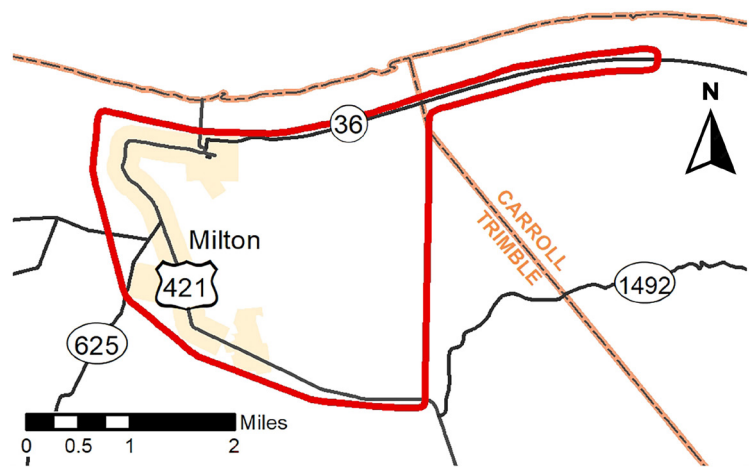




Milton Small Area Study

TRIMBLE COUNTY, KY
FINAL REPORT | JANUARY 2026

PREPARED FOR
TEAM KENTUCKY
 TRANSPORTATION
 CABINET

IN PARTNERSHIP WITH




EXECUTIVE SUMMARY

The Kentucky Transportation Cabinet (KYTC) initiated a small area study surrounding the city of Milton in Trimble County. This planning study focuses on three key components:

Improve the Ohio River bridge approach, including US 421 “Milton Hill”		
	Address freight mobility along KY 36	
Consider bicycle and pedestrian mobility in town		

Milton marks one of two Ohio River crossings between Louisville and Cincinnati metropolitan areas. It is a small agricultural community that is divided into two distinct sections: Lower Milton, stretching along Ohio River floodplains, and Upper Milton, standing atop the 300-foot-high bluffs. Shown in **Figure ES-1**, the study area encompasses 4.4 miles along KY 36, 5.3 miles along US 421, and areas between.

For the past decades, KYTC investments in the region focused on the Ohio River Bridge connecting Milton with Madison, Indiana. The historic truss bridge was reconstructed in the early 2010s, gaining national recognition for its innovative construction technique to assemble the new truss on temporary piers adjacent to the 1929 structure, sliding the 2,400-foot-long multi-span structure into place to minimize closure timelines. Minimal approach work was conducted with the bridge project to satisfy timelines associated with a federal grant, though the project included commitments to explore improvement concepts as a separate project.

Soon after the bridge reconstruction, KYTC began preliminary design work and environmental investigations to improve the Milton approach to the US 421 bridge under Item No. 5-135.81. Work was funded with “BRO” federal bridge money and the extent of these design options were limited to

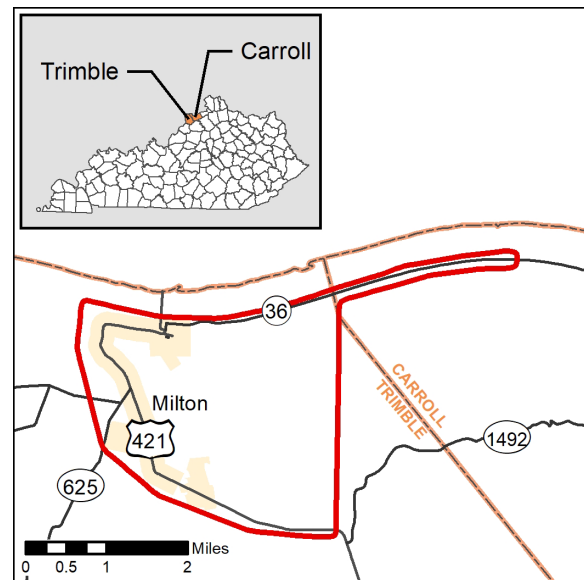


Figure ES-1: General Project Location

a small area adjacent to the existing bridge approach. The design effort culminated in selection of the No-Build Alternative in 2018, due to a lack of public support, high right-of-way costs compared to available funding, and reasonable performance for current traffic volumes.

EXISTING CONDITIONS

South of the bridge, US 421 is a minor arterial with 11-foot lanes and 1-foot paved shoulders. Shown in **Figure ES-2**, grades are up to 7% coming down "Milton Hill" that climbs the edge of the bluffs with 290-foot and 400-foot radii horizontal curves. Warning signs provide advance notice for northbound motorists approaching the descent. There is a runaway truck ramp at the bottom of the hill—one of the only remaining facilities in the state. A December 2024 traffic count shows 5,700 vehicles per day (vpd) on Milton Hill, increasing to 9,200 vpd (11% trucks) crossing the river.

Resting on interbedded limestones and shales, geotechnical investigations recommended a tied-back wall following a 1992 landslide to stabilize the segment.

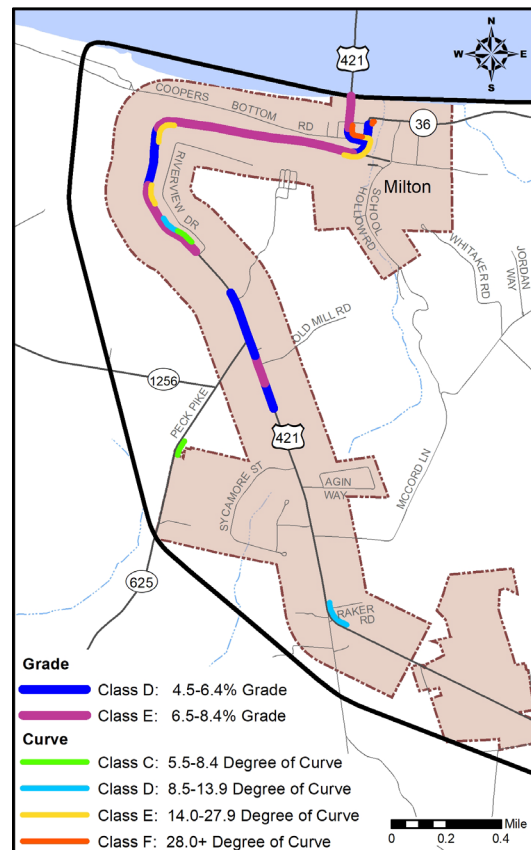


Figure ES-2: Steep Grades and Sharp Curves

KY 36 runs through two tight turns in Lower Milton before continuing east to Carrollton with 10- to 11-foot lanes and narrow paved shoulders. It is a rural major collector but represents a 10-mile gap in the KY Highway Freight Network—constrained by tight turns; narrow pavement widths; and a narrow, poor condition bridge over Canip Creek (112B00002N). Rather than taking KY 36, commercial vehicles coming from Madison today should follow US 421 south to I-71 to KY 227 to get to Carrollton, adding an estimated 45 minutes to each trip. An estimated 4,000 vpd (13% trucks) travel the route near Milton; a quarry and industrial park lie along the eastern portion of the study area limits.

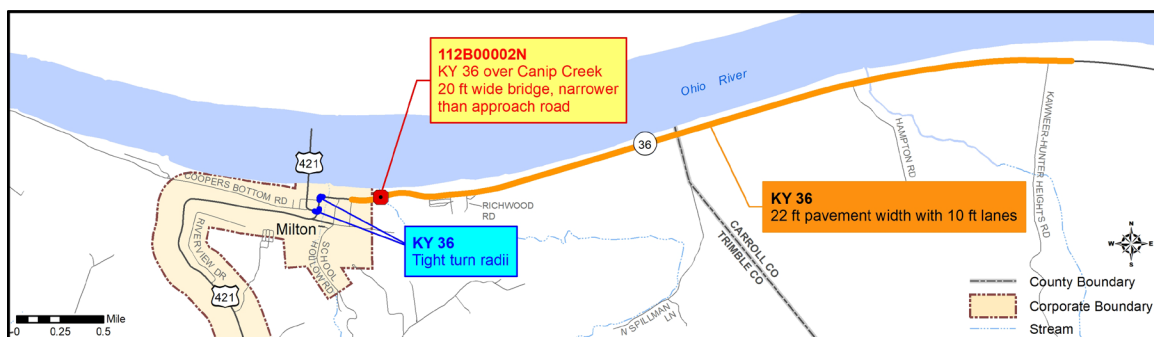


Figure ES-3: KY 36 Constraints to Truck Mobility

Whichever route is selected, motorists must traverse two 90-degree turns to get to/from Lower Milton.

The Ohio River Bridge provides a 5-foot walkway for pedestrians and paved shoulders for cyclists. Beyond the bridge, there are a few scattered sidewalk segments in Lower Milton, plus a shared use path looping through the City Park. KY 36 is also a US Bike Route, though minimally used. The 2012 bridge project resulted in several commitments on improving bicycle and pedestrian facilities.



Figure ES-4: Ferry Street Turn, Milton Hill, and Canip Creek Bridge

Based on 2025 volumes, the current US 421/KY 36 intersection provides adequate capacity for existing traffic. All movements operate at Level of Service (LOS) A-B with less than 11 seconds of delay per vehicle on all approaches. Anecdotal insights from locals suggest unfamiliar drivers may experience confusion regarding traffic control. Southbound KY 36 and eastbound US 421 are stop-controlled but northbound US 421 from Milton Hill is a free-flow movement. Limited visibility and unrestricted access points to adjacent businesses further complicate throughput. Queues may back up during busy periods, especially when large vehicles require additional width to complete turns.

Future traffic is projected to grow at a 0.5% annual rate (0.6% for trucks) with no capacity concerns through 2050.

Crashes reported during 2019-2023 (**Figure ES-5**) include 72 crashes on KY 36 (1 fatality, 8 injury collisions) and 120 on US 421 (1 fatality, 19 injury). Both fatalities involved alcohol. By type, most reported crashes involved a single vehicle (46%) and opposite direction sideswipes (20%). Overall, 63% represent roadway departures—one of the emphasis areas for the Kentucky Office of Highway Safety. Crash clusters were noted at the KY 36/Ferry Street intersection by the boat ramp, on the KY 36 Canip Creek bridge, the US 421/KY 36 intersection, and near the milepoint (MP) 17.9 curve on Milton Hill.

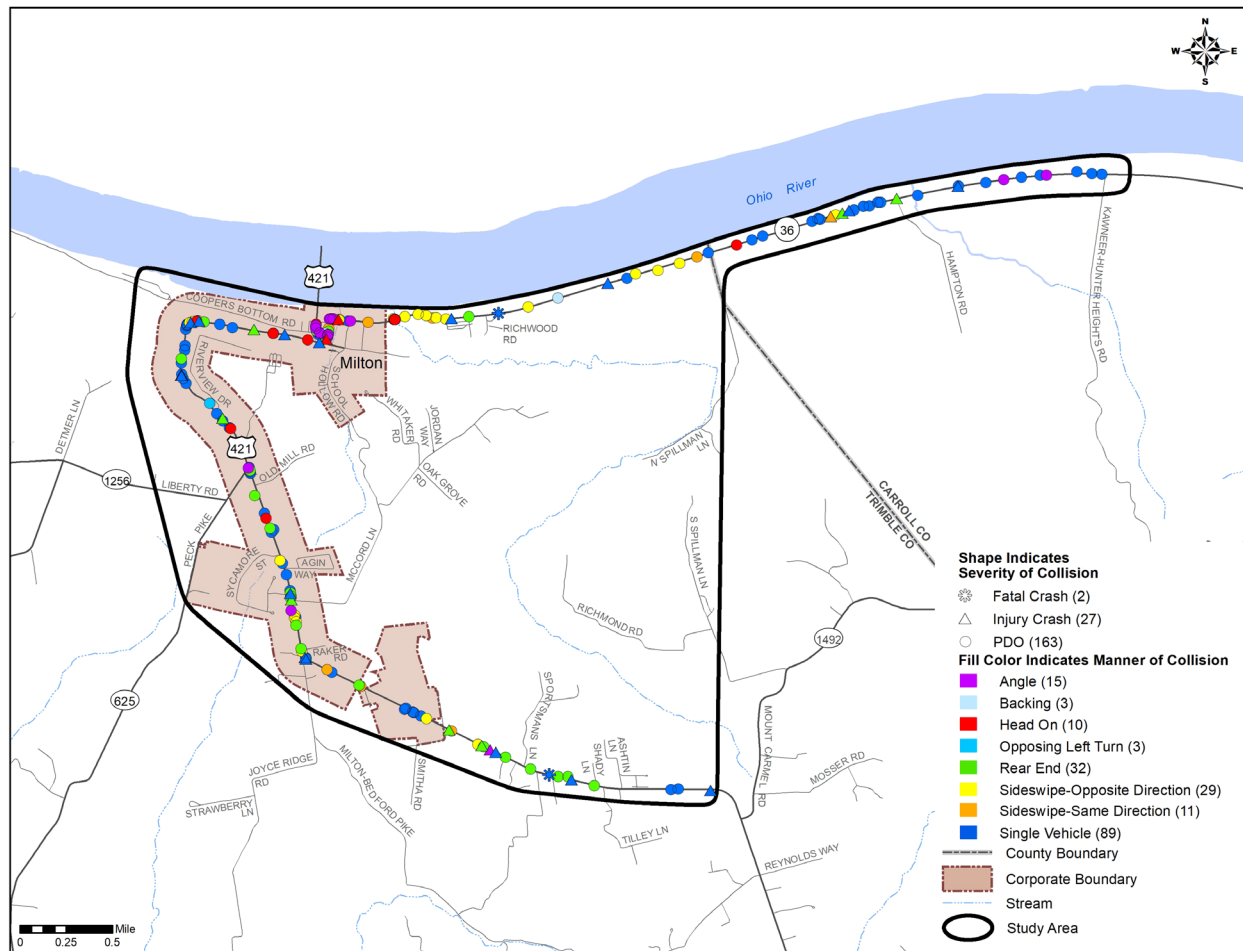


Figure ES-5: Crash Locations by Severity and Type

BUILD CONCEPTS

Build concepts were organized into three categories: Spot Improvements, Improve Existing Corridors, and New Connectors.

Spot Improvements look at relatively small areas to target lower cost, low impact solutions. These included realigning the KY 36 Ferry Street intersection to accommodate truck turns, a three-way stop with access management at the US 421/KY 36 intersection, adding sidewalks, and replacing the Canip Creek bridge with a wider structure with sidewalk.

Larger scale improvements along existing highway corridors examined both US 421 and KY 36.

- Concept E explored a range of options to address Milton Hill but requires detailed future geotechnical engineering work to determine feasibility. Variations considered one or two lanes open to traffic during construction with the impacted hillside sloped back or protected via a

large retaining wall to reduce the footprint. Either widens the highway to provide 11-foot lanes with 4-foot paved shoulders.

- Concept F widens KY 36 for 4.3 miles through the study area to provide 12-foot lanes with 4-foot paved shoulders. A sidewalk stretches 0.9 miles near town. Additional widening to the east would be required to close the 10-mile gap in the freight network but is beyond the scope of this planning effort.

A third set of Build concepts look at new alignment options to provide a connection between Upper and Lower Milton. This planning study started with a wide range of new corridor options, trying to find options that minimized costs and impacts. Each assumes 30 feet of total pavement with a 45-mph design speed. Three variations were presented to the public: one east of School Hollow Road, one west of School Hollow Road, and one that raises the connection to the Ohio River Bridge above the floodplain.

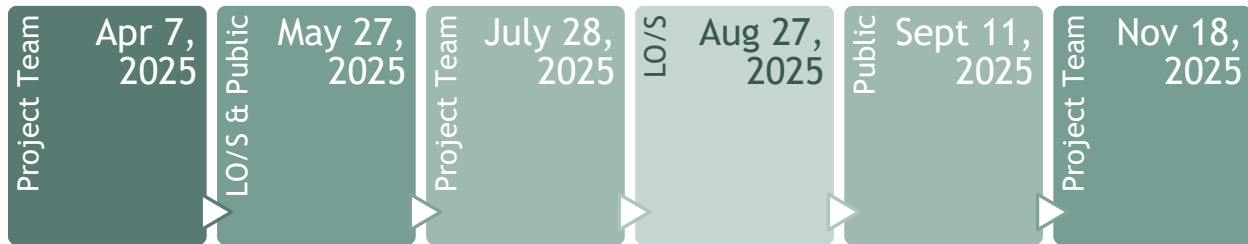
Planning-level design concepts represent a high-level look at proposed improvements; the extent of unknowns means there are large contingencies to consider when estimating costs. To account for these uncertainties, cost estimates progressed through a three-stage process:



In addition to monetary costs, transportation benefits and effects on the human and natural environment were also weighed. Some of the Build options are contained within existing right-of-way and would result in minimal impacts. Others have a larger footprint and, therefore, greater potential to impact the surrounding environment. Impacts include relocated homes/businesses, stream/floodplain impacts, historic resources, transmission lines, and a cemetery—discussed further in **Chapter 6.0**.

COORDINATION MEETINGS

The project team met at key milestones over the course of the study. Coordination meetings with local officials and stakeholders (LO/S) and the public were conducted to collect local insights on transportation needs and to rate preferences between different Build concepts.



- Based on 81 public surveys on transportation needs, the greatest concerns in the study area were stability of Milton Hill, narrow pavement widths, and the KY 36 bridge at Canip Creek. The majority of participants agreed that improvements are warranted for each of the three main study objectives.
- Based on 89 surveys on Build concepts, spot improvements A, B, and D were all similarly rated as high priorities while Concept C (sidewalks) was lower. Improved KY 36 was rated a higher priority than a safer connector from Upper Milton to the Ohio River Bridge. Concepts H (New Alignment West of School Hollow) and E (Rebuild Milton Hill) were the highest rated options to improve connectivity.

RECOMMENDATIONS

Table ES-1 summarizes recommended priorities alongside escalated programming costs, including design, right-of-way, utility, and construction phases shown in year of expenditure dollars.

Table ES-1: Build Costs and Priorities

Concept	Programming Cost	Priority
Spot Improvements		
A KY 36 at Ferry St	\$10.4 million	High
B Restripe US 421/KY 36	\$100k	Medium
C Sidewalk in town + ramp	\$950k	Low
D-1 Canip Creek Bridge	\$6.7 million	High
D-2 Canip Creek Bridge Shifted	\$17 million	
Existing Corridors		
E-1 Milton Hill – Sloped	\$40 million	Long Term 2
E-1 Milton Hill – Wall	\$58 million	
E-2 Milton Hill – Wall	\$140 million	
F Widen KY 36/Sidewalk	\$50 million	Long Term 1
New Alignments		
H West of School Hollow	\$150 million	Long Term 2
H2 West of School Hollow Ext.	\$170 million	
I Raised Tie to Bridge	\$160 million	
I2 West of School Hollow Ext.	\$180 million	

Additional details about each concept are presented on project summary sheets in **Section 8.4**. No funding to date has been assigned to advance improvement concepts beyond this initial planning phase.

Concepts A and D are rated High priorities. **Concept A** reconstructs the KY 36 turn at Ferry Street to improve visibility and accommodate truck turns, closing a 650-foot gap in the sidewalk network on the north side of KY 36. **Concept D** replaces the aging Canip Creek Bridge with a wider bridge including a sidewalk. If Concepts A and D advance independently, KYTC should evaluate pavement widening and creating a continuous sidewalk connection between their limits.

Concept B is a Medium priority, intended as a low-cost, low-impact solution at the US 421/KY 36 intersection entirely contained within existing pavement. Consistent with public feedback, **Concept C** (sidewalk) is a Low priority for implementation though a commitment to improve sidewalks remains from the 2012 Ohio River Bridge project.

Both widening KY 36 and providing an improved hilltop connector are important long-term priorities. **Concept F** should advance first as it represents a gap in the truck network and, if improved, could help carry detour traffic during US 421 construction. Future project development efforts should evaluate **Concept E** alongside **Concepts H/I** as a single design/environmental item moving forward, including multiple connection options on the north and south end.

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- D. Cultural Historic Overview
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Acronyms

BCR	Benefit-Cost Ratio
BMP	Best Management Practices
CDAT	Crash Data Analysis Tool
CHAF	Continuous Highway Analysis Framework
CMF	Crash Modification Factor
EEC	Excess Expected Crashes
EMS	Emergency Medical Services
FHWA	Federal Highway Administration
HDM	Highway Design Manual
HIS	Highway Information System
HSIP	Highway Safety Improvement Program
ICE	Intersection Control Evaluation
IJA	Infrastructure Investment and Jobs Act
KDOW	Kentucky Division of Water
KHFN	KY Highway Freight Network
KIPDA	Kentuckiana Planning and Development Agency
KYTC	Kentucky Transportation Cabinet
LEP	Limited English Proficiency
LO/S	Local Officials/Stakeholders
LOS	Level of Service
LOSS	Level of Service of Safety
LWCF	Land and Water Conservation Fund
MP	Milepoint
mph	miles per hour
NBI	National Bridge Inspection
NEPA	National Environmental Policy Act
NHS	National Highway System
NN	National Truck Network
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OBBB	One Big Beautiful Bill
PDO	Property Damage Only
SHIFT	Strategic Highway Investment Formula for Tomorrow
SHPO	State Historic Preservation Office
STIP	Statewide Transportation Improvement Program
TAP	Transportation Alternatives Program
TED	Transportation Enterprise Database
USACE	US Army Corps of Engineers
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
UST	Underground storage tank
v/c	Volume-to-Capacity Ratio
vpd	vehicles per day
WHPA	Wellhead Protection Area

1.0 INTRODUCTION

The Kentucky Transportation Cabinet (KYTC) initiated a small area study in the city of Milton, nestled along the banks of the Ohio River in Trimble County, KY. This planning study focuses on three key components:

Improve the Ohio River bridge approach, including US 421 "Milton Hill"		
	Address freight mobility along KY 36	
Consider bicycle and pedestrian mobility in town		

Milton was founded in 1789 and has a population around 600 persons. It marks one of two Ohio River crossings between Louisville and Cincinnati metropolitan areas. Milton is a small agricultural community that is divided into two distinct sections: Lower Milton, stretching along Ohio River floodplains, and Upper Milton, standing atop the 300-foot high bluffs. Shown in **Figure 1**, the study area encompasses 4.4 miles along KY 36, 5.3 miles along US 421, and areas between. The easternmost section of the study area lies within Carroll County.

Trimble County is largely rural and falls within KYTC's District 5 and KIPDA's regional transportation planning jurisdiction. Carroll County lies within KYTC District 6 and the Northern Kentucky Area Development District. The study limits cover segments of three state-maintained highways:

- US 421 milepoints (MP) 13.5-18.8 in Trimble County
- KY 36 MP 0.0-2.2 in Trimble County
- KY 36 MP 0.0-2.2 in Carroll County

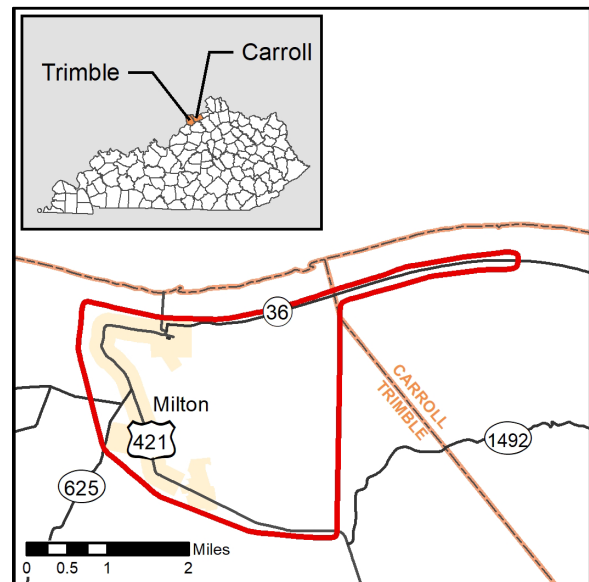


Figure 1: General Project Location

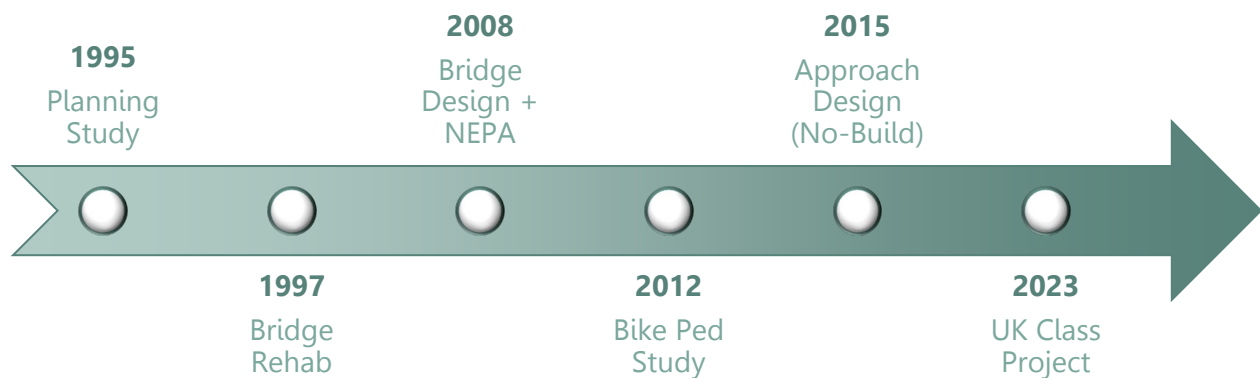
1.1 PLANNING PROCESS

The planning process works through main six steps, documented throughout this report:

- 1 Regional Context**
What other plans and projects influence future traffic flows?
- 2 Existing Transportation System**
How the highway meets current needs, measured via traffic operations and safety performance.
- 3 Environmental Setting**
What sensitive features constrain future improvement options?
- 4 Community Engagement**
What do everyday users think?
- 5 Build Concepts**
Develop improvement options to address identified needs.
- 6 Recommendations**
Weigh costs, benefits, and impacts to prioritize solutions.

1.2 PREVIOUS PLANNING STUDIES

A vibrant history of past planning efforts defines the community's vision for its infrastructure. For the past decades, much of the focus has been on the Ohio River Bridge connecting Milton with Madison, Indiana. The historic truss bridge was reconstructed in the early 2010s, gaining national recognition for its innovative construction approach.



OHIO RIVER BRIDGE REPLACEMENT (1995-2012)

In 1995, KYTC completed a planning study that considered a host of cross-river connections (**Figure 2**), stretching between Hanover, IN to the west and the Trimble/Carroll County line to the east. Needs driving the study included extensive bridge maintenance or replacement, future traffic volumes, and

recurring slides along US 421 Milton Hill. Alongside rehabilitation, new location corridors #2 (opposite US 421 Jefferson Street in Madison) or #3C (immediately east of the existing structure) were preferred, despite having higher costs and impacts than repair work. With no consensus reached on a new alignment option, rehabilitation of the 1929 structure began in 1997 to replace the deck, repair steel elements, patch concrete, and repaint the structure.

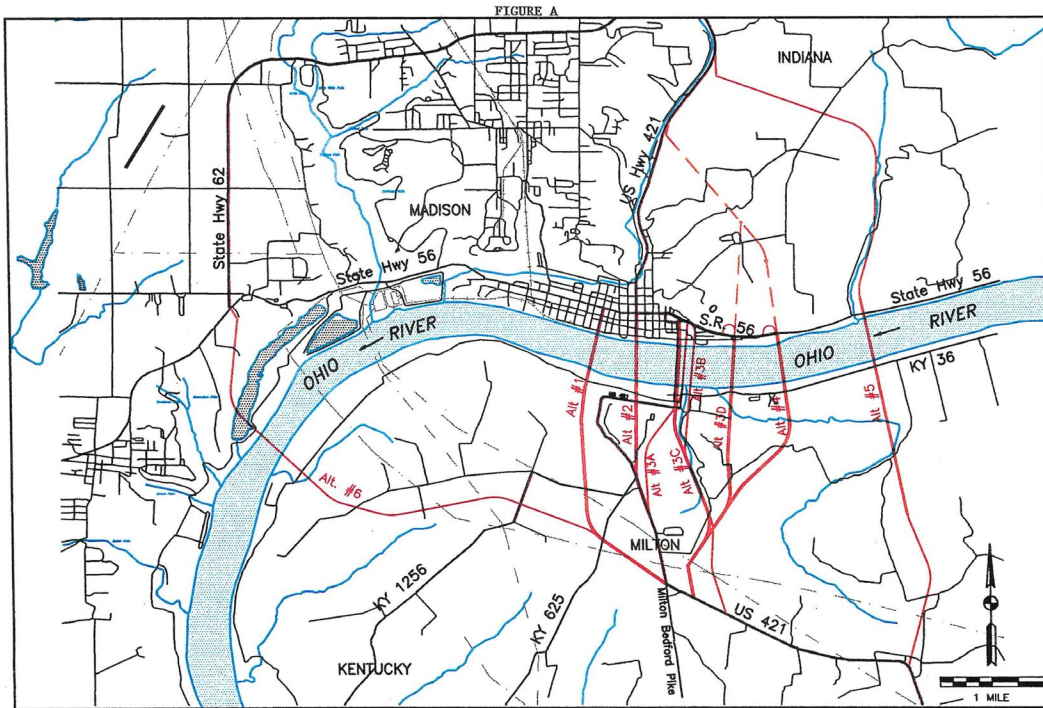


Figure 2: 1995 Build Concepts Considered

In 2006, a large section of the town of Madison was listed as a National Historic Landmark. National Historic Landmarks are nationally significant historic places designated by the Secretary of the Interior because they “possess exceptional value or quality in illustrating or interpreting the heritage of the United States.” The designation layered more stringent protections over the area than previously.

In 2008, a fresh planning study explored new river crossing options, coordinating with both KYTC and Indiana Department of Transportation, and incorporating a robust community outreach effort. The project need focused on three factors: 1) bridge condition—its geometry did not meet current standards while member age and condition suggested a finite service life remaining, 2) maintaining cross-river mobility and community connectivity, and 3) improving safety. The effort explored a wide range of options (**Figure 3**), progressing through a tiered screening process against the project purpose, engineering considerations, and Section 4(f) resources—public parks and historic resources. The selected alternative replaced the existing truss superstructure with a wider section (two 12-foot lanes plus 8-foot paved shoulders) and 5-foot sidewalk. Any cyclists are assumed to travel along the wide shoulders.

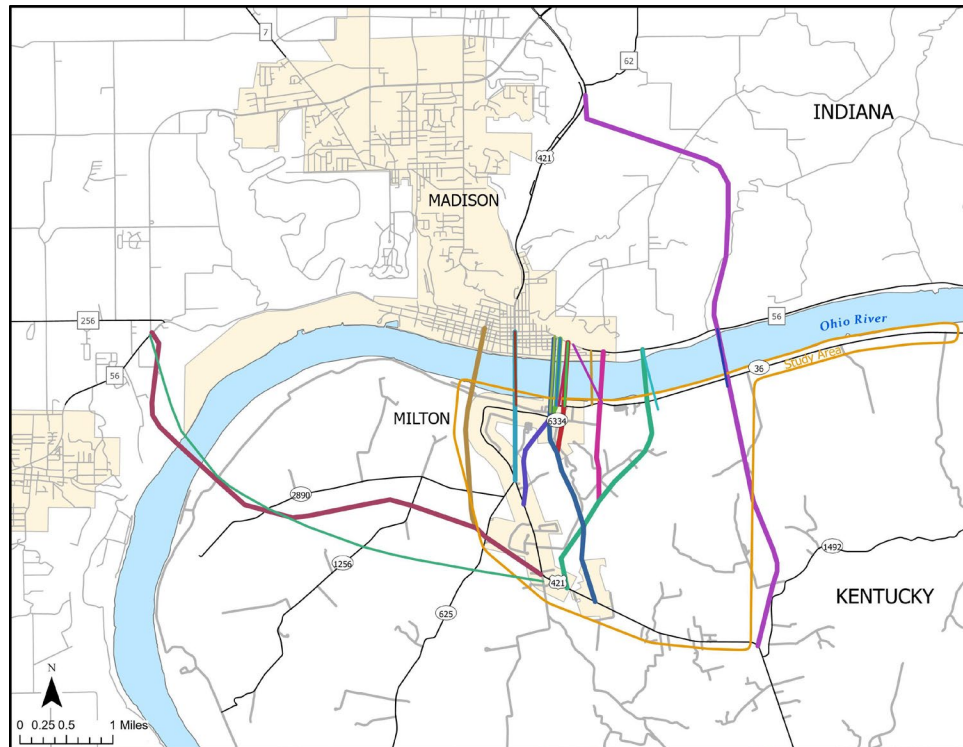


Figure 3: 2008 Build Concepts Considered

The project won a federal grant in 2010 to accelerate construction, advancing as a design-build project later that year. An innovative construction technique assembled the new truss on temporary piers adjacent to the 1929 structure, sliding the 2,400-foot-long multi-span structure into place to minimize closure timelines. Minimal approach work was conducted to satisfy timelines associated with the grant, though the project included commitments to explore improvement concepts as a separate project.



Figure 4: 2012 Bridge Slide, Before and After

SIDEWALK CONNECTIONS (2011-2012)

As another commitment from the Ohio River Bridge replacement, KYTC completed a 2012 *Pedestrian and Bicycle Facilities Study*¹ that defines “a master plan for improving pedestrian/bicycle connectivity between the new rehabilitated US 421 Milton-Madison Bridge, the Lower Milton Commercial District, KY 36 and the Milton City Park.” The effort inventoried existing facilities, noted connectivity gaps, and explored different connection options. The recommended scenario (**Figure 5**) extends shared use paths through Lower Milton and realigns/widens a section of KY 36 at Tiber Creek. A minimum 10-foot width is recommended for trails with a 5-foot planted buffer to separate non-motorized users from on-street traffic.



Figure 5: 2012 Recommended Sidewalks

BRIDGE APPROACH (2014-2018)

Another commitment from the larger bridge project, KYTC conducted preliminary design work and environmental investigations to improve the Milton approach to the US 421 bridge. As the Item No. 5-135.81 work was funded with “BRO” federal bridge money, the extent of these design options were limited to a small area. **Figure 6** summarizes the range of options presented at a January 2015 public

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

meeting. Each extends a 5-foot sidewalk along existing US 421 to the Dairy Queen—in the southwest quadrant of the US 421/KY 36 intersection—running along a series of curbed islands to define access points to adjacent businesses.

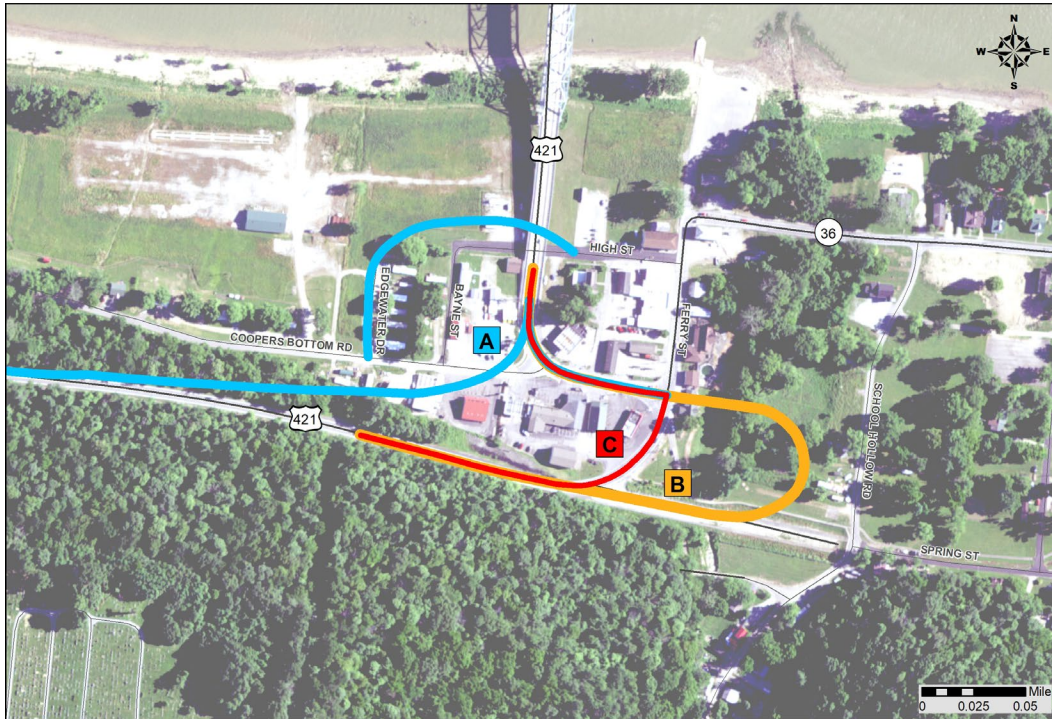


Figure 6: 2015 Bridge Approach Options

Most public comments received fit into one of three themes:

- Any improvements proposed should not bypass Milton. Impacts to businesses, especially parking and truck accessibility, are a concern.
- The 90-degree curve on KY 36 at Ferry Street is the worst perceived issue in Milton and needs to be corrected.
- There are concerns about the long-term stability of US 421 Milton Hill; several comments noted that the alternatives presented did not go far enough up the hill to address this problem.

The design effort culminated in selection of the No-Build Alternative in 2018, due to a lack of public support, high right-of-way costs compared to available funding, and reasonable performance for current traffic volumes.

UK CLASS PROJECT

In 2023, a group of landscape architecture students at the University of Kentucky explored “Milton Re-imagined” as their senior design seminar. Grand visions for Lower Milton explored strategies to

connect Trimble County to riverfront recreational opportunities, promote tourism/development, and incorporate resiliency given regular flooding. Strategies were built around site visits, input from local leaders, and coordination with industry leaders and agencies. Different teams promoted greenways, terraces, marina/boat docks, parks, a boardwalk, planted green spaces, housing, campgrounds, commercial spaces, an event venue, and more. While no specific development plans have arisen to date, the undertaking emphasizes local interest in attracting visitors and finding the best use for low-lying, flood-prone stretches.

1.3 COMMITTED AND PLANNED PROJECTS

Every two years, the Commonwealth’s transportation budget is established by the state legislature in its biennial highway plan. In the current *2024–2030 Enacted Highway Plan*,² one project is identified within the study area. Other potential future projects near the study area were compiled from the Continuous Highway Analysis Framework (CHAF) database. The CHAF database is the starting point for the biennial SHIFT process³ that informs Kentucky’s Highway Plan.

Active CHAF concepts and Highway Plan projects near the study area are shown in **Figure 7** with additional details summarized in **Table 1**. None of the projects include funding within the current biennium.

Table 1: Nearby Projects & Concepts

ID	Route	MP	Description	Estimate
Item 5-80309	KY 36	0.000-2.211	Improve Safety, Truck Mobility, and Address Geometric Deficiencies	\$11M
IP20240021	US 421	15.5-18.8	Realign US 421, from Ohio River Bridge south to near MP 15.45	\$81M
IP20080266	US 421	6.7-18.8	US 421 safety and geometric deficiencies, Bedford to Milton	\$84M

² Online at <https://transportation.ky.gov/Program-Management/Pages/default.aspx>

³ SHIFT, or the Strategic Highway Investment Formula for Tomorrow, is a data-driven project scoring process to compare and prioritize statewide capital improvement projects to make better use of limited transportation funds in the Commonwealth’s biennial budget.

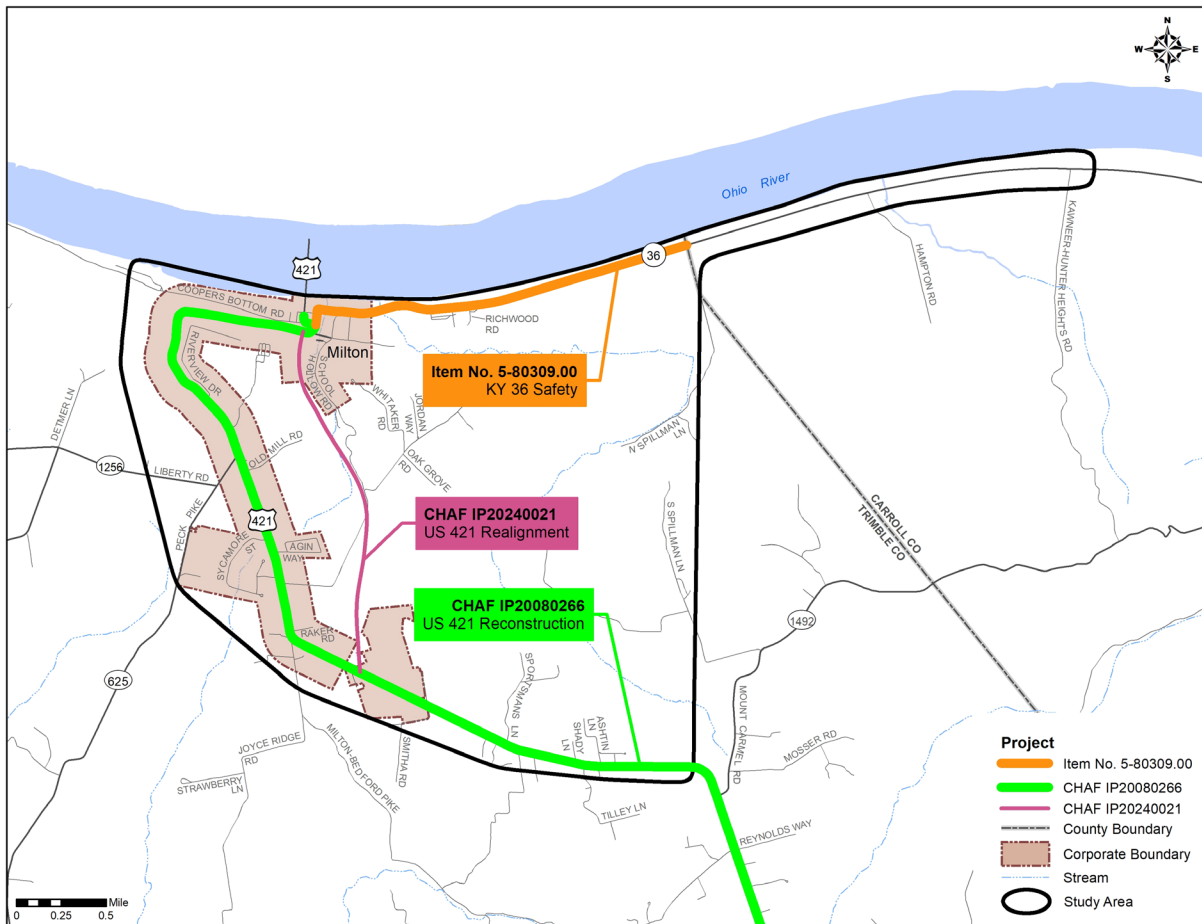


Figure 7: Nearby Transportation Projects

2.0 EXISTING CONDITIONS

Existing transportation conditions are described in the following sections. Data were obtained from KYTC's Highway Information System (HIS) database, KYTC's Transportation Enterprise Database (TED), the Federal Highway Administration's (FHWA) National Bridge Inventory (NBI), traffic counts, and field reviews.

2.1 ROADWAY SYSTEMS, FUNCTIONAL CLASS & FREIGHT CONSIDERATIONS

Road systems, functional class, and freight considerations vary across study area routes, influencing transportation infrastructure planning and analysis.

Table 2 summarizes roadway attributes, highlighting key characteristics for state routes within study area limits. The following sections explain these attributes and their significance within the transportation network.

Table 2: Systems, Functions and Freight Networks in Study Area

		US 421	KY 36
System	National Highway System (NHS)	No	No
	State System	State Primary	State Secondary
	Scenic Byway	No	No
Function	Area Type	Rural	Rural
	Functional Classification	Minor Arterial	Major Collector
Freight	KY Highway Freight Network	Tier 3	No
	National Truck Network (NN)	No	No

ROADWAY SYSTEMS. The National Highway System (NHS) consists of roadways important to the nation's economy, defense, and mobility. Neither US 421 nor KY 36 are part of the NHS.

Kentucky's Primary and Secondary Road Systems classify state-maintained roads based on their role in the transportation network. The Primary Road System includes interstates, parkways, and major state routes that connect cities, regions, and key economic centers. These roads carry higher traffic volumes and serve as the backbone of Kentucky's transportation infrastructure. US 421 is part of the State Primary System.

The Secondary Road System consists of smaller state-maintained roads that provide local access, linking rural areas and smaller communities to the primary network. These roads typically carry lower traffic volumes and address more localized travel needs. KY 36 is a State Secondary Route.

A Scenic Byway is a designated route that highlights the state's natural beauty, cultural heritage, and historic landmarks, promoting tourism, supporting local economies, and encouraging conservation efforts. There are no scenic byways in the study area. However, KY 36 is a component of the Lewis and Clark National Historic Trail⁴ auto tour route, which stretches from Pittsburg to the west coast.

FUNCTIONAL CLASSIFICATION. The federal functional classification system organizes roads based on their role in balancing mobility and access, traditionally designated as urban or rural. More recently, design policies acknowledge a broader spectrum of land use contexts: rural, rural town, suburban,

⁴ Online at <https://www.nps.gov/lecl/index.htm>

urban, and urban core. Understanding this classification system helps guide roadway planning and design decisions, specifically, vehicle speed, capacity, and the roadway's relationship to land use development. Federal legislation uses functional classification in determining eligibility under the Federal-aid program. The five major functional classes are defined in **Figure 8**. US 421 is a minor arterial; KY 36 is a major collector.

Freeways & Interstates	Provide high speed, high mobility links for long distance trips.
Principal Arterials	Serve major centers for metropolitan areas, provide a high degree of mobility, and can also provide mobility through rural areas.
Minor Arterials	Provide service for trips of moderate length, serve geographic areas smaller than their Principal Arterial counterparts, and offer connectivity to the Principal Arterial system.
Collectors	Gather traffic from local roads and funnel to the arterial network. Classified as either a major or minor collector; generally serve intra-county travel and shorter trips.
Local Roads	Not intended for long distance travel, except at the origin or destination end of the trip, due to their direct access to abutting land. Often designed to discourage through traffic.

Figure 8: Functional Classifications

FREIGHT ROUTES. US 421 is a designated truck route, included in the Kentucky Highway Freight Network (KHFN)—a designated system of interstates, US highways, and major state routes designed to accommodate freight movements.

KY 36 is not a freight route; the connection between Milton and Carrollton represents a 10-mile gap in the network. Several elements preclude its inclusion, regulated by 603 KAR 5:250. Specifically, the pavement width is too narrow, the bridge over Canip Creek (Trimble County MP 0.44) is narrower than the approach, and two tight turns in town are difficult for trucks to navigate. Rather than taking KY 36, commercial vehicles coming from Madison today should follow US 421 south to I-71 to KY 227 to get to Carrollton, adding an estimated 45 minutes to each trip.

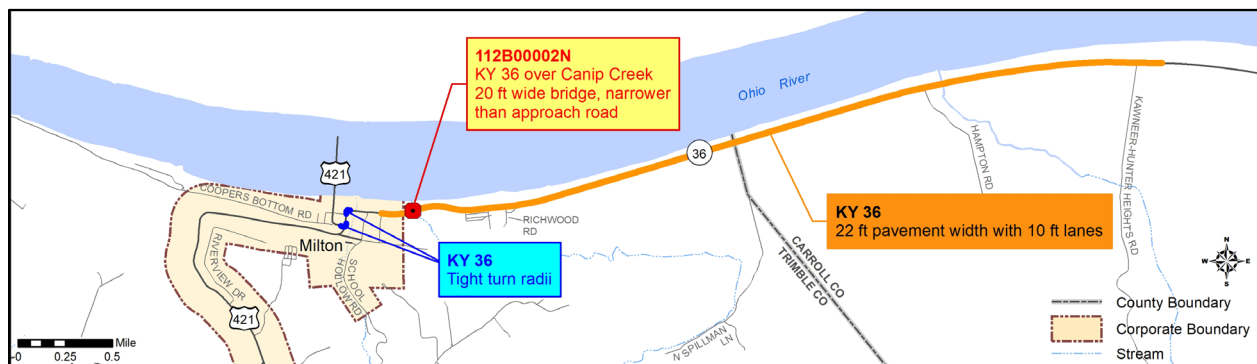


Figure 9: KY 36 Constraints to Truck Mobility

2.2 ROADWAY GEOMETRY

KYTC's HIS database was queried to obtain geometric characteristics related to speed limits, driving lanes, shoulders, vertical grades, and horizontal curves. Existing geometrics were compared to KYTC's *Highway Design Manual* (HDM)⁵ to identify roadway characteristics that do not meet current practice guidelines.

SPEED LIMITS. **Figure 10** shows posted speed limits for state-maintained routes throughout the study area. Rural routes are signed at 55 mph; in town, speed limits range from 35-45 mph.

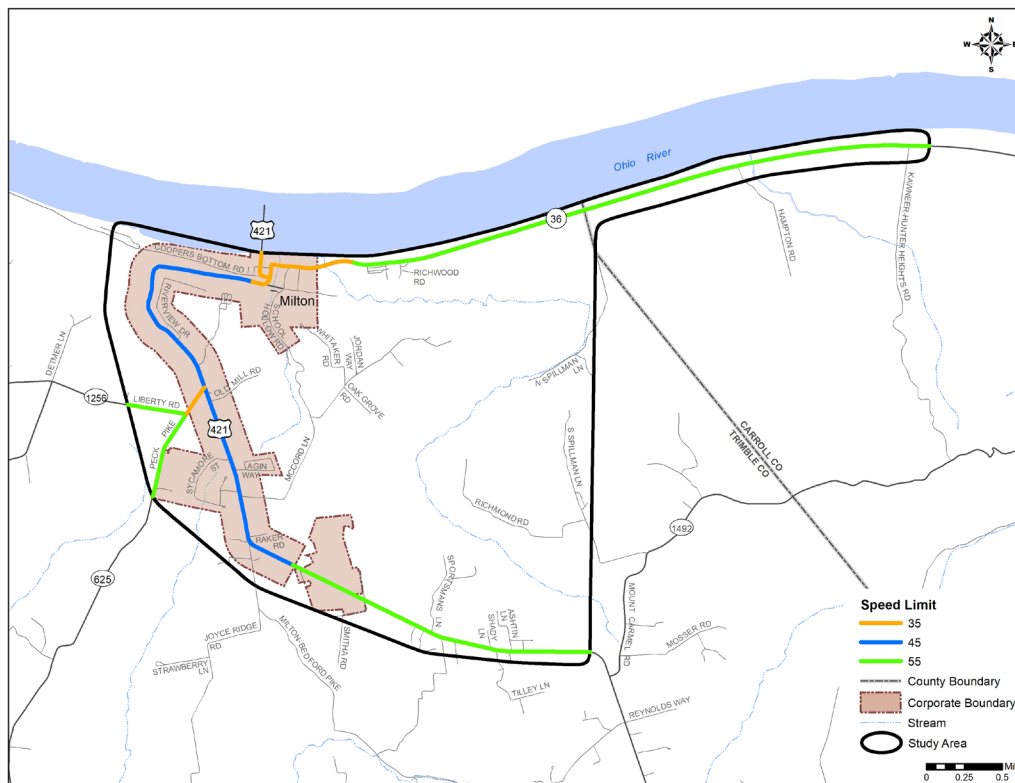


Figure 10: Posted Speed Limits in Study Area

LANES AND SHOULDERS. **Figure 11** illustrates lane and shoulder widths within the study area.

- US 421 has two 11-foot-wide driving lanes with 1-foot paved shoulders for most of its length.
- Approaching the Ohio River bridge, it widens out to 12-foot-wide lanes with 8-foot shoulders and a 5-foot sidewalk along the west side.

⁵ Online at <https://transportation.ky.gov/Highway-Design/Pages/default.aspx>

- KY 36 has 10-foot-wide lanes with 1- to 2-foot paved shoulders.

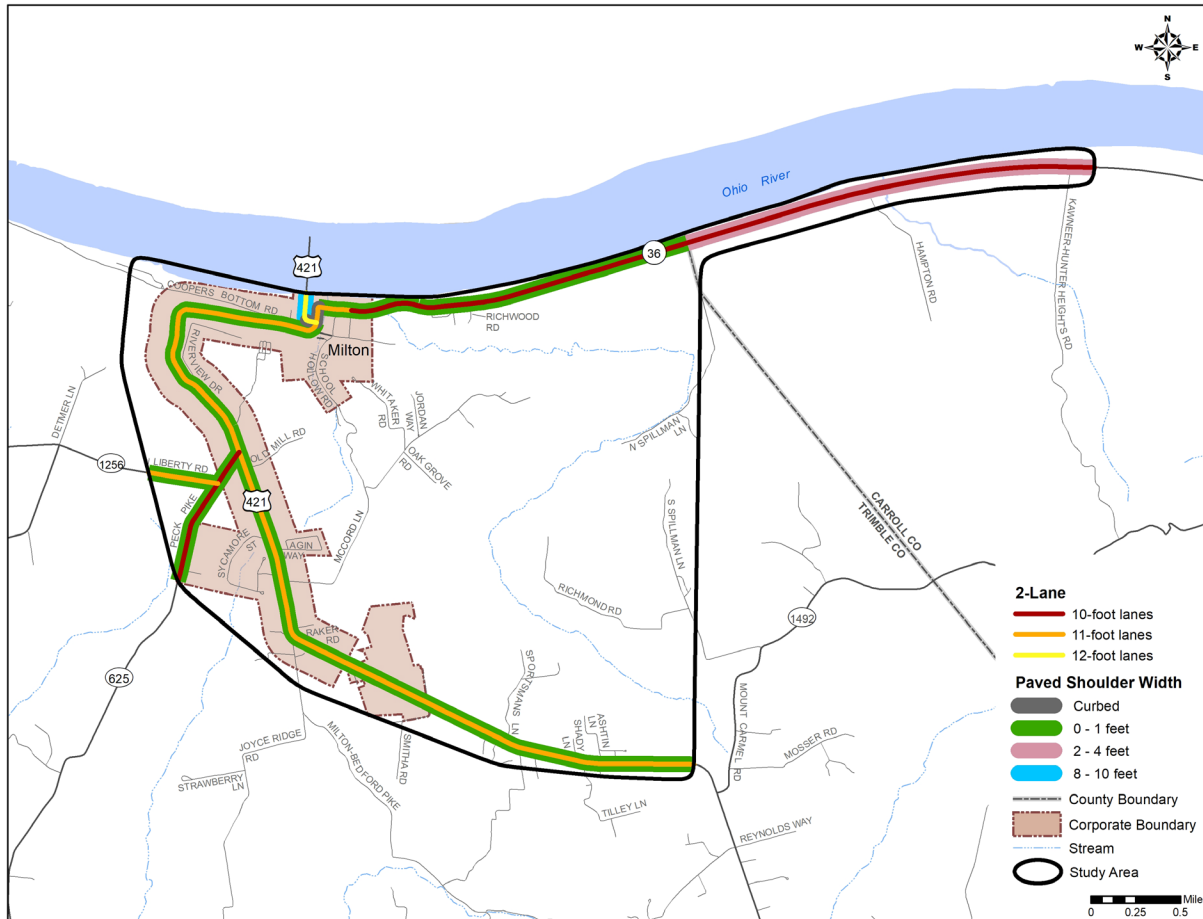


Figure 11: Lane and Shoulder Widths on Study Area Highways



Figure 12: Representative Sections on KY 36 (left) and US 421 (right)

For comparison, HDM recommends 12-foot-wide lanes with 6- to 8-foot-wide usable shoulders for rural arterial routes like US 421 carrying over 2,000 vehicles per day (vpd). For rural collectors like KY 36, HDM suggests 11-foot lane widths—or 12 feet for speeds over 50 mph carrying substantial truck traffic—with 6-foot-wide usable shoulders when traffic exceeds 2,000 vpd.

VERTICAL GRADES. HIS records were reviewed to identify the steepest grades (i.e., hills) along the study route. Vertical grades are organized into six classes, graded A (flattest) through F (steepest), as shown in **Table 3**. KY 36 through the floodplain is relatively flat but HDM Exhibit 700-03 recommends 6% maximum grade for 45 mph rural arterials in rolling terrain, i.e., Class D or better.

Table 3: Vertical Grade Class

Code	Description (percent)
A	0.0-0.4
B	0.5-2.4
C	2.5-4.4
D	4.5-6.4
E	6.5-8.4
F	8.5+

Figure 13 maps Class D and E grades within the study area alongside sharp horizontal curves, discussed below.

Along Milton Hill (US 421 MP 17.8-18.6), grades average 7%. Warning signs provide advance notice for northbound motorists approaching the descent. There is a runaway truck ramp at the bottom of the hill as a precaution—one of the only remaining facilities in the state.

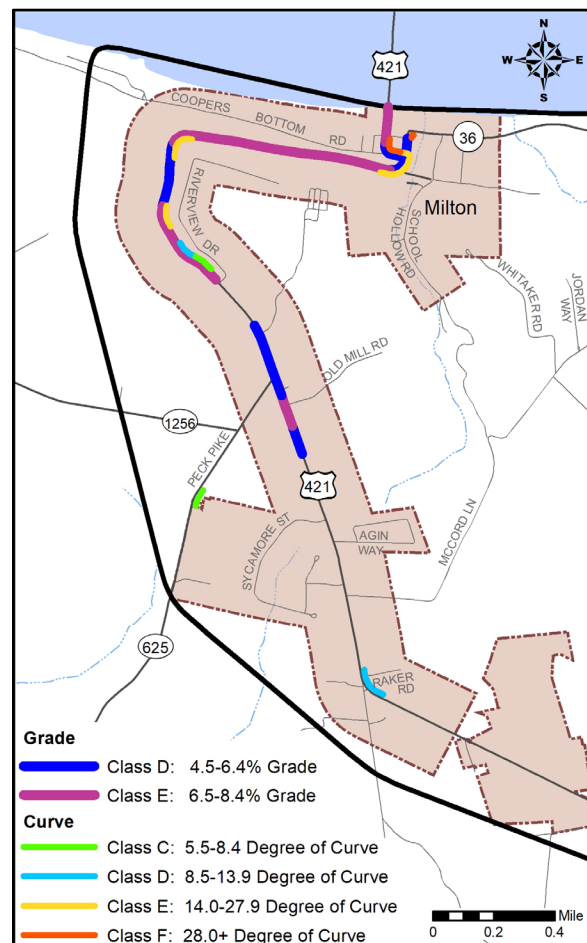


Figure 13: Steep Vertical Grades and Sharp Horizontal Curves



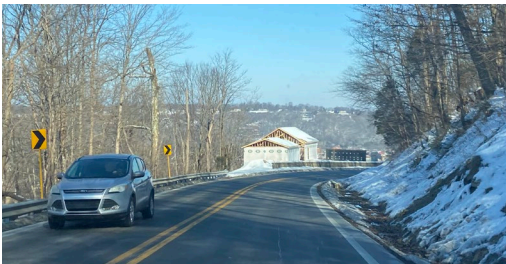
Figure 14: Warning Signs Approaching Milton Hill

HORIZONTAL CURVES. HIS data were reviewed to identify horizontal curves along the study routes. At a planning level, KYTC organizes horizontal curves into six classes, graded A (most sweeping) through F (sharpest), as listed in **Table 4**. Design guidelines vary by area type (rural versus urban), design speed, and superelevation, with the minimum radius for 45 mph rural collectors falling into Class D or better.

Table 4: Horizontal Curve Class

Code	Degrees	Radius (ft)
A	0.0-3.4	≥1,680
B	3.5-5.4	1,640-1,060
C	5.5-8.4	1,040-680
D	8.5-13.9	670-410
E	14.0-27.9	410-205
F	28.0+	≤205

Figure 13 shows Class C-F horizontal curves within the study area. The four sharpest curves in the area are listed below:



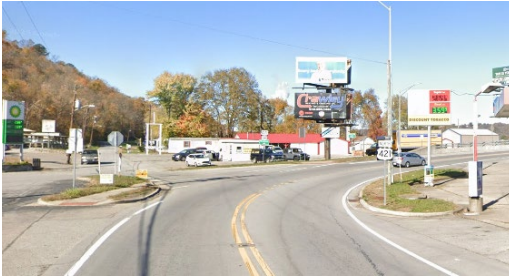
US 421, MP 17.9

480-foot radius curve in a 6.9% grade where US 421 bends to run parallel to the river, entering Milton Hill. A private residence just outside the curve has driveways aligning with each tangent approach.

US 421, MP 18.6

235-foot radius curve at the bottom of Milton Hill. US 421 swings left approaching its intersection with KY 36. Northbound US 421 is a free-flow movement through a 90-degree curve while southbound stops. Adjacent businesses have wide, poorly defined access points, increasing potential conflict points. Striping for the adjacent DQ drive thru directs exiting customers directly into the channelized right turn lane at this intersection.





US 421, MP 18.75

260-foot radius curve approaching the Ohio River bridge. Coopers Bottom Road intersects US 421 from the outside at a one-way stop-controlled intersection. Adjacent businesses have wide, poorly defined access points, increasing potential conflict points.

KY 36, MP 0.1

90-degree turn at Ferry Street with historic building inside curve limiting sight distance. Westbound KY 36 is stop-controlled. Turn radii in both directions are too small for large vehicles to track within lanes; local drivers know to watch while approaching and leave space if a truck is approaching.



PEDESTRIAN AND BICYCLE FACILITIES. Limited pedestrian infrastructure exists in Milton (**Figure 15**). There are a few scattered sidewalk segments, plus a shared use path looping through the City Park. The Ohio River Bridge provides a 5-foot walkway with paved shoulders for cyclists. KY 36 is designated as a US Bike Route: part of Route 25 (Underground Railroad), which stretches between Milton and Maysville. Other states independently designate routing, leading to disjointed sections.

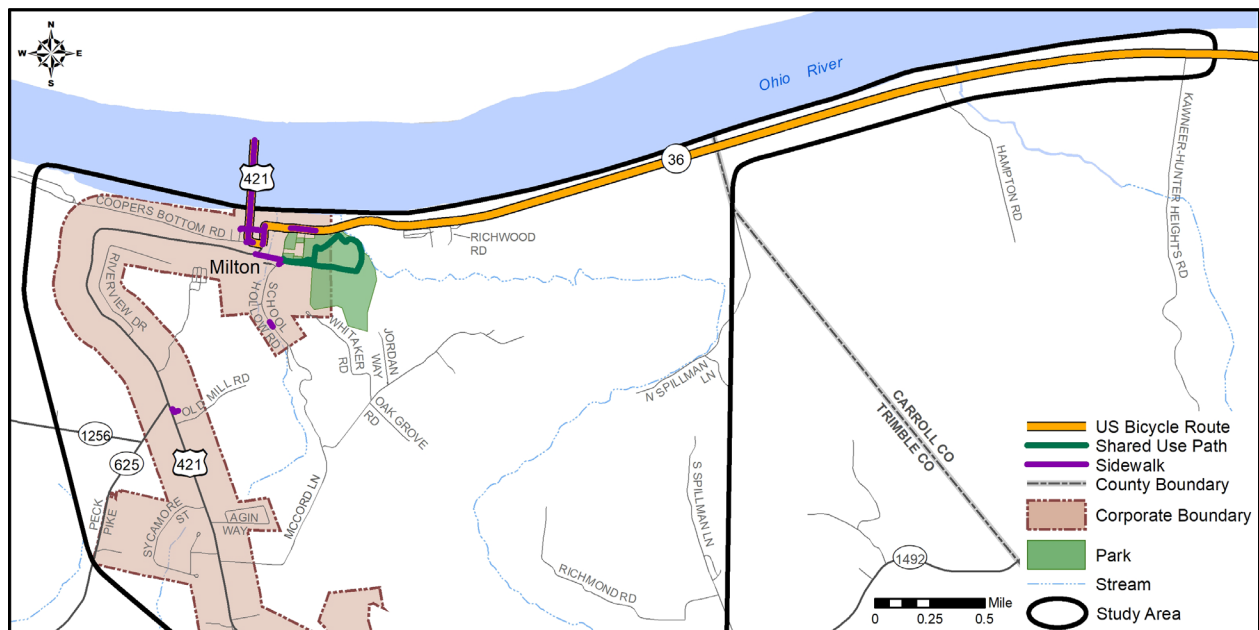


Figure 15: Existing Bicycle and Pedestrian Facilities

KYTC adopted a Complete Streets Policy⁶ in 2022, committing to partnering with other agencies to:

- Identify opportunities to promote and provide safe, convenient access and travel for all users of the transportation network while reducing crash rates and the severity of crashes.
- Improve mobility and accessibility for all individuals.
- Support mode shift to non-motorized transportation.
- Ensure early coordination to identify potential actions/strategies.

Consideration of the needs of all modal users is critical throughout the planning and project development process.

The 2012 Ohio River Bridge Project resulted in several committed mitigation measures relevant to bicycle and pedestrian facilities: funding planning studies for walkways along KY 36, local streets, and the riverfront. A separate commitment to construct restrooms at the public boat ramp was later amended to providing \$25,000 to the city to construct sidewalks.

2.3 STRUCTURES

Figure 17 shows five structures within study area boundaries.

- The Ohio River Bridge (112B00040N) was reconstructed just over a decade ago, providing one of two highway crossings between the Louisville and Cincinnati metro areas. The truss is rated in Good condition as of its 2025 inspection.
- 112B00002N carries KY 36 over Canip Creek. The aging bridge is in Poor condition with 20 feet of clearance between curbs.

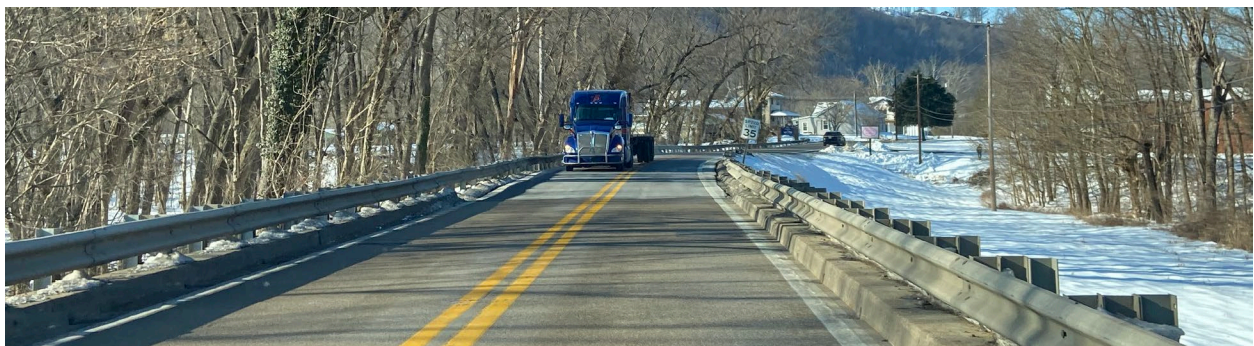


Figure 16: View westbound crossing Canip Creek Bridge

- 021B00027N carries KY 36 over Hamptons Creek in Carroll County, rated in Fair condition. It provides 22 feet of horizontal clearance between curbs.
- 122B00030N carries the runaway truck ramp over Tiber Creek, rated in Fair condition.

⁶ Online at <https://transportation.ky.gov/BikeWalk/Pages/Complete-Streets.aspx>

- 122B00031N carries KY 6334 over Tiber Creek, rated in Fair condition. KY 6334 is a dead-end stub off School Hollow Road, no longer carrying thru traffic.

A culvert carries KY 36 across Tiber Creek as well, but it is smaller than threshold to be considered a NBI structure. The culvert provides 25 feet of paved horizontal clearance.

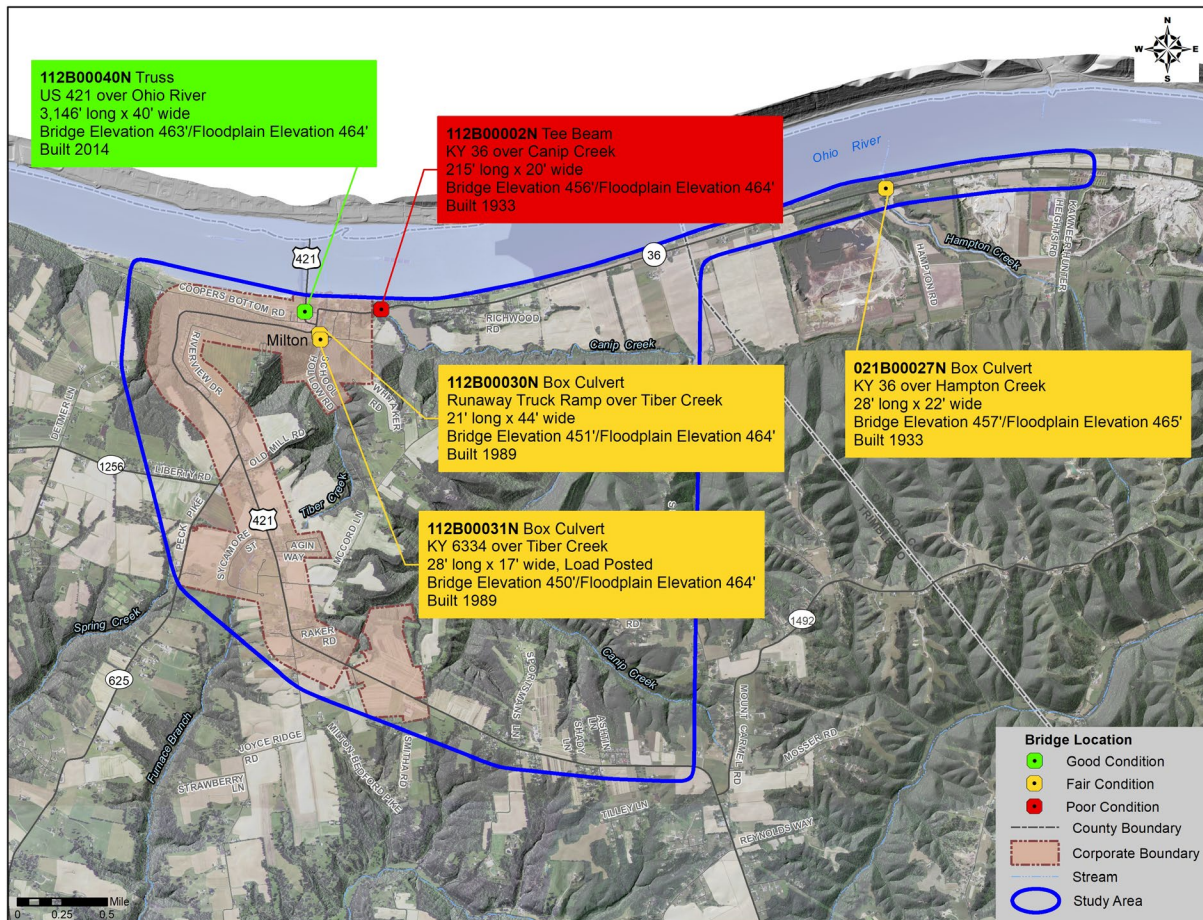


Figure 17: Study Area Structures

2.4 2025 TRAFFIC

To understand current roadway users, a 24-hour video-based turning movement count was conducted at the US 421/KY 36 intersection during December 2024. Counts classified vehicles into one of five categories—motorcycles, cars, buses, single-unit trucks, and articulated trucks—and identified any pedestrians and bicyclists.

Analysts also reviewed historic KYTC volume data, including truck percentages, hourly factors, and peak-hour directional distributions. Additional information is in **Appendix A**.

- North of KY 36, US 421 carried 9,200 vpd, including 11% trucks.

- South of KY 36, US 421 carried 5,700 vpd, including 9% trucks.
- East of US 421, KY 36 carried 4,000 vpd, including 13% trucks.

Two pedestrians and zero cyclists were observed during the 24-hour count. AM and PM peak hour turning movement volumes are shown in **Figure 18**.

TRAFFIC OPERATIONS. Two commonly applied highway performance indicators, level of service (LOS) and volume-to-capacity (v/c) ratios, were calculated to describe traffic operations along the corridor. Computations were performed in accordance with current *Highway Capacity Manual* (7th edition) procedures.

LOS is a qualitative measure that describes traffic conditions based on metrics such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. LOS typically represents a driver's outlook on traffic conditions based on perceived congestion. As illustrated in **Figure 19**, LOS A is associated with free flow conditions, high freedom to maneuver, and little or no delay. Conditions at or near capacity typically are associated with LOS E; whereas LOS F represents oversaturated traffic conditions beyond capacity, with low travel speeds, little or no freedom to maneuver, and lengthy delays.

LOS can be measured as an average for a highway segment or for any stop-controlled movement(s) at an intersection, though the delay thresholds vary based on whether the intersection is signalized or stop-controlled. As a general rule, LOS D is acceptable for urban areas and LOS C for rural areas.

Another measure, v/c, compares a facility's traffic volume to its theoretical capacity over a specific duration, one hour in this instance. A



Figure 18: 2025 AM (PM) Peak Traffic

LEVEL OF SERVICE	INTERSECTION	
A	Highly stable, free-flow condition with little or no congestion.	
B	Stable, free-flow condition with little congestion.	
C	Free-flow condition with moderate congestion.	
D	Approaching unstable condition with increasing congestion.	
E	Unstable, congested condition.	
F	Stop and go.	

Figure 19: Level of Service Thresholds

v/c ratio greater than 1.0 indicates a route has exceeded its theoretical capacity and additional throughput may be justified.

Because the US 421/KY 36 intersection has an atypical traffic control configuration, Synchro with SimTraffic (version 12.2) was used to measure performance. Based on 2025 peak volumes, the current configuration provides adequate capacity for existing traffic by volume. All movements operate at LOS A-B with less than 11 seconds of delay per vehicle on all approaches. Queues may back up during busy periods, especially when oversize vehicles require additional width to complete turns.

Anecdotal insights from locals suggest unfamiliar drivers may experience confusion regarding traffic control. Southbound KY 36 and eastbound US 421 are stop-controlled but northbound US 421 from Milton Hill is a free-flow movement. Limited visibility and unrestricted access points to adjacent businesses further complicate throughput.



Figure 20: Eastbound US 421 approaching KY 36

2.5 CRASH HISTORY

Safety analyses were conducted using crash data retrieved from KYTC's TED warehouse and the Crash Data Analysis Tool (CDAT). Historical crash data were evaluated for a five-year period (January 2019 through December 2023) to determine trends (see **Appendix B**). **Figure 21** shows crash locations by severity and type.

During the analysis period, 192 crashes were reported on state routes in the study area. This includes 72 crashes along KY 36 plus 120 along US 421.

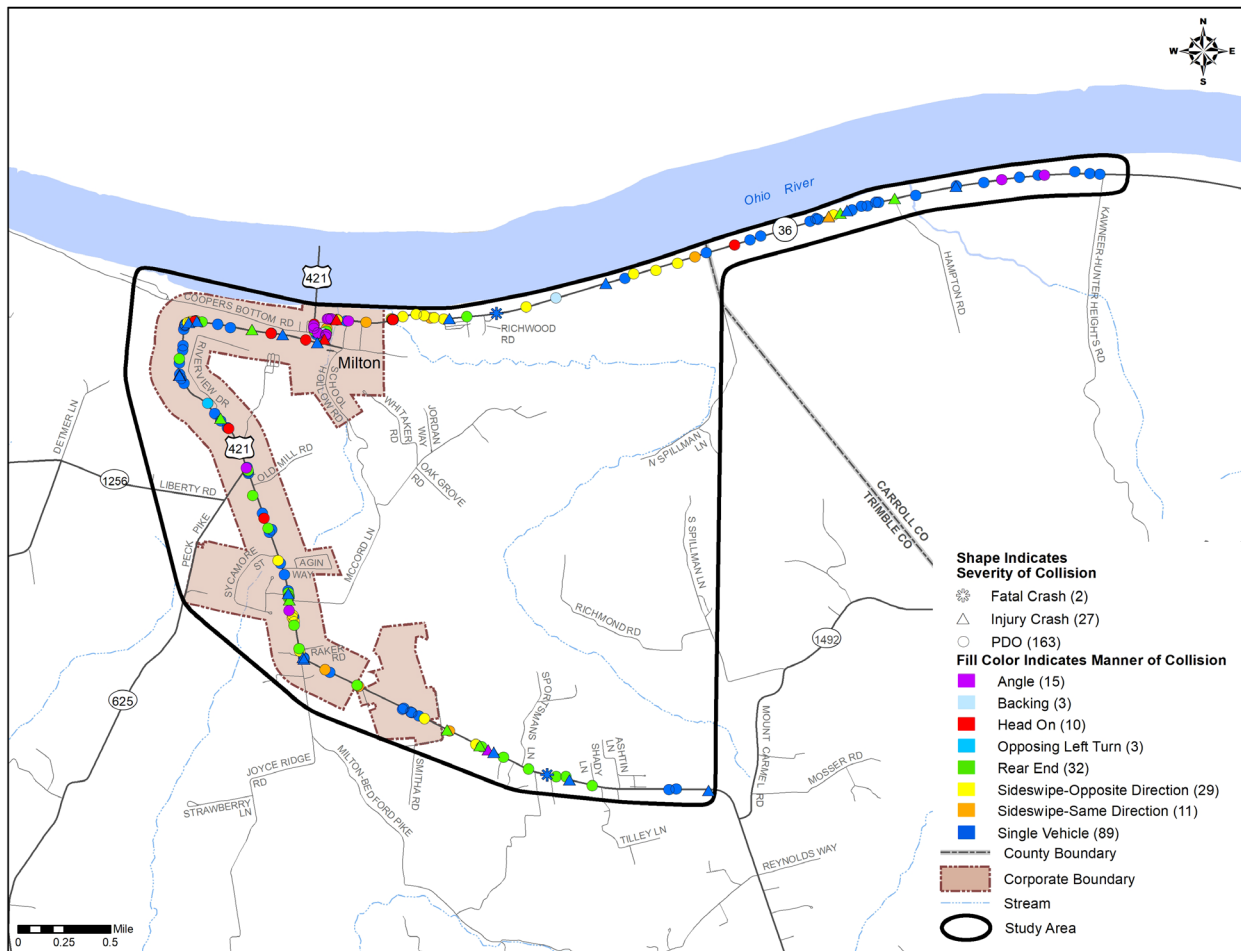


Figure 21: Crash Locations by Severity and Type

BY SEVERITY. The “KABCO” scale classifies crashes by severity with letters representing injury levels:

K	A	B	C	O
Killed	Suspected Severe Injury	Suspected Minor Injury	Possible Injury	Property Damage Only (PDO)

Over the five-year analysis period, there were two fatalities:

- Nighttime, September 2022. Impaired westbound motorist on KY 36 near Richwood Road (Trimble County, MP 1.0) dropped off edge of pavement then overcorrected, rolling vehicle. Alcohol involved.
- Evening, September 2019. Impaired southbound driver on US 421 near Greenbriar Road (MP 14.5) lost control, striking a tree. Alcohol involved.

Table 5 presents the breakdown of crashes along each route according to their KABCO rating.

Whereas traditional road safety strives to modify human behavior and prevent all crashes, the US Department of Transportation’s Safe System Approach ⁷ refocuses its emphasis. The approach prioritizes anticipating human mistakes and lessening impact forces to reduce crash severity and save lives. It also emphasizes shared responsibility: everyone has a role to play in prioritizing safety.

Table 5: Severity by Route

Severity	US 421	KY 36
K	1	1
A	1	3
B	12	3
C	6	2
PDO	100	63
All	120	72

BY TYPE. Single vehicle crashes are the leading crash type, accounting for 46% of all reported crashes, followed by rear end collisions (17%, primarily along US 421) and opposite direction sideswipes (15%, concentrated on KY 36). **Figure 22** summarizes the distribution between routes.

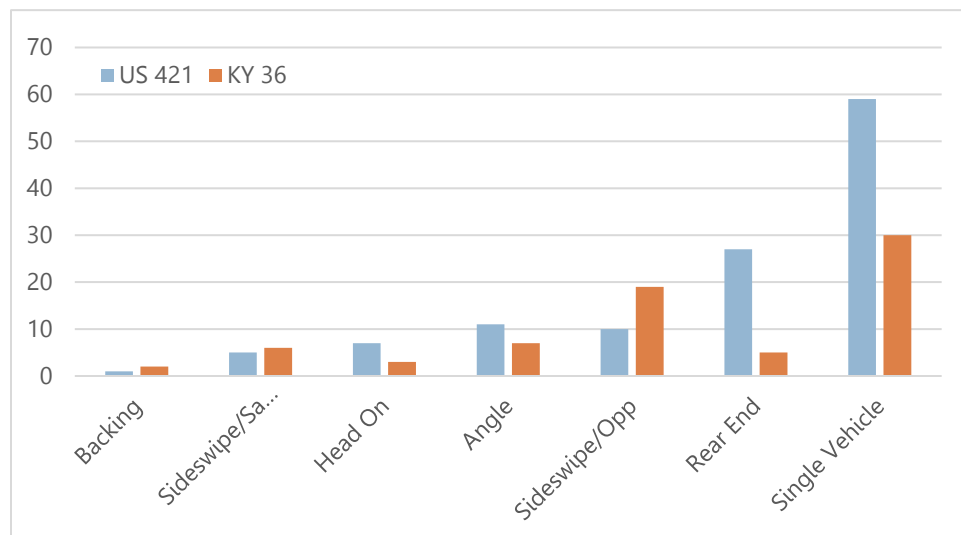


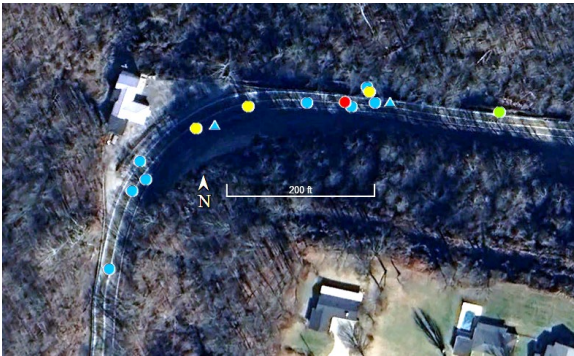
Figure 22: Crash Types by Route

There was one reported pedestrian strike during the five-year analysis period. Someone was walking along the US 421 shoulder near its intersection with KY 625 (Peck Pike). It was nighttime, the pedestrian was wearing dark clothing, and the intersection has minimal lighting. No one was injured. Vulnerable roadway users—pedestrians and cyclists—are one of nine focus areas in Kentucky’s 2025 *Strategic Highway Safety Plan*. ⁸

GEOGRAPHIC CLUSTERS. Higher density crash clusters were noted at a few key locations in the study area. Crashes mapped for each correspond to the legend entries shown in **Figure 21** above.

⁷ Online at <https://www.transportation.gov/NRSS/SafeSystem>

⁸ Online at <https://transportation.ky.gov/HighwaySafety/Pages/default.aspx>



US 421, MP 17.9 Curve

Within 500 feet of the curve, there were 15 crashes (2 injury crashes) during the five year analysis period. Most (67%) were single vehicle crashes with an even distribution between northbound and southbound.

US 421/KY 36 Intersection
Within 150 feet of the intersection, 12 crashes (1 injury) were reported. Crashes represent a wide range of types and directions. This stretch has sharp curves and closely spaced access points, combined with restrictive geometry at the intersection itself.



KY 36/Ferry Street Turn

Six crashes were reported at the 90-degree turn at KY 36/Ferry Street, plus an additional three crossing the Tiber Creek culvert. All but one resulted in PDO; three of nine involved commercial vehicles.

KY 36 at Canip Creek Bridge
During 2019-2023, 11 crashes were reported on the narrow Canip Creek bridge, all resulting in PDO. Seven were opposite direction sideswipes and five involved commercial trucks.



OTHER CRASH TRENDS. Study area crash trends were compared to identify correlations in the data that could highlight underlying concerns.

- 63% of crashes were coded as Roadway Departures, where a vehicle leaves its travel lane. Roadway departures are another of the strategic safety focus areas identified by KYTC's Office of Highway Safety as these crash types tend to be more severe.
- 30% of crashes occurred after dark, with no streetlights beyond the city limits.
- 18% of study area crashes occurred in wet/icy conditions.
- 11% involved a commercial vehicle: seven along US 421 and fifteen on KY 36.

LEVEL OF SERVICE OF SAFETY. Statistical analyses were performed using the Kentucky Transportation Center's CDAT to find areas of crash concentrations. CDAT calculates two measures of safety from methodologies in the *Highway Safety Manual*.

- Excess Expected Crashes (EEC) applies crash prediction models to compare crash rates against predicted estimates, accounting for traffic volumes, roadway/intersection type, and a statistical correction. Positive EECs indicate more crashes are reported than predicted.
- Level of Service of Safety (LOSS) ranks statewide segments into one of four categories. LOSS categories 1 and 2 represent sites with fewer than anticipated crashes, while categories 3 and 4 represent sites with more than anticipated crashes. Because LOSS 4 sites experience such elevated crash rates, there is a higher probability that safety countermeasures at these locations would result in larger improvements.

Study area highway segments with a LOSS 3-4 are mapped in **Figure 23**, with separate colors distinguishing between severe (KAB) and non-severe (CO) crash types. As shown, three segments show higher than expected severe crash rates.

Curves on Milton Hill (US 421 MP 17.3-18.0) show the highest overages. It demonstrates a 1.5 EEC for KAB crashes. That is, based on 2019-2023 reported crashes, there were 1.5 more severe crashes in five years than predicted by the safety performance function. The same segment shows 11.1 excess non-severe crashes. US 421 MP 13.5-15.5 and KY 36 in Carroll County also demonstrate elevated EEC rates for KAB crashes though at lower rates.

Intersection EEC can also be calculated and compared.

- US 421 at the runaway truck ramp shows a 0.4 EEC for KAB crashes, or 0.4 more severe crashes over five years at this intersection than predicted. It is the highest KAB EEC intersection in the study area.
- The US 421/KY 36 intersection shows a 2.6 EEC for CO crashes, or 2.6 more non-severe crashes over five years at this intersection than predicted. It is the highest CO EEC intersection in the study area.

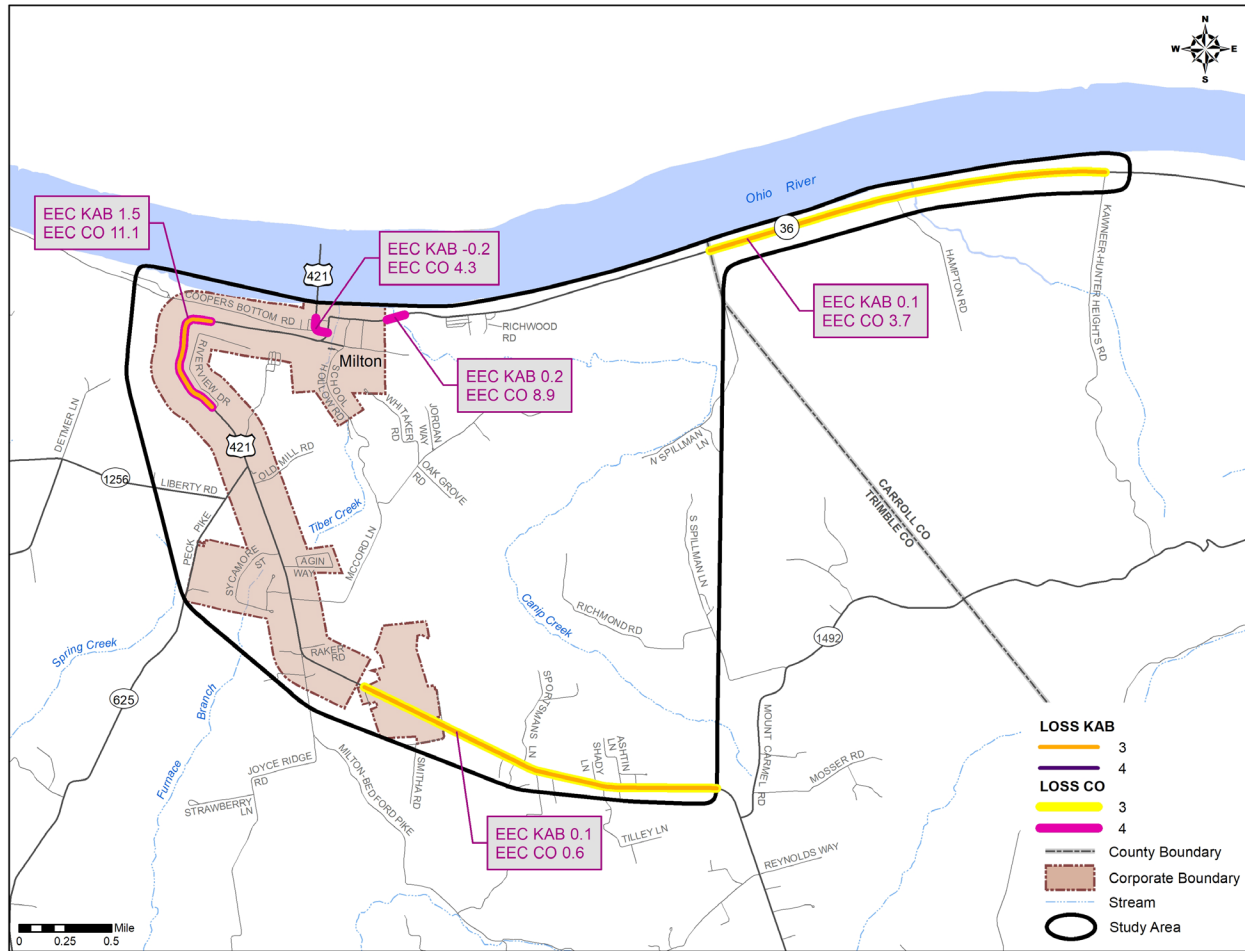


Figure 23: Segment EEC and LOSS

3.0 ENVIRONMENTAL OVERVIEW

The purpose of this environmental overview is not to quantify environmental impacts, but instead to identify potential environmental issues to consider during the project development process. This information should aid the project team in making decisions to avoid, minimize, and/or plan for mitigation of potential project impacts, as appropriate. Should future projects develop following this study, additional environmental studies will likely be required.

If there is a federal nexus (e.g., federal funds, lands, permits, etc.) on a future project, then the procedures established by the *National Environmental Policy Act* (NEPA) must be followed. NEPA requires, to the fullest practicable extent, that federal actions be interpreted and administered in accordance with its environmental protection goals. It requires an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment. The potential

environmental impacts and need for safe and efficient transportation must be weighed to reach a decision that is in the best overall public interest.

Figure 25 provides a visual summary of environmental resources around the study area.

3.1 NATURAL ENVIRONMENT

The natural environment includes all living and non-living things occurring naturally (not artificial or human-built). This includes aquatic ecology, such as rivers, streams, and wetlands; threatened and endangered species; farmlands; and geotechnical resources.

WATER RESOURCES

Numerous naturally occurring water resources exist within the study area. Most notably, the Ohio River flows generally east to west along the northern border of the state. Other named streams are:

- Tiber Creek, which drains into the Ohio River near KY 36 MP 0.15 in Trimble County
- Canip Creek, which drains into the Ohio River near KY 36 MP 0.45 in Trimble County, and
- Hampton Creek, which drains into the Ohio River near KY 36 MP 1.1 in Carroll County.

There are no Wild/Scenic Rivers or state or federally designated special use waters in the study area limits but a section of the Ohio River 2.5 miles downstream is designated as an Outstanding State Resource Water for the freshwater rabbitsfoot mussel (*Quadrula cylindrica cylindrica*), classified as a threatened species.

Associated floodplains follow all three named streams, with much of Lower Milton and the KY 36 corridor within the 100-year floodplain.



Figure 24: April 2025 Flooding (left) and historic flood levels (right) in Lower Milton

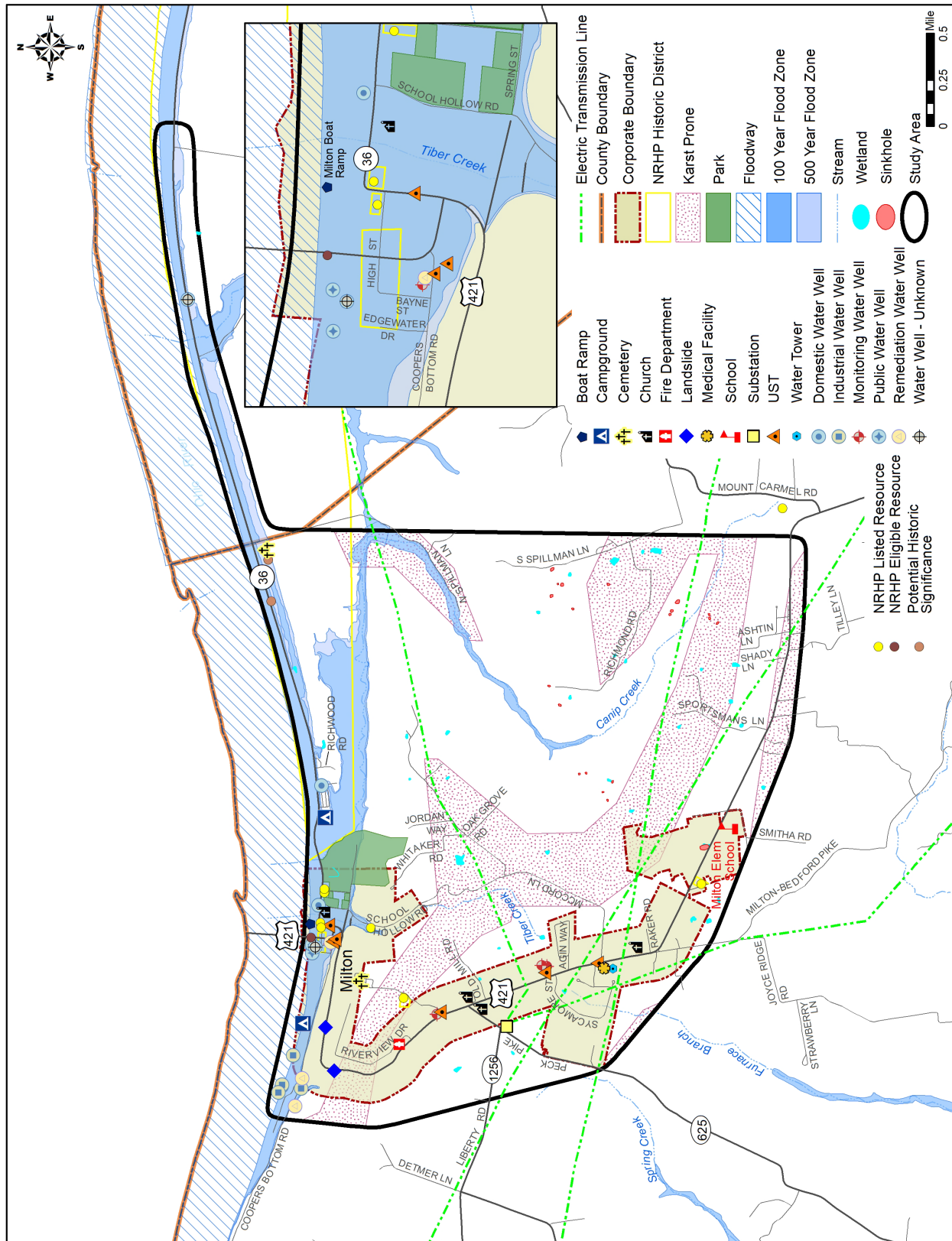


Figure 25: Environmental Overview

Much of Trimble County lies within the Source Water Protection Area for Louisville Water Company. Lower Milton is also designated as a Wellhead Protection Area (WHPA) though records show it is currently inactive. WHPA's are regulated to protect the public water supply. To minimize potential contamination, future project(s) drainage patterns in these areas would warrant special considerations during design, construction, and operation of the roadway. These could include best management practices (BMP) to minimize and treat stormwater runoff during both construction and roadway operations.

National Wetlands Inventory records 41 scattered wetlands beyond riverine habitat along the river and creeks, including primarily freshwater ponds.

Impacts to streams and wetlands require permit coordination with the US Army Corps of Engineers (USACE), US Coast Guard, and Kentucky Division of Water (KDOW), depending on the scale of the water resource and potential disturbance.

GEOLOGY

In February 2025, KYTC prepared a *Geotechnical Overview* (**Appendix C**) to identify considerations for the study area. The region falls in the Outer Bluegrass Physiographic Region, developed on Silurian and Ordovician-age limestones, shales, and shaly limestones. It is characterized by irregular, steep-sided hills and sinuous ridges separated by angular, closely spaced, narrow valleys. Surrounding bluffs rise 300-400 feet along the Ohio River. Ridgetops are prone to karst activity; there are no known faults in the area.

There are two abandoned quarries nearby: west of Timber Creek and south of Canip Creek. Sand and gravel from the glacial outwash of the Ohio River Valley has been dredged from the riverbed for aggregate.

The project area is prone to cut and fill slope stability failures. The driving force behind these instabilities can be attributed to groundwater movement, poor rock mass quality, deep colluvium accumulations, and steep hillside cut and fill situations. Geotechnical investigations⁹ in the 1990s examined a 300-foot scarp along northbound lane on Milton Hill eroding over the previous decades, mitigated with rails driven into the hillside with 6-10 feet of asphalt to level the roadway surface. Detailed boring logs are included with Memo L-039-1992. A tied-back wall with drainage improvements was recommended to stabilize the section.

For any future projects identified from this 2025 planning effort, presplit cut slopes of 1H:2V in bedrock are generally appropriate, with intermediate benches at 18-20 feet or 15-foot overburden benches. With interbedded limestones and shales, 2H:1V or flatter cut slopes with ditches to catch debris are

⁹ Online at https://kgs.uky.edu/kgswweb/KYTC/search_r.asp

recommended. Avoid cut slopes in ridge flanks where colluvium have accrued. Detailed explorations and geotechnical analyses will be needed should a Build concept advance. Future projects should consider KYTC's karst policy as described in *KYTC Design Memorandum No 12-05*¹⁰ for installation and maintenance of BMP during construction.

PROTECTED SPECIES

The US Fish and Wildlife Service (USFWS) maintained database of federally protected species are listed as endangered or threatened under the *Endangered Species Act*. As of September 2025, ten protected species potentially inhabit the study area. **Table 6** lists potential threatened and endangered species in the area. There are no critical habitats in the study area boundary.

Table 6: Listed Threatened and Endangered Species

Group	Name	Scientific Name	Status
Mammals	Gray bat	<i>Myotis grisescens</i>	Endangered
	Indiana bat	<i>Myotis sodalis</i>	Endangered
	Northern long-eared bat	<i>Myotis septentrionalis</i>	Endangered
	Tricolored Bat	<i>Perimyotis subflavus</i>	Proposed Endangered
Birds	Whooping Crane	<i>Grus americana</i>	Experimental
Amphibians	Eastern Hellbender	<i>Cryptobranchus alleganiensis alleganiensis</i>	Proposed Endangered
Clams	Fanshell	<i>Cyprogenia stegaria</i>	Endangered
	Pink Mucket (pearlymussel)	<i>Lampsilis abrupta</i>	Endangered
	Sheepnose Mussel	<i>Plethobasus cyphus</i>	Endangered
Insects	Monarch Butterfly	<i>Danaus Plexippus</i>	Proposed Threatened

Aquatic sampling with mussel surveys were conducted in summer 2009 within the Ohio River, Tiber Creek, and Canip Creek. Testing demonstrated low species diversity, potentially a reflection that sites lacked in-stream habitat with reduced water quality. Canip Creek was rated in better condition than Tiber Creek. Low mussel densities with no endangered species were revealed.

The *Migratory Bird Treaty Act* prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior USFWS authorization. Records note four species have the potential to occur in the study area: chimney swifts, field sparrows, red-headed woodpeckers, and bald eagles—which are also protected under the *Bald and Golden Eagle Protection Act*.

¹⁰ Online at <https://transportation.ky.gov/Highway-Design/Memos/Design%2012-05.pdf>

A habitat assessment may be needed in the early stages of project development for future project(s) to assess potential project impacts to threatened and endangered species. Projects that occur within an area of known bat habitat will require project-specific evaluation to assess appropriate minimization/mitigation measures. KYTC maintains a *Programmatic Conservation Memorandum of Agreement for Forest Dwelling Bats* to streamline measures to minimize impacts for Indiana and gray bats. For other federally listed species, specific ecological surveys may be required for projects that have the potential to impact habitat. Coordination with the USFWS Kentucky Field Office will be necessary to determine the need for future project-specific surveys.

FARMLAND CLASSIFICATIONS

Natural Resource Conservation Service (NRCS) classifies farmlands based on soil type. As shown in **Figure 26**, 14% of study area soils qualify as farmlands of statewide importance, with another 37-40% classified as prime farmlands. No protected easements or agricultural districts were identified within the study area. Should federal funds be used on future projects, the *Farmland Protection Policy Act* must be followed. If there is potential to convert farmland, coordination with the local NRCS office is required.

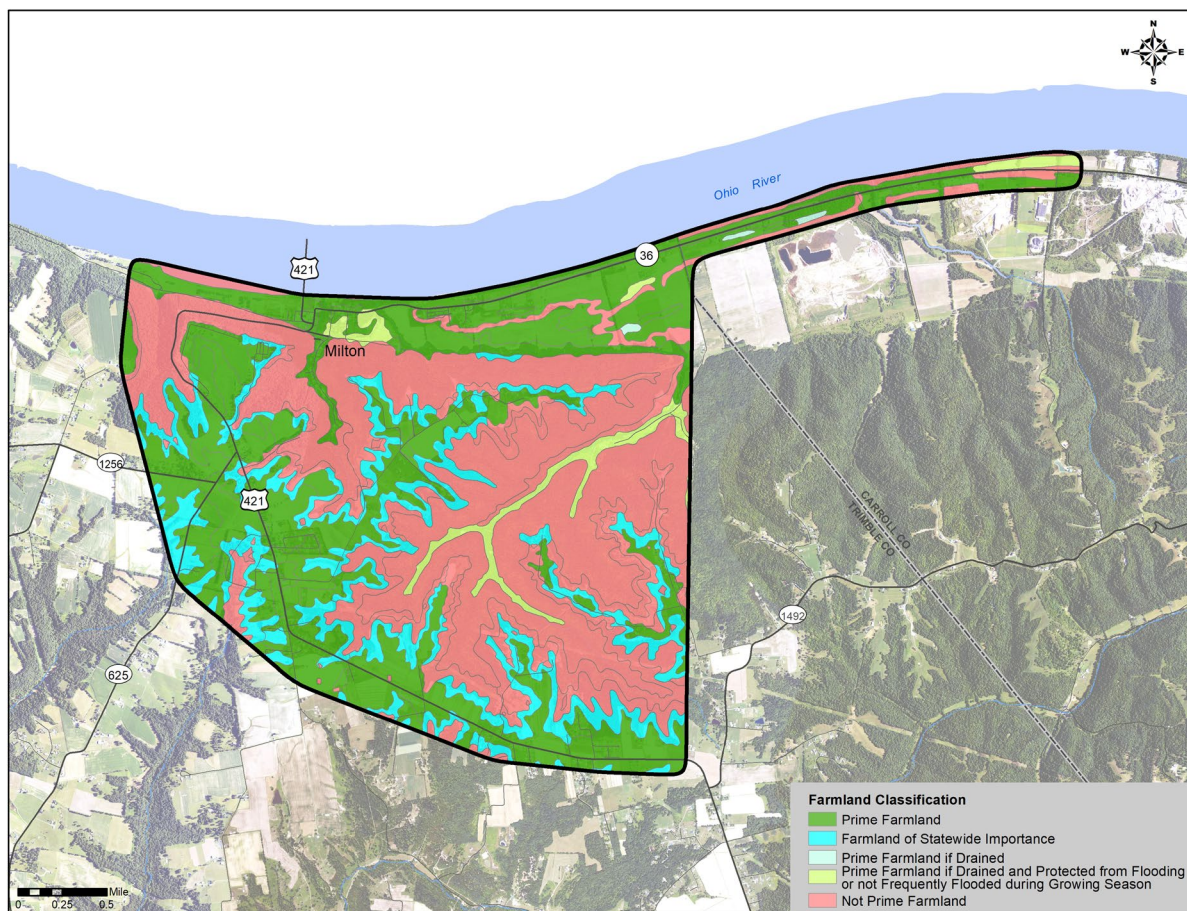


Figure 26: Farmland Soil Classifications

HAZARDOUS MATERIALS

A detailed third-party records search was conducted during March 2009 to identify potential hazardous materials concerns in the vicinity. At that time, four sites were noted in Milton though the query did not include the Carroll County portion of the current study area. Three represent Underground Storage Tanks (UST)--at the former Milton Save property on Coopers Bottom Road, at the former elementary school on Smitha Road, and at the Trimble County Farm Supply store (11300 US 421). The fourth was a lead inspection for property at 216 Coopers Bottom Road.

Current US Environmental Protection Agency (USEPA) records show additional USTs, noted as orange triangles in **Figure 25**. In addition, Martin Marietta Aggregates, Milton Plaza, and Dollar General are listed as RCRA¹¹ handlers.

Subsequent windshield survey did not reveal undocumented waste disposal sites, stressed vegetation, and/or stained soils indicative of underground storage tank and/or hazardous materials contamination. No other hazmat records were noted, although gas stations, industrial sites, and other commercial properties may contain additional USTs.

AIR QUALITY CONSIDERATIONS

USEPA has set up National Ambient Air Quality Standards for six criteria pollutants: ozone, lead, nitrogen dioxide, sulfur dioxide, carbon monoxide, and particulate matter (PM_{2.5} and PM₁₀). The region is currently in attainment for all criteria pollutants monitored by the USEPA.

To prove air quality conformity, federally funded transportation projects recommended for further development should be modeled and included in KYTC's statewide transportation improvement program (STIP) to ensure conformity requirements are satisfied.

3.2 HUMAN ENVIRONMENT

The human environment includes people and the resources they define: land use, community features, cultural historic resources, etc. Each could potentially be affected by future projects. The following sections identify these resources for consideration during any future project development phases. **Figure 25** shows corresponding locations.

¹¹ The *Resource Conservation/Recovery Act* (RCRA) regulates the management and disposal of solid and hazardous waste in the US.

LAND USE AND COMMUNITY RESOURCES

Milton is a home-rule city in northern Trimble County with a population around 600. The county has a rich agricultural heritage, historically relying on the river for transport and trade.

Current land use within Milton is a mix of residential, civic, and commercial uses fronting major highways, including US 421. By comparison, the KY 36 corridor is a mix of floodplains, agricultural fields, wooded lots, and rural residential land uses. Industrial uses dominate the far eastern end of the study area. Considering Trimble County as a whole, nearly 90% of the area represents agricultural uses.

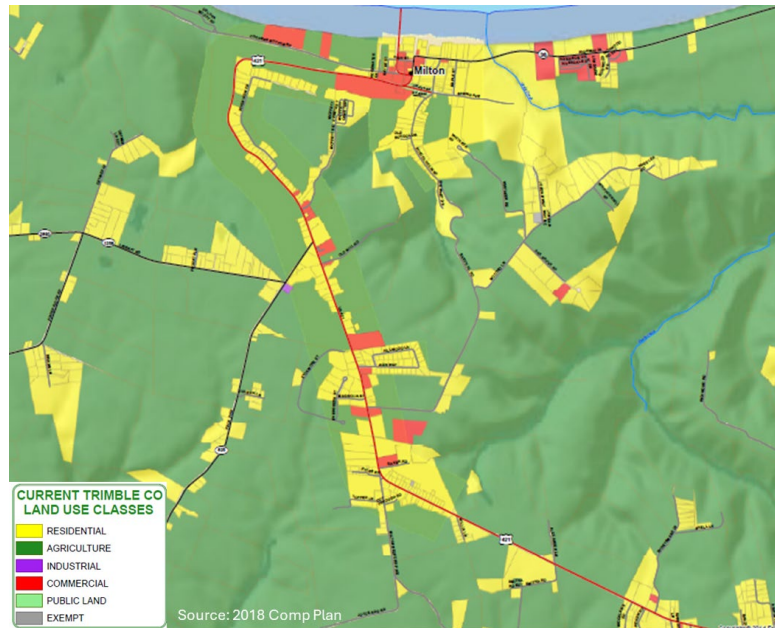


Figure 27: Milton Land Uses

Specific community resources within and serving the study area include:



Figure 28: Milton Elementary School

SCHOOLS. Trimble County middle and high schools are located in Bedford while Milton Elementary School (9245 Highway 421 North in Upper Milton) serves younger students.

MEDICAL. The nearest hospitals are located in Madison, Indiana or Carroll County. Emergency response is provided by Trimble County Emergency Medical Services (EMS) with eight full-time employees and three ambulances. The county's 2019 comprehensive plan notes Trimble EMS is the last remaining "basic life support" service in the Commonwealth with surrounding counties representing "advanced life support" certifications. A doctors office in Upper Milton also provides everyday family medical services for non-emergency needs.

CIVIC SERVICES. Government services for the city are based in the Milton Municipal Building at 10179 Highway 421 North. County services are provided out of Bedford, approximately 10 miles south along US 421. Law enforcement is provided by the Trimble County Sheriff, based in Bedford.

Milton Fire and Rescue maintains two stations: one in Upper Milton (1156 Highway 421 North) and another between Milton and Bedford. The department has 15 staff, two fire engines, and serves the entire county—including about 25 miles of Ohio riverfront.

PARKS. Milton City Park covers three acres in Lower Milton with ballfields, playground equipment, picnic shelters, and a walking trail. The park hosts youth sports leagues and community-wide social events. Additionally, much of the river frontage is devoted to privately owned campgrounds for seasonal visitors.



Figure 29: Milton Fire Station

CHURCHES. There are four churches within the study area limits:

- Milton Baptist Church, 10076 Highway 421
- Mount Byrd Christian Church, 92 Peck Pike
- Christian Life Church of Milton, 11100 Highway 421
- Milton Christian Church, 35 School Hollow Road

There are two known cemeteries in the study area limits:

- Moffett Cemetery overlooks the Ohio River bluffs from the end of Moffett Road. There are an estimated 2,000 burial sites on the property.
- An unnamed cemetery south of KY 36 near Spillman Lane with headstones dating from the mid-1800s.

Smaller cemeteries and individual burial sites may be found on private land, particularly in rural areas.

HISTORIC RESOURCES

Section 106 of the *National Historic Preservation Act of 1966* requires federal agencies to consider impacts to historic properties when making project decisions, in coordination with the State Historic Preservation Officer (SHPO).

A *Cultural Historic Overview* (**Appendix D**) was completed for the study area to identify properties listed or potentially eligible for listing on the National Register of Historic Places (NRHP). A records review found 96 previously surveyed resources within or adjacent to the study area. Windshield surveys during Spring 2025 identified two NRHP-listed districts, eight individually listed resources, and two new potentially significant resources that may be considered NRHP eligible upon formal evaluation.

The Third Street Historic District in Lower Milton was NRHP-listed in 1984, with six contributing resources dating to 1840-1890 notable for their architecture. Today, two of six residences remain, fronting High Street on either side of the Ohio River Bridge.

The Hunters Bottom Rural Historic District stretches along seven miles of the riverfront in Trimble and Carroll Counties. It was listed in 1976 for its contributions to the settlement of the area, commercial and agricultural development, and 19th century architecture. The district initially contained 33 contributing resources, but several have been demolished in the intervening decades.

Other NRHP-listed and potentially eligible resources are summarized in **Table 7**.

Table 7: Potentially Significant or NRHP-Eligible Resources

Name	ID	Status	Address	Condition
Bebelt House	TMM 7	Pending Listing	375 School Hollow Rd	Excellent
Masonic Lodge/General Store	TMM 12	Listed	112 Ferry St	Poor
Gunn's Furniture Store	TMM 15	Listed	1945 High St	Fair
Rowlett's Grocery	TMM 25	Listed	Ferry St	Demolished
Federal House	TMM 27	Listed	163 KY 36	Excellent
Federal House	TMM 28	Listed	201 KY 36	Excellent
Federal House	TM 55	Listed	KY 1492	Demolished
Federal House	TM 57	Listed	201 Moffett Rd	Excellent
Neal House	TM 59	Listed	79 Willis Ln	Excellent
Culvert/Stone Headwall	CRA 1	Potentially Eligible	KY 36	-
Cemetery	CRA 2	Potentially Eligible	KY 36	-

CRA 1 (**Figure 30**) is a clay-pipe culvert with a stone headwall, shown as early as 1914 mapping. It runs beneath KY 36, approximately half a mile west of the county line. It appears to be potentially significant under Criteria A and C for potential associations with early highway construction and as a rare example of culvert engineering and construction. Other stone features within the limits of the Hunters Bottom Historic District were not included as contributing in the nomination form but may warrant consideration as contributing elements.

CRA 2 is a small, unnamed cemetery visible from Spillman Lane. It appears to be potentially significant under Criteria A and C and meets Criteria Consideration D for its potential association with the settlement of Trimble County and for its nineteenth-century design and funerary art. Archival research and a closer examination of significance and integrity are necessary to make comprehensive recommendations of eligibility for either resource.



Figure 30: Potentially Historic CRA 1 culvert (left) and CRA 2 cemetery (right)

Should federal monies or permits be included in future projects, field survey and coordination with SHPO will be required to assess project effects on cultural historic resources.

From an archaeological perspective, records reviews show 12 previous surveys were completed with 12 recorded archaeological sites within the study area. None are listed but one (15Tm112) has been identified as potentially eligible. Soil data suggests there is a high potential for deeply buried, intact archaeological deposits along floodplains including the Canip and Tiber creek corridors. Additional information is on file with KYTC Division of Environmental Analyses. Further testing in undisturbed areas and coordination with SHPO will be needed should a Build option advance.

SOCIOECONOMIC PROFILE

KIPDA completed a socioeconomic study for the corridor (**Appendix E**) to highlight potential areas statistically likely to contain elevated concentrations of minority, elderly, low-income, limited English proficiency (LEP), and/or disabled populations. The study area covers portions of four US Census block groups, shown in **Figure 31**. Statistics are summarized in **Table 8**, reported from 2022 American Community Survey five-year estimates. Concentrations for the encompassing county serve as the reference threshold, highlighting any block group populations exceeding this level.

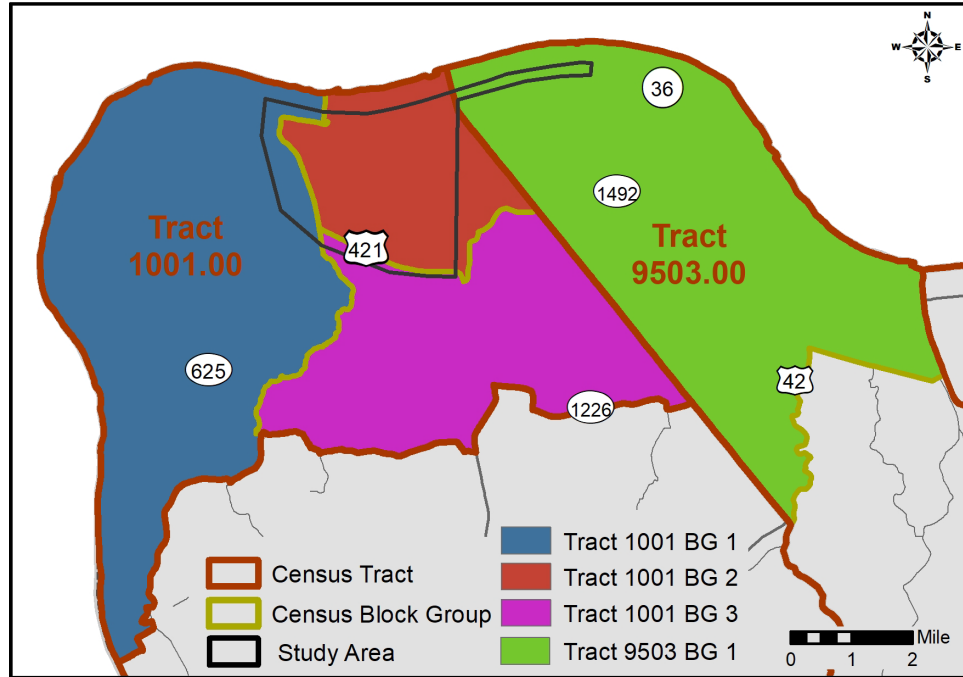


Figure 31: Census Tracts and Block Groups

Table 8: Socioeconomic Metrics for Study Area Block Groups

Geography	Population	Minority	Low-Income	Age 65+	Disabled	LEP
United States	331 million	41.1%	12.5%	16.5%	15.4%	8.2%
Kentucky	4.5 million	16.8%	16.1%	16.8%	21.1%	2.4%
KIPDA Region	1.0 million	29.39%	12.4%	16.3%	16.5%	3.9%
Milton	633	31.1%	7.9%	23.5%	23.5%	3.3%
Trimble County	8,510	7.8%	13.7%	17.6%	24.0%	1.7%
CT 1001 BG 1	1,254	2.6%	13.3%	22.1%	24.7%	0%
CT 1001 BG 2	1,142	22.7%	2.5%	25.0%	31.6%	0.2%
CT 1001 BG 3	997	2.2%	8.2%	14.6%	27.8%	0%
Carroll County	10,842	12.7%	20.3%	16.1%	23.5%	2.7%
CT 9503 BG 1	1,357	19.8%	21.2%	23.1%	19.6%	0%

As shown, all block groups demonstrate population concentrations greater than the countywide threshold for one or more demographic categories. LEP populations were not identified as a likely concern. It should be noted that block groups encompass much larger areas than the study area limits.

SECTION 4(F)

Section 4(f) of the *Department of Transportation Act of 1966* is a substantive law that applies to federally funded projects using land from publicly owned public parks, recreation areas, and wildlife or waterfowl refuges and publicly or privately owned historic sites eligible for or listed in the NRHP.

Section 4(f) requires that transportation projects avoid use of such protected properties unless no feasible and prudent alternative exists and project planning minimizes harm to Section 4(f) sites.

Section 4(f) protected properties within the study area include public parks and any historic resources that may meet NRHP criteria. No wildlife and waterfowl refuges are found within the study area.

SECTION 6(F)

The *Land and Water Conservation Fund (LWCF) Act* was established to safeguard natural areas, water resources, and cultural heritage, and to provide recreation opportunities. The fund helps strengthen communities, preserve history, and protect the national endowment of lands and waters. The LWCF provides federal grants to acquire land for outdoor recreation, protect important natural areas, and develop or renovate outdoor recreation facilities (e.g., campgrounds, picnic areas, swimming facilities, etc.). Section 6(f) of the LWCF Act addresses protection from permanent conversion of outdoor recreation property acquired or developed using LWCF funds. Impacts must be addressed when projects would result in permanent conversion of grant-assisted facilities. No Section 6(f) investments lie within the study area.

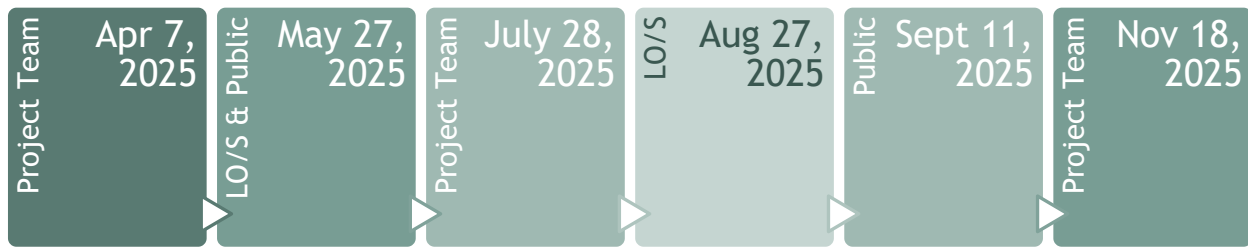
NOISE CONSIDERATIONS

Federally funded transportation projects typically require consideration of noise impacts. Noise sensitive receptors include residential areas, parks, cemeteries, hospitals, churches, schools, etc. Commercial properties with exterior uses can also be considered noise sensitive. Specific traffic noise impact analyses may be needed as part of future project development activities if projects are shown to add capacity or shift traffic closer to sensitive receptors.

As study corridors have access by permit with numerous intersections and driveways providing access to adjacent low density land uses, it is unlikely that noise mitigation measures would be recommended even if noise increases were predicted.

4.0 INITIAL COORDINATION EFFORTS

The project team includes representatives from KYTC Central Office, KYTC Districts 5-6, KIPDA, and the consultant. The project team met at key milestones over the course of the study. Detailed meeting summaries are arranged chronologically in **Appendix F**.



4.1 FIRST PROJECT TEAM MEETING

The project team met April 7, 2025, to review existing conditions information. The team reviewed area planned projects, previously completed studies, and existing conditions including roadway geometry, traffic flow, crash trends, and environmental resources as presented in **Chapters 1.0** through **3.0**. Upcoming community outreach efforts were also discussed.

4.2 FIRST LOCAL OFFICIAL/STAKEHOLDER MEETING

On May 27, 2025, the project team met with local officials and stakeholders (LO/S) at Milton Elementary School to present an overview of existing roadway conditions and to gather local insights on transportation needs in the study area. Group discussions included the following:

- The turn at KY 36/Ferry Street, the Canip Creek Bridge, Milton Hill, and improved sidewalks are all important issues.
- The Ohio River Bridge has a nice pedestrian path that is regularly used. But there are no connections once you get off the bridge in Milton. There are pedestrians who regularly walk KY 36 from the trailer park east of town to the DQ and across the bridge into Madison. Walking along the narrow Canip Creek bridge is especially concerning.
- While KY 36 is a designated bike route, no cyclists use it today.
- The runaway truck ramp is a unique feature. Nearby residents have seen trucks use it 2-3 times over the past decade. However, many passenger cars assume it is roadway and attempt to drive across it to Spring Street.
- Raising KY 36 would help reduce flooding impacts. Raising the bridge over Canip Creek could open the creek to recreational boat traffic and attract tourists.

The group also brainstormed opportunities to boost public engagement for the next set of meetings.

4.3 INITIAL PUBLIC MEETING

The project team also hosted a public open house at Milton Elementary School on May 27 after the LO/S meeting. The meeting was advertised on social media, via the study website, and radio ads, with a press release issued to alert local media. The meeting was advertised on the light-up sign in front of the school for a few days leading up to the event. During the meeting, a series of large-scale meeting boards were displayed, with members of the project team circulating to answer questions and discuss the project. Following the in-person meeting, exhibit boards were displayed in the Trimble County Library in Bedford and online with the website/survey further promoted on Facebook.

As part of the public outreach campaign, a project webpage was launched through the KYTC District 5 website. Basic information about the project was shared, including a link to a survey and copies of the meeting exhibits. Throughout June, 81 surveys collected input regarding existing transportation needs.

Summarized in **Figure 32**, the greatest concerns in the study area were stability of Milton Hill, narrow pavement widths, and the KY 36 bridge at Canip Creek. Cyclist needs were the lowest rated, with zero responses listing it as their most important priority.

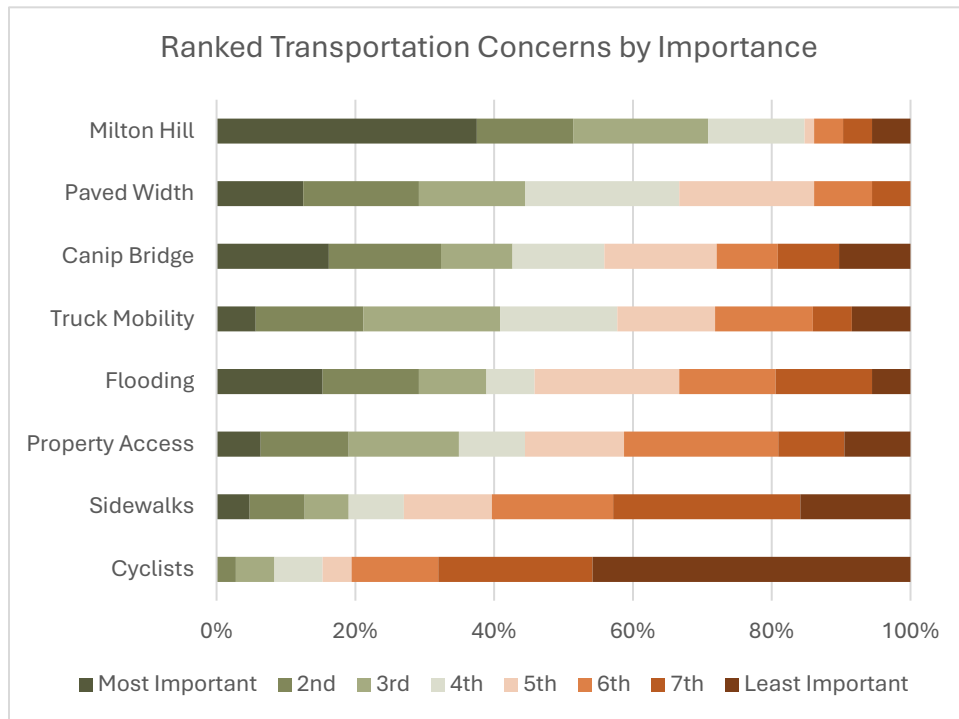


Figure 32: Survey Responses on Study Area Needs

Other questions asked about the importance of different components of the planning study. The majority of survey participants agreed that improvements are warranted for each of the three main objectives presented in **Chapter 1.0**.

Do you think improvements to US 421 Milton Hill are warranted?	<u>Yes</u> 66 81%	<u>Yes, but on Existing</u> 9 11%	<u>No</u> 5 6%
Do you think improvements to help trucks travel through Lower Milton are warranted?	<u>Yes</u> 56 69%	<u>Yes, but few impacts</u> 21 26%	<u>No</u> 3 4%
Do you think improved bicycle and/or pedestrian connections are needed in Lower Milton?	<u>Yes</u> 53 65%	<u>No</u> 25 31%	

5.0 2050 NO-BUILD TRAFFIC AND OPERATIONS

KYTC Planning's Modal Branch provided a *Traffic Forecast Report*, included as **Appendix A**. Comparing projected growth patterns from historic traffic counts, population projections, local development goals, and the statewide travel demand model, a 0.5% annual growth rate was applied to estimate 2050 traffic volumes. Daily traffic trends are summarized in **Table 9** with AM and PM peak hour turning movements shown in **Figure 33**.

Table 9: 2050 No-Build Daily Traffic

Segment	2025 Daily Volume	2050 Daily Volume	Trucks
US 421 MP 15.45-18.675 (Milton Hill)	5,700	6,500	9%
US 421 MP 18.675+ (to Indiana)	9,200	10,500	11%
KY 36 Trimble Co.	4,000	4,500	14%

Based on forecast 2050 peak hour volumes, the current configuration provides adequate capacity for existing traffic by volume. All movements operate at LOS A-B with less than 16 seconds of delay per vehicle on all approaches. Queues may back up during busy periods, especially when oversize vehicles require additional width to complete turns.



Figure 33: 2050 No-Build AM (PM)
Traffic

6.0 CONCEPT DEVELOPMENT

Relying on the data collection and analyses described above, analysts were tasked to define a list of potential improvement concepts that could address observed needs. Build concepts were developed based on review of existing geometric deficiencies, existing and future traffic operations, crash concentrations, field reconnaissance, environmental constraints, and input from community members and the project team. Concepts were organized into three categories: Spot Improvements, Improve Existing Corridors, and New Connectors.

It is important to note two key facts when considering these concepts:

- **These are planning-level concepts.** The project team is looking at broad corridors to illustrate a long-term vision, not actual alignments. Any recommended Build concepts would still have to compete for funding and progress through detailed design phases before an exact footprint is known.
- **The study can recommend some, all, or none of the options to advance.** Planning is about weighing costs and impacts to inform decision-making. It can show why some options should not advance as well as why others should.

Additional details about recommended Build concepts are presented on one-page project summary sheets in **Section 8.4**.

6.1 SPOT IMPROVEMENTS

The first group of Build Concepts look at relatively small spot improvements to target relatively low cost, low impact solutions.

Concept A. KY 36 at Ferry Street. This intersection improvement realigns the sharp turn along KY 36 at Ferry Street (**Figure 34**) to accommodate turning trucks. Nine crashes were reported on this stretch during 2019-2023; crashes were a mix of types with one resulting in injuries. Both buildings to the south are NRHP-listed and have minimal setbacks, constraining geometric solutions.

The proposed improvement shifts KY 36 north towards the river, softening the curve without impacting either historic building. This is consistent with the recommended solution in the 2012 *Pedestrian and Bicycle Facilities Study*. It adds width for truck turns, replaces the culvert over Tiber Creek, and extends the sidewalk network. This concept relocates one business and likely displaces 1-2 long-term campers on the same property but maintains access to the public boat ramp. Shifting the intersection south was also considered but dismissed as it would be difficult to maintain a direct connection to High Street.



Figure 34: Turning Trucks at KY 36/Ferry Street

Should continuing deterioration of TMM 12—the white building in **Figure 34**—compromise its integrity such that it no longer meets NRHP eligibility guidelines, a less impactful in-place solution could be considered.

Concept B. US 421 at KY 36. This intersection improvement is contained within existing pavement, converting the US 421/KY 36 intersection to a three-way stop with advance warning signs for northbound US 421 motorists traveling down Milton Hill. Access around the Dairy Queen is better defined, through striping or positive separation, with the alley converted to a right-out only configuration. Delineators or rollover curb could discourage use of the runaway truck ramp in non-emergency situations. **Figure 35** presents a schematic of the proposed improvement.

During the five-year analysis period, 14 crashes were reported within 150 feet of the intersection representing a mix of crash types and directions.



Figure 35: Spot B Concept

Concept C. Downtown Sidewalk Loop. Concept C adds a 5-foot sidewalk along Coopers Bottom Road, Bayne Street, and High Street to connect the Ohio River Bridge sidewalk to existing paths along KY 36 in town. Cyclists could be accommodated on the same routes, sharing the travel lanes with low-speed local motorists. Driveways along US 421 make a shorter connection challenging without access changes that received pushback during 2015 design work.

Concept D. Canip Creek Bridge. Bridge 112B00002N was built in the 1930s, provides 20 feet of clearance between curbs, and is rated in poor condition. Over 2019-2023, 11 crashes were reported on the bridge; 64% were opposite direction sideswipes and five involved commercial vehicles.

Concept D replaces the aging bridge with a wider structure, including a sidewalk. Two variations were considered: rebuilding on alignment with one lane open to traffic during construction or constructing an offset bridge so the existing structure can carry two-way traffic throughout construction.

INTERSECTION CONTROL EVALUATIONS

KYTC’s Intersection Control Evaluation (ICE) policy provides a data-driven, performance-based framework to screen different intersection configurations, predicting both safety and traffic operational measures. The tool is set up for a range of traditional and innovative intersection layouts, as well as grade-separated interchanges. Planning studies, like this one, include Stage 1 analyses to screen options while Stage 2 helps select a preferred layout in future design phases. ICE calculations come from high-level screening spreadsheets produced by FHWA: “CAP-X” for capacity and the SSI Score Calculator Tool for safety. The “SSI” safety score aligns with the Safe System Approach, derived based on conflict point types, exposure, severity probabilities, and complexity. Safety scores for intersections range from 0-100 with higher numbers representing better performance—that is, lower chances for fatalities or serious injuries.

The US 421/KY 36 intersection was analyzed per the Stage 1 ICE guidance with stop-control, a signal, or roundabout providing reasonable capacity and safety scores. It should be noted that the site’s topography, roadway curvature, and adjacent land uses substantially constrain which intersection types are feasible.

Table 10: Stage 1 ICE Results at US 421/KY 36

Configuration	CAP-X v/c	CAP-X Ped Score	SSI Score	Notes
All-Way Stop	1.17	4.25	99	Synchro shows LOS A/B
Signal	0.68	5.10	99	May meet signal warrants by 2050
Roundabout	0.49	5.35	100	Constrained by terrain and adjacent buildings

6.2 IMPROVE EXISTING CORRIDORS

Another group of Build Concepts consider larger scale improvements along existing highway corridors.

Concept E. Reconstruct US 421 Milton Hill. KYTC records were queried to estimate the scale of maintenance investments associated with the upkeep of Milton Hill. During the past ten years (2015-

2024), over 12,000 labor hours were logged along US 421¹² in Trimble County, including tasks like repairing shoulders, clearing rockfalls, emergency repairs, patching potholes, etc.

Several Build variations were explored to address crash trends and stability concerns along existing US 421 Milton Hill, the highest rated local concern according to public survey data. Two alignments with two different typical sections were considered to provide an estimated range of costs and impacts; more detailed design work and geotechnical investigations are needed to determine the feasibility should one of these concepts be recommended to advance.

Concept E-1 shifts US 421 uphill far enough to maintain one lane of traffic during construction. Concept E-2 shifts US 421 farther uphill, far enough to maintain two lanes of traffic during construction. Either widens the highway to provide 11-foot lanes with 4-foot paved shoulders. Beyond the pavement, typical sections assume laying back the hillside with a 1.5V:1H slope or constructing a continuous soil nail wall with benching at the tallest cuts near the MP 17.9 curve.

Basic Wall Types	
A TIE-BACK WALL is built from the bottom up, with vertical beams supporting timber or concrete between. Cables set into underlying rock help secure the structure, with extra fill added between the existing ground and newly built wall.	A SOIL NAIL WALL relies on closely spaced rods driven into a slope to increase its strength. A steel grid and concrete face are added to the surface. This configuration can be built from the top down and is often faster and less expensive than other wall options.

Table 11 summarizes key impacts for different Concept E combinations. Concept E-2 variations push further into the hillside, leading to greater property impacts on the hilltop. However, it shifts the highway further from the downhill slope that contributes to stability concerns. Conversely, Concept E-1 variations have fewer hilltop impacts but less leeway from the downhill cross-slope.

Table 11: Concept E Comparison

Concept	Relocations	Earthwork
E-1 Sloped	10-13	Medium
E-1 Wall	1-4	Low
E-2 Sloped	14-24 & cemetery	High
E-2 Wall	4-10	Medium

¹² OMS reports vary how MP limits are coded. Any records entirely beyond Milton Hill were excluded from the query though some workorders include longer segments. For example, a maintenance activity linked to MP 10-18.8 would be counted as there is no way to distinguish which costs are associated specifically with the hillside.

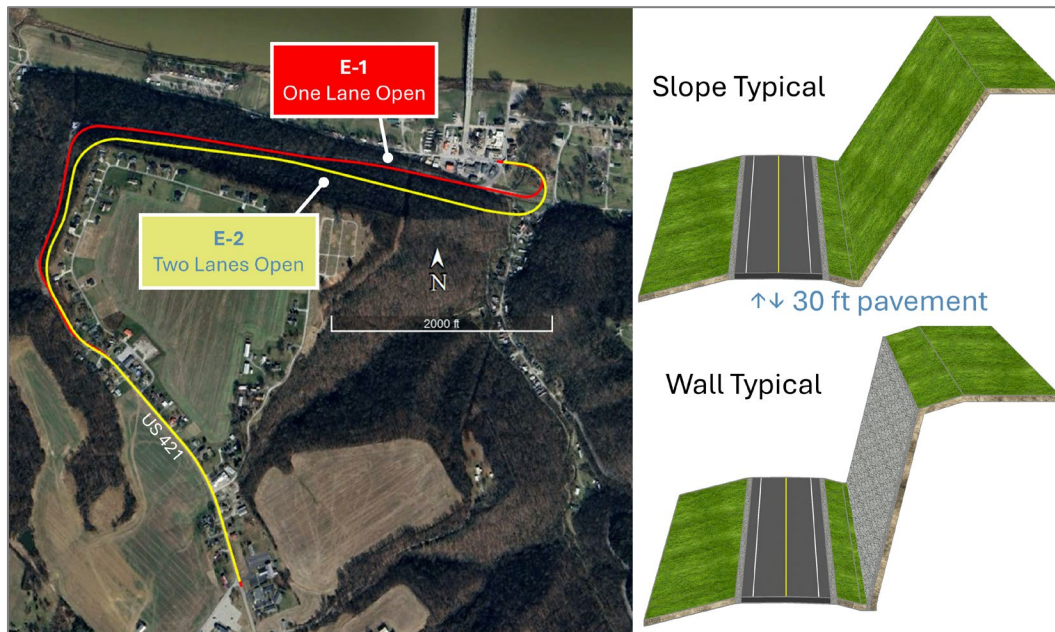


Figure 36: Concept E Variations

With either E-1 or E-2, the sloped typical section leads to a larger footprint with more earthwork—including more impacts for hilltop properties. Conversely, the walled typical section leads to a smaller footprint but increases upfront construction costs and long-term maintenance requirements. In either scenario, the wall is nearly a mile in length.

Concept F. Widen KY 36. KY 36 today provides 22 feet of pavement; the 10-mile section between Milton and Carrollton is a designated US Bike Route but represents a gap in the state’s freight network. Concept F widens KY 36 for 4.3 miles through the study area to provide 12-foot lanes with 4-foot paved shoulders. A sidewalk stretches 0.9 miles from Concept A near Ferry Street to campgrounds near Richwood Road. The corridor passes through the Hunters Bottom Rural Historic District and is expected to result in 1-2 relocations.

6.3 NEW CONNECTORS

A third set of Build Concepts look at new alignment options to provide a connection between Upper and Lower Milton. This planning study started with a wide range of new corridor options (**Figure 37**), trying to find options that minimized costs and impacts. The three most competitive options advanced for a closer look. Each assumes 30 feet of total pavement with a 45-mph design speed. Disturb limits conservatively assume 2V:1H cross-slopes but this could change upon detailed design and geotechnical investigations should a new corridor advance.

- Blue and Pink corridors shown mimic public suggestions but would be too steep.

- White improves existing Barth Hill and School Hollow roads but would impact many homes.
- Orange would impact the city park and water treatment plant.
- Yellow lies within the historic district and would route more trucks through tight KY 36 turns.

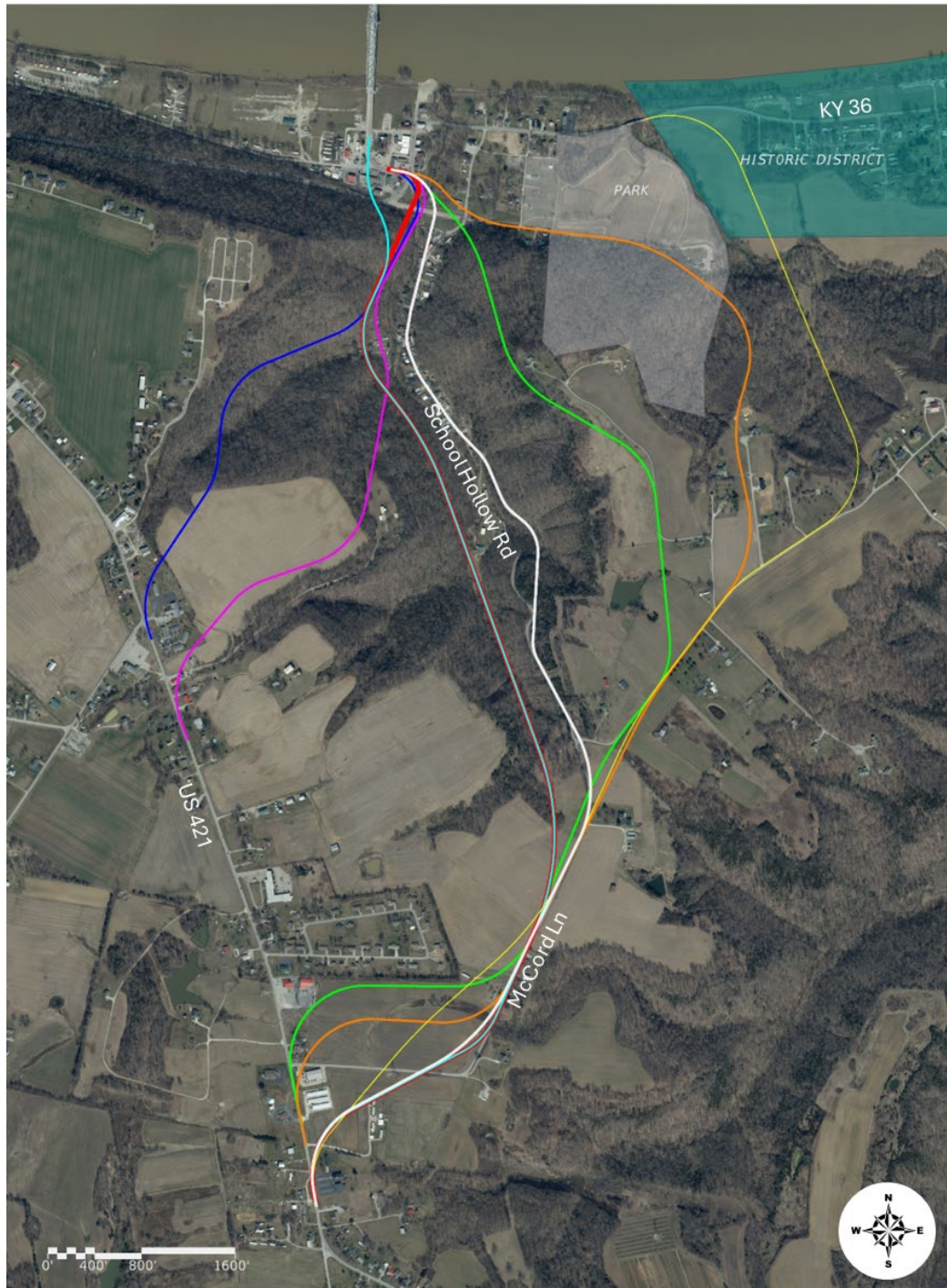


Figure 37: Range of New Alignment Connectors Considered

Concept G. East of School Hollow Road. Shown as the green line in **Figure 37**, Concept G follows a section of McCord Lane and climbs down the bluffs east of School Hollow Road. It is 2.3 miles long with a maximum grade of 6%. It requires a huge amount of earthwork and 12-20 relocations.

Concept H. West of School Hollow Road. Shown as the red line in **Figure 37**, Concept H follows a section of McCord Lane then climbs down the bluffs west of School Hollow Road. It is 2.2 miles long with moderate earthwork and an estimated 8-10 relocations. The maximum grade is 5.5%; **Figure 38** presents one possible configuration to connect to the existing street network in Lower Milton. Redundant sections of KY 36 and US 421 (shaded gray on the map) could be eliminated or converted to local streets.



Figure 38: Possible Lower Milton Connection Option for Concept H

Concept I. Raised Tie to Bridge. Shown as the teal line in **Figure 37**, Concept I closely matches Concept H but at the north end, it lines up straight with the Ohio River Bridge to stay above the floodplain. It is 2.2 miles long with a 6% maximum grade and moderate earthwork. It is estimated 8-10 homes and businesses require relocation. **Figure 39** presents one possible configuration to connect to the existing street network in Lower Milton.



Figure 39: Possible Lower Milton Connection Option for Concept I

6.4 SECOND PROJECT TEAM MEETING

The project team met July 28, 2025, to discuss initial Build concepts considered to date. The team reviewed existing conditions and environmental resources, discussed merits of various concepts, and considered unit cost assumptions. Key discussion items included accommodations for bicyclists, need for the runaway truck ramp, and upcoming community outreach efforts.

6.5 COST ESTIMATES

Planning-level design concepts represent a high-level look at proposed improvements: around 10-20% of an engineered solution with the remaining details to be worked out in future project development phases. The intent is to provide estimated costs, benefits, and impacts so decision-makers can weigh different options and focus later design work on best fit solutions. But the extent of unknowns at the planning stage means there are large contingencies to consider when estimating costs. To account for these uncertainties, cost estimates progress through a three-stage process:



BID-BASED ESTIMATES

Planning-level designs for Build concepts were used to estimate preliminary quantities of high-cost construction items like earthwork and pavement. Construction costs were tabulated using Bid Express average unit bid prices for recent construction bids in Trimble, Carroll, Henry, and Gallatin counties. Parametric factors were applied to account for drainage, traffic control, mobilization, and miscellanea. A 30% contingency factor was also applied to construction cost totals. KYTC District 5 provided right-of-way and utility cost estimates based on conceptual modeled disturb limits, aerial imagery, approximate locations of property lines, and utility records. Design phase costs are estimated at 15% of construction estimates up to \$7 million maximum.

Planning-level cost estimates by phase (i.e., design, right-of-way acquisition, utility relocations, and construction) are presented in **Table 12**. Costs are presented in 2025 dollars, rounded to reflect a reasonable level of precision.

Table 12: Bid-Based Build Costs by Phase

Concept	D	R	U	C	Total
Spot Improvements					
A KY 36 at Ferry St	\$0.8M	\$0.9M	\$0.3M	\$5.5M	\$7.5M
B Restripe US 421/KY 36	-	-	-	\$90k	\$90k
C Sidewalk in town	\$50k	\$500k	-	\$300k	\$900k
D-1 Canip Creek Bridge	\$500k	\$250k	\$200k	\$3.5M	\$4.5M
D-2 Canip Creek Bridge Shifted	\$1.3M	\$0.4M	\$0.5M	\$8.7M	\$11.0M
Existing Corridors					
E-1 Milton Hill – Sloped	\$2.0M	\$3.5M	\$1.1M	\$10M	\$17M
E-1 Milton Hill – Wall	\$3.0M	\$2.2M	\$1.1M	\$19M	\$25M
E-2 Milton Hill – Sloped	\$4.0M	\$9.6M	\$1.1M	\$27M	\$42M
E-2 Milton Hill – Wall	\$7.0M	\$3.8M	\$1.1M	\$47M	\$59M
F Widen KY 36/Sidewalk	\$3.0M	\$3.0M	\$2.5M	\$18M	\$27M
New Alignments					
G East of School Hollow	\$7.0M	\$9.0M	\$0.9M	\$210M	\$230M
H West of School Hollow	\$7.0M	\$6.7M	\$0.6M	\$49M	\$63M
I Raised Tie to Bridge	\$7.0M	\$7.5M	\$0.4M	\$53M	\$68M

RISK-BASED CONTINGENCIES

The traditional project development process, illustrated in **Figure 40**, involves several phases before construction can begin. It starts with project-level planning, followed by design, right-of-way acquisition, utility relocations, construction, and ultimately maintenance phases. Unique risk factors can emerge at each stage: challenges such as public opposition, environmental investigations, unforeseen geotechnical challenges, and redesigns or alternative approaches due to unexpected conditions.

To account for these uncertainties, bid-based construction costs from **Table 12** were factored up to account for unexpected conditions that could increase construction costs.

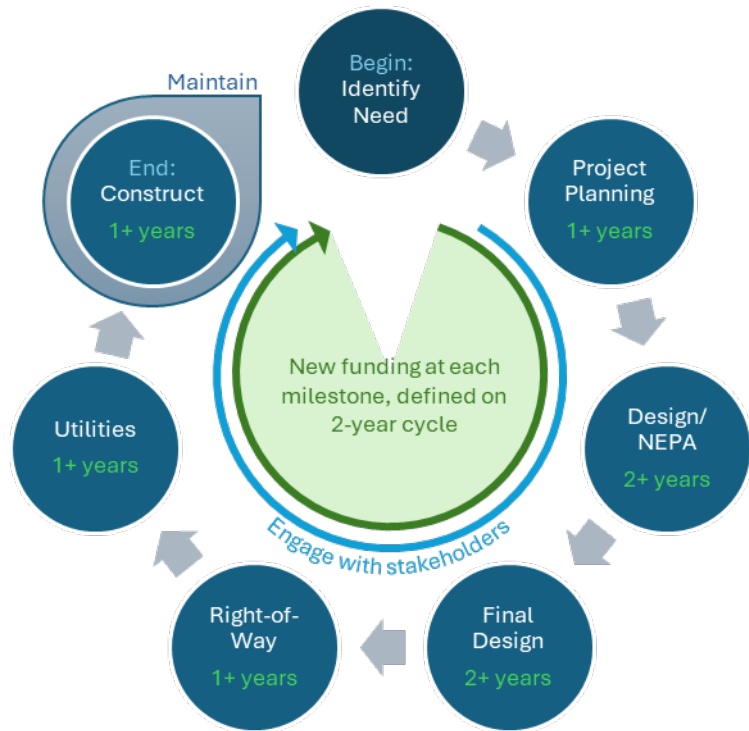


Figure 40: Typical Project Development Process

- Environmental risks include items like mitigation measures for stream impacts, undiscovered archaeological deposits, or contaminated soils. A “worst case” estimate for unexpected environmental complications is assumed at 20% of total earthwork costs.
- Geotechnical risks include contingencies like finding poor quality rock or moving greater quantities than expected as concepts are based on Lidar contours rather than survey data. Unexpected geotechnical cost increases are assumed at 20-30% of total earthwork costs.
- Right-of-way costs can increase if project footprints are larger than expected—either because designs evolve or property limits do not match public GIS extents. Public controversy, complex ownership structures, or unwilling sellers can also increase costs. A “worst case” estimate for unexpected right-of-way is assumed at 20-30% of bid-based right-of-way costs.
- Utility costs can increase if buried lines are not identified early in the process or upon coordination with individual utility companies. Unexpected utility risks are assumed at 20-30% of bid-based utility estimates.

- Scope changes occur regularly throughout design—for example, advancing a wider pavement section, softening a curve shifting the alignment, or incorporating an innovative intersection type. A “worst case” estimate for scope changes is assumed at 25-30% of total bid-based construction costs.
- Construction unit costs change frequently, with risk factors accounting for items like competition, haul routes, weather delays, inefficiencies, working near traffic, etc. Construction contingencies are assumed at 30% of total pavement costs.

Each of these risk factors are assumed to have a 50% likelihood to occur so 50% of the “worst case” assumptions for each risk category were added to bid-based costs. Details are presented in **Appendix G** for each Build concept. **Table 13** summarizes factored costs incorporating risk-based contingencies, presented in 2025 dollars.

Table 13: Risk-Factored Build Costs by Phase

Concept	Bid-Based DRUC	Risk-Factored Construction	Risk-Factored DRUC
Spot Improvements			
A KY 36 at Ferry St	\$7.5M	\$6.4M	\$8.2M
B Restripe US 421/KY 36	\$90k	\$100k	\$100k
C Sidewalk in town	\$900k	\$390k	\$950k
D-1 Canip Creek Bridge	\$4.5M	\$4.1M	\$5.0M
D-2 Canip Creek Bridge Shifted	\$11.0M	\$10.4M	\$12.0M
Existing Corridors			
E-1 Milton Hill – Sloped	\$17M	\$13M	\$19M
E-1 Milton Hill – Wall	\$25M	\$22M	\$28M
E-2 Milton Hill – Sloped	\$42M	\$34M	\$48M
E-2 Milton Hill – Wall	\$59M	\$55M	\$65M
F Widen KY 36/Sidewalk	\$27M	\$23M	\$31M
New Alignments			
G East of School Hollow	\$230M	\$270M	\$290M
H West of School Hollow	\$63M	\$61M	\$74M
I Raised Tie to Bridge	\$68M	\$66M	\$80M

TIME-BASED ESCALATION

Each phase of the project development process can potentially take a year or more to complete depending on the project’s size and complexity. Each phase also needs added funding, typically identified through the biennial Highway Plan. For large-scale projects, securing sufficient funding often requires competing against other projects statewide across multiple budgetary cycles. As projects advance, uncertainty and risk continue, and the time value of money becomes a critical factor in long-term estimates. A two-year delay to secure funding can increase phase costs by 10%—even if nothing about the project itself changes.

As prioritization influences anticipated timelines, time-based factors are applied later in the process and discussed in **Section 8.3**.

6.6 TRANSPORTATION BENEFITS

Predicted crash reductions were weighed against risk-factored project costs. Safety benefits were assumed to accrue over a 20-year planning horizon. A benefit-cost ratio (BCR) greater than 1.0 suggests benefits exceed costs, suggesting the project is worthwhile. **Table 14** summarizes results of the benefit-cost analyses. Safety benefits were calculated based on one or more factors from the Crash Modification Factor (CMF) Clearinghouse.¹³ Travel time savings were derived from anticipated travel speeds and corridor lengths. It should be noted that BCR for federal grants typically require a different approach to calculations.

Table 14: Benefit-Cost Analyses

Concept	Risk-Factored DRUC	Annual Benefits	BCR
Spot Improvements			
A KY 36 at Ferry St	\$8.2M	\$82k	0.2
B Restripe US 421/KY 36	\$100k	\$120k	20+
C Sidewalk in town	\$950k	N/A	N/A
D-1 Canip Creek Bridge	\$5.0M	\$13k	0.1
D-2 Canip Creek Bridge Shifted	\$12M	\$17k	<0.1
Existing Corridors			
E-1 Milton Hill – Sloped	\$19M	\$350k	0.4
E-1 Milton Hill – Wall	\$28M	\$350k	0.3
E-2 Milton Hill – Sloped	\$48M	\$350k	0.1
E-2 Milton Hill – Wall	\$65M	\$350k	0.1
F Widen KY 36/Sidewalk	\$31M	\$1.0M	0.7
New Alignments			
G East of School Hollow	\$290M	\$1.5M	0.1
H West of School Hollow	\$74M	\$2.0M	0.5
I Raised Tie to Bridge	\$80M	\$2.3M	0.6

As shown, few improvements result in BCRs greater than one, indicating monetized safety or travel time benefits do not outweigh capital costs. It should be noted that improved sidewalks provide additional benefits that are difficult to quantify at the planning stage—such as quality of life and increased economic revenues for adjacent businesses.

¹³ Online at <https://cmfclearinghouse.fhwa.dot.gov/>

6.7 ENVIRONMENTAL IMPACTS

In addition to monetary costs, effects on the human and natural environment were also weighed. Some of the Build options are contained within existing right-of-way and would result in minimal impacts. Others have a larger footprint and, therefore, greater potential to impact the surrounding environment, as discussed in **Chapter 3.0**. Each would require more detailed analyses during future design stages. Impacts are summarized in **Table 15** and discussed below.

Table 15: Comparative Impacts

Concept	Relocations	Earthwork	Water Res. ¹	Historic ²	Other ³
A KY 36 at Ferry St	1 business 1-2 campers	2k yd ³	1 bridge, FP	Abuts 2	boat ramp
B Restripe US 421/KY 36	-	-	FP	-	
C Sidewalk in town	-	Minimal	FP	Abuts 1, HD	
D-1 Canip Creek Bridge	-	5k yd ³	1 bridge, FP	HD	by park
D-2 Canip Cr. Br. Shifted	-	25k yd ³	1 bridge, FP	HD	by park
E-1 Milton Hill – Sloped	10-13 houses	350k yd ³	2 bridges, FP	-	
E-1 Milton Hill – Wall	1-4 houses	60k yd ³	2 bridges, FP	-	
E-2 Milton Hill – Sloped	14-24 houses	1.5M yd ³	2 bridges, FP	-	cemetery
E-2 Milton Hill – Wall	4-10 houses	450k yd ³	2 bridges, FP	-	
F Widen KY 36/Sidewalk	1-2 houses	140k yd ³	1 bridge, FP	Abuts 2, HD	
G East of School Hollow	11-19 houses 1 church	15M yd ³	1 bridge, FP	-	by park, TL
H West of School Hollow	8-10 houses	3M yd ³	3 bridges, FP	Abuts 1-3	TL
I Raised Tie to Bridge	1-2 businesses 6-8 houses	3M yd ³	1 bridge	Abuts 1	gas stn., TL

¹ FP = project limits within floodplain; ² HD = within or adjacent to historic district; ³ TL = electric transmission line(s)

Concept A crosses Tiber Creek on a new alignment; costs are based on bridging the stream to reduce impacts. The entire footprint is within the 100-year floodplain; this corner is the lowest in elevation of state routes in the vicinity—first to flood as the river rises. The planning-level alignment displaces one newly renovated business north of the intersection and potentially 1-2 long-term residential tenants in RVs to its east. The intent is to maintain access to the public boat ramp as this represents a Section 4(f) resource. Two listed NRHP properties (TMM 12 and TMM 15) abut the intersection with minimal setbacks; the shifted alignment is intended to avoid both structures. Should continuing deterioration of TMM 12 compromise its integrity such that it no longer meets NRHP eligibility guidelines, a less

impactful in-place solution could be evaluated as part of a future design phase. Based on soil types, there is the potential to encounter buried archaeological materials in undisturbed areas.

Concept B lies within the 100-year floodplain, but all proposed improvements fall with existing pavement, minimizing the potential for environmental impacts.

Concept C runs largely along existing city streets, adjacent to a low-income mobile home community. The two structures closest to Bayne Street (**Figure 41**) appear to be storage buildings. The proposed sidewalk continues along High Street, passing through the High Street Historic District though neither contributing resource is expected to be affected. It ties to the existing sidewalk next to NRHP-listed TMM 15 at the KY 36/High Street intersection.

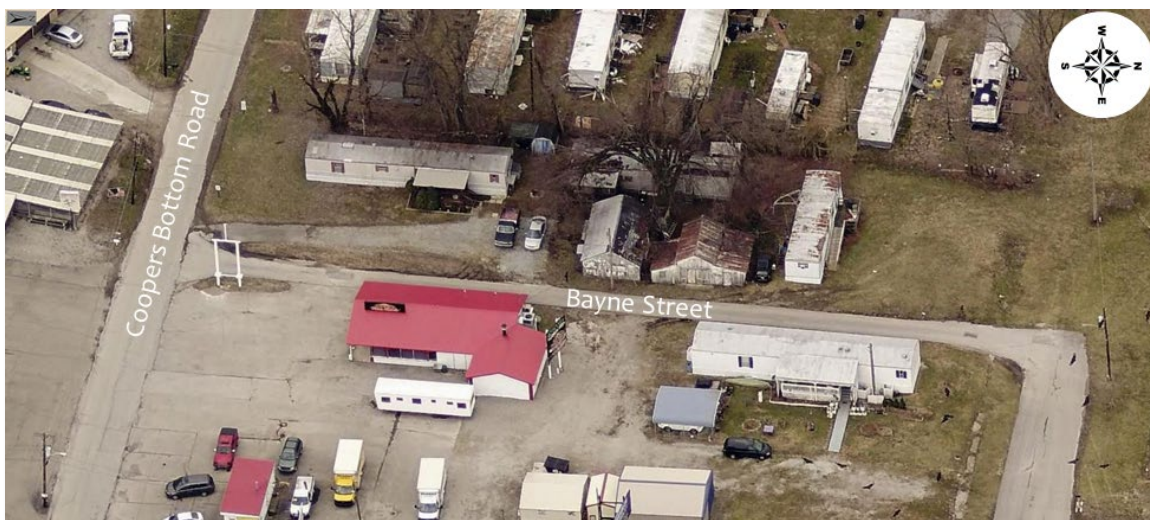


Figure 41: Buildings along Bayne Street

Concept D constructs a new bridge over Canip Creek, with potential impacts to the stream, floodplain, and endangered bat habitat. Canip Creek forms the western boundary of the Hunters Bottom Rural Historic District but no contributing elements are near the improvement limits. The city park boundary abuts KY 36 but any necessary right-of-way acquisition could likely be processed as a Section 4(f) *de minimis* finding.

Concept E-1 generally follows the US 421 corridor down the hillside, impacting 9-22 acres of forest-dwelling bat habitat covering the hillside. The sloped Build option leads to a larger footprint: impacting 10-13 residences along US 421 and Riverview Drive. The Build option with a wall reduces the footprint, impacting 1-4 houses at the foot of the hill. The northernmost 600 feet of the corridor lie within the Ohio River floodplain; there is the potential to encounter buried archaeological deposits in alluvial soils along the Tiber Creek corridor.

Concept E-2 shifts uphill from the US 421 corridor with wider disturb limits than E-1, impacting 16-36 acres of forest-dwelling bat habitat. The sloped Build option leads to a larger footprint: impacting a

portion of Moffett Cemetery plus 14-24 residences along US 421, School Hollow Road, and Riverview Drive. The Build option with a wall reduces the footprint, impacting an estimated 1-4 houses. The northernmost 1,100 feet lie within the floodplain; there is the potential to encounter buried archaeological deposits in alluvial soils along the Tiber Creek corridor.

Concept F follows the existing KY 36 alignment east of School Hollow Road. Within Lower Milton, two NRHP-listed resources at Maple Street (TMM 27 and TMM 28) are set back 30 feet from the highway though their NRHP boundary corresponds to the property lines.

Continuing east, F passes through the Hunters Bottom Rural Historic District (**Figure 42**) with a dozen contributing resources fronting the highway on the south side. There are also five stone walls/fences and one culvert along the existing highway that were not addressed in the 1970s nomination form but that may be considered historic. While buildings are generally well setback from the highway, stone features would be difficult to avoid with the improved section.

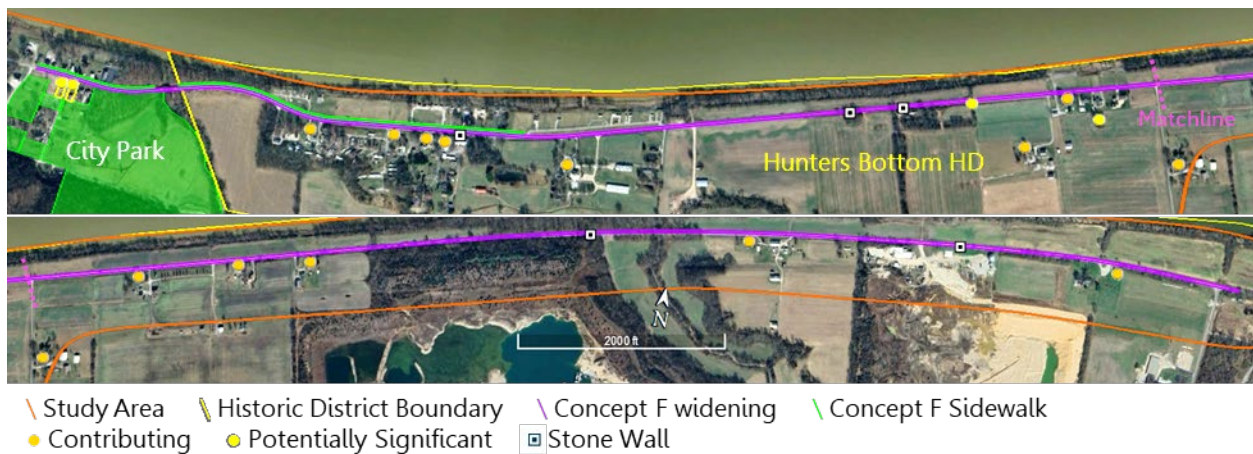


Figure 42: Concept F through Historic District

The entire corridor lies within the floodplain with 12 acres of scattered woodlands representing potential bat habitat. It crosses Canip and Hampton creeks, replacing existing structures to carry the wider typical section. Widening primarily to the north, 1-2 residential relocations are anticipated as most development lies to the south.

Concept G has the largest footprint, with larger disturbances often leading to greater potential impacts. It displaces 11-19 residences and a church, 39 acres of bat habitat, and 700+ feet of electric transmission line along McCord Lane including 1-3 poles. It crosses Tiber Creek with a bridge to minimize impacts. One wetland, totaling 0.8 acres, overlaps the planning-level disturb limits. A connector provides an improved connection along School Hollow Road (along the edge of the city park, a Section 4(f) resource) to connect to KY 36. The northernmost 1,800 feet of the proposed Build G corridor lie within the floodplain. Much of the upland area is actively farmed and contains prime farmland soil types. Archaeological testing will be required in undisturbed soils.

Concept H displaces 8-10 residences, impacts 41 acres of bat habitat, and crosses beneath three electric transmission lines. It crosses Tiber Creek twice with bridges to minimize impacts. The northernmost 2,000 feet lie in floodplain. Beyond woodlands, upland fields represent active cropland and contain prime farmland soil types. The proposed corridor passes near TMM 7 (NRHP listing pending), TMM 12 (NRHP listed), and TMM 27 (NRHP listed) but no direct impacts are expected. Archaeological testing will be required in undisturbed soils.

Concept H displaces 6-8 residences and 1-2 businesses—including a gas station with underground tanks. The corridor impacts 50 acres of bat habitat and crosses beneath three electric transmission lines. It crosses Tiber Creek twice with bridges to minimize impacts. Approximately 500 feet of improvements lie within floodplain, associated with connections to KY 36 and local streets rather than US 421 thru movements. Beyond woodland, upland fields represent active cropland and contain prime farmland soil types. The proposed corridor passes near TMM 7 (NRHP listing pending). Archaeological testing will be required in undisturbed soils.

7.0 FINAL COORDINATION MEETINGS

Following concept development, the project team reached out to local leaders to solicit feedback on transportation needs and Build concepts.

7.1 LOCAL OFFICIAL AND STAKEHOLDER MEETING

The project team met with LO/S on August 27, 2025, at city hall in Milton. The purpose of the meeting was to present proposed improvement concepts (**Chapter 6.0**) and gather local input.

Key group discussions included:

- Concept A is a low-lying corner and the first to flood during heavy rains. KY 36 slopes downhill from the bank. Raising this stretch would help but adjacent buildings constrain viable solutions.
- Attendees were concerned about stopping traffic coming down Milton Hill. Queues back up, especially during 3-6 PM and on holiday weekends. When it gets busy, queues back up past the truck ramp and to Maple Street/School Hollow Road along KY 36. Traffic accessing DQ can also spill back onto US 421.
- Raising the Canip Creek bridge could enable the property to develop a boat access. KY 36 is relatively flat from Milton to Carrollton so raising just one section would have minimal impact on thru traffic during flood events.

- The large footprint and high price tag with Concept G makes options west of School Hollow Road seem more reasonable. Getting US 421 out of the floodplain would be beneficial; the nearest hospital is in Madison so the cross-river access is critical even during floods.
- Concepts A and D together address most KY 36 needs without widening the whole length.
- No one indicated support for improving existing US 421 over a new hilltop connector.

Attendees agreed to help promote the upcoming public meeting to local residents.

7.2 PUBLIC INPUT ON BUILD CONCEPTS

Following the LO/S meeting, the project team hosted a second public meeting on September 11, 2025, at the Milton Christian Life Church. The meeting was advertised on social media, the study website, community bulletin boards, variable message board, and radio ads, with a press release issued to alert local media. During the meeting, a series of large-scale meeting boards were displayed, with members of the project team circulating to answer questions and discuss the project. A survey was distributed online and in-person to collect local input.

Following the in-person meeting, the website/survey were further promoted on Facebook and made accessible through the study's website, hosted by KYTC District 5. Surveys were collected over a month with 89 completed surveys returned.

One question asked participants to rank which factors were most important when deciding which Build Concepts are the best fit for Trimble County. Summarized in **Figure 43**, not bypassing Milton received the most #1 rankings but minimizing impacts to businesses had the highest overall ranking. The bar graph shows higher ratings as darker colors and lower as light. Average numeric scores are presented for each with the lower numbers representing higher importance.

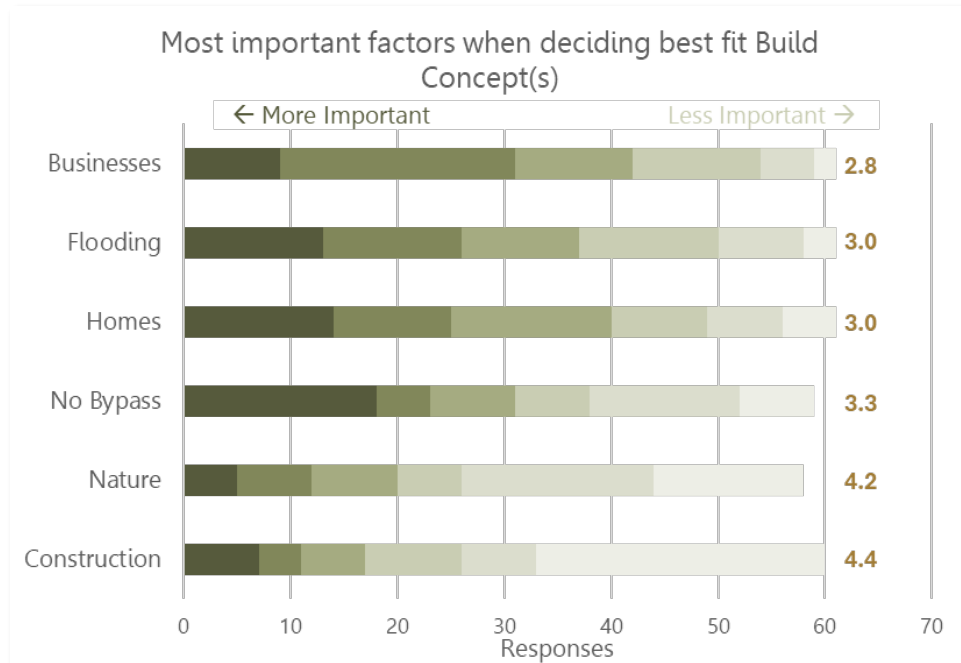


Figure 43: Decision-Making Factors

Participants were asked to prioritize smaller scale spot improvements, shown in **Figure 44**. Concepts A, B, and D were all similarly rated as high priorities while Concept C (sidewalks) was lower. No-Build received the lowest rating of any option. Most survey takers (75%) agreed additional KY 36 improvements are needed, even if Concepts A and D are implemented to address the tight turns in town and narrow bridge.

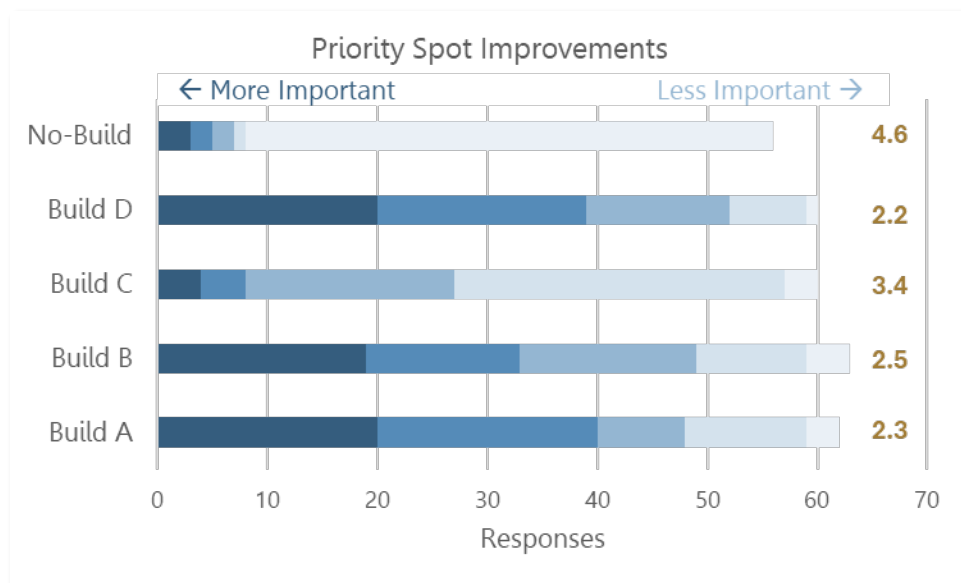


Figure 44: Spot Improvement Priorities

Another question asked which category of improvements is a higher long-term priority:

- A safer KY 36 link towards Carrollton, 39 responses
- A safer highway from Upper Milton to the Ohio River Bridge, 13 responses
- Neither option is important; the existing highways are fine, 7 responses

Figure 45 summarizes ranked preferences between the different hilltop connectors with Concepts H and E in the highest rated slots. Again, No-Build was consistently rated the least preferred solution.

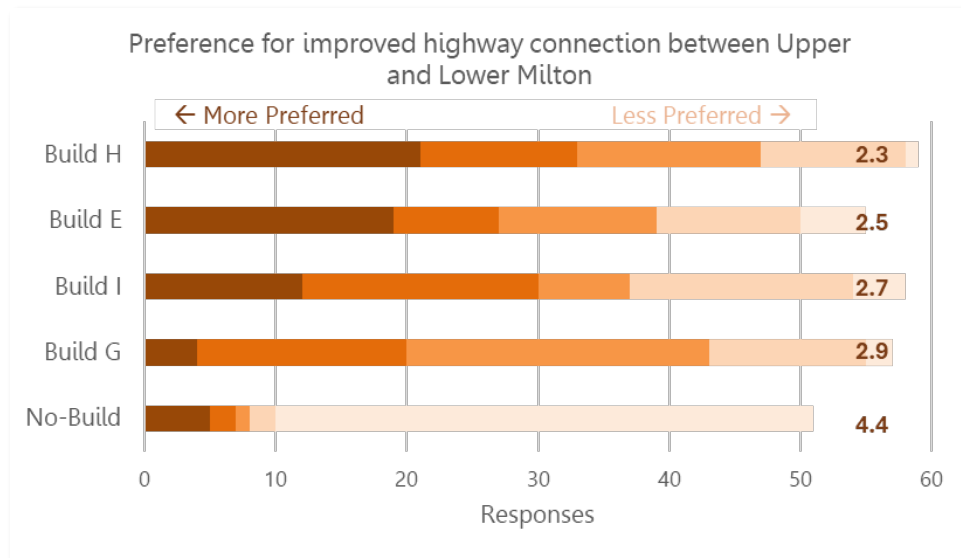


Figure 45: Corridor Priorities

Open-ended questions provided an opportunity to write additional comments. Comment themes varied—from "don't change anything" to individual Build concept preferences. Some suggested infeasible solutions (e.g., prohibiting trucks or collecting user tolls to access public roads) or were beyond the scope of the current study. Other comment themes included:

- Lower speed limit along KY 36.
- Sidewalk along south side of KY 36 would better connect to city park.
- Consider a roundabout at the US 421/KY 36 intersection.
- Existing Barth Hill/School Hollow Road should be improved. It serves as a bypass route currently but does not provide adequate width for oncoming traffic to safely pass.
- Extend the new corridors to connect to US 421 south of Milton-Bedford Pike (discussed below).
- Improve drainage along KY 36, which can be challenging during wet or icy weather.
- Concern stopping cars/trucks at the bottom of Milton Hill.

7.3 THIRD PROJECT TEAM MEETING

A third and final project team meeting occurred November 18, 2025. The purpose of the meeting was to review study findings to date and reach a consensus on recommendations. Key discussion items are listed below, with recommendations presented in **Chapter 8.0**.

- Concept G can be dismissed. The large earthwork quantities drive up costs, making the option impractical to implement.
- Concept E-2 with the laid-back slopes can be dismissed due to the extent of property impacts, including homes on Riverview Drive and a portion of Moffett Cemetery.

A few Build concept variations derived from public suggestions were explored in greater detail.

Concept B. US 421 at KY 36. Other reconfigurations were suggested at this intersection. A roundabout is not feasible given the terrain and position of the Ohio River bridge. It would impact multiple businesses in Lower Milton and introduce a smaller, tighter turn at the bottom of the hill.

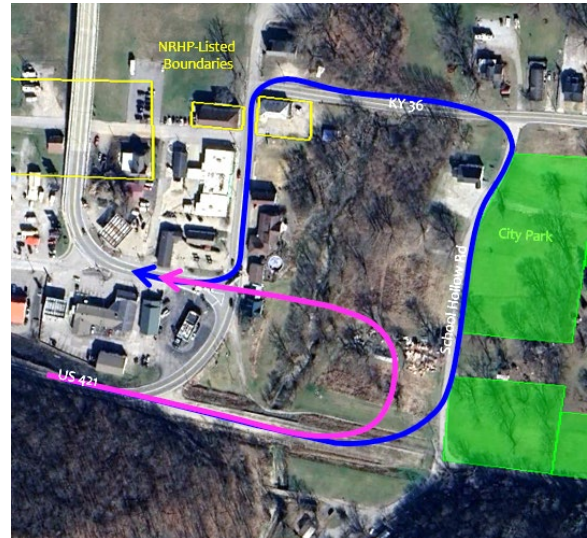


Figure 46: Concept B variations

Extending US 421 along the runaway truck ramp then looping back (**Figure 46**) improves visibility at the intersection but leads to greater property impacts and routes trucks through additional turns. The runaway truck ramp would be lost, unless it shifted east along Spring Street, which today provides access to two homes and the wastewater treatment plant.

Concept H. East of School Hollow Road. Shifting the southern end of Concept H or Concept I south of Milton-Bedford Pike introduces a gentler curve and bypasses a 0.5-mile stretch with 10 crashes during the five-year analysis period. Both alignments should be considered as part of a future project development phase.

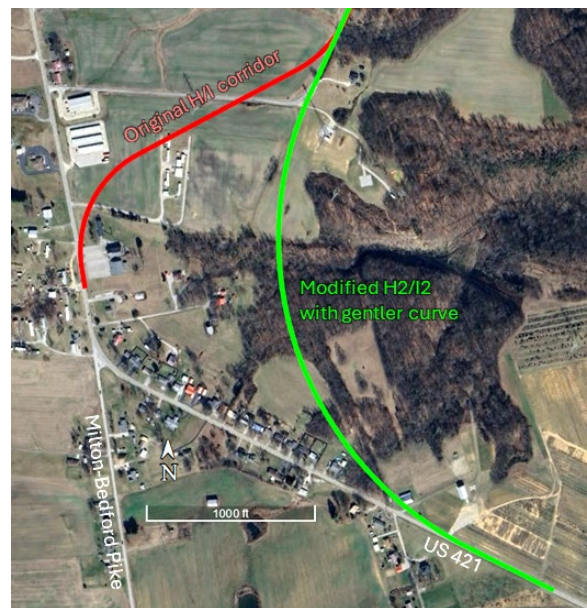


Figure 47: Concept H/I variation

The NRHP-listed Neal House (TM 59) off Willis Lane lies near the new southern terminus but on the south side of US 421. Costs for Concepts H2 and I2,

incorporating the green curve in **Figure 47**, are presented in **Table 16** alongside the initial estimates for Concepts H and I.

Table 16: Cost Estimates for Modified Build Concepts (2025\$)

Concept	D	R	U	C	Bid-Based DRUC	Risk-Factored DRUC
H West of School Hollow	\$7.0M	\$6.7M	\$0.6M	\$49M	\$63M	\$74M
H2 West of School Hollow Ext.	\$7.0M	\$7.5M	\$0.6M	\$57M	\$72M	\$87M
I Raised Tie to Bridge	\$7.0M	\$7.5M	\$0.4M	\$53M	\$68M	\$80M
I2 West of School Hollow Ext.	\$7.0M	\$8.1M	\$0.4M	\$60M	\$75M	\$91M

8.0 RECOMMENDATIONS

A wide range of Build concepts were considered throughout this planning study, which compares associated costs, benefits, and impacts. Each was developed to address one or more of the goals discussed in **Section 1.0**: improving the Ohio River bridge approach, addressing freight mobility along KY 36, and considering bicycle and pedestrian mobility in town.

8.1 SPOT IMPROVEMENTS

Concepts A and D are rated High priorities.

Concept A reconstructs the KY 36 turn at Ferry Street to improve visibility and accommodate truck turns, closing a 650-foot gap in the sidewalk network. There were nine reported crashes in five years. Beyond 2-3 relocations, it would have relatively few environmental impacts and was ranked a high priority by the public.

Concept D replaces the aging Canip Creek Bridge with a wider bridge including a sidewalk. There were 11 crashes reported over five years. The location lies at the westernmost limit of the Hunters Bottom Rural Historic District but would have few impacts beyond the stream/floodplain and surrounding agricultural field. It was also rated a high priority during September public surveys.

If concepts A and D advance separately, KYTC should evaluate pavement widening and creating a continuous sidewalk connection between their limits.

Concept B is a Medium priority, intended as a low-cost, low-impact solution at the US 421/KY 36 intersection entirely contained within existing pavement. It is possible the concept could be implemented as a temporary “demonstration” project to gauge impacts and community opposition on a trial basis. There were 14 crashes at the intersection during the five-year analysis period. The site was ranked a high priority by the public although several attendees noted concerns with a stop condition at the bottom of the hill.

Consistent with public feedback, **Concept C** (sidewalk) is a Low priority for implementation. A commitment to improve sidewalks remains from the 2012 Ohio River Bridge project. One of the original mitigation measures called for the construction of a restroom facility at the Milton Boat Ramp, which was proposed to host a ferry service during the year-long bridge closure. The innovative construction approach reduced the closure duration, reducing the scope of the ferry service. In 2015, the City indicated they preferred not to maintain a permanent restroom facility and amended the agreement to address sidewalk improvements; KYTC and FHWA concurred with the revised commitment up to \$25,000. While the Item 5-135.81 approach project explored additional sidewalk connectivity along US 421, a Build solution was not advanced. Therefore, the \$25,000 commitment to extend sidewalks to serve the boat ramp remains unfulfilled.

Accordingly, Concept C as presented to the public was revised to add 200 feet of extra sidewalk serving the boat ramp. This adds an additional \$50,000 to construction phase estimates presented in **Table 12** (page 48).

8.2 LONG-TERM PRIORITIES

Both widening KY 36 and providing an improved hilltop connector are important long-term priorities.

Concept F should advance first as it represents a gap in the truck network and, if improved, could help carry detour traffic during US 421 construction. While beyond the scope of this planning study, KYTC District 6 staff indicated widening KY 36 through Carroll County to provide an improved truck linkage to Carrollton would likely be supported by community leaders.

An improved US 421 hilltop connector is also an important link in the network. Future design/NEPA efforts should compare **Concept E** alongside **Concepts H/I**, including both connection options on the north and south end.

8.3 TIME-BASED ESCALATED COSTS

Using the priorities presented above, estimated years for funding each phase of larger scale projects were forecast to apply time-based contingency factors to cost estimates. Smaller projects that would likely be advanced independent of Highway Plan funding were omitted from this step. A 5% annual inflation factor is applied to 2025 risk-factored costs to reach projected years of expenditure. Results are summarized in **Table 17**. For example, Concept A programming costs include \$700,000 for design in 2027 dollars, estimated to take 2 years to complete with \$1.1 million for right-of-way acquisition in 2029 dollars, etc.

Table 17: Time-Escalated Build Costs by Phase (YOE\$)

Concept	Risk-Based DRUC	Priority	Start Year ²	Design ³		Right-of-Way		Utilities		Const.	Escalated DRUC
Spot Improvements											
A KY 36 at Ferry St	\$8.2M	High	2027	2 yrs	\$0.7M	1 yr	\$1.1M	1 yr	\$0.3M	\$8.3M	\$10.4 million
B Restripe US 421/KY 36	\$100k	Medium	N/A	-	-	-	-	-	-	-	\$100k
C Sidewalk in town + ramp	\$950k	Low	N/A	-	-	-	-	-	-	-	\$950k
D-1 Canip Creek Bridge	\$5.0M	High	2027	4 yrs	\$0.4M	1 yr	\$0.3M	1 yr	\$0.3M	\$5.7M	\$6.7 million
D-2 Canip Creek Bridge Shifted	\$12M		2027	4 yrs	\$1.1M	1 yr	\$0.5M	1 yr	\$0.6M	\$14.6M	\$17 million
Existing Corridors											
E-1 Milton Hill – Sloped	\$19M	Long Term ¹	2040	5 yrs	\$2.3M	2 yrs	\$7.0M	1 yr	\$2.3M	\$28M	\$40 million
E-1 Milton Hill – Wall	\$28M				\$3.9M		\$4.4M		\$2.3M	\$47M	\$58 million
E-2 Milton Hill – Wall	\$65M				\$7.0M		\$7.6M		\$2.3M	\$120M	\$140 million
F Widen KY 36/Sidewalk	\$31M	Long Term	2030	5 yrs	\$2.9M	2 yrs	\$4.5M	2 yr	\$4.0M	\$39M	\$50 million
New Alignments											
H West of School Hollow	\$74M	Long Term ¹	2040	5 yrs	\$7.0M	2 yrs	\$13M	1 yr	\$1.2M	\$130M	\$150 million
H2 West of School Hollow Ext.	\$87M				\$7.0M		\$15M		\$1.2M	\$150M	\$170 million
I Raised Tie to Bridge	\$80M				\$7.0M		\$15M		\$0.8M	\$140M	\$160 million
I2 West of School Hollow Ext.	\$91M				\$7.0M		\$16M		\$0.8M	\$160M	\$180 million

¹Build Concepts E, H, and I should be evaluated side-by-side as a single design/environmental item moving forward.

²Estimated year to see initial funding in future Highway Plan or “N/A” if funded beyond Highway Plan

³Assumed capped at \$7 million

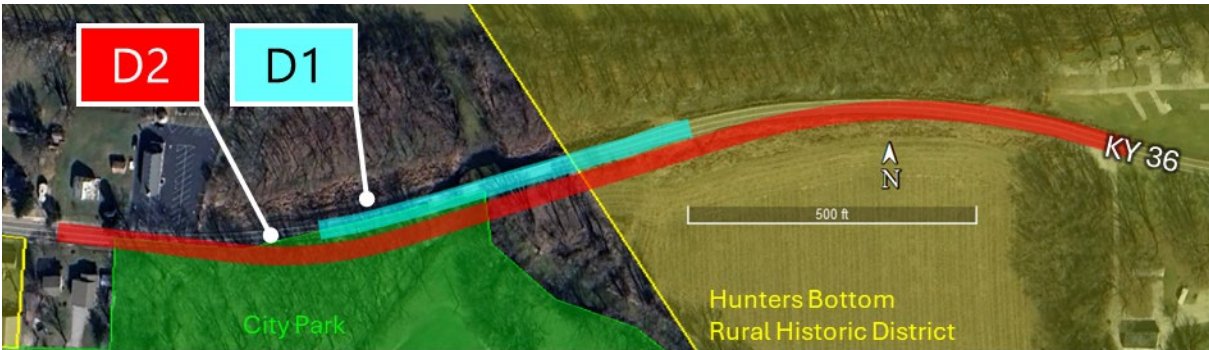
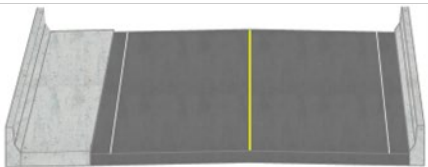
8.4 PROJECT SHEETS

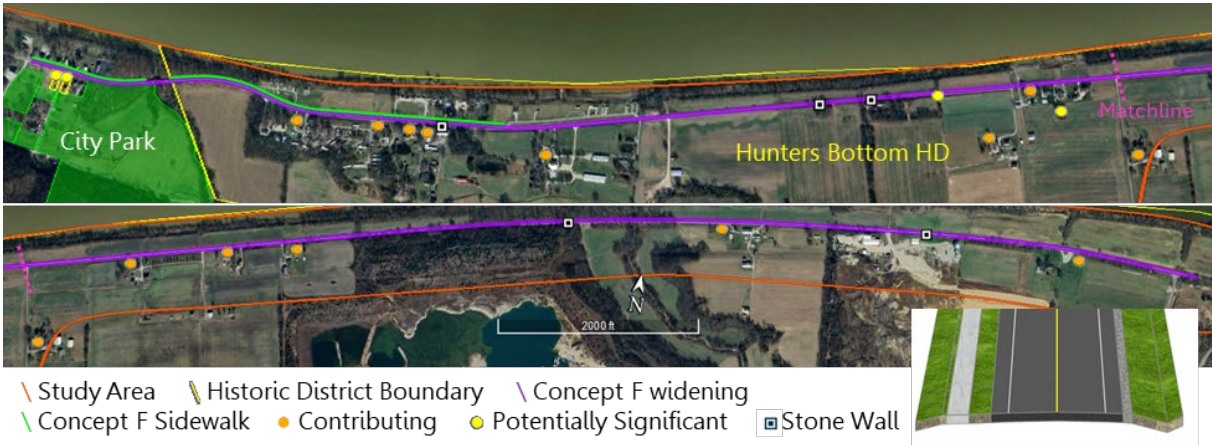
The following pages present project sheets for recommended Build concepts. Additional discussion on funding streams is included in **Section 9.1**.

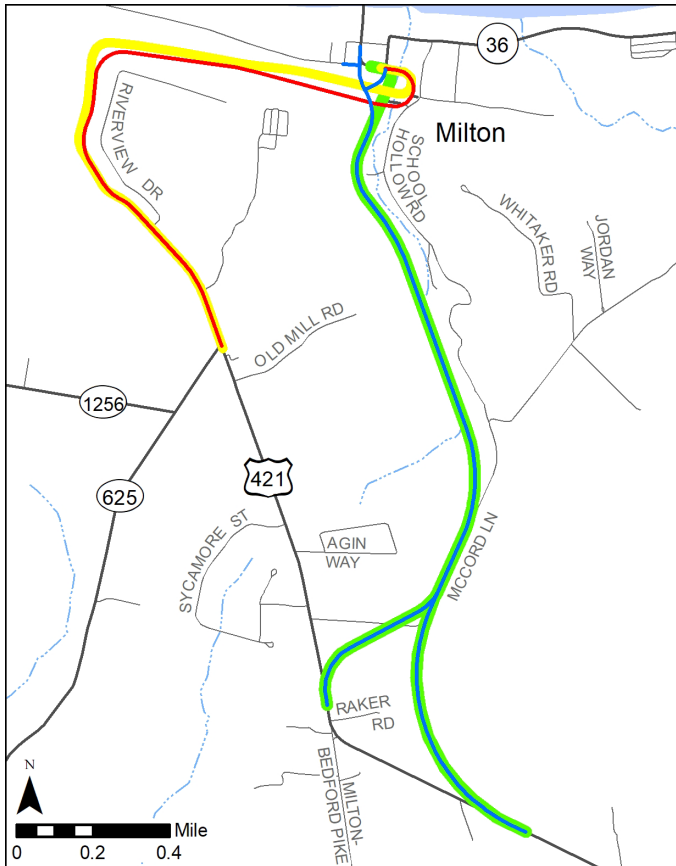
A. KY 36 at Ferry Street Reconstruction			
KY 36 MP 0.05-0.20		High Priority	
DESCRIPTION: Reconstruct KY 36 turn at Ferry Street to accommodate truck turns, improve visibility, and improve pedestrian connectivity.	Phase Estimate	Year	\$
	Design	2027	\$0.7M
	Right-of-Way	2029	\$1.1M
	Utilities	2030	\$0.3M
	Construction	2031	\$8.3M
	DRUC Total	\$10.4 million	
IDENTIFIED NEEDS:			
2025 Traffic:	4,000 vpd, operates at LOS B		
2050 Traffic:	4,500 vpd, operates at LOS B		
2019-2023 Crashes:	11 crashes (1 Injury) with 6 PDOs at Ferry St turn. Three crashes on Tiber Creek culvert: 2 opposing sideswipes and one head-on.		
CONCEPT: Reconstruct KY 36 turn at Ferry Street. Extend sidewalks. Replace culvert.			
 Costs assume 12-foot lanes, curb/gutter west of Tiber Creek, 4-foot paved shoulders beyond, and 5-foot sidewalks.			
Impacts: stream, floodplain, 2-3 relocations, historic			
Notes: Consider traditional highway plan funding or federal grant			

B. US 421/KY 36 Restriping			
US 421 MP 18.675/KY 36 MP 0.0		Med. Priority	
DESCRIPTION: Manage access to promote safety and clarify driver expectations at US 421/KY 36 intersection in Lower Milton.	Phase Estimate	Year	\$
	Design		-
	Right-of-Way		-
	Utilities		-
	Construction	2025	\$100k
	DRUC Total	\$100,000	
IDENTIFIED NEEDS:			
2025 Traffic:	9,500 vpd entering intersection, operates at LOS A/B		
2050 Traffic:	10,800 vpd entering intersection, operates at LOS B		
2019-2023 Crashes:	14 crashes (2 Injury) with mix of types		
CONCEPT: Convert to all-way stop with advance warning signs for northbound US 421. Define access points to adjacent business. Restrict turns to local alley near MP 18.6.			
			
Impacts: minimal, within existing pavement			
Notes: Consider FE01, FD05, or STP3 funding			

C. Sidewalks in Lower Milton			
Local Streets CS-2007, CS-2008, CS-2009		Low Priority	
DESCRIPTION: Improve pedestrian connectivity in Lower Milton.	Phase Estimate	Year	\$
	Design	2025	\$60k
	Right-of-Way	2025	\$500k
	Utilities		-
	Construction	2025	\$390k
	DRUC Total	\$950,000	
IDENTIFIED NEEDS:			
2025 Traffic:	Low volume local streets		
2050 Traffic:	Low volume local streets		
2019-2023 Crashes:	No reported pedestrian crashes		
CONCEPT: Construct 5-foot sidewalk along Coopers Bottom Road, Bayne Street, and High Street to link bridge sidewalk to KY 36 (Ferry Street). Extend 5-foot sidewalk to serve boat ramp.			
			
Impacts: minimal: potentially 2 storage buildings to relocate, parking areas shift			
Notes: Consider local TAP grant			

D. Replace Canip Creek Bridge			
KY 36 MP 0.3-0.6		High Priority	
DESCRIPTION: Improve safety for all users and address structure condition for KY 36 Canip Creek crossing. <i>Range of costs represent MOT offset.</i>	Phase	Year	\$
	Design	2027	\$0.4-1.1M
	Right-of-Way	2031	\$0.3-0.5M
	Utilities	2032	\$0.3-0.6M
	Construction	2033	\$5.7-14.6M
	DRUC Total	\$6.7-17 million	
IDENTIFIED NEEDS:			
2025 Traffic:	4,000 vpd, operates at LOS B		
2050 Traffic:	4,500 vpd, operates at LOS B		
2019-2023 Crashes:	11 crashes (all PDO) on bridge, with 64% opposite direction sideswipes		
CONCEPT: Replace aging structure over Canip Creek. Widen pavement and add sidewalk.			
  Costs assume 12-foot lanes, 4-foot paved shoulders, and 5-foot sidewalks.			
Impacts: stream, floodplain, historic district, park			
Notes: Consider highway plan funding, bridge funding, or federal grant			

F. Widen KY 36			
KY 36 MP 0.3-2.2 Trimble & KY 36 MP 0.0-2.2 Carroll		Long Term	
DESCRIPTION: Improve safety and mobility for all users along KY 36 from Milton to Hunter Heights Road.	Phase Estimate	Year	\$
	Design	2030	\$2.9M
	Right-of-Way	2035	\$4.5M
	Utilities	2037	\$4.0M
	Construction	2039	\$39M
	DRUC Total	\$50 million	
IDENTIFIED NEEDS:			
2025 Traffic:	4,000 vpd, operates at LOS B		
2050 Traffic:	4,500 vpd, operates at LOS B		
2019-2023 Crashes:	60 crashes (1 fatal, 7 inj) with 48 roadway departures		
CONCEPT: Widen KY 36 from Milton to Hunter Heights Road. Add sidewalk for westernmost 0.9 miles. Costs assume 12-foot lanes with 4-foot paved shoulders.			
 Study Area Historic District Boundary Concept F widening Concept F Sidewalk Contributing Potentially Significant Stone Wall			
To satisfy 603 KAR 5:250 requirements and include KY 36 as a truck route, similar widening project should extend 6.1 miles east to US 42 near Carrollton.			
Impacts: stream, floodplain, historic, 1-2 relocations, bat habitat			
Notes: Consider highway plan funding or federal grant			

E/H/I. New Hilltop Connector			
US 421 MP 15.3-18.75 or New Alignment		Long Term	
DESCRIPTION: As combined preliminary design/NEPA project, evaluate reconstructing Milton Hill or constructing new alignment west of School Hollow Road to connect hilltop to Ohio River Bridge.	Phase	Year	\$
	Design	2040	\$7.0M
	Right-of-Way	2045	\$4.4-16M
	Utilities	2047	\$0.8-2.3M
	Construction	2048	\$28-160M
		DRUC Total	TBD in Design
IDENTIFIED NEEDS:			
2025 Traffic:		5,700 vpd, operates at LOS C	
2050 Traffic:		6,500 vpd, operates at LOS D	
2019-2023 Crashes:		97 crashes (15 injury) on existing US 421 north of MP 15.3	
STUDY GOALS: ☒ Mobility ☒ Safety ☐ Multimodal			
			
Impacts: streams, floodplain, historic, relocations, bat habitat, park, transmission lines			
Notes: Consider highway plan funding or federal grant			

9.0 NEXT STEPS

No funding to date has been assigned to advance improvement concepts beyond this initial planning phase. Some improvements are low-cost actions requiring little advance preparation and could be implemented relatively quickly by KYTC maintenance forces. Others are higher-cost projects that must compete for funding and progress through the project development process: preliminary design/environmental, final design, right-of-way acquisition, utility relocation, then construction.

For those competing for traditional Highway Plan funds, CHAF forms should be created or modified so potential projects can compete for future funding in the next SHIFT cycle.

9.1 POTENTIAL FUNDING STREAMS

Traditionally, most funds for highway projects statewide are allocated within the biennial Highway Plan, competing against other projects through the SHIFT process. Beyond SHIFT, a range of other federal grants and other funding streams align with specific project types and could represent other mechanisms to advance smaller projects. A brief discussion follows, with notes on projects sheets above to suggest which Build options could align with which programs.

It should be noted that many of the federal funds are allocated through the *Infrastructure Investment and Jobs Act* (IIJA) that runs through fiscal year 2026. The *One Big Beautiful Bill* (OBBB) was enacted in July 2025 and is likely to change funding levels and even which programs are available. To date, the current administration places emphasis on efficiency as the Highway Trust Fund faces insolvency within the next few years.

Within SHIFT/Highway Plan

The federal Surface Transportation Block Grant (**STBG**) program provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway; bridge and tunnel projects on any public road; pedestrian and bicycle infrastructure; and transit capital projects, including intercity bus terminals. The annual budget is around \$250 million.

Dedicated federal funds for bridges (**FBP**, **BRO**, **BRX**, **BRZ**) are set aside for structures and their approaches. The annual budget is about \$112 million statewide.

National Highway Performance Projects (**NH**) are federal funds supporting the condition and performance of the NHS. Kentucky receives an estimated \$0.5 billion in NH funds annually.

State Priority Projects (**SPP**) funds target high priority construction projects based on prioritized needs. The annual budget varies but can be over \$100 million.

State-Managed Funds Beyond SHIFT/Highway Plan

The federal Highway Safety Improvement Program (**HSIP**) targets strategic, data-driven safety applications with over \$50 million for Kentucky annually. Funding is overseen by the KYTC Division of Traffic Operations, with an Investment Plan establishing funding targets for intersections, roadway departure corridors, and vulnerable roadway users.

The federal Transportation Alternatives Program (**TAP**) is available for non-motorized transportation projects such as sidewalks, trails, bike lanes, etc. Traditionally, there is a 20% local match although the GRANT Program of 2024¹⁴ provides competitive funding to offset the local match. TAP is managed through the KYTC Office of Local Programs with applications collected each spring.

Limited **FE01** maintenance funds are allocated to each District to address low-cost repairs like striping or roadside clearing. A similar **FE02** budget covers bridge maintenance needs.

Limited **FE04** funds are available to the Division of Traffic Operations to improve signal systems, lighting, and similar operational measures.

Pavement overlays and striping projects can be funded through **FD05** funds, overseen through the Division of Maintenance.

Other Federal Grant Opportunities

The IIJA, also known as the *Bipartisan Infrastructure Law*¹⁵, provided federal highway programs more than \$350 billion over a five-year period (fiscal years 2022–2026). The OBBB will alter these funding levels—eliminating some previously identified 2026 programs—but impacts to specific programs are still being determined. Most of this funding is distributed to states based on formulas spelled out in legacy programs such as the Federal-aid Highway Program and HSIP. However, funds may also be provided through competitive grant programs. The [Grants.gov](https://www.grants.gov) website provides a one-stop shop for information on available grant programs across multiple agencies, including a feature to search by keyword.

Better Utilizing Investments to Leverage Development (**BUILD**) grants support multi-modal, multi-jurisdictional projects with a significant national, regional, or local impact that are difficult to support through traditional programs. Beyond planning, applications require a solid benefit-cost analysis to compete and must align with key focus areas like safety and partnership.

Established under the IIJA, the Safe Streets for All (**SS4A**) program is open to metropolitan planning organizations, local, and Tribal governments to develop or implement projects from a Comprehensive

¹⁴ Online at <https://ced.ky.gov/grant>

¹⁵ Online at <https://www.fhwa.dot.gov/bipartisan-infrastructure-law/funding.cfm>

Safety Action Plan. The program was funded with about \$1 billion per year nationally with a 20% local match component. However, a project must be from the local/regional Action Plan to be eligible for SS4A implementation funding.

10.0 ADDITIONAL INFORMATION

Written requests for additional information should be sent to:

KYTC Division of Planning
ATTN: Director
200 Mero Street
Frankfort, KY 40622
By phone: 502.564.7183