt River (Mount Washington - Smithville)		
PDBRA1L042*069	*Leavenworthia exigua var. laciniata*	Kentucky Gladecress	G4T1T2	S1S2	E	SOMC		Y	1994-04-19	S	C	Bullitt	Mount Washington	380346N	0853116W	05140102190 - Floyds Fork (Fern Creek - Jeffersontown)		
PDVIO040H0*012	*Viola septemloba var. egglestonii*	Eggleston's Violet	G4	S3	S			Y	1992-06-03	S	C	Bullitt	Mount Washington	380252N	0853204W	05140102110 - Salt River (Mount Washington - Smithville)		Calcareous barrens, glades and dry prairies associated with silurean and Mississippian limestones.
Freshwater Mussels																		

Standard Occurrence Report
KSNPC Monitored Elements within a 1-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV10020*054	*Cyprogenia stegaria*	Fanshell	G1	S1	E	LE		Y	1979-10-20	M	X	Spencer	Waterford	380124N	0852554W	05140102110 - Salt River (Mount Washington - Smithville) 05140102140 - Plumb Creek (Waterford - Wilsonville)		Medium to large streams and rivers with moderate to strong current in coarse sand and gravel and depth ranging from shallow to deep (Goodrich and Van Der Schalie 1944, Neel and Allen 1964, Parmalee 1967, Johnson 1980, Gordon and Layzer 1989).
IMBIV21110*022	*Lampsilis abrupta*	Pink Mucket	G2	S1	E	LE		Y	1982-10-02	M	X	Spencer	Waterford	380123N	0852554W	05140102110 - Salt River (Mount Washington - Smithville) 05140102140 - Plumb Creek (Waterford - Wilsonville)		Large rivers in habitats ranging from silt to boulders, but apparently more commonly from gravel and cobble. Collected from shallow and deep water with current velocity ranging from zero to swift (Ahlstedt 1983, Bogan and Parmalee 1983, Buchanan 1980), but never standing pools of water (Lauritsen 1987).
IMBIV35060*017	*Pleurobema clava*	Clubshell	G2	S1	E	LE			1983-02-19	M	X	Spencer	Taylorsville	380213N	0852025W	05140102100 - Brashears Creek 05140102040 - Salt River (Van Buren) 05140102110 - Salt River (Mount Washington - Smithville)		This species is an inhabitant of small streams and rivers (Goodrich and Van Der Schalie 1944; Ortmann 1919,1925), although in Kentucky it is known from moderately large rivers. Often deeply buried in the substrate and consequently difficult to find (Watters 1987).

Standard Occurrence Report
KSNPC Monitored Elements within a 1-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

DR# 08-119_1mi

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
IMBIV35060*023	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1982-04-23	M	X	Spencer	Taylorsville	380202N	0852108W	05140102100 - Brashears Creek 05140102110 - Salt River (Mount Washington - Smithville) 05140102040 - Salt River (Van Buren)		This species is an inhabitant of small streams and rivers (Goodrich and Van Der Schalie 1944; Ortmann 1919,1925), although in Kentucky it is known from moderately large rivers. Often deeply buried in the substrate and consequently difficult to find (Watters 1987).
IMBIV35060*032	*Pleurobema clava*	Clubshell	G2	S1	E	LE		Y	1980-07-19	M	X	Spencer	Waterford	380125N	0852553W	05140102140 - Plumb Creek (Waterford - Wilsonville) 05140102110 - Salt River (Mount Washington - Smithville)		
IMBIV35250*028	*Pleurobema rubrum*	Pyramid Pigtoe	G2	S1	E	SOMC		Y	1982-10-02	M	X	Spencer	Waterford	380123N	0852554W	05140102140 - Plumb Creek (Waterford - Wilsonville) 05140102110 - Salt River (Mount Washington - Smithville)		Inhabits medium to large rivers and usually occurs in sand or gravel bottoms in deep waters (Ahlstedt 1984, Murray and Leonard 1962, Parmalee et al. 1982).
IMBIV41010*007	*Simpsonaias ambigua*	Salamander Mussel	G3	S2S3	T	SOMC		Y	1980-07-21	G	F	Bullitt Spencer Jefferson Nelson	Mount Washington Samuels Waterford Fairfield	380048N	0853041W	05140102110 - Salt River (Mount Washington - Smithville) 05140102160 - Cedar Creek (Cedar Grove) 05140102190 - Floyds Fork (Fern Creek - Jeffersontown) 05140102140 - Plumb Creek (Waterford - Wilsonville) 05140102150 - Cox Creek (Fairfield)		Often found buried in substrate such as soft mud and/or gravel, and/or under flat stones in shallow water in small streams where the current may be swift (Baker 1928, Buchanan 1980, Goodrich and Van Der Schalie 1944).

Standard Occurrence Report
KSNPC Monitored Elements within a 1-mile radius of the KY 44 (31E to 1633) Project (Bullitt and Spencer Counties)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	OTHER STATUS	IDENT	LASTOB	PREC	EORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT
Others																		
Communities																		
CTGLD00060*002	*Dolomite glade*		GNR	S2				Y	1994-04-02	S	X	Bullitt	Mount Washington	380251N	0853202W		MT WASHINGTON CEDAR GLADE, CA 0.3 AIR MI E OF JCT KY 44 AND US 31E.	

APPENDIX B

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APPENDIX C

Project Area Maps

Gas Pipeline

560

1319

44

End
Project 5-347.50

Begin
Project 5-347.50
Begin
Project 5-396.00

31E
150

Legend

- Cemetery
- School
- Church
- Substation
- VFD (non profit)
- Water Well
- Oil/Gas Well
- Hazmat Site
- Park
- Flood Area
- Wetland Area
- Sinkhole Area
- Karst Area

1:23,338

EXHIBIT 1A

KY 44 Corridor
Bullit-Spencer County
USGS Topographic Map

KY 44, From US 31E to SR 1633

Gas Pipeline

560

1319

44

BULLITT CO

SPENCER CO

End
Project 5-347.50

Begin
Project 5-347.50
Begin
Project 5-396.00

31E
150

Goose Creek

Legend

- Cemetery
- School
- Church
- Substation
- VFD (non profit)
- Water Well
- Oil/Gas Well
- Hazmat Site
- Park
- Flood Area
- Wetland Area
- Sinkhole Area
- Karst Area

1:22,446

EXHIBIT 2A

KY 44 Corridor
Bullit-Spencer County
USGS Aerial Photo

KY 44, From US 31E to SR 1633

MATCHLINE

Waterford

1060

1251

623

44

1633

Taylorsville

End
Project 5-395.00
End
Project 5-396.00

Begin
Project 5-395.00

Greenwell
Natural Gas Dist

Legend

- Cemetery
- School
- Church
- Substation
- VFD (non profit)
- Water Well
- Oil/Gas Well
- Hazmat Site
- Park
- Flood Area
- Wetland Area
- Sinkhole Area
- Karst Area

1:22,446

EXHIBIT 1B

KY 44 Corridor
Bullit-Spencer County
USGS Topographic Map

KY 44, From US 31E to SR 1633

MATCHLINE

Waterford

1060

1251

623

44

1633

Taylorsville

Pond Run Creek

Salt River

End
Project 5-395.00
End
Project 5-396.00

Begin
Project 5-395.00

Greenwell
Natural Gas Dist

Legend

- Cemetery
- School
- Church
- Substation
- VFD (non profit)
- Water Well
- Oil/Gas Well
- Hazmat Site
- Park
- Flood Area
- Wetland Area
- Sinkhole Area
- Karst Area

1:22,446

EXHIBIT 2B

KY 44 Corridor
Bullit-Spencer County
USGS Aerial Photo

KY 44, From US 31E to SR 1633

Mount Washington, KY 1982
USGS 7.5 minute series digital topographic quadrangle. Map J33, Governor's Office for Technology, Office of Geographic Information.

Waterford, KY 1981 (Revised 1993)
USGS 7.5 minute series digital topographic quadrangle. Map J34, Governor's Office for Technology, Office of Geographic Information.

CULTURAL HISTORIC LEGEND

- Potentially eligible or determined eligible for listing in the NRHP by the KHC
- Survey Site
- Demolished Site

The final determinations of all sites may change following additional survey and research.

QUADRANGLE LOCATION

0 1000 2000 feet
0 300 600 meters

K07H004 (03APR08).JTW

Figure 2a. Topographic map showing project area and cultural historic sites.

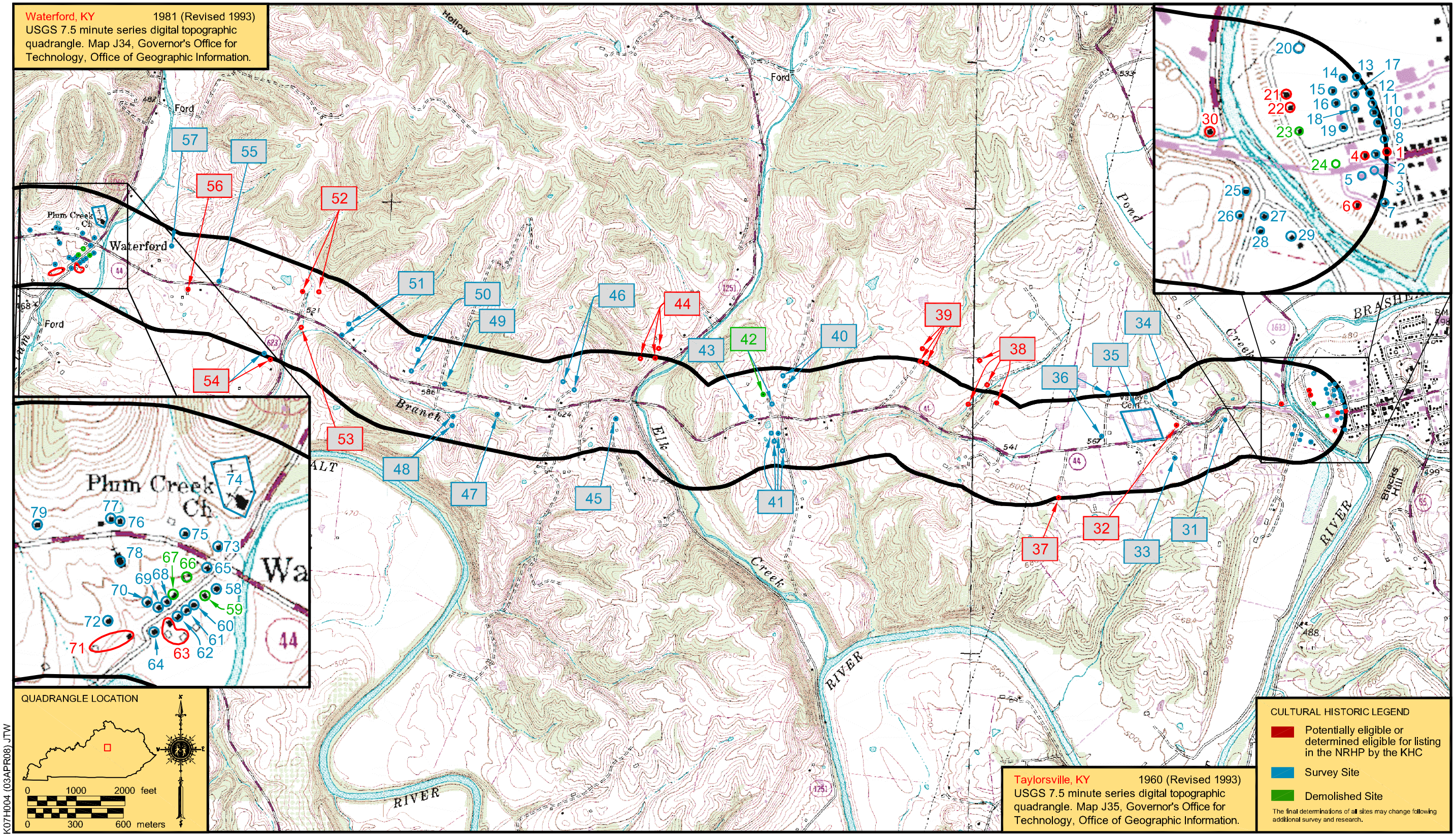

Figure 2b. Topographic map showing project area and cultural historic sites.

APPENDIX D

CORRESPONDENCE AND COORDINATION

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET

Steven L. Beshear
Governor

DEPARTMENT FOR ENVIRONMENTAL PROTECTION
300 FAIR OAKS LANE
FRANKFORT, KENTUCKY 40601
PHONE (502) 564-2150
FAX (502)564-4245
www.dep.ky.gov

Robert D. Vance
Secretary

R. Bruce Scott
Commissioner

January 31, 2008

Mr. John Brown
HMB Professional Engineers
3 HMB Circle
U.S. 460
Frankfort, KY 40601

Re: Bullitt and Spencer Counties Improvements to KY 44. Item No. 5-396.00, 05-347.50. Environmental Overview Study (SERO 2007-35)

Dear Mr. Brown,

The Environmental and Public Protection Cabinet serves as the state clearinghouse for review of environmental documents generated pursuant to the National Environmental Policy Act (NEPA). Within the Cabinet, the Commissioner's Office in the Department for Environmental Protection coordinates the review for Kentucky state agencies.

The Kentucky agencies listed on the attached sheet have been provided an opportunity to review the above referenced report. Responses were received from 3 of the reviewing agencies that were forwarded a copy of the document. Comments were received from the Kentucky Divisions of Water, Waste Management, and Air Quality.

If you should have any questions, please contact me at (502) 564-2150, ext. 112.

Sincerely,

Larry C. Taylor
State Environmental Review Officer

Enclosures

Division of Water Comments

Environmental Overview Study for Improvements to KY 44

Endorsement:

A request for review of the Environmental Overview Study for Improvements to KY 44 in Bullitt and Spencer Counties, Kentucky was received on December 21, 2007. The Division of Water (DOW) completed this review and found that the information provided warranted an endorsement of this project. Below are the comments that were received.

Water Quality Branch:

No comment.

Groundwater Branch:

The KYTC, as well as their contractor, HMB Engineering, Inc., have the necessary background and experience to conduct the appropriate hydrogeologic studies for this project. Standard procedures developed by the KYTC should suffice in guiding this process, including: KYTC Best Management Practices, the Kentucky Department of Highways Standard Specifications, and the KYTC Generic Groundwater Protection Plan. However, if, during the course of this investigation, these procedures are found to be inadequate, KYTC and its consultant are strongly encouraged to contact the Kentucky Geological Survey and the Groundwater Branch of the Kentucky Division of Water to develop any new measures that may be necessary.

Enforcement Branch:

The Division of Enforcement does not object to the project proposed by the applicant.

Division of Waste Management Comments

Project Number: SERO 2007-35

All solid waste generated by this project must be disposed at a permitted facility. If underground storage tanks are encountered they must be properly addressed. If asbestos, lead paint, and/or other contaminants are encountered during this project, they must be properly addressed.

Division for Air Quality Comments

REVIEW DATE: January 10, 2008

TITLE: Environmental Overview Study – Improvements to KY 44, Bullitt and Spencer Counties, No. 05-396.00 and 05-347.50

PROJECT NUMBER: SERO 2007 - 35

SPONSOR: HMB Professional Engineers

COMMENTS: Kentucky Division for Air Quality's comments are provided below

The following Kentucky Administrative Regulations apply to this proposed project:

Kentucky Division for Air Quality Regulation **401 KAR 63:010** Fugitive Emissions states that no person shall cause, suffer, or allow any material to be handled, processed, transported, or stored without taking reasonable precaution to prevent particulate matter from becoming airborne. Additional requirements include the covering of open bodied trucks, operating outside the work area transporting materials likely to become airborne, and that no one shall allow earth or other material being transported by truck or earth moving equipment to be deposited onto a paved street or roadway. Please note the Fugitive Emissions Fact Sheet located at http://www.air.ky.gov/homepage_repository/e-Clearinghouse.htm.

Kentucky Division for Air Quality Regulation **401 KAR 63:005** states that open burning is prohibited. Open Burning is defined as the burning of any matter in such a manner that the products of combustion resulting from the burning are emitted directly into the outdoor atmosphere without passing through a stack or chimney. Open burning may be utilized for the expressed purposes listed on the Open Burning Fact Sheet located at http://www.air.ky.gov/homepage_repository/e-Clearinghouse.htm. Although, vegetative matter accumulated by land clearing is included as a permissible method of disposal, the Division encourages the use of chipping and grinding in order to avoid excessive particulate emissions in the immediate vicinity of the project.

Finally, the projects listed in this document must meet the conformity requirements of the Clean Air Act as amended and the transportation planning provisions of Title 23 and Title 49 of United States Code.

The Division also suggests an investigation into compliance with applicable local government regulations.

Every effort should be made to maintain compliance with the preceding regulations and requirements. The Division also suggests an investigation into compliance with applicable regulations in the local governments. If there are any questions relating to this matter, please contact Joe Forgacs at (502) 573-3382 extension 309.

Appendix G

Geotechnical Review

M E M O R A N D U M **P-001-2012**

TO: **Keith Damron, PE**
Director
Division of Planning

FROM: **Bart Asher, PE, PLS**
Geotechnical Branch Manager
Division of Structural Design

BY: **Christian Wallover, PG**
Geotechnical Branch

DATE: **March 14, 2012**

SUBJECT: **Bullitt & Spencer Counties**
KY 44 (US 31E to KY 1633)
Item No. 5-396.00
MARS No. 8105001P
Planning Study

At your request, a geotechnical review has been conducted for the proposed project on KY 44 from Mount Washington to Taylorsville. In this report is an assessment of site conditions and potential geologic impacts to the project based upon available data. A geologic maps identifying areas of concern is attached. Refer to the Geologic Maps of the Mount Washington (#1282), Waterford (#1432) and Taylorsville (#1433) Quadrangles for more detailed information.

The study area is within the Outer Blue Grass Physiographic Region of Kentucky. This Region is known to contain carbonate units able to produce sinkholes, caves, sinking streams and springs. Geologic mapping indicates the project traverses across multiple rock formations including the Laurel Dolomite; Osgood and Brassfield Formations; Saluda Dolomite, Bardstown Member, and Rowland Member of the Drakes Formation; Grant Lake Limestone; Calloway Creek Limestone and Clays Ferry Formation. These rock formations range in composition from limestone/dolomite with minor amounts of shale, interbedded limestone and clay shale varying from 40 to 90 percent limestone, to highly erodible clay shale with minor dolomite.

Geotechnical Engineering Roadway Reports were issued for the reconstruction of KY 44 from US 31E to KY 1319 (R-020-2009), and widening of KY 44 from Turnpike Ave. to KY 1633 (R-025-2009). These reports can be found at the following websites:

R-020-2009 (Item No. 5-347.50)
http://kgs.uky.edu/kgsweb/KYTC/Reports/R-020-2009.pdf

R-025-2009 (Item No. 5-395.00)

http://kgs.uky.edu/kgsweb/KYTC/Reports/R-025-2009.pdf

Geotechnical Concerns:

1) Alluvium and lacustrine deposits consisting of silt, clay, gravel and sand are found in valleys along the creeks and rivers. Lacustrine deposits are considered highly erodible and may require slope protection for cut sections and around any structures. Due to anticipated depths of these deposits (0-70'+), bridge piers located in these areas may need to be founded on drilled shafts or piles.

2) The Osgood Formation, found west of the Bullitt/Spencer County Line, consists of erodible clay shale. This shale has very poor engineering characteristics and may result in flatter than normal cut slopes and fills. Osgood Formation shale is not desirable for embankment construction and embankments should be constructed out of durable material if available.

3) The project is located in an area of low to moderate karst potential. Numerous sinkholes in the Laurel Dolomite Formation have been identified on the attached geologic map. Sinkholes, caves and variable rocklines are also common in the upper part of the Calloway Creek Limestone, the upper part of the Saluda Dolomite Member and near the contact of the Bardstown and Rowland Members of the Drakes Formation. Springs and wet hillside conditions may be encountered at the base of the Laurel Dolomite. Springs and seeps are likely in the lower parts of the Saluda Dolomite and Rowland Members. All karst features should be located, and during preliminary line grade development will require the appropriate design procedures for remediation.

4) Abandoned and operating quarries may be found in the Calloway Creek Limestone and Saluda Dolomite and Rowland Members of the Drakes Formation.

5) Several abandoned gas wells are within the study area and should be avoided. Refer to the attached map for known locations.

6) This project is in a classified seismic zone 2, which is defined as an area of moderate earthquake damage due to earthquake activity.

Should there be any questions, please call the Geotechnical Branch at 502-564-2374.

cc: Sreenu Gutti
Paul Davis
Tom Hall

Bullitt/Spencer County - KY 44 Geologic Map

N

660

1319

44

Study Area

Legend

- County Boundary Lines
- US Highways
- State Roads
- Local Roads
- Sinkholes
- Sinkhole Drainage Areas
- KGS Springs
- Oil Well
- Combined Oil && Gas Well
- Gas Well
- Dry and Abandoned Well

Qald	Alluvium and Lacustrine Deposits
Sl	Laurel Dolomite
Sob	Osgood and Brassfield Formations
Ods, Odb, Odr	Drakes Formation
Ogl	Grant Lake Limestone
Occ	Calloway Creek Limestone
Ocf	Clays Ferry Formation

0 1,250 2,500 5,000 Feet

Bullitt/Spencer County - KY 44 Geologic Map

N

Study Area

Occ
Ogl
Odr
Qald
Ocf
Qal
af

1169
1251
1060
623
44
1633
2885

0 1,250 2,500 5,000 Feet

Appendix H

Resource Agency Coordination

CABINET FOR ECONOMIC DEVELOPMENT

Steven L. Beshear
Governor

Old Capitol Annex
300 West Broadway
Frankfort, Kentucky 40601
ThinkKentucky.com

Larry M. Hayes
Secretary

2/17/2012

Keith Damron P.E.
Director, Division of Planning,
Kentucky Transportation Cabinet
200 Mero Street 5th Floor
Frankfort, Kentucky 40622

Re: KY 44 Corridor Study from US 31E (Bullitt County) to KY 1633 (Spencer County) Item No. R-396.00

Dear Mr. Damron:

The Kentucky Cabinet for Economic Development's Site Evaluation Branch reviewed the proposed study in relation to the following industrial sites and did not see any negative impact on the sites. In fact, we see potential positive impacts by improving safety and functionality of the roadway as it will improve truck access to both communities.

Bullitt County site in Mt. Washington: http://www.thinkkentucky.com/edis/PDF/Site/SM029-001.pdf Spencer County site in Taylorsville: http://www.thinkkentucky.com/edis/PDF/Site/SM215-007.pdf . We wish you the best of luck as you complete this study and appreciate your invitation to provide comments.

Thanks,

ErIK Dunnigan
Commissioner of Business Development

Steven L. Beshear
Governor

Energy and Environment Cabinet
Department for Environmental Protection
Division for Air Quality
200 Fair Oaks Lane, 1st Floor
Frankfort, Kentucky 40601-1403
Web site: air.ky.gov

Leonard K. Peters
Secretary

March 6, 2012

Mr. Keith R. Damron, P.E.
Director
Division of Planning
Kentucky Transportation Cabinet
200 Mero Street, 5th Floor
Frankfort, Kentucky 40622

Dear Mr. Damron:

The Division has reviewed the planning study for evaluating potential impacts for a proposed highway project from US 31E in Bullitt County to KY 1633 in Spencer County, Item Number 05-396.00. The following Kentucky Administrative Regulations apply to this proposed project:

Kentucky Division for Air Quality Regulation **401 KAR 63:010** Fugitive Emissions states that no person shall cause, suffer, or allow any material to be handled, processed, transported, or stored without taking reasonable precaution to prevent particulate matter from becoming airborne. Additional requirements include the covering of open bodied trucks, operating outside the work area transporting materials likely to become airborne, and that no one shall allow earth or other material being transported by truck or earth moving equipment to be deposited onto a paved street or roadway. Please note the Fugitive Emissions Fact Sheet located at http://air.ky.gov/Pages/OpenBurning.aspx

Kentucky Division for Air Quality Regulation **401 KAR 63:005** states that open burning is prohibited. Open Burning is defined as the burning of any matter in such a manner that the products of combustion resulting from the burning are emitted directly into the outdoor atmosphere without passing through a stack or chimney. However, open burning may be utilized for the expressed purposes listed on the Open Burning Brochure located at http://air.ky.gov/Pages/OpenBurning.aspx

The Division would like to offer the following suggestions on how this project can help us stay in compliance with the NAAQS. More importantly, these strategies are beneficial to the health of citizens of Kentucky.

- Utilize alternatively fueled equipment.
- Utilize other emission controls that are applicable to your equipment.
- Reduce idling time on equipment.

Finally, the projects listed in this document must meet the conformity requirements of the Clean Air Act as amended and the transportation planning provisions of Title 40 of United States Code.

The Division also suggests an investigation into compliance with applicable local government regulations.

The Division appreciates the opportunity to review this submittal. If you have any questions regarding this matter, please contact Joe Forgacs of my staff at (502) 564-3999.

Sincerely,

John E. Gowins

John E. Gowins
Supervisor, Evaluation Section
Program Planning & Administration Branch

JEG/jmf

KENTUCKY DEPARTMENT OF FISH & WILDLIFE RESOURCES
TOURISM, ARTS, AND HERITAGE CABINET

Steven L. Beshear
Governor

#1 Sportsman's Lane
Frankfort, Kentucky 40601
Phone (502) 564-3400
1-800-858-1549
Fax (502) 564-0506
fw.ky.gov

Marcheta Sparrow
Secretary

Dr. Jonathan W. Gassett
Commissioner

20 February 2012

Keith Damron, P.E.
Director, Division of Planning
KY Transportation Cabinet
200 Mero Street 5th Floor
Frankfort, KY 40622

RE: Planning Study
KY 44 Corridor Study from US 31E (Bullitt County) to KY 1633 (Spencer County)
Item No. 5-396.00

Dear Mr. Damron:

The Kentucky Department of Fish and Wildlife Resources (KDFWR) has received your request for information regarding the subject project. The Kentucky Fish and Wildlife Information System indicates the federally-endangered Indiana bat *(Myotis sodalis)*, Fanshell *(Cyprogenia stegaria)*, Clubshell *(Pleurobema clava)*, and Pink Mucket *(Lampsilis abrupta)* are known to occur within close proximity to the project site. Additionally, both the western and eastern ends of the project (Begin to Goose Creek Rd and Bennett Spur to End) fall within known maternity summer habitat for the Indiana bat according to the U.S. Fish and Wildlife Service Kentucky Field Office (USFWS KFO). Therefore, I recommend contacting the USFWS KFO (502-695-0468) to discuss this project and ways to ensure compliance under the Federal Endangered Species Act. Please be aware that our database system is a dynamic one that only represents our current knowledge of various species distributions.

It appears that the proposed project has the potential to impact wetland habitats. The KDFWR recommends that you look at the appropriate US Department of Interior National Wetland Inventory Map (NWI) and the appropriate county soil surveys to determine where the proposed project may impact wetlands. Additionally, field verification may be needed to determine the extent and quality of wetland habitats within the project area. Any planning should include measures designed to eliminate and/or reduce impacts to wetland habitats. If impacts cannot be avoided, mitigation should be properly designed and proposed to offset the losses. KDFWR will recommend, at a minimum, a 2:1 mitigation ratio for any permanent loss or degradation of wetland habitats.

Additionally, the KDFWR recommends the following measures for any work that may occur within a stream to help reduce impacts to the aquatic environment:

- When crossing a stream, any pipe should be laid perpendicular to the stream bank to minimize the direct impacts to the streambed.
- Avoidance of impacts to intermittent and perennial streams if it is feasible.
- Development/excavation during low flow period to minimize disturbances.
- Proper placement of erosion control structures below highly disturbed areas to minimize entry of silt to the stream.
- Replanting of disturbed areas after construction, including reforestation of stream banks, with native vegetation for soil stabilization and enhancement of fish and wildlife populations.
- Avoid impacts to forested areas if possible. If impacts cannot be avoided we recommend reforestation of common areas with native trees to promote use by various species of wildlife.
- Return all disturbed instream habitat to stable condition upon completion of construction in the area.
- Preservation of any tree canopy overhanging the stream.

To minimize indirect impacts to aquatic resources, strict erosion control measures should be developed and implemented prior to construction to minimize siltation into streams and storm water drainage systems located within the project area. Such erosion control measures may include, but are not limited to silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches. Erosion control measures will need to be installed prior to construction and should be inspected and repaired regularly as needed.

I hope this information is helpful to you, and if you have questions or require additional information, please call me at (502) 564-7109 extension 4453.

Sincerely,

Dan Stoelb
Wildlife Biologist

Cc: Environmental Section File

UNIVERSITY OF KENTUCKY

Kentucky Geological Survey
Research
504 Rose Street
228 Mining & Mineral Resources Bldg.
Lexington, KY 40506-0107
Phone: (859) 257-5500
Fax: (859) 257-1147
www.uky.edu/kgs

Keith Damron, P.E.
Director
Division of Planning
Kentucky Transportation Cabinet
200 Mero Street 5th Floor
Frankfort, KY 40622

March 12, 2012

Keith,

This letter pertains to the planning study for KY-44 between Taylorsville and Mount Washington. As you are probably already aware, this route transects geologic units that are susceptible to karst development. Our online karst potential map shows a low to medium probability of karst development along the corridor with greater potential at each end of the route and lesser potential in the center. I consulted our karst specialist, and he is not aware of any site specific issues in the area, such as caves.

The Silurian Osgood Formation is exposed near the intersection of KY-1319. This shale-rich unit may contain low-durability material that is susceptible to slides. However, exposure to this unit along the alignment is very limited.

If you have any specific questions relating to the geology of the area, I would be glad to assist you or your staff.

Jerry Weisenfluh
Associate Director

KGS

KENTUCKY STATE NATURE PRESERVES COMMISSION

Steven L. Beshear
Governor

801 Schenkel Lane
Frankfort, Kentucky 40601-1132
Phone (502) 573-2886
Fax (502) 573-2355
http://naturepreserves.ky.gov

February 28, 2012

Dr. Leonard Peters
Secretary
Energy and
Environment Cabinet

Donald S. Dott, Jr.
Director

Keith Damron
Director
Division of Planning
Kentucky Transportation Cabinet
200 Mero Street, 5th floor
Frankfort, KY 40622

Dear Mr. Damron,

We received notice of a planning study for the KY 44 Corridor and are concerned about possible impacts to a rare plant that is known to occur along the proposed construction corridor. Kentucky gladecress (*Leavenworthia exigua* var. *laciniata*) is a globally rare plant and one of only two plants endemic to the state and recorded from this area. It is important that a thorough survey for this rare plant be conducted within the proposed area of construction.

Please feel free to contact me if you have additional questions. I thank you for the opportunity to comment on this upcoming study.

Sincerely,

Deborah L. White
Natural Heritage Manager/ Botanist

RECEIVED
FEB 29 2012
Div. of Planning

DW/fh

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
771 Corporate Drive, Suite 210
Lexington, KY 40503

March 14, 2012

Kentucky Transportation Cabinet
Division of Planning
ATTN: Keith Damron, P.E., Director
200 Mero Street 5th Floor
Frankfort, KY 40622

RE: Planning Study
KY 44 Corridor Study from US 31E (Bullitt County) to KY 1633 (Spencer County)
Item No. 5-396.00

Dear Mr. Damron:

In regards to the planning study for KY 44 Corridor, the USDA-Natural Resources Conservation Service (NRCS) is concerned with potential impacts that projects might have upon prime farmland soils, farmlands of statewide importance, PL-566 watershed structures, wetlands, Wetland Reserve Program (WRP) easements, and Grassland Reserve Program (GRP) easements. Based upon the information provided, Kentucky NRCS does not anticipate the proposed actions will affect WRP easements, GRP easements or PL-566 watershed structures. NRCS is not aware of any plans or activities related to our agency in the defined project area. If federal dollars are to be used to convert wetlands or convert important prime farmlands from agricultural uses to non-agricultural uses a Form AD-1006 (or Form NRCS-CPA-106 if the project is a corridor type project) must be submitted to the local NRCS office. These forms may be obtained from the local NRCS office and are also available as electronic forms on the web at http://forms.sc.egov.usda.gov/eForms/welcomeAction.do?Home. The current defined project area may impact prime farmland soils and farmlands of statewide importance. NRCS recommends further investigation into the impacts on the soils. We appreciate the opportunity to comment and provide input for the scoping process of this study.

Sincerely,

ELIZABETH CRANE-WEXLER
Acting Assistant State Conservationist

STEVEN L. BESHEAR
GOVERNOR

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL

MARCHETA SPARROW
SECRETARY

THE STATE HISTORIC PRESERVATION OFFICE
300 WASHINGTON STREET
FRANKFORT, KENTUCKY 40601
PHONE (502) 564-7005
FAX (502) 564-5820
www.heritage.ky.gov

LINDY CASEBIER
ACTING EXECUTIVE DIRECTOR AND
STATE HISTORIC PRESERVATION OFFICER

March 9, 2012

Mr. Keith R. Damron, P. E., Director
Division of Planning
Kentucky Transportation Cabinet
200 Mero Street
5th Floor West
Frankfort, KY 40622

Re: Planning Study
KY 44 Corridor Study from US 31E (Bullitt County) to KY 1633 (Spencer County)
Item No. 5-396.00

Dear Mr. Damron:

Our office recently received a request for comments on the above-referenced project. Because FHWA is the lead federal agency on this project, the Kentucky Transportation Cabinet (KYTC) must ensure compliance with relevant state and federal regulations regarding cultural resources. These may include any or all of the following: the Advisory Council on Historic Preservation's Rules and Regulations for the Protection of Historic and Cultural Properties (36CRF, Part 800) pursuant to the National Historic Preservation Act of 1966; the National Environmental Policy Act of 1969; Executive Order 11593, Kentucky Antiquities Act; Kentucky Cave Protection Act; and graves protection legislation.

In order to determine if properties eligible for listing in the National Register of Historic Places will be affected by this project, you must submit one copy of a historic architectural survey report and one copy of an archaeological survey report to this office for review and comment. The reports must be completed by professionals meeting the Secretary of the Interior's Standards for Professional Qualifications in archaeology, history, or architectural history, and they must meet the Kentucky Heritage Council's *Specifications for Conducting Fieldwork and Preparing Cultural Resource Assessment Reports*, available at http://heritage.ky.gov/envreview. The determination of the area of potential effect (APE) for both archaeological and cultural historic resources should be made in consultation with our office. The documents enclosed with your letter show a study area for the project that may or may not be adequate to account for all potential direct or indirect impacts. This effort should be coordinated with the Division of Environmental Analysis at KYTC.

Pending our review of the requested documentation, there may be a need for additional consultation with our office to determine how to avoid, minimize, or mitigate any adverse effects to significant cultural resources. Thank you for giving our office an opportunity to comment in the planning stages for this project. If you have any questions, please contact Vicki Birenberg at (502) 564-7005, ext. 127, or Vicki.Birenberg@ky.gov.

Sincerely,

Lindy Casebier
Acting Executive Director and
State Historic Preservation Officer

cc: Amanda Abner – KYTC – DEA
Sreenu Gutti – KYTC – Division of Planning

LC:vmb

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P.O. BOX 59
LOUISVILLE KY 40201-0059
FAX: (502) 315-6677
http://www.lrl.usace.army.mil/

March 21, 2012

Operations Division
Regulatory Branch (South)

Mr. Keith Damron
Kentucky Transportation Cabinet
Direct, Division of Planning
200 Mero Street, 5th Floor
Frankfort, Kentucky 40622

Dear Damron:

This is in regard to your letter requesting comments for the proposed improvements to KY 44 highway project beginning at US 31E and Ending at KY 1633. The proposed highway project would improve safety of the road and provide a linkage that would connect the cities of Mount Washington, Bullitt County to Taylorsville, Spencer County, Kentucky.

The U.S. Army Corps of Engineers (USACE) exercises regulatory authority under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act, 1972 (33 USC 1344) for certain activities in "waters of the United States (U.S.)." Section 404 requires that a DA permit be obtained for the placement or discharge of dredged and/or fill material into waters of the U.S., including wetlands, prior to conducting the work.

"Waters of the U.S." include hydrologically connected lakes, rivers and stream channels exhibiting an Ordinary High Water Mark (OHWM), wetlands, sloughs, wet meadows and wetlands adjacent to "waters of the U.S." The Ordinary High Water Mark (OHWM) elevation is the line on the bank established by the changing water surface and indicated by physical characteristics such as a clear natural line impressed on the bank; shelving; changes in the character of the soil; destruction of terrestrial vegetation; and other indications as determined upon inspection of the area.

Section 10 requires that a Department of the Army (DA) permit be obtained for any work that occurs in, under or over a navigable water. These waters include all waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce.

Based on the information provided by you, the following "waters of the U.S." may be located within the project area: Pond Run Creek, Elk Creek, Plum Creek, Goose Creek, Dutchmans Creek, Little Dutchmans

Creek and any other stream channels (perennial, intermittent ephemeral) and/or hydrologically connected lakes exhibiting an OHWM and any adjacent wetlands within the proposed project area. A delineation of "waters of the U.S." should be completed if the proposed project would impact "waters of the U.S.," including wetlands.

We do not have any comments on the general environmental impacts of the proposed project(s). Our lack of comments on specific potential environmental impacts should not be construed as concurrence that no significant environmental damage would result from the project. Our comments on this project are limited to only those effects which may fall within our area of jurisdiction and thus does not obviate the need to obtain other permits from state or local agencies.

This project may necessitate the discharge of dredged or fill material into "waters of the U.S., including jurisdictional wetlands, and you should submit a DA permit application for review by this office if the project would impact "waters of the U.S." We will need a completed DA permit application along with additional details regarding the project's design, scope, photos, construction methods, purpose, a delineation of all "waters of the U.S." Please allow sufficient time in your preconstruction schedule for the processing of a DA permit application. Copies of DA permit application forms can be obtained by writing to the above address ATTN: CELRL-OP-FS or online at http://www.lrl.usace.army.mil/.

If we can be of any further assistance, please contact us by writing to the above address ATTN: CELRL-OP-FS, or by calling me at 502-315-6709.

Sincerely,

Meagan Chapman
Project Manager
Regulatory Branch

KENTUCKY STATE POLICE

Steven L. Beshear
Governor

919 Versailles Road
Frankfort, Kentucky 40601
www.kentuckystatepolice.org

J. Michael Brown
Secretary

Rodney Brewer
Commissioner

February 13, 2012

Mr. Keith R. Damron, P.E.
Director
Division of Planning
Kentucky Transportation Cabinet
200 Mero Street
5th Floor West
Frankfort, KY 40622

Dear Mr. Damron:

We are in receipt of your letter requesting our comments in regards to the Planning Study for KY 44 Corridor Study from US 31E (Bullitt County) to KY 1633 (Spencer County), Item No. 5-396.00.

At this time, we do not perceive any problems as it pertains to commercial vehicle enforcement.

If you have any questions, please do not hesitate to contact us.

Sincerely,

Lieutenant Colonel Keith Peercy
Director
Commercial Vehicle Enforcement Division

ENERGY AND ENVIRONMENT CABINET

Steven L. Beshear
Governor

DEPARTMENT FOR ENVIRONMENTAL PROTECTION
300 FAIR OAKS LANE
FRANKFORT, KENTUCKY 40601
PHONE (502) 564-2150
FAX (502) 564-4245
www.dep.ky.gov

Leonard K. Peters
Secretary

R. Bruce Scott
Commissioner

March 14, 2012

Mr. Keith Damron, P.E.
Director, Division of Planning
Kentucky Transportation Cabinet
200 Mero St. 5lh Floor
Frankfort, KY 40622

Re: Planning Study – KY 44 Corridor Study from US 31E to KY 1633 (Item No. 5-396.00)
(SERO-2012-8)

Dear Mr. Damron,

The Energy and Environment Cabinet serves as the state clearinghouse for review of environmental documents generated pursuant to the National Environmental Policy Act (NEPA). Within the Cabinet, the Commissioner's Office in the Department for Environmental Protection coordinates the review for Kentucky state agencies.

We received your letter dated February 2, 2012 requesting review of your project for the KY 44 Corridor Study from US 31E to KY 1633 (Item No. 5-396.00). We distributed copies to the State Nature Preserves Commission, the Kentucky Heritage Council, the Division of Water, the Division for Air Quality, the Division of Waste Management, the Division of Conservation, and the Department for Natural Resources. Comments were received from the Division of Water, the Division of Air Quality and the Division of Waste Management.

If you should have any questions, please contact me at (502) 564-2150, ext. 3125.

Sincerely,

Ronald T Price

Ronald T. Price
State Environmental Review Officer

COMMONWEALTH OF KENTUCKY
STATE ENVIRONMENTAL REVIEW PROCESS

Project Number: SERO 2012 - 8

Initial Coordination Effort

Project Title:

Planning Study - KY 44 Corridor Study from US 31E to KY 163

The following Commomwealth of Kentucky agencies make up the State Environmental Review Process. Their response is listed below. Agencies that did not receive the document for review or did not respond are also noted.

REVIEWING AGENCIES:	RESPONSE:
Division of Water	COMMENTS ATTACHED
Division of Waste Management	COMMENTS ATTACHED
Division for Air Quality	COMMENTS ATTACHED
Department for Public Health	Not Sent for Review
Cabinet for Economic Development	Not Sent for Review
Division of Forestry	Not Sent for Review
Department of Parks	Not Sent for Review
Department of Agriculture	Not Sent for Review
Nature Preserves Commisssion	No Response Received
Kentucky Heritage Council	No Response Received
Division of Conservation	No Response Received
Department for Natural Resources	No Response Received
Department of Fish and Wildlife Resources	No Response Received
Transportation Cabinet	Not Sent for Review
Department for Military Affairs	Not Sent for Review

Division of Water Comments

SERO 2012-8

Planning Study - KY 44 Corridor Study from US 31E to KY 163

Endorsement:

A request for review of the Planning Study - KY 44 Corridor Study from US 31E to KY 163 in Spencer County, Kentucky was received on February 21, 2012. The Division of Water (DOW) completed this review and has provided the following comments.

Compliance & Technical Assistance Branch: No comments

Water Quality Branch: Best management practices shall be utilized to reduce runoff from the project area into adjacent surface waters.

Watershed Management: The contractor(s) constructing the project may need a groundwater protection plan depending on the onsite activities. Any water well or monitoring well in the construction area will need to be properly abandoned by a certified water well or monitoring well driller before any construction occurs on the well location.

No comments for Water Withdrawal Permitting, Floodplain Section or Water Management Planning.

Enforcement Branch: The Division of Enforcement does not object to the project proposed by the applicant.

Division of Waste Management Comments

Project Number: SERO 2012-8

All solid waste generated by this project must be disposed at a permitted facility. If underground storage tanks are encountered they must be properly addressed. If asbestos, lead paint or other contaminants are encountered during this project they must be properly addressed.

Division for Air Quality Comments

Steven L. Beshear
Governor

Energy and Environment Cabinet
Department for Environmental Protection
Division for Air Quality
200 Fair Oaks Lane, 1st Floor
Frankfort, Kentucky 40601-1403
Web site: air.ky.gov

Leonard K. Peters
Secretary

March 6, 2012

Mr. Keith R. Damron, P.E.
Director
Division of Planning
Kentucky Transportation Cabinet
200 Mero Street, 5th Floor
Frankfort, Kentucky 40622

Dear Mr. Damron:

The Division has reviewed the planning study for evaluating potential impacts for a proposed highway project from US 31E in Bullitt County to KY 1633 in Spencer County, Item Number 05-396.00. The following Kentucky Administrative Regulations apply to this proposed project:

Kentucky Division for Air Quality Regulation **401 KAR 63:010** Fugitive Emissions states that no person shall cause, suffer, or allow any material to be handled, processed, transported, or stored without taking reasonable precaution to prevent particulate matter from becoming airborne. Additional requirements include the covering of open bodied trucks, operating outside the work area transporting materials likely to become airborne, and that no one shall allow earth or other material being transported by truck or earth moving equipment to be deposited onto a paved street or roadway. Please note the Fugitive Emissions Fact Sheet located at http://air.ky.gov/Pages/OpenBurning.aspx

Kentucky Division for Air Quality Regulation **401 KAR 63:005** states that open burning is prohibited. Open Burning is defined as the burning of any matter in such a manner that the products of combustion resulting from the burning are emitted directly into the outdoor atmosphere without passing through a stack or chimney. However, open burning may be utilized for the expressed purposes listed on the Open Burning Brochure located at http://air.ky.gov/Pages/OpenBurning.aspx

The Division would like to offer the following suggestions on how this project can help us stay in compliance with the NAAQS. More importantly, these strategies are beneficial to the health of citizens of Kentucky.

- Utilize alternatively fueled equipment.
- Utilize other emission controls that are applicable to your equipment.
- Reduce idling time on equipment.

Finally, the projects listed in this document must meet the conformity requirements of the Clean Air Act as amended and the transportation planning provisions of Title 40 of United States Code.

The Division also suggests an investigation into compliance with applicable local government regulations.

The Division appreciates the opportunity to review this submittal. If you have any questions regarding this matter, please contact Joe Forgacs of my staff at (502) 564-3999.

Sincerely,

John E. Gowins
Supervisor, Evaluation Section
Program Planning & Administration Branch

JEG/jmf

Appendix I

Photos

Photo No. I1 – US 31E - KY 44 intersection, looking east

Photo No. I2 – KY 44 in front of Bullitt East High School and Old Mill Elementary School

Photo No. I3 – KY 44 at KY 1319 intersection.

Photo No. I4 – KY 44 intersects KY 1319 at a skew

Photo No. I5 – KY 44 approaching the Bullitt/Spencer County line from the east side

Photo No. I6 – KY 44 going east approaching Goose Creek Rd

Photo No. I7 – at MP 2.0 and going east. Entrance to Saddlebrook Trail/Jewel Valley Rd is in the curve on the left

Photo No. I8 – MP 3.0 and traveling east. Waterford Loop intersection is ahead on the right just before the curve to the left

Photo No. I10 – KY 44 – Hickory Woods intersection looking east

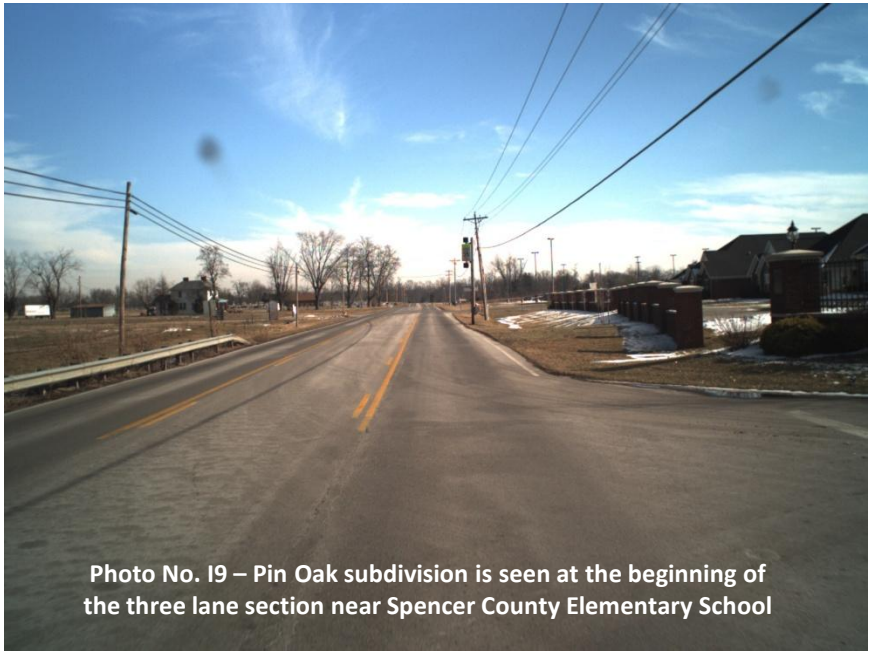

Photo No. I9 – Pin Oak subdivision is seen at the beginning of the three lane section near Spencer County Elementary School

Photo No. I11 - KY 44 at KY 1060 intersection looking east

Photo No. I12 - KY 44 at KY 623 intersection looking east

KY 44 Highway Crossings

Photo No. I13 - KY 44 at KY 1251 intersection looking east

Photo No. I14 - KY 44 at KY 1633 intersection looking east

Photo No. I15 - KY 44 and Carl Monroe /Bennett Spur intersection looking east

Photo No. I16 - KY 44 and Akins Rd intersection at MP 5.0

Photo No. I17 - KY 44 going east at River Heights Blvd intersection

Photo No. I18 – Spencer County Elementary School sign along KY 44

Photo No. I19 – The three lane section of KY 44 in front of Spencer County Elementary School

Photo No. I20 – Valley Cemetery along KY 44