

ENVIRONMENTAL ASSESSMENT

for

**US 431 Reconstruction/Relocation
Logan County, Kentucky
KYTC Item No. 3-273.00**

Submitted Pursuant to 42 USC 4332(2)(c) By
US Department of Transportation
Federal Highway Administration
and
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I. INTRODUCTION

This Environmental Assessment (EA) has been written to comply with the requirements of the National Environmental Policy Act of 1969, as amended (42 United States Code 4321 *et seq.*) (NEPA). NEPA requires that federal agencies use an interdisciplinary approach in planning and decision-making for federally funded actions that impact the environment. An EA is used as a tool to assist in determining if a proposed action might create significant impacts, which would then require an Environmental Impact Statement (EIS). If impacts are not significant, a Finding of No Significant Impact (FONSI) is then prepared. The proposed project, reconstruction of a portion of US 431 on new alignment in Lewisburg, Logan County, Kentucky, does not appear to have significant environmental impacts. This EA describes the project's impacts on the natural and human environment.

II. PURPOSE AND NEED

A. *Project Description and Setting*

The proposed project is the reconstruction of a portion of US 431 on new alignment in Lewisburg, Logan County, Kentucky. The project corridor extends from the existing 4-lane section of US 431 at the Logan Aluminum plant south of Lewisburg to Old Greenville Road approximately 1.5 miles north of Lewisburg (mile points 21.311 to 25.718). The project corridor is approximately 4.5 miles long. The project is referred to in Kentucky Transportation Cabinet's (KYTC) *Kentucky 2010 Recommended Six-Year Highway Plan, FY 2010 through FY 2016* (dated January 28, 2010) as "Reconstruct/Relocate US-431 from the end of the existing 4-lane north of Epleys to approximately 1.5 mile north of KY-106 East (North of Lewisburg)" (KYTC Item No. 3-273.00). Figure 1 on the following page shows the project corridor in relation to Logan County and surrounding counties.

Exhibit 1 (page 3) shows project alternatives on topographic mapping, and Exhibit 2 (page 4) shows the project centerlines on aerial mapping.

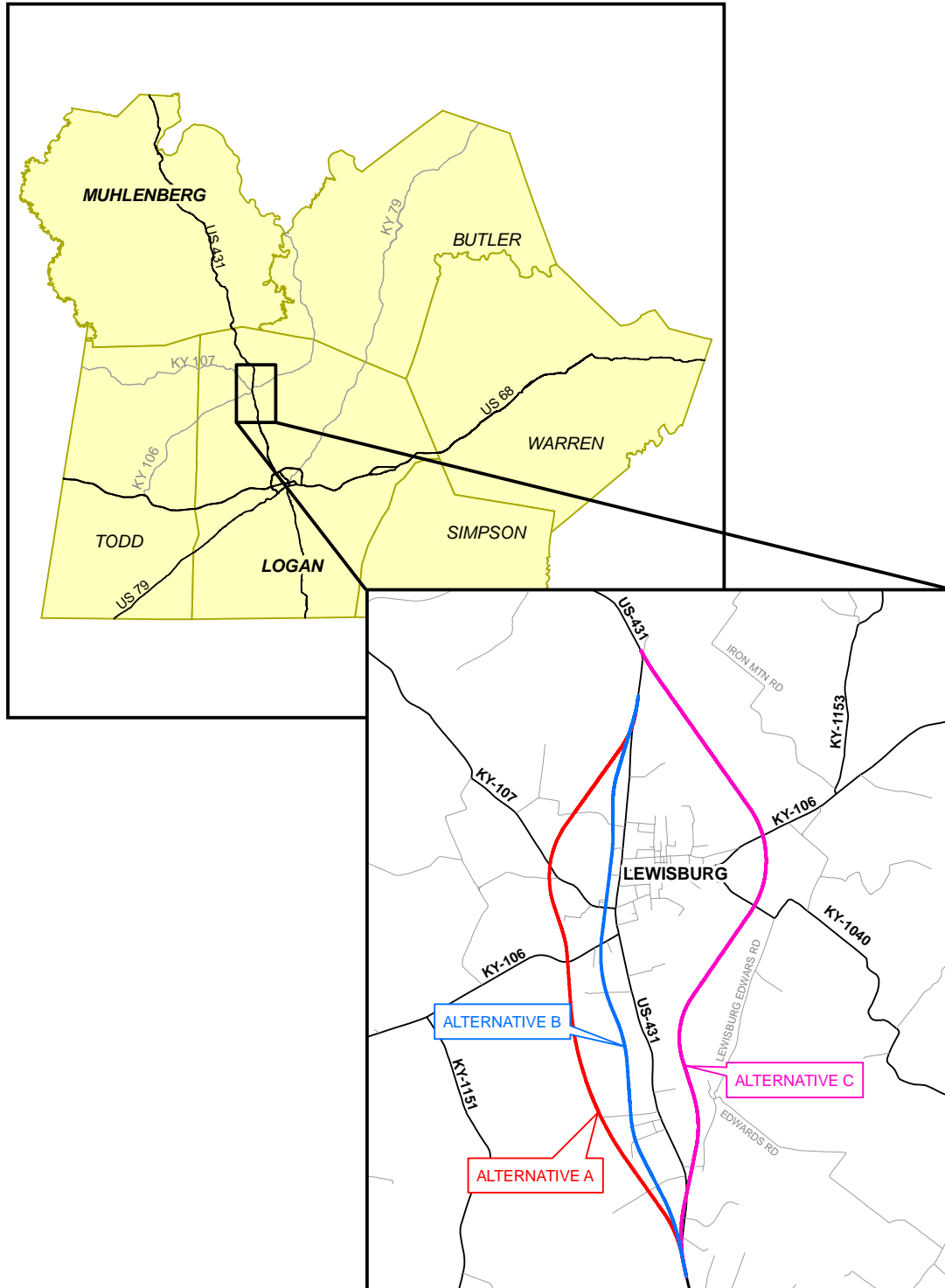
B. *Purpose and Need of the Project*

US 431 is a rural minor arterial highway and is the major north-south artery in Logan and Muhlenberg Counties connecting Russellville and Springfield, Tennessee, to the south with Central City and Owensboro to the north. Development of the project's corridor, purpose, and need occurred through several years of public involvement with local, county, and state officials. The purposes of the project are to (1) accommodate truck traffic as well as increased traffic volumes, which in the future are anticipated to be a greater percentage of heavy trucks; (2) preserve local access in Lewisburg by maintaining the existing road at an acceptable LOS, (3) improve safety; and (4) enhance economic development potential in the region.

1. *Accommodate Truck Traffic and Increased Traffic Volumes*

The project is needed to accommodate the expected increase in truck traffic within the project corridor. Currently (2008), the average truck traffic within the project corridor is 12 percent and is expected to increase to an average of 21 percent in the design year 2035. This volume of trucks will impose the unacceptable level of service (LOS) of E on the existing alignment. US 431 has many driveways, intersections, and access points as it passes near the center of Lewisburg, which result in reduced capacity. Existing US 431 through Lewisburg will be closed to heavy truck traffic once the new road is constructed, limiting vehicular traffic in Lewisburg to automobiles, light trucks, and local delivery truck service.

FIGURE 1 – PROJECT AREA LOCATION



Note: Planimetric mapping, provided by GRW Engineers, is dated February 2010.

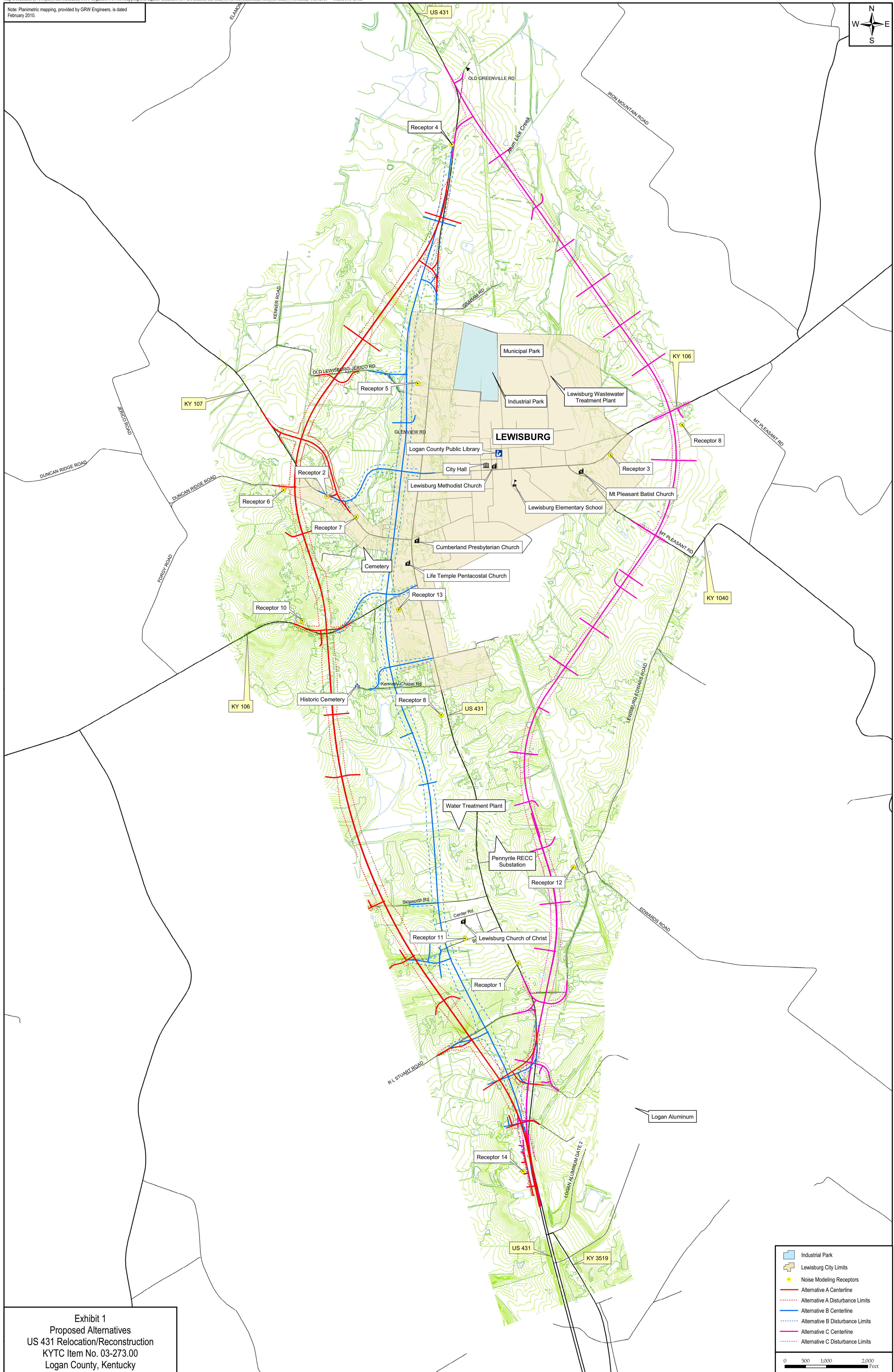
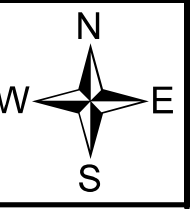
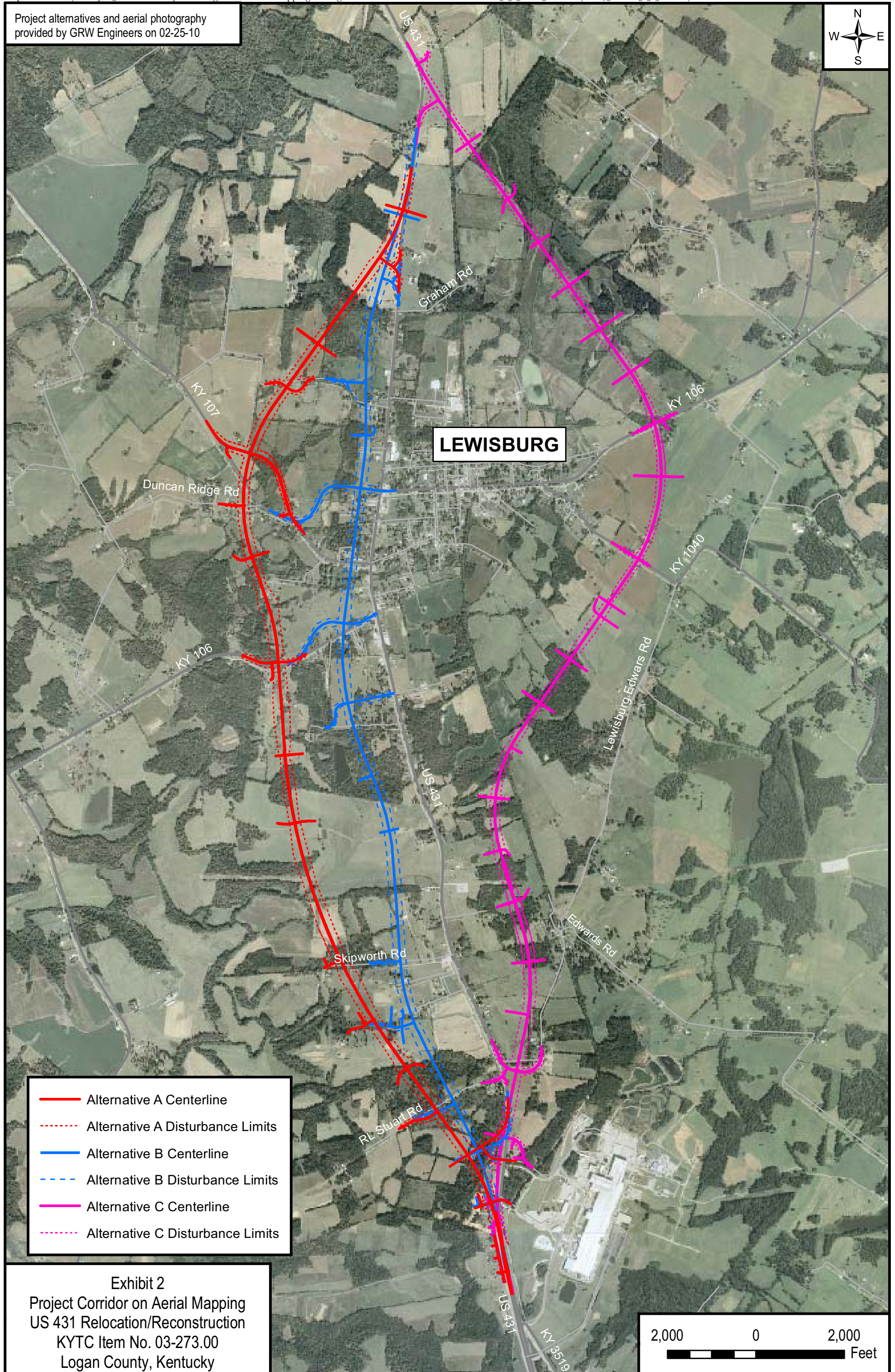
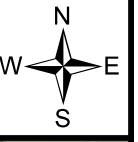


Exhibit 1
Proposed Alternatives
US 431 Relocation/Reconstruction
KYTC Item No. 03-273.00
Logan County, Kentucky

	Industrial Park
	Lewisburg City Limits
	Noise Modeling Receptors
	Alternative A Centerline
	Alternative A Disturbance Limits
	Alternative B Centerline
	Alternative B Disturbance Limits
	Alternative C Centerline
	Alternative C Disturbance Limits

0 500 1,000 2,000 Feet

Project alternatives and aerial photography provided by GRW Engineers on 02-25-10



LEWISBURG

- Alternative A Centerline
- - - Alternative A Disturbance Limits
- Alternative B Centerline
- - - Alternative B Disturbance Limits
- Alternative C Centerline
- - - Alternative C Disturbance Limits

Exhibit 2
Project Corridor on Aerial Mapping
US 431 Relocation/Reconstruction
KYTC Item No. 03-273.00
Logan County, Kentucky



Traffic data for US 431 provides support for this project's purpose and need. Traffic data was compiled from two traffic surveys taken in 2003 and 2004 and updated in 2008 (KYTC Division of Multimodal Programs [DMP]). In addition, a Capacity Analysis was performed by the design engineer in March 2004 and updated in February 2010. A copy of the 2010 Capacity Analysis is included in Appendix A.

DMP divided the existing road into four segments for the No Build scenario and provided separate traffic for each segment. Segment 1 is US 431 from Logan Aluminum to KY 106 (east), Segment 2 is from KY 106 (east) to KY 107, Segment 3 is between KY 107 and KY 106 (west), and Segment 4 is from KY 106 to Old Greenville Road at the northern terminus.

Average daily traffic (ADT) for the No Build scenario (2008 and 2035), with level of service (LOS) for the No-Build 2008 and 2035 scenarios, is shown in Table 1 below. Truck percentages were presumed constant for 2008 and 2035, 12 percent and 21 percent respectively.

TABLE 1 – AVERAGE DAILY TRAFFIC AND LOS (NO BUILD)

SEGMENT	2008	LOS (2008)	2035	LOS (2035)
1	5,600	D	11,000	E
2	6,500	E	13,000	E
3	6,200	E	12,000	E
4	5,600	E	11,000	E

As described more fully in the Capacity Analysis contained in Appendix A (revised June 2010), these LOS rates are due to the low average travel speed coupled with the high percent of time following and the high volume to capacity ratio on existing US 431. LOS E is characterized by undesirable unstable flow, which approaches capacity. Also, the intersection analysis indicates that all three major intersections in Lewisburg will need to be signalized resulting in additional delays and causing this section of US 431 to more appropriately be defined as an urban highway. Thus, the capacity analysis demonstrates the need for the project.

Three alternatives are currently being considered to replace existing US 431: a western by-pass (Alternative A), a close-in western by-pass (Alternative B), and an eastern by-pass (Alternative C). DMP provided projected traffic for each of these alternatives divided into three segments each. Segment 1 is US 431 from Logan Aluminum to KY 106. Segment 2 is KY 106 to KY 107. Segment 3 is KY 107 to old US 431. Tables showing ADT for Build scenarios (2008 and 2035) and truck percentages for 2035 for the three alternatives are shown below.

TABLE 2 – AVERAGE DAILY TRAFFIC (BUILD ALTERNATIVE A)

SEGMENT	2008	2035	% TRUCKS
1	3,000	6,700	34
2	3,200	7,000	34
3	2,700	6,000	42

TABLE 3 – AVERAGE DAILY TRAFFIC (BUILD ALTERNATIVE B)

SEGMENT	2008	2035	% TRUCKS
1	3,800	8,500	28
2	3,900	8,700	30
3	3,400	7,600	33

TABLE 4 – AVERAGE DAILY TRAFFIC (BUILD ALTERNATIVE C)

SEGMENT	2008	2035	% TRUCKS
1	2,700	6,800	36
2	2,600	6,600	37
3	2,300	5,800	37

Part of the Purpose and Need for the project is to “accommodate truck traffic and increased traffic volumes.” Truck traffic is accommodated on all alternatives by signing the proposed route as a truck route and prohibiting through truck traffic on existing US 431. Automobile traffic is a different matter. While it is desirable for automobile traffic to shift to the new route because it is designed to be safer, it is expected that this traffic will make their decisions of which route to take based on perceived travel times for their particular trip. Therefore, because each alternative provides different potential travel times for the variety of trips studied as part of the traffic projections, it has been determined that each alternative performs differently in diverting traffic from the existing, less safe US 431 to the proposed new safer road.

An alternative which has less residual traffic on existing US 431 should be considered superior to one which has more residual traffic on US 431. Therefore, the amount of residual traffic on existing US 431 for each alternative should be considered as a measure of effectiveness in meeting the Purpose and Need of the project. The following residual 2035 existing US 431 projected traffic was reported in the Traffic Projections provided by the Division of Multimodal Programs:

TABLE 5 – RESIDUAL TRAFFIC, BUILD ALTERNATIVES

Segment	2008	2035	% Trucks
Alternative A			
1	2,600	4,500	5
2	3,300	5,600	9
3	3,000	5,100	5
4	2,900	4,900	3
Alternative B			
1	1,800	2,800	5
2	2,600	4,100	7
3	2,800	4,500	6
4	2,200	3,500	4
Alternative C			
1	2,900	4,700	4
2	3,900	6,200	8
3	3,600	5,800	5
4	3,300	5,200	6

The primary purpose of the project is to reduce truck traffic in the community. As may be seen from the residual traffic table above, truck traffic on US 431 decreases in the design year from 21 percent to between 3 percent and 9 percent, depending on the alternative, a decrease of between 57 and 85 percent. Alternatives A and B shift more traffic off existing US 431. Overall, Alternative B provides the lowest residual truck percentages. Alternative C would carry the highest percentage of truck traffic. However, total volume of traffic for Alternative C in 2035 is forecast to be less than for Alternatives A and B. This is because Alternative C is furthest from Lewisburg and fewer vehicles would choose to use that route.

Since the Design Year (2035) traffic is very similar to the Current Year (2008) traffic, it should be noted that the improvement in LOS is not due to decreased congestion but to a change in classification. In accordance with the Highway Capacity Manual, US 431 is a Class I highway because it is an arterial meant to serve long distance trips. Yet the bypassed US 431 becomes a Class II highway because it will become a collector providing access to a Class I facility (the bypass). On Class II highways, mobility is less critical, and LOS is defined only in terms of percent time-spent-following, without consideration of average travel speed. Drivers will tolerate higher levels of percent time-spent-following on a Class II facility than on a Class I facility, because Class II facilities usually serve shorter trips and different trip purposes.

Table 5 above shows that residual traffic for the design year for Alternative C is the highest, which means that the alternative is not shifting through traffic out of town onto the bypass alternative. To meet the project's purpose of "accommodating increased traffic volumes, Alternative C is acceptable, Alternative A is better, and Alternative B is best.

Level of service (LOS) is a qualitative, subjective measure used to describe traffic conditions factoring speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Figure 2, page 8 shows the six levels of service (A to F), which represent free-flow conditions (A) to severe congestion (F). Levels E and F generally represent unacceptable operating conditions. Heavy trucks reduce level of service because they are slower to accelerate from stop lights, require more space to

maneuver, turn more slowly, reduce visibility for motorists behind them, and in general back up traffic following them.

The Capacity Analysis updated by GRW in June 2010 is shown in Appendix A. For the No-Build 2035 scenario, LOS was shown to be E throughout the project corridor. Construction of a two-lane bypass improves level of service on existing US 431 to C throughout, with the exception of Segment 4 (KY 107 to Old US 431) for Alternative B, which is LOS B. The two-lane analysis for each Build alternative for the design year (2035) shows that all alternatives were LOS B in the build year (2015) and were generally LOS C for the design year except for Segment 1 for Alternatives A and C.

2. Preserve Local Access

Preserving local access is a project need that is important to residents and businesses in the community. A public meeting was held in August 2004. Approximately 240 persons attended, and the project team received 42 responses. From these comments, it appears that the community is in favor of Alternative B and less favorable of Alternative C. Some of the related comments were: Alternative C is too far out, the city needs good access, and Lewisburg does not need a by-pass. Thus it is clear that the residents of Lewisburg are concerned about preserving local access. Alternative B best preserves local access to the central area of Lewisburg. Alternatives A and C do not preserve the local access nearly as well as Alternative B and create more of a "bypass effect" to businesses, homes, and community resources located in central Lewisburg. Additional discussion of the public meeting is contained in Section VI, Comments and Coordination, page 56.

Approximately 25 businesses are located along US 431 between the project's end mile points (MPs). All proposed alternatives will deflect heavy trucks that are currently passing through the community. Residents will be able to travel in and near the center of town without having to contend with the growing number of heavy trucks on the main thoroughfare. This will allow residents easier access to local businesses, thus preserving US 431 as a local access route and maintain the economic vitality of the community.

3. Improve Safety

All the proposed alternatives will increase safety, which is an additional purpose of the project, by correcting geometric deficiencies of the existing road including narrow shoulders, limited sight distance curves, and access points. Along much of the roadway, shoulders are narrow (approximately 2 feet) or non-existent and the pavement contains a several-inch drop-off into drainage paths and ditches. Vehicles turning left against traffic can create back-ups as overtaking traffic must halt to wait for on-coming traffic to clear. The lack of shoulders makes passing on the right to preserve the flow of traffic either unsafe or not feasible.

Connector roads do not have proper sight distances at their intersections. These conditions impede visibility and accessibility to connector roads and the numerous driveways along the project corridor. The narrow connector roads along the corridor are nearly indistinguishable from driveways, further adding to visibility and accessibility concerns. The proposed project will correct these deficiencies with wide, safe shoulders and clear, unimpeded intersections for crossroads.

FIGURE 2 – LEVEL OF SERVICE

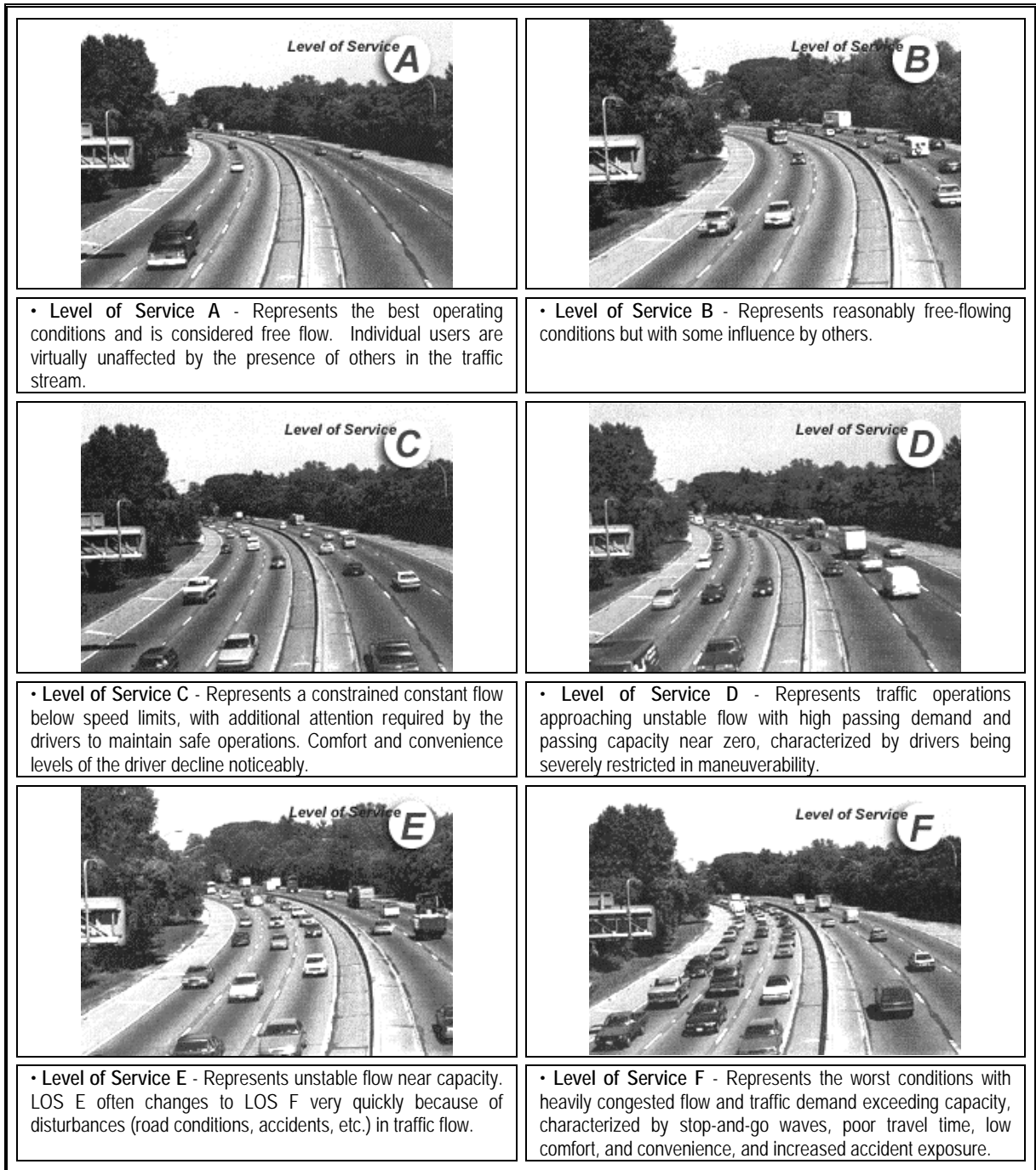


Table 6 below shows accidents and number of injuries for three segments of US 431 from January 2004 through December 2009. Information was provided from the Kentucky State Police crash information database. It should be noted that during this period, there were no fatalities.

TABLE 6 – US 431 ACCIDENT/INJURED DATA, 2004-2009

Year	MP 21.311 - 22.599		MP 22.600 - 24.699		MP 24.700 - 25.718	
	Accidents	Injuries	Accidents	Injuries	Accidents	Injuries
2009	3	0	5	2	4	2
2008	2	1	7	2	2	3
2007	7	3	8	3	6	2
2006	1	0	7	2	4	0
2005	5	6	1	1	2	3
2004	1	0	6	0	4	0
Total	19	10	34	10	22	10
Accidents/ mile	14.8		16.2		21.6	

Source: Kentucky State Police (<http://crashinformationky.org/KCAP/Public/Home.aspx>)

US 431 between Old Lewisburg-Jerico Road (MP 24.6) and the northern terminus had the highest incidence of accidents per mile. However, from the water treatment plant (MP 22.6) to the intersection of Old Lewisburg-Jerico Road (MP 24.6), accidents were much more likely to result in injuries to vehicle occupants. Because this section of US 431 has many more access points due to residential and commercial driveways and street intersections, vehicles entering and leaving the roadway create conflicts with free-flowing traffic.

Accidents do occur on the existing facility, as shown by Table 6; however, the accident rates do not exceed statewide averages. All the proposed alternatives will improve safety by reducing the amount of truck traffic on US 431. A truck route around Lewisburg will reduce the number of trucks traveling through Lewisburg along US 431 by up to 85 percent.

A section of highway is considered to have a statistically significant high accident rate when the actual annual accident rate (accidents per 100 million vehicle-miles) is higher than the critical accident rate. The critical accident rate is the maximum statistically significant accident rate or number of accidents that may be expected to occur on a highway given the statewide accident rate, type of roadway, length of section, and average annual daily traffic volume. Thus a section of highway that has a critical rate factor greater than 1.0 is considered a high-accident segment.

Current critical rate factor calculations are not available. However, in the *US 431 Corridor Feasibility Study* (2002), it was determined that no section of US 431 within the project area had a critical rate factor exceeding 1.0. The *Feasibility Study* compared statewide accident rates for similar types of facilities to accident rates within the study corridor. This comparison showed that the accident rate along rural two-lane undivided sections of the study corridor is slightly less than the overall statewide average accident rate for a similar roadway type.

4. Enhance Economic Development

The current Lewisburg Industrial Park, located just north of the center of town, is neither at full occupancy nor development potential (Exhibit 1, page 3). At present (2010), only one small manufacturing facility is located at the site. It is the goal of the Lewisburg local government to maximize occupancy in the industrial park to generate jobs and revenue for the city. Current efforts to lease all the available space may result in an increase in the number of trucks traveling through Lewisburg. Therefore, construction of the new road will meet the purpose and need of the project by reducing truck traffic and meet the additional purpose of enhancing economic development opportunities for corporate and residential citizens. Alternative C provides the best direct access to the industrial park because it is east of the industrial park and has potential for direct access without impacting traffic on existing US 431. Alternatives A and B have similar access capabilities as trucks will need to travel along existing US 431 for a short distance to access the current entrance to the industrial park.

C. Description of Existing Facility

Lewisburg is located on US 431, a AAA-rated highway (a roadway having an 80,000-pound gross load limit). US 431 connects Owensboro on the Ohio River to Russellville in Logan County and continues south to Nashville, Tennessee. US 68 bisects Logan County east-west and connects Russellville with Hopkinsville on the Pennyryle Parkway to the west and Bowling Green on Interstate 65 (I-65) in the east. Lewisburg is 11 miles north of Russellville. US 431 is a 4-lane divided highway from Russellville north to Epleys Station at the Logan Aluminum plant. It is a 2-lane state primary route north of Epleys Station to Central City. US 79 is a 2-lane state primary route from Russellville to Interstate 24 (I-24) just south of the Tennessee border. US 431 connects Logan Aluminum with the Owensboro Riverport on the Ohio River, which is the major inland port handling import aluminum for distribution throughout the Midwest.

R.J. Corman Railroad Group maintains a branch line to the Logan Aluminum plant from their Memphis short line. This line connects Cumberland City in Tennessee to Bowling Green and passes through Russellville. The Memphis short line then connects with the CSX rail system at Bowling Green and Guthrie, Kentucky. Logan Aluminum is a major customer for this rail service and ships aluminum can stock from the rolling mill. The nearest airport is in Bowling Green, about 25 miles east of Russellville. The Bowling Green-Warren County Regional Airport is operated by Co-Mar Aviation and has two runways. It is a full service, fixed base operation (FBO), offering aircraft service, corporate jet hangar rental and fueling capabilities. A general aviation terminal serves the needs of the corporate traveler with a flight planning room, pilot lounge, meeting rooms, and other amenities. Charter flights are available to accommodate business travelers.

D. Logical Termini

The proposed termini were selected to achieve the objectives of the project while minimizing impacts to the city. However, the project is a segment of improvements contained in the Six-Year Plan (2010 Recommended Six-Year Highway Plan, FY 2010 through FY 2016 (dated January 28, 2010) for improving US 431 from Lewisburg to the Western Kentucky Parkway near Central City. The southern terminus of all three proposed alternatives is located at the Logan Aluminum plant where US 431 narrows from four to two lanes as it proceeds north through Lewisburg. Northern termini for Alternatives A and B is located 2,500 feet north of Graham Road. The northern terminus for Alternative C is at Old Greenville Road.

These termini are logical for the proposed project. All alternatives will ultimately be four lanes where they connect to US 431 at the southern terminus, which connects to the existing 4-lane improvements already

completed on US 431. Thus the project will continue to widen US 431 north of Lewisburg, representing a logical continuation of improvements to US 431 at the project's southern terminus. At the northern terminus, US 431 takes a slight northwest bend after Old Greenville Road. A substantial floodplain to Wolf Lick Creek lies north of Old Greenville Road. Crossing this floodplain would create impacts to aquatic resources. Because the proposed project, as a segment of long-term US 431 improvements, is a by-pass around Lewisburg, there is no purpose to extending the proposed alignments further north.

E. History of the Project

This project was developed as part of a US 431 corridor analysis, which analyzed the need for transportation improvements of US 431 from 0.8 mile north of Epleys in Logan County to the Western Kentucky Parkway in Muhlenberg County. Two published studies resulted from this analysis: the *US 431 Corridor Study, Existing Conditions Technical Memorandum* (KYTC Division of Planning, Department of Highways District 3, and Barren River Area Development District, April 1999), and the *US 431 Corridor Feasibility Study, Final Report* (KYTC Division of Planning, April 2002) (*Final Report*). The studies documented the existing transportation infrastructure, socioeconomic conditions, and known environmental issues and concerns along the study corridor; described public involvement activities; analyzed future traffic demand; and evaluated the feasibility of alternative transportation improvement options. The *Final Report* was intended to be used for the evaluation of projects with respect to their merit for inclusion in future KYTC planning and preconstruction programs.

The present project was considered as Construction Section 1 (Lewisburg to Diamond Springs Road) in the corridor analysis. Diamond Springs Road is approximately three miles north of Old Greenville Road. Subsequent to publication of the *Final Report*, the project corridor was shortened to its present length as an alternate route around the community of Lewisburg.

III. ALTERNATIVES

A. The No-Build Alternative

The No-Build alternative would maintain US 431 and connecting roadways in their present configuration and would require only routine maintenance. As projected by KYTC Division of Multimodal Programs, truck traffic is anticipated to increase from 12 percent of existing traffic to 21 percent in 2035. This increased truck traffic will cause more extensive wear and tear on the roadbed, as well as increase noise and air concerns in the small community of Lewisburg. Should the industrial park be fully developed, all the southbound traffic from the park would be routed along US 431 and thus contribute to traffic congestion, air, and noise considerations.

The advantages of the No-Build alternative include no required residential relocations, prime farmland would continue in production, and the cost of constructing a 4.5-mile roadway would not be incurred.

Despite these advantages, the No-Build alternative does not support the purposes and need for this project, which are to accommodate increased truck traffic and traffic volumes, preserve local access to Lewisburg, improve safety, and enhance economic development potential. Concerns about capacity and safety on existing roadways will not be addressed. US 431 through Lewisburg will continue to service heavy truck traffic destined for Logan Aluminum and Russellville. Maintaining roads in their present configuration will hamper development of the Lewisburg Industrial Park.

Finally, the No-Build alternative is not consistent with state transportation planning. The proposed project is included in *Kentucky 2010 Recommended Six-Year Highway Plan, FY 2010 through FY 2016* (dated January 28, 2010). As seen in Table 1, page 5, LOS for the No-Build scenario for 2035 is E throughout the project corridor.

B. Public Transit Alternative

Public transportation alternatives generally relieve congestion by improving the efficiency of the mode of travel. The rural nature of this project is not conducive to public transportation. There is a low population density throughout the project area that would not support a public transit alternative.

C. Transportation System Management Alternative

The primary purpose of the Transportation System Management (TSM) alternative is to improve the operational efficiency of the existing transportation system. Typically, the TSM approach includes low-cost improvements such as widening shoulders, constructing minor realignments of curves, adding turning and/or climbing lanes, installing traffic signals and/or computerizing signal systems, or other traffic service improvements designed to promote smooth and efficient traffic flow. TSM measures are generally considered appropriate in urban settings where the existing facilities operate beyond their design capacity limits (FHWA Technical Advisory T6640.8A, Oct. 30, 1987). The proposed project does not fit this profile as it is in a rural environment.

D. Build Alternatives

Within the study corridor, existing US 431 has two lanes with narrow shoulders. Lane widths are predominantly 10 feet, with 1-foot shoulders. At the south end of the project, where US 431 transitions into the existing 4-lane section at Logan Aluminum, lane widths are 12 feet. Although the entire length of US 431 is not included on either the Federal or State Designated Truck Network or the National Highway System, it is designated as a "AAA" highway with an 80,000-pound gross load limit and receives a considerable amount of heavy truck traffic.

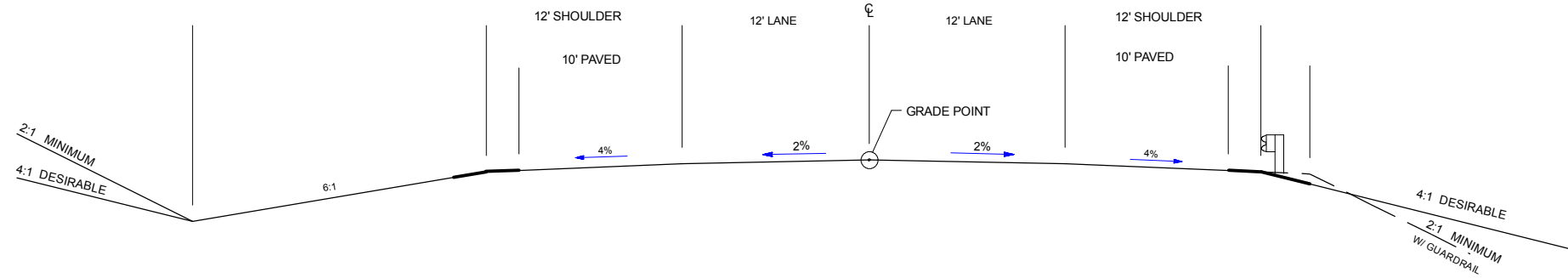
Three alternatives in addition to the No-Build alternative are being considered for this project. While the ultimate alternative will include four lanes, the initial typical section is a two-lane road (Exhibit 3, page 14). The two-lane typical section includes 12-foot traffic lanes and 12-foot shoulders (10-foot paved), with an 18-foot ditch. The anticipated speed limit will be 55 miles per hour. All Build alternatives have a common southern terminus, which is located at US 431 mile point 21.311 near Gate 4 of Logan Aluminum. The northern terminus is either 2,500 feet north of Graham Road (Alternatives A and B) or at Old Greenville Road (Alternative C).

Alternative A is the western-most route and is 5.11 miles long (see Exhibit 1, page 3). The centerline is west of US 431. It heads north-northwest, intersecting R L Stuart Road, Blackford Road, Skipworth Road, KY 106, Duncan Ridge Road, KY 107, and Old Lewisburg-Jerico Road before rejoining US 431 approximately 2,500 feet north of the Graham Road intersection. Alternative A has two options for connecting new US 431 to existing US 431. The first option ties to existing KY 107 east of proposed US 431 and utilizes the existing intersection of KY 107 and existing US 431. The second option takes a direct route to existing US 431 and ties in opposite the existing intersection of existing US 431 and KY 106E. Alternative A acquires 161 acres of new right-of-way.



TYPICAL SECTIONS

SCALE: 1"=5'

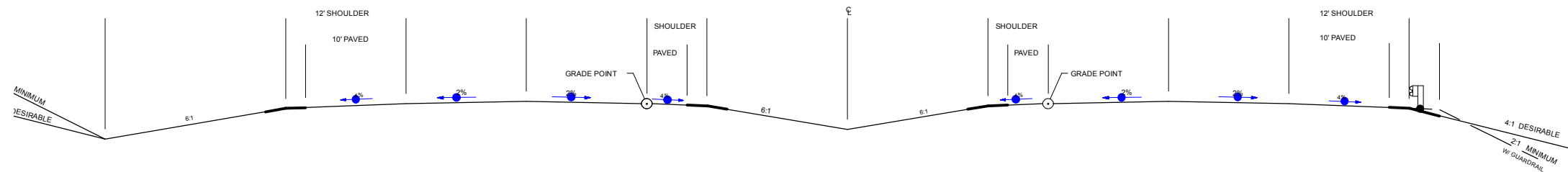


NORMAL CUT/FILL SECTION

US 431 - 2 LANE INITIAL

TYPICAL SECTIONS

SCALE: 1"=5'



NORMAL CUT/FILL SECTION

US 431 - 4 LANE DIVIDED ULTIMATE

Alternative B is 4.94 miles long and also lies west of Lewisburg and most closely parallels the existing US 431 alignment (see Exhibit 1, page 3). This alternative intersects R L Stuart Road, Blackford Road, Center Road, Skipworth Road, Kennerly Chapel Road, KY 106, KY 107, Glenview Street, and Old Lewisburg-Jerico Road. As for Alternative A, the terrain at the proposed intersection of US 431 and R L Stuart Road is steep and wooded. The northern portion of Alternative B crosses farmland and reconnects with existing US 431 at the same location as Alternative A. Alternative B has two options for connecting proposed US 431 to existing US 431. The existing intersection of US 431 and KY 106 is an offset intersection with the west approach of KY 106 intersecting US 431 approximately 3,000 feet south of the east approach. The first option for KY 106 maintains the offset intersection along the proposed US 431 with the west approach intersecting the proposed US 431 near the current intersection. The second option takes a direct route to existing US 431 and ties in opposite the existing intersection of existing US 431 and KY 106E at the same location as Alternative A. This connection then travels southwest from proposed US 431 to connect with KY 107. At its closest point, Alternative B is 500 feet west of the most densely developed section of US 431 in Lewisburg and is within the Lewisburg city limits.

Because of its proximity to town, Alternative B crosses more residential areas and thus has the greatest number and degree of residential relocation impacts. P 227 is a low-income trailer park that would be acquired in part by Alternative B. However, only 4 of the 11 trailers on the site are occupied. Alternative B acquires 146 acres of new right-of-way.

Subsequent to the submittal of the baseline analyses, Alternative B was revised to its existing configuration by eliminating a western connection from proposed US 431 to KY 107 that was approximately 1,000 feet south of the US 431/KY 106 existing intersection.

Alternative C is east of Lewisburg and is also the longest; it is 5.74 miles long (see Exhibit 1, page 3). Alternative C closely follows the existing alignment for 2,000 feet north of the southern terminus, and then heads nearly due north. Alternative C intersects Lewisburg-Edwards Road, KY 1040, and KY 106, before curving northwest to reconnect with existing US 431 2,500 feet north of Alternatives A and B at Old Greenville Road. At its furthest point, Alternative C is more than one mile east of existing US 431. Alternative C primarily crosses farmland, woodland, and gently rolling terrain and has the least residential impacts. Alternative C acquires 128 acres of new right-of-way.

In 2010, due to KYTC's Practical Solutions initiative, the project design was modified. The main change in the project design is reduction of the four-lane typical section to a two-lane typical section. Most of the two-lane facilities will be constructed on the east side of a right-of-way suitable for a four-lane facility. A description of the individual changes for each of the Build Alternatives follows.

For Alternative A, the vertical curves at Stas. 102, 163, 245 and 264 were made shorter to provide more positive drainage for the roadway ditches and the median. The transition from two northbound lanes to a single northbound lane at the beginning of the project was accomplished by first closing the right lane and then transitioning the left lane to the location of the right lane centered 38 feet right of centerline. Previously, at the north end of the project, the four lanes tapered and transitioned into two lanes about the same centerline, which then tied into the existing centerline. The refinement was to tie the proposed centerline into a 32-foot offset of the existing centerline so that the two northbound lanes met the two

existing lanes. The four-lane ultimate is carried to an abrupt end at the end of the project and right-of-way is shown acquired for all of it.

For Alternative B, the vertical curves at Stas. 110, 156 and 225 were made shorter to provide more positive drainage for the roadway ditches and the median. Also the profile grade from Sta. 225 to the end of the project was adjusted by adding an additional vertical curve to more closely follow the existing terrain. The changes in the horizontal alignment for Alternative B were similar to those for Alternative A.

For Alternative C, the transition from four lanes to the two-lane initial section at the beginning of the project is the same as for Alternatives A and B. The transition from the four-lane ultimate to the two-lane ultimate at Sta. 101 was changed. The transition will be entirely in the southbound lanes when they are constructed. Also the vertical curves at Stas. 101, 141+50, 258, and 286 were made shorter to provide more positive drainage for the roadway ditches and the median.

It should be noted that right-of-way for the four-lane ultimate alternative will be acquired at the time of the two-lane construction to allow for anticipated modifications to the roadway in the future.

E. Alternative Considered But Eliminated

As discussed in Section IV.J below, it was determined that Alternative B represented an Environmental Justice impact to a low-income population. A conceptual EJ Alternative B was developed, which attempted to minimize impacts to this group of residents. The conceptual EJ Alternative B was developed by moving the alignment of the original Alternative B immediately to the east or to the west in order to miss the area where a large portion of the low-income population is located.

In developing EJ Alternative B, an existing boundary constraint was identified that prevented an eastward shift. Near the middle section of EJ Alternative B, a connector road between US 431 and existing KY 106 would be necessary. The length of this KY 106 connector would be required to be at least 380 feet. This length requirement is necessary to avoid unsafe operating conditions that may occur from traffic backing up onto either road while waiting for turning access. In this area the boundary constraint exists because there is insufficient area to construct the necessary KY 106 connector to the required length of 380 feet. Thus an eastward shift of Alternative B would not improve safety, a need of the project, and was therefore eliminated from consideration.

A minor westward shift that avoids the low-income group of residents was also assessed. However, a westward shift is constrained by a large, potentially historic cemetery. This minor alignment shift to the west would require the acquisition of about 2 acres from the cemetery. Assuming 800 gravesites per acre with only half of them occupied, this acquisition would result in hundreds of grave relocations, an impact that would likely be considered unacceptable to the community. Additionally, given the age of the cemetery (many of the headstones date to the 19th century), the cemetery has potential historic ties to the community. Additional cultural historic investigations would be required if this property were disturbed. Therefore, due to community disruption and cultural historic impact, this avoidance alternative was eliminated from consideration.

A centerline shift of 200 feet to the west to avoid some, but not all, of the group of low-income residents was assessed. This westward shift would begin at Old Lewisburg Jerico Road and end at Kennerly-Chapel

Road, a distance of 8,600 feet (1.6 miles). Because this shift would not impact the cemetery and avoids a portion of the trailer park, this shift was considered feasible. However, by avoiding a portion the trailer park with EJ Alternative B, a total of 13 relocations would still be required, 6 of which are low income. This would result in 46% low-income relocations for EJ Alternate B, in comparison to 38% low income for the census tract. Based upon interviews with the EJ community residents in 2010, it was found that 44% of residents in Alternative B were low income. This percentage is lower than 46% for EJ Alternative B. The 46% of low-income relocations required by EJ Alternative B would therefore create a greater EJ concern than for Alternative B.

TABLE 7 – LOW-INCOME HOUSEHOLD RELOCATIONS

Alternative or Geographic Area	Relocations	Low-Income Households	% Low Income
A	9	0	0
B	16	7	44
EJ B	13	6	46
C	4	1	25
Census Tract 9602	N/A	585 of 1,562	

There are 11 trailers in the park, but only four of them are occupied (March 2010), three with low-income family units. Alternative B acquires three occupied trailers and EJ Alternative B acquires two. However, of the three trailers acquired by Alternative B, only two are occupied by low-income family units. Therefore, EJ Alternative B does not benefit the residents of the trailer park, nor does it eliminate the original EJ concern. And in 2010, it was found that EJ Alternative B had the highest impact to the low-income community of all the alternatives.

Additionally, while EJ Alternative B reduces the number of acquisitions by three, the personal situations of the residents on parcels not acquired by EJ Alternative B as compared to Alternative B are not compelling. Some favor construction or have no particular opposition to the project. By contrast, EJ Alternative B impacts two family clusters that would disrupt family interdependence, and would bisect another resident's property. And for some low-income residents, avoiding them with EJ Alternative B leaves them adjacent to a four-lane roadway, which is an adverse impact compared to their existing situation. Acquiring their homes with Alternative B would allow their relocation to a site that would not subject them to noise impacts from the new roadway. Therefore, selection of EJ Alternative B does not represent a significant reduction of adverse impacts to the low-income community.

During the assessment of EJ Alternative B, an additional environmental impact was also identified. This assessment identified that EJ Alternative B would impact approximately 1,500 linear feet of a blue line stream (unnamed tributary of Wolf Lick Creek). Such an impact would require an individual US Army Corps of Engineers permit. Additionally, this would create additional floodplain impacts. By comparison Alternative B would impact approximately 509 linear feet at two crossings of the same unnamed tributary of Wolf Lick Creek. Thus EJ Alternative B has three times the aquatic impacts as Alternative B.

In summary, EJ Alternative B reduces the number, but not the percent, of low-income acquisitions and has the highest percent impact to the EJ community. Given that the low-income relocations for EJ Alternative B still represent a higher percentage as compared to the census tract, the impacts to a potentially historic,

large cemetery, and that stream impacts are greater for this alternative, EJ Alternative B was eliminated from consideration.

F. Schedule

The proposed project is listed in *Kentucky Recommended Six-Year Highway Plan FY 2010-2016*. Right-of-way acquisition and utility construction is scheduled for 2013. Construction is scheduled for 2015. Current funding allocated in the *Six-Year Plan* is as follows:

- Right-of-Way Acquisition, \$6,120,000
- Utility Construction, \$2,540,000
- Construction, \$29,700,000
- Total: \$38,360,000

Estimated cost comparisons (initial two-lane and ultimate four-lane) of the three Build alternatives are as follows:

- | | | |
|------------------|----------------|----------------|
| • Alternative A: | \$19.8 million | \$32.7 million |
| • Alternative B: | \$17.1 million | \$26.5 million |
| • Alternative C: | \$18.4 million | \$22.4 million |

Final selection of an alternative will be made only after full consideration of impacts and review the public hearing comments.

IV. ENVIRONMENTAL IMPACTS

Environmental impacts determined for each of the Build alternatives are compared and summarized by alternative in Table 8, page 19 and are discussed in detail below.

TABLE 8 – SUMMARY OF ENVIRONMENTAL IMPACTS

Category Impacts		Alternative A	Alternative B	Alternative C
Air Quality		None		
Noise Assessment		None		Possible Noise Barrier Site 12
Aquatic Ecosystems	Floodplains	5.4 acres	None	0.9 acres
	Wetland	0.91 acres	None	0.37 acres
	Permits	USACE 404 Nationwide #14 and individual 404 wetland permit, KDOW Water Quality Certification, Floodplain Certification	USACE Nationwide #14, KDOW Water Quality Certification	USACE 404 Nationwide #14 permit (stream and wetland), KDOW Water Quality Certification, Floodplain Certification
	Wild/Scenic	None		
Threatened & Endangered Species		BA for Indiana and Gray bats		
Historic Resources		None		
Archaeology Resources		Site 15Lo186: take measures to ensure that unmarked graves will not be impacted	None Eligible	Site 15Lo219: FHWA coordination with parties to resolve disagreement over eligibility status; possible coordination with ACHP
Relocations		5 Residential 0 Businesses	16 Residential 0 Businesses	4 Residential 0 Businesses
Replacement Housing		Adequate housing is available	Last resort housing may be necessary for some residents.	Adequate housing is available
Environmental Justice		None	Yes	None
UST/Hazardous Materials		None	One site recommended for Phase II, Parcel 255	None
4(f) and 6(f) Resources		None	None	None

A. Air Quality

An *Air Quality Baseline Assessment* was submitted to KYTC-DEA on April 23, 2004 for the proposed project. This study provides supporting documentation for this Environmental Assessment.

Logan County, Kentucky is part of the South Central Kentucky Intrastate Air Quality Control Region. Currently, the county is "in attainment for all transportation related pollutants". An air quality analysis was performed according to KYTC and Federal Highway Administration (FHWA) protocols. This analysis used computer modeling (Mobile 6.2 and Cal3QHC) to estimate vehicle emissions and predict carbon monoxide (CO) concentrations at two receptors along the proposed project corridor. One receptor was used in the free-flow analysis and the other receptor was used in the signalized intersection analysis for the No-Build Alternative. All calculated existing and future CO concentrations are below the one-hour National Ambient Air Quality Standard (NAAQS) of 35 parts per million (ppm) and the eight-hour NAAQS of 9 ppm. The maximum one-hour and eight-hour concentrations predicted are shown in Table 9 below. According to the predictions of the existing and future CO emissions, the proposed project will not result in negative air quality impacts for Logan County or the air quality control region. The projected increase of emissions of

transportation-related pollutants associated with the proposed project should not alter the attainment status of the county with respect to current standards.

TABLE 9 – MAXIMUM PREDICTED CO CONCENTRATIONS

Scenario	Maximum One-Hour (ppm)		Maximum Eight-Hour (ppm)	
	Free-Flow	Intersection	Free-Flow	Intersection
Existing	2.5	N/A	1.55	N/A
No-Build	2.4	2.4	1.48	1.48
Alternative A	2.3	N/A	1.41	N/A
Alternative B	2.3	N/A	1.41	N/A
Alternative C	2.3	N/A	1.41	N/A

With respect to the latest transportation improvement program, the proposed project is located on page 143 of *Kentucky Statewide Transportation Improvement Program (STIP), Fiscal Years 2003-2008*. The proposed project is in compliance with the Kentucky State Implementation Plan for Attainment and Maintenance of National and State Ambient Air Quality Standards. The State Implementation Plan considers the cumulative impacts of air emissions from mobile and stationary sources. No mitigation is necessary for air quality.

The air baseline was reevaluated in 2010 due to changes in the project design, and to incorporate Mobile Source Air Toxics information. The main change in the project design is reduction of the four-lane typical section to a two-lane typical section. Most of the two-lane facilities will be constructed on the east side of a right-of-way suitable for a four-lane facility.

For Alternative A, the vertical curves at Stas. 102, 163, 245 and 264 were made shorter to provide more positive drainage for the roadway ditches and the median. The transition from two northbound lanes to a single northbound lane at the beginning of the project was accomplished by first closing the right lane and then transitioning the left lane to the location of the right lane centered 38 feet right of centerline. Previously, at the north end of the project, the four lanes tapered and transitioned into two lanes about the same centerline, which then tied into the existing centerline. The refinement was to tie the proposed centerline into a 32-foot offset of the existing centerline so that the two northbound lanes met the two existing lanes. The four-lane ultimate is carried to an abrupt end at the end of the project and right-of-way is shown acquired for all of it.

For Alternative B, the vertical curves at Stas. 110, 156 and 225 were made shorter to provide more positive drainage for the roadway ditches and the median. Also the profile grade from Sta. 225 to the end of the project was adjusted by adding an additional vertical curve to more closely follow the existing terrain. The changes in the horizontal alignment for Alternative B were similar to those for Alternative A.

For Alternative C, the transition from four lanes to the two-lane initial section at the beginning of the project is the same as for Alternatives A and B. The transition from the four-lane ultimate to the two-lane ultimate at Sta. 101 was changed. The transition will be entirely in the southbound lanes when they are constructed.

Also the vertical curves at Stas. 101, 141+50, 258, and 286 were made shorter to provide more positive drainage for the roadway ditches and the median.

The 2004 *Air Quality Baseline Assessment* was conducted prior to the June 2008 release of the KYTC and FHWA joint guidance of *NEPA Documentation - Air Quality*. The following paragraphs address both the design changes and updates in air quality documentation associated with that guidance.

1. *Mobile Source Air Toxics*

On February 3, 2006, the FHWA released "*Interim Guidance on Air Toxic Analysis in NEPA Documents.*" This guidance was superseded on September 30, 2009 by FHWA's "*Interim Guidance Update on Air Toxic Analysis in NEPA Documents.*" The purpose FHWA's guidance is to advise on when and how to analyze Mobile Source Air Toxics (MSATs) in the NEPA process for highways. This guidance is interim, because MSAT science is still evolving. As the science progresses, FHWA will update the guidance.

Technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions of this project. However, even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions. The qualitative assessment presented below has been prepared in accordance with FHWA's Interim Guidance derived in part from a study conducted by the FHWA entitled "*A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives.*" Additional information regarding MSATs is provided in Appendix B.

FHWA's Interim Guidance groups projects into the following categories:

- Exempt Projects and Projects with no Meaningful Potential MSAT Effects
- Projects with Low Potential MSAT Effects
- Projects with Higher Potential MSAT Effects

FHWA's Interim Guidance provides examples of "Projects with Low Potential MSAT Effects." These projects include minor widening projects and new interchanges, such as those that replace a signalized intersection on a surface street or where design year traffic projections are less than 140,000 to 150,000 AADT. This project falls into that category.

For each alternative in this EA, the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for each of the Build Alternatives is slightly higher than that for the No Build Alternative because of the construction of additional alignments (Table 10). This increase in VMT means MSATs under the Build Alternatives is estimated to be slightly higher than the No Build Alternative in the study area. There could also be localized differences in MSATs from indirect effects of the project such as associated access traffic, emissions of evaporative MSATs (*e.g.*, benzene) from parked cars, and emissions of diesel particulate matter from delivery trucks, depending on the type and extent of development. On a regional scale, this emissions increase would be offset somewhat by reduced travel to other destinations.

Because the estimated VMT under each of the Build Alternatives are nearly the same, varying by less than nine percent, it is expected there would be no appreciable difference in overall MSAT emissions among the

various Build Alternatives. MSAT levels for Build Alternative C are slightly higher due to the increased road length. For all Alternatives, emissions are virtually certain to be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent from 2000 to 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

In sum, under all Build Alternatives in the design year it is expected there would be reduced MSAT emissions in the immediate vicinity of the existing US 431, relative to the No Build Alternative, due to the reduced VMT along the existing roadway and to EPA's MSAT reduction programs. In comparing various project alternatives, MSAT levels could be higher in some locations than others, but current tools and science are not adequate to quantify them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

TABLE 10 – TOTAL VEHICLE MILES TRAVELED (VMT) BY ALTERNATIVE

Facility	No Build			Alternative A			Alternative B			Alternative C		
	2035 AADT	Dist. (mi)	2035 VMT	2035 AADT	Dist. (mi)	2035 VMT	2035 AADT	Dist. (mi)	2035 VMT	2035 AADT	Dist. (mi)	2035 VMT
Start to KY 106	11000	2.97	32670	4500	2.97	13365	2800	2.97	8316	4700	2.97	13959
KY 106 to KY 107	13000	0.22	2860	5600	0.22	1232	4100	0.22	902	6200	0.22	1364
KY 107 to KY 106	12000	0.31	3720	5100	0.31	1581	4500	0.31	1395	5800	0.31	1798
KY 106 to End	11000	1.8	19800	4900	1.8	8820	3500	1.8	6300	5200	1.8	9360
Build Alternatives	Start - Segment 1			6700	2.94	19698	8500	2.99	25415	6800	3.36	22848
	Middle - Segment 2			7000	0.92	6440	8700	0.58	5046	6600	0.6	3960
	End - Segment 3			6000	1.42	8520	7600	1.58	12008	5800	1.94	11252
Total		5.3	59050		10.58	59656		10.45	59382		11.20	64541

Substantial construction-related MSAT emissions are not anticipated for this project, as construction is not planned to occur over an extended building period. However, construction activity may generate temporary increases in MSAT emissions in the project area. Project-level assessments that render a decision to pursue construction emission mitigation will benefit from a number of technologies and operational practices that should help lower short-term MSATs. In addition, the SAFETEA-LU (Public Law 109-59, 2005) has emphasized a host of diesel retrofit technologies in the law's CMAQ provisions - technologies that are designed to lessen a number of MSATs.

Construction mitigation includes strategies that reduce engine activity or reduce emissions per unit of operating time. Operational agreements that reduce or redirect work or shift times to avoid community exposures can have positive benefits when sites are near vulnerable populations. For example, agreements that stress work activity outside normal hours of an adjacent school campus would be operations-oriented mitigation. Also on the construction emissions front, technological adjustments to equipment, such as off-road dump trucks and bulldozers, could be appropriate strategies. These

technological fixes could include particulate matter traps, oxidation catalysts, and other devices that provide an after-treatment of exhaust emissions. The use of clean fuels, such as ultra-low sulfur diesel, also can be a very cost-beneficial strategy.

The EPA has listed a number of approved diesel retrofit technologies; many of these can be deployed as emissions mitigation measures for equipment used in construction. This listing can be found at: www.epa.gov/otaq/retrofit/retroverifiedlist.htm.

2. Other Air Quality Pollutants

This project is in an area of attainment for lead (Pb), nitrogen dioxide (NO₂), ozone, sulfur dioxide (SO₂), and particulate matter (PM_{2.5} and PM₁₀). Lead has not been a mobile source concern since Tetraethyl Lead was banned as a fuel additive. SO₂ is primarily an industrial source concern and not a mobile source concern. Because this project is located in a PM_{2.5} and PM₁₀ attainment area, the conformity procedures of 23 CFR 770 do not apply to this project.

Because the project is not a signalized intersection with a projected open to traffic year average daily traffic (ADT) greater than 80,000 vehicles per day, it does not meet the criteria requiring a CO project level analysis and will not produce a projected violation of the CO standards (35 parts per million over a 1-hour period or 9 parts per million over an 8-hour period) based on the KYTC 2007 criteria in *Kentucky CO Screening Procedure for NEPA Background Documentation*.

In summary, this project is not expected to have an adverse impact on the air quality of the area. Therefore, the project will not have any cumulative or indirect impacts to the community of Lewisburg.

B. Noise

A *Traffic Noise Analysis Baseline Assessment* was submitted to KYTC-DEA on April 23, 2004 for the proposed project. This study provides supporting documentation for this Environmental Assessment.

Fourteen (14) noise sensitive receptors (all residences) were identified to predict existing and future noise levels (Exhibit 1, page 3). All sites selected had an uninterrupted line-of-sight between the receptor and the nearby existing or proposed roadway. Existing noise level readings were recorded at Sites 1 through 4 to validate Federal Highway Administration's Traffic Noise Model (FHWA's TNM) version 1.1. TNM was then used to predict Existing, No-Build, and Build noise levels.

According to the FHWA Policy, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, contained in 23 CFR 772, traffic noise impacts occur when any of the following conditions are met:

- The predicted traffic noise levels approach (*i.e.*, come within 1 decibel) or exceed the noise abatement criteria (NAC);
- The noise level increase predicted for the design year is 10 dBA or greater than the measured existing noise level (*i.e.*, substantial increase).

All noise levels predicted in this study are in decibels (dB) on the A-weighted scale, or dBA, using the L_{eq} descriptor. The A-weighted scale is used because it most nearly matches the response of the human ear to sound. L_{eq} is defined as the continuous steady-state noise level with the same total A-weighted acoustic energy as the real fluctuating noise measured over the same period. The NAC is a set decibel level that is

a threshold value for acceptable noise levels. The receptors on this project are in Category B, the exteriors of residences, schools, motels, and churches, and is 67.0 dBA L_{eq} .

The results from the noise analysis are summarized in Table 11. Traffic noise impacts occurred at Receptors 1, 2, 4, 7, and 8 due to the noise levels approaching or exceeding the NAC. Noise barriers are generally not considered reasonable if the difference between No-Build and Build levels is less than 3 dBA. Therefore, barriers are not considered reasonable at these receptors because the difference between No-Build and Build noise levels is less than 3 dBA. Additionally, Build levels at these receptors are less than the predicted No-Build levels.

TABLE 11 – EXISTING AND PREDICTED NOISE LEVELS AND BARRIER CRITERIA

Receptor/n*	Existing 2003	No-Build 2030	Alternative A 2030	Alternative B 2030	Alternative C 2030
1	69.4	73.2	67.4	66.5	67.6
2	67.1	70.9	55.2	66.3	44.4
3	59.0	63.1	65.5	57.6	57.3
4	69.1	73.1	72.3	71.6	66.5
5/5	57.0	61.3	53.9	62.2	53.1
6/8	46.9	51.0	61.9	50.1	39.8
7/5	62.9	66.8	51.5	55.1	43.5
8/22	63.7	67.6	61.7	61.4	61.8
9/1	51.7	56.0	57.3	48.6	64.1
10/2	56.7	60.5	59.4	55.7	43.4
11/9	48.8	52.9	51.4	59.2	50.9
12/16	43.3	47.4	45.9	47.4	57.3
13/17	53.0	57.1	53.3	61.0	49.1
14/6	61.5	64.6	63.3	63.9	62.9
	Receptors approach or exceed the NAC				
	Substantial increase; barrier would not be cost effective				
	Substantial increase; barrier would be cost effective				

n* = Number of Receivers represented

Traffic noise impacts with a substantial increase over existing traffic noise levels were predicted for Receptors 6, 9, 11, and 12. Preliminary calculations determined the Cost-Effectiveness Factor (CEF), which is used to ensure a degree of reasonableness in assessing the severity of impact and cost-effectiveness for remediation at a particular location. The preliminary CEF indicates that Receptors 6, 9, and 11 are above the KYTC threshold of \$250 per benefited receptor and barriers are unlikely to be cost effective in these areas. However, for Receptor 12, preliminary calculations indicate a CEF that is below the KYTC threshold of \$250, and it is likely that a barrier would be cost effective in this area. A more detailed noise barrier analysis is recommended for the location at Receptor 12 if Alternative C is selected.

In 2010, an evaluation of the change in effects due to project design modification was performed. Since all roadway design changes are being made within the previous disturbance limits, the changes in the traffic noise levels at individual noise receptors are expected to be minimal. According to principles of sound propagation, sound levels decrease in proportion with the square of the distance from the source such that

a 4.5 dBA decrease is usually achieved on soft surfaces (*i.e.*, lawns) when the distance from the roadway is doubled. Since the design changes reduce the number of lanes from four to two within the existing right-of-way, the distance between the receptor and the traffic noise will change slightly throughout the corridor. Where the distance from the edge of pavement to the receptor will increase, the traffic noise levels would slightly decrease. In areas in which the distance from the edge of pavement to the receptor remains the same as in the four-lane model, the traffic noise level would be expected to slightly increase because the traffic is now closer to the receptor due to the reduction of lanes. Overall these changes are expected to be minimal.

In addition to the design changes, a revised traffic forecast was produced by Kentucky Transportation Cabinet (KYTC) in June 2008 entitled *Traffic Forecast Report, Logan County, US 431, Relocation and Widening, Item No. 3-273.01*. This traffic forecast replaced the February 6, 2004 forecast used in the *Traffic Noise Analysis Baseline Assessment*. The differences between the 2004 and 2008 traffic forecasts are shown in Table 12, page 26. The original traffic forecast was for the design year 2030, while the revised forecast is for design year 2035. For the No-Build Alternative, design hour volume (DHV) forecasts were decreased within Lewisburg city limits but increased outside of the city limits. The percentage of trucks was also made constant throughout the alternative at 20 percent. For the Build Alternatives, the DHV forecast of residual traffic on the existing US 431 alignment was decreased by a range of 50 to 400 while the percentage of trucks was increased by an average of 4 percent over this route. The forecasts on the constructed alignments for the Build Alternatives were higher (0 to 130 DHV) and the truck percentages were for the most part lower.

For the No-Build Alternative, the overall effect of these changes in the traffic forecasts would be a slight increase in the traffic noise levels north of KY 106 to the northern terminus of the project but decreased traffic noise for the remainder of the corridor. For the residual traffic on US 431 for the Build Alternatives, the noise reduction from the decreased overall traffic is expected to produce decreased noise levels even though the number of trucks is increased. The traffic noise on the new alignments for the Build Alternatives would be expected to increase.

Without traffic noise modeling, the implications of these changes on the noise receivers cannot be quantified. However, because the changes in the roadway design and the traffic forecast are minimal, the traffic noise impacts indicated in the original baseline are not expected to change.

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

Indirect noise impacts may be caused by future noise producing activities that occur as a result of a highway project. Improved access may facilitate development with subsequent changes in the pattern of land use, population density, and growth rate. It is likely that development will occur along the roadway, where traffic noise is the greatest. Modeling results from FHWA TNM using the predicted traffic volumes provided by KYTC indicate noise impacts that warrant mitigation diminish quickly beyond a single line of structures. Therefore, indirect noise impacts are not anticipated from land use changes due to the current predicted increase in traffic.

TABLE 12 – DIFFERENCES IN TRAFFIC FORECASTS FOR DESIGN YEAR 2035 AND 2030

	Alignment	Facility	No-Build		Alternative A		Alternative B		Alternative C	
			2035 DHV	% Trucks	2035 DHV	% Trucks	2035 DHV	% Trucks	2035 DHV	% Trucks
Revised Traffic	Existing	Start to KY 106	1200	20%	470	5%	290	5%	490	4%
		KY 106 to KY 107	1400	20%	590	8%	430	7%	650	8%
		KY 107 to KY 106	1300	20%	540	5%	470	6%	610	5%
		KY 106 to End	1200	20%	510	3%	370	4%	550	6%
	Build	Segment 1	N/A	N/A	700	33%	890	27%	710	34%
		Segment 2	N/A	N/A	740	34%	910	29%	690	36%
		Segment 3	N/A	N/A	630	40%	800	32%	610	36%
	Alignment	Facility	No-Build		Alternative A		Alternative B		Alternative C	
			2030 DHV	% Trucks	2030 DHV	% Trucks	2030 DHV	% Trucks	2030 DHV	% Trucks
Original Traffic	Existing	Start to RL Stuart	1170	20.1%	550	1.0%	410	1.2%	890	0.7%
		RL Stuart to KY 106	1490	15.8%	860	0.5%	730	0.7%	890	0.7%
		KY 106 to KY 107	1710	20.8%	980	0.5%	830	0.6%	1090	0.6%
		KY 107 to KY 106	1500	15.8%	890	0.6%	700	0.7%	880	0.7%
		KY 106 to End	1080	21.7%	560	1.0%	510	1.0%	650	1.0%
	Build	Segment 1	N/A	N/A	650	33.9%	770	28.8%	630	36.0%
		Segment 2	N/A	N/A	740	33.9%	900	26.4%	600	39.3%
Segment 3		N/A	N/A	560	43.2%	640	37.8%	480	51.4%	

Cumulative impacts may result from the incremental effect of a project when added to the other past, present, and reasonably foreseeable future actions in the project vicinity. Higher noise levels are predicted with or without the proposed project for some of the receptors modeled. However, the additional noise impacts predicted for this project are not sufficient to create an adverse cumulative impact.

Contractors will be required to use noise abatement measures to restrict or reduce construction noise impacts in the vicinity of noise sensitive areas such as schools, residences, and churches. These measures are discussed in Section IV.N. KYTC has the responsibility for monitoring construction noise levels and can advise the contractor of any violations.

C. Aquatic Ecosystems

An *Aquatic and Terrestrial Baseline Assessment* was submitted to KYTC-DEA on September 16, 2004 for the proposed project. This study provides supporting documentation for this Environmental Assessment.

1. Water Quality

Surface streams in the project corridor are located within the Green River watershed, which is one of Kentucky's ten major drainage systems. All streams crossing or originating within the project corridor ultimately intersect the Mud River, one of the major tributaries of the Green River. The project corridor lies

along a watershed divide between Wolf Lick Creek (a tributary of Mud River) on the west and several direct tributaries of Mud River on the east.

The project corridor could potentially intersect three streams. In the southwestern portion of the project corridor, Wolfe Lick Creek is a third order stream that runs parallel to existing US 431. This stream is approximately 4 to 8 feet wide and contains gravel/sand substrate. Several first order tributaries of Wolfe Lick Creek are also in the project corridor. These first order tributaries have similar gravel/sand substrates but range from 4 to 6 feet in width. Just south of Wolfe Lick Creek are Elk Lick Creek and its first order tributaries. This stream is second order, low gradient, and pool-dominated with silt substrates and channel widths ranging from 4 to 6 feet. Finally, the headwaters of Alum Lick Creek, a second order tributary of Wolf Lick Creek, originate along the eastern side of the project corridor south of KY 106. The stream has channel widths around 6 feet and gravel/sand substrates at its crossing of the project corridor near Graham Road. These potential impacts are shown in Exhibit 4, page 28, and are summarized in Table 13, page 29.

Water quality, instream habitat, macroinvertebrate, mussel, fish, and substrate investigations were conducted at five sites located in the general vicinity of the project corridor from February 23 through 27, 2004. Sampling methods followed Kentucky Division of Water (KDOW) protocols (2002). Station 1 was located at an unnamed tributary of Elk Lick Creek at the south end of the project corridor. This station was not quantifiably sampled for macroinvertebrates due to an absence of riffle habitat. Station 2 was located at an unnamed tributary of Wolf Creek on the west side of the KY 431, while Station 3 was located at the same tributary further downstream. Station 4 was at Alum Lick Creek located on the northeast side of the corridor. Finally, Station 5 was located at Rawhide Creek located northwest of the project corridor. This station was chosen as an area reference reach for statistical comparison of biological, physical, and chemical data.

Overall, water chemistry results from the sampling stations were normal for Warm Water Aquatic Habitats in Kentucky (Table 14, page 30), though fecal coliform levels appeared elevated in the sampled reach of Alum Creek. Anthropogenic influences on conductivity were apparent when comparing the stream within the project corridor to the adjacent reference reach (Rawhide Creek).

Conductivity levels were up to ten-fold higher in the urban (Lewisburg) area due to development. Physical habitat scores were impaired for three of the five stations: Elk Lick (Station 1), Wolf Creek 1 (Station 3), and Alum Lick (Station 4) creeks. The physical impairment (scores below 137), that included severe embeddedness, a lack of substrate variety, and narrow riparian zones, was also believed to be a result of area development.

The types of aquatic species present in water bodies are an indication of the water quality. The effects of physical impairments were apparent in the macroinvertebrate community with Macroinvertebrate Biotic Indices revealing impairment at the reference reach as well. Alum Lick Creek had the highest Macroinvertebrate Biotic Index (MBI) of 46, which indicates a "fair" quality headwater stream in the Mississippi River Valley-Interior River (MVIR) region (KDOW 2002). The upstream station on Wolfe Creek (Station 2) indicated a "Poor" macroinvertebrate community, while the down stream station (Station 3) had a "Fair" macroinvertebrate community according to MBI scores. Though containing plentiful EPT taxa, the reference stream (Station 5) scored only a "Fair" MBI rating due to a dominance of Chironomidae taxa.

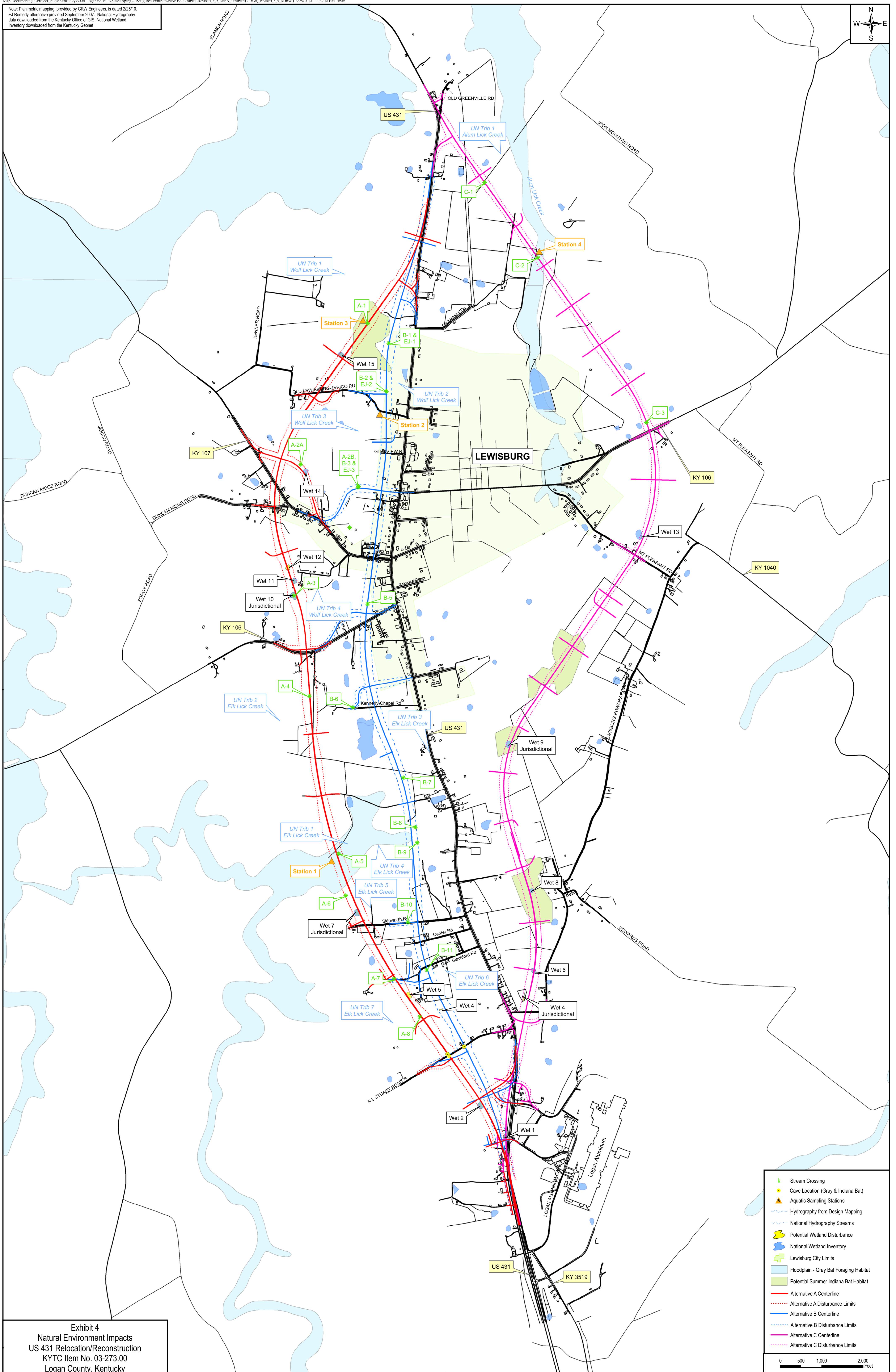
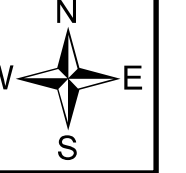


Exhibit 4
 Natural Environment Impacts
 US 431 Relocation/Reconstruction
 KYTC Item No. 03-273.00
 Logan County, Kentucky

	Stream Crossing
	Cave Location (Gray & Indiana Bat)
	Aquatic Sampling Stations
	Hydrography from Design Mapping
	National Hydrography Streams
	Potential Wetland Disturbance
	National Wetland Inventory
	Lewisburg City Limits
	Floodplain - Gray Bat Foraging Habitat
	Potential Summer Indiana Bat Habitat
	Alternative A Centerline
	Alternative A Disturbance Limits
	Alternative B Centerline
	Alternative B Disturbance Limits
	Alternative C Centerline
	Alternative C Disturbance Limits

0 500 1,000 2,000 Feet

TABLE 13 – POTENTIAL IMPACTS TO STREAMS WITHIN THE PROJECT AREA

Alternative	Crossing ID	Disturbance (feet)	Disturbance (acre)	Impact Type	Stream Name	Stream Order	Watershed Area (sq. mile)
Alternative A	1	269.6	0.04	Bridge	Unnamed Tributary 1 Wolf Lick Creek	3	1.14
	2A	218.1	0.01	Culvert	Unnamed Tributary 3 Wolf Lick Creek	1	0.04
	2B	131.7	0.01	Culvert	Unnamed Tributary 2 Wolf Lick Creek	2	0.40
	3	284.0	0.01	Culvert	Unnamed Tributary 4 Wolf Lick Creek	1	0.04
	4	244.5	0.01	Culvert	Unnamed Tributary 2 Elk Lick Creek	1	0.02
	5	256.7	0.04	Bridge	Unnamed Tributary 1 Elk Lick Creek	3	1.31
	6	497.1	0.01	Culvert	Unnamed Tributary 5 Elk Lick Creek	1	0.09
	7	474.3	0.02	Culvert	Unnamed Tributary 6 Elk Lick Creek	1	0.25
	8	116.2	0.01	Culvert	Unnamed Tributary 7 Elk Lick Creek	1	0.16
Total:	8	2492.0	0.17				
Alternative B	1	276.9	0.03	Bridge	Unnamed Tributary 1 Wolf Lick Creek	3	1.08
	2	339.5	0.03	Culvert	Unnamed Tributary 2 Wolf Lick Creek	2	0.66
	3	169.5	0.01	Culvert	Unnamed Tributary 2 Wolf Lick Creek	2	0.40
	4	200.5	0.02	Culvert	Unnamed Tributary 2 Wolf Lick Creek	2	0.32
	5	410.7	0.02	Culvert	Unnamed Tributary 2 Wolf Lick Creek	1	0.08
	6	551.0	0.02	Culvert	Unnamed Tributary 1 Elk Lick Creek	1	0.07
	7	193.4	0.01	Culvert	Unnamed Tributary 3 Elk Lick Creek	1	0.16
	8	361.5	0.01	Culvert	Unnamed Tributary 4 Elk Lick Creek	1	0.20
	9	203.1	0.02	Bridge	Unnamed Tributary 4 Elk Lick Creek	2	0.42
	10	135.2	0.01	Culvert	Unnamed Tributary 5 Elk Lick Creek	1	0.04
	11	351.6	0.01	Culvert	Unnamed Tributary 6 Elk Lick Creek	1	0.14
Total:	10	3192.9	0.17				
Alternative C	1	155.9	0.01	Culvert	Unnamed Tributary 1 Alum Lick Creek	1	0.12
	2	0	0.00	Bridge	Alum Lick Creek	3	1.78
	3	310.7	0.01	Culvert	Unnamed Tributary 2 Alum Lick Creek	1	0.07
Total:	3	467.0	0.02				

TABLE 14 – WATER QUALITY PARAMETERS FOR SAMPLING STATIONS

Parameter ¹	Criteria ²	Elk Lick	Wolfe Creek 1	Wolfe Creek 2	Alum Creek	Rawhide Creek
		Station 1	Station 2	Station 3	Station 4	Station 5
Alternative		A	B	A	B	NA
Fecal Coliform	<2000	340	200	150	>600	<10
Nitrogen, Ammonium	<i>n/a</i> ³	<0.11	<0.11	<0.11	<0.11	<0.11
Nitrogen, Ammonia	0.05	<0.10	<0.10	<0.10	<0.10	<0.10
Total Phosphorus	<i>n/a</i> ³	0.01	0.02	0.02	0.01	0.02
Nitrogen, Total Kjeldahl	<i>n/a</i> ³	<0.10	0.12	<0.10	0.12	<0.10
Dissolved Oxygen	6	8.64	8.43	8.94	10.59	9.86
Conductivity	<i>n/a</i> ³	454	599	516	388	65
Total Suspended Solids	<i>n/a</i> ³	7.70	4.00	4.70	<3.00	3.70
pH (field)	6 to 9	8.64	8.12	8.22	8.42	7.12
Temperature °C	<i>n/a</i> ³	4.76	2.38	4.40	3.08	4.05
Habitat Score ⁴	<i>min, 137</i>	70	131	158	112	152

¹All units are mg/L unless indicated

²Warmwater Aquatic Habitat criteria (chronic)

³No established Kentucky Water Quality Standards

⁴Allows investigators to evaluate the quality of instream and riparian habitat

The results of the fish analysis revealed more positive biological integrity than the macroinvertebrate results. Kentucky Index of Biotic Integrity (KIBI) scores indicated that three of the streams were scored as “Fair” (Station 3, Station 4, and Station 5), while two of the stream sites (Station 1 and Station 2) were scored as “Good”. Communities were predominately tolerant but contained good native diversity at most stations. One species of simple lithophile, the blackside darter, was caught at four of the stations. Lithophiles need a relatively good aquatic habitat for spawning with very little silt or embeddedness. As with the macroinvertebrate metric scoring, the physical habitat quality of the reference reach was not apparent in the sampled fish community metrics. No mussels were found in the sampled stream sites.

Groundwater within the northern half of Logan County is not as prevalent as in the southern half of the county. Only a few wells in the northern half of the county yield enough water for a domestic supply. Wells drilled in the Menard Limestone, Waltersburg Formation, Vienna Limestone, Tar Springs Sandstone, Glen Dean Limestone, and Hardinsburg Sandstone yield almost no water and are not suitable for a domestic supply.

Wells drilled in strata of the Golconda Formation (Haney Limestone, Big Clifty Sandstone, Beech Creek Limestone Members) may produce enough water for a domestic supply (more than 500 gallons per day) if the wells are deep enough to penetrate the sandstone formations near perennial stream levels. The most conspicuous springs are those that discharge from the base of the Big Clifty sandstone at the southern end of the project corridor. These are the “dripping springs” of the Dripping Springs escarpment. Many of these springs go dry by late summer or fall and are inadequate as a domestic water supply. Some wells in lowland areas along streams do produce enough water for a domestic supply.

The proposed roadway has avoided impacts to the maximum extent practical to maintain road safety. If bridge piers are not placed in the stream channel, no instream habitat losses should occur. Construction

activities at these crossings may cause short-term sediment impacts, but sediment control structures such as straw bales, silt fences, and erosion mats should prevent or minimize these impacts. Additional opportunities for minimization of impacts may be implemented during final design and construction. Similarly, Kentucky Department of Fish and Wildlife Resources (KDFWR) and Kentucky State Nature Preserve Commission (KSNPC) recommend numerous best management practices (BMPs) for all portions of the project corridor where ephemeral, intermittent, or perennial streams are crossed.

Compensatory mitigation for stream loss may take several forms. Examples include repair of stream bank stability problems on other stream reaches; stream restoration projects that involve the creation of in-channel aquatic habitat and riparian reestablishment (on-site or off-site); and stream projects that result in permanent water quality improvement.

Construction activities and associated erosion will produce short-term and long-term impacts on water quality and habitat quality of streams in the project corridor, which equate into direct and indirect impacts. The potential for sedimentation to increase during road construction is a direct impact as sediments are exposed, extracted, and moved. This indirectly impacts the stream as the levels for parameters such as turbidity, conductivity, and suspended solids may increase due to the fresh sediment and exposed rock. Completion of the new roadway will directly result in more rapid surface runoff to streams as the amount of impervious surfaces is increased. Indirectly the more rapid surface runoff will cause increased stream flows and velocities during rainfall events and reduce stream base flow during drier periods. Also the new road surfaces will directly impact streams as road salt, oil, antifreeze, and other non-point source pollutants wash into adjacent aquatic environments. The placement of culverts also directly impact streams as they eliminate some instream habitat.

The removal of the stream canopy may cause an increase in average stream temperatures during warmer months depending on the amount of canopy removed, stream flow, and surface area of the stream. Higher stream temperatures will support lower concentrations of dissolved oxygen. Both factors will have a negative impact on resident animal communities (fish, amphibians, macroinvertebrates).

In addition, more open canopies and the subsequent increase in sunlight could promote the establishment of excessive algal growths. If not revegetated, stream banks will be less stable and could erode and release sediment into the stream channel. Increased sediment inputs will reduce instream cover for fish and macroinvertebrates. Aquatic communities will likely continue to be dominated by pollution-tolerant species.

2. Floodplains

The 100-year floodplain was estimated for each alternative using Flood Insurance Maps from the Federal Emergency Management Agency (FEMA 1998). Floodplain disturbance is greatest for Alternative A with 5.4 acres bordering tributaries of Elk Lick Creek. The location of Alternative B has no disturbance, while Alternative C would impact 0.9 acres adjacent to Alum Lick Creek (Exhibit 4, page 28, and Table 15, page 32).

TABLE 15 – FLOODPLAIN DISTURBANCE

Acres		
Alternative A	Alternative B	Alternative C
5.4	0	0.9

Construction activities on the impacted floodplains will require hydraulic modeling when design details are known for bridge and culvert crossings over these streams. Prior to onset of construction activities for stream crossings, Kentucky Division of Water (KDOW) needs to be contacted for floodplain certification if Alternatives A or C are selected.

Cumulative and indirect impacts to floodplains resulting from the project are expected to be minimal. The use of Best Management Practices for erosion and sedimentation control will minimize water quality and stream impacts.

3. Wetlands

National Wetland Inventory (NWI) mapping for the Lewisburg and Dunmor 7.5 minute USGS quadrangles was reviewed for the presence of wetlands within the project corridor. Thirteen (13) wetlands were indicated within the project corridor from NWI mapping (Exhibit 4, page 28). Upon field inspection, four of these wetlands were believed to be jurisdictional and occur on Alternatives A and C. Alternative B has no jurisdictional wetland impacts. Potential jurisdictional wetland impacts are summarized in Table 16. United States Army Corps of Engineers (USACE) personnel will verify the determination of wetland jurisdictional status. Exact determination of impacts to jurisdictional wetlands will be made by Division of Environmental Analysis (DEA) after final design.

TABLE 16 – JURISDICTIONAL WETLAND IMPACTS

Alternative	Acreage of Impact	Wetland Type	Map ID
A	0.39	PUBHx	7
A	0.52	PUBHx	10
A Total	0.91		
C	0.07	Unknown	4
C	0.30	PUBHx	9
C Total:	0.37		

Wetlands within the project corridor represent important habitat for aquatic wildlife, especially amphibians. Disturbance of these aquatic resources could potentially eliminate important breeding habitat for these species. The various wetlands throughout the project corridor slow overland flow of water, provide water quality filtering of surface runoff, and minimize stream turbidity through sediment storage. Disturbance or removal of these resources would eliminate these functions.

No significant cumulative and indirect wetland impacts are expected to occur as a result of the project.

4. Permits

Stream crossings for the proposed project are anticipated to require a 404 Nationwide 14 permit issued by the US Army Corps of Engineers (USACE) and a Section 401 water quality certification issued by KDOW, regardless of the alternative selected. A Nationwide 14 permit is for linear transportation crossings that do not cause a loss of greater than 0.5 acres of non-tidal waters of the US. Impacts of more than 200 linear feet on streams with watersheds greater than 250 acres require Section 401 water quality certifications from the Kentucky Division of Water (KDOW). The KDOW currently expects compensatory mitigation to be submitted for all permanent stream losses greater than 200 feet on blue-line streams. KDOW will also need to be contacted to coordinate floodplain certification.

All jurisdictional wetlands within the disturbance limits of the proposed alternatives that are greater than 0.5 acres will require individual USACE permitting for unavoidable impacts within the selected alternative. Wetland disturbance acreages falling between 0.1 – 0.5 acres would potentially qualify for a nationwide permit per review by USACE. Permitting and mitigation requirements will be determined after evaluation by USACE and DEA and completion of final design.

As required for construction activities that disturb approximately one (1) or more acre, a Notice of Intent for coverage under a Kentucky Pollutant Discharge Elimination System (KPDES) general permit number KYR100000 for storm water point sources, construction, will be filed with KDOW, Permit Branch. The BMP plan set forth in Part IV of this general permit will be implemented to minimize potential pollution to surface and groundwater.

5. Wild and Scenic Rivers

Correspondence from the KDOW confirmed that no Outstanding State Resource Waters, Exceptional Waters, or Wild Rivers exist within the project corridor.

D. Terrestrial Ecosystems

1. Plant Communities

The deciduous forest within the project corridor is primarily oak (*Quercus* sp.) and hickory (*Carya* sp.). Small units of cedar glades can be found near the three alternatives where soils are very thin above limestone. There are no state champion trees in the project corridor.

2. Plant Community Impacts

Total terrestrial impacts are similar among the three alternatives. Alternative A will impact slightly more total area. The predominant land feature for all three alternatives is pasture/hay and row crops, although a large portion of the land is deciduous forest. Alternative A and B would impact almost identical amounts of deciduous forest (37.6 and 37.1 acres, respectively) while C would impact the least (21.3 acres).

3. Federally Threatened and Endangered Species

Coordination with the U.S. Fish and Wildlife Service (USFWS) was conducted in March 2004 to determine if any federally protected species are known or potentially known to occur in the vicinity of the proposed project. The USFWS listed three federally endangered species: gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), and Littlewing pearlymussel (*Pegias fibula*) known to be present in Logan County; and fanshell mussel (*Cyprogenia stegaria*) and ring pink mussel (*Obovaria retusa*) as potentially present. The KSNPC and

KDFWR were also contacted to obtain lists of state threatened, endangered, and special concern species. Threatened and endangered species lists for Logan County from USFWS, KSNPC, and KDFWR are included in Appendix C.

Gray bats are a federally and state endangered species that inhabit caves year-round. They generally prefer caves that have a nearby water source. Females form large maternity colonies in wet caves and typically give birth in June.

Indiana bats are a federally and state endangered species that typically hibernate in limestone caves with stable temperatures ranging from 39°F to 46°F. During summer months, Indiana bats usually occupy roosts and foraging habitat in hardwood forests near riparian corridors. Roosting Indiana bats tend to prefer trees with exfoliating bark, crevices, or holes. Clusters of large trees with exfoliating bark, such as mature shagbark hickories and oaks, as well as dead snags were found in the project corridor. These trees are known to be ideal summer roosting habitat for the Indiana bat. Table 17 and Exhibit 4 (page 28) detail the habitat found for Indiana bat and gray bat.

All three caves found in the south end of the project corridor should be surveyed for bat use if either Alternative A or B is chosen. The caves could provide suitable year-round gray bat habitat or winter Indiana bat habitat. Additionally, the USFWS recommends that tree removal within the project corridor take place between October 15 and March 31. If these recommendations cannot be accomplished, a Biological Assessment (BA) should be performed to determine the presence or absence of these species.

TABLE 17 – DISTURBANCE OF POTENTIAL BAT HABITAT

Species	Status	Habitat Impact by Alternative		
		A	B	C
Indiana bat	US/KY endangered	5.4 acres	1.3 acres	12.8 acres
Gray bat	US/KY endangered	2 caves	1 caves	0 caves

The littlewing pearlymussel inhabits cool, clear, high to moderate gradient streams with low turbidity. The streams within the project corridor did not provide potential habitat for littlewing pearlymussel, due to their degraded state. Therefore, no individuals were observed during field surveys. Fanshell and ring pink mussels are found in larger river habitats, which are not present in the project area. The proposed project is not likely to adversely affect the Littlewing pearlymussel, fanshell mussel, and ring pink mussel.

Cumulative and indirect impacts to habitat for Indiana and gray bat may occur as a result of the project and subsequent development in the area.

E. Section 106 and Cultural Resources

All transportation projects receiving federal funding (such as the proposed US 431 reconstruction) are required to evaluate impacts to historic properties. Section 106 of the National Historic Preservation Act, 16 United States Code (USC) Sec. 470 *et seq.* (1966), provides a procedure for evaluating project impacts by federally funded projects on historic and cultural resources and for encouraging public comment of the evaluation.

Part of the Section 106 process is to determine if any historic (or potentially historic) properties or sites are located within the impact area of the project. This is done with cultural/historic and archaeological baseline analyses that document the historic, or potentially historic, properties or ancient sites affected. An Area of Potential Effect (APE) delineating the geographic extent of the evaluation is prepared based on direct (acquisition) and indirect (noise, visual, induced growth, etc.) effects. Concurrence from federal, state, and local agencies of the proposed APE is obtained. Then resources within the APE are examined in a cultural/historic and archaeological baseline, and the project effects on those resources eligible for the National Register of Historic Places are scrutinized according to methods specified in 36 CFR 400.8.

The Section 106 process also requires that Native American tribes that may have an interest in archaeological sites and findings be allowed to comment on the proposed project. Native American consultation has been completed pursuant to FHWA letter dated November 24, 2006 (Appendix D). No responses were received.

Section 106 also requires that consulting parties and the public at large be kept apprised of project developments. There are no consulting parties on this project; however, a public information meeting was held on August 3, 2004 at the Lewisburg Elementary School to discuss the project and collect public input. The three alternatives (A, B and C) were presented to the public for comment and questions. Although not specifically held for discussion of Section 106 and cultural resources, the meeting allowed the approximately 240 persons attending to comment on all aspects of the US 431 realignment. A summary of the public meeting comments is included in Appendix E.

1. *Historic Structures or Districts*

A Cultural Historic Resource Study for the Reconstruction/Relocation of US 431 in the Vicinity of Lewisburg in Logan County, Kentucky was submitted to KYTC-DEA in June 2004 for the proposed project. The study provides supporting documentation for this Environmental Assessment.

The Area of Potential Effect (APE) is located along the proposed alternatives from the existing 4-lane section of US 431 at the Logan Aluminum plant south of Lewisburg to Old Greenville Road, approximately 1.5 miles north of Lewisburg. The APE is based upon the project's potential direct and visual effects. The APE varies in width depending upon topography and vegetation.

A total of 32 new sites were documented with survey forms after completion of fieldwork. Kennerly's Chapel Cemetery (Site 7, LO-165) is identified with significant events related to the history of the Methodist Church and the Great Revival and is determined eligible for listing in the National Register of Historic Places. However, none of the alternatives will affect this property. A ranch with craftsman detailing (Site 20, LO-178) was determined ineligible for NRHP in the *Cultural Historic Resources Study*. SHPO disagreed with this determination and stated Site 20 is considered an unusual example of a transitional craftsman style house. However, this resource will not be affected by any of the alternatives, so SHPO deemed further consultation regarding its eligibility is not required. Correspondence with SHPO is included in Appendix D. Table 18 below summarizes the results of the survey.

The proposed project therefore does not impact any cultural historic resources.

TABLE 18 – SITES ELIGIBLE FOR NATIONAL REGISTER OF HISTORIC PLACES

	Alternative A	Alternative B	Alternative C
Site 7	No Impact	No Impact	No Impact
Site 20	No Impact	No Impact	No Impact

2. Archaeology Sites

An Archaeological Survey of Three Alternates (A, B, and C) for the Proposed US 431 Reconstruction/Relocation in Logan County, Kentucky (Item No. 3-273.00) was submitted to KYTC-DEA on March 18, 2005 for the proposed project. The study provides supporting documentation for this Environmental Assessment. The cultural resource inventory of the three proposed alternatives for US 431 resulted in the discovery of 15 new archaeological sites (15Lo213-227), two non-site localities (NSL-1 and NSL-2) and 13 isolated artifact finds (IF-1 through IF-13). Table 19 below summarizes the results of the archaeology survey.

Site 15Lo186, a previously recorded large multiple family cemetery, lies just beyond the proposed right of way of Alternative A. The project will not encroach upon the recognized cemetery boundaries. In accordance with recommendations of KYTC and FHWA as concurred upon by SHPO, care will be taken in the vicinity of the cemetery (remove topsoil to search for grave shafts) to ensure that unknown graves will not be impacted. Site 15Lo219, a lithic scatter, would be impacted by Alternative C. KYTC and FHWA do not consider this site eligible for the National Register. SHPO has determined that the site is “potentially eligible” and recommended avoidance or Phase II testing if it cannot be avoided. If Alternative C is selected, FHWA will need to address this disagreement among the parties and seek the opinion of the Advisory Council on Historic Preservation (ACHP) if it cannot be resolved. In addition, archaeological deep testing is recommended in the area of Elk Lick Creek should Alternative A be selected. Fine-grained alluvial deposit in this area has the potential to contain significant prehistoric deposits. Letters documenting the coordination among the agencies can be found in Appendix D.

No significant cumulative and indirect impacts to archaeological resources are expected to result from Alternatives A or C. Impacts to cultural resources would be avoided by selection of Alternative B. Any Phase II testing required will be completed prior to the FONSI.

TABLE 19 – SUMMARY OF PHASE I ARCHAEOLOGY SURVEY

Alternative	Site	NRHP Eligibility	Recommendations
A	15Lo186	Potentially Eligible	Known boundary not impacted; take measures to ensure unmarked graves are not impacted
B	15Lo227	Not Eligible	SHPO suggests that removal of cemetery should be monitored by a professional archaeologist to ensure that unmarked graves are not overlooked
C	15Lo219	SHPO determined Potentially Eligible; FHWA and KYTC disagree	FHWA coordination with parties to resolve disagreement over eligibility status; possible coordination with ACHP

F. Land Use

A *Socioeconomic Baseline Analysis* was submitted to KYTC-DEA on May 24, 2004 for the proposed project. The study provides supporting documentation for this Environmental Assessment.

Logan County has a land area of 555.7 square miles, making it the seventh largest county in the Commonwealth. Average population density is 47.8 persons per square mile. Lewisburg is 1.2 square miles, with a population density of 742 persons per square mile. The northern portion of the county is both hilly and partially wooded, with gently rolling areas of prime farmland. Within the project corridor around the community of Lewisburg, the land is extensively farmed, however, small areas west of US 431 are steep and wooded. The town itself is small and concentrated just west of the US 431/KY 106 intersection. Commercial and residential properties, as well as churches, line both sides of US 431 near this intersection. At the northeast corner of town, an industrial park is located on one side of a municipal park, and a wastewater treatment plant is located on the other side of the park. A few new residential structures are being built along the roads leading from the center of town, but as of 2004, no large residential subdivisions had been constructed.

Each Build Alternative has different land use impacts, as land will be converted from present use to highway right-of-way. Alternative A, the western-most route, traverses farmland in the northern portion and steep, rocky terrain in the southern portion before rejoining US 431 at Logan Aluminum. Conversion of farmland for Alternative A is slightly less than for Alternative C, and conversion of residential property to right-of-way is not as great as for Alternative B.

Alternative B closely parallels the existing US 431 alignment and involves the greatest land use change from residential use to right-of-way by crossing into the western Lewisburg city limit line and converting the greatest number of residential properties to right-of-way.

Alternative C has the least amount of residential conversion. However, Alternative C crosses the most intensively farmed portion of the area, and the percentage of farmland acquired for Alternative C is the greatest (70.2 percent of total right-of-way for Alternative C, as opposed to 55.5 percent for Alternative A).

Conversion of land to right-of-way is not anticipated to significantly alter the land use for adjoining properties, which are primarily outside the Lewisburg city limits. However, Logan County Planning & Zoning places restrictions to landowners only upon subdivision development. Most of the land in the project corridor is outside the city of Lewisburg and thus not restricted by any zoning ordinance. However, cumulative and indirect impacts associated with land use are expected to be minimal.

G. Community Profile and Impacts

Detailed information about the community is contained in the *Socioeconomic Baseline Assessment*. The community profile for Lewisburg is summarized below.

1. Community Profile

For the 2000 U.S. Census, Lewisburg had a population of 903 and grew from 1990 to 2000 at 14.5 percent, twice the rate for Logan County and Kentucky. The median age for men was 33.5 years; for women, 42.2 years. Ninety-six (96) percent of the residents are white. Lewisburg households are typically (nearly 75 percent) either households with residents 65 years of age and older or non-family households.

Median household income for the Logan County in 2000 was \$32,474, nearly the same as Kentucky. Lewisburg had a lower median income of \$21,600. Poverty levels in Lewisburg are slightly higher than for Kentucky (18.8 percent), with 23.6 percent in poverty, 32.7 percent of them children under 18. Kentucky has 10.9 percent residents 65 and older in poverty, while Lewisburg has 17.1 percent older residents in poverty.

During field reconnaissance, a large number of mobile homes in and around the project area suggested a high number of renters. Census data confirmed that approximately 35 percent of Lewisburg residents live in rental property.

The unemployment rate in Logan County in December 2009 was 10.1 percent, slightly lower than Kentucky's rate of 10.4 percent. Logan Aluminum, the world's largest supplier of rolled aluminum can stock, is the largest employer in the area, employing approximately 1,000 people (January 2010). Most residents in Lewisburg work either at the plant or commute to Russellville, about 11 miles south of Lewisburg.

Utilities in the project corridor are provided by Logan Telephone Cooperative, Pennyrite Rural Electric Cooperative (RECC), Lewisburg Water Works, and Lewisburg Sewer Department (for properties within the city of Lewisburg). The North Logan Water District serves US 431 from Russellville to the Lewisburg city limits. Logan Aluminum maintains its own private (non-community) water distribution lines. Properties not within Lewisburg city limits have septic systems. The Lewisburg Substation for the Pennyrite RECC is located across US 431 from the Lewisburg Water Works. Natural gas pipelines are not available in the region. However, bottled propane may be purchased from several vendors in Russellville.

The Lewisburg Water Works is located near the southern end of the project corridor on US 431. It has a treatment capacity of 576,000 gallons per day (gpd), with an average daily use of 158,000 gpd. In 2002, it served approximately 1,500 households and 2,500 people. Its source water is drawn from Spa Lake, which is located about 3.5 miles west of Lewisburg along KY 106. The Lewisburg Sewer Department is located in Lewisburg. It has a treatment capacity of 350,000 gpd, with an average daily flow of 178,000 gpd.

Lewisburg has several churches. A windshield survey revealed five churches in or near the project corridor: United Methodist Church of Lewisburg, Mt. Pleasant Baptist Church, Church of Christ, Cumberland Presbyterian Church, and Life Temple Pentecostal Church of Lewisburg.

An Emergency Medical Services building is located in Lewisburg; it is operated as an annex by The Medical Center in Bowling Green. In addition, a doctor and a dentist are located in Lewisburg. Medical emergencies and more involved treatments require travel to either Russellville (Columbia Logan Memorial Hospital) 11 miles south of Lewisburg or Bowling Green (The Medical Center or Greenview Regional Hospital) about 25 miles east of Russellville.

The Logan County Coon Hunters Club, a privately owned facility, is located south of Lewisburg just outside the project corridor. The Lewisburg City Park is located about 0.2 mile east of US 431 off KY 106 across from the Lewisburg Sewer Plant and near the industrial park. The Lewisburg Masonic Lodge #324 is located at the northern end of the project corridor along US 431. A branch of the Logan County Public Library is located in Lewisburg on Front Street. The main branch is located in Russellville.

Police protection for the area is provided by the Logan County Sheriff's office, the Lewisburg police department (Lewisburg has one police officer), and the Kentucky State Police from Post 3 in Bowling Green. Fire protection for the project area is provided by the Lewisburg Rural Volunteer Fire Department.

None of the referenced facilities will be directly impacted by the proposed project.

2. Community Impacts

Lewisburg is small enough to be considered one community or neighborhood. Construction of the proposed project will impact every resident in the town, both during the construction phase of the project and after the road is built. After completion of the realigned US 431, the existing road through Lewisburg will be closed to heavy through-truck traffic, which will be re-routed around town. Thus the community of Lewisburg will have a main thoroughfare that has much less traffic and is safer for local vehicles, pedestrians, and bicyclists.

The mobile home park located just west of US 431 on KY 107 represents a cluster of homes that will be acquired for Alternative B. The alignment for Alternative B, which most closely parallels the existing US 431 alignment, is prone to a higher number of relocations because development is more likely to occur near existing roadways. Field reconnaissance included interviews with the property owner of the mobile home park and town mayor to accurately assess the mobile home park as a community. Information gathered showed that the residents of the mobile home park remain at the park for short periods of time, often only during the school year (August to May). While the residents of the trailer park comprise a low-income community based upon common socioeconomic status, it was determined that this trailer park displays a lack of interdependence. Based upon extensive outreach to the residents in the trailer park (discussed more fully in Section IV.J below), they are not opposed to the project. Therefore, it is anticipated that the project will not create an adverse impact to these residents.

Two family clusters are located at Parcels 140 and 260 (see Exhibit 5, page 40).

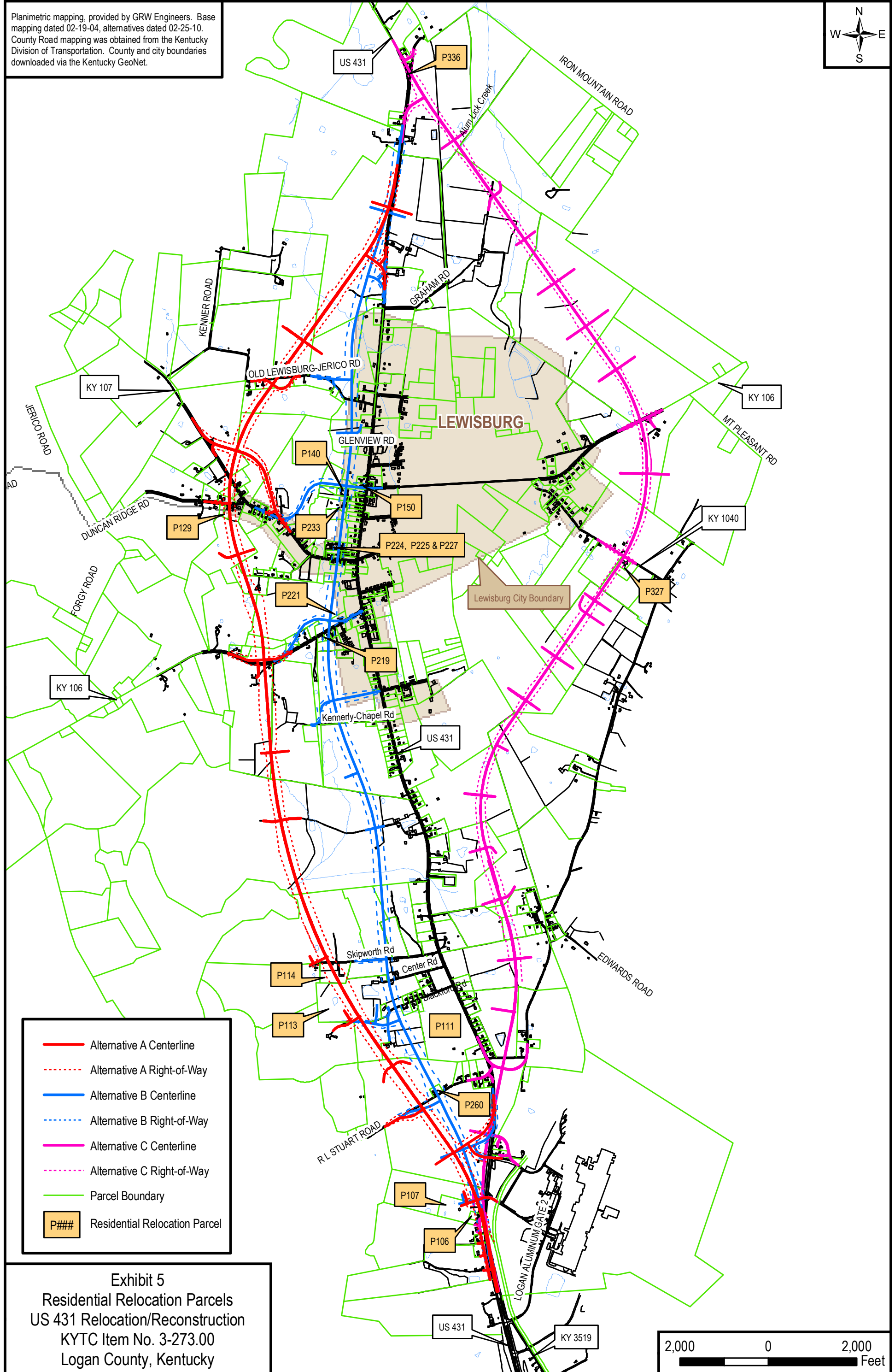
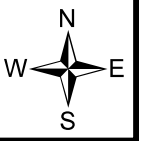
H. Relocations and Displacements

Each alternative acquires residential properties. Alternative B has the most residential parcel acquisitions, and Alternative C has the least. Not all residential parcels are occupied; however, since they are acquisitions, they are documented below.

- Alternative A: 9 residential parcels (5 structures occupied)
- Alternative B: 17 residential parcels, some with multiple units (16 structures occupied)
- Alternative C: 6 residential parcels (4 structures occupied)

Exhibit 5 shows the locations of the parcels that have residential relocations. Table 20 below compares impacted parcel numbers by alternative.

Planimetric mapping, provided by GRW Engineers. Base mapping dated 02-19-04, alternatives dated 02-25-10. County Road mapping was obtained from the Kentucky Division of Transportation. County and city boundaries downloaded via the Kentucky GeoNet.



- Alternative A Centerline
- - - Alternative A Right-of-Way
- Alternative B Centerline
- - - Alternative B Right-of-Way
- Alternative C Centerline
- - - Alternative C Right-of-Way
- Parcel Boundary
- P### Residential Relocation Parcel

Exhibit 5
Residential Relocation Parcels
US 431 Relocation/Reconstruction
KYTC Item No. 3-273.00
Logan County, Kentucky

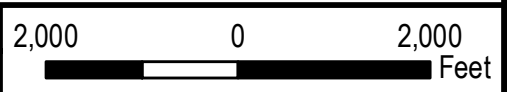


TABLE 20 – RESIDENTIAL PARCELS IMPACTED BY ALTERNATIVE

Alternative	Parcels Impacted	Parcels Occupied
Alternative A	106, 107, 109, 111, 114, 118, 129, 135, 145	106, 107, 111, 114, 129
Alternative B	106, 107, 109, 113, 140 (2 trailers), 150, 218, 219, 221, 224 (2 trailers and house), 225 (house and trailer), 226, 227 (7 trailers), 233, 251, 253, 260	106, 107, 113, 140 (2 trailers), 150, 219, 221, 224 (2 trailers), 225 (trailer), 227 (3 trailers), 233, 260
Alternative C	106, 107, 109, 327, 329, and 336	106, 107, 327, and 336

As more fully discussed above in Section III.E, Alternatives Considered But Eliminated, an EJ avoidance alternative was developed (EJ Alternative B). However, it was found that EJ Alternative B reduces the number, but not the percent, of low-income acquisitions and has the highest percent impact to the EJ community. Given that the low-income relocations for EJ Alternative B still represent a higher percentage as compared to the census tract, the impacts to a potentially historic, large cemetery, and that stream impacts are greater for this alternative, EJ Alternative B was determined not to be a prudent and feasible avoidance alternative and was eliminated from consideration.

Most of the properties acquired by Alternative B are mobile homes since this alternative bisects a mobile home park (Parcel 227). Alternative B will acquire three of the four occupied mobile homes in the mobile home park. Homes acquired in the project corridor that are not mobile homes are typically small two or three bedroom older homes. One residence on Glenview Road, which is impacted by Alternative B, has been modified for handicapped access. At the time of the site visits, however, the structure did not appear to be occupied.

Based upon analysis of census data, site visits, and conversation with the Mayor of Lewisburg, many residents in the community are elderly and/or low-income. The same is potentially true for the relocated residents. Owners and tenants of these properties will be assisted with locating safe and sanitary housing that is a comparable replacement dwelling. Owners will also be compensated for their property at fair market value in accordance with the KYTC’s Division of Right-of-Way and Utilities policies and procedures. Tenants will be eligible for either rent supplement payment or down payment assistance.

The acquisition and relocation program will be conducted in accordance with (i) the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended; Public Law 91-646, *Title IV of the Surface Transportation Uniform Relocation Act of 1987*; CFR, Part 24, *Uniform Relocation Assistance and Real Property Regulations for Federal and Federally Assisted Programs*; and Final Rule and Notice, as administered by the Kentucky Transportation Cabinet. Relocation resources, including Last Resort Housing funds, will be made available to all residential relocatees without discrimination in accordance with the *Civil Rights Act of 1964, Title VI*. Agencies available to assist with housing or loan issues include:

- United States Department of Agriculture
- Habitat for Humanity of Kentucky
- HUD-Housing Counseling for Homebuyers and Renters
- Social Security Administration

- National Housing Conference
- Kentucky Housing Corporation
- Russellville Housing Authority

Due to the very limited amount of low-cost housing in Logan County, last resort housing may become necessary for some residents. Last resort housing may be implemented in a number of ways, including (but not limited to):

- Rental assistance subsidy;
- Construction of a new replacement dwelling either on-site or off-site;
- Relocation (on-site or off-site) and (if necessary) rehabilitation of a dwelling; and
- Change in status of the displaced household from tenant to homeowner when it is more cost effective to do so.

A total of 464 low-income housing units (Section 8, Section 236, Rural Development, Public Housing, HOME Investment Partnerships, and Housing Credits programs) are available throughout the county, although not necessarily vacant at the time residents will be seeking new housing. Most low-income housing is located in Russellville, although some properties are located in Adairville and Lewisburg as well. The Lewisburg Village Apartments has 21 units available for low to moderate-income residents (those paying rent more than 30 percent of adjusted annual income). Because right-of-way acquisition is anticipated to occur in 2013 for this project, it is not possible at this time to predict availability of alternative or low-income housing for the displaced residents.

For all displaced residents, sufficient lead time will be given in order that residents may have ample opportunity to relocate to a suitable alternative location with the least amount of disruption possible. At present (2010), there are no planned transportation projects in the county that will compete with the proposed project for available housing within the next two years.

Indirect and cumulative impacts from the project are positive for the community. Reconstruction of US 431 will enhance the liveability of Lewisburg and encourage economic development in the region. An increased tax base will allow for more services and amenities to the residents of the community.

I. Farmland

By 1970, manufacturing had replaced agriculture as the dominant source of income for Logan County. Nevertheless, for the 1998 agricultural census, Logan County ranked first in the state for winter wheat, dark air-cured tobacco, and barley; and ranked fourth for dark fired tobacco. It was also one of the state's top ten counties for production of corn and soybeans.

Approximately 275,000 acres of Logan County are farmland. Since 1992, farmland decreased slightly, from 2 percent of its total. But while full-time farms decreased 12 percent from 1992 to 1997, cropland harvest increased slightly, to nearly 150,000 acres. A site visit confirmed that much land in the project corridor is actively cultivated cropland in hay, tobacco, row crops, and beef cattle.

This project will impact prime farmland. Based upon a review of soil mapping from Natural Resources Conservation District, prime and statewide farmland in the project corridor comprises all land that is not wooded, hillside, or karst. Land within the city limits of Lewisburg, however, is not considered farmland,

even though it may be one of the prime soil types. Exhibit 6, page 43 shows soil types of prime and statewide importance in the project area.

Alternatives A and C have the greatest amount of agricultural impacts. Prime and statewide important acreage acquired for each alternative is as follows:

- Alternative A: 91.5 acres
- Alternative B: 73.8 acres
- Alternative C: 81.5 acres

While Alternative C is longer and crosses more farmland, the disturbance limits are narrower than for Alternative A, resulting in a lower farmland impact.

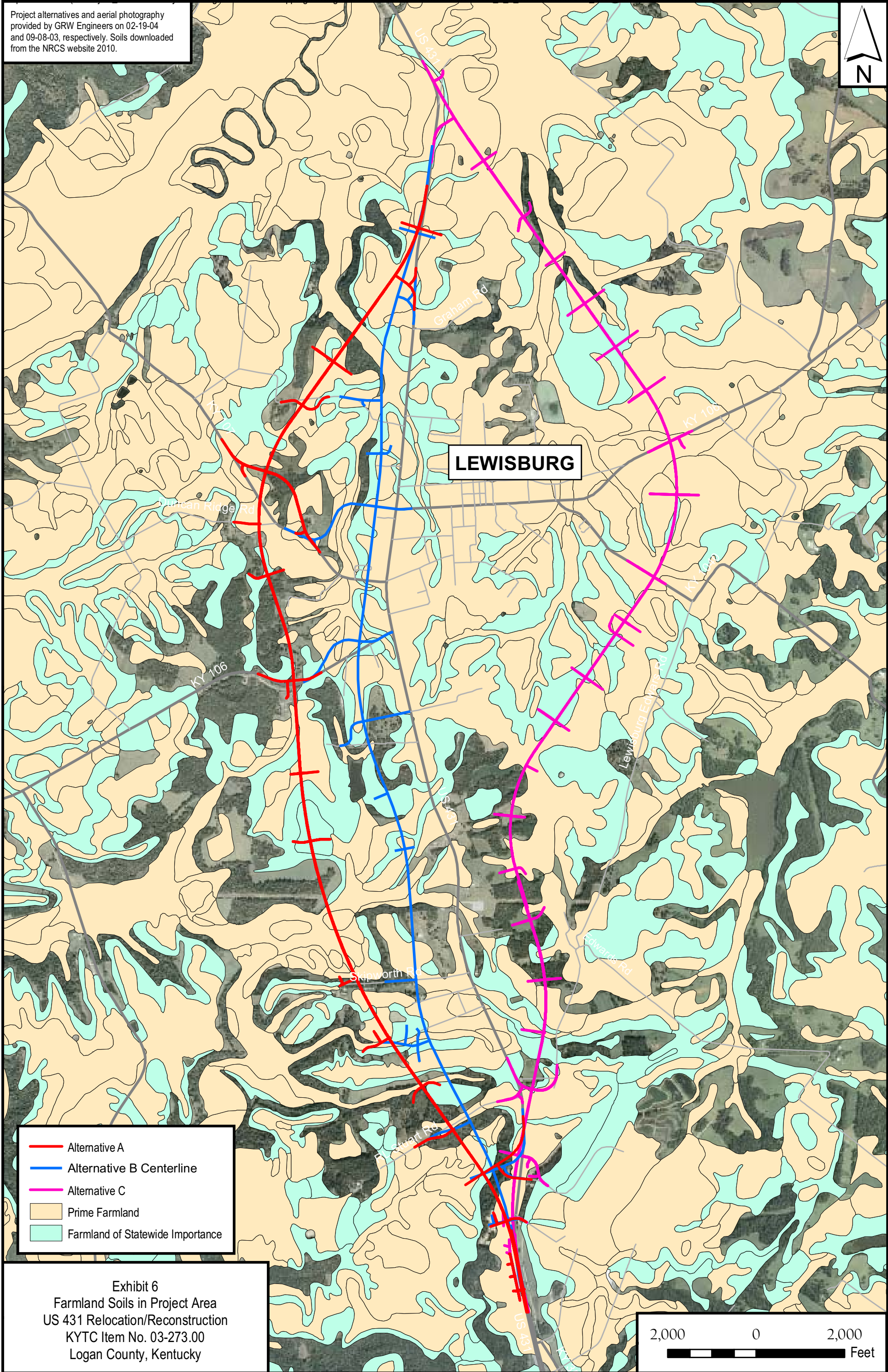
Most farmland parcels impacted by ROW acquisition will likely continue to be farmed, as the parcels are large and remaining acreage is greater than 5 acres. Only a few parcels are small enough that ROW acquisition will acquire most of the land in each and not leave enough land to economically keep in production.

A Land Evaluation Site Assessment form (Form AD-1006) was prepared to determine the degree of farmland impact. An assumption was made in Section V that the relative value of farmland to be converted was 100 points (the maximum allowable). This is a reasonable, but generous, assumption based upon the amount of prime farmland in the project corridor. Total corridor assessment criteria totals (part VI) were: Alternative A, 45 points; Alternative B, 30 points; Alternative C, 50 points.

Because the total number of points in part VI was less than 60, the Federal Highway Administration, in its Environmental Guidebook documentation, indicated that Form AD-1006 "need not be submitted to Natural Resource Conservation Service (NRCS) field offices" if the total Site Assessment points in part VI of the form are 60 points or less. Based upon these criteria, it was determined that a Farmland Conversion Impact Rating form was not required for this project. Therefore, conversion to highway right-of-way in the project corridor will not cause a substantial negative impact requiring mitigation for agricultural purposes. A copy of the Form AD-1006 documenting the above points of reference is presented in Appendix F.

An estimate was made to place a value on the loss of agricultural income for each of the Build alternatives. Referring to the 2007 Agricultural Census, average market value (AMV) of agricultural products sold per farm (\$69,102) for an average size farm in Logan County (247 acres) yielded an AMV per acre of about \$280. This amount was multiplied by the number of farmland acres required for right-of-way for each of the Build alternatives. Based upon this formula, Table 21 below shows the estimated total loss of farm income for each of the Build alternatives. This estimate generously assumes that all farmland acreage acquired for highway right-of-way is income-producing farmland. Alternative C has the greatest potential loss of agricultural income.

Project alternatives and aerial photography provided by GRW Engineers on 02-19-04 and 09-08-03, respectively. Soils downloaded from the NRCS website 2010.



LEWISBURG

- Alternative A
- Alternative B Centerline
- Alternative C
- Prime Farmland
- Farmland of Statewide Importance

Exhibit 6
Farmland Soils in Project Area
US 431 Relocation/Reconstruction
KYTC Item No. 03-273.00
Logan County, Kentucky

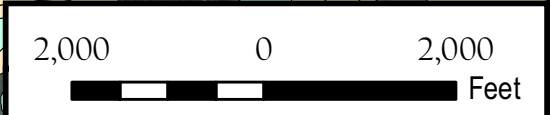


TABLE 21 – ESTIMATED TOTAL LOSS OF ANNUAL FARM INCOME

Alternative	Prime or Statewide Farmland Acreage Taken for Right-of-Way	Total Estimated Loss of Farm Income
Alternative A	82	\$22,960
Alternative B	74	\$20,720
Alternative C	92	\$25,760

Indirect and cumulative impacts to farmland in the corridor will primarily be related to growth and development. However, growth may come slowly to Logan County and is not likely to create significant losses of farmland. Thus, cumulative and indirect impacts from the project to farmland are expected to be minimal.

J. Environmental Justice

Specific consideration was given to Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, throughout the evaluation of all alternatives. The purpose of Executive Order 12898 is to identify, address, and avoid disproportionately high and adverse human health or environmental effects on minority and low-income populations. During the course of data collection for this baseline assessment, attention was given to minority and low-income populations. Social, economic, and environmental impacts were also considered for the community at large.

Census data and field reconnaissance indicate Lewisburg and Census Tract 9602 are predominately white. There are no definable minority communities either in the city or in the project corridor. However, according to US census data, the poverty rate in Lewisburg is about 23 percent. A site visit indicated there are a number of potentially low-income residents who may be impacted by the proposed project. Alternative B will acquire a mobile home park just west of Lewisburg on KY 107 that is home to potentially low-income persons.

The residents in this mobile home park appeared to meet the definition of low-income as defined by the US Department of Transportation *Order to Address Environmental Justice in Minority Populations and Low-Income Populations* (1997) (DOT Order). Therefore, KYTC-DEA conducted an Environmental Justice Assessment to determine if the project creates an Environmental Justice issue.

The Environmental Justice Assessment considered the three Build alternatives (A, B and C) as well as the No-Build with emphasis on those properties requiring relocations. Interviews with residents and property owners occurred April 23-24, 2007, and the document was completed in May 2007. Two follow-up visits to the trailer park were conducted in February and March 2010 to ensure that the project team had current data on the number of residents in the trailer park. The Environmental Justice Assessment was revised to include this information and is contained in Appendix G. The methodology is summarized below.

1. EJ Assessment

The focus of Executive Order 12898 is on “disproportionately high and adverse effects on minority and low-income populations.” The DOT Order defines these terms as follows. *Adverse effects* were defined as the totality of significant individual or cumulative human health or environmental effects, including interrelated

social and economic effects. *Disproportionately high and adverse effect on minority and low-income populations* were defined as an adverse effect that: 1) is predominantly borne by a minority population and/or a low-income population, or 2) which will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low income population.

The definition for *low-income* used in this analysis deviated from the DOT Order and was defined as "a household whose income is below 80 percent of the median household income (1999) for the 2000 Census tract that encompasses the entire project corridor." This definition is more inclusive than the DOT Order's definition for low-income which is "low-income means a person whose median household income is at or below the Department of Health and Human Services poverty guidelines." The definition used in this analysis is in line with definitions used for federal housing programs.

The methodology employed for this analysis stems primarily from an interpretation of these definitions. Following the field interviews, data was sorted and summarized by alternative. Adverse effects were first discussed for the project as a whole without regard to income status. Secondly, the affected environment was described. This description demonstrated that for this project, the Environmental Justice population of concern is relative to low-income persons rather than minorities. Finally, the Findings section detailed information gathered as a result of the interviews with residents and property owners in April 2007. See Appendix G.

The Environmental Justice Assessment concluded that Alternative B includes a low-income population that would by definition and guidance merit consideration as an Environmental Justice concern and thus does present an Environmental Justice issue. Alternatives A and C do not. If Alternative B is selected, mitigation for the Environmental Justice issue, in addition to standard relocation benefits, will be required.

An additional EJ avoidance alternative, EJ Alternative B, was developed to consider the impacts of avoiding the trailer park. It was determined that this alternative did not provide a satisfactory solution to the EJ issue, particularly in light of the stream impacts that would result. A complete discussion of EJ Alternative B is contained in the Alternatives Considered But Eliminated section, page 16.

To communicate with the residents who might be relocated as a result of the project, the project team developed a 3-page questionnaire that was hand-delivered to every household for all three alternatives. A copy of the questionnaire is contained as an attachment to Appendix G (the Environmental Justice Assessment) of this document. Members of the project team interviewed each resident over the course of several field visits in 2007, 2009 and 2010 to ensure that everyone had an opportunity to comment on the project and to update the project team on current residency status. The questionnaire requested detailed information about the members of the household (age, race, economic status, disability status, interdependency with neighbors); whether the residence was owned or rented, mortgage or rent, utility bills, length of residency; whether the resident was aware of the project and if she or he had attended any public meeting; and if they were aware of the project, whether they supported or opposed it. The questionnaire also asked if they had a preference for any alternative. They were also invited to comment on the proposed project.

The results of the questionnaire are summarized in detailed tables attached to the Environmental Justice Assessment in Appendix G. The income status by alternative is contained in Table 22, page 48 below. In summary, for Alternative A, two residents did not wish to be relocated; neither were low income. For Alternative B, no resident from the trailer park was opposed to the project or objected to being relocated. One trailer park resident commented in favor of the project. Two interdependent households outside the trailer park did object to the project; one household was low-income and the other was not. One resident (not low income) indicated he did not want to move, but then added that he had been thinking of moving, and he favored Alternative B. For Alternative C, no resident objected to being moved.

Based upon the results of the community outreach, the project does not appear to present an adverse impact to a low-income community. Yet because of the socioeconomic status of some of the residents, the project team developed a framework within which to identify potential environmental justice impacts to this community. This framework is discussed below.

2. Assessing Project EJ Impacts

The low-income residents adversely impacted by Alternative B will experience loss of familiar setting, displacement from proximity to family members, and disruption of accustomed patterns of travel to reach usual services (*e.g.*, utilities offices, post office, etc.). In addition, they will experience the stress of the relocation process itself, which will likely be compounded by their lack of understanding of the process. Some may believe that they cannot afford to move, not understanding the last resort housing provision that could be used to help them. The environmental justice decision-making framework follows.

Due to the potential for Environmental Justice (EJ) impacts from this project, KYTC conducted an Environmental Justice Assessment in 2007 to collect information on residents that would be relocated by the US 431 Reconstruction project. This information allowed KYTC to identify any EJ populations that would be affected by the project. From prior studies, it was determined that EJ impacts do not include minority populations (EJ Assessment, p. 4 (Appendix G)). However, data from the 2000 U.S. Census suggested that the population of Lewisburg contained low-income persons.

"A review of Census 2000 data for Census Tract 9602 revealed that approximately 38 percent of households had an annual income of less than \$21,000. Kentucky and Logan County each had approximately 32 percent meeting this same annual household income threshold. These percentages for the county and census tract in conjunction with the field survey performed as part of the baseline analyses revealed that low-income residents may be affected by the proposed project. The field survey in particular revealed a cluster of potential low-income residents in a mobile home park along Alternative B." (EJ Assessment, Appendix G, p. 6)

Information gathered from further field studies and one-on-one interviews with affected residents confirmed the status of low-income residents within the project corridor. Thus, it was determined that EJ impacts included members of a low-income population.

A "community" is defined¹ as:

- A group of people living in the same locality and under the same government

¹ Dictionary.com. *The American Heritage® Dictionary of the English Language, Fourth Edition*. Houghton Mifflin Company, 2004. <http://dictionary.reference.com/browse/community> (accessed: January 18, 2008).

- The district or locality in which such a group lives
- A group viewed as forming a distinct segment of society

Thus, it is clear that Lewisburg contains a low-income population that may be defined as a community.

“EJ Community” must be defined more stringently. Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, has defined environmental justice as disproportionately high and adverse human health or environmental effects on minority or low-income populations. The proposed undertaking has no impact upon some members of the low-income population of Lewisburg. Thus, the EJ Community is a sub-set of the low-income community at large. For purposes of this project, EJ Community is defined as *those low-income members of the Lewisburg community who will receive disproportionately high impacts from the proposed undertaking as compared to the remaining low-income members of the Lewisburg Community.*

As a part of the EJ Assessment a survey was conducted with each identified member of the EJ Community. During field work, Third Rock contacted each household to be acquired for all alternatives for the project and concluded that:

“. . . much higher numbers of relocations required for Alternative B were low-income as compared with Alternatives A or C. The percentage was also considerably higher than that of the geographic comparison area of Census Tract 9602. [None in 2010] of Alternative A’s nine residential relocations is considered low-income. Of Alternative C’s four residential relocations, one household met the criteria for low-income and three households did not. Of the 16 residential relocations required by Alternative B, [7 in 2010] were considered low-income. The No-Build Alternative would require no relocations of low-income households. All three Build alternatives would relocate residents on Parcels 106 and 107. [Table 23 below] shows the percentages of low-income relocations by alternative as compared with each other and the census tract.”

TABLE 22 – LOW-INCOME HOUSEHOLDS

Alternative or Geographic Area	Relocations	Low-Income Households	Percent Low-Income
A	5	0	0
B	16	7	44
C	4	1	25
Census Tract 9602	N/A	585 of 1,562	38

Thus, the EJ Community comprises the 7 low-income households that will be relocated by Alternative B.

3. *Alternative Impacts*

Social and natural environment impacts were determined for Alternatives A, B and C through baseline analyses of the aquatic/terrestrial and socioeconomic environments, air quality, traffic noise, and underground storage tank or hazardous materials concerns. Additionally, cultural historic and archaeology investigations were conducted. The results of these studies are summarized in the above and were used in the decision-making framework for the project.

As documented above, Alternatives A and C have aquatic impacts that would require permitting and mitigation measures from the US Army Corps of Engineers (USACE). Thus, the project team is confronted with two competing environmental concerns:

- Alternatives A and C: Stream impacts requiring 404 Individual permit (USACE)
- Alternative B: Environmental Justice

4. Traffic

The purposes of the project are to (1) accommodate truck traffic as well as increased traffic volumes, which in the future are anticipated to be a greater percentage of heavy trucks; and (2) preserve local access in Lewisburg by maintaining the existing road to an acceptable level of service (LOS). Traffic data and level of service is discussed more fully above in Section II.B, Purpose and Need of the Project. The proposed undertaking will thus benefit the entire Lewisburg community, including the EJ Community, as these are common goals. Each alternative will achieve these goals to varying degrees and was assessed by the project team as it relates to meeting the project purpose and need, as well as how it might impact the EJ community.

In summary, Alternative B diverts truck traffic from the center of town with the highest percentage of traffic improvement of the three Build alternatives. Alternative B also preserves local access better than Alternatives A and C because it is closest to existing US 431. Alternative B has lower aquatic impact permitting requirements than Alternatives A and C. However, Alternative B impacts an EJ Community as defined above. The benefits and/or burdens to this community are discussed below.

5. Benefits and Burdens to the EJ Community

a. Benefits

Selection of Alternative B could benefit members of the EJ Community by (i) relocating them into improved housing, (ii) educating the community to needs of low-income community, and (iii) community awareness which could lead to programs that may benefit the EJ Community.

Additionally, the construction of Alternative B represents the most favorable vehicle for providing an economic benefit to the community. Alternative C would clearly have a "bypass" effect on Lewisburg. Alternative A, being closer to the community but still a distance from town, would have a lesser effect. Alternative B, being close to town, has the least "by-pass" effect and would best preserve the existing commercial district as well as providing for opportunities for commercial development along the new intersections to US 431. Because Lewisburg is a small, somewhat poor community, any economic benefit to the community would benefit the EJ Community as well by providing for additional jobs and tax revenue.

b. Burdens to the Community

Low-income communities often have a stronger "sense of place" than for other segments of society. Relocating residents out of their homes, even if they are "better", may violate this sense of place. A community liaison (or Ombudsman) has been shown to be effective in helping residents make the transition from old home to new community and to allow them to redefine their "place" that is consistent with their sense of community.

If Alternative B is selected, the burdens to the EJ Community must be determined by consideration of each personal situation. And their personal situation today may be different when the right-of-way phase commences. However, what may be perceived as a burden to one household might be neutral or even positive by another. Generally speaking, the relocation process may be considered a burden in itself. It has been documented during the community surveys that there was limited interdependency among the members of the EJ Community, but relocation may impact some of these family members negatively.

Selection of Alternatives A or C would not directly impact the EJ Community. However, if an opportunity to assist them through project mitigation measures and community outreach is identified, that opportunity would be lost.

Mitigation for burdens to the EJ community is discussed below in Section VI.

6. *Decision-Making Framework*

The Environmental Justice issue will guide alternative selection for this project. The decision-making framework (in addition to that afforded by the NEPA process) will consider the following criteria:

- *Purpose and need:* First and foremost, a viable alternative must meet the project's purpose and need. Thus the question: does each alternative adequately meet the project's purpose and need? How is each alternative ranked in this regard and why?
- *Additional EJ community assessment:* The EJ community will be surveyed prior to the public meeting to determine if there have been any changes to the number or composition of the community. The owner of the trailer park will be interviewed as well. The assessment will determine and verify the benefits and burdens of each alternative and include community outreach to formulate project measures to avoid, minimize and mitigate EJ impacts.
- *EJ community input:* An EJ Assessment was performed in April 2007 that confirmed the presence of the EJ community. Comments from the affected residents were recorded. These comments will be reviewed again and given great consideration in the selection process. A public meeting will be held after the Environmental Assessment has been signed by FHWA. Additional outreach to the community will ensure that every member has an opportunity to comment upon the project. These comments will be added to the earlier survey and reviewed to determine if there is a preference towards one alternative or another.
- *General public input:* Reaction from the general public to the alternatives presented at the public meeting will be considered.
- *Stream impacts:* Alternatives A and C have aquatic resource impacts that will require an USACE individual 404 permit. These impacts have been documented and weighed with the other data regarding the EJ impact.

The project team will review all data collected from the additional public involvement. There are no set guidelines on what constitutes disproportionately high and adverse impact to an EJ community. However, the information obtained will provide the project team with the tools to assess impacts and make a professional judgment whether the project presents a disproportionately high and adverse impact to the EJ community. It is possible that proposed mitigation measures are attractive enough to the EJ community residents that they believe the project would represent a benefit, rather than a burden. However, if the EJ community clearly does not support the alternative that most directly impacts them, the project team will

select another alternative that avoids or reduces EJ impacts, provided that alternative adequately supports the project's purpose and need.

7. Summary

The project team has assessed the project's impacts as required by NEPA and has also taken into consideration the needs and concerns of the EJ Community along KY 107. As discussed above, the project has two competing environmental concerns:

- Alternatives A and C: Stream impacts requiring USACE Individual 404 permit
- Alternative B: Environmental Justice

In addition, Alternative B diverts truck traffic from the center of town with the highest percentage of traffic improvement of the three Build alternatives. Also, Alternative B preserves local access better than Alternatives A and C because it is closest to existing US 431. Thus Alternative B best meets the project purpose and need.

In summary, the public involvement process regarding EJ is key to completing the alternative selection process. A determination whether the project presents a disproportionately high and adverse impact to the EJ community will result from the additional public involvement findings.

K. Pedestrian and Bicycle Facilities

The community of Lewisburg has sidewalks in the central portion of town. US 431 does not have sidewalks. The project corridor does not have any dedicated bicycle lanes. However, the Southern Lakes Bicycle trail crosses Logan County along KY 591, KY 1041, KY 96, and KY 102. This trail runs the entire width of Kentucky along its southern counties and crosses into Virginia on the eastern end and into Tennessee at the Reelfoot Lake National Wildlife Refuge at its southwest point in Kentucky. The Midland Kentucky Bike Trail is located just north of Logan County. Both trails are accessible by US 431.

Because of its rural setting, Logan County roads are attractive to bicyclists who wish to explore the state's by-ways by this means. Although the reconstructed US 431 will have wide shoulders and good visibility, bicycle lanes are not proposed at the present time. In addition, the relocation/realignment of US 431 does not meet the criteria for incorporation of pedestrian and bicycle facilities in a rural area based upon Official Order 101153 of the Secretary of KYTC, Pedestrian and Bicycle Travel Policy, signed July 16, 2002. The policy recommends when and where pedestrian and bicycle facilities shall be considered in roadway projects. Criteria for rural roadways are:

- Pedestrian or bicycle traffic exists along the current roadway;
- Project limits are adjacent to planned or anticipated development;
- Existence of a state, regionally, or locally adopted pedestrian or bicycle network or policy;
- Gaps in connectivity; and
- Public interest and demand for pedestrian and bicycle facilities.

While limited pedestrian and bicycle traffic may occur on roads in Logan County and the state is moving toward incorporating bicycle lanes where feasible on new highway projects (pursuant to Official Order 101153), no other criteria can be met. The new highway will provide wide, safe shoulders for pedestrians or bicyclists who choose to use the roadway by those means.

L. UST/Hazardous Materials

An *Underground Storage Tank and Hazardous Materials Baseline Assessment* was submitted to KYTC-DEA April 28, 2004 and provides supporting documentation for this environmental assessment. The Phase I site assessment was conducted to identify recognized environmental conditions, in accordance with ASTM Standard E 1527-00, within the proposed disturbance limits and to recommend Phase II investigations as warranted.

Several oil or gas wells are plotted within the disturbance limits of the proposed alternatives, specifically three within Alternative A, one within Alternative B, and one within Alternative C. Another nine, two, and three wells, respectively, are allegedly within 300 feet of the disturbance limits of the alternatives. A review of aerial mapping, site reconnaissance, and a records review did not reveal evidence of the plotted wells. Potential therefore exists for disturbance caused by alternatives to encounter closed or abandoned wells, as well as collection lines from wells to tanks.

Relative to Alternative B, a petroleum tank on parcel 255 along Old Lewisburg Jerico Road is a site of concern (Exhibit 7, page 52). The revised disturbance limits suggest that this tank will be taken. At least four borings are recommended around the perimeter of the tank to check for any underground release. No other Phase II investigations are recommended for the proposed alternatives.

This parcel also contains one plotted well within 300 feet of Alternative B's disturbance limits. No well was found during the site reconnaissance or review of aerial mapping; however, an interview with a nearby landowner indicated the property does have an active well. The potential to encounter a well or wells should be noted throughout the right-of-way acquisition phase of this project. No cumulative and indirect impacts to UST/hazardous materials sites are expected to result from the project.

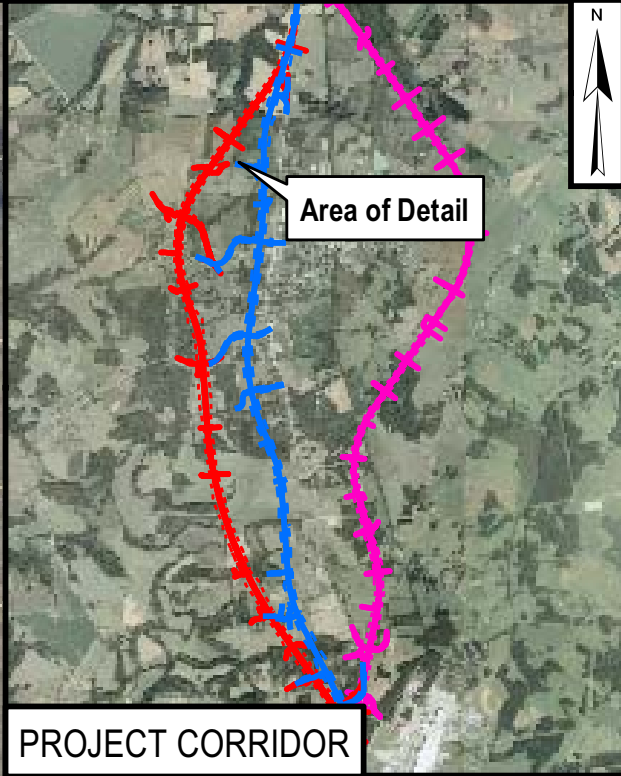
M. Visual Impacts

The project corridor does not contain any vistas or visually sensitive areas, nor does the proposed project interfere with any areas of recognized scenic beauty, state or national parks and/or recreational areas, or historic and/or culturally important resources. The Lewisburg Community Park is located near Alternative C, which will be visible from the park. However, because this park is presently sited between the city's industrial park and sewer treatment plant, it cannot be said that construction of a road nearby will significantly alter the aesthetic impression of the park.

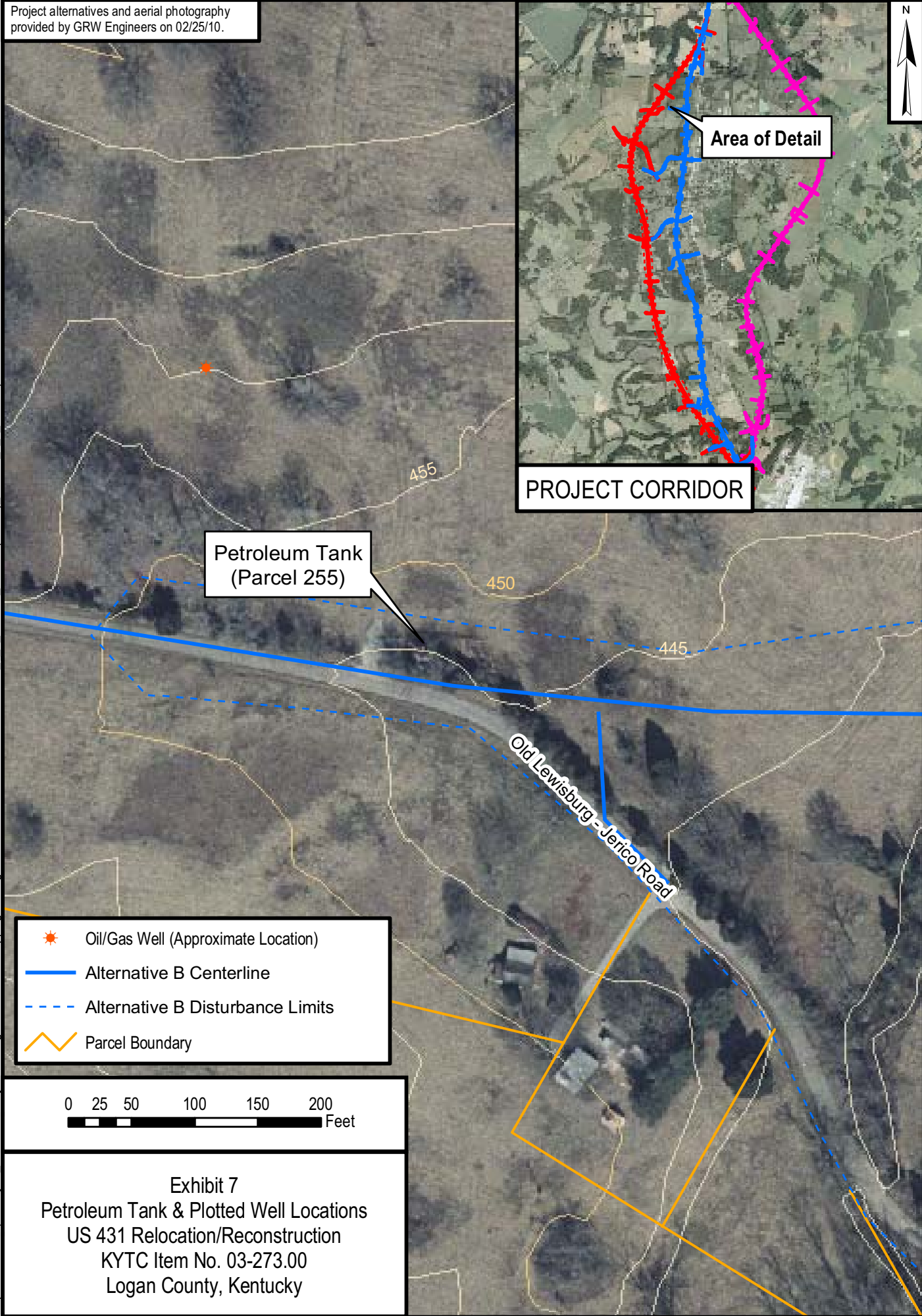
Conversion of large amounts of farmland to highway right-of-way bring inevitable negative aesthetic visual impact, although land adjacent to the roadway is anticipated to continue being farmed. Thus the rural character of the community will likely be preserved.

The Lewisburg cemetery is located on the south side of KY 107 about 1,000 feet west of US 431. If either Alternative A or B is selected, this will represent a negative aesthetic impact for visitors to the cemetery. Alternative A will be about 1,200 feet at its closest point to the cemetery, while Alternative B will be about 500 feet east at its closest point. Presently a thick row of trees and shrubbery along the creek, as well as structures along US 431, shield the cemetery from much traffic noise. While the disturbance limits of Alternative B will not impact the vegetation along the creek, the road will be immediately east of the creek, and the resulting traffic noise may diminish the peaceful atmosphere of the site.





Project alternatives and aerial photography provided by GRW Engineers on 02/25/10.



Map Document: (P:\Project_Files\Kentucky\3006-LoganEA-FONS\Mapping\GIS\figures-exhibits\New EA exhibits\Revised_3_9_10\UST_exhibit7(8.5x11)_revised_3_9_10.mxd) 3/29/2010 -- 5:09:34 PM dwm



Petroleum Tank
(Parcel 255)

-  Oil/Gas Well (Approximate Location)
-  Alternative B Centerline
-  Alternative B Disturbance Limits
-  Parcel Boundary

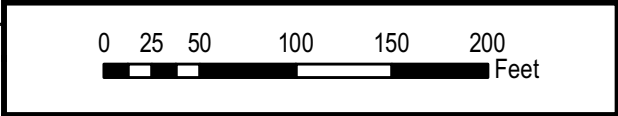


Exhibit 7
 Petroleum Tank & Plotted Well Locations
 US 431 Relocation/Reconstruction
 KYTC Item No. 03-273.00
 Logan County, Kentucky

Because each of the alternatives will be located in areas presently undeveloped, conversion of undeveloped and/or agricultural properties to highway and right-of-way will alter the viewshed of the project area and ultimately represent an indirect visual impact. Thus the project may result in cumulative and indirect visual impacts as a result of the road construction, regardless of the alternative selected.

N. Impacts of Construction Activities

Most of the project corridor traverses undisturbed farmland. There is no existing traffic to maintain, however, it crosses several local roads, which will require traffic maintenance. On these local roads, the existing right-of-way will be utilized to the fullest extent to minimize disruption. Should Alternative B be selected, this alternative may cause disruption to homes, churches, and businesses located along US 431. Because this alternative runs parallel and very close to the existing alignment, the community of Lewisburg must contend with through traffic as well as construction traffic during the construction phase of the project.

Traffic delays, congestion, and detours during construction should be expected, particularly where the project intersects existing roads. Short-term community disruption during the construction phase of the project is also inevitable. A formal Traffic Control Plan, which incorporates the provisions set forth in Section 112 (*Maintenance and Control of Traffic During Construction*) of the KYTC's *Standard Specifications for Road and Bridge Construction* (2004 edition) (*Standard Specs*) shall be followed to maintain adequate access to residents, businesses, and community facilities in the project corridor.

Sedimentation and erosion are two environmental concerns created with any development, but impacts can be minimized through implementation of best management practices. The Erosion Control Plan will be developed in accordance with the Standard Specifications and KPDES permit requirements. During construction, the effectiveness of the Erosion Control Plan will be monitored on a weekly basis and after each rainfall event. It will be adjusted as necessary to ensure minimal sediment leaves the confines of the project. Sections 212 (*Erosion Control*) and 213 (*Water Pollution Control*) of the *Standard Specs* shall guide mitigation efforts for these concerns. These actions will alleviate sedimentation and erosion, environmental concerns created during construction of the roadway.

Construction will bring short-term positive impacts including increased revenues, increased employment, and additional salaries directly related to construction activities. Local businesses in Lewisburg will likely see an increase in sales of food, beverages, and fuel for the construction crews.

Contractors will be required to use noise abatement measures to restrict or reduce construction noise impacts in the vicinity of noise sensitive areas such as schools, residences, and churches. These measures may include, but are not limited to, the following:

- Provide soundproof housing or enclosures for stationary noise-producing machinery such as drills, augers, cranes, derricks, compactors, pile drivers, etc.
- Provide efficient silencers on air intakes of equipment.
- Provide efficient intake and exhaust mufflers of internal combustion engines.
- Perform proper maintenance on all noise-producing equipment to prevent excessive rattling and vibration of metal surfaces.
- Restrict construction operations in the vicinity of noise sensitive locations to periods of the day when excessive noise would be least harmful.

- Take other measures as necessary to prevent construction noise from becoming a public health nuisance or detriment to human health.

The proposed project will have the following cut and fill requirements for the two-lane initial and four-lane ultimate scenarios, by alternative.

TABLE 23 – CUT AND FILL REQUIREMENTS, CU YD

CUBIC YARDS		
	Two-Lane Initial	Four-Lane Ultimate
<i>Alternative A</i>		
Cut	1,028,192	1,515,400
Fill	1,013,119	1,548,316
<i>Alternative B</i>		
Cut	738,842	1,070,920
Fill	547,969	999,645
<i>Alternative C</i>		
Cut	945,138	1,057,753
Fill	580,529	761,710

At this time, a Preferred Alternative has not been selected. Thus the size needed and resulting location of fill (waste) sites has not been identified.

V. MITIGATION MEASURES

Detailed mitigation and/or permit requirements for impacts of the proposed alternatives are included in the respective sections of *Section III. Environmental Impacts*. Table 24 below summarizes these impacts, and subsequent minimization and mitigation measures.

TABLE 24 – SUMMARY OF MINIMIZATION OR MITIGATION MEASURES

Impacted Resource	Alternative A	Alternative B	Alternative C
Noise	N/A	N/A	Noise barrier analysis recommended at Site 12.
Floodplain	No-rise floodplain certification needed	N/A	No-rise floodplain certification needed
Aquatic Resources	USACE permit anticipated for wetlands (individual or nationwide) and stream impacts	USACE permit anticipated for stream impacts	USACE permit anticipated for wetlands (individual or nationwide) and stream impacts
Threatened & Endangered Species	BA for Indiana and Gray bats		
Archaeology	Site 15Lo186: take measures to ensure that unmarked graves will not be impacted	None Eligible	Site 15Lo219: FHWA coordination with parties to resolve disagreement over eligibility status; possible coordination with ACHP
Environmental Justice	N/A	Last Resort Housing may become necessary after additional public involvement is complete and impacts are determined; other additional mitigation will be required for EJ issue; additional public outreach for affected residents prior to second public meeting; possible relocation of homes to unacquired portions of parcels; possible purchase of excess property for relocations	N/A
UST/Hazardous Materials	N/A	Phase II assessment recommended for one site (Parcel 255)	N/A
Construction Impacts	Follow all specified construction activity guidelines		

A. EJ Impact Mitigation

Should Alternative B be selected, KYTC will implement mitigation measures to minimize the burdens to the affected EJ community. Mitigation will be assessed on a case-by-case basis to accommodate personal situations. One form of mitigation that will be implemented is the appointment of an Ombudsman for the project. The Ombudsman would ideally be someone from the area who has a social service background, is familiar with the affected community, and knows what resources are available. This person could assess the needs of each household being relocated, and provide mitigation services that would be most effective.

The housing of the at-risk EJ community comprises primarily mobile homes in, at best, fair condition, or very small frame dwellings in fair to poor condition. Selection of Alternative B would allow the project team to provide decent, safe and sanitary homes for these residents through the Last Resort Housing provisions of the Uniform Relocation Act. While it is normal procedure to find replacement homes within the same community, it was discovered that several members of the EJ Community had family outside the immediate project area, including other counties. Some residents expressed interest in relocating closer to other family members, and project funds could be used to accommodate that need.

Another relocation option could be that, where appropriate, some dwellings could be moved, or new homes installed, on remnant parcels if the resident wished to remain in the same area. Again, the Ombudsman could determine from interviews if this would be an attractive option to the resident that would allow him or her to retain the sense of place.

The needs of the EJ Community are perhaps not well known to the community. Appointing an Ombudsman can lead to education of the local population, particularly young people, by giving schools and/or churches an opportunity to teach their students or members about NEPA and Environmental Justice. Since the EJ Community is small, many basic needs could be met by classes or congregations "adopting" a family to assist them with acquiring necessities such as food, clothing, and transportation to appointments, etc. This community awareness could lead to implementation of programs that would best serve this population. It should be left to the community of Lewisburg what these programs should be and how best to implement them. The leaders of the community should be involved in this important decision-making process, as they probably already know more about the specific needs of their residents than the project team. However, it should be documented that, if Alternative B is selected, sustained community outreach will become an important element of the mitigation.

If decent, safe and sanitary (DSS) replacement housing cannot be found for the displaced residents, KYTC Division of Right-of-Way and Utilities will invoke last resort housing provisions. This may involve the use of replacement housing payments that exceed the normal Uniform Relocation Act maximum amounts. The project team will ensure that all affected residents will be relocated into DSS housing in accordance with their financial means.

If Alternate B is ultimately chosen as the preferred alternate, measures to mitigate for the adverse effect to the affected EJ community will be developed by the project team and approved by FHWA.

VI. COMMENTS AND COORDINATION

Public involvement began as part of the corridor analysis, after project information was presented to the Lewisburg City Council on February 10, 1997. Little discussion was generated from these meetings. The most common question was whether the roadway would be two lanes or four. The Logan County Transportation Action Team also involved the public. A committee was formed which included representatives from KYTC, Barren River Area Development District, Bowling Green airport board, Logan County, the city of Lewisburg, Lewisburg industrial board, Lewisburg Board of Education, and the downtown business association. This committee met three times and provided valuable information about the purpose and need for corridor improvements. The committee helped to incorporate all segments of the proposed corridor improvements into the statewide transportation planning process.

The project team for the US 431 reconstruction project sent questionnaires to all property owners in the project corridor. One hundred thirty-one (131) questionnaires were returned. While the purpose of the questionnaire was to determine environmentally sensitive sites, historical, burial, easements, and public utility use on properties, the respondents were also provided opportunity to comment on the project. While many residents had questions and concerns about the project and project location, only five comments that specifically opposed the project were received.

On August 3, 2004 a public information meeting was held in Lewisburg, Kentucky at the Lewisburg Elementary School Cafeteria. An Open Format was utilized for this meeting and a handout of information was made available to the public. All persons attending were afforded the opportunity to review the information presented, make comments, and discuss the project. Since the public information meeting, all of the exhibits and information have been available at the District Office for the public to view and provide input or obtain information about the project.

Approximately 240 people attended the meeting. A total of 42 written comments were received on the project. From these comments, the community favored Alternative B the most and Alternative C the least (Table 25). A summary of the public meeting comments is included in Appendix E.

TABLE 25 – SUMMARY OF PUBLIC MEETING ALTERNATIVE PREFERENCE

Alternative	Preferred	Least Preferred
No-Build	2	0
Alternative A	8	4
Alternative B	25	5
Alternative C	6	27

It was determined that Alternative B represented an EJ impact to the residents at and near the trailer park. Additional outreach has been conducted for these residents. An EJ Assessment was conducted in April 2007, which involved one-on-one interviews with all residents for all alignments. Particular attention was paid to the EJ population. Each resident was interviewed and given complete information about the project as well as a project history. They were also advised that another public meeting would be held, although the date of this meeting was not known at the time of the interviews. Additional assessments were conducted in February and March 2010 with the residents of the trailer park, and additional communication with the low-income community will occur prior to the public hearing.

In addition, KYTC will conduct two additional visits to each of the affected households. The first meeting will be to update them on the status of the project and to remind them of the project hearing and to offer transportation if needed. They will be encouraged to attend and will be advised that their comments will be given serious consideration by the project team. A second visit after the public hearing will be conducted. This visit will ensure that they attended the hearing. If they did not, they will be solicited for their comments regarding the project.

VII. SECTION 4(F)/ PROGRAMMATIC 4(F)

Currently no Section 4(f) or Programmatic 4(f) issues have been identified in the project area.

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APPENDICES

APPENDIX A – TRAFFIC CAPACITY ANALYSIS

CAPACITY ANALYSIS

Introduction

Within the project limits, existing US 431 is a north-south route along the western edge of the city limits of Lewisburg. The vertical and horizontal alignment generally meets a 35 MPH Design Speed. The lanes and shoulders are narrow. There are numerous access points, which result in reduced capacity.

The KYTC Division of Multimodal Programs has determined that the present traffic (2008) on US 431 varies from 5,600VPD to 6,500VPD. Projected traffic (No Build) for design year 2035 varies from 11,000VPD to 13,000VPD. The Division of Multimodal Programs has divided the existing road into four segments and provided separate traffic for each segment. There are three alternates currently being considered to replace existing US 431: a western by-pass (Alternate A), a close-in western by-pass (Alternate B) and an eastern by-pass (Alternate C). The Division of Multimodal Programs has also provided projected traffic for each of these alternates divided into three segments each with residual traffic projections for existing US 431.

In this report, the existing US 431 (No Build) with 2008(current) and 2035(design year) projected traffic will be analyzed to document the need for an improvement. This analysis will be performed using the two-lane rural highway module of the Highway Capacity Software and the un-signalized and signalized intersection modules of the Highway Capacity Software, as appropriate. Then, the residual 2035 traffic on existing US 431 will be analyzed for each of the alternates being considered to determine which, if any, of these alternates diverts sufficient traffic from existing US 431 to provide an acceptable level of service (LOS), which is defined in the Green Book as LOS C for the residual traffic on existing US 431. Finally, we will analyze each segment of the alternates being considered to determine the number of lanes required to meet an acceptable LOS, which is defined in the Green Book as LOS B, for the Build Year, the Design Year and selected intermediate years.

Existing US 431 (No Build)

For the No-Build Option, each segment of existing US 431 was analyzed utilizing the two lane module of the highway capacity software with 2008(current) and 2035(design year) projected traffic with the following results:

SEGMENT	2008 DHV	AVG SPEED	% TIME SPENT FOLLOWING	V/C	LOS
Segment 1	590	43.5 MPH	51.0%	0.28	D
Segment 2	650	37.1 MPH	65.4%	0.25	E
Segment 3	680	36.9 MPH	66.1%	0.26	E
Segment 4	590	37.2 MPH	64.8%	0.28	E

SEGMENT	2035 DHV	AVG SPEED	% TIME SPENT FOLLOWING	V/C	LOS
Segment 1	1,200	38.1 MPH	71.1%	0.49	E
Segment 2	1,300	32.7 MPH	81.1%	0.49	E
Segment 3	1,400	31.8 MPH	83.0%	0.52	E
Segment 4	1,200	33.0 MPH	78.0%	0.49	E

The three intersections on existing US 431 at KY 106W, KY 107 and KY 106E were analyzed using the un-signalized intersection module of the highway capacity software for the 2008(existing) traffic and the 2035(design year) projected traffic. All three intersections operate at LOS C for existing traffic and LOS F for the projected traffic. Since these intersections fail with projected traffic, they were further analyzed as signalized intersections with the projected traffic and it was determined that the two KY 106 intersections will operate at a LOS B with the addition of a signal and the KY 107 intersection will operate at a LOS C with the addition of a signal.

As can be seen in the previous tables, the low average travel speed coupled with the high per cent of time following and the high volume to capacity ratio results in a Level of Service of D/E for current traffic and Level of Service E for design year traffic throughout this section of highway. LOS E is characterized by undesirable unstable flow which approaches capacity. Also, the intersection analysis indicates that all three major intersections in Lewisburg will need to be signalized resulting in additional delays and causing this section of US 431 to more appropriately be defined as an urban highway. This analysis demonstrates the need for the project.

Existing US 431 (Build)

For the various build alternates, each segment of existing US 431 was analyzed with 2035(design year) projected residual traffic with the following results:

ALTERNATE A SEGMENT	2035 DHV	AVG SPEED	% TIME SPENT FOLLOWING	V/C	LOS
Segment 1	510	46.6 MPH	59.7%	0.21	C
Segment 2	540	37.6 MPH	62.5%	0.20	C
Segment 3	590	37.4 MPH	63.8%	0.22	C
Segment 4	470	42.8 MPH	58.3%	0.19	C

ALTERNATE B SEGMENT	2035 DHV	AVG SPEED	% TIME SPENT FOLLOWING	V/C	LOS
Segment 1	370	47.6 MPH	57.7%	0.15	C

Segment 2	470	37.9 MPH	60.0%	0.18	C
Segment 3	430	38.1 MPH	58.2%	0.17	C
Segment 4	290	43.4 MPH	70.6%	0.16	B

ALTERNATE C SEGMENT	2035 DHV	AVG SPEED	% TIME SPENT FOLLOWING	V/C	LOS
Segment 1	550	46.3 MPH	61.4%	0.23	C
Segment 2	610	37.3 MPH	64.2%	0.23	C
Segment 3	650	37.2 MPH	65.1%	0.24	C
Segment 4	490	43.0 MPH	57.4%	0.19	C

As can be seen from the above results, all alternates demonstrate the desirable benefit of increasing the residual Levels of Service on existing US 431 to a LOS of C or better. LOS C represents stable flow and is the appropriate Level of Service for a Collector as cited in the Green Book. Of the three alternates under consideration, Alternate B shows the greatest improvement to the residual traffic on existing US 431.

Since the Design Year (2035) traffic is very similar to the Current Year (2008) traffic, it should be noted that the improvement in LOS is not due to decreased congestion but to a change in classification. In accordance with the Highway Capacity Manual, the existing route is a Class I highway because it is an arterial meant to serve long distance trips and the bypassed route becomes a Class II highway because it will become a collector providing access to a Class I facility. On Class II highways, mobility is less critical, and LOS is defined only in terms of percent time-spent-following, without consideration of average travel speed. Drivers will tolerate higher levels of percent time-spent-following on a class II facility than on a Class I facility, because Class II facilities usually serve shorter trips and different trip purposes.

Build Alternates (Two Lane Analysis)

For each Build Alternate, each segment of proposed US 431 was analyzed utilizing the two lane module of the highway capacity software with 2015(build year) and 2035(design year) projected traffic. All alternates met the criteria for LOS B in the build year (2015). The results of the analysis for the 2035 (design year) are:

ALTERNATE A SEGMENT	2035 DHV	AVG SPEED	% TIME SPENT FOLLOWING	V/C	LOS
Segment 1	630	51.8 MPH	49.2%	0.25	B
Segment 2	740	50.0 MPH	61.4%	0.32	C
Segment 3	700	49.1 MPH	59.2%	0.36	C
Seg 3 SB Dir w/o PL	700	46.3 MPH	54.1%	0.54	C
Seg 3 SB Dir w PL	700	47.8 MPH	36.9%		C

Seg 3 NB Dir w/o PL	700	48.2 MPH	50.4%	0.38	C
Seg 3 NB Dir w PL	700	49.7 MPH	34.1%		C

ALTERNATE B SEGMENT	2035 DHV	AVG SPEED	% TIME SPENT FOLLOWING	V/C	LOS
Segment 1	800	50.2 MPH	57.4%	0.31	C
Segment 2	910	49.2 MPH	62.0%	0.35	C
Segment 3	890	48.7 MPH	60.2%	0.38	C
Seg 3 SB Dir w/o PL	890	45.0 MPH	63.2%	0.59	D
Seg 3 SB Dir w PL	890	46.4 MPH	43.7%		C

ALTERNATE C SEGMENT	2035 DHV	AVG SPEED	% TIME SPENT FOLLOWING	V/C	LOS
Segment 1	610	52.0 MPH	48.0%	0.24	B
Segment 2	690	51.2 MPH	52.3%	0.27	C
Segment 3	710	51.1 MPH	53.2%	0.28	C
Seg 3 SB Dir w/o PL	690	46.5 MPH	57.1%	0.54	C
Seg 3 SB Dir w PL	690	48.1 MPH	39.1%		C

For South Bound traffic on the south end of the project, there is a long 3.5-3.6% upgrade that was analyzed for a Passing Lane because it met the criteria for consideration. For all three alternates, a Passing Lane shows slight improvements for average travel speed and per cent time spent following. A Passing Lane would be simple to add at this location since the downstream traffic already has two lanes.

Key intersections were analyzed for all three alternates. For Alternate A, the intersection at Old US 431 and KY 106 operated at LOS of D with All Way Stop Control and the intersection at New US 431 and KY 106/KY 107 operated at LOS C. For Alternate B, the intersection at Old US 431 and KY 106 operated at LOS of C and the intersection at New US 431 and KY 106/KY107 operated at LOS E for the Westbound Approach. For Alternate C, the intersection at New US 431 and KY 106 operated at LOS C. All of these Levels of Service are acceptable, so none of these intersections should be a candidate for signalization.

Since all of the alternates met LOS B criteria in the 2015 (build year) but not in the 2035 (design year), additional analysis were performed to determine in which year that operation degraded from a LOS B to LOS C. In all cases the change first appeared in the Southbound direction of Segment 3. Alternate A operated at LOS B without a passing lane until 2029 and until 2031 with a passing land. Alternate B operated at LOS B until 2017 without a passing lane and until 2026 with a passing lane. Alternate C operated at LOS B until 2023 without a passing lane and until 2029 with a passing lane.

Build Alternates (Four Lane Analysis)

In accordance with the Green Book, the appropriate Level of Service for a rural arterial in rolling terrain is LOS B. None of the Alternates being considered satisfy this requirement as two lane alternates throughout their entire length until the design year. They all satisfy this requirement as two lane alternates from the intersection with KY 106 to the north end of the project.

Therefore, each of the segments of each build alternate which failed to meet LOS B for the two lane analysis were further analyzed utilizing the multi-lane module of the highway capacity software with 2035(design) projected traffic. The result of this analysis is that all segments of all alternates meet LOS A with four lanes.

Conclusion

The need for the project has been established based on the low Levels of Service for the No Build option in the Current Year and the Design Year. All Alternates improve the Levels of Service for the residual traffic on existing US 431 to an acceptable LOS C in the design year. A four lane facility is required from the South end of the project to KY 106E for Alternates A and B to meet the appropriate LOS B for the design year. A four lane facility is required from the South end of the project to the end of the steep grade (a distance of approximately 1.5 miles) for Alternate C to meet the appropriate LOS B for the design year. The remainder of the Alternates meet a LOS B with two lanes for the design year. Any of the alternates could initially be constructed with two lanes that would meet a LOS B in the build year and for some time thereafter depending on the alternate selected and then have the second two lanes completed after the operation degrades to a LOS C.

APPENDIX B – MSAT SUPPLEMENTARY INFORMATION

Appendix A – Mobile Source Air Toxics (MSATs)

Background

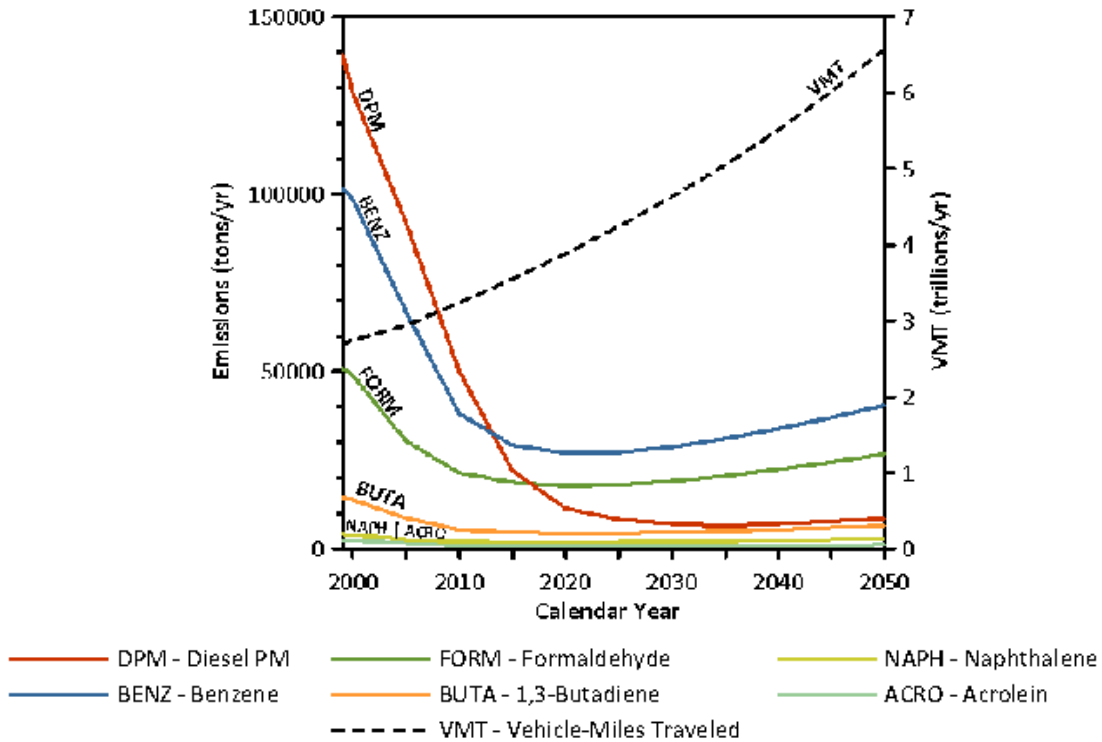
Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (<http://www.epa.gov/ncea/iris/index.html>). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (<http://www.epa.gov/ttn/atw/nata1999/>). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle-miles travelled, VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in Figure 1 below.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the National Environmental Policy Act (NEPA).

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

Figure 1: National MSAT Emission Trends 1999 – 2050 For Vehicles Operating On Roadways Using EPA's Mobile6.2 Model



Note:

- (1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.
 - (2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.
- Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009.

Unavailable Information for Project Specific MSAT Impact Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, <http://www.epa.gov/ncea/iris/index.html>). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's

Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, <http://pubs.healtheffects.org/view.php?id=282>) or in the future as vehicle emissions substantially decrease (HEI, <http://pubs.healtheffects.org/view.php?id=306>).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study (http://www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at ten sites across the country - three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with National Ambient Air Quality Standards for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (<http://pubs.healtheffects.org/view.php?id=282>). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA and the HEI have not established a basis for quantitative risk assessment of diesel PM in ambient settings (<http://www.epa.gov/risk/basicinformation.htm#g>; <http://pubs.healtheffects.org/getfile.php?u=395>).

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could

result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Due to the limitations cited, a discussion such as the example provided in this Appendix (reflecting any local and project-specific circumstances), should be included regarding incomplete or unavailable information in accordance with Council on Environmental Quality (CEQ) regulations [40 CFR 1502.22(b)]. The FHWA Headquarters and Resource Center staff Victoria Martinez (787) 766-5600 X231, Shari Schaftlein (202) 366-5570, and Michael Claggett (505) 820-2047, are available to provide guidance and technical assistance and support.

**APPENDIX C – THREATENED & ENDANGERED SPECIES AGENCY
DETERMINATIONS**



United States Department of the Interior

FISH AND WILDLIFE SERVICE

3761 GEORGETOWN ROAD

FRANKFORT, KY 40601

March 31, 2004

Mr. Gerry Fister
Third Rock Consultants
2514 Regency Road, Suite 104
Lexington, Kentucky 40503

Subject: FWS #04-0612; US 431 Reconstruction/Relocation, Logan County, Kentucky
KTC Item No. 3-273.00

Dear Mr. Fister:

Thank you for your correspondence of February 19, 2004, regarding the reconstruction and relocation of US 431 in Logan County, Kentucky. The project corridor reaches from the end of the existing four-lane section north of Epleys to approximately 1.5 miles north of KY 106 and the City of Lewisburg. Fish and Wildlife Service (Service) personnel have reviewed the information submitted, and we offer the following comments.

In general, we are concerned that highway projects frequently accelerate erosion and sedimentation in streams, resulting in adverse effects to the aquatic environment. The use of heavy equipment to move earth and existing vegetation disrupts natural drainage patterns and exposes large areas of disturbed soil to erosion. Excessive sedimentation can clog stream channels and contribute to increased flooding. It can also increase water temperatures and cause oxygen demands that can damage or destroy fish and invertebrate populations. Deposition of sediment on the channel bottom also degrades aquatic habitat by filling in substrate cavities, burying demersal eggs, and smothering bottom organisms. In addition, turbidity, as induced by accelerated erosion and sedimentation, results in further damage to aquatic systems. Increased particulate matter suspended in the water column may drive fish from the polluted area by irritating the gills, concealing forage, and/or destroying vegetation that may be essential for spawning and cover habitat for particular species. Turbidity also degrades water quality by reducing light penetration, pH and oxygen levels, and the buffering capacity of the water. Degraded water quality may continue far downstream from the point where the erosion occurs.

Prevention of excessive sedimentation can occur only through application of Best Management Practices during daily construction activities. Rigid application of your agency's construction erosion control standards can preclude most sedimentation problems. In some cases, however, additional measures will need to be taken by on-site inspectors and construction representatives that are trained in erosion and sediment control methods. We request that you consider having an inspector on-site during all construction activities to ensure that work areas are stabilized on a daily or regular basis.

Upon review of the proposed projects, we find that the information provided is insufficient to determine if the proposed actions will require U.S. Army Corps of Engineers' permits. Since permit applications could more thoroughly reveal the extent of construction activities affecting aquatic resources, we will provide additional comments during the 404 review process should the project necessitate Corps' 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. The following conditions are specifically recommended:

1. Erosion and sediment control measures, including but not limited to the following, should be implemented on all vegetatively denuded areas:
 - a. Preventive planning: A well-developed erosion control plan which entails a preliminary investigation, detailed contract plans and specifications, and final erosion and sediment control contingency measures should be formulated and made a part of the contract.
 - b. Diversion channels: Channels should be constructed around the construction site to keep the work site free of flow-through water.
 - c. Silt barriers: Appropriate use should be made of silt fences, hay bale and brush barriers, and silt basins in areas susceptible to erosion.
 - d. Temporary seeding and mulching: All cuts and fill slopes, including those in waste sites and borrow pits, should be seeded as soon as possible.
 - e. Limitation of in-stream activities: In-stream activities, including temporary fills and equipment crossings, should be limited to those absolutely necessary.
2. Channel excavations required for pier placement should be restricted to the minimum necessary for that purpose. Overflow channel excavations should be confined to one side of the channel, leaving the opposite bank and its riparian vegetation intact.
3. All fill should be stabilized immediately upon placement.
4. Streambanks should be stabilized with riprap or other accepted bioengineering technique(s).
5. Existing transportation corridors should be used in lieu of temporary crossings where possible.
6. Good water quality should be maintained during construction.

Efficient management practices can minimize adverse impacts associated with construction. It is important that these and other measures be monitored and stringently enforced. This will aid in preserving the quality of the natural environment.

According to our records, summer roost habitat for the endangered Indiana bat (*Myotis sodalis*) and gray bat (*Myotis grisescens*) may exist within the project area. Based on this information, we believe that: (1) forested areas in the vicinity of and on the project area may provide potentially suitable summer roosting and foraging habitat for the Indiana bat and potentially suitable foraging habitat for the gray bat (if suitable roosting sites are present); and (2) caves, rockshelters, and abandoned underground mines in the vicinity of and on the project area may provide potentially suitable winter hibernacula habitat for the Indiana bat and/or potentially suitable summer roosting and winter hibernacula habitat for the gray bat. Our belief that potentially suitable habitat may be present, and possibly occupied by one or both of these species, is based on the information provided in your correspondence, the fact that much of the project site and surrounding areas contain forested habitats that are within the natural ranges of these species, and our knowledge of the life history characteristics of these species.

The Indiana bat utilizes a wide array of forested habitats, including riparian forests, bottomlands, and uplands for both summer foraging and roosting habitat. Indiana bats typically roost under exfoliating bark, in cavities of dead and live trees, and in snags (i.e., dead trees or dead portions of live trees). Trees in excess of 16 inches diameter at breast height (DBH) are considered optimal for maternity colony roosts, but trees in excess of 9 inches DBH appear to provide suitable maternity roosting habitat. Male Indiana bats have been observed roosting in trees as small as 3 inches DBH.

Prior to hibernation, Indiana bats utilize the forest habitat around the hibernacula, where they feed and roost until temperatures drop to a point that forces them into hibernation. This "swarming" period lasts, depending on weather conditions in a particular year, from about September 15 to about November 15. This is a critical time for Indiana bats, since they are acquiring additional fat reserves and mating prior to hibernation. Research has shown that bats exhibiting this "swarming" behavior will range up to five miles from chosen hibernacula during this time. For hibernation, the Indiana bat prefers limestone caves, sandstone rockshelters, and abandoned underground mines with stable temperatures of 39 to 46 degrees F and humidity above 74 percent but below saturation.

Gray bats roost, breed, rear young, and hibernate in caves year round. They migrate between summer and winter caves and will use transient or stopover caves along the way. For hibernation, the roost site must have an average temperature of 42 to 52 degrees F. Most of the caves used by gray bats for hibernation have deep vertical passages with large rooms that function as cold air traps. Summer caves must be warm, between 57 and 77 degrees F, or have small rooms or domes that can trap the body heat of roosting bats. Summer caves are normally located close to rivers or lakes where the bats feed. Gray bats have been known to fly as far as 12 miles from their colony to feed.

Because we have concerns relating to these species on this project and due to the lack of occurrence information available on these species relative to the proposed project area, we have the following recommendations relative to Indiana bats and gray bats.

1. Based on the presence of numerous caves, rockshelters, and underground mines in Kentucky, we believe that it is reasonable to assume that other caves, rockshelters, and/or

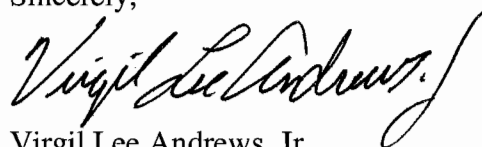
abandoned underground mines may occur within the project area, and, if they occur, they could provide winter habitat for Indiana bats and/or summer and winter habitat for the gray bat. Therefore, we recommend that the KTC survey the project area for caves, rockshelters, and underground mines, identify any such habitats that may exist on-site, and avoid impacts to those sites pending an analysis of their suitability as Indiana bat habitat by this office.

2. We also recommend that the KTC only remove trees within the project area between October 15 and March 31 in order to avoid impacting summer roosting Indiana bats. However, if any Indiana bat hibernacula are identified on the project area or are known to occur within 10 miles of the project area, we recommend the KTC only remove trees between November 15 and March 31 in order to avoid impacting Indiana bat "swarming" behavior.

If these recommendations cannot be accomplished, then the KTC should survey the project area to determine the presence or absence of the species within the project area in an effort to determine if potential impacts to these species are likely. A qualified biologist who holds the appropriate collection permits for these species must undertake such surveys, and we would appreciate the opportunity to approve the biologist's survey plan prior to the survey being undertaken and to review all survey results, both positive and negative. If any Indiana bats and/or gray bats are identified, we request written notification of such occurrence(s) and further coordination and consultation with the KTC. Surveys would not be necessary if sufficient site-specific information was available that showed: (1) that there is no potentially suitable habitat within the project area or its vicinity or (2) that the species would not be present within the project area or its vicinity due to site-specific factors.

Thank you for the opportunity to comment on this proposed action. If you have any questions regarding the information which we have provided, please contact Mindi Brady at (502)/695-0468 (ext.229).

Sincerely,



Virgil Lee Andrews, Jr.
Field Supervisor

FISH & WILDLIFE COMMISSION

Mike Boatwright, Paducah
Tom Baker, Bowling Green
Allen K. Gailor, Louisville
Ron Southall, Elizabethtown
Dr. James R. Rich, Taylor Mill, Chairman
Ben Frank Brown, Richmond
Doug Hensley, Hazard
Dr. Robert C. Webb, Grayson
David H. Godby, Somerset



COMMONWEALTH OF KENTUCKY
DEPARTMENT OF FISH AND WILDLIFE RESOURCES
C. Thomas Bennett, Commissioner

February 24, 2004

Gerry Fister
Third Rock Consulting
2514 Regency Road, Suite 104
Lexington, KY 40503

RE: Threatened/endangered species, critical habitat review, and potential environmental impacts for the US 431 Reconstruction, Logan County, Kentucky. KYTC Item 3-273.00

Dear Mr. Fister:

The Kentucky Department of Fish and Wildlife Resources (KDFWR) has received your request for the above-referenced information. The Kentucky Fish and Wildlife Information System indicates that federally endangered or threatened species are known to occur at the county or quad level with in a 10 mile radius of the project area (see attached list). Please be aware that our database system is a dynamic one that only represents our current knowledge of the various species distributions.

There are state listed species are known to occur at the quad or county record level within a 1 mile radius of the project area (see attached list). Please use necessary precautions to minimize any impact this project may have on these species.

County or quad records are records in which no specific location record is given, but the species are known to occur within the county or quad.

Based on this information, KDFWR makes the following recommendations.

In areas where gray bats are known to occur, any cave entrances that exist within the project area (i.e. the right-of-way and regeneration sites) should be surveyed for potential use by gray bats. Because gray bats are cave residents year-round and maternity colonies are generally found in close proximity to rivers, streams and lakes, any caves within the project area could offer potentially valuable habitat to resident gray bats. If a bat survey is necessary, please contact this office at (502) 564-7109 or the US Fish and Wildlife Service office at (502) 695-04681 for information on how to proceed.



In areas where Indiana bats are known to occur, any wooded areas that may be impacted by the proposed project should be examined for potential Indiana bat habitat. Indiana bats form maternity colonies and roost under the bark of trees in both riparian and upland areas. Therefore, disturbance of trees with exfoliating bark, dead limbs or cavities should be avoided when bat activity may occur. If a bat survey is necessary, please contact this office at (502) 564-7109 or the US Fish and Wildlife Service office at (502) 695-0468 for information on how to proceed.

The KDFWR recommends that you contact the appropriate US Corps of Engineers office (Louisville COE (502) 582-5452) and the Kentucky Natural Resources and Environmental Protection Cabinet, Division of Water (502) 564-3410 prior to any excavation within the waterways of Kentucky. Additionally, KDFWR recommends the following for the portions of the project that cross intermittent or perennial streams:

1. Development/excavation during a low flow period to minimize disturbance;
2. Proper placement of erosion control structures below highly disturbed areas to minimize entry of silt to the stream;
3. Replanting of disturbed areas after construction, including stream banks and right-of- ways, with native vegetation for soil stabilization and enhancement of fish and wildlife populations;
4. Return all disturbed instream habitat to its original condition upon completion of construction in the area;
5. Preservation of any tree canopy overhanging the stream;
6. Return all right-of-ways to original elevation.

It appears the proposed area for the project may include wetland areas and stream crossings. KDFWR recommends that you look at the appropriate US Department of the Interior National Wetlands Inventory Map to determine where the proposed project may impact these wetlands. The appropriate US Army Corps of Engineers office and the Kentucky Division of Water should be contacted before any construction takes place in jurisdictional wetlands. Additionally, KDFWR will recommend at least 2:1 mitigation for any permanent loss or degradation of wetland acreage. Any planning should include measures designed to reduce or eliminate impacts to these areas. If impacts cannot be avoided, mitigation should be properly designed and proposed to offset these losses.

I hope this information proves useful to you. If you have any questions or require additional comment, please call me at the above listed number, extension 366.

Sincerely,



Brad Pendley

Wildlife Biologist II

Brad.Pendley@ky.gov

cc: Environmental Section File

Known county or quad records for federally listed species within a 10 mile radius of the project area.

ScientificName	CommonName	QuadName	CountyName	FederalStatus	KSNPCStatus
<i>Myotis grisescens</i>	GRAY MYOTIS		MUHLEMBERG	LE	E
<i>Myotis grisescens</i>	GRAY MYOTIS		LOGAN	LE	E
<i>Myotis sodalis</i>	INDIANA BAT		LOGAN	LE	E
<i>Pegias fabula</i>	LITTLEWING PEARLYMUSSEL		LOGAN	LE	E

Known county or quad records for state listed species within a 1 mile radius of the project area.

<i>Lithasia armigera</i>	ARMORED ROCKSNAIL		LOGAN	N	S
<i>Etheostoma cinereum</i>	ASHY DARTER		LOGAN	N	S
<i>Aimophila aestivialis</i>	BACHMAN'S SPARROW		LOGAN	N	E
<i>Erismystax insignis</i>	BLOTCHED CHUB		LOGAN	N	E
<i>Ichthyomyzon castaneus</i>	CHESTNUT LAMPREY		LOGAN	N	S
<i>Myotis grisescens</i>	GRAY MYOTIS		LOGAN	LE	E
<i>Myotis sodalis</i>	INDIANA BAT		LOGAN	LE	E
<i>Villosa ortmanni</i>	KENTUCKY CREEKSHHELL		LOGAN	N	T
<i>Villosa lienosa</i>	LITTLE SPECTACLECASE		LOGAN	N	S
<i>Pegias fabula</i>	LITTLEWING PEARLYMUSSEL		LOGAN	N	E
<i>Villosa vanuxemensis</i>	MOUNTAIN CREEKSHHELL		LOGAN	LE	E
<i>Hybopsis amnis</i>	PALLID SHINER		LOGAN	N	T
<i>Toxolasma lividus</i>	PURPLE LILIPUT		LOGAN	N	H
<i>Lexingtonia dolabelloides</i>	SLABSIDE PEARLYMUSSEL		LOGAN	N	E
<i>Etheostoma microlepidum</i>	SMALLSCALE DARTER		LOGAN	C	H
<i>Pleurobema oviforme</i>	TENNESSEE CLUBSHELL		LOGAN	N	E

DONALD S. DOTT, JR.
DIRECTOR



Ernie Fletcher

GOVERNOR

COMMONWEALTH OF KENTUCKY
KENTUCKY STATE NATURE PRESERVES COMMISSION

801 SCHENKEL LANE
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March 11, 2004

Gerry Fister
Third Rock Consultants
2514 Regency Road, Suite 104
Lexington, KY 40503

Data Request **04-109**

Dear Mr. Fister:

This letter is in response to your data request of February 19, 2004 for the US 431 Reconstruction/Relocation Logan County project. We have reviewed our Natural Heritage Program Database to determine if any of the endangered, threatened, or special concern plants and animals or exemplary natural communities monitored by the Kentucky State Nature Preserves Commission occur in the vicinity of the project. Based on our most current information, we have determined that six occurrences of the plants or animals and no occurrences of the exemplary natural communities that are monitored by KSNPC are reported as occurring within one mile of this project area. Please see the attached report for more information.

Prenanthes aspera (Rough Rattlesnake-root, KSNPC endangered) has been found in the area of the project the Lewisburg, Ky. quadrangle. This plant is found in dry prairies and barrens, limestone glades, dry open rocky woods, usually in acid soils.

You should be aware that the Copperbelly water snake (*Nerodia erythrogaster neglecta*, KSNPC Special Concern) occurs near the project area. This species could be impacted by disturbance of bottomlands or adjacent areas. Kentucky has a Copperbelly water snake Conservation Agreement, which is overseen by the Kentucky by the Department of Fish and Wildlife Resources in cooperation with the U.S. Fish and Wildlife Service. The project sponsor should contact Mr. Wayne Davis, Wildlife Division, KDFWR to coordinate measures that will assess potential impacts to the Copperbelly water snake and opportunities for mitigative measures to improve habitat for the snake.



AN EQUAL OPPORTUNITY EMPLOYER M/F/D

Data Request 04-109

March 11, 2004

Page 2

Myotis sodalis (Indiana myotis, federally listed endangered, KSNPC endangered) and *Myotis grisescens* (Gray myotis, federally listed endangered, KSNPC endangered) are known to occur in Logan County. A thorough survey for these species should be conducted by a qualified biologist if suitable habitat will be disturbed. The survey should include a search for potential roost and winter sites, and a mistnetting census at numerous points within the proposed corridor, particularly in preferred summer habitat. Summer foraging habitats include upland forests, bottomland forests and riparian corridors. Suitable roost and winter sites include sandstone and limestone caves, rockhouses, cliffhines, auger holes, and abandoned mines. In order to avoid impacts to bats, bottomland forests and riparian corridors, particularly near caves, should not be disturbed.

Lepomis miniatus (Redspotted sunfish, KSNPC threatened) occurs near the project area. This and other aquatic species and habitats are sensitive to increased turbidity, sediment, and other adverse influences on water quality. A written erosion control plan should be developed that includes 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. Our data are not sufficient to guarantee absence of endangered, threatened or sensitive species from the sites of proposed construction disturbance. We recommend that impacted streams be thoroughly surveyed by a qualified biologist prior to any in-stream disturbance.

I would like to take this opportunity to remind you of the terms of the data request license, which you agreed upon in order to submit your request. The license agreement states "Data and data products received from the Kentucky State Nature Preserves Commission, including any portion thereof, may not be reproduced in any form or by any means without the express written authorization of the Kentucky State Nature Preserves Commission." The exact location of plants, animals, and natural communities, if released by the Kentucky State Nature Preserves Commission, may not be released in any document or correspondence. These products are provided on a temporary basis for the express project (described above) of the requester, and may not be redistributed, resold or copied without the written permission of the Kentucky State Nature Preserves Commission's Data Manager (801 Schenkel Lane, Frankfort, KY, 40601. Phone: (502) 573-2886).

Please note that the quantity and quality of data collected by the Kentucky Natural Heritage Program are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Kentucky have never been thoroughly surveyed, and new plants and animals are still being discovered. For these reasons, the Kentucky Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of Kentucky. Heritage reports summarize the existing information known to the Kentucky Natural

Data Request 04-109

March 11, 2004

Page 3

Heritage Program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. We would greatly appreciate receiving any pertinent information obtained as a result of on-site surveys.

If you have any questions or if I can be of further assistance, please do not hesitate to contact me.

Sincerely,

A handwritten signature in cursive script that reads "Sara Hines".

Sara Hines
Data Manager

SLD/SGH

Enclosures: Data Report and Interpretation Key

Copy: Mr. Wayne Davis, Wildlife Division, KDFWR

Standard Occurrence Report
KSNPC monitored elements reported for the US 431 Reconstruction/Relocation (Logan County)

EOCODE	SNAME	SCOMNAME	GRANK	SRANK	SPROT	USESA	IDENT	LASTOBS	PREC	FORANK	COUNTY	7.5 MINUTE QUADRANGLE	LAT	LONG	EPA WATERBODY	DIRECTIONS	HABITAT	
Vascular Plants																		
PDFAB0G032*005	<i>Baptisia australis</i> <i>var. minor</i>	Blue Wild-Indigo	G5T4	S2S3	S		Y	1976-05-13	M	H	Logan	Lewisburg	365832N	0865753W	05110003060 - Mud River	LEWISBURG, ALONG KY 106, 5.9 MI E OF TODD CO LINE.	GLADES, BARRENS, OPEN WOODLANDS, PRAIRIES, OAK SAVANNAS OR AREAS THAT WERE FORMERLY SUCH COMMUNITIES (WEAKLEY 1998); IN KY, PRAIRIE PATCHES.	
PDA5T7K040*002	<i>Prenanthes aspera</i>	Rough Rattlesnake-root	G4?	S1	E			1976-10-14	M	H	Logan	Lewisburg	365832N	0865753W	05110003060 - Mud River	ALONG SR-106, 5.9 MI E OF LOGAN-TODD CO LINE.	DRY PRAIRIES AND BARRENS, LIMESTONE GLADES, DRY, OPEN ROCKY WOODS. USUALLY IN ACID SOILS.	
Fishes																		
AFCB15010*002	<i>Hybopsis amnis</i>	Pallid Shiner	G4	SX	Ext trip dated		Y	1970-04-19	M	H	Logan	Dunmor Lewisburg Rosewood Sharon Grove	365953N	0865844W	05110003060 - Mud River	WOLF LICK CREEK, AT SR 107.	Sandy and silty pools of medium to large rivers (page and Burr 1991).	
AFCQB11120*012	<i>Lepomis miniatus</i>	Redspotted Sunfish	G5	S2	T		Y	1984-07-20	S	D	Logan	Lewisburg	365953N	0865844W	05110003060 - Mud River	WOLF LICK CREEK AT RT 107 BRIDGE NEAR LEWISBURG.	OCCURS IN WELL-VEGETATED SWAMPS, SLOUGHS, BOTTOMLAND LAKES, AND LOW GRADIENT STREAMS (BURR AND MAYDEN 1979, PELIEGER 1975, SMITH 1979, BURR AND WARREN 1986, ETNER AND STARNES 1993).	
Reptiles																		
ARADB22023*048	<i>Nerodia erythrogaster neglecta</i>	Copperbelly Water Snake	G5T2T3	S3	S		Y	1996-09-25	S	C	Logan	Dunmor	370116N	0865760W	05110003060 - Mud River	KY 75 roadside, 0.05 mi W of Wolf Lick Cr (N side = 048A) and 0.45 mi W of Wolf Lick Cr (S side = 048B); Wolf Lick Cr at Iron Mountain Rd (048C); and Coon Range Lake (048D).		
ARADB36123*020	<i>Thamnophis sauritus</i>	Eastern Ribbon Snake	G5T5	S3	S		Y	1996-09-25	S	D	Logan	Lewisburg	365945N	0865526W	05110003060 - Mud River	KY 1153, JUST N OF ITS JCT W/KY 106 NE OF LEWISBURG.		



ERNIE FLETCHER
GOVERNOR

ENVIRONMENTAL AND PUBLIC PROTECTION CABINET

DEPARTMENT FOR ENVIRONMENTAL PROTECTION

DIVISION OF WATER

14 REILLY ROAD

FRANKFORT, KENTUCKY 40601-1190

www.kentucky.gov

LAJUANA S. WILCHER
SECRETARY

March 11, 2004

Gerry Fister
Third Rock Consultants, LLC
2514 Regency Road
Lexington, Kentucky 40503

RE: US 431 Reconstruction/Relocation
Logan Co., Kentucky
KYTC Item No. 3-273.00

Dear Gerry:

The Water Quality Branch has reviewed your request for information about the referenced area. There are no Outstanding Resource Waters or Wild Rivers within the proposed corridor. The NWI maps showed some palustrine wetlands within the project area. Wetland field delineation should be done prior to final site selection, to avoid impact to wetland areas. If wetlands cannot be avoided, any wetland losses must be mitigated. We have no biological data for the referenced area. I am enclosing some data from an adjacent reach of Elk Lick Creek and Clifty Creek.

If you have any questions or need further information on biological communities, ORWs or wetlands, please contact me by phone (502/564-3410) or e-mail (greg.pond@ky.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Gregory J. Pond".

Gregory J. Pond, Supervisor
Ecological Support Section

c: File
Enclosure



APPENDIX D – SHPO CORRESPONDENCE



SEP 14 2005 AM 10:25

**COMMERCE CABINET
KENTUCKY HERITAGE COUNCIL**

Ernie Fletcher
Governor

The State Historic Preservation Office
300 Washington Street
Frankfort, Kentucky 40601
Phone (502) 564-7005
Fax (502) 564-5820
www.kentucky.gov

W. James Host
Secretary

David L. Morgan
Executive Director and
State Historic Preservation Officer

September 2, 2005

Mr. David M. Waldner, Director
Division of Environmental Analysis
Kentucky Transportation Cabinet
200 Mero Street, 5th Floor
Frankfort, KY 40622

Re: Addendum for "A Cultural Historic Resources Study for the Reconstruction/Relocation of US 431 in the Vicinity of Lewisburg, Logan County, Kentucky" (Item No 3-273.00)

Dear Mr. Waldner:

The State Historic Preservation Office has received for review and approval the above referenced addendum report completed by Helen Powell of H. Powell and Company. Since Alternates A and B have been revised to avoid Site 7, we concur with your office that there will be no effect on this property which has been determined to be eligible for listing in the National Register of Historic Places. We also concur that Sites 25 and 28 are not eligible for listing in the National Register of Historic Places individually or within the context of an historic district.

We disagree, however, with the determination that Site 20 is not eligible for listing in the National Register of Historic Places. The consultant did not provide a convincing argument for its ineligibility in the addendum; the discussion of the lot divisions did not address any questions about the physical integrity of the structure. The dwelling, along with the three-bay garage, is an unusual example of a transitional Craftsman style house, constructed of frame and uncoursed rubble, with such distinctive period details as the battered porch supports, intersecting front gables and the chimney with the small arched niche, combined with the low, horizontal lines that suggest the growing influence of the ranch and Minimal Traditional styles as well. The window openings appear original and the application of siding does not camouflage any important architectural details. Additionally, this resource does not appear to be a common architectural type within the project area. Since this resource will not be impacted by any of the alternates, further consultation regarding its eligibility is not needed at this time. Should modification of project plans result in potential adverse impacts to this property, then it would have to be fully evaluated at that time. If you have questions regarding these comments, please contact Janie-Rice Brother of my staff at (502) 564-7005, ext. 121.

Sincerely,

David L. Morgan, Executive Director
Kentucky Heritage Council and
State Historic Preservation Officer

Cc: Anthony Goodman, FHWA



FEB 20 AM 10:14

**COMMERCE CABINET
KENTUCKY HERITAGE COUNCIL**

Ernie Fletcher
Governor

The State Historic Preservation Office
300 Washington Street
Frankfort, Kentucky 40601
Phone (502) 564-7005
Fax (502) 564-5820
www.kentucky.gov

George Ward
~~XXXXXXXXXX~~
Secretary

David L. Morgan
Executive Director and
State Historic Preservation Officer

February 14, 2006

Mr. David M. Waldner, Director
Division of Environmental Analysis
Transportation Cabinet
200 Mero Street
Frankfort, KY 40622

Dear Mr. Waldner:

David Pollack and Charles Hockensmith of my staff met with James Hixon of your staff on February 14, 2006. The meeting concerned a historic cemetery (15Lo227) described in a revised archaeological report entitled "An Archaeological Survey of Three Alternates (A, B, and C) for the Proposed US 431 Reconstruction/Relocation in Logan County, Kentucky (Item No. 3-273.00)" by Paul D. Bundy with contributions by Rebecca Miller Gillespie and Jessica Allgood. In my letter of January 23, 2006 to you, I indicated that this cemetery was potentially eligible for listing in the National Register of Historic Places. After further discussions, we now feel that this cemetery is not eligible for listing in the National Register of Historic Places. However, we feel that the removal of the cemetery should be monitored by a professional archaeologist to ensure that unmarked graves are not overlooked.

Should you have any questions, feel free to contact Charles Hockensmith of my staff at (502) 564-7005.

Sincerely,

David L. Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer

cc: Mr. Charles M. Niquette
Dr. George Crothers



FILE COPY

**COMMERCE CABINET
KENTUCKY HERITAGE COUNCIL**

Ernie Fletcher
Governor

The State Historic Preservation Office
300 Washington Street
Frankfort, Kentucky 40601
Phone (502) 564-7005
Fax (502) 564-5820
www.kentucky.gov

George Ward
~~XXXXXXXXXXXX~~
Secretary

David L. Morgan
Executive Director and
State Historic Preservation Officer

January 23, 2006

Mr. David M. Waldner, Director
Division of Environmental Analysis
Transportation Cabinet
200 Mero Street
Frankfort, KY 40622

Dear Mr. Waldner:

The State Historic Preservation Office has received for review and approval a revised archaeological report entitled "An Archaeological Survey of Three Alternates (A, B, and C) for the Proposed US 431 Reconstruction/Relocation in Logan County, Kentucky (Item No. 3-273.00)" by Paul D. Bundy with contributions by Rebecca Miller Gillespie and Jessica Allgood.

During the course of the investigations, two previously recorded archaeological sites (15Lo165 and 15Lo186) were revisited, 14 previously unknown sites (15Lo213-15Lo227), two non-site localities, and 13 isolated finds were located. Of these sites, the author only considered two historic cemeteries (15Lo186 and 15Lo227) as potentially eligible for listing in the National Register of Historic Places. We agree that sites 15Lo186 and 15Lo227 are potentially eligible for listing in the National Register. Further, we agree that sites 15Lo165, 15Lo213, 15Lo214, 15Lo215, 15Lo216, 15Lo217, 15Lo218, 15Lo220, 15Lo221, 15Lo222, 15Lo223, 15Lo224, 15Lo225, 15Lo226, the two non-site localities, and 13 isolated finds are not eligible for listing in the National Register of Historic Places. However, we disagree with the author and KYTC concerning the eligibility of site 15Lo219. Site 15Lo219 is a Late Paleoindian site that was not adequately evaluated during the Phase I survey since no shovel tests were excavated within its boundaries. Since such sites are relatively rare in Kentucky, we feel that site 15Lo219 is potentially eligible for listing in the National Register of Historic Places and should be subjected to Phase II testing to determine its significance.

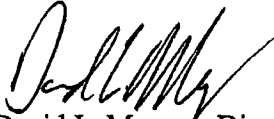
In summary, three of the sites examined during the survey (15Lo186, 15Lo219, and 15Lo227) are potentially eligible for listing in the National Register of Historic Places and should be either avoided or subjected to Phase II testing to establish their eligibility. The remaining sites are considered ineligible for listing in the National Register of Historic Places and require no further work.

Mr. David M. Waldner
January 23, 2006
Page 2

On page 190 of the report, the author noted that a cut off of Elk Creek on Alternate A (between STA 100+00 and 112+00) had potential to contain deeply buried archaeological sites. I concur with the author that deep backhoe testing be conducted at this location if Alternate A is selected.

We look forward to reviewing the result of the Phase II test excavations for sites 15Lo186, 15Lo219, and 15Lo227 if they cannot be avoided. Should you have any questions, feel free to contact Charles Hockensmith of my staff at (502) 564-7005.

Sincerely,



David L. Morgan, Director
Kentucky Heritage Council and
State Historic Preservation Officer

cc: Mr. Charles M. Niquette
Dr. George Crothers



U.S. Department
of Transportation
**Federal Highway
Administration**

Kentucky Division Office
Jose Sepulveda, Division Administrator

330 West Broadway
Frankfort, KY 40601
PH. (502) 223-6720
FAX (502) 223-6735

November 24, 2006

Mr. William Nighbert, Secretary
Kentucky Transportation Cabinet
200 Mero Street, Room 613
Frankfort, Kentucky 40622

Attn: David Waldner, Director

Dear Mr. Nighbert:

Subject: Invitation to Consult on Transportation Impacts to Native American Sites
Phase I Archaeological Results
Proposed US 431 Reconstruction
Logan County, Kentucky
KYTC Item Number 3-273

The coordination with the Native Americans has been completed. The response period has expired and we have not received any responses. This completes this phase of coordination for the project.

Sincerely yours,

/s/ A. Goodman

Anthony S. Goodman
Environmental Specialist



APPENDIX E – PUBLIC MEETING SUMMARY

PUBLIC INFORMATION MEETING SUMMARY

Road: US 431 (Russellville-Central City Road)
County: Logan County
Item No.: KYTC Item 3-273.00
Date: August 3, 2004
Time: 4:00 p.m. to 7:00 p.m., CST
Location: Lewisburg Elementary School Cafeteria
750 Stacker Street
Lewisburg, Kentucky

The Open Format Type Meeting was utilized for this project. The meeting began at 4:00 p.m. and ended at 7:00 p.m. All persons attending were afforded the opportunity to review the information presented, make comments, and discuss the project. A handout of information was made available to the public. KYTC and consultant personnel were present to explain the project and answer specific questions. Since the meeting, all exhibits and information have been available at KYTC-District 3 office for the public to view and provide input or obtain information about the project.

Approximately 240 persons attended the meeting. Forty-two (42) written comments were received. They are summarized as follows:

<u>Alternative</u>	<u>Most Preferred</u>	<u>Least Preferred</u>
Alternative A	8	4
Alternative B	25	5
Alternative C	6	27
No-Build	2	0

From these comments, it appears that the community is in favor of Alternative B and less favorable of Alternative C. Some of the comments offered were: Alternative C is too far out; need a four-lane to Owensboro; need to spend money improving the road north of Lewisburg; the city needs good access; Lewisburg does not need a by-pass; concerned over prime farm land taking; and comments concerning the effects of the project (particularly Alternative A) upon the Kennerly's Chapel Cemetery.

APPENDIX F – FARMLAND CONVERSION IMPACT RATING FORM

AGRICULTURAL PARCELS IMPACTED BY ALTERNATIVE

Alternative A		Alternative B		Alternative C	
Parcel #	Farmland Acres Acquired*	Parcel #	Farmland Acres Acquired*	Parcel #	Farmland Acres Acquired*
109	6.6	109	7.7	109	20.9
112	4.3	111	6.5	312	7.5
113	4.9	112	1.3	315	0.1
114	3.4	113	3.9	316	3.1
116	6.0	117	8.1	317	1.8
117	10.7	146	9.3	320	6.8
118	7.3	205	3.0	321	2.4
119	3.4	207	2.3	323	3.1
123	6.7	208	2.2	324	5.2
125	0.3	209	3.2	325	1.0
127	5.7			326	0.4
132	1.1			327	1.9
133	0.7			328	0.7
135	4.4			329	3.7
136	4.0			330	7.0
137	3.9			331	5.4
142	2.1			332	18.9
145	7.0				
146	6.7				
Acreage Totals	89.2		47.5		89.9

APPENDIX G – ENVIRONMENTAL JUSTICE ASSESSMENT



Environmental Justice Assessment

US 431 Reconstruction/Relocation
Logan County, KY
KYTC Item No. 3-273.00

Prepared for
Kentucky Transportation Cabinet
Division of Environmental Analysis

July 12, 2007

Revised June 30, 2010

Prepared by
Third Rock Consultants, LLC
2514 Regency Road
Lexington, KY 40503
859.977.2000
www.thirdrockconsultants.com



Environmental Justice Assessment

US 431 Reconstruction/Relocation
Logan County, Kentucky
Item No. 3-273.00

for

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

July 12, 2007
Revised June 30, 2010

Prepared by:



Virginia Goodman

Reviewed by:



Gina Morris

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APPENDIX

Appendix A – Survey Questionnaire

I. INTRODUCTION

The 1994 Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, requires federal agencies to address the effects of all programs, policies, and activities on "minority populations and low-income populations." The purpose of Executive Order 12898 is to identify, address, and avoid disproportionately high and adverse human health or environmental effects on these populations. In 1997, the US Department of Transportation issued the *DOT Order to Address Environmental Justice in Minority Populations and Low-Income Populations* (DOT Order) to summarize and expand upon the requirements of Executive Order 12898.

Third Rock Consultants has been contracted to prepare an Environmental Justice Assessment for Kentucky Transportation Cabinet project Item No. 3-273.00, which would reconstruct/relocate a portion of US 431 in Logan County, Kentucky. Detailed information about the project is included below in the *Project Description* section.

This Environmental Justice Assessment considers three Build alternatives as well as the No-Build with emphasis on those properties requiring relocation. The objective of this assessment is to determine if the project creates an Environmental Justice issue.

This Environmental Justice Assessment was revised in March 2010 to reflect the resident changes in the trailer park since 2007.

II. PROJECT DESCRIPTION

The proposed transportation project is the reconstruction of a portion of US 431 on new alignment in Lewisburg, Logan County, Kentucky (Exhibit 1). The project corridor extends from the existing four-lane section of US 431 at the Logan Aluminum plant south of Lewisburg to Old Greenville Road approximately 1.5 miles

north of Lewisburg (mile points 21.311 to 25.718). The project corridor is approximately 4.5 miles long. An EA has been being prepared for the project.

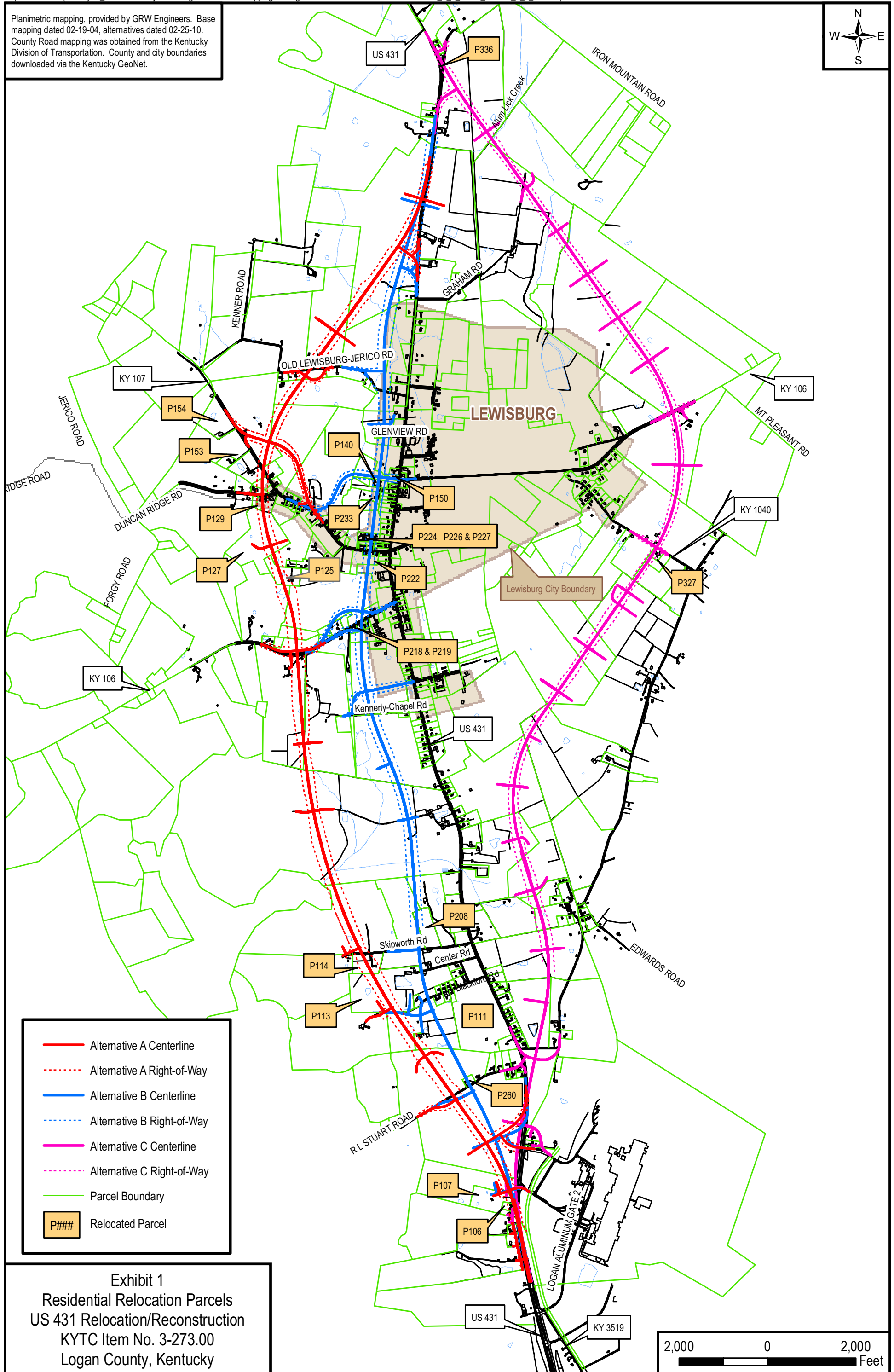
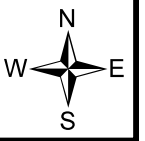
The project, KYTC Item No. 3-273.00, is referred to in the Kentucky Transportation Cabinet's (KYTC) *2010 Recommended Highway Plan, FY 2010 - 2016* as "Reconstruct/relocate and continue four-laning of US-431 from the end of the existing four-lane north of Epleys to approximately 1.5 miles north of KY-106 East (North of Lewisburg)."

The primary purpose of the project is to accommodate truck traffic as well as increased traffic volumes, which in the future are anticipated to include a greater percentage of heavy trucks. Additional goals of the project are to (a) preserve local access in Lewisburg, (b) improve safety; and (c) enhance economic development potential in the region. Existing US 431 through Lewisburg will be closed to heavy truck traffic after the roadway is constructed, which will limit vehicular traffic in Lewisburg to automobiles, light trucks, and local delivery truck service.

Traffic data for US 431 provides support for this project's purpose and need. Traffic data was compiled from two traffic surveys taken in 2003 and 2004 and updated in 2008 (KYTC Division of Multimodal Programs [DMP]). In addition, a Capacity Analysis was performed by the design engineer in March 2004 and updated in February 2010.

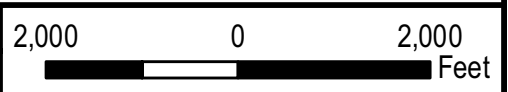
DMP divided the existing road into four segments for the No Build scenario and provided separate traffic for each segment. Segment 1 is US 431 from Logan Aluminum to KY 106 (east). Segment 2 is from KY 106 (east) to KY 107. Segment 3 is between KY 107 and KY 106 (west). Segment 4 is from KY 106 to Old Greenville Road at the northern terminus.

Planimetric mapping, provided by GRW Engineers. Base mapping dated 02-19-04, alternatives dated 02-25-10. County Road mapping was obtained from the Kentucky Division of Transportation. County and city boundaries downloaded via the Kentucky GeoNet.



- Alternative A Centerline
- - - Alternative A Right-of-Way
- Alternative B Centerline
- - - Alternative B Right-of-Way
- Alternative C Centerline
- - - Alternative C Right-of-Way
- Parcel Boundary
- P### Relocated Parcel

Exhibit 1
Residential Relocation Parcels
US 431 Relocation/Reconstruction
KYTC Item No. 3-273.00
Logan County, Kentucky



Average daily traffic (ADT) for the No Build scenario (2008 and 2035) is shown in Table 1 below. Truck percentages were shown as constant for 2008 and 2035, 12 percent and 21 percent respectively.

TABLE 1 – AVERAGE DAILY TRAFFIC (NO BUILD)

SEGMENT	2008	2035
1	5,600	11,000
2	6,500	13,000
3	6,200	12,000
4	5,600	11,000

Three alternatives are currently being considered to replace existing US 431: a western by-pass (Alternative A), a close-in western by-pass (Alternative B), and an eastern by-pass (Alternative C). DMP provided projected traffic for each of these alternatives divided into three segments each. Segment 1 is US 431 from Logan Aluminum to KY 106. Segment 2 is KY 106 to KY 107. Segment 3 is KY 107 to old US 431. Tables showing ADT for Build scenarios (2008 and 2035) for the three alternatives and truck percentages for 2035 are shown below.

TABLE 2 – AVERAGE DAILY TRAFFIC (BUILD ALTERNATIVE A)

SEGMENT	2008	2035	% TRUCKS
1	3,000	6,700	34
2	3,200	7,000	34
3	2,700	6,000	42

TABLE 3 – AVERAGE DAILY TRAFFIC (BUILD ALTERNATIVE B)

SEGMENT	2008	2035	% TRUCKS
1	3,800	8,500	28
2	3,900	8,700	30
3	3,400	7,600	33

TABLE 4 – AVERAGE DAILY TRAFFIC (BUILD ALTERNATIVE C)

SEGMENT	2008	2035	% TRUCKS
1	2,700	6,800	36
2	2,600	6,600	37
3	2,300	5,800	37

Part of the Purpose and Need for the project is to “accommodate truck traffic and increased traffic volumes.” Truck traffic is accommodated on all alternatives by signing the proposed route as a truck route and prohibiting through truck traffic on existing US 431. Automobile traffic is a different matter. While it is desirable for automobile traffic to shift to the new route because it is designed to be safer, it is expected that this traffic will make their decisions of which route to take based on perceived travel times for their particular trip. Therefore, because each alternative provides different potential travel times for the variety of trips studied as part of the traffic projections, it has been determined that each alternative performs differently in diverting traffic from the existing, less safe US 431 to the proposed new safer road.

In 2010, the project alternatives were modified to be two lanes as opposed to four lanes with a median. The changes in the alternatives are discussed more fully in the draft Environmental Assessment (March 2010). However, because the project will acquire right-of-way for a four-lane roadway even though a two-lane facility will be

constructed, impacts to the affected community do not change.

III. METHODOLOGY

The focus of Executive Order 12898 is on "disproportionately high and adverse effects on minority and low-income populations". The DOT Order defines these terms, most of which are used in this analysis of the project's potential to create an Environmental Justice concern. Following are the definitions directly from the DOT Order that are used in this analysis:

Adverse Effect

Adverse effect means the totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic effects, which may include, but are not limited to:

- bodily impairment, infirmity, illness, or death;
- air, noise, and water pollution and soil contamination;
- destruction or disruption of man-made or natural resources;
- destruction or diminution of aesthetic values;
- destruction or disruption of community cohesion or a community's economic vitality;
- destruction or disruption of the availability of public and private facilities and services;
- vibration;
- adverse employment effects;
- displacement of persons, businesses, farms, or nonprofit organizations;
- increased traffic congestion, isolation, exclusion, or separation of minority or low-income individuals within a given community or from the broader community; and
- the denial of, reduction in, or significant delay in the receipt of, benefits of DOT programs, policies, or activities.

Disproportionately High and Adverse Effect on Minority and Low-income Populations

Disproportionately high and adverse effect on minority and low-income populations means an adverse effect that: 1) is predominantly borne by a minority population and/or a low-income population, or 2) which will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low income population.

The definition for low-income used in this analysis is "a household whose income is below 80 percent of the median household income (1999) for the 2000 Census tract that encompasses the entire project corridor." This definition is more inclusive than the DOT Order's definition for low-income which is "low-income means a person whose median household income is at or below the Department of Health and Human Services poverty guidelines." The definition used in this analysis is in line with definitions used for federal housing programs.

The methodology employed for this analysis stems primarily from an interpretation of these definitions. Adverse effects will be discussed first for the project as a whole without regard to income status (see *Previously Identified Adverse Effects* below). Secondly, indirect impacts will be discussed. Then, the affected environment will be described (see *Affected Environment* below); this description will demonstrate that for this project the Environmental Justice population of concern is relative to low-income persons rather than minorities. Finally, following these three sections will be the Findings section, which will detail information gathered as a result of public involvement.

As noted in the definitions, low-income is defined relative to data for the 2000 census tract that encompasses the entire project corridor. A single census tract, Census Tract 9602, encompasses the project corridor and will be considered the

community of comparison. Although some relocations are from within the city of Lewisburg and some are from within the county boundary and a separate low-income threshold could have been used for each of these governmental boundaries, the census tract will be used for consistency across all relocations. This census tract does include the city of Lewisburg. Low-income for purposes of this analysis will be any household with an annual income less than \$21,000.

IV. PREVIOUSLY IDENTIFIED ADVERSE EFFECTS

A Socioeconomic Baseline Analysis of the project was completed in 2004. Areas considered "adverse effects" as defined above were essentially reviewed as part of that document and were incorporated into an EA in 2006. The effects of the project, by alternative, were denoted in the EA as shown in Table 5, on page 6.

A review of the data from this table in relation to what constitutes an adverse effect reveals that the potential area of concern for Environmental Justice populations is relocation. This area of impact has the potential to have a disproportionately high and adverse effect on, in this case, low-income populations.

V. INDIRECT IMPACTS

In addition to direct impacts, indirect impacts on low-income residents were also considered. For instance, Alternative B will impact a mobile home park known to house low-income residents (see Section VI, Affected Environment). The owner has indicated that if this Alternative is selected, he will likely discontinue use of the property as a mobile home park. This would be a potential indirect impact to other, in all likelihood, low-income residents. However, it should be noted that currently 8 of the 11 mobile homes in the park are unoccupied. Occupancy at the time of right-of-way acquisition may be different,

although the owner has indicated the units are currently uninhabitable and would require repair prior to occupancy. No other areas of low-income residents, along any of the alternatives, are expected to experience this potential change in surrounding land uses.

The agricultural community may also experience indirect impacts. Direct agricultural impacts, *i.e.*, land acquisition, are highest for Alternatives A and C, although Alternative B impacts agricultural activity as well. Agricultural activity and associated employment may be indirectly impacted due to conversion of land use from agricultural activity to highway right-of-way. This indirect impact of land use change has the potential to impact low-income persons, particularly tenant or hired persons working for farm owners.

Another area considered was the potential to impact businesses in the downtown area due to the re-routing of traffic around the city proper. In a small town such as Lewisburg the potential exists for small business owners to be low-income. Yet, indirect impacts due to the rerouting and resulting loss of business are not likely for this project due to the purpose of the project, be the owners low-income or not. The purpose of the project is to accommodate truck traffic and not to reduce local traffic through town, regardless of the alternative selected. In fact, one of the goals of the project is to preserve local access in Lewisburg. As such, alternatives have been designed with this goal in mind. One alternative, Alternative B, is very near the existing alignment (as compared to Alternatives A and C) and would keep traffic very close to the city center.

TABLE 5 – PROJECT IMPACTS BY ALTERNATIVE

Category Impacts		Alternative A	Alternative B	Alternative C
Air Quality		None	None	None
Noise		None	None	Possible Noise Barrier at Site 12
Aquatic Ecosystems	Water Quality	Impacts from human activities	Impacts from human activities	Impacts from human activities
	Floodplains	5.4 acres	None	0.9 acres
	Wetland	0.91 acres	None	0.37 acres
	Permits	USACE 404 Nationwide #14 and Individual 404 wetland permit, KDOW Water Quality Certification, Floodplain Certification	USACE Nationwide #14, KDOW Water Quality Certification	USACE 404 Nationwide #14 permit (stream and wetland), KDOW Water Quality Certification, Floodplain Certification
	Wild/Scenic Rivers	None	None	None
Terrestrial Ecosystems	Plant & Animal	None	None	None
	Threatened & Endangered Species	BA required for Gray bat and Indiana bat	BA required for Gray bat and Indiana bat	BA required for Gray bat and Indiana bat
Historic Resources		None	None	None
Archaeology Resources		Site 15Lo186 avoid or recommend additional work	None	Site 15Lo219 avoid or recommend additional work
Relocations		9 Residential 0 Businesses	*16 Residential 0 Businesses	*4 Residential 0 Businesses
Replacement Housing		Adequate housing is available	Last resort housing may be necessary for some residents.	Adequate housing is available
Community Resources		Improved safety	Improved safety	Improved safety
Safety		Reduced traffic through the community	Reduced traffic through the community	Reduced traffic through the community
Land Use		Residential and agricultural impacts	Residential and agricultural impacts	Residential and agricultural impacts
Farmland Impacts		No adverse impact	No adverse impact	No adverse impact
Environmental Justice		None	*Yes	None
Pedestrian & Bicycle Facilities		Roadway shoulders available	Roadway shoulders available	Roadway shoulders available
UST/Hazardous Materials		None	One site recommended for Phase II Assessment, Parcel 255	None
Visual Impacts		Minimal impacts to Lewisburg cemetery	Minimal impacts to Lewisburg cemetery	None
Construction Activities		Impacts minimized by use of BMPs and compliance with Standard Specifications	Impacts minimized by use of BMPs and compliance with Standard Specifications	Impacts minimized by use of BMPs and compliance with Standard Specifications
4(f) and 6(f) Resources		None	None	None

*Data have been updated with additional information compiled since EA completion in 2006.

VI. AFFECTED ENVIRONMENT

The Socioeconomic Baseline Analysis performed as part of the EA process identified potential Environmental Justice concerns relative to low-income populations; similar concerns relative to minority populations were ruled out (Goodman 2004). In 2000, Census Tract 9602 had a minority population of 1.1 percent. The city, county, and state had minority populations of 1.6 percent, 9.3 percent, and 9.9 percent, respectively. Site visits and a public meeting have also indicated that the Environmental Justice concerns are not relative to minority populations.

A review of Census 2000 data for Census Tract 9602 revealed that approximately 38 percent of households had an annual income of less than \$21,000. Kentucky and Logan County each had approximately 32 percent meeting this same annual household income threshold. These percentages for the county and census tract in conjunction with the field survey performed as part of the baseline analyses revealed that low-income residents may be affected by the proposed project. The field survey in particular revealed a cluster of potential low-income residents in a mobile home park along Alternative B.

The combination of field survey and research results led to additional research and public involvement to (i) determine whether the affected environment contains low-income populations and (ii) compare the number of low-income residents being relocated with the number of households that are not low-income.

Surveys of each household subject to relocation were conducted in April 2007 (a copy of the questionnaire is contained in Appendix A) and again in February and March 2010. Attempts were made to contact all households, and the survey was successful in contacting all households.

The survey indicated that higher numbers of relocations required for Alternative B were low-income as compared with Alternatives A or C. The percentage was also somewhat higher than that of the geographic comparison area of Census Tract 9602. None of Alternative A's 9 residential relocations is considered low-income. Of Alternative C's four residential relocations, one household met the criteria for low-income and three households did not. Of the 16 residential relocations required by Alternative B, 7 were considered low-income. The No-Build Alternative would require no relocations of low-income households. All three Build alternatives would relocate residents on Parcels 106 and 107. Table 6 shows the percentages of low-income relocations by alternative as compared with each other and the census tract.

TABLE 6 – LOW-INCOME HOUSEHOLDS

Alternative or Geographic Area	Number of Relocations	Low-Income Households	Percent Low-Income
A	9	0	0
B	16	7	44
C	4	1	25
Census Tract 9602	N/A	585 of 1,562	38

Table 6 indicates that impacts of relocation by Alternative B are disproportionately borne by low-income populations.

VII. FINDINGS

The Affected Environment analysis indicates that Alternative B includes a low-income population that would by definition and guidance merit consideration as an Environmental Justice concern (see definitions above for "disproportionately high and adverse effect," Criteria 1). Alternative B presents an

Environmental Justice issue. Alternatives A and C do not.

Although the objective of this assessment, which was to determine if an Environmental Justice issue exists for the project, has been accomplished, information gathered during the public involvement effort provides insight on Criteria 2. Criteria 2 of the definition of a "disproportionately high and adverse effect" seeks to determine if the effects that will be suffered by the minority and/or low-income population are appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority and/or non-low income population.

Tables 7 through 9, pages 10 through 13, summarize the data gathered during the surveys and the qualitative information gained from conversations held concurrently with those surveys for each alternative. These summary tables provide additional insight on the level of adverse effect for both low-income and non-low income relocations.

The summary of data provides some insight on noteworthy items for each of the alternatives. For instance, none of the alternatives contains a predominance of elderly residents. All alternatives do have a predominance of residents with family nearby.

Six of the nine households that would be relocated by Alternative A indicated that they had lived at their current place of residence for more than 10 years, with some having lived at their current location for 30 to 40 years. It is also worthy of note that two of the households requiring relocation include a person who is permanently disabled.

For Alternative B, half of the residents (8 of 16) requiring relocation by Alternative B indicated that their household includes a permanently

disabled member. Of those eight residences, five are low-income.

Alternative B has two groups that may be termed family clusters. One cluster consists of a set of grandparents, a daughter and son-in-law, and three grandchildren who live in two mobile homes on the same parcel. Both residences are relocated. A second cluster includes a mother and two sons who live next to one another. The mother and son live in one residence, and the other son lives next door. The son next door will be relocated.

Alternative C, like Alternative A, has a predominance (3 of 4) of residents that have lived at their current location for more than 10 years. None of these residents rely on others for services such as transportation or childcare, and none includes a household with a permanently disabled member.

VIII. MITIGATION

Mitigation will be developed by project team.

REFERENCES

Executive Order 12898. Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. 1994.

Goodman, Virginia. 2004. *Socioeconomic Baseline Analysis, US 431 Reconstruction / Relocation, Logan County, Kentucky, KYTC Item 3-273.00.*

Kentucky Transportation Cabinet (KYTC). 2006. *Enacted FY 2007-2012 Six Year Highway Plan. Frankfort, Kentucky.*

US Department of Transportation Order to Address Environmental Justice in Minority Populations and Low-Income Populations. 1997.

TABLE 7 – DATA SUMMARY, ALTERNATIVE A

Type of Structure	Property Value	Low Income	# in Household	Annual Income (in Thousands)	Age Range	Own or Rent (Monthly Mortgage or Rent)	Tenure (Years)	Anticipated Relocation Area	Property Has Long-standing Family Ties	Family Nearby	Dependent On Others For Transportation, Childcare, Etc.	Permanently Disabled Household Member	Comments
1-story frame	\$110,000	No	1	>24	18-50	Own (\$0)	>10	within 5 miles	No	No	No	No	Has been considering moving
1-story frame	\$85,000	No	2	>24	18-50	Rent (\$450.00)	<1	within 10 miles	No	Yes	No	No	Newlywed couple who recently moved to home
1-story frame	\$115,000	No	2	>24	50-65	Own (\$737.00)	>10	within 5 miles	No	Yes	No	Yes	Alternative splits farm
1.5-story frame	\$150,000	No	4	>24	18-50	Own (\$360.00)	>10	unsure	Yes	Yes	Yes	No	Parents, who live nearby but out of project area, are dependent on them
1-story frame	\$150,000	No	2	>24	65 & over	Own (N/A)		within 5 miles	Yes	Yes	No	Yes	Prefers Alternative A
1-story frame	\$30,000	No	3	>24	50-65	Own (\$0)	>10 (39)		No	Yes	No	No	
1-story frame	\$100,000	No	1	>24	65 & over	Own (\$0)	>10 (40)	do not want to move	Yes	Yes	No	No	Inherited property from parents
1-story frame	\$85,000	No	2	Did not give info	18-50	Own	<1	Definitely don't want to move	N/A	Yes	No	No	Don't think much about the idea that I may have to move from my home. I think the new by-pass will hurt Lewisburg more than help it as it has with other areas as well.
1-story stone house	NA	No	3 to 4	>24	50-65	Own (\$0)	>10 (29)	within 5 miles	Yes	Yes	No	No	Owens farmland nearby; daughter moving to house on property; prefers Alt B

TABLE 8 – DATA SUMMARY, ALTERNATIVE B

Type of Structure	Property Value	Low Income	# in Household	Annual Income (in Thousands)	Age Range	Own or Rent (Monthly Mortgage or Rent)	Tenure (Years)	Anticipated Relocation Area	Property Has Long-standing Family Ties	Family Nearby	Dependent On Others For Transportation, Childcare, Etc.	Permanently Disabled Household Member	Comments
1-story frame	\$135,000	No	1	>24	18-50	Own (\$0)	>10	within 5 miles	No	No	No	No	Has been considering moving
1-story frame	\$135,000	No	2	>24	18-50	Rent (\$450.00)	<1	within 10 miles	No	Yes	No	No	Newlywed couple who recently moved to home
1-story brick	\$150,000	No	4	>24	18-50	Rent (\$500)	1-5	Within 10 miles	Yes	Yes	No	Yes	Road needs to be safer northbound of Logan Aluminum! Is any route safer than another for truck use?
1 mobile home (Parents)	\$55,000 (total for Parcel 140)	Yes	2	17-21	18-50	Own (N/A)	6-10	do not want to move; within 5 miles	No	Yes	No	Yes	Daughter and son-in-law live in mobile home behind them; they do not believe they can replace the setting of their home; like the access to their grandchildren; are concerned that their house is currently collateral for their daughter's house
1 mobile home (Daughter & Son-in-law)	\$55,000 (total for Parcel 140)	No	5	>24	18-50	Own (\$259.00)	1-5	do not want to move; within 5 miles	No	Yes	Yes	Yes	Parents live in front of them; rely on them for child care for 3 children
1-story frame	\$85,000	No	2	>24	18-50	Own	<1	Definitely don't want to move	N/A	Yes	No	No	Don't think much about the idea that I may have to move from my home. I think the new by-pass will hurt Lewisburg more than help it as it has with other areas as well.
1-story	\$75,000	Yes	2	0-17	18-50	Own (\$0)	>10	Portland, TN	No	Yes	Yes	Yes	Feels better roads needed in Logan Co.; will work with project; would like to relocate to Portland TN; mother gave her the home
1-story	N/A	No	4	>24	18-50	Own (\$600)	<1	Within 5 miles	No	No	No	No	
mobile home 1	\$80,000 (total for Parcel 224)	Yes	2	0-17	50-65	Rent (\$225.00)	1-5	do not want to move	No	No	No	Yes	Upset about government taking her home; son lives with her

TABLE 8 – DATA SUMMARY, ALTERNATIVE B, CONTINUED

Type of Structure	Property Value	Low Income	# in Household	Annual Income (in Thousands)	Age Range	Own or Rent (Monthly Mortgage or Rent)	Tenure (Years)	Anticipated Relocation Area	Property has Long-standing Family Ties	Family Nearby	Dependent On Others For Transportation, Childcare, Etc.	Permanently Disabled Household Member	Comments
mobile home 2	\$80,000 (total for Parcel 224)	No	6	21-24	50-65	Rent (\$320.00)	>10	within 5 miles	No	No	Yes	Yes	Grandmother does all the driving; are not upset about moving
mobile home	\$55,000	Yes	2	17-21	N/A	Own (\$0)	>10	within 10 miles	No	Yes	Yes	No	Believes project is needed; would not be opposed to moving; would like to move to FL
1 mobile home	\$160,000*	Yes	3	17-21 each	18-50	Rent (\$245)	>1	unknown	No	No	No	No	Looking forward to project; thinks project will cut commute & decrease semi traffic
1 mobile home - 24	\$160,000*	Yes	4	0-17	18-50	Rent (\$235)	<1	unknown	No	Yes	No	Yes	Did not appear interested in project
1 mobile home	\$160,000*	No	2	21-24	18-50	Rent (\$210)	1-5	unknown	No	No	No	No	Is aware of the project; no specific comments given
1 mobile home	\$15,000	Yes	2	0-17	18-50	Own (N/A)	>10	within 10 miles	Yes	Yes	No	Yes	
frame building and mobile home	\$15,000	No	2	21-24	18-50	Own (\$0)	>10	do not want to move	Yes	Yes	No	N/A	Mother lives next door; have had thoughts of moving; at 2004 public meeting, commented in favor of Alternative B

* - The property value listed is for the entire parcel, which includes 11 mobile homes, 7 of which are vacant (2010).

TABLE 9 – DATA SUMMARY, ALTERNATIVE C

Type of Structure	Property Value	Low Income	# in Household	Annual Income (in Thousands)	Age Range	Own or Rent (Monthly Mortgage or Rent)	Tenure (Years)	Anticipated Relocation Area	Property Has Long-standing Family Ties	Family Nearby	Dependent On Others For Transportation, Childcare, Etc.	Permanently Disabled Household Member	Comments
1-story frame	\$110,000	No	1	>24	18-50	Own (\$0)	>10	within 5 miles	No	No	No	No	Has been considering moving
1-story frame	\$85,000	No	2	>24	18-50	Rent (\$450.00)	<1	within 10 miles	No	Yes	No	No	Newlywed couple who recently moved to home
1-story frame	\$150,000	Yes	2	17-21	65 & Over	Own (\$0)	>10	within 5 miles	Yes	Yes	No	No	
mobile home	\$50,000	No	5	21-24	18-50	Own (\$0)	>10	Muhlenberg Co.	No	Yes	No	No	Mr. Hudson wants to be sure he is fully compensated for his property; Ms. Hudson does not like her residence and wishes property would be taken.

APPENDIX A – SURVEY QUESTIONNAIRE



US 431 Reconstruction, Lewisburg, Logan County, Kentucky

Pre-Interview:

Parcel Number: _____ Alternate: _____.

Address: _____ Photo taken?

Date and time of survey: _____

Surveyors: _____

Does house appear to be occupied? Yes No

If not, have utilities been turned off? Yes No

Was anyone home? Yes No

Was the resident willing to be interviewed in person? Yes No

If not (or if no one home), was a questionnaire left? Yes No

Interview questions:

Gender of interviewee: Male Female

Age range: 0-18 18-50 50-65 65 and over

Race: White Black Amer. Indian Asian Hispanic Other _____

Are you aware of the proposed US 431 relocation project? Yes No

Do you believe the public has been kept informed about the project? Yes No

Did you receive a questionnaire about the project in 2004? Yes No

If so, did you respond to the questionnaire? Yes No

Did you attend the public meeting on August 3, 2004? Yes No

Would you attend another project meeting when it occurs? Yes No

Would you feel comfortable stating an opinion about the project at the meeting?
Yes No



If not, how could the project team make that easier for you? _____

Are you familiar with the three different locations for the alternatives associated this project? Yes No

Do you have a preference for one of the alternatives? Yes No

If yes, Alt A Alt B Alt C

If you were relocated because of the project, where would you choose to move?

Definitely don't want to move

Within 5 miles of current location

Within 10 miles of current location

Russellville

Other location _____

Do you have any additional comments about the project that you would like to share?

Do you own this house? Yes No

Do you have a mortgage? Yes No

What is monthly mortgage (approx.) \$ _____

Do you rent this house? Yes No

What is monthly rent? \$ _____

Does this include utilities? Yes No

If not, what is approx monthly utility bill? \$ _____

How long have you lived here? <1 year 1-5 years 6-10 yrs >10 yrs



Does this property have long-standing family ties? Yes No

How many people live here (including you)? _____

Are they all family members? Yes No

If not, how many non-family members live here? _____

Do you have family members living nearby? Yes No

Are any household members permanently disabled? Yes No

Are you dependent upon family or non-family members for transportation or other needs,
such as childcare, healthcare, etc.? Yes No

If so, what are those needs? _____

What is the annual household income range?

\$0 - \$17,000 \$17,000-\$21,000 \$21,000-\$24,000 >\$24,000

Is the income-earning member(s) of household retired? Yes No

If not retired, place of employment _____

Any supplemental income (SS, pension, disability, etc.)? Yes No

Does any household member own a car? Yes No

If yes, how many cars in household? _____

How many trips per week do you make on US 431?

0-5 5-10 >10