Russellville Road
(US 68X and US 231X) Planning Study

Warren County
KYTC Item No. N/A

EXECUTIVE SUMMARY

November 2019

KENTUCKY TRANSPORTATION CABINET

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EXECUTIVE SUMMARY

INTRODUCTION

The Russellville Road (US 68X and US 231X) Planning Study was initiated by the Kentucky Transportation Cabinet (KYTC) to evaluate the need for and impacts of transportation improvements along portions of Russellville Road and adjacent roadway facilities in Warren County. The study area, shown on **Figure ES-1**, includes approximately 86 acres surrounding US 68X (Russellville Road/University Boulevard) and US 231X (University Boulevard/Morgantown Road) in central Bowling Green, Kentucky and includes portions of the Western Kentucky University (WKU) campus.

The study includes US 68X from south of Robinson Avenue (MP 1.000) to north of Avenue of Champions (MP 1.626) and US 231X from north of Normal Street (MP 2.300) to south of Holly Drive (MP 2.600) along with portions of Robinson Avenue and Creason Street. This study serves as the first step in establishing goals, completing an existing conditions analysis, identifying potential needs and concerns, evaluating improvement concepts, and developing cost estimates in the study area.

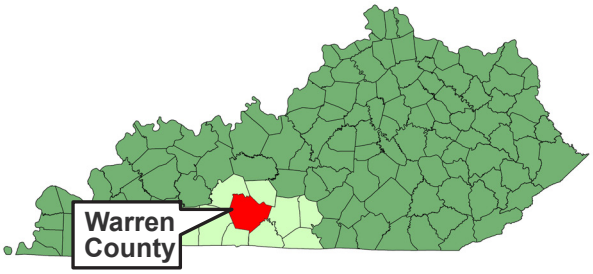

Figure ES-1*: Study Area (Not to Scale)*

PURPOSE AND NEED

The purpose of the Russellville Road study is to improve safety, reduce congestion, and better accommodate all modes of travel on US 68X (Russellville Road/University Boulevard) and US 231X (University Boulevard/Morgantown Road) in Bowling Green, KY.

Purpose & Need

- Safety, congestion, and multimodal travel are the primary concerns in the study area.
- Multimodal travel in the area includes pedestrians, bicyclists, and buses.

Over the three-year period between January 1, 2014 and December 31, 2016, there were 315 crashes reported in the study area. This included 35 injury collisions and zero fatal collisions. Of the 315 reported crashes, the most common were rear end collisions (114 crashes, 36 percent) with angle (65, 21 percent) and sideswipe collisions (63, 20 percent) the next most common. These types of crashes are often indicative of congested roadways and can be a symptom of poor access control. During this same three-year time period, there were six vehicle collisions with pedestrians, five of which resulted in injuries and zero fatalities. Critical crash rate factors (CRF's) were calculated for the three-year study period between January 1, 2014 and December 31, 2016. There is one high crash segment and eight high crash spots (0.1 miles in length) with CRF values greater than 1.0. The high crash spots and segments are shown in **Figure ES-2**.

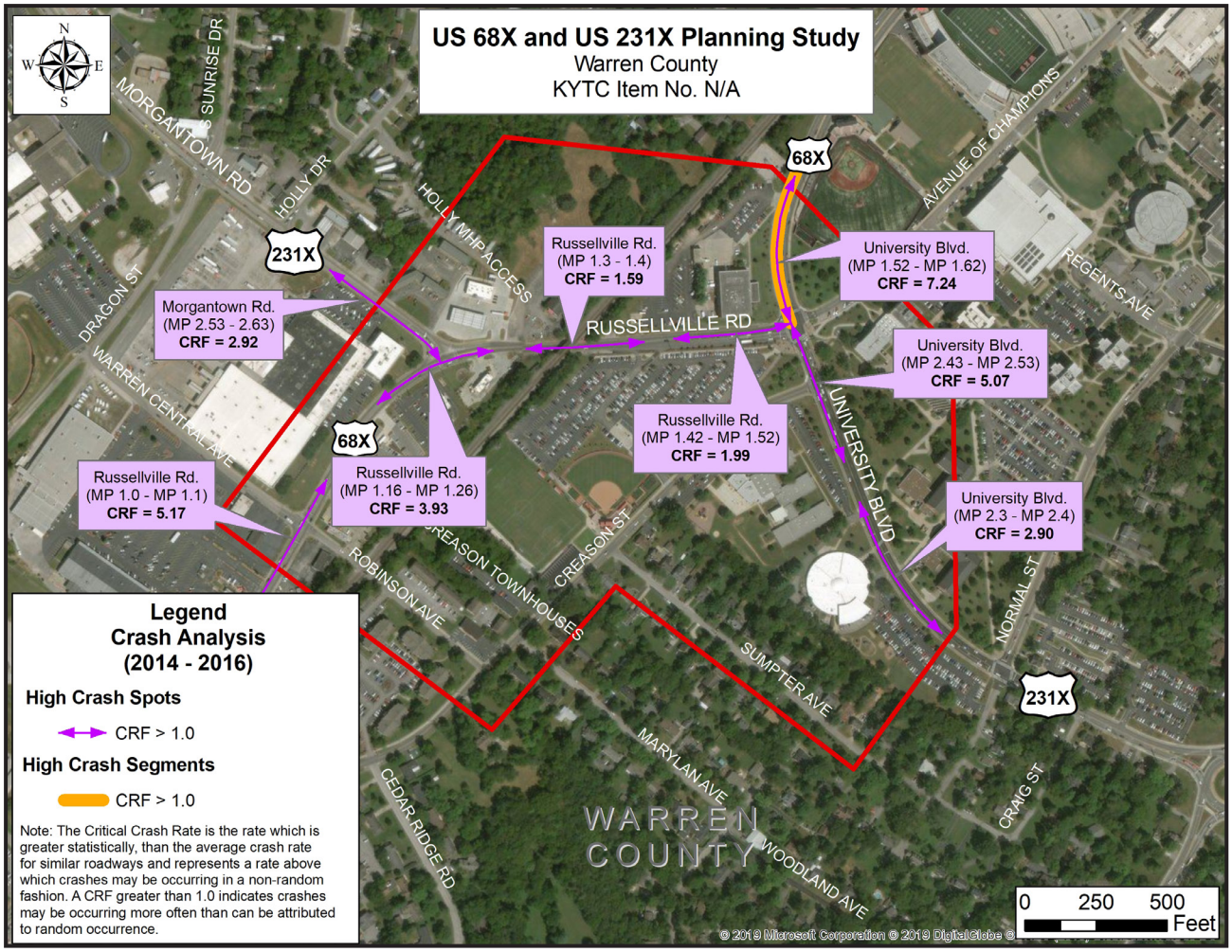

Figure ES-2*: High Crash Spots and Segments*

With the study area's proximity to WKU, traffic demand includes a mix of commuter travel into campus and local traffic traveling to/from downtown Bowling Green and the surrounding areas. Russellville Road has the highest Average Annual Daily Traffic (AADT) volume in the study area with 25,000 – 27,000 vehicles per day (VPD). University Boulevard (US 68X/US 231X) carries 16,500 – 19,000 VPD and Morgantown Road (US 68X) carries 13,600 VPD. The high traffic volumes on Russellville Road along with the proximity of the Morgantown Road

and University Boulevard intersections cause congestion issues, especially during the PM peak hour (4:30 to 5:30 PM). Currently, the Russellville Road intersection with University Boulevard operates at an undesirable Level of Service (LOS) E during the PM peak hour. LOS is a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience.

Midblock Pedestrian Crossing on University Boulevard

Due to the proximity of WKU, there are high volumes of pedestrians and bicyclists in the study area. This is especially the case at the Russellville Road intersection with University Boulevard, where pedestrians using the Creason parking facilities cross to access campus. Many students also utilize Topper Transit, WKU's campus bus system. The Red, White, and Green Lines all travel through the study area. A 700-space parking garage on the Creason Parking Lot (WKU Parking Structure No. 3) was opened in November 2017, which has increased pedestrian travel in the area.

IMPROVEMENT CONCEPTS

Community outreach helped guide the study, particularly in identifying potential issues and developing improvement concepts. Over the course of the study, the project team held three in-person project team meetings, two local officials/stakeholders meetings, one meeting with the WKU Master Plan Committee, and one meeting with CSX Railroad. The project team also conducted public outreach that included mailing 3,200 survey postcards to addresses in and around the study area and sending a WKU campus-wide email with information on the project and a link to the survey.

Of the 421 responses from the online survey, approximately 36 percent were WKU faculty/staff, 32 percent were Bowling Green residents, and 29 percent were WKU students. The majority (84 percent) of the respondents travel the study area at least two times per week, with 58 percent living in the study area. 95 percent of respondents indicated that improvements were needed within the study area. When asked which improvements are most important, respondents indicated that widening Russellville Road and improving the intersection at University Boulevard were most important, as shown in **Figure ES-3**.

Respondents were then asked, understanding the lengthy road closures needed to replace the railroad bridge on Russellville Road (up to one year), should Russellville Road be widened to improve traffic flow and provide dedicated bicycle and pedestrian facilities? 79 percent of respondents indicated that Russellville Road should be widened even if lengthy road closures are needed.

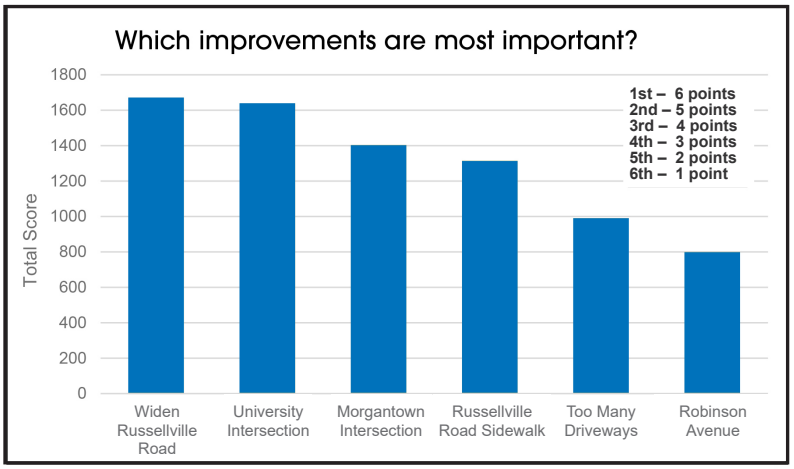

Figure ES-3*: Online Survey Responses*

Improvement concepts were developed based on a combination of input from the public and local stakeholders, a review of existing conditions, simulation model traffic analyses, and field reconnaissance. Along with the No-Build, this study examined several other types of improvements, as described below:

- **No-Build** – This option would make no transportation improvements. The No-Build serves as a baseline for comparison of improvement concepts.
- **Improvement Concept 1** – Signal optimization at the University Boulevard intersection and provide a sidewalk on Russellville Road. This improvement concept was modeled at the beginning of the concept development process and did not provide sufficient congestion relief and was therefore eliminated from further consideration.
- **Improvement Concept 2** – Add additional turn lanes at the University Boulevard intersection and provide a sidewalk on Russellville Road.
- **Improvement Concept 3** – Construct a roundabout at the University Boulevard intersection with a signalized midblock pedestrian crossing and provide a sidewalk on Russellville Road.

- **Improvement Concept 4** – Add additional turn lanes at the University Boulevard intersection and widen Russellville Road to four lanes including bicycle and pedestrian accommodations.
- **Improvement Concept 5** – Construct a roundabout at the University Boulevard intersection with a signalized midblock pedestrian crossing and widen Russellville Road to four lanes including bicycle and pedestrian accommodations.
- **Improvement Concept 6** – Construct a roundabout at the University Boulevard intersection with a signalized midblock pedestrian crossing, construct a roundabout at the Morgantown Road intersection, and widen Russellville Road to four lanes including bicycle and pedestrian accommodations.
- **Improvement Concept 7** – Construct a bike/ped tunnel under University Boulevard from the Creason Parking Lot. The cost of this improvement concept far outweighed the congestion relief and was therefore eliminated from further consideration.
- **Improvement Concept 8** – Construct a flyover to take Russellville Road over the existing CSX railroad bridge. The grades would be too steep for a flyover to tie into the adjacent intersections and was therefore eliminated from further consideration.

EVALUATION MATRIX

The improvement concepts were evaluated using detailed traffic microsimulation models to help the project team make recommendations regarding concept(s) to be carried forward for future project development. A summary of the complete evaluation matrix is shown in **Table ES-1**. Crash reduction and congestion relief benefits were used along with planning level cost estimates, which were prepared for each improvement concept based on average KYTC unit costs plus additional costs for special features such as bridges and traffic signals. Improvement Concepts 4, 5, and 6 include the widening of Russellville Road, which requires the replacement of the existing CSX bridge. These estimates include costs for a 30 mph "shoofly" which utilizes a temporary railroad alignment and a temporary railroad bridge for bypass track(s) while the existing railroad bridge is being replaced.

Table ES-1: *Evaluation Matrix*

Evaluation Matrix and Cost Estimates														
Improvement Concepts	Traffic at Russellville Rd/University Blvd Intersection				Bike/Ped Facilities on Russellville Road		2018 Cost Estimates (millions)					10-Year Benefit-Cost Ratio (BCR)		
	Year 2018 PM Peak Hour		Year 2040 PM Peak Hour											
	Intersection Delay (sec)	Intersection LOS[1]	Intersection Delay (sec)	Intersection LOS[1]	Pedestrian Accomodations	Bicycle Accomodations	Design	Right-of Way	Utility	Construction	Total	Crash Reduction (millions)	Congestion Relief[2] (millions)	BCR
No-Build	76	E	117	F	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Improvement Concept 2 Intersection Improvements at University Boulevard and Sidewalk on Russellville Road	36	D	74	F	Yes	No	$0.2	$2.0	$0.5	$1.0	$3.7	0.7	11.0	3.16
Improvement Concept 3 Roundabout at University Boulevard with Signalized Midblock Pedestrian Crossing and Sidewalk on Russellville Road	27	D	50	E	Yes	No	$0.3	$2.4	$1.9	$2.5	$7.1	3.4	7.5	1.54
Improvement Concept 4 Widen Russellville Road with intersection improvements at University Boulevard	36	D	68	E	Yes	Yes	$1.0	$2.7	$4.4	$8.6	$16.7	4.9	11.1	0.96
Improvement Concept 5 Widen Russellville Road with Roundabout at University Boulevard and Signalized Midblock Pedestrian Crossing	27	D	40	E	Yes	Yes	$1.1	$2.7	$4.4	$9.6	$17.8	7.5	9.1	0.93
Improvement Concept 6 Widen Russellville Road and Roundabout at University Boulevard with Signalized Midblock Pedestrian Crossing and Roundabout at Morgantown Road	19	C	43	E	Yes	Yes	$1.3	$2.9	$5.4	$11.0	$20.6	10.5	9.8	0.99

[1] In urban areas a LOS D or better is desirable.
[2] Based on reduction in average delay from AM and PM peak hours between 2018 and 2028 and average hourly rate of $19.09 per hour (source: Bureau of Labor Statistics)

RECOMMENDATIONS

Considering the technical data, comments from local officials/stakeholders, results from the public outreach survey, and results from the benefit-to-cost analysis, the project team chose to recommend a short-term project and a long-term project. Improvement Concept 2, improving the University Boulevard intersection and providing a sidewalk on Russellville Road, is the recommended short-term improvement. This concept is shown in **Figure ES-4**.

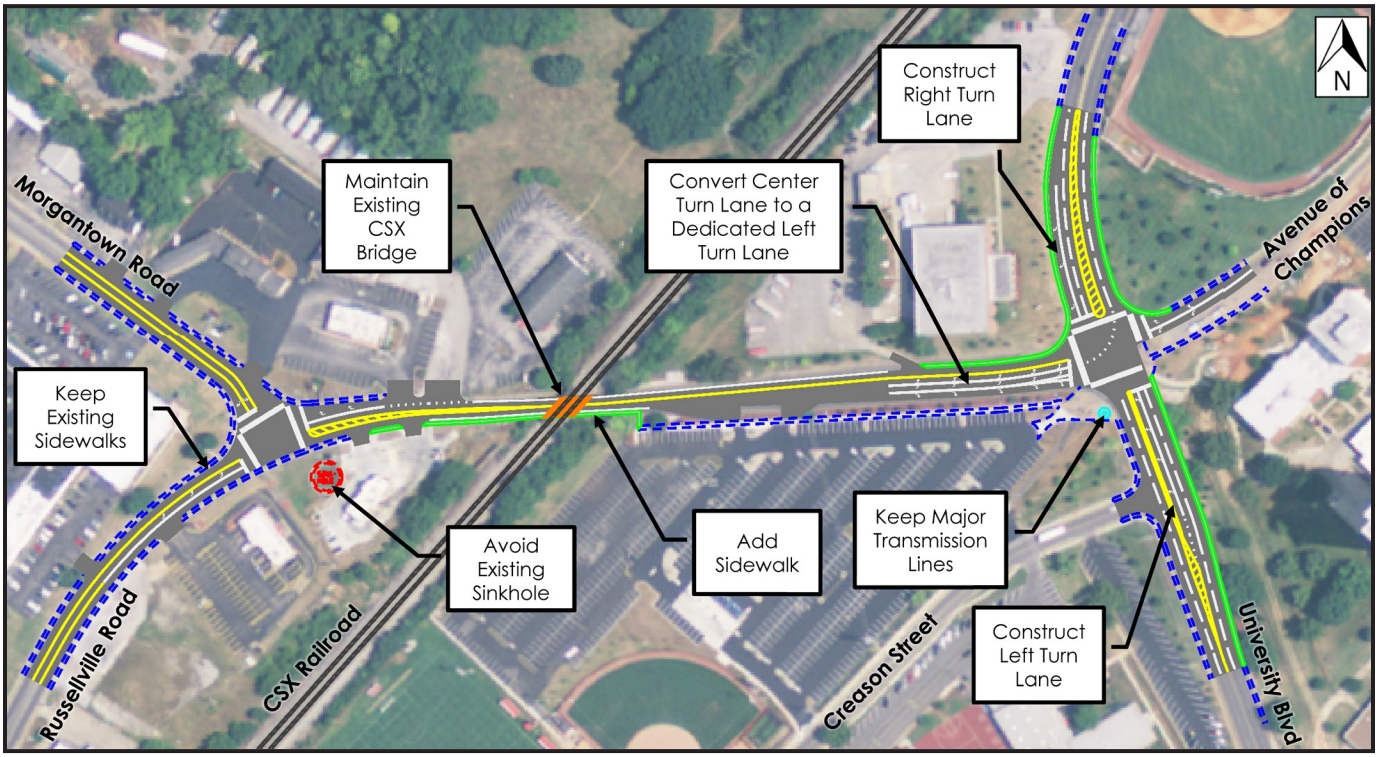

Figure ES-4*: Improvement Concept 2*

Improvement Concept 4, improving the University Boulevard intersection and widening Russellville Road to four lanes including a raised median and bicycle/pedestrian facilities, is the recommended long-term improvement. This concept is shown in **Figure ES-5**. Improvement Concept 4 utilizes the same intersection improvements at Russellville Road and University Boulevard so resources would not be wasted if Improvement Concept 2 were built first. The difference is Concept 4 replaces the CSX railroad bridge over Russellville Road in order to provide four travel lanes along with a sidewalk and a shared-use path.

The roundabout concepts were not recommended by the project team for the Russellville Road/University Boulevard intersection because the benefit-cost ratios, shown in **Table ES-1**, are better for the traditional intersection improvement concepts. Also, the utility impacts are considerably less, and the traffic analyses show that the roundabout alternatives have significantly increased delays on Creason Street, Morgantown Road, and Avenue of Champions. With the consistent stream of pedestrians coming to/from the Creason Parking Lot and vehicles coming from the major approaches, the minor approaches do not have sufficient gaps to enter the roundabouts. For these reasons, intersection improvements at Russellville Road/University Boulevard (Improvement Concepts 2 and 4) provide the best balance of traffic performance, multimodal accommodation, and reduced impacts. The traffic analyses also showed that in order to achieve a desirable LOS and delay during the 2040 PM peak, the widening of Russellville Road will eventually need to extend through Morgantown Road to the existing five-lane section at KY 880 (Campbell Lane), at which time a roundabout should be reconsidered for the Russellville Road/Morgantown

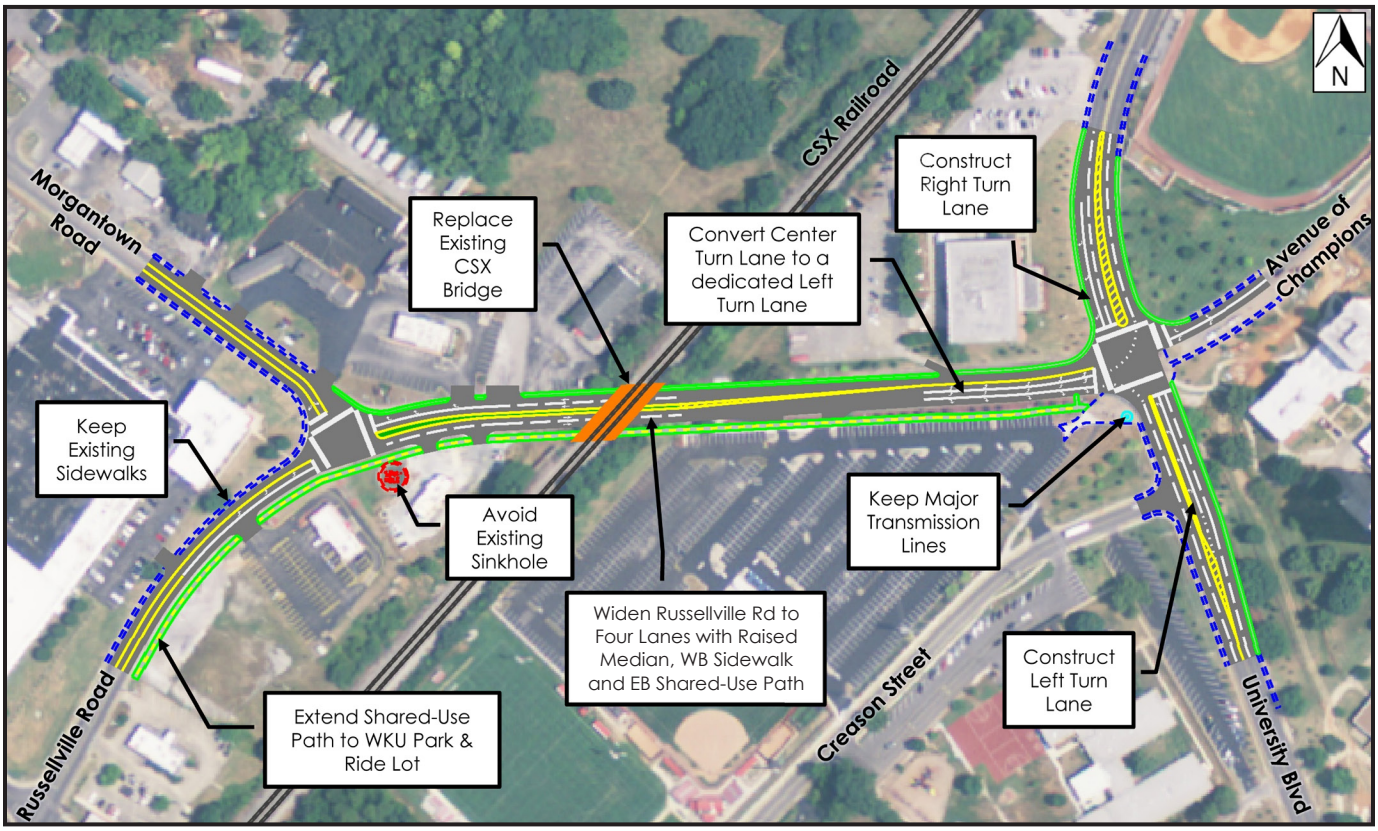

Figure ES-5*: Improvement Concept 4*

Road intersection. Widening Russellville Road to Campbell Lane was outside the scope of this study and is therefore not included in the cost estimates.

Future phases of the project should also explore prohibiting left turns from University Boulevard onto Creason Street. Stakeholder feedback indicated that this left turn is critical to WKU Topper Transit routes and some school buses accessing the W.R. McNeill Elementary School. The safety and traffic operation benefits of restricting this left turn merit further exploration in future project development phases if these buses can utilize alternate routes.

NEXT STEPS

The next phase for the Russellville Road (US 68X and US 231X) Planning Study would be Phase 1 Design (Preliminary Engineering and Environmental Analysis) for one or more of the recommended improvement concepts. Any improvement that includes the replacement of the existing CSX bridge will require the completion of TSL (type, size, and location) plans to be submitted to CSX for review and approval before continuing to the next design phase. Further funding will be necessary to advance an improvement to the design phase. Additional phases of the project are not funded in Kentucky's FY 2018 – FY 2024 Highway Plan. The next Highway Plan will be enacted in Spring 2020.