

August 2004

Item No. 01-182.00

US 51 Planning *Study*

Clinton, Kentucky
Hickman County

Final Report



Prepared for:

Kentucky Transportation Cabinet
Division of Planning

Kentucky Transportation Cabinet
District 1

Prepared by:



In Association With:

Jordan, Jones and Goulding, Inc.
Third Rock Consultants, LLC
Cultural Resource Analysts, Inc.

Project Summary

Study Background and Purpose

The US 51 Study in Clinton, Kentucky is a planning and feasibility study to assess the need for and potential improvements to US 51 in the vicinity of Clinton in Hickman County, Kentucky. The Kentucky Transportation Cabinet (KYTC) initiated the study in 2002 as part of the implementation of the KYTC Six-Year Highway Plan. This project was programmed in the highway plan in response to a 1995 US 51 Wickliffe to Fulton corridor study. The 1995 study concluded that widening US 51 from Wickliffe to Fulton was not warranted. However, it identified the portion of US 51 through the town of Clinton as a potential future traffic congestion area.

This current study therefore examined traffic and highway conditions on US 51 in Clinton to confirm whether there are current or projected future deficiencies and to evaluate the extent of those deficiencies. A range of improvement alternatives was developed to address each identified deficiency. The alternatives were then compared and evaluated based on transportation, community, economic, environmental, and construction benefits and impacts/costs. The result of the study was a recommended set of highway improvements for future implementation.

At the outset of the project, KYTC informed the project team, local officials, and members of the public that the study would examine a wide range of possible improvements from doing nothing, to in-town improvements, to bypass alternatives. The Cabinet also made it clear that there was not a predetermined solution or outcome to the study.

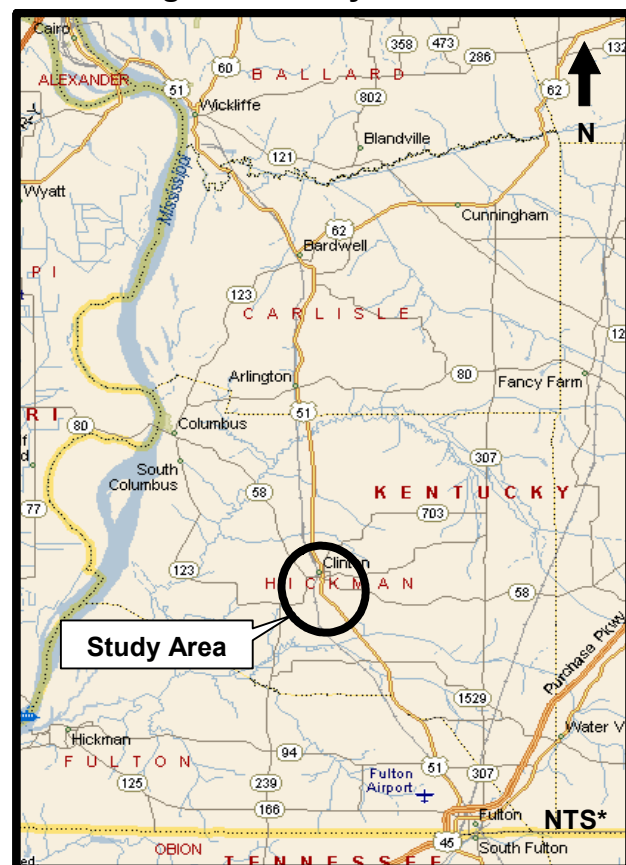
Study Location and Limits

US 51 is a north-south highway in Western Kentucky, connecting Cairo, Illinois to Fulton, Kentucky near the Tennessee border. Clinton, Kentucky is located along US 51 in Hickman County. This study is limited to the portion of US 51 in the vicinity of Clinton and extends from Cane Creek in the north to the Bayou de Chien in the south for a distance of approximately 5.4 miles. Figure 1 illustrates the study location.

No-Build Conditions Analysis

US 51 is an undivided two-lane highway. Average daily traffic volumes (ADT) peak at approximately 7,100 ADT in town, with

Figure 1: Study Location



*NTS = Not to Scale

2,200 ADT north of town and 2,500 ADT south of town. Truck traffic percentages are approximately 7 percent in town, 14 percent south of town, and 18 percent north of town. Based on the traffic volumes, the current traffic levels of service (LOS) are acceptable (LOS B or C) indicating little vehicle delay and good traffic flow conditions from a capacity standpoint.

Traffic growth on US 51 in Clinton has been modest over the last 19 years with an average growth rate of less than 1.0 percent per year at the eight study area count stations. (In fact, traffic volumes are lower now on US 51 than they were in the late 1970s due to the construction of I-55 in Missouri.) However, for purposes of this study a 1.5 percent growth rate was applied to evaluate how traffic conditions would change if the growth rate were higher.

Using the 1.5 percent per year growth rate, 2030 traffic volumes increase to a high of approximately 10,900 ADT in town, with volumes of around 3,300 to 3,900 ADT north and south of town, respectively. With these traffic volumes and assuming no highway improvements, the two-lane highways north and south of town are projected to operate at acceptable levels of service through 2030. The two key intersections in town however, are expected to fall below the threshold of LOS C. The US 51 / KY 58 / KY 123 intersection will fall to LOS D in 2020 and the side street approaches to the US 51 / KY 58 (Mayfield Road) intersection will fall to LOS E in 2010.

There are several geometric issues with the current highway. While the average lane width ranges from 10 to 14 feet, there are sections with limited shoulders of less than 3 feet. There are curb and gutter sections in town, but the curb heights are small (or missing) in some areas due to damaged curbs and pavement overlays. There are utility poles and other objects in close proximity to the highway in some areas. Also, sight distance is limited along US 51 at some locations due to the vertical geometry.

There are two intersections with deficient turning radii. Field observations indicate that trucks have a difficult time turning at the US 51 / KY 58 / KY 123 intersection due in part to the presence of on street parking on all legs of the intersection. The parking also poses a safety problem for pedestrians and vehicles since many of the parking spaces are angled thereby requiring that vehicles back out into traffic on US 51 or the side streets when leaving. Much of this parking is well used, particularly around the courthouse. The US 51 / KY 58 (Mayfield Road) intersection also has a deficient corner radius. Many sidewalks along US 51 are in disrepair.

A review of recent crash data did not reveal a significant crash problem when US 51 was compared to the statewide critical crash rate for similar roadways. Clusters of crashes were observed however at US 51 / KY 58 (Mayfield Road) and south on US 51 toward Martin Road, indicating the possible need for improvements to the existing highway at these locations.

Project Issues and Goals

Based on the technical analysis, as well as extensive public involvement, the project team identified a number of important issues for consideration in examining US 51 in Clinton. A list of these issues is provided below.

- Vehicular Safety and Highway Design
- Pedestrian Safety
- Truck Traffic
- Traffic Flows
- Economic Development and Regional Access
- Historic Preservation, Property Impacts, and Community Character
- Environmental Issues
- Parking, Drainage, and Utilities
- Highway Beautification
- Minority, Low-Income, and Senior Populations
- Project Implementation and Funding

The goals for projects to be evaluated in the US 51 study directly relate to the key issues discussed above. These goals were developed with extensive input from the local community as well as the project team and technical analysis. The key project goals include:

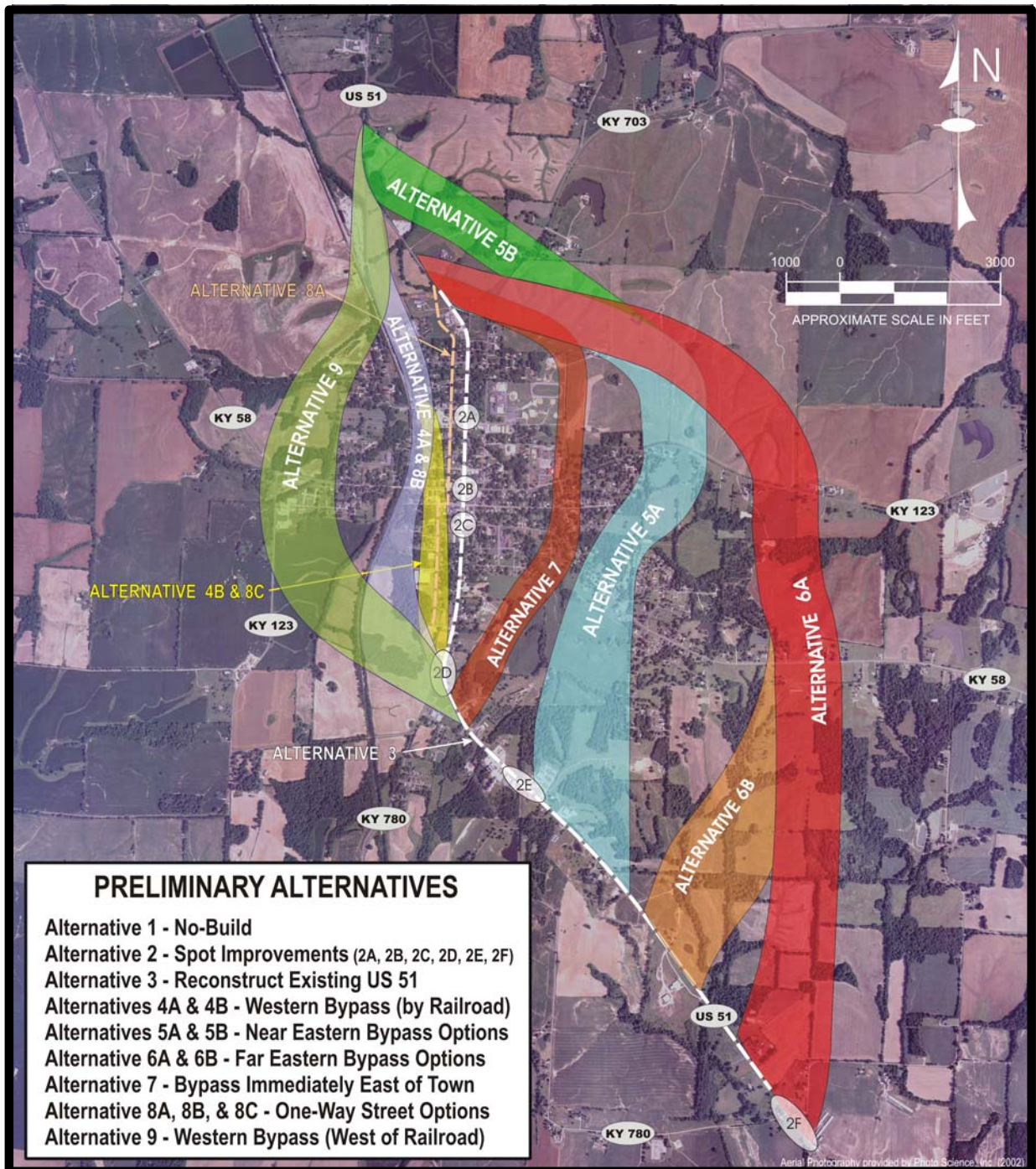
1. Enhance vehicle and pedestrian safety on US 51 in the study area;
2. Mitigate the negative impacts of heavy truck traffic on US 51, while maintaining an efficient through route for trucks and other vehicles;
3. Maintain appropriate traffic controls and traffic flow conditions;
4. Preserve downtown business, while enhancing overall economic development opportunities;
5. Improve highway geometry and drainage;
6. Avoid, minimize, and/or mitigate property takings on US 51 as well as other community and environmental impacts (This was put forward specifically by many local citizens and has been included even though it is understood to be part of the normal KYTC planning and design process); and
7. Facilitate improved regional connections to the Purchase Parkway and other existing regional highways as well as to the possible future I-66 corridor (should it be implemented).

Alternative Development

In response to roadway deficiencies identified in the No-Build Conditions Analysis, fourteen alternatives were developed (see Figure 2). These alternatives were based on both technical analysis and public input. They include:

- Alternative 1 – No-Build
- Alternative 2 – Spot Improvements
 - 2A – US 51 in the Vicinity of Cresap Street
 - 2B – US 51 (Washington Street) at KY 58 / KY 123 (Clay Street)
 - 2C – Vicinity of US 51 (Washington Street) and KY 58 (Mayfield Road)
 - 2D – US 51 in the Vicinity of KY 780 (North)
 - 2E – US 51 in the Vicinity of Martin Road
 - 2F – US 51 in the Vicinity of KY 780 (South)
- Alternative 3 – Reconstruct US 51 as a Two-Lane Roadway with Center Two-Way Left Turn Lane

Figure 2: All Preliminary Alternatives



- Alternative 4A – Western Bypass Option A
- Alternative 4B – Western Bypass Option B
- Alternative 5A – Near Eastern Bypass Option A
- Alternative 5B – Near Eastern Bypass Option B
- Alternative 6A – Far Eastern Bypass Option A
- Alternative 6B – Far Eastern Bypass Option B
- Alternative 7 – Bypass Immediately East of Town
- Alternative 8A – One-Way Street System Using Existing Streets
- Alternative 8B – One-Way Street System Using Mainly New Highways
- Alternative 8C – One-Way Street System Using a Combination of Existing and New Streets
- Alternative 9 – Western Bypass (West of Railroad)

Alternative Evaluation

The evaluation process used in this study is a three-step process (see Figure 3). The goal is to successively refine the list of alternatives from all possible alternatives, to a short list of promising alternatives, and then finally to the recommended

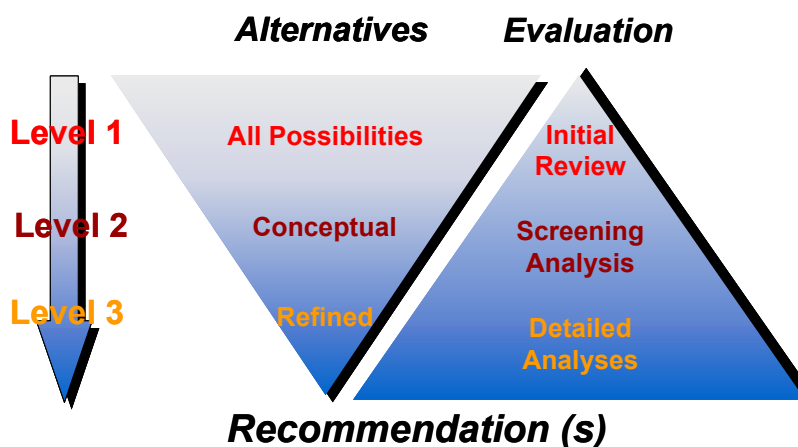
alternative(s). The evaluation begins at

Level 1 with a qualitative analysis applied to all possible alternatives. Alternatives advanced to Level 2 are subjected to a screening analysis that combines both qualitative and quantitative evaluation criteria. The final level, Level 3, uses the most detailed information about each of the remaining alternatives to select the recommended alternative or set of alternatives.

The Level 1 evaluation began with fourteen initial alternatives. Of these, eight were recommended for more detailed analysis and six were set aside from further consideration (Alternatives 4B, 5B, 6B, 7, 8B, 8C).

Most of the alternatives set aside in Level 1 were the less desirable corridors from each pair of alternatives. For example, Alternative 4B was set aside because it was determined to have greater property impacts compared to Alternative 4A since it went through town instead of following the railroad tracks. Compared to Alternative 5A, Alternative 5B is longer and is expected to have higher costs and more impacts. As a result, Alternative 5A was advanced to Level 2 and Alternative 5B was set aside. Of the Alternative 6 corridors, Alternative 6B is shorter, but the terrain at the southern end is not as good as Alternative 6A, which follows a ridgeline. Also, Alternative 6B was determined to have more potential environmental impacts than Alternative 6A and was therefore not advanced to Level 2. For the one-way street pair alternatives, Alternatives 8B and 8C were not considered further since Alternative 8A was determined to be the

Figure 3: Three-Level Process



preferable one-way street alternative. The primary reason for setting Alternative 8B aside was that the one-way street pairs would be located far apart (several blocks) without good connections between them. Alternative 8C had the same connectivity issue as Alternative 8B, but also had the potential community and environmental impacts associated with Alternative 4B since they follow similar corridors.

Alternative 7 was not paired with another similar corridor, but it was not considered past Level 1 because of several major issues. This corridor stays close to town, going through a residential neighborhood east of town. As a result, significant property impacts would result from implementing this alternative. Furthermore, the corridor is located very close to the schools, thereby directing heavy truck traffic close to them. The construction cost would likely be high to build a highway through the built up portions of Clinton. This alternative was also not supported by the public.

In Level 2, five of the remaining alternatives were recommended for more detailed analysis and three were set aside from further consideration (Alternatives 4A, 5A, 8A). Also, each Alternative 2 spot improvement was analyzed separately in Level 2, which led to the recommendation of removing Alternatives 2D, 2E, and 2F from further consideration and the advancement of Alternatives 2A, 2B, and 2C to the Level 3 evaluation. This evaluation level included specific quantitative analysis elements.

Alternatives 2D, 2E, and 2F were developed to address identified geometric deficiencies as the result of perceived safety issues at three intersections south of town. However, a review of the crash data showed that the total crash rates were below the critical rates for these spot locations. In addition, most of the crashes did not appear to be directly related to intersection geometrics. The traffic volumes at these intersections are very low, and without the supporting crash data, the high improvement costs were not deemed to be warranted. Therefore these spot improvements were not considered further.

During the Level 2 evaluation, the potential corridors for a bypass were narrowed down to one east of town (Alternative 6A) and one west of town (Alternative 9). The other western bypass, Alternative 4A was also not considered further for a number of reasons including:

- Little travel time savings expected.
- Did not address the traffic and geometric deficiencies in town.
- May impact the western neighborhoods through property impacts, noise, and increased traffic on local streets.
- Potential impact to the Environmental Justice Community in the north and west portions of town.
- Potential significant environmental impacts including extensive stream relocation and floodplain issues.
- High construction cost estimate.

The other eastern bypass, Alternative 5A was set aside during the Level 2 evaluation as a result of the following issues / impacts:

- Did not address the traffic and geometric deficiencies in town.
- Low forecasted traffic volumes on the bypass.
- Separates a small neighborhood from the rest of town.

- Potential property impacts.
- Potential environmental impacts.
- Low public support.

Alternative 8A, the last one-way street option was also set aside in Level 2 due to a number of drawbacks including: expected operational problems, residential community impacts, business and community impacts, potential property impacts near the courthouse, safety concerns, environmental justice issues, and a high capital cost. It also appeared to be unwarranted based on the traffic volumes and out of character for the community.

The five alternatives remaining in Level 3 included the No-Build option (Alternative 1), spot improvements 2A, 2B, and 2C (Alternative 2), reconstruction of the existing alignment of US 51 with a center two-way left turn lane south of town (Alternative 3), an eastern bypass option (Alternative 6A), and a western bypass option (Alternative 9). Figure 4 shows these alternatives on a map.

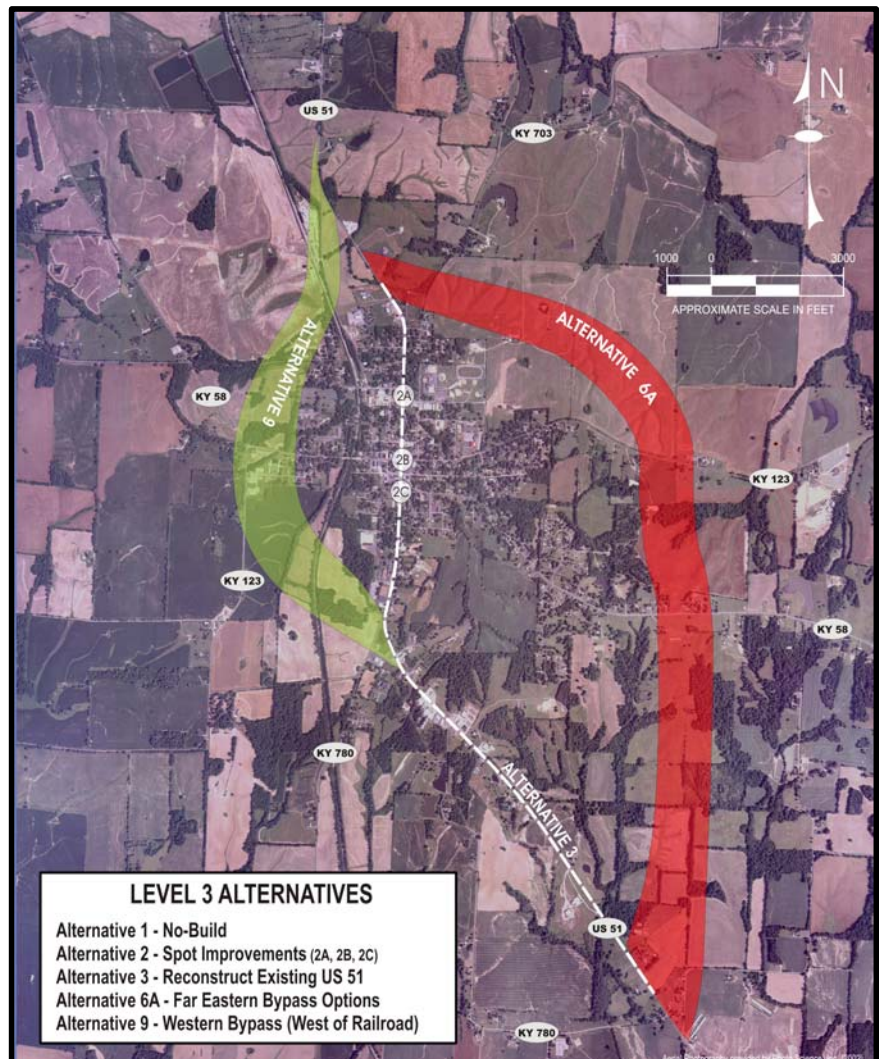
For the five alternatives advanced to Level 3 (Alternatives 1, 2, 3, 6A, and 9), the following section includes the evaluation discussion as well as the recommended alternative.

Level 3 Analysis Summary

Overall, the No-Build alternative did not compare favorably with the build alternatives in addressing the project goals (in areas such as safety, truck traffic, capacity and level of service, and economic development); therefore it was not recommended as the preferred alternative.

Alternative 2A was a spot improvement proposed by the community to improve pedestrian safety. However, the data did not show this to be a high crash location; therefore, the potential benefits might not warrant

Figure 4: Level 3 Alternatives



pursuing it as a separate project. Consequently, it was not recommended as a stand-alone project, but is instead recommended as part of Alternative 3, which includes reconstructing US 51 through town.

Alternative 2B directly addressed a number of the key project goals including safety, traffic flow, truck traffic operations, and highway geometrics. It is one of only two alternatives (Alternative 3 is the other) that improved the US 51 / KY 58 / KY 123 intersection to an acceptable LOS in the design year. Therefore, to ensure adequate operating conditions, improved geometrics, and enhanced safety it was recommended that Alternative 2B be included as part of the recommended implementation package (either as a stand alone project or in conjunction with another project).

Alternative 2C also addressed the project goals of traffic flow, level of service, safety, truck turning movements, and geometric design. The costs associated with the operational improvements (signing, striping, beacon, and signal) were modest (only the geometric improvements raised issues related to property acquisition). Therefore, it was recommended that some form of Alternative 2C be included in the recommended implementation package either as a stand-alone project or in conjunction with another project.

Overall, Alternative 3 addressed all seven of the project goals in some manner. It improves safety on the existing highway (for all users); it improves truck operations through town; it directly addresses the level of service issues in town; it preserves downtown business, while still encouraging new development and investment in the area; it improves the highway geometry; it limits property/community/and environmental impacts; and it facilitates connections through town to other regional highways. Furthermore, it serves the most users (10,900 in the design year); has the lowest construction cost estimate of the three long-term alternatives (Alternatives 3, 6A, and 9); and could easily be phased over time. Alternative 3 is also compatible with the philosophy of maintaining the existing highway system. Therefore, Alternative 3 was recommended at present, as the most appropriate and cost-effective long-term option for improving US 51 in Clinton.

Alternative 6A meets some of the key project goals. It significantly reduces truck traffic through town; provides a new highway meeting current design standards; and limits impacts to the human environment. It also opens new land parcels to development but, based on recent University of Kentucky research, bypasses may cause economic activities to relocate, but they do not necessarily lead to economic growth.

Other aspects of Alternative 6A are in conflict with key project goals including the low traffic volume on the bypass (1,200 ADT in 2030), loss of visibility of businesses through town; a small reduction in travel times through Clinton; insufficient traffic improvements in town (without Alternative 2B or 2C); and no improvements benefiting the large volume of traffic that will remain on the old highway. In addition, the cost is high and public support for a far eastern bypass has been modest. In general, the benefits of Alternative 6A do not appear to be worth the cost. For these various reasons

Alternative 6A is not recommended for further study at this time. However, Alternative 6A does offer a very feasible bypass corridor. If traffic volumes, especially traffic traveling through the study area, increases beyond the projected levels, it would be reasonable to revisit the traffic projections and reassess this recommendation.

Similar to Alternative 6A, Alternative 9 meets some of the project goals. It significantly reduces truck traffic through town; it opens new land parcels to development; it provides a new highway meeting current design standards; and it limits impacts to the human environment. In comparison to Alternative 6A, it also is located closer to town, is predicted to carry higher traffic volumes, and does not bypass all of the businesses in town but improves access to some of them. Alternative 9 also has the highest public support of any alternative. However, Alternative 9 still has low traffic volumes (2,200 – 2,600 ADT in 2030); yields insufficient traffic improvements in town (without Alternative 2B or 2C); has a similar modest per trip travel-time savings; offers no physical improvements for the large volume of traffic that will remain on the old highway; runs adjacent to an Environmental Justice community; involves construction of two bridges over the railroad (which could lead to higher future maintenance costs); and overall costs more to build when including improvements south of the study area boundary. As with Alternative 6A, it is not clear that the high cost of Alternative 9 is justified given the projected use, modest travel-time savings, and other issues. Therefore, the Alternative 9 bypass is not recommended at this time.

Recommendation

The final recommendation for improvements to US 51 through Clinton was Alternative 3 – Reconstruct US 51 as a Two-Lane Roadway with Center Two-Way Left Turn Lane South of Town. Alternative 3 was selected for implementation because overall, it best addresses the following key project goals.

➤ **Enhance vehicle and pedestrian safety on US 51 in the study area.**

Alternative 3 enhances vehicular safety for all 10,900 vehicles in the design year through improved geometrics, turn lanes, signal upgrades, improved sight distance, access control, wider lanes, and wider shoulders. The spot improvements 2A and 2B specifically target pedestrian safety on US 51 by improving sight distance at US 51 and Cresap Street, and improving pedestrian circulation around the courthouse. Furthermore, the reconstruction of US 51 through town will provide an upgraded sidewalk system.

➤ **Mitigate the negative impacts of heavy truck traffic on US 51, while maintaining an efficient through route for trucks and other vehicles.**

Alternative 3 improves the existing highway for better truck circulation and safety for all truck traffic. These improvements include wider lanes through town and increased turning radii for trucks at select intersections that are currently insufficient with regard to truck turning movements. (The bypasses do remove a

substantial portion of the truck traffic from town, but they leave most of the rest of the traffic on the old highway.)

➤ **Maintain appropriate traffic controls and traffic flow conditions.**

Alternative 3 directly addresses the need for appropriate traffic controls and traffic flow conditions on US 51 in town. Without these improvements, the two key intersections will operate poorly by the years 2010 / 2020. Therefore, only Alternatives 3, 2B, and 2C address this goal.

➤ **Preserve downtown business, while enhancing overall economic development opportunities.**

Alternative 3 preserves downtown business opportunities better than the other possible alternatives. Whether it enhances overall economic development opportunities is a more open question. One could argue that improving the existing highway (including adding left turn lane access south of town) could spur more development activity in the established US 51 business corridor. Alternatively, an argument could be made that opening new land to development is key to new local economic activity. However, based on the recent University of Kentucky research regarding bypasses, it is not clear that any of the proposed alternatives will have a significant positive impact on economic development in the study area. Instead it may simply cause some businesses to decline and other new businesses to open with little or no net gain to the area's economy. Furthermore, it appears based on recent business developments in the area that macro economic changes may overshadow any transportation system changes that would be made.

➤ **Improve highway geometry and drainage.**

Alternative 3 addresses this goal as it specifically calls for reconstructing US 51 to improve highway geometry and drainage.

➤ **Avoid, minimize, and/or mitigate property takings on US 51 as well as other community and environmental impacts.**

This goal was put forward specifically by many local citizens and has been included even though it is understood to be part of the normal KYTC planning and design process. All alternatives were developed in accordance with this goal. However, Alternative 3 meets this goal well because it has little impact on the environment and requires the least amount of new property. Also, no homes or businesses are expected to be relocated.

- **Facilitate improved regional connections to the Purchase Parkway and other existing regional highways as well as to the possible future I-66 corridor (should it be implemented).**

For this goal, Alternative 3 simply improves the existing, regional through-connections by improving and reinforcing US 51 as the major north-south spine in the area.

Overall, Alternative 3 is the preferred alternative because it best addresses the key project goals in the most cost effective manner and in so doing serves the largest number of people. However, if traffic volumes increase substantially, construction of an eastern bypass as proposed in Alternative 6A could be justified. Therefore, it is suggested that traffic counts be monitored over the next five to ten years. Should traffic volumes increase considerably, KYTC may choose to re-evaluate the viability of an Eastern Bypass.

Next Steps / Implementation

The next step would be to allocate funding for the design and implementation of Alternative 3. Based on the proposed project phasing plan, Alternatives 2B and 2C would be undertaken first, as they involve the least construction and cost. They are also needed sooner than the other improvements. After this first phase is underway, it would be appropriate for KYTC to review the traffic count data on US 51 to verify the scope and phasing of the remainder of the proposed project elements. Subsequently, funding could be allocated for the design and implementation of the remaining phases.