



# Putnam County Community Mobility Plan

October 2023

FINAL REPORT



**RESOLUTION to adopt the Putnam County Community Mobility Plan**

WHEREAS, Putnam County received a Community Transportation Planning Grant from the Tennessee Department of Transportation (TDOT) to conduct a Community Mobility Plan along US-70N/SR-24 and County Farm Road / Pippin Road in western Putnam County; and

WHEREAS, HNTB and Fairpointe Planning have conducted the study; and

WHEREAS, the Stakeholder Committee has reviewed and provided feedback on the plan over the course of several meetings; and the County Commission reviewed the plan in their meeting on Monday, October 16, 2023; and

WHEREAS, the Putnam County Community Mobility Plan is a tool that, when adopted and applied, can serve as a tool to help guide future transportation improvements in the area

NOW, THEREFORE, BE IT RESOLVED, by the County Commission of Putnam County, Tennessee that the Putnam County Community Mobility Plan attached as Exhibit A is hereby adopted.

Duly Passed by the County Commission on this the 16th day of October 2023.

  
Randy Porter, Putnam County Mayor

# Table of Contents

<b>INTRODUCTION</b> .....	1
<b>EXISTING CONDITIONS</b> .....	1
<b>ROADWAY CHARACTERISTICS</b> .....	2
<b>TRAFFIC COUNTS</b> .....	3
<b>SAFETY ANALYSIS AND PROJECTS</b> .....	5
<b>PUBLIC TRANSPORTATION</b> .....	9
<b>TRAVEL PATTERNS</b> .....	10
<b>ACTIVE TRANSPORTATION</b> .....	10
<b>GROWTH AND FUTURE NEEDS</b> .....	11
<b>EXISTING PLANS AND POLICY REVIEW</b> .....	13
<b>2018 COUNTY &amp; MUNICIPALITY PLAN</b> .....	13
<b>PUTNAM COUNTY LAND USE AND TRANSPORTATION POLICY PLAN</b> .....	13
<b>2019 BICYCLE AND PEDESTRIAN PLAN</b> .....	14
<b>STATE ROUTE 56 CORRIDOR STUDY</b> .....	15
<b>CENTER HILL RURAL REGIONAL TRANSPORTATION PLAN</b> .....	16
<b>PUBLIC SURVEY SUMMARY</b> .....	17
<b>PUBLIC SURVEY OVERVIEW</b> .....	17
<b>COMMUNITY PRIORITIES</b> .....	17
<b>POSSIBLE IMPROVEMENTS</b> .....	19

**MAP CONCERNS AND NEEDS** ..... 23

**DEMOGRAPHICS**..... 25

**NEEDS ASSESSMENT** .....29

**TRAFFIC FORECASTS AND ANALYSIS** ..... 29

**ENVIRONMENTAL CONSIDERATIONS**..... 35

**POTENTIAL IMPROVEMENTS AND RECOMMENDATIONS** .....38

**US-70N/SR-24 WIDENING**..... 41

**PIPPIN ROAD / COUNTY FARM ROAD IMPROVEMENTS**..... 42

**TENNESSEE AVENUE EXTENSION**..... 43

**REALIGNMENTS**..... 43

**TURN LANE INTERSECTION IMPROVEMENTS** ..... 44

    COUNTY FARM ROAD AT GAINESBORO GRADE.....44

    PIPPIN RD AT PIPPIN RD / W JACKSON ST .....44

    US-70N/SR-24 AT HAWKINS CRAWFORD RD / PLUNK WHITSON RD .....44

    BLOOMINGTON RD / SR-291 / DOUBLE SPRINGS RD .....44

**RAIL WITH TRAIL** ..... 44

**COST ESTIMATES** ..... 45

**ANALYSIS OF ALTERNATIVES** ..... 45

**APPENDIX: SUMMARY OF OUTREACH ACTIVITIES**.....50

**STEERING COMMITTEE** ..... 50

**STAKEHOLDER COMMITTEE** ..... 50

**PUBLIC OUTREACH**..... 51

## Table of Figures

Figure 1: Highway 70/SR 24/W Broad St .....	2
Figure 2: County Farm Rd.....	2
Figure 3: Roadway Classification .....	3
Figure 4: TDOT Traffic Count Station Locations.....	4
Figure 5: Crash Data Heat Map (2017-2021) .....	5
Figure 6: Location of Crashes along Corridors .....	6
Figure 7: Type of Crashes along Corridor (2017-2021) .....	7
Figure 8: Pippin Rd Safety Audit .....	8
Figure 9: Hawkins Crawford Rd Flashing Beacon .....	9
Figure 10: Putnam County Residents: Work Locations .....	10
Figure 11: Future Putnam County Expo Center and Fairgrounds .....	12
Figure 12: City of Cookeville Bike and Ped Plan Cover .....	14
Figure 13: State Route 56 Corridor Study Cover .....	15
Figure 14: CH RRTP AADT Percent Change Map .....	16
Figure 15: Survey Screen One.....	17
Figure 16: Survey Screen Two.....	18
Figure 17: Total Rankings by Priority .....	19
Figure 18: Survey Screen Three .....	20
Figure 19: Intersection Improvements Preference.....	20
Figure 20: Multimodal Improvements Preference .....	21
Figure 21: North/West Connectivity Improvements Preference .....	22
Figure 22: Turn Lane Improvements Preference .....	22
Figure 23: US-70N/SR-24 Improvements Preference.....	23
Figure 24: Survey Screen Four .....	24
Figure 25: Total Map Markers .....	24
Figure 26: Map Markers Heat Map.....	25
Figure 27: Putnam County Residents.....	26
Figure 28: Survey Responders Trip Purposes.....	26
Figure 29: Survey Responders Age Range .....	27
Figure 30: Survey Responders Gender Identity.....	27
Figure 31: Survey Responders Race/Ethnicity .....	28
Figure 32: Traffic Network.....	30
Figure 33: 2022 AADT in Study Area .....	31

Figure 34: 2022 DHV AM Peak Hour .....32

Figure 35: 2022 DHV PM Peak Hour .....32

Figure 36: 2047 DHV AM Peak Hour .....33

Figure 37: 2047 DHV PM Peak Hour .....33

Figure 38: 2022 LOS.....34

Figure 39: 2047 LOS.....35

Figure 40: Project Area Analyzed for Potential Environmental Considerations .....36

Figure 41: Recent, Ongoing, and Potential Improvements Map.....39

Figure 42: Potential Improvements Map.....41

Figure 43: US-70N/SR-24 Widening Typical Section.....42

Figure 44: Tennessee Avenue Extension Typical Section .....43

Figure 45: Detailed Cost Estimates .....47

Figure 46: Analysis of Alternatives .....48

Figure 47: Recommended Improvements .....49

## Table of Tables

Table 1: TDOT Traffic Counts ..... 4

Table 2: Location of Crashes along Corridor ..... 6

Table 3: Top Crash Intersections along Corridors ..... 6

Table 4: Type of Crashes along Corridor (2017-2021) ..... 7

Table 5: Highlights of Plans and Studies .....13

Table 6: Potential Improvements Descriptions .....40

## INTRODUCTION

The Tennessee Department of Transportation (TDOT) awarded Putnam County a Community Transportation Planning Grant to develop a county community mobility plan that identifies and prioritizes needed transportation improvements. This report documents the project team’s work in data collection, existing conditions analysis, needs assessment, stakeholder and public engagement, and recommendation formulation for this mobility plan. This plan addresses transportation infrastructure improvements for two major routes in Putnam County. The two routes identified focused on traffic control from western Putnam County to the city of Cookeville, these two routes are US-70N/SR-24 from the City of Baxter to the City of Cookeville and a north / south connector that follows County Farm Road from SR-290/Gainesboro Grade to US-70N/SR-24. A main point of emphasis will be traffic flow from the western portion of Putnam County as it is directed into the heart of the city of Cookeville.

The four primary sections of this report cover existing conditions, existing plans and policy review, active transportation, public survey results, and needs assessment. The existing conditions assessment covers Putnam County as it is today. The project team reviewed roadway data, growth trends, safety, and ongoing plans and projects. In addition, key recent and upcoming projects set the context for the study. The public survey collected public input on priorities, tradeoffs, and locations of concern. The needs assessment primarily includes traffic forecasts and analysis as well as environmental considerations.

The project vision and goals as developed in the project application and verified by stakeholders provided valuable context in the identification and assessment of needs. The vision of the plan is:

This Community Mobility Plan aims to identify existing and future transportation systems needed to serve the current and anticipated travel demand patterns in Putnam County.

### PROJECT GOALS:



**Identify roadway deficiencies throughout the study area**  
(roadway capacity, safety issues, functional classification adjustments)



**Improve multimodal transportation**



**Enhance livability and economic development**

## EXISTING CONDITIONS

The existing conditions assessment of Putnam County covers roadway characteristics, examines traffic counts and growth trends, presents safety analysis, freight activity, and existing active transportation assets. In addition, recent and upcoming plans and projects set the context for the study.

## ROADWAY CHARACTERISTICS

US Highway 70 runs east-west between eastern North Carolina to east-central Arizona. In the study area, US-70N/SR-24/W Broad Street is a two-lane principal arterial that runs through Putnam County. It is part of the National Highway System starting in the east section of the study area, running through Cookeville. The speed limit for US-70N/SR-24 within the study area is 45 miles per hour (mph). County Farm Road is a local two-lane road that runs north-south from US-70N/SR-24 to SR-290. The speed limit for County Farm Road is 35 mph.

Figure 1: Highway 70/SR 24/W Broad St

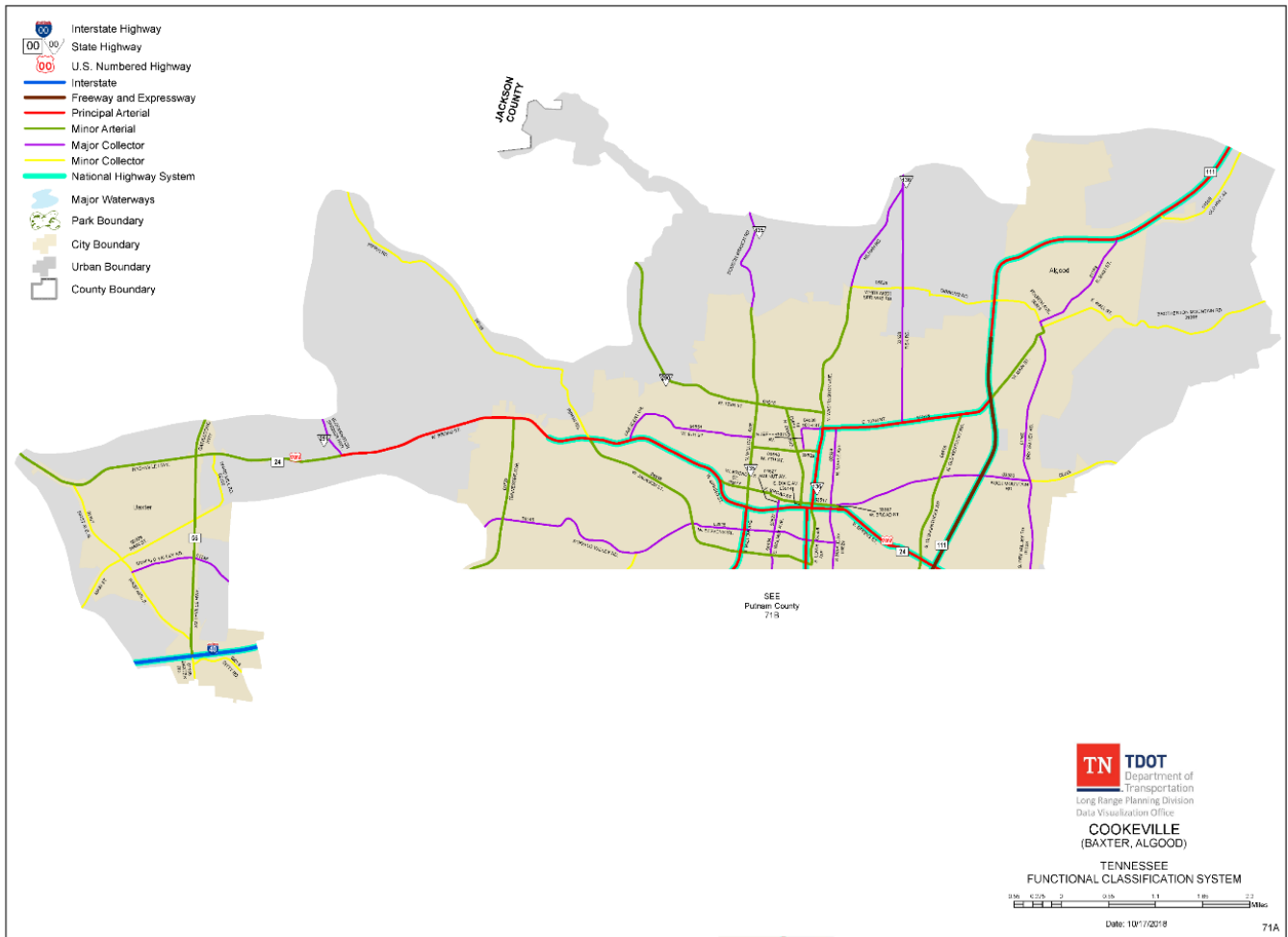


Figure 2: County Farm Rd





Figure 3: Roadway Classification



## TRAFFIC COUNTS

Traffic count data was reviewed via the TDOT TN-TIMES: Tennessee Traffic Information Management and Evaluation System. Figure 4 identifies the traffic count stations in the vicinity. Table 1 lists historic traffic counts at these stations. In 2022, the average annual daily traffic (AADT) for US-70N/SR-24 ranged from 6,320 to 7,900. The 2022 AADT for County Farm Road ranged between 1,575 to 5,129. In addition, traffic counts from the City of Cookeville were received and reviewed.

Figure 4: TDOT Traffic Count Station Locations

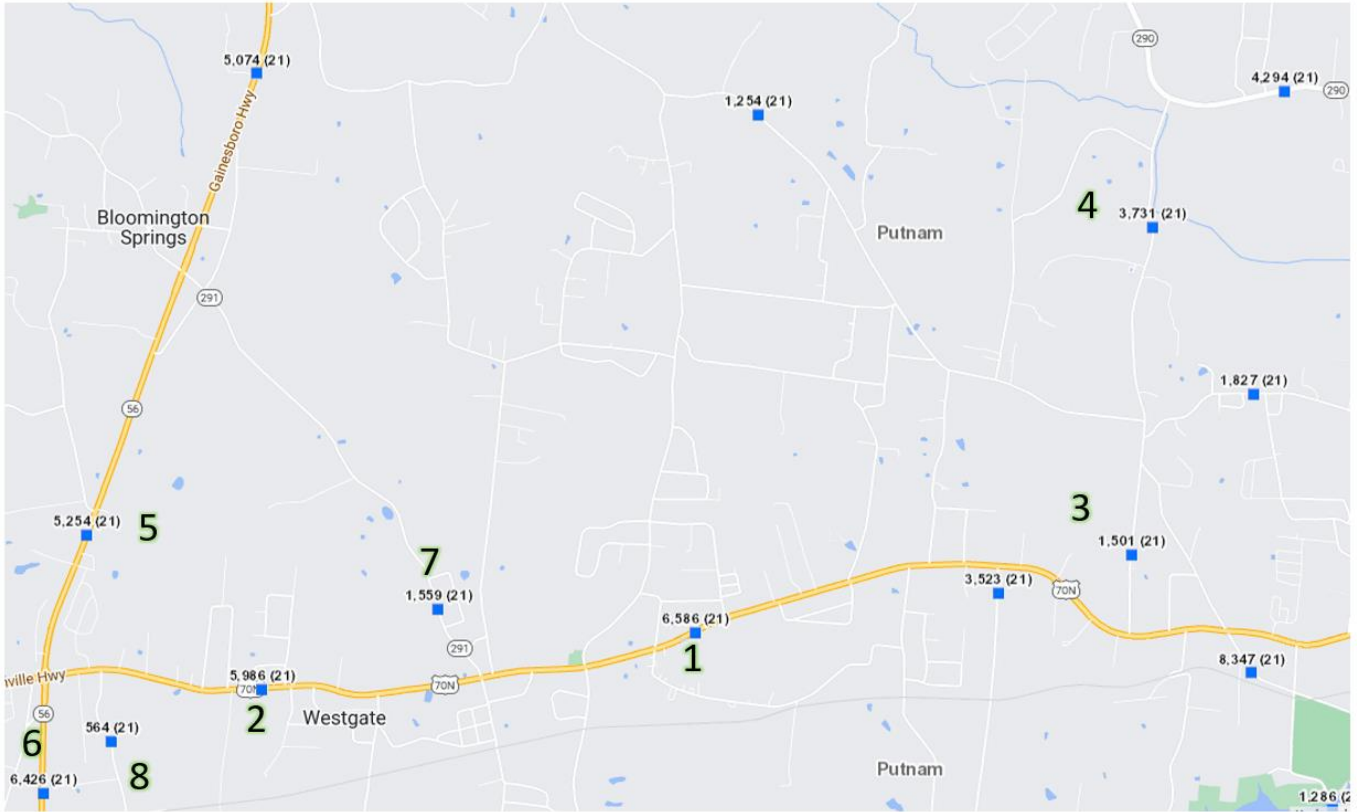


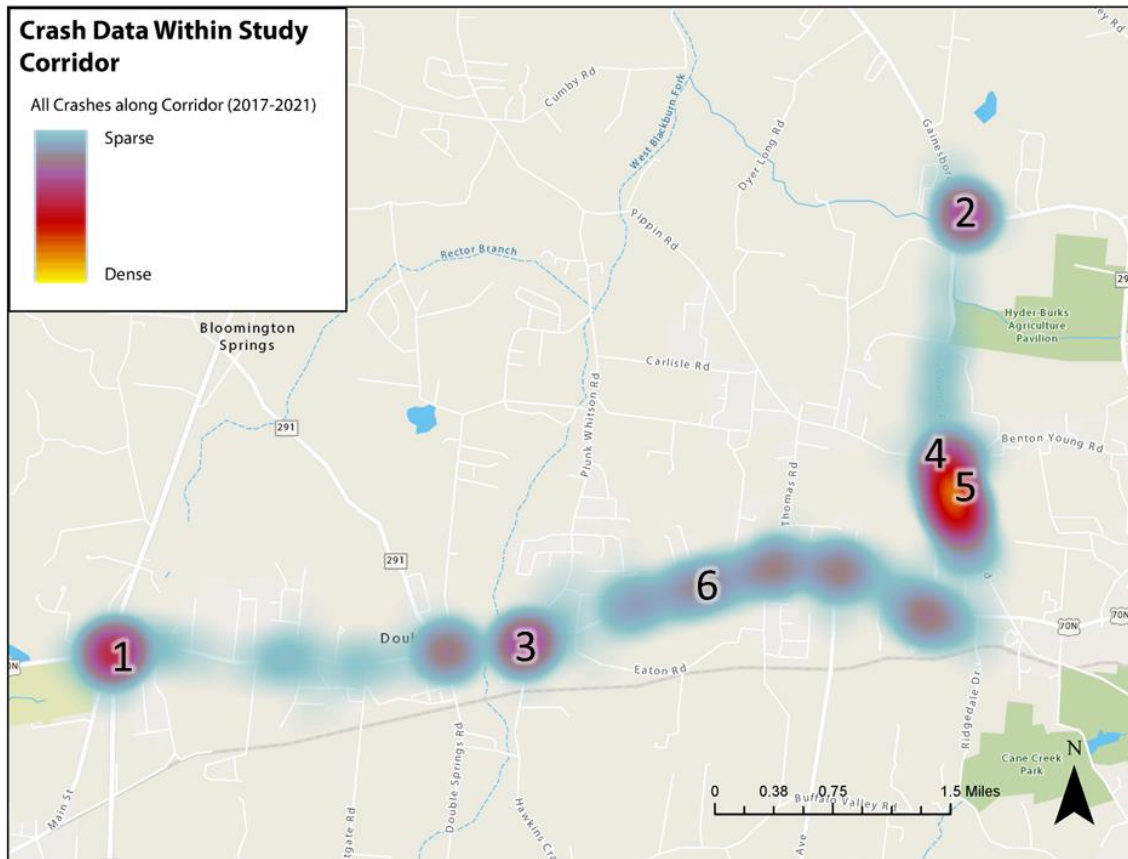
Table 1: TDOT Traffic Counts

Route	US 70N		Country Farm Rd		SR 56		SR 291	Ward Mill Rd	Benton Young Rd
Map ID	1	2	3	4	5	6	7	8	9
Station	71000017	71000019	71000196	71000198	71000016	71000015	71000018	71000188	71000155
Year	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT
2012	5,698	7,808			4,898	6,624	1,263	606	1,762
2013	5,689	7,775			4,548	6,112	1,182	490	1,562
2014	5,535	7,864			4,316	6,216	1,210	490	1,713
2015	6,607	8,362			5,130	7,241	1,232	536	1,665
2016	6,424	8,055			5,410	6,710	1,230	512	1,681
2017	6,184	7,924			5,701	6,721	1,255	535	1,748
2018	4,990	8,107			4,817	5,517	1,201	570	1,928
2019	6,167	8,251			5,471	7,020	1,390	613	1,976
2020	5,328	6,355			4,928	5,347	1,318	516	1,918
2021	5,986	6,586	1,501	3,731	5,254	6,426	1,559	564	1,827
2022	6,320	7,900	1,575	3,914	5,129	6,360	1,542	592	1,917

## SAFETY ANALYSIS AND PROJECTS

Many concerns regarding safety along both US-70N/SR-24 and County Farm Road are collisions in the study area. The heat map shows the concentration of all 491 crashes that occurred on both corridors within the 2017-2021 timeframe.

Figure 5: Crash Data Heat Map (2017-2021)



Source: E-TRIMS

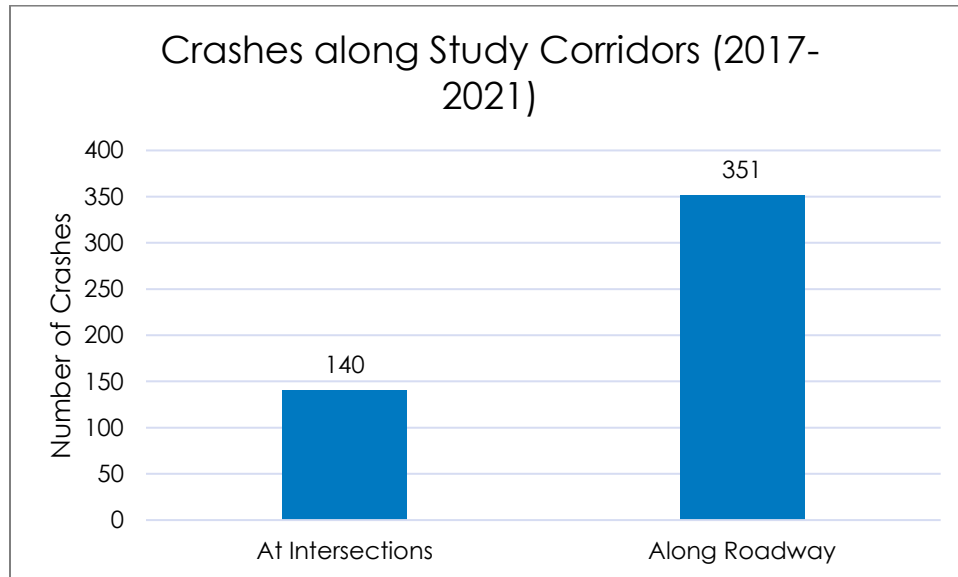
Of the 491 crashes along the study corridors, 93 involved serious or minor injuries. Only one crash over the last five years involved a pedestrian. This occurred along the roadway on US-70N/SR-24 near the intersection of Hawkins Crawford Rd. The crash occurred in 2018 on a clear day during daylight hours. The pedestrian suffered serious injuries.

Most of the crashes along the corridor occurred along the roadway (351). Of the crashes occurring at intersections, the three locations with the highest number of crashes were: US-70N/SR-24 at SR-56, County Farm Road at SR-290, and US-70N/SR-24 at Hawkins Crawford Road. Of the 491 crashes, 351 (71.5 percent) occurred along the roadway and 140 (28.5 percent) occurred at intersections (Table 2 and Figure 6 below).

Table 2: Location of Crashes along Corridor

Crash Locations	Number of Crashes	Percentage
At Intersections	140	28.5%
Along Roadway	351	71.5%
<b>Total</b>	<b>491</b>	<b>100%</b>

Figure 6: Location of Crashes along Corridors



Below is a table of the intersections with the top number of crashes along the study corridors. These ranked intersections are also called out in the map above (Figure 5).

Table 3: Top Crash Intersections along Corridors

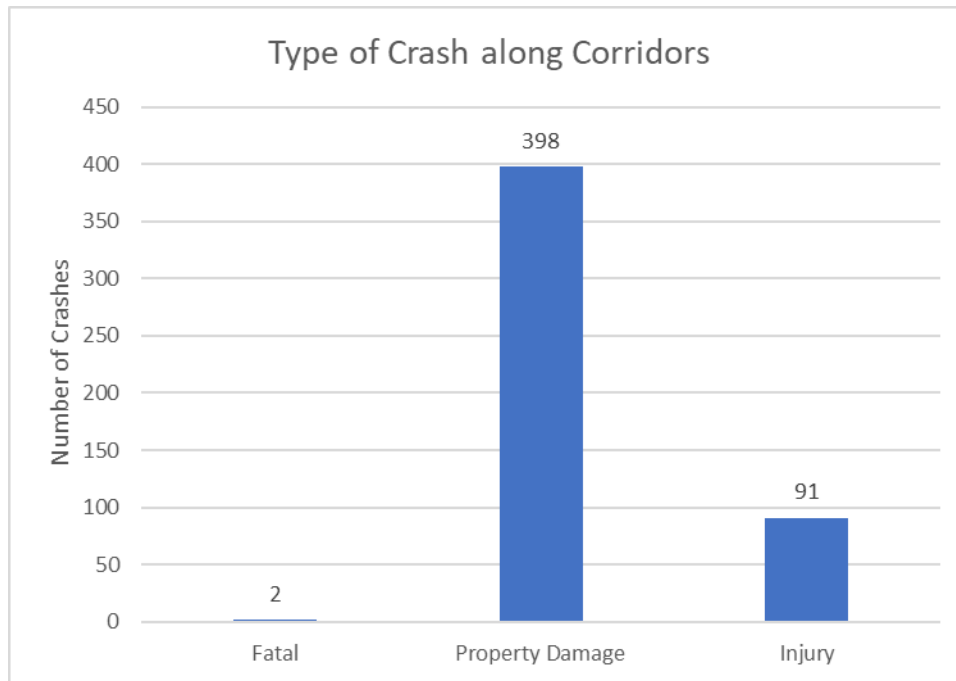
Rank	Intersections with Highest Number of Crashes	# Of Crashes
1	HWY 70/Hwy 56	83
2	HWY 290/County Farm Road	56
3	HWY 70/Hawkins Crawford Road	47
4	County Farm Road/Pippen Road	27
5	County Farm Road/Benton Young Road	25
6	HWY 70/Peach Orchard Rodd	25

The table and graph below show the kind of crashes along the corridor. Of the 491 crashes that occurred along both corridors, 398 (81.1 percent) were reported as property damage only, 91 (18.5 percent) were reported as injury related, and 2 (0.4 percent) were fatal.

Table 4: Type of Crashes along Corridor (2017-2021)

Type of Crash	Number of Crashes	Percentage
Property Damage	398	81.1%
Injury Related	91	18.5%
Fatal	2	0.4%
<b>Total</b>	<b>491</b>	<b>100%</b>

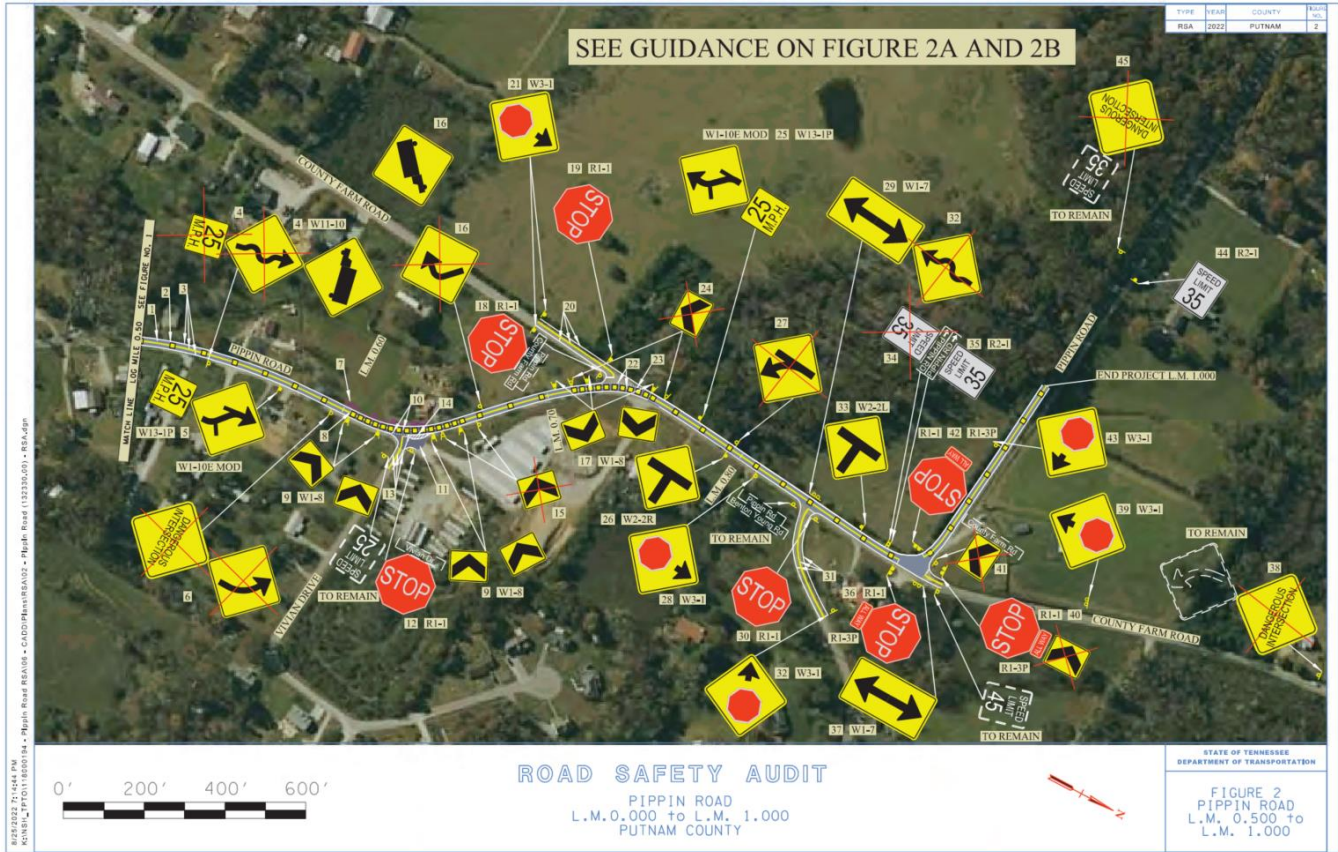
Figure 7: Type of Crashes along Corridor (2017-2021)



There are several recent and ongoing safety projects on and around the study corridor that address crash hotspots identified in Figure 5 and Table 3, which will impact analysis and recommendations for this project. First of all, the US-70N/SR-24 at SR-56 intersection was recently converted from a four-way stop to a signalized intersection. TDOT is conducting a road safety audit of Pippin Road (PIN 132330), which is proposing signage, striping, and resurfacing improvements to address the number four and five safety hotspots on County Farm Road at Benton Young Road and Pippin Road (see Figure 8).



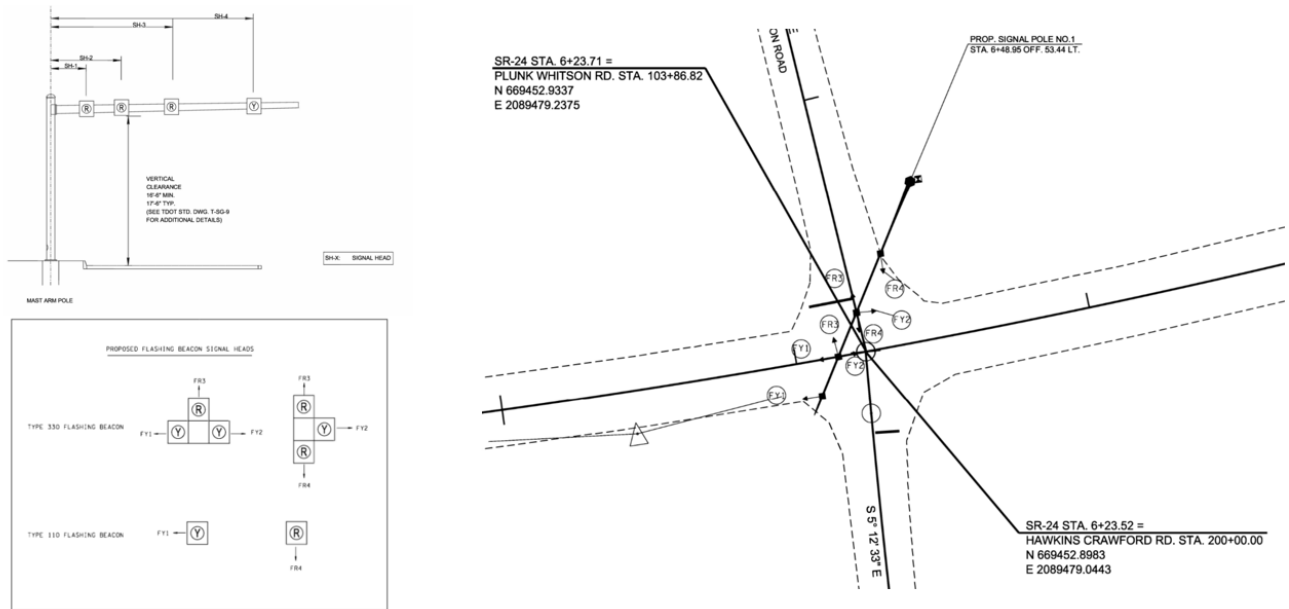
Figure 8: Pippin Rd Safety Audit<sup>1</sup>



Additionally, safety has been a concern at the intersection of US-70N/SR-24 and Hawkins Crawford Road / Plunk Whitson Road, the number three safety hotspot in the study area. A safety project (PIN 131401.00) is installing a flashing beacon to warn drivers on all approaches of the intersection, which suffers from limited sight distance on its southbound approach adjacent to the cemetery.

<sup>1</sup> TDOT

Figure 9: Hawkins Crawford Rd Flashing Beacon<sup>2</sup>



## PUBLIC TRANSPORTATION

Throughout Putnam County, there are several public transportation programs that serve residents in and around the study area. Go Upper Cumberland provides a fixed-route bus service within several municipalities, including Algood, Cookeville, McMinnville, and Crossville. Go Upper Cumberland picks up and drops off passengers at designated points along their route. However, this service is outside the study area.

Ride Upper Cumberland offers a demand-response service that picks up and drops off residents throughout various counties based on residents' needs. This system is only available on Tuesday and Friday in the western part of the study area. It is available on all weekdays in the eastern part of the study area.

Pick Up Upper Cumberland is also an on-demand service through a partnership with Uber Technologies as part of their mobile app service. Users throughout all of Putnam County can select this option through the Uber app after hours and on weekends.

Connect Upper Cumberland provides intercity bus services on the I-40 and I-24 routes into Nashville and Murfreesboro with stops along the route including the Cookeville Greyhound Station. This service is outside the study area.

As part of Connect Upper Cumberland, there are two stop locations for the I-40 Express Bus that begins at the Cookeville Transit Hub/Greyhound Station and ends at the Nashville Greyhound Station<sup>3</sup>. The two stops are at the Greyhound Station in downtown Cookeville, as well as on Exit 273 on I-40 in Silver Point.

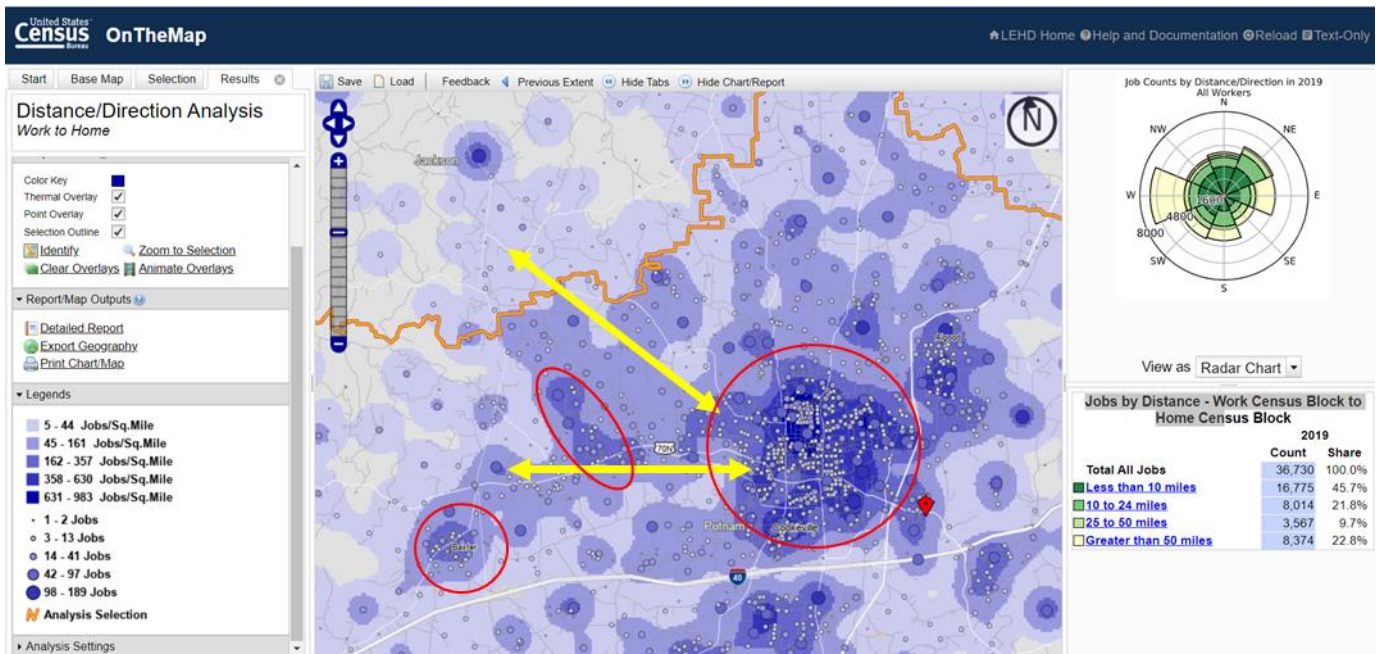
<sup>2</sup> TDOT

<sup>3</sup> Connect Upper Cumberland

## TRAVEL PATTERNS

As part of the existing conditions analysis, the project team reviewed the travel patterns within Putnam County. Using Census OnTheMap, Figure 10 shows the commute patterns for Putnam County residents. Figure 10 shows that many residents of Putnam County are making long commute trips to the west. Major areas of employment concentration include Cookeville, along the US-70N/SR-24 corridor, Baxter, and near Mayfield in Jackson County. The distribution of employment locations of Putnam County residents indicates potential travel markets for east-west movement along US-70N/SR-24 and north-south travel between US-70N/SR-24 and points to the northwest.

Figure 10: Putnam County Residents: Work Locations



## ACTIVE TRANSPORTATION

The W. Broad Street/ US-70N/SR-24 corridor, stretching from Pippin Road to SR-56, suffers from a notable absence of active transportation facilities. As a historically rural area in Putnam County, Tennessee, this corridor is projected to experience future retail, commercial, and residential growth. However, the current lack of pedestrian and bicycle infrastructure poses a significant challenge to accommodate the anticipated increase in traffic and the public's desire for active transportation options. Without appropriate facilities, residents and visitors alike will face limited experience mobility and safety concerns as they navigate these roadways.

Similarly, the County Farm Road corridor also lacks sufficient active transportation facilities. With the projected growth in development underway, it becomes increasingly important to address this issue. As the roadways undergo reconstruction to accommodate higher traffic volumes, it is imperative to incorporate pedestrian and bicycle infrastructure to support the community's desire for increased active transportation options. Failing to do so would hinder accessibility and discourage the adoption of active transportation, which can have numerous health, environmental, and economic benefits.

In light of the anticipated growth and the public's expressed interest in promoting active transportation, it is essential that the local authorities and stakeholders recognize the importance of incorporating pedestrian and



bicycle facilities within the study area. By doing so, they can ensure the safety, accessibility, and convenience of all road users, encouraging healthier and more sustainable modes of transportation. Moreover, providing adequate active transportation infrastructure will enhance the overall livability and attractiveness of the community, attracting residents, businesses, and visitors who prioritize walkability and cycling options.

To address the lack of active transportation facilities along the W. Broad Street/US-70N/SR-24, it is crucial to incorporate pedestrian and bicycle infrastructure into the roadway redesign. The inclusion of sidewalks on both sides of the road will provide safe paths for pedestrians, while designated bicycle lanes will cater to cyclists' needs. Additionally, installing well-placed crosswalks and pedestrian-activated signals at key intersections will enhance safety for pedestrians crossing the corridor. By integrating these active transportation facilities, the community can create a more walkable and bike-friendly environment that accommodates the anticipated growth in retail, commercial, and residential activities.

Similarly, the County Farm Road corridor should be equipped with active transportation facilities as it undergoes reconstruction to accommodate future traffic demands. Adding shared-use paths or separate bike lanes along this corridor will cater to cyclists and encourage active transportation. Sidewalks should also be incorporated to provide safe pedestrian access, particularly near retail and commercial areas. Introducing traffic calming measures, such as raised crosswalks and pedestrian refuge islands, will further promote pedestrian safety and encourage active transportation. By prioritizing the inclusion of these facilities during the reconstruction process, local leaders and stakeholders can embrace the community's desire for increased active transportation and create a more inclusive and sustainable transportation network.

## GROWTH AND FUTURE NEEDS

As of 2020, the Putnam County population was 79,854, which is a 10 percent increase from the 2010 population. The population is forecasted to continue to increase, with the 2045 population estimate of approximately 101,956<sup>4</sup>.

Cookeville is directly to the east of the study area and has a population of 34,842 as of 2020. Cookeville houses Tennessee Tech University, which has an enrollment of 9,902<sup>5</sup> (undergraduate and graduate). North of the study area, Cummins Falls State Park is a significant tourist attraction with a scenic waterfall and swimming hole.

Several major warehousing and distribution facilities have been developed in recent years just south of the study area near Tennessee Avenue at the I-40 interchange. Though primarily served by the interstate, these emerging freight generators could contribute to traffic in the study area along US-70N/SR-24. In 2016, an Academy Sports opened a distribution center roughly three miles south of US-70N/SR-24 and directly off I-40 bringing roughly 700 new jobs to the area<sup>6</sup>. Ficosa, with an estimated workforce about 600, is an automotive global supplier and provides support to automakers across the world. A manufacturing facility for Ficosa is located right off I-40 near Tennessee Avenue. Additionally, a FedEx Freight facility is located just south of the project study area.

There are several planned developments around the study corridor that will impact traffic patterns. In 2019, the Putnam County Commission voted to purchase 187 acres on Tennessee Avenue, just south of the study area. A new Expo Center and Fairgrounds will be built there. In 2022 the Putnam County Commission approved a new

---

<sup>4</sup> Boyd Center population projections

<sup>5</sup> Tennessee Tech University

<sup>6</sup> Press Release (<https://www.prnewswire.com/news-releases/academy-sports--outdoors-opens-third-distribution-center-located-in-cookeville-tenn-300257155.html>)



## EXISTING PLANS AND POLICY REVIEW

Many plans, studies, and surveys have been completed in Putnam County and its municipalities in recent years. The Community Mobility Plan took into consideration plans from a statewide, Rural Planning Organization (RPO), county, and city perspective. The following table is a highlight of the plans and studies that were reviewed and considered during the development of this plan.

Table 5: Highlights of Plans and Studies

Plan & Study	Jurisdiction
Bike Level of Service Statewide Map	State
2018 County & Municipality Plan	Putnam County
Land Use and Transportation Plan Policy	Putnam County
2003 Bike and Pedestrian Circulation Plan	City of Cookeville
Major Street Plan Update	City of Cookeville
2019 Bicycle & Pedestrian Plan	City of Cookeville
Cookeville Corridor Analysis- Existing Conditions Report	City of Cookeville
2030 Cookeville Comprehensive Plan	City of Cookeville
SR-56 Corridor Study	City of Baxter
Center Hill Rural Regional Transportation Plan	TDOT

### 2018 COUNTY & MUNICIPALITY PLAN

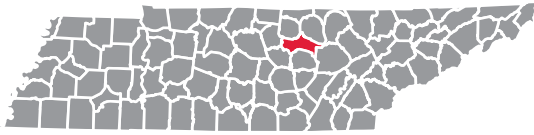
The 2018 Putnam County and Municipality Plan allowed the county and its municipalities to rank the most important and needed transportation projects by soliciting input from the citizens of Putnam County. The county conducted a survey collecting over 1,100 responses and relayed citizens of Putnam County, the Towns of Algood, Baxter, Monterey, and the City of Cookeville’s top priority transportation projects. Out of the 27 projects selected, the projects relative to the study area are:

- Nashville Highway (Hwy 70N) - Gainesboro Highway (SR-56) Intersection Improvements- Install traffic signal
- Nashville Highway (Hwy 70N) Highway 70N Improvements- Install center turn lane on Highway 70N from Cookeville City limits to Highway 56
- Gainesboro Grade (SR-290) County Farm Road Intersection Improvements- Install turn lane on Gainesboro Grade at County Farm Road
- West Broad Street (Hwy 70N) - West Jackson Street/Pippin Road Intersection Improvements- Provide additional turn lane

### PUTNAM COUNTY LAND USE AND TRANSPORTATION POLICY PLAN

The Putnam County Land Use and Transportation Policy Plan is a 20-year (2004-2024) planning document used to provide a framework to guide Putnam County officials, community leaders and stakeholders as they make decisions that affect the future growth and development in the County. Although the plan is outdated, it aims to provide appropriate planning and design standards and guidelines for future transportation infrastructure in the county. Some relevant goals are listed below:

## GOALS



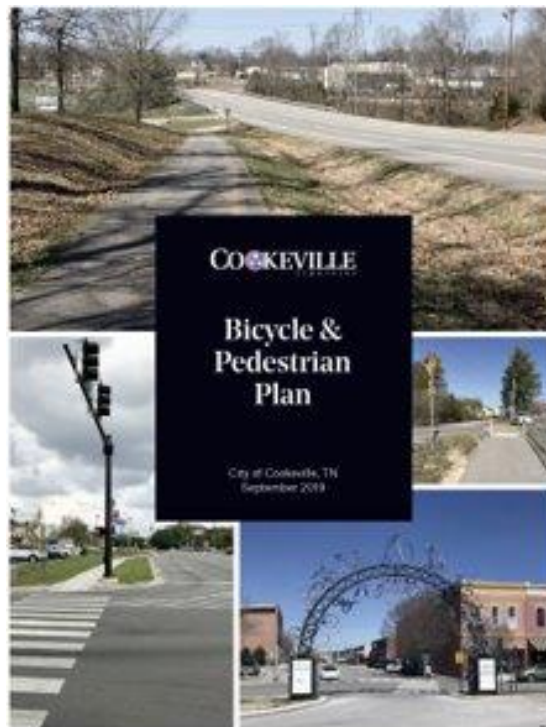
Provide a transportation system that will adequately meet the future needs of the county for growth and development.

Provide appropriate planning and design standards and guidelines for the construction of new roads and other transportation facilities.

## 2019 BICYCLE AND PEDESTRIAN PLAN

The City of Cookeville updated its previous 2003 Bicycle and Pedestrian Circulation Plan in 2019 to guide the development of bicycle and pedestrian improvements throughout the next 20 years.

Figure 12: City of Cookeville Bike and Ped Plan Cover



The plan includes vision, goals, objectives, current conditions and analysis for future needs, recommended bike and ped networks, design guides, recommended non-infrastructure programs, and implementation and funding strategies. Goals of the Walking and Biking network within the plan include:





Connect people to the places they want to go.



Safe and convenient for people of all ages and abilities.



Comfortable and attractive and fit their surrounding context.



Protect natural areas and provide quality open spaces.



Minimize conflicts among pedestrians, bicyclists, and vehicles.



Build facilities in a cost-efficient manner.



Promote walking and bicycling through pilot projects, programs, and special events.



Develop and fund maintenance programs for all facilities.

## STATE ROUTE 56 CORRIDOR STUDY

The City of Baxter completed a study in 2019 to anticipate growth in traffic along SR-56, or Gainesboro Road, which intersects US-70N/SR-24. The plan includes an existing conditions analysis with components like crash rates, growth projections, and turning movements at the intersection of SR-56 and US-70N/SR-24.

Figure 13: State Route 56 Corridor Study Cover

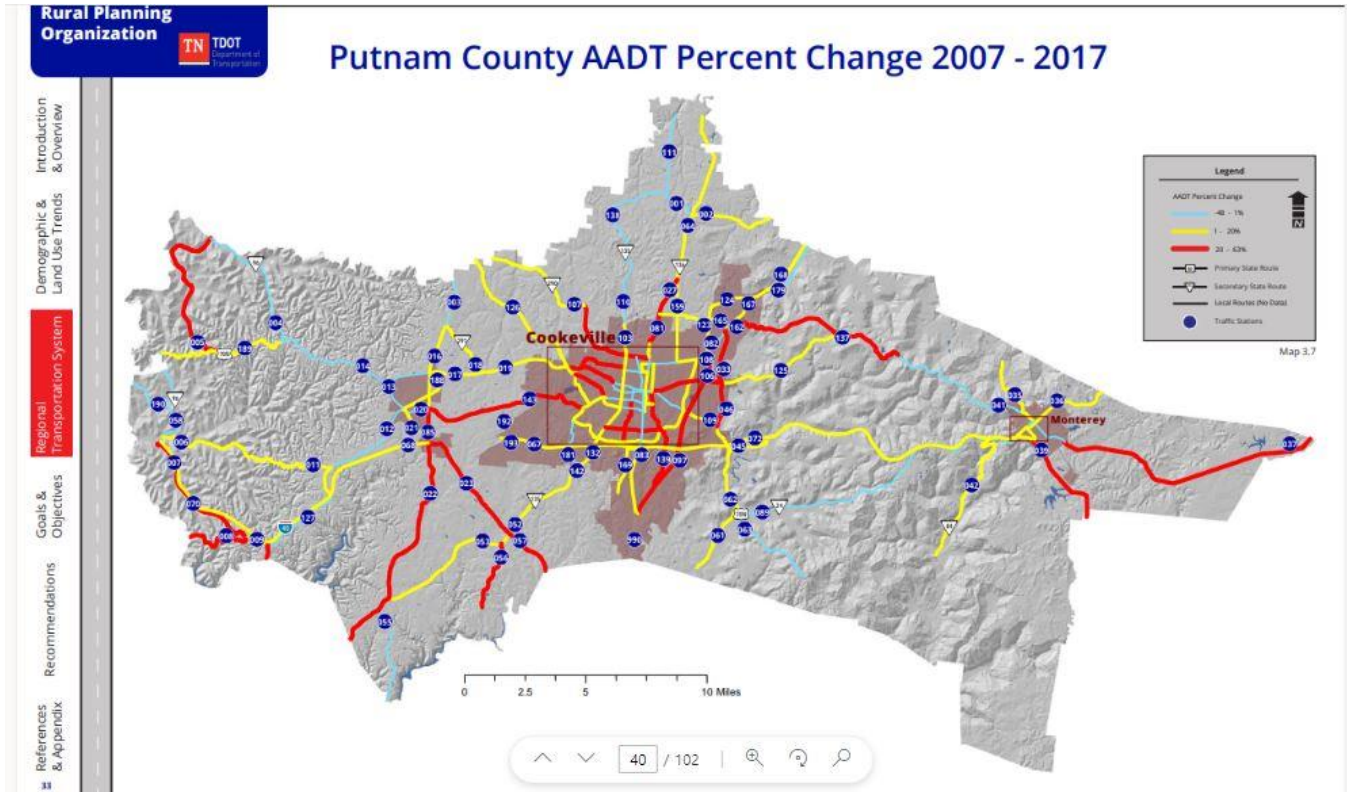


Following a future conditions assessment, the plan recommends four improvements such as intersection improvements, proposed frontage road network, future development concepts, and access management guidelines.

## CENTER HILL RURAL REGIONAL TRANSPORTATION PLAN

The Rural Regional Transportation Plan (RRTP) for the Center Hill Rural Planning Organization (RPO), which includes Putnam County, examines the current and future conditions of the transportation network. The Center Hill RRTP includes demographic analysis, economic profiles, land use breakdowns, functional classifications, traffic AADT changes, crash maps, and project recommendations within the region.

Figure 14: CH RRTP AADT Percent Change Map



The plan identifies the following goals for the region:



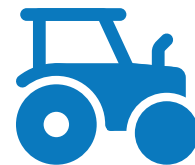
Monitor the region's freight traffic while supporting the movement of goods through the region.



Increase multimodal access and support existing infrastructure.



Improve safety throughout the region.



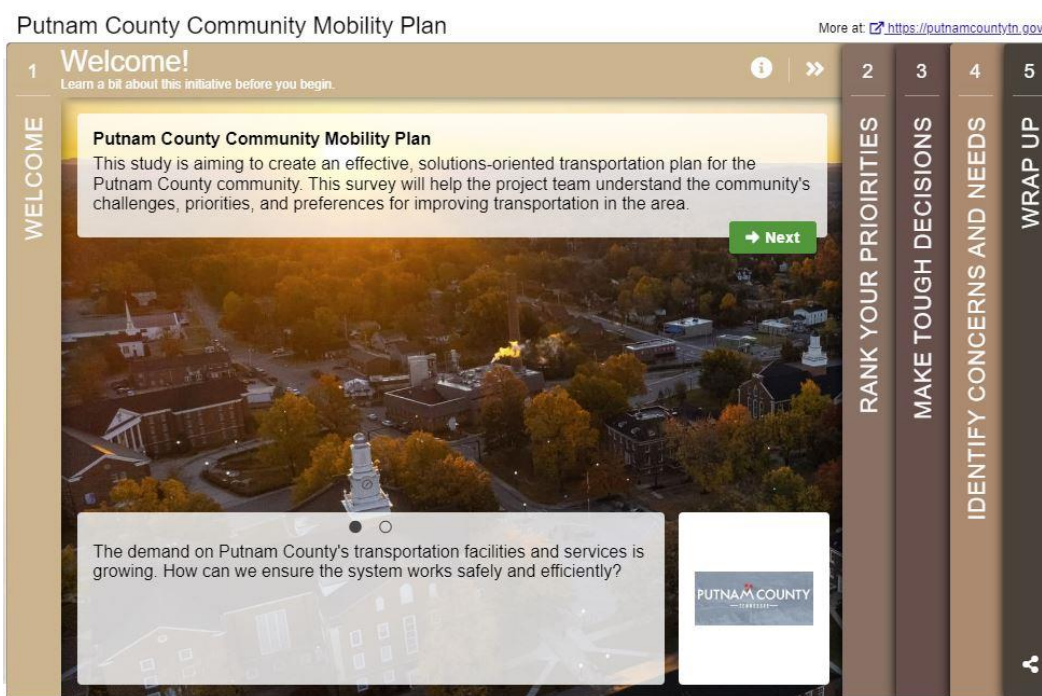
Support the state's efforts in better serving rural Tennessee.

## PUBLIC SURVEY SUMMARY

### PUBLIC SURVEY OVERVIEW

The Putnam County Community Mobility Plan survey was created to collect input on the community’s transportation priorities, improvement preferences, and concerns/needs. The study area includes parts of US-70N/SR-24, County Farm Road, and Tennessee Avenue west of Downtown Cookeville. The public survey was designed by the project team and hosted by MetroQuest. The survey was open for responses from January 5, 2023, to February 10, 2023, and received 358 responses. It was widely distributed throughout the community through social media, the Putnam County website, local stakeholders, newspaper and media outlets, and paper flyers. The first screen of the survey introduced respondents to the Community Mobility Plan and explained the purpose of the survey. The Putnam County website address was available at the top of the screen and the Putnam County logo was displayed as the project client.

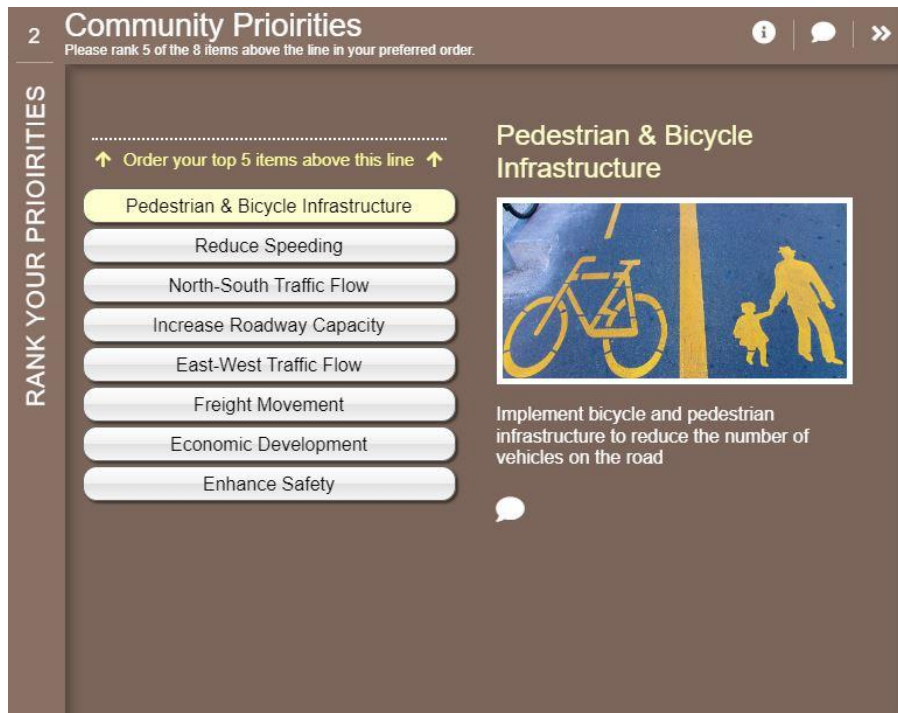
Figure 15: Survey Screen One



### COMMUNITY PRIORITIES

The second screen asked survey respondents to rank their top five transportation priorities out of eight options. This means that not every option was selected in an individual’s ranking choice. The two most frequent priorities observed in all the respondent’s top five were to increase roadway capacity, followed by north-south traffic flow. The option with the highest average ranking , was also to increase roadway capacity, followed by enhancing safety. Freight movement was the priority that was least chosen in the top five and with the lowest average ranking.

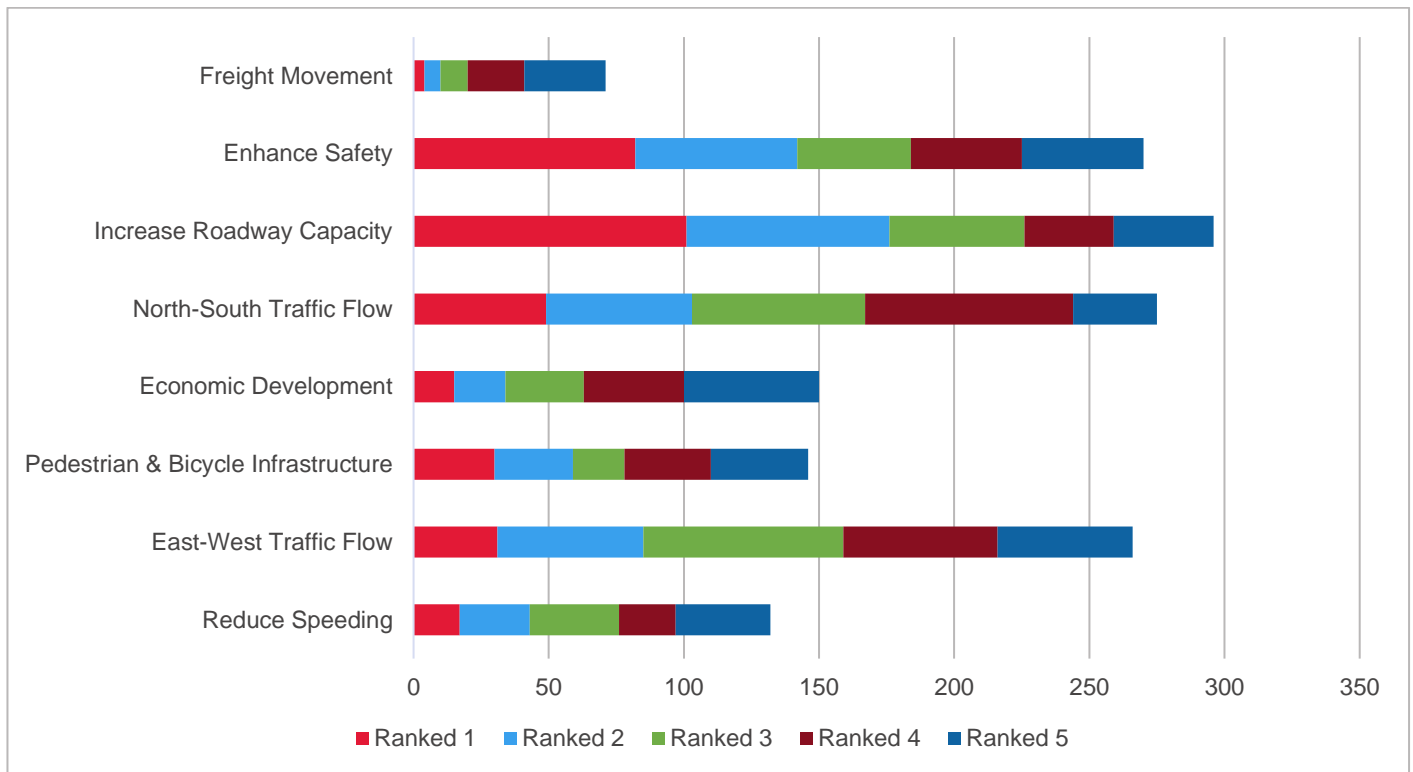
Figure 16: Survey Screen Two



The following figure displays the frequency of priority selections and their rankings.



Figure 17: Total Rankings by Priority



Additional comments on this screen expressed that there is too much traffic and that safety for pedestrians and bicyclists is important because there has been an increase in activity along the study area.

### POSSIBLE IMPROVEMENTS

The third screen asked survey respondents to make a tradeoff decision for one potential improvement or another. The categories of improvement decisions were intersections, multimodal, north/west connectivity, turn lanes, and US-70N/SR-24 improvements. For each category, two potential improvement options were given, and respondents could choose to strongly prefer one, slightly prefer one, or be neutral. The following figures display the overall preferences for each category.

Figure 18: Survey Screen Three

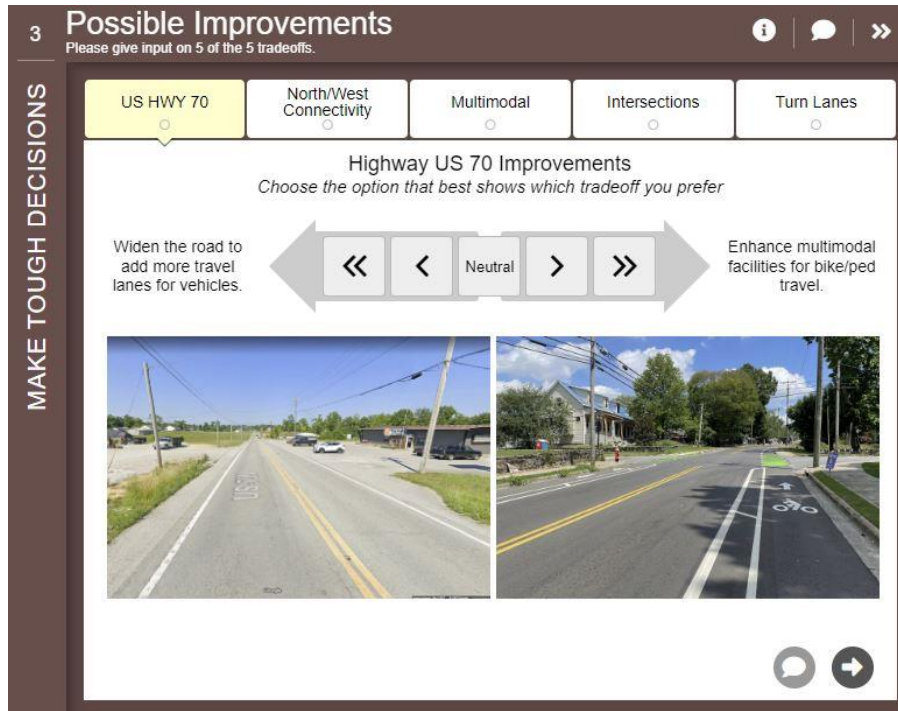
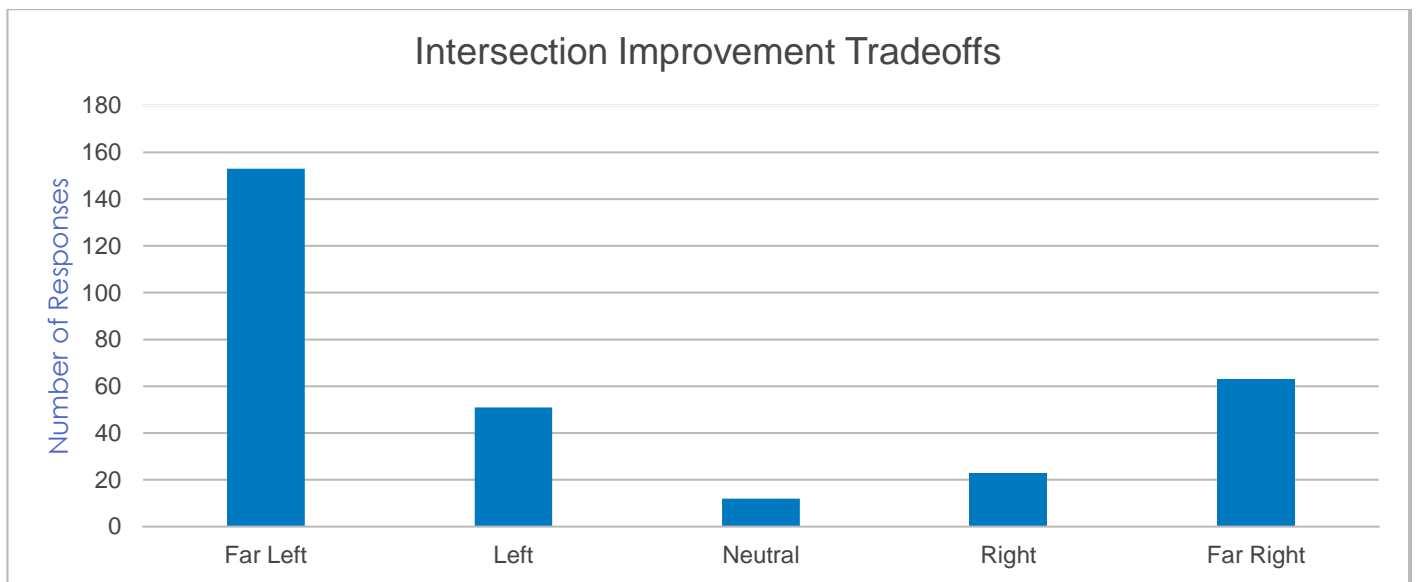


Figure 19: Intersection Improvements Preference

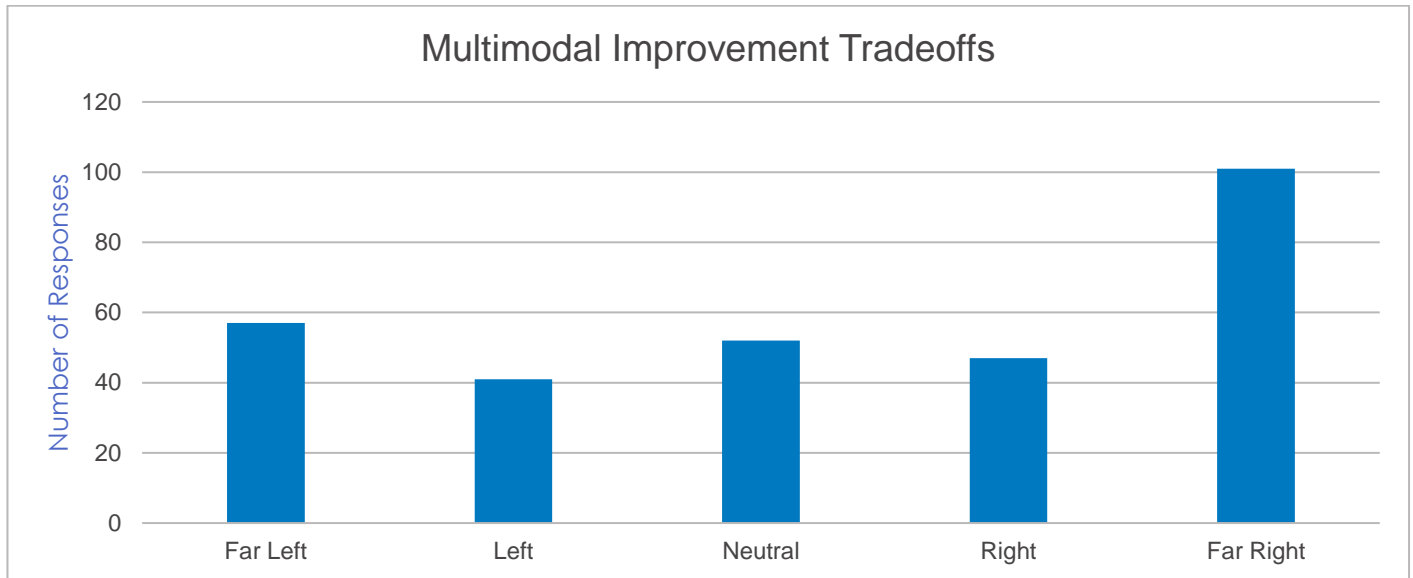


Left: Improve traffic signals and signage

Right: Implement roundabouts to manage traffic flow

Most respondents, (at 50 percent) preferred improving traffic signals and signage at intersections over implementing roundabouts to manage traffic flows. Other comments expressed concerns over the lack of understanding of how roundabouts work and the opinion that improving signals is a cheaper and quicker option to improve traffic conditions.

Figure 20: Multimodal Improvements Preference

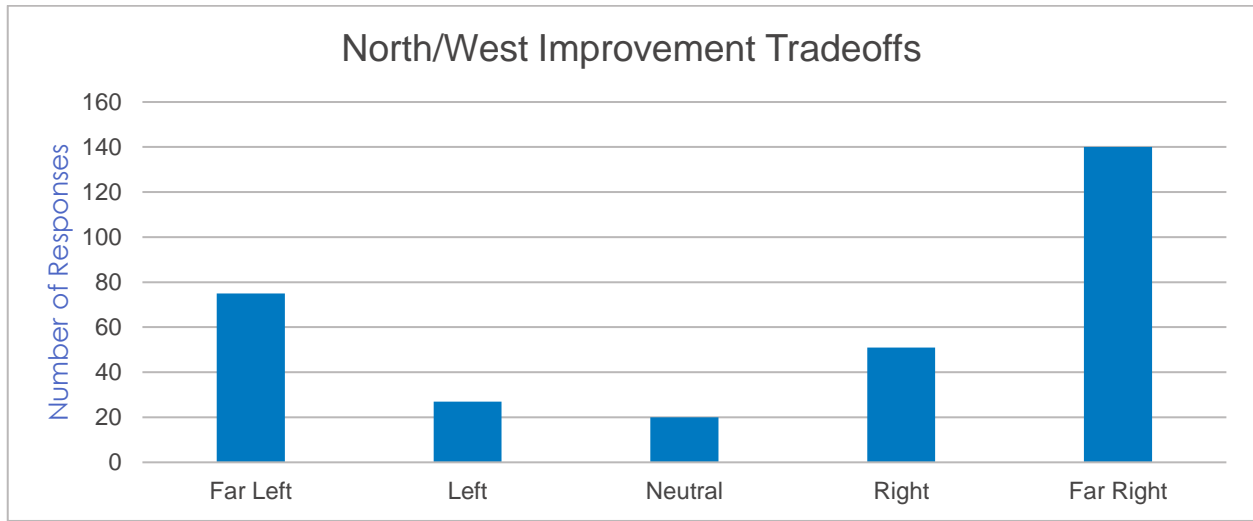


**Left:** Utilize existing right-of-way on roadways and add multimodal infrastructure

**Right:** Transform the railroad right-of-way into a shared use path to connect East/West

The most popular choice for multimodal improvements was a strong preference for transforming the railroad right-of-way into a shared use path. Other comments included the notion that turning the railroad into a shared use path would be a safer option than adding multimodal facilities on roadways, but both are needed.

Figure 21: North/West Connectivity Improvements Preference

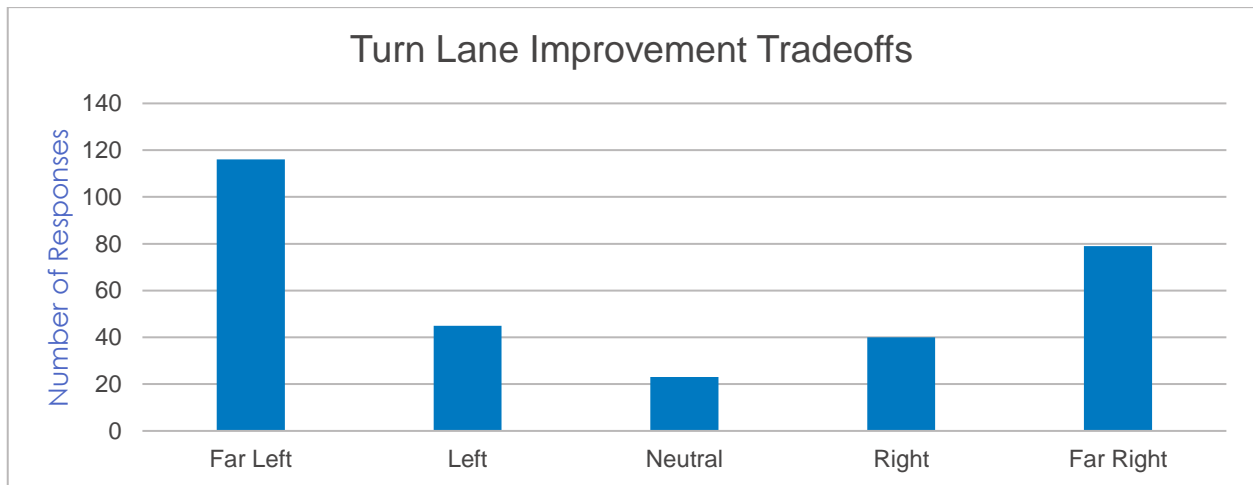


**Left:** Extend Tennessee Ave to meet County Farm Rd

**Right:** Upgrade County Farm Rd to make it safer and more reliable

About 45 percent of survey respondents strongly preferred upgrading County Farm Road over extending Tennessee Avenue to meet County Farm Road. Respondents pointed out that extending Tennessee Avenue would result in too much disruption to the neighborhood and community, but a few were in support of both options.

Figure 22: Turn Lane Improvements Preference

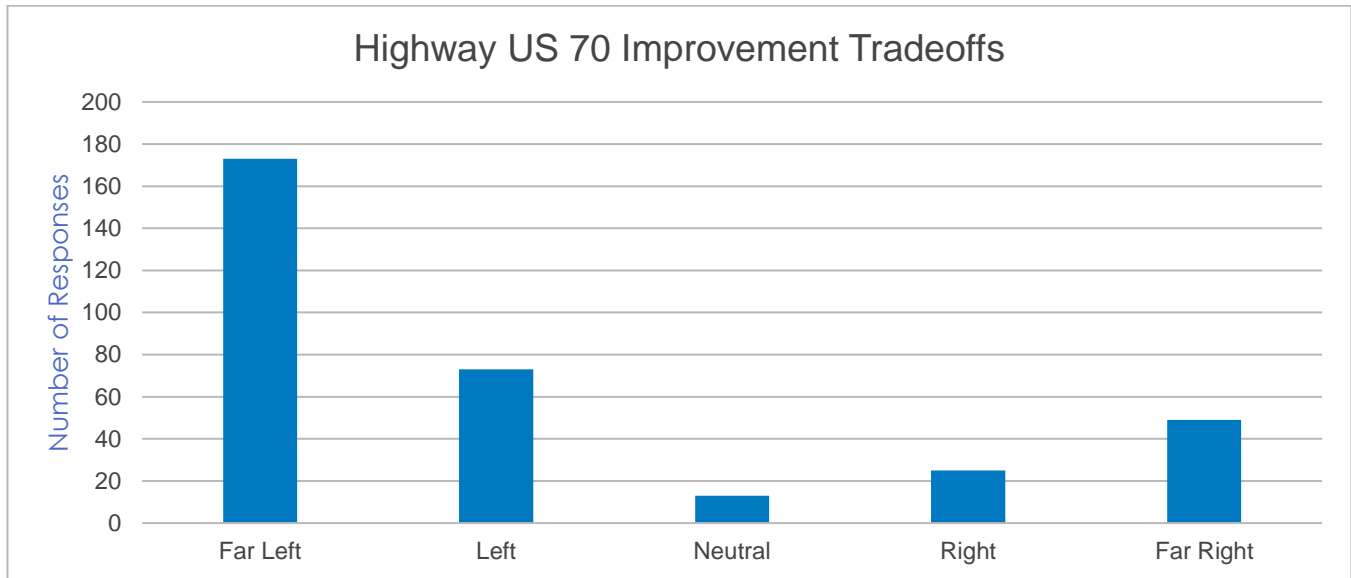


**Left:** Two-Way Left-Turn lanes along the corridor

**Right:** Discrete, left-turn lanes where needed

Of the two options for turn lane improvements, two-way left-turn lanes along the whole corridor were preferred over discrete, left-turn lanes where needed. Comments expressed concern that discrete turn lanes would potentially cause traffic to back-up, especially with the high number of driveways, businesses, and neighborhoods along the corridor.

Figure 23: US-70N/SR-24 Improvements Preference



**Left:** Widen the road to add more travel lanes for vehicles

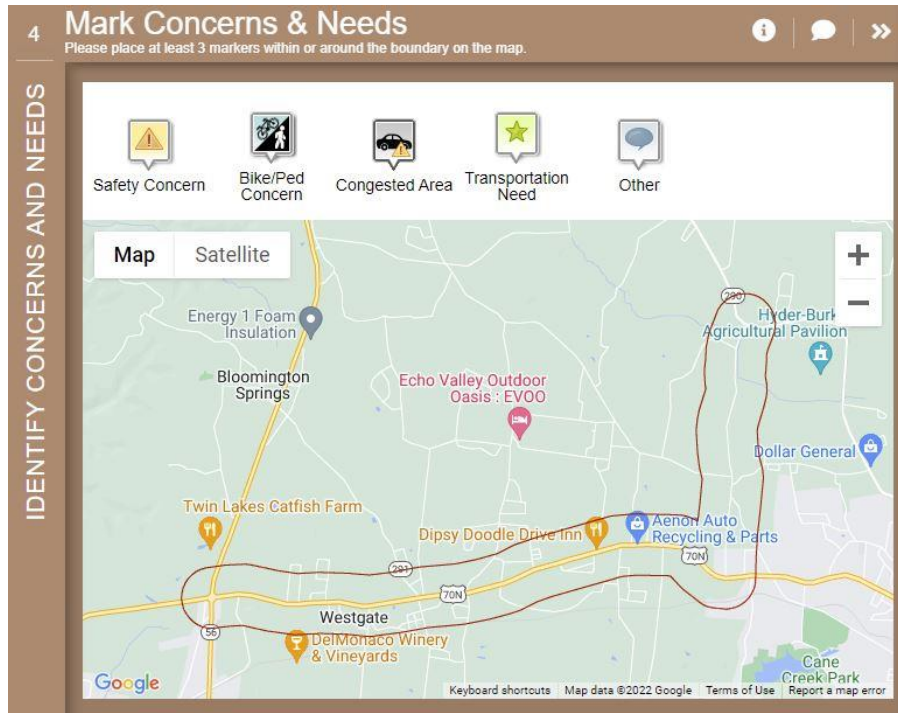
**Right:** Enhance multimodal facilities for bike/ped travel

The preferences for US-70N/SR-24 improvements were consistent with the transportation priority results from the previous section. Over 50 percent of survey respondents preferred widening the road and adding more travel lanes rather than enhancing or adding multimodal facilities. Additional comments emphasized traffic congestion as a problem and the need for safe and efficient travel options for vehicles, pedestrians, and bicyclists.

## MAP CONCERNS AND NEEDS

The fourth screen consisted of an interactive map with the study area boundary and instructions to place a map marker on specific locations where there was a transportation concern or need. The map marker options identified a safety concern, a bike/ped concern, a transportation need, or other for an additional comment.

Figure 24: Survey Screen Four



The map received a total of 758 markers, with 42 percent of those relaying a safety concern. Safety concerns related most often to frequent crash areas and limited visibility areas.

Figure 25: Total Map Markers

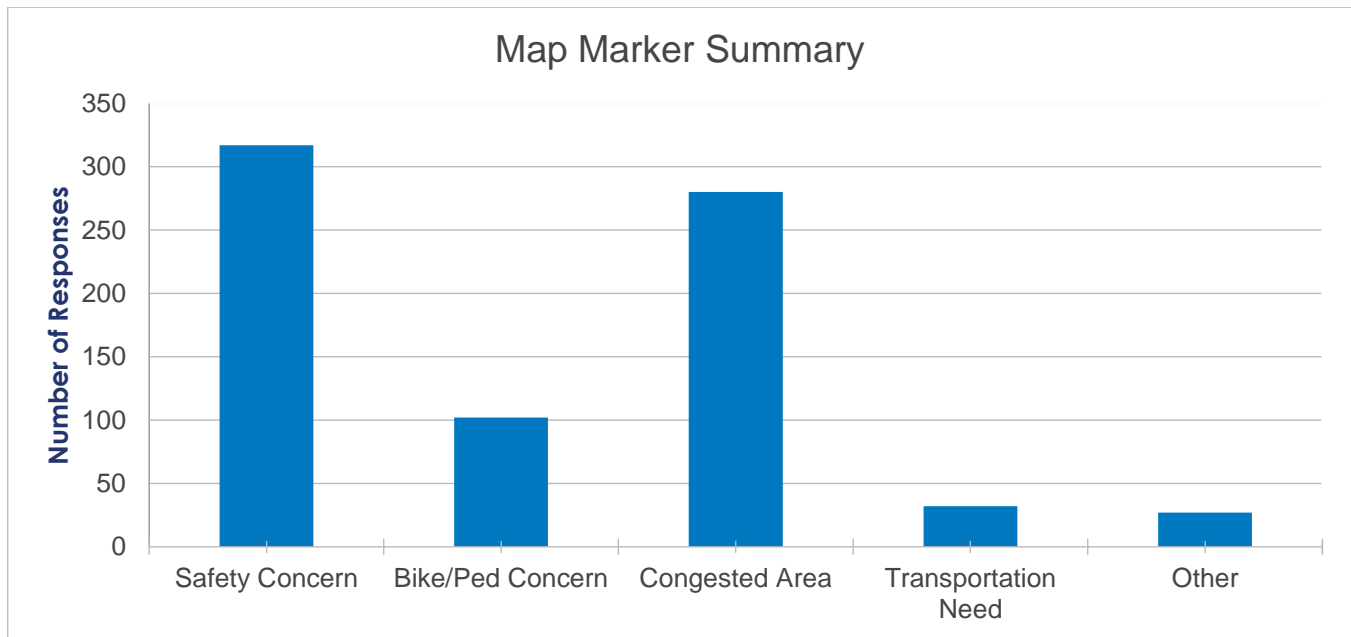
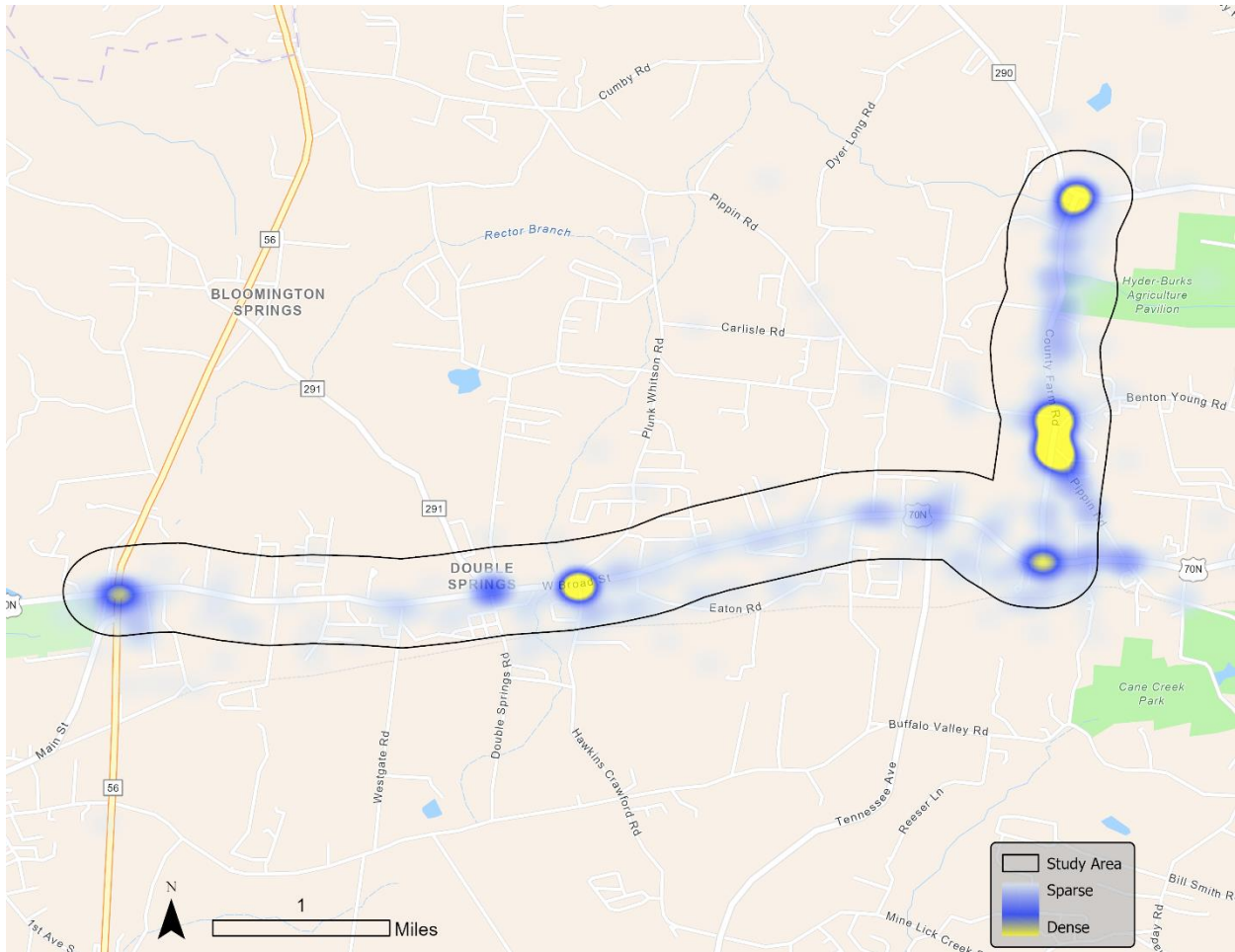


Figure 26: Map Markers Heat Map



The areas that were densely populated with map markers were mostly major intersections like US-70N/SR-24 and Gainesboro Highway, US-70N/SR-24 and Hawkins Crawford Road, and County Farm Road and Pippin Road, which accounted for the highest number of congested area markers. According to those that indicated a bike/ped concern, they feel unsafe to walk in that location and that there is too much traffic to walk or bike. Congestion seems to be bad at both AM and PM peak times. Additionally, 64 percent of the transportation need markers indicated a need for a turn lane. The map screen also received over 270 separate comments that contained more specific information and other concerns like flooding, lack of public transportation, and speeding.

## DEMOGRAPHICS

The final screen of the public survey presented optional questions that aimed to collect demographic information. The results cannot be fully representative of all survey respondents, as some chose not to answer. The following figures reflect those who responded to the survey. The figures below show the demographic data breakdown for where respondents live, purpose of trips, age, gender and race.

Figure 27: Putnam County Residents

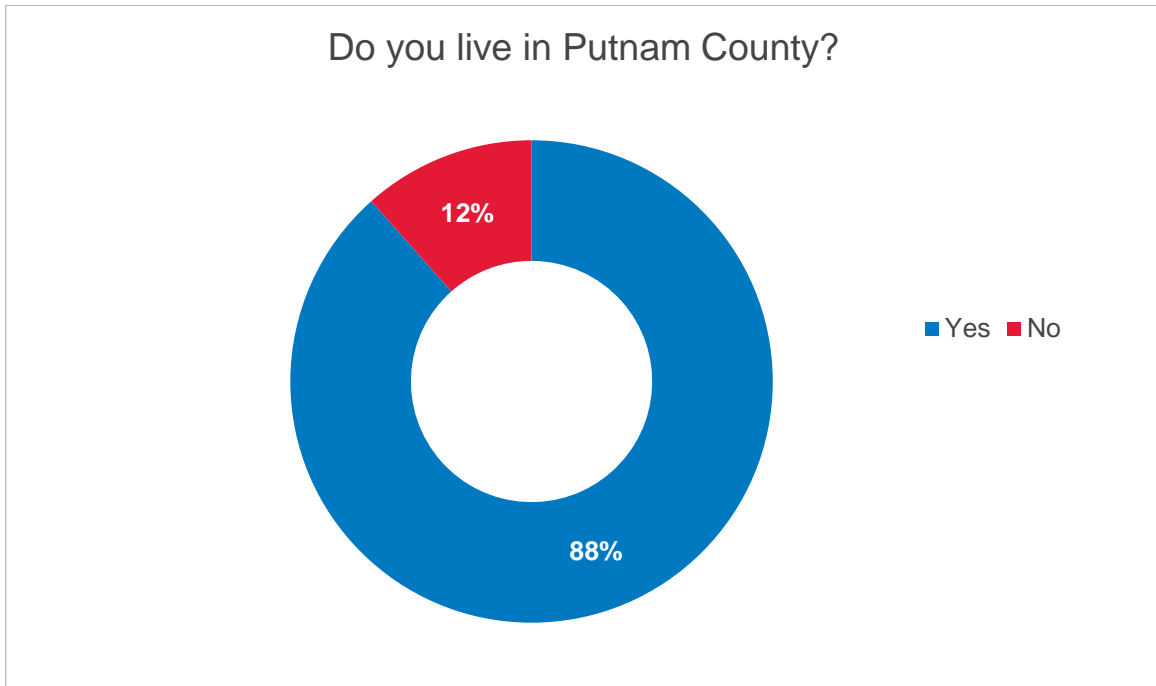


Figure 28: Survey Responders Trip Purposes

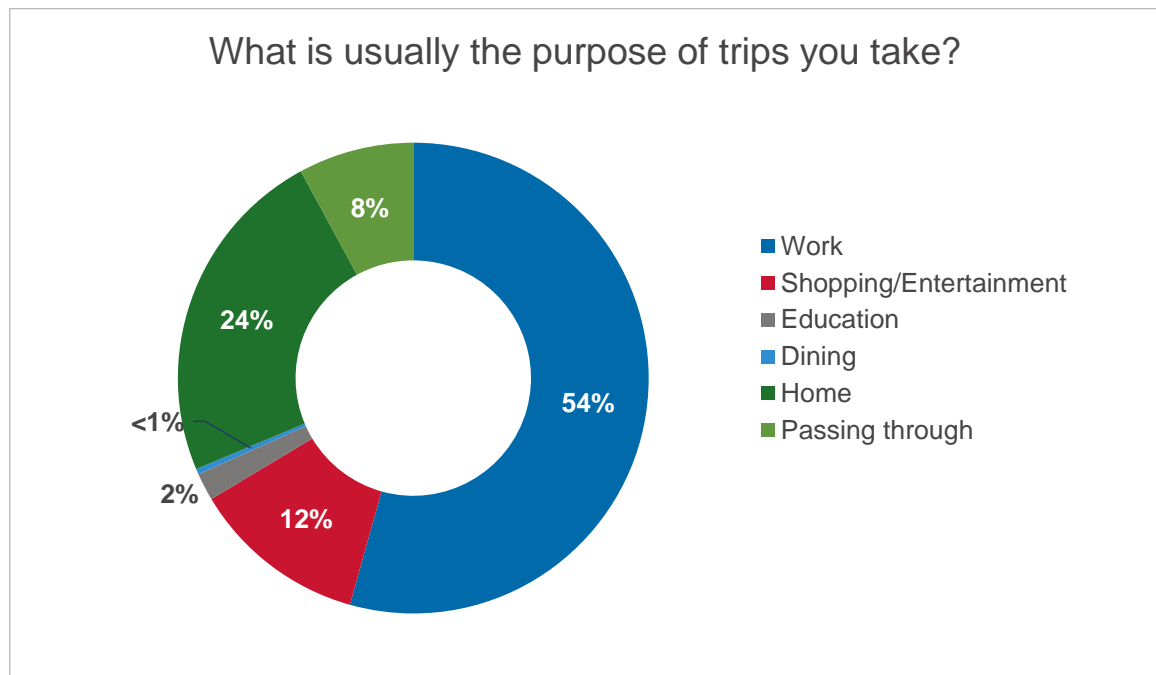




Figure 29: Survey Responders Age Range

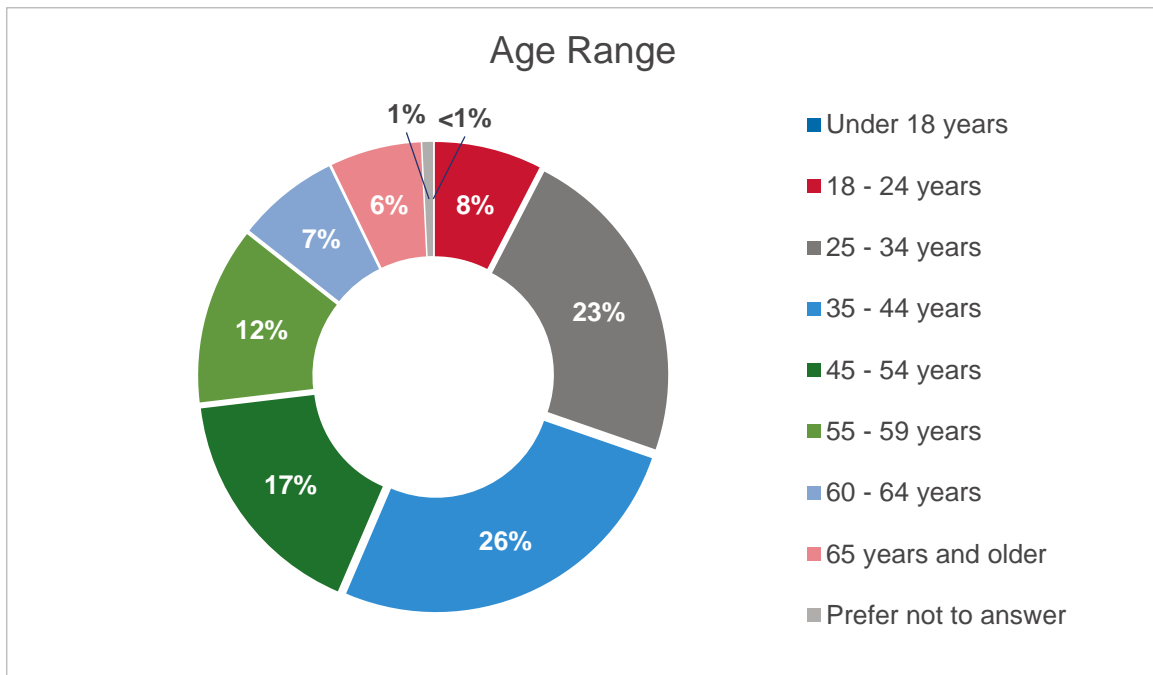


Figure 30: Survey Responders Gender Identity

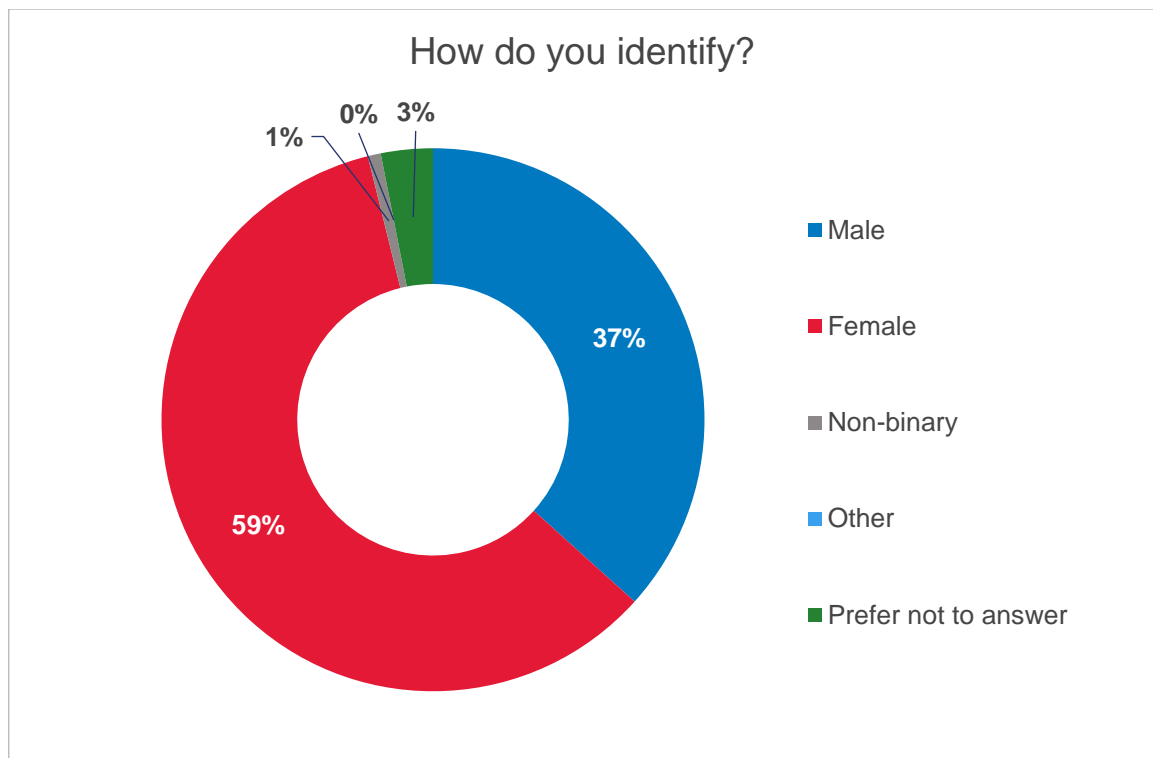
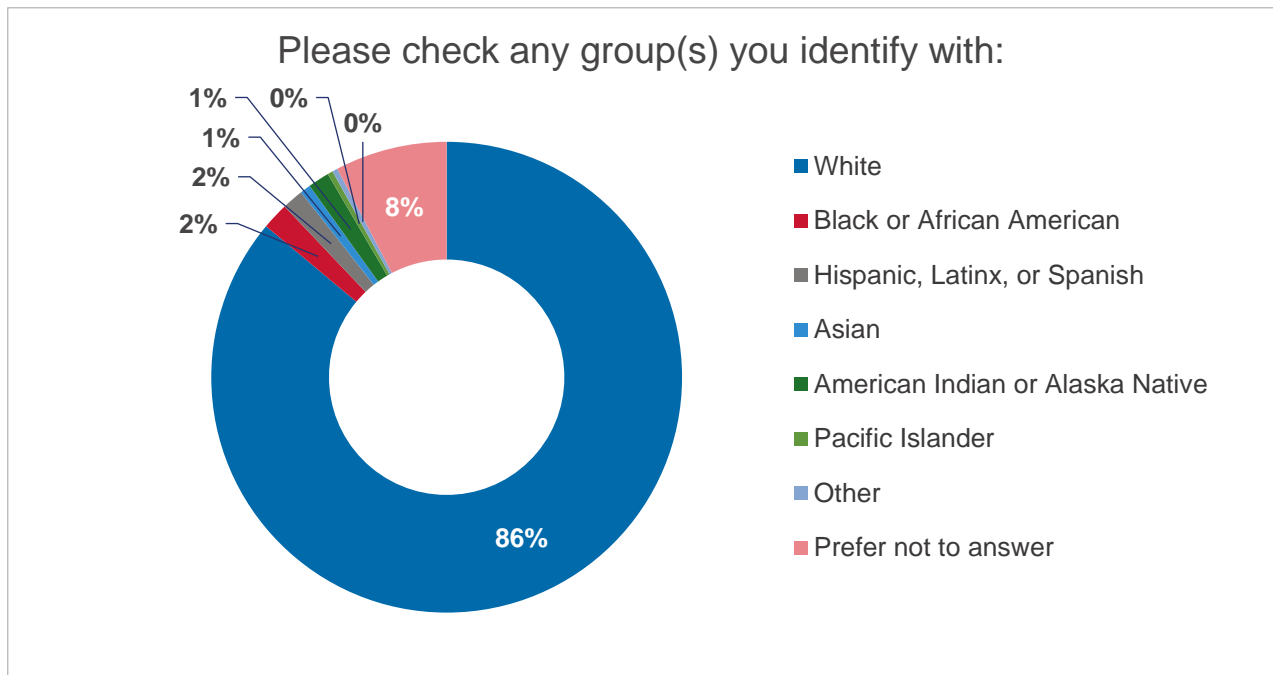


Figure 31: Survey Responders Race/Ethnicity



## NEEDS ASSESSMENT

### TRAFFIC FORECASTS AND ANALYSIS

To evaluate the need for roadway capacity enhancements along US-70N/SR-24 and County Farm Road, the team forecasted future traffic flow and needs along the corridor based on proposed developments, population growth and employment trends. First, the team established a baseline of existing traffic counts along the corridor utilizing available TDOT and City of Cookeville data. For example, a City of Cookeville bi-directional count incorporated into the analysis was approximately 6,000 average daily traffic (ADT) on Pippin Road just north of US-70N/SR-24 in 2021. The map displayed as Figure 4 shows where TDOT traffic count stations exist along the corridors. Table 6 shows 10-year and 5-year growth rates based on the historical counts. Given fluctuations in traffic related to the COVID-19 pandemic, the years 2020 and 2021 were omitted from the growth rate calculations.

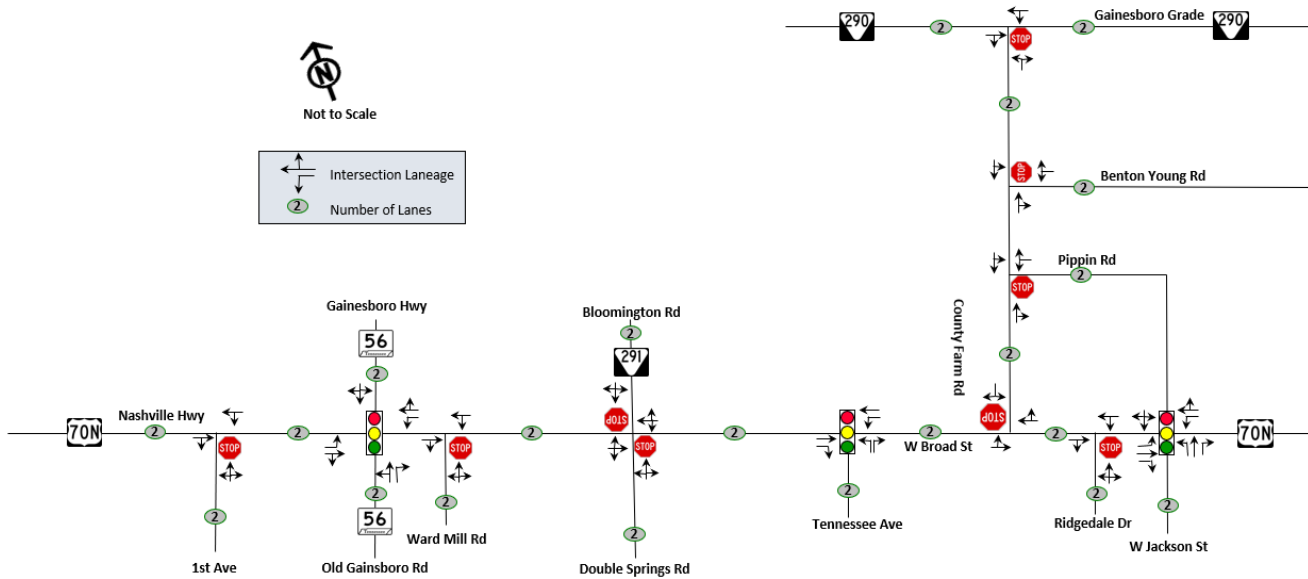
Considering the historic traffic counts, population, employment, and development information, an annual growth rate of 1.5 percent was selected to project 2022 numbers if 2022 counts were not available at a given location. Considering anticipated development in the study area, a 2.0 percent annual growth rate was selected to estimate traffic from the 2022 existing year to a 2027 opening year and 2047 design year. This follows TDOT's convention for forecasting open five years from existing year and design year 20 years from open year.

Table 6: Historic Growth Rates

Route	US 70N		Country Farm Rd		SR 56		SR 291	Ward Mill Rd	Benton Young Rd
	1	2	3	4	5	6	7	8	9
Map ID	7100017	7100019	71000196	71000198	71000016	71000015	71000018	71000188	71000155
Station	71000017	71000019	71000196	71000198	71000016	71000015	71000018	71000188	71000155
Year	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT	AADT
2012	5,698	7,808			4,898	6,624	1,263	606	1,762
2013	5,689	7,775			4,548	6,112	1,182	490	1,562
2014	5,535	7,864			4,316	6,216	1,210	490	1,713
2015	6,607	8,362			5,130	7,241	1,232	536	1,665
2016	6,424	8,055			5,410	6,710	1,230	512	1,681
2017	6,184	7,924			5,701	6,721	1,255	535	1,748
2018	4,990	8,107			4,817	5,517	1,201	570	1,928
2019	6,167	8,251			5,471	7,020	1,390	613	1,976
2020	5,328	6,355			4,928	5,347	1,318	516	1,918
2021	5,986	6,586	1,501	3,731	5,254	6,426	1,559	564	1,827
2022	6,320	7,900	1,575	3,914	5,129	6,360	1,542	592	1,917
10 year growth rate	0.63%	0.25%	0.00%	0.00%	1.38%	-0.15%	2.13%	1.34%	1.97%
Valid counts	100%	100%	18%	18%	73%	73%	73%	73%	73%
5 year growth rate	2.04%	-0.19%	0.00%	0.00%	-1.04%	0.24%	4.82%	1.76%	1.32%
Valid counts	100%	100%	33%	33%	100%	100%	100%	100%	100%

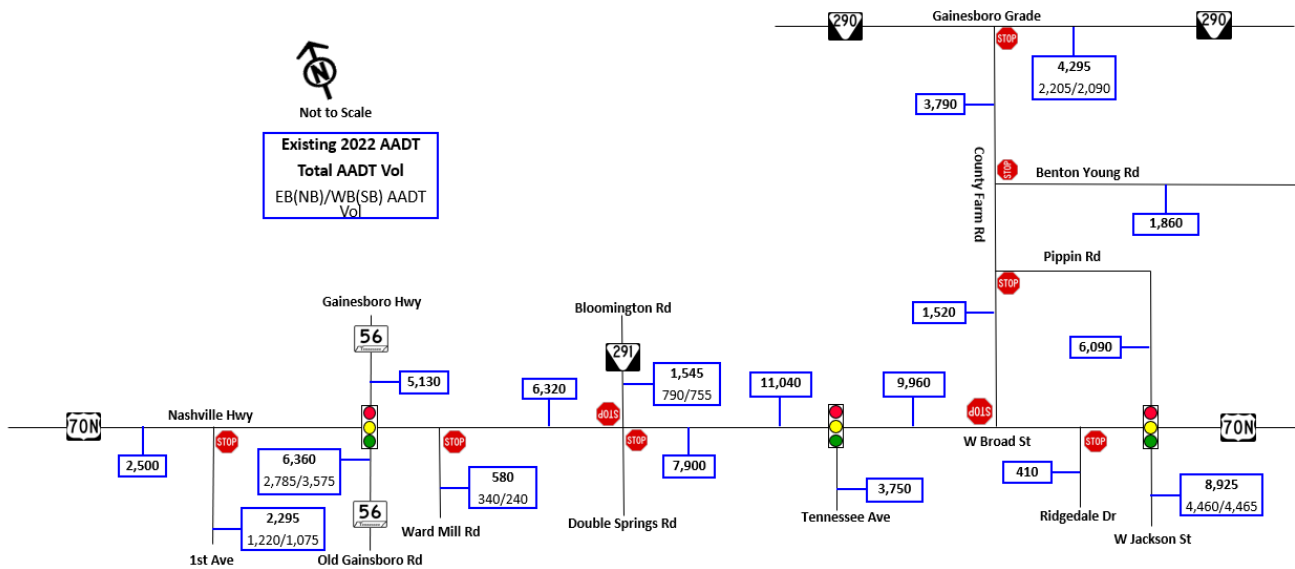
The graphic below illustrates the traffic network in and around the two study corridors in Putnam County. As shown in the graphic, US-70N/SR-24 is a two-lane road with seven intersections within the study area from SR-56 to Pippin Road – three of them are signalized. County Farm Road has two lanes as well, and it has four major intersections in the study area, none of which are signalized.

Figure 32: Traffic Network



Using the 2022 traffic volumes in [Figure 5 \(previous section\)](#), the roadway network graphic below lays out traffic volumes on the various segments of the network. Traffic volume is measured using Annual Average Daily Traffic data (AADT), which is the traditionally measured by the total volume of vehicle traffic on a road for a year divided by 365 days. As illustrated in Figure 33 below, the highest traffic volumes were along US-70N/SR-24 east of Bloomington Road. County Farm Road saw the highest traffic counts on the north end of the corridor, with Pippin Road carrying the majority of north-south traffic toward the US-70N/SR-24/Jackson Street intersection.

Figure 33: 2022 AADT in Study Area



Design hourly volume (DHV) represents the number of vehicles that travel through a selected roadway segment within the busiest observed hour. DHV is a standard tool to measure estimates of peak traffic loads during the day. Analyzing peak hourly volumes instead of daily volumes provides a focused basis for analyzing capacity constraint and the potential need to improve congestion now or in the future. The project team conducted DHV analysis for corridors in and around the study area for both AM and PM peak traffic times utilizing limited peak hour and directional factors available from the counts. The graphics below (Figure 34 and 35) illustrate these findings.

Figure 34: 2022 DHV AM Peak Hour

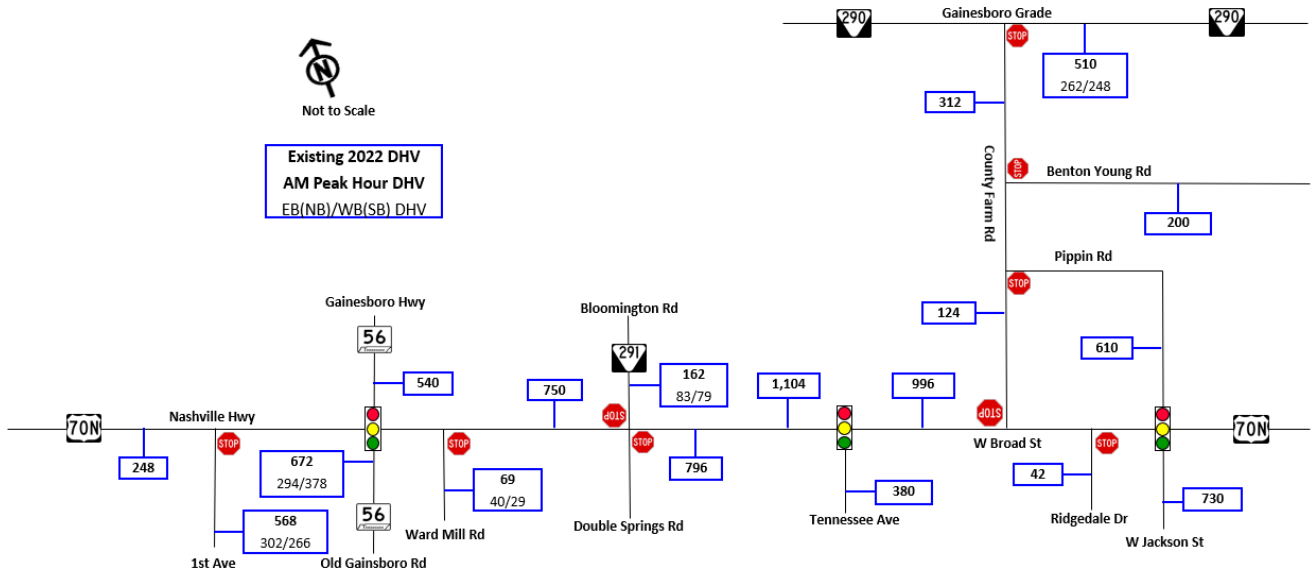
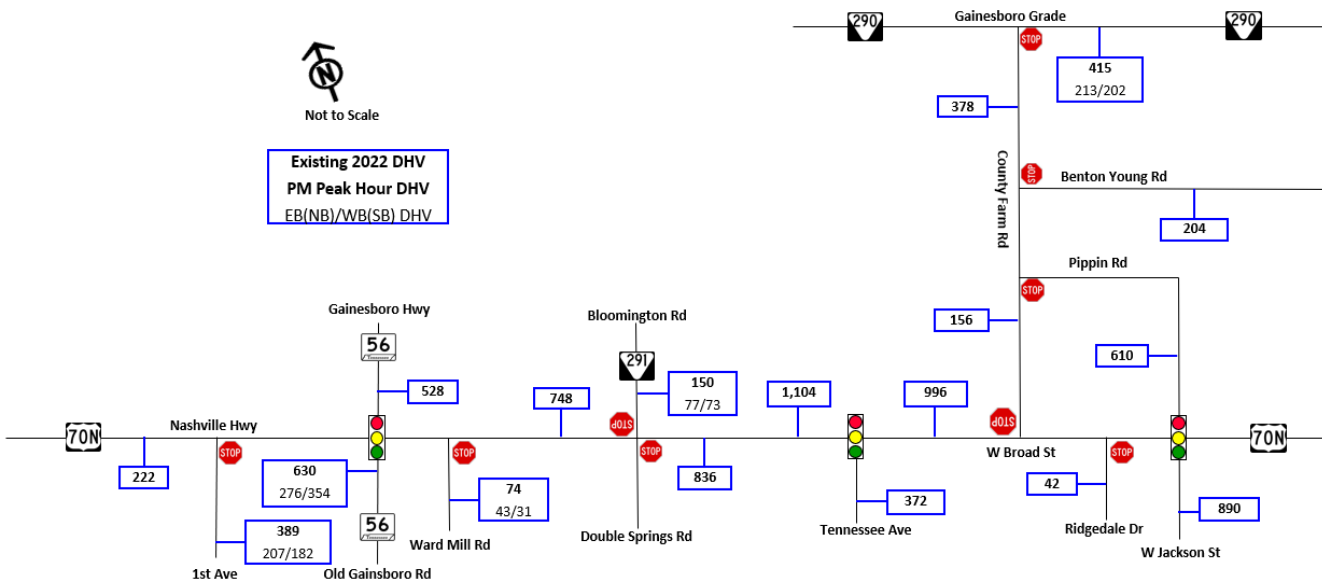


Figure 35: 2022 DHV PM Peak Hour



After establishing the 2022 DHV for both AM and PM peak times for traffic flow, the team used this data to forecast DHV for AM and PM periods in the year 2047 (as well as AADTs for 2027). The graphics below illustrate these forecasts based on future growth trends in Putnam County.

Figure 36: 2047 DHV AM Peak Hour

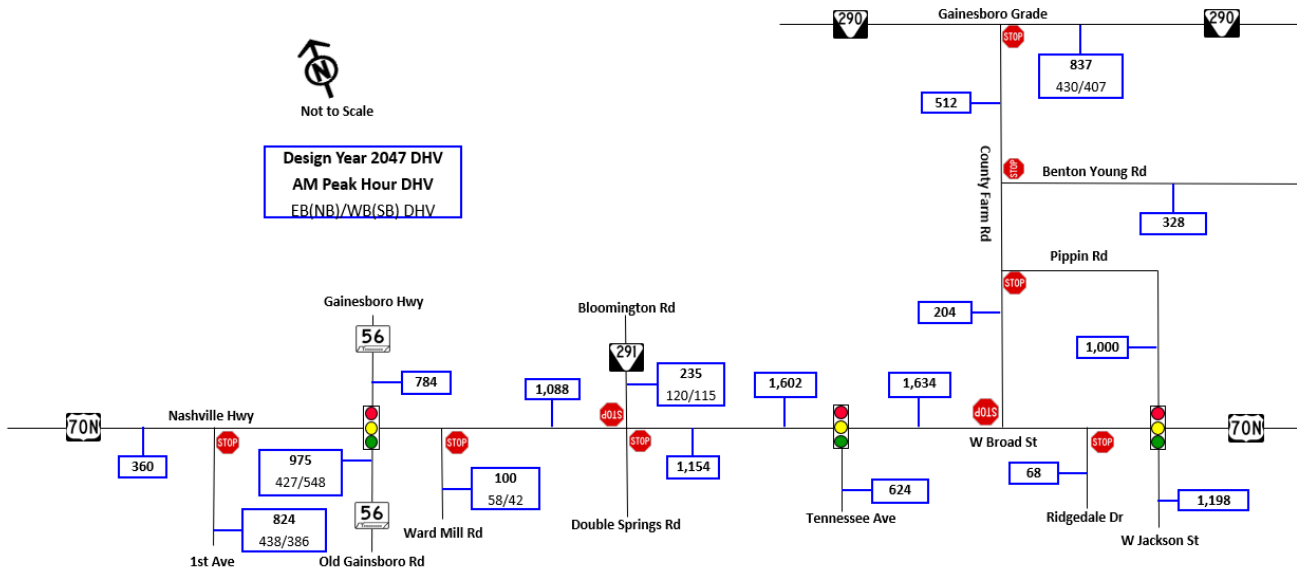
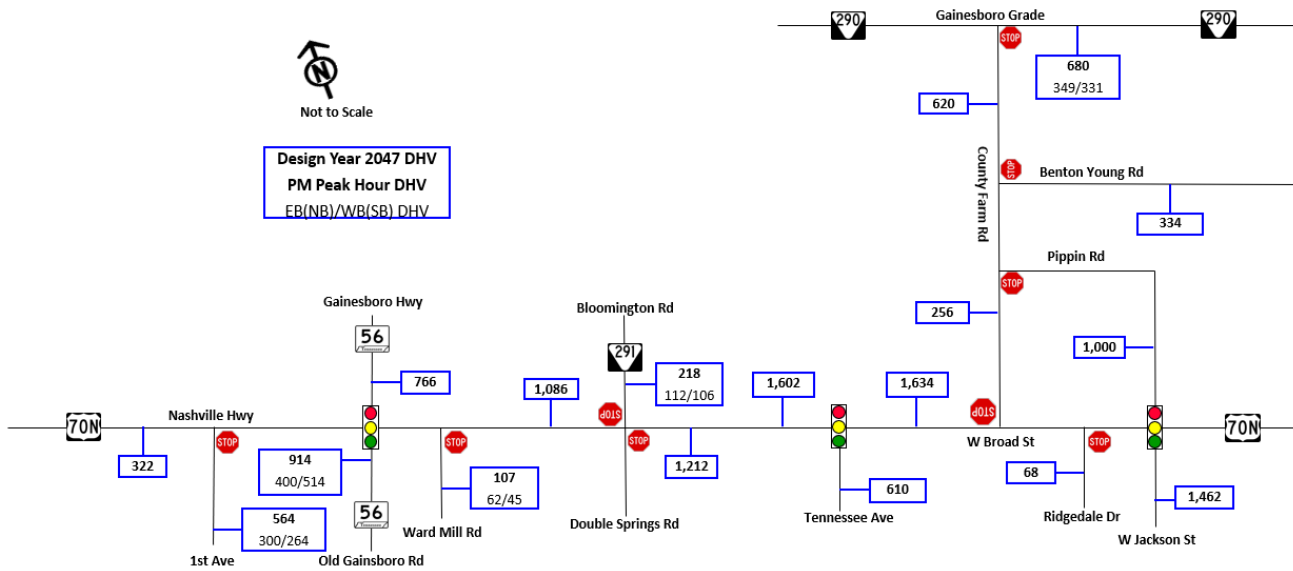


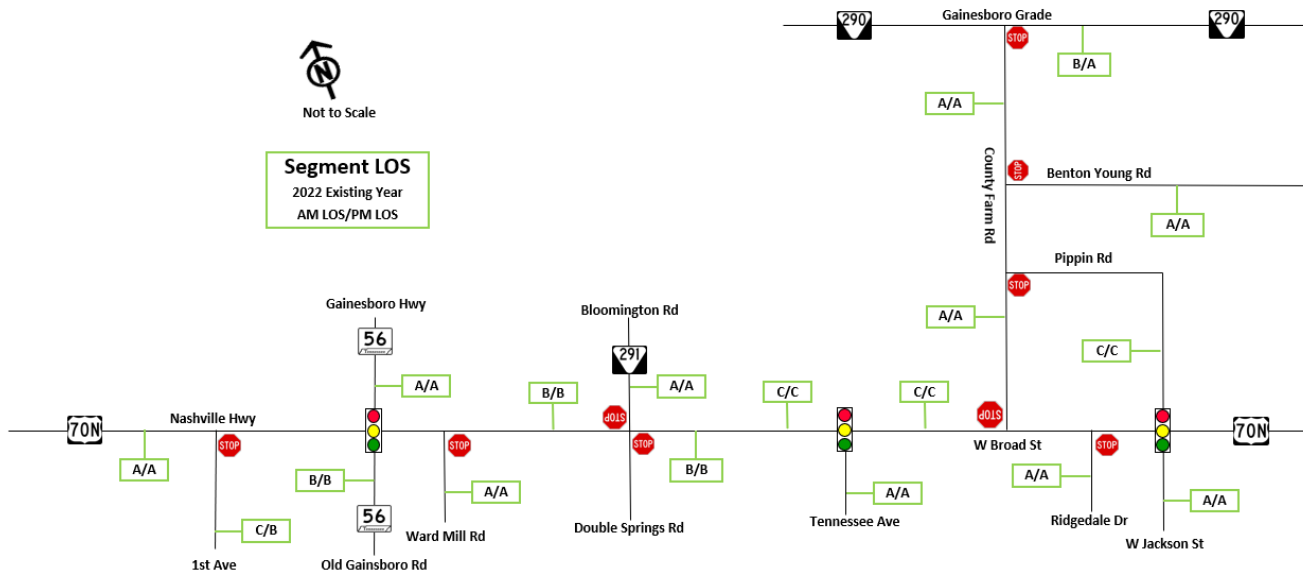
Figure 37: 2047 DHV PM Peak Hour



Finally, the team conducted a level of service (LOS) analysis for roadway segments along and near the study corridors, utilizing Highway Capacity Software (HCS). Level of Service is a term used to qualitatively describe the operating conditions of a roadway based on factors such as speed, travel time, delay, and safety. LOS is designated with a letter, with A representing the best operating conditions and F representing the worst. Below

is a schematic of the roadways in and around the study area with LOS for the various roadway segments identified. As seen on the map, US-70N/SR-24 operates at an A level on the west end, but as the roadway continues eastward, LOS deteriorates to a level C. County Farm Road operates at an A level.

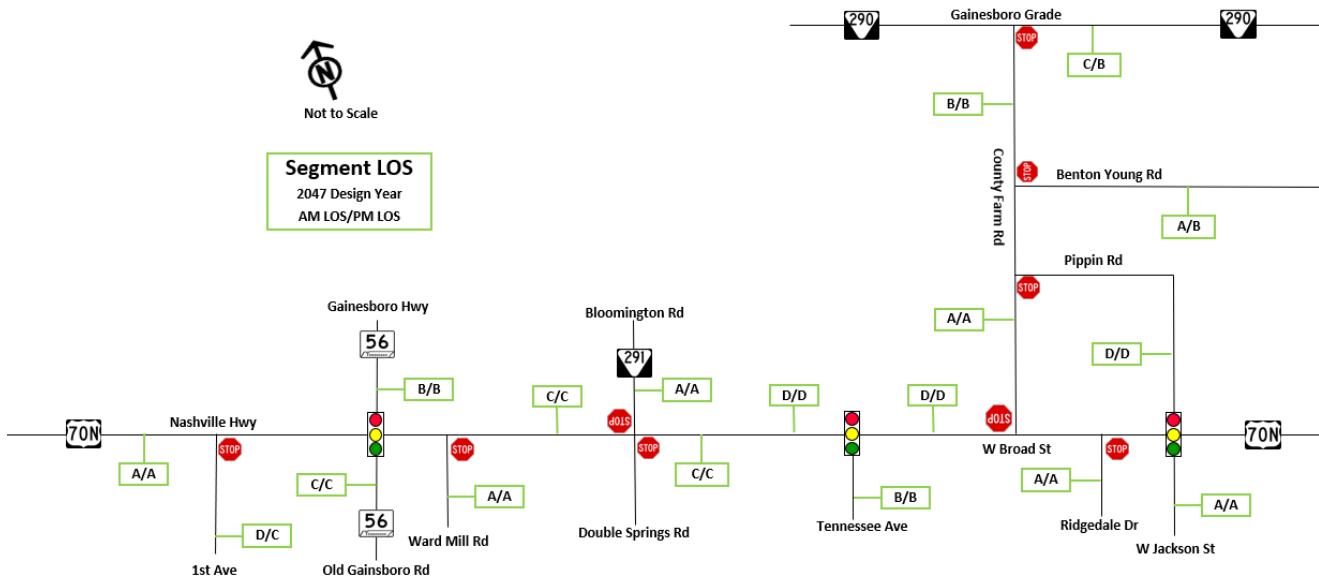
Figure 38: 2022 LOS



As seen below, the LOS for both US-70N/SR-24 and County Farm Road are forecasted to deteriorate. US-70N/SR-24 LOS is estimated to be at a D level east of Bloomington Road by 2047. Pippin Road north of US-70N/SR-24 is also forecast to experience LOS D. County Farm Road LOS will be lowered to a B at the north end of the corridor.



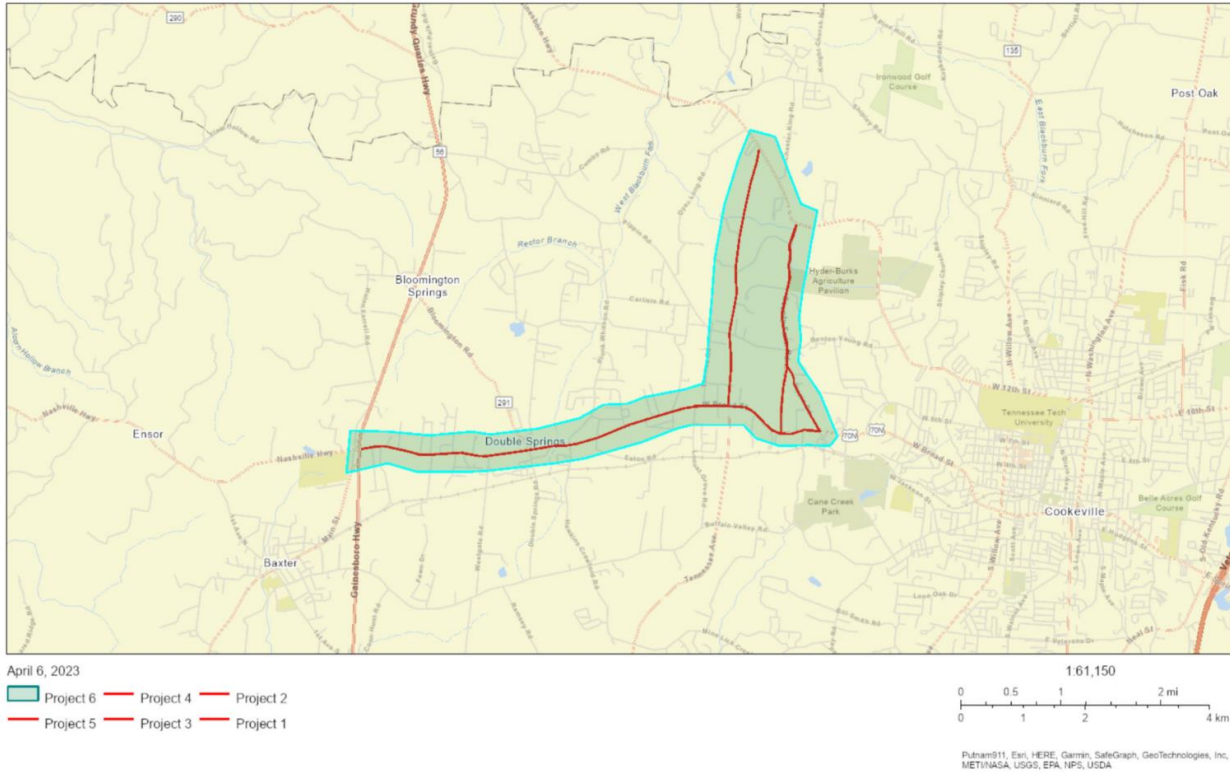
Figure 39: 2047 LOS



## ENVIRONMENTAL CONSIDERATIONS

As potential improvements to US-70N/SR-24 and County Farm Road proceed through planning and implementation, a variety of environmental aspects should be considered. Below is a map of the area in which the project may have environmental impacts. Figure 40 shows the areas for environmental consideration within the study areas for this CMP.

Figure 40: Project Area Analyzed for Potential Environmental Considerations



**National Environmental Policy Act (NEPA)**

- Class of Action: Likely a D-List Categorical Exclusion (CE) or Environmental Assessment (EA) – Scope, alignment, and design would determine this.

**Section 401 and 404 Permitting (Clean Water Act)**

- Several streams and wetlands are currently shown on the United State Fish and Wildlife (USFWS) National Wetlands Inventory. Stream and wetland delineations needed.

**Floodplains**

- Tennessee Avenue Extension would cross the 100-year floodplain (Little Creek) (Flood Insurance Rate Map [FIRM] Panel 47141C0125D).
- Old County Road is not currently in the 100-year floodplain based on Federal Emergency Management Agency (FEMA) maps, but it is very close (Little Creek) (FIRM Panel 47141C0125D).

**Cultural Resources (National Historic Preservation Act)**

- Limited data/information currently available.
- Section 106 Assessments would be needed to identify historic and archaeological resources and potential impacts to these resources.

**Farmland Protection and Policy Act (FPPA)**

- Agricultural land is present. Evaluation consistent with the FPPA as well as coordination with United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) may be required

### **Environmental Justice (EJ)**

- EPA EJScreen indicates portions of the project areas would qualify as Environmental Justice populations. An assessment would need to be conducted to identify and evaluate impacts to these communities.

### **Noise**

- Noise impacts to residential areas should be evaluated if the roadway is widened.

### **Section 4(f) (Department of Transportation Act)**

- Pippin Road widening could result in impacts to potential Section 4(f) resources (Hyde-Burks Agricultural Pavilion/Tennessee Tech Farm). Additional information is needed to determine if it is protected under Section 4(f).

### **ROW Impacts**

- Residential and business relocations and displacements should be considered as the project develops.

## POTENTIAL IMPROVEMENTS AND RECOMMENDATIONS

Building on the existing conditions analysis, review of previous plans, and needs assessment, this section presents potential improvements that were evaluated along with a subset of recommended improvements. After an initial overview, each potential improvement is outlined, followed by cost estimates, analysis of alternatives, and a summary of the final recommendations. The planning process involved feedback from project stakeholders and the public along with evaluation by the project team in conjunction with the steering committee.

Figure 41 provides an overview of general potential improvements in the context of recent and ongoing TDOT projects. The Hawkins Crawford Road safety project and the Pippin Road Safety Audit, covered earlier in Existing Conditions, and the recent US-70N/SR-24 intersection improvement are shown. The potential improvements were refined into those shown in Figure 42 and Table 6.

The list of potential improvements is grouped by project type and directional movement. The potential projects would improve safety and traffic flow along two primary movements - east-west along the US-70N/SR-24 corridor and north-south between US-70N/SR-24 and Gainesboro Grade/SR-290. As detailed further in the following sections, feasibility analyses of roadway widenings and new alignments were conducted within the software Concept Station to quantify right-of-way impacts at the concept level. Cost estimates were then developed using TDOT's Planning Level Cost Estimate Tool.

Figure 41: Recent, Ongoing, and Potential Improvements Map

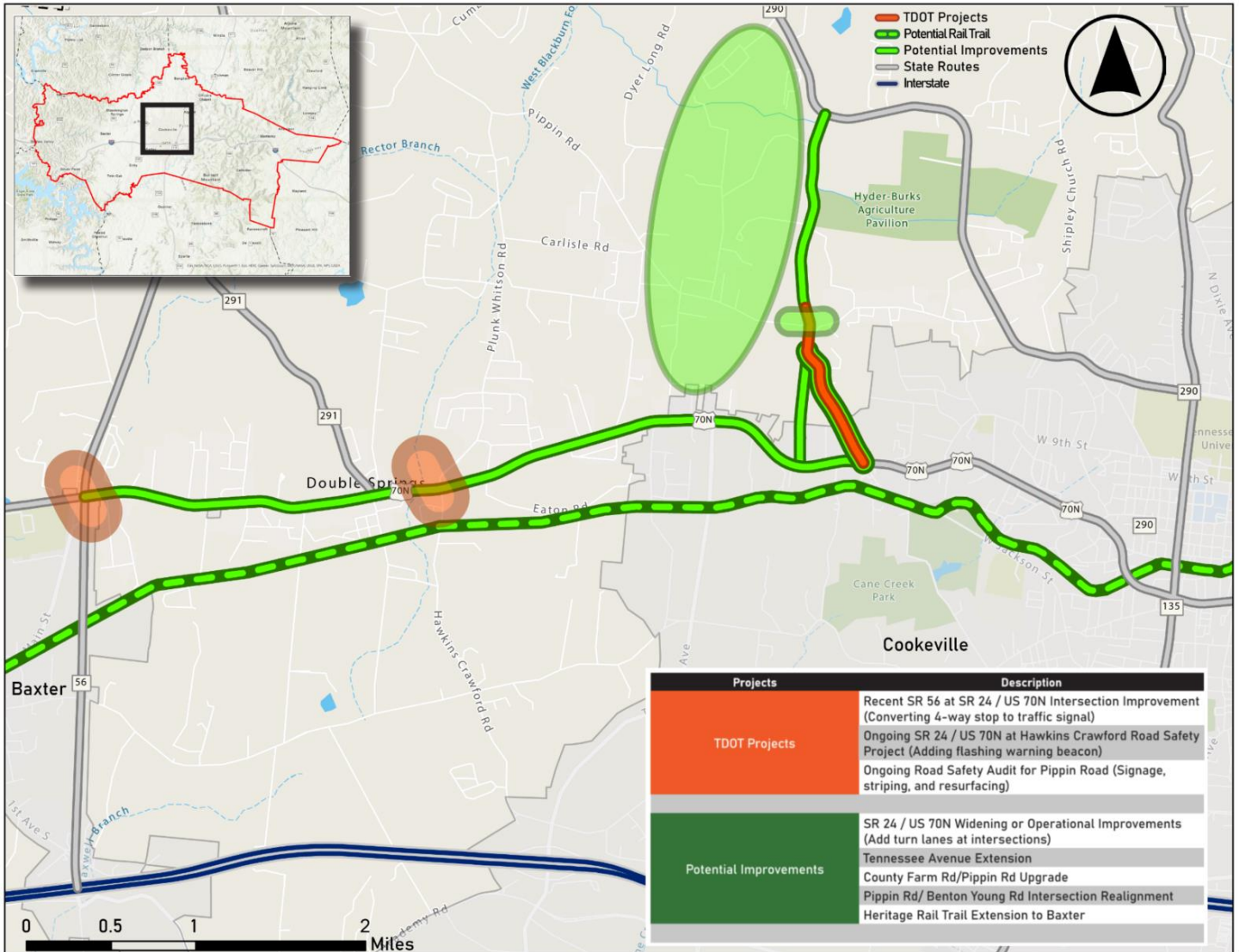
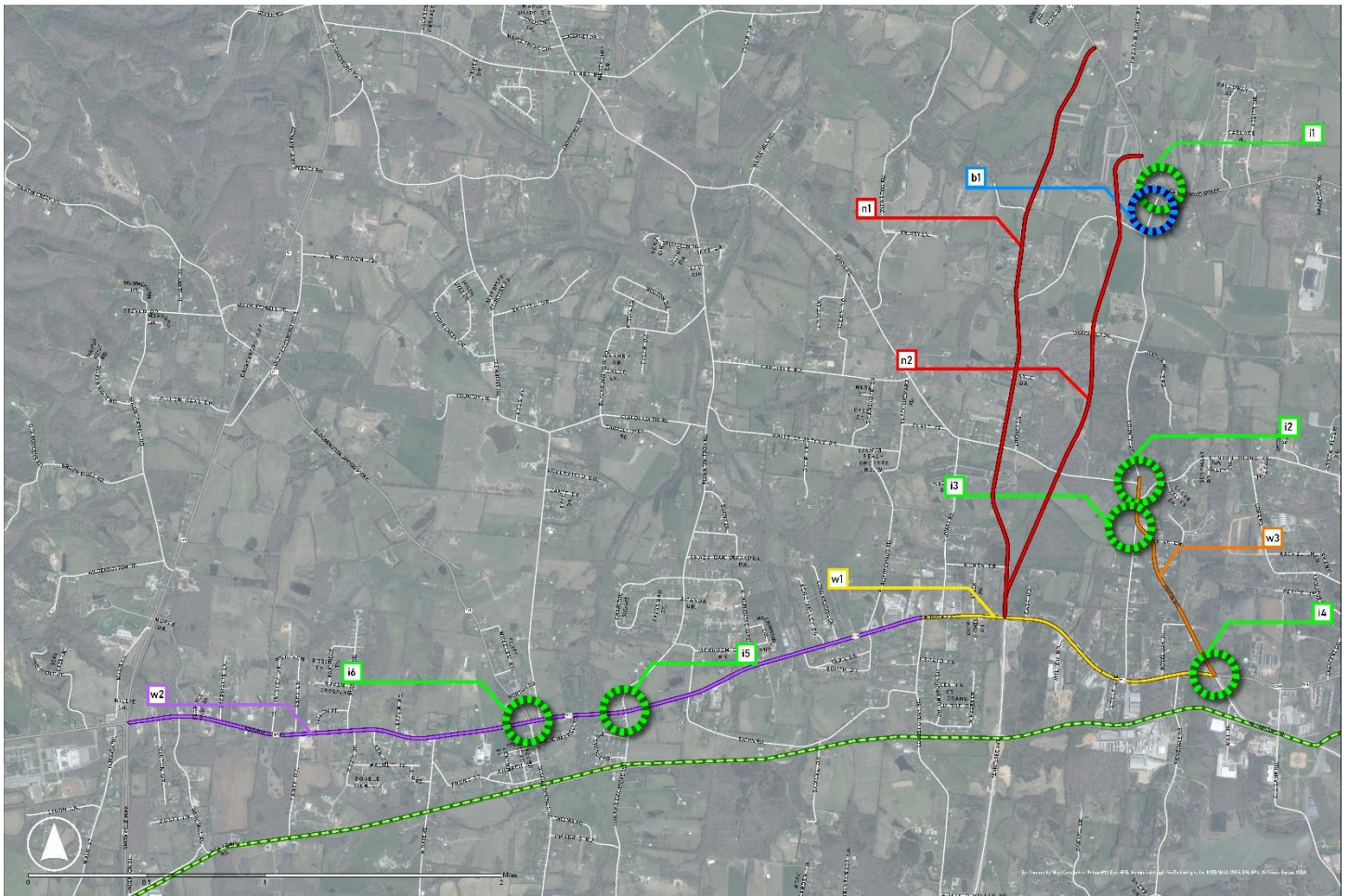


Table 6: Potential Improvements Descriptions

Type	ID	Description	Route	Miles
E-W	w1	5-lanes with sidewalks	US-70N/SR-24 (Pippin Rd to Locust Grove Rd)	1.4
E-W	w2	5-lanes without sidewalks	US-70N/SR-24 (Locust Grove Rd to SR-56)	3.4
N-S	w3	3-lanes with sidewalks	Pippin Rd/County Farm Road (US-70N/SR-24 to northern Pippin Rd / County Farm Rd intersection)	0.9
N-S	n1	2-lanes without sidewalks	Tennessee Ave Extension (Existing Roads)	2.5
N-S	n2	2-lanes without sidewalks	Tennessee Ave Extension (Greenfield)	2.2
N-S	i1	Turn lanes	County Farm Rd at Gainesboro Grade	N/A
N-S	i2	Realignment	Pippin Rd at County Farm Rd (north) & Benton Young Rd	N/A
N-S	i3	Realignment	Pippin Rd at County Farm Rd (south)	N/A
N-S	i4	Turn lanes	US-70N/SR-24 at Pippin Rd / W Jackson St	N/A
E-W	i5	Turn lanes	US-70N/SR-24 at Hawkins Crawford Rd / Plunk Whitson Rd	N/A
E-W	i6	Turn lanes	US-70N/SR-24 at Bloomington Rd / SR-291 / Double Springs Rd	N/A
N-S	b1		County Farm Rd at Little Creek	N/A
E-W	t1		Near W Jackson St and Mill Dr to SR 56	5



Figure 42: Potential Improvements Map



## US-70N/SR-24 WIDENING

Throughout the stakeholder engagement process, one of the top priorities identified for this study was improving east-west traffic flow through western Putnam County. Widening US-70N/SR-24 as the main east-west corridor was a popular option. As outlined in the needs assessment, portions of US-70N/SR-24 are anticipated to experience LOS D in the design year peak hour. The eastern portion of the corridor experienced higher traffic volumes and congestion than the western portion. While the study area extends along US-70N/SR-24 from Pippin Road / West Jackson Street to SR-56, this potential improvement is segmented into two sections to reflect a possible increase in traffic demand and desire for pedestrian facilities on the more developed eastern portion and for potential flexibility of phased implementation.

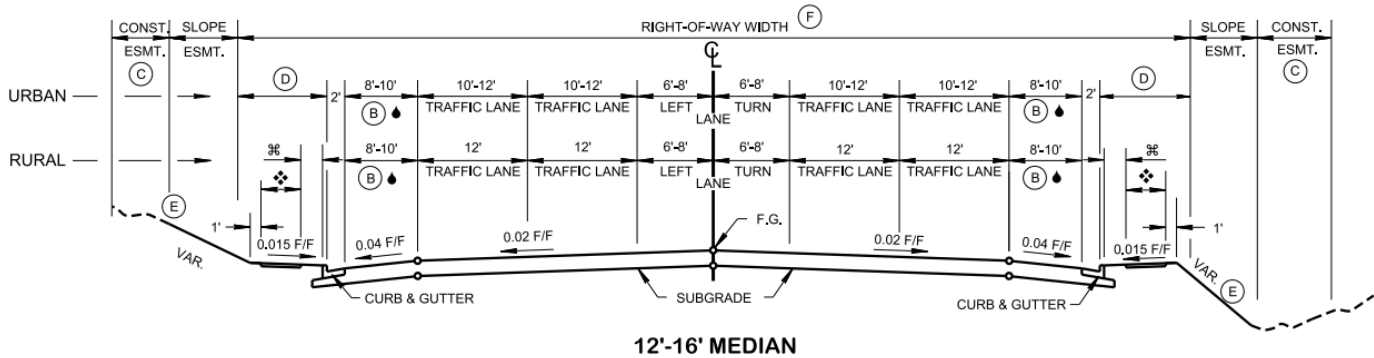
The eastern portion (project ID w1) is US-70N/SR-24 from Pippin Road to Locust Grove Road (1.4 miles) and generally coincides with the portion of the corridor within the City of Cookeville. This improvement widens the two-lane road to five lanes and includes sidewalks on both sides. The five-lane section would increase from one lane in each direction to two and would allow for a two-way center turn lane. Adding sidewalks would provide more pedestrian connectivity to Cookeville as well, as there are currently no pedestrian facilities on the corridor.

The widening of the remainder of the US-70N/SR-24 from Locust Grove Rd to SR-56 to five lanes runs approximately 3.4 miles. Because this portion of the corridor is currently less developed, there is a smaller demand for pedestrian infrastructure.

Following much discussion of possible typical sections including right-of-way impacts of widening and the benefits of medians, such as increasing safety, reducing conflicts, and managing access, the five-lane typical section was selected for analysis.

Figure 43 below shows the typical section applied to the US-70N/SR-24 widening project showing the relevant portion of the TDOT standard drawing *RD11-TS-6A: Typical Curb & Gutter Sections with Shoulders and with Grass Strips*. Given that US-70N/SR-24 is classified as urban and falls within the Cookeville urban cluster, the urban values are applied.

Figure 43: US-70N/SR-24 Widening Typical Section



## PIPPIN ROAD / COUNTY FARM ROAD IMPROVEMENTS

Improving the Pippin Road/County Farm Road corridor would facilitate north-south movements and could be a possible alternative to extending Tennessee Avenue. The traffic analysis indicated volumes are highest on the southern portion of the corridor, Pippin Road north of US-70N/SR-24, which would reach a design year peak hour LOS D. Given the smaller demand on County Farm Road north of Pippin Road, safety and operational issues at the County Farm Road / Pippin Road intersections, and previously recommended pedestrian infrastructure, project w3 proposes widening the two lanes to three with sidewalks from US-70N/SR-24 to the northern County Farm Road / Pippin Road intersection. Although a two-way center turn lane would mostly serve residential driveways on this corridor, it could help improve operations by reducing backups caused by turning vehicles waiting for an opening.

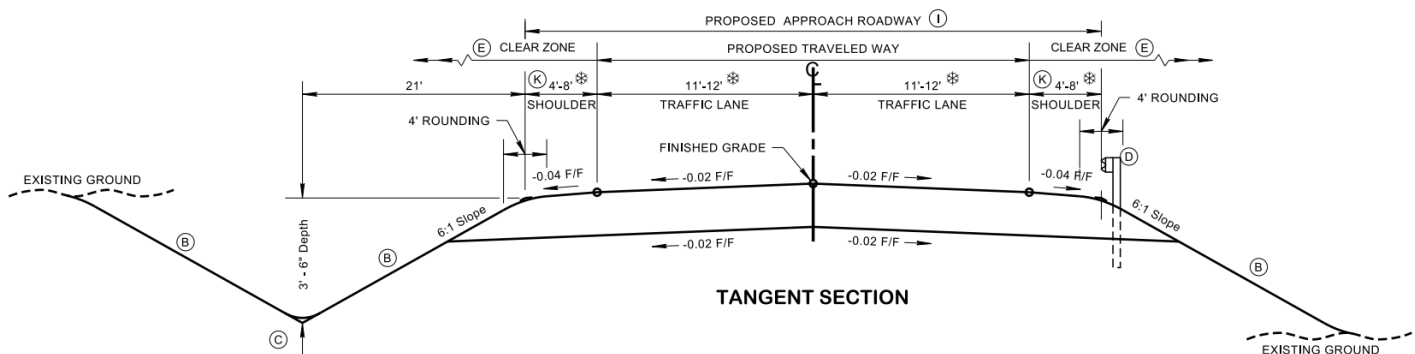
On the northern section of County Farm Road, the existing bridge over Little Creek (structure ID 710A1830001) is in fair condition as of 2022. However, it lacks shoulders in its current state. It does have steel guardrails, but they do not continue beyond the bridge. The TDOT Inventory and Appraisal Report gave the Deck Geometry a 2, and the bridge Traffic Safety Features are 0000, meaning they do not meet current acceptable safety standards. In addition, public feedback indicated this is a narrow road and a desire for a guardrail along Little Creek to improve driver comfort. This road could be improved by adding shoulders which would further facilitate safer north-south movements.

## TENNESSEE AVENUE EXTENSION

One of the main identified needs in the study area was improving north-south movements. One proposal would be the extension of Tennessee Avenue north from US-70N/SR-24 to Gainsboro Grade. Two alternative alignments for the extension were analyzed.

The first alternative would follow existing roadways, specifically tying in Anderson Lane and Dyer Creek Road. The second alternative would avoid right-of-way impacts to residential properties and would not use existing streets but would require more grading and greenfield development. Both of these alternatives would maintain the current configuration of the existing Tennessee Avenue with two lanes and no sidewalks. Although the existing two-lane Tennessee Avenue is classified as urban, its greenfield context was built with a rural typical section and without a center turn lane. Given this fact and based on demand, the Tennessee Avenue extension is evaluated as a two-lane facility, on a two-lane footprint, without a center turn lane. See a typical section of the Tennessee Avenue Extension in Figure 44 based on TDOT standard drawing RD11-TS-3: *Standard Design for Arterial Highway (2-Lane)*

Figure 44: Tennessee Avenue Extension Typical Section



Extending Tennessee Avenue following existing road alignments (project n1) would cost slightly less than extending the roadway through undeveloped properties (project n2). Project n2 includes a curve with a reduced design speed before tying into Gainesboro Grade to provide adequate sight distance given adjacent ROW constraints.

## REALIGNMENTS

As discussed in the existing conditions section, the Pippin Road Safety Audit recommends signage and striping improvements to improve safety at the Pippin Road / County Farm Road intersections. Beyond these near-term fixes and beyond even the Pippin Road / County Farm Road improvements (project w3), realigning the two intersections would further improve safety and operations.

The northern intersection of Pippin Road and County Farm Road experiences a high number of crashes given the geometry of the intersection, including grade, curvature, and alignment/offsets. This intersection should be realigned to provide adequate sight distance at a clearly defined intersection with approaches at right angles. Given the proximity and alignment of Benton Young Road, Benton Young Road could be realigned as a fourth leg to this intersection.



The southern intersection of Pippin Road and County Farm Road meet at a skewed angle. To improve safety and to further clarify flow of traffic, this intersection could also be realigned by aligning the southern approach of County Farm Road to intersect Pippin Road County Farm Road at a right angle.

## TURN LANE INTERSECTION IMPROVEMENTS

### COUNTY FARM ROAD AT GAINESBORO GRADE

Safety challenges are a key issue at this intersection based on the existing crash data and community feedback. As currently constructed, there is limited sight distance for northbound vehicles seeking to turn on to Gainesboro Grade, which has a 55 mile-per-hour posted speed limit. Therefore, speed reductions on Gainesboro Grade via signage and other measures should be considered. Over the long-term, Gainesboro Grade could be realigned to remove the sharp curve and provide more run for vehicles on County Farm Road to get up to grade. Although turn lanes would not fully address these issues, this intersection improvement is estimated as a turn lane improvement for the purposes of this plan.

### PIPPIN RD AT PIPPIN RD / W JACKSON ST

On Pippin Road/West Jackson Street at US-70N/SR-24, there is currently a traffic signal with protected left turns and left turn lanes from US-70N/SR-24 to Pippin Road, but there is no turn lane or protected left turn signal onto US-70N/SR-24 from Pippin Road. This project would add turn lanes on Pippin Road to improve the efficiency of the intersection.

### US-70N/SR-24 AT HAWKINS CRAWFORD RD / PLUNK WHITSON RD

Safety conditions were a big concern from the crash data analysis and public feedback at the intersection of US-70N/SR-24 and Hawkins Crawford Road/Plunk Whitson Road. As currently constructed, the intersection is side street stop controlled, with vehicles traveling north-south on Hawkins Crawford Road/Plunk Whitson Road stopping at stop signs to cross the highway, but cars traveling east/west on US-70N/SR-24 are not required to stop. As noted in the existing conditions section, a flashing beacon is being installed at this intersection to alert drivers of the intersection. As an alternative to recommendation w2, or the western widening of US-70N/SR-24, adding turn lanes at this intersection on US-70N/SR-24 would help improve traffic operations along US-70N/SR-24.

### BLOOMINGTON RD / SR-291 / DOUBLE SPRINGS RD

US-70N/SR-24 at Bloomington Road/SR-291/Double Springs Road is also side street stop controlled, requiring drivers moving north/south on Bloomington Road/Double Springs Road to stop, while drivers on US-70N/SR-24 are not required to stop. As constructed currently, there are no turn lanes moving in any direction. This project would add turn lanes that would help to improve traffic flow throughout this area in lieu of widening US-70N/SR-24.

## RAIL WITH TRAIL

Improving pedestrian needs would be served by sidewalks along the eastern portion of the US-70N/SR-24 widening and by the Pippin Road / County Farm Road improvements. In lieu of bike lanes along US-70N/SR-24, regional east-west bicycle movements could be accommodated through the study area through an extension of the Heritage Trail.

The overall project would extend the existing Heritage Trail in downtown Cookeville to Baxter. The portion of this route within the plan’s study area paralleling US-70N/SR-24 is near W Jackson St and Mill Dr to SR 56.

Potential alignments for the trail along the rail corridor have not been evaluated as part of this study. While planning level cost estimates have been applied for the portion through the study area, an additional trail or trail extension would be needed to connect with the existing Heritage Trail in downtown Cookeville.

## COST ESTIMATES

Planning level cost estimates were generated for each of the potential improvements. For the roadway widenings and new alignments, the software Concept Station was used to analyze the concepts, including potential right-of-way required. Cost estimates were developed using the TDOT Planning Level Cost Estimate Tool – 2023 Update for roadway widening and new alignment alternatives. The 2023 tool’s right-of-way cost estimating methodology was employed, including a per-mile basis and property level of impact scale approach. For the other improvements, planning level cost categories were created for turn lane intersection improvement, major realignment, minor realignment, bridge, and rail with trail to estimate construction cost subtotals.

For all projects, several cost components were estimated as percentage of the construction cost subtotal, per methodology employed by the TDOT Planning Level Cost Estimate Tool. Components calculated as a percentage of construction cost subtotal as reflected in the TDOT Planning Level Cost Estimate Tool – 2023 Update are:

**Mobilization** (10%)

**Other:** Other Items and Annual Inflation (20%)

**Contingency:** Construction Contingency (50%)

**CEI:** Construction Engineering & Inspection (15%)

**PE:** Preliminary Engineering (10%)

Table 44 shows each of the cost estimates for the potential improvements.

## ANALYSIS OF ALTERNATIVES

Table 45 summarizes the comparison of alternatives, including estimated total cost along with various needs and impacts. Needs include the worst design year peak hour roadway LOS of existing roads, the number of crashes at intersections within the last five years, and number of survey comments related to existing segments or intersections. Qualitative impacts included relative right-of-way, cost, and environmental impacts. Right-of-way impacts were quantified as acres. Considering these factors, the following potential improvements are recommended.

The widening of US-70N/SR-24 is recommended to accommodate future local and through traffic in the corridor (projects w1 and w2). If the western portion of the widening (project w2) is not able to be implemented, then turn lane intersection improvements are recommended at US-70N/SR-24 at Hawkins Crawford Rd / Plunk Whitson Rd (project i5) and US-70N/SR-24 at Bloomington Rd / SR-291 / Double Springs Rd (project i6).

Of the Tennessee Avenue Extension alternatives, project n2 is recommended given less impact to existing residential parcels despite higher estimated project cost.

Potential improvements are recommended along the Pippin Road / County Farm Road corridor: i1, i2, i3, i4, and w3. As the intersection improvements would improve efficiency and operations of Pippin Road / County Farm Road, the w3 widening could be a lower tier project for potential future implementation.

The bridge could be replaced with a potential future improvement to the northern portion of County Farm Road.

Though more work and coordination will be needed, the rail-trail could provide bicycle and pedestrian benefits. It would also strengthen the connection between Cookeville and the western parts of Putnam County into Baxter.

The final recommended improvements are listed in Figure 46.



Figure 45: Detailed Cost Estimates

Dir	ID	Type	Description	Route	Cost Subtotal	Mobilization	Other	Contingency	CEI	Construction Estimate	Utilities	PE	ROW	Total Cost
E-W	w1	Roadway Widening	5-lanes with sidewalks	US-70N/SR-24 (Pippin Rd to Locust Grove Rd)	\$14,080,000	\$1,410,000	\$2,820,000	\$9,150,000	\$4,120,000	\$31,900,000	\$2,610,000	\$3,190,000	\$3,390,000	\$41,100,000
E-W	w2	Roadway Widening	5-lanes without sidewalks	US-70N/SR-24 (Locust Grove Rd to SR-56)	\$27,760,000	\$2,780,000	\$5,550,000	\$17,100,000	\$7,980,000	\$61,800,000	\$7,140,000	\$6,180,000	\$4,670,000	\$79,800,000
N-S	w3	Roadway Widening	3-lanes with sidewalks	Pippin Rd/County Farm Road	\$6,820,000	\$682,000	\$1,360,000	\$4,430,000	\$1,990,000	\$15,400,000	\$1,090,000	\$1,540,000	\$2,620,000	\$20,700,000
N-S	n1	New Alignment	2-lanes without sidewalks	Tennessee Ave Extension (Existing Roads)	\$9,810,000	\$981,000	\$1,960,000	\$4,760,000	\$2,630,000	\$20,300,000	\$1,040,000	\$2,030,000	\$2,460,000	\$25,800,000
N-S	n2	New Alignment	2-lanes without sidewalks	Tennessee Ave Extension (Greenfield)	\$11,950,000	\$1,190,000	\$2,390,000	\$7,140,000	\$3,400,000	\$26,300,000	\$783,000	\$2,630,000	\$2,270,000	\$32,000,000
N-S	i1	Intersection Improvement	Turn lanes	County Farm Rd at Gainesboro Grade	\$762,000	\$76,000	\$168,000	\$500,000	\$230,000	\$1,700,000	\$229,000	\$170,000	\$110,000	\$2,200,000
N-S	i2	Intersection Improvement	Realignment	Pippin Rd at County Farm Rd (north) & Benton Young Rd	\$3,050,000	\$305,000	\$671,000	\$2,010,000	\$910,000	\$6,900,000	\$915,000	\$690,000	\$4,960,000	\$13,500,000
N-S	i3	Intersection Improvement	Realignment	Pippin Rd at County Farm Rd (south)	\$762,000	\$76,000	\$168,000	\$500,000	\$230,000	\$1,700,000	\$229,000	\$170,000	\$990,000	\$3,100,000
N-S	i4	Intersection Improvement	Turn lanes	US-70N/SR-24 at Pippin Rd / W Jackson St	\$762,000	\$76,000	\$168,000	\$500,000	\$230,000	\$1,700,000	\$229,000	\$170,000	\$1,513,000	\$3,600,000
E-W	i5	Intersection Improvement	Turn lanes	US-70N/SR-24 at Hawkins Crawford Rd / Plunk Whitson Rd	\$762,000	\$76,000	\$168,000	\$500,000	\$230,000	\$1,700,000	\$229,000	\$170,000	\$360,000	\$2,500,000
E-W	i6	Intersection Improvement	Turn lanes	Bloomington Rd / SR-291 / Double Springs Rd	\$762,000	\$76,000	\$168,000	\$500,000	\$230,000	\$1,700,000	\$229,000	\$170,000	\$360,000	\$2,500,000
N-S	b1	Bridge Replacement		County Farm Rd at Little Creek	\$787,000	\$79,000	\$173,000	\$520,000	\$230,000	\$1,800,000	\$236,000	\$180,000	\$720,000	\$2,900,000
E-W	t1	Rail with Trail		Near W Jackson St and Mill Dr to SR 56	\$ 12,500,000	\$1,250,000	\$2,750,000	\$8,250,000	\$3,710,000	\$28,500,000	\$ 3,750,000	\$2,850,000	\$ -	\$35,100,000

Figure 46: Analysis of Alternatives

Dir	ID	Type	Description	Route	Miles	Need			Impact				Total Cost (\$M)	Recommended
						LOS	Crashes	Survey Comments	ROW	Cost	Env	ROW Acres		
E-W	w1	Roadway Widening	5-lanes with sidewalks	US-70N/SR-24 (Pippin Rd to Locust Grove Rd)	1.4	D		98	High	High	High	2.2	\$41.1	Yes
E-W	w2	Roadway Widening	5-lanes without sidewalks	US-70N/SR-24 (Locust Grove Rd to SR-56)	3.4	D		226	High	High	High	13.0	\$79.8	Yes
N-S	w3	Roadway Widening	3-lanes with sidewalks	Pippin Rd/County Farm Road	0.9	D		105	Med	Med	Med	2.6	\$20.7	Yes
N-S	n1	New Alignment	2-lanes without sidewalks	Tennessee Ave Extension (Existing Roads)	2.5	N/A		N/A	High	Med	Med	20.4	\$25.8	No
N-S	n2	New Alignment	2-lanes without sidewalks	Tennessee Ave Extension (Greenfield)	2.2	N/A		N/A	Med	High	High	20.7	\$32.0	Yes
N-S	i1	Intersection Improvement	Turn lanes	County Farm Rd at Gainesboro Grade	N/A	N/A	56	56	Low	Low	Low	1	\$2.2	Yes
N-S	i2	Intersection Improvement	Realignment	Pippin Rd at County Farm Rd (north) & Benton Young Rd	N/A	N/A	27	75	Med	Med	Med	5	\$13.5	Yes
N-S	i3	Intersection Improvement	Realignment	Pippin Rd at County Farm Rd (south)	N/A	N/A	25	84	Low	Low	Low	1	\$3.1	Yes
N-S	i4	Intersection Improvement	Turn lanes	US-70N/SR-24 at Pippin Rd / W Jackson St	N/A	N/A		15	Low	Low	Low	1	\$3.6	Yes
E-W	i5	Intersection Improvement	Turn lanes	US-70N/SR-24 at Hawkins Crawford Rd / Plunk Whitson Rd	N/A	N/A	47	46	Low	Low	Low	1	\$2.5	No
E-W	i6	Intersection Improvement	Turn lanes	Bloomington Rd / SR-291 / Double Springs Rd	N/A	N/A		17	Low	Low	Low	1	\$2.5	No
N-S	b1	Bridge Replacement		County Farm Rd at Little Creek	N/A	N/A		29	Low	Low	Low		\$2.9	No
E-W	t1	Rail with Trail		Near W Jackson St and Mill Dr to SR 56	5	N/A						TBD	\$35.1	Yes

Figure 47: Recommended Improvements

Dir	ID	Type	Description	Route	Miles	Total Cost (\$M)
E-W	w1	Roadway Widening	5-lanes with sidewalks	US-70N/SR-24 (Pippin Rd to Locust Grove Rd)	1.4	\$41.1
E-W	w2	Roadway Widening	5-lanes without sidewalks	US-70N/SR-24 (Locust Grove Rd to SR-56)	3.4	\$79.8
N-S	w3	Roadway Widening	3-lanes with sidewalks	Pippin Rd/County Farm Road	0.9	\$20.7
N-S	n2	New Alignment	2-lanes without sidewalks	Tennessee Ave Extension (Greenfield)	2.2	\$32.0
N-S	i1	Intersection Improvement	Turn lanes	County Farm Rd at Gainesboro Grade	N/A	\$2.2
N-S	i2	Intersection Improvement	Realignment	Pippin Rd at County Farm Rd (north) & Benton Young Rd	N/A	\$13.5
N-S	i3	Intersection Improvement	Realignment	Pippin Rd at County Farm Rd (south)	N/A	\$3.1
N-S	i4	Intersection Improvement	Turn lanes	US-70N/SR-24 at Pippin Rd / W Jackson St	N/A	\$3.6
E-W	t1	Rail with Trail		Near W Jackson St and Mill Dr to SR 56	5	\$35.1

## APPENDIX: SUMMARY OF OUTREACH ACTIVITIES

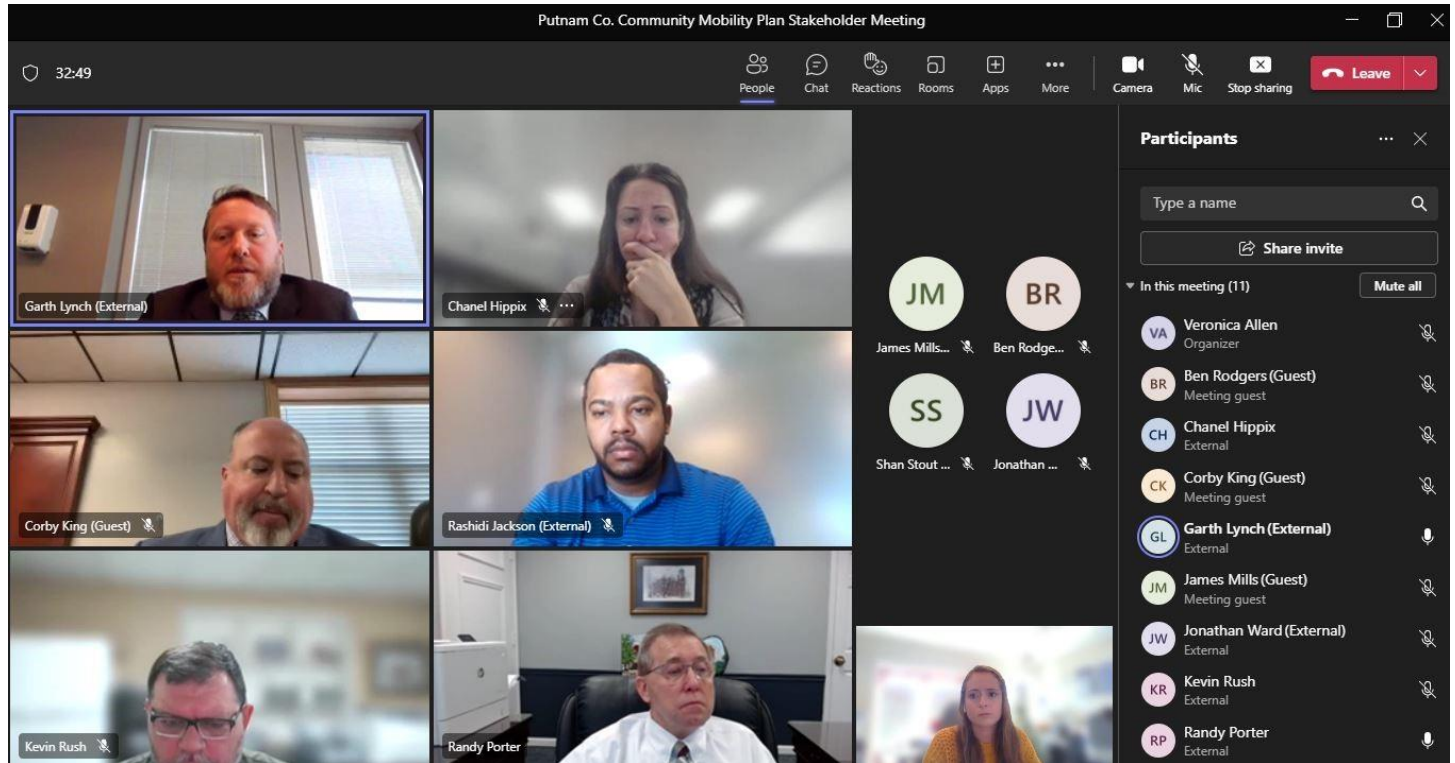
Public and stakeholder outreach activities conducted as part of this planning effort included stakeholder committee meetings, stakeholder committee meetings, and public outreach via an online survey and in-person event.

### STEERING COMMITTEE

The steering committee consisted of the Putnam County Mayor and Planning Director along with representatives of the City of Cookeville, the Upper Cumberland Development District (UCDD) / Center Hill Rural Planning Organization (RPO), TDOT, and consultant team. The steering committee met monthly over the course of the study. The monthly meetings covered ongoing project tasks, such as public engagement, existing conditions, needs assessment, and recommendation review. The steering committee members contributed valuable input regarding challenges, opportunities, and preferences within the project area. The project team conducted separate meetings with TDOT on project recommendations and cost estimates throughout the project, as well.

### STAKEHOLDER COMMITTEE

At the beginning of the project, a Stakeholder committee was identified to provide insight from various community groups and perspectives on the mobility challenges, opportunities, and needs in Putnam County. The Stakeholder Committee met three times, covering topics such as public survey review and promotion, existing conditions, and draft and final recommendations. The meetings were spread throughout the project with meetings in January, April, and July of 2023. Representatives from Putnam County, the City of Cookeville, the Chamber of Commerce, the Police Department, the School District, and TDOT were involved in the Stakeholder discussions. The project team typically presented project updates and recent findings, followed by comments or suggestions from the Stakeholder committee. The Stakeholders also played a big part in distributing the survey and sharing project information with their networks and community.



## PUBLIC OUTREACH

The public engagement for the Putnam County Community Mobility Plan not only consisted of an online survey (see public survey summary) but also an in-person community event. The project team participated in an outreach effort at the Cookeville Father's Day event on July 17, 2023. Community members attending the event had the opportunity to view draft recommendations, ask questions to the project team, and provide feedback regarding mobility challenges and the potential plan recommendations. The project team interacted with over 80 community members and received valuable feedback on lived experiences, transportation challenges, and preferences within the project area. Following the public engagement, project team members considered all comments and revised recommendations as necessary.

