ENVIRONMENTAL ASSESSMENT

US 127 Reconstruction and Relocation
Clinton and Russell Counties, Kentucky

KYTC Item Numbers: 8-108.00, 8-115.10

The proposed highway project involves the reconstruction and relocation of one of several independent sections of US 127 in Kentucky. The project corridor begins at KY 90 and continues north to the Jamestown Bypass, a distance of approximately 20 miles. For almost the entire length, the project would traverse new alignment. Only at the southern and northern termini would the project use the existing alignment of US 127.

Submitted Pursuant to 42 U.S.C. 4332(2)(c) by the U.S. Department of Transportation, Federal Highway Administration and Kentucky Transportation Cabinet, Division of Environmental Analysis

United States Department of Transportation
Federal Highway Administration

Kentucky Transportation Cabinet

April 2010

Approved June 24, 2010

ADMINISTRATIVE ACTION
ENVIRONMENTAL ASSESSMENT

US 127 REALIGNMENT

CLINTON AND RUSSELL COUNTIES, KENTUCKY

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Approved For Public Availability

Division Administrator
Federal Highway Administration

6-24-2010
Date

Director of Division of Environmental Analysis
Kentucky Transportation Cabinet

5/10/10
Date

Recommended by
4/12/10

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1.0 PURPOSE AND NEED

The proposed highway project involves the reconstruction and relocation of one of several independent sections of US 127 in Kentucky. Below are descriptions of the project Study Area, existing roadway facilities, project history, the purpose and need for the project, and the process for considering alignment alternatives.

1.1 Project Setting and History

1.1.1 Clinton and Russell Counties

Clinton and Russell counties are located in south-central Kentucky (see Figure 1, *Location Map*), with the proposed project extending across the county line (see Figure 2, *Project Area*). Adjacent Kentucky counties are: Cumberland, Adair, Casey, Pulaski, and Wayne. Tennessee borders Clinton County to the south. Parts of two major recreational areas are located within approximately 25 miles of the Study Area—Lake Cumberland to the northeast and Dale Hollow Lake to the southwest—while Russell County encompasses a significant portion of Lake Cumberland within its eastern limits. The Build Alternatives would include a crossing of the Cumberland River below Wolf Creek Dam.

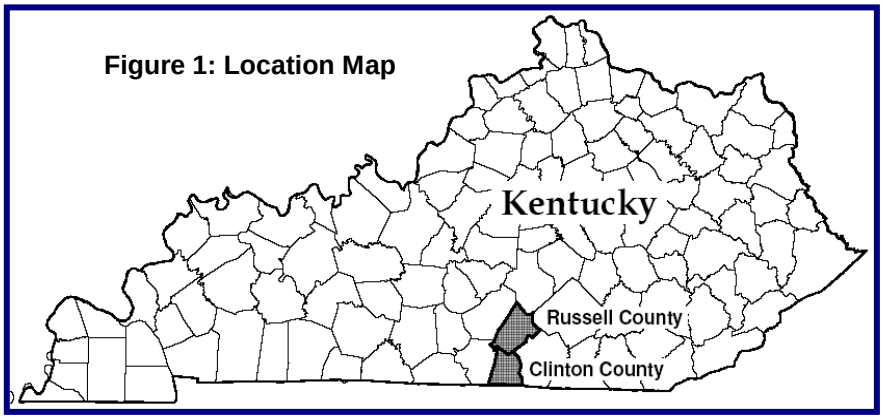


Figure 1: Location Map

Clinton County has a land area of 197 square miles, and Russell County has a land area of 254 square miles. The county seats are Albany and Jamestown, respectively; and each is the economic activity center in its county. Both counties are situated within the Pennyrile physiographic region of Kentucky. The Pennyrile stretches across the state from the Land Between the Lakes in the west to the Pottsville Escarpment in the east. It is a Mississippian plateau with a large karst region that includes Mammoth Cave. The topography is underlain by brecciated sandstone, St. Louis limestone, and Salem and Warsaw limestones, Chattanooga shale geological groups, and Fort Payne formations. The counties and proposed project Study Area are characterized by rolling terrain. Karst terrain is present. Both counties are characterized by major topographic changes and rolling hills. Elevations in Clinton County range from 530 to 1,780 feet above mean sea level (msl), while Russell County elevations range from 530 to 1,140 feet msl.

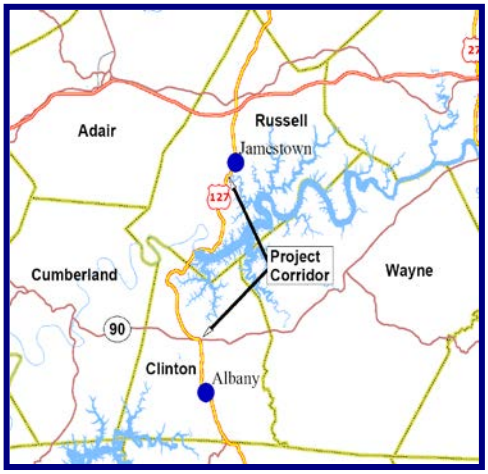


Figure 2: Project Area

1.1.2 Project Study Area

The project corridor begins at KY 90 and continues north to the Jamestown Bypass, a distance of approximately 20 miles (see Figures 1 and 2). Because the existing US 127 has substandard curves and hills for almost its entire length, the proposed Build Alternatives are on new alignment. The various alignments cross several state and local roads. Only at the southern and northern termini would the project use the existing alignment of US 127.

The Kentucky Tourism, Arts and Heritage Cabinet, the Kentucky Department of Travel, and the Kentucky Tourism Council heavily promote the area's tourist and recreational attractions. In the project area, US 127, coupled with KY 90, links two major tourist attractions: Lake Cumberland State Resort Park to the northeast and Dale Hollow Lake State Resort Park to the southwest. Seasonal travelers from Kentucky, Indiana, and Ohio frequent these parks from the north via I-65 or I-75 to the Louie B. Nunn/Cumberland Parkway, which intersects US 127 at the city of Russell Springs, about 6.0 miles north of the proposed project. In addition, the U.S. Fish and Wildlife Service's (USFWS) Wolf Creek National Fish Hatchery and U.S. Army Corps of Engineers' (USACE) Kendall Campground are located at Wolf Creek Dam on the Cumberland River (see locations on Exhibit 1, Appendix A). These destinations attract more than 100,000 fishing enthusiasts, campers, students, and tourists per year.

1.1.3 Major Roads in the Area

Data on the existing conditions in the Study Area were taken from the Kentucky Transportation Cabinet (KYTC) Division of Planning's Highway Information System (HIS) database. Table 1 shows general route information for US 127.

US 127 is a major north-south thoroughfare extending through the Commonwealth from the Kentucky-Tennessee to approximately the Kentucky-Ohio state lines. Within Clinton and Russell counties, it begins at the state line in Static, Kentucky, and extends north 47.9 miles to the Casey County line. In the Study Area, it has two lanes with widths varying between 10 and 12 feet, narrow shoulders, and a posted speed limit of 55 miles per hour (mph). US 127 is classified in the KYTC's Functional Classification System as a Rural Principal Arterial, and on the state system as a State Primary (Other) roadway. It is listed on the Defense Highway Network, which identifies routes used for defense material shipments, troop movements during a national defense emergency, and/or for evacuation of the general public from disaster areas. For approximately 0.6 mile (mile-points [MP] 10.43 to 11.017) US 127 shares the alignment of KY 90 and is listed on the National Truck Network as a federal designated truck route for use by trucks with increased dimensions. Through Clinton and Russell counties, US 127 is assigned a truck weight classification of "AAA" (a maximum allowable gross weight limit of 80,000 pounds).

Traffic on US 127 through the project corridor consists of heavy trucks (from 11.0% to 11.6% of the traffic volume on US 127 in Clinton County and 6.5% in Russell County), tourists, and recreational vehicles, as well as local residents and/or commuters.

KY 90 in Clinton County is a major east-west corridor and the area's main route connecting Burkesville and Somerset. It enters Clinton County west of Seminary and heads 12.8 miles east before exiting the county at Alpha. The existing KY 90 roadway is a two-lane undivided road with 12-foot-wide driving lanes, 10-foot-wide shoulders, and a posted speed limit of 55 miles per hour. KY 90 is classified in KYTC's Functional Classification System as a Rural Minor Arterial, and on the state system as a State Primary (Other) roadway. It is also listed on the Defense Highway Network. KY 90 is listed on the National Truck Network as a federal designated truck route for use by trucks with increased dimensions, and assigned a truck weight classification of "AAA" (a maximum allowable gross weight limit of 80,000 pounds).

Other local roads. Throughout the project corridor, eight state and numerous local roads intersect US 127, providing access to rural communities and farmland. Following are the state routes that intersect US 127: in Clinton County—KY 3156, KY 639, KY 1590, KY 734, and KY 3063; and in Russell County—KY 1730, KY 55, and KY 2284.

Table 1: HIS Base Data Route Information—US 127

Route	Functional Class	Beginning Mile-point (MP)	Ending MP	Posted Speed Limit	# of Lanes	Lane Width	% Passing Sight Distance*	ADT (2008)	% Truck	Composite Adequacy Rating Percentile
Clinton										
US127	Rural Principal Arterial	10.1	10.43	55	2	11’	0%	3,730	11.0%	34.59
		10.43	11.017	55	2	12’	82%	4,050	11.6%	70.21
		11.017	11.673	55	2	10’	10%	1,690	11.0%	8.09
		11.673	20.967	55	2	10’	10%	1,890	11.0%	8.09
Russell										
US127	Rural Principal Arterial	0	.923	55	2	10’	0%	1,350	6.5%	7.28
		.923	5.6	55	2	10’ – 11’	0%	1,520	6.5%	7.28
		5.6	8.092	55	2	11’ -10’	0%	2,560	6.5%	23.96
		8.092	10.569	55	2	10’	0%	2,420	6.5%	23.96
		10.569	11.573	55	2	12’	0%	1,760	Not avail.	23.96

** Percent Passing Sight Distance is the percent of segment length (estimated to the nearest 10%) that has available passing sight distance (as measured from the driver's eye to the road surface) of at least 1,500 feet.*

NOTE: Highlighting indicates substandard conditions.

Composite Adequacy Rating is a method being developed by KYTC to assess a roadway's condition and prioritize highway improvements. The ratings are 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. The Composite Adequacy Percentile ranks a particular roadway section compared to other Kentucky roads in the same functional class into a percentile. For example, a road section with a composite adequacy percentile of 75.0 means that 25% of the roads are rated better. Composite adequacy data is from the 9-18-2008 update.

1.1.4 Project History and Current Status

In the early 1980s, KYTC began improving various sections of US 127 from I-71 in Gallatin County (near Warsaw) south to Jamestown (about 150 miles south of Warsaw, and 30 miles north of Albany) to meet current roadway design and safety standards. As an initial step toward continuing the improvements south to the Tennessee state line, KYTC published a scoping study in March 1990 entitled *US 127 Jamestown to Tennessee*. The study analyzed the transportation issues throughout the US 127 project corridor, and evaluated the need to improve the corridor. The scoping study found that the section of US 127 from Jamestown to the Tennessee state line was deficient through most of the route, and recommended design considerations and realignment to improve safety and service.

In 2000, the section of US 127 between KY 90 and the Jamestown Bypass was added to state’s Highway Plan. In November 2002, a kick-off meeting was held with state and local officials and other interested parties. The participants identified issues for consideration during the alternative selection process, problems to be corrected by the project, and needs to be addressed by the project (see Section 1.2, *Purpose and Need, Goals*). A public meeting followed in January 2003, at which the project was presented to area citizens and attendees were given the opportunity to provide their suggestions and comments.

Current status. The project is in the state’s 2008 Highway Plan (as approved by the 2009 General Assembly), published in June 2009 (see Section 1.5, *Schedule and Funding Sources,* herein). Since the Preliminary Engineering and Environmental Documentation phases were programmed, KYTC has studied many possible combinations of alignments and has held two public meetings. The alignments have been reduced to four Build Alternatives and a No-Build Alternative, which have been studied and are presented herein. Chapter 2, *Proposed Alternative Concepts,* describes the alternatives evaluation process.

1.2 Purpose and Need, Goals

The US 127 project would result in an improved section of a critical north-south highway corridor that enters Kentucky at the Kentucky-Tennessee line and exits in Covington. The *US 127 Jamestown to Tennessee* scoping study evaluated the need to improve US 127 from Albany to the south through Jamestown to the north. The study identified capacity deficiencies along the route in both cities and major geometric deficiencies throughout the entire route. The study recommended solutions that included:

- Elevating the level of service through the two communities by constructing bypasses around both.
- Linking the communities via a roadway constructed to current design standards, thereby eliminating design deficiencies and improving safety.

The Jamestown Bypass is now open to traffic and right-of-way is being purchased for the reconstruction of US 127 from KY 90 south to Tennessee, including a western bypass of Albany. The purpose and need for the current US 127 project are summarized as follows:

Purpose. To provide a key link in this important local and regional Rural Principal Arterial roadway by relocating US 127 on new alignment. The relocated US 127 will offer benefits that include:

- Removing this Rural Principal Arterial from atop Wolf Creek Dam (see Figure 3).
- Providing a roadway having improved geometrics compared with existing US 127, which is substandard to contemporary design.

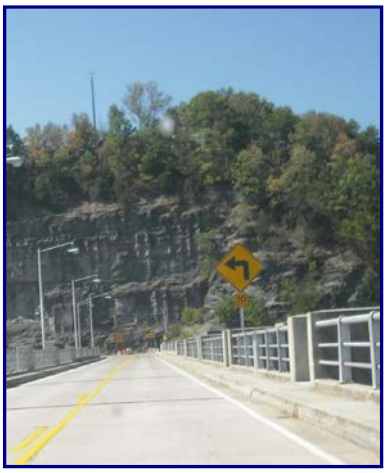
Figure 3: Wolf Creek Dam/US 127

(From top to bottom)—

Sharp turn sign, heading west on US 127 across dam.

"Falling Rock Area warnings at west dam exit.

Heading east on US 127 toward dam.



Need. The need for the improvement within the corridor is threefold:

- Potential for closing US 127 over Wolf Creek Dam due to national security threat: The existing roadway crosses Wolf Creek Dam, which is operated by USACE and has an average daily traffic (ADT) volume of 1,700 vehicles per day (vpd). In 1996, **USACE requested that KYTC partner with USACE to remove US 127 from the dam and relocate the roadway downstream.** USACE cited as its concerns the effects of traffic on dam integrity, safety, and security. The issue was raised again at a June 21, 2001, meeting with KYTC. In reviewing options for improvements to US 127 in 2004, USACE again cited concerns about any plans that would modify the existing roadway across the dam. In its October 21, 2004, letter, USACE commented on the potential effects of proposed US 127 improvement alternatives on its operation of the dam. Among USACE's concerns about "Alternative II"—improving the existing road—was the potential need to close the road across the dam without advance notice, as stated in its 2004 letter:

> *A possible terrorist threat exists which suggests that major hydroelectric and dam infrastructure assets are high on terrorist target lists.…The roadway currently presents a formidable task for surveillance and monitoring at existing security levels.…During the highest security threat, United States Government will close the roadway to all traffic as necessary, immediately and without notice, to ensure that the security level is maintained. This could result in major and severe interruptions to a large number of people who depend on the roadway for access to work, school, and medical facilities without advance warning.*

Closing the dam road without ample notice would likely leave many motorists—through travelers, commercial haulers, and local residents, alike—stranded on the "wrong side" of the Cumberland River from their intended destinations. Such an action would require motorists needing to cross the river to travel long distances (see Figure 4) to the nearest river crossings, at Burkesville (southwest) or Somerset and Burnside (northeast). For example, a resident living south of the dam but stranded on the north side would have as the most efficient option (*i.e.*, least travel

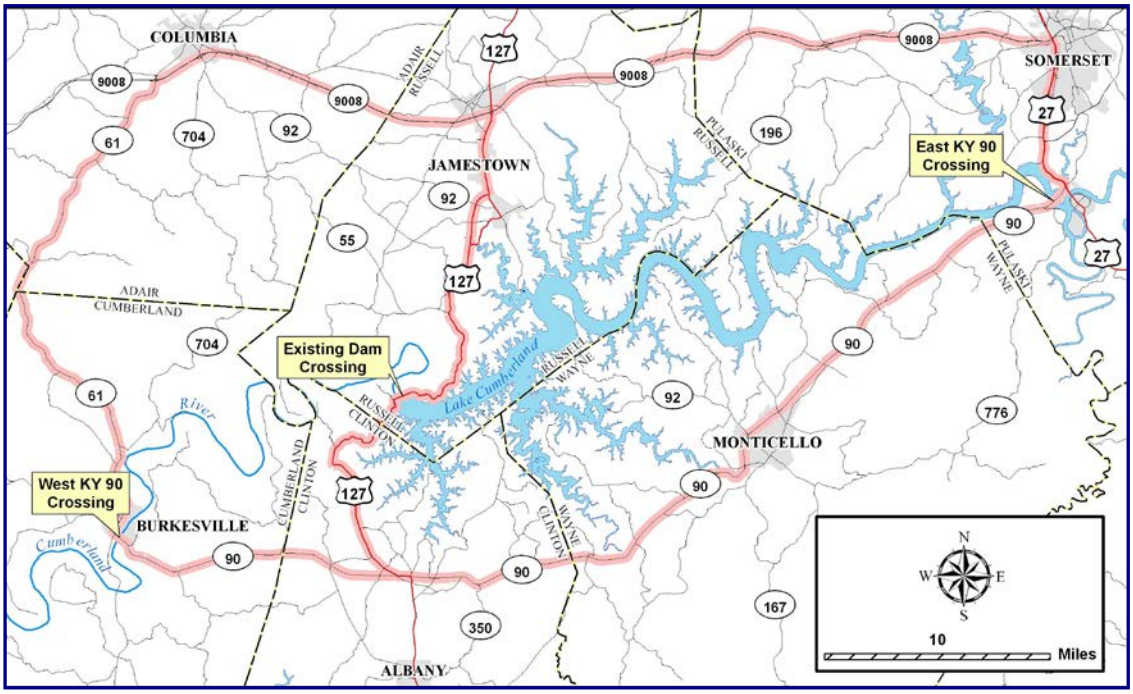


Figure 4: River Crossing Options if Wolf Creek Dam Closed

distance and least time on narrow, circuitous local roads) driving north to Russell Springs via US 127, then heading west on Cumberland Parkway to KY 61, then turning south to Burkesville, then east to KY 90, and finally north on US 127—a distance of 85–90 miles.

Another option—driving to Somerset via US 127 and Cumberland Parkway, then heading south via US 27 and then east via KY 90, and finally northward via US 127—would be well over 100 miles. Considering that traffic volumes average 1,700 vpd across the dam, the need to develop an alternative that eliminates the potential for this scenario became apparent.

- Other concerns related to USACE operations and maintenance of the dam: In its 2004 letter of comment on US 127 improvement options, USACE provided the following additional reasons for their concern about the presence of US 127 atop the dam:

  - *The Wolf Creek Dam and Powerhouse and associated facilities are considered eligible for listing on the National Register of Historic Places. Extensive coordination between the Corps and the Kentucky Transportation Cabinet would be required in the design and administration of any work modifying the existing roadway crossing Wolf Creek Dam. Crucial dam safety instrumentation…could potentially be impacted and have to be modified or relocated* [and] *meet Corps of Engineers' standards….A thorough plan addressing how instruments would be modified or relocated and their impacts on the current performance monitoring, would be necessary before a thorough evaluation of this alternative could be provided. However…a substantial effort would be required to maintain the current level of performance monitoring.*

  - *Prior to any construction to the existing roadway across the dam, stability analyses of the embankment and the concrete portion of the dam would have to be conducted to assure the new sections comply with Corps' design criteria. The cost of these analyses and studies would be the responsibility of the Transportation Cabinet and again would require a close coordination effort.*

  In addition, USACE noted:

  - *Unless no reasonable alternative exists, we request that construction activities be kept a minimum of 2,000 feet from the dam and powerhouse, which obviously would eliminate Alternatives II and III.* (Alternative III would construct a new roadway in the vicinity of Kendall Campground).

  Section 2.2, *Rebuild the Existing Road*, provides additional discussion regarding USACE's concerns. The above-cited correspondence is in Appendix B, *Agency Coordination Correspondence*.

- Substandard design: As demonstrated by the existing roadway cross section (traveled way, shoulders, and roadsides/ditches), the **roadway is substandard to contemporary design**. The following conditions exist along the 22.4-mile segment of US 127 through the project corridor:

  - The many access points and substandard geometries—which consist of numerous horizontal and vertical deficiencies—are indicative of the substandard conditions.
  - The percent passing sight distance[1] for all but one section ranges from 10% to 0%.
  - Approximately 75% of the roadway consists of 10-foot-wide lanes.
  - The scoping study identified the section south of Wolf Creek Dam as "severely deficient for the posted speed limit" (55 mph). Moreover, while the posted speed limit for the US 127

[1] Percent Passing Sight Distance is the percent of segment length (estimated to the nearest 10%) that has available passing sight distance (as measured from the driver's eye to the road surface) of at least 1,500 feet.

sections through the project corridor is 55 mph, there are approximately 23 locations southbound and 36 locations northbound on US 127 where signs advise of reduced speed limits (10 mph at Wolf Creek Dam; and 35 mph, 40 mph, or 45 mph elsewhere).

- Also, the Composite Sufficiency Rating Percentile indicates that approximately 92% of Kentucky's roads are rated higher than sections of the Clinton County portion of US 127 in the project corridor, and from approximately 76% to 93% are rated higher than the Russell County portion.

(See Table 1, p. 3, for selected road characteristics data.)

Goals. The following goals were identified that support the overall purpose and need:

- Improve travel efficiency within a corridor where travel speed is now frequently below the posted speed limits on the corridor's major north-south roadway—US 127—due to the road's substandard horizontal and vertical alignments (i.e., steep slopes and sharp curves), short sight and stopping distances, narrow and/or unpaved pavement, and low design speeds in some locations. These conditions provide few safe opportunities to pass, which slows traffic flow and results in congested conditions and increased travel time even where traffic volumes are relatively low.
- Provide a route free of the major geometric deficiencies that are present on existing US 127 and that can contribute to unsafe conditions.

  Crash and traffic data provided by KYTC were used to identify roadway sections with abnormally high crash rates, thus indicating a possible need for safety improvements. Crash analysis procedures involve assigning reported crashes to roadway locations by mile-point. The crashes are normally classified by severity into one of three categories: fatal, injury, or property damage only (PDO). Then, the average crash rate for roadway sections of various lengths is determined. Generally, the analysis includes analyzing the entire roadway length under study, followed by analyzing successively smaller roadway sections, especially those containing higher concentrations of crashes. Roadway sections are classified as either "spots" (sections less than 0.3 mile) or "segments" (sections over 0.3 mile). Roadway section crash rates are normalized for comparison by either hundred-million-vehicle-miles traveled (HMVM) for segments, or millions-of-vehicles (MV) for spots.

  Using the average crash rate, the critical crash rate was obtained from Kentucky Transportation Research Center's *Analysis of Traffic Crash Data in Kentucky (*see Table 2). The "critical crash rate" is the maximum crash rate expected to occur on a roadway section, given the statewide average crash rate for that functional road class, the ADT volume, and the roadway section length. The ratio of these two rates (*i.e.*, the actual annual crash rate to the critical crash rate) produces a critical crash rate factor (CCRF), or a measure of crash frequency for each segment or spot location. If the roadway section's actual crash rate exceeds the critical rate (*i.e.*, the CCRF is greater than 1.0), then that section is classified as a high crash location. In other words, that roadway section has more crashes than is statistically probable in the absence of an unsafe condition(s).

  The KYTC crash database for the 2002–2006 study period listed the following crashes by type on US 127: 2 fatalities, 38 injuries, and 77 PDO crashes. The traffic crash analysis indicates three US 127 roadway sections are experiencing high crash rates. Table 2 shows the high crash locations for the project area (indicated by shading), with three sections of US 127 exhibiting CCRFs greater than 1.0, and one section slightly less than 1.0. The section from KY 55 to KY

2284 exhibits the potential to become a high crash location. These statistically high crash locations are indicated on Exhibit 1. The crash density is generally higher north of the Clinton-Russell county line. Poor/restricted visibility and speed differentials between vehicles, combined with a roadway not meeting current design standards, are the likely contributing factors for the high crash rates on US 127. This assumption is supported by the documented poor visibility on these roadways, and essentially zero-percent passing sight distances.

Table 2: US 127 Crash Analysis, 2002–2006

From	To	Mile Point		Length (Miles)	ADT[1]	Lanes	Rural / Urban	Functional Class Rate	Crashes			
		Begin	End						Fatal	Injury	PDO[2]	Total
KY 55	KY 2284	8.092	9.066	0.974	2,120	2	R	248.00	0	4	5	9
Lure Lodge Rd.	KY 55	5.600	8.092	2.492	2,590	2	R	248.00	0	8	16	24
Dam Rd.	Lure Lodge Rd.	2.515	5.600	3.085	1,520	2	R	248.00	1	7	15	23
KY 1730	Dam Rd.	0.923	2.515	1.592	1,520	2	R	248.00	0	5	13	18
Clinton C/L[3]	KY 1730	0.000	0.923	0.923	1,030	2	R	248.00	0	7	13	20
KY 1590	Russell C/L	12.380	20.976	8.587	1,760	2	R	248.00	1	7	7	15
KY 90	KY 1590	10.430	12.380	1.950	1,540	2	R	248.00	0	0	8	8
								Total	**2**	**38**	**77**	**117**

From	To	HMVM[4]	Rates Per HMVM				Critical Rate	Critical Crash Rate Factor[5]
			Fatal Rate	Injury Rate	PDO Rate	Total Rate		
KY 55	KY 2284	0.038	0	106.2	132.7	238.8	470.2	0.96
Lure Lodge Rd.	KY 55	0.118	0	67.9	135.8	203.8	370.4	0.82
Dam Rd.	Lure Lodge Rd.	0.086	12	81.8	175.3	257.1	392.5	**1.04**
KY 1730	Dam Rd.	0.044	0	113.2	294.4	407.6	452.4	**1.64**
Clinton C/L[3]	KY 1730	0.017	0	403.5	749.3	1152.7	584.8	**4.65**
KY 1590	Russell C/L	0.276	4	25.4	25.4	50.8	327.1	0.20
KY 90	KY 1590	0.055	0	0	146.0	146.0	430.4	0.59

[1] Average Daily Traffic [2] Property Damage Only [3] County Line [4] Hundred Million Vehicle Miles

[5] Critical Crash Rate Factors greater than 1.00 indicate a location with a statistically high accident rate when compared to similar roadways in Kentucky, as indicated by the shaded box and bold text. The roadway segment from KY 55 to KY 2284 is considered a potentially high accident location, and therefore shaded.

NOTE: Highlight = CCRF approaching or exceeding 1.0.

- Develop an alternative alignment that ensures continuity of roadway access through the area by providing an alternate route should USACE close the road across the dam for national security purposes, and responds to related concerns raised by USACE; provides a bridge across the river at a location that satisfies the project's stated purpose while meeting USACE's criteria for proximity to the dam; and avoids or minimizes impacts to sensitive resources in the project area.
- Enhance the local socioeconomic environment by improving accessibility to the regional roadway network, which can lead to increased competitive and locational advantages and improved opportunities for employment and economic development in an economically depressed area.

1.3 Existing and Projected Traffic

Existing traffic volumes were obtained for the year 2006 and traffic projections were developed for the year 2026 to determine how US 127 would function if no improvements beyond normal maintenance were made during that time period (i.e., the No-Build Alternative). A Level of Service (LOS) analysis was conducted for the existing and projected scenarios. Tables 3a and 3b present the results of the traffic analysis. Exhibit 1 shows the existing and projected No-Build traffic volumes and percent trucks.

Table 3a: Existing and Projected Traffic Volumes

Route	From	To	Speed Limit	2006 Baseline		2026 No-Build		Truck %	2026 Build, (with Alts A, B)		Truck %	2026 Build, (with Alts C, D)		Truck %
				ADT*	DHV*	ADT	DHV		ADT	DHV		ADT	DHV	
On US 127	KY 734 / KY 90	KY 3156 / KY 90	55	2,200	330	3,600	540	16%	3,400	1,305	10%	3,400	1,305	10%
	KY 3156 / KY 90	KY 734	55	1,800	270	3,000	450	16%	1,300	195	3%	1,300	195	3%
	KY 734	KY 3063	55	1,800	270	3,000	450	16%	1,300	195	3%	1,300	195	3%
	KY 3063	KY 1730	55	1,800	270	3,000	450	16%	500	75	13%	200	30	25%
	KY 1730	State Park Entrance	55	1,900	285	3,100	465	15%	500	75	8%	500	75	8%
	State Park Entrance	KY 55	55	3,100	465	5,100	765	14%	2,600	390	11%	2,800	420	10%
	KY 55	KY 2284	55	2,700	405	4,400	660	16%	2,000	300	14%	------	------	------
	KY 2284	Jamestown Bypass	55	2,400	360	3,900	585	16%	------	------	------	------	------	------
									Note: *Data highlighted above represent residual traffic on US 127 with a Build Alternative in operation. Traffic projected for the Build Alternative is shown below.*					
On Build Alternative	KY 734 / KY 90	Garfield Brown Rd.	55	------	------	------	------	------	4,300	645	9%	4,300	645	9%
	Garfield Brown Rd.	KY 639	55	------	------	------	------	------	2,500	375	16%	2,500	375	16%
	KY 639	KY 734	55	------	------	------	------	------	2,100	315	21%	2,100	315	21%
	KY 734	KY 3063	55	------	------	------	------	------	3,400	510	12%	3,400	510	12%
	KY 3063	KY 1730	55	------	------	------	------	------	3,000	450	13%	3,100	465	13%
	KY 1730	KY 55	55	------	------	------	------	------	3,000	450	13%	3,000	450	13%
	KY 55	KY 2284	55	------	------	------	------	------	3,000	450	14%	4,900	735	13%
	KY 2284	Jamestown Bypass	55	------	------	------	------	------	3,000	585	16%	3,900	585	16%

** DHV = Design Hour Volume, i.e., peak-hour volume.* *ADT = Average Daily Traffic.*

As Table 3a shows, in 2006 the average daily traffic (ADT) on US 127 ranged between 1,800 vpd and 3,100 vpd. By 2026, without any major construction activity on US 127 (i.e., the No-Build Alternative), traffic volumes are projected to increase to 3,000 vpd and 5,100 vpd—an increase of approximately 60%. Table 3b shows the existing and projected traffic volumes and LOS for the corridor. Level of service is a qualitative measure of expected traffic conflicts, delay, driver discomfort, and congestion. Levels of service are described according to a letter rating system (similar to school grades) ranging from LOS "A" (free flow, minimal or no delays—best conditions) to LOS "F" (stop and go conditions, very long delays—worst conditions). With the No-Build Alternative, the approximately 60% increase in traffic volumes on existing US 127 by 2026 does not result in a decline in the level of service (LOS) because the projected volumes are not sufficient to produce a decline: the level of service is projected to be "B" at the south end of the corridor and "C" along the rest of US 127—the same as the LOS for the existing (year 2006) condition.

Table 3b: Existing and Projected Traffic Volumes, and Levels of Service

Route	From	To	2006 Baseline		2026 No-Build		2026 Build, (with Alts A, B)		2026 Build, (with Alts C, D)	
			ADT	LOS	ADT	LOS	ADT	LOS	ADT	LOS
On US 127	KY 734 / KY 90	KY 3156 / KY 90	2,200	B	3,600	B	3,400	B	3,400	B
	KY 3156 / KY 90	KY 734	1,800	C	3,000	C	1,300	C	1,300	C
	KY 734	KY 3063	1,800	C	3,000	C	1,300	C	1,300	C
	KY 3063	KY 1730	1,800	C	3,000	C	500	B	200	B
	KY 1730	State Park Entrance	1,900	C	3,100	C	500	B	500	B
	State Park Entrance	KY 55	3,100	C	5,100	C	2,600	C	2,800	C
	KY 55	KY 2284	2,700	C	4,400	C	2,000	C	------	------
	KY 2284	Jamestown Bypass	2,400	C	3,900	C	------	------	------	------
							Note: ***Highlighted rows above represent residual traffic on US 127.***			
On Build Alternative	KY 734 / KY 90	Garfield Brown Rd.	------	------	------	------	4,300	B	4,300	B
	Garfield Brown Rd.	KY 639	------	------	------	------	2,500	B	2,500	B
	KY 639	KY 734	------	------	------	------	2,100	B	2,100	B
	KY 734	KY 3063	------	------	------	------	3,400	B	3,400	B
	KY 3063	KY 1730	------	------	------	------	3,000	B	3,100	B
	KY 1730	KY 55	------	------	------	------	3,000	B	3,000	B
	KY 55	KY 2284	------	------	------	------	3,000	B	4,900	B
	KY 2284	Jamestown Bypass	------	------	------	------	3,000	B	3,900	B

With the Build Alternatives, year 2006 traffic volumes are projected to decrease on existing US 127 most notably between KY 3063 and the state park entrance (from 3,000 vpd down to 200 or 500 vpd, depending on alternative)—thereby improving the LOS from "C" to "B" along that section of roadway. Along the other sections, the existing and projected LOS would remain the same. Although the project would attract traffic from the existing US 127, the LOS would remain the same because the deficiencies on the existing road include poor passing sight distance at many locations. The presence of trucks, recreational vehicles, and other slow-moving vehicles and the absence of safe passing opportunities often keep motorists from achieving the road's design speeds, which, as a consequence, causes delays despite a decrease in the volume of traffic on the road.

The LOS on newly constructed US 127 is projected to be "B" throughout.

1.4 Project Termini

The proposed project's southern terminus, KY 90, was selected because it is a major state road and the northern terminus of the reconstruction of US 127 south to Tennessee. The project's proposed northern terminus is the southern end of the US 127 section of the Jamestown Bypass (KYTC Item #s 8-165.01).

1.5 Schedule and Funding Sources

The proposed project is included in the state's 2008 Highway Plan (approved in 2009). Design is scheduled for FY 2010; acquisition of right-of-way and utility work for FY 2012; and construction for FY 2014 for the portion of the project from KY 90 to KY 55 near Freedom (KYTC Item No. 8-115.10 in Clinton and Russell counties). For the northernmost portion of the project—KY 55 to the Jamestown Bypass (Item No. 8-108.00 in Russell County), acquisition of right-of-way and utility work are scheduled for FY 2009 and construction for FY 2011. Most of the money for this project has been allocated from the State Construction Fund; however, federal funding will also be required.

2.0 PROPOSED ALTERNATIVE CONCEPTS

The identification and evaluation of alternatives were the most important and critical steps of the study. Any alternative that could meet the purpose and need for the project was identified and given consideration. Starting from a wide range of alternatives, the number of alternatives was reduced as more detailed information was collected and analyzed. Purpose and need, environmental factors, engineering feasibility, public comment, and cost were evaluated before a preferred alternative was recommended. Alternatives considered in determining whether they met the purpose and need for the project included:

- A No-Build ("Do Nothing") Alternative
- Rebuild the existing road either in total or at selected locations ("spot" improvements)
- Build a road on new alignment within the same general roadway corridor

2.1 No-Build Alternative

The No-Build Alternative is one in which KYTC would take no action to provide an alternative to the Wolf Creek Dam crossing and to improve the existing travel corridor by constructing a road to current standards on new alignment. No residential displacements or commercial impacts would occur with the No-Build Alternative. Overall, however, selection of the No-Build Alternative would not meet the stated purpose and need of the proposed project (see Section 1.2, *Purpose and Need, Goals*). The No-Build Alternative would be expected to result in progressively deteriorating conditions for safe, efficient, and economical (time and money) vehicular traffic movement that would, in turn, impede improvement of the socioeconomic environment of Clinton County, Russell County, and the region. Selecting the No-Build Alternative would diminish access to the area's major tourist centers, and fail to provide an adequate transportation network for traffic and economic development. Public safety would continue to be a concern. The increasing volume of passenger vehicles, recreational vehicles, and large trucks forced to negotiate the narrow lanes, sharp curves, and steep hills could result in elevated crash rates in areas that are already experiencing high rates and in other areas that are approaching a CCRF of 1.0. These negative impacts would translate to increased costs to drivers and lessened freight accessibility—conditions that can restrict competitive and locational advantages and impact opportunities for employment and economic development.

2.2 Rebuild the Existing Road

Improving existing US 127 was evaluated but is not being advanced for further study for reasons that include failure to meet purpose and need related to removal of a Rural Principal Arterial from atop Wolf Creek Dam, constraints posed by the crossing of Lake Cumberland at the Wolf Creek Dam, notable design deficiencies and topographical constraints along roadway, numerous residential relocations that would result from the need for additional right-of-way, and difficulty in maintaining traffic during construction though this area. Considerations given to each are described below:

Wolf Creek Dam. US 127 crosses the Cumberland River at Wolf Creek Dam, just north of the Clinton-Russell county line. At a meeting on June 26, 2001, discussions with USACE included the possibility of closing the road (see meeting minutes, Appendix B). However, the road provides access to residences, recreational areas such as the National Fish Hatchery, Kendall Campground, and the state park. Therefore, closing the road was not considered an option.

In its October 21, 2004, letter (Appendix B), USACE commented on the potential effects of proposed US 127 improvement alternatives on its operation of the dam. Among USACE's concerns about "Alternative II"—improving the existing road—were national security considerations, design constraints, and the dam's eligibility for listing in the National Register of Historic Places. In addition, USACE noted: "Unless no

reasonable alternative exists, we request that construction activities be kept a minimum of 2,000 feet from the dam and powerhouse, which obviously would eliminate Alternatives II and III." (Alternative III would construct a new roadway in the vicinity of Kendall Campground).

Rather than improving the existing road, constructing a road on new alignment and at a distance from the dam acceptable to USACE could provide a regional facility that would not be subject to closure by USACE for purposes of national security, and would be responsive to USACE's concerns about traffic and safety by reducing through traffic crossing the dam. All Build Alternatives evaluated herein are on new alignment and farther than 2,000 feet away from the dam. The existing road would remain open to accommodate local traffic and provide access to tourist/visitor activities in the area.

Design deficiencies and topographic constraints. The roadway crossing of the dam is considered adequate for existing and future traffic—two 12-foot-wide lanes with curb and gutter, and no vertical/horizontal deficiencies. However, from the south end of the dam to the project's southern terminus at KY 90, the lane widths narrow to 10 or 11 feet for most of the distance, the shoulder widths vary from 3 to 4 feet, there is a sharp (90 degree) curve immediately south of the crossing (see Figure 3), and the terrain just south of the dam is particularly hilly. The scoping study noted that this section of the roadway is "severely deficient for the posted speed limit" of 55 mph. In addition, there is a sharp horizontal curve at the intersection of US 127 with KY 90, creating a stopping sight distance restriction. North of the dam, the roadway widths are narrow and horizontal and vertical deficiencies exist. Overall, US 127 has 10-foot-wide lanes for approximately 75% of the corridor, 11-foot-wide lanes for 17%, and 12-foot-wide lanes for only 7%. The shoulder widths are 3 to 4 feet along most of the route. As noted above, although the posted speed limit is 55 mph along the identified road sections, there are approximately 23 locations southbound and 36 locations northbound on US 127 where reduced-speed signs indicate 55 mph is not considered safe. Reconstructing the existing road would be very costly, given the topographic and alignment limitations associated with US 127. "Spot" improvements along the existing roadway would not be sufficient to meet the project's purpose of linking the improved sections of US 127 to the north and south via a roadway that meets current design standards, and removing the Rural Principal Arterial from atop Wolf Creek Dam.

Residential relocations and commercial/institutional displacements. Reconstructing the existing roadway to current KYTC design standards would require additional right-of-way that would result in the relocation of numerous residents and several small businesses along the existing road. A roadway on new alignment would minimize this impact.

Maintenance of traffic. Because of the narrowness of the corridor and the lack of north-south tending roads in the corridor's vicinity that could provide alternate access, maintenance of traffic during construction would be difficult at best and potentially impossible without the costly construction of new access roads along the corridor.

2.3 Build Road on New Alignment

2.3.1 Development of Build Alternative Sections and Segments

Because neither the No-Build Alternative nor rebuilding the existing road would meet the project's purpose and need, Build Alternatives on new alignment were developed. The locations of the alternatives took into account several constraints including USACE requirements/recommendations related to the Wolf Creek Dam; aligning US 127 at KY 90 (the intersection is currently offset); historical and recreational resources (involving Section 106 and Section 4(f) issues); natural resources such as wetlands, streams, and endangered species habitat; farmland and residential/commercial impacts; and engineering constraints related to the terrain and the Cumberland River crossing.

At four locations along the corridor all of the Build Alternatives intersect, in effect dividing the corridor into four sections—South, South Central, Central, and North. At various locations within the sections, two or more of the alternatives intersect each other and existing US 127 to create 23 individual segments. These unique segments were numbered I through 23 for ease of reference and analysis. In addition, a segment numbered 16.1 (a derivative of Segment 16) was developed as the evaluation of alternatives revealed an opportunity to retain beneficial features of the original segment (Segment 16) while avoiding/minimizing several potential impacts. The 23 segments that form alignments within the sections are described below. The end-to-end Build Alternatives created by combining the segments are discussed in Section 2.3.2, *Development of Build Alternative Alignments.*

In Appendix A, Exhibits 2 and 3 depict the Build Alternatives with their segment combinations; Exhibit 4 shows environmental constraints encountered by the alternatives; and Exhibits 5a, 5b, and 6 show the project corridor's cultural historic resources in relation to the alternatives.

SOUTH SECTION: Segments 1 through 5. This section of the corridor begins south of KY 90 (from which point US 127 continues south to Tennessee). The section is approximately 4.0 miles in length. It includes several commercial, institutional, and residential properties north of that state highway. All of the segments are east of US 127 in this section, which terminates in the vicinity of the segments' crossings of Patrick's Branch.

- Segment alignments within the South Section: **Segment 3** (stand-alone alignment); and combined **Segments 1-4, 2-4, 1-5,** and **2-5**.

SOUTH CENTRAL SECTION: Segments 6 through 10. This section of the corridor continues northward and has segment alignments that closely parallel existing US 127. Segment 8 crosses that roadway twice. The section is approximately 2.0 miles in length and terminates at the Turkeypen Creek crossings.

- Segment alignments within the section: **Segment 8** (stand-alone alignment); and combined **Segments 6-9, 6-10, 7-9,** and **7-10**.

CENTRAL SECTION: Segments 11 through 15. This section of the corridor heads northeastward and all of its segments cross and then lie northwest of existing US 127. The section is approximately 2.5 miles in length and terminates with the junction of the segments approximately 0.5 mile south of the Cumberland River.

- Segment alignments within the section: **Segment 11** (stand-alone alignment); and combined **Segments 12-14, 12-15, 13-14,** and **13-15**.

NORTH SECTION: Segments 16 through 23. This section of the corridor continues northeastward and, at approximately 9.0 miles in length, is the longest section. Within the section, Segments 17 and 18 cross the Cumberland River through Salt Lick Bottom and Segments 16 and 16.1 cross the river in Swan Pond Bottom. All of these segments traverse land within the Creelsboro Rural Historic District (District; see Exhibits 5a and 5b), which is eligible for listing in the National Register of Historic Places (discussed further in Section 2.4.2, *Rationale for the Recommendation of Preferred Alternative D;* Section 3.6, *Section 106: Cultural Historical and Archaeological Resources*; and Section 3.7*, Section 4(f) Evaluation, Draft*). All of the segments are west of existing US 127 for most of their distances, rejoining that roadway near the project's north terminus.

Note: As the evaluation of alternative segments in this section proceeded, Segment 16.1 was developed to achieve two objectives: (1) avoid/minimize Segment 16's impacts to a wetland in Swan Pond Bottom and to Blackfish Creek north of the Cumberland River, and (2) retain Segment 16's ability to minimize impacts to the District. Section 2.5, *Creelsboro Rural Historic District: Avoidance/Minimization*

Alternatives; Section 3.6.2, *Cultural Historic Resources;* and Section 3.7, *Section 4(f) Evaluation (Draft),* address in detail the issues associated with potential impacts to the District.

- Segment alignments within the section: Combined **Segments 16-21-23, 16.1-21-23, 16.1-22-23, 17-19-21-23, 17-19-22-23, 17-20-23, 18-19-21-23, 18-19-22-23,** and **18-20-23.**

2.3.2 Development of Build Alternative Alignments

The following combinations of segments comprise the Build Alternatives that were developed to extend the full length of the corridor, from its southern terminus to its northern terminus.

ALTERNATIVE	SEGMENT COMBINATIONS
Alternative A	**2-4-8-11-18-19-21-23**
Alternative B	**3-6-10-12-15-17-20-23**
Alternative C	**1-5-7-9-13-14-16-22-23**

During the evaluation of these alternatives, other combinations of segments were also reviewed to ensure a thorough consideration of potential end-to-end Build Alternatives. Starting from a wide range of segment combinations, the number was reduced as more information was collected and analyzed. Elements considered in the selection of end-to-end Build Alternatives to be evaluated in detail included the project's purpose, needs, and goals; social and environmental impacts; engineering and design feasibility/constraints; and project costs. Continuing analysis resulted in the development of a fourth Build Alternative—Alternative D, the recommended preferred alternative. The four Build Alternatives, by section and segment, are shown in Table 4.

Table 4: Build Alternatives by Section and Segment

Alternative	Segment Combinations by Section				Length (Miles)
	South	South Central	Central	North	
Alternative A	**2, 4**	**8**	**11**	**18, 19, 21, 23**	**17.45**
Alternative B	**3**	**6, 10**	**12, 15**	**17, 20, 23**	**17.35**
Alternative C	**1, 5**	**7, 9**	**13, 14**	**16, 22, 23**	**17.56**
Alternative D	**3**	**6, 9**	**11**	**16.1, 21, 23**	**16.68**

For ease of reference, the names of the Build Alternatives generally include both the letter and the segment number combination; e.g., Alternative A (2-4-8-11-18-19-21-23). For purposes of comparison, the No-Build Alternative is included in the evaluation of the Build Alternatives presented in Chapter 3.0, *Affected Environment and Environmental Consequences.*

Each Build Alternative would be a two-lane, undivided roadway with 12-foot-wide driving lanes, 10-foot-wide shoulders (8 feet of which will be paved), truck climbing lanes where necessary, access to be controlled by permit, a 60-mph design speed, and a rural typical section (i.e., one in which grass ditches rather than curbs and gutters would be used to direct stormwater runoff) as shown on Figure 5. Each alternative includes intersections with existing state and local roads to ensure connectivity, and each alternative bridges the Cumberland River north of Creelsboro.

While efforts were made to use the existing alignment where possible, environmental and design constraints—including achieving the goal of reducing traffic on US 127 across Wolf Creek Dam—limited the opportunities to do so. The locations of the four alternatives are described below and shown on Exhibits 2 and 3.

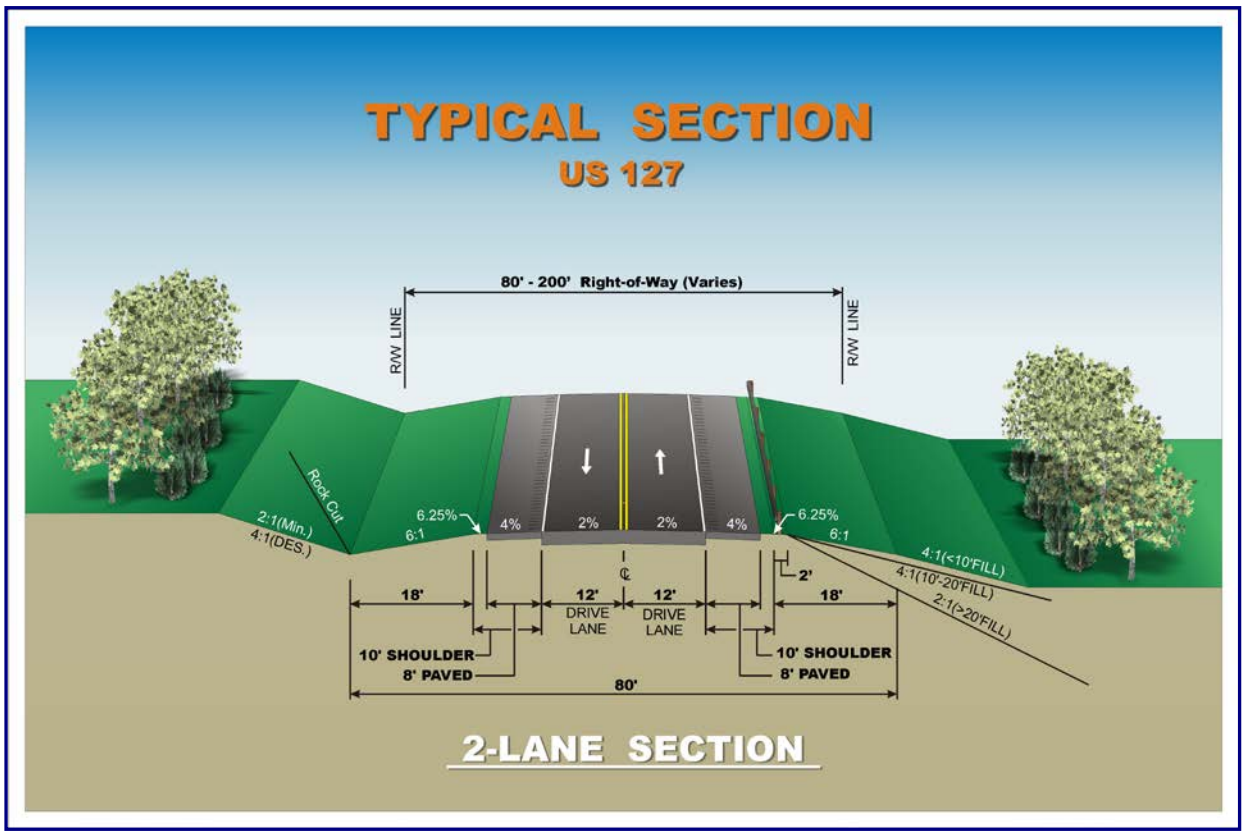


Figure 5: US 127 Proposed Typical Cross Section

Alternative A segments from south to north are as follows:

SOUTH SECTION—

Segment 2 begins in Clinton County at the intersection of KY 90 and KY 734. It generally follows KY 734, but truncates the latter road's sharp curve to the east. After Segment 2 crosses KY 734 east of the curve, it connects with Segment 4.

Segment 4 continues northwest on new alignment, paralleling and then crossing KY 1553. It crosses the northern section of KY 734 and continues northwest for approximately 1.9 mile before connecting with Segment 8.

Alternative A
(2-4-8-11-18-19-21-23)

Approximately 17.45 miles in length

Crosses Cumberland River in Salt Lick Bottom, farther downstream from the dam than the crossings of other alternatives

Crosses US 127 four times

SOUTH CENTRAL SECTION—

Segment 8 crosses the existing US 127 north of Blue Ridge Road, then continues northwest as US 127 turns westward. The segment turns northeast and again crosses US 127, connecting with Segment 11 approximately 0.5 mile to the north.

CENTRAL SECTION—

Segment 11 continues to curve toward the northeast, crosses US 127 and Salt Lick Creek, and then curves north to cross into Russell County before connecting with Segment 18.

NORTH SECTION—

Segment 18 continues northward, crossing Manntown Road in Salt Lick Bottom before bridging the Cumberland River at river mile point 453. It enters the Creelsboro Rural Historic District in Jackman Bottom, and crosses KY 379 twice, curving to the northeast and connecting with Segment 19.

Segment 19 curves eastward, then proceeds northeast to cross Maynard Road and KY 55 at KY 1058. Segment 19 parallels KY 55 to Blankenship Road, then curves northward to cross KY 2284 and US 127 and connecting with Segment 21.

Segment 21 proceeds northeast to connect with **Segment 23**, which ends at the Jamestown Bypass.

➢ **Alternative B segments from south to north are as follows:**

Alternative B
(3-6-10-12-15-17-20-23)

Approximately 17.35 miles in length

Crosses Cumberland River in Salt Lick Bottom

Crosses US 127 one time

SOUTH SECTION—

Segment 3 begins at the KY 90/KY 734 intersection, curves westward on new alignment, and intersects KY 639. It continues westward to cross KY 734 then heads northward, staying east of existing US 127. It connects with Segment 6 approximately 1.5 miles north of KY 734.

SOUTH CENTRAL SECTION—

Segment 6 stays east of and generally parallel to the existing US 127, crosses Aaron Ridge Road, and connects with Segment 10.

Segment 10 begins curving toward the north, and terminates roughly 0.6 mile east of Malone Ridge Road. At this point, Segment 10 connects with Segment 12.

CENTRAL SECTION—

Segment 12 travels northward, crossing existing US 127 and meeting Segment 15 about 850 feet farther north.

Segment 15 continues northward generally paralleling and crossing Williams Road and Salt Lick Creek, and connects with Segment 17 approximately 800 feet west of B. Mann Road.

NORTH SECTION—

Segment 17 continues northeast to cross B. Mann Road, and then curves north to cross Manntown Road just west of KY 1730. Segment 17 then bridges the Cumberland River upstream of river mile-point 453 and continues north, crossing KY 379 and connecting to Segment 20 south of KY 1058. This segment traverses the Creelsboro Rural Historic District through Jackman Bottom.

Segment 20 heads northeastward, crossing KY 1058 and KY 55, staying north of KY 55 and KY 2284 before connecting with **Segment 23**, which ends at the new Jamestown Bypass.

➢ **Alternative C segments from south to north are as follows:**

Alternative C
(1-5-7-9-13-14-16-22-23)

Approximately 17.56 miles in length

Crosses Cumberland River at Swan Pond Bottom

Crosses US 127 three times

SOUTH SECTION —

Segment 1 begins at the KY 90/KY 734 intersection and heads northwest on new alignment, crossing KY 3062 and then generally paralleling and crossing KY 734, where it connects to Segment 5.

Segment 5 continues westward, crosses KY 1553, and then crosses KY 734 where it turns northward and connects with Segment 7east of Blue Ridge Road.

SOUTH CENTRAL SECTION—

Segment 7 stays east of and generally parallels US 127. It crosses Aaron Ridge Road, and connects with Segment 9 approximately 0.6 mile to the north of the crossing.

Segment 9 continues traveling northwest until it connects with Segment 13 at the crossing of Turkeypen Creek.

CENTRAL SECTION—

Segment 13 begins a broad curve toward the north and northeast, crossing US 127 and then connecting with Segment 14.

Segment 14 curves sharply northward, crosses Salt Lick Creek, and travels north, and then curves northeast to connect with Segment 16 approximately 800 feet west of B. Mann Road.

NORTH SECTION—

Segment 16 continues northeast, crossing B. Mann Road, the Rock Lick Creek and then KY 1730 and Swan Pond Road. It traverses the Creelsboro Rural Historic District in Swan Pond Bottom, and then crosses the Cumberland River. It continues northeast up Blackfish Creek, then curves northward to cross US 127 at KY 55. Segment 16 then connects with Segment 22.

Segment 22 heads north and then turns eastward, crosses US 127, and joins the other alignments at **Segment 23**, which ends at the new Jamestown Bypass.

➢ **Alternative D segments from south to north are as follows:**

Alternative D
(3-6-9-11-16.1-21-23)

Approximately 16.68 miles in length

Crosses Cumberland River in Swan Pond Bottom

Crosses US 127 two times

SOUTH SECTION—

Segment 3 begins at the KY 90/KY 734 intersection, curves westward on new alignment, and intersects KY 639. It continues westward to cross KY 734 then heads northward, staying east of US 127. It connects with Segment 6 approximately 1.5 miles north of KY 734.

SOUTH CENTRAL SECTION—

Segment 6 stays east of and generally parallel to the existing US 127, crosses Aaron Ridge Road, and connects with Segment 9.

Segment 9 continues traveling northwest until it connects with Segment 11 at the crossing of Turkeypen Creek.

CENTRAL SECTION—

Segment 11 continues to curve toward the northeast, crosses US 127 and Salt Lick Creek, and then curves north to cross into Russell County before connecting with Segment 16.1.

NORTH SECTION—

Segment 16.1 initially lies slightly east of Segment 16, crosses of KY 1730, and joins the alignment of Segment 16 for 1.3 miles, entering Swan Pond Bottom within the Creelsboro Rural Historic District. Segment 16.1 turns east from Segment 16 approximately 0.9 mile south of the Cumberland River, and crosses the river farther east of Blackfish Creek than does Segment 16. Lying east of the creek, Segment 16.1 continues northeast up Blackfish Hollow, then curves northward and rejoins the alignment of Segment 16, crossing US 127 at KY 55 and connecting with Segment 21.

Segment 21 proceeds northeast to connect with **Segment 23**, which ends at the Jamestown Bypass.

2.4 Recommended Preferred Alternative—Build Alternative D

2.4.1 Introduction

Based on the evaluation of alternatives described throughout this Environmental Assessment, **Alternative D (Segments 3-6-9-11-16.1-21-23)** is recommended as the preferred alternative. The alternative was created as a result of preliminary evaluations of Alternatives A through C. Individual segments of those alternatives comprise Alternative D, as follows:

Segments 3, 6	-	**Alternative B**
Segment 9	-	**Alternative C**
Segment 11	-	**Alternative A**
Segments 16.1	-	**Alternative C** (partially shared alignment)
Segments 21, 23	-	**Alternative A**

2.4.2 Rationale for the Recommendation of Preferred Alternative D

Because the proposed road would be on new alignment for almost its entire length, all four Build Alternatives would equally satisfy the project's purpose and need of removing the Rural Principal Arterial from the Wolf Creek Dam and providing a road with geometrics that would be an improvement over those of the existing US 127. While the existing road would continue to provide service across the dam, it would no longer be the primary north-south route through the area.

With purpose and need met by all Build Alternatives, the other criteria—social and environmental impacts, engineering and design feasibility/constraints, Section 106 and Section 4(f) requirements, and project costs—were employed to evaluate the alternatives. Considerations leading to the recommendation of Alternative D as the preferred alternative are summarized below, by corridor section and segment. Exhibits 2 and 3 show the Build Alternatives by the segments comprising each. Exhibit 4 (sheets 1 through 5) shows the environmental constraints associated with the Build Alternatives.

Note that some of the segment combinations discussed below resulted from the division of the corridor into sections, which occurred after Alternatives A, B, and C were developed. Although all of these segment combinations were evaluated, not all were incorporated into end-to-end Build Alternatives. The segment combinations that are not features of Build Alternative A, B, C, or D are referenced below as "non-aligned" in parentheses following the segment(s) identification; e.g., "Segment 1+4 (non-aligned)."

Tables 5 through 8 (pp. 20, 22, 23, and 28) compare potential impacts of segment combinations within each of the four corridor sections. Table 9 (p. 31) presents a summary matrix comparing the estimated costs and key potential environmental impacts of the proposed Build Alternatives A through D described throughout Chapter 3.0, *Affected Environment and Environmental Consequences.* Table 10 (p. 33) lists all segment combinations and summarizes selected impacts of each.

SOUTH SECTION

Recommended alignment:	**Segment 3** (stand alone)
A feature of:	***Preferred Alternative D*** *(recommended) and* ***Alternative B***
Other alignments considered:	**Segments 2-4 (Alternative A), 1-5 (Alternative C),** and non-aligned **1-4** and **2-5**

Considerations for recommending Segment 3:

Whereas Segment 3 would potentially impact one wetland 0.14 acre in size, overall the potential impacts were considered to be less than those of the other alignments in the South Section (see Table 5). Key determinants in recommending Section 3 as the preferred alignment were the segment's avoidance of relocations/displacements and reconstruction of the KY 90 intersection.

Section 3 …

- Has no residential relocations, whereas other segments would relocate 4 to 6 residences.
- Has no commercial displacements: same as Segments 2-4 and 2-5, while Segments 1-4 and 1-5 would displace 2 each.
- Requires no reconstruction of the newly constructed intersection with KY 90.
- Has the least length-of-stream impact (2,007 linear feet) and second fewest stream crossings (8).
- Has one potential hazardous materials site impact, compared with 2 to 4 with other segments.
- Potentially affects one cave and one sinkhole, which is large but possibly could be avoided. Segments 1-5 and 2-5 have no sinkhole impacts, while Segments 1-4 and 2-4 potentially have 10. All segment combinations would potentially impact one cave.
- Has an estimated construction cost of $14.5 million: from $1.1 million to $7.8 million less than all alternatives except Segments 2-5's approximately $13.0 million estimated cost. The cost difference was considered to be offset by the impacts associated with residential relocations: 0 with Segment 3, but 6 with Segments 2-5.

Considerations for eliminating other alignments:

- **Segments 1-4** (Non-aligned)—This combination would displace a truck stop/gas station on KY 90 and require reconstruction of the newly constructed intersection with KY 90. It would also share with Segments 2-4 the greatest streams impacts: 3,620 linear feet and 10 stream crossings, require 4 residential relocations, and impact 3 potential hazardous materials sites. There are a total of 10 sinkholes adjacent to/within the disturb limits of the alignment. A cave carrying Indian Creek under a local road would be within the right-of-way. This segment combination would have the highest construction cost of all alternatives in the section: Estimated $22.3 million.
- **Segments 1-5** (Alternative C)—This alignment would also displace the truck stop/gas station on KY 90 and require reconstruction of the newly constructed intersection with KY 90. It would impact 2,271 linear feet of streams and have 6 stream crossings, require 5 residential relocations, and impact 2 potential hazardous materials sites. There is 1 sinkhole adjacent to the disturb limits of the alternative. A cave carrying Indian Creek under a local road would be within the right-of-

way. This segment combination would have the second highest construction cost in the section: Estimated $19.7 million.

- **Segments 2-4** (Alternative A)—This alignment would have the stream impacts equal to those of the Segment 1-4 alignment, require 5 residential relocations, and affect 4 potential hazardous materials sites. There are a total of 10 sinkholes adjacent to/within the disturb limits of the alternative. A cave carrying Indian Creek under a local road would be within the right-of-way. This combination would have the third highest construction cost of all alternatives in the section: Estimated $15.6 million.
- The **Segment 2-5** (Non-aligned)—This alignment would have stream and cave impacts equal to those of the Segment 1-5 alignment, require 6 residential relocations, and affect 3 potential hazardous materials sites. There is one sinkhole adjacent to the disturb limits of the alternative. This segment combination would have the lowest construction cost of all alternatives in the section: Estimated $13.0 million. The low estimated construction cost was offset by the number of residential relocations and other impacts compared with the recommended preferred alternative.

Table 5: South Section Alternative Segments—Comparison of Potential Impacts

Resources & Cost	SOUTH SECTION—Alternative Segments				
	3 (B & **D**)*	**1-4**	**2-4** (A)*	**1-5** (C)*	**2-5**
Stream Crossings	**8**	10	10	6	6
Stream Impacts (LF)	**2,007**	3,620	3,620	2,271	2,271
Wetlands **# of sites / (total acres)**	**1** / (0.14)**	0	0	0	0
Floodplains (acres)	0	0	0	0	0
Caves	**1**	1	1	1	1
Sinkholes	**1**	10	10	1	1
HAZMAT	**1**	3	4	2	3
Historic/Archaeological	0	0	0	0	0
Relocation/Displacement					
Residential	**0**	4	5	5	6
Commercial	**0**	2	0	2	0
Institutional	0	0	0	0	0
Construction Cost (est., million)	**$14.5**	$22.3	$15.6	$19.7	$13.0

Bold *data in green box = Recommended preferred segment.*

YELLOW= Least impacts ROSE = Greatest impacts GRAY = Equal impacts for all Alternatives

** Indicates end-to-end Build Alternative(s) with which this segment is associated.*

***Wetland acreage potentially jurisdictional; USACE determination pending permitting phase.*

SOUTH CENTRAL SECTION

Recommended alignment:	**Segments 6-9**
A feature of:	**Preferred Alternative D** (recommended) *Segment 6 also is a feature of Alternative B and Segment 9 is a feature of Alternative C*
Other alignments considered:	**Segments 8 (**stand alone, **Alternative A), 6-10 (Alternative B), 7-9 (Alternative C),** and non-aligned **7-10**

Considerations for recommending Segments 6-9:

The key reason for the recommendation of Segments 6-9 is because Segment 6 provides the best connection with the recommended Segment 3 and the combination's impacts are similar to those of the other alignments. In addition, the Segments 6-9 combination has an estimated construction cost that is less than all but Segment 8.

The Segments 6-9 combination…

- Has 4,995 linear feet of stream impact, which is less than all but Segment 8; and 12 stream crossings: 2 less than Segments 6-10 and 7-10, the same as Segments 7-9, and 3 more than Segment 8.
- Has 2 residential relocations: the same as Segments 6-10, one more than Segment 8, and 2 more than Segments 7-9 and 7-10.
- Does not cross existing US 127, unlike Segment 8 which crosses twice.
- Does not impact a hillside cave, unlike Segment 8.
- Has an estimated cost of $13.3 million, which is from approximately $1.5 to $4.1 million less than the other alternatives considered in this section.

Considerations for eliminating other alignments:

- **Segment 8** (Alternative A)—This alignment has one residential relocation and no commercial/institutional displacements. The segment would have 4,706 linear feet of stream impact and 9 stream crossings, and would impact one hillside cave. The estimated construction cost is $11.9 million. The alignment would cross existing US 127 twice within approximately 1.0, which would impact traffic on the existing roadway during construction.
- **Segments 6+10** (Alternative B)—This alignment would have more overall impacts than the recommended alignment: 5,120 linear feet of stream impact and 14 stream crossings, 2 residential relocations, and an estimated construction cost of $14.9 million.
- **Segments 7+9** (Alternative C)—This alignment would have 12 stream crossings and 5,538 linear feet of stream impact. It would also have the second highest construction cost—estimated to be $17.1 million.
- **Segments 7+10** (Non-aligned)—This alignment would have the greatest overall stream impacts: 14 crossings and 5,663 linear feet. It would also have the highest construction cost—estimated to be $17.5 million.

Table 6: South Central Section Alternative Segments—Comparison of Potential Impacts

Resources & Cost	SOUTH CENTRAL SECTION— Alternative Segments				
	6-9 (D)*	**6-10** (B)*	**7-9** (C)*	**7-10**	**8** (A)*
Stream Crossings	**12**	14	12	14	9
Stream Impacts (LF)	**4,995**	5,120	5,538	5,663	4,706
Wetlands: # of sites / (total acres)	0	0	0	0	0
Floodplains (acres)	0	0	0	0	0
Caves	**0**	0	0	0	1
Sinkholes	0	0	0	0	0
Historic/Archaeological	0	0	0	0	0
HAZMAT	0	0	0	0	0
Relocation/Displacement					
Residential	**2**	2	0	0	1
Commercial	0	0	0	0	0
Institutional	0	0	0	0	0
Construction Cost (est., million)	**$13.3**	$14.9	$17.1	$17.5	$11.9

Bold *data in green box= Recommended preferred segment*

YELLOW= Least impacts ROSE = Greatest impacts GRAY = Equal impacts for all Alternatives

** Indicates end-to-end Build Alternative(s) with which this segment is associated.*

CENTRAL SECTION

Recommended alignment: **Segment 11** (stand-alone)

A feature of: **Alternative D** (recommended preferred) and **Alternative A**

Other alignments considered: **Segments 12-15 (Alternative B), 13-14 (Alternative C),** and non-aligned **12-14** and **13-15**

Considerations for recommending Segment 11:

Cost, the lack of residential relocations, and the ability to avoid maintenance of traffic issues were key factors in the recommendation of Segment 11 over the other alignments.

Segment 11…

- Avoids maintenance of traffic and local access problems associated with the other alignments' impacts to Williams Road.
- Has no residential relocations, unlike the other alignments, which have either 2 or 3.
- Has 8,136 linear feet of stream impact: more than Segments 12-14 and 13-14 but less than Segments 12-15 and 13-15.
- Has 15 stream crossings: fewer than Segments 12-14, the same as Segments 13-14, and more than Segments 12-15 and 13-15.

- Has an estimated construction cost of $27.0 million, which is from $2.6 to 10.5 million less than the other alternatives in this section.

Considerations for eliminating other alignments:

- **Segments 12-14** (Non-aligned)—This alignment would impact 6,763 linear feet of streams and have 17 stream crossings, which is the most crossings of all the alignments. The alignment would also require 2 residential relocations. While this alignment would provide access to Williams Road, maintenance of traffic on that road during construction would involve temporary road closings/one-laning of traffic, detours, and resulting travel delays. This combination has the second highest construction cost of all alternatives in the section: Estimated $36.2 million.
- **Segments 12-15** (Alternative B)—This alignment would have 13 stream crossings and the greatest length-of-stream impact, 8,718 linear feet. The alignment would require 2 residential relocations. Due to the impact of Segment 15 on Williams Road, maintenance of traffic during construction would be difficult. The construction cost is an estimated $29.5 million.
- **Segments 13-14** (Alternative C)—This alignment would have 15 stream crossings and the least length-of-stream impact, 6,310 linear feet. The alignment would require 3 residential relocations. While this alignment would provide access to Williams Road, maintenance of traffic on that road during construction would involve temporary road closings/one-laning of traffic, detours, and resulting travel delays. The construction cost of this combination is an estimated $33.1 million.
- **Segments 13-15** (Non-aligned)—This alignment would have the fewest stream crossings (11), but the second greatest length-of-stream impact, 8,265 linear feet. The alignment would require 3 residential relocations. Due to the impact of Segment 15 on Williams Road, maintenance of traffic during construction would be difficult. The construction cost is an estimated $37.4 million, the highest of all alignments.

Table 7: Central Section Alternative Segments—Comparison of Potential Impacts

Resources & Cost	CENTRAL SECTION—Alternative Segments				
	11 (A & **D**)*	**12-14**	**12-15** (B)*	**13-14** (C)*	**13-15**
Stream Crossings	**15**	17	13	15	11
Stream Impacts (LF)	**8,136**	6,763	8,718	6,310	8,265
Wetlands: # of sites / (total acres)	0	0	0	0	0
Caves / Sinkholes	0	0	0	0	0
Floodplains (acres)	0	0	0	0	0
Historic/Archaeological	0	0	0	0	0
HAZMAT	**6**	0	0	0	0
Relocation/Displacement					
Residential	**0**	2	2	3	3
Commercial	**0**	0	0	0	0
Institutional	**0**	0	0	0	0
Construction Cost (est., million)	**$27.0**	$36.2	$29.5	$33.1	$37.4

Bold *data in green box= Recommended preferred segment*

YELLOW= Least impacts ROSE = Greatest impacts GRAY = Equal impacts for all Alternatives

** Indicates end-to-end Build Alternative(s) with which this segment is associated. NOTE: Segment combinations not associated with an end-to-end alternative were eliminated from consideration following preliminary evaluation.*

NORTH SECTION

Recommended alignment:	**Segments 16.1-21-23**
A feature of:	**Preferred Alternative D (recommended)** and **Alternative C** *Segment 23 is a feature of all Build Alternatives.*
Other alignments considered:	**Segments 18-19-21-23 (Alternative A), Segments 17-20-23 (Alternative B), Segments 16-22-23 (Alternative C),** and non-aligned **16-21-23, 16.1-22-23, 17-19-21-23, 17-19-22-23, 18-19-22-23,** and **18-20-23** ***Little Indian Creek Alignment*** *(an early option to Segment 16's alignment)*

The North Section is the longest project section with the most segment combinations. Its location requires the crossing of the Creelsboro Rural Historic District (District) and the Cumberland River. From the start of the project, two facts were apparent: (1) this section could experience more substantial environmental impacts than would the other sections, and (2) an alignment's ability to address impacts to Section 106 and Section 4(f) resources could become the deciding factor in the recommendation of a preferred alternative in this section.

The many segment combinations in the North Section presented opportunities for evaluating potential impacts of a wide variety of alignment options. Because all of the segments encountered more or less the same physical conditions—natural and manmade—no single combination of segments proved the best choice in every evaluation category. However, one segment was determined to best address Section 106 and Section 4(f) issues. That segment, Segment 16, occurred in two segment combinations: Segments 16-22-23 of Alternative C and Segments 16-21-23, a "non-aligned" combination. ***Segment 16.1 was derived from Segment 16. Combined Segments 16.1-21-23 are a feature of Alternative D, the recommended preferred alignment.***

Considerations that led to the recommendation of Segments 16.1-21-23 as the alignment preferred over other segment combinations are summarized in the following paragraphs.

Considerations for recommending Segments 16.1-21-23:

Although the combination of Segments 16.1-21-23 would not have the fewest impacts in every category, it is the recommended preferred alignment in the North Section primarily due to its ability to minimize impacts to Sections 106 and 4(f) resources; and to avoid direct impacts to a wetland and Blackfish Creek.

Segment 16.1 of Alternative D:

- Minimizes impacts to the Creelsboro Rural Historic District, a wetland, and Blackfish Creek. Due to the location and size of the District and the locational requirements dictated by the project's purpose and need, avoidance of the District was not possible. (Section 2.5, *Creelsboro Rural Historic District Avoidance/Minimization Alternatives,* summarizes the potential impacts to the District, and the avoidance and minimization alternatives considered.) The focus turned to selecting an alignment that would have the least impact to the District. Initially, Segment 16 fulfilled this roll, and the Kentucky State Historic Preservation Officer (SHPO) concurred that Section 16 "will have the least physical and visual impact to contributing historic resources" (see correspondence dated April 22, 2009, in Appendix C).

  However, Segment 16's impacts to streams, in particular Blackfish Creek and its tributaries north of the District, were substantial (20,261 linear feet). Therefore, Segment 16.1 was developed, reducing the overall impact to 14,281 linear feet. Segment 16.1's slight shift to the east of Segment 16 does not alter the basis for the SHPO's conclusion. The segment's shift begins just

south of the Cumberland River crossing and places the roadway farther than Segment 16 from two of the contributing elements (see RU 582 and 583 on Table 23, p. 78). Where Segment 16.1 is nearer than Segment 16 to contributing elements, only the Wooldridge Cemetery (RU-584) is closer than 1,000 feet from the roadway. The cemetery is approximately 375 feet from a proposed access road with Segment 16, and approximately 100 feet from that road with Segment 16.1.

- Leaves a larger percent of the District acreage in tact. The majority of the land within the District would be on the west side of the proposed road. Swan Pond Bottom would be traversed from southwest to northeast by the proposed road, which would leave the larger area of its land east of the road and cut off from the rest of the District. However, Swan Pond Bottom is already cut off from the main body of the District by the Cumberland River.
- Has the least use (24.97 acres) of District land, which is protected under Section 4(f) of the Department of Transportation Act of 1966, 49 USC 303(c). Segment 16 (Alternative C) would use 31.83 acres, Segment 17 (Alternative B) would use 29.47 acres, and Segment 18 (Alternative A) would use 39.68 acres.
- Provides the same improved access to/from of Swan Pond Bottom as Segment 16. Several consulting parties favored Segment 16, primarily because of the improved access. The primary access to Swan Pond Bottom is currently via a road that is very substandard (see Figure 6) and poses hazards that include falling rocks, icy/slippery conditions, and a steep drop-off toward the Cumberland River along one side.

Figure 6:
Swan Pond Bottom Road—Cliff and Drop-off to River

- Impacts no known caves.
- Avoids a wetland impact in Swan Pond Bottom. The shift of the alignment to the east enables Segment 16.1 to avoid impacts to a wetland that would be affected by Segment 16 (Wetland 3, discussed in Section 3.3.5, *Wetlands and Ponds*).
- Has the least floodplain impact—0.5 acre. The impacts of Segments 16, 17, and 18 would be 6.0 acres, 12.2 acres, and 5.0 acres, respectively.

Alternative D combination of Segments 16.1-21-23:

- Has the fewest stream crossings—23, compared to 35 with Alternative A, 42 with Alternative B, and 34 with Alternative C.
- Has the second fewest linear feet of stream impact: approximately 15,835 linear feet—3,236 linear feet more than Alternative A, 223 linear feet less than Alternative B, and 6,215 linear feet less than Alternative C.
- Has the second least impact to wetlands: 0.14 acre—less than Alternatives A (0.27 acre) and C (0.23 acre). Alternative B has no wetland impact.
- Has one sinkhole adjacent to the disturb limits—the fewest of all Build Alternatives and one more than non-aligned segments 16.1-22-23.
- Potentially requires an institutional (church) relocation (Segment 23), as would all alternatives in the North Section.

- Requires 12 residential relocations: one less than Alternative A and C, and 3 more than Alternative B.
- Displaces 3 businesses: one more than Alternative A and one less than Alternative C. Alternative B would displace no businesses.
- Has no caves within the disturb limits, compared with Alternative A's one cave within the disturb limits. Alternatives B and C have no caves within their disturb limits.
- Impacts 3 potential hazardous materials sites: the same as Alternative C, one more than Alternative A, and 2 more than Alternative B.
- Has an estimated cost of approximately $62.3 million: approximately $2.1 million less than Alternative C, $7.9 million more than Alternative B, and $12.6 million more than Alternative A. (Alternatives C and D are substantially more costly than Alternatives A and B in the North Section due in large part to the excavation through Blackfish Hollow and structures crossing tributaries to Blackfish Creek.)

Considerations for eliminating alignments: *Note: As stated previously, Segment 23 is a feature of all of the Build Alternatives in the North Section, and it would potentially require the displacement of one institution (a church).*

- **Segments 18-19-21-23** (Alternative A)—This segment combination was not recommended as the preferred alignment primarily because Segment 18 would have greater adverse effects to Section 106 and Section 4(f) resources in the District than would Segments 16.1 or 16. Segment 18 would sever the District in a way that would notably impair its continuity; and would be within 1,000 feet or less of 22 of the District's contributing elements, compared with 13 with Alternatives D and C. Segment 18 would have 8,148 linear feet of stream impacts, 5.0 acres of floodplain impacts, and one cave in the disturb limits. It would require no relocations/displacements.

  The combination of all four segments comprising Alternative A would have 35 stream crossings and 12,599 linear feet of stream impact; would potentially impact 2 wetlands and 4 sinkholes; and would require 13 residential relocations and 2 business displacements. The estimated cost of this combination is $49.7 million.

- **Segments 17-20-23** (Alternative B)—This segment combination was not recommended as the preferred alignment because Segment 17 would have greater adverse effects to Section 106 and Section 4(f) resources in the District than would Segments 16.1 or 16. This segment would sever the District in a way that would notably impact its continuity; and would be within 1,000 feet or less of 21 of the District's contributing elements, compared with 13 with Alternatives D and C. Segment 17 also would have the greatest impact to floodplains (12.2 acres) of all segments in this section, impact 9,844 linear feet of streams, and cross 24 streams. It would potentially have no residential relocations/business displacements.

  The segment combination would have the second greatest length-of-stream impact, 16,058 linear feet; and the most stream crossings (42). It would potentially impact 5 sinkholes, require the fewest residential relocations (9), and have no business displacements. The estimated cost of this combination is $54.4 million.

- **Segments 16-22-23** (Alternative C)—Although Segment 16 of this alternative would minimize potential adverse effects to the District, it would impact 0.23 acre of a 2.74-acre wetland within Swan Pond Bottom. Segment 16 would also have 30 stream crossings and the greatest length-of-stream impact of all alignments—approximately 20,261 linear feet, most notably 6,765 linear feet

of Blackfish Creek. (Segment 16.1 was developed to the alignment's minimized impacts to the District while avoiding/minimizing the wetland and substantial stream impacts.)

The segment combination would have a total length-of-stream impact of 22,050 linear feet (the majority of which would be along Blackfish Creek), and 34 stream crossings. The combined segments would impact 4 sinkholes and the wetland referenced in Segment 18. The estimated cost of this combination is $64.4 million.

- **Non-aligned segments—**Although the following alignments would be viable, from a design perspective, they were eliminated after preliminary evaluations because the potential benefits and constraints associated with them could be adequately evaluated within the context of the Alternatives A, B, C, and D. Table 8 provides the data used to compare the potential impacts of viable segment combinations. Selected impacts associated with these eliminated combinations are listed below. As noted previously, Segment 23 is a component of all alignments in the North Section.
  - **Segments 16-21-23**—The combination would impact 0.23 acre of wetland and potentially 4 sinkholes and have the second greatest length-of-stream impact of all combinations including those of the Build Alternatives—21,816 linear feet (primarily due to Segment 16's 20,261 linear feet of impact). The estimated cost is approximately $65.8 million.
  - **Segments 16.1-22-23—**Segment 16.1 would minimize impacts to streams and a wetland, and provide other benefits listed above (see *Considerations for recommending Segments 16.1-21-23*). Segment 22 combined with Segment 16.1 would result in greater length-of-stream impact and more stream crossings than would Segment 16.1 combined with Segment 21. The estimated cost of this segment is approximately $57.7 million
  - **Segments 17-19-21-23**—Among the potential impacts are those to the District (see *Segments 17-20-23*); and impacts to 14,295 linear feet of streams, 2 wetlands, and 4 sinkholes. There would be 13 residential relocations and 3 business displacements. The estimated construction cost is approximately $56.8 million.
  - **Segments 17-19-22-23**—Potential impacts include those to the District (see *Segments 17-20-23*); and impacts to 14,530 linear feet of streams, 2 wetlands, and 3 sinkholes. In addition, there would be 14 residential relocations and 1 business displacement. The estimated cost of this segment is approximately $55.4 million.
  - **Segments 18-19-22-23**—Among the potential impacts are those to the District (see *Segments 18-19-21-23*); impacts to 12,834 linear feet of streams and 37 stream crossings; and impacts to 2 wetlands, one cave, and potentially 3 sinkholes. In addition, there would be 14 residential relocations and one business displacement. The estimated cost of this segment is approximately $48.2 million.
  - **Segments 18-20-23**—Potential impacts include those to the District (see *Segments 18-19-21-23*); impacts to 14,362 linear feet of streams and 46 stream crossings (the most of any alignment); and potential impacts to one cave and 5 sinkholes. The alignment would have 9 residential relocations and no business displacements. The estimated cost of this segment is approximately $47.2 million.

Table 8: North Section Alternative Segments—Comparison of Potential Impacts

Resources & Cost	NORTH SECTION—Alternative Segments									
	16-21-23	**16.1-21-23 (D)***	**16-22-23 (C)***	**16.1-22-23**	**17-19-21-23**	**17-19-22-23**	**17-20-23 (B)***	**18-19-21-23 (A)***	**18-19-22-23**	**18-20-23**
Stream Crossings	32	**23**	34	25	32	34	42	35	37	46
Stream Impacts (LF)	21,815	**15,835**	22,050	16,070	14,295	14,530	16,058	12,599	12,834	14,362
Wetlands # of sites/(total acres)	1 (0.23)**	**1 (0.14)****	1 (0.23)**	1 (0.14)**	2 (0.21)** (0.06)	2 (0.21)** (0.06)	0	2 (0.21)** (0.06)	2 (0.21)** (0.06)	0
Floodplain (total acres)	6.0	**0.5**	6.0	0.5	12.2	12.2	12.2	5.0	5.0	5.0
Caves	0	**0**	0	0	0	0	0	1	1	1
Sinkholes	4	**1**	3	0	4	3	3	5	3	5
Historic Resources:										
Individual Resources: Effects Determinations— No Effect (NE) / No Adverse Effect (NAE)	NE	**NE**	NE	NE	NE	NE	1 NAE	NE	0	1 NAE
Creelsboro RHD: Effects Determinations— Adverse Effect (AE), visual	AE	**AE*****	AE	AE***	AE	AE	AE	AE***	AE***	AE***
Creelsboro RHD— Contributing elements near segment / # acquired	13 / 0	**13 / 0**	13 / 0	13 / 0	21 / 0	21 / 0	21 / 0	22 / 0	22 / 0	22 / 0
Creelsboro RHD: Section 4(f) acres acquired	31.83	**24.97**	31.83	24.97	29.47	29.47	29.47	39.68	39.68	39.68
Archaeological Resources: Potentially eligible individual sites **(recommended for research & additional testing)**	3	**1**	3	1	3	3	3	2	2	2
HAZMAT	3	**3**	3	3	2	2	1	2	2	1
Relocation/Displacement										
Residential	12	**12**	13	13	13	14	9	13	14	9
Commercial	3	**3**	2	2	2	1	0	2	1	0
Institutional	1	**1**	1	1	1	1	1	1	1	1
Construction Cost (est., million)	$65.8	**$62.3**	$64.4	$57.7	$56.8	$55.4	$54.4	$49.7	$48.2	$47.2

Bold *data in green box= Recommended preferred segment*

YELLOW= Least impacts ROSE = Greatest impacts GRAY = Equal impacts for all Alternatives

** Indicates end-to-end Build Alternative(s) with which this segment is associated.*

*** Wetland acreage potentially jurisdictional; USACE determination pending permitting phase.*

**** Segments 16, 16.1, 17, and 18 are determined to have a visually Adverse Effect on the District. However, Segment 16.1 is near the fewest contributing elements and would use fewer acres protected under Section 4(f). Therefore, segment combinations that include Segment 16.1 are considered to have less impact than other segment combinations. Conversely, Segment 18 is near the most contributing elements and would use the most acres protected under Section 4(f). Therefore, segment combinations that include Segment 18 are considered to have the greatest impact.*

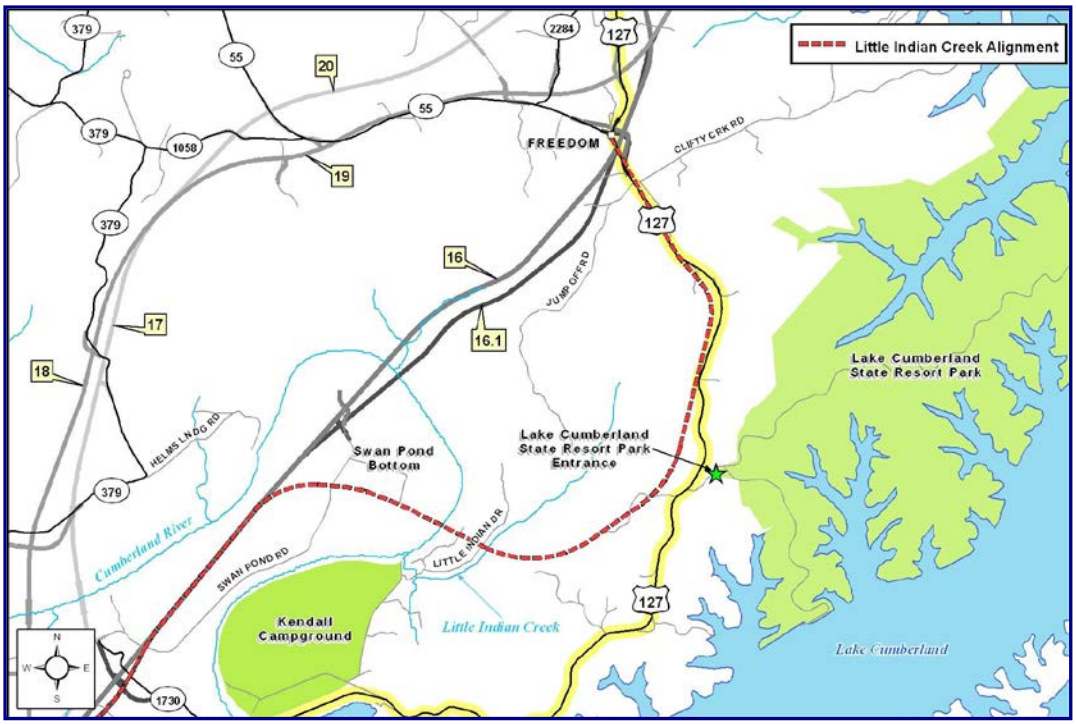


Figure 7: Little Indian Creek Alignment

Little Indian Creek alignment—In the early stages of planning for the project, a segment referred to as the "Little Indian Creek alignment" was considered as a result of a public comment recommending the alignment. This alignment was east of the current Segment 16 and was considered to be an alternative to that alignment. The Little Indian Creek alignment departed from Segment 16 north of Manntown and reconnected in the vicinity of the community of Freedom on existing US 127 (see Figure 7). The alignment passed through the eastern section of Swan Pond Bottom (within the boundary of the Creelsboro Rural Historic District), crossed the Cumberland River, and then turned eastward, crossing Little Indian Creek and intersecting US 127 just north of the entrance to Lake Cumberland State Resort Park. The alignment then headed north along US 127 before rejoining Segment 16. A key objective of this alignment was to improve access to the state park. However, this alignment was rejected because it would have added approximately 2.0 miles to the project length compared with Segment 16 and, therefore, increased the project cost; and because there would likely have been additional stream impacts to Little Indian Creek, and residential relocations and commercial displacements due to the alignment's proximity to existing US 127.

2.5 Creelsboro Rural Historic District: Avoidance/ Minimization Alternatives

The Creelsboro Rural Historic District is eligible for listing in the National Register of Historic Places (NRHP) through consensus between USACE and the SHPO in 1987. The District encompasses 4,349 acres in the river bottoms that lie along both sides of the Cumberland River near the town of Creelsboro (see Figure 8).

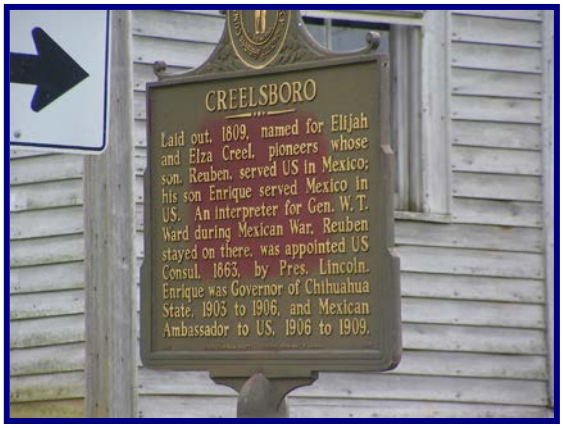


Figure 8: Creelsboro Historic Marker

All of the Build Alternatives include alignment segments that would take land from within the District boundary and also would have an adverse effect due to visual impacts to elements that contribute to NRHP eligibility. In the *Cultural Historic Resources Survey* report prepared for this project, the following segments were identified as having an adverse effect on the District: Alternative A, Segment 18; Alternative B, Segment 17; and Alternative C, Segment 16. Alternative D, which includes Segment 16.1 through the District, was developed after the report was submitted. However, its alignment through the District is similar to that of Segment 16, which was evaluated in the report; and its impacts to the District would be similar to (in some respects less than) those of Alternative C. The Segment 16.1 alignment was presented to the SHPO at a November 24, 2009, meeting to discuss potential measures to mitigate impacts to the District. Section 3.6.2, *Cultural Historic Resources*, summarizes coordination with the SHPO and the results of the historic surveys conducted for this project, including the finding of effects to historic resources located within the project's area of potential effects (APE).

Section 4(f) of the 1966 Department of Transportation Act protects the use of significant publicly owned parks, recreation areas, and wildlife and waterfowl refuges, as well as significant public and private historical sites listed in or eligible for listing in the NRHP unless the following conditions apply:

- There is no feasible and prudent alternative to the use of land.
- The action includes all possible planning to minimize harm to the property resulting from use.

Coordination with the SHPO has occurred and it has been determined that each Build Alternative would both use and have an adverse effect on the NRHP-eligible District. Because the District is protected under Section 4(f), and because both of the above conditions apply, a draft individual Section 4(f) Evaluation is included herein as Section 3.7. To demonstrate that the above conditions apply, the following avoidance/minimization options were discussed in the draft Section 4(f) Evaluation:

- Avoidance Alternative 1—No-Build Alternative
- Avoidance Alternative 2—Rebuild Existing US 127
- Avoidance Alternative 3—Western Alignment
- Avoidance Alternative 4—Eastern Alignment
- Minimization Alternatives—Segments 16 and 16.1 of Alternatives C and D, respectively

The evaluation also includes a discussion of the reasons the avoidance alternatives were eliminated as not prudent and potentially not feasible. Figure 16 in Section 3.7 shows the locations of the Western Bypass and Eastern Bypass alignments. Exhibits 5a and 5b (Appendix A) show, respectively, the location of the Build Alternatives through District and the contributing elements within the District, including photographs of several residences.

Table 9: Summary of Potential Environmental Impacts by Build Alternatives

	Alternative A 2-4-8-11-18-19-21-23	Alternative B 3-6-10-12-15-17-20-23	Alternative C 1-5-7-9-13-14-16-22-23	Alternative D 3-6-9-11-16.1-21-23
DESIGN				
Length (miles)	17.43	17.30	17.86	16.68
Estimated right-of-way (ROW) costs	$15,750,000	$15,750,000	$15,750,000	$15,750,000
Estimated utility costs	$8,320,000	$8,320,000	$8,320,000	$8,320,000
Estimated construction costs	$104,188,400	$113,271,100	$134,222,800	$117,086,900
Estimated total costs	$128,258,400	$137,341,100	$158,292,800	$141,156,900
TRAFFIC				
ADT on new route	2,100 - 4,300	2,100 - 4,300	2,100 - 4,900	2,100 - 4,900
Residual ADT on existing road	500 - 2,600	500 - 2,600	200 - 2,800	200 - 2,800
LOS on new route	B	B	B	B
LOS on US 127, "No-Build" Condition	B - C	B - C	B - C	B - C
ABILITY TO MEET PURPOSE AND NEED				
Remove Rural Principal Arterial from atop Wolf Creek Dam	high	high	high	high
Provide road having improved geometrics	high	high	high	high
POTENTIAL ENVIRONMENTAL IMPACTS				
Natural Environment				
Sinkholes	14	6	5	2
Caves	3	1	1	1
Wetlands (acres): Total / (potentially jurisdictional)	0.21 / (0.6)	0.14 / (0.14)	0.23 / (0.23)	0.14 / (0.14)
Ponds	1	4	4	6
Floodplain (acres)	5.0	12.2	6.0	0.5
Wooded areas (acres)	291	356	355	430
Stream crossings (number / linear feet [LF]):				
Perennial	5 / 2,195	8 / 2,552.1	8 / 8,215.3	5 / 1,167.0
Intermittent	17 / 9,601.7	23 / 13,884.3	17 / 12,478.2	16 / 13,249.8
Ephemeral	47 / 17,264.2	47 / 15,465.1	42 / 15,476.2	37 / 16,556.2
Total stream crossings (number / LF, rounded)	69 / 29,061	78 / 31,902	67 / 36,170	58 / 30,973
Endangered species	BA likely	BA likely	BA likely	BA likely
Cultural Environment				
Number of sites with noise criteria exceedance	1	0	0	0
Section 106 resources:				
Creelsboro Rural Historic District: Number of individual sites / effects	22 / Adverse (visual)	21 / Adverse (visual)	13 / Adverse (visual)	13 / Adverse (visual)
Other historic sites: Effects to 4 sites	No Effect (4)	No Adverse Effect (1) No Effect (3)	No Effect (4)	No Effect (4)
Archaeology sites potentially affected (recommend research/testing)	2	3	3	1
Section 4(f): Creelsboro Rural Historic District (acres used)	39.68	29.47	31.83	24.97
NRHP-Eligible individual sites potentially acquired for ROW	0	0	0	0
Recreation areas: State Park/Kendall Campground/Fish Hatchery	Reduced traffic on US 127 could reduce visits	Reduced traffic on US 127 could reduce visits	Reduced traffic on US 127 could reduce visits	Reduced traffic on US 127 could reduce visits
Environmental Justice impacts	0	0	0	0
Hazardous materials sites (excludes utility/ oil drilling equipment / residential USTs/ASTs—further reconnaissance needed)	6	6	5	4
Potential residential relocations, of which ( ) are farms	19 (1)	13 (1)	21 (1)	14 (1)
Potential number of institutional displacements	1	1	1	1
Potential total number of commercial displacements	2	0	4	3
Agricultural / Open Land: Total acres within disturb limits	149	154	157	130
Prime & unique farmland (acres)*	25	47.6	32.5	40.1
State & local important farmland (acres)*	82.6	76.4	88.5	82.5
Farmland rating points*	124	124	127	129

Note: Yellow highlight identifies the recommended preferred alternative.

* *From Farmland Conversion Impact Rating, Form AD-1006 (see Appendix B).*

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Table 10: Summary of Selected Impacts by Alternative Segment Combinations

Corridor Section	Alternative Segments & End-to-End Alternative ( )	Water Features						TES	HAZ	Historic Properties			Relocation / Displacement			Construct. Cost Estimate (Millions)
		Stream Crossings / LF of Impact	Floodplain Impacts (Ac)	Wetlands # of sites / (Total Ac Impact)	Caves Adjacent to/ in Disturb Limits (DL)	Sinkholes Adjacent to/ in DL	Ponds			Individual No Effect (NE) / No Adverse Effect (NAE)	Creelsboro District: Contributing Elements Near Alts. / # Acquired	Creelsboro District: 4(f) Acres Acquired	Residential	Commercial	Institut.	
South	**3** (B & **D**)	8 / 2,007	0	1 (0.14) [j]	1	1	3	Need BA	1	0	0	0	0	0	0	$14.5
	1-4	10 / 3,620	0	0	1*	10	0	Need BA	3	0	0	0	4	2	0	$22.3
	2-4 (A)	10 / 3,620	0	0	1*	10	1	Need BA	4	0	0	0	5	0	0	$15.6
	1-5 (C)	6 / 2,271	0	0	1*	1	2	Need BA	2	0	0	0	5	2	0	$19.7
	2-5	6 / 2,271	0	0	1*	1	3	Need BA	3	0	0	0	6	0	0	$13.0
South Central	**8** (A)	9 / 4,706	0	0	1 in DL	0	0	Need BA	0	0	0	0	1	0	0	$11.9
	6-9 (**D**)	12 / 4,995	0	0	0	0	0	Need BA	0	0	0	0	2	0	0	$13.3
	6-10 (B)	14 / 5,120	0	0	0	0	0	Need BA	0	0	0	0	2	0	0	$14.9
	7-9 (C)	12 / 5,538	0	0	0	0	0	Need BA	0	0	0	0	0	0	0	$17.1
	7-10	14 / 5,663	0	0	0	0	0	Need BA	0	0	0	0	0	0	0	$17.5
Central	**11** (A & **D**)	15 / 8,136	0	0	0	0	0	Need BA	6	0	0	0	0	0	0	$27.0
	12-14	17 / 6,763	0	0	0	0	0	Need BA	0	0	0	0	2	0	0	$36.2
	12-15 (B)	13 / 8,718	0	0	0	0	0	Need BA	0	0	0	0	2	0	0	$29.5
	13-14 (C)	15 / 6,310	0	0	0	0	0	Need BA	0	0	0	0	3	0	0	$33.1
	13-15	11 / 8,265	0	0	0	0	0	Need BA	0	0	0	0	3	0	0	$37.4
North	**16-21-23**	32 / 21,815	6.0	1 (0.23) [j]	4 Adjacent	4	1	Need BA	3	0	13 / 0	31.83	12	3	1 meet hall	$65.8
	16.1-21-23 (D)	23 / 15,835	0.5	1 (0.14) [j]	4 Adjacent	1	3	Need BA	3	0	13 / 0	24.97	12	3	1 meet hall	$62.3
	16-22-23 (C)	34 / 22,050	6.0	1 (0.23) [j]	0	3	1	Need BA	3	0	13 / 0	31.83	13	2	1 meet hall	$64.4
	16.1-22-23	25 / 16,070	0.5	1 (0.14) [j]	0	0	2	Need BA	3	0	13 / 0	24.97	13	2	1 meet hall	$57.7
	17-19-21-23	32 / 14,295	12.2	2 (0.21) [j, 0.06]	4 Adjacent	4	2	Need BA	2	0	21 / 0	29.47	13	2	1 meet hall	$56.8
	17-19-22-23	34 / 14,530	12.2	2(0.21) [j, 0.06]	0	3	2	Need BA	2	0	21 / 0	29.47	14	1	1 meet hall	$55.4
	17-20-23 (B)	42 / 16,058	12.2	0	0	3	1	Need BA	1	Lawrence (NAE)	21 / 0	29.47	9	0	1 meet hall	$54.4
	18-19-21-23 (A)	35 / 12,599	5.0	2 (0. 21) [j, 0.06]	1 in DL 4 Adjacent	5	0	Need BA	2	0	22 / 0	39.68	13	2	1 meet hall	$49.7
	18-19-22-23	37 / 12,834	5.0	2 (0. 21) [j, 0.06]	1 in DL	3	0	Need BA	2	0	22 / 0	39.68	14	1	1 meet hall	$48.2
	18-20-23	46 / 14,362	5.0	0	1 in DL	5	0	Need BA	1	Lawrence (NAE)	22 / 0	39.68	9	0	1 meet hall	$47.2

BUILD ALTERNATIVE	ALTERNATIVE SEGMENTS	LENGTH	TOTAL COST ESTIMATE
Alternative A	2-4-8-11-18-19-21-23	17.43	$128,258,400
Alternative B	3-6-10-12-15-17-20-23	17.30	$137,341,100
Alternative C	1-5-7-9-13-14-16-22-23	17.86	$158,392,900
Alternative D (Recommended Preferred)	**3-6-9-11-16.1-21-23**	**16.68**	**$141,156,900**

[j] = All of site potentially Jurisdictional **[j, #] = Of the total acres of affected wetlands, acres that are potentially Jurisdictional**

* Cave straddles Alternative C Segments 1-5 and Alternative A Segments 2-4. The cave carries Indian Creek under the existing road intersecting US 127.

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3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The methods used to examine and evaluate potential impacts are those currently recognized by regulatory agencies and/or prescribed by FHWA and KYTC. Detailed, topic-specific information can be found in the supporting technical reports, which were prepared as separate technical studies and are on file with KYTC. Where applicable, the analyses address direct, indirect, and cumulative impacts, defined as follows:

Direct impacts are changes that happen in the same time and place as the proposed action.

Indirect impacts are those that are caused by the action and are later in time and further removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate (see 40 CFR 1508.8).

Cumulative impacts occur when the effects (both direct and indirect) of the action interact with the effects of other actions. The Council on Environmental Quality (CEQ) defines cumulative impacts as those that "result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

3.1 Air Quality

An *Air Quality Report* focusing on carbon monoxide, particulate matter, air toxics, and other priority pollutants was prepared for this project. The report was approved March 19, 2008, and is available for review from KYTC.

3.1.1 Carbon Monoxide (CO)

The primary source of air pollutants associated with either construction of a new highway or improvement of an existing highway is from motor vehicle use. The major pollutant emitted by motor vehicles is carbon monoxide (CO), which is formed primarily by the combustion of fuel associated with transportation.

A microscale analysis comparing existing (2006) and future (2026) conditions for the project corridor was performed. This analysis was conducted to determine if CO emissions generated by the proposed project would cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS) as promulgated by U.S. Environmental Protection Agency (USEPA). The state and federal ambient air quality standards for CO are as follows:

One hour - 35 ppm or 40 mg/ m^3
Eight hour - 9 ppm or 10 mg/ m^3

Note: ppm = parts per million
mg/m^3 = milligrams per cubic meter

These values may not be exceeded more than once per year. Any computer-modeled concentration above either the one-hour or eight-hour standard is considered a violation. Since CO is a product of combustion and is relatively inert, in addition to being emitted near the ground the highest concentrations are typically found near the source.

CO concentrations generated along the free flow sections of the existing roadway network and the proposed project were predicted using the CAL3QHC computerized dispersion model developed for the USEPA, and USEPA's MOBILE6.2 model for the calculation of emission factors. Roadway segments representing the "hot spot" (that portion of the facility with the highest traffic volume) for the existing

condition, the No-Build Alternative, and the Build Alternatives were modeled as line segments plotted on a Cartesian coordinate system.

The X, Y, and Z coordinates for receptor sites were entered into the model as representative receptors at the existing or proposed right-of-way lines. Table 11 and subsequent text summarize the results.

Table 11: Maximum 1-Hour and 8-Hour CO Concentrations (PPM)—Hot Spots

US 127 – KY 90 to Jamestown Bypass	Existing Alignment 2006		No-Build Alternative 2026		Build Alternative Segments 2 and 3 2026		Build Alternative Segment 22 2026	
Hot Spot Analysis	**1 Hr.**	**8 Hr.**	**1 Hr.**	**8 Hr.**	**1 Hr.**	**8 Hr.**	**1 Hr.**	**8 Hr.**
Site 1 – KY 127 NB	2.3	1.4	2.3	1.4	2.2	1.3	2.2	1.3
Site 2 – KY 127 SB	2.3	1.4	2.3	1.4	2.2	1.3	2.2	1.3
Max. ppm value 1-Hr.	2.3		2.3		2.2		2.2	
Max. ppm value 8-Hr.	1.4		1.4		1.3		1.3	

Existing conditions. The results of the existing conditions analysis indicate the one-hour CO concentration for both sites is 2.3 ppm, while the eight-hour concentration is 1.4 ppm.

No-Build Alternative. The No-Build Alternative has a one-hour CO concentration of 2.3 ppm and an eight-hour concentration of 1.4 ppm at both receptors. When compared to existing levels, the one-hour and eight-hour CO concentrations for the No-Build Alternative are predicted to remain the same at both receptor sites.

Build Alternatives. The Build Alternatives have a one-hour CO concentration of 2.2 ppm and an eight-hour concentration of 1.3 ppm at both receptors. When compared to existing and No-Build levels, the one-hour and eight-hour CO concentrations for the Build Alternatives are predicted to decrease at both receptor sites.

None of the CO values pertaining to the US 127 realignment, either now or in the design year, exceed the ambient air quality standards mandated by USEPA.

3.1.2 Lead, Nitrogen Dioxide, Sulfur Dioxide, and Particulate Matter

Pursuant to the 1990 Clean Air Act Amendments (CAAA) and the National Environmental Policy Act (NEPA), all areas of Kentucky are in attainment for lead, nitrogen dioxide, sulfur dioxide, and particulate matter. Further analysis of the project's impact regarding these pollutants is not required.

3.1.3 Mobile Source Air Toxics (MSATs)

The purpose of this project is to provide a key link in an important local and regional Rural Principal Arterial roadway by relocating US 127 on new alignment in the vicinity of the existing US 127. The relocated US 127 will serve traffic within same general corridor as existing US 127, and will also reduce traffic crossing Wolf Creek Dam and provide a roadway having improved geometrics compared with existing US 127, which is substandard to contemporary design. This project has been determined to generate minimal air quality impacts for CAAA criteria pollutants and has not been linked with any special MSAT concerns. As such, this project will not result in appreciable changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in MSAT impacts of the project from that of the No-Build Alternative. Moreover, USEPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on

regulations now in effect, an analysis of national trends with USEPA's MOBILE6.2 model forecasts a combined reduction of 72% in the total annual emission rate for the priority MSATs from 1999 to 2050 while vehicle-miles of travel are projected to increase by 145%. This will reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project.

3.1.4 Air Quality Summary

In accordance with the Amended Final Conformity Guidelines issued by both the U.S. Department of Transportation and USEPA, which are in effect as of September 15, 1997, the project is located in an air quality area that does not require transportation control measures. The proposed project is located in the Statewide Transportation Improvement Program (STIP, Appendix A, p. 21), Fiscal Years 2007-2010, approved September 2006. Based on the air quality analysis performed for this project, it is in compliance with the Kentucky State Implementation Plan for the Attainment and Maintenance of National and State AAQS.

3.2 Noise

Noise can be generally defined as unwanted sound. It is a vibrational energy form that causes pressure variations in elastic media such as air or water. The human ear perceives these variations as sound. The ear can discern different levels of loudness as the intensity of pressure variations fluctuates. These pressure differences are commonly measured in decibels (dB). The decibel scale audible to humans ranges from 0 to 140 dBs. A level of zero decibels corresponds to the lowest limit of audibility, while a level of 140 decibels represents the threshold of pain.

A *Noise Impact Analysis* prepared for this project was approved March 26, 2008, and is available for review from KYTC. Traffic noise impacts were analyzed in accordance with the procedures established for the abatement of highway traffic noise and construction noise as outlined in Part 772 of Title 23 of The Code of Federal Regulations (CFR). An effective, quantitative noise impact analysis must first identify potential noise sensitive land uses in the Study Area, and establish existing noise levels at these sites. Future (design year) noise levels are then predicted and compared to both existing noise levels and Federal noise level criteria to determine the noise impacts resulting from implementing the project.

3.2.1 Existing Noise Levels

To gain an accurate representation of the overall study corridor with respect to potential noise impacts, ambient readings were recorded at six locations (see Exhibit 4) using a sound level meter. Among its multiple functions, the sound level meter integrates noise levels on a continuous basis and produces an equivalent (or average) sound level—known as the L_{eq}—for any desired test duration. The selected sites represent a total of 10 individual receptor sites. The sites represent locations possibly subject to future increases in noise generated by implementing the proposed project. The noise sensitive receptors were selected based on FHWA noise abatement criteria (NAC) guidelines established for noise sensitive land uses (see Table 12). Land use Category B—which represents residential properties, parks/playgrounds, schools, and churches—was applicable to all noise sensitive receptors on this proposed project. The NAC standard established for Category B sites is 67 dBA L_{eq} (exterior). As shown in Table 13, existing measured noise levels in the project corridor range from 49 dBA L_{eq} at Site 5 to 62 dBA L_{eq} at Sites 1 and 6. Noise levels were assumed to approach the noise abatement criteria if the resultant noise level was within 1 dBA of the value shown for the appropriate activity category identified in Table 12 (*i.e.,* 67 dBA).

Table 12: FHWA Noise Abatement Criteria

Activity Category	Hourly A-Weighted Sound Level - Decibels (dBA)		Description of Activity
	$L_{eq}(h)$	$L_{10}(h)$	
A	57 (Exterior)	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in categories A or B.
D	--	--	Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

3.2.2 Future Noise Levels

Future noise levels for the No-Build Alternative and the proposed Build Alternatives were modeled using the FHWA Traffic Noise Model (TNM2.5) computer model. The analysis results are summarized in Table 13. The analysis of the noise impacts associated with the No-Build and Build Alternatives was based upon average daily traffic (ADT) and design hourly volume (DHV) projections for the year 2026 provided by the KYTC Division of Multimodal Programming.

Table 13: Existing and Predicted Noise Levels

Site Number, (Number of represented receptors), and Receptor Description		1 (1) Residence, US 127/ KY 90	2 (3) Residence, KY 734	3 (2) Residence, US 127	4 (1) Residence, KY 1058	5 (2) Residence, KY 55	6 (1) Residence, US 127
Noise Abatement Criterion Standard (dBA L_{eq})		67	67	67	67	67	67
Existing Measured Noise Level (dBA L_{eq})		62	56	54	50	49	62
Predicted 2026 Noise Levels (dBA L_{eq})	No-Build	62	56	61	52	55	65
	Alt. A	65	62	56	53	58	**66**
	Alt. B	65	45	40	—	—	65
	Alt. C	65	49	43	—	—-	64
	Alt. D	65	45	43	—	—	64
Noise Impact (approach/ exceed criterion, or substantial increase over existing levels)	No-Build	No	No	No	No	No	No
	Alt. A	No	No	No	No	No	**Yes** (approaches criterion)
	Alt. B	No	No	No	—	—	No
	Alt. C	No	No	No	—	—	No
	Alt. D	No	No	No	—	—	No

Notes: Highlight indicates noise impact.

---- Indicates sites not analyzed: too far away to be affected.

No-Build Alternative. The results of the noise analysis conducted for the No-Build Alternative indicate that year 2026 noise levels without the project would range from 52 dBA L_{eq} at Site 4 to 65 dBA L_{eq} at Site 6. These levels represent a difference from existing noise levels ranging between 0 and 7 dBA L_{eq}. Generally, a 3-dBA L_{eq} change is considered as the minimum average increase perceived by most people. None of the sites approach or exceed the NAC standard of 67 dBA.

Build Alternatives. Build Alternative A will generally produce noise level increases over existing and No-Build levels for most sites. Build Alternatives B, C, and D will produce mixed results, with noise level decreases from existing and No-Build levels the case for most sites.

Alternative A will produce noise levels greater than those of the No-Build Alternative at five of the six sites, and less than those of the No-Build Alternative at one site. Noise levels are predicted to range from 53 dBA L_{eq} (Site 4) to 66 dBA L_{eq} (Site 6). These levels represent a difference from existing and No-Build noise levels ranging between -5 and 9 dBA L_{eq}. Site 6 approaches the NAC standard. None of the sites exceed the NAC standard.

Alternative B will produce noise levels equal to or greater than those of the No-Build Alternative at two of the six sites, and less than those of the No-Build Alternative at two sites. Sites 4 and 5 were not analyzed for this alternative because they are too far from the proposed alignment to be affected. Noise levels are predicted to range from 40 dBA L_{eq} (Site 3) to 65 dBA L_{eq} (Sites 1 and 6). These levels represent a difference from existing and No-Build noise levels ranging between -21 and 3 dBA L_{eq}. None of the sites approach or exceed the NAC standard.

Alternative C will produce noise levels less than those of the No-Build Alternative at three of the six sites, and greater than those of the No-Build Alternative at one site. Sites 4 and 5 were not analyzed for this alternative because they are too far from the proposed alignment to be affected. Noise levels are predicted to range from 43 dBA L_{eq} (Site 3) to 65 dBA L_{eq} (Site 1). These levels represent a difference from existing and No-Build noise levels ranging between -18 and 3 dBA L_{eq}. None of the sites approach or exceed the NAC standard.

Alternative D, the recommended preferred alternative, will produce noise levels greater than those of the No-Build Alternative at one of the six sites, and less than those of the No-Build Alternative at three sites. Sites 4 and 5 were not analyzed for this alternative because they are too far from the proposed alignment to be affected. Noise levels are predicted to range from 43 dBA L_{eq} (Site 3) to 65 dBA L_{eq} (Site 1). These levels represent a difference from existing and No-Build noise levels ranging between -18 and 3 dBA L_{eq}. None of the sites approach or exceed the NAC standard.

3.2.3 Noise Abatement Measures and Summary

KYTC has developed a policy consistent with FHWA guidelines to determine the need, feasibility, and reasonableness of noise abatement measures, including barrier walls, for all major highway projects. FHWA, in 23 CFR Part 772, offers a number of measures for abating or eliminating highway noise impacts. A consideration of the primary means of mitigating noise impacts, as offered by FHWA, follows.

Traffic management measures. Traffic management measures were not considered feasible for abating noise impacts for any receptor. Measures such as installation of additional traffic control devices, prohibition of vehicle types, time-use restrictions, speed limit reductions, and exclusive lane designations would be adversely detrimental to the proposed project's ability to function as a principal arterial and major north-south route. Restricting truck traffic would be unreasonable, very difficult to enforce, and was considered to be a disincentive to economic development.

Alteration of horizontal and vertical alignments. KYTC is in the process of integrating noise impact considerations into the selection of alternatives, and into the horizontal and vertical design of highways. A

preferred alignment selection usually includes shifting the alignment both vertically and horizontally, wherever feasible, to minimize impacts to adjacent land uses. Vertical and horizontal alignments are altered to minimize noise impacts where other factors are not prohibitive. Based on the proposed project's topography, which consists mainly of rolling terrain, it is likely that the final design would result in noise levels similar to those predicted for this study.

Acquisition of property rights or acquisition of property. KYTC does not consider purchasing property or buildings for barrier construction or the creation of a buffer zone to be a viable alternative for noise abatement.

Construction of noise barriers. To abate noise impacts, KYTC and FHWA generally give the most serious consideration to the construction of noise barriers between the shoulder and the right-of-way limits. KYTC has established a policy for determining the reasonableness of when and where barriers should be constructed. KYTC considers the following factors when determining barrier construction reasonableness as a means for abating noise impacts associated with a proposed project: the noise impact severity, the number of people affected, barrier costs, the structural feasibility of a barrier, and the impacted residents' viewpoint. The KYTC has also determined under what circumstances barrier construction is generally **not** reasonable. These circumstances are identified as:

1. Along existing roadways where the proposed project does not appreciably alter (greater than 3 dBA) future noise levels (measured by the difference between the No-Build Alternative and Build Alternatives in the design year).
2. At locations involving improvements to existing highways that were undeveloped when the original highway was completed, and at which the new project does not appreciably alter (greater than 3 dBA) the future noise environment.
3. At locations where site characteristics prohibit a reasonable height wall (up to 20 feet) from obtaining a substantial reduction (5 dBA or greater) in noise levels.
4. At locations where the barrier would pose overriding safety and maintenance problems.
5. At locations where, after citizen involvement, it is obvious that the majority of the affected public is opposed to the barrier.

KYTC has identified four categories under which noise abatement measures should be analyzed. If any noise receptor site qualified under any one of the four categories, an analysis was considered. The categories are as follows:

Category 1 Locations with noise increases of 10 dBA or greater over existing noise levels and levels that approach (within 1 dBA) or exceed the applicable NAC due to project implementation.

Category 2 Locations with noise increases less than 10 dBA and levels that approach (within 1 dBA) or exceed the applicable NAC due to the project.

Category 3 Locations with noise increases of 10 dBA or greater and predicted noise levels of between 60-65 dBA L_{eq}.

Category 4 Locations with noise increases of 10 dBA or greater and the predicted noise levels are less than 60 dBA L_{eq}.

Upon review of KYTC's policy for considering barrier reasonableness, it was determined that criteria for constructing barrier walls as a means of noise abatement were not met at any receptor location. One receptor site (Site 6) had a noise level of 66 dBA for Alternative A, which approaches the applicable NAC and thus is included in Category 2, above; however, the difference between No-Build Alternative and Alternative A noise levels is less than 3 dBA. Therefore, the project would not appreciably alter future

noise levels at Site 6. In addition, this site is also located near the intersection of the proposed project with Story Lane. Gaps in a noise barrier allowing for access to intersecting roadways (such as Story Lane) severely decrease the barrier's effectiveness and may create traffic safety concerns, to the point that the barrier becomes unreasonable to construct.

Noise insulation of public use or non-profit institutional structures. KYTC's policy is consistent with FHWA's interior noise level criteria policy on noise insulation and air conditioning compliance. This noise abatement measure option applies only to public institutional use buildings. No receptor sites in the study are classified within this category.

Noise abatement summary. Construction of noise walls was not determined to be reasonable at any location because Site 4 is an isolated receptor location and is adjacent to an intersection with the proposed bypass. Physical measures such as traffic management, alteration of horizontal and vertical alignments, acquisition of property rights, and insulation of buildings were also addressed. At locations where barrier construction is not reasonable and/or cost-effective, visual screening may be proposed to help reduce the psychological impacts of the project. The final decision on implementation of abatement measures will be made after completion of the project design and the public involvement process.

3.2.4 Construction Noise Impacts and Abatement

Project construction would result in unavoidable short-term noise impacts. The primary noise source would originate from construction activities such as earth removal, hauling, grading, and paving. KYTC requires construction noise abatement on highway construction projects. Contractors must use mufflers and other noise abatement techniques on their equipment and will implement procedures to limit work hours and restrict the transmission of noise to sensitive receptors such as hospitals, churches, schools, libraries, parks, museums, residences, and sensitive commercial activities. Such required techniques may include, but not necessarily be limited to, the following:

- Soundproof housing or enclosures for stationary noise-producing machinery such as drills, augers, cranes, derricks, compactors, pile drivers, etc.
- Efficient silencers on air intakes or equipment.
- Efficient intake and exhaust mufflers on internal combustion engines.
- Proper maintenance on all noise-producing equipment to prevent excessive rattling and vibration of metal surfaces.
- Restriction of operations in the vicinity of noise-sensitive locations to hours of the day when excessive noise would be least harmful.
- Other steps as necessary to prevent construction noise from becoming a public health nuisance or detriment to human health.

KYTC will be responsible for monitoring construction noise and for advising the contractor of maximum allowable noise level violations.

3.3 Aquatic Ecosystems

An *Aquatic and Terrestrial Baseline Report* (Baseline Report) was prepared for this proposed project, and is on file with the KYTC. The following sections describe the findings of the aquatic ecosystem analysis.

3.3.1 Water Quality

Streams in the project area were field investigated for this assessment. In all, there were 171 streams investigated, of which 69 drain into Lake Cumberland and 102 drain into the Cumberland River. At a number of stream locations where the project could result in impacts, macroinvertebrates, fishes, and

mussels were inventoried and water chemistry was tested to characterize overall water quality in the area, as described below. The aquatic habitats were surveyed according to guidelines from Kentucky Division of Water's (KDOW) most current publications: *Methods for Assessing Biological Integrity of Surface Water,* the *Kentucky Macroinvertebrate Bioassessment Index* (MBI), and *Development and Application of the Kentucky Index of Biotic Integrity* (KIBI). Collection and analysis of all data was completed by degreed biologists and reviewed by professionals to ensure accuracy. Numerous reference sources were used to analyze and interpret data including: *Stream Ecology Structure and Function of Running Waters* (Allan 2000); *Fish Collection Catalogue of the Kentucky Division of Water* (1976-1987; KDOW 1088); and *Impacts on Warmwater Streams: Guidelines for Evaluation* (Bryan and Rutherford 1993). The results of the inventory and analysis discussed below indicate that water quality is generally fair to good, although there are some streams with poor water quality or that do not fully support [2] aquatic wildlife.

Macroinvertebrates. Macroinvertebrate[3] community attributes are used in water quality assessments as environmental indicators of biological integrity to describe water quality conditions or health of the aquatic ecosystem and to identify causes of impairment (KDOW 2002). Throughout the project's alternative alignments, 20 sample sites were selected containing a least 100 individual specimens to determine the biological integrity of the stream. The sampling sites were analyzed using KDOW selected core stream conditions (referred to as "core metrics"). The various metrics were combined into an index of biotic integrity—the Macroinvertebrate Biotic Index (MBI). The numerical scores derived through this process were converted to a rating system ranging from 0 to 72 or greater: for example, a score from 0 to 21 indicated **very poor** water quality while a score of 72 or above indicated **excellent** water quality. The results of the analysis for the 20 sample sites are summarized in Table 14 (p. 44). As the table shows, while 2 sample sites rated **poor**, the remaining rated **fair** (11 sites), **good** (5 sites)**,** or **excellent** (2 sites).

In addition to the sampling performed for this project, historic macroinvertebrate collections conducted from May 14, 1999, to February 24, 2000, at two locations in the Cumberland River below Wolf Creek Dam were reviewed. Site 1 was located approximately 984 feet below the dam on the north bank. The average MBI calculated for the site indicated very poor water quality. Site 2 was located on the south bank of the Wells Island Shoal. The average MBI calculated for this site indicated poor water quality.

Fishes. Streams with fish populations were sampled following the procedures outlined in Development and Application of the Kentucky Index of Biotic Integrity (Compton, *et al*., 2003). A KIBI for headwater streams was calculated, if possible, to determine the quality of the stream. Fish were collected from 10 streams throughout the project area, of which 5 sites displayed KIBI values that indicated "fair" water quality. One stream had a water quality rating of "good," one stream received an "excellent" ranking, and one stream received a "poor" ranking. A KIBI value could not be calculated for Rock Lick Creek (STR 71) because only one fish was collected, a rainbow trout (*Oncorhynchus mykiss*), which is an introduced species. The average KIBI of the streams sampled indicated "fair" water quality for the project area. This "fair" rating is most likely due to poor agricultural practices that occur within the project's watersheds, non-point source pollution from existing roadways, and numerous oil wells. In addition, the majority of the streams sample for fish was intermittent streams and should generally have lower KIBI values than perennial streams.

2 A supporting / non-supporting designation indicates that a stream may / may not provide suitable habitat to sustain the flora (plants) and fauna (animals) typically found in the region.

3 Macroinvertebrates are animals lacking a backbone, such as crustaceans, insects, spiders, worms, and mollusks. Benthic (i.e., "bottom dwelling") macroinvertebrates, the subjects of the water quality analysis, live most or all of their lives on stream bottoms. Some are the larval forms of flying insects and, as such, spend only part of their lives in streams; others such as water mites spend all their lives in streams. These animals are important links in the food chain and their presence/absence is an indicator of the health of a stream.

Mussels. Streams within the project's proposed alternatives were extensively searched for habitat that would support mussels. Potential habitat was identified within the Cumberland River below Wolf Creek Dam. However, due to the impacts created by the dam, such as bed scouring during heavy discharge, sedimentation, and a cold water discharge regime, all freshwater mussels once known to be located in the Cumberland River below the dam are believed to be extirpated. No threatened or endangered mussel species, alive or dead, were observed in the project area. Only relic dead shells, all of which were unidentifiable, were observed in the Cumberland River. In addition, other streams in the project area had very limited habitat to support mussels. Two common species, the giant floater (*Pyganodon grandis*) and the paper pondshell (*Utterbackia imbecillis*) were observed in a farm pond approximately 1,000 feet west of Alternative A in the Jackman Bottom area adjacent to the Cumberland River. These two species are generally distributed statewide. Additional farm ponds were checked for mussels in the project area; no mussels were located. These two species are believed to have been introduced during fish stockings as young attached to the gills of a host fish.

3.3.2 Streams and Stream Crossings

During the development and evaluation of alternatives for this project, careful consideration was given to stream crossings to avoid or minimize their associated impacts. Locations chosen for all stream crossings were evaluated for design feasibility as well as environmental impact. Because the project is on new alignment for most of its length, the majority of proposed stream crossings are new crossings. Where US 127 would encounter county roads at their stream crossings, some existing stream crossing structures may be modified or relocated to accommodate the new construction.

Overview of potential impacts. The potential impacts to streams vary with the alternatives considered. Depending upon the Build Alternative chosen, there may be over 70 stream crossings. This presents a considerable potential for stream crossing impacts. The linear feet of streams within the construction limits at the crossings range from approximately 29,061 linear feet with Alternative A to 36,170 linear feet with Alternative C. The greatest potential impact to a single stream would occur with Segment 16 of Alternative C. Segment 16 traverses the hollow through which Blackfish Creek flows. Approximately 6,764 linear feet of the creek and a total of 2,842 linear feet of 12 of its tributaries lie within the alternative segment's right-of-way. Overall, Segment 16 would impact 20,261 linear feet of streams. Alternative D, the recommended preferred alternative, would have approximately 30,973 total linear feet of impact to streams, 14,281 linear feet of which would be attributable to Segment 16.1.

Table 15 (p. 45) presents the potential length of impacts in linear feet for each Build Alternative by stream type (perennial, intermittent, ephemeral). Table 16 (p. 45) identifies the potential length of stream impacts by the segments comprising each Build Alternative. Table 17 (p. 47) provides a composite of stream crossing impacts by stream sections, Build Alternative segments, and stream type (perennial, intermittent, and ephemeral).

Table 14: Summary of Physical Character / Water Quality in Sampled Stream Sections

Stream	Stream ID	Stream Type	Width/ (Depth)	Riparian Zone Dominant Species	Stream Habitat Assessment	Water Quality			Length of Potential Impact (Linear Feet)			
						Based on Macro-invertebrates Sampling & MBI	Based on Fish Sampling & KIBI	Based on Survey of Availability of Habitat to Support Mussels	Alt. A	Alt. B	Alt. C	Alt. D
UT Indian Creek	STR 1	P	3' – 4' / (2" – 15")	Grasses	Supporting but threatened	Fair	Excellent	Very limited	158			
Mid. Fork Lake Cumberland	STR 10	I	10' / (1" – 4")	Trees	Fully supporting	Fair	*	Very limited	356			
Patrick's Branch	STR 12	P	9' / (1" – 8")	Trees	Fully supporting	Good	Fair	Very limited	521			
UT W. Fork Lake Cumberland	STR 29	P	3' – 5' / (1" – 2")	Trees	Not supporting	Fair	*	Very limited		388	178	388
UT Hollow York Branch	STR 36	I	3' – 8' / (1")	Trees	Fully supporting	Good	*	Very limited	535			
Turkeypen Creek	STR 43	I	17' / (2")	Trees	Supporting but threatened	Fair	*	Very limited	935	812	689	689
W. For k Lake Cumberland	STR 48	I	15' / (2")	Trees	Partially supporting	Excellent	*	Very limited	1,011			1,011
Salt Lick Creek	STR 68	I	12' – 18' / (2" – 6")	Trees	Not supporting	Fair	Good	Very limited		904		
UT Salt Lick Creek	STR 70	I	6' – 10' / (2" – 4")	Trees	Supporting but threatened	Fair	*	Very limited		223	144	
Rock Lick Creek	STR 71	I	3' / (7")	Trees	Partially supporting	Fair	N/A	Very limited		868	846	846
UT Rock Lick Creek	STR 76	I	3' / (4")	Trees	Partially supporting	Fair	*	Very limited		463	657	657
Indian Creek	STR 78	P	10' – 25' / (4')	Trees, grasses	Fully supporting	Fair	Fair	Very limited	239		283	
UT Cumberland River	STR 104	I	1' / (0.3")	Shrubs, grasses	Not supporting	Poor	N/A	Very limited	929			
Blackfish Creek	STR 114	P	10' – 22' / (4")	Trees, grasses	Not supporting	Good	Fair	Very limited			1,793	
UT Coe Creek * * *	STR 147	I	4' – 10' / (2" – 6")	Trees	Fully supporting	Good	Fair	Very limited		710		
UT Coe Creek	STR 154	P							1,012	833		
UT Bethel Creek	STR 159	I	4' – 8' / (1" – 8")	Trees	Partially supporting	Fair	*	Very limited		168		
Jobbe's Fork	STR 162	I / P* *	3' – 6' / (3")	Trees, grasses	Not supporting	Fair	Fair	Very limited		347 I 179 P 526		
U.T. Jobbe's Fork	STR 165	P	4' – 6' / (2")	Trees	Fully supporting	Poor	*	Very limited		373		
U.T. Clifty Creek	STR 174	I	8' – 12' / (2" – 7")	Trees	Fully supporting	Excellent	Fair	Very limited	618		762	762
U.T. Clifty Creek	STR 179	I	8' – 11' / (3" – 11")	Trees	Supporting but threatened	Good	*	Very limited	452			452

Source of data: Aquatic and Terrestrial Baseline Report, June 2008, on file with KYTC.

Abbreviations: STR # = Stream identification number in Baseline report P = Perennial I = Intermittent UT = Unnamed Tributary
N/A = Not available (too few collected to evaluate)

*Note: Regarding the **Length of Impact** column: The length of impact refers only to the section of stream sampled for macroinvertebrates, as identified in the **Stream ID** column. Table 17* provides data on the potential length of impacts to all stream segments surveyed.

* *Not sampled.*

** *The stream is crossed by Alternative B, only. The alternative is wide at the stream crossing. Both intermittent and perennial conditions exist within the alignment.*

*** *These streams converge to form a single, perennial stream outside the alternative. They share features within the alternative and were evaluated together.*

Table 15: Stream Crossing Impacts by Stream Types

Build Alternatives	Stream Types	Number of Crossings	Total LF of Impact*
A	Perennial	5	2,195.0
	Intermittent	17	9,601.7
	Ephemeral	47	17,264.2
TOTAL		**69**	**29,060.9**
B	Perennial	8	2,552.1
	Intermittent	23	13,884.3
	Ephemeral	47	15,465.1
TOTAL		**78**	**31,901.5**
C	Perennial	8	8,215.3
	Intermittent	17	12,478.2
	Ephemeral	42	15,476.2
TOTAL		**67**	**36,169.7**
D	Perennial	5	1,167.0
	Intermittent	16	13,249.8
	Ephemeral	37	16,556.2
TOTAL		**58**	**30,973.0**

Source: Aquatic and Terrestrial Baseline Report, June 2008 – stream data tables concluding Appendix C, "Field Data Sheets." The report is on file with KYTC. Also, Qk4 (for Segment 16.1 of Alternative D).

Table 16: Stream Crossing Impacts by Build Alternatives and Alternative Segments

Build Alternatives	Alternative Segment	Number of Crossings	Total LF of Impact
A	2	0	0
	4	10	3,620.3
	8	9	4,705.6
	11	15	8,135.6
	18	27	8,148.0
	19	6	2,897.2
	21	2	1,554.2
	23	0	0
TOTAL		**69**	**29,060.9**
B	3	8	2,007.0
	6	7	1,699.8
	10	7	3,419.5
	12	5	2,464.7
	15	8	6,253.2
	17	24	9,843.5
	20	19	6,213.8
	23	0	0
TOTAL		**78**	**31,901.5**
C	1	0	0
	5	6	2,270.5
	7	7	2,243.3
	9	5	3,295.3
	13	3	2,012.2
	14	12	4,297.7
	16	30	20,261.4
	22	4	1,789.3
	23	0	0
TOTAL		**67**	**36,169.7**
D	3	8	2,007.0
	6	7	1,699.8
	9	5	3,295.3
	11	15	8,135.6
	16.1	21	14,281.1
	21	2	1,554.2
	23	0	0
TOTAL		**58**	**30,973.0**

Source: Aquatic and Terrestrial Baseline Report and Qk4 (for Segment 16.1).

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Table 17: Stream Crossing Impacts by Stream Sections and Build Alternative Segments

Alternative Segment & LF Impact	Stream Section Identification Numbers and Linear Feet of Impact (from *Aquatic and Terrestrial Baseline Report*)																												
Alt. A																													
4	**1**	**6**	**10**	**11**	**12**	**13**	**14**	**15**	**25**	**78**																			
3,620	158	261	356	127	521	377	805	177	600	239																			
8	**34**	**35**	**36**	**37**	**38**	**39**	**41**	**42**	**43**																				
4,706	338	574	535	200	667	394	533	529	935																				
11	**48**	**49**	**53**	**59**	**60**	**73**	**74**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**														
8,136	1,011	758	339	339	339	492	337	1,539	205	113	443	628	997	253	344														
18	**75**	**89**	**90**	**91**	**92**	**103**	**104**	**121**	**122**	**123**	**124**	**125**	**126**	**127**	**128**	**129**	**137**	**138**	**139**	**140**	**141**	**142**	**149**	**150**	**151**	**152**	**153A**		
8,148	274	264	340	181	247	369	929	345	103	156	168	189	92	178	304	236	121	793	589	468	279	129	304	326	158	193	415		
19	**153B**	**154**	**155**	**173**	**174**	**175**																							
2,897	456	1,012	237	239	618	335																							
21	**178**	**179**																											
1,554	1,102	452																											
Alt. B																													
3	**4**	**8**	**16**	**17**	**19**	**23**	**24**	**77**																					
2,007	655	180	56	213	304	132	180	287																					
6	**26**	**27**	**28**	**29**	**30**	**31**	**32**																						
1,700	202	354	326	388	244	85	102																						
10	**40**	**41**	**42**	**43**	**44**	**79**	**80**																						
3,420	324	197	1,101	812	198	357	431																						
12	**46**	**47**	**51**	**52**	**53**																								
2,465	1,001	604	259	132	470																								
15	**54**	**55**	**56**	**61**	**62**	**65**	**68**	**70**																					
6,253	4,130	203	59	438	213	84	904	223																					
17	**71**	**72**	**75**	**76**	**92**	**105**	**130**	**131**	**132**	**133**	**134**	**135**	**136**	**137**	**142**	**143**	**144**	**146**	**147**	**148**	**149**	**150**	**152**	**153A**					
9,844	868	499	123	463	367	707	419	176	492	1,131	244	131	151	580	461	156	239	175	710	396	425	710	61	162					
20	**153B**	**154**	**156**	**157**	**158**	**159**	**160**	**161**	**162**	162	**163**	**164**	**165**	**166**	**167**	**168**	**169**	**170**	**171**										
6,214	412	833	285	215	238	168	428	139	179	347	500	879	373	213	135	204	266	154	247										
Alt. C																													
5	**7**	**9**	**17**	**18**	**19**	**78**																							
2,271	320	380	725	103	460	283																							
7	**23**	**24**	**26**	**27**	**29**	**30**	**32**																						
2,243	132	627	386	545	178	107	267																						
9	**42**	**43**	**44**	**79**	**80**																								
3,295	917	689	639	433	617																								
13	**45**	**50**	**52**																										
2,012	723	557	732																										
14	**54**	**56**	**57**	**58**	**63**	**64**	**65**	**66**	**67**	**69**	**70**	**74**																	
4,298	522	497	853	365	276	371	316	198	254	220	144	282																	
16	**71**	**72**	**76**	**94**	**95**	**96**	**97**	**98**	**99**	**100**	**101**	**102**	**106** ^{T}	**107** ^{T}	**108** ^{BF}	**109** ^{T}	**110** ^{T}	**111** ^{T}	**112** ^{T}	**113** ^{T}	**114** ^{BF}	**115** ^{T}	**116** ^{T}	**117** ^{BF}	**118** ^{T}	**119** ^{T}	**120** ^{T}	**172**	**173**	**174**
20,261	846	186	657	335	777	3,554	919	273	377	359	747	366	369	94	3322	34	191	27	92	463	1,793	129	311	1,649	297	436.6	399	260	239	762
22	**169**	**171**	**176**	**177**																									
1,789	230	135	1,175	250																									
Alt. D																													
3	**4**	**8**	**16**	**17**	**19**	**23**	**24**	**77**																					
2,007	655	180	56	213	304	132	180	287																					
6	**26**	**27**	**28**	**29**	**30**	**31**	**32**																						
1,700	202	354	326	388	244	85	102																						
9	**42**	**43**	**44**	**79**	**80**																								
3,295	917	689	639	433	617																								
11	**48**	**49**	**53**	**59**	**60**	**73**	**74**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**														
8,136	1,011	758	339	339	339	492	337	1,539	205	113	443	628	997	253	344														
16.1*	**71**	**72**	**76**	**94**	**95**	**96**	**97**	**98**	**99**	**100**	**101**	**102**	**1N** ^{T}	**2N** ^{T}	**110** ^{T}	**3N** ^{T}	**112** ^{T}	**118** ^{T}	**172**	**173**	**174**								
14,281	846	186	657	335	777	3,554	919	273	377	359	747	366	500	375	500	500	1000	750	260	239	762								
21	**178**	**179**																											
1,554	1102	452																											

Perennial	Intermittent	Ephemeral		***Notes:*** *Segment 23 has no stream impacts. Alternative B Stream162 is Intermittent and Perennial.*	*LF = Linear Feet (LF are rounded to nearest tenth).* ^{BF} *= Blackfish Creek* ^{T} *= Tributary to BF*	** Alternative D Segment 16.1 was developed after the publication of the Baseline Report; therefore, streams 1N, 2N, and 3N, are BF tributaries that were not evaluated in the report. The length of impact is estimated based on disturb limits, and their identification as ephemeral streams reflects the predominant tributary stream type in the area.*

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Avoidance and minimization. Efforts to avoid and minimize impacts to the water quality of streams have been made during the development of the preliminary alternatives and will be continued throughout the development of a Build Alternative, should one be selected. Through intergovernmental coordination, the U.S. Fish and Wildlife Service (USFWS), Kentucky State Nature Preserves Commission (KSNPC), Kentucky Department of Fish and Wildlife Resources (KDFWR), and Kentucky Division of Water (KDOW) have identified potential impacts and recommended avoidance, minimization, and mitigation options. These options will be provided to the engineering design team to be considered during the final design if a Build Alternative is selected.

As noted above, Alternative C has the greatest overall impact to streams, crossing a total of 36,170 linear feet, 20,261 linear feet of which are attributable to Segment 16. That segment impacts 6,764 linear feet of Blackfish Creek and a total of 2,842 linear feet of 12 of its tributaries. Despite the stream impacts, the Segment 16 alignment was initially preferred in this section of the project corridor because the SHPO concurred that it would have "the least physical and visual impact to contributing historic resources" in the Creelsboro Rural Historic District (see Appendix C, letter dated April 22, 2009). Impacts to Blackfish Creek spurred efforts to modify Segment 16 with an alignment that would retain the "least…impact" finding for the District while minimizing the impacts along Blackfish Creek. The result was the development of Segment 16.1, which shares Segment 16's alignment within the District to approximately 0.9 mile south of the Cumberland River crossing, and then shifts eastward from Segment 16, crosses the river, and remains east of Segment 16. The shift not only removes the alignment from the Blackfish Creek streambed, but also reduces the number of tributary crossings from 12 to 6, and avoids a wetland that Segment 16 would impact. Segment 16.1 is a feature of the recommended preferred Alternative D.

In summary, Segment 16.1 would minimize impacts to the District in a manner similar to Segment 16 while also:

- Reducing the total length-of-stream impact to approximately 14,281 linear feet compared with Segment 16's total of approximately 20,261 linear feet.
- Reducing the total of all stream crossings to 21, compared with Segment 16's total of 30.
- Reducing the crossings of Blackfish Creek tributaries from 12 to 6.

  Note: Although there are fewer crossings, the total impact to the Blackfish Creek tributaries is an estimated 3,625 linear feet rather than Segment 16's impact of 2,842 linear feet. The estimated 780+ linear feet difference is the result of construction requirements (excavation and fill) necessitated by the terrain to the east of Blackfish Creek. For both Segments 16 and 16.1, the majority of the impacts appear[4] to be to ephemeral streams.
- Avoiding Segment 16's 0.23-acre impact to Wetland 3. Segment 16.1 would have no wetland impacts. (See Section 3.3.5, *Wetlands and Ponds,* for a discussion of wetland impacts.)

Insofar as impacts to the District, wetlands, and streams are concerned, Segment 16.1 is the alignment that best provides both avoidance and minimization of impacts.

4 Three streams that would be encountered by Segment 16.1 were not included in the ecological baseline study because, at the time the study was conducted, that alignment was not under consideration. The length-of-impact to those streams was estimated based on the width of the disturb limits at each stream crossing. The assumption of "ephemeral" rather than "intermittent" or "perennial" was based on the prevalence of ephemeral streams along Blackfish Creek.

Agency consultation and mitigation. In a letter of October 8, 2002 (see Appendix B), **USFWS** noted the importance of applying Best Management Practices during construction to prevent excessive sedimentation: "Rigid application of [KYTC's] construction erosion control standards can preclude most sedimentation problems; however, in some cases additional measures will need to be taken…." The agency also stated that additional comments would be provided during the agency review process should the project necessitate USACE permits. "However, we would likely have no objection to the issuance of permits if any necessary stream channel work is held to a minimum and Best Management Practices are utilized and enforced, effectively controlling erosion, sedimentation, and other potential hazards." USFWS listed several recommendations to address stream impacts, including:

- Provide an erosion control plan, diversion channels, silt barriers, temporary seeding and mulching of all cuts and fill slopes, and limitation of in-stream activities.
- Place concrete box culverts in a manner that prevents impediment to low flows or to movement of indigenous aquatic species.
- Restrict channel excavations for pier placement to the minimum needed.
- Immediately stabilize all fill.
- Stabilize stream banks with riprap or other techniques.
- Use existing transportation corridors in lieu of temporary crossings where possible.
- Maintain good water quality during construction.

KSNPC and KDOW noted that the project area is located within a known karst landscape characterized by numerous sinkholes, underground conduits, or caves. KSNPC stated that construction disturbances or release of pollutants within the specified area could easily cause contamination of groundwater. In addition, KSNPC noted that caves are often associated with sensitive ecosystems and may provide habitat for a number of rare or endangered species. KSNPC explained that cave organisms are heavily dependent on water quality and that steps should be taken to avoid introducing contaminants into the water system. KSNPC has stated in a letter dated June 27, 2007 (see Appendix B):

> *A written erosion control plan should be developed that included stringent erosion control methods (i.e., straw bales, silt fences and erosion mats, immediate seeding and mulching of disturbed areas) which are placed in a staggered manner to provide several stages of control. All erosion control measures should be monitored periodically to ensure that they are functioning as planned.*

From below Wolf Creek Dam to the Kentucky/Tennessee state line the Cumberland River is designated a Coldwater Aquatic Habitat (CAH). KDOW stated that due to the CAH designation, a "no stormwater" discharge drainage design should be considered for any bridge design that crosses the Cumberland River.

Coordination with KDFWR resulted in a letter dated August 2, 2007 (see Appendix B), in which the agency recommended the following for those sections of the project that cross streams:

- Incorporate natural stream channel design into channel changes associated with the project.
- Place culverts even with substrate to allow free movement of aquatic organisms.
- Design culverts so degradation upstream and downstream does not occur.
- Develop or excavate in or near streams during low flow periods to minimize disturbance.
- Properly place erosion control structures below disturbed areas to minimize silt entry into streams.

- Replant disturbed areas after construction, including stream banks and rights-of-way, with native vegetation for soil stabilization and enhancement of fish and wildlife populations. A 100-foot-wide forested buffer along each stream bank is recommended.
- Return disturbed in-stream habitat to a stable condition upon completion of construction in area.
- Preserve tree canopy overhanging the stream.

The letter from KDFWR also recommended coordination with USACE and KDOW prior to any work within streams or wetlands.

The potential minimization and mitigation options identified by the agencies noted above will be provided to the engineering design team to consider during the final design if a Build Alternative is selected.

In the final design stage, additional efforts would be made to avoid or limit stream impacts, thereby minimizing direct impacts. Water quality impacts from erosion and sedimentation during construction would be controlled in accordance with KYTC's *Standard Specifications* and through the use of Best Management Practices. Mitigation measures proposed for impacts during construction are addressed in Chapter 4.0, *Mitigation Measures*.

USACE and KDOW are the agencies responsible for regulating jurisdictional waters. If excess fill deposition sites located outside of the project corridor are needed, these areas should be surveyed for potential "waters of the United States." USACE regulates headwater streams and several of the valley fills in the project area contain headwater streams or larger. As such, fill sites (if needed) will require permitting. USACE will make jurisdictional determinations that will take into account all aquatic resources subject to Section 404 jurisdiction. The nature of the Section 404 permits (whether Individual or general) requires USACE to make a jurisdictional determination on all stream and wetland impacts prior to the permit application. The Section 401 Water Quality Certification is a state's review of applications for Section 404 USACE permits for compliance with state water quality standards. If a Section 404 Permit(s) is required for the project, a Section 401 certification from KDOW would also be required. Detailed permit coordination would occur during the final design phase of the project. If this permitting is to be the responsibility of the contractor, the contractor must be made aware of such obligations.

3.3.3 Public Water Sources

Wellhead Protection Plans (WHPP) are required for public water suppliers that use groundwater as their water supply source. According to KDOW there is not a public water supplier using groundwater in the project area. The area is served by the Albany Water Works and Jamestown Water Works, which use surface water (Lake Cumberland) as the water supply source. There are no Wellhead Protection Plans being developed for the project area. Since Lake Cumberland serves as a source for drinking water in the area, KDOW noted Best Management Practices should be employed as needed to protect the local water supply (see letter dated June 27, 2007, in Appendix B).

3.3.4 Floodplains

The Federal Emergency Management Agency (FEMA) Q3 data was reviewed for the project area. (FEMA insurance rate mapping is not available for this area.) All Build Alternatives cross the Cumberland River via a bridge structure, albeit at different locations; therefore, impacts to the floodplain differ according to the alignment considered. The river is located in and extends from south to north across the entire Study Area; therefore, its floodplain cannot be avoided. The alternatives also cross the floodplains of one or more streams near their confluence with the river. The alternatives' potential acres of impacts to the floodplains are shown on Table 18, below. Note that the data is presented by the alignment segment

corresponding to each alternative's river crossing location. Figure 9 shows the floodplain areas in relation to the Build Alternatives, identified by colors: Alternatives A (**orange**), B (**red**), C (**blue**), and D (**green**).

Table 18: Estimated Floodplain Impact by Build Alternative Segments

Alternative Segments	Build Alternatives			
	Alternative A Segment 18	Alternative B Segment 17	Alternative C Segment 16	Alternative D Segment 16.1
Acres of Impact	5.0	12.2	6. 0	0.5

Source: Floodplain acreage was derived from digital Q3 flood data developed and distributed by FEMA.

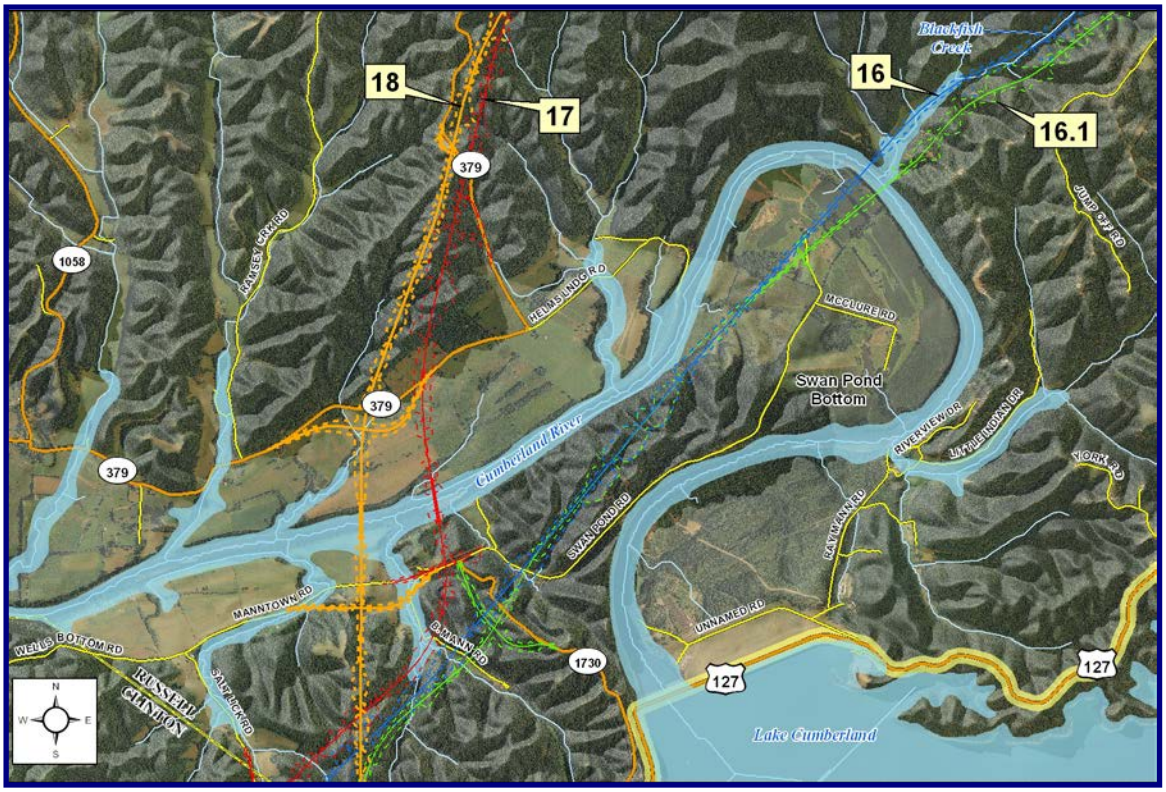

Figure 9: Floodplains in Relation to Build Alternatives

Construction activities in floodplains are regulated by USACE permit. Should a Build Alternative be selected, appropriate regulatory agencies will be consulted regarding potential floodplain impacts, and a floodway analysis will be performed to determine the need for a No-rise certification and floodplain plan. If required, a floodplain plan would be developed in coordination with FEMA. Through analysis of the floodplain and the river crossing, the opening of the proposed bridge would be sized so that 100-year floodway elevations would not be substantially affected. Since the proposed bridge would be designed to "pass" the 100-year flood volume with adequate clearance under the bridge, the US 127 crossing is not expected to increase flooding. As a result, there would be no significant impacts to the natural and beneficial value of the Cumberland River floodplain; there would be no change in flood risk due to the project; and there would be no increase in potential for interruption or termination of emergency service or emergency evacuation routes. In addition, if filling in a floodplain is required, then a KDOW Construction in a Floodplain Permit would also be required.

3.3.5 Wetlands and Ponds

This project has been developed in conformity with Executive Order 11990 and USDOT Order 5660.1A. The *Aquatic and Terrestrial Baseline Report* prepared for this project (June 2008) is available for review from the KYTC. Local county soil survey, National Wetlands Inventory (NWI) maps, aerial photographs, and USGS topographic maps were used to determine potential wetland areas within the project corridor, and field reconnaissance was conducted using the 1987 USACE *Wetland Delineation Manual*. Field reconnaissance and USGS topographic maps were also used to locate ponds.

Wetlands. The report identified six potentially affected wetlands (Wetlands 1 through 6 on Exhibit 4, sheets 1, 4, and 5). However, refinement of the data and proposed alignments after the report's publication resulted in revisions to the total areas of the wetlands and potential direct impacts, and the elimination of Wetlands 1 and 2 from the list of those potentially affected.

Wetlands 3 though 6 range in size from an estimated 0.06 acre to 0.71 acre. Wetlands 3, 4, and 6 were determined to have hydrological connections to waters of the United States and could, therefore, potentially be classified as jurisdictional by USACE—a determination that is made at the permitting stage of a project. Impacts to potentially jurisdictional wetlands are 0.06 acre with Alternative A, 0.14 acre with Alternatives B and D, and 0.23 acre with Alternative C. Wetland 5 (0.71 acre) is considered to be isolated (i.e., non-jurisdictional). Impact to that wetland potentially would be 0.15 acre with Alternative A. Wetlands 3 though 6 are described below. Table 19 summarizes the wetland data and potential impacts.

Wetland 3 (estimated 2.74 acres) is located within the historic floodplain of the Cumberland River at the end of Swan Pond Road. It developed in a large swale area that has been partially diked/impounded by the road. The wetland is a Palustrine emergent, persistent, seasonally flooded/saturated wetland (PEM1E; Cowardin 1979). The wetland is not listed on NWI mapping. The plant community is dominated by carex species, false nettle, common rush, wool-grass, black willow, oriental lady's thumb, umbrella sedge, green ash, silver maple, tickseed-sunflower, and rose-mallow. The site meets the hydrophytic vegetation, hydrology, and hydric soil criteria of a wetland.

The wetland has a hydrologic connection to waters of the United States, and is potentially jurisdictional. Approximately 0.23 acre of this wetland potentially would be impacted Segment 16 (Alternative C).

Wetland 4 (estimated 0.06 acre) is located 600 feet northwest of the intersection of KY 55 and KY 2284 in a pasture. It is a small, spring-fed cattle pond with emergent hydrophytic vegetation growing in the shallow water areas. According to NWI mapping, the wetland is a Palustrine unconsolidated bottom, mud, permanently flooded, and/or diked/impounded wetland (PUB3Hh; Cowardin 1979). The plant community is dominated by common rush, umbrella sedge, spike rush, water primrose, and oriental lady's thumb. The site meets the hydrophytic vegetation, hydrology, and hydric soil criteria of a wetland.

The wetland appears to have a connection to waters of the United States, and could potentially be jurisdictional. All of the approximately 0.06 acre of this wetland potentially would be impacted by Segment 19 (Alternative A).

Wetland 5 (estimated 0.71 acre) is located 600 feet northeast of the intersection of KY 55 and KY 2284 in a small wood lot. It is an old farm pond with hydrophytic vegetation growing along its margin where the water level fluctuates. According to NWI mapping, the wetland is a Palustrine, unconsolidated bottom, mud, permanently flooded, and/or diked/impounded wetland (PUB3Hh; Cowardin 1979). The plants dominating the site include squarestem spikerush, black willow, common cat-tail, oriental lady's thumb, silver maple, and water primrose. The site meets the hydrophytic vegetation, hydrology, and hydric soil criteria of a wetland.

The wetland appears to be isolated, with no hydrologic connection to waters of the United States. Approximately 0.15 acre of this wetland potentially would be impacted by Segment 19 (Alternative A).

Wetland 6 (estimated 0.14 acre) is located in the floodplain of Indian Creek, a named perennial stream. It is a Palustrine emergent, persistent, seasonally flooded, saturated wetland (PEM1E; Cowardin 1979). It was not displayed on NWI mapping. Water testing was not performed at this site; however, the hydrology of the wetland is believed to be fed by a sulfur spring/abandoned oil well. The water from this wetland flows directly into Indian Creek and was milky white in color with a strong "rotten-egg" odor (hydrogen sulfide). The plant community is dominated by cat-tail, Japanese stilt-grass, false nettle, common rush, green ash, red maple, wild cane, and fescue. The site meets the hydrophytic vegetation, hydrology, and hydric soil criteria of a wetland.

The wetland appears to have a connection to waters of the United States, and could potentially be jurisdictional. Approximately 0.14 acres of this wetland potentially would be impacted by Segment 3 (Alternative B and recommended preferred Alternative D).

Table 19: Summary of Wetlands and Potential Wetland Impacts

Build Alternatives (Segment IDs)	Alternative Segment	Wetland ID in *Baseline Report*	Potentially Jurisdictional?	Total Area of Wetland	Total Area of Wetland within Disturb Limits
A (2-4-8-11-18-19-21-23)	19	Wetland 4	**Yes**	0.06	**0.06**
	19	Wetland 5	No	0.71	0.15
TOTAL				**0.77**	**0.21**
B (3-6-10-12-15-17-20-23)	3	Wetland 6	**Yes**	0.14	**0.14**
TOTAL				**0.14**	**0.14**
C (1-5-7-9-13-14-16-22-23)	16	Wetland 3	**Yes**	2.74	**0.23**
TOTAL				**2.74**	**0.23**
D (3-6-9-11-16.1-21-23)	3	Wetland 6	**Yes**	0.14	**0.14**
TOTAL				**0.14**	**0.14**

Wetland sizes and potential impacts identified above were based on the computation of GIS data.

Ponds. Ponds are located throughout the corridor, and those associated with other waters (i.e., intermittent or perennial streams) can be considered jurisdictional by USACE. Regardless of which alternative is chosen, several ponds could be affected—1 with Alternative A, 4 with Alternatives B and C, and 5 with Alternative D. However, none appear to be jurisdictional. Due to the type of habitat in which these ponds are located (i.e., primarily pasture/farm fields) and the number of remaining ponds, it is anticipated that the loss of ponds will have a minimal impact on the environment.

Minimization/avoidance. Alternative B and Alternative D, the recommended preferred alternative, would have the least wetland impact—0.14 acre of Wetland 6, which is within the alignment of Segment 3 in the South Section of the project corridor. Segment 3 was selected as a feature of the preferred alternative because it would require no residential relocations or commercial displacements, require no reconstruction of the newly constructed intersection with KY 90; have the least length-of-stream impacts (2,007 linear feet, versus 2,271 and 3,620 linear feet with other segments), and impact the fewest potentially hazardous materials sites. (See Section 2.4.2, herein, for a comparison of alternative segments within the South Section.)

Mitigation/permitting. Preliminary and informal coordination has occurred with USACE. If a Build Alternative is selected and the total area of jurisdictional wetlands within its disturbance limits is greater than 0.5 acre, a USACE Individual 404 Permit will be required. Wetland disturbance acreages falling between 0.1–0.5 acre would potentially qualify for a Nationwide permit per review by USACE. Wetland disturbance less than 0.1 acre only requires USACE notification. For the loss of emergent wetlands and ponds, creation of small, shallow, seasonally flooded ponds would minimize the loss of these habitats. Ideally, the mitigation should take place on-site if locations with available right-or-way are suitable. If suitable locations are not found onsite, off-site mitigation would be required.

No alternative considered with this project would have a wetland impact greater than 0.5 acre. Alternative D, the recommended preferred alternative, would potentially impact 0.14 acre; therefore, it would potentially qualify for a Nationwide permit. Prior to construction (i.e., after final design) an exact determination of impacts to jurisdictional wetlands will be made. Detailed permit coordination will occur during the final design phase of the project.

3.4 Wild and Scenic Rivers

No wild and/or scenic rivers designated by state or federal agencies are located in the project corridor.

3.5 Terrestrial Ecosystems

The following sections recount the results of the analyses of terrestrial ecosystems presented in the *Aquatic and Terrestrial Baseline Report* (Baseline Report) prepared for this project.

3.5.1 Geographic Characteristics

Clinton and Russell counties are located in south-central Kentucky (see Figure 1), with the proposed project extending across the county line (see Figure 2). Adjacent Kentucky counties are: Cumberland, Adair, Casey, Pulaski, and Wayne. Tennessee borders Clinton County to the south. Parts of two major recreational areas are located within approximately 25 miles of the Study Area—Lake Cumberland to the northeast and Dale Hollow Lake to the southwest—while Russell County encompasses a significant portion of Lake Cumberland within its eastern limits. The Build Alternatives would include a crossing of the Cumberland River below Wolf Creek Dam.

Clinton County has a land area of 197 square miles, and Russell County has a land area of 254 square miles. The county seats (Albany and Jamestown, respectively) are the economic activity centers in each county.

3.5.2 Geophysical Environment

Soils. The project area lies within five soil associations; Elk-Nolin-Melvin, Garmon-Caneyville, Frederic-Mountainview-Gilpin, Garmon-Caneyville-Dewey, and Dewey-Mountainview. In all, there are 29 soil complexes affected by the project. Most of these are moderately deep to very deep, well-drained soils, although there are a few that are poorly drained. In addition, 4 hydric soils and 13 highly erodible soils have been identified in the project area.

Topography and physiography. The project is in the Pennyrile physiographic region, which stretches across the state from the Land Between the Lakes in the west to the Pottsville Escarpment in the east. It is a Mississippian age plateau with a large karst region, and is underlain by brecciated sandstone; St. Louis, Salem/Warsaw, Fort Payne, Warsaw, and Leipers limestones; Chattanooga shale geological groups; Younger alluvium; and the Fort Payne formations.

Elevations in the project area range from 580 feet above mean sea level (msl) along the Cumberland River to approximately 1,100 feet above msl along ridge tops in the corridor. The project is located in the

Cumberland River basin. Terrain is generally rolling to hilly, ranging from well-dissected plateau to river bottom, with karst features such as sinkholes being prevalent particularly in the Clinton County portion of the project area.

3.5.3 Terrestrial Environment

Terrestrial habitats within the project corridor include open land and mixed mesophytic forest. Many of these habitats are very disturbed, having been logged, grazed, or cultivated. The remaining woodlots in the area have become important habitats since they provide pockets of refuge for many of the local plant and animal species from agricultural development. They also provide travel corridors between nesting and feeding areas. These woodlots are of various ages, and have been logged or grazed in the past. The loss of woodland to maintained right-of-way and pavement would result in woodland plant and animal species being replaced by grassland species, and less total biomass in the area.

Cumulative and indirect impacts to wildlife habitat and migration patterns stem from the gradual development of an area from rural to suburban and urban land uses, displacing the natural habitat of faunal and floral species.

Fauna. Open lands generally provide very little habitat for wildlife, except as foraging areas for deer, hawks, owls, coyotes, and small mammals. Reduced cover restricts the diversity of its fauna. Forested areas, which are more important habitat for wildlife, have been cut and disturbed in the past and are in various stages of regeneration. Terrestrial fauna observed and/or collected within the project corridor include nineteen mammal species such as the white-tailed deer, coyote, opossum, gray squirrel, eastern chipmunk, eastern pipistrelle bat, eastern cottontail, and woodchuck; thirty-one reptile and amphibian species such as the green frog, pickerel frog, five-lined skink, northern red salamander, and northern water snake; and forty-three bird species including the mourning dove, wild turkey, bald eagle, eastern meadowlark, common grackle, northern bobwhite, American kestrel, indigo bunting, and red-tailed hawk. A complete listing of observed/collected fauna, with taxonomical identification, appears in the Baseline Report available for review from the KYTC.

The approximate area of forest habitat impacted per alternative for the project is as follows:

- Alternative A = 291
- Alternative B = 356
- Alternative C = 355
- Alternative D = 430

Wildlife species inhabiting the area have already been impacted by, and adjusted to, previous activities within the corridor (e.g., farming, recreational activities, and roadway corridors). In addition, the habitat currently being used by these species is plentiful in the surrounding areas. As such, it is unlikely that the proposed project will result in additional long-term negative impacts such as isolation of populations or loss of significant habitat. During surveys of the project area, no threatened or endangered species were identified (see Section 3.5.4, *Threatened and Endangered Species*) nor were any unique or critical faunal habitats observed.

Flora. The project area is located in the Eastern Highland Rim of the Mississippian Plateau. A mixed mesophytic forest is the primary floral community. Present vegetation in woodlots is dominated by beech, oak, maple, and hickory, with associated forest species on the drier ridges and slopes. Open areas in the project corridor are mostly pasture and hayfields. Two hundred twenty-six plant species were identified in the project area: one hundred forty-one herbaceous, forty-nine tree, twenty-five shrub, and twelve woody vine species.

KSNPC indicated that the proposed project goes through one or more large forest blocks. Recently, KSNPC began monitoring large forest blocks, defined as 900 or more acres of contiguous forest in areas west of the Cumberland Plateau and 4,500 or more contiguous acres in areas east of the Cumberland Plateau. According to KSNPC, forest fragmentation is one of the leading detrimental impacts to plants and animals that require large tracts of forest for all parts of their life cycles. KSNPC recommended avoiding fragmentation of/impacts to large forested blocks or, where impacts could not be avoided, mitigation that could include limiting forest removal to the edges of the blocks, or planting trees in the areas where tree removal was temporarily necessary.

Coordination with the Kentucky Division of Forest (KDOF) has been conducted. According to KDOF, no state forests or state or national champion trees will be impacted by the project. KDOF indicated that special care should be taken around existing trees that will remain after construction is completed. According to KDOF, heavy equipment should be kept away from the base of trees to prevent wounding of the trunk and/or surface roots. KDOF recommended that construction traffic should be routed away from the drip line of the tree to lessen the severity of soil compaction. Compacted soil reduces the amount of water available to the tree, and this lack of water can cause added stress, and stressed trees are vulnerable to insect and disease infestation. In addition, KDOF recommended that after completion of the project, trees should be planted back where removed temporarily. KDOF recommended that tree selection (i.e. species) should be matched to the site or project area.

3.5.4 Threatened and Endangered Species

KSNPC, KDFWR, and USFWS listed one Coldwater Aquatic Habitat (CAH) and 29 species of fauna and flora that are of special concern, threatened, or endangered and could be affected by the project. However, 21 of these listed species, mainly freshwater mussels, are believed to be extirpated from the area. No plants or animals listed by these agencies were found within the project area during field investigations. However, suitable habitats for the following three listed bat species and four state-listed endangered/threatened/special concern plant species were identified in the project area during this study, as well as possible breeding habitat for one hawk species. Another bird species is state-listed as having potential to occur in Clinton County, though appropriate habitat within the project corridor is sparse. The descriptions below include the listing designations as follows: FE (Federal endangered), FE (Federal threatened), SE (State endangered), ST (State threatened), SC (State species of special concern).

- **Fauna**

  Indiana bat (*Myotis sodalis*)—FE, SE: USFWS and KDFWR list the Indiana bat as “potentially” occurring within the area. There is potential foraging and roosting habitat available. Foraging habitat would be openings in forested areas that might have a pond, creek channel, or a temporary water source, such as water-filled road ruts. Trees alive or dead with a diameter at breast height greater than 6 inches and having cavities or patches of exfoliating bark large enough for a single bat to roost would be considered Indiana bat roosting habitat. There is an abundant amount of similar habitat outside the project’s corridor to accommodate this species. The project should not have any direct, indirect, or cumulative impacts to this species.

  Gray bat (*Myotis grisescens*)—FE, ST: Both USFWS and KDFWR list the gray bat as “known” to occur within the area. No adverse impacts to the gray bat populations in the corridor are anticipated because no caves with gray bat activity were located. There is an abundant amount of similar habitat outside of the project’s corridor to accommodate this species. This project should not have any direct, indirect or cumulative impacts to this species.

  Eastern small-footed bat (*Myotis leibii*)—ST: Due to the wide range of suitable habitat and the hardiness of this species coupled with the abundant amount of similar habitat outside of the

project's corridor, this project should not have any direct, indirect or cumulative impacts to this species.

- **Flora**

  Mercury spurge (*Euphorbia mercurialina*)—ST: KNSPC's rare plant database has this plant listed as historical observation. No individual specimens or evidence were found to suggest this species exists within the project's corridor. This project should not have any direct, indirect, or cumulative impacts to this species.

  Kidneyleaf grass-of-Parnassus (*Parnassia asarifolia*)—SE: KNSPC's rare plant database has this plant listed as historical observation. No individual specimens or evidence were found to suggest this species exists within the project's corridor. This project should not have any direct, indirect, or cumulative impacts to this species.

  Cutleaf meadow-parsnip (*Thaspium pinnatifidum*)—ST: KNSPC's rare plant database has this plant being currently (2006) observed only in Clinton County. No individual specimens or evidence were found to suggest this species exists within the project's corridor. This project should not have any direct, indirect, or cumulative impacts to this species.

  White cedar (*Thuja occidentalis*)—ST: KNSPC's rare plant database has this plant being currently (July 2008) listed only in Russell County in the project area. No individual specimens or evidence were found to suggest this species exists within the project's corridor. This project should not have any direct, indirect, or cumulative impacts to this species.

  Sharp-shinned hawk (*Accipiter striatus*)—SC: There is potential foraging and roosting habitat available. The species is most frequently observed in heavily forested areas with fewer observances in fragmented forest. There were no sightings of this species within the project's corridor. If this species does exist therein, there is enough undisturbed surrounding habitat to accommodate this species. This project should not have any direct, indirect or cumulative impacts to this species.

  King rail (*Rallus elegans*)—SE: KNSPC's database has this species being currently (July 2008) listed only in Clinton County in the project area. There are only from 0.21 to 4.02 acres of scattered wetlands available throughout the entire project corridor for this freshwater marsh bird to inhabit. No individual specimens or evidence was found to suggest this species exists within the project's corridor. This project should not have any direct, indirect or cumulative impacts to this species.

Mitigation. KDFWR recommended in its letter of August 2, 2007 (see Appendix B), that: 1) the project area be surveyed for caves, rock shelters, and abandoned underground mines that may be suitable for bat habitat, and any identified sites should be avoided; and 2) that tree clearing in the project area be restricted to between October 15 and March 31 unless Indiana bat hibernacula are located within 10 miles of the project, in which case tree clearing should be restricted to between November 15 and March 31. KDFWR noted: "Written acceptance of and strict adherence to the recommendations should satisfy the consultation requirements of Section 7 of the Endangered Species Act." In its letter of October 8, 2002, USFWS stated the following:

> *Endangered species collection records available to the Service do not indicate that federally listed or proposed endangered or threatened species occur within the impact area of the projects. We note, however, that collection records available to the Service may not be all-inclusive….based on the best information available at this time, we believe that the requirements of Section 7 of the Endangered Species Act of 1973, as amended, are fulfilled. Obligations under Section 7…must*

be reconsidered if … new information reveals impacts of the proposed actions that may affect listed species or critical habitat in a manner not previously considered….

After coordinating the results of the field survey with USFWS, a Biological Assessment (BA) may be undertaken during the design phase of the project to determine the presence within the project corridor of the two federally endangered bat species listed for this project. Mitigation for potential impacts would be included in the BA.

3.6 Section 106: Cultural Historical and Archaeological Resources

Section 106 of the National Historic Preservation Act (1966), as amended, and 36 CFR Part 800 (Protection of Historic Properties, Revised 11 January 2001) require the Federal Government to take into account the effect of its proposed actions on historic and archaeological properties or resources before making project decisions. Historic and archaeological sites listed in or eligible for the National Register of Historic Places (NRHP) are afforded protection under federal regulations. In accordance with the procedures contained in 36 CFR Part 800, cultural resource assessments, including background research and field surveys, were performed for the proposed project to locate above- and below-ground historic and archaeological resource properties, sites, and structures that may be affected by the proposed project. A *Cultural Historic Resource Survey* report and *Management Summary for the Preliminary Archaeological Investigations* were prepared and are on file with KYTC. These assessments identified resources located within the area of potential effects (APE); evaluated their historical significance; and provided a preliminary evaluation of the proposed alternatives' potential effects on the identified resources. The APE is the "geographic area within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist" (36 CFR 800.16(d)). Indirect effects include noise, light, vibrations, aesthetics impacts, etc. The boundary of the APE for the project is shown on Exhibit 4 (sheets 1 through 5).

Consultation with the Kentucky State Historic Preservation Office (SHPO) has been initiated. The following sections describe the public involvement conducted to date and then the results of the historic and archaeological surveys and assessments. Unless otherwise noted, coordination correspondence and related Section 106 documentation are provided in Appendix C, herein.

3.6.1 Public Involvement—Consulting Parties

A key element of the Section 106 process is the involvement of "consulting parties" who have an interest in the historic resource issues associated with the project. According to KYTC and Kentucky FHWA policy there are two types of consulting parties: "by-right" consulting parties and "by-invitation" consulting parties. By-right consulting parties are legally entitled to participate and, for this project, include the SHPO, federally-recognized Native American tribes, FHWA, KYTC, and local governments. By-invitation consulting parties may include individual citizens, local historic preservation organizations or interest groups, and federal/state agencies with an interest in the project. By-invitation consulting parties must petition KYTC in writing to formally request to become a consulting party. Participation in the consulting party process for this project was solicited in a variety of ways, including:

- Letters of invitation to be consulting parties to local government officials, Native American Tribes identified as potentially having an interest in the project area, and owners of historic properties in the area.
- Newspaper advertisements announcing public meetings
- Information provided at meetings with stakeholders in November 2002 and the public in January 2003 and December 2007.

The invitation letters, the newspaper advertisements, and the information handed out at public meetings generated several responses of interest in participation in the Section 106 process.

For this project, six Native American Tribes were identified as having an interest in the project area: Cherokee Nation, Eastern Shawnee Tribe of Oklahoma, Shawnee Tribe, Absentee Shawnee Tribe of Oklahoma, United Keetoowah Band of Cherokee Indians, and Eastern Band of Cherokee Indians. In addition to the Native American Tribes, there are nine by-right consulting parties (including FHWA, KYTC, and the SHPO) and ten by-invitation consulting parties (see Appendix C). The meetings with stakeholders and the public, all of which included solicitations of input regarding historic resources in the project area, are summarized below.

November 19, 2002. A project "kick-off" meeting with local elected officials, state agency representatives, and community groups was held to identify issues, problems, and community needs to be addressed by the project. Community representatives did not identify or express concerns regarding historic or potentially historic resources within the project corridor. See Section 5.1, *Public Involvement Activities,* for additional information about this meeting.

January 30, 2003, and **December 13, 2007.** To date, two public meetings have been held in the project area to provide information and receive citizens' input about the project. At the first meeting, public input was sought regarding existing conditions/features that could impact the roadway design process. One letter was received from a resident who noted the potential for archaeological sites in Swan Pond Bottom. The second meeting was held to present alignment alternatives and solicit comments from the public. Public announcements/ advertisements and handouts for the meetings presented information on the Section 106 process and included a solicitation for consulting parties. A comment letter from a consulting party expressed concerns about the project's potential impacts to the District, and noted that residents of Swan Pond Bottom prefer the "Blue Route" (i.e., Segment 16 of Alternative C[5]) because it would improve access to the bottom and because it "negatively impacts the integrity of the bottom less than any other proposed route." See Section 5.1 for additional information about these meetings.

In addition to the above-referenced meetings, Section 106-related consultation with consulting parties was conducted via a meeting and through correspondence, as summarized below.

January 11, 2007. An initial consulting parties' meeting was held on January 11, 2007, to describe the Section 106 process, explain the requirements of Section 4(f) of the Department of Transportation Act of 1966, present information on the APE and those properties deemed eligible for the NRHP, and solicit information regarding any other properties to be considered for eligibility. Discussion at the meeting centered on the alignments through the District, the height and length of the bridge over the Cumberland River, and coordination efforts with USACE concerning the Wolf Creek Dam and with USFWS regarding the National Fish Hatchery (see USFWS correspondence dated January 30, 2003 and December 20, 2007, Appendix B). The attendees said that the alignment that crosses Swan Pond Bottom (Segment 16 of Alternative C) would better minimize the effects to and use of the District since the alignment is the farthest from the historic Creelsboro area and on the other side of the river. They noted that the alignment would also provide improved access to/from Swan Pond Bottom. Attendees were provided copies of the eligibility determinations and maps of the APE, and were asked to provide comments to the KYTC District 8 office within 30 days.

Comments were received from four individuals, two of whom are area residents who requested consulting party status and two of whom, also area residents, provided information about the history of the area and detailed comments regarding the Build Alternatives' potential impacts to the District and other resources.

[5] Segment 16.1 of Alternative D had not been developed at the time of the meeting. It shares Segment 16's ability to minimize impacts to the District and improve access to/from Swan Pond Bottom.

All respondents were accorded consulting party status. Both respondents who submitted detailed information considered Alternatives A and B to have the greatest impacts, and advocated that Alternative C or other routes be considered. KYTC responded to their comments in correspondence mailed on July 14, 2009, to all consulting parties (see below).

July 14, 2009. KYTC corresponded with consulting parties to describe the project status and request the following input:

- Comments on the SHPO's April 22, 2009, letter, which (1) concurred with the *Cultural Historic Eligibility Report's* (February 2008, Rev. March 2009) finding that there would be an adverse effect to the District due to visual impacts and land acquisition within the District; and (2) identified additional sites that are potentially both NRHP-eligible and affected by the project.
- Suggested measures to mitigate the adverse effects to the District, to be submitted by August 15, 2009.

KYTC's submittal to consulting parties explained that, since the previous meeting, Segment 16.1 had been added as an alternative alignment that would share Segment 16's ability to minimize impacts to the District while eliminating a wetland impact and reducing impacts stream through Blackfish Hollow. The submittal included the following attachments:

- Map showing the locations of proposed alignments traversing the District.
- Table identifying the District's contributing elements and their proximity to project alternatives.
- Summary of the January 11 consulting parties' meeting (referenced above).
- FHWA/KYTC responses to consulting parties' comments regarding eligibility, submitted following the January 11 meeting.
- The SHPO's April 22, 2009, letter regarding findings of effects. Section 3.6.2, below, provides more detailed information regarding the adverse effects findings.

Five responses to the request for comments were received, none of which provided comments on the information presented in KYTC's mailing or contained recommendations for mitigating impacts to the District. The Clinton County Historical Society submitted a letter notifying of an address change; three consulting parties telephoned, one saying he would submit questions via email (which were never received by KYTC), another commenting on his interest in Civil War data, and the third asking what made Sites 6, 8, 18, and 32 and the District eligible for listing in the NRHP (to which KYTC provided an email response). Another respondent requested a copy of KYTC's packet, which was provided. A log of contacts and KYTC responses is included in Appendix C.

September 28, 2009. The six Native American Tribes were invited by FHWA to consult on the project. The invitation (provided in Appendix C) requested assistance in identifying areas with potentially impacted cultural and/or religious significance to the tribe, and included information about the Phase I archaeological survey of proposed impacts that was conducted for the project. It noted that Phase II archaeological testing, additional Phase I archaeological survey, or deep testing has been recommended if four identified sites cannot be avoided. The submittal also included the *Management Summary for the Preliminary Archaeological Investigations*

October 12, 2009. The Cherokee Nation responded that they were not aware of "any historic, cultural, or sacred sites within the affected area." Should construction activities reveal archaeological sites or human remains, they asked that "all activity cease immediately and the Cherokee Nation and other appropriate agencies be contacted immediately."

November 24, 2009. KYTC and project consultants met with the SHPO to review the status of project and potential impacts to historic resources including the District, and to initiate discussion of potential measures to mitigate adverse effects to the District.

3.6.2 Cultural Historic Resources

The "Cultural Historic Resource Survey" assessment was conducted for this project to identify individual sites or structures, or districts listed on or eligible for the National Register within the project area. The assessment included a review of Kentucky Heritage Council files for historic places in Clinton and Russell counties, and a literature search on the project vicinity. The purpose of this examination was to gather background material to establish the historic themes in the project area. Following the literature research, on-site reconnaissance was conducted in the project Study Area, including a field review that was coordinated with and attended by KTYC and the SHPO (see Appendix C, *Site Review Minutes*, April 23, 2003).

The assessment report concluded that 1) within the project corridor, there are four individual sites and one rural historic district (i.e., the Creelsboro Rural Historic District) eligible for listing in the NRHP; and 2) some of the project's alternatives would have an "Adverse Effect" on the District and an "Effect" (not adverse) on one of the individual sites. Mitigation of adverse effects to the District was coordinated with the SHPO. A Memorandum of Agreement (MOA) is being prepared to address measures to mitigate impacts to the District.

The SHPO has concurred with the boundary of the historic APE and with FHWA's determinations of eligibility and effects (see correspondence dated August 14, 2006, and April 22, 2009, in Appendix C). The eligible sites are identified on Exhibits 5a, 5b, and 6 by site number. Figures 10 through 13 show the four individual sites. Descriptions of the sites (excerpted from the assessment document) are as follows:

- **Seventy-Six Baptist Church (Site 33)—Eligible under Criterion C: Embodies the distinctive characteristics of a type (rural vernacular church). Also possibly eligible under Criterion A: Association with the history of religious institutions in the area.**

Figure 10: Seventy-Six Baptist Church

The congregation of the Seventy-Six Baptist Church was formed in 1822. The present building on the site is a two-story, two-bay, front gabled, weather boarded structure. The original windows with two-over-two glazing remain. Above the entry is a square bell tower which has a pyramidal roof. Along the eaves of the bell tower and roof of the main block of the church are knee brackets. The building is on an outcropping of rock which is visible along the sides of the church. The spaces between the original corner stone piers have been filled in with concrete block. Over the double-leaf entry is a modern, front-gabled metal porch that is supported by simple metal posts. Adjacent to the entry is a modern concrete ramp for handicapped access. A creek circles the church on the east, north, and west.

- **Wolf Creek Dam and Powerhouse (Site 18)—Eligible under Criteria A and C: Association with the tourism industry created with the impoundment of Lake Cumberland, and a distinctive work of engineering.**

Figure 11: Wolf Creek Dam

The dam and powerhouse have been determined eligible for the NRHP through consensus between USACE Nashville District and the Kentucky SHPO. The construction of Wolf Creek Dam across the Cumberland River for flood control and hydroelectric power generation was authorized by Congress in 1938. A contract for construction was let in 1941, but the work was suspended during World War II. The completion of the dam and impoundment of water occurred in 1952. The 240-foot-high embankment backs up the flow of the Cumberland River for 101 miles. The dam controls runoff from a 5,800-square-mile area. Lake Cumberland, with its 1,317 miles of shoreline, provides the Jamestown vicinity with recreational fishing and boating.

- **Creelsboro Rural Historic District (Site 19)—Eligible under Criteria A and C: Association with exploration and settlement patterns, commerce, trade, transportation, agriculture, and architecture. Also possibly eligible under Criterion D: Information regarding nineteenth century building techniques.**

The District was determined eligible for the NRHP as the result of coordination between the SHPO and USACE in 1987. The District is approximately 4,349 acres in size and includes the following areas along the Cumberland River in Russell and Clinton counties: Swan Pond Bottom, Jackman Bottom, Salt Lick Bottom, Creelsboro Bottom, and Wells Bottom. In 1987, an architectural/historical survey was conducted in connection with a proposed improvement to the Wolf Creek Powerhouse. The survey, which detailed the structures and history of the District, was a key reference for the "Cultural Historic Resources Survey" prepared for this project. Individual sites identified as contributing to the historic nature of the District are listed below. Their locations are shown (by SHPO Identification Number) on Exhibits 5a and 5b.

State SHPO Identification Number and Site Name

RU-556 Helm Landing
RU-557 Helm Cemetery[1]
RU-558 Helm House[2]
RU-559 Jackman House Site
RU-560 Jackman Cemetery
RU-561 Blankenship House[2]
RU-562 Grave of C. Jackman
RU-563 Blankenship-Oldham Cemetery
RU-564 Jackman House[2]
RU-565 Grave of S. Jackman
RU-566 Dink Mann House[2]
RU-567 Mann Cemetery
RU-568 Campbell House Site
RU-569 Beulah Campbell House[2]
RU-570 Campbell Cemetery[1]
RU-571 Pioneer Road[1]
RU-28 Cyrus Campbell House
RU-572 Olga/Campbell Ferry Landing
RU-573 Ruins of Oil Refinery
RU-574 L.A. McClure House
RU-575 Milt Lester House Site
RU-576 Aaron McClure House[2]
RU-577 Myrtle & Leon Lester House[2]
RU-578 McClure-Boyd Cemetery
RU-579 Benjamin Blankenship House[2]
RU-580 Blankenship Ferry
RU-581 Blankenship Cemetery
RU-582 J.E. Wooldridge House Site
RU-583 Wooldridge Wheat House
RU-584 Wooldridge Cemetery
RU-585 Northrip Log House Site
RU-586 Northrip-Cummings House Site[1]
RU-587 Northrip Cemetery[1]
RU-588 C.H. Campbell House Site[1]
RU-589 Slave Cemetery[1]

[1] *Site is within the District boundaries but outside the APE.*

[2] *See photo, Exhibit 5b.*

Segments 16, 16.1, 17, and 18 will have an adverse visual effect on the Creelsboro Rural Historic District. Each of these segments is a feature of a Build Alternative.

- **Lake Cumberland Texaco Service Station (Site 8)—Eligible under Criterion C: Embodies the distinctive characteristics of a type (Texaco "Type C" service station).**

Figure 12: Texaco Service Station

The Texaco station, a concrete block structure built in 1951, appears to be an example of the oblong box plan designed when the company expanded into auxiliary product lines to counter deteriorating gas sales during the Depression in the 1930s. The sale of batteries, tires, and accessories and a new emphasis on automobile repair required gas stations with larger display rooms and storage spaces, and more service bays. The hip or gable roofs of previous years were replaced by flat or shed roofs. Offices were enlarged and integrated with service bays. The amount of plate glass increased as exterior decoration decreased. Exterior walls were stucco or porcelain enamel. This new gas station design loosely followed the principles of the new "international" style of architecture. Walter Dorwin Teague was hired by Texaco in 1934 to create a new look for the company. The white streamlined boxes were designed to give the impression of speed, modernity, and progress.

- **Dr. M. M. Lawrence House (Site 6)—Eligible under Criterion B: Association with a significant person.**

Figure 13: Lawrence House

The Lawrence House is a two-story, five-bay, brick Colonial Revival house designed by M. M. Lawrence circa 1907 and built during the period from 1953 to 1957. The dwelling has a massive two-story porch supported by fluted Ionic columns and covers the three central bays of the dwelling. Windows have eight-over-twelve glazing on the first floor and eight-over-eight glazing on the second. Lawrence called his home "The Amaranth" after a mythical flower said never to fade. Dr. Marshall Marvin Lawrence, Sr., practiced medicine in the communities of Rowena and Jamestown, including areas in the surrounding Wayne, Clinton, and Cumberland counties. In addition to his practice, Dr. Lawrence also designed and built the 50-room Lawrence Hotel on the Jamestown Square, which opened in 1935. At the time the hotel was built, Jamestown did not have a public water system, according to Dr. Lawrence's son. Dr. Lawrence installed a pump station and ran a clay pipe to deliver water to the hotel, which also included a café, beauty shop, and drugstore. The hotel served for a time as a home for high school students who left their homes in remote parts of Russell County to attend Jamestown High School. The hotel also housed the switchboard and circuits for the Lawwell Phone Company (later Russell Home Telephone), founded by Dr. Lawrence and a partner, Mr. Wells. Dr. Lawrence was also a charter member of the Jamestown Lion's Club, organized in 1942.

Segment 20 (Alternative B) would take a narrow strip of land (550 x 50 feet) from the west boundary of the Lawrence House site, and the realignment of Warner Ridge Road and its intersection with Segment 20 of Alternative B would be visible from the house. These effects were determined not to be adverse and, as noted above, the SHPO has concurred with the finding of effects (see correspondence dated April

22, 2009, in Appendix C). If Segment 20 is part of the final selected alignment, further coordination will occur with the SHPO and consulting parties.

Table 20 summarizes the effects findings associated with resources in the project area that are eligible for listing in the NRHP. Table 21 summarizes the potential effects to the District. As the table shows, the recommended preferred Alternative D would require the acquisition of the fewest acres of the District's land—24.97 acres, which is approximately 4.5 acres to 14.7 acres less than the other alternatives. No structural contributing elements would be acquired for right-of-way.

Table 20: Effects on NRHP-Eligible Properties, by Build Alternatives

Site Name (Identification Number on Exhibits)	Build Alternatives			
	Alternative A	Alternative B	Alternative C	Alternative D
Seventy-Six Baptist Church (Site 33)	**Segments 2, 4 No Effect**	**Segment 3 No Effect**	**Segments 1, 5 No Effect**	**Segment 3 No Effect**
Wolf Creek Dam & Powerhouse (Site 18)	**Segment 18 No Effect**	**Segment 17 No Effect**	**Segment 16 No Effect**	**Segment 16.1 No Effect**
Creelsboro Rural Historic District (Site 19) *(See also Table 23, Section 3.7)*	**Segments 18 Adverse Effect (Visual)**	**Segment 17 Adverse Effect (Visual)**	**Segment 16 Adverse Effect (Visual)**	**Segment 16.1 Adverse Effect (Visual)**
Texaco Service Station (Site 8)	**Segment 19 No Effect**	**Segment 20 No Effect**	**Segment 16 No Effect**	**Segment 16.1 No Effect**
Dr. M. M. Lawrence House (Site 6)	**Segment 21 No Effect**	**Segment 20 No Adverse Effect**	**Segment 22 No Effect**	**Segment 21 No Effect**

Table 21: Creelsboro Rural Historic District—Summary of Effects and Right-of-Way Impacts

Category of Visual Effects	Alternative A Segment 18	Alternative B Segment 17	Alternative C Segment 16	Alternative D Segment 16.1
Effect Determination	Adverse Effect (Visual)	Adverse Effect (Visual)	Adverse Effect (Visual)	Adverse Effect (Visual)
Number of Individual Sites Potentially Affected	22	21	13	13
Contributing Elements Potentially Acquired for Right-of-Way	0	0	0	0
Acres of Land in District Potentially to Be Acquired for Right-of-Way	39.68	29.47	31.83	24.97

Indirect and cumulative impacts. Indirect impacts occur as a result of changes in land use induced due to the construction of the proposed project. Impacts of these types are likely to result in a loss of the historic settings associated with the eligible properties. It is not anticipated that new development induced by the project would occur that would affect the Creelsboro Rural Historic District or other eligible historic sites. Cumulative impacts occur as a result of past, current, and future projects that alter land uses. There are currently no local/regional land use plans to indicate future development proposed in the area. It is anticipated that most, if not all, future development would be located in/around the communities of Jamestown and Albany, north and south of the project corridor.

Mitigation. Build Alternative Segments 18 (Alternative A), 17 (Alternative B), 16 (Alternatives C), and 16.1 (Alternative D) would require the acquisition of land from within the District boundary and also would have an adverse effect due to visual impacts to elements that contribute to NRHP eligibility. Section 106 requires consultation with consulting parties and the identification of measures to mitigate the adverse effects. An MOA is being prepared to address mitigation commitments. The draft MOA will be provided to consulting parties for review and comment. The executed MOA will be included in the Finding of No Significant Impact (FONSI) for this project.

Section 4(f) of the 1966 Department of Transportation Act includes protection of the use of public and private historical sites unless proscribed conditions apply. Because each Build Alternative would both use land within and have an adverse effect on the District, a Section 4(f) Evaluation is being prepared, the draft of which comprises Section 3.7, herein.

3.6.3 Archaeological Resources

Research was conducted, a predictive model prepared, and a limited Phase I archaeological investigation completed to investigate previously unsurveyed areas and known archaeological sites along the Build Alternative alignments in Jackman Bottom, Swan Pond Bottom, and Blackfish Hollow. The results of the preliminary investigation were presented in the *Management Summary for the Preliminary Archaeological Investigations* (Management Summary) baseline study on file with KYTC. The investigation consisted of archival research, pedestrian surveys, and shovel and auger testing along the alternatives' routes. During the survey, known archaeological sites near/extending into the corridor of the alternatives were located, and several new archaeological sites were identified.

The survey results recorded or reexamined seven sites that contained prehistoric components (15Ru59, 15Ru60, 16Ru83, 15Ru84, 15Ru87, 15Ru125, and 15Ru126). The nature of the sites varies, with descriptions ranging from refuse scatters associated with historic farms/residences to prehistoric tool making and occupation.

As indicated on Table 22, Segments 16, 16.1, 17, and 18 could each affect potentially NRHP-eligible archaeological sites. Alternative D's Segment 16.1 would appear to have the least effect.[6] The Management Summary noted regarding Alternative A:

> *…at least one significant archaeological site is anticipated* [on Salt Lick Bottom]. *Finally, the close proximity of the Long* [Jackman] *Bottom portions of Alternate A to the NRHP eligible sites 15Ru300 and 15Ru301, a Mississippian-age habitation site and platform mound, further suggests that Alternate A would have at least as many, if not more, significant archaeological sites found there.* (p. 25)

The Management Summary recommended Phase II testing, deep testing, or additional Phase I survey for Sites 15Ru59, 15Ru60, 15Ru83, and 15Ru125 if they would be affected by the project. If a Build Alternative is selected, it will be subject to an intensive inventory along the remainder of its alignment. Where appropriate, formal testing will be conducted to determine National Register eligibility and mitigation for impacts to eligible sites. If any concentrations of archaeological artifacts are discovered during construction activities, work must cease and the project engineer must be notified immediately. Coordination with the Kentucky SHPO will be conducted to determine the potential eligibility of such sites and whether Phase II testing should be completed. If human remains, associated burial items, sacred items, or items of cultural patrimony are discovered, construction in those areas must cease and FHWA will notify and consult with the SHPO, identified Native American tribes, and other parties deemed appropriate by FHWA to determine a specific protocol for treatment, handling and reburial of the remains.

An MOA is being prepared for this project that will include commitments for completion of Phase 1 and other archaeological investigations, as needed; and stipulate how potential impacts, including inadvertent discoveries such as graves, will be treated. The executed MOA will be appended to the FONSI together with the final Section 4(f) Evaluation.

6 Although Segment 16.1 had not been identified at the time of the survey, its alignment was compared with the Management Summary mapping to determine potential impacts.

Table 22: Summary of Preliminary Archaeological Investigation Results

Potential NRHP-eligible sites recommended for additional investigation	Build Alternatives: Impacts / Recommendations			
	Alternative A* Segment 18	**Alternative B Segment 17**	**Alternative C Segment 16**	**Alternative D Segment 16.1*** **
Jackman Bottom *(Referred to as Long Bottom in the Management Summary)*				
Site 15Ru125 (FS1)	*(No impact)*	**Phase II**	*Alternatives do not enter Jackman Bottom*	
Site 15Ru59 (FS2)	*(No impact)*	**Phase II**		
Site 15Ru60 (FS3)	**Phase II**	**Phase II**		
Site 15Ru127 (FS5)	**Archival research, additional Phase I, possibly Phase II**	*(No impact)*		
Swan Pond Bottom				
Site 15Ru83	*Alternatives do not enter Swan Pond Bottom*		**Phase II**	*(No impact)*
Site 15Ru86			**Archival research, Phase II**	**Archival research, Phase II**
Blackfish Hollow				
Site 15Ru128 (FS6) – *Note: House on site determined not NRHP eligible.*	*Alternatives do not enter Blackfish Hollow*		**Archival research, Phase II**	*(No impact)*
Locations recommended for investigation to assess archaeological potential				
Salt Lick Bottom between Rock Lick Creek and Salt Lick Creek	**Phase I, deep testing ******	*(No impact)*	*Alternatives do not enter Salt Lick Bottom*	
T0 landforms	**Phase I**	**Phase I**	**Phase I, deep testing, archival research**	**Phase I, deep testing, archival research**
T1 landform	**Phase I, deep testing, archival research**	**Phase I, deep testing, archival research**	*(Only on 15Ru83; see above)*	*(No impact)*
T2 landform	**Phase I**	**Phase I**	*(Only on 15Ru86; see above)*	*(Only on 15Ru86; see above)*
Blackfish Creek bottomland	*Alternatives do not enter BC bottomland*		**Shovel probe**	*(No impact)*

Source: Management Summary for the Preliminary Archaeological Investigations, U.S. 127 Reconstruction Project, Cultural Resource Analysts, Inc., 2007; on file with KYTC.

* *Proximity to two NRHP-eligible sites, a Mississippian-age habitation site and a platform mound, suggests the alternative would have significant archaeological sites through Jackman Bottom.*

** *At least one significant site anticipated.*

*** *Although Segment 16.1 was not specifically analyzed in the report, information therein related to Section 16 was sufficiently detailed to permit consideration of potential impacts of the alignment.*

3.7 Section 4(f) Evaluation (Draft)

Section 4(f) of the U.S. Department of Transportation Act of 1966 (1966 USDOT Act) provides protection for a significant publicly owned park, recreation area, and wildlife or waterfowl refuge; and for a significant historic site that is on or eligible for inclusion in the National Register of Historic Places (NRHP), and archaeological sites on or eligible for the NRHP and important for "preservation in place."

USDOT has a review process for Section 4(f) resources potentially impacted by a federally aided transportation project. If it is determined that the project would have a minimal (*de minimis*[7]) impact, the Section 4(f) process is complete. However, if there would be an adverse effect to a protected resource, then USDOT may approve use of the protected resource only if:

- There is no feasible and prudent alternative to the use of land.
- The action includes all possible planning to minimize harm to the Section 4(f) property resulting from use.

As described in Section 3.6, herein, a *Cultural Historic Resources Survey* assessment was prepared for this project and approved by the SHPO. The assessment concluded that (1) within the project corridor there are four individual sites (Sites 6, 8, 18, and 33) and one rural historic district (i.e., the Creelsboro Rural Historic District, Site 19) that are eligible for NRHP listing and, therefore, protected under Section 4(f); and (2) **all of the project's Build Alternatives—including the recommended preferred Alternative D—would have an adverse effect on the District**, and one Build Alternative (Alternative B) would have an effect (not adverse) on one individual site.

Because of the District's NRHP eligibility and the finding of adverse effect due to the use of land within the District for right-of-way and visual impact, this draft Section 4(f) Evaluation has been prepared. The final Section 4(f) document will be included in the FONSI.

The following sections of this evaluation describe the proposed project, the Section 4(f) resources in the project area including the affected resource (the District), the potential impacts to the affected resource, avoidance and minimization alternatives evaluated, efforts underway to identify measures to mitigate the impacts, a preliminary conclusion, and ongoing coordination efforts to protect 4(f) resources.

3.7.1 Proposed Action

The proposed action involves the reconstruction and relocation of one of several independent sections of US 127 in Kentucky. The project corridor begins at KY 90 and continues north to the Jamestown Bypass, a distance of approximately 20 miles (see Section 1.1, *Project Setting and History,* Figures 1 and 2).

Section 1.2, *Purpose and Need, Goals,* discusses in detail the project purpose and need. In summary, the US 127 project would result in an improved section of a critical north-south highway corridor that enters Kentucky in Covington and exits at the Kentucky-Tennessee line. The project's purpose is to provide a key link in this important local and regional Rural Principal Arterial roadway by relocating US 127 on new alignment. The need for the project is threefold: 1) provide an alternate route should US 127 over Wolf Creek Dam be closed due to a national security threat, 2) respond to USACE concerns about the operations and maintenance of the dam given the presence of US 127 crossing the dam, and 3) address safety and other issues related to the substandard design of the existing roadway.

Build Alternatives A, B, C, and D were developed as described in Chapter 2.0, *Alternatives.* The No-Build Alternative does not meet the project's purpose and need; however, it has been retained for analysis in the Environmental Assessment for comparison with the Build Alternatives. The No-Build Alternative is one

7 *De minimis* impacts related to historic sites are defined as the determination of either "no adverse effect" or "no historic properties affected" in compliance with Section 106 of the National Historic Preservation Act (NHPA).

in which KYTC would take no action to provide an alternative to the Wolf Creek Dam crossing or to improve the existing travel corridor by constructing a road to current standards on new alignment.

3.7.2 Section 4(f) Property

MAP OF SECTION 4(F) PROPERTIES

Exhibit 4 shows the project's cultural historic APE, the locations of the four individual sites (Sites 6, 8, 18, and 33) and the Creelsboro Rural Historic District (Site 19). Exhibits 5a and 5b show the District's contributing elements (by SHPO identification number) that are in the vicinity of the Build Alternatives. Exhibit 6 shows the boundaries of the four individual sites. Photographs of the NRHP-eligible Sites 6, 8, 18, and 33 are provided in Section 3.6.2, *Cultural Historic Resources,* and photographs of several eligible structures (residences) within the District are shown on Exhibit 5b.

SIZE AND LOCATION OF SECTION 4(f) PROPERTIES

Coordination with the SHPO has occurred and it has been determined that four individual sites and one rural historic district are eligible for listing in the NRHP. Section 3.6.2 provides a description of the sites and the criteria under which they were determined eligible for the NRHP. The following **Individual Eligible Sites** section locates each resource, and provides the SHPO identification number ("RU" denoting Russell County and "CT" denoting Clinton County) and *Cultural Historic Resource Survey* site number used for site identification on exhibits herein. The **Creelsboro Rural Historic District** section describes the District and identifies all of the sites that are contributing elements to the historic nature of the District. The locations of the individual sites and the District are shown on the exhibits noted above. The **Other Section 4(f) Properties** section discusses recreational resources in the project area that meet the criteria for protection under Section 4(f).

- **Individual Eligible Sites (Sites 6, 8, 18, and 33)—**The following individual sites are eligible for listing in the NRHP, and as such they are protected under Section 4(f). They are listed in the order of their locations, from south to north, within the Study Area. The recommended preferred Alternative D will not have any Section 4(f) use of these four protected resources. Section 3.6.2, *Cultural Historic Resources* includes a photograph and describes the notable features of each site and the criteria under which they were determined eligible for the NRHP.

Seventy-Six Baptist Church (CT-103, Site 33): The church is in the South Section of the project north of the KY 639/KY 734 intersection. The NRHP boundary encompasses approximately 4.4 acres.

Wolf Creek Dam and Powerhouse (RU-555, Site 18): This site is in the North Section of the project corridor. US 127 crosses the dam. USACE's concerns about dam operations, travel safety, and national security (see Chapter 1.0, *Purpose and Need),* combined with the site's NRHP eligibility, contributed substantially to the decision to eliminate improving existing US 127 as an alternative for this project. The NRHP boundary encompasses approximately 14.7acres.

Lake Cumberland Texaco Service Station (RU-545, Site 8): The service station is in the North Section of the project corridor at the US 127/KY 55 intersection in the community of Freedom. The structure is no longer in operation as a service station, but appears to be used for storage. The NRHP boundary encompasses approximately 0.5 acre.

Dr. M. M. Lawrence House (RU-543, Site 6): This site is in the North Section of the project corridor, northwest of the intersection of US 127 and KY 2284, in an area known as Sewellton. The NRHP boundary encompasses approximately 12.7 acres.

- **Creelsboro Rural Historic District (Site 19)—**All Build Alternatives would use and visually impact land in the District. The SHPO has concurred in the "Adverse Effects" finding.

The *Architectural/Historical Survey for the Proposed Feasibility Study to Improve Wolf Creek Power Plant*[8] (*Architectural/Historical Survey*) prepared for USACE Nashville District, provided an inventory and in-depth study of the bottoms along the Cumberland River in Russell and Clinton counties. The report was written in conjunction with a feasibility study of modifying or expanding the existing Wolf Creek hydroelectric power plant. The report assessed the potential effects to historic resources in the river bottoms located between the dam and the site of a proposed structure below Creelsboro. The study provided an inventory of historic resources in a 4,349-acre study area—now identified as the Creelsboro Rural Historic District—and included 24 cemeteries, 6 former steamboat landings and/or ferry crossings, and 76 key structures such as dwellings, commercial buildings (within the community of Creelsboro, only), and churches. Also noted were 132 barns or pivotal farm structures. The study concluded that the District was eligible for the National Register under Criteria A and C for its associations in the areas of exploration and settlement, commerce, trade, transportation, agriculture, and architecture. They indicated that the district could also be eligible under Criterion D for the information it may yield regarding 19th century building techniques. The District was determined eligible for listing in the NRHP by consensus between the Kentucky SHPO and USACE.

The District includes five bottomland areas along the Cumberland River in Russell and Clinton counties: Creelsboro Bottom and Jackman Bottom on the north side of the river; and Wells Bottom, Salt Lick Bottom, and Swan Pond Bottom on the south side. The APE for this project includes a portion of Salt Lick Bottom and all of Jackman and Swan Pond bottoms. Alternative Segments 16, 16.1, 17, and 18, which are in the North Section of the project corridor, pass through the District.

The individual sites within the District that contribute to the historic nature of the District and are in the vicinity of the project alternatives are briefly described below. Note that the contributing elements were not assigned individual site numbers in the *Cultural Historic Resource Survey* report; therefore, they are identified on the exhibits by their SHPO identifications.

Jackman Bottom. The first settlers in the east end of Jackman Bottom (see Figure 14) were members of the Jackman family. In the 1790s they established farms in the area east of Ramsey Creek and present-day Creelsboro. Early settlers in the area included the Jackmans, Campbells, Helms, Bartholomew, Wooldridges, Manns, and Blankenships. William Jackman was given 1,700 acres in the vicinity as a military grant for his service in the Revolutionary War. Sites within Jackman Bottom that are in the vicinity of project alternatives and that contribute to the historic nature of the District are as follows:

Figure 14: Jackman Bottom Looking West from the Vicinity of the Helm House (RU-558)

RU-556 Helm Landing: Established by George Helm who settled in the area prior to 1810, it included a post office (opened 1905, closed 1955) and warehouses, which are no longer standing.

[8] Martha Carver, Margaret Slater, and Richard Tune, of Barcon, Inc. 1988.

RU-557 Helm Cemetery: North of Helm Landing, atop a hill, the cemetery contains 16 marked graves and two markers that are unreadable. The grave dates range from 1849 to 1953.

RU-558 Helm House: The Helm, Jackman, Bartholomew, and Wooldridge families are associated with the residence constructed circa 1880 (photo on Exhibit 5b).

RU-559 Jackman House Site: Built by Alexander Jackman in the last quarter of the nineteenth century, the house was torn down and replaced by a modern dwelling in 2006.

RU-560 Jackman Cemetery: The cemetery is between the Jackman House site (RU-559) and the Cumberland River, and contains nine grave stones including one for the original settler and Revolutionary War veteran, William Jackman.

RU-561 George Blankenship House: In 1877 Alexander Jackman, Sr. (RU-559) sold a portion of his 142 acres to Blankenship. Construction on the house (photo on Exhibit 5b) was completed in 1893. Several early twentieth century outbuildings are associated with the house. Upon the death of George in 1934, the farm was acquired by his son, Asa.

RU-562 Grave of Catherine Jackman: The grave of the wife of J.W. Jackman (1842-1924) is on property associated with George Blankenship who, prior to buying the Jackman property (RU-561), lived in a log cabin on the west side of present-day KY 379. The cabin is no longer standing.

RU-563 Blankenship-Oldham Cemetery: Located north of the Blankenship House (RU-561) on the east side of KY 379, this cemetery contains 16 grave stones dating from 1839 to 1976.

RU-564 Joe W. and Cate Jackman House: A descendant of William Jackman, Joe lived in the house (photo on Exhibit 5b) in the early twentieth century. The Jackmans sold the property to the Grants in 1927. Several outbuildings dating circa 1915 and two non-contributing structures dating from 1942 are associated with the site.

RU-565 Grave of Sarah Jackman: West of the Jackman House (RU-564) is the grave of Sarah Jackman who died in 1885.

RU-566 Dink Mann House: Eldon (Dink) Mann and his wife, Stella, moved from Birdwell Hollow in 1909 when they purchased the 258-acre farm in Jackman Bottom. The present house on the property was completed in 1926 (photo on Exhibit 5b). Associated with the site are several structures circa 1920 as well as modern structures including a mobile home. Mann, a farmer and trader in livestock, moved the livestock to Cincinnati via steamboats and trains. Mann Landing, where livestock was loaded onto the steamboats, was located south of his house on the north bank of the Cumberland River.

RU-567 Mann Cemetery: Located north of the Mann House (RU-566) on the north side of KY 379, the cemetery contains the graves of Dink (d. 1942) and Sarah Mann (d. 1963), and a son, Arvis (d. 1947).

RU-568 Campbell House Site: Circa 1800, William and Jeanne Campbell moved from Virginia to the Creelsboro area. William served in the Revolutionary War. A son, John, married Sarah Hays. John died in 1865 and Sarah married Alexander Jackman, Sr. (RU-559) in 1869.

RU-569 Beulah Campbell Property, Mouth of Horse Hollow: A one-story frame dwelling (photo on Exhibit 5b), with brick-pattern asphalt siding covering the original exterior material, stands on property associated with the Campbell and Jackman families.

RU-570 Campbell Cemetery: Located on a hillside north of KY 379, the cemetery contains six inscribed grave stones and several crude stones without inscriptions (may mark the burials of slaves). Local sources indicate William Campbell (RU-568), a Revolutionary War veteran and operator of the Creelsboro Ferry, is buried in the cemetery.

RU-571 Pioneer Road: On the north side of the Campbell Cemetery there is a sunken roadbed that was used by area settlers.

RU-572 Olga Ferry and Landing: The ferry and landing were operated from 1880 through the 1930s by Cyrus Campbell (RU-28). During the 1920s oil boom, the Currahan Oil Company's boat based its operation at this landing. The warehouse that was located at the landing is no longer standing.

RU-573 Ruins of Oil Refinery Site: The ruins are located to the northeast of the Cyrus Campbell House (RU-28). During the 1920s, operations for an oil boom in this area were centered on the Campbell property and Olga Landing. A pipeline was run south across the bottom.

RU-28 Cyrus Campbell House: Cyrus Campbell (d. 1928) was the son of John W. Campbell, grandson of John Campbell (RU-568), and great-grandson of William Campbell (RU-568 and 570). The house (photo on Exhibit 5b) was built circa 1880. Associated with the property are an early twentieth century barn and a modern barn. Cyrus's sister, Cora Campbell Armstrong, was married to Creelsboro merchant W.A. Armstrong (d. 1932).

Swan Pond Bottom. Deeds dating to the 1820s refer to the area as Swan Pond. According to local history, the name derived from the presence of a large pond where swans congregated. Early families who settled the area included the McClures, Blankenships, Boyds, and Manns. Figure 15 shows a typical area view. Sites within Swan Pond Bottom that are in the vicinity of project alternatives and that contribute to the historic nature of the District are as follows:

Figure 15: A View of Swan Pond Bottom

RU-574 L.A. McClure House: The residence was built circa 1903 for the grandson of early settle James McClure on the site of McClure's original house. James McClure, whose descendents still reside in the area, came to the bottom in 1804 to farm 324 acres. He built a log house facing the Cumberland River on the southeast side of the bottom in the present-day front yard of the L.A. McClure House. McClure's log house was dismantled circa 1903 when the present house on the site was built.

RU-575 Milt Lester House Site: Mary Lester inherited the property and an early log cabin from her parents, George and Alice Boyd. A house was completed on the property around 1885. Mary and husband Milt Lester operated a store in Creelsboro and later another store at Kendall Landing across the river in Long Bottom. A son married the daughter of Jim McClure, grandson of James McClure (RU-574).

RU-576 Aaron McClure House: Completed by James McClure's son, Aaron, circa 1845, the house (photo on Exhibit 5b) was later occupied by Aaron's son, James. Aaron's two other children, L.A. McClure (RU-574) and Myrtle McClure Lester (RU-577), built nearby.

RU-577 Myrtle McClure Lester and Leon Lester House: Family relations of both Myrtle and Leon include the McClures, Helms, Boyds, and Blankenships, all with longstanding associations with the area. Leon Lester died in 1920 and Myrtle left the Swan Pond area in 1948 and bought a farm in Jamestown. The house (photo on Exhibit 5b) was completed in 1904. Associated with the dwelling is a deteriorated log shed that was moved from the Blankenship farm.

RU-578 McClure-Boyd-Lester Cemetery: This cemetery contains approximately 40 grave stones dating from 1861 to the present. A number of stones are very crude and have no markings.

RU-579 Benjamin Blankenship House: In 1814, Samuel McClure, brother of James McClure, sold his holdings on Swan Pond to Jesse and Abel Blankenship. In 1819 additional land was purchased by the Blankenships. In 1828, Abel died and his land passed to his son, Jesse, and then (circa 1850) to Jesse's son, John Blankenship. Circa 1870, John's son, Benjamin, built the dwelling that still stands but is in deteriorating condition (photo on Exhibit 5b).

RU-580 Blankenship Ferry: As early as 1826, John and Benjamin Blankenship (RU-579) ran a ferry on the Cumberland River to the east of Blankenship Island.

RU-581 Blankenship Cemetery: The cemetery contains approximately 24 marked graves, the earliest of which dates to 1874.

RU-582 James Edward Wooldridge House Site: The house was built circa 1870. In 1992, only the chimney remained north of the present-day modern brick house. Associated with the property were two sheds circa 1900 and several later structures. In the 1990s, the property was changed from agricultural to commercial use with the establishment of Nature's Catch Fish Farm. Eight fish ponds were constructed in the northern area of the farm adjacent to the Cumberland River. Research[9] indicates several members of the Wooldridge family have resided on the farm since the late nineteenth century.

RU-583 Wooldridge-Wheat House Site: The house dates from 1870. It was moved to the site in the 1960s.

RU-584 Wooldridge Cemetery: The cemetery contains six graves, with dates ranging from 1922 to 1964. A second, smaller, cemetery is located west of a modern brick residence. The headstones mark the graves of two Woodridge children who died in infancy (1885 and 1896).

Salt Lick Bottom. Salt Lick Bottom is located in the south side of the Cumberland River. Early settlers included William Beard, who received a land grant there in 1800; and Elisha Northrip. Sites within Salt Lick Bottom that are in the vicinity of project alternatives and contribute to the historic nature of the District are as follows:

RU-585 Northrip Log House Site: In 1842, Elisha Northrip sold land on Salt Lick Creek to James Northrip, who also bought land from William Jackman and other Jackmans of Jackman Bottom. A log house was built on the property ca. 1830. Only the stone chimney remains.

RU-586 Northrip-Cummings House Site: The house belonging to James Northrip was built in the same timeframe at that referenced above (RU-585), but is no longer standing. The property passed to a family member whose heirs sold it to the Cummings in 1919. Associated with the property is a tobacco barn completed in 1939. At the time, it was the largest tobacco barn in Russell County. Behind the barn is a raised rock wall (in excellent condition) that protects the graves of a river boat captain and his slave. According to family legend, the slave fell overboard during a storm and the captain died trying to rescue him. Legend also has it that the captain was a relative of General Robert E. Lee, a great nephew of whom lived near the Manntown Church for many years.

RU-587 Northrip-Campbell Cemetery: The cemetery is located on top of a hill on the west side of Salt Lick Creek Road. There are 18 marked graves, the earliest dating to 1869; and a large number of crude, uninscribed stone markers.

RU-588 C.H. Campbell House Site: Charles H. Campbell, son of John Campbell (see Jackman Bottom entries) had settled on Salt Lick Creek by the mid-nineteenth century. He married Elizabeth Northrip, daughter of James (RU-585 and 586). Charles and brother, John W. (RU-568), jointly owned land on both

9 *Revised Report on a Cultural Resource Assessment of the Early Times Fish Farm in Russell County, Kentucky.* Tom Sussenback.

sides of the Cumberland River. In 1866 they divided their holding so that John owned the section on the north side of the river and Charles owned property south of the river. Charles's first house was located on the lower part of the bottom, but was subject to flooding. He built a second house circa 1884 on a hillside above the floodplain. The house is no longer standing. Associated structures include barns dating from circa 1880, 1885, 1920, 1930, and 1940. In addition, there were a nineteenth century stone cellar, mid-nineteenth century shed, a mobile home, two tenant houses, and two other structures. Charles and his son, John, operated a landing on the south side of the river from the late nineteenth century until circa 1930. They also operated the Creelsboro Ferry every other year in cooperation with Ed Campbell, who lived on the north side of the river.

RU-589 Campbell Slave Cemetery: On a hillside southwest of the Campbell House site are the uninscribed, crude markers of the cemetery.

Creelsboro Bottom and **Wells Bottom** are also within the District; however, they are not near the project's alternatives and there will be no Section 4(f) use of land in these areas.

Creelsboro Bottom: By 1803, William Campbell was operating a ferry across the Cumberland River to connect Creelsboro Bottom to Salt Lick Bottom. The ferry crossed the river near a ford that had been the meeting place of two trails used by Native Americans. Near the crossing was a tavern and trading post (circa 1809) operated by the Creel brothers, Elijah and Elza. The brothers never lived in Creelsboro, but operated businesses in the area. In 1819, a plat for a town, first known as Campbellsburg, was drawn. The post office was renamed Creelsburgh in 1828 and the town was incorporated in 1836. Creelsburgh became the mercantile center for the agrarian society in the surrounding river bottoms. In 1833, the packet boat "Jefferson" became the first steamboat to sail to Point Isabel (later known as Burnside), the head of navigation on the Cumberland River. Creelsburgh became one of the twelve major landings and trading centers along the river. The town's name was changed to Creelsborough in 1864, at which time it was known as a shipping center. The town's name was changed to Creelsboro in 1890. The advent of the railroad ended steamboat traffic and the prominence of Creelsboro. The post office closed in 1962.

Wells Bottom: Located south of the Cumberland River in Clinton County, Wells Bottom is within the District but outside the project's APE. The area was first known as the Bottom Opposite the Rock House. In the 1790s, the area became known as Elliott's Bottom after settler Sam Elliott. David Wells owned the largest amount of land in the bottom; therefore, the area became know as Wells Bottom. The Williams family operated a ferry that connected Wells Bottom with Creelsboro Bottom. The Williams Ferry operated until the 1930s, closing at approximately the same time as the Creelsboro Ferry.

- **Other Section 4(f) Properties—**The following sites in the project area are publicly owned recreational areas that meet the criteria for Section 4(f) resources:

Kendall Campground: Operated by USACE, the campground is located on Lake Cumberland immediately below Wolf Creek Dam, 12 miles south of Jamestown on US 127. The campground has access to fishing, boat launches, trails, and wildlife viewing; 108 campsites with utilities; and day-use facilities such as picnic sites, restrooms, and playgrounds.

Wolf Creek National Fish Hatchery: Located north of Wolf Creek Dam and operated by USFWS, the fish hatchery produces rainbow and brown trout for stocking public fishing waters in the state; and is engaged in recovery and restoration of threatened/endangered aquatic species. The Visitor/Environmental Education Center has exhibits, a classroom, a theatre, a gift shop, and aquariums. Fishing is allowed in specified areas. USFWS reports there are more than 100,000 visitors annually.

Lake Cumberland State Resort Park: The state park is located in Russell County on the northwestern edge of the 63,000-acre Lake Cumberland. Park features include the 63-room Lure Lodge and 13-room Pumpkin Creek Lodge; 30 cottages; a picnic shelter and picnic areas; a state dock with rental boats; an

18-hole miniature golf course and a disk golf course; hiking and horseback riding trails; tennis and shuffleboard courts; and interpretive programs.

OWNERSHIP AND TYPE OF SECTION 4(f) PROPERTIES

Properties within the Creelsboro Rural Historic District are in private ownership. The land use is almost entirely agricultural or undeveloped land with scattered residences/farmsteads and family cemeteries.

FUNCTION ON PROPERTIES AND AVAILABLE ACTIVITIES

Activities associated with agricultural and residential uses occur on the properties that would experience an adverse visual effect, and on properties that would have land acquired for right-of-way. In addition, there are numerous wells (oil or unspecified) scattered throughout the District (see Exhibit 4), with the greatest concentrations in the immediate vicinity of the project occurring in Salt Lick Bottom, in Jackman Bottom south of Ramsey Creek Road, and in Swan Pond Bottom along Swan Pond Road. More than half of these wells are identified as being "dry and abandoned" on the Kentucky Geological Survey's "Kentucky Geological Map Information Service" database.

DESCRIPTION AND LOCATION OF ALL EXISTING AND PLANNED FACILITIES

The only facilities that are within the District and potentially affected by the project are rural residences, barns and related farming structures, cemeteries, and the above-referenced wells. Neither Russell County nor Clinton County has a land use plan, nor are there plans by local, state or federal agencies for locating facilities (recreational, institutional, etc.) within the District. As noted above, the *Architectural/Historical Survey* included an inventory of historic resources in the District that listed 24 cemeteries, 6 former steamboat landings and/or ferry crossings, and 76 key structures. The historic elements potentially affected by the project are listed in Table 23 (p. 78).

ACCESS AND USAGE

The District, as a whole, does not experience a high level of vehicular traffic. Land use is primarily agricultural or undeveloped, with wells on scattered sites (as discussed above); access is via a few narrow, winding, two-lane roads; and there are no commercial centers, institutions, or tourism facilities that would attract high volumes of traffic to destinations within the District. Roads providing access to the District are shown on Exhibit 1.

Three state roads—KY 3063 in Clinton County, and KY 379 and KY 1058 in Russell County—provide direct access to the District. These are narrow, two-lane roads (9-foot-wide lane widths) that travel circuitous routes along ridge tops and/or river bottomland. Several two-lane, narrow local roads also provide direct access: Wells Bottom Road in Clinton County, and Ramsey Creek Road, Manntown Road, and Swan Pond Road in Russell County.

Access to District south of Cumberland River: Wells, Salt Lick, and Swan Pond bottoms. KY 3063 is designated a Rural Local road on the state's Functional Classification System. It heads northwest from US 127 and terminates at its junction with Wells Bottom Road in the Wells Bottom section of the District. The current average daily traffic (ADT) volume is 38 vehicles per day (vpd) in the project vicinity. The primary access to the portion of the District south of the river (Salt Lick and Swan Pond bottoms) is via KY 3063 to Wells Bottom Road to Manntown Road to Swan Pond Road. KY 1730 is a Rural Local road on the Functional Classification System. It heads westward from US 127 and intersects Manntown Road south of Manntown and Manntown Road's junction with Swan Pond Road. The current ADT is 126 vpd.

Access to District north of Cumberland River: Creelsboro and Jackman bottoms. KY 1058 is designated a Rural Minor Collector on the state's Functional Classification System. From Creelsboro, KY 1058 heads north (away from the District), then turns sharply eastward and terminates at KY 55. The current ADT is 566 vpd from KY 379 in Creelsboro to KY 379 at Old Olga, and 385 vpd to KY 55. KY

1058 lies well to the north and west of the District except at its junction with KY 379 in Creelsboro. Together with KY 379 and Ramsey Creek Road, it provides access from the north to Creelsboro Bottom and Jackman Bottom (i.e., the portion of the District north of the river).

KY 379, from west of Creelsboro to KY 1058, is designated a Rural Local road on the state's Functional Classification System. KY 379 traverses the northern part of the District (more-or-less parallel to the Cumberland River) from west of Creelsboro to Helm Road where it turns sharply northward, leaves the District, and intersects KY 1058, then continues northward to US 127, which is north of the project's northern terminus. The current ADT is 171 vpd to Helm Road and 401 vpd to KY 1058.

RELATIONSHIP TO SIMILARLY USED LANDS IN THE VICINITY

The District is located in an area that retains a rural, agricultural, and river-oriented character dating back to the 1790s. Like the river trade, itself, evidence of that trade—in the nature of historical boat landing structures and related facilities along the river—has all but disappeared from the District; however, the sites are noted in cultural surveys and recalled by local residents, many of whom are descendents of the area's earliest settlers. Long Bottom, south of and across the river from Swan Pond Bottom[10], was not included in the District because of its distance from Creelsboro and its physical separation from the other bottoms. The structures in Long Bottom were cleared due to the construction of the Wolf Creek Dam. Rock House Bottom, downstream from the lower terminus of the District, was excluded because of its physical separation from Creelsboro due to terrain. There are no other listed districts within the general project area. The lack of ready access to the District and predominantly agricultural land use in other areas extending away from the District (outside the project area) have resulted in little change in land use over the years. It is likely that some of these areas could contain features similar to those that make the Creelsboro District historic. However, no cultural historic surveys have been conducted in these areas.

APPLICABLE CLAUSES AFFECTING THE OWNERSHIP

As the proposed project is federally funded and the District is a resource eligible for listing in the NRHP, the District is subject to the provisions of Section 4(f) of the Department of Transportation Act of 1966 and Section 106 of the National Historic Preservation Act as amended. In addition to this Section 4(f) Evaluation, the project is also being reviewed under Section 106 Regulations of the National Historic Preservation Act (see Section 3.6, herein). No other applicable clauses affecting the ownership of the Creelsboro Rural Historic District have been identified.

UNUSUAL CHARACTERISTICS REDUCING OR ENHANCING THE VALUE OF THE PROPERTY

The Creelsboro Rural Historic District is associated with the region's earliest settlement and retains, more or less in tact, many of the elements that date from pioneer life in the late 1700s through the oil boom decades of the 1920s and 1930s in the region. The *Architectural/Historical Survey* prepared for USACE (1988) describes the significance of the District in its discussion of the rationale for its NRHP eligibility:

> *Under Criterion a, the district is associated with settlement patterns of this entire region by early pioneers in the 1790–1930 period. The district contains significant structures with a considerable degree of integrity which date from this period of early settlement. Also the area derives significance from its association with the history of the use of the Cumberland River as a major artery of trade….Creelsboro and the associated bottoms are representative of the towns and rural communities along the Upper Cumberland River….Creelsboro was one of the most significant of these river land communities…The buildings and structures in Creelsboro and the farmsteads and landings in nearby bottoms are reflective of and directly associated with the pattern of historical development.*

[10] On USGS map, the area identified as Long Bottom, west of and across the river from Swan Pond Bottom, is locally known and referred to herein and in the cultural survey report as Jackman Bottom. Long Bottom is east of Swan Pond Bottom.

The District is also eligible under Criterion C (and potentially Criterion D) as being:

> *…significant as an intact grouping of vernacular folk architecture from the 1800-1940 period….Also, the district contains a wide variety of structural types…representing a total picture of the lifestyle of these farmsteads…..Initial research revealed that little formal architectural evaluation of this geographic region has been undertaken. Further study may conclude that this district is also eligible under Criterion D as one of the best intact groupings of building from this time period in this region of Kentucky.*

3.7.3 Impacts on Section 4(f) Properties

Public parks/recreational areas. The following public parks/recreational areas are within project area: USACE's Kendall Campground, USFWS's Wolf Creek National Fish Hatchery, and Lake Cumberland State Resort Park. They are described in Section 3.7.2, above. All Build Alternatives were developed to avoid these resources. Therefore, there would be no Section 4(f) use of any of these areas.

Cultural historical resources. Four individual sites and one historic district are within the project APE.

Seventy-Six Baptist Church (CT-103, Site 33): The church is in the vicinity of Build Alternative Segments 1 through 5, none of which would have use of or an effect on the site. The SHPO has concurred with a "No Effect" finding for these alignments. There would be no Section 4(f) use of the site.

Wolf Creek Dam and Powerhouse (RU-555, Site 18): The dam and powerhouse is in the vicinity of Build Alternative Segments 16, 16.1, 17, and 18, none of which would have use of or an effect on the site. The SHPO has concurred with a "No Effect" finding for these alignments. There would be no Section 4(f) use of the site.

Lake Cumberland Texaco Service Station (RU-545, Site 8): This site is in the vicinity of Build Alternative Segments 16, 16.1, 19, and 20, none of which would have use of or an effect on the site. The SHPO has concurred with a "No Effect" finding for these alignments.

Dr. M. M. Lawrence House (RU-543, Site 6): At its closest point, the proposed centerline for Segment 20 (Alternative B) is approximately 200 feet north of the northeast corner of the boundary for the Lawrence House. At its intersection with Warner Ridge Road, Segment 20 will take a narrow strip of land (approximately 550' x 50') from the west boundary of the site. The realigned Warner Ridge Road and its intersection with Segment 20 will be visible from the house. The SHPO and consulting parties have been notified of the "No Adverse Effect" finding for Segment 20 and the SHPO has concurred with the finding. The recommended preferred alternative in this area is Alternative D, Segment 21. Segments 21 and 22 would require no acquisition of land from the site, and vegetation and topography would preclude visual impact. The SHPO has concurred with a "No Effect" finding for these alignments. There would be no Section 4(f) use of the site with these alignments.

Creelsboro Rural Historic District (Site 19): The District will experience twofold impacts from the project. All of the Build Alternatives would (1) have an adverse visual effect on the District and (2) require land for right-of-way within the District (namely from Swan Pond Bottom, Jackman Bottom, and/or Salt Lick Bottom, depending on the alternative considered). There will be no Section 4(f) use of property within Creelsboro Bottom or Wells Bottom. Exhibits 5a and 5b show the locations of the Build Alternatives in relation to the District as a whole and to the contributing elements within the District. The approximate area of land within the District that would be used for right-of-way by each alternative is as follows:

Alternative A (Segment 18)—39.68 acres

Alternative B (Segment 17)—29.47 acres

Alternative C (Segment 16)—31.83 acres

Alternative D (Segment 16.1)—24.97 acres
(Recommended preferred alternative)

Table 23 lists the contributing elements in the District, indicates the approximate distance between a site and each alternative, and notes whether an alternative would be visible from the site.

Table 23: Creelsboro Rural Historic District—Potential Visual Effects to Contributing Elements

State SHPO Number & Site Name	Alt. A Segment 18	Alt. B Segment 17	Alt. C Segment 16	Alt. D Segment 16.1
RU-556 Helm Landing	V	V	V	V
RU-557 Helm Cemetery*	V	V	NV	NV
RU-558 Helm House	V	V	V	V
RU-559 Jackman House Site	V	V	NV	NV
RU-560 Jackman Cemetery	V	V	NV	NV
RU-561 Blankenship House	V	V	NV	NV
RU-562 Grave of C. Jackman	V	V	NV	NV
RU-563 Blankenship-Oldham Cemetery	V	V	NV	NV
RU-564 Jackman House	V	V	NV	NV
RU-565 Grave of S. Jackman	V	V	NV	NV
RU-566 Dink Mann House	200 X	600	NV	NV
RU-567 Mann Cemetery	1,000	300	NV	NV
RU-568 Campbell House Site	300	1,000	NV	NV
RU-569 Beulah Campbell House	1,000 / 600 X	V	NV	NV
RU-570 Campbell Cemetery*	600 X	V	NV	NV
RU-571 Pioneer Road*	600 X	V	NV	NV
RU-28 Cyrus Campbell House	V	V	NV	NV
RU-572 Olga/Campbell Ferry Landing	V	V	NV	NV
RU-573 Ruins of Oil Refinery	V	V	NV	NV
RU-574 L.A. McClure House	NV	NV	V	V
RU-575 Milt Lester House Site	NV	NV	V	V
RU-576 Aaron McClure House	NV	NV	V	V
RU-577 Myrtle & Leon Lester House	NV	NV	V	V
RU-578 McClure-Boyd Cemetery	NV	NV	V	V
RU-579 Benjamin Blankenship House	NV	NV	1,000	1,000
RU-580 Blankenship Ferry	V	V	1,000	1,000
RU-581 Blankenship Cemetery	NV	NV	300	300
RU-582 J.E. Wooldridge House Site	NV	NV	200 / 100 X	500 / 200 X
RU-583 Wooldridge-Wheat Site House	NV	NV	600 / 200X	800 / 650X
RU-584 Wooldridge Cemetery	NV	NV	600 / 375 X	500 / 100 X
RU-585 Northrip Log House Site	600 X	NV	NV	NV
RU-586 Northrip-Cummings House Site*	200 X	NV	NV	NV
RU-587 Northrip Cemetery*	NV	600 X	NV	NV
RU-588 C.H. Campbell House Site*	NV	NV	NV	NV
RU-589 Slave Cemetery*	NV	NV	NV	NV
Total Sites	**35**	**35**	**35**	**35**
Sites Potentially Visually Affected	**22**	**21**	**13**	**13**
Sites Potentially Acquired for ROW	**0**	**0**	**0**	**0**

Creelsboro Rural Historic District Visual Effects

100 = Site within 100 feet of alternative mainline that would be visible
300 = Site within 300 feet of alternative mainline that would be visible
600 = Site within 600 feet of alternative mainline that would be visible
1000 = Site within 1,000 feet of alternative mainline that would be visible
 # X = Site within (#) feet of realigned crossroad / intersecting road
V = Visible, though site more than 1,000 feet from alternative mainline
NV = Not visible / not within 1,000 feet

* *Outside the APE but within the boundaries of the District*.

Table 24 summarizes the potential impacts to cultural historic resources and publically owned recreational areas, and indicates whether there is Section 4(f) use of the sites.

Temporary construction-related impacts. The recommended preferred Alternative D (Segment 16.1) would be approximately 1,000 feet or more from all but four of the above-listed contributing elements in the District. Of the four closer sites, two are cemeteries and two are house sites (structures no longer standing). Despite the distances from standing structures and other contributing features, noise, vibration, dust, and other temporary construction-related impacts would be anticipated. There could also be temporary visual impacts due to the presence and operation of construction equipment, and short-term inconveniences due to temporary reduction in travel lanes or road closures. Property access surrounding the construction area could be temporarily affected, and temporary construction easements may be required.

Section 3.16, herein, identifies measures to mitigate construction-related impacts. Coordination with the SHPO and consulting parties will identify measures to mitigate impacts to the District, and will conclude with an executed MOA.

Table 24: Summary of Use of Section 4(f) Properties, by Build Alternative

Site Name	Effects Determinations / Impacts				Section 4(f) Use
	Alt. A	Alt. B	Alt. C	Alt. D	
PUBLIC PARKS/ RECREATIONAL AREAS					
Kendall Campground	No impact	No impact	No impact	No impact	No
Wolf Creek National Fish Hatchery	No impact	No impact	No impact	No impact	No
Lake Cumberland State Resort Park	No impact	No impact	No impact	No impact	No
CULTURAL HISTORIC RESOURCES					
Individual Sites					
Seventy-Six Baptist Church (Site 33)	Segments 2, 4 No Effect	Segment 3 No Effect	Segments 1, 5 No Effect	Segment 3 No Effect	No
Wolf Creek Dam (Site 18)	Segment 18 No Effect	Segment 17 No Effect	Segment 16 No Effect	Segment 16.1 No Effect	No
Texaco Service Station (Site 8)	Segment 19 No Effect	Segment 20 No Effect	Segment 16 No Effect	Segment 16.1 No Effect	No
Dr. M. M. Lawrence House (Site 6)	Segment 21 No Effect	Segment 20 No Adverse Effect	Segment 22 No Effect	Segment 22 No Effect	No*
Rural Historic District					
Creelsboro Rural Historic District (Site 19) *(See Table 20 for details of visual effects)*	Segments 18 Adverse Effect (Visual)	Segment 17 Adverse Effect (Visual)	Segment 16 Adverse Effect (Visual)	Segment 16.1 Adverse Effect (Visual)	Yes
Acres Potentially Acquired for Right-of-Way	39.68	29.47	31.83	24.97	Yes
Eligible Individual Sites Potentially Acquired for Right-of-Way	0	0	0	0	No

** Although Section 20 Alternative B would acquire approximately 0.6 acre along the historic boundary of the Lawrence House, there would be no Section 4(f) use based on de minimis, which applies due to the "No Adverse Effect" finding.*

3.7.4 Avoidance Alternatives

Avoidance alternatives that were considered are identified below. They were eliminated primarily due to excessive cost, inability to meet the project's purpose and need, and/or Federal agency requirements regarding bridging Lake Cumberland.

Avoidance Alternative 1—No-Build Alternative. The No-Build Alternative is one in which KYTC would take no action to improve the existing travel corridor by constructing a road to current standards on new alignment. The No-Build Alternative would not meet the stated purpose and need of the proposed project (see Section 1.2, *Purpose and Need, Goals*). The No-Build Alternative would be expected to result in progressively deteriorating conditions for safe, efficient, and economical (time and money) vehicular traffic movement. These conditions would, in turn, impede improvement of the socioeconomic environment of Clinton County, Russell County, and the region. Section 2.1, *No-Build Alternative,* provides additional details regarding the rationale for eliminating this alternative.

Avoidance Alternative 2—Rebuild the Existing Road. This alternative would not use land within the District or have an adverse effect on the District. However, it was eliminated early-on for reasons that include failure to meet the project's purpose and need involving removal of this Rural Principal Arterial from atop Wolf Creek Dam; constraints posed by the crossing of Lake Cumberland at the Wolf Creek Dam (which, like the District, is NRHP eligible); notable design deficiencies and topographical constraints along roadway; numerous residential relocations that would result from the need for additional right-of-way; and the difficulty in maintaining traffic during construction though this area. The rationale for eliminating this alternative is detailed in Section 2.2 *Rebuild Existing Road*.

Avoidance Alternative 3—Western Alignment (24.3 miles). This avoidance alternative, shown on Figure 16, would head west from KY 90/US 127 in Clinton County, extend into Cumberland County to the west of the District, cross the Cumberland River and enter Russell County, head northwest paralleling the river and bypassing the District, and then turn northeastward to intersect US 127. The alignment would extend well beyond the identified project corridor, add some 7.0 miles to the project length, and cost approximately $165 million—an increase over the Build Alternatives ranging from an estimated $30 million to $61 million. This alternative was dismissed as being not prudent due to its (1) excessive cost, and (2) inability to meet the project's need to provide efficient local and regional access through the corridor in the event USACE would close the existing road across the Wolf Creek Dam.

Avoidance Alternative 4—Eastern Alignment (17.8 miles). This alternative, shown on Figure 16, would begin at KY 90/US 127 and more or less follow Alternative C before crossing US 127 and heading eastward on new alignment, then turning north to bridge Lake Cumberland above the dam and cross US 127. It then continues north, bypassing the northeastern boundary of the District. It crosses Little Indian Creek and US 127 again, and terminates at US 127 farther north. The length of the alternative is similar to those of Build Alternatives A through D; however, its estimated construction cost is substantially higher: the cost of the bridge across the lake, an estimated $117 million, plus the estimated $117.0 million cost of the roadway would result in a total estimated cost of $234 million—an increase over the Build Alternatives ranging from an estimated $99 million to $129 million.

USACE's October 2004 letter included the following comments on this alternative:

> *Relocation of Highway 127 to cross Lake Cumberland above Wolf Creek Dam would likely involve placing a significant amount of fill below flood storage pool elevation, 760.0 msl, thus reducing the flood storage capacity of the lake. The Nashville District Guidelines and Policy for the Review Fill Proposals Below Maximum Flood Pool Elevations on Corps of Engineers Lakes and Interests in Lands, dated 11 December 2002 requires that, in order to maintain the authorized flood control capabilities of the lake, equal alternative storage volume must be provided in the same elevation range in which the fill is placed. The flood storage offset is likely to be expensive to provide and substantially increase the proposed relocation's adverse environmental impacts. Some of the material obtained by excavating this flood storage offset could likely be used as embankment material for a new bridge, potentially offsetting construction costs. However, such excavation would substantially increase the proposed relocation environmental impacts thereby requiring additional mitigation under the Fish and Wildlife*

Coordination Act and the National Environmental Policy Act. Also, as navigable waters of the United States, any bridge crossing Lake Cumberland above the dam must have US Coast Guard approval and be constructed so as to allow sufficient clearance for vessels passing beneath. All current boat traffic is recreational, but there have been commercial barge shipments (primarily coal) on this impoundment that could resume, although highly unlikely, in the future (depending upon world market conditions).

This alternative was dismissed as being not prudent due to its (1) excessive cost, and (2) inability to meet the project's need to provide efficient local and regional access through the corridor in the event USACE would close the existing road across the Wolf Creek Dam. In addition, the alternative may not be feasible given USACE's flood control requirements.

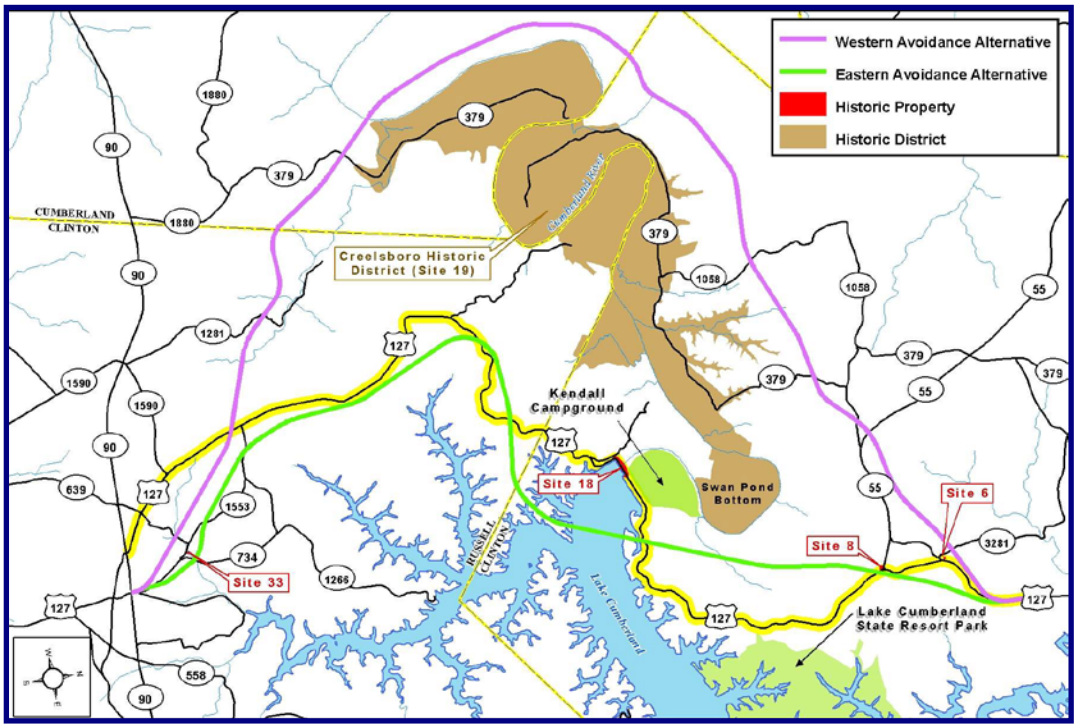

Figure 16: Eastern and Western Avoidance Alignments

3.7.5 Measures to Minimize Harm

Minimization Alternative—Segment 16.1 of Alternative D (16.68 miles). As the avoidance alternatives indicate, the size and extent of the Creelsboro Rural Historic District are such that an alignment that would circumvent the District would not be feasible or prudent to construct. As described in detail in Chapter 2.0, *Alternatives,* **all Build Alternatives would result in some unavoidable impact to the District. Therefore, a key consideration in recommending a preferred alignment has been identifying a route that would minimize impacts.**

Alternative D is the recommended preferred alternative. Section 16.1 of Alternative D (see Exhibit 5a) minimizes impacts to the District primarily because it separates a smaller portion of the District than Sections 17 and 18; traverses Swan Pond Bottom, which is already separated from the District by the Cumberland River; requires the least amount of right-of-way (i.e., has the least direct impact) from the District; and is near fewer contributing elements than the other segments.

Initially, Segment 16 was considered to be the minimization alignment because it had fewer impacts than Segments 17 and 18. The SHPO concurred that Section 16 "will have the least physical and visual impact

to contributing historic resources" **(**see correspondence dated April 22, 2009, in Appendix C). However, Segment 16's impacts to streams, in particular Blackfish Creek and its tributaries to the north of the District, were substantial at 20,261 linear feet. In addition, that alignment impacted a wetland in Swan Pond Bottom.

Therefore, Segment 16.1, which shifts slightly to the east of Segment 16, was developed to retain Segment 16's minimization benefits to the District while reducing the overall stream impact to 14,281 linear feet and avoid the wetland. Segment 16.1's slight shift to the east of Segment 16 does not alter the basis for the SHPO's conclusion regarding "least physical and visual impact" to the District. In fact, Segment 16.1 requires approximately 24.97 acres for right-of-way versus 31.80 acres with Segment 16. Segment 17 would use 29.47 acres, and Segment 18 would use 39.68 acres. Comparing of Segment 16.1's impacts to multiple resources—in particular the Creelsboro Rural Historic District—against those of Segments 16, 17, and 18, it was determined that Segment 16.1 (a feature of Alternative D) is the alternative that would cause the least overall harm.

Section 2.4.2, *Rationale for the Recommendation of Preferred Alternative* (see "North Section") describes in greater detail the minimization features of Segment 16.1.

An MOA is being prepared to address measures to mitigate impacts to the District. The executed MOA will be appended to the FONSI together with the final Section 4(f) Evaluation.

3.7.5 Section 6(f)

Federal Land and Water Conservation Act (LAWCON) funds are often used to purchase or improve lands that are used for parks, conservation, recreation, or similar purposes. Under Section 6(f) of the act, any federal project that would convert any part of a property improved with LAWCON funds to another use must be approved by the Secretary of the Interior. To be approved, the project must demonstrate that equivalent land or facilities have been replaced elsewhere adjacent to the impacted property. This program is administered by the U.S. Department of the Interior, National Park Service.

No properties purchase or improved with LAWCON funds would be affected by any alternatives associated with this project.

SECTION 4(f) EVALUATION—PRELIMINARY CONCLUSION

As discussed above, none of the alternatives that could avoid the Creelsboro Rural Historic District are considered to be prudent and/or feasible. However, among the four Build Alternatives are two alternative segments that minimize impacts to the District—Segment 16 of Alternative C and Segment 16.1 of Alternative D. Of these, Segment 16.1 has slightly less impact to the cultural historic elements in the District and avoids two sensitive resources Segment 16 would impact—a wetland and Blackfish Creek. Overall, Alternative D is recommended as the preferred alternative because it minimizes impacts compared with the other Build Alternatives (see Section 2.4.2, *Rationale for the Recommendation of Preferred Alternative D*).

A **Public Hearing** will be held soon after the approval of the Environmental Assessment to obtain input on the recommendations in this document; and mitigation measures and continued coordination will also be needed before a final conclusion can be reached regarding the selection of an alternative. However, the preliminary designs and analyses completed to date indicate that (1) there is no feasible and prudent alternative that avoids the affected resource; (2) the project includes all possible planning to minimize harm to the Section 4(f) property resulting from the use; and (3) in accordance with Section 774.3(c), **Alternative D "causes the least overall harm."**

COORDINATION

The Kentucky SHPO has been consulted on the determination of eligibility and finding of effects for properties within the project APE. As noted above, consultation with the SHPO is progressing toward the preparation of an MOA that will address impacts to the District. The SHPO consultation correspondence, including the summary of the November 24, 2009, meeting to discuss mitigation, is in Appendix C.

3.8 Land Use

3.8.1 Existing Land Uses

Land uses in Clinton and Russell counties' are predominantly agricultural and rural residential. The county seats (Albany and Jamestown, respectively) are the economic activity centers in each county. The majority of the land along the existing US 127 roadway is either agricultural and single-family rural residential or undeveloped hilly and wooded. Isolated commercial and institutional (church) uses occupy some parcels. Exceptions include a few rural residential clusters and the unincorporated community of Freedom, which is located at the intersection of US 127/KY 55. The Freedom area is somewhat more densely settled, primarily with residential development but including two churches and some businesses (including a motel, utility facilities, and home-based businesses). The following is a discussion of land use types in the proposed project area.

Agricultural. Agriculture, including timber production, is the predominant land use in Clinton and Russell counties. Approximately 89% of Clinton County and 86% of Russell County are in agricultural and timber production uses. According to the 2007 Census of Agriculture (the latest census available), there are 629 farms in Clinton County, comprising 91,097 acres (approximately 72% of the county's area); and 805 farms in Russell County, comprising 93,039 acres (approximately 57% of the county's area). The 2007 census reported that the average farm size in Russell County was 116 acres (11 acres more than was reported in the in 2002 census), and the average farm size in Clinton County was 145 acres (31 acres more than was reported in the 2002 census). Section 3.11, *Farmland Impacts,* contains a discussion of potential effects of the project on farmland.

Residential. The project area consists primarily of a limited number of dispersed single-family rural residential dwellings (primarily frame structures and trailers). There is a vacation-home condominium development—Apple Valley Resort—off US 127 at the state park entrance road; and the unincorporated community of Freedom farther to the north has several residential streets. Many residences are located along US 127, and there are a few clusters of residences along local roads that could be considered loosely-defined neighborhoods (see discussion in Section 3.9.3, *Areas of Community Cohesion*). Some dwellings can be classified as residential farms. Section 3.10, *Relocation and Displacements,* includes a discussion of potential residential relocation impacts as a result of the project.

Commercial and industrial. Most of the commercial and industrial activity in Clinton County is located in or near the county seat of Albany. Most of the commercial and industrial activity in Russell County is located in or near the county seat of Jamestown and the city of Russell Springs, which is just north of Jamestown. In the project corridor there are only a few commercial and no industrial establishments. Section 3.10 includes a discussion of potential commercial displacements as a result of the project.

Institutional. Eight established churches are located in the US 127 project area: Seventy-Six Baptist Church, Cave Spring Church, Lands Chapel, Manntown United Methodist Church, Union Chapel United Methodist Church, Fairview Separate Baptist Church, Freedom Christian Church, and Sewellton Church of God of Prophecy. One public elementary school—Union Chapel Elementary—is located on KY 379 in the project area. No government buildings, non-profit organizations, or public buildings other than those

associated with recreational facilities (see below) are located in the project area. Section 3.10 discusses potential impacts to institutional[11] facilities as a result of the project.

Recreational. Public parks/recreational areas located in the immediate vicinity of the project are Lake Cumberland State Resort Park, USACE's Kendall Campground, and the USFWS's Wolf Creek National Fish Hatchery. Section 3.9.4, *Community Resources,* includes a discussion of potential impacts to recreational areas as a result of the project.

Table 25 summarizes the estimated land uses within the disturb limits of each Build Alternative under consideration. The project would convert these land uses to highway use.

Table 25: Estimated Direct Land Use Impacts (Acres) by Build Alternatives

Land Uses	Total Land Area (Acres)			
	Alternative A **(2-4-8-11-18-19-21-23)**	**Alternative B** **(3-6-10-12-15-17-20-23)**	**Alternative C** (1-5-7-9-13-14-16-22-23)	**Alternative D** (3-6-9-11-16.1-21-23)
Developed	17	17	19	14
Agricultural / Open	149	154	157	130
Forest	291	356	355	430
Wetland	<1	<1	<1	<1
Recreational	0	0	0	0
TOTAL	**457**	**527**	**531**	**574**

3.8.2 Indirect and Other Land Use Impacts

Transportation projects often induce the development of land, which results in indirect impacts. In other words, indirect impacts are associated with land that will likely be developed if the highway project is implemented, but would not likely be developed if the highway is not constructed.

Although there are no long-range planning documents available for Clinton/Russell counties or the cities of Jamestown and Albany, the potential for induced land use changes has been discussed with local officials. From such discussions it has been concluded that the project could induce some minor development in the vicinities of the two cities, which are outside the corridor but could benefit from improved local and regional access—and anticipated goal of the project. However, project-related development along the corridor, itself, is not likely or anticipated in the foreseeable future.

3.8.3 Compatibility With Regional and Community Plans

There are no current or future land use plans, or development controls (such as zoning ordinances or subdivision regulations) for Clinton County or Russell County. Because of its poor economic status (see details in Section 3.8), Clinton County was designated a federal Enterprise Zone, which permits the county to offer financial incentives to expand and diversify employment and economic opportunities. These incentives encouraged a large poultry processing plant—Cables Keystone Foods, Inc.—to locate in Albany, Clinton County. The plant is one of the county's largest employers with 500 employees. The processing plant is located along KY 90 west of the US 127 and KY 90 intersection, and outside the project corridor. Much of the facility's inbound and outbound truck traffic uses US 127. New development is not expected to locate along the proposed roadway solely as a result of implementing the proposed project. Economic incentives associated with the Enterprise Zone designation are anticipated to encourage additional economic development and investment in the county. The improved transportation

[11] In the context of this document, an institution is an established organization dedicated to public service or culture, such as churches, schools, hospitals, government or social service agencies, museums, libraries, etc.

network could assist in encouraging new employment opportunities and attracting business to the area. Regarding land use changes, the governments of Clinton County and Russell County could facilitate development in a manner that would minimize any adverse impacts, maximize benefits, and help achieve the area's goals and objectives for economic development.

The KYTC has included the US 127 reconstruction/realignment project in Kentucky's 2008 Highway Plan (approved 2009). Design work is scheduled for FY 2010; acquisition of right-of-way and utility work for FY 2012; and construction for FY 2014 for the portion of the project from KY 90 to KY 55 (KYTC Item No. 8-115.01 in Clinton and Russell counties). For the northernmost portion of the project—KY 55 to the Jamestown Bypass (Item No. 8-108.00 in Russell County), acquisition of right-of-way and utility work are scheduled for FY 2009 and construction for FY 2011.

3.9 Community Impacts

3.9.1 Socioeconomic and Demographic Characteristics

The following sections summarize the trends and status of the socioeconomic and demographic characteristics for the Commonwealth of Kentucky, Clinton County, Russell County, and the proposed project's Study Area, as recorded in the 1990 and 2000 Census (see Figure 17). The proposed project traverses the Census Tracts 9701, 9602, and 9603. To satisfy Environmental Justice requirements, the three Census Block Groups *(i.e.*, 9701.2, 9602.2, and 9603.4) either adjoining or containing the proposed project right-of-way were examined, and are collectively referred to as the "Study Area." The relevant census block group boundaries do not appear to have changed between the 1990 and 2000 Census. Clinton County is not part of a Metropolitan Area, and its 2000 population ranked it as 102nd out of 120 counties in the Commonwealth. Russell County is not part of a Metropolitan Area, and its 2000 population ranked it as 68th out of 120 counties in the Commonwealth.

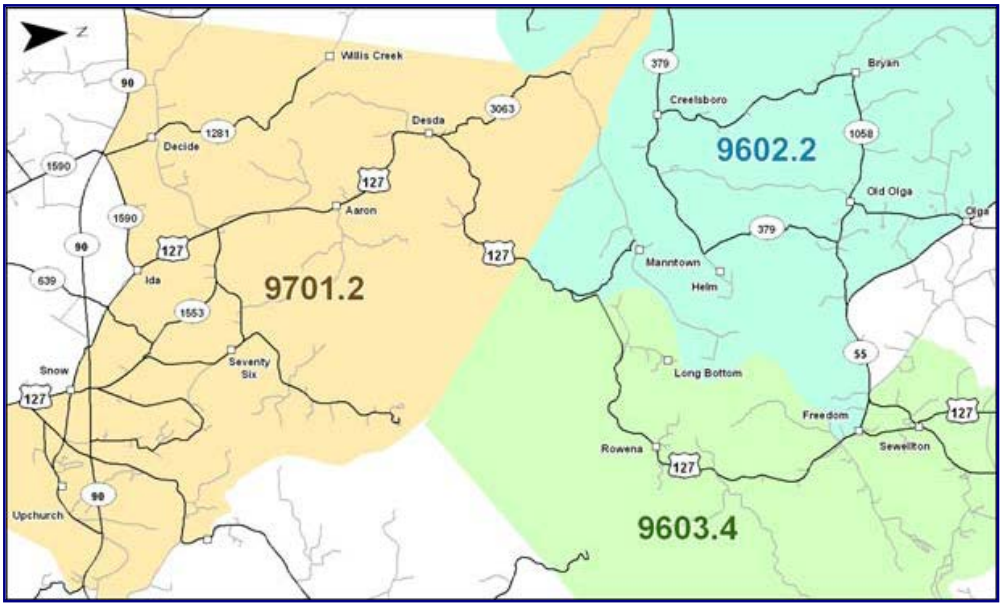

Figure 17: Socioeconomic Study Area—Census Block Groups

Population trends and projections. Table 26 presents the population data as reported by the U.S. Census Bureau for the years 1980, 1990, and 2000 for the Commonwealth of Kentucky, Clinton County, and Russell County. It also shows state and county population projections for the years 2010, 2020, and 2030. Population projections below the county level generally are not available. The population projections were calculated by the Kentucky State Data Center, located at the University of Louisville, and based on assumptions about future births, deaths, and in and out migration.

Between 1980 and 1990, the population of Clinton County decreased (-2.0%), while the state's and Russell County's populations increased (0.7% and 7.4%, respectively). However, the U.S. Census Bureau's population data shows an increase in all three jurisdictions from 1990 to 2000, with Clinton County growing about half the rate of the state and Russell County. Clinton County's population increased 5.5%, from 9,135 in 1990 to 9,634 in 2000; while Russell County's population increased 10.9%, to 16,315 from 1990 to 2000; and Kentucky's population increased 9.6% during the same time period. Although extensive historical population data is not available for the individual census block groups, the 2000 Census indicates the Study Area grew 12.6% (328 people) from 1990 to 2000. Virtually all of this growth occurred in block group 9701.2 (Clinton County), increasing 28.1% (335 people). The two Russell County block groups effectively cancelled one another out, with 9602.2 decreasing 5.3% (41 people) and 9603.4 increasing 5.3% (34 people).

Kentucky State Data Center projections indicate Kentucky will continue to increase in population over the next 30 years, although the rate of increase will generally decline. Clinton County's rate of population increase is anticipated to fluctuate between 0.5% in 2010 and 3.6% in 2020 before settling at 1.8% in 2030. Russell County's rate of population increase is projected to follow a pattern similar to that of Clinton County's. The population of Clinton County is projected to increase about 6.0%, from 9,634 in 2000 to 10,209 in 2030. Russell County's population is projected to increase from 16,315 to 18,590, or 13.9%, between 2000 and 2030. No projected population figures are available below county level.

Table 26: Population Trends and Projections

	Year					
	1980	**1990**	**2000**	**2010**	**2020**	**2030**
Kentucky	3,660,777	3,686,891	4,041,769	4,326,490	4,660,703	4,912,621
Number Change	442,071	26,114	356,473	284,281	334,213	251,918
% Change	13.7	0.7	9.7	7.0	4.6	5.4
Clinton County	9,321	9,135	9,634	9,683	10,028	10,209
Number Change	1,147	-186	499	49	345	181
%t Change	14.0	-2.0	5.5	0.5	3.6	1.8
Russell County	13,708	14,716	16,315	17,043	17,915	18,590
Number Change	3,166	1,008	1,599	728	872	675
% Change	30.0	7.4	10.9	4.5	5.1	3.8
Study Area	not	2,608	2,936	not	not	not
Number Change	available	--	328	available	available	available
% Change		--	12.6			

Sources: U.S. Bureau of the Census, 1970, 1980, 1990, and 2000. University of Louisville, Urban Studies Institute, Kentucky State Data Center (http://ksdc.louisville.edu/kpr/pro/projections.htm). Years 2010, 2020, and 2030 projections were released November 2004 by the Kentucky State Date Center.

Age distribution. Tables 27a and 27b present a summary of comparative population characteristics from the 1990 and 2000 Census for Kentucky, Clinton and Russell counties, and the Census block groups containing the project. The population data indicates that Clinton County, Russell County, and the Study Area had a lower percentage of people ages 0–17 than the state (22.7%, 22.5%, and 20.7%, versus 24.6%, respectively); and they had a higher percentage of people over age 65 than the state. The percentage of elderly population increased slightly in Russell County, and more notably in the Study Area. The percentage of school age children decreased in all jurisdictions, with the Study Area experiencing the greatest decrease at 5.2%. The percentage of working age adults increased in all four jurisdictions, with the Study Area experiencing the largest increase of about 3.2 percentage points. Overall, the population in the state, counties, and Study Area appears to be aging, with the Study Area aging markedly faster than the other jurisdictions.

Table 27a: Comparative Population Characteristics, 1990 and 2000 Census

	Kentucky		Clinton County		Russell County		Study Area[1]	
	1990	2000	1990	2000	1990	2000	1990	2000
Population	3,686,891	4,041,769	9,135	9,634	14,716	16,315	2,608	2,936
Age (%)								
0-17	26.0	24.6	24.8	22.7	23.6	22.5	25.9	20.7
18-64	61.4	62.9	59.9	62.3	60.3	61.0	60.1	63.3
65+	12.6	12.5	15.3	15.0	16.1	16.5	14.0	16.0
Race[2] (%)								
White	92.1	–	99.8	–	99.2	–	99.4	–
Non-White	7.9	–	0.2	–	0.8	–	0.6	–

Sources: U.S. Bureau of the Census, 1990 and 2000. University of Louisville, Urban Studies Institute, Kentucky State Data Center.

[1] Total population characteristics for the Census Block Groups adjoining or containing the proposed project. See Table 27b for individual Block Group characteristics.

[2] The 2000 Census, for the first time, allowed individuals to report one or more race categories. This information is not comparable *to 1990 and earlier census years. Census 2000 race information is presented in Table 28.*

Table 27b: Comparative Population Characteristics, 1990 and 2000 Census—Study Area Census Block Groups

	BG 9701.2		BG 9602.2		BG 9603.4		Study Area Total	
	1990	2000	1990	2000	1990	2000	1990	2000
Population	1,192	1,527	773	732	643	677	2,608	2,936
Age (%)								
0-17	27.1	21.7	24.6	18.4	25.2	20.8	25.9	20.7
18-64	60.8	64.0	59.0	61.5	60.0	63.8	60.1	63.3
65+	12.1	14.3	16.4	20.1	14.8	15.4	14.0	16.0
Race[1] (%)								
White	99.9	–	98.1	–	100.0	–	99.4	–
Non-White	0.1	–	1.9	–	0.0	–	0.6	–

Sources: U.S. Bureau of the Census, 1990 and 2000. University of Louisville, Urban Studies Institute, Kentucky State Data Center.

[1] The 2000 Census, for the first time, allowed individuals to report one or more race categories. This information is not comparable to 1990 and earlier census years. Census 2000 race information is presented in Table 28.

The Kentucky State Data Center projections for the state indicate the percentage of those from 18 to 65 and those over 65 years of age will generally continue to increase, while the percentage of those under 18 will decease through the year 2030. Even though elderly persons are present, there are no known pockets of elderly along the proposed project corridor.

Racial characteristics. Historically, the racial composition of the counties and block groups has always been nearly all white. The method of collecting racial information changed with the 2000 Census. The 2000 Census, for the first time, allowed individuals to report one or more race categories. Therefore, 2000 race information is not comparable to 1990 and earlier census years. 1990 Census race information appears in Tables 27a and 27b, while 2000 Census race information is presented in Table 28. The racial compositions of these population areas are nearly equal, appear to have remained fairly steady, and consist of a much lower percentage of non-white persons than the state average. There are no minority neighborhoods located in the path of the proposed alignment.

Table 28: Race Data, 2000 Census—Kentucky, Clinton County, Russell County, and Study Area

Geographic Area	Total Population	One Race							Population of Two or More Races	Hispanic or Latino Origin
		Population of One Race	White Alone	Black or African American Alone	American Indian & Alaska Native Alone	Asian Alone	Native Hawaiian & Other Pacific Islander Alone	Some Other Race Alone		
Kentucky										
Total	4,041,769	3,999,326	3,640,889	295,994	8,616	29,744	1,460	22,623	42,443	59,939
%	100	98.9	91.0	7.4	0.2	0.7	0.04	0.6	1.1	1.5
Clinton County										
Total	9,634	9,603	9,546	10	24	4	11	8	31	118
%	100	99.7	99.1	0.1	0.2	0.04	0.1	0.1	0.3	1.2
Russell County										
Total	16,315	16,218	16,044	95	19	23	3	34	97	140
%	100	99.4	98.3	0.6	0.1	0.1	0.02	0.2	0.6	0.9
Study Area (Census Block Groups adjoining or containing the proposed project)										
9701.2	1,527	1,524	1,515	0	5	0	0	4	3	9
9602.2	732	727	719	8	0	0	0	0	5	2
9603.4	677	676	676	0	0	0	0	0	1	16
Total	2,936	2,927	2,910	8	5	0	0	4	9	27
%	100	99.9	99.1	0.3	0.2	0.0	0.0	0.1	0.3	0.9

Source: U.S. Bureau of the Census, 2000.

Labor force characteristics and unemployment status. Profiles of selected economic characteristics provided by the 2000 Census are based upon data samples. Employment status characteristics for the residents of Kentucky, Clinton County, Russell County, and the Study Area, age 16 years and older, are presented in Table 29. Overall, this area is characterized by similar unemployment rates.

Table 29: Employment Status—Kentucky, Clinton County, Russell County, and Study Area

Subject	Kentucky		Clinton County		Russell County		Study Area	
	Number	%	Number	%	Number	%	Number	%
Population 16 years and over	3,161,542	100.0	7,683	100.0	13,135	100.0	2,453	100.0
In Labor Force	1,926,731	60.9	4,278	55.7	7,030	53.5	1,204	49.1
Civilian Labor Force	1,907,614	60.3	4,263	55.5	7,030	53.5	1,204	49.1
Employed	1,798,264	56.9	4,002	52.1	6,572	50.0	1,153	47.0
Unemployed	109,350	3.5	261	3.4	458	3.5	51	2.1
Percent of civilian labor force	5.7	n/a	6.1	n/a	6.5	n/a	4.2	n/a
Armed Forces	19,117	0.6	15	0.2	0	0	0	0.0
Not in Labor Force	1,234,811	39.1	3,405	44.3	6,105	46.5	1,249	50.9
Females 16 years and over	1,638,529	100.0	4,035	100.0	6,880	100.0	1,202	100.0
In Labor Force	891,713	54.4	2,041	50.6	3,196	46.5	543	45.2
Civilian Labor Force	890,071	54.3	2,041	50.6	3,196	46.5	543	45.2
Employed	838,668	51.2	1,875	46.5	2,952	42.9	508	42.3
Own Children under 6 years	305,950	100.0	669	100.0	1,006	100.0	128	100.0
All parents in family in labor force	179,167	58.6	354	52.9	656	65.2	89	69.5
Unemployment Rate[1] Dec. 2009 (Not seasonally adjusted)	--	10.4	--	10.0	--	14.5	n/a	n/a

Sources: U.S. Bureau of the Census, 2000. Kentucky Department for Workforce Investment (http://www.workforcekentucky.ky.gov).

[1]*The most recent rate available from the Kentucky Department for Workforce Investment.*

In general, the 2000 Census unemployed population for Clinton and Russell counties and the Study Area (3.4%, 3.5%, and 2.1%) were comparable to the state's rate (3.5%). More recent data available from the Kentucky Department for Workforce Investment indicates the December 2009 unemployment rate[12] for Clinton County (10.0%) is slightly lower than but within range of the state's rate (10.4%), while the rate for Russell County (14.5%) well above that of the state and Clinton County. Table 29 also indicates the percentage of people "not in the labor force" is greater for the two counties and Study Area (44.3%, 46.5%, and 50.9%, respectively) than the state (39.1%); and that the percentage of working age females in the labor force is less than the state average. This is partly attributable to higher percentage of elderly in the two counties and the Study Area. Historical data from the Kentucky Department for Workforce Investment shows that from 2000 to 2007, the annual average unemployment rates in Clinton County (6.8%) and Russell County (6.7%) have been higher than for the state (4.9%) and national (5.0%) averages. Unemployment rates below the county level are not available.

Employment by industry. A listing of employment by industry is presented in Table 30. In comparing the percentage of employment in each industry in 2000 among the four jurisdictions, the three largest employment industries are the same: "manufacturing," "retail trade," and "educational, health and social services."

Table 30: Employment by Industry, 2000 Census—Kentucky, Clinton County, Russell County, and Study Area

Industry	Kentucky		Clinton County		Russell County		Study Area	
	Number	%	Number	%	Number	%	Number	%
Agriculture, forestry, fishing & hunting, mining	59,729	3.3	250	6.2	270	4.1	71	6.2
Construction	129,618	7.2	295	7.4	633	9.6	67	5.8
Manufacturing	315,774	17.6	1,059	26.5	1,523	23.2	233	20.2
Wholesale trade	60,854	3.4	61	1.5	169	2.6	14	1.2
Retail trade	217,164	12.1	424	10.6	857	13.0	176	15.3
Transportation & warehousing, & utilities	108,738	6.0	206	5.1	279	4.2	53	4.6
Information	39,303	2.2	39	1.0	85	1.3	13	1.1
Finance, insurance, real estate, and rental and leasing	97,350	5.4	111	2.8	194	3.0	27	2.3
Professional, scientific, management, administrative, and waste management services	111,878	6.2	159	4.0	264	4.0	72	6.2
Educational, health and social services	365,605	20.3	799	20.0	1,265	19.2	238	20.6
Arts, entertainment, recreation, accommodation and food services	129,973	7.2	324	8.1	422	6.4	96	8.3
Other services (except public administration)	85,150	4.7	128	3.2	317	4.8	48	4.2
Public administration	77,128	4.3	147	3.7	294	4.5	45	3.9
TOTAL	**1,798,264**	**100**	**4,002**	**100**	**6,572**	**100**	**1,153**	**100**

Source: U.S. Bureau of the Census, 2000.

The "manufacturing industry" is more heavily represented in Clinton (26.5%), Russell (23.2%), and the Study Area (20.2%) than in the state (17.6%). While the category "Agriculture, forestry, fishing and hunting, mining" accounts for approximately 3.3% of employment state wide, it accounts for 6.2% to 4.1% of employment in Clinton, Russell, and the Study Area, reflecting the agricultural emphasis. Russell County has a higher percentage of workers in the "Construction" category than Clinton County or the

[12] Unemployment statistics are based on estimates, and compiled to measure trends rather than count people working. Civilian labor force statistics include non-military workers and unemployed Kentuckians who are actively seeking work. They do not include unemployed Kentuckians who have not looked for employment within the past four weeks. Kentucky's statewide unemployment rate is seasonally adjusted; however, county unemployment rates are not seasonally adjusted.

state (9.6% versus 7.4% and 7.2%, respectively). The "Arts, entertainment, recreation, accommodation, and food services" industry employs 8.1% in Clinton County and 8.3% in the Study Area, which is more than either the state (7.1%) or Russell County (6.4%) and which indicates the emphasis on tourism associated with the lake, state park, and other recreational facilities.

Average income and percent of residents living below the poverty level. A summary of the 1999 per capita and household income data (the most recent data available) published by the U.S. Census Bureau is presented in Tables 31a and 31b, for Kentucky, Clinton County, Russell County, and the Study Area.

Table 31a: 1999 Comparative Median Household Income, Per Capita Income, and Percent Living Below Poverty Level—Kentucky, Clinton County, Russell County, and Study Area

	Kentucky	Clinton County	Russell County	Study Area
Median Household Income				
Total	$33,672	$19,563	$22,042	$15,759 - 25,299
Per Capita Income				
Total	$18,093	$13,286	$13,183	$11,433 - 12,398
Percent Living Below Poverty Level				
Total %	15.8	25.8	24.3	22.5
% of All Youths (Ages 0-17) Below Poverty Level	20.4	31.8	30.8	26.0
% of All Elderly (Ages 65+) Below Poverty Level	14.2	29.9	27.3	23.6

Source: U.S. Bureau of the Census, 2000, Summary File 3 (SF 3), which is based upon data from a sample population.

Table 31b: 1999 Comparative Median Household Income, Per Capita Income, and Percent Living Below Poverty Level—Study Area Census Block Groups

	BG 9701.2	BG 9602.2	BG 9603.4
Median Household Income			
Total	$25,299	$15,759	$21,083
Per Capita Income			
Total	$12,398	$12,048	$11,433
Percent Living Below Poverty Level			
Total %	19.3	24.9	27.2
% of All Youths (Ages 0-17) Below Poverty Level	30.0	11.1	28.2
% of All Elderly (Ages 65+) Below Poverty Level	17.8	37.9	12.5

Source: U.S. Bureau of the Census, 2000, Summary File 3 (SF 3), which is based upon data from a sample population.

Overall, the population of Clinton County, Russell County, and the Study Area is less wealthy than the rest of the state. The median household income of the state is $33,672, which is more than Clinton County, Russell County, and the Study Area ($19,563, $22,042, and $15,759 to $25,299, respectively). Block Group 9701.2 has the highest median household income in the project area ($25,299), and Block Group 9602.2 has the lowest ($15,759).

Regarding the population percentages living below the poverty level, Clinton County, Russell County, and the Study Area had higher percentages of their total population living below the poverty level than the state (25.8%, 24.3%, and 22.5%, respectively, versus the 15.8% state rate). Both counties and the Study Area have higher percentages of their youths and elderly in poverty than the state. The two counties each have approximately 50% more youths below the poverty level (31.8% and 30.8%, respectively) than the state (20.4%). And the two counties have about twice as many elderly below the poverty level (29.9% and 27.3%, respectively), than does the state (14.2%). Taken as a whole, the Study Area tends to follow the

patterns of the two counties, but at slightly reduced rates. However, there is wide variation within the individual block groups composing the Study Area.

Study Area youth poverty rates range from 11.1% to 30.0%; and elderly rates from 12.5% to 37.9%. These differences are believed attributable to the faster population-aging pattern exhibited in the Study Area block groups, where over 5.0% of the youth age population was lost from 1990 to 2000, and there were corresponding increases in the working age and elderly populations (see Tables 27a and 27b). The most dramatic example of this occurs in block group 9602.2, which experienced the greatest population-aging shift as well as a decrease in population. The 1999 youth population below the poverty level (11.1%) is almost one third that of Russell County (30.8%), and nearly half the state rate (20.4%). In contrast, the elderly population below the poverty level (37.9%) is over two and one-half times the state rate (14.2%), and over one third more than Russell County (27.3%).

Taken as a whole, it is probable the project could affect low-income people because the two counties and project corridor have high percentages of low-income individuals. Because low-income individuals characterize the area, the project would not have a disproportionately high impact on this population.

In addition to the data published by the U.S. Census Bureau, descriptions of county economics can be obtained from the U.S. Bureau of Economic Analysis' (BEA) Regional Economic Information System. Below are selected statements from the most recent BEAR analysis of the economics concerning Clinton and Russell counties from the 1995-2005 BEAR facts report, based on county estimates published April 24, 2008.

> *In 2006 Clinton had a per capita personal income (PCPI) of $22,824. This PCPI ranked 73rd in the state and was 77 percent of the state average, $29,729, and 62 percent of the national average, $36,714. In 1996 the PCPI of Clinton was $12,763 and ranked 105th in the state.*
>
> *In 2006 Russell had a per capita personal income (PCPI) of $21,979. This PCPI ranked 79th in the state and was 74 percent of the state average, $29,729, and 60 percent of the national average, $36,714. In 1996 the PCPI of Russell was $14,908 and ranked 81st in the state.*

Residents' work commuting patterns. Table 32 presents the means of commuting to work reported in the 2000 Census, for workers aged 16 years and older. Overall, Kentucky, Clinton County, Russell County, and the Study Area have similar commuting patterns, with 92.8% to 96.1% driving to work. The table clearly indicates that motor vehicles are the dominant mode of transportation for anyone residing in Clinton or Russell counties. In addition, between 80.5% and 84.7% drive to work alone. Russell County and the Study Area show a larger percentage of those working at home (4.1% and 3.0%, respectively), than either Clinton County or the Kentucky, which may reflect a greater emphasis on agricultural employment. The mean travel time to work for the state is 23.5 minutes; for Clinton and Russell counties 21.0 and 22.5 minutes, respectively; and for the Study Area 19.8 minutes.

The Kentucky State Data Center compiled additional information concerning county-to-county 2000 Census commuting patterns. This data indicates that for workers who live in Clinton County, approximately 25.7% work elsewhere. And, when all workers who work in the county are considered, about 29.3% are commuting into Clinton County from outside the county, mostly from the surrounding counties in Kentucky and Tennessee. For workers who live in Russell County, approximately 24.8% work elsewhere, and, when all county workers are considered, about 20.7% commute into Russell County from outside the county, usually from the surrounding Kentucky counties.

Table 32: Commuting to Work, 2000 Census—Kentucky, Clinton County, Russell County, and Study Area

Subject	Kentucky		Clinton County		Russell County		Study Area	
	Number	%	Number	%	Number	%	Number	%
Workers 16 years and over	1,781,733	100.0	3,935	100.0	6,463	100.0	1,319	100.0
Car, truck, or van	1,653,696	92.8	3,782	96.1	6,060	93.8	1,252	94.9
Drove alone	1,429,053	80.2	3,169	80.5	5,352	82.8	1,117	84.7
Carpooled	224,643	12.6	613	15.6	708	11.0	135	10.2
Public transportation	21,522	1.2	17	0.4	0	0.0	0	0.0
Motorcycle	894	0.1	7	0.2	2	0.0	0	0.0
Bicycle	2,609	0.1	0	0.0	0	0.0	0	0.0
Walked	42,494	2.4	15	0.4	95	1.5	16	1.2
Other means	12,347	0.7	33	0.8	41	0.6	12	0.9
Worked at home	48,144	2.7	88	2.2	267	4.1	39	3.0
Mean travel time to work (minutes)	23.5		21.0		22.5		19.8	

Source: U.S. Bureau of the Census, 2000.

3.9.2 Communities Served by the Project

The communities that will be served by the project include the cities of Albany and Jamestown near the project termini, and several smaller, unincorporated communities along and near US 127 in the project corridor. These smaller communities include: Seventy Six, Aaron, Desda, Manntown, Creelsboro, Freedom, and Sewellton.

The proposed project would also serve many other residents of rural Clinton and Russell counties by improving the transportation network in the region, providing access to regional centers of employment, health care, shopping, recreation, and other services.

3.9.3 Areas of Community Cohesion

The proposed project corridor is situated primarily within unincorporated areas of Clinton and Russell counties. There are a few clusters of rural residences along existing area roads in the project area that could be considered to have loosely-defined community cohesion. Three such clusters would be affected by the project. They are listed below by their identification numbers shown on Exhibit 1:

- Alternative A would acquire three of seven residences along KY 734 between KY 90 and KY 639—Residential Cluster CL-1
- Alternative C would acquire three of six residences along KY 734 east of its intersection with US 127—Residential Cluster CL-2
- Alternative A would acquire two of the eight residences in the vicinity of the KY 1058/KY 55 intersection— Residential Cluster CL-3

Alternatives B and D would not acquire any residences from residential clusters.

Though residences in rural residential clusters may generally be few in number, a sense of interdependence and community cohesion can develop due to their proximity to each other and distance from their next-closest neighbors. In these instances, the displacement of any residences could produce a negative impact to the remaining residents.

In addition to the rural clusters, the unincorporated community of Freedom, surrounding and north of the US 127/KY 55 intersection, contains residences, a few small businesses, and two churches. Two businesses and several residences could be displaced by one or more Build Alternatives. A sense of community cohesion could exist that could be affected by these displacements.

The Apple Valley Resort, which is primarily a vacation-home development, is along US 127 but not in the vicinity of the project alternative alignments.

3.9.4 Community Resources

The following sections address key public services located in, near, or potentially affected by, the proposed project. The proposed project would not split community service boundaries.

Health care and emergency services. The area's health care and emergency medical facilities are located in Albany and Russell Springs, outside the project corridor. The proposed road would provide a more direct and a safer route to the medical facilities. Implementing the proposed project would increase the efficiency and safety of community services (i.e., fire, emergency medical, ambulance, law enforcement, rescue squad, and public school busses) in accomplishing their respective missions. The proposed highway would provide a north-south roadway built to current design standards, thereby improving motoring safety, local/regional access, and response times for emergency responders.

Educational facilities. One public elementary school is within the project area. Union Chapel Elementary School is located on KY 397, west of Alternative B. It will not be impacted by the project. As noted regarding emergency services, the proposed road would provide a more direct route to/from this school and those that are outside the project area but are accessed via sections of US 127 within the project area. Changes in access for school bus routes will be discussed with the school system well in advance of when they actually take place so the school system can adjust routes in a timely manner.

Churches and other institutions. A building that serves as a meeting hall associated with the Sewellton Church of God of Prophecy could be displaced by all Build Alternatives. No government buildings, non-profit organizations, or libraries are in the project area. Other public buildings in the area are associated with recreational facilities described in the following section.

Parks and recreational facilities. Lake Cumberland State Resort Park, Kendall Campground, and Wolf Creek National Fish Hatchery are in or near the project Study Area. They are described in Section 3.7.2, *Other Section 4(f) Properties.*

No recreational or park lands will be acquired to implement any Build Alternative. However, constructing a roadway on new alignment will attract traffic from existing US 127, the primary access route to these attractions. The potential exists that reduced traffic on US 127 would reduce the number of visitors to these facilities. USFWS has expressed its concerns regarding potential loss of visitation due to a change in access to its facility. Correspondence from USFWS, dated December 20, 2007 (see Appendix B), called the current access "very visitor friendly" and noted concern that tourism/visitation to facilities in the Wolf Creek Dam area could be adversely affected.

Access to the USFWS fish hatchery and adjacent USACE campground at the dam, as well as access to the state park, will still be available via US 127. Access from the new road to the dam area would be via KY 1730 to US 127 (Alternatives B and C) or via Manntown Road to KY 1730 to US 127 (Alternative A)—the distance ranging from approximately one to two and one half miles. A reduction in traffic along US 127 could result in the loss of some drive-by visitors (i.e., motorists along US 127 who make a decision to visit the attractions based on signage and proximity). However, visitors who have the hatchery or campground areas as destinations would have a choice of using the existing US 127 or taking the new roadway most of the way and exiting onto the local roads for the remainder of the trip. Appropriate

signage along the new roadway could direct motorists to these recreational destinations and offset the loss of some of the drive-by visitation.

Shopping and business districts. In the project corridor, the business establishments are generally located along the existing US 127. Since these establishments are widely distributed along the highway, there is no area that could be recognized as a business or shopping district.

3.10 Relocations and Displacements

Information regarding potential relocations/displacements was gathered by field visits and by reviewing planning documents and detailed mapping of the alignment options. For purposes of this report, it is assumed all residences are owner occupied, and that the number of employees of potentially impacted business ranges from one to three. Table 33 summarizes the potential residential and business impacts and estimated costs by Build Alternative and segment.

Residential relocations. The Build Alternatives would potentially require 13 to 21 single-family residential relocations, depending on the Build Alternative considered. No apartment complexes or other multi-family dwellings are located within or adjacent to the right-of-way of the proposed Build Alternatives. No minorities, handicapped individuals, or residences with five or more family members were observed living in the project corridor. Ancillary building displacements (*i.e.*, sheds, farm structures, garages, etc.) are likely with any Build Alternative. A comparative tally of these structures is not available.

Commercial/industrial displacements. Up to four business displacements could occur, depending upon the proposed Build Alternative selected. In addition, the new road would attract traffic from existing US 127, potentially resulting in loss of revenues for some businesses along US 127.

Institutional or non-profit organizations displacements. No displacement of governmental, church, non-profit, or other institutional establishments is anticipated with the selection of a proposed Build Alternative. However, a building that serves as a meeting hall on Sewell Church of God of Prophecy property at the intersection of US 127 and Wooldridge Road could be within the right-of-way of all Build Alternatives. Should the meeting hall be essential to the functioning of the church and not be able to be relocated on the property, the result could be an institutional displacement.

3.10.1 Relocation Assistance Program

To minimize the unavoidable effects of right-of-way acquisition and displacement of people, KYTC offers a Relocation Assistance Program in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970* (Public Law 91-646), as amended in 1987. Housing and relocation resources would be available to all residential and business relocatees without regard to race, creed, color, national origin, or economic status, as required by Title VI of the *Civil Rights Act of 1964*. In accordance with *Environmental Justice Executive Order 12898*, an analysis was conducted to identify any geographic areas containing disproportionately high concentrations of minority, low-income, or elderly households. It was concluded that none of the proposed Build Alternatives would have a disproportionately high and adverse effect on minority or low-income populations (see Section 3.12, *Environmental Justice*).

Table 33: Summary of Potential Residential Relocations and Business Displacements

Build Alternatives	Segment	Residential Relocation			Business Displacement	
		Potential No. Residential Relocations	Potential No. Individuals Relocated	Estimated Relocation Cost**	Potential No. Business Displacements	Estimated Displacement Cost**
ALTERNATIVE A	**2**	3	9	$ 75,000	0	$0
	4	2	6	$ 50,000	0	$0
	8	1	0	$ 25,000	0	$0
	11	0	0	$ 0	0	$0
	18	0	0	$ 0	0	$0
	19	7	21	$ 175,000	1	$20,000
	21	3	8	$ 75,000	1	$ 5,000
	23*	3	9	$ 75,000	0	$0
	TOTAL	**19**	**53**	**$ 475,000**	**2**	**$25,000**
ALTERNATIVE B	**3**	0	0	$ 0	0	$ 0
	6	2	6	$ 50,000	0	$ 0
	10	0	0	$ 0	0	$ 0
	12	1	3	$ 25,000	0	$ 0
	15	1	3	$ 25,000	0	$ 0
	17	0	0	$ 0	0	$ 0
	20	6	18	$ 150.000	0	$ 0
	23*	3	9	$ 75,000	0	$ 0
	TOTAL	**13**	**39**	**$ 325,000**	**0**	**$ 0**
ALTERNATIVE C	**1**	2	6	$ 50,000	2	$40,000
	5	3	9	$ 75,000	0	$ 0
	7	0	0	$ 0	0	$ 0
	9	0	0	$ 0	0	$ 0
	13	2	6	$ 50,000	0	$ 0
	14	1	3	$ 25,000	0	$ 0
	16	6	18	$ 150.000	2	$25,000
	22	4	12	$ 100.000	0	$ 0
	23*	3	9	$ 75,000	0	$ 0
	TOTAL	**21**	**63**	**$ 525 ,000**	**4**	**$65,000**
ALTERNATIVE D	**3**	0	0	$ 0	0	$ 0
	6	2	6	$ 50,000	0	$ 0
	9	0	0	$ 0	0	$ 0
	11	0	0	$ 0	0	$ 0
	16.1	6	18	$ 150.000	2	$25,000
	21	3	8	$ 75,000	1	$ 5,000
	23*	3	9	$ 75,000	0	$ 0
	TOTAL	**14**	**41**	**$ 350 ,000**	**3**	**$30,000**

***** *All Alternatives share the Segment 23 alignment.*

****** *Estimates = relocation assistance cost plus moving cost, only. Property acquisition costs are not included.*

KYTC provides advance notification of impending right-of-way acquisition. Before acquiring right-of-way, all properties would be appraised on the basis of their fair market value. Owners of property to be acquired would be offered and paid fair market value for their property rights. No person lawfully occupying real property would be required to relocate without written notice of the intended vacation date;

and no residential property occupant would be required to relocate until decent, safe, and sanitary replacement housing would be made available. "Made available" means the relocatee has either obtained (and has the right of possession of) replacement housing on his/her own; or the KYTC has offered the relocatee decent, safe, and sanitary housing within his/her financial means and available for immediate occupancy. KYTC has several options available to locate replacement housing, including:

- Repositioning dwellings on their existing property so they are outside the right-of-way limits.
- New house construction by the existing landowners.
- Relocating individuals into housing for sale on the real estate market, locally, regionally, or elsewhere.
- Advertisements in local media requesting to purchase housing meeting specific requirements.

In some situations, the demand for new housing generated by right-of-way acquisition could encourage new local ventures in real estate development to meet the housing requirements. If, however, decent, safe, and sanitary replacement housing cannot be found by these or other means, or if there is no housing within the displacee's financial means, then Housing of Last Resort may be considered. [13]

A review of the local housing market reveals a limited supply of comparable housing available at any one time. For example, on REALTOR.com, as of January 2009, there were 503 single-family residences (including 50 manufactured homes) listed on the market within 20 miles of Jamestown (in all directions, including Albany south into Tennessee).[14] Of these, 36 had listed values ranging from $0 to $49,900, 129 ranged from $50,000 to $99,999, 210 ranged from $100,000 to $199,999, and the rest ranged from $200,000 to over $1,000,000. In comparison, the estimated values of the residences that might be relocated range from $45,000 to $85,000. Therefore, it is anticipated that there would be more relocations than available, affordable residences at any given time; consequently, it is unlikely all the residences could be relocated at the same time. However, over the course of a year or more for relocations, it is possible that sufficient comparable housing would become available when the right-of-way is acquired for this proposed project. Accordingly, it is likely the relocations for this project would be accomplished using normal relocation procedures, and the need for Last Resort Housing should not be anticipated. This program would be used if comparable replacement housing would not be available, or unavailable within the displacee's financial means, and the replacement payment exceeds the state legal limitation.

Under the Relocation Assistance Program, when right-of-way is acquired, at least one relocation specialist is assigned to the roadway project to execute the relocation assistance and payments program. The relocation specialist contacts each person/family to be relocated to ascertain individual needs and desires. The specialist also provides information, answers questions, and provides assistance in finding replacement property. Relocation services and payments would be provided without regard to race, color, religion, sex, national origin, or economic status. All tenants and owner-occupant displacees would receive an explanation regarding all options available to them, such as: varying methods of claiming moving expenses reimbursement; replacement housing rental, either private or publicly subsidized; replacement housing purchase; or moving owner-occupied housing to another location. Financial assistance would be available to the eligible relocatee for the following:

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13 "Last resort housing" is a program used when comparable replacement housing is not available or when it is unavailable within the displacee's financial means, and the replacement payment exceeds the state legal limitation. The purpose of the program is to allow broad latitudes in methods of implementation by the state so that decent, safe, and sanitary replacement housing can be provided. This program is used, as the name implies, only as a "last resort," when there is no adequate opportunity for relocation within the area.

14 Residential listings for these cities incorporate almost all of the properties in both counties listed on REALTOR.com. Every effort is made to relocate residents in the vicinity of the residence from which they are moving. Therefore, available housing in the adjacent counties of Cumberland, Adair, Casey, Pulaski, and Wayne, as well as in neighboring Tennessee, was not researched for this report.

- Reimburse the relocatee for the actual reasonable costs of moving from homes, businesses, and farm operations acquired for a highway project;
- Make up the difference, if any, between the amount paid for the acquired dwelling and the cost of a comparable decent, safe, and sanitary dwelling available on the private market;
- Provide expenses reimbursement, such as legal fees and other eligible closing costs incurred in buying a replacement dwelling;
- Make payment for eligible increased interest costs resulting from having to acquire a higher interest rate mortgage.

A displaced tenant may be eligible to receive a payment to rent a replacement dwelling or room, or use as a down payment, including closing costs, on the purchase of a replacement dwelling.

A brochure entitled "Your Benefits as a Highway Displacee under the Relocation Assistance Program" describes in detail the state assistance available, and would be made available to interested person(s).

3.10.2 Relocation Schedule

KYTC has included the US 127 improvement projects in the state's 2008 Highway Plan (adopted in 2009). Design work is scheduled for FY 2010; acquisition of right-of-way and utility work for FY 2012; and construction for FY 2014 for the portion of the project from KY 90 to KY 55 (KYTC Item No. 8-115.01 in Clinton and Russell counties). For the northernmost portion of the project—KY 55 to the Jamestown Bypass (Item No. 8-108.00 in Russell County), right-of-way acquisition and utility work are scheduled for FY 2009 and construction for FY 2011. Currently, there are no other known projects, public or private, or economic development initiatives that might compete for available housing during or surrounding fiscal year 2012.

3.11 Farmland Impacts

Formal consultation with the U.S. Department of Agriculture's Clinton County and Russell County offices of the Natural Resources Conservation Service (NRCS) for compliance with the *Farmland Protection Policy Act of 1981* was completed. In accordance with state and federal regulations concerning farmland protection, the Farmland Conversion Impact Rating Form AD-1006 was used to evaluate this project's effect on farmland (see Appendix B). A scoring system is used to identify the relative value of farmland to be converted (0 – 100 points) and to assess the project corridor (based on 10 criteria ranging from 0–5 to 0-25 points). The relative value and corridor assessment points are combined to provide a total score per alternative. In 7 CFR 658.4(c)(1), the USDA recommends that "sites with the highest combined scores be regarded as most suitable for protection…and sites with the lowest scores, as least suitable." In addition, USDA recommends in 7 CFR 658.4(c)(3) that "sites receiving scores totaling 160 or more be given increasingly higher levels of consideration for protection." The evaluation results (Part VII, Form AD-1006) are almost the same for the four alternatives: 128 for Alternative C and 129 for Alternatives A, B, and D (see Table 34). Since this project received total scores of less than 160 points, the proposed project's impact on farmland would not be adverse and the protection of this farmland should not override the need for the project. No alternatives other than those discussed in this document will be considered without a re-evaluation of the project's potential impacts upon farmland.

The farmland in the project corridor is used for livestock grazing (dairy cows and beef cattle) and crop cultivation (hay, tobacco). No agricultural districts are located in or near the project area. As Table 34 shows, depending on which alternative is selected about 25 to 48 acres of prime and unique farmland and 76 to 89 acres of statewide or local important farmland would be converted to from agricultural to transportation use as a result of the project.

Farm impacts are ill-defined because complete and accurate property line information is not yet available. The rural nature of the project area makes some farmland impacts unavoidable with any Build Alternative on new alignment. Even reconstructing the existing road would require additional right-of-way that could result in farmland impacts. However, as noted above, coordination with NRCS indicated impacts from the conversion of agricultural land to highway right-of-way would be minimal. Some farm residence relocations and farm building acquisitions would be required. Any Build Alternative is likely to split some farms, which may affect farm operations. In the event this occurs, a relocation assistance specialist would be assigned to deal specifically with those farms affected to help resolve problems resulting from splitting farms. Loss of farmland for right-of-way, or creation of an uneconomic remnant, will be addressed during the right-of-way acquisition phase should a Build Alternative be selected for construction.

Table 34: Potential Agricultural Impacts by Build Alternatives

	Build Alternatives			
	A **2-4-8-11-18-19-21-23**	**B** **3-6-10-12-15-17-20-23**	**C** 1-5-7-9-13-14-16-22-23	**D** **3-6-9-11-16.1-21-23**
Acres of Prime/Unique Farmland	25.0	47.6	32.5	40.1
Acres of Statewide and Local Important Farmland	82.6	76.4	88.5	82.5
Percentage of farmland in county or local government unit to be converted	0.1	0.1	0.1	0.1
Total Farmland Rating Points from Form AD-1006, Part VII	129	129	128	129

Source: NRCS Farmland Conversion Impact Rating Form AD-1006.

3.12 Environmental Justice

Environmental Justice policy. Title VI of the 1964 Civil Rights Act requires each federal agency to ensure that "no person, on the ground of race color or national origin, be excluded from participating in, denied the benefits of, or subjected to discrimination" under any program or activity receiving Federal Aid. Title VI implications on the transportation planning process were further refined on February 11, 1994, in Executive Order 12898 titled *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*. The President's Memorandum on Environmental Justice requires each federal department and agency to "identify and address disproportionately high and adverse human health or environmental effects of their policies, programs and activities on minority populations or low income populations." On April 15, 1997, the U.S. Department of Transportation (USDOT) published DOT Order 5680-1 as a component of the June 29, 1995, Federal Highway Administration's Environmental Justice Strategy. The Order, which appeared in the *Federal Register*, *Volume 62*, *Number 72*, describes the process USDOT implemented to incorporate Environmental Justice principles into existing programs, policies, and activities.

Environmental Justice analysis. Efforts were conducted to identify areas of low-income and minority populations within the Study Area, including: a review of census data (see Section 3.9.1.3, *Racial Characteristics* and Section 3.9.1.6, *Average Income and Percent of Residents Living Below the Poverty Level*), project mapping, contact with local governmental officials and community leaders, field observations, and discussions with property owners and residents during public meetings. Regarding minorities, the census data analysis, consultations with local officials, and field surveys/interviews confirm there are no pockets of minorities within the corridor.

It is probable that the proposed project will affect some low-income people because the two counties, the Study Area, and the project corridor have a high number of low-income individuals. However, the impact

would not be disproportionately high, since the entire area is generally characterized as having low-income individuals.

Research results indicate that, in accordance with *Environmental Justice Executive Order 12898*, the proposed project would not have a disproportionately high and adverse effect on minority or low-income populations.

3.13 Pedestrian and Bicycle Facilities

No pedestrian or designated bicycle facilities are in place along the project corridor. Although the proposed project does not provide dedicated bike lanes or paths along its length, the wide roadway and planned 10-foot-wide shoulders (8 feet of which would be paved) would provide a safer place for bicyclists compared to the existing conditions.

3.14 Hazardous Materials

A primary concern when developing a new facility, or improving an existing roadway, is the potential for disturbing hazardous materials sites. It is essential to identify early in the development of a project the hazardous materials site locations. Discovering a hazardous materials site during right-of-way acquisition or construction would have a detrimental impact on the project. The project could be delayed or even halted until a lengthy, detailed, and expensive site evaluation is completed. If identified early in the process, mitigative measures to either eliminate or minimize hazardous materials site impacts can be addressed.

A *Hazardous Materials/Underground Storage Tank (UST) Assessment* was performed to identify potential hazardous materials sites. Land use in the area is mostly residential and agricultural, with a few commercial properties concentrated near the northern and southern termini. The Phase I investigation identified 10 properties in the project area, including the gas station/convenience store shown in Figure 18, that are reported or potential hazardous materials site locations. These are within/adjacent to the project disturb limits and, thus, could be impacted by a Build Alternative.

Additional reconnaissance to determine the need for Phase II hazardous materials investigations is recommended at the suspect site(s) that would be impacted by the selected Build Alternative. If Phase II hazardous materials investigations are found to be necessary, they should be completed prior to right-of-way acquisition unless KYTC is unable to obtain site access. In those cases, the work would be completed as early as possible following the securing of the legal right to enter the property. The proposed project would not be advertised for construction until all clearances are obtained.

Figure 18: Cumberland Corner Mart

Table 35 (p. 102) identifies those sites that could affect the project, the potential contaminants at those sites, and recommendations for remediation. The sites' locations are shown on Exhibit 4.

The *Hazardous Materials / UST Assessment* noted the following concerning properties within or adjacent to the proposed project rights-of-ways:

> *A variety of materials including building debris, household furnishings, oil drilling equipment and appliances were included in the waste at some locations. Special waste in the form of air conditioners, automotive tires, asbestos, lead, solvents and paints could also exist at some of the*

identified dumpsites. Several abandoned automobiles and pieces of farm equipment were also observed in the study area, including two auto salvage operations. Contamination could include heavy metals, volatile and semi-volatile organic compounds, and other constituents of petroleum-based products. The potential contamination is not considered to be extensive. Where dumps are encountered, the materials should be recycled or otherwise disposed of properly.

In addition, two other locations are expected to be contaminated with petroleum-based products, volatile organics, and heavy metals: Groce's Electric Motor Repair on KY 734 north of KY 90 (where an abandoned aboveground storage tank, motors, and parts were also observed), and Bill Lee's Boat Storage on US 127 north of KY 55.

No registered solid waste landfills, transfer stations, or recycling facilities are located within the project disturb limits.

Due to site conditions, some of the undeveloped and forested areas were not fully inspected during field investigations. These sites, which were viewed only from a distance, could include sinkholes or waste dumps hidden by vegetation. Frequently, sinkholes are used for dumping various types of waste. Residential/farm waste dumps could be present within forested areas on private properties.

Eleven registered underground storage tank (UST) sites were identified in the government database search reports; three sites are within or in close proximity to the project's disturb limits, but only one of them (Site 2, the Cumberland Corner Mart) is still active. The Hilltop Grocery (Site 22) is listed as having its USTs removed in 2003, but there may be some residual soil contamination present in or near the former tank pit. The Lake Cumberland Unocal (Site 13) is listed as having its USTs removed in 1993, and has recently been issued a letter from the Kentucky Department for Environmental Protection's UST Branch stating that no further remedial action is required.

One unregistered UST system is located on a farm in Swan Pond Bottom; according to the owner, the tank has not been used in over twenty years. Another UST on the same property has been removed and no information as to the former location of the tank was obtained during investigations. Petroleum contamination could be present at these locations.

In addition to the concerns noted above, there were two springs found during field investigations that appeared to be contaminated. One of the locations featured a pink and black substrate in a shallow pool; the other featured gray/black water with a gas bubbling up through it, and a gray substance on the water surface (see Figure 19). A strong petroleum odor was associated with the second spring.

Given the area's past connection with oil and gas wells, and the number of wells still existing in the area, these may be natural gas or oil springs not necessarily indicative of man-made pollution.

Figure 19: Spring With Suspected Contamination

Additional environmental concerns found at multiple locations within the project area, but not included in the mapping within this report, include the following:

- Multiple power pole-mounted electrical transformers that are suspected to contain polychlorinated biphenyls (PCBs) were found throughout the project area. The majority of transformers were inspected and no visible leakage of contents from the transformers was observed; however, several casings exhibited staining and rust from weathering. Due to the quantity of PCBs typically found in these types of transformers, any releases or associated contamination would be minimal.

- Area farms are likely to use pesticides and herbicides. Pesticides or herbicides pose a hazard if they are improperly disposed of or misapplied. No obvious evidence of chemical misapplication or improper storage of chemicals was observed during investigations. No large-scale agricultural crop operations were observed in the Study Area that would utilize large quantities of these chemicals.
- Residential dwellings in the subject area could use underground or aboveground storage tanks (USTs/ASTs) to store heating fuel oil. No vent or fill pipes were observed on area residences; however, the majority of structures were viewed only from a distance during the inspections for the overview study. The presence of these types of tank systems would only be determined by a visual inspection of the structures on a case-by-case basis.
- Some properties, particularly in the southern third of the project area, contain contract oil drilling operations. These sites typically involve the well, three or four aboveground storage tanks, and other appurtenances. If any of these operations lie within the preferred alternative, their operators or owners would be contacted for proper closure of the sites.

There were several other sites noted and discussed in the *Hazardous Materials / UST Assessment* that are located in the project corridor but do not affect any of the proposed Build Alternatives. Those sites are not included in this Environmental Assessment.

Hazardous materials manufacture, use, storage, treatment, transportation, and disposal are regulated by the *Resource Conservation and Recovery Act of 1976* (*RCRA*), as amended by the hazardous and solid waste amendments of 1984. The *Comprehensive Environmental Response, Compensation and Liability Act* (*CERCLA*), as amended, is responsible for regulating the control, cleanup, and liability designation for abandoned, uncontrolled, or inactive waste sites. *CERCLA* is also designed to handle hazardous materials discharges and emergencies. The 1986 Amendments of *CERCLA*, also known as the *Superfund Amendments and Reauthorization Act of 1986* (*SARA*), were designed to provide protection against liability for both private and public "Innocent Landowners." This defense was provided for those parties who acquire property without prior knowledge of the presence of hazardous materials, and who made a good faith effort to identify any hazardous materials located on the site prior to purchase. Other federal laws with relevance to the generation, control, disposal, or detection of hazardous materials include NEPA, the *Clean Water Act,* the *Safe Drinking Water Act*, the *Toxic Substances Control Act (TSCA)*, the *Clean Air Act*, and the *Occupational Safety and Health Act* (*OSHA*).

Potentially Impacted Sites*

Alternative A = 6 sites

Alternative B = 2 sites

Alternative C = 5 sites

Alternative D = 4 sites

** Excludes sites not mapped. (See Table 35.)*

During right-of-way acquisition and/or construction, if a site suspected of containing hazardous materials is discovered, then activities at that site will cease and further investigations must be performed before construction can proceed. Such materials/conditions could include hazardous building materials, soil discoloration, odors, or oily sheen on water. The number of suspect sites potentially impacted by each alternative is shown at right. The number excludes utility transformers, oil drilling equipment, and residential USTs/ASTs, and agricultural chemicals. These potential contaminants were observed throughout the project area and further reconnaissance would be required to identify all sites. Table 35 identifies suspected contamination sites and recommendations for additional site reconnaissance.

Table 35: Suspected Contaminated Sites, Recommendations, and Build Alternatives Potentially Impacting the Sites

Site ID # (Exhibit 4)*	Site Name or Description	Suspected Contaminants	Recommendation	Build Alternative Segments Potentially Impacting Site
2	Gas station/convenience store, KY 90 at KY 734	Aboveground and underground storage tanks, petroleum products, heavy metals, and semi-volatile organic compounds	**Conduct Phase II investigation if necessary:** Properly close all on-site storage tanks. If evidence of soil staining, noxious odors, or contamination is detected during demolition activities, conduct soil sampling and analysis to profile site. Perform any necessary remedial activities.	1 (Alt. C) 2 (Alt. A)
4	Electric Motor Repair, KY 734	Heavy metals, volatile and semi-volatile organics, other petroleum constituents	**Conduct Phase II investigation if necessary:** Inspect and test for site contamination, if necessary. Properly dispose of or recycle any special or hazardous waste materials identified according to profile.	2 (Alt. A)
5	Residence/farm, KY 734	Residential/farm waste dump (metals, lumber, brush, plastics, household wastes)	**Conduct Phase II investigation if necessary:** Remove regular household/farm wastes to permitted facility. Properly dispose of or recycle any special or hazardous waste materials identified according to profile. Inspect and test for site contamination, if necessary.	5 (Alt. C)
13	Gas station, US 127 at KY 55	Possible contamination from petroleum, heavy metals, and semi-volatile organic compounds.	**Conduct Phase II investigation if necessary:** Identify and evaluate extent of any soil contamination, and dispose of contaminated soil according to applicable laws and regulations.	16 (Alt. C) 16.1 (Alt. D)
14	Electric Substation KY 55 at US 127	Oil/grease, and volatile organic compounds	**Conduct Phase II investigation if necessary:** Identify and evaluate extent of any soil contamination, and dispose of contaminated soil according to applicable laws and regulations. Contact local electric utility for removal of equipment.	16 (Alt. C) 16.1 (Alt. D)
18	Boat Storage, US 127	Heavy metals, volatile and semi-volatile organics, other petroleum constituents from winterized and stored vessels	**Conduct Phase II investigation if necessary:** Identify and evaluate extent of any soil contamination, and dispose of contaminated soil according to applicable laws and regulations.	20 (Alt. B) 21 (Alts. A, D) 22 (Alt. C)
19	Field, North of KY 639	Old oil well; potential for petroleum constituents in soil	**Conduct Phase II investigation if necessary:** Identify and evaluate extent of any soil contamination. Close well according to applicable laws and regulations.	3 (Alts. B, D)
20	Field, East of US 127	Black and pink discoloration in pools of intermittent stream	**Conduct Phase II investigation if necessary:** Identify and evaluate extent of any soil contamination. If possible, trace source of spring contamination.	4 (Alt. A)
21	Field, East of US 127	Spring/seep with petroleum odor	**Conduct Phase II investigation if necessary:** Identify and evaluate extent of any soil contamination. If possible, trace source of spring contamination.	4 (Alt. A)
22	Grocery, KY 55	Former UST site; possible contamination from petroleum, volatile and semi-volatile organics, and heavy metals	**Conduct Phase II investigation if necessary:** Identify and evaluate extent of any soil contamination. Dispose of any contaminated soil according to applicable laws and regulations.	19 (Alt. A)

* *The site numbering is non-consecutive because several sites included in the Hazardous Materials / UST Assessment report do not affect any of the Build Alternatives, so are not discussed herein.*

Table 35: Suspected Contaminated Sites, Recommendations, and Build Alternatives Potentially Impacting the Sites (*Continued*)

Site ID #	Site Name or Description	Suspected Contaminants	Recommendation	Build Alternative Segments Potentially Impacting Site
Not mapped	Power pole-mounted electrical transformers throughout corridor	Polychlorinated biphenyls (PCBs)	**Conduct Phase II investigation if necessary:** Found throughout project area. Evaluate condition of electrical equipment. Inspect for evidence of leaking contents. Coordinate relocation and handling with local utility company.	all
Not mapped	Oil drilling operations throughout corridor	Aboveground storage tanks, petroleum constituents in soil	**Conduct Phase II investigation if necessary:** Found throughout project area. Identify and evaluate extent of any soil contamination. Close tanks and wells, and handle and dispose of any contaminated soil according to applicable laws and regulations.	all
Not mapped	Residential and agricultural properties throughout corridor	Aboveground or underground storage tanks, pesticides, herbicides, Lead-based paints, asbestos building materials	**Conduct Phase II investigation if necessary:** Found throughout project area. Identify and evaluate the condition of any stored pesticides or herbicides. Handle and dispose according to applicable laws and regulations. Conduct inspections of residences to be taken by selected alignment for presence of regulated materials.	all

Mitigation

Should a Build Alternative be selected that impacts a given site, additional reconnaissance is recommended to determine the need for Phase II hazardous materials investigations. If Phase II hazardous materials investigations were found to be necessary, they would be completed prior to needed right-of-way acquisition, unless the KYTC is unable to obtain site access. In those cases, the work would be completed as early as possible following the securing of the legal right to enter the property. The proposed project would not be advertised for construction until all clearances are obtained.

Structures identified for acquisition should be inspected for aboveground or underground storage tanks. Confirmed tanks will be removed prior to demolition, and handled and disposed of consistent with existing local, state, and federal regulations. Structures identified for acquisition should be inspected for asbestos containing building materials (ACBM) by an accredited inspector. Confirmed ACBM will be removed prior to demolition, and handled and disposed of consistent with existing local, state, and federal regulations.

Any wells impacted by construction activities would be closed in accordance with state and federal regulations. If excavation occurs within 50 feet of a well, an inspection will be conducted to identify any contaminated soil. Coordination with owners will occur.

During right-of-way acquisition and/or construction, if a site suspected of containing hazardous materials is discovered, then activities at that site will cease and further investigations must be performed before construction can proceed.

3.15 Visual Impacts

"Aesthetics" refer to the visual qualities and scenic nature of an area. Studies show there can be individual and regional preferences over what qualifies as "scenic." The project area presents a visual character that is typical for the area and, with the exception of existing US 127's crossing of the Wolf Creek Dam, possesses no unique aesthetic features or viewsheds potentially impacted by the proposed project. In those locations where new roadway construction would replace open ground, trees, and other

Figure 20: US 127 Crossing Wolf Creek Dam

vegetation, the aesthetic appeal would be reduced along the corridor.

The Wolf Creek Dam crossing (see Figure 20) has been identified by some local residents and through field visits as providing an aesthetic and memorable view of Lake Cumberland and the river valley to the east. While the new proposed crossing of the dam would remove much of the traffic from the dam, the crossing would remain open to traffic for those wishing to access the dam, USFWS's Fish Hatchery, USACE's Kendall Campground, or simply to enjoy the view. The new road would not be visible from the dam due to the area's vegetation and topography.

A crossing of the Cumberland River on new alignment would result in a change in the viewshed of the area in which the new road and bridge are located. The river crossing for the Alternative A and Alternative B alignments are in close proximity and traverse a sparsely populated area, as does the Alternative C alignment farther east. The preliminary design of the Build Alternatives has determined that the bridge will be approximately 75 feet above the river for Alternative A (Segment 18), 102 feet for Alternative B (Segment 17), 68 feet for Alternative C (Segment 16), and 87 feet for the recommended preferred Alternative D (Segment 16.1).

Motorists on the new alignment would have a view of the scenic river valley, while some residents would have a view of the bridge that could be considered an obstruction of the scenic valley vista. The river crossing for any Build Alternative would occur within the Creelsboro Rural Historic District, which encompasses 4,349 acres in the river bottoms that lie along both sides of the Cumberland River in proximity to the town of Creelsboro. The boundaries were determined primarily by landscape features, and were drawn to include the cleared areas of the river bottoms and tributary coves. The historic resource survey indicated the project would have an adverse effect due to visual impact on the District. The District extends east-west along the Cumberland River and beyond; therefore, impacts to the District as a result of any of the Build Alternative are unavoidable. FHWA's approval of the determination recommendation, together with the SHPO's concurrence with same, is resulting in the preparation of an MOA that stipulates measures to mitigate the adverse effects to the District.

With the exception of the District, the Build Alternatives would have minimal impacts on the visual character of the corridor, and should enhance driving pleasure by providing a safe, efficient, and economical route. In the vicinity of the dam—the one location that has been identified as memorable for its view of the river and river valley—the traffic reduction would be expected to reduce traffic-related noise and enhance the view. All Build Alternatives would produce similar results. The only visual impact of the No-Build Alternative would be that associated with increased traffic and congestion on the existing roadway.

3.16 Construction Impacts

The proposed project is anticipated to produce a beneficial short-term economic impact by stimulating the local economy in terms of construction-related jobs, sales, income, government revenue and expenditures, and other variables. Highway construction activities would have minimal and temporary air, water quality, noise, traffic flow, and associated impacts within the project area. Steps that will be taken to minimize or avoid these temporary impacts include the following:

- The air quality impact would be temporary, and primarily in the form of diesel-powered construction equipment emissions and dust from exposed earth. Air pollution associated with airborne particle creation would be effectively controlled through the use of watering or the application of calcium chloride in accordance with the KYTC's *Standard Specifications for Road and Bridge Construction (Standard Specifications),* as directed by the KYTC project manager.
- Water quality impacts from erosion and sedimentation, and noise and vibration impacts from heavy equipment movement and other construction activities would be temporary and controlled in accordance with KYTC's *Standard Specifications,* as directed by the KYTC project manager, and by using Best Management Practices. Structure and debris removal would be performed in accordance with local, state, and federal regulating agencies permitting the operation. Contractors will be required to obtain the necessary permits that are related to their construction practices such as for construction of temporary roads or waste and borrow pits, if necessary.
- Noise and vibration impacts would originate from heavy equipment movement, blasting, and construction activities such as pile driving and vibratory compaction of embankments. Noise control measures would include those contained in KYTC's *Standard Specifications*.
- Construction activities, including traffic maintenance and construction sequence, would be planned and scheduled to minimize traffic delays. Signs would be used as appropriate to provide notice of road closures and other pertinent information to the traveling public. The local news media would be notified in advance of road closings and other construction-related activities that could excessively inconvenience the local residents, allowing motorists to plan travel routes in advance. Property access would be maintained to the maximum extent practical through controlled construction scheduling. Traffic delays would be controlled to the maximum extent possible where many construction operations are in progress simultaneously. The contractor would be required to maintain one lane of traffic in each direction at all times, and to comply with Best Management Practices.
- Structure and debris removal would be performed in accordance with local and state regulatory agencies permitting the operation. The contractor would be responsible for pollution control methods in borrow pits, other materials pits, and areas used for waste materials disposal.
- Temporary erosion control features, as specified in KYTC's *Standard Specifications*, would consist of measures that could include the temporary placement of sod, mulching, sandbagging, slope drains, sediment basins, sediment checks, artificial coverings, and berms.

3.17 Economic Impacts—Taxes and Revenues

Considering both positive and negative revenue impacts of the proposed project, the following issues were identified: tax revenue and a short-term construction income surge. Overall, the direct revenue impacts of this proposed project would be negligible.

Potential adverse impacts. Since the project would construct a road primarily on new alignment, it would cause the direct conversion of private, taxable property to non-taxable, government-owned right-of-way. The majority of land required is either open undeveloped agricultural land, or rural-residential. Constructing any proposed Build Alternative would result in the permanent removal of land and buildings from the tax rolls. The taxable land loss would result in an initial minimal tax revenue loss to Clinton and Russell counties. Some farmers could experience a loss in income or land value due to the partial taking of farm holdings for right-of-way. The farmers may also realize a reduction in gross agricultural wealth (value of production) and gross farm income due to the removal of land from production for right-of-way. Businesses bypassed by the construction of a road on new alignment could also experience revenue losses; however, other economic development would be expected to occur that could offset such losses.

Lake Cumberland State Resort Park, USACE's campground, USFWS's fish hatchery, and Cumberland Lake-based businesses depend on existing US 127 to provide access to visitors. These facilities could experience reduced visitation and revenues due to the reduction of traffic on the existing road if a Build Alternative is selected. As a measure to mitigate this impact, KYTC would place signage along the new roadway to direct motorists to these destinations and offset the potential revenue losses.

Potential benefits. The short-term economic benefit of this proposed construction project would be expected to stimulate the local economy in terms of jobs, sales, income, government revenue and expenditures, and other variables.

Regarding long-term socioeconomic benefits, the proposed project is expected to enhance the competitive and locational advantages for Clinton and Russell counties. An improved roadway would improve freight accessibility, which would also lessen the transportation costs for businesses and industries. Major upgrades to the transportation network (*i.e.*, system linkage) would be expected to improve opportunities for employment and economic development for the local economy. The 2000 Census indicates residents of Clinton County, Russell County, and the Study Area are less wealthy than the rest of the state, and the counties and Study Area have higher percentages of their total populations living below the poverty level than the state (25.8%, 24.3%, and 22.5%, respectively, versus the 15.8% state rate). Study Area block group percentages were also high, ranging from 19.3% to 27.2%. Because of its poor economic status, Clinton County was designated a federal Enterprise Zone in the 1990s, which authorized the county to offer financial incentives designed to expand and diversify employment and economic opportunities. Although new development is not expected to locate along the proposed roadway solely as a result of implementing the project, the improved transportation network would be expected to complement local efforts to encourage new employment opportunities and attract business to the area, as well as to enhance efforts of the Kentucky Tourism, Arts, and Heritage Cabinet, the Kentucky Department of Travel, and the Kentucky Tourism Council to promote this area's tourist and recreational attractions. An increase in the tourism industry could increase business and employment opportunities in the two counties.

The overall *beneficial* socioeconomic impacts of implementing a Build Alternative would be expected to be substantial, since each alternative would meet the purpose and need for the project, including providing an improved roadway that is constructed to current design and safety standards, thereby providing drivers with an alternative to existing US 127, which has numerous deficiencies. Any of the proposed Build Alternatives would provide improved access to the region's tourist industry attractions. Throughout the local area, a Build Alternative would increase overall travel speed, reduce travel time, and thereby improve the economy of travel by lowering operating costs. Accessibility, response time, and safety for law enforcement, fire protection, EMS, and school buses would be improved. Long-term economic benefits associated with regional accessibility could offset revenues lost. It is expected that the impacts to Clinton and Russell counties' tax bases will not be significant in the long term.

4.0 MITIGATION MEASURES

Chapter 3.0 of this Environmental Assessment identifies the impacts for the proposed Build Alternatives and, where applicable, mitigation measures that could be expected to result from the proposed project. The following summarizes these impacts and the committed mitigation measures associated with them. The section of this report wherein a subject is discussed is indicated in brackets [0.0] following each category heading, below.

Construction noise impacts [3.2.4]. KYTC requires construction noise abatement on highway construction projects. Contractors must use mufflers and other noise abatement techniques on their equipment and implement procedures to limit work hours and restrict the transmission of noise to sensitive receptors such as hospitals, churches, schools, libraries, parks, museums, residences, and sensitive commercial activities. Required techniques may include, but not be limited to, the following:

- Soundproof housing or enclosures for stationary noise-producing machinery such as drills, augers, cranes, derricks, compactors, pile drivers, etc.
- Efficient silencers on air intakes or equipment.
- Efficient intake and exhaust mufflers on internal combustion engines.
- Proper maintenance on all noise-producing equipment to prevent excessive rattling and vibration of metal surfaces.
- Restriction of operations in the vicinity of noise-sensitive locations to hours of the day when excessive noise would be least harmful.
- Other steps as necessary to prevent construction noise from becoming a public health nuisance or detriment to human health.

KYTC will be responsible for monitoring construction noise and for advising the contractor of maximum allowable noise level violations.

Streams and stream crossings [3.3.2]. Depending upon the Build Alternative considered, there may be over 70 stream crossings. The linear feet of streams within the construction limits at the crossings range from approximately 29,061 linear feet with Alternative A to 36,170 linear feet with Alternative C. The greatest potential impact to a single stream would occur with Alternative C's Segment 16, which traverses the hollow through which Blackfish Creek flows. Segment 16 would potentially impact 9,606 linear feet of streams in Blackfish Hollow—approximately 6,764 linear feet of the creek and approximately 2,842 linear feet of 12 tributaries. Overall, Segment 16 would potentially impact 20,261 linear feet of streams.

Alternative D is the recommended preferred alternative. Its alignment would have 5 crossings of perennial streams (1,167 linear feet), 16 crossings of intermittent streams (13,250 linear feet), and 37 crossings of ephemeral streams (16,556 linear feet)—a total of 58 crossings and 30,973 linear feet of impact. Segment 16.1 of Alternative D was developed to minimize Segment 16's impacts to streams in Blackfish Hollow while retaining Segment 16's minimized adverse effects to the Creelsboro Rural Historic District. Segment 16.1 would avoid Blackfish Creek entirely and potentially impact approximately 3,625 linear feet of six of the creek's tributaries. Overall, Segment 16.1 would potentially impact 14,281 linear feet of streams.

Based on current requirements and length of impacts indicated at this preliminary design stage, it appears that all Build Alternatives would qualify for a USACE Individual Section 404 permit. USACE would make jurisdictional determinations that would take into account all aquatic resources (including streams and ditches) subject to Section 404 jurisdiction during the permitting phase of the project.

Through intergovernmental coordination, USFWS, KSNPC, KDFWR, and KDOW have identified potential impacts and recommended avoidance, minimization, and mitigation options, which are summarized below:

USFWS: In a letter of October 8, 2002 (see Appendix B), USFWS noted the importance of applying Best Management Practices during construction to prevent excessive sedimentation: "Rigid application of [KYTC's] construction erosion control standards can preclude most sedimentation problems; however, in some cases additional measures will need to be taken…." The agency also stated that additional comments would be provided during the agency review process should the project necessitate [USACE] permits. "However, we would likely have no objection to the issuance of permits if any necessary stream channel work is held to a minimum and Best Management Practices are utilized and enforced, effectively controlling erosion, sedimentation, and other potential hazards." USFWS listed several recommendations to address stream impacts, including:

- Provide an erosion control plan, diversion channels, silt barriers, temporary seeding and mulching of all cuts and fill slopes, and limitation of in-stream activities.
- Place concrete box culverts in a manner that prevents impediment to low flows or to movement of indigenous aquatic species.
- Restrict channel excavations for pier placement to the minimum needed.
- Immediately stabilize all fill.
- Stabilize stream banks with riprap or other techniques.
- Use existing transportation corridors in lieu of temporary crossings where possible.
- Maintain good water quality during construction.

KSNPC and KDOW noted that the project area is located within a known karst landscape characterized by numerous sinkholes, underground conduits, or caves. KSNPC stated that construction disturbances or release of pollutants within the specified area could easily cause contamination of groundwater. In addition, KSNPC noted that caves are often associated with sensitive ecosystems and may provide habitat for a number of rare or endangered species. KSNPC explained that cave organisms are heavily dependent on water quality and that steps should be taken to avoid introducing contaminants into the water system.

- KSNPC has stated in a letter dated June 27, 2007 (see Appendix B): *A written erosion control plan should be developed that included stringent erosion control methods (i.e., straw bales, silt fences and erosion mats, immediate seeding and mulching of disturbed areas) which are placed in a staggered manner to provide several stages of control. All erosion control measures should be monitored periodically to ensure that they are functioning as planned.*
- According to KDOW, from below Wolf Creek Dam to the Kentucky/Tennessee state line the Cumberland River is designated a Coldwater Aquatic Habitat (CAH). KDOW stated that due to the CAH designation, a "no stormwater" discharge drainage design should be considered for any bridge design that crosses the Cumberland River.

KDFWR: Coordination with KDFWR resulted in a letter dated August 2, 2007 (see Appendix B), in which the agency recommended:

- Incorporate natural stream channel design into channel changes associated with the project.
- Place culverts even with substrate to allow free movement of aquatic organisms.
- Design culverts so degradation upstream and downstream does not occur.
- Develop or excavate in or near streams during low flow periods to minimize disturbance.

- Properly place erosion control structures below disturbed areas to minimize silt entry into streams.
- Replant disturbed areas after construction, including stream banks and rights-of-way, with native vegetation for soil stabilization and enhancement of fish and wildlife populations. A 100-foot forested buffer along each stream bank is recommended.
- Return disturbed in-stream habitat to a stable condition upon completion of construction.
- Preserve tree canopy overhanging the stream.
- Coordinate with USACE and KDOW prior to any work within streams or wetlands.

Each of these options identified by the above-referenced agencies will be taken into consideration by the engineering team during final design, if a Build Alternative is selected. In the final design stage, additional efforts will be made to avoid or limit stream impacts. Water quality impacts from erosion and sedimentation during construction will be controlled in accordance with KYTC's Standard Specifications and through the use of Best Management Practices.

If excess fill deposition sites located outside of the project corridor are needed, these areas should be surveyed for potential "waters of the United States." USACE regulates headwater streams and the several of the valley fills in the project area contain headwater streams or larger. As such, fill sites (if needed) will require permitting. If this permitting is to be the responsibility of the contractor, the contractor must be made aware of such obligations.

Public water sources [3.3.3]. The area is served by the Albany Water Works and Jamestown Water Works, which use surface water (Lake Cumberland) as the water supply source. As recommended by KDOW (see letter dated June 27, 2007, in Appendix B), Best Management Practices will be employed as needed to protect the local water supply.

Floodplains [3.3.4]. All potential impacts to the floodplains will be reviewed by the appropriate regulatory authorities to gain their concurrence with the determination that there will be no substantial impacts. If a Build Alternative is selected, a floodway analysis will be performed to determine the need for a No-rise certification and floodplain plan, the development of which would be coordinated with FEMA. In addition, if there will be filling in a floodplain, then a KDOW Construction in a Floodplain Permit would also be required.

Wetlands and ponds [3.3.5]. Four wetland sites may be directly impacted by one or more of the proposed Build Alternative segments. Three of these four wetlands were determined to have hydrological connections to waters of the United States and could, therefore, potentially be classified as jurisdictional by USACE—a determination that is made at the permitting stage of a project. Impacts to potentially jurisdictional wetlands would be 0.21 acre with Alternative A, 0.14 acre with Alternative B and the recommended preferred Alternative D, and 0.23 acre with Alternative C.

No alternative considered would have a wetland impact greater than 0.5 acre. Based on current USACE requirements and preliminary design, it appears that this project would potentially qualify for a USACE Nationwide permit. If it is determined during final design that the total amount of jurisdictional wetland within the disturbance limits of a selected alternative would be greater than 0.5 acre, an Individual USACE 404 Permit would be required. Wetland disturbance of less than 0.1 acre would only require USACE notification.

Prior to construction (i.e., after final design) KYTC, Division of Environmental Analysis will make an exact determination of impacts to jurisdictional wetlands. Detailed permit coordination—which will identify specific mitigation measures—will occur with USACE during the final design phase of the project should a Build Alternative be selected. For the loss of emergent wetlands and ponds, such mitigation could

include creation of small, shallow, seasonally flooded ponds to minimize the loss of these habitats. Ideally, the mitigation would take place on-site if locations with available right-or-way are suitable. If suitable locations are not found onsite, off-site mitigation would be required.

Regardless of which alternative is chosen, several ponds could be impacted—1 with Alternative A, 4 with Alternatives B and C, and 5 with Alternative D. However, none appear to be jurisdictional. Due to the type of habitat in which these ponds are located (i.e., primarily pasture/farm fields) and the number of remaining ponds, it is anticipated that the loss of ponds will have a minimal impact on the environment.

Terrestrial environment [3.5.3]. KSNPC indicated that the proposed project goes through one or more large forest blocks. KSNPC recommended avoiding fragmentation of/impacts to large forested blocks or, where impacts could not be avoided, mitigation that could include limiting forest removal to the edges of the blocks, or planting trees in the areas where tree removal was temporarily necessary. KDOF indicated that special care should be taken around existing trees that will remain after construction is completed. According to KDOF, heavy equipment should be kept away from the base of trees to prevent wounding of the trunk and/or surface roots. KDOF recommended that construction traffic should be routed away from the drip line of the tree to lessen the severity of soil compaction. In addition, KDOF recommended that after completion of the project, trees should be planted back where removed temporarily. KDOF recommended that tree selection (i.e. species) should be matched to the site or project area.

Each of these options identified by the above-referenced agencies will be taken into consideration by the engineering team during final design, if a Build Alternative is selected. In the final design stage, additional efforts will be made to avoid or limit forest impacts, and Best Management Practices will be employed.

Threatened and endangered species [3.5.4]. Suitable habitats for two federally listed endangered bat species, one state-listed endangered bat species, and four state-listed plant species were identified in the project area, as well as possible breeding habitat for one hawk species. Another bird species is state-listed as having potential to occur in Clinton County, though appropriate habitat within the project corridor is sparse. KDFWR recommended the following in its letter of August 2, 2007:

- The project area be surveyed for caves, rock shelters, and abandoned underground mines that may be suitable for bat habitat, and any identified sites should be avoided; and
- Tree clearing in the project area be restricted to between October 15 and March 31 unless Indiana bat hibernacula are located within 10 miles of the project, in which case tree clearing should be restricted to between November 15 and March 31.

The agency noted that "written acceptance of and strict adherence to the recommendations should satisfy the consultation requirements of Section 7 of the Endangered Species Act." After coordinating the results of the field survey with USFWS, a Biological Assessment (BA) may be undertaken during the design phase of the project to determine the presence within the project corridor of the two federally endangered bat species listed for this project. Mitigation for potential impacts would be included in the BA.

Cultural historic resources [3.6.2]. Segment 20 (Build Alternative B) would be visible from the Dr. M. M. Lawrence House. The SHPO has concurred that this effect is not considered adverse (see correspondence dated April 22, 2009, in Appendix C. If Segment 20 is part of the final selected alignment, mitigation will be developed through consultation with the SHPO and consulting parties.

Segments 16, 16.1, 17, and 18 will have an adverse effect due to visual impacts to the Creelsboro Rural Historic District. One or more of these segments are features of all of the Build Alternatives. Alternative D (Section 16.1) is the recommended preferred alternative. A draft Section 4(f) Evaluation has been completed (see Section 3.7, herein), and mitigation strategies are being coordinated with the SHPO and

consulting parties. Mitigation commitments will be identified in the MOA being prepared for this project. The MOA and the final Section 4(f) Evaluation will be included in the FONSI for this project.

Archaeological resources [3.6.3]. Research, a predictive model, and limited Phase I archaeological reconnaissance were undertaken to investigate unsurveyed areas and known archaeological sites along Alternatives A (Segment 18) and B (Segment 17) in Jackman Bottom and areas along Alternatives C and D (Segments 16 and 16.1) in Swan Pond Bottom and Blackfish Hollow. The investigation identified known archaeological sites near/in the corridor of the alternatives and several new archaeological sites.

Segments 16, 16.1, 17, and 18 could each affect potentially NRHP-eligible archaeological sites. It appears that Segment 16.1 (Alternative D) would have the least potential for impacting a site. The draft Section 4(f) Evaluation (see Section 3.7, herein) addresses Section 4(f) use of historic resources. The *Management Summary for the Preliminary Archaeological Investigations, U.S. 127 Reconstruction Project*, prepared for this study, recommended additional testing at all identified sites and several areas with archaeological potential that could be affected by the project.

If a Build Alternative is selected, it will be subject to a full, intensive inventory of sites and, where appropriate, formal testing will be conducted to determine National Register eligibility and mitigation for impacts to eligible sites. If any archaeological sites potentially impacted by the project are determined to be eligible for listing on the National Register, the MOA being prepared for this project will stipulate the conduct of phased archaeological investigations and document mitigation measures. The MOA will have stipulations that include procedures that must be followed if any concentrations of archaeological artifacts are discovered during construction activities. Such stipulations would include:

- Work must cease and the project engineer must be notified immediately.
- Coordination with the Kentucky SHPO will be made to determine the potential eligibility of such sites and whether Phase II testing should be completed.
- If human remains, associated burial items, sacred items, or items of cultural patrimony are discovered, construction in those areas must cease and FHWA will notify and consult with the SHPO, identified Native American tribes, and other parties deemed appropriate by FHWA to determine a specific protocol for treatment, handling and reburial of the remains.

Relocations/displacements [3.10]. All Build Alternatives would result in the acquisition of residences for right-of-way, as follows: Alternative A, 17; Alternative B, 13; Alternative C, 21; and Alternative D, 14. Up to four business displacements could occur, as follows: Alternative A, 2; Alternative B, 0; Alternative C, 4; and Alternative D, 3. In addition, the new road would attract traffic from existing US 127, potentially resulting in loss of revenues and potentially closure for some businesses along US 127. A building that serves as a meeting hall on Sewell Church of God of Prophecy property at the intersection of US 127 and Wooldridge Road could be within the right-of-way of all Build Alternatives. Should the meeting hall be essential to the functioning of the church and not be able to be relocated on the property, the result could be an institutional displacement.

If a Build Alternative is selected KYTC will implement a program in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646),* as amended in 1987. Relocation resources will be available to all residential relocatees and business/institutional displacement without discrimination.

A review of the local housing market reveals a limited supply of comparable housing available at any one time. It is anticipated that there could be more relocations than available, affordable residences at any given time; consequently, it is unlikely all the residences could be relocated at the same time. However, over the course of a year or more for relocations, it is possible that sufficient comparable housing would

become available when the right-of-way is acquired for this proposed project. Accordingly, it is likely the relocations for this project would be accomplished using normal relocation procedures, and the need for Last Resort Housing should not be anticipated. This program would be used if comparable replacement housing would not be available, or unavailable within the displacee's financial means, and the replacement payment exceeds the state legal limitation.

Hazardous materials [3.14]. The Build Alternatives could impact several sites that have the potential to contain hazardous materials. The recommended preferred Alternative D is estimated to impact four sites. In addition, there is further potential to impact sites scattered throughout the Study Area but not mapped during this study. These sites include pole-mounted electrical transformers, oil drilling generators, and area residential/agricultural properties containing ASTs/USTs, pesticides, herbicides, and other pollutants. Mitigation measures would include the following:

- Should a Build Alternative be selected that impacts a given site, additional reconnaissance is recommended to determine the need for Phase II hazardous materials investigations. If Phase II hazardous materials investigations were found to be necessary, they would be completed prior to needed right-of-way acquisition, unless the KYTC is unable to obtain site access. In those cases, the work would be completed as early as possible following the securing of the legal right to enter the property. The project would not be advertised for construction until all clearances are obtained.
- Structures identified for acquisition should be inspected for aboveground or underground storage tanks. Confirmed tanks will be removed prior to demolition, and handled and disposed of consistent with existing local, state, and federal regulations.
- Structures identified for acquisition should be inspected for asbestos containing building materials (ACBM) by an accredited inspector. Confirmed ACBM will be removed prior to demolition, and handled and disposed of consistent with existing local, state, and federal regulations.
- Any wells impacted by construction activities would be closed in accordance with state and federal regulations. If excavation occurs within 50 feet of a well, an inspection will be conducted to identify any contaminated soil. Coordination with owners will occur.
- During right-of-way acquisition and/or construction, if a site suspected of containing hazardous materials is discovered, then activities at that site will cease and further investigations must be performed before construction can proceed.

Visual impacts [3.15]. The Cumberland River crossing for any Build Alternative would occur within an area known as the Creelsboro Rural Historic District (District). The District is considered eligible for listing in the National Register. The historic resource survey indicated the project would have an adverse effect due to visual impacts on the District. FHWA issued an adverse effect determination and the SHPO concurred; therefore, an MOA is being prepared that will stipulate measures to mitigate the adverse effects resulting from the project. The executed MOA will be included in the FONSI.

Construction [3.16]. Highway construction activities would have minimal and temporary air, water quality, noise, traffic flow, and associated impacts within the project area. Impacts will be addressed by implementing the KYTC's *Standard Specifications for Road and Bridge Construction*, as directed by the KYTC project manager, and through the use of Best Management Practices.

Taxes and revenues [3.17]. Recreational facilities along existing US 127 could experience reduced visitation and revenues due to the reduction of traffic on the existing road.

- KYTC will place appropriate signage along the new roadway to direct motorists to the recreational destinations and offset the loss of some of the drive-by visitation and revenues.

5.0 COMMENTS AND COORDINATION

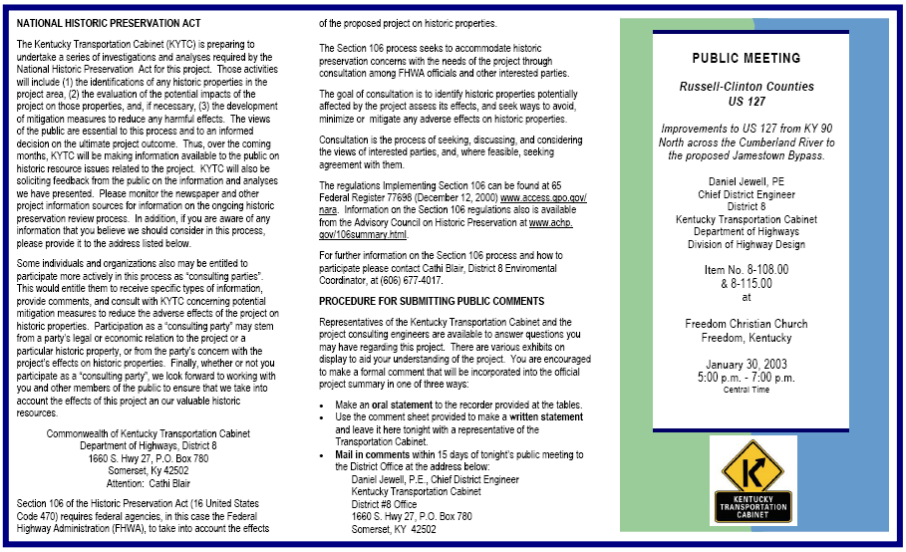
FHWA and KYTC have provided opportunities for public involvement and resource agency coordination in the development of this Environmental Assessment. Opportunities and methods used to involve the public in the study and coordinate with agencies are described herein. The environmental documentation process will not conclude, and an alignment or the No-Build option will not be selected, until a Public Hearing has been held and all comments have been given consideration.

5.1 Public Involvement Activities

Stakeholder and public meetings/Public Hearing. The project "kick-off" meeting with stakeholders and the two meetings with the public that have been held, to date, are summarized below.

November 19, 2002. A project "kick-off" meeting with local elected officials, state agency representatives, and community groups was held to identify issues, problems, and community needs to be addressed by the project. The issues most often identified related to access to Lake Cumberland State Resort Park and the National Fish Hatchery at Wolf Creek Dam. Problems and needs to be addressed by the project were related to safety concerns (heavy truck traffic, the absence of shoulders and passing zones, and accidents), improved access for tourism and industry, and connections to other primary routes in the region. Community representatives did not identify or express concerns regarding historic or potentially historic resources within the project corridor.

January 30, 2003. A public meeting was held in Freedom, during which the project was described, maps showing the preliminary alternatives were displayed for review and comment, and the Section 106 "consulting party" process was explained. A brochure was provided (see Figure 21) explaining the purpose of the meeting, the Section 106 process for consulting parties' participation, and methods for providing input.



NATIONAL HISTORIC PRESERVATION ACT

The Kentucky Transportation Cabinet (KYTC) is preparing to undertake a series of investigations and analyses required by the National Historic Preservation Act for this project. Those activities will include (1) the identifications of any historic properties in the project area, (2) the evaluation of the potential impacts of the project on those properties, and, if necessary, (3) the development of mitigation measures to reduce any harmful effects. The views of the public are essential to this process and to an informed decision on the ultimate project outcome. Thus, over the coming months, KYTC will be making information available to the public on historic resource issues related to the project. KYTC will also be soliciting feedback from the public on the information and analyses we have presented. Please monitor the newspaper and other project information sources for information on the ongoing historic preservation review process. In addition, if you are aware of any information that you believe we should consider in this process, please provide it to the address listed below.

Some individuals and organizations also may be entitled to participate more actively in this process as "consulting parties". This would entitle them to receive specific types of information, provide comments, and consult with KYTC concerning potential mitigation measures to reduce the adverse effects of the project on historic properties. Participation as a "consulting party" may stem from a party's legal or economic relation to the project or a particular historic property, or from the party's concern with the project's effects on historic properties. Finally, whether or not you participate as a "consulting party", we look forward to working with you and other members of the public to ensure that we take into account the effects of this project an our valuable historic resources.

Commonwealth of Kentucky Transportation Cabinet
Department of Highways, District 8
1660 S. Hwy 27, P.O. Box 780
Somerset, Ky 42502
Attention: Cathi Blair

Section 106 of the Historic Preservation Act (16 United States Code 470) requires federal agencies, in this case the Federal Highway Administration (FHWA), to take into account the effects of the proposed project on historic properties.

The Section 106 process seeks to accommodate historic preservation concerns with the needs of the project through consultation among FHWA officials and other interested parties.

The goal of consultation is to identify historic properties potentially affected by the project assess its effects, and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.

Consultation is the process of seeking, discussing, and considering the views of interested parties, and, where feasible, seeking agreement with them.

The regulations Implementing Section 106 can be found at 65 Federal Register 77698 (December 12, 2000) www.access.gpo.gov/nara. Information on the Section 106 regulations also is available from the Advisory Council on Historic Preservation at www.achp.gov/106summary.html.

For further information on the Section 106 process and how to participate please contact Cathi Blair, District 8 Enviromental Coordinator, at (606) 677-4017.

PROCEDURE FOR SUBMITTING PUBLIC COMMENTS

Representatives of the Kentucky Transportation Cabinet and the project consulting engineers are available to answer questions you may have regarding this project. There are various exhibits on display to aid your understanding of the project. You are encouraged to make a formal comment that will be incorporated into the official project summary in one of three ways:

- Make an **oral statement** to the recorder provided at the tables.
- Use the comment sheet provided to make a **written statement** and leave it here tonight with a representative of the Transportation Cabinet.
- **Mail in comments** within 15 days of tonight's public meeting to the District Office at the address below:
  Daniel Jewell, P.E., Chief District Engineer
  Kentucky Transportation Cabinet
  District #8 Office
  1660 S. Hwy 27, P.O. Box 780
  Somerset, KY 42502

PUBLIC MEETING

Russell-Clinton Counties
US 127

Improvements to US 127 from KY 90 North across the Cumberland River to the proposed Jamestown Bypass.

Daniel Jewell, PE
Chief District Engineer
District 8
Kentucky Transportation Cabinet
Department of Highways
Division of Highway Design

Item No. 8-108.00
& 8-115.00
at

Freedom Christian Church
Freedom, Kentucky

January 30, 2003
5:00 p.m. - 7:00 p.m.
Central Time

KENTUCKY TRANSPORTATION CABINET

Figure 21: Brochure for First Public Meeting

Public comment forms were made available and 12 persons returned comments that addressed the following issues. The number of comments on each issue is shown in parentheses (#) following the comment. (Many respondents provided comments on more than one issue.)

- Concerns about losing access to homes, properties, and/or the area's tourist attractions if US 127 is relocated (6)
- Importance of avoiding historical and archaeological resources in the area, including cemeteries and Native American graves (4)
- Potential dangers of fog and ice on the new bridge should a new road go through Swan Pond Bottom; impacts to commenters' properties (3 each)

- Impacts to a business along US 127 if the road is relocated; the location of a well and a cemetery in the vicinity of the project (1 each)

In addition to the comments submitted by the public, the U.S. Fish and Wildlife Service's (USFWS) Wolf Creek National Fish Hatchery submitted a letter expressing the importance of maintaining access to the fish hatchery.

December 13, 2007. Another public meeting was held in Freedom, during which the project purpose and need was explained, maps showing the preliminary alternatives were displayed for review and comment, information about the Section 106 process again was provided, known environmental issues were discussed, current project status and future steps were outlined, and a listing of ways the public could submit comments was provided. A brochure (an updated version of the one shown above) and comment forms for submitting at the meeting or by mail were also provided. Over 200 people attended the meeting.

A petition signed by 54 individuals was received following the meeting. The petition's primary statement was that the signers oppose any realignment of US 127, in particular from its intersection with KY 90 north to KY 3063. In addition, 64 respondents submitted comments via comment forms (58), letters (2), and e-mail messages (4). While a few submittals offered general support for the project of suggested other alternatives, most expressed support and/or opposition for specific alternative segments or end-to-end Build Alternatives, as follows:

23 Preferred Alternative A (Orange, which uses Segment 18)
9 Preferred Alternative B (Red, which uses Segment 17)
25 Preferred Alternative C (Blue, which uses Segment 16)
10 Opposed using Segment 16
4 Opposed using Segment 17
2 Opposed using Segment 18
7 Opposed using Segment 19
3 Opposed using Segment 20
1 Suggested a new route along Little Indian Creek
4 Suggested using the existing US 127 from KY 90 to Blue Ridge Market (same indicated on the petition)
3 Indicated support for the project in general
2 Did not indicate a preference

Proponents of a build alternative were almost equally divided between Alternative A (23) and Alternative C (25). Alternative B was favored by only 9 respondents, 7 of whom also favored Alternative A. References to Alternatives A, B, and C almost solely focused on their alignments through the North Section of the project—particularly in the Creelsboro Rural Historic District area. The comments are summarized below, by build alternative. The number of comments on each issue is shown in parentheses (#) following the comment. (Many respondents provided comments on more than one issue.)

Alternative C. Respondents who expressed **support for** Alternative C favored the alternative primarily because it would…

- Have fewer impacts to homes/farms/people, or to the District as a whole, due to the small population and location of Swan Pond Bottom (11)
- Be the most direct and least costly route (9)

- Be closest to existing US 127, tourist destinations such as the state park and fish hatchery, and/or a business on the existing road (8)
- Avoid commenters' properties in Swan Pond Bottom; improve access to/from Swan Pond Bottom by providing an alternative to the narrow and dangerous road "over the bluff" (4 each)
- Help the Swan Pond Bottom area "grow"; fix a dangerous intersection (US 127/KY 55); avoid a church attended by a commenter; be the "most feasible" (1 each)

All commenters who expressed **opposition to** Alternative C addressed impacts in Swan Pond Bottom, wherein most owned property and/or resided. Comments noted that Alternative C would…

- Impact, by acquisition or increased traffic, people's homes/properties/quality of life (beauty of area, peace and quiet, etc.) (8)
- Cause safety problems due to frequent fog and potential icy conditions on the new bridge in winter ; benefit too few people (due to the area's small population) (3 each)
- Cost more than Alternative A (2)
- Decrease the land values; impact Creelsboro and Rock House (due to distance from those areas) (1 each)

Alternative A. Respondents who expressed **support for** Alternative A favored the alternative primarily because it would…

- Cost less; improve access to and thereby potentially revitalize the Creelsboro area (8 each)
- Avoid commenters' homes/properties (7)
- Benefit more people (5)
- Avoid impacting a historic site; encounter terrain better suited to construction; have less impact on scenic areas; increase land values (1 each)

Respondents who expressed **opposition to** Alternative A noted the alternative would…

- Impact, by acquisition or proximity, people's homes/properties (8)
- Impact sites of historical, archaeological, and/or cultural significance including graves (7)
- Be more costly (2)
- Be too far from tourist destinations, such as the state park and fish hatchery (1)

Alternative B. Respondents who expressed **support for** Alternative B favored the alternative primarily because it would…

- Avoid commenters' homes or impact fewer homes (4)
- Be less costly; have less impact on scenic areas; increase land values; help revitalize Creelsboro; avoid impacting a historic site (1 each)

Respondents who expressed **opposition to** Alternative B noted the alternative would…

- Impact sites of historical, archaeological, and/or cultural significance including graves (4)
- Be more costly (3)
- Impact, by acquisition, people's homes/properties (3)
- Be too far from tourist destinations, such as the state park and fish hatchery (1)

Consulting party consultation. A consulting parties' meeting was held on January 11, 2007, to review the APE and discuss issues related to properties listed on or potentially eligible for listing on the NRHP. Additional consultation, via correspondence dated July 14, 2009, solicited comments on adverse effects findings associated with potential impacts to the Creelsboro Rural Historic District. Consulting parties' consultation is described in detail in Section 3.6.1, *Public Involvement—Consulting Parties.* Appendix C contains documentation related to Section 106 issues, including consulting parties' consultation.

5.2 Interagency Coordination and Consultation

Early coordination has occurred with the following agencies. Letters, meeting minutes, and other project-related documentation received from responding agencies are provided in Appendix B (all except Section 106 related) and Appendix C (Section 106 related).

- U.S. Department of the Interior, Fish and Wildlife Service (Tennessee Office)
- U.S. Department of the Interior, Fish and Wildlife Service, Wolf Creek Fish Hatchery
- U.S. Department of Agriculture, Natural Resources Conservation Service
- U.S. Department of the Army, Nashville District, Corps of Engineers, Eastern Kentucky Area Office
- Kentucky State Nature Preserves Commission
- Kentucky Natural Resources and Environmental Protection Cabinet:
    - Department for Natural Resources—Division of Conservation and Division of Forestry
    - Department for Environmental Protection—Division of Water
- Kentucky Transportation Cabinet: Division of Environmental Analysis
- Kentucky Commerce Cabinet:
    - Kentucky Heritage Council, State Historic Preservation Office
    - Kentucky Department of Fish and Wildlife Resources
- University of Kentucky: Office of State Archaeology