CRTPA

N. Monroe Safety Implementation

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Executive Summary

The North Monroe Street (SR 63/US 27) corridor (the corridor) is a major north/south route connecting the urbanized Tallahassee core with the suburban and rural communities to the north. This route also contains one of Leon County's four interchanges with Interstate 10 (I-10) which roughly bisects the county. The corridor is largely represented by four to six lane sections with speeds ranging from 35 miles per hour (mph) to 45 mph. Many businesses and homes are adjacent to the corridor presenting significant travel conflict points which have led to high crash rates at select locations along the corridor.

As a result of these factors, an analysis was conducted to identify potential improvements that would improve safety for all users of this corridor. The purpose of this study was to outline and define the need for safety improvements in the corridor and support addressing that need by conducting the following:

- Seven-year safety analysis (2017-2023)
- Camera count and near miss analysis for pedestrians and bicyclists
- Stakeholder Coordination
- Walking safety audit
- Site visits
- A public workshop
- Development of a Safe Streets for All (SS4A) Implementation Grant
    - Leveraging $4.2 million in local funds to receive an additional $16.8 million as part of the federal grant
    - Results pending
- Potential improvement identification
- Potential improvement cost estimates
- Potential improvement visualizations to show suggested location and potential alignment

This implementation plan provides the location and identification of potential improvements to be implemented along one of Leon County and Tallahassee's major corridors.

Context

The North Monroe Street (SR 63/US 27) corridor is one of the Capital Region's most significant roadways, providing direct interstate access into downtown Tallahassee and operating as a significant freight, commuting, and tourism route. This corridor has a history of safety concerns which have been discussed through various Capital Region Transportation Planning Agency (CRTPA), City of Tallahassee, and Leon County efforts. Depicted in Figure 1, the corridor was identified as part of the Vulnerable Roadway User (VRU) High Injury Network (HIN) developed within the Safe Streets and Roads for All Safety Action Plan (Safety Action Plan)[1] completed last

[1] https://crtpa.org/safe-streets-and-roads-for-all-ss4a-safety-action-plan/

year (2023). This document will describe these conditions, outlining the areas of concern and highlighting how the implementation of safety improvements will provide significant benefits to the corridor.

Figure 1: Project Location and High Injury Network

The CRTPA developed this report and a supporting implementation grant application for the specific purpose of implementing a project to improve safety along one of the region's most critical HIN corridors. The grant was submitted under the 2024 SS4A Implementation Grant Program. In coordination with the Florida Department of Transportation (FDOT), the Blueprint Intergovernmental Agency (BPIA) has committed to providing the local match for the grant and implementing the safety improvements upon successful award. Figure 2 indicates a sidewalk gap area with clear signs of wear.

Figure 2: Pedestrian Gap Area

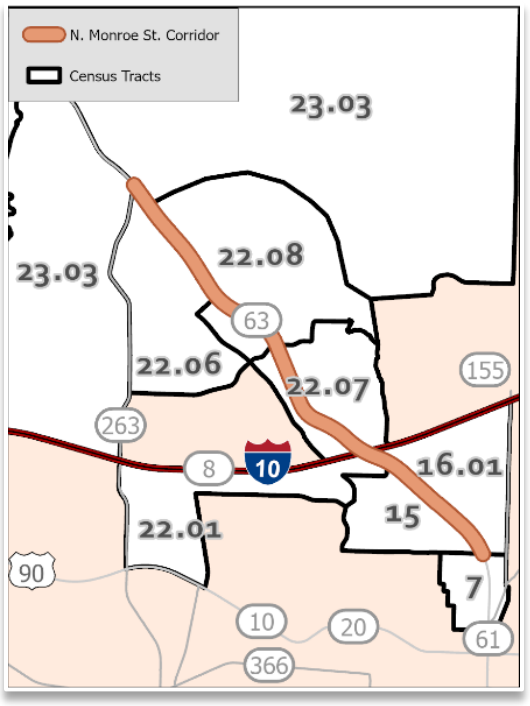
Throughout the years, a series of improvements have been introduced along the corridor; however, safety issues and high crash rates remain even with the past improvements. This report builds upon significant prior investment along the corridor to create a safe complete streets network. Through the identification within the Safety Action Plan, a safety-specific review of the corridor has been conducted to identify implementable improvements.

The corridor is home to historically disadvantaged populations as identified within the USDOT Equitable Transportation Community ETC Explorer (ETC Explorer). Beyond the Census population statistics, a known population of unhoused individuals live in the area. These disadvantaged communities and individuals rely on the sidewalk and bicycle infrastructure to access their destinations, yet there are multiple network gaps along the corridor. Therefore, the corridor is a known hotspot for VRUs, and a high level of bicyclist and pedestrian crashes.

To address these gaps and increase the safety along the corridor, an analysis and in-depth review of the conditions and safety statistics of the corridor was conducted. This analysis utilized known crash locations, previous planning efforts, stakeholder / public engagement, GPS probe data, a walking safety audit, and a camera count bicycle / pedestrian analysis to identify areas of concern and determine recommended improvements to address the high number of bicycle and pedestrian crashes.

Location

Figure 3: Adjacent Census Tracts



North Monroe Street is located in the northern area of Tallahassee. Leon County shares a northern boundary with Georgia and is connected to the remainder of northern Florida via the east/west route of I-10 which bisects the county. The improvements recommended in this project extend throughout a seven-mile corridor from West Tharpe Street at the southern terminus near the Tallahassee Midtown Area to Capital Circle NW/Old Bainbridge Road to the north in unincorporated Leon County. The corridor passes through nine census tracts with 37,227 residents according to the 2020 Census 5-year American Community Survey (ACS) as depicted in Table 1 and Figure 3. The 2020 Census total population of Leon County was 291,863.

The corridor is home to many community resources such as an emergency room, medical offices, schools, religious centers, cultural sites, retail, and residential areas. The potential safety improvements will increase the multimodal network connectivity and accessibility along the corridor and between activity centers.

Table 1: Corridor Census Tracts

Name	2020 Census 5-Yr ACS Population	Population Metric
Census Tract 7	2,076	--
Census Tract 15	5,076	Area of Persistent Poverty
Census Tract 16.01	4,856	Area of Persistent Poverty
Census Tract 22.01	6,032	Area of Persistent Poverty / ETC Disadvantaged
Census Tract 22.06	3,606	--
Census Tract 22.07	2,362	--
Census Tract 22.08	5,034	--
Census Tract 23.02	3,385	--
Census Tract 23.03	4,800	--
Total	37,227	--

Source: 2020 US Census ACS 5-yr; Climate and Economic Justice Screening Tool; ETC Explorer

Land Use and Zoning

At the northern terminus of North Monroe Street, the corridor is bounded by Rural Future Land Use category (based on the Tallahassee- Leon County Future Land Use Map). Moving south along North Monroe Street, the corridor transitions to Commercial Parkway Zoning and Suburban Future Land Use category. As North Monroe extends south into the city, the Lake Protection land use category bounds the area to ensure that development within the Lake Jackson basin imposes minimal impact on water quality. Recreation / Open Space and Suburban land use is also found within this area towards the south near the Lake Jackson Town Center at Huntington. A mix of Planned Unit Developments (PUDs), General Commercial Zoning, Office Residential Medium Density, and Activity Center categories bound both sides of North Monroe Street nearing Lake Ella. As North Monroe Street nears downtown and Midtown, Central Urban Zoning and Land Use encompasses the area.

Previous Studies, Ongoing and Planned Projects

Surveys were conducted by the Tallahassee-Leon County Planning Department from July 5 through October 14, 2023, As part of the North Monroe Corridor Strategic Initiative for the North Monroe Street corridor.[2] According to survey data, out of 306 responses, 30% of participants expressed that traffic calming transportation enhancements would be beneficial for improving conditions for drivers on North Monroe Street. Additionally, transportation enhancements to improve conditions for each respective mode of transportation were overwhelmingly identified as a need by pedestrians and bicyclists currently using the corridor.

Due to the persistent safety issues along the corridor, there have been proactive safety projects undertaken by both the public sector and private development. The projects below highlight the previous and on-going efforts for the corridor which reflect the community's commitment to safety. Information on the many of the referenced projects are available at the footnote link.[3]

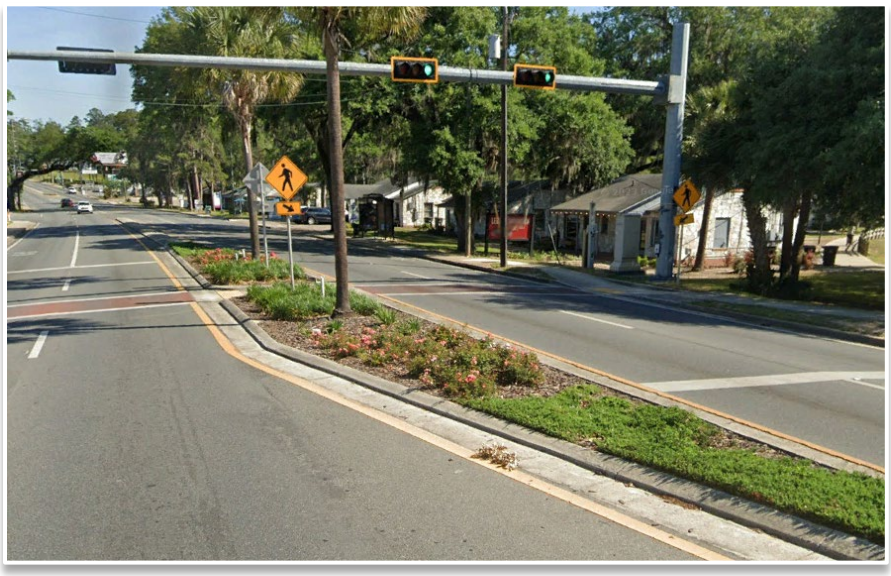
- FDOT; CRTPA: Lake Ella Median Implementation Study (2013) – Identification of improvements just south of the corridor, which led to the development of a pedestrian signal. An initial median feasibility concept was developed for the Monroe Street corridor and amended throughout the public involvement process. Median configurations were determined based on the existing right-of-way, traffic operational characteristics, and the need to improve safety.
- Tallahassee-Leon County Planning Department (TLCPD): North Monroe Corridor Action and Management Plan (2016) – An action plan for the segment north of I-10 to Fred George Road was developed to focus on business and economic revitalization as well as opportunities to enhance pedestrian and open space amenities. Key recommendations included an upgraded transit stop at Walmart near Sessions Road, revisions to signage codes for consistency and improvement,

[2] North Monroe Corridor - A Capital Gateway (leoncountyfl.gov)
[3] North Monroe Corridor Enhancement Plan (arcgis.com)

and backing for FDOT median projects. These efforts were spearheaded by a citizen-led task force consisting of business owners and residents over the course of a four-month period.

- FDOT: Monroe Street Median Construction (2016) – In 2016, construction began on landscaped medians on North Monroe Street from Tharpe Street to Seventh Avenue. A signalized pedestrian crossing (example depicted in Figure 4) was implemented following the construction of the medians.

Figure 4: Median and Pedestrian Crosswalk at US 27 Near Lake Ella



Source: Google Earth, 2023

- FDOT; Leon County; Tallahassee; CRTPA; BPIA: Monroe Street Resurfacing (2016-2023) – Resurfacing was completed from John Knox Road to Thomasville Road, and included Americans with disabilities Act (ADA) and crosswalk enhancements with the final completion in 2023. Infrastructure improvements included brick paved crosswalks, ADA sidewalks and curb ramps, bike lanes from John Knox Road to Tharpe Street, shared lane marking from Tharpe Street to Monroe Street, and new crosswalks at Monroe Street/7th Avenue and Monroe Street/Thomasville Road. Utility upgrades were also completed.
- Canterfield Assisted Living Facility (2019) – Sidewalk and pedestrian crosswalk markings were included at the N Monroe/Tharpe Street intersection as part
- of a three-story multi-unit dwelling development located on Tharpe Street focusing on assisted and independent living.
- Lake Jackson Emergency Room (2019)[4] –A freestanding emergency room located on North Monroe Street (see Figure 5) was opened in 2019. This project included the implementation of a five-foot-wide sidewalk with a landscape buffer and trees from Northmont Drive to Okeeheepkee Road.

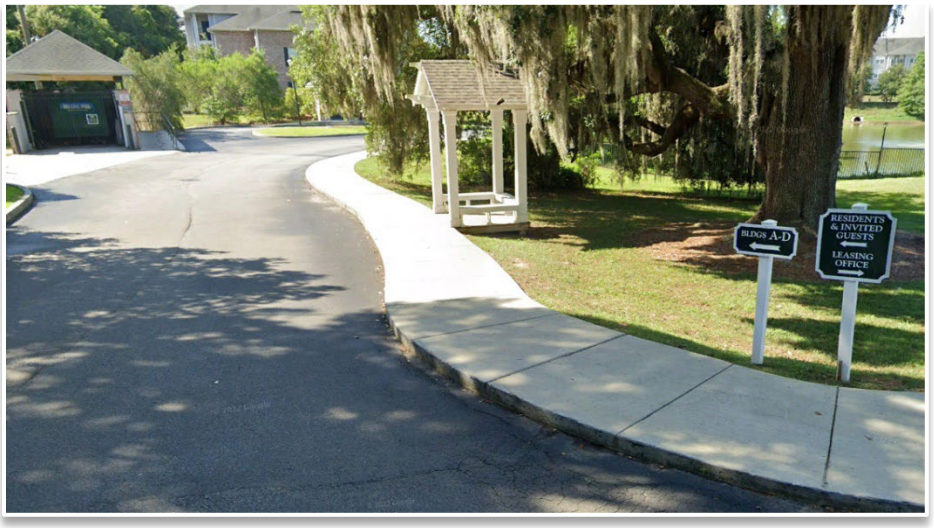
[4] https://culpepperconstruction.com/construction/lake-jackson-emergency-room-capital-regional-medical-center/

Figure 5: Lake Jackson ER Sidewalk

Source: North Monroe Corridor Enhancement Plan, 2019

- FDOT; CRTPA; Tallahassee: Safe Routes to Schools (2019-2020) – This FDOT project consisted of various Safe Routes to School projects constructing approximately 0.7 miles of sidewalk in various locations including Canopy Oaks Elementary School and the School of Math and Sciences on North Monroe Street.
- Arbor Landing Development (2020) – This 2020 private investment development located on North Monroe Street (south of Capital Circle NW/Old Bainbridge Road) featured an internal wide sidewalk infrastructure which could create a connection to sidewalks along North Monroe Street. (example shown in Figure 6). Arbor Landing features 120 multi-family units.

Figure 6: Sidewalk at Arbor Landing



Source: Google Earth, 2023

- Summerfield Development (2021) – Continuous sidewalk development and bike lane connections with landscape buffers were constructed on North Monroe Street after the development of single-family homes south Old Bainbridge Road

on North Monroe Street. As of February 2024, 143 homes have been constructed in Summerfield.

- TLCPD: Citizens North Monroe Task Force (2021)[5] – A citizens task force (consisting of community stakeholders, business owners, and residents of the area was established (depicted in Figure 7) in 2021 to find opportunities for corridor improvements, determine crime reduction strategies, and identify issues of homelessness to enhance the quality of life between Fred George Road and Tharpe Street.

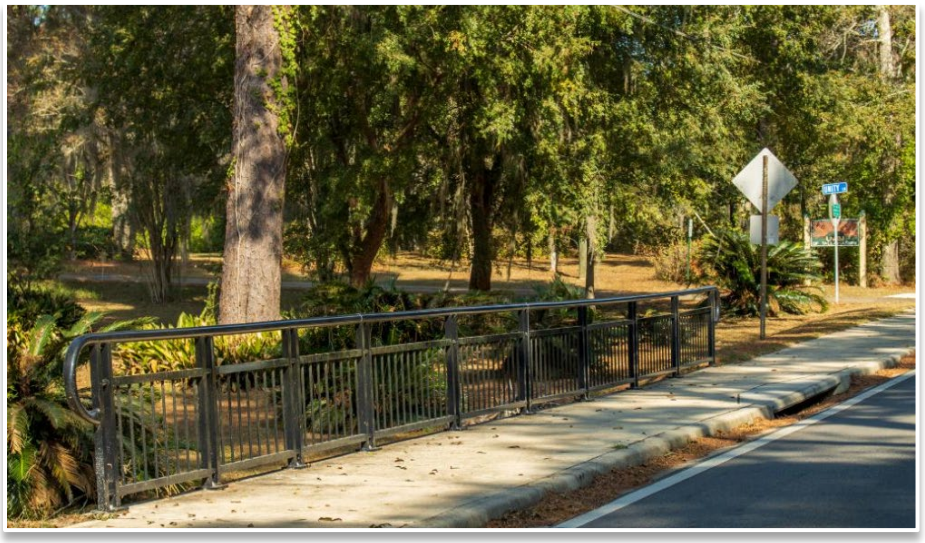
Figure 7: Citizens N. Monroe Corridor Task Force Meeting

Source: North Monroe Corridor Enhancement Plan, 2021

- Leon County: Infrastructure Investment (2022)[6] – A dedicated right turn lane, a new sidewalk on the north side of Crowder Road (see Figure 8), and an enclosed stormwater drainage system were completed along Crowder Road.

[5] Citizens' North Monroe Corridor Task Force Final Report (leoncountyfl.gov)
[6] https://www2.leoncountyfl.gov/PublicWorksProjects/Reports/ReportViewer.aspx?ID=49&Open=true

Figure 8: New sidewalk on Crowder Road



Source: North Monroe Corridor Enhancement Plan, 2021

- Leon County; BPIA: North Monroe Corridor: A Capital Gateway (2023)[7] – Continuation of public involvement, multi-day charrettes and surveys to determine community needs. The project aims to create a northern gateway entrance into Tallahassee that visibly identifies and brands Tallahassee from I-10 to Seventh Avenue. Improvements intended for this project include pedestrian and bicyclist enhancements, promoting reinvestments, and improving the overall quality of life for users of this network.
- FDOT; BPIA: North Monroe Gateway Landscaped Medians (2021-2026)[8] – Continued investment along the corridor building from previous projects and development. This project involves the modification of the roadway infrastructure to include safety and aesthetic median improvements.
- CRTPA: Safe Streets and Roads For All Safety Action Plan (2023) – Completion of the regional safety analysis and identification the North Monroe corridor within the HIN.[9] The Safe Streets and Roads for All program is intended to reduce transportation fatalities and serious injuries on roadways.
- CRTPA: Regional Freight Study (2024) – The North Monroe corridor was identified as one of the region's major freight routes, highlighting its importance for regional trade.[10] As a result of the anticipated increase of cargo movement through the region, a freight mobility framework will be identified.

Additional efforts include the City of Tallahassee and FDOT restriping pavement markings along the North Monroe corridor. The signalization of the Talpeco Road Intersection in 2020 to add turn lanes and improve safety in the area. Eight median improvements were also approved with design and installation planned for the next five years. StarMetro, the community transit provider, also implemented

[7] North Monroe Corridor - A Capital Gateway (leoncountyfl.gov)
[8] https://blueprintia.org/projects/north-monroe-gateway/
[9] https://crtpa.org/projects/safe-streets-and-roads-for-all-ss4a/
[10] https://crtpa.org/projects/crtpa-freight-plan/

recommendations to relocate and incorporate additional bus stops. A sidewalk project on the west side of North Monroe Street from John Knox Road to Lakeshore Drive has been programmed for construction funding in 2025.

Safety Analysis

Crash data for the seven (7) most recent full years (2017-2023) available was gathered to understand crash characteristics, safety trends, and hotspots along the study corridor. After cleaning and refining the dataset, a total of 3,196 crashes were recorded within the study limits.

Historical Analysis/Crash Characteristics

Out of the 3,196 crashes observed from 2017-2023, fourteen (14) resulted in fatalities and 41 resulted in incapacitating injuries. The most common types of crashes were rear end (45%), left turn (15%), and sideswipe (15%). There were 21 bicycle crashes on the study corridor, of which one (1) was fatal, and 54 pedestrian crashes, of which eight (8) were fatal. Bicycle and pedestrian crashes comprised 2.3% of all crashes and 64% of all fatal crashes in the study area.

The KABCO Injury Classification Scale describes the injury severity level for a person involved in a crash, as follows:

- K: Fatal Injury
- A: Incapacitating Injury
- B: Non-Incapacitating Injury
- C: Possible Injury
- O: Property Damage Only (PDO)

Crashes with severity defined as fatal, incapacitating, and non-incapacitating were considered to be injuries and were used in the subsequent fatal/injury (F/I) calculations.

Most crashes occurred during the day (71%), with some (21%) occurring at night but under lit conditions; only 4% occurred in the dark under unlit conditions. Most crashes took place on dry pavement (84%).

The crash dataset was reduced to a four-year period (2017-2021) for use in the grant application for consistency with the stated criteria, and further reduced to a three-year period of 2017-2019 to compare directly to the most recently available three (3)-year statewide average crash rates. However, the trends and characteristics are generally consistent across the time periods.

Crash Rate Analysis

Corridor Segmentation

To calculate crash rates and compare them to statewide averages, the study area was subdivided into intersections and segments. As shown in Table 2, the intersections (full numbers) are defined by locations with traffic signals present; the

segments (half numbers) in Table 3 are the roadway links connecting the intersections.

Table 2: Intersections and Numbering

#	Intersection
1	Tharpe Street
2	Northwood Boulevard
3	N MLK Jr. Boulevard/E Bradford Road
4	John Knox Road/Monticello Drive
5	Allen Road
6	Sharer Road
7	Lakeshore Drive
8	Callaway Road/Meginnis Arm Road
9	I-10 Eastbound Off-Ramp
10	I-10 Westbound Off-Ramp
11	Sessions Road
12	Talpeco Road
13	Crowder Road/Fred George Road
14	Faulk Drive/Perkins Road
15	Old Bainbridge Road/Capital Circle NW

Table 3: Segments and Numbering

#	Roadway Segment
0.5	South of Tharpe Street
1.5	From Tharpe Street to Northwood Boulevard
2.5	From Northwood Boulevard to N MLK Jr. Boulevard/E Bradford Road
3.5	From N MLK Jr. Boulevard/E Bradford Road to John Knox Road/Monticello Drive
4.5	From John Knox Road/Monticello Drive to Allen Road
5.5	From Allen Road to Sharer Road
6.5	From Sharer Road to Lakeshore Drive
7.5	From Lakeshore Drive to Callaway Road/Meginnis Arm Road
8.5	From Callaway Road/Meginnis Arm Road to I-10 Eastbound Off-Ramp
9.5	From I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp
10.5	From I-10 Westbound Off-Ramp to Sessions Road
11.5	From Sessions Road to Talpeco Road
12.5	From Talpeco Road to Crowder Road/Fred George Road
13.5	From Crowder Road/Fred George Road to Faulk Drive/Perkins Road
14.5	From Faulk Drive/Perkins Road to Old Bainbridge Road/Capital Circle NW
15.5	North of Old Bainbridge Road/Capital Circle NW

Figure 9 Depicts the location of the intersections and their identification number.

Figure 9: Corridor Intersection Identifiers

Traffic Volumes

Traffic volumes were estimated for use in the subsequent crash rate calculations and comparison. Statewide average crash rates for 2017-2019 were utilized and thus, volumes were estimated for this period.

Average Annual Daily Traffic (AADT) volumes were gathered from the FDOT Florida Traffic Online (FTO) database for use in the crash rate analysis. The Northwest Regional Planning Model (NWRPM) base year model was also referenced to provide information for roadway links lacking FDOT count stations. Where no information was available, assumptions were made based on the facility type, level of development, and engineering judgement. Table 4 and Table 5 document the segment and intersection volumes adopted for use in the crash rate analysis. The three locations with the highest traffic volume along the corridor were:

1. Between Lakeshore Drive and Callaway Road/Meginnis Arm Road (46,500 est.)
2. Between the I-10 ramp intersections (43,500 est.)
3. Between I-10 westbound and Sessions Road (42,833 est.)

Table 4: Intersection Traffic Volumes

#	Intersection	Average AADT 2017-2019 (South)	Average AADT 2017-2019 (North)	Average AADT 2017-2019 (East)	Average AADT 2017-2019 (West)
1	Tharpe Street	33,000	30,500	6,133	12,033
2	Northwood Boulevard	30,500	*29,667*	917	3,133
3	N MLK Jr. Boulevard/E Bradford Road	*29,667*	38,000	10,500	18,933
4	John Knox Road/Monticello Drive	38,000	38,667	15,633	9,600
5	Allen Road	38,667	*40,667*	9,100	8,333
6	Sharer Road	*40,667*	*40,500*	3,233	
7	Lakeshore Drive	*40,500*	*46,500*	3,667	7,667
8	Callaway Road/Meginnis Arm Road	*46,500*	40,500	1,000	4,933
9	I-10 Eastbound Off-Ramp	40,500	*43,500*		5,967
10	I-10 Westbound Off-Ramp	*43,500*	42,833	12,667	
11	Sessions Road	42,833	36,167	1,000	4,400
12	Talpeco Road	36,167	32,000	5,167	6,567
13	Crowder Road/Fred George Road	32,000	*29,667*	2,500	7,900
14	Faulk Drive/Perkins Road	*29,667*	19,167	6,067	2,600
15	Old Bainbridge Road/Capital Circle NW	19,167	16,367	7,667	15,633

Italicized volumes were estimated or assumed.

Table 5: Segment Traffic Volumes

#	Roadway Segment	Average AADT (2017-2019)
0.5[1]	South of Tharpe Street[1]	33,000
1.5	From Tharpe Street to Northwood Boulevard	30,500
2.5	From Northwood Boulevard to N MLK Jr. Boulevard/E Bradford Road	*29,667*
3.5	From N MLK Jr. Boulevard/E Bradford Road to John Knox Road/Monticello Drive	38,000
4.5	From John Knox Road/Monticello Drive to Allen Road	38,667
5.5	From Allen Road to Sharer Road	*40,667*
6.5	From Sharer Road to Lakeshore Drive	*40,500*
7.5	From Lakeshore Drive to Callaway Road/Meginnis Arm Road	*46,500*
8.5	From Callaway Road/Meginnis Arm Road to I-10 Eastbound Off-Ramp	40,500
9.5	From I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	*43,500*
10.5	From I-10 Westbound Off-Ramp to Sessions Road	*42,833*
11.5	From Sessions Road to Talpeco Road	36,167
12.5	From Talpeco Road to Crowder Road/Fred George Road	32,000
13.5	From Crowder Road/Fred George Road to Faulk Drive/Perkins Road	*29,667*
14.5	From Faulk Drive/Perkins Road to Old Bainbridge Road/Capital Circle NW	19,167
15.5[1]	North of Old Bainbridge Road/Capital Circle NW[1]	16,367

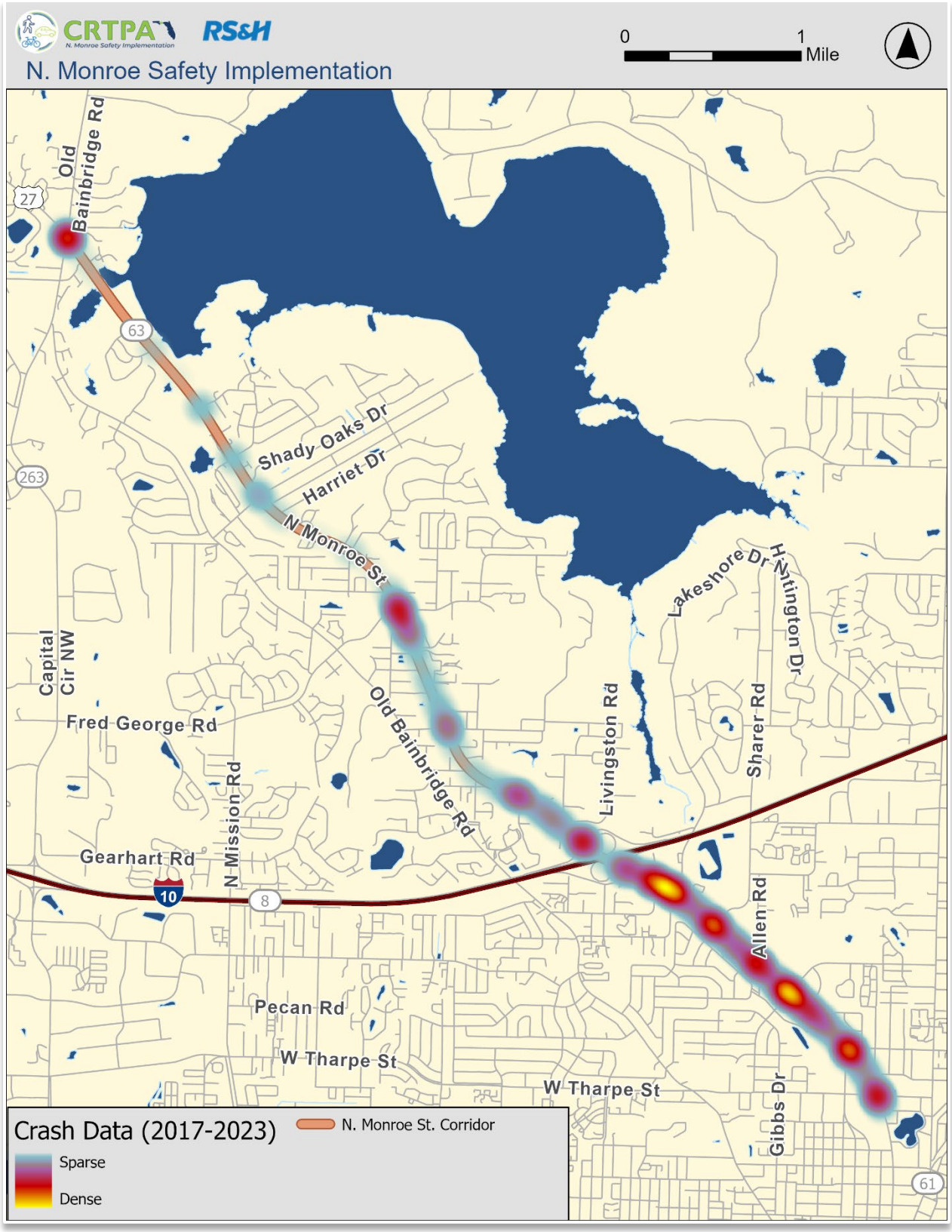
Italicized volumes were estimated or assumed.

1: These segments were included for the purpose of the crash rate analysis but were not further evaluated as they fall outside the study limits.

Crash Locations

The first step in the crash analysis was the identification of crash locations throughout the corridor. Using Signal 4 Analytics (S4 Analytics), crash data from 2017-2023 was collected along the corridor. Once collected, several analyses were conducted to determine crash rates and areas of concern or hotspots which may indicate opportunities for improvement. Figure 10 depicts the crash clustering throughout the corridor.

Figure 10: Crash Clustering in Corridor



Crash Data by Intersection

Table 6 lists, by study intersection, the total number of crashes, severe (fatal/injury) crashes, bicycle crashes, pedestrian crashes, crashes that occurred when the pavement was wet or icy, and crashes that occurred when the roadway was dark and unlit. Severe crashes are defined as KAB on the KABCO scale, which is as follows:

- K: Fatal Injury (within 30 days)
- A: Incapacitating Injury
- B: Non-incapacitating Injury
- C: Possible Injury
- O: Property Damage only

Table 6: Intersection Crash Summary

Intersection #	2017-2019	2017-2023					
	Total Crashes[1]	Total Crashes[1]	Fatal/Inj. Crashes[2]	Bike Crashes	Ped Crashes	Wet/Ice Crashes	Dark – Unlit Crashes
1	71	136	16	0	5	15	1
2	15	33	6	1	2	1	1
3	90	181	11	0	1	36	3
4	93	191	15	1	1	25	1
5	72	133	10	0	0	15	1
6	75	162	22	1	10	22	3
7	100	204	19	2	4	36	2
8	71	159	7	0	0	44	4
9	41	86	9	0	2	17	1
10	59	133	13	2	1	23	3
11	37	81	15	0	4	15	3
12	109	66	12	1	1	9	7
13	62	137	20	1	0	18	2
14	18	32	4	0	0	2	0
15	68	171	21	2	0	21	20

1: Total crashes listed for 2017-2019 (crash rate calculation) and 2017-2023 (for comparison to other raw values used in the prioritization effort).

2: Fatal/Injury crashes defined as KAB on the KABCO scale (fatal, incapacitating injury, and non-incapacitating injury).

Crash Data by Segment (2017-2023)

Table 7 lists, by study segment, the total number of crashes, severe (fatal/injury) crashes, bicycle crashes, pedestrian crashes, crashes that occurred when the pavement was wet or icy, and crashes that occurred when the roadway was dark and unlit. Severe crashes are defined as KAB on the KABCO scale, which is as follows:

- K: Fatal Injury (within 30 days)
- A: Incapacitating Injury
- B: Non-incapacitating Injury
- C: Possible Injury
- O: Property Damage only

Table 7: Segment Crash Summary

Segment #	2017-2019	2017-2023					
	Total Crashes[1]	Total Crashes[1]	Fatal/Inj. Crashes[2]	Bike	Ped	Wet/Ice	Dark – Unlit
1.5	15	37	5	1	0	0	1
2.5[3]	0	1	0	0	0	0	0
3.5	120	267	33	4	2	2	34
4.5	53	94	8	1	1	1	8
5.5	69	149	21	1	4	0	24
6.5	60	136	20	1	2	2	28
7.5	6	14	0	0	0	0	1
8.5	23	44	4	0	0	3	13
9.5	15	27	5	0	0	1	13
10.5	59	115	13	0	4	4	24
11.5	35	73	5	0	3	12	13
12.5	55	159	24	1	1	13	23
13.5	33	64	9	0	3	9	13
14.5	44	89	9	0	2	14	15

1: Total crashes listed for 2017-2019 (crash rate calculation) and 2017-2023 (for comparison to other raw values used in the prioritization effort).

2: Fatal/Injury crashes defined as KAB on the KABCO scale (fatal, incapacitating injury, and non-incapacitating injury).

3: Due to the close spacing of adjacent intersections, this segment is extremely short.

Statewide Average Crash Rates

The FDOT statewide average crash rates were obtained from the Signal Four Analytics platform. Facility-specific 3-year crash rates for 2017-2019 were available for use in this analysis for comparison to the calculated intersection and segment crash rates. Crash rate analysis of a segment or intersection accounts for crash exposure normalized by traffic volumes and roadway length. The crash rate is calculated to determine relative safety compared to other similar roadways, segments, or intersections.

The benefit of crash rate analysis is that it provides a more effective comparison of similar locations with safety issues. This allows for prioritization of these locations when considering safety improvements with limited resources. The ratio between the calculated crash rates and the statewide average crash rates for similar facilities is called a safety ratio. The safety ratio is calculated by dividing the actual crash rate over the statewide average; any value greater than 1.0 indicates a higher-than-average crash rate. A safety ratio of 2.0 indicates a site-specific crash rate that is two times the statewide average.

Intersection Crash Rate Analysis

Utilizing the selected AADT values, the number of entering vehicles was estimated. The following equation was used to calculate the intersection crash rates:

$$R = \frac{1{,}000{,}000 \times C}{365 \times N \times V}$$

Where:

- R = Crash rate for the intersection expressed as crashes per million entering vehicles (MEV).
- C = Total number of intersection crashes in the study period.
- N = Number of years of data (3).
- V = Traffic volumes entering the intersection daily.

The equation variables, intersection crash rates, statewide average crash rates for similar intersections, and safety ratios are shown in Table 8. The following intersections have crash rates that exceed the statewide average (safety ratio greater than 1.0):

- Intersection #1: Tharpe Street
- Intersection #3: N MLK Jr. Boulevard/E Bradford Road
- Intersection #6: Sharer Road
- Intersection #7: Lakeshore Drive
- Intersection #8: Callaway Road/Meginnis Arm Road
- Intersection #12: Talpeco Road
- Intersection #13: Crowder Road/Fred George Road
- Intersection #15: Old Bainbridge Road/Capital Circle NW

Table 8: Intersection Crash Rates and Comparison to Statewide Averages (2017-2019)

Intersection #	Facility Type	Intersection Crashes	Intersection Crash Rate	Statewide Average Crash Rate	Safety Ratio
1 (Tharpe St.)	Suburban 4-5 Lane 2-Way Divided Roadway with Paved Median	71	0.794	0.568	1.4
2 (Northwood Blvd.)	Suburban 4-5 Lane 2-Way Divided Roadway with Paved Median	15	0.213	0.568	0.4
3 (N MLK Jr. Blvd.)	Suburban 4-5 Lane 2-Way Divided Roadway with Paved Median	90	0.846	0.568	1.5
4 (John Knox Rd.)	Suburban 6+ Lane 2-Way Divided Roadway with Paved Median	93	0.833	0.940	0.9
5 (Allen Rd.)	Suburban 6+ Lane 2-Way Divided Roadway with Paved Median	72	0.680	0.940	0.7
6 (Sharer Rd.)	Suburban 6+ Lane 2-Way Divided Roadway with Paved Median	75	0.812	0.527	1.5
7 (Lakeshore Dr.)	Suburban 4-5 Lane 2-Way Divided Roadway with Paved Median	100	0.929	0.527	1.8
8 (Callaway Rd.)	Suburban 4-5 Lane 2-Way Divided Roadway with Paved Median	71	0.698	0.527	1.3
9 (I-10 EB)	Ramp Rural	41	0.416	2.208	0.2
10 (I-10 WB)	Ramp Rural	59	0.544	2.208	0.2
11 (Sessions Rd.)	Suburban 4-5 Lane 2-Way Divided Roadway with Paved Median	37	0.400	0.527	0.8
12 (Talpeco Rd.)	Suburban 4-5 Lane 2-Way Divided Roadway with Paved Median	109	1.246	0.527	2.4
13 (Fred George Rd.)	Suburban 4-5 Lane 2-Way Divided Roadway with Paved Median	62	0.786	0.527	1.5
14 (Perkins Rd.)	Suburban 4-5 Lane 2-Way Divided Roadway with Paved Median	18	0.286	0.527	0.5
15 (Capital Cir. NW)	Suburban 4-5 Lane 2-Way Divided Roadway with Paved Median	68	1.056	0.527	2.0

Actual crash rate exceeds statewide average for similar facilities

Segment Crash Rate Analysis

The crash rate for road segments is calculated as:

$$R = \frac{1{,}000{,}000 \times C}{365 \times N \times V \times L}$$

Where:

- R = Crash rate for the road segment expressed as crashes per million vehicle-miles of travel (VMT).
- C = Total number of crashes in the study period.
- N = Number of years of data (3).
- V = Number of vehicles per day (both directions).
- L = Length of the roadway segment in miles.

The equation variables, intersection crash rates, statewide average crash rates for similar facilities, and safety ratios are shown in Table 9. The following locations have crash rates that exceed the statewide average (safety ratio greater than 1.0):

- From Tharpe Street to Northwood Boulevard
- From N MLK Jr. Boulevard/E Bradford Road to I-10 Eastbound Off-Ramp
- From I-10 Westbound Off-Ramp to Sessions Road
- From Talpeco Road to Crowder Road/Fred George Road

Table 9: Segment Crash Rates and Comparison to Statewide Averages (2017-2019)

Segment #	Avg. AADT	Segment Length (mi)	Segment # Crashes	Segment Crash Rate	Statewide Avg. Crash Rate	Safety Ratio
1.5	30,500	0.114	15	4.0	2.4	1.6
2.5	*29,667*	0.002	0	0.0	2.4	0.0
3.5	38,000	0.381	120	7.6	2.4	3.1
4.5	38,667	0.133	53	9.4	2.7	3.4
5.5	*40,667*	0.241	69	6.4	2.7	2.3
6.5	*40,500*	0.227	60	6.0	1.7	3.4
7.5	*46,500*	0.014	6	8.3	1.7	4.8
8.5	40,500	0.085	23	6.1	1.7	3.5
9.5	*43,500*	0.284	15	1.1	1.7	0.6
10.5	*42,833*	0.445	59	2.8	1.7	1.6
11.5	36,167	0.492	35	1.8	1.7	1.0
12.5	32,000	0.625	55	2.5	1.7	1.4
13.5	*29,667*	0.956	33	1.1	1.7	0.6
14.5	19,167	1.742	44	1.2	1.7	0.7

Actual crash rate exceeds statewide average for similar facilities

In addition to the Segment Crash Rate Analysis Identified above, an additional rate analysis was conducted to increase parity with the identification of the Safe Streets and Roads for All Safety Action Plan High Injury Network. This analysis included a review and normalization of crash data into the Equivalent of Property Damage Only (EPDO). The value of each crash severity was established using the FDOT values within the FDOT Design Manual.[11] The EPDO rate normalizes crash severity to the equivalent value of crashes without injuries or fatalities. This analysis utilizes the same traffic volumes and segment lengths in Table 9; however, this data has been modified to include the additional crashes experienced over the 2017-2023 period. The formula used in this analysis is as follows and the results of that analysis are included within Table 10.

$$\textbf{EPDO Crash Rate} = \frac{(N_k*EPDO_k+NA*EPDO_A+N_B*EPDO_B+N_C*EPDO_C+N_O*EPDO_O)*100{,}000{,}000}{365*Years*V*Length*Sum\ of\ EPDO)}$$

EPDO = Weighting factor for crash severity based on FDOT estimated crash costs
N =Number of crashes
Years = Number of years of crash data
V=Average Traffic Volume
Length = Segment length (mi)
Sum of EPDO =sum of the EPDOs for severity

Table 10: Equivalent Property Damage Only Analysis

Segment #	Avg. AADT	Segment Length (mi)	Segment # Crashes	EPDO Rate
1.5	30,500	0.114	37	63.02
2.5	*29,667*	0.002	1	696.59
3.5	38,000	0.381	267	30.43
4.5	38,667	0.133	94	9.77
5.5	*40,667*	0.241	149	40.25
6.5	*40,500*	0.227	136	6.64
7.5	*46,500*	0.014	14	829.58
8.5	40,500	0.085	44	77.37
9.5	*43,500*	0.284	27	14.75
10.5	*42,833*	0.445	115	3.25
11.5	36,167	0.492	73	8.94
12.5	32,000	0.625	159	2.97
13.5	*29,667*	0.956	64	1.73
14.5	19,167	1.742	89	5.16

[11] https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/roadway/fdm/2024/2024fdm122varexcept.pdf?sfvrsn=23e25c46_1

Hotspot Identification

The study intersections and roadway segments were evaluated according to several characteristics, including:

- Safety ratio (ranking): Ranking of the ratios between the calculated crash rates and the statewide average crash rates for similar facilities.
- Severe (fatal/injury) crash rate (ranking): Ranking of the total number of crashes with severity defined as fatal, incapacitating, and non-incapacitating.
- Bike/ped crash rate (ranking): Ranking of the calculated rate of crashes involving a bicyclist or pedestrian.
- Dark/unlit crashes (% of total): The percentage of crashes occurring in dark, unlit conditions.
- Wet/ice surface crashes (% of total): The percentage of crashes occurring on a wet or icy roadway surface.

The following tables summarize the crash hotspot identification effort for the study segments (see Table 11) and intersections (Table 12). The results of this effort were also used to inform the placement of the cameras for the subsequent multimodal (bicycle/pedestrian) counts and near miss analyses.

Segment Hotspots

From a segment perspective, bicycle/pedestrian and severe crashes are a concern from North MLK Jr. Boulevard/East Bradford Road to Lakeshore Drive. Crashes that occur in the dark in areas without lighting are a concern from Sessions Road to Old Bainbridge Road/Capital Circle NW, where there is little or no overhead lighting present. Wet weather crashes are a concern at the following locations:

- From Sharer Road to Lakeshore Drive
- From Callaway Road/Meginn's Arm Road to I-10 Westbound Off-Ramp

These wet weather crash locations may be influenced by the presence of horizontal curves at the I-10 interchange (ramps) and vertical curves along Monroe Street.

Table 11: Segment Crash Hotspots

Roadway Segment	#	Crash Rate Rank	F/I Crash Rank	Bike/Ped Crash Rank	Dark, Unlit	Wet/ Ice	Within the High Injury Network?
From Tharpe Street to Northwood Boulevard	1.5	7	6	6	0%	7%	Yes
From Northwood Boulevard to N MLK Jr. Boulevard/E Bradford Road	2.5	14	13	11	0%	0%	Yes
From N MLK Jr. Boulevard/E Bradford Road to John Knox Road/Monticello Drive	3.5	5	3	2	2%	28%	Between
From John Knox Road/Monticello Drive to Allen Road	4.5	3	4	3	2%	15%	Yes
From Allen Road to Sharer Road	5.5	6	2	1	0%	35%	Yes
From Sharer Road to Lakeshore Drive	6.5	4	1	4	3%	47%	Yes
From Lakeshore Drive to Callaway Road/Meginnis Arm Road	7.5	1	13	11	0%	17%	Yes
From Callaway Road/Meginn's Arm Road to I-10 Eastbound Off-Ramp	8.5	2	5	11	13%	57%	Yes
From I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	9.5	12	9	11	7%	87%	Yes
From I-10 Westbound Off-Ramp to Sessions Road	10.5	8	8	5	7%	41%	Yes
From Sessions Road to Talpeco Road	11.5	10	10	7	34%	37%	No
From Talpeco Road to Crowder Road/Fred George Road	12.5	9	7	8	24%	42%	No
From Crowder Road/Fred George Road to Faulk Drive/Perkins Road	13.5	13	11	9	27%	39%	No
From Faulk Drive/Perkins Road to Old Bainbridge Road/Capital Circle NW	14.5	11	12	10	32%	34%	No

Intersection Hotspots

Several intersections with high rankings for severe crashes also have high rankings for bicycle/pedestrian crashes (Tharpe Street, Sharer Road, and Lakeshore Drive). This highlights the fact that bike/ped crashes tend to be severe in nature, much more so than vehicle-vehicle crashes. Additionally, a high percentage of crashes at the Callaway Road/Meginn's Arm Road intersection occurred with wet/ice pavement conditions.

While only the Old Bainbridge Road/Capital Circle NW intersection stood out with a high percentage of crashes in the dark with unlit conditions (as shown in Table 12), many of those crashes were recorded before a recent improvement project which included the addition of lighting at the intersection.

Table 12: Intersection Crash Hotspots

Intersection	#	Crash Rate Rank	F/I Crash Rank	Bike/Ped Crash Rank	Dark, Unlit	Wet/ Ice	Within the High Injury Network?
Tharpe Street	1	7	5	3	1%	21%	Yes
Northwood Boulevard	2	13	14	5	7%	7%	Yes
N MLK Jr. Boulevard/ E Bradford Road	3	5	10	11	3%	40%	Yes
John Knox Road/ Monticello Drive	4	9	6	7	1%	27%	Yes
Allen Road	5	11	11	13	1%	21%	Yes
Sharer Road	6	4	1	1	4%	29%	Yes
Lakeshore Drive	7	3	4	2	2%	36%	Yes
Callaway Road/ Meginn's Arm Road	8	8	13	13	6%	62%	Yes
I-10 Eastbound Off-Ramp	9	15	12	7	2%	41%	Yes
I-10 Westbound Off-Ramp	10	14	8	5	5%	39%	Yes
Sessions Road	11	10	6	4	8%	41%	Yes
Talpeco Road	12	1	9	7	6%	8%	Yes
Crowder Road/ Fred George Road	13	6	3	11	3%	29%	No
Faulk Drive/Perkins Road	14	12	15	13	0%	11%	No
Old Bainbridge Road/ Capital Circle NW	15	2	2	7	29%	31%	No

Hotspot Focus Areas and Typical Countermeasures

Based on the crash characteristics and other information, focus areas were identified (where applicable) along with potential countermeasures that may address the potential issues. The focus areas as shown in Table 13 include bicycle/pedestrian (bike/ped) crashes, wet weather crashes, severe (fatal/injury) crashes, left-turn crashes, and crashes that occurred in dark, unlit conditions. Based on the identification of crash hotspots and types, typical countermeasures which could improve safety in the area were identified. Potential countermeasures could include:

- Crosswalk improvements (including Leading Pedestrian Intervals, or LPI)
- High Friction Surface Treatment (HFST)
- Midblock crossings
- Increased lighting
- Offset turn lanes

Table 13: Safety Focus Areas and Potential Countermeasures

Location	#	Safety Concern	Typical Countermeasures
Tharpe Street Intersection	1	Bike/Ped	Crosswalk improvements/LPI
From Tharpe Street to Northwood Boulevard	1.5		
Northwood Boulevard Intersection	2		
From Northwood Boulevard to N MLK Jr. Boulevard/E Bradford Road	2.5		
N MLK Jr. Boulevard/E Bradford Road Intersection	3	Wet Weather	HFST
From N MLK Jr. Boulevard/E Bradford Road To John Knox Road/Monticello Drive	3.5	Severe, Bike/Ped	Midblock crossing
John Knox Road/Monticello Drive Intersection	4		
From John Knox Road/Monticello Drive to Allen Road	4.5	Severe, Bike/Ped	Midblock crossing
Allen Road Intersection	5		
From Allen Road to Sharer Road	5.5	Severe, Bike/Ped	Midblock crossing
Sharer Road Intersection	6	Severe, Bike/Ped	Crosswalk improvements/LPI
From Sharer Road to Lakeshore Drive	6.5	Severe, Bike/Ped, Wet Weather	Midblock crossing
Lakeshore Drive Intersection	7	Severe, Bike/Ped	Crosswalk improvements/LPI
From Lakeshore Drive to Callaway Road/Meginnis Arm Road	7.5		
Callaway Road/Meginnis Arm Road Intersection	8	Wet Weather	HFST
From Callaway Road/Meginnis Arm Road to I-10 Eastbound Off-Ramp	8.5	Wet Weather	HFST
I-10 Eastbound Off-Ramp Intersection	9	Wet Weather	HFST
From I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	9.5	Wet Weather	HFST
I-10 Westbound Off-Ramp Intersection	10	Wet Weather	HFST
From I-10 Westbound Off-Ramp to Sessions Road	10.5	Bike/ped	Midblock crossing
Sessions Road Intersection	11	Wet Weather	HFST
From Sessions Road to Talpeco Road	11.5	Dark - Unlit	Lighting at median openings
Talpeco Road Intersection	12		
From Talpeco Road to Crowder Road/Fred George Road	12.5	Dark - Unlit	Lighting at median openings
Crowder Road/Fred George Road Intersection	13		
From Crowder Road/Fred George Road to Faulk Drive/Perkins Road	13.5	Dark - Unlit	Lighting at median openings
Faulk Drive/Perkins Road Intersection	14		
From Faulk Drive/Perkins Road to Old Bainbridge Road/Capital Circle NW	14.5	Dark - Unlit	Lighting at median openings
Old Bainbridge Road/Capital Circle NW Intersection	15	Severe, Dark – Unlit*, left-turn crashes	Offset NB & SB left-turn lanes for better visibility

*Many of the crashes that occurred in the dark at this location took place before a recent intersection improvement project, which added additional lighting.

Road Safety Audit

In addition to the detailed data review and safety analysis along the corridor, a walking and driving safety audit was conducted to further assess the conditions along the corridor. This safety audit was conducted Friday, March 15th, 2024 and included planners, engineers, law enforcement, and Leon County elected officials. Figure 11 provides a picture of the safety audit team.

Figure 11: Safety Audit Team

Specifically, the audit team consisted of representatives from the following:

- CRTPA
- Leon County Commission
- City of Tallahassee
- Leon County Sheriff's Office
  - Homeless Outreach Street Team (HOST)
  - Traffic Unit Supervisor
- Members of the general public
- Consultant support team planners and engineers

The team was also given a map series, showing the corridor locations and known crash locations through the corridor. The crash locations and data enhanced team understanding and was instrumental in the development of potential improvements along the corridor. Figure 12 represents an example of the notes pages provided to the team members.

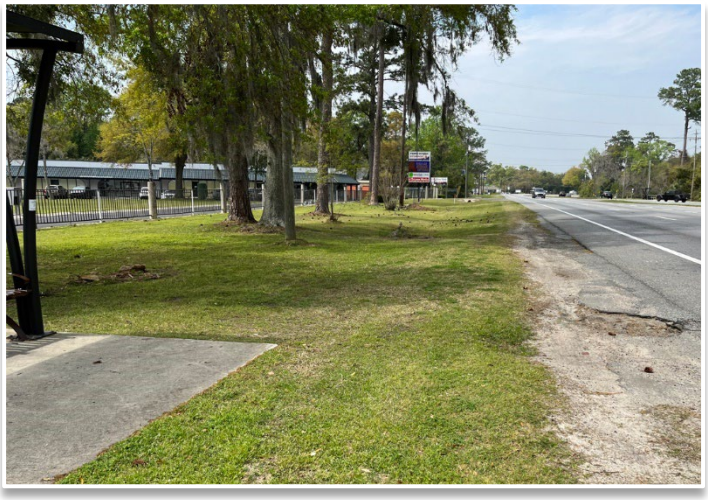
Figure 12: Notes Page Example

This audit was conducted to confirm conditions along the corridor and to identify additional areas of concern that were not readily identified through desktop analysis. As depicted in Figure 13, Figure 14, and Figure 15, this multidisciplinary team identified key infrastructure and conditions of the corridor, taking a collaborative approach that helped generate coordinated and integrated potential improvements.

Figure 13: Crosswalk Without High Emphasis Markings

Figure 14: Example of Damaged/Missing Pedestrian Safety Features (no railing)

Figure 15: Example of a Transit Stop with Limited Pedestrian Access



Camera Count Analysis

A critical component of addressing safety concerns is understanding road user behavior. Pedestrians and bicyclists have unique characteristics and often will travel in less predictable fashions when compared to motor vehicles. Performing camera count analyses can assist in identifying the current conditions affecting motor vehicles, bicycles, and pedestrians, focusing particularly on their routes and primary crossing locations. This analysis aims to highlight key crossing zones in order to better understand the patterns of bicycle and pedestrian movement and assess potential safety concerns.

In order to identify key areas for camera placement, the results of the safety analysis and roadway safety audit were reviewed with estimated movement counts provided through the Replica data. Replica allows users to examine detailed characteristics of trips such as trip purpose and mode split through its activity-based travel demand model. The camera count analysis is summarized below and included within Appendix B.

Camera Analysis Methodologies

Bicycle and Pedestrian (Non-Motorized) Analysis

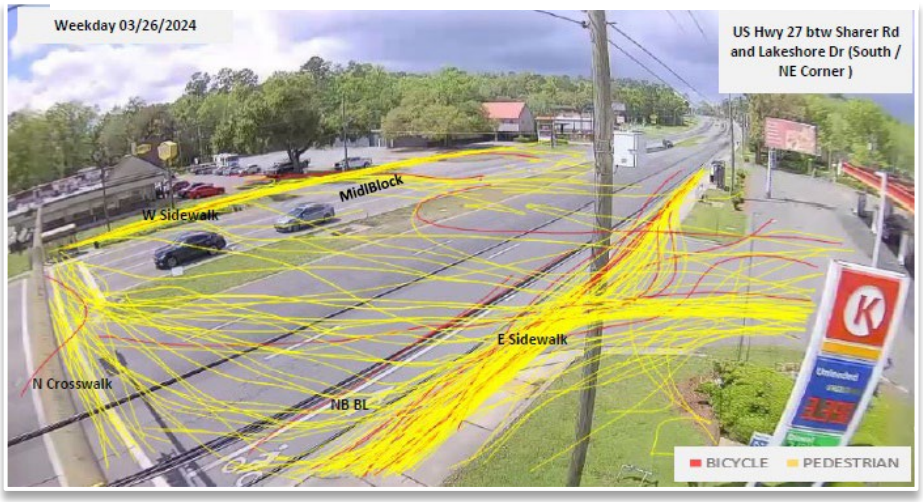
As part of the analysis, two 24-hour camera count analyses were conducted to better understand movements at key mid-block and intersection locations for VRUs. The camera counts were conducted in March 2024 and included one typical weekday and one typical weekend day. The analysis identified and tracked the movements of bicyclists and pedestrians, providing a more direct and enhanced view of potentially needed improvements than would have otherwise been possible.

Non-motorized traffic data was collected at the following locations:

1. N Monroe Street at Sessions Road
2. N Monroe Street at Lakeshore Drive
3. N Monroe Street between Lakeshore Drive and Sharer Road (Two Midblock Locations)
4. N Monroe Street at Sharer Road
5. N Monroe Street at John Knox Road
6. N Monroe Street at Tharpe Street

As depicted in Figure 16, cameras were strategically placed at each intersection and mid-block segment to capture interactions of pedestrians and bicyclists with facilities such as crosswalks and sidewalks. This analysis was also conducted to further understand and quantify crossings happening away from marked crosswalk locations. The recorded video footage was processed to identify and segment pedestrian and bicycle movements within the designated areas.

Figure 16: Bicyclist and Pedestrian Pathing



The following steps were followed to analyze the data:

- Counting Lines and Zones: Specific lines and zones were defined in the video scenes to count crossing events.
- Extracting Data: Relevant data points were extracted from the video based on movement patterns and counts.
- Trajectories: The paths taken by each pedestrian and bicyclist were analyzed to understand movement trends and interactions with traffic facilities.
- Data Summary: All data was compiled into a summary report, detailing the traffic patterns and usage statistics of non-motorized traffic facilities.

Motorized

A total of two (2) days of Vehicle Turning Movement Counts were collected on a typical weekday and typical weekend to identify existing motorized traffic volume conditions. The counts were performed utilizing video detection camera technology following the Manual of Uniform Traffic Standards (MUTS) at the following locations:

1. North Monroe Street at Sessions Road
2. North Monroe Street at Lakeshore Drive
3. North Monroe Street at Sharer Road
4. North Monroe Street at John Knox Road
5. North Monroe Street at Tharpe Street

Near Miss Analysis

To further understand the safety aspects of non-motorized traffic at the identified locations, a near miss analysis was conducted using the same artificial intelligence (AI) video detection technology and manual review of the recorded periods at each location. This analysis focused on incidents where pedestrians or bicyclists came into close proximity with vehicles, potentially leading to accidents under slightly altered circumstances.

Methodology for Near Miss Analysis

The methodology employed in the near miss analysis encompassed several essential steps:

1. Zone Definition

Specific zones within areas were defined where interactions between vehicles and non-motorized traffic (pedestrians or cyclists) are frequent. These zones typically include high-traffic areas, such as near schools, parks, and other public spaces, known for dense interactions.

2. Data Collection

Traffic and surveillance cameras were utilized to gather data on interactions between vehicles and pedestrians or cyclists within these defined zones. Event Flagging

An automated system was implemented to flag all interactions where the separation distance between a vehicle and a pedestrian or cyclist was less than two (2) seconds. This threshold is derived from transportation safety studies, which suggest that a minimum of two (2) seconds is necessary to safely avoid a collision.

3. Event Review and Validation

Each flagged event was manually reviewed by a team of traffic safety analysts to:

- Validate the accuracy of the automated flagging system.
- Document the specific circumstances of each interaction.
- Classify the event either as an actual near miss or as a general safety concern.

This structured approach ensures a thorough and accurate analysis of near miss incidents, providing critical insights into the dynamics of non-motorized traffic interactions and the efficacy of current urban traffic designs.

Non-Motorist Near Miss Results

Location 1: Sessions Road

The results of the non-motorist near miss analysis are documented in Figure 17. Data collection was conducted on one weekday (3/21/24) and one weekend day (3/23/24). One camera location was discovered to have shifted during the analysis. This site was updated to record on 3/26/24 to make up for the missed weekday data.

The highest number of pedestrian crossings was observed at the north crosswalk (51), followed by the west crosswalk (43), south crosswalk (23), and east crosswalk (21). The south crosswalk appears to have a substantial proportion of near misses (30% of crossings). A smaller proportion of near misses was recorded at the east crosswalk; no near misses were recorded at the north or west crosswalks. Non-motorist routes at the intersection are shown below in Figure 18. Figure 19 and Figure 20 depict near misses recorded at this location.

Figure 17: Sessions Road Volume and Near Miss Events

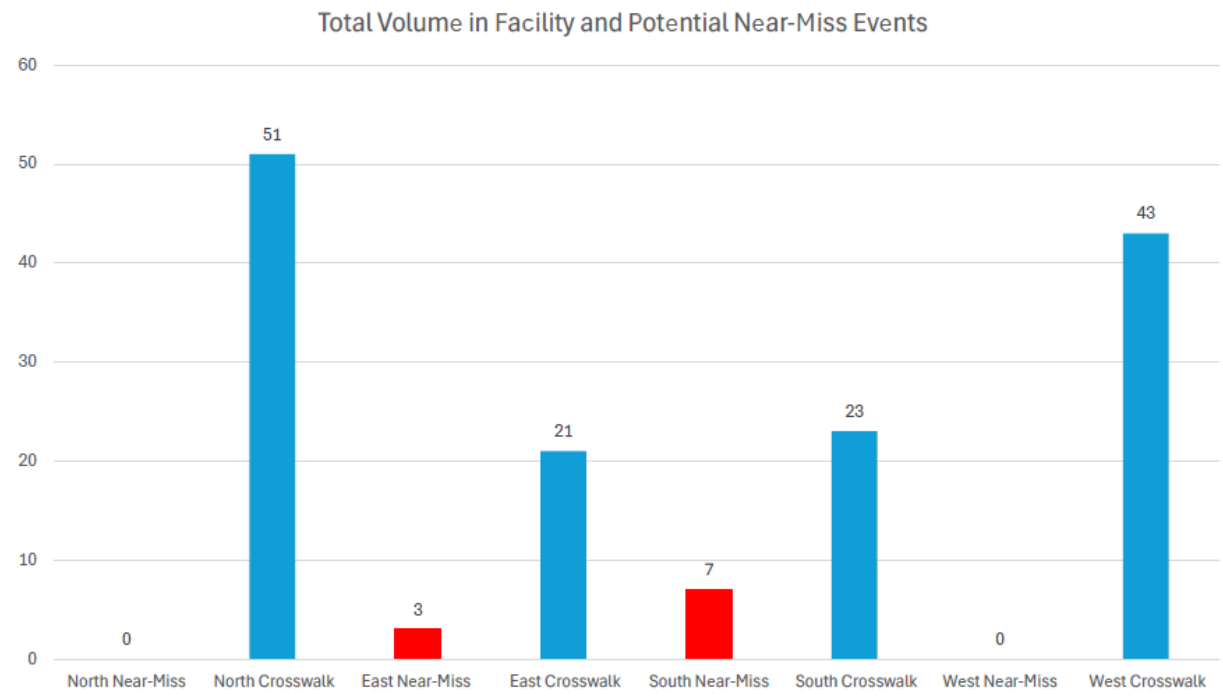


Figure 18: Sessions Road Pedestrian and Bike Pathing

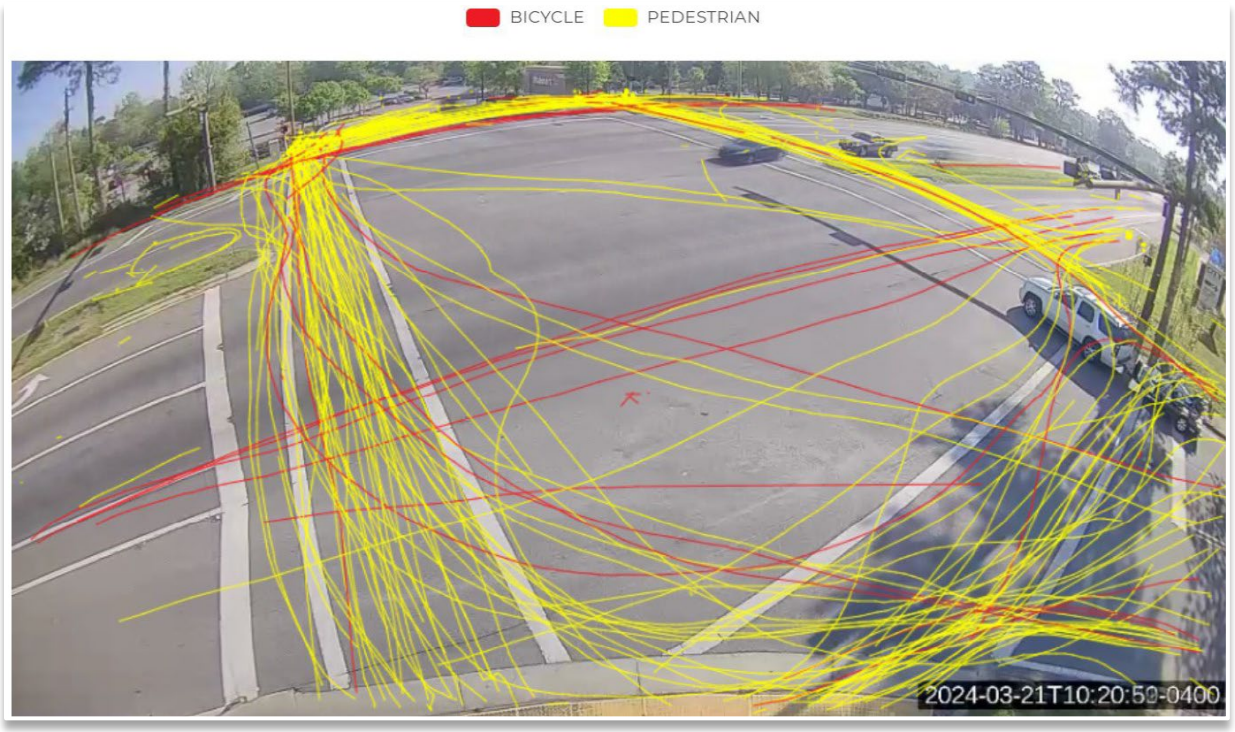


Figure 19: Sessions Road A Family Crossing Outside of the Crosswalk Area

Figure 20: Sessions Road Individual Using the Crosswalk in Front of a Truck

Location 2: N Monroe Street at Lakeshore Drive

The results of the non-motorist near miss analysis are documented in Figure 21.

The highest number of pedestrian crossings was observed at the east crosswalk (110), followed by the west crosswalk (82), north crosswalk (51), and south crosswalk (45).

Non-motorist near misses were observed at all four crosswalks. The south crosswalk had the largest proportion of near misses (18%), followed by the east crosswalk (9%), north crosswalk (8%), and west crosswalk (1%). The non-motorist routes are shown in Figure 20. Figure 23 and Figure 24 depict near misses recorded at this location.

Figure 21: Lakeshore Drive Volume and Near Miss Events

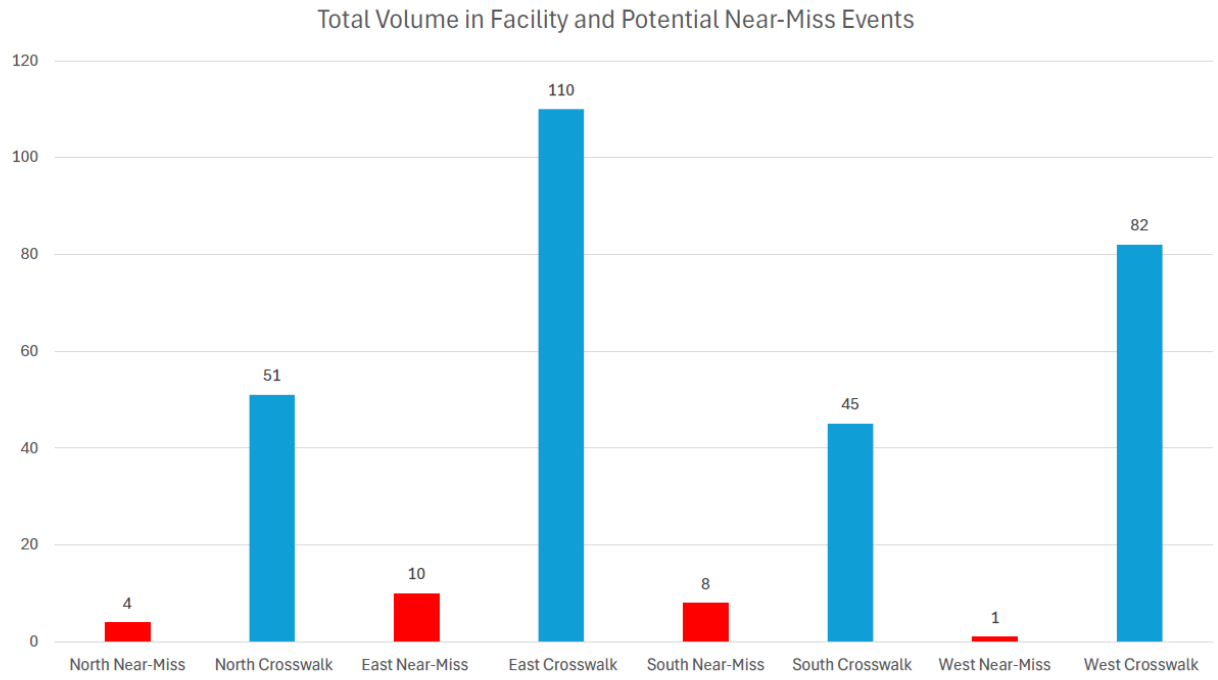


Figure 22: Lakeshore Drive Pedestrian and Bike Pathing

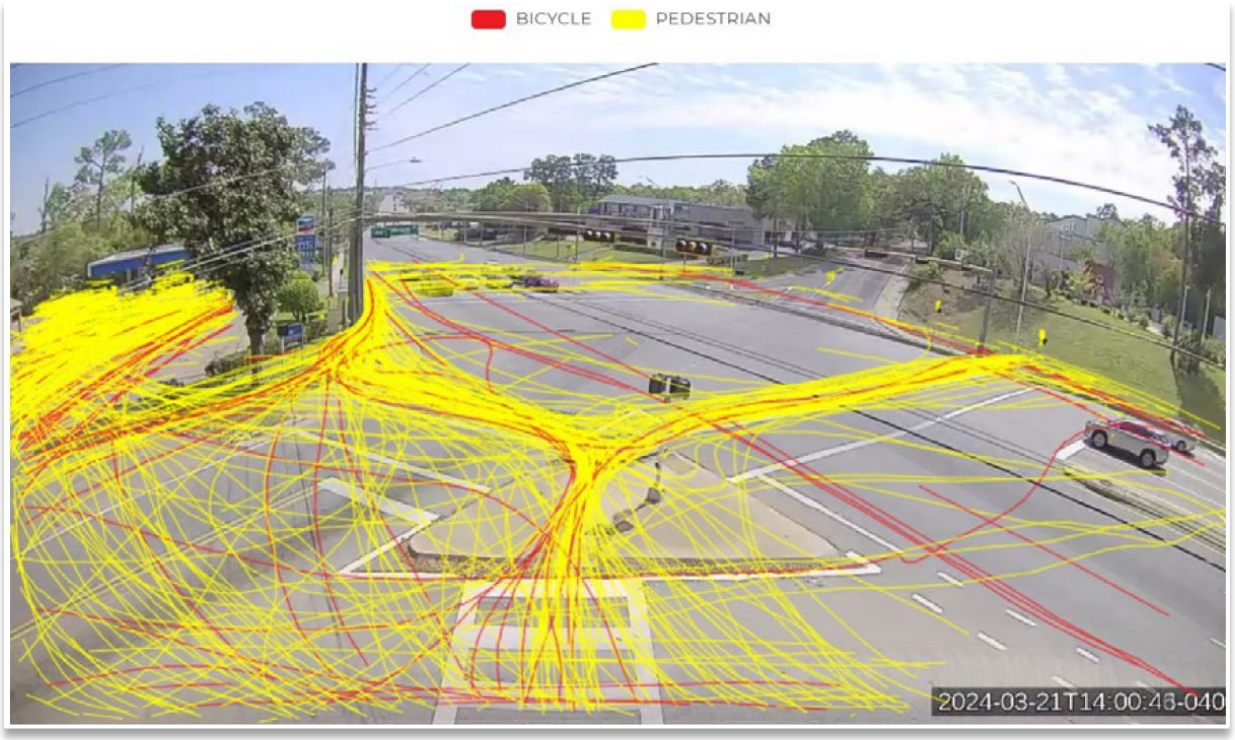


Figure 23: Lakeshore Drive Pedestrians Crossing In Front of a Turning Vehicle

Figure 24: Bicyclist Avoiding Collision with a Vehicle While Exiting the Gas Station

Location 3A: N Monroe Street between Lakeshore Drive and Sharer Road (Midblock - North)

Figure 25 demonstrates the north midblock camera coverage area. The results of the non-motorist near miss analysis are documented in Figure 26.

The recorded pedestrian volumes are as follows:

- Typical weekday: 278 pedestrians observed, 26 midblock crossings, 8 near miss events
- Typical weekend day: 242 pedestrians observed, 22 midblock crossings, 13 near miss events

Figure 25: Overview of the North Midblock Camera Coverage

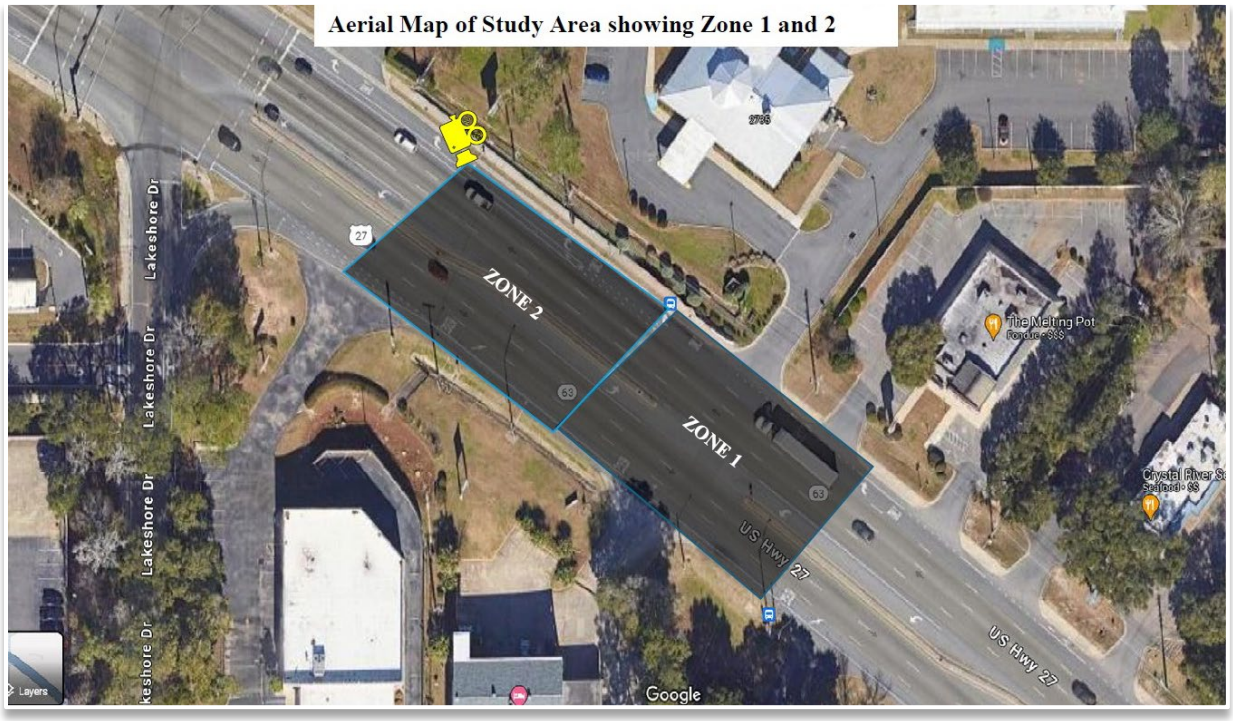


Figure 26: North Midblock between Lakeshore Drive and Sharer Road Volume and Near Miss Events

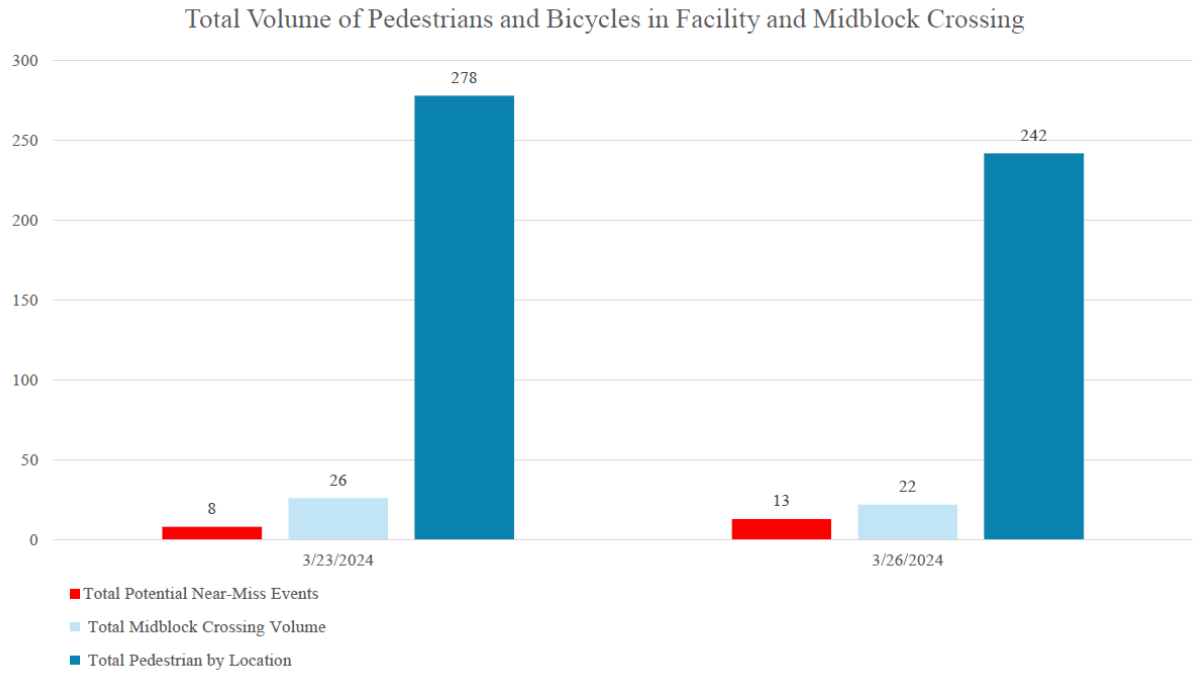


Table 14 lists the average near miss time gap per zone, total volume of midblock crossings with near miss events per zone, and total midblock crossing wait time on the median.

Table 14: Average Near Miss Time Gap per Zone in North Midblock

	Zone 1	Zone 2
Total Volume of Midblock Near Miss Events	20	28
Average Near Miss Time Gap (s)	1.43	0.74
Total Midblock Crossing Wait Time on Median (s)	10.32	9.15

The non-motorist routes are shown in Figure 27.

Figure 27: North Midblock between Lakeshore Drive and Sharer Road Pedestrian and Bike Pathing

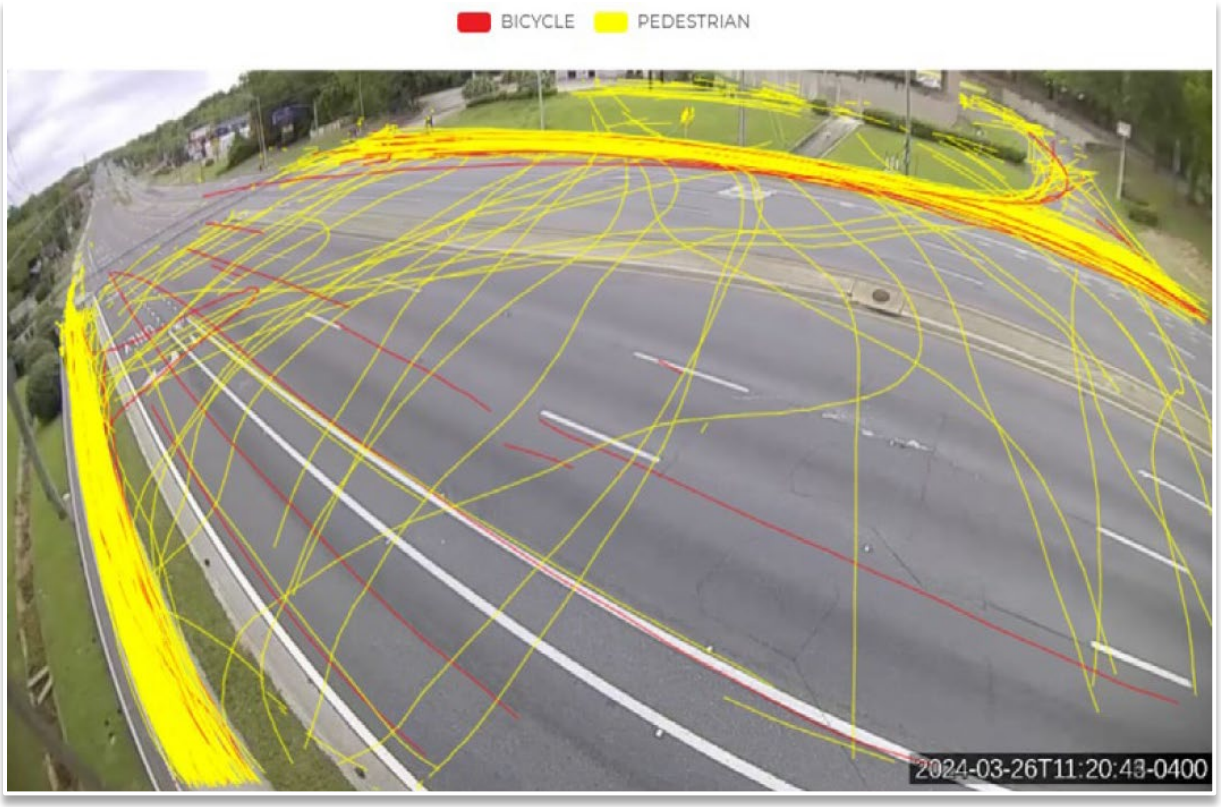


Figure 28 and Figure 29 depict near misses recorded at this location.

Figure 28: North Midblock between Lakeshore Drive and Sharer Road Pedestrian Crossing between Traffic

Figure 29: North Midblock between Lakeshore Drive and Sharer Road Pedestrian Crossing Midblock

Location 3B: N Monroe Street between Lakeshore Drive and Sharer Road (Midblock - South)

Figure 30 demonstrates the south midblock camera coverage area. The results of the non-motorist near miss analysis are documented in Figure 31.

The recorded pedestrian volumes are as follows:

- Typical weekday: 250 pedestrians observed, 43 midblock crossings, 8 near miss events
- Typical weekend day: 266 pedestrians observed, 91 midblock crossings, 15 near miss events

Figure 30: Overview of the South Midblock Camera Coverage

Figure 31: South Midblock between Lakeshore Drive and Sharer Road Volume and Near Miss Events

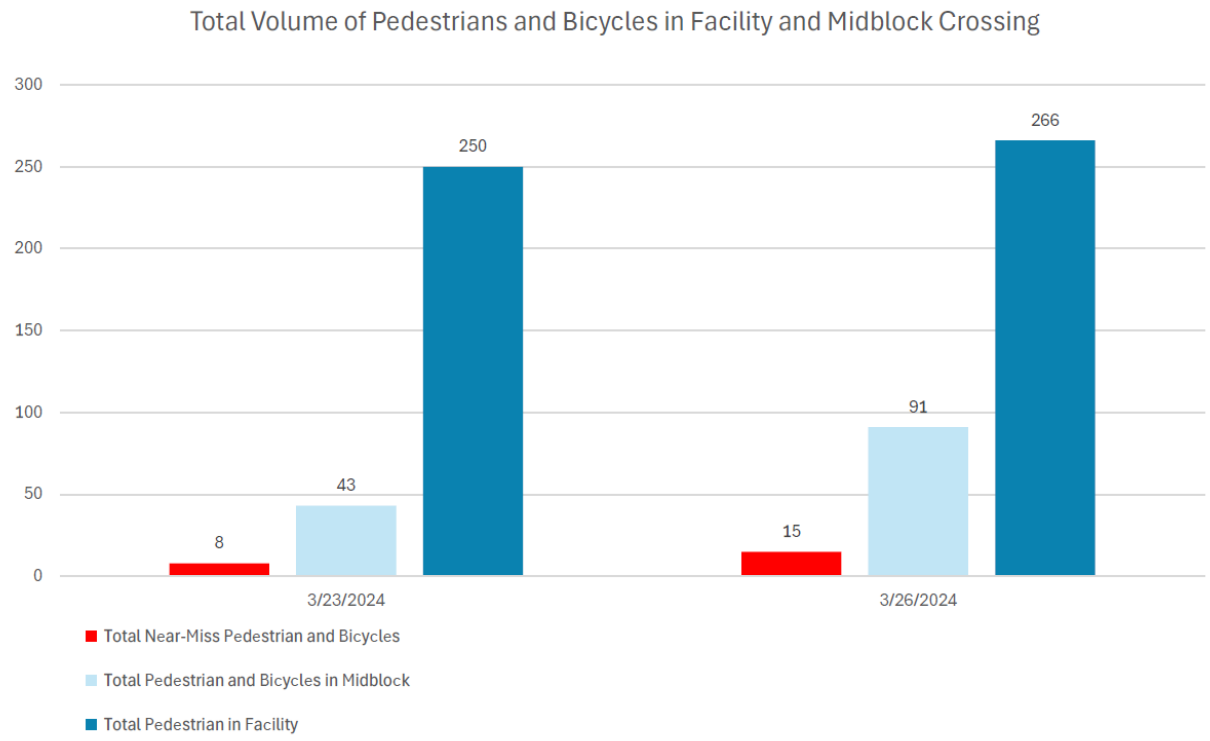


Table 15 lists the average near miss time gap per zone and total volume of midblock crossings with near miss events per zone.

Table 15: Average Near Miss Time Gap per Zone in South Midblock

	Zone 1	Zone 2
Total Volume of Midblock Near Miss Events	98	36
Average Near Miss Time Gap (s)	0.93	1.66

The non-motorist routes are shown in Figure 32. Figure 33 and Figure 34 depict near misses recorded at this location.

Figure 32: South Midblock between Lakeshore Drive and Sharer Road Pedestrian and Bike Pathing

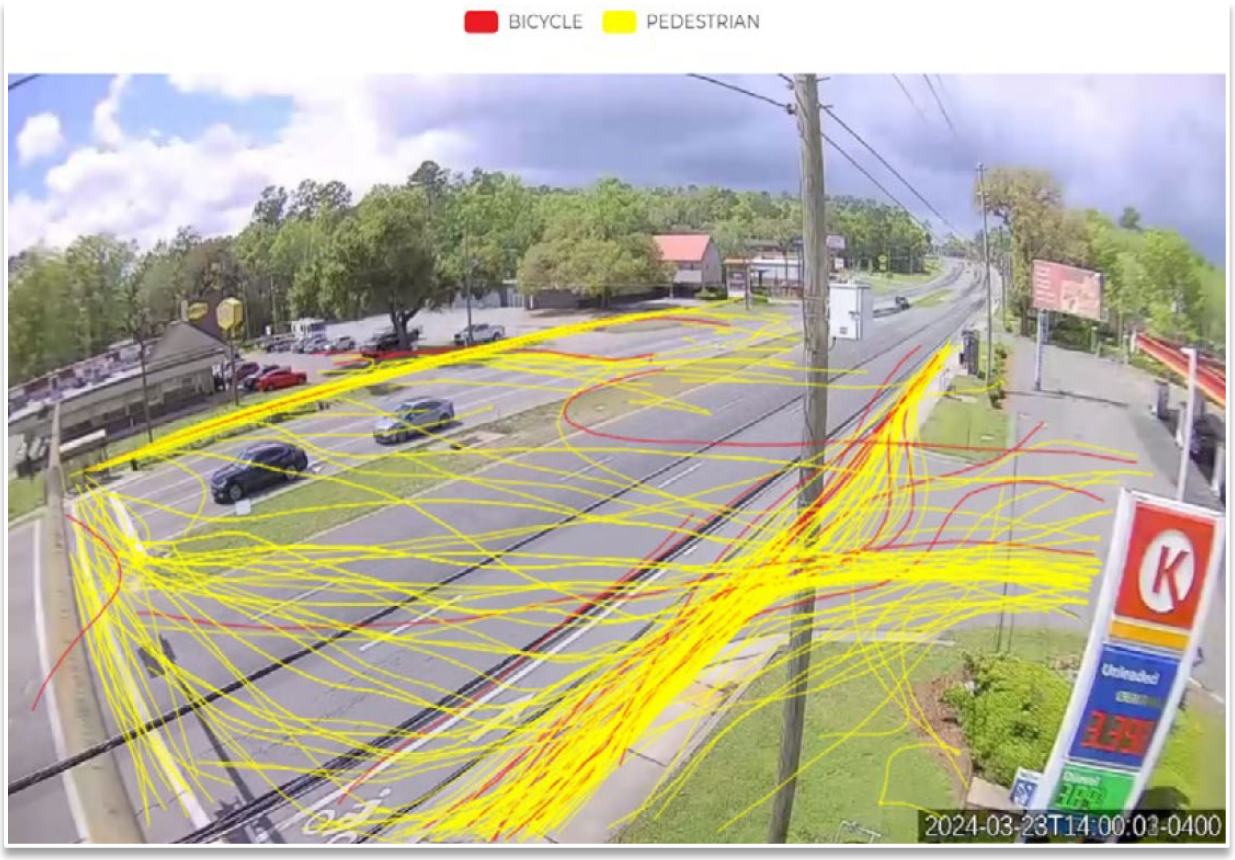


Figure 33: South Midblock between Lakeshore Drive and Sharer Road Pedestrians Crossing between Moving Traffic

Figure 34: South Midblock between Lakeshore Drive and Sharer Road Pedestrians Crossing between Moving Traffic (Car Avoided Collision)

Location 4: N Monroe Street at Sharer Road

The results of the non-motorist near miss analysis are documented Figure 35..

The highest number of pedestrian crossings was observed at the east crosswalk (223), followed by the north crosswalk (192) and south crosswalk (21). Non-motorist near misses were observed at all three crosswalks. The south crosswalk had the highest proportion of near misses (33%), followed by the north crosswalk (6%) and east crosswalk (4%).

The non-motorist routes are shown in Figure 36. Figure 37 and Figure 38 depict near misses recorded at this location.

Figure 35: Sharer Road Volume and Near Miss Events

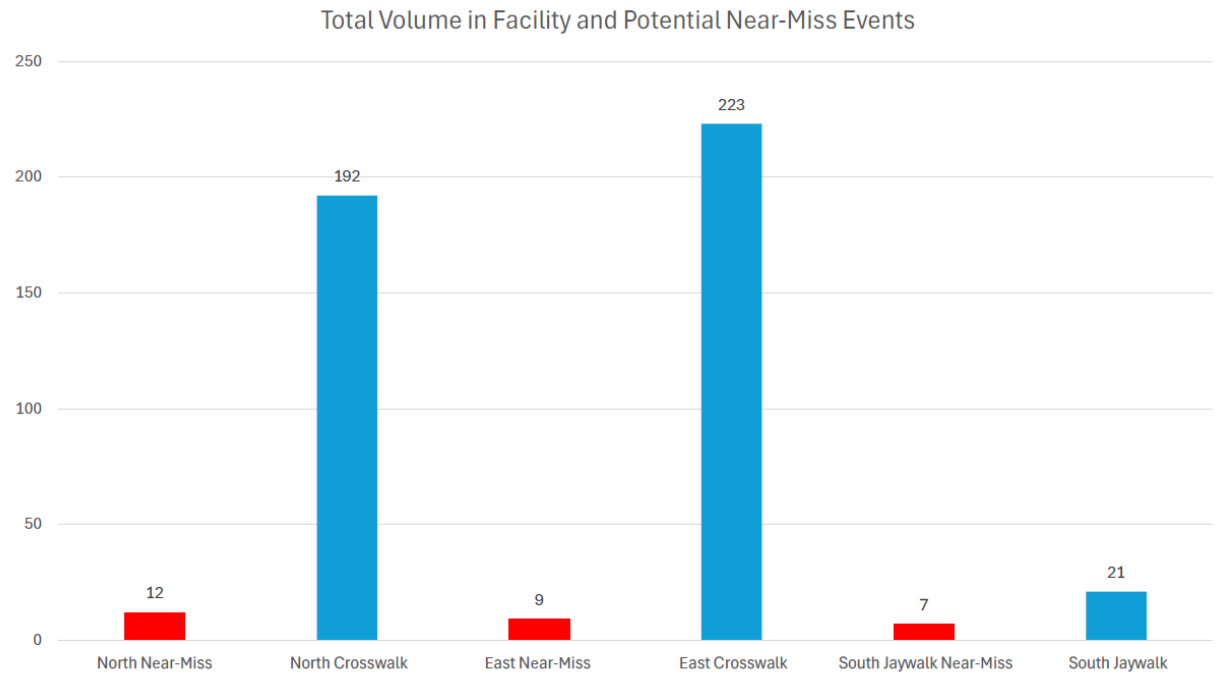


Figure 36: Sharer Road Pedestrian and Bike Pathing

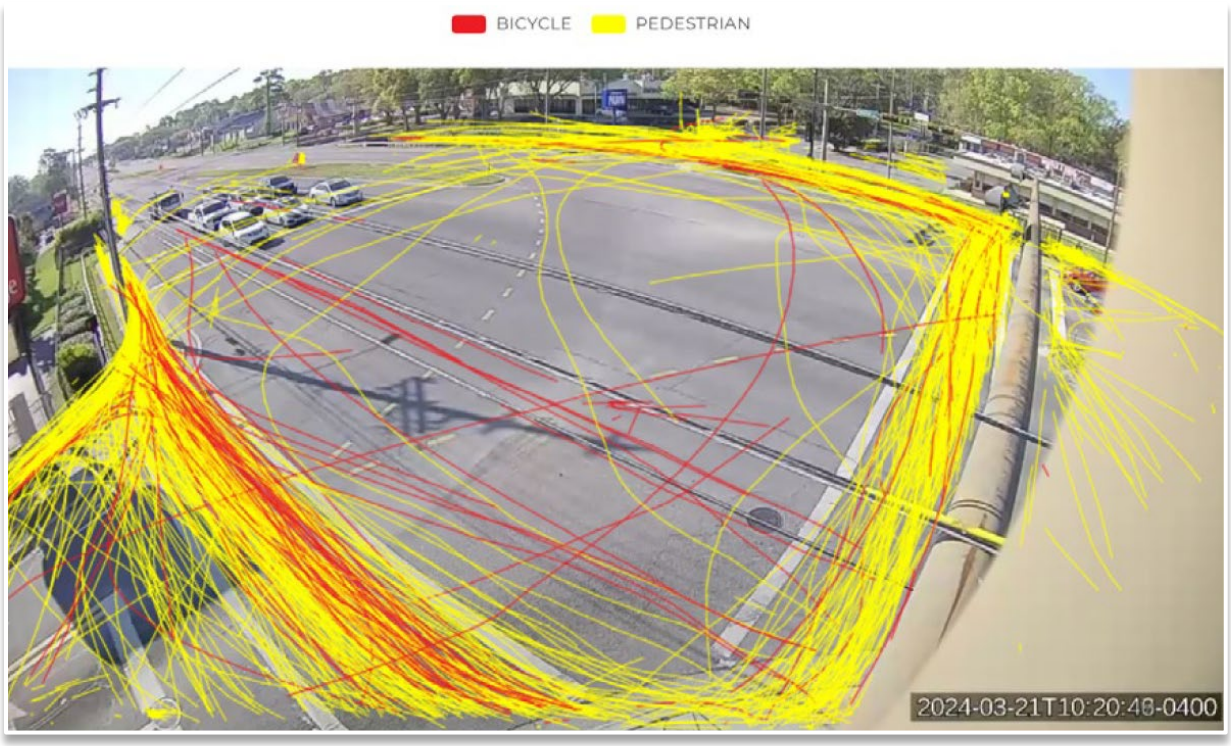
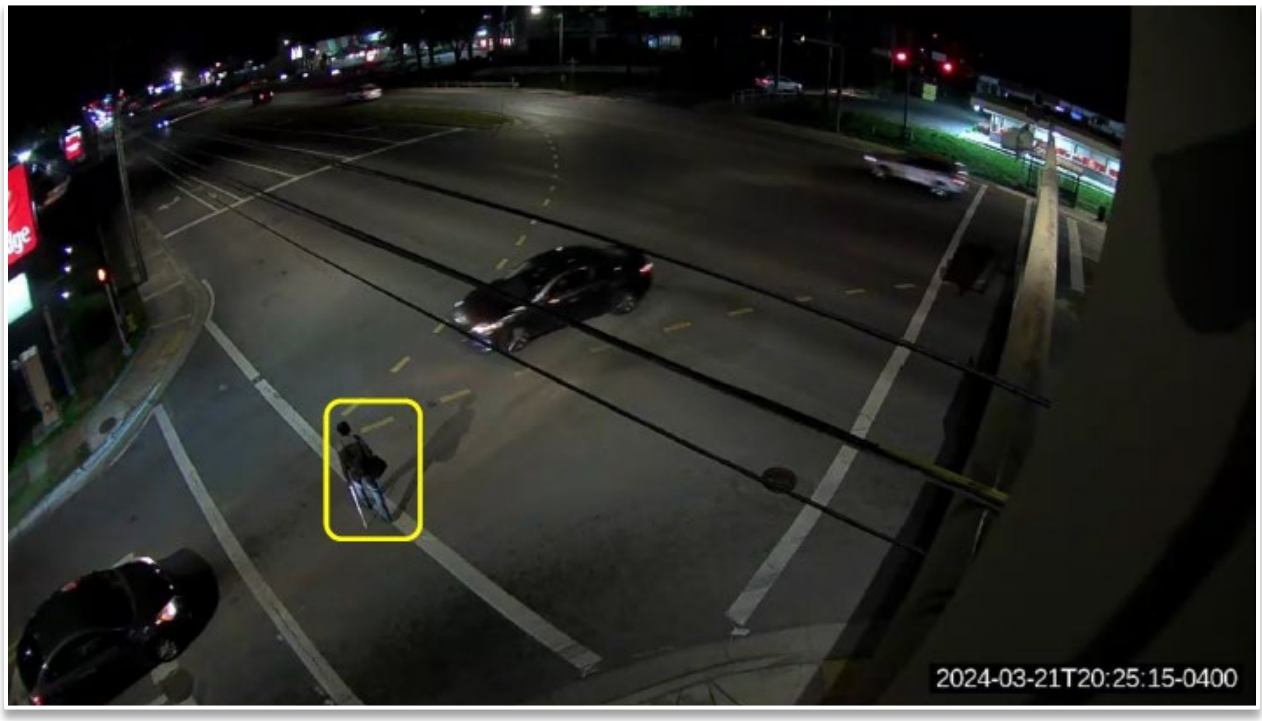


Figure 37: Sharer Road Pedestrians Crossing Between Traffic

Figure 38: Sharer Road Pedestrian Conflict with a Nighttime Left Turn



Location 5: N Monroe Street at John Knox Road

The results of the non-motorist near miss analysis are documented in Figure 39. The highest number of pedestrian crossings was observed at the east crosswalk (140), followed by the west crosswalk (114), south crosswalk (72), and north crosswalk (53). Non-motorist near misses were observed at all four crosswalks. The north and south

crosswalks had the highest proportion of near misses (6%), followed by the east crosswalk (5%), and west crosswalk (3%).

The non-motorist routes are shown in Figure 40. Figure 41 depicts near a miss recorded at this location.

Figure 39: John Knox Road Volume and Near Miss Events

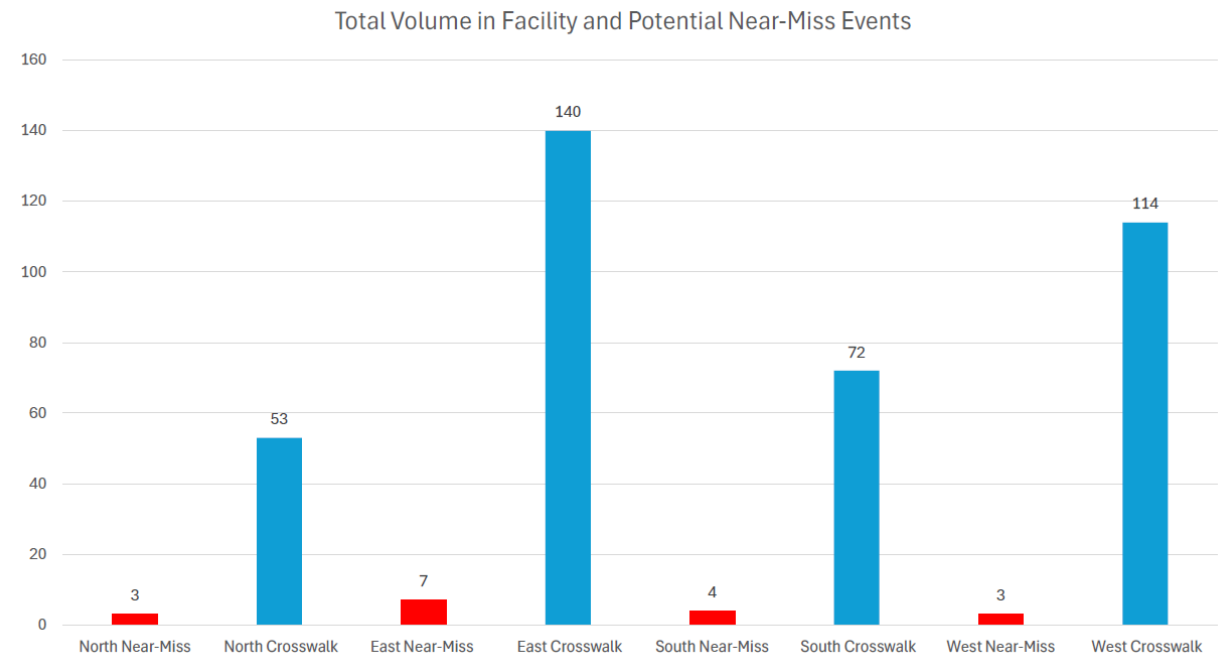


Figure 40: John Knox Road Pedestrian and Bike Pathing

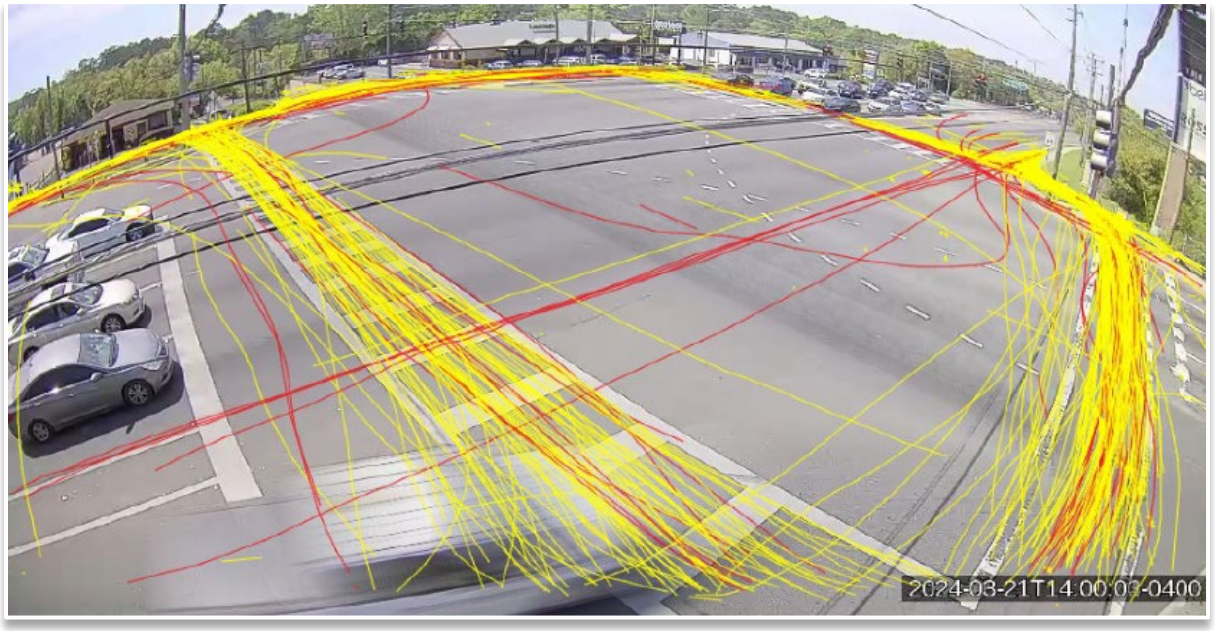
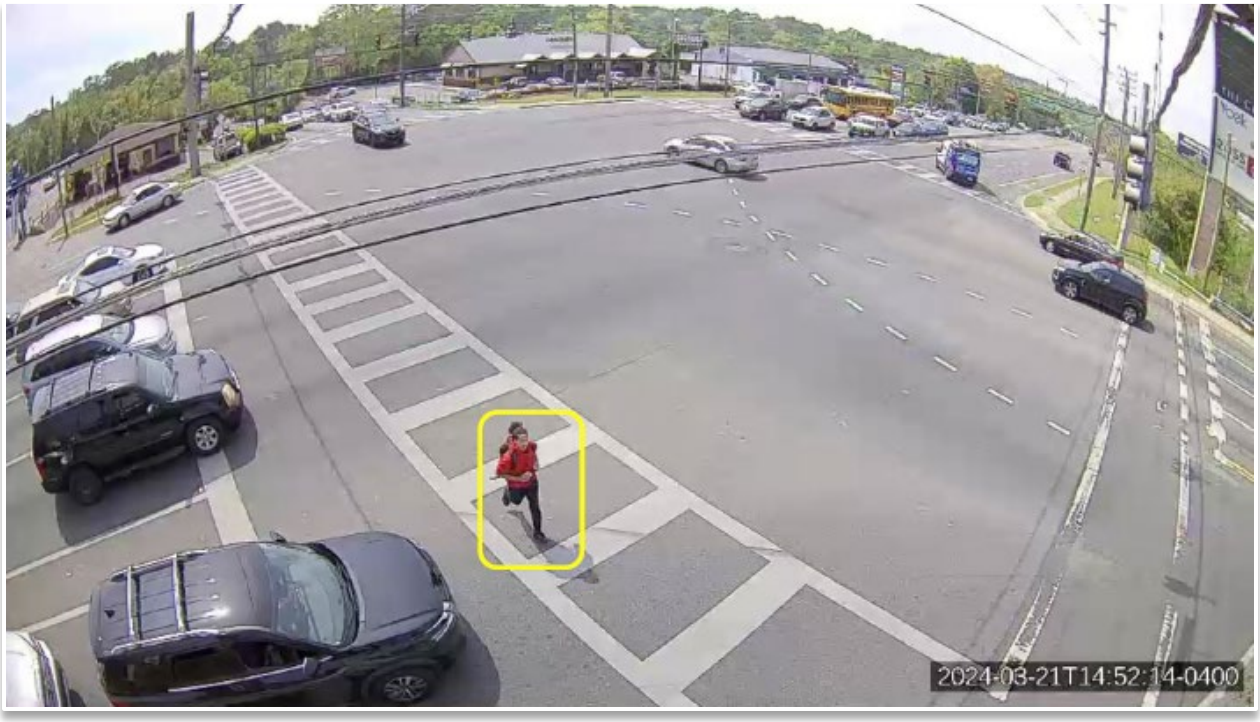


Figure 41: John Knox Road Vehicle Failing to Yield to Pedestrian



Location 6: N Monroe Street at Tharpe Street

The results of the non-motorist near miss analysis are documented in Figure 42.

The highest number of pedestrian crossings was observed at the east crosswalk (159), followed by the west crosswalk (102), south crosswalk (76), and north crosswalk (14). There is a large variance in usage of the crosswalks at this intersection; the east crosswalk was used over ten times more frequently than the north crosswalk.

Non-motorist near misses were observed at all four crosswalks. The west crosswalk had highest proportion of near misses (16%), followed by the south crosswalk (11%), north crosswalk (7%), and east crosswalk (6%). The non-motorist routes are shown in Figure 43. Figure 19 and Figure 20 depict near misses recorded at this location.

Figure 42: Tharpe Street Volume and Near Miss Events

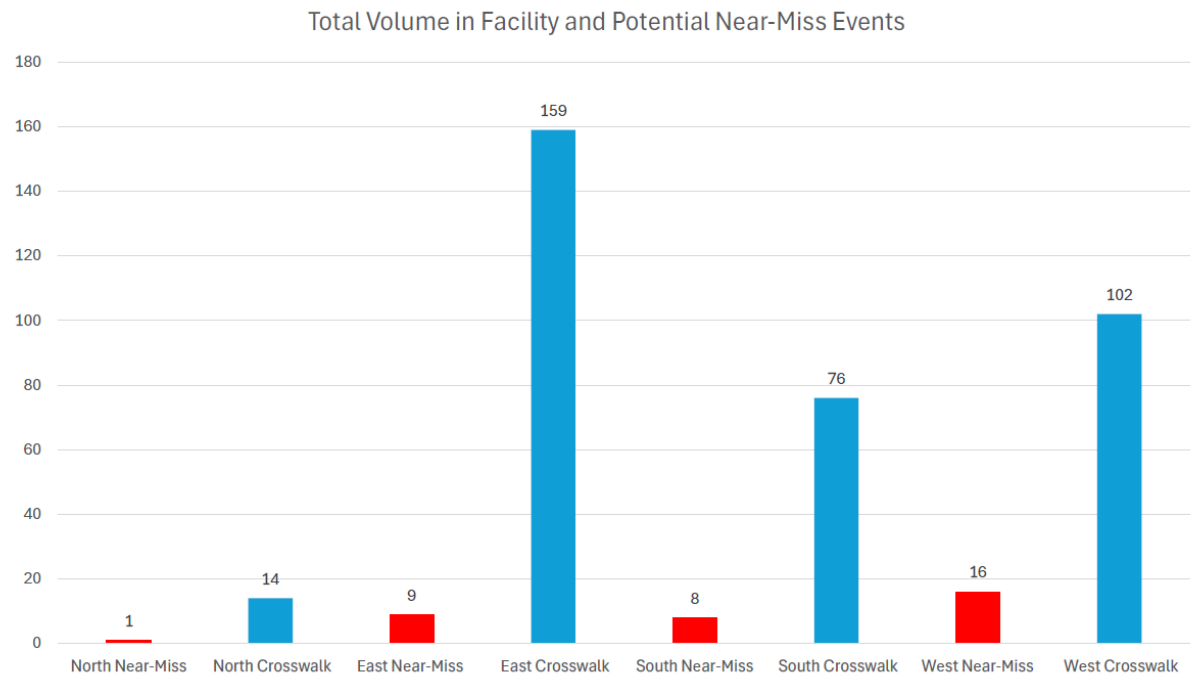


Figure 43: Tharpe Street Pedestrian and Bike Pathing

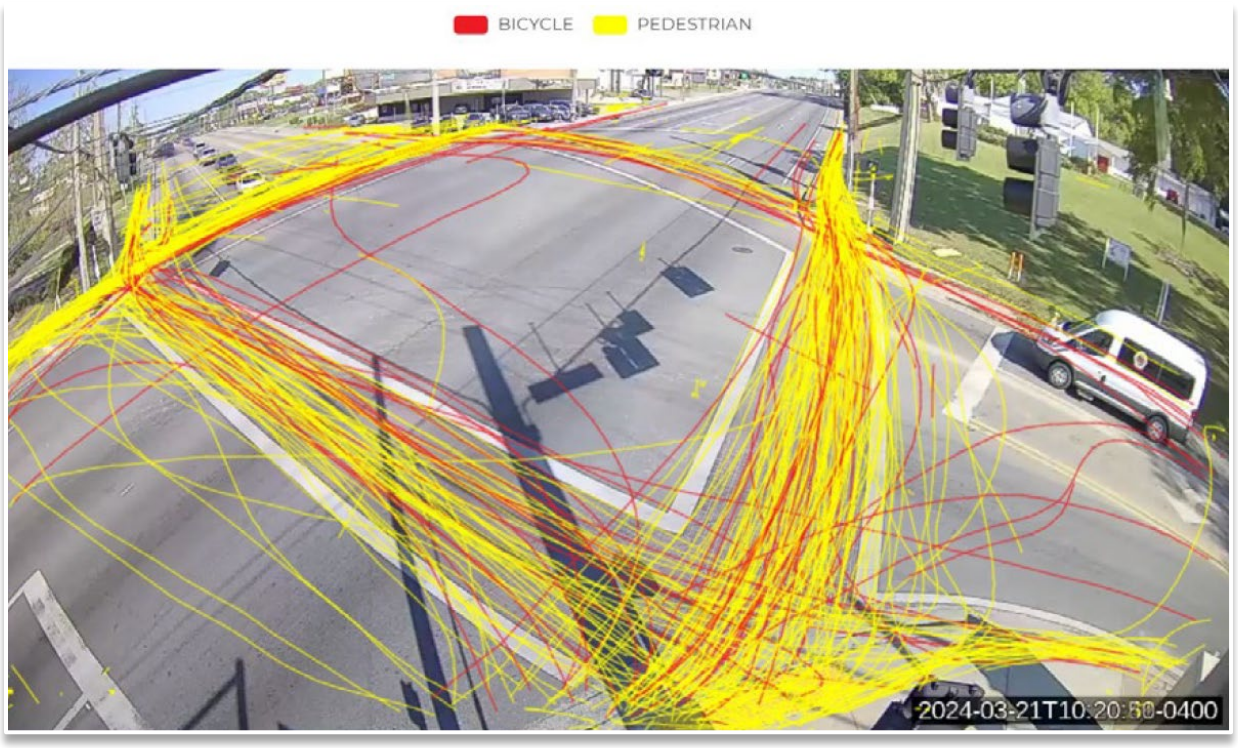
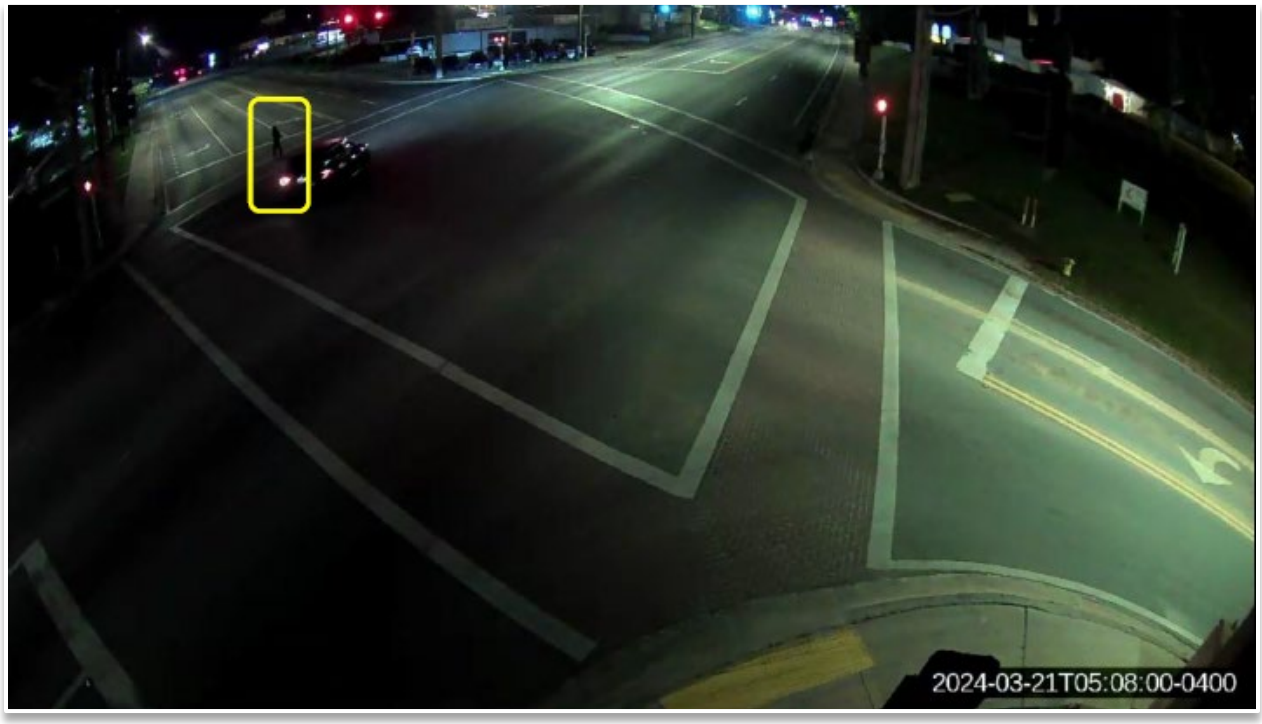


Figure 44: Tharpe St Pedestrian and Vehicle Left Turn Near Miss



Overall Camera Count Results

Table 16 documents the total number of pedestrian crossings and near misses, as well as the proportion of near misses, by location. As seen in this table, near misses where experienced at each of the camera locations; however, the segment between Sharer Road and Lakeshore Drive experienced significantly higher numbers with 44% and 17% of the crossings at the two respective camera locations being identified as near misses. The Sharer Road area is also the location of a significant number of pedestrian crashes, indicating that this is a historic and future safety issue area.

Table 16: Total Pedestrian Crossings and Near Misses

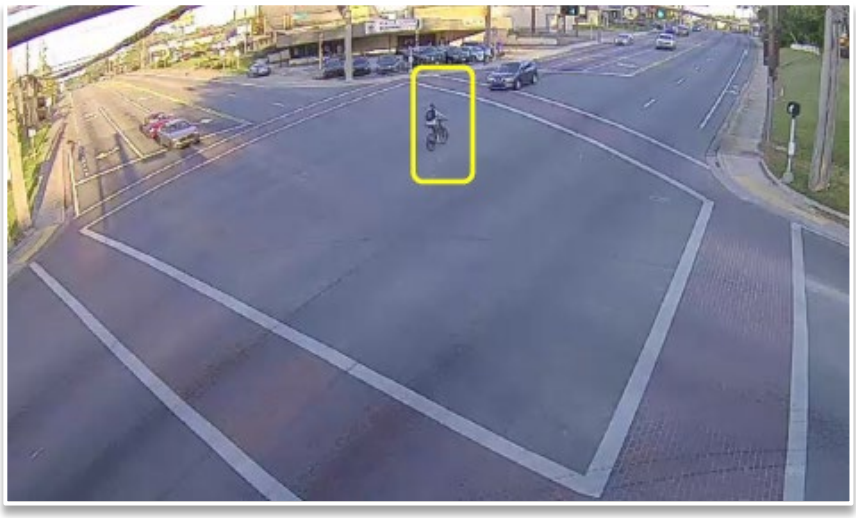
Location	Total Number of Pedestrian Crossings	Total Number of Near Misses	Proportion of Near Misses
Sessions Rd.	138	10	7%
Lakeshore Dr.	288	23	8%
Between Lakeshore Dr. and Sharer Rd. (N)	48*	21*	44%*
Between Lakeshore Dr. and Sharer Rd. (S)	134*	23*	17%*
Sharer Rd.	436	28	6%
John Knox Rd.	379	17	4%
Tharpe St.	351	34	10%
Total	1,774	156	9%

*Mid-block crossings (no marked crosswalk)

This analysis allowed for a more accurate review of the actual movements in the area and the development of key recommendations.

This near miss analysis allowed for the development of proactive recommendations rather than reactive to previous crash data. Figure 45 depicts an example of a recorded near miss where a bicyclist crossed through the center of an intersection with oncoming traffic. To reduce the number of unsafe crossings, pedestrian fencing and the implementation of signalized midblock crossings have been recommended. These countermeasures channelize pedestrian crossings to designated and safer locations.

Figure 45: Bicyclist and Vehicle Near Miss



Stakeholder and Public Engagement

Stakeholder Engagement

Given the significance of this corridor and the overlapping efforts that have been conducted previously, a series of stakeholder meetings were held to increase understanding and foster buy-in from community representatives.

The first stakeholders involved were representatives from the City of Tallahassee and Leon County. The Tallahassee Advanced Transportation Management System (TATMS), who is responsible for the management of signals throughout the community, provided information related to the signal management in the area. This coordination led to increased data availability, including an understanding of pedestrian actuations at the signal locations. Additionally, City of Tallahassee and Leon County staff were contacted to further understand previous efforts. Increased understanding of the previous efforts along the corridor created opportunities for combined assessment of the conditions and refinement of potential improvements.

The Leon County Sheriff's Office (LCSO) was involved throughout the process to gain valuable perspective on corridor issue areas, enforcement, and activities related to the Homeles Outreach Steet Team (HOST). The HOST representatives identified key features along the corridor which could be improved to aide pedestrian movements.

Representatives from FDOT District 3 and the BPIA were also involved throughout the process. North Monroe Street is an FDOT roadway and as such, agreement from FDOT to allow BPIA to implement the potential improvements via the grant funding, should the grant be awarded and agreed upon. FDOT representatives also reviewed the potential improvements and provided recommendations based on existing

deployments throughout the District. The BPIA has recently completed aesthetic improvements along the corridor which were considered during the identification of potential safety related improvements.

Public Engagement

Continuing the extensive outreach and collaboration of the previous efforts along the corridor, the North Monroe Safety Implementation Study conducted an additional public outreach opportunity on April 29th, 2024. This engagement opportunity was held at a community center near the approximate midpoint of the corridor (Fred George Road at US 27) and was attended by over 30 members of the public including elected officials, members of advocacy groups, and local jurisdictional engineering and planning staff.

Figure 46: Public Workshop, April 29, 2024

Representatives from local municipal and county engineering staff attended the meeting to provide feedback and to present results from a recent charette development process that was conducted along the corridor.

Attendees were provided with locations and descriptions of the safety improvements via concept drawings and strip maps as seen in Figure 46 and Figure 47. The participants were asked to identify their priorities through interactive exercises and provide additional comments/feedback.

The results from this outreach were incorporated into the analysis to ensure the potential improvements also considered direct public input into their development.

Public Workshop Results

Images of content provided and the specific comments received are provided in Appendix A. Generally, the attendees indicated that they were very supportive of improvements throughout the corridor. Many questions were fielded about specific locations and the potential impact of the proposed improvements. Overall, the community expressed a desire to improve the safety of the corridor through the provision of safer infrastructure and increased enforcement of current speed limits. Some members of the public were not able to attend and they elected to provide their comments via email. Those comments have been included with those received in person at the event.

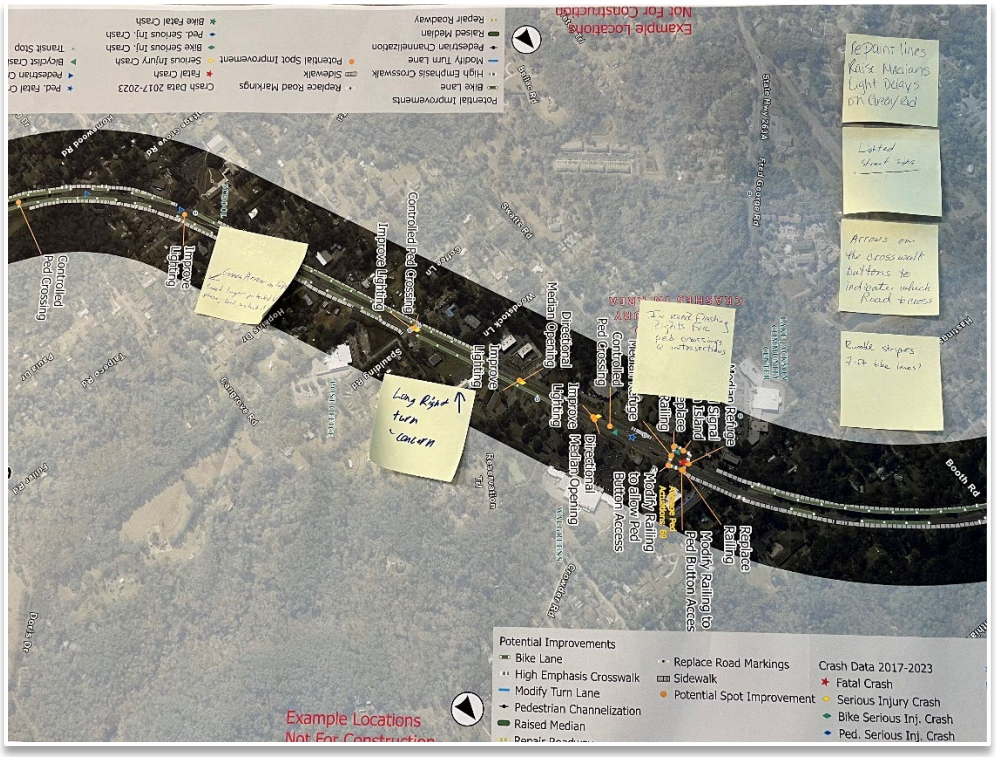
Figure 47: Public Workshop and Comment Opportunity

The comments received have been summarized below.

- Consider the filling of sidewalk and bike lane gap areas.
    - Consider implementing buffered bike lanes.
- Consider enhanced enforcement of traffic rules along the corridor.
    - Portions of the corridor are key enforcement areas for the LCSO.
- Where feasible, consider connections to nearby networks and trails being considered such as the Lake Jackson Greenways trail that is currently under design.
- Consider the improvement of bus stops along the corridor.
    - Adding shelters and improving access.
- Consider realignments of intersections to more perpendicular.
- Consider right turn lane modifications.
    - Increased no turn on red.
    - Increased enforcement on queue jumping using right turn lanes.
- Consider pedestrian fencing along the corridor to increase safety.
- Consider a protected left turn signal for Lakeshore Drive.
- Consider modifications to the Talpeco Road turn signals to increase the duration of the protected left turn.
- Consider increased pedestrian signage and flashing lights to indicate crossing areas.
    - Including clearer signage for the pedestrian pedestals to indicate which direction is being actuated.
- Consider improved and additional school zone signage and lighting.
- Consider the implementation of alternative infrastructure materials to increase safety and reduce environmental impacts.

- Consider landscaping enhancements which can also improve safety along the corridor.
- Consider operational improvements nearby schools.

Figure 48: Example of Public Comments Received



Potential Improvements and Countermeasures

The North Monroe Street Corridor is utilized by all modes of travel, and as such, potential improvements were developed which are expected to increase safety for all modes with minimal impacts to mobility. The context for the area varies from urban in the south to suburban in the north and as such all potential improvements were developed through a context-sensitive lens. Extensive consideration was taken to recommend proven improvements that are appropriate for the existing and planned land uses in the area, as identified within FDOT Complete Streets Policy and supporting materials[12].

As part of its Strategic Highway Safety Plan, FDOT has implemented a Target Zero initiative to reduce fatalities and serious injuries to zero via the implementation of system enhancements on the public roadway system. The potential improvements identified in this project directly support that goal and will lead to significant reductions along a roadway which is currently experiencing high severe and

[12] https://experience.arcgis.com/experience/77c7386c09924809bf8c08476eab9da8/

vulnerable road user crash rates. For example, the implementation of high friction surface treatment (CMF ID 11449) can be expected to reduce crashes in a specific location by 67%.

With all the potential improvements working in tandem, significant safety benefits should be realized throughout the corridor. For example, the U.S. DOT Benefit Cost Analysis Guidance suggests that the reduction of two fatal crashes throughout the life of the improvements will net a benefit/cost value of $25 million ($12.5 million each fatal crash).[13] The recommendations are intended to reduce all crash types with a specific focus on VRUs, resulting in benefits that are anticipated to significantly outweigh the project costs.

These recommendations were also developed to address each of the five (5) safe system approach elements highlighted in the United State Department of Transportation National Roadway Safety Strategy by identifying improvements that lead to Safer People, Safer Roads, Safer Speeds, Safer Vehicles, and Post-Crash Care. The modification of roadway infrastructure, driving habits, and provision of additional pedestrian and bicyclist facilities will provide significant safety benefits to the community and all population groups. These recommendations will improve the ability of disabled individuals to navigate the corridor more effectively, while providing positive impacts to all members of the community through the replacement of worn warning surfaces, the provision of sidewalks, and increased access to transit in areas which previously required travel along the roadway shoulder where no facilities exist or where the network gaps occur. Improved corridor infrastructure can also improve the ability of newer automatic safety features in vehicles to detect conditions and respond appropriately. With the corridor being one of the community's major roadways with access to I-10, improved conditions may reduce the overall crash prevalence, while improving corridor efficiency to address crashes as they are experienced.

Through the identification of these safety issue areas, a series of potential improvements have been developed to improve safety along the corridor and are included in Table 17 and Table 18 . The study recommendations focused on proven, successful, innovative, and implementable safety measures.

General improvements include the modification of signal walk times, implementation of leading pedestrian intervals, increased pavement marking maintenance, safety / roadway education, and traffic enforcement. These strategies could be considered throughout the corridor.

The potential modifications were further grouped into linear and spot improvement types.

Linear improvements consist of the elimination of sidewalk and bike lane gaps as well as development of pedestrian fencing, high emphasis crosswalks, raised medians, pedestrian fencing / railings, road repairs, and turn lane modifications. The inclusion of sidewalks throughout the corridor to fill gap locations should be

[13] https://www.transportation.gov/mission/office-secretary/office-policy/transportation-policy/benefit-cost-analysis-guidance

prioritized to provide for a mode that is significantly under served through the corridor. Similarly, the signing and marking of bike lanes along the corridor should be implemented. The corridor has shoulder space which could be repurposed and marked as bike lanes.

Spot improvements were typically specific to locations throughout the corridor or less expansive than the more linear improvements. These included the replacement of missing or damaged infrastructure, and site specific improvements for identified safety concerns.

- Blank Out Signs
- Controlled Pedestrian Crossing
- Directional Median Opening (semi-permanent or permanent)
- Dynamic Speed Feedback Sign
- Green-Colored Pavement Marking
- Heavy Pedestrian Signage
- High Friction Surface Treatment
- Near Perpendicular Right Turn
- No U-turn Signage
- Pedestrian Fencing
- Pedestrian / Median Refuge
- Rectangular Rapid Flashing Beacon (RRFB)
- Repositioning of a Transit Stop
- Truncated Domes / Detectable Warning Surface
- Temporary Curb

Further explanation of these improvements has been included within Table 19, including reference materials or improvement examples. Additional descriptions of the intersections and segments included within this analysis are included within Appendix C

The extensive list of proposed improvements will increase the safety of all modes (especially benefiting VRUs) along the corridor, while enhancing one of the community's main roadways. Each of the recommendations will provide individual safety benefits; however, cohesive implementation of all of the recommended improvements will provide increased benefits throughout the corridor and for the adjacent populations, rather than point-focused solutions. A review of applicable Crash Mitigation Factors (CMFs) has been conducted with the crash reduction factors included within the Table 20.[14]

[14] https://www.cmfclearinghouse.org/

Table 17: Potential Improvements at Intersections

Intersections	#	Hotspot(s) (2017-2023)	Potential Improvement(s)	Bike Gap Area	Ped Gap Area
Tharpe Street	1	Bike/Ped	Crosswalk Improvements, LPI, Lighting	No	No
Northwood Boulevard	2	-	LPI, Lighting	No	No
N MLK Jr. Boulevard/E Bradford Road	3	Wet Weather	HFST, LPI, Right Turn Modification, Shift Traffic Control Box, Remove/Relocate Transit Stop	No	No
John Knox Road/Monticello Drive	4	-	Crosswalk Improvements, LPI, Replace Truncated Domes	No	Yes; West Side (FDOT Project)
Allen Road	5	-	Crosswalk Improvements, LPI, Right Turn Modification, Ped Fencing	No	Yes; West Side (FDOT Project)
Sharer Road	6	Severe, Bike/Ped	Crosswalk Improvements, LPI, Add Crosswalk, Ped Fencing, Lighting	No	Yes; West Side (FDOT Project)
Lakeshore Drive	7	Severe, Bike/Ped	Crosswalk Improvements, LPI, Ped Fencing, Right Turn Modification	No	Yes; West Side (FDOT Project)
Callaway Road/Meginnis Arm Road	8	Wet Weather	HFST, Crosswalk Improvements, LPI, Ped Fencing, Right Turn Modification	No	Yes; West Side
I-10 Eastbound Off-Ramp	9	Wet Weather	HFST, RRFB, No U turn, Ped Fencing, Crosswalk Improvements	No	No
I-10 Westbound Off-Ramp	10	Wet Weather	HFST, RRFB, Ped Signage, Ped Fencing, Blank Out Sign, Crosswalk Improvements	No	No
Sessions Road	11	Wet Weather	LPI/HFST Realign to Perpendicular, Median Refuge, Replace Truncated Domes, Sidewalk Location Sign, Crosswalk Improvements, Ped Fencing	Yes	No
Talpeco Road	12	-	Add Crosswalk	Yes	Yes
Crowder Road/Fred George Road	13	-	LPI, Median Refuge, Ped Railing Replacement, Modification of Railing for ADA, Ped Signal in Island	No	Partial; NE Corner
Faulk Drive/Perkins Road	14	-	-	Yes; West/South Side	Partial; NW Side
Old Bainbridge Road/Capital Circle NW	15	Severe, Dark – Unlit, Left-Turn Crashes	Offset NB & SB left-turn lanes for better visibility, Blank Out Sign	Partial; NB Side	Partial; East/West Side

Acronym Key

LPI – Leading Pedestrian Interval

HFST – High Friction Surface Treatment

Controlled pedestrian crossings – Pedestrian Hybrid Beacon

RRFB – Rectangular Rapid Flashing Beacon

Table 18: Potential Improvements within Corridor Segments

Segments	#	Crash Hotspot(s) (2017-2023)	Potential Improvement(s)	Bike Gap Area	Ped Gap Area
From Tharpe Street to Northwood Boulevard	1.5	-	Controlled Pedestrian Crossing	No	No
From Northwood Boulevard to N MLK Jr. Boulevard/E Bradford Road	2.5	-	-	No	No
From N MLK Jr. Boulevard/E Bradford Road to John Knox Road/Monticello Drive	3.5	Severe, Bike/Ped	Controlled Pedestrian Crossing, Reconfigure Silver Slipper Access	No	No
From John Knox Road/Monticello Drive to Allen Road	4.5	Severe, Bike/Ped	Raised Median, Directional Median Opening, Ped Fencing Turn Lane Modification	No	Yes; West Side (FDOT Project)
From Allen Road to Sharer Road	5.5	Severe, Bike/Ped	Controlled Pedestrian Crossing, Ped Fencing, Directional Median Opening	No	Yes; West Side (FDOT Project)
From Sharer Road to Lakeshore Drive	6.5	Severe, Bike/Ped, Wet Weather	Controlled Pedestrian Crossing, Ped Fencing, Directional Median Opening	No	Yes; West Side (FDOT Project)
From Lakeshore Drive to Callaway Road/Meginnis Arm Road	7.5	-	Ped Fencing	No	Yes; West Side
From Callaway Road/Meginnis Arm Road to I-10 Eastbound Off-Ramp	8.5	Wet Weather	HFST, Ped Signage, Ped Fencing	No	No
From I-10 Eastbound Off-Ramp to I-10 Westbound Off-Ramp	9.5	Wet Weather	HFST, Ped Barrier on Bridge	No	No
From I-10 Westbound Off-Ramp to Sessions Road	10.5	Bike/Ped	Ped Fencing	No	Yes
From Sessions Road to Talpeco Road	11.5	Dark - Unlit	Lighting at median openings, Ped Fencing, Controlled Pedestrian Crossing, Directional Median Opening	Yes	Yes
From Talpeco Road to Crowder Road/Fred George Road	12.5	Dark - Unlit	Lighting at Median Openings, Controlled Pedestrian Crossings, Directional Median Opening	Yes	Yes
From Crowder Road/Fred George Road to Faulk Drive/Perkins Road	13.5	Dark - Unlit	Lighting at Median Openings	Yes	Yes
From Faulk Drive/Perkins Road to Old Bainbridge Road/Capital Circle NW	14.5	Dark - Unlit	Lighting at Median Openings	Yes	Yes

Acronym Key

LPI – Leading Pedestrian Interval

HFST – High Friction Surface Treatment

Controlled pedestrian crossings – Pedestrian Hybrid Beacon

RRFB – Rectangular Rapid Flashing Beacon

Table 19: Glossary of Potential Improvements

Potential Improvement	Description	Benefit	Sources, References, and Examples
Blank Out Sign	A blank out sign, also known as a changeable message sign (CMS), appears dark unless activated. One application includes for right-turns: • "No right turn" symbol appears during pedestrian crossing activation "Yield to peds" text can also be used	Pedestrian safety	https://mutcd.fhwa.dot.gov/htm/2009/part2/part2l.htm
Controlled Pedestrian Crossings	Signalization of midblock crossing locations for pedestrian movement using either an actuated traffic signal or similar technologies such as the pedestrian hybrid beacon. These traffic control devices are designed to help pedestrians safely cross higher-speed roadways at midblock crossings and uncontrolled intersections. These improvements temporarily stop motor vehicular movement to encourage safe pedestrian travel. Most pedestrian fatalities occur at mid-block crossings or on multi-lane roadways at non-signalized locations. For pedestrians, walking just a half block out of the way to get to a signal can increase their delay by up to 3 minutes or more (note: assumes a 660-foot block, and walking speed of 3.5 to 4 feet per second)—a delay which would not be tolerated by motorists at a traffic signal.	Pedestrian safety	FHWA FDOT Traffic Engineering Manual MUTCD Chapter 4F FHWA_CONTROLLED PEDESTRIAN CROSSINGS Guide Recommendations
Directional Median Opening (semi-permanent or permanent)	Directional (channelized) median openings are designed to accommodate left-turn movements from the through roadway and prevent or discourage left-turn and crossing movements by traffic from a side road or driveway.	Motorist safety	FDOT Multimodal Access Management Guidebook
Leading Pedestrian Interval (LPI)	Gives pedestrians the opportunity to enter the crosswalk at an intersection 3-7 seconds before vehicles are given a green indication. Pedestrians can better establish their presence in the crosswalk before vehicles have priority to turn right or left.	Pedestrian safety	FHWA
Dynamic speed feedback sign	A dynamic message sign that uses radar or laser technology to determine the speed of an approaching vehicle and then displays the speed to the driver.		ITE
Green-Colored Pavement Markings	Green-colored pavement markings may be used when the need to enhance the conspicuity of bicycle-vehicular conflict areas is demonstrated. The Federal Highway Administration (FHWA) has issued an Interim Approval (IA.14) for the use of green-colored pavement in marked bicycle lanes, extensions of bicycle lanes through intersections, and other bicycle-vehicular conflict areas. FDOT has received permission from FHWA for use of green-colored pavement on the SHS. Bicycle-vehicular conflict areas include: 1) Bicycle lane crosses a vehicular right turn lane a) Separate right-turn lane b) Dropped lane transitioning into a right-turn lane c) Free-flow channelized right-turn lane, such as at an interchange: lane addition or merge lane 2) Bicycle lane adjacent to a dedicated bus bay 3) Intersection Bicycle Boxes, see FDM 223.2.1.5 Two-Stage Bicycle Turn Boxes, see FDM 223.2.1.5	Bicyclist safety	FDOT FDM 223 Bicycle Facilities MUTCD Interim Approval https://www.fdot.gov/gis/bim/green-pavement NACTO
Heavy Pedestrian Signage	Signs highlighting heavy pedestrian activity can alert drivers to be more aware of pedestrians and drive more cautiously.	Pedestrian safety	www.fdot.gov/docs/default-source/traffic/trafficservices/Studies/TEM/TEM2017/TEM-Chapter-4-June-2018.pdf https://mutcd.fhwa.dot.gov/htm/2009/part2/part2c.htm#section2C50
High Friction Surface Treatment	High friction surface treatments (HFST) are pavement treatments that dramatically and immediately reduce crashes, injuries, and fatalities associated with friction demand issues, such as: A reduction in pavement friction during wet conditions, and/or a high friction demand due to vehicle speed and/or roadway geometrics.	Safety (all modes)	FHWA FDOT Pilot Project & Award (1) FDOT Pilot Project & Award (2) FDOT HFST Guidelines
No U-turn	No U-turn signs alert drivers that the U-turn movement is prohibited at that specific location.	Motorist safety	

Potential Improvement	Description	Benefit	Sources, References, and Examples
Pedestrian Fencing	Pedestrian Channelization Barriers are used along medians and roadsides to help guide pedestrians to marked crosswalk locations.	Pedestrian safety	
Pedestrian / Median Refuge	All State and local agencies are encouraged to consider raised medians in curbed sections of multi-lane roadways in urban and suburban areas, particularly in areas where there are mixtures of a significant number of pedestrians, high volumes of traffic (more than 12,000 Average Daily Trips (ADT)), and intermediate or high travel speeds.	Pedestrian safety	FHWA
Rectangular Rapid Flashing Beacon (RRFB)	To enhance pedestrian conspicuity and increase driver awareness at uncontrolled, marked crosswalks, transportation agencies can install a pedestrian actuated Rectangular Rapid Flashing Beacon (RRFB) to accompany a pedestrian warning sign. RRFBs consist of two, rectangular- shaped yellow indications, each with a light-emitting diode (LED)-array-based light source. RRFBs flash with an alternating high frequency when activated to enhance conspicuity of pedestrians at the crossing to drivers.	Pedestrian safety	FHWA FDOT Traffic Engineering Manual MUTCD
Near Perpendicular Right Turn	Channelized right turn lanes can be designed with a flat or near perpendicular angle of entry to the cross street. The flat angle of entry is most appropriate for higher speed turning movements with no pedestrian accommodations. Large turning radii and angles of entry into the cross street allow higher turning speeds, reduced traffic delays, and the turning movement of large trucks. The higher speeds, angle of entry and large radii adversely impact pedestrian safety at the crosswalk. The near perpendicular angle of entry is preferred where pedestrian facilities are provided. Tight turning radii and angles of entry into the cross street accommodate the following: • Slower turning speeds, • Reduced cross walk length, • Improved pedestrian visibility, • Improved sight distance • Decreased angle of driver head turning • Reduced right-of-way impacts.	Safety (all modes)	FDOT Design Manual 212 Fowler Avenue at Bruce B Downs Boulevard (Tampa, FL)
Posted speed limit reduction	The goal of reducing motorist travel speeds is to increase reaction time for both drivers and pedestrians to avoid crashes, as well as reduce the severity of pedestrian injuries when these crashes occur. It is important to keep in mind that actual travel speeds often exceed posted or statutory speed limits and that posted speed limits often exceed safe travel speeds. Evidence shows that actual speeds are reduced by only a fraction of the reduction in speed limits—typically 1- to 2 mph speed reduction for every 5-mph speed limit reduction (Elvik et al., 2004). However, even 1- to 2 mph reductions in average speed are estimated to yield substantial fatal and injury crash reductions.	Safety (all modes)	FHWA (1) FHWA (2)
Truncated Domes/Detectable Warning	Truncated domes (AKA detectable warnings, tactile paving, detectable warning surfaces) are ground surface indicators designed to assist and warn pedestrians who are blind or visually impaired. Truncated domes feature a unique pattern of cones that are easily detected by a cane or foot, alerting the visually impaired to the presence of a street or sudden drop-off.	Pedestrian safety	https://safety.fhwa.dot.gov/saferjourney1/library/countermeasures/22.htm https://www.fdot.gov/docs/default-source/roadway/ds/14/idx/00304.pdf
Temporary Curb	Temporary curb/traffic lane separators can facilitate a “test” or “pilot” condition; in this case, changes to median openings (see Directional Median Opening).	Motorist safety	https://qwickkurb.com/

Table 20: Potential Crash Modification Factors Considered

Improvement	CMF ID	Name/Description	Comments	Crash Type	Crash Severity	Star Rating	CMF Value	CRF Value
Directional Median Opening	5457	Convert a full median opening to a directional median opening	CMF for total crashes (based on the KABCO scale). The SPF only included VMT. It was not clear if annual calibration factors or other methods were used to account for trends.	All	All	3	0.93	7%
Pedestrian Fencing	5258	Install pedestrian fencing	The number of crashes in the after period were not reported in this study, however, they have been recorded as 300 to give 10 points as a benefit of doubt for one or more of the following: (1) number of miles/sites in the reference/treatment group, (2) number of crashes in the references/treatment group, (3) reporting AADTs for the aggregate dataset but not for the disaggregated dataset used for CMF development.	All	All	3	0.88	12%
Controlled Median Crossing	9022	Install PHB or HAWK w/advanced yield or stop markings/signs	Study sites were a combination of intersection and mid-block locations.	All	All	4	0.82	18%
Median Treatment	9120	MEDIAN TREATMENT FOR PED/BIKE SAFETY	Install various median treatment: median fencing, sidewalk fencing, median brick planters, pedestrian islands	All	All	3	0.86	14%
LPI	9904	Modify signal phasing (implement a leading pedestrian interval)	This CMF is for sites where LPIs were implemented at all crossings (across major and minor roads)	All	All	5	0.9	10%
LPI	9906	Modify signal phasing (implement a leading pedestrian interval)	This CMF is for sites where LPIs were implemented at all crossings (across major and minor roads)	Vehicle/Pedestrian	All	5	0.81	19%
HFST	11449	Install high friction surface treatment (HFST)	CMF for crashes at intersections	All	All	3	0.334	67%
RRFB	11172	Install rectangular rapid flashing beacon (RRFB)	CMF for total crashes.	All	All	4	1.14	-14%
RRFB	11158	Install rectangular rapid flashing beacon (RRFB)	CMF of total pedestrian crashes.	Vehicle/Pedestrian	All	4	0.31	69%
RRFB	11168	Install rectangular rapid flashing beacon (RRFB)	It is the CMF for fatal and injury crashes in pedestrian crashes.	Vehicle/Pedestrian	Fatal and Injury	4	0.3	70%
RRFB		Install rectangular rapid flashing beacon (RRFB)	CMF of urban pedestrian crashes.	Vehicle/Pedestrian	All	3	0.526	47%

Source: https://www.cmfclearinghouse.org

Recommended improvements from this analysis were generated from the review of proven safety improvements ranging from low-cost, near-term implementation and demonstration activities to permanent infrastructure changes along the corridor. With the key focus of increasing safety for all users along the corridor in the most efficient way possible, several of the proposed improvements can be effectively and quickly implemented without requiring significant changes to existing infrastructure. Examples of these lower cost, quick implementation improvements include remarking crosswalk areas to increase emphasis and visibility, utilizing green bike lane markings, and modifying signal timings for improved pedestrian safety. Figure 48 depicts an ADA detectable warning surface in need of replacement.

Figure 49: Missing/Damaged Detectable Warning Surface

Behavioral improvements were also reviewed and identified as feasible options with proven results. These types of improvements include the implementation of increased education and traffic enforcement to improve the safety along the corridor. During the public workshop, several attendees inquired about general traffic laws and appropriate understanding of roadway markings. As such, the consideration of educational programs may be helpful in the area.

More permanent and higher cost improvements, such as the implementation of median refuges, midblock crossings, near perpendicular right turns, and intersection approach realignments were also considered. These more intensive improvements require more time to implement and represent substantial infrastructure changes along the corridor.

For each of the areas with significant improvements identified, a series of visualizations have been developed to depict the type and location of the potential improvements. This analysis utilized the safety analysis and review of proven countermeasures to recommend key locations for the improvements in coordination with the Florida Design Manual. These visualizations have been included within Appendix D, while generalized locations of improvements throughout the corridor have been included within a map series in Appendix E.

Cost Analysis

Building upon the previous efforts and expenditures along the corridor, an analysis was conducted for the development of planning level cost estimates. These estimates are based on known quantities and the FDOT Historical Item Average Cost Reports[15] which allowed for the development of estimates based on the length, size, and number of improvements being considered. The costs were developed using the estimated construction values with an additional 25% contingency to estimate the inclusion of design engineering, variable costs, and unforeseen challenges to development.

Bicycle and pedestrian modal improvements are anticipated to utilize existing infrastructure where feasible and largely focus on the filling of gap areas (missing sidewalks and bike lanes) in the network. Additionally, the implementation of green markings are included within the costs to more effectively indicate bike lanes throughout the corridor. Overall, the development of sidewalk and bike lane (with green paint) infrastructure is anticipated to account for $15.7 million of the total estimated costs.

The complete list potential improvements identified within this report (and the Appendix) would carry an estimated cost of just over $29 million. Table 21 depicts the estimated costs per segment and intersection.

[15] https://www.fdot.gov/programmanagement/estimates/reports/historical-item-average-cost-reports

Table 21: Planning Level Cost Estimates for Potential Improvements

Intersection and Segment #	Location / Activity	Estimated Project Cost
--	**Total Estimated Costs**	**$ 29,112,782**
1	Tharpe Street Intersection	$ 69,060
1.5	Pedestrian Crossing Between Tharpe St and Northwood Blvd	$ 347,286
2	Northwood Blvd Intersection	$ 129,223
2.5	Northwood Blvd to N MLK Jr Blvd	N/A
3	N MLK Jr Blvd Intersection	$ 470,888
3.5	Pedestrian Crossing Between N MLK Jr Blvd and John Knox Rd	$ 347,286
3.5	Right in Right Out and Pedestrian Signage at Silver Slipper Lane	$ 245,028
4	John Knox Rd Intersection	$ 15,436
4.5	Crossings and Median Improvements Between John Knox Rd And Allen Rd	$ 165,419
5	Allen Rd Intersection	$ 291,313
5.5	Median Improvements and Midblock Crossings between Allen Rd and Sharer Rd	$ 585,311
6	Sharer Rd Intersection	$ 199,521
6.5	Crossings and Median Improvements between Sharer Rd and Lakeshore Dr	$ 542,966
7	Lakeshore Dr Intersection	$ 278,662
7.5	Lakeshore Dr to Callaway Rd	$ 31,326
8	Callaway Rd Intersection	$ 1,861,271
8.5	Safety Improvements between Callaway Rd and I-10	$ 290,230
9	Eastbound I-10 Ramp Intersection	$ 273,605
9-10.5	Rectangular Rapid Flashing Beacon Installation	$ 339,755
10	Westbound I-10 Ramp	$ 281,915
10.5	Safety Improvements between I-10 and Sessions Rd	$ 206,153
11	Sessions Rd Intersection	$ 659,164
11.5	Safety Improvements between Sessions Rd and Talpeco Rd	$ 852,161
12	Talpeco Rd Intersection	$ 48,490
12.5	Safety Improvements between Talpeco Rd and Fred George Rd	$ 1,225,232
13	Fred George Rd Intersection	$ 112,992
13.5	Safety Improvements Between Fred George Road and Perkins Road	$ 1,013,158
14	Perkins Road Intersection	N/A
14.5	Safety Improvements Between Perkins Road and CC NW	Gap Area Costs
15	Capital Circle NW Intersection	$ 2,528,440
Throughout	Bicycle and Pedestrian Facility Gap Areas	$ 15,701,493

Conclusion

The North Monroe Street corridor represents a premier opportunity for the improvement of safety conditions while leveraging agency partnerships and preexisting efforts along the corridor. The corridor has seen significant investment in community involvement and the prioritization of infrastructure improvements in recent years. This implementation plan capitalizes on those efforts to identify feasible safety improvements throughout the corridor. Nearby community resources and private development have continued to grow in the area, adding to the importance of the roadway. The corridor is one of Leon County's most significant roadways, connecting the suburban and rural communities to the north with I-10 and downtown Tallahassee.

The presence of bicycle and pedestrian facility gaps hinder multimodal use and specifically limit safe access to transit stop locations. This lack of connectivity decreases safety in the area by promoting inappropriate use of shoulder areas and increasing the opportunity for conflicts with motor vehicle movements. Significant bicyclist and pedestrian movements have been identified throughout the corridor with clustering primarily in the area between Tharpe Street and Sessions Road. These trends coincide generally coincide with the VRU HIN which was identified through other planning efforts.

The significance of the corridor and known safety issues warrant the implementation of safety improvements throughout the area for all modes of travel. Dedicated space for non-motorized travel will highlight their presence along the corridor while providing safer methods for travel. Many of the improvements are designed to reduce motor vehicle conflict points and promote increased line of sight with the goal of reducing overall crash rates and their severity. The potential improvements consist of proven and tested countermeasures in accordance with current design standards. Where applicable, additional traffic operations analysis may be conducted to further review the corridor.

The location of known utilities, drainage, right-of-way, and planned improvements have been considered within the identification of potential improvements. The improvements have been depicted in the location they are most likely to have significant safety benefits; however, the specific alignment and design of these potential improvements will need to be further refined within the Preliminary Engineering and Design phases of project implementation.