



US 25 Corridor Study

Laurel County, KY
KYTC Item No. 11-181



Executive Summary



The Kentucky Transportation Cabinet (KYTC) initiated a planning study in April 2023 to identify Complete Streets, Roads, and Highways-focused improvements on US 25 in Laurel County. The objective of the study was to identify short-term wins and long-term capital improvement projects to provide safe mobility for all users.

Study Area

The US 25 corridor study area is shown in Figure 1. The study area begins near the intersection of CVB Drive at milepoint (MP) 13.5 in the City of London and ends at MP 16.7 to the north of the intersection of US 25 and KY 490 in Laurel County. The study corridor represents a suburban transition from historic, urban London to rural Laurel County. The study area is anticipated to develop in the near future, particularly around the KY 80 (Hal Rogers Parkway) intersection.

Study Process

- Identify the user needs and goals of the study
- Observe existing conditions and travel patterns
- Evaluate current and future land use context
- Identify safety concerns and unmet user needs
- Develop potential recommendations
- Evaluate recommendations based on the study vision and goals
- Propose a list of prioritized short-term and long-term recommendations

To develop the project goals and objectives, the mobility and safety needs of the anticipated users were established. Mobility needs refer to the ability of each of the users to access, travel along, and connect to their destinations in the study area. Safety needs refer to areas where frequent crashes and lack of infrastructure contribute to crashes or inform user behavior during their travel.

Mobility Needs

- Consistent volumes of pedestrians and bicyclists along US 25, through its intersection with KY 80, and along KY 490

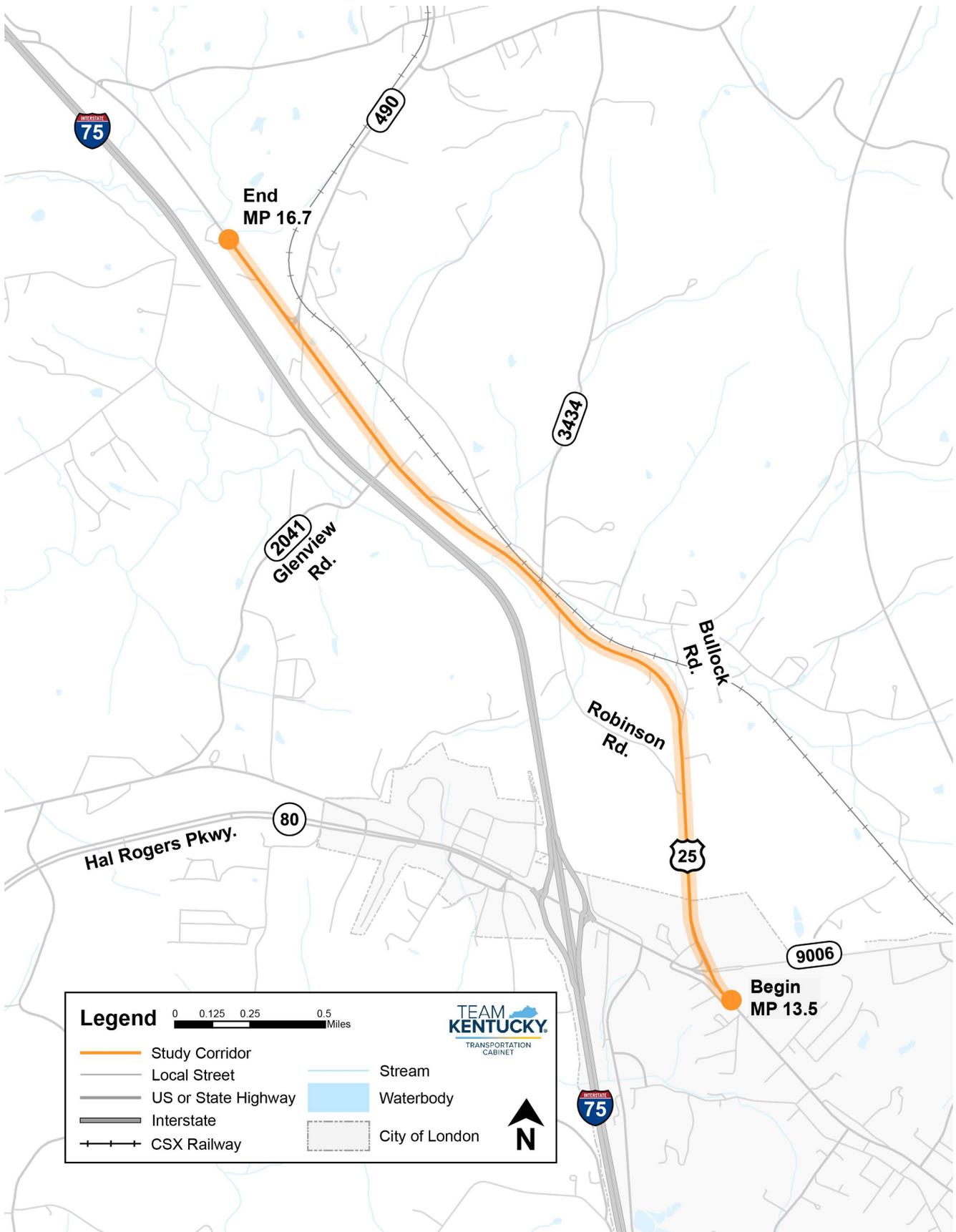


Figure 1: Study Area

- High-volume freight corridor to access Baxters North America and Robinson Stave
- High emergency vehicle volume with Kentucky State Police and East Bernstadt Fire Department located on the corridor

Safety Needs

- Undefined and frequent parcel entrances contribute to frequent opposing left-turn, angle, and rear-end crashes.
- Left-turn movements at the intersection of State Police Road, CVB Drive, and KY 80 have contributed to frequent crashes, with sixteen total crashes from 2018-2022 at this intersection.
- Lack of pedestrian and bicycle infrastructure require the use of the roadside and shoulder to travel. Defined crossing opportunities are not provided on the corridor.

Project Goals

Project goals were developed through stakeholder input, public feedback, and evaluation of current and future needs of the corridor.

- Provide safe, accessible accommodation for all users, including bicyclists, pedestrians, freight, and emergency vehicles.
- Accommodate pedestrians and bicyclists with facilities separated from the roadway to minimize uncomfortable interactions with large vehicles.
- Provide appropriate crossing opportunities for bicyclists and pedestrians at intersections and near destinations that generate pedestrian and bicycle travel.
- Prevent crashes at frequent and undefined access points.
- Prevent crashes and improve operations at the intersections of KY 80, Bullock Road, KY 3434, KY 2041, and KY 490.
- Accommodate I-75 detour traffic without negatively impacting safety for all users.

Related Projects and Plans

No specific projects are located on the study corridor from Kentucky’s 2024 Enacted Highway Plan (Six Year Plan) and the Continuous Highway Analysis Framework (CHAF) database. However, four Six Year Plan projects and one CHAF project are identified in the vicinity of the study area on KY 490 to address pavement and bridge conditions and KY 2041 to install guardrail. Related plans considered included the City of London and Laurel County and included the City of London Bike and Pedestrian Master Plan, the 2007 London-Laurel County Comprehensive Plan, and the I-75 Major Incident Detour Guide.

Existing Conditions

The study corridor is comprised of three different land use contexts, transitioning from urban City of London to suburban commercial at KY 80, and then to a rural context north of KY 490. The presence and travel patterns of motor vehicle drivers, freight operators, emergency

service providers, and bicycles and pedestrians are informed by observation and expectations by land use context. Motor vehicle, pedestrian, and bicyclist volumes decrease from south to north as the context changes. Freight volume is driven by local delivery freight and longer-range industrial and commercial freight generated by the proximity of access to I-75 and local industries to London.

| Characteristic | Description | Begin MP | End MP |
|---------------------------|----------------------------------|----------|--------|
| Functional Classification | Minor Arterial | 13.5 | 13.6 |
| | Major Collector | 13.6 | 16.7 |
| Lane Configuration | Four 12 ft Lanes | 13.5 | 13.6 |
| | Two 11 ft Lanes | 13.6 | 16.7 |
| Speed Limit | 35 MPH Posted | 13.5 | 13.8 |
| | 55 MPH Statutory | 13.8 | 16.7 |
| Freight | Coal Haul System | 13.5 | 16.7 |
| | Kentucky Highway Freight Network | 13.5 | 16.7 |

Table 1: Summary of Existing Conditions

The study area is comprised of nineteen intersections, sixty-one defined access points, and approximately 2.17 miles of undefined access where motor vehicles may turn into a parcel at any point along the corridor. In addition, a high-turnover Park and Ride is located at the intersection of US 25 and State Police Road. The Park and Ride frequently operates at, or above, capacity. When the Park and Ride is full, users will park vehicles on the verge along State Police Road and near the intersection.

There are six horizontal curves, and the US 25 corridor is flat within the study area with minimal vertical curvature. The two horizontal curves located between MP 13.5 and 13.8, paired with roadside vegetation, may be below the minimum design radius for sight distance to the signal. US 25 meets the grade requirements in the KYTC Highway Design Guidance Manual.

A CSX rail line runs parallel to US 25 between MP 14.7 and 16.5. This results in adjacent rail crossings for three intersecting routes, Bullock Road, KY 3434, and KY 490. The at-grade crossing at KY 3434 is approximately 100 feet from the US 25 intersection; it includes flashing signals and gate arms. The rail crossings on Bullock Road and KY 490 are grade-separated.

The sole structure within the study corridor is a culvert over Wood Creek at MP 15.10. Its bridge identification number is 063B00006N. It is a two-span structure approximately thirty-one feet in length built in 1951. It has a Fair condition rating as of 2022.

Known utilities within the study corridor include natural gas, aerial electric, telecommunications, water and sewer.

Five years of crash data (January 2018 to January 2023) from the Kentucky State Police database was reviewed to identify crash trends and potential safety improvements. Within the five-year analysis period, 147 crashes were reported in the study segment of US 25. Crash density is highest near the intersections of KY 80/Hal Rogers Parkway and KY 490. Crash

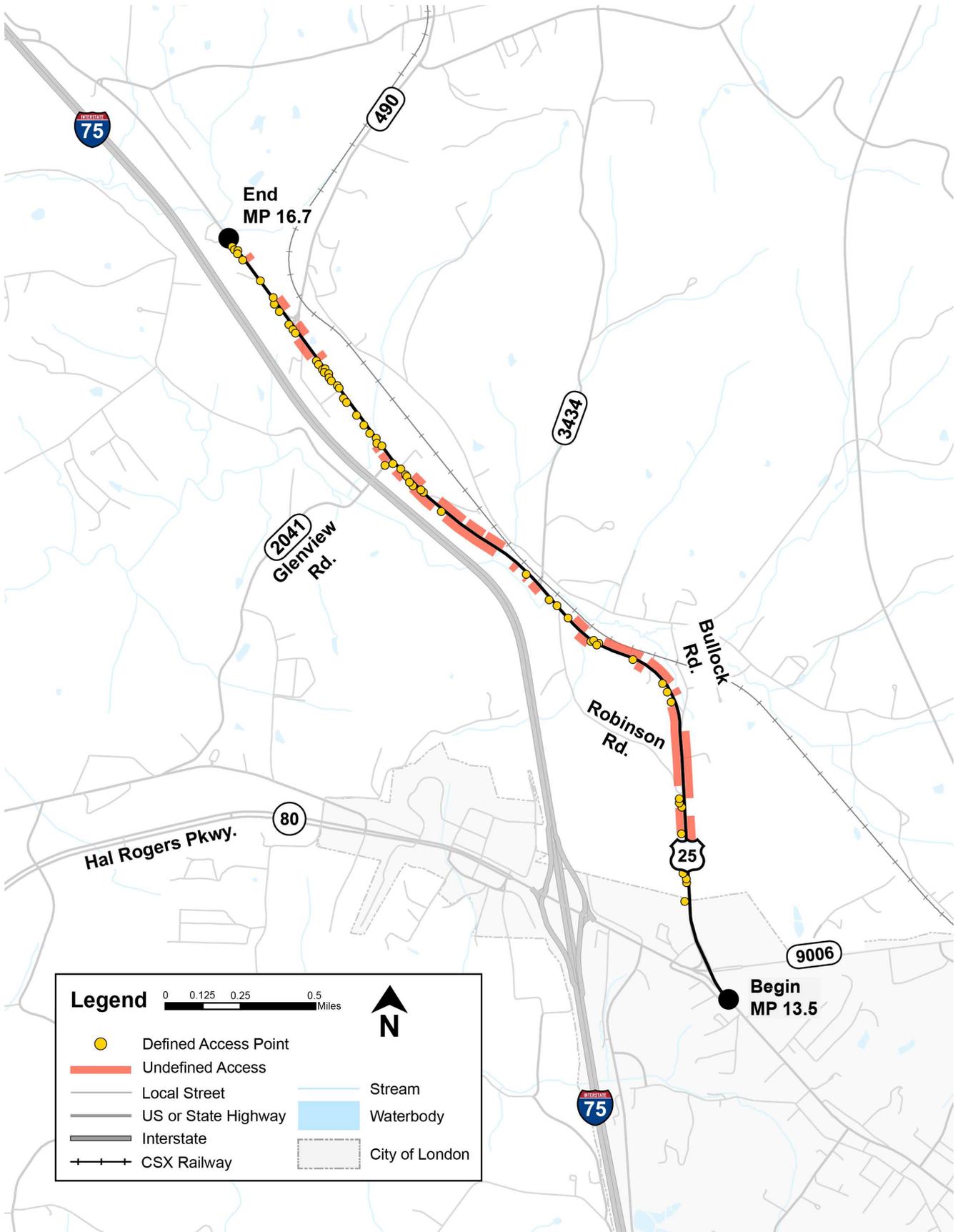


Figure 2: Defined and undefined access along US 25

density is also higher near MP 15.0 and around the intersection with Glenview Road near MP 15.8. Although crash density is highest near KY 80, the severity of the crashes increases to the north.

The Kentucky Transportation Center’s Crash Data Analysis Tool was used to calculate Excess Expected Crashes (EEC) values and Level of Service of Safety (LOSS) for the study segment of US 25. The northern section corresponds to a positive EEC and LOSS III while the southern section corresponds to a positive EEC and LOSS IV, indicating that the segment near KY 80/Hal Rogers Parkway has a greater potential for crash reduction from safety improvements. Crash history and speed data are located in **Appendix A**.

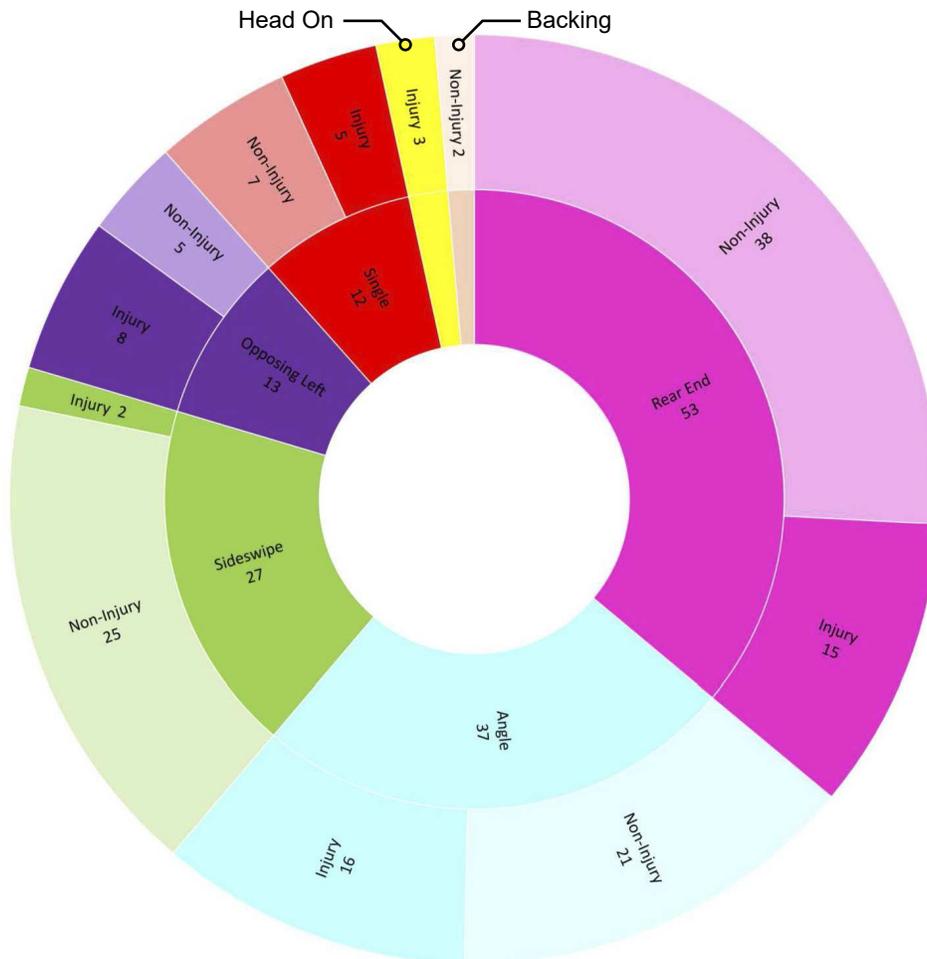


Figure 3: Severity of Crash by Manner of Collision

Environmental Overview

Data was collected for an Environmental Overview (EO) based on existing geographic information system (GIS) datasets, state and federal agency databases, literature research, archival data, and a windshield survey of the corridor. Desktop research was performed to identify and locate areas of importance or concern that lie within a 250'-wide corridor along the centerline of US 25, with a 500' in diameter buffer at four major intersections: KY 80, KY 3434 (Old Richmond Road), KY 2041 (Glenview Road), and KY 490.

The EO considers resources in the following categories: ecological resources (i.e., streams, wetlands, and floodplains); threatened and endangered species and unique habitats; UST

and hazardous materials; historic and archaeological resources; Environmental Justice (EJ) / socioeconomic data. A summary of findings is located in **v**. The full environmental overview and socioeconomic study are located in **Appendix C**.

| Environmental Concerns | Description | |
|---|--|--|
| Threatened and Endangered Species Habitat | Federally Listed T&E Species | Four bats, six clams/mussels, and two plants |
| | Forest Habitat | Suitable forested and foraging habitat |
| | Cave-Like Habitat | Two permitted mine boundaries in study area; many others located in ½-mile buffer of study area |
| Water Resources | Streams | Peacock Branch, Wood Creek, and other unnamed tributaries; Gillis Branch located just outside study area |
| | Floodplains | Wood Creek floodplain |
| | Wetlands | Wood Creek and Peacock Branch RSUBH, others are R4SBC |
| | Wellhead Protection Areas | Source Water Protection Area: Wood Creek Water District – Zone 1 |
| UST/Hazmat Sites | Potential sites throughout | |
| Mines | Two permitted mines in study area | |
| | Seven permitted mines within 1/2 mile | |
| Historic Resources | 1 Site - National Register of Historic Places (NRHP) | |

Table 2: Summary of Environmental Overview

Concept Development and Evaluation

Initial improvement concepts were developed based on the safety and traffic analyses, stakeholder and public feedback, and project team recommendations. The potential improvement concepts were evaluated based on key performance metrics, including:

- Safety performance, including benefit-cost analysis.
- Traffic analysis, including current and future performance.
- Environmental impacts, including both human and natural environment.
- Accommodation of pedestrians and bicyclists.

Traffic data and analysis methodology are located in **Appendix B**.

Final Study Recommendations

The evaluation matrix for the initial list of recommendations was reviewed by the project team, along with stakeholder and public input, and refined to a set of final recommendations in **Table 3**. In addition to the recommended project concepts, broader improvements to encourage driver operating speeds appropriate to the context of the corridor include:

- Maintain 35 MPH posted speed limit south of KY 80 with target speeds of 30-35 MPH.

- Implement 45 MPH target speed between KY 80 and KY 490 paired with speed management and traffic calming.
- Maintain 55 MPH statutory speed limit north of KY 490 with target speed of 55 MPH.

The implementation of the 45 MPH target speed in the suburban context between KY 80 and KY 490 allows for the design of intersections and road geometrics that will slow down driver operating speeds and reduce the footprint of innovative intersections such as smaller radii for horizontal curves and turning movements, shorter roundabout splitter islands, and narrower width driving lanes.

| Improvement Category | Description | US 25 Milepoint Location | Recommend Short-Term to Mid-Term Implementation | Recommend Long-Term Implementation | Concept | |
|-------------------------------------|--|---|---|------------------------------------|---------|-----|
| Corridor | Bicycle and pedestrian improvements | MP 13.5 to 16.4 | | X | A | |
| | - Alternate A: Shared-use path and sidewalk - Alternate B: Sidewalk on each side | | | | | |
| Corridor | Alternate 1: Widen US 25 to a three-lane typical section with one travel lane in each direction and a center two-way left-turn lane (TWLTL). | MP 13.8 to 16.4 | | | | |
| | - Modified swale drainage - Curb and gutter drainage | | | | | |
| US 25 at KY 80 Intersection | Mill and resurface asphalt shoulder to address roadside deterioration causing ice glaze on westbound KY 80 lane and shoulder at State Police Road | MP 11.1 (KY 80) | X | | B1 | |
| | Vegetation control on east side of northbound US 25 curve | MP 13.65 to 13.85 | X | | B2 | |
| | Retroreflective signal backplates | MP 13.6 | X | | | |
| | Channelize or eliminate WB KY 80 to NB US 25 acceleration lane | MP 13.6 | X | | | |
| | Restrict left turns | - Left turn from State Police Road and CVB Drive to KY 80 | MP 11.09 (KY 80) | X | | B3 |
| | | - Left turn from CVB Drive to US 25 | MP 13.5 | | | |
| | Park and Ride study | - | | X | | N/A |
| | KY 80 Planning Study | | MP 9.8 (KY 80) to 0.2 (HR 9006) | X | | N/A |
| | Update signal timing | | MP 13.6 | X | | C1 |
| | Quadrant intersection | | MP 13.6 | | X | C2 |
| Continuous flow intersection | | C3 | | | | |
| US 25 at Bullock Road Intersection | Lane extensions across Bullock Road "Y" | MP 14.46 to 14.56 | X | | D | |
| | Vegetation control or removal | | X | | | |
| | Relocation of intersection | MP 14.5 | | X | E1 | |
| Single-lane roundabout | | | | E2 | | |
| US 25 at KY 3434 Intersection | Full-depth widening for right-turn lane on US 25 | MP 15.15 | | X | F1 | |
| | Dynamic envelope pavement markings and "Do Not Stop on Tracks" crossing signage and crossing warning signage for at-grade crossing (R8-8, W10-2, and W10-11a); radar-detected WATCH FOR STOPPED TRAFFIC sign (W26-1) with yellow warning beacon and WHEN FLASHING sign (W16-13P) | MP 0.02 (KY 3434) | X | | F2 | |
| US 25 at Glenview Road Intersection | Quick Kurb (paint and post) gas station entry delineation | MP 15.82 | X | | G | |
| | Intersection lighting | | | X | | |
| | Full-depth widening for right-turn and left-turn lanes on all approaches | | | | X | H1 |
| | Single-lane roundabout | | | | H2 | |
| US 25 at KY 490 Intersection | Retroreflective signal backplates | MP 16.4 | X | | I | |
| | Update northbound channelized right-turn pavement markings to eastbound KY 490 | | | | | |
| | Realigned T intersection | | | | X | J1 |
| | Single-lane roundabout | | | | J2 | |

Table 3: Summary of Final Recommendations

The context and target speed for each segment of US 25 also inform access spacing recommendations:

- Maintain access spacing south of KY 80 and north of KY 490
- Intermittent median restrictions between KY 80 and KY 490
- Driveway and entrance access spacing of 440 feet or more recommended between KY 80 and KY 490
- Pedestrian and bicycle crossings at intersections and near pedestrian and bicycle traffic generators

The detailed analysis and evaluation of all recommended concepts are located in **Appendix E**.

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Introduction



The Kentucky Transportation Cabinet (KYTC) initiated a planning study in April 2023 to identify Complete Streets, Roads, and Highways-focused improvements on US 25 in Laurel County. The planning study identifies short-term and long-term capital improvement projects to provide safe mobility for all users.

Study Area

The US 25 corridor study area is shown in **Figure 1**. The study area begins near the intersection of CVB Drive at milepoint (MP) 13.5 in the City of London and ends at MP 16.7 to the north of the intersection of US 25 and KY 490 in Laurel County. The study corridor represents a suburban transition from historic, urban London to rural Laurel County. The study area is anticipated to develop in the near future, particularly around the KY 80 (Hal Rogers Parkway) intersection.

Study Objectives and Process

The purpose of the project is to improve the safety and mobility of all users on US 25, aligning with the KYTC Complete Streets, Roads, and Highways Manual¹. All users considered during the planning study process include, but are not limited to, bicyclists, pedestrians, motorists, freight operators, and emergency service providers. The areas of focus to achieve this vision through the study included: crash mitigation, access management, traffic capacity, and bicycle and pedestrian accommodations.

Study Process

- Identify the user needs and goals of the study
- Observe existing conditions and travel patterns
- Evaluate current and future land use context
- Identify safety concerns and unmet user needs
- Develop potential recommendations
- Evaluate recommendations based on the study vision and goals
- Propose a list of prioritized short-term and long-term recommendations

1. KYTC Complete Streets, Roads, and Highways Manual <https://transportation.ky.gov/BikeWalk/Documents/Complete%20Streets,%20Roads,%20and%20Highways%20Manual.pdf>

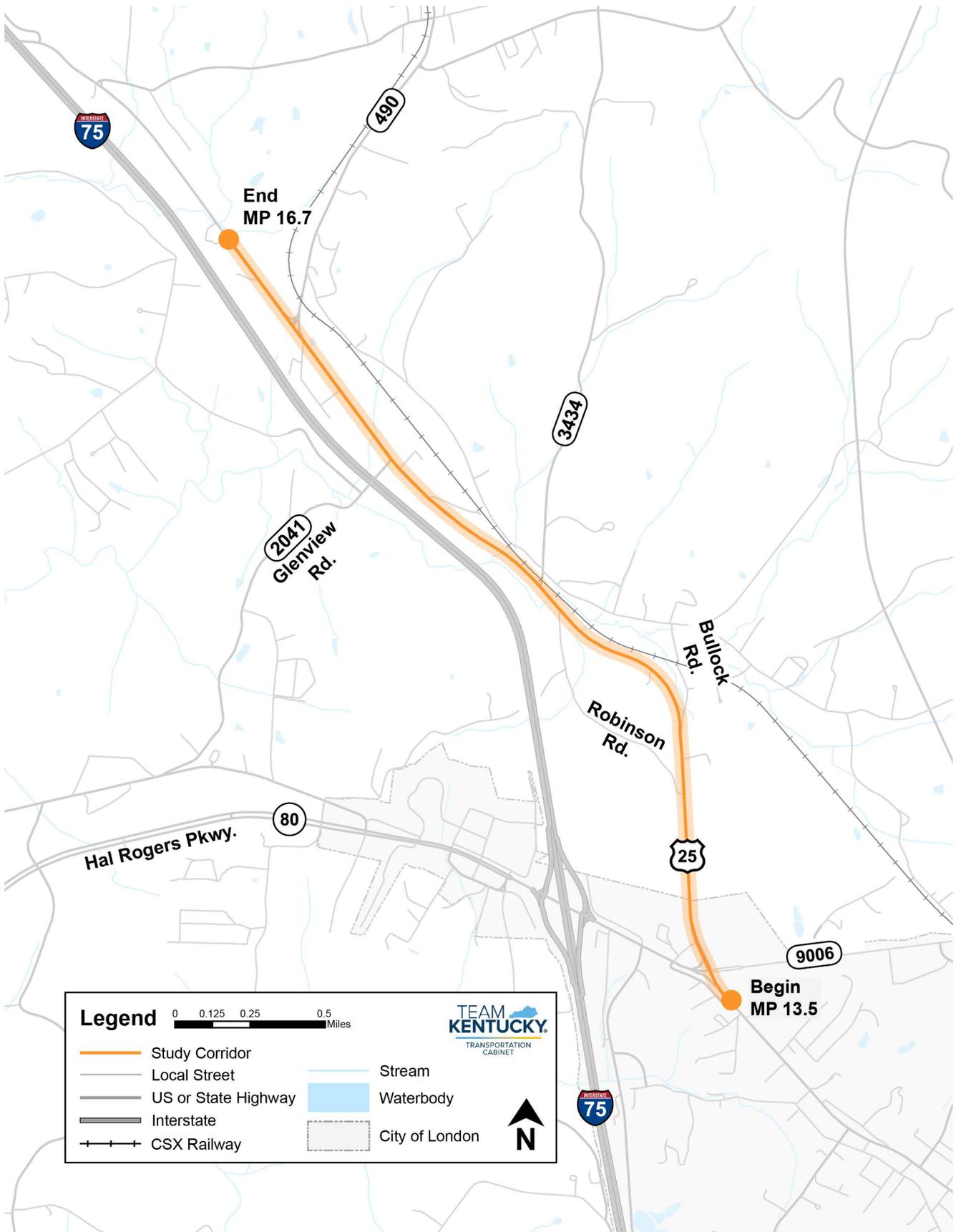


Figure 1: Study Area

To develop the project goals and objectives, the mobility and safety needs of the anticipated users were established. Mobility needs refer to the ability of each of the users to access, travel along, and connect to their destinations in the study area. Safety needs refer to areas where frequent crashes and lack of infrastructure contribute to crashes or inform user behavior during their travel.

Mobility Needs

- Consistent volumes of pedestrians and bicyclists along US 25, through its intersection with KY 80, and along KY 490
- High-volume freight corridor to access Baxters North America and Robinson Stave
- High emergency vehicle volume with Kentucky State Police and East Bernstadt Fire Department located on the corridor

Safety Needs

- Undefined and frequent parcel entrances contribute to frequent opposing left-turn, angle, and rear-end crashes.
- Left-turn movements at the intersection of State Police Road, CVB Drive, and KY 80 have contributed to frequent crashes, with sixteen total crashes from 2018-2022 at this intersection.
- Lack of pedestrian and bicycle infrastructure require the use of the roadside and shoulder to travel. Defined pedestrian and bicycle crossing opportunities are not provided on the corridor.

Project Goals

Project goals were developed through stakeholder input, public feedback, and evaluation of current and future needs of the corridor.

- Provide safe, accessible accommodation for all users, including bicyclists, pedestrians, freight, and emergency vehicles.
- Accommodate pedestrians and bicyclists with facilities separated from the roadway to minimize uncomfortable interactions with large vehicles.
- Provide appropriate crossing opportunities for bicyclists and pedestrians at intersections and near destinations that generate pedestrian and bicycle travel.
- Prevent crashes at frequent and undefined access points.
- Prevent crashes and improve operations at the intersections of KY 80, Bullock Road, KY 3434, KY 2041, and KY 490.
- Accommodate I-75 detour traffic without negatively impacting safety for all users.

Related Projects and Plans

KYTC Proposed Projects

No specific projects are located on the study corridor from Kentucky’s 2022 Enacted Highway Plan (Six Year Plan) and the Continuous Highway Analysis Framework (CHAF) database. However, three Six Year Plan projects and one CHAF project are identified in the vicinity of the study area on KY 490 as shown in **Table 1**.

| ID or Item No. | Road | Begin MP | End MP | Description | Plan Year |
|----------------|---------|----------|--------|---|-----------------------|
| IP20160144 | KY 490 | 0 | 3.8 | Shoulder breakoff and settlement repairs and resurfacing | 2016 |
| 11-8952 | KY 490 | 0 | 3.8 | Shoulder breakoff and pavement settling repairs and resurfacing | 2016 General Assembly |
| 11-20023 | KY 490 | 0 | 6.14 | Address pavement condition | 2018 Highway Plan |
| 11-10207 | KY 490 | 0.075 | 0.123 | Bridge project over CSX railroad | 2022 Highway Plan |
| 11-4380 | KY 2041 | 0.75 | 0.85 | Install guardrail on KY-2041 in Laurel County | 2024 Highway Plan |

Table 1: KYTC Proposed Projects Near US 25

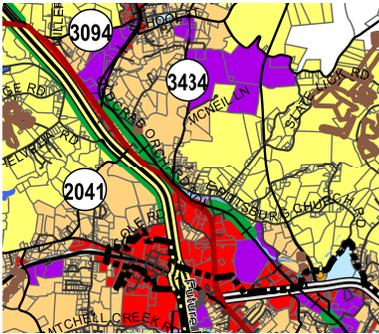
Related Planning Studies

In addition to KYTC's proposed projects in the study area, related plans to inform current and future land use, transportation needs, and other growth patterns were identified from the City of London and Laurel County.



City of London Bike and Pedestrian Master Plan

Adopted in June 2015, the master plan identifies the use of the northern portion of the study area for the annual Redbud Ride and notes pedestrian facilities ending at the southern terminus of the study area. The master plan does not specifically recommend improvements in the study area.



2007 London-Laurel County Comprehensive Plan

The Comprehensive Plan anticipated commercial and medium density residential land use along the study corridor, anchored by existing industrial land use on either end. Typically, the corridor has followed this pattern of commercial development; however, residential development remains light in the study area.



I-75 Major Incident Detour Guide

During an incident management scenario on I-75 between exits 41 and 49, the study corridor is utilized as a detour route. Recommendations and concepts should consider the accommodation of relatively infrequent, large interstate freight traffic along the study corridor.

Existing Conditions



Following is an overview of the existing conditions along and near the US 25 study corridor. These include the land use context adjacent to the corridor, the frequency of expected users, classifications, and the physical characteristics of the highway.

Land Use Context

The study corridor is comprised of three different land use contexts. The segment south of KY 80 is urban context in the City of London, characterized by commercial businesses with low building setbacks. Near the southern terminus of the study area, the context transitions from the urban City of London to a suburban commercial context from KY 80 to KY 490. The suburban context is also characterized by primarily commercial businesses; however, the development is less dense than in an urban context. Typically, buildings in this segment of the study corridor are set further back on larger parcels and fronted with surface parking lots. An occasional residential parcel is also located in this segment. The context transitions from suburban commercial to rural at the intersection of KY 490. The rural context is characterized by sparsely developed residential and agricultural land use.



US 25 Urban Context
Image Credit: City of London



US 25 Suburban Context



US 25 Rural Context

Users

The presence and travel patterns of motor vehicle drivers, freight operators, emergency service providers, and bicycles and pedestrians are informed by observation and expectations by land use context. In the urban context south of KY 80, high motor vehicle, moderate freight, and moderate-to-high bicycle and pedestrian volumes are anticipated. In the urban context, access and connectivity for bicyclists and pedestrians is driven by the proximity of destinations to each other through smaller parcel sizes, lower building setbacks, and pedestrian-oriented development resulting in a higher volume of commuters in these modes. Freight volume is driven by local delivery freight and longer-range industrial and commercial freight generated by the proximity of access to I-75 and local industries to London.

The suburban context between KY 80 and KY 490 experiences moderate-to-high motor

vehicle, moderate-to-high freight, and low-to-moderate bicycle and pedestrian volumes. Bicycle and pedestrian volumes in this segment of the study corridor are largely driven by access to sparsely located, pedestrian-oriented developments such as convenience stores, gas stations, or to access destinations and services in London. Freight volume is increased through this segment due to the location of Baxters North America on the study corridor, and additional industrial land use surrounding the study corridor. Motor vehicle volumes are typically lower than to the south of the study corridor. The prevalence and access of US 25 by emergency services is higher in this section due to the location of the East Bernstadt Fire Department near the intersection of KY 490.

The rural context in the northern segment of the study corridor is characterized by a sharp drop in the volumes of all users. Typical travel patterns are represented by through traffic and low bicycle and pedestrian volumes due to the relatively sparse development and agricultural land use. Bicyclists and pedestrian volumes are typically characterized by recreational travel.

Transportation Characteristics

Speed Limits and Observed Speed

From MP 13.5 to approximately 13.8, the speed limit of US 25 is 35 MPH. The limit is a statutory 55 MPH from this point to the north end of the study segment. **(Figure 2)** Based on the context segments, target speed is aligned with the 35 MPH urban section and the 55 MPH rural section. However, recommended target speed for the suburban segment between KY 80 and KY 490 is recommended to be in the range of 30 to 45 MPH.

Prior to 2019, US 25 between KY 80 and KY 490 had a posted speed limit of 45 MPH. A speed study was performed and recommended removing the 45 MPH speed signs, which were removed mid-year in 2019. Based on available HERE data, current operational speeds during the day, on average, are consistently at or lower than the posted or statutory speed limit. However, speeding is observed outside in off-peak hours through the night.

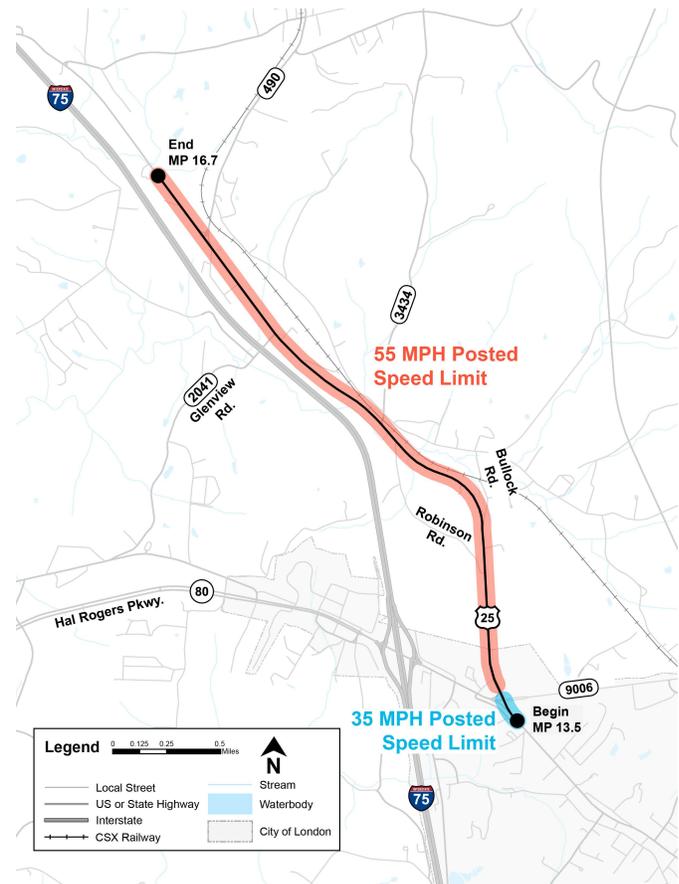


Figure 2: US 25 Posted Speed Limit

Bicycle and Pedestrian Accommodations

No specific bicycle and pedestrian accommodations exist in the study area. One existing sidewalk in the City of London is located adjacent to the study area at MP 13.5 on the west side of US 25. Pedestrians and bicyclists in the study area were observed during field visits and through public engagement feedback walking and bicycling either on the shoulder or in

the travel lane.

Access

The study area is comprised of nineteen intersections, sixty-one defined access points, and approximately 2.17 miles of undefined access where motor vehicles may turn into a parcel at any point along the corridor. The sixty-one defined access points are frequently wider than necessary to accommodate the vehicles accessing the parcel. The current design of the existing access points creates a risky environment for all users due to unclear locations for motor vehicle turning movements and wide access encouraging high speeds during the maneuver. As with speed limits, the access spacing in the urban and rural segments of the study corridor are in alignment with current best practices; however, the suburban section recommended access spacing based on target speed and context is 245 to 660 feet which is exceeded in many areas along the corridor.



Example of undefined access on US 25.

Park and Ride

A Park and Ride is located at the intersection of US 25 and State Police Road. The Park and Ride is a high-turnover parking location, utilized as both a carpool meeting location for area residents and a meeting place for online sales transactions. The Park and Ride frequently operates at, or above, capacity. When the Park and Ride is full, users will park vehicles on the verge along State Police Road and near the intersection.



Park and Ride located at the intersection of US 25 and State Police Road.

Truck Routes

US 25 is not part of the National Truck Network, though Hal Rogers Parkway, which intersects US 25 at the southern study terminus, is a federally designated route. Beginning at mile point 13.62 and extending north to the project terminus, US 25 is listed as part of the Coal Haul System, and the full segment has a Tier 1 designation in the Kentucky Highway Freight Network. The corridor allows for “AAA” Weight Class trucks with an 80,000-pound maximum weight.

Functional Classification and Roadway System Designation

US 25 is not on the National Highway System. It is classified as a minor arterial between mile point 13.5 (southern study terminus) and its intersection with KY 80/Hal Rogers Parkway at mile point 13.62, and as a major collector for the remaining section of the study corridor.

Roadway Geometrics

An inventory of roadway characteristics was completed to identify factors contributing to safety and congestion issues along US 25. Geometric information for this study was obtained from the KYTC Highway Information System (HIS), and additional characteristics were obtained from Google Earth aerial imagery, Google Street View, and field visits.

Lanes, Shoulders, and Median Widths

The study segment is primarily a two-lane roadway with 11-foot lanes, but sections vary at each end. From MP 13.5 to 13.8, US 25 is a four-lane roadway with 12-foot lanes and additional turn lanes. From MP 16.2 to 16.5, the roadway widens to accommodate center turn lanes at the intersection with KY 490. These lane variations are shown in **Figure 3**.

The sections shown in **Figure 3** also roughly correspond to changes in paved shoulders. Between MP 13.5 and 16.4, the segment contains 10-foot shoulders, though it is only fully paved between MP 13.5 and 14.0. Between MP 14.0 and 16.4, the 10-foot shoulder has a paved surface width of two feet. Beginning at MP 16.4, the shoulder width is reduced to six feet, of which one foot is paved. Except for the intersections of KY 80 and KY 490, to accommodate turn lanes, the study corridor does not include a median.

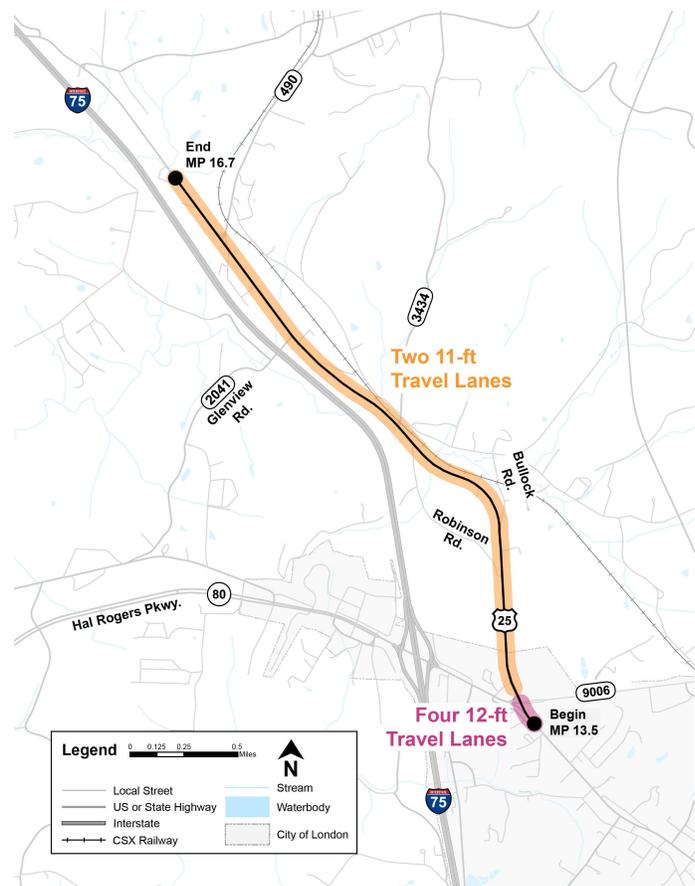
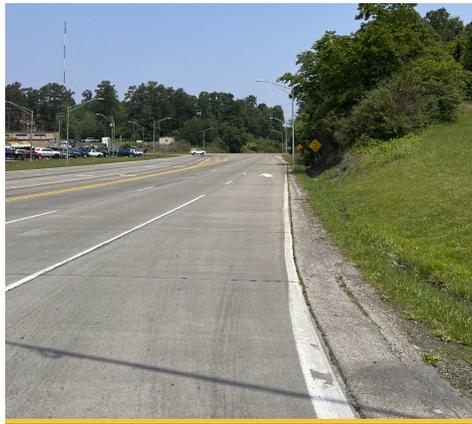


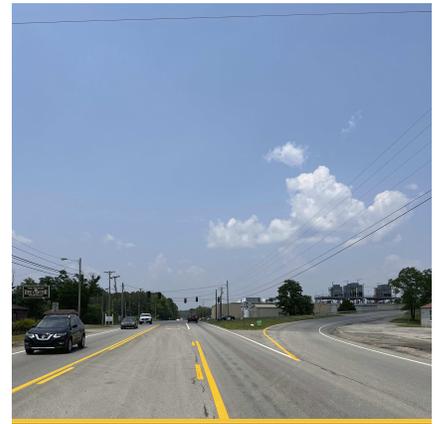
Figure 3: US 25 Lane Configurations



Typical Two-lane Section



KY 80 Intersection



KY 490 Intersection

Horizontal and Vertical Alignment

There are six horizontal curves, and the US 25 corridor is relatively flat within the study area with minimal vertical curvature. The two horizontal curves located between mile point 13.5 and 13.8 may be below the minimum design radius for sight distance to the signal. The curves and their design elements are shown in **Figure 4**. KYTC Highway Design Guidance Manual lists a maximum grade of 5% for arterial roads with a 35 MPH speed and 6% for collector roads with a speed of 55 MPH. All segments of US 25 meet these requirements.



Figure 4: *Curves and Vegetation Blocking Signal Sight Distance*

Crash History and Safety Analysis

Historical Crash Analysis

Five years of crash data (January 2018 to December 2022) from the Kentucky State Police database was reviewed to identify crash trends and potential safety improvements. Within the five-year analysis period, 147 crashes were reported in the study segment of US 25. Figures and tables describing the crash trends are presented in this section, and the crash data can be found in **Appendix A**.

Figure 5 presents an overview of crash severity within the corridor and highlights notable crashes that occurred within the five-year period. Crash density is highest near the southern terminus of the study corridor near the intersection of US 25 and KY 80/Hal Rogers Parkway. Density is also higher south of the reverse curve near mile point 15.0 and around the intersection with Glenview Road near mile point 15.8.

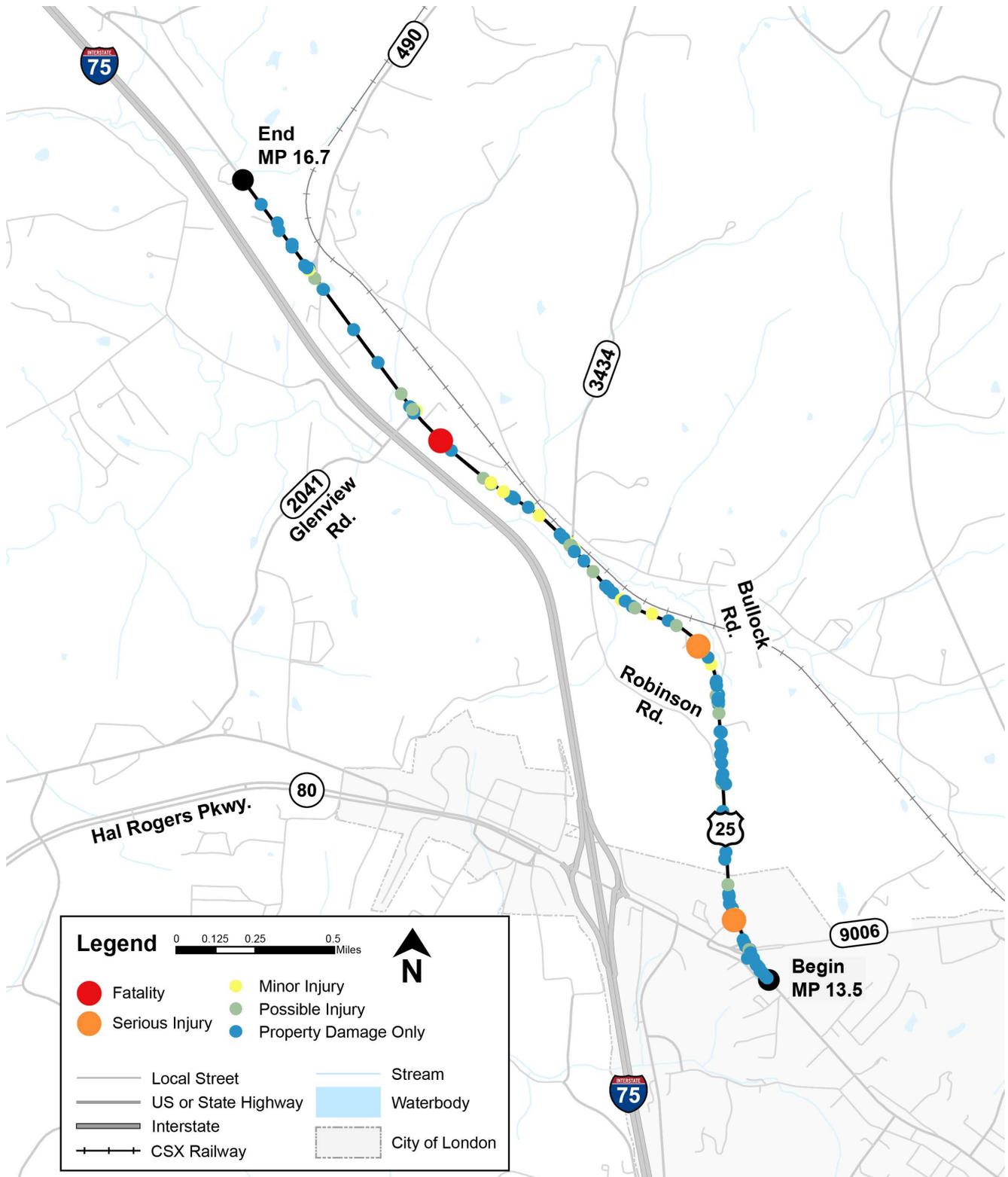


Figure 5: Crash Severity Within the Study Segment

Notable crashes include:

- Angle (MP 13.729): a serious injury crash resulting from a vehicle turning from a stop-controlled side street.
- Angle (MP 14.74): a serious injury crash.
- Single Vehicle (MP 15.14): a collision with a vehicle and bicyclist.
- Angle (MP 15.69): the sole fatality within the study segment resulting from a vehicle turning from a parking lot.

While crash density is highest near the KY 80/Hal Rogers Parkway intersection, the severity of the crashes increases moving away from this intersection to the north, as shown in **Figure 5**. In the vicinity of KY 80/Hal Rogers Parkway (mile point 13.5 - 13.9) injuries account for approximately 30% of the crashes that occurred near KY 80, while injuries account for approximately 60% of crashes that occurred in the remainder of the study segment.

| Severity | Number of Crashes | Percent of Total Crashes |
|--------------------------------|-------------------|--------------------------|
| K - Fatality | 1 | 1% |
| A - Serious Injury | 2 | 1% |
| B - Minor Injury | 18 | 12% |
| C - Possible Injury | 28 | 19% |
| O - Property Damage Only | 98 | 67% |
| Total Number of Crashes | 147 | 100% |

Table 2: US 25 Crashes by Severity

| Manner of Collision | Number of Crashes | Percent of Total Crashes |
|--------------------------------|-------------------|--------------------------|
| Angle Crashes | 37 | 25.17% |
| Backing Crashes | 2 | 1.36% |
| Head On Crashes | 3 | 2.04% |
| Opposing Left Turn Crashes | 13 | 8.84% |
| Rear End Crashes | 53 | 36.05% |
| Sideswipe Crashes | 27 | 18.37% |
| Single Vehicle Crashes | 12 | 8.16% |
| Total Number of Crashes | 147 | 100% |

Table 3: US 25 Crashes by Manner of Collision

Table 2 provides a breakdown of the crashes by severity shown in **Figure 5**. A majority of the crashes (67%) were property damage only crashes. Fatal and serious injury crashes make up 2% of the total, whereas minor and possible injury crashes comprise 31%. A breakdown of crashes by the manner of collision is provided in **Table 3**. Rear end and angle crashes make up the majority of crash types at 36% and 25%, respectively. Of the 53 rear end crashes, approximately 30% were in the vicinity of the KY 80/Hal Rogers Parkway intersection (mile point 13.5 – 13.7). **Figure 6** illustrates the location of these crashes. **Figure 7** illustrates the location of angle, head on, opposing left turn, and single vehicle crashes. **Figure 8** illustrates

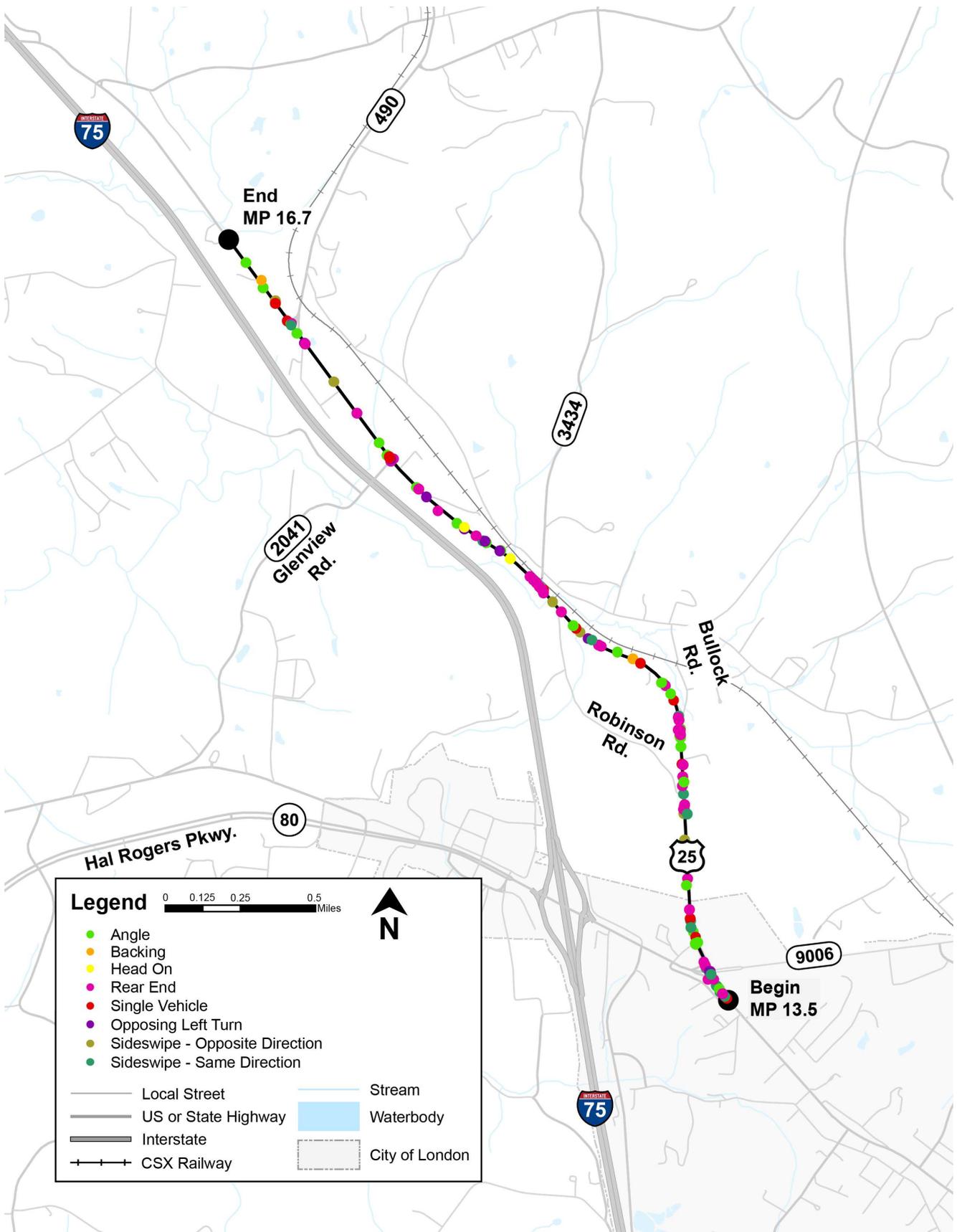


Figure 6: Crash Locations by Manner of Collision within the Study Segment

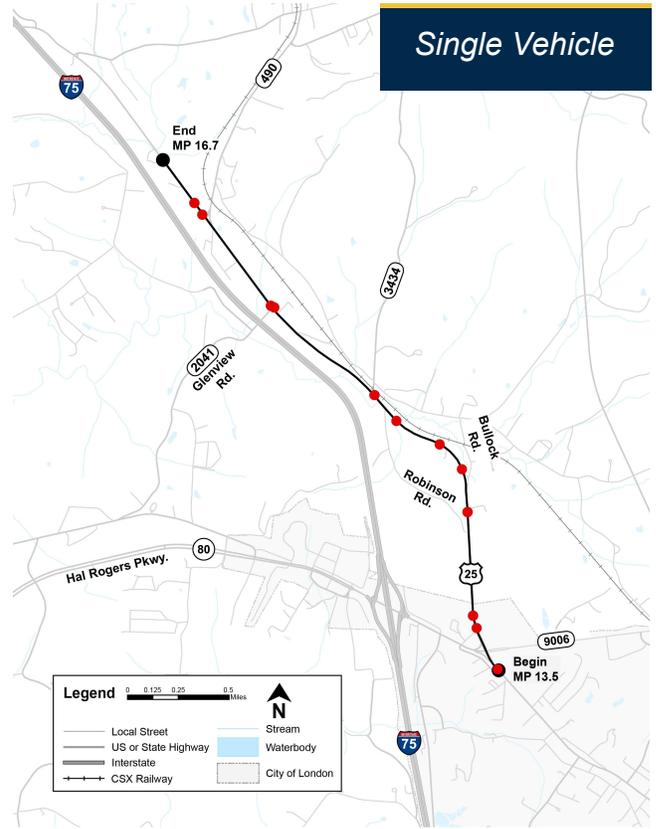
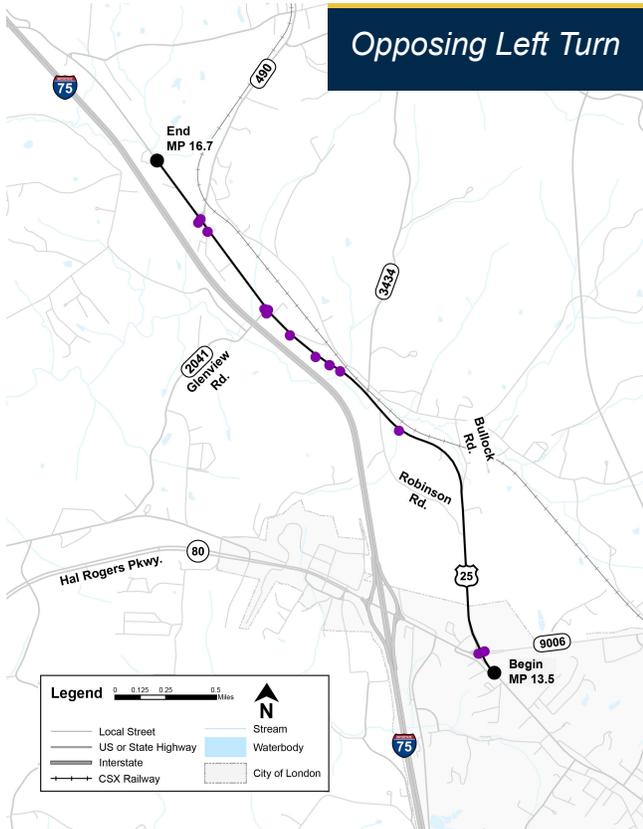
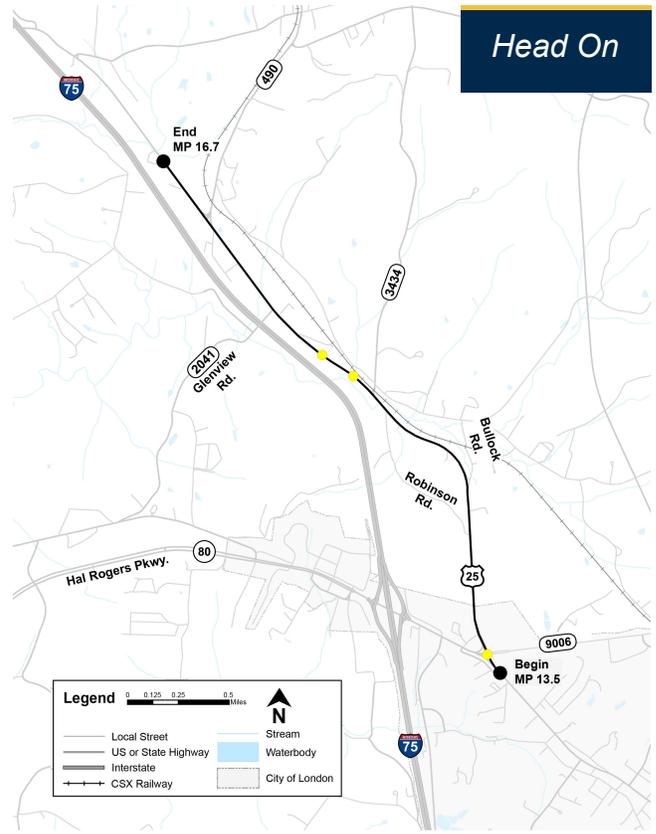
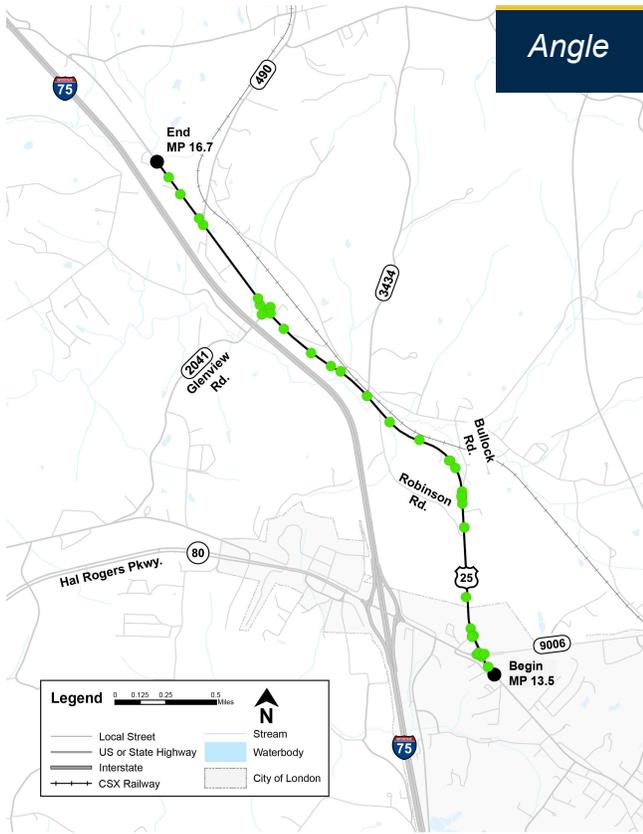


Figure 7: Angle, Head On, Opposing Left, and Single Vehicle Crash Locations

the relationship between the manner of collision and the severity of crashes within the study segment. Head on crashes are among the lowest number of crashes across the study period at 3, but the highest rate of injury at 100%. This is followed by opposing left turn crashes, angle crashes, and single vehicle crashes at 62%, 43%, and 42%, respectively.

One of the three head on crashes occurred at the KY 80/Hal Rogers Parkway intersection, and two in the segment between KY 3434 and KY 2041. Opposing left turn crashes primarily occurred at intersections rather than commercial driveways, specifically KY 80/Hal Rogers Parkway, Glenview Road, and KY 490. Angle crashes are spread across the study segment, but a significant portion are clustered around the KY 80/Hal Rogers Parkway and Glenview Road intersections. The segment near Bullock Road between mile point 14.4 and 14.6 also has a dense cluster of angle crashes. Single vehicle crashes are also spread across the study segment but primarily occur in the two-lane section.

Angle crashes have the second-highest percentage of crashes and percentage of crashes resulting in injury, suggesting they should be a primary focus of safety-related countermeasures. **Table 4** classifies the crashes by roadway condition, indicating that most crashes, and a significant majority of injury crashes, occur under dry conditions. According to the National Oceanographic and Atmospheric Institute, the precipitation in Laurel County was higher during the study period than the average for the state of Kentucky, so lack of rain would not contribute to this disparity. The majority of crashes also occurred during daylight



Figure 8: Severity of Crash by Manner of Collision

conditions, accounting for 77.55% of injury crashes. Therefore, lighting and wet pavement conditions are not major contributing factors to crashes.

| Roadway Condition | Number of Crashes | Percent of Total Crashes | Number of Injury Crashes | Percent of Total Injury Crashes |
|---------------------|-------------------|--------------------------|--------------------------|---------------------------------|
| Dry | 123 | 84% | 47 | 96% |
| Wet | 24 | 16% | 2 | 4% |
| Daylight | 116 | 79% | 38 | 78% |
| Dawn/Dusk/ Night | 31 | 21% | 11 | 22% |

Table 4: US 25 Crashes by Roadway and Daylight Conditions

Excess Expected Crashes

Determining Excess Expected Crashes (EEC) is based on crash prediction methods and represents the number of crashes occurring in a segment compared to what would be expected on roadways of a similar type and length. Positive EEC values represent a higher number of crashes than expected and negative EEC values represent a lower-than-expected number of crashes. The EEC values are further categorized into four Level of Service of Safety (LOSS) values to describe the magnitude of the safety problem. A LOSS value of I or II represents sites with fewer than expected crashes where safety improvements are likely to have a lower impact. A LOSS III indicates a moderate-to-high potential that safety improvements will reduce crashes and LOSS IV indicates a high potential for crash reduction.

The Kentucky Transportation Center’s Crash Data Analysis Tool was used to calculate EEC values for the study segment of US 25. **Figure 9** shows the location of the positive EEC values and corresponding LOSS values, highlighting where safety analysis should be focused. The northern section corresponds to a LOSS III while the southern section corresponds to a LOSS IV, indicating that the segment near KY 80/Hal Rogers Parkway has a greater potential for crash reduction from safety improvements.

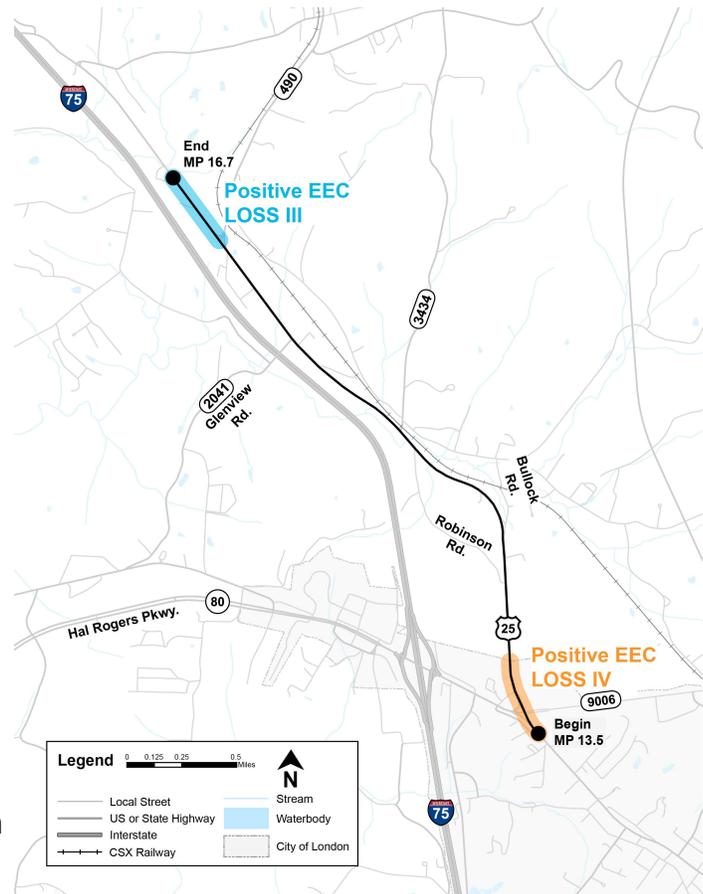


Figure 9: US 25 Excess Expected Crashes and Level of Service of Safety

Potential Safety Improvements

Potential improvements for the corridor are discussed later in this document. Specific

safety-focused improvements are summarized here for the sections of the corridor with LOSS values greater than II, breaking the corridor into its northern and southern termini.

Northern Terminus (MP 16.7) – LOSS III

Crash density at the northern terminus is high north of the intersection of US 25 and KY 490. The majority of crashes during the five-year period were single vehicle incidents or collisions between vehicles entering or exiting the roadway. Proven countermeasures applicable to this section of the study segment include:

- Shoulder improvements
- Access management modifications
- Lighting improvements
- Median barriers
- Road widening to include center two-way left-turn lanes.

Southern Terminus (MP 13.5) – LOSS IV

Crash density at the southern terminus is high near the intersection of US 25 and KY 80/Hal Rogers Parkway. The majority of crashes during the five-year period were rear end collisions, followed by sideswipe (same direction) and angle crashes. These types of crashes are typically associated with intersections, though sideswipe crashes can often be found in non-intersection segments as well. Proven countermeasures applicable to this section of the study segment include:

- Applying backplates with retroreflective borders to traffic signal heads
- Access management modifications and/or left turn restrictions
- Updating signal timing and coordination
- Alternative intersection configurations.

Known Utilities

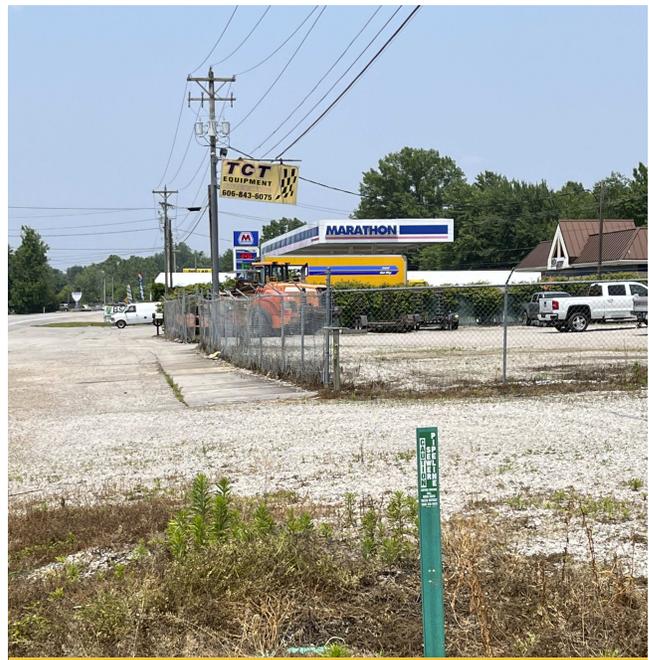
Known utilities within the study segment of US 25 include:

Natural Gas

- Delta Natural Gas lines are primarily located on the east side of the corridor beginning at MP 13.5, though there are connections crossing the roadway to the west side throughout. Beginning near MP 16.3 and ending close to KY 490, the gas lines are primarily on the west side of the corridor.
- Somerset Gas has a transmission line crossing the intersection of KY 2041 (Glenview Road) and US 25. The line runs on the east side of US 25 for a short distance to MP 15.9 before continuing north, away from the corridor.

Electrical

- LG&E and KU Energy electrical service and light poles are located on both sides of US 25 beginning at the southern terminus. At the KY 80/Hal Rogers Parkway intersection, aerial power lines on the west side diverge west in alignment with KY 80/Hal Rogers Parkway, while the electric lines continue on US 25 on the east side. Aerial transmission lines are located on the west side of US 25 at the State Police Road intersection at MP 13.7, connecting to the eastern side lines at MP 13.9. The light poles do not continue north of this intersection. The power lines continue to parallel the roadway to the northern project terminus, crossing US 25 at various points throughout.



Electrical, telecommunications, and sewer utilities on US 25.

- Eastern Kentucky Power Cooperative has two overhead transmission lines crossing US 25, one near MP 14.4 and one near MP 15.9.

Telecommunications

- Windstream Telecommunications aerial fiber optic lines are located on both sides of the corridor beginning at MP 13.5, before consolidating to the west side of the roadway at MP 13.7. The primary cable location alternates to the other side of the road at MP 14.7 (east side), MP 15.0 (west side), and MP 15.2 (east side). The cable lines are located on both sides of the road beginning south of the KY 490 intersection at MP 16.25. On the north side of this intersection near MP 16.5, the fiber optic cable is consolidated to the east side of the roadway for the remainder of the study segment.
- Kentucky Wired aerial fiber optic lines run along the west side of the corridor starting at MP 13.5, then alternate sides along the study corridor. The lines diverge to the east at the KY 490 intersection, aligning with that corridor.

Water

- London Utility Commission water and sewer lines are located on both sides of US 25 south of MP 13.5, then are consolidated to the west side of the roadway prior to the KY 80/Hal Rogers Parkway intersection. They continue on the west side of the roadway, diverging west of the intersection then converge back in alignment with US 25 approaching MP 13.85. The utility's sewer main ends at this point, while the water line continues north to tie into the Wood Creek Water District.
- Wood Creek Water District's water line is located on the east side of the roadway at the KY 80/Hal Rogers Parkway intersection. Beginning at MP 13.9, the water line shifts to the west side of the road, while the wastewater line is located on the

east side. Beginning at MP 15.2, north of the Old Richmond Road intersection, an additional water line extends from State Lick Road and runs along the east side of US 25. This additional line branches to the west at the Glenview Road intersection at MP 15.82. From this point, the water and wastewater lines continue along the corridor in their respective alignments to the end of the study segment.

Railway

A CSX rail line runs parallel to US 25 between mile point 14.7 and 16.5. This results in adjacent rail crossings for three intersecting routes: Bullock Road, KY 3434, and KY 490. The crossings at KY 490 and Bullock Road are grade-separated. The crossing at KY 3434 is at-grade with flashing signals and gate arms. According to information from the USDOT Crossing Inventory, there are an estimated 13 trains per day, 6 during daylight hours and 7 at night. The rail speed at this crossing is 30-45 MPH.



At-grade CSX crossing on KY 3434 near US 25.

Structures

KYTC's Bridge Data Miner was used to determine the condition of structures on US 25, as well as structures adjacent to study intersections. The sole structure within the study corridor is a culvert over Wood Creek at MP 15.10. Its bridge identification number is 063B00006N. It is a two-span structure approximately thirty-one feet in length and was built in 1951. It has a "Fair" condition rating as of 2022.

In addition to this structure, two grade-separated rail crossings are located near US 25 on Bullock Rd. and KY 490. Although both are outside the primary corridor, these structures can affect the feasibility of potential concepts.



Wood Creek culvert structure on US 25.

- Structure 1 is a CSX rail line overpass over Bullock Road. Bullock Road narrows from two travel lanes to a single lane under the structure.
- Structure 2 is a bridge on KY 490 over the CSX rail line from MP 0.07 to 0.12. Its bridge identification number is 063B00002N. It is a five-span structure approximately 252 feet in length, including a roadway width of twenty-four feet, and was built in 1941. It has a "Fair" condition rating as of 2022.

Existing and Future Traffic Analysis



The traffic analysis used existing volumes, grew them with an anticipated growth rate, then applied them to proposed alternates for analysis. The traffic volume work included using known traffic counts and proportions from Streetlight data to determine turning movement counts (TMCs) at each intersection of interest. Historical and existing average annual daily traffic (AADT) counts were also used to evaluate historic growth rates and corridor daily volumes. These historic growth rates were used in conjunction with travel demand model (TDM) growth rates and census population trends to select an anticipated growth rate of 0.50% along the corridor. A detailed explanation of this methodology can be found in **Appendix B**.

Existing Intersection Volumes and Operations

Traffic counts were collected at the four major intersections of KY 80, KY 3434, KY 2041, and KY 490. Streetlight data was utilized and adjusted to estimate intersection counts. Proportions were calculated for Streetlight volumes to count volumes at the above-mentioned intersections. These proportions, along with some balancing, were used to adjust the Streetlight counts at the remaining intersections.

These existing intersection volumes were then analyzed with the existing roadway configuration and signal timing, where applicable, to determine existing operations in the AM and PM peak hours using the Highway Capacity Manual 6th Edition (HCM6) methods. These volumes and operational level of service (LOS) are shown in **Figure 10**.

Existing Segment Counts and Operations

KYTC conducted segment counts for three separate segments of US 25 and traffic volumes were collected from the corresponding stations for each segment. HCM6 analyses utilized the segment counts along with existing roadway configurations to determine segment LOS. The segment data is shown alongside the intersection data in **Figure 10**.

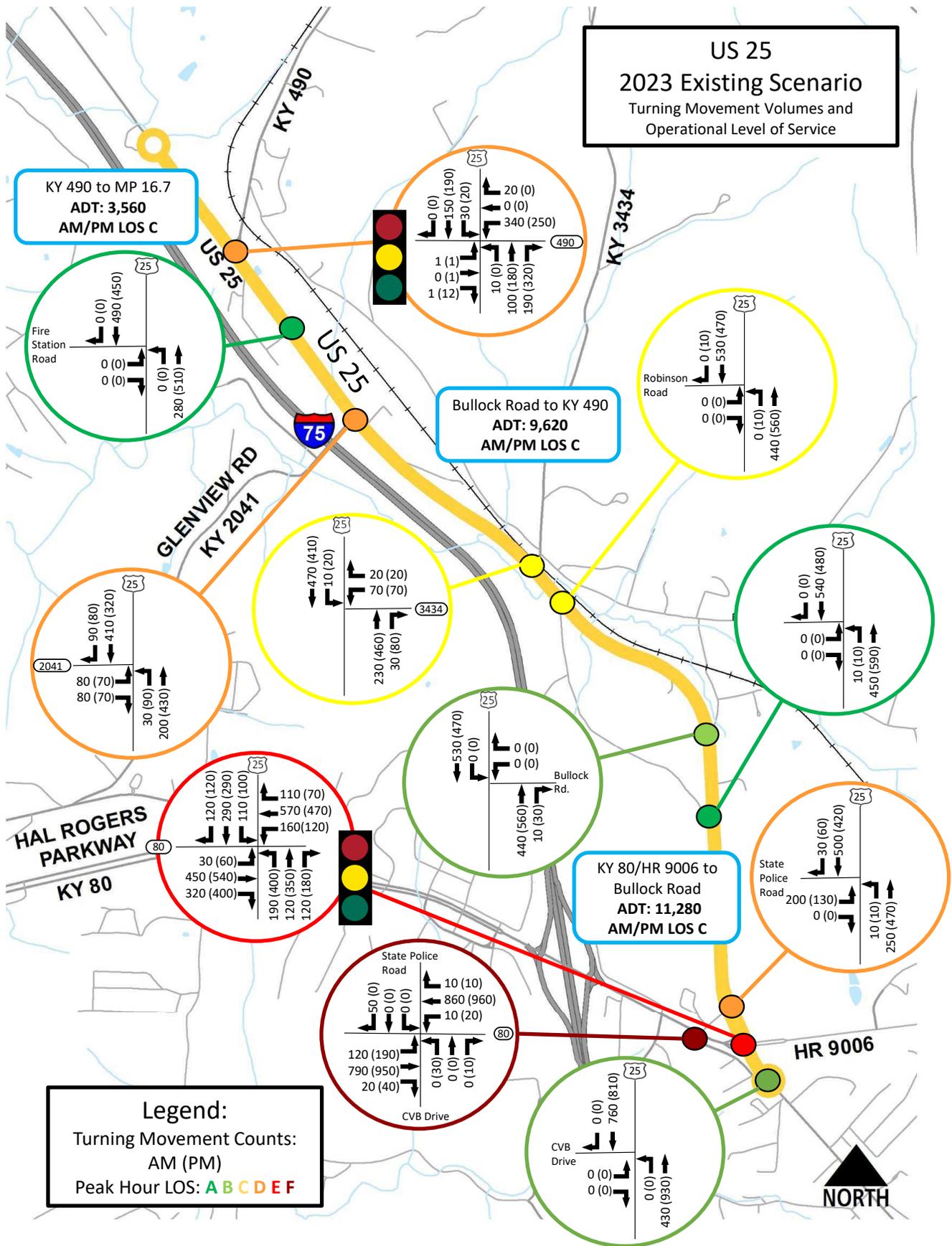


Figure 10: 2023 Existing Turning Movement Counts and Peak Hour Level of Service.

Forecast Volumes and Growth Rate

The forecast for traffic within the US 25 Corridor Study considers total vehicular and truck volumes for the existing year (2023) and design year (2045) along with expected bicycle and pedestrian activities. Current projects planned in the vicinity of the study corridor are not expected to have a significant influence on future traffic growth in both the build and no-build scenarios.

A traffic growth rate was selected after considering several growth trends. These include historical traffic patterns, population growth trends, and data from the Laurel-Pulaski Regional Travel Demand Model (TDM). The information gathered from these trends played a crucial role in determining a 0.5% growth rate for the design year 2045.

This growth rate was applied to the existing volumes to calculate volumes for the design year. The anticipated design year volumes, rounded to the nearest ten, are shown in **Figure 11**. In addition to the anticipated increase in traffic, the planning team expects bicycle and pedestrian activity to continue along and across the study corridor. The area adjacent to the study boundary is primarily residential, where the proportion of individuals living below the poverty level surpasses the national, state, and Laurel County averages. These populations may rely on walking and bicycling as their mode of transportation.

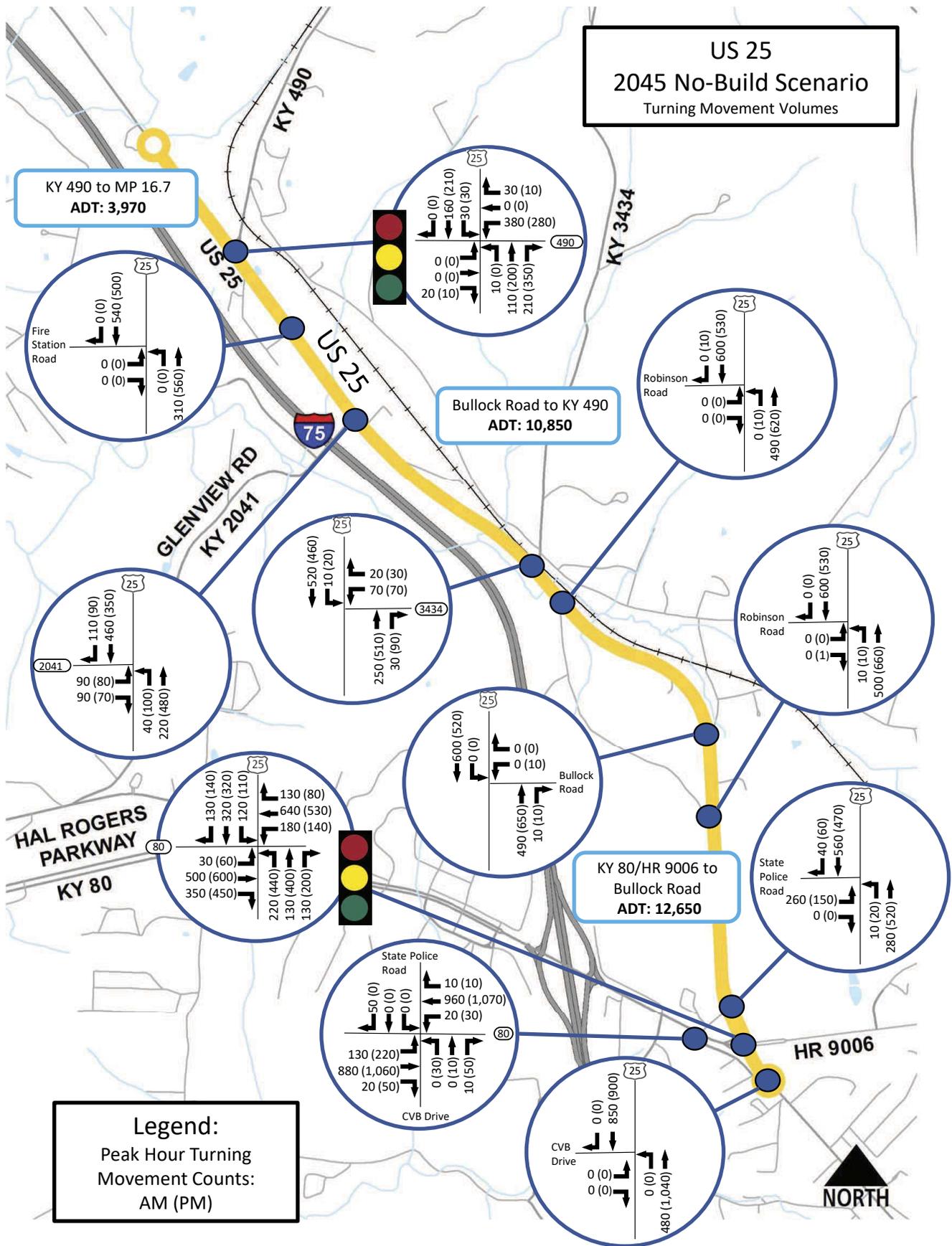


Figure 11: 2045 No-build Scenario Turning Movement Counts

Environmental Overview



Data was collected for an Environmental Overview (EO) based on existing geographic information system (GIS) datasets, state and federal agency databases, literature research, archival data, and a windshield survey of the corridor. Desktop research was performed to identify and locate areas of importance or concern that lie within a 250'-wide corridor along the centerline of US 25 from MP 13.5 to MP 16.7. This area was expanded to a 500' diameter circle centered on US 25 at four major intersections: KY 80, KY 3434 (Old Richmond Road), KY 2041 (Glenview Road), and KY 490. The limits of the study buffer are shown in **Figure 12**.

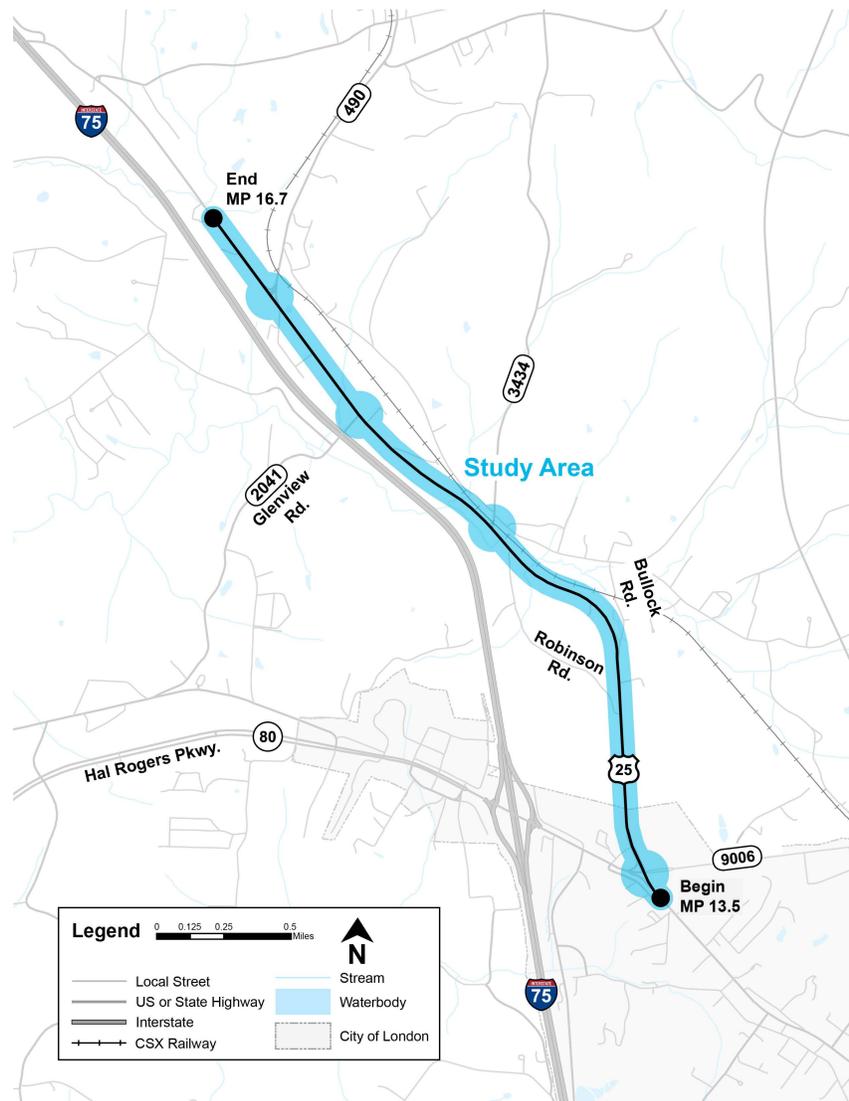


Figure 12: US 25 Environmental Study Area Boundary

Once identified, those resources were considered within the context of improvement concepts and the potential for those concepts to impact the identified resources. The detailed EO is attached as **Appendix C**.

The EO considers resources in the following categories: ecological resources (i.e., streams, wetlands, and floodplains); threatened and endangered species and unique habitats; UST and hazardous materials; historic and archaeological resources; and Environmental Justice (EJ) / socioeconomic data.

A key consideration for all improvement concepts was whether they occur outside of existing right-of-way. Those occurring outside of existing right-of-way or creating ground disturbance have greater potential to impact natural and socioeconomic resources. Concepts chosen during the design phase will require in-depth analysis and review to provide National Environmental Policy Act (NEPA) location approval (NEPA documentation) before transitioning to future phases of project development.

Natural Environment

The natural environment includes ecological resources, threatened and endangered species, and important habitats. The potential to encounter natural environment resources is considerable. The desktop review identified that potential habitats for threatened and endangered species are found throughout the study area. Similarly, multiple stream crossings are located within the study area including Wood Creek, Peacock Branch, and three unnamed tributaries to Wood Creek. Wood Creek also has an associated floodplain within the study area, near KY 3434. Wetland areas were not identified on National Wetland Inventory (NWI) mapping, though three potential wetlands were observed toward the northern terminus of the study area between KY 3434 and KY 490. Finally, two permitted mine boundaries intersect the southern end of the study area, with an additional seven (7) permitted mines within a half-mile buffer.

Human Environment

The human environment includes air quality and noise issues; EJ / socioeconomic data; land use / farmland; hazardous materials; and historic and archaeological resources. As with the natural environment, improvement concepts that require additional right-of-way or other ground disturbance are considerable and may result in impacts to these resources. The Office of State Archaeology reveals one (1) resource falls within the boundaries of the study area. Historic maps show approximately ninety-six mapped structures within or adjacent to the study area, with seven appearing to have been removed. If archaeological sites are associated with any of these structures, those sites could potentially be significant. Soil data includes the Stendal soil series, which has the potential to contain deeply buried, intact archaeological deposits.

Kentucky Heritage Council (KHC) data indicates (12) previously identified cultural historic resources located within or adjacent to the study area, with one resource (LL 131) listed in the NRHP. The London Tuberculosis Hospital (LL 131), located just north of KY 80 at the southern end of the corridor, is listed in the NRHP under Criterion A for its significance in health and medicine in the mid-twentieth century. A two-cell concrete box culvert (LL 733) carrying US 25 over Wood Creek near KY 3434 may be eligible for listing in the NRHP for its decorative

railing. Additional detail may be found in **Appendix C**.

The Cumberland Valley Area Development District prepared the Laurel County US 25 Study Socioeconomic Report in June 2023 to analyze and identify potential populations that may be displaced or adversely affected by the recommended improvements proposed in this study. Data for this report was collected by using the method outlined in the KYTC document Methodology for Assessing Potential Environmental Justice Concerns for KYTC Planning Studies. The socioeconomic study, located in **Appendix C**, noted the following:

- Racial minorities in the study area are higher than Laurel County's percentages, but lower than the nation and state's population percentage.
- Census Tracts 9705 and 9706 both have higher population percentages of elderly persons (age 65 years and older) than the nation, state, and county. Census Tract 9702.02 has a lower population than the nation, state, county, and other Census Tracts in the study area.
- Census Tract 9705, Block Group 1, has a significant population percentage of individuals that live below the poverty line. Census Tract 9706 Block Group 1 was only 5.8 percentage points lower than that of Census Tract 9705 Block Group 1. Both Census Tracts and Block Groups were over double that of the nation and state.
- No conclusion can be drawn relative to disability status of the population from American Community Survey data.
- Census Tract 9702.02 Block Group 2, Census Tract 9705 Block Group 1, and Census Tract 9705 Block Group 2 have no people with limited English proficiency (LEP); however, Census Tract 9706 Block Group 1 has a percentage of 7.83, which is almost as high as the nation.

Stakeholder, Local Officials, and Public Engagement



In addition to three project team meetings between the consultant team and KYTC, outreach for this project included two meetings with local officials and stakeholders and a public survey.

Project Team Meetings

Meeting #1

The project team met to review a summary of existing conditions along US 25. The summary included a review of the study area and related projects. Topics covered included roadway characteristics, land use context, intersections and access points, speed limits and observed speeds, traffic volumes, level of service, bicycle and pedestrian activity, crash history, environmental and historic resources, and an overview of field observations.

Meeting #2

An initial concept development workshop was held after the first stakeholder meeting. The project team discussed potential alternates and recommendations that should be considered for analysis.

Meeting #3

The final project team meeting included a review of the analysis of initial concepts and selection of the final study recommendations for detailed analysis and concept sheet development.

Stakeholder and Local Officials Meetings

Meeting summaries for each Local Officials meeting can be found in **Appendix D**.

Meeting #1

Gresham Smith presented an overview of the US 25 project to local officials on September 25, 2023. The project team's review consisted of a thorough overview of the study area and its current conditions, a discussion of related studies and projects, photos from the project team's field review, and an outlook of the project



Stakeholder and local officials feedback on development plans, existing conditions, and potential improvements.

schedule. Participants provided feedback on the existing conditions and input on needs for the corridor.

Meeting #2

Gresham Smith presented an overview of the public survey results and initial recommendations developed by the project team. The overview included a description of how the survey results and existing conditions analysis informed recommendations and initial construction cost estimates. Input from the stakeholders was used to further refine the initial recommendations and select the final study recommendations.

Public Survey

Stakeholder engagement efforts included an online public survey, which was advertised via the KYTC District 11 Facebook page. The survey received 379 responses. A summary of travel patterns along US 25 from the public survey is shown in **Figure 13**. Most of the survey respondents drive a personal vehicle on US 25 daily for a variety of reasons, such as trips to and from personal errands, work, home, or recreation. Although few respondents walk or bike for their daily commute, 13% of respondents have walked or biked on US 25 at least once.

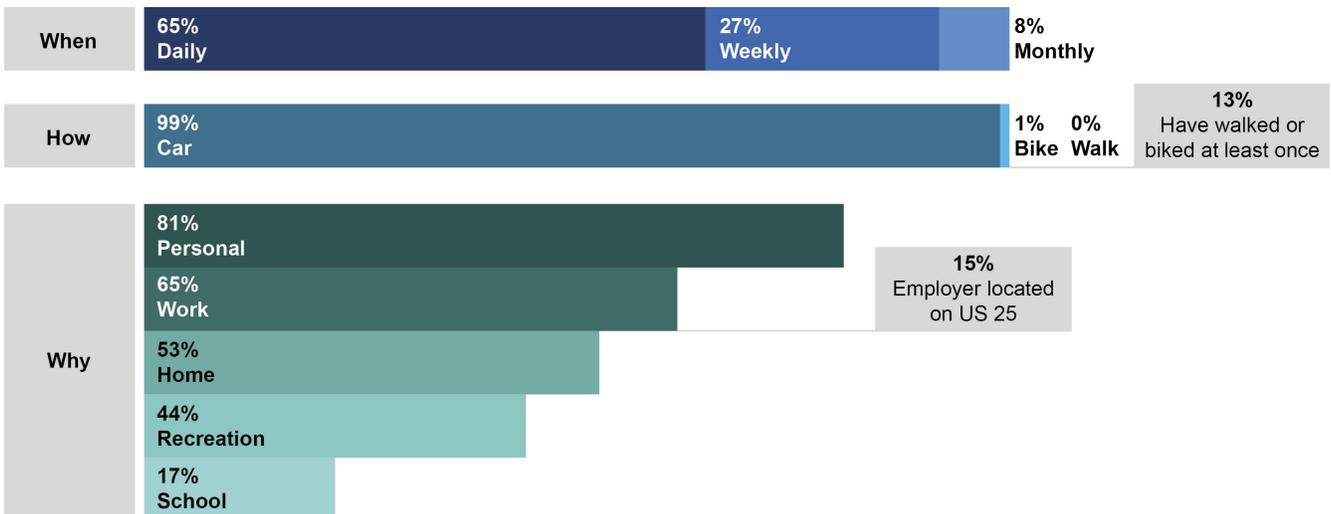


Figure 13: Public Survey Summary of US 25 Travel Patterns

Those surveyed were asked to answer the following three questions by rating on a scale of 1-5:

Do you see others walking or bicycling along US 25? (1 = Never; 5 = All the time)

The most common rating was 5, indicating heavy pedestrian and bicyclist presence.

How do you feel about the current pedestrian and bicycle facilities along US 25? (1 = Perfect the way they are; 5 = Need more work)

Most respondents chose 5, as they felt the current facilities are inadequate.

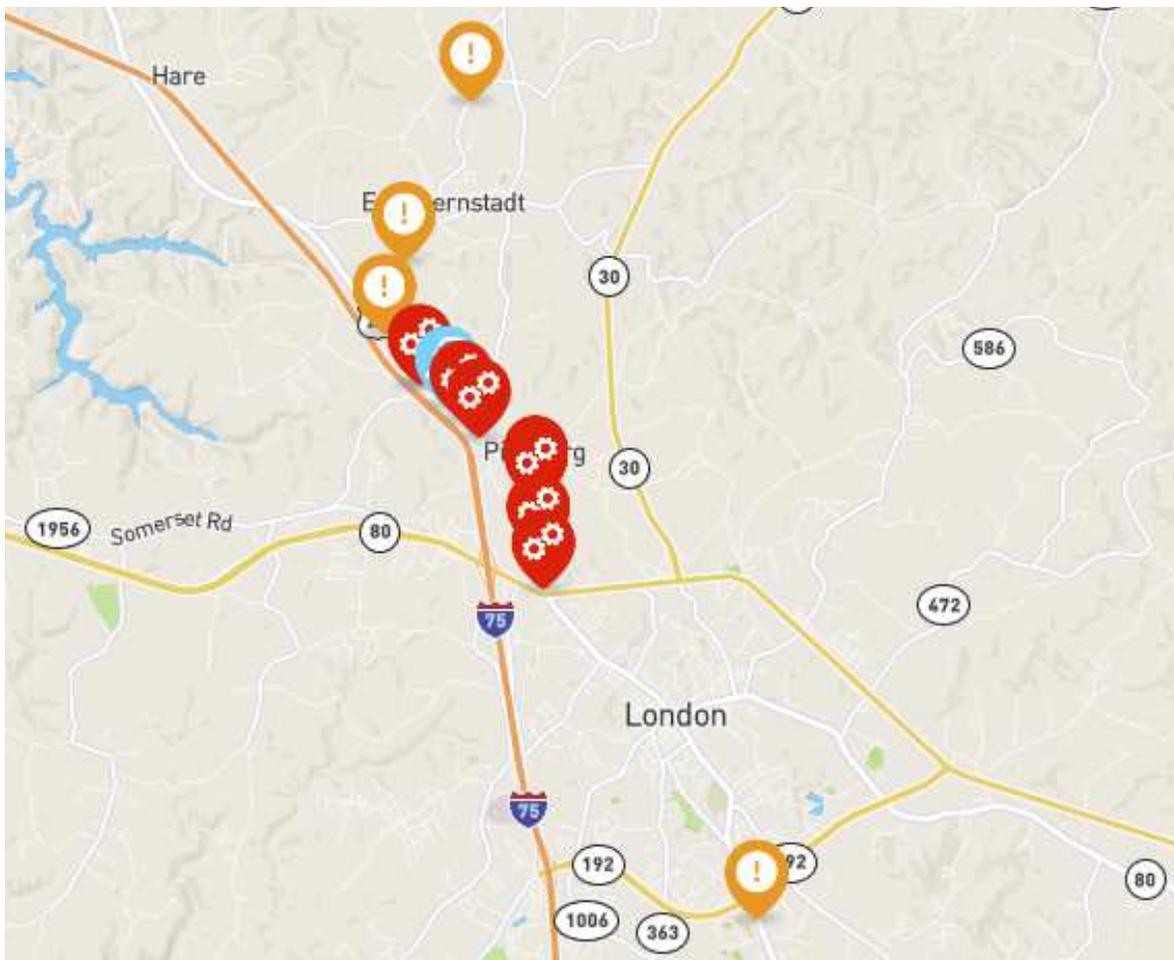
How safe do you feel traveling along US 25? (1 = I feel very safe; 5 = I do not feel safe)

The most selected rating was 3; respondents only feel somewhat safe traveling US 25.

Respondents were asked for any additional comments related to the US 25 study before completing the survey. Common themes from the survey comments included:

- Frequent pedestrian/bike traffic along the project section.
- Requests for sidewalks for pedestrians.
- Heavy traffic congestion creates dangerous conditions for people walking and biking.
- Turning the project section into a four-lane road would be beneficial to accommodate demand.
- A traffic signal is needed at Glenview to accommodate turning traffic.
- Left turns throughout the study corridor are difficult and dangerous.

Those surveyed were given the option to map their concerns on an interactive online project map under one of three categories: Improvement Needed, Challenge, or Other. Of the sixteen notes left on the map, twelve indicated an Improvement Needed, and four marked a Challenge. Two of the Challenge markers described safety issues created by the lack of infrastructure to support people walking on US 25. Improvement Needed comments demonstrated a variety of safety issues and unpredictability caused by inadequate facilities. A full list of comments and survey results is included in **Appendix D**.



The online project map included three types of map markers: Improvement Needed (red), Challenge (orange), and Other (blue).

Concept Development and Evaluation



Initial improvement concepts were developed based on the safety and traffic analyses, stakeholder and public feedback, and project team recommendations. The potential improvement concepts were evaluated based on key performance metrics, including:

- Safety performance, including benefit-cost analysis.
- Traffic analysis, including current and future performance.
- Environmental impacts, including both human and natural environment.
- Accommodation of pedestrians and bicyclists.

Table 5 summarizes the analysis of all studied improvement concepts. The full evaluation matrix is included in **Appendix E**. Following is a description of each key performance metric analysis.

Safety Performance

A predictive safety analysis was performed for the intersection improvement concepts as well as the corridor typical section alternatives to determine performance metrics that could be incorporated in the ultimate benefit-cost analysis of improvements. This safety analysis determines potential reduction in crashes and projects that to cover a 20-year period to correspond with the anticipated lifecycle of the investments. Converting the potential crash reduction into a dollarized benefit amount is a product of applying the crash reduction values by KY-standardized values for the comprehensive costs of crashes by severity of outcome.

For many of the intersection improvement concepts, FHWA's Safety Performance for Intersection Control Evaluation (SPICE) Tool was used. For evaluating other improvements, including the corridor typical section alternatives, Safety Performance Functions (SPFs) developed by the Kentucky Transportation Center (KTC) were deployed. These SPFs were developed by KTC through an annual regression analysis process that uses the previous 5 years of statewide crash history and road type factors. The SPFs were identified from the annual report published in 2022 that summarizes the period from 2017-2021 and specific functions were selected for applicability to the segments of the corridor in both existing and proposed configurations. Since the latest values for the comprehensive cost of crashes by severity of outcome were published in 2021, the crash period ending that same year was selected so the dollar-year would be compatible.

Notes:

* Minor improvements to Operational Level of Service due to the implementation of a two-way left-turn lane result in an estimated 13-minute reduction on average over the corridor per day.

| Improvement Category | Description | US 25 Milepoint Location | Operational Level of Service | | |
|--|--|---|------------------------------|----|----|
| | | | AM | PM | |
| Corridor | No-build | MP 13.5 to 16.7 | C | C | |
| | Access management (graded bioswales) | MP 14.0 to 16.3 | - | - | |
| | Paved shoulder widening for entrance aprons | | - | - | |
| | Bicycle and pedestrian improvements | - Alternate A: Shared-use path and sidewalk | MP 13.5 to 16.4 | - | - |
| | | - Alternate B: Sidewalk on each side | | - | - |
| | Alternate 1: Widen US 25 to a three-lane typical section with one travel lane in each direction and a center two-way left-turn lane (TWLTL). | - Modified swale drainage | MP 13.8 to 16.4 | C* | C* |
| | | - Curb and gutter drainage | | C* | C* |
| Alternate 2: Widen US 25 to a four-lane typical section with two travel lanes in each direction. | - Modified swale drainage | MP 13.8 to 16.4 | - | - | |
| | - Curb and gutter drainage | | - | - | |
| US 25 at KY 80 Intersection | No-build (Existing signal timing) | - | E | E | |
| | Mill and resurface asphalt shoulder to address roadside deterioration causing ice glaze on westbound KY 80 lane and shoulder at State Police Road | MP 11.1 (KY 80) | - | - | |
| | Vegetation control on east side of northbound US 25 curve | MP 13.65 to 13.85 | - | - | |
| | Retroreflective signal backplates | MP 13.6 | - | - | |
| | Channelize or eliminate WB KY 80 to NB US 25 acceleration lane | MP 13.6 | - | - | |
| | Restrict left turns | - Left turn from State Police Road and CVB Drive to KY 80 | MP 11.09 (KY 80) | - | - |
| | | - Left turn from CVB Drive to US 25 | MP 13.5 | - | - |
| | Park and Ride study | - | - | - | |
| | KY 80 Planning Study | MP 9.8 (KY 80) to 0.2 (HR 9006) | - | - | |
| | Update signal timing | MP 13.6 | C | D | |
| Quadrant intersection | MP 13.6 | B | B | | |
| Continuous flow intersection | | B | B | | |
| US 25 at Bullock Road Intersection | No-build | - | - | - | |
| | Lane extensions across Bullock Road "Y" | MP 14.46 to 14.56 | - | - | |
| | Vegetation control or removal | | - | - | |
| | Relocation of intersection | MP 14.5 | - | - | |
| Single-lane roundabout | - | | - | | |
| US 25 at KY 3434 Intersection | No-build | - | - | - | |
| | Full-depth widening for right-turn lane on US 25 | MP 15.15 | - | - | |
| US 25 at Glenview Road Intersection | Dynamic envelope pavement markings and "Do Not Stop on Tracks" crossing signage and crossing warning signage for at-grade crossing (R8-8, W10-2, and W10-11a); radar-detected WATCH FOR STOPPED TRAFFIC sign (W26-1) with yellow warning beacon and WHEN FLASHING sign (W16-13P) | MP 0.02 (KY 3434) | - | - | |
| | No-build | - | C | E | |
| | Intersection warning signage | MP 15.82 | - | - | |
| | Quick Kurb (paint and post) gas station entry delineation | | - | - | |
| | Intersection lighting | | - | - | |
| | Full-depth widening for left-turn lane from US 25 | | - | - | |
| | Full-depth widening for right-turn and left-turn lanes from Glenview Road | | - | - | |
| | Full-depth widening for right-turn lane and left-turn lane from US 25 | | C | D | |
| | Full-depth widening for right-turn and left-turn lanes on all approaches | | - | - | |
| | Single-lane roundabout | | A | A | |
| Signalized intersection | - | - | | | |
| US 25 at KY 490 Intersection | No-build | - | B | C | |
| | Fire station signal | MP 16.27 | - | - | |
| | Retroreflective signal backplates | MP 16.4 | - | - | |
| | Update northbound channelized right-turn pavement markings to eastbound KY 490 | | - | - | |
| | Green extension loops from westbound KY 490 to southbound US 25 and update signal timing | | B | B | |
| | Realign slip lane on northeast quadrant and remove acceleration lane | | - | - | |
| | Realigned T intersection | | B | B | |
| Single-lane roundabout | A | A | | | |

Table 5: US 25 Concept Traffic Analysis Summary Matrix.

Traffic Analysis

Eleven of the study intersections were analyzed using Synchro Version 11 (per HCM6 methods) software to evaluate the AM and PM peak hours. Two of these intersections are controlled with a traffic signal while the rest are controlled by two-way stop control (TWSC) on the side-street approaches.

The forecasted volumes were then used to help determine potential solutions at these intersections. FHWA’s Capacity Analysis for Planning Junctions Tool (CAP-X) was used in conjunction with intersection geometry and an understanding of the area to determine some potential solutions to consider at the signalized intersections.

Similarly, the team used forecasted volumes along with an understanding of the existing geometry at the TWSC intersections to determine potential changes to improve safety and operations. Intersections where proposed alternates impacted operations were further analyzed with Synchro’s HCM6 methods or Sidra software which more accurately evaluates roundabouts with specific geometrics.

Full HCM analysis, CAP-X, and existing and proposed alternate analyses’ full outputs can be found in Appendix B. Output summaries are found in the following sections.

Intersection Analysis: US 25 at KY 80/Hal Rogers Parkway

The previously mentioned exercises led the team to evaluate a no-build option, new signal timing, partial displaced lefts, a quadrant intersection, and a dual-lane roundabout at the intersection with KY 80. **Table 6** shows AM and PM peak hour analysis summaries for each of these alternates.

| Alternate | Operational Level of Service* | |
|-------------------------|-------------------------------|-----|
| | AM | PM |
| Existing | E | E |
| Existing (New Timing) | B | C |
| No Build | C | D |
| Partial Displaced Lefts | B | B |
| Quadrant (N-W) | B** | B** |
| Dual-lane Roundabout | A | A |

*Operational analysis considers future volumes except for existing condition.

** State Police Rd. at US 25 and State Police Rd. at KY 80 operate at LOS B or better.

Table 6: US 25 at KY80/Hal Rogers Parkway Analysis Outputs

Intersection Analysis: US 25 at KY 2041/Glenview Road

The intersection of US 25 at KY 2041 is an intersection with stop control on KY 2041. Potential alternates to improve safety and operations at this intersection included a single-lane roundabout, right-turn, and left-turn lanes on US 25, and right-turn and left-turn lanes on all approaches, where applicable. **Table 7** shows AM and PM peak hour analysis summaries for each of these alternates.

| Alternate | Operational Level of Service* | |
|---------------------|-------------------------------|-----|
| | AM | PM |
| Existing | C | D |
| No Build | C | E |
| Roundabout | A | A |
| Turn Lanes on US 25 | C** | D** |

*Operational analysis considers future volumes except for existing condition.

Table 7: US 25 at KY 2041/Glenview Road Analysis Outputs

Intersection Analysis: US 25 at KY 490

The intersection of US 25 at KY 490 is a signalized intersection with the main movement being along US 25. Potential alternates to improve safety and operations at this intersection included new signal timing, a realigned T, where the US 25 NB to KY 490 became the aligned movement, and a single-lane roundabout. **Table 8** shows AM and PM peak hour analysis summaries for each of these alternates.

| Alternate | Operational Level of Service* | |
|-----------------------|-------------------------------|----|
| | AM | PM |
| Existing | C | B |
| Existing (New Timing) | B | E |
| No Build | B | C |
| Realigned T | B | B |
| Roundabout | A | A |

*Operational analysis considers future volumes except for existing condition.

Table 8: US 25 at KY 490 Analysis Outputs

Corridor Analysis

Aside from intersection alternate analyses, corridor segment analyses were also conducted. Highway Capacity Software (HCS) was used for these evaluations. HCS uses density and/or follower density for a highway such as US 25, depending on speeds and lane configurations to determine corridor segment LOS.

The US 25 study corridor is divided into three segments by KYTC based on configuration and volumes. These segments are KY 80 to Bullock Road, Bullock Road to KY 2041, and KY 2041 to KY 490. Average annual daily traffic counts (AADT) were obtained from KYTC and used for the existing analysis then grown as previously described for future year analyses.

Segment configurations that were analyzed include the existing two-lane section, a three-lane section, and a four-lane section. It should be noted that capacity could not be analyzed for the three-lane section any differently than the two-lane section due to no formal methodology being included for a TWLTL. Installation of a TWLTL on a two-lane road offers minimal operational benefit with an estimated 13-minute reduction in delay on average over the corridor per day. However, the TWLTL has been proven to have great safety benefits such as reducing crashes up to 31% (CMF Clearinghouse, CMF 2338). Analysis outputs for worst-case direction are summarized in **Table 9**. Full HCM output data can be found in **Appendix B**.

| | Average Speed (MPH) | Follower Density (Followers/Mile/Lane) | LOS | Average Speed (MPH) | Follower Density (Followers/Mile/Lane) | LOS |
|-------------------------|--|--|-----|--|--|-----|
| Segment | AM Peak Hour - 2023 | | | PM Peak Hour - 2023 | | |
| KY 80 to Bullock Road | 56.2 | 5.8 | C | 56.8 | 6.5 | C |
| Bullock Road to KY 2041 | 55.0 | 5.9 | C | 55.9 | 6.3 | C |
| KY 2041 to KY 490 | 55.1 | 5.5 | C | 57.3 | 5.0 | C |
| Segment | AM Future No Build - 2045 | | | PM Future No Build - 2045 | | |
| KY 80 to Bullock Road | 56.1 | 6.8 | C | 57.0 | 7.6 | C |
| Bullock Road to KY 2041 | 54.8 | 7.0 | C | 56.1 | 7.4 | C |
| KY 2041 to KY 490 | 54.9 | 6.5 | C | 57.5 | 6.1 | C |
| Segment | AM Future Build (3 lane) - 2045 | | | PM Future Build (3 lane) - 2045 | | |
| KY 80 to Bullock Road | 56.1 | 6.8 | C | 57.0 | 7.6 | C |
| Bullock Road to KY 2041 | 54.8 | 7.0 | C | 56.1 | 7.4 | C |
| KY 2041 to KY 490 | 54.9 | 6.5 | C | 57.5 | 6.1 | C |
| Segment | AM Future Build (4 lane) - 2045 | | | PM Future Build (4 lane) - 2045 | | |
| KY 80 to Bullock Road | 43.2 | 8.2 | A | 43.9 | 8.9 | A |
| Bullock Road to KY 2041 | 41.9 | 8.5 | A | 42.9 | 8.8 | A |
| KY 2041 to KY 490 | 41.9 | 8.0 | A | 44.2 | 7.6 | A |

Table 9: US 25 Corridor Analysis Outputs

Environmental Impacts

Improvement concepts that require additional right-of-way or other ground disturbance are considerable and may result in impacts to human and/or natural environment resources. The items below provide a summary of the potential natural environment impacts to consider as a result of the recommended conceptual improvements.

Three-Lane Section with Bicycle and Pedestrian Improvements (Concept A)

Improvement options include widening US 25 to a three-lane typical section with one travel lane in each direction and a center two-way left-turn lane (MP 13.8 – 16.4) with shared-use path and sidewalk or sidewalks on each side (MP 13.5 – 16.4).

- These improvements may impact creeks and observed streams, notably Wood Creek, Peacock Branch, and three unnamed tributaries to Wood Creek. The 100-year floodplain for existing Wood Creek also crosses the existing US 25 right-of-way (ROW) near KY 3434, and three (3) potential wetlands are observed toward the northern terminus between KY 3434 and KY 490. Ground disturbance and tree removal would result in impacts to potential habitats of sixteen species identified by USFWS: four (4) bats, one (1) bird, two (2) plants, one (1) insect, and eight (8) mussels. Two permitted mine boundaries intersect the southern end of the study area.
- Improvement options may require consideration of EJ populations (namely, those living below the poverty line and elderly persons). Several potential UST/HazMat sites are located throughout the corridor between MP 13.8 and 16.4 as shown in Appendix C. This concept will likely only benefit EJ populations by adding walking and biking facilities.

US 25 at KY 80 Intersection Improvements (Concepts B1-B3 and C1-C3)

Improvement options include resurfacing shoulders, vegetation control, left turn lane restrictions, channelization or elimination of WB KY 80 to NB US 25 acceleration lane, continuous flow intersection or quadrant intersection.

- Vegetation control on east side of northbound US 25 may impact habitats of existing species identified by USFWS.
- Nearby historic property may be impacted, with limited space for widening of State Police Road. Several potential UST/HazMat sites are located near the US 25 at KY 80 intersection, with several concentrated just south of the intersection and at the US 25 southbound and KY 80 eastbound approaches.

US 25 at Bullock Road Intersection Improvements (Concepts D, E1, and E2)

Improvements options include lane extensions across Bullock Road “Y,” vegetation control, a single-lane roundabout, and intersection relocation.

- Vegetation control or removal has potential to impact species habitat. USGS mapped stream runs parallel to US 25, crossing Bullock Road near US 25. The 100-year floodplain is located just north of the intersection to the east of US 25.
- One potential UST/HazMat site is located to the west of this intersection.

US 25 at KY 3434 Intersection Improvements (Concepts F1 and F2)

Improvement options include full-depth widening for a right-turn lane on US 25, dynamic envelope pavement markings, and additional signage.

- There is a deep swale draining to Wood Creek with limited space available for widening between US 25 and the railroad. This intersection is located within the 100-year floodplain, with modifications likely to impact habitats of existing species. One potential mine site is located to the southwest of the existing intersection beyond the 250-foot corridor buffer.
- One potential UST/HazMat site (Collision Masters) is located adjacent to the intersection between US 25 and I-75, though out of the 500-foot intersection buffer. A two-cell concrete box culvert (LL 733) carrying US 25 over Wood Creek near KY 3434 may be eligible for listing in the NRHP for its decorative railing.

US 25 at Glenview Road Intersection Improvements (Concepts G, H1, and H2)

Improvement options include additional signage, lighting, widening for right-turn and left-turn lanes from US 25, widening for right-turn and left-turn lanes from Glenview Road, intersection signalizations, and a single-lane roundabout.

- There is a potential wetland located in the roadside ditch in the southwest quadrant of intersection, with one observed stream traversing US 25 south of the intersection and outside of the 500-foot intersection buffer.
- Two potential UST/HazMat sites are located near the intersection (Glenview Market and one former gas station).

US 25 at KY 490 Intersection Improvements (Concepts I, J1, and J2)

Improvement options include fire station signal, retroreflective signal backplates, updates to the northbound channelized right-turn pavement markings to eastbound KY 490, green extension loops from WB KY 490 to SB US 25, updated signal timing, slip lane realignment on northeast quadrant/removal of acceleration lane, realignment to a T intersection, and a single lane roundabout.

- There is a potential wetland located at the northwestern corner of intersection.
- Two potential UST/HazMat sites are located near the intersection, though outside the 500-foot buffer.

Bicycle and Pedestrian Accommodations

In alignment with the study purpose, need, and project goals, each recommendation was evaluated for providing safe mobility for bicyclists and pedestrians. Pedestrians and bicyclists are more vulnerable road users due to their exposure to weather and are particularly vulnerable in potential hazardous interactions or crashes involving motor vehicles. The evaluation matrix prioritized recommendations that provided separated bicycle and pedestrian facilities, opportunities to enhance mainline crossings with refuge islands, and other safety improvements.

Final Study Recommendations



The evaluation matrix for the initial list of recommendations was reviewed by the project team, along with stakeholder and public input, and refined to a set of final recommendations. The final recommendations were developed into a series of conceptual project sheets, located at the end of this section. **Table 10** provides a summary of final recommendations and associated concept sheets. Additional plan recommendations include target speed, access spacing based on context, and bicycle and pedestrian crossing safety enhancements.

| Improvement Category | Description | US 25 Milepoint Location | Recommend Short-Term to Mid-Term Implementation | Recommend Long-Term Implementation | Concept | |
|-------------------------------------|--|---|---|------------------------------------|---------|-----|
| Corridor | Bicycle and pedestrian improvements | MP 13.5 to 16.4 | | X | A | |
| | <ul style="list-style-type: none"> - Alternate A: Shared-use path and sidewalk - Alternate B: Sidewalk on each side | | | | | |
| Corridor | Alternate 1: Widen US 25 to a three-lane typical section with one travel lane in each direction and a center two-way left-turn lane (TWLTL). | MP 13.8 to 16.4 | | | | |
| | <ul style="list-style-type: none"> - Modified swale drainage - Curb and gutter drainage | | | | | |
| US 25 at KY 80 Intersection | Mill and resurface asphalt shoulder to address roadside deterioration causing ice glaze on westbound KY 80 lane and shoulder at State Police Road | MP 11.1 (KY 80) | X | | B1 | |
| | Vegetation control on east side of northbound US 25 curve | MP 13.65 to 13.85 | X | | | |
| | Retroreflective signal backplates | MP 13.6 | X | | B2 | |
| | Channelize or eliminate WB KY 80 to NB US 25 acceleration lane | MP 13.6 | X | | | |
| | Restrict left turns | - Left turn from State Police Road and CVB Drive to KY 80 | MP 11.09 (KY 80) | X | | B3 |
| | | - Left turn from CVB Drive to US 25 | MP 13.5 | | | |
| | Park and Ride study | - | | X | | N/A |
| | KY 80 Planning Study | | MP 9.8 (KY 80) to 0.2 (HR 9006) | X | | N/A |
| | Update signal timing | | MP 13.6 | X | | C1 |
| | Quadrant intersection | | MP 13.6 | | X | C2 |
| Continuous flow intersection | | | | | C3 | |
| US 25 at Bullock Road Intersection | Lane extensions across Bullock Road "Y" | MP 14.46 to 14.56 | X | | D | |
| | Vegetation control or removal | | X | | | |
| | Relocation of intersection | MP 14.5 | | X | E1 | |
| US 25 at KY 3434 Intersection | Single-lane roundabout | | | X | E2 | |
| | Full-depth widening for right-turn lane on US 25 | MP 15.15 | | X | F1 | |
| US 25 at KY 3434 Intersection | Dynamic envelope pavement markings and "Do Not Stop on Tracks" crossing signage and crossing warning signage for at-grade crossing (R8-8, W10-2, and W10-11a); radar-detected WATCH FOR STOPPED TRAFFIC sign (W26-1) with yellow warning beacon and WHEN FLASHING sign (W16-13P) | MP 0.02 (KY 3434) | X | | F2 | |
| US 25 at Glenview Road Intersection | Qwick Kurb (paint and post) gas station entry delineation | MP 15.82 | X | | G | |
| | Intersection lighting | | | X | | |
| | Full-depth widening for right-turn and left-turn lanes on all approaches | | | X | H1 | |
| | Single-lane roundabout | | | | H2 | |
| US 25 at KY 490 Intersection | Retroreflective signal backplates | MP 16.4 | X | | I | |
| | Update northbound channelized right-turn pavement markings to eastbound KY 490 | | | | | |
| | Realigned T intersection | | | X | J1 | |
| | Single-lane roundabout | | | | J2 | |

Table 10: Summary of Final Recommendations

Target Speed

In addition to the recommended project concepts, broader improvements to encourage driver operating speeds appropriate to the context of the corridor include:

- Maintain 35 MPH posted speed limit south of KY 80 with target speeds of 30-35 MPH.
- Implement 45 MPH target speed between KY 80 and KY 490 paired with speed management and traffic calming.
- Maintain 55 MPH statutory speed limit north of KY 490 with target speed of 55 MPH or lower.

The implementation of the 45 MPH target speed in the suburban context between KY 80 and KY 490 allows for the design of intersections and road geometrics that will slow driver operating speeds and reduce the footprint of innovative intersections such as smaller radii for horizontal curves and turning movements, shorter roundabout splitter islands, and narrower driving lanes.

Access Spacing

The context and target speed for each segment of US 25 also inform access spacing recommendations:

- Maintain access spacing south of KY 80 and north of KY 490
- Add intermittent median restrictions between KY 80 and KY 490
- Increase driveway and entrance access spacing distance to 440 feet or greater between KY 80 and KY 490
- Add frequent pedestrian and bicycle crossings at intersections and near pedestrian and bicycle traffic generators

Bicycle and Pedestrian Crossings

In addition, the implementation of a 45 MPH target speed in the suburban section between KY 80 and KY 490 may necessitate enhanced pedestrian and bicycle crossing treatments. The treatments that should be considered at all pedestrian and bicycle crossings include high-visibility crosswalk markings and pedestrian refuge islands. If the crossing location is uncontrolled, rectangular rapid-flashing beacons and advance “Yield Here to Pedestrians” signage and pavement markings should also be considered.

Concept A

Widen US 25 to a three-lane section with one travel lane in each direction, two-way left-turn lane, sidewalk, and shared-use path. Implement access management throughout the corridor, including consolidating entrances and defining access points with appropriate spacing.



Purpose

Improve safety and reliability for all users along US 25, including vulnerable road users and freight.

Need

In the last five years, a total of 112 crashes occurred in this segment of US 25, with 15 of those crashes resulting in a suspected serious injury or fatality. In addition, the corridor lacks facilities to accommodate bicyclists and pedestrians.

Benefits

Benefit-Cost Ratio 2.9-5.6

45% estimated reduction in future crashes

Separation from the travel lane for vulnerable road users and potential **median refuge islands**

Concerns

Environmental Concerns: Wood Creek and tributaries, wetlands, tree removal (bat habitat), UST/HazMat

Low-to-medium potential right-of-way and utility impacts are anticipated depending on drainage alternate.

Cost

| | Modified Swale | Curb and Gutter |
|----------|-----------------------|------------------------|
| D | \$940,000 | \$1.4 Million |
| R | \$2.1 Million | \$2.1 Million |
| U | \$2.7 Million | \$2.7 Million |
| C | \$9.4 Million | \$14 Million |

Concept B1

Roadside spot improvements at the intersection of US 25 and KY 80. Implement vegetation control and repair and resurface asphalt shoulder.



Purpose

Implement short-term, low-cost roadside safety improvements near the US 25 and KY 80 intersection.

Need

Vegetation in the curve of US 25 to the north of State Police Rd. can impede visibility of entering and exiting traffic.

The intersection of State Police Rd. and KY 80 has been the site of reported near-miss crashes due to seasonal ice glaze from deteriorated shoulder pavement.

Benefits

Improve sight distance to traffic entering and exiting State Police Rd.

Improve the pavement interface and **prevent seasonal out-of-control crashes.**

Concerns

Environmental Concerns: Tree removal (bat habitat)

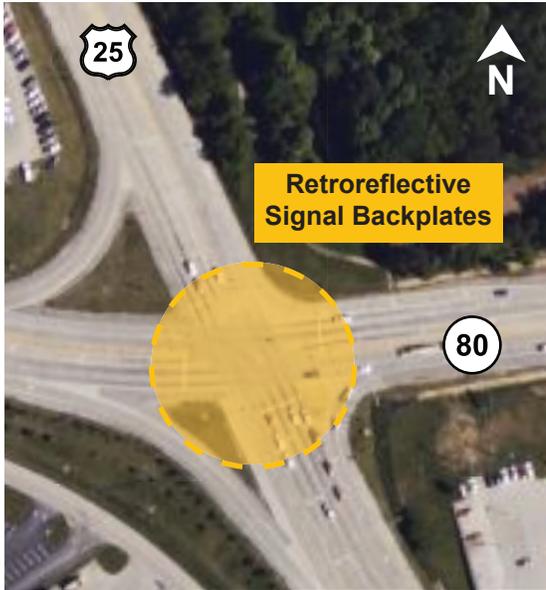
No right-of-way or utility impacts are anticipated.

Cost

D \$0
R \$0
U \$0
C \$45,000

Concept B2

Intersection spot improvements at the major intersection of US 25 and KY 80. Install retroreflective backplates on all signalheads and channelizing delineators on the westbound KY 80 right turn to northbound US 25.



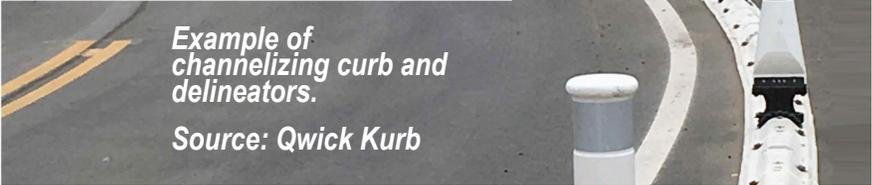
Purpose Implement short-term, low-cost safety improvements at the intersection of US 25 and KY 80.

Need In the past five years, 18 crashes have occurred at this intersection, of which six crashes included injury.

Benefits **Benefit-Cost Ratio 48.3**
15% reduction in predicted future crashes through improved visibility of signals.
Reduce conflicts and clarify lane assignments to traffic turning right on northbound US 25 with channelizing delineators.

Concerns No environmental, right-of-way, or utility impacts are anticipated.

Cost
D \$3,000
R \$0
U \$0
C \$30,000



Concept B3

Intersection spot improvements at the minor intersections of US 25/CVB Dr. and KY 80/CVB Dr./State Police Rd. Install median islands to restrict left turns at one, or both, intersections.



KY 80 Restricted Left Turns



Purpose

Implement short-term, low-cost safety improvements at the minor intersections with CVB Dr. and State Police Rd. near the major intersection of US 25 and KY 80.

Need

In the past five years, 21 crashes have occurred at the intersection of KY 80, CVB Dr., and State Police Rd., one of which was an injury crash. Seven crashes have occurred at the intersection of US 25 and CVB Dr. in the same five-year period.

Benefits

Benefit-Cost Ratio

93.9 (US 25); 282 (KY 80)

Reduce conflicts between turning motor vehicles.

Concerns

No environmental, right-of-way, or utility impacts are anticipated.

Traffic circulation should be considered if both locations are implemented.

Cost

D \$2,000
R \$0
U \$0
C \$20,000



Concept C1

Update the signal timing at the intersection of US 25 and KY 80.

US 25 Corridor Study Laurel County, Kentucky



Purpose

Reduce congestion and improve mobility through the intersection of US 25 and KY 80.

Need

The current signal operates at a Level of Service E, with greater congestion than expected for the current traffic volume and intersection configuration.

Concerns

No environmental, right-of-way, or utility impacts are anticipated.

Benefits

Low-cost to no-cost opportunity to improve mobility.



Concept C2

Capital improvements at the intersection of US 25 and KY 80. Install a quadrant intersection with two traffic signals on State Police Rd. to improve operations and safety. Left-turning movements are redirected from the main intersection to State Police Road.



Purpose

Improve mobility and safety through the intersection of US 25 and KY 80 for all users.

Need

In the last five years, 63 total crashes have occurred at the intersection of US 25 and KY 80, including 34 crashes at the signalized intersection, 21 crashes at the intersection of KY 80 and State Police Rd., and 8 crashes at the intersection of US 25 and State Police Rd. Nine crashes resulted in injury.

Benefits

Benefit-Cost Ratio 1.8

26% reduction in predicted future crashes

Concerns

Environmental Concerns: Historic property, UST/HazMat, tree removal (bat habitat)

State Police Rd. is currently City-maintained.

Medium-to-high right-of-way and utility impacts are anticipated.

Cost

D \$175,000

R \$75,000

U \$400,000

C \$1.75 Million

Concept C3

Install a continuous flow intersection to improve safety and mobility, and to reduce congestion at the intersection of US 25 and KY 80.

US 25 Corridor Study

Laurel County, Kentucky



Purpose

Improve mobility and safety through the intersection of US 25 and KY 80 for all users.

Benefits

Benefit-Cost Ratio 0.3

12% reduction in predicted future crashes

Need

In the last five years, 63 total crashes have occurred at the intersection of US 25 and KY 80, including 34 crashes at the signalized intersection, 21 crashes at the intersection of KY 80 and State Police Rd., and 8 crashes at the intersection of US 25 and State Police Rd. Nine crashes resulted in injury.

Concerns

Environmental Concerns: Historic property, UST/HazMat, tree removal (bat habitat)

Closure of southern access to State Police Rd.

Medium-to-high right-of-way and utility impacts are anticipated.

Cost

D \$450,000
R \$0
U \$300,000
C \$4.5 Million



Concept D

Intersection spot improvements at the intersection of US 25 and Bullock Rd. Install lane extension pavement markings at Bullock Rd. and remove vegetation.



Purpose

Implement short-term, low-cost safety improvements at the intersection of US 25 and Bullock Rd.

Need

In the past five years, nine crashes have occurred at this intersection, of which two crashes included injury.

Benefits

Benefit-Cost Ratio 1,683

19% reduction in predicted future crashes through clarification of US 25 through-lane.

Improve sight distance to traffic entering and exiting Bullock Rd.

Concerns

Environmental Concerns: Tree removal (bat habitat)

No right-of-way or utility impacts are anticipated.

Cost

D \$0
R \$0
U \$0
C \$5,500



Concept E1

Capital improvements at the intersection of US 25 and Bullock Rd. Realign Bullock Rd. to a single, perpendicular intersection with US 25.



Purpose Improve safety and sight distance at the intersection of US 25 and Bullock Rd.

Need In the past five years, nine crashes have occurred at this intersection, of which two crashes included injury. In addition, the geometry and grade of both legs of the Bullock Rd “Y” impair sight distance at the intersection with US 25.

Benefits **Improve sight distance** to traffic entering and exiting Bullock Rd.

Concerns **Environmental Concerns:** UST/HazMat, wetlands, floodplain, tree removal (bat habitat)
Substantial right-of-way and utility impacts are anticipated.

Cost
D \$100,000
R \$500,000
U \$500,000
C \$1,000,000

Concept E2

Capital improvements at the intersection of US 25 and Bullock Rd. Realign Bullock Rd. to a single, roundabout intersection with US 25.



Purpose

Improve safety and sight distance at the intersection of US 25 and Bullock Rd.

Need

In the past five years, nine crashes have occurred at this intersection, of which two crashes included injury. In addition, the geometry and grade of both legs of the Bullock Rd “Y” impair sight distance at the intersection with US 25.

Benefits

Benefit-Cost Ratio 0.8

42% reduction in predicted future crashes

Improve sight distance to traffic entering and exiting Bullock Rd.

Traffic calming to encourage 45 MPH target speed

Concerns

Environmental Concerns:

UST/HazMat, wetlands, floodplain, tree removal (bat habitat)

Substantial right-of-way and utility impacts are anticipated.

Cost

D \$200,000

R \$500,000

U \$500,000

C \$2,000,000

Concept F1

Spot improvements at the intersection of US 25 and KY 3434. Install a northbound right-turn lane at the intersection of US 25 and KY 3434 in the existing unpaved shoulder.



Purpose

Implement short-term, low-cost roadside safety improvements near the US 25 and KY 3434 intersection.

Need

In the past five years, eight crashes have occurred at this intersection, of which three crashes included injury.

Benefits

Benefit-Cost Ratio 26.3

20% reduction in predicted future crashes.

Concerns

Environmental Concerns:

UST/HazMat, wetlands, mine

No right-of-way and minimal utility impacts are anticipated.

Cost

D \$7,500

R \$0

U \$0

C \$75,000



Concept F2

Spot improvements at the intersection of US 25 and KY 3434. Install railroad crossing enhancements at the at-grade CSX railroad crossing.



Not to Scale
Placement for Reference Only

Purpose

Implement short-term, low-cost safety improvements at the intersections of US 25, KY 3434, and the CSX railway.

Need

The elevation of the CSX railway impairs the sight distance to the intersection of US 25 and KY 3434, frequently resulting in vehicles stopping on the tracks.

Benefits

Alerts drivers to stopped traffic on the west side of the railroad tracks, and warns drivers not to stop on the tracks.

Concerns

Environmental Concerns:
Tree removal (bat habitat)
No right-of-way and minimal utility impacts are anticipated.

Cost

- D** \$5,000
- R** \$0
- U** \$0
- C** \$10,000



Concept G

Spot improvements at the intersection of US 25 and Glenview Rd. Install intersection lighting on existing poles and channelizing delineators to define entrances into gas station.



Purpose

Implement short-term, low-cost safety improvements at the intersection of US 25 and Glenview Rd.

Need

The access to the parcel on the northwest corner is undefined. Traffic will often bypass the intersection through the open access.

Benefits

Benefit-Cost Ratio:

Lighting 32.5
Access Control 44.3

80% estimated reduction in future crashes

Reduce conflicts with entering and exiting traffic to the parcel.

Concerns

No environmental, right-of-way, or utility impacts are anticipated.

Cost

D \$0
R \$0
U \$0
C \$12,000

Example of channelizing curb and delineators.

Source: *Quick Kurb*



Concept H1

Capital improvements at the intersection of US 25 and Glenview Rd. Install turn lanes on all approaches at the intersection of US 25 and Glenview Rd.



Purpose

Improve safety and operations at the intersection of US 25 and Glenview Rd.

Need

In the last five years, a total of 15 crashes occurred at this intersection, with 5 of those crashes resulting in injury.

Benefits

Benefit-Cost Ratio 5.8

20% estimated reduction in future crashes

Reduce driver frustration from waiting in a shared right-turn and left-turn lane.

Concerns

Environmental Concerns:

UST/HazMat, wetlands

Medium-to-high potential right-of-way and utility impacts are anticipated.

Cost

D \$60,000

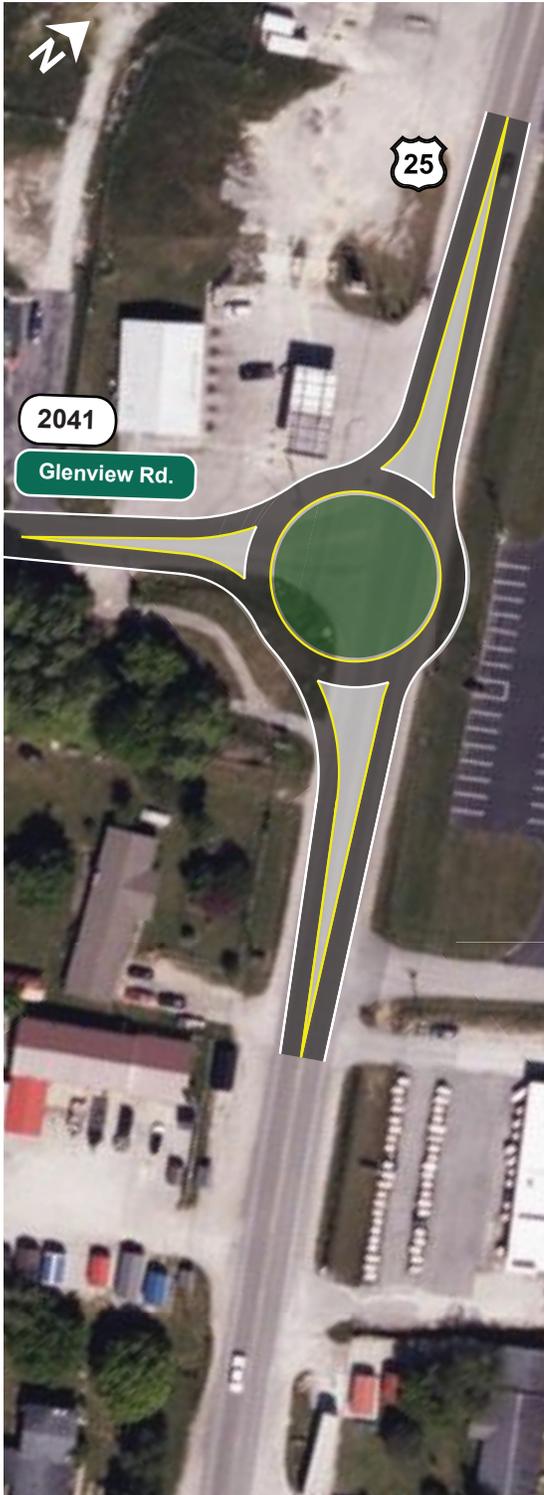
R \$75,000

U \$500,000

C \$600,000

Concept H2

Capital improvements at the intersection of US 25 and Glenview Rd. Install a roundabout at the intersection of US 25 and Glenview Rd.



Purpose

Improve safety and operations at the intersection of US 25 and Glenview Rd.

Need

In the last five years, a total of 15 crashes occurred at this intersection, with 5 of those crashes resulting in injury.

Benefits

Benefit-Cost Ratio 1.4

42% estimated reduction in future crashes

Traffic calming to encourage 45 MPH target speed

Concerns

Environmental Concerns:
UST/HazMat, wetlands

Substantial right-of-way and utility impacts are anticipated.

Cost

D \$200,000

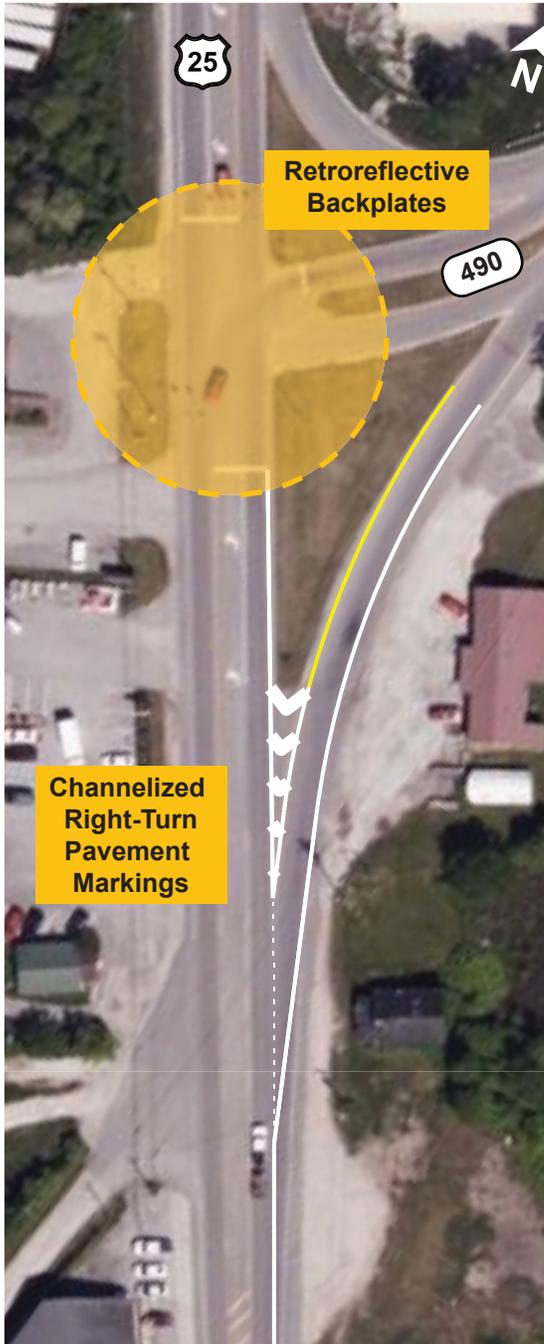
R \$500,000

U \$600,000

C \$2,000,000

Concept I

Spot improvements at the intersection of US 25 and KY 490. Update channelized right-turn pavement markings to current standard. Install retroreflective backplates at the intersection of US 25 and KY 490.



Purpose

Implement short-term, low-cost safety improvements at the intersection of US 25 and KY 490.

Need

In the last five years, a total of 15 crashes occurred at this intersection, with 7 of those crashes resulting in injury. In addition, the major freight movement occurs between US 25 and KY 490.

Benefits

Benefit-Cost Ratio 47.0

15% reduction in predicted future crashes through improved visibility of signals

Reduce conflicts and clarify lane assignments to traffic turning right on eastbound KY 490.

Concerns

No environmental, right-of-way, or utility impacts are anticipated.

Cost

D \$1,500
R \$0
U \$0
C \$13,000

Concept J1

Capital improvements at the intersection of US 25 and KY 490. Realign the intersection to accommodate the major freight movements.



Purpose

Improve safety, mobility, and reliability for all users along US 25, including freight.

Need

In the last five years, a total of 15 crashes occurred at this intersection, with 7 of those crashes resulting in injury. In addition, the major freight movement occurs between US 25 and KY 490.

Benefits

Benefit-Cost Ratio 1.2

Near continuous accommodation of major freight movement

Concerns

Environmental Concerns:
UST/HazMat, wetlands

Substantial right-of-way and utility impacts are anticipated.

Cost

Modified Swale

D \$80,000

R \$0

U \$600,000

C \$800,000

Concept J2

Capital improvements at the intersection of US 25 and KY 490. Install a roundabout at the intersection.



Purpose

Improve safety, mobility, and reliability for all users along US 25, including freight.

Need

In the last five years, a total of 15 crashes occurred at this intersection, with 7 of those crashes resulting in injury.

Benefits

Benefit-Cost Ratio 2.4

42% estimated reduction in future crashes

Traffic calming to encourage transition to 45 MPH target speed south of KY 490

Concerns

Environmental Concerns:

UST/Hazmat, wetlands

Substantial right-of-way and utility impacts are anticipated.

Cost

Modified Swale

D \$150,000

R \$75,000

U \$600,000

C \$1.5 Million

Design and Implementation Funding



Design and implementation funding has not yet been established for the study corridor. Highway Safety Improvement Program (HSIP) or other available internal resources may be considered for lower-cost, short-term safety improvements. Inclusion of the capital improvement recommendations as projects for design and construction in the KYTC Enacted Highway Plan is recommended. Although state funding may be allocated, given the scope of the recommended improvements, federal grants should be considered for design and/or construction funding. Federal grants are competitive and grant types, funding availability, and project eligibility change frequently. Although not a guarantee of eligibility or availability, the grant programs summarized in **Table 11** may be considered.

| Federal Transportation Grant Program | Program Description |
|---|--|
| Active Transportation Infrastructure Investment Program | Funding beyond FY23 is subject to the availability appropriations; the program provides grants to construct safe and connected active transportation facilities in an active transportation network or active transportation spine and to develop plans for active transportation networks and active transportation spines. |
| RAISE - Rebuilding American Infrastructure with Sustainability and Equity | Provides grants for surface transportation infrastructure projects that will have a significant local or regional impact (aka Local and Regional Project Assistance). |
| Rural Surface Transportation Grant Program | Provides grants for projects to improve and expand the surface transportation infrastructure in rural areas to increase connectivity, improve the safety and reliability of the movement of people and freight, and generate regional economic growth and improve quality of life. |
| Reconnecting Communities Pilot Program — Capital Construction Grants | Provides grants for projects to restore community connectivity by removing, retrofitting, or mitigating highways or other transportation facilities that create barriers to community connectivity, including to mobility, access, or economic development. |

Note: Adapted from the Federal Highway Administration (FHWA) Bipartisan Infrastructure Law Competitive Grant Funding Matrix https://www.fhwa.dot.gov/bipartisan-infrastructure-law/grant_programs.cfm

Table 11: Summary of Potential Federal Grant Opportunities

