

KY 32

CORRIDOR STUDY
Final Report | March 2024



TEAM
KENTUCKY®
TRANSPORTATION
CABINET





FINAL REPORT

KY 32 Corridor Study



Kentucky Transportation Cabinet
Central Office, Division of Planning
Highway District 9, Morehead

In partnership with:



March 2024

Executive Summary

The KY 32 Corridor Study was initiated by the Kentucky Transportation Cabinet (KYTC) to identify and evaluate the need for and scope of potential options to improve safety, mobility, and capacity along KY 32 in Morehead, Kentucky.

Existing Conditions

The KY 32 study corridor, shown in **Figure ES-1**, extends from the intersection at KY 377 (MP 4.496) to the intersection at US 60 (MP 8.439) in Morehead, Kentucky and includes an interchange with I-64.

The study portion of KY 32 is a five-lane urban minor arterial with 12-foot lanes and a center two-way left-turn lane (TWLTL). The northern portion of the corridor has ten-foot paved shoulders which transition to curb & gutter and sidewalks south of Mabry Drive, approaching downtown Morehead. KY 32 carries a mixture of local, commercial, and regional traffic with daily volumes ranging from 15,200 vehicles per day (VPD) north of Walmart Way to 28,000 VPD east of the I-64 interchange.

Over the five-year period between 2017 and 2021, a total of 780 crashes were reported on the study portion of KY 32. Of the 780 crashes, five (0.6 percent) resulted in a fatality and 94 (12 percent) resulted in an injury. Rear end collisions were the most common crash type (51 percent) with a high concentration of crashes occurring at the signalized intersections near the I-64 interchange and the US 60 intersection.

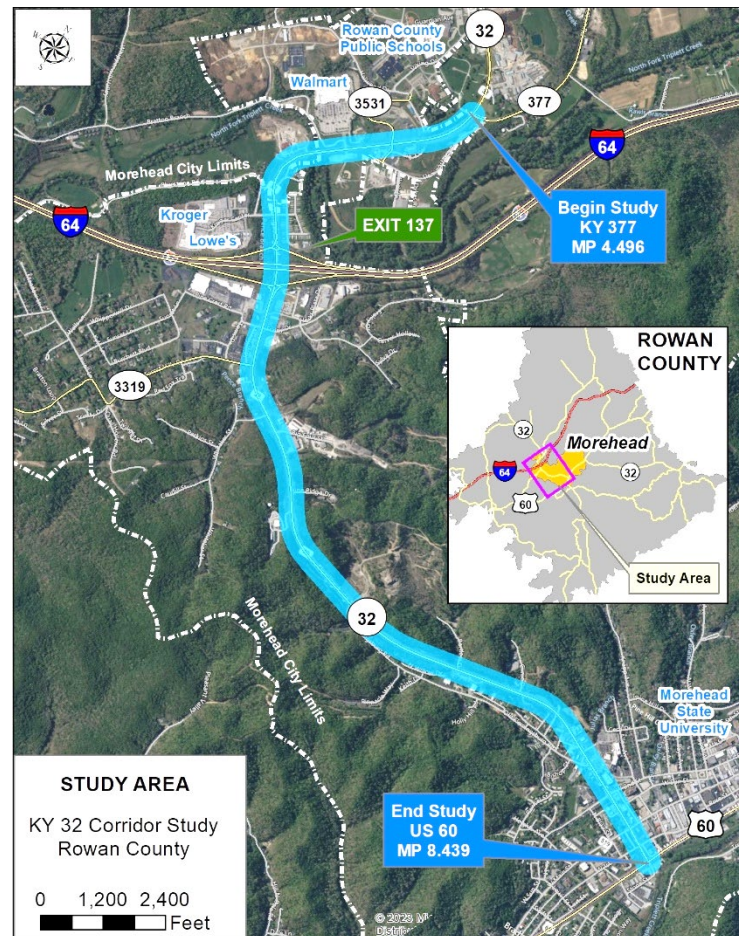


Figure ES-1: KY 32 Study Corridor

Public Outreach

Early in the study process, the project team met with local officials and stakeholders and created an online MetroQuest survey to solicit feedback from the public on transportation concerns in the study area. Nearly 700 people responded to the public survey and most (94 percent) indicated they drive the corridor daily or two to three times per week. Respondents were asked to rank their overall transportation concerns on KY 32. Traffic congestion was the highest priority, followed by safety, and excessive speeds.

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A heat map of the congestion concerns from the public survey, with red representing a higher density of concern, is shown in **Figure ES-2**.

Future Conditions

Based on population projections from the Kentucky State Data Center (KSDC), Rowan County is expected to be one of the higher growing areas in the region, around 0.8 percent per year between 2020 and 2040. This growth is due in part, at least, to Morehead State University, a public university with a Fall 2022 enrollment of 8,218¹ located north of the KY 32 intersection with US 60.

In addition to population growth, this area is also expected to experience significant commercial growth. There are 10 development sites, all in different stages of advancement, located along the study portion of KY 32. Due to the unknowns surrounding many of these development sites, low and high growth scenarios were developed for use in estimating future traffic demand. Based on the high growth scenario, daily traffic on KY 32 is expected to reach 44,000 VPD in 2045, a more than 50 percent increase from existing count of 28,000.

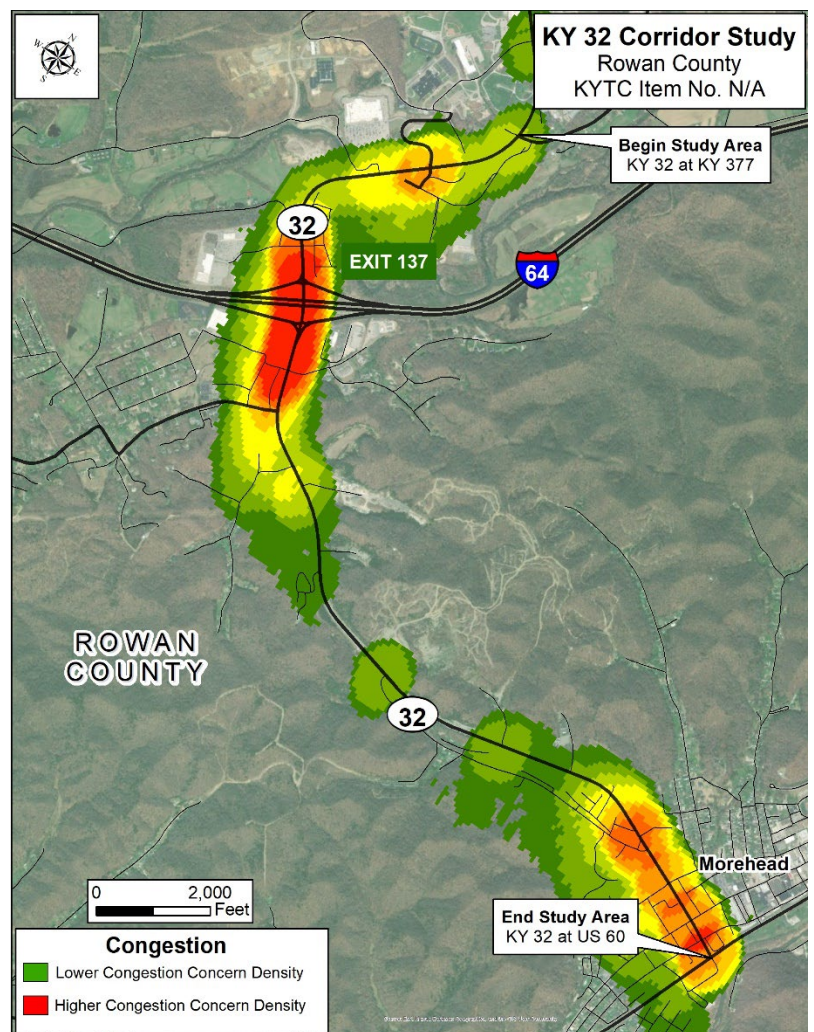


Figure ES-2: Public Survey Results – Congestion Concerns Heat Map

Improvement Concept Development

Improvement concepts were developed based on a combination of input from the project team, a review of the existing conditions, traffic analyses, safety analyses, field reconnaissance, and input from local officials and public. Concepts focused on three sections of KY 32: Downtown Morehead / US 60 intersection, the Corridor section between Viking Drive and Mabry Drive, and the I-64 interchange, as shown in **Figure ES-3**.

¹ www.usnews.com/best-colleges/morehead-state-university-1976

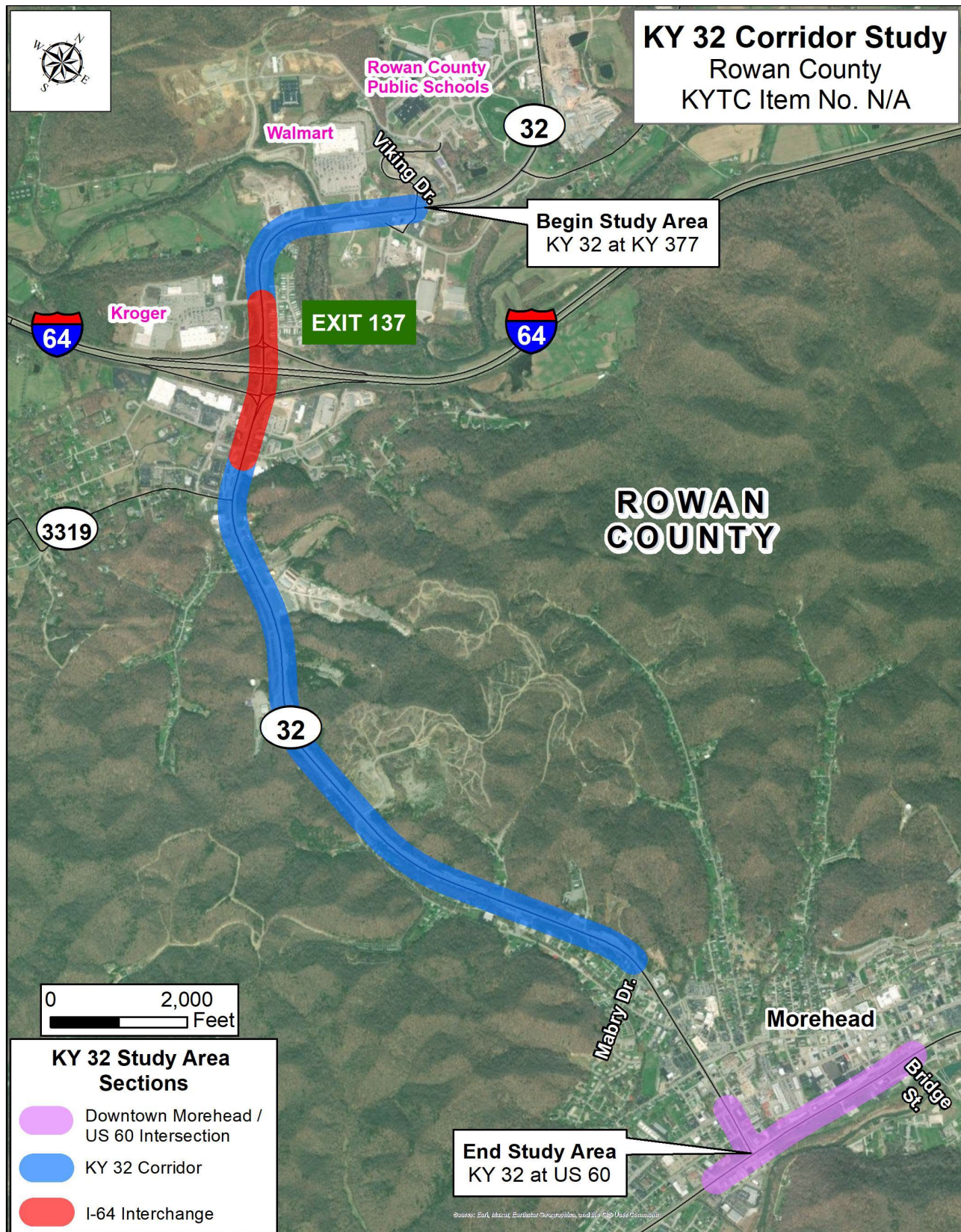


Figure ES-3: KY 32 Improvement Concept Sections

Downtown Morehead / US 60 Intersection

Based on results from traffic simulation modeling, the KY 32 intersection with US 60 currently operates at a Level of Service (LOS) D during the AM and PM peak hours and is expected to operate at LOS F during the AM peak hour in 2030. LOS D is considered acceptable for traffic operations in an urban area. Between 2017 and 2021, there were 88 crashes at this intersection, six (7 percent) of which resulted in an injury and 64 (73 percent) of which were rear end collisions. An Excess Expected Crashes (EEC) analysis, as discussed in more detail in Section 2.5, revealed that there were 2.1 more crashes per year at this intersection than expected, indicating an opportunity to improve safety. This intersection was also identified by the local officials and public as having congestion and safety issues.

The short-term option, showing in **Figure ES-4**, includes converting the 1st Street approaches to right-in/right-out by installing delineator posts on KY 32. Emergency vehicles, including ambulances, firetrucks, and police cars, are able to drive over the posts if needed during emergencies, so response times would remain unchanged. Additionally, the westbound KY 32 left-turn lane to 1st Street could be restriped to an eastbound left-turn lane onto eastbound US 60. This would create more storage by adding a dedicated left turn lane to eastbound US 60. The westbound US 60 left-turn lane could also be restriped to a northbound through lane to Bridge Street to provide a receiving lane for the eastbound KY 32 turn lane. The southbound US 60 left-turn movement would be eliminated, and vehicles would be rerouted to the southern Stone Street intersection.

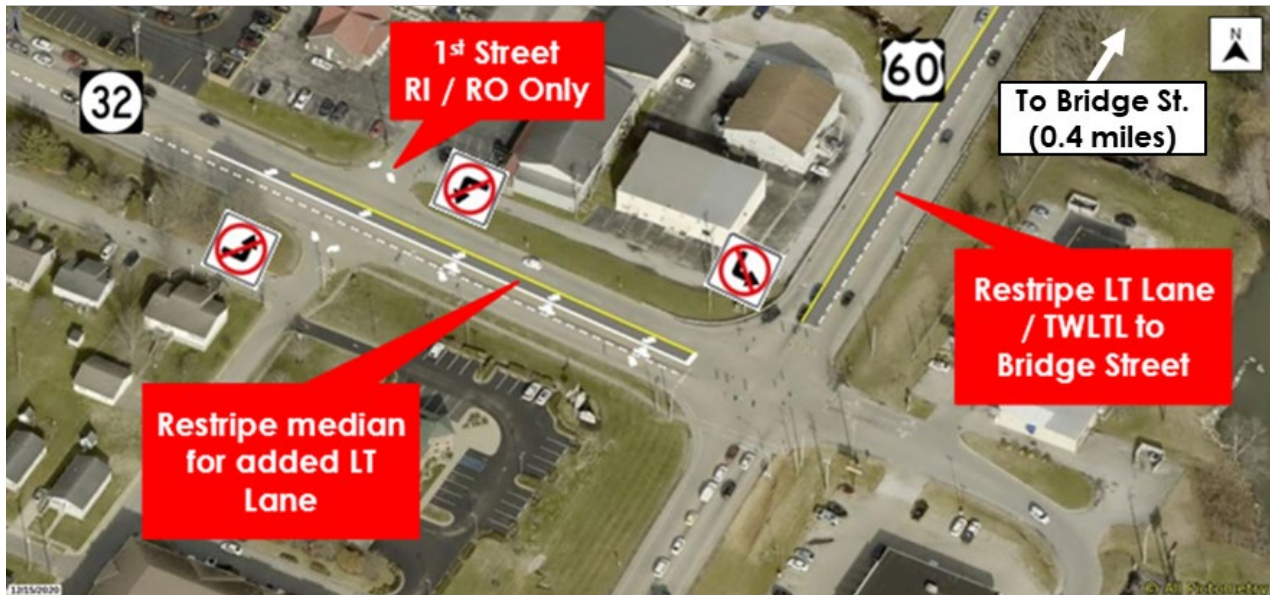


Figure ES-4: KY 32 / US 60 Short-Term Improvement Concept

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The long-term option for this area, shown on **Figure ES-5**, includes restriping the eastbound KY 32 approach to include a left-turn lane, a shared left / through lane, and a right-turn lane. US 60 would be widened from the southern Stone Street intersection to Bridge Street, 2,700 feet north of the KY 32 intersection, to accommodate the dual left-turn lanes on KY 32 and the dual northbound left-turn lanes from US 60 to KY 32. At the southern Stone Street intersection, offset left-turn lanes would be constructed to accommodate the increased left turning traffic due to the westbound US 60 left-turn to Stone Street being relocated from the KY 32 intersection to the southern Stone Street entrance. This concept would also include converting the 1st Street approaches at KY 32 to right-in/right-out by constructing “porkchop” islands and delineator posts. The westbound KY 32 left-turn lane to 1st Street would also be restriped to an eastbound left-turn lane onto northbound US 60. This concept would also include the extension of a culvert on US 60 north of the KY 32 intersection.

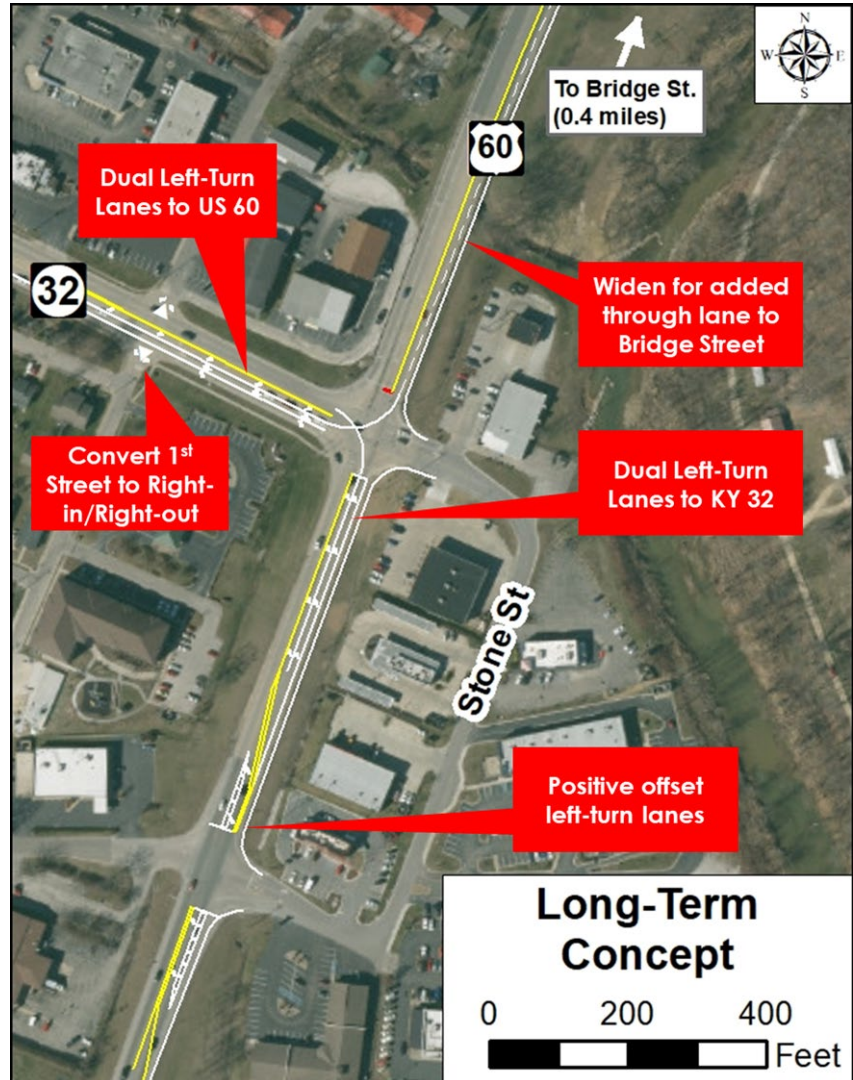


Figure ES-5: KY 32 / US 60 Long-Term Improvement Concept

An alternative to the long-term concept for the intersection includes the improvements from the short-term concept along with converting Stone Street to one-way. Shown on **Figure ES-6**, converting Stone to one-way would allow the US 60 intersection to be restriped (no pavement widening required) to provide dual left-turn lanes from KY 32 by eliminating the need for the southbound left from US 60 (see inset). Both options should be considered during future phases of project development.

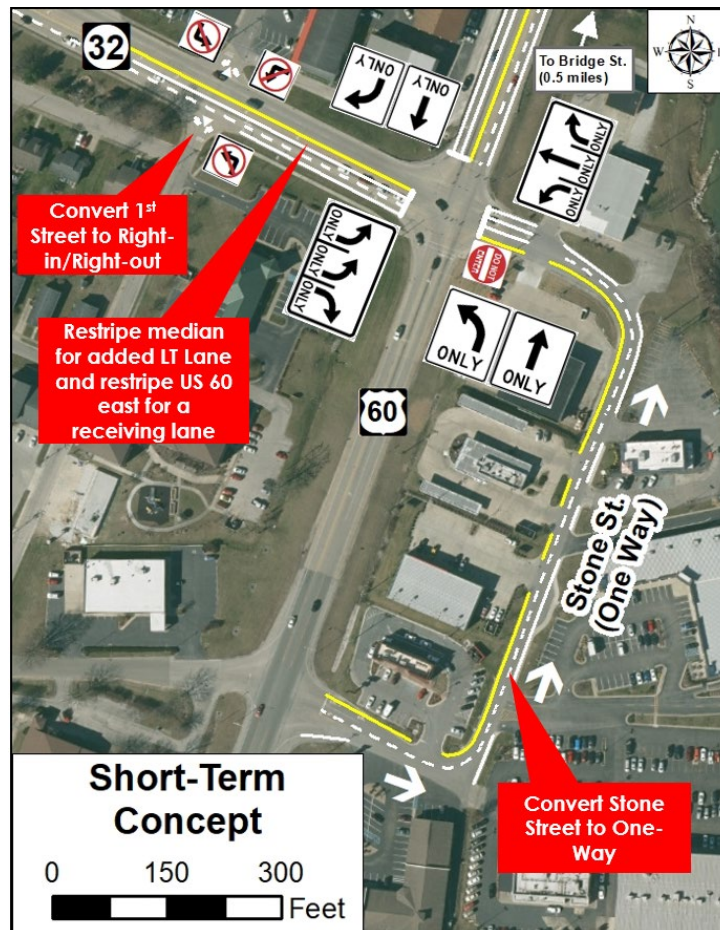


Figure ES-6: US 60 Intersection Concept with Stone Street Converted to One-Way

The KY 32 Corridor

Between Viking Drive west of the I-64 interchange and Mabry Drive just west of the commercial section in Morehead, KY 32 has four 12-foot lanes with ten-foot shoulders and a center two-way left-turn lane (TWLTL) and currently carries up to 28,000 vehicles per day (VPD). Based on traffic forecasts, which include significant developments in the area, this section of KY 32 is expected to carry up to 43,900 in 2045. Between 2017 and 2021, there were 157 crashes on this section of KY 32 not including the I-64 interchange area between Kroger Center Drive and Fraley Drive. Of the 157 crashes, two (one percent) resulted in a fatality and 26 (17 percent) resulted in an injury. The most common crash type was rear end (62 crashes, 39 percent) followed by single vehicle (34, 22 percent).

A concept to improve safety along the KY 32 corridor is to convert the center TWLTL to a raised 14-foot median, as shown in **Figure ES-7**. Major intersections would remain full access while minor intersections would be converted to right-in/right-out. U-turn opportunities would be provided along the corridor, with loons to accommodate wider-turning trucks. Drivers turning left onto KY 32 currently cross two directions of traffic traveling at 55 MPH. This concept would allow these vehicles to cross one stream of traffic at a time. A multi-use path could also be constructed along the south side of KY 32 to facilitate bicycle and pedestrian trips between the I-64 interchange and Morehead.

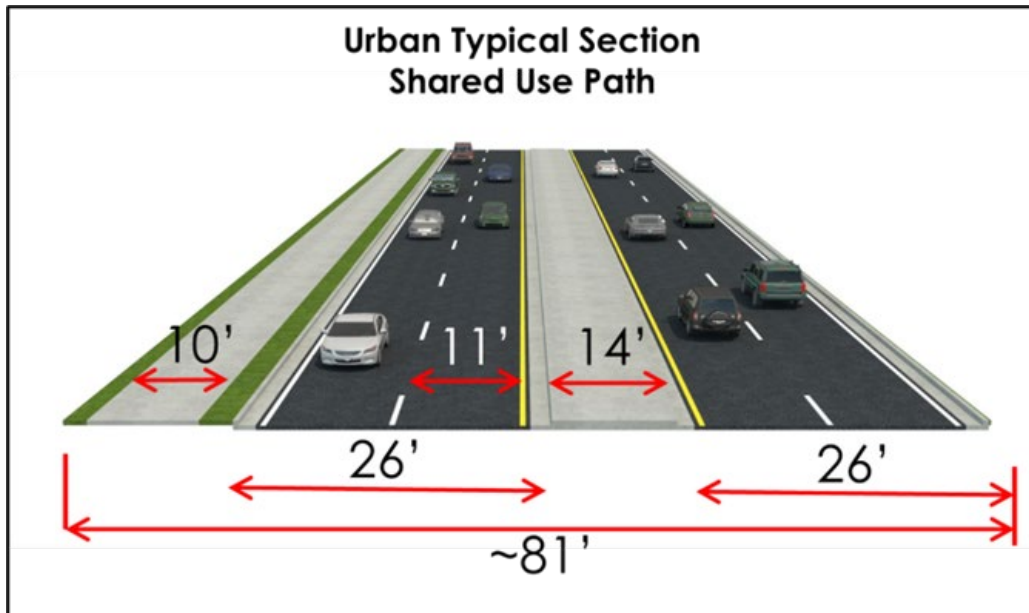


Figure ES-7: The KY 32 “Corridor” Improvement Concept - Urban Typical Section with Raised Median & Shared-Use Path

The I-64 Interchange

The I-64 interchange with KY 32 was the most identified area with traffic issues and the need for improvement based on feedback from local officials and the public. I-64 carries around 20,700 vehicles per day (VPD) south of KY 32 and 13,000 VPD to the north, indicating that many of the trips on this section of the interstate utilize KY 32. The interchange area is one of the busiest sections of KY 32, carrying between 21,800 and 28,500 VPD. Based on traffic forecasts, this area is expected to experience significant growth, with several developments anticipated in the next 10 years. In 2030, the KY 32 intersection with the eastbound I-64 ramps is expected to operate at LOS E during the PM peak hour. Between 2017 and 2021, there were 128 collisions at the interchange, 13 (10 percent) of which resulted in an injury. The most common crash type was rear end (83, 65 percent), indicating that congestion could be a contributing factor. An Excess Expected Crashes (EEC) analysis revealed that there were 19.5 more crashes per year than expected at the eastbound ramp intersection, indicating a significant opportunity to improve safety.

Short-term improvements have been implemented or initiated to improve traffic operations, including widening the eastbound off ramp to include storage for a dedicated right-turn lane to KY 32 and signal re-timing along KY 32. While these short-term improvements aim to maximize the efficiency of the existing infrastructure, long-term solutions are needed at the I-64 interchange to manage future traffic conditions.

The proposed long-term improvement at the I-64 interchange is to construct a Single Point Urban Interchange (SPUI), as shown in **Figure ES-8**. This type of interchange combines the eastbound and westbound ramps into one centralized intersection to operate with only one signal. Under this concept, the existing I-64 bridges will be replaced but the new ramps will be constructed within the existing right-of-way.

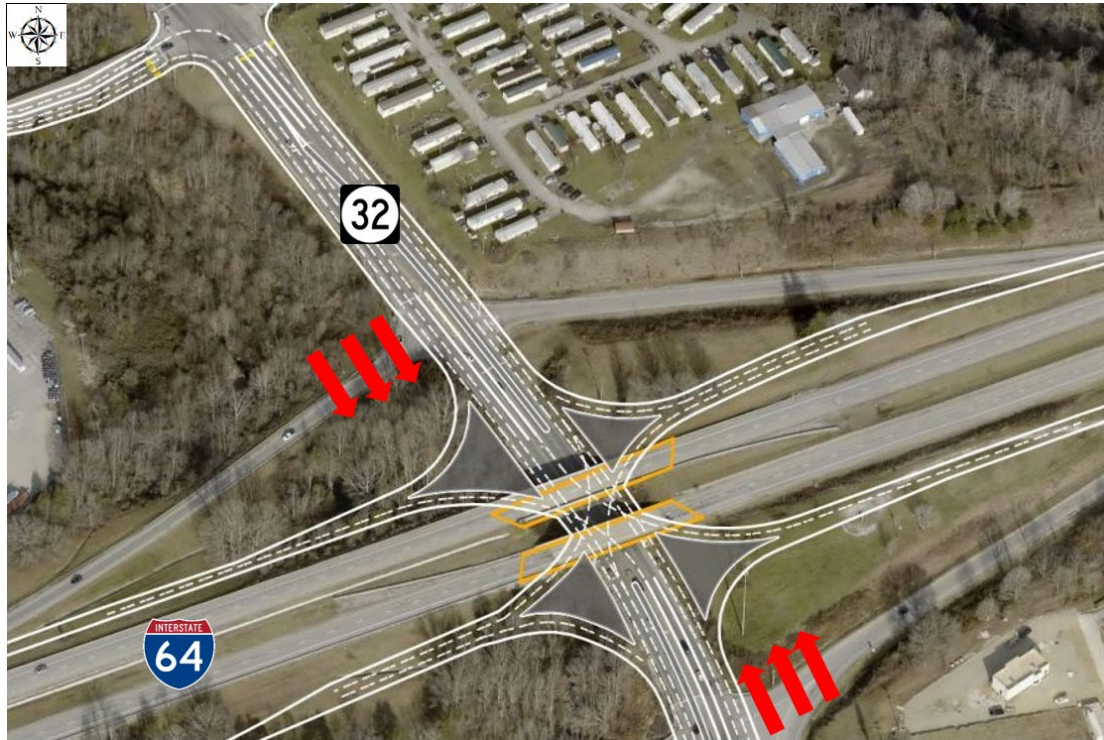


Figure ES-8: I-64 Interchange Improvement Concept

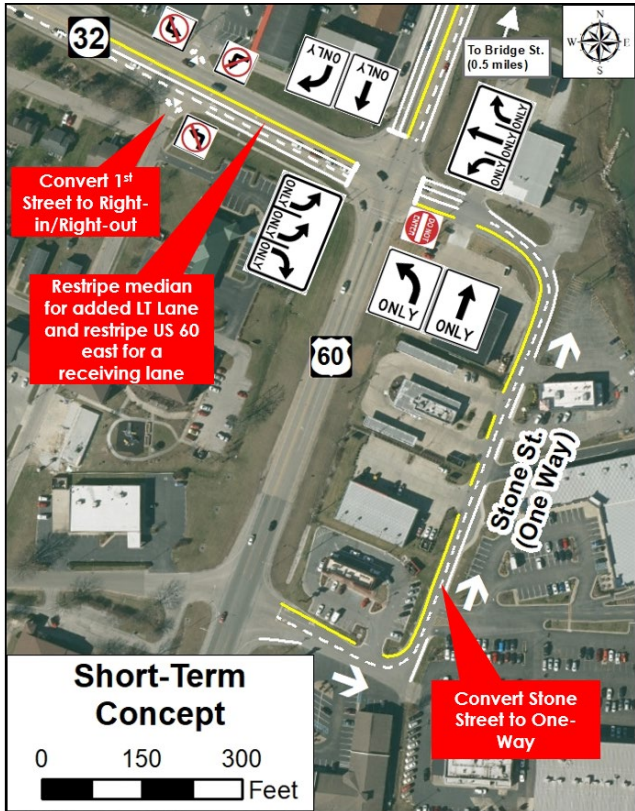
Conclusions

Improvement concepts were prioritized based on their ability to address the study goals of improving safety, mobility, and capacity on KY 32. **Table ES-1** presents the prioritization and cost estimates (in 2023 dollars) for the recommended concepts. Conceptual improvement descriptions for each of the recommended strategies are included on the following pages.

Table ES-1: Improvement Concept Prioritization & Cost Estimates

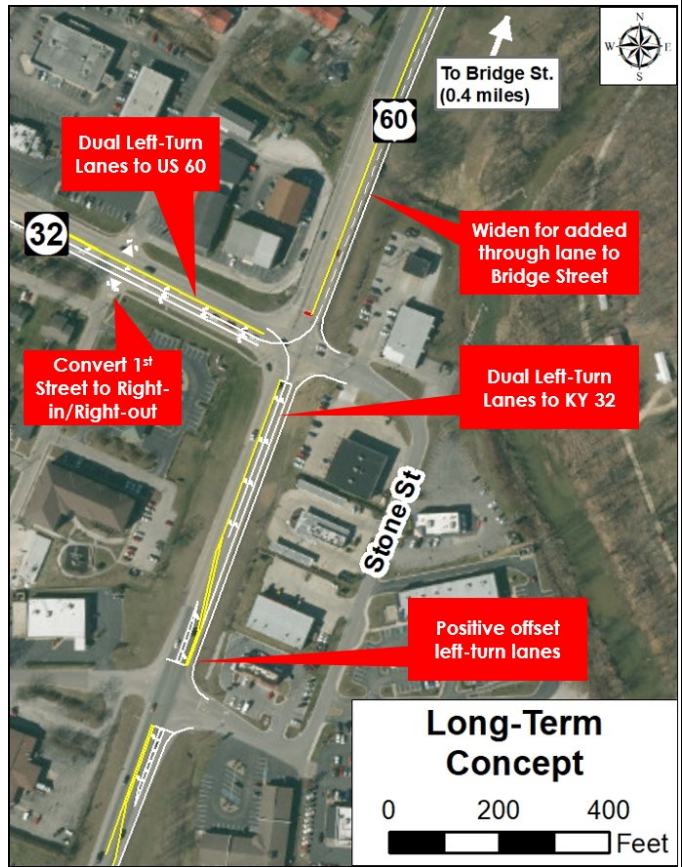
Priority	Alternative	Description	2023 Cost Estimates				
			Design	Right-of-Way	Utilities	Construction	Total
#1a	US 60	Convert 1st St. to right-in/right-out, restripe KY 32 & US 60 north approaches, convert Stone St. to one-way, update signal timing	\$50,000	\$0	\$0	\$250,000	\$300,000
#1b		Widen US 60, provide dual left-turn lanes from KY 32 to US 60 and from US 60 to KY 32	\$420,000	\$275,000	\$400,000	\$2,830,000	\$3,925,000
#2	SPUI	Construct a single point urban interchange (SPUI) at I-64	\$2,000,000	\$1,000,000	\$4,950,000	\$19,990,000	\$27,940,000
#3	KY 32 Corridor	Construct raised, non-traversable median and provide left-turn, u-turn opportunities	\$1,150,000	\$1,000,000	\$2,350,000	\$11,460,000	\$15,960,000
TOTAL			\$3,620,000	\$2,275,000	\$7,700,000	\$34,530,000	\$48,125,000

<p>1a Short-Term</p>	<p>LOCATION KY 32 at US 60</p>	<p>PROJECT PRIORITY: Recommended</p>
<p>DESCRIPTION Intersection Improvements including:</p> <ul style="list-style-type: none"> • Converting 1st Street to right-in/right-out at KY 32 • Restriping the KY 32 and US 60 north approaches • Converting Stone Street to One-Way Traffic Flow • Updating KY 32 / US 60 traffic signal phasing 		<p>COST ESTIMATE Design: \$50,000 Right-of-Way: \$0 Utility: \$0 Construction: \$250,000 Total: \$300,000</p>
<p>Project Needs: The mix of local traffic using KY 32 to access businesses and Morehead State University (MSU), along with regional through traffic traveling between I-64 and Morehead, cause congestion during the peak periods. This is especially true at the intersection with US 60, which currently operates at a Level of Service (LOS) D during the AM and PM peak hours. Based on 2030 traffic projections, which include several expected developments in the area, congestion is expected to worsen, and the intersection will operate at LOS F. Between 2017 and 2021, there were 88 crashes at this intersection, six (seven percent) of which resulted in an injury and 64 (73 percent) of which were rear end collisions. An Excess Expected Crashes (EEC) analysis revealed that there were 2.1 more crashes per year at this intersection than expected, indicating an opportunity to improve safety. This intersection was also identified by the local officials/public as having congestion and safety issues.</p> <p>Improvement Concept: A short-term option at the KY 32 intersection with US 60 includes converting the 1st Street approaches to right-in/right-out by installing delineator posts with quick-curb on KY 32. While the existing “No Left Turns” signs are consistently disregarded, the curbing would eliminate the ability for vehicles to turn left. Emergency vehicles would still be able to drive over the curb and posts, so response time would remain unchanged. Eliminating left turns from westbound KY 32 to 1st Street allows eastbound KY 32 to be restriped to include a second left-turn lane onto US 60 north, dramatically increasing left-turn storage. Converting Stone Street to one-way traffic flow (two northbound lanes) would allow US 60 north to be restriped to Bridge Street to provide the extra through lane necessary to accommodate the dual left turn lanes from KY 32. Restriping the Stone Street approach, now one-way, with dedicated turn lanes would provide for more efficient traffic signal phasing as the KY 32 and Stone Street approaches would no longer need to be split phase. The construction cost includes either the reconstruction of the US 60 / KY 32 traffic signal or the installation of a new signal at the US 60 intersection with Stone Street.</p>		



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<p>1b Long-Term</p>	<p>LOCATION KY 32 at US 60</p>	<p>PROJECT PRIORITY: Recommended</p>
<p>DESCRIPTION Intersection Improvements including:</p> <ul style="list-style-type: none"> • Widening US 60 from southern Stone Street to Bridge Street • Converting 1st Street to right-in/right-out at KY 32 • Widen eastbound KY 32 approach for dual left-turn lanes • Widen northbound US 60 approach for dual left-turn lanes 		<p>COST ESTIMATE Design: \$420,000 Right-of-Way: \$275,000 Utility: \$400,00 Construction: \$2,830,000 Total: \$3,925,000</p>
<p>Project Needs: Near its eastern terminus in Morehead, Kentucky, KY 32 transitions to a commercial corridor with business entrances lining both sides of the roadway. The mix of local traffic to the businesses and Morehead State University (MSU), along with regional through traffic traveling between I-64 and Morehead cause congestion during the peak periods. This is especially true at the KY 32 intersection with US 60, which currently operates at a Level of Service (LOS) D during the AM and PM peak hours. Based on 2030 traffic projections, which include several expected developments in the area, congestion is expected to worsen, and the intersection will operate at LOS F during the AM peak hour. Between 2017 and 2021, there were 88 crashes at this intersection, 6 (7 percent) of which resulted in an injury and 64 (73 percent) of which were rear end collisions. An Excess Expected Crashes (EEC) analysis revealed that there were 2.1 more crashes per year at this intersection than expected, indicating an opportunity to improve safety. This intersection was also identified by the local officials and the public as having congestion and safety issues.</p> <p>Improvement Concepts: A long-term option to accommodate future traffic growth includes widening US 60 from the southern Stone Street intersection to Bridge Street to provide dual northbound left-turn lanes to KY 32. At the southern Stone Street intersection, offset left-turn lanes would be constructed to accommodate the increased left turning traffic. A culvert extension will be required beneath US 60 north of the KY 32 intersection. The westbound KY 32 left-turn lane to 1st Street would also be restriped to an eastbound left-turn lane onto northbound US 60. This concept would also include converting the 1st Street approaches at KY 32 to right-in/right-out by constructing “porkchop” islands and installing delineator posts on KY 32.</p>		



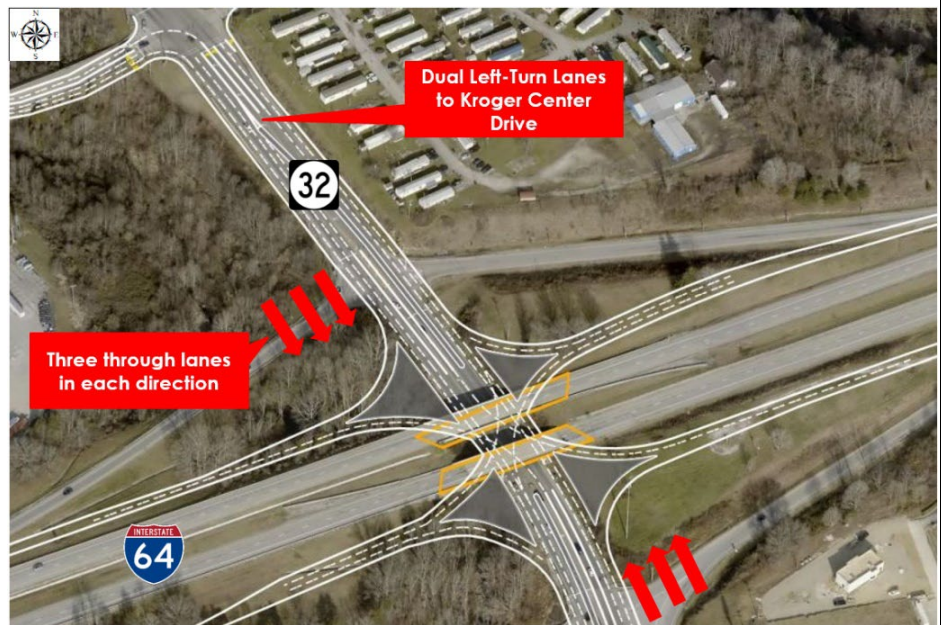
2 Long-Term	LOCATION The I-64 interchange with KY 32	PROJECT PRIORITY: Recommended
DESCRIPTION Construct a Single-Point Urban Interchange (SPUI) at I-64 (Exit 137) and provide six lanes (three in each direction between Fraley Drive and Kroger Center Drive)		COST ESTIMATE Design: \$2,000,000 Right-of-Way: \$1,000,000 Utility: \$ 4,950,000 Construction: \$19,990,000 Total: \$27,940,000

Project Needs: The I-64 interchange with KY 32 was the most identified area with traffic issues and the need for improvement based on feedback from local officials and the public. I-64 carries around 20,700 vehicles per day (VPD) south of KY 32 and 13,000 VPD to the north, indicating that many of the trips on this section of the interstate utilize KY 32. The interchange area is one of the busiest sections of KY 32, carrying between 21,800 and 28,500 VPD. Based on traffic forecasts, this area is expected to experience significant growth, with several developments anticipated by 2045. The eastbound I-64 off-ramp was recently widened to include storage for a dedicated right-turn lane. While this improvement helped reduce queueing on the ramp, more extensive improvements are needed to accommodate future traffic. In 2030, the KY 32 intersection with the eastbound I-64 ramps is expected to operate at LOS E during the PM peak hour.

Between 2017 and 2021, there were 128 collisions at the interchange, 13 (ten percent) of which resulted in an injury. The most common crash type was rear end (83, 65 percent), indicating that congestion could be a contributing factor. An Excess Expected Crashes (EEC) analysis revealed that there were 19.5 more crashes per year than expected at the eastbound ramp intersection, indicating a significant opportunity to improve safety.

Improvement Concept:

The proposed improvement at the I-64 interchange is to construct a Single Point Urban Interchange (SPUI). This type of interchange combines the eastbound and westbound ramps into one centralized intersection. Under this concept, the existing I-64 bridges will be replaced, but the new ramps will be constructed within the existing right-of-way.



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<h1 style="font-size: 2em; margin: 0;">3</h1> <p style="margin: 0;">Long-Term</p>	<p>LOCATION KY 32 from Viking Drive to Mabry Drive</p>	<p>PROJECT PRIORITY: Recommended</p>
<p>DESCRIPTION Convert the two-way left-turn lane (TWLTL) to a raised 14' median</p>		<p>COST ESTIMATE Design: \$1,150,000 Right-of-Way: \$1,000,000 Utility: \$2,350,000 Construction: \$11,460,000 Total: \$15,960,000</p>

Project Needs: Between Viking Drive west of the I-64 interchange and Mabry Drive just west of the commercial section and the US 60 intersection in Morehead, KY 32 has four 12-foot lanes with ten-foot shoulders and a center two-way left-turn lane (TWLTL). This section of KY 32 has speed limits ranging from 45 to 55 miles per hour (MPH) and currently carries up to 28,000 vehicles per day (VPD). Based on traffic forecasts, which include significant developments in the area, KY 32 is expected to carry up to 43,900 in 2045. Between 2017 and 2021, there were 157 crashes on this section of KY 32 not including the I-64 interchange area between Kroger Center Drive and Fraley Drive. Of the 157 crashes, two (one percent) resulted in a fatality and 26 (17 percent) resulted in an injury. The most common crash type was rear end (62 crashes, 39 percent) followed by single vehicle (34, 22 percent).

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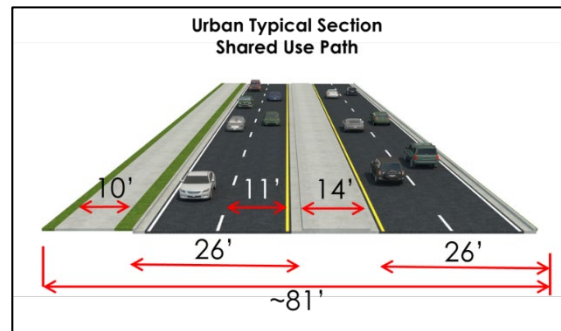


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1.0 INTRODUCTION

The Kentucky Transportation Cabinet (KYTC) initiated the *KY 32 Corridor Study* in Rowan County to identify and evaluate the need for and scope of potential options to improve safety, mobility, and capacity along approximately four miles of KY 32 in Morehead, Kentucky. The study is located within KYTC District 9, as shown on **Figure 1**.

This study is federally funded with Federal State Planning and Research (SPR) Chapter 7 funds. Future phases of the project are not funded in *Kentucky's FY 2022 – FY 2028 Enacted Highway Plan*.

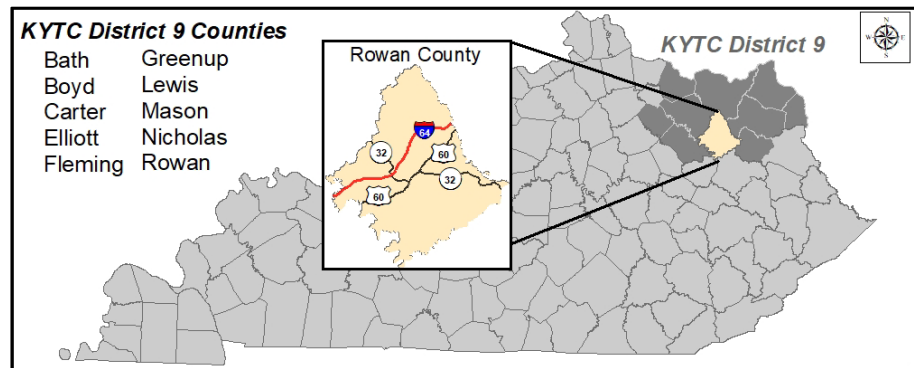


Figure 1: KYTC District 9 Map

1.1 STUDY AREA

The KY 32 study corridor, shown on **Figure 2**, extends from the intersection at KY 377 (MP 4.496) to the intersection with US 60 (MP 8.439) in Morehead, Kentucky. There is one interchange with I-64, in the northern portion of the study area at MP 5.6.

KY 32 is an east-west arterial that provides a connection between I-64 and Morehead, running mostly north-to-south in the study area. It is a primary artery through Rowan County and carries a mix of local and regional traffic. The northern portion of the study corridor is mostly commercialized, with restaurants, gas stations, grocery stores, and other businesses adjacent to the I-64 interchange (Exit 137). Between I-64 and Morehead, KY 32 becomes less commercialized and has fewer access points. Near Morehead, KY 32 transitions back to a commercial corridor with business entrances lining both sides of the roadway.

With an area of 281 square miles, Rowan County is the 73rd largest county in Kentucky. According to 2022 data provided by the Kentucky State Data Center (KSDC), Rowan County's population has grown over the past 20 years and continuing growth is expected. This makes Rowan County one of the few counties in eastern Kentucky with population growth anticipated. This growth is due, in part, to the City of Morehead, which had a 2020 Census population of 7,151, and Morehead State University (MSU), which had a 2022 Fall enrollment of 8,218.¹

¹ www.usnews.com/best-colleges/morehead-state-university-1976





Figure 2: KY 32 Study Area



1.2 PLANNED AND COMMITTED PROJECTS

There are three projects in the vicinity listed in *Kentucky's FY 2022 – 2028 Enacted Highway Plan*:

- **KYTC Item No. 09-8406** includes improving safety/connectivity and reducing congestion on KY 377 from KY 32 to north of KY 799 (U = \$8.0 million, C = \$25.76 million).
- **KYTC Item No. 09-204** involves improving KY 32 from Park Hills Drive to Viking Drive North (C = \$22.5 million).
- **KYTC Item No. 09-80108** includes widening and softening the curve on Bratton Branch Road at Walmart (C = \$150,000).

In addition to the active Highway Plan projects, there are two Highway Safety Improvement Program (HSIP) projects in the study area.

- Intersection improvements at KY 32 and Kroger Center Drive.
- Minor widening on the eastbound I-64 off ramp to include storage for a dedicated right-turn lane to KY 32. This project has been completed.

1.3 MOREHEAD SMALL URBAN AREA STUDY (2011)

A Small Urban Area (SUA) Study was performed for the city of Morehead in 2011.² Five of the recommended projects from the SUA are on the study portion of KY 32:

- Long Term Project #2 (I-64 EB Off Ramp) – This project includes adding a lane to the EB Off Ramp and adding a merge lane on KY 32 to receive the off ramp.
- Long Term Project #3 (KY 32 at US 60 Intersection Improvements) – This project includes installing a left-turn lane on KY 32. A traffic study was also recommended at this location.
- Short Term Project #2 (KY 32 at Pinecrest Dr./Fraleley Dr.) – This project includes constructing offsetting left-turn lanes on KY 32 to improve sight distance.
- Short Term Project #3 (KY 32 at BP/Fraleley Dr.) – This project includes drainage improvements and was completed in 2011.
- Short Term Project #6 (KY 32 at First Street) – This project includes constructing a right-in/right-out at the KY 32 intersection with First Street. The intersection has not been reconstructed but signs were placed to restrict left turns from First Street.

²transportation.ky.gov/Planning/Planning%20Studies%20and%20Reports/Morehead%20SUA%20Study%20Final%20Report.pdf



2.0 EXISTING CONDITIONS

The existing conditions of the transportation network were examined and are shown in the following sections. Data for this section were collected from KYTC's Highway Information System (HIS) database, Kentucky State Police Collision Data, KYTC's Traffic Count Reporting System, the Kentucky State Data Center (KSDC), aerial photography, and field inspection.

2.1 FUNCTIONAL CLASSIFICATION

Functional classification is the process of grouping streets and highways according to the character of travel service they provide. The functional classifications within the study area are shown in **Figure 3**. The KY 32 study corridor is classified as an urban minor arterial, providing regional connections for moderate length trips. US 60, located in the southeastern portion of the study area, is also categorized as an urban minor arterial. I-64 is a rural Interstate and provides connections for longer trips at higher speeds. Major Collectors within the study area include Cranston Road (KY 377), Viking Drive (KY 3531), Forest Hills Drive (KY 3319), West 2nd Street, and West Main Street.

2.2 ROADWAY GEOMETRY

KYTC's HIS database was used to identify roadway geometry. The current number of lanes and estimated lane widths within the study area are shown in **Figure 4**. KY 32 includes four 12-foot wide travel lanes and a center two-way left-turn lane (TWLTL) throughout the study limits.

The shoulder widths for each roadway within the study area are shown in **Figure 5**. The KY 32 corridor has varying shoulder widths. Between milepoints 4.496 and 7.865, the shoulders are 10 feet wide and asphalt paved. Between milepoints 7.865 and 8.439, approaching downtown Morehead, KY 32 has curb and gutter.

2.3 SPEED LIMIT

Speed limits along the KY 32 study corridor and adjacent roadways were mapped using KYTC's HIS Database and are shown in **Figure 6**. The northern end of the study, including through the I-64 interchange, is posted for 45 miles per hour (mph). Traveling southbound on the study corridor towards Morehead, the speed limit transitions from 45 mph to 55 mph at milepoint 6.33 as the surrounding area becomes more rural. The speed limit remains 55 mph for the rural portion of the corridor and transitions to back to 45 mph for less than half a mile before it drops to 35 mph approaching the commercial area near Morehead.



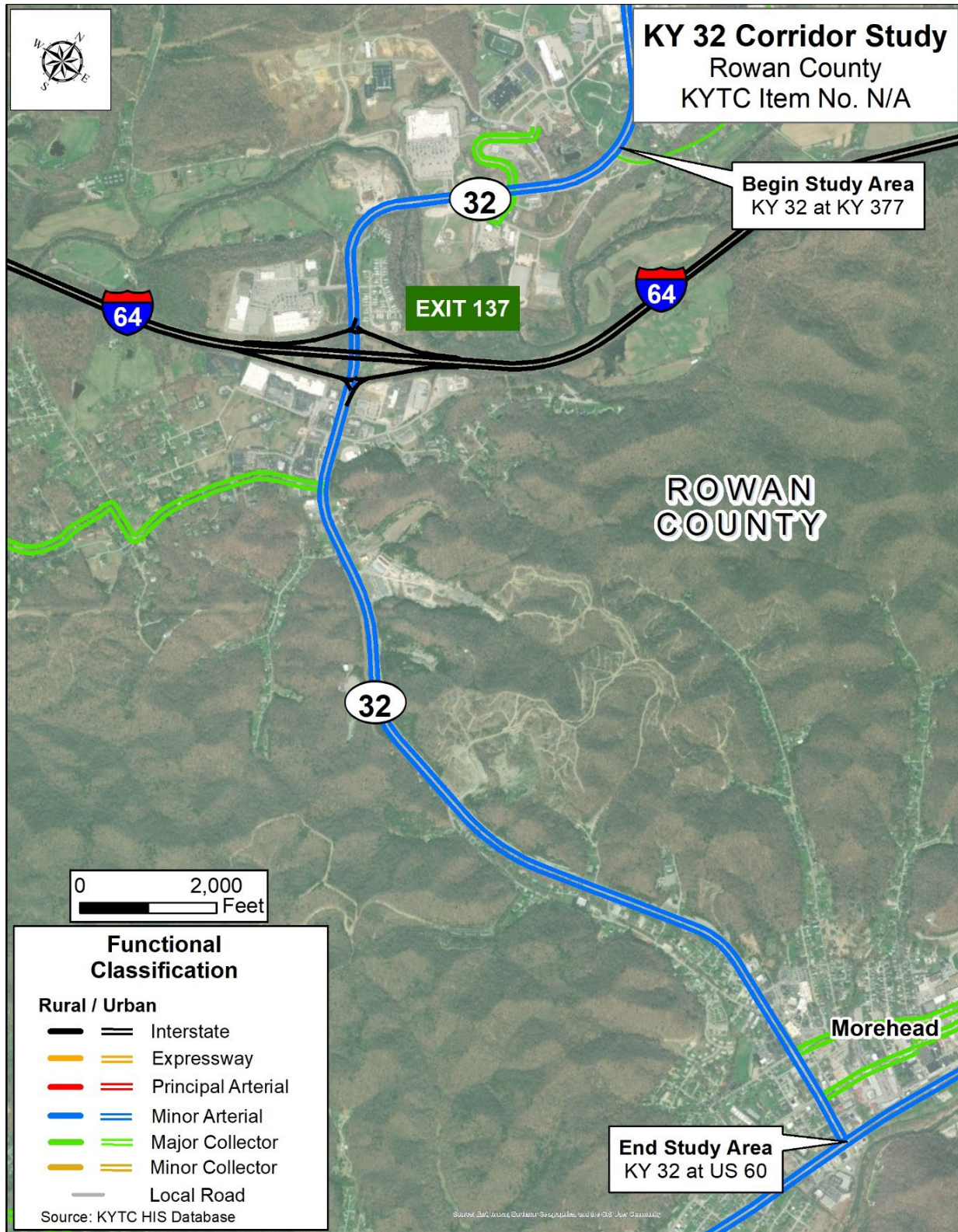


Figure 3: Functional Classification



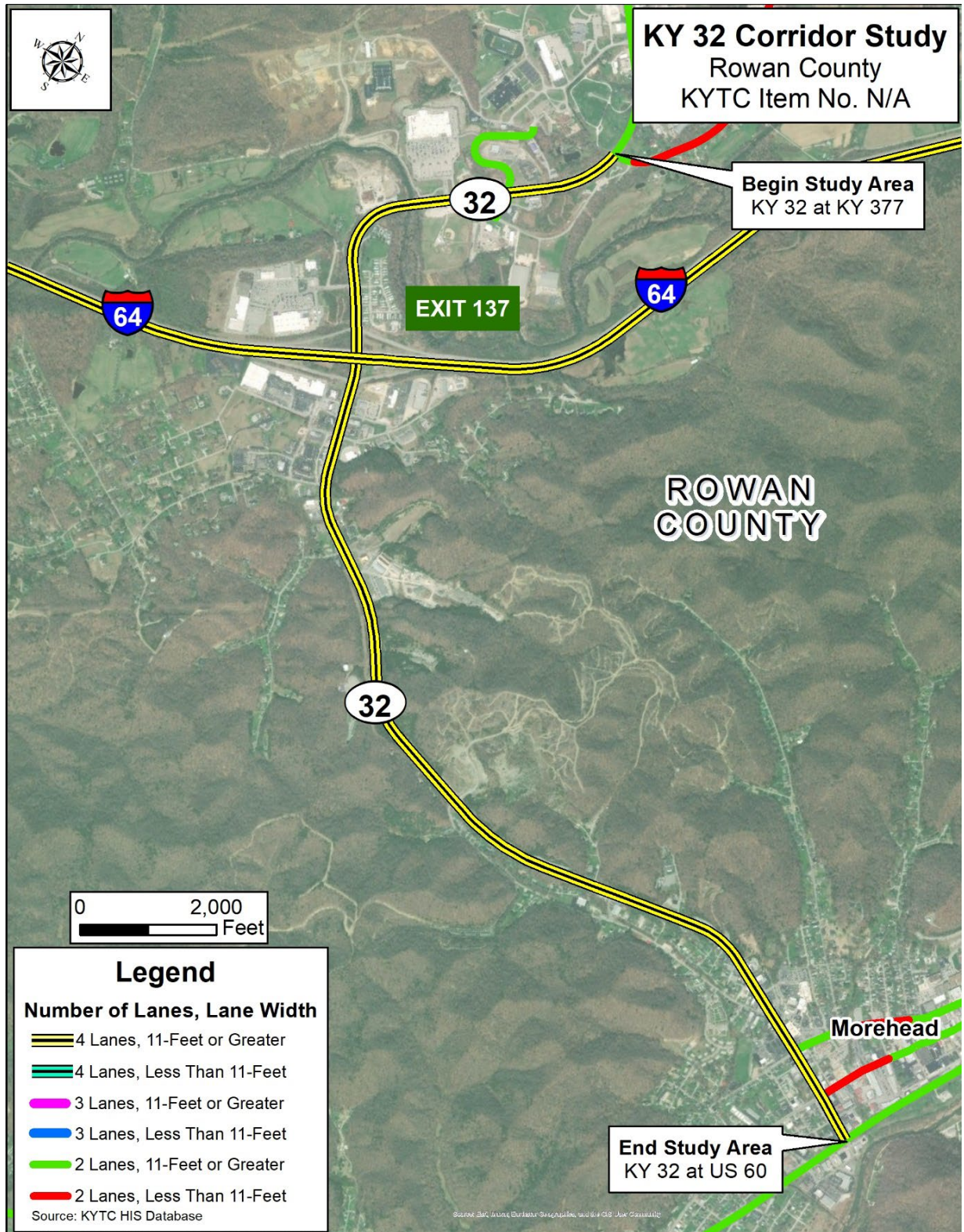


Figure 4: Number of Lanes and Lane Widths



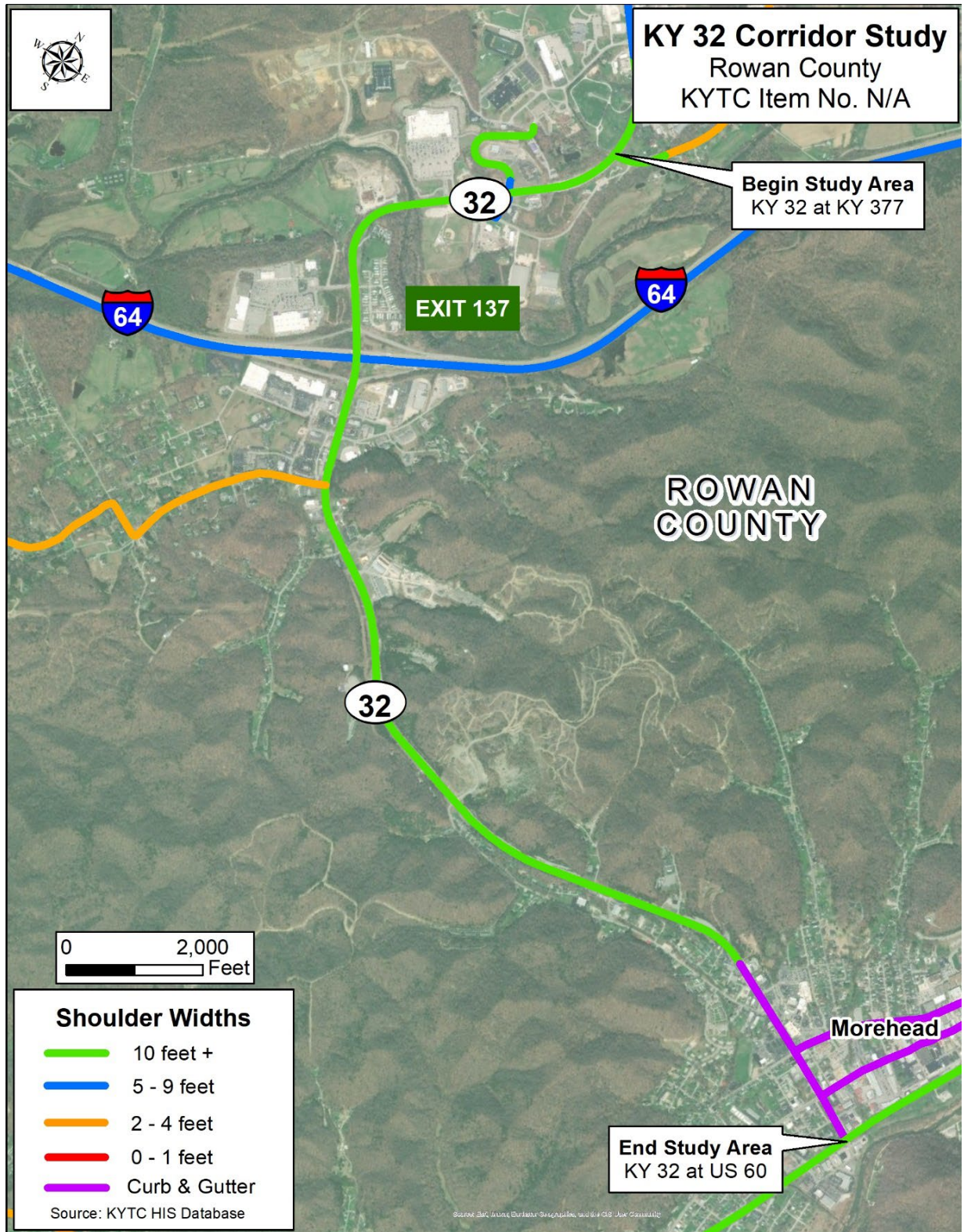


Figure 5: Shoulder Widths

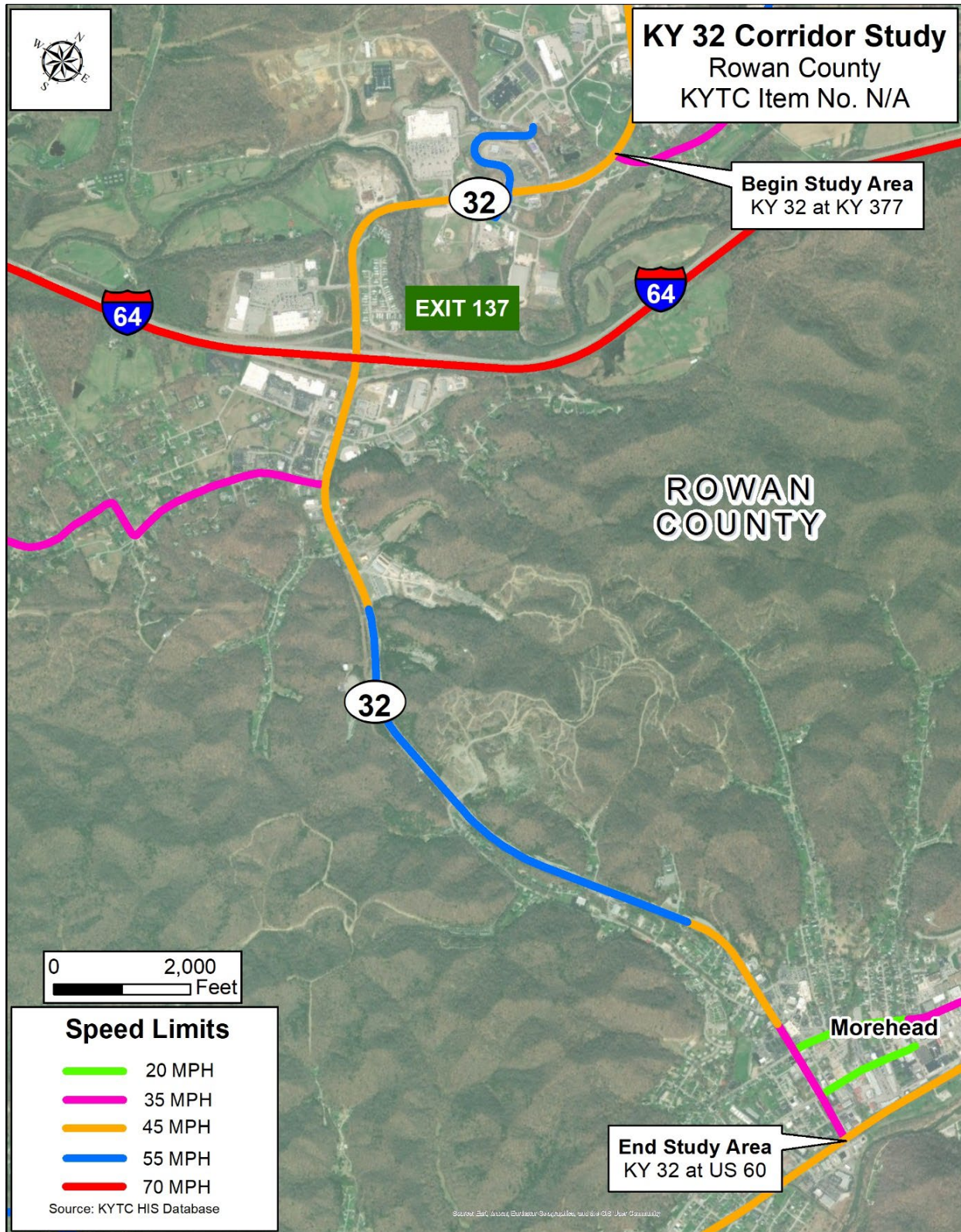


Figure 6: Speed Limits

2.4 EXISTING TRAFFIC ANALYSIS

Existing traffic volumes were analyzed on the study portion of KY 32 and surrounding roadways. The most recent KYTC daily traffic counts showed average daily traffic (ADT) volumes on KY 32 ranging from 15,200 vehicles per day (VPD) north of the interchange to 28,000 VPD near the commercial section south of the interchange, as shown in **Figure 7**. Daily traffic on I-64 ranges from 21,200 VPD west of the interchange to 13,500 VPD to the east.



Traffic Queueing on the I-64 EB Off Ramp

2.4.1 Existing (2021) Traffic Simulation Model

Existing AM (7:15 AM – 8:15 AM) and PM (4:30 PM – 5:30 PM) peak hour simulation models were developed using TransModeler (version 5). The existing models, based on traffic turning movement counts collected in May 2021 and traffic signal timings provided by the KYTC Division of Traffic, were calibrated to recognized industry standards before use by the study team. A more detailed discussion of simulation model development and calibration statistics can be found in **Appendix A**.

Level of service (LOS), a qualitative measure describing operational conditions, was used to evaluate the adequacy of the existing roadway. In rural areas, LOS C or better is desirable and in urban areas, LOS D or better is desirable. Results from the existing simulation model analysis show that all study area intersections operate at a LOS D or better during the AM and PM peak hour, as shown in **Figure 8** and **Figure 9**.

While existing intersection LOS was D or better throughout the corridor, there were instances of approaches with LOS E. These approaches operated at LOS E in peak periods:

- The eastbound US 60 approach during the PM peak hour.
- The eastbound I-64 off-ramp approach during both AM and PM peak hours.

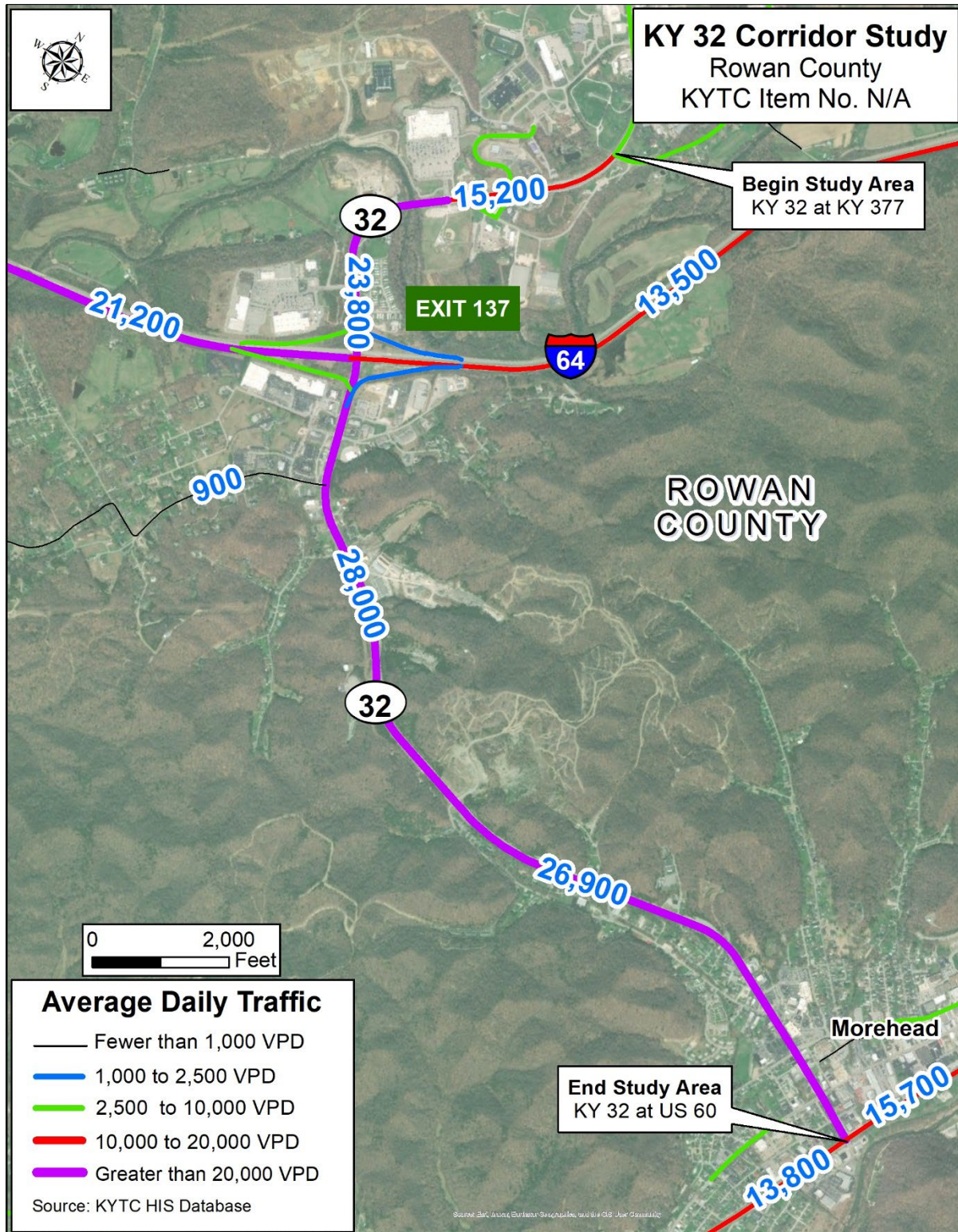


Figure 7: Average Daily Traffic





Figure 8: Existing AM Peak Hour Level of Service (LOS)



Figure 9: Existing PM Peak Hour Level of Service (LOS)

2.5 CRASH HISTORY

Crash data were collected along the study portion of KY 32 for a five-year period between January 1, 2017, and December 31, 2021. Over the course of the five-year period, a total of 780 crashes were reported on the study portion of KY 32. The crash records are included in **Appendix B**, and the locations are shown on **Figure 10**.

Of the 780 crashes, five resulted in a fatality (0.6 percent), and 94 resulted in an injury (12.1 percent), and 681 resulted in property damage only (87.3 percent). Two of the fatal collisions were angle collisions at intersections, two were single vehicle collisions, and one was labeled as a sideswipe along the 55-mph portion of KY 32 in the middle of the study area. Of the two fatal, single vehicle collisions, one was a collision with a pedestrian at a non-intersection. Rear end crashes (51.3 percent) and angle crashes (18.5 percent) were the most prominent types of collisions as shown in **Figure 11**.

Figure 12 displays the density of crashes that occurred along the KY 32 study corridor between 2017 and 2021. There are a few spots along the corridor that are considered “high density” crash areas, including the I-64 interchange and the commercial section to the south. Other high-density intersections include Walmart Way, Kroger Center Drive, Old Flemingsburg Road (East Entrance), West Sun Street/West 2nd Street, West Main Street, West 1st Street, and US 60.

Excess expected crashes (EEC) were calculated for the KY 32 roadway segments and intersections using the Crash Data Access Tool (CDAT). EEC is a measure of crash frequency at a given site compared to what is expected based on current conditions (geometrics, traffic, etc.). A positive EEC indicates more crashes are occurring than should be expected. There are several KY 32 study area intersections with positive EECs. Three of these intersections have an EEC above 5 crashes per year, which include the eastbound I-64 Interchange, Pinecrest Drive/Fraley Drive, and Walmart Way. There are three segments on the corridor that have an EEC greater than zero, which includes the segment between the I-64 interchange and Fraley Drive, the segment between West Sun Street and West Main Street, and between West Main Street and US 60. The positive EEC segments and intersections on the KY 32 study corridor are shown in **Figure 13**.

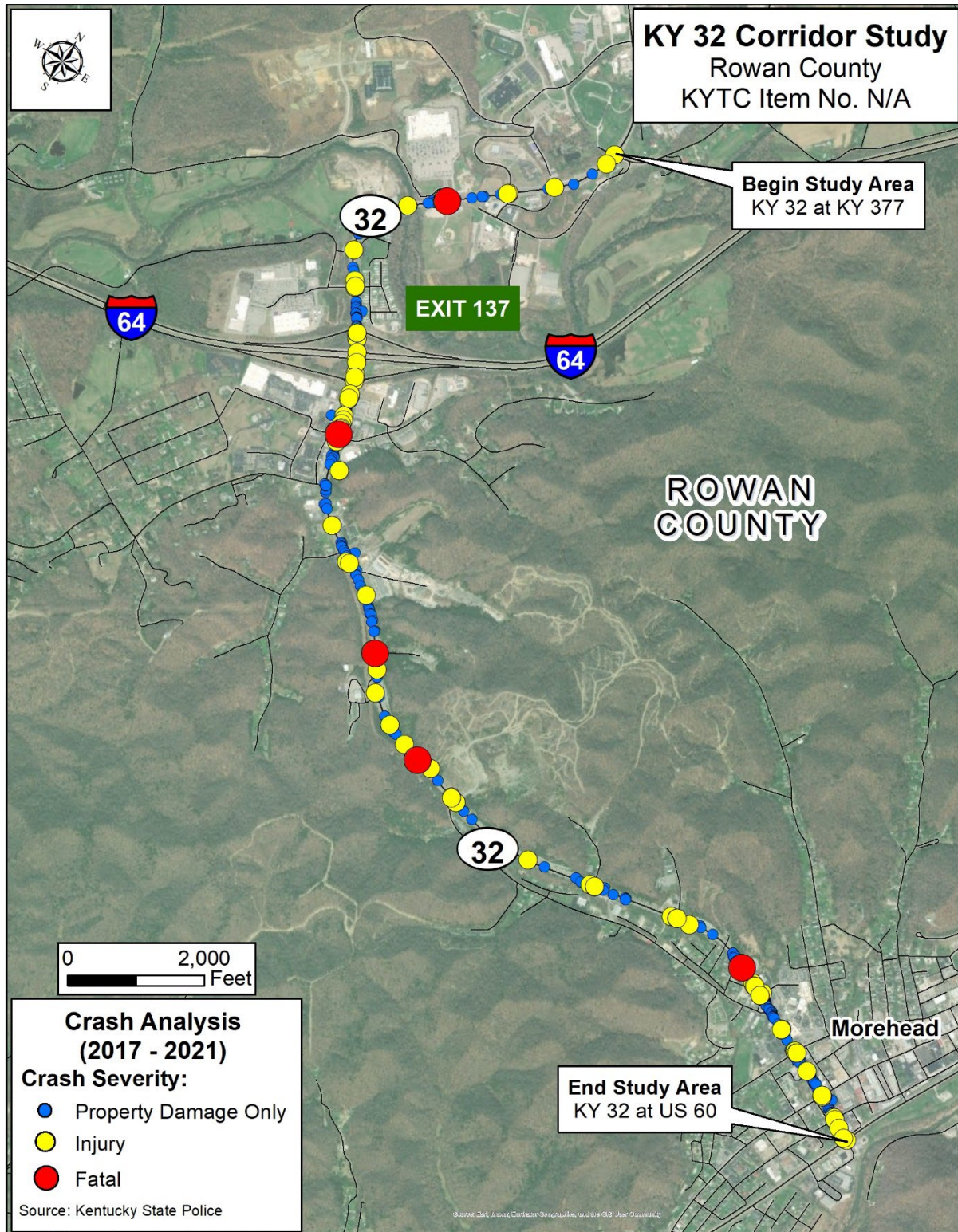


Figure 10: Crash Severity (2017 – 2021)

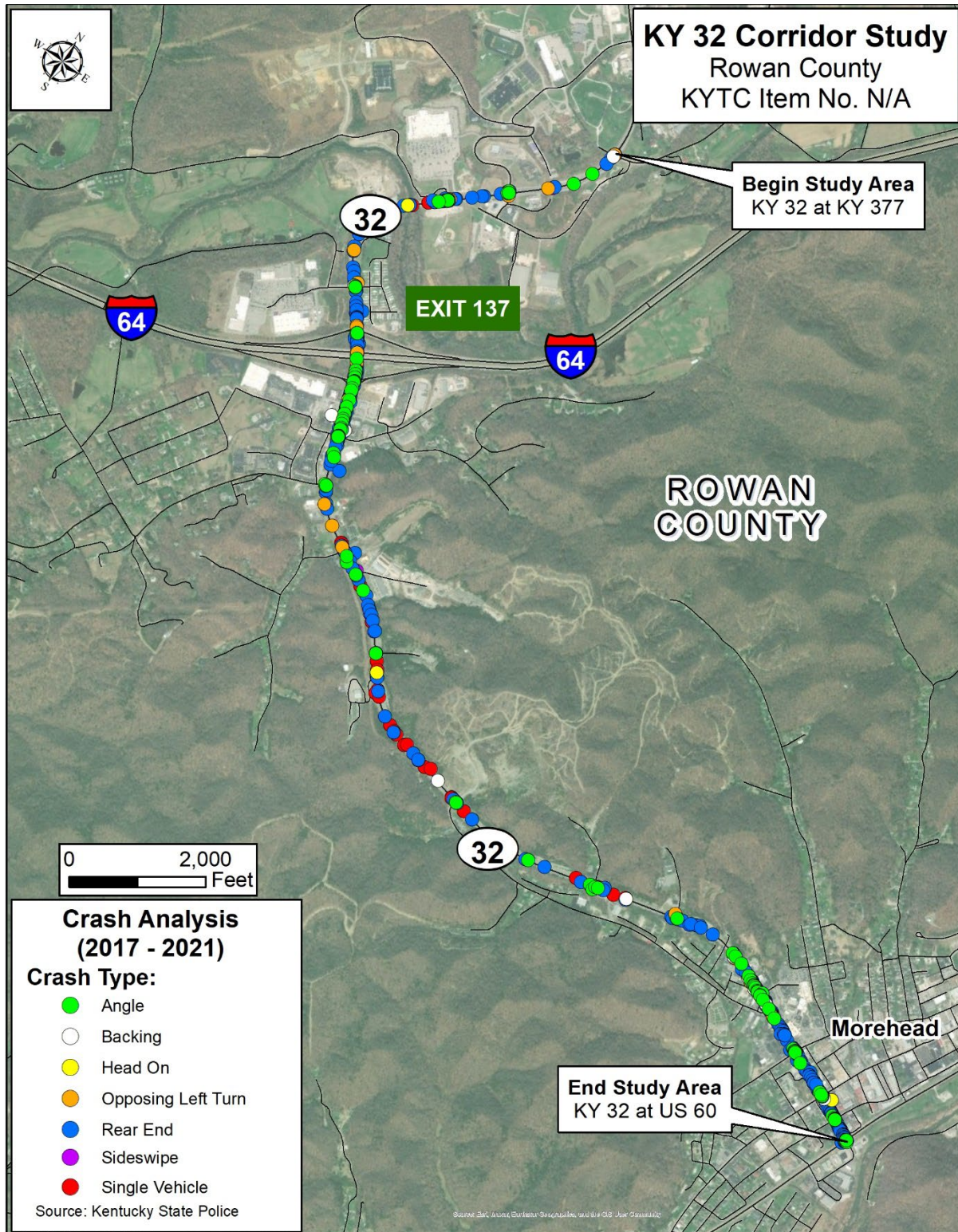


Figure 11: Crash Type (2017 – 2021)



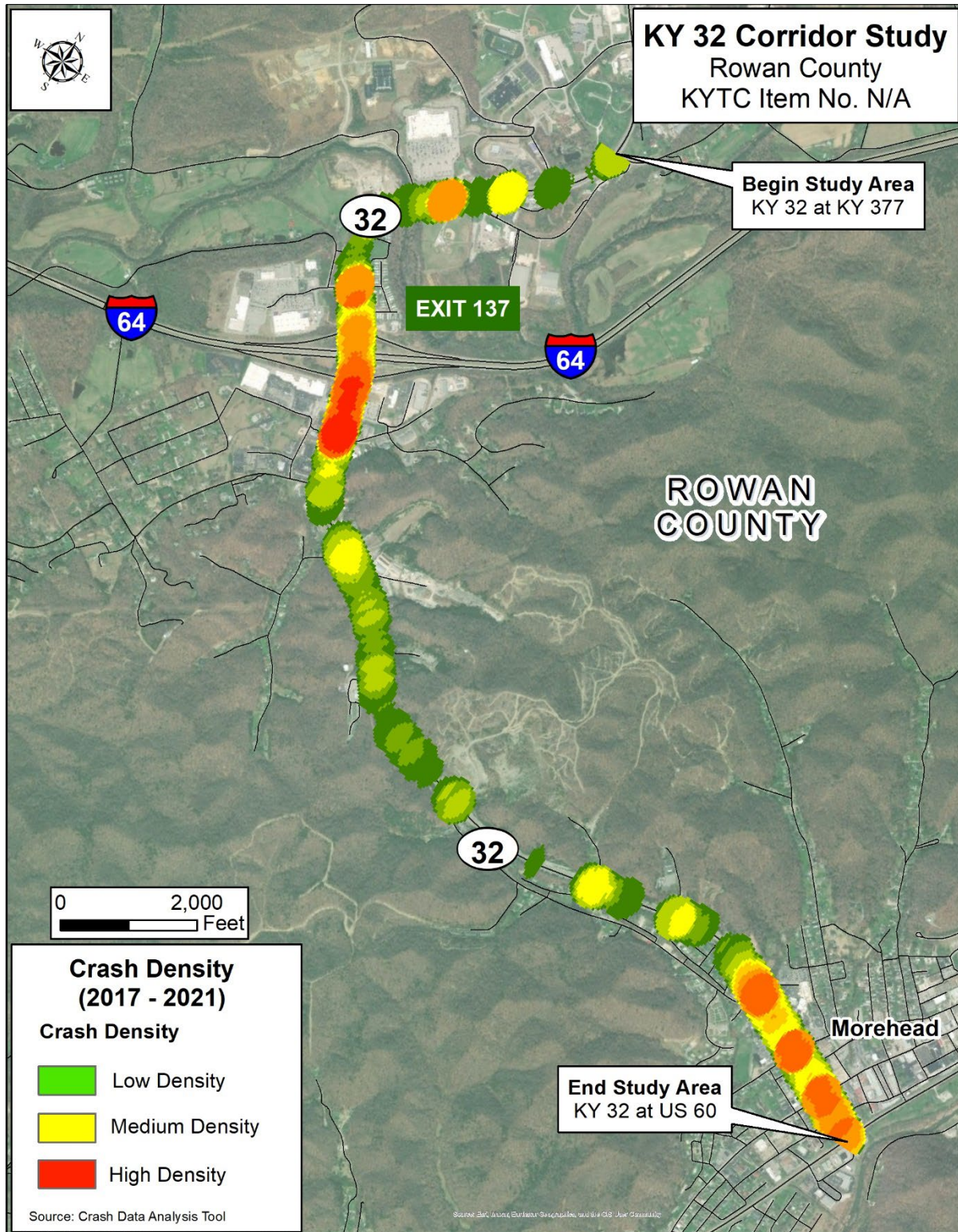


Figure 12: Crash Heat Map (2017 - 2021)

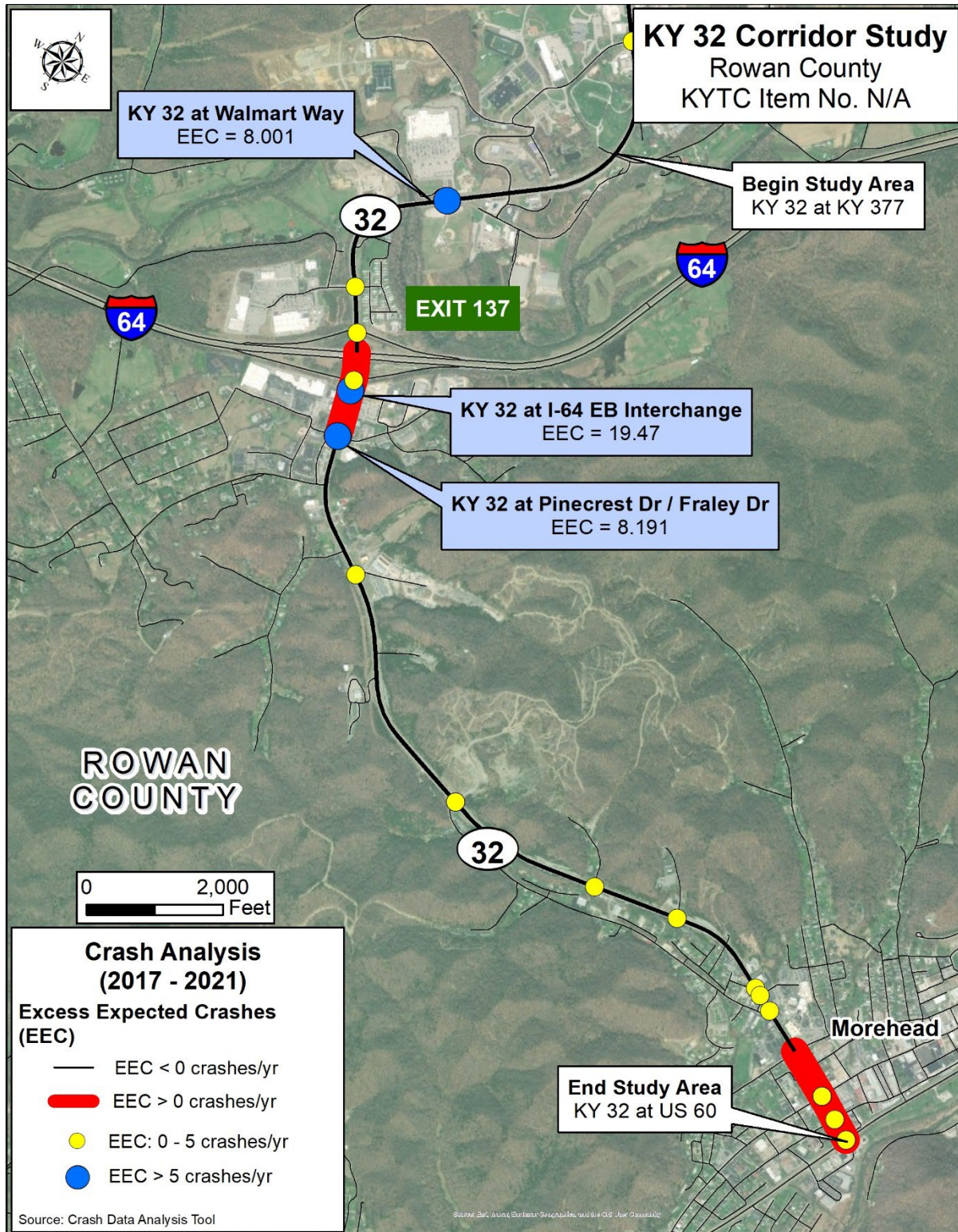


Figure 13: Excess Expected Crashes (EEC)

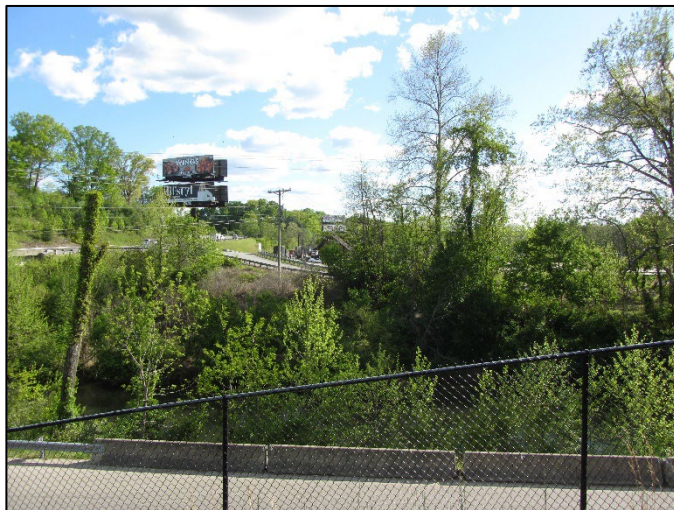


3.0 ENVIRONMENTAL OVERVIEW

Stantec Consulting Services prepared the Environmental Overview (EO) as part of the KY 32 Corridor Study to identify known natural and human features which occur within the study area. These features should be considered during the development and advancement of conceptual alternatives along with avoidance or minimization of impacts to the environment. The complete document is included in **Appendix C**. The following sections summarize the findings from the EO.

3.1 NATURAL ENVIRONMENT

There are two National Wetland Inventory (NWI) features mapped within the study area, one classified as Freshwater Forested/Shrub wetland and the other as Riverine, comprising a total of approximately 4.9 acres inside the study area.



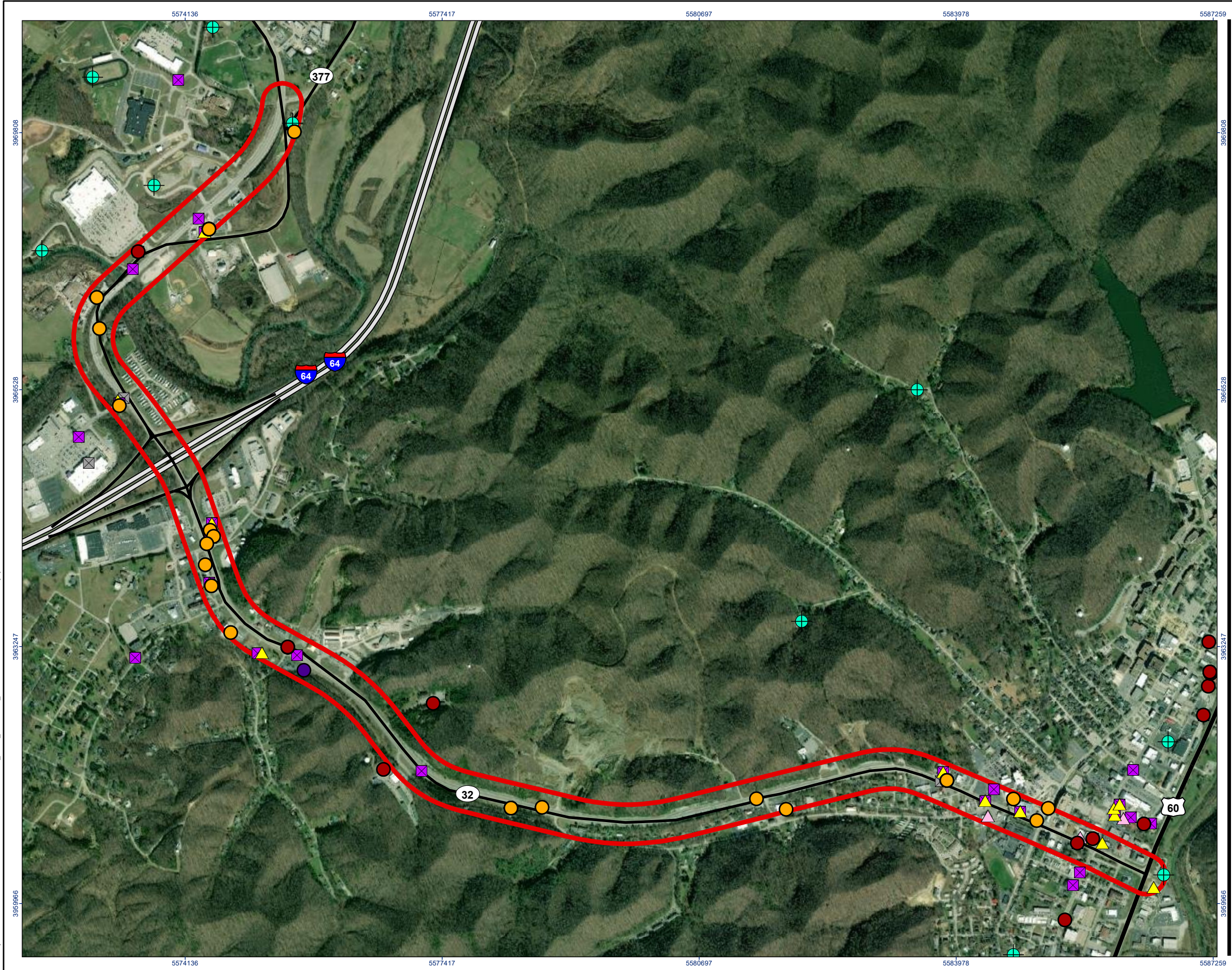
Potential Bat Habitat near KY 32

There are 12 federally listed threatened and endangered species that could be found within the study area. Forested areas in and adjacent to the study area may provide suitable summer roost and foraging for the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*). North Fork Triplett Creek, which crosses the study area, may provide suitable habitat for the 10 mussel species on the list.

54 state water wells are found within the study area, most of which are listed as monitoring wells, remediation use, and industrial use. There were no federal wells identified within the study area and two public water supply systems.

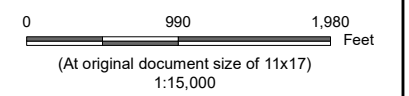
3.2 HUMAN ENVIRONMENT

An overview of the human environment in and around the study area is shown in **Figure 14**. Based on the review of National Register of Historic Places (NRHP) there are no registered historic places located within the study area vicinity. Community resources and sensitive noise receptors in the study area include single family residential neighborhoods and houses, at least one house of worship, one cemetery, no currently operational schools, two parks, and two public service facilities. There are two oil/gas wells mapped within the study area.

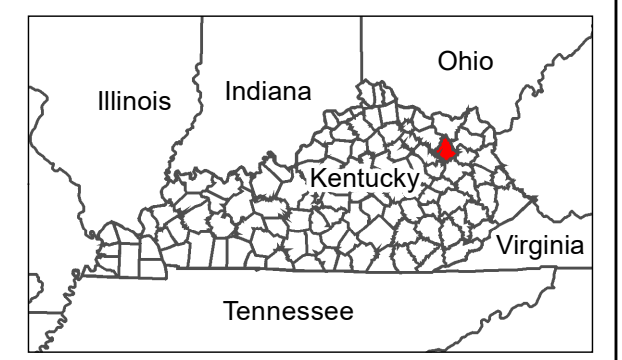


Legend

- Study Area
- US 64
- Primary Road
- Secondary Road
- Oil and Gas Well
- ▲ Historic Auto Shop
- ▲ Historic Dry Cleaners
- State Hazardous Waste Site
- Spill Site
- Solid Waste/Landfill Site
- Underground Storage Tank
- Aboveground Storage Tank
- Air Emission Facility



Notes
 1. Coordinate System: NAD 1983 StatePlane Kentucky FIPS 1600 Feet
 2. Data Sources: ESRI Aerial, USGS National Water Inventory System (2021), US EPA (2021), and KY Geological Survey (2021)
 3. Background: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Project Location
 Rowan County, Kentucky

Client/Project
 Kentucky Transportation Cabinet
 KY-32 Corridor Study
 Environmental Overview

Figure No.
 14

Title
 Human Environment - Hazards

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The following features are a portion of the records identified in the database review: five Resource Conservation and Recovery Act (RCRA) Non-Generator records, one RCRA generator records, four state hazardous waste sites (SHWS) records, one solid waste/landfill facility (SWF/LF), 17 underground storage tank (UST) records and two above ground storage tanks (AST) records, as well as three KY Spills records. Approximately 153.7 acres (63 percent) of the soils in the study area are identified as Prime Farmland, Farmland of Statewide Importance, Prime Farmland if drained, and Prime Farmland if protected from flooding.

3.3 SOCIOECONOMIC STUDY

The Gateway Area Development District (GADD) conducted a socioeconomic study for the study area. A complete copy of the report is found in **Appendix D**. The information in this report outlines data from the 2016-2020 American Community Survey (ACS) statistics in the study area vicinity using tables, charts, and maps. The information is intended to aid the Kentucky Transportation Cabinet in making informed and prudent transportation decisions in the project area. Statistics are provided for minority, elderly, poverty status, limited English proficiency (LEP), and disabled populations for the nation, state, and Rowan County, as shown in **Table 1**.

Table 1: Socioeconomic Study

Category	United States	Kentucky	Rowan County
Percent of Minority Population	39.9%	15.9%	5.6%
Percent Below the Poverty Line	12.8%	16.6%	27.1%
Percent of Adults over 65	16.0%	16.4%	13.8%
Percent of Adults with a Disability	15.3%	21.2%	21.2%
Percent with Limited English Proficiency	8.3%	2.3%	0.9%



4.0 GEOTECHNICAL OVERVIEW

A geotechnical overview for the subject project was performed by the KYTC Division of Structural Design. The purpose of this overview was to provide a general summary of the bedrock, soil, and geomorphic features likely to be encountered within the study area; and to identify geotechnical features that may have an adverse impact on the project. The overview will be utilized to identify geotechnical considerations for the study area. The complete document is included in **Appendix E**.

The project study area is in a small section of the Mississippian Plateau Physiographic Region between the Outer Bluegrass Physiographic Region and the Eastern Kentucky Coal Field Physiographic Region. This region is characterized with rounded hills and ridges, narrow valleys with high gradient streams, and a few wide, locally swampy bottoms underlain by weak shales. Typical vertical relief is in the magnitude of 200 to 300 feet. Surface drainage from the study area is directed towards unnamed tributaries of the North Fork of Triplett Creek and follows a dendritic pattern because of bedrock with uniform resistance to erosion. Available geologic mapping indicates the project area to be underlain by a mixture of Mississippian-age through Devonian-age sedimentary rocks. **Figure 15** presents the karst potential in and around the study area.

A site investigation was performed on May 6th, 2021, to help identify any geotechnical deficiencies with the current alignment. Based on the available resources combined with a site investigation the Geotechnical Branch does not anticipate any large-scale geotechnical concerns. On the east side of KY 32, at approximate mile point 6.9, lies an abandoned surface quarry. Geologic mapping indicates that the Farmers Member of the Borden Formation has been quarried for building stone for local use. Surficial mapping indicates that unconsolidated and consolidated material generated from surface rock quarries has been placed in the narrow valleys of the area.

The project location tends to have shallow soil depths. In the case where insufficient quantities of clay shale is available from roadway excavation it may be required to further excavate the iron sulfide bearing shale and cover it with a thicker layer of excavated material. Any stockpiling of the acidic shales will require controlled drainage.

At the time the geotechnical analysis was performed, it was unknown as to whether anticipated roadway improvements would require new and/or widened substructure elements. It can be anticipated that most of the bridges within the project study area are likely supported by rock bearing foundation systems. Culverts along the proposed alignments may be replaced or widened. The culverts within the study area are likely supported by either nonyielding or yielding foundation systems depending upon the location along the proposed alignment. A detailed geotechnical investigation will be required to determine the foundation support systems.



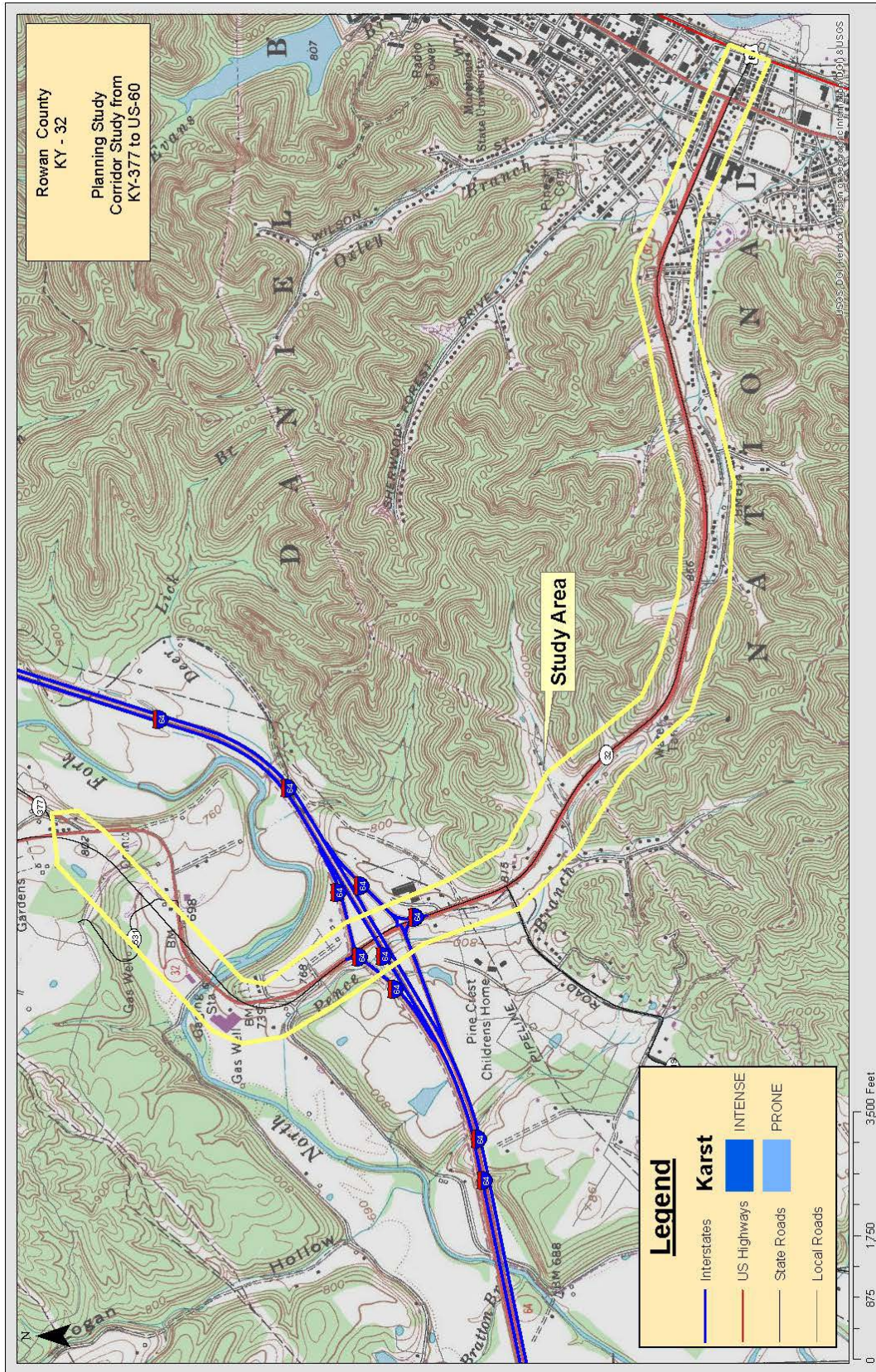


Figure 15: Karst Potential



5.0 FUTURE CONDITIONS

To determine the need for and type of potential transportation improvement concepts, it is necessary to estimate future conditions. This chapter summarizes the anticipated future conditions within the study area.

5.1 EXPECTED STUDY AREA DEVELOPMENTS

Over the course of the study, the project team maintained communication with key stakeholders to both gather and disseminate information on expected developments in the study area. Before hosting formal Project Team and Local Officials / Stakeholder meetings, project managers met with the City of Morehead and St. Claire Healthcare to better understand potential future land use along the KY 32 corridor. Meeting summaries are included in **Appendix F**.

5.1.1 Coordination Meeting with The City of Morehead

A meeting to coordinate with the City of Morehead was held via Microsoft Teams on April 23, 2021. Attendees included the City of Morehead, KYTC District 9, KYTC Central Office Planning, and the consultant team. The discussion was focused on anticipated development in the area.

There are 10 locations along the study portion of KY 32 that are anticipated to develop or have the potential to develop over the next 20 years. The locations of these known and potential developments, described below, are displayed in **Figure 16**.

1. Area northwest of Walmart
 - 100 acres for industrial development
2. Wells Sawmill Property
 - The Wells Sawmill Property is a 40-acre plot of land within the northern portion of the KY 32 corridor, just west of Walmart. It is currently being developed into Oak & Prime³, a mixed-use commercial and residential development. It is assumed this site will be 50 percent developed within 10 years with full build-out by 2045.
3. West of Viking Drive (south entrance)
 - There are three available commercial outlets.

³ www.theoakandprime.com



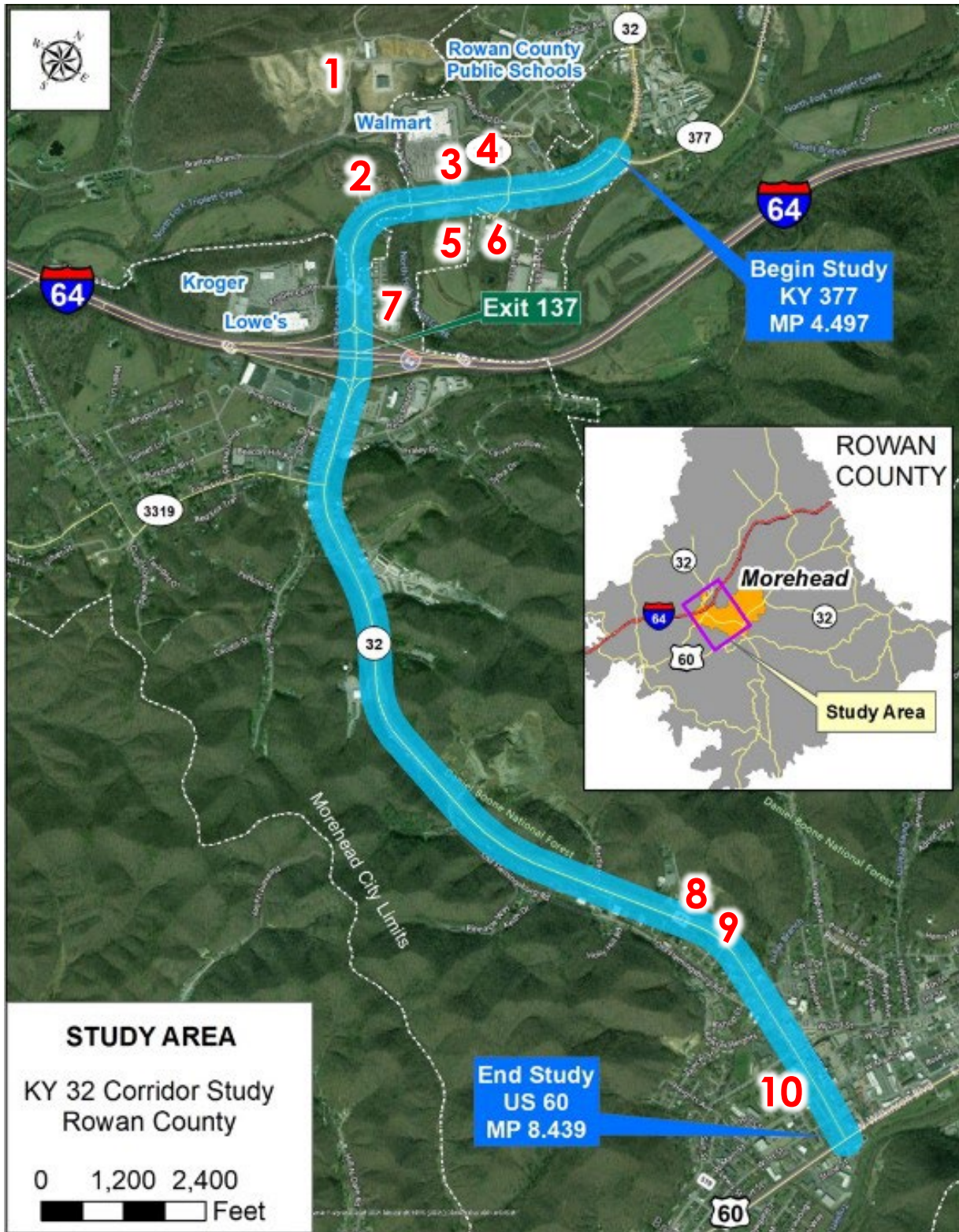


Figure 16: Potential Developments along KY 32

4. Dollar Tree Shopping Center

- There is one available lot.

5. Rowan County Community Park

- The project team was provided a conceptual development plan for this site showing the possibility of multiple fast-food restaurants and retail stores. It is assumed this parcel will be fifty percent developed within 10 years with full build-out by 2045.
- An updated concept was shared with the project team in September 2023 that included only three fast food restaurants along the northern portion of the property. The original concept was used for purposes of the study traffic forecasts.



Rowan County Community Park

6. Old Cranston Road Area

- Vacant lots are available for development near KY 32.

7. Polo 1 Development

- Polo 1 LLC has developed the initial phase of a 12.5-acre plot of land in the northeast quadrant of the KY 32 interchange with I-64, which was previously a mobile home community. A Traffic Impact Study (TIS) was developed and shared with the project team. Per the TIS, Phase 1 of the development included three restaurants and a grocery store, is expected to be completed by 2025. Phase 2, which includes a gas station, a bank, three additional restaurants, and other retail businesses, was expected by 2030.
- As of October 2023, a fast food restaurant, sit-down restaurant, and gas station have been developed on the site.

8. East of Clinic Drive

- Long-term development is possible in this area.

9. West of Valero / Downtown Morehead

- This area will likely be developed into a restaurant.

10. Former Rowan County Middle School

- This former middle school was occupied by Clearfield Elementary School during the 2021 school year. There exists a number of possibilities for how this site may redevelop. The site could potentially be developed by St. Claire Healthcare as it is directly across KY 32 from the St. Claire Regional Medical Center, but based on meeting with St. Claire Healthcare, that did not seem to be likely.

5.1.2 Coordination Meeting with St. Claire Healthcare

A meeting to coordinate with St. Claire Healthcare was held via Microsoft Teams on May 10, 2021. Attendees included individuals from St. Claire Healthcare, KYTC District 9, and KYTC Central Office Planning. Key discussion items included the following:

- St. Claire was beginning the process of updating their Master Plan.
- A number of nearby trouble spots were identified:
 - The nearby McDonald's restaurant drive-thru is very busy and impacts access to the hospital at times.
 - The 2nd Street intersection suffers from recurring congestion.
 - There is significant pedestrian traffic from 2nd Street to Allen Avenue.
- A relatively recent study was completed that examined St. Claire shift changes.
 - The workday starts at 5 a.m.
 - The biggest change is the opening of the Medical Pavilion at 245 Flemingsburg Road. This consolidated traffic access to one point.
- Would anticipate any hospital growth to be on the north side of KY 32, potentially impacting Sister Jeanette Drive and access to McDonald's.
- The parking lot next to 2nd Street has been expanded; no further expansion is expected.

5.2 POPULATION TRENDS

Population estimates and projections for Rowan County and the City of Morehead were obtained from the Kentucky State Data Center (KSDC) at the University of Louisville, and 2020 census data were obtained from the United States Census Bureau, as shown in **Table 2**. Between 2000 and 2020, Rowan County experienced an increase in population at a rate of 0.55 percent per year, which is similar to the state average of 0.54 percent per year. Over the past 20 years, the City of Morehead has increased in population at a higher rate than the rest of the county, at 0.95 percent per year. The area is expected to continue to grow, with the Rowan County population expected to increase at a rate of 0.81 percent per year over the next 20 years.

Table 2: Population Estimates and Projections

Area	Census Estimates			Annual Growth	Projection	Annual Growth
	2000	2010	2020	2000 - 2020	2040	2020 - 2040
Kentucky	4,041,769	4,339,367	4,505,836	0.54%	4,886,381	0.41%
Rowan County	22,094	23,333	24,662	0.55%	28,982	0.81%
Morehead	5,914	6,845	7,151	0.95%	N/A	



5.3 HISTORICAL KYTC TRAFFIC COUNTS

The average daily traffic trends between 2000 and 2021 are summarized in **Table 3**, with the station locations shown in **Figure 17**. **Figure 18** provides a graphical summary of the historical count trends, broken down by stations located north of the I-64 interchange and south of the interchange.

Table 3: KY 32 Average Daily Traffic

Year	KY 32 (North)	KY 32 (North)	KY 32 (North)	KY 32 (North)	KY 32 (South)	KY 32 (South)	KY 32 (South)
	Sta. 103755	Sta. 103A70	Sta. 103A69	Sta. 103A54	Sta. 103A43	Sta. 103A09	Sta. 103B07
2000				20,600			18,300
2001			24,000	20,800	25,600		
2002	14,300	17,500		29,300			28,800
2003				28,900		29,700	20,000
2004	14,600		29,200	28,700			
2005				25,700	25,400		22,000
2006		16,300		26,400		27,100	
2007	13,800		26,700	24,800			
2008					24,700		20,900
2009		22,300				27,600	
2010	14,400		30,800				
2011			30,000	28,900	27,500		20,800
2012			29,907			26,412	18,751
2013	14,200					26,273	19,362
2014		23,501	30,103	27,528	25,667	25,563	18,741
2015		24,713	30,833	28,263		26,614	20,444
2016	16,038	23,548	30,124	27,953		26,971	20,264
2017			28,718		26,884	25,382	
2018		23,077	29,239	27,132		25,326	18,788
2019	15,165	23,847	29,809			25,581	19,428
2020		19,259		23,518	21,492	23,030	17,810
2021		21,815	28,532	26,053		24,349	19,126
Medium term % CAGR	0.58%	-0.18%	-0.69%	-1.03%	0.95%	-1.04%	-0.68%
Long-term % CAGR	0.35%	1.84%	1.21%	1.54%	0.31%	-0.93%	0.32%

Long-term Compound Annual Growth Rate (CAGR) refers to the annual growth rate over roughly a 20-year period. Medium-term CAGR refers to the annual growth over roughly a 10-year period. Daily traffic on the corridor has generally increased over the past 20 years, with only one of the seven traffic stations showing negative growth. Over the past 10 years, five of the seven traffic count stations have shown a reduction in traffic.



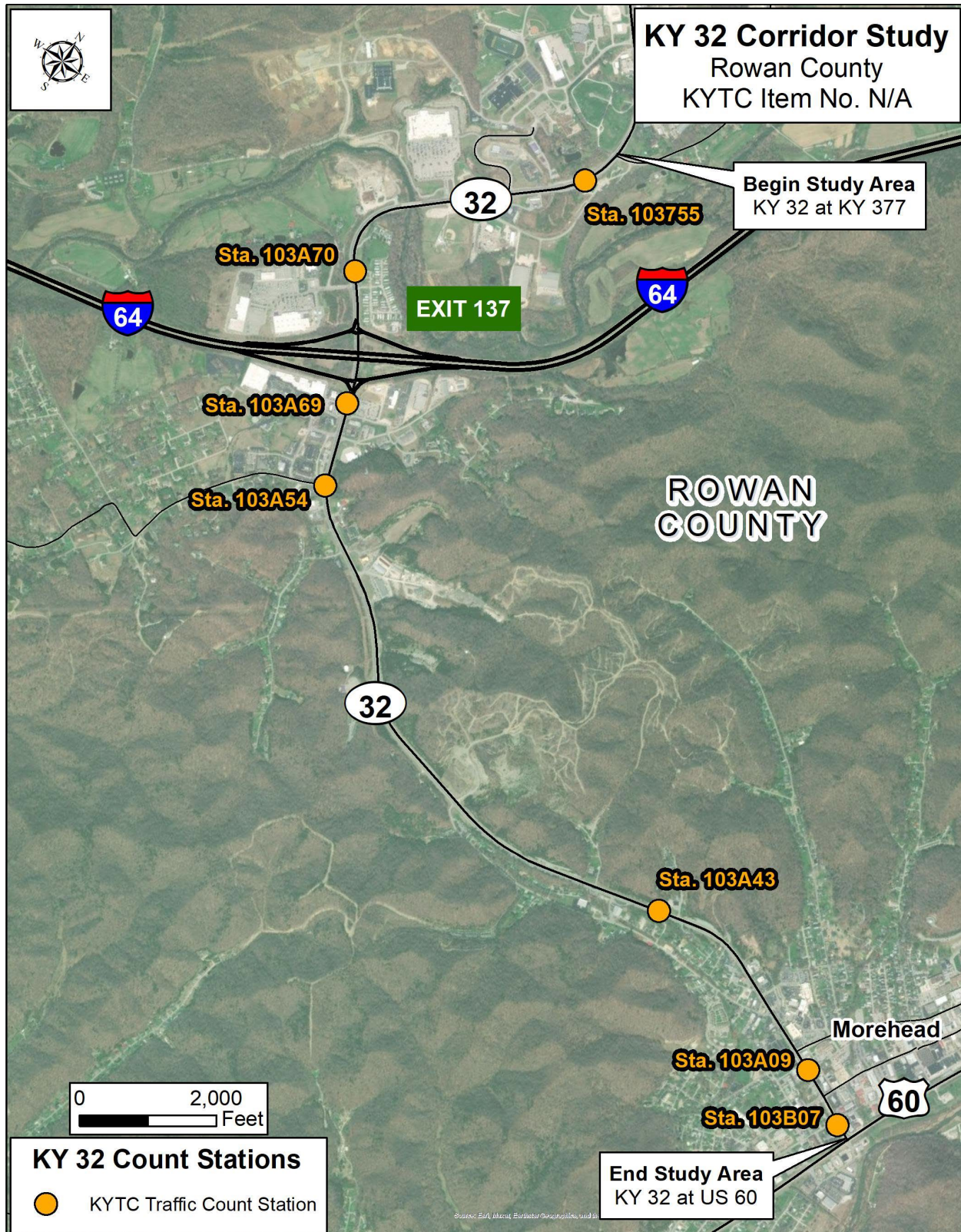


Figure 17: KYTC KY 32 Traffic Count Stations



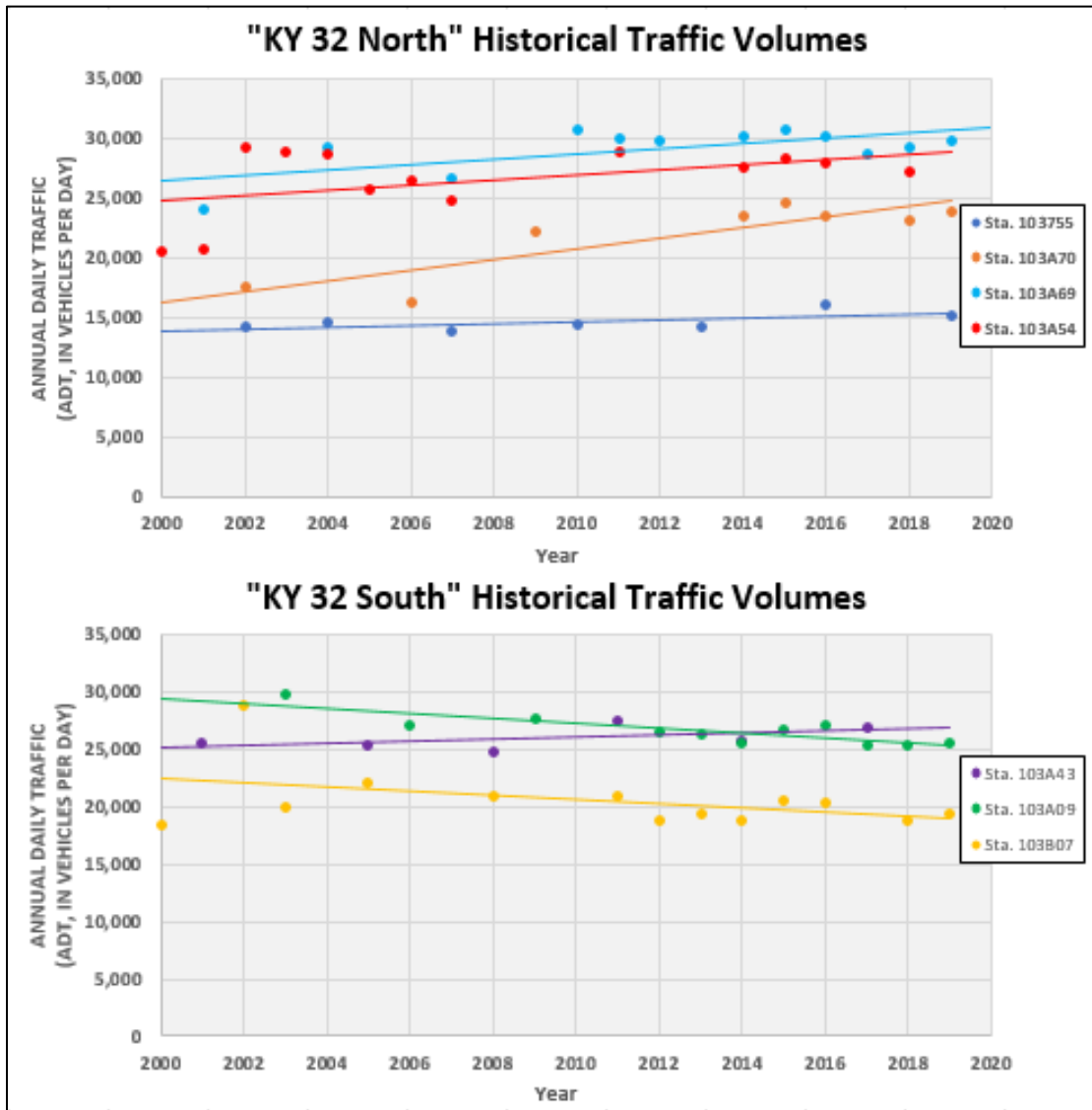


Figure 18: Historical KYTC Traffic Counts



5.4 DISTRICT 9 REGIONAL TRAVEL DEMAND MODEL

The District 9 Regional Travel Demand Model version 20161011 (“the model”) was updated and used as a tool to estimate growth rates and traffic forecasts to support the study. To better reflect existing and future land use, traffic analysis zones (TAZs) were split and socioeconomic data updated to account for future development. These data were updated based on conversations with the project team, local officials, and the most current information available for each potential development site. The full traffic forecasting technical memorandum can be found in **Appendix G**.

Due to the unknown nature of several of the developments along KY 32, two growth scenarios were developed to capture a range of possible growth: a “Low Growth” scenario and a “High Growth” scenario. For potential development sites where information was not available regarding the development scope or timeline, the Low Growth scenario assumed half development and the High Growth scenario assumed full development.

5.5 KENTUCKY STATEWIDE TRAVEL DEMAND MODEL (KYSTM)

As an additional data source, study area growth rates from the Kentucky Statewide Travel Demand Model (KYSTMv19) were also reviewed. No socioeconomic data refinements were incorporated into the KYSTM. As a result, KYSTM growth rates on KY 32 are slightly lower than rates from the District 9 Regional Travel Demand Model. Therefore, the study team elected to focus on output from the District 9 model for development of the study traffic forecasts.

5.6 TRAFFIC FORECASTS

Future growth scenarios were then developed based on historical traffic trends, regional population trends, expected developments, and output from the updated District 9 Regional Travel Demand Model. “Low” annual growth rates along the KY 32 corridor range from 0.8 to 1.1 percent and “High” annual growth rates range from 1.0 to 2.0 percent, as shown in **Figure 19**. With more development expected to occur just north of the I-64 interchange, growth rates are slightly higher in this area. Growth rates on mainline I-64 are slightly lower, 0.3 percent to 0.5 percent for the low and high growth scenarios, respectively.

The “Low” and “High” annual growth rates were applied to the latest KYTC daily traffic counts (excluding 2020) to develop 2045 daily traffic estimates. The 2045 High Growth daily forecasts are shown in **Figure 20**. Daily traffic in 2045 is expected to reach up to 43,900 VPD on KY 32.



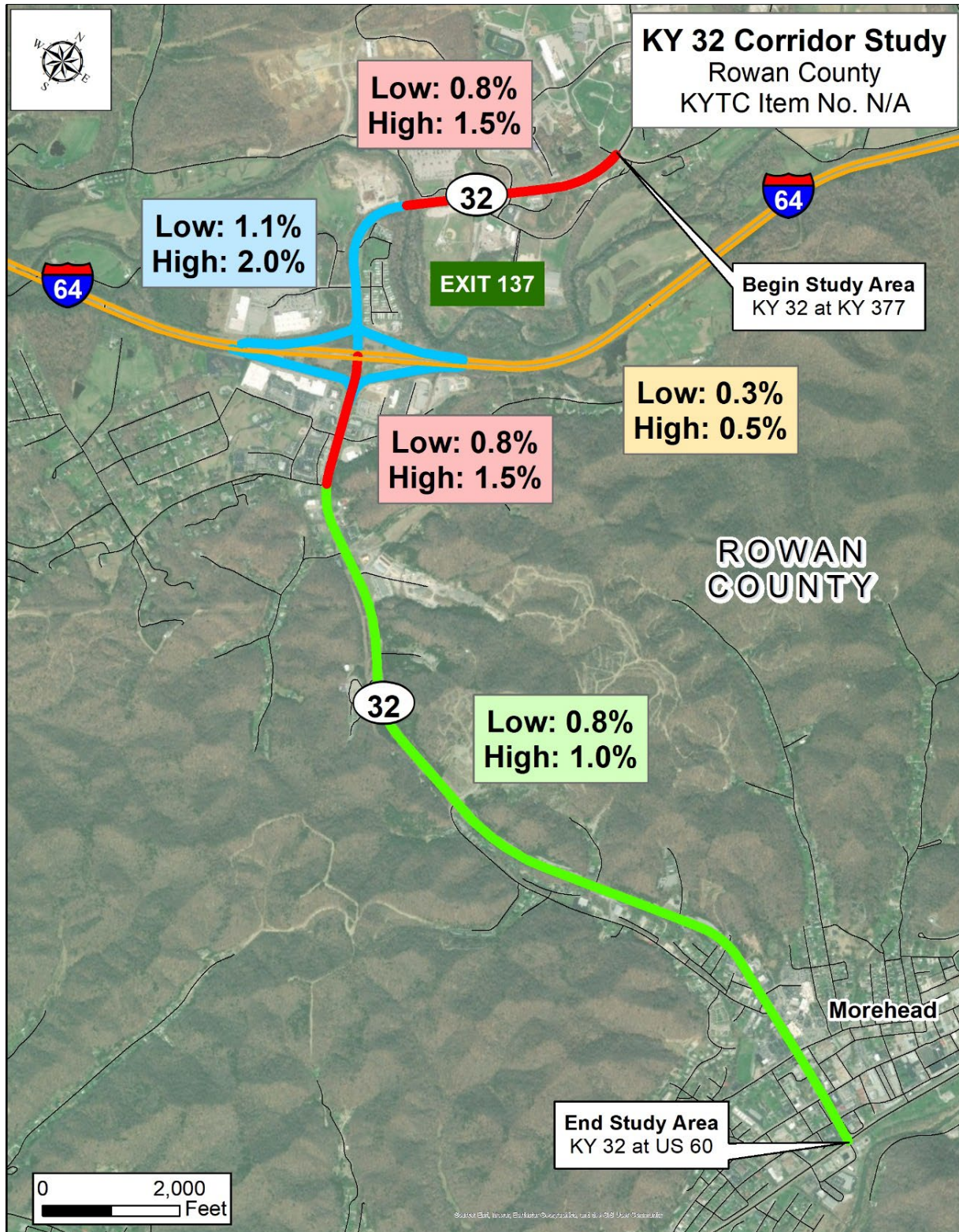


Figure 19: KY 32 Annual Growth Rates



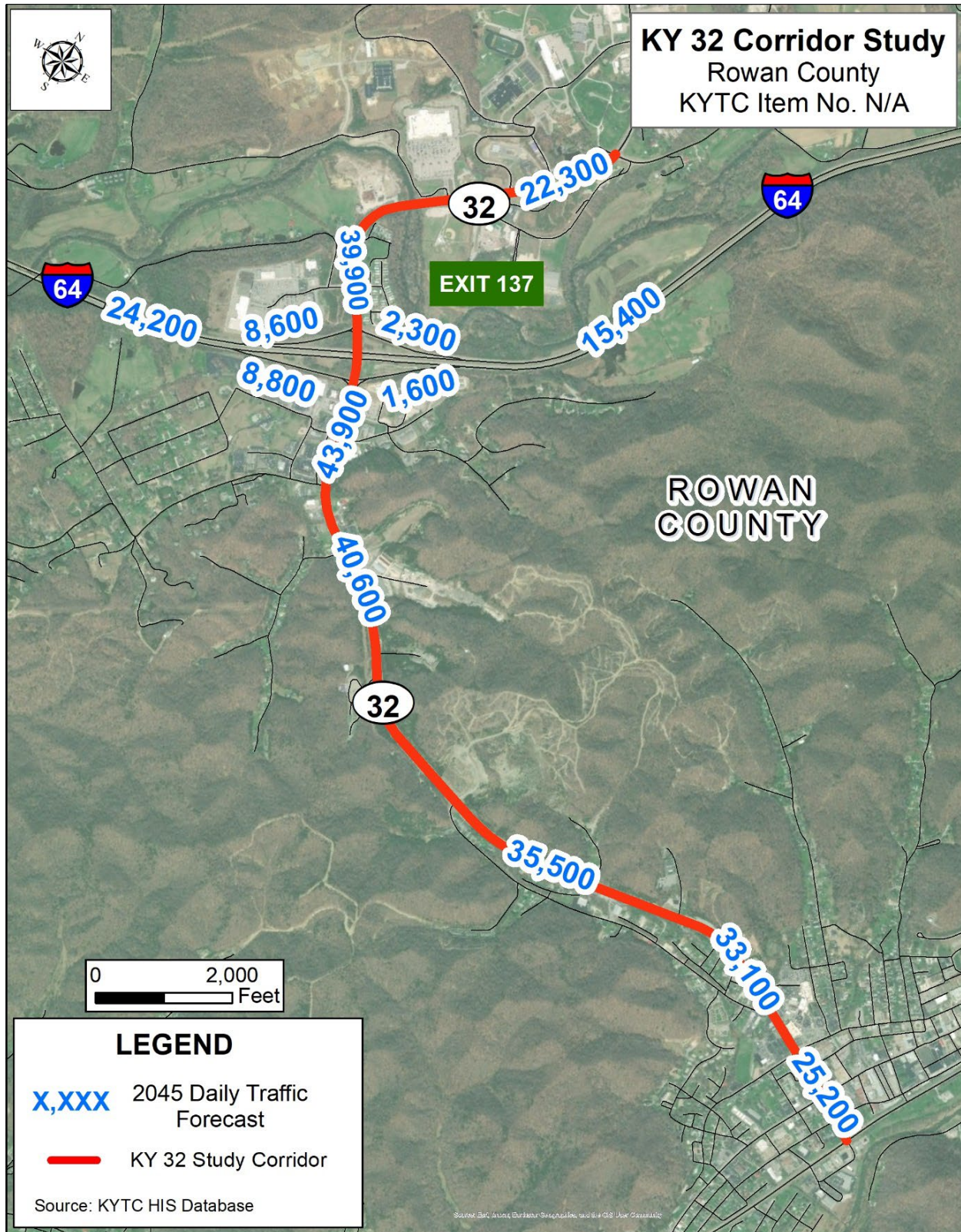


Figure 20: 2045 "High Growth" Daily Traffic Forecasts



5.7 2030 NO-BUILD SIMULATION MODELS

Future year (2030) No-Build peak hour simulation models were developed using the existing simulation model networks and forecasted traffic volumes developed using the growth rates discussed in Section 5.6. Under the “low growth” scenario, all study area intersections are expected to operate at LOS D or better with future signal optimization during the AM and PM peak hours. Under the “high growth” scenario, there are several intersections that are expected to operate at LOS E and F. During the AM peak hour, the eastbound I-64 off-ramp and US 60 intersections are expected to operate at LOS E and F, respectively, as shown in **Figure 21**. During the PM peak hour, the eastbound I-64 off-ramp, Fraley Drive, and US 60 intersections are expected to operate at LOS F with the Main Street intersection operating at a LOS E, as shown in **Figure 22**.

6.0 STUDY GOALS

KY 32 carries a mix of local and regional traffic as it connects I-64 to regional traffic generators such as Morehead State University (MSU) and St. Claire Regional Medical Center. The City of Morehead provides a regional hub for shopping and education, resulting in traffic volumes on KY 32 between 15,000 and 28,500 VPD. As one of few growing communities in eastern Kentucky, traffic demand is expected to continue growing. The KY 32 corridor is expected to experience even more growth, with several developments in various stages of progress planned along the corridor.



KY 32 / I-64 Interchange

This study was needed to identify possible strategies to address operational and safety issues that result from the combination of heavy traffic volumes, signalized intersections, and access concerns.

The objective of the *KY 32 Corridor Study* is to develop and evaluate improvement options to improve traffic flow, safety, and access along the KY 32 (Flemingsburg Road) corridor between KY 377 and US 60 in Morehead, Kentucky.



Figure 21: 2030 No-Build High Growth AM Peak Hour Level of Service (LOS)

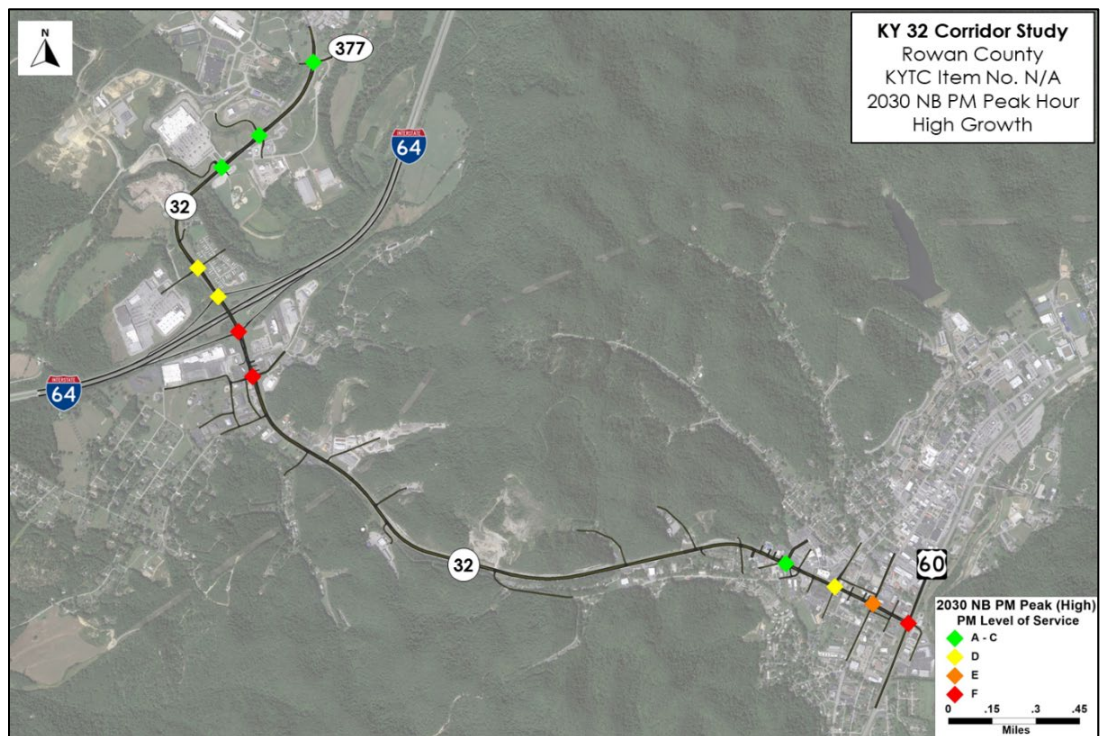


Figure 22: 2030 No-Build High Growth PM Peak Hour Level of Service (LOS)

7.0 INITIAL PROJECT TEAM AND STAKEHOLDER COORDINATION

Over the course of the study, the project team held three meetings to coordinate on key issues. The project team included representatives from KYTC Central Office, KYTC District 9, the Gateway Area Development District (GADD), and the consultant, Stantec. Detailed summaries of each meeting are presented in **Appendix F**.

7.1 PROJECT TEAM MEETING NO. 1

The first project team meeting was held via Microsoft Teams on October 7, 2021. The purpose of the meeting was to present the results from the existing conditions analysis and to get feedback from the project team on transportation issues in the study area. Key discussion items included the following:

- There are two Highway Safety Improvement (HSIP) projects in the study area. These include intersection improvements at KY 32 and Kroger Center Drive and improvements to the I-64 eastbound off-ramp including minor widening to increase storage for a dedicated right-turn lane.
- The existing traffic signals operate well with little to no unmet demand on KY 32 during the AM peak. There is more congestion during the PM peak, particularly near the US 60 intersection and within the I-64 interchange area.
- There are multiple anticipated developments in the study area, which were considered during the traffic forecast development process.
- Preliminary improvement concept for KY 32 will include both short-term and long-term concepts, including bicycle and pedestrian improvements.
- It was determined that the first Local Officials / Stakeholder meeting would be a hybrid meeting to allow for both in-person and virtual attendance.

7.2 LOCAL OFFICIALS / STAKEHOLDER MEETING NO. 1

The first Local Officials / Stakeholder meeting was held at the Maysville Community & Technical College Rowan Campus and virtually with Microsoft Teams on November 17, 2021. In addition to the project team, individuals / representatives from the City of Morehead, Morehead State University, Rowan County Emergency Management, Rowan County Chamber of Commerce, St. Claire Regional Medical Center, and Rowan County Public Schools were in attendance. The purpose of the meeting was to present the results from the existing conditions analysis and to get feedback from the local officials and stakeholders on transportation issues in the study area. Key discussion items from the meeting include:



- It was noted by stakeholders that residents of surrounding counties commute to work in Morehead so the traffic on KY 32 is likely to increase at a faster rate than the population of Rowan County. KY 32 is not only used as a connection between Morehead and I-64, but also as a regional connection.
- Starbucks is now open near the I-64 interchange and was removed from the list of “potential” developments.
- Improvements to US 60 between KY 519 and KY 801 will not be considered to alleviate traffic on KY 32 because they are outside of the study area.
- St. Claire Regional Medical Center is developing a new Master Plan and may evaluate options to improve traffic congestion at the signalized Sister Jeannette intersection.

7.2.1 Local Officials / Stakeholder MetroQuest Online Survey

A MetroQuest survey was sent to the local officials and stakeholders to solicit feedback regarding general transportation concerns, traffic and safety concerns, potential improvement concepts, and areas of expected growth. There were five participants who completed the survey, all of which indicated they travel on KY 32 daily, with one participant owning property in the study area and one leasing.

Participants were asked to rank transportation issues on KY 32 from #1 through #5, with #1 being the highest rating. A point system was used to summarize the results, with five points given to a first-place ranking, four points to a second place, and so on. Traffic congestion was by far the highest ranked issue, followed by safety and excessive speeds, as shown in **Figure 23**.

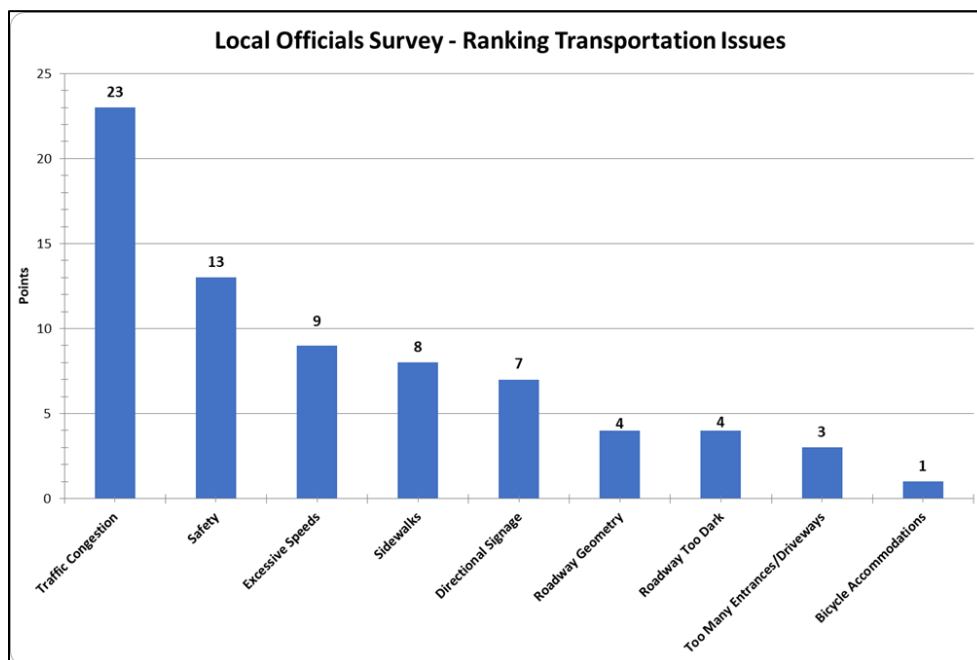


Figure 23: Online Survey – Ranking Transportation Issues on KY 32



Participants were then asked to indicate trouble spots related to congestion and safety on a study area map. Most congestion related concerns are near the I-64 interchange and to the north and included morning traffic, afternoon traffic, the need for turn lanes, poor signal timing, and the need for interchange reconfiguration, as shown in **Figure 24**. The safety related concerns are all south of the interchange and include poor roadway geometry and sight distance, excessive truck traffic, the need for a traffic signal, and the need for intersection reconfiguration. Several points are shown away from the KY 32 corridor. This is due to participants not zooming in on the map when placing points.

Participants were then asked to indicate potential improvement concepts on a study area map. Improvement ideas included additional lanes, new traffic signals, improving signal timing, interchange improvements, and turn lanes, as shown in **Figure 25**.

8.0 PUBLIC SURVEY

A MetroQuest survey was developed and disseminated to the public to solicit feedback on transportation issues on the KY 32. The public survey solicited input for the same topics as the local officials and stakeholders' survey. Nearly 700 people responded to the survey and most (94 percent) indicated they drive the corridor daily or two to three times per week with 65 percent using KY 32 to get to work. When asked where they reside, 40 percent indicated they are Rowan County residents, 33 percent were Morehead residents, and 9 percent were Morehead State University students.

When asked to rank transportation issues #1 through #5, with a #1 ranking receiving 5 points, #2 receiving 4 points, #3 receiving 3 points, #4 receiving 2 points, and #5 receiving 1 point, traffic congestion was ranked as the primary issue followed by safety, as shown in **Figure 26**.

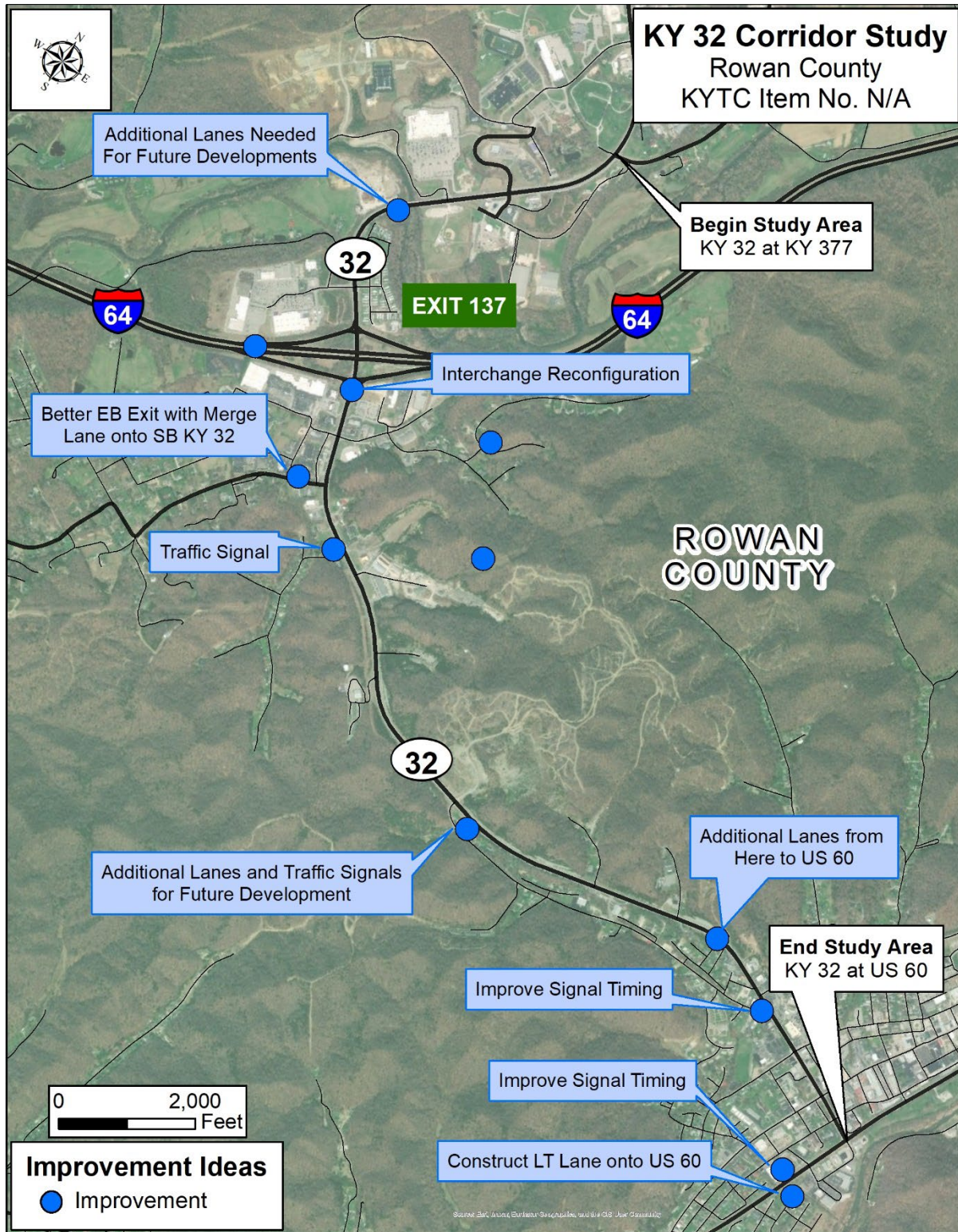


Figure 25: Local Officials / Stakeholder Survey – Improvement Ideas

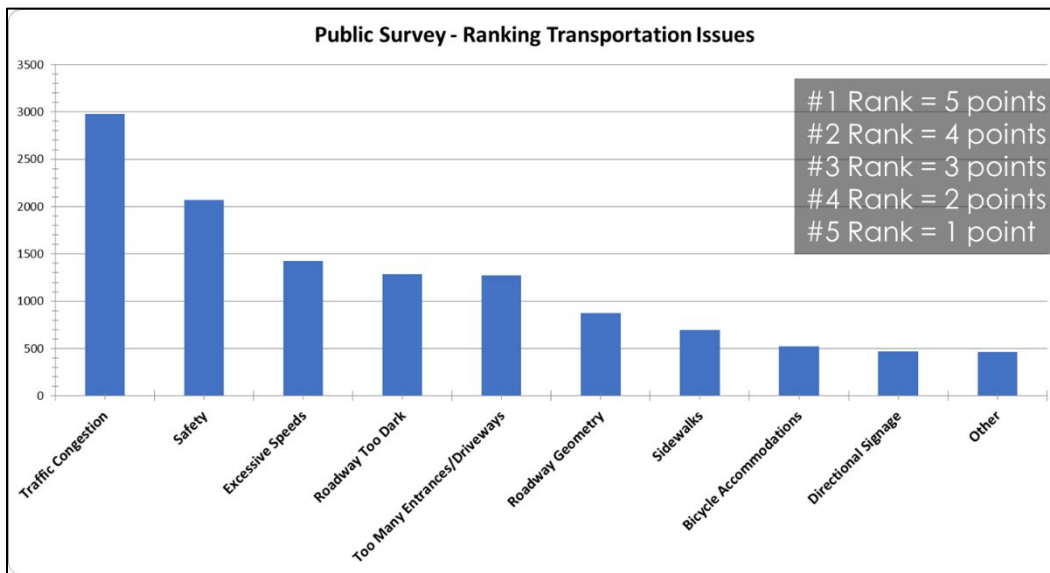


Figure 26: Public Survey – Ranking Transportation Issues

When asked to identify trouble spots related to congestion, most of the spots were related to the afternoon rush hour near the interchange and the US 60 intersection. **Figure 27** presents a heat map summarizing all congestion trouble spots that were identified with the highest concentration of points in red.

Respondents were then asked to identify trouble spots related to safety. Speeding, too many entrances, lack of turn lanes, and intersection reconfiguration were the most common safety concerns. **Figure 28** presents a heat map showing the highest concentration of points in red. The area south of the I-64 interchange, between the eastbound ramp and Forest Hill Drive, and the transition area between the rural and urban areas north of US 60, have the highest number of safety concerns.

When asked to identify improvement ideas, turn lanes, improved signal timing, access point improvement or elimination, new traffic signals, and additional through lanes were the most common improvements. The highest concentration of points was the I-64 interchange followed by the US 60 intersection.

Overall, results from the public survey indicate that congestion is the biggest concern on KY 32. The I-64 interchange was the area most often identified, and signal timing improvements were the most common suggestion for improvement. The public also believes safety is an issue with drive-thru lines from fast food restaurants consistently backing up onto mainline KY 32. It is also a challenge to turn left into and out of non-signalized intersections which causes drivers to accept smaller gaps. Speeding is also a concern on KY 32, especially in the transition from 55 to 45 to 35 miles per hour (MPH). There was also mention of better lighting and better bicycle and pedestrian accommodations on KY 32.



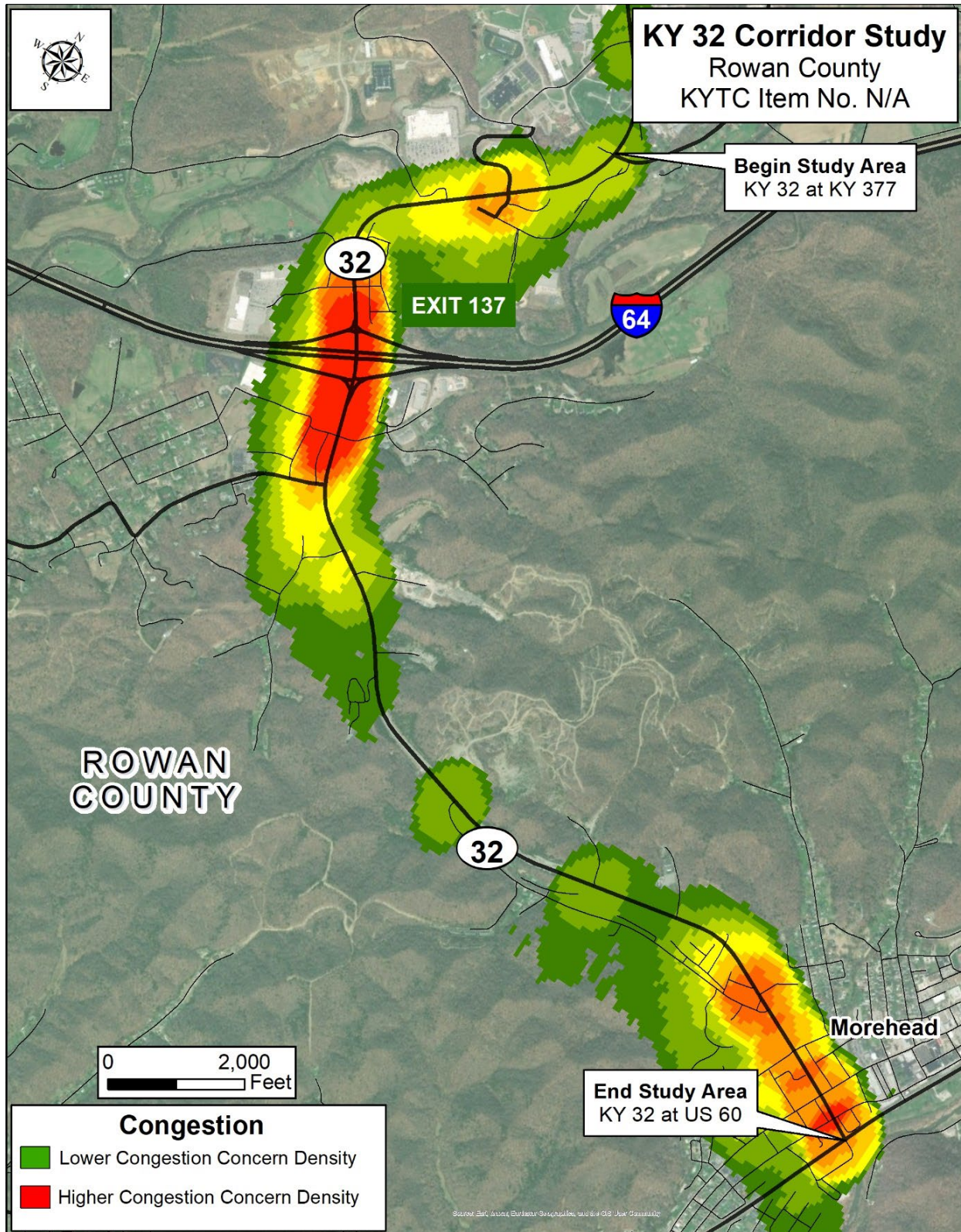


Figure 27: Public Survey – Congestion Concerns Heat Map

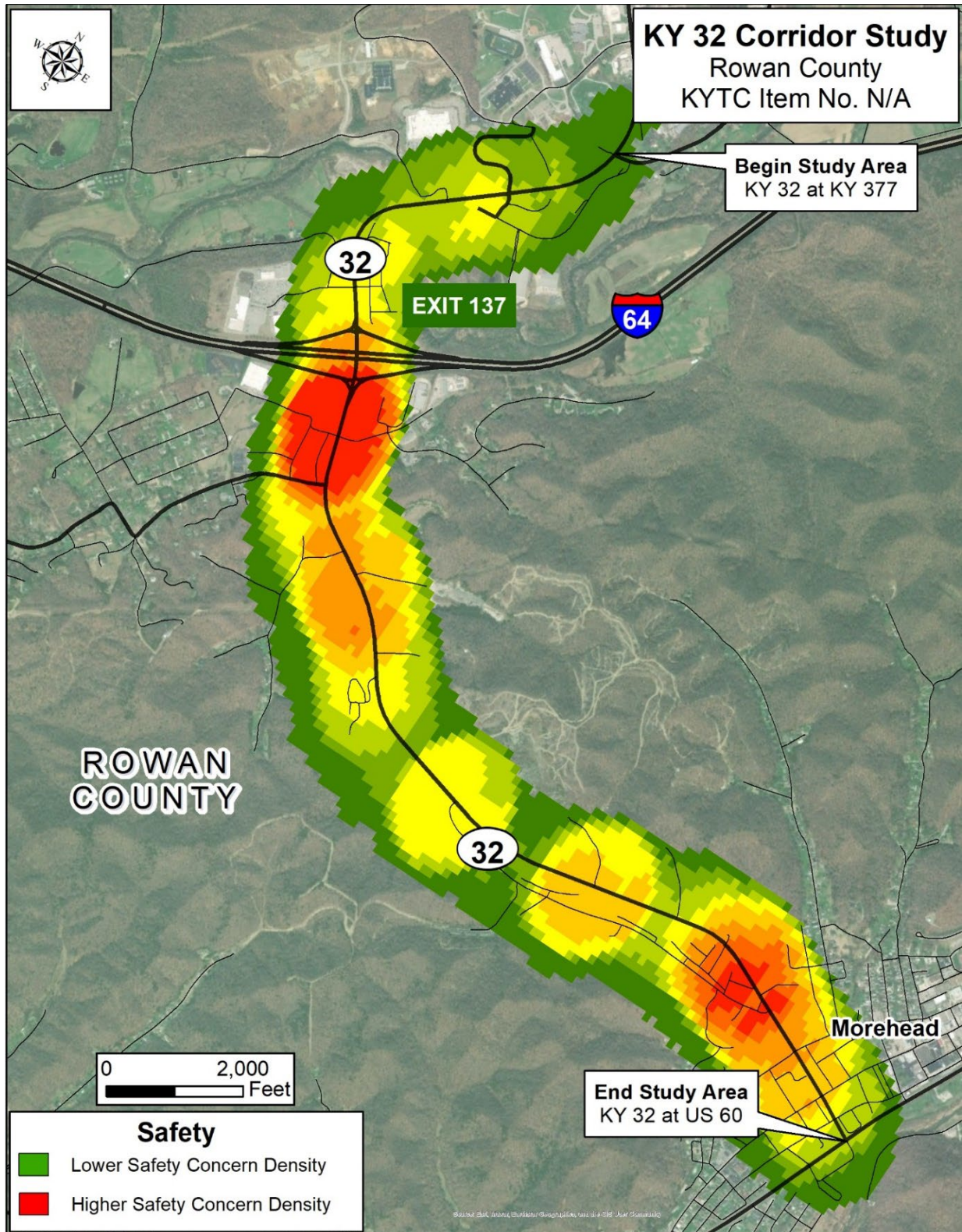


Figure 28: Public Survey – Safety Concerns Heat Map



9.0 IMPROVEMENT CONCEPT DEVELOPMENT

Improvement concepts were developed based on a combination of input from the project team, a review of existing conditions, local officials / stakeholder input, public input, and field reconnaissance. Improvement concepts were categorized into three sections of KY 32: the downtown Morehead area near the southern end of the study area and the US 60 intersection, the “corridor” area where the speed limit is 55 MPH, and the I-64 interchange and north. These sections are shown on **Figure 29**.

9.1 DOWNTOWN MOREHEAD / US 60 INTERSECTION

The mix of local traffic using KY 32 to access businesses and Morehead State University (MSU), along with regional through traffic traveling between I-64 and Morehead, cause congestion during the peak periods. This is especially true at the intersection with US 60, which currently operates at a Level of Service (LOS) D during the AM and PM peak hours. Based on 2030 traffic projections, which include several expected developments in the area, congestion is expected to worsen, and the intersection is expected to operate at LOS F. Between 2017 and 2021, there were 88 crashes at this intersection, six (seven percent) of which resulted in an injury and 64 (73 percent) of which were rear end collisions. An Excess Expected Crashes (EEC) analysis revealed that there were 2.1 more crashes per year at this intersection than expected, indicating an opportunity to improve safety. This intersection was also identified by the local officials/public as having congestion and safety issues.

The short-term option, shown in **Figure 30**, includes converting the 1st Street approaches to right-in/right-out by installing delineator posts on KY 32. Emergency vehicles, such as ambulances, fire rescue vehicles, or police cars, can drive over the posts, so response times would not be impacted. Additionally, the westbound KY 32 left-turn lane to 1st Street could be restriped to an eastbound left-turn lane onto eastbound US 60. This would create more storage by adding a dedicated left turn lane to eastbound US 60. The westbound US 60 left-turn lane could also be restriped to a northbound through lane to Bridge Street to provide a receiving lane for the eastbound KY 32 turn lane. The southbound US 60 left-turn movement would be eliminated, and vehicles would be rerouted to the southern Stone Street intersection.

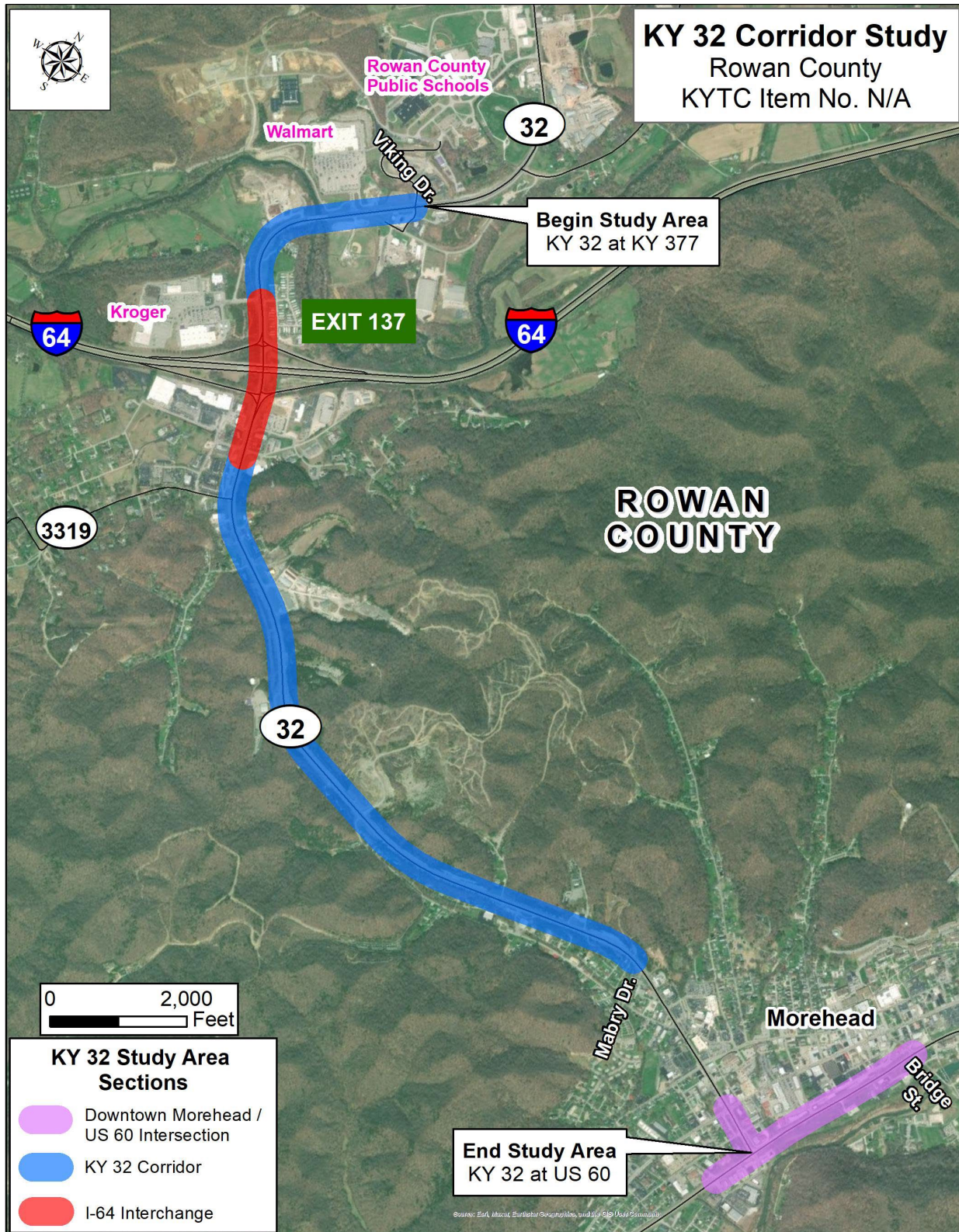


Figure 29: KY 32 Improvement Concept Sections





Figure 30: KY 32 / US 60 Short-Term Improvement Concept

The long-term option for this area, shown on **Figure 31**, includes restriping the eastbound KY 32 approach to include a left-turn lane, a shared left / through lane, and a right-turn lane. US 60 would be widened from the southern Stone Street intersection to Bridge Street, 2,700 feet north of the KY 32 intersection, to accommodate the dual left-turn lanes on KY 32 and the dual eastbound left-turn lanes from US 60 to KY 32. At the southern Stone Street intersection, offset left-turn lanes would be constructed to accommodate the increased left turning traffic due to the westbound US 60 left-turn to Stone Street being relocated from the KY 32 intersection to the southern Stone Street entrance. This concept would also include converting the 1st Street approaches at KY 32 to right-in/right-out by constructing “porkchop” islands and delineator posts. The westbound KY 32 left-turn lane to 1st Street would also be restriped to an eastbound left-turn lane onto northbound US 60. This concept would also include the extension of a culvert on US 60 north of the KY 32 intersection.

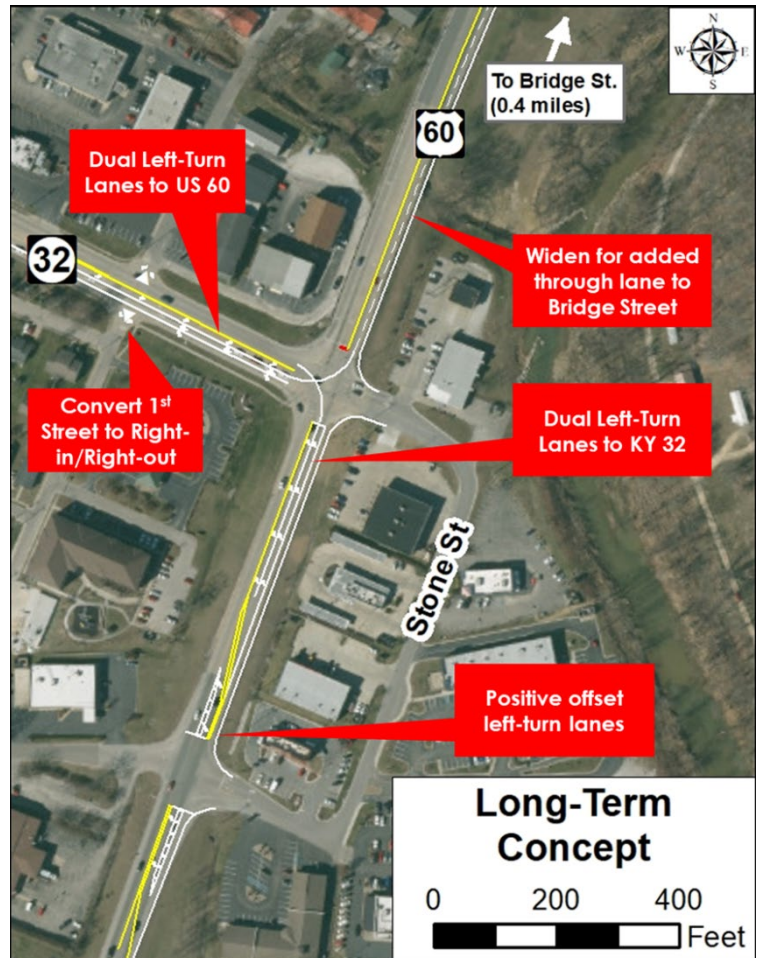


Figure 31: KY 32 / US 60 Long-Term Improvement Concept



As an alternative to the more expensive widening associated with the long-term concept for the US 60 intersection, an alternative concept includes converting Stone Street to one-way. Shown on **Figure 32**, converting Stone to one-way would allow the US 60 intersection to be restriped without pavement widening to provide dual left-turn lanes from KY 32 by eliminating the need for the southbound left from US 60. This option provides similar traffic performance, particularly in the near-term, and should be considered alongside both the short- and long-term improvement concepts during future phases of project development.

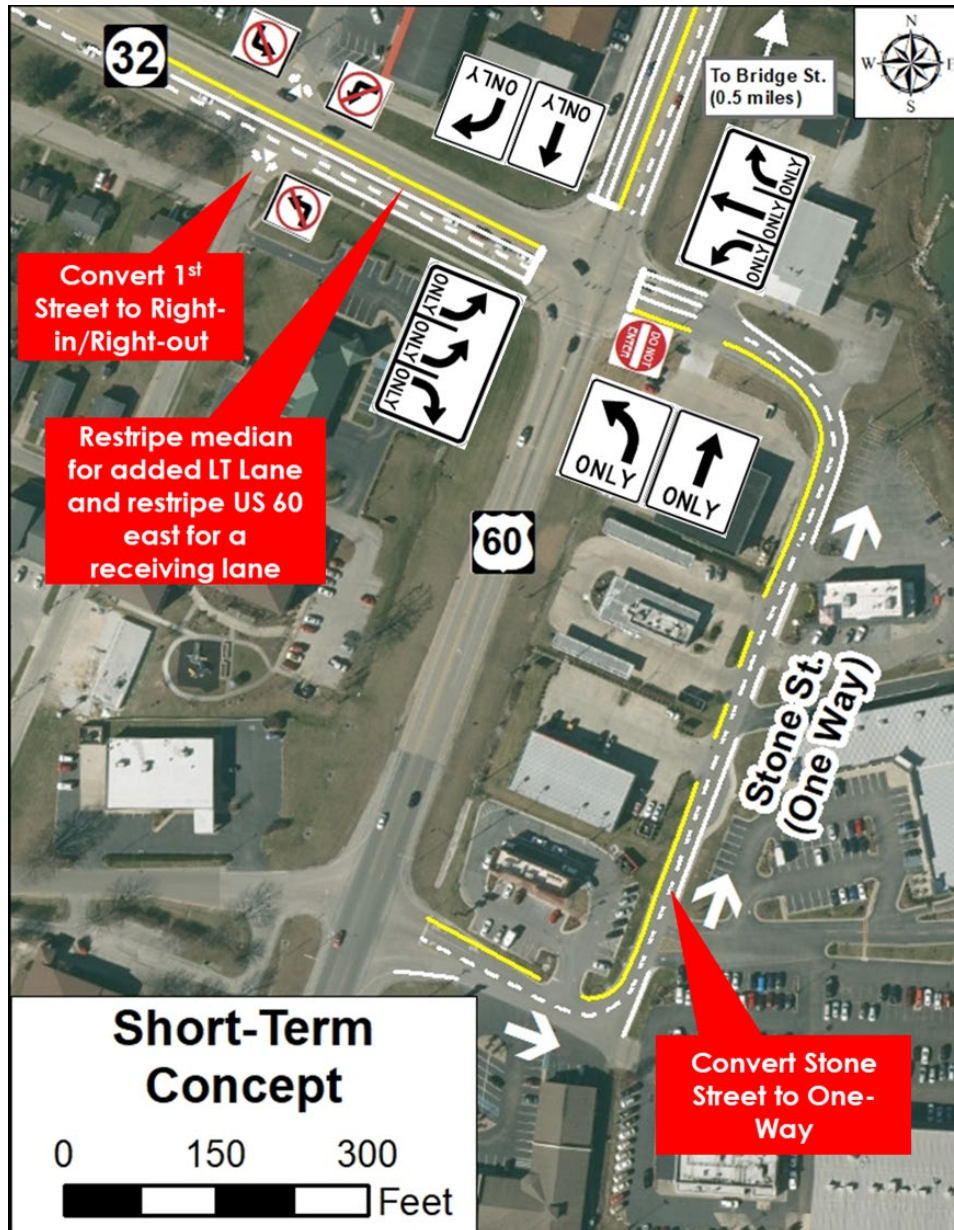


Figure 32: US 60 Intersection Concept with Stone Street Converted to One-Way

9.2 THE KY 32 CORRIDOR

Between Viking Drive northwest of the I-64 interchange and Mabry Drive just west of the commercial section in Morehead, KY 32 has four 12-foot lanes with ten-foot shoulders and a center two-way left-turn lane (TWLTL). This section of KY 32 has speed limits ranging from 45 to 55 miles per hour (MPH) and currently carries up to 28,000 vehicles per day (VPD). Based on traffic forecasts, which include significant developments in the area, KY 32 is expected to carry up to 43,900 in 2045. Between 2017 and 2021, there were 157 crashes on this section of KY 32 not including the I-64 interchange area between Kroger Center Drive and Fraley Drive. Of the 157 crashes, two (one percent) resulted in a fatality and 26 (17 percent) resulted in an injury. The most common crash type was rear end (62 crashes, 39 percent) followed by single vehicle (34, 22 percent).

A concept to improve safety along the KY 32 corridor is to convert the center TWLTL to a raised 14-foot median. A conceptual typical section for this segment is shown on **Figure 33**. Based on input from the public and guidance from the 2019 *Morehead Bicycle and Pedestrian Master Plan*, a 10-foot multi-use path is provided along the north side of KY 32 to facilitate bicycle and pedestrian trips between the I-64 interchange and Downtown Morehead.

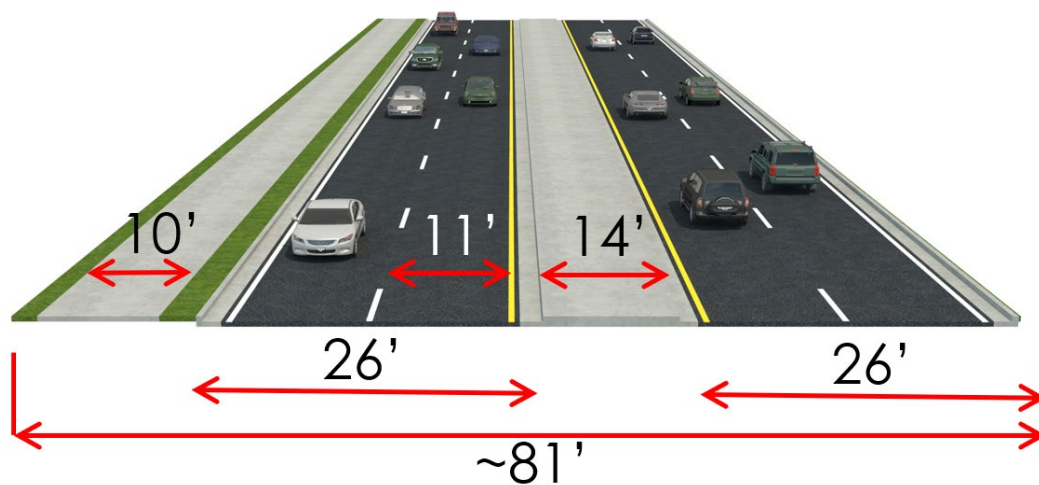


Figure 33: Proposed Typical Section Concept for the KY 32 Corridor

Drivers turning left onto KY 32 currently cross two directions of traffic traveling at 55 MPH. Converting the unsignalized intersections to restricted crossing U-turn (RCUT) intersections would allow these vehicles to cross one stream of traffic at a time. With the proposed concept, major intersections would remain full access while minor intersections would be converted to right-in/right-out. U-turn opportunities would be provided along the corridor, with loons to accommodate wider-turning trucks, as shown in **Figure 34**.



Figure 34: Example U-Turn Section along the KY 32 Corridor

9.3 THE I-64 INTERCHANGE

The I-64 interchange with KY 32 was the most identified area with traffic issues and the need for improvement based on feedback from local officials and the public. I-64 carries around 20,700 vehicles per day (VPD) south of KY 32 and 13,000 VPD to the north, indicating that many of the trips on this section of the interstate utilize KY 32. The interchange area is one of the busiest sections of KY 32, carrying between 21,800 and 28,500 VPD. Based on traffic forecasts, this area is expected to experience significant growth, with several developments anticipated by 2045. The eastbound I-64 off-ramp was recently widened to include storage for a dedicated right-turn lane. While this improvement helped reduce queueing on the ramp, more extensive improvements are needed to accommodate future traffic. In 2030, the KY 32 intersection with the eastbound I-64 ramps is expected to operate at LOS E during the PM peak hour.

Between 2017 and 2021, there were 128 collisions at the interchange, 13 (ten percent) of which resulted in an injury. The most common crash type was rear end (83, 65 percent), indicating that congestion could be a contributing factor. An Excess Expected Crashes (EEC) analysis revealed that there were 19.5 more crashes per year than expected at the eastbound ramp intersection, indicating a significant opportunity to improve safety.

Short-term solutions have recently been implemented to improve traffic operations at the I-64 interchange. Along with the eastbound I-64 off ramp being widened to include storage for a dedicated right-turn lane to KY 32, KYTC initiated a signal re-timing project along this portion of KY 32 as part of a KYTC Statewide Traffic Engineering Letter Agreement. While these short-term solutions aim to maximize efficiency of the existing infrastructure, long-term solutions are needed at the I-64 interchange to manage future traffic conditions.

Two long-term options were analyzed to improve the area near the I-64 interchange: a Double Crossover Diamond (DCD) and a Single Point Urban Interchange (SPUI). These two options represent two different approaches to improving the interchange. A DCD is a less expensive option because it would mostly be constructed within the right-of-way and would not require new I-64 bridges over KY 32. A SPUI covers more area and would require bridge replacement, as shown in **Figure 35**.



Figure 35: I-64 Interchange Concept (SPUI)

2030 TransModeler simulation models were developed for both interchange options. **Figure 36** presents the results of the 2030 PM peak hour DCD model without widening the bridge over KY 32. Under this scenario, all intersections around the interchange operate at LOS E or worse. **Figure 37** presents the results of the 2030 PM peak hour SPUI model with improvements to the KY 32 intersection with US 60 intersection included to ensure traffic was able to enter the network to the south. Under this scenario, all intersections are expected to operate at LOS D or better.

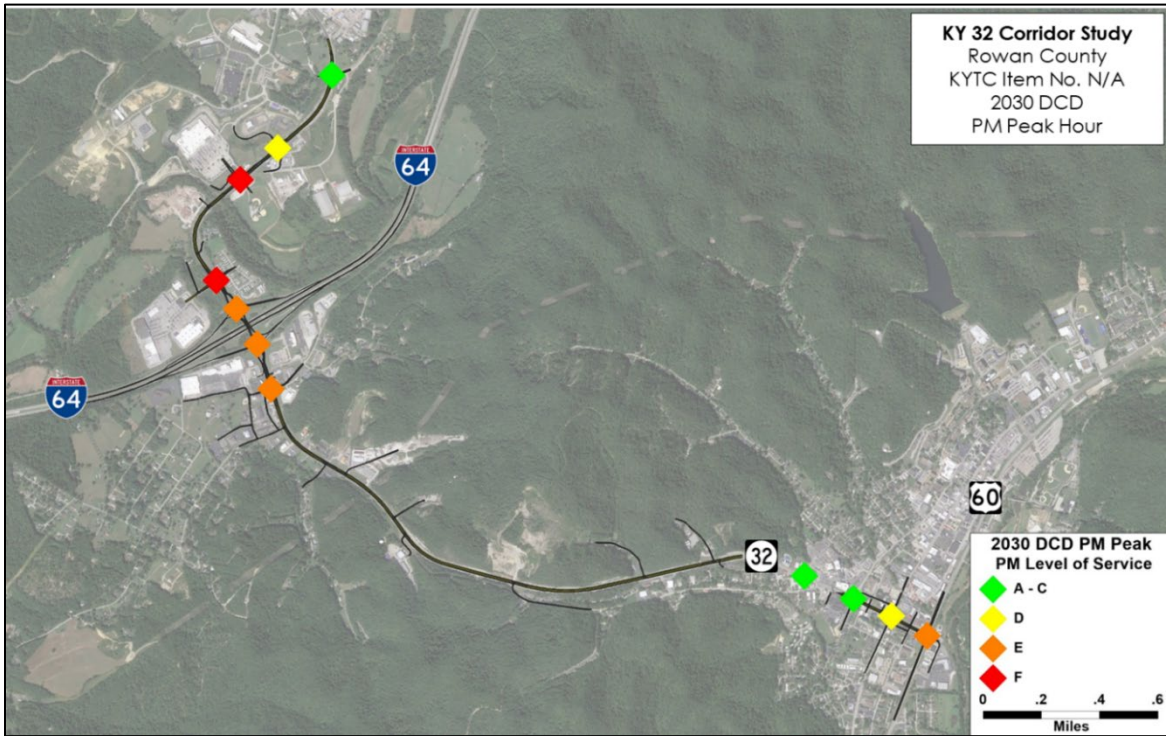


Figure 36: 2030 DCD PM Peak Hour Simulation Model Results

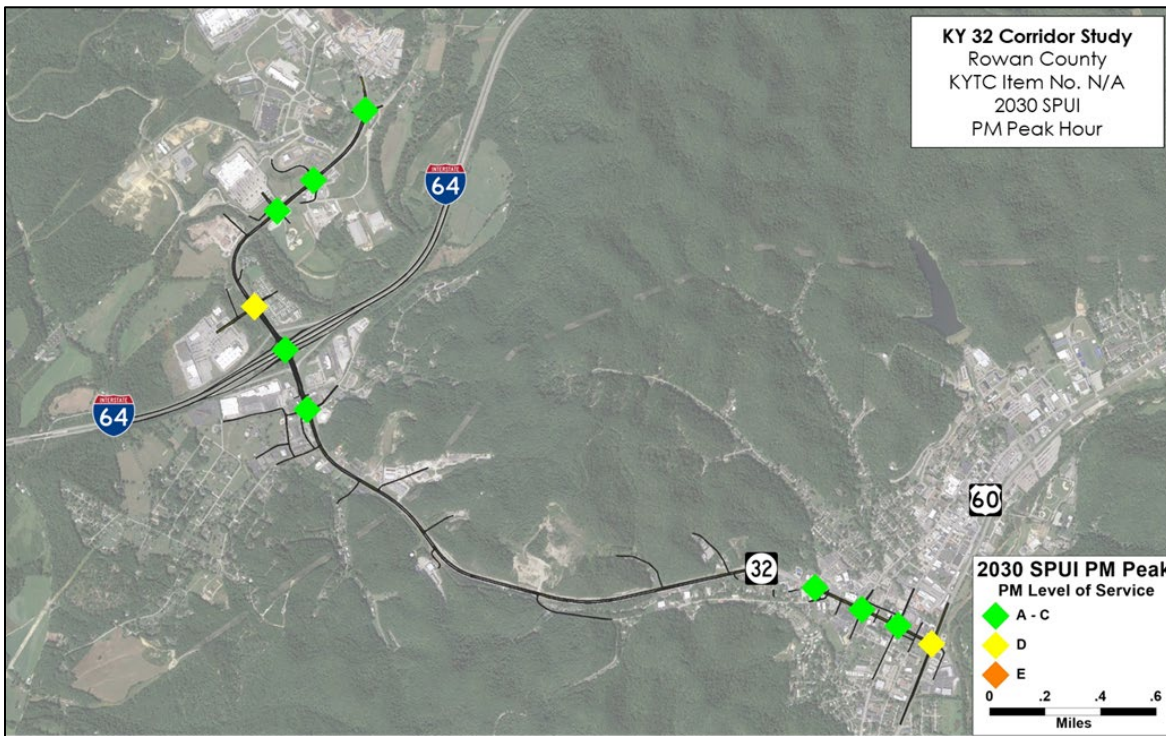


Figure 37: 2030 SPUI PM Peak Hour Simulation Model Results

North of the interchange, the proximity of the Wells Sawmill site / Oak & Prime development access to the signalized Walmart Way intersection, combined with the development's access location on a grade and in a horizontal curve, would make a conventionally signalized intersection undesirable. Therefore, the long-term recommendation is to provide a "3/4 intersection" at the development access that could be signalized once signal warrants are satisfied. This would allow for left-turn access into the site but only right-turns exiting from the site, and northbound through traffic would have a continuous green ball indication so that it is not required to stop at the intersection.



Access Concept for Wells Sawmill / Oak & Prime

An updated TIS was received in the fall of 2023 for the proposed development on the Rowan County Community Park site across from Walmart. It is critical that no new access points along KY 32 be provided into the development to maintain safe and efficient operation of the primary access at the signalized Walmart Way intersection.

10.0 SECOND PROJECT TEAM AND STAKEHOLDER MEETINGS

Following the development of the initial improvement concepts, the project team met for a second time. During the meeting, improvement concepts were presented, and attendees were asked to provide feedback regarding their concerns and priorities. Summaries for all meetings are found in **Appendix G**.

10.1 PROJECT TEAM MEETING NO. 2

The second Project Team Meeting for the subject project was held at the District 9 office in Flemingsburg, Kentucky and virtually with Microsoft Teams on August 18, 2022. The purpose of the meeting was to present the results from the public survey and to get feedback from the project team on improvement concepts. Key discussion items included the following:

- Results from the Local Officials / Stakeholder MetroQuest survey were discussed. Several participants indicated safety issues related to driving at night. Retro-reflectivity of existing and proposed signs will be considered moving forward as an improvement.
- There are potential sight distance issues at Old Flemingsburg Road intersection and near the Papa Johns in the commercial area near Morehead. While these locations may satisfy design speed requirements, the sight distance concerns are amplified by speeding on KY 32.

- Several of the locations identified as needing turn lanes have existing turn lanes. In these instances, it was assumed that longer turn lanes are desirable.
- The Sister Jeanette intersection is the main entrance to both St. Claire Healthcare and McDonalds. Traffic from the McDonalds drive-thru backs up and has the potential to block Emergency Medical Services (EMS) vehicles from accessing the hospital.
- There was a discussion regarding the speed limit on the corridor for the shared use path improvement concept. It is assumed that the speed limit will be lowered from 55 MPH to 45 MPH.
- Right-turn lanes will be considered on downhill portions of KY 32 at strategic locations, even if the traffic does not warrant a turn lane.

10.2 LOCAL OFFICIALS / STAKEHOLDER MEETING NO. 2

The second Advisory Committee Meeting was held at the Gateway Area Development District Office in Morehead, KY on January 6, 2023. In addition to the project team, representatives from the City of Morehead, the Rowan County Chamber of Commerce, and St. Claire Regional Medical Center were in attendance. The purpose in this meeting was to solicit feedback from the local officials / stakeholders on improvement concepts. Key discussion items included the following:

- The former middle school will likely revert from the school board to Rowan County and property near Big 4 Street (three acres) is ready to be developed.
- Converting Stone Street to a one-way, with traffic flowing in from the southern entrance and out at the KY 32/US 60 intersection may not be favored by businesses on Stone Street.
- It was noted that many drivers do not adhere to the existing signs on 1st Street restricting left turns.
- There was a discussion of entrances for the Wells Sawmill development. The access point on KY 32 south of Walmart Way will be right-in/right-out. It can be designed initially as unsignalized with the option to signalize if traffic warrants a signal. There is a need for additional access to the development. One option is to connect to Kroger Center Drive to White House Hill Road.

The Local Officials/Stakeholders were then asked to fill out a questionnaire to solicit feedback on the proposed improvement concepts. All five respondents indicated that a project is needed on KY 32. When asked if the respondents believe the improvement concepts will adequately address recurring congestion and safety concerns affecting KY 32, all five responded that the short-term US 60 concept and three long-term concepts adequately address congestion and safety concerns. Finally, respondents were asked if they agree with prioritizing US 60 first, the I-64 interchange second, and the “corridor” third. All five respondents agreed with the proposed prioritization.

11.0 CONCLUSIONS

The objective of this study was to develop and evaluate improvement options to improve traffic flow, safety, and access along the KY 32 corridor between KY 377 and US 60 in Morehead, Kentucky. Improvement concepts were developed based on a combination of input from the project team, a review of existing conditions, local officials / stakeholder input, public input, and field reconnaissance. Concepts were grouped into three sections: the downtown Morehead area near the US 60 intersection, the “corridor” area where KY 32 acts as a rural corridor, and the I-64 interchange.

Downtown Morehead / US 60 Intersection

Short-term improvements to the KY 32 intersection with US 60 include:

- Convert the 1st Street approaches to right-in/right-out by installing delineator posts.
- Restripe the westbound KY 32 left-turn lane to 1st Street to an eastbound left-turn lane onto eastbound US 60.
- Eliminate the southbound US 60 left-turn.
- Restripe the southbound US 60 left-turn lane to a northbound through lane to Bridge Street to provide a receiving lane for the eastbound KY 32 turn lane.
- Installation of a traffic signal should be considered at the US 60 intersection with Stone Street.

Long-term improvements to the KY 32 intersection with US 60 include:

- Widen US 60 from the southern Stone Street intersection to Bridge Street to provide dual northbound left-turn lanes to KY 32.
- Construct offset left-turn lanes at the southern Stone Street intersection.
- Convert the 1st Street approaches at KY 32 to right-in/right-out by constructing “porkchop” islands and delineator posts.
- Restripe the westbound KY 32 left-turn lane to 1st Street to an eastbound left-turn lane onto northbound US 60.
- Extend the culvert on US 60 north of the KY 32 intersection.

As an alternative to the long-term improvements, converting Stone Street to one-way (northbound) could allow the US 60 intersection to be restriped, providing similar operational improvement.

The KY 32 Corridor

The proposed concept to improve safety along the KY 32 corridor is to convert the center TWLTL to a raised 14-foot median between Viking Drive and Mabry Way. Major intersections would remain full access while minor intersections would be converted to right-in/right-out. U-turn opportunities would be provided along the corridor, with loons to accommodate wider-turning



trucks. Drivers turning left onto KY 32 currently cross two directions of traffic traveling at 55 MPH. Converting the unsignalized intersections to RCUT intersections would allow these vehicles to cross one stream of traffic at a time. A multi-use path is proposed along the north side of KY 32 to facilitate bicycle and pedestrian trips between the I-64 interchange and Morehead.

I-64 Interchange

The proposed improvement at the I-64 interchange is to construct a Single Point Urban Interchange (SPUI). This type of interchange combines the eastbound and westbound ramps into one centralized intersection. Under this concept, the existing I-64 bridges will be replaced, but the new ramps will be constructed within the existing right-of-way. Access management is strongly encouraged north of the interchange to provide access to developing parcels that maintains safe and efficient operation along KY 32.

If growth along the KY 32 corridor flattens and traffic does not reach the forecasted values, a DCD interchange should be reevaluated during the preliminary design phase.

11.1 PRIORITIZATION

Improvement concepts were prioritized based on their ability to satisfy the study goals of improving safety, mobility, and capacity on KY 32. **Table 4** presents the prioritization and cost estimates for the recommended concepts.

Table 4: Improvement Concept Prioritization & Cost Estimates

Priority	Alternative	Description	2023 Cost Estimates				
			Design	Right-of-Way	Utilities	Construction	Total
#1a	US 60	Convert 1st St. to right-in/right-out, restripe KY 32 & US 60 north approaches, convert Stone St. to one-way, update signal timing	\$50,000	\$0	\$0	\$250,000	\$300,000
#1b		Widen US 60, provide dual left-turn lanes from KY 32 to US 60 and from US 60 to KY 32	\$420,000	\$275,000	\$400,000	\$2,830,000	\$3,925,000
#2	SPUI	Construct a single point urban interchange (SPUI) at I-64	\$2,000,000	\$1,000,000	\$4,950,000	\$19,990,000	\$27,940,000
#3	KY 32 Corridor	Construct raised, non-traversable median and provide left-turn, u-turn opportunities	\$1,150,000	\$1,000,000	\$2,350,000	\$11,460,000	\$15,960,000
TOTAL			\$3,620,000	\$2,275,000	\$7,700,000	\$34,530,000	\$48,125,000

11.2 NEXT STEPS

The next step following this study for any potential improvements would be Phase 1 Design (Preliminary Engineering and Environmental Analysis).



12.0 CONTACTS/ADDITIONAL INFORMATION

Written requests for additional information should be sent to Mikael Pelfrey, Director, KYTC Division of Planning, 200 Mero Street, Frankfort, KY 40622. Additional information regarding this study can also be obtained from the KYTC District 9 Project Manager, Blake Jones, at (606) 845-2551 (email at Blake.Jones@ky.gov).

