US 11E Corridor Study

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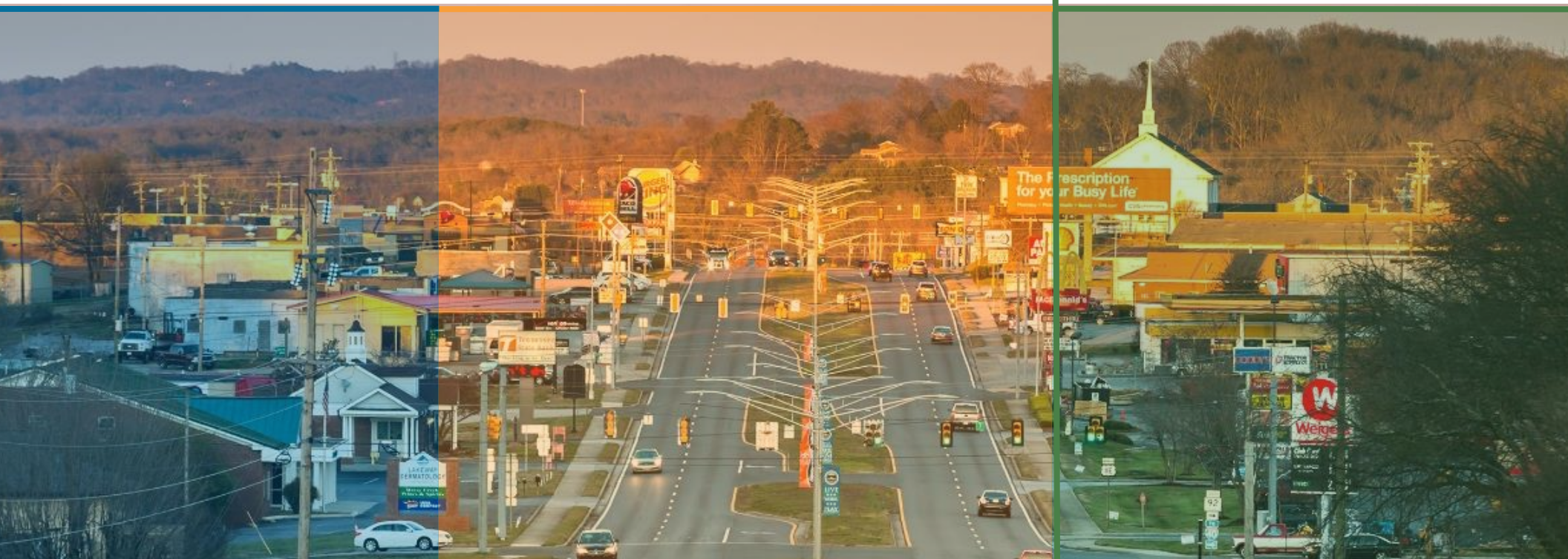
Prepared by:

CDM Smith

TN TDOT Department of Transportation



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1. INTRODUCTION

Jefferson City was awarded a Tennessee Department of Transportation (TDOT) Transportation Planning Grant (TPG) in 2022 for the US 11E/SR 34 Corridor Study and Transportation Systems Management and Operations (TSMO) Plan. The TSMO Plan is a companion study to this Corridor Study, which analyzes the operations of the signalized intersections included under the Corridor Study. The study area includes Broadway Boulevard/SR 34/US 11E, hereinafter referred to as US 11E, from Jefferson Memorial Hospital at W Old Andrew Johnson Highway to the intersection with E Old Andrew Johnson Highway and State Highway 92 (SR 92) between US 11E and George Avenue. The study provides a detailed transportation planning level analysis of the corridor, identifies existing conditions, identifies issues and opportunities along the corridor, and provides recommendations for the City moving forward with emphasis on safety and capacity improvements.

1.1. Project Background

Jefferson City applied for the TDOT Transportation Planning Grant in an effort to address the overall safety, traffic flow, and operations for all transportation modes along US 11E within the Jefferson City corporate boundary. In a regional context, US 11E is a vital linkage to the Knoxville Metropolitan Area to the southwest and the Johnson City Metropolitan Area to the northeast. The study area is located within the Morristown Metropolitan Area (Lakeway Area). Additionally, access to Interstate 40 is provided via SR 92 from US 11E.

US 11E is the primary transportation corridor within Jefferson City and consequently, much of the city's commercial land uses have gravitated to the area. It serves as the major conduit through which the city's residential, commercial, and industrial traffic travel regardless of their destination. There are approximately 100 acres of vacant property that have access to US 11E. New residential developments are being built toward the eastern extents of the study area and a new Food City has direct access to US 11E at Odell Avenue. A small industrial park is planned behind the Walmart Supercenter and Lowe's Home Improvement shopping centers between N Chucky Pike and Odyssey Road. It is anticipated that more commercial and residential development will continue to occur throughout the corridor, leading to an increase in traffic.

In addition to the operational concerns, there are safety concerns throughout the corridor. Between 2018 and 2022, there were 803 total crashes within the study area of both corridors, two of which were fatal and occurred nearby E Old Andrew Johnson Highway. There were 21 serious injury crashes, two of which involved pedestrians. The crash data shows that 15.3%, 10.5%, and 8.3% of crashes have occurred at the US 11E intersections with N Chucky Pike, George Avenue, and Russell Avenue, respectively.

Just north of the US 11E corridor is Carson-Newman University, a liberal arts university with enrollment of

approximately 2,800 students from 40 states and 51 countries. Given this demographic and the multitude of benefits that multimodal facilities bring, the city desires providing more bicycle- and pedestrian-friendly infrastructure for individuals to use the corridor without the need of a vehicle. Throughout the commercial corridor, there are existing sidewalks, but as development continues, the city would like to plan for connections to key locations on either end of the study corridor. There is a need to upgrade the existing pedestrian facilities, especially the crossing locations to make them ADA-compliant and add more conspicuity so drivers are aware of pedestrians' presence.

1.2. Project Purpose

The purpose of the corridor study is to undergo a comprehensive analysis of the US 11E corridor with the objective of providing recommendations for safety enhancements, operational improvements, and the integration of multimodal infrastructure. The study aims to address existing challenges and develop strategies to make this integral corridor safer for all road users.

The study will assess the existing conditions along the corridor, including demographics, land use and development patterns, crash occurrences, roadway geometry, traffic patterns, and congestion. By analyzing this data, the study will identify areas where there are existing safety concerns and operational inefficiencies that can be addressed by infrastructure modifications.

To improve safety, the study will focus on intersections and other areas with a high occurrence of crashes (as compared to the statewide averages for similar facilities), locations of severe crash types, and crashes that involved pedestrians or bicyclists. Potential safety countermeasures include reducing the number of conflict points at intersections, signal optimization, deceleration lanes, and pedestrian infrastructure at intersections: marked crosswalks, pedestrian signal equipment, and ADA-compliant curb ramps.

Regarding traffic operations, the study will analyze existing and future traffic volumes, capacity constraints, and signal operations to determine signal timing alterations and geometric improvements that will improve travel times for the current and future demand.

Multimodal infrastructure facilities prioritize the needs of bicyclists and pedestrians, resulting in safer, healthier, and more sustainable communities while enhancing overall transportation options and quality of life. The study provides options for the city to implement a shared-use path, repair sidewalks that are in poor condition, and add sidewalks to rectify existing gaps in the network.

Overall, the corridor study seeks to provide a thoughtful and intentional approach to enhance safety, operations, and multimodal connectivity along US 11E to serve the residents and visitors of Jefferson City.

2. EXISTING CONDITIONS

This section will focus on the existing conditions of the study area and will establish the foundation upon which the recommendations of this study are based.

2.1. Demographics

Demographics of a city provide a window into its present and future needs as well as its future capacity. Any single dataset provides a snapshot of a given point in time. Multiple snapshots over time reveal developing patterns of significance. As of the 2020 Decennial Census, Jefferson City's total population amounts to 8,419 people. This is a 4.6-percent increase from the 2010 population of 8,047. Since 1990, the city has grown in population by 34-percent. Jefferson County experienced 6.4-percent growth from 2010 to 2020, of which 11-percent is attributed to Jefferson City. Likewise, the county has grown 65% in the last 30 years. Neighboring counties in which US 11E passes through have also grown – Knox County experienced 10.8-percent population growth from 2010 to 2020 and Hamblen County experienced population growth of 3.1-percent during the same time period.

Utilizing data from the University of Tennessee's Boyd Center for Economic and Business Research, Jefferson County's population is expected to grow approximately 14.3-percent over the next thirty years. Assuming Jefferson City continues to grow in population relative to Jefferson County, the city could be home to approximately 1,000 new residents by 2050. This mirrors trends for the State of Tennessee, which continues to experience population growth albeit unevenly distributed. These projections should be used with caution as projections are often subject to a variety of altering factors, possibly altering their trajectory. These estimates are more helpful as an indicator of health in the terms of population growth than predicting a definite outcome.

As shown in Table 2-1, the racial composition of the city has remained relatively stable over the past 10 years. The most notable change is the 4.6-percent decrease in the proportion of the population who identify as Black or African American alone.

Table 2-1 Jefferson City Population by Race (2010-2020)

	2010	% of the population	2020	% of the population	Change in % of the population	% Population Change
Hispanic or Latino	667	8.2%	768	9.3%	1.1%	15.1%
Not Hispanic or Latino	7,429	91.8%	7,452	90.7%	-1.1%	3.1%
White alone	6,617	81.7%	6,998	85.1%	3.4%	5.8%
Black or African American alone	751	9.3%	389	4.7%	-4.6%	-48.2%
American Indian and Alaska Native alone	6	0.1%	0	0.0%	-0.1%	-100%
Asian alone	21	0.3%	40	0.5%	0.2%	90.5%
Native Hawaiian and Other Pacific Islander alone	0	0.0%	0	0.0%	0.0%	0.0%
Some other race alone	0	0.0%	0	0.0%	0.0%	0.0%
Two or more races	34	0.4%	250	3.0%	2.6%	635.3%
Two races including Some other race	0	0.0%	0	0.0%	0.0%	0.0%
Two races excluding Some other race, and Three or more races	34	0.4%	25	0.3%	-0.1%	-26.5%
Total Population (ACS)	**8,096**		**8,220**			**1.5%**
Total Population (Decennial Census)	**8,047**		**8,419**			**4.6%**

Source: US Census Bureau ACS 5-Year Data Estimates Data Profiles (ACSDP5Y)

The United States Census Bureau's web-based application OnTheMap[1] provides data to understand travel patterns to and from Jefferson City. The application uses Longitudinal Employer-Household Dynamics (LEHD) to calculate where residents in Jefferson City live and work. Table 2-1 portrays the number of workers who travel to Jefferson City from somewhere else, travel from Jefferson City to somewhere else, or who travel within Jefferson City for work.

Within the municipal limits of Jefferson City, there were 5,017 jobs in 2020. Of those jobs, approximately 91% were filled by individuals who live outside of the city limits and the remaining 9% were filled by individuals who live and work in Jefferson City. Additionally, 2,616 individuals live within the Jefferson City municipal limits but work outside of the city.

Most residents are commuting in a northeastern direction or to the west and southwest from the city, as shown in Figure 2-1. These directions correspond with the study area and emphasize the significance of the US 11E corridor.

[1] **US Census Bureau, OnTheMap (https://onthemap.ces.census.gov/)**

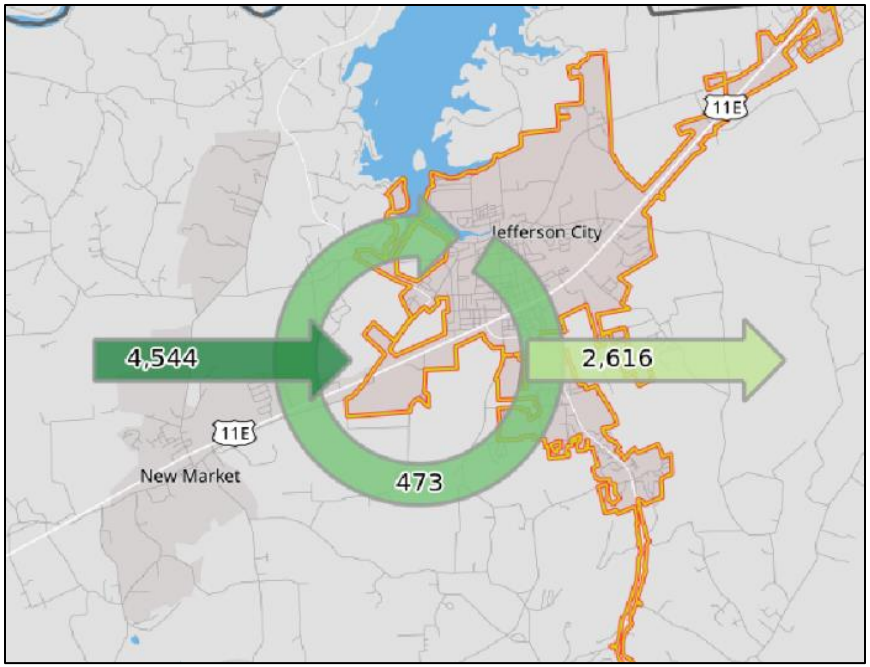


Figure 2-1 Number of Workers Commuting To and From Jefferson City

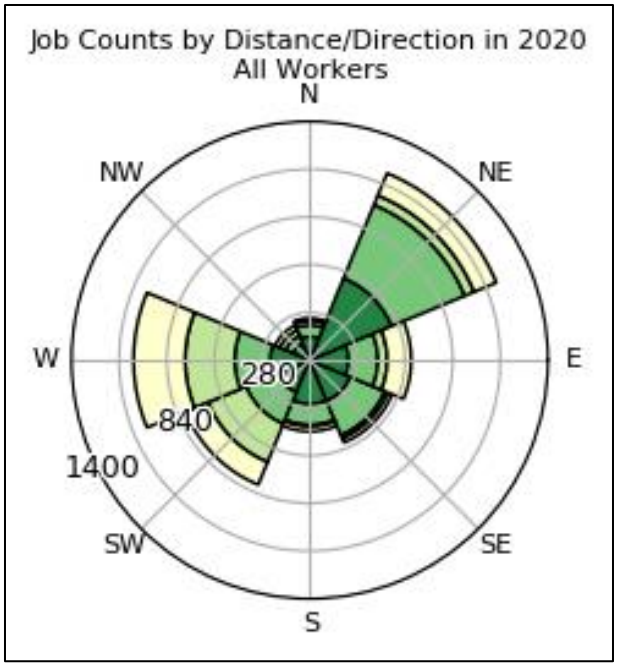


Figure 2-2 Radar Chart: Distance and Direction of All Workers

Commute distance into and out of Jefferson City are shown in Table 2-2. A majority of commuters (68.7%) work within less than 25 miles of the city. Utilizing data and methodology from the U.S. Census Bureau, the city's daytime population is approximately 11,509, or 140-percent of the residential population.

Table 2-2 Commute Distances

Distance	Commuters to Jefferson City	Share	Commuters from Jefferson City	Share
Less than 10 miles	1,946	38.79%	1,008	32.63%
10-24 miles	1,502	29.94%	924	29.91%
25-50 miles	742	14.79%	722	23.37%
Greater than 50 Miles	827	16.48%	435	14.08%
Total Jobs	**5,017**		**3,089**	

Source: US Census Bureau, OnTheMap (https://onthemap.ces.census.gov/)

The top three industries within Jefferson City are retail trade (20.1%), health care and social assistance (19.9%), and manufacturing (15.4%). The top employers located within the city include the Oshkosh Corporation, Carson-Newman University, Jefferson Memorial Hospital, and Wal-Mart.

TDOT provides a land use forecasting tool[2] for information regarding current and future employment growth on a county level. Based on the forecasts from this tool, Jefferson County will experience the growth shown in Figure 2-3.

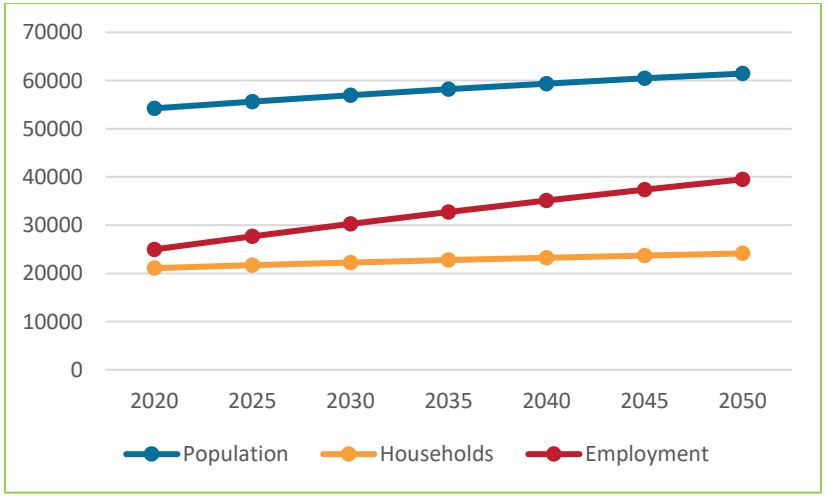


Figure 2-3 Jefferson County Growth (2020-2050)

The same TDOT land use forecasting tool provides estimates for growth and changes in different employment sectors based on North American Industrial Classification System (NAICS) codes. Using this forecast, the overall employment mix in the county is projected to remain relatively stable with the construction and health care industries to remain consistently significant over the next 30 years. The projected top three industries are shown in Table 2-3 Top Industries in Jefferson County (2020-2050).

Table 2-3 Top Industries in Jefferson County (2020-2050)

Rank	2020	2035	2050
1	Public Administration	Construction	Administrative and Support Waste Management and Remediation Services
2	Retail Trade	Health Care and Social Assistance	Construction
3	Construction	Other Services (Except Public Administration)	Health Care and Social Assistance
Source: TDOT Land Use Forecasting Dashboard			

[2] TDOT Land Use Forecasting Dashboard (https://tn-landuse.maps.arcgis.com/apps/dashboards/2adfd9c6a1344399a1be4ebfe66d68e5)

2.2. Land Use

Reflecting its current land use, most of the property adjacent to US 11E is zoned for intensive land uses on the city's Official Zoning Map[3]. Highway Business District (B-3) is the dominant zoning except for one parcel zoned Neighborhood Business District (B-1) and areas on the southwest of the corridor zoned as General Commercial Park District (B-4) and Professional and Civil District (P-1). The B-4 area is primarily comprised of land used by Jefferson Memorial Hospital with a large portion available for future expansion. The P-1 area is primarily used by the Jefferson County School District. The property adjacent to SR 92 is zoned B-3. Parcels along US 11E outside of Jefferson City to the northeast are zoned Intermediate Business (IB), which reflects the road's status as a major connector and commercial corridor within the area. Figure 2-5 shows the existing land use by the number of lots utilized and Figure 2-6 shows the existing land use by the total acreage.

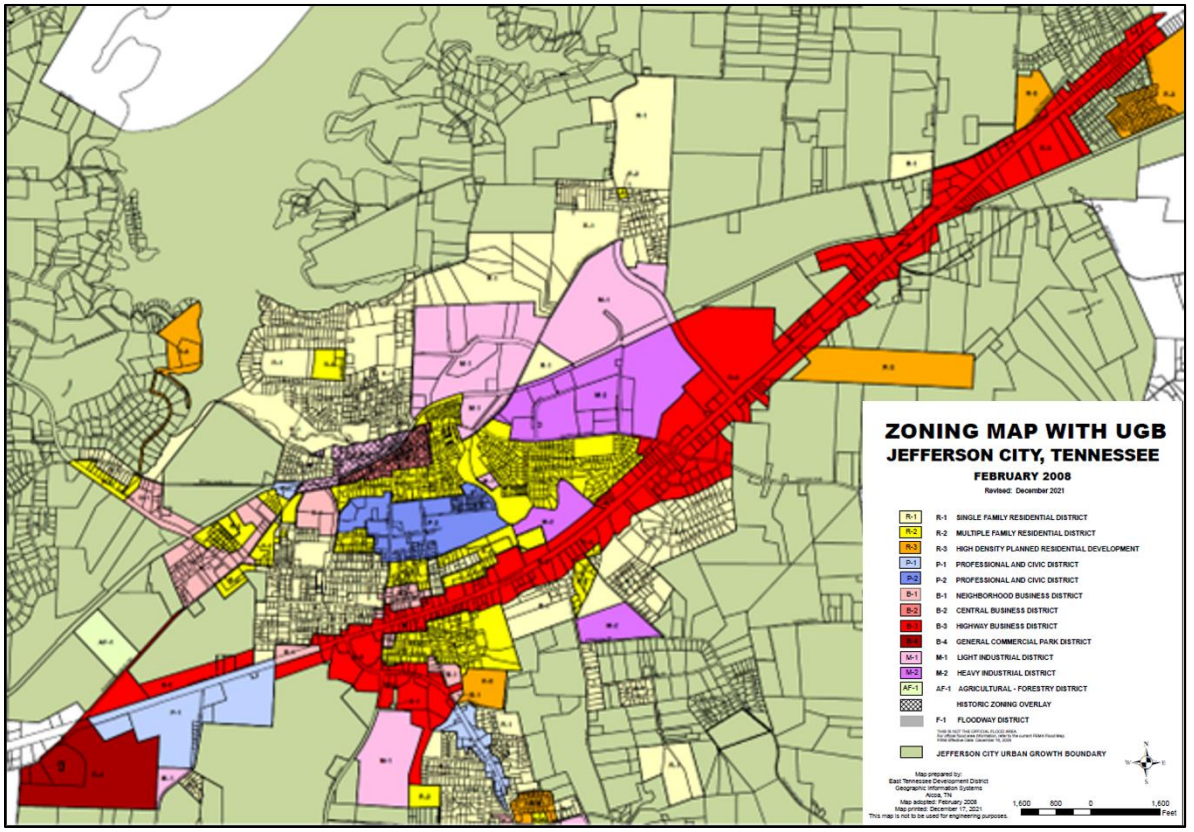


Figure 2-4 Jefferson City Zoning Map

[3] City of Jefferson City website (https://jeffcitytn.com/community/boards-committees/planning-commission/)

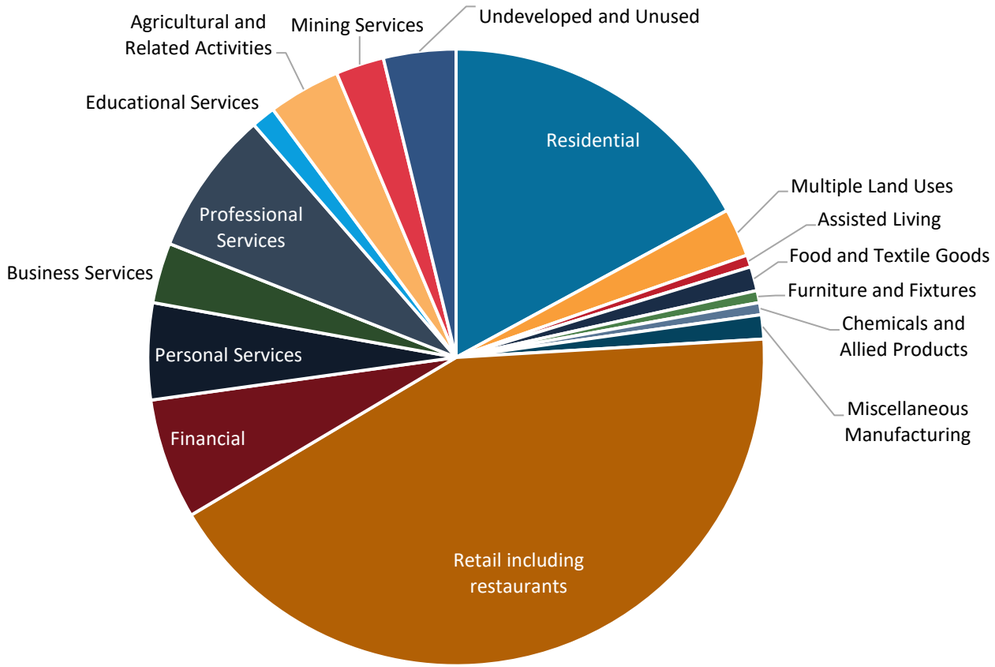


Figure 2-5 Land Use by Frequency (Total Lots)

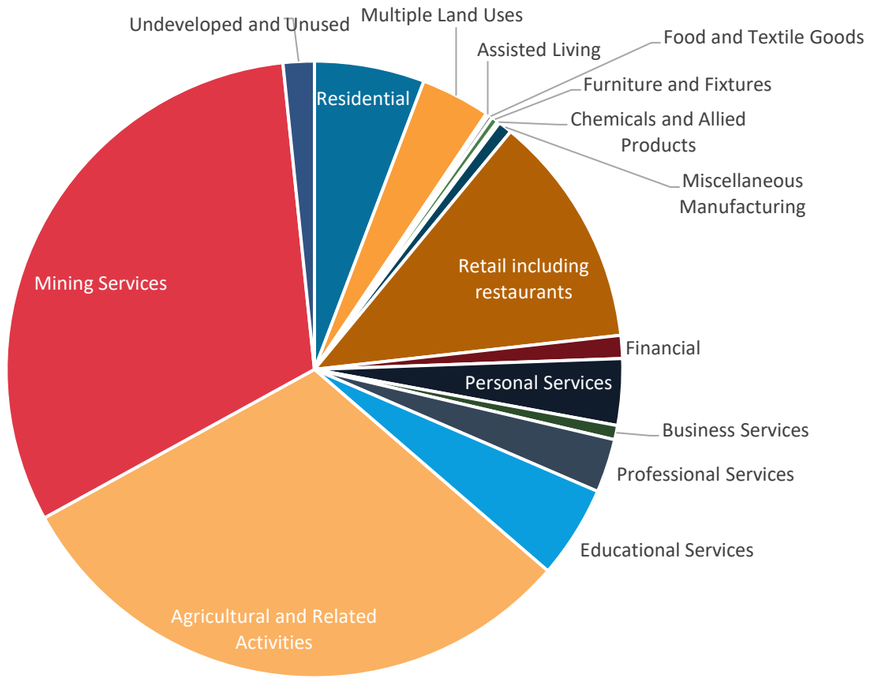


Figure 2-6 Land Use by Area (Total Acres)

2.3. Safety

Increased traffic volumes and vehicle miles traveled increase the likelihood of traffic incidents. To identify the need for safety improvements in Jefferson City, a comprehensive review of crash data was conducted. The analysis included an examination of the traffic crash history, development of crash rates, and the quantification of crash severity for each intersection. The review period encompassed five years, from January 2018 to December 2022, to capture sufficient crash data and identify patterns over time.

Crash data was collected within an approximately 200-foot radius of each signalized intersection's approach, depending on intersection spacing, encompassing crashes that may have been influenced by signal operations. Emphasis was placed on analyzing angle, left turn, and rear-end collisions, as these types of crashes are often associated with signal operations, including signal phasing, timing, and configuration. Crash diagrams were created for each signalized intersection, providing visual representations of the crash patterns and aiding in the identification of potential improvement opportunities. Please refer to Appendix D for the corridor crash diagrams.

More rear-end collisions occur at the signalized intersections at the beginning of the systems where traffic may approach at higher speeds and angle/left-turn collisions appear to be a more dominant pattern where the minor approaches experience adverse queuing and congestion. Crash severity along the corridor can be seen in Figure 2-8.

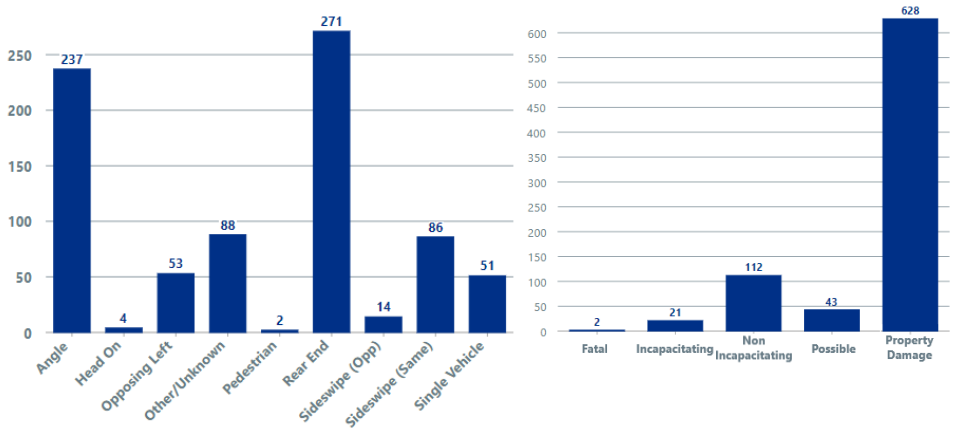


Figure 2-7 Corridor Safety Snapshot

Crash rates were calculated using the crash history data and intersection turning movement counts (TMC) obtained specifically for this study. To determine the intersection crash rate, entering Average Daily Traffic (ADT) volumes and K-factors were developed. The PM peak-hour entering traffic was extrapolated to estimate an average daily traffic (ADT) volume using K-factors derived from automated traffic counts conducted during the study. These rates are reported in terms of crashes per million entering vehicle (/MEV).

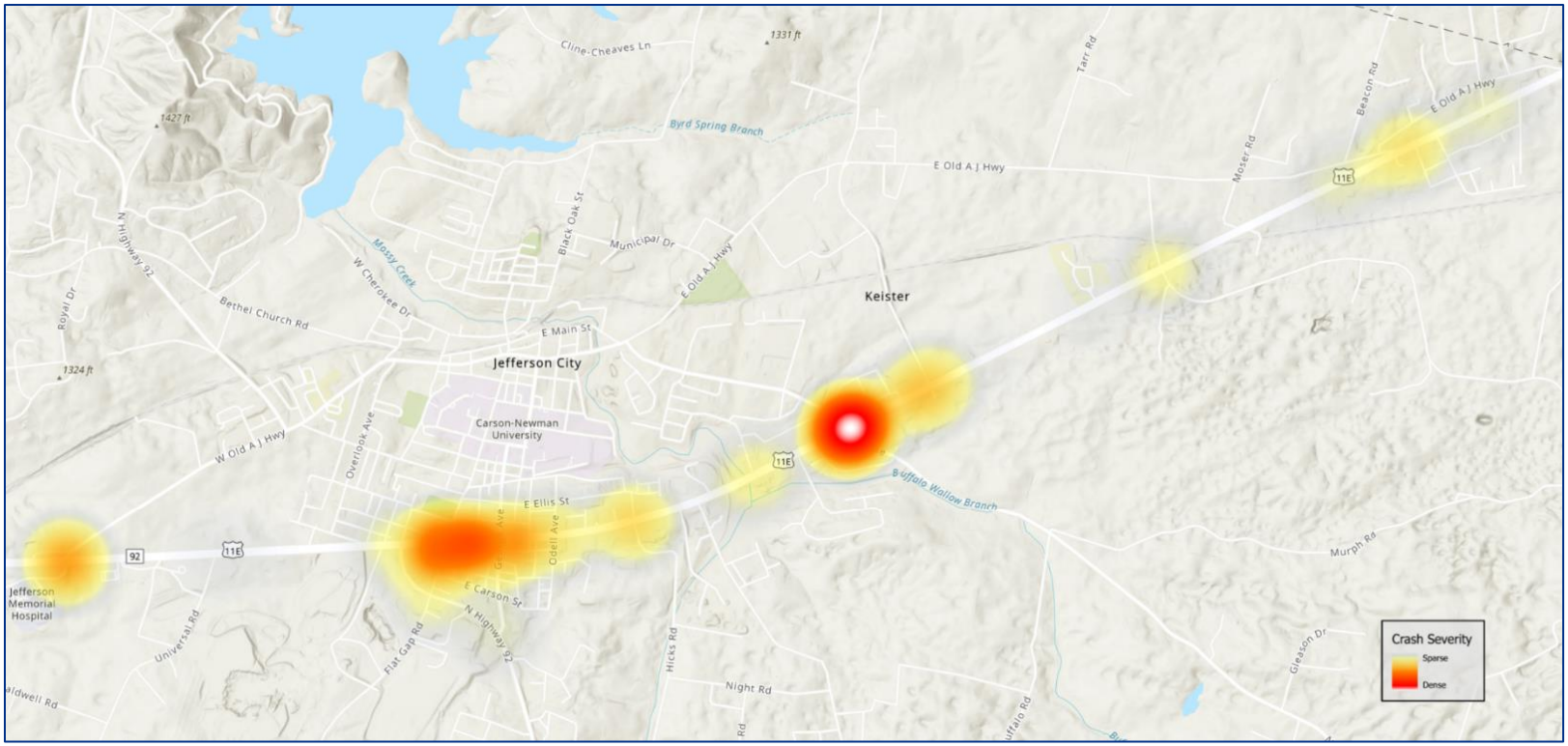


Figure 2-8 Crash Severity in Study Area

More specifically, the statewide average crash rate for urban signalized multilane divided and with turn lanes is 0.714/MEV and 0.618/MEV, respectively. The crash rates for all intersections within the study area can be found in Appendix D. The crash rates were compared to the Tennessee statewide averages based on the following metrics:

Below Average: Locations with crash rates below the statewide average

Average: Locations with crash rates at or within 15 percent above the statewide average

Above Average: Locations with crash rates 15 percent above the statewide average

Significantly Above Average: Locations with crash rates at or above the critical statewide average

2.4. Roadway Characteristics and Performance

US 11E is a four-lane divided highway that acts as Jefferson City's primary transportation corridor. The study area along US 11E is approximately 5.3 miles beginning at W Old Andrew Johnson Highway, near Jefferson Memorial Hospital, and extending northeast to the intersection with E Old Andrew Johnson Highway. The study also includes a section of SR 92 from its junction with US 11E south to George Avenue.

According to TDOT's Functional Classification System map provided in Figure 2-9, US 11E is classified as a Principal Arterial throughout the length of this study. SR 92 is also classified as a Principal Arterial. The posted speed limit varies between 40mph and 45 mph throughout the corridor, with the exception of the school zone encompassing the Jefferson County Schools, where the speed limit is 25 mph during school hours. However, it should be noted that this signage is inconsistent, and there is a stretch of 2.1 miles of roadway between two speed limit signs. In this instance, it would not be unreasonable for a driver to assume the speed limit is the statutory speed limit of Tennessee for public divided roads, which is 65 mph.

The cross section generally consists of two 12-foot travel lanes in each direction and a grass median separating them, which varies in width between 24-feet and 40-feet. There are also 12-foot turn lanes at most large intersections throughout the roadway. The paved inside shoulder varies between 1-foot and 4-feet, while the paved outside shoulder varies between 4-feet and 12-feet.

In a regional context, US 11E is a vital linkage to the Knoxville Metropolitan Area to the southwest and Johnson City Metropolitan Area to the northeast and within the Lakeway Area Metropolitan Transportation Planning Organization.

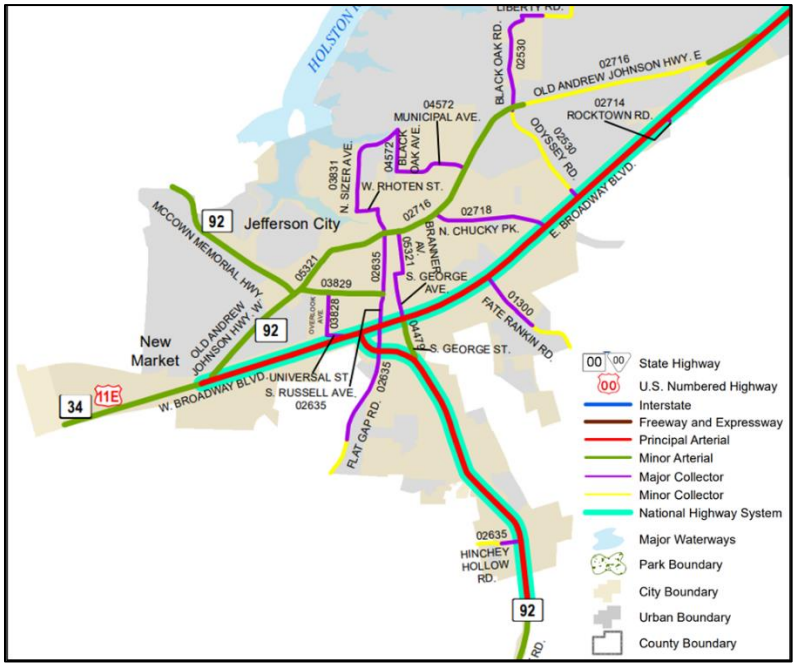


Figure 2-9 TDOT's Functional Classification Map for Jefferson City

2.4.1. Existing Traffic Volumes

The turning movement counts collected for these signalized intersections and 24-hour segment counts are found in the Appendix B and Appendix C, respectively. Figure 4 contains the 24-hour segment volume counts conducted by CDM Smith and annual average daily traffic (AADT) volumes published by the Tennessee Department of Transportation for 2022.

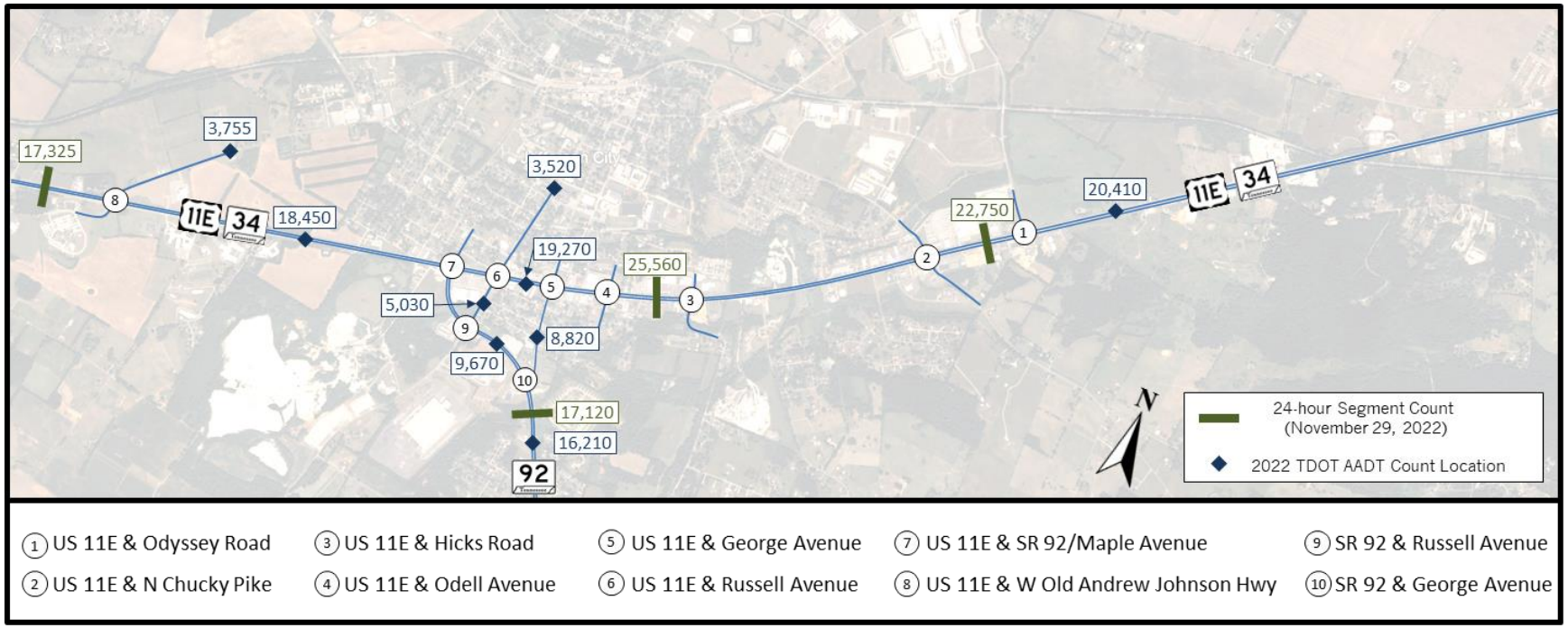


Figure 2-10 Daily Traffic Volumes

2.4.2. Existing Level of Service & Capacity

To evaluate the current operations of the traffic control devices, capacity and level of service (LOS) were calculated using the Highway Capacity Manual (HCM), published by the Transportation Research Board (TRB). Signalized and unsignalized intersections are evaluated based on estimated intersection delays, which may be related to LOS.

Capacity of an intersection represented by the intersection V/C (volume/capacity) ratio is the calculation of traffic volumes in relation to the intersection geometry, signal phasing, and the green time assignment for any traffic movement. Capacity ratios between 0.80 and 0.90 represent acceptable and efficient use of the intersection's geometry, whereas capacity ratios exceeding 0.90 indicate intersections operating near or over capacity, which may be less stable and greater delays may occur more often. Signalized delays are attributed to the intersection geometry and the signal timing employed. In saturated traffic conditions or over capacity conditions, delay may be reduced but the capacity may only be marginally improved. Signal phasing improvements may improve capacity and decrease delays, but more often, capacity issues require intersection geometric improvements.

LOS and capacity are the measurements of an intersection's ability to accommodate traffic volumes. LOS for intersections ranges from A to F. LOS A is the best, and LOS F is failing. For signalized intersections, a LOS of A has an average estimated intersection delay of less than 10 seconds, and LOS F has an estimated delay of greater than 80 seconds. A LOS of C and D are typical design values. Within urban areas, a LOS D, with delay between 35 and 55 seconds, is considered acceptable by the Institute of Transportation Engineers (ITE) for signalized intersections. Table 4 presents a description of signalized LOS.

Table 2-4 Level of Service Description for Signalized Intersection

LOS	Average Control Delay per Vehicle (seconds)	Description
A	≤ 10.0	Very low delay with extremely favorable progression. Most vehicles don't stop.
B	> 10.0 and ≤ 20.0	Generally good progression. Increased number of stops from that described for LOS "A" resulting in higher delays.
C	> 20.0 and ≤ 35.0	Fair progression with increased delay. Number of stopping vehicles become significant; however, many still pass through the intersection without stopping. Stable flow.
D	> 35.0 and ≤ 55.0	The influence of congestion becomes more noticeable. Longer delays resulting from unfavorable progression, longer cycles, or high V/C ratios. Approaching unstable flow.
E	> 55.0 and ≤ 80.0	Limit of acceptable delay. Long delays associated with poor progression, long cycles, or high V/C ratios.
F	> 80.0	Unacceptable operation resulting from oversaturation (flow rates exceed capacity). Poor progression, long cycles, and high V/C ratios.

The existing Jefferson City signal timing was modeled using Synchro, Version 11, a signal modeling software developed by Trafficware. Synchro is often used in the evaluation of signal timing and its optimization. Traffic turning movement count (TMC) data collected, signal phasing, and timing were entered in the Synchro models for the AM and PM peak hours. The turning movements modelled in Synchro are provided in Appendix H for the peak hours including the AM, midday, and two PM peak hours.

During the peak hours, most of Jefferson City's existing signalized intersections for the corridor are currently operating below the intersection capacity, and delays are acceptable, with a minimum LOS C. However, improvements can be provided with optimized signal timing, thereby reducing the delays and providing some signal coordination for the reduction of stops that are now experienced.

The analysis of the existing signal operations of the corridor determined that a LOS C or better is provided for the intersections during the peak hours with the exception of the US 11E and N. Chucky Pike intersection which may experience a LOS D during the midday and PM peak hours.

Table 2-5 2022 Level of Service and Capacity

SIGNALIZED INTERSECTION	PEAK HOUR	EXISTING		
		V/C	AVERAGE DELAY	LEVEL OF SERVICE
US 11E & Odyssey Road	AM	0.37	14.2	B
	Mid	0.35	13.7	B
	PM	0.54	23.9	C
US 11E & N. Chucky Pike	AM	0.63	32.8	C
	Mid	0.74	44.3	D
	PM	0.80	46.8	D
US 11E & Hicks Road	AM	0.35	10.8	B
	Mid	0.44	8.8	A
	PM	0.57	12.5	B
US 11E & Odell Avenue	AM	0.33	14.8	B
	Mid	0.45	24.3	C
	PM	0.52	18.4	B
US 11E & George Avenue	AM	0.49	23.0	C
	Mid	0.62	23.4	C
	PM	0.78	28.6	C
US 11E & Russell Avenue	AM	0.37	11.6	B
	Mid	0.38	25.8	C
	PM	0.55	19.0	B
US 11E & SR 92/Maple Avenue	AM	0.59	26.3	C
	Mid	0.36	27.8	C
	PM	0.48	19.6	B
US 11E & Old AJ Highway (SR 92)	AM	0.41	15.6	B
	Mid	0.38	12.0	B
	PM	0.32	13.5	B
SR 92 & George Avenue	AM	0.45	15.2	B
	Mid	0.46	23.8	C
	PM	0.53	26.9	C
SR 92 & Russell Avenue/Flat Gap Road	AM	0.32	11.7	B
	Mid	0.25	19.2	B
	PM	0.37	22.7	C

2.5. Existing Intersections

This section provides an overview of the existing geometric and safety conditions of the corridor intersections along US 11E and SR 92. A comprehensive understanding of these conditions is essential for developing effective transportation strategies and implementing targeted improvements. The existing conditions analysis serves as a foundation for identifying key issues, opportunities, and recommendations.

The TSMO plan delves into further detail regarding the existing conditions, including intersection configurations, signal timings, signal infrastructure, and vehicle detection systems. To support this analysis, Appendix D contains intersection crash diagrams, providing visual representations of the crash severity and types that have occurred within the study area. Additionally, Appendix K offers signal summary sheets, providing comprehensive information on the current signal infrastructure and operations.

By evaluating the existing geometric and safety conditions, we can gain valuable insights into the strengths and weaknesses of the corridor intersections. This knowledge will inform the development of strategies and recommendations aimed at improving safety, efficiency, and overall operational performance. The subsequent sections of this report will explore these conditions in detail, laying the groundwork for a data-driven and evidence-based approach to enhancing the transportation system within the study area.

US 11E & E Old Andrew Johnson Highway

Geometry

The intersection under consideration is a T-intersection with stop control, located at the eastern edge of Jefferson City. It connects E Old Andrew Johnson Highway to US 11E at a skew, with a gravel driveway across from the minor street serving as additional access to the KARM Store. The intersection features a left turn lane on US 11E and an acceleration lane for right turns from E Old Andrew Johnson Highway. With ongoing housing developments nearby, it is important to consider the intersection's capacity and operational characteristics. The intersection does not have sidewalks or handicap curb ramps. Pedestrian crosswalks and signal control are not present.

Safety

Over the past five years, the intersection has experienced 26 reported crashes, with notable incidents including 13 angle collisions and 8 rear-end collisions. The severity of these crashes includes one fatality, 5 injuries, and 20 cases of property damage. Comparatively, the intersection's crash rate stands at .713 crashes per million entering vehicles (MEV), which is over six times higher than the statewide average crash rate of .109/MEV for this type of intersection.

US 11E & Odyssey Road

Geometry

Known as Intersection 1 along US 11E, this is the first signalized intersection when travelling westbound. The signal has a combination of steel and wood poles with span wire installation providing signalized access for Odyssey Road to the north and a driveway to the south. The southbound approach includes a separate channelized free flow right-turn lane. The intersection does not have sidewalks or handicap curb ramps. Pedestrian crosswalks and signal control are not present. The southbound approach to the signal provides access from the Lowes.

Safety

Rear-end collisions are the predominant accident pattern, with most resulting in property damage. A total of 38 collisions have been recorded, with rear-end collisions accounting for 21 of the crashes, and angle/left-turn collisions representing 8. In terms of the severity of the crashes, property damage accounted for 28 of the incidents, while injuries were reported in 7 of the crashes. The crash rate at the intersection, measured at .878/MEV, exceeds the statewide average of .717/MEV. However, the crash rate remains below the critical crash rate.

US 11E & N Chucky Pike

Geometry

Signalized intersection 2, utilizes wood poles and span wire installation, with shared utility poles facilitating signalized access for N. Chucky Pike. The north and south approaches operate on split phases (Phases 3 and 4), while US 11E incorporates protected/permissive left-turn phasing. Notably, the northbound approach consists of a single lane, whereas the southbound approach features a separate right-turn lane. Access to the signalized intersection from the Walmart store is provided via the southbound approach. Presently, the intersection lacks essential pedestrian infrastructure such as sidewalks and curb handicap ramps. Additionally, pedestrian crosswalks and signal control are absent, and there are no plans to include them in the intersection upgrade being carried out by the City and TDOT. However, the current upgrade plans do involve the addition of left-turn lanes on N. Chucky Pike, enabling quad signal phasing for enhanced signal operation and improved efficiency.

Safety

The intersection in question is marked by a significant number of crashes, totaling 123 incidents, which stands as the highest among all intersections along the corridor. Rear-end collisions make up 38% of the crashes, while angle/left-turn collisions represent 41% of the total. Property damage accounts for the majority of the crashes, comprising 75%, while injuries are reported in 17% of the incidents. Importantly, the crash rate at this intersection surpasses both the statewide average and the critical crash rate.

US 11E & Mossy Creek Drive

Geometry

Stop controlled T-intersection restricted to only allow right turns to and from US 11E. The minor street access allows access to Pal's and other high-volume businesses. Mossy Creek Drive also has secondary access from N. Chucky Pike.

Safety

The crash rate at the intersection in question is twice as high as the statewide average. Over a specific period, a total of 11 crashes were reported at the intersection, with 7 of them being rear-end collisions resulting in property damage.

US 11E & Clinch View Circle

Geometry

Stop controlled intersection with Clinch View Circle to the south and a driveway to a car wash to the north. Clinch View Circle serves as the sole access point for the Buena Vista subdivision. Notably, the intersection features a left turn lane on US 11E, facilitating safer left turns, as well as an acceleration lane for right turns from Clinch View Drive.

A notable characteristic of this intersection is the frequent occurrence of westbound vehicles making U-turns at a median opening, using it to access businesses along Mossy Creek Drive. Existing food and retail businesses indicate the potential for future development on the parcels situated on either side of Clinch View Circle.

Past discussions have been held regarding the connection of E Commerce Drive to Buena Vista to allow business access to the median opening at this intersection and the possibility of a signal if warranted. The Buena Vista residents have strongly voiced their objection during past discussions and at this study's public meetings.

Safety

The crash rate at the intersection is double the statewide average, with a total of 11 reported crashes. These include 4 rear-end collisions, 3 sideswipe incidents, and 3 angle collisions. Furthermore, 10 of these crashes resulted in property damage.

US 11E & Driveways from N Chucky Pike to Meadow Spring Drive

There are 19 driveways accessing US 11E from the northside between N Chucky Pike and Meadow Spring Drive. There are only 2 median breaks within this .38-mile section of US 11E, at Clinch View Circle and the driveway for the Valvoline Quick Lube and the Jefferson City Water Plant. There is only one left turn lane at the median breaks, and it serves the southbound traffic to Clinch View Road. There are no left turn lanes at the median breaks to allow vehicles to safety turn left or make a U-turn to access the 19 driveways to the north. Most drivers make U-turns at N Chucky Pike to access the driveways to the north.

US 11E & Meadow Spring Drive

Geometry

Stop controlled T-intersection restricted to only allow right turns to and from US 11E. The minor street southbound approach consists of one lane. Meadow Spring Drive grants access to numerous residential neighborhoods and multiple connections to the northern portion of N. Chucky Pike.

Safety

The crash rate is twice as high as the statewide average. Over the 5-year period, a total of 10 crashes were reported, including 5 rear-end collisions, 2 angle collisions, and one pedestrian-related incident. These crashes resulted in 4 reported injuries and 6 cases of property damage.

US 11E & Hicks Road

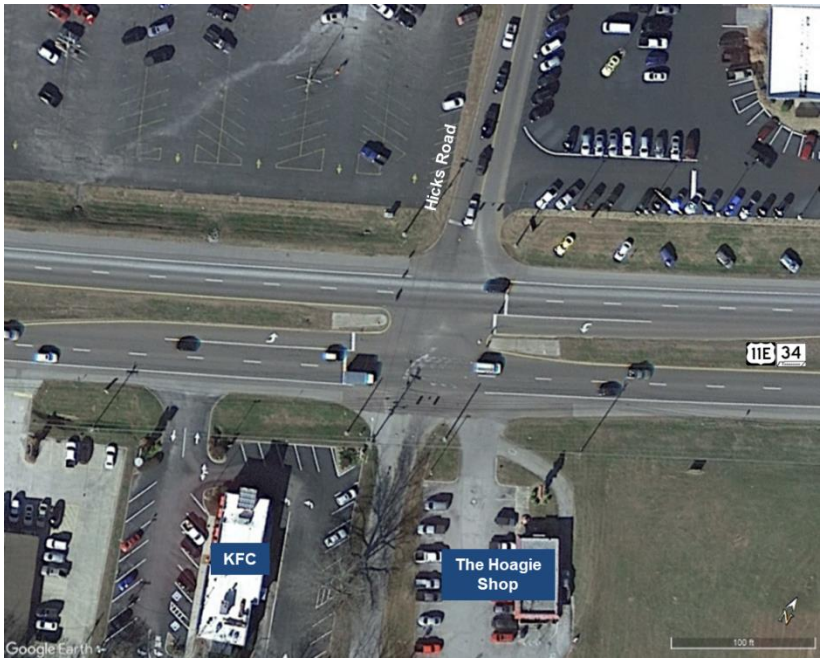
Geometry

Signalized intersection number 3 is a steel strain poles and span wire installation. The northbound and southbound approaches are single lanes. The southbound approach to the signal provides access from Tarr Chevrolet and College Square Shopping Center. The northbound approach gives access to KFC and The Hoagie Shop from the rear, as well as multiple single-family dwellings. The intersection does not have sidewalks or handicap curb ramps. Pedestrian crosswalks and signal control are not present.

The driveway access from US 11E for the Hoagie Shop is located close to Hicks Road and doesn't meet TDOT's driveway access standards.

Safety

The primary accident pattern observed at the intersection is rear-end collisions, followed by angle and opposing left-turning collisions, with property damage being the most common outcome. Out of the total 35 reported collisions, 15 were rear-end collisions, while 12 were angle or left-turn collisions. These incidents resulted in 27 cases of property damage and 4 reported injuries. Despite these occurrences, the crash rate at the intersection remains below the statewide average rate.



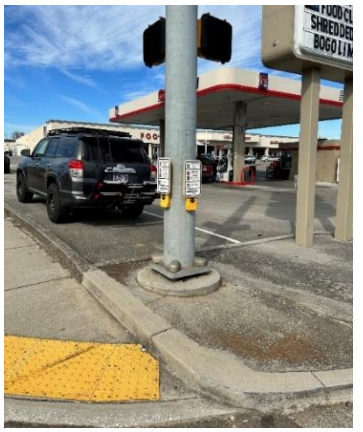
US 11E & Odell Avenue

Geometry

Signalized intersection number 4 features steel strain poles and span wire installation. The northbound and southbound approaches are single lanes, while sidewalks with handicap curb ramps provide pedestrian accessibility. US 11E utilizes protected/permissive left-turn phasing at the intersection. The primary accident pattern observed at this intersection consists of rear-end and angle collisions, resulting in mostly property damage. Pedestrian crosswalks and signal control are present, although it should be noted that the current location of pushbuttons on the north side is separated from the handicap ramps by a curb, potentially restricting wheelchair access.

Safety

A total of 28 collisions have been reported at this intersection. Out of these, 11 were rear-end collisions, while 8 were angle or left-turn collisions. The majority of the collisions resulted in property damage (21), with 4 reported injuries. Despite these incidents, the crash rate at the intersection remains below the statewide average rate.



US 11E & Pearl Avenue

Geometry

The intersection is stop controlled on the minor street, Pearl Avenue. There are no left turn lanes at the median breaks to allow vehicles to safety turn left. Pearl Drive grants access to numerous residential neighborhoods and businesses located of US 11E.

Safety

The intersection at Pearl Avenue had the second most number of crashes at an unsignalized intersection with 25 over the 5 year period. The collision manner includes 12 angle and 8 rear-end crashes- showing the need for turn lanes on US 11E.

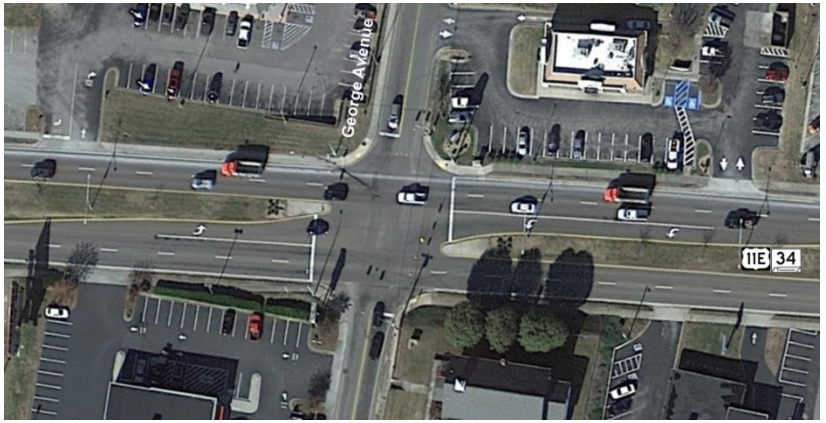
US 11E & George Avenue

Geometry

Signalized intersection number 5, The signal is a steel strain poles and a shared utility wood pole installation with span wire. The northbound and southbound approaches are single lanes. The intersection has sidewalks with handicap curb ramps, but no pedestrian signal control.

Safety

Among the corridor intersections, George Avenue stands out with the second-highest number of crashes, totaling 84 incidents. Interestingly, rear-end collisions occur less frequently, which may be attributed to the greater signal density and system progression in place. Conversely, angle and left-turn collisions dominate the crash pattern, potentially resulting from adverse side street queues and driver frustrations. A breakdown of the collision data reveals 17 rear-end collisions and 35 angle/left-turn collisions. The majority of the crashes resulted in property damage (71), with 9 reported injuries.



US 11E & Russell Avenue

Geometry

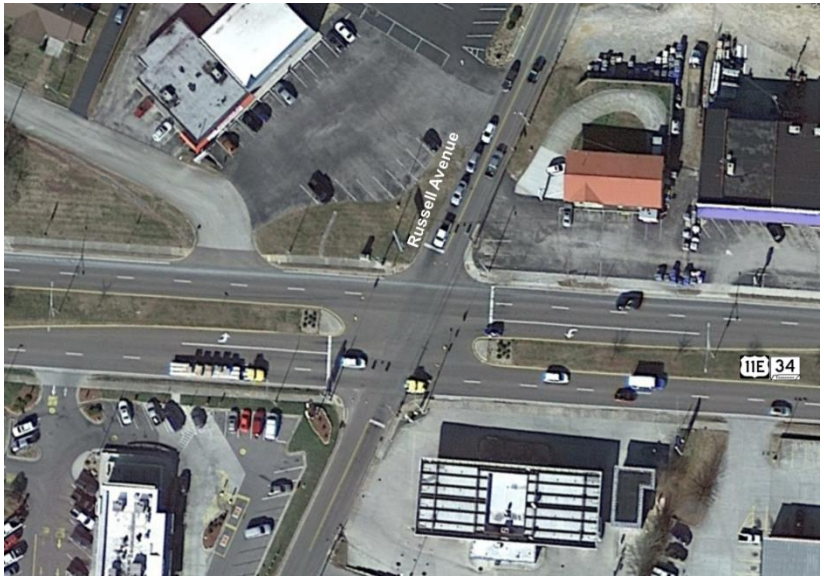
At signalized intersection number 6, the signal installation consists of steel strain poles and shared utility wood poles with span wire. The northbound and southbound approaches are single lanes, and the intersection features sidewalks with handicap curb ramps. However, it should be noted that obstacles on the sidewalks create barriers that prevent wheelchair passage. US 11E utilizes protected/permissive left-turn phasing at this intersection.

Russell Avenue, located south of US 11E, experiences a significant Average Daily Traffic (ADT) volume of 5,030 vehicles in 2022. This approach, characterized by a single lane and commercial corner development, often leads to substantial queues, impacting traffic flow and operational efficiency.

Safety

Among the corridor intersections, Russell Avenue ranks third in terms of the total number of crashes, amounting to 67 incidents. Rear-end collisions represent 21% of the crashes (14), while angle and left-turn collisions account for the majority, representing 61% of the crashes (41). The majority of the crashes resulted in property damage (48), while 14 incidents resulted in reported injuries.

The crash rate at this intersection exceeds both the statewide average and the critical crash rate. The lower occurrence of rear-end collisions may be attributed to the greater signal density and system progression implemented. However, angle and left-turn collisions are more prevalent, potentially due to adverse side street queues and driver frustrations.



US 11E & SR 92/Maple Avenue

Geometry

At signalized intersection number 7, the signal installation features a steel strain pole with span wire. The north and south approaches are split phased (Phases 3 and 4), providing separate signal control for each direction. US 11E utilizes protected/permissive left-turn phasing, while the eastbound approach includes a right-turn overlap. Notably, the northbound approach offers multiple lanes, accommodating separate double left-turn lanes from SR 92 to westbound US 11E. The intersection is equipped with sidewalks and curb handicap ramps, ensuring pedestrian accessibility.

Safety

A total of 30 collisions have been reported at this intersection. Out of these, 12 were rear-end collisions, while 4 were angle or left-turn collisions. The majority of the crashes resulted in property damage (26), with 3 reported injuries. While the crash rate at this intersection exceeds the statewide average, it remains below the critical crash rate.

The higher occurrence of rear-end collisions may be associated with the higher speeds observed at the eastbound and northbound highway approaches. However, the angle and left-turn collisions are relatively low, primarily due to minimal through traffic movements from northbound SR 92 to Maple Avenue.

US 11E & Universal Road

Geometry

The unsignalized intersection between Universal Road and US 11E is a three-leg intersection with a simple median cut to provide access to Universal Road, which approaches from the south. No turn lanes exist at this intersection. Universal Road is stop-controlled.

Safety

Most of the crashes at this intersection are either angle crashes or single-vehicle crashes. However, field observation revealed a number of vehicles slowing in the westbound travel lane to turn into the median, creating a conflict and potential for rear-end collisions.

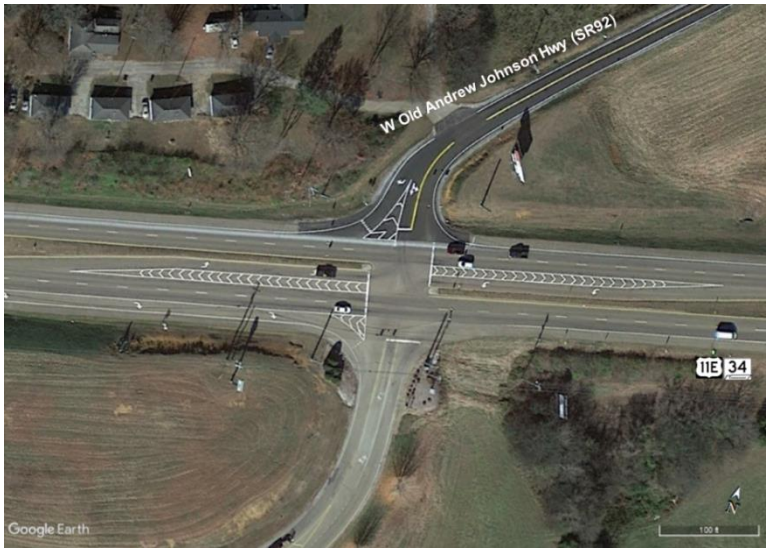
US 11E & W Old Andrew Johnson Highway

Geometry

Signalized intersection number 8 has steel strain poles with span wire installation providing signalized access for SR 92 to the north and Jefferson Memorial Hospital to the south The signal is to the west of the City. The southbound approach includes a separate channelized YIELD right-turn lane. The intersection does not have sidewalks, curb ramps, or pedestrian signals. The north and south approaches are concurrently phased (Phases 4 and 8). US 11E has protected/permissive left-turn phasing.

Safety

A total of 37 crashes occurred at this location, during the 5-year study period. Crashes were predominantly either rear-end (15) or angle (13) crashes, combined accounting for 76% of the total crashes at the intersection. Three serious injury crashes were reported. The observed crash rate exceeds the statewide average, but is below the critical rate.



SR 92 & Russell Avenue

Geometry

The intersection between SR 92 and Russell Avenue is a box span installation on steel strain poles. The southbound approach is a single lane, with all other approaches providing a left-turn lane. The intersection has sidewalks with a single curb ramp at each corner. The north and south approaches are serviced concurrently, with all permissive turns. US 11E has permissive left-turn phasing as well, so this intersection operates as a 2-phase signal.

Safety

A total of 16 crashes were recorded at this intersection, 56% of which were angle crashes. No serious injury crashes were included in the crash data. The crash rate is above the statewide average, but does not exceed the critical rate.

SR 92 & George Avenue

Geometry

The signalized intersection of SR 92 and George Avenue is a box span signal supported by steel strain poles. George Avenue (to the north) and the Jefferson City Community Center driveway (to the south) are serviced concurrently. SR 92 has protected-permissive left-turn phases on both approaches. The southbound right-turn is channelized with a pedestrian refuge island. Pedestrian signal heads and push-buttons are present in the island. The westbound right-turn is also channelized, but no crosswalk exists on the east (westbound) approach. Curb ramps have been installed at each entry point for the existing crosswalks, however the driveway approaching from the south has dropped sidewalk that carries thru, across the driveway, without tactile mats to warn visually impaired pedestrians that they are crossing a signalized approach.

Safety

A total of 22 crashes were observed over the study period. Only 1 serious injury and 3 injury crashes were included. Rear-end crashes (9) accounted for 41% of the total, and angle crashes (7) accounted for an additional 32%.

3. PUBLIC ENGAGEMENT

Public engagement in the study process is essential for the project team to understand and analyze existing conditions based on perception by the users. Throughout the study, the project team solicited feedback from a steering committee consisting of members of representatives from Jefferson City, the Lakeway Area Metropolitan Planning Organization (LAMPTO), and the Tennessee Department of Transportation (TDOT). Public engagement meetings were held to solicit public feedback and understand concerns, opportunities, and values from the users of the corridor. To maximize opportunities for public engagement, the project team also conducted an online public survey.

3.1. Steering Committee Meetings

Including the kick-off, a total of six meetings were held with the steering committee. Members of the steering committee were vital in providing technical expertise, information, and understanding of local conditions which may not be evident from data collection and visual observation. The meeting minutes are provided in Appendix M. Except for the kick-off meeting, the steering committee met virtually.

October 4, 2022 (In-person) – Initial kick-off meeting in which the project scope and schedule were reviewed, the approach to the operational and safety analysis was discussed, and existing areas of concern along the corridor were mapped.

November 29, 2022 (Virtual) – Status update meeting and discussion of online survey questions for public engagement.

December 27, 2022 (Virtual) – Status update regarding online survey and discussion regarding crash data and signalized intersection analysis.

February 22, 2023 (Virtual) – Review of public survey responses, crash evaluation and highlights, and existing operational analysis results.

March 23, 2023 (Virtual) – Review of safety and operational analysis and discussion of initial recommendations.

June 1, 2023 (Virtual) – Discussion of findings and feedback from the first public meeting and review of updates to initial recommendations.

3.2. Public Survey

The public survey was generated using MetroQuest Studio and was available from January 15, 2023, through February 15, 2023. To publicize the survey, a flyer was posted on the LAMTPO and Jefferson City websites, Nextdoor, LinkedIn, and social media sites. Press releases were sent to the Standard Banner and Citizen Tribune newspapers. Over 200 flyers were hand delivered to properties along US 11E and SR 92.

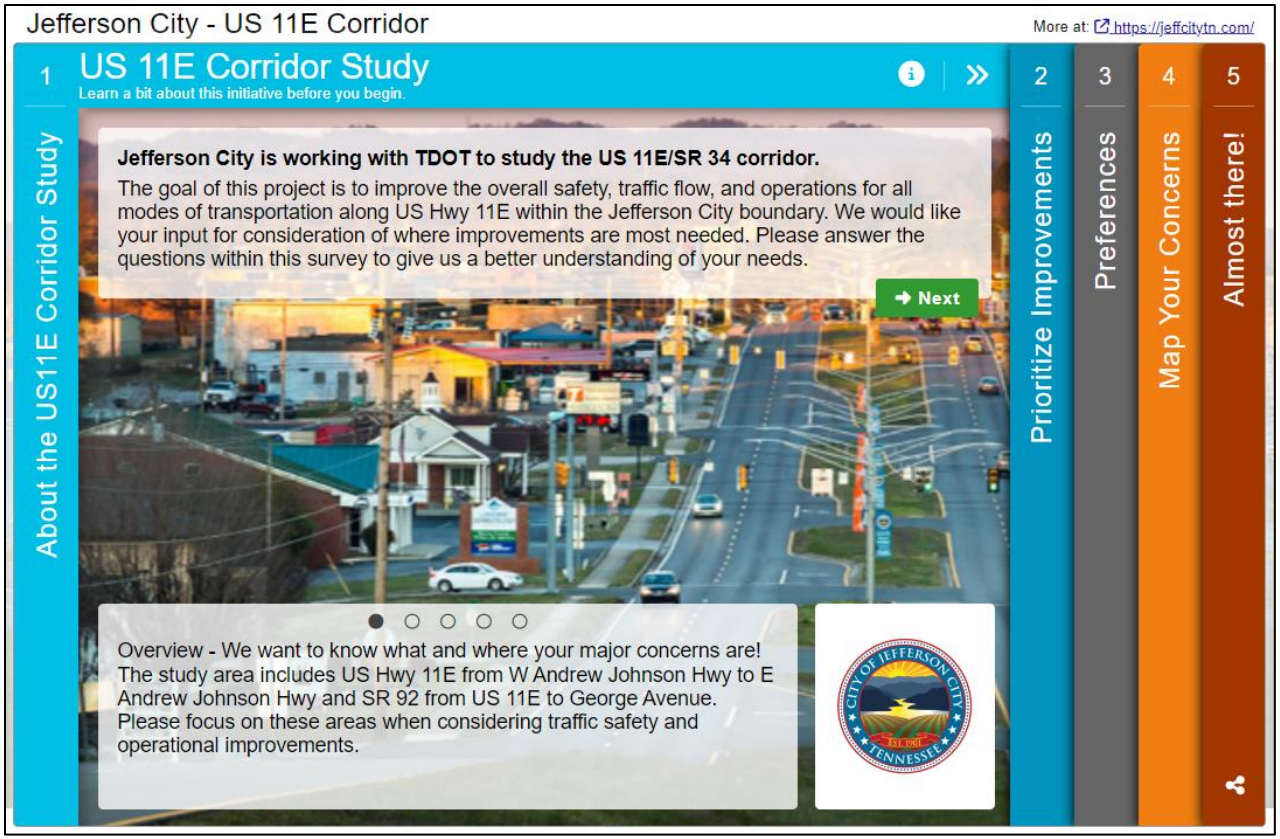


Figure 3-1 MetroQuest Snapshot of Public Survey

The home page of the MetroQuest survey is shown in Figure 3-1. The survey received 863 visitors, of which 402 participated in the survey. The survey asked respondents to comment and respond on areas where they felt improvements should be made as well as leave general comments. To ascertain public values for improving the corridor, a ranking exercise was included which asked respondents to prioritize categories of improvements. Traffic Operations Improvements, Access Management, and Safety Improvements were the top three ranked categories. In ranking multimodal and bike facilities, a preference for a shared use path along the corridor was expressed for both categories.

Respondents were also presented with a map and the ability to place markers on locations where they felt improvements

were needed. The markers were categorized by the type of improvement. Congestion Relief and Safety received the most markers followed by Access. The Congestion Relief markers were highly concentrated around the US 11E intersections with George Avenue and N Chucky Pike and the issue is recurring in both the AM and PM peak hours. The Safety markers are dispersed throughout the corridor, but the intersections with the most concerns were:

- Russell Avenue
- George Avenue
- Odell Avenue
- N Chucky Pike
- E Old Andrew Johnson Highway

Regarding Access issues, respondents mostly expressed that more left turn lanes and median openings are desired. A detailed summary of the survey responses is provided in the Stakeholder Meeting Minutes from February 22, 2023, in Appendix M.

3.3. Public Meetings

Two public meetings were held to solicit feedback on the proposed recommendations and allow the public to speak directly with the project team.

April 6, 2023 – The first public meeting was held at the Jefferson City City Hall building. The project team reviewed the purpose of the project and identified improvement opportunities. Results of the public survey were presented. Following the presentation, a map exercise allowed attendees to identify preferred multimodal improvements and express any comments directly to the project team. Figure 3-2 is a summary of the comments received for the portion of US 11E from Hicks Road to Odyssey Road.

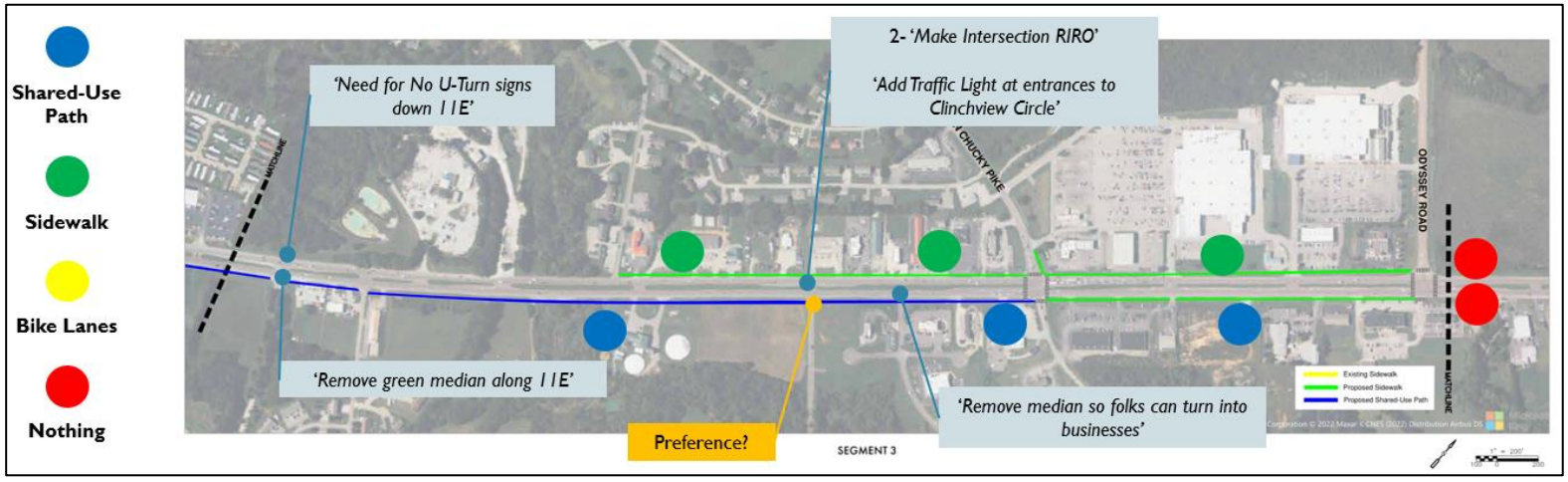


Figure 3-2 Public Meeting Comment Summary

Public Meeting #1

Public Meeting #2

Public Meeting #2

June 21, 2023 – The second public meeting was also held at the Jefferson City City Hall building. The project team reviewed the purpose of the project for individuals who may be hearing about the corridor study for the first time. The revised concepts were presented to the public and attendees were encouraged to provide comments on the recommendations.

4. FUTURE CONDITIONS

The future conditions were analyzed to understand how the expected growth in the area will affect the recommended improvements to the corridor. Traffic for the corridor was grown 25-percent, reflecting an annual 1-percent growth rate estimated from the Lakeway Area Metropolitan Transportation Planning Organization (LAMTPO) travel demand model.

4.1. Intersection Levels of Service

The signalized intersections within the study area were analyzed for the 2047 traffic conditions, assuming the optimization of the signals and the improved geometry at the US 11E intersections with N Chucky Pike and George Avenue. This analysis provides an assessment of how the expected growth in the area will impact operations in the long term.

Year 2047 Analysis

Analyzing the 2047 projected traffic conditions shows that without intervention two of the signalized intersections will reach capacity. Table 4-1 provides the existing, projected and projected with mitigation analysis for the signalized intersections. The column for volume/capacity (V/C) indicates the extent to which an intersection is able to adequately serve demand volumes, with ratios above 1 representing demand above capacity. The intersection of E. Broadway Blvd. and N. Chucky Pike is projected to exceed capacity in the 2047 traffic conditions without intervention. The intersection of E. Broadway Blvd. and Odell Avenue comes close to full capacity in the 2047 scenario. With mitigation, all intersections will have sufficient capacity for the projected volumes, with some experiencing improvements in levels of service.

To achieve the necessary optimized projections, increased capacity in the form of new or expanded turn lanes are proposed. For the intersection of 11E and N. Chucky Pike this involves creation of a dedicated 150’ left-turn lane on the northbound side of N. Chucky Pike, and the creation of dedicated 150’ left and right turn lanes on the southbound side. To increase capacity for the intersection of 11E and George Avenue, a 200’ dedicated left turn lane on the southbound side of George Avenue and a dedicated 200’ right turn lane on the northbound side are proposed.

Table 4-1 Signalized intersection performance summary

SIGNALIZED INTERSECTION	PEAK HOUR	OPTIMIZED EXISTING 2022			OPTIMIZED PROJECTED 2047			OPTIMIZED PROJECTED 2047 w MITIGATION		
		V/C	AVERAGE DELAY	LEVEL OF SERVICE	V/C	AVERAGE DELAY	LEVEL OF SERVICE	V/C	AVERAGE DELAY	LEVEL OF SERVICE
1. E. Broadway Blvd (AJ Hwy, US 11E) & Odyssey Road	AM	0.34	10.3	B	0.45	15.7	B	0.46	15.5	B
	PM	0.54	22.4	C	0.66	29.9	C	0.71	23.8	C
2. E. Broadway Blvd (AJ Hwy, US 11E) & N. Chucky Pike	AM	0.58	31.0	C	0.81	37.8	D	0.60	21.0	C
	PM	0.81	33.3	C	1.01	52.0	D	0.88	40.4	D
3. E. Broadway Blvd (AJ Hwy, US 11E) & Hicks Road	AM	0.35	9.8	A	0.44	8.5	A	0.44	8.1	A
	PM	0.57	12.6	B	0.73	17.5	B	0.68	12.9	B
4. E. Broadway Blvd (AJ Hwy, US 11E) & Odell Avenue	AM	0.33	13.4	B	0.41	5.6	A	0.41	8.1	A
	PM	0.51	18.5	B	0.66	15.0	B	0.67	19.2	B
5. E. Broadway Blvd (AJ Hwy, US 11E) & George Avenue	AM	0.50	20.9	C	0.68	22.7	C	0.51	19.2	B
	PM	0.76	27.1	C	0.99	45.3	D	0.82	23.5	C
6. E. Broadway Blvd (AJ Hwy, US 11E) & Russell Avenue	AM	0.37	9.2	A	0.47	9.4	A	0.43	10.9	B
	PM	0.54	23.1	C	0.70	26.8	C	0.60	23.1	C
7. E. Broadway Blvd (AJ Hwy, US 11E) & St. Highway 92/Maple Avenue	AM	0.59	21.8	C	0.73	34.0	C	0.74	26.6	C
	PM	0.47	21.0	C	0.58	22.4	C	0.62	20.4	C
8. E. Broadway Blvd (AJ Hwy, US 11E) & Old AJ Highway (SR 92)	AM	0.42	15.1	B	0.53	17.6	B	0.53	16.8	B
	PM	0.34	13.0	B	0.41	14.3	B	0.44	14.3	B
9. State Route 92 & George Avenue	AM	0.45	14.9	B	0.56	15.3	B	0.57	18.2	B
	PM	0.52	24.4	C	0.65	30.4	C	0.67	30.6	C
10. State Route 92 & Russell Avenue/Flat Gap Road	AM	0.32	9.0	A	0.40	11.6	B	0.40	10.7	B
	PM	0.37	22.4	C	0.49	26.1	C	0.48	18.3	B

5. RECOMMENDATIONS

The following sections describe the recommendations that were developed based on data collection, existing conditions assessments, discussions with the steering committee, and comments received from the public engagement efforts. These recommendations are designed to address the identified challenges presented in the Existing Conditions and provide solutions to make the corridor safer, more efficient, and more accessible to all users.

Each recommendation includes a high-level planning cost that does not account for utility relocations or right-of-way acquisition. The costs were calculated using TDOT's Cost Estimate Tool, which is based on average unit prices from TDOT 2021 bids, and then inflated to 2023 dollars. Quantities were determined from the concept drawings presented in the subsequent sections and should be refined during the detailed design phase. The cost estimate worksheets are provided in Appendix N.

5.1. Shared-Use Path

Jefferson City expressed early in the study process their desire for a shared-use path along the US 11E corridor to connect to the Jefferson Middle and Elementary Schools. Multimodal facilities such as shared-use paths provide numerous benefits to the community: active transportation opportunities, safe infrastructure for vulnerable users, connectivity, recreational spaces, community cohesion, environmental benefits, and are known to boost economic development.

The City had previously applied for a TDOT Multimodal Access Grant in 2013 to help facilitate the school connection but were unsuccessful in securing funding for the sidewalk project. This corridor study elaborates on the previous application and recommends a shared-use path along the south side of US 11E from the W Old Andrew Johnson Highway intersection to Cedar Avenue, where the existing sidewalk ends. Figure 5-1 shows a depiction of what the shared-use path would look like in front of the elementary school.

Figure 5-1 Proposed Shared-Use Path

Figure 5-2 provides a cross-section view of the proposed shared-use path and how it would align with the existing utility poles and drainage.

In addition to the shared-use path on the western end of the corridor, another shared-use path is proposed on the eastern end of the city limits to connect users from the commercial district to the residential development underway. This path would also be located along the south side of US 11E, beginning at Hicks Road and ending just east of Rocktown Road at the existing bridge over the railroad. The bridge presents a chokepoint for the path; therefore, a Phase Two is proposed to account for the complexity of extending the path beyond the bridge and to the end of the corridor study limits at E Old Andrew Johnson Highway

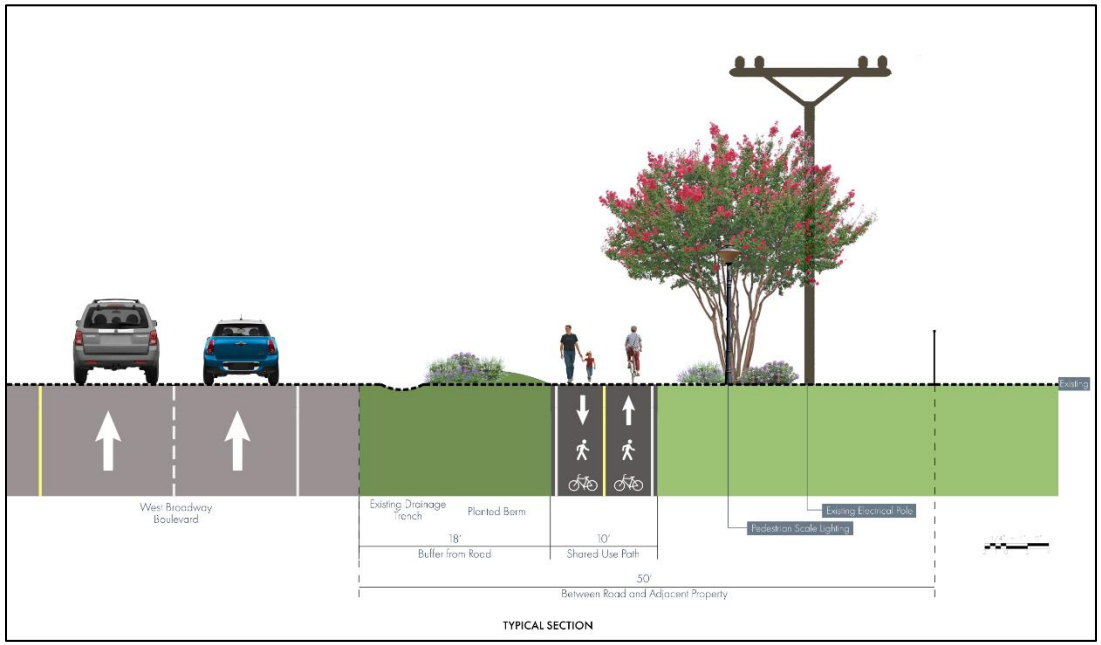


Figure 5-2 Proposed Shared-Use Path Cross-Section

For cost estimating purposes, the shared-use path is broken down into three segments:

- Segment 1: W Old Andrew Johnson Highway to Cedar Avenue (approximately 6,000 feet) **Cost Estimate: $1,512,000**
- Segment 2: Hicks Road to Bridge (approximately 12,500 feet) **Cost Estimate: $3,150,000**
- Segment 3: Bridge to E Old Andrew Johnson Highway (approximately 4,000 feet) **Cost Estimate: $1,008,000**
- Total: 4.25 miles **Cost Estimate: $5,670,000**

The cost estimate does not account for right-of-way acquisition, utility relocations, landscaping, or the bridge located in Segment 3. The bridge is estimated to cost an additional $1.65 million. Lighting is assumed for the entire length of the shared-use path and is estimated to cost $1.35 million. The city could opt to add the lighting features during a later phase to help reduce the upfront cost of constructing the path.

5.2. Sidewalks

Sidewalks are provided throughout much of the commercial section of the corridor study area (between SR 92 and Harrington Drive). The photos below show two locations where there are existing sidewalks. At the US 11E intersection with George Avenue, sidewalks are in good condition and have ADA-compliant curb ramps; however, there are other locations along the corridor, such as east of Odell Avenue, with sidewalks in need of repairs and upgrades. Figure 5-3 shows the existing sidewalk locations along with proposed areas for sidewalk upgrades, new sidewalks, and the shared-use path. The existing sidewalks are depicted by a yellow line.

US 11E at George Avenue (northeast corner – looking east)

US 11E at Odell Avenue (looking east)

Sidewalk Repairs

The proposed locations for sidewalk upgrades are depicted in Figure 5-3 by a purple line. It is recommended that areas of existing sidewalk in need of repairs should be prioritized over new sidewalks because it is a more cost-effective improvement since the infrastructure is already in place. Additionally, by repairing portions of the existing sidewalk network, it gives users a continuous network to safely access areas of the community already connected by sidewalks.

Cost Estimate: $106,000

New Sidewalks

In addition to identifying areas where sidewalk upgrades would be beneficial, locations where new sidewalks would help with community connectivity and multimodal accessibility were identified. The entire corridor was assessed to determine where additional sidewalks could help to bridge the gaps in connectivity. The shared-use path is proposed to start at Hicks Road and run along the less densely developed properties along the south side of US 11E. New sidewalks are proposed along both sides of US 11E from the end of the existing sidewalks to Hicks Road. The proposed shared-used path is shown as a blue line and the new sidewalks are depicted with green lines in Figure 5-3.

Additionally, to complement the shared-use path, new sidewalks were proposed along the north side of US 11E between Meadow Spring Drive and Odyssey Road. This area is largely commercial with some vacant parcels ripe for additional development. Jefferson City requires new development to construct sidewalk along their US 11E frontage, so it is recommended that the city encourage developers to align their site plans with the proposed facilities.

Cost Estimate: $831,000

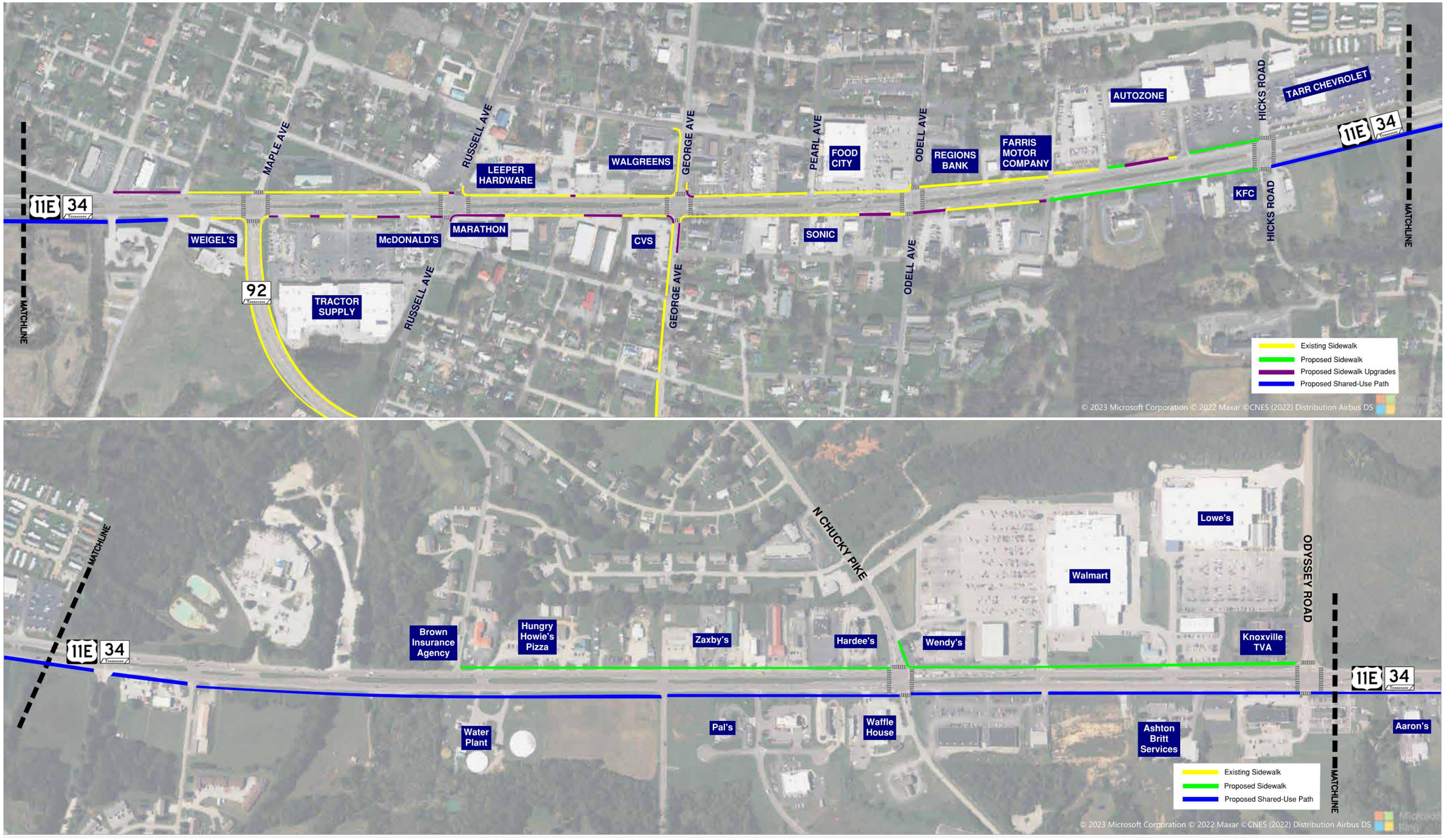


Figure 5-3 Proposed US 11E Pedestrian Facilities

5.3. Intersections

Intersection improvements make up a large portion of the recommendations along the corridor. Many of the intersection recommendations include similar improvements such as: crosswalk markings, pedestrian refuge islands, pedestrian signal equipment, ADA-compliant curb ramps, and realignment of the left turn lanes on US 11E to be offset. The following sections provide an overview of the physical improvements proposed for each intersection. Operational improvements to the signal timings and detection are included in the corresponding TSMO Report.

Crosswalk Markings

There are two intersections along US 11E with existing crosswalk markings – SR 92/Maple Avenue and Odell Avenue. The intersections of Russell Avenue and George Avenue at SR 92 also have existing crosswalks. All of the existing crosswalk markings in the corridor study area are the transverse marking style, shown in Figure 5-4. According to the TDOT Standard Drawing T-M-4, this style is typically used on roadways with traffic volumes lower than 2,000 vehicles per day and would thus not be appropriate for either US 11E or SR 92. The intersection recommendations presented below include the longitudinal marking style because it provides higher visibility and is more appropriate for the study area intersections.

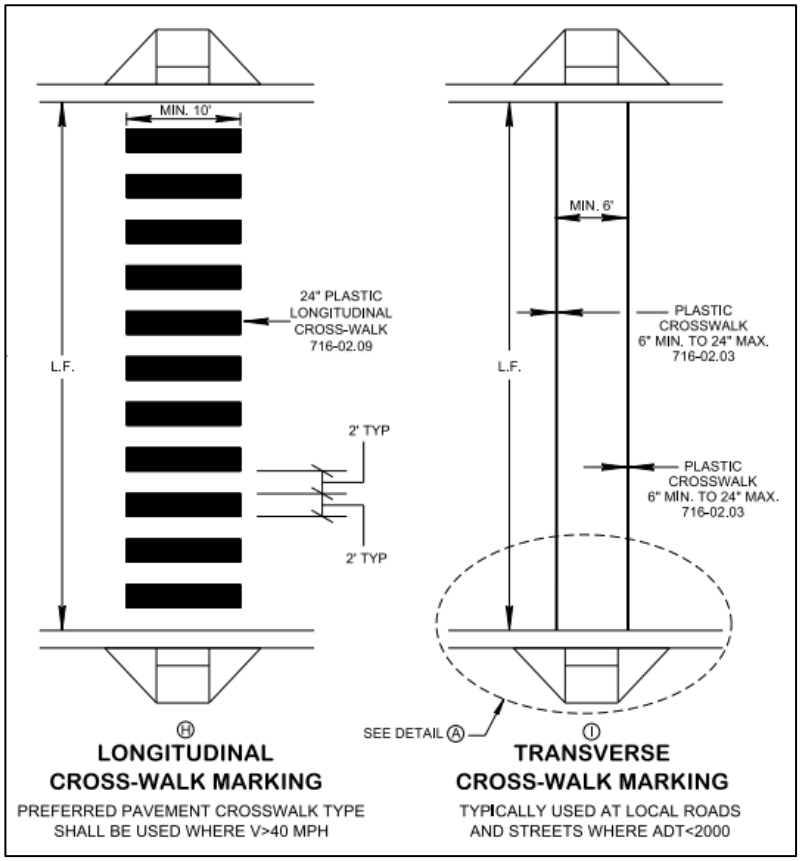


Figure 5-4 TDOT Standard Drawing T-M-4: Standard Intersection Pavement Markings

Pedestrian Refuge Islands

Recommendations at the signalized intersections along US 11E include pedestrian refuge islands. The upgraded signal timings provided in the TSMO Report include pedestrian phasing that will accommodate pedestrian crossing times long enough to cross US 11E in one phase, but in the event that a pedestrian cannot fully cross the intersection in one phase, they will have a safe place to wait. Figure 5-5 shows TDOT's standard drawing for a median pedestrian refuge.

Where there are channelized right turn lanes, another type of pedestrian refuge island is recommended. The raised right turn channelization island allows pedestrians to make two-stage crossings to access either direction of the intersection. The typical plan view of the channelized island is shown in Figure 5 6.

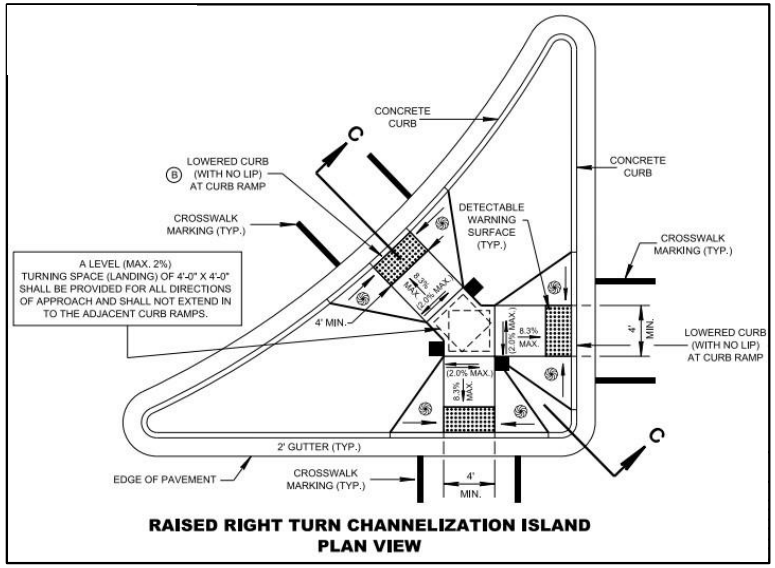


Figure 5-6 TDOT Standard Drawing MM-CR-4: Pedestrian Refuge (Channelized Island)

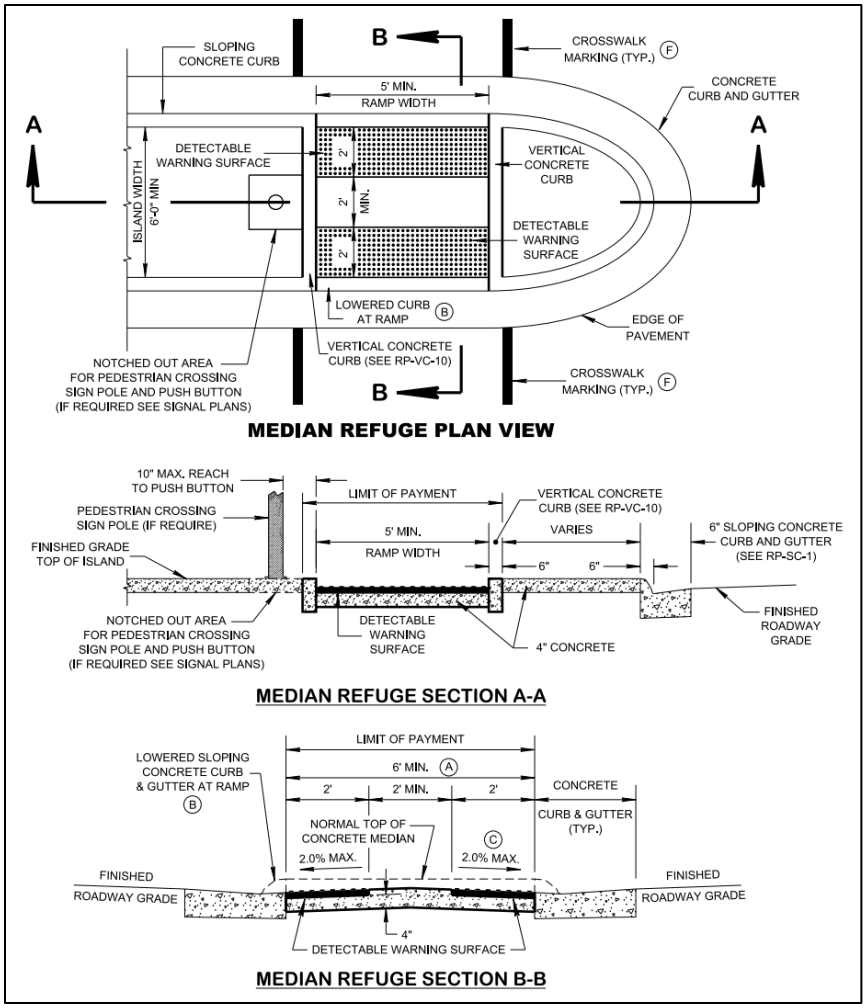


Figure 5-5 TDOT Standard Drawing MM-CR-4: Pedestrian Refuge (Median)

Curb Ramps

Providing ADA-compliant curb ramps is crucial for ensuring accessibility and equity for individuals with disabilities. Curb ramps remove the barriers caused by curbs and allow individuals to access sidewalks or pathways from streets and intersections. A component of ADA-compliant curb ramps is the presence of a detectable warning surface to provide sensory cues for individuals with visual impairments. The proper placement of detectable warning surfaces at each of the curb ramp types is shown in Figure 5-7.

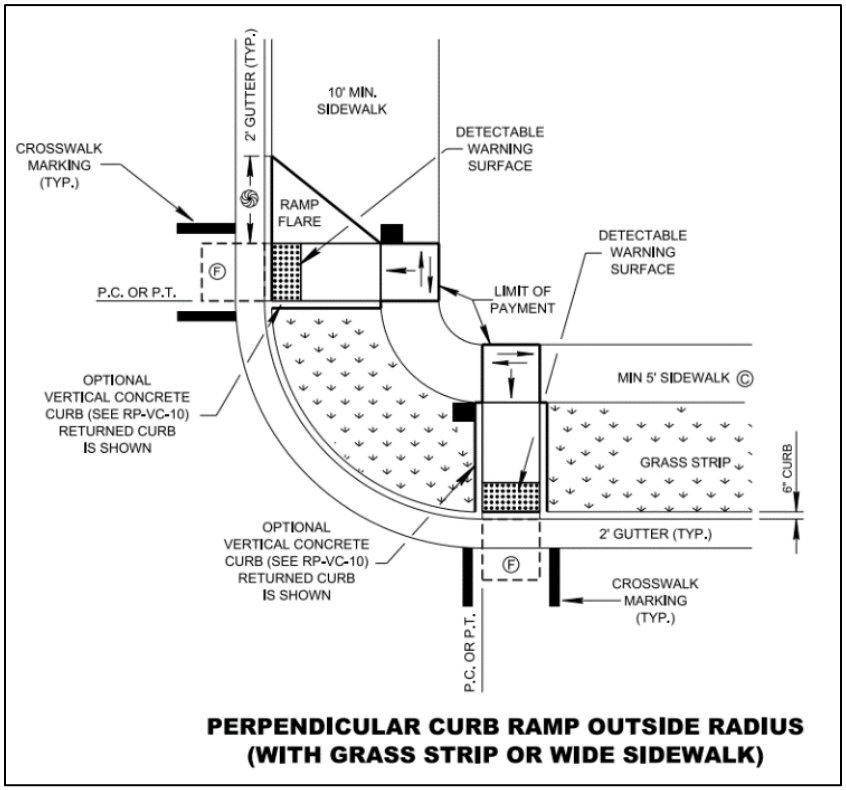


Figure 5-8 TT Standard Drawing MM-CR-6: Dual Crossing Curb Ramp

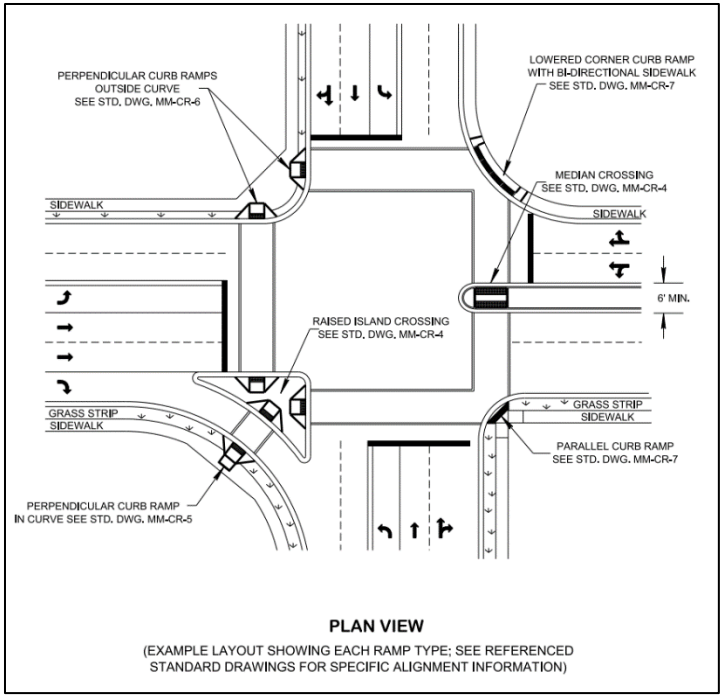


Figure 5-7 TDOT Standard Drawing MM-CR-1: Detectable Warning Surface Placement on Curb Ramps

At intersections with crosswalks in two directions, TDOT prefers separate curb ramps leading to each crosswalk, like shown in Figure 5-8. One major benefit of the separate curb ramps is that visually impaired individuals will be guided by the detectable warning surface into the correct direction of travel within the crosswalk area. Another benefit of separating the crosswalks outside of the middle of the curve radius is that pedestrians will have a shorter crossing distance.

In instances where parallel, perpendicular, and combination curb ramps will not work due to geometric constraints, TDOT will allow a blended transition curb type, shown in Figure 5-9. This design is not ideal and should only be used when other design options are not viable.

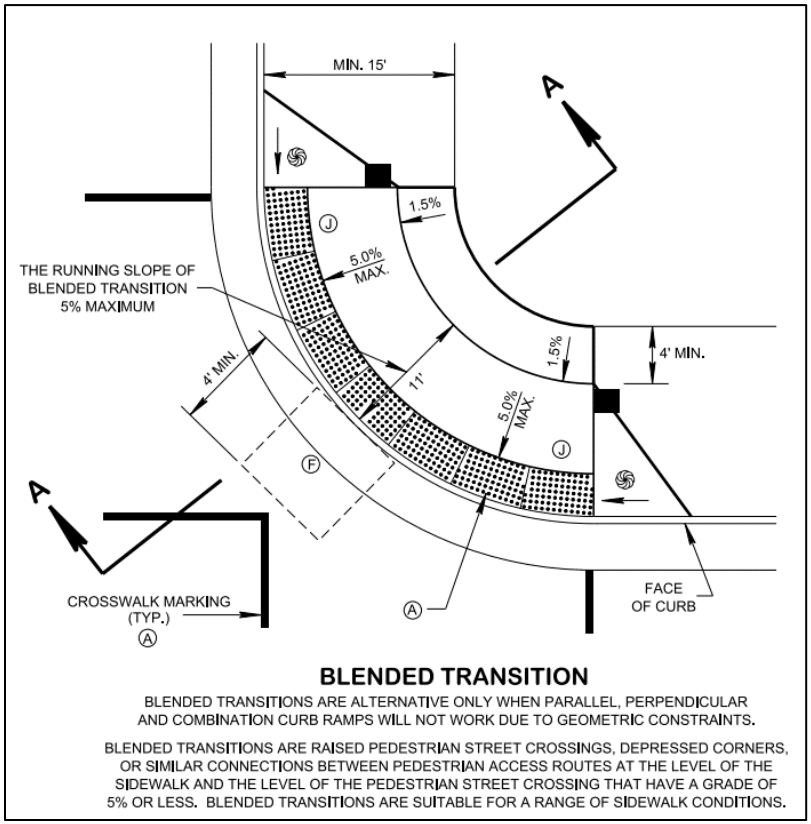


Figure 5-9 TDOT Standard Drawing MM-CR-7: Curb Ramps in Curve Bi-Directional Dual Crossing

Offset Left Turn Lanes

Offset left turn lanes along US 11E are another common recommendation presented in this study. According to the TDOT *Roadway Design Guidelines Section 2-170.00: Guidelines for Design of Turning Lanes*, the centerline of left turn lanes shall be placed along the centerline of the median, so that opposing left turn lanes are opposite each other. This configuration is displayed in Figure 5-10.

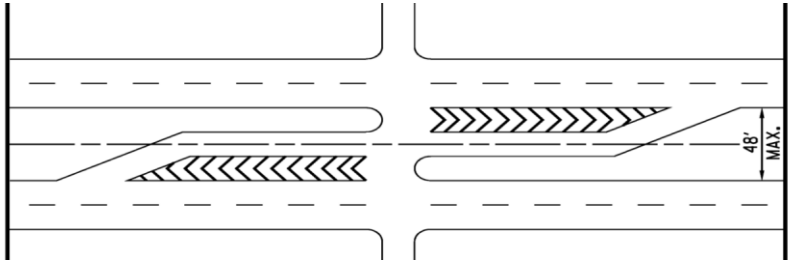


Figure 5-10 Left Turn Lane Alignment in Medians

The benefits of this layout include:

- Better visibility of opposing through traffic as left turning drivers look for gaps
- Decreased conflict between opposing left turn vehicle paths
- Increased numbers of left turn vehicles served in a given period of time due to the shorter crossing distance

Figure 5-11 provides a rendering of what these improvements will look like at the US 11E intersections.

Figure 5-11 Proposed Rendering of Intersection Improvements

US 11E & Old AJ Highway

TDOT evaluated the intersection of US 11E and East Old Andrew Johnson Highway in 2021 to determine if a traffic signal was warranted. The Department found that the intersection met MUTCD volume warrants 1, 2, and 3. Between December 2021 and December 2022, 8 angle crashes occurred at this location, meeting the MUTCD crash warrant. Traffic volumes are likely to increase significantly in future years, due to planned development in the surrounding area, which may exacerbate these issues. A traffic signal is recommended at this intersection.

Cost Estimate: $304,000

US 11E & Odyssey Road

The US 11E at Odyssey Road intersection consists of a free-flow southbound channelized right turn lane. Free-flow channelized turn lanes pose great risks to pedestrians because there are no precautions to warn drivers to slow down for potential pedestrian conflicts. As seen on the aerial image to the right, the existing intersection does not have any pedestrian accommodations and there are no sidewalks currently. Two alternatives are proposed for this intersection. The common improvements for both alternatives include:

- Marked crosswalks
- Median pedestrian refuge islands
- ADA-compliant curb ramps
- Offset left turn lanes
- Removal of eastbound acceleration lane

Alternative 1

This recommendation maintains the channelized right turn lanes in the southbound and westbound directions. Though this type of configuration is not ideal for pedestrian safety, signing and marking can help to bring awareness to drivers.

Cost Estimate: $554,000

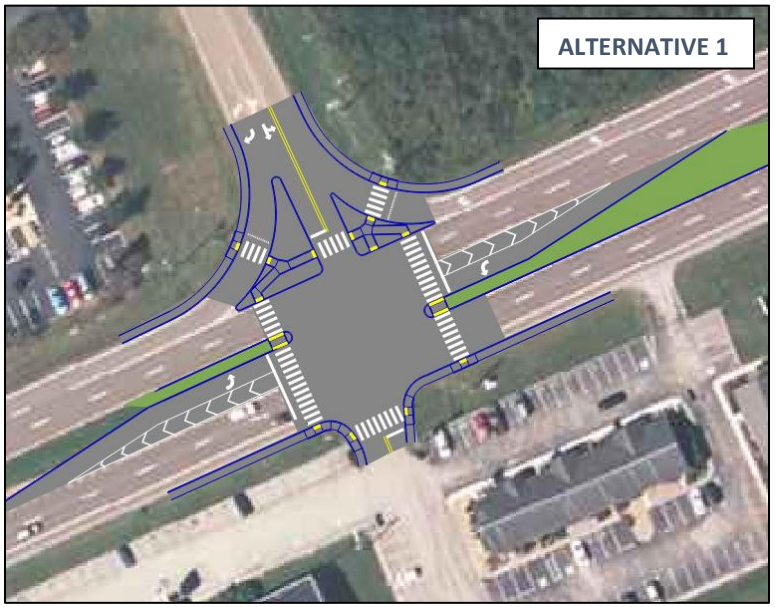


Figure 5-12 US 11E at Odyssey Road Proposed Improvements

Alternative 2

This recommendation proposes to remove the channelization. While this type of improvement may slightly impact the capacity of the intersection, there are more benefits to pedestrian safety in this design.

Cost Estimate: $473,000

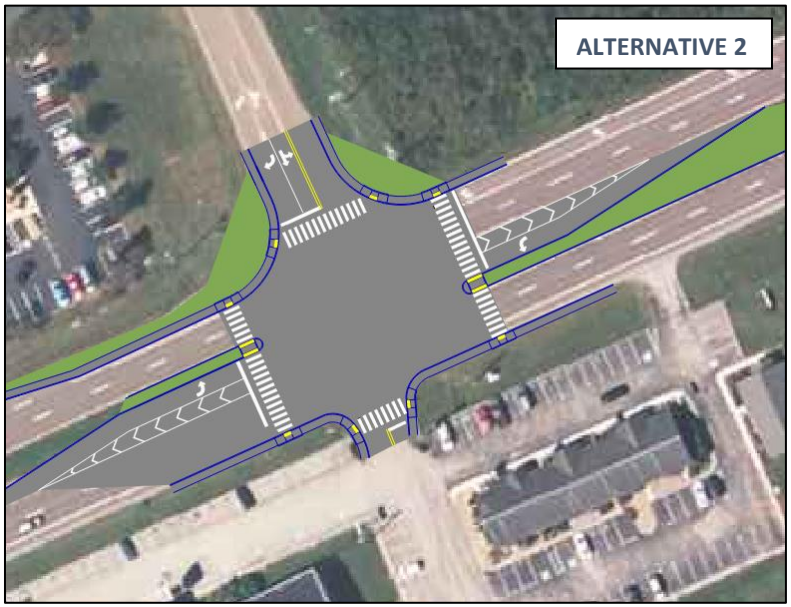


Figure 5-13 US 11E at Odyssey Road Proposed Improvement

US 11E & N Chucky Pike

The intersection of US 11E and N Chucky Pike has the highest occurrence of crashes out of all the intersections along the corridor and has been the subject of a TDOT safety project. The recommendations at the intersection include pedestrian refuge islands, marked crosswalks, and pedestrian signal equipment.

Cost Estimate – Alternative 1: $410,000

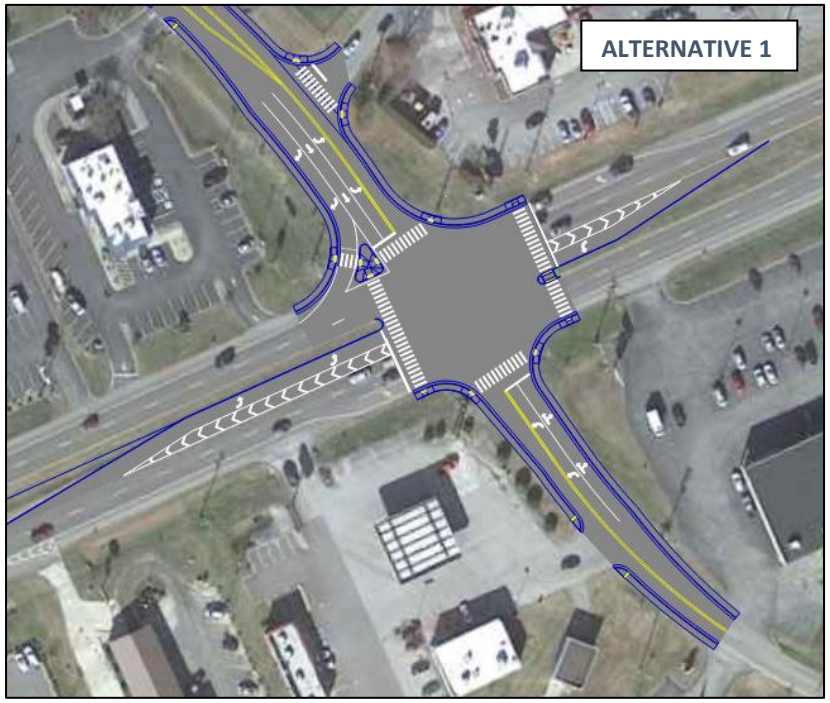


Figure 5-14 US 11E at N Chucky Pike Proposed Improvements

Cost Estimate – Alternative 2: $388,000

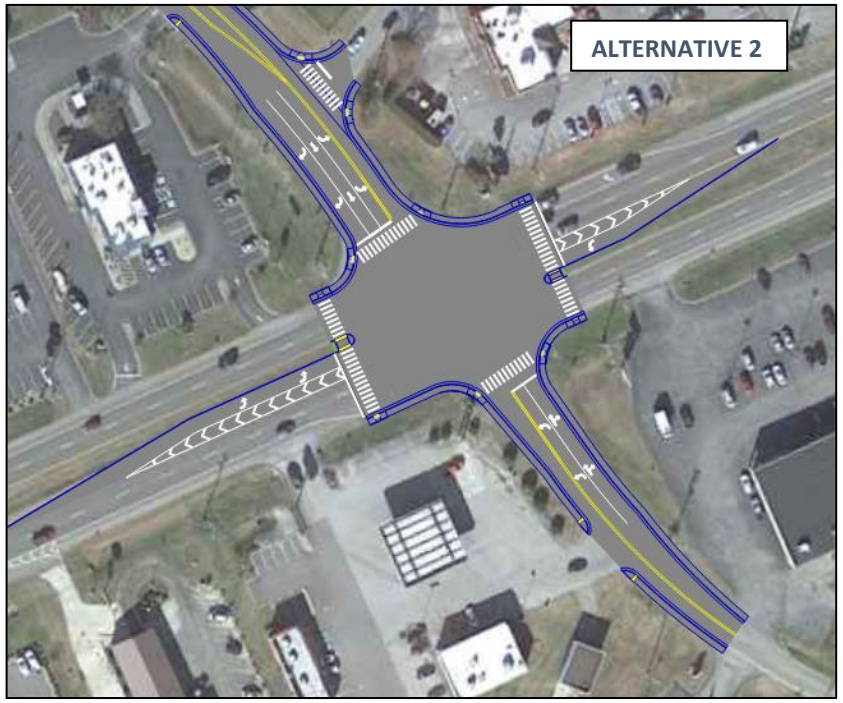


Figure 5-15 US 11E at N Chucky Pike Proposed Improvements

US 11E & Hicks Road

The recommendations at the intersection of US 11E and Hicks Road include providing a dedicated southbound left turn lane and a dedicated northbound right turn lane. Additionally, offset left turn lanes on US 11E, marked crosswalks, curb ramps, pedestrian refuge islands, and pedestrian signal equipment are proposed. Figure 5-16 shows the recommended improvements.

Cost Estimate – Hicks Road: $759,000

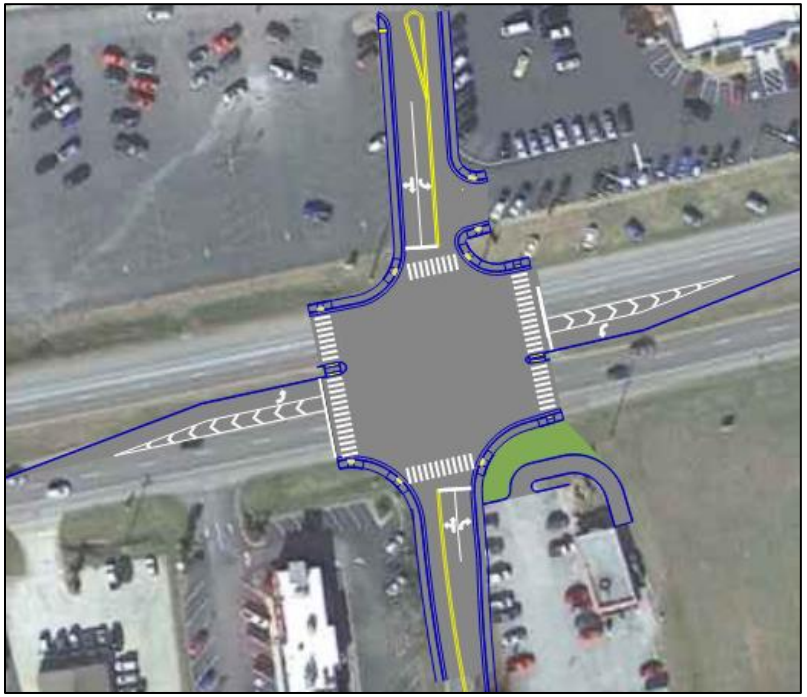


Figure 5-16 US 11E at Hicks Road Proposed Improvements

US 11E & Odell Avenue

The intersection of US 11E and Odell Avenue is one of two intersections along the corridor with existing crosswalks. There are existing pedestrian signal heads and push buttons, which are recommended to be replaced and upgraded. Other recommendations at the intersection include upgrading the crosswalks to higher visibility markings and aligning them so that they are perpendicular to the curb, pedestrian refuge islands, and offset left turn lanes on US 11E.

Cost Estimate – Odell Avenue: $587,000

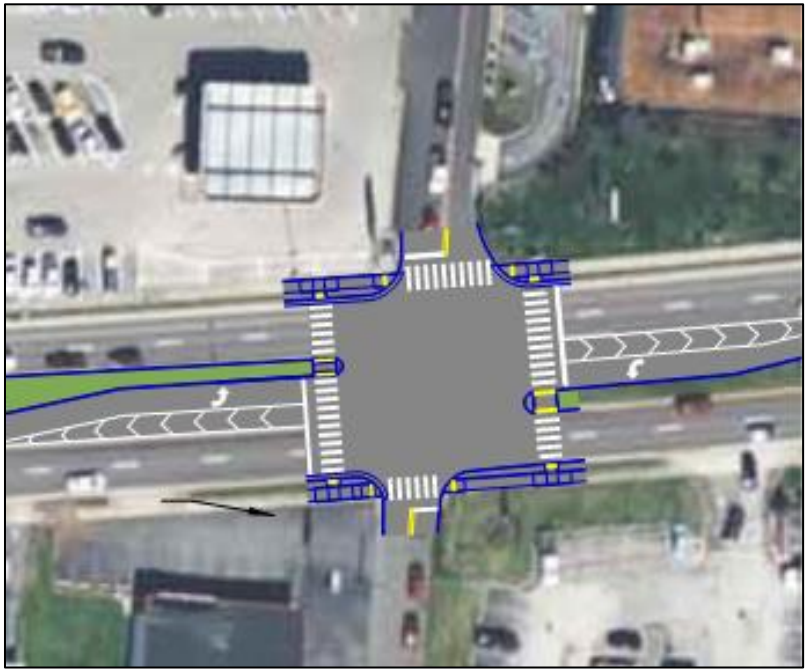
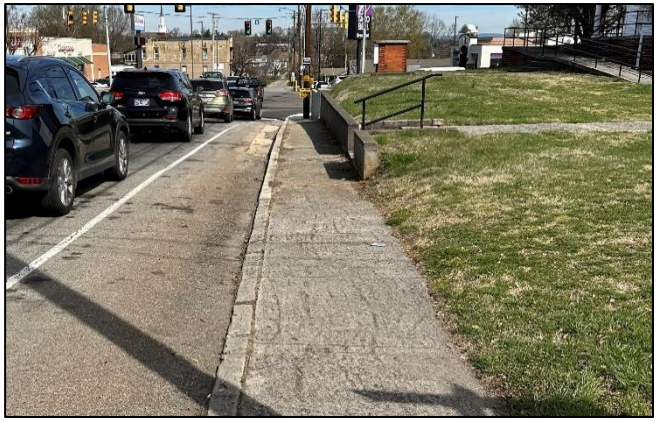


Figure 5-17 US 11E at Odell Avenue Proposed Improvements

US 11E & George Avenue

The recommendations at the US 11E and George Avenue intersection are in response to George Avenue being used as a cut-through road to bypass the US 11E and SR 92 intersection. A northbound right turn lane and southbound left turn lane will increase the capacity at the intersection and help to improve signal operations. There is an existing retaining wall along the property in the southeast corner of the intersection that should be avoided.



Additionally, the driveway to the property in the southwest corner of the intersection, along George Avenue, should be converted to a right-in/right-out driveway. Other recommendations include offset left turn lanes on US 11E, marked crosswalks, curb ramps, pedestrian refuge islands, and pedestrian signal equipment.

Cost Estimate: $638,000

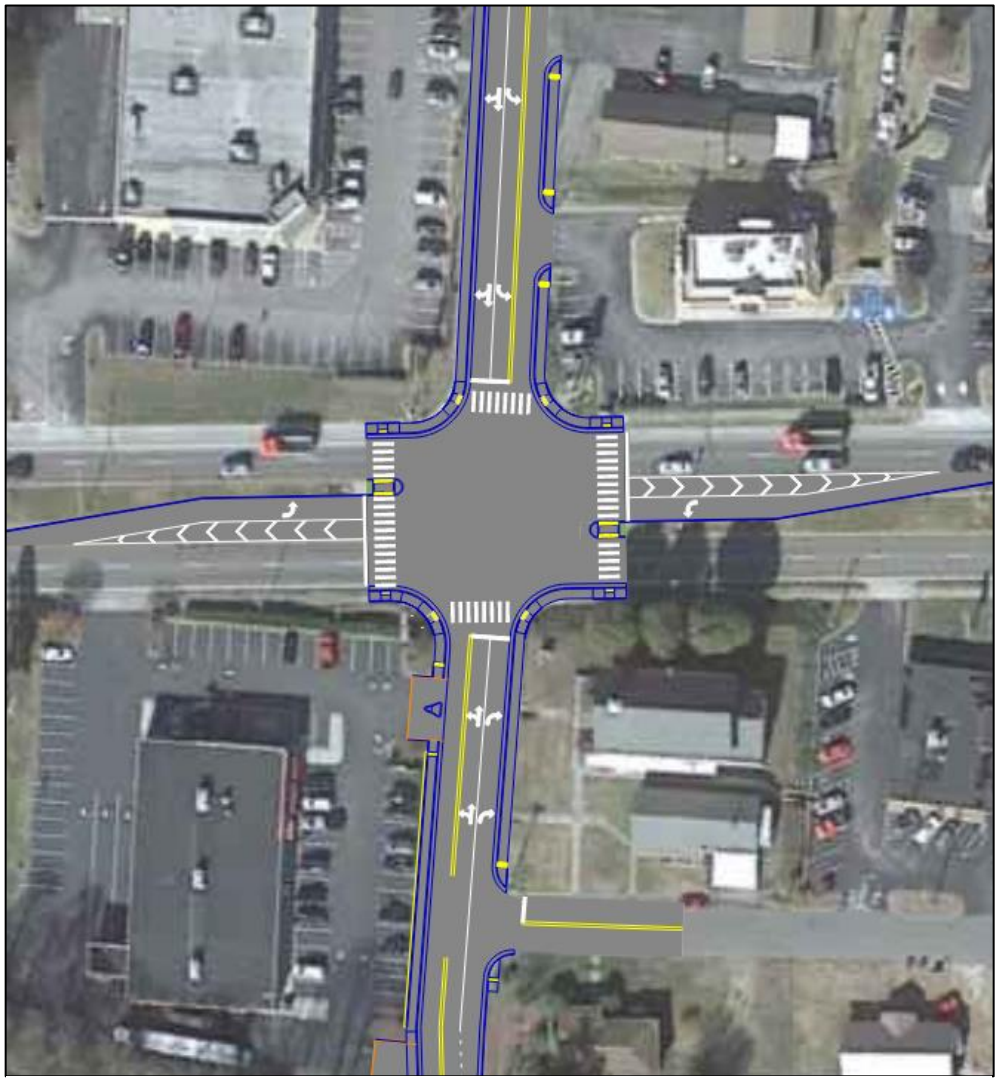


Figure 5-18 US 11E at George Avenue Proposed Improvements

US 11E & Russell Avenue

Recommendations at the US 11E and Russell Avenue intersection are similar to those at George Avenue, including addition of a northbound right turn lane and southbound left turn lane to increase the capacity for vehicles using Russell Avenue as a bypass to the US 11E and SR 92 intersection. Additional recommendations include offset left turn lanes on US 11E, marked crosswalks, curb ramps, pedestrian refuge islands, and pedestrian signal equipment.

Cost Estimate: $640,000

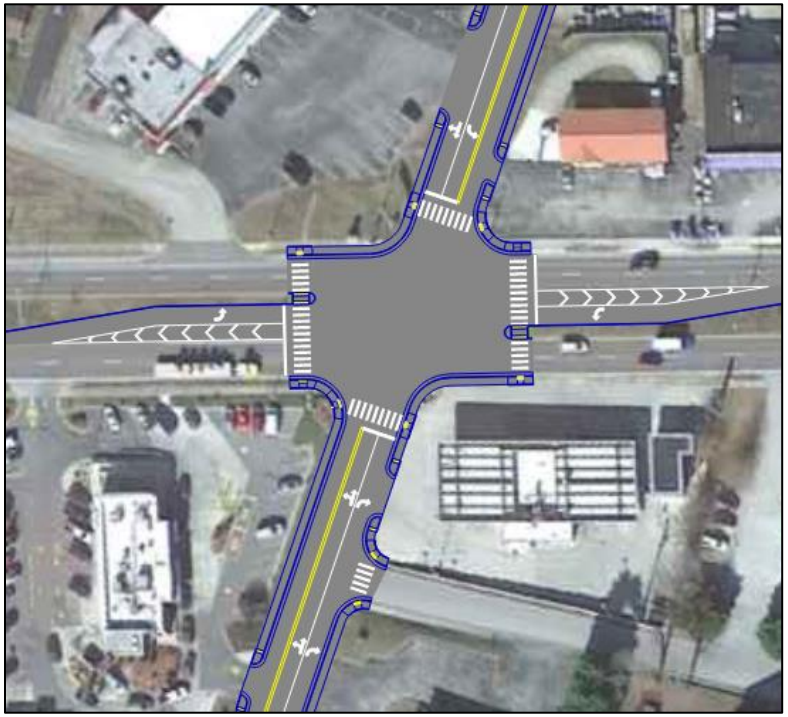


Figure 5-19 US 11E at Russell Avenue Proposed Improvements

US 11E & SR 92/Maple Avenue

The intersection of US 11E and SR 92/Maple Avenue is the only other intersection along the corridor with existing crosswalks. The recommendations at this intersection include upgrading those crossings to more visible markings and to provide crosswalks along all four approaches. The crosswalks should be oriented perpendicular to the curb line to provide the shortest path for pedestrians. Other recommendations include offset left turn lanes on US 11E, curb ramps, pedestrian refuge islands, and pedestrian signal equipment.

Cost Estimate: $299,000

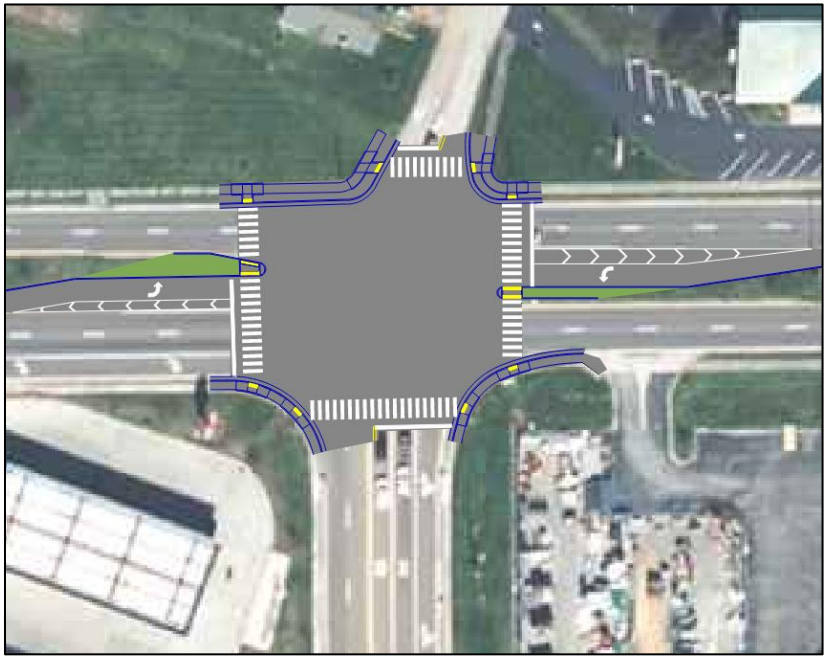


Figure 5-20 US 11E at SR 92 Proposed Improvements

SR 92 at Russell Avenue (southwest corner)

SR 92 at Russell Avenue (northwest corner)

SR 92 & Russell Avenue

At the time of this report, SR 92 is scheduled for resurfacing. In preparation of the resurfacing, TDOT has improved the curb ramps at the intersection. A field visit confirmed the ramps constructed are the bi-directional, dual crossing type. The curb ramp on the northwest corner of the intersection should be improved to eliminate the sedimentation that is occurring. The long-term recommendation is to provide separate ramps at each corner and align the crosswalks to be perpendicular to the curb, as shown in Figure 5-21.

Cost Estimate: $134,000

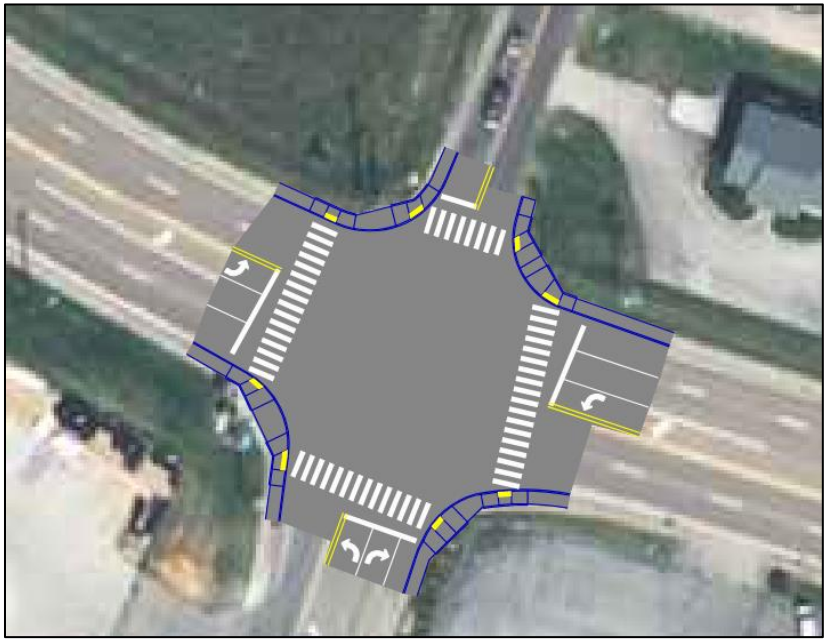


Figure 5-21 SR 92 at Russell Avenue Long-Term Improvement

SR 92 & George Avenue

Similar to the SR 92 and Russell Avenue intersection, TDOT has upgraded the curb ramps at the George Avenue intersection in preparation for the resurfacing along SR 92. As shown in the photo, there is an existing channelized right turn lane on the westbound approach with a pedestrian refuge island. Two alternatives are proposed for this intersection and are described below.

SR 92 at George Avenue (westbound channelized right turn lane)

Short-Term Alternative

The short-term alternative maintains the existing westbound channelized right turn lane and curb ramps; however, it proposes to bring the northbound right turn lane under signal control and remove the channelization. A rectangular rapid flashing beacon (RRFB) at the pedestrian crossing within the channelized right turn lane is recommended to alert drivers when there is a pedestrian in the crosswalk. A crosswalk across the eastbound approach of the intersection is also proposed.

Cost Estimate: $144,000

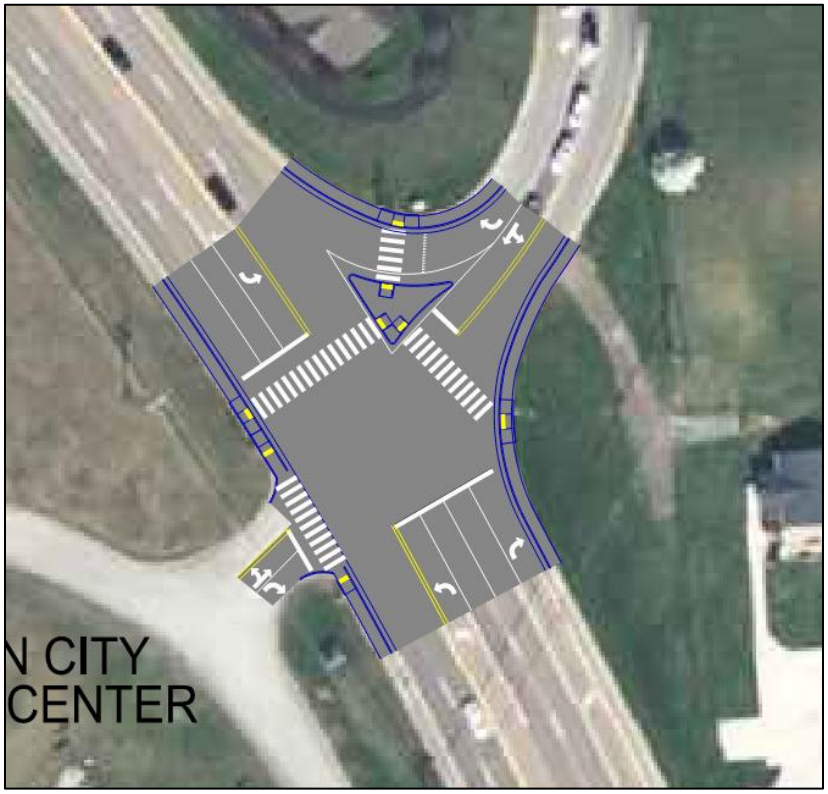


Figure 5-22 SR 92 at George Avenue Short-Term Improvement

Long-Term Alternative

The long-term alternative removes both channelized right turn lanes from the intersection and proposes marked crosswalks across all four approaches. The curb ramps would need to be relocated to provide pedestrians with the shortest crossing paths perpendicular to the roadway.

Cost Estimate: $254,000

Figure 5-23 SR 92 at George Avenue Long-Term Improvement

5.4. Median/Access Improvements

Throughout the corridor study area, there is a grass median that divides the roadway. The grass median is a safety asset for the corridor, as it provides a physical barrier between bidirectional traffic and only allows left turns at defined median openings. The corridor was assessed regarding how to improve certain existing median openings that cause recurring issues with congestion or crashes. The following sections provide the access management recommendations along the corridor.

US 11E at Mossy Creek Drive/Clinch View Circle

The issues at this location stem from the conflicts at the median opening at Clinch View Circle. Drivers traveling westbound must make a U-turn at the existing opening to access the fast-food restaurants located on the south side of US 11E at Mossy Creek Drive. There is a high volume of U-turns at the median, making it challenging for residents along Clinch View Circle to leave their neighborhood. The existing median opening is not wide enough to accommodate the conflicting turning movements.

Two alternatives were prepared for the area between Clinch View Circle and N Chucky Pike. The first alternative, presented in Figure 5-24, maintains the existing right-in/right-out configuration at Mossy Creek Drive and extends Commerce Court to Clinch View Circle. This would create a "backage" road to access the commercial properties and reduce the existing U-turn movement. The advantage of this alternative is that it introduces the use of a back access drive for vehicles to use in lieu of accessing properties directly from US 11E. As parcels on the south side of US 11E develop, an existing roadway network would already be in place to help alleviate conflict points. Additionally, as parcels develop, the volumes at Clinch View Circle would likely increase to the point where a signal would be warranted. Without the installation of the connection of Commerce Court to Clinch View Drive and the consolidation of traffic at the single roadway, the volumes will remain steady, and a signal will not be warranted.

Figure 5-24 Clinch View Circle/Mossy Creek Drive Proposed Access Improvements (Alt 1)

Figure 5-25 Clinch View Circle/Mossy Creek Drive Proposed Access Improvements (Alt 2)

The second alternative is presented in Figure 5-25. In this alternative, a directional median opening is recommended at Mossy Creek Drive to allow westbound drivers direct access. This configuration would redirect many of the existing conflicting U-turns at Clinch View Circle and make it safer for residents along Clinch View Circle to exit their neighborhood. The alternative provides direct access at the Mossy Creek Drive intersection, which is where most drivers are destined, and removes the conflicts at Clinch View Circle, the only access for residents of the Buena Vista neighborhood. Both alternatives address safety and access, but the directional median opening at Mossy Creek Drive is the preferred alternative based on public feedback.

Cost Estimate – Alternative 1: $95,600

Cost Estimate – Alternative 2: $105,000

US 11E at Meadow Spring Drive

Meadow Spring Drive provides access to several residences north of US 11E. While assessing the corridor, it was evident that better access at Meadow Spring Drive could help to alleviate traffic congestion at the N Chucky Pike intersection to the east. The crash data show rear end and angle crashes have occurred at the intersection and there was one serious injury crash involving a pedestrian walking along the north shoulder of US 11E. Two alternatives have been prepared as a short-term recommendation and a long-term recommendation.

Alternative 1

The short-term alternative for Meadow Spring Drive preserves the existing median opening location but provides offset left turn lanes to better define the allowed movements. The left turn lanes protect vehicles from the high-speed through traffic, which is typically a major contributor to rear end crashes at median openings. The recommendation provides room for eastbound vehicles to make a U-turn to access

Meadow Spring Drive. As part of this recommendation, driveways along the commercial property on the north side of US 11E are consolidated and the westernmost driveway is proposed to be realigned to reduce confusion with the adjacent driveway.

Cost Estimate – Alternative 1: $107,000

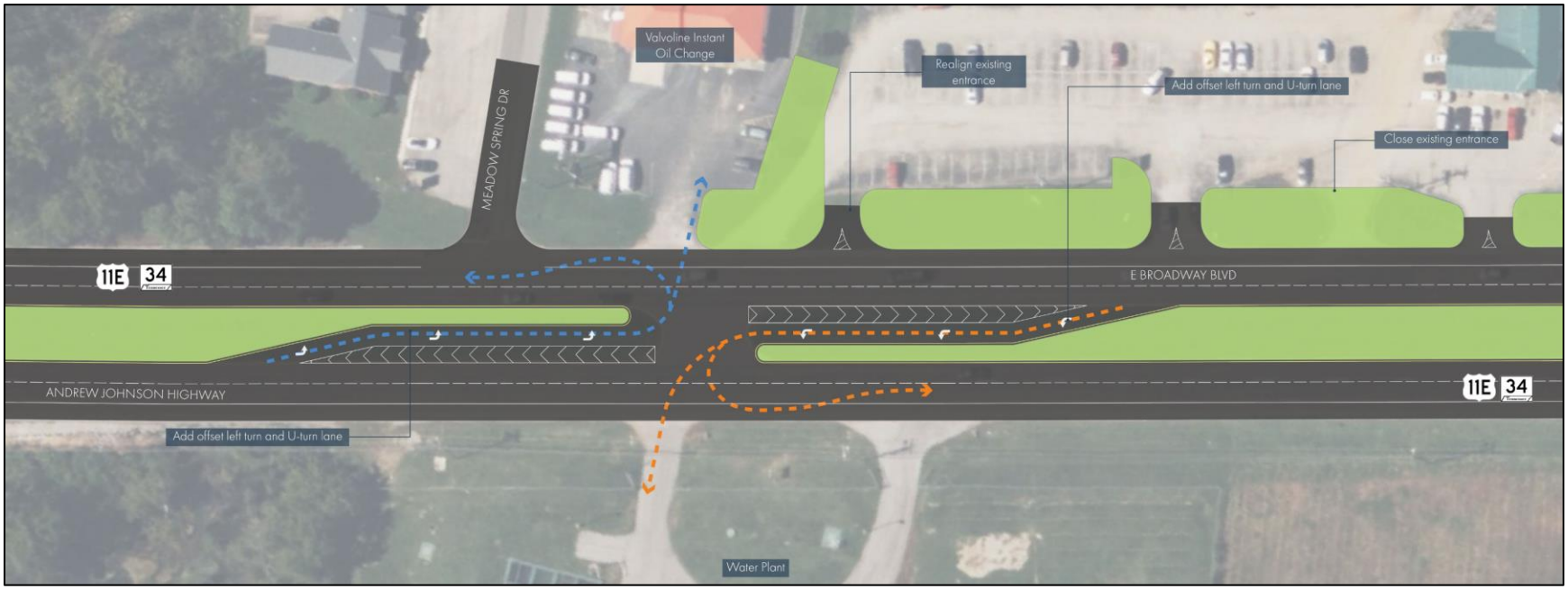


Figure 5-26 US 11E at Meadow Spring Drive Proposed Short-Term Access Improvements

Alternative 2

The second alternative for Meadow Spring Drive looks more holistically at access control along the segment of US 11E between the Nyrstar Coy Mine and Mossy Creek Drive. Directional median openings are utilized to help channelize traffic and reduce the number of conflict points present at full median openings. The concept ties in the recommended alternative for Clinch View Circle and Mossy Creek Drive. In the event the parcel on the south side of US 11E west of Clinch View Circle develops, there is enough space to allow another westbound directional median opening to access the property.

Cost Estimate – Alternative 2: $277,000

Figure 5-27 US 11E at Meadow Spring Drive Proposed Long-Term Access Improvements

Figure 5-27 US 11E at Meadow Spring Drive Proposed Long-Term Access Improvements

US 11E at Pearl Avenue

Offset turn lanes are proposed at the US 11E and Pearl Avenue intersection. This intersection experienced a crash rate over twice the critical crash rate with a high occurrence of angle and rear end crashes. These types of crashes are likely due to the lack of left turn lanes in the median. The recommendation also includes closing the full median opening between Pearl Avenue and Odell Avenue since it does not comply with TDOT's current median spacing requirements. As a result, the Food City driveway would become a right-in/right-out access.

Cost Estimate: $164,000

Figure 5-28 US 11E at Pearl Avenue Proposed Access Improvements

US 11E at Universal Road

During the field visit, many vehicles were observed turning left onto Universal Road. This recommendation proposes adding a left turn lane onto and an acceleration lane from Universal Road. There is an existing full median opening just east of Universal Road that is proposed to be closed as part of this recommendation.

Cost Estimate: $58,300

Figure 5-29 US 11E at Universal Road Proposed Access Improvements

6. IMPLEMENTATION

This study provides several recommendations at key locations to help create a safer corridor that improves the mobility for all users. This section describes how each recommendation was ranked and prioritized to come up with a strategic implementation plan that categorizes projects into short-term (1-3 years), mid-term (3-10 years), and long-term (more than 10 years) timeframes.

6.1. Project Evaluation Factors

Each project identified in the Recommendations was assessed based on four criteria to aid in prioritization. Within each criterion, projects were scored based on a system where 1 represents a higher priority and is denoted by a green dot, 2 represents a medium priority and is denoted by a yellow dot, and 3 represents a lower priority and is denoted by a red dot.

Each factor is described below:

Complexity – The complexity ranking is based on the level of design and thus the degree of procedural tasks that are anticipated with each project.

1 = low complexity; *examples include projects that do not require right-of-way acquisition or detailed survey to design*

2 = moderate complexity; *examples include projects that moderately alter the curb or require new pavement*

3 = high complexity; *examples include projects that require right-of-way acquisition, significantly alter the curb, or require an environmental analysis before construction*

Safety – The safety ranking is based on the existing safety concerns at the location of the project. If a project provides protection for vulnerable users, it is automatically given the highest ranking.

1 = highest safety priority; *project is located at an area where a pedestrian-involved crash occurred, or the crash rates are significantly above average (actual crash rate/critical rate > 1)*

2 = medium safety priority; *project is located at an area where the crash rates are above average (actual crash rate/statewide average > 1.15)*

3 = lowest safety priority; *project is located at an area where the crash rates are at or below average (actual crash rate/statewide average < 1.15)*

Mobility – The mobility ranking is based on the type of modal improvements being made.

1 = mobility for all modes; *project incorporates complete street design*

2 = mobility for vehicular traffic along corridor; *project incorporates access management to increase vehicle efficiency*

3 = mobility for vehicular traffic at intersection; *project improves vehicular mobility at a single location*

Cost – The cost ranking is based on the level of financial investment that would be required as determined by the cost estimates.

1 = low cost; *projects less than $250,000*

2 = moderate cost; *projects greater than $250,000 and less than $750,000*

3 = high cost; *projects greater than $750,000*

6.2. Implementation Plan

The project evaluation summary is provided in Table 6-1. The scores in the table are categorized by the following:

- highest priority rankings (1)
- medium priority rankings (2)
- lowest priority rankings (3)

The total score for each project was calculated by taking the average score across each evaluation category and is shown in the Priority Band column, which indicates timeframe the improvement should fall under.

6.2.1. Short-Term Improvements

Short-term improvement projects are those than can be completed within one to three years or provide an exceptional safety benefit and should thus be implemented as soon as possible. The recommended short-term improvements are:

- Sidewalk Repairs
- New Sidewalks
- US 11E & E Old AJ Highway Signal
- US 11E at Mossy Creek Drive and Clinch View Circle (either Alternative 1 OR 2)
- US 11E at Meadow Spring Drive (either Alternative 1 OR 2)
- US 11E at Pearl Avenue

6.2.2. Mid-Term Improvements

Mid-term improvement projects are those that can be completed within three to ten years, either because of the complexity of the project or the cost. The recommended mid-term improvements are:

- Shared Use Path
- US 11E & Odyssey Road (either Alternative 1 OR 2)
- US 11E & N Chucky Pike (either Alternative 1 OR 2)
- US 11E & George Avenue
- US 11E & Russell Avenue
- SR 92 & Russell Avenue
- SR 92 & George Avenue – Alternative 1
- US 11E & Universal Road

6.2.3. Long-Term Improvements

Long-term improvement projects are those that do not pose an immediate safety need and could be planned for a longer-term horizon. The recommended long-term improvements are:

- US 11E & Hicks Road
- US 11E & Odell Avenue
- US 11E & SR 92
- SR 92 & George Avenue – Alternative 2

Table 6-1 Project Prioritization Table

Location	Recommendation	COMPLEXITY	SAFETY	MOBILITY	COST	PRIORITY BAND	Cost Estimate
Corridor-wide	Sidewalk Repairs						$ 106,000
US 11E at Mossy Creek Drive and Clinch View Circle	Alt. 1 - Connect Commerce Court to Clinch View Circle						$ 95,600
US 11E at Mossy Creek Drive and Clinch View Circle	Alt. 2 - Directional median opening to Mossy Creek Drive						$ 105,000
US 11E at Pearl Avenue	Offset left turn lanes and median closure at Food City driveway						$ 164,000
Corridor-wide	New Sidewalks						$ 831,000
US 11E & E Old AJ	New Signal						$ 304,000
US 11E at Meadow Spring Drive	Alt. 1 - Full access median opening with offset left turn lanes						$ 107,000
US 11E at Meadow Spring Drive	Alt. 2 - Directional median openings/access control						$ 277,000
Corridor-wide	Shared-Use Path						$ 5,670,000
US 11E & Odyssey Road	Alt. 1 - Intersection improvements with channelized right turn lanes						$ 554,000
US 11E & Odyssey Road	Alt. 2 - Intersection improvements without channelized right turn lanes						$ 473,000
SR 92 & Russell Avenue	Separate curb ramps and crosswalks						$ 134,000
SR 92 & George Avenue	Alt. 1 - Intersection improvements with channelized right turn lanes						$ 144,000
US 11E at Universal Road	Left turn lane with acceleration lane						$ 58,300
US 11E & N Chucky Pike	Alt. 1 - Intersection improvements with channelized right turn lanes						$ 410,000
US 11E & N Chucky Pike	Alt. 2 - Intersection improvements without channelized right turn lanes						$ 388,000
US 11E & George Avenue	Intersection improvements with side road turn lanes						$ 638,000
US 11E & Russell Avenue	Intersection improvements with side road turn lanes						$ 640,000
US 11E & Odell Avenue	Intersection improvements						$ 587,000
US 11E & SR 92	Intersection improvements						$ 299,000
SR 92 & George Avenue	Alt. 2 - Intersection improvements without channelized right turn lanes						$ 254,000
US 11E & Hicks Road	Intersection improvements with side road turn lanes						$ 759,000

6.3. Funding Opportunities

Transportation projects can often be costly to design and construct. Without intergovernmental assistance, a single government entity may find it difficult to adequately resolve its transportation needs drawing solely from its own tax base. Fortunately, a variety of state of and federal programs are available to assist with transportation funding. Table 6-2 provides summaries of available funding programs for implementing transportation improvements.

Table 6-2 Available Funding Strategies

Grant/Program	Agency	Examples of Eligible Activities	Funding
Multimodal Access Grant	TDOT Multimodal Division	Multimodal Access Grant funding is available to improve transportation access for pedestrians, bicyclists, and transit users along State Routes using the following improvement types: sidewalks; pedestrian crossing improvements; bicycle facilities; multi-use paths; transit stop amenities; complete streets, road diet or traffic calming measures; improvements that address ADA non-compliance; pedestrian-scale lighting; and other improvements which primarily improve access for multimodal users.	90% state 10% local match State portion may not exceed $1,125,000
National Highway Performance Program (NHPP)	FHWA funds distributed to TDOT	The National Highway Performance Program provides federal funding to support the condition and performance of the National Highway System and for the construction of new facilities on the National Highway System. Projects may include planning, design, and construction.	Conditional Apportionment based on TDOT discretion
Highway Safety Improvement Program	FHWA funds distributed to TDOT	HSIP funds can be used for safety projects that are consistent with the State's Strategic Highway Safety Plan and that correct or improve a hazardous road location or feature or address a highway safety problem. The following projects are eligible: installation of vehicle-to-infrastructure communication equipment; pedestrian hybrid beacons; and roadway improvements that provide separation between pedestrians and motor vehicles, including medians and pedestrian crossing islands	90% federal 10% local match

Grant/Program	Agency	Examples of Eligible Activities	Funding
Congestion Mitigation and Air Quality Improvement Program (CMAQ)	FHWA funds distributed to TDOT	The Congestion Mitigation and Air Quality Improvement program provides dedicated federal funding for projects that improve air quality and reduce congestions. Air quality is improved by funding transportation projects and programs that reduce emissions from vehicles in designated air quality nonattainment and maintenance areas. Project involving carpooling and vanpooling, roundabouts, or traffic flow improvements/intelligent transportation systems are eligible for 100% federal funding. Other project types are eligible for 80% federal funding.	80-100% Federal Match
Transportation Alternatives Program (TAP)	FHWA funds distributed to TDOT & TPO	All facilities must be hard-surfaced, ADA compliant, and provide adequate connectivity and separation from vehicular traffic. Sidewalk facilities must be a minimum of 5 feet wide and shared-use facilities must be a minimum of 10 feet wide. TAP funds can be used for sidewalks, walkways or curb ramps, bike lane striping, wide paved shoulders, bike parking and bus racks, traffic calming for the safety of bike/ped traffic, off-road trails, bike and pedestrian bridges/underpasses, and ADA compliance.	20% local match for construction Preliminary engineering, design, and ROW expenses are responsibility of local government
Surface Transportation Block Grant	FHWA funds distributed to TDOT & MPO	In general, STBG projects may not be on local roads or rural minor collectors. There are a number of exceptions to this requirement, such as the ability to use up to 15 percent of a state's rural suballocation on minor collectors. Other exceptions include: bridge and tunnel projects; safety projects; fringe and corridor parking facilities/programs; recreational trails, pedestrian and bicycle projects, and safe routes to school projects; boulevard/roadway projects largely in the ROW of divided highways; inspection/evaluation of bridges, tunnels, and other highway assets; port terminal modifications; and projects within the pre-FAST Act title 23 definition of "transportation alternatives."	80-100% federal 20% local match
Safe Streets and Roads for All (SS4A); Planning & Demonstration and Implementation Plan Grants	FHWA	The SS4A Action Plan Grant provides federal funds for Planning and Demonstration projects which can include an Action Plan. The goal of an Action Plan is to develop a strategy to prevent roadway fatalities and serious injuries in a locality. The SS4A Implementation Plan Grant provides federal funds for projects and strategies identified in an Action Plan that addresses roadway safety problems.	80% Federal Match 20% State or Local Planning & Demonstration: $100,000 - $10,000,000 Implementation Plan: $2,500,000 - $25,000,000

Grant/Program	Agency	Examples of Eligible Activities	Funding
TN Highway Safety Office Grants	TN Highway Safety Office	The Tennessee Highway Safety Office provides grants to programs which are designed to reduce the number of fatalities, injuries and related economic losses resulting from traffic crashes on Tennessee's roadways. Grant areas include, but are not limited to: Alcohol and Impaired Driving Education & Enforcement, Bicycle and Pedestrian Safety, High Visibility Enforcement, Police Traffic Services, and Safe Communities.	Conditional
Community Development Block Grant	TN Dept. of Economic and Community Development	Provide essential, pressing community development needs in underserved areas. Can go towards community livability projects.	87% federal 13% Local Match $400,000 Maximum
Healthy Built Environment Grants	TN Dept of Health	Healthy Built Environment grants are non-competitively provided to each county in Tennessee. These funds are to be used for transportation convening, planning, programming, and construction projects.	Conditional $20,000 (2019)
Built Environment Grants	TN Dept of Health	These grants aim to increase access to safe and publicly accessible places that provide opportunities for physical activity for a diverse group of users, including those who live, visit, work, play, worship, and learn in the community.	TBD
Project Diabetes	TN Dept of Health	Grants are awarded to community partners with a focus on reducing overweight and obesity as risk factors for the development of type 2 diabetes. Grant activities are geared toward interventions that are applied before there is any evidence of disease.	Category A – funded up to 3 years; max of $150,000/year Category B – funded up to 2 years; max of $15,000/year
AARP Community Challenge	AARP	The AARP Community Challenge provides small grants to fund quick-action projects that can help communities become more livable for people of all ages. Applications will be accepted for projects to improve public spaces, housing, transportation and civic engagement; support diversity, equity and inclusion; build engagement for programs under new federal laws; and pursue innovative ideas that support people aged 50 or older. Transportation and Mobility projects include options that increase connectivity, walkability, bikeability, wayfinding, access to transportation options and roadway improvements.	None Required.

Grant/Program	Agency	Examples of Eligible Activities	Funding
Rebuilding American Infrastructure with Sustainability & Equity (RAISE)	FHWA	The RAISE grant provides funds for surface transportation infrastructure projects that will improve: safety; environmental sustainability; qualify of life; mobility and community connectivity; economic competitiveness and opportunity including tourism; state of good repair, partnership and collaboration; and innovation. Funds can be used for planning and development as well as construction, including right-of-way acquisition.	Up to 20% match may be required. Minimum award for rural areas is $1,000,000.
Rural Surface Transportation Grant Program	FHWA	The Rural Surface Transportation Grant Program supports projects that improve and expand the surface transportation infrastructure in rural areas to increase connectivity, improve the safety and reliability of the movement of people and freight, and generate regional economic growth and improve quality of life.	80% match for planning grants and no more than 50% for capital projects.

TDOT= Tennessee Department of Transportation; FHWA= Federal Highway Administration