

APPENDIX H – MEETING SUMMARIES

Meeting Minutes

TO: Shane McKenzie
Co-Project Manager
KYTC Central Office
200 Mero Street
Frankfort, KY 40622

Andy Stewart
Co-Project Manager
KYTC District Office #3
900 Morgantown Rd.
Bowling Green, KY 42101

FROM: Len Harper
Project Manager
Stantec Consulting Services Inc.

DATE: July 10, 2018

SUBJECT: Russellville Road (US 68X and US 231X) Planning Study
US 68X from south of Robinson Ave. (MP 1.000) to north of Avenue of
Champions (MP 1.626)
US 231X from north of Normal St. (MP 2.300) to south of Holly Dr. (MP 2.600)
KYTC Item No. N/A
Project Team Meeting No. 1

A project team meeting for the Russellville Road (US 68X and US 231X) Planning Study was held at the KYTC District 3 Office in Bowling Green, KY on June 22, 2018 at 8:30 a.m. CDT. The following individuals were in attendance:

Steve De Witte	KYTC – Central Office Planning
Gavin Hodges	KYTC – District 3
Matthew Holder	KYTC – District 3
Daniel Hulker	KYTC – Central Office Planning
Ben Hunt	KYTC – District 3
Nikki Jones	KYTC – District 3
Karissa Lemon	Bowling Green – Warren County MPO
Stewart Lich	KYTC – District 3
Anthony Norman	KYTC – Central Office Planning
Joe Plunk	KYTC – District 3
J.C. Puryear Jr.	KYTC – District 3
Steve Ross	KYTC – Central Office Planning
Tim Sharp	KYTC – District 3
Wendy Southworth	KYTC – Central Office Design
Chandler Stephanski	KYTC – District 3
Andy Stewart	KYTC – District 3
Jennifer Tougas	Western Kentucky University
Wes Watt	KYTC – District 3
Brian Aldridge	Stantec Consulting Services Inc.
Len Harper	Stantec Consulting Services Inc.

Graham Winchester

Stantec Consulting Services Inc.

Andy Stewart welcomed everyone and said the purpose of the meeting was to discuss the progress to date on the Russellville Road Planning Study. Handouts included a meeting agenda and a copy of the PowerPoint slides. Large study area maps were also made available for participants to view and comment on. After introductions, Len Harper delivered a presentation. The following enumerated items were discussed.

1. The purpose of the meeting is to present the results of the existing conditions analysis and to get feedback from the project team on potential improvement concepts.
2. The Russellville Road and University Boulevard intersection ranked 6th out of 42 planning projects that were scored statewide through the Strategic Highway Investment Formula for Tomorrow (SHIFT) prioritization process. As a result, two Project Identification Forms (PIFs) were combined in the development of this planning study:
 - PIF 03 114 B0068X 3.00 - Reconstruct the intersection of US 68X (MP 1.0-1.6) with US 231X (MP 2.3-2.6), including major widening of roadway extending through the CSX overpass on US 68X, to improve safety and congestion. Provide safe modes of travel for pedestrians and bicyclists, including a shared-use path and/or bike lane connecting WKU's campus to the existing greenway on Robinson Ave. (P = \$200,000; D = \$2 Million; R = \$4 Million; U = \$5 Million; C = \$12 Million).

3. Len introduced the draft Purpose and Need Statement:

The purpose of the Russellville Road (US 68X and US 231X) project 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.

4. The study area, shown in **Figure 1**, 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). The Morgantown Road and University Boulevard intersections are approximately 1,600 feet apart with major generators nearby, namely Western Kentucky University (WKU) and associated athletic venues (softball, baseball, and football stadiums) along with commuter parking. Within the study area, both US 68X and US 231X are functionally classified as Urban Minor Arterials. South of the Morgantown Road intersection, Russellville Road (US 68X) is a two-lane road with 12-foot lanes, a two-way left-turn lane (TWLTL), curb and gutter, and sidewalks. The TWLTL and sidewalks are removed between the Morgantown Road intersection and the University Boulevard intersection to squeeze through the 30-ft wide opening under the CSX railroad bridge. North of the Russellville Road/University Boulevard

- intersection, University Boulevard (US 68X) is a four-lane road with 12-foot lanes, a 4-foot median, and curb and gutter. South of the intersection, University Boulevard (US 231X) is a four-lane road with 10' lanes, no median, and curb and gutter. Morgantown Road (US 231X) is a two-lane road with 12-ft lanes, a TWLTL, and curb and gutter. The speed limit for both routes is 35 mph throughout the study area.
5. There is an upcoming repaving project that will remove the channelized right-turn lanes and improve the crosswalks at the Russellville Road/Morgantown Road intersection. The project will be let in the fall.
 6. There are two CSX railroad tracks in the study area (one mainline and one bypass track). There is an at-grade crossing at Robinson Avenue which is routinely blocked while trains allow each other to pass using the bypass track. The second crossing is an overpass on Russellville Road which has approximately 30-feet of horizontal clearance and approximately 14-feet of vertical clearance.
 7. Crash data from the Kentucky State Police database indicate 315 crashes were reported between January 1, 2014 and December 31, 2016. This includes 35 (11 percent) injury collisions and no fatal collisions. Of the 315 reported crashes, 114 (36 percent) were single vehicle collisions, 65 (21 percent) were angle collisions, and 63 (20 percent) were sideswipe collisions. Critical crash rate factors (CRF) were calculated for the three-year period (2014 – 2016). A CRF greater than 1.0 suggests crashes are likely not occurring at random. There is one high crash segment and eight 0.3-mile long high crash spots with CRF values greater than 1.0.
 8. In accordance with the Highway Safety Manual methodologies, the Kentucky Transportation Center (KTC) is in the process of creating localized safety performance functions (SPFs) to better predict the potential for crash reductions at intersections and along roadway segments. Intersection analyses based on preliminary SPFs show a potential crash reduction (PCR) factor of -0.002 at the Russellville Road/University Boulevard intersection and -0.037 at the Russellville Road/Morgantown Road intersection. A positive PCR indicates a potential for improvement. Preliminary SPF curves are not yet available for urban roadway segments, so they could not be analyzed. Because the localized SPFs are still being finalized by KTC, the CRF methodology for identifying high crash locations will be utilized for this study. The Highway Safety Manual methodologies will be used in more detail during the alternative development phase of this study, as a means of comparing the crash reduction potential of different improvement types.
 9. Russellville Road has an Annual Average Daily Traffic (AADT) volume of 25,000 – 27,000 vehicles per day (vpd), as shown in **Figure 2**. University Boulevard has 19,000 vpd north of Russellville Road and 16,500 vpd south of Russellville Road. Morgantown Road has 13,600 vpd.

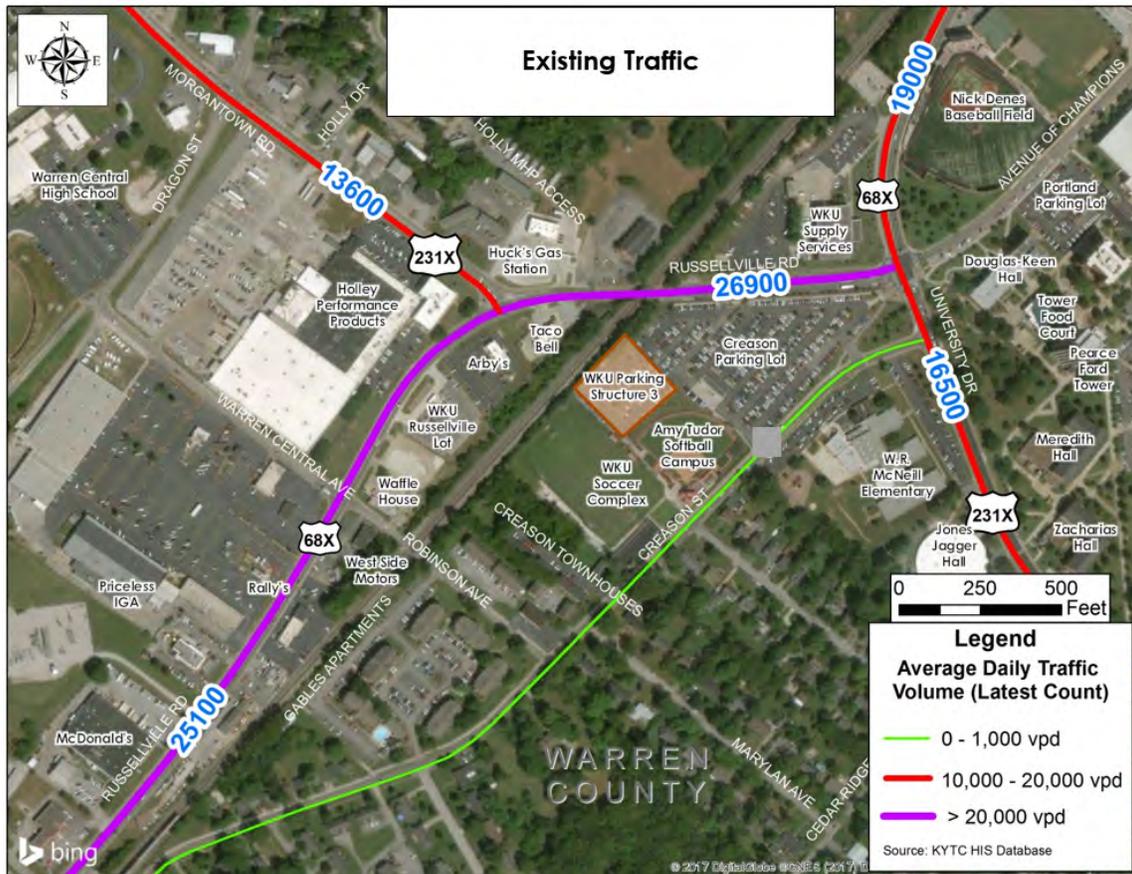


Figure 2: Average Daily Traffic Volumes

10. A new parking garage near the Creason Parking Lot (WKU Parking Structure No. 3) was opened in November 2017. The garage is currently underutilized but is expected to be full in August. 2018 trips for the new parking garage were estimated using the parking space allocation information from WKU (number of commuter and residential parking passes) and the trip distribution factors from the ITE Trip Generation Manual. The additional anticipated trips from the new parking garage were added to the existing turning movement counts that were collected by KYTC in February 2018. Turning movement counts were collected at the following locations:

- Russellville Rd. and Morgantown Rd.
- Russellville Rd. and Robinson Ave.
- Creason St. and Robinson Ave.
- Creason St. and Sumpter Ave.
- Russellville Rd. and University Blvd.
- University Blvd. and Creason St.
- University Blvd. and Normal St.

Stantec also collected spot counts at the following locations:

- Morgantown Rd. and Western Hills Motel
- Russellville Rd. and Taco Bell/Huck’s Gas Station
- Russellville Rd. and Creason Parking Lot
- Robinson Ave. at-grade crossing
- Creason St. and Creason Parking Lot (N entrance)
- Creason St. and Creason Parking Lot (S entrance)
- University Blvd. and Jones Jagger Hall entrance

11. A traffic simulation model was developed in TransModeler based on the Bowling Green Downtown Circulation Study Model. The model network was expanded to include the entire study area, updated with the latest traffic counts and signal timing plans, and calibrated to existing conditions. Existing year (2018) and No-Build (2040) operational performance measures were developed for the weekday A.M. (7:30 - 8:30) and P.M. (4:30 – 5:30) peak hours. Forecasts were developed for the 2040 No-Build (including KYTC’s Existing plus Committed network which includes the major widening on US 31W from Campbell Lane to University Boulevard). Videos of the simulation model were shown to the project team. The base year simulation model activities, assumptions, and results will be documented in a technical memorandum and submitted to KYTC Central Office Planning for review.

12. Level of service (LOS) is a qualitative measure describing operational conditions within a traffic stream. In urban areas, LOS D or better is desirable. The results of the existing (2018) traffic analysis are shown in **Table 1** and **Table 2** and the No-Build (2040) in **Table 3** and **Table 4**. Two scenarios were analyzed for the 2040 No-Build representing both the lower and upper range of expected growth in the study area. It should also be noted that the No-Build scenarios include optimized signal timing. The results indicate that the Russellville Road/University Boulevard intersection has an undesirable existing LOS E in the PM peak hour. By 2040, if no improvements are made, it is expected that both the Russellville Road/University Boulevard intersection and the Russellville Road/Morgantown Road intersection will have an undesirable LOS for the AM and PM peak hours.

Table 1: Existing Peak Hour Traffic Operations Summary by Intersection

Intersection	Existing (2018)			
	AM LOS	AM Delay	PM LOS	PM Delay
Russellville Road @ University Boulevard	D	42.4	E	62.7
Russellville Road @ Morgantown Road	C	20	C	24.9

Table 2: Existing Peak Hour Traffic Operations Summary by Approach

Russellville @ University	Existing (2018)			
	AM LOS	AM Delay	PM LOS	PM Delay
SB University	D	38.1	D	46.7
NB University	D	37.3	F	85.3
EB Russellville	D	46.9	E	58.9
WB Ave of Champions	D	48.0	E	70.4
Russellville @ Morgantown	Existing (2018)			
	AM LOS	AM Delay	PM LOS	PM Delay
SB Morgantown	D	40.9	D	49.5
WB Russellville	D	45.1	C	30.8
EB Russellville	B	12.3	A	5

Table 3: No-Build Peak Hour Traffic Operations Summary by Intersection

Intersection	Lower Growth 2040 No-Build				Upper Growth 2040 No-Build			
	AM LOS	AM Delay	PM LOS	PM Delay	AM LOS	AM Delay	PM LOS	PM Delay
Russellville Road @ University Boulevard	E	70.4	F	97.7	F	81.3	F	129.3
Russellville Road @ Morgantown Road	F	82	F	89.9	F	105.9	F	117.5

Table 4: No-Build Peak Hour Traffic Operation Summary by Approach

Russellville @ University	Lower Growth 2040 No-Build				Upper Growth 2040 No-Build			
	AM LOS	AM Delay	PM LOS	PM Delay	AM LOS	AM Delay	PM LOS	PM Delay
SB University	D	48.4	D	41.5	D	52.2	E	58.4
NB University	F	84	F	167.3	F	117.5	F	155.4
EB Russellville	E	72.8	E	76.8	E	74.3	F	99.4
WB Ave of Champions	E	78.9	F	200.1	E	78.4	F	312.1
Russellville @ Morgantown	Lower Growth 2040 No-Build				Upper Growth 2040 No-Build			
	AM LOS	AM Delay	PM LOS	PM Delay	AM LOS	AM Delay	PM LOS	PM Delay
SB Morgantown	F	161.6	F	207.8	F	224.5	F	289.1
WB Russellville	C	24.4	D	39.9	D	50.8	E	70.4
EB Russellville	E	71	E	73.5	D	80.5	F	111.7

13. There is a proposed student apartment complex development in the study area near the Russellville Road/Morgantown Road intersection. There are expected to be 228 units with 378 beds. Access points will be located at Russellville Road (right-in/right-out only), Holly Drive, and Gary Avenue. The estimated traffic to be generated from this development was included in the No-Build (2040) simulation model.
14. Stantec presented two preliminary improvement concepts that may be considered during the alternative development process and noted the improvement concepts

were for discussion purposes only (shown in **Figure 3** and **Figure 4**). The alternative development phase of this project has just been initiated. The group had an open discussion about these items:

- In addition to the No-Build, this study will examine several improvements:
 - i. Existing Intersection Improvements
 - ii. Roundabout at the Morgantown Road/Russellville Road Intersection
 - iii. Roundabout at the University Boulevard/Russellville Road Intersection
 - iv. Widening Russellville Road including adding bicycle lanes and pedestrian facilities
 - v. Other improvements will be considered such as signal optimization, additional turn lanes, sidewalk improvements, driveway consolidation, access management, etc.
- The project team suggested looking at a pedestrian tunnel or bridge at the intersection of Russellville Road and University Boulevard.
- There was also a discussion about replacing/widening the existing CSX railroad bridge on Russellville Road. Roll-in bridge replacements are CSX's preferred method, where the new bridge would be built next to the existing bridge, then rolled in to place once the existing bridge is removed. Total construction time would likely be two construction seasons and Russellville Road would have lengthy, intermittent closures during that time. A new bridge would cost approximately \$4.3 million using the roll-in method. Russellville Road currently has approximately 14-feet of vertical clearance under the existing CSX bridge, short of the minimum 14.5-feet required in the KYTC Design Manual. Russellville Road would have to be lowered approximately two to three feet under the new bridge to allow for the depth of the new bridge beams and still meet the minimum vertical clearance requirements. Or KYTC could pursue a design exception for the vertical clearance since the existing bridge is already below the minimum requirement. It was also noted that the desired vertical clearance is 17-feet in the KYTC Design Manual which would require Russellville Road to be lowered approximately five feet under the new bridge.
- As part of this study, an Environmental Overview and Geotechnical Overview have been completed. The project team discussed the drainage and geological concerns in the study area. Russellville Road under the CSX bridge is a low spot and collects water during heavy rain events. KYTC has pumps that keep this area from flooding. WKU has vortex drainage units in the Creason Parking lot to mitigate flooding risks. Also, the study area sits on top of Creason Cave.

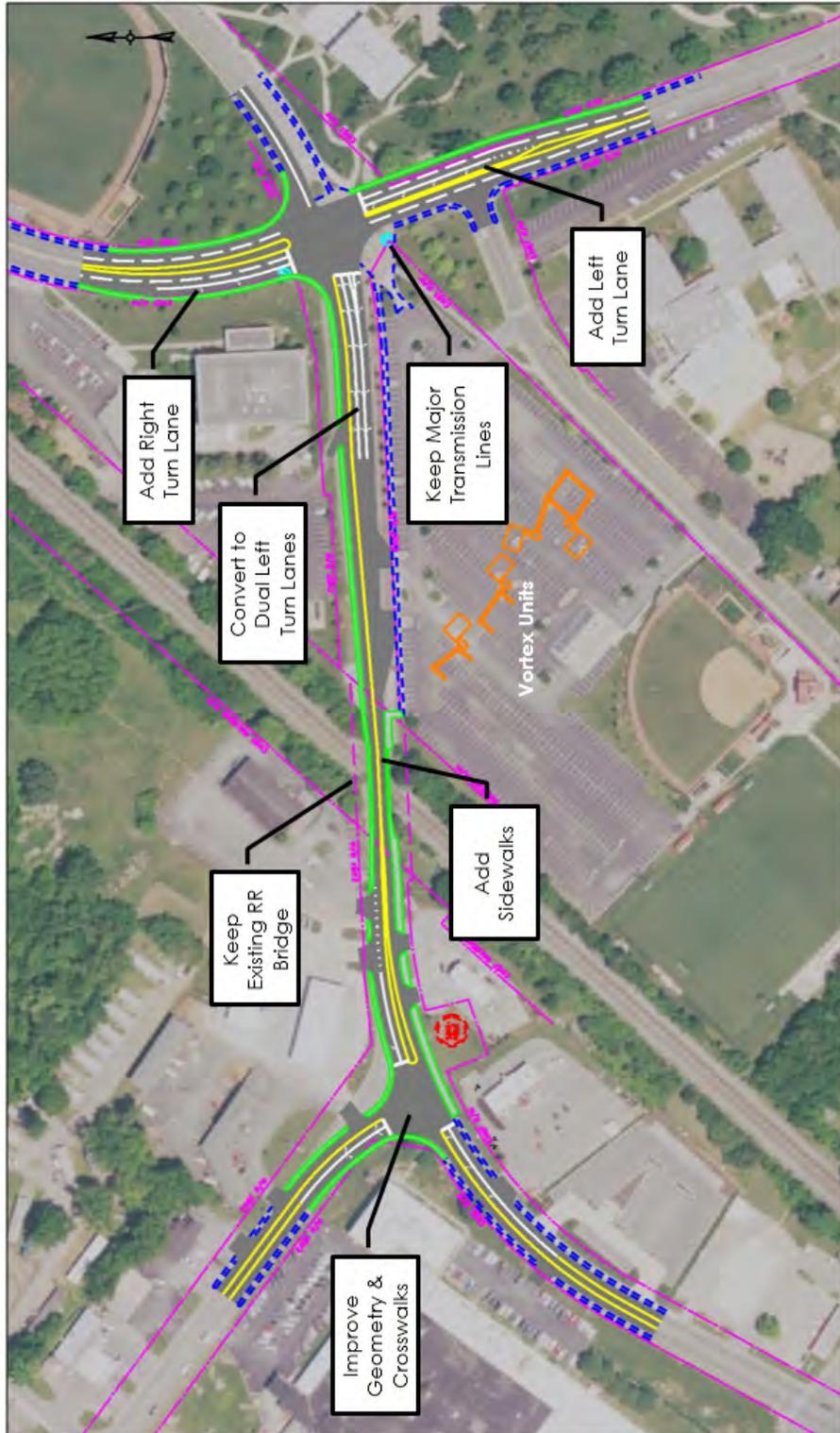


Figure 3: Preliminary Intersection Improvement Concept

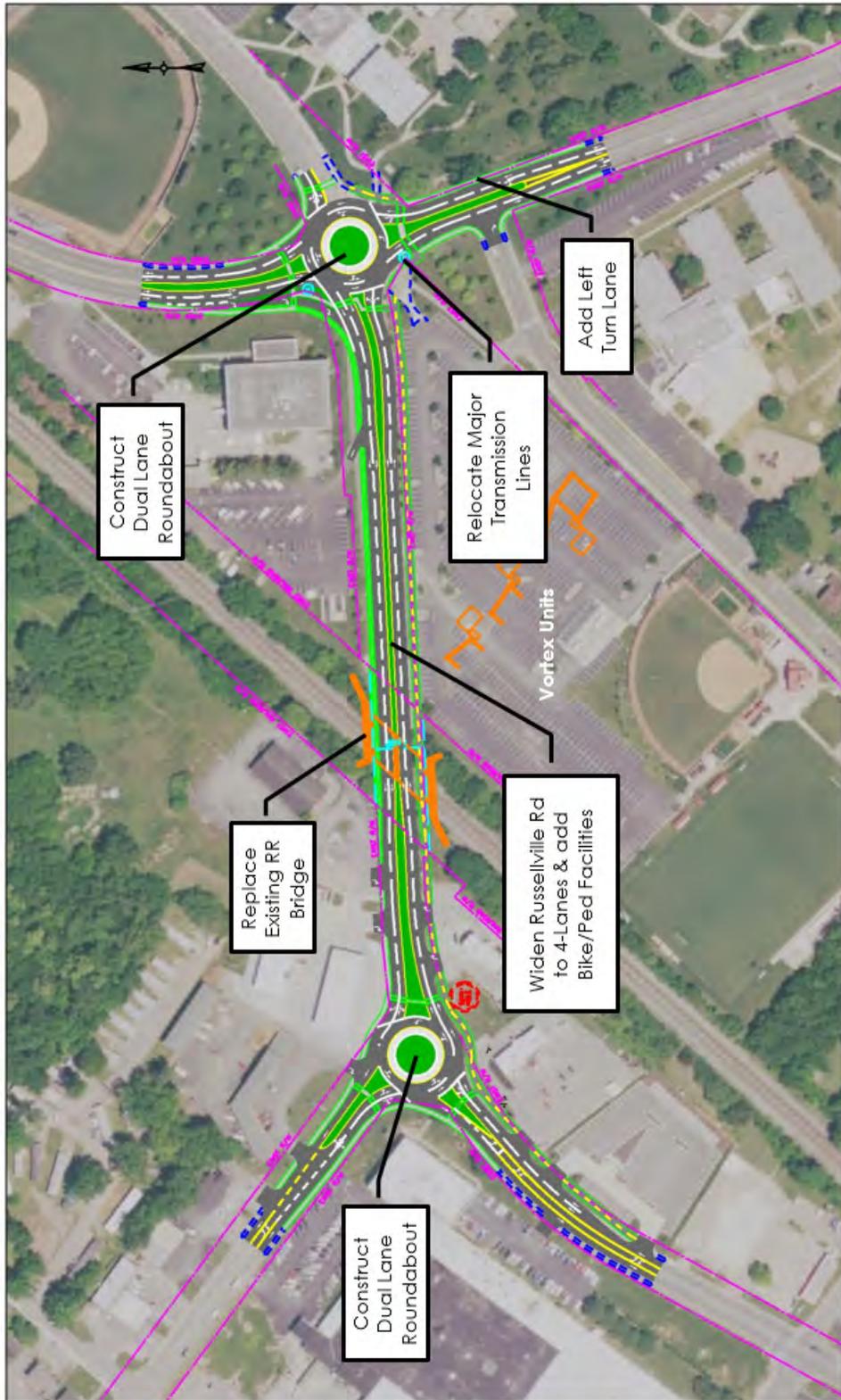


Figure 4: Preliminary Roundabout Improvement Concept

15. Len ended the meeting with a discussion of the project schedule and next steps. The next step will be for Stantec to submit a technical memorandum summarizing all the base year simulation model activities, assumptions, and results to KYTC Central Office for review. After that, Stantec will begin the development of improvement alternatives and complete traffic analyses of those improvements in preparation for the second Project Team Meeting in August.

The meeting ended at approximately 10:30 A.M. CDT.

Meeting Minutes

TO: Shane McKenzie
Co-Project Manager
KYTC Central Office
200 Mero Street
Frankfort, KY 40622

Andrew Stewart
Co-Project Manager
KYTC District Office #3
900 Morgantown Rd.
Bowling Green, KY 42101

FROM: Len Harper
Project Manager
Stantec Consulting Services Inc.

DATE: July 10, 2018

SUBJECT: Russellville Road (US 68X and 231X) Planning Study
US 68X from south of Robinson Ave. (MP 1.000) to north of Avenue of
Champions (MP 1.626)
US 231X from north of Normal St. (MP 2.300) to south of Holly Dr. (MP 2.600)
KYTC Item No. N/A
Local Officials/Stakeholders Meeting #1

A local officials/stakeholders meeting for the Russellville Road (US 68X and US 231X) Planning Study was held at KYTC District 3 Office in Bowling Green, KY on June 22, 2018 at 10:30 A.M. CDT. The following individuals were in attendance:

Amanda Bentley	Bowling Green Chamber
Melissa Cansler	City of Bowling Green
Steve De Witte	KYTC – Central Office Planning
Daniel Hulker	KYTC – Central Office Planning
Ben Hunt	KYTC – District 3
Karissa Lemon	Bowling Green – Warren County MPO
Josh Moore	Warren County
Anthony Norman	KYTC – Central Office Planning
Ben Peterson	City Council Planning Commission
Joe Plunk	KYTC – District 3
Steve Ross	KYTC – Central Office Planning
Bryan B. Russell	Western Kentucky University
Amy Scott	Barren River Area Development District
Wendy Southworth	KYTC – Central Office Design
Andrew Stewart	KYTC – District 3
Jennifer Tougas	Western Kentucky University
Wes Watt	KYTC – District 3
Brian Aldridge	Stantec Consulting Services Inc.
Len Harper	Stantec Consulting Services Inc.
Graham Winchester	Stantec Consulting Services Inc.

Joe Plunk welcomed everyone and said the purpose of the meeting was to discuss the progress to date on the Russellville Road Planning Study. Handouts included a meeting agenda and a questionnaire. Large study area maps were also made available for participants to view and comment on. After introductions, Len Harper delivered a presentation. The following enumerated items were discussed.

1. The purpose of the meeting is to present the results of the existing conditions analysis and to get feedback from local officials and stakeholders before developing improvement alternatives. Stakeholders were also asked to fill out a questionnaire to help the project team identify improvement alternatives.
2. The Russellville Road and University Boulevard intersection ranked 6th out of 42 planning projects that were scored statewide through the Strategic Highway Investment Formula for Tomorrow (SHIFT) prioritization process. As a result, two Project Identification Forms (PIFs) were combined in the development of this planning study:
 - PIF 03 114 B0068X 3.00 - Reconstruct the intersection of US 68X (MP 1.0-1.6) with US 231X (MP 2.3-2.6), including major widening of roadway extending through the CSX overpass on US 68X, to improve safety and congestion. Provide safe modes of travel for pedestrians and bicyclists, including a shared-use path and/or bike lanes connecting WKU's campus to the existing greenway on Robinson Ave. (P = \$200,000; D = \$2 Million; R = \$4 Million; U = \$5 Million; C = \$12 Million).
3. The study area, shown in **Figure 1**, 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). The Morgantown Road and University Boulevard intersections are approximately 1,600 feet apart with major generators nearby, namely Western Kentucky University (WKU) and associated athletic venues (softball, baseball, and football stadiums) along with commuter parking. Within the study area, both US 68X and US 231X are functionally classified as Urban Minor Arterials. South of the Morgantown Road intersection, Russellville Road (US 68X) is a two-lane road with 12-foot lanes, a two-way left-turn lane (TWLTL), curb and gutter, and sidewalks. The TWLTL and sidewalks are removed between the Morgantown Road intersection and the University Boulevard intersection to squeeze through the 30-ft wide opening under the CSX railroad bridge. North of the Russellville Road/University Boulevard intersection, University Boulevard (US 68X) is a four-lane road with 12-foot lanes, a 4-foot median, and curb and gutter. South of the intersection, University Boulevard (US 231X) is a four-lane road with 10' lanes, no median, and curb and gutter. Morgantown Road (US 231X) is a two-lane road with 12-ft lanes, a TWLTL, and curb and gutter. The speed limit for both routes is 35 mph throughout the study area.

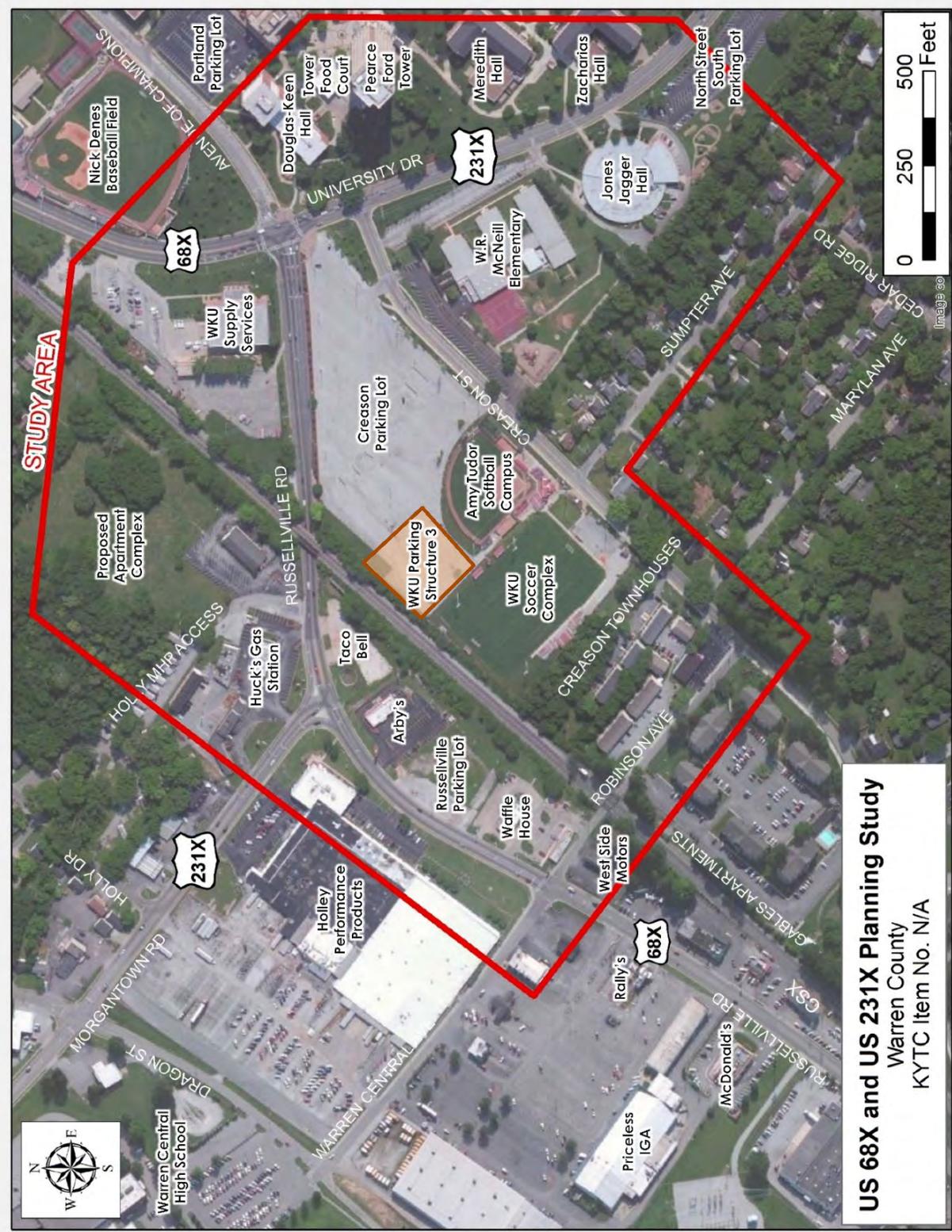


Figure 1: Study Area

4. There is an upcoming repaving project that will remove the channelized right-turn lanes and improve the crosswalks at the Russellville Road/Morgantown Road intersection. The project will be let in the fall.
5. There are two CSX railroad tracks in the study area (one mainline and one bypass track). There is an at-grade crossing at Robinson Avenue which is routinely blocked while trains allow each other to pass using the bypass track. The second crossing is an overpass on Russellville Road which has approximately 30-feet of horizontal clearance and approximately 14-feet of vertical clearance.
6. Crash data from the Kentucky State Police database indicate 315 crashes were reported between January 1, 2014 and December 31, 2016. This includes 35 (11 percent) injury collisions and no fatal collisions. Of the 315 reported crashes, 114 (36 percent) were single vehicle collisions, 65 (21 percent) were angle collisions, and 63 (20 percent) were sideswipe collisions. Critical crash rate factors (CRF) were calculated for the three-year period (2014 – 2016). A CRF greater than 1.0 suggests crashes are likely not occurring at random. There is one high crash segment and eight 0.3-mile long high crash spots with CRF values greater than 1.0.
7. Russellville Road has an Annual Average Daily Traffic (AADT) volume of 25,000 – 27,000 vehicles per day (vpd), as shown in **Figure 2**. University Boulevard has 19,000 vpd north of Russellville Road and 16,500 vpd south of Russellville Road. Morgantown Road has 13,600 vpd.

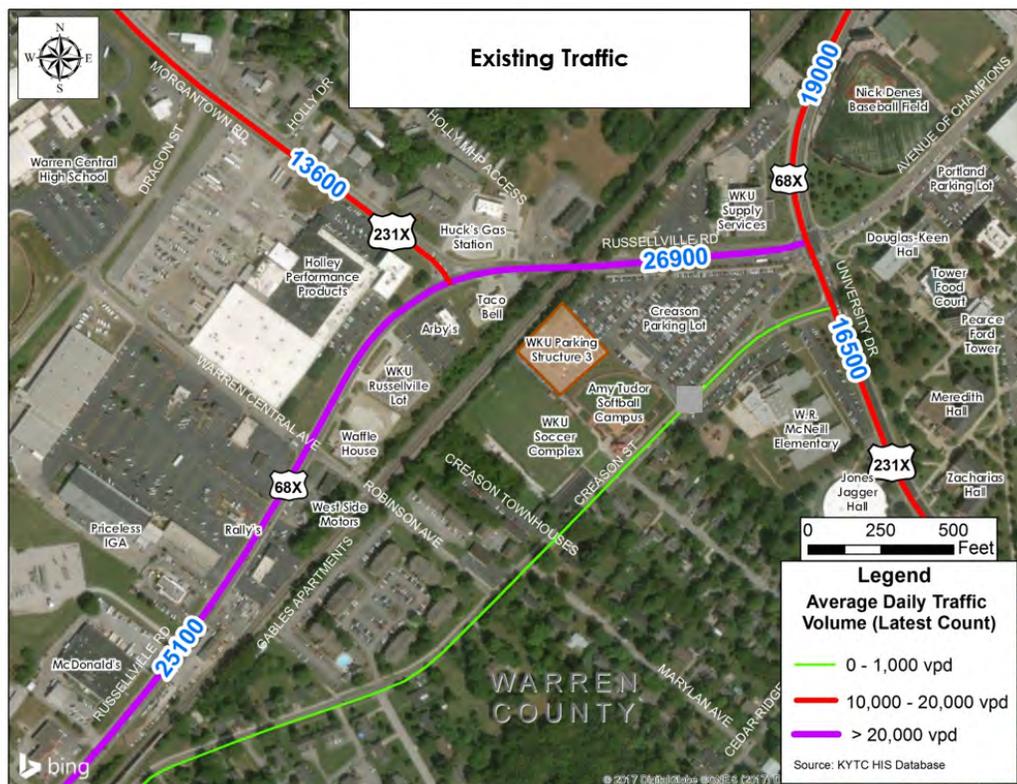


Figure 2: Average Daily Traffic Volumes

8. Len introduced the draft Purpose and Need Statement:
The purpose of the Russellville Road (US 68X and US 231X) project 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.
9. A new parking garage near the Creason Parking Lot (WKU Parking Structure No. 3) was opened in November 2017. The garage is currently underutilized but is expected to be full in August. 2018 trips for the new parking garage were estimated using the parking space allocation information from WKU (number of commuter and residential parking passes) and the trip distribution factors from the ITE Trip Generation Manual. The additional anticipated trips from the new parking garage were added to the existing turning movement counts that were collected by KYTC in February 2018.
10. A traffic simulation model was developed for the study area. The model network includes the latest traffic counts and signal timing plans, and was calibrated to existing conditions. Existing year (2018) and No-Build (2040) operational performance measures were developed for the weekday A.M. (7:30 - 8:30) and P.M. (4:30 – 5:30) peak hours. Forecasts were developed for the 2040 No-Build (including KYTC’s Existing plus Committed network which includes the major widening on US 31W from Campbell Lane to University Boulevard).
11. Level of service (LOS) is a qualitative measure describing operational conditions within a traffic stream. In urban areas, LOS D or better is desirable. The results of the existing (2018) traffic analysis are shown in **Table 1** and **Table 2** and the No-Build (2040) in **Table 3** and **Table 4**. Two scenarios were analyzed for the 2040 No-Build representing both the lower and upper range of expected growth in the study area. The results indicate that the Russellville Road/University Boulevard intersection has an undesirable existing LOS E in the PM peak hour. By 2040, if no improvements are made, it is expected that both the Russellville Road/University Boulevard intersection and the Russellville Road/Morgantown Road intersection will have and undesirable LOS for the AM and PM peak hours.

Question: Will this study look at traffic during special events and/or develop traffic management plans for these events?

Answer: No. This study only analyzes traffic during the typical AM and PM peak hours. Analyzing special events would require a different set of traffic counts.

Table 1: Existing Peak Hour Traffic Operations Summary by Intersection

Intersection	Existing (2018)			
	AM LOS	AM Delay	PM LOS	PM Delay
Russellville Road @ University Boulevard	D	42.4	E	62.7
Russellville Road @ Morgantown Road	C	20	C	24.9

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Russellville @ University	Existing (2018)			
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	AM LOS	AM Delay	PM LOS	PM Delay
SB Morgantown	D	40.9	D	49.5
WB Russellville	D	45.1	C	30.8
EB Russellville	B	12.3	A	5

Table 3: No-Build Peak Hour Traffic Operations Summary by Intersection

Intersection	Lower Growth 2040 No-Build				Upper Growth 2040 No-Build			
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Russellville @ Morgantown	Lower Growth 2040 No-Build				Upper Growth 2040 No-Build			
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SB Morgantown	F	161.6	F	207.8	F	224.5	F	289.1
WB Russellville	C	24.4	D	39.9	D	50.8	E	70.4
EB Russellville	E	71	E	73.5	D	80.5	F	111.7

12. Stantec presented two preliminary improvement concepts (shown in **Figure 3** and **Figure 4**) that may be considered during the alternative development process and noted the improvement concepts were for discussion purposes only. The alternative development phase of this project has just been initiated. The group had an open discussion about these items:
- In addition to the No-Build, this study will examine several improvements:
 - i. Existing Intersection Improvements
 - ii. Roundabout at the Morgantown Road/Russellville Road Intersection
 - iii. Roundabout at the University Boulevard/Russellville Road Intersection
 - iv. Widening Russellville Road including adding bicycle lanes and pedestrian facilities
 - v. Other improvements will be considered such as signal optimization, additional turn lanes, sidewalk improvements, driveway consolidation, access management, etc.
 - There was a discussion about replacing/widening the existing CSX railroad bridge on Russellville Road. Roll-in bridge replacements are CSX's preferred method, where the new bridge would be built next to the existing bridge, then rolled in to place once the existing bridge is removed. Total construction time would likely be two construction seasons and Russellville Road would have lengthy, intermittent closures during that time. A new bridge would cost approximately \$4.3 million using the roll-in method. Russellville Road currently has approximately 14-feet of vertical clearance under the existing CSX bridge, short of the minimum 14.5-feet required in the KYTC Design Manual. Russellville Road would have to be lowered approximately two to three feet under the new bridge to allow for the depth of the new bridge beams and still meet the minimum vertical clearance requirements. Or KYTC could pursue a design exception for the vertical clearance since the existing bridge is already below the minimum requirement. It was also noted that the desired vertical clearance is 17-feet in the KYTC Design Manual which would require Russellville Road to be lowered approximately five feet under the new bridge.
 - As part of this study, an Environmental Overview and Geotechnical Overview have been completed. The project team discussed the drainage and geological concerns in the study area. Russellville Road under the CSX bridge is a low spot and collects water during heavy rain events. KYTC has pumps that keep this area from flooding. WKU has vortex drainage units in the Creason Parking lot to mitigate flooding risks. Also, the study area sits on top of Creason Cave.

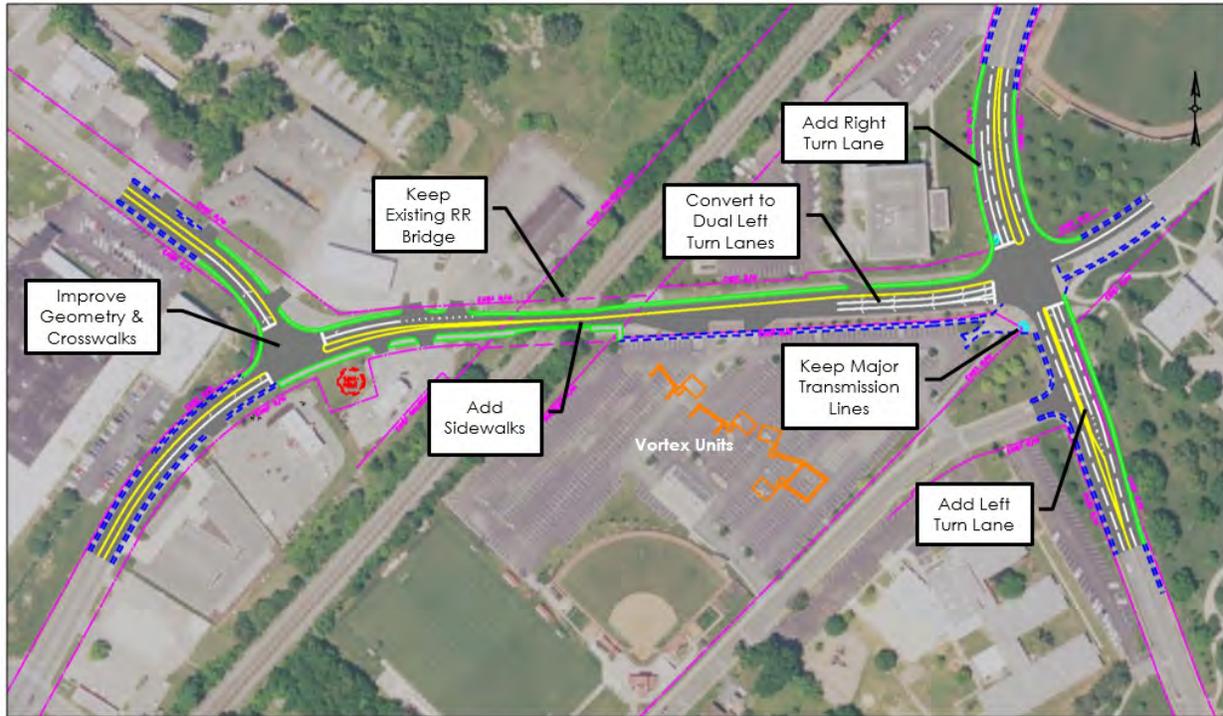


Figure 3: Preliminary Intersection Improvement Concept

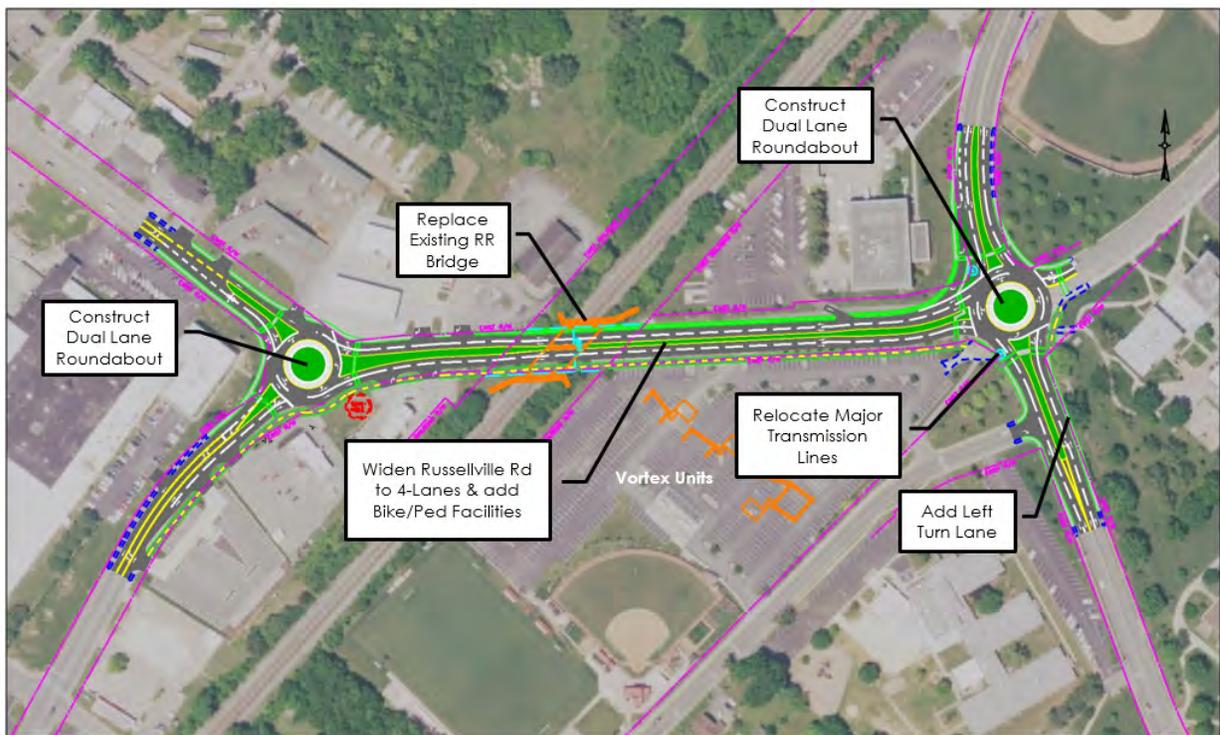


Figure 4: Preliminary Roundabout Improvement Concept

13. The Local Officials/Stakeholders were then asked to fill out a questionnaire to provide input on transportation goals and interest in projects.
- Question 1 asked respondents to rank transportation goals from 1-7, where 1 is the highest priority and 7 is the lowest. The transportation goals are shown below in order of lowest average ranking by the eight Local Officials/Stakeholders:
 1. Reduce Congestion (Average Score = 1.5)
 2. Improve Safety (Average Score = 1.6)
 3. Enhance Pedestrian Connections (Average Score = 3.4)
 4. Access Management (Average Score = 4.4)
 5. Enhance Bicycle Mobility (Average Score = 4.6)
 6. Minimize Impacts to residents, businesses, and the environment (Average Score = 6.1)
 7. Reduce Through Truck Traffic (Average Score = 6.3)

 - Question 2 asked respondents to rank the projects presented at the meeting from 1-5, where 1 is the highest priority and 5 is the lowest. The projects are shown below in order of lowest average ranking by the eight Local Officials/Stakeholders:
 1. Reconstruct University Boulevard/Russellville Road Intersection (Average Score = 2.4)
 2. Widen Russellville Road to 4-Lanes with Bike/Ped Facilities. This alternative includes replacing the railroad bridge. (Average Score = 2.5)
 3. Access Management/Driveway Consolidation. (Average Score = 3.3)
 4. Reconstruct Morgantown Road/Russellville Road Intersection (Average Score 3.4)
 5. Add sidewalks on existing Russellville Road and do not replace the existing railroad bridge. (Average Score = 3.5)

 - The following comment was left by one of the Local Officials/Stakeholders:
 - Access management should be a part of all legs of the project. Although new sidewalks under the bridge would help pedestrian movement, I am concerned that 10' lanes are too narrow for the volume and truck traffic.

 - There was also a suggestion for an improvement concept to create a pedestrian bridge over the railroad to connect the proposed apartment development with WKU's campus. This is outside the scope of this project, but bicycle and pedestrian connections will be considered along Russellville Road.

14. Len ended the meeting with a discussion of the project schedule and next steps. The next step will be for Stantec to use the input from the Local Officials and Stakeholders to begin developing improvement alternatives. The next project team meeting will be in August. At that time Stantec will present preliminary alternatives for the project team to review. After that, refined alternatives will be presented to the local officials and public in October to solicit feedback and suggested prioritization.

The meeting ended at approximately 12:00 p.m. CDT.

Meeting Minutes

TO: Shane McKenzie
Co-Project Manager
KYTC Central Office
200 Mero Street
Frankfort, KY 40622

Andy Stewart
Co-Project Manager
KYTC District Office #3
900 Morgantown Rd.
Bowling Green, KY 42101

FROM: Len Harper
Project Manager
Stantec Consulting Services Inc.

DATE: September 14, 2018

SUBJECT: Russellville Road (US 68X and US 231X) Planning Study
US 68X from south of Robinson Ave. (MP 1.000) to north of Avenue of
Champions (MP 1.626)
US 231X from north of Normal St. (MP 2.300) to south of Holly Dr. (MP 2.600)
KYTC Item No. N/A
Project Team Meeting No. 2

A project team meeting for the Russellville Road (US 68X and US 231X) Planning Study was held at the KYTC District 3 Office in Bowling Green, KY on August 30, 2018 at 10:00 a.m. CDT. The following individuals were in attendance:

Steve De Witte	KYTC – Central Office Planning
Gavin Hodges	KYTC – District 3
Matthew Holder	KYTC – District 3
Ben Hunt	KYTC – District 3
Karissa Lemon	Bowling Green – Warren County MPO
Stewart Lich	KYTC – District 3
Shane McKenzie	KYTC – Central Office Planning
Mikael Pelfrey	KYTC – Central Office Planning
Joe Plunk	KYTC – District 3
Daryl Price	KYTC – District 3
J.C. Puryear, Jr.	KYTC – District 3
Mike Russell	KYTC – District 3
Tim Sharp	KYTC – District 3
Wendy Southworth	KYTC – Central Office Design
Andy Stewart	KYTC – District 3
Jennifer Tougas	Western Kentucky University
Wes Watt	KYTC – District 3
Brian Aldridge	Stantec Consulting Services Inc.
Len Harper	Stantec Consulting Services Inc.
Graham Winchester	Stantec Consulting Services Inc.

Len Harper welcomed everyone and said the purpose of the meeting was to discuss the progress to date on the Russellville Road Planning Study. Handouts included a meeting agenda and a copy of the PowerPoint slides. After introductions, Len Harper delivered a presentation. The following enumerated items were discussed.

1. The purpose of the meeting is to get feedback from the project team on the preliminary improvement alternatives.
2. Some highlights from the existing conditions inventory were discussed. The study area, shown in **Figure 1**, 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). The Morgantown Road and University Boulevard intersections are approximately 1,600 feet apart with major generators nearby, namely Western Kentucky University (WKU) and associated athletic venues (softball, baseball, and football stadiums) along with commuter parking. Within the study area, both US 68X and US 231X are functionally classified as Urban Minor Arterials. South of the Morgantown Road intersection, Russellville Road (US 68X) is a two-lane road with 12-foot lanes, a two-way left-turn lane (TWLTL), curb and gutter, and sidewalks. The TWLTL and sidewalks are removed between the Morgantown Road intersection and the University Boulevard intersection to squeeze through the 30-foot wide opening under the CSX railroad bridge. North of the Russellville Road/University Boulevard intersection, University Boulevard (US 68X) is a four-lane road with 12-foot lanes, a four-foot median, and curb and gutter. South of the intersection, University Boulevard (US 231X) is a four-lane road with 10-foot wide lanes, no median, and curb and gutter. Morgantown Road (US 231X) is a two-lane road with 12-foot lanes, a TWLTL, and curb and gutter. The speed limit for both routes is 35 miles per hour (mph) throughout the study area.
3. There are two CSX railroad tracks in the study area (one mainline and one bypass track). There is an at-grade crossing at Robinson Avenue which is routinely blocked while trains allow each other to pass using the bypass track. The second crossing is an overpass on Russellville Road which has approximately 30 feet of horizontal clearance and approximately 14 feet of vertical clearance.
4. Crash data from the Kentucky State Police database indicate 315 crashes were reported between January 1, 2014 and December 31, 2016. This includes 35 (11 percent) injury collisions and no fatal collisions. Of the 315 reported crashes, 114 (36 percent) were single vehicle collisions, 65 (21 percent) were angle collisions, and 63 (20 percent) were sideswipe collisions. Critical crash rate factors (CRF) were calculated for the three-year period (2014 – 2016). A CRF greater than 1.0 suggests crashes are likely not occurring at random. There is one high crash segment and eight 0.3-mile long high crash spots with CRF values greater than 1.0.

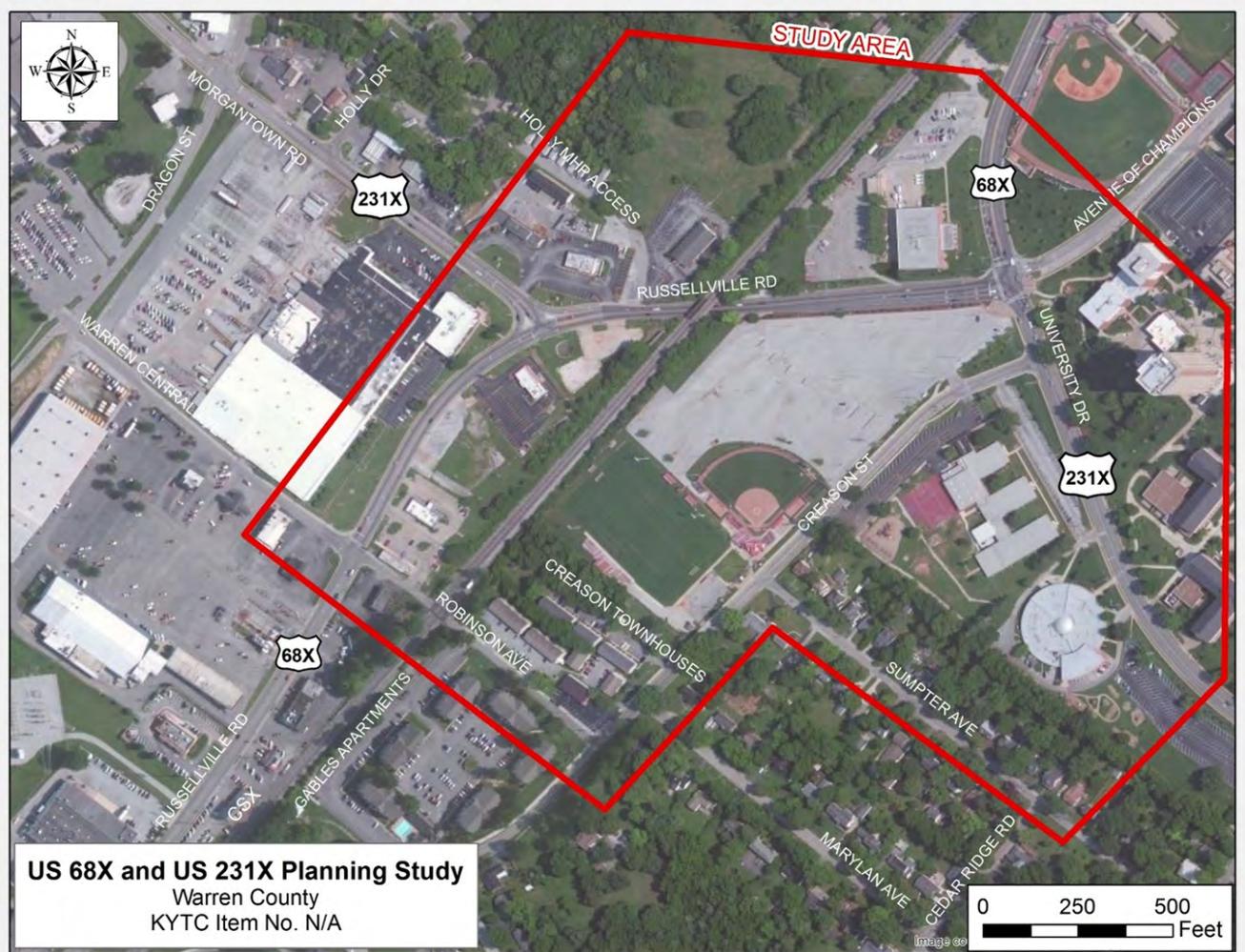


Figure 1: Study Area

5. Russellville Road has an Annual Average Daily Traffic (AADT) volume of 25,000 – 27,000 vehicles per day (vpd). University Boulevard has 19,000 vpd north of Russellville Road and 16,500 vpd south of Russellville Road. Morgan Town Road has 13,600 vpd.
6. A traffic simulation model was developed in TransModeler based on the Bowling Green Downtown Circulation Study Model. The model network was expanded to include the entire study area, updated with the latest traffic counts and signal timing plans, and calibrated to existing conditions. Existing year (2018) and No-Build (2040) operational performance measures were developed for the weekday A.M. (7:30 - 8:30) and P.M. (4:30 – 5:30) peak hours. Results of the existing and No-Build traffic analyses are shown in **Table 1** and **Table 2**. For urban areas, a level of service (LOS) D or better is desirable. The results indicate that the Russellville Road intersection with University Boulevard has an undesirable LOS during the existing PM peak as

well as both the AM and PM peak in 2040. The Russellville Road intersection with Morgantown Road has an undesirable LOS for both peaks during the 2040 scenario, however only the Morgantown Road approach is undesirable to the point it fails in 2018.

Table 1: No-Build Traffic Operations at University Boulevard and Russellville Road Intersection

University @ Russellville	No-Build							
	2018				2040			
	AM LOS	AM Delay	PM LOS	PM Delay	AM LOS	AM Delay	PM LOS	PM Delay
SB University	D	40	D	48	D	50	E	61
NB University	D	39	F	88	E	79	F	153
EB Russellville	E	68	E	73	E	77	F	92
WB Ave. of Champions	D	49	E	75	E	58	F	125
Intersection	D	51	E	69	E	68	F	99

Table 2: No-Build Traffic Operations at Morgantown Road and Russellville Road Intersection

Morgantown @ Russellville	No-Build							
	2018				2040			
	AM LOS	AM Delay	PM LOS	PM Delay	AM LOS	AM Delay	PM LOS	PM Delay
SB Morgantown	F	90	F	85	F	157	F	445
WB Russellville	A	5	A	8	C	24	D	49
EB Russellville	C	23	D	41	E	70	E	78
Intersection	C	27	D	38	E	80	F	98

- Question: What assumptions were made in determining traffic growth for the 2040 forecast year?

Answer: The 2040 future year simulation model trip tables were developed from a combination of estimated on-campus and off-campus traffic growth and forecasted through-trip traffic using the Warren County regional travel demand model. These assumptions were documented in a technical memorandum submitted to and approved by KYTC Central Office Planning on August 22, 2018. Given the explicit control of parking facilities on campus at WKU, on-campus travel demand is limited to the level dictated by the parking facilities available to students and employees. Most on-campus facilities require explicit parking passes controlled by the university. A general assumption is that most centrally located surface lots are currently at or close to maximum capacity, while the recently opened garage between Creason Street and Russellville Road (WKU Parking Structure #3) has additional capacity. With the exception of the new garage, trips to and from on-campus zones were set at ten percent above current level. The zone with the new garage was set at 70 percent greater than the base year level. Similarly, the off-campus zones representing mature single family residential

neighborhoods and the WR McNeill Elementary School were grown by five percent under the premise that new housing stock or significantly increased enrollment was not likely to occur in these areas. Supplemental traffic was also added for the park-and-ride facility on Russellville Road just west of Morgantown Road.

Using the same subarea network used to create the seed table for the development of the base year simulation model, 26 x 26 subarea trip tables were created for the 2040 future year for both the AM and PM peak periods. Growth factors were calculated between the respective 2015 and 2040 trip pairs representing through trips. A cap of 50 percent growth, or 1.8% annual growth, was placed on all trips to ensure that growth between trip pairs was realistically tempered by operational constraints and in line with historic growth trend lines for the area. Overall, total trips in the AM peak period grew by 35% and by 26% in the PM peak period, as seen in **Table 3**.

Table 3: Trip Table Growth Summary

	AM					
	2018		2040		Delta	
	To	From	To	From	To	From
On-campus	1,135	525	1,369	670	234	145
Off-campus	569	774	670	903	101	129
Through trips	3,587	3,992	5,084	5,549	1,497	1,557
Total	5,291		7,123		1,832	
	PM					
	2018		2040		Delta	
	To	From	To	From	To	From
On-campus	924	1,241	1,063	1,435	139	194
Off-campus	784	791	874	901	90	110
Through trips	4,805	4,481	6,297	5,898	1,492	1,417
Total	6,513		8,234		1,721	

- Survey results from the first Local Officials/Stakeholder Meeting were discussed. Of the seven listed transportation goals, reducing congestion and improving safety were found to be the highest priorities. Of the improvement concepts presented, widening Russellville Road, and reconstructing the University Boulevard intersection with Russellville Road were found to be the highest priorities. It was noted that there were no elected officials and only project stakeholders at the meeting and only eight returned surveys, so the results do not necessarily reflect the opinion of all local officials and stakeholders. The purpose of the survey, however, was not to guide the alternative development process but to confirm that the goals of the study align with the goals of the local officials and stakeholders, which it appears they do.

8. Len re-introduced the draft Purpose and Need Statement:

The purpose of the Russellville Road (US 68X and US 231X) project 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.

9. Stantec presented the following preliminary improvement alternatives for project team discussion:

Alternative 1

- Convert the existing center right turn lane on Russellville Road to a shared left/right turn lane at the Russellville Road / University Boulevard intersection.
- KYTC repaving project that will remove the channelized right-turn lanes and improve the crosswalks at the Russellville Road / Morgantown Road intersection.
- Construct a sidewalk on EB Russellville Road under the CSX Bridge.
- Construct a sidewalk across the at-grade railroad crossing on Robinson Avenue to connect the existing shared-use path to Russellville Road.

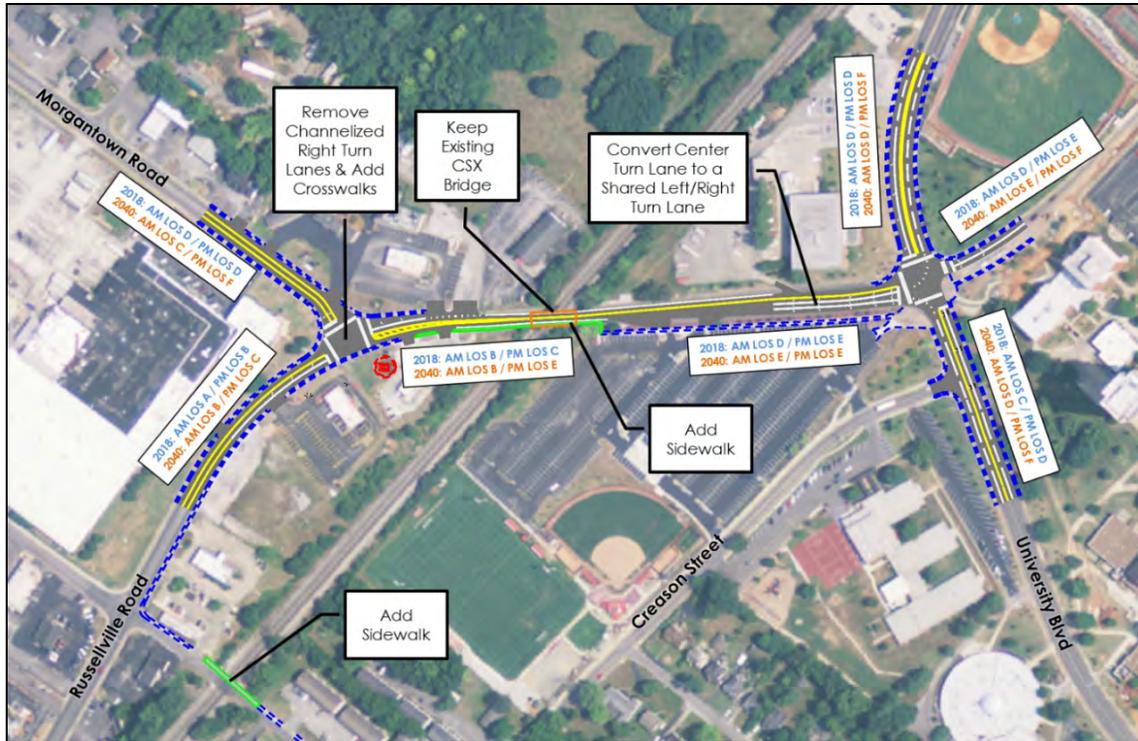


Figure 2: Alternative 1

It was noted that restriping the center right turn lane on Russellville Road to a shared left/right turn lane would eliminate the right-turn overlap during the northbound University Boulevard left-turn phase. Stantec will consider an alternative that restripes the center right turn lane as a left only, so the right-turn overlap can be maintained.

Alternative 2

- Russellville Road / University Boulevard Intersection:
 - Convert the existing center right turn lane on EB Russellville Road to a shared left/right turn lane.
 - Construct left turn lane on NB University Boulevard.
 - Construct right turn lane on SB University Boulevard.
- KYTC repaving project at the Russellville Road/Morgantown Road intersection (discussed above).
- Construct a sidewalk on EB Russellville Road under the CSX Bridge.
- Construct a sidewalk across the at-grade railroad crossing on Robinson Avenue to connect the existing shared-use path to Russellville Road.

Like Alternative 1, Stantec will look at restriping the center right turn lane as a left only, so the right-turn overlap can be maintained.

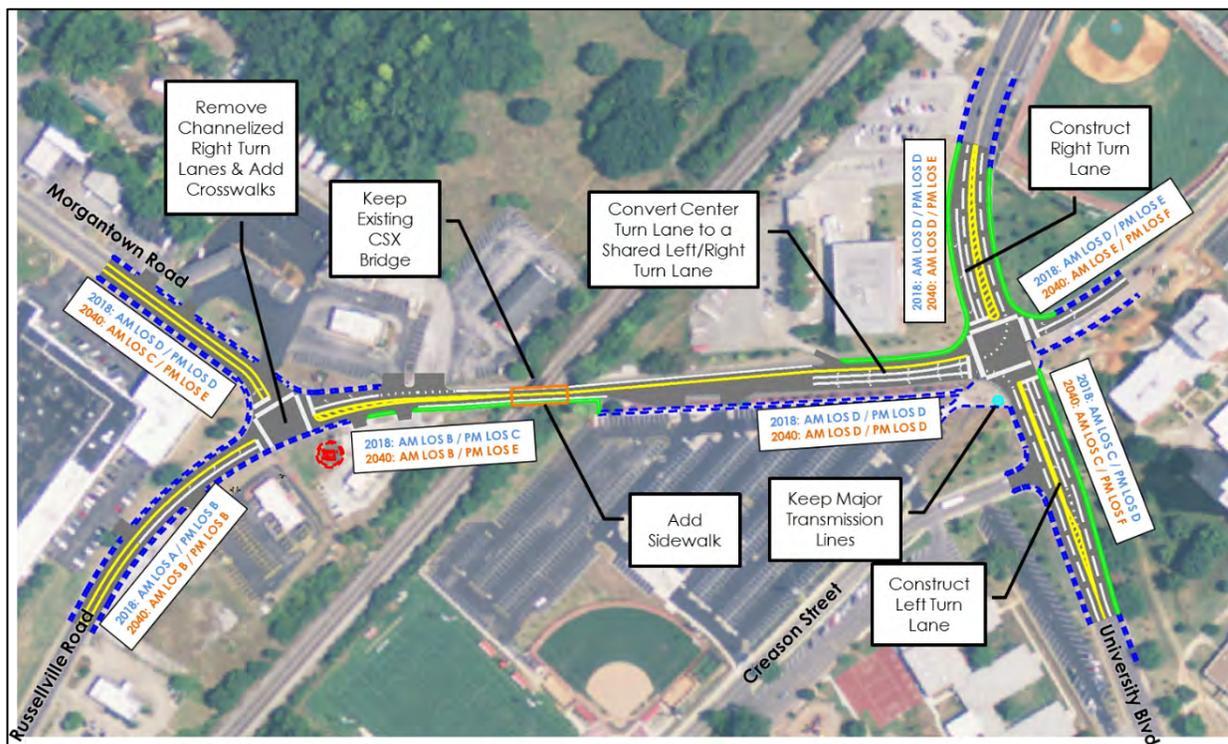


Figure 3: Alternative 2

Alternative 3a

- Construct a roundabout at University Boulevard and Russellville Road.
- KYTC repaving project at the Russellville Road / Morgantown Road intersection (discussed above).
- Construct a sidewalk on EB Russellville Road under the CSX Bridge.
- Construct a sidewalk across the at-grade railroad crossing on Robinson Avenue to connect the existing shared-use path to Russellville Road.

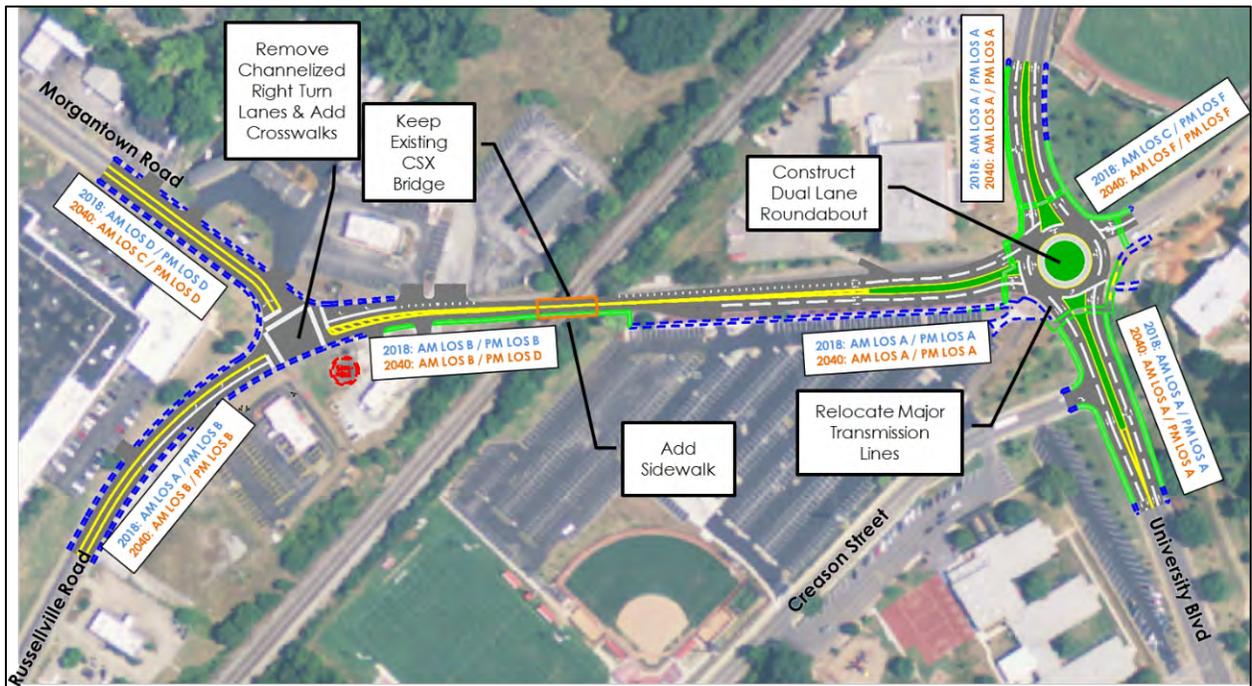


Figure 4: Alternative 3a

Alternative 3b

- Construct a roundabout at University Boulevard and Russellville Road with a right-turn bypass lane from Avenue of Champions.
- KYTC repaving project at the Russellville Road / Morgantown Road intersection (discussed above).
- Construct a sidewalk on EB Russellville Road under the CSX Bridge.
- Construct a sidewalk across the at-grade railroad crossing on Robinson Avenue to connect the existing shared-use path to Russellville Road.

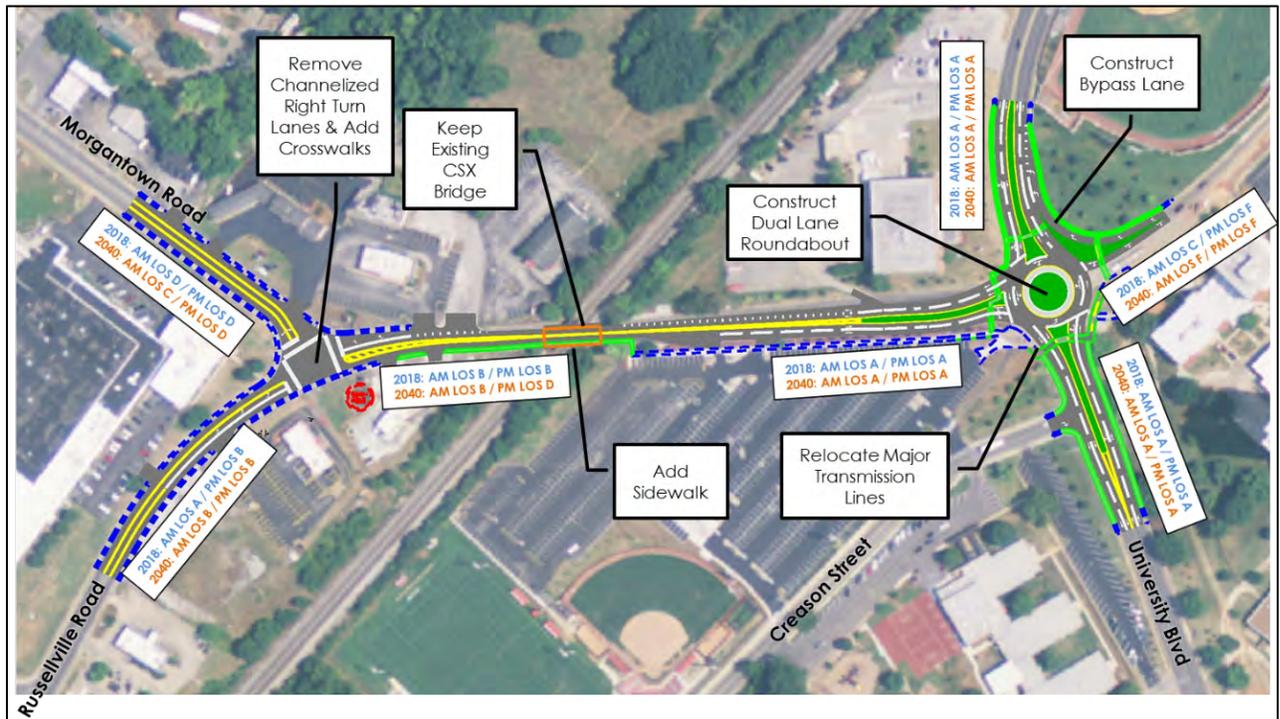


Figure 5: Alternative 3b and 3c

Alternative 3c

- Construct a roundabout at University Boulevard and Russellville Road with a right-turn bypass lane from Avenue of Champions and restrict vehicle access on Avenue of Champions to those with parking permits.
- KYTC repaving project at the Russellville Road/Morgantown Road intersection (discussed above).
- Construct a sidewalk on EB Russellville Road under the CSX Bridge.
- Construct a sidewalk across the at-grade railroad crossing on Robinson Avenue to connect the existing shared-use path to Russellville Road.

Jennifer Tougas from WKU mentioned that Avenue of Champions is one-way because there is high pedestrian traffic in the area. It is also used by many service vehicles and buses, so requiring a permit for access may be difficult. Stantec and KYTC are meeting with the WKU Master Plan Committee on October 5th to further evaluate options for this alternative. One suggestion was to reverse the direction of the one-way traffic on Avenue of Champions. Something else that could be considered to help create a gap for vehicles to pull out from Avenue of Champions is to add a coordinated pedestrian signal upstream on University Boulevard.

Alternative 4

- Russellville Road / University Boulevard Intersection:
 - Convert the existing center right turn lane on EB Russellville Road approach to a shared left/right turn lane.
 - Construct left turn lane on NB University Boulevard.
 - Construct right turn lane on SB University Boulevard.
- KYTC repaving project at the Russellville Road / Morgantown Road intersection (discussed above).
- Widen Russellville Road to four lanes (replace the existing CSX bridge) with a raised median and include bicycle and pedestrian facilities.

Like Alternative 1, Stantec will look at restriping the center right turn lane on Russellville Road at the University intersection as a left only, so the right-turn overlap can be maintained.

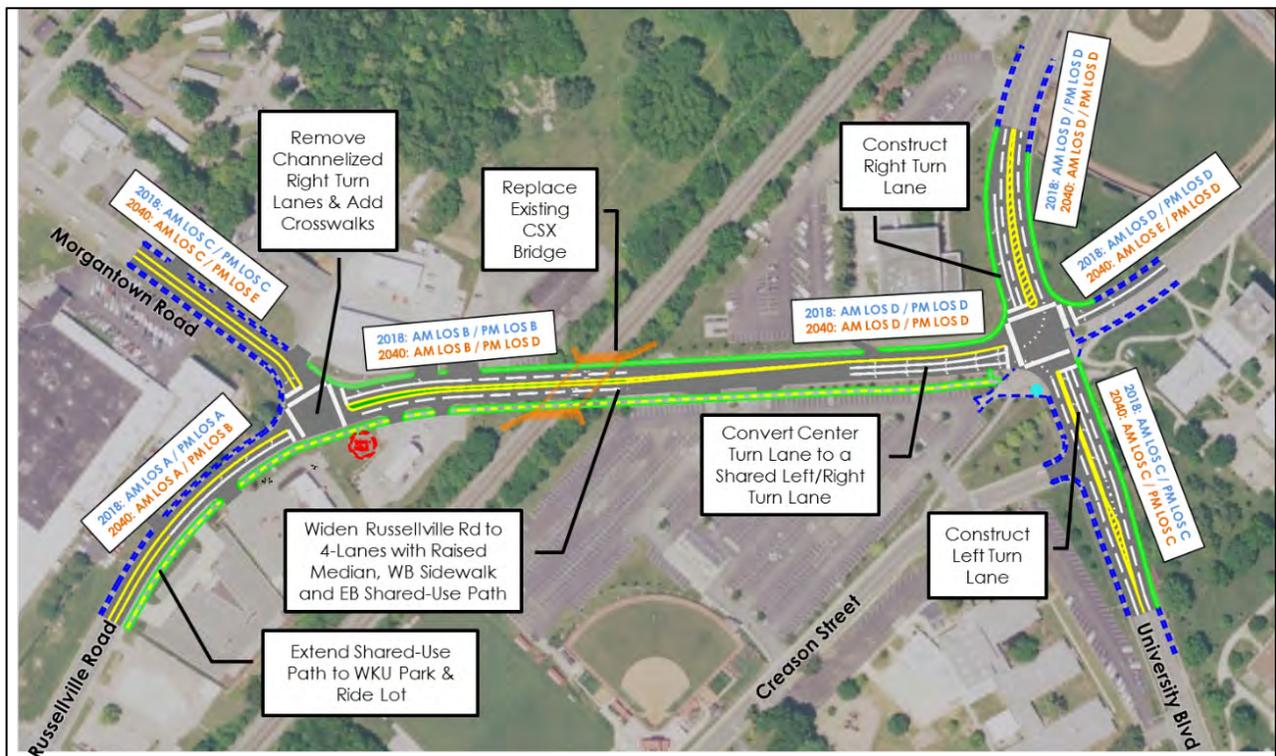


Figure 6: Alternative 4

Alternative 5

- Construct a roundabout at University Boulevard and Russellville Road with a right-turn bypass lane from Avenue of Champions.
- KYTC repaving project at the Russellville Road / Morgantown Road intersection (discussed above).

- Widen Russellville Road to four lanes (replace the existing CSX bridge) with a raised median and include bicycle and pedestrian facilities.

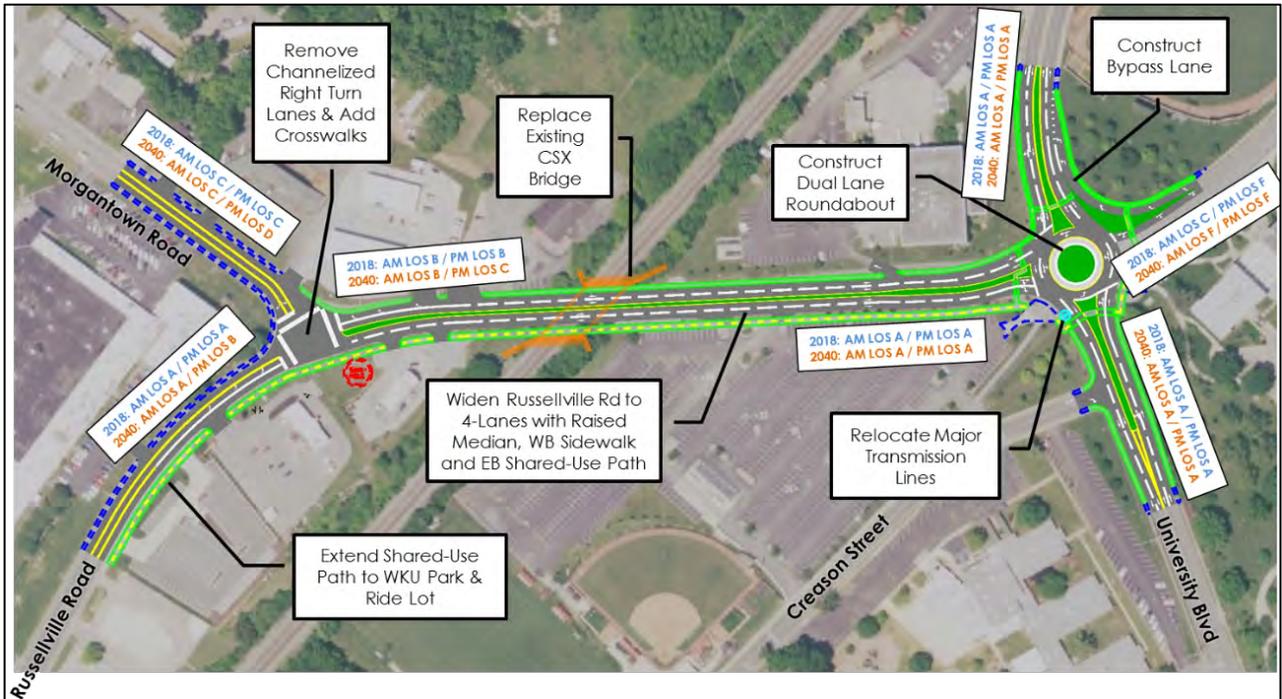


Figure 7: Alternative 5

Alternative 6

- Construct a roundabout at University Boulevard and Russellville Road with a bypass lane from Avenue of Champions.
- Construct a roundabout at Morgantown Road and Russellville Road.
- KYTC repaving project at the Russellville Road/Morgantown Road intersection (discussed above).
- Widen Russellville Road to four lanes (replace the existing CSX bridge) with a raised median and include bicycle and pedestrian facilities.

It was noted that a roundabout at the Morgantown Road intersection could affect the sinkhole. The best option would be to avoid the sinkhole; however, mediation would have to be considered regardless.

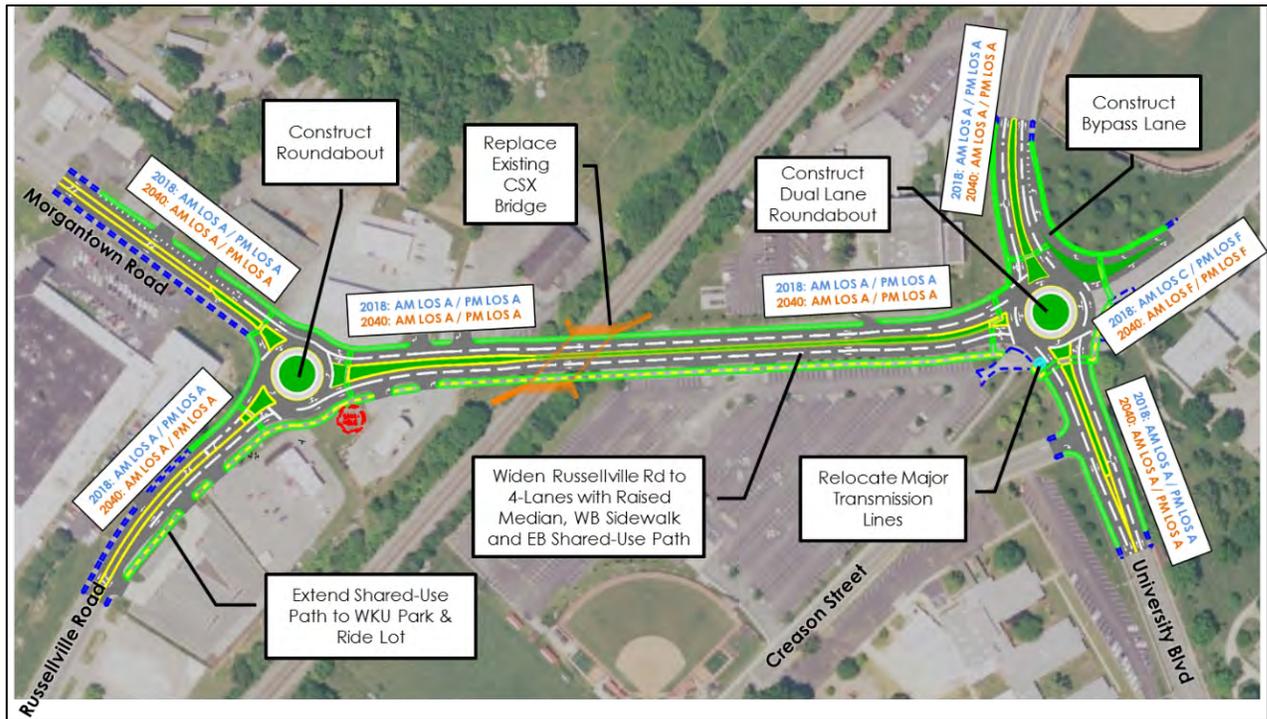


Figure 8: Alternative 6

Alternative 7

- Convert the existing center right turn lane on EB Russellville Road approach to a shared left / right turn lane.
- Construct a shared-use path tunnel, as shown in **Figure 9**, under University Boulevard from the Creason Parking Lot which will eliminate pedestrian conflicts at University and allow right turns on red on Russellville Road at the University Boulevard intersection.

It was noted that while this alternative improves pedestrian safety, it does not help vehicular traffic other than allowing right turns on red on the eastbound Russellville Road approach at University. Resources may be more wisely allocated to alternatives that both alleviate congestion and improve pedestrian safety for the entire study area. It was also noted that even though the tunnel would be well lit and safe to use at night, some users may not feel comfortable using it after dark. Some parking spaces in the Creason Parking Lot would likely be taken to make enough room for the tunnel.

Stantec will develop a planning level cost estimate and evaluate some of the pros and cons of building this tunnel.



Figure 9: Rendering of a shared-use path tunnel

Alternative 8

- Construct a bridge to elevate Russellville Road over the existing CSX Railroad Bridge. The existing roadway could be used for bicycles and pedestrians and the existing CSX Railroad Bridge would not have to be replaced.

This alternative was examined and determined to be infeasible. It is not possible to tie back down to Morgantown Road and maintain acceptable roadway grades on Russellville Road (shown in pink on **Figure 10** below).

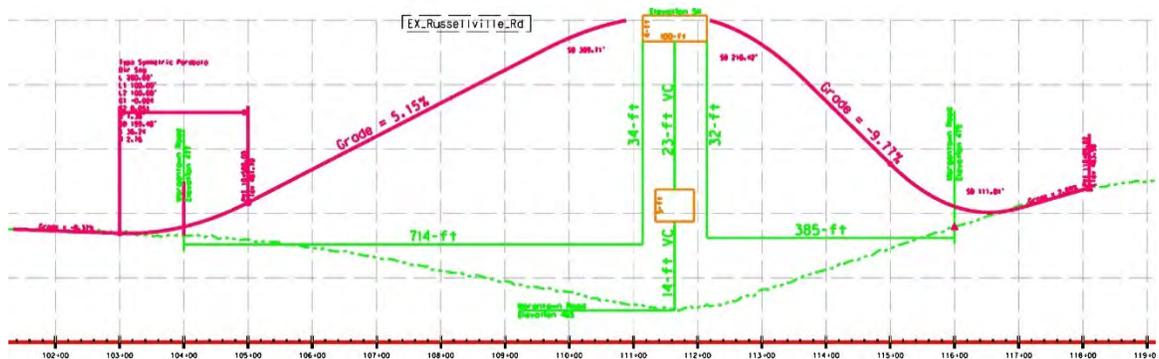


Figure 10: Grades to Construct a New Bridge Over the Existing CSX Bridge and Tie Back Down to University Boulevard (left) and Morgantown Road (right)

10. There was an open discussion about which concepts should move forward in the alternative development process. Several of the preliminary alternatives have similar features which can be combined based on results from the traffic analyses. It was decided that four alternatives would be carried forward for more detailed analyses. The alternatives will be refined based on feedback from the project team. The four alternatives that will be further refined are Alternative 2 (University Intersection Improvements), Alternative 3b (University Roundabout), Alternative 5 (University Roundabout and Widen Russellville Road), and Alternative 6 (Morgantown and University Roundabouts and Widen Russellville Road).
11. There was an open discussion about public involvement. It was noted that obtaining valuable feedback from the public is difficult with projects of this type and location (i.e. college campus with a transient user base). A conventional open house public meeting would most likely not be well attended. Instead, an online survey will be created to find out what “type” of improvements the public would like to see rather than voting on which alternative they like best. The project team will work with the WKU newspaper (WKU Herald) to write an article on the project and provide a link to the survey. Local businesses will be mailed postcards with a link to the survey. Stantec will also engage WKU students by setting up poster boards on campus, talking to students about the project, and handing out postcards with a link to the survey.
12. Len ended the meeting with a discussion of the project schedule and next steps. The next step will be for Stantec to refine the improvement alternatives based on project team input and develop cost estimates and cost-benefit ratios (based on potential crash reductions) for the refined alternatives. Stantec will present these improvement alternatives at the second Local Officials/Stakeholders Meeting tentatively scheduled for October.

The meeting ended at approximately 12:30 p.m. CDT.

Meeting Minutes

TO: Shane McKenzie
Co-Project Manager
KYTC Central Office
200 Mero Street
Frankfort, KY 40622

Andrew Stewart
Co-Project Manager
KYTC District Office #3
900 Morgantown Rd.
Bowling Green, KY 42101

FROM: Len Harper
Project Manager
Stantec Consulting Services Inc.

DATE: December 4, 2018

SUBJECT: Russellville Road (US 68X and 231X) Planning Study
US 68X from south of Robinson Ave. (MP 1.000) to north of Avenue of Champions
(MP 1.626)
US 231X from north of Normal St. (MP 2.300) to south of Holly Dr. (MP 2.600)
KYTC Item No. N/A
Local Officials/Stakeholders Meeting #2

The second local officials/stakeholders meeting for the Russellville Road (US 68X and US 231X) Planning Study was held at KYTC District 3 Office in Bowling Green, KY on November 19, 2018 at 9:30 A.M. CST. The following individuals were in attendance:

Patrick Blevins	KYTC - District 3 Utilities
Mike Buchanon	Warren County
Melissa Cansler	City of Bowling Green
Steve De Witte	KYTC – Central Office Planning
Gavin Hodges	KYTC – District 3
Matthew Holder	KYTC – District 3
Ben Hunt	KYTC – District 3
Karissa Lemon	Bowling Green – Warren County MPO
Stewart Lich	KYTC – District 3
Shane McKenzie	KYTC – Central Office Planning
Greg Meredith	City of Bowling Green
Ben Peterson	City Council Planning Commission
Joe Plunk	KYTC – District 3
J.C. Puryear	KYTC – District 3 Utilities
Steve Ross	KYTC – Central Office Planning
Bryan B. Russell	Western Kentucky University
Wendy Southworth	KYTC – Central Office Design
Andrew Stewart	KYTC – District 3
Jennifer Tougas	Western Kentucky University
Wes Watt	KYTC – District 3
Bruce Wilkerson	City of Bowling Green

Brian Aldridge
Len Harper
Graham Winchester

Stantec Consulting Services Inc.
Stantec Consulting Services Inc.
Stantec Consulting Services Inc.

Len Harper welcomed everyone and said the purpose of the meeting was to discuss the progress to date on the Russellville Road Planning Study. Handouts included a meeting agenda, an evaluation matrix summarizing the alternatives, and a questionnaire. After introductions, Len delivered a presentation. The following enumerated items were discussed.

1. The purpose of the meeting is to present the conceptual improvement alternatives and solicit feedback from local officials and stakeholders. Stakeholders were also asked to fill out a questionnaire to help the project team evaluate improvement alternatives.
2. Len provided a brief recap of the first meeting held in June 2018. The study area, shown in **Figure 1**, 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). Russellville Road has an Annual Average Daily Traffic (AADT) volume of 25,000 – 26,900 vehicles per day (vpd). University Boulevard has 19,000 vpd north Russellville Road and 20,300 vpd south of Russellville Road. Morgantown Road has 13,600 vpd. Crash data from the Kentucky State Police database indicate 315 crashes were reported between January 1, 2014 and December 31, 2016. There is one high crash segment and eight 0.1-mile long high crash spots with CRF values greater than 1.0.
3. At the first Local Officials/Stakeholders meeting, attendees were asked to complete a questionnaire to provide input on transportation goals and interest in projects. The results indicate reducing congestion and improving safety are the two most important project goals followed by enhancing pedestrian connections and consideration for access management. Of the improvement concepts presented at that meeting, reconstruction of the Russellville Road/University Boulevard intersection and widening Russellville Road received the most support.
4. The draft Purpose and Need Statement for the project is as follows:
The purpose of the Russellville Road (US 68X and US 231X) project 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.
5. Five conceptual improvement options were presented (shown in **Figures 2** through **5**):
 - a. No-Build
 - b. Intersection Improvements and Sidewalk on Russellville Road
 - c. Roundabout at University Boulevard and Sidewalk on Russellville Road
 - d. Widen Russellville Road with Roundabout at University Boulevard
 - e. Widen Russellville Road with Roundabouts at Morgantown Road and University Boulevard



Figure 1: Study Area

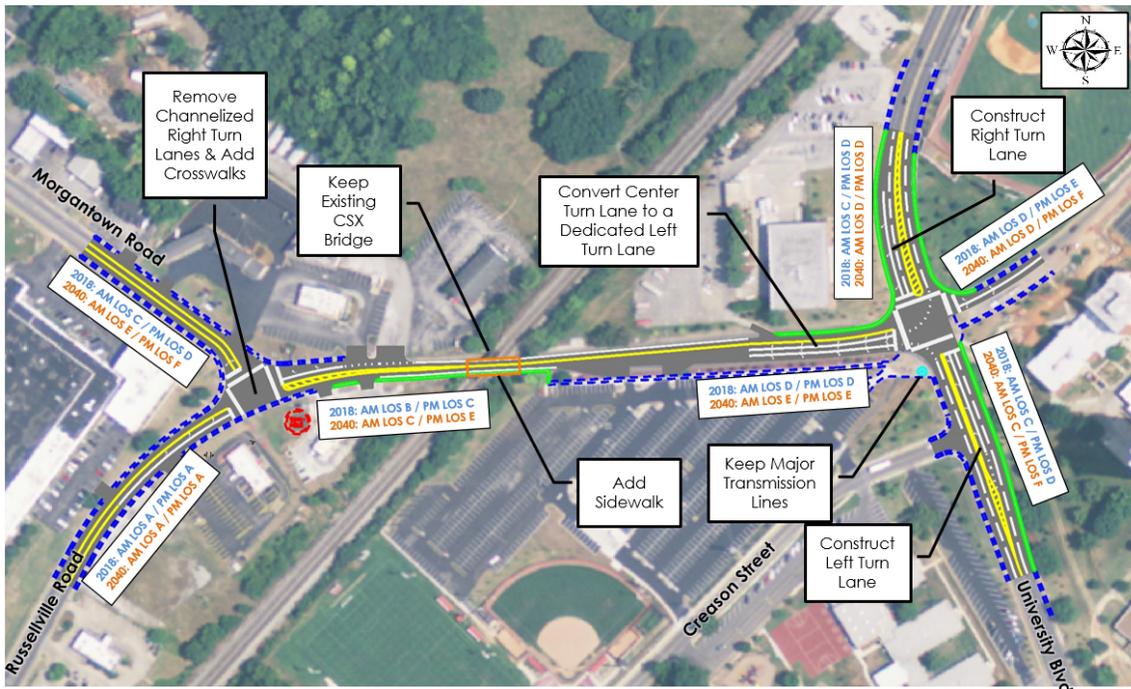


Figure 2: Intersection Improvements and Sidewalk on Russellville Road

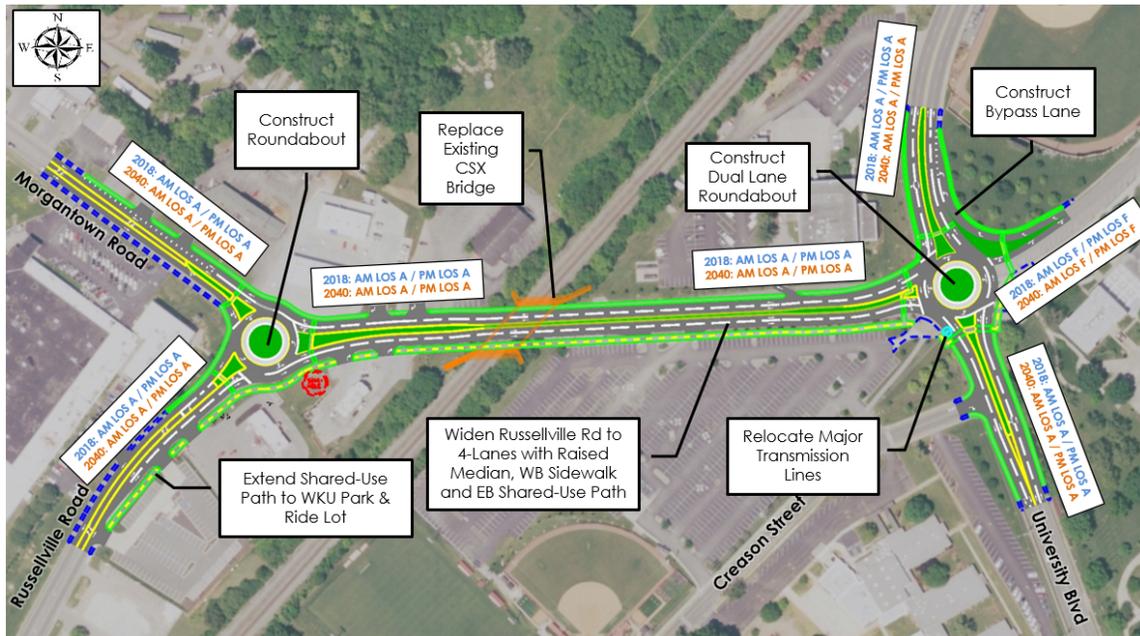


Figure 5: Widen Russellville Road with Roundabouts at Morgantown Road and University Boulevard

6. The recently completed pavement rehabilitation project at the Morgantown and Russellville Road intersection removed the channelized rights and added crosswalks. Pedestrian signal indications will be added soon.
7. The intersection Improvement Alternative includes restriping, signal timing improvements, and the construction of a sidewalk along Russellville Road under the CSX railroad bridge. The conceptual typical section is shown in **Figure 6**.

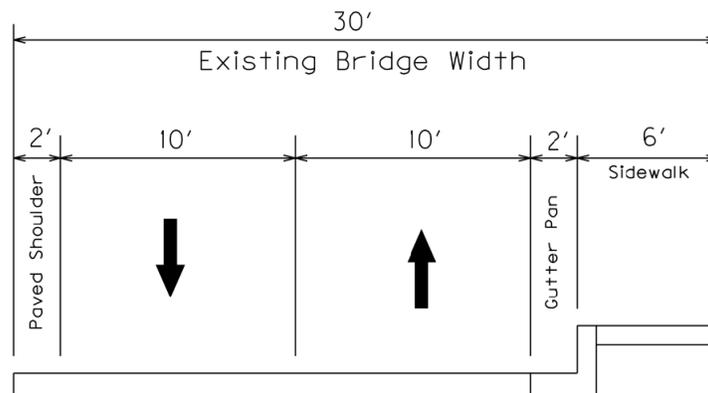


Figure 6: Conceptual Typical Section to Provide a Sidewalk on Existing Russellville Road

8. As discussed at the first meeting, Len provided an overview of Level of service (LOS). In urban areas, LOS D or better is desirable. The results of the traffic analysis for the No-Build (2040) and conceptual improvement options are shown in **Table 1**. The results indicate that by 2040, if no improvements are made, both the Russellville Road/University Boulevard intersection and the Russellville Road/Morgantown Road intersection will have an undesirable LOS for the AM and PM peak hours. All proposed improvements can provide LOS D or better in the AM peak today and in 2040. In the 2040 PM scenario, conventional intersection improvements alone would result in LOS E or LOS F at the two study intersections.

Based on feedback from this meeting, traffic results for widening Russellville Road with intersection improvements at the University Boulevard intersection were added to Table 1 for comparison purposes. The results show that this improvement can provide a desirable LOS in 2018 and the AM peak in 2040. In the 2040 PM peak, conventional intersection improvements would result in a LOS E at the two study intersections.

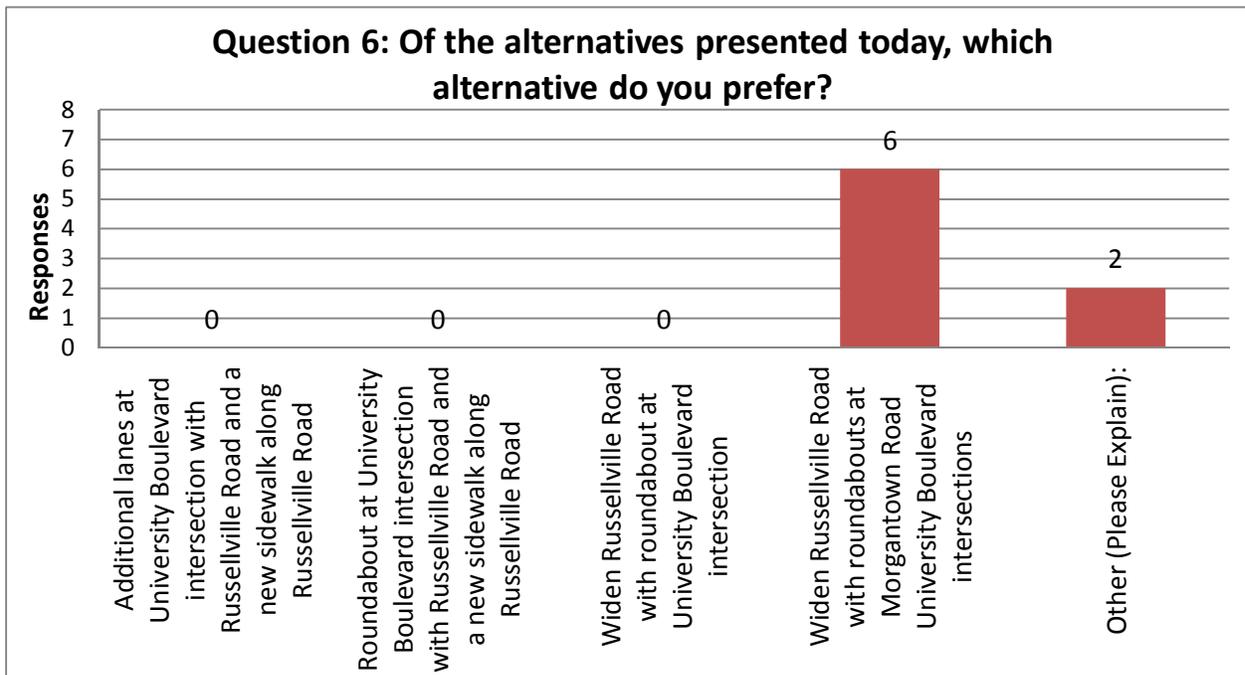
Table 1: Existing (2018) and Design Year (2040) Peak Hour Traffic Operations Summary

Alternative	Intersection	2018				2040			
		AM LOS	AM Delay (sec)	PM LOS	PM Delay (sec)	AM LOS	AM Delay (sec)	PM LOS	PM Delay (sec)
No-Build	University at Russellville	D	54	E	74	E	60	F	107
	Morgantown at Russellville	D	40	D	45	E	77	F	87
Intersection Improvements at University Boulevard	University at Russellville	D	36	D	49	D	47	F	90
	Morgantown at Russellville	B	11	C	23	C	22	E	66
Roundabout at University Boulevard	University at Russellville	A	6	A	7	A	7	A	7
	Morgantown at Russellville	B	16	C	22	C	27	D	53
Widen Russellville Road & Intersection Improvements at University Blvd	University at Russellville	C	34	D	41	D	43	E	58
	Morgantown at Russellville	B	11	B	18	B	20	E	57
Widen Russellville Road & Roundabout at University Boulevard	University at Russellville	A	6	A	7	A	7	A	7
	Morgantown at Russellville	B	15	B	18	D	21	D	38
Widen Russellville Road & Roundabouts at University Boulevard and Morgantown Road	University at Russellville	A	5	A	5	A	7	A	7
	Morgantown at Russellville	A	1	A	2	A	2	A	3

9. A question was asked about the traffic forecasts developed for the study. Len said the Warren County Travel Demand model was used to estimate growth rates for the study area, and the growth rates were applied to current counts to estimate future traffic demand. Stantec also developed a traffic impact analyses for the parking garage.
10. There was considerable discussion concerning the roundabout alternatives, particularly related to accommodating pedestrians. Some considerations for enhancing pedestrian safety were discussed, including proper design of the approaches and crosswalks, implementation of rapid rectangular flashing beacons (RRFB) at the crosswalks, and the possibility of signalized pedestrian crossings.

11. Stantec developed a planning-level construction cost estimate for a pedestrian tunnel beneath University Boulevard that ranges from \$4 to \$6 Million. Len mentioned other impacts with a pedestrian tunnel including impacts to the Creason parking lot, utility impacts and geologic concerns.
12. A question was asked about the level of pedestrian crossing demand, and Len responded that KYTC collected peak hour counts for both vehicles and pedestrians, but the AM/PM peaks did not include many pedestrians. Shuttle services with eight-minute headways are heavily used by those who park in the new garage, which reduces pedestrian demand. Pedestrians would largely be from the adjacent surface parking lot which are primarily reserved for students that live in the dorms across the street. WKU is working to provide additional pedestrian counts at the Russellville Road intersection with University Boulevard.
13. It was reiterated that any options that widen Russellville Road would require replacing the CSX railroad bridge and would require a complete roadway closure that could take up to a year.
14. The cost estimates and comparison matrix summarizing the conceptual alternatives were discussed. KYTC District 3 provided planning-level right-of-way costs which are primarily related to loss of parking in the Creason surface lot.
15. Other discussion
 - a. There was discussion concerning the possibility of widening Russellville Road and implementing the conventional intersection improvements. Len indicated widening with intersection improvements will improve traffic operations and should serve traffic demand reasonably well. However, the full benefit of widening won't be realized until Russellville Road is widened outside the current project limits to Campbell Lane.
 - b. WKU prefers the conventional improvements rather than roundabouts. They have concerns about pedestrian safety as it relates to the roundabout.
 - c. A question was asked about the possibility of boring a tunnel under the railroad, north of Russellville Road, for a shared use path. With such a concept, would it be possible to provide three lanes under the existing bridge if the bikes and pedestrians are on separated facility? It was noted that the existing horizontal clearance would not accommodate three travel lanes.
 - d. A question was asked about the possibility of relocating the Creason Street approach to University Boulevard through the surface parking lot. There were concerns about the elementary school losing access and safety concerns within the surface parking lot itself.

16. Attendees were asked to fill out a survey at the end of the meeting. Eight surveys were returned. The results are summarized as follows:
 1. The first question asked if respondents felt improvements are needed at the Russellville Road intersection with University Boulevard. All eight respondents indicated improvements are needed.
 2. Question two asked respondents which alternative they prefer at the Russellville Road intersection with University Boulevard: additional lanes, a roundabout, or other. Of the eight responses, six (75 percent) preferred a roundabout and two (25 percent) preferred additional lanes.
 3. Question three asked respondents if the recent improvements at the Russellville Road intersection with Morgantown Road, which included removing the channelizing right-turn lanes and improved crosswalks, are adequate. Of the six responses, five (83 percent) indicated no, the improvements are not adequate while one (17 percent) indicated that the improvements are adequate. One respondent indicated that there has not been enough time to determine if the improvements are adequate.
 4. Attendees were asked if additional improvements are needed at the Russellville Road intersection with Morgantown Road, which option is preferable, additional lanes, a roundabout, or other. Of the five responses, three (60 percent) preferred a roundabout and two (40 percent) preferred additional lanes.
 5. Question five asked respondents even with 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. All eight local officials responded yes, Russellville Road should be widened.
 6. The final question asked which alternative the respondents prefer. Widening Russellville Road with roundabouts at the Morgantown Road and University Boulevard intersections received the most votes with six (75 percent). The remaining two respondents indicated a preference for widening Russellville Road and intersection improvements at the Morgantown Road and University Boulevard intersections.



The following comments were made at the end of the survey:

- i. I have concerns about the safety of pedestrians if a roundabout is built at University Boulevard.
- ii. I would like to see the traditional intersection option at University Boulevard with widening Russellville Road in more detail before deciding the final alternative.
- iii. The roundabout has better aesthetic value as a secondary factor.
- iv. Any improvements without gaining pedestrian and bicycle facilities is short sighted.

17. Len ended the meeting with a discussion of the project schedule and next steps. Approximately 3,200 survey postcards will be mailed to addresses in the project area to solicit input on study goals and project alternatives. WKU is assisting in this effort by sending a campus-wide email with information on the project and a link to the survey. The final project team meeting will be in January. At that time Stantec will present the online survey results and refined alternatives for the project team to review and develop study recommendations. Based on feedback from this meeting, widening Russellville Road with intersection improvements at the Morgantown Road and University Boulevard intersections will be added to the list of refined alternatives that Stantec will present for project team consideration.

The meeting ended at approximately 11:30 a.m. CST.

Meeting Minutes

TO: Shane McKenzie
Co-Project Manager
KYTC Central Office
200 Mero Street
Frankfort, KY 40622

Andrew Stewart
Co-Project Manager
KYTC District Office #3
900 Morgantown Rd.
Bowling Green, KY 42101

FROM: Len Harper
Project Manager
Stantec Consulting Services Inc.

DATE: February 26, 2019

SUBJECT: Russellville Road (US 68X and 231X) Planning Study
US 68X from south of Robinson Ave. (MP 1.000) to north of Avenue of Champions
(MP 1.626)
US 231X from north of Normal St. (MP 2.300) to south of Holly Dr. (MP 2.600)
KYTC Item No. N/A
Project Team Meeting #3

The final project team meeting for the Russellville Road (US 68X and US 231X) Planning Study was held at KYTC District 3 Office in Bowling Green, KY on January 31, 2019 at 9:30 A.M. CST. The following individuals were in attendance:

Steve De Witte	KYTC – Central Office Planning
Gavin Hodges	KYTC – District 3
Matthew Holder	KYTC – District 3
Ben Hunt	KYTC – District 3
Karissa Lemon	Bowling Green – Warren County MPO
Stewart Lich	KYTC – District 3
Shane McKenzie	KYTC – Central Office Planning
Joe Plunk	KYTC – District 3
Steve Ross	KYTC – Central Office Planning
Wendy Southworth	KYTC – Central Office Design
Andrew Stewart	KYTC – District 3
Jennifer Tougas	Western Kentucky University
Wes Watt	KYTC – District 3
Len Harper	Stantec Consulting Services Inc.
Graham Winchester	Stantec Consulting Services Inc.

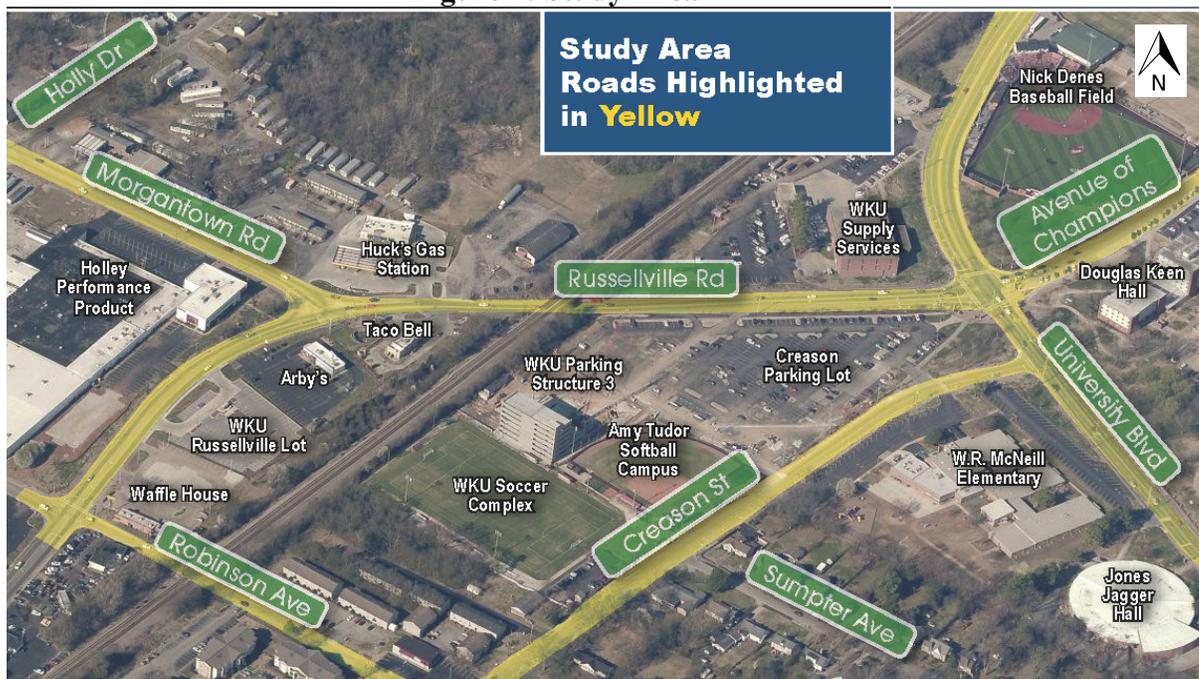
Len Harper welcomed everyone and said the purpose of the meeting was to discuss the refined improvement alternatives and determine project team recommendations. Handouts included a meeting agenda, an evaluation matrix summarizing the alternatives, and the presentation slides. Len delivered a presentation. The following enumerated items were discussed.

1. The purpose of the meeting is to discuss the survey results from the second local officials/stakeholders meeting and the public solicitation, review the refined simulation model results, review the benefit-to-cost analysis, and discuss project team recommendations.
2. The draft Purpose and Need Statement for the project is as follows:

The purpose of the Russellville Road (US 68X and US 231X) project 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.

3. The study area, shown in **Figure 1**, 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). The Morgantown Road and University Boulevard intersections are approximately 1,600 feet apart with major generators nearby, namely Western Kentucky University (WKU) and associated athletic venues (softball, baseball, and football stadiums) along with commuter parking.

Figure 1: Study Area

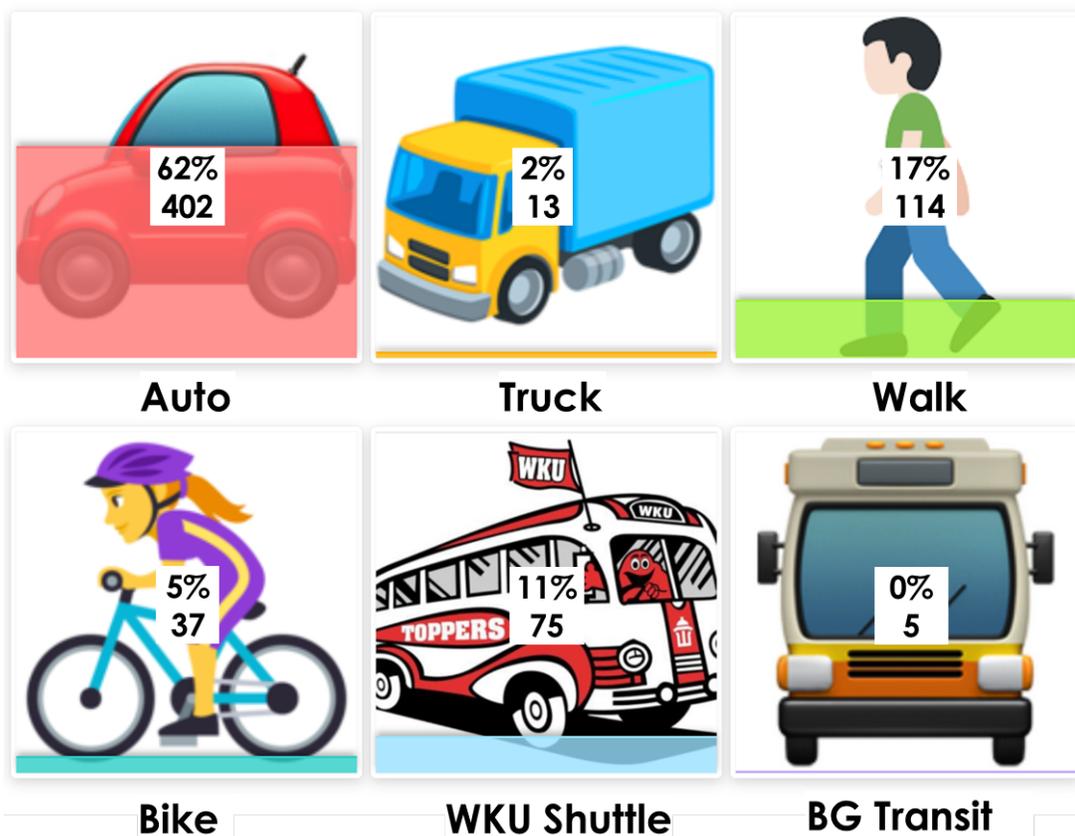


4. At the second Local Officials/Stakeholders meeting, attendees were asked to complete a questionnaire to provide input on improvement alternatives. The results indicate improvements are desired at both the Russellville Road intersection with University Boulevard and the Russellville Road intersection with Morgantown Road. Attendees were also in unanimous favor of the widening of Russellville Road between the intersections. Two attendees wrote in votes for widening Russellville Road and

intersection improvements at both intersections. This alternative had been presented at the first local officials meeting but was not presented at the second meeting due to the initial traffic results. Based on the feedback received at the second local officials meeting, Stantec added this alternative to the list of refined alternatives that was presented today for project team consideration.

5. Approximately 3,200 survey postcards were mailed to addresses in and around the study area to solicit input on study goals and project alternatives. WKU assisted in the effort by sending a campus-wide email with information on the project and a link to the survey. Of the 646 responses, approximately 36 percent of the responses were from WKU faculty/staff, 32 percent were from Bowling Green residents, and 29 percent were from WKU students with 53 percent working in the study area. The majority (84%) of these respondents travel the study area at least 2-3 times per week, with 58 percent living in the study area. The survey results are summarized below.

- When asked how they travel the study area, the majority of respondents indicated they travel by auto, with walking being the second most common form of travel.

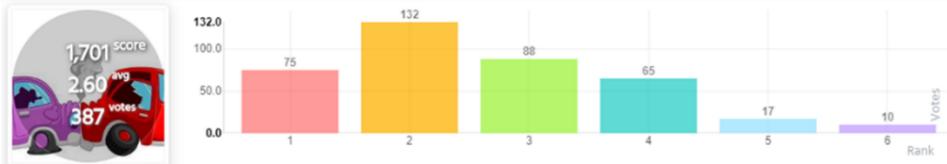


- When asked what issues exist along the study area that are most important, respondents indicated that congestion is the most important, with safety and not having enough sidewalks next important. The figures below present a summary of the results with total number of votes each issue received, the average ranking (with 1 the highest priority), and the total score (with six points given to a #1 ranking, five to a #2 ranking, etc.).

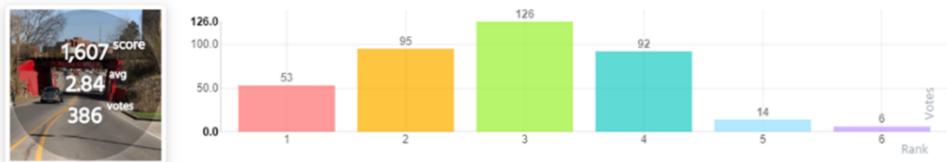
1) Congestion



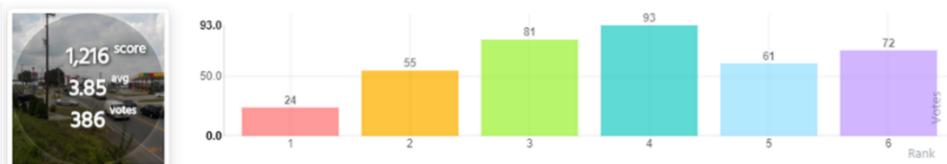
2) Safety



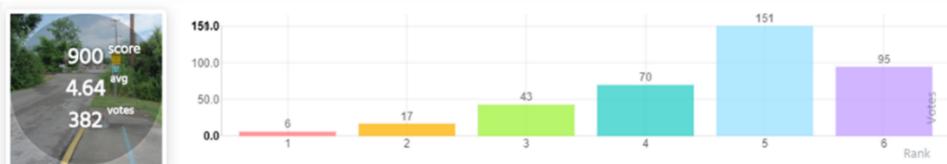
3) Not enough sidewalks



4) Too many driveways



5) Not enough bike facilities



6) Not enough bus stops



- When asked if improvements are needed in the study area, 95 percent of respondents indicated that yes, improvements are needed.
- When asked which improvements are most important, respondents indicated that widening Russellville Road and improving the University intersection were most important.

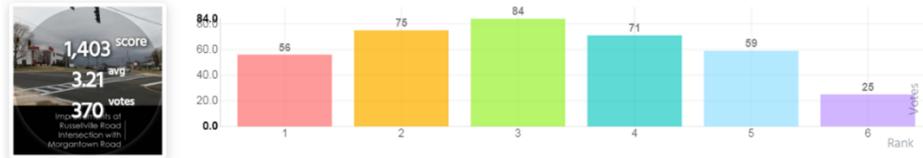
1) Widen Russellville Road



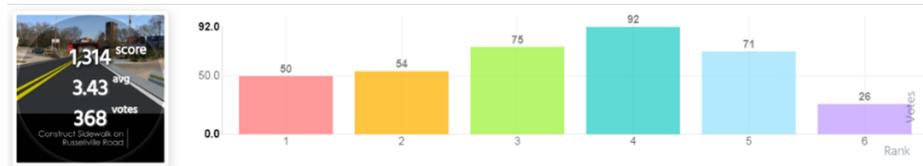
2) University Intersection



3) Morgantown Intersection



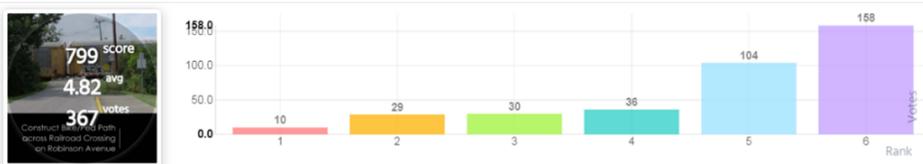
4) Russellville Road Sidewalk



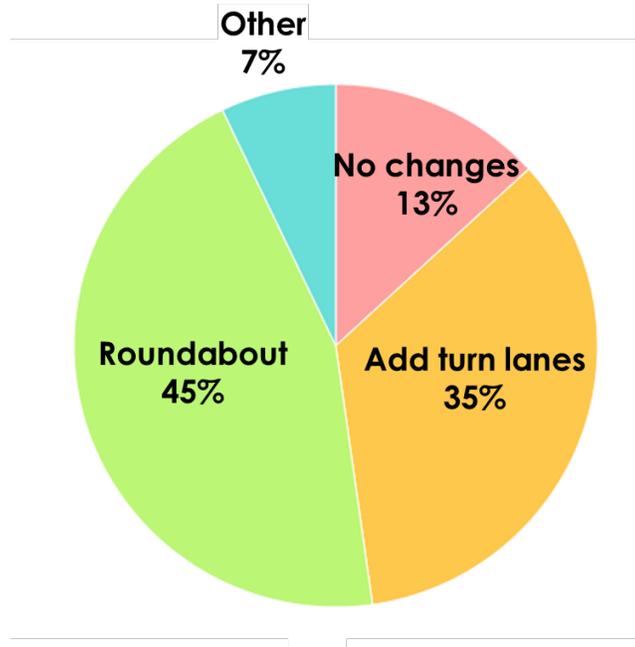
5) Driveways



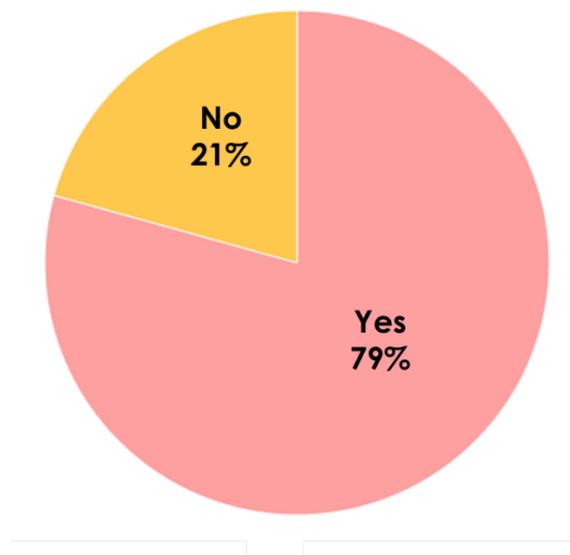
6) Robinson Ave.



- When asked if respondents feel intersection improvements are needed at the Russellville Road intersection with University Boulevard, which improvement is preferred, 169 (45%) indicated a roundabout is their preferred alternative.



- 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? 298 (79%) respondents indicated that yes, Russellville Road should be widened even with lengthy road closures.



- When asked for additional improvements, respondents mentioned a focus on pedestrian safety, improved roadway capacity, and the need to prohibit left turns from University Boulevard onto Creason Street.
 - Question: Do any of WKU's shuttle routes use the left turn from University Boulevard onto Creason Street?

Answer: Yes, WKU Topper Transit routes use this turn.

6. Due to the relatively recent opening of the WKU Parking Structure #3 in the Creason Parking Lot, additional pedestrian counts were taken at the Russellville Road intersection with University Boulevard on Tuesday, October 23, 2018. From this footage, 30 pedestrians were counted crossing NB University Boulevard during the AM peak hour (7:30 – 8:30) and 145 were counted during the PM peak hour (4:30 – 5:30). These counts are significantly higher than the original pedestrian counts from February 8, 2018 and February 9, 2018, in which 8 pedestrians crossed during the AM peak and 51 crossed during the PM peak. Several factors could have contributed to this increase in pedestrian traffic; WKU Parking Structure #3 did not open to full operations until after the original February counts, WKU fall semester enrollment is higher than the spring enrollment, and the weather is significantly colder in February which could drive more pedestrians to use the shuttle service.
7. Six refined improvement alternatives were presented. The increased number of pedestrians crossing University Boulevard from the Creason Parking Lot warranted a signalized midblock pedestrian crossing to be added to all of the roundabout alternatives to allow them to function effectively.
 - No-Build
 - Alternative 2 – Intersection improvements at University Boulevard and sidewalk on Russellville Road
 - Alternative 3 – Roundabout at University Boulevard with a signalized midblock pedestrian crossing and sidewalk on Russellville Road
 - Alternative 4 – Widen Russellville Road with intersection improvements at University Boulevard (added after 2nd Local Officials Meeting)
 - Alternative 5 – Widen Russellville Road with roundabout at University Boulevard and signalized midblock pedestrian crossing
 - Alternative 6 – Widen Russellville Road with roundabouts at University Boulevard (with midblock pedestrian crossing) and Morgantown Road
8. Len provided an overview of the simulation model results from each of the alternatives. In urban areas, LOS D or better is desirable. The results of the traffic analysis for the No-Build and the refined improvement alternatives are shown in **Table 1**, **Figure 2**, and **Figure 3**. Based on feedback from the second local officials meeting, traffic results for widening Russellville Road with intersection improvements at the University Boulevard intersection (Alternative 4) were added. In addition, all the refined traffic results include the new pedestrian count from October 23rd.

The results indicate that currently the Russellville Road/University Boulevard intersection has an undesirable LOS in the PM peak hour and that both the Russellville Road/University Boulevard intersection and the Russellville Road/Morgantown Road intersection will have an undesirable LOS for the AM and PM peak hours in 2040. The traffic simulation model shows that while the roundabout alternatives perform best at the Russellville Road/University Boulevard intersection, there are increased delays on Creason Street, Morgantown Road, and Avenue of Champions. With the consistent stream of vehicles coming from the major approaches, the minor approaches do not have sufficient gaps to enter the roundabouts. Looking at the entire study area, intersection improvements at Russellville Road/University Boulevard (Alternatives 2 and 4) perform best.

Table 1: Existing (2018) and Design Year (2040) Peak Hour Traffic Operations Summary

Alternative	Intersection	2018				2040			
		AM LOS	AM Delay (sec)	PM LOS	PM Delay (sec)	AM LOS	AM Delay (sec)	PM LOS	PM Delay (sec)
No-Build	University at Russellville	D	55	E	76	D	52	F	117
	Morgantown at Russellville	C	28	C	33	D	49	F	85
Alternative 2 Intersection Improvements at University Boulevard and Sidewalk on Russellville Road	University at Russellville	C	25	D	36	D	43	F	74
	Morgantown at Russellville	B	11	C	22	C	23	E	68
Alternative 3 Roundabout at University Boulevard with Signalized Midblock Pedestrian Crossing and Sidewalk on Russellville Road	University at Russellville	C	17	C	25	D	30	E	50
	Morgantown at Russellville	B	15	C	25	D	47	E	78
Alternative 4 Widen Russellville Road with Intersection Improvements at University Boulevard	University at Russellville	C	23	D	36	C	32	E	68
	Morgantown at Russellville	B	11	B	20	B	16	E	58
Alternative 5 Widen Russellville Road with Roundabout at University Boulevard and Signalized Midblock Pedestrian Crossing	University at Russellville	C	17	D	27	D	30	E	40
	Morgantown at Russellville	B	15	C	23	C	25	D	52
Alternative 6 Widen Russellville Road & Roundabout at University Boulevard with Signalized Midblock Pedestrian Crossing and Roundabout at Morgantown Road	University at Russellville	C	18	C	19	D	32	E	43
	Morgantown at Russellville	A	8	B	13	D	33	E	43

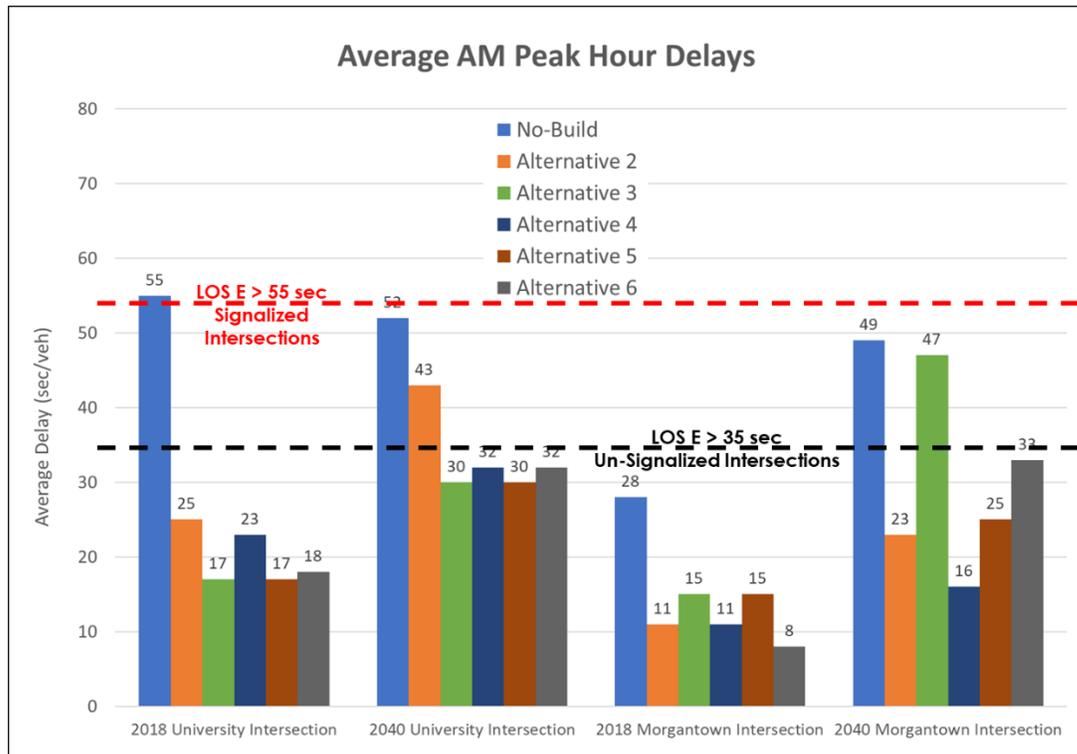


Figure 2: Average AM Peak Hour Delays

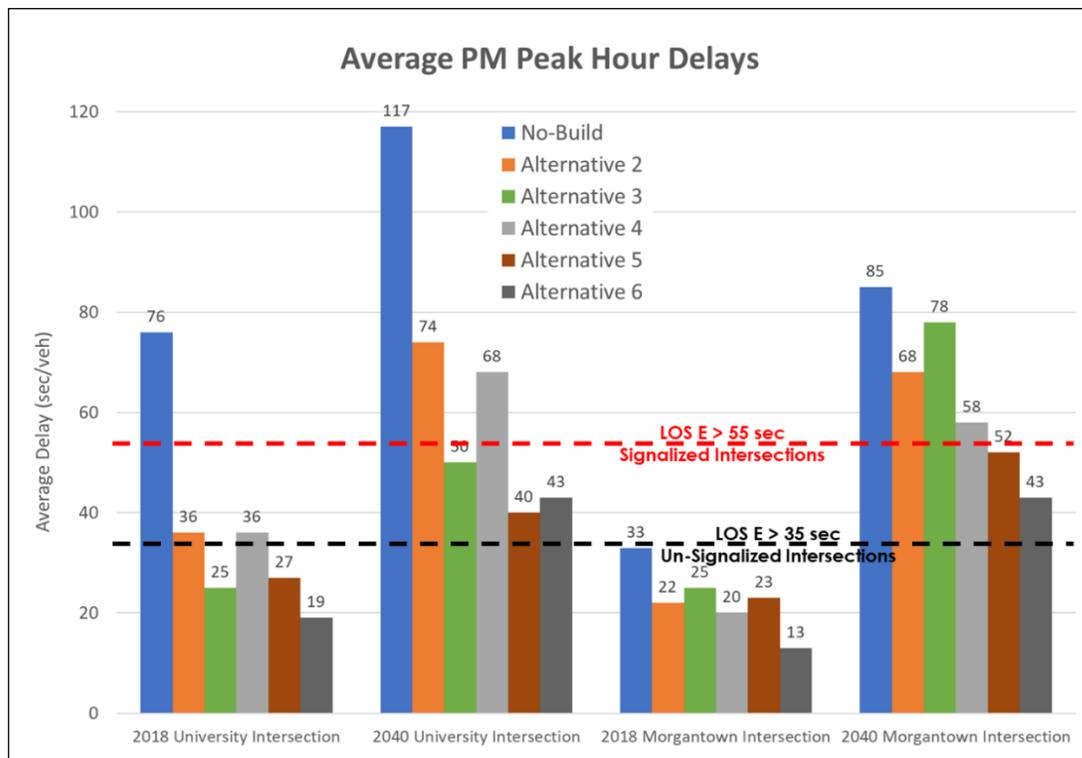


Figure 3: Average PM Peak Hour Delays

9. A benefit-to-cost analysis was conducted based on expected crash reductions and travel time savings. The Crash Modification Factors Clearinghouse was used to estimate the crash reduction by type with comprehensive costs (including wage loss, medical expense, administration costs, property damage, employer costs, and lost quality of life) by crash severity used to estimate the cost of crashes.

The **COMPREHENSIVE COST** (\$18.9 billion) was derived from the following formula:

COST PER	X	NUMBER REPORTED	=	ESTIMATED COST
Fatalities				
\$10,080,000	X	763	=	\$7,691,040,000
Incapacitating Injuries				
\$1,100,000	X	3,114	=	\$3,425,400,000
Non-Incapacitating Injuries				
\$304,000	X	12,493	=	\$3,797,872,000
Possible Injuries				
\$140,000	X	21,740	=	\$3,043,600,000
Property Damage Only				
\$8,500	X	114,780	=	\$975,630,000
TOTAL COMPREHENSIVE COST ESTIMATE				\$18,933,542,000

The following tables present the benefits related to crash reduction:

Table 2: Alternative 2 Benefits Related to Crash Reduction

Location	Improvement	CMF ID	CMF	CRF	Type	Severity	Crashes (2008-2017)				Cost per Crash			10-Yr Benefit
							Fatal	Injury	PDO	Total	Fatal	Injury	PDO	
University Blv. Intersection	New left-turn lane	263	0.76	0.24	All	All	0	3	49	52	\$10,080,000	\$274,905	\$8,500	\$297,900
	New right-turn lane	290	0.92	0.08	All	All	0	2	19	21	\$10,080,000	\$274,905	\$8,500	\$56,900
Russellville Rd.	Install sidewalk (to avoid walking along roadway)	1333	0.35	0.65	Ped	All	0	2	1	3	\$10,080,000	\$274,905	\$8,500	\$362,900
													\$717,700	

Table 3: Alternative 3 Benefits Related to Crash Reduction

Location	Improvement	CMF ID	CMF	CRF	Type	Severity	Crashes (2008-2017)				Cost per Crash			10-Yr Benefit
							Fatal	Injury	PDO	Total	Fatal	Injury	PDO	
University Blvd. intersection	Convert signalized intersection to modern roundabout	225	0.52	0.48	All	All	0	17	192	209	\$10,080,000	\$274,905	\$8,500	\$3,026,600
Russellville Rd.	Install sidewalk (to avoid walking along roadway)	1333	0.35	0.65	Ped	All	0	2	1	3	\$10,080,000	\$274,905	\$8,500	\$362,900
													\$3,389,500	

Table 4: Alternative 4 Benefits Related to Crash Reduction

Location	Improvement	CMF ID	CMF	CRF	Type	Severity	Crashes (2008-2017)				Cost per Crash			10-Yr Benefit
							Fatal	Injury	PDO	Total	Fatal	Injury	PDO	
University Blv. Intersection	New left-turn lane	263	0.76	0.24	All	All	0	3	49	52	\$10,080,000	\$274,905	\$8,500	\$297,900
	New right-turn lane	290	0.92	0.08	All	All	0	2	19	21	\$10,080,000	\$274,905	\$8,500	\$56,900
Russellville Road	Convert 2 lane roadway to 4 lane divided roadway	7572	0.236	0.764	All	All	0	17	89	106	\$10,080,000	\$274,905	\$8,500	\$4,148,400
	Install sidewalk (to avoid walking along roadway)	1333	0.35	0.65	Ped	All	0	2	1	3	\$10,080,000	\$274,905	\$8,500	\$362,900
	Install bike lanes	9244	0.86	0.14	Bike	All	0	0	0	0	\$10,080,000	\$274,905	\$8,500	\$0
\$4,866,100														

Table 5 – Alternative 5 Benefit Related to Crash Reduction

Location	Improvement	CMF ID	CMF	CRF	Type	Severity	Crashes (2008-2017)				Cost per Crash			10-Yr Benefit
							Fatal	Injury	PDO	Total	Fatal	Injury	PDO	
University Blvd intersection	Convert signalized intersection to modern roundabout	225	0.52	0.48	All	All	0	17	192	209	\$10,080,000	\$274,905	\$8,500	\$3,026,600
Russellville Road	Convert 2 lane roadway to 4 lane divided roadway	7572	0.236	0.764	All	All	0	17	89	106	\$10,080,000	\$274,905	\$8,500	\$4,148,400
	Install sidewalk (to avoid walking along roadway)	1333	0.35	0.65	Ped	All	0	2	1	3	\$10,080,000	\$274,905	\$8,500	\$362,900
	Install bike lanes	9244	0.86	0.14	Bike	All	0	0	0	0	\$10,080,000	\$274,905	\$8,500	\$0
\$7,537,900														

Table 6 – Alternative 6 Benefit Related to Crash Reduction

Location	Improvement	CMF ID	CMF	CRF	Type	Severity	Crashes (2008-2017)				Cost per Crash			10-Yr Benefit
							Fatal	Injury	PDO	Total	Fatal	Injury	PDO	
University Blvd. intersection	Convert signalized intersection to modern roundabout	225	0.52	0.48	All	All	0	17	192	209	\$10,080,000	\$274,905	\$8,500	\$3,026,600
Morgantown Rd. intersection	Convert signalized intersection to modern roundabout	225	0.52	0.48	All	All	0	18	134	152	\$10,080,000	\$274,905	\$8,500	\$2,921,900
Russellville Rd.	Convert 2 lane roadway to 4 lane divided roadway	7572	0.236	0.764	All	All	0	17	89	106	\$10,080,000	\$274,905	\$8,500	\$4,148,400
	Install sidewalk (to avoid walking along roadway)	1333	0.35	0.65	Ped	All	0	2	1	3	\$10,080,000	\$274,905	\$8,500	\$362,900
	Install bike lanes	9244	0.86	0.14	Bike	All	0	0	0	0	\$10,080,000	\$274,905	\$8,500	\$0
\$10,459,800														

The TransModeler traffic simulation model was used to determine the delay savings for each improvement alternative in relation to the No-Build. This delay was used along with the Bureau of Labor Statistics mean hourly wage for Bowling Green residents (\$19.09) to find the wage savings for each alternative, as shown in **Table 7**.

Table 7: Benefit Related to Congestion Relief

	Alternative 2		Alternative 3		Alternative 4		Alternative 5		Alternative 6	
	Delay Savings (hours)	Wages	Delay Savings (hours)	Wages	Delay Savings (hours)	Wages	Delay Savings (hours)	Wages	Delay Savings (hours)	Wages
10-YR Savings	578,000	\$11,034,014	392,016	\$7,483,576	579,510	\$11,062,855	478,425	\$9,133,133	513,486	\$9,802,455

Benefit-to-cost ratios (BCRs) were calculated based on the crash reduction, congestion relief, and 2018 cost estimates for each of the alternatives, as shown in **Table 8**. All alternatives, except for Alternative 5, had BCRs above one, indicating the benefits outweigh the costs.

Russellville Road (US 68X and US 231X) Planning Study Evaluation Matrix																
Alternative Description	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	Pedestrian Accommodations	Bicycle Accommodations	Design	Right-of-Way	Utility	Construction	Total	Crash Reduction (millions)	Congestion Relief ² (millions)	BCR
	Intersection Delay (sec)	Intersection LOS ¹	Intersection Delay (sec)	Intersection LOS ¹												
No-Build	76	E	117	F	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Alternative 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	3.21		
Alternative 3 Roundabout at University Boulevard with Signalized Midblock Pedestrian Crossing and Sidewalk on Russellville Road	25	C	50	E	Yes	No	\$0.4	\$2.4	\$1.9	\$2.6	\$7.3	3.4	7.5	1.50		
Alternative 4 Widen Russellville Road with Intersection Improvements at University Boulevard	36	D	68	E	Yes	Yes	\$1.3	\$2.4	\$3.3	\$8.7	\$15.7	4.9	11.1	1.02		
Alternative 5 Widen Russellville Road with Roundabout at University Boulevard and Signalized Midblock Pedestrian Crossing	27	D	40	E	Yes	Yes	\$1.5	\$2.4	\$3.3	\$9.7	\$16.9	7.5	9.1	0.98		
Alternative 6 Widen Russellville Road & Roundabout at University Boulevard with Signalized Midblock Pedestrian Crossing and Roundabout at Morgantown Road	19	C	43	E	Yes	Yes	\$1.7	\$2.6	\$4.3	\$11.3	\$19.9	10.5	9.8	1.02		

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)

Table 8: Evaluation Matrix

10. Other discussion:

- A question was asked about the traffic forecasts developed for the study. Len said the Warren County Travel Demand model was used to estimate growth rates for the study area, and the growth rates were applied to current counts to estimate future traffic demand. Overall, total trips in the AM peak period grew by 1.36 percent annually and by 1.07 percent annually in the PM peak period, as seen in **Table 9**.

Table 9: Trip Table Growth Summary

	AM					
	2018		2040		Delta	
	To	From	To	From	To	From
On-campus	1,135	525	1,369	670	234	145
Off-campus	569	774	670	903	101	129
Through trips	3,587	3,992	5,084	5,549	1,497	1,557
Total	5,291		7,123		1,832	
	PM					
	2018		2040		Delta	
	To	From	To	From	To	From
On-campus	924	1,241	1,063	1,435	139	194
Off-campus	784	791	874	901	90	110
Through trips	4,805	4,481	6,297	5,898	1,492	1,417
Total	6,513		8,234		1,721	

- It was noted that the draft report should contain a discussion of why the roundabouts were not recommended even though they were supported by the local officials and the public. There are several reasons as to why the roundabout alternatives were not recommended. The local officials and public were not shown the benefit-cost ratios, which are higher for the intersection improvement alternatives. Also, the traffic operation results shown to the local officials did not include the higher pedestrian volumes which creates more delay for the roundabout alternatives.
- There was some discussion related to the closures on Russellville Road during the CSX bridge replacement.
 - It was noted that WKU’s campus is serviced by the Bowling Green Fire Department Station 4 on Morgantown Road. In an emergency event, they will drive the wrong way on Avenue of Champions to gain access to campus. In the event of any road closure, an alternate route would have to be taken, which would increase response times.
 - To minimize road closures the option of utilizing a temporary structure for bypass track(s) was discussed. This would be a similar construction

technique to what was used to widen the CSX overpass at Veterans Memorial Lane. To explore this option further, Joe Plunk arranged a phone call with CSX to discuss bridge replacement options. CSX noted it usually prefers roll-in construction for bridges over waterways. The preferred method of construction over roadways is to construct a run-around track to minimize time of closure for CSX (generally 8 – 12 hours). A run-around track may or may not be feasible due to right-of-way constraints. As a result, KYTC Central Office Planning has agreed to setup funding for CSX to conduct preliminary engineering to allow them to participate in the dialog, visit the site, and make preliminary recommendations. Stantec agreed to assist in this effort as needed.

11. The project team recommends Alternative 2, intersection improvements at University Boulevard and a sidewalk on Russellville Road, as the short-term improvement and Alternative 4, intersection improvements at University Boulevard and widening Russellville Road, as the long-term improvement.
12. Len ended the meeting with a discussion of the project schedule and next steps. Cost estimates, benefit-to-cost ratios, and project recommendations will be finalized after we have feedback from CSX on the temporary run-around track/bridge replacement alternative. A draft report will be submitted once this feedback has been received.

The meeting ended at approximately 10:30 a.m. CST.