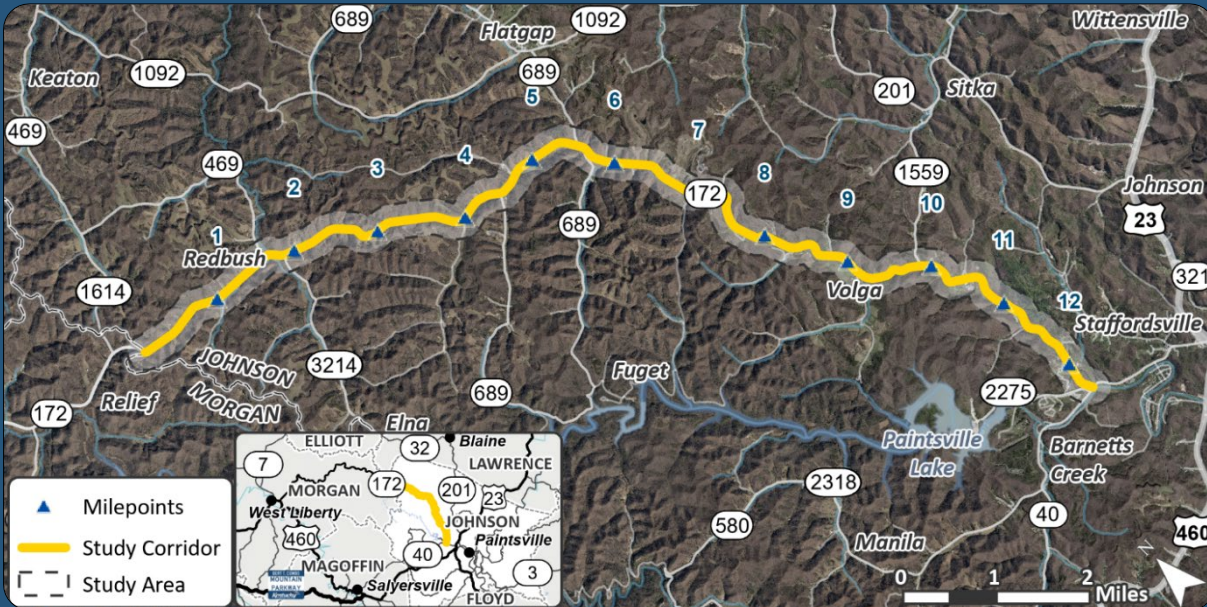




KY 172 CORRIDOR STUDY



FINAL REPORT

Item No. 12-171.00

Johnson County, Kentucky



In partnership with:

APRIL 2026



KY 172 CORRIDOR STUDY

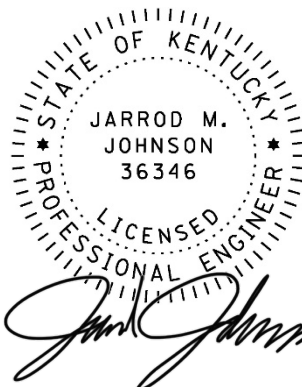
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Final Report
April 2026



Kentucky Transportation Cabinet
Central Office – Division of Planning
& Highway District 12

In partnership with:



EXECUTIVE SUMMARY

The Kentucky Transportation Cabinet (KYTC) initiated this study for the KY 172 corridor in Johnson County to improve safety and address mobility and access concerns along this segment of KY 172 for approximately 12.37 miles from the Morgan County line (MP 0.000) to the intersection with KY 40, west of Paintsville (MP 12.370). Additional emphasis is placed on higher-volume intersections along this portion of KY 172 including KY 689, KY 1559, and KY 40. The project was identified in the KYTC 2024-2030 Enacted Highway Plan with the goal of performing a planning study to examine potential spot improvements along the corridor to match improvements recently made to the Morgan County portion of KY 172. The study area is shown in **Figure ES-1**.

Figure ES-1. Study Area



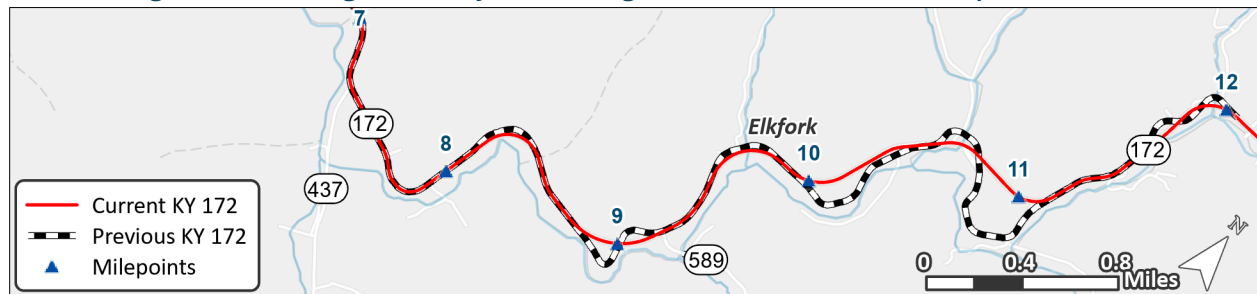
The KY 172 corridor serves as a vital connection between the communities of West Liberty and Paintsville as well as the surrounding area. This study identifies opportunities and proposes potential solutions to promote safe, efficient, and reliable transportation for both local and regional motorists. The outcome of the study is a list of prioritized short- and long-term improvement concepts that KYTC may use for further project development and implementation. The list of improvement concepts is evaluated and prioritized based on transportation needs, environmental / economic benefits and impact, benefit / cost, safety, structural needs, and existing roadway conditions.

PREVIOUS MORGAN COUNTY KY 172 IMPROVEMENTS

The Morgan County improvements run from MP 2.000 to MP 13.000 and include reconstruction and spot improvement projects (Item No.'s 10-8300.00, 10-8100.00, 10-8301.00 and 10-8003.00) which were constructed between 2014 and 2016.

These projects involved alignment improvements, spot improvements and minor widening along KY 172. **Figure ES-2** illustrates an example of the roadway's alignment before and after the improvements.

Figure ES- 2. Morgan County KY 172 Alignment Before and After Improvements



OTHER STUDIES & PROJECTS

Several nearby projects are either recently completed, ongoing, identified, or committed near the study area. These include:

◆ Previous Studies and Projects

- **Resurfacing Project:** ID 24-2375 – MP 0.000 to 1.927 (Completed June 2025)
- **Planning Study:** US 460 Corridor Study – Item No. 10-80101.00 (Completed Dec. 2024)
- **Planning Study:** KY 321 Corridor Study – Item No. 12-80116.00 (Completed Oct. 2024)

◆ Current Projects

- **HSIP – KY 40 and KY 2275 Intersection Improvements:** Ongoing project approximately 275' west of the KY 40 and KY 172 intersection. The study team has been in coordination with the HSIP project team throughout the study.
- **Item No. 12-5020.00 – District 12 Rockfall/Landslide Study:** Ongoing planning study to identify and scope potential rockfall and slide areas on various routes in District 12.

◆ Identified Projects (CHAF)

- **CHAF ID IP20190185:** KY 172, MP 20.400 (Morgan County) to 0.300 (Johnson County) crossing the Morgan/Johnson County Line at MP 21.169. Geometric improvements and roadway reconstruction on KY 172 from west of KY 1614 to 0.3 miles into Johnson County. This is a KYTC District 10 CHAF project. District 10 was consulted during this study and will use the outcomes to determine next steps with this CHAF project.
- **CHAF ID IP20190028:** KY 172, MP 13.000 to 16.400, Morgan County. Geometric improvements and roadway reconstruction on KY 172 from Crockett (MP 13.000) to just south of KY 1715 at Moon (MP 16.400).

◆ Committed Projects (2024 Enacted Highway Plan)

- **Item No. 12-80250.00:** New Route, Johnson County. Construct access road to proposed Johnson County High School and Middle School campus to intersect with KY 40 at MP 8.850.
- **Item No. 12-80116.00:** KY 321, MP 7.113 to 8.791, Johnson County. Address congestion and safety issues on KY 321 from 6th Street to the junction of KY 321 and KY 40.
- **Item No. 12-80100.00:** KY 40, MP 9.155 to 9.800, Johnson County. Improve roadway geometrics and capacity on KY 40 from KY 321 to Garbage Hollow.
- **Item No. 12-149.00:** KY 40, MP 9.800 to 10.700, Johnson County. Improve roadway geometrics and capacity from Garbage Hollow to east of Mill Street.
- **Item No. 12-194.00:** KY 40, MP 9.375 to 9.575, Johnson County. Address geometric and safety issues and future congestion mitigation on KY 40 from 0.10 mile west of Teays Branch Road to 0.10 miles east of Teays Branch Road.
- **Item No. 10-80101.00:** US 460, MP 0.000 to 7.620, Johnson County & MP 14.297 to 20.133, Magoffin County. Improve US 460 from the intersection with KY 114 to the interchange with US 23.

EXISTING CONDITIONS

An inventory and evaluation of existing roadway conditions were completed to identify elements that may contribute to potential needs for improvement. The following existing roadway conditions were evaluated:

- ◆ Roadway System & Characteristics
 - Functional Classification
 - Roadway System & Freight Network
 - Lanes, Shoulders, & Medians
 - Speed Limit
- ◆ Horizontal Alignment
 - Curve Radii
 - Horizontal Sight Distance
 - Superelevation
 - Curve Advisory Speeds
- ◆ Vertical Alignment
 - Grades
 - Crest and Sag Curves
 - Stopping Sight Distance
- ◆ Intersections and Access Points
 - Intersection Skew
 - Intersection Sight Distance
- ◆ Passing Zones
- ◆ Structures
- ◆ Pavement Conditions
- ◆ Guardrail
- ◆ Cribbing / Slope Stability
- ◆ Signing
- ◆ Multimodal & Recreational Considerations

KY 172 is a rural, two-lane major collector with a posted speed limit of 55 miles per hour. It has 10' lanes, no median, and limited paved shoulder width (0 – 1.5'). The roadside conditions vary along the corridor with generally more floodplains and farmland along the roadway in the west towards Morgan County while the eastern section is more constrained by mountains and streams. **Figure ES-3** includes photos of the roadway at representative eastern and western portions along the corridor. Because of the terrain, there are many horizontal and vertical curves rated with a grade of “D” or below in KYTC’s HIS database classification system. Few opportunities for passing are present along the corridor, and the terrain also leads to many intersections with skews or sight distance that do not meet modern design guidelines. Mudlick Creek runs parallel to the corridor which has resulted in several areas with unstable slopes or cribbing. Several signs and sections of guardrail along the corridor are either missing, damaged, or otherwise in need of replacement or repair. Much of the corridor exhibits areas with limited to no shoulder width and locations that have a difference in elevation between the pavement and shoulder. Two structures along the corridor built between 1933 and 1937 have narrow widths and railing that does not meet modern design standards. One of the structures, located at milepoint 11.916, has a narrow opening between two rock faces approaching the bridge. No bicycle or pedestrian accommodations exists.

Figure ES-3. Representative Comparison of Eastern vs. Western KY 172



TRAFFIC

Traffic volumes generally increase heading east along the corridor from the Morgan County line to KY 40, ranging from an AADT of 740 to 2,810 vehicles per day (vpd) according to data collected between 2022-2024. Existing year (2025) and future year (2045) traffic volumes were determined through a traffic forecast for use in this study to evaluate corridor and intersection operations. The 2045 projected traffic along the corridor ranges from 2,400 to 3,700 vpd with 6.9% trucks. Limited bicycle or pedestrian activity is present along the corridor.

Highway Capacity Software (HCS) was used to determine the corridor Level of Service (LOS) based on the existing roadway conditions and forecasted traffic. No segment fell below a LOS of “B” in either direction. Corridor speeds along the corridor via HERE’s GPS-based data fluctuate, with 85th percentile speeds falling below the 55-mph speed limit at several points along the corridor. Most of the speeds in the eastern half of the corridor fall below the speed limit. Based on the results from the corridor traffic operations, these speed variances are mostly due to the roadway geometry and not congestion.

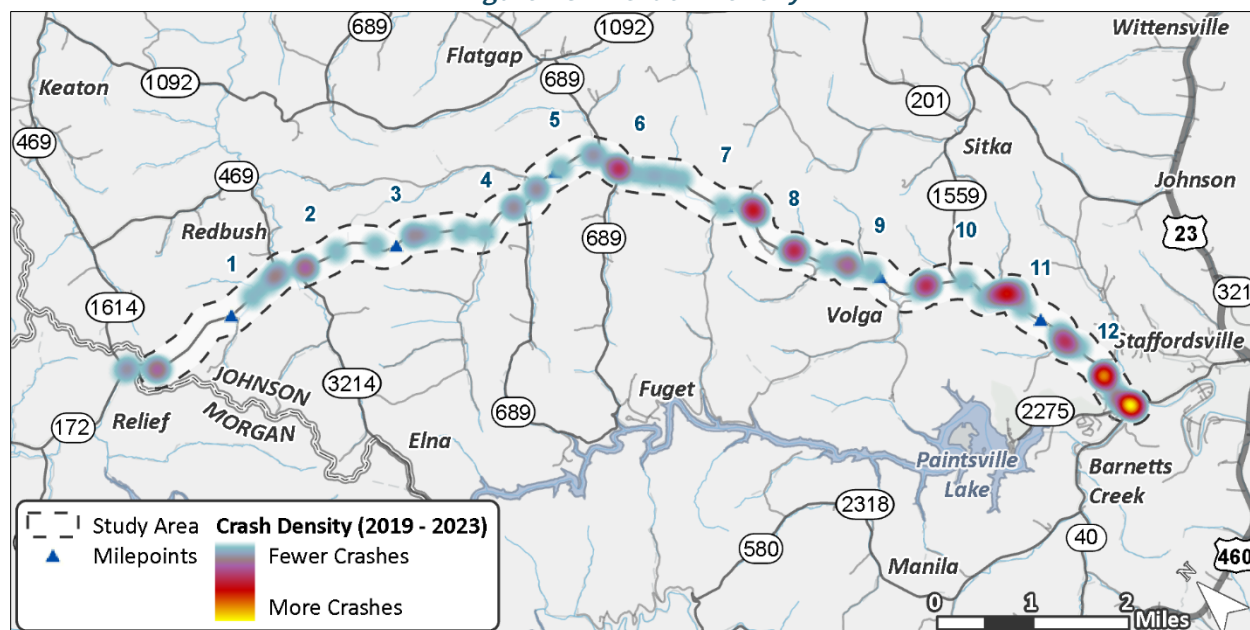
The forecast also included turning movement projections for the intersections of KY 689 (north), KY 689 (south), KY 1559, and KY 40 which are all three-leg, stop-controlled intersections. Synchro software was used to analyze intersection operations. At the intersections with KY 689 and KY 1559, no LOS falls below “B” for any scenario, and no queueing issues are reported. At the intersection with KY 40, the KY 172 approach reaches LOS “D” in the 2045 AM peak hour with a queue that extends beyond the entrance to the adjacent Dollar General. A turn lane warrant analysis at the KY 40/KY 172 intersection indicated a southbound right-turn lane onto KY 172 is already warranted with 2025 volumes, and a northbound left-turn lane onto KY 172 is nearly warranted with future 2045 volumes.

SAFETY

Historical crash data was analyzed to identify locations along KY 172 that could be considered high crash locations, determine crash trends, and identify potential safety issues in the study area. Overall, 93 crashes were reported along the corridor within the five-year period from 2019 to 2023. The crash density along the corridor is shown in **Figure ES-4** as a visual representation. Overall, a higher density of crashes appear on the eastern half of the study area. Of the crashes, 23, or approximately 24.7%, resulted in a Fatal (1) or injury collision. Along KY 172, most crash types could be indicative of roadway related issues such as geometry (i.e. single-vehicle (43%), sideswipe (21%), and head-on (6%)). Additionally, rear-end (12%), angle (13%), and opposing left-turn (4%) crashes occur at access points and intersections along KY 172, most of which involved limited visibility or sight distance of vehicles along the roadway.

A statistical analysis was performed based on methods that compare existing crash rates with crash rates of similar types of facilities through Kentucky Transportation Center (KTC) research and can be categorized by Excess Expected Crashes (EEC) and a Level of Service of Safety (LOSS). Overall, the eastern half of KY 172 shows higher EECs and LOSSs which indicate a higher potential for crash reductions. Also, five intersections with EEC values above zero are present, with the intersection at KY 40 having the highest EEC value for intersections at 2.5, over four times the next highest intersection EEC. These results could be indicative of a relationship between the terrain, traffic volumes, and number/severity of crashes in the eastern half of the corridor.

Figure ES-4. Crash Density



ENVIRONMENTAL OVERVIEW

An environmental overview was conducted to identify resources and potential issues for consideration during the development of improvement concepts. Natural and human environmental resources were identified from a literature / database review. Features such as streams, cemeteries, churches, wells, and other community / cultural resources are identified on the concept sheets as well as potential environmental impacts. A geotechnical overview and socioeconomic overview were completed as supplements to the environmental overview.

COORDINATION & ENGAGEMENT

The project team consisted of KYTC District 12, KYTC Central Office, KYTC Division of Design, KYTC Division of Environmental Analysis, Big Sandy Area Development District (BSADD), and the HMB Consultant team. Over the course of the study, the project team met to discuss findings, study progress, and coordinate on key issues. The project team met for three scheduled project team meetings, one meeting with local officials and stakeholders, and one additional follow-up meeting to finalize project prioritizations. The schedule of meetings is shown in **Figure ES-5**.

Figure ES-5. Meeting Schedule



DEVELOPMENT & EVALUATION OF POTENTIAL IMPROVEMENT CONCEPTS

Concepts were identified and developed based on a review of the existing conditions, traffic operations, crash analysis, and input from the project team and local officials / stakeholders (LO/S) with the goal to match the recent Morgan County KY 172 improvements. The design guidelines used for those improvements, such as the design speed (50 mph) and typical section (11' lane width and 9' (2' paved) shoulder width), were used as the basis for concept development. Improvement concepts were developed for various spots, segments, and intersections as well as the entire corridor.

Concept limits for spots and segments were based on feasibility, practicality, and the extent or number of conditions that do not meet modern design guidelines on adjacent sections of the corridor. In some instances, multiple concept options were developed for individual locations to compare benefits, impacts, costs, and feasibility during concept refinement including a benefit-to-cost ratio. Off-alignment and widening concepts were thoughtfully developed to limit or consider impacts to environmental features such as cemeteries, flood hazard areas, churches / homes / businesses, utilities, geotechnical features / terrain, etc. The initial development yielded four full-corridor improvement concepts and 29 spot, segment, or intersection improvement concepts identified over 26 locations.

Corridor-wide improvement concepts primarily included improvement concepts that may be more feasible to implement across the entire corridor. This includes lower-cost or lower-impact improvements to features like signing, guardrail, cribbing, or slope stability. While spot and segment concepts include improvements to these features if there is a need, these concepts are intended to give the project team the information they need for flexibility in decision-making for future projects.

Additionally, a concept to bring the entire corridor up to the standards that would match the Morgan County improvements was included. This concept combines all spot, segment, and intersection improvements mentioned previously while also filling in the gaps with roadway improvements between them. This was done to give the project team information on corridor-wide costs, impacts, and benefits to compare with segmentation of the concepts as shown previously.

Costs were developed for Design, Right-of-Way, Utility, and Construction phases in 2025 dollars with risk-based contingencies. An evaluation of cost, feasibility, impacts, benefit-cost, and feedback from the project team and LO/S was used to refine the concepts throughout the study. This led to a final, prioritized list of three full-corridor concepts and 30 spot, segment, or intersection improvement concepts identified over 25 locations.

RECOMMENDATIONS

Based on review and discussion of the concepts, the project team determined a recommended high, medium, or low priority for each. A map showing the concept locations along the corridor with their associated recommended priorities is shown in **Figure ES-6**. A table summarizing each concept is shown as **Table ES-1**. The individual concept sheets can be found in **Section 8** of the report with detailed cost estimates in **Appendix G**.

Figure ES-6. Improvement Concept Locations & Priorities

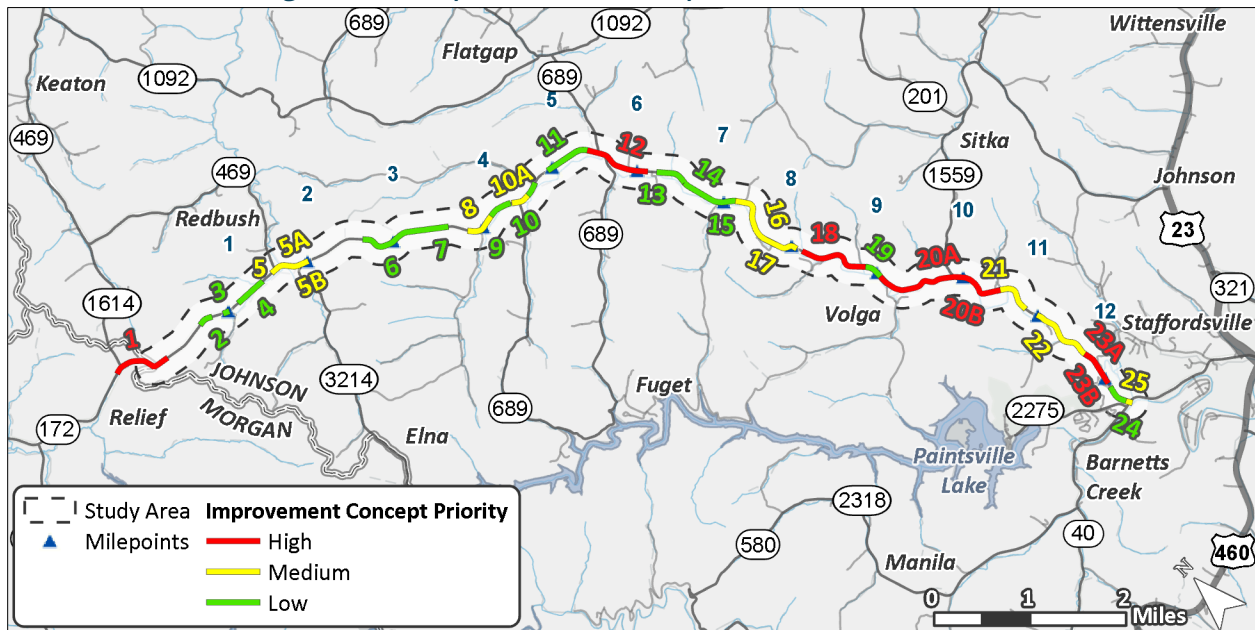


Table ES-1. Final List of Potential Improvement Concepts

ID	Primary Improvement	Location / Milepoints	Length (mi)	Total Cost (2025 Dollars Without Risk-Based Contingencies)	Total Cost (2025 Dollars with Risk-Based Contingencies)	Priority
1	Horz. & Vert.	MP 20.74 (Morgan) - 0.14	0.57	\$13,940,000	\$16,840,000	High
2	Horz.	MP 0.69 - 0.79	0.10	\$1,980,000	\$2,310,000	Low
3	Intersection	0.981 (Salyers Branch Rd)	N/A	\$ 1,430,000	\$1,700,000	Low
4	Vert.	MP 1.16 - 1.44	0.28	\$4,750,000	\$5,470,000	Low
5	Horz., Vert., & Bridge	MP 1.64 - 1.98	0.34	\$6,580,000	\$7,810,000	Medium
5A	Intersection	MP 1.950 (KY 3214)	N/A	\$1,610,000	\$1,890,000	Medium
5B	Intersection	MP 1.950 (KY 3214)	N/A	\$3,440,000	\$4,140,000	Medium
6	Horz. & Vert.	MP 2.67 - 3.25	0.58	\$8,970,000	\$10,540,000	Low
7	Vert.	MP 3.28 - 3.58	0.30	\$6,130,000	\$7,330,000	Low
8	Horz. & Vert.	MP 3.85 - 4.11	0.26	\$4,820,000	\$5,760,000	Medium
9	Horz. & Vert.	MP 4.14 - 4.36	0.22	\$4,580,000	\$5,430,000	Low
10	Horz., Vert., & Intersection	MP 4.43 - 4.73	0.30	\$6,310,000	\$7,280,000	Low
10A	Horz., Vert., & Intersection	MP 4.43 - 4.57	0.14	\$2,620,000	\$3,060,000	Medium
11	Vert.	MP 4.97 - 5.41	0.44	\$6,640,000	\$7,490,000	Low
12	Horz., Vert., & Intersection	MP 5.44 - 6.08	0.64	\$18,800,000	\$22,440,000	High
13	Horz. & Vert.	MP 6.23 - 6.50	0.27	\$6,200,000	\$7,100,000	Low
14	Vert.	MP 6.56 - 6.82	0.26	\$7,080,000	\$8,590,000	Low
15	Horz. & Vert.	MP 6.83 - 7.15	0.32	\$15,930,000	\$18,920,000	Low
16	Horz., Vert., & Intersection	MP 7.15 - 7.76	0.61	\$17,180,000	\$20,330,000	Medium
17	Horz., Vert., & Intersection	MP 7.76 - 8.03	0.27	\$21,870,000	\$26,550,000	Medium
18	Horz., Vert., & Intersection	MP 8.15 - 8.83	0.68	\$20,590,000	\$24,460,000	High
19	Horz. & Vert.	MP 8.89 - 9.12	0.23	\$11,510,000	\$13,920,000	Low
20A	Horz., Vert., & Intersection	MP 9.08 - 10.45	1.37	\$36,310,000	\$43,240,000	High
20B	Horz., Vert., & Intersection	MP 9.08 - 10.45	1.37	\$36,850,000	\$44,150,000	High (Preferred)
21	Horz., Vert., & Intersection	MP 10.47 - 10.83	0.36	\$10,590,000	\$12,440,000	Medium
22	Horz., Vert., & Intersection	MP 11.02 - 11.69	0.67	\$18,150,000	\$21,700,000	Medium
23A	Bridge, Horz., & Intersection	MP 11.69 - 12.03	0.34	\$11,190,000	\$13,030,000	High
23B	Bridge	MP 11.83 - 11.99	0.07	\$6,000,000	\$6,790,000	High
24	Horz. & Vert.	MP 12.13 - 12.34	0.21	\$3,270,000	\$3,700,000	Low
25	Intersection	MP 12.370 (KY 40)	N/A	\$4,530,000	\$5,120,000	Medium
C1	Signing	0.00 - 12.37	12.37	\$275,000	\$275,000	-
C2	Guardrail	0.00 - 12.37	12.37	\$2,290,000	\$2,290,000	-
C3	Full Corridor Improvement	20.74 (Morgan Co.) - 12.37	12.80	\$224,100,000	\$267,300,000	-

Note: For Time/Management-Based Contingency, add 10% per biennium, per phase

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APPENDIX F: Intersection Control Evaluation (ICE)

APPENDIX G: Cost Estimates & Additional Concept Information

1 Introduction

The Kentucky Transportation Cabinet (KYTC) initiated this study for the KY 172 corridor in Johnson County to improve safety and address mobility and access concerns along this segment of KY 172 for approximately 12.37 miles from the Morgan County line (MP 0.000) to the intersection with KY 40, west of Paintsville (MP 12.370). The project was identified in the KYTC 2024-2030 Enacted Highway Plan with the goal to perform a planning study to examine potential spot improvements along the corridor to match improvements recently made to the Morgan County portion of KY 172.

The project team consists of KYTC District 12, KYTC Central Office, KYTC Division of Environmental Analysis, KYTC Division of Design, Big Sandy Area Development District (BSADD), and the HMB Consultant team.

1.1 Study Area

The study area encompasses KY 172 from the Morgan County line (MP 0.000) to the intersection with KY 40, west of Paintsville (MP 12.370). Additional emphasis is placed on higher-volume intersections along this portion of KY 172 including KY 689, KY 1559, and KY 40. The study area is shown in **Figure 1**.

Figure 1. Study Area



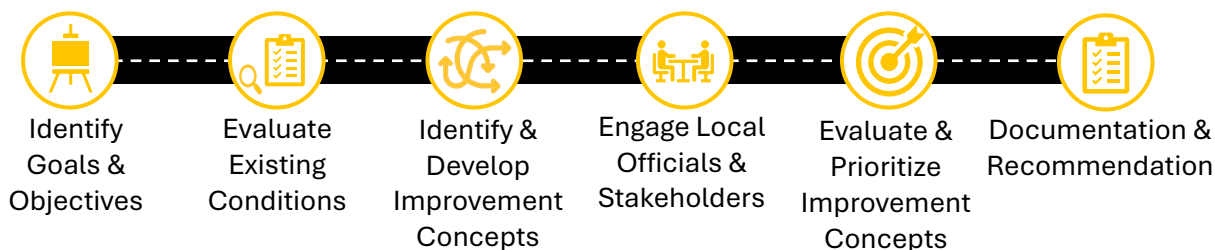
1.2 Study Purpose and Goals

The KY 172 corridor serves as a vital connection between the communities of West Liberty and Paintsville as well as the surrounding area. This study identifies opportunities and proposes potential solutions to promote safe, efficient, and reliable transportation for both local and regional motorists. The outcome of the study is a list of prioritized short- and long-term improvement concepts that KYTC may use for further project development and implementation. The list of improvement concepts is evaluated and prioritized based on transportation needs, environmental / economic benefits and impact, benefit / cost, safety, structural needs, and existing roadway conditions.

1.3 Study Process

The process of this study is described in detail in the following nine sections. Additional resource / reference materials are included in the appendices. **Figure 2** illustrates the overall process.

Figure 2. Study Process



Section 1 – Introduction

Provides background introductory information about the study and provides the framework for the remainder of the report.



Section 2 – Existing Transportation Conditions

Encompasses existing roadway information including roadway and roadside characteristics, geometrics and terrain, speeds, intersection access, structures, signing, guardrail, and bicycle / pedestrian / recreational accommodations.



Section 3 – Traffic Volumes & Operations

Presents the existing and forecasted traffic volumes along the corridor as well as existing and future corridor and intersection operations.



Section 4 – Safety Analysis

Summarizes the historical and predictive crash data analysis along the corridor.



Section 5 – Environmental Overview

Summarizes the natural, human, socioeconomic, and geotechnical resources within the study area.



Section 6 – Coordination & Engagement

Summarizes coordination efforts with the project team and local officials / stakeholders. Meeting summaries and outcomes are discussed.



Section 7 – Development of Improvement Concepts

Presents the process by which spot, segment, and corridor-wide improvement concepts were identified and developed.



Section 8 – Evaluation & Refinement of Improvement Concepts

Focuses on the evaluation and refinement of improvement concepts including more detailed information such as impacts, cost estimates, return on investment, and prioritization.



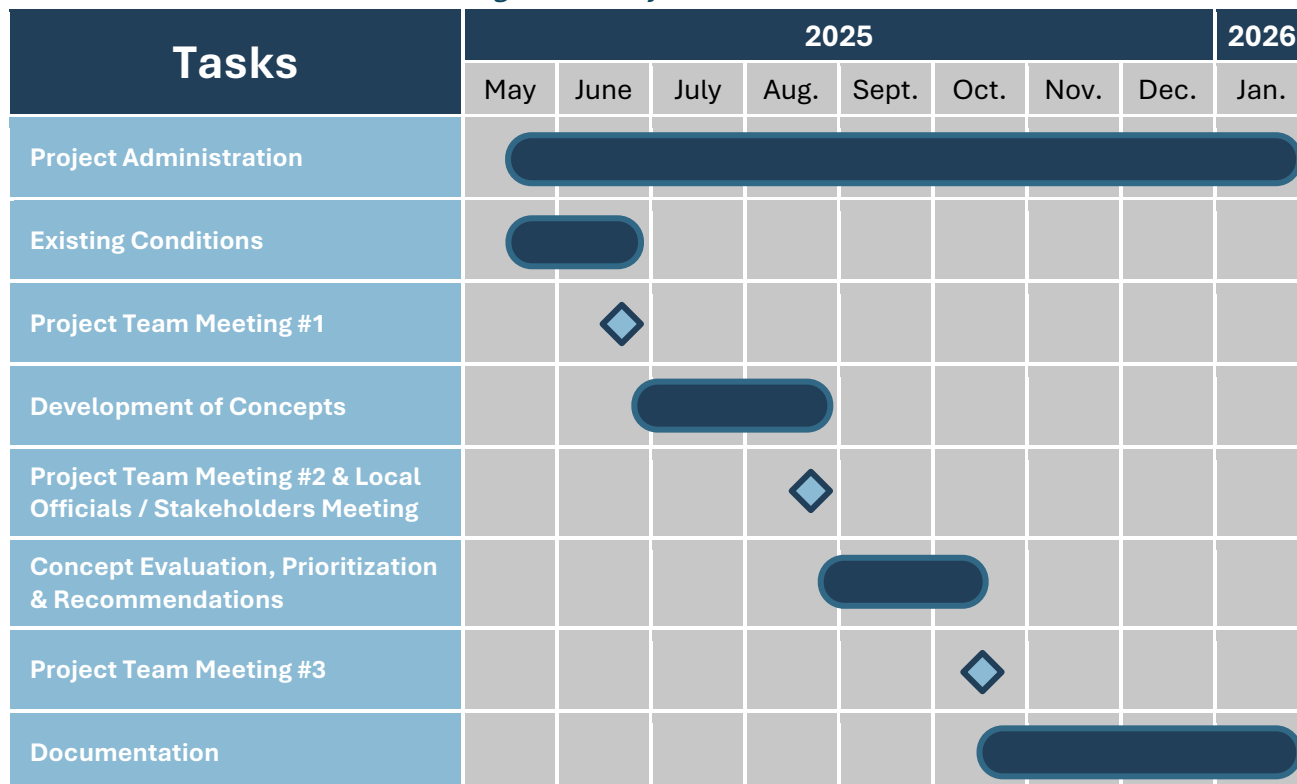
Section 9 – Study Outcomes

Presents the outcomes of the study as a prioritized list of locations and improvement concepts as well as next steps and additional information.

1.4 Study Schedule

The study began in May 2025 with the final report completed in January 2026. **Figure 3** shows the timeline of events throughout the study.

Figure 3. Study Schedule

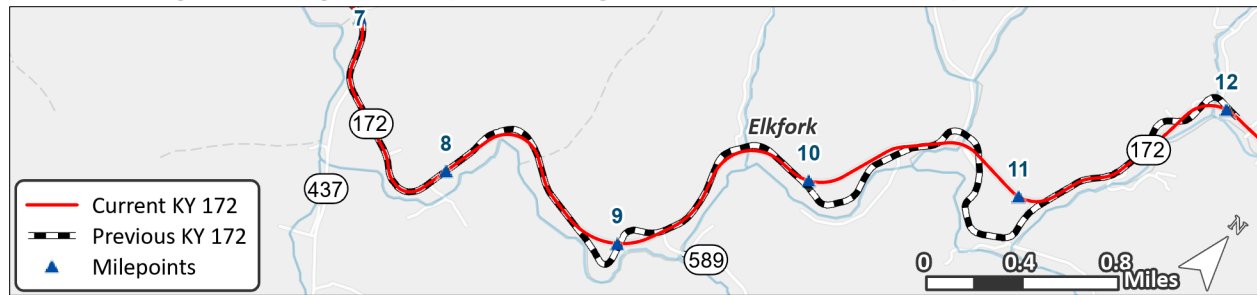


1.5 Previous Morgan County KY 172 Improvements

The Morgan County improvements run from MP 2.000 to MP 13.000 and include reconstruction and spot improvement projects (Item No.'s 10-8300.00, 10-8100.00, 10-8301.00 and 10-8003.00) which were constructed between 2014 and 2016.

These projects involved alignment improvements, spot improvements and minor widening along KY 172. **Figure 4** illustrates an example of the roadway's alignment before and after the improvements.

Figure 4. Morgan County KY 172 Alignment Before and After Improvements



Construction plans for Item No. 10-8003.00, were available from KYTC's Project Archives Database (As-Built & Record Plans)¹. The design parameters and typical sections from those plans were used as reference guidelines to ensure consistency with the improvement concepts developed for KY 172 in Johnson County. **Figures 5 and 6** show the typical section used for the Morgan County improvements along with a representative image taken from the field.

Figure 5. Morgan County Improvements Typical Section

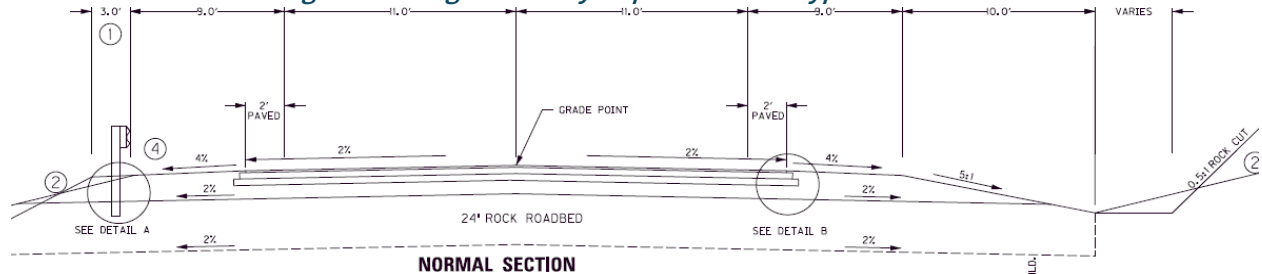
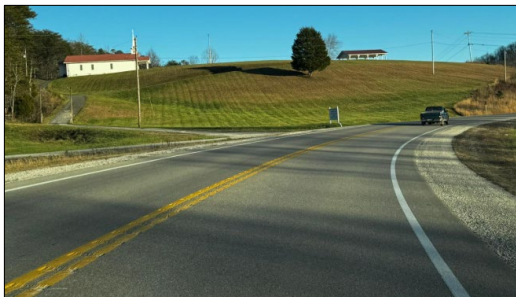


Figure 6. Morgan County KY 172 Representation



The following design parameters were used for the Morgan County improvement project:

- ◆ 50-mph Design Speed
- ◆ Rural Collector
- ◆ Rolling Terrain
- ◆ 11' Lane Width
- ◆ 9' Shoulder Width (2' Paved)

¹ KYTC Project Archives available at: <https://maps.kytc.ky.gov/projectarchives>

1.6 Other Studies & Projects

PREVIOUS STUDIES & PROJECTS

Previous projects and studies in or near the study area were identified. These include:

- ◆ Resurfacing Project: ID 24-2375 – MP 0.000 to 1.927 (Completed June 2025)
- ◆ Planning Study: US 460 Corridor Study – Item No. 10-80101.00 (Completed December 2024)²
 - Improve US 460 from the intersection with KY 114 to the interchange with US 23.
- ◆ Planning Study: KY 321 Corridor Study – Item No. 12-80116.00 (Completed October 2024)²
 - Address congestion and safety issues on KY 321 from 6th Street to the junction of KY 321 and KY 40.

CURRENT, IDENTIFIED, & COMMITTED PROJECTS

Current, identified, and committed projects and studies that may affect the study area were identified. The projects are shown in **Figure 7** and discussed below.

Current

There are two actively ongoing projects near the study area at the time of this report:

HSIP – KY 40 and KY 2275 Intersection Improvements – An intersection improvement project that is currently under conceptual design is being performed at the intersection of KY 40 and KY 2275, approximately 275' west of the KY 40 and KY 172 intersection. This project is being completed through KYTC's Highway Safety Improvement Program (HSIP), a federally funded program administered by the KYTC Traffic Safety Branch. The project team has been in coordination with the HSIP project team throughout the study.

Item No. 12-5020.00 – District 12 Rockfall/Landslide Study – There is an ongoing planning study to identify and scope potential rockfall and landslide areas on various routes in District 12. One of the potential areas is KY 172 from MP 9.0 to 10.0. The final ranking of rockfall/landslide sites has not been determined.

Identified (SHIFT / CHAF)

Identified projects are transportation projects that have been identified as a need and submitted into the KYTC Continuous Highway Analysis Framework (CHAF) database. This database provides a means to track and analyze potential projects as a first step towards project funding. Once sponsored, these projects become part of the next stage in a project's evolution in a biennial process called SHIFT (Strategic Highway Investment Formula for Tomorrow). SHIFT is KYTC's data-driven, objective process to compare capital improvement projects across the state and prioritize limited transportation funds. Projects are evaluated and scored based on key attributes and can be boosted based on local priorities. KYTC then combines statewide and local priorities to help develop the Governor's Recommended State Highway Plan. This plan is then adjusted by lawmakers based on additional information and funding availability, ultimately becoming the biennial Enacted State Highway Plan, which includes two years of funded projects and four additional years of spending priorities. There are two CHAF / SHIFT projects identified near the study area:

² KYTC Planning Studies & Reports available at <https://transportation.ky.gov/Planning/Pages/Planning-Studies-and-Reports.aspx>

- ◆ **IP20190185:** KY 172, MP 20.400 (Morgan County) to 0.300 (Johnson County) crossing the Morgan/Johnson County Line at MP 21.169
 - Geometric improvements and roadway reconstruction on KY 172 from west of KY 1614 to 0.3 miles into Johnson County.
 - This is a KYTC District 10 CHAF project. District 10 was consulted during this study and will use the outcomes to determine next steps with this CHAF project.
- ◆ **IP20190028:** KY 172, MP 13.000 to 16.400, Morgan County
 - Geometric improvements and roadway reconstruction on KY 172 from Crockett (MP 13.000) to just south of KY 1715 at Moon (MP 16.400).

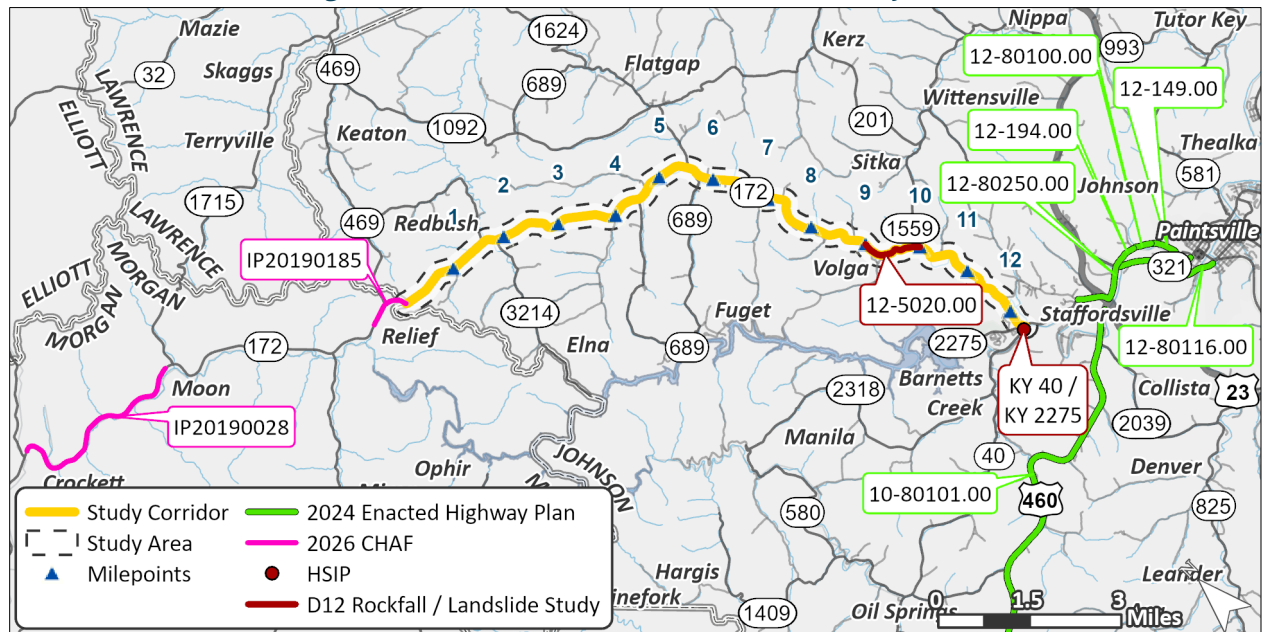
Committed (2024 Enacted Highway Plan)

Committed projects are those prioritized through SHIFT, refined during the legislative session, and included in the Enacted Highway Plan³. The enacted plan at the time of this study is 2024 – 2030. It includes six relevant projects that are primarily located east of the study area near Paintsville:

- ◆ **Item No. 12-80250.00:** New Route, Johnson County
 - Construct access road to proposed Johnson County High School and Middle School campus to intersect with KY 40 at MP 8.850.
 - Funding – R: \$750,000 (2024) | U: \$350,000 (2025) | C: \$2,000,000 (2026)
- ◆ **Item No. 12-80116.00:** KY 321, MP 7.113 to 8.791, Johnson County
 - Address congestion and safety issues on KY 321 from 6th Street to the junction of KY 321 and KY 40.
 - Funding – D: \$1,770,000 (2025)
- ◆ **Item No. 12-80100.00:** KY 40, MP 9.155 to 9.800, Johnson County
 - Improve roadway geometrics and capacity on KY 40 from KY 321 to Garbage Hollow.
 - Funding – D: \$811,000 (2024)
- ◆ **Item No. 12-149.00:** KY 40, MP 9.800 to 10.700, Johnson County
 - Improve roadway geometrics and capacity from Garbage Hollow to east of Mill Street.
 - Funding – R: \$3,000,000 (2025) | U: \$1,000,000 (2026)
- ◆ **Item No. 12-194.00:** KY 40, MP 9.375 to 9.575, Johnson County
 - Address geometric and safety issues and future congestion mitigation on KY 40 from 0.10 mile west of Teays Branch Road to 0.10 miles east of Teays Branch Road.
 - Funding – R: \$500,000 (2024) | U: \$500,000 (2024)
- ◆ **Item No. 10-80101.00:** US 460, MP 0.000 to 7.620, Johnson County & MP 14.297 to 20.133, Magoffin County
 - Improve US 460 from the intersection with KY 114 to the interchange with US 23.
 - Funding – D: \$3,750,000 (2025)

³ KYTC Projects listed in the current 2024-2030 Enacted Highway Plan: <https://transportation.ky.gov/Program-Management/Pages/default.aspx>. Online map available at <https://maps.kytc.ky.gov/activehighwayplan/>

Figure 7. Current, Identified, & Committed Projects



2 Existing Transportation Conditions

In this section, the existing transportation conditions are presented. This includes information on the following:

- ◆ Roadway System & Characteristics
 - Functional Classification
 - Roadway System & Freight Network
 - Lanes, Shoulders, & Medians
 - Speed Limit
- ◆ Horizontal Alignment
 - Curve Radii
 - Horizontal Sight Distance
 - Superelevation
 - Curve Advisory Speeds
- ◆ Vertical Alignment
 - Grades
 - Crest and Sag Curves
 - Stopping Sight Distance
- ◆ Intersections and Access Points
 - Intersection Skew
 - Intersection Sight Distance
- ◆ Passing Zones
- ◆ Structures
- ◆ Pavement Conditions
- ◆ Guardrail
- ◆ Cribbing / Slope Stability
- ◆ Signing
- ◆ Multimodal & Recreational Considerations

Data for this section was collected from KYTC's Highway Information System (HIS) database, KYTC Photolog Viewer, KYTC Archive Plans database, KYTC and FHWA Bridge Inspection Reports, KyFromAbove Aerial Imagery and LiDAR (Light Detection and Ranging) elevation data, Google Earth / Streetview, and field data collection / verification. More detailed existing geometric analysis is found in **Appendix A**.

2.1 Roadway System & Characteristics

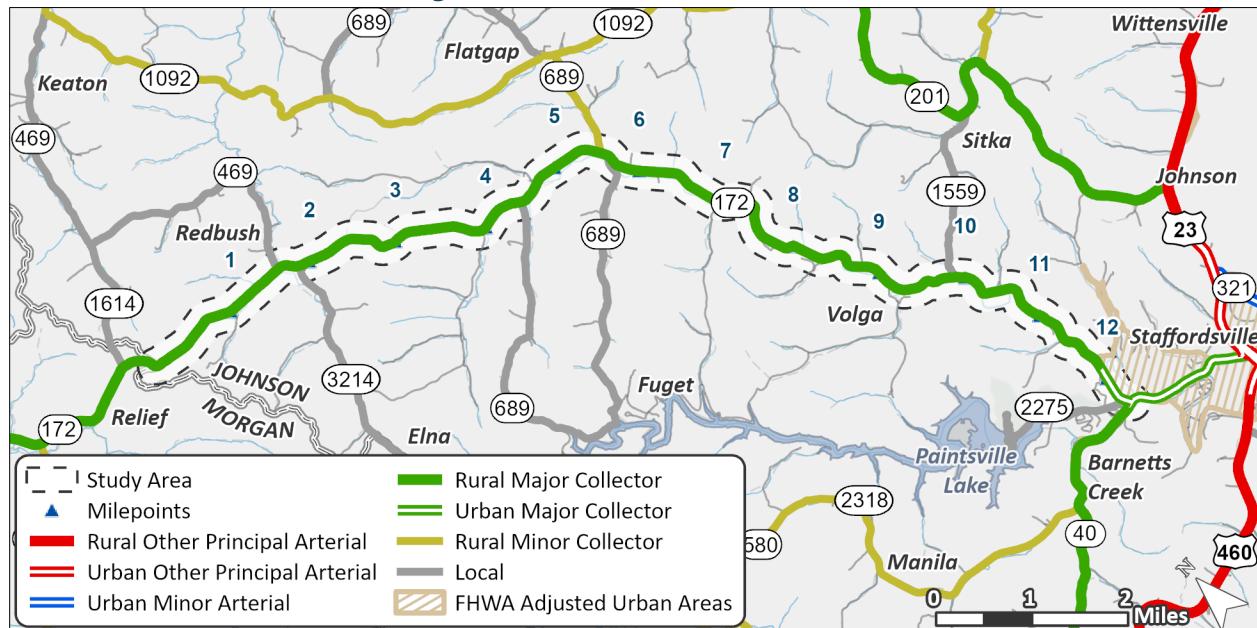
FUNCTIONAL CLASSIFICATION

Functional classification is the process of grouping streets and highways according to the character of travel service and access to adjacent land uses they provide. This classification system recognizes that travel involves movement through a hierarchical system of facilities that progress from lower classifications handling short, locally-oriented trips to higher classifications that serve longer-distance travel at a higher level of mobility. The function performed by a roadway within this hierarchical system and whether it is listed as urban (within a FHWA Adjusted Urban Area) or rural determines its classification.

Functional classification is an important transportation planning tool used for such programs as: Federal-aid funding and eligibility; traffic modeling; reporting of highway statistics; highway and pavement design; and measurement of highway system performance.

Throughout most of the study corridor, KY 172 is classified as a rural major collector until switching to an urban major collector at MP 11.889 in the east near Paintsville. Major collectors are defined as roadways that distribute and channel trips between nearby larger towns, cities, or arterial routes and serve the most important intra-county travel corridors. The functional classification is shown in **Figure 8**.

Figure 8. Functional Classification

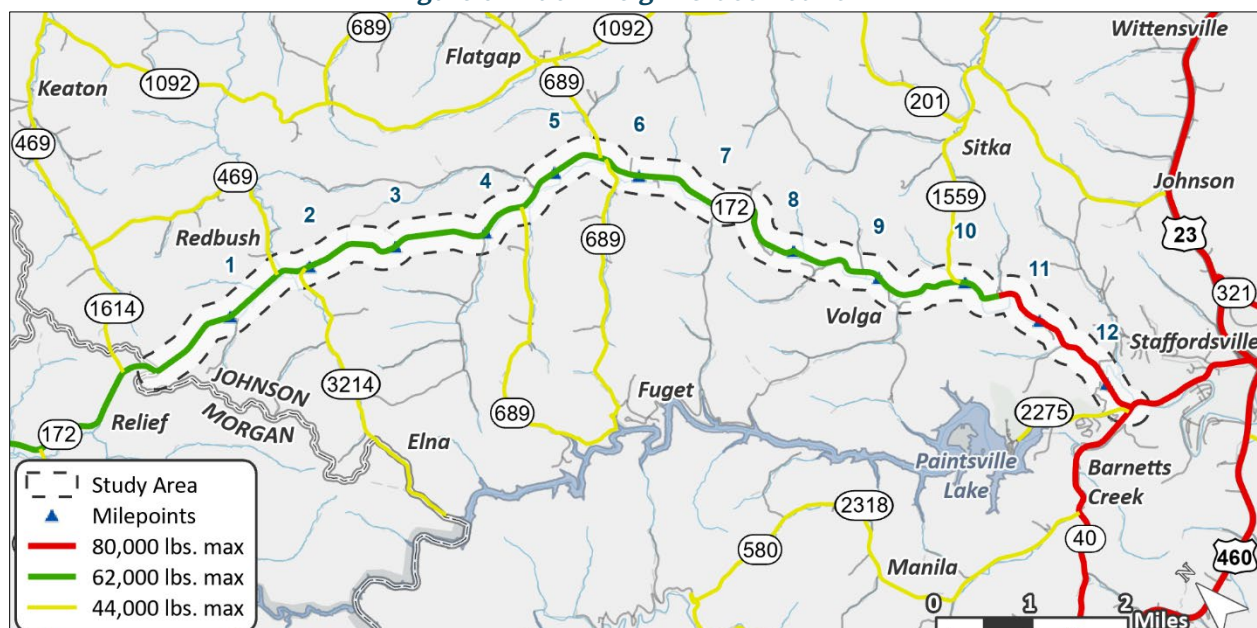


ROADWAY SYSTEM & FREIGHT NETWORK

KY 172 is listed as a KYTC State Secondary Roadway meaning it is considered a regionally significant route of shorter distance which provides mobility and access to land use activity, generally serving smaller cities and county seats within a region. It is listed as a KYTC Snow and Ice Priority A which means it receives top priority with a goal of a two-hour turnaround time during snow and ice events.

KY 172 is not listed on any freight network including the Kentucky Highway Freight Network (KHFN), National Freight Network (NFN), or National Truck Network (NTN). The majority of KY 172 has a maximum permitted truck weight of 62,000 pounds but increases to 80,000 pounds beginning at MP 10.445 towards the east. The Truck Weight Classification is shown on **Figure 9**.

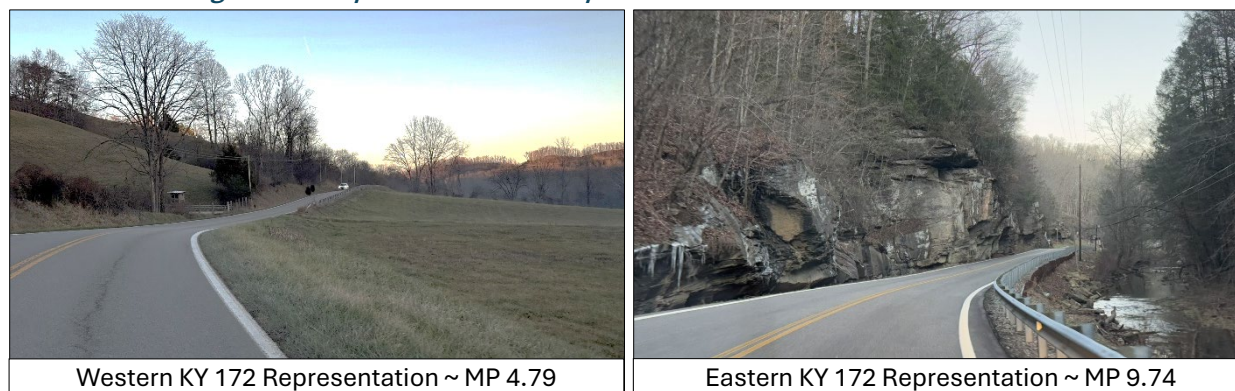
Figure 9. Truck Weight Classification



LANES, SHOULDERS, & MEDIANS

KY 172 is a two-lane, undivided roadway throughout the study area with a 10-foot lane width and 0 to 1.5-foot paved shoulder width depending on where existing site conditions permit. This typical section was verified in the field as well as reviewing the typical section shown in the recent resurfacing project plans. The roadside conditions vary along the corridor with generally more floodplains and farmland along the roadway in the west towards Morgan County while the eastern section is more constrained by mountains and streams. The most significant change in terrain occurs near MP 6.9, where Mudlick Creek generally begins running more closely parallel to KY 172. **Figure 10** includes photos of the roadway at representative eastern and western portions along the corridor.

Figure 10. Representative Comparison of Eastern vs. Western KY 172



SPEED LIMIT

The posted speed limit along KY 172, as well as all other intersecting KYTC-maintained routes, is 55 mph. Observed corridor speed data was compared and discussed in **Section 3.2**.

2.2 Horizontal Alignment

Information for the horizontal alignment was extracted from the KYTC HIS database, archive plans, the Kentucky Transportation Center (KTC) Curve Advisory Reporting Service (CARS), and KyFromAbove aerial imagery and LiDAR data. This includes data such as horizontal curve classifications, recommended curve advisory speeds, sight distances, and superelevations.

HIS HORIZONTAL CURVE CLASS

The HIS database contains a total of 54 horizontal curves along the corridor. The HIS curves are designated into six classes on a scale from A (flattest, high radius curves) to F (sharpest, low radius curves) to allow for a planning-level assessment of a roadway's horizontal curves. **Figure 11** shows the HIS horizontal curves graded A through F along the study area. There are 21 curves, approximately 40%, that fall into a grade of D or below. **Figure 12** shows the distribution of the horizontal curve classification. Overall, nearly 6.28 miles, or approximately 51%, of KY 172 falls within a horizontal curve. There is a higher concentration of horizontal curves which are also generally steeper on the eastern half of the corridor past MP 7.0. This is where the terrain starts to become more mountainous and constrained by Mudlick Creek running parallel to the roadway. **Figure 13** shows representative examples of the horizontal curvature of the corridor.

Figure 11. HIS Horizontal Curve Class

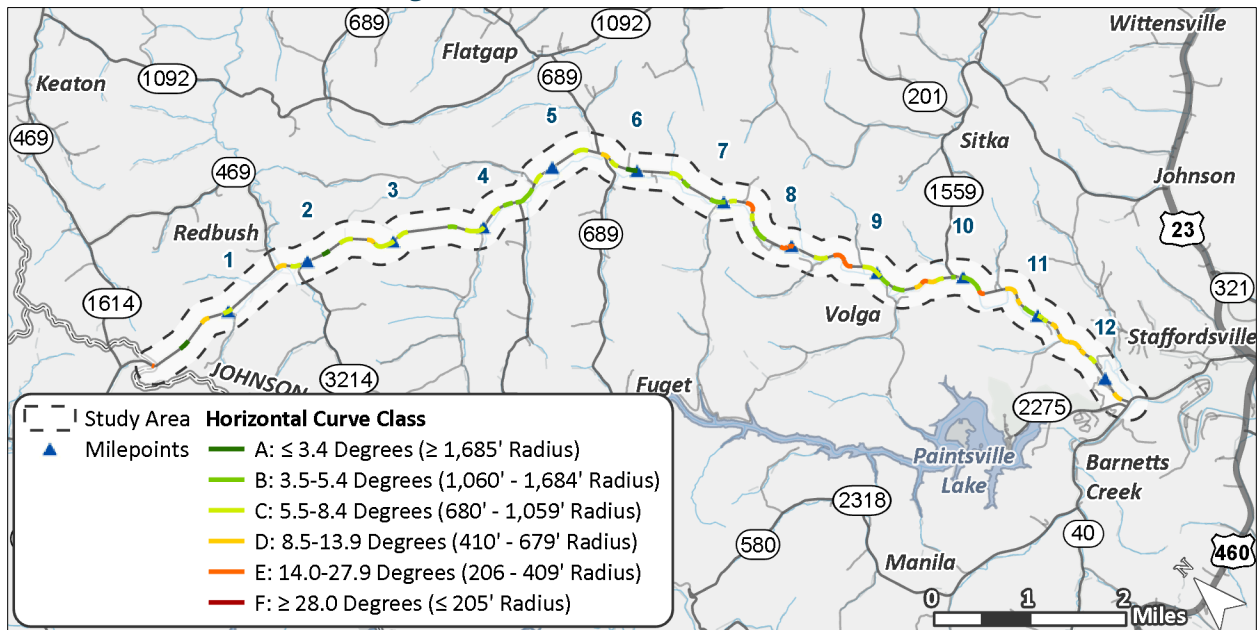


Figure 12. HIS Horizontal Curve Class Distribution

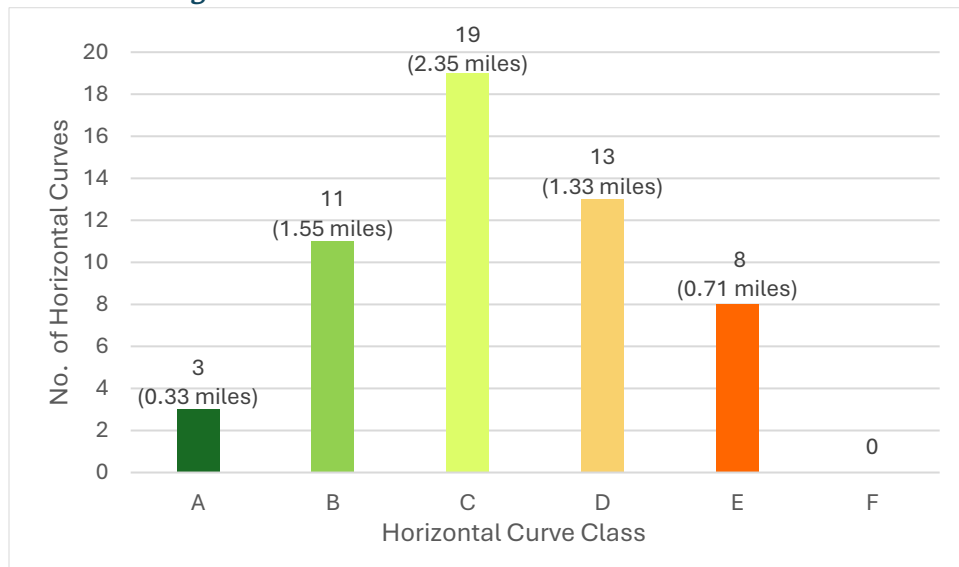


Figure 13. Representative Horizontal Curves



RADIUS, SIGHT DISTANCE, & SUPERELEVATION

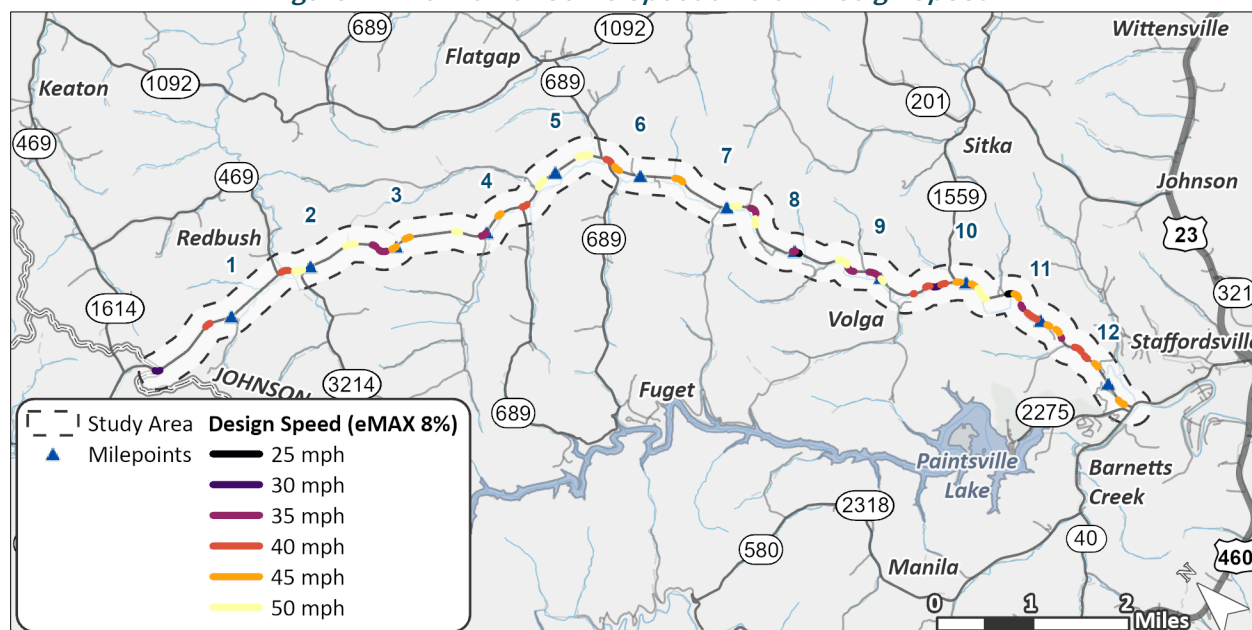
In addition to the HIS data, a more detailed horizontal alignment was created using OpenRoads Designer (ORD) by Bentley Systems, the standard Computer Aided Design and Drafting (CADD) program used on KYTC projects. This resulted in a more detailed alignment and measurement of the existing horizontal radii, sight distances, and superelevations to compare to the current design guidelines. The latest KYTC Highway Design Guidance Manual (HDM), December 2022 Revision, 4 was used to determine the recommended common geometric practices and guidelines for comparison.

The HDM provides varying guidelines based on roadway classification, terrain type, traffic volume, and design speeds. Since KY 172 is primarily a rural major collector, the guidelines found in HDM Exhibit 700-02, Common Geometric Practices – Rural Collector Roads, were used. KY 172 is classified as having a rolling terrain, has a speed limit of 55 mph, and has an Annual Average Daily Traffic (AADT) exceeding 2,000 vehicles per day. Therefore, a minimum radius of 960' and minimum stopping sight distance of 495' was used to compare whether the existing alignment meets current horizontal design guidelines.

Horizontal Radius

The ORD alignment broke down the corridor into more detailed horizontal curves to limit potential accuracy concerns from HIS. For example, where HIS would classify a segment as being one curve, it was a combination of multiple curves. Overall, there were 74 total horizontal curves drawn in ORD. Forty-seven (47) curves or approximately 65% do not meet the minimum 960' radius for a 55 mph design speed. The curves that do not meet the minimum radius in modern design guidelines are shown in **Figure 14**.

Figure 14. Horizontal Curve Speeds Below Design Speed

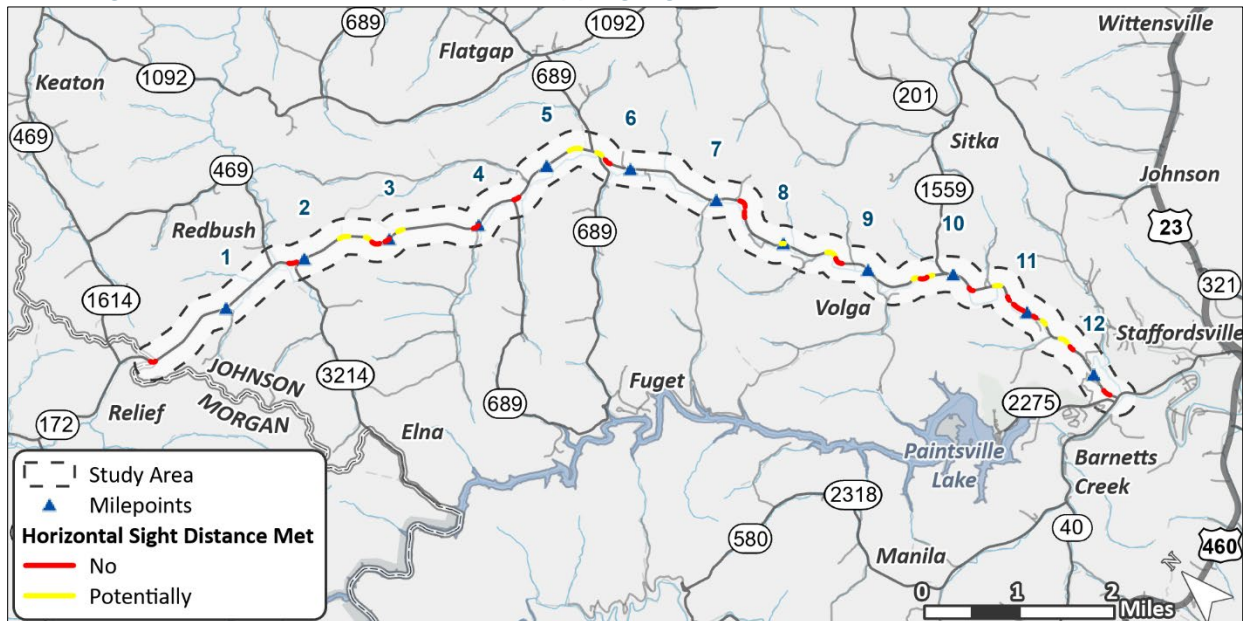


⁴ The KYTC Highway Design Guidance Manual is available at <https://transportation.ky.gov/Organizational-Resources/Policy%20Manuals%20Library/Highway%20Design.pdf>

Horizontal Stopping Sight Distance

Horizontal stopping sight distance was measured for each curve based on curvature and terrain. 20 curves, approximately 40%, did not meet the minimum 495' sight distance. An additional 14 met the sight distance based on curvature and terrain, but sight distance was limited by trees or other objects. The status of horizontal curves meeting stopping sight distance are shown in **Figure 15**.

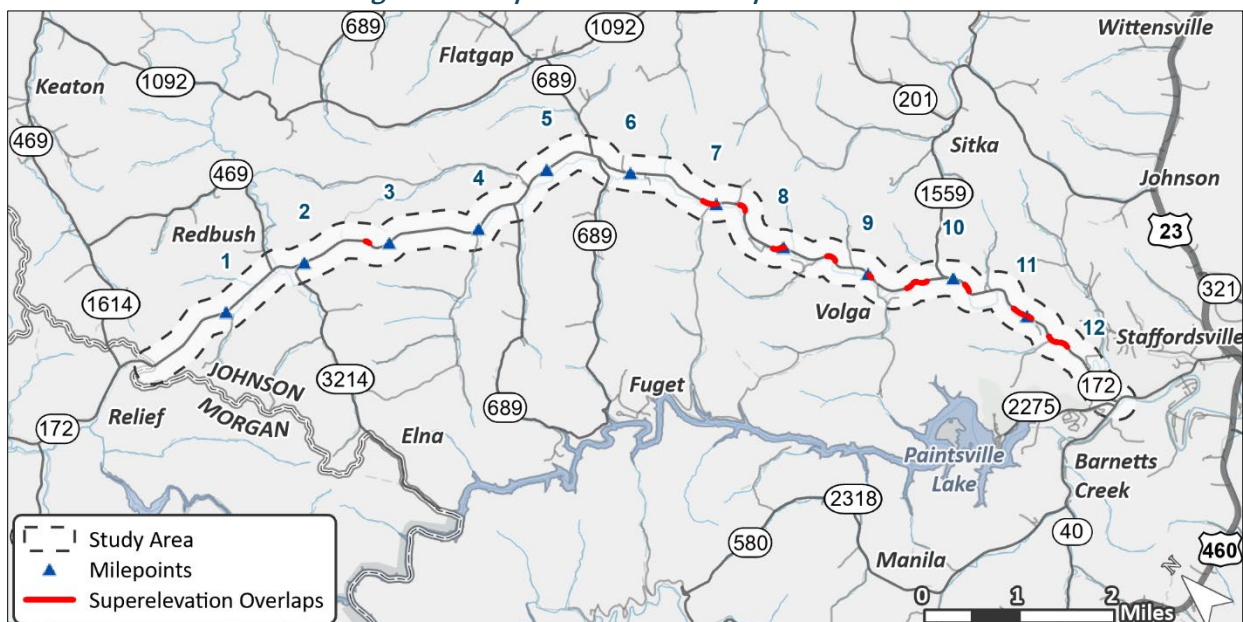
Figure 15. Horizontal Curves with Stopping Sight Distance Below Modern Guidelines



Superelevation

Superelevations were collected from HIS and CARS data. Due to the prevalence of consecutive curves along the corridor, superelevation transition overlaps were identified due to the potential for adverse cross slopes, drainage issues, or insufficient distances for proper banking on curves. These overlaps may cause flat or conflicting superelevations that could cause potential safety issues. There were 15 locations of superelevation overlaps identified as shown in **Figure 16**.

Figure 16. Superelevation Overlap Locations

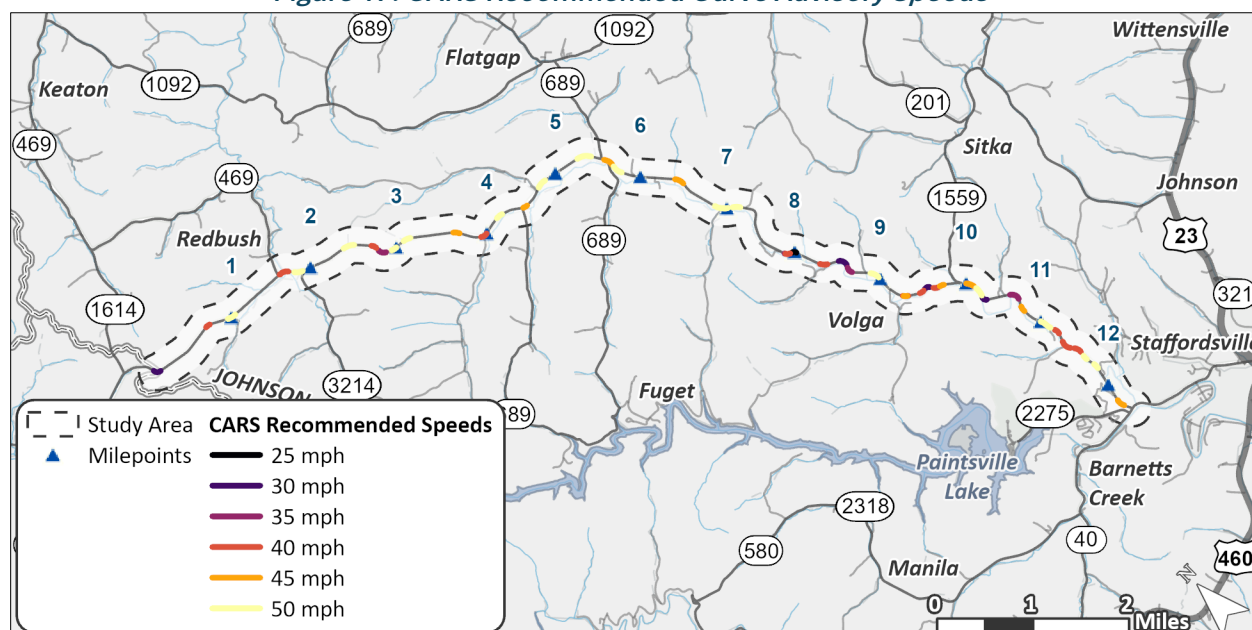


RECOMMENDED CURVE ADVISORY SPEEDS

Recommended curve advisory speeds for both travel directions were obtained via KTC CARS data, a GPS-based method to obtain recommended curve advisory speeds by capturing data that allows calculation of several parameters, including curve radius and superelevation, which assist in deriving a safe curve speed. There were 55 total curves in this data including three curves with no data between milepoints 7.2 and 7.7. This CARS data was used as an additional tool to identify curves that do not meet the design speed along the corridor and to what extent. This allowed for a comparison amongst datasets and a method to identify locations with insufficient curve warning signage, discussed further in **Section 2.10**.

Overall, 45 of the curves, approximately 80%, had a recommended speed less than the 55-mph speed limit. Thirty-seven (37) curves, approximately 67%, had recommended speeds less than or equal to 45 mph – the point in which curve warning signage is recommended for this corridor based on FHWA’s *Manual on Uniform Traffic Control Devices for Streets and Highways*, 11th Edition (MUTCD).⁵ The speeds recommended for each curve is shown on **Figure 17**. Charts comparing the recommended speeds along the corridor and the distribution of speeds among curves are shown on **Figures 18 and 19**.

Figure 17. CARS Recommended Curve Advisory Speeds



⁵ The MUTCD 11th Edition can be found online at <https://mutcd.fhwa.dot.gov/>

Figure 18. CARS Recommended Curve Advisory Speeds by Milepoint

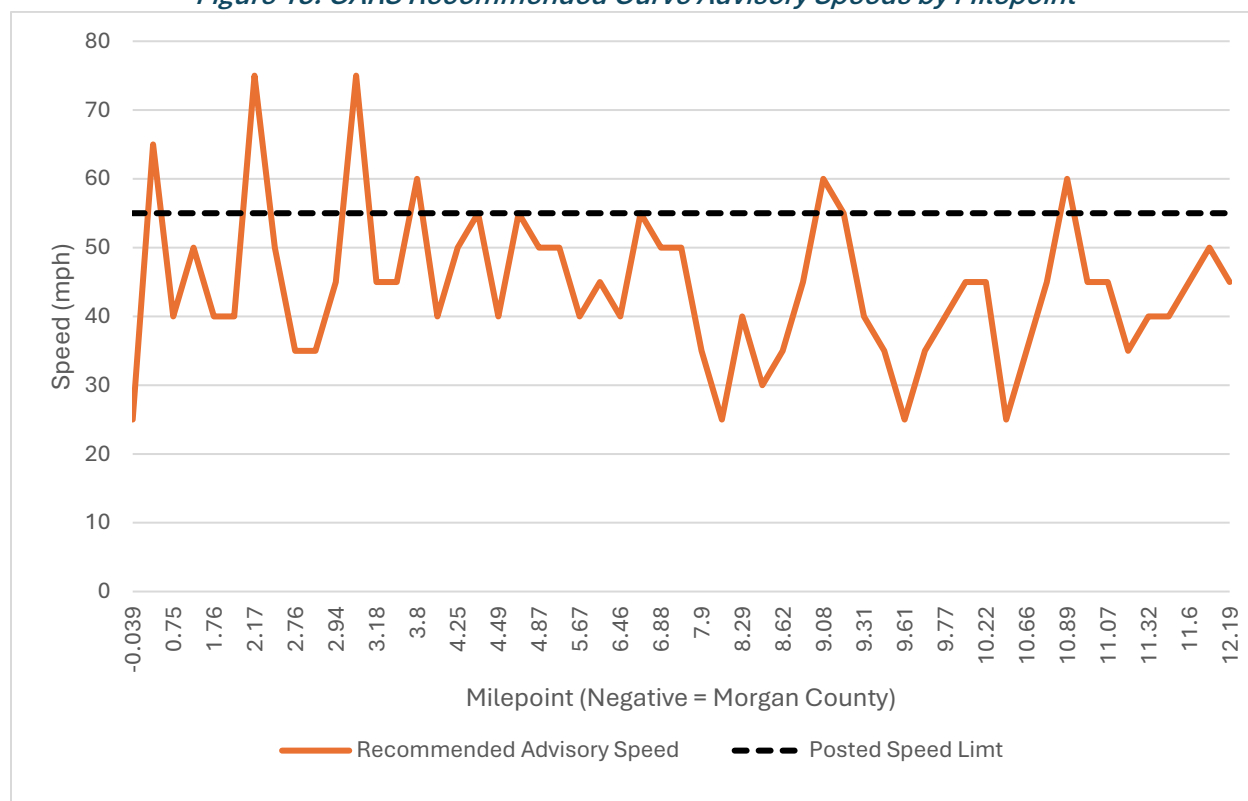
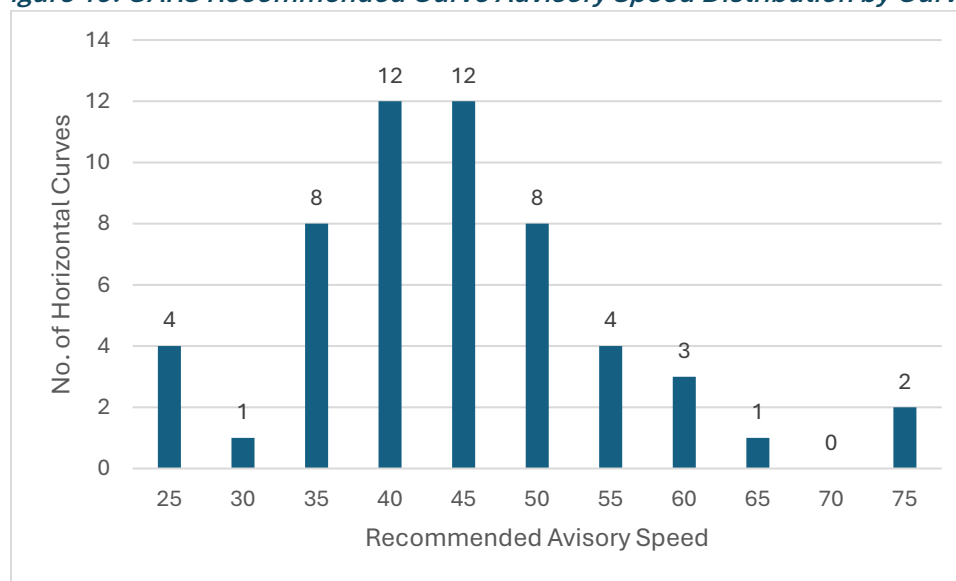


Figure 19. CARS Recommended Curve Advisory Speed Distribution by Curves



2.3 Vertical Alignment

Information for the vertical alignment was identified from KYTC's HIS database, archive plans, and KyFromAbove LiDAR elevation data. The corridor is classified as having rolling terrain via KYTC HIS.

HIS VERTICAL GRADE CLASS

The HIS vertical grade database contains a total of 149 segments of varying vertical grades, with 124 of those being vertical curves along the corridor. Of the curves, 58 are crest curves and 66 are sag curves. The HIS grades are designated into six classes on a scale from A (flattest, lowest grades) to F (steepest, highest grades) to allow for a planning-level assessment of a roadway's vertical grades and curves. **Figure 20** shows the HIS vertical grades classified A through F along the study area. There are 91 curves, approximately 73%, that fall into a grade of D or below. Overall, over 7.5 miles, or approximately 61%, of KY 172 is at a grade D or below. **Figure 21** shows the distribution of the grade classification.

Figure 20. HIS Vertical Grade Class

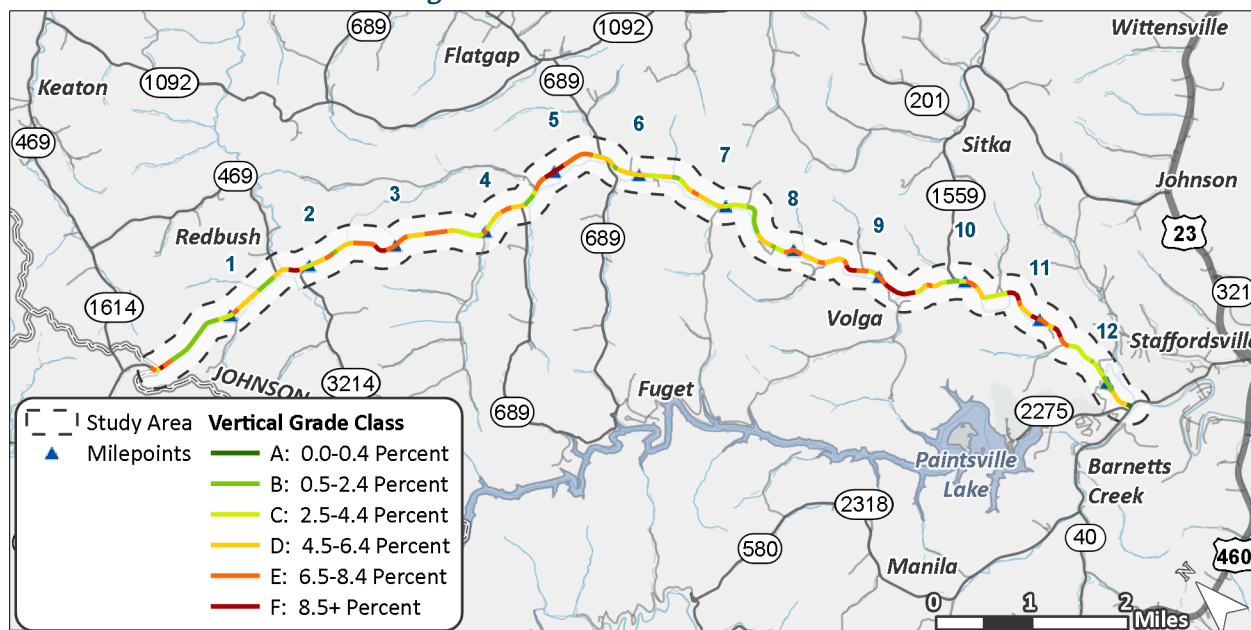
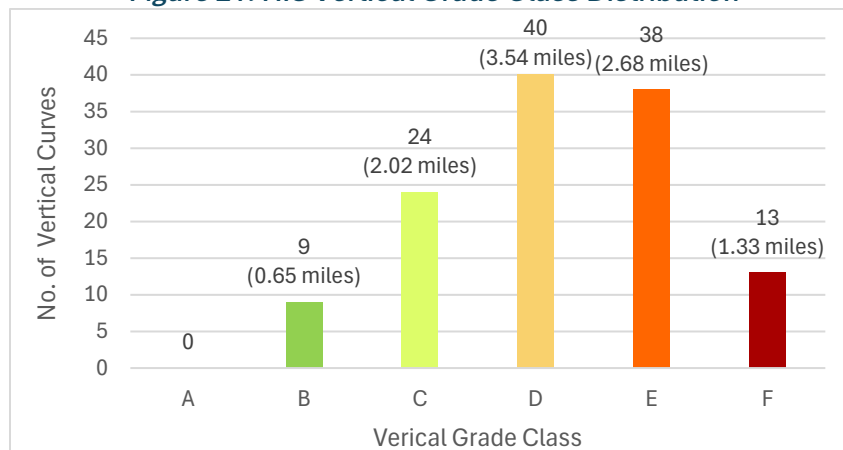


Figure 21. HIS Vertical Grade Class Distribution



CREST & SAG CURVES

In addition to the HIS data, a more detailed horizontal alignment was created with ORD via state LiDAR elevation data and archive plans. This allowed for a potentially more accurate alignment and measurement of the existing vertical alignment, grades, and sight distances to compare with current design guidelines and the HIS database. The alignment created in ORD resulted in 154 total vertical curves. This included 71 crest curves and 83 sag curves.

VERTICAL SIGHT DISTANCE & MINIMUM GRADES

The HDM recommends a maximum grade of 7% and minimum stopping sight distance of 495' for KY 172. An evaluation of the vertical alignment was used to compare whether the existing alignment meets current vertical design guidelines. One hundred and nine (109) curves, approximately 70%, do not meet stopping sight distance guidelines. Fourteen (14) segments have grades exceeding the maximum of 7% which totals approximately one mile, or 8%, of the corridor. Curves not meeting stopping sight distance and grades exceeding the maximum of 7% are shown in **Figure 22**. Representative photos of the vertical curves are shown in **Figure 23**.

Figure 22. Vertical Stopping Sight Distance & Grades Not Meeting Modern Design Guidelines

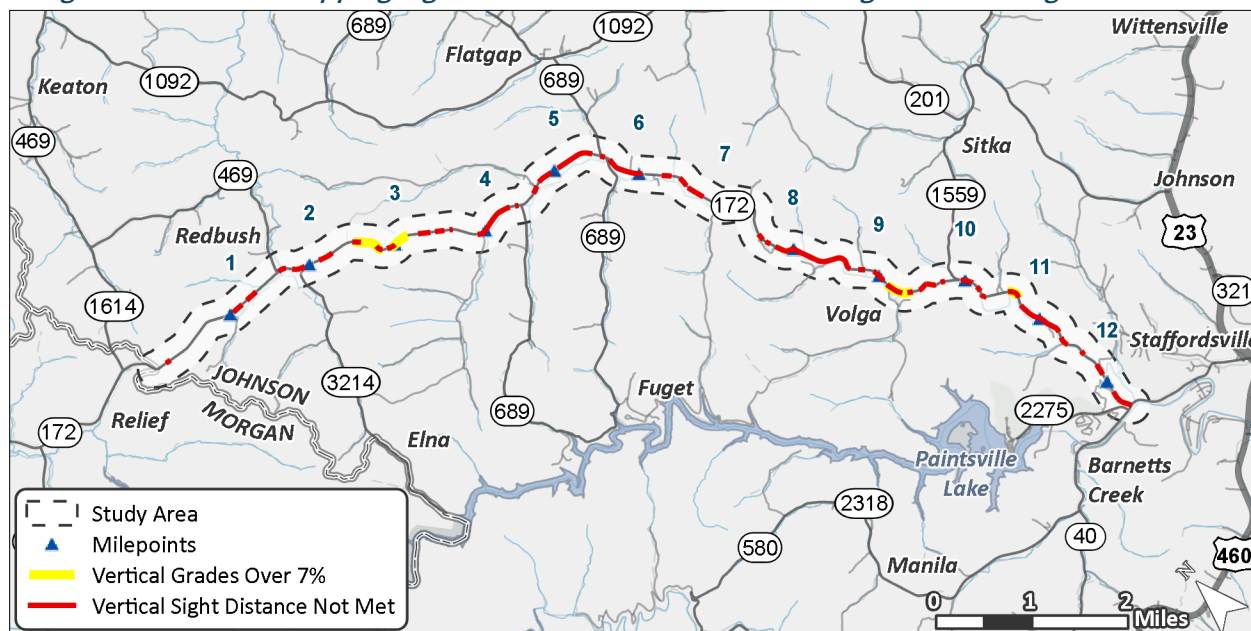
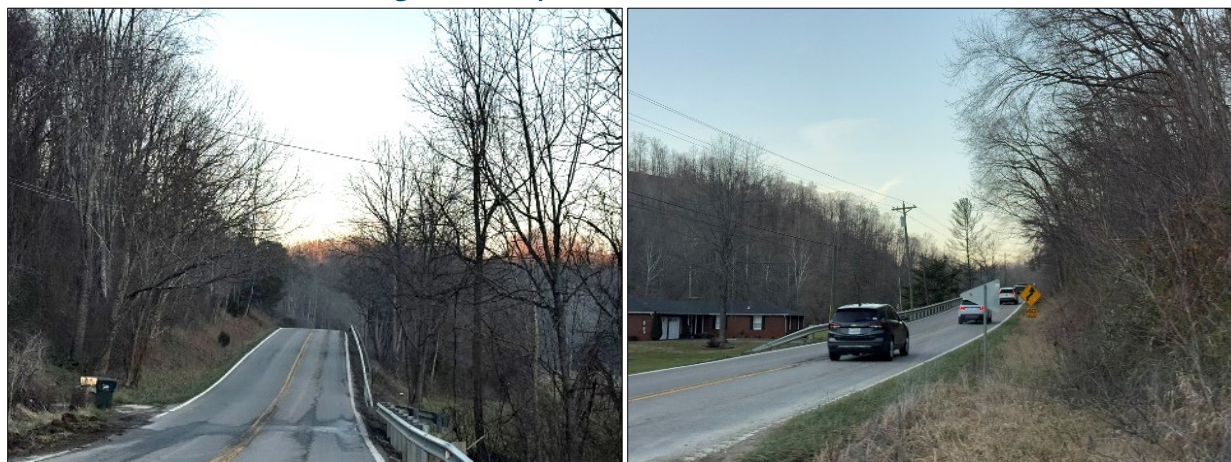


Figure 23. Representative Vertical Curves



2.4 Intersections & Access Points

KY 172 has no access control, meaning access is by permit only. Additional access locations must be approved by KYTC. There are 26 intersections along KY 172 identified on KYTC's HIS route log as well as several other direct driveway access points for residences and businesses. There is a higher density of access points along the eastern portion of KY 172.

INTERSECTION SKEW

The KYTC HDM provides guidance on intersection skew angles in HD-902.2. It states that for safety and economic reasons, intersecting roadways should meet at right angles when feasible. Although a 90-degree intersection is desired, some deviation from this is permissible. Generally, intersection angles between 75 and 90 degrees are preferred. Intersection angles should not be less than 60 degrees.

Intersection angles were measured for the 26 intersections listed on the route log. The terrain along KY 172 has led to limitations in the angle that access points have been constructed. This has resulted in nine intersections with angles less than the 60-degree minimum recommended, and three between the permissible, but not preferred, 60 to 75-degree range. Access points and their skew angle range are shown in **Figure 24**. Representative photos showing example intersections with a skew angle below modern design guidelines are shown in **Figure 25**.

Figure 24. Intersection Skew Angle Categories

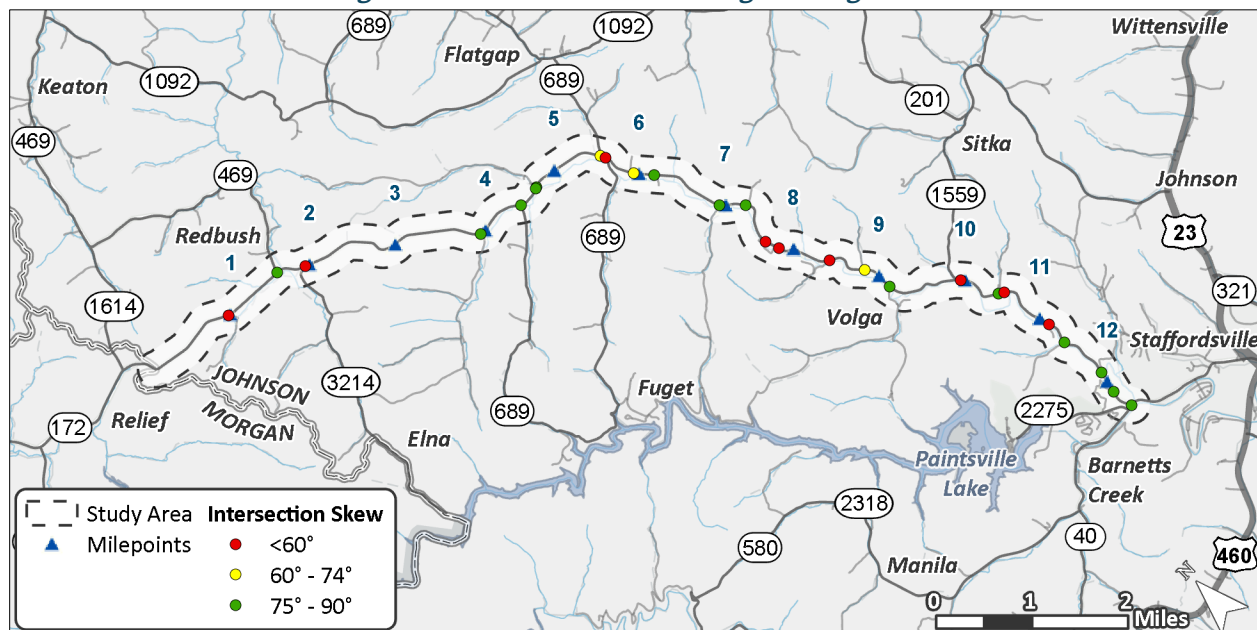


Figure 25. Representative Skew Intersections



INTERSECTION SIGHT DISTANCE

HD-902.8 of the KYTC HDM states to use the recommendations for intersection sight distance found in Chapter 9 of AASHTO's *A Policy on Geometric Design of Highways and Streets, 2018 Edition* (Green Book). Table 9-7 of the Green Book provides a recommended minimum sight distance of 610' for 55-mph roadways. Sight distance was measured for the 26 intersections listed on the route log. Due to the terrain, most intersections do not meet this distance. This resulted in 18 intersections, approximately 69%, not meeting sight distance with an additional four that potentially meet, but may be blocked by trees or other objects. Intersections with intersection sight distance not meeting modern design guidelines are shown in **Figure 26**. Intersections that potentially meet are noted as "Potentially" on the figure. Representative photos of intersections with sight distances not meeting modern design guidelines are shown in **Figure 27**.

Table 1 shows a summary of the skew angle and sight distance for the 26 intersections along KY 172 described previously. More details can be found in **Appendix A**.

Figure 26. Intersection Sight Distance

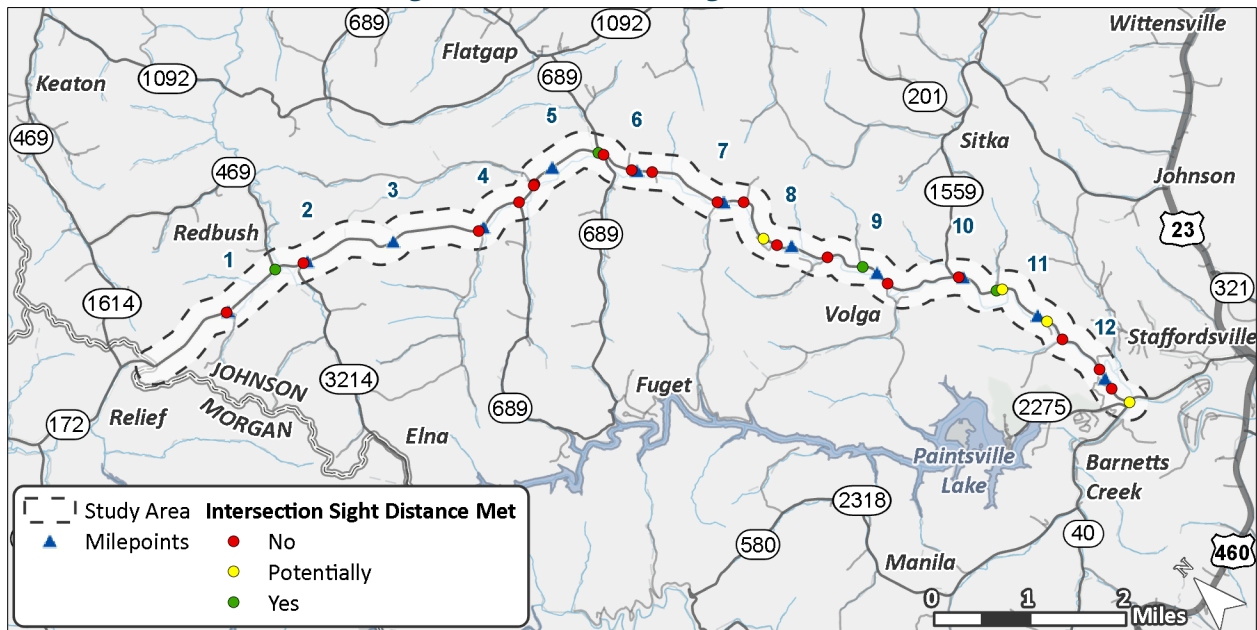


Figure 27. Representative Intersections Not Meeting Modern Design Guidelines



Table 1. Intersection Skew & Sight Distance Summary

Intersecting Route	KY 172 Milepoint	Approx. Skew	Skew Category	Sight Distance Met
Salyers Branch Rd.	0.980	12°	<60°	No
KY 469	1.643	10°	75° - 90°	Yes
KY 3214	1.950	40°	<60°	No
Mudlick Creek Rd.	3.940	88°	75° - 90°	No
KY 689	4.480	89°	75° - 90°	No
Curtis Dr.	4.725	10°	75° - 90°	No
Patterson Creek Rd.	4.740	87°	75° - 90°	No
KY 689 (north)	5.530	70°	60° - 74°	Yes
KY 689 (south)	5.595	14°	<60°	No
Flatgap Lookout Tower Rd.	5.944	68°	60° - 74°	No
Iva Segraves Holllow	6.152	89°	75° - 90°	No
McKenzie Br.	6.930	86°	75° - 90°	No
Dixon Branch Rd.	7.204	85°	75° - 90°	No
Noah Stapleton Rd (east)	7.681	1°	<60°	Potentially
Noah Stapleton Rd (west)	7.839	35°	<60°	No
Stapleton Branch Rd.	8.405	38	<60°	No
Ramey Branch Rd.	8.830	66	60° - 74°	Yes
Stonecoal Rd.	9.159	83°	75° - 90°	No
KY 1559	9.950	29°	<60°	No
Arlen Dr.	10.437	83°	75° - 90°	Yes
Slate Branch Rd.	10.500	55°	<60°	Potentially
Tackett Rd.	11.116	Varies	<60°	Potentially
Rocky Knob Branch Rd.	11.370	86°	75° - 90°	No
Little Mudlick-Falls Rd.	11.889	89°	75° - 90°	No
Rocky Hill Rd.	12.126	90°	75° - 90°	No
KY 40	12.370	76°	75° - 90°	Potentially

ACCESS MANAGEMENT

There are two locations to note relating to access management. One is the entrance to the Dollar General business adjacent to the intersection with KY 40. Section HD-1101.6 of the KYTC HDM recommends a minimum corner clearance of 150' between a major roadway intersection and the nearest driveway. Inadequate corner clearances can result in traffic-operation, safety, and capacity problems. The corner clearance between KY 40 and the Dollar General is approximately 65', less than half the minimum distance, which can be seen in **Figure 28**.

Another potential access concern to note is the spacing between the offset KY 689 intersections at MP 5.530 to 5.590. The spacing between the two intersections is approximately 300'. Since KY 172 is not a controlled-access roadway, there is no requirement on minimum access spacing. Instead, as described in section HD-1103.1 of the KYTC HDM, the department shall establish criteria for modifying existing access and allowing additional access points and proposals for modification to access should always consider the safety and interest of the highway users. For comparison, the minimum access spacing for rural roadways is 1,200' on partially controlled access highways. An aerial view and photo showing the spacing of the KY 689 intersections is shown in **Figure 29**.

Figure 28. KY 172 / KY 40 Corner Clearance



Figure 29. KY 689 Access Spacing



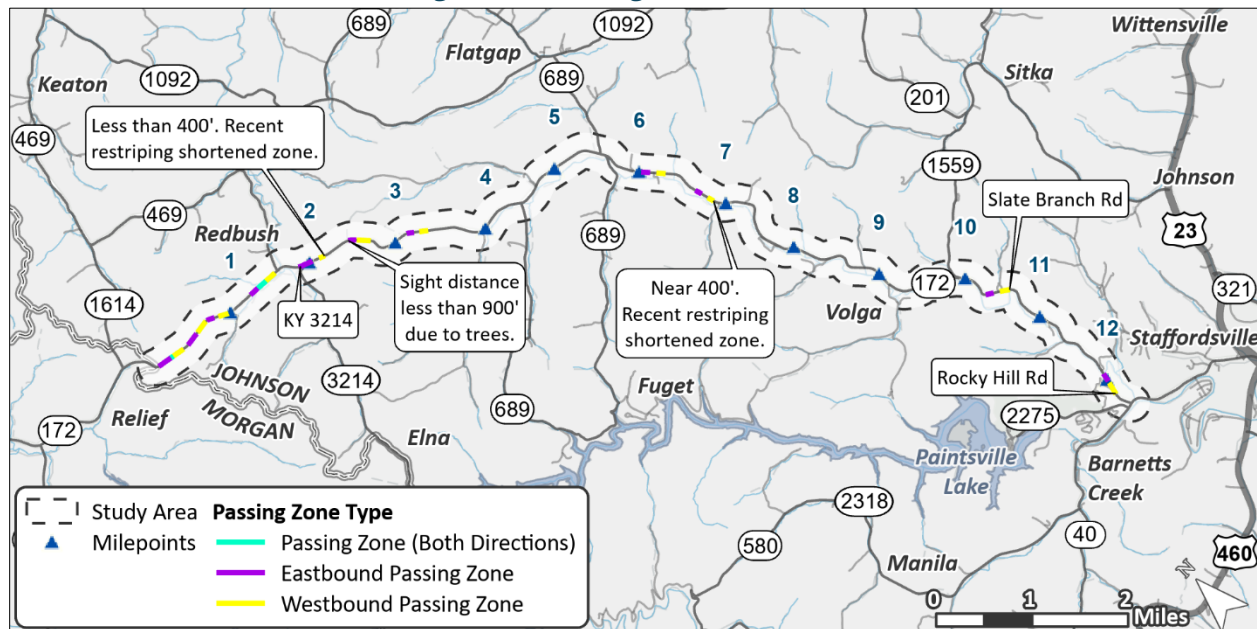
2.5 Passing Zones

Passing zones along KY 172 were identified and evaluated through field collection and KyFromAbove aerial imagery. Overall, most of KY 172 is passing-constrained due to the terrain. The majority of locations where passing is permitted are near Morgan County. There are two areas where passing is permitted in both directions, 10 areas with passing in the eastbound direction only, and 11 areas with passing in the westbound direction only. There is approximately 755' of passing in both directions, 6,170' of passing in the eastbound direction, and 6,580' of passing in the westbound direction.

Passing zone locations were evaluated for length and passing-sight distance per Section 3B.02 of the MUTCD. Where the distance between successive no-passing zones is less than 400 feet, no-passing markings should connect the zones. There were three passing zone locations identified that do not meet modern design guidelines. Two were near or below 400', which is due to recent repaving and restriping that shortened the passing distance length as seen by historic aerial imagery. The minimum passing sight distance for KY 172 is 900'. One zone does not meet the minimum passing sight distance due to trees. Three of the passing zones contain an intersection within them that may be a conflict for intersecting vehicles. More information about these locations can be found in the summary of passing zones found in **Appendix A**.

The lengths and locations of passing zones are also used to conduct corridor traffic operations as discussed in **Section 3**. An overview of passing zones is shown in **Figure 30**.

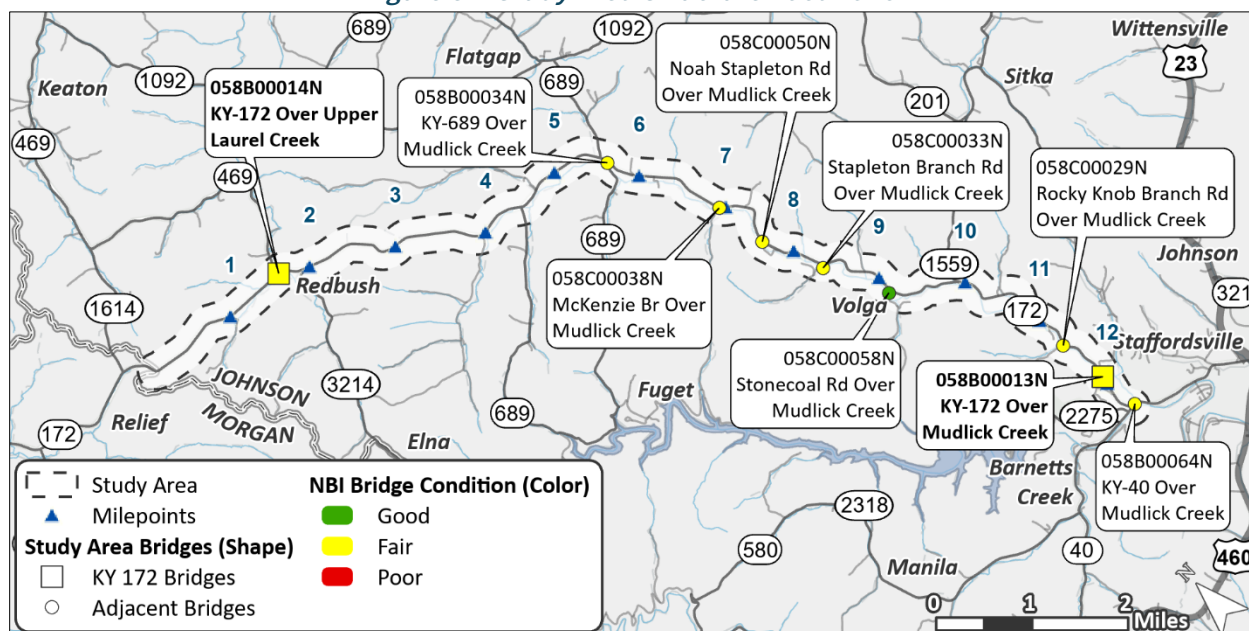
Figure 30. Passing Zone Locations



2.6 Structures

There are two bridges along KY 172 as well as seven other adjacent structures on intersecting roadways. Bridge inspection reports were reviewed to determine the status of the bridges on KY 172. FHWA classifies bridges in the National Bridge Inventory (NBI) from Good, Fair, or Poor based on condition. The locations of the study area bridges and their condition are shown on **Figure 31**.

Figure 31. Study Area Structure Locations



KY 172 STRUCTURES

Bridge ID 058B00013N is located at MP 11.916 over Mudlick Creek near Staffordsville. It is a three-span concrete tee beam bridge with a Fair NBI condition rating. It is 129' long and 22' wide. While the bridge foundation was noted as stable, the channel was noted to need minor repairs for bank protection. The deck geometry is noted as intolerable requiring high priority of replacement due to the 19' bridge roadway width curb-to-curb. The status of the bridge and approach rail does not meet modern design guidelines. Built in 1933, it is possibly eligible for the National Register of Historic Places.

Bridge ID 058B00014N is located at PM 1.661 over Upper Laurel Creek near Redbush. It is a two-span concrete tee beam bridge with a Fair NBI condition rating. It is 66' long and 23' wide. While the bridge foundation was noted as stable, the channel was noted as beginning to slump. The deck geometry is noted as intolerable requiring high priority of replacement due to the 19' bridge roadway width curb-to-curb. The status of the bridge and approach rail does not meet modern design guidelines. Built in 1937, it is possibly eligible for the National Register of Historic Places.

Just east of Bridge ID 058B00013N, there is a narrow opening between two rock faces on either side of KY 172 and an entrance to a property right at the end of the bridge as shown in **Figure 32**. Just west of the bridge, there is a business and the intersection with Falls Road. Just west of Bridge ID 058B00014N is the intersection with KY 469 also shown in **Figure 32**.

Figure 32. KY 172 Bridges

ADJACENT STRUCTURES

Adjacent structures including Bridge ID's 058C00033N, 058C00058N, 058B00064N, 058B00034N, 058C00029N, 058C00050N, and 058C00038N were also considered when developing concepts for this study.

2.7 Pavement Conditions

An evaluation of pavement condition was collected from KYTC's HIS database, archive plans, KYTC's Photolog viewer, and KyFromAbove aerial imagery. KYTC rates the pavement condition for sections of roadways based on a Good, Fair, or Poor rating system. These values are determined by a combination of International Roughness Index (IRI), traffic volumes, and visual inspections. Generally, pavement conditions are closely tied to rideability. However, during recent years, the percentage of Poor pavements in KYTC's Maintenance Priority database has increased despite decreases in average roughness. This is likely due to an increase in surface distresses that do not impact rideability. Examples include centerline joint separation, raveling, and rutting. The sections along KY 172 were evaluated by KYTC for pavement conditions from July 2024 and July 2025.

While the rating from MP 0.000 to 1.927 shows Poor, however, this section was recently repaved as of July 2025 and would presumably be reclassified as "Good". Two sections are currently classified as "Good", totaling approximately 4.455 miles (36%), however, if the recently repaved section was reclassified, the total would be 6.382 miles (51%). One section is classified as "Fair" from MP 3.934 to 5.607, approximately 1.673 miles (14%). Two sections are classified as "Poor", totaling approximately 6.242 miles (50%), however, if the recently repaved section was reclassified, there would only be one section classified as "Poor", approximately 4.315 miles (35%), from MP 5.607 to 9.922. Recent pavement patching and repair was identified along KY 172 as well, mostly in this section. A section of pavement was identified with a pavement failure near MP 9.050, however, there had been a core sample taken from the pavement and lines had been spray painted, indicating it was already identified and going through the repair process.

Several areas were found where there is limited paved shoulder width and a difference between pavement and shoulder elevation. The pavement condition ratings are shown in **Figure 33** and representative photos of the pavement condition are shown in **Figure 34**.

Figure 33. Study Area Pavement Conditions

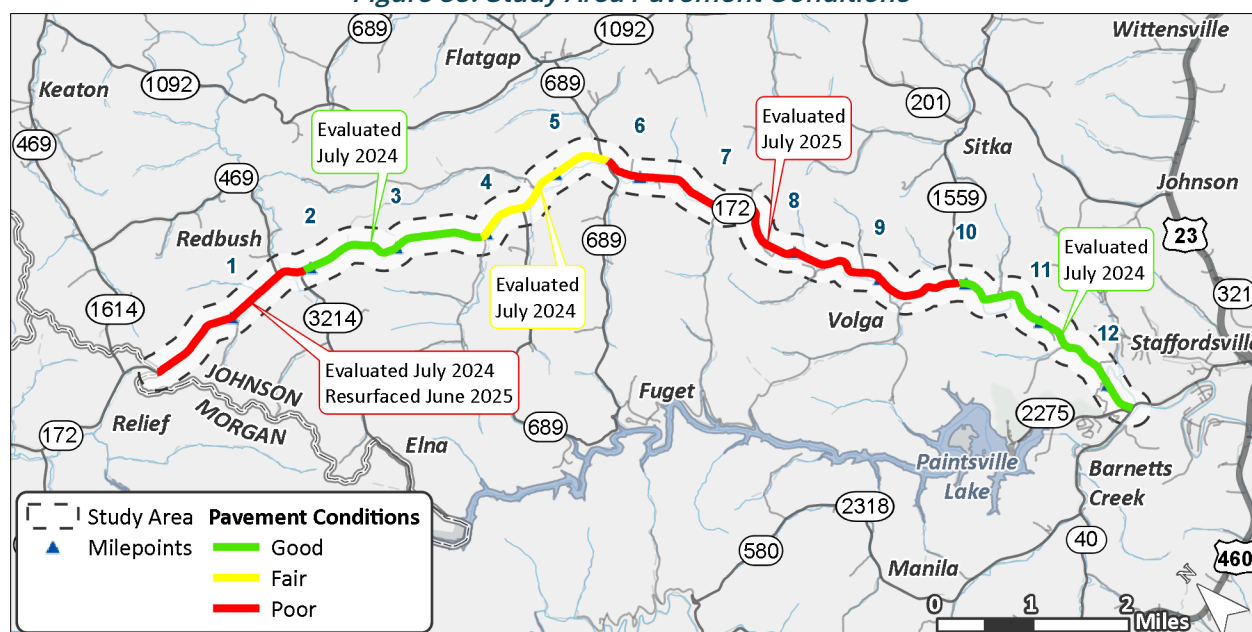


Figure 34. Representative Pavement Conditions Not Meeting Modern Guidelines



2.8 Guardrail

Guardrail was inventoried and evaluated via field review, KYTC's Photolog Viewer, and aerial imagery. An existing inventory that occurred between 2015 and 2017 was also provided to the project team. This list was compared with the updated inventory to identify relatively recent guardrail installations to assist in the evaluation. The guardrail evaluation included identification of guardrail height, end treatments, post and spacer materials, as well as damage or other conditions not meeting modern design guidelines which are detailed in **Appendix A**. The locations of guardrail and their condition are shown in **Figure 35**. Representative photos of guardrail or end treatments not meeting modern guidelines along the corridor are shown in **Figure 36**.

Figure 35. Guardrail Locations

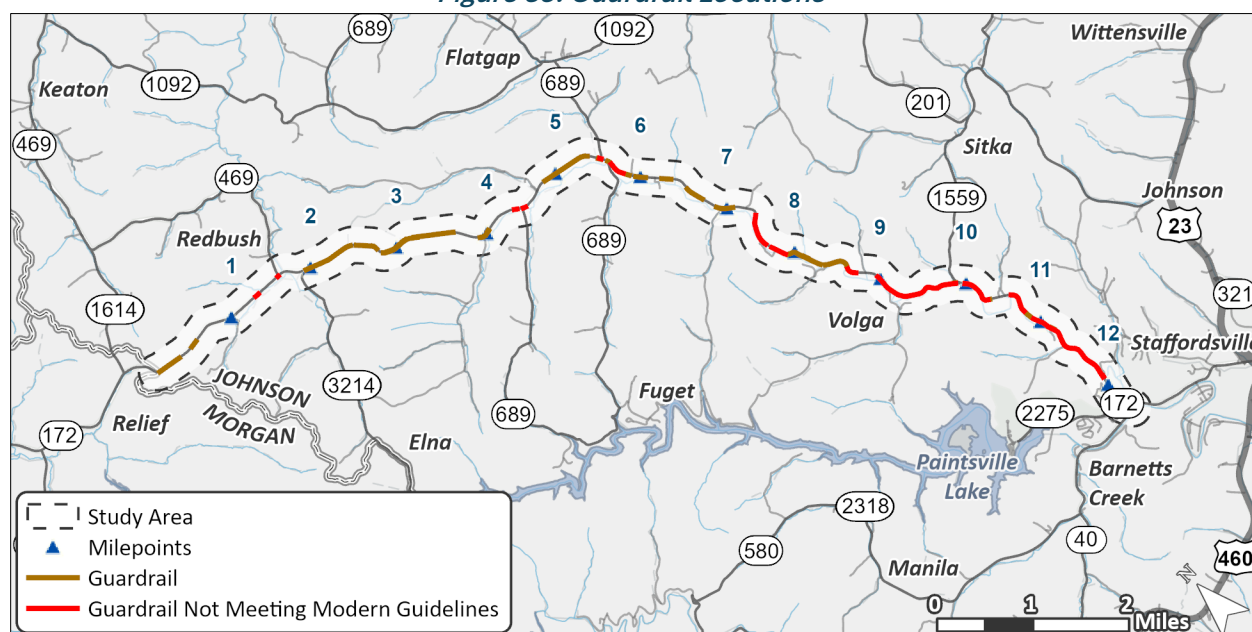


Figure 36. Representative Guardrail Not Meeting Modern Design Guidelines

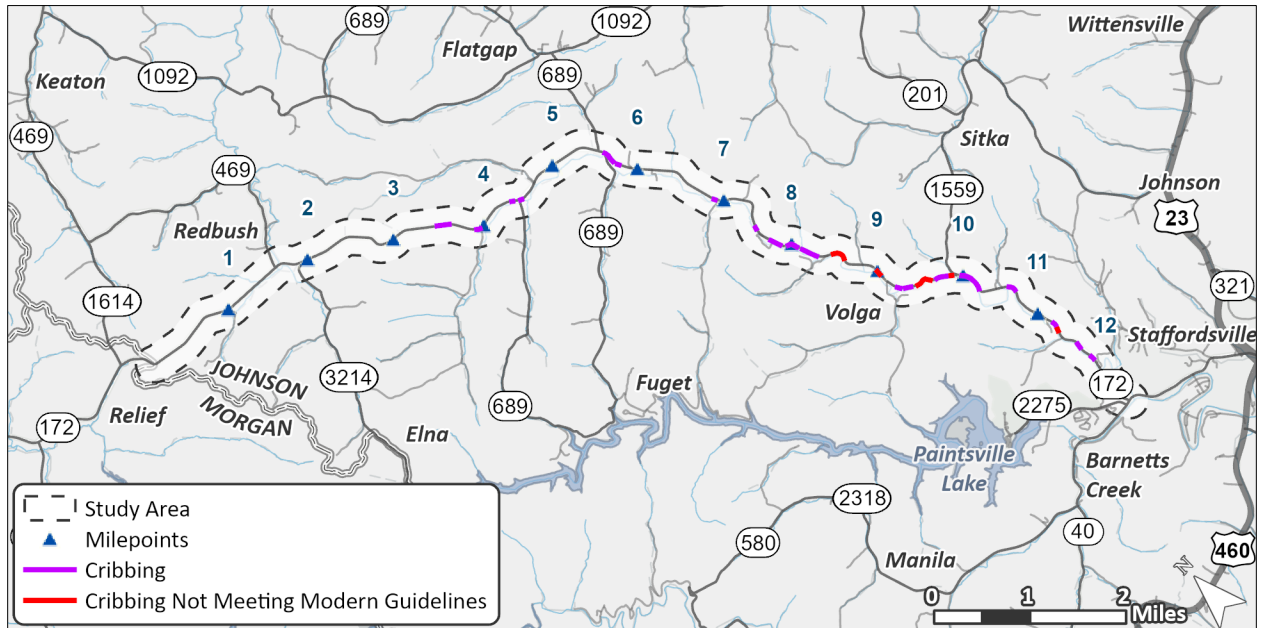


2.9 Cribbing & Slope Stability

An inventory of cribbing and slope stability was identified along the study area through site visits and KyFromAbove aerial imagery. The streams adjacent to the roadway likely impact embankment erosion and other instances of slope instability over time.

CRIBBING

Cribbing is a construction technique involving structures to support heavy loads such as the roadside embankment to prevent slides or other effects from slope instability. Overall, there were 34 sections of cribbing totaling approximately 7,170' along KY 172. Seven of these sections, approximately 1,520', have conditions not meeting modern design guidelines. This includes cribbing or rails that are missing, damaged, or installed to guardrail rather than railroad rails behind the guardrail. The location of cribbing and their status are shown in **Figure 37**. Representative photos of cribbing with conditions not meeting modern design guidelines are shown in **Figure 38**. Refer to **Appendix A** for more information on the location and status of cribbing and slope stability.

Figure 37. Cribbing Locations*Figure 38. Representative Cribbing Not Meeting Modern Design Guidelines*

SLOPE STABILITY

Unstable slope locations where slope stability countermeasures such as cribbing or soil nails could potentially be installed were identified and are shown on **Figure 39**. The area near MP 9.0 was identified by KYTC during the study and scheduled for repair starting March 2026. Representative photos of locations with unstable slope conditions are shown in **Figure 40**.

Figure 39. Slope Stability

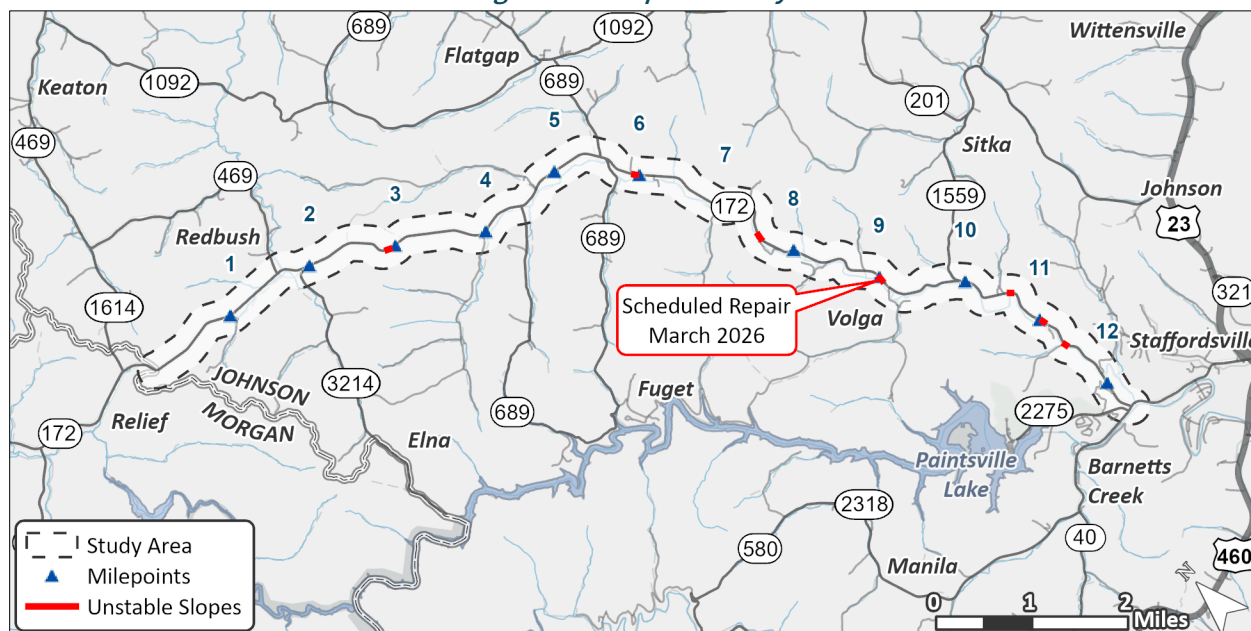


Figure 40. Representative Unstable Slopes



2.10 Signing

Existing signing was inventoried throughout the corridor via field review, KYTC Photolog Viewer, and aerial imagery. An existing sign inventory that occurred between 2019 and 2020 was provided to the project team that was compared with this updated inventory. There was a total of 309 signs on 217 sign assemblies identified along or adjacent to KY 172. Several signs are missing, bent, or otherwise in need of replacement or repair. An overview of the study area signs is shown in **Figure 41**. Representative photos of damaged signing are shown in **Figure 42**. The type, location, and condition of each sign was detailed and can be found in **Appendix A**.

Figure 41. Signing Locations

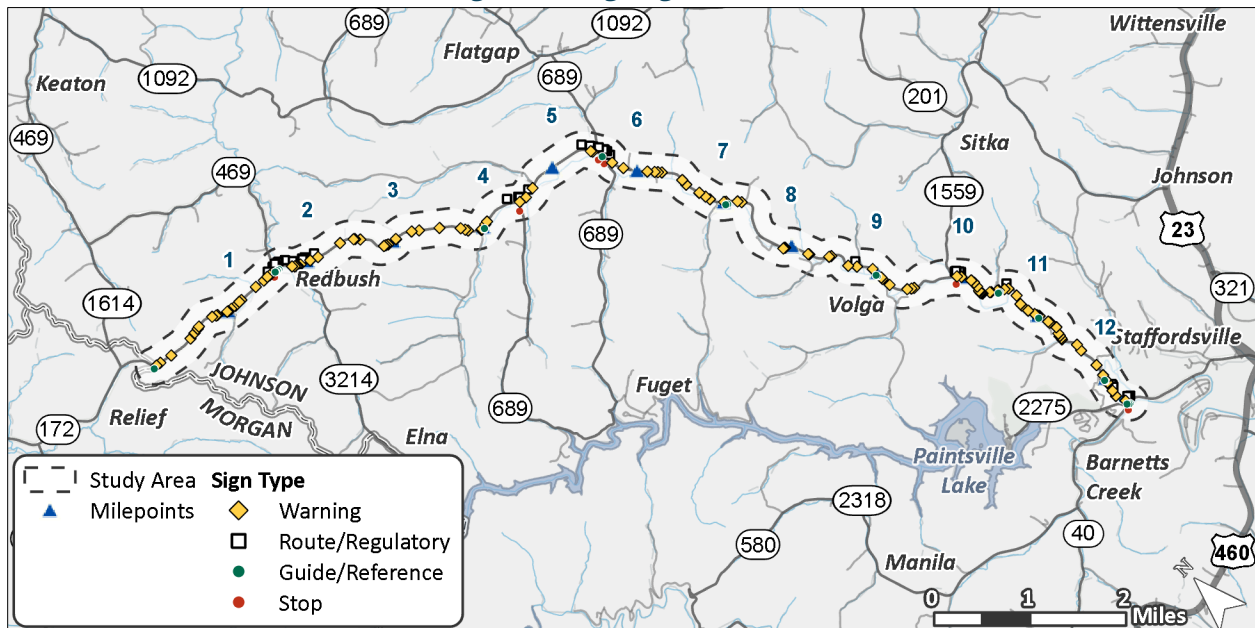


Figure 42. Representative Damaged Signing



2.11 Multimodal & Recreational Considerations

KYTC adopted a Complete Streets Policy in September 2022. A complete street is a street, road, or highway that is safe and accommodating for all expected users. The intent of the Policy is to promote the inclusion of Complete Streets design and multimodal access in all transportation activities at the local, regional, and statewide levels, and to develop a comprehensive, integrated and connected transportation network focused on the safety of all users.

BICYCLE & PEDESTRIAN CONSIDERATIONS

There are no designated bicycle or pedestrian accommodations along the corridor. KY 172 is a high-speed, rural, two-lane collector road with limited shoulder width. Strava is a GPS-based social networking application for exercise that records activities and allows the user to share information with friends and followers that can be used to identify bicycle and pedestrian activity in a study area. Data from Strava is available which shows a record of user activity for either cycling, walking, or

running and displayed as a density heat map. **Figure 43** shows user activity where people log bicycling activity as recorded through the Strava app. **Figure 44** is a density map of user activity showing where people log running or walking activities as recorded through the Strava app. A lighter color indicates more activity.

There is no cycling, running, or walking activity shown occurring in the study area via Strava. The closest activity is logged near Paintsville Lake State Park. The traffic forecast report in **Appendix B** also identified no bicycle or pedestrian activity via Strava. However, there is some bicycle segment history which can be seen in **Figure 45**. Furthermore, lack of Strava activity does not indicate there is no bicycle or pedestrian activity since they may just not use the Strava app. The project team noted that there have been bicyclists and pedestrians observed along the corridor.

Figure 43. Strava Bicycle Activity

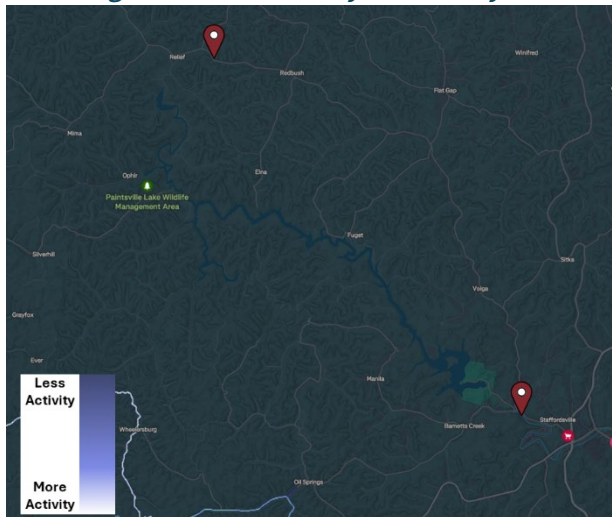


Figure 44. Strava Run / Walk Activity

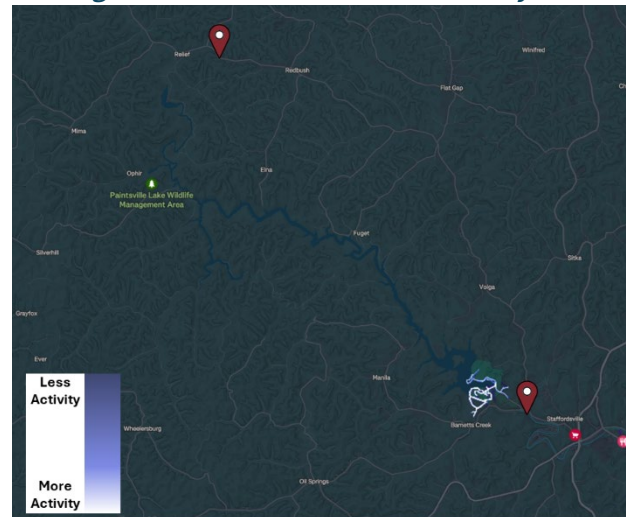
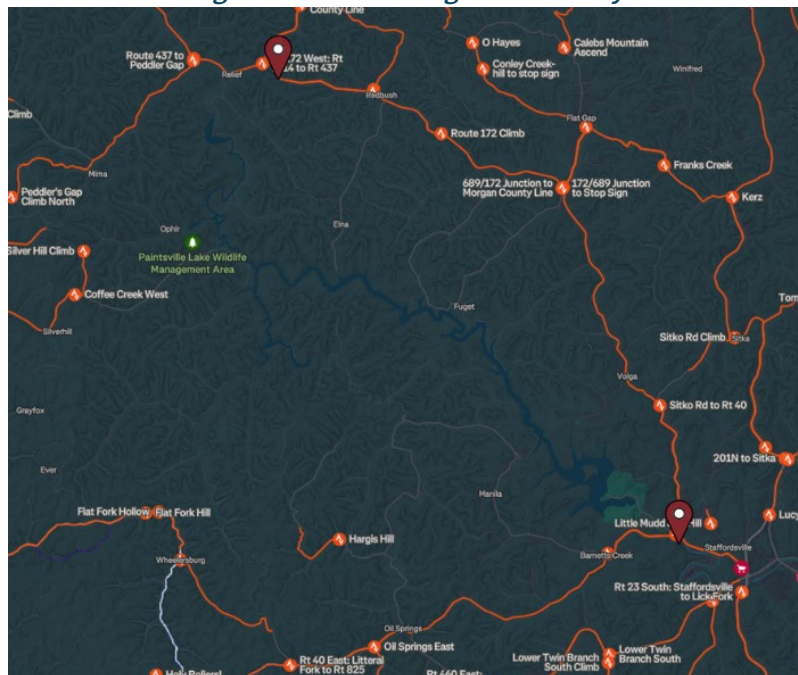


Figure 45. Strava Segment History



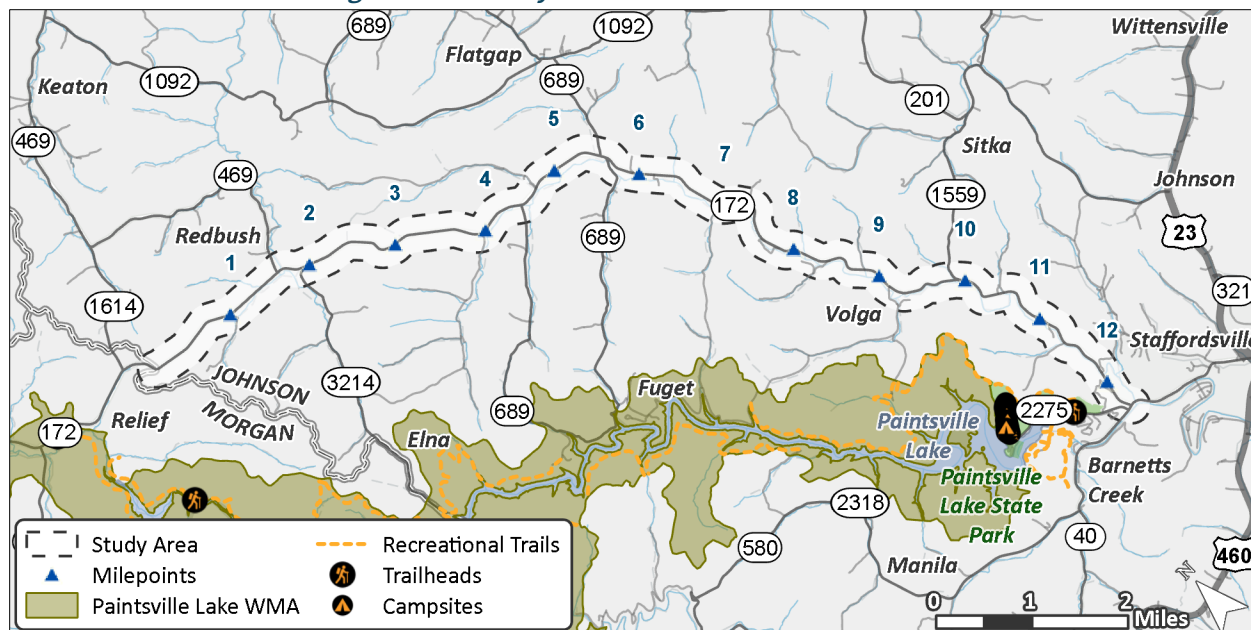
OTHER ROADWAY USER CONSIDERATIONS

The study area is near Paintsville Lake, Paintsville Lake State Park, and the Paintsville Lake Wildlife Management Area (WMA) with public hunting, fishing, camping, boating, and recreational trail accommodations as shown in **Figure 46**. Access to the Paintsville Lake WMA and trails can be accessed via intersecting routes along KY 172.

The project team has observed recreational or special-purpose vehicles such as ATVs and UTVs along the corridor. Kentucky’s Senate Bill 63, passed March 2025, provides regulation of use for these vehicles on state-maintained roadways. A permit was filed from a company constructing a network of trails across 18 counties to allow special-use vehicles to use state-maintained roadways in Johnson County to access their trail network. KY 172 was not included in the list of roadways at this time and there are no known plans for any additional future trails or trail head connections in the study area.

School bus traffic with stops occurs along KY 172. KY 689 connects KY 172 to Flat Gap Elementary School north of the study area. There are no other fixed-route bus services. However, Sandy Valley Transportation Services (SVTS) is a nonprofit demand response public transit system that provides transportation services for five counties, including Johnson County, with an emphasis on serving the elderly and individuals with special needs.

Figure 46. Nearby Recreational Accomodations



3 Traffic Volumes & Operations

Existing year (2025) and future year (2045) traffic volumes were determined for use in this study to evaluate corridor and intersection operations. The following is a summary of the methodology used and resulting operations analysis.

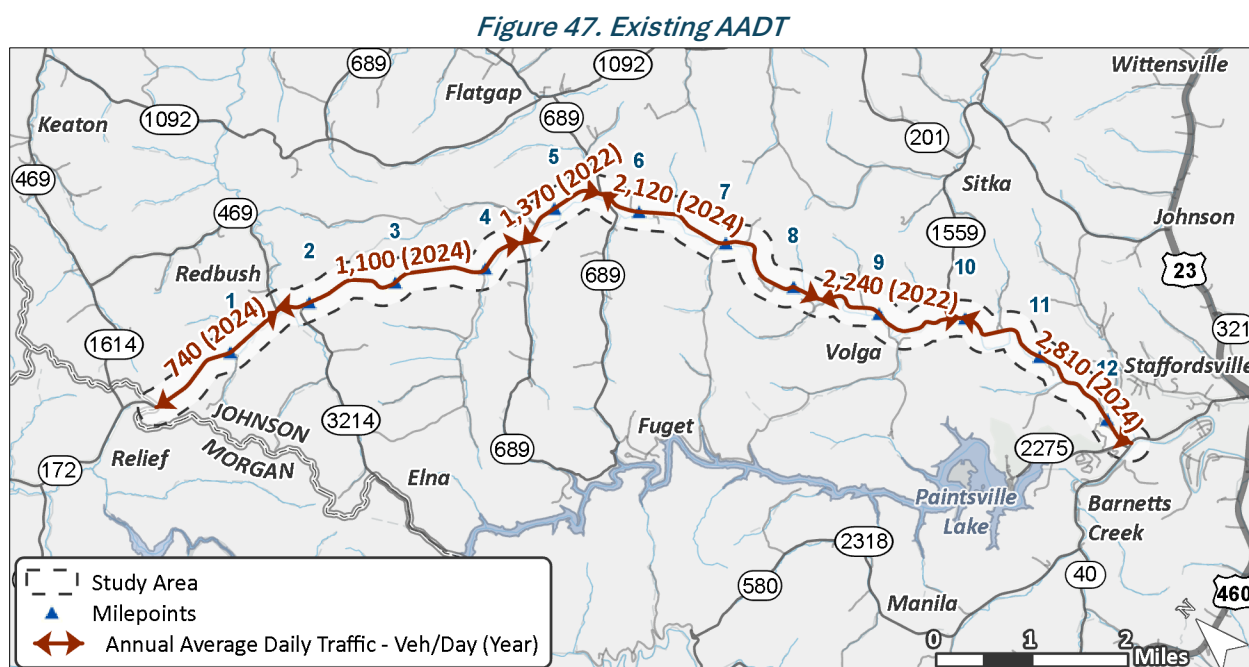
3.1 Existing & Forecasted Traffic Volumes

Existing and forecasted study area traffic volumes were provided in a traffic forecast report completed by KYTC in May of 2025, included in **Appendix B**. To analyze traffic operations along the KY 172 study corridor, traffic volumes were provided for the base-year (2025) and future-year (2045) scenarios. The forecast provided the following data:

- ◆ 2025 and 2045 Annual Average Daily Traffic (AADT)
- ◆ 2025 and 2045 Design Hourly Volumes (DHV)
- ◆ 2025 and 2045 Annual Average Daily Truck Traffic (AADTT) and Truck Percent
- ◆ 2025 and 2045 Daily and Peak Hour Turn Movement Counts
 - KY 172 and KY 689 (N) / KY 689 (S)
 - KY 172 and KY 1559
 - KY 172 and KY 40

EXISTING COUNT STATION DATA

There are six count station segments along the KY 172 study corridor. The most recent count data can be seen in **Figure 47**. Traffic volumes generally increase heading east along the corridor from the Morgan County line to KY 40, ranging from an AADT of 740 to 2,810 vehicles per day (vpd) according to data collected between 2022 to 2024.



TRAFFIC FORECAST DATA

Although there are six count station segments along the corridor, the forecast divided the corridor into two sections. The first section, noted as Section A in the forecast report, extends from the beginning of the study area at MP 0.000 (Morgan County line) to MP 9.950 (KY 1559 intersection). The second section, Section B, extends from MP 9.950 (KY 1559 intersection) to MP 12.370 (KY 40 intersection), the end of the study area.

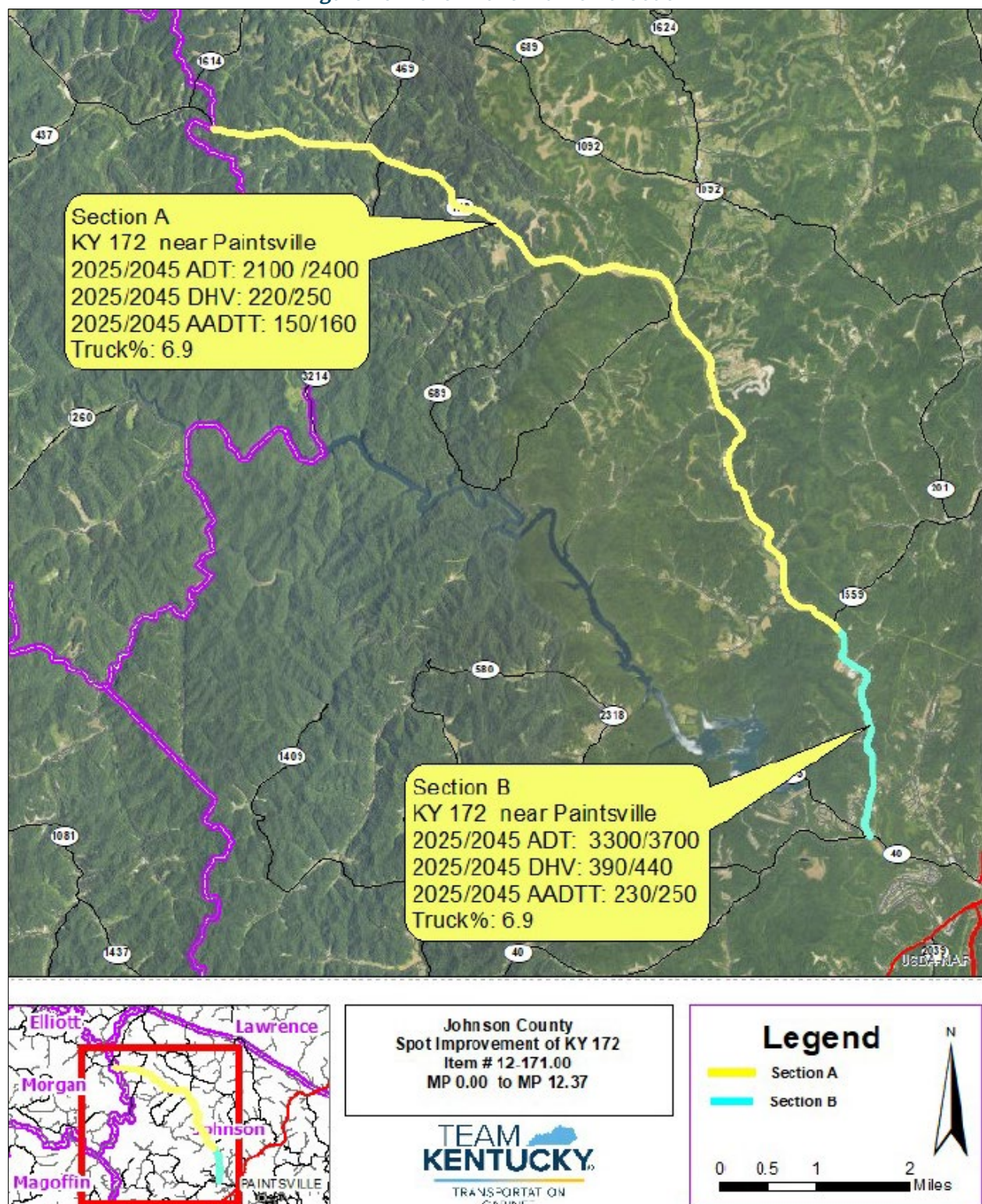
Design-year growth rates were determined based on population projections for Johnson County, historical growth rates for the surrounding traffic count stations, and traffic model output from the Kentucky Statewide Model. The historical growth rate showed a negative rate for all the count stations ranging from -0.13% to -1.16%. The Kentucky Statewide Model suggested an annual growth rate of about -0.50% on the project corridor between the 2025 and 2045 model scenario runs. Having considered the information, an annual growth rate of 0.50% was used for the purpose of this forecast. Though all the sources showed negative growth, a positive growth rate was used on the corridor to be able to analyze improvements and to account for a scenario where the project area experiences some level of growth in the next 20 years.

Turn movement counts were collected and forecasted for three higher-volume intersections along the corridor. All turn movement counts were collected on different days:

- ◆ KY 172 and KY 689 N / KY 689 S – Data collected on 03/04/2025 and 03/05/2025
- ◆ KY 172 and KY 1559 – Data collected on 03/06/2025
- ◆ KY 172 and KY 40 – Data collected on 03/12/2025

2025 AADTs in the forecast are higher than those given in the most recent AADT count data and ranges from 2,100 to 3,300 vpd along the corridor. These increase to 2,400 to 3,700 vpd by 2045. DHV's are higher in the eastbound direction towards Paintsville in the morning AM peak and westbound in the afternoon PM peak. The summary map from the forecast is included as **Figure 48**. More details in the forecast report can be found in **Appendix B**.

Figure 48. 2025 / 2045 Traffic Forecast



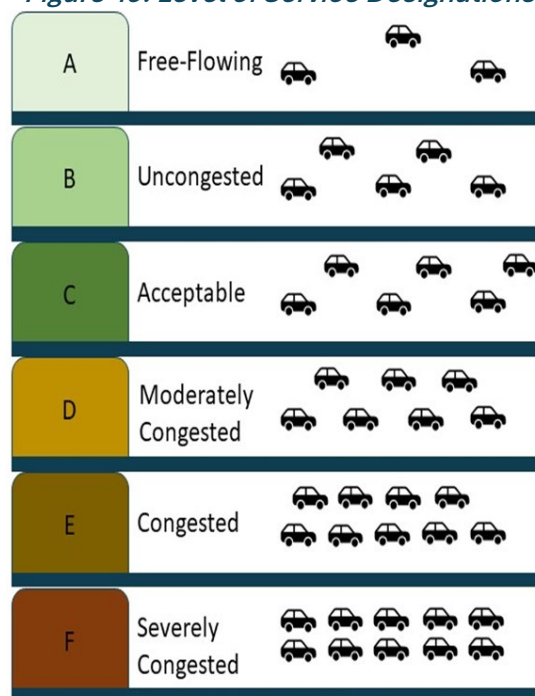
3.2 Corridor Traffic Operations

Corridor operations including level of service and speeds were evaluated for the base year (2025) and future no-build design year (2045).

LEVEL OF SERVICE OVERVIEW

Level of service (LOS) analysis was performed to assess traffic operations for the corridor and intersections using tools based on the *Highway Capacity Manual, 7th Edition* (HCM). LOS is a qualitative measure of determining the operational characteristics of a roadway facility. It is used to define how well a transportation facility operates based on measures such as vehicle speeds, travel time, comfort and convenience, maneuverability, congestion, and delay. There are six levels of service for each type of facility. The levels are designated by letters, from A to F, with LOS A representing the best operating conditions with free-flow conditions, and LOS F the worst where traffic breakdown conditions are evident. Acceptable operations for roadways are generally LOS C for rural areas and LOS D for urban areas. **Figure 49** presents a graphical depiction of LOS for reference.

Figure 49. Level of Service Designations



CORRIDOR LEVEL OF SERVICE

The HCM measures LOS differently based on facility type. Since KY 172 is a rural, two-lane highway with a 55-mph posted speed limit, the LOS evaluation methodology for two-lane highways above 50-mph was used with Highway Capacity Software 2024. This analysis primarily relies on hourly volumes in each direction, truck percentages, access density, lane and shoulder width, and presence and length of passing zones. On higher-speed two-lane highways like KY 172, speed and delay due to passing restrictions are generally both important to motorists. At LOS A, motorists experience operating speeds near the posted speed limit with little difficulty in passing. Platooning is minimal and follower density is very low. At LOS E, speeds may still be reasonable, but platooning is significant and follower density is high with passing essentially impossible.

Using the forecast volumes along with the information collected in **Section 2**, the base and future year scenarios were analyzed for both directions of KY 172. LOS for this type of facility is measured based on follower density (followers / mile). The thresholds for each LOS designation for two-lane highways above 50-mph is shown in **Table 2**. No segment fell below LOS B in any direction or scenario. The 2025 and 2045 corridor results are shown in **Tables 3 and 4**, respectively.

Table 2. LOS Criteria for Two-Lane Highways

LOS	Follower Density (followers/mile/lane)	
	Higher Speed Highways Posted Speed Limit $\geq$ 50 mph	Lower Speed Highways Posted Speed Limit < 50 mph
A	≤ 2.0	≤ 2.5
B	$> 2.0 - 4.0$	$> 2.5 - 5.0$
C	$> 4.0 - 8.0$	$> 5.0 - 10.0$
D	$> 8.0 - 12.0$	$> 10.0 - 15.0$
E	> 12.0	> 15.0
F	Demand exceeds capacity	

Table 3. 2025 Traffic Volumes and LOS

Section	From	To	Truck %	2025 AADT	2025 AADTT	2025 AM DHV	2025 PM DHV	AM		PM	
								EB LOS	WB LOS	EB LOS	WB LOS
Section A	Morgan Co. MP 0.00	KY 1559 MP 9.95	6.9%	2,100	150	210	220	A	A	A	A
Section B	KY 1559 MP 9.95	KY 40 MP 12.37	6.9%	3,300	230	380	390	B	A	A	A to B
Entire Corridor	Morgan Co. MP 0.00	KY 40 MP 12.37	6.9%	2,100-3,300	150-230	210-380	220-390	A	A	A	A

Table 4. 2045 Traffic Volumes and LOS

Section	From	To	Truck %	2045 AADT	2045 AADTT	2045 AM DHV	2045 PM DHV	AM		PM	
								EB LOS	WB LOS	EB LOS	WB LOS
Section A	Morgan Co. MP 0.00	KY 1559 MP 9.95	6.9%	2,400	160	230	250	A to B	A	A	A to B
Section B	KY 1559 MP 9.95	KY 40 MP 12.37	6.9%	3,700	250	430	440	B	A	A	B
Entire Corridor	Morgan Co. MP 0.00	KY 40 MP 12.37	6.9%	2,400-3,700	160-250	230-430	250-440	B	A	A	B

CORRIDOR SPEEDS

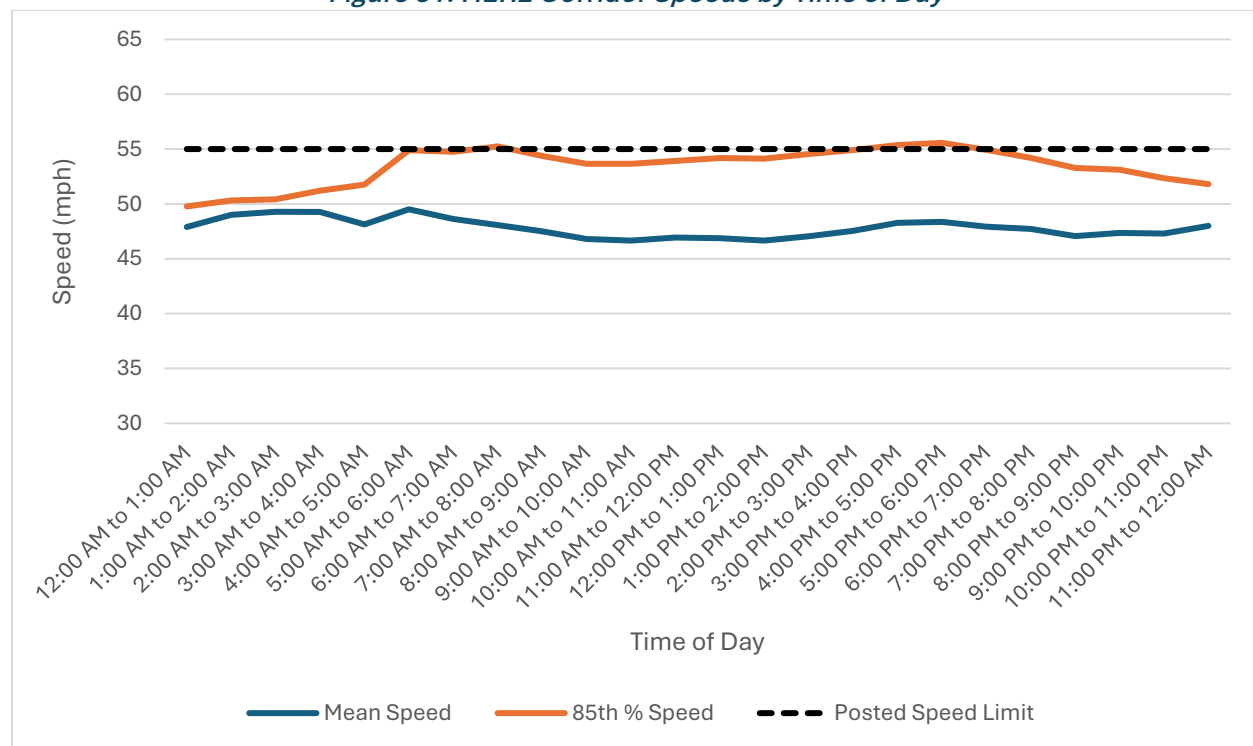
Travel speeds along the corridor are an indication of corridor operations for a facility, especially for a two-lane, rural highway as drivers typically expect to be driving at or near the posted speed limit. Locations with speeds that vary from the posted speed limit could indicate geometric conditions such as horizontal or vertical curves, intersection-related delay or congestion, or other causes for speed reduction. To evaluate speeds, KYTC provided HERE Technologies' GPS-based speed data to help determine real-world speeds along roadways. The data is from 2023 and includes the average mean and various percentile speeds by hour and direction for all vehicle types. These travel speeds were used to evaluate the range in speeds by direction, time of day, and location. The data was also compared with the crashes, curve geometries, and CARS recommended curve advisory speeds to assist in evaluating the corridor.

Typically, agencies such as KYTC have set their speed limits based on the 85th percentile speed of motorists on a roadway. This is the speed at or below which 85% of drivers travel on a road segment, and motorists traveling above this speed are considered to be exceeding the safe and reasonable speed for road and traffic conditions. The 85th Percentile speed data compared to the 55-mph posted speed limit along the corridor is shown on **Figure 50**. The 85th percentile speeds fluctuate up and down along the corridor several times. They mostly fall below the posted speed limit east of the midpoint of the corridor towards KY 40. This data reflects a correlation in the curvature of KY 172 and recommended curve advisory speeds discussed in **Section 2**. Overall mean and 85th percentile speeds for the entire corridor length by time of day are shown in **Figure 51**. Generally, the 85th percentile speed is near the 55-mph posted speed limit for most of the day from 5:00 AM to 7:00 PM, but begins to decrease overnight which may be linked to the limited visibility at night.

Figure 50. HERE Corridor Speeds by Milepoint



Figure 51. HERE Corridor Speeds by Time of Day



3.3 Intersection Traffic Operations

Three intersections along the corridor were included in the traffic forecast:

- ◆ KY 172 and KY 689 N / KY 689 S*
 - *KY 172 and KY 689 N / KY 689 S was included in the report as one intersection. However, it is currently a pair of three-leg intersections approximately 300' apart.
- ◆ KY 172 and KY 1559
- ◆ KY 172 and KY 40

All study intersections are three-leg, unsignalized intersections with single lane approaches and no turn lanes. At the intersections with KY 689 and KY 1559, KY 172 is the major roadway where the KY 689 and KY 1559 approaches are stop-controlled. At the intersection with KY 40 and the end of the KY 172 corridor, KY 172 is the minor, stop-controlled approach and KY 40 is the major roadway.

INTERSECTION LEVEL OF SERVICE

LOS for intersections is related to the average seconds of delay experienced by motorists. For unsignalized intersections, the major roadway is free-flowing and therefore only turning motorists experience any delay. This delay is related to several factors including the amount of traffic, intersection type, lane configurations, truck percents, and more. The LOS delay thresholds for unsignalized intersections given by the HCM is shown in **Table 5**. In addition to LOS, queue lengths are recorded to compare to existing available storage lengths to determine if existing turn lane lengths are adequate to capture queues without backing up into adjacent travel lanes, driveways, or intersections. The intersections were analyzed using the software Synchro 12 to report results based

on the HCM methodology. The LOS, delay, and queue results are shown in **Table 6**. At the intersections with KY 689 and KY 1559, no LOS falls below LOS B for any scenario and there are no queueing issues reported. At the intersection with KY 40, the KY 172 approach reaches LOS D in the 2045 AM peak hour with an average delay of 30.7 seconds per vehicle and 150-foot 95th percentile queue length. This extends beyond the entrance to the adjacent Dollar General potentially causing issues with vehicles blocking the entrance.

Table 5. LOS Criteria for Unsignalized Intersections

LOS	Average Control Delay (sec/veh)
A	0 – 10
B	> 10 – 15
C	> 15 – 25
D	> 25 – 35
E	> 35 – 50
F	> 50

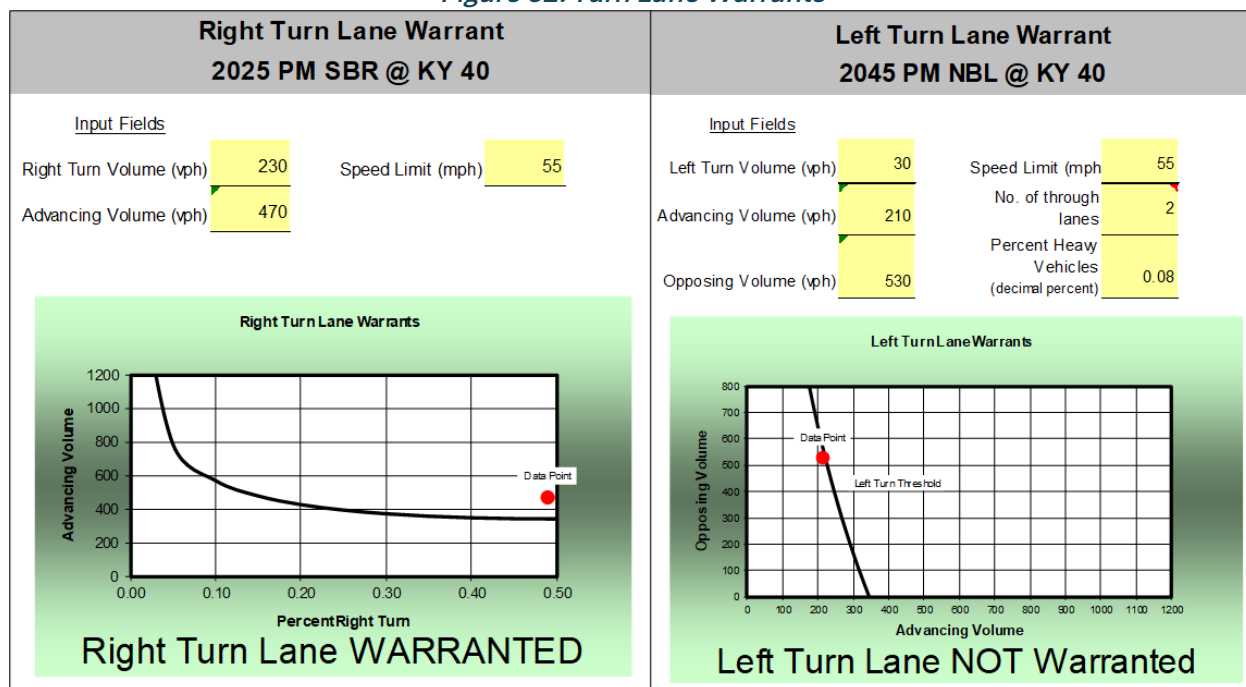
Table 6. Intersection Operations

Intersection	Traffic Control	Movements & Approaches	2025				2045			
			AM Peak		PM Peak		AM Peak		PM Peak	
			LOS / Delay (sec/veh)	95 th % Queue (ft)	LOS / Delay (sec/veh)	95 th % Queue (ft)	LOS / Delay (sec/veh)	95 th % Queue (ft)	LOS / Delay (sec/veh)	95 th % Queue (ft)
KY 689 (N)	Stop-Controlled	EB Left	A / 7.4	0'	A / 7.7	0'	A / 7.4	0'	A / 7.7	0'
		SB	A / 10	10'	A / 9.9	10'	B / 10.3	15'	B / 10.1	10'
KY 689 (S)	Stop-Controlled	WB Left	A / 7.6	0'	A / 7.5	0'	A / 7.7	0'	A / 7.5	0'
		NB	A / 9.4	0'	A / 9.5	0'	A / 9.6	0'	A / 9.6	0'
KY 1559	Stop-Controlled	WB Left	A / 7.4	0'	A / 8	0'	A / 7.4	0'	A / 8	0'
		SB	B / 10.2	0'	B / 10.8	0'	B / 10.3	0'	B / 10.8	0'
KY 40	Stop-Controlled	EB	C / 21.1	100'	C / 17.3	40'	D / 30.7	150'	C / 20.6	50'
		NB Left	A / 7.7	0'	A / 8.7	0'	A / 7.8	0'	A / 8.9	0'

INTERSECTION TURN LANE WARRANTS

An assessment of left and right turn lanes was conducted at each forecasted intersection KYTC-provided spreadsheets based on section HD-902 of the KYTC HDM. These warrants are based on advancing and opposing volumes, speeds, and truck percents along uncontrolled approaches. At the KY 40/KY 172 intersection, the turn lane warrant analysis indicated that a southbound right-turn lane onto KY 172 is already warranted with 2025 volumes, and a northbound left-turn lane onto KY 172 is nearly warranted with future 2045 volumes. While a northbound left-turn lane from KY 40 did not meet warrants for 2025 or 2045 volumes, it was very near the threshold in the 2045 PM peak. No other turn lanes were near meeting warrants at the other intersections for any scenario. However, the HDM states that left and right turn lanes should be considered whenever practical regardless of meeting warrants for safety, operational, or other considerations. The results for the KY 40 left and right turn lane warrants are shown in **Figure 52**. Turn lane modifications on minor roads are based on capacity analysis. An additional separate turn lane on the KY 172 approach at KY 40 may be beneficial due to the proximity to the Dollar General entrance.

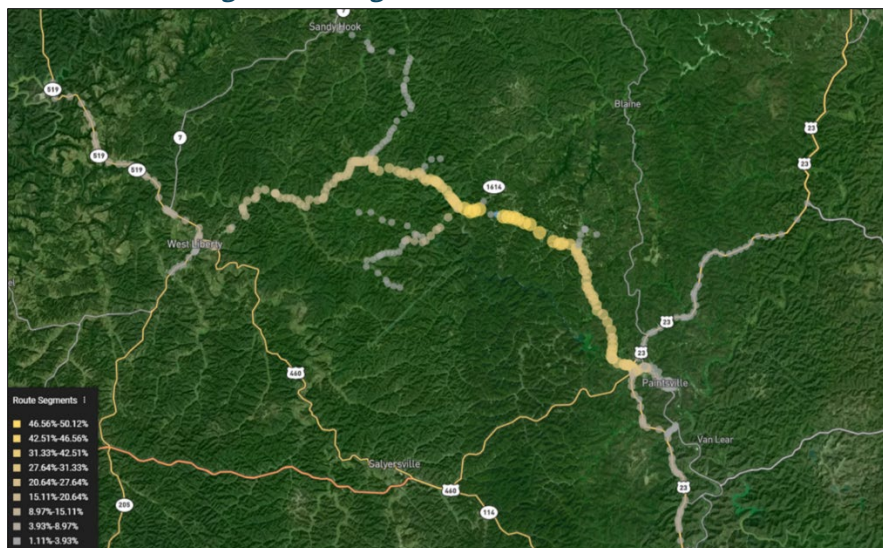
Figure 52. Turn Lane Warrants



3.4 Origin & Destination Patterns

An analysis of origin-destination patterns was conducted using StreetLight Data's GPS-based real-world traffic analysis tools to evaluate trip patterns in the study area. Origin and destination zones were placed at various points of the study area to gain an understanding of the regional connectivity between West Liberty and Paintsville. According to the analysis, approximately 200 vehicles travel the entire study area corridor daily; approximately 40 of those are coming to or from West Liberty. **Figure 53** shows a visual representation of where trips are coming from to access a point selected on KY 172 between West Liberty and Paintsville, near the Morgan County line. Approximately half the trips to this location are coming from US 23 and Paintsville to the east, KY 819 and West Liberty to the west, and several intersecting roadways along KY 172. KY 437 and KY 706 towards Sandy Hook show the largest origin percentage for routes along KY 172.

Figure 53. Origin – Destination Patterns



4 Safety Analysis

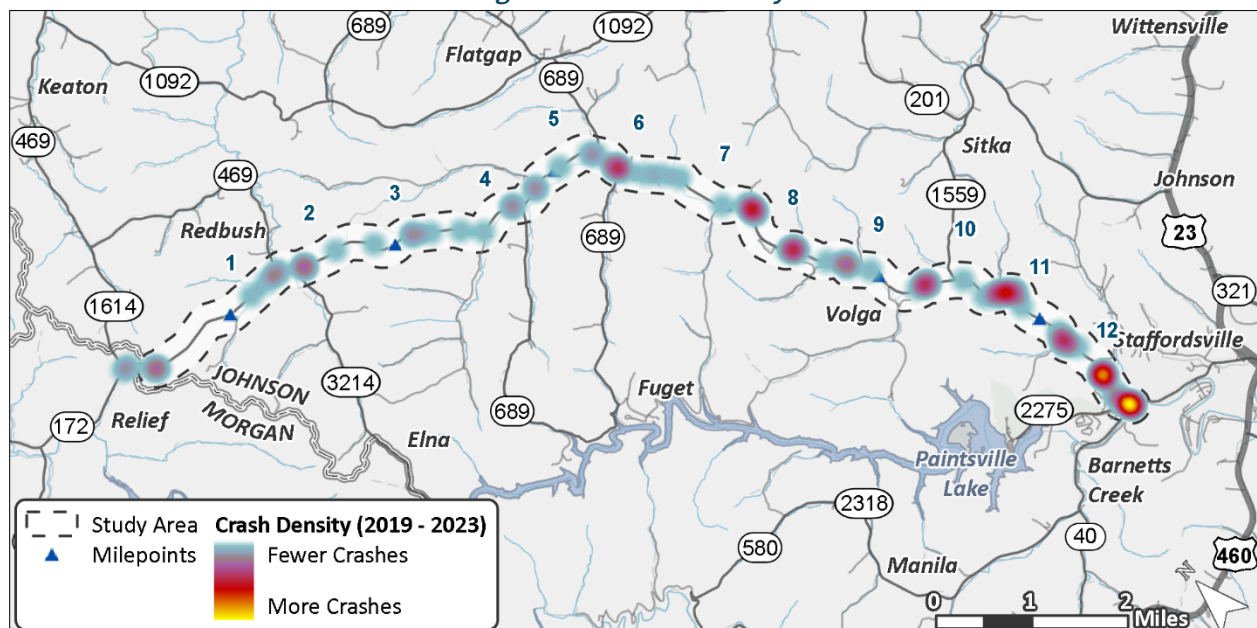
4.1 Crash History

Historical crash data was analyzed to identify locations along KY 172 that could be considered high crash locations, determine crash trends, and identify potential safety issues in the study area. Historical crash records were collected from Kentucky Transportation Center's (KTC) Crash Data Analysis Tool (CDAT) and the Kentucky State Police's (KSP) Collision Database for a five-year period (January 1, 2019 – December 31, 2023). Typically, the most recent full five years of available crash data is used to identify trends. However, to remain consistent with the most recent data available on CDAT, 2024 crashes were not included. Since the beginning of the study corridor at the Morgan County line is located within a horizontal curve, crash data was extended into Morgan County to capture any crashes related to this curve and be able to evaluate any potential concepts in this area. Parking lot and private driveway-related crashes were not included in the analysis. A full listing of crashes for the data set is included in **Appendix C**.

CRASH LOCATION

Overall, 93 crashes were reported along the corridor within the five-year period from 2019 to 2023. The crash density along the corridor is shown in **Figure 54** as a visual representation. Overall, a higher density of crashes appear on the eastern half of the study area. CDAT breaks down crashes whether they can be attributed to the roadway segment or are intersection related. Most crashes along KY 172 are segment related. There were 21, or approximately 22%, that were intersection related crashes according to CDAT, with eight crashes occurring at the intersection with KY 40.

Figure 54. Crash Density



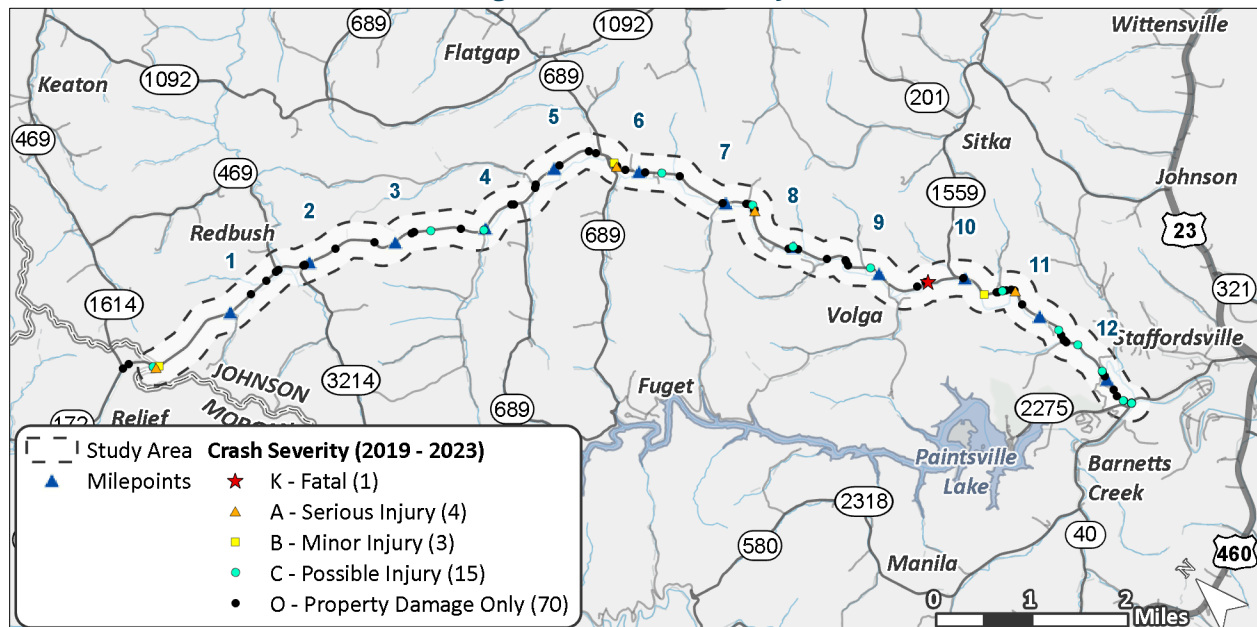
CRASH SEVERITY

Other trends in crash locations such as injury severity were examined. Kentucky uses the “KABCO” scale to classify crashes by severity:

- ◆ K – Fatal
- ◆ A – Suspected Serious Injury
- ◆ B – Suspected Minor Injury
- ◆ C – Possible Injury
- ◆ O – No Apparent Injury / Property Damage Only

The location and numbers of crashes by injury severity is shown in **Figure 55**. Of the crashes, 23, or approximately 24.7%, resulted in a Fatal (1) or injury collision. According to the *Kentucky Traffic Collision Facts 2023 Report*⁶, the statewide average was 17.9% fatal or injury collisions on public roads. Of the injury collisions on KY 172, five resulted in either a fatality or serious injury, or approximately 21.7% of the injury collisions, while the statewide average was 12.6% of injury collisions. The fatal crash occurred in 2019 and involved a driver exiting a curve near MP 9.6 who lost control of the vehicle and ran off the roadway during wet conditions. There are other identifiable groups of injury collisions along the corridor including a curve near the county line, a curve near KY 689 and MP 5.8, a curve near MP 7.2, and a set of curves near MP 10.5.

Figure 55. Crash Severity



⁶Kentucky Traffic Collision Facts 2023 Report available at <https://wp.kentuckystatepolice.ky.gov/wp-content/uploads/2024/12/Kentucky-Crash-Facts-2023-FY2024.pdf>

CRASH MANNER OF COLLISION

In addition to the severity, the manner of collision of the crashes was identified and can be seen on **Figure 56**. A chart showing the distribution of the manner of collision for crashes is shown on **Figure 57**. Along KY 172, most crash types could be indicative of roadway condition related issues such as geometry (i.e. single-vehicle (43%), sideswipe (21%), and head-on (6%)). Additionally, rear-end (12%), angle (13%), and opposing left-turn (4%) crashes occur at access points and intersections along KY 172, most of which involved limited visibility or sight distance of vehicles along the roadway. Considering only K, A, or B crashes, seven were single-vehicle and one was head-on. No collisions involving a pedestrian or bicyclist were reported.

Figure 56. Crash Manner of Collision

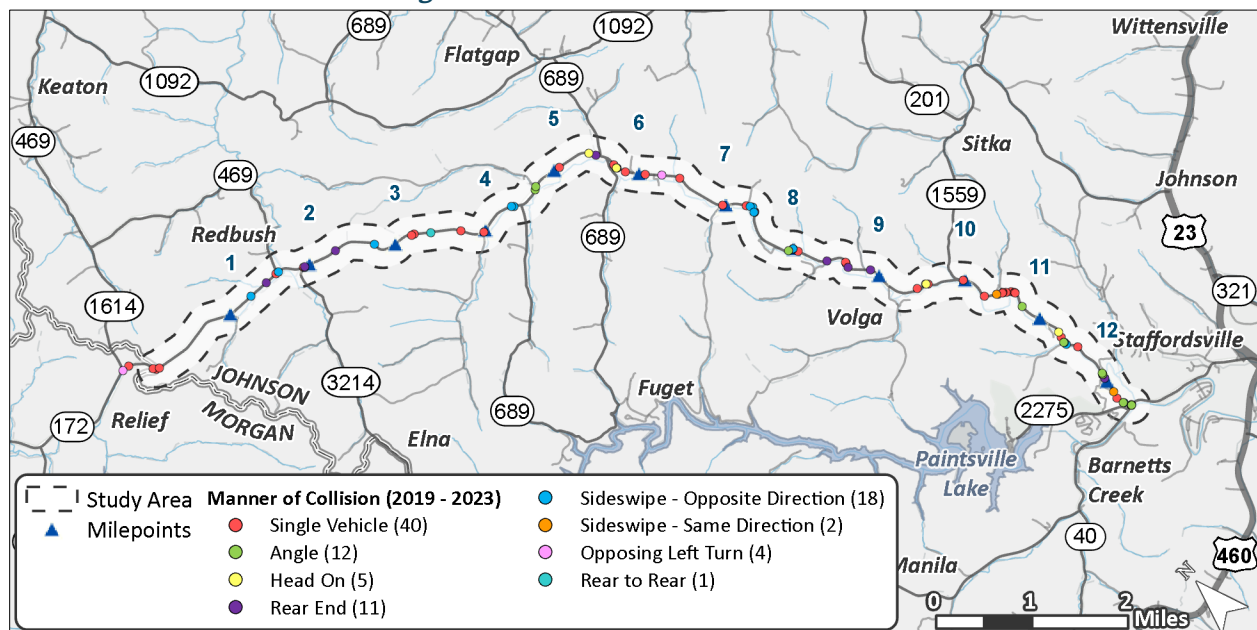
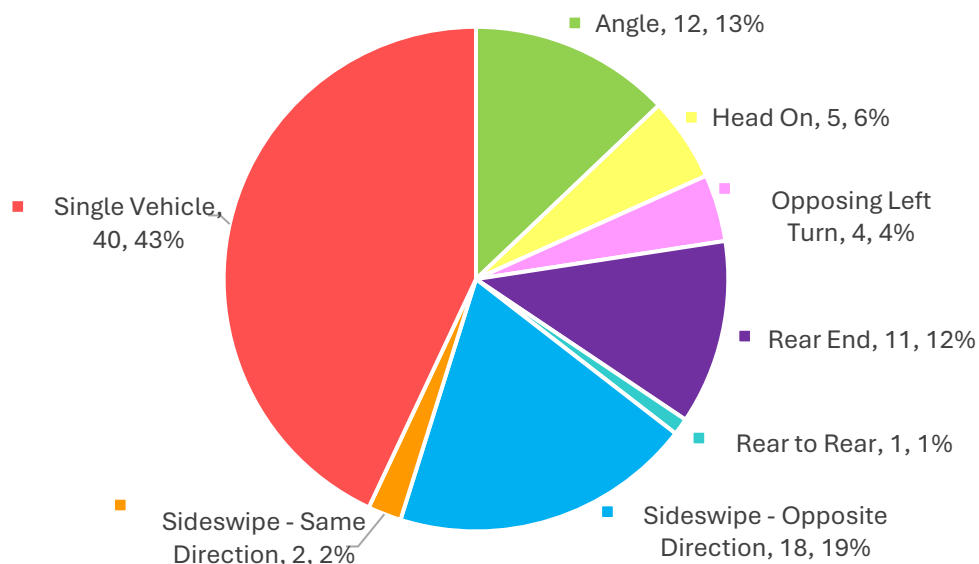


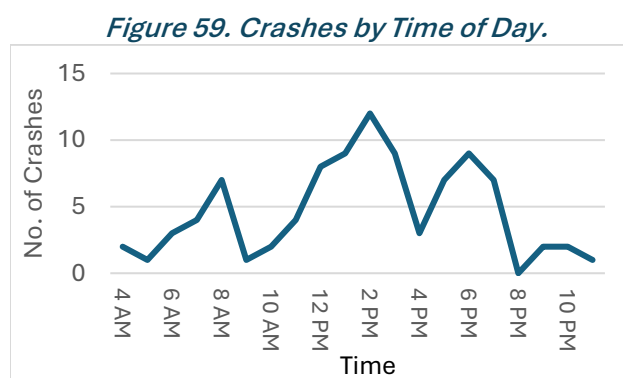
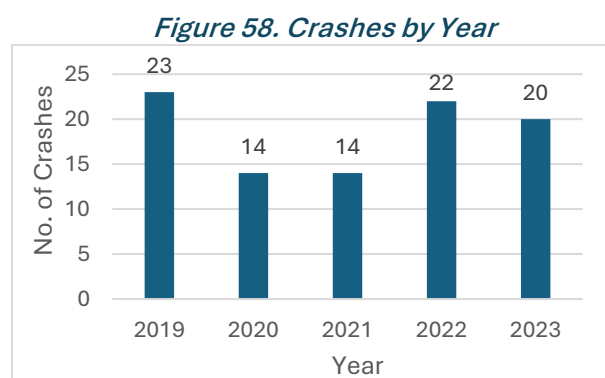
Figure 57. Distribution of Crashes by Manner of Collision



OTHER CRASH METRICS

Other crash metrics analyzed were that 36% were in non-dry conditions, 26% in non-daylight conditions, and 42% were attributed to being in a curve. There were eight hit-and-run incidents reported. Crash narratives were reviewed to investigate potential contributing factors of the crashes. For example, although a crash was not coded or located in a curve, it still may have been attributed to a previous curve where a driver lost control. These narratives assisted in the evaluation of potential improvement concept locations.

On average, there were 18.6 crashes per year from 2019 to 2023 with slight decreases in 2020 and 2021, potentially due to the affects of the COVID pandemic. Crashes by year are shown on **Figure 58**. Crashes by time of day are shown on **Figure 59**. Crashes tend to peak during the morning, midday, and afternoon peaks, with the most crashes occurring during midday between 2:00 PM and 3:00 PM.

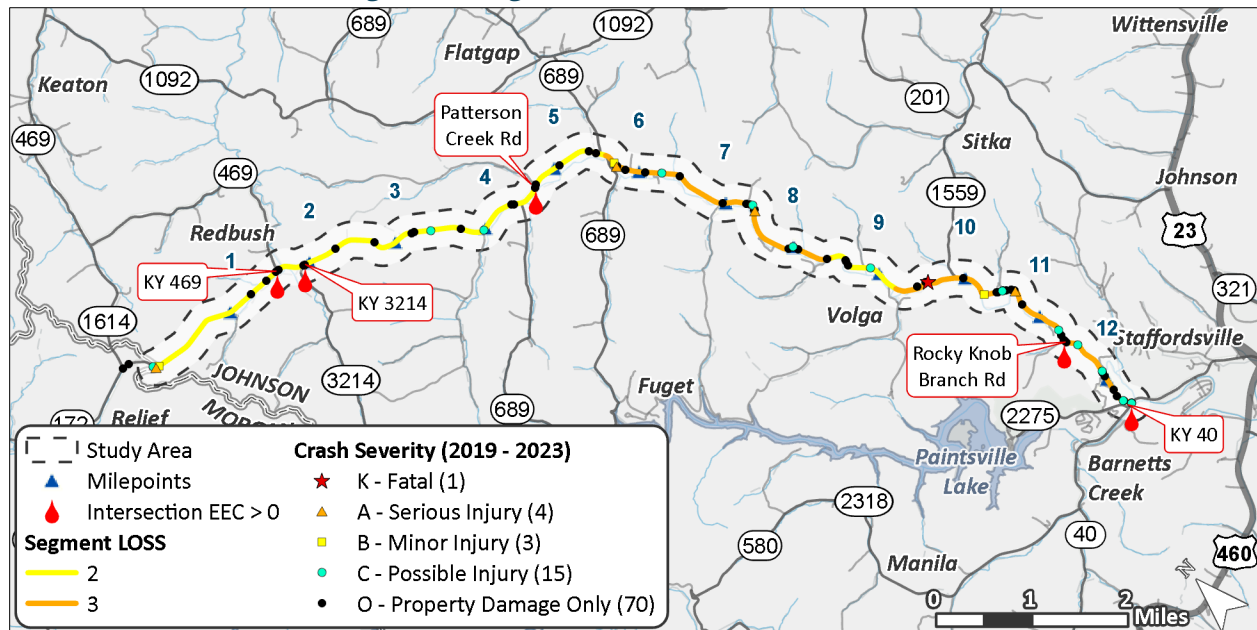


4.2 Excess Expected Crashes

A statistical analysis was performed based on methods that compare existing crash rates with crash rates of similar types of facilities. Excess Expected Crashes (EEC) is a statistical model to calculate crash distributions based on AASHTO's *Highway Safety Manual* (HSM) procedures that has been developed for Kentucky-specific use by Kentucky Transportation Center's CDAT. This method allows for the ability to estimate the frequency of crashes based on differences in roadway characteristics such as geometry, lane / shoulder / median configurations, AADT, length, functional classification, and traffic control. A positive EEC value indicates more crashes have occurred than expected in a segment. A negative EEC value indicates fewer crashes have occurred than expected in a segment. Once established, EEC values can be categorized by a Level of Service of Safety (LOSS) based on a comparison of the standard deviation in EEC values for a segment or intersection. LOSS ranges from LOSS 1 to LOSS 4. LOSS 1 indicates areas with substantially better safety performance, fewer than anticipated crashes, and a low potential for crash reduction. LOSS 4 indicates areas with a substantially worse than expected safety performance, higher than expected crashes, and a high potential for crash reduction.

Figure 60 displays the LOSS categories for the segments as well as intersections that had an EEC value greater than zero. Segments were based on where there are changes in key roadway characteristics. The KABCO crash severities are also shown for reference. Overall, the eastern half of KY 172 shows higher EECs and LOSSs which indicate a higher potential for crash reductions. Also, five intersections with EEC values above zero are present, with the intersection at KY 40 having the highest EEC value for intersections at 2.5, over four times the next highest intersection EEC. A summary of the EECs and LOSS for the segments and intersections is provided in **Appendix C**.

Figure 60. Segment LOSS & Intersection EEC



5 Environmental Overview

An environmental overview was conducted to identify resources and potential issues for consideration during the development of improvement concepts. Natural and human environmental resources were identified from a literature/database review. Study area environmental resources are summarized in this section with supplemental mapping and resources included in **Appendix D**.

This environmental overview is intended to identify environmental resources from the natural and human environment, early in the project development process. These resources should be considered during the development of improvement concepts and during the decision-making process. Resources outlined in this overview were identified utilizing available databases, mapping, coordination with regulatory agencies and stakeholders, and a windshield survey. Additional information or resources may be identified during future surveys required as potential improvement concepts are carried forward. Features such as streams, cemeteries, churches, wells, and community / cultural resources are identified on the concept sheets as well as potential environmental impacts.

5.1 Natural Environment

GEOLOGY

A Geotechnical Overview was completed for the corridor by Athena Engineering, Inc. and is included in *Appendix B* of the Environmental Overview Report. Key environmental takeaways from this report include:

- ◆ The study area is within the Eastern Kentucky Coal Field physiographic region, which is also known as the Cumberland Plateau.
- ◆ Within the Cumberland Plateau, wooded mountain crests extend to the horizon in all directions. The mountain slopes are carved by ravines eroded through thick, flat-lying sequences of Pennsylvanian age, coal-bearing elastic rocks. The ravines are tributary to sinuous, narrow valley bottoms which wind between steep valley walls.
- ◆ The study area is primarily underlain by fine-loamy colluvium derived from sandstone and shale over clayey residuum weathered from shale and siltstone. The topography of the study area is variable, ranging from approximately 619 feet elevation at the southwestern end of the roadway to approximately 1,048 feet elevation at approximately 9.5 miles north northwest along the roadway from the southwestern end of the roadway.
- ◆ Water, gas, and oil wells are present within the study area.
- ◆ Various mines and mined-out areas are present within the study area. Most are inactive, but there is an active mine near Meadow Branch Road to near McKenzie Branch Road.
- ◆ Multiple landslide areas are present within the study area.

According to the Kentucky Geological Survey (KGS), the study area is not in an area of karst development and there are no known sinkholes within the study area.

WATERSHED

The study area is contained within the following Hydrologic Unit Codes (HUCs):

- ◆ **Eight-digit HUCs** – Big Sandy, Kentucky, West Virginia (05070204) and Lower Levisa, Kentucky (5070203). The Lower Levisa, Kentucky watershed covers the majority of the

project, from MP 12.370 to MP 2.800. The Big Sandy, Kentucky, West Virginia, covers the westernmost part of the project, from approximately MP 0.0 to 2.8.

- ◆ **Ten-digit HUCs** – Upper Blaine Creek (0507020401) and Paint Creek (0507020304)
- ◆ **Twelve-digit HUCs** – Upper Laurel Creek-Blaine Creek (050702040105) and Mudlick Creek-Paint Creek (050702030502)

STREAMS

The westernmost part of the study area, from approximately MP 0.0 to 2.1, streams within the study area include Hamilton Branch, Salyer Branch, and Upper Laurel Creek, as well as numerous unnamed tributaries. Hamilton Branch and Salyer Branch flow into Upper Laurel Creek, which flows north and ultimately connects to Blaine Creek.

Mudlick Creek is the primary stream throughout the majority of the corridor as it runs parallel to KY 172 for nearly 9 miles (approximately MP 3.9 to the project end at MP 12.370). There is a short section of Mudlick Creek that is on the Kentucky Division of Water's (KDOW) 303(d) list of impaired streams for only partially supporting warm water aquatic habitat. Blueline streams that flow into Mudlick Creek include:

- | | |
|------------------------|---------------------|
| ◆ Stonecoal Branch | ◆ Vaughan Branch |
| ◆ Rocky Knob Branch | ◆ Joe Salyer Branch |
| ◆ Little Mudrick Creek | ◆ Williams Branch |
| ◆ State Branch | ◆ Joes Creek |
| ◆ Tucker Branch | ◆ Patterson Creek |
| ◆ Ramey Branch | ◆ Cantrell Branch |
| ◆ Sturgeon Branch | |

Just beyond the eastern end of the project along KY 172, Mudlick Creek flows into Paint Creek. Paint Creek is also designated as a Kentucky Special-use waters for Cold Water Aquatic Habitats (CAH), and as an Outstanding National Resource Water (ONRW), Exceptional and Reference Reach Waters. It also is on the 303(d) list of impaired streams due to non-supporting of cold-water aquatic habitat and non-supporting of primary contact recreation (swimming). Paint Creek connects to Paintsville Lake, which has the same special use designations (CAH and ONRW). These streams are part of the Big Sandy river watershed and eventually flow into the Levisa Fork.

Potential improvement concepts that would impact streams may require a Section 404 permit through the U.S. Army Corps of Engineers (USACE) and a Section 401 Water Quality Certification through the Kentucky Division of Water (DOW). Mitigation requirements would be determined during this permitting process. Due to their special-use designations, any potential improvement concepts that impact Paint Creek or Paintsville Lake may require additional design considerations.

All blue-line streams are shown in the exhibits of *Appendix A* of the Environmental Overview Report.

FLOODPLAINS AND FLOODWAYS

The Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL) shows a regulatory floodway surrounding Paint Creek, Mudlick Creek, Little Mudlick Creek, Joe's Creek, and Meadow Branch. For Mudlick Creek, the stream running parallel to KY 172, the regulatory floodway runs from the eastern-most point of KY 172 to near KY 689 at approximate MP 4.6. These streams, along with Stonecoal Branch, also have a 1% Annual Chance Flood Hazard beyond the regulatory floodway boundaries.

WETLANDS

Within the study area, the U.S. Fish & Wildlife Service’s (USFWS) National Wetland Inventory database shows the blueline streams (previously identified) as riverine wetlands and a few freshwater ponds spaced occasionally along the route. Potential improvement concepts that would impact wetlands may require a Section 404 permit through the U.S. Army Corps of Engineers (USACE) and a Section 401 Water Quality Certification through the Kentucky Division of Water (DOW). Mitigation requirements would be determined during this permitting process.

SPRINGS AND WATER WELLS

A KGS database identified 23 known wells within the study area. The vast majority are active domestic wells for single household use. There are a few locations of known monitoring wells, however most of them are considered plugged or lost / destroyed. There are no known springs within the study area. The known water wells in the study area are shown in the exhibits of *Appendix A* of the Environmental Overview Report.

FARMLAND

The Web Soil Survey from the United States Department of Agriculture’s (USDA) Natural Resources Conservation Service (NRCS) was reviewed to gain an understanding of the soil types in the Study Area. This soil data is used to develop a farmland classification, which outlines areas of prime and unique farmland, farmland of importance (state or local), or unique farmland.

From the eastern end of the project to near MP 4.0, much of the flat land adjacent to KY 172 is designated as “Farmland of Statewide Importance.” A small section, from MP 5.5 to 6.3 is considered “Prime Farmland.” A windshield survey only identified small areas of farming activity currently along the route. Impacts to farmland from any proposed improvements is anticipated to be minimal.

LISTED SPECIES

The USFWS Information for Planning and Consultation (IPaC) website was used to obtain a list of federally listed Threatened and Endangered (T&E) species with the potential to be within the study area. This list includes proposed species as well. This database listed four bats, one amphibian, one clam, and one insect as known or expected to be in or near the study area. No critical habitat for the listed species is noted within the study area. The T&E species are shown in **Table 7**.

Table 7. Federally Listed Threatened and Endangered (T&E) Species

Common Name	Scientific Name	Status
Bats		
Gray bat	<i>Myotis grisescens</i>	Endangered
Indiana bat	<i>Myotis sodalist</i>	Endangered
Tricolored bat	<i>Perimyotis subflavus</i>	Proposed Endangered
Virginia big-eared bat	<i>Corynorhinus townsendii virginianus</i>	Endangered
Amphibians and Clams		
Eastern Hellbender	<i>Cryptobranchus alleganiensis alleganiensis</i>	Proposed Endangered
Longsolid	<i>Fusconaia subrotunda</i>	Threatened
Insects		
Monarch Butterfly	<i>Danaus Plexippus</i>	Proposed Threatened

Preferred habitat for the Indiana bat and tricolored bat includes caves during the winter months and forested areas during the summer months. The gray bat and Virginia big-eared bat are primarily found within caves year-around, although it too uses riparian forested habitat for foraging. All of the bat species can also be found within bridge crevices. Considering its rural setting, a large amount of forested habitat exists within the study area. In addition to the forested habitat, there are two bridges along KY 172 with the potential for bat usage. Additional investigations would be required, along with coordination with the USFWS, for all potential improvement concepts.

The eastern hellbender salamander is found in perennial streams with cool and clear water. The larger streams in the study area, such as Mudlick Creek, have the potential for suitable habitat for the eastern hellbender. The species is only designated as a proposed endangered species, but if it were to become listed as Endangered prior to construction of any proposed improvement option, a presence / absence survey for the species may be required.

The monarch butterfly is another proposed species. Currently no additional surveys or mitigation is required to determine potential impacts to the species, however, this may change if the species were to become listed as Endangered prior to construction of any proposed improvement option.

5.2 Human Environment

The human environment includes all things that are not man-made, such as air, land, water, vegetation, and animal life.

LAND USE

The study area is a rural area with most of the land use being forested areas, with residential areas spaced throughout, and some small areas of agriculture use. Commercial land use is very rare along the corridor. This land use is common with this type of topography, with rugged terrain and flat areas primarily along the streams making development more unlikely.

The more developed areas are at the eastern end of KY 172, closer to Paintsville, the county seat. There are a few commercial properties as well as residential areas. Further away from Paintsville, residential areas are the primary use for developed lands. There are residential properties spaced sporadically along the route, as well as a few clusters of homes in the flat areas. There are seven churches along the route as well. To the north of the study area, there are areas of mining.

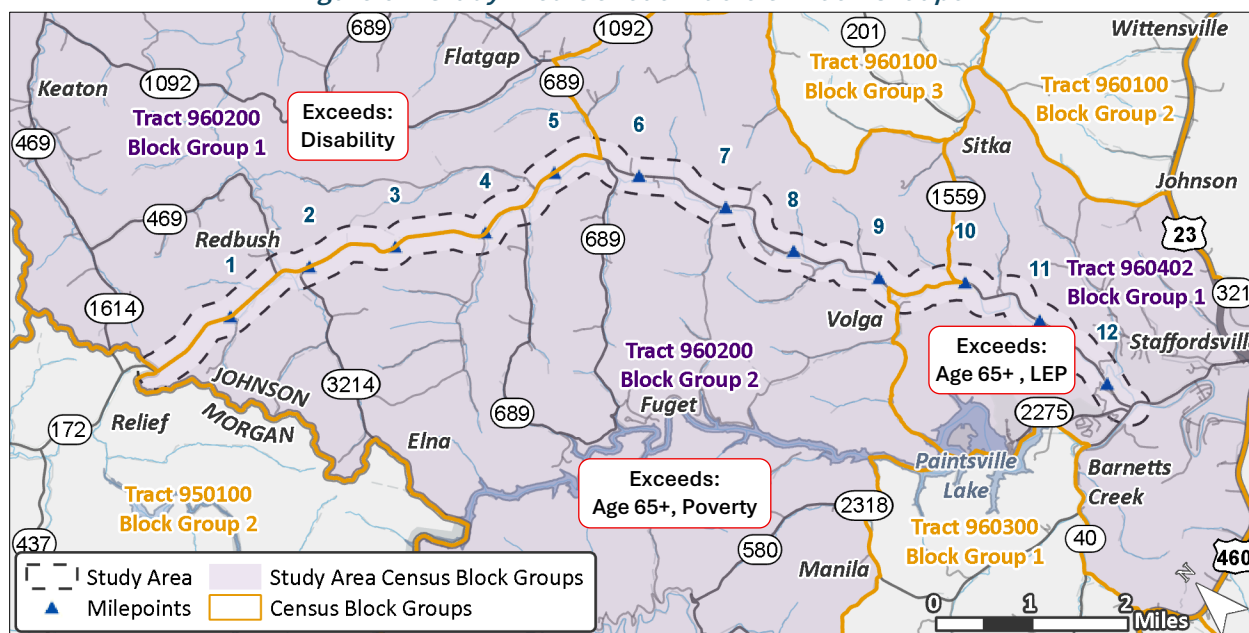
POPULATION DEMOGRAPHICS

A socioeconomic study was completed by the Big Sandy Area Development District (BSADD) and is included as *Appendix C* of the Environmental Overview Report. This study found that, “The Big Sandy Region and Johnson County have much lower percentages of minority individuals and percentages of persons with limited English proficiency than Kentucky and the nation. The Big Sandy Region and Johnson County have higher percentages of individuals aged 65 years and older, below poverty level, and individuals 18 years and older with a disability than Kentucky and the nation.” It also provided the following table, **Table 8**, which summarizes the population demographics within the census blocks and tracts within the study area, along with the Big Sandy Region, Johnson, County, Kentucky, and the United States for comparison. The percentages for Johnson County are highlighted in bold, and the percentages that exceed Johnson County percentages are highlighted in red. **Figure 61** shows the census tracts and block groups for reference with the categories that exceed Johnson County percentages called out.

Table 8. Summary of Population Demographics

Location	Minority	Age 65+	Poverty	Disability	Limited English Proficiency (LEP)
United States	42.0%	16.8%	12.4%	15.5%	8.4%
Kentucky	17.7%	17.0%	16.1%	21.3%	2.7%
Big Sandy Region	5.2%	19.3%	26.1%	33.4%	0.5%
Johnson County	4.7%	18.7%	23.3%	29.7%	0.4%
Census Tract (CT) 9602	1.7%	17.9%	33.9%	34.1%	0.0%
CT 9602, Block Group 1	0.0%	15.6%	21.6%	46.3%	0.0%
CT 9602, Block Group 2	2.7%	19.2%	41.0%	26.9%	0.0%
Census Tract (CT) 9604.02	3.2%	25.9%	12.8%	18.2%	1.2%
CT 9604.02, Block Group 1	2.0%	27.0%	16.8%	20.3%	2.0%

Figure 61. Study Area Census Tracts & Block Groups



CHURCHES

There are seven churches located within or immediately adjacent to the study area. Refer to the exhibits of *Appendix A* of the Environmental Overview Report for the churches in the study area.

- ◆ Red Bush Enterprise Baptist – located on KY 172 near MP 1.700.
- ◆ Bethel United Baptist – located just outside the study area at MP 6.900 of KY 689.
- ◆ Hope Valley Mennonite Church – located off CR-1382 near KY 172 MP 6.900.
- ◆ Ramey Branch Gospel Church – located on KY 172 near MP 9.000.
- ◆ Cannons Chapel – located on KY 172 near MP 8.200.
- ◆ Big Mud Lick First Church of God – located on KY 172 near MP 12.300.
- ◆ Fishtrap United Baptist Church – located off CR-1200, near KY 2275 at MP 1.100.

CEMETERIES

There are seven named cemeteries believed to be within or immediately adjacent to the study area. The named cemeteries include:

- ◆ Guess Family Cemetery – located off Patterson Road, near MP 4.700 KY 172.
- ◆ Salyers Cemetery – located approximately 250 feet off KY 172 near MP 5.400.
- ◆ Ramey Branch Cemetery / Whitehouse Cemetery – this cemetery is located directly next to KY 172 at MP 9.350. There is an entrance to the cemetery off KY 172. References to both names were found during the study.
- ◆ Abraham Adam Picklesimer Cemetery – this cemetery is located directly next to KY 172 at MP 10.250. It is within a sharp curve of KY 172 and the headstones are within 30 feet from the edge of pavement.
- ◆ O'Bryan Cemetery – located off Pelphrey Subdivision Road, just outside the study area. This is closest to MP 11.700 of KY 172.
- ◆ Persimmon Point Cemetery – located beside Fishtrap United Baptist Church, which is located off CR-1200, near KY 2275 at MP 1.100.
- ◆ Johnson County Memorial Cemetery – located off KY 2275 near MP 1.000. This is a large cemetery extending beyond the study area. Immediately adjacent to the cemetery is the Highland Memorial Cemetery.

There were many other unnamed cemeteries that were identified through historic mapping that do not appear in online databases. These are most likely small family cemeteries. Refer to the exhibits of *Appendix A* of the Environmental Overview Report for all identified cemeteries in the study area. As project development progresses, all cemeteries will be verified through field surveys and research.

COMMUNITY RESOURCES

The Red Bush Volunteer Fire Department is located adjacent to KY 172 at MP 0.800. Its building is less than 30 feet from the edge of pavement. A small section of the Paintsville Recreational Area encroaches the study area. Its boundary encompasses KY 2275 to its connection to KY 40. These resources are shown in the exhibits of *Appendix A* of the Environmental Overview Report.

There were no other schools, libraries, medical facilities or other community institutions identified within the study area. Other non-residential areas along KY 172 are commercial buildings, including automotive / body shops, a logging company, a convenience store, a discount variety store, and a fishing pond.

CULTURAL RESOURCES

A review of the Kentucky Heritage Council's (KHC) online database reveals the Lloyd Hamilton Mott House as listed on the National Register of Historic Places (NRHP). This is a vernacular style house built in 1980 and "exemplifies local building techniques and characteristics." It is located at the intersection of KY 172 and KY 469. The structure is within 50 feet of the KY 172 edge of pavement. Refer to the exhibits of *Appendix A* of the Environmental Overview Report for the location of the Lloyd Hamilton Mott House. No other known historic or archaeological sites were located within the study area.

HAZARDOUS MATERIALS

The EPA database and available mapping were reviewed to identify sites with the potential to be Recognized Environmental Conditions (REC) for hazardous materials or underground storage tanks. Two potential REC sites were identified in the study area including two automotive / body shops near MPs 11.9 – 12.0 which are located within Concepts 23A and 23B. Potential improvement concepts that require acquisition of new right-of-way should have an Environmental Site Assessment (ESA) and additional investigation completed to identify and investigate Recognized Environmental Conditions.

OTHER CONSIDERATIONS

- ◆ Section 4(f) – Parks and recreation lands, wildlife and refuges, and historic sites require special consideration under Section 4(f) of the U.S. Department of Transportation Act of 1966. Consideration of 4(f)-properties requires the FHWA to determine that there are no feasible and prudent alternatives that avoid the property. It also requires that potential impacts are minimized as much as possible. The historic site previously discussed would require consideration under Section 4(f).
- ◆ Section 6(f) – A database review of the Land and Water Conservation Fund Act (LWCFA) past projects did not identify any projects within the study area that received LWCF grants. When LWCF grants are utilized for land or facilities, Section 6(f) of this law requires coordination with the National Park Service prior to converting them from their recreational use. In addition, Section 6(f) requires that when the conversion is to take place, they must be replaced with land elsewhere that provides the same value as what is being converted.
- ◆ Noise Quality – when a transportation project has the potential to significantly change traffic noise levels, a noise study is required to determine the project's impact on noise-sensitive land uses. These land uses are locations where noise can interfere with human activity, such as residential areas, parks, and cemeteries. The only noise sensitive land uses identified along the corridor were residential properties. Improvements to KY 172 are unlikely to result in significant change to the traffic noise levels unless they greatly increase the roadway capacity, or move the roadway significantly closer to the noise sensitive land uses.
- ◆ Air Quality - As required by the Clean Air Act, the U.S. Environmental Protection Agency (EPA) set National Ambient Air Quality Standards (NAAQS) for six common air pollutants. Those that are caused by transportation-related sources include carbon monoxide (CO), ozone (O₃), particulate matter (PM_{2.5} and PM₁₀), and nitrogen dioxide (NO₂). The study area is not within any areas of non-attainment, and air quality studies are not anticipated for any potential improvement concepts.

6 Coordination & Engagement

The project team consisted of KYTC District 12, KYTC Central Office, KYTC Division of Design, KYTC Division of Environmental Analysis, Big Sandy Area Development District (BSADD), and the HMB Consultant team. Over the course of the study, the project team met to discuss findings, study progress, and coordinate on key issues. The project team met for three scheduled project team meetings, one additional follow-up meeting, and one meeting with local officials and stakeholders. No public meetings or resource agency mailings occurred. This section focuses on main discussion points and key takeaways from each coordination effort. Detailed meeting summaries are included in **Appendix E**.

6.1 Project Team Meeting No. 1

The project team held its first meeting on June 25, 2025, focusing on existing conditions information and discussion of study needs. The meeting was held at KYTC District 12 with an option to attend virtually. The team discussed the study background, schedule, planned and previously completed studies and projects, and existing conditions. The existing conditions included roadway systems and characteristics, roadway geometrics, structures, access, pavement conditions, signing, guardrail, cribbing / slope conditions, multimodal considerations, traffic, crash history, environmental overview, utilities overview, and the geotechnical and socioeconomic studies. The KYTC Johnson County Section Office is located along the study corridor, and there were many items discussed from their local perspective. The need for improvements along the study area and comparisons to recent improvements to the Morgan County side of KY 172 were emphasized. Next steps were discussed including improvement option development, Intersection Control Evaluation (ICE), and preparation for the Local Officials and Stakeholders Meeting such as potential meeting areas and invitees.

6.2 Project Team Meeting No. 2

The project team held its second meeting August 12, 2025, to present and discuss the initial improvement concepts that were developed by the consultant and prepare for the Local Officials and Stakeholders Meeting. The meeting was held at KYTC District 12 with an option to attend virtually. The process for identifying and developing potential concept locations was discussed as well as the evaluation of costs, benefits, and impacts going forward. The project team requested modifications and additional details to be added to the improvement concept sheets such as traffic, geometric data, and legends. Concepts were discussed one by one to determine feasibility, potential additions, modifications, or removal, or other pertinent information for refinement before presenting to the local officials and stakeholders. KYTC also provided information such as typical unit costs to refine the cost estimates. The location, list of attendees, and format for the Local Officials and Stakeholders Meeting were set.

6.3 Local Officials & Stakeholders Meeting

The project team held a meeting with local officials and stakeholders August 26, 2025, to present an overview of the study and improvement concepts to gather their local insights and feedback. The meeting was held at the US 23 Country Music Highway Museum in Paintsville, located near the study area. The consultant gave a presentation detailing the study area and background, existing conditions, concept development, and the concepts. The concepts were presented via handouts and large-format exhibits to facilitate discussion. Attendees were able to discuss concerns and potential solutions with the project team in an interactive format. A survey handout as well as a link to an online survey was provided to gain additional feedback after the meeting. Attendees generally

discussed issues they have seen along the corridor, concepts, cost estimates, and funding. Only one survey response was received by the project team. Photos from the meeting showing attendance and the breakout session concept layouts are shown in **Figure 62**.

Figure 62. Local Officials & Stakeholders Meeting



6.4 Project Team Meeting No. 3

The project team held its third meeting October 14, 2025, to discuss the feedback collected from the Local Officials and Stakeholders meeting as well as the additional detailed improvement concept screening, evaluation, and refinement. The meeting was held at KYTC District 12 with an option to attend virtually. Initial prioritization of improvement concepts was discussed. A follow up meeting was scheduled to discuss any final refinements to concepts and make final prioritization recommendations based on discussion from this meeting.

6.5 Prioritization Follow-Up to Project Team Meeting No. 3

Key project team members including the consultant and KYTC project managers had a virtual meeting held October 28, 2025, as a follow up meeting to discuss any final refinements to the concepts and make final prioritizations. Final concepts, prioritizations, cost estimate methodologies, and other information to include in the study documentation were discussed and finalized. Key changes to the concepts were centered around the cost estimates which resulted in a scaled Design phase cost, defined in **Section 8**, so that lower-cost concepts had appropriate Design phase estimates. An additional cost for potential excavation waste area impacts was added.

7 Development of Improvement Concepts

This section summarizes the process completed to identify and develop proposed improvement concepts. The existing conditions analysis, safety analysis, traffic analysis, recent Morgan County KY 172 improvements, and input from the project team and local officials / stakeholders were used to help guide the identification and development of improvement locations and concepts.

Two project categories were selected to define conceptual improvements. These include:

- ◆ Spot, Segment, and Intersection Improvement Concepts
- ◆ Corridor-Wide Improvement Concepts

7.1 Spot, Segment, & Intersection Improvements

IDENTIFICATION

To Identify improvement concepts, the existing conditions analysis was evaluated to determine locations that exhibited conditions not meeting KYTC's highway design guidelines, crash history, and traffic operations. Additionally, locations that were identified by the project team or local officials and stakeholders were included.

Since most of the corridor does not meet current standards of KYTC highway design, emphasis was placed on crash history, traffic, and project team / local officials and stakeholders' input. The corridor's existing conditions were compared with the design criteria used for the recently completed Morgan County KY 172 improvements that this study's goals are to match. This included a 50-mph design speed and a roadway template with 11' lane width, and 9' shoulder width (2' paved). Most of the corridor exhibits lane, shoulder, and roadside characteristics that do not meet modern design guidelines. Therefore, emphasis was given to locations that exhibited crash history or potential for greater crash reduction. For vertical curves, an emphasis was given to crest curves since sight distance is limited at all times of day and they are more prone to crashes based on project team experience. Additionally, locations where both the horizontal and vertical curvature do not meet modern design guidelines were identified to assist in the concept identification and evaluation. These combinations, as well as the crashes associated with each curve, can be found in **Appendix A**.

Locations that exhibited multiple overlapping or adjacent features not meeting modern design guidelines including horizontal alignment, vertical alignment, intersections and access characteristics, signing, guardrail, and cribbing / slope stability were identified for potential concept development locations, regardless of crash history. For those areas with overlapping features not meeting modern design guidelines, rather than having multiple concepts per location, each initial concept included all improvements to meet modern design guidelines within its combined limits. This led to concepts being extended to include adjacent areas since it would not have been practical to make them separate projects. Also, due to the nature of horizontal and vertical alignment improvements, some concepts were extended to have a transition back to the existing alignment that fell within modern design guidelines which resulted in concepts covering multiple horizontal and vertical curves.

INTERSECTION CONTROL EVALUATION

In 2024, KYTC implemented Intersection Control Evaluation (ICE) Guidance.⁷ ICE is a data-driven, performance-based framework used to screen intersection alternatives and identify an optimal solution.

The benefits of using ICE include:

- ◆ Implementation of solutions that are safer, more balanced for all users, and more cost-effective.
- ◆ Consistent documentation to support transparent decision making
- ◆ Increased awareness of innovative solutions
- ◆ Objective performance metrics for decision making

KYTC has developed its own spreadsheet to summarize findings from the NCHRP spreadsheet tools with other pertinent intersection information.

The KYTC guidelines define the conditions for which intersections should have ICE completed. These include a review of existing conditions such as AADT and crash patterns. The following intersections met the conditions to warrant ICE:

- ◆ KY 172 and KY 689 (N) / KY 689 (S)
- ◆ KY 172 and KY 1559
- ◆ KY 172 and KY 40

There are two stages of ICE – Stage 1 is a screening process used to shortlist possible alternatives that merit further consideration and analysis because they meet organizational goals, project needs and are practical. Stage 2 is the intersection selection stage where alternatives are evaluated in more detail and objectively compared to other alternatives. Generally, Stage 1 is used during conceptual planning phase or the beginning of preliminary design, Stage 2 is completed during the end of preliminary design. For the purposes of this study, only Stage 1 was completed for the identified intersections.

Stage 1 includes the application of the following spreadsheet tools based on the National Cooperative Highway Research Program's (NCHRP) Report 1087 (Project 17-98, 2024)⁸:

- ◆ Capacity Analysis for Planning of Junctions (CAP-X)
- ◆ SSI Score Calculator Tool

The evaluation showed that there are several viable alternatives to address traffic and safety at the intersections, including the existing configurations. Alternative intersections may result in potential capacity improvements and reductions in crashes at these intersections, however, the evaluation showed that more traditional strategies for intersection modifications such as changes in access / traffic control / turn lanes may be more efficient to address congestion and safety needs. For additional information, the KYTC ICE Forms along with the CAP-X and SSI results are included in **Appendix F**.

⁷ KYTC's Intersection Control Evaluation (ICE) Guidance can be found at <https://transportation.ky.gov/Highway-Design/Documents/ICE%20Guidance.pdf>

⁸ NCHRP Report 1087 and tools can be found at <https://www.nationalacademies.org/publications/27509>

DEVELOPMENT

After the identification of potential concept locations, concepts were developed using ORD design software to create new alignments that have the new roadway template matching the criteria of the Morgan County improvements. Running the new alignments through the software with engineering judgement, the limits of the potential impacted area and construction quantities were identified. In some instances, multiple concept options were developed for individual locations to compare benefits, impacts, costs, and feasibility during concept refinement. Off-alignment and widening concepts were thoughtfully developed to limit or consider impacts to environmental features such as cemeteries, flood hazard areas, churches / homes / businesses, utilities, geotechnical features / terrain, etc. described in **Section 5**. The initial development yielded 29 potential improvement concepts identified over 26 locations. **Table 9** shows a list of initial concept locations, their descriptions, and crash history.

Table 9. Initial List of Potential Spot, Segment, & Intersection Improvement Concepts

ID	Primary Improvement	Location / Milepoints	Length (mi)	Description	No. of Crashes
1	Horz. & Vert.	MP 20.74 (Morgan) - 0.14	0.57	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width	5
2	Horz.	MP 0.69 - 0.79	0.10	Improve Horizontal Conditions, Increase Lane and Shoulder Width	0
3	Intersection	0.981 (Salyers Branch Rd)	N/A	Improve Intersection Skew at Salyers Branch Rd	0
4	Vert.	MP 1.16 - 1.44	0.28	Improve Vertical Conditions, Increase Lane and Shoulder Width	1
5	Horz., Vert., & Bridge	MP 1.62 - 1.98	0.36	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width, Replace Bridge	5
6A	Intersection	MP 1.950 (KY 3214)	N/A	Improve Intersection Skew at KY 3214	3
6B	Intersection	MP 1.950 (KY 3214)	N/A	Improve Intersection Skew at KY 3214	3
7	Horz. & Vert.	MP 2.67 - 3.25	0.58	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width. Improve Slope Stability.	3
8	Vert.	MP 3.28 - 3.58	0.30	Improve Vertical Conditions, Increase Lane and Shoulder Width. Improve previous embankment repair area.	1
9	Horz. & Vert.	MP 3.85 - 4.11	0.26	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width. Improve previous embankment repair area.	1
10	Horz. & Vert.	MP 4.14 - 4.36	0.22	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width	1
11	Horz. & Vert.	MP 4.43 - 4.73	0.30	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width. Improve previous embankment repair area.	3
12	Vert.	MP 4.97 - 5.41	0.44	Improve Vertical Conditions, Increase Lane and Shoulder Width	2
13	Horz., Vert., & Intersection	MP 5.44 - 6.08	0.64	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width, and Improve Intersection Skew at KY 689. Improve previous embankment repair area and slope stability.	7
14	Horz. & Vert.	MP 6.23 - 6.50	0.27	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width	2
15	Vert.	MP 6.56 - 6.82	0.26	Improve Vertical Conditions, Increase Lane and Shoulder Width	0
16	Horz. & Vert.	MP 6.83 - 7.15	0.32	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width. Improve previous embankment repair area.	1
17	Horz., Vert., & Intersection	MP 7.15 - 7.76	0.61	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width, and Improve Intersection Skew at Noah Stapleton Rd. Improve previous embankment repair area and slope stability.	6
18	Horz., Vert., & Intersection	MP 7.76 - 8.03	0.27	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width, and Improve Intersection Skew at Noah Stapleton Rd. Improve previous embankment repair area and slope stability.	4
19A	Horz., Vert., & Intersection	MP 8.15 - 8.83	0.68	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width, and Improve Intersection Skew at Stapleton Branch Rd	4
19B	Horz., Vert., & Intersection	MP 8.15 - 8.83	0.68	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width, and Improve Intersection Skew at Stapleton Branch Rd	4
20	Horz. & Vert.	MP 8.89 - 9.12	0.23	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width. Improve slope stability.	1
21A	Horz., Vert., & Intersection	MP 9.08 - 10.45	1.37	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width, and Improve Intersection Skew at KY 1559. Improve previous embankment repair area and slope stability.	9
21B	Horz., Vert., & Intersection	MP 9.08 - 10.45	1.37	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width, and Improve Intersection Skew at KY 1559	9
22	Horz., Vert., & Intersection	MP 10.47 - 10.83	0.36	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width, and Improve Intersection Skew at Slate Branch Rd. Improve previous embankment repair area and slope stability.	7
23	Horz., Vert., & Intersection	MP 11.02 - 11.69	0.67	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width, and Improve Intersection Skew at Tackett Rd. Improve previous embankment repair area and slope stability.	6
24	Bridge, Horz., Intersection	MP 11.69 - 12.03	0.34	Improve Horizontal, Bridge, and Sight Distance Conditions, Replace/Widen Bridge at MP 11.912 - Modify Cut, Increase Lane and Shoulder Width. Improve previous embankment repair area.	8
25	Horz. & Vert.	MP 12.13 - 12.34	0.21	Improve Horizontal and Vertical Conditions, Increase Lane and Shoulder Width	3
26	Intersection	MP 12.370 (KY 40)	N/A	Improve Intersection by Adding Turn Lanes and Relocating Dollar General Entrance. Increase Lane and Shoulder Width	8

7.2 Corridor-Wide Improvements

Corridor-wide improvement concepts primarily included improvement concepts that may be more feasible to implement across the entire corridor. This includes lower-cost or lower-impact improvements to features like signing, guardrail, cribbing, or slope stability. While spot and segment concepts include improvements to these features if there is a need, these concepts are intended to give the project team the information they need for flexibility in decision-making for future projects.

Additionally, a concept to bring the entire corridor up to the standards that would match the Morgan County improvements was included. This concept combines all spot, segment, and intersection improvements mentioned previously while also filling in the gaps with roadway improvements between them. This was done to give the project team information on corridor-wide costs, impacts, and benefits to compare with segmentation of the concepts as shown previously. The initial corridor-wide improvement concepts are summarized in **Table 10**.

Table 10. Initial List of Potential Corridor-Wide Improvement Concepts

ID	Primary Improvement	Location / Milepoints	Length (mi)	Description
C1	Signing	0.00 - 12.37	12.37	Replace / Install Recommended Signing
C2	Guardrail	0.00 - 12.37	12.37	Replace, Extend, or Install Guardrail & End Treatments
C3	Full Corridor	20.74 (Morgan Co.) - 12.37	12.80	Match Morgan County improvements - 50 mph Design Speed, 11' lanes, 9' Shoulders (2' Paved)
C4	Cribbing / Slope Stability	Varies	Varies	Replace, Extend, or Install Cribbing or Other Slope Stability Improvements

SIGNING

A comprehensive inventory of signing along the corridor was created as described in **Section 2**. In addition to replacing existing signing, Table 2C-4 of the MUTCD recommends horizontal warning signs based on the difference between the posted and advisory speed limit. Using the CARS recommended curve advisory speeds discussed previously, locations were evaluated to determine new potential signing. Refer to **Appendix A** to see what kind of horizontal signing is recommended for each curve based on the CARS recommended curve advisory speeds. For example, there are 13 curves where chevrons are recommended in the MUTCD, but there are only three where they currently exist, leaving 10 other potential curves where chevrons could be recommended. However, the project team noted the potential for over-signing along the corridor. Therefore, for each curve, recommended signs along with the number and severity of crashes are included for reference in the CARS summary table in **Appendix A**.

GUARDRAIL

A comprehensive inventory of guardrail along the corridor was created as described in **Section 2**. The inventory of guardrail and end treatments was used to develop proposed replacements.

8 Evaluation & Refinement of Improvement Concepts

Improvement concepts were evaluated based on results from traffic and safety analysis, environmental impacts, costs, and feedback from the project team and local officials and stakeholders. Continuous coordination with the project team occurred as the concepts were refined. This section covers the development of the cost estimates and the evaluation of the safety, traffic, environmental / utility / right-of-way impacts, constructability concerns, and a cost-benefit evaluation. Once evaluated and refined, the concepts were given priorities based on a scale of high, medium, or low by the project team. The final proposed concepts are shown with their respective priorities at the end of this section.

8.1 Concept Refinement

Throughout the study, concepts developed during the initial phase were refined based on further evaluation, project team feedback, and/or feedback from local officials and stakeholders. Refinement to concepts included items such as additional information to the concept sheets, alternative alignments, and the combination or complete removal of concepts. Some concepts were considered but ultimately dismissed from further study based on feasibility, effectiveness, or alignment with project goals. Changes made to each concept as well as the explanations of why certain concepts were either combined, removed, or otherwise altered after the initial concept development are covered in more detail in the meeting summaries found in **Appendix E**. Over the course of the study, concepts were renamed since some were removed or combined. For reference when reviewing the changes as noted in the meeting summaries, **Table 11** shows the changes to Concept IDs as they progressed through the study. Concepts dismissed from further study can be found in **Appendix G**.

CRIBBING / SLOPE STABILITY

Two locations of cribbing and unstable slopes identified in **Section 2** are currently being evaluated for repair by KYTC. KYTC has submitted requests for funding through the Federal Emergency Management Agency (FEMA). Since there was uncertainty on the approval, timing, cost, and proposed solutions for these and other locations, a concept to repair cribbing and slope stability throughout the corridor was removed from further consideration at this time. Instead, each location was accounted for in the spot, segment, and intersection improvement concepts and noted on the concept sheets. More information is provided in the meeting summaries found in **Appendix E**.

Table 11. Concept ID Changes

Project Team Meeting No. 2 ID	Project Team Meeting No. 3 ID	Final ID
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6A	5A	5A
6B	5B	5B
7	6	6
8	7	7
9	8	8
10	9	9
11	10	10
-	-	10A
12	11	11
13	12	12
13A	12A	-
13B	12B	-
13C	12C	-
14	13	13
15	14	14
16	15	15
17	16	16
18	17	17
19A	18A	18
19B	18B	-
-	18C	-
20	19	19
21A	20A	20A
21B	20B	20B
22	21	21
23	22	22
24	23A	23A
-	23B	23B
25	24	24
26	25	25

8.2 Cost Estimates

Planning-level cost estimates were produced for each of the improvement concepts by estimating the 2025 costs of Design, Right-of-Way Acquisition, Utility Relocation, and Construction. No surveying or detailed design was performed. Project Information was obtained through available GIS information, KyFromAbove aerial and LiDAR data, field review, and archive plans. Using this information, a planning-level horizontal and vertical alignment was established allowing to obtain quantities and establish preliminary construction limits to develop cost estimates. Detailed cost estimates including risk contingencies can be found in **Appendix G**.

CONSTRUCTION

Construction quantities such as pavement, earthwork, rock-roadbed, and structures used average unit KYTC prices for the KYTC District 12 region. Mobilization and demobilization have been included at the standard KYTC allowed percentage. Several concepts include estimates for unknown excavation waste area costs. The structure cost for culverts (\$45 to \$118 per cubic ft.) and bridges (\$250 to \$400 square ft.) varied depending on the structure location, complexity in building, and removal of the old structure. Concept 23B, the bridge replacement near MP 11.900, includes a temporary diversion with an estimate developed after acquiring information for installing a temporary bridge.

While industry practice in construction is for tree removal to occur outside of the higher-fee active bat season when possible (November 14 to April 1), for estimate purposes, a conservative cost was included as a risk for this to account for various bat habitat multipliers and the anticipated increases in yearly reevaluations or potential design changes.

Miscellaneous items considering known items such as staking, clearing and grubbing, drainage, striping, etc. were added to the estimates using a miscellaneous lump sum percentage varying from 30% to 50% between concepts. The percentage depended on the complexity of the concept and the overall construction cost. The total construction cost was then applied with an additional 30% for contingencies to cover unknown costs to account for risks such as potential scope increases, inflation, or unknown utility, environmental, or right-of-way impacts.

RIGHT-OF-WAY

Right-of-way cost estimates have a wide range of variance, not only depending on how much area is potentially impacted, but the kind of property impacted such as hillside, farmland, residential or commercial property. It is also dependent if any residence or business structures need to be acquired and relocated. The KYTC District 12 right-of-way supervisor provided average prices to use for preparing right-of-way cost estimates.

UTILITIES

The KYTC District 12 utility supervisor provided average cost to be used for estimating utilities along the KY 172 corridor. In addition to the numbers provided from District 12, a contingency fee of 15% was used to cover continuously increasing costs in utility items and labor cost. High-level utility location and identification was performed for each improvement concept using existing information available from online GIS utility mapping sources, field review, and KYTC's Photolog viewer / Google Streetview. The KYTC District 12 utilities supervisor provided average prices to use for preparing utility relocation cost estimates.

DESIGN

Design fees were established for each concept based on a varying scale with the percentage being higher for a lower cost construction project and decreasing for a higher cost construction project. This provided a more realistic estimate of design fee estimates than the flat 10% that has traditionally been used for planning based on project team coordination. This overall construction cost was multiplied by this factor to estimate the design cost.

The design percentage scale is shown in **Table 12** and was used for each concept:

Table 12. Design Fee Estimate Percentage

Construction Cost	Design %
< \$2,500,000	20%
< \$5,000,000	15%
< \$10,000,000	10%
< \$15,000,000	8%
≥ \$15,000,000	6%

Additional information and calculations of cost estimates for each concept are provided in **Appendix G**. Costs by phase (i.e., Design, Right-of-Way, Utilities, and Construction) are included on the final improvement concept summary sheets found later in this section and summarized in **Table 13**. Costs provided in this study are relatively conservative and as detailed as possible with the information available including the latest average costs. Contingencies were included in the initial estimates shown to the project team for risks such as construction, excess excavation, environmental mitigation, utilities, and right-of-way acquisition. However, an additional cost has been included to account for further unexpected risks such as scope changes, surprise utility conflicts, geotechnical conflicts, environmental mitigation, right-of-way, and other unknowns. This risk-based contingency was added to the Construction phase which subsequently increased the Design phase but did not affect the Right-of-way or Utility phases. A summary of costs with this risk-based contingency is shown in **Table 14**.

Additionally, a contingency for time and management risks to account for the lack of funding is suggested to be added at a cost of ten percent (10%) per phase, per biennium. However, no time / management-based contingency factors were included in the costs at this time after consideration with the project team. Costs are all presented in 2025 Dollars both with and without additional risk-based contingencies. As additional requests for funding and the implementations of subsequent phases for projects progress, cost estimates should be revisited to determine whether any time escalation or modifications are necessary as more information becomes available. This is increasingly important as inflation continues to rise, as evidenced by the latest reports from FHWA's National Highway Construction Cost Index (NHCCI)⁹ where construction costs have risen almost 70% since 2020.

⁹ NHCCI information available at <https://www.fhwa.dot.gov/policy/otps/nhcci/>

Table 13. Summary of Improvement Concept Cost Estimates Without Additional Risk-Based Contingencies

ID	Primary Improvement	Location / Milepoints	Length (miles)	Cost (2025 Dollars Without Additional Risk-Based Contingencies)				
				Design (D)	Right of Way (R)	Utility (U)	Construction (C)	Total
1	Horz. & Vert.	MP 20.74 (Morgan) - 0.14	0.57	\$960,000	\$100,000	\$830,000	\$12,050,000	\$13,940,000
2	Horz.	MP 0.69 - 0.79	0.10	\$300,000	\$50,000	\$140,000	\$1,490,000	\$1,980,000
3	Intersection	0.981 (Salyers Branch Rd)	N/A	\$230,000	\$30,000	\$30,000	\$1,140,000	\$1,430,000
4	Vert.	MP 1.16 - 1.44	0.28	\$410,000	\$1,040,000	\$540,000	\$2,760,000	\$4,750,000
5	Horz., Vert., & Bridge	MP 1.64 - 1.98	0.34	\$550,000	\$100,000	\$450,000	\$5,480,000	\$6,580,000
5A	Intersection	MP 1.950 (KY 3214)	N/A	\$250,000	\$20,000	\$110,000	\$1,230,000	\$1,610,000
5B	Intersection	MP 1.950 (KY 3214)	N/A	\$430,000	\$30,000	\$120,000	\$2,860,000	\$3,440,000
6	Horz. & Vert.	MP 2.67 - 3.25	0.58	\$690,000	\$640,000	\$750,000	\$6,890,000	\$8,970,000
7	Vert.	MP 3.28 - 3.58	0.30	\$500,000	\$320,000	\$310,000	\$5,000,000	\$6,130,000
8	Horz. & Vert.	MP 3.85 - 4.11	0.26	\$580,000	\$50,000	\$340,000	\$3,850,000	\$4,820,000
9	Horz. & Vert.	MP 4.14 - 4.36	0.22	\$540,000	\$190,000	\$250,000	\$3,600,000	\$4,580,000
10	Horz., Vert., & Intersection	MP 4.43 - 4.73	0.30	\$560,000	\$1,700,000	\$340,000	\$3,710,000	\$6,310,000
10A	Horz., Vert., & Intersection	MP 4.43 - 4.57	0.14	\$340,000	\$340,000	\$250,000	\$1,690,000	\$2,620,000
11	Vert.	MP 4.97 - 5.41	0.44	\$680,000	\$850,000	\$560,000	\$4,550,000	\$6,640,000
12	Horz., Vert., & Intersection	MP 5.44 - 6.08	0.64	\$960,000	\$870,000	\$980,000	\$15,990,000	\$18,800,000
13	Horz. & Vert.	MP 6.23 - 6.50	0.27	\$720,000	\$370,000	\$280,000	\$4,830,000	\$6,200,000
14	Vert.	MP 6.56 - 6.82	0.26	\$610,000	\$50,000	\$280,000	\$6,140,000	\$7,080,000
15	Horz. & Vert.	MP 6.83 - 7.15	0.32	\$1,130,000	\$340,000	\$390,000	\$14,070,000	\$15,930,000
16	Horz., Vert., & Intersection	MP 7.15 - 7.76	0.61	\$1,160,000	\$820,000	\$730,000	\$14,470,000	\$17,180,000
17	Horz., Vert., & Intersection	MP 7.76 - 8.03	0.27	\$1,190,000	\$580,000	\$340,000	\$19,760,000	\$21,870,000
18	Horz., Vert., & Intersection	MP 8.15 - 8.83	0.68	\$1,000,000	\$2,000,000	\$900,000	\$16,690,000	\$20,590,000
19	Horz. & Vert.	MP 8.89 - 9.12	0.23	\$800,000	\$320,000	\$350,000	\$10,040,000	\$11,510,000
20A	Horz., Vert., & Intersection	MP 9.08 - 10.45	1.37	\$1,720,000	\$3,900,000	\$2,040,000	\$28,650,000	\$36,310,000
20B	Horz., Vert., & Intersection	MP 9.08 - 10.45	1.37	\$1,920,000	\$890,000	\$2,040,000	\$32,000,000	\$36,850,000
21	Horz., Vert., & Intersection	MP 10.47 - 10.83	0.36	\$780,000	\$1,340,000	\$640,000	\$7,830,000	\$10,590,000
22	Horz., Vert., & Intersection	MP 11.02 - 11.69	0.67	\$910,000	\$1,120,000	\$920,000	\$15,200,000	\$18,150,000
23A	Bridge, Horz., & Intersection	MP 11.69 - 12.03	0.34	\$840,000	\$1,540,000	\$400,000	\$8,410,000	\$11,190,000
23B	Bridge	MP 11.83 - 11.99	0.07	\$640,000	\$940,000	\$150,000	\$4,270,000	\$6,000,000
24	Horz. & Vert.	MP 12.13 - 12.34	0.21	\$440,000	\$330,000	\$310,000	\$2,190,000	\$3,270,000
25	Intersection	MP 12.370 (KY 40)	N/A	\$360,000	\$60,000	\$2,290,000	\$1,820,000	\$4,530,000
C1	Signing	0.00 - 12.37	12.37	\$50,000	\$0	\$0	\$225,000	\$275,000
C2	Guardrail	0.00 - 12.37	12.37	\$0	\$0	\$0	\$2,290,000	\$2,290,000
C3	Full Corridor Improvement	20.74 (Morgan Co.) - 12.37	12.80	\$10,560,000	\$20,310,000	\$17,180,000	\$176,050,000	\$224,100,000

Note: For Time/Management-Based Contingency, add 10% per biennium, per phase

Table 14. Summary of Improvement Concept Cost Estimates With Additoinal Risk-Based Contingencies

ID	Primary Improvement	Location / Milepoints	Length (miles)	Cost (2025 Dollars With Additional Risk-Based Contingencies)				
				Design (D)	Right of Way (R)	Utility (U)	Construction (C)	Total
1	Horz. & Vert.	MP 20.74 (Morgan) - 0.14	0.57	\$1,180,000	\$100,000	\$830,000	\$14,730,000	\$16,840,000
2	Horz.	MP 0.69 - 0.79	0.10	\$350,000	\$50,000	\$140,000	\$1,770,000	\$2,310,000
3	Intersection	0.981 (Salyers Branch Rd)	N/A	\$270,000	\$30,000	\$30,000	\$1,370,000	\$1,700,000
4	Vert.	MP 1.16 - 1.44	0.28	\$510,000	\$1,040,000	\$540,000	\$3,380,000	\$5,470,000
5	Horz., Vert., & Bridge	MP 1.64 - 1.98	0.34	\$660,000	\$100,000	\$450,000	\$6,600,000	\$7,810,000
5A	Intersection	MP 1.950 (KY 3214)	N/A	\$290,000	\$20,000	\$110,000	\$1,470,000	\$1,890,000
5B	Intersection	MP 1.950 (KY 3214)	N/A	\$520,000	\$30,000	\$120,000	\$3,470,000	\$4,140,000
6	Horz. & Vert.	MP 2.67 - 3.25	0.58	\$830,000	\$640,000	\$750,000	\$8,320,000	\$10,540,000
7	Vert.	MP 3.28 - 3.58	0.30	\$610,000	\$320,000	\$310,000	\$6,090,000	\$7,330,000
8	Horz. & Vert.	MP 3.85 - 4.11	0.26	\$700,000	\$50,000	\$340,000	\$4,670,000	\$5,760,000
9	Horz. & Vert.	MP 4.14 - 4.36	0.22	\$650,000	\$190,000	\$250,000	\$4,340,000	\$5,430,000
10	Horz., Vert., & Intersection	MP 4.43 - 4.73	0.30	\$680,000	\$1,700,000	\$340,000	\$4,560,000	\$7,280,000
10A	Horz., Vert., & Intersection	MP 4.43 - 4.57	0.14	\$410,000	\$340,000	\$250,000	\$2,060,000	\$3,060,000
11	Vert.	MP 4.97 - 5.41	0.44	\$550,000	\$850,000	\$560,000	\$5,530,000	\$7,490,000
12	Horz., Vert., & Intersection	MP 5.44 - 6.08	0.64	\$1,170,000	\$870,000	\$980,000	\$19,420,000	\$22,440,000
13	Horz. & Vert.	MP 6.23 - 6.50	0.27	\$590,000	\$370,000	\$280,000	\$5,860,000	\$7,100,000
14	Vert.	MP 6.56 - 6.82	0.26	\$750,000	\$50,000	\$280,000	\$7,510,000	\$8,590,000
15	Horz. & Vert.	MP 6.83 - 7.15	0.32	\$1,030,000	\$340,000	\$390,000	\$17,160,000	\$18,920,000
16	Horz., Vert., & Intersection	MP 7.15 - 7.76	0.61	\$1,060,000	\$820,000	\$730,000	\$17,720,000	\$20,330,000
17	Horz., Vert., & Intersection	MP 7.76 - 8.03	0.27	\$1,450,000	\$580,000	\$340,000	\$24,180,000	\$26,550,000
18	Horz., Vert., & Intersection	MP 8.15 - 8.83	0.68	\$1,220,000	\$2,000,000	\$900,000	\$20,340,000	\$24,460,000
19	Horz. & Vert.	MP 8.89 - 9.12	0.23	\$980,000	\$320,000	\$350,000	\$12,270,000	\$13,920,000
20A	Horz., Vert., & Intersection	MP 9.08 - 10.45	1.37	\$2,110,000	\$3,900,000	\$2,040,000	\$35,190,000	\$43,240,000
20B	Horz., Vert., & Intersection	MP 9.08 - 10.45	1.37	\$2,330,000	\$890,000	\$2,040,000	\$38,890,000	\$44,150,000
21	Horz., Vert., & Intersection	MP 10.47 - 10.83	0.36	\$950,000	\$1,340,000	\$640,000	\$9,510,000	\$12,440,000
22	Horz., Vert., & Intersection	MP 11.02 - 11.69	0.67	\$1,110,000	\$1,120,000	\$920,000	\$18,550,000	\$21,700,000
23A	Bridge, Horz., & Intersection	MP 11.69 - 12.03	0.34	\$820,000	\$1,540,000	\$400,000	\$10,270,000	\$13,030,000
23B	Bridge	MP 11.83 - 11.99	0.07	\$520,000	\$940,000	\$150,000	\$5,180,000	\$6,790,000
24	Horz. & Vert.	MP 12.13 - 12.34	0.21	\$400,000	\$330,000	\$310,000	\$2,660,000	\$3,700,000
25	Intersection	MP 12.370 (KY 40)	N/A	\$460,000	\$60,000	\$2,290,000	\$2,310,000	\$5,120,000
C1	Signing	0.00 - 12.37	12.37	\$50,000	\$0	\$0	\$225,000	\$275,000
C2	Guardrail	0.00 - 12.37	12.37	\$0	\$0	\$0	\$2,290,000	\$2,290,000
C3	Full Corridor Improvement	20.74 (Morgan Co.) - 12.37	12.80	\$13,010,000	\$20,310,000	\$17,180,000	\$216,800,000	\$267,300,000

Note: For Time/Management-Based Contingency, add 10% per biennium, per phase

8.3 Return on Investment

Benefits of a transportation investment measure the direct and positive effects of that project over a specified period of time. A return on investment (ROI) analysis can be leveraged as one of the many tools to consider improvements and support decisions for infrastructure investment. Relying upon guidance from the U.S. Department of Transportation Benefit-Cost Analysis Guidance for Discretionary Grant Programs (January 2024), there are four primary areas of project benefit that can be translated into monetary values. These include:

- ◆ Travel Time Savings (vehicle-hours traveled or VHT)
- ◆ Vehicle Operating Costs (vehicle-miles traveled or VMT, which is the most common variable that affects vehicle operating costs)
- ◆ Safety Benefits (reduction in the likelihood of fatalities, injuries, and property damage resulting from crashes on the investment)
- ◆ Emissions Reduction Benefits

Costs for this planning stage are focused on capital costs – the total investment required to prepare an improvement for service. Maintenance costs are not included as the initial period focuses on the benefit of construction. All monetary values are in constant (2025) dollars without additional risk-based contingencies. Discounting (the process of converting the costs and benefits that take place in different years into a common year) is not included in this high-level analysis.

The emphasis for this study has been on the consideration of improving safety and mobility. As noted through the existing conditions analysis and development of future year volumes, traffic operations are generally at an acceptable level for the corridor throughout the study area. Therefore, this analysis focuses on identifying the safety benefits and comparing that to the investment cost to determine a ROI ratio.

To translate the safety benefits associated with an improvement, crash modification factors (CMFs) from the Crash Modification Factors Clearinghouse were applied to the number of applicable crashes at each location to determine an estimated number of crashes “saved” by implementing the countermeasure.

For reference, the following table, **Table 15**, is a list of improvement types and the corresponding CMF ID or resource used to calculate the estimated crash reduction:

Table 15. Summary of Improvement CMFs for ROI

Countermeasure Type	CMF ID / Reference
Striping	HSIP CMF Calculated for Roadway Departure Studies
Signing	HSIP CMF Calculated for Roadway Departure Studies
Flatten Crest Vertical Curve	CMF ID 721
Improve Horizontal Curve	HSIP CMF Calculated for Roadway Departure Studies
Pavement Widening	HSIP CMF Calculated for Roadway Departure Studies
Curve Widening	HSIP CMF Calculated for Roadway Departure Studies
Guardrail Upgrade	HSIP CMF Calculated for Roadway Departure Studies
Guardrail End Treatment Upgrade	HSIP CMF Calculated for Roadway Departure Studies
Change Bridge Width from X to Y	CMF ID 2839
Change Intersection Skew	CMF ID 11273
Add Left Turn Lane	FHWA Proven Countermeasures
Add Right Turn Lane	FHWA Proven Countermeasures

The estimated crash reduction number was then multiplied by an estimated cost per crash. The costs per crash were determined based on initial research completed by Vanasse Hangen Brustlin, Inc. (VHB) and broken down by the KABCO severity scale. KYTC has further developed a spreadsheet using these costs calibrated by the severity distribution for each KYTC district using the historic crash severity breakdown (based on the HSIP 2/26/25 worksheet). Comparing the estimated crash benefit to the estimated project cost yields a ROI value. Anything greater than 1.0 indicates a positive return on investment. Simplified, the process for determining ROI for this study is:

Estimated Crash Benefit = *(Estimated Crash Reduction % (from CMF)) x (Total Number of Crashes CMF Applies To) x (Average Crash Cost)*

ROI = *Estimated Crash Benefit / Estimated Project Cost*

The ROI is then applied for a 20-year horizon period to allow for a more comprehensive assessment of costs versus benefits over time. ROI values are shown in **Table 16** (Spots, Sections, and Intersections) and **Table 17** (Corridor-wide) by location along with a brief description of improvements, cost estimate, and local officials and stakeholders' input.

Table 16. ROI Summary for Spot, Segment, and Intersection Improvement Concepts

ID	Countermeasure Description	CMF	Estimated Crash Reduction	Total # Crashes CMF Applies to (5-year)	Total # Crashes CMF Applies to (per year)	Estimated # of Crashes "saved" (per year)	Average Crash Cost	Estimated Crash Benefit (20 years)	2025 Total Cost (w/out Risk-Based Contingencies)	20 Year ROI
1	Horizontal and Vertical Alignment	0.09	91%	5	1	0.91	\$385,070	\$6,998,542	\$13,940,000	0.50
2	Horizontal Alignment	0.57	43%	0	0	0.00	\$385,070	\$0	\$1,980,000	0.00
3	Intersection Skew	0.49	51%	0	0	0.00	\$385,070	\$0	\$1,430,000	0.00
4	Vertical Alignment	0.49	51%	1	0.2	0.10	\$385,070	\$785,543	\$4,750,000	0.17
5	Horizontal and Vertical Alignment	0.49	51%	5	1	0.51	\$385,070	\$3,927,714	\$6,580,000	0.60
5A	Intersection Skew Improvement	0.38	62%	3	0.6	0.37	\$385,070	\$2,870,636	\$1,610,000	1.78
5B	Intersection Skew Improvement	0.38	62%	3	0.6	0.37	\$385,070	\$2,870,636	\$3,440,000	0.83
6	Horizontal and Vertical Alignment	0.34	66%	3	0.6	0.40	\$385,070	\$3,056,693	\$8,970,000	0.34
7	Vertical Alignment	0.49	51%	1	0.2	0.10	\$385,070	\$785,543	\$6,130,000	0.13
8	Horizontal and Vertical Alignment	0.45	55%	1	0.2	0.11	\$385,070	\$851,114	\$4,820,000	0.18
9	Horizontal and Vertical Alignment	0.49	51%	1	0.2	0.10	\$385,070	\$785,543	\$4,580,000	0.17
10	Horizontal and Vertical Alignment	0.49	51%	3	0.6	0.31	\$385,070	\$2,356,628	\$6,310,000	0.37
10A	Horizontal Alignment	0.55	45%	1	0.2	0.09	\$385,070	\$698,651	\$2,620,000	0.27
11	Vertical Alignment	0.49	51%	2	0.4	0.20	\$385,070	\$1,571,086	\$6,640,000	0.24
12	Horizontal and Vertical Alignment	0.48	52%	7	1.4	0.72	\$385,070	\$5,566,195	\$18,800,000	0.30
13	Horizontal and Vertical Alignment	0.49	51%	2	0.4	0.20	\$385,070	\$1,571,086	\$6,200,000	0.25
14	Vertical Alignment	0.49	51%	0	0	0.00	\$385,070	\$0	\$7,080,000	0.00
15	Horizontal and Vertical Alignment	0.49	51%	1	0.2	0.10	\$385,070	\$785,543	\$15,930,000	0.05
16	Horizontal and Vertical Alignment; Intersection Skew	0.16	84%	6	1.2	1.01	\$385,070	\$7,746,518	\$17,180,000	0.45
17	Horizontal and Vertical Alignment; Intersection Skew	0.03	97%	4	0.8	0.77	\$385,070	\$5,952,288	\$21,870,000	0.27
18	Horizontal and Vertical Alignment; Intersection Skew	0.44	56%	4	0.8	0.45	\$385,070	\$3,444,222	\$20,590,000	0.17
19	Horizontal and Vertical Alignment	0.49	51%	1	0.2	0.10	\$385,070	\$785,543	\$11,510,000	0.07
20A	Horizontal and Vertical Alignment; Intersection Skew	0.04	96%	9	1.8	1.73	\$385,070	\$13,328,621	\$36,310,000	0.37
20B	Horizontal and Vertical Alignment; Intersection Skew	0.06	94%	9	1.8	1.70	\$385,070	\$13,071,056	\$36,850,000	0.35
21	Horizontal and Vertical Alignment; Intersection Skew	0.40	60%	7	1.4	0.84	\$385,070	\$6,445,848	\$10,590,000	0.61
22	Horizontal and Vertical Alignment; Intersection Skew	0.49	51%	6	1.2	0.61	\$385,070	\$4,713,257	\$18,150,000	0.26
23A	Bridge, Horizontal Alignment, and Sight Distance	0.71	29%	8	1.6	0.47	\$385,070	\$3,621,520	\$11,190,000	0.32
23B	Bridge and Sight Distance	0.71	29%	8	1.6	0.47	\$385,070	\$3,621,520	\$6,000,000	0.60
24	Horizontal and Vertical Alignment	0.49	51%	3	0.6	0.31	\$385,070	\$2,356,628	\$3,270,000	0.72
25	Intersection and Access	0.48	52%	8	1.6	0.83	\$385,070	\$6,407,565	\$4,530,000	1.41

Table 17. ROI Summary for Corridor-Wide Improvement Concepts

ID	Countermeasure Description	CMF	Estimated Crash Reduction	Total # Crashes CMF Applies to (5-year)	Total # Crashes CMF Applies to (per year)	Estimated # of Crashes "saved" (per year)	Average Crash Cost	Estimated Crash Benefit (20 years)	2025 Total Cost (w/out Risk-Based Contingencies)	20 Year ROI
1	Signing	0.82	18%	23	4.6	0.83	\$385,070	\$6,376,759	\$275,000	23.19
2	Guardrail	0.84	17%	8	1.6	0.26	\$385,070	\$2,033,170	\$2,290,000	0.89
3	Full Corridor	0.42	58%	93	18.6	10.77	\$385,070	\$82,947,582	\$224,100,000	0.37

8.4 Concept Prioritization

This study resulted in a range of conceptual improvements for future consideration / implementation. Improvement concepts primarily focused on areas with safety, access, or mobility needs. The KYTC District 12 recommended priorities are based on technical analysis, identified needs, and project team feedback. Prioritization is classified as follows:

- ◆ **High Priority** projects include those that were overall in a higher tier of ratings based on crash history, crash reduction potential / ROI, project team experience and feedback, feasibility, and cost. There are five total High Priority projects. Two locations include two options to provide flexibility with future project development. High Priority projects are those that District 12 has determined will be submitted first into the SHIFT process to acquire potential funding.
- ◆ **Medium Priority** projects include those that were overall in the middle tier of ratings based on crash history, crash reduction potential / ROI, project team experience and feedback, feasibility, and cost. There are nine total Medium Priority projects.
- ◆ **Low Priority** projects included those that are overall in the lowest tier of ratings based on crash history, ROI analysis, and public input. There are thirteen total Low Priority projects.

Corridor-wide concepts were not assigned a priority. They may be considered and included as additional initiatives, through alternative funding, or in conjunction with future development of the identified high, medium, and low-priority projects.

Concepts 20A/20B: Ongoing Rockfall/Landslide Study and Maintenance Considerations

There is an ongoing planning study, KYTC Item No. 12-5020.00, to identify and scope potential rockfall and landslide areas on various routes in District 12. One of the potential areas is KY 172 from MP 9.0 to 10.0 which falls within the limits of these High Priority concepts. A final ranking of the rockfall/landslide sites has not been determined. The outcomes of that study should be reviewed if either of these concepts move forward. Additionally, an unstable slope near MP 9.0, identified in **Section 2**, was also identified by KYTC and scheduled for repair with soil nail stabilization in March 2026.

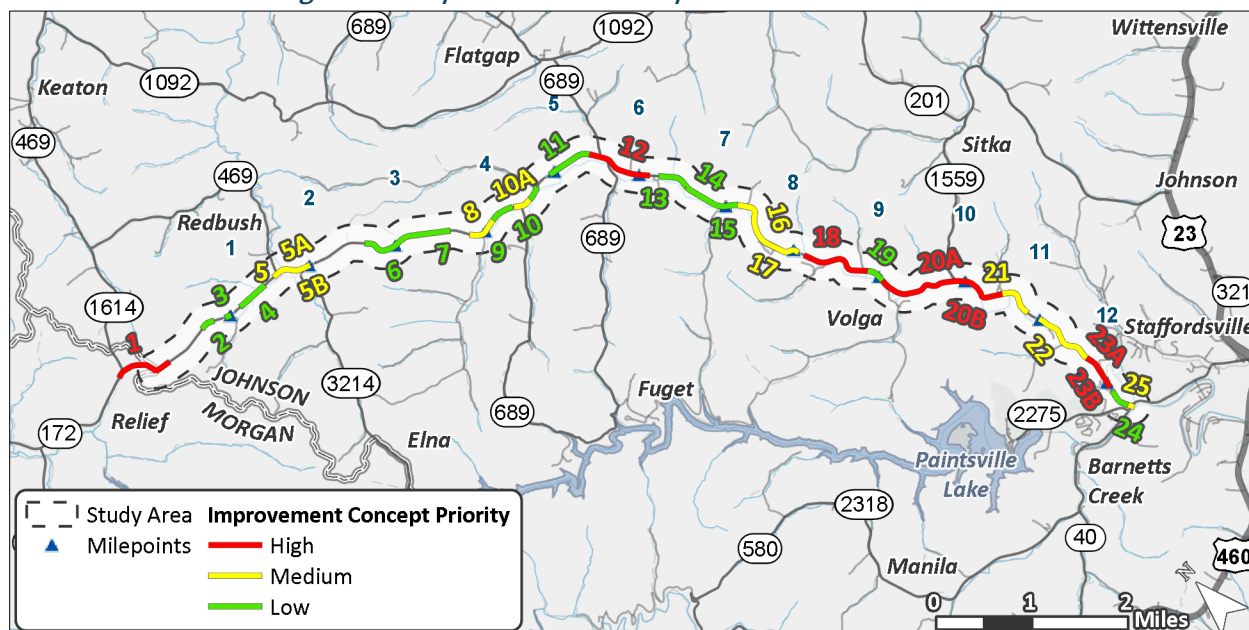
Concept 25: KY 172 at KY 40 Intersection Considerations

Due to unknowns surrounding the KY 40 intersection including the ongoing, adjacent HSIP project at the intersection of KY 40 and KY 2275 as well as ongoing discussions about a potential relocation of the Dollar General entrance, the concept at this location was set as a Medium Priority. The District noted that it otherwise would have been set to High, but it may take some unknown amount of time to address this intersection due to the other factors still in progress at the time of this study. Additionally, there may be alternative sources of funding such as HSIP to address the intersection improvements instead of going through the highway plan process.

8.5 Improvement Concept Summary Sheets

After concept development, evaluation, refinement, and prioritization from the project team, the final improvement concept sheets for spots, segments, intersections, and the overall corridor were prepared. A summary map of concept locations and priorities is shown as **Figure 63**.

Figure 63. Improvement Concept Locations & Priorities



The following pages present a summary of each concept for these categories with a summary of information for programming or further project development as funding allows.

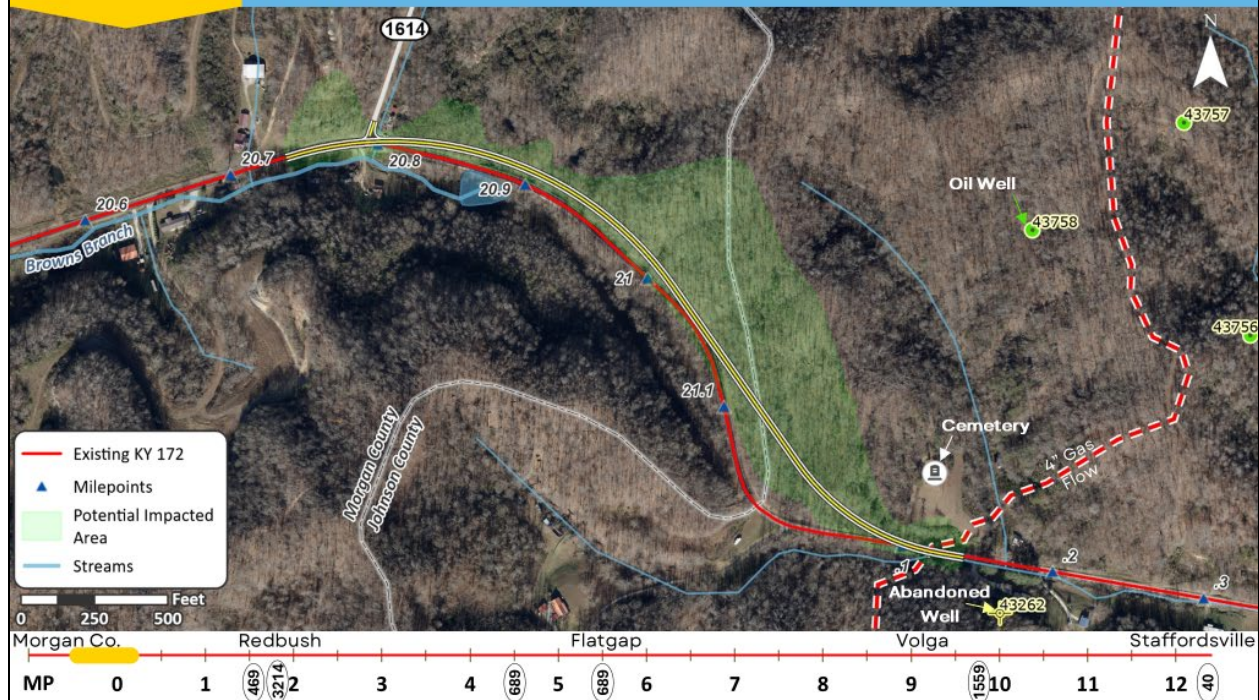
FUNDING

Potential funding avenues were included on each project sheet. Most statewide highway funding is allocated through Kentucky's biennial Highway Plan via the SHIFT process, with projects competing for limited resources. Additional federal and state funding streams can support smaller or specialized projects, including dedicated bridge funds (FBP, BRO, BRX, BRZ), National Highway Performance (NH) funds, Surface Transportation Block Grant (STP, STPF, STP3, SPT4, SPT5) funds, and State Priority Projects (SPP). Outside the Highway Plan, state-managed programs such as the Highway Safety Improvement Program (HSIP), Transportation Alternatives Program (TAP), and various maintenance and operations funds (FE01, FE02, FE04, FD05) provide targeted support for safety, maintenance, and non-motorized infrastructure.

Beyond Highway Plan funding, competitive federal grants offer additional opportunities. There are several additional funding sources tied to the Infrastructure Investment and Jobs Act (IIJA), which runs through FY 2026. Programs like BUILD support large, multi-modal projects, while Safe Streets for All (SS4A) funds safety planning and implementation tied to local action plans. However, the recent One Big Beautiful Bill (OBBB), enacted in 2025, is expected to reshape funding and program availability, as federal priorities shift toward efficiency amid concerns about funding. Most of the recommended improvement concepts encompass several potential funding sources. Smaller, more targeted projects or portions of larger projects may be able to utilize funding sources outside the traditional SHIFT / Highway Plan process.

1

MP 20.74 (Morgan Co.) – MP 0.14 Horizontal and Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 740 veh/day (2024)
- KY 1614 AADT: 100 veh/day (2024)



CRASH ANALYSIS (2019 – 2023)

- 5 Crashes (1 A, 1 B, 1 C, 2 O)
- 5 Single Vehicle – 5 Ran Off Roadway

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Cemetery
- Utilities: 25 Utility Poles, 3010' Waterline, 4" Gas Flow Line Crossing
- Right of Way: Up to 23 acres

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Ex. 230' / Prop. 758'

Max. Vert. Grade:

Ex. 8.7% / Prop. 7.0%

COST ESTIMATE (2025 Dollars)

\$13,940,000

D: \$960,000	U: \$830,000
R: \$100,000	C: \$12,050,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$16,840,000

D: \$1,180,000	U: \$830,000
R: \$100,000	C: \$14,730,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 91% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation



PRIORITY: HIGH

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

2

MP 0.69 - 0.79 Horizontal Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal Guideline Deviations
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 740 veh/day (2024)



CRASH ANALYSIS (2019 – 2023)

- 0 Crashes

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Fire Station
- Utilities: 4 Utility Poles, 530' Waterline, Oil Well
- Right of Way: Up to 1 acre, 2 structures

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Ex. 530' / Prop. 758'

Max. Vert. Grade:

Ex. 1.5% / Prop. 1.4%

COST ESTIMATE (2025 Dollars)

\$1,980,000

D: \$300,000	U: \$140,000
R: \$50,000	C: \$1,490,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$2,310,000

D: \$350,000	U: \$140,000
R: \$50,000	C: \$1,770,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Although 0 crashes, still a safety concern that can have up to 43% potential reduction in crashes

CONSTRUCTABILITY CONSIDERATIONS

- Maintenance of traffic – one lane traffic / short closures



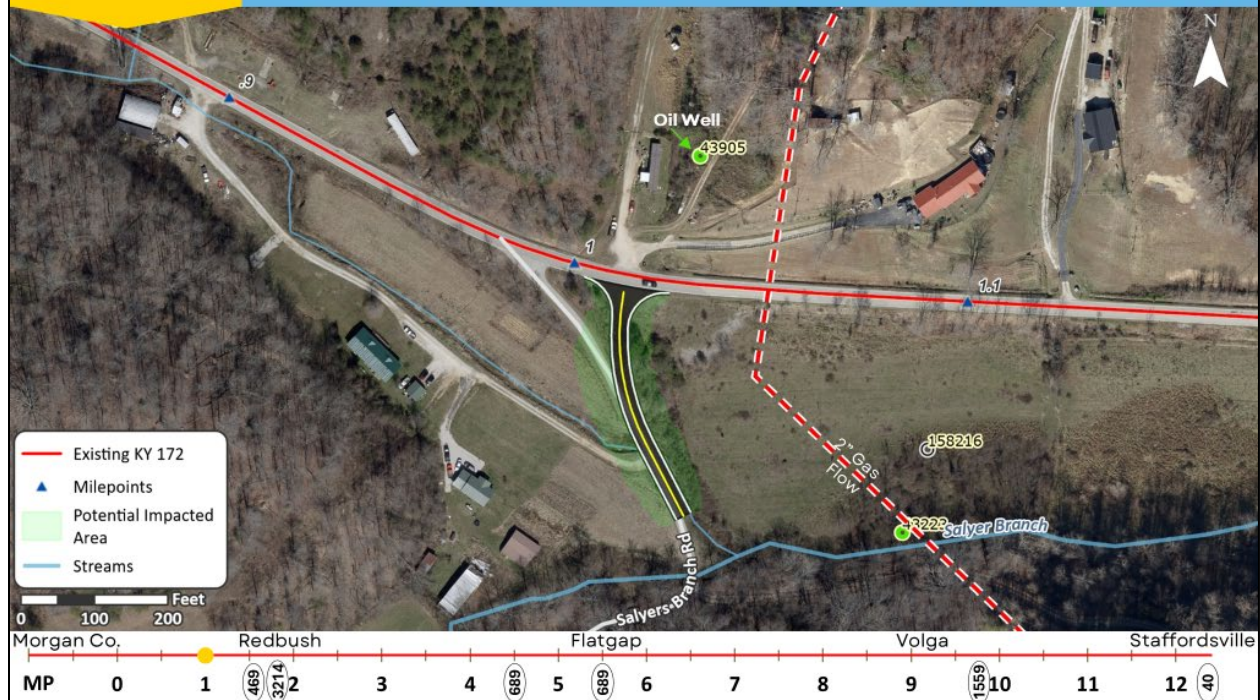
PRIORITY: LOW

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

3

0.981 (Salyers Branch Rd) Intersection Skew Improvement



INFORMATION



ROADWAY FEATURES

- Skewed Intersection Approach – Salyers Branch Rd.



TRAFFIC

- AADT: 740 veh/day (2024)



CRASH ANALYSIS (2019 – 2023)

- 0 Crashes

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Farmland of Statewide Importance
- Utilities: 320' Waterline
- Right of Way: Up to 1 acre

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

COST ESTIMATE (2025 Dollars)

\$1,430,000 D: \$230,000 U: \$30,000
 R: \$30,000 C: \$1,140,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$1,700,000 D: \$270,000 U: \$30,000
 R: \$30,000 C: \$1,370,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Although 0 crashes, still a safety concern that can have up to 51% potential reduction in crashes

CONSTRUCTABILITY CONSIDERATIONS

- Maintenance of traffic – one lane traffic / short closures
- Dead end road



PRIORITY: LOW

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

4

MP 1.16 - 1.44 Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Vertical Guideline Deviations
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 740 veh/day (2024)



CRASH ANALYSIS (2019 – 2023)

- 1 Crash (O – Sideswipe Opposite Direction)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Farmland of Statewide Importance
- Utilities: 12 Utility Poles, 1480' Waterline, Oil Well
- Right of Way: Up to 3 acres, 8 structures (3 relocations)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

N/A

Max. Vert. Grade:

Ex. 6.1% / Prop. 5.0%

COST ESTIMATE (2025 Dollars)

\$4,750,000

D: \$410,000	U: \$540,000
R: \$1,040,000	C: \$2,760,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$5,470,000

D: \$510,000	U: \$540,000
R: \$1,040,000	C: \$3,380,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 51% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Difficult to construct on existing alignment
- Maintenance of traffic – one lane traffic / short closure



PRIORITY: LOW

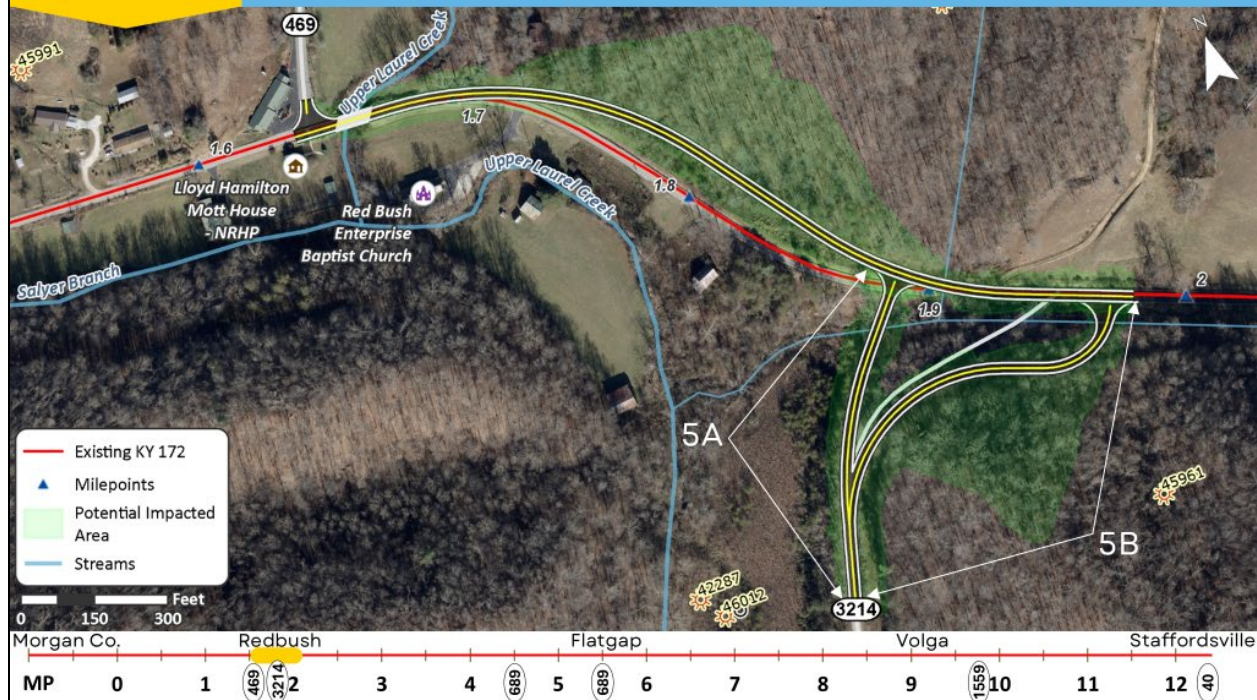
POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

5

MP 1.64 - 1.98

Horizontal and Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Narrow / Limited Lane and Shoulder Width
- Bridge Does Not Meet Modern Design Guidelines



TRAFFIC

- AADT: 1,100 veh/day (2024)
- KY 469 AADT: 210 veh/day (2022)
- KY 3214 AADT: 110 veh/day (2024)



CRASH ANALYSIS (2019 - 2023)

- 5 Crashes (5 O)
- 1 Rear End, 2 Sideswipe Opposite Direction, 2 Single Vehicle - Animal and Fixed Object
- 3 Crashes at KY 3214 Intersection

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Farmland of Statewide Importance, Home on National Register of Historic Places
- Utilities: 11 Utility Poles, 2170' Waterline, Monitoring Well
- Right of Way: Up to 8 acres

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Ex. 515' / Prop. 758'

Max. Vert. Grade:

Ex. 9.1% / Prop. 4.9%

COST ESTIMATE (2025 Dollars)

5 (KY 172, MP 1.64 - 1.98):

\$6,580,000 (D: \$550,000 R: \$100,000 U: \$450,000 C: \$5,480,000)

With Additional Risk-Based Contingencies:

\$7,810,000 (D: \$660,000 R: \$100,000 U: \$450,000 C: \$6,600,000)

5A (KY 3214, MP 3.080 - 3.243):

+\$1,610,000 (D: \$250,000 R: \$20,000 U: \$110,000 C: \$1,230,000)

With Additional Risk-Based Contingencies:

+\$1,890,000 (D: \$290,000 R: \$20,000 U: \$110,000 C: \$1,470,000)

5B (KY 3214, MP 3.080 - 3.243):

+\$3,440,000 (D: \$430,000 R: \$30,000 U: \$120,000 C: \$2,860,000)

With Additional Risk-Based Contingencies:

+\$4,140,000 (D: \$520,000 R: \$30,000 U: \$120,000 C: \$3,470,000)

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 62% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation
- Prone to flooding
- Maintenance of traffic - one lane traffic / short closures
- Long-term lane closure for bridge



PRIORITY: MEDIUM

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding
(For Bridge: FBP/BRO/BRX/BRZ)

6

MP 2.67 - 3.25

Horizontal and Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Narrow / Limited Lane and Shoulder Width
- Unstable Slopes



TRAFFIC

- AADT: 1,100 veh/day (2024)



CRASH ANALYSIS (2019 – 2023)

- 3 Crashes (3 O)
- 2 Single Vehicle – Ran Off Roadway, Animal, 1 Sideswipe Opposite Direction

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat)
- Utilities: 19 Utility Poles, 3380' Waterline, Water Tank, Cell Tower
- Right of Way: Up to 20 acres, 7 structures (1 relocation)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Ex. 350' / Prop. 758'

Max. Vert. Grade:

Ex. 10.3% / Prop. 7.0%

COST ESTIMATE (2025 Dollars)

\$8,970,000

D: \$690,000	U: \$750,000
R: \$640,000	C: \$6,890,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$10,540,000

D: \$830,000	U: \$750,000
R: \$640,000	C: \$8,320,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 66% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

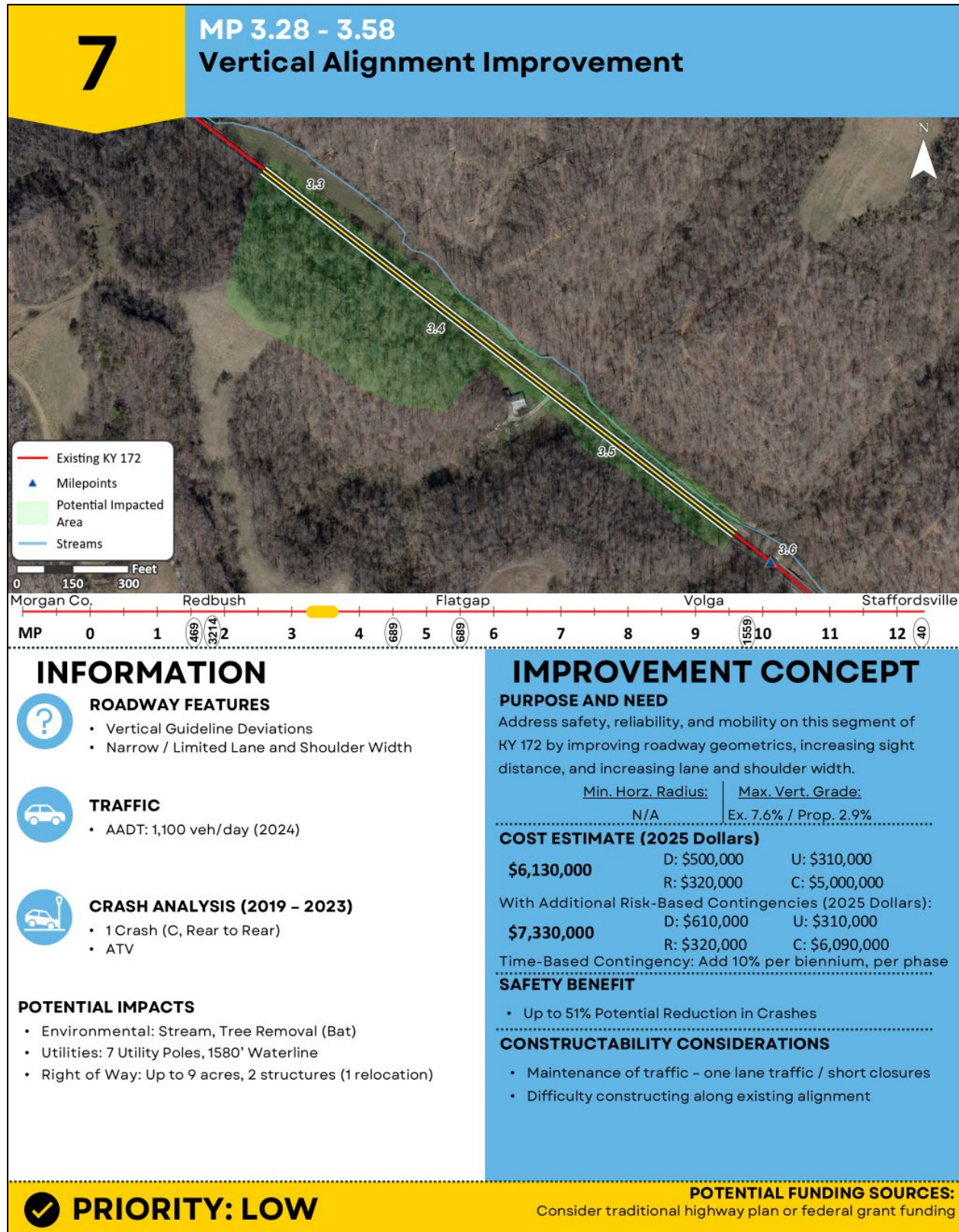
- Maintenance of traffic –one lane traffic / short closures
- Tie-ins
- Red Bush Water Tank



PRIORITY: LOW

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding



8

MP 3.85 - 4.11

Horizontal and Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 1,100 veh/day (2024)



CRASH ANALYSIS (2019 – 2023)

- 1 Crash (C, Single Vehicle – Ran Off Roadway)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Farmland of Statewide Importance
- Utilities: 9 Utility Poles, 1430' Waterline
- Right of Way: Up to 6 acres, 2 structures

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Ex. 420' / Prop. 758'

Max. Vert. Grade:

Ex. 6.8% / Prop. 2.3%

COST ESTIMATE (2025 Dollars)

\$4,820,000

D: \$580,000	U: \$340,000
R: \$50,000	C: \$3,850,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$5,760,000

D: \$700,000	U: \$340,000
R: \$50,000	C: \$4,670,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 55% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation
- Maintenance of traffic – one lane traffic / short closures
- Difficulty constructing along existing alignment



PRIORITY: MEDIUM

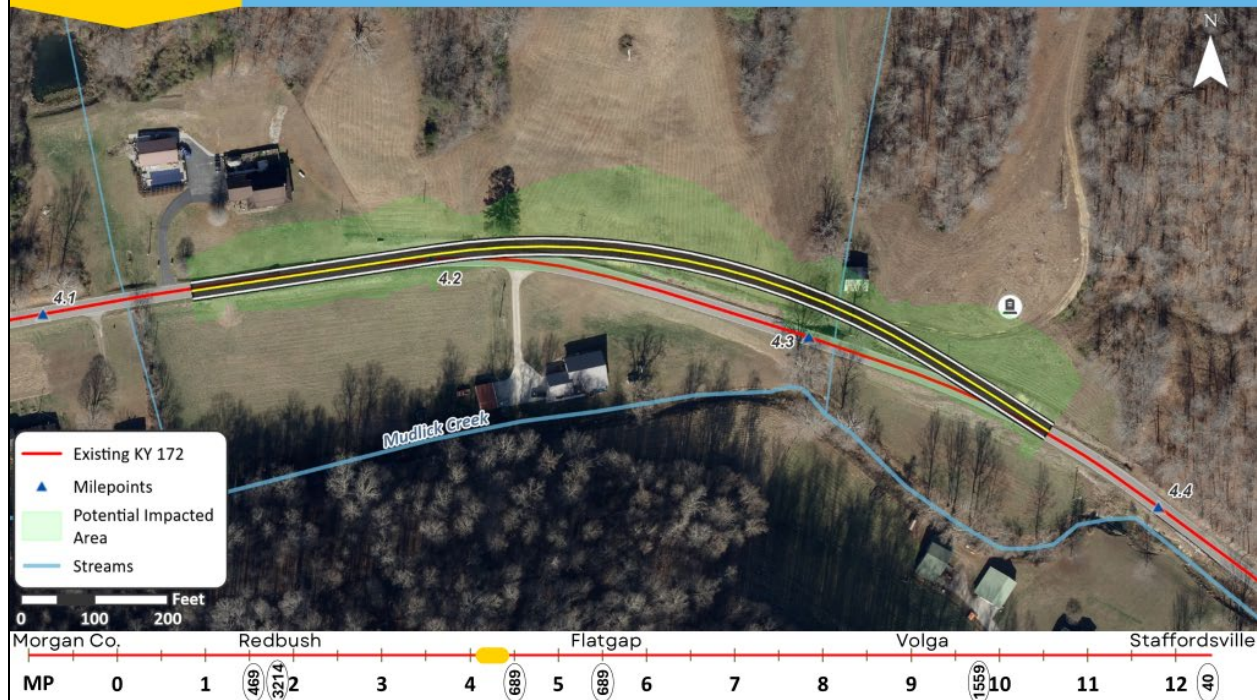
POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

9

MP 4.14 - 4.36

Horizontal and Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 1,100 veh/day (2024)



CRASH ANALYSIS (2019 – 2023)

- 1 Crash (O, Sideswipe Opposite Direction)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Farmland of Statewide Importance
- Utilities: 6 Utility Poles, 1210' Waterline
- Right of Way: Up to 4 acres, 1 structure

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Max. Vert. Grade:

Ex. 700' / Prop. 1000' | Ex. 7.8% / Prop. 5.0%

COST ESTIMATE (2025 Dollars)

\$4,580,000

D: \$540,000	U: \$250,000
R: \$190,000	C: \$3,600,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$5,430,000

D: \$650,000	U: \$250,000
R: \$190,000	C: \$4,340,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 51% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Maintenance of traffic – one lane traffic / short closures
- Difficulty constructing along existing alignment



PRIORITY: LOW

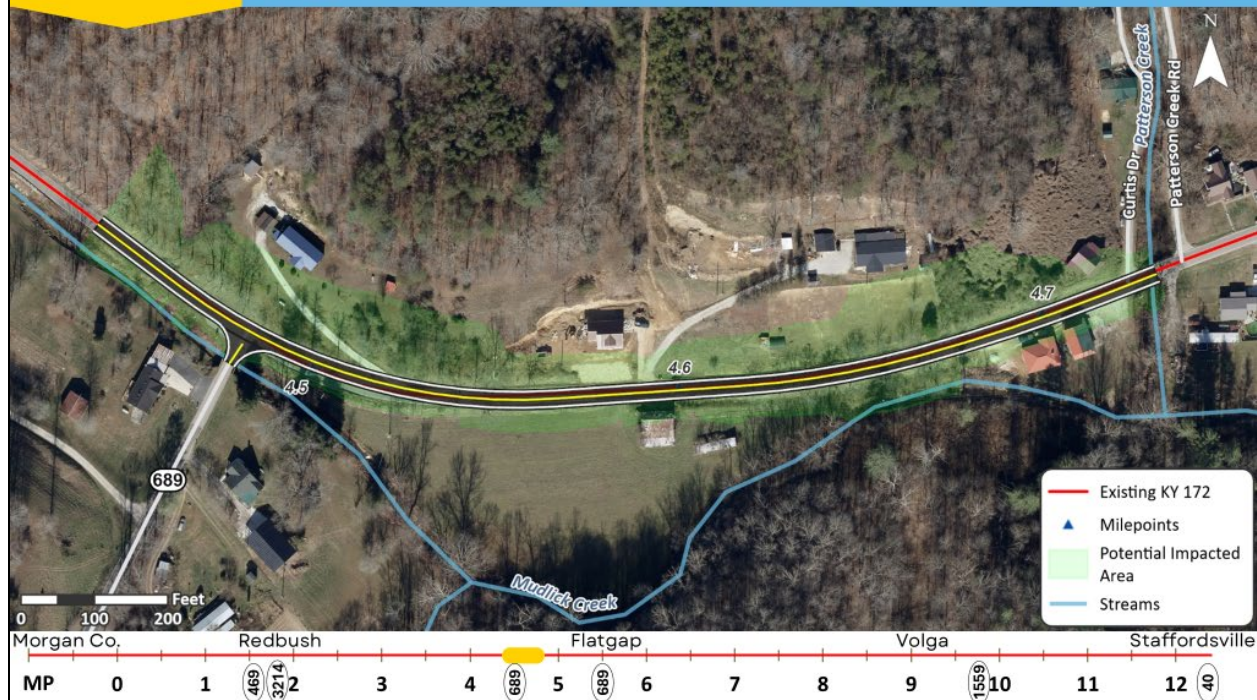
POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

10

MP 4.43 - 4.73

Horizontal and Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 1,370 veh/day (2022)
- KY 689 AADT: 170 veh/day (2022)



CRASH ANALYSIS (2019 – 2023)

- 3 Crashes (3 O)
- 2 Angle (O), 1 Sideswipe Opposite Direction (O)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Farmland of Statewide Importance
- Utilities: 13 Utility Poles, 1580' Waterline
- Right of Way: Up to 4 acres, 11 structures (5 relocations)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Ex. 510' / Prop. 758'

Max. Vert. Grade:

Ex. 5.2% / Prop. 4.9%

COST ESTIMATE (2025 Dollars)

\$6,310,000

D: \$560,000	U: \$340,000
R: \$1,700,000	C: \$3,710,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$7,280,000

D: \$680,000	U: \$340,000
R: \$1,700,000	C: \$4,560,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 51% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Maintenance of traffic – one lane traffic / short closures
- Difficulty constructing along existing alignment



PRIORITY: LOW

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

10A

MP 4.43 - 4.57

Horizontal and Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 1,370 veh/day (2022)
- KY 689 AADT: 170 veh/day (2022)



CRASH ANALYSIS (2019 – 2023)

- 1 Crash (O - Sideswipe Opposite Direction)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Farmland of Statewide Importance
- Utilities: 4 Utility Poles, 750' Waterline
- Right of Way: Up to 2 acres, 3 structures (1 relocation)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Ex. 510' / Prop. 758'

Max. Vert. Grade:

Ex. 3.3% / Prop. 2.2%

COST ESTIMATE (2025 Dollars)

\$2,620,000

D: \$340,000	U: \$250,000
R: \$340,000	C: \$1,690,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$3,060,000

D: \$410,000	U: \$250,000
R: \$340,000	C: \$2,060,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 45% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Maintenance of traffic – one lane traffic / short closures
- Difficulty constructing along existing alignment



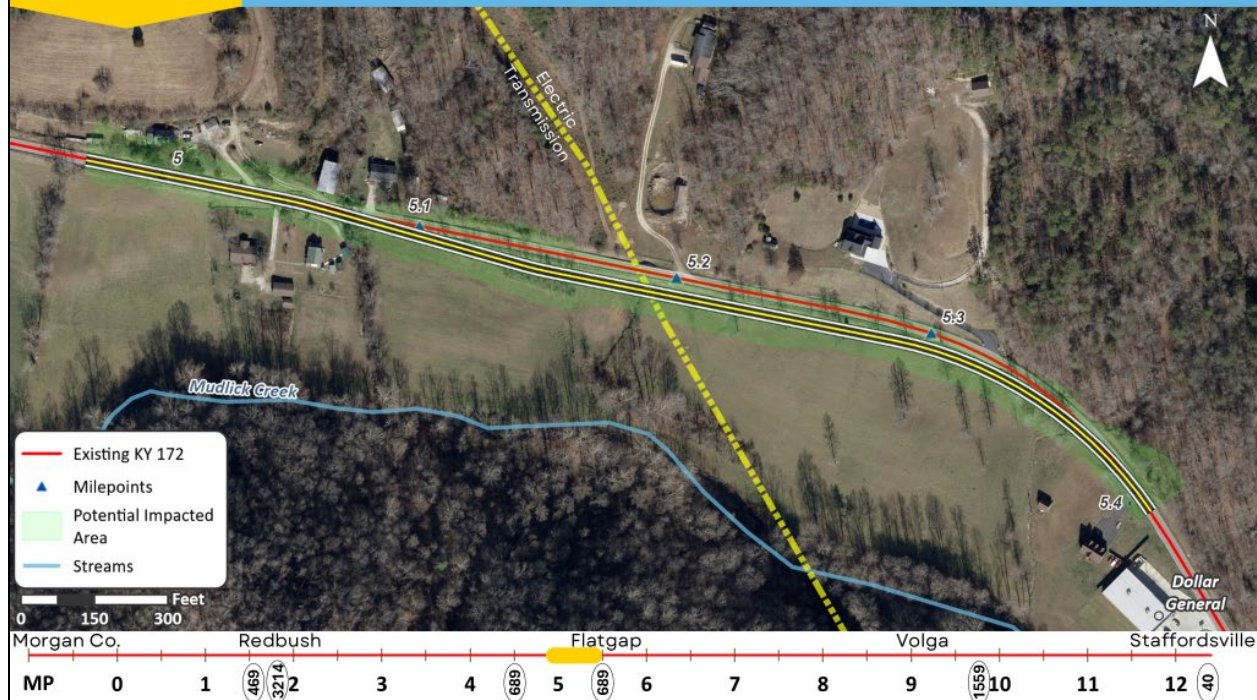
PRIORITY: MEDIUM

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

11

MP 4.97 - 5.41 Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Vertical Guideline Deviations
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 1,370 veh/day (2022)



CRASH ANALYSIS (2019 – 2023)

- 2 Crashes (2 O)
- 2 Single Vehicle – Animal (O)

POTENTIAL IMPACTS

- Environmental: Tree Removal (Bat), Farmland of Statewide Importance
- Utilities: 15 Utility Poles, 2380' Waterline, Transmission Line
- Right of Way: Up to 5 acres, 8 structures (2 relocations)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Ex. 815' / Prop. 815'

Max. Vert. Grade:

Ex. 8.9% / Prop. 6.3%

COST ESTIMATE (2025 Dollars)

\$6,640,000

D: \$680,000	U: \$560,000
R: \$850,000	C: \$4,550,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$7,490,000

D: \$550,000	U: \$560,000
R: \$850,000	C: \$5,530,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 51% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Prone to flooding
- Maintenance of traffic – one lane traffic / short closures
- Difficulty constructing along existing alignment



PRIORITY: LOW

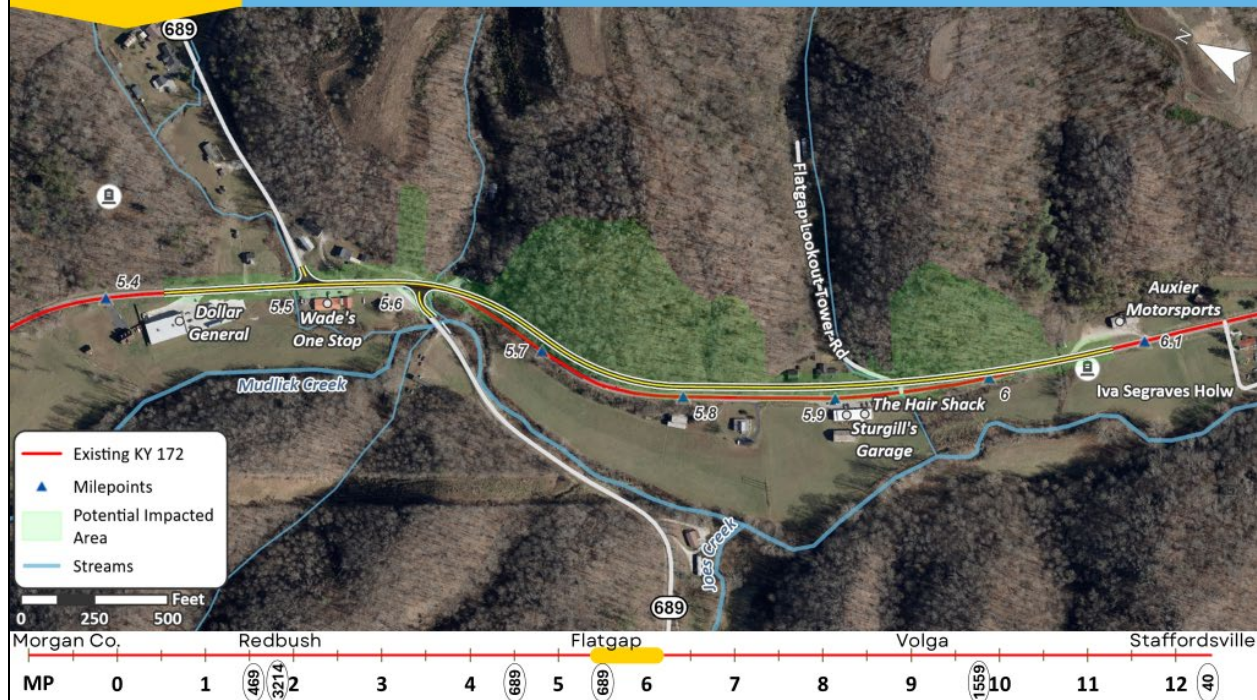
POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

12

MP 5.44 – 6.08

Horizontal and Vertical Alignment Improvement Intersection Skew Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Skewed Intersection Approach – KY 689 (S)
- Narrow / Limited Lane and Shoulder Width
- Unstable Slopes



TRAFFIC

- AADT: 2,120 veh/day (2024)
- KY 689 (N) AADT: 990 veh/day (2024)
- KY 689 (S) AADT: 290 veh/day (2024)



CRASH ANALYSIS (2019 – 2023)

- 7 Crashes (1 A, 1 B, 5 O)
- 1 Head On (A), 2 Rear End (O), 4 Single Vehicle – 2 Ran Off Roadway (1 B, 1 O), 1 Fixed Object (O), 1 Animal (O)
- 0 KY 689 Intersection Crashes

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Strip Mine, Prime Farmland
- Utilities: 31 Utility Poles, 3270' Waterline
- Right of Way: Up to 18 acres, 7 structures (2 relocations)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Max. Vert. Grade:

Ex. 525' / Prop. 758' Ex. 6.2% / Prop. 4.4%

COST ESTIMATE (2025 Dollars)

\$18,800,000 D: \$960,000 U: \$980,000
R: \$870,000 C: \$15,990,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$22,440,000 D: \$1,170,000 U: \$980,000
R: \$870,000 C: \$19,420,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 52% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation
- Prone to flooding
- Maintenance of traffic – one lane traffic / short closures
- Difficulty constructing along existing alignment



PRIORITY: HIGH

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

13

MP 6.23 - 6.50

Horizontal and Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 2,120 veh/day (2024)



CRASH ANALYSIS (2019 – 2023)

- 2 Crashes (1 C, 1 O)
- 1 Single Vehicle – Fixed Object (O), 1 Opposing Left Turn (C)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Farmland of Statewide Importance
- Utilities: 6 Utility Poles, 1480' Waterline
- Right of Way: Up to 6 acres, 2 structures (1 relocation)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Ex. 620' / Prop. 758'

Max. Vert. Grade:

Ex. 6.2% / Prop. 2.8%

COST ESTIMATE (2025 Dollars)

\$6,200,000

D: \$720,000	U: \$280,000
R: \$370,000	C: \$4,830,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$7,100,000

D: \$590,000	U: \$280,000
R: \$370,000	C: \$5,860,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 51% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation
- Maintenance of traffic – one lane traffic / short closures
- Difficulty constructing along existing alignment



PRIORITY: LOW

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

14

MP 6.56 - 6.82 Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 2,120 veh/day (2024)



CRASH ANALYSIS (2019 – 2023)

- 0 Crashes

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Farmland of Statewide Importance
- Utilities: 10 Utility Poles, 1370' Waterline
- Right of Way: Up to 10 acres, 1 structure

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Max. Vert. Grade:

Ex. 980' / Prop. 980' | Ex. 7.8% / Prop. 3.8%

COST ESTIMATE (2025 Dollars)

\$7,080,000

D: \$610,000	U: \$280,000
R: \$50,000	C: \$6,140,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$8,590,000

D: \$750,000	U: \$280,000
R: \$50,000	C: \$7,510,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Although 0 crashes, still a safety concern that can have up to 51% potential reduction in crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation
- Maintenance of traffic – one lane traffic / short closures
- Difficulty constructing along existing alignment



PRIORITY: LOW

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

15

MP 6.83 - 7.15

Horizontal and Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Limited Sight Distance
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 2,120 veh/day (2024)
- McKenzie Branch AADT: 140 veh/day (2011)



CRASH ANALYSIS (2019 – 2023)

- 1 Crash (O, Single Vehicle – Animal)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Farmland of Statewide Importance
- Utilities: 10 Utility Poles, 1740' Waterline
- Right of Way: Up to 17 acres, 2 structures (1 relocation)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Max. Vert. Grade:

Ex. 940' / Prop. 950' | Ex. 4.6% / Prop. 2.6%

COST ESTIMATE (2025 Dollars)

\$15,930,000 D: \$1,130,000 U: \$390,000
R: \$340,000 C: \$14,070,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$18,920,000 D: \$1,030,000 U: \$390,000
R: \$340,000 C: \$17,160,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 51% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation
- Maintenance of traffic – one lane traffic / short closures
- Difficulty constructing along existing alignment



PRIORITY: LOW

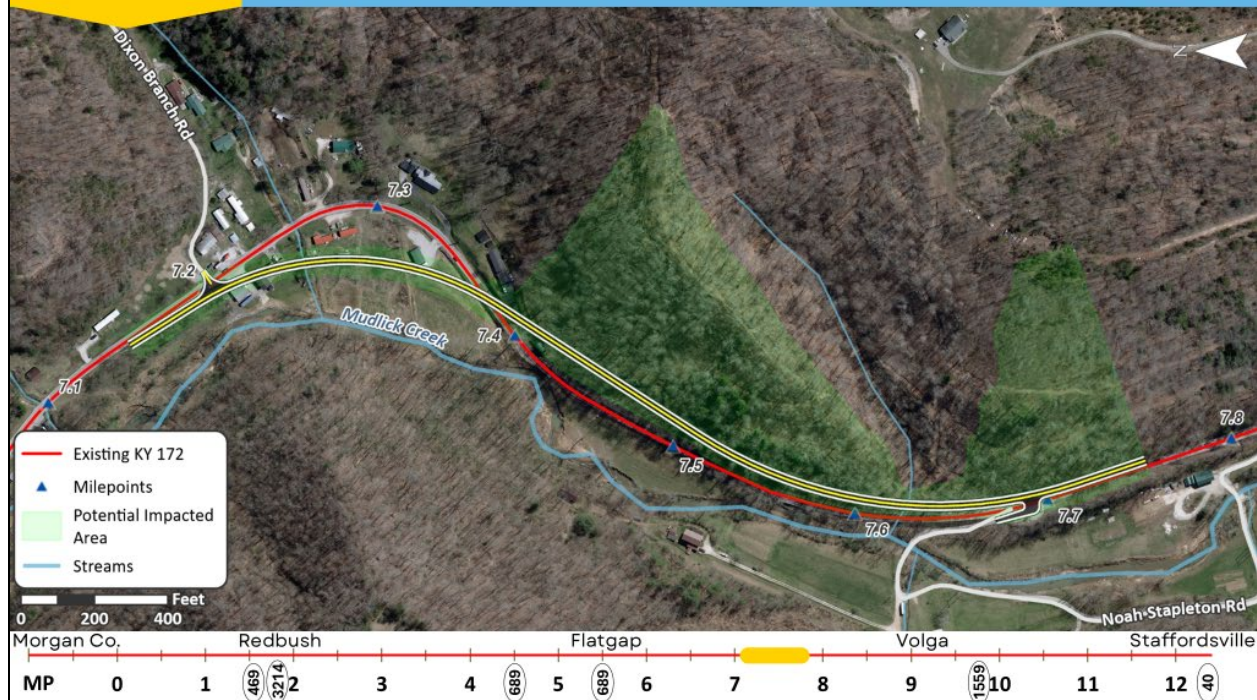
POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

16

MP 7.15 - 7.76

Horizontal and Vertical Alignment Improvement Intersection Skew Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Skewed Intersection Approach - Noah Stapleton Rd.
- Narrow / Limited Lane and Shoulder Width
- Unstable Slopes



TRAFFIC

- AADT: 2,120 veh/day (2024)
- Noah Stapleton Rd. AADT: 30 veh/day (2011)



CRASH ANALYSIS (2019 - 2023)

- 6 Crashes (1 A, 1 C, 4 O)
- 3 Sideswipe Opposite Direction (1 C, 2 O), 3 Single Vehicle - 2 Fixed Object (1 A, 1 O), 1 Ran Off Roadway (O)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Strip Mine, Farmland of Statewide Importance
- Utilities: 19 Utility Poles, 3220' Waterline
- Right of Way: Up to 24 acres, 9 structures (2 relocations)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Max. Vert. Grade:

Ex. 320' / Prop. 758'

Ex. 5.9% / Prop. 2.6%

COST ESTIMATE (2025 Dollars)

\$17,180,000

D: \$1,160,000

U: \$730,000

R: \$820,000

C: \$14,470,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$20,330,000

D: \$1,060,000

U: \$730,000

R: \$820,000

C: \$17,720,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 84% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation
- Maintenance of traffic - one lane traffic / short closures



PRIORITY: MEDIUM

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

17

MP 7.76 - 8.03

Horizontal and Vertical Alignment Improvement Intersection Skew Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Skewed Intersection Approach - Noah Stapleton Rd.
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 2,120 veh/day (2024)
- Noah Stapleton Rd. AADT: 30 veh/day (2011)



CRASH ANALYSIS (2019 - 2023)

- 5 Crashes (1 C, 4 O)
- 1 Angle (O), 1 Sideswipe Opposite Direction (O), 3 Single Vehicle - 2 Fixed Object (1 C, 1 O), 1 Ran Off Roadway (O)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area
- Utilities: 9 Utility Poles, 1480' Waterline
- Right of Way: Up to 19 acres, 4 structures (1 relocation)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Max. Vert. Grade:

Ex. 200' / Prop. 758' | Ex. 7.4% / Prop. 2.6%

COST ESTIMATE (2025 Dollars)

\$21,870,000 D: \$1,190,000 U: \$340,000
R: \$580,000 C: \$19,760,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$26,550,000 D: \$1,450,000 U: \$340,000
R: \$580,000 C: \$24,180,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 97% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation
- Maintenance of traffic - one lane traffic / short closures



PRIORITY: MEDIUM

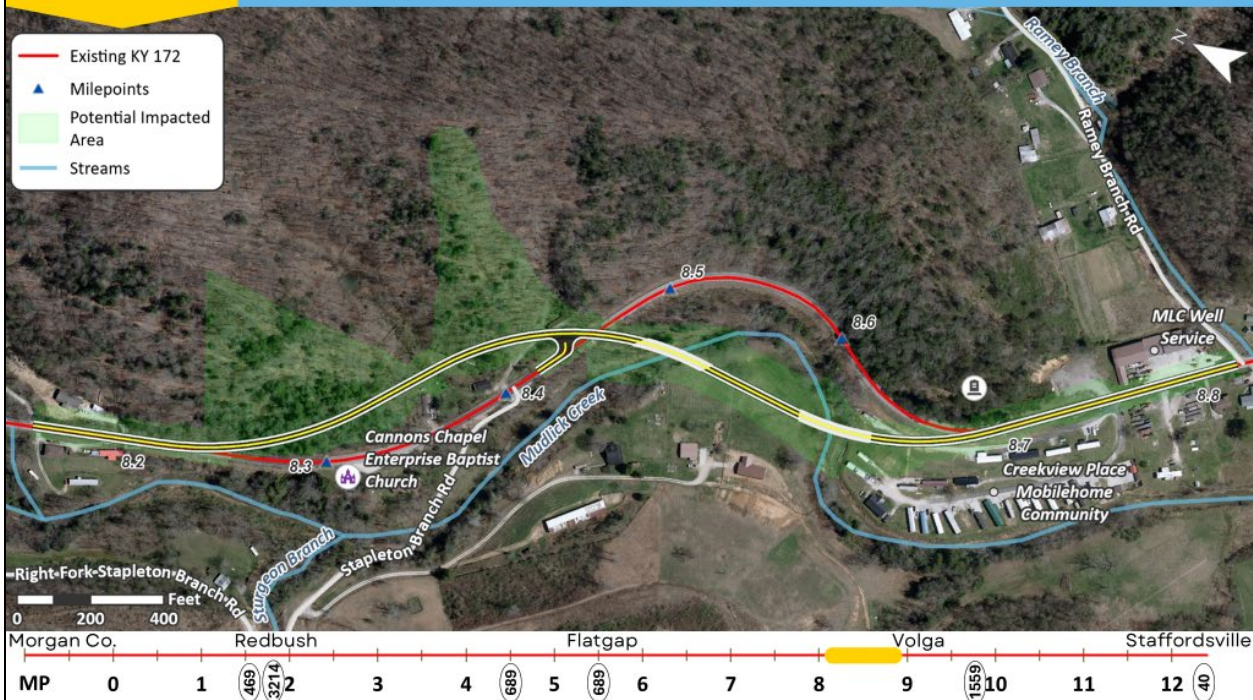
POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

18

MP 8.15 - 8.83

Horizontal and Vertical Alignment Improvement Intersection Skew Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Skewed Intersection Approach - Stapleton Branch Rd.
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 2,120 veh/day (2024)
- Stapleton Branch Rd. AADT: 60 veh/day (2011)



CRASH ANALYSIS (2019 - 2023)

- 4 Crashes (4 O)
- 2 Rear End (O), 1 Sideswipe Opposite Direction (O), 1 Single Vehicle - Ran Off Roadway (O)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Farmland of Statewide Importance
- Utilities: 25 Utility Poles, 3650' Waterline
- Right of Way: Up to 20 acres, 9 structures (6 relocations)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Ex. 380' / Prop. 758'

Max. Vert. Grade:

Ex. 8.9% / Prop. 6.5%

COST ESTIMATE (2025 Dollars)

\$20,590,000

D: \$1,000,000	U: \$900,000
R: \$2,000,000	C: \$16,690,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$24,460,000

D: \$1,220,000	U: \$900,000
R: \$2,000,000	C: \$20,340,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 56% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation
- Prone to flooding
- Maintenance of traffic - one lane traffic / short closures



PRIORITY: HIGH

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

19

MP 8.89 - 9.12

Horizontal and Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Narrow / Limited Lane and Shoulder Width
- Limited Sight Distance
- Unstable Slopes



TRAFFIC

- AADT: 2,240 veh/day (2022)



CRASH ANALYSIS (2019 - 2023)

- 1 Crash (C, Rear End)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Church, Farmland of Statewide Importance
- Utilities: 11 Utility Poles, 1210' Waterline, Transmission Line, Substation, Water Well, Pump Station
- Right of Way: Up to 9 acres, 2 structures (1 relocation)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Max. Vert. Grade:

Ex. 800' / Prop. 800' | Ex. 6.7% / Prop. 4.2%

COST ESTIMATE (2025 Dollars)

\$11,510,000

D: \$800,000 U: \$350,000

R: \$320,000 C: \$10,040,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$13,920,000

D: \$980,000 U: \$350,000

R: \$320,000 C: \$12,270,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 51% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation
- Maintenance of traffic - one lane traffic / short closures
- Difficulty constructing along existing alignment



PRIORITY: LOW

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

20A

MP 9.08 - 10.45

Horizontal and Vertical Alignment Improvement Intersection Skew Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Skewed Intersection Approach - KY 1559
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 2,240 veh/day (2022) to 2,810 (2024) veh/day
- Stonecoal Rd. AADT: 340 veh/day (2011)
- KY 1559 AADT: 540 veh/day (2024)



CRASH ANALYSIS (2019 - 2023)

- 9 Crashes (1 K, 1 B, 7 O)
- 1 Head On (O), 1 Sideswipe Same Direction (O), 1 Sideswipe Opposite Direction (O), 6 Single Vehicle - 1 Animal (O), 5 Ran Off Roadway (1 K, 1 B, 3 O)

POTENTIAL IMPACTS

- Environmental: Cemetery Relocation, Stream, Tree Removal (Bat), Flood Hazard Area
- Utilities: 62 Utility Poles, 7300' Waterline
- Right of Way: Up to 55 acres, 23 structures (12 relocations)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius: Ex. 195' / Prop. 1200'
Max. Vert. Grade: Ex. 13.2% / Prop. 4.7%

COST ESTIMATE (2025 Dollars)

\$36,310,000
D: \$1,720,000 U: \$2,040,000
R: \$3,900,000 C: \$28,650,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$43,240,000
D: \$2,110,000 U: \$2,040,000
R: \$3,900,000 C: \$35,190,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 96% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation
- Maintenance of traffic - one lane traffic / short closures
- Tie-ins



PRIORITY: HIGH

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

20B**MP 9.08 - 10.45****Horizontal and Vertical Alignment Improvement
Intersection Skew Improvement****INFORMATION****ROADWAY FEATURES**

- Horizontal and Vertical Guideline Deviations
- Skewed Intersection Approach - KY 1559
- Narrow / Limited Lane and Shoulder Width

**TRAFFIC**

- AADT: 2,240 veh/day (2022) to 2,810 (2024) veh/day
- Stonecoal Rd. AADT: 340 veh/day (2011)
- KY 1559 AADT: 540 veh/day (2024)

**CRASH ANALYSIS (2019 - 2023)**

- 9 Crashes (1 K, 1 B, 7 O)
- 1 Head On (O), 1 Sideswipe Same Direction (O), 1 Sideswipe Opposite Direction (O), 6 Single Vehicle - 1 Animal (O), 5 Ran Off Roadway (1 K, 1 B, 3 O)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Cemetery, Farmland of Statewide Importance
- Utilities: 62 Utility Poles, 7300' Waterline
- Right of Way: Up to 83 acres, 5 structures (2 relocations)

IMPROVEMENT CONCEPT**PURPOSE AND NEED**

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Ex. 195' / Prop. 758'

Max. Vert. Grade:

Ex. 13.2% / Prop. 7.0%

COST ESTIMATE (2025 Dollars)

\$36,850,000 D: \$1,920,000 U: \$2,040,000
R: \$890,000 C: \$32,000,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$44,150,000 D: \$2,330,000 U: \$2,040,000
R: \$890,000 C: \$38,890,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 94% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

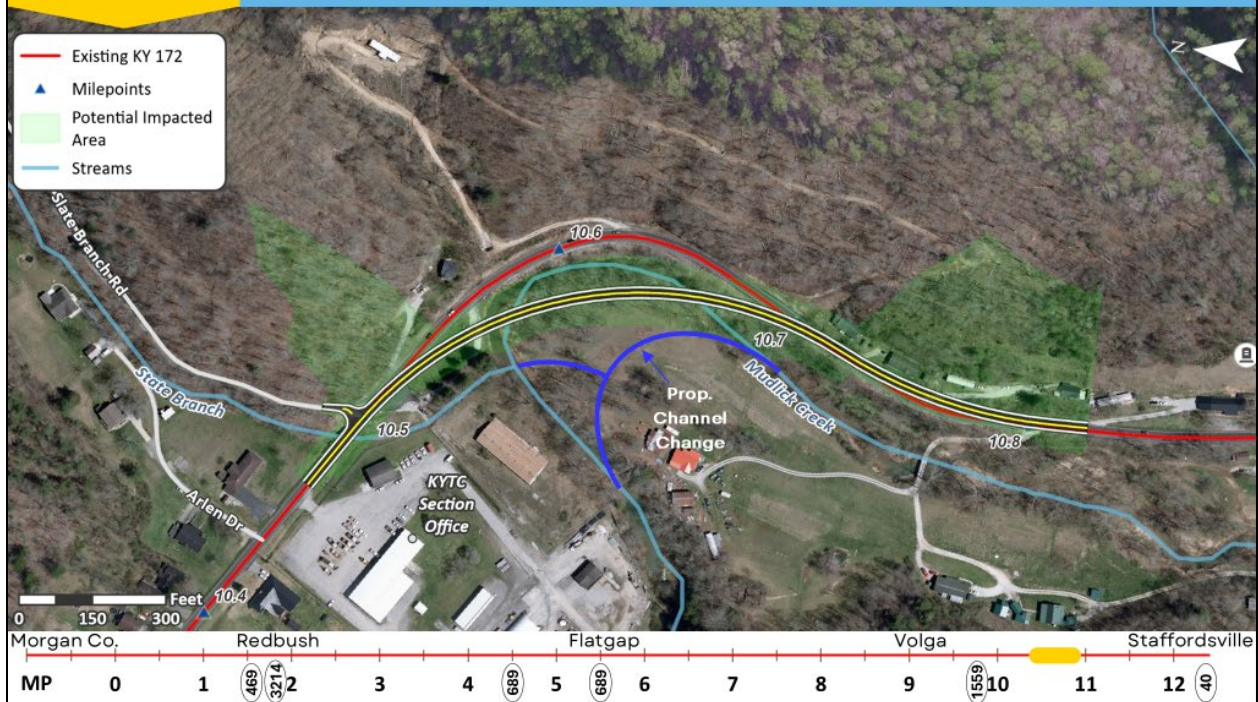
- Excess excavation
- Prone to flooding
- Maintenance of traffic - one lane traffic / short closures
- Tie-ins

**PRIORITY: HIGH****POTENTIAL FUNDING SOURCES:**

Consider traditional highway plan or federal grant funding

21

MP 10.47 - 10.83

Horizontal and Vertical Alignment Improvement
Intersection Skew Improvement

INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Skewed Intersection Approach - Slate Branch Rd.
- Narrow / Limited Lane and Shoulder Width
- Unstable Slopes



TRAFFIC

- AADT: 2,810 (2024) veh/day



CRASH ANALYSIS (2019 - 2023)

- 7 Crashes (1 A, 1 C, 5 O)
- 1 Angle (O), 6 Single Vehicle - 1 Fixed Object (O), 5 Ran Off Roadway (1 A, 1 C, 3 O)

POTENTIAL IMPACTS

- Environmental: Channel Change, Stream, Tree Removal (Bat), Flood Hazard Area, Farmland of Statewide Importance
- Utilities: 21 Utility Poles, 1960' Waterline
- Right of Way: Up to 18 acres, 11 structures (4 relocations)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Ex. 400' / Prop. 758'

Max. Vert. Grade:

Ex. 10.0% / Prop. 3.1%

COST ESTIMATE (2025 Dollars)

\$10,590,000

D: \$780,000	U: \$640,000
R: \$1,340,000	C: \$7,830,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$12,440,000

D: \$950,000	U: \$640,000
R: \$1,340,000	C: \$9,510,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 60% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation
- Prone to flooding
- Channel change
- Maintenance of traffic - one lane traffic / short closures



PRIORITY: MEDIUM

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

22

MP 11.02 - 11.69

Horizontal and Vertical Alignment Improvement Intersection Skew Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Skewed Intersection Approach - Tackett Rd.
- Narrow / Limited Lane and Shoulder Width
- Unstable Slopes



TRAFFIC

- AADT: 2,810 (2024) veh/day
- Rocky Knob Branch Rd. AADT: 260 (2011)



CRASH ANALYSIS (2019 - 2023)

- 6 Crashes (2 C, 4 O)
- 1 Angle (O), 2 Sideswipe Opposite Direction (O), 1 Head On (C), 2 Single Vehicle - Ran Off Roadway (1 C, 1 O)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Farmland of Statewide Importance
- Utilities: 26 Utility Poles, 3680' Waterline
- Right of Way: Up to 32 acres, 7 structures (3 relocations)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Max. Vert. Grade:

Ex. 520' / Prop. 758'

Ex. 8.9% / Prop. 3.6%

COST ESTIMATE (2025 Dollars)

\$18,150,000

D: \$910,000	U: \$920,000
R: \$1,120,000	C: \$15,200,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$21,700,000

D: \$1,110,000	U: \$920,000
R: \$1,120,000	C: \$18,550,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 51% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

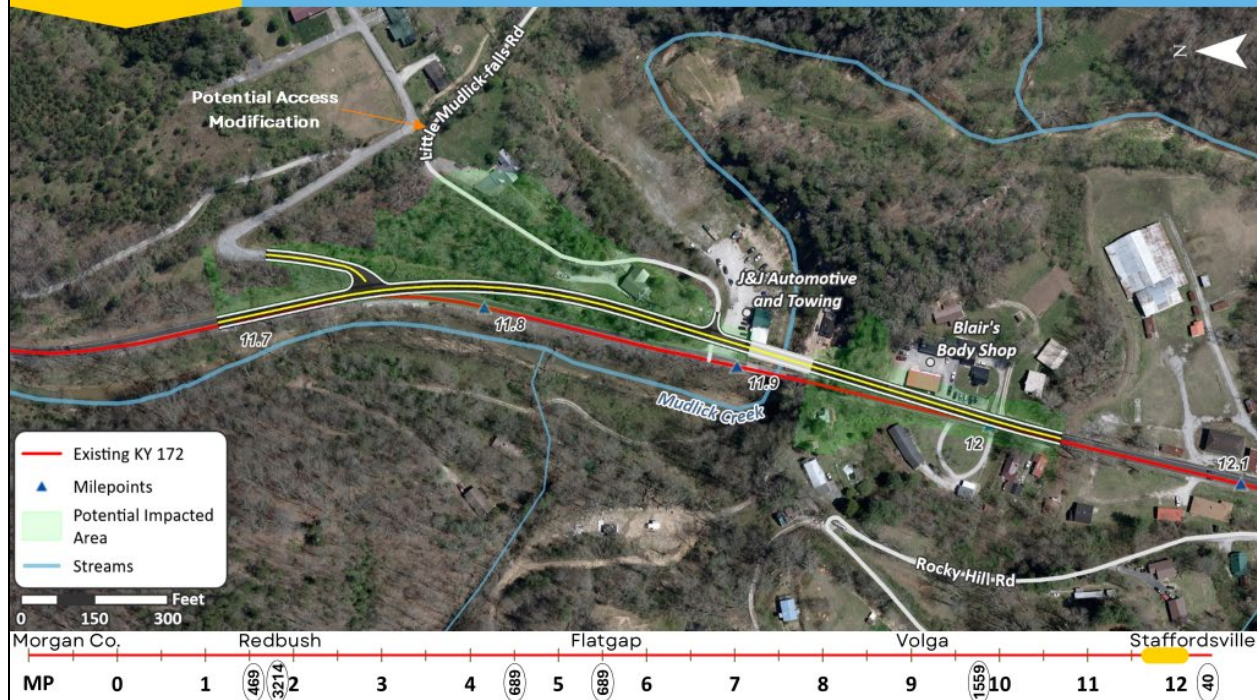
- Excess excavation
- Maintenance of traffic - one lane traffic / short closures
- Tie-ins



PRIORITY: MEDIUM

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

23A**MP 11.69 - 12.03****Bridge, Horizontal Alignment, and Sight Distance Improvement****INFORMATION****ROADWAY FEATURES**

- Bridge Does Not Meet Modern Design Guidelines
- Steep Cut on Approach to Bridge
- Narrow / Limited Lane and Shoulder Width
- Horizontal Guideline Deviations

**TRAFFIC**

- AADT: 2,810 (2024) veh/day

**CRASH ANALYSIS (2019 - 2023)**

- 8 Crashes (1 C, 7 O)
- 2 Angle (1 C, 1 O), 2 Rear End (O), 4 Sideswipe Opposite Direction (O)
- All crashes occurred near bridge

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Hazardous Waste (Automotive / body shops)
- Utilities: 10 Utility Poles, 1800' Waterline, Gas Well
- Right of Way: Up to 7 acres, 10 structures (5 relocations)

IMPROVEMENT CONCEPT**PURPOSE AND NEED**

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Max. Vert. Grade:

Ex. 640' / Prop. 758' | Ex. 4.3% / Prop. 4.3%

COST ESTIMATE (2025 Dollars)

\$11,190,000

D: \$840,000	U: \$400,000
R: \$1,540,000	C: \$8,410,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$13,030,000

D: \$820,000	U: \$400,000
R: \$1,540,000	C: \$10,270,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

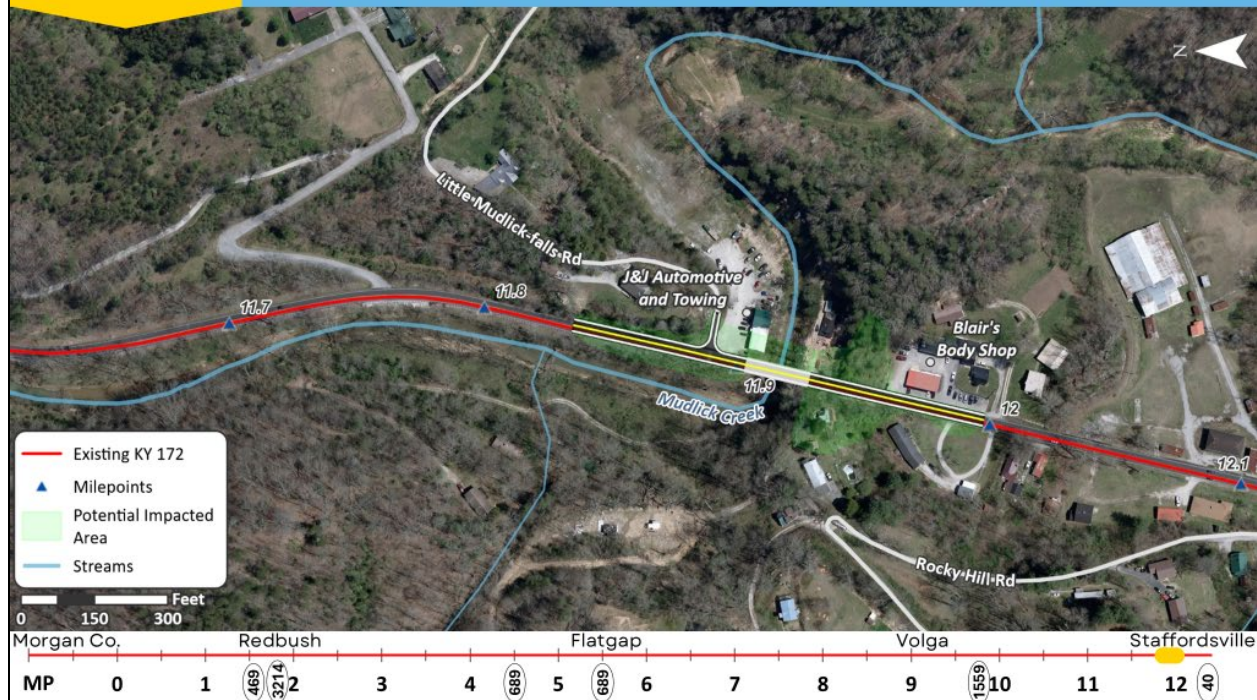
- Up to 29% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Closure during high wall blasting and cleanup
- Long-term diversion for bridge
- Maintenance of traffic - one lane traffic / short closures
- Prone to flooding
- Tie-ins
- Excess excavation

**PRIORITY: HIGH****POTENTIAL FUNDING SOURCES:**

Consider traditional highway plan or federal grant funding
(For Bridge: FBP/BRO/BRX/BRZ)

23B**MP 11.83 - 11.99****Bridge and Sight Distance Improvement****INFORMATION****ROADWAY FEATURES**

- Bridge Does Not Meet Modern Design Guidelines
- Steep Cut on Approach to Bridge
- Narrow / Limited Lane and Shoulder Width

**TRAFFIC**

- AADT: 2,810 (2024) veh/day

**CRASH ANALYSIS (2019 – 2023)**

- 8 Crashes (1 C, 7 O)
- 2 Angle (1 C, 1 O), 2 Rear End (O), 4 Sideswipe Opposite Direction (O)
- All crashes occurred near bridge

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Hazardous Waste (Automotive / body shops)
- Utilities: 4 Utility Poles, 600' Waterline, Gas Well
- Right of Way: Up to 1 acres, 5 structures (3 relocations)

IMPROVEMENT CONCEPT**PURPOSE AND NEED**

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

COST ESTIMATE (2025 Dollars)

\$6,000,000	D: \$640,000	U: \$150,000
	R: \$940,000	C: \$4,270,000
With Additional Risk-Based Contingencies (2025 Dollars):		
\$6,790,000	D: \$520,000	U: \$150,000
	R: \$940,000	C: \$5,180,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 29% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Closure during high wall blasting and cleanup
- Long-term diversion for bridge
- Maintenance of traffic –one lane traffic / short closures
- Prone to flooding
- Excess excavation

**PRIORITY: HIGH****POTENTIAL FUNDING SOURCES:**

Consider traditional highway plan or federal grant funding
(For Bridge: FBP/BRO/BRX/BRZ)

24

MP 12.13 - 12.34

Horizontal and Vertical Alignment Improvement



INFORMATION



ROADWAY FEATURES

- Horizontal and Vertical Guideline Deviations
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 2,810 (2024) veh/day



CRASH ANALYSIS (2019 – 2023)

- 3 Crashes (1 C, 3 O)
- 1 Angle (C), 1 Sideswipe Same Direction (O), 1 Single Vehicle – Fixed Object (O)

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area,
- Utilities: 7 Utility Poles, 1300' Waterline, 320' Sewer Line, Gas
- Right of Way: Up to 3 acres, 2 structures (1 relocation)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY 172 by improving roadway geometrics, increasing sight distance, and increasing lane and shoulder width.

Min. Horz. Radius:

Max. Vert. Grade:

Ex. 640' / Prop. 758'

Ex. 5.5% / Prop. 2.6%

COST ESTIMATE (2025 Dollars)

\$3,270,000

D: \$440,000	U: \$310,000
R: \$330,000	C: \$2,190,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$3,700,000

D: \$400,000	U: \$310,000
R: \$330,000	C: \$2,660,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 51% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

- Excess excavation
- Maintenance of traffic – one lane traffic / short closures
- Difficulty constructing along existing alignment

**PRIORITY: LOW**

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

25

MP 12.370 (KY 40) Intersection and Access Improvement



INFORMATION



ROADWAY FEATURES

- Access at Dollar General
- Absence of Turn Lanes
- Narrow / Limited Lane and Shoulder Width



TRAFFIC

- AADT: 2,810 veh/day (2024)
- KY 40 AADT: 2,830 veh/day (2022)
- KY 2275 AADT: 1,160 veh/day (2024)
- Right Turn Warranted; Left Turn Nearly Warranted
- 2045 Level of Service: D



CRASH ANALYSIS (2019 – 2023)

- 8 Crashes (3 C, 5 O)
- 4 Angle (2 C, 2 O), 2 Opposing Left Turn (O), 1 Rear End (O), 1 Head On (C)
- All crashes located at intersection

POTENTIAL IMPACTS

- Environmental: Stream, Tree Removal (Bat), Flood Hazard Area, Sensitive Water Area
- Utilities: 10 Utility Poles, 910' Waterline, 450' Sewer Line, Gas
- Right of Way: Up to 1 acres

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, congestion and access at this intersection of KY 172 and KY 40 by adding turn lanes and improving access spacing.

Min. Horz. Radius:	Max. Vert. Grade:	Int. Skew Angle
N/A	N/A	N/A

COST ESTIMATE (2025 Dollars)

\$4,530,000	D: \$360,000	U: \$2,290,000
	R: \$60,000	C: \$1,820,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$5,120,000	D: \$460,000	U: \$2,290,000
	R: \$60,000	C: \$2,310,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 52% Potential Reduction in Crashes

CONSTRUCTABILITY CONSIDERATIONS

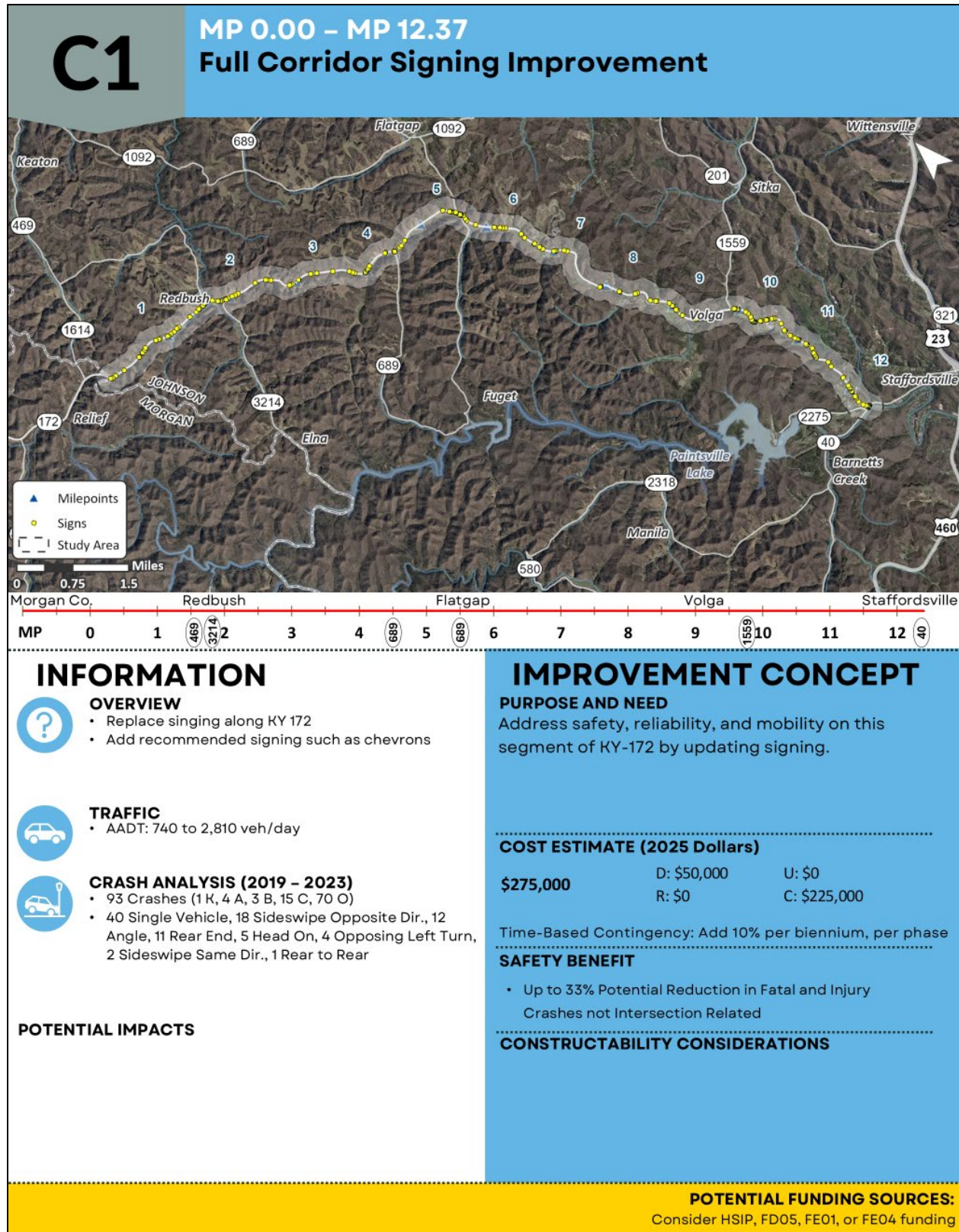
- Excess excavation
- Prone to flooding
- Maintenance of traffic –one lane traffic / short closures
- Difficulty constructing along existing alignment



PRIORITY: MEDIUM

POTENTIAL FUNDING SOURCES:

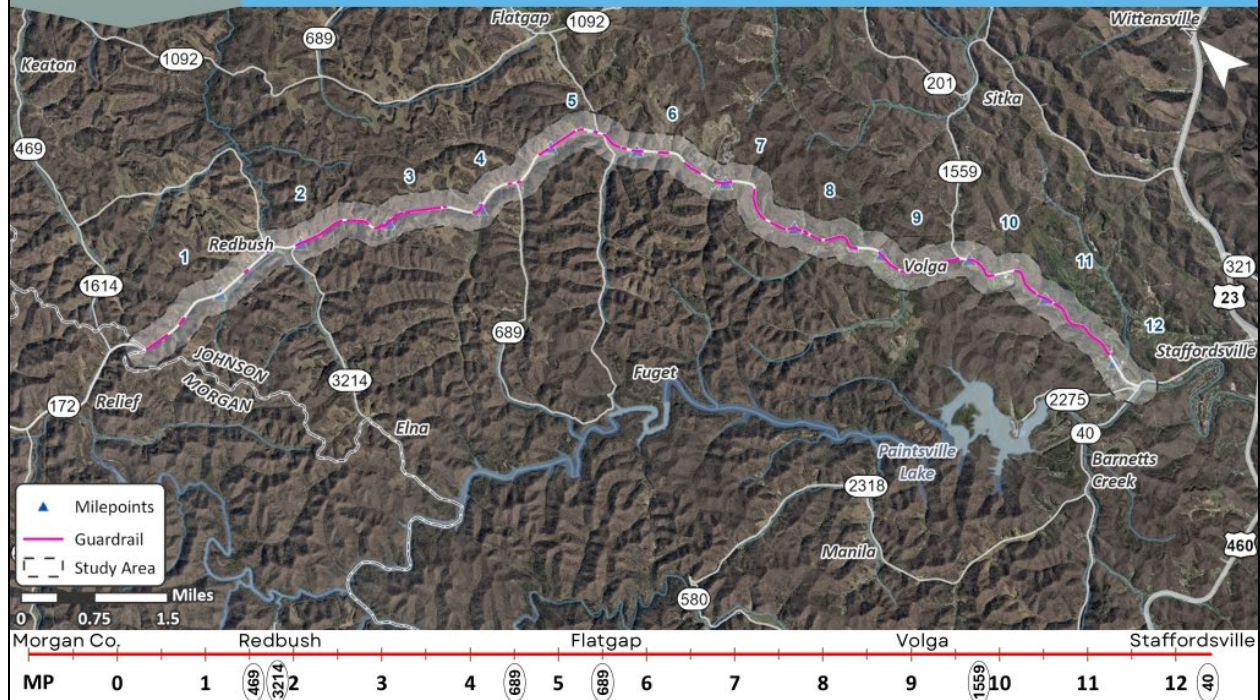
Consider traditional highway plan or federal grant funding
(For Bridge: FBP/BRO/BRX/BRZ)



C2

MP 0.00 – MP 12.37

Full Corridor Guardrail Improvement



INFORMATION



OVERVIEW

- Replace guardrail not meeting modern design guidelines along KY 172 – 24,140 ft
- Replace TS 1 and Type 7 end treatments with crash-worthy Type 1 and Type 2m – 78



TRAFFIC

- AADT: 740 to 2,810 veh/day



CRASH ANALYSIS (2019 – 2023)

- 93 Crashes (1 K, 4 A, 3 B, 15 C, 70 O)
- 40 Single Vehicle, 18 Sideswipe Opposite Dir., 12 Angle, 11 Rear End, 5 Head On, 4 Opposing Left Turn, 2 Sideswipe Same Dir., 1 Rear to Rear

POTENTIAL IMPACTS

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY-172 by improving roadway geometrics and increasing lane and shoulder width.

COST ESTIMATE (2025 Dollars)

\$2,290,000	D: \$0	U: \$0
	R: \$0	C: \$2,290,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Up to 17% Potential Reduction in Fatal and Injury Crashes that Involve Guardrail

CONSTRUCTABILITY CONSIDERATIONS

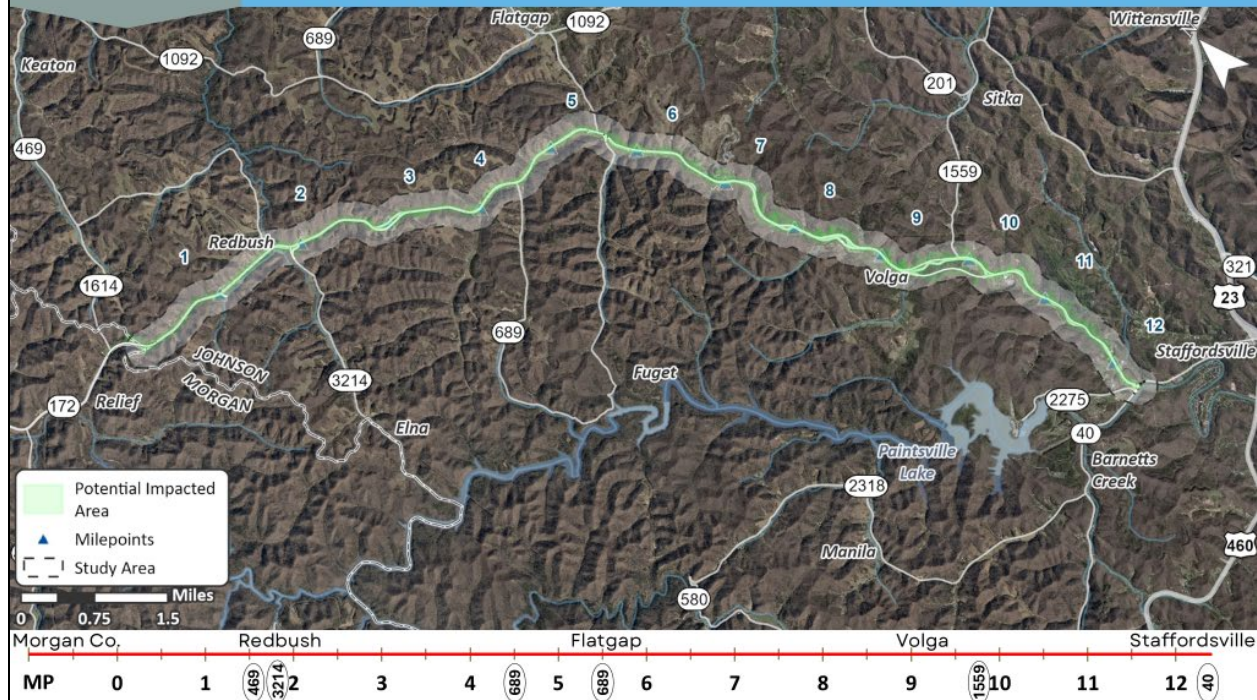
- Slope Stability / Cribbing locations

POTENTIAL FUNDING SOURCES:

Consider HSIP, FD05, or FE01 funding

C3

MP 20.74 (Morgan Co.) – MP 12.37 (Johnson Co.) Full Corridor Improvement



INFORMATION



OVERVIEW

- Match the Morgan County improvements by:
- Improving horizontal and vertical crest curves to meet 50-mph Design Speed criteria for collectors
- Increase lane width to 11' with 9' Shoulders (2' Paved)



TRAFFIC

- AADT: 740 to 2,810 veh/day



CRASH ANALYSIS (2019 – 2023)

- 93 Crashes (1 K, 4 A, 3 B, 15 C, 70 O)
- 40 Single Vehicle, 18 Sideswipe Opposite Dir., 12 Angle, 11 Rear End, 5 Head On, 4 Opposing Left Turn, 2 Sideswipe Same Dir., 1 Rear to Rear

POTENTIAL IMPACTS

- Environmental: Streams, Tree Removal (Bat), Flood Hazard Areas, Sensitive Water Areas, Strip Mines, Prime Farmland, Cemeteries, Churches, Hazardous Waste
- Utilities: Utility Poles, Water/Sewer, Gas/Oil, Water Tank, Water Wells, Cell Tower, Transmission Line, Substation
- Right of Way: Up to 446 acres, 137 structures (51 relocations)

IMPROVEMENT CONCEPT

PURPOSE AND NEED

Address safety, reliability, and mobility on this segment of KY-172 by improving roadway geometrics and increasing lane and shoulder width.

COST ESTIMATE (2025 Dollars)

\$224,100,000 D: \$10,560,000 U: \$17,180,000
R: \$20,310,000 C: \$176,050,000

With Additional Risk-Based Contingencies (2025 Dollars):

\$267,300,000 D: \$13,010,000 U: \$17,180,000
R: \$20,310,000 C: \$216,800,000

Time-Based Contingency: Add 10% per biennium, per phase

SAFETY BENEFIT

- Varies

CONSTRUCTABILITY CONSIDERATIONS

- Dividing corridor into construction sections
- Difficulty constructing along existing alignment
- Excess excavation
- Prone to flooding
- Maintenance of traffic
- Tie-ins

POTENTIAL FUNDING SOURCES:

Consider traditional highway plan or federal grant funding

9 Study Outcomes

9.1 Summary of Improvement Concepts

Table 18 shows a summary of each concept location with their total cost estimate and priority designation. A more detailed summary table is shown in **Appendix G**.

Table 18. Final List of Potential Improvement Concepts

ID	Primary Improvement	Location / Milepoints	Length (mi)	Total Cost (2025 Dollars Without Risk-Based Contingencies)	Total Cost (2025 Dollars with Risk-Based Contingencies)	Priority
1	Horz. & Vert.	MP 20.74 (Morgan) - 0.14	0.57	\$13,940,000	\$16,840,000	High
2	Horz.	MP 0.69 - 0.79	0.10	\$1,980,000	\$2,310,000	Low
3	Intersection	0.981 (Salyers Branch Rd)	N/A	\$1,430,000	\$1,700,000	Low
4	Vert.	MP 1.16 - 1.44	0.28	\$4,750,000	\$5,470,000	Low
5	Horz., Vert., & Bridge	MP 1.64 - 1.98	0.34	\$6,580,000	\$7,810,000	Medium
5A	Intersection	MP 1.950 (KY 3214)	N/A	\$1,610,000	\$1,890,000	Medium
5B	Intersection	MP 1.950 (KY 3214)	N/A	\$3,440,000	\$4,140,000	Medium
6	Horz. & Vert.	MP 2.67 - 3.25	0.58	\$8,970,000	\$10,540,000	Low
7	Vert.	MP 3.28 - 3.58	0.30	\$6,130,000	\$7,330,000	Low
8	Horz. & Vert.	MP 3.85 - 4.11	0.26	\$4,820,000	\$5,760,000	Medium
9	Horz. & Vert.	MP 4.14 - 4.36	0.22	\$4,580,000	\$5,430,000	Low
10	Horz., Vert., & Intersection	MP 4.43 - 4.73	0.30	\$6,310,000	\$7,280,000	Low
10A	Horz., Vert., & Intersection	MP 4.43 - 4.57	0.14	\$2,620,000	\$3,060,000	Medium
11	Vert.	MP 4.97 - 5.41	0.44	\$6,640,000	\$7,490,000	Low
12	Horz., Vert., & Intersection	MP 5.44 - 6.08	0.64	\$18,800,000	\$22,440,000	High
13	Horz. & Vert.	MP 6.23 - 6.50	0.27	\$6,200,000	\$7,100,000	Low
14	Vert.	MP 6.56 - 6.82	0.26	\$7,080,000	\$8,590,000	Low
15	Horz. & Vert.	MP 6.83 - 7.15	0.32	\$15,930,000	\$18,920,000	Low
16	Horz., Vert., & Intersection	MP 7.15 - 7.76	0.61	\$17,180,000	\$20,330,000	Medium
17	Horz., Vert., & Intersection	MP 7.76 - 8.03	0.27	\$21,870,000	\$26,550,000	Medium
18	Horz., Vert., & Intersection	MP 8.15 - 8.83	0.68	\$20,590,000	\$24,460,000	High
19	Horz. & Vert.	MP 8.89 - 9.12	0.23	\$11,510,000	\$13,920,000	Low
20A	Horz., Vert., & Intersection	MP 9.08 - 10.45	1.37	\$36,310,000	\$43,240,000	High
20B	Horz., Vert., & Intersection	MP 9.08 - 10.45	1.37	\$36,850,000	\$44,150,000	High (Preferred)
21	Horz., Vert., & Intersection	MP 10.47 - 10.83	0.36	\$10,590,000	\$12,440,000	Medium
22	Horz., Vert., & Intersection	MP 11.02 - 11.69	0.67	\$18,150,000	\$21,700,000	Medium
23A	Bridge, Horz., & Intersection	MP 11.69 - 12.03	0.34	\$11,190,000	\$13,030,000	High
23B	Bridge	MP 11.83 - 11.99	0.07	\$6,000,000	\$6,790,000	High
24	Horz. & Vert.	MP 12.13 - 12.34	0.21	\$3,270,000	\$3,700,000	Low
25	Intersection	MP 12.370 (KY 40)	N/A	\$4,530,000	\$5,120,000	Medium
C1	Signing	0.00 - 12.37	12.37	\$275,000	\$275,000	-
C2	Guardrail	0.00 - 12.37	12.37	\$2,290,000	\$2,290,000	-
C3	Full Corridor Improvement	20.74 (Morgan Co.) - 12.37	12.80	\$224,100,000	\$267,300,000	-

Note: For Time/Management-Based Contingency, add 10% per biennium, per phase

9.2 Next Steps

No additional funding currently exists for any of the recommendations made in this study. Some improvements could be relatively low-cost and require minimal preliminary design or preparation using existing or alternative funding sources. This includes improvements such as signing, guardrail, cribbing, tree clearing, slope stability improvements, passing zone modifications, or pavement rehabilitation. KYTC Maintenance could implement these types of projects relatively quickly.

Any identified projects that need additional funding or resources, such as realignment, major widening, or other higher-cost improvements, would need to be integrated into the KYTC Strategic Highway Investment Formula for Tomorrow (SHIFT) process as a first step in pursuit of competitive funding. KYTC and the Big Sandy Area Development District (BSADD) could potentially collaborate on funding and implementation for projects.

If federal funds are used or permits are required, additional environmental analysis will be required to satisfy the National Environmental Policy Act (NEPA). Once a project moves forward and acquires additional funding, it would then need to develop through the project development process including Preliminary Engineering, Design, Right-of-Way Acquisition, Utility Relocation, and Construction. The general public was not engaged in this study; only local officials and stakeholders were involved. If any projects are to move forward, public involvement may be necessary.

9.3 Additional Information

Additional information or questions regarding this study can be obtained from KYTC. Written requests should be sent to:

KYTC Division of Planning
Attention: Director
200 Mero Street
Frankfort, KY 40622