

EXECUTIVE SUMMARY
PROGRAMMING STUDY
KY 121, GRAVES COUNTY
RECONSTRUCT FROM 400 FEET SOUTH OF HARRIS LANE
TO THE INTERSECTION WITH KY 945
ITEM NO. 01-8100.00

The Kentucky Transportation Cabinet has undertaken this planning study to evaluate the need, and make recommendations for the reconstruction of KY 121 in Graves County. The project begins approximately one mile north of the Julian M. Carroll Purchase Parkway and the northwest urban limits of the city of Mayfield. The project then extends to the north approximately three miles to the intersection with KY 945. The project is identified in the 2003-2008 Six-Year Highway Plan as Item No. 01-8100.00. The termini in the original project description were modified during the course of this study to account for related reconstruction projects and recent milepoint changes to KY 121. The existing KY 121 corridor is a two-lane roadway through rolling terrain with 11-foot travel lanes and two-foot shoulders. The posted speed limit is 55 mph.



Looking south on KY 121 at intersection with KY 1276

Traffic Volumes

For year 2002, the highest volume of traffic, 5,000 vehicles per day with 14.5 percent trucks, was identified on the southernmost segment, between 400 feet south of Harris Lane and the intersection of KY 1276. The next highest volume of traffic, 3,970 vehicles per day with 14.5 percent trucks, was identified in the next segment to the north, between KY 1276 and KY 440. The northernmost segment between KY 440 and KY 945 carried the least traffic volume, 2,960 vehicles per day, but had the highest percentage of trucks, 17.0 percent. All three of these segments comprising the entire study corridor are operating at Level of Service “D.”

Future year (2030) traffic volumes were calculated based on an annual growth rate of 2.4 percent. The highest projected traffic volume for the year 2030 is 9,710 vehicles per day between the project’s southern terminus and KY 1276. The next highest projected traffic volume, 7,710 vehicles per day, is in the next segment to the north, between KY 1276 and KY 440. The lowest projected traffic volume for the study corridor, 5,750 vehicles per day, is in the northernmost segment, between KY 440 and KY 945. The study corridor is expected to remain at Level of Service “D” into the year 2030 if no improvements are made.

Purpose and Need

The Purpose and Need for this project are summarized as follows:

- **The proposed project is needed to improve safety on KY 121.**

While historical crash rates are less than critical along the study corridor, the combination of traffic from three area schools, increased dimension trucks, two-foot shoulders, and intersections with less than optimal sight distance make safety improvements the primary goal of this study.

- **Reconstruction is needed to address factors that will increase the average travel speed and decrease the percent time-spent following.**

The study corridor is located in a predominantly rural area in rolling terrain with clusters of residential dwellings and private driveway access along both sides of KY 121. South of the study corridor, urban five lane improvements have relieved congestion on KY 121 between the Julian M. Carroll (Purchase) Parkway to just north of the Graves County High School entrance. Reconstruction of KY 1830 is in the Right-of-Way acquisition phase and includes three-lane improvements on KY 121 from immediately north of the Graves County High School entrance to just beyond the KY 1830 intersection (400 feet south of Harris Lane). While capacity is not a problem on the study corridor, several factors contribute to a reduction in average travel speeds that bring the Level of Service down to “D.” Those factors include 11-foot lane and two-foot shoulder widths, a relatively high number of access points, and between 59 and 75 percent no-passing zones. Percent time-spent following is not an issue at the present, but becomes an issue at the higher projected traffic volumes within a couple of years, resulting in Level of Service “D.” Factors contributing to the higher percent time-spent following are the directional distribution (assumed a 57/43 percent split) combined with the percentage of no-passing zones (59-75 percent).

- **An improved KY 121 is needed to accommodate increased truck use and promote regional connectivity.**



Looking south from cutover between KY440 and KY 121.
Note the empty log trucks travelling southbound on KY 121.

KY 121 is the main truck route between Mayfield and Wickliffe, with both cities generating trucks on the corridor. Trucking companies in the area have expressed concern with lane and shoulder widths on KY 121. KYTC Highway Information System (HIS) data show 11-foot lanes and two-foot shoulders throughout the corridor. Truck percentages on KY 121 in 2002 were 14.5 percent on the segment

immediately south of the KY 440 intersection, and had increased to 15.4 percent by 2004. KY 121 is a designated “AAA” weight class highway allowing 80,000 pound gross vehicle

weights and is a state designated truck route on the National Truck Network (NN) allowing the use of increased dimension vehicles (102 inch wide trailers, versus 96 inches).

Concerns and Issues Considered During the Study

- A high school and new elementary school are located on KY 121 just south of the project study area. A middle school is also located in this general area on KY 1830.
- Continental General Tire, one of the areas largest employers and traffic generators, stopped production at its Mayfield plant in December 2004 resulting in the loss of over 800 jobs. The plant is located immediately east of the project study area at the KY 1276/US 45 intersection.
- There are plans for a major regional industrial park to be developed in the Folsomdale-Viola area north of Mayfield on US 45. Initial funding for land acquisition has been delivered. Employment estimates start at 1000 in 2008 rising to 4000 in 2017.
- An I-69 corridor is in the planning phase. It is expected this corridor will follow the existing Julian M. Carroll Purchase Parkway.
- An I-66 corridor is planned for the region. While the location of the proposed I-66 corridor has not been decided, there is no impact expected to this study segment of KY 121.
- The KY 1830 reconstruction project has moved forward with right-of-way acquisition. The utilities and construction phases are scheduled for 2005. A portion of this project includes intersection improvements at KY 121 as well as three-laning a segment of KY 121 immediately south of the project study area.
- Environmental concerns include numerous wetlands and streams, at least three potential threatened plant and animal species, 40 to 50 percent prime farmland soils, four possible hazardous materials contamination sites, and one cemetery within the project study area.

Proposed Improvement Alternatives

The following seven alternatives were developed for the possible reconstruction of KY 121:

- **Alternative 1, No-build** - This alternative involves making no improvements to KY 121 and does not address any of the project needs.
- **Alternative 2, Spot improvements** – The realignment of the skewed KY 440 intersection is the most pressing need on the study corridor. The northern study terminus was extended to the KY 945 intersection since it also is on a skew and would possibly be affected by any improvements made at the KY 440 intersection. KY 1276 also intersects KY 121 on a skew. Statistically there are no crash problems at any of these intersections, however, as traffic density increases, the potential for angle collisions with high speed-differentials and involving increased dimension vehicles would also be expected to increase.
- **Alternative 3, Two-lane reconstruction** – Two-lane improvements, shoulder and lane widening, would improve safety and the ability to handle trucks on KY 121 but would not do anything significant to improve level of service.
- **Alternative 4, Three-lane reconstruction** – At current or projected traffic levels, no significant operational improvements are expected by adding a two-way left-turn lane (TWLTL). A TWLTL might be considered if there was a crash problem, especially a problem with rear-end crashes.
- **Alternative 5, Two-lane reconstruction on four-lane right-of-way** – This recommendation would likely involve going off alignment due to the additional right-of-

way needed for the median, but would still fall within the project study corridor. This improvement would have the same advantages as the two-lane improvements noted above, with the added benefit of being able to provide additional capacity if needed in the future. The disadvantage would be the additional right-of-way costs.

- **Alternative 6, Four-lane reconstruction** – Four lane improvements would involve either a.) a four-lane rural divided section, or b.) a four-lane urban section with a TWLTL. Either would improve the current LOS from “D” to “A,” and would accommodate increases in traffic, improving the projected 2030 LOS from LOS “D” to “A.” The downside is that these improvements may be more than are needed given the current traffic levels and the uncertainty of projected future traffic levels. A combination of improvements, beginning on the east end of the study corridor with an urban section, and then switching to a rural section further west is also a consideration.



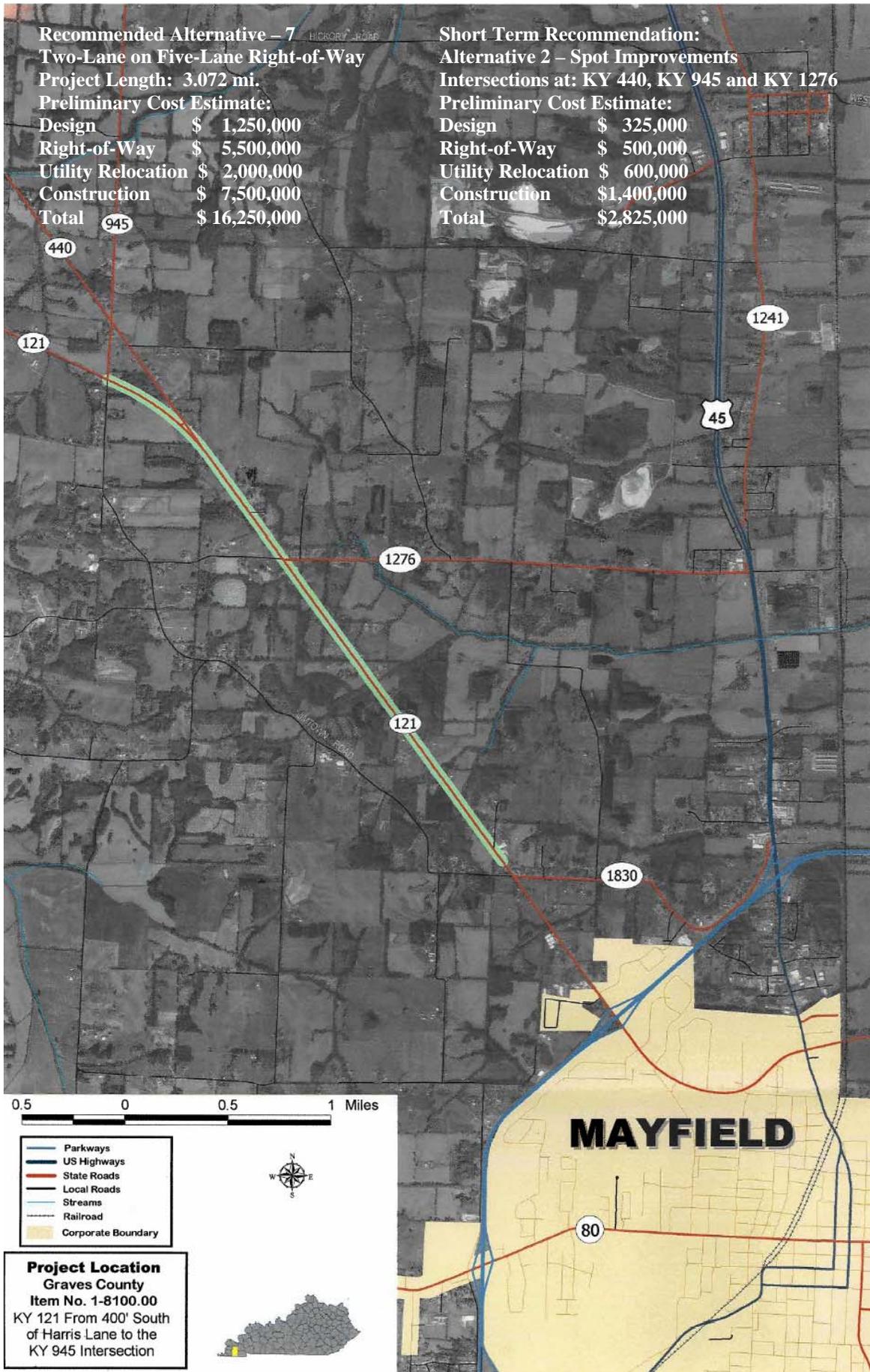
Looking north from intersection with KY 1830.

- **Alternative 7, Super-two reconstruction on five-lane right-of-way** – This alternative would involve purchasing the right-of-way for future five-lane improvements and reconstructing a two-lane highway with full shoulders. This alternative would have the same benefits as the two-lane improvements noted above with the advantage of being able to accommodate future increases in traffic if needed. The disadvantage is the same as that for the two-on-four case, that it

would require additional right-of-way. However, the right-of-way requirements would be less for the super-two compared to the two-on-four case and have a better chance to stay on the existing alignment.

Recommendations

It is recommended to make those improvements that address the immediate safety concerns on the corridor by providing full-width shoulders and realigning the major intersections at KY 440, KY 945 and KY 1276. While, four or five lane improvements are not being recommended at this time, it is recommended to allow for such improvements in the future should they become justified, and purchase the additional right-of-way early, before development continues and property values and right-of-way costs increase. **Therefore, the recommendation of this study is Alternative 7, Super-two on five-lane right-of-way. Refer to Exhibit ES1.** If traffic increases beyond projections, the additional right-of-way purchased can accommodate further improvements when needed. Full width shoulders are recommended due to the fact that this route is on the National Truck Network, designated by the state to carry increased dimension vehicles. **Improvements to realign the skewed intersections on the KY 121 study segment are also recommended in the following priority order: KY 440, KY 945, KY 1276. It is recommended that these intersection improvements be implemented in the short term, followed by the Alternative 7 recommended improvements.** While there are no immediate crash problems on the roadway, having existing and new schools immediately south of the project study area demand that an increased emphasis be placed on safety



Recommended Alternative – 7
 Two-Lane on Five-Lane Right-of-Way
 Project Length: 3.072 mi.
 Preliminary Cost Estimate:

Design	\$ 1,250,000
Right-of-Way	\$ 5,500,000
Utility Relocation	\$ 2,000,000
Construction	\$ 7,500,000
Total	\$ 16,250,000

Short Term Recommendation:
 Alternative 2 – Spot Improvements
 Intersections at: KY 440, KY 945 and KY 1276
 Preliminary Cost Estimate:

Design	\$ 325,000
Right-of-Way	\$ 500,000
Utility Relocation	\$ 600,000
Construction	\$ 1,400,000
Total	\$ 2,825,000

0.5 0 0.5 1 Miles

- Parkways
- US Highways
- State Roads
- Local Roads
- Streams
- Railroad
- Corporate Boundary



Project Location
 Graves County
 Item No. 1-8100.00
 KY 121 From 400' South
 of Harris Lane to the
 KY 945 Intersection



Exhibit ES1

while considering improvement alternatives. School bus safety will also benefit from wider shoulder and lane widths. Bicycle and pedestrian needs should also be addressed in future project phases. Turning lanes at the major intersections are also recommended.

Phase Costs

The only phase funded for this project was the planning phase listed in the FY 2003-2008 Six-Year Highway Plan. No other phases were scheduled or had funds allocated. The following table summarizes each of the alternatives and estimates for their respective costs.

	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6a	Alternative 6b	Alternative 7
Phase	Spot Improvements	Two-Lane	Three-Lane	Two-Lane on Four-Lane R/W	Four-Lane Rural	Four-Lane Urban	Two-Lane on Five-Lane R/W
Design	325,000	1,000,000	1,500,000	2,000,000	2,000,000	1,750,000	1,250,000
Right-of-Way	500,000	4,000,000	4,000,000	7,000,000	7,000,000	5,500,000	5,500,000
Utility Relocation	600,000	1,500,000	1,500,000	2,000,000	2,000,000	2,000,000	2,000,000
Construction	1,400,000	7,000,000	8,000,000	8,000,000	13,000,000	10,000,000	7,500,000
Total	2,825,000	13,500,000	15,000,000	19,000,000	24,000,000	19,250,000	16,250,000

Alternative 1, No-Build, has no associated costs.

Alternative 2, Spot improvements, are detailed in the following table:

Spot Improvements - KY 121 Intersections at:				
Phase	KY 440	KY 945	KY 1276	Total
Design	150,000	75,000	100,000	325,000
Right-of-Way	300,000	100,000	100,000	500,000
Utility Relocation	300,000	100,000	200,000	600,000
Construction	750,000	250,000	400,000	1,400,000
Total	1,500,000	525,000	800,000	2,825,000

Additional Information

The following KYTC Division of Planning Staff may be contacted if additional information is needed on the KY 121 Planning Study:

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