Murray Small Urban Area Study

Calloway County

KYTC Item No. N/A

April 2023

TEAM KENTUCKY TRANSPORTATION CABINET

Stantec

FINAL REPORT

Murray Small Urban Area Study

TEAM KENTUCKY
TRANSPORTATION CABINET

Kentucky Transportation Cabinet
Central Office, Division of Planning
Highway District 1

In partnership with:

Stantec

April 2023

Executive Summary

The Murray Small Urban Area (SUA) Study was initiated by the Kentucky Transportation Cabinet (KYTC) to identify and examine transportation issues related to safety and congestion in the City of Murray and the surrounding area. The study included reviewing previous planning documents, analyzing existing conditions, soliciting input from the public and local officials, developing traffic forecasts, and developing and evaluating improvement concepts.

Existing Conditions

The Murray SUA study area includes the incorporated limits for the City of Murray and surrounding area, which is just over 27 square miles, as shown in **Figure ES-1**. *Kentucky's Enacted FY 2022 – 2028 Highway Plan* projects total nearly $52 million in funding to improve the transportation infrastructure in the study area.

Two principal arterial roadways are present in the study area. US 641 is a 165-mile principal arterial that provides north-south regional connectivity, stretching from Clifton, Tennessee to Marion, Kentucky. It runs through the center of Murray and has the highest average daily traffic (ADT) volumes within the study area, ranging from 7,500 to 23,700 vehicles per day (VPD). KY 80 is a 484-mile principal arterial that provides east-west regional connectivity, extending from Elkhorn City near the Virginia State Line in Pike County to Columbus, Kentucky in Hickman County.

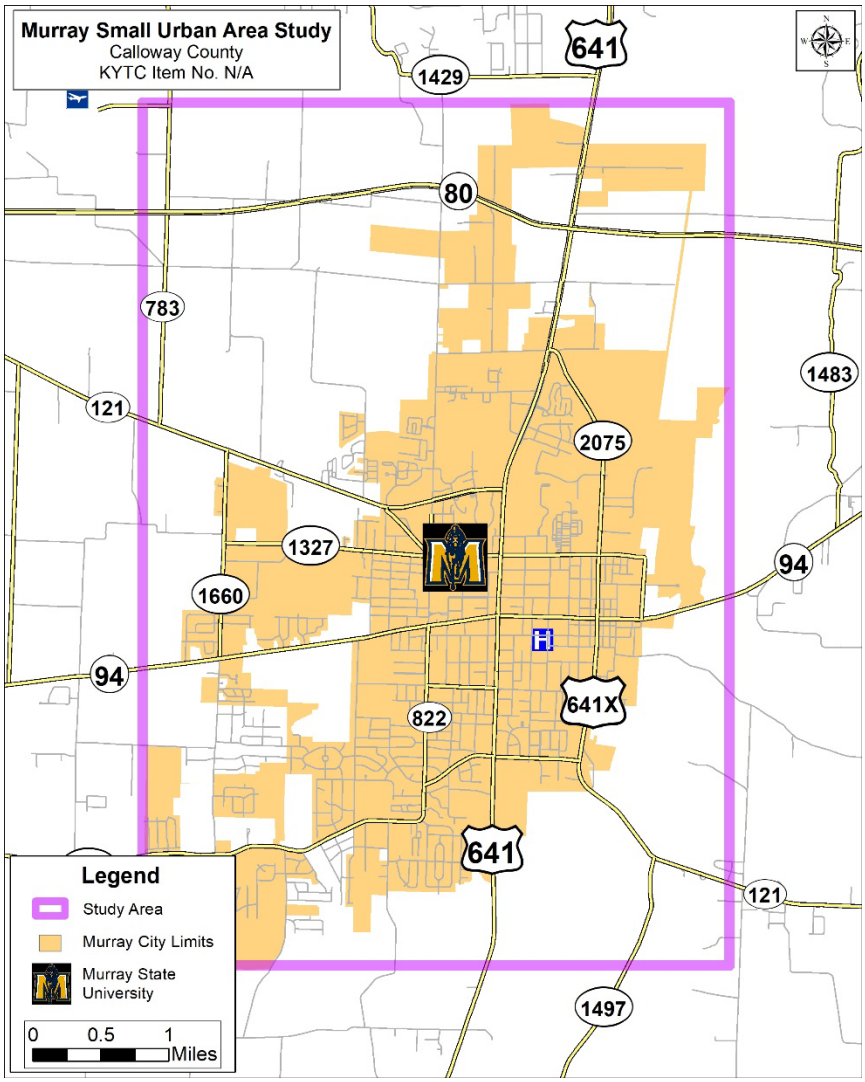


Figure ES-1: Murray SUA Study Area

A total of 3,168 crashes were reported within the study area between January 1, 2017, and December 31, 2019. Of those, two resulted in a fatality (one on KY 121 near Airport Road and one on KY 1660 south of College Farm Road), and 322 collisions resulted in an injury. Rear end crashes (675 crashes, 33 percent) and angle crashes (526 crashes, 26 percent) were the most prominent types of collisions. There were 11 bicycle collisions and 19 pedestrian collisions concentrated near Murray State University (MSU) and along the US 641 corridor. Of these 30 bicycle/pedestrian crashes, 21 (70 percent) resulted in injuries.

Public Outreach

Early in the process, the project team met with a diverse array of local officials and other stakeholder representatives, referred to as the Advisory Committee, and created an online survey for the public to solicit feedback on transportation concerns in the study area.

There were 619 respondents to the online survey, 90 percent of which indicated that they travel the study area daily. Respondents were asked to rank their overall transportation concerns in Murray. Traffic congestion, intersections, and pedestrian facilities were noted as the top three transportation issues. Another concern for the public was safety, with the highest concern being the need for sidewalks, followed by speeding and poor sight distance. A heat map of the safety concerns with red representing a higher density of concern is shown in **Figure ES-2**.

Future Conditions

Based on projections by the Kentucky State Data Center (KSDC), Calloway County is expected to be one of the higher growing areas in western Kentucky, around 0.8 percent per year between 2010 and 2040. This growth is due in part, at least, to MSU, a four-year state-supported public university in the central portion of the study area with a Fall 2021 enrollment of 9,427.

The Advisory Committee indicated that the residential growth will likely occur in the western and southern portions of the study area. Commercial growth, alternatively, is expected in the eastern and northern portions of the study area, especially around KY 2075 (North 4th Street) and the KY 80/US 641 intersection. Traffic forecasts were developed based on expected future growth and suggest that portions of KY 94, KY 121, KY 822, US 641, and US 641X will operate over capacity by 2045, indicating that mitigation measures may be warranted.

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 the Advisory Committee and public. The improvement concepts were categorized as follows:

- **Short-Term:** The short-term concepts are typically lower-cost improvements that can be implemented in the near future. These types of improvements should require little or no right-of-way to construct and, in some cases, could conceivably be implemented by the KYTC Division of Maintenance as part of regular activities.
- **Long-Term:** The long-term concepts are higher-cost improvements that will require more significant resources to implement. These types of improvements will generally require additional right-of-way to construct and will need to be funded through a future Kentucky Highway Plan.
- **Bicycle/Pedestrian:** The bicycle and pedestrian concepts can be stand-alone projects or can be added to the short- and long-term concepts. Standalone bike-ped projects require funding that does not utilize Kentucky Road Fund dollars.

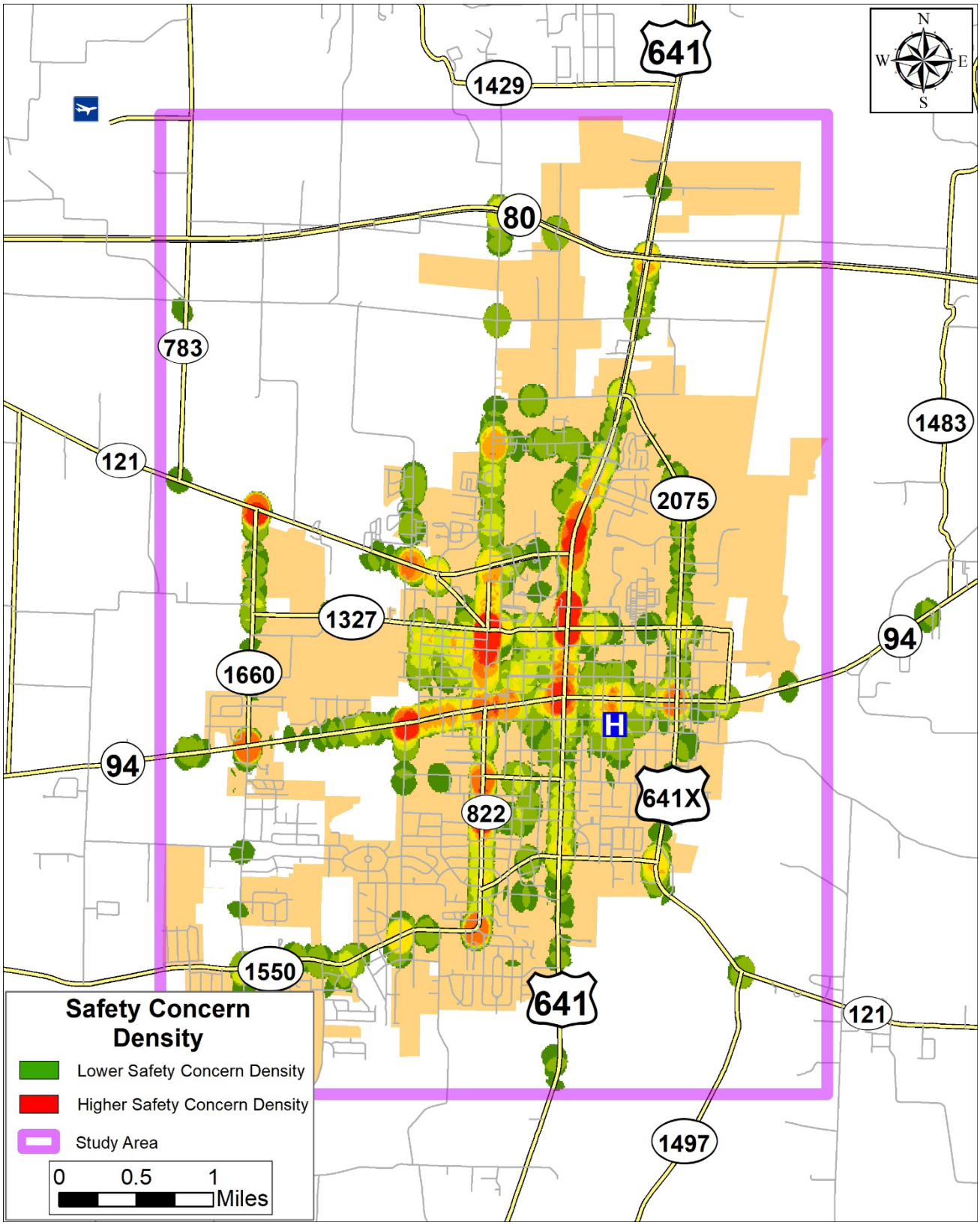


Figure ES-2: Public Survey – Safety Concern Heat Map

Nine short-term concepts and eight long-term concepts were initially developed. Additionally, 12 bicycle/pedestrian concepts were developed. An Advisory Committee meeting was held to solicit feedback on the initial improvement concepts. Improvement concepts were revised and prioritized after the meeting.

Conclusions

Short-Term Improvement Concepts: The short-term improvement concepts were categorized as high, medium, or low priority, or as a maintenance project. Maintenance projects are improvements that the KYTC Division of Maintenance could implement internally using KYTC forces or statewide contracts. The short-term improvement concepts are summarized in **Table ES-1** and shown on **Figure ES-3**.

Table ES-1: Short-Term Improvement Concepts

ID	Location	Description	Total Cost Estimate	Priority
A	US 641	Perform a detailed traffic analysis on US 641	$250,000	High
B	Courthouse Square	Convert 5th Street to pedestrian area and convert on-street parking to back-in parking	$240,000	Medium
C	KY 94 at 8th Street	Install a four-way stop and curb bump out at the KY 94/8th Street intersection	$60,000	Medium
D	US 641X at Sycamore Street	Remove the channelized right-turn lane from US 641X to Sycamore Street	$60,000	Low
E	KY 121 at Lowes Drive	Terminate the westbound KY 121 through lane at Lowes Drive	$20,000	Maintenance
F	KY 1550 at Oxford Drive	Enhance striping and signing at the KY 1550 horizontal curve at Oxford Drive	$15,000	Maintenance

Long-Term Improvement Concepts: The long-term improvement concepts were categorized as high, medium, or low priority. They are summarized in **Table ES-2** and shown on **Figure ES-4**.

Table ES-2: Long-Term Improvement Concepts

ID	Location	Description	Total Cost Estimate	Priority
G	East Bypass	Construct a new route from the Murray Business Loop to KY 80	$19.9 Million	High
H	Main Street (KY 94)	Construct a TWLTL and multi-use path on Main Street (KY 94)	$6.2 Million	High
I	KY 94 at KY 1660	Convert the KY 94/KY 1660 intersection to a roundabout.	$1.4 Million	Medium
J	KY 121 at KY 1660	Convert the KY 121/KY 1660 intersection to a roundabout.	$1.6 Million	Medium
K	West Bypass	Construct a new route between US 641 and KY 90 west of Murray	$64.1 Million	Low

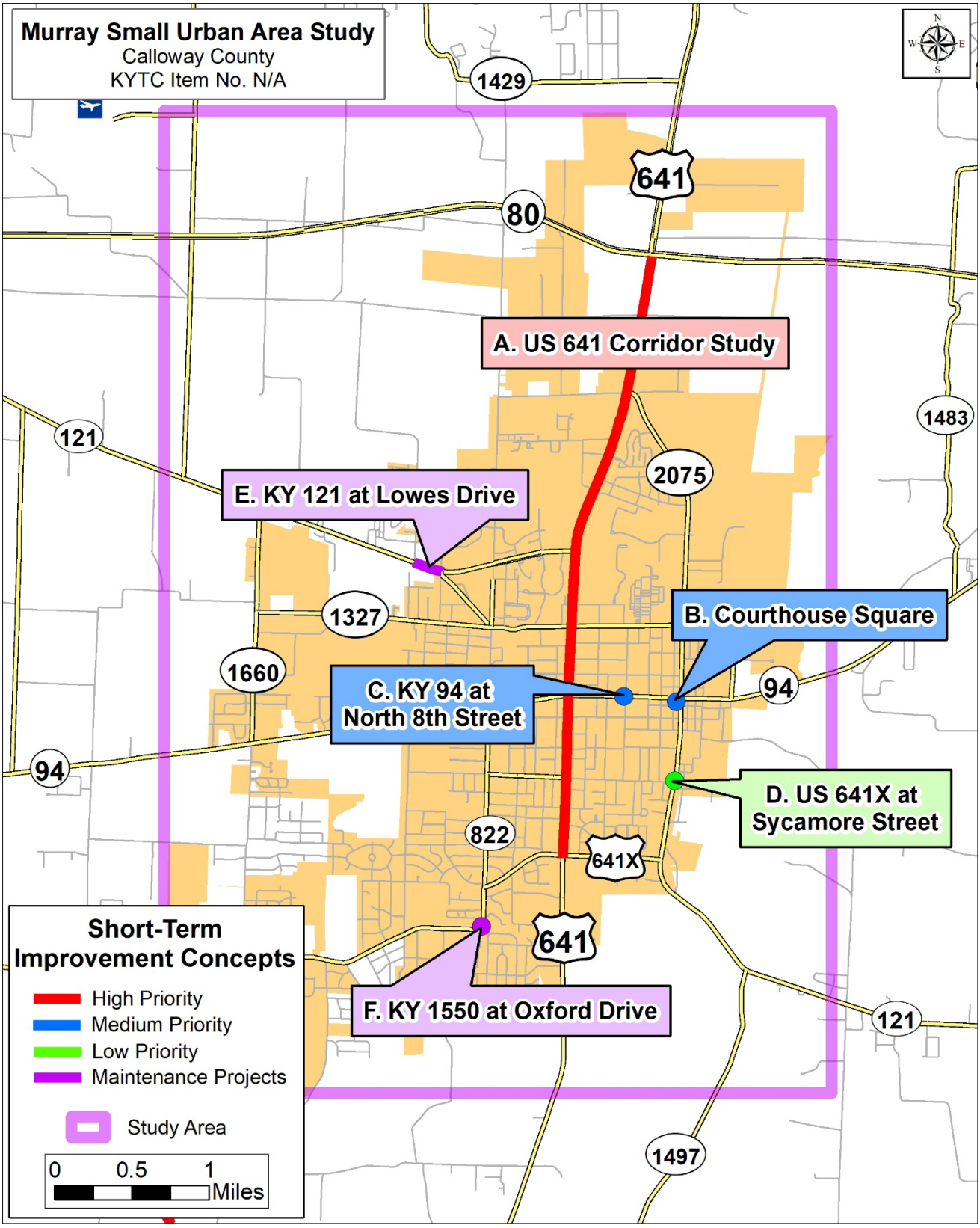


Figure ES-3: Short-Term Improvement Concepts

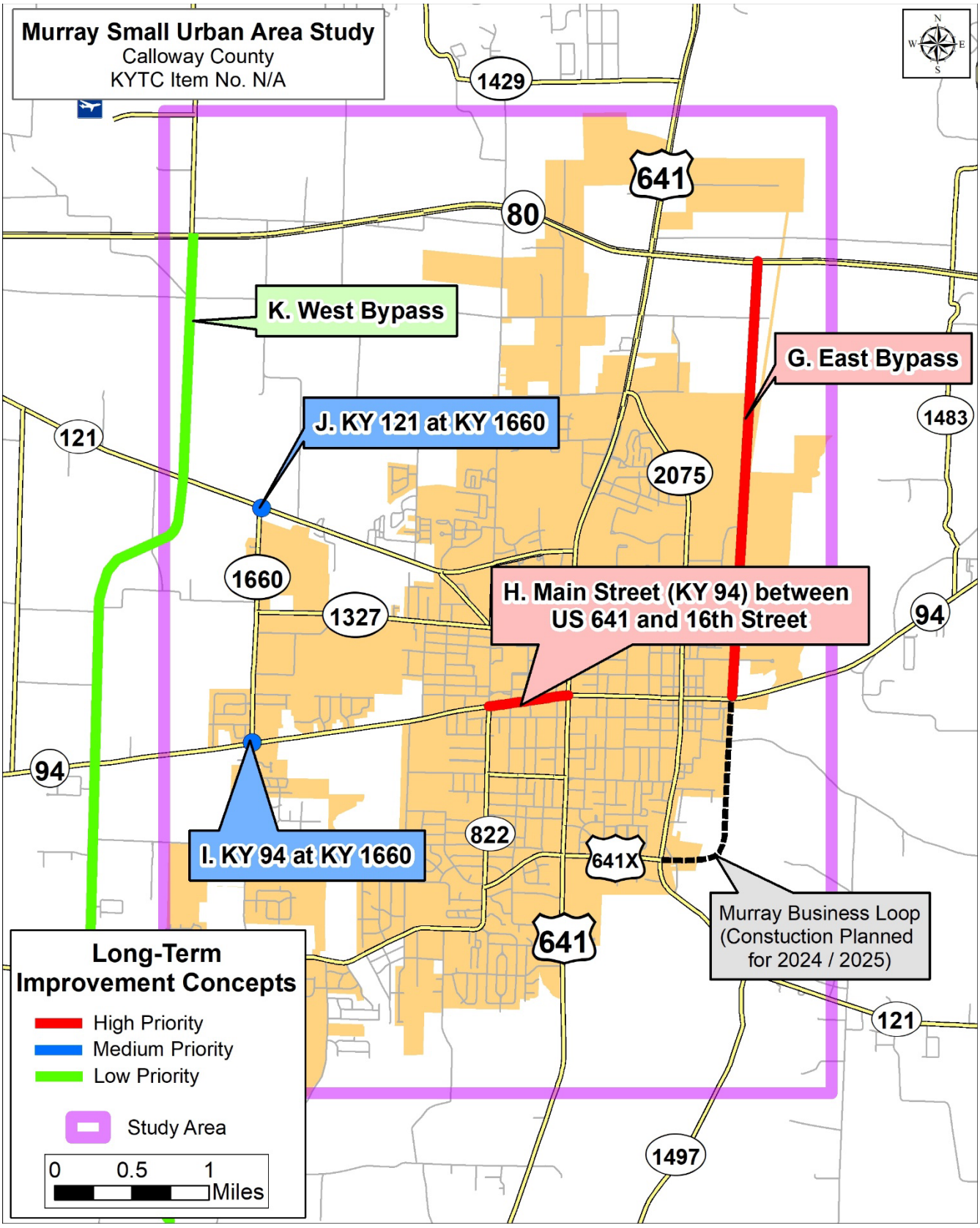
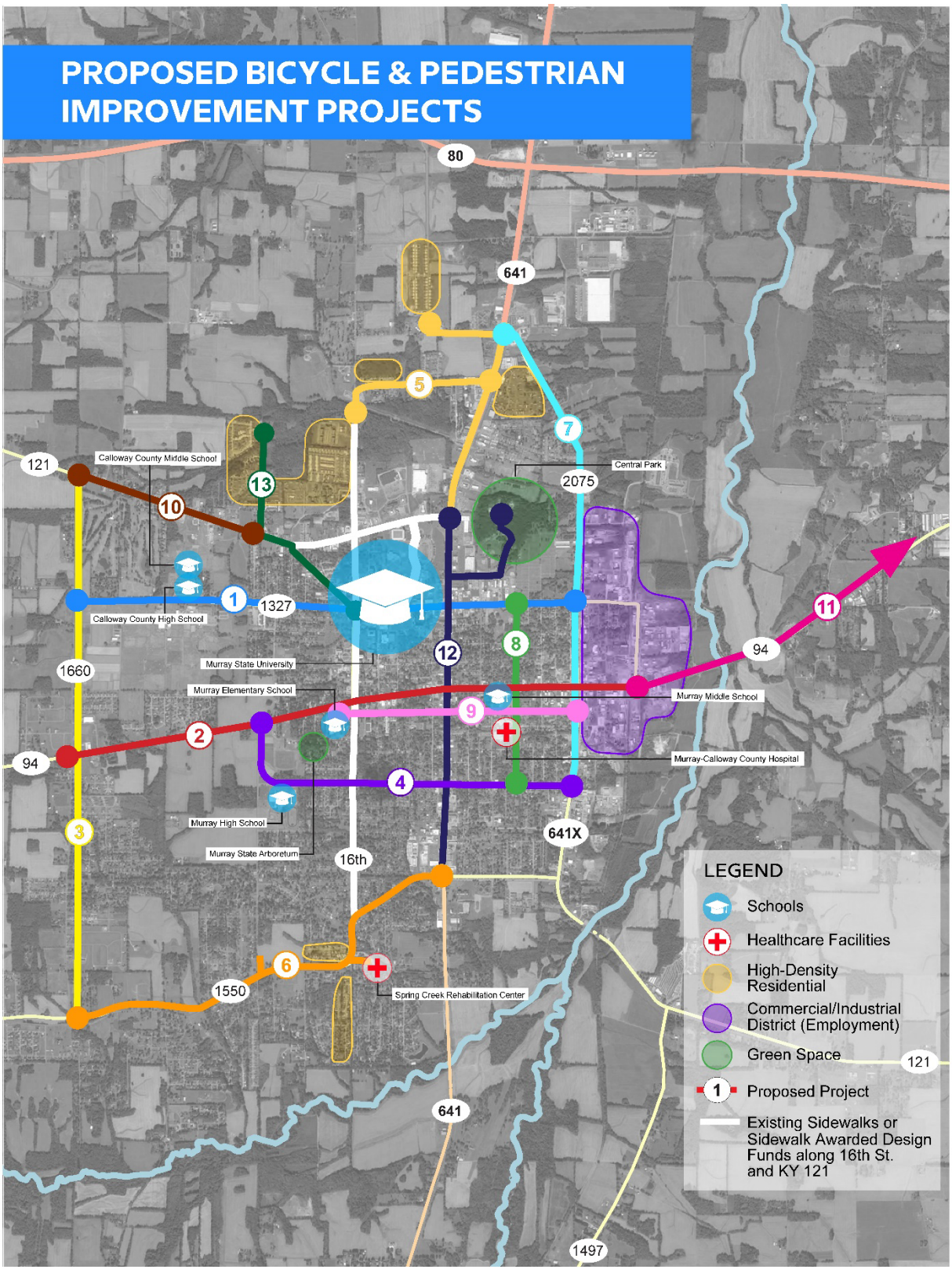


Figure ES-4: Long-Term Improvement Concepts

Bicycle/Pedestrian Improvement Concepts: The bicycle/pedestrian improvement concepts, summarized in **Table ES-3** and shown on **Figure ES-5**, were categorized as high, medium, or low priority.

Table ES-3: Bicycle/Pedestrian Improvement Concepts

ID	Location	Description	Priority
2	Main Street (KY 94)	Construct a shared-use path on Main Street (KY 94)	High
4	Doran Road/ Sycamore Street	Construct sidewalks on Doran Road and buffered on-street bike lane on Sycamore Street	High
5	US 641 North of KY 121	Construct at shared-use path on US 641 with crosswalks at Lowes Drive and Center Drive	High
10	KY 121	Construct a shared-use path on KY 121	High
13	U B Bailey Road / Coldwater Road	Construct sharrows on U B Bailey Road and a shared-use path on KY 121 and Coldwater Road	High
1	KY 1327	Construct a shared-use path on KY 1327	Medium
3	KY 1660	Construct a shared-use path on KY 1660	Medium
6	KY 1550	Construct a shared-use path on KY 1550, shared-use paths on 16th Street and Glendale Road, and sidewalks on Doran Road	Medium
12	US 641 South of KY 121	Construct a shared-use path on US 641 and a buffered on-street bike lane/sidewalk on Arcadia Circle and Hobson Drive	Medium
7	US 641X / KY 2075	Construct a buffered on-street bike lane and sidewalk on KY 2075/US 641X	Low
8	8th Street	Construct a buffered on-street bike lane and sidewalk on 8th Street	Low
9	Poplar Street	Construct a buffered on-street bike lane and sidewalk on Poplar Street	Low
11	KY 94 to Land Between the Lakes	Construct a buffered on-street bike lane on KY 94	Low



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1.0 INTRODUCTION

The Kentucky Transportation Cabinet (KYTC) initiated a Small Urban Area (SUA) study for the City of Murray, Kentucky in Calloway County. The purpose of the study was to identify and examine transportation issues related to safety and congestion in the city and the surrounding area.

The KYTC Division of Planning conducts SUA transportation studies in Kentucky for areas with populations of 5,000 to 50,000. SUA studies provide a thorough examination of an area's transportation network, including an analysis of existing and future traffic conditions, with the goal of identifying needs and potential solutions to provide a more efficient transportation network.

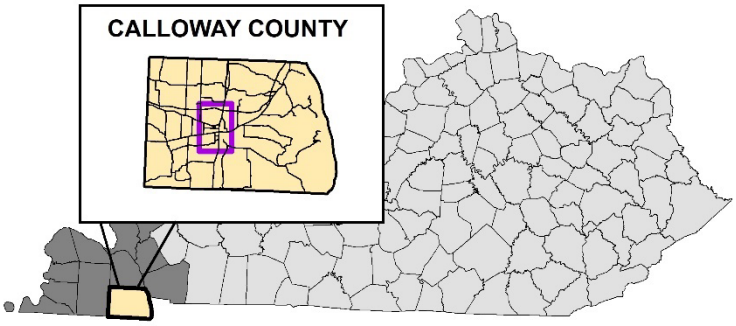

Figure 1: KYTC District 1 Map

The City of Murray requested the development of an urban transportation study for the Murray area, as the last Murray-Calloway County Transportation Study was completed in 2008. This SUA planning study was funded with Federal Statewide Planning and Research (SPR) funds. Future planning, design, right-of-way, utility, and construction phases for any projects identified as part of this study are not included in *Kentucky's FY 2022 – 2028 Highway Plan*.

1.1 STUDY AREA

The study area includes the Murray incorporated limits and surrounding area, which is just over 27 square miles, as shown in **Figure 2**. With an area of 386 square miles, Calloway County is the 36th largest county in Kentucky. Based on a 2016 analysis by the Kentucky State Data Center (KSDC), Calloway County is expected to be one of the highest growing areas in western Kentucky between 2010 and 2040. This growth is likely due to the location of Murray State University (MSU), a four-year state-supported public university in the northwest portion of the study area, which enrolled 9,427 students in the Fall of 2021. Population projections are not available for individual cities, but Murray's 2020 Census population of 17,307 is essentially unchanged from the 2010 Census estimate of 17,741. Although Murray's population has remained flat over the past 10 years, it has grown from 14,950 in the 2000 Census.

1.2 STUDY GOALS

The study examined existing transportation conditions in terms of both safety and operational characteristics. Following the analysis of these characteristics, the study recommends a list of transportation improvement concepts to address existing and long-term transportation needs for this portion of Calloway County. The basic work items accomplished under the transportation study included the following:

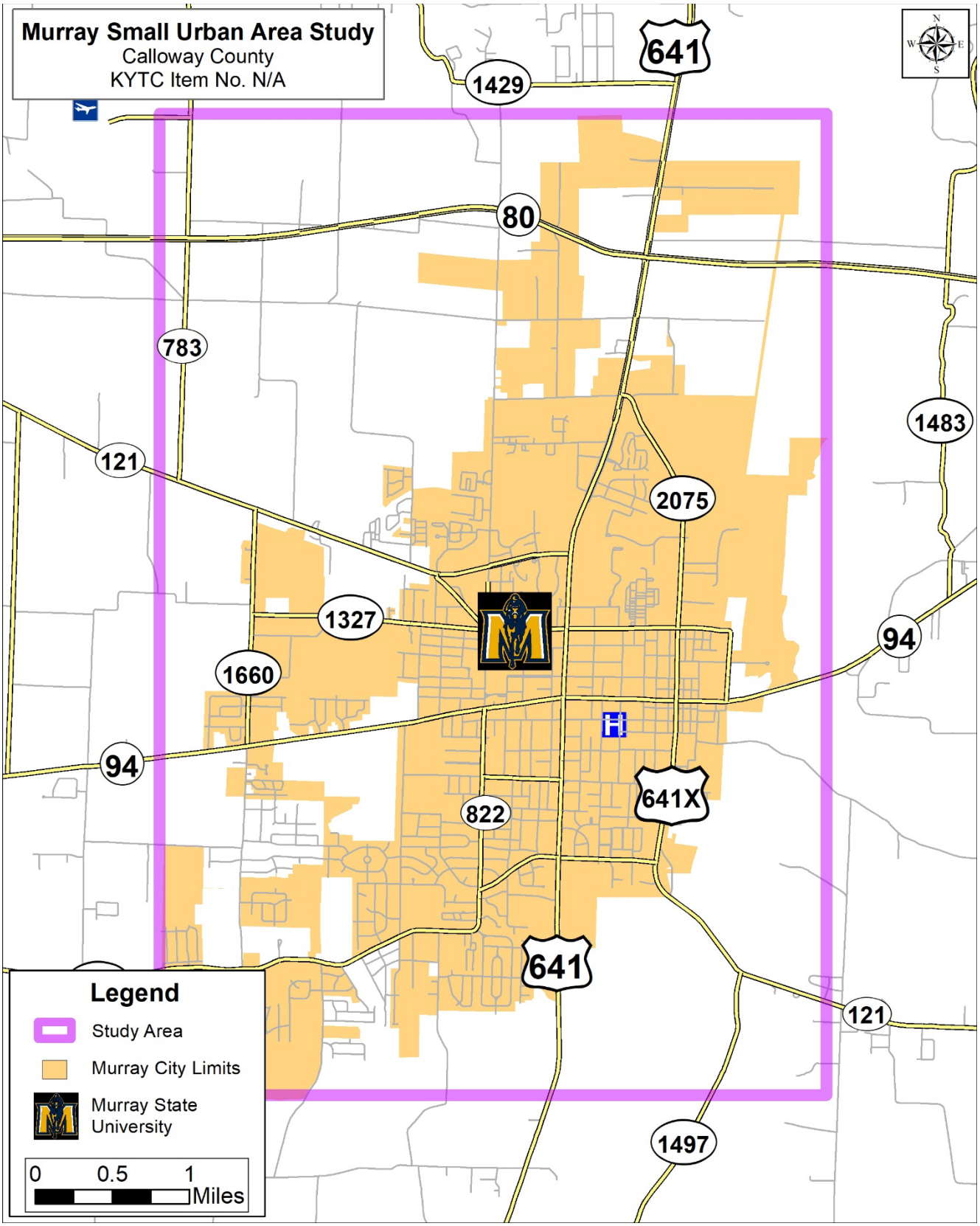

Figure 2: Murray SUA Study Area

- Review previous planning documents and committed transportation projects.
- Collect data and analyze the existing transportation system.
- Update Calloway County socioeconomic data in the Kentucky Statewide Travel Demand Model (KYSTM).
- Develop traffic forecasts to analyze anticipated future conditions.
- Develop recommended improvement concepts, cost estimates, and strategies.
- Coordination with KYTC, the City of Murray, the Purchase Area Development District (PADD), Calloway County staff, and the Calloway SUA Advisory Committee, made up of local officials, emergency responders, transit, and other stakeholders.
- Disseminate information, gather input, and identify needs and goals during the public involvement process.
- Document the study process.

1.3 PLANNED AND COMMITTED PROJECTS

The previous Murray SUA Study was completed in 2008. There are currently three projects in the study area listed in *Kentucky's Enacted FY 2022 – 2028 Highway Plan* (shown in **Figure 3**):

A. **KYTC Item No. 1-8502.00**: City of Murray Business Loop from Glendale Road to Industrial Road (Construction = $3 Million (2024), $4.5 Million (2025)).
B. **KYTC Item No. 1-8952.00**: '5 points' Intersection: Improve North 16th Street from KY 1327 to KY 121. (Right-of-Way = $2.21 Million (2023), Utilities = $2.17 Million (2024), Construction = $3.38 Million (2026)).
C. **KYTC Item No. 1-80200.00**: Address congestion, geometric deficiencies, and access issues on North16th Street from KY 121 to Utterback Road in Murray. (Design = $750,000 (2023), Right-of-Way = $3 Million (2025), Utilities = $3 Million (2026), Construction = $3.5 Million (2027)).

There are also five ongoing projects in the study area, as shown in **Figure 4:**

D. **KYTC Item No. 1-9026.00**: Left and right turn lanes at Southwest Calloway Elementary. Design for this project was completed by KYTC. Utility relocations and right-of-way acquisition are currently underway.
E. **KYTC Item No. 1-314.20**: Improve US 641 from the Tennessee state line. This project is currently under construction. (Construction = $37.6 million)
F. **KYTC Item No. 1-22312.00**: Address pavement condition on US 641X from MP 0.0 to MP 2.873. This project is currently under design. (Construction = $1.7 million (2023))
G. Highway Safety Improvement Program (HSIP) project for signing, striping, and advanced warning flashers at the KY 80 intersection with US 641.
H. 16th Street Sidewalk Project: KYTC is in the process of administering the project which was awarded funds by the Federal Transportation Alternatives Program.

Current Highway Plan projects total nearly $52 million in funding from KYTC to improve the transportation infrastructure in the study area.

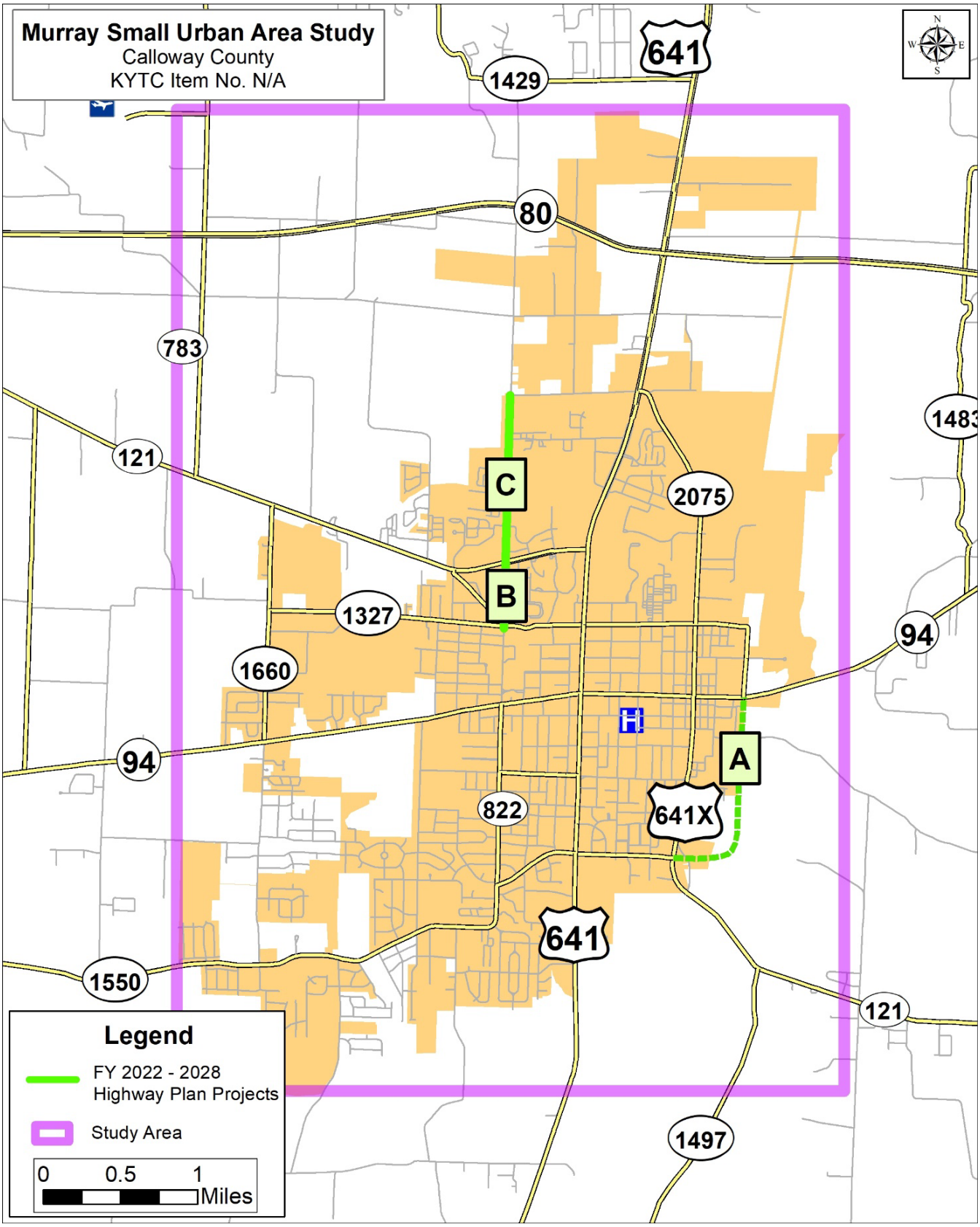

Figure 3: 2022 - 2028 Highway Plan Projects

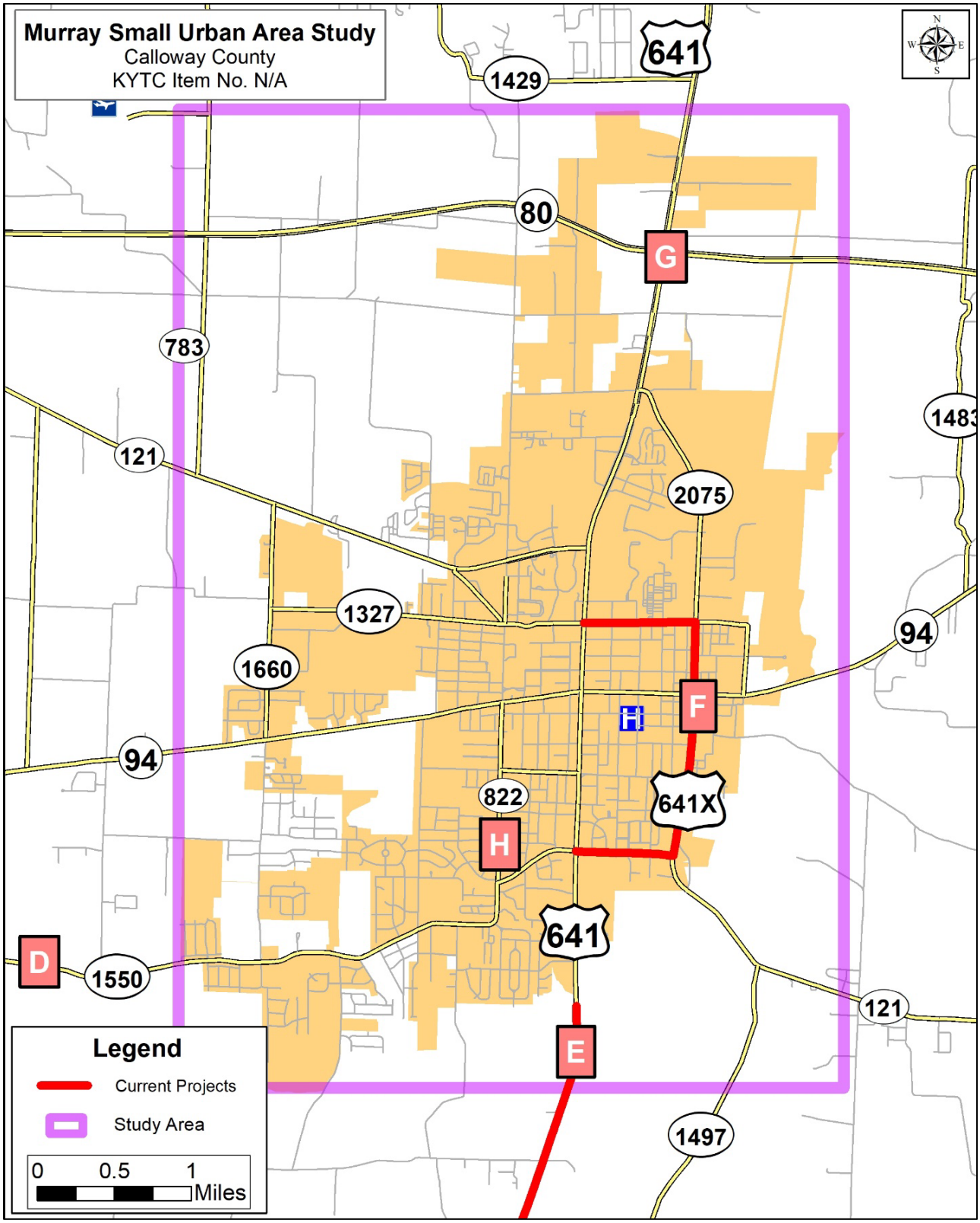

Figure 4: Ongoing Projects

There were three recently completed projects in the study area, shown in **Figure 5**:

I. **KYTC Item No. 1-9004.50**: Construct right-turn lane on US 641 (12th Street) at Sycamore Street.

J. **KYTC Item No. 1-20001.00**: Address pavement condition on KY 1327.

K. US 641/12th Street Mainline Signal Coordination in 2017 from Glendale Road to Walmart. Travel time data was used to adjust the green splits along the mainline to improve progression between signals. No traffic counts were collected and cycle lengths on the side streets were not adjusted.

2.0 EXISTING CONDITIONS

Existing transportation network conditions are examined in the following sections. The information compiled includes roadway facilities and geometrics, crash history, and traffic volumes within the study area. Data for this section were collected from KYTC's Highway Information System (HIS) database, the KYSTM, and from field review.

2.1 FUNCTIONAL CLASSIFICATION

Functional classification is the grouping of roads, streets, and highways into integrated systems ranked by the level of mobility for through movements and access to adjoining land. This grouping acknowledges that roads serve multiple functions, and it provides a basis for a uniform comparison of roads. Functional classification can be used for, but is not limited to, the following purposes:

- Provide a framework for highways serving mobility and connecting regions and cities within a state.
- Provide a basis for assigning jurisdictional responsibility according to the roadway's importance.
- Provide a basis for development of minimum design standards according to function.
- Provide a basis for evaluating present and future needs.
- Provide a basis for allocation of limited financial resources.

Figure 6 shows the functional classification of roadways within the study area. There are two principal arterial roadways in the study area. US 641 is a 165-mile principal arterial that provides north-south regional connectivity, stretching from Clifton, Tennessee to Marion, Kentucky. KY 80 is a 483-mile principal arterial that provides east-west regional connectivity, extending from Elkhorn City, Kentucky to Columbus, Kentucky.

KY 822 South of MSU

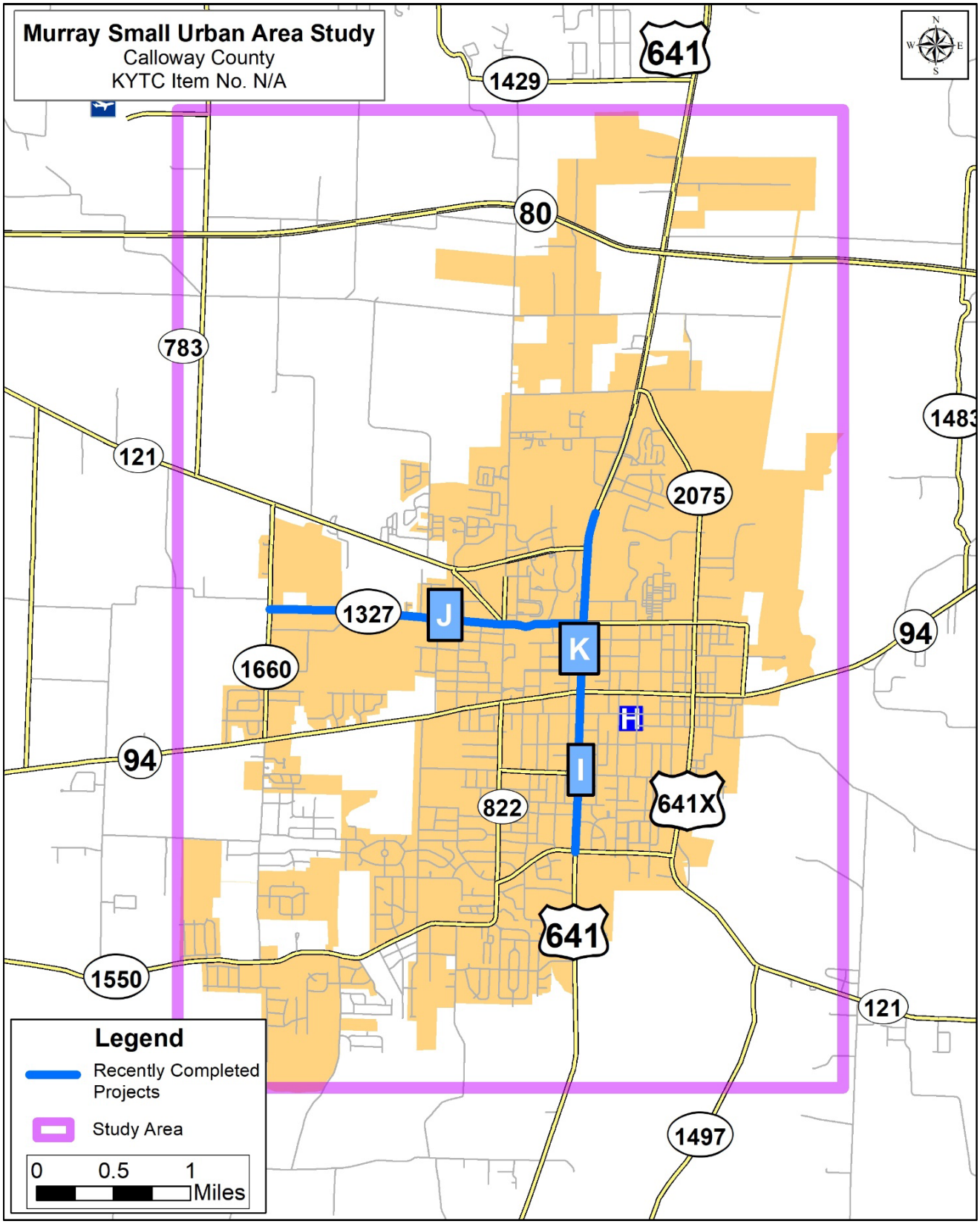

Figure 5: Recently Completed Projects

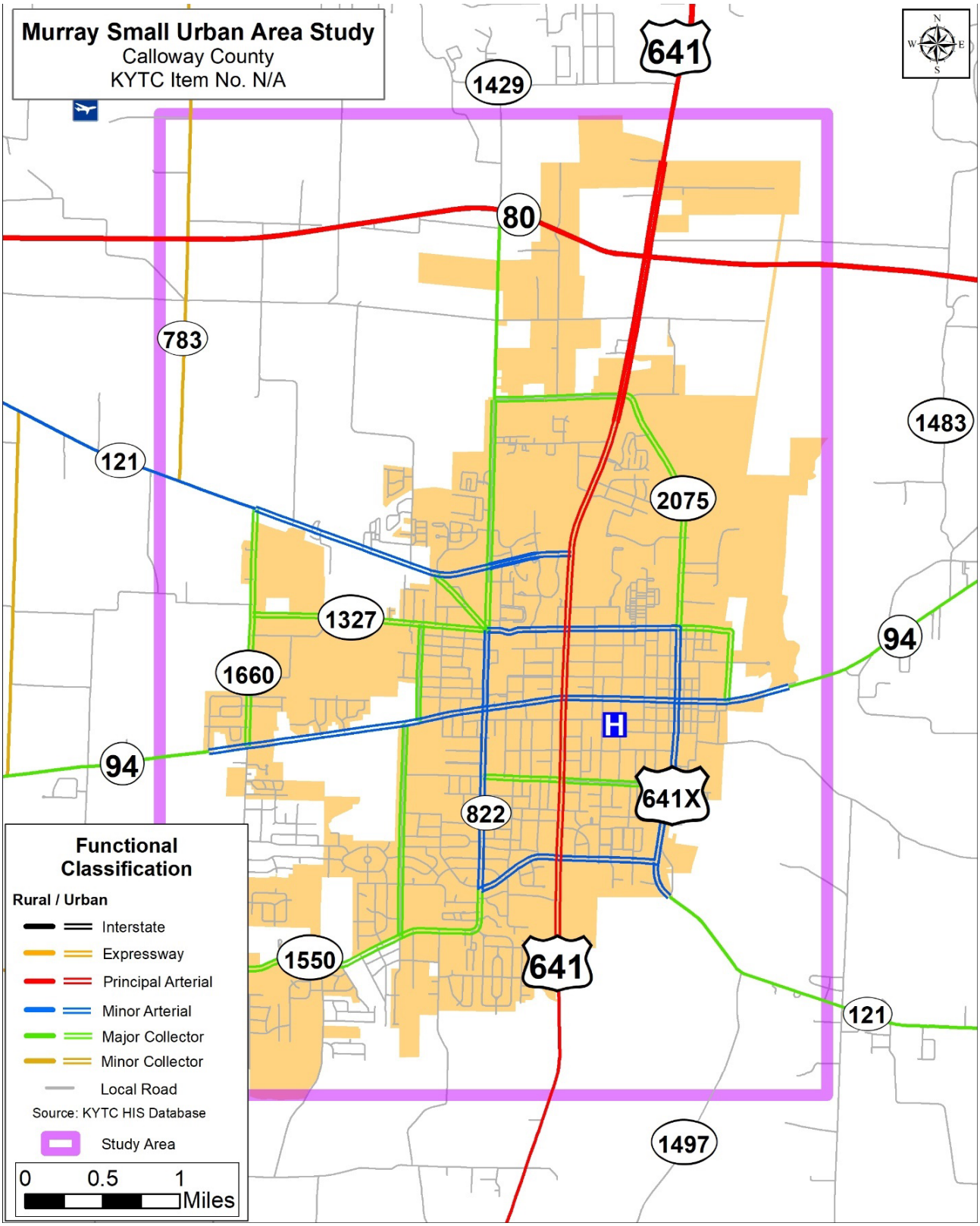

Figure 6: Functional Classification

Other important roadways, which are functionally classified as Minor Arterials, include the following:

- KY 121 – This route provides an east-west connection from Murray to rural Calloway County.
- KY 94 (Main Street) – This route provides east-connectivity through the suburban and commercial areas in Murray.
- KY 822 (South 16th Street) – This route provides a north-south connection through the suburban areas south of MSU.
- US 641X (Business Loop) – This minor arterial route provides a loop around US 641 through the industrial section of Murray.
- KY 1550 (Glendale Road) – This route provides access from the growing rural and suburban areas in southwest Murray to KY 822 and US 641.
- KY 1327 (Chestnut Street) - This minor arterial route provides access to Murray State University, Calloway County Middle School, and Calloway County High School.

Figure 7 depicts the truck weight classifications of the study area roadways. Roadways rated to support 80,000-pound trucks include US 641, US 641X, KY 121, KY 80, sections of KY 94, a section of KY 1327, sections of KY 2075, and Industrial Road. KY 94 on the western portion of the US 641 intersection is rated to support 62,000-pound truck weights. All other state routes in the study area are rated to support 44,000 pounds.

In compliance with the Surface Transportation Assistance Act of 1982 (STAA), Kentucky has established a network of highways on which commercial vehicles with increased dimensions may operate. These "STAA" vehicles include semi-tractor trailers with 53-foot-long trailers and single-unit trucks with a total length of 45 feet. These designated truck routes are shown on **Figure 8**. US 641 is the only federally authorized truck route in the study area. There are no state-designated truck routes in the study area.

2.2 ROADWAY GEOMETRIC CONDITIONS

KYTC's HIS database was used to identify roadway geometry. The current number of lanes and estimated lane widths along study area roadways are displayed on **Figure 9**. Current KYTC design guidelines suggest a minimum of 11-foot-wide lanes on arterials and collector roadways. Several study area arterials have less than 11-foot-wide lanes, which include sections of US 641, US 641X, KY 121, KY 94, KY 822, and KY 1550.

Estimated shoulder widths are shown on **Figure 10**. Most of the study area arterial routes have shoulders less than eight feet wide, the KYTC recommended minimum for such roadways. Many downtown streets have curb and gutter.

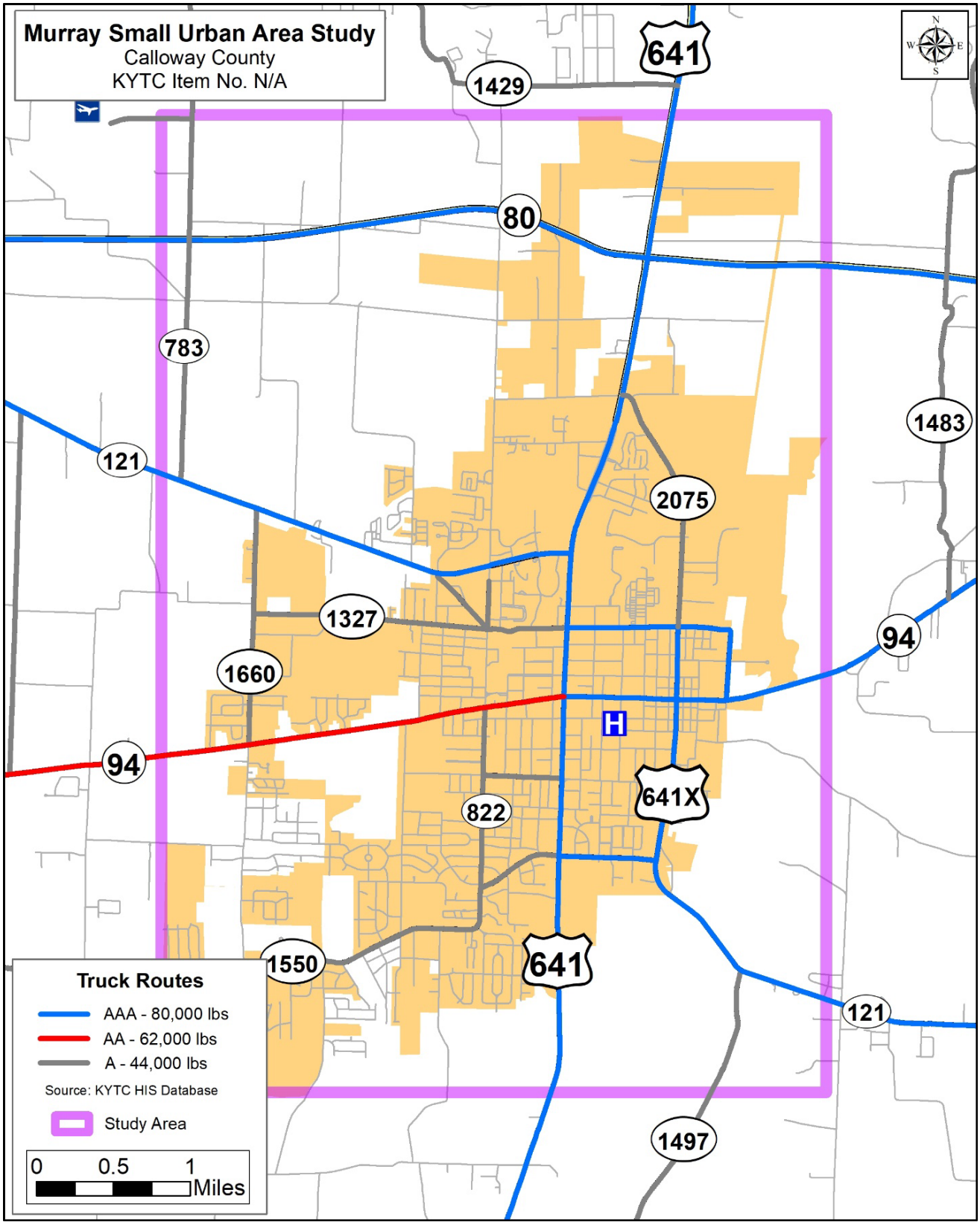

Figure 7: Truck Weight Classifications

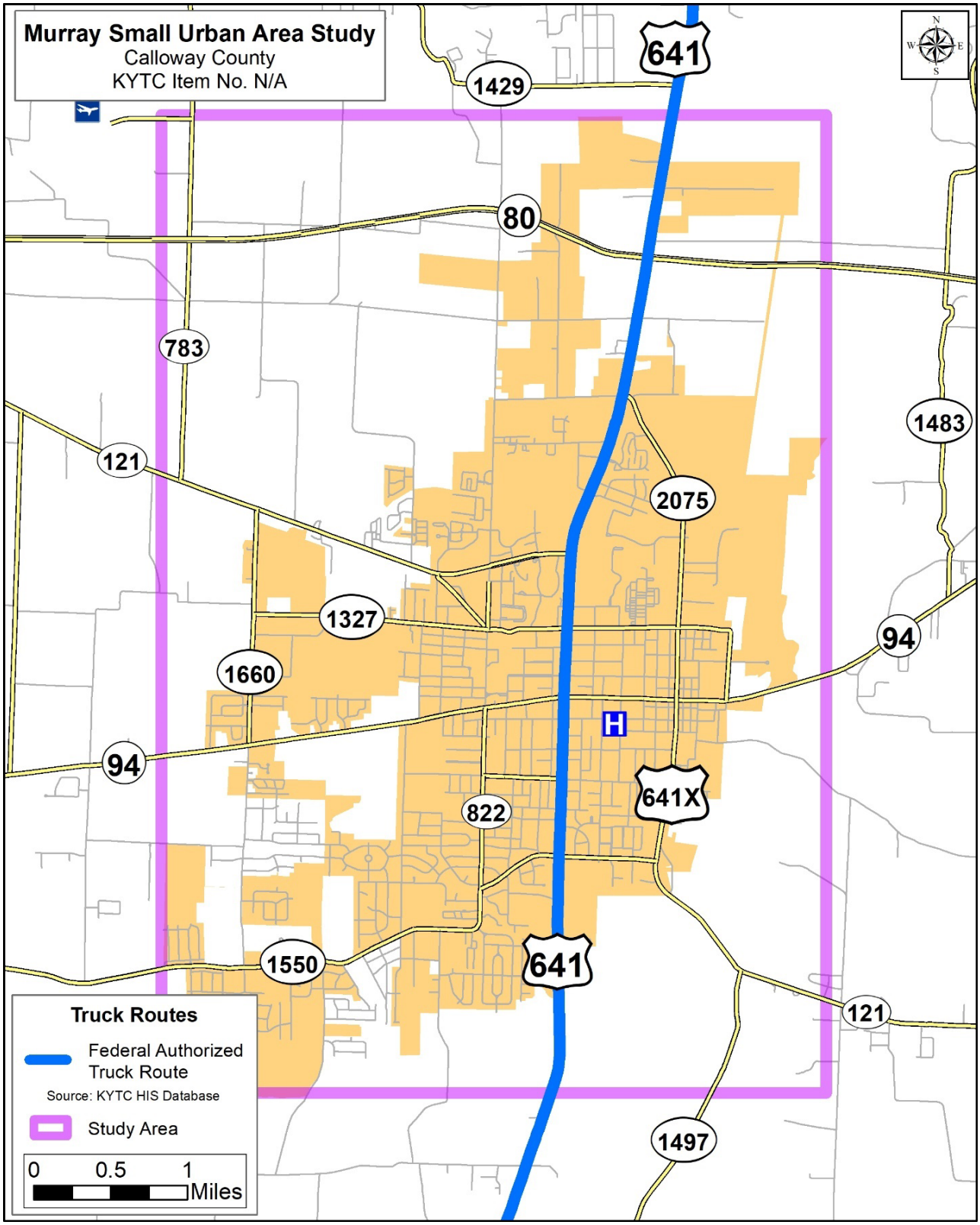

Figure 8: Designated Truck Routes

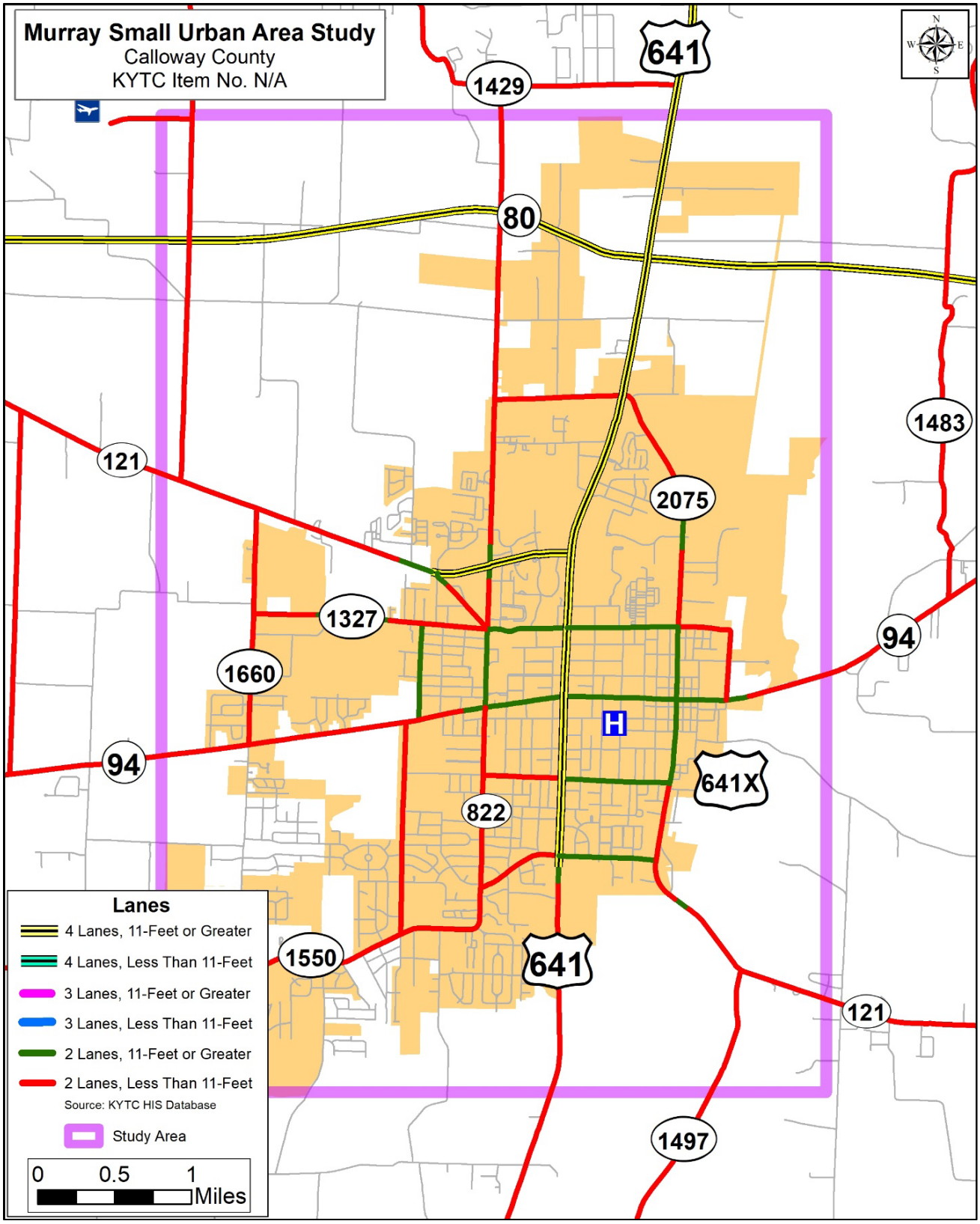

Figure 9: Number of Lanes and Lane Widths

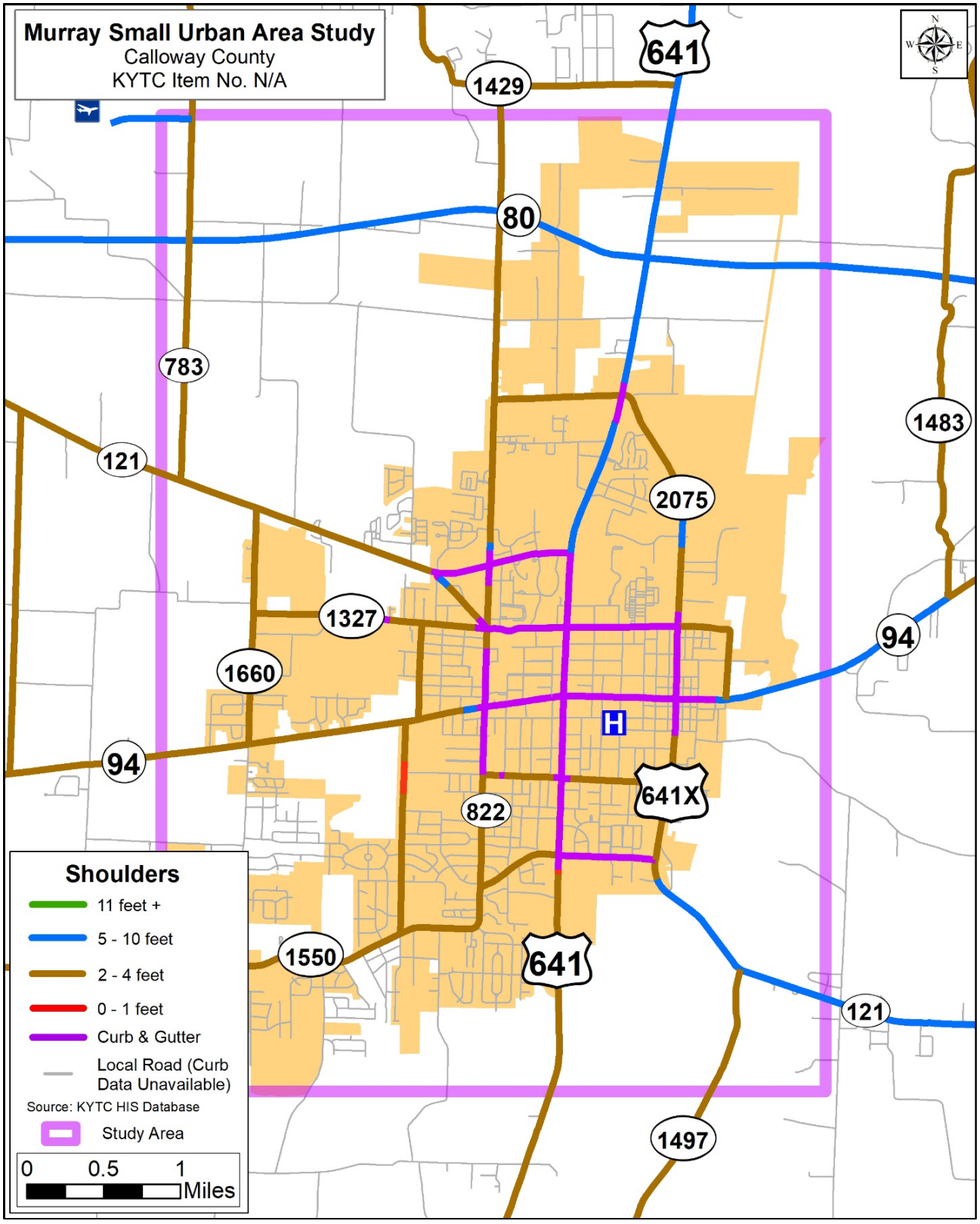

Figure 10: Shoulder Widths

2.3 EXISTING TRAFFIC VOLUMES

The most current average daily traffic (ADT) volumes from KYTC's traffic count stations are shown on **Figure 11**. US 641 has the highest ADT volumes within the study area, ranging from 7,500 vehicles per day (VPD) to 23,700 VPD. Most of the other routes within the study area have between 5,000 and 10,000 VPD.

2.4 CRASH HISTORY

Crash data were collected along existing roadways within the study area for a three-year period between January 1, 2017, and December 31, 2019. A total of 3,168 crashes were reported within the study area, as shown in **Figure 12**. Of the 3,168 crashes, 1,126 were animal-related or parking lot collisions and were removed from the analysis. Of the remaining 2,042 crashes, two resulted in a fatality and 322 (16 percent) resulted in an injury. Rear end crashes (33 percent) and angle crashes (26 percent) were the most prevalent types of collisions. There were 11 bicycle collisions and 19 pedestrian collisions concentrated near Murray State University and along the US 641 corridor. Of these 30 bicycle/pedestrian crashes, 21 (70 percent) resulted in an injury. The crash records and locations are included in **Appendix A**.

The Crash Data Analysis Tool (CDAT) was used to perform an Excess Expected Crashes (EEC) analysis. EEC is a measure of the crash frequency at a given site compared to what is expected based on the current conditions of the roadway (geometrics, traffic, etc.). A positive EEC indicates more crashes are occurring than should be expected. Results from this analysis showed portions of US 641 and US 641X with the highest EEC values in the study area. Additionally, several intersections on US 641, KY 121, and KY 94, among others, have positive EEC values. Segments and intersections with positive EEC values are shown on **Figure 13**.

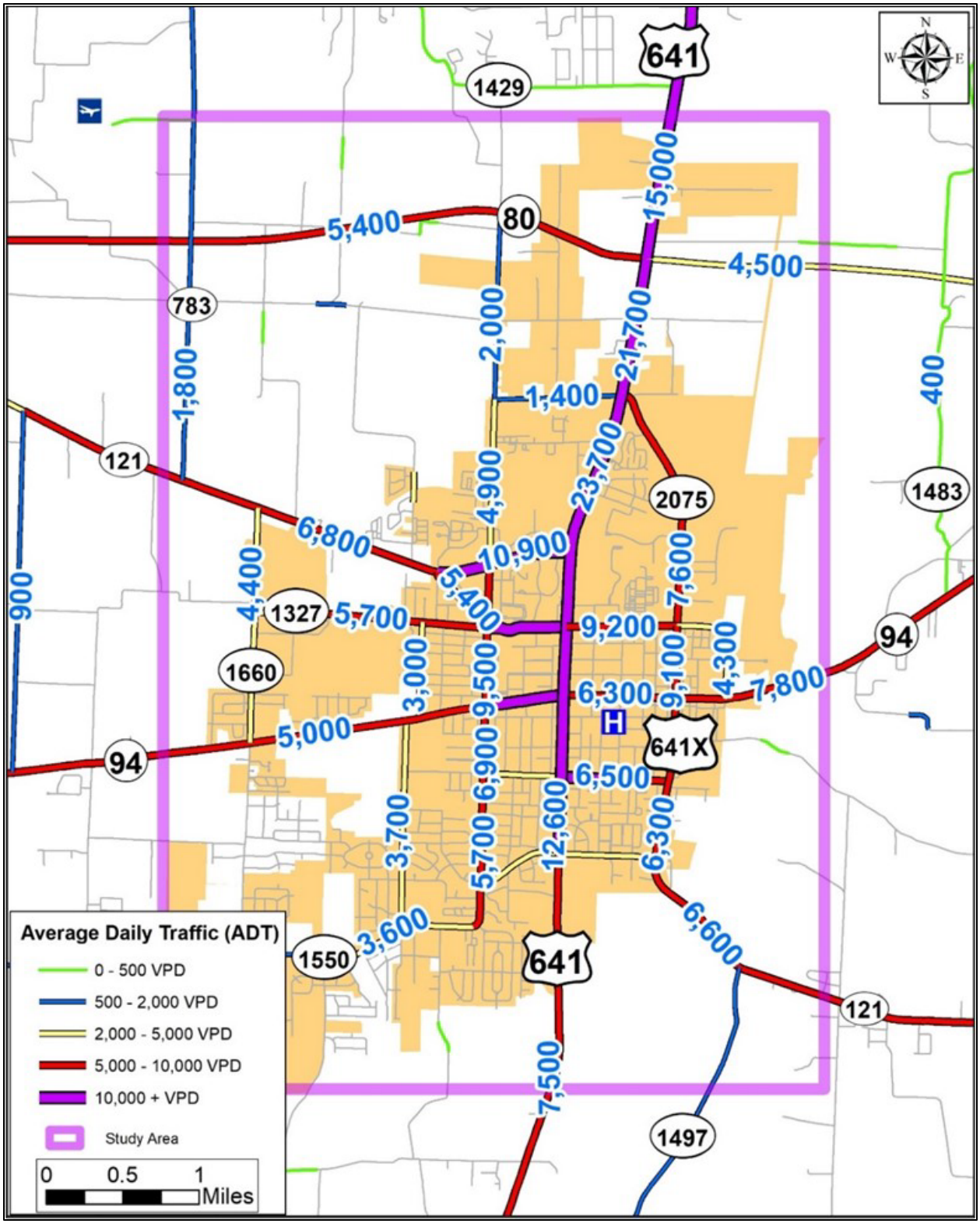

Figure 11: Existing Average Daily Traffic (ADT) Volumes

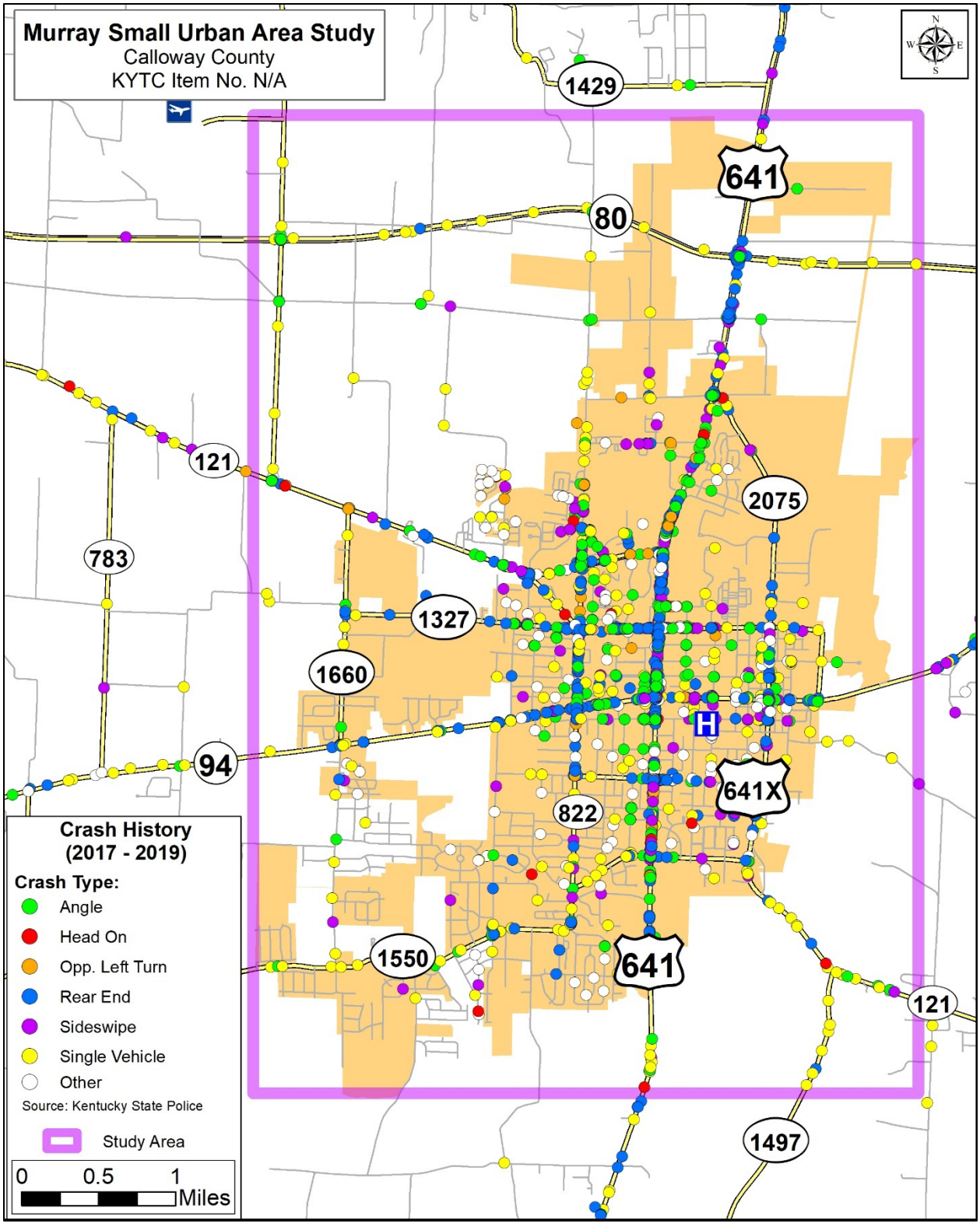

Figure 12: Crash Type (2017 – 2019)

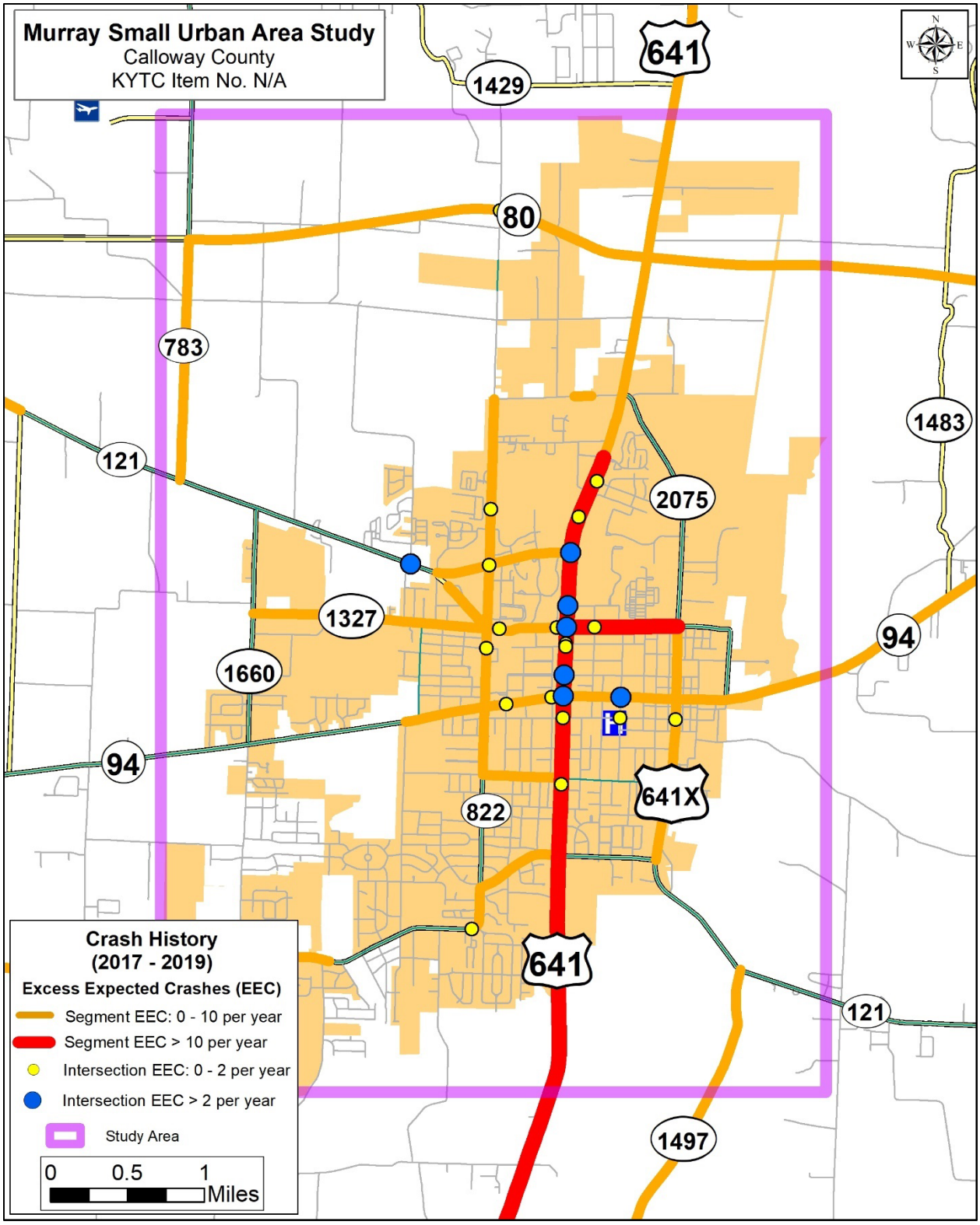

Figure 13: Excess Expected Crashes (EEC)

3.0 ENVIRONMENTAL OVERVIEW

An Environmental Overview was completed to identify environmental resources of significance, potential jurisdictional features, and other environmental areas of concern that should be considered during project development. Natural and human environmental resources within the study area were identified from a literature/database review, as well as a windshield survey. More detailed environmental studies may be required as individual projects are further developed. If a future project is federally funded, the National Environmental Policy Act (NEPA) requires that potential environmental impacts regarding jurisdictional wetlands, archaeological sites, cultural historic sites, and federally endangered species must be avoided if possible. If not, then impact minimization efforts are required. Mitigation for unavoidable impacts may also be necessary. The following provides a summary of the findings. The complete document is included in **Appendix B**.

3.1 NATURAL ENVIRONMENT

Natural Environment resources include species of concern and habitat, woodland and terrestrial areas, and parks. Through a literature/database review and field reconnaissance, potentially sensitive resources that affect the natural environment were identified in the study area and are discussed in the following sections. **Figure 14** presents the water resources in the study area.

There are seven United States Geological Survey (USGS) named streams and 198 unnamed stream resources mapped within the study area (most are stream tributaries).

There are 314 National Wetland Inventory (NWI) features mapped within the study area, comprising a total of 1,661.3 acres. The NWI dataset indicates there are 82 freshwater pond features in the study area, comprising a total of 37.2 acres.

The United States Fish and Wildlife Service (USFWS) indicates four species of concern within the study area: northern long-eared bat (threatened), prices potato-bean (threatened), gray bat (endangered), and Indiana bat (endangered). Kentucky Department of Fish and Wildlife Resources (KDFWR) lists 24 endangered species, 21 threatened species, and 21 concerned species in Calloway County. The Office of Kentucky Nature Preserves (OKNP) listed Murray State University Campus as an area of concern within one mile of the study area.

Most of the study area is underlain with bedrock with limited or no potential for karst development and there were no sinkholes identified within the study area. The Clarks River floodplain is a Federal Emergency Management Agency (FEMA) 100-Year floodplain along the eastern side of the study area. In the Northwest portion of the study area the East Fork Rockhouse Creek has a 100-Year floodplain as well. FEMA designated floodways occur in the eastern portion of the study area along the Clark River and on Bee Creek. Total area of floodway within the study area is 1,300 acres. Approximately 46 percent of the soils in the study area are identified as Prime Farmland, 11 percent are Farmland of Statewide Importance, and 14 percent Prime Farmland if drained, or protected from flooding.

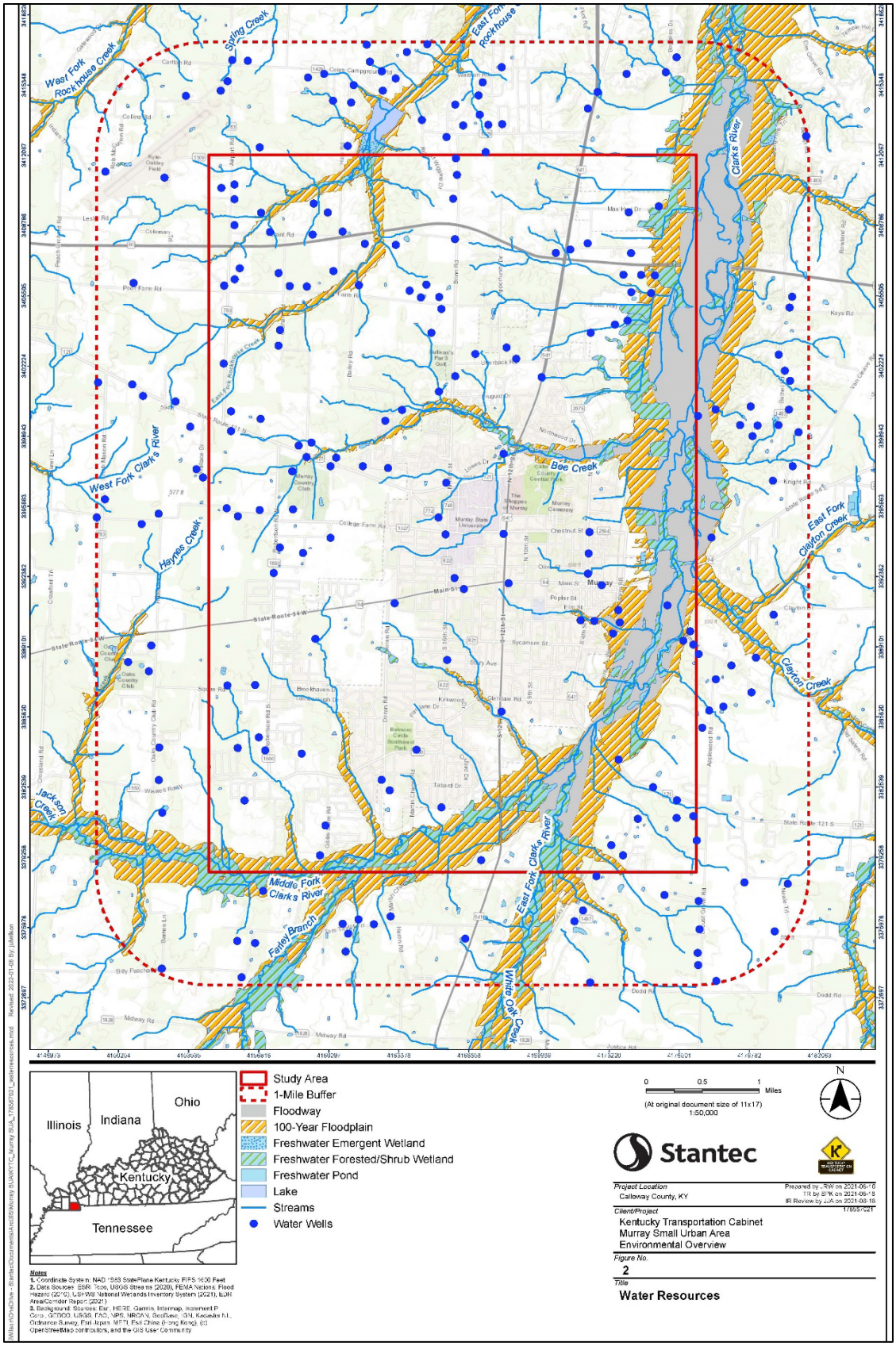

Figure 14: Murray Water Resources

3.2 HUMAN ENVIRONMENT

Human environment is defined as what we live in and around and what we have built. Through a literature/database review and field reconnaissance, potentially sensitive resources that affect the human environment were identified in the study area and are discussed in the following sections and presented in **Figure 15**.

Residential land use comprises approximately 50 percent of the study area, predominately as single-family residential dwellings with adjoining pasture or farmland and some single-family residential developments. Commercial and Industrial land use comprises approximately 20 percent of the study area and includes downtown Murray, primarily to the east. The remaining 30 percent of the study area is undeveloped with rivers, streams, and flood zone areas.

Based on the review of National Register of Historic Places (NRHP) there are 24 historic places located in the study area, including: the Main Street Historic District, the Murray Commercial Historic District, and Murray State University Historic Buildings. There are 13 houses of worship in the study area and seven schools. The only school outside of Murray in the study area is North Calloway Elementary School which is in the north central portion of the study area.

There are five cemeteries identified in the study area from current and historical mapping resources. There are multiple public service facilities in the project study area, including: the US Post Office, the Calloway County Jail, the Calloway County Health Center, the Calloway County Public Library, and the City of Murray Police Department.

3.3 SOCIOECONOMIC STUDY

The Purchase Area Development District conducted a socioeconomic study for the study area. A complete copy of the report is found in **Appendix C**. The information in this report outlines 2015-2019 American Community Survey (ACS) five-year data in and near the study area using tables, charts, and maps. The data presented in this document is intended to highlight areas of concern that may require additional analysis should any transportation project be advanced to future phases. Statistics are provided for minority, elderly, poverty status, Limited English Proficiency (LEP), and disabled populations for the nation, state, region, county, and census block groups located in the study area. **Table 1** presents key findings related to the socioeconomic characteristics of the study area. Calloway County is comprised of nine Census Tracts divided into 31 Census Block Groups. The study area study area consists of 13 full and five partial block groups. During future phases of project development, a more detailed and robust analysis would be required for the NEPA documentation when assessing the potential for adverse and disproportion impacts to those with disabilities, poverty status, and minority populations.

Table 1: Socioeconomic Summary

Category	United States	Kentucky	Purchase Region	Calloway County
Percent of Minority Population	38.9%	15.2%	12.3%	10.4%
Percent Below the Poverty Line	13.1%	16.9%	17.3%	21.5%
Percent of Adults over 65	15.2%	15.6%	18.9%	16.8%
Percent of Adults with a Disability	15.2%	21.1%	20.4%	20.5%
Percent with Limited English Proficiency	8.5%	2.3%	1.6%	1.7%

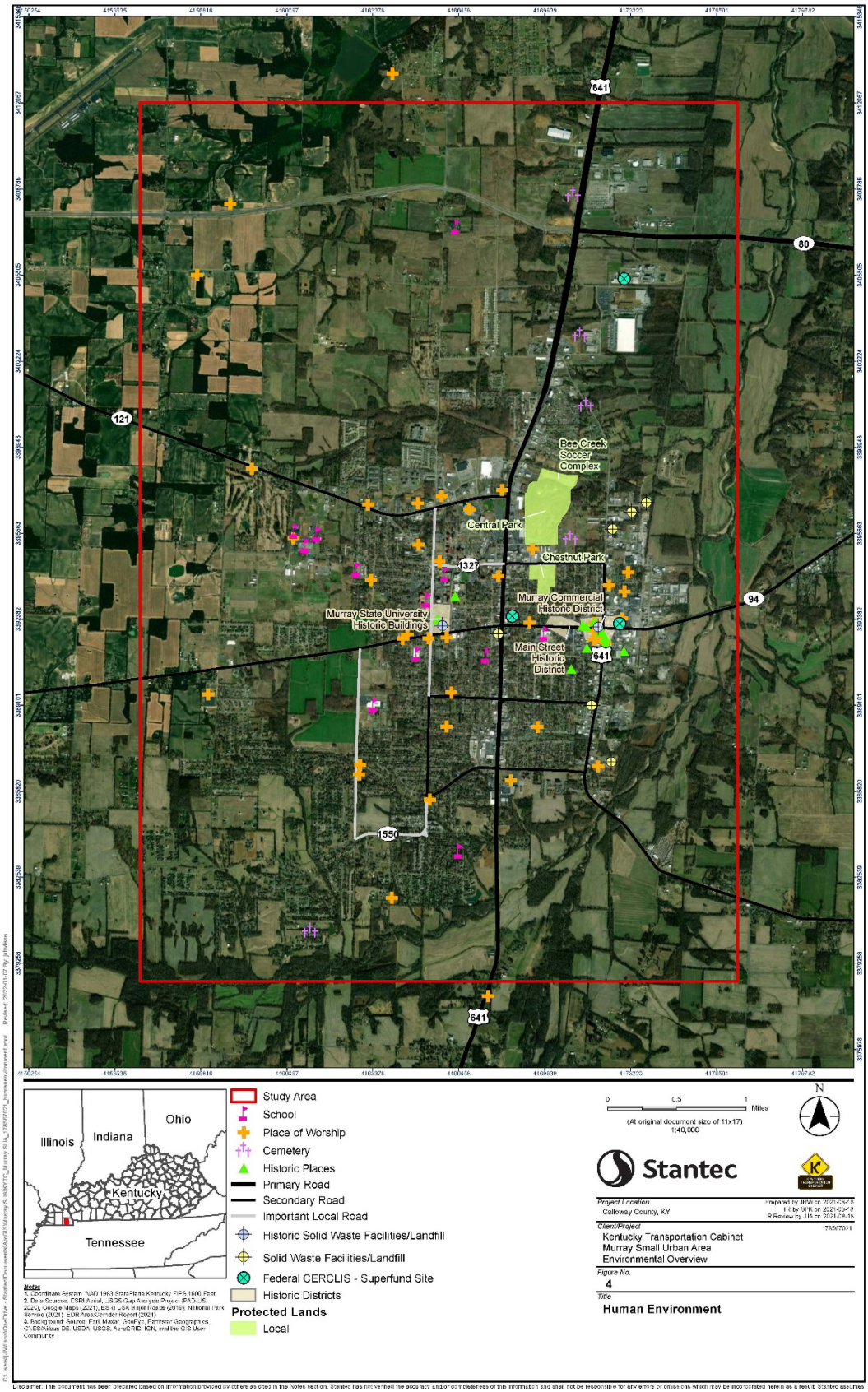

Figure 15: Murray Human Environment

4.0 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 includes representatives from KYTC Central Office, KYTC District 1 Office, the PADD, and the consultants, Stantec and TSW Design Group. Detailed summaries of each meeting are presented in **Appendix D**.

4.1 PROJECT TEAM MEETING NO. 1

The first Project Team Meeting was held on September 28, 2021. The purpose of the meeting was to discuss 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:

- The previous Murray Small Urban Area Study was completed in 2008.
- There are a number of ongoing KYTC projects in the study area.
- A MetroQuest survey was developed and sent to participants before the first Advisory Committee Meeting to solicit feedback regarding general transportation concerns, traffic and safety concerns, potential improvement concepts, and areas of expected growth in the study area.
- It was noted that trucks frequently travel on US 641X around the Courthouse Square.

4.2 ADVISORY COMMITTEE MEETING NO. 1

The project team reached out to local government representatives and other community groups early in the planning process. The first Advisory Committee Meeting was held after the first Project Team Meeting on September 28, 2021. In addition to the project team, representatives from the Kentucky State Legislature, the Murray-Calloway Economic Development Corporation, the City of Murray, Murray/Calloway Transit, and Murray State University were in attendance. The purpose of the meeting was to introduce the Murray SUA Study, present results from the existing conditions analysis, and solicit feedback using a MetroQuest survey. The results from the survey are as follows:

There were 17 participants who fully or partially completed the survey, all of whom travel within the study area regularly. Six respondents identified as Calloway County residents, three as Murray residents, three chose 'other' and five did not respond. When asked how often they travel in the study area, nine of the 13 respondents indicated that they drove it daily. Of the 12 respondents, nine (75 percent) indicated they work in Murray.

- Respondents were then asked to rank their top five transportation concerns in the study area. Of the concerns listed, traffic congestion, excessive speeds, and large trucks were the top concerns.

- The next question asked participants to identify trouble spots in the study area. The Advisory Committee Identified traffic concerns including poor signal timing, lack of turn lanes, the need for intersection reconfigurations, and school traffic, as shown in **Figure 16**. Safety concerns that were identified included school traffic, lack of bicycle and pedestrian facilities, sharp curves, poor sight distance, narrow lanes, offset lanes, lack of turn lanes, and the need for intersection reconfigurations, as shown in **Figure 17**. Several concerns were listed as "other" and included intersection reconfigurations, poor sight distance, poor pavement, poor signal timing, narrow lanes, and turning trucks striking a pedestrian signal.
- Participants were then asked to identify any potential improvement ideas in the study area. Improvements listed included a roundabout, constructing a two-way left-turn lane (TWLTL), constructing crosswalks, reconstructing an intersection, and converting an intersection to right-in right-out, as shown in **Figure 18**.
- The final question asked participants to identify where growth is likely to occur over the next 20 years. Based on results from the survey, the Advisory Committee expects residential growth to occur mostly in the southern and western portions of the study area. Additionally, the Advisory Committee expects commercial growth to occur in the northern and eastern portions of the study area, especially along the KY 2075 corridor and the US 641/KY 80 intersection.

5.0 PUBLIC INVOLVEMENT

An online MetroQuest survey and mapping exercise was made available between October 5, 2021 and November 2, 2021 to solicit feedback regarding general transportation concerns, traffic and safety concerns, and potential improvement concepts. The public was made aware of the survey through KYTC press releases, KYTC Facebook posts, a MSU email to all faculty and students, and by local news articles.

5.1 ONLINE SURVEY

There were 619 respondents to the survey, 90 percent of which indicated that they travel the study area daily and 86 percent indicated they travel the study area in a car. Most of the respondents (80 percent) are either Murray or Calloway County residents, while 12 percent of respondents were MSU students.

Respondents were asked to rank their overall transportation concerns in Murray. A point scale was used to summarize the results, with a No. 1 ranking = 5 points, No. 2 = 4 points, No. 3 = 3 points, No. 4 = 2 points, and No. 5 = 1 point. Based on this scoring system, traffic congestion was found to be the biggest transportation issue, followed by intersections, as shown in **Figure 19**.

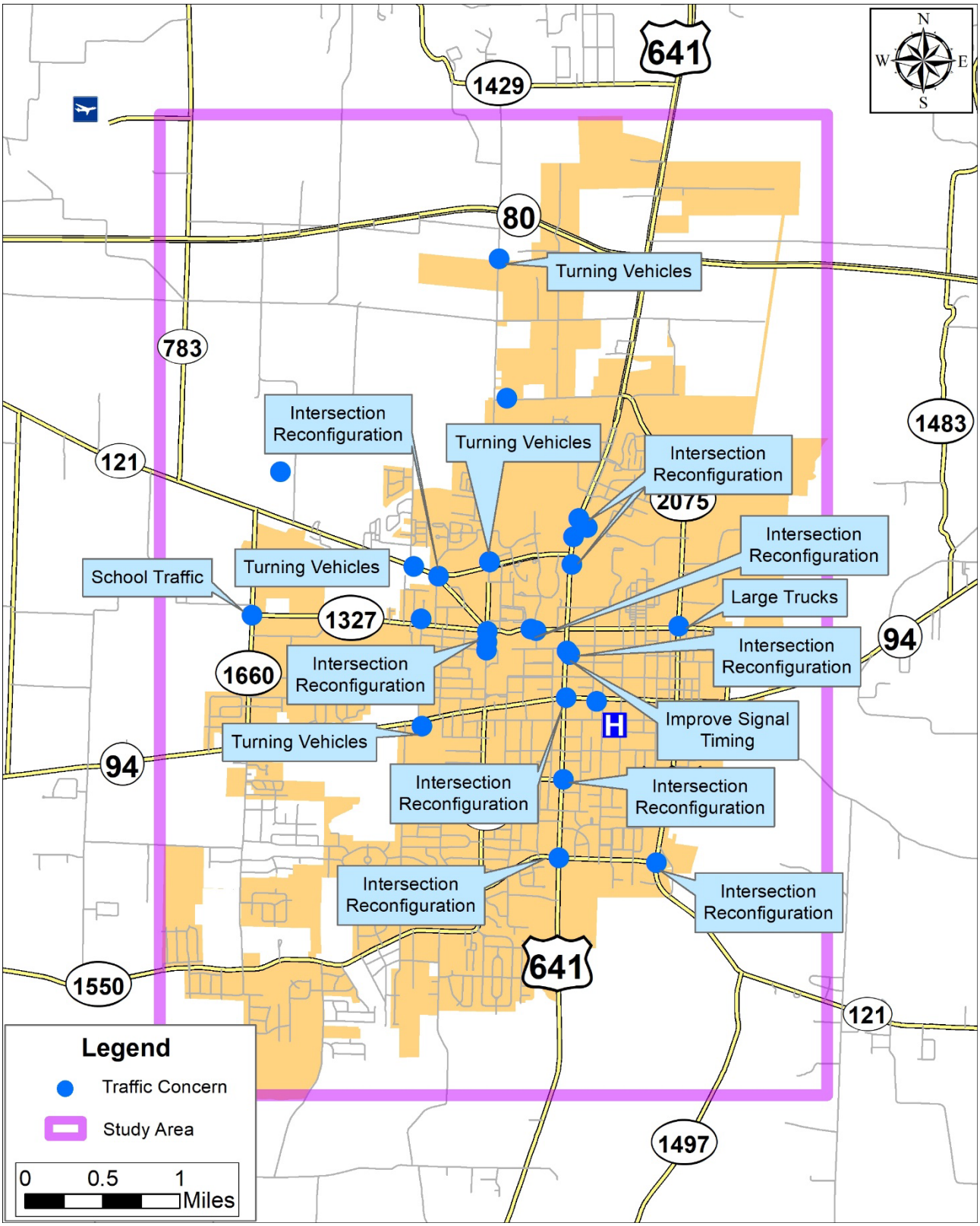

Figure 16: Advisory Committee Survey – Traffic Concerns

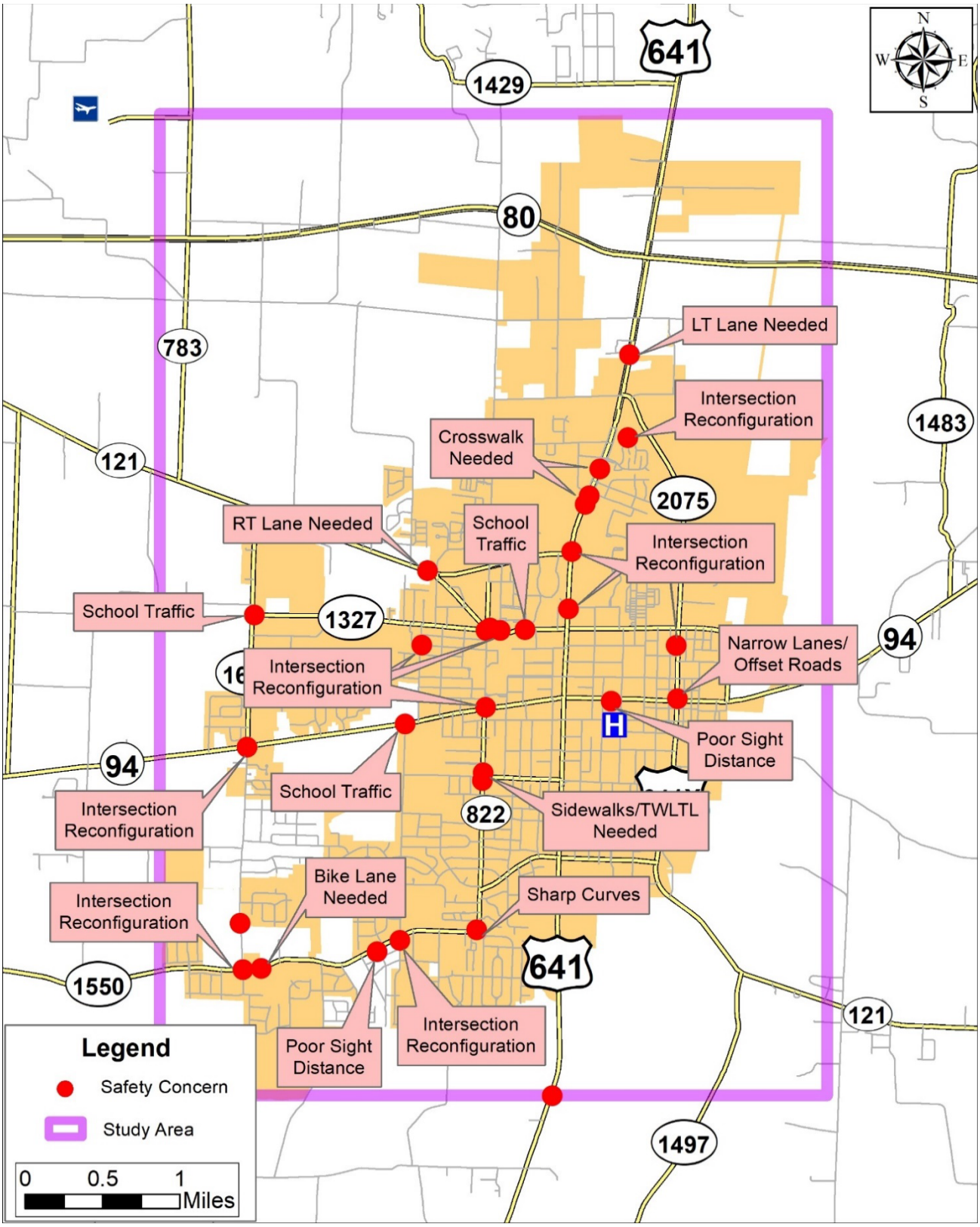

Figure 17: Advisory Committee Survey – Safety Concerns

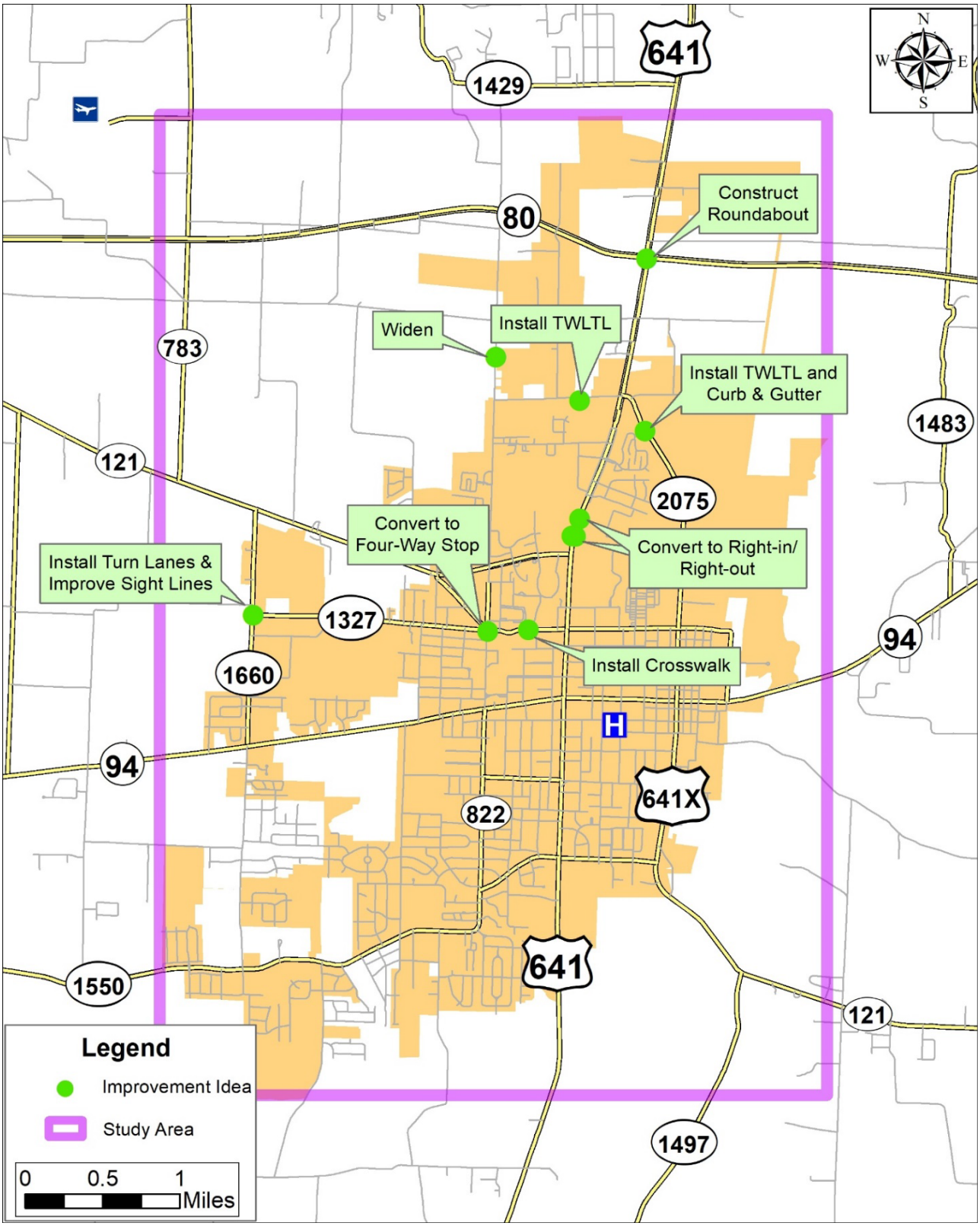

Figure 18: Advisory Committee Survey – Improvement Ideas

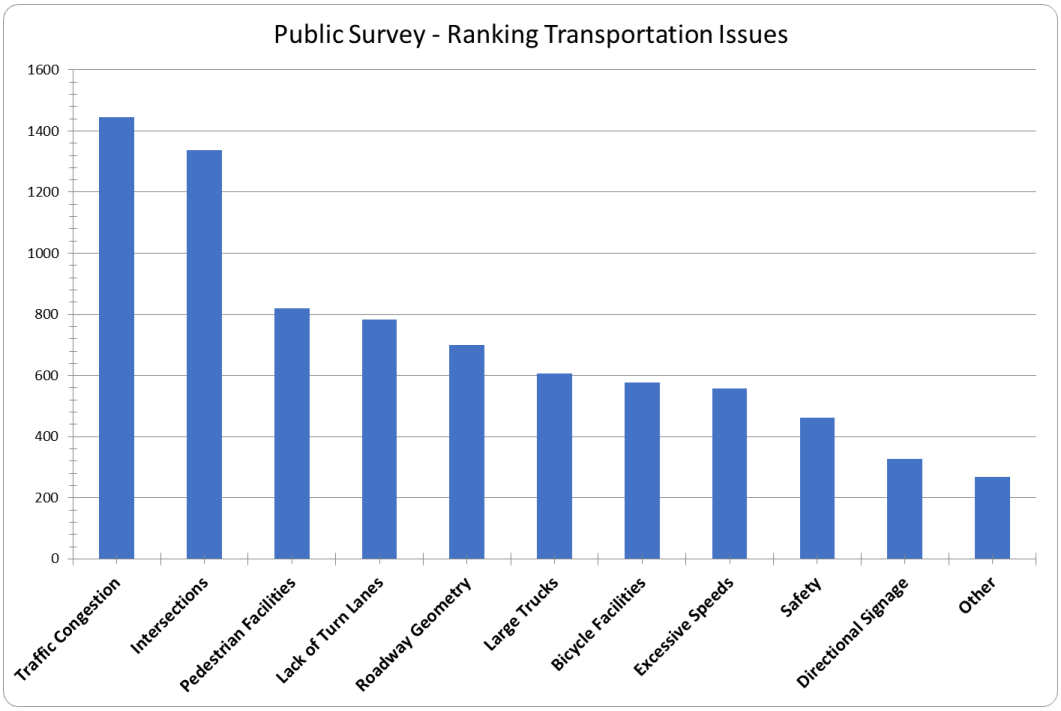

Figure 19: Public Survey – Ranking Transportation Issues

When asked to identify locations with traffic concerns, US 641 was the most identified corridor, followed by the 'Five' points intersection (Chestnut Street at North 16th Street). The biggest traffic concern for the public was the need for improved signal timing, as shown in **Figure 20**, especially to reduce queueing on side streets along US 641. The second biggest concern included the need to reconfigure intersections, which was most suggested at the 'Five' points intersection.

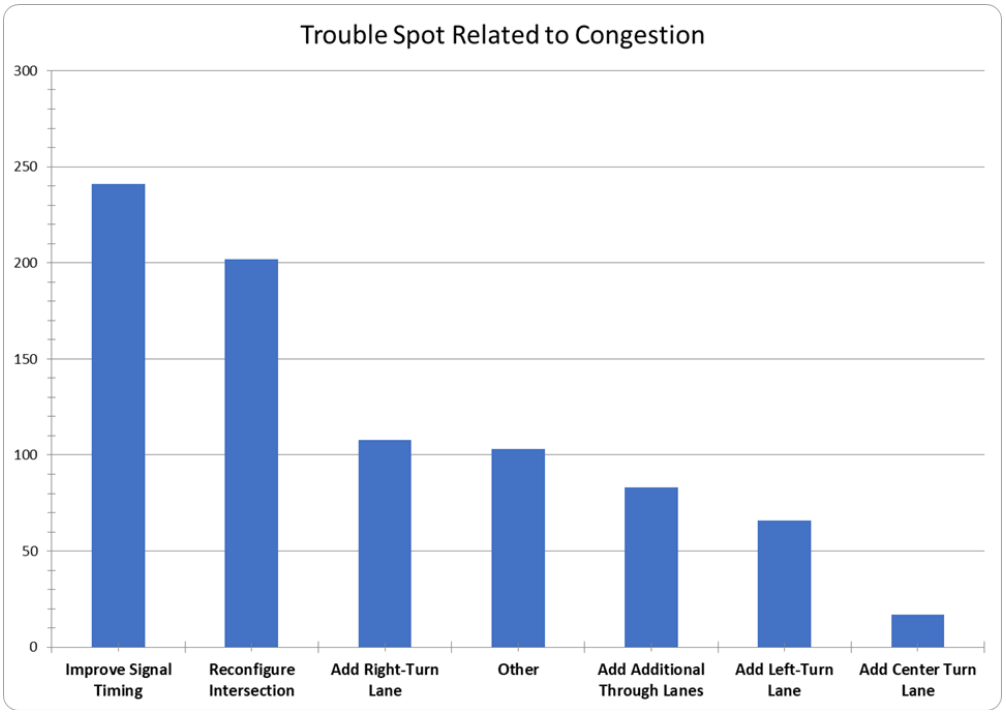

Figure 20: Public Survey – Ranking Traffic Concerns

Another concern for the public was safety, with the highest concern being the need for sidewalks, followed by speeding and poor sight distance. A heat map of the safety concerns with red representing a higher density of concern is shown in **Figure 21**.

When asked to provide improvement ideas, 88 respondents suggested turn lanes, as shown in **Table 2**. Most of the suggested turn lanes were located at the 'Five' points intersection and at various locations along US 641, including the KY 94, KY 121, and Chestnut Street intersections. Installing sidewalks/crosswalks was the second most suggested improvement idea. These suggestions were mainly located along the southern portion of KY 822 and US 641 between KY 2075 and KY 121. While only five percent of respondents indicated that they either walk or bike within the study area, the overall concern with lack of bicycle and pedestrian facilities suggests that more people would likely use alternate transportation if it were more accessible. Other than the 'Five' points intersection and US 641, intersection improvements were commonly suggested at the rural intersections to the west. Many of these respondents suggested constructing roundabouts. Another suggestion was to construct a bypass around Murray. Most of these responses indicated that removing traffic off US 641, especially trucks, was the primary purpose of a bypass alternative.

The public survey results were also filtered to better understand the concerns of MSU students. This analysis showed that the students' concerns are similar to the overall public. Congestion concerns of MSU students include the need for improved signal timing, the need for turn lanes, and the need for intersection improvements. Safety concerns of the students include lack of bike/pedestrian facilities, the need for intersection improvements, poor sight distance, and speeding.

6.0 FUTURE CONDITIONS

To determine the need for and type of potential transportation improvement options, it is necessary to estimate future conditions. This chapter summarizes the anticipated future conditions within the study portion of Calloway County. The complete Traffic Forecasting Technical Memorandum can be found in **Appendix E**.

6.1 TRAFFIC FORECASTS

Regional population trends and growth rates from the Kentucky Statewide Travel Demand Model (KYSTM) were used to develop the forecasts.

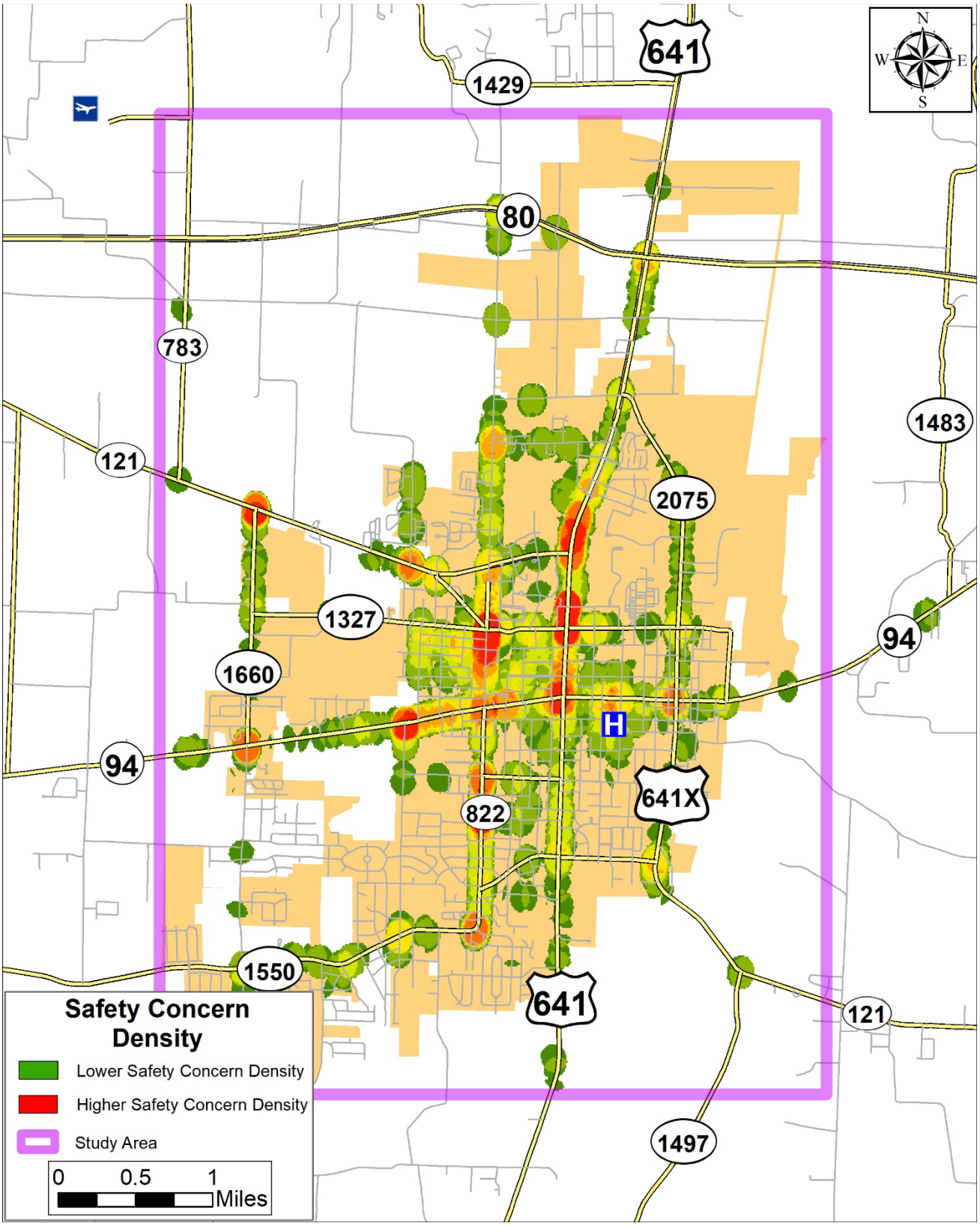

Figure 21: Public Survey – Safety Concern Heat Map

Table 2: Public Survey – Improvement Ideas

Improvement Category	Number
Turn lanes	88
Sidewalks/Crosswalks	83
Signal timing (mostly US 641)	55
Install traffic signal	46
Intersection improvements*	43
Bike facilities	41
Construct bypass**	27
Enforce speed limit/reduce speed	23
Additional through lanes***	19
Better signage	18
Improve sight distance	12
Fix flooding issues	6
Remove parking downtown	6
Repaving	6
Close 16th St to vehicular traffic	4
Fix roadside ditches	2
Build frontage roads for US 641	1
Additional parking	1

*Roundabouts were a popular suggestion
**To get traffic off US 641 (especially trucks)
***Especially the growing areas to the west

6.1.1 Population Growth

Over the past 20 years, Calloway County has experienced slight growth with a 0.41 percent increase in population per year between 2000 and 2020. The City of Murray saw similar growth, growing at a rate of 0.73 percent per year since 2000. Based on projections from the Kentucky State Data Center (KSDC), Calloway County is expected to grow 0.8 percent per year over the next 20 years as shown in **Table 3**.

Table 3: 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%
Calloway County	34,177	37,191	37,103	0.41%	43,503	0.80%
Murray	14,950	17,741	17,307	0.73%	N/A	

6.1.2 Kentucky Statewide Travel Demand Model (KYSTMv19) Updates

For the first Advisory Committee meeting, a survey was developed to solicit feedback from local officials and stakeholders in Murray. The survey asked respondents to indicate where residential and commercial growth is likely to occur within the study area over the next 20 years. Based on

results from the Advisory Committee survey, residential growth in Murray is expected in the western and southern portions of the study area. 2045 household data in the KYSTM were reallocated to reflect this expected growth.

Similarly, employment growth was also updated in the KYSTM based on results from the Advisory Committee survey. Commercial growth in Murray is expected in the eastern and northern portions of the study area, especially around KY 2075 and the KY 80/US 641 intersection.

The KYSTM originally divided Calloway County into 33 traffic analysis zones (TAZs). These zones are used to allocate socioeconomic data such as households, employment, and population for trip productions and attractions. These data, and particularly the estimated projections, are fundamental to the forecast development process. To better reflect land-use within the 5,972 TAZs, several zones were split, resulting in 5,984 total zones.

6.1.2.1 KYSTM Growth Rates

The updated base year and future year models were then run, and daily volumes were assigned to each link.

Based on the results, it is evident that routes in the western portion of the study area are expected to grow at a faster rate than those to the east, which matches what was shared by the local Advisory Committee. Therefore, average growth rates were calculated for the western and eastern portions of the study area. An annual growth rate of 1.35 percent was used for routes west of US 641and 0.6 percent was used for routes to the east including US 641.

6.1.3 2045 Traffic Forecasts

The growth rates were also used to develop 2045 daily traffic forecasts, as shown in **Figure 22**. To evaluate the adequacy of roadway segments, existing ADT volumes were compared to the road's theoretical capacity. This is the preferred KYTC methodology for evaluating the adequacy of roadway segments. A volume-to-capacity ratio (V/C) represents proportion of

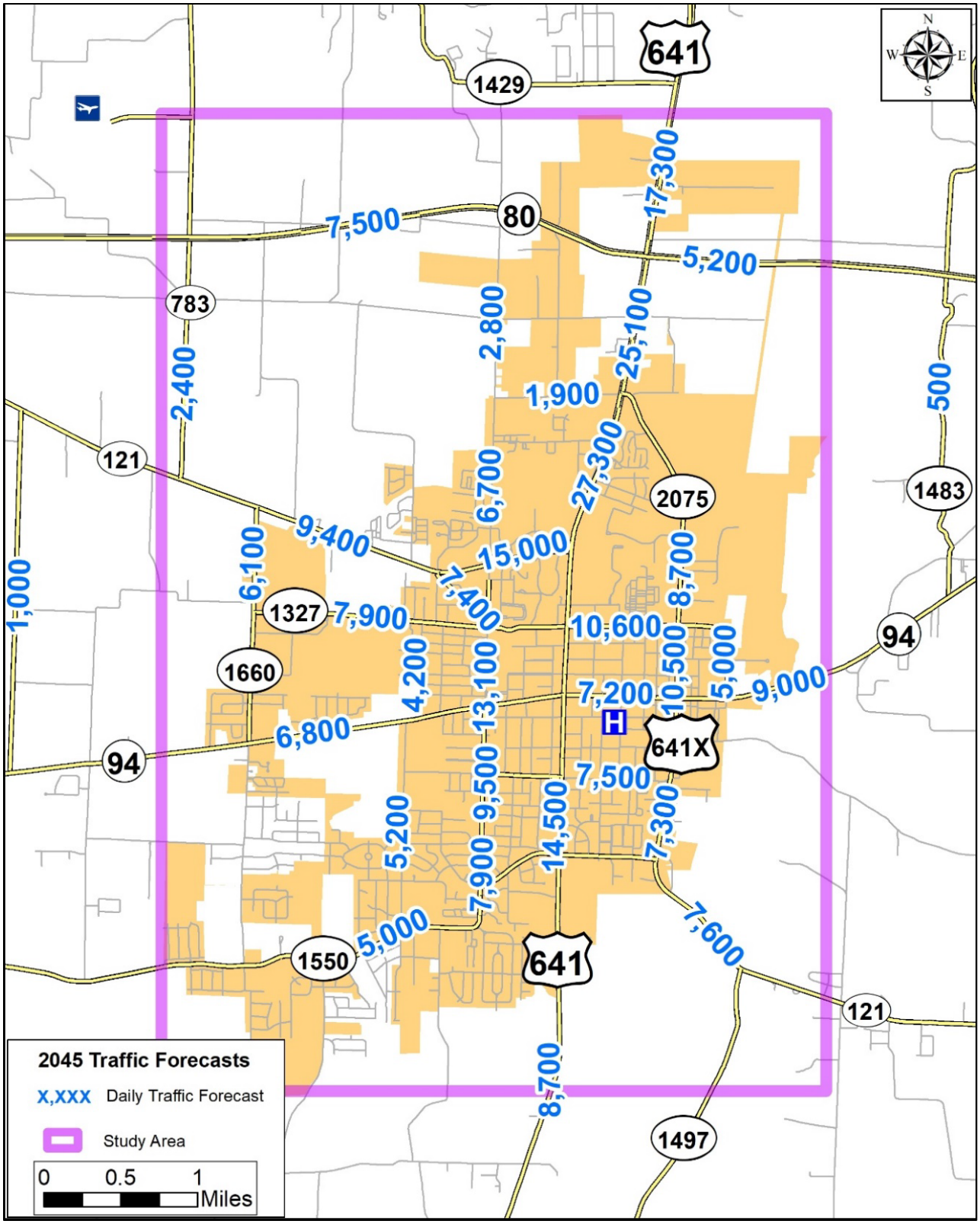

Figure 22: 2045 Daily Traffic Forecasts

traffic demand for using the roadway for the designated time period in relation to its capacity to serve the demand.

The threshold V/C ratio is 1.0 for urban areas. A V/C greater than 1.0 indicates the road is operating above its design capacity and may be congested. After performing a V/C analysis using Highway Capacity Manual (HCM) procedures with the KYSTM, portions of KY 94, KY 121, KY 822, US 641, US 641X have a V/C greater than 1.0 in the year 2045, indicating that mitigation measures (including the possibility of constructing additional lanes) may be warranted. All other roadway segments are expected to operate at less than capacity in the year 2045 with a V/C less than 1.0, as shown in **Figure 23**.

7.0 INITIAL IMPROVEMENT CONCEPTS

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, input from the Advisory Committee, and input from the public. The improvement concepts were categorized as follows:

- **Short-Term:** The short-term concepts are typically lower-cost improvements that can be implemented in the near future. These types of improvements should require little or no right-of-way to construct and, in some cases, could conceivably be implemented by the KYTC Division of Maintenance as part of regular activities.
- **Long-Term:** The long-term concepts are higher-cost improvements that will require more significant resources to implement. These types of improvements will generally require additional right-of-way to construct and will need to be funded through Kentucky's Highway Plan.
- **Bicycle/Pedestrian:** The bicycle and pedestrian concepts can be stand-alone projects or can be added to the short- and long-term concepts.

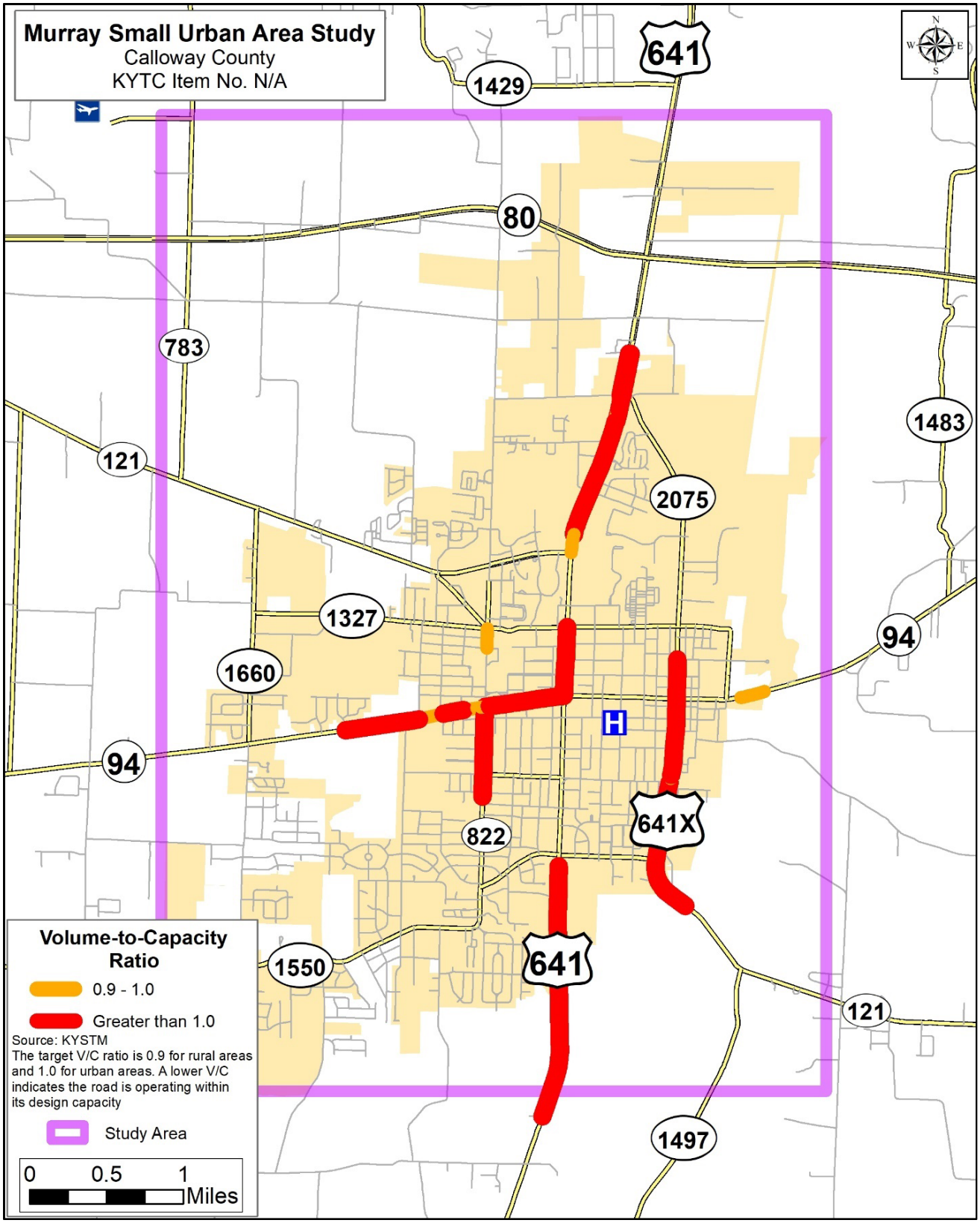

Figure 23: 2045 Volume-to-Capacity (V/C) Ratio

7.1 SHORT-TERM IMPROVEMENT CONCEPTS

Nine short-term improvement concepts were initially developed, as shown in **Figure 24** and detailed below.

7.1.1 Short-Term Improvement Concept 1: US 641 Corridor between KY 80 and US 641X (Glendale Road)

Project Needs: US 641 is the only north-south principal arterial in Calloway County and the only Federally Authorized Truck Route in the area. This five-lane roadway provides a regional connection from I-69 in the north to Tennessee in the south. It also serves local trips and provides access to the many businesses on the commercial section through Murray. Over the three-year period between 2017 and 2019, there were 800 reported crashes on the study portion of US 641, 97 of which involved an injury. Three hundred and forty-eight (44 percent) of the crashes were rear end collisions and 226 (28 percent) were angle collisions, indicating that traffic congestion may be contributing to the high number of crashes. On this stretch of US 641, the EEC ranges from 12 – 55 crashes per year, indicating that more crashes are predicted than would be expected along similar roadways. US 641 is expected to carry up to 27,300 VPD by 2045 and was the most identified corridor as having transportation issues, especially related to congestion and the need for improved signal timing, in the public survey.

Faded Street Sign on US 641

Improvement Options: One improvement option for the US 641 corridor is to perform a more detailed traffic operations analysis. This analysis could include collecting turning movement counts and developing a simulation model to analyze intersection improvements between KY 80 and Glendale Road, including signal timing optimization and lane configuration. With the highest ADTs in the county, optimizing US 641 for current conditions and preparing it for future conditions is imperative to a healthy transportation system in Murray.

An additional improvement concept for this corridor is to update the signs. Many of the overhead signs on intersecting roadways are faded and are difficult to read. This will include converting the five-Section "Doghouse," a traffic signal head with two columns of yellow and green signals below a single red head, to Flashing Yellow Arrow (FYA) signal head displays.

7.1.2 Short-Term Improvement Concept 2: US 641 at Keepers Way and Lowes Drive

Project Needs: Keepers Way and Lowes Drive provide access from US 641 to a shopping center that includes Walmart and Lowe's Home Improvement Store. Between 2017 and 2019, there were 24 reported crashes at the signalized Keepers Way intersection and 18 crashes at the unsignalized Lowes Drive intersection. Traffic on this portion of US 641 is expected to be around 27,300 VPD in 2045. These intersections were identified in the public survey as having transportation concerns related to poor signal timing at Keepers Way and unsafe turning conditions at Lowes Drive.

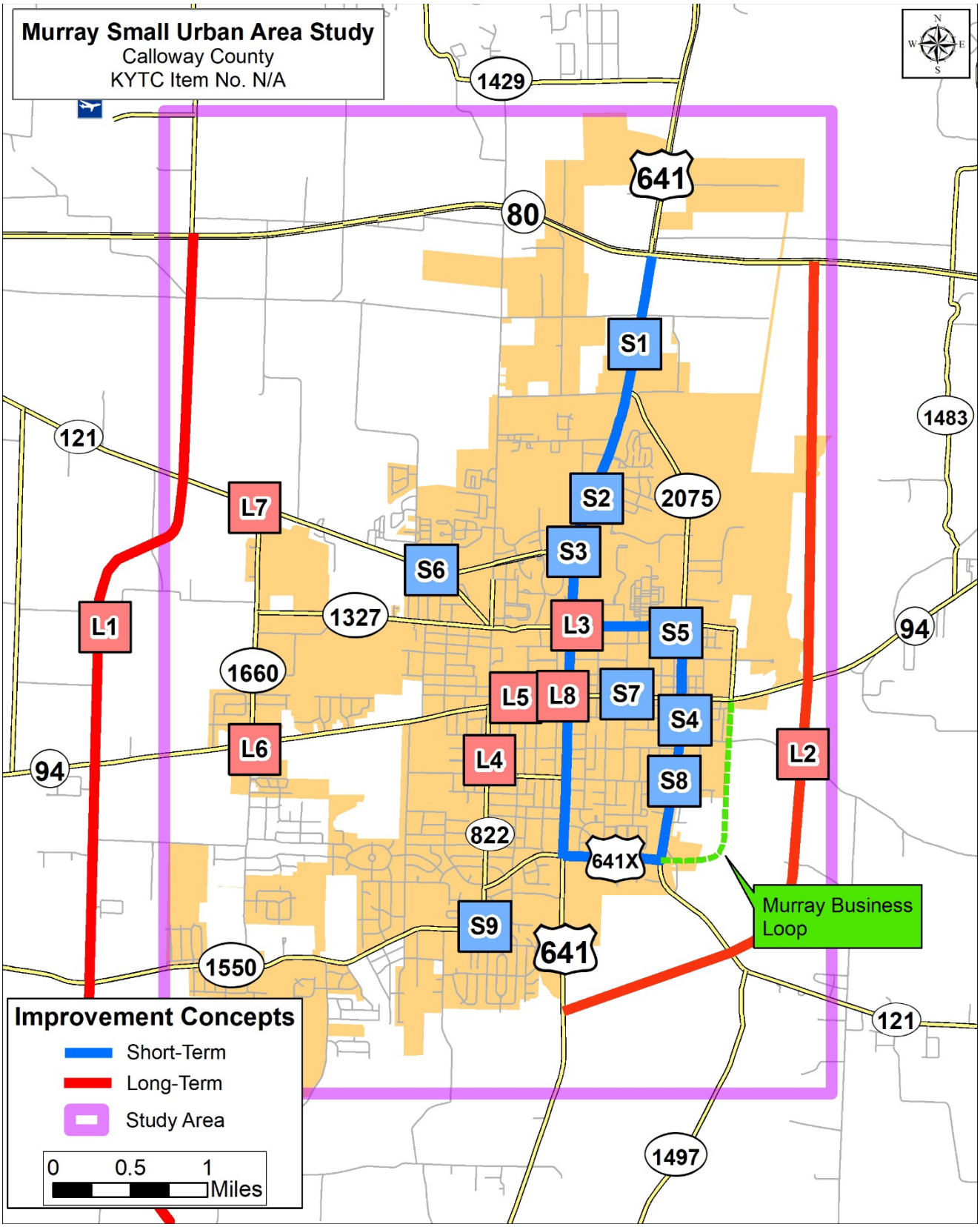

Figure 24: Preliminary Short- and Long-Term Improvement Concepts

Improvement Options: With only 600 feet between the two intersections, access management guidelines do not recommend adding an additional traffic signal at Lowes Drive. One improvement option is to construct a raised median on US 641 and the Lowes Drive intersection would be converted to right-in/right-out to restrict left turns to the signals at Keepers Way and KY 121. This would improve safety by restricting unsignalized left turns across multiple lanes of traffic. Turning movement counts were collected at Keepers Way and KY 121 to assist with the signal optimization for this improvement.

7.1.3 Short-Term Improvement Concept 3: US 641 at KY 121

Project Needs: KY 121 is a northern boundary for the MSU campus and provides access to the MSU football and basketball stadiums. The KY 121 intersection with US 641 was identified in the public survey as having transportation concerns related to the need for additional turn lanes and better signal timing. Over the three-year period between 2017 and 2019, there were 64 reported crashes at the US 641 intersection with KY 121, six (9 percent) of which involved an injury and 48 (75 percent) were rear end or angle collisions. This intersection has an EEC of 6 crashes per year, indicating that more crashes are predicted than would be expected along similar roadways. The eastbound KY 121 approach currently has one left-turn lane, one through lane, and one shared through/right-turn lane and is expected to carry 9,400 VPD in 2045.

Improvement Options: With most of the traffic turning left or right, an improvement option is to re-stripe the approach to include two left-turn lanes and a shared through-right-turn lane. Collecting a turning movement count at this location would also help optimize signal operations. The westbound approach is the entrance to a shopping center and would benefit from some delineation to clearly define paths and provide stop signs on the access road. One final improvement option is to move the northbound US 641 stop bar closer to the intersection. It was originally placed further back due to the location of the crosswalk, which has since been relocated closer to the intersection.

7.1.4 Short-Term Improvement Concept 4: US 641X corridor

Project Needs: US 641X is a 2.8-mile business loop of US 641 located along the east side of Murray between Glendale Road and KY 121. It provides access to the commercial and industrial areas of east Murray along with the old courthouse near KY 94. Over the three-year period between 2017 and 2019, there were 139 reported crashes on the US 641X corridor, nine (7 percent) of which were injury and 66 (49 percent) of which were rear end or angle collisions. The EEC ranges from 0 to 14 crashes per year, indicating that more crashes are predicted than would be expected along similar roadways. Traffic on US 641X is expected to grow to 10,500 VPD by 2045. Based on feedback from the public survey, this route was identified as having transportation concerns, especially relating to truck traffic and poor pavement condition.

Improvement Options: A short-term improvement option is to restrict through truck traffic on US 641X. This would provide a safer route for passenger vehicles and would enable the pavement to last longer.

7.1.5 Short-Term Improvement Concept 5: Courthouse Square

Truck Traffic around the Courthouse Square

Project Needs: The former Calloway County Courthouse is surrounded by US 641X to the east, Maple Street to the south, south 5th Street to the west, and Main Street (KY 94) to the north, all together referred to as the Courthouse Square. There are businesses facing all four sides of the courthouse, with angled parking available along both sides of the street. Between 2017 and 2019, there were 27 reported crashes around the Courthouse Square, all of which were PDO collisions and nine (33 percent) of which were backing collisions. US 641X carries the most daily traffic around the courthouse, with 10,500 VPD expected in 2045. This location was identified as having transportation concerns through the public survey, especially relating to safety issues with the on-street parking and narrow lanes.

Improvement Options: An improvement option is to close 5th Street to traffic between Main Street and Maple Street and convert it to a pedestrian friendly pavilion or farmer's market. This would provide a safer walking space for pedestrians and provide more opportunities for public events. Another improvement option is to convert the on-street parking to back-in parking. Signs would direct drivers to pull past the parking spot, then back in. This would reduce the likelihood of backing collisions.

7.1.6 Short-Term Improvement Concept 6: KY 121 at Lowes Drive

Project Needs: West of the MSU campus, KY 121 has two westbound through lanes at the Lowes Drive intersection. The left through lane continues to the west while the right lane ends just past the intersection. The merging of the through lanes was identified as causing safety and congestion issues based on feedback from the public survey. Between 2017 and 2019, there were 21 crashes on this portion of KY 121, which has an EEC of two crashes per year. Daily traffic on KY 121 is expected to be around 9,400 VPD in 2045.

Improvement Options: An improvement option is to restripe the right through lane into a right-turn lane at the Lowes Drive intersection. This would improve safety and congestion by removing the merge west of the intersection.

7.1.7 Short-Term Improvement Concept 7: KY 94 at North 8th Street

Project Needs: Near Murray Middle School, the KY 94 intersection with North 8th Street was identified as having more crashes than anticipated, with an EEC of four crashes per year. Between 2017 and 2019, there were 17 reported crashes at this intersection, 15 (88 percent) of which were angle collisions. Five of the crashes occurred during school arrival between 7:30 am and 8:30 am and six of the crashes occurred between 11:30 am and 12:00 pm. This portion of KY 94 has a 2021 ADT of 6,300 VPD and is expected to carry 7,200 VPD in 2045.

Improvement Options: An improvement concept is to install a four-way stop. This would require all vehicles to stop and would improve safety by slowing traffic on KY 94. A turning movement count would be needed to analyze the traffic impacts before installing a four-way stop.

7.1.8 Short-Term Improvement Concept 8: US 641X at Sycamore Street

Project Needs: On the southern end of US 641X, the Sycamore Street intersection was identified in the public survey as having safety issues and needing intersection reconfiguration. The Sycamore Street approach is stop-controlled and southbound US 641X has a channelized right-turn onto Sycamore Street. Between 2012 and 2021, there were 22 reported crashes, 12 (55 percent) were rear end collisions. This section of US 641X is expected to carry 10,500 VPD in 2045 while Sycamore Street is expected to carry 7,200 VPD.

Improvement Options: An improvement option is to remove the channelized right-turn and square up the intersection. This intersection could also be analyzed to determine if a three-way stop is warranted. A turning movement count would be needed for this analysis.

7.1.9 Short-Term Improvement Concept 9: KY 1550 at Oxford Drive

Project Needs: In the southwestern residential section of Murray, KY 1550 has a horizontal curve with two channelized turn lanes at Oxford Drive and was identified in the public survey as having safety concerns and needing reconfiguration. Between 2017 and 2019, there were nine reported crashes on this curve, four (44 percent) of which were single vehicle. This section of KY 1550 is expected to carry 7,900 VPD in 2045.

Improvement Options: An improvement option is to remove the channelized turn lanes and square up the Oxford Drive intersection. This would reduce the likelihood of vehicles entering the turn lanes with too much speed. Additionally, curve warning signs could be added to encourage drivers to slow their speed before entering the curve.

7.2 LONG-TERM IMPROVEMENT CONCEPTS

Eight long-term improvement concepts were initially developed, as detailed below.

7.2.1 Long-Term Improvement Concepts 1 & 2: Bypass Options around Murray

Project Needs: US 641 is the only north-south principal arterial in Calloway County and the only Federally Authorized Truck Route in the area. This five-lane roadway provides a regional connection from I-69 in the north to Tennessee in the south. It also serves local trips and provides access to many businesses on the commercial corridor through Murray and was the most identified corridor in the public survey as having congestion issues. An option to relieve congestion on US 641 is to construct a bypass around Murray.

Improvement Options: The first option, the West Bypass, is a bypass around the western portion of Murray that utilizes some existing routes such as Oaks Country Club Road, Hudson Road, and Airport Road. This concept would provide a more direct route from the residential areas on the

west side of Murray to the KY 121 corridor and the MSU campus. The KYSTM estimates the West Bypass could carry up to 8,700 VPD in 2045 and divert up to 1,800 VPD from US 641.

The second option, the East Bypass, was identified as a possible bypass option in 2004 and provides a connection between US 641 south of Murray and KY 80 east of the US 641 intersection. The KYSTM estimates the East Bypass could carry up to 10,200 VPD in 2045 and divert up to 4,300 VPD from US 641.

7.2.2 Long-Term Improvement Concept 3: US 641 (Chestnut Street to Arcadia Circle) / Chestnut Street (US 641 to 8th Street)

Project Needs: The Chestnut Street intersection with US 641 is in the center of the study area and is one of the most congested signalized intersections in Murray. Traffic often queues on the westbound Chestnut Street approach and blocks the Rushing Way intersection, making it difficult for left-turning vehicles to enter and exit. Rushing Way continues north and eventually intersects with US 641. This unsignalized intersection was identified in the public survey as having safety concerns for turning vehicles, especially vehicles turning left. Between 2017 and 2019, there were 20 reported crashes at the Arcadia Circle/Rushing Way intersection, four (20 percent) of which were injury and 15 (75 percent) of which were angle collisions. Over the same three-year period, there were six reported crashes at the Chestnut Street intersection with Rushing Way. The section of US 641 between Arcadia Circle/Rushing Way and Chestnut Street has several direct access points for businesses and has experienced a higher number of crashes than would be expected with an EEC of four crashes per year. Additionally, this is one of the higher volume sections of US 641, with 28,600 VPD expected in 2045. With these traffic volumes, access management guidelines would recommend a non-traversable median to restrict left turns to the signalized intersections.

The westbound approach of Chestnut Street at the US 641 intersection is the northern terminus of US 641X and serves primarily commercial businesses with multiple access points. Between 2017 and 2019, there were 39 reported crashes in this area, 11 (28 percent) of which were sideswipe collisions. This section of US 641X is expected to carry 10,600 VPD in 2045 and was identified in the public survey as having safety issues with turning vehicles.

Access Points along US 641X

Improvement Options: An improvement option is to develop a Traffic Circulation and Access Management Plan for this area to install a non-traversable median on US 641, consolidate entrances along US 641X, and examine frontage and backage road connections between properties. This would improve traffic operations and safety by reducing the number of conflict points. With only 700 feet between the two intersections, access management guidelines do not recommend adding an additional traffic signal on US 641 at Arcadia Circle. Another improvement option is to perform a signal warrant analysis for the US 641X intersection with 10th Street.

7.2.3 Long-Term Improvement Concept 4: Sycamore Street at South 16th Street

Project Needs: South of the MSU campus, 16th Street provides a north-south connection for the residential neighborhoods in west Murray. The Sycamore Street intersection is signalized and provides a connection to Murray High School to the west and US 641 to the east. Between 2017 and 2019 there were 12 reported crashes at this intersection, six (50 percent) of which were rear end collisions. This portion of Sycamore Street is expected to carry 5,800 VPD in 2045. This intersection was identified in the public survey as having safety concerns and needing signal retiming.

Improvement Options: One improvement concept is to reconfigure the intersection. Options include replacing the diagonal signal span with a box span, installing a four-way stop, constructing turn lanes, and constructing a roundabout.

7.2.4 Long-Term Improvement Concept 5: Main Street (KY 94) at 13th Street

Project Needs: West of US 641, North 13th Street is a local road that runs north-to-south and intersects KY 94 at a skewed angle. Due to its proximity to US 641, traffic on KY 94 often backs up and blocks the 13th Street intersection. Based on results from the public survey, there are safety concerns with turning left onto and off 13th Street and the surrounding businesses. Between 2017 and 2019, there were 20 reported crashes, 11 (55 percent) of which were rear end collisions. This portion of KY 94 is expected to carry 18,300 VPD in 2045.

Improvement Options: An improvement option is to extend the eastbound KY 94 left-turn lane at the US 641 intersection or provide a two-way left-turn lane to provide safer turning opportunities off of KY 94. Another improvement option is to perform access management and consolidate entrances on KY 94 to reduce the number of conflict points.

Additionally, the 13th Street intersection could be converted to right-in/right-out to eliminate left turns. A final option is to realign the 13th Street approaches to remove the skew.

7.2.5 Long-Term Improvement 6: KY 94 at KY 1660 (Robertson Road)

Project Needs: West of Murray, KY 94 and KY 1660 are rural two-lane roads that serve mainly residential and farmland areas. This western part of Murray is likely to experience residential growth over the next 20 years according to feedback from local officials. The KY 94/KY 1660 intersection is signalized and was identified in the public survey as having safety and congestion issues and needing additional turn lanes. Between 2017 and 2019, there were eight reported crashes at this intersection, four (50 percent) of which were angle collisions. This portion of KY 94 is expected to carry 6,800 VPD in 2045 while KY 1660 is expected to carry 6,100 VPD.

Improvement Options: An improvement concept is to convert the intersection to a roundabout.

7.2.6 Long-Term Improvement 7: KY 121 at KY 1660 (Robertson Road)

Project Needs: KY 1660 provides a north-south connection for the residential and rural areas in west Murray. Its northern terminus intersects with KY 121 and was identified in the public survey as having safety issues, especially related to poor sight distance. Over the three-year period between 2017 and 2019, there were six reported crashes, four (67 percent) of which were injury collisions. This portion of KY 121 is expected to carry 9,400 VPD in 2045 while KY 1660 is expected to carry 6,100 VPD.

Improvement Options: An improvement concept is to convert the intersection to a roundabout.

7.2.7 Long-Term Improvement 8: Main Street (KY 94) at 14th Street

Project Needs: West of US 641 on the MSU campus, KY 94 provides a major east-west connection for MSU, the residential areas to the west, and the commercial areas to the east. The North 14th Street intersections on this portion of KY 94 are offset, causing through traffic on 14th Street to turn twice before continuing. Between 2017 and 2019 there were two reported crashes at this intersection, one backing and one rear end collision. This section of KY 94 is expected to carry 18,300 VPD in 2045 and was identified in the public survey as needing turn lanes.

Improvement Options: An improvement option is to construct a TWLTL on KY 94 to provide safe opportunities for drivers to turn left. Another option is to realign the North 14th Street approaches to eliminate the offset. Both options could include shared-use paths.

7.3 BICYCLE/PEDESTRIAN IMPROVEMENT CONCEPTS

In order to best serve Murray residents' alternative transportation needs, the project team evaluated land use patterns, prior planning studies, and a public survey. Land use patterns were used to create the base of the proposed network, which seeks to serve the greatest number of people by connecting common origins and destinations. These origins and destinations include high-density residential areas, commercial corridors, industrial/employment areas, schools, parks, and medical facilities.

Two prior planning studies also informed the proposed network. The 2020 Murray Comprehensive Plan includes proposed cycle paths, which are laid out in three phases: the first phase concentrates on connections into town and downtown arteries; the second phase focuses on the campus area and minor downtown streets; and the third phase focuses on the western and southern parts of town. The five-year Sidewalk Plan developed by the City of Murray Department of Planning and Engineering in 2021 shows that Murray currently has a strong sidewalk network within urbanized areas, but there are gaps throughout. New sidewalks have been proposed by that plan, such as on the west side of campus, portions of 12th through 15th Streets downtown, the northern part of the industrial district on the east side of town, and the shopping area north of town on US 641.

The results of the public survey also provided guidance for the proposed bike and pedestrian network. Participants were asked to identify locations on a map where they would like to see bike facilities, sidewalks, or shared-use facilities. The most diverse input was concentrated near campus, the heart of downtown, and on major corridors like 16th Street, US 641, and KY 94.

Using the data gathered from the survey, prior planning studies, and a review of land use patterns, concepts were developed for bicycle and pedestrian improvements throughout Murray. The concepts have four possible typical sections[1]:

1. Sidewalks: **Figure 25** shows a typical cross section.

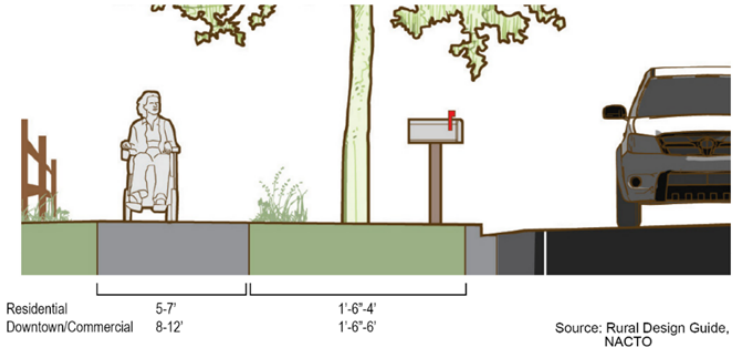

Figure 25: Typical Cross Section with a Sidewalk

2. Buffered on-street bike lanes and sidewalks: **Figure 26** shows a typical cross section.

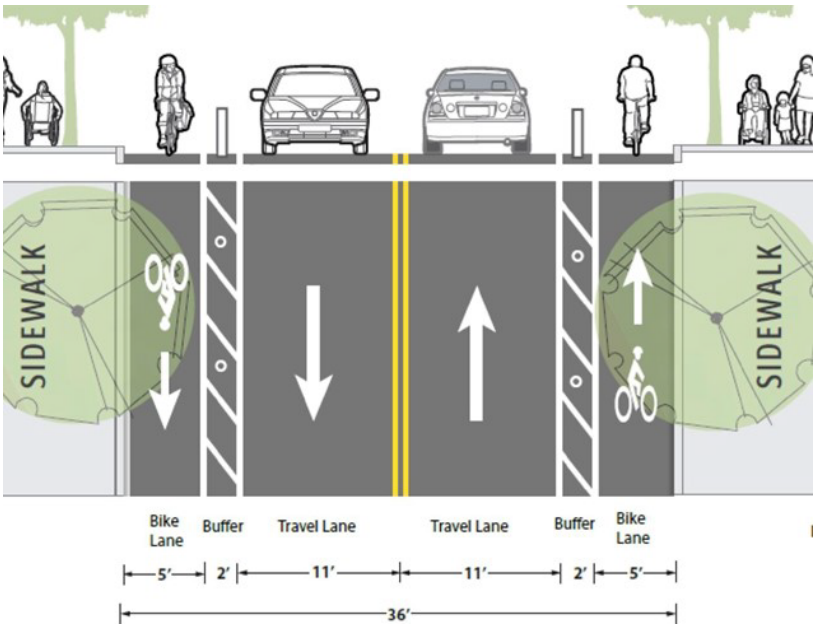

Figure 26: Typical Cross Section for On-Street Bike Lanes and Sidewalks

[1] See NACTO's Urban Bikeway Design Guide for more information on desired widths and configurations. https://nacto.org/wp-content/uploads/2011/03/NACTO_UrbanBikeway_DesignGuide_MRez.pdf

3. A shared-use path on one side of the road that would be shared by pedestrians and cyclists, as shown in **Figure 27.**

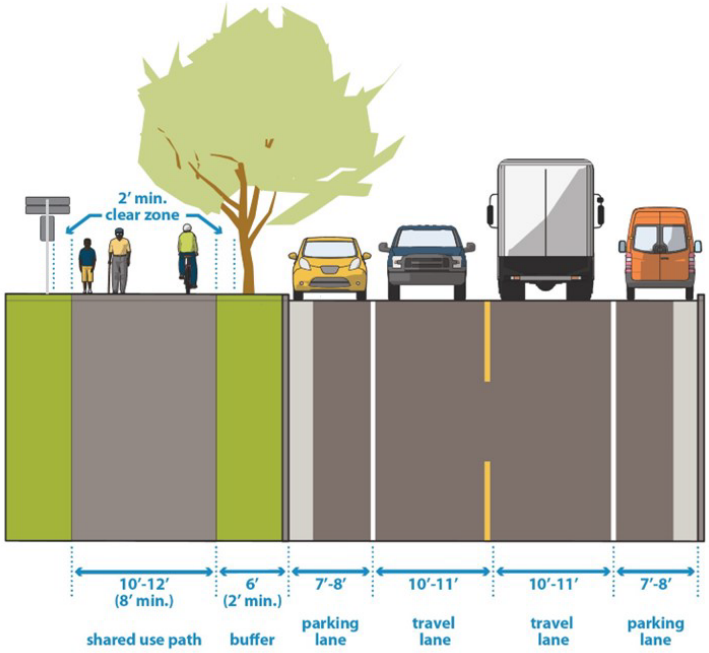

Figure 27: Typical Cross Section for Shared-Use Path

4. On-street bike lanes, as shown in **Figure 28**.

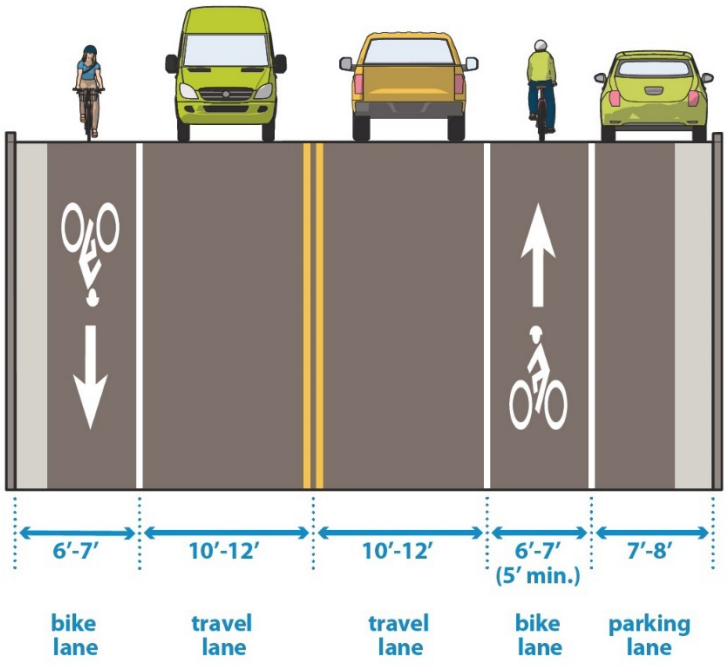

Figure 28: Typical Cross Section for Unprotected Bike Lanes
Source: Minneapolis Street Design Guide

7.3.1 Bicycle/Pedestrian Concept Descriptions

Proposed bicycle and pedestrian improvement concepts are detailed below and shown in **Figure 29**.

Bicycle/Pedestrian Concept 1: On KY 1327 from KY 1660 to KY 2075, a shared-use path is proposed. This route would stretch from the western, rural edge of town, past Calloway County High School and Calloway County Middle School, through the heart of Murray State University and to the industrial district on the east side of town.

Bicycle/Pedestrian Concept 2: This concept creates a safe pedestrian route through the heart of downtown, from the rural area in the west to the industrial district on the east side of town. The route will pass by connections to Murray High School, Murray Middle School, and Murray Elementary School. The suggested treatment is a shared-use path on KY 94 from Belle Meade Drive to Industrial Road.

Bicycle/Pedestrian Concept 3: A shared-use path is proposed on KY 1660 from KY 1550 to KY 121. This route runs north-south along the western side of town and passes through residential and rural areas, connecting to three proposed east-west routes.

Bicycle/Pedestrian Concept 4: This concept would connect travelers on KY 94 to Murray High School, and from the school to the east side of town. On Doran Road from KY 94 to Sycamore Street, sidewalks are proposed, while buffered on-street bike lanes and sidewalks are suggested on Sycamore Street from Doran Road to US 641X.

Bicycle/Pedestrian Concept 5: This multi-road concept connects several high-density residential areas to the major commercial corridor on US 641. On Opportunity Drive, on Utterback Drive between Opportunity Drive and US 641, on 16th Street from the end of the existing sidewalk to Diuguid Drive, and on Diuguid Drive from 16th Street to US 641, sidewalks are the proposed

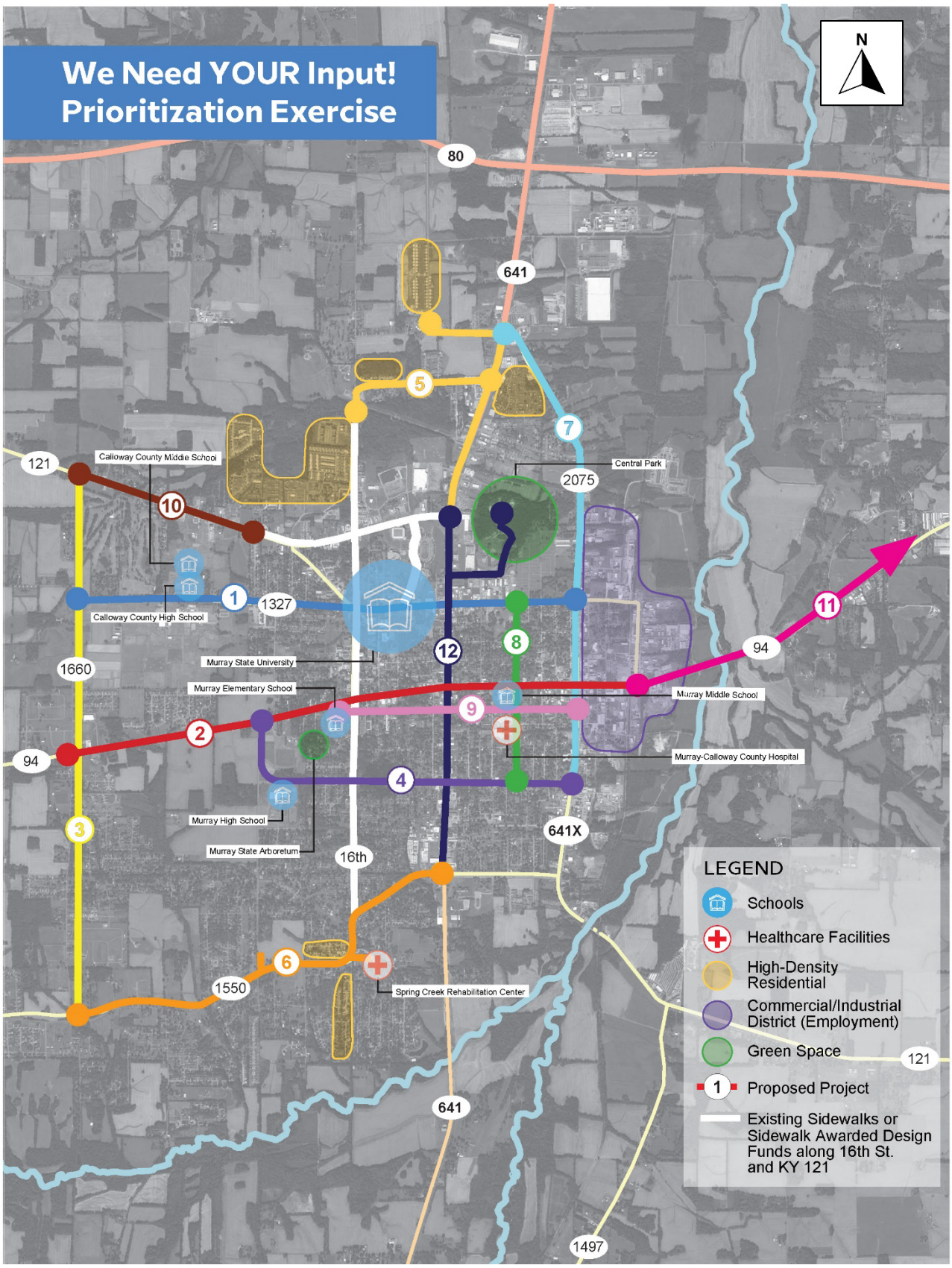

Figure 29: Bicycle and Pedestrian Concepts

treatment. A shared-use path is suggested on the major thoroughfare, US 641, between Utterback Road and KY 121. Safe crosswalks are proposed on US 641 at Lowes Drive and at Center Drive that will allow pedestrians to access shopping areas.

Bicycle/Pedestrian Concept 6: This route runs along the southern end of town and connects the rural and residential areas in the west to the southern end of downtown. It passes through residential areas, including two with high-density, as well as Spring Creek Rehabilitation Center. For most of this route, a shared-use path is the proposed treatment: on KY 1550 from King Drive to 16th Street, on 16th Street from KY 1550 to Glendale Road, and on Glendale Road from 16th Street to US 641. Sidewalks are proposed on Doran Road from KY 1550 to Azalea Drive, which would connect a neighborhood to the rest of the route.

Bicycle/Pedestrian Concept 7: Buffered on-street bike lanes and sidewalks are proposed on KY 2075 from US 641 to Sycamore Street. This corridor on the eastern edge of town would link the northern end of US 641, near shopping and high-density residential areas, to the industrial district where residents may work, as well as other destinations in the southeastern quadrant of Murray like Murray Middle School and the Murray-Calloway County Hospital.

Bicycle/Pedestrian Concept 8: Buffered on-street bike lanes and sidewalks are proposed on 8th Street between KY 1327 and Sycamore Street. This north-south route through downtown would connect to several proposed east-west routes and pass near Murray Middle School and the Murray-Calloway County Hospital.

Bicycle/Pedestrian Concept 9: Connecting Murray Elementary School and Murray Arboretum to thoroughfares and the east side of town, this concept consists of buffered on-street bike lanes and sidewalks on Poplar Street between South Broach Avenue in the west and KY 2075 in the east.

Bicycle/Pedestrian Concept 10: A shared-use path is proposed on KY 121 from KY 1660 to U B Bailey Road. This concept would connect the rural northwest corner of town, several businesses, a country club, a church, and the school baseball fields to existing sidewalks leading into town.

Bicycle/Pedestrian Concept 11: This route would create a regional bike connection for longer-distance cyclists. Starting at Industrial Road on the eastern side of downtown, an on-street bike lane heading east out of town is proposed to connect to Land Between the Lakes. The treatment could transition from a bike lane to sharrows outside of town where there are lower traffic volumes. The entire route is around 17 miles.

Bicycle/Pedestrian Concept 12: This concept would create a safe pedestrian and cyclist route along the southern portion of the major commercial corridor of US 641, as well as a connection between US 641 and Central Park. On US 641 from KY 121 to Glendale Road, a shared-use path is proposed that would border the eastern edge of Murray State University and allow access to various restaurants and businesses and major downtown intersections. To connect US 641 to Central Park, buffered on-street bike lanes and sidewalks are proposed on Arcadia Circle from US 641 to Gil Hobson Drive, and on Gil Hobson Drive from Arcadia Circle to Central Park.

8.0 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 D**.

8.1 PROJECT MEETING NO. 2

The second Project Team Meeting for the subject project was held on February 16, 2022. The purpose of the meeting was to present the results from the public outreach survey and to get feedback from the project team on preliminary improvement concepts. Key discussion items included the following:

- KYTC Item No. 01-22312 to address the pavement condition on US 641X is currently in the design phase.
- A signal coordination project was conducted by KYTC in 2017 on US 641. Travel time data was used to adjust the green splits along the mainline to improve progression between the signals. No traffic counts were collected and green times on the side streets were not adjusted.
- It was noted that restricting through truck traffic on US 641X would not significantly reduce the number of trucks. Trucks are using US 641X to get to destinations in the industrial areas to the east.
- Starbucks and Aspen Dental have recently opened on Rushing Way and have added traffic to the area.
- The current box span signal at the KY 94 intersection of KY 1660 was installed through an HSIP project in 2016.
- The crash history at the KY 94 intersection with 14th Street does not warrant an improvement.
- There are "Share the Road" signs on US 641, indicating that bicyclists and vehicles should share the roadway. With significant congestion and high speeds, US 641 is not an ideal road for bicyclists.

8.2 ADVISORY COMMITTEE MEETING NO. 2

The second Advisory Committee Meeting for the subject project was held at Murray City Hall on July 28, 2022. The purpose of the meeting was to provide the Advisory Committee the opportunity to rank the proposed improvement concepts.

The project team presented the preliminary improvement concepts to the advisory committee and discussed results from the public survey. The Advisory Committee members were then given handouts and asked to rank the improvement concepts. The results from the scoring exercise are as follows:

Each Advisory Committee member was given nine points to rank the nine short-term improvement concepts. The members were directed to vote for at least two concepts. **Figure 30** presents the results. The US 641 Corridor received the most points (48) followed by the US 641 intersections with Keepers Way and Lowes Drive (10), the Courthouse Square (9), the KY 94 intersection with 8th Street (9), and the KY 94 intersection with 13th Street (9).

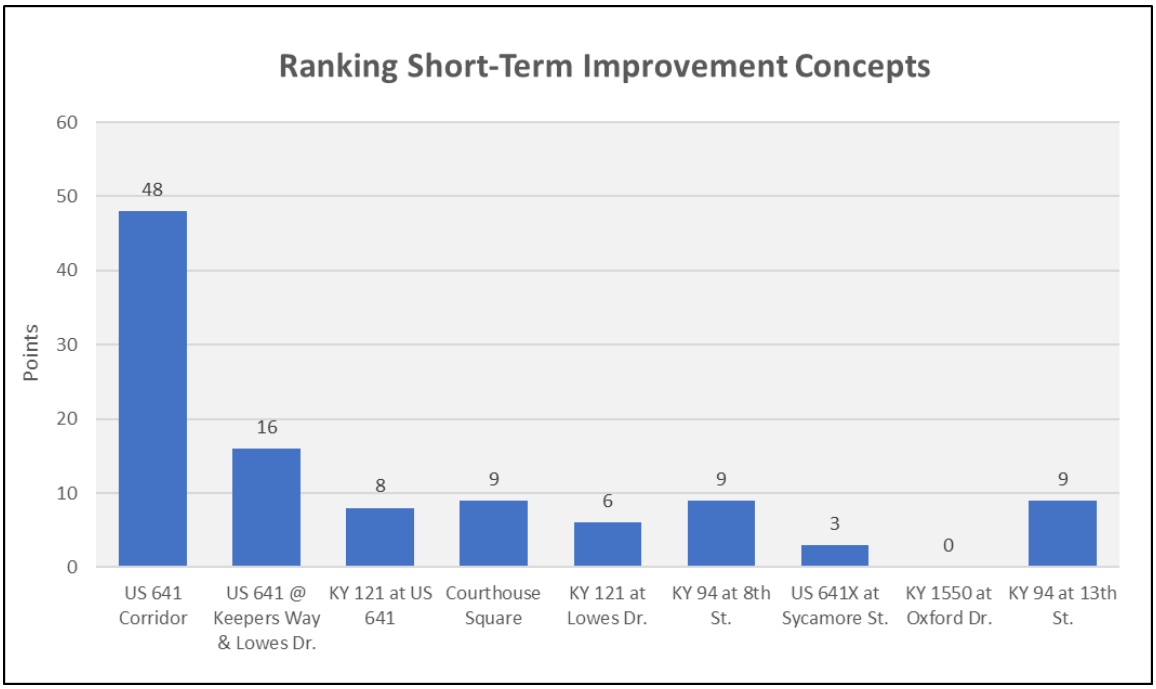

Figure 30: Advisory Committee Survey 2 – Ranking Short-Term Improvement Concepts

The Advisory Committee members were then given seven points to rank the seven long-term improvement concepts. The members were directed to vote for at least two concepts. **Figure 31** presents the results. The Main Street (KY 94) concept to construct a TWLTL received the most votes (32), with the bypass concepts receiving the next most votes.

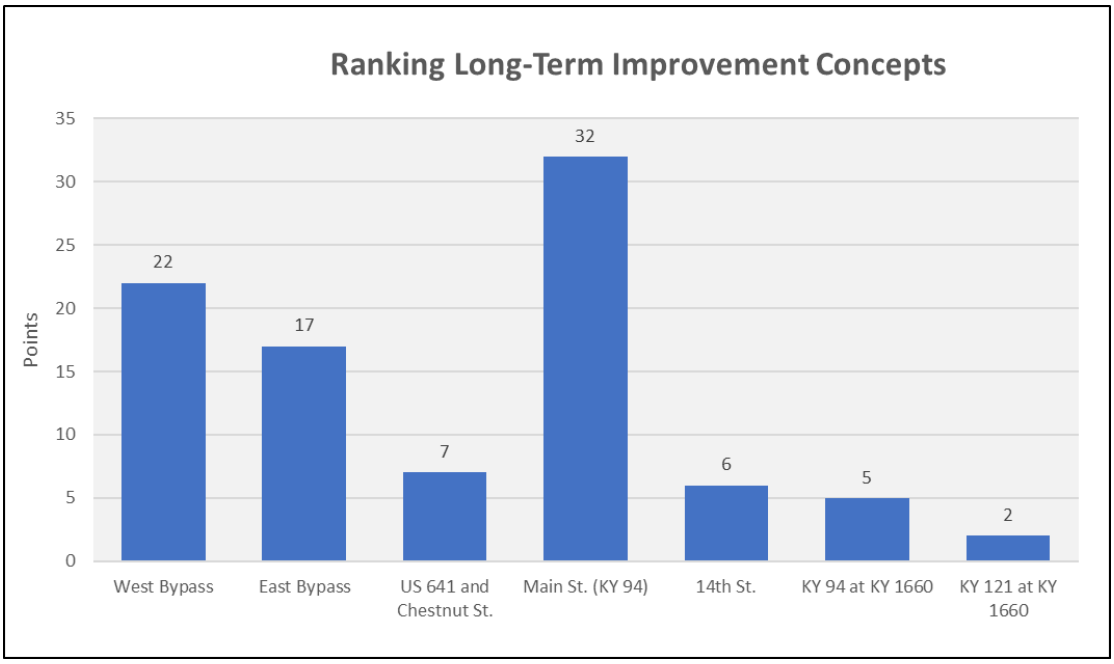

Figure 31: Advisory Committee Survey 2 – Ranking Long-Term Improvement Concepts

The Advisory Committee members were then given 12 points to rank the 12 bicycle/pedestrian improvement concepts. The members were directed to vote for at least two concepts. **Figure 32** presents the results. Constructing sidewalks on Doran Road and a buffered on-street bike lane with sidewalks on Sycamore Street received the most points (31) followed by constructing a shared-use path on KY 94 between Belle Meade Drive and Industrial Road.

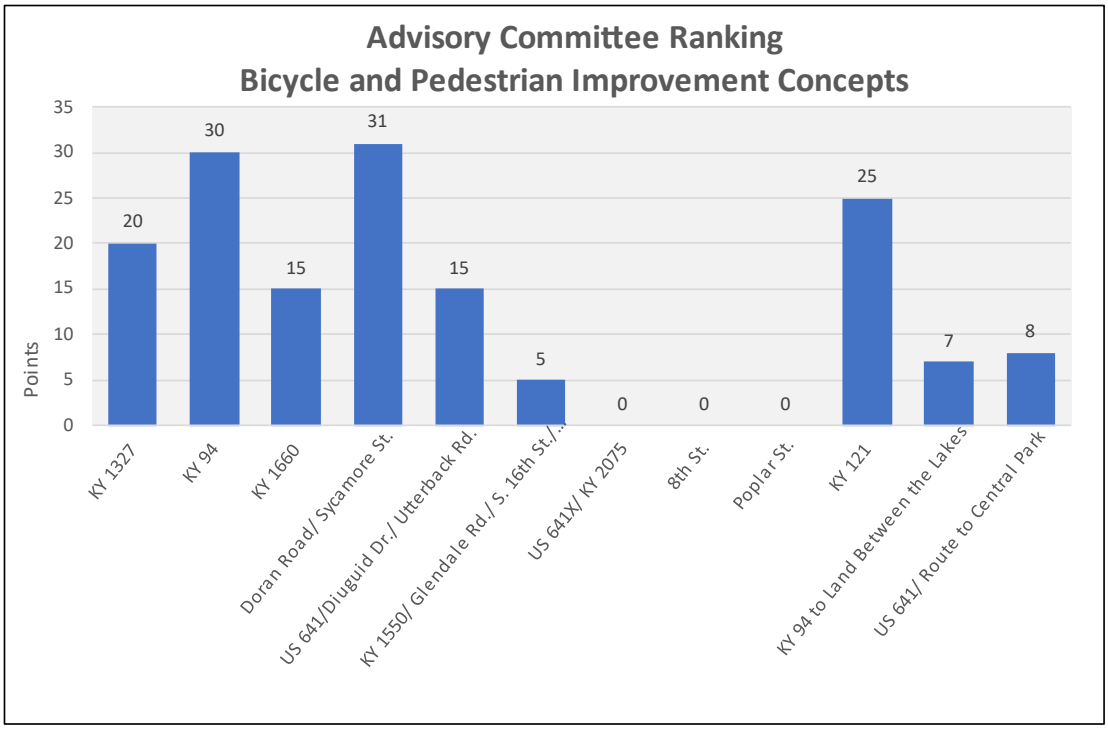

Figure 32: Advisory Committee Survey 2 – Ranking Bike/Ped Improvement Concepts

9.0 CONCLUSIONS

After the second round of meetings, improvement concepts were revised based on feedback from the project team, the Advisory Committee, and the public.

9.1 PROJECT TEAM MEETING NO. 3

The purpose of the third and final Project Team Meeting was to present the results from the second Advisory Committee Meeting and to prioritize the improvement concepts. Key discussion items included the following:

- It was noted during the Advisory Committee Meeting that improved signal timing should be a focus on US 641.
- Based on feedback from the Advisory Committee, a bicycle/pedestrian concept to provide a shared-use path from Bailey Road to the MSU Campus was added.
- Four Advisory Committee members requested to align the Eastern Bypass option with the Murray Business Loop and extend it to KY 80.

9.2 PRIORITIZATION

Concepts were prioritized based on results from the traffic analysis, safety analysis, public outreach, Advisory Committee feedback, and Project Team feedback.

9.2.1 Short-Term Improvement Concepts

The short-term improvement concepts were categorized as high priority, medium priority, low priority, and maintenance projects as shown in **Table 4** and **Figure 33**. Maintenance projects are improvements that the KYTC Division of Maintenance can implement internally. Detailed project sheets for the short-term improvement concepts are included in **Appendix F**.

Table 4: Short-Term Improvement Concepts

ID	Initial ID's	Location	Description	Total Cost Estimate	Priority
A	S1, S2, S3, L3	US 641	Perform a detailed traffic analysis on US 641	$250,000	High
B	S5	Courthouse Square	Convert 5th Street to pedestrian area and convert on-street parking to back-in parking	$240,000	Medium
C	S7	KY 94 at 8th Street	Install a four-way stop and curb bump out at the KY 94/8th Street intersection	$60,000	Medium
D	S8	US 641X at Sycamore Street	Remove the channelized right-turn lane from US 641X to Sycamore Street	$60,000	Low
E	S6	KY 121 at Lowes Drive	Terminate the westbound KY 121 through lane at Lowes Drive	$20,000	Maintenance
F	S9	KY 1550 at Oxford Drive	Enhance striping and signing at the KY 1550 horizontal curve at Oxford Drive	$15,000	Maintenance

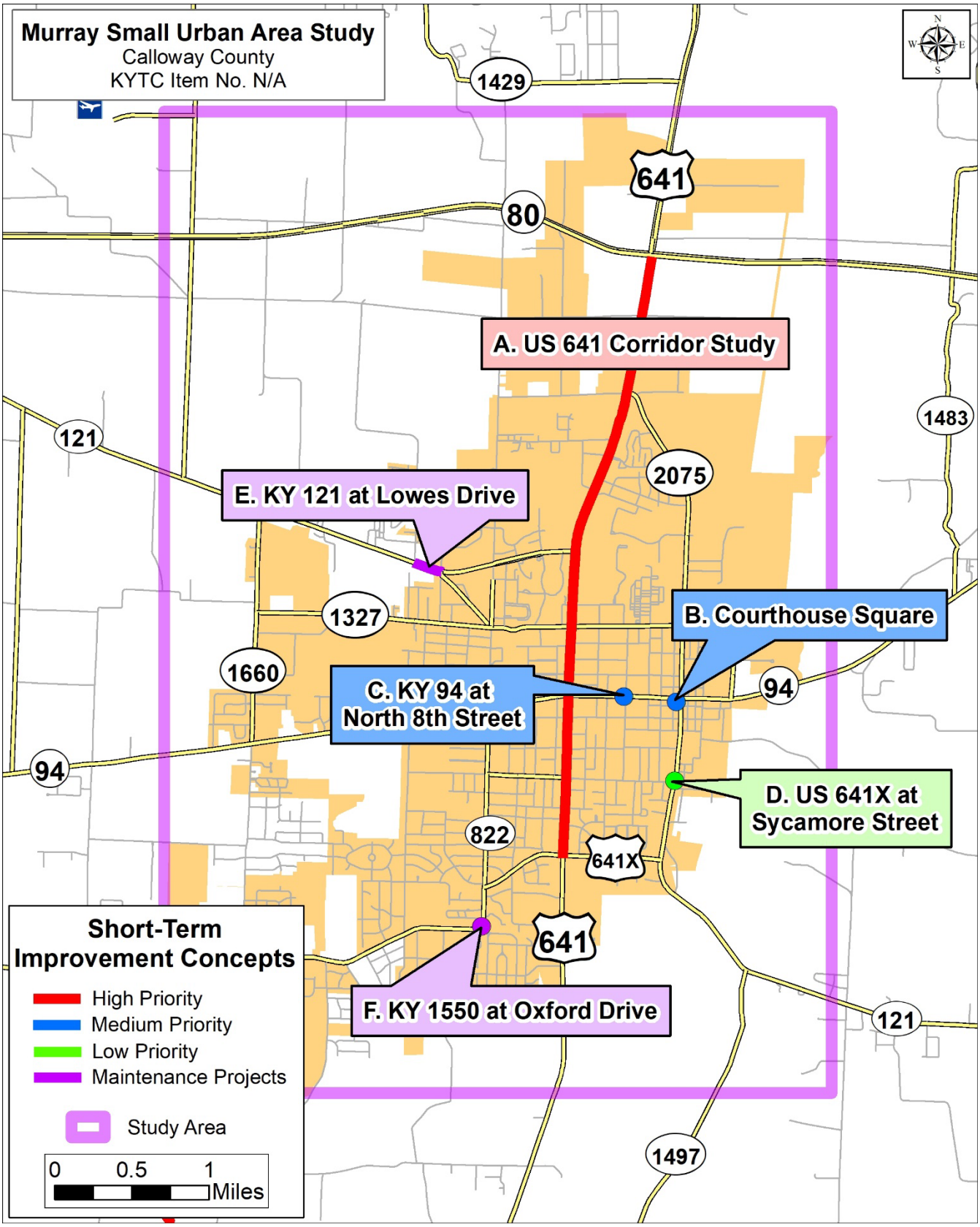

Figure 33: Short-Term Improvement Concepts

9.2.1.1 High Priority

US 641 Corridor Study between Glendale Road and KY 80

This concept includes performing a detailed traffic operations analysis with turning movement counts and a simulation model along US 641. The study will examine the need for updated traffic signal timing and signage. Because the following improvement concepts would impact traffic operations along US 641, it is recommended that they be included in this comprehensive US 641 Corridor Study:

- US 641 at Keepers Way and Lowes Drive: Construct a raised median on US 641 between Keepers Way and Lowes Drive.
- US 641 at KY 121: Restripe the eastbound KY 121 approach and improve signal timing at the US 641 intersection.
- US 641 and US 641X: Construct a raised median on US 641 and perform access management on US 641X (Chestnut Street).

9.2.1.2 Medium Priority

Courthouse Square

This concept includes closing 5th Street to traffic and converting it to a pedestrian area. The on-street parking could also be converted to back-in parking. This improvement concept was tied with the fourth highest score from the Advisory Committee. This concept can be developed further at the local level using federal grants.

KY 94 at 8th Street

This concept includes installing a four-way stop and a curb bump out to improve safety on KY 94 at the 8th Street intersection. Results from the existing conditions analysis indicated a high number of angle collisions at this location, along with significant pedestrian travel due to the proximity of Murray Middle School. This concept was tied for the fourth highest score from the Advisory Committee survey.

9.2.1.3 Low Priority

US 641X at Sycamore Street

This concept includes removing the channelized right-turn lane from US 641X to Sycamore Street and replacing it with a standard right-tun lane. This concept is considered low priority because it did not receive a high score from the Advisory Committee and there have been no crashes which can be directly attributed to the channelized right-turn lane in the last 10 years.

9.2.1.4 Maintenance Projects

KY 121 at Lowes Drive

This concept is to restripe the right through lane into a right-turn lane at the KY 121 and Lowes Drive intersection. This would improve safety and congestion by removing the merge west of the intersection.

KY 1550 at Oxford Drive

This concept includes enhancing signing and striping on the KY 1550 horizontal curve at Oxford Drive.

9.2.2 Long-Term Improvement Concepts

The long-term improvement concepts were categorized as high, medium, and low priority, as shown in **Table 5** and **Figure 34**. Detailed project sheets for the long-term improvement concepts are included in **Appendix F**.

Table 5: Long-Term Improvement Concepts

ID	Initial ID's	Location	Description	Total Cost Estimate	Priority
G	L2	East Bypass	Construct a new route from the Murray Business Loop to KY 80	$19.9 Million	High
H	L5, L8	Main Street (KY 94)	Construct a TWLTL and shared-use path on Main Street (KY 94)	$6.2 Million	High
I	L6	KY 94 at KY 1660	Convert the KY 94/KY 1660 intersection to a roundabout.	$1.4 Million	Medium
J	L7	KY 121 at KY 1660	Convert the KY 121/KY 1660 intersection to a roundabout.	$1.6 Million	Medium
K	L1	West Bypass	Construct a new route between US 641 and KY 90 west of Murray	$64.1 Million	Low

9.2.2.1 High Priority

East Bypass

This concept includes constructing a new route from the Murray Business Loop to KY 80. Based on traffic projections from the KYSTM, this new route is projected to carry more vehicles and divert more traffic away from US 641 than the proposed West Bypass. The project is also significantly less expensive compared to the West Bypass and received the third highest score from the Advisory Committee.

Main Street (KY 94)

This concept includes constructing a center TWLTL and a shared-use path along Main Street (KY 94) between US 641 and 16th Street, as shown in **Figure 34**. This improvement concept received the highest score from the Advisory Committee and includes a portion of Bicycle/Pedestrian Improvement Concept No. 2. Consideration should also be given in future phases for the inclusion of the following access management and realignment concepts near 13th and 14th Streets:

- KY 94 at 13th Street: Perform access management on KY 94 near 13th Street. The Advisory Committee showed an interest in this long-term improvement concept.
- Realign the offset intersections at 13th Street and KY 94.
- Realign the offset intersections at 14th Street and KY 94.

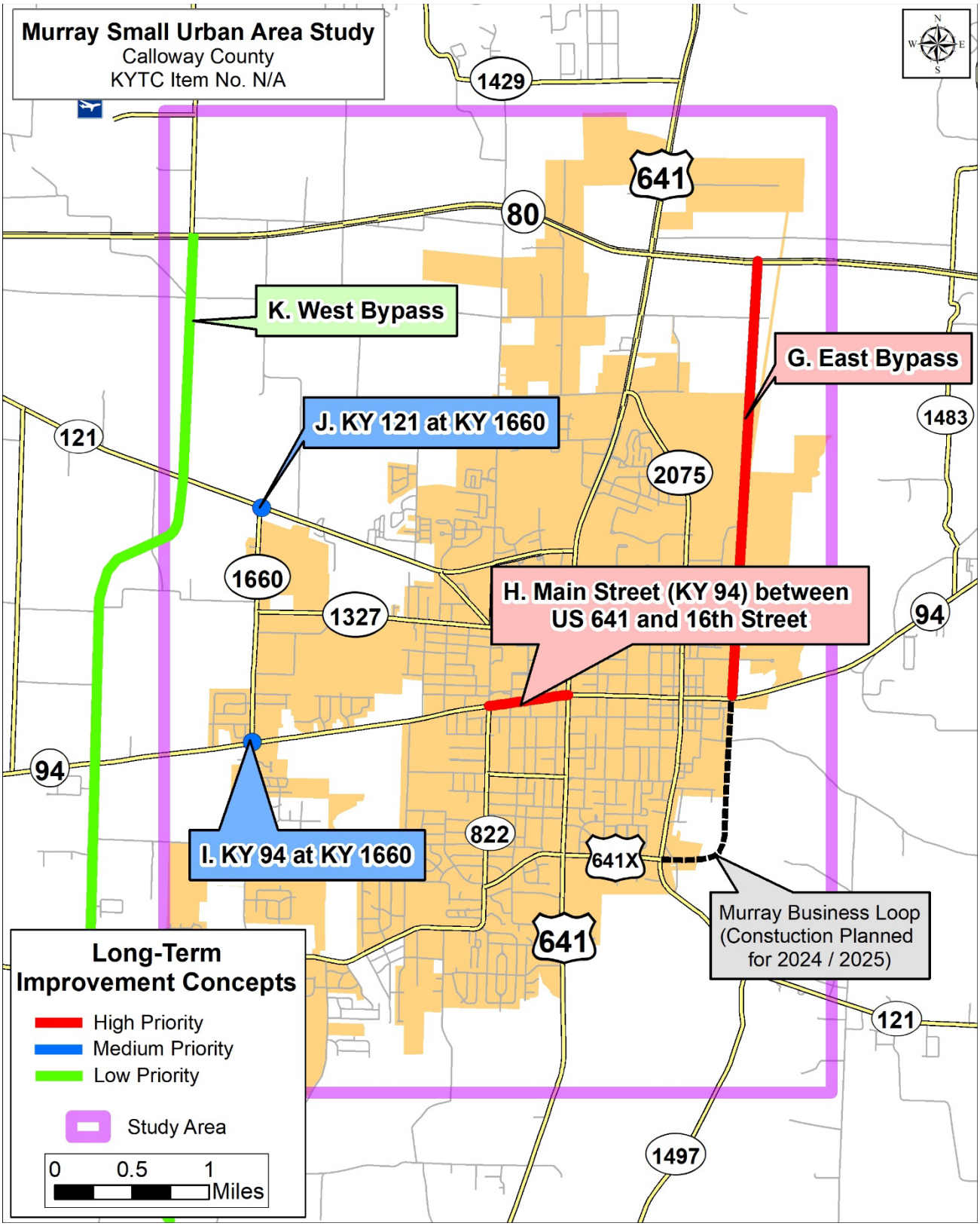

Figure 34: Long-Term Improvement Concepts

Figure 35: Main Street (KY 94) Improvements

9.2.2.2 Medium Priority

KY 94 at KY 1660

This concept includes converting the KY 94 intersection with KY 1660 (Robertson Road) to a roundabout.

KY 121 at KY 1660

Convert the KY 121 intersection with KY 1660 (Robertson Road) to a roundabout. Low Priority

9.2.2.3 Low Priority

West Bypass

This concept includes constructing a new route between US 641 and KY 80 west of Murray. Although this concept had the second highest score from the Advisory Committee survey, this route is projected to carry less traffic and divert less traffic away from US 641 than the proposed East Bypass due to the existing north-south roadways that connect KY 1550 to KY 80 on the west side of Murray. It also has a higher construction cost at $45 million.

9.2.3 Bicycle/Pedestrian Improvement Concepts

The bicycle/pedestrian improvement concepts, as shown in **Figure 36** and **Table 6**, were categorized as high, medium, and low priority.

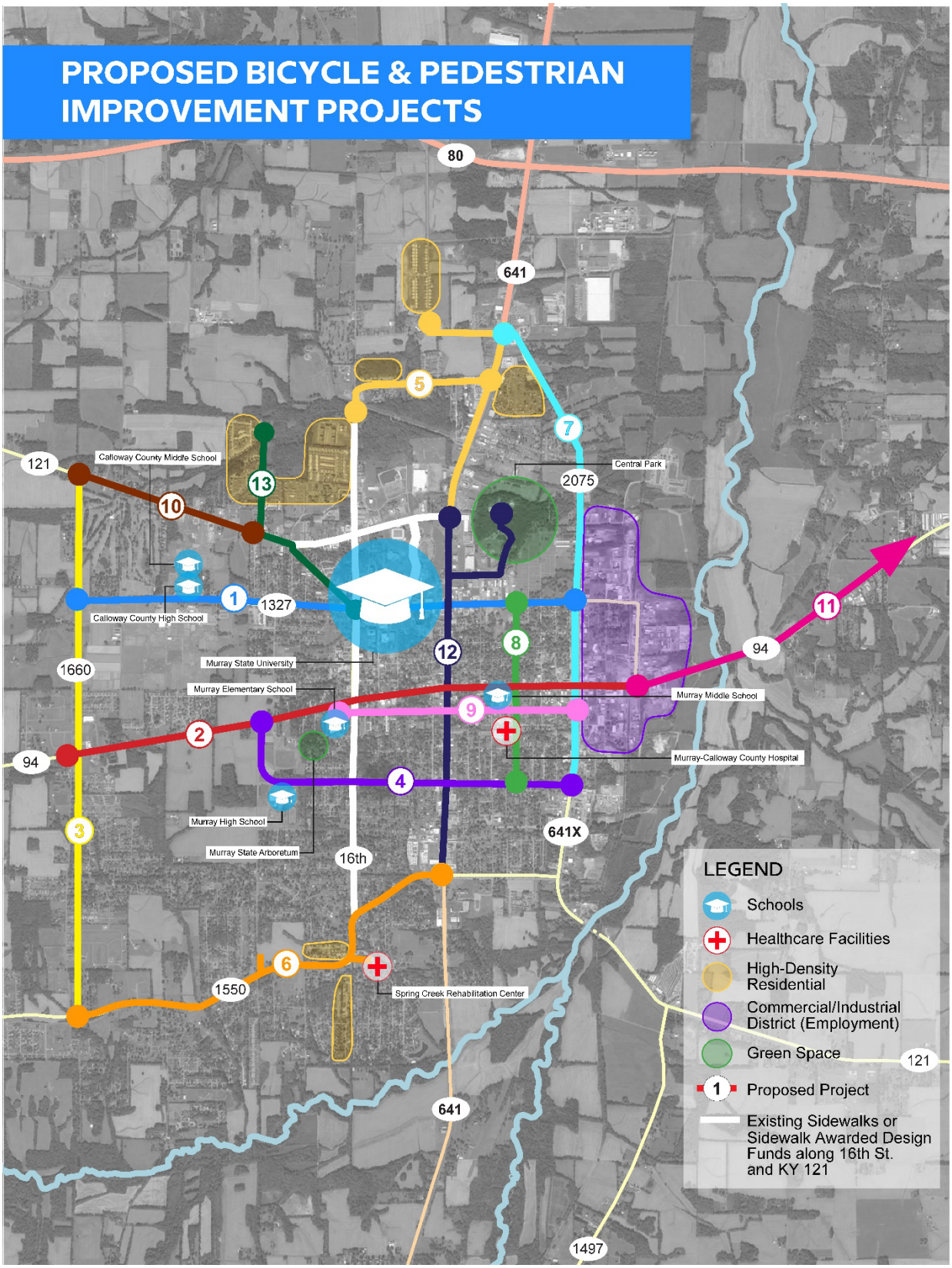

Figure 36: Bicycle/Pedestrian Improvement Concepts

Table 6: Bicycle/Pedestrian Improvement Concepts

ID	Location	Description	Priority
2	Main Street (KY 94)	Construct a shared-use path on Main Street (KY 94)	High
4	Doran Road/ Sycamore Street	Construct sidewalks on Doran Road and buffered on-street bike lane on Sycamore Street	High
5	US 641 North of KY 121	Construct at shared-use path on US 641 with crosswalks at Lowes Drive and Center Drive	High
10	KY 121	Construct a shared-use path on KY 121	High
13	U B Bailey Road / Coldwater Road	Construct sharrows on U B Bailey Road and a shared-use path on KY 121 and Coldwater Road	High
1	KY 1327	Construct a shared-use path on KY 1327	Medium
3	KY 1660	Construct a shared-use path on KY 1660	Medium
6	KY 1550	Construct a shared-use path on KY 1550, shared-use paths on 16th Street and Glendale Road, and sidewalks on Doran Road	Medium
12	US 641 South of KY 121	Construct a shared-use path on US 641 and a buffered on-street bike lane/sidewalk on Arcadia Circle and Hobson Drive	Medium
7	US 641X / KY 2075	Construct a buffered on-street bike lane and sidewalk on KY 2075/US 641X	Low
8	8th Street	Construct a buffered on-street bike lane and sidewalk on 8th Street	Low
9	Poplar Street	Construct a buffered on-street bike lane and sidewalk on Poplar Street	Low
11	KY 94 to Land Between the Lakes	Construct a buffered on-street bike lane on KY 94	Low

Because of the wide range of potential typical sections and the lack of survey, this study did not develop cost estimates for the bicycle/pedestrian improvement concepts.

9.2.3.1 High Priority

Doran Road/Sycamore Street

This concept includes constructing sidewalks on Doran Road from KY 94 to Sycamore Street and buffered on-street bike lanes and sidewalks on Sycamore Street between Doran Road and US 641X. This is a major east-west connection between residential areas, MSU, and the Murray High School and received the highest score from the Advisory Committee survey.

Main Street (KY 94)

This concept includes constructing a shared-use path on Main Street (KY 94) between Belle Meade Drive to Industrial Road. This is a major east-west connection between residential areas, MSU, Murray Elementary School, the commercial area along US 641, and Murray Middle School and received the second highest score from the Advisory Committee survey.

US 641 North of KY 121

This concept includes constructing a shared-use path on US 641 from Utterback Road to KY 121 with crosswalks at the signalized Lowes Drive and Center Drive intersections. It also includes constructing sidewalks on 16th Street from the existing sidewalk to Diuguid Drive, sidewalks on Diuguid Drive from 16th Street to US 641, and sidewalks on Utterback Drive from Opportunity Drive to US 641. This will provide a multimodal connection between three manufactured housing developments and important shopping centers such as Walmart and Kroger.

U B Bailey Road and Coldwater Road

Comments made through the public survey led to a realization that residents in the large, high-density residential area northwest of Murray's campus desired a safe biking route to campus and downtown. This concept could use sharrows on U B Bailey Road to connect to KY 121 if the traffic volume is sufficiently low. A shared-use path is proposed on the higher-volume KY 121 between U B Bailey Road and Coldwater Road, and on Coldwater Road from KY 121 to the intersection with North 16th Street and College Farm Road. This concept is one option, but additional bicycle and pedestrian infrastructure may be desired to connect this residential area to Murray State's campus.

KY 121

This concept includes constructing a shared-use path on KY 121 between KY 1660 and Bailey Road.

9.2.3.2 Medium Priority

KY 1327

This concept includes constructing a shared-use path on KY 1327 between KY 1660 and KY 2075. This is a major east-west connection between residential areas, Calloway County High School, Calloway County Middle School, MSU, and the commercial area along US 641 and received the fourth highest score from the Advisory Committee.

KY 1660

This concept includes constructing a shared-use path on KY 1660 between KY 1550 and KY 121. This is a major north-south connection between a growing residential areas and multiple schools.

US 641 South of KY 121

This concept includes constructing a shared-use path on US 641 from KY 121 to Glendale Road, a buffered on-street bike lane and sidewalk on Arcadia Circle from US 641 to Gil Hobson Drive, and a buffered on-street bike lane and sidewalk on Hobson Drive from Arcadia Circle to Central Park. This concept will provide a dedicated bicycle facility along the commercial area of US 641 and a new multimodal connection to Central Park.

KY 1550, 16th Street, Glendale Road, and Doran Road

This concept includes constructing a shared-use path on KY 1550 from King Drive to 16th Street, a shared-use path on 16th Street from KY 1550 to Glendale Road, a shared-use path on Glendale Road from S. 16th Street to US 641, and sidewalks on Doran Road from KY 1550 to Azalea Drive.

This will provide a multimodal connection between the growing residential area along KY 1550, two manufactured housing developments, the proposed sidewalk project along 16th Street currently under project development, and the commercial area along US 641.

9.2.3.3 Low Priority

KY 94 to Land Between the Lakes

This concept includes constructing a buffered on-street bike lane on KY 94 from Industrial Road to Land Between the Lakes. This is a project that would likely need to be developed as part of a larger regional bike trail project.

US 641X/KY 2075

This concept includes constructing a buffered on-street bike lane and sidewalk on US 641X from US 641 to Sycamore Street.

8th Street

This concept includes constructing a buffered on-street bike lane and sidewalk on 8th Street from KY 1327 to Sycamore Street.

Poplar Street

This concept includes constructing a buffered on-street bike lane and sidewalk on Poplar Street from S. Broach Avenue to US 641X.

10.0 NEXT STEPS

The next step following this study for any potential improvements would be prioritization within the next round of Strategic Highway Investment Formula for Tomorrow (SHIFT) to program funding for a more detailed planning study or Phase 1 Design (Preliminary Engineering and Environmental Analysis). Further funding will be necessary to advance an improvement concept as no future phases of these projects are funded in *Kentucky's FY 2022 – FY 2028 Highway Plan*.

11.0 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 James Tilley, KYTC District 1 Office, at (502) 764-0673 (email at James.Tilley@ky.gov).