

Turkey Neck Bend Bridge

FEASIBILITY STUDY

Final Report
September 2024

TEAM
KENTUCKY[®]

TRANSPORTATION
CABINET



Executive Summary

Turkey Neck Bend Bridge Feasibility Study

Executive Summary

The Kentucky Transportation Cabinet (KYTC) initiated the *Turkey Neck Bend Bridge Feasibility Study*, KYTC Item No. 3-80200.00 in Monroe County to evaluate an array of options to maintain a connection for Turkey Neck Bend Road (KY 214) across the Cumberland River.

Existing Conditions

The Turkey Neck Bend study area, shown in **Figure ES-1**, crosses the Cumberland River at KY 214 milepoint (MP) 1.54 and ends at MP 1.9 in southeastern Monroe County, Kentucky. KY 214 is a two-lane east-west collector with eight- to nine-foot lanes that provides a connection between KY 100 in Monroe County to KY 61 in Cumberland County, serving mostly sparsely populated, rural farmland areas.

The Turkey Neck Bend Ferry, formerly a privately-owned operation, was acquired by KYTC in 1968 and is the only free KYTC-operated ferry open 24 hours per day. It connects KY 214 across the Cumberland River at an area known as McMillian's Landing, and a ferry service has operated in the area since before the American Civil War. The ferry currently transports an average of 200 vehicles per day (VPD) across the river, including emergency response vehicles and Monroe County School District students via SUV.

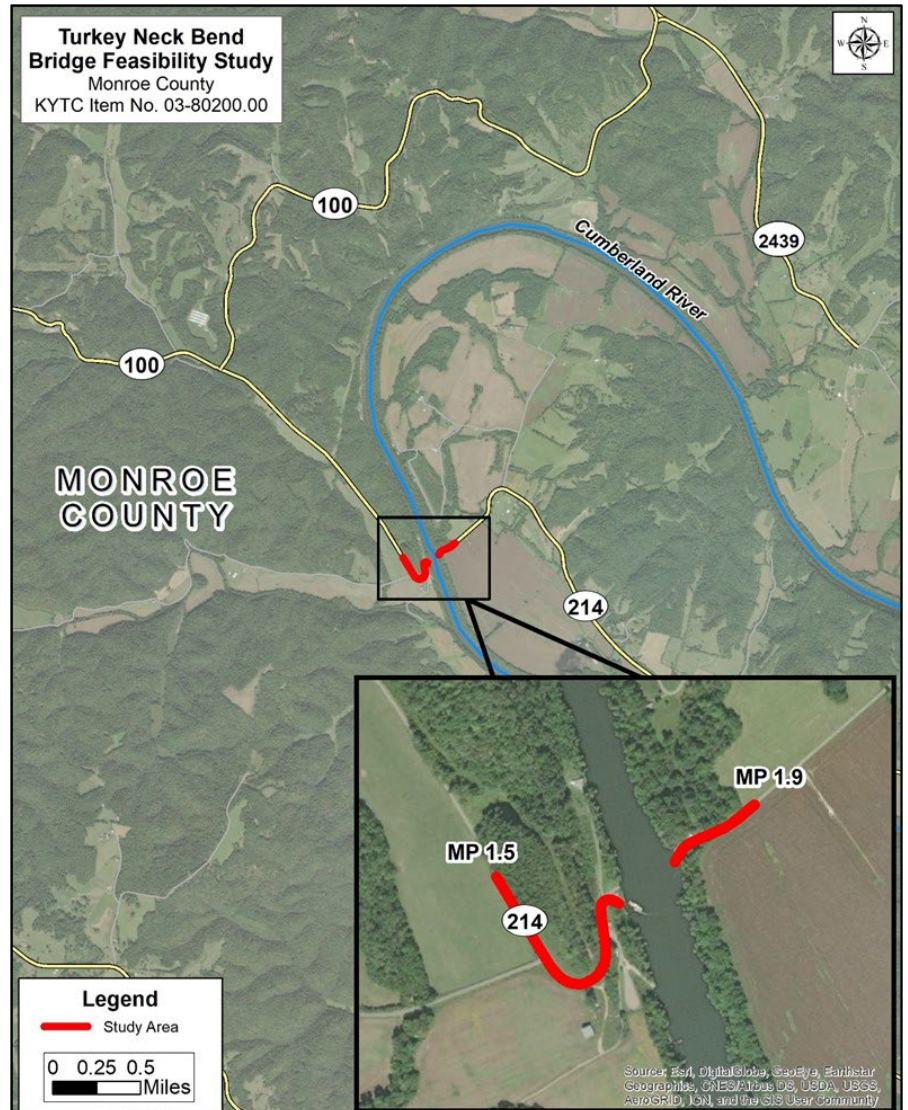


Figure ES-1: Turkey Neck Bend Study Area

The Turkey Neck Bend Ferry provides the only Cumberland River crossing in Monroe County, as shown in **Figure ES-2**. The nearest river crossing to the north is approximately 27 miles from the western bank of the Turkey Neck Bend crossing in Burkesville and requires an estimated 37 minutes to drive. The nearest river crossing to the south is 25.5 miles from Turkey Neck Bend in Celina, Tennessee and requires an estimated 34 minutes to drive. The ferry currently costs over \$1 million per year to operate including labor, equipment, and repairs. \$1.25 million is budgeted for fiscal year 2025.

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Between 2017 – 2021, there were two crashes on the study portion of KY 214, both resulting in property damage only. One of the crashes was a single vehicle collision while the other was a rear end.

Based on historical KYTC daily traffic count data, Monroe County population projections and growth rates from the most updated version of the KYSTM, an annual growth rate of 0.5 percent was selected to reflect moderate growth for the KY 214 corridor through the year 2045. The annual growth rate was applied to the latest KYTC daily traffic counts to develop 2045 daily traffic forecasts. KY 214 is expected to carry around 225 VPD across the Cumberland River in 2045.

Public Outreach

Over the course of the study, the project team met with local officials and stakeholders to coordinate on key issues. Agencies represented included Monroe County Schools, Monroe County Economic Development, Monroe County Property Value Administrator (PVA), and Community Action of Southern Kentucky, among others. A Local Officials / Stakeholder meeting was held at the Monroe County Courthouse to discuss the existing conditions and solicit feedback on potential river crossing options via a paper survey. **In the near-term, 85 percent of the 13 responding local officials do not think changes are needed. In the long-term, 87 percent support the construction of a bridge over maintaining the ferry.**

A broader survey was disseminated to Turkey Neck Bend Ferry users starting on December 5, 2023 to solicit feedback on ferry use. Paper copies of the survey were handed out to motorists while on the ferry and an online version was also available. A total of 91 survey responses were collected during the comment period, 54 of which were mailed in or returned in person and 37 were submitted online.

Shopping was the most popular reason to use the ferry, followed by healthcare and work. 42 respondents stated their reason as “other,” with comments that included banking, visiting friends and family, and recreation. The most common time of day to use the ferry was between 6:00 a.m. and 12:00 p.m. (44 percent), followed by the period between 12 p.m. and 6 p.m. (36 percent). When the ferry is closed, 70 percent of ferry users indicated they use a detour, most of which detour through Clay County, Tennessee or Cumberland County, Kentucky. Approximately 27 percent of respondents indicated they do not cross the river or do not make a trip if the ferry is closed.

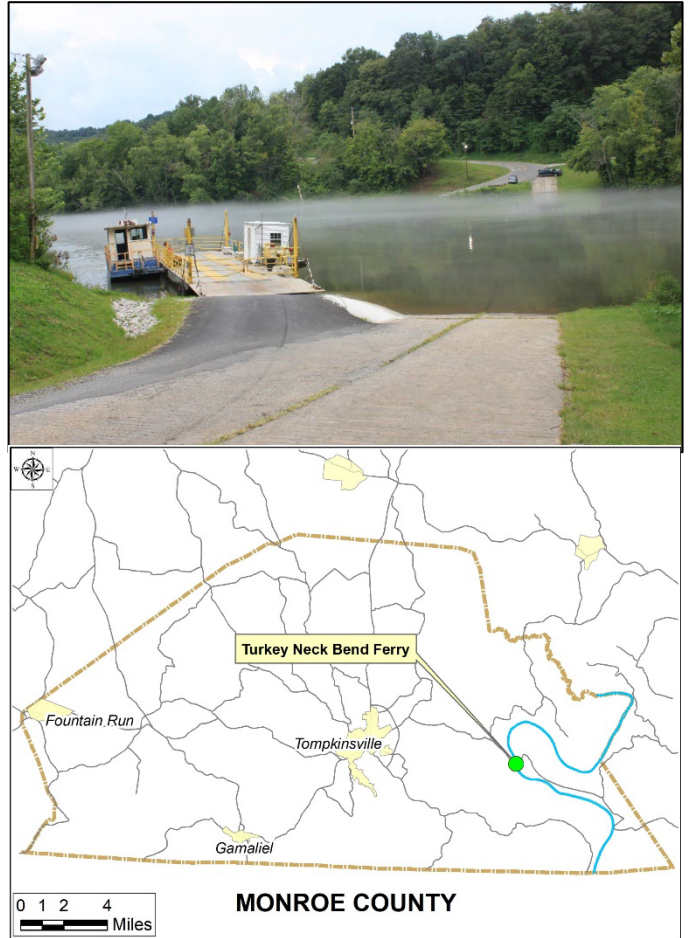


Figure ES-2: Turkey Neck Bend Ferry

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In the near-term, ferry users indicated they do not think changes are needed. In the long-term, 48 respondents (53 percent) support maintaining the ferry while 43 (47 percent) support the construction of a bridge.

Improvement Concept Development

Improvement concepts were developed based on a combination of a review of existing conditions, local officials / stakeholder input, public input, and field reconnaissance. These improvements were developed while considering a comprehensive range of options and included both ferry and bridge concepts.

Ferry Options

The following options were considered for continued operations of the Turkey Neck Bend Ferry:

No Action / Do Nothing

The No Action concept maintains the Turkey Neck Bend Ferry with its current 24-hour service, which costs KYTC over \$1 million per year. The 2022 Long-Range Statewide Transportation Plan identified \$32.5 million in funding needs between 2022 and 2045 to operate the Turkey Neck Bend Ferry. This includes \$22 million in operations and maintenance, \$4.3 million in budget requests, and \$6.1 million in additional staffing based on expected Coast Guard requirements.

Adjust Hours of Operation

Based on a review of the Valley View Ferry budget, reducing the daily operating hours of the Turkey Neck Bend Ferry from 24 to 12 or 16 hours would result in reduced labor and fuel costs. It was assumed that 25 percent of the trips would divert to the north detour if the ferry hours were reduced. Overall, cutting the hours of operations to 16 would result in an estimated \$217,000 in savings per year and reducing to 12 hours would result in \$435,000 in savings per year. The reduced operational hours would result in added travel time costs for motorists due to diversions while the ferry is closed.

Crossing Fee (Toll)

Based on a review of fee-based ferries in Kentucky, a user fee of \$5 per trip was assumed for Turkey Neck Bend. It was also assumed that this fee would result in a 25 percent reduction in traffic demand across the river. Based on these assumptions, a \$5 fee would bring in approximately \$262,500 in gross revenue per year.

Close Ferry

Closing the Turkey Neck Bend Ferry would require current users to detour to the north or south to cross the Cumberland River. User costs associated with the ferry closure were calculated using a cost of time of \$18.80 per hour, a driving cost per mile of \$0.46 per mile, a current ferry delay time of approximately six minutes, and no reduction in travel demand for crossing the Cumberland River. The cost for all users using the south detour to Celina, Tennessee rather than the Turkey Neck Bend Ferry would be about \$2.7 million per year and the cost of using the north detour to Burkesville would be \$1.5 million per year.

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Bridge Options

This segment of the Cumberland River is not a navigable waterway and sees only recreational river traffic. Base criteria assumptions for the bridge concepts, largely based on the KY 61 bridge over the Cumberland River in Tompkinsville, include 30 feet of vertical clearance above the normal pool and 250 feet of horizontal clearance for the main river span. Bridge options include two 11-foot-wide lanes with four-foot-wide shoulders and are shown north and south of the ferry for it to remain in operation during construction. The general locations are shown on **Figure ES-3**.

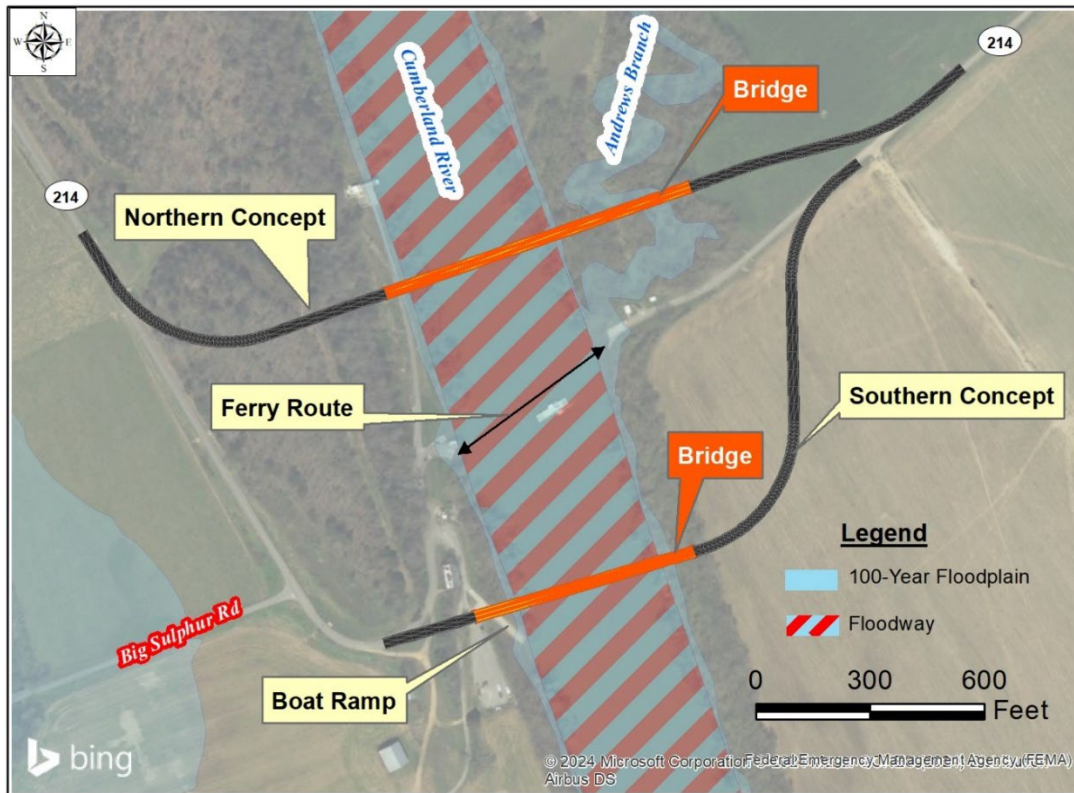


Figure ES-3: Cumberland River Bridge Options

Bridge North of the Ferry

The northern bridge option includes constructing a new alignment north of the existing crossing with a total 850-foot-long bridge, including a 250-foot main span with 175-foot approach spans and 125-foot spans over the floodplain associated with Andrews Branch, as shown in **Figure ES-4**. The approximate cost of a bridge north of the ferry is \$40.2 million. An additional \$9.9 million would be spent on ferry operations assuming 16-hour ferry operation from 2024 to 2032 until the new bridge opens.

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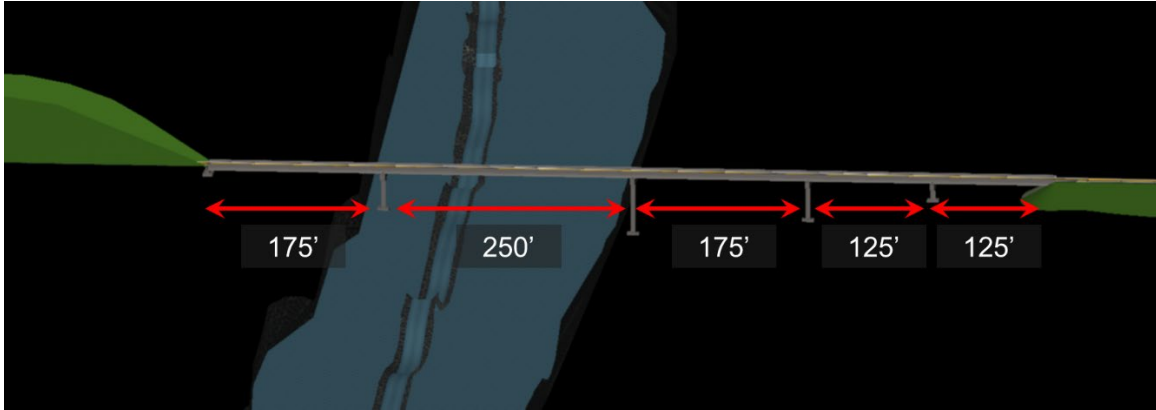


Figure ES-4: Bridge North of the Ferry

Bridge South of the Ferry

The southern bridge option includes constructing a new alignment south of the existing crossing with a 600-foot-long bridge, as shown in **Figure ES-5**. The approximate cost of a bridge south of the ferry is \$25.8 million. An additional \$9.9 million would be spent on ferry operations assuming 16-hour ferry operation from 2024 to 2032 until the new bridge opens.



Figure ES-5: Bridge South of the Ferry

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Conclusions

The goal of the *Turkey Neck Bend Bridge Feasibility Study* was to assess future traffic demand along KY 214 and to evaluate feasible alternatives to maintain a connection in the KY 214 corridor across the Cumberland River. Local officials and the ferry-crossing public were given surveys to solicit input on potential crossing options and lifecycle costs were developed to compare the crossing strategies. **Table ES-1** presents a summary of the lifecycle costs from 2024 to 2075, including maintaining 16-hour ferry operations during the design and construction of the bridge concepts. Maintenance costs are included for all ferry and bridge options.

Table ES-1: Life Cycle Analysis (2024 – 2075)

Concept	Cost (2024 - 2075)				
	Bridge	24-Hour Ferry Operation	16-Hour Ferry Operation	12-Hour Ferry Operation	Total
24-Hour Ferry Operation	N/A	\$133,165,000	N/A	N/A	\$133,165,000
16-Hour Ferry Operation	N/A	N/A	\$105,921,000	N/A	\$105,921,000
12-Hour Ferry Operation	N/A	N/A	N/A	\$78,652,000	\$78,652,000
South Bridge Option*	\$25,806,000	N/A	\$9,922,600	N/A	\$35,728,000
North Bridge Option*	\$40,164,000	N/A	\$9,922,600	N/A	\$50,086,000

*Assumes 16-hour ferry operation from 2024-2032 until new bridge opens.

As a long-term solution, it is recommended that the south bridge concept be moved forward to Phase 1 Design (Preliminary Engineering and Environmental Analysis). The Turkey Neck Bend Ferry will reduce to 16-hour operations between 6 a.m. and 10 p.m. until the bridge is open to traffic, and the costs associated with the reduced hours of operation are included. Once construction is complete, it is recommended that the ferry is closed permanently, with the boat dock remaining open to the public.



FINAL REPORT

Turkey Neck Bend Bridge Feasibility Study

KYTC Item No. 3-80200.00



Kentucky Transportation Cabinet
Central Office, Division of Planning
Highway District 3, Bowling Green

In partnership with:



September 2024

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1.0 INTRODUCTION

The Kentucky Transportation Cabinet (KYTC) initiated the *Turkey Neck Bend Bridge Feasibility Study*, KYTC Item No. 3-80200.00, in Monroe County to evaluate an array of options to maintain a connection for Turkey Neck Bend Road (KY 214) across the Cumberland River. The study is located within KYTC District 3, as shown in

Figure 1. Future phases of the project are not funded in *Kentucky's FY 2024 – FY 2030 Highway Plan*.

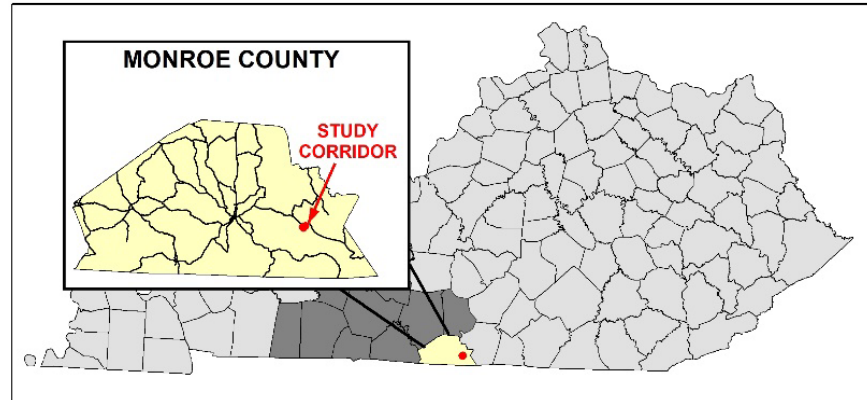


Figure 1: KYTC District 3

The Turkey Neck Bend study area,

shown in **Figure 2**, crosses the Cumberland River at KY 214 milepoint (MP) 1.54 and ends at MP 1.9 in southeastern Monroe County, Kentucky. The Turkey Neck Bend Ferry connects KY 214 across the Cumberland River and transports an average of 200 vehicles per day (VPD) across the river. KY 214 is an east-west collector that provides a connection between KY 100 in Monroe County and KY 61 in Cumberland County, serving mostly sparsely populated, rural farmland areas.

The Turkey Neck Bend Ferry provides the only Cumberland River crossing in Monroe County, and the river isolates the southeastern portion of the county. The nearest river crossing to the north is approximately 27 miles from the western bank of the Turkey Neck Bend crossing in Burkesville (Cumberland County) and requires an estimated 37 minutes to drive, as shown in **Figure 3**. The nearest river crossing to the south is 25.5 miles from Turkey Neck Bend in Celina, Tennessee and requires an estimated 34 minutes to drive.

With an area of 332 square miles, Monroe County is the 56th largest county in Kentucky. According to data provided by the Kentucky State Data Center (KSDC), Monroe County's population of 11,338 is the 93rd largest in the state. Within Monroe County lies the City of Tompkinsville, which had a 2020 census population of 2,309. Over the past 20 years, both Tompkinsville and Monroe County have experienced population declines.

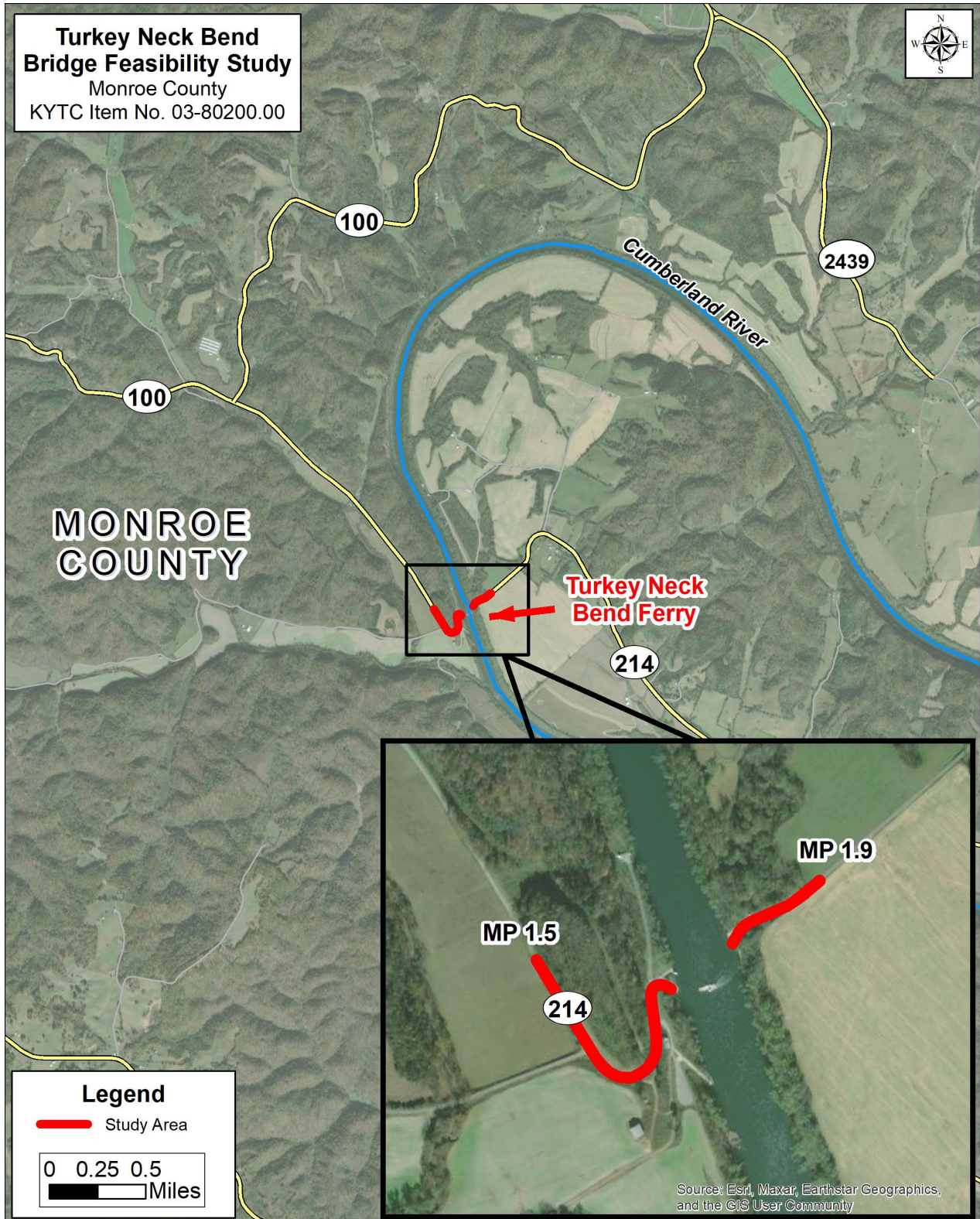


Figure 2: Turkey Neck Bend Study Area

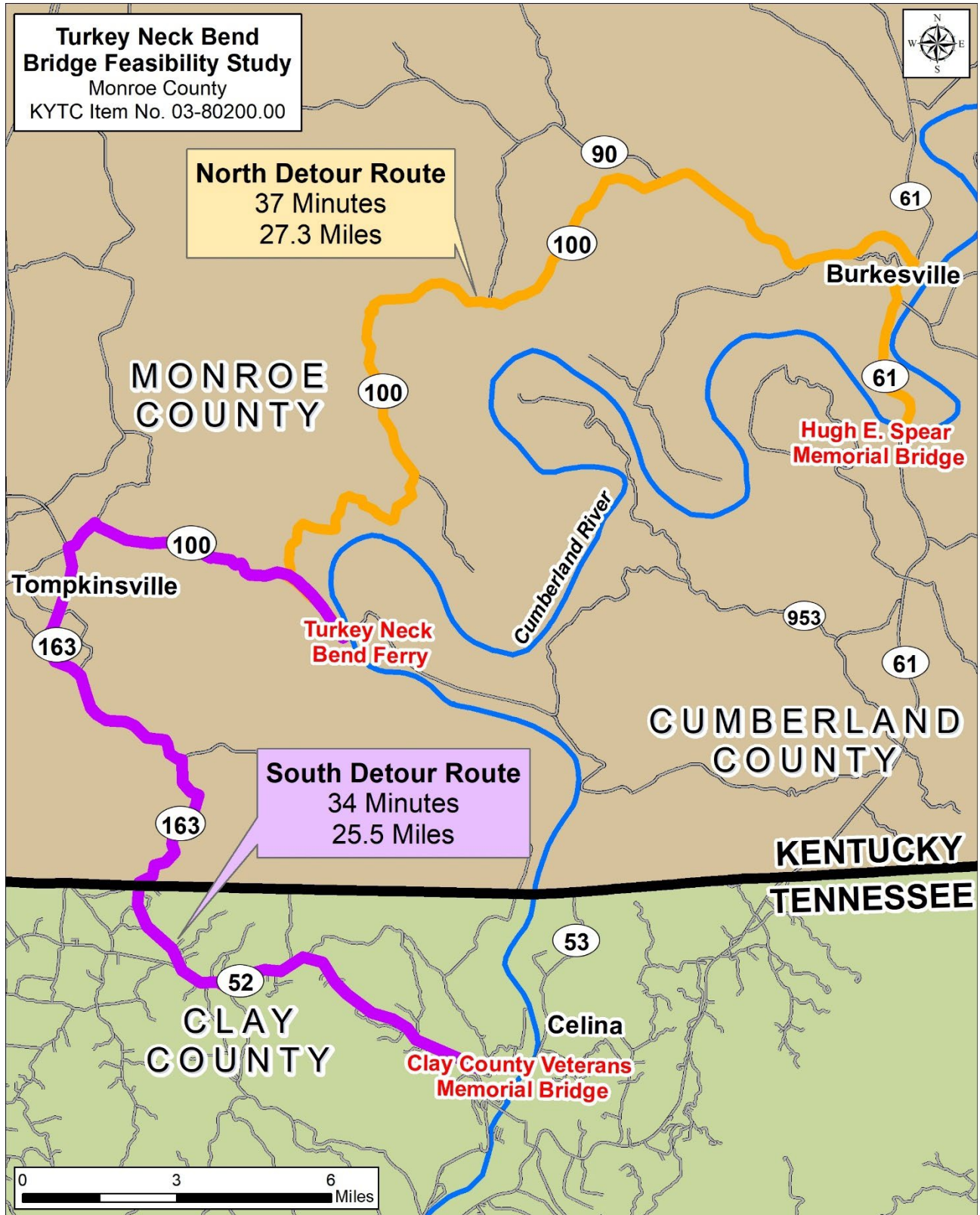


Figure 3: Alternative Cumberland River Crossing Options

1.2 PLANNED AND COMMITTED PROJECTS

This study was listed in Kentucky's 2022 – 2028 Enacted Highway Plan as Item No. 3-80200 to complete a Turkey Neck Bend Planning Study. There are two active projects in the study area listed in *Kentucky's 2024-2030 Enacted Highway Plan*.

- KYTC Item No. 3-128.11 includes operation of Turkey Neck Bend Ferry for FY 2022 – 2028. This project has a length of 0.1 miles across the Cumberland River. (C = \$7.5 million).

There have been several previous studies evaluating river crossing options at Turkey Neck Bend. The following is a summary of the previous studies:

- A 1966 study resulted in a bridge estimate of \$1.3 million, \$12.1 million in 2023 dollars accounting for inflation.
- A 1998 study resulted in a bridge estimate of \$14.4 million (\$26.8 million in 2023)
- A 2003 study resulted in a bridge estimate of \$14.5 million (\$23.75 million in 2023).

1.3 TURKEY NECK BEND FERRY

The Turkey Neck Bend Ferry, formerly a privately-owned operation, was acquired by KYTC in 1968 and is the only free KYTC-operated ferry open 24 hour per day. It connects KY 214 across the Cumberland River at an area known as McMillian's Landing, sometimes spelled McMillin's Landing or McMillan's Landing, and a ferry service has operated in the area since before the American Civil War. The ferry currently transports an average of 200 VPD across the river, including emergency response vehicles and Monroe County School District students. **Table 1** presents a summary of public ferry boat operations in Kentucky.

The ferry currently costs over \$1 million per year to operate including labor, equipment, and repairs. \$1.25 million is budgeted for fiscal year 2025. The following presents a summary of repairs and equipment purchases over the past 15 years:

- 2009 – New vehicle barge
- January 2022 – Tugboat repairs
- April 2022 – KY 214 resurfacing
- December 2022 – Two new tugboats (\$825,000)



Turkey Neck Bend Ferry at McMillian's Landing

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Table 1: Kentucky Ferry Operations

Ferry	River	Counties Served		Fee	Schedule			
		From:	To:		Dates	M-F	Saturday	Sunday
Anderson Ferry (Privately Owned)	Ohio	Boone	Hamilton (OH)	\$5 / .50¢	May-Oct	6:00am - 9:30pm	7:00am - 9:30pm	9:00am - 9:30pm
					Nov-April	6:00am - 8:00pm	7:00am - 8:00pm	9:00am - 8:00pm
Augusta Ferry	Ohio	Bracken	Brown (OH)	\$5 / Free	Yearly	8:00am - 8:00pm	8:00am - 8:00pm	8:00am - 8:00pm
Cave in Rock Ferry	Ohio	Crittenden	Hardin (IL)	Free	Yearly	6:00am - 9:30pm	6:00am - 9:30pm	6:00am - 9:30pm
Dorena-Hickman Ferry	Mississippi	Fulton	Mississippi (MO)	\$14 / \$1	Summer	7:00am - 6:30pm	7:00am - 6:30pm	7:00am - 6:30pm
					Winter	7:00am - 5:30pm	7:00am - 5:30pm	7:00am - 5:30pm
Green River Ferry (Federally Operated)	Green	Edmonson	Edmonson	Free/No	Yearly	6:00am - 9:55pm	6:00am - 9:55pm	6:00am - 9:55pm
Houchin Ferry	Green	Edmonson	Edmonson			Closed	Closed	Closed
Reeds Ferry	Green	Butler	Butler	Free	Yearly	Sunrise - Sunset	Sunrise - Sunset	Sunrise - Sunset
Rising Star (Privately Owned)	Ohio	Boone	Ohio (IN)	\$5		11:00am - 8:00pm	8:00am - 11:00pm	11:00am - 8:00pm
Rochester Ferry	Green	Butler	Ohio	Free	Yearly	8:00am - 8:00pm	8:00am - 8:00pm	8:00am - 8:00pm
Turkey Neck Bend Ferry	Cumberland	Monroe	Monroe	Free	Yearly	24 hours	24 hours	24 hours
Valley View Ferry	Kentucky	Fayette/Jessamine	Madison	Free	Yearly	6:00am - 6:00pm	8:00am - 8:00pm	8:00am - 8:00pm

2.0 EXISTING CONDITIONS

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

2.1 FUNCTIONAL CLASSIFICATION

Functional classification is the process of grouping streets and highways according to the character of travel service they provide. The functional classifications for roadways within the study area are shown in **Figure 4**. The KY 214 study corridor is classified as a minor collector, providing local traffic connections to KY 100 west of the Cumberland River and KY 61 to the east, as shown in Figure 4.

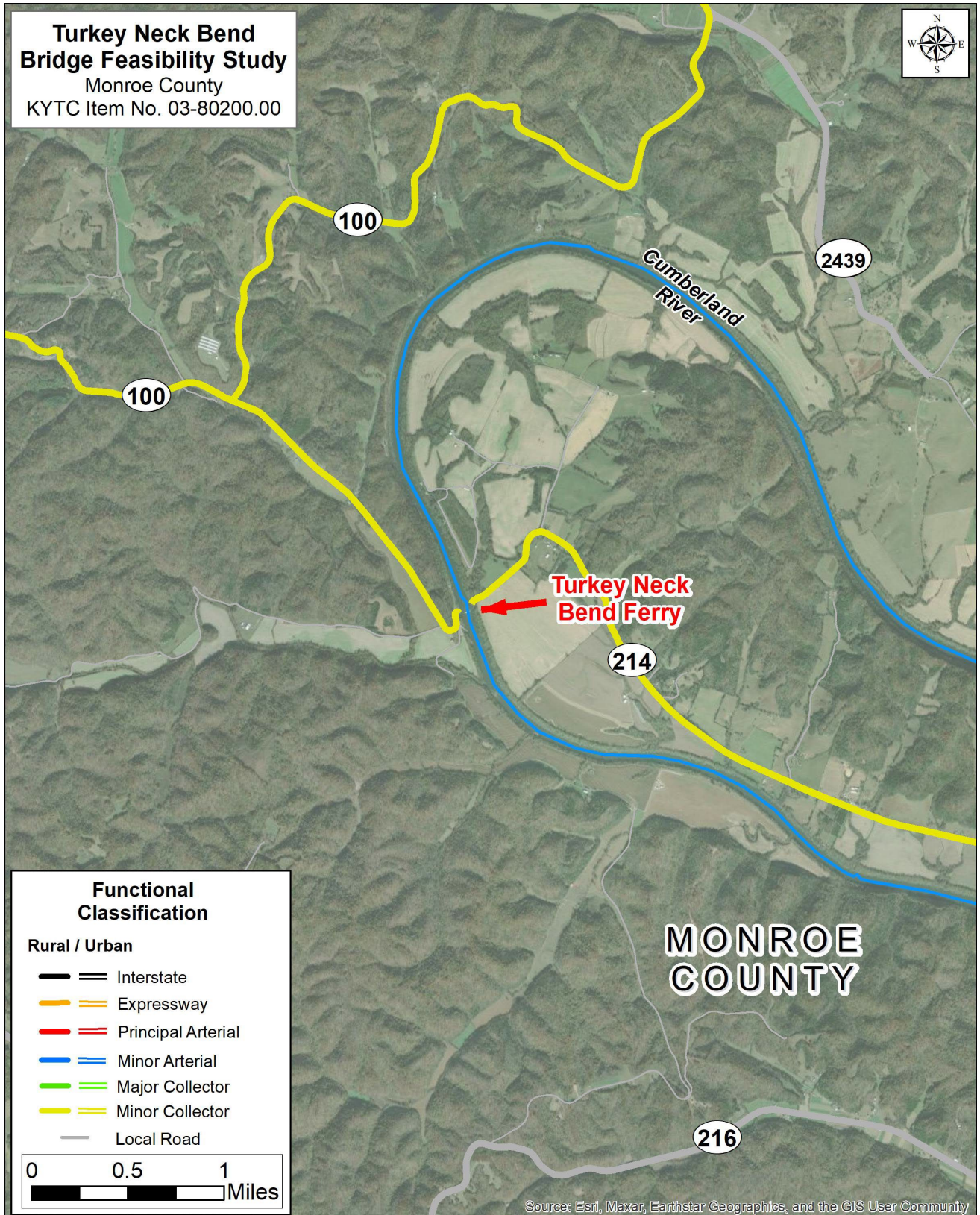


Figure 4: Functional Classification

2.2 ROADWAY GEOMETRY

KYTC's HIS database was used to identify roadway geometry. The current number of lanes and estimated lane widths within the study area are shown in **Figure 5**. KY 214 has two eight- to nine-foot lanes within the study area with combination shoulders that are three feet wide on both sides of the ferry crossing.



KY 214 Approaching Turkey Neck Bend

2.3 SPEED LIMIT

Posted speed limits for roadways within the study area are shown in **Figure 6**. KY 214 maintains a speed limit of 55 miles per hour (mph) on either side of the ferry crossing.

2.4 EXISTING TRAFFIC ANALYSIS

Existing traffic volumes were analyzed for the study corridor and surrounding roadways. The most current annual average daily traffic (AADT) volumes from KYTC's traffic count stations are shown in **Figure 7**. Daily traffic on KY 214 is heaviest just west of the ferry crossing, at 200 VPD, and drops to 125 VPD east of the crossing. KY 100 has the highest daily traffic in the study area with 575 VPD.

2.5 CRASH HISTORY

Crash data were collected along the study corridor for the five-year period between 2017 – 2021. Over the course of the five years, a total of two crashes were reported on study area roads. The two crashes each resulted in property damage only. One of the crashes was a single vehicle collision while the other was a rear end. **Figure 8** presents the locations of the crashes by crash type. The crash records are included in **Appendix A**.

In February 2020, a motorist drove off the ramp and drowned in the Cumberland River. This crash is not in the Kentucky State Police Crash Database but shows the unique risk of ferry crossings.

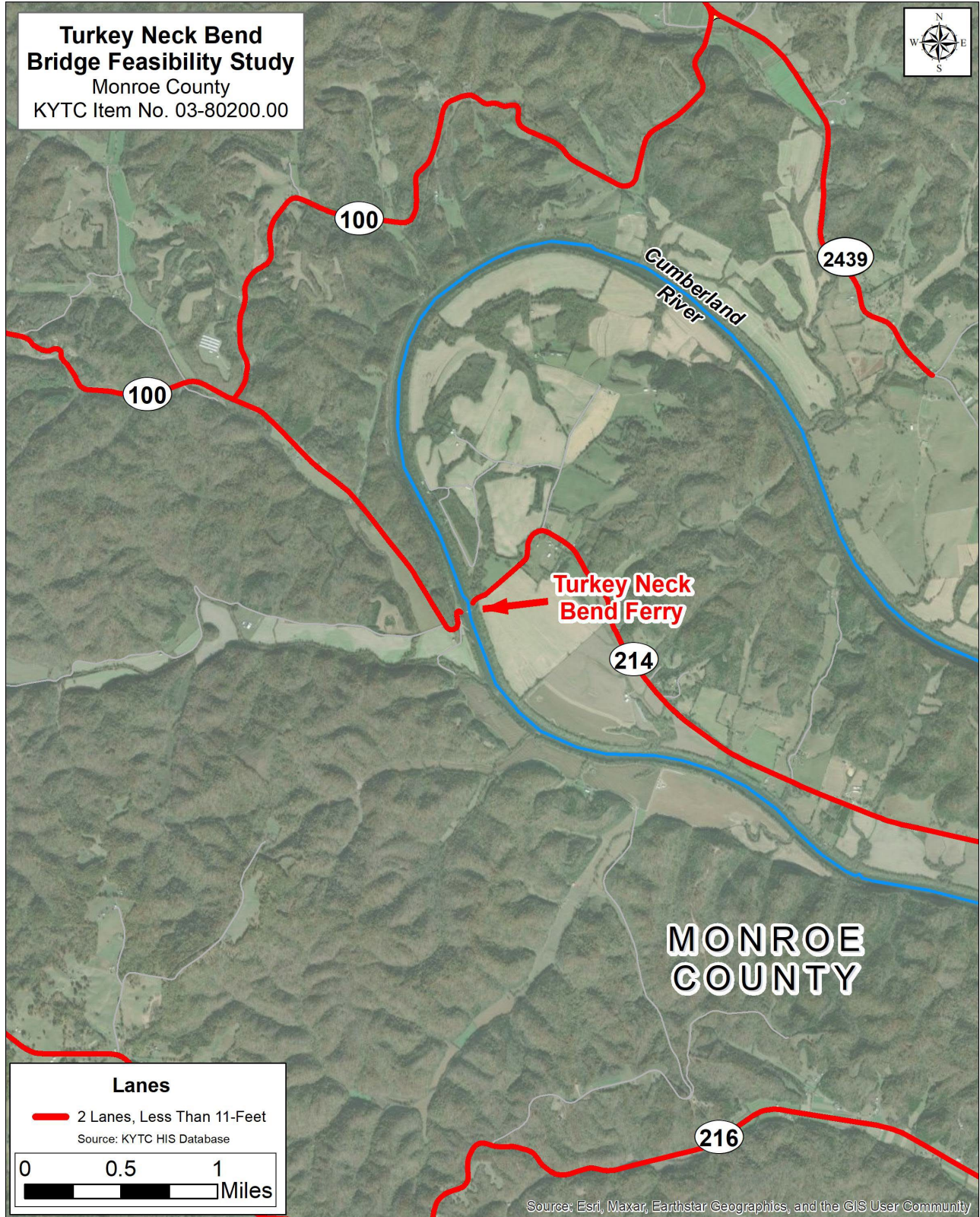


Figure 5: Lane Widths

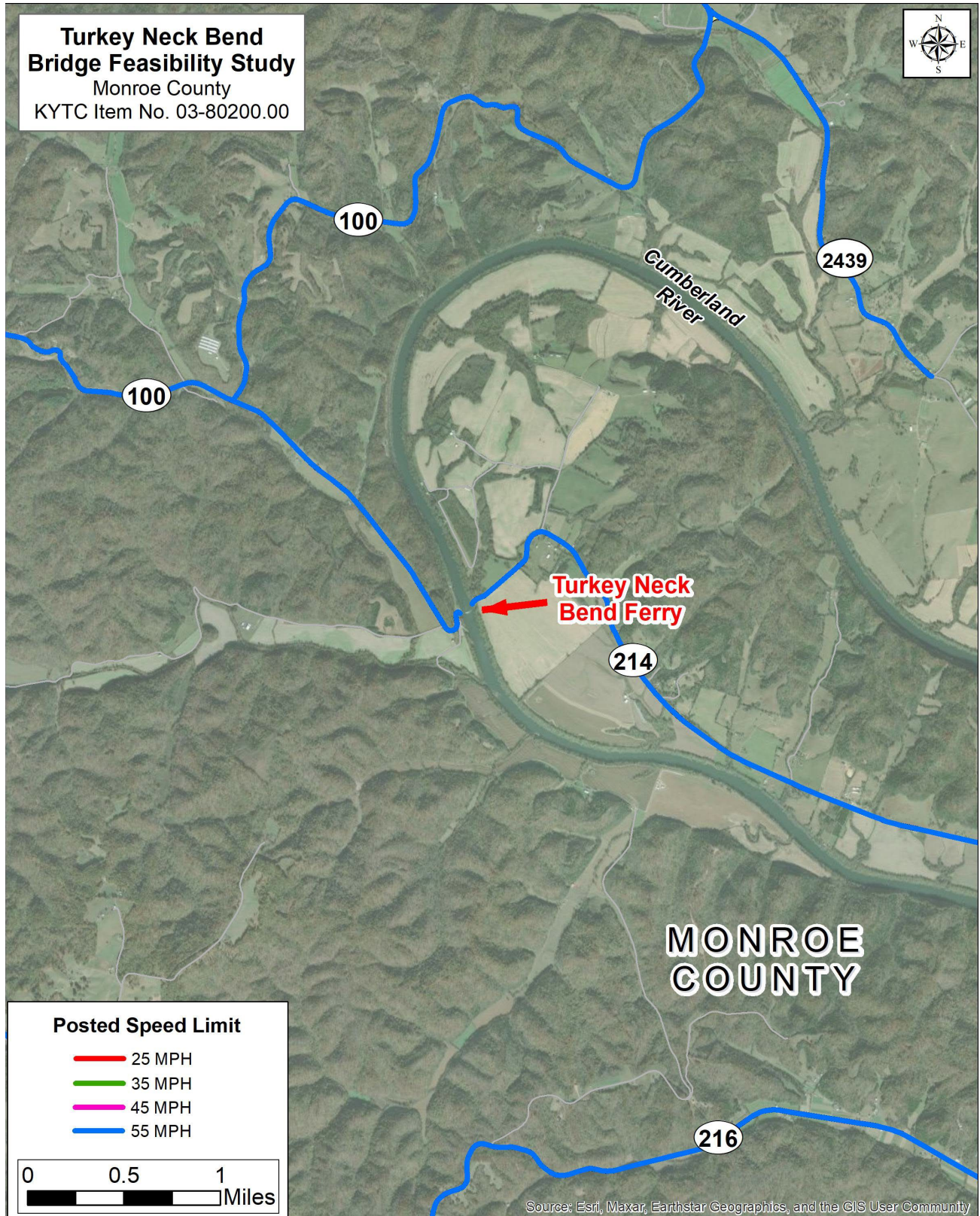


Figure 6: Speed Limit

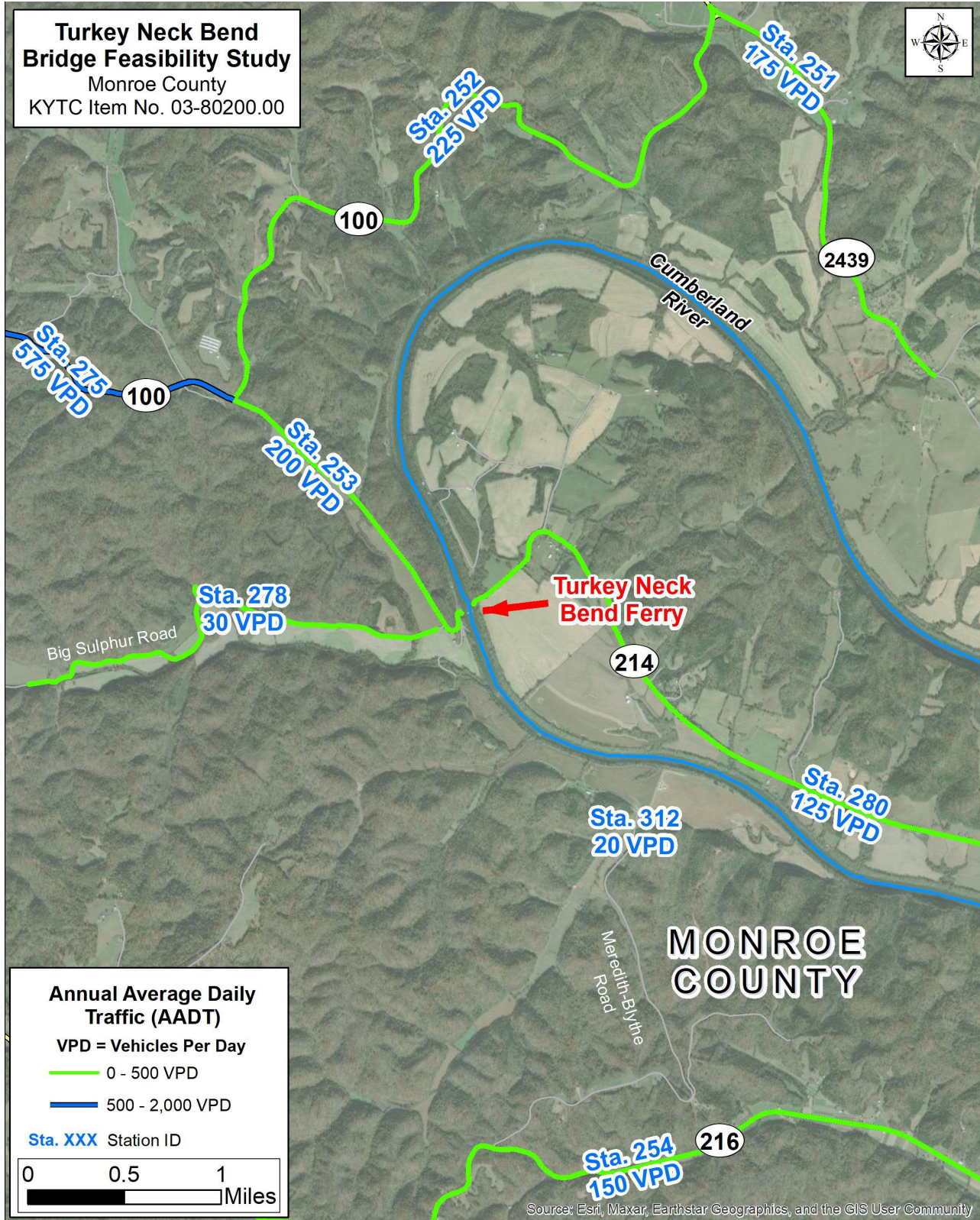


Figure 7: Annual Average Daily Traffic

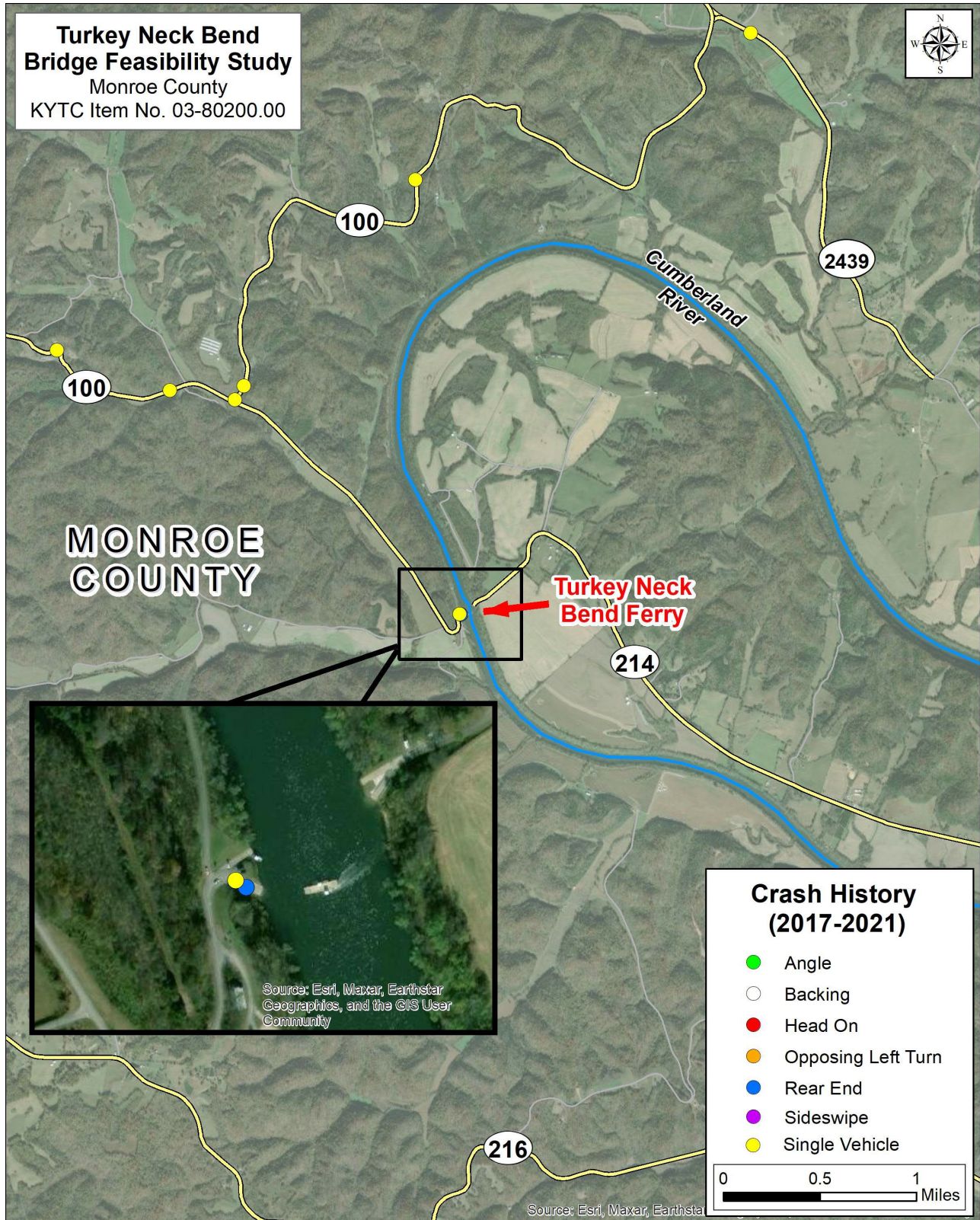


Figure 8: Crash Type

3.0 ENVIRONMENTAL OVERVIEW

An Environmental Overview (EO) was developed to identify known natural and human features which occur within the study area. These features were considered during the development and advancement of improvement concepts along with avoidance or minimization of impacts to the environment. The complete document is included in **Appendix B**.

3.1 NATURAL ENVIRONMENT

There are four National Hydrography Dataset (NHD) streams mapped within the study area, including the Cumberland River. There are three Federal Emergency Management Agency (FEMA) 100-year floodplains occurring within the study area along Little Sulphur Creek, Andrews Branch, and the Cumberland River and one FEMA designated floodway associated with the Cumberland River. **Figure 9** summarizes these features within the study area.

A review of available data revealed no water wells within the study area. Most of the study area is underlain by bedrock with minimal chance of karst development and there were no sinkholes or caves mapped within the study area.

According to U.S. Fish and Wildlife Service's Information for Planning and Consultation (IPaC), there are twelve federally listed endangered species, two federally listed threatened species, and one federally listed candidate potentially living in the study area.

Prime farmland is land that contains the best attributes for producing food with nutrient rich soil producing high yields. Approximately 27.9 percent of the study area is classified as "Prime Farmland" or "Farmlands of Statewide Importance." **Figure 10** summarizes the farmland in the study area.

3.2 HUMAN ENVIRONMENT

An overview of the human environment in and around the study area is shown in **Figure 11**. Based on the review of National Register of Historic Places (NRHP), there are no registered historic places located within the study area vicinity. There are two potential cultural points of interest, the community of Otia and McMillians Ferry, also known as the Turkey Neck Bend Ferry. While there are no schools or houses of worship located within the study area there is one registered cemetery on the east side of the Cumberland River.

Along Andrews Branch in the northern portion of the study area is a registered National Resources Conservation Service (NRCS) Wetland Reserve Program (WRP) property. The WRP easements help private landowners protect and provide habitat for wetland dependent wildlife and protect biological diversity¹. The NRCS chooses wetlands that were previously degraded by agricultural uses and have high potential for cost-effectively protecting wildlife.

¹ [Wetland Reserve Easements | Natural Resources Conservation Service \(usda.gov\)](https://www.usda.gov/land-conservation/programs/wetland-reserve-program)

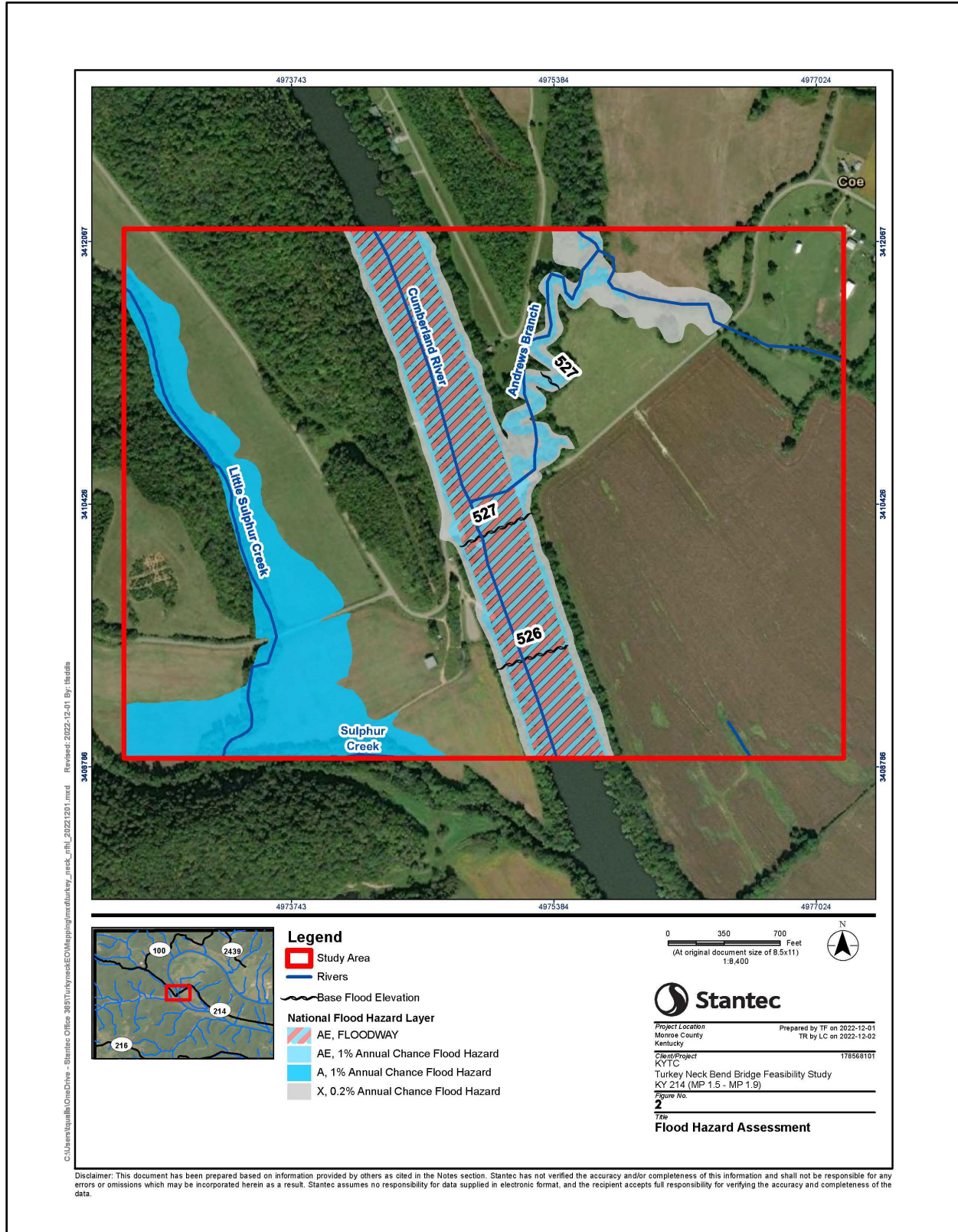


Figure 9: National Wetland Inventory

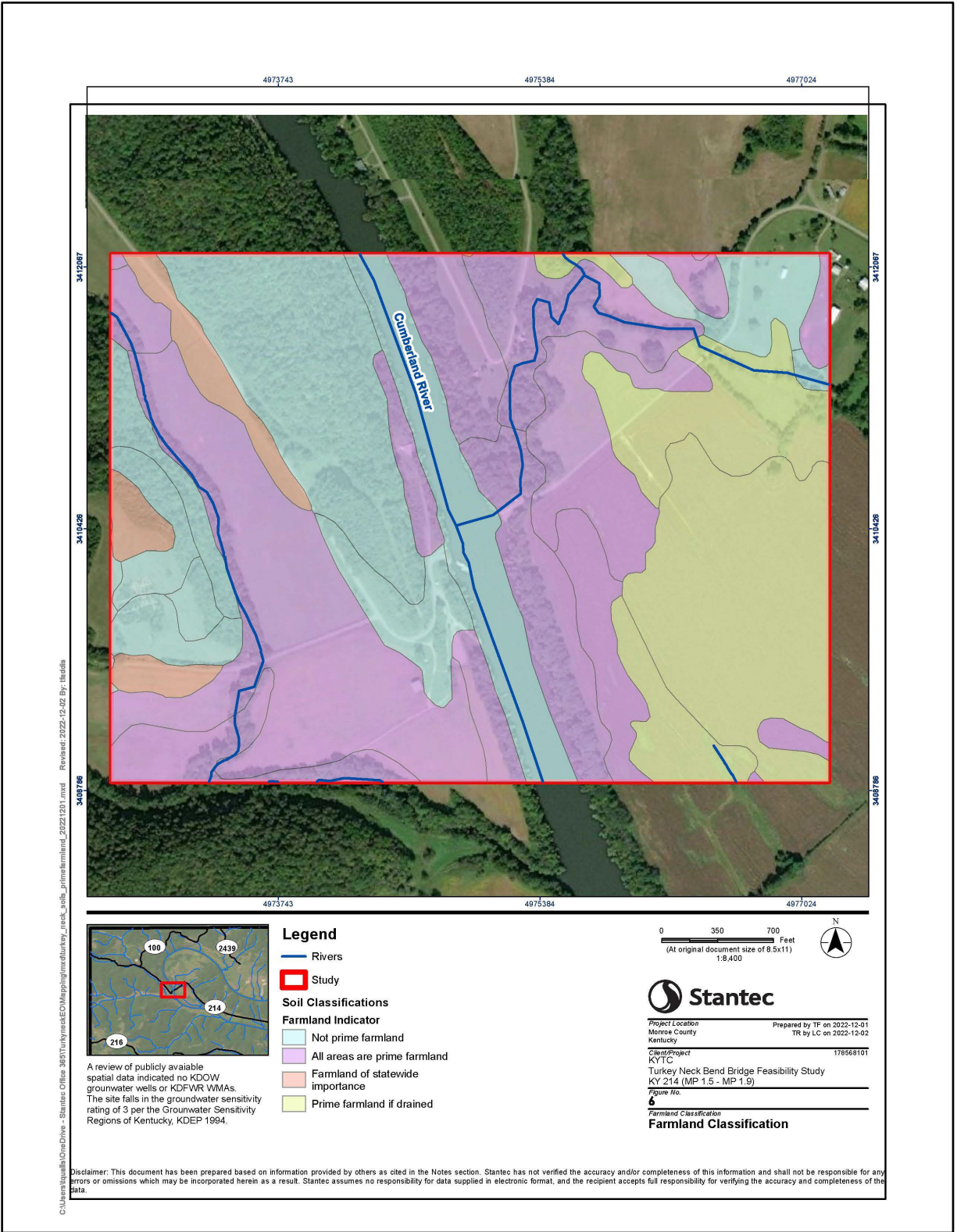


Figure 10: Farmland Inventory

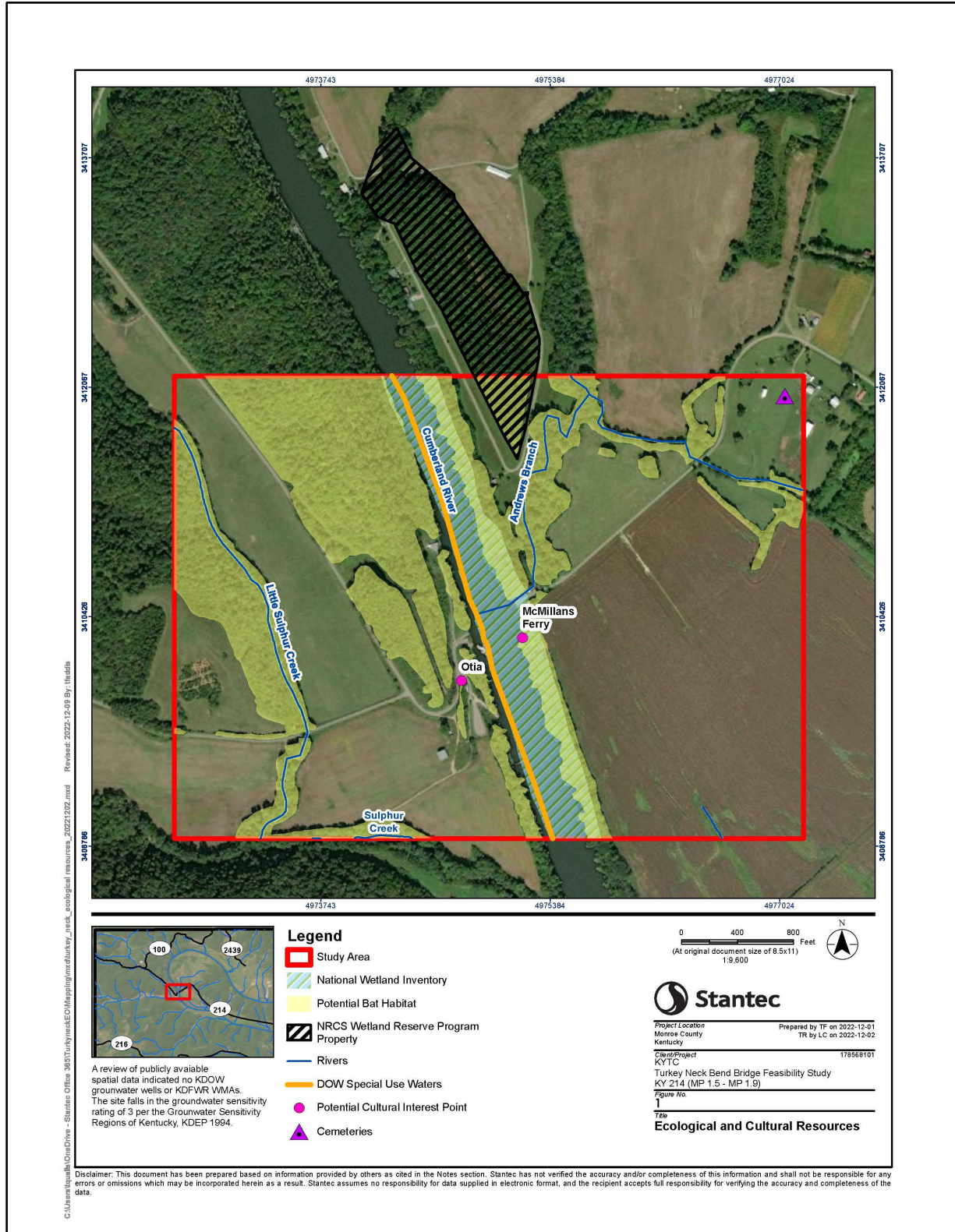


Figure 11: Human Environment

4.0 FUTURE CONDITIONS

To determine the need for and type of potential transportation improvement concepts, it is necessary to estimate future conditions. This chapter summarizes the anticipated future conditions within the study area. A complete discussion of the traffic forecasting process can be found in **Appendix C**.

4.1 POPULATION TRENDS

Population estimates and projections for Monroe County and the City of Tompkinsville were obtained from the Kentucky State Data Center (KSDC) at the University of Louisville, and 2020 census data were obtained from the United States Census Bureau, as shown in **Table 2**. Between 2000 and 2020, Monroe County experienced a decline in population at a rate of 0.18 percent per year, which is lower than the state average of 0.54 percent per year. Over the past 20 years, the City of Tompkinsville has decreased in population at a rate of 0.71 percent per year. The area is expected to maintain relatively flat with the Monroe County population expected to increase at a rate of 0.03 percent per year over the next 20 years.

Table 2: Population Estimates and Projections

Area	2000	2020	Annual Growth (2000 - 2020)	2050 Projection	Annual Growth (2020 - 2050)
Kentucky	4,041,769	4,505,836	0.54%	4,785,233	0.20%
Monroe County	11,756	11,338	-0.18%	11,428	0.03%
Tompkinsville	2,660	2,309	-0.71%	N/A	

Source: US Census and Kentucky State Data Center

4.2 HISTORICAL KYTC TRAFFIC COUNTS

Historical traffic volumes and annual growth rates, between 2000 and 2021, are summarized in **Table 3** and shown graphically in **Figure 12**. Station 253 on KY 214, to the west of the Cumberland River, has shown a decline in daily traffic, decreasing at a rate of 1.50 percent per year between 2002 and 2017. Station 280 on KY 214, to the east of Turkey Neck Bend, is the only station showing an increase in daily traffic between 2003 and 2021, increasing at a rate of 0.85 percent per year from 110 VPD to 128 VPD. The red text in **Table 3** represents the traffic counts from 2020 which may not be an accurate representation of recent traffic patterns due to COVID-19 shutdowns and were not used to calculate growth rates. The bolded values were used as the most up-to-date traffic count.

Table 3: Turkey Neck Bend Historical KYTC Traffic Counts

Year	KY 214 W	KY 214 E	KY 100	KY 100	KY 2439	KY 216
Station ID	086253	086280	086252	086275	086251	086254
2000				723		
2001						
2002	279		434			119
2003		110		1,090	186	
2004					161	
2005	298		344			214
2006		97				
2007					175	
2008	242		368			228
2009		87		749		
2010					186	
2011	245		285			197
2012		95				
2013					166	
2014	195		288			186
2015		89				
2016					166	
2017	241		280			183
2018		89		786		
2019					174	
2020	196		246			153
2021		128		569		
2022						
2023	203		227			140
Annual Growth Rate	-1.50%	0.85%	-3.04%	-1.13%	-0.42%	0.78%

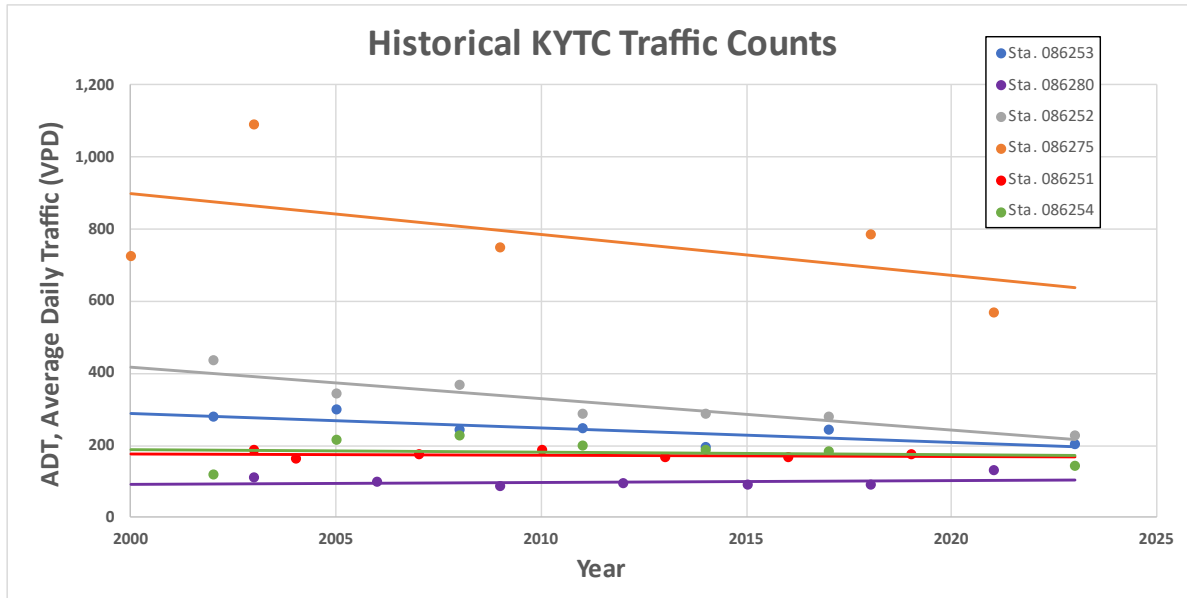


Figure 12: Turkey Neck Bend Historical KYTC Traffic Counts

4.3 KENTUCKY STATEWIDE TRAFFIC MODEL (KYSTM)

As an additional data source, traffic assignments from the Kentucky Statewide Traffic Model version 19 (KYSTMv19) were reviewed. As there is no roadway connection across the Cumberland River, the KYSTM did not have connecting links on KY 214 and therefore showed no daily traffic assignments. To replicate the ferry crossing, the KY 214 links were connected across the river and adjusted for travel speeds, resulting in a model run with 226 VPD crossing the Cumberland River. These same changes were then made to the 2045 model network, resulting in an annual growth rate of 0.5 percent per year. The updates to the network were meant to better reflect existing traffic and do not indicate improvements to the KY 214 corridor. Improvements to KY 214 outside the immediate study area would likely increase traffic at the river crossing but are not being considered as part of this study.

4.4 TRAFFIC FORECASTS

Based on the historical count data, Monroe County population projections, and growth rates from the most updated version of the KYSTM, an annual growth rate of 0.5 percent was selected to reflect moderate growth for the KY 214 corridor through the year 2045. The annual growth rate was applied to the latest KYTC daily traffic counts to develop 2045 daily traffic forecasts, as shown in **Figure 13**.

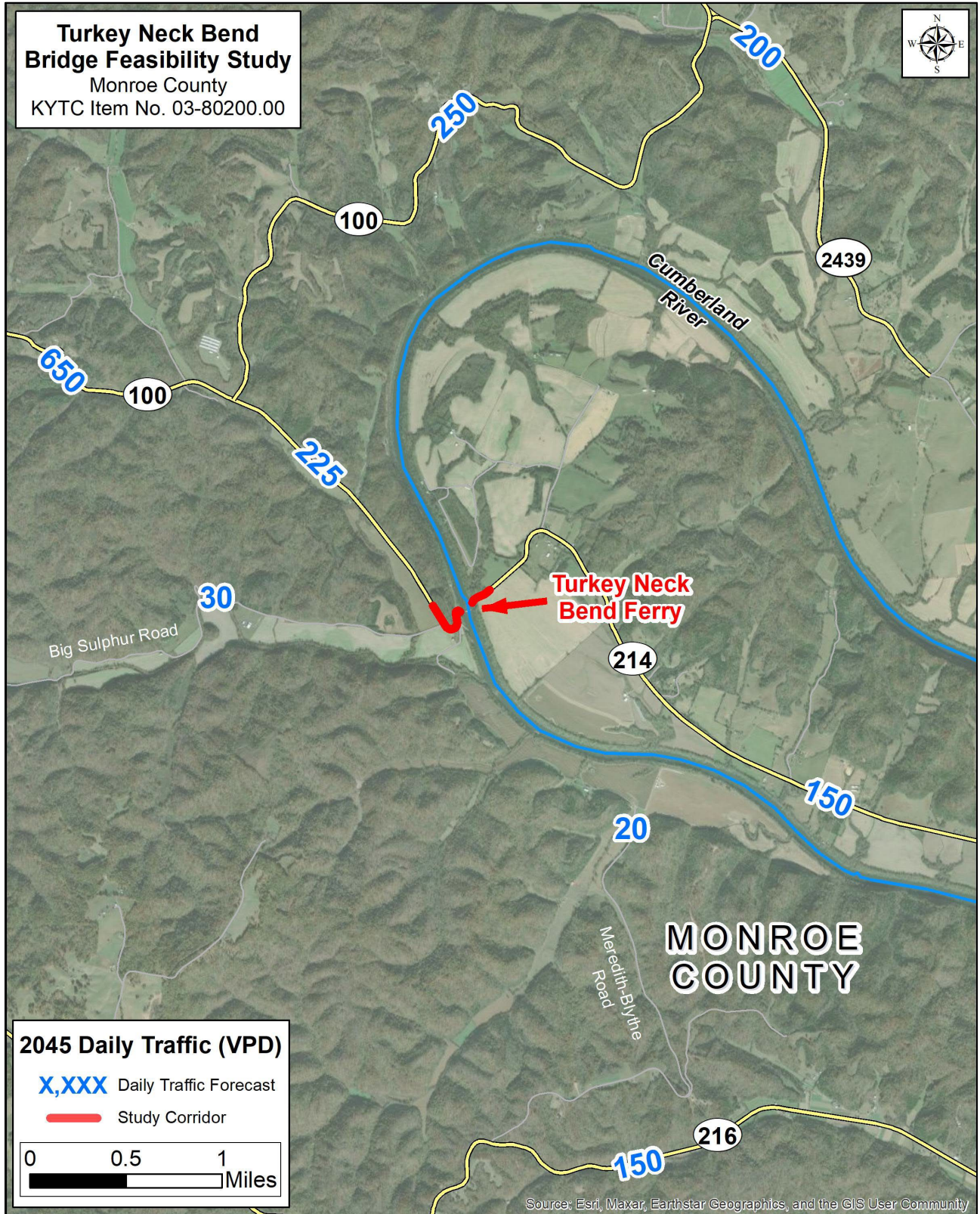


Figure 13: 2045 Daily Traffic Forecasts

5.0 STUDY GOALS

As stated previously, the Turkey Neck Bend Ferry is the only free KYTC-operated ferry open 24 hour per day. This differs from the typical operations at other state-operated ferries that tend to be in service 12 to 18 hours per day.

As the only Cumberland River crossing in Monroe County, the ferry provides an essential crossing for local residents. When it is closed for maintenance, flood conditions, or high winds, drivers are forced to use lengthy detours or avoid crossing the Cumberland River.

The goals of the *Turkey Neck Bend Feasibility Study* include:

- Assess future traffic demand along the KY 214 corridor.
- Evaluate feasible alternatives to connect KY 214 across the Cumberland River.
- Develop and compare life cycle costs for KY 214 connection strategies.
- Engage the public and other stakeholders.
- Document the study process and findings.

6.0 INITIAL PROJECT TEAM AND STAKEHOLDER COORDINATION

Over the course of the study, the project team held three meetings to coordinate on key issues. The project team included representatives from KYTC Central Office, KYTC District 3, the Barren River Area Development District (BRADD), and the consultant Stantec. Detailed summaries of each meeting are presented in **Appendix D**.

6.1 PROJECT TEAM MEETING NO. 1

The first Project Team Meeting for the subject project was held at the KYTC District 3 Office in Bowling Green, Kentucky and virtually via Microsoft Teams on May 4, 2023. The purpose of the meeting was to recap existing conditions and discuss improvement concepts before meeting with local officials and stakeholders.

- It was noted that the ferry is used to transport school children. The students are ferried across the river in SUVs rather than school buses.
- 10 years was determined to be a reasonable timeframe for opening a new bridge.
- Other ferries in Kentucky collect cash-only tolls and make bank deposits each night.
- The public survey will include a question to determine if travelers cross the Cumberland River when the ferry is closed, how they cross the river.

6.2 LOCAL OFFICIALS / STAKEHOLDER MEETING

After the first project team meeting, the project team met with local officials and stakeholders to coordinate on key issues. Agencies represented included Monroe County Schools, Monroe County Economic Development, Monroe County Property Value Administrator (PVA), and Community Action of Southern Kentucky, among others. The Local Officials / Stakeholder meeting was held at the Monroe County Courthouse in Tompkinsville, Kentucky on September 25, 2023. The purpose of the meeting was to discuss the existing conditions and solicit feedback on potential river crossing options. Detailed summaries for all meetings are found in **Appendix D**.

Attendees were asked to fill out a survey to provide input on the ferry operations and bridge options. 15 Local Officials / Stakeholders filled out the survey, 12 of which live in postal code 42167 that serves Tompkinsville and the surrounding area, and 14 of which work in postal code 42167. One respondent indicated daily use of the ferry, two use the ferry two to three times per week, six use the ferry two to three times per month, and six rarely use the ferry, as shown in **Figure 14**.

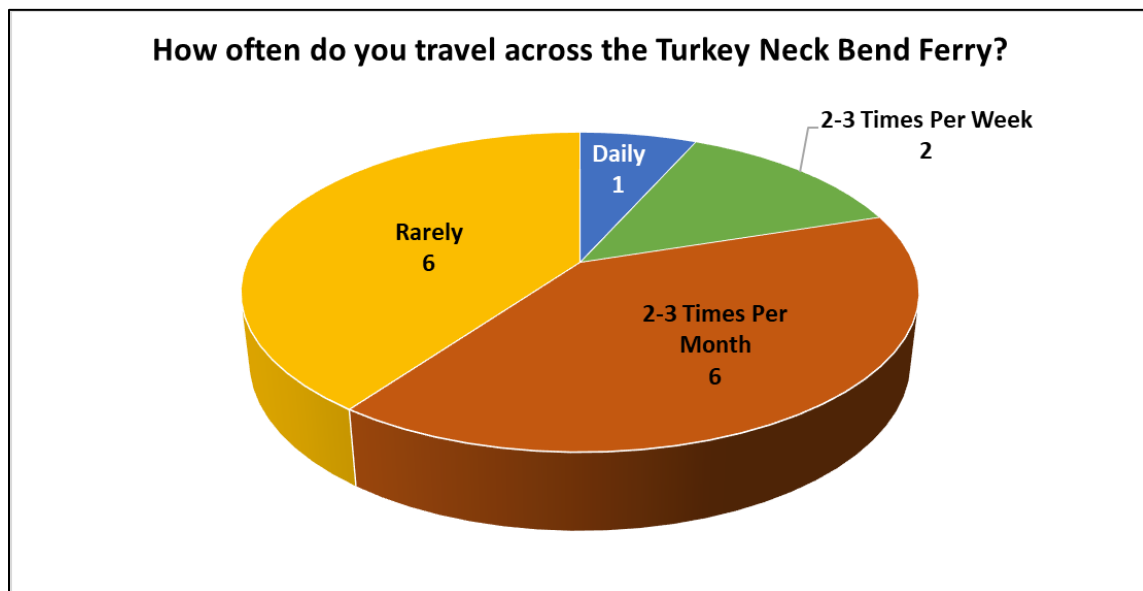


Figure 14: Local Officials / Stakeholder Survey – Travel Frequency

When asked about their purpose for using the ferry, five attendees indicated they use it to commute to work, one for shopping, one for healthcare and eight respondents use the ferry for other purposes, as shown in **Figure 15**. The “other” responses included visiting family, accessing property, attending church, paying bills, recreation, and transporting students to and from school.

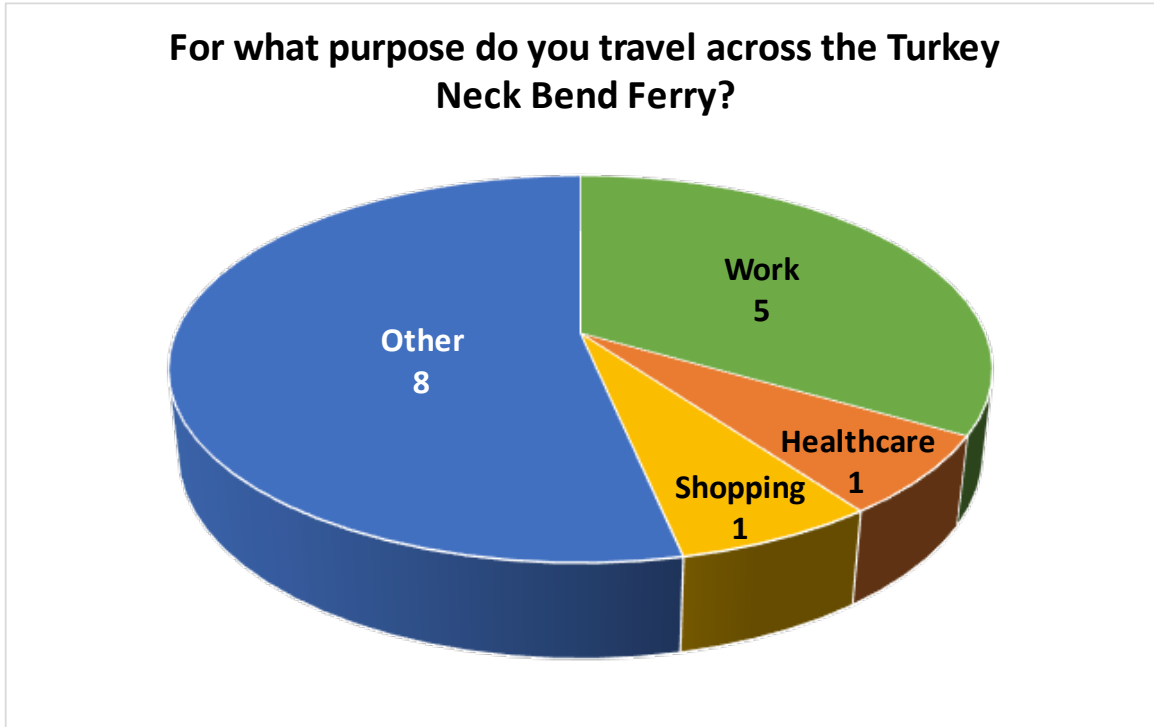


Figure 15: Local Officials / Stakeholder Survey – Trip Purposes

The most common time of day to use the ferry was between 6:00 a.m. and 12:00 p.m., followed by the period between 12:00 p.m. and 6:00 p.m., as shown in Figure 16.

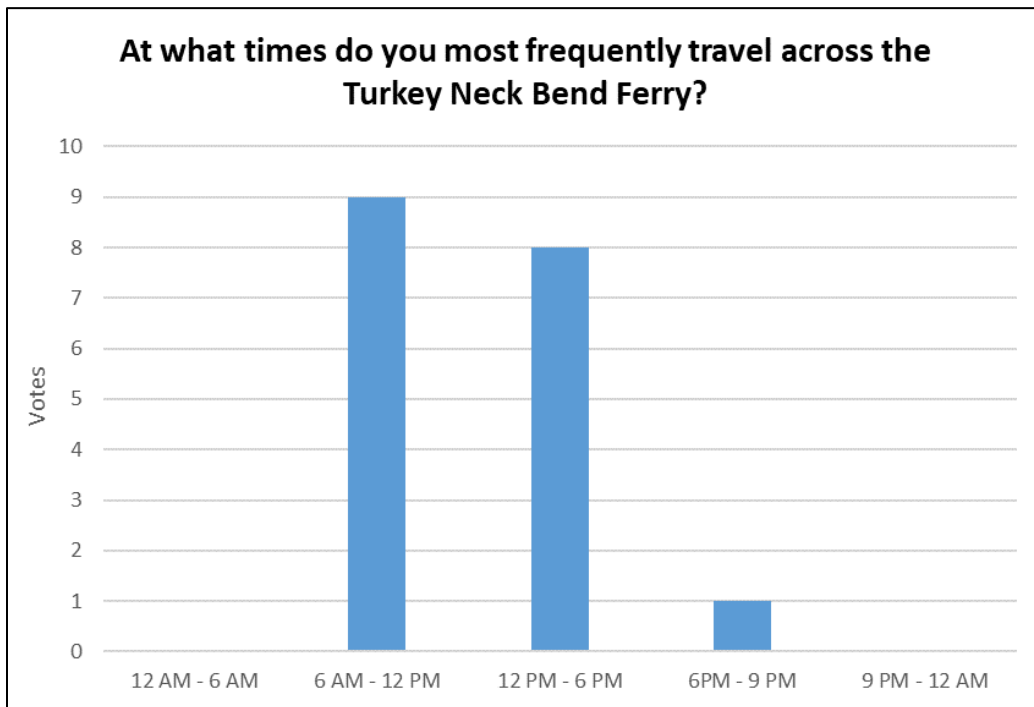


Figure 16: Local Officials / Stakeholder Survey – Time of Day

When asked if changes are needed in the near-term, 11 respondents said no changes are needed, as shown in **Figure 17**.

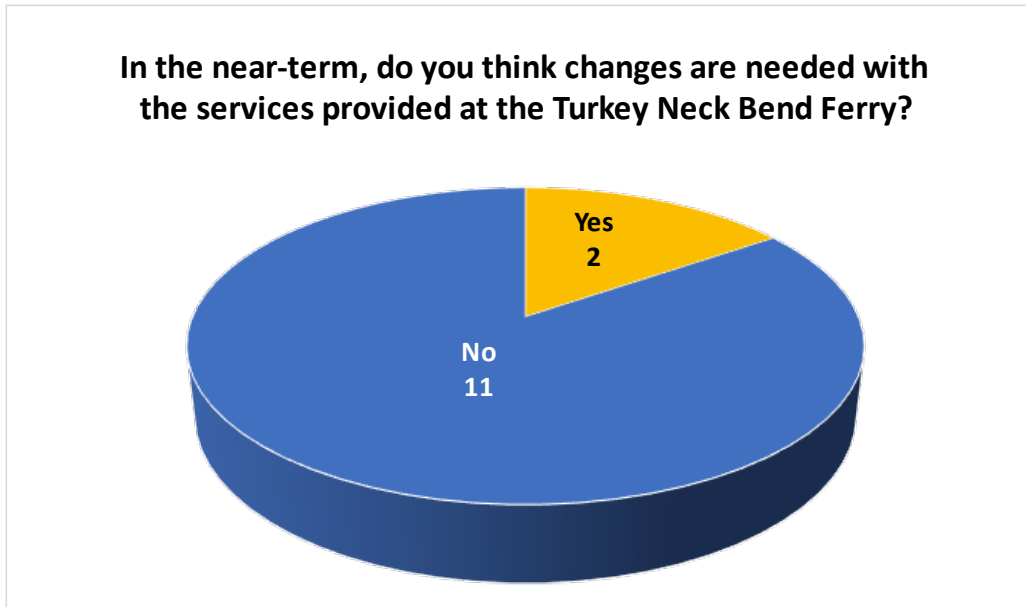


Figure 17: Local Officials / Stakeholder Survey – Near-Term Changes

When asked if respondents support maintaining the ferry or the construction of a bridge in the long-term, 13 respondents indicated they prefer a bridge while two indicated they prefer maintaining the ferry. Reasons provided for maintaining the ferry included maintaining the tourist attraction for Monroe County as well as the historical context for the ferry.

7.0 PRELIMINARY IMPROVEMENT CONCEPTS

Preliminary improvement concepts were developed based on a combination of a review of existing conditions, local officials / stakeholder input, public input, and field reconnaissance. These improvements were developed while considering a comprehensive range of options and included both ferry and bridge concepts.

7.1 FERRY CONCEPTS

The following options were considered for continued operations of the Turkey Neck Bend Ferry.

7.1.1 No Action / Do Nothing

The No-Action concept maintains the Turkey Neck Bend Ferry with its current 24-hour service, which costs KYTC over \$1 million per year. The 2022 *Long-Range Statewide Transportation Plan* identified \$32.5 million in funding needs between 2022 and 2045 to operate the Turkey Neck Bend Ferry.² This includes \$22 million in operations and maintenance, \$4.3 million in budget requests, and \$6.1 million in additional staffing based on expected Coast Guard requirements (Subchapter M) that establish guidelines for inspection compliance, as shown in **Table 4**.

Table 4: Ferry Needs Analysis (2022 to 2045)

Ferry	County	Historically Derived Operations and Maintenance	Additional Needs			TOTAL NEEDS
			Known Budget Requests	Subchapter M	Capital	
Augusta	Bracken	\$5,563,307	\$625,000	\$3,073,728	\$3,500,000	\$12,762,035
Reeds	Butler	\$3,684,733	\$-	\$3,073,728	\$-	\$6,758,461
Rochester	Butler	\$3,684,733	\$-	\$3,073,728	\$-	\$6,758,461
Cave-in-Rock	Crittenden	\$38,337,955	\$-	\$3,970,232	\$-	\$42,308,187
Valley View	Fayette	\$8,696,547	\$2,125,000	\$3,073,728	\$-	\$13,895,275
Dorena-Hickman	Fulton	\$3,349,757	\$-	\$2,817,584	\$-	\$6,167,342
Turkey Neck Bend	Monroe	\$21,973,609	\$4,325,000	\$6,147,457	\$-	\$32,446,066
TOTAL						\$121,095,827

7.1.2 Adjust Hours of Operation

Based on a review of the Valley View Ferry (connecting Fayette and Jessamine County across the Kentucky River) budget, reducing the daily operating hours of the Turkey Neck Bend Ferry from 24 to 12 or 16 hours would result in reduced labor and fuel costs.

² <http://transportation.ky.gov/Planning/Pages/Long-Range-Statewide-Transportation-Plan.aspx>

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Overall, cutting the hours of operations to 16 would result in an estimated \$217,000 in savings per year and reducing to 12 hours would result in \$435,000 in savings per year. **Table 5** presents the Valley View Budget by expense type along with the Turkey Neck budget based on hours of operation. The reduced operational hours would result in added travel time costs for motorists due to diversions while the ferry is closed. It was assumed that 25 percent of the trips would divert to the north detour if the ferry hours were reduced. Emergency Medical Services (EMS) response times could be impacted by reduced operations. During off-hours, EMS would operate similar to when the ferry is closed with maintenance, with Cumberland County EMS responding to Monroe County east of the Cumberland River.

Table 5: Adjusted Hours of Operations

Expense	Valley View		Current (24-hour)	Modified (16-hour)	Modified (12-hour)
			Turkey Neck		
Fees	2.8%	\$16,000	\$1,050,000	\$833,000	\$615,000
Contract Services	3.5%	\$19,900			
Dues & Subscriptions	0.1%	\$500			
Employee Expenses	72.8%	\$413,900			
Fuel	3.7%	\$21,000			
Insurance	5.0%	\$28,518			
Repairs/Maintenance	8.8%	\$50,000			
Utilities	1.0%	\$5,536			
Miscellaneous	2.4%	\$13,577			
Total	100.0%	\$568,931	\$1,050,000	\$833,000	\$615,000

7.1.3 Crossing Fee (Toll)

Based on a review of fee-based ferries in Kentucky, a user fee of \$5 per trip was evaluated for Turkey Neck Bend. It was also assumed that this fee would result in a 25 percent reduction in traffic demand across the river. Based on these assumptions, a \$5 fee would bring in approximately \$262,500 in gross revenue per year.

7.1.4 Close Ferry

Closing the Turkey Neck Bend Ferry would require current users to detour to the north or south to cross the Cumberland River. User costs associated with the ferry closure were calculated using a cost of time of \$18.80 per hour (based on USDOT BCA Guidance), a driving cost per mile of \$0.46 per mile, a current ferry delay time of approximately six minutes, and no reduction in travel demand for crossing the Cumberland River. The cost for all users using the south detour to Celina, Tennessee rather than the Turkey Neck Bend Ferry would be about \$2.7 million per year and the cost of using the north detour to Burkesville would be about \$1.5 million per year.

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Emergency Medical Services (EMS) would operate similar to when the ferry is closed with maintenance today, with Cumberland County EMS responding to Monroe County east of the Cumberland River.

Table 6 presents a summary of the user costs.

Table 6: Ferry Closure User Costs

Detour	ADT (VPD)	Original Distance	Detour Distance (mi)	Original Time (Hr.)	Detour Route Speed	Time at Reduced Speed	Delay / Trip (hrs)	V-hrs/ day Delay (hrs)	Cost of Time (\$18.80/hr)	Cost of Distance (\$0.46/mi)	Total Cost Detour	Yearly Cost
South Detour	200	0.36	45	0.100	45	1.000	0.900	180.000	\$3,384	\$4,100	\$7,484	\$2,732,000
North Detour	200	0.36	25	0.100	45	0.556	0.456	91.111	\$1,713	\$2,300	\$4,013	\$1,465,000

7.1.5 Summary of Ferry Concepts

Table 7 presents a summary of the ferry concepts. The life cycle costs from 2023 through 2045 were estimated based on future traffic growth rates (0.5 percent per year) and are shown in 2023 dollars. As shown, ferry closure options have high overall costs for users as a result of the lengthy detours.

Table 7: Summary of Ferry Concepts

Option	Description	Expected Costs (2023 - 2045)		
		Ferry O&M	User Costs	Total
1	Do Nothing	\$32,400,000	\$0	\$32,400,000
2a	Reduce Hours of Operation (16-Hour)	\$29,616,000	\$9,313,000	\$38,929,000
2b	Reduce Hours of Operation (12-Hour)	\$21,861,000	\$14,900,000	\$36,761,000
3	User Fee (Toll)	\$26,000,000	\$0	\$26,000,000
4a	Closure - South Detour	\$0	\$66,700,000	\$66,700,000
4b	Closure - North Detour	\$0	\$37,250,000	\$37,250,000

7.2 BRIDGE CONCEPTS

This segment of the Cumberland River is not a navigable waterway and sees only recreational river traffic. Base criteria assumptions for the bridge concepts, largely based on the KY 61 bridge over the Cumberland River in Tompkinsville, include 30 feet of vertical clearance above the normal pool and 250 feet of horizontal clearance for the main river span. Bridge options include two 11-foot-wide lanes with four-foot-wide shoulders and are shown north and south of the ferry for it to remain in operation during construction. The general locations are shown in **Figure 18**.

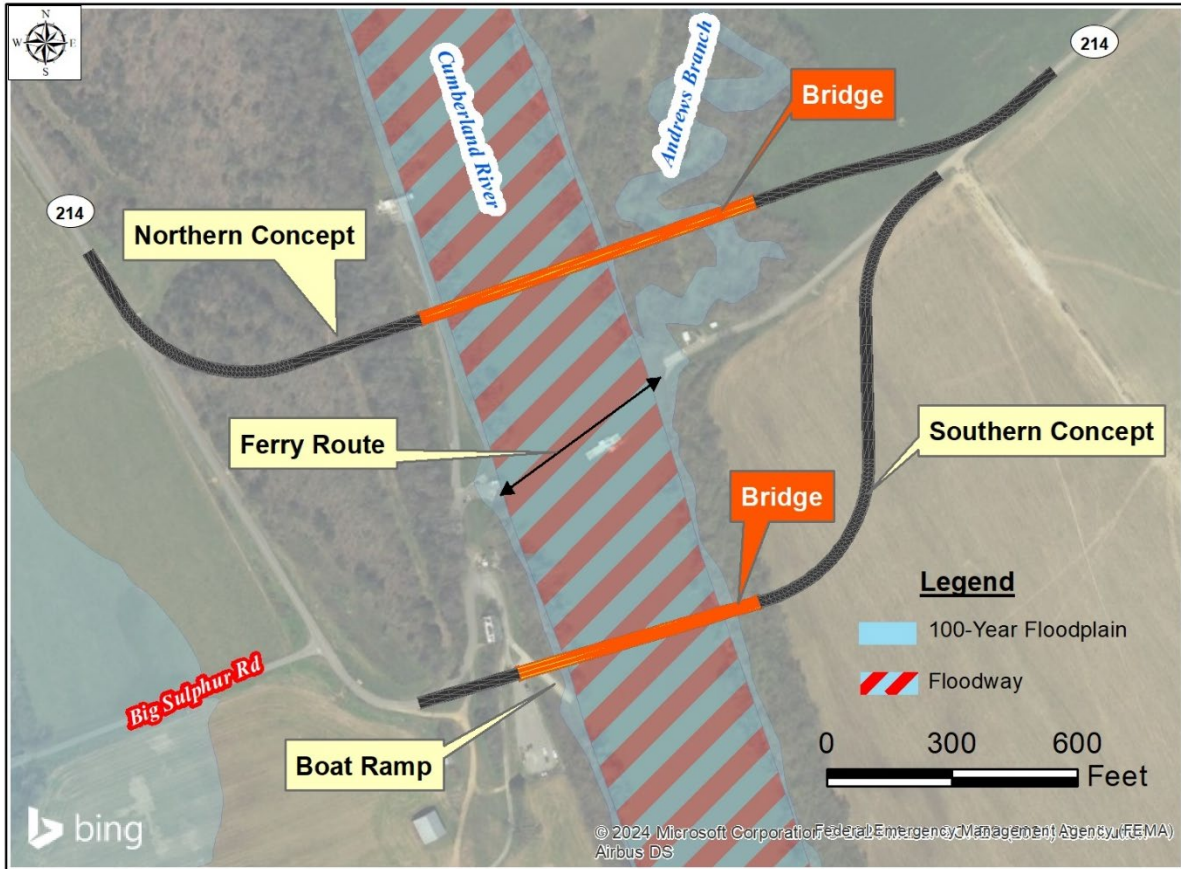


Figure 18: Cumberland River Bridge Options

7.2.1 Bridge North of the Ferry

The northern bridge option includes constructing a new alignment north of the existing crossing with a total 850-foot-long bridge, including a 250-foot main span with 175-foot approach spans and 125-foot spans over the floodplain associated with Andrews Branch, as shown in **Figure 19**.



Figure 19: Bridge North of the Ferry

7.2.2 Bridge South of the Ferry

The southern bridge option includes constructing a new alignment south of the existing crossing with a 600-foot-long bridge (250-foot main span with two 175-foot approach spans), as shown in **Figure 20**.



Figure 20: Bridge South of the Ferry

7.2.3 Bridge Cost Estimates

Table 8 presents the estimated bridge costs in 2024 dollars.

Table 8: Estimated Bridge Costs

Bridge Cost Estimates (Year 2024 Dollars)						
Alternative	Length (miles)	Design	Right-of-Way	Utilities	Construction Cost	Total Cost
North	0.53	\$2,929,000	\$293,000	\$241,000	\$25,900,000	\$29,360,000
South	0.41	\$1,742,000	\$223,000	\$120,300	\$19,346,000	\$21,430,000

8.0 PUBLIC SURVEY

A survey was handed out to the public at the Turkey Neck Bend Ferry starting on December 5, 2023 to solicit feedback on ferry use. Paper copies of the survey were handed out to motorists while on the ferry and an online version was also made available. A total of 91 survey responses were collected during the comment period which ran through the end of January 2024. Of the returned surveys, 54 were mailed in or returned in person and 37 were submitted online.

Respondents were first asked what zip code they live in. As shown in **Figure 21**, most of the respondents live in zip code 42167, which covers Tompkinsville and the west side of the Cumberland River, and 42717, which includes Burkesville and the east side of the river.

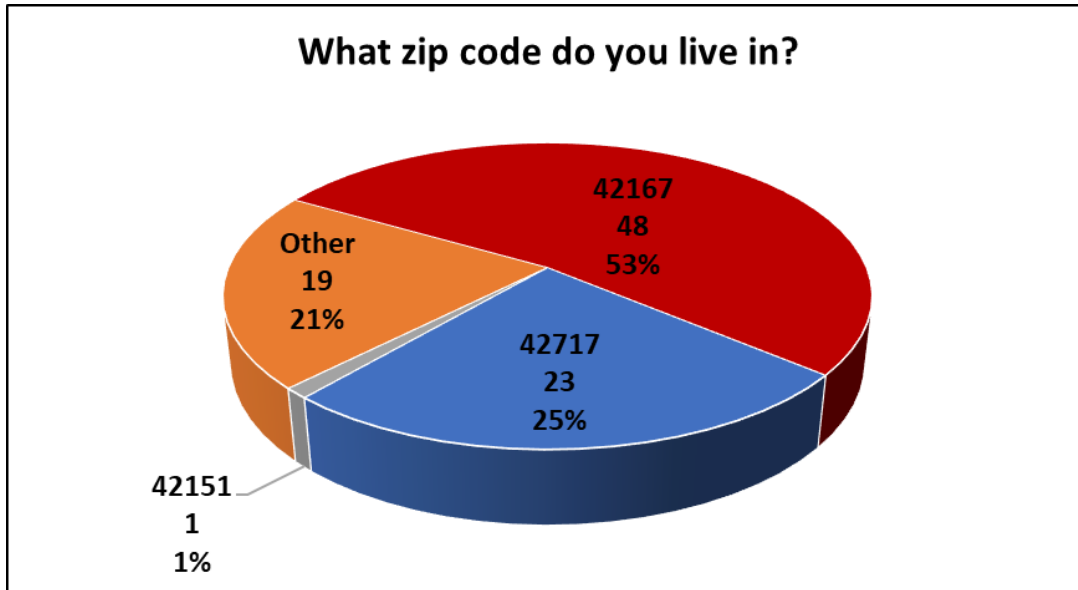


Figure 21: Public Survey – Zip Code for Residence

Respondents were asked what zip code they worked in. Of the 91 respondents, over half work in zip code 42167, with zip code 42717 being the second highest, as shown in **Figure 22**. A map of the study area zip codes is shown in **Figure 23**.

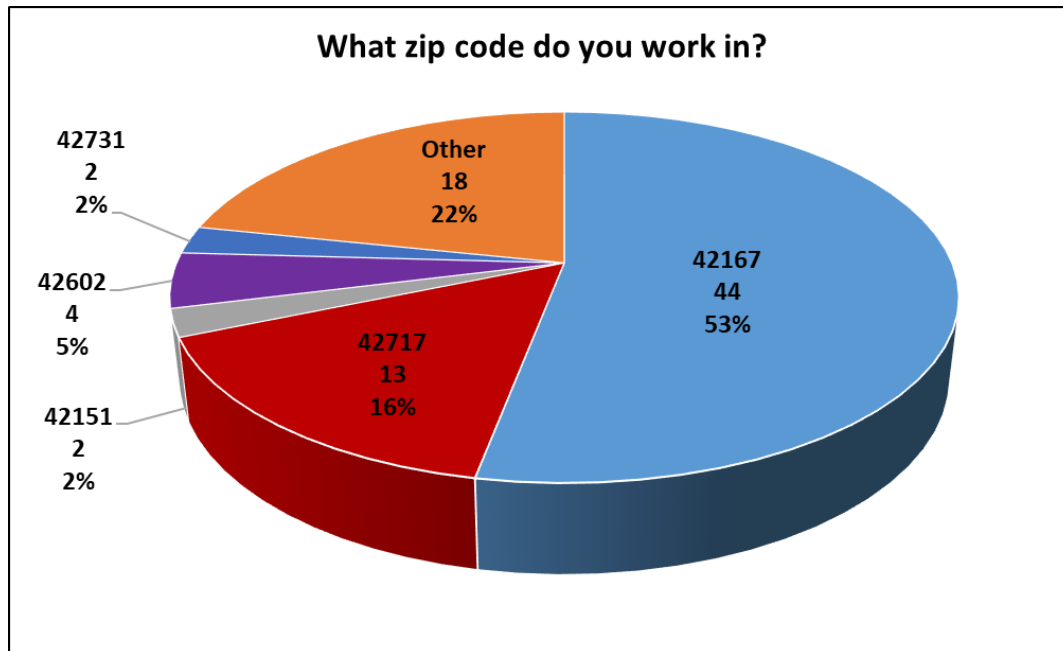


Figure 22: Public Survey – Zip Code for Work

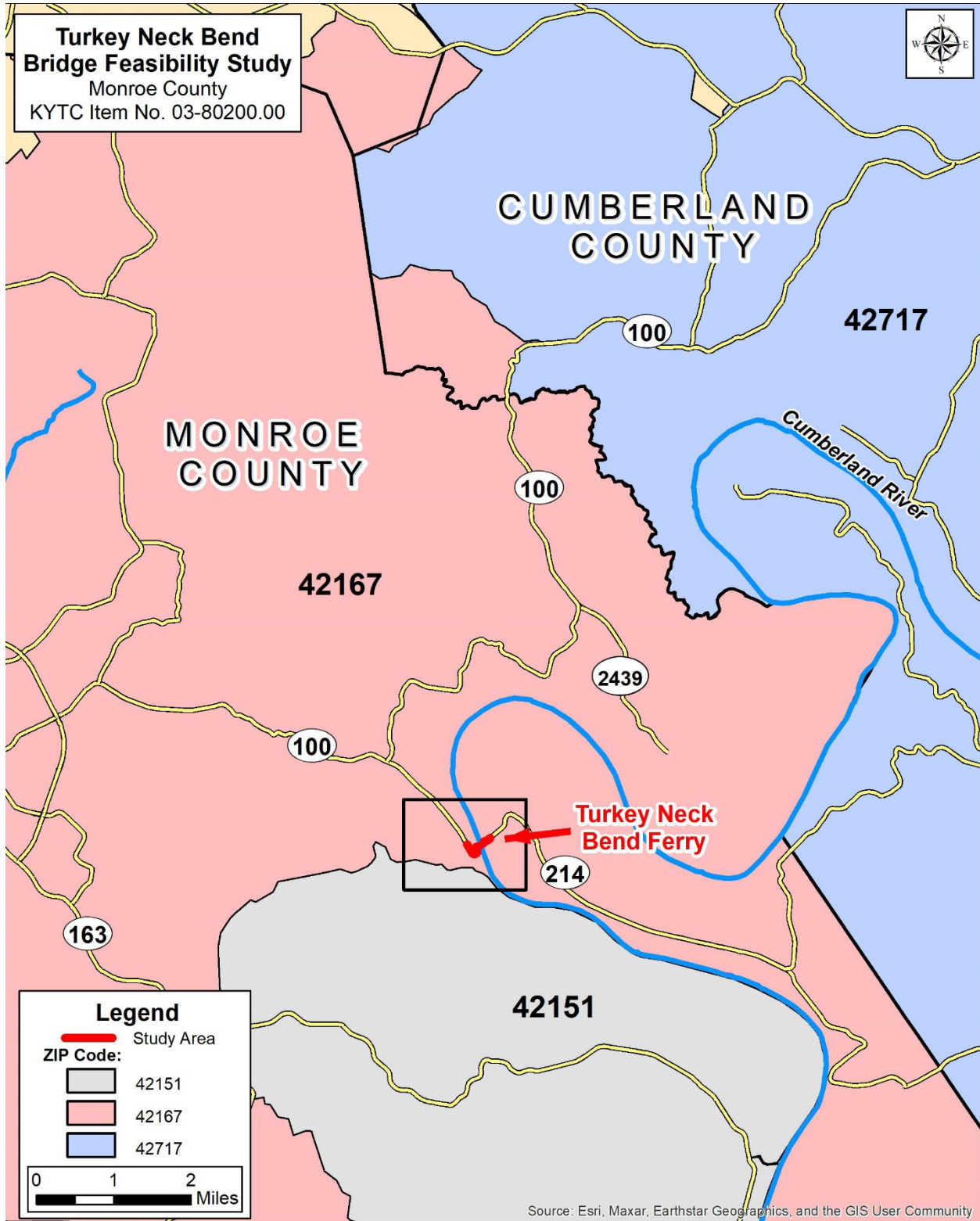


Figure 23: Study Area Zip Codes

Respondents were asked how often they travel across the Turkey Neck Bend Ferry. More than half of respondents travel across the ferry at least two times per week. **Figure 24** summarizes the input received on Question 3.

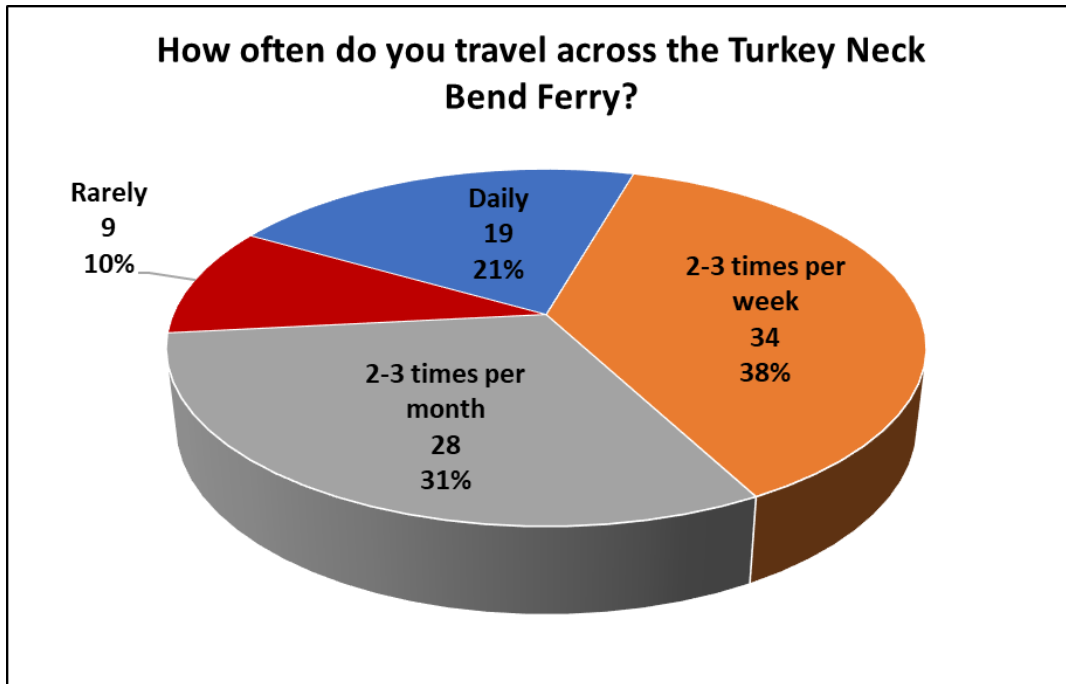


Figure 24: Public Survey – Travel Frequency

Respondents were asked for their purpose when traveling using the ferry. Shopping was the most popular reason to use the ferry, followed by healthcare and work, as shown in **Figure 25**. 42 respondents stated their reason as "other," with comments that included banking, visiting friends and family, and recreation.

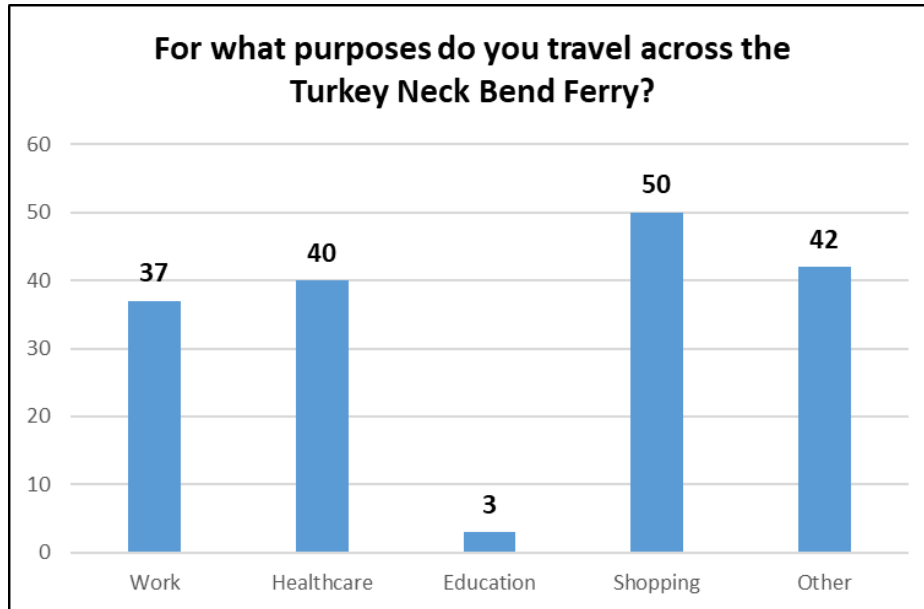


Figure 25: Public Survey – Trip Purposes

Respondents were asked what times they most frequently travel across the ferry. The most common time of day to use the ferry was between 6:00 a.m. and 12:00 p.m., followed by the period between 12:00 p.m. and 6:00 p.m., as shown in **Figure 26**. Few respondents indicated they use the ferry between the hours of 9:00 p.m. and 6:00 a.m.

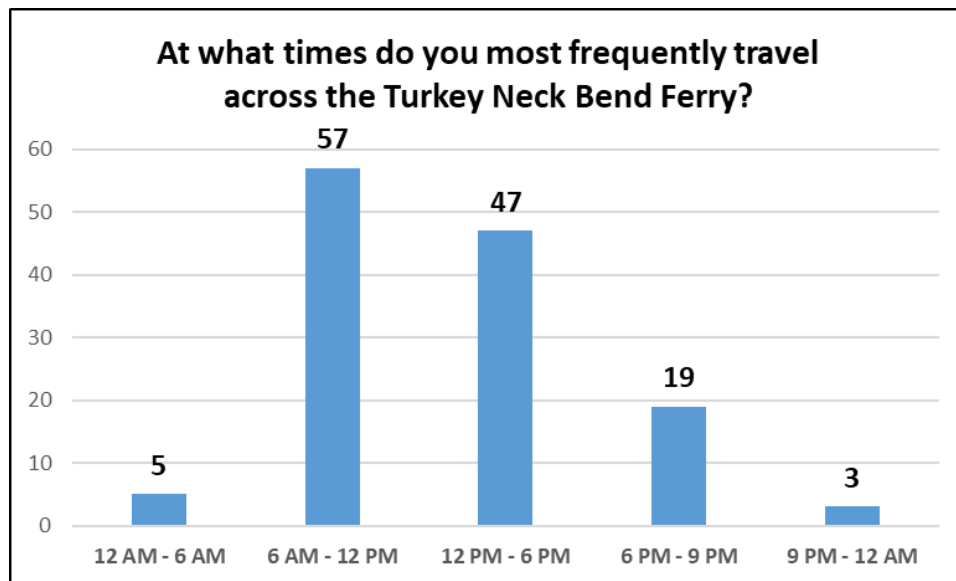


Figure 26: Public Survey – Time of Day

Respondents were asked if they use an alternative route while the ferry is closed and if so, what route they use. **Figure 27** summarizes the input received. Of the 64 responses that indicated they would use a detour, 49 respondents indicated they detour through either Clay County, Tennessee or Cumberland County, Kentucky. 25 (27 percent) respondents indicated they do not cross the river or do not make a trip if the ferry is closed for any reason.

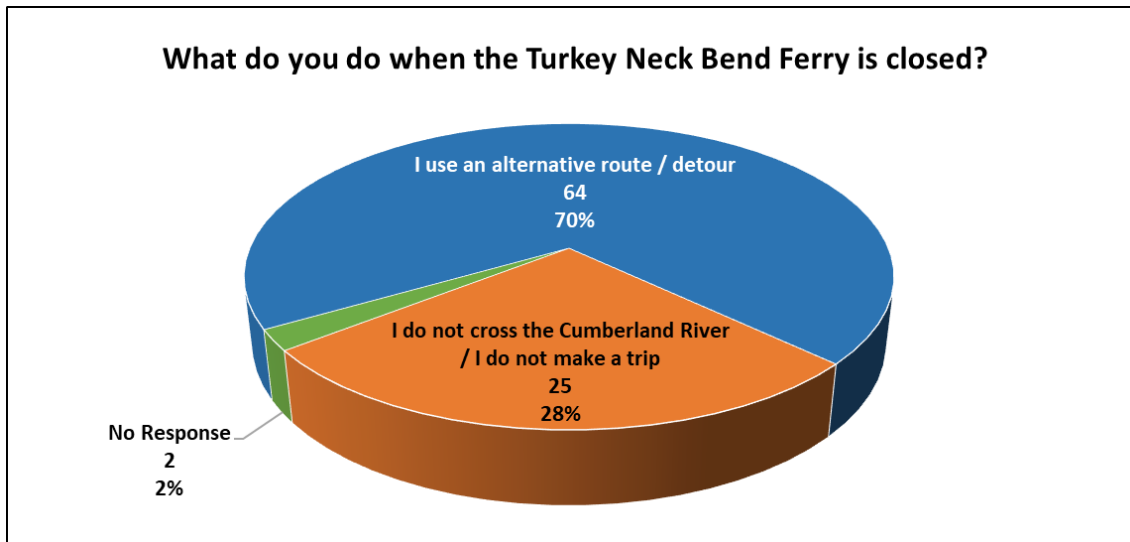


Figure 27: Public Survey – Ferry Closure Options

Respondents were asked if changes are needed with the service provided at the Turkey Neck Bend Ferry. Of the 79 respondents, 58 percent indicated changes were not needed while 24 respondents (30 percent) indicated changes are needed in the services provided, as shown in **Figure 28**. Suggestion comments for changes included building a bridge, extending ferry ramps to increase accessibility to low riding vehicles, adding a vehicle arrival alert system for ferry workers between the 12 AM and 6 AM shift, and adding a small fee to use the ferry. A common request was it would be desirable if ferry closures were more widely announced or otherwise communicated to residents. While KYTC uses social media and traditional media outlets to publicize anticipate closures, weather-related events are not as simple to announce in advance. Some ferry users commented they sometimes do not know the ferry is closed until they drive to the river.

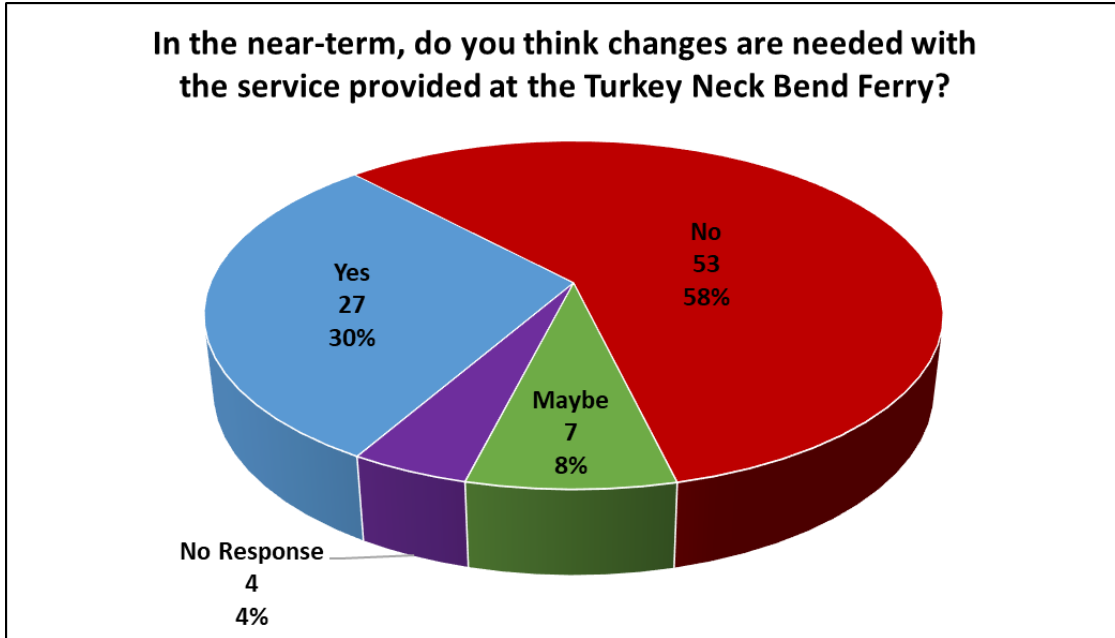


Figure 28: Public Survey – Near Term Ferry Service Changes

Respondents were then asked if they supported maintaining the ferry crossing or the construction of a bridge. 48 respondents (53 percent) support maintaining the ferry crossing while 43 (47 percent) support constructing a bridge, as shown in **Figure 29**.

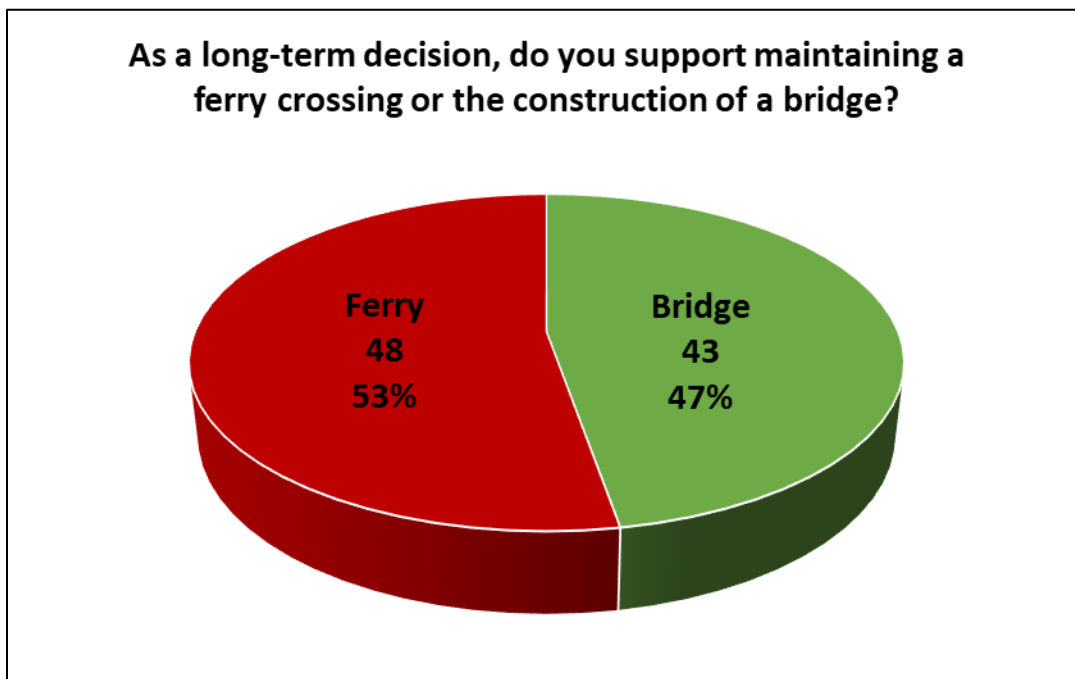


Figure 29: Public Survey – Long-Term Bridge Construction

The following comments or suggestions were made at the end of the survey:

- Build a bridge (11)
- Keep Ferry in service (7)
- Wait times can be lengthy overnight 12 AM – 6 AM (3)
- Announce estimated wait time on Ferry Shutdowns to allow travelers to plan alternative modes of transportation (2)
- Extend loading ramps to make more accessible to low-riding vehicles
- Charge a small fee to keep the ferry open
- Increase operation speed
- Better lighting on the ferry itself
- Increase pay for ferry employees

9.0 PROJECT TEAM MEETING NO. 2

Following the public survey, the project team met for a second time to discuss results of the survey and the revised improvement concepts. The second Project Team Meeting for the subject project was held at the KYTC District 3 Office in Bowling Green, Kentucky and virtually via Microsoft Teams on March 4th, 2024. Some of the key topics of discussion from the meeting are outlined below, and more detailed summaries for all meetings are found in **Appendix D**.

- Driving factors for those who want to keep the ferry open include nostalgia and relationships with the ferry operators.
- A common misconception of the public, and a potential factor for the backing of maintaining the ferry, is that the ferry operators would lose their jobs if the ferry were to close. Any bridge option would take many years to plan, design, and construct. Additionally, the operators are employed by the Commonwealth of Kentucky and would have opportunities to transfer to other positions within the KYTC.
- A 16-hour ferry operational analysis should be evaluated to better accommodate the operators' 8-hour work shifts. The life cycle cost analysis should also be extended to 2075 as any newly constructed bridges will have a longer life than previously analyzed.
- The ferry's historic context will be preserved under all bridge construction scenarios. Additionally, the boat ramp will be maintained.
- It was noted that during ferry closures, emergency medical services (EMS) service areas change and Cumberland County EMS responds to eastern Monroe County.

10.0 CONCLUSIONS

The goal of the *Turkey Neck Bend Bridge Feasibility Study* was to assess future traffic demand along KY 214 and to evaluate feasible alternatives to maintain a connection in the KY 214 corridor across the Cumberland River. Local officials and the ferry-crossing public were given surveys to solicit input on potential crossing options and life cycle costs were developed to compare the crossing strategies. **Table 9** presents a summary of the life cycle costs from 2024 to 2075, including maintaining 16-hour ferry operations during the design and construction of the bridge concepts. The life cycle costs for the non-bridge options accounted for both operational and capital costs and the following inflation rates: 3.1 percent (2024), 2.9 percent (2025), 2.7 percent (2026), and 2.5 percent (2026 – 2075). The life cycle costs for the bridge options included design, right-of-way, utilities, construction, and maintenance. A more detailed version of the life cycle cost analysis table can be found in **Appendix E**.

Table 9: Life Cycle Analysis (16-Hour Operation from 2024 – 2075)

Concept	Cost (2024 - 2075)				Total
	Bridge	24-Hour Ferry Operation	16-Hour Ferry Operation	12-Hour Ferry Operation	
24-Hour Ferry Operation	N/A	\$133,165,000	N/A	N/A	\$133,165,000
16-Hour Ferry Operation	N/A	N/A	\$105,921,000	N/A	\$105,921,000
12-Hour Ferry Operation	N/A	N/A	N/A	\$78,652,000	\$78,652,000
South Bridge Option*	\$25,806,000	N/A	\$10,181,000	N/A	\$35,987,000
North Bridge Option*	\$40,164,000	N/A	\$10,181,000	N/A	\$50,345,000

*Assumes 16-hour ferry operation during bridge planning, design, and construction from 2024-2032

10.1 RECOMMENDATIONS

As a long-term solution, it is recommended that the south bridge concept be moved forward to Phase 1 Design (Preliminary Engineering and Environmental Analysis). This option will provide a permanent and reliable option for travelers to cross the Cumberland River and will save the Commonwealth money over the life of the project. As part of a future bridge project, KYTC should explore options to work with Monroe County to provide opportunities to highlight and memorialize the ferry crossing.

Based on ferry ridership numbers, it is also recommended the Turkey Neck Bend Ferry hours of operation be reduced to 16 hours per day between 6:00 a.m. and 10:00 p.m. This would continue to serve the periods when most travelers indicate they use the ferry and would reduce operational and labor costs as the ferry can be operated with only two personnel shifts. Once the bridge construction is complete, it is recommended that the ferry is closed permanently, with the boat ramp remaining open to the public.

10.2 NEXT STEPS

The next step following this study for any potential improvements would be Phase 1 Design (Preliminary Engineering and Environmental Analysis). Further funding will be necessary to advance an improvement to the design phase as additional phases of this project are not funded in *Kentucky's FY 2024 – FY 2030 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 the KYTC District 3 Project Manager, Ben Hunt, at (502) 764-2074 (email at Benjamin.Hunt@ky.gov).