

KY 86 SCOPING STUDY
BRECKINRIDGE AND HARDIN COUNTIES
KYTC ITEM NO. 4-8901.00

APPENDIX G – MEETING SUMMARIES

Meeting Minutes

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

Charlie Allen
Co-Project Manager
KYTC District Office #4
634 East Dixie Hwy
Elizabethtown, KY 42702

FROM: Brian Aldridge
Project Manager
Stantec Consulting Services Inc.

DATE: February 8, 2017

SUBJECT: KY 86 Scoping Study
Breckinridge County – US 60 (MP 15.957) to Hardin County Line (MP 26.137)
Hardin County – Breckinridge County Line (MP 0.000) to US 62 (MP 16.145)
KYTC Item No. 4-8901.00
Project Team Meeting #1

A project team meeting for the KY 86 Scoping Study was held at Franklin Crossroads Baptist Church in Cecilia, KY on January 31, 2017 at 1:00 p.m. EST. The following individuals were in attendance:

Charlie Allen	KYTC – District 4
Brad Bottoms	KYTC – District 4
Derrick Dennison	KYTC – District 4
Joseph Ferguson	KYTC – District 4
Brian Gregory	KYTC – District 4
Chris Jessie	KYTC – District 4
Adam King	Hardin County Planning & Development
Larry Krueger	KYTC – District 4
Kevin Martin	KYTC – Central Office Design
Vicki Meredith	Hardin County Engineer
Mikael Pelfrey	KYTC – Central Office Planning
Paul Sanders	KYTC – District 4
Mike Skaggs	Lincoln Trail ADD
Eileen Vaughan	KYTC – Central Office Planning
Jamie Watkins	KYTC – District 4
Wesley Wright	Hardin County Planning & Development
Kevin Young	KYTC – District 4
Brian Aldridge	Stantec Consulting Services Inc.
Steve Farmer	Stantec Consulting Services Inc.
Glenn Hardin	Stantec Consulting Services Inc.
Len Harper	Stantec Consulting Services Inc.

Graham Winchester

Stantec Consulting Services Inc.

Charlie Allen welcomed everyone and said the purpose of the meeting was to discuss the progress to date on the KY 86 Scoping study. Handouts included a project information brochure, maps comparing high crash spots with horizontal curve deficiencies, and maps comparing high crash spots with vertical curve deficiencies. Large environmental footprint maps were also made available for participants to view and comment on. After introductions, Brian Aldridge 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 very conceptual potential improvement alternatives.
2. State Representative Dean Schamore pushed for the project which became a legislative insert in the 2016 Highway Plan. The project is listed in the 2016 Highway Plan as Item No. 04-8901.00: Reconstruction study on KY 86 from US 60 (MP 15.957) to the Hardin County Line (MP 26.137). The limits of the study have been extended to include KY 86 in Hardin County from the Breckinridge County Line (MP 0.000) to US 62 (MP 16.145). The 2016 Highway Plan includes \$500,000 for the planning phase. This Scoping Study will not spend the entire planning budget, leaving some money for preliminary design of one or more improvement projects. Additional phases of the project are not funded in the 2016 Highway Plan.
3. There are no other projects in the study area listed in the 2016 Highway Plan. Outside of the 2016 Highway Plan, there are three projects on KYTC's Unscheduled Needs List (UNL) that have an active Project Identification Form (PIF) within the study limits:
 - PIF 04 014 D0086 4.10: Address safety, geometric deficiencies, and maintenance issues along KY 86 from US 60 to Rosetta-Corners Road.
 - PIF 04 047 D0086 1.00: Reconstruct the intersection of KY 86 (Hardinsburg Road) and South Black Branch Road west of Cecilia.
 - PIF 04 047 D0086 45.00: Planning study for KY 86 from US 62 to Breckinridge County line.
4. Some highlights from the existing conditions inventory were discussed. The KY 86 study area is approximately 26.325 miles in length between the US 60 intersection in Breckinridge County and the US 62 intersection in Hardin County. Within the study corridor, KY 86 is functionally classified as a Rural Minor Arterial from US 60 in Breckinridge County to Cecilia in Hardin County and an Urban Minor Arterial from Cecilia to US 62. KY 86 is a two-lane road with nine-foot wide lanes and eighteen-inch wide paved shoulders. The road widens in Cecilia to include 12-foot-wide lanes, curb and gutter, and sidewalks. The posted speed limit throughout most of the corridor is 55 mph except in Cecilia and several unincorporated communities, where the posted speed limit drops to 35 mph.

5. A review of the as-built plans reveals there are 72 horizontal curves in the study area, and 18 (25 percent) do not meet design standards for the posted speed limit. Of the 242 vertical curves in the study area, 160 (66 percent) have stopping sight distance that does not satisfy the posted speed limit.
6. Crash data from the Kentucky State Police database indicate 398 crashes were reported between July 1, 2006 and June 30, 2016. This includes six fatal crashes (1.5 percent) and 105 (26 percent) injury collisions. Of the 398 reported crashes, 224 (56 percent) were single vehicle collisions. Critical crash rate factors (CRF) were calculated for the most recent five-year study period (July 1, 2011 to June 30, 2016). A CRF greater than 1.0 suggests crashes are likely not occurring at random. There are nineteen 0.3-mile long spots with CRF values greater than 1.0, shown in **Figure 1**.
7. KY 86 has an Annual Average Daily Traffic (AADT) volume between 1,700 and 4,200 vehicles per day (vpd) with 2.5 to 11 percent trucks. Historic traffic counts from the KYTC indicate traffic growth along KY 86 between US 60 and US 62 has generally been flat or declining for the last 20 years. According to the KY State Data Center, Breckinridge County's population is expected to decrease 0.4% per year through 2040 and Hardin County's population is expected to increase 1.0% per year through 2040. Assuming a conservative one percent annual growth in traffic and a 0.5 percent annual growth in trucks, the 2040 AADT volumes are expected to grow to between 2,100 and 5,300 vpd with 2.7 to 11.7 percent trucks.
8. After performing a capacity analysis of the existing and future traffic, all roadway segments have a volume to capacity (V/C) ratio of 0.24 or less, as shown in the table below. The target V/C ratio is 0.9 for rural areas and 1.0 for urban areas. A V/C lower than this indicates KY 86 is operating within its design capacity. Level of service (LOS) is a qualitative measure describing operational conditions within a traffic stream. For two-lane highways, LOS is determined based on two parameters – average travel speed and percent time spent following in a platoon. In rural areas, LOS C or better is desirable and in urban areas, LOS D or better is desirable. Looking at the existing and future traffic, all roadway segments have a LOS of C or better, as shown in the table below. The results of the traffic analyses indicate a two-lane road can adequately accommodate the existing and future traffic demand.

Description	Begin Milepoint	End Milepoint	Existing (2016)			No Build (2040)		
			ADT	LOS	V/C	ADT	LOS	V/C
US 60 to Hardin County Line ¹	15.957	26.137	1,700	B	0.09	2,100	B	0.11
Hardin County Line to KY 920 ¹	0.000	5.287	1,700	B	0.09	2,100	B	0.11
KY 920 to KY 1375 ¹	5.287	11.790	2,700	C	0.16	3,400	C	0.18
KY 1375 to KY 253 ¹	11.790	14.601	3,100	C	0.16	3,900	C	0.19
KY 253 to PAL Railroad Crossing ²	14.601	15.165	4,200	C	0.20	5,300	C	0.24
PAL Railroad Crossing to US 62 ²	15.165	16.145	4,200	C	0.20	5,300	C	0.24

¹ Rural Arterial

² Urban Arterial

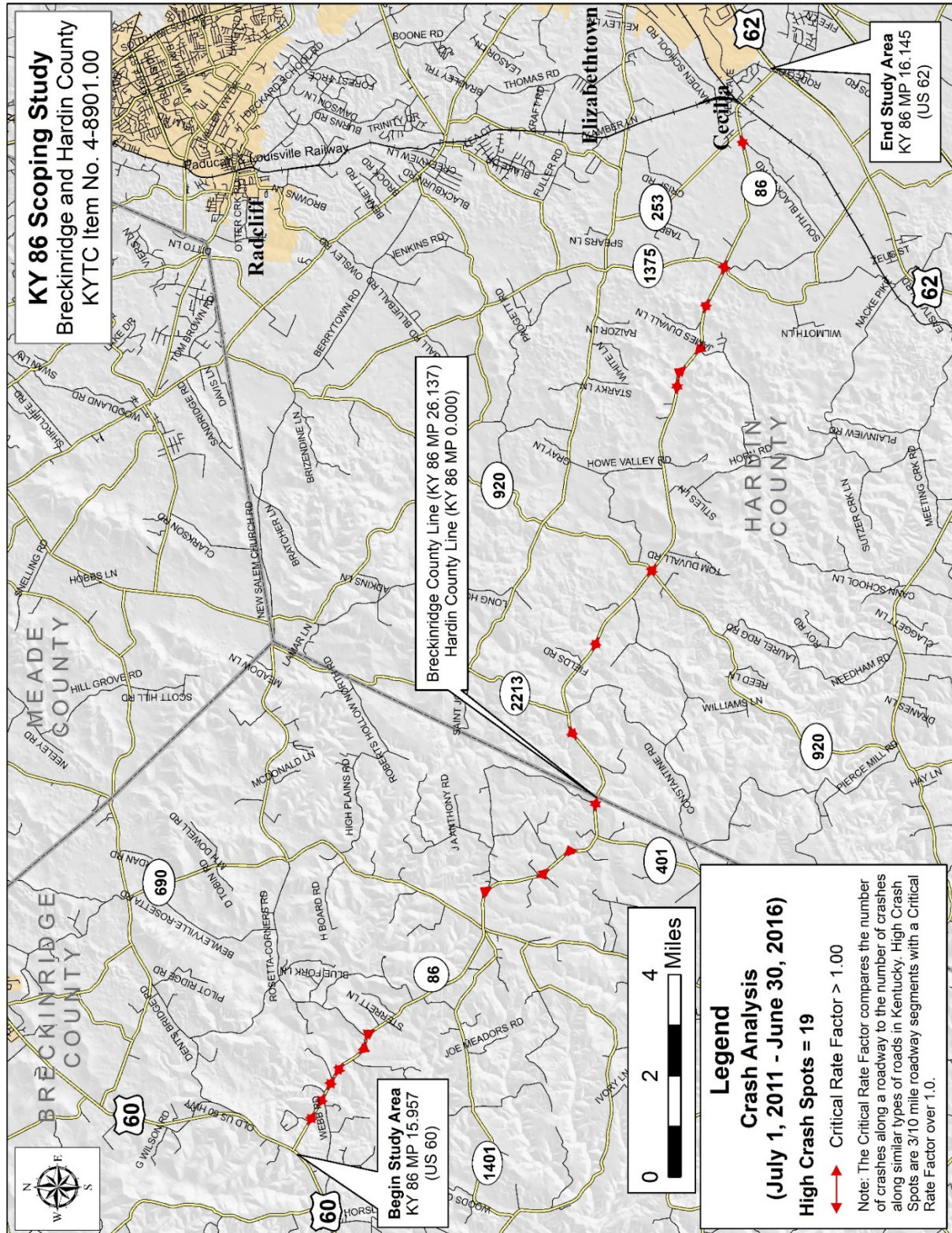


Figure 1: High Crash Spots

9. Brian introduced the draft Purpose and Need Statement. The purpose of the KY 86 Improvement Project is to enhance regional mobility and to provide a safer east/west corridor across Breckinridge and Hardin Counties. KY 86 provides the most direct regional connection for areas between Hardinsburg, Cecilia, Elizabethtown, the Western Kentucky Parkway, and I-65. I-65 is a major north-south interstate highway that travels through Western Kentucky from Nashville, Tennessee in the south to Louisville, Kentucky in the north.
 - The project team had an open discussion about “deficiency” versus “need”. A “need” is more than a deficiency. The intention should be to improve the roadway to meet driver expectations rather than bring it up to “desirable” Green Book Standards. Curves without a crash history that fit the context of the road do not necessarily “need” to be fixed.
10. Stantec presented several preliminary improvement concepts 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 as follows:
 - In addition to the No-Build, this study will examine three types of improvements:
 - i. Complete Reconstruction: Widen driving lanes and shoulders and bring roadway geometrics to 55 mph design speed. This alternative would cost approximately \$160 million (assumes \$6 million per mile) which would likely make such an undertaking infeasible because it would have to compete against other statewide projects for funding.
 - ii. Spot Improvements: Lower cost safety improvements focused on locations with high crash rates and less than desirable roadway geometry.
 - iii. Highway Safety Improvement Program (HSIP) Improvements: To receive this Federal funding, the HSIP requires a data-driven, strategic approach to improving highway safety. They address low cost (typically \$1,000,000 or less) short-term safety projects that require little to no right-of-way acquisition. Examples of possible HSIP projects include improving the clear zone at culvert headwalls, replacing guardrail and guardrail end treatments, fixing the superelevation in curves, using high friction pavement in curves, etc.
 - Question: There have been four reported fixed object crashes at the Allgood Road intersection in the last ten years. What are these vehicles hitting?
Answer: Three of the fixed object collisions were with a utility pole and the fourth was with a tree. Two of those collisions were on icy roadway conditions and one was on wet roadway conditions.
 - Question: What is the radius and superelevation at the horizontal curve at Cave Hollow Lane?

Answer: Based on KYTC's field measurements, the horizontal radius is 585-feet. Per KYTC's Common Geometric Practices, Exhibit 700-03, for Rural Arterials, the minimum radius for an eMax 8% with a 45 mph posted speed limit is 600 ft. Therefore, the curve is slightly deficient in horizontal geometry.

Comment: Straightening the curve to meet a 50 mph design speed may not fix the problem if drivers are speeding. Long tangent sections of KY 86 approach both sides of this curve which encourage higher speeds. Speed data collected by KYTC show speeds in excess of 65 mph at this curve.

Based on KYTC's field measurements, the maximum superelevation is 7.3 percent in the inside lane (westbound) and 5.11 percent in the outside lane (eastbound). The outside lane never achieves full superelevation, nor matches the superelevation of the inside lane. The minimum superelevation required for a 45 mph horizontal curve with eMax 8.0% and a radius of 587-feet is 8.0 percent.

- Question: At the horizontal curve at Cave Hollow Lane how many of the crashes were on wet road conditions?
Answer: All six reported crashes in the previous ten years were on wet road conditions.
- Question: Would it be possible to fix the drainage problems at the railroad crossing in Cecilia as part of a three-lane widening project?
Answer: Stantec will look at the drainage issue in more detail.
- Comment: The KY 86 and KY 253 intersection has a sight distance problem.
- Comment: Improvements should be considered at the KY 86 and KY 1375 intersection due to the high number of crashes.
- Comment: There are low spots along KY 86 near Franklin Crossroads Church where there is ponding.
- Comment: Many crossroads along KY 86 are skewed. Hardin County is willing to work with the KYTC to address skewed county road intersections.
- Question: Why is the intersection of KY 86 and KY 920 a high crash spot?
Answer: This intersection has a CRF of 1.70. At this location there were 15 reported crashes in the last ten years. Angle collisions made up 47 percent of the crashes, rear-end collisions made up 13 percent of the crashes, opposing-left-turn collisions made up seven percent of the crashes, and backing collisions made up seven percent of the crashes. These collisions total 74 percent of all the crashes at this location and are likely related to access management and congestion.

11. Brian ended the meeting with a discussion of the project schedule and next steps. The next step will be for Stantec to begin the development of improvement alternatives in preparation for the second Project Team Meeting in April.

The meeting ended at approximately 2:30 p.m. EST.

Meeting Minutes

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

Charlie Allen
Co-Project Manager
KYTC District Office #4
634 East Dixie Hwy
Elizabethtown, KY 42702

FROM: Brian Aldridge
Project Manager
Stantec Consulting Services Inc.

DATE: February 8, 2017

SUBJECT: KY 86 Scoping Study
Breckinridge County – US 60 (MP 15.957) to Hardin County Line (MP 26.137)
Hardin County – Breckinridge County Line (MP 0.000) to US 62 (MP 16.145)
KYTC Item No. 4-8901.00
Local Officials/Stakeholders Meeting #1

A local officials/stakeholders meeting for the KY 86 Scoping Study was held at Franklin Crossroads Baptist Church in Cecilia, KY on January 31, 2017 at 3:00 p.m. EST. The following individuals were in attendance:

Charlie Allen	KYTC – District 4
Harry Berry	Hardin County Judge Executive
Brad Bottoms	KYTC – District 4
SGT. Kevin Burton	Kentucky State Police
Richard Butler	Breckinridge County Board of Education
Derrick Dennison	KYTC – District 4
Jim Duplessis	KY State Representative
Richard Dewitt	Hardin County
Joseph Ferguson	KYTC – District 4
Lori Gass	Hardin County 911
Ronnie Goodman	Hardin County Road Department
Brian Gregory	KYTC – District 4
Chris Jessie	KYTC – District 4
Larry Krueger	KYTC – District 4
Maurice Lucas	Breckinridge County Judge Executive
Kevin Martin	KYTC – Central Office Design
Steve Meredith	KY State Senator
Tim Moore	KY State Representative
Mikael Pelfrey	KYTC – Central Office Planning
Paul Sanders	KYTC – District 4
Dean Schamore	KY State Representative
Mike Skaggs	Lincoln Trail ADD

Eileen Vaughan
Eric Vertrees
Jamie Watkins
Kevin Young

KYTC – Central Office Planning
Breckinridge County EMA Director
KYTC – District 4
KYTC – District 4

Brian Aldridge
Steve Farmer
Glenn Hardin
Len Harper
Graham Winchester

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

Charlie Allen welcomed everyone and said the purpose of the meeting was to discuss the progress to date on the KY 86 Scoping Study. Handouts included a meeting agenda, a project information brochure, maps comparing high crash spots with horizontal curve deficiencies, and maps comparing high crash spots with vertical curve deficiencies. After introductions, Brian Aldridge 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 locate potential trouble spots to help the project team identify improvement alternatives.
2. State Representative Dean Schamore pushed for the project which became a legislative insert in the 2016 Highway Plan. The project is listed in the 2016 Highway Plan as Item No. 04-8901.00: Reconstruction study on KY 86 from US 60 (MP 15.957) to the Hardin County Line (MP 26.137). The limits of the study have been extended to include KY 86 in Hardin County from the Breckinridge County Line (MP 0.000) to US 62 (MP 16.145). The 2016 Highway Plan includes \$500,000 for the planning phase. This Scoping Study will not spend the entire planning budget, leaving some money for preliminary design of one or more improvement projects. Additional phases of the project are not funded in the 2016 Highway Plan.
3. Some highlights from the existing conditions inventory were discussed. The KY 86 study area is approximately 26.325 miles in length between the US 60 intersection in Breckinridge County and the US 62 intersection in Hardin County. Within the study corridor, KY 86 is functionally classified as a Rural Minor Arterial from US 60 in Breckinridge County to Cecilia in Hardin County and an Urban Minor Arterial from Cecilia to US 62. KY 86 is a two-lane road with nine-foot wide lanes and eighteen-inch wide paved shoulders. The road widens in Cecilia to include 12-foot-wide lanes, curb and gutter, and sidewalks. The posted speed limit throughout most of the corridor is 55 mph except in Cecilia and several unincorporated communities, where the posted speed limit drops to 35 mph.
4. A review of the as-built plans reveals there are 72 horizontal curves in the study area, and 18 (25 percent) do not meet design standards for the posted speed limit. Of the

- 242 vertical curves in the study area, 160 (66 percent) have stopping sight distance that does not satisfy the posted speed limit.
5. Crash data from the Kentucky State Police database indicate 398 crashes were reported between July 1, 2006 and June 30, 2016. This includes six fatal crashes (1.5 percent) and 105 (26 percent) injury collisions. Of the 398 reported crashes, 224 (56 percent) were single vehicle collisions. Critical crash rate factors (CRF) were calculated for the most recent five-year study period (July 1, 2011 to June 30, 2016). A CRF greater than 1.0 suggests crashes are likely not occurring at random. There are nineteen 0.3-mile long spots with CRF values greater than 1.0, as shown in **Figure 1**.
- Of the 398 reported crashes on KY 86 over the ten-year period, 58 (15 percent) were rear end collisions. Sergeant Kevin Burton of the Kentucky State Police indicated several contributing factors including driver inattention, following too close, vertical/horizontal curves, and cars backing up behind school buses at stops.
 - Question: Why does the crash map not show a high number of crashes at the intersection of KY 86 and US 60?
Answer: Many of these crashes may have been attributed to US 60 instead of KY 86. Stantec will check the crashes at this intersection.
 - Comment: The bridge over Rough River, west of the KY 920 intersection, is very narrow which is a safety concern.
6. KY 86 has an Annual Average Daily Traffic (AADT) volume between 1,700 and 4,200 vehicles per day (vpd) with 2.5 to 11 percent trucks. Historic traffic counts from the KYTC indicates traffic growth along KY 86 between US 60 and US 62 has generally been flat or declining for the last 20 years. According to the KY State Data Center, Breckinridge County's population is expected to decrease 0.4% per year through 2040 and Hardin County's population is expected to increase 1.0% per year through 2040. Assuming a conservative one percent annual growth in traffic and a 0.5 percent annual growth in trucks the 2040 AADT volumes are expected to grow to between 2,100 and 5,300 vpd with 2.7 to 11.7 percent trucks. After performing a capacity analysis of the existing and future traffic, all roadway segments operate at less than full capacity with a volume to capacity (V/C) ratio less than 0.24 and a level of service (LOS) C or better. The results of this analysis indicate a two lane road can adequately accommodate the existing and future traffic demand.
7. Brian explained the difference between a "deficiency" and a "need". A "need" is more than a deficiency. Curves without a crash history that fit the context of the road do not necessarily "need" to be fixed. The intention is to improve the roadway to meet driver expectations rather than bring it up to "desirable" Green Book Standards.

8. A draft purpose and need statement was prepared for the scoping study that is unique to the goals and issues to be addressed by the project:

The purpose of the KY 86 Improvement Project is to enhance regional mobility and to provide a safer east/west corridor across Breckinridge and Hardin Counties. KY 86 provides the most direct regional connection for areas between Hardinsburg, Cecilia, Elizabethtown, the Western Kentucky Parkway, and I-65. I-65 is a major north-south interstate highway that travels through Western Kentucky from Nashville, Tennessee in the south to Louisville, Kentucky in the north.

9. The Local Officials/Stakeholders was asked to identify general concerns in the study area. The group developed the following list:

- Clear Zone
- Vegetation Issues
- Curves
- Grades
- Lack of Passing Opportunities
- Visibility
- Speed (not only speeding but also speed differentials)
- Trucks (large chip trucks from the paper mill)

After some further discussion the group agreed the above issues were mostly safety concerns and that improving safety should be the primary goal of this study.

10. In addition to the No-Build, this study will examine three types of improvements:
- Complete Reconstruction: Widen driving lanes and shoulders and bring roadway geometrics to 55 mph design speed. This alternative would cost approximately \$160 million (assumes \$6 million per mile) which would likely make such an undertaking infeasible because it would have to compete against other statewide projects for funding.
 - Spot Improvements: Lower cost safety improvements focused on locations with high crash rates and less than desirable roadway geometry.
 - Highway Safety Improvement Program (HSIP) Improvements: To receive this Federal funding, the HSIP requires a data-driven, strategic approach to improving highway safety. They address low cost (typically \$1,000,000 or less) short-term safety projects that require little to no right-of-way acquisition. Examples of possible HSIP projects include improving the clear zone at culvert headwalls, replacing guardrail and guardrail end treatments, fixing the superelevation in curves, using high friction pavement in curves, etc.

11. Stantec presented two example improvement concepts to help demonstrate the types of improvements that will be looked at during the alternative development process. Brian noted the examples were for discussion purposes only and that the alternative development phase of this project has just been initiated.
 - a. Example Improvement Concept #1: Realign KY 86 between Jesse Priest Rd. and Rosetta Corners in Breckinridge County. There are three high crash spots, three deficient vertical curves, and seven deficient vertical curves along this portion of KY 86. Of the 17 reported crashes between 2006 and 2016, 10 (59 percent) were single vehicle collisions. A majority of the single vehicle collisions are where a vehicle ran off the road. The high number of these types of collisions suggests the roadway geometry may not match driver expectations and may warrant realignment.
 - b. Example Improvement Concept #2: Widen KY 86 to three-lanes through Cecilia in Hardin County to include a center two-way left turn lane. There were 30 crashes on this portion of KY 86 between 2006 and 2016, 15 (50 percent) of which were rear end collisions. A center two-way left turn lane would reduce these types of crashes and reduce congestion.
12. The Local Officials/Stakeholders were then separated into two groups and asked to identify locations with current safety concerns or areas where improvements should be considered. A plot of the study area and a plot comparing high crash spots with horizontal and vertical curve deficiencies were provided to help with the group exercise.
 - Group A identified the following locations:
 - i. KY 86 is too narrow at a box culvert between KY 253 (Bethlehem Academy Rd) and KY 1375 (Long Grove Rd).
 - ii. The KY 86 intersection with KY 1764 (Franklin Crossroads) has limited sight distance and issues with speeding.
 - iii. The curve between KY 1355 (Yates Chapel Road) and Wright Lane has horizontal and vertical curve issues.
 - iv. The city of Cecilia has several issues and would benefit from a three-lane widening.
 - v. The KY 86 and KY 920 (Salt River Road) intersection has parking lots just off the road.
 - vi. KY 86 between Fields Road and N Grandview Church Rd has a steep hill and areas where trees fall into the road. A recent fatal crash was cited at this location.
Note: No recorded fatality is reported in the Kentucky State Police crash database at this location within the last ten years.
 - Group B identified the following locations:
 - i. KY 86 between Jesse Priest Road and East of Marr Cemetery has several vertical and horizontal curve issues. There was a recent fatal crash at this location.

Note: The fatal collision was in July 2015. The driver crossed the centerline in a 40 MPH curve and hit another vehicle head on.

- ii. KY 86 between Merle Allen Rd and Lonnie Haynes Rd has several curves with vertical and horizontal issues.
 - iii. The KY 86 curve at Allgood Road has vertical and horizontal curve issues and the intersection is skewed.
 - iv. The KY 86 curve west of Redfern Lane has vertical and horizontal issues.
 - v. The KY 86 and US 60 intersection has poor sight distance. Caution lights should be considered.
13. Brian 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 April. 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 June to solicit feedback and suggested prioritization.

The meeting ended at approximately 4:30 p.m. EST.

Meeting Minutes

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

Charlie Allen
Co-Project Manager
KYTC District Office #4
634 East Dixie Hwy
Elizabethtown, KY 42702

FROM: Brian Aldridge
Project Manager
Stantec Consulting Services Inc.

DATE: May 12, 2017

SUBJECT: KY 86 Scoping Study
Breckinridge County – US 60 (MP 15.957) to Hardin County Line (MP 26.137)
Hardin County – Breckinridge County Line (MP 0.000) to US 62 (MP 16.145)
KYTC Item No. 4-8901.00
Project Team Meeting #2

The second project team meeting for the KY 86 Scoping Study was held at the KYTC District 4 Office in Elizabethtown, KY on May 3, 2017 at 10:00 a.m. EDT. The following individuals were in attendance:

Charlie Allen	KYTC – District 4
Brandon Bagby	KYTC – District 4
Brad Bottoms	KYTC – District 4
Brian Gregory	KYTC – District 4
Chris Jessie	KYTC – District 4
Adam King	Hardin County Planning & Development
Larry Krueger	KYTC – District 4
Lindsay Newton	Lincoln Trail ADD
Mikael Pelfrey	KYTC – Central Office Planning
Paul Sanders	KYTC – District 4
Mike Skaggs	Lincoln Trail ADD
Eileen Vaughan	KYTC – Central Office Planning
Jamie Watkins	KYTC – District 4
Kevin Young	KYTC – District 4
Brian Aldridge	Stantec Consulting Services Inc.
Steve Farmer	Stantec Consulting Services Inc.
Glenn Hardin	Stantec Consulting Services Inc.
Len Harper	Stantec Consulting Services Inc.
Graham Winchester	Stantec Consulting Services Inc.

Charlie Allen welcomed everyone and said the purpose of the meeting was to discuss the progress to date on the KY 86 Scoping Study, with particular attention on the preliminary improvement concepts. Handouts included a meeting agenda, a map depicting the preliminary improvement locations, maps comparing high crash spots with horizontal curve deficiencies, and maps comparing high crash spots with vertical curve deficiencies. A large study area map was also made available for participants to view and comment on. After introductions, Brian Aldridge and Len Harper delivered a presentation. The following enumerated items were discussed.

1. Brian noted the primary purpose of the meeting is to get feedback from the project team on preliminary improvement concepts and locations. Public meetings have been scheduled for June 12th at Franklin Crossroads Baptist Church and June 19th at Custer Elementary School.
2. State Representative Dean Schamore pushed for the project which became a legislative insert in the 2016 Highway Plan. The project is listed in the 2016 Highway Plan as Item No. 04-8901.00: Reconstruction study on KY 86 from US 60 (MP 15.957) to the Hardin County Line (MP 26.137). The limits of the study have been extended to include KY 86 in Hardin County from the Breckinridge County Line (MP 0.000) to US 62 (MP 16.145). The 2016 Highway Plan includes \$500,000 for the planning phase. This Scoping Study will not spend the entire planning budget, leaving some money for preliminary design of one or more improvement projects. Additional phases of the project are not funded in the 2016 Highway Plan.
3. Some highlights from the existing conditions inventory were discussed. The KY 86 study area is 26.325 miles in length between the US 60 intersection in Breckinridge County and the US 62 intersection in Hardin County. Within the study corridor, KY 86 is functionally classified as a Rural Minor Arterial from US 60 in Breckinridge County to Cecilia in Hardin County and an Urban Minor Arterial from Cecilia to US 62. KY 86 is a two-lane road with nine-foot wide lanes and eighteen-inch wide paved shoulders. The road widens in Cecilia to include 12-foot-wide lanes, curb and gutter, and sidewalks. The posted speed limit throughout most of the corridor is 55 mph except in Cecilia and several unincorporated communities, where the posted speed limit drops to 35 mph.
4. A review of the as-built plans reveals there are 72 horizontal curves in the study area, and 18 (25 percent) do not meet design standards for the posted speed limit. Of the 242 vertical curves in the study area, 160 (66 percent) have stopping sight distance that does not satisfy the posted speed limit.
5. Crash data from the Kentucky State Police database indicate 398 crashes were reported between July 1, 2006 and June 30, 2016. This includes six fatal crashes (1.5 percent) and 105 (26 percent) injury collisions. Of the 398 reported crashes, 224 (56 percent) were single vehicle collisions. Critical crash rate factors (CRF) were calculated for the most recent five-year study period (July 1, 2011 to June 30, 2016).

A CRF greater than 1.0 suggests crashes are likely not occurring at random. There are nineteen 0.3-mile long spots with CRF values greater than 1.0.

6. KY 86 has a 2016 Annual Average Daily Traffic (AADT) volume between 1,700 and 4,100 vehicles per day (vpd) with 2.5 to 11 percent trucks. Historic traffic counts from the KYTC indicate traffic growth along KY 86 between US 60 and US 62 has generally been flat or declining for the last 20 years. According to the KY State Data Center, Breckinridge County's population is expected to decrease 0.4 percent per year through 2040 and Hardin County's population is expected to increase 1.0 percent per year through 2040. The Hardin-Meade Travel Demand Model estimates a small amount of growth along KY 86 in the study area. Assuming a conservative 0.5 percent annual growth in traffic and trucks, the 2040 AADT volumes are expected to grow to between 1,900 and 4,700 vpd with three to 12 percent trucks.

7. The draft Purpose and Need Statement for the project is as follows:

The purpose of the KY 86 Improvement Project is to enhance regional mobility and to provide a safer east/west corridor across Breckinridge and Hardin Counties. KY 86 provides the most direct regional connection for areas between Hardinsburg, Cecilia, Elizabethtown, the Western Kentucky Parkway, and I-65. I-65 is a major north-south interstate highway that travels through Western Kentucky from Nashville, Tennessee in the south to Louisville, Kentucky in the north.

The project team had an open discussion about "deficiency" versus "need". A "need" is more than a deficiency. The intent of this project should be to improve the roadway to meet driver expectations rather than bring it up to "desirable" Green Book Standards. Curves without a crash history that fit the context of the road do not necessarily "need" to be addressed.

8. Brian provided a recap of the first Local Officials/Stakeholders Meeting held on January 31, 2017 at Franklin Crossroads Baptist Church in Cecilia, KY. During that meeting, attendees were asked to identify locations of concern for the project team to consider possible improvements. Fourteen locations were identified as shown in **Figure 1**.

9. In addition to the No-Build, this study will examine two types of improvements:

- Complete Reconstruction: Widen driving lanes and shoulders and bring roadway geometrics to 55 mph design speed. This alternative would cost approximately \$160 million (assumes \$6 million per mile) which would likely make such an undertaking infeasible because it would have to compete against other statewide projects for funding.
- Spot Improvements: Lower cost safety improvements focused on locations with high crash rates and less than desirable roadway geometry.

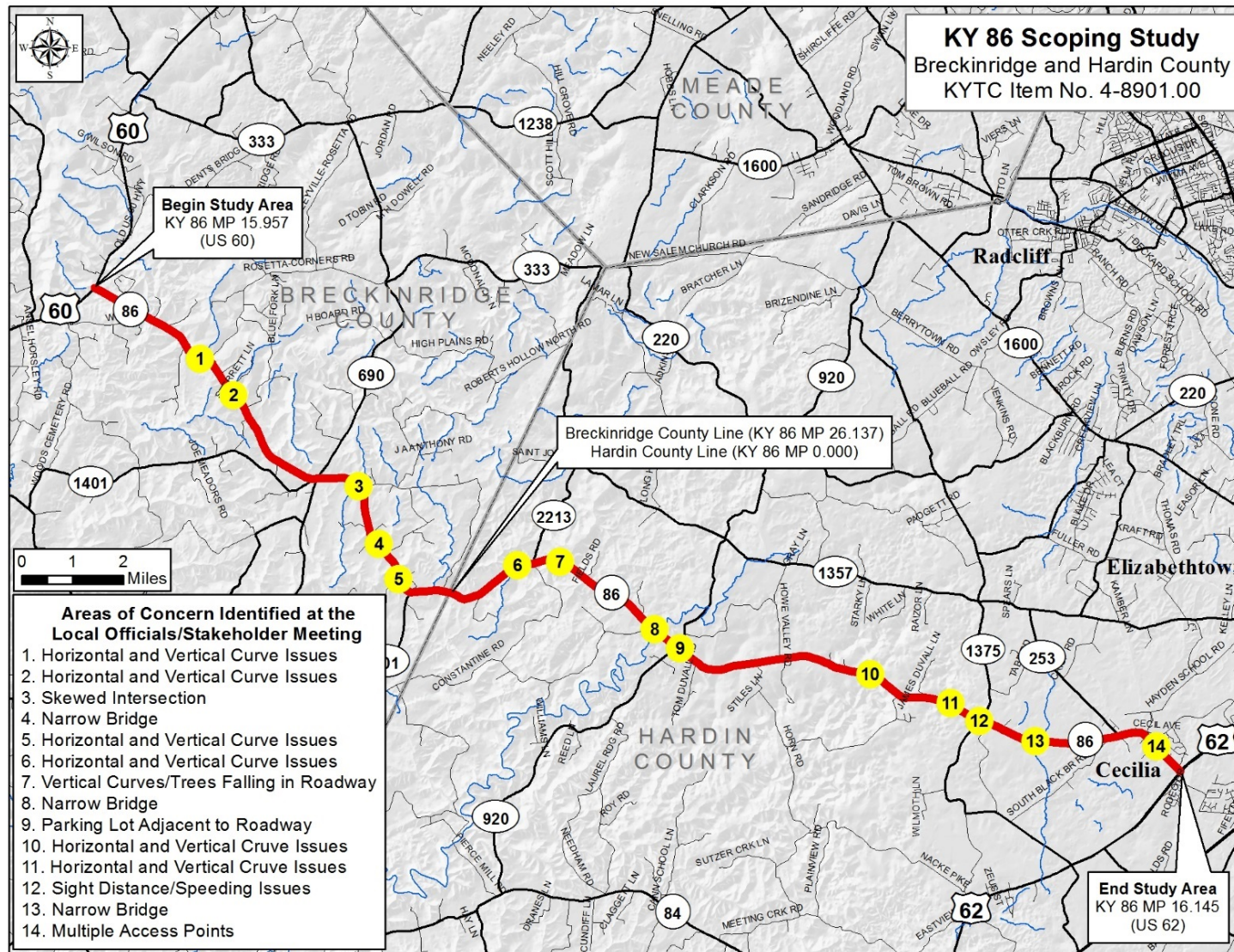


Figure 1 – Areas of Concern Identified at the Local Officials/Stakeholders Meeting #1

10. Len presented 22 preliminary spot improvement projects which have been revised or combined to result in 19 segments. The locations were identified because they had a high crash rate and/or they were identified as an area of concern at the first Local Officials/Stakeholders Meeting. The Performance Based Flexible Solutions (PBFS) philosophy was followed when developing potential improvements. The intent is not to bring each location to a 55 mph design speed when so much of the existing road does not accommodate that. Instead, solutions which could be implemented in the near term were identified based on the site-specific crash history. Where geometrics do not appear to meet driver expectations, roadway realignment was also considered. The spot improvements have been revised based on feedback and recommendations from the project team. **Figure 2** shows the location of the revised spot improvements and a description of each spot improvement is below. The revised spot improvement project sheets are also included as an attachment to this meeting summary.

- **Spot Improvement 1:** This spot improvement includes KY 86 between US 60 and Jesse Priest Road in Breckinridge County (MP 15.957 to MP 17.700). This portion of the route includes three high crash spots with CRF's of 1.24. Of the 29 reported crashes over the past ten years, 15 were injury collisions. 14 of those crashes (48 percent) were single vehicle crashes including vehicles that ran-off the road. A possible improvement is to widen the shoulders along this portion of KY 86. The narrow shoulders and shoulder breaks provide less than desirable recovery opportunity for vehicles leaving the travel way. Additional improvements along this portion of KY 86 include improving the clear zone at a steep roadside ditch and paving the minor approaches to KY 86 at Wee Springs Road and Lucas-Moore Lane.
- **Spot Improvement 2:** This spot improvement includes KY 86 from Jesse Priest Road to south of Rosetta Corners in Breckinridge County (MP 17.700 to MP 18.800). This portion of the route includes three high crash spots with CRF's ranging from 1.24 to 1.86. Of the 21 reported crashes over the past ten years, one was a fatal collision and eight were injury collisions. This portion of the route includes a combination of sharp curves and poor stopping sight distance. A short-term option could include widening shoulders, adding flexible delineators, and the application of a high-friction pavement surface at the three horizontal curves. A long-term improvement could include realigning the segment replacing three of the horizontal curves with a single curve. It was noted that there is a PIF at this location and that there are advisory curve signs but no advisory speed signs at this location. There is also a cluster of rear-end and head-on collisions at Rosetta Corners. Access management could be considered to reduce the number of access points.

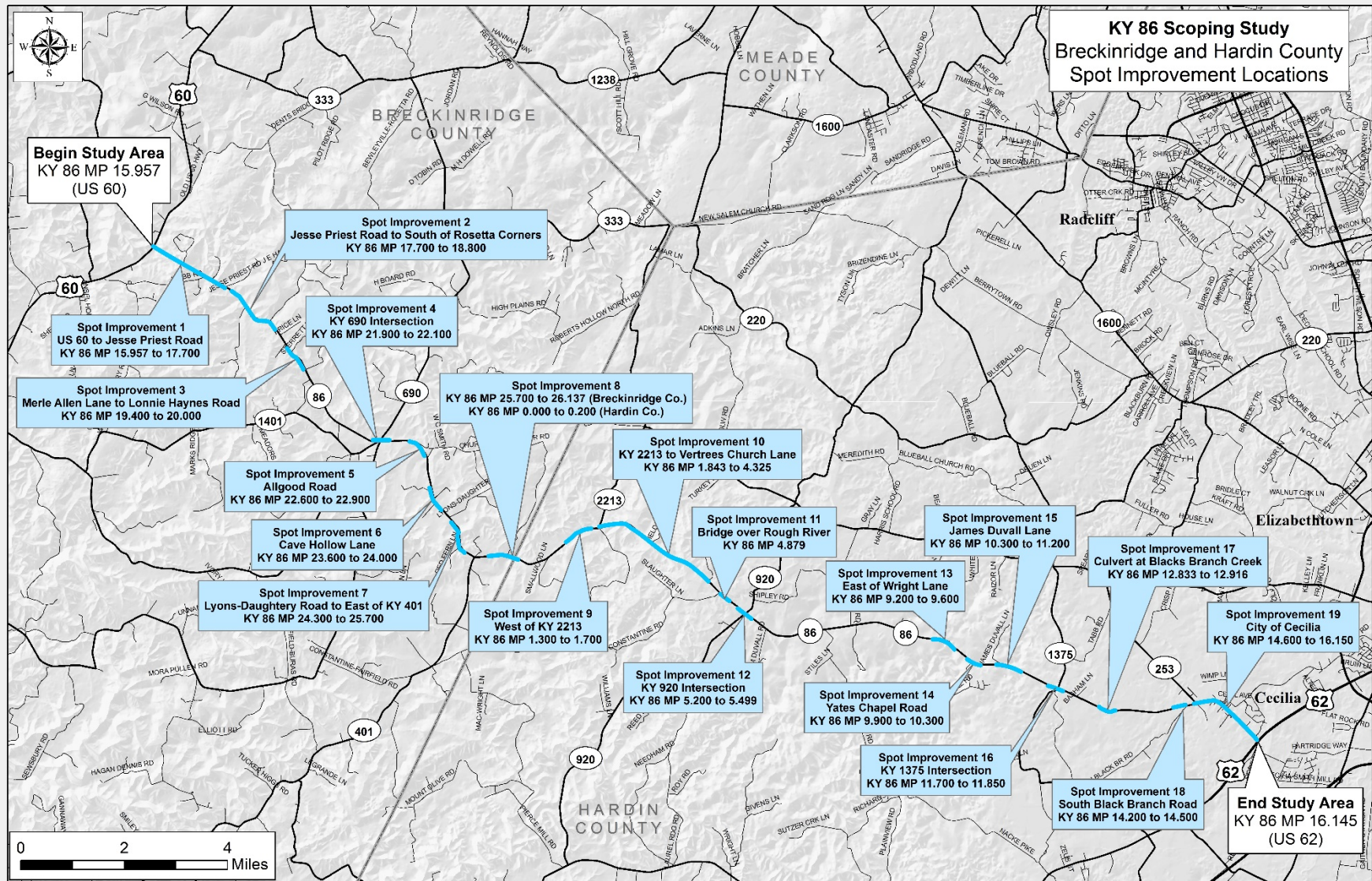


Figure 2 – Spot Improvement Location Map

- **Spot Improvement 3:** This spot improvement includes KY 86 between Merle Allen Lane and Lonnie Haynes Road in Breckinridge County (MP 19.400 to MP 20.000). This location was identified as an area of concern at the first Local Officials/Stakeholders Meeting. Of the seven reported crashes over the past ten years, two were injury collisions. Five of those crashes (71 percent) were single vehicle crashes. This portion of the route includes reverse curves. A possible improvement could include widening shoulders, adding flexible delineators, and the application of a high-friction pavement surface at the two horizontal curves.
- **Spot Improvement 4:** This spot improvement includes the KY 86 intersections with KY 1401 and KY 690 in Breckinridge County (MP 21.900 to MP 22.100). Of the five reported crashes over the past ten years, one was an injury collision. The five reported crashes include two head on collisions, one angle collision, one rear end collision, and one backing collision. There is a general store and a post office located at the KY 690 intersection, and access is poorly defined. A possible improvement would be to implement access management improvements to better define access. Additional improvements include realigning the skewed intersections at KY 690 and KY 1401.
- **Spot Improvement 5:** This spot improvement includes KY 86 near Allgood Road in Breckinridge County (MP 22.600 to MP 22.900). This location is a high crash spot with a CRF of 2.29 and was identified as an area of concern at the first Local Officials/Stakeholders Meeting. Of the nine reported crashes over the past ten years, three were injury collisions (33 percent). Eight of those crashes (89 percent) were single vehicle crashes. This portion of the route includes a 45 mph horizontal curve with a skewed intersection at Allgood Road. A possible improvement could include removing vegetation to improve the clear zone and sight-lines, widening shoulders, adding flexible delineators, and the application of a high-friction pavement surface at the horizontal curve. Allgood Road is connected to Conder-St. John Road, and the Allgood Road approach to KY 86 is skewed. Removing the direct connection from Allgood to KY 86 would improve safety at the horizontal curve. Access to KY 86 would be maintained at Conder-St. Johns Road.
- **Spot Improvement 6:** This spot improvement includes KY 86 near Cave Hollow Lane in Breckinridge County (MP 23.600 to MP 24.000). This location is a high crash spot with a CRF of 1.96 and was identified as an area of concern at the first Local Officials/Stakeholders Meeting. Of the six reported crashes over the past ten years, three were injury collisions. Four of those crashes (67 percent) were single vehicle crashes. This portion of the route includes a 45 mph horizontal curve. A possible improvement could include widening shoulders and the application of a high-friction pavement surface at the horizontal curve. It was noted that flexible delineators were recently installed at this horizontal curve on April 23, 2017. An additional

improvement along this portion of KY 86 includes improving the clear zone at a culvert.

- **Spot Improvement 7:** This spot improvement includes KY 86 from Lyons-Daughtery Road to east of KY 401 in Breckinridge County (MP 24.300 to MP 25.700). This location is a high crash spot with a CRF of 2.49 and was identified as an area of concern at the first Local Officials/Stakeholders Meeting. Of the 27 reported crashes over the past ten years, one was a fatal collision and nine were injury collisions. This portion of the route includes a combination of sharp curves and poor stopping sight distance. A short-term option could include widening shoulders, adding flexible delineators, and the application of a high-friction pavement surface at the four horizontal curves. A long-term improvement could include realigning the route to eliminate many of the curves. KY 401 would likely need to be extended to the realignment. An additional improvement along this portion of KY 86 could include paving the intersection approaches at Lyons-Daughtery Road and Dyer Cemetery Road.
- **Spot Improvement 8:** This spot improvement includes KY 86 at the Breckinridge and Hardin County Line. This location is a high crash spot with a CRF of 1.25. Of the 13 reported crashes over the past ten years, two were fatal collisions and four were injury collisions. The two fatal collisions included a driver under the influence and a collision with a deer. Nine of the crashes (69 percent) were single vehicle. This portion of the route includes a 50 mph horizontal curve. A possible improvement could include widening shoulders, adding flexible delineators, and the application of a high-friction pavement surface at the horizontal curve. An additional improvement along this portion of KY 86 includes improving the clear zone at a culvert.
- **Spot Improvement 9:** This spot improvement includes KY 86 west of Grandview Church Road in Hardin County (MP 1.300 to MP 1.700). This location is a high crash spot with a CRF of 1.25 and was identified as an area of concern at the first Local Officials/Stakeholders Meeting. Of the nine reported crashes over the past ten years, three were injury collisions (33 percent). Six of the crashes (67 percent) were single vehicle crashes. A possible improvement could include removing vegetation to improve the clear zone and sight-lines and widening shoulders where guardrail is needed at the horizontal curve.
- **Spot Improvement 10:** This spot improvement includes KY 86 between KY 2213 and Vertrees Church Lane in Hardin County (MP 1.843 to MP 4.325). This location was identified as an area of concern at the first Local Officials/Stakeholders Meeting. Of the 22 reported crashes over the past ten years, five were injury collisions (23 percent). 15 of the crashes (68 percent) were single vehicle crashes including vehicles that ran-off the road and hit a fixed object such as guardrail. This portion of KY 86 has minimal clear zone

between the roadway and adjacent trees, guardrail, culverts, and bridge. Possible improvements include removing trees to improve the clear zone and sight-lines, widening shoulders where guardrail is needed, widening or replacing the bridge, and improving the clear zone at the culverts.

- **Spot Improvement 11:** This spot improvement includes the KY 86 bridge over Rough River in Hardin County (MP 4.879). The narrow 20-foot wide bridge has a sufficiency rating of 65.6 and was identified as an area of concern at the first Local Officials/Stakeholders Meeting. Over the past ten years there was one sideswipe accident on the bridge. A short-term option could include removing vegetation to improve the clear zone and sight-lines. A long-term improvement could include widening or replacing the bridge.
- **Spot Improvement 12:** This spot improvement includes the KY 86 intersection with KY 920 in Hardin County (MP 5.200 to MP 5.499). This location is a high crash spot with a CRF of 1.70 and the multiple access points were identified as an area of concern at the first Local Officials/Stakeholders Meeting. A flashing caution light is present at the intersection. Of the 15 reported crashes near this intersection over the past ten years, five were injury collisions (33 percent). Eight of the crashes (53 percent) were angle crashes. Field's Grocery is located at this busy intersection and access is poorly defined. A possible improvement would be to implement access management improvements to better define access. An additional improvement would move the passing permitted striping away from the intersection.
- **Spot Improvement 13:** This spot improvement includes KY 86 east of Wright Lane in Hardin County (MP 9.200 to MP 9.600). This portion of the route includes a 45 mph horizontal curve with poor stopping sight distance. This portion of the route includes two high crash spots with CRF's ranging from 1.21 to 1.70 and was identified as an area of concern at the first Local Officials/Stakeholders Meeting. Of the 13 reported crashes over the past ten years, three were injury collisions (23 percent). Nine of the crashes (69 percent) were single vehicle crashes including vehicles that ran-off the road. A possible improvement could include removing vegetation to improve the clear zone and sight-lines, widening shoulders, adding flexible delineators, and the application of a high-friction pavement surface at the horizontal curve. An additional improvement could include improving the clear zone at the steep roadside ditch.
- **Spot Improvement 14:** This spot improvement includes KY 86 near Yates Chapel Road in Hardin County (MP 9.900 to MP 10.300). This portion of the route includes a 50 mph horizontal curve and is a high crash spot with a CRF of 1.21. Of the 14 reported crashes over the past ten years, one was a fatal collision and seven were injury collisions (50 percent). The fatal collision was a head on collision in the horizontal curve. Ten of the crashes (71

percent) were single vehicle crashes. A possible improvement could include widening shoulders, adding flexible delineators, and the application of a high-friction pavement surface at the horizontal curve.

- **Spot Improvement 15:** This spot improvement includes KY 86 near James Duvall Lane in Hardin County (MP 10.300 to MP 11.200). This portion of the route has a combination of multiple driveways and vertical curves with poor stopping sight distance. The segment is a high crash spot with a CRF of 1.21. Of the 16 reported crashes over the past ten years, five were injury collisions (31 percent). Nine of the crashes (56 percent) were rear end collisions. A short-term option could include removing vegetation along the vertical curves to improve the clear zone and sight-lines. A long-term improvement could include realigning the vertical curves to improve the stopping sight distance.
- **Spot Improvement 16:** This spot improvement includes the KY 86 intersection with KY 1375 in Hardin County (MP 11.700 to MP 11.850). This location is a high crash spot with a CRF of 1.37 and the poor sight distance was identified as an area of concern at the first Local Officials/Stakeholders Meeting. Of the nine reported crashes near this intersection over the past ten years, one was a fatal collision. Five of the crashes (56 percent) were angle crashes. A short-term option could include removing vegetation east of KY 1375 to improve the sight-lines at the intersection. A long-term improvement could include realigning the vertical curves west of KY 1375 to improve the stopping sight distance.
- **Spot Improvement 17:** This spot improvement includes the KY 86 culvert for Blacks Branch Creek in Hardin County (MP 12.833 to MP 12.916). The narrow culvert was identified as an area of concern at the first Local Officials/Stakeholders Meeting. Over the past ten years, six single vehicle collisions, one sideswipe collision, and one rear end collision occurred near the culvert. A possible improvement could include improving the clear zone at the culvert.
- **Spot Improvement 18:** This spot improvement includes KY 86 near South Black Branch Road in Hardin County (MP 14.200 to MP 14.500). This location is a high crash spot with a CRF of 1.51. Of the eight reported crashes at this intersection over the past ten years, two were injury collisions (25 percent). Six of the crashes (75 percent) were single vehicle crashes. Of the six single vehicle collisions, two were collisions with an animal and one was a collision with a bicyclist. A possible improvement could include improving the clear zone along the northern roadside ditch.
- **Spot Improvement 19:** This spot improvement includes KY 86 through the city of Cecilia in Hardin County (MP 14.600 to MP 16.150). This location was identified as an area of concern at the first Local Officials/Stakeholders

Meeting. There were 31 crashes on this portion of KY 86 between 2006 and 2016, 15 (48 percent) of which were rear end collisions. A possible improvement could be to widen KY 86 to three-lanes through Cecilia in Hardin County to include a center two-way left turn lane. A center two-way left turn lane would reduce these types of crashes and reduce congestion. Additional improvements include realigning the vertical alignment on KY 86 at the KY 253/Lewis Lane intersection to improve stopping sight distance, drainage improvements from West Rhudes Creek to the Farm Supply Lot to reduce flooding, and adding signal ahead warning signage prior to KY 86/US 62 intersection to improve intersection and traffic signal conspicuity.

11. Brian ended the meeting with a discussion of the project schedule and next steps. Based on feedback and recommendations from the project team, the revised spot improvements will be carried forward for further refinement and evaluation, including developing construction cost estimates. The refined alternatives will be presented to the local officials and the general public in June to solicit feedback and suggested prioritization. A Resource Agency Mailing will also be conducted to solicit feedback.

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

Meeting Minutes

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

Charlie Allen
Co-Project Manager
KYTC District Office #4
634 East Dixie Hwy
Elizabethtown, KY 42702

FROM: Brian Aldridge
Project Manager
Stantec Consulting Services Inc.

DATE: June 13, 2017

SUBJECT: KY 86 Scoping Study
Breckinridge County – US 60 (MP 15.957) to Hardin County Line (MP 26.137)
Hardin County – Breckinridge County Line (MP 0.000) to US 62 (MP 16.145)
KYTC Item No. 4-8901.00
Local Officials/Stakeholders Meeting #2 in Hardin County

A second local officials/stakeholders meeting for Hardin County was held at the Franklin Crossroads Baptist Church in Cecilia, KY on June 12, 2017 at 3:00 p.m. EDT. The following individuals were in attendance:

Charlie Allen	KYTC – District 4
Harry Berry	Hardin County Judge Executive
Brad Bottoms	KYTC – District 4
Nick Douthitt	Hardin County Engineering
Joseph Ferguson	KYTC – District 4
Chris Jessie	KYTC – District 4
Dana King	KYTC – District 4
Kevin Martin	KYTC – Central Office Design
Vicki Meredith	Hardin County Engineering
Lindsay Newton	Lincoln Trail ADD
Mikael Pelfrey	KYTC – Central Office Planning
Mike Skaggs	Lincoln Trail ADD
Benjamin Warren	KYTC – District 4
Wesley Wright	Hardin County Planning
Kevin Young	KYTC – District 4
Brian Aldridge	Stantec Consulting Services Inc.
Steve Farmer	Stantec Consulting Services Inc.
Len Harper	Stantec Consulting Services Inc.
Graham Winchester	Stantec Consulting Services Inc.

Brian Aldridge welcomed everyone and said the purpose of the meeting was to discuss the progress to date on the KY 86 Scoping Study. Handouts included a questionnaire and a project overview, as well as a green, yellow and red sticker. After introducing the Project Team, Brian delivered a presentation. The following enumerated items were discussed.

1. The purpose of the meeting is to share information about the KY 86 Scoping Study, discuss improvement concepts under consideration, and to obtain input from local officials and stakeholders.
2. State Representative Dean Schamore pushed for the project which became a legislative insert in the 2016 Highway Plan. The project is listed in the 2016 Highway Plan as Item No. 04-8901.00: Reconstruction study on KY 86 from US 60 (MP 15.957) to the Hardin County Line (MP 26.137). The limits of the study have been extended to include KY 86 in Hardin County from the Breckinridge County Line (MP 0.000) to US 62 (MP 16.145). The 2016 Highway Plan includes \$500,000 for the planning phase. This Scoping Study will not spend the entire planning budget, leaving some money for preliminary design of one or more improvement projects. Additional phases of the project are not funded in the 2016 Highway Plan.
3. Some highlights from the existing conditions inventory were discussed. The KY 86 study area is approximately 26.325 miles in length between the US 60 intersection in Breckinridge County and the US 62 intersection in Hardin County. Within the study corridor, KY 86 is functionally classified as a Rural Minor Arterial from US 60 in Breckinridge County to Cecilia in Hardin County and an Urban Minor Arterial from Cecilia to US 62. KY 86 is a two-lane road with nine-foot wide lanes and eighteen-inch wide paved shoulders. The road widens in Cecilia to include 12-foot-wide lanes, curb and gutter, and sidewalks. The posted speed limit throughout most of the corridor is 55 mph except in Cecilia and several unincorporated communities, where the posted speed limit drops to 35 mph.
4. A review of the as-built plans reveals there are 72 horizontal curves in the study area, and 18 (25 percent) do not meet design standards for the posted speed limit. Of the 242 vertical curves in the study area, 160 (66 percent) have stopping sight distance that does not satisfy the posted speed limit.
5. Crash data from the Kentucky State Police database indicate 398 crashes were reported between July 1, 2006 and June 30, 2016. This includes six fatal crashes (1.5 percent) and 105 (26 percent) injury collisions. Of the 398 reported crashes, 224 (56 percent) were single vehicle collisions. Critical crash rate factors (CRF) were calculated for the most recent five-year study period (July 1, 2011 to June 30, 2016). A CRF greater than 1.0 suggests crashes are likely not occurring at random.
6. KY 86 has an Annual Average Daily Traffic (AADT) volume between 1,700 and 4,200 vehicles per day (vpd) with 2.5 to 11 percent trucks. Historic traffic counts from the KYTC indicates traffic growth along KY 86 between US 60 and US 62 has generally been flat or declining for the last 20 years. According to the KY State Data

Center, Breckinridge County's population is expected to decrease 0.4% per year through 2040 and Hardin County's population is expected to increase 1.0% per year through 2040. Assuming a conservative one percent annual growth in traffic and a 0.5 percent annual growth in trucks the 2040 AADT volumes are expected to grow to between 2,100 and 5,300 vpd with 2.7 to 11.7 percent trucks. After performing a capacity analysis of the existing and future traffic, all roadway segments operate at less than full capacity with a volume to capacity (V/C) ratio less than 0.24 and a level of service (LOS) C or better. The results of this analysis indicate a two-lane road can adequately accommodate the existing and future traffic demand.

7. Brian explained the difference between a “deficiency” and a “need”. A “need” is more than a deficiency. Curves without a crash history that fit the context of the road do not necessarily “need” to be fixed. The intention is to improve the roadway to meet driver expectations rather than bring it up to “desirable” Green Book Standards.
8. A draft purpose and need statement was prepared for the scoping study that is unique to the goals and issues to be addressed by the project:

The purpose of the KY 86 Improvement Project is to enhance regional mobility and to provide a safer east/west corridor across Breckinridge and Hardin Counties.

9. During the first Local Officials/Stakeholders meeting, attendees were asked to identify areas of concerns in the study area, as shown in **Figure 1**. These locations, along with crash data, were used to determine potential locations for improvement projects.
10. In addition to the No-Build, this study will examine two types of improvements:
 - Improved Two-Lane for Entire Corridor: Widen driving lanes and shoulders and bring roadway geometrics to 55 mph design speed. This alternative would cost approximately \$130 to \$160 million (assumes \$5 to \$6 million per mile) which would likely make such an undertaking infeasible because it would have to compete against other statewide projects for funding.
 - Spot Improvements: Lower cost safety improvements focused on locations with high crash rates and less than desirable roadway geometry.

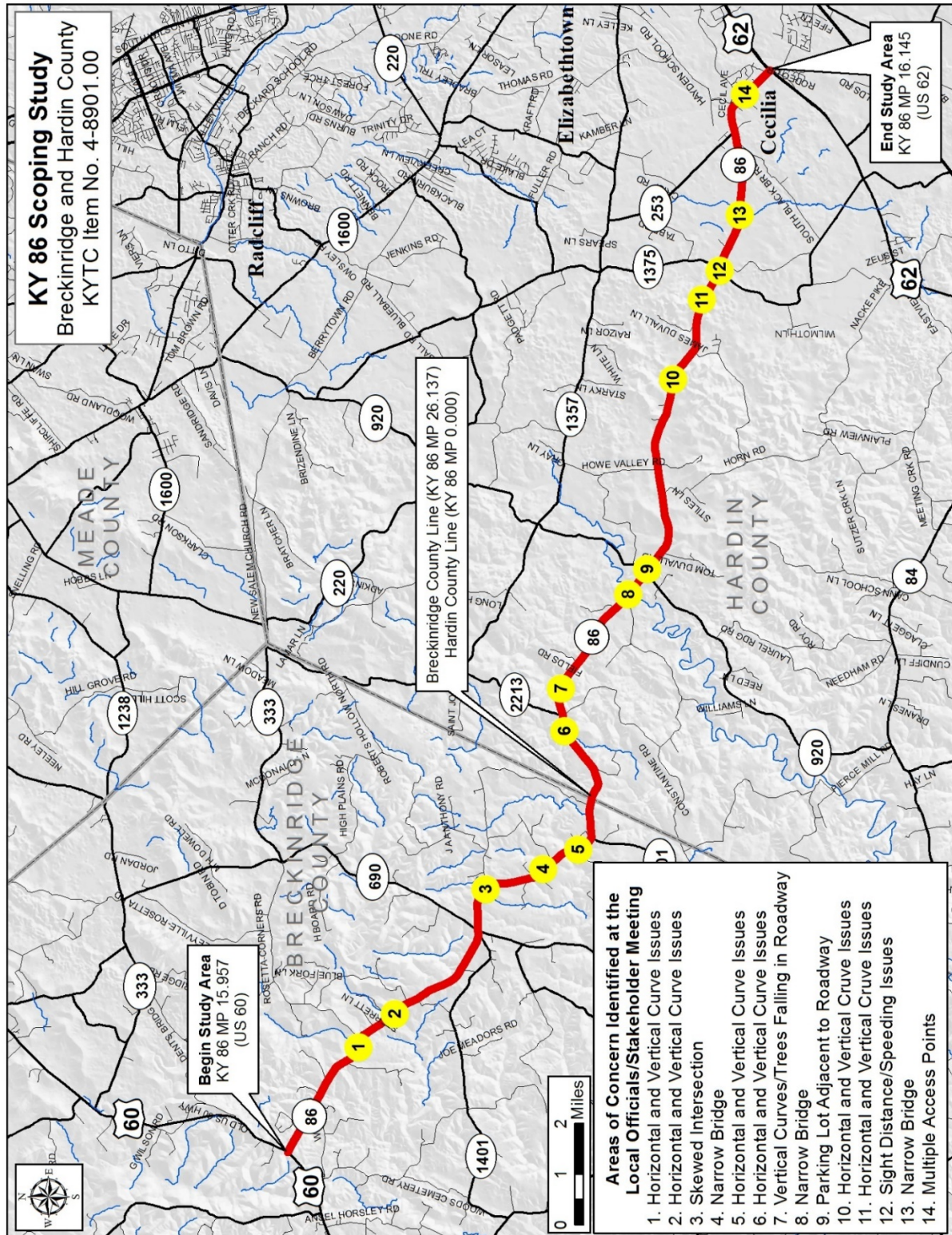


Figure 1: Areas of Concern Identified at the First Local Officials/Stakeholders Meeting

11. Stantec presented four example spot improvement concepts to help demonstrate the types of improvement projects under consideration.
 - a. Spot Improvement 1: KY 86 in Breckinridge County from US 60 (MP 15.957) to Jessie Priest Road (MP 17.700). There were 29 crashes on this section of KY 86 between 2006 and 2016, 15 (48 percent) of which were single vehicle collisions. Possible improvement options include widening shoulders, improving the clear zone, and paving an intersection approach.
 - b. Spot Improvement 6: KY 86 in Breckinridge County at Cave Hollow Lane (MP 23.600-24.000). There were six reported crashes in this location from 2006 to 2016, two (30 percent) of which were recent single vehicle collisions. Possible improvement options include widening shoulders at the horizontal curve, installing flexible delineators, installing high-friction pavement surface (\$20,000), and improving the clear zone.
 - c. Spot Improvement 7: KY 86 in Breckinridge County from Lyons-Daughtery Road (MP 24.300) to east of KY 401 (MP 25.700). There were 27 reported crashes in this location from 2006 to 2016, nine (33 percent) of which were injury collisions. Possible improvement options include widening shoulders at the horizontal curves, installing flexible delineators, installing high-friction pavement surface, paving an intersection approach, and realigning KY 86.
 - d. Spot Improvement 19: KY 86 in Hardin County the city of Cecilia (MP 14.600-16.150). There were 31 reported crashes in this location from 2006 to 2016, 15 (48 percent) of which were rear end collisions. Possible improvement options include realigning the vertical alignment, drainage improvements, installing a signal ahead warning sign, and widening KY 86 to 3-lanes.
12. The Local Officials/Stakeholders were then asked to identify their top three priority spot improvements and provide comments on specific locations by participating in a sticker exercise. Each attendee was given a green (top priority), yellow (second priority), and red (third priority) sticker to place on the improvement concept exhibit boards. Attendees also provided the Project Team with the following comments:
 - At the skewed KY 86 intersection with South Branch Road, farm equipment cannot make turns because of a utility pole.
 - There are sight distance issues at the skewed KY 86 intersection with KY 253.
13. The Local Officials/Stakeholders were also asked to fill out a survey to help the Project Team evaluate alternatives. One survey was filled out and returned at the meeting by Harry Berry, the Hardin County Judge Executive. Given a list of eleven transportation issues, Mr. Berry identified safety, excessive speed, few passing

opportunities, slow moving vehicles, steep grades, sharp curves, and narrow shoulders as issues that should be addressed by this project. Mr. Berry indicated that improvements are needed along KY 86 and selected Spot Improvements as the preferred alternative. The top three Spot Improvements chosen by the Hardin County Judge Executive include the City of Cecilia (Spot Improvement 19), James Duvall Lane (Spot Improvement 15), and the KY 1375 intersection (Spot Improvement 16).

14. Brian 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 meeting as well as the public meeting to refine improvement alternatives. The final project team meeting will be in August. At that time Stantec will present the refined alternatives for the project team to review and final prioritization.

The meeting ended at approximately 4:00 p.m. EDT.

Meeting Summary

TO:	Eileen Vaughn Co-Project Manager KYTC Central Office 200 Mero Street Frankfort, KY 40622	Charlie Allen Co-Project Manager KYTC District Office #4 634 East Dixie Highway Elizabethtown, KY 42701
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FROM: Brian Aldridge
Project Manager
Stantec Consulting Services Inc.

DATE: July 31, 2017

SUBJECT: KY 86 Scoping Study
Breckinridge County – US 60 (MP 15.957) to Hardin County Line (MP 26.137)
Hardin County –Breckinridge County Line (MP 0.00) to US 62 (MP 16.145)
Item Number 4-8901.00
Public Meeting

A Public Information Meeting for the KY 86 Scoping Study was held on June 12, 2017 at 5:00 p.m. EDT at Franklin Crossroads Baptist Church in Cecilia, KY. The purpose of the meeting was to provide information about the study, discuss conceptual alternatives, and solicit input from the public. The following individuals from the Kentucky Transportation Cabinet (KYTC) and the consultant staff were in attendance:

Charlie Allen	KYTC – District 4
Brad Bottoms	KYTC – District 4
Joseph Ferguson	KYTC – District 4
Chris Jessie	KYTC – District 4
Dana King	KYTC – District 4
Mikael Pelfrey	KYTC – Central Office Planning
Neela Saha	KYTC – Central Office Planning
Benjamin Warren	KYTC – District 4
Kevin Young	KYTC – District 4
Brian Aldridge	Stantec Consulting Services Inc.
Steve Farmer	Stantec Consulting Services Inc.
Len Harper	Stantec Consulting Services Inc.
Graham Winchester	Stantec Consulting Services Inc.

The meeting was held in an open house format, with a formal presentation at 5:15 p.m. to explain the project. Two variable message boards were used to inform people of the public meeting – one facing westbound traffic on KY 86 at the intersection with US 62 and the other facing eastbound traffic on KY 86 at Liberty Chapel near the Hardin/Breckinridge County line. A newspaper advertisement was also placed in The News-Enterprise on May 30, 2017 and June 5,

2017 to invite people to the public meeting.

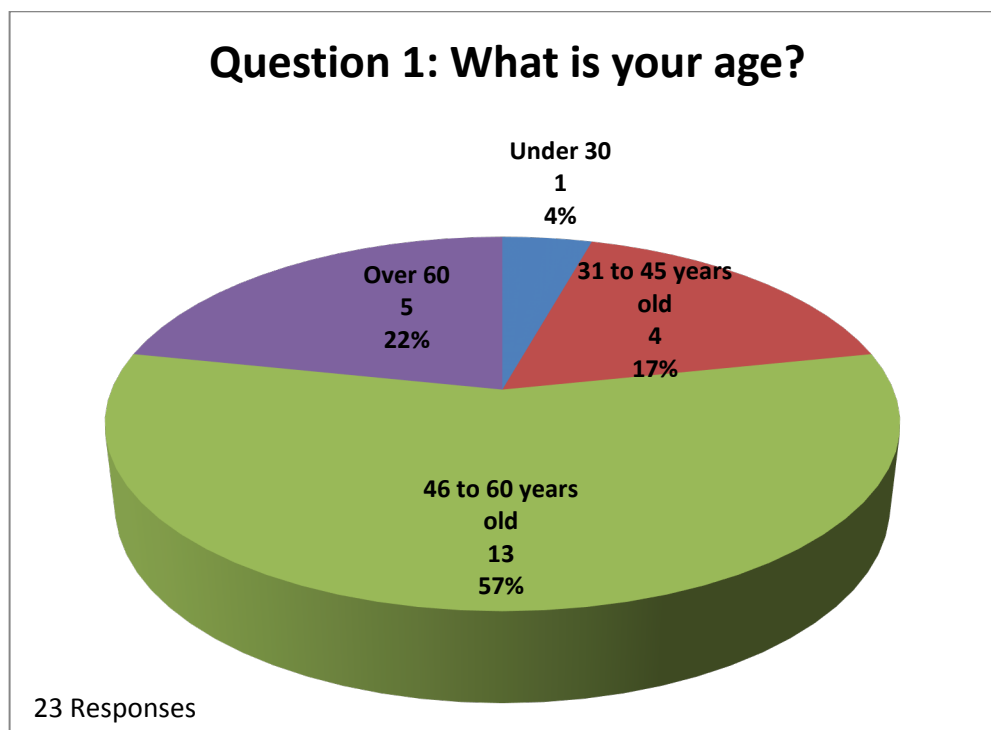
Upon arrival, attendees were asked to sign in and were provided handouts that included a questionnaire and a project overview, as well as a green, yellow and red sticker. All information was made available on the temporary project website at http://transportation.ky.gov/District-4/Pages/ky86_improvements.aspx. KYTC and consultant staff were available to answer questions and discuss issues. Based on the sign-in sheets, 70 members of the public attended the meeting.

The following project exhibits were on display:

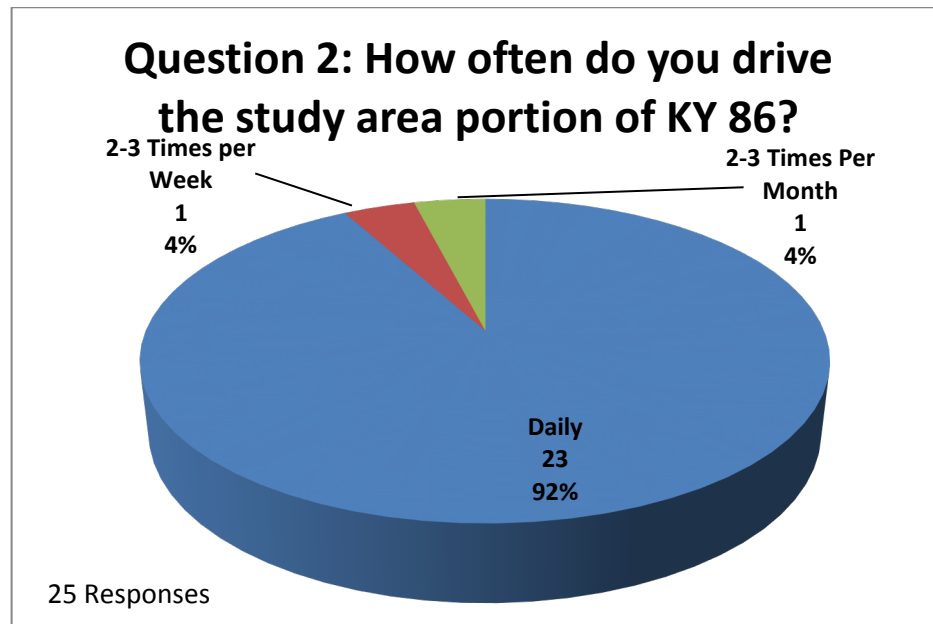
- How the KYTC Builds Roads
- Environmental Footprint
- Crash History, Traffic, and Roadway Characteristics
- Improvement Concepts

Public meeting attendees were given the option to either fill out their questionnaire at the meeting or return it by mail after the meeting. Nineteen questionnaires were returned at the meeting. An additional six questionnaires were returned after the meeting through July 31, 2017. The results of the questionnaire are summarized as follows:

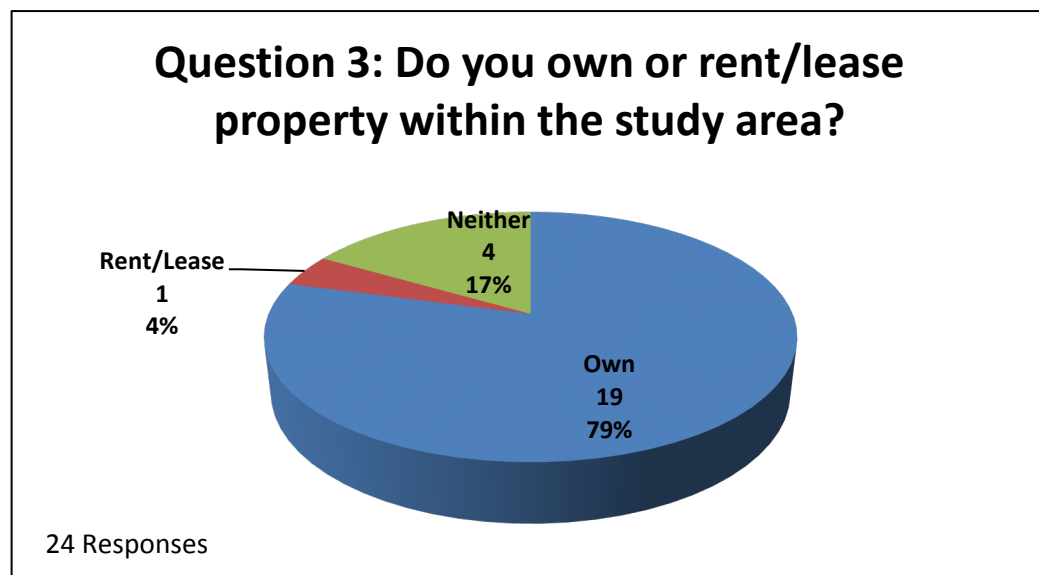
- The first question asked the age of the attendee. Thirteen respondents (57 percent) answered that they are 46-60 years old, five respondents (22 percent) answered that they are over 60 years old, four respondents (17 percent) answered that they are 31-45 years old, and one respondent (4 percent) answered that they are under 30 years old.



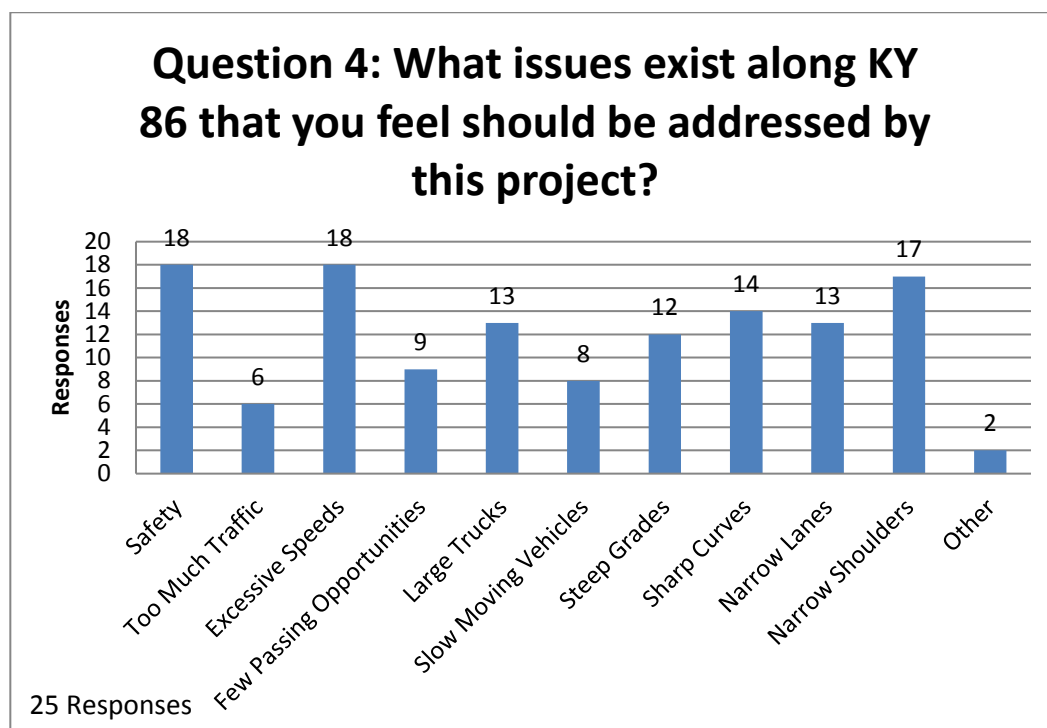
- b. Question 2 asked how frequently the attendees drove through the study area. Twenty-three respondents (92 percent) said they drive through the study area daily, one respondent (4 percent) said they drive through the study area 2-3 times a week and one respondent (4 percent) said they drive through the study area 2-3 times a month.



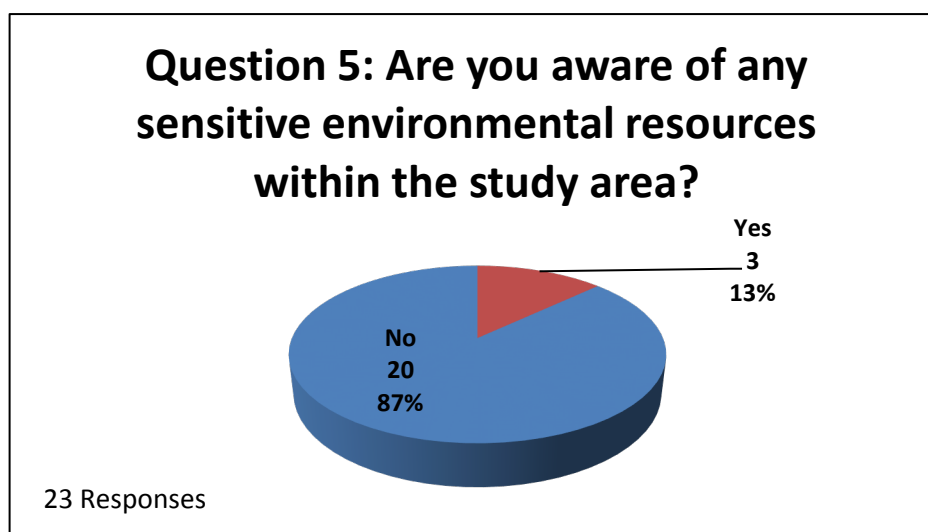
- c. Question 3 asked if the attendees own or rent/lease property within the study area. Nineteen respondents (79 percent) indicated they own property within the study area, four respondents (17 percent) indicated they neither own nor rent property in the study area and one respondent (4 percent) indicated they rent or lease property within the study area.



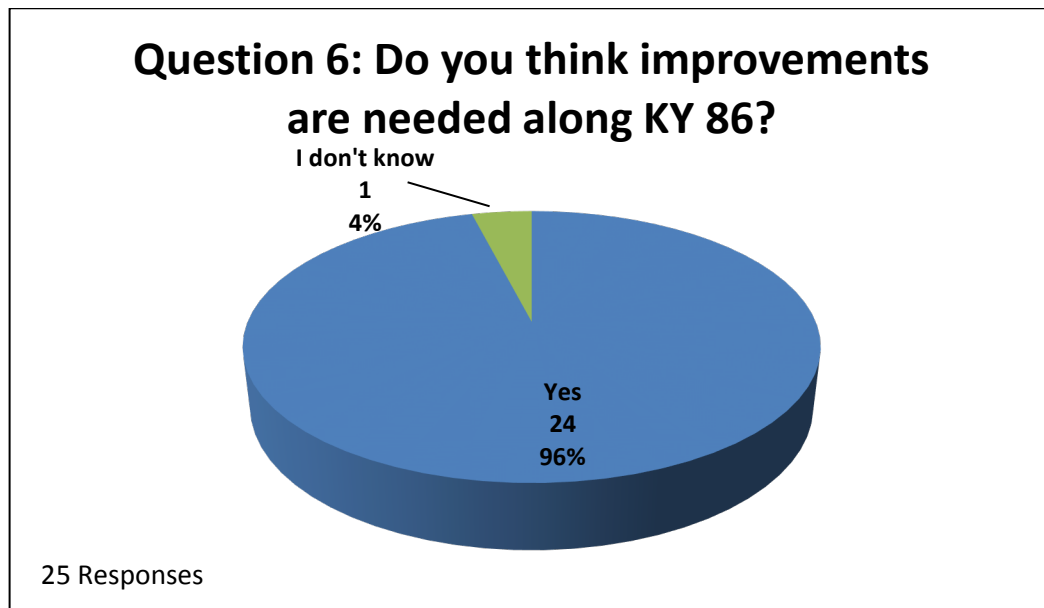
- d. Attendees were asked whether several transportation issues along KY 86 should be considered as a part of the project. Of the eleven options provided, safety (18 responses), excessive speeds (18 responses), and narrow shoulders (17 responses) were selected most. Other issues that were mentioned include ponding, trees falling onto the road and poor pavement condition.



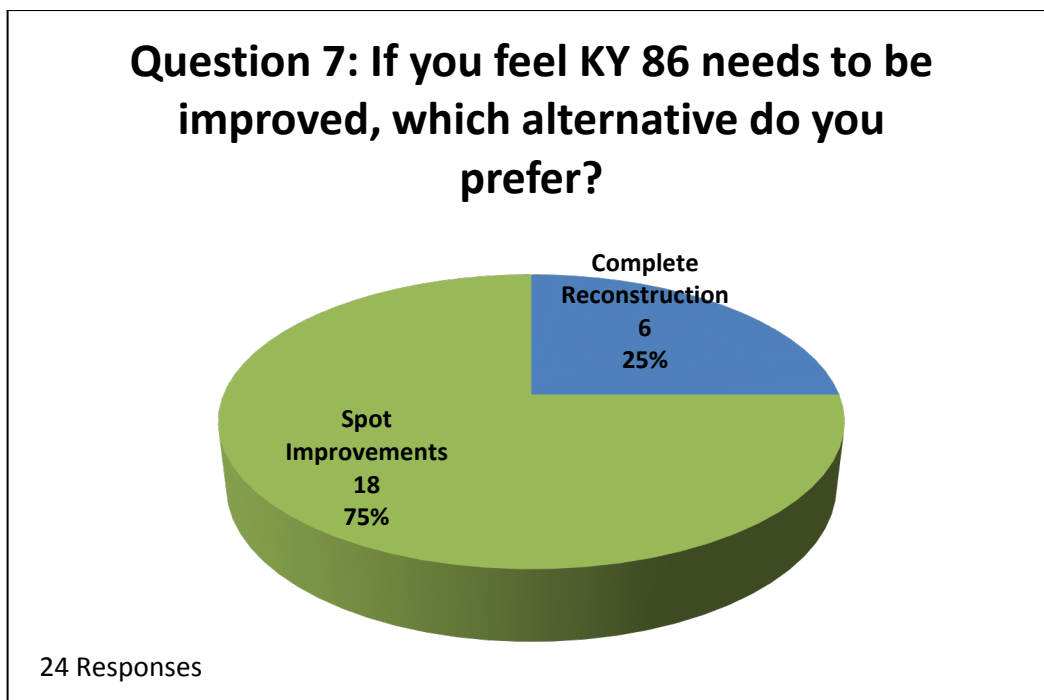
- e. Question 5 asked if there were any sensitive resources within the study area. Of the twenty-three respondents, three (13 percent) indicated they were aware of sensitive resources. Waterways that meet wetland standards and protected sandhill cranes were listed by one respondent and a fresh water spring at the bottom of Arch Hill was listed by another.



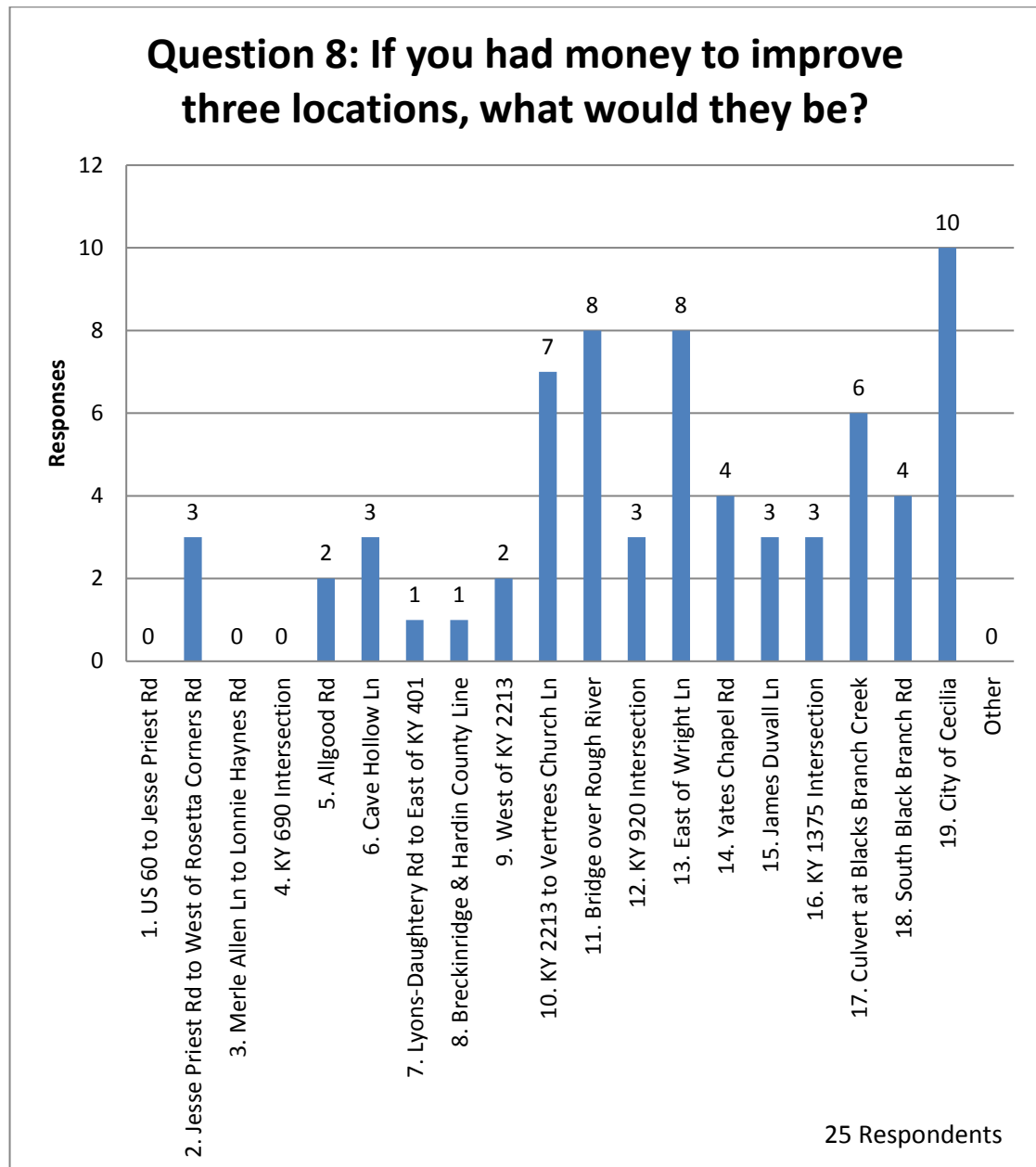
- f. Question 6 asked if respondents' felt improvements were needed along KY 86. All but one respondent (24 responses, 96 percent) indicated improvements were needed.



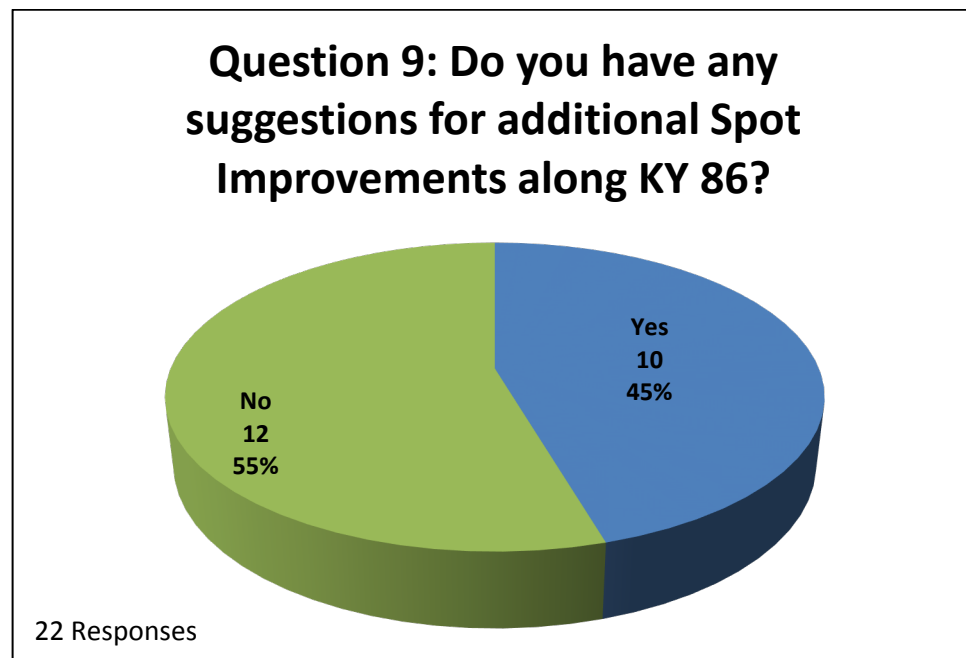
- g. Attendees were asked if they prefer further consideration of Complete Reconstruction or Spot Improvements. Of the 24 respondents, eighteen (75 percent) selected Spot Improvements and six (25 percent) selected Complete Reconstruction.



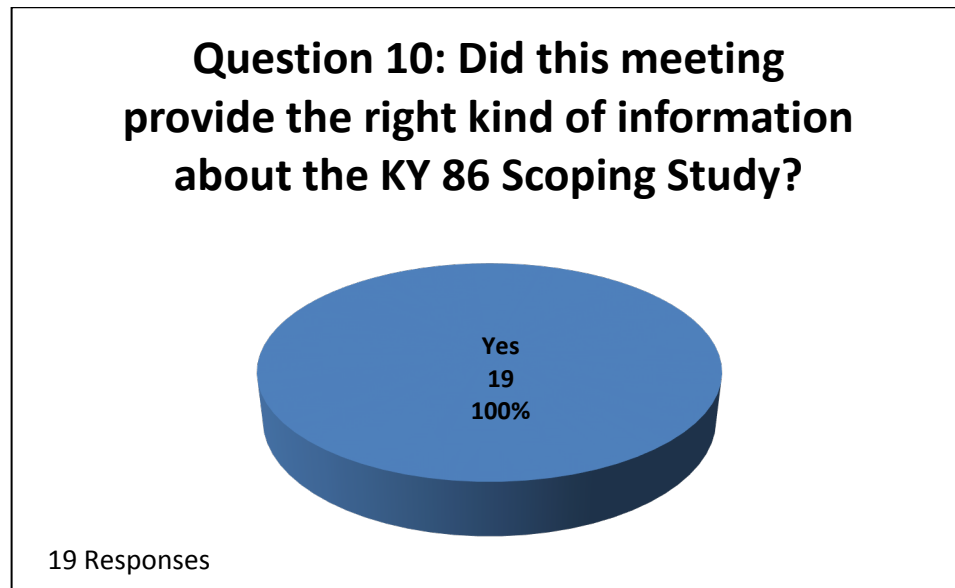
- h. Question 8 asked attendees which three spot improvement locations they prefer. Spot Improvements 19, 13, 11, 10, and 17 were the most commonly selected Spot Improvements, with Spot Improvement 19 receiving the most votes.



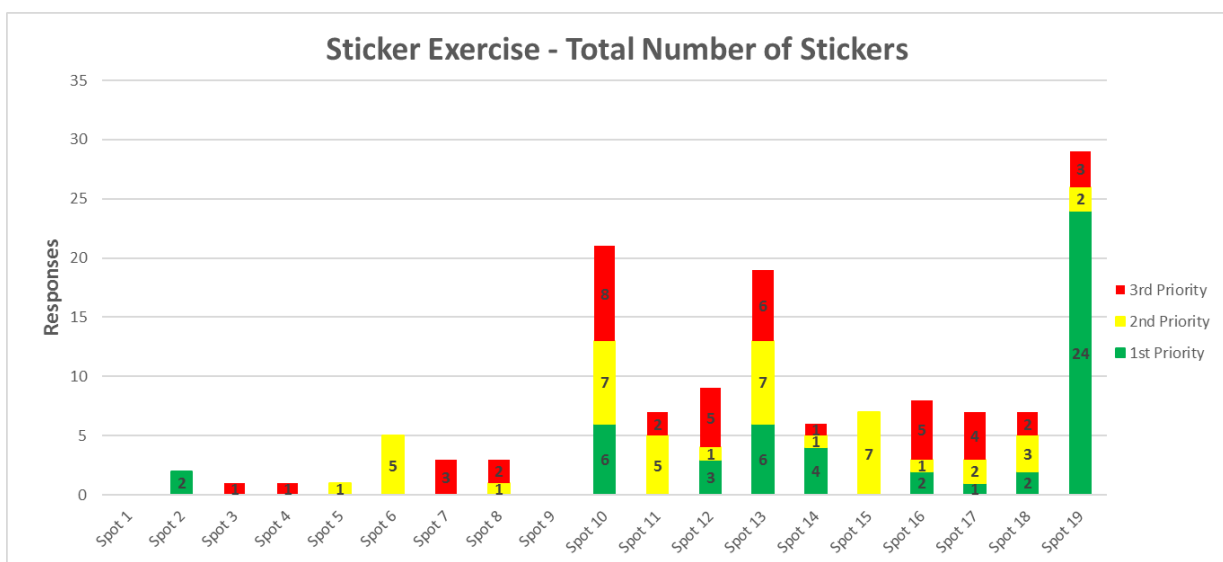
- i. Question 9 asked if any suggestions could be made for additional Spot Improvements along KY 86. Out of twenty-two responses, ten (45 percent) had suggestions. Several responses were corridor wide improvements such as repairing pavement failures on the shoulders, repaving the road, adding guardrail, clearing trees, and adding turn lanes. In addition to the corridor wide improvements there were some proposed additions and/or clarifications to the proposed Spot Improvements:
- Spot Improvement 6: Straighten the curve at the Cave Hollow Lane intersection.
 - Spot Improvement 13: Flatten the vertical curve near the Cherry Tree Coon Hunters Club.
 - Spot Improvement 15: Remove the ponding east of James Duvall Lane.
 - Spot Improvement 19:
 - i. Drainage improvements in Cecilia without the widening of KY 86 to three-lanes.
 - ii. Trains blocking KY 86 for too long in Cecilia.
 - iii. Raise the driveways to be even with the road in Cecilia.
 - iv. Drivers do not stop before turning right on red from US 62.
 - New Spot Improvement: Straighten the curve at the KY 401 intersection.



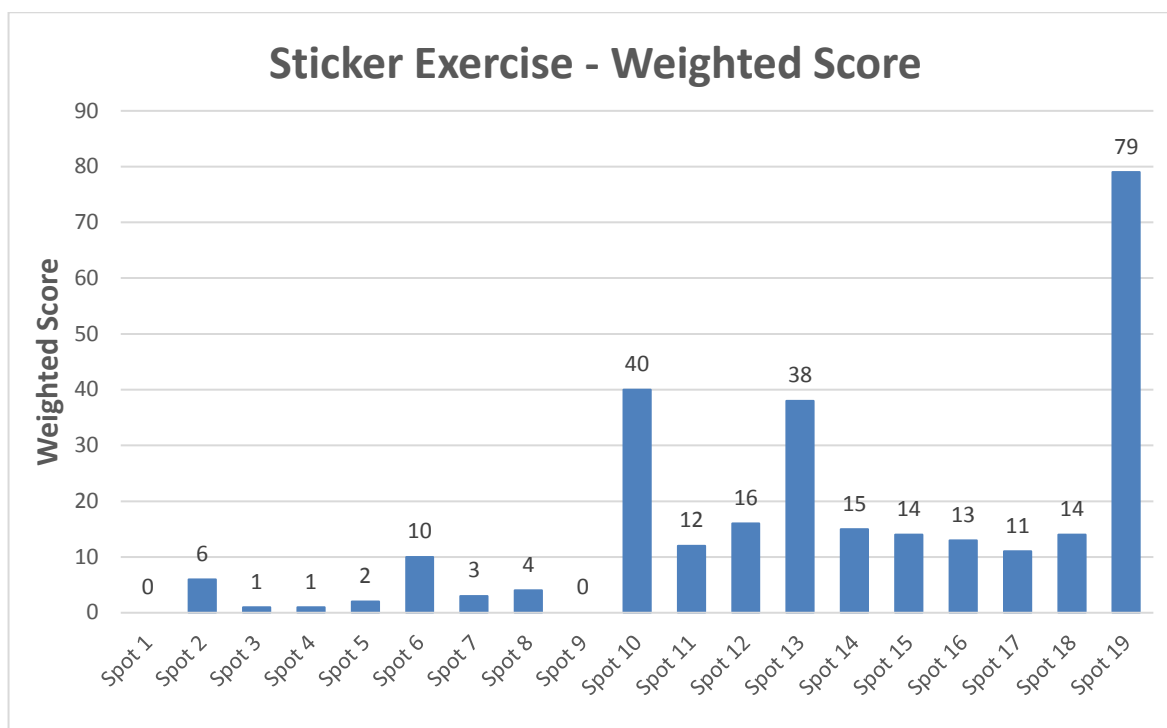
- j. The final question asked if the attendees felt the appropriate type of information was provided at the meeting. All respondents indicated the meeting provided the right kind of information for the KY 86 Scoping Study.



Public meeting attendees were also asked to assist the project team in prioritizing the Spot Improvements by selecting the top three projects they felt should be priorities for implementation by completing a sticker exercise. Each attendee was given a green (top priority), yellow (second priority), and red (third priority) sticker to place on the improvement concept exhibit boards. The following figure presents the results from the sticker exercise based on the total number of stickers received for each Spot Improvement. Similar to the results from Question 8 in the survey, Spot Improvement 19 – City of Cecilia - received the most overall stickers (29) and the most top priority stickers (24). Spot Improvement 10 – Arch Hill – had the second most overall stickers (21) and Spot Improvement 13 – Cherry Tree Coon Hunters Club - received the third most stickers (19).



To further summarize the results from the sticker exercise, each sticker was assigned a point value and a weighted score was calculated for each Spot Improvement, shown in the figure below. Green stickers (top priority) were assigned a value of three points, yellow stickers (second priority) were assigned a value of two points, and red stickers (third priority) were assigned a value of one point. The top three priorities remained the same with Spot Improvement 19 having the highest weighted score (79 points), Spot Improvement 10 having the second highest weighted score (40 points) and Spot Improvement 13 having the third highest weighted score (38 points).



Attendees also provided the project team with additional one-on-one comments during the open house. The following comments were noted:

- Spot Improvement 10: The tree canopy keeps ice from melting. This is especially an issue coming down grade.
- Spot Improvement 15: After a hard rain, there is ponding on KY 86 in front of the driveway at 5462 Hardinsburg Road. Drivers coming over the hill have a hard time seeing the ponding in time to slow down.
- Spot Improvement 16: At the intersection of KY 86 and KY 1375, there is ponding in the roadway. This section of KY 86 has been shut down in past years due to heavy rainfall.
- Spot Improvement 17: Between Rough Creek and KY 920 there is a culvert in a sag curve where the pavement is breaking down.
- Did the traffic forecast consider the industrial park on US 62?

The meeting ended at approximately 7:00 p.m. EDT.

Meeting Minutes

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

Charlie Allen
Co-Project Manager
KYTC District Office #4
634 East Dixie Hwy
Elizabethtown, KY 42702

FROM: Brian Aldridge
Project Manager
Stantec Consulting Services Inc.

DATE: June 23, 2017

SUBJECT: KY 86 Scoping Study
Breckinridge County – US 60 (MP 15.957) to Hardin County Line (MP 26.137)
Hardin County – Breckinridge County Line (MP 0.000) to US 62 (MP 16.145)
KYTC Item No. 4-8901.00
Local Officials/Stakeholders Meeting #2

A second local officials/stakeholders meeting for the KY 86 Scoping Study was held at Custer Elementary School in Custer, KY on June 19, 2017 at 3:00 p.m. EDT. The following individuals were in attendance:

Charles Allen	KYTC – District 4
James Beauchamp	KYTC – District 4
Willis Bosley	Breckinridge County Magistrate
Brad Bottoms	KYTC – District 4
Richard Butler	Breckinridge County Board of Education
Jim Duplessis	Hardin County
Maurice Lucas	Breckinridge County Judge Executive
Steve Meredith	Kentucky State Senate
Sam Moore	Breckinridge County Magistrate
Mikael Pelfrey	KYTC – Central Office Planning
Steve Ross	KYTC – Central Office Planning
Dean Schamore	State Representative
Benjamin Warren	KYTC – District 4
Brian Aldridge	Stantec Consulting Services Inc.
Steve Farmer	Stantec Consulting Services Inc.
Len Harper	Stantec Consulting Services Inc.
Graham Winchester	Stantec Consulting Services Inc.

Brian Aldridge welcomed everyone and said the purpose of the meeting was to discuss the progress to date on the KY 86 Scoping Study. Handouts included a questionnaire and a

project overview, as well as a green, yellow and red sticker. After introducing the Project Team, Brian delivered a presentation. The following enumerated items were discussed.

1. The purpose of the meeting is to share information about the KY 86 Scoping Study, discuss improvement concepts under consideration, and to obtain input from local officials and stakeholders.
2. State Representative Dean Schamore pushed for the project which became a legislative insert in the 2016 Highway Plan. The project is listed in the 2016 Highway Plan as Item No. 04-8901.00: Reconstruction study on KY 86 from US 60 (MP 15.957) to the Hardin County Line (MP 26.137). The limits of the study have been extended to include KY 86 in Hardin County from the Breckinridge County Line (MP 0.000) to US 62 (MP 16.145). The 2016 Highway Plan includes \$500,000 for the planning phase. This Scoping Study will not spend the entire planning budget, leaving some money for preliminary design of one or more improvement projects. Additional phases of the project are not funded in the 2016 Highway Plan.
3. Some highlights from the existing conditions inventory were discussed. The KY 86 study area is approximately 26.325 miles in length between the US 60 intersection in Breckinridge County and the US 62 intersection in Hardin County. Within the study corridor, KY 86 is functionally classified as a Rural Minor Arterial from US 60 in Breckinridge County to Cecilia in Hardin County and an Urban Minor Arterial from Cecilia to US 62. KY 86 is a two-lane road with nine-foot wide lanes and eighteen-inch wide paved shoulders. The road widens in Cecilia to include 12-foot-wide lanes, curb and gutter, and sidewalks. The posted speed limit throughout most of the corridor is 55 mph except in Cecilia and several unincorporated communities, where the posted speed limit drops to 35 mph.
4. A review of the as-built plans reveals there are 72 horizontal curves in the study area, and 18 (25 percent) do not meet design standards for the posted speed limit. Of the 242 vertical curves in the study area, 160 (66 percent) have stopping sight distance that does not satisfy the posted speed limit.
5. Crash data from the Kentucky State Police database indicate 398 crashes were reported between July 1, 2006 and June 30, 2016. This includes six fatal crashes (1.5 percent) and 105 (26 percent) injury collisions. Of the 398 reported crashes, 224 (56 percent) were single vehicle collisions. Critical crash rate factors (CRF) were calculated for the most recent five-year study period (July 1, 2011 to June 30, 2016). A CRF greater than 1.0 suggests crashes are likely not occurring at random. There are nineteen 0.3-mile long spots with CRF values greater than 1.0, as shown in **Figure 1**.
6. KY 86 has an Annual Average Daily Traffic (AADT) volume between 1,700 and 4,200 vehicles per day (vpd) with 2.5 to 11 percent trucks. Historic traffic counts from the KYTC indicates traffic growth along KY 86 between US 60 and US 62 has generally been flat or declining for the last 20 years. According to the KY State Data

Center, Breckinridge County's population is expected to decrease 0.4% per year through 2040 and Hardin County's population is expected to increase 1.0% per year through 2040. Assuming a conservative one percent annual growth in traffic and a 0.5 percent annual growth in trucks the 2040 AADT volumes are expected to grow to between 2,100 and 5,300 vpd with 2.7 to 11.7 percent trucks. After performing a capacity analysis of the existing and future traffic, all roadway segments operate at less than full capacity with a volume to capacity (V/C) ratio less than 0.24 and a level of service (LOS) C or better. The results of this analysis indicate a two-lane road can adequately accommodate the existing and future traffic demand.

7. Brian explained the difference between a “deficiency” and a “need”. A “need” is more than a deficiency. Curves without a crash history that fit the context of the road do not necessarily “need” to be fixed. The intention is to improve the roadway to meet driver expectations rather than bring it up to “desirable” Green Book Standards.
8. A draft purpose and need statement was prepared for the scoping study that is unique to the goals and issues to be addressed by the project:

The purpose of the KY 86 Improvement Project is to enhance regional mobility and to provide a safer east/west corridor across Breckinridge and Hardin Counties.

9. During the first Local Officials/Stakeholders meeting, attendees were asked to identify general concerns in the study area. These locations, along with crash data, were used to determine potential locations for improvement projects. **Figure 1** depicts the 14 locations identified by the Local Officials and Stakeholders.
10. In addition to the No-Build, this study will examine two types of improvements:
 - Improved Two Lane for Entire Corridor: Widen driving lanes and shoulders and bring roadway geometrics to 55 mph design speed. This alternative would cost approximately \$130 to \$160 million (assumes \$5 to \$6 million per mile) which would likely make such an undertaking infeasible because it would have to compete against other statewide projects for funding.
 - Spot Improvements: Lower cost safety improvements focused on locations with high crash rates and less than desirable roadway geometry.

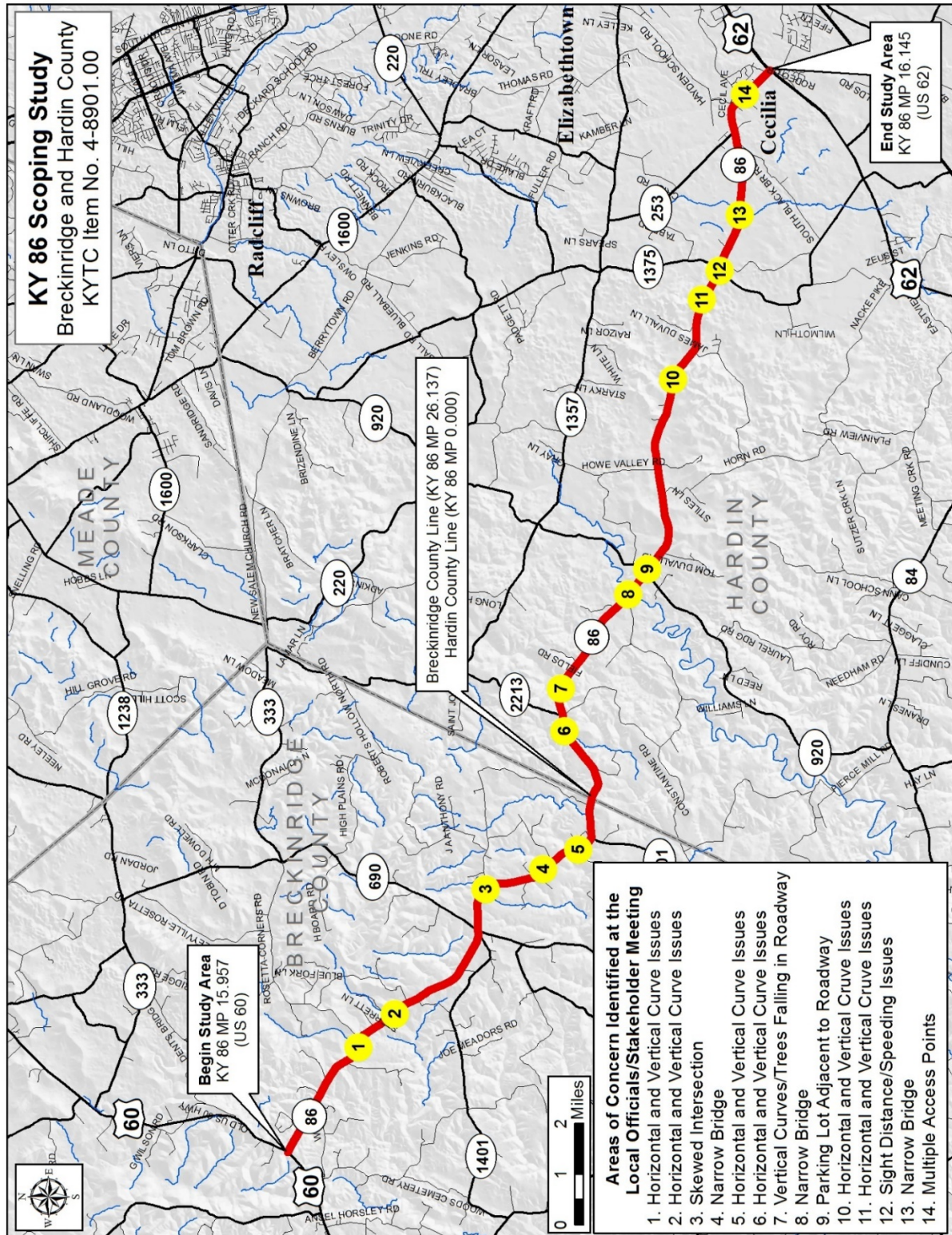


Figure 1: Areas of Concern Identified at the First LO/Stakeholder Meeting

11. Stantec presented four example improvement concepts to help demonstrate the types of improvement projects under consideration.
 - a. Example Improvement Concept #1: KY 86 in Breckinridge County from US 60 (MP 15.957) to Jessie Priest Road (MP 17.700). There were 29 crashes on this section of KY 86 between 2006 and 2016, 15 (48 percent) of which were single vehicle collisions. Possible improvement options include widening shoulders, improving the clear zone, and paving an intersection approach.
 - b. Example Improvement Concept #6: KY 86 in Breckinridge County at Cave Hollow Lane (MP 23.600-24.000). There were six reported crashes in this location from 2006 to 2016, two (30 percent) of which were recent single vehicle collisions. Possible improvement options include widening shoulders at the horizontal curve, installing flexible delineators, installing high-friction pavement surface, and improving the clear zone.
 - c. Example Improvement Concept #7: KY 86 in Breckinridge County from Lyons-Daughtery Road (MP 24.300) to east of KY 401 (MP 25.700). There were 27 reported crashes in this location from 2006 to 2016, nine (33 percent) of which were injury collisions. Possible improvement options include widening shoulders at the horizontal curves, installing flexible delineators, installing high-friction pavement surface, paving an intersection approach, and realigning KY 86.
 - d. Example Improvement Concept #19: KY 86 in Hardin County the city of Cecilia (MP 14.600-16.150). There were 31 reported crashes in this location from 2006 to 2016, 15 (48 percent) of which were rear end collisions. Possible improvement options include realigning the vertical alignment, drainage improvements, installing a signal ahead warning sign, and widening KY 86 to 3-lanes.
12. The Local Officials/Stakeholders were then asked to identify their top three priority spot improvements and provide comments on specific locations. Each attendee was given a green (top priority), yellow (second priority), and red (third priority) sticker to place on the improvement concept boards. These stickers were counted as a part of the Public Meeting and are summarized in the Public Meeting Summary. Attendees also provided the Project Team with the following comments:
 - Truck climbing lanes should be considered as an improvement concept. KY 86 at Arch Hill is a possible location.
 - Several of the Local Officials/Stakeholders commented that they expect higher future traffic volumes. The industrial park near US 62 is growing and will create more traffic on KY 86. It was also noted that improvements made to KY 86 will diverge traffic from KY 313 and further increase future

traffic volumes. Could these higher projections create a need for a three-lane highway?

- Even if the Project Team tripled the future traffic on KY 86, which was determined based on historical population data, a two-lane highway would be sufficient. The daily traffic would have to increase to 18,000 vehicles per day before a three-lane widening would be considered.
13. The Local Officials/Stakeholders were also asked to fill out a survey to help the Project Team evaluate alternatives. Four surveys were filled out and returned at the meeting by Dean Schamore, State Representative, Same Moore, Breckinridge County Magistrate, Willis Bosley, Breckinridge County Magistrate, and Maurice Lucas, Breckinridge County Judge Executive. Given a list of eleven transportation issues, the Local Officials identified safety, too much traffic, few passing opportunities, large trucks, sharp curves, narrow lanes, and narrow shoulders as issues that should be addressed by this project. All four respondents indicated that improvements are needed along KY 86 and selected Complete Reconstruction as the preferred alternative. Three of the four respondents selected their top three Spot Improvements, with Jesse Priest Rd. to West of Rosetta Corners Rd (Spot Improvement 2) selected the most and Merle Allen Ln. to Lonnie Haynes Rd. (Spot Improvement 3) selected second most. Other Spot Improvements selected include US 60 to Jesse Priest Rd. (Spot Improvement 1), the KY 690 intersection (Spot Improvement 4), Cave Hollow Ln. (Spot Improvement 6), and Lyons-Daughtery Rd. to East of KY 401 (Spot Improvement 7).
14. Brian 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 meeting as well as the public meeting to refine improvement alternatives. The final project team meeting will be in August. At that time Stantec will present the refined alternatives for the project team to review and final prioritization.

The meeting ended at approximately 4:00 p.m. EDT.

Meeting Summary

TO:	Eileen Vaughn Co-Project Manager KYTC Central Office 200 Mero Street Frankfort, KY 40622	Charlie Allen Co-Project Manager KYTC District Office #4 634 East Dixie Highway Elizabethtown, KY 42701
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FROM: Brian Aldridge
Project Manager
Stantec Consulting Services Inc.

DATE: July 31, 2017

SUBJECT: KY 86 Scoping Study
Breckinridge County – US 60 (MP 15.957) to Hardin County Line (MP 26.137)
Hardin County –Breckinridge County Line (MP 0.00) to US 62 (MP 16.145)
Item Number 4-8901.00
Public Meeting

A Public Information Meeting for the KY 86 Scoping Study was held on June 19, 2017 at 5:00 p.m. EDT at Custer Elementary School in Custer, KY. The purpose of the meeting was to provide information about the study, discuss conceptual alternatives, and solicit input from the public. The following individuals from the Kentucky Transportation Cabinet (KYTC) and the consultant staff were in attendance:

Charlie Allen	KYTC – District 4
Brad Bottoms	KYTC – District 4
Joseph Ferguson	KYTC – District 4
Debbie Hassell	KYTC – District 4
Chris Jessie	KYTC – District 4
Dana King	KYTC – District 4
Mikael Pelfrey	KYTC – Central Office Planning
Steve Ross	KYTC – Central Office Planning
Neela Saha	KYTC – Central Office Planning
Paul Sanders	KYTC – District 4
Benjamin Warren	KYTC – District 4
Kevin Young	KYTC – District 4
Brian Aldridge	Stantec Consulting Services Inc.
Steve Farmer	Stantec Consulting Services Inc.
Len Harper	Stantec Consulting Services Inc.
Graham Winchester	Stantec Consulting Services Inc.

The meeting was held in an open house format, with a formal presentation at 5:15 p.m. to explain the project. Two variable message boards were used to inform people of the public meeting –

one facing eastbound traffic on KY 86 at the intersection with US 60 and the other facing westbound traffic on KY 86 at Liberty Chapel Near the Hardin/Breckinridge County line. A newspaper advertisement was also placed in The News-Enterprise on May 30, 2017 and June 5, 2017 to invite people to the public meeting.

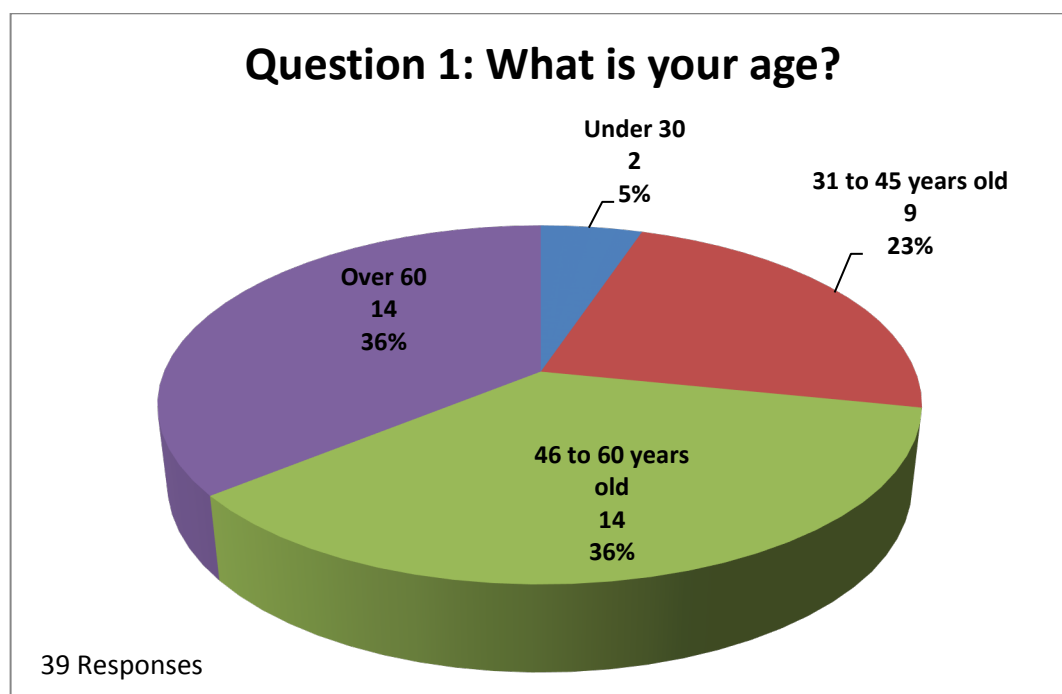
Upon arrival, attendees were asked to sign in and were provided handouts that included a questionnaire and a project overview, as well as a green, yellow and red sticker. All information was made available on the temporary project website at http://transportation.ky.gov/District-4/Pages/ky86_improvements.aspx. KYTC and consultant staff were available to answer questions and discuss issues. Based on the sign-in sheets, 70 members of the public attended the meeting.

The following project exhibits were on display:

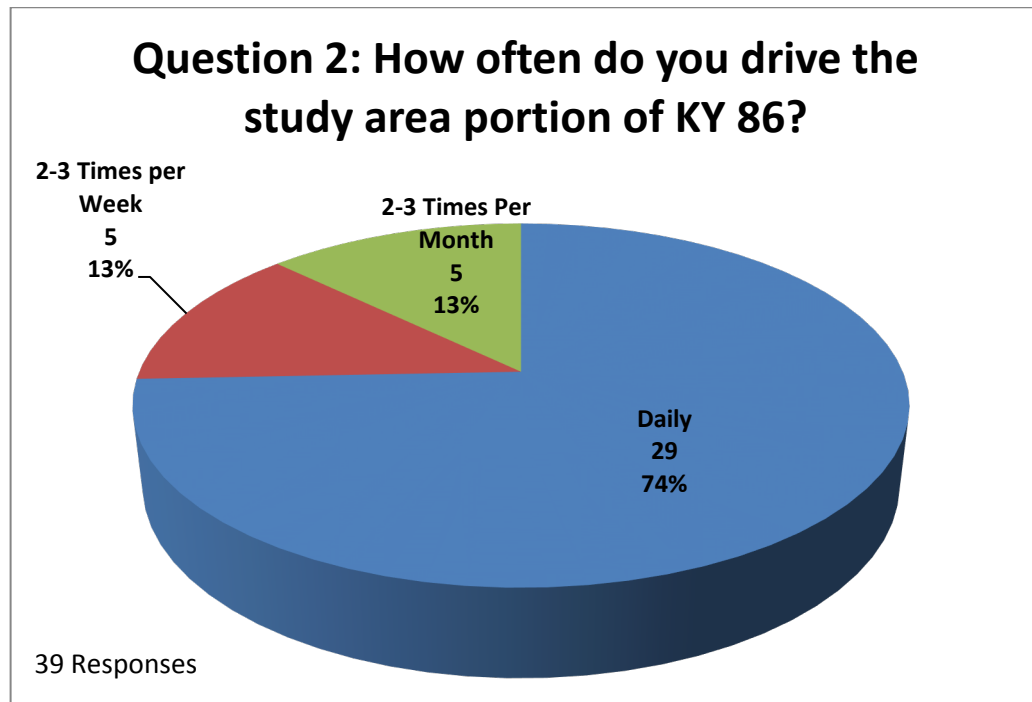
- How the KYTC Builds Roads
- Environmental Footprint
- Crash History, Traffic, and Roadway Characteristics
- Improvement Concepts and Evaluation Matrix

Public meeting attendees were given the option to either fill out their questionnaire at the meeting or return it by mail after the meeting. Twenty-two questionnaires were returned at the meeting. An additional seventeen questionnaires were returned after the meeting through July 31, 2017. The results of the questionnaire are summarized as follows:

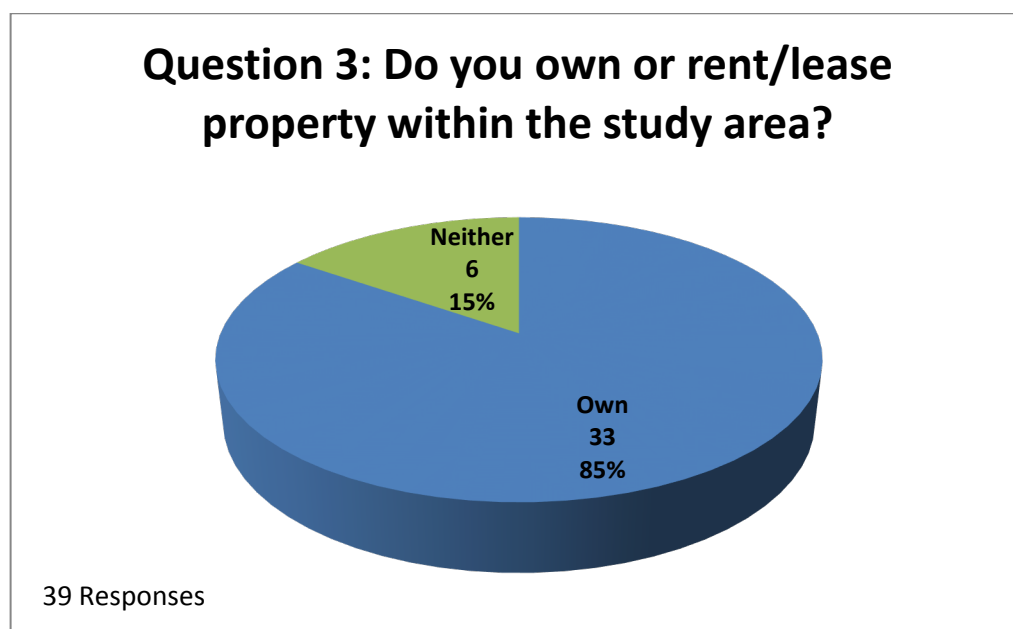
- The first question asked the age of the attendee. Fourteen respondents (36 percent) indicated they are 46-60 years old, fourteen respondents (36 percent) indicated they are over 60 years old, nine respondents (23 percent) indicated they are 31-45 years old and two respondents (5 percent) indicated they are under 30.



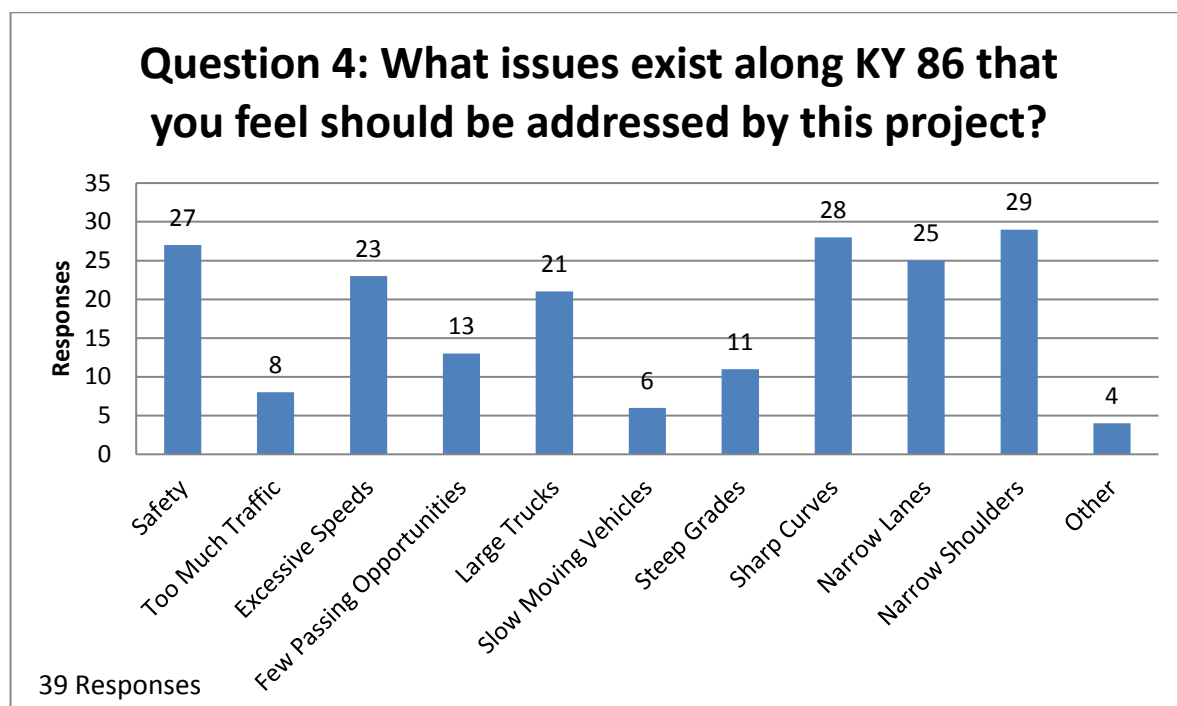
- b. Question 2 asked how frequently the attendees drove through the study area. Twenty-nine respondents (74 percent) said they drive through the study area daily, five respondents (13 percent) said they drive through the study area 2-3 times per week, and five respondents (13 percent) said they drive through the study area 2-3 times a month.



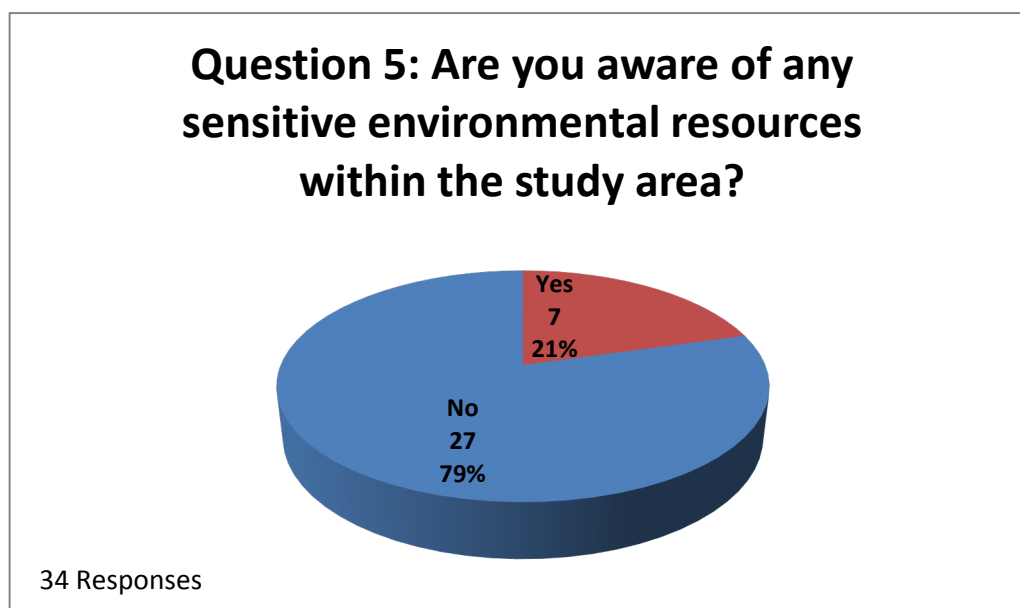
- c. Question 3 asked if the attendees own or rent/lease property within the study area. Thirty-three respondents (85 percent) indicated they own property within the study area and six respondents (15 percent) indicated they neither own nor rent property in the study area.



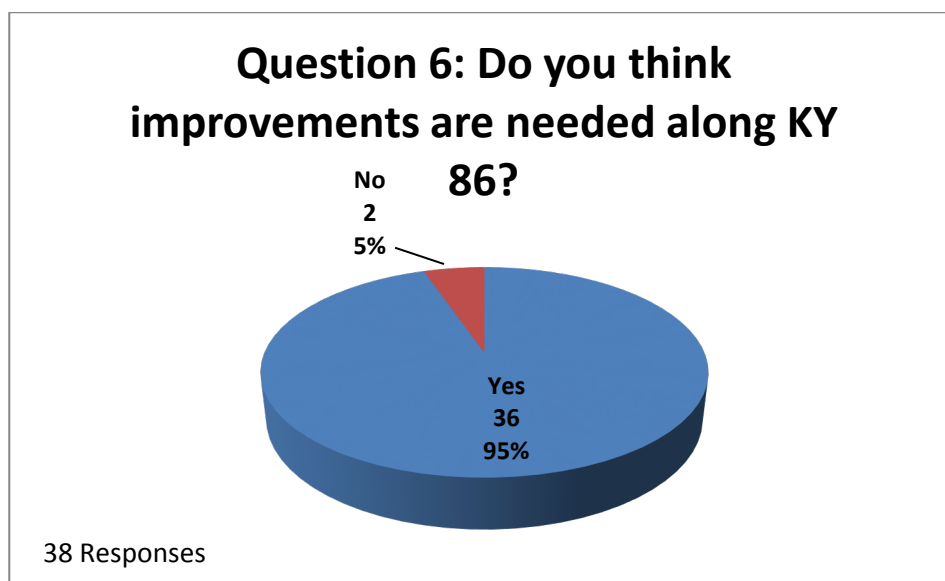
- d. Attendees were asked whether several transportation issues along KY 86 should be considered as a part of the project. Of the eleven options provided, narrow shoulders (29 responses), sharp curves (28 responses), and safety (27 responses) were selected most. Other issues that were mentioned include narrow bridges, animals in the roadway, large farm equipment driving in the road, improving sight distance at Cave Hollow Lane, and hidden entrances.



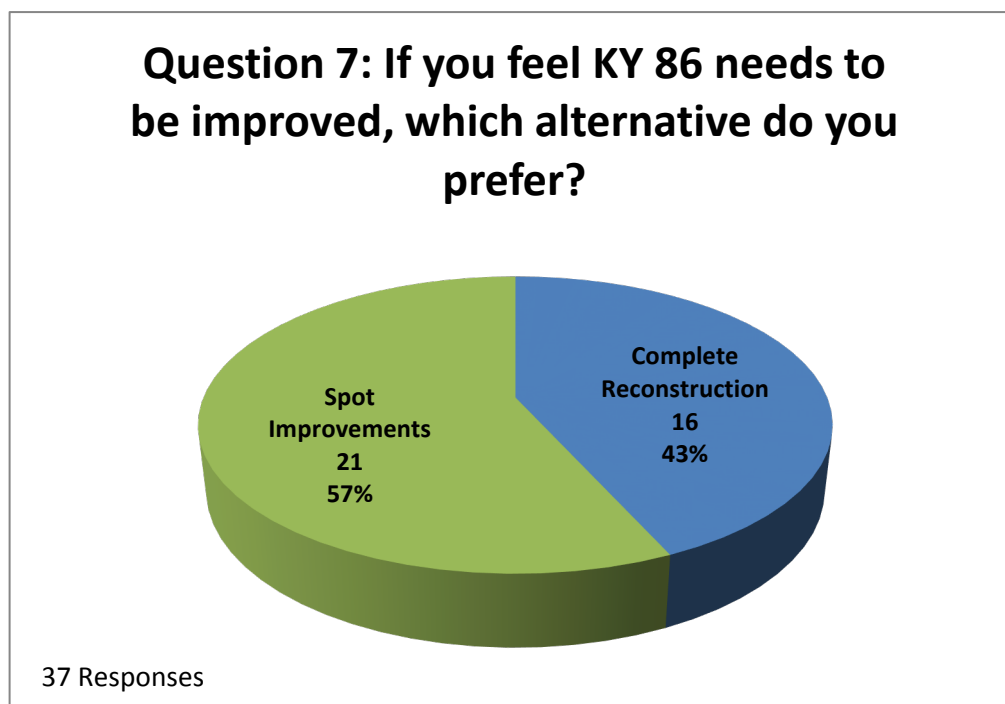
- e. Question 5 asked if there were any sensitive resources within the study area. Of the thirty-four respondents, seven (21 percent) indicated they were aware of sensitive resources. A natural spring, creeks, and caves were mentioned as natural resources.



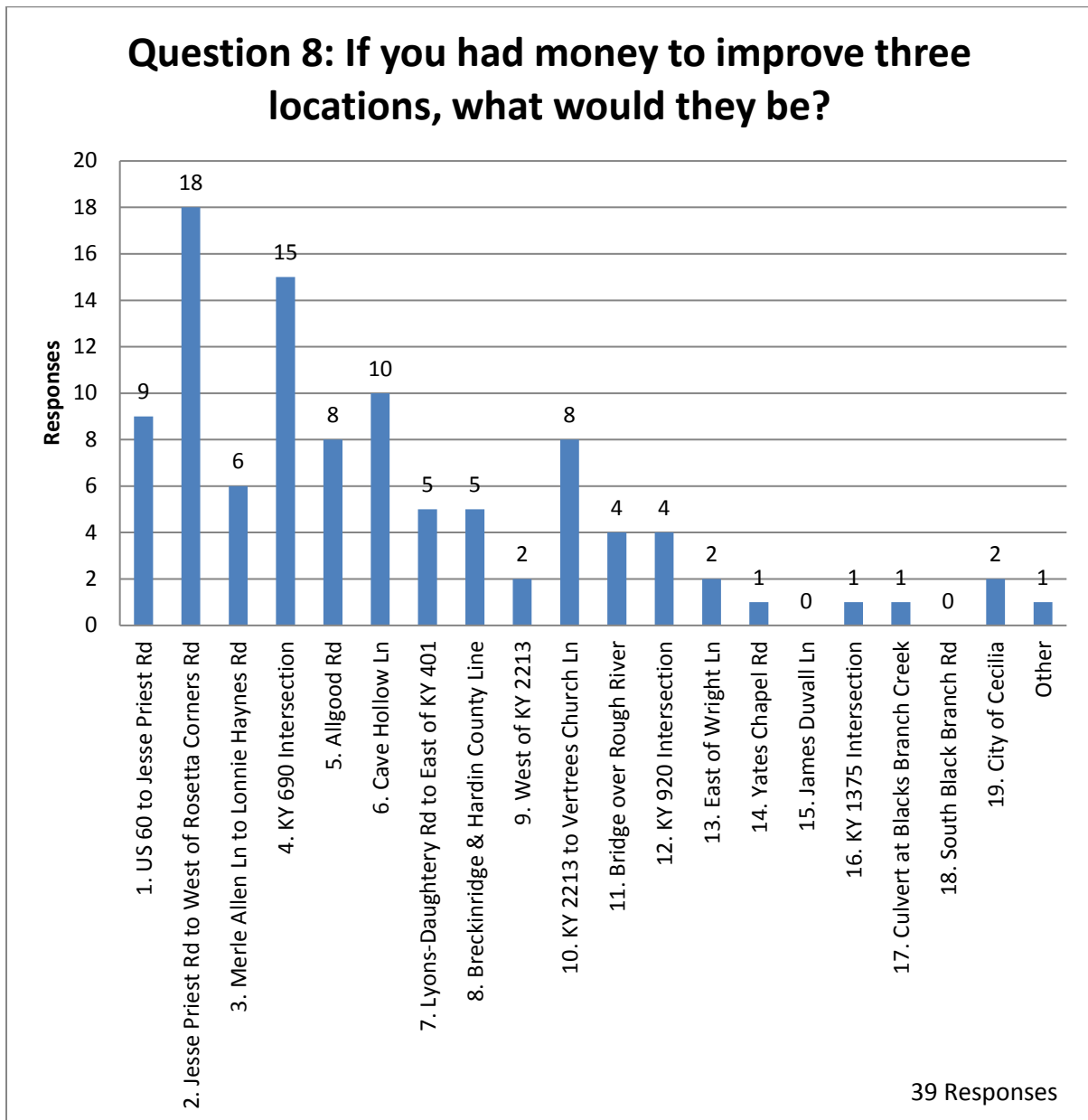
- f. Question 6 asked if respondents felt improvements were needed along KY 86. All but two respondents (36, 95 percent) indicated improvements were needed.



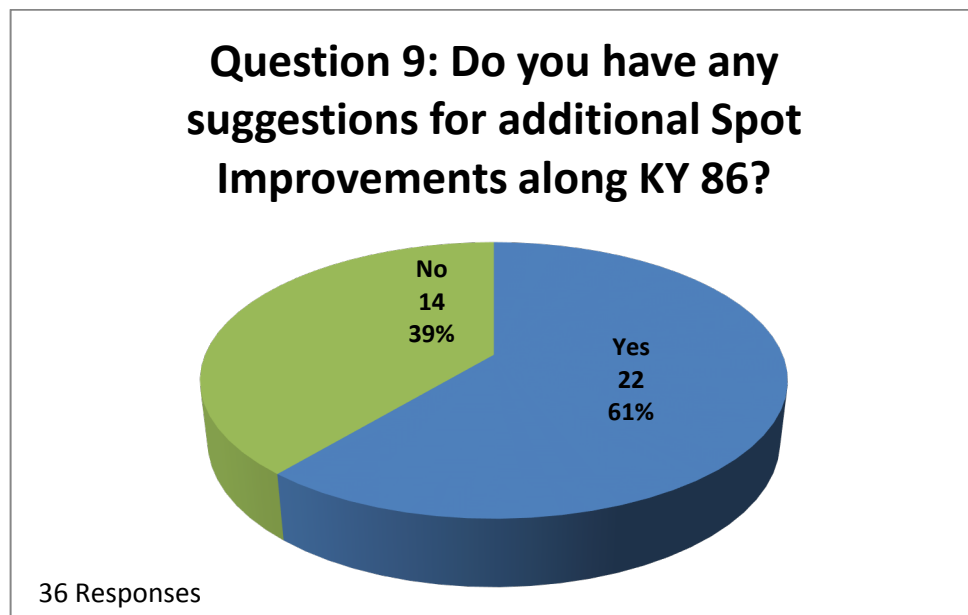
- g. Attendees were asked if they prefer further consideration of Complete Reconstruction or Spot Improvements. With thirty-six respondents, twenty-one (57 percent) selected Spot Improvements and sixteen (43 percent) selected Complete Reconstruction. Of the twenty-one responses received at the meeting, 62 percent voted for Spot Improvements and 38 percent voted for Complete Reconstruction. Of the sixteen responses received after the meeting, 50 percent voted for Spot Improvements and 50 percent voted for Complete Reconstruction.



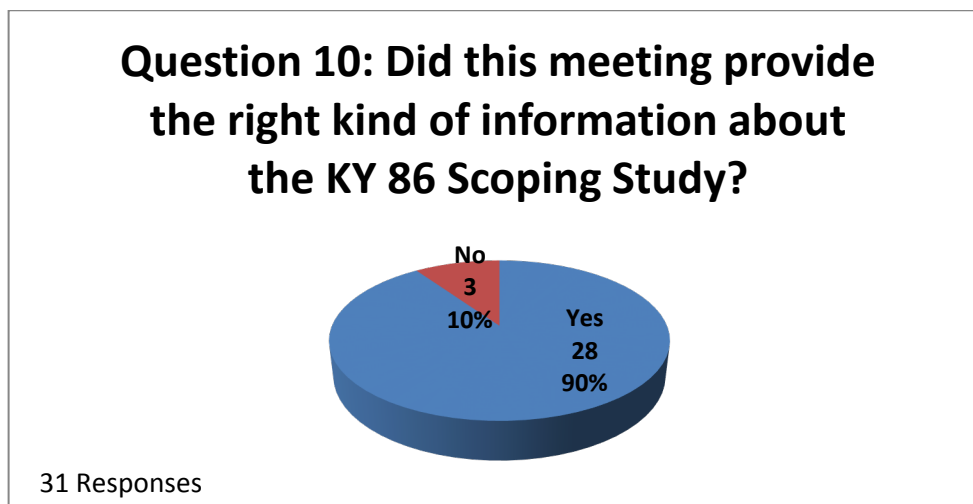
- h. Question 8 asked attendees which three spot improvement locations they prefer. Spot Improvements 2, 4, 6, and 1 were the most commonly selected Spot Improvements, with Spot Improvement 2 receiving the most votes.



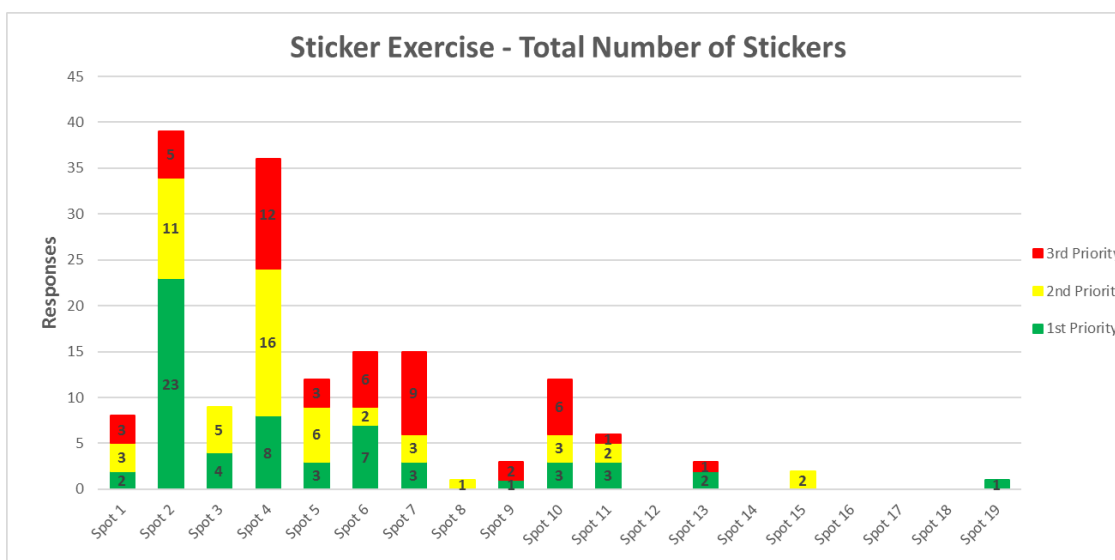
- i. Question 9 asked if there were suggestions for additional Spot Improvements along KY 86. Out of thirty-six responses, twenty-two (61 percent) had suggestions. Several responses were corridor wide improvements such as speed enforcement, adding guardrail, adding pavement reflectors, increased signage, and improving blind entrances. In addition to the corridor wide improvements there were several proposed additions to the proposed Spot Improvements:
- Spot Improvement 1: Add a stop light at the US 60 intersection.
 - Spot Improvement 4:
 - i. Widen KY 86 and improve pavement conditions near the Custer General Store.
 - ii. Add a stop light at the KY 690 intersection.
 - Spot Improvement 10:
 - i. Improve sight distance.
 - ii. Add a truck passing lane at Arch Hill.
 - Spot Improvement 13: Horizontal realignment near the Coon Hunters Club.
 - Spot Improvement 16: Remove the ponding at the KY 1375 intersection.



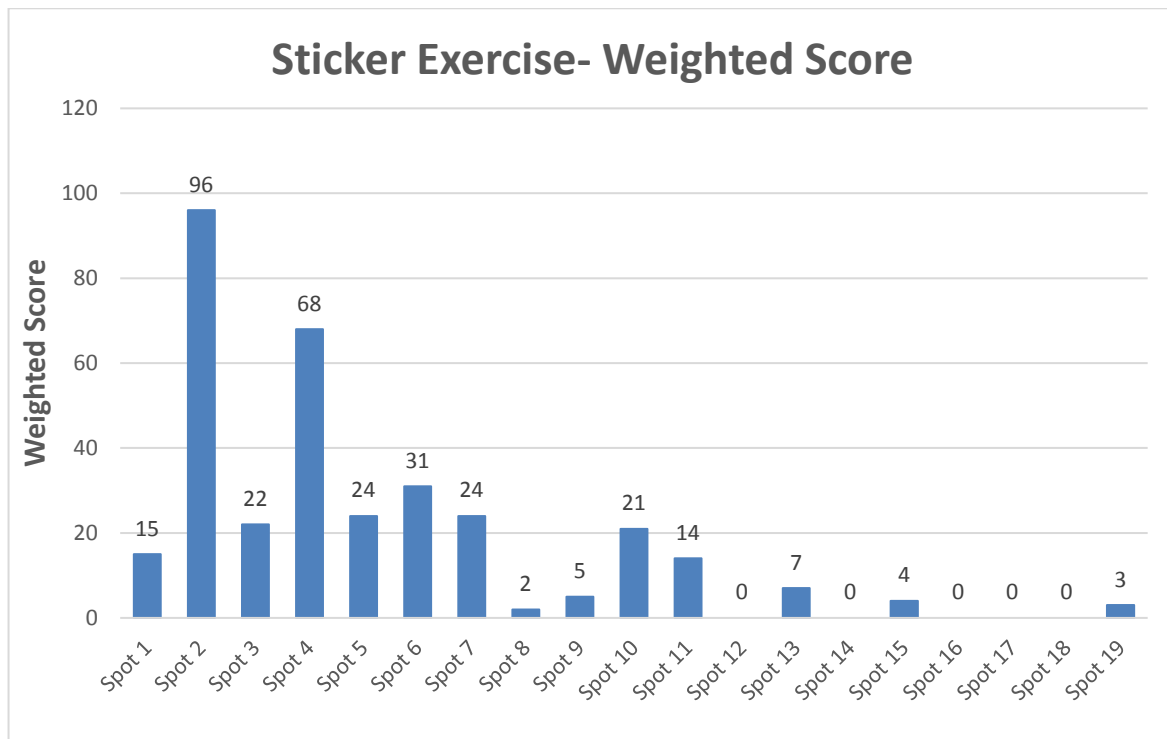
- j. The final question asked if the attendees felt the appropriate type of information was provided at the meeting. All but three respondents (28, 90 percent) indicated the meeting provided the right kind of information for the KY 86 Scoping Study. One respondent wanted immediate action and another was concerned with pulling onto KY 86 from Cave Hollow Lane. The third respondent did not indicate what information they thought should have been presented.



Public meeting attendees were also asked to assist the project team in prioritizing the Spot Improvements by selecting the top three projects they felt should be priorities for implementation by completing a sticker exercise. Each attendee was given a green (top priority), yellow (second priority), and red (third priority) sticker to place on the improvement concept exhibit boards. The following figure presents the results from the sticker exercise based on the total number of stickers received by each Spot Improvement. Similar to the results from Question 8 in the survey, Spot Improvement 2 – Jesse Priest Road to West of Rosetta Corners Road - received the most overall stickers (39) and the most top priority stickers (23). Spot Improvement 4 – KY 690 Intersection – had the second most overall stickers (36).



To further summarize the results from the sticker exercise, each sticker was assigned a point value and a weighted score was calculated for each Spot Improvement. Green stickers (top priority) were assigned a value of three points, yellow stickers (second priority) were assigned a value of two points, and red stickers (third priority) were assigned a value of one point. The top two priorities remained the same with Spot Improvement 2 having the highest weighted score (96 points) and Spot Improvement 4 having the second highest weighted score (68 points).



Attendees also provided the project team with additional one-on-one comments during the open house. The following comments were noted:

- Spot Improvement 4: Add flashing caution lights to the KY 690 intersection.
- Spot Improvement 6: Speed enforcement should be considered.
- Spot Improvements 7 & 8: Combine locations and include the curve at KY 401.
- Spot Improvement 19: The realignment of KY 86 through Custer should be shifted to the north to allow for more room for drivers to pull in and out of the General Store.
- Pavement markers should be considered as a possible improvement concept.
- Speed enforcement and truck enforcement should be considered along KY 86.

The meeting ended at approximately 7:00 p.m. EDT.

Meeting Minutes

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

Charlie Allen
Co-Project Manager
KYTC District Office #4
634 East Dixie Hwy
Elizabethtown, KY 42702

FROM: Brian Aldridge
Project Manager
Stantec Consulting Services Inc.

DATE: September 15, 2017

SUBJECT: KY 86 Scoping Study
Breckinridge County – US 60 (MP 15.957) to Hardin County Line (MP 26.137)
Hardin County – Breckinridge County Line (MP 0.000) to US 62 (MP 16.145)
KYTC Item No. 4-8901.00
Project Team Meeting #3

The third and final project team meeting for the KY 86 Scoping Study was held at the KYTC District 4 Office in Elizabethtown, KY on September 1, 2017 at 10:00 a.m. EDT. The following individuals were in attendance:

Charlie Allen	KYTC – District 4
Brandon Bagby	KYTC – District 4
Brad Bottoms	KYTC – District 4
Joseph Ferguson	KYTC – District 4
Chris Jessie	KYTC – District 4
Larry Krueger	KYTC – District 4
Vicki Meredith	Hardin County Engineering
Mikael Pelfrey	KYTC – Central Office Planning
Paul Sanders	KYTC – District 4
Mike Skaggs	Lincoln Trail ADD
Eileen Vaughan	KYTC – Central Office Planning
Benjamin Warren	KYTC – District 4
Jamie Watkins	KYTC – District 4
Kevin Young	KYTC – District 4
Brian Aldridge	Stantec Consulting Services Inc.
Len Harper	Stantec Consulting Services Inc.
Graham Winchester	Stantec Consulting Services Inc.

Charlie Allen welcomed everyone and said the purpose of the meeting was to discuss the progress to date on the KY 86 Scoping Study. Handouts included a meeting agenda, a map showing the conceptual spot improvement locations, draft benefit-to-cost ratio tables, and the spot improvement project sheets. After introductions, Brian Aldridge delivered a presentation. The following enumerated items were discussed.

1. Brian noted the primary purpose of the meeting was to discuss findings from the local official/stakeholder meetings and the public meetings held in June, review the results from the benefit-to-cost analysis, and prioritize the proposed improvement concepts.
2. The project is listed in the 2016 Highway Plan as Item No. 04-8901.00: Reconstruction study on KY 86 from US 60 (MP 15.957) to the Hardin County Line (MP 26.137). The limits of the study have been extended to include KY 86 in Hardin County from the Breckinridge County Line (MP 0.000) to US 62 (MP 16.145). The 2016 Highway Plan includes \$500,000 for the planning phase. This Scoping Study will not spend the entire planning budget, leaving some money for preliminary design of one or more improvement projects. Additional phases of the project are not funded in the 2016 Highway Plan.

3. The draft Purpose and Need Statement for the project is as follows:

The purpose of the KY 86 Improvement Project is to enhance regional mobility and to provide a safer east/west corridor across Breckinridge and Hardin Counties. KY 86 provides the most direct regional connection for areas between Hardinsburg, Cecilia, Elizabethtown, the Western Kentucky Parkway, and I-65. I-65 is a major north-south interstate highway that travels through Western Kentucky from Nashville, Tennessee in the south to Louisville, Kentucky in the north.

4. In addition to the No-Build, this study examined two types of improvements:
 - Complete Reconstruction: Widen driving lanes and shoulders and bring roadway geometrics to 55 mph design speed. This alternative would cost approximately \$160 million (assumes \$6 million per mile) which would likely make such an undertaking infeasible because it would have to compete against other statewide projects for funding.
 - Spot Improvements: Lower cost safety improvements focused on locations with high crash rates and less than desirable roadway geometry.
5. Brian provided a recap of the second round of public involvement. A summary is as follows:
 - a) Two Local Official/Stakeholder Meetings were held, one in Hardin County and another in Breckinridge County. The same information was provided at both meetings.

- i. Monday, June 12, 2017 at 3:00 PM EDT at Franklin Crossroads Baptist Church in Cecilia. Based on the sign-in sheets, five (5) local officials/stakeholders attended the meeting.
 - ii. Monday, June 19, 2017 at 3:00 PM EDT at Custer Elementary School in Custer. Based on the sign-in sheets, seven (7) local officials/stakeholders attended the meeting.
- b) Two Public Meetings were held, one in Hardin County and another in Breckinridge County. The same information was provided at both meetings.
 - i. Monday, June 12, 2017 from 5:00 to 7:00 PM EDT at Franklin Crossroads Baptist Church in Cecilia. Based on the sign-in sheets, 70 members of the public attended the meeting.
 - ii. Monday, June 19, 2017 from 5:00 to 7:00 PM EDT at Custer Elementary School in Custer. Based on the sign-in sheets, 70 members of the public attended the meeting.

Surveys were distributed at each meeting and were made available online to those who could not attend either of the meetings. Brian discussed the results from the Local Official/Stakeholder meetings. One survey was returned from the Hardin County meeting and four (4) from the Breckinridge County meeting. All respondents indicated improvements were needed, but the Hardin County respondent chose spot improvements as the preferred alternative while all four Breckinridge County respondents chose the complete reconstruction alternative. The only suggestion for additional Spot Improvements along KY 86 was a truck passing lane on Arch Hill, which was subsequently added to Spot Improvement 10.

Brian also discussed the survey results from the Public meetings. There were 25 surveys returned from the Hardin County meeting and 39 surveys returned from the Breckinridge County meeting. Only three respondents indicated improvements were not needed along KY 86, and the majority of respondents favored spot improvements over the complete reconstruction alternative. There were several suggestions for additional spot improvements along KY 86 in both counties. In Hardin County, two suggestions were added as spot improvements: flattening the vertical curve near the Cherry Tree Coon Hunters Club was added to Spot Improvement 13 and addressing the drainage concerns on KY 86 east of James Duvall Lane was added to Spot Improvement 15.

In Breckinridge County, four suggestions were added as spot improvements: widening KY 86 and improving pavement conditions near the Custer General Store was added to Spot Improvement 4, improving sight distance and adding a truck passing lane at Arch Hill was added to Spot Improvement 10, horizontal realignment near the Coon Hunters Club was added to Spot Improvement 13, and addressing drainage concerns at the KY 1375 intersection was added to Spot Improvement 16. More detailed summaries for each of these meetings are included in the Public Meeting Notebook.

6. At each Public Meeting, attendees were asked to place stickers on exhibits to indicate which spot improvements should be considered the highest priority. Each attendee was given a green (top priority), yellow (second priority), and red (third priority) sticker to place on the improvement concept exhibit boards. **Figure 1** presents the results of the sticker exercise based on the total number of stickers received for each spot improvement.

To further summarize the results from the sticker exercise, each sticker was assigned a point value and a weighted score was calculated for each spot improvement, shown in the **Figure 2**. Green stickers (top priority) were assigned a value of three points, yellow stickers (second priority) were assigned a value of two points, and red stickers (third priority) were assigned a value of one point. A total of 298 stickers were placed on these boards. In Hardin County, Spot Improvement 19 (30 stickers, 82 points), Spot Improvement 10 (33 stickers, 61 points), and Spot Improvement 13 (22 stickers, 45 points) received the highest total number of stickers and the highest weighted scores. In Breckinridge County, Spot Improvement 2 (41 stickers, 102 points), Spot Improvement 4 (37 stickers, 69 points), and Spot Improvement 6 (20 stickers, 41 points) received the highest total number of stickers and the highest weighted scores.

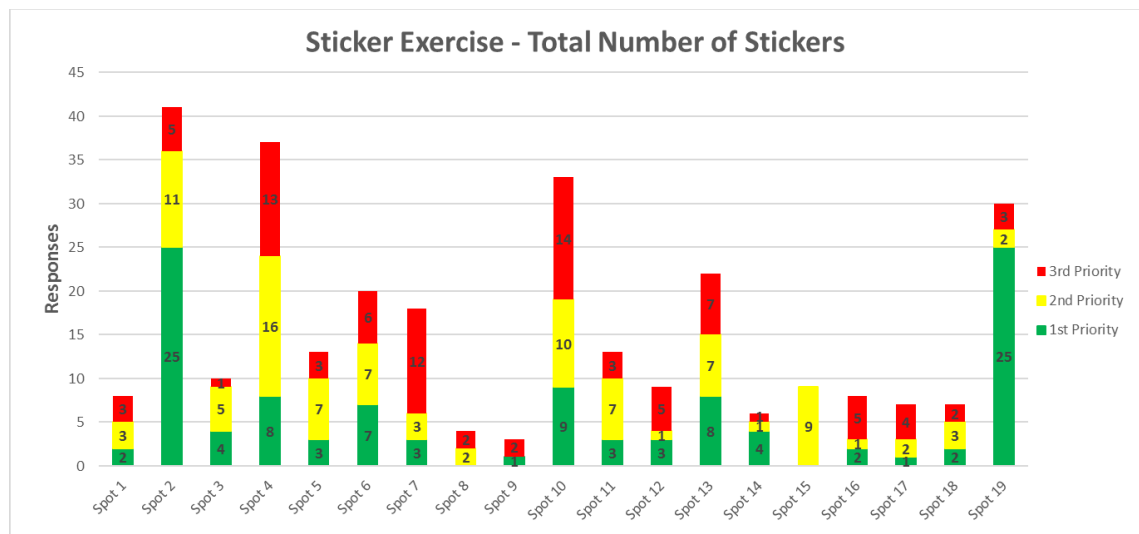


Figure 1 – Sticker Exercise Results (Total Number of Stickers)

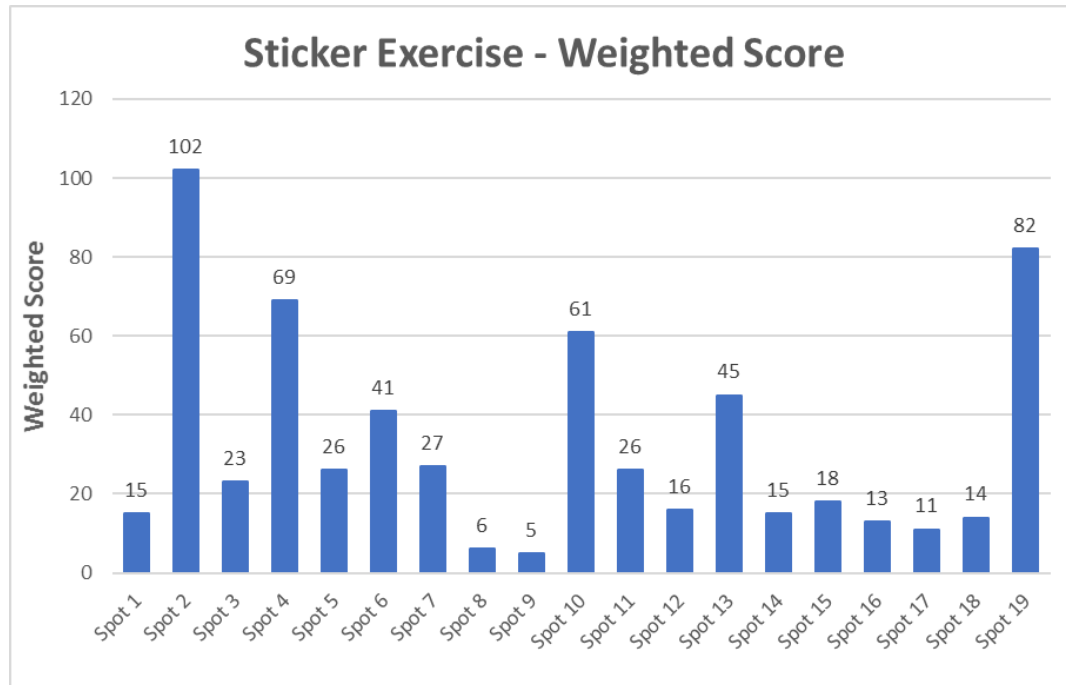


Figure 2 – Sticker Exercise Results (Weighted Score)

7. Because congestion is not an issue on KY 86, a benefit-to-cost analysis was conducted based on the expected crash reductions from each Spot Improvement. The Crash Modification Factors Clearinghouse was used to estimate the crash reduction by improvement type. Based on the *2015 Kentucky Traffic Collision Facts Report*¹, there are two different costs associated with collisions: economic cost and comprehensive cost. Economic costs include wage loss, medical expense, administration costs, property damage, and employer costs. Comprehensive costs include economic costs plus a measure of the value of lost quality of life associated with deaths and injuries. Crash costs by crash severity from the *2015 Kentucky Traffic Collision Facts Report* are listed in **Table 1**.

Table 1 – 2015 Kentucky Crash Costs by Severity

Crash Severity	Economic Cost	Comprehensive Cost
Fatality	\$1,500,000	\$9,900,000
Incapacitating Injury	\$88,500	\$1,100,000
Non-Incapacitating Injury	\$25,600	\$298,000
Possible Injuries	\$21,000	\$138,000
Property Damage Only	\$4,200	\$8,400

¹ http://transportation.ky.gov/Highway-Safety/Documents/2015_KY_Traffic_Collision_Facts.pdf

Using the economic costs, five spot improvement locations were found to have a benefit-to-cost ratio greater than one, shown in **Table 2**. It was noted that fatal collisions make a drastic difference on the benefit-to-cost ratio. This is evident at Spot 8, which is shown with and without two fatal collisions because one collision was alcohol related and the second was an animal collision, crash types that may not likely be prevented by countermeasures.

Table 2 – Economic Benefit-to-Cost Ratios > 1.0

Spot Improvements	Construction Cost	10 Year Savings from Anticipated Crash Reduction*	Benefit-to-Cost Ratio
Spot 2			
Widen Shoulders at Horizontal Curves	\$500,000	\$1,010,000	2.02
Flexible Delineators at Horizontal Curves			
High-Friction Pavement Surface at Horizontal Curves			
Spot 7			
Widen Shoulders at Horizontal Curves	\$600,000	\$1,240,000	2.07
Flexible Delineators at Horizontal Curves			
High-Friction Pavement Surface at Horizontal Curves			
Pave Intersection Approach			
Spot 8			
Widen Shoulders at Horizontal Curves	\$200,000	\$940,000 (\$80,000**)	4.70 (0.40**)
Flexible Delineators at Horizontal Curves			
High-Friction Pavement Surface at Horizontal Curves			
Lengthen Culvert and Improve Clear Zone	\$100,000	\$200,000 (\$5,000**)	2.00 (0.05**)
Spot 14			
Widen Shoulders at Horizontal Curve	\$250,000	\$980,000	3.92
Flexible Delineators at Horizontal Curve			
High-Friction Pavement Surface at Horizontal Curve			
Spot 16			
Vertical Realignment	\$600,000	\$710,000	1.18

* Source: Crash Modification Factors Clearinghouse - <http://www.cmfclearinghouse.org/>

** Removes the two fatal collisions. One was alcohol related and the second was an animal collision.

Using the comprehensive costs, 15 spot improvement locations were found to have benefit-to-cost ratios greater than one, shown in **Table 3**. Spot 8 is once again shown with and without the two fatal collisions.

Table 3 – Comprehensive Benefit-to-Cost Ratios > 1.0

Spot Improvements	Construction Cost	10 Year Savings from Anticipated Crash Reduction*	Benefit-to-Cost Ratio
Spot 2			
Widen Shoulders at Horizontal Curves	\$500,000	\$6,960,000	13.92
Flexible Delineators at Horizontal Curves			
High-Friction Pavement Surface at Horizontal Curves			
Realignment	\$3,800,000	\$6,180,000	1.63
Spot 5			
Remove Vegetation at Horizontal Curve	\$350,000	\$670,000	1.91
Widen Shoulders at Horizontal Curves			
Flexible Delineators at Horizontal Curves			
High-Friction Pavement Surface at Horizontal Curves			
Remove Allgood Road Connection to KY 86			
Spot 6			
Widen Shoulders at Horizontal Curves	\$100,000	\$490,000	4.90
Flexible Delineators at Horizontal Curves			
High-Friction Pavement Surface at Horizontal Curves			
Spot 7			
Widen Shoulders at Horizontal Curves	\$600,000	\$9,370,000	15.62
Flexible Delineators at Horizontal Curves			
High-Friction Pavement Surface at Horizontal Curves			
Pave Intersection Approach			
Realignment	\$3,700,000	\$18,100,000	4.89
Spot 8			
Widen Shoulders at Horizontal Curves	\$200,000	\$6,300,000 (\$660,000**)	31.50 (3.30**)
Flexible Delineators at Horizontal Curves			
High-Friction Pavement Surface at Horizontal Curves			
Lengthen Culvert and Improve Clear Zone	\$100,000	\$1,320,000 (\$40,000**)	13.20 (0.40**)
Spot 9			
Remove Vegetation at Horizontal Curve	\$200,000	\$220,000	1.10
Widen Shoulders at Horizontal Curves			
Spot 10			
Replace Bridge	\$700,000	\$1,050,000	1.50
Lengthen Culvert and Improve Clear Zone	\$100,000	\$200,000	2.00
Spot 12			
Access Management at Fields Grocery	\$50,000	\$330,000	6.60
Remove Passing Permitted Striping			
Spot 13			
Remove Vegetation at Horizontal Curve	\$250,000	\$550,000	2.20
Widen Shoulders at Horizontal Curve			
Flexible Delineators at Horizontal Curve			
High-Friction Pavement Surface at Horizontal Curve			
Spot 14			
Widen Shoulders at Horizontal Curve	\$250,000	\$6,770,000	27.08
Flexible Delineators at Horizontal Curve			
High-Friction Pavement Surface at Horizontal Curve			
Spot 15			
Remove Vegetation	\$30,000	\$40,000	1.33
Fix Ponding in front of 5462 Hardinsburg Road Cecilia	\$100,000	\$470,000	4.70
Spot 16			
Vertical Realignment	\$600,000	\$4,660,000	7.77
Spot 17			
Lengthen Culvert and Improve Clear Zone	\$100,000	\$180,000	1.80
Spot 18			
Widen Shoulders/Improve Clear Zone	\$100,000	\$180,000	1.80
Spot 19			
Realign Vertical Alignment on KY 86 at KY 253 Intersection	\$600,000	\$800,000	1.33
Drainage Improvements	\$500,000	\$600,000	1.20

* Source: Crash Modification Factors Clearinghouse - <http://www.cmfclearinghouse.org/>

** Removes the two fatal collisions. One was alcohol related and the second was an animal collision.

8. In light of the technical data and results from the second round of public involvement, the project team worked together to prioritize each of the spot improvements.

High Priority (in no particular order)

- Spot Improvement 2 – Jesse Priest Road to West of Rosetta Corners Road
- Spot Improvement 7 – Lyons-Daughtery Road to East of KY 401
- Spot Improvement 10 – KY 2213 to Vertrees Church Lane
- Spot Improvement 13 – East of Wright Lane (Cherry Tree Coon Hunters Club)
- Spot Improvement 14 – Yates Chapel Road
- Spot Improvement 19 – City of Cecilia

Medium Priority (in no particular order)

- Spot Improvement 4 – KY 690 Intersection
- Spot Improvement 5 – Allgood Road
- Spot Improvement 6 – Cave Hollow Lane
- Spot Improvement 12 – KY 920 Intersection
- Spot Improvement 15 – James Duvall Lane
- Spot Improvement 16 – KY 1375 Intersection

Low Priority (in no particular order)

- Spot Improvement 1 – US 60 to Jesse Priest Road
- Spot Improvement 3 – Merle Allen Lane to Lonnie Haynes Road
- Spot Improvement 8 – Breckinridge and Hardin County Line
- Spot Improvement 9 – West of KY 2213
- Spot Improvement 11 – Bridge over Rough River
- Spot Improvement 17 – Culvert at Blacks Branch Creek
- Spot Improvement 18 – South Black Branch Road

No Priority (not recommended)

- Complete Reconstruction

The following comments were made during the prioritization discussion:

- Spot Improvements 1 and 2 could be combined into a single project.
- Many of the “widen shoulder” improvements could be combined into a single HSIP project.
- The priority of Spot Improvement 19 should be the drainage improvements and improving the sight distance at the KY 253 intersection. Widening this portion of KY 86 to three-lanes is not considered a high priority. The PIF for Spot Improvement 19 will address safety and drainage.

- There were concerns about not having a turn lane at the new elementary school in Cecilia. A turn lane is not required because KYTC and Hardin County Schools developed an internal traffic management plan similar to the one implemented on KY 1357 for G.C. Burkhead Elementary. That plan was very successful and both agencies feel that this plan will also work for the new school when it is open.
 - PIFs will be created for each of the six high priority spot improvements.
 - KYTC District 4 will develop right-of-way and utility cost estimates for the six high priority projects.
 - The benefit-to-cost analysis will only include construction costs.
9. Brian ended the meeting with a discussion of the project schedule and next steps. Cost estimates, benefit-to-cost ratios, and project priorities will be finalized based on feedback and recommendations from the project team. A draft report will be submitted in September and the final report in November.

The meeting ended at approximately 11:45 a.m. EDT.