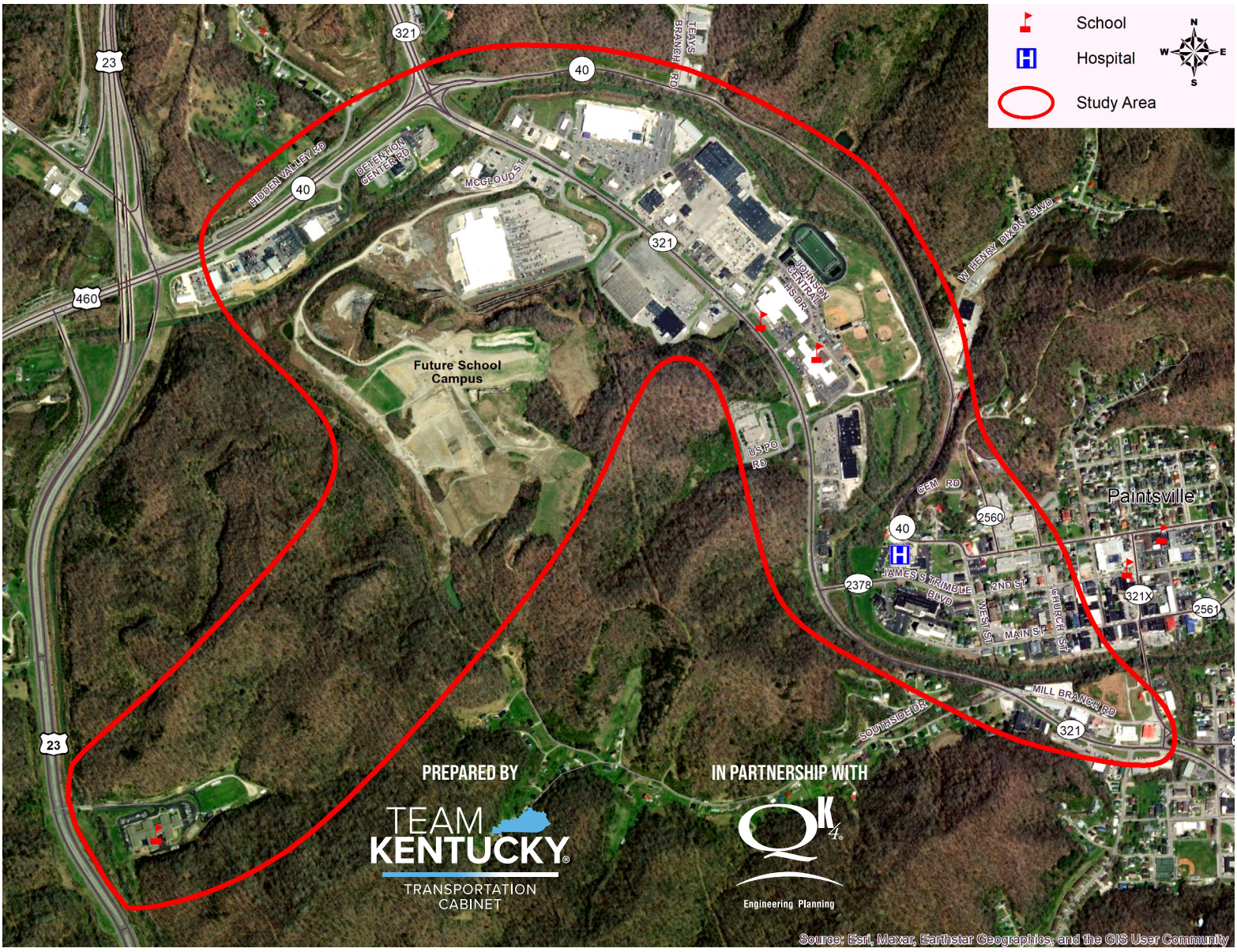
REPRESENTATIVE VIEWS OF KY 321

EXECUTIVE SUMMARY | OCTOBER 2024

KY 321 CORRIDOR STUDY

JOHNSON COUNTY, KY
ITEM NO. 12-80116



EXECUTIVE SUMMARY

The Kentucky Transportation Cabinet (KYTC) initiated this study for the KY 321 corridor in the City of Paintsville, Johnson County in December 2022. The study limits extend from its intersection with KY 321X (Broadway) at milepoint (MP) 7.061 in the south through the KY 40 intersection at MP 8.791 in the north plus the length along KY 40 from just east of the US 23 interchange (MP 8.600) to College Street (MP 10.890) downtown. The study area is shown in **Figure ES-1**.

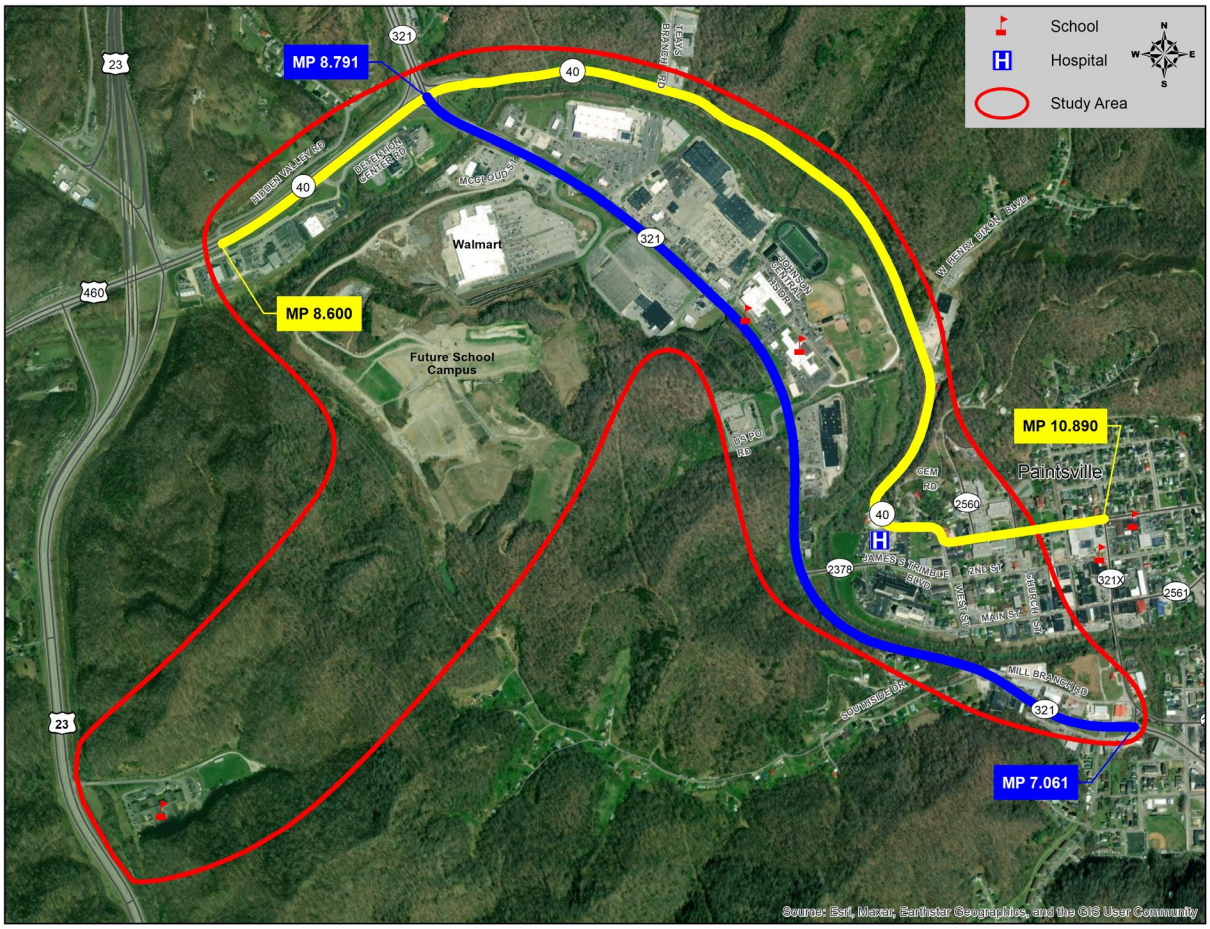


Figure ES-1: Study Area Limits

In addition to providing local access to adjacent commercial areas and the county school campus, the KY 321 corridor is the primary connection between Paintsville and US 23—the main north/south highway for much of Eastern Kentucky. Through the study area, KY 321 experiences peak period congestion and elevated crash rates. The goal of this corridor study is to identify transportation needs and evaluate conceptional improvements for increased safety and mobility for all users. Any

improvement concepts should balance vehicular throughput and safety needs as well as provide safe spaces for other modal users.

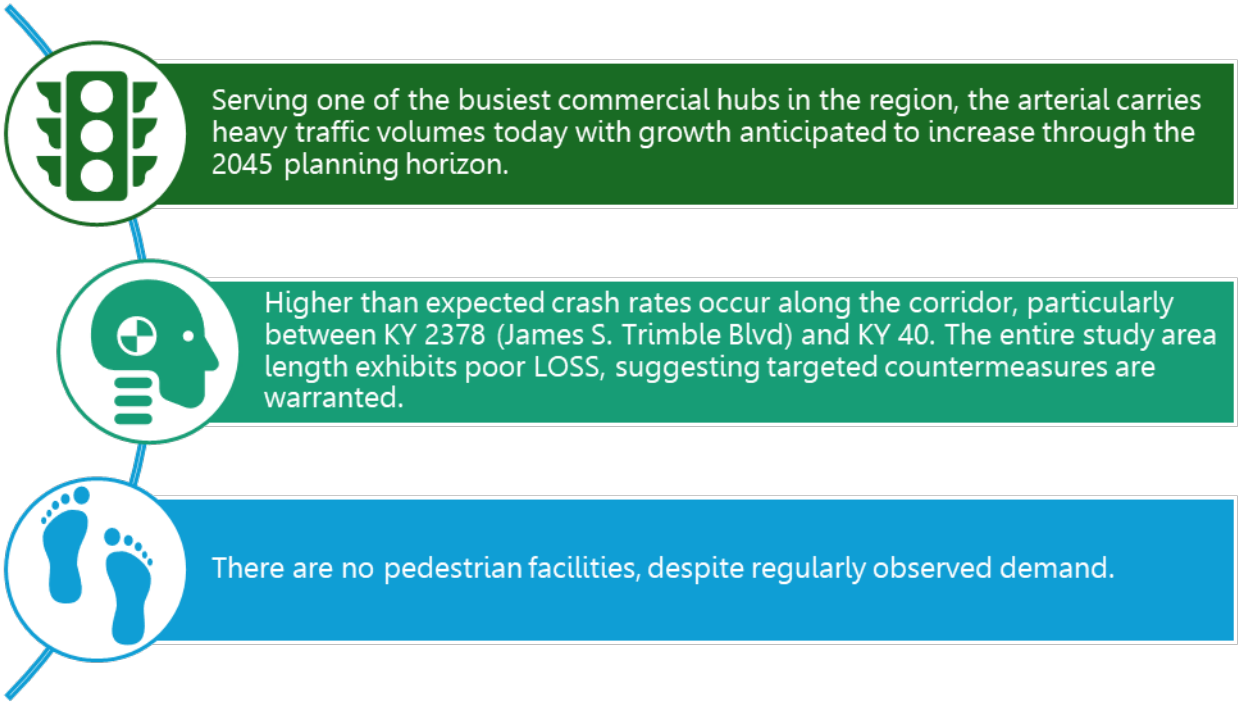


Figure ES-2: Data-driven Study Goals

This corridor study updates the 2012 *KY 321 Programming Study*,[1] incorporating fresh data, ongoing projects (listed below), and new insights from local officials. Several other developments in the area are influencing demands placed on the highway:

- Johnson County High School will be shifting students from its current location to a new hilltop campus currently under construction and expected to open for the 2027–2028 school year. KY 40 will provide access to the new campus.
- Various transportation projects are under development along KY 40, which provides a secondary connection between Paintsville and US 23.
- Additional flood walls are proposed, including one near the new judicial center to protect existing structures, under development by the US Army Corps of Engineers.

[1] Online at https://transportation.ky.gov/Planning/Pages/Planning-Studies-and-Reports.aspx

EXISTING ROADWAY

KY 321 is classified as an urban minor arterial within the study area and listed in Kentucky's state secondary system. It has two 12-foot-wide driving lanes for most of its length, with an 11-foot-wide, two-way left-turn lane (TWLTL) between KY 2378 (James S Trimble Boulevard) and the Walmart driveway (MP 8.537). Shoulders are 8 feet wide (3 feet paved) for most of the study area length, widening to 10 or 11 feet paved near the study area limits. This creates a consistent 41-foot pavement width within most of the study limits, with at least 100 feet of state-owned right-of-way between KY 2378 and the Walmart driveway. Aside from the KY 2378 sidewalk connection towards the city, there are no dedicated facilities for cyclists or pedestrians.

The posted speed limit is 45 mph, dropping to 35 mph near Mill Branch Road approaching Paintsville. However, peak period travel speeds tend to be much lower due to traffic congestion, closely spaced access points, and the six signalized intersections between KY 40 and KY 2378.

The horizontal and vertical alignment meet current design standards.

TRAFFIC

Existing (2023) average daily traffic volumes along KY 321 range from 11,400 to 15,100 vehicles per day (vpd). During peak hours, approximately 2% of this traffic represents commercial vehicles or 9% of the daily volume. Vissim microsimulation software was used to model corridor operations. Today, thru trips along KY 321 generally operate smoothly—Level of Service (LOS) C or better overall at signalized intersections, but turns from minor cross-streets can experience longer delays and LOS E performance. In some cases, queues spillback beyond closely spaced access points upstream.

KYTC's statewide travel demand model estimated future year growth, incorporating growth patterns from discussions with local leaders. An annual 1.0% growth rate was applied to derive 2045 No-Build traffic volumes, increasing KY 321 daily volumes to between 13,200 and 18,800 vpd. As part of the No-Build scenario, school enrollment was shifted from existing high school to the new hilltop campus west of Walmart, with access from KY 40 near Tractor Supply (approximate MP 8.85). Just optimizing signal timing, No-Build performance improves compared to 2023 metrics, even with increasing traffic volumes. Signalized intersections remain at LOS C or better and there are fewer LOS E moves from cross-streets. This suggests that adjusting signal timing without other Build improvements may be an effective means to increase corridor mobility with relatively low costs and impacts.

While limited volume data is available, the corridor represents an important link for cyclists and pedestrians to access one of the largest retail centers in the region. It is common to see people walking along the side of the street. The 2012 planning study emphasized the need for multimodal access, including for limited-mobility elders who use electric scooters.

CRASH TRENDS

Historical crash data (2018-2022) showed 255 crashes were reported along KY 321 and 40 crashes along KY 40. The highest density of crashes (**Figure ES-3**) occurred along the commercial strip, which carries the highest traffic volumes and has the most cross-streets/driveways. One fatality occurred within the study area during the analysis period: an angle crash on KY 40 near Teays Branch Road when a vehicle hydroplaned on a rainy morning in February 2020. There were also 51 injury collisions.

Along KY 321, most crashes are rear ends (50%), followed by angle crashes (23%). While rear end crashes are the most common type, they tend to be less severe than other collision types. Considering only severe (KAB) crashes, the most common type was angle (66%). Most KY 321 crashes occurred at intersections, with McCloud Street (MP 8.602), the Walmart driveway (MP 8.537), and Mayo Plaza (MP 8.398) showing the highest crash concentrations.

Statistical analyses were performed to find areas of higher-than-expected crash concentrations, defined as the Level of Service of Safety (LOSS). Most of the corridor demonstrates poor LOSS with crash frequencies greater than predicted by mathematical formulas, with higher severity rates between KY 40 and McCloud Street. The McCloud Street intersection exhibits a LOSS 4 rating for both severe and non-severe crash types, suggesting a very high potential for countermeasures at this location to reduce observed crash rates.

Figure ES-3: Crash Heat Map

BUILD CONCEPTS

Concepts were developed based on reviews of existing geometry, existing and future traffic operations, crash concentrations, field reconnaissance, and input from the project team and local officials/stakeholders (LO/S). As most of the Build concepts are contained within existing right-of-way or parking areas along a densely developed urban corridor, minimal impacts to sensitive environmental features are anticipated. Utility impacts are more concerning due to the numerous lines running along/across the corridor.

Corridor-level Build concepts fit into one of three categories:

- Major widening, which was recommended in the 2012 study, to create a five-lane section from KY 40 to KY 2378 with 12-foot thru lanes, a 15-foot TWLTL, curb/gutter, and a 5-foot sidewalk on the east side. Increasing capacity improves KY 321 travel times approximately 15% compared to the No-Build scenario.
- Add an 8-foot shared-use path meandering along the east side of the highway. This option has minimal impact on traffic or safety needs but provides a safe space for unmet pedestrian demand.
- Access management options—including roundabouts, left turn restrictions, and consolidating access points—were not supported by locals but offer substantial safety benefits.

Additionally, smaller scale improvements focus on specific intersections:

- Striping solution and Right-in/Right-out (RIRO) at McCloud Street to improve safety
- Reconstruct KY 321/Walmart driveway as a roundabout
- Add northbound right turn lanes to Taco Bell opposite Walmart (MP 8.537), McDonalds (MP 8.231), and/or JCHS Drive (MP 8.100)
- Create connection between Walmart and adjacent development to south to relieve traffic at KY 321/Walmart Driveway signalized intersection
- Stripe offset left turn lanes at KY 321/Walmart driveway and add high visibility signal backplates

Travel time savings and safety benefits were weighed against estimated costs, which include design, right-of-way, utilities, and construction. A benefit-cost ratio greater than one suggests the discounted present value of the benefits exceeds the discounted present value of the costs, suggesting the project is worthwhile. **Table ES-1** summarizes results; as benefits for the shared use path are qualitative, it is omitted from the calculations. As shown, costs for the roundabouts and right turn lanes outweigh benefits but others are greater than 1.0.

Table ES-1: Benefit-Cost Analyses

Concept	2023 Cost	Safety Benefit	Travel Time Benefit	Benefit-Cost Ratio
Corridor-Level				
Optimize Signals	$30,000	$13.5 million	$400,000	>300
Five-Lane Widening	$12.3 million	$18.9 million	$2.3 million	1.1
Frontage Road/RIROs	$3.8 million	$8.7 million	$2.0 million	1.9
Three Roundabouts	$21.3 million	$18.3 million	$3.4 million	0.7
Small Scale				
McCloud Striping	$50,000	$3.6 million	-	47.9
Walmart Roundabout	$3.7 million	$5.5 million	$440,000	0.3
Walmart Small Safety	$110,000	$2.3 million	-	10.4
Taco Bell Right	$250,000	$17,000	-	0.4
McDonalds Right	$250,000	$11,000	-	0.3
JCHS Right	$350,000	$31,000	-	0.8

Without quantifiable pedestrian demand data or a history of pedestrian crashes along the corridor, benefits of a shared use path are challenging to quantify. More walkable communities with increased pedestrian access contributes to direct revenue for nearby businesses, better health at individual and societal levels, fewer vehicle emissions, and equitable access for all population demographics.

MEETINGS

The project team met at key milestones throughout the study process, engaging with LO/S at two key points to discuss findings and coordinate key issues.

RECOMMENDATIONS

Reviewing the concepts, costs, benefits, impacts, and input from locals, the project team agreed to dismiss the frontage road, Walmart connector, and school turn lane concepts. Opportunities to incorporate access management principles should be a continuing consideration as adjacent developments increase traffic flows and/or other transportation projects progress. Other recommended priorities are summarized in **Table ES-2** with corresponding project sheets in **Chapter 9.0** of the report.

Table ES-2: Prioritization of Build Concepts

Concept	DRUC Cost	BCA	Local Input	Priority
Optimize Signals	$30,000	300+	Top priority	High/As Needed
Five-Lane Widening	$12.3 M	1.1	1/7 Oppose	Long-Term/Low
Shared Use Path	$5.9 M	Qualitative	Seeking funds	Short-Term
Frontage Road/RIROs	$3.8 M	1.9	2/7 Oppose	Dismiss
Three Roundabouts	$21.3M	0.7	7/7 Oppose	Long-Term/Low
Walmart Connector	$1.4M	-	NA	Dismiss
McCloud Striping	$50,000	48	Favored	Short-Term/High
Walmart Roundabout	$3.7 M	0.3	7/7 Oppose	Dismiss
Walmart Small Safety	$110,000	10.4	NA	Short-Term/High
Taco Bell Right	$250,000	0.4	Favored	Medium
McDonalds Right	$250,000	0.3	Favored	Medium
JCHS Right	$350,000	0.8	3/7 Oppose	Dismiss