



Report prepared by:

Kimley»Horn
Expect More. Experience Better.

Final Report and Plan

Kirkman Road (SR 435) from Conroy Road to Raleigh Street

December 30, 2025

VISION ZERO
CROSS
CONNECTING RESIDENTS
ON SAFE STREETS

Executive Summary

The Orlando CROSS study utilized a RAISE grant to study six corridors identified on the high injury network. This report contains the results for the Kirkman Road corridor from Conroy Road to Raleigh Street.

Kirkman Road is the most suburban corridor. It features a wide right-of-way with open swales and a 50-mph speed limit. There is a shared-use path on part of the east side, but pedestrian connectivity to Valencia College is limited. It is bordered by a major master-planned community, MetroWest. Kirkman Road has an FDOT Context Classification of C3C (Suburban Commercial).

Public outreach for the CROSS study included multiple public meetings, pop-up events, and a project website. Comments received reflected a mix of concerns, most commonly for bicyclists and pedestrian safety. Public sentiment regarding safety countermeasures showed positive feelings towards separated bikeways, hardened median nose extensions, and buffered/separated bike lanes. Roundabouts, directional medians, and pedestrian hybrid beacons received mixed feelings.

The Kirkman Road crash characteristics from 2019 to 2023 include:

- 1,271 crashes in total over 5 years corridor-wide
- 254 crashes annually corridor-wide
- 107 crashes annually per mile
- 5.840 crash rate in crashes per year per million vehicle-miles

Based on the results of the CROSS study, the following improvements are recommended for Kirkman Road:

Short-term improvements (approximately 1 year or less) on Kirkman Road focus on signalization upgrades, signal timing adjustments, and enhanced signing and marking visibility.

Mid-term improvements (approximately 1 to 3 years) on Kirkman Road focus on phasing changes for signalized turning movements, lane emphasis, new pedestrian crossings, and protection for non-motorists.

Long-term improvements (3 years or more) are depicted on the CROSS Kirkman Road Concept roll plot under separate cover from this report. The proposed context classification and speed limits for the corridor are shown in **Figure 99**. The proposed typical section for the corridor is shown in **Figure 100**.

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Attachments: Recommendations Roll Plots (available electronically as a separate file)

CHAPTER 1

CORRIDOR ANALYSIS AND COMMUNITY SNAPSHOT

MetroWest



Background

The Orlando Connecting Residents on Safe Streets Project (“Project” or “CROSS”) aims to develop a comprehensive implementation plan for safety improvements across six Vision Zero corridors in the City of Orlando. Vision Zero is a global initiative embraced by cities committed to eliminating traffic-related deaths and serious injuries, with a focus on equity and community engagement. In 2017, Mayor Buddy Dyer solidified Orlando’s commitment to Vision Zero by adopting the Vision Zero Action Plan through an official resolution.

The U.S. Department of Transportation awarded the City of Orlando a Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant to support the CROSS Project. This funding enables a detailed examination of six critical corridors within Orlando, using the city’s established methodology to identify context-specific countermeasures and capital improvements. These efforts are part of Orlando’s goal to eliminate all traffic-related deaths and serious injuries by 2040.

As part of this initiative, Kimley-Horn conducted a comprehensive analysis of six corridors and developed the Corridor Analysis and Community Snapshots Interim Report in alignment with the city’s methodology.

Selection Criteria

The selection of corridors for the Orlando Connecting Residents on Safe Streets (CROSS) Project was guided by data-driven methodologies as a part of the City of Orlando’s Vision Zero Action Plan, adopted in 2017.

Key criteria for selecting the six Vision Zero corridors included:

- **Crash Frequency and Severity:** Focusing on locations with significant safety concerns, particularly for vulnerable road users.
- **Equity Considerations:** Ensuring underserved communities and high-risk areas were prioritized for improvements.
- **Community Impact:** Targeting corridors with high pedestrian, cyclist, and transit activity to enhance safety outcomes.

The selected corridors include both on-system FDOT roads and locally managed streets, spanning critical segments within the City of Orlando. These corridors, depicted in **Figure 1**, are as follows:

1. **Kirkman Road:** From Conroy Road to Raleigh Street
2. **SR-50/Colonial Drive:** From Ferguson Drive to Maguire Boulevard
3. **Orange Blossom Trail:** From Winifred Street to SR-50
4. a. **Orange Avenue:** From SR-408 to SR-50
b. **Rosalind/Magnolia Avenue:** From SR-408 to SR-50
5. **Orange Avenue:** From Pineloch Avenue to SR-408
6. a. **Semoran Boulevard:** From Grant Street to Dahlia Drive
b. **Curry Ford Road:** From Larkin Avenue to Bowen Drive

By applying these selection criteria, the Project ensures safety improvements are targeted at the most critical locations, advancing Orlando’s Vision Zero goal of eliminating traffic-related deaths and serious injuries by 2040.

Methodology

This report provides a comprehensive overview of each corridor, assessing conditions, demographics and equity profiles, transit accessibility, employment, land use, developmental activity, and community dynamics to determine the current conditions and gain insights into future opportunities. Each analysis begins with an overview of the historical and physical context supplemented by field observations and photos.

A base map for each corridor was compiled, including environmental features, community amenities, surrounding neighborhoods, and commercial and cultural landscapes. A demographics and equity profile was developed using 2020 U.S. Census data, American Community Survey data and the City of Orlando Communities of Concern methodology to identify diverse, vulnerable, or underserved communities.

Corridor context was assessed by creating a quarter-mile buffer around the study corridors to reflect a five-minute walking distance. This buffer was used to analyze land use and area characteristics. Boarding and alighting data were mapped along

these corridors to identify high-pedestrian zones and transit usage patterns. A half-mile buffer was also created around train stations to represent a ten-minute walking distance. While train stations are not directly located on the corridors, their access buffers overlap with the corridor, indicating a potential influence on corridor safety. Furthermore, Areas of Concentration were identified where clusters of services, goods, and employment hubs intersect with transit-accessible zones.

Four Kimley-Horn staff surveyed each of the six Vision Zero corridors once during an in-person, daytime site visit, recording observations using an audit sheet and taking photos. The primary purpose of this site visit was to observe land use and planning context, in addition to transportation conditions and behaviors.



Data Sources

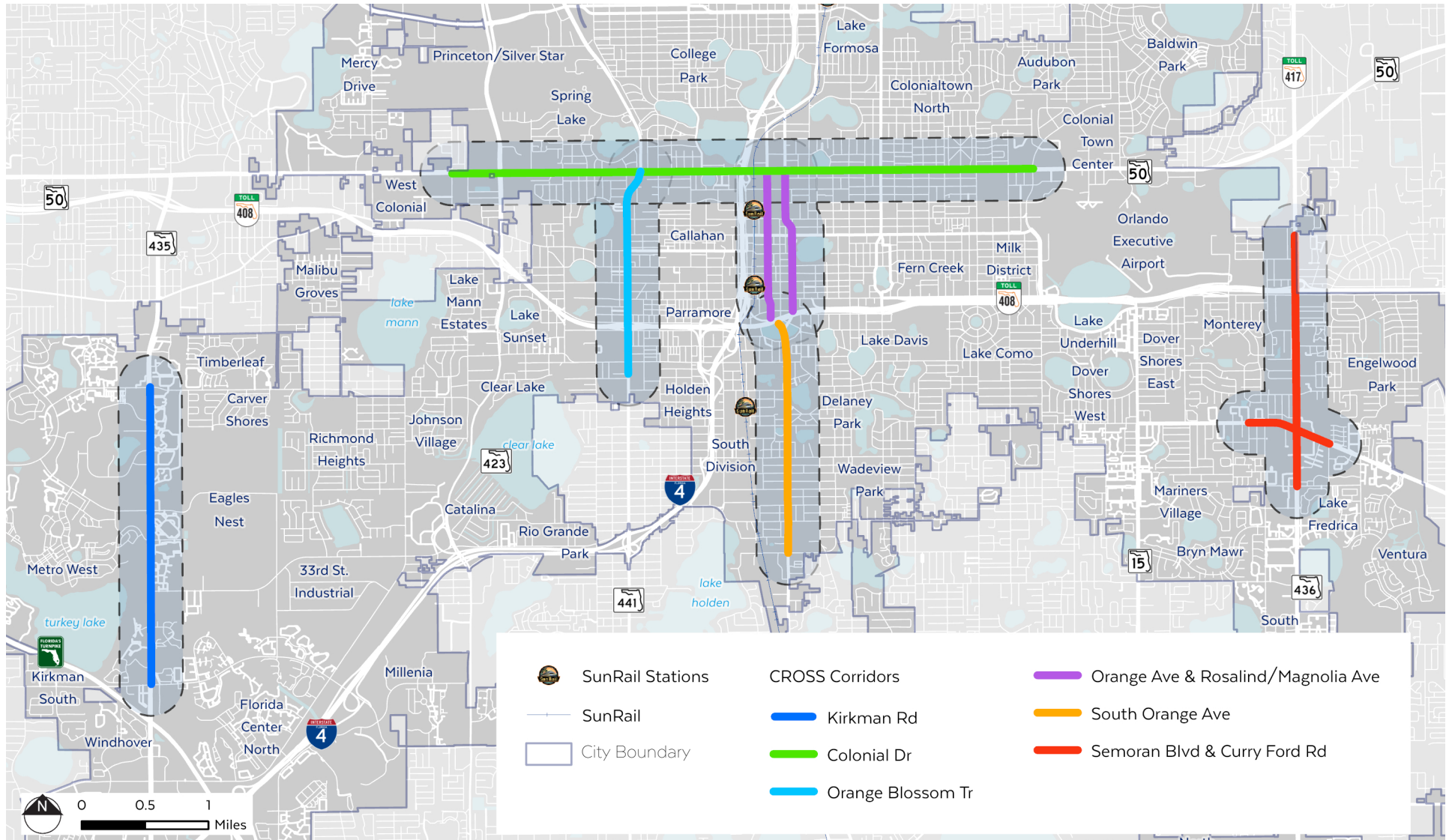
A variety of data sources were utilized to capture the full range of factors influencing corridor safety, including:

1. Demographic and Socioeconomic Data
 - a. 2020 Census data from Census.gov and ACS 2020 5-year
 - b. Communities of Concern methodology from the City of Orlando
 - c. Justice40 Tool
2. Geospatial Data and Mapping Sources
 - a. City of Orlando | Open Data Hub:
 - Parks data
 - Existing Land Use (ELU), Zoning, Transect, and Future Land Use (FLU) data
 - Incentive Programs like Orlando Main Streets, STRIVE, Opportunity Zones etc.
 - Neighborhood boundaries, and other community layers
 - b. Orange County | Open Data Hub:
 - K-12 Schools data (OCPS GIS)
 - Zoning, Future Land Use (FLU), and Existing Land Use (ELU) parcel data
 - Environmental features such as wetlands and hydrology data
 - c. ESRI Business Analyst
 - Business Locator Reports
3. Transportation and Transit Data
 - a. LYNX
 - SunRail Stations
 - Bus Stops with boarding/alighting data
 - b. LYMMO Routes

Overview of Study Corridors

Summary Map

Figure 1: Overview Map of the six CROSS Corridors and Study Areas



Overview of Common and Unique Characteristics

The corridors included in this analysis share several common characteristics, including high traffic volumes, 2 or more lanes in each direction, pedestrian and cyclist activity, and safety concerns from high vehicle speeds. All corridors are built-out from a land use standpoint though some areas are seeing redevelopment or vacancy.

High transit usage is a feature of all corridors, meaning that bus stops generally receive more than 15 passengers a day. Throughout all corridors, bus stop amenities range from well-equipped shelters with sidewalk connections to minimal facilities. People walking across streets between crosswalks is common, as are long distances between marked crosswalks or long signal cycles. The corridors are lower-income and higher poverty than the City averages though with significant variation between and within them.



All corridors have a higher proportion of zero-vehicle households than the City as a whole meaning **more residents rely on public transportation, walking, and cycling to access their daily needs.**

These wide, multi-lane roadways support higher-speed travel which can increase the severity of crashes for drivers and pedestrians alike. While pedestrian infrastructure is present along all corridors, the quality varies significantly with narrow or obstructed sidewalks and ADA compliance issues in older areas with more narrow rights-of-way. Newer, more suburban areas, like Kirkman Road and Semoran Boulevard, have wider sidewalks less likely to be obstructed by infrastructure, but greater distances between destinations, higher speeds, and more auto-oriented design of land uses along the roadway with building entrances far from the sidewalk. With the exception of downtown, the corridors largely lack shade to buffer people walking from heat effects. Bicycle infrastructure is often absent. Where bike lanes exist, they are sometimes along a paved shoulder with bike lane markings next to high-speed traffic of 50 mph or greater, which are unattractive to many people bicycling.

In addition to these shared issues, each corridor has unique characteristics:

Kirkman Road is the most suburban corridor. It features a wide right-of-way with open swales and a 50-mph speed limit. There is a shared-use path on part of the east side, but pedestrian connectivity to Valencia College is limited. It is bordered by a major master-planned community, MetroWest. Kirkman Road has an FDOT Context Classification of C3C (Suburban Commercial).

Colonial Drive is the longest corridor with a wide variety of neighborhoods and Main Streets, from quickly growing residential and social destinations to lower-income communities. It benefits from a strong grid of local streets providing parallel connectivity along most of the corridor, and has posted speeds ranging from 35 to 50 miles per hour. Colonial Drive has three FDOT Context Classifications: C3C (Suburban Commercial), C4 (Urban General), and C6 (Urban Core).

Orange Blossom Trail (OBT) serves a low income, majority African-American community. It is a five-lane corridor with a posted speed of 40 miles per hour and without bike lanes. There is heavy pedestrian activity, particularly near Jones High School, where frequent unsignalized crossings pose a safety risk. The corridor carries traffic from industrial uses as well as events at Camping World Stadium. Orange Blossom Trail has an FDOT Context Classification of C4 (Urban General).

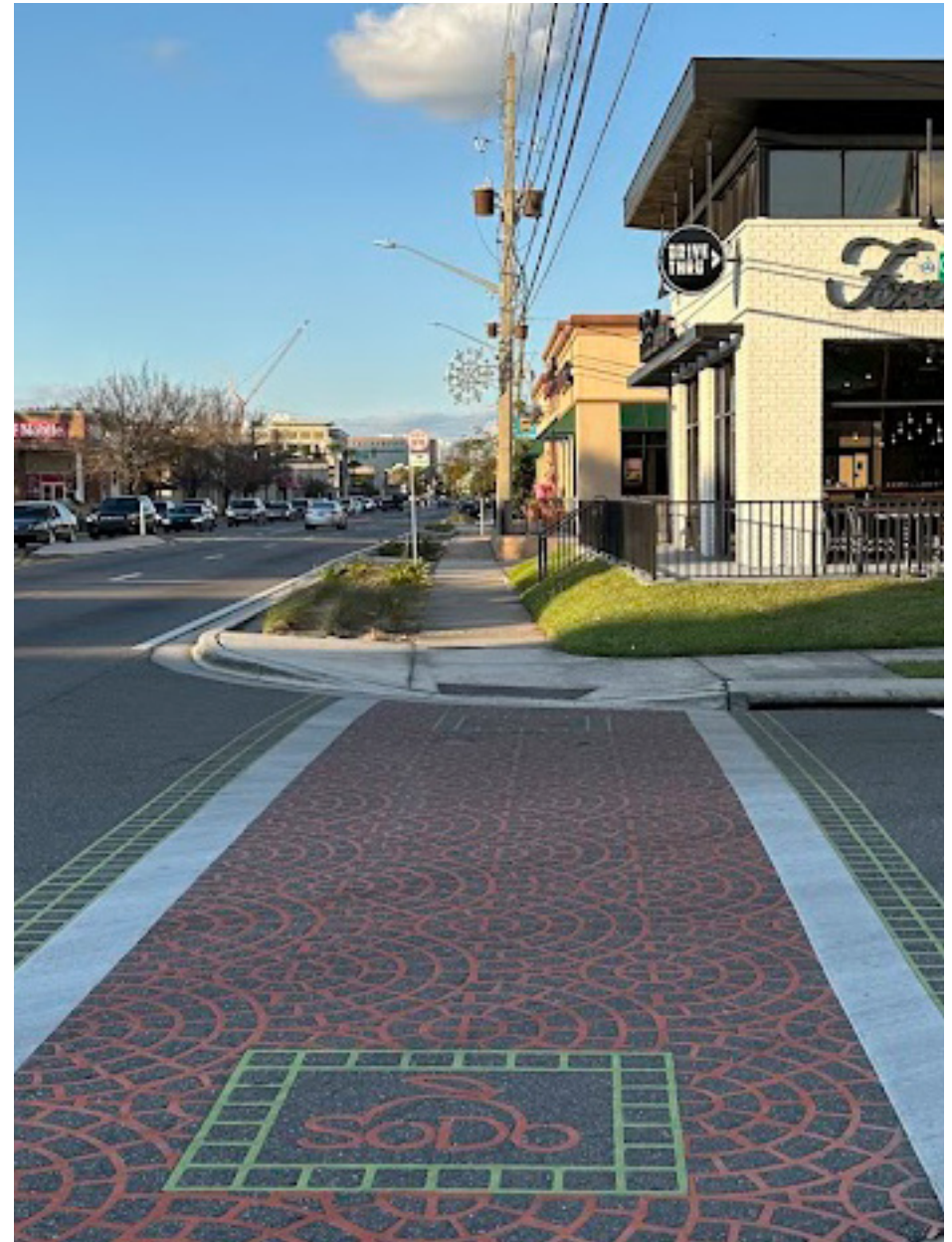
Orange and Rosalind/Magnolia Avenues are in the heart of downtown Orlando, with posted speeds of 25 and 30 miles per hour. They have significant pedestrian activity and business, government, and cultural destinations. Existing improvements for people walking and biking include highly visible green bike lanes and extended sidewalks. The City's current vision, DTO Action Plan, anticipates a major redesign to improve business outlook and walkability.

Both Orange and Rosalind/Magnolia Avenues have two FDOT Context Classifications: C4 (Urban General) and C6 (Urban Core).

South Orange Avenue serving Orlando’s “SoDo” district is a growing area driven by the presence of Orlando Regional Medical Center. It is a five-lane corridor with posted speeds of 30 to 50 miles per hour and is currently under construction for pedestrian and streetscape improvements. South Orange Avenue has two FDOT Context Classifications: C4 (Urban General) and C5 (Urban Center).

Semoran Boulevard stands out as a high-speed, six-lane divided roadway with large commercial driveways that contribute to frequent pedestrian-vehicle conflicts, compounded by minimal landscaping and an excess of business signage. The high-volume intersection with Curry Ford Road, a 4-lane road with additional turning lanes at intersections, is large with major conflict points. Semoran Boulevard has an FDOT Context Classification of C4 (Urban General) while Curry Ford Road has three: C3C (Suburban Commercial), C3R (Suburban Residential), and C4 (Urban General).

The conditions of these corridors are influenced by the nearby land uses and patterns. The more urban conditions seen along Orange Avenue, Rosalind/Magnolia Avenue, and Colonial Drive benefit from improved access through a dense mix of uses located close together and more connected street networks to support walkability. More suburban conditions, as seen along Semoran Boulevard/Curry Ford Road and Kirkman Road force local trips, including people biking and walking, onto higher speed roadways and make those trips longer due to lack of direct connections between adjacent properties.



KIRKMAN RD

CORRIDOR ANALYSIS AND COMMUNITY SNAPSHOT

MetroWest



Executive Summary

Kirkman Road is located in Southwest Orlando. The study area is a 2-mile stretch of the corridor from Raleigh Street to the north to Conroy Road to the south. This report assesses the conditions of the corridor and the interconnectedness between demographics, land use, and transportation. The analysis focuses on a one-quarter mile buffer from the roadway.

The corridor is primarily residential with Valencia College at the north end and the turnpike just past the south end. There are significant numbers of apartment developments on both sides of the roadway. Most of the development west of Kirkman Road within the corridor is part of the MetroWest community, a master planned community developed in the 1980s with a mix of housing types and a commercial center. East of the roadway consists mostly of multifamily development, with some commercial, office, and industrial uses.



Kirkman Road plays a significant role in the region's transportation network by supporting

traffic generated by key tourist destinations such as the Universal Orlando Resort and International Drive to the south.

Adjacent Neighborhoods:

1. MetroWest
2. Kirkman North
3. Kirkman South



At a Glance

FDOT Context Classification: C3C Suburban Commercial



Roadway Design: Six travel lanes; 50 mph speed limit; wide right-of-way with open drainage, and high vehicle volumes.



Walking Infrastructure: Sidewalks and a shared-use path from Raleigh Street to L.B. McLeod Road.



Biking Infrastructure: Standard bike lanes on both sides.



Land Use and Activity: Suburban commercial corridor with moderate walking and biking activity and high transit use driven by surrounding residential and commercial areas.

Language Barriers: 11% of households have limited English proficiency.

Income: Per capita income is ~\$25,000, below the city average. Lower-income households are more likely to face unsafe walking and biking conditions.



Approximately **10%** of people in the study area rely on public transit, walking, or biking to get to work, which is higher than the Orlando average of **5.5%.**

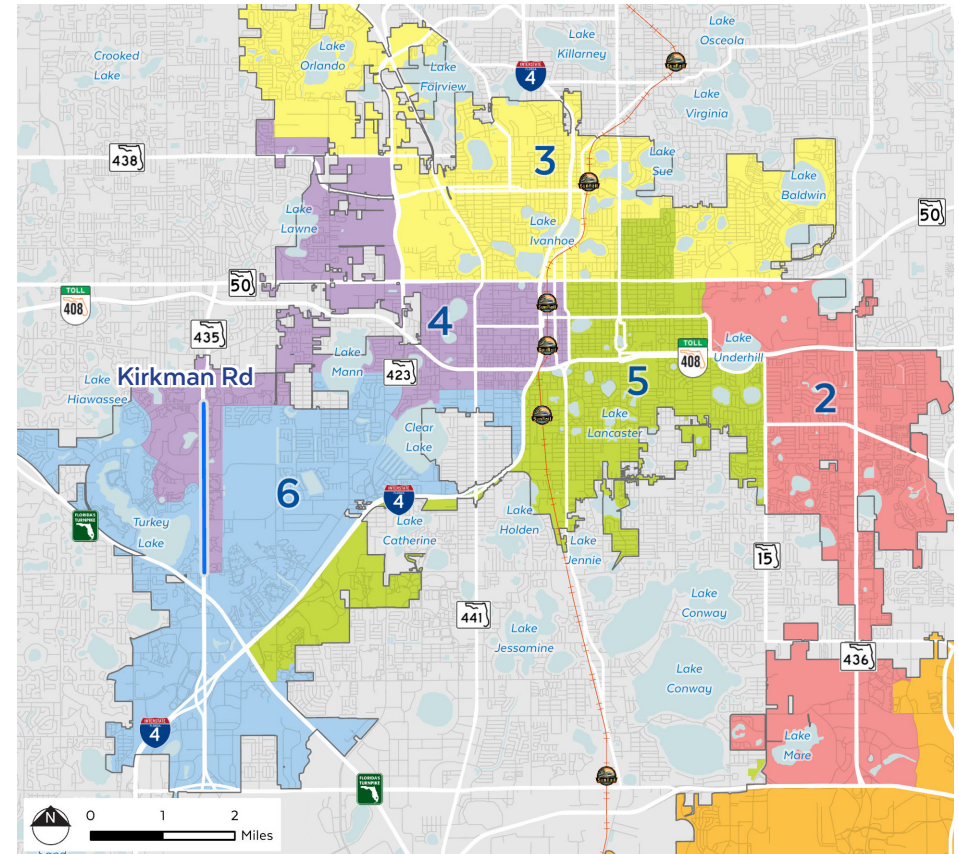


Figure 2: Location Map of Commissioner Districts and Kirkman Rd

Context

Kirkman Road was initially established as a rural road serving the undeveloped western outskirts of Orlando. It was not until the post-World War II period that Kirkman Road began to see significant development and urbanization.

Starting in the 1960s, Orlando began annexing properties in the corridor to accommodate expanding residential development. Kirkman Road became a major route for both commuters traveling to work and visitors heading to attractions like Universal Studios, which opened in 1990. The road's proximity to tourist destinations, as well as its connection to other major routes like Interstate 4 (I-4) and the Florida Turnpike, helped it become a key part of the transportation network for both residents and tourists.

The road remains vital for the daily commute of residents in western Orlando, with its proximity to key destinations such as the Universal Orlando Resort, the Dr. Phillips area, and the Interstate 4 corridor making it a critical part of the region's transportation network.

The corridor is predominately residential, with apartments and condos. Retail establishments such as grocery stores, restaurants, and local shopping centers serve the adjacent communities and passersby. There has been minimal new development in the last 5 years. Critical community assets in on or near the corridor include Valencia College, several parks, a school, a public library, and Millenia Mall. Outside of MetroWest, residential and commercial uses are typically separated on different properties in a disconnected land use pattern. With a lack of roadway or sidewalk connections between residential and commercial uses, indirect routes are required to access needs and amenities and many local trips are diverted onto Kirkman Road. The MetroWest neighborhood is more connected, allowing residents to walk or drive to restaurants, banks, and other services on internal roadways.

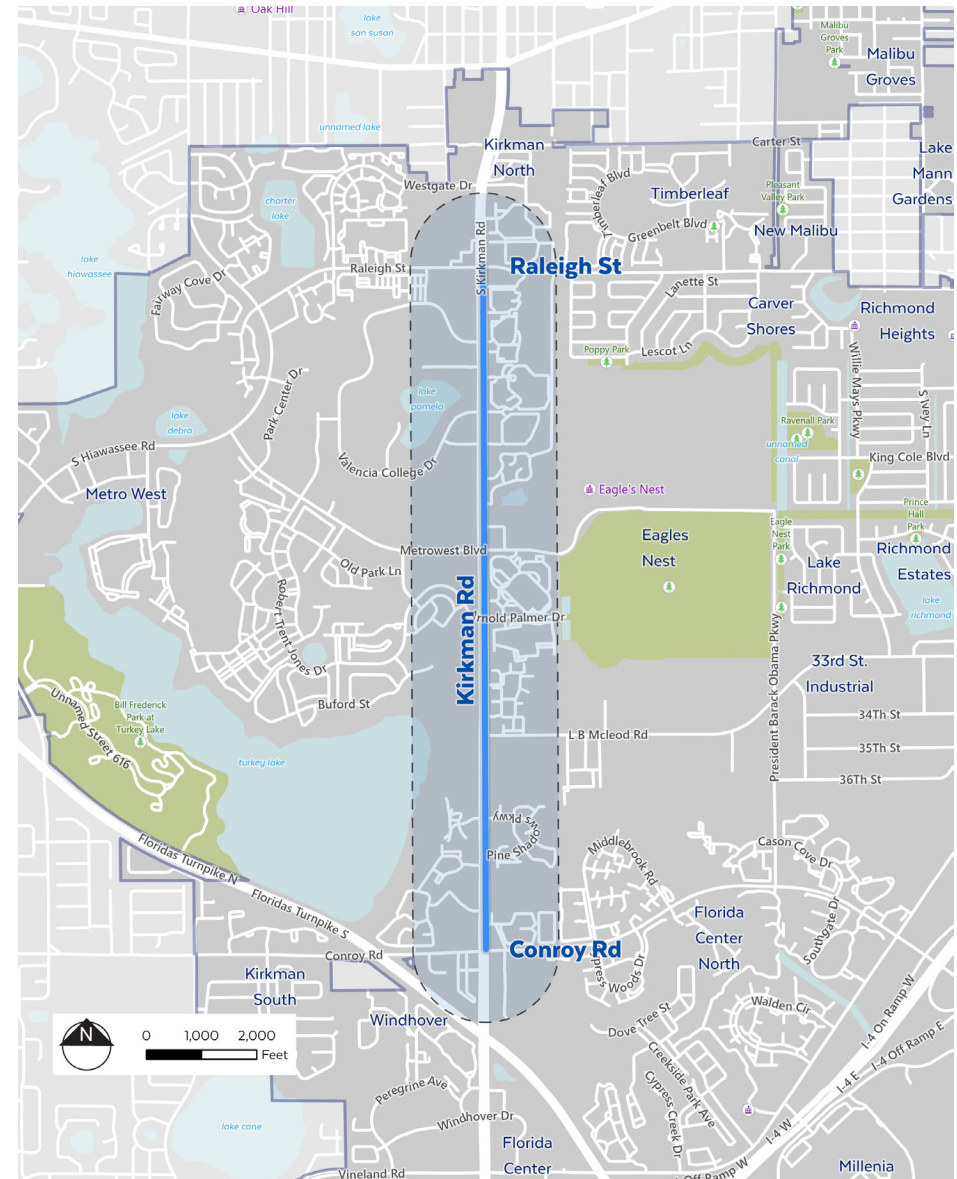


Figure 3: Overview Map of Kirkman Rd and Study Area

Existing Corridor Conditions

Roadway Classification

The segment of South Kirkman Road (State Road 435) between Conroy Road and Raleigh Street, approximately 2.35 miles in length, serves as a vital north-south arterial in Orlando, Florida. This corridor provides access to key destinations, including residential communities, commercial centers, and educational institutions.

Existing Roadway Configuration:

FDOT Context Classification: C3C (Suburban Commercial) consists mostly of non-residential uses with large building footprints and parking lots within large blocks and a disconnected or sparse roadway network.

Lanes: The roadway consists of six lanes, with three lanes in each direction and an annual average daily traffic count of 52,000 vehicles per day. There is no on-street parking along this corridor (**Figure 4**).

Median: A grass median strip separates opposing traffic flows, incorporating designated left-turn lanes at key intersections.



Sidewalks & Shared-Use Path:

- A 5-foot sidewalk is present on the west side of the corridor.
- On the east side, a 5-foot sidewalk extends from Conroy Road to McLeod Road.
- From McLeod Road to Raleigh Street, the east side features a 10-foot shared-use path/trail, accommodating both pedestrians and cyclists.

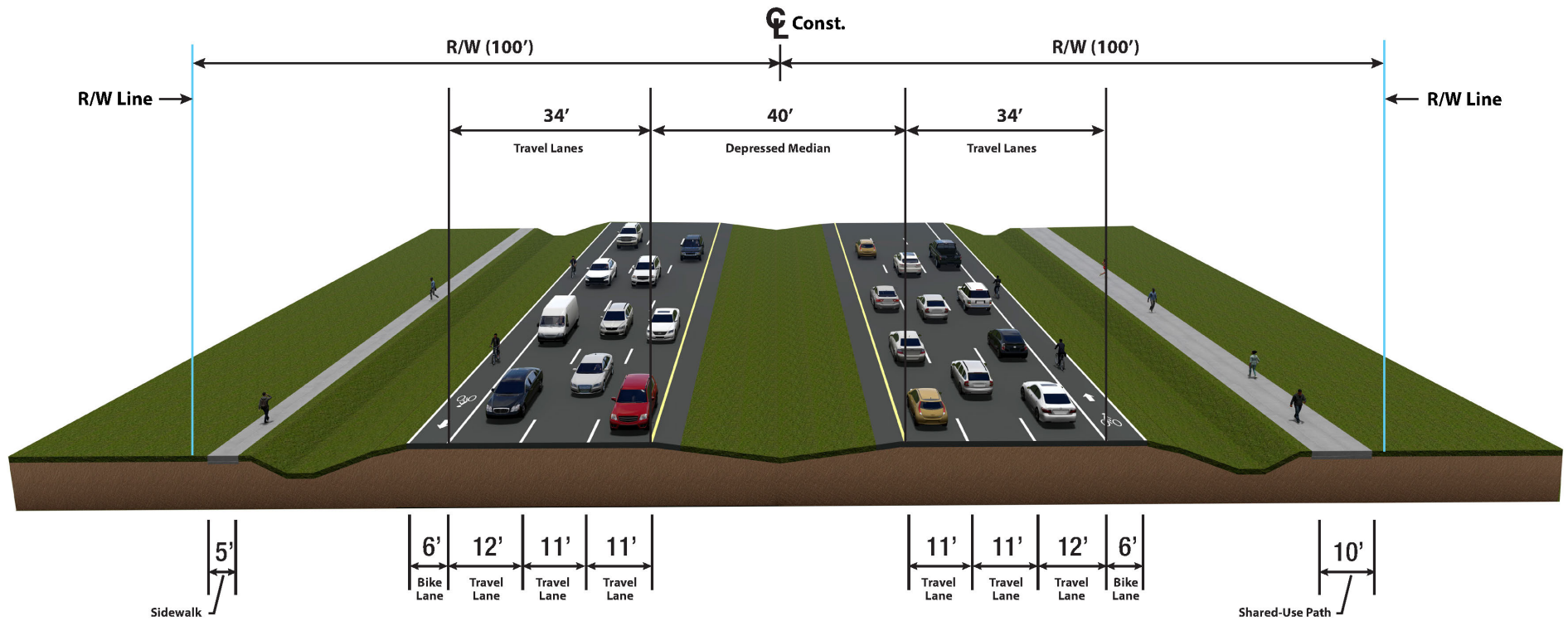
Bicycle Facilities: Five-foot bike lanes with no vertical separation are present on both sides of the roadway for the entire segment, providing designated space for cyclists separate from vehicular traffic. Along most of the corridor they are buffered with double striping against the motor vehicle travel lanes.

Relevant Studies and Planned Infrastructure Projects

- Southwest Orlando Bike and Pedestrian Study
- Operational Safety Improvement
 - 2.35 miles from Conroy Rd to Raleigh St
- Kirkman Road Vision Plan
- Kirkman Road Trail Extension
- Citywide Plans:
 - Orlando Vision Zero Action Plan
 - LYNX Transit Development Plan
 - Orlando Bike Plan



Figure 4: Existing Kirkman Road typical section



Field Observations

Roadway Design: Kirkman Road features a wide roadway and right-of-way with a posted speed limit of 50 miles per hour. Vehicles were generally observed adhering to the posted speed limit.



Landscaping & Environmental Features: There is a lack of landscaping along the corridor, and swales are present both along the roadside and in the median.

Pedestrian Infrastructure: The corridor includes sidewalks on both sides with a wide setback from the roadway. A portion of the east side features a shared-use path. There is a lack of pedestrian-scale lighting along the sidewalks, reducing visibility and safety at night.



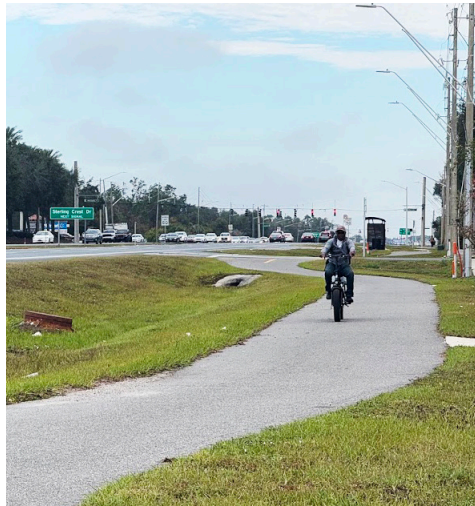
Traffic Control Features: Most intersections are signalized, and there are red light cameras installed at Raleigh Street to enforce traffic compliance.

Transit Usage: Transit users were observed and many stops along the corridor had bus shelters. Pedestrians were observed crossing between intersections, most often in the vicinity of bus stops. Signalized intersections with crosswalks are at approximately 1/4 mile intervals north of Arnold Palmer Drive and more widely spaced to the south.



Behavioral Observations:

- A local employee reported that workers frequently cross directly to the bus stop instead of using the nearby signal. Walking to the signal would increase the travel distance approximately 500 feet.
- Pedestrians were observed crossing at Raleigh Street against the “DO NOT WALK” indication, indicating potential signal timing or placement issues.



Bicycle Traffic: People were observed biking on the 5-foot sidewalks or the 10-foot shared-use path, with minimal activity in the designated bike lane or roadway.

Development Patterns: The corridor includes commercial properties and multifamily residential developments, characterized by individual uses on large lots.

Neighborhoods and Destinations Map

Figure 5: Base Map of Adjacent Neighborhoods and Key Destinations



Demographics and Equity Profile

2020 Census and ACS Demographic Snapshot

Topic	Demographic	Semoran-Curry Ford Rd		City of Orlando	Orange County
		Block	Block Group	Estimate	Estimate
Population	Total	21,308	35,139	307,573	1,429,908
	Male	48.1%	48.3%	48.3%	48.7%
	Female	51.9%	51.7%	51.7%	51.3%
Race	White	24.1%	26.2%	40.0%	44.0%
	Black	31.7%	27.3%	23.8%	19.4%
	Other, Including 2 or More	44.0%	46.6%	36.2%	36.5%
Ethnicity	Hispanic or Latino	34.4%	34.5%	32.9%	33.1%
Age	Less than 18	23.2%	23.0%	20.1%	22.0%
	18-64	71.3%	70.2%	67.3%	65.5%
	Greater than 64	5.4%	6.8%	12.6%	12.5%
Housing Units	Total	9,548	14,382	140,895	561,851
	Owner occupied	11.0%	19.4%	35.8%	53.8%
	Renter occupied	89.0%	80.6%	64.2%	46.2%
	Occupied	89.9%	82.5%	91.0%	92.5%
	Vacant	10.1%	17.5%	9.0%	7.5%
Travel*	Workers	N/A	16,763	175,845	766,736
	Drove Alone	N/A	76.7%	68.3%	67.9%
	Carpooled	N/A	9.8%	8.8%	9.7%
	Public Transit, Bike, or Walk	N/A	9.8%	5.5%	4.9%
	Worked from Home	N/A	3.7%	17.4%	17.5%
Income*	Per capita income	N/A	\$24,736	\$34,033	\$39,640
Education*	Population 25 years and over	N/A	22,329	226,644	1,010,918
	High School equivalent or less	N/A	49.9%	46.9%	23.0%
	Some college or associates	N/A	14.1%	11.9%	11.0%
	Bachelors or more	N/A	36.0%	41.2%	40.7%

Neighborhood demographics in **BOLD RED** indicate a deviation of $\pm 10\%$ from citywide averages.

*Where noted, data is from the American Community Survey 2020 5-Year. All other data is from the 2020 US Census.

Table 1: Demographic Comparison of the Kirkman Rd Study Area, City of Orlando, and Orange County

Communities of Concern

Seven socio-economic indicators were analyzed to evaluate equity in transportation investments. Four indicators focused on vulnerable road users, while the remaining three addressed historically marginalized populations.

Using 2020 Census data and American Community Survey, the analysis identified areas with above- and below-average concentrations of these indicators to recognize communities with vulnerable populations.

By evaluating infrastructure availability and quality across different demographic areas, the analysis intends to highlight gaps in equitable investment. These insights will help guide future transportation planning to ensure safe and accessible streets for all residents, particularly those in historically underserved communities.

Vulnerable Road Users

Some people in the city rely on or prefer modes of travel other than personal motor vehicles. These groups—including pedestrians, cyclists, transit riders, older adults, and youth—face unique challenges in accessing safe and equitable transportation infrastructure. Ensuring their mobility needs are met is essential to connecting residents on safe streets.

The analysis considers four socio-economic indicators to assess the distribution and needs of vulnerable road users:

1. Percentage of residents who commute to work by walking, biking, or taking transit
2. Percentage of zero-vehicle households
3. Percentage of population aged 65 and older
4. Percentage of population aged 18 and younger

Figure 6 visually compares these vulnerable road user indicators to citywide averages, highlighting disparities and identifying areas where targeted investments can enhance safety and accessibility.

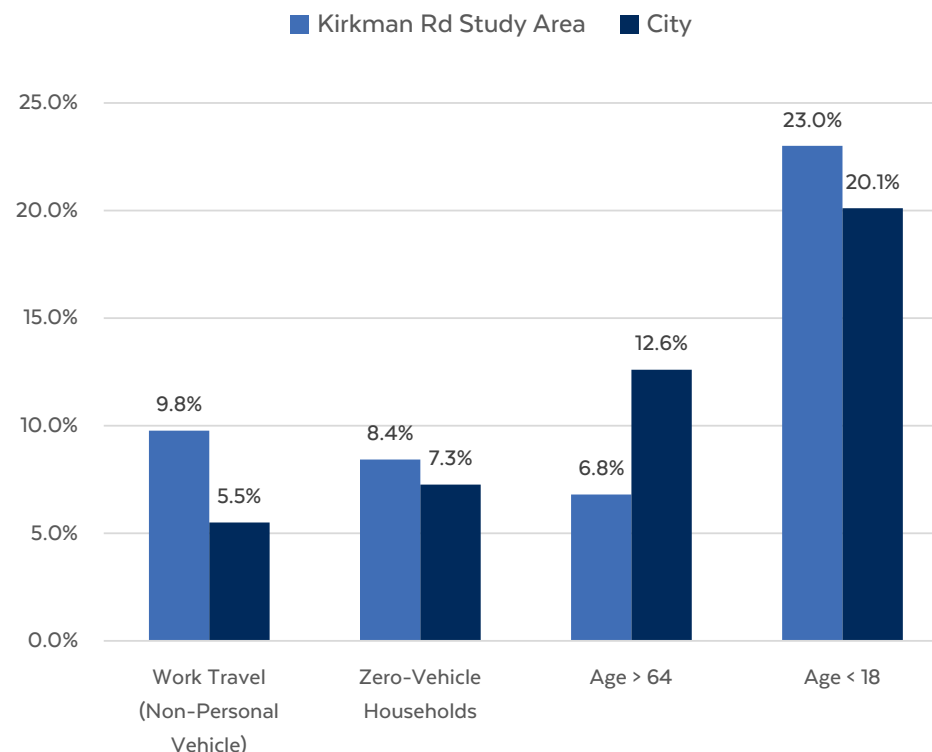


Figure 6: Socio-Economic Characteristics of the Study Area with Citywide Context

Marginalized Populations

Historically marginalized populations have been disproportionately affected by transportation inequities. These communities face greater risks related to environmental hazards, pedestrian and bicycle safety, and accessibility barriers.

The analysis considers three socio-economic indicators to evaluate these disparities:

1. Percentage of population below the poverty level
2. Percentage of minority population
3. Percentage of population with limited English proficiency

These populations often experience higher exposure to traffic-related pollution, increased vulnerability to bicycle and pedestrian crashes, and greater health disparities such as high blood pressure, diabetes, obesity, and respiratory illnesses. Additionally, minority and low-income populations are more likely to use walking and biking as primary modes of transportation.

Figure 7 illustrates the distribution of these socio-economic indicators compared to citywide averages, further emphasizing the disparities that exist within different communities.

Composite Indicators of Inequity

A composite analysis was conducted to evaluate the combined impact of these socio-economic indicators. Census Block Groups received a score of one (1) for each indicator exceeding the citywide average. These scores were then aggregated across all seven indicators to generate a composite equity score.

The results, shown in **Figure 8**, highlight areas with varying levels of transportation equity concerns. Census Block Groups are color-coded based on their composite equity score: scores of 0-1 are shaded in yellow, indicating lower concentrations of vulnerable populations; scores of 2-3 appear in green, representing moderate concentrations; and scores of 4 or above are shaded in blue, signifying the highest concentrations of vulnerable road users and marginalized populations.

The majority of Census Block Groups in the study area have a score of 2-3, with a few over a score of 4.

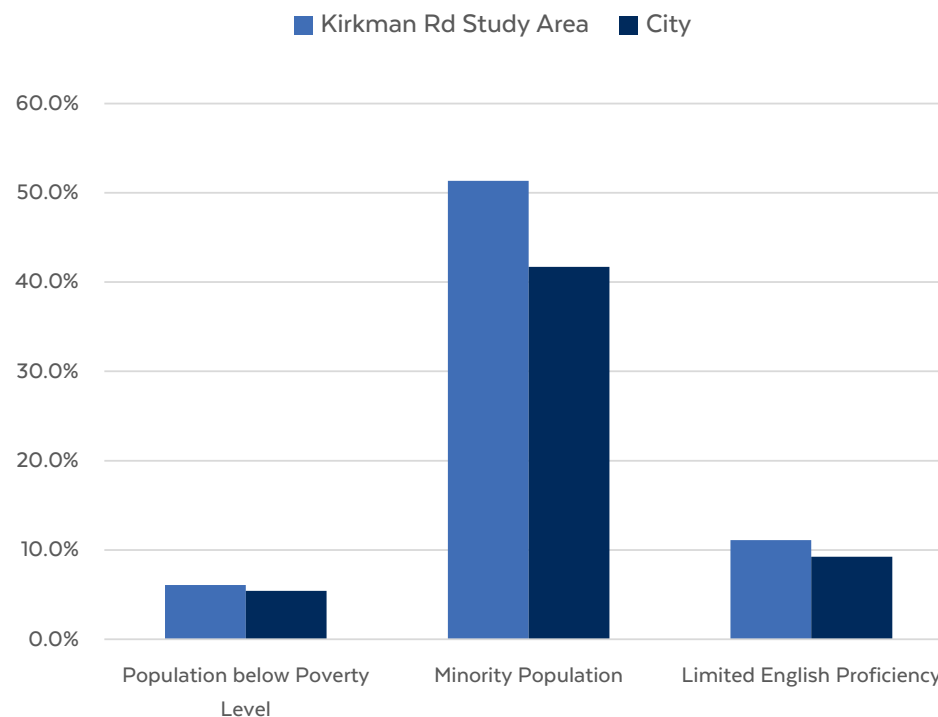


Figure 7: Socio-Economic Characteristics of the Study Area with Citywide Context

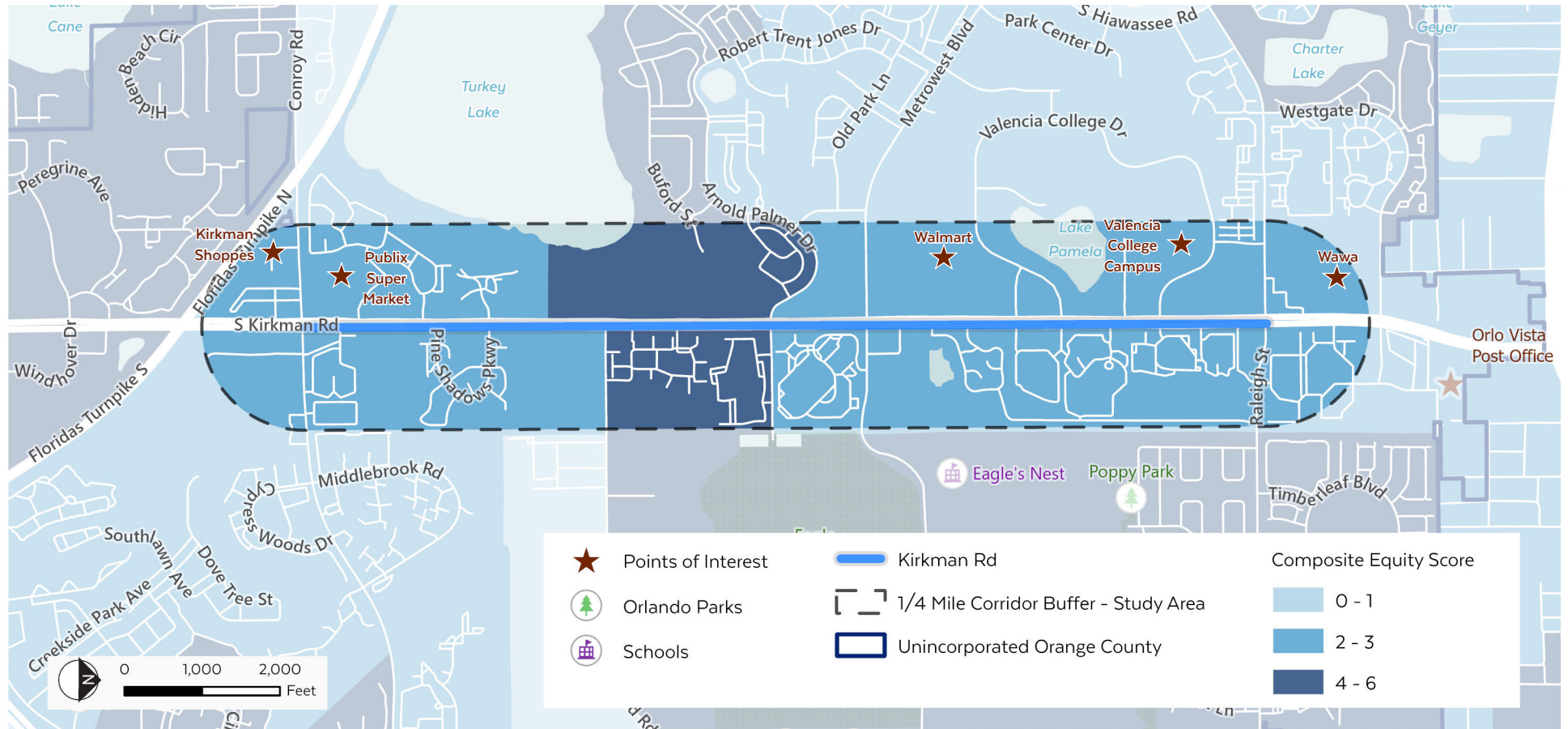


Figure 8: Composite Equity Score by Census Block Group

Justice 40

The Justice40 Tool was a federal initiative designed to identify disadvantaged communities by analyzing key socio-economic and environmental indicators at the census tract level. This tool aimed to ensure that at least 40% of the benefits from federal investments, including transportation projects, supported historically underserved populations.

The tool utilized various public data sources, including demographic information from the Census American Community Survey, environmental data from the Environmental Protection Agency (EPA), and housing data from the Department of Housing and Urban Development (HUD).

Figure 9 illustrates the Justice40-designated disadvantaged census tracts within the study area when the tool was in use.

The numbers on the map indicate how many burden categories each census tract exceeded.

- Western and southern parts of the study area are not classified as disadvantaged.
- Eastern and northern parts of the study area exceed the thresholds for multiple burden categories, including high levels of poverty.
- The northern portion faces affordability issues for energy and housing while also experiencing high rates of obesity and asthma, exceeding the thresholds for health burdens.

To learn more about Justice40, visit the [Mapping Tool](#) and [Initiative](#) websites.

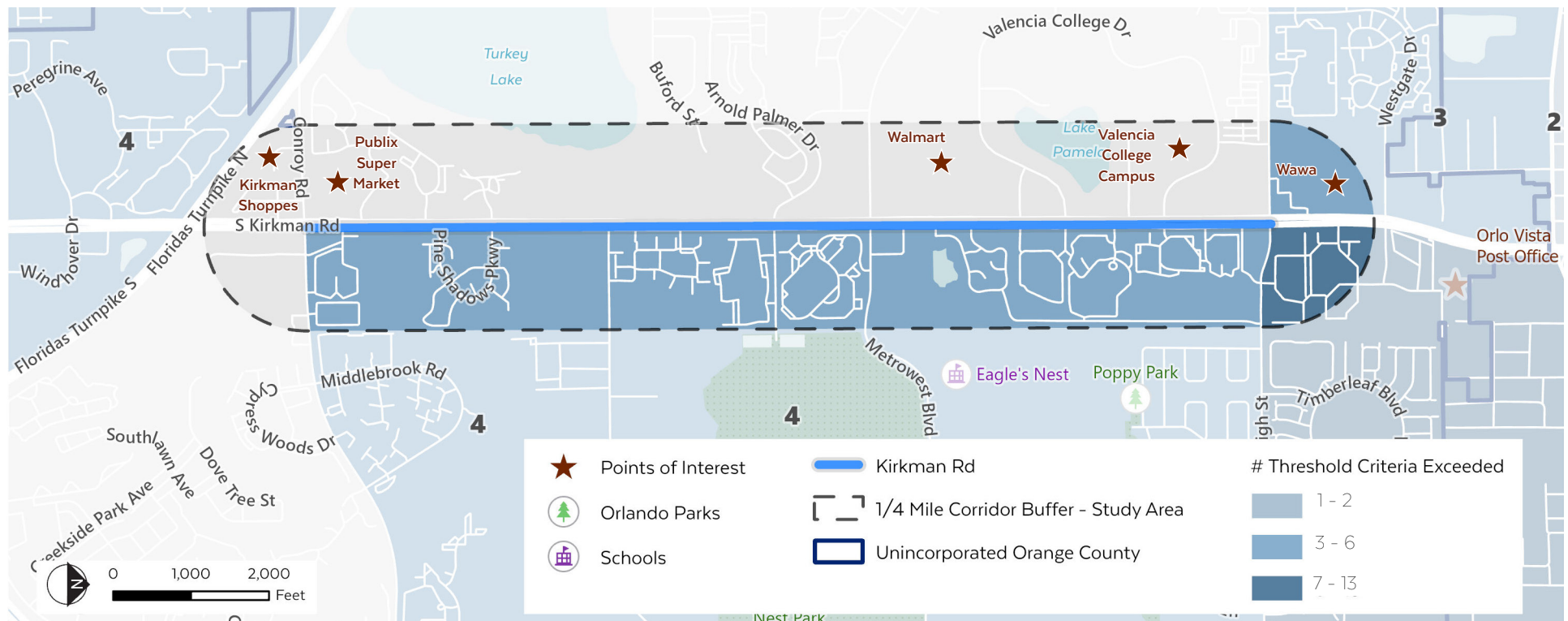


Figure 9: Disadvantaged Census Tracts identified by Justice40 tool

Census tracts were classified as disadvantaged based on the environmental, economic, and health burdens they experienced. A census tract was considered disadvantaged if it had low-income status (at or below 200% of the federal poverty level) and met the threshold for at least one of the following burden categories:

- Climate Change
- Clean Energy and Efficiency
- Clean Transit
- Affordable and Sustainable Housing
- Reduction and Remediation of Legacy Pollution
- Critical Clean Water and Waste Infrastructure
- Health Burdens
- Training and Workforce Development

Each category had a set of indicators that determined whether a census tract exceeded the burden threshold.

Relevant Programs and Features

The City of Orlando administers several incentive programs designed to support economic development, business retention, and investment in targeted areas. These programs provide financial assistance, tax incentives, and technical support to encourage business activity and redevelopment in designated districts. Four of these programs overlap with the Kirkman Corridor Study Area (See Figure 10 & 11). Below is an overview of each program:

Opportunity Zones

Opportunity Zones in Orlando are federally designated areas aimed at spurring economic development by providing tax incentives to investors. These zones offer benefits such as temporary deferral of capital gains taxes when reinvested in qualified projects within the zones, a step-up in basis for capital gains reinvested, and potential permanent exclusion from taxable income of gains from the sale or exchange of investments held long-term. This initiative seeks to attract private investment to underserved communities, fostering job creation and economic growth.

Orlando Economic Enhancement District (OEED)

The Orlando Economic Enhancement District (OEED) is a state-designated economic development tool that encourages the redevelopment of properties perceived as contaminated or blighted. By offering incentives such as tax credits and refunds, the program aims to facilitate the cleanup and rehabilitation of these sites, promoting their productive reuse and contributing to the city's economic vitality.

Urban Job Tax Credit Program

The Urban Job Tax Credit Program is a state-level initiative that provides tax credits to eligible businesses located within designated urban areas of Orlando. Offering up to \$2,000 per new job created, these credits can be applied against Florida's corporate income tax or sales and use tax. The program's objective is to stimulate job creation and economic development in urban communities, thereby enhancing the overall economic health of the city.

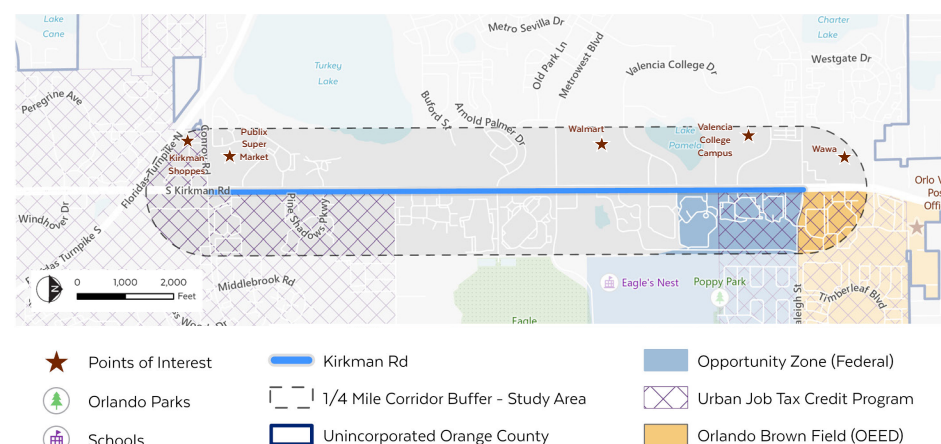


Figure 10: Incentive Programs along Kirkman Corridor Study Area

STRIVE Orlando Program

The STRIVE Orlando Program is a performance-based local job incentive initiative aimed at promoting broad-based prosperity within the city and the greater Orlando region. By offering financial incentives to businesses that create quality jobs, the program seeks to stimulate economic growth, attract new industries, and support the expansion of existing businesses, thereby enhancing the city's economic landscape.

The program utilizes a Neighborhood Opportunity Index (NOI) to categorize every Census block group into four tiers based on factors such as median household income, unemployment rate, and educational attainment. Tier I areas have the lowest opportunity scores, indicating higher economic challenges, while Tier IV areas have the highest opportunity scores. To encourage investment in economically distressed neighborhoods, businesses that locate in lower-tier areas (Tiers I and II) qualify for higher incentive bonuses. This tiered structure ensures that incentives are distributed equitably, prioritizing economic development in areas that need it most. The study area has Tier I, II & III classifications as shown in **Figure 11**.

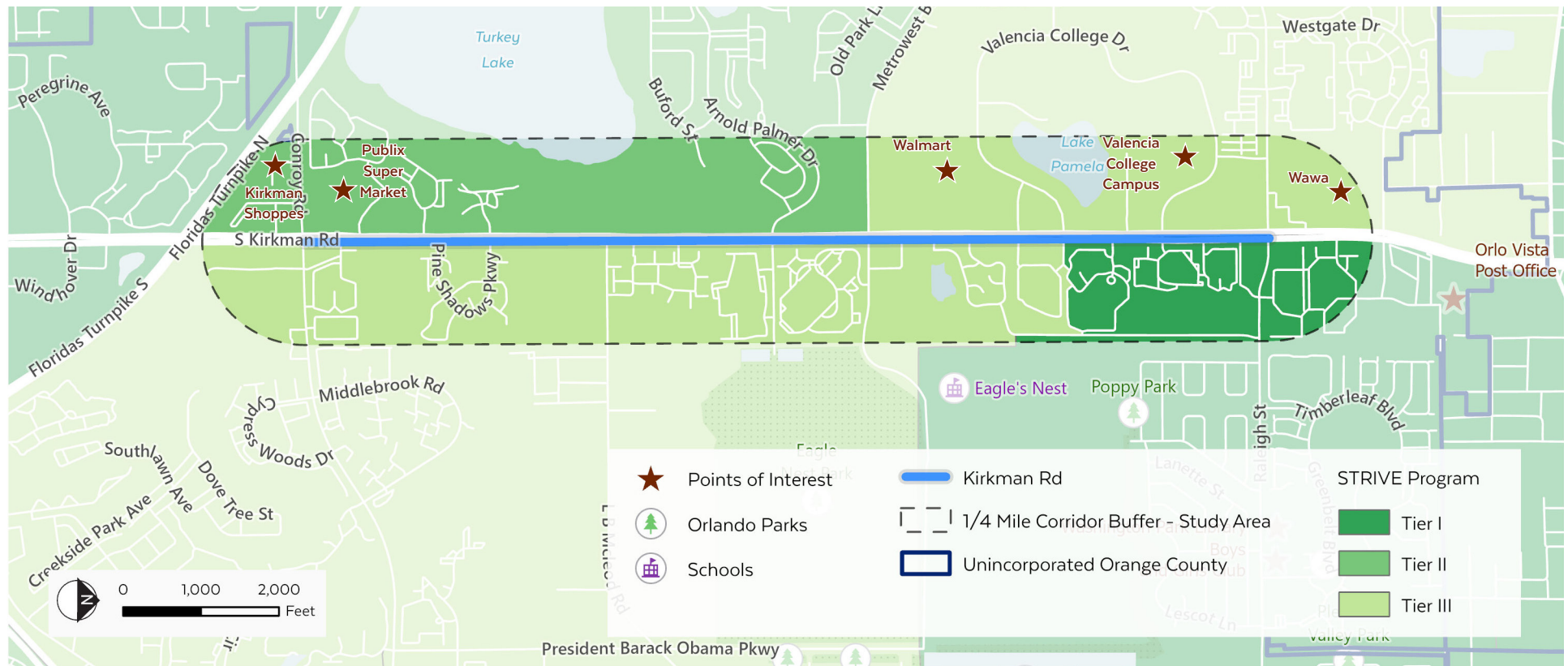


Figure 11: Orlando STRIVE Incentive Program Tiers along Kirkman Corridor Study Area

Transit and Employment

Public Transit Access

The Kirkman Rd corridor is served by five LYNX routes: 21, 37, 40, 301, and 302, with a total of 15 bus stops along the corridor as shown in **Figure 12**.

These routes operate at varying frequencies and serve a mix of local and regional destinations, including employment centers, commercial areas, and transit hubs. Routes 21, 37, and 40 provide regular service along Kirkman Rd, connecting destinations such as Universal Orlando, Valencia College, Florida Mall, and LYNX Central Station. Route 21 serves locations including Sand Lake Commons and Washington Shores, while Route 37 connects areas such as Hiawasse Rd and Pine Hills Transfer Center. Route 40 links Universal Orlando Employment Center, Vineland Rd, and downtown Orlando via LYNX Central Station.

Routes 301 and 302 provide limited-service connections to Disney Springs. Route 301 has two outbound trips daily, one in the morning and one in the afternoon, with a single inbound trip in the evening, serving areas including Pine Hills Transfer Center, Kirkman Rd, and Conroy Rd. Route 302 operates one inbound trip in the morning and one outbound trip in the evening, providing service to Disney Springs.

Transit Ridership Along the Study Segment

This analysis visualizes transit ridership along the Kirkman Road corridor by mapping boardings and alightings at each bus stop within the study area.

The data is visualized in **Figure 12** to represent total ridership activity, allowing for a clearer understanding of stop-level transit demand. Ridership levels vary across the corridor, with higher activity observed at key intersections such as S Kirkman Rd & Conroy Rd, S Kirkman Rd & Valencia College Dr, and S Kirkman Rd & Metropolis Way. These locations serve as major transfer points or destinations, contributing to increased passenger movement.

Areas of Service/Employment Concentrations:

The study area contains a significant concentration of service and retail employment, with major businesses such as Publix, Walmart, Kirkman Shoppes Mall, and Wawa contributing to local job opportunities. Given the service-oriented nature of these businesses, a notable portion of employees may rely on public transit for their commutes, contributing to ridership and pedestrian traffic in the corridor.

According to the business locator report generated using ESRI Business Analyst, the study area includes 541 businesses, employing approximately 3,501 workers as of 2024. The employee-to-population ratio is 26.92 per 100 residents, indicating a strong employment presence relative to the local residential population.

Note: These employment and population figures were derived using parcel geography within the study area to pull data from Business Analyst. As a result, the population numbers may differ from estimates based on Census block or block group-level data, which use different geographic boundaries. This distinction should be considered when comparing employment-to-population ratios or analyzing demographic trends in the corridor.

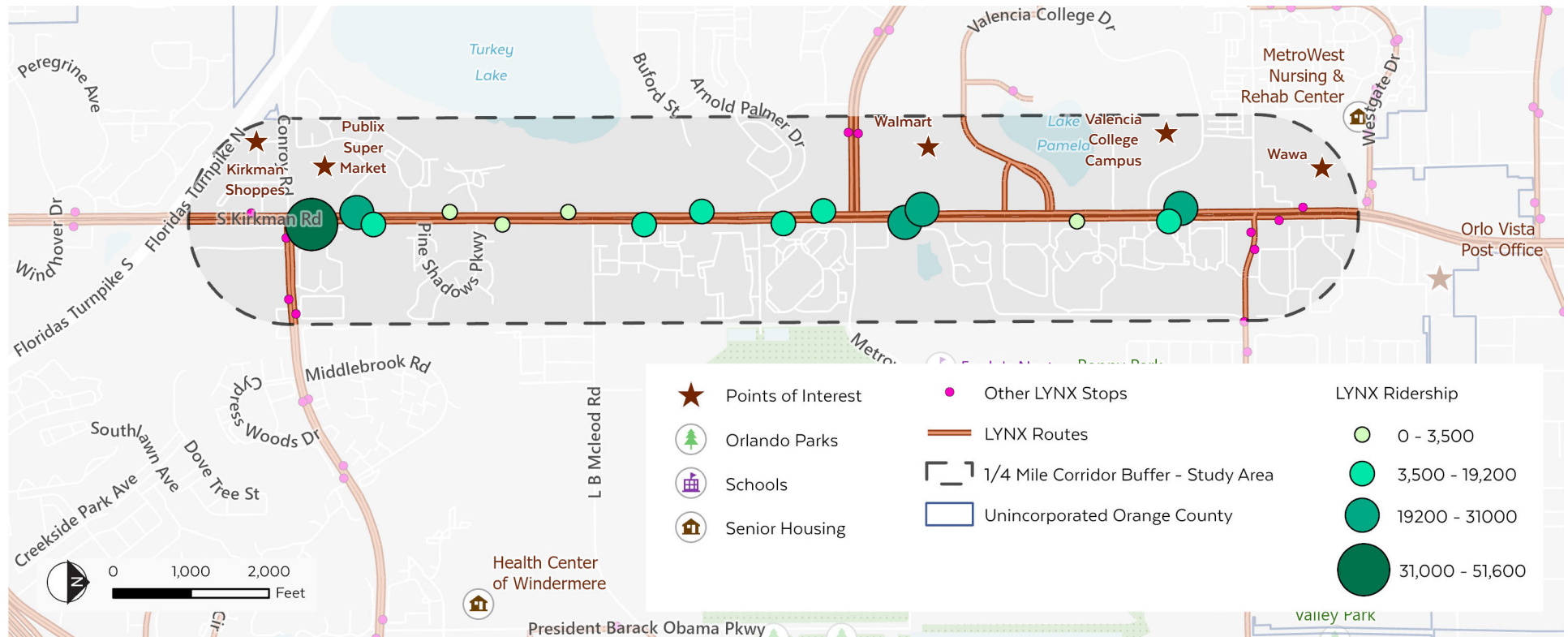


Figure 12: LYNX Ridership (2022 Annual Boardings & Alightings) by stop on Kirkman Rd

Population Density

The Kirkman Road study area shows a range of residential densities. Most of the eastern side features multifamily housing, with densities primarily between 11 and 30 and 31 and 60 people per acre. The southwest portion of the study area also includes townhomes and condominiums, generally falling within the 2 to 10 and

11 to 30 people per acre ranges. Non-residential areas, such as Valencia College and surrounding commercial development, are typically represented as less than 2 people per acre.

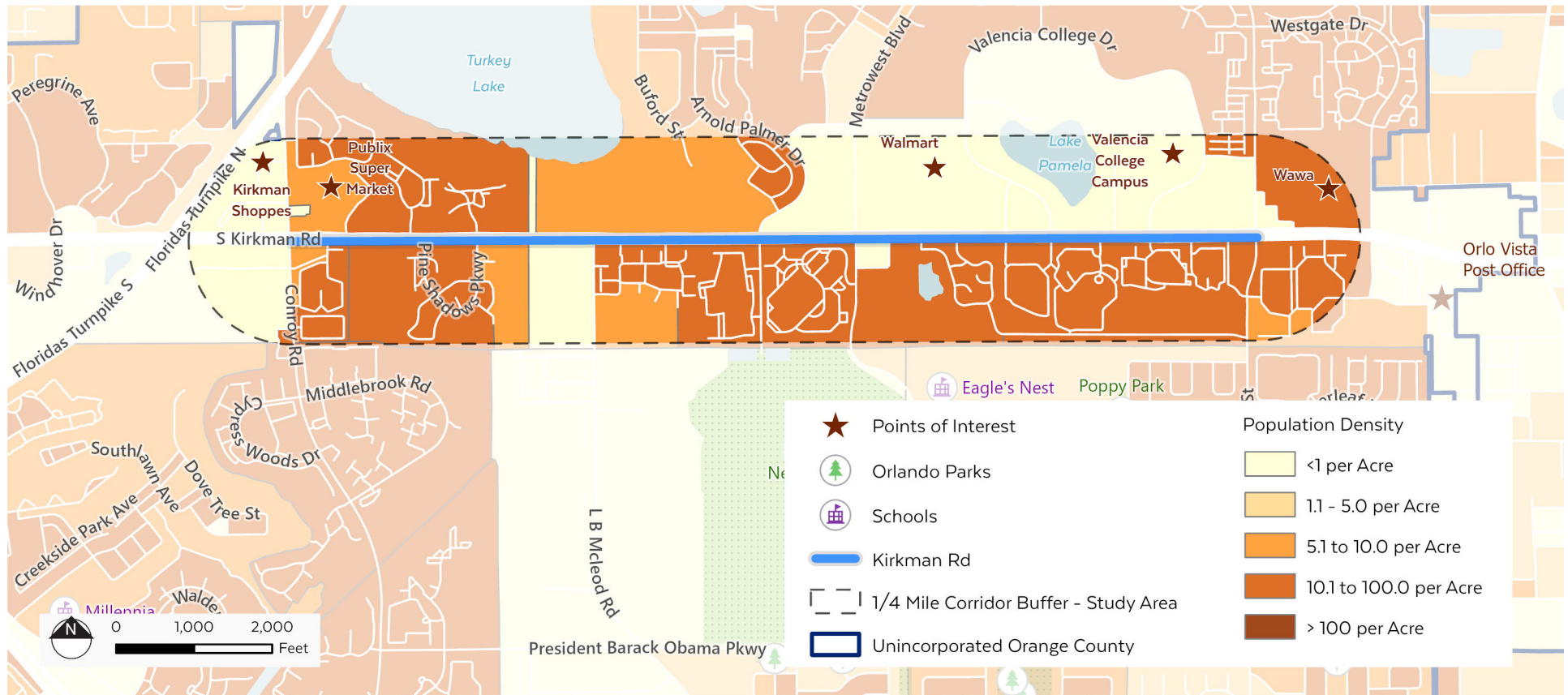


Figure 13: Population Density (People/Acre) from 2020 Census Blocks

Land Use and Developmental Activity

Existing Land Uses

The Kirkman corridor consists mostly of multifamily and commercial developments, with several industrial uses. There are several large parcels within the study area with public/civic uses, including public parks and Valencia Community College.

The uses in this corridor are medium density, with the capacity to accommodate more development, including mixed-use.

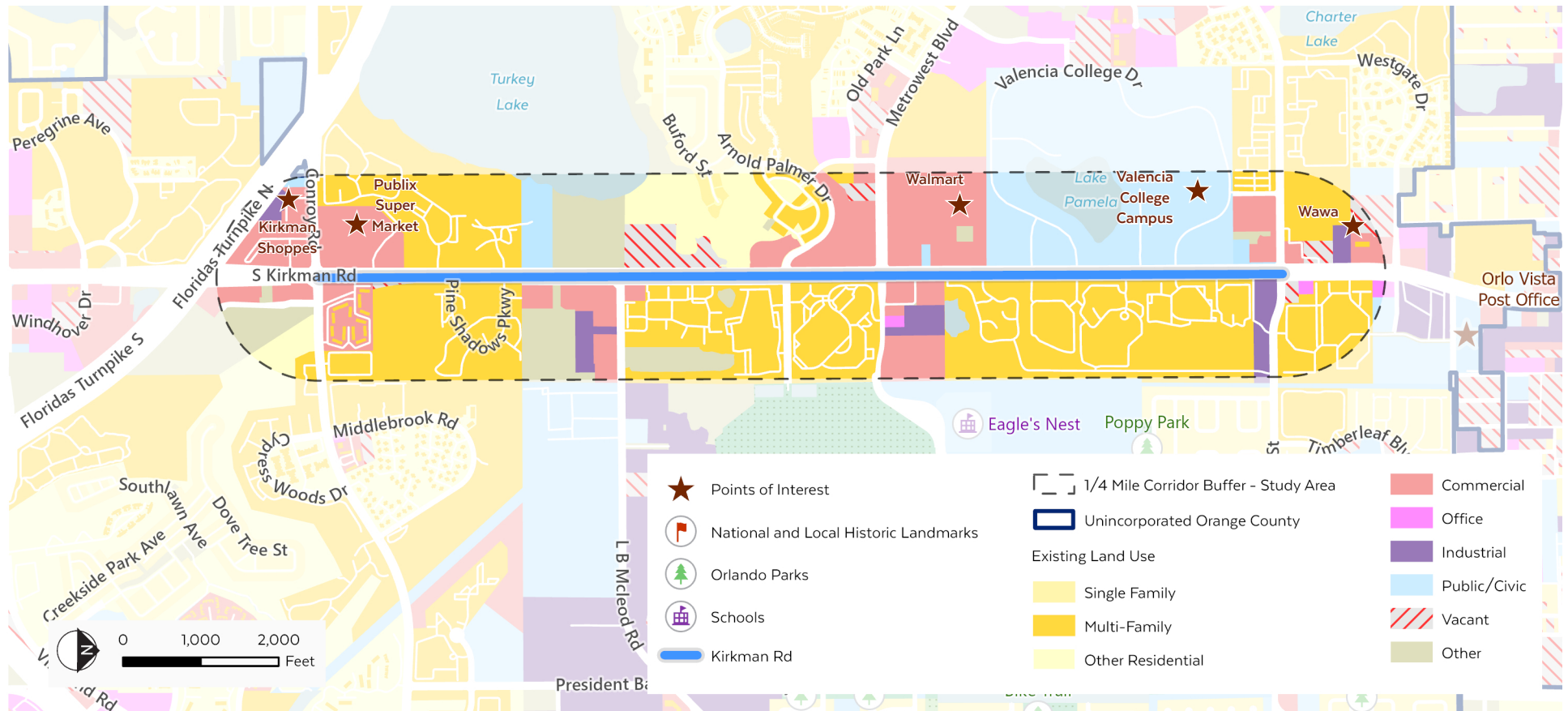


Figure 13: Existing Land Use Map

Zoning and Future Land Uses

Zoning and Future Land Use regulations work together to guide development, determining the permitted uses on a parcel of land, and the allowable density and intensity. The future land uses (**Figure 15**) and associated zoning (**Figure 16**) along the Kirkman corridor includes low density residential, medium density residential, activity centers, medium intensity office, conservation, and public/recreational and institutional.

Low intensity residential supports single-family homes, while medium intensity residential supports apartment buildings and condos. Activity Centers are intended to encourage redevelopment, permitting a mix of uses ranging from medium to high intensity.

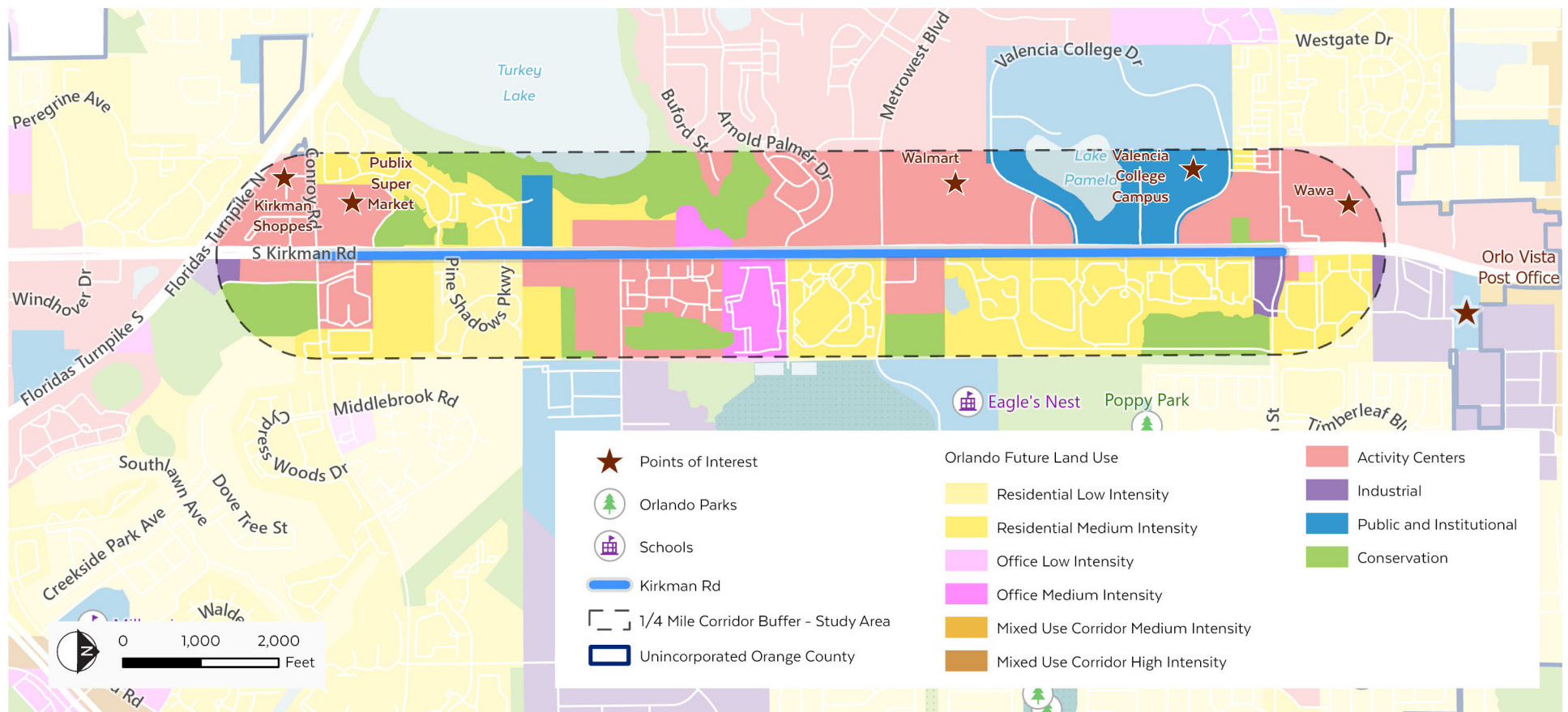


Figure 15: Future Land Use Map

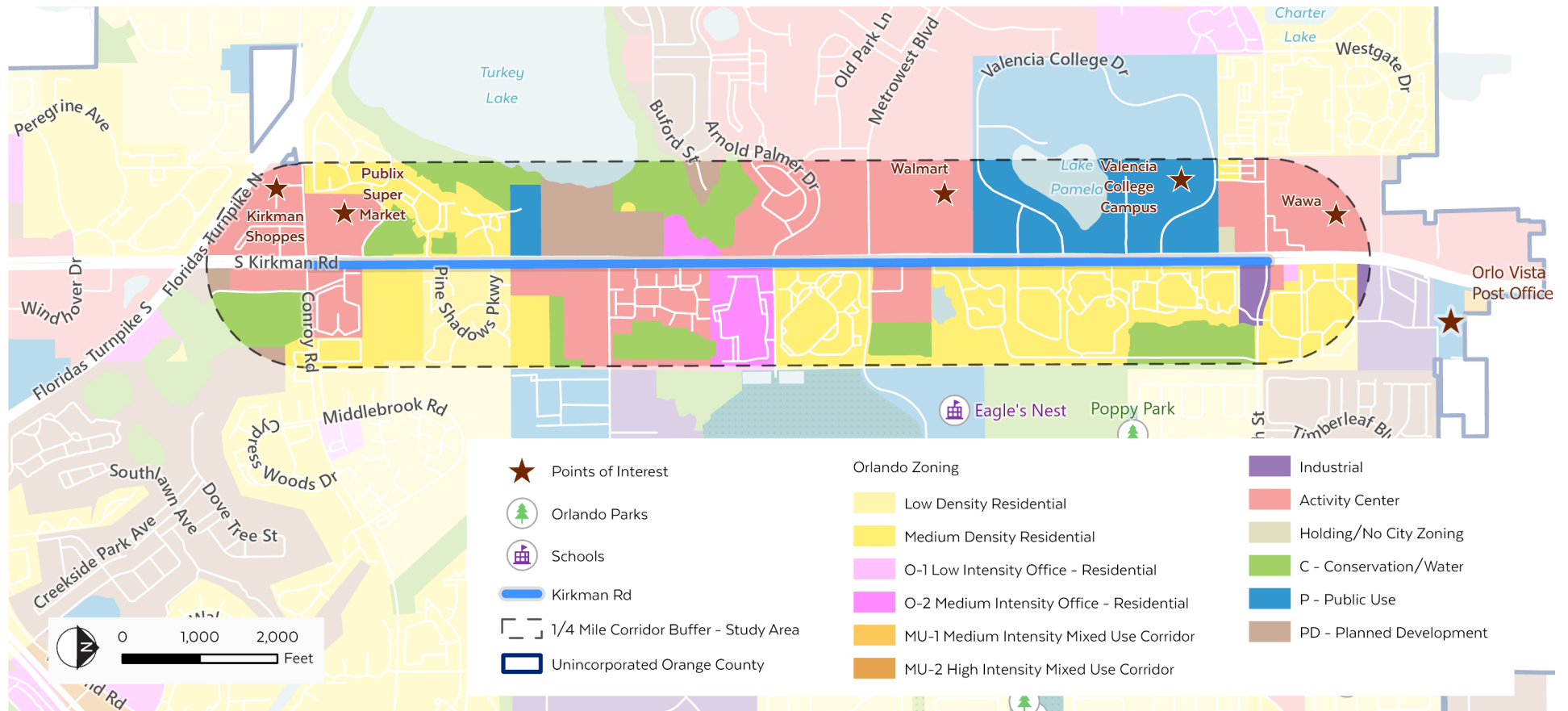


Figure 16: Zoning Map

Development Analysis

Development potential on any given site within the corridor is affected by the area's market demand (reflected in the land value) and level of investment in buildings already present on the property. Where the buildings on a parcel have a lower value than the land, the parcel is determined to have high development potential; where the buildings have a value equal to twice that of the land, it has low potential for development. Within the parcels designated as Activity Center, there is medium to

high potential for infill development based on land value. Both low intensity and medium intensity residential designations tend to have low development potential in the corridor. Vacant land associated with condominiums appears to have a low building to land ratio but is typically not available for development. Development in the last 5 years has been suburban commercial.

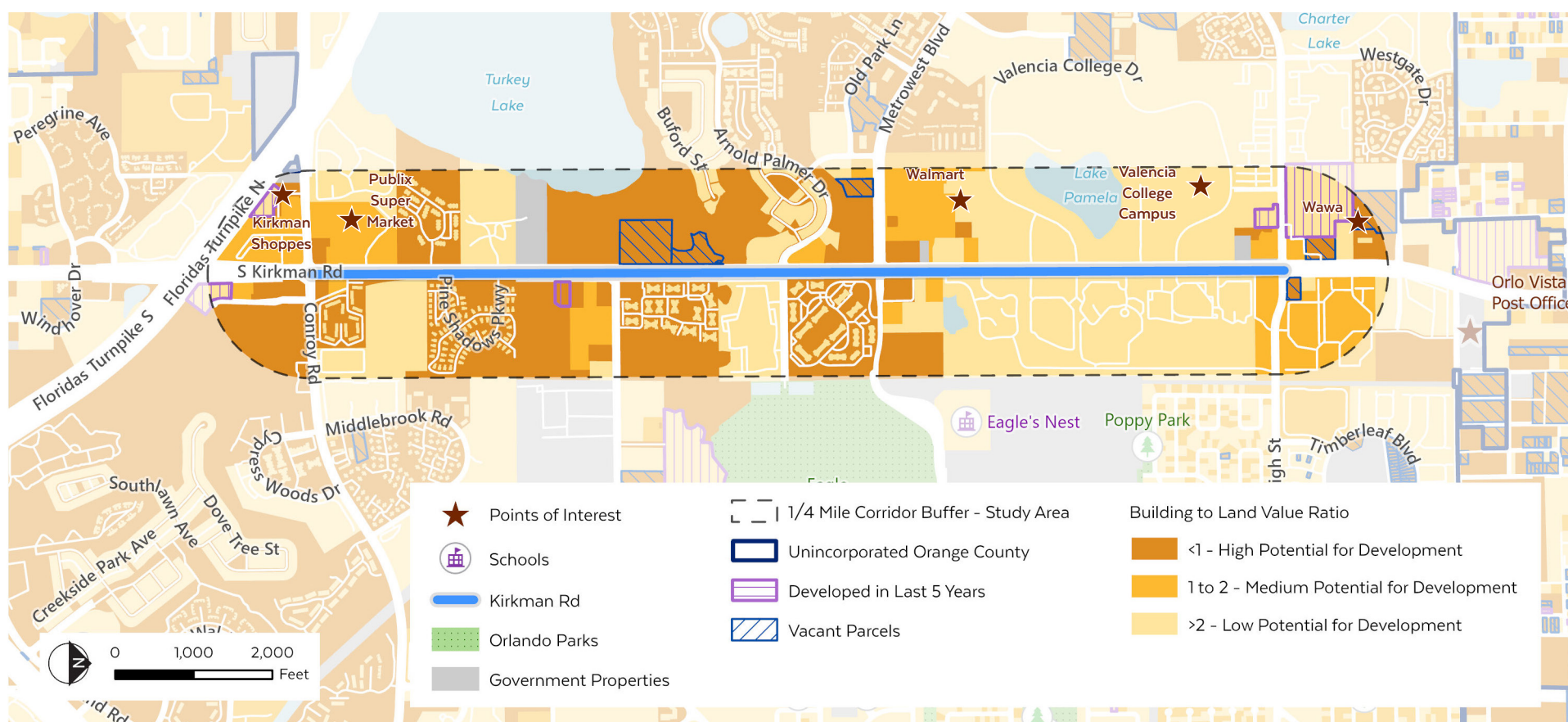


Figure 16: Potential for Development

CHAPTER 2

COMMUNITY ENGAGEMENT



Background

The Orlando Connecting Residents on Safe Streets Project (“Project” or “CROSS”) aims to develop a comprehensive implementation plan for safety improvements across six Vision Zero corridors in the City of Orlando. Vision Zero is a global initiative embraced by cities committed to eliminating traffic-related deaths and serious injuries, with a focus on equity and community engagement. In 2017, Mayor Buddy Dyer solidified Orlando’s commitment to Vision Zero by adopting an official resolution.

The U.S. Department of Transportation awarded the City of Orlando a Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant to support the CROSS Project. This funding enables a detailed examination of six critical corridors within Orlando, using the city’s established methodology to identify context-specific countermeasures and capital improvements. These efforts are part of Orlando’s goal to eliminate all traffic-related deaths and serious injuries by 2040.

As part of this initiative, Kimley-Horn conducted a comprehensive analysis of six corridors and developed the Community Engagement Interim Report in alignment with the prior outreach and evaluation contained in the Public Engagement Plan. Individual Final Comprehensive Reports for each study corridor will be prepared at the conclusion of this project pulling from the following interim reports;

- Community Snapshot Interim Report
- Safety Analysis Interim Report
- Recommendations Interim Report
- Community Engagement Interim Report

Selection Criteria

The selection of corridors for the Project was guided by data-driven methodologies as a part of the City of Orlando’s Vision Zero Action Plan, adopted in 2021.

Key criteria for selecting the six Vision Zero corridors included:

- **Crash Frequency and Severity:** Focusing on locations with significant safety concerns, particularly for vulnerable road users.
- **Equity Considerations:** Ensuring underserved communities and high-risk areas were prioritized for improvements.
- **Community Impact:** Targeting corridors with high pedestrian, cyclist, and transit activity to enhance safety outcomes.

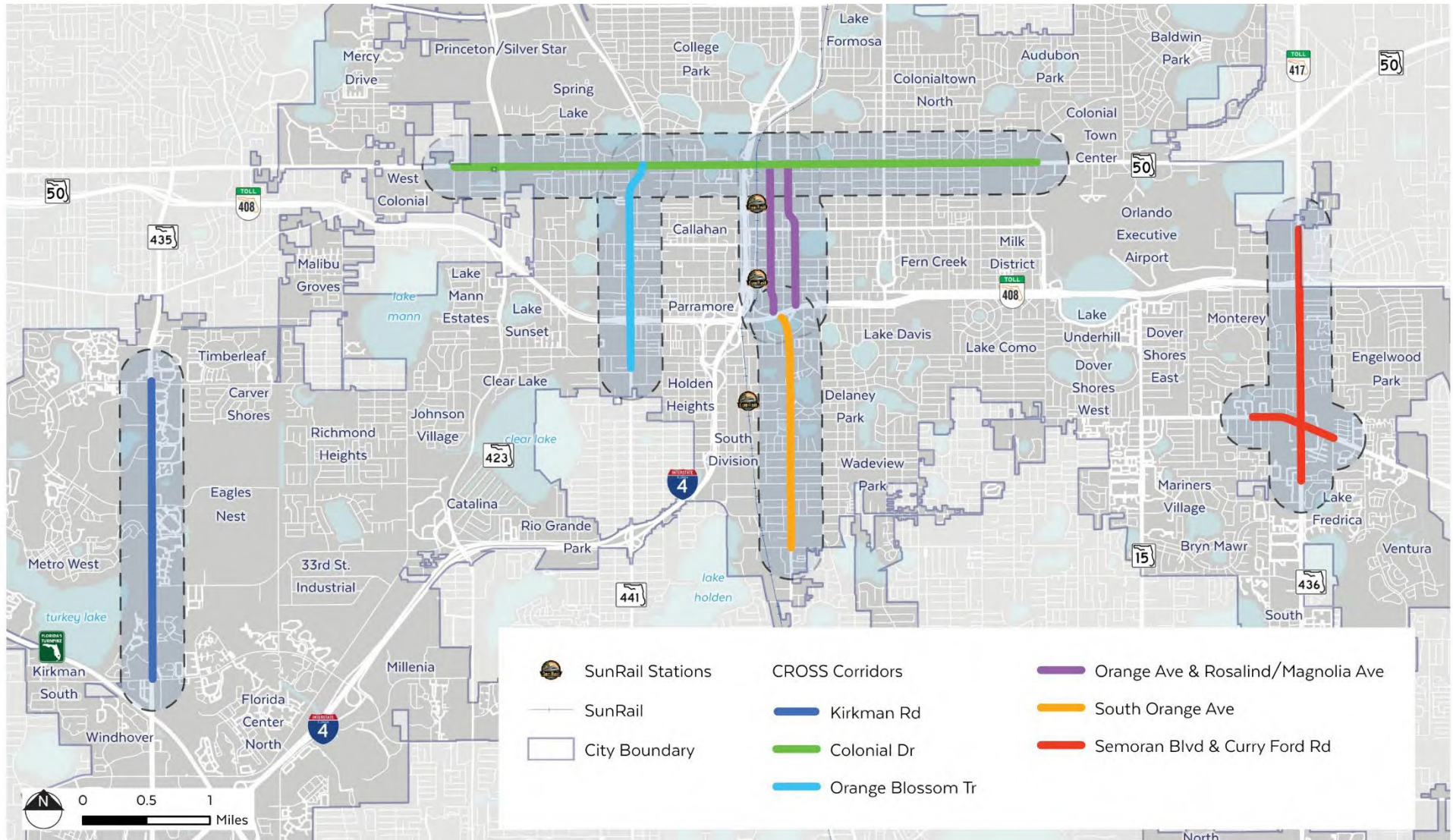
By applying these selection criteria, the Project ensures safety improvements are targeted at the most critical locations, advancing Orlando’s Vision Zero goal of eliminating traffic-related deaths and serious injuries by 2040.

The selected corridors include both on-system FDOT roads and locally managed streets, spanning critical segments within the City of Orlando. These corridors are shown on **Figure 18:**

1. **Kirkman Road:** From Conroy Road to Raleigh Street
2. **Colonial Drive:** From Ferguson Drive to Maguire Boulevard
3. **Orange Blossom Trail:** From Winifred Street to SR-50
4.
 - a. **Orange Avenue:** From SR-408 to SR-50
 - b. **Rosalind/Magnolia Avenue:** From SR-408 to SR-50
5. **South Orange Avenue:** From Pineloch Avenue to SR-408
6.
 - a. **Semoran Boulevard:** From Grant Street to Dahlia Drive
 - b. **Curry Ford Road:** From Larkin Avenue to Bowen Drive

Kirkman Road, Colonial Drive, Orange Blossom Trail, South Orange Avenue, Semoran Boulevard, and Curry Ford Road are FDOT-maintained roadways. Orange Avenue and Rosalind/Magnolia Avenue are city-maintained roadways.

Figure 18: Overview Map of Study Corridors



Project Kickoff

Public Engagement Plan (PEP)

A Public Engagement Plan (PEP) was prepared under separate cover (May 2025) for the CROSS study. The PEP outlines the meaningful community participation and stakeholder involvement in the planning and implementation of proposed safety improvements along six key corridors in the Greater Orlando Area:

- Overview of the study corridors (e.g., demographics)
- Anticipated public concerns and considerations
- Project messaging
- Identification of shareholders
- Community outreach tools and techniques
- Engagement activity schedule

The PEP included an electronic mailing list of community stakeholders to be included in public meeting invitations and other project updates.

Project Kickoff Meeting

The study team held a project kickoff meeting on September 24, 2024, with key agency stakeholders from FDOT and other City of Orlando departments. The meeting detailed the project scope and identified additional studies or projects that would need to be considered by the CROSS study team.

Public Meetings

Public meetings were arranged in two rounds:

- Round 1: Workshops presenting community characteristics and crash analysis insights to elicit feedback on community needs and concerns
- Round 2: Workshops presenting the recommendations to elicit feedback and provide education on proposed improvements

Project Website

The project website (orlando.gov/CROSS) was hosted by the City of Orlando and updated as the study progressed. The webpage provides project background, as well as a summary of the public feedback received thus far. Community members have the opportunity to provide public comment via the project website or by contacting City of Orlando's Safe Mobility Manager, Laura Hardwicke.

A snapshot of the project website is in the **Community Engagement Interim Report**, under separate cover.

Additional Considerations

Additional considerations were given to ensure a representative demographic of each corridor, with special attention to Communities of Concern, as defined in the Vision Zero Action Plan. Using the Florida Department of Transportation (FDOT) Public Information Handbook to guide community engagement, the study team worked collaboratively to prioritize the accessibility of public engagement events.

Public Information Meetings

Open Houses

Six public open houses were scheduled at various locations near different study corridor segments. The purpose of these open houses was to inform, update, and educate locally impacted residents, businesses, tenants, and other parties interested in the project. The public open house event locations are summarized in **Table 2**.

Table 2: Public Open Houses

Corridor	Location	Date
Colonial Drive	American Legion Post	June 23, 2025
Orange Blossom Trail	John H. Jackson Neighborhood Center	July 8, 2025
Orange Avenue & Rosalind Avenue	Orlando Public Library	June 18, 2025
South Orange Avenue	Wadeview Community Center	June 24, 2025
Semoran Boulevard & Curry Ford Road	Englewood Neighborhood Center	June 26, 2025
Kirkman Road	Boys and Girls Club	September 18, 2025

Notifications

Notifications for public open houses were posted on the City of Orlando's social media platforms and emailed to community members / stakeholders. These notifications can be found in the **Community Engagement Interim Report**, under separate cover.

The study team also contacted community leaders near each of the study area corridors who would best be able to share important project information and updates. This mailing list consisted of 39 individuals from organizations ranging from Main Street Organizations to schools. Emails were sent on May 6, 2025 and invited the recipient to explore the project webpage and leave comments on the interactive study map. A follow up email inviting these community leaders to the Recommendations Hybrid Workshop was sent out on October 20, 2025. Stakeholder coordination emails can be found in the **Community Engagement Interim Report**, under separate cover.

Pop-up Events

Three pop up events were held at various locations near different study corridor segments. The pop-up event locations are summarized in **Table 3** and depicted in **Figure 19**.

Table 3: Pop-Up Events

Engagement Target	Location	Date
Colonial Drive & Orange Blossom Trail Corridors	Christian Service Center	June 10, 2025
Orange Avenue / Rosalind Avenue & Colonial Drive Corridors	Discover Downtown Center	June 11, 2025
Orange Avenue & Orange Blossom Trail Corridors	West Lakes Community Market	June 14, 2025

Feedback from the pop-up events included the following:

Christian Service Center

- Request to repair and widen sidewalks in poor condition
- Existing bicycle lanes typically contain debris
- Signalized crosswalks do not allow enough time for wheelchair users to cross safely
- Construction blocks sidewalks and bike lanes for pedestrians / bicyclists
- Safety concerns are driveways along Colonial Dr.
- Request for improved lighting conditions and traffic calming
- Request for buffered bicycle and pedestrian facilities

Discover Downtown Center

- Request for bicycle infrastructure improvements at the intersection of Colonial Dr. and Maguire Blvd.
- Pedestrian safety concerns along Orange Ave. / Rosalind Ave. corridors due to vehicles failing to yield to pedestrians at traffic signals
- Pedestrian safety concerns Orange Ave. / Rosalind Ave. corridors due to bicyclists failing to yield to pedestrians on sidewalks
- Positive feedback to closed median improvement on Conway Road

West Lakes Community Market

- Positive feedback on PHB implementation on OBT.
- Access management concerns about closing the medians on OBT.
- Drainage concerns identified for Colonial Dr. and Kirkman Rd
- Request for additional bike parking and lower speeds on Colonial Dr. in the Mills District
- Safety concerns at Rock Lake Elementary School



Figure 19: West Lakes Community Market Pop-up

Recommendations Hybrid Workshop

A Hybrid Workshop was held in-person and online (via Zoom) at the Beardall Senior Center on Wednesday, October 22, 2025, at 5:30PM. The meeting was hosted both in-person (**Figure 20**) and virtually via Zoom to share the safety improvements recommended by the CROSS project. Notifications for the meeting were distributed on Monday, October 13, 2025.

The Hybrid Workshop was attended by eight community members and the study team. Attendees were invited to leave notes on the roll plots regarding any bicycle or pedestrian safety concerns, operational concerns, or general comments. Three written comments were received at the meeting. No emails, virtual comments, or mail addressed to the City of Orlando were received.

Overall, the comments received from the in-person meeting included the following:

- City-Wide
 - Request for signal progression on main roads
 - Request for backage road connection on Fairgreen Street
 - Request for regular signals over flashing signals
 - Request for signalization at multi-lane crosswalks
 - Suggestion to implement 8-foot to 12-foot shared use paths instead of painted shoulder for bicycles along roadways exceeding 35 mph
 - Suggestion to implement buffers between vehicle travel lanes and shared use paths / sidewalks
- Corridor Specific
 - Request for increased safety features and pedestrian traffic at the Valencia College and Kirkman Road intersection
 - Request for reduced speed along Colonial Drive
 - Scanned copies of the received comments can be found in the **Community Engagement Interim Report**, under separate cover.

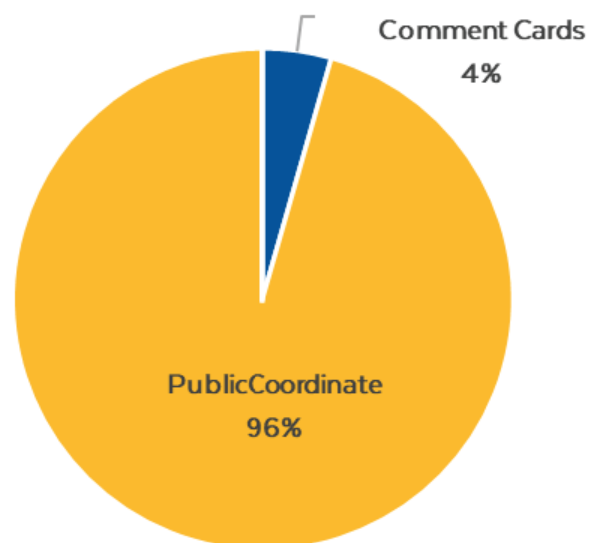


Figure 20: Recommendations Workshop

Public Comments

Several methods of data collection were used to gather public comments. At in-person open houses and pop-up events, the community had the opportunity to verbally communicate concerns with the study team, leave written comments, or leave notes on roll plots. Alternatively, public comments were collected virtually via PublicCoordinate, an interactive web-based map. City staff also accepted email and mail-in comments. A majority of recorded comments were provided via PublicCoordinate (172), while the remaining comments were provided via comment cards (8) (**Figure 21**) No comments were provided via mail or email.

Figure 21: Public Comment Platform Breakdown



PublicCoordinate

PublicCoordinate accounted for 96% of the total comments received during the comment collection period (172 total comments). PublicCoordinate is an interactive map tool that allowed users to leave comments, react to previous comments, or pinpoint areas on a map.

This map tool was adjusted based on the project phase. When collecting community feedback, comments were added by users to describe specified concerns, shown in **Table 4**.

Table 4: PublicCoordinate Comment Categories

Comment Symbol	Comment Category
	General Comment
	Safety Concern
	Accessibility Concern
	Bicycle Concern
	Pedestrian Concern
	Transit Concern
	Mark Your Destinations
	Report Near Miss Crash

Within this data collection phase, 172 comments were received. The comments reflect a mix of concerns, most commonly including bicycle and pedestrian concerns. Many comments were pinned at marked destinations, informing the study team of local hotspots and notable travel patterns of the community. **Figure 22** depicts the geographic spread of comments received for the overall project and **Figure 23** summarizes the distribution of comment types by category.

Figure 22: PublicCoordinate Map View of Comments

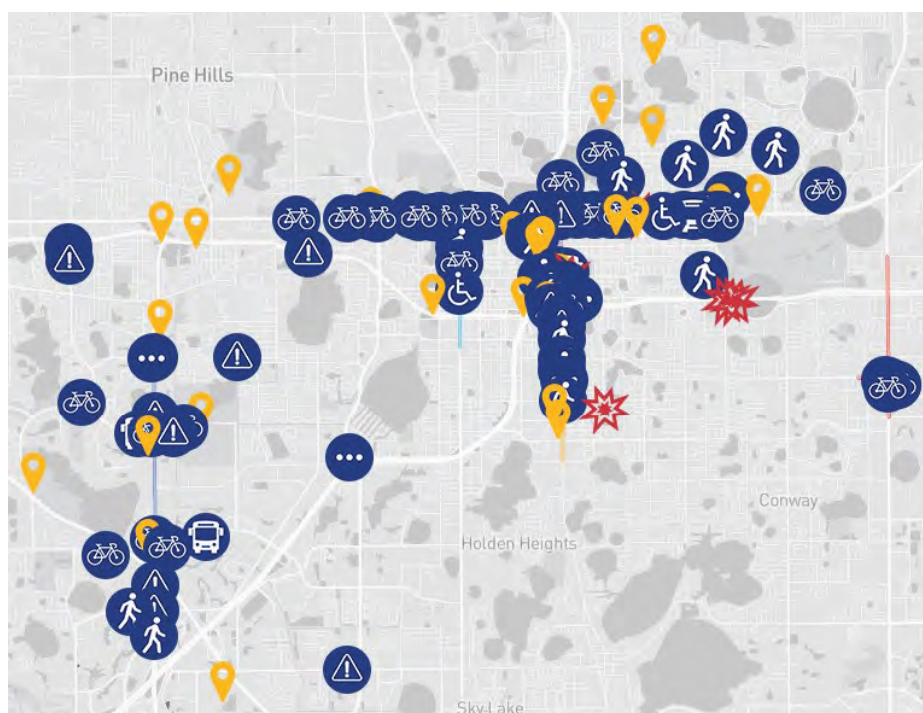
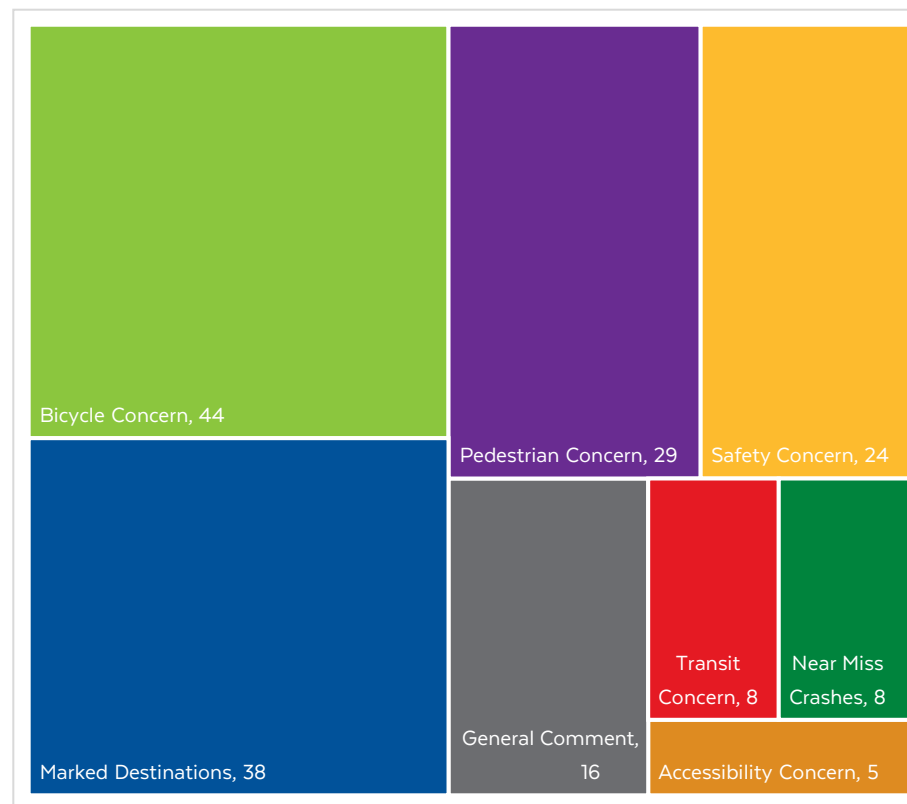


Figure 23: Public Comment Summary Distribution by Category



Countermeasure Preference Boards

At each of the pop-up events and open public houses, countermeasure preference boards were provided to guide conversations regarding the potential countermeasure strategies that would be considered along the study corridors. Community members placed stickers at each of these countermeasures to represent the sentiment surrounding the potential recommendations. Stickers resembled a range of sentiments from very positive, positive, neutral, to negative.

Figure 24 and Figure 25 display the countermeasure boards.

Figure 24: Countermeasure Preference Board 1

VISION ZERO CROSS
CONNECTING RESIDENTS ON SAFE STREETS

What countermeasures would you like to see in your community?
Place a sticker on the line next to the improvements you like.

BICYCLE	
Bike Lane / Buffered / Separated Bike Lane	"Bicycles May Use Full Lane" Signage
Floating Transit Island	Parking Buffer
Separated Bikeway	Two-Stage Queue Bike Box

PEDESTRIAN	
Add Sidewalk	Curb Extension
High Visibility Crosswalks	Pedestrian Hybrid Beacon
Rectangular Rapid Flashing Beacon (RRFB)	Shared Use Path

INTERSECTION	
All Way Stop Control	Hardened Median Nose Extension
Raised Crosswalk	Directional Median Openings to Restrict Turns
Roundabout	Reduced Left Turn Conflict Intersection

CITY OF ORLANDO

Figure 25: Countermeasure Preference Board 2

VISION ZERO CROSS
CONNECTING RESIDENTS ON SAFE STREETS

What countermeasures would you like to see in your community?
Place a sticker on the line next to the improvements you like.

BICYCLE	
Bike Lane / Buffered / Separated Bike Lane	"Bicycles May Use Full Lane" Signage
Floating Transit Island	Parking Buffer
Separated Bikeway	Two-Stage Queue Bike Box

PEDESTRIAN	
Add Sidewalk	Curb Extension
High Visibility Crosswalks	Pedestrian Hybrid Beacon
Rectangular Rapid Flashing Beacon (RRFB)	Shared Use Path

INTERSECTION	
All Way Stop Control	Hardened Median Nose Extension
Raised Crosswalk	Directional Median Openings to Restrict Turns
Roundabout	Reduced Left Turn Conflict Intersection

CITY OF ORLANDO

Based on the results of the countermeasure boards, the community generally had positive feelings towards separated bikeways, hardened median nose extensions, and buffered / separated bike lanes. Roundabouts, directional medians, and pedestrian hybrid beacons had mixed feelings, but most stickers indicated positive sentiment to the countermeasures.

KIRKMAN RD

**COMMUNITY
ENGAGEMENT**

MetroWest

CITY OF
ORLANDO
WATER RECLAMATION

Kirkman Road Corridor

Public Open House

The Kirkman Road Public Open House was scheduled to be held in-person Eagle's Nest Elementary School (5353 Metrowest Boulevard, Orlando, FL 32811) on Wednesday, July 9, 2025 at 6:00PM. Public Open House notices were emailed to community/stakeholder members and posted on the City of Orlando's social media platforms. Due to issues at the facility, this meeting was cancelled. As a replacement meeting, the study team attended the Kirkman Shingle Creek Trail Extension Meeting on September 18, 2025 to share project updates and related project information.

The Kirkman Road corridor map is shown in **Figure 26**, and approved project collateral can be found in the **Community Engagement Interim Report**, under separate cover.

PublicCoordinate

PublicCoordinate is an online interactive map webpage that allows users to leave comments at specific locations. The study team utilized PublicCoordinate to collect information about the community's travel behaviors and perspectives. The following prompts guided these responses:

- Where do you go regularly?
- Where do you feel safe or unsafe using the existing roads?
- Tell us what you want to see in your community to help you travel safely.

This comment collection period was launched on December 30, 2024, and concluded on November 5, 2025. A total of 172 comments were collected for the overall project (of which, 77 were designated as corridor specific comments) and analyzed to inform the recommendations for each of the study corridors. Of these comments, a total of five comments were related to the Kirkman Road corridor. The most frequent comment types were bicycle concern (2) and safety concern (2), while the most frequent location was at the intersection of Kirkman Road and Raleigh Street. A summary of these comments is provided in **Table 5**. Original comments obtained from PublicCoordinate can be found in the **Community Engagement Interim Report**, under separate cover.

Table 5: Kirkman Road Corridor - PublicCoordinate Comments Summary

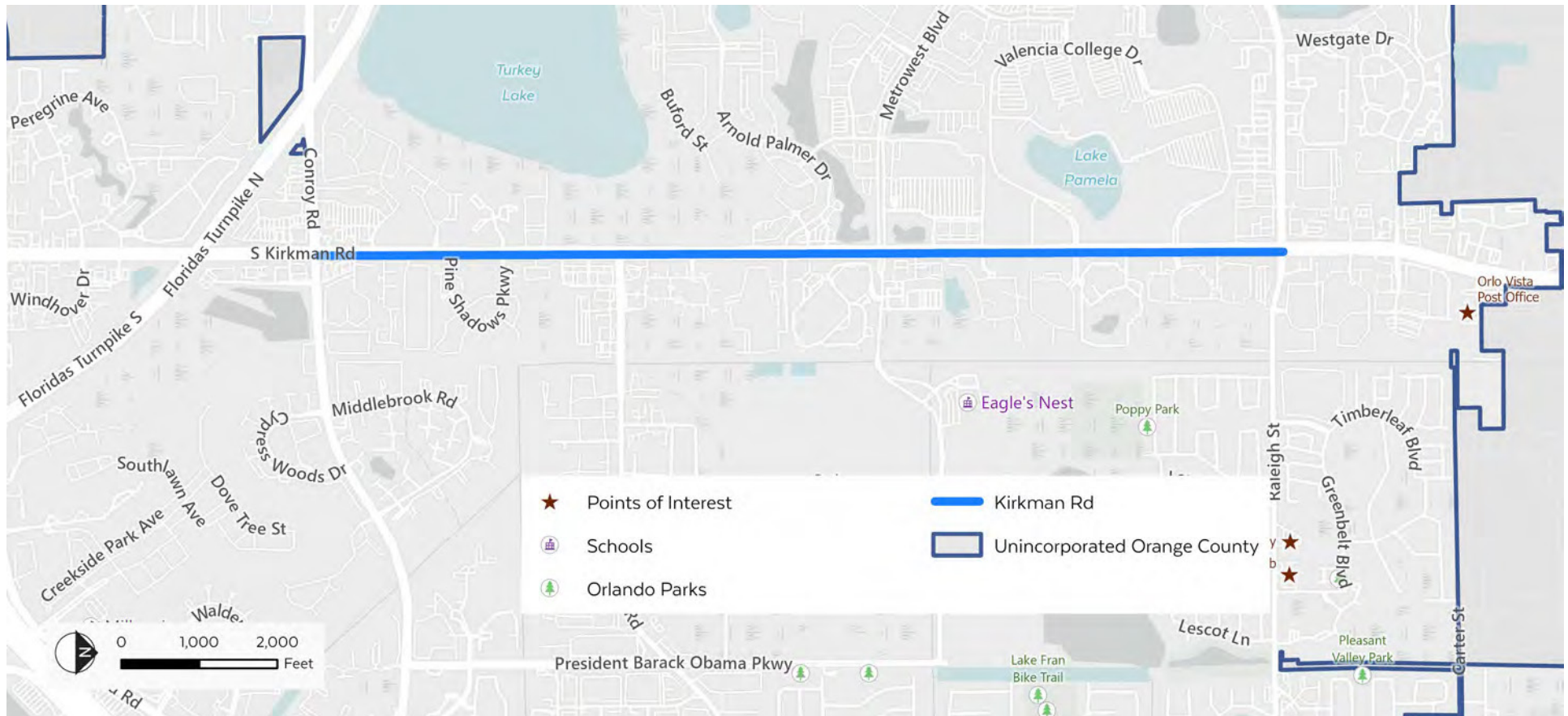
No.	Location	Category	Comment (1)
1	Monterey Dr	Bicycle Concern	- Recommendation to implement a protected bike lane with a raised divider to protect cyclists from motor vehicles on the roadway and to prevent cyclists from using the sidewalk - Safety concerns regarding the use of e-bikes and e-scooters - Bicycle lanes are typically littered with broken glass or other debris, causing concern for the impacts a raised divider may cause
2	Metrowest Blvd	Bicycle Concern	- Positive feedback for the intersection of Metrowest Blvd and Kirkman Rd, highlighting the shade available for pedestrians and location of crosswalk push buttons - Safety concerns include pedestrians crossing when pedestrian signalization is broken - Noted experiences as a cyclist traversing steeper slopes across Kirkman Rd and waiting at traffic signals without loops in bike lane
3	Metropolis Way	Safety Concern	- Pedestrian and bicycle safety concern crossing the southbound crosswalk due to conflict with eastbound left-turning vehicles, green traffic signal and pedestrian crosswalk are provided at the same time and causes conflict - Noted that the Metrowest Blvd and Kirkman Rd intersection is preferred due to safety concerns
4	Raleigh St	Safety Concern	- Positive feedback on the crossing guards at the intersection during AM and Mid-Day hours - Recommendation to install canopy / shade for crossing guards
5	Raleigh St	General Comment	- Noted a desired path forming across a sharp corner of the sidewalk [the exact intersection corner was not specified] - Pedestrians and cyclists safety concerns caused by crossing the road between vehicle gaps rather than waiting for the pedestrian signal

⁽¹⁾ Comments shown are summarized. Original comments are in the **Community Engagement Interim Report**, under separate cover.

Open House Roll Plots

At the Public Open Houses, roll plots were provided to depict the study corridors and the surrounding area at a larger scale. Attendees were invited to leave notes on the roll plots regarding any bicycle or pedestrian safety concerns, operational concerns, or general comments. However, no comments were received on the Kirkman Road roll plots.

Figure 26: Kirkman Road Corridor



CHAPTER 3

SAFETY ANALYSIS

MetroWest



Background

The Orlando Connecting Residents on Safe Streets Project (“Project” or “CROSS”) aims to develop a comprehensive implementation plan for safety improvements across six Vision Zero corridors in the City of Orlando. Vision Zero is a global initiative embraced by cities committed to eliminating traffic-related deaths and serious injuries, with a focus on equity and community engagement. In 2017, Mayor Buddy Dyer solidified Orlando’s commitment to Vision Zero by adopting the Vision Zero Action Plan through an official resolution.

The U.S. Department of Transportation awarded the City of Orlando a Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant to support the CROSS Project. This funding enables a detailed examination of six critical corridors within Orlando, using the city’s established methodology to identify context-specific countermeasures and capital improvements. These efforts are part of Orlando’s goal to eliminate all traffic-related deaths and serious injuries by 2040.

As part of this initiative, Kimley-Horn conducted a comprehensive analysis of six corridors and developed the Safety Analysis Interim Report in alignment with the city’s methodology.



Selection Criteria

The selection of corridors for the Project was guided by data-driven methodologies as a part of the City of Orlando’s Vision Zero Action Plan, adopted in 2017.

Key criteria for selecting the six Vision Zero corridors included:

- **Crash Frequency and Severity:** Focusing on locations with significant safety concerns, particularly for vulnerable road users.
- **Equity Considerations:** Ensuring underserved communities and high-risk areas were prioritized for improvements.
- **Community Impact:** Targeting corridors with high pedestrian, cyclist, and transit activity to enhance safety outcomes.

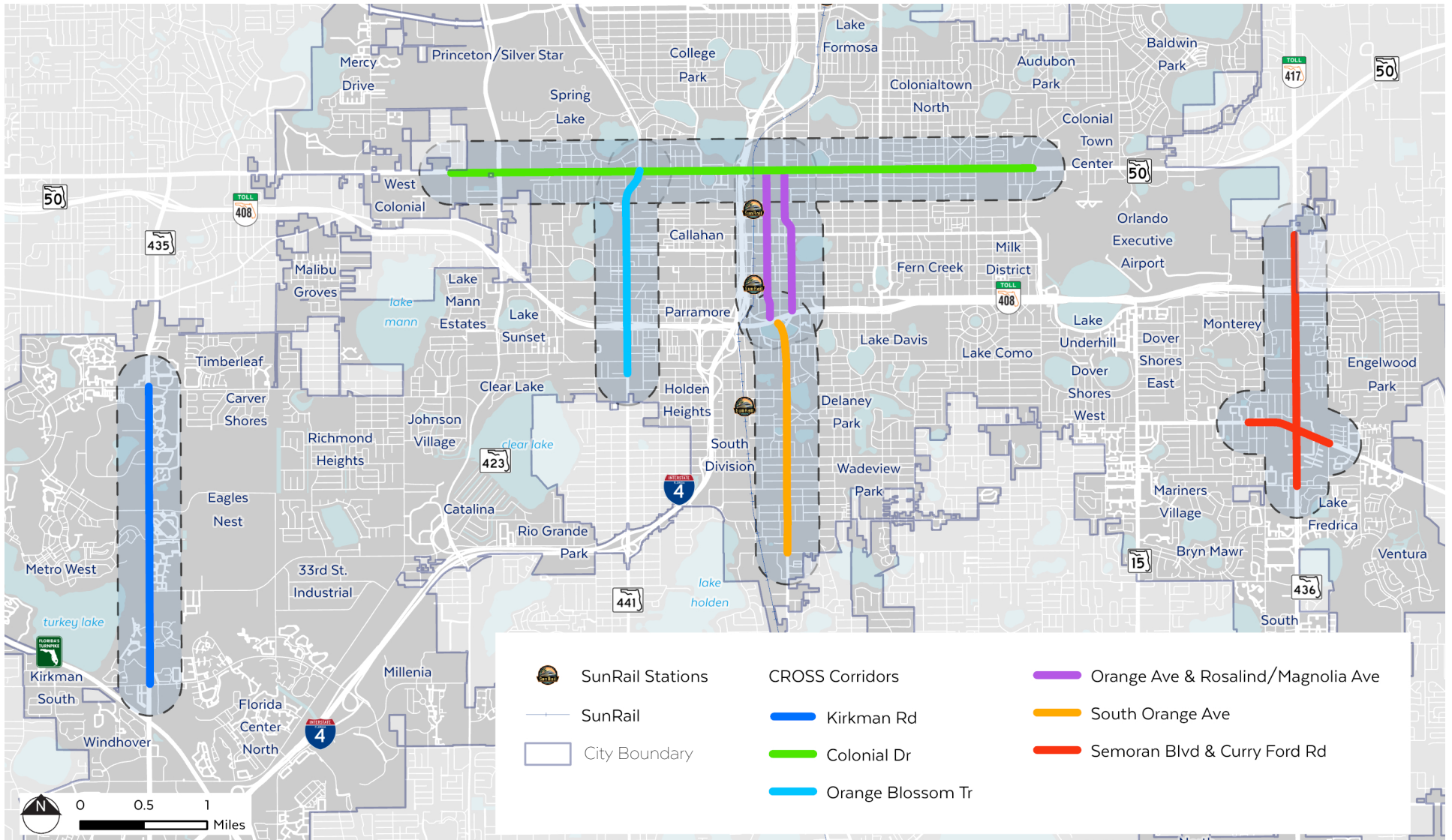
By applying these selection criteria, the Project ensures safety improvements are targeted at the most critical locations, advancing Orlando’s Vision Zero goal of eliminating traffic-related deaths and serious injuries by 2040.

The selected corridors include both on-system FDOT roads and locally managed streets, spanning critical segments within the City of Orlando. These corridors are:

1. Kirkman Road: From Conroy Road to Raleigh Street
2. SR-50/Colonial Drive: From Ferguson Drive to Maguire Boulevard
3. Orange Blossom Trail: From Winnifred Street to SR 50
4.
 - a. Orange Avenue: From SR 408 to SR 50
 - b. Rosalind/Magnolia Avenue: From SR 408 to SR 50
5. South Orange Avenue: From Pineloch Avenue to SR 408
6.
 - a. Semoran Boulevard: From Grant Street to Dahlia Drive
 - b. Curry Ford Road: From Larkin Avenue to Bowen Drive

A map of the corridors is shown in **Figure 27**. Kirkman Road, Colonial Drive, Orange Blossom Trail, South Orange Avenue, Semoran Boulevard, and Curry Ford Road are FDOT-maintained roadways. Orange Avenue and Rosalind/Magnolia Avenue are city-maintained roadways.

Figure 27: Overview Map of Study Corridors



Methodology

The City of Orlando's Vision Zero Action Plan evaluated citywide fatal and serious injury crash data from 2017 through 2019 extracted from two sources that have since been combined into one. The primary source for crash data within the State of Florida is now the Signal Four Analytics website hosted by the University of Florida. Signal Four Analytics was used for the current safety analysis.

Historic crash data from January 1, 2019 through December 31, 2023 were extracted for each individual corridor, inclusive of all severity levels of crashes. The searches were performed using local street networks by name for the city-maintained roadways (Orange Avenue and Rosalind/Magnolia Avenue) and the applicable FDOT section number and milepost limits for on-system roadways (all remaining corridors). These values are summarized in **Table 6 and 7**.

Files included the "FDOT Tables Crash & Roadway & Vehicle 1&2 & Driver 1&2" CSV selection as well as the "GIS Geolocation & Crash Event" shape files selection.

It should be noted that coded crash data in data extracts is subject to error. Crash type, location, and contributing factors can sometimes be miscoded based on differing interpretations of law enforcement officers or unknown factors where there are conflicting accounts and no witnesses. Manual crash report review was not included in the scope of this analysis due to the magnitude of crash data. Individual crash report narratives were reviewed on a limited case-by-case basis only where deemed necessary for critical crash trend elements. This cursory qualitative crash report narrative review included fatal, serious injury, pedestrian, and bicycle crash report narratives. The insights from crash report narratives were used to understand root causes of crashes, guide the recommendations process, and select appropriate countermeasures in subsequent phases of the overall study. The summarized crash data included in this safety analysis represents the raw data from the crash extracts.

Table 6: Crash Data Extract Input Values – City Roads

City Road	Begin Limit	End Limit
Orange Avenue	SR 408	Colonial Drive
Rosalind/ Magnolia Avenue	SR 408	Colonial Drive

Table 7: Crash Data Extract Input Values – State Roads

State Road	Section Number	Begin Milepost	End Milepost
Kirkman Road from Conroy Road to Raleigh Street			
SR 435	75270000	3.063	5.448
Colonial Drive from Ferguson Drive to Maguire Boulevard			
SR 50	75050000	14.495	15.977
SR 50	75060000	0.000	3.098
Orange Blossom Trail from Winnifred Street to Colonial Drive			
SR 500/US 441	75010000	12.574	14.201
South Orange Avenue from Pineloch Avenue to Gore Street			
SR 527	75040000	11.783	13.289
Semoran Boulevard from Grant Street to Dahlia Drive			
SR 436	75003000	4.570	6.548
Curry Ford Road from Larkin Avenue to Bowen Drive			
SR 551	75012000	0.877	1.541

KIRKMAN RD

**SAFETY
ANALYSIS**

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Overview of Crash Data

Citywide Historic Crash Trends

Since adoption of the Vision Zero Action Plan, the city has been making notable progress in reducing fatal and serious injury crashes. A historic crash trend analysis was prepared in line with the dataset analyzed in the Vision Zero Action Plan. The trend lines for fatal and incapacitating injury crashes are summarized for a 10-year period for all crashes occurring on roadways within the City of Orlando, excluding limited access facilities but including roadways maintained by the city, the county, and FDOT. The data was summarized from the 2025 FORWARD Orlando Vision Zero Safety Action Plan update filtered dataset. **Figure 28** depicts all crash types, **Figure 29** illustrates pedestrian crashes, and **Figure 30** illustrates bicycle crashes.



From a peak in 2014, severe crashes have
decreased by 46% citywide.

Figure 28: Historic Citywide Trends for Incapacitating Injury & Fatal Crashes

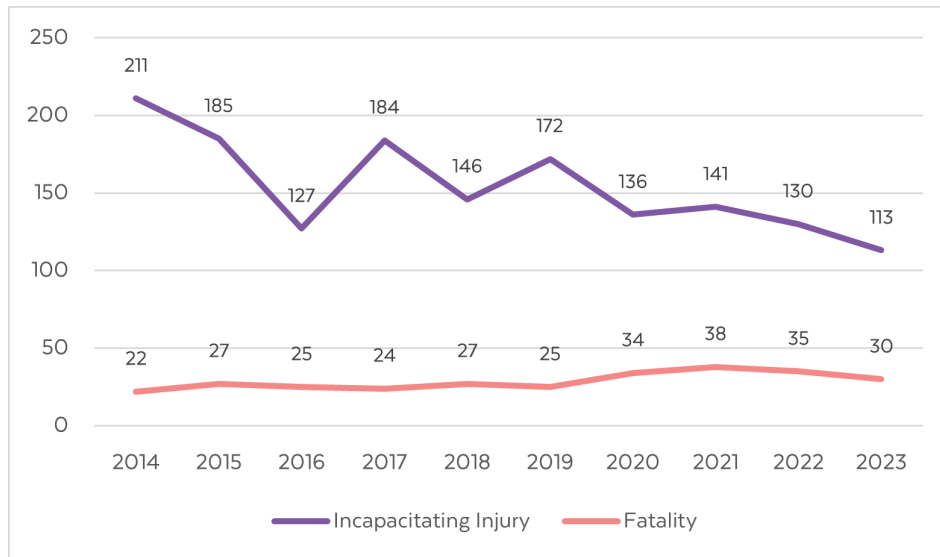


Figure 29: Historic Citywide Trends for Incapacitating Injury & Fatal Pedestrian Crashes

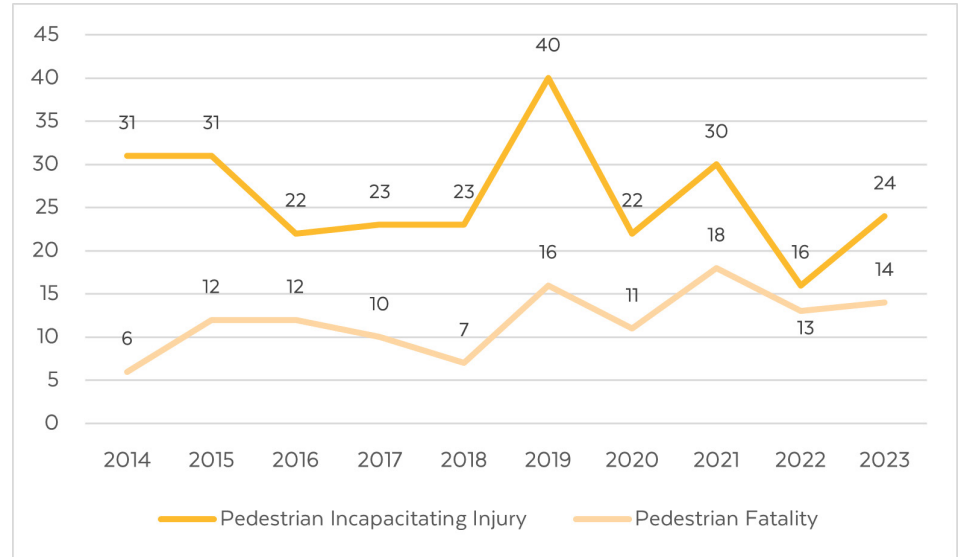
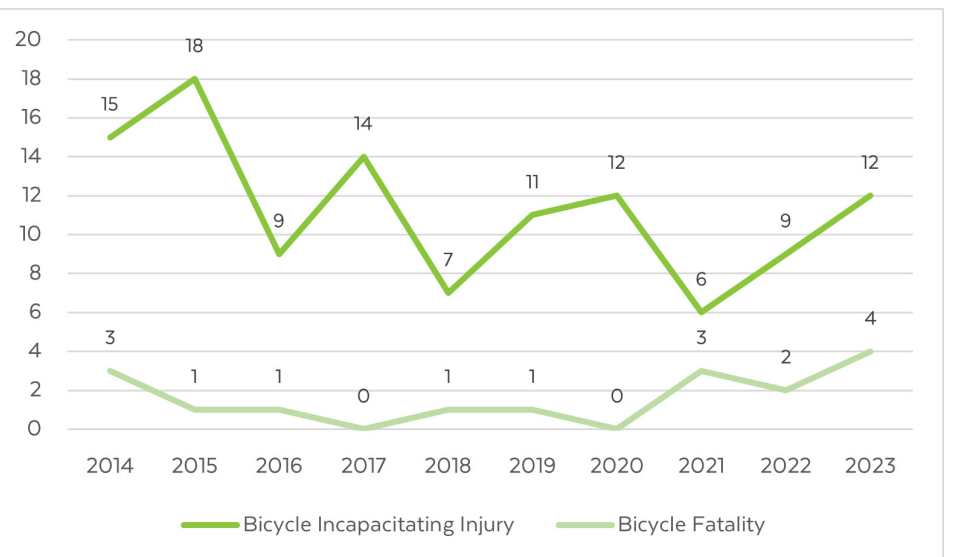


Figure 30: Historic Citywide Trends for Incapacitating Injury & Fatal Bicycle Crashes



Project-Level Comparison of Crash Data

The CROSS study area encompasses over 15 centerline miles of roadway across the six corridors with 86 traffic signals. During the five-year period from 2019 to 2023, the study corridors experienced:

- Over 8,800 crashes
- 32 fatal crashes
- 125 incapacitating injury crashes
- 211 pedestrian-involved crashes
- 104 bicycle-involved crashes



During the 2019 to 2023 analysis period, the six-corridor CROSS study network **represented 18% of all crashes and 20% of fatalities** occurring on non-limited access facilities within the city limits, including 23% of pedestrian-involved crashes, and 16% of bicycle-involved crashes.

The crash characteristics for each individual corridor are discussed in further detail in the following report sections. Comparing the general trends across corridors, Colonial Drive has experienced the highest frequency of incapacitating injury and fatal crashes, followed by Kirkman Road. Colonial Drive has also experienced the highest frequency of non-motorist crashes, followed by the Semoran Boulevard & Curry Ford Road pairing.

It should be noted that these figures represent total five-year crash frequency without normalization for the variability in segment length, number of lanes, or traffic volume exposure. Additional data visualizations follow on subsequent pages that provide a percentage-based comparison.

Figure 31: Total 2019-2023 Incapacitating Injury & Fatal Crashes by Corridor

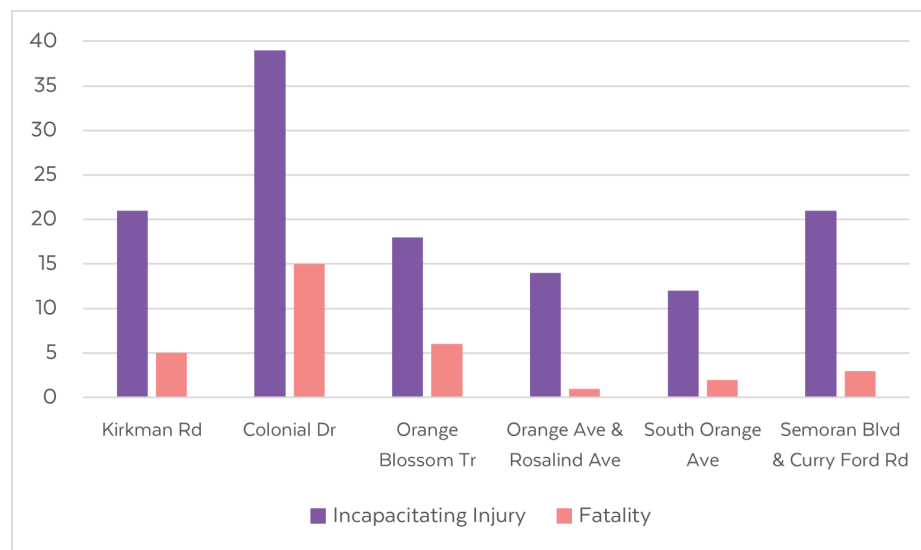
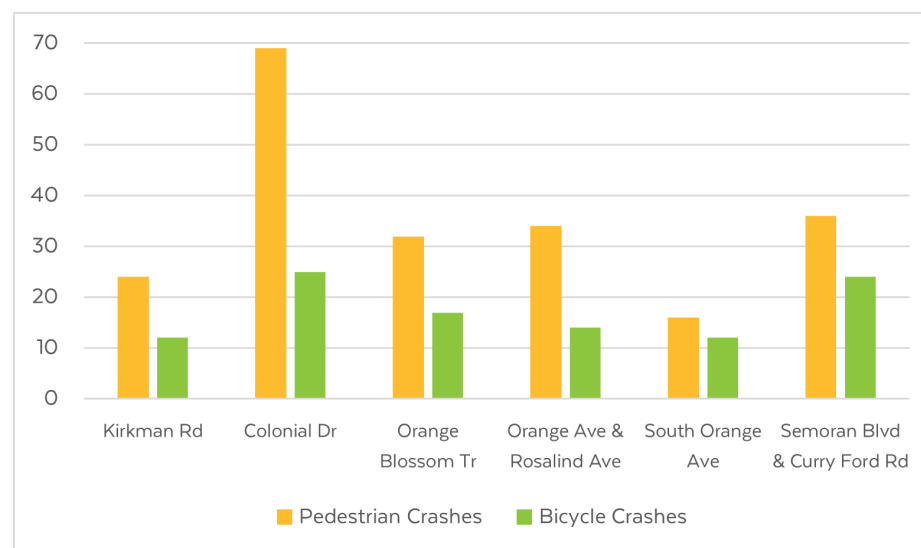


Figure 32: Total 2019-2023 Pedestrian and Bicyclist Crashes by Corridor (All Severities)



To provide parity in the comparison across corridors, the crash frequency related to high severity outcomes and the crash frequency related to vulnerable users was visualized as a percentage of total crashes per corridor.

Each corridor was independently evaluated to determine the likelihood of a crash resulting in a high-severity outcome, either an incapacitating injury or a fatality. The equation used to compare the proportion of crashes resulting in high severity:

$$\% \text{ Resulting in High Severity} = \frac{\text{incapacitating injury crashes} + \text{fatal crashes}}{\text{total number of crashes}}$$

Each corridor was also independently evaluated to determine the likelihood of a crash involving a non-motorist, either a pedestrian or a bicyclist. The equation used to compare the proportion of crashes involving a non-motorist:

$$\% \text{ Involving Non-Motorist} = \frac{\text{pedestrian crashes} + \text{bicycle crashes}}{\text{total number of crashes}}$$

Figure 33 illustrates the proportion of all crashes resulting in incapacitating injuries and fatalities by individual corridor. **Figure 34** illustrates the proportion of all crashes involving pedestrians and bicyclists by individual corridor.



The **Orange Blossom Trail** corridor has experienced the **highest percentage of high-severity crashes**, with over 2.5% of all crashes resulting in either an incapacitating injury or a fatality.



The **Orange Avenue & Rosalind/Magnolia Avenue** downtown one-way pair has experienced the **highest percentage of crashes involving non-motorists**, followed closely by Orange Blossom Trail, with both corridors experiencing over 5% of all crashes involving a pedestrian or bicyclist.

Figure 33: Total 2019–2023 Proportion of Crashes Resulting in High Severity

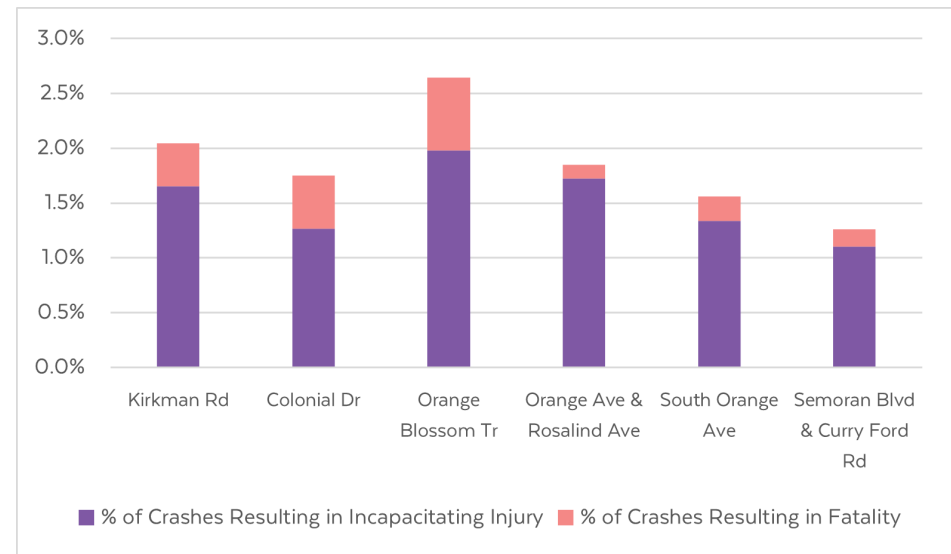
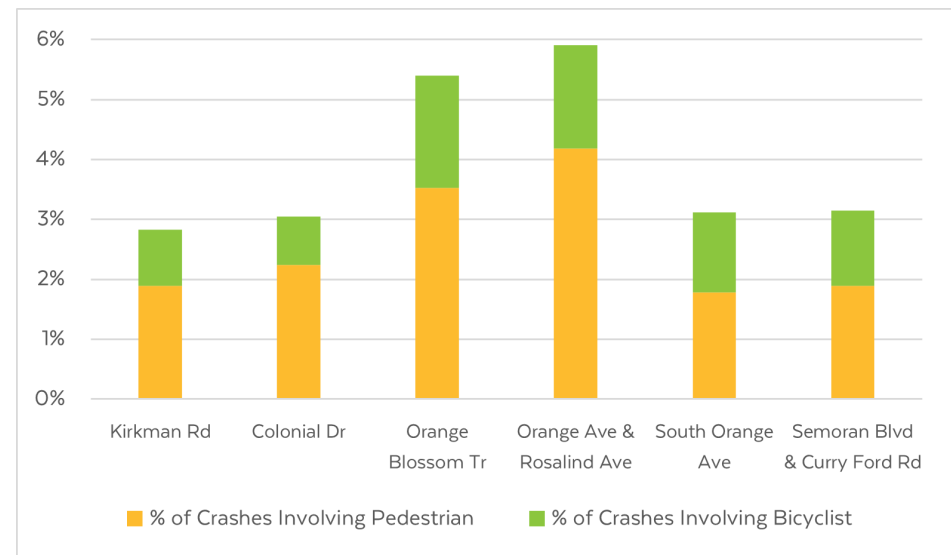


Figure 34: Total 2019–2023 Proportion of Crashes Involving Non-Motorist (All Severities)



Additional visualizations were prepared to present the data with a normalized base to account for the variability in segment length, number of lanes, and traffic volume exposure on each corridor. Traditional safety analysis utilizes calculated crash rates as an effective tool to compare the relative safety of roadways with different characteristics. The crash rate incorporates not only number of crashes occurring during the period (for this analysis, five years), but also the length of the segment in miles and the average daily traffic, and is reported in the units of “Crashes Per Million-Vehicle-Miles” or for fatal crash rate “Crashes Per 100 Million-Vehicle-Miles”. Crash rates must be calculated by individual facility, therefore the Orange Avenue & Rosalind/Magnolia Avenue downtown one-way pair and the Semoran Boulevard & Curry Ford Road intersecting pair were calculated separately for each roadway.

It should be noted that to obtain the most accurate crash rates, calculations should be performed separately for intersections and bounded segments due to the high concentration of crashes typically occurring at intersections where there are more conflict points. The rates presented in this analysis are calculated for the entire segment length of each corridor inclusive of all contained intersections, and therefore cannot be directly compared to other statewide or national averages for similar facilities. These are only intended for comparison across study corridors.

The standard equation used to calculate total crash rate (crashes of all severities) is:

$$\text{Crash Rate} = \frac{\text{total number of crashes} * 1,000,000}{5 \text{ years} * 365 \text{ days} * \text{length} * \text{AADT}}$$

The standard equation used to calculate fatal crash rate (fatal crashes only) is:

$$\text{Fatal Crash Rate} = \frac{\text{number of fatal crashes} * 1,000,000}{5 \text{ years} * 365 \text{ days} * \text{length} * \text{AADT}}$$



The comparison of crash rates shows that **the Orange Avenue corridor** (of the Orange Avenue & Rosalind/Magnolia Avenue downtown one-way pair) has experienced the **highest total crash rate** of all study corridors, yet no fatal crashes within the study period.

The **Orange Blossom Trail corridor** has experienced the **highest fatal crash rate** of all study corridors.

Figure 35: 2019–2023 Five-Year Crash Rates in Crashes per Million-Vehicle-Miles

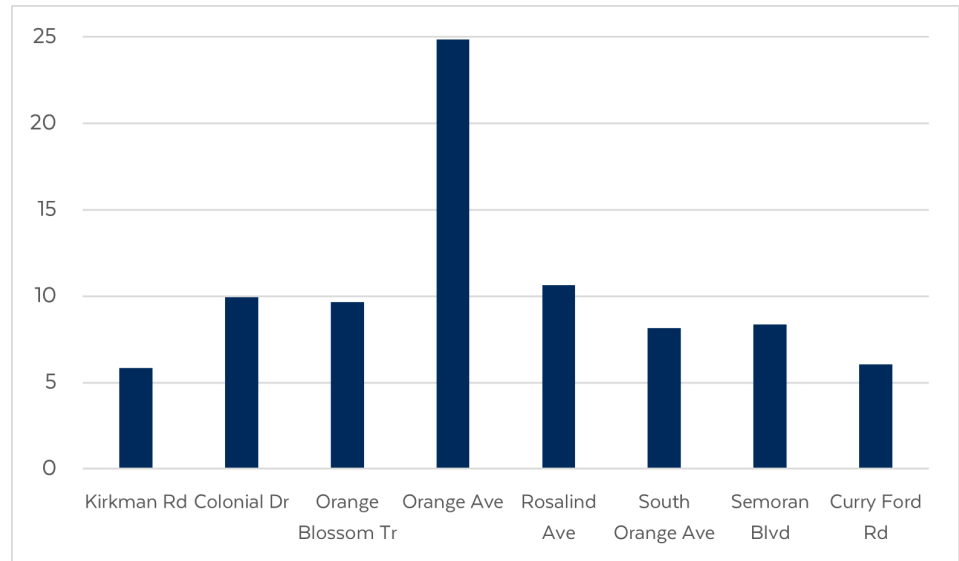
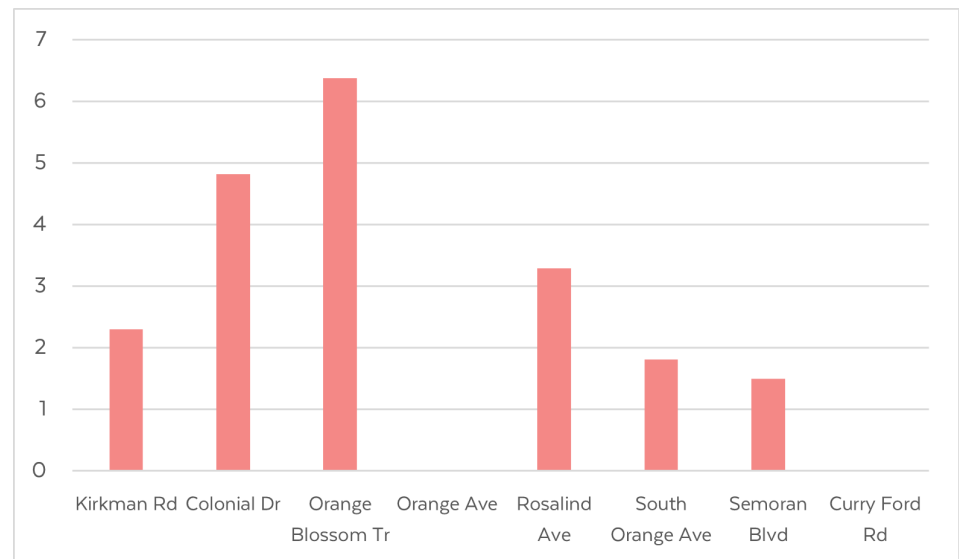


Figure 36: 2019–2023 Five-Year Fatal Crash Rates in Fatal Crashes per 100 Million-Vehicle-Miles



Kirkman Road Corridor Crash Trends

The 2.385-mile segment of Kirkman Road from Conroy Road to Raleigh Street was analyzed for prominent crash trends and characteristics contributing to fatalities and serious injuries. The typical section is an urban, six-lane, divided facility carrying average traffic of 50,000 vehicles per day.

The crash characteristics from 2019 to 2023 are summarized below:

- 1,271 crashes in total over 5 years corridor-wide
- 254 crashes annually corridor-wide
- 107 crashes annually per mile
- 5.840 crash rate in crashes per year per million vehicle-miles

The following graphs and tables break out crash frequency by temporal trends (year, day of week, time of day), location, mode, severity, type, and contributing factors. Trends for overall crash concentration, high-severity crashes, and non-motorist crashes are also mapped.

Figure 37: Kirkman Road Corridor – Crash Frequency by Year

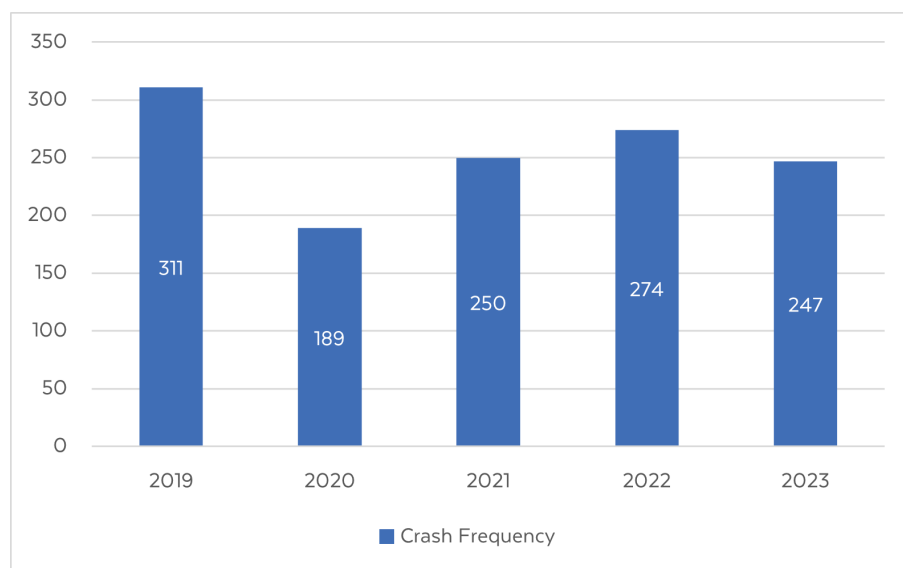


Figure 38: Kirkman Road Corridor – Crash Frequency by Severity

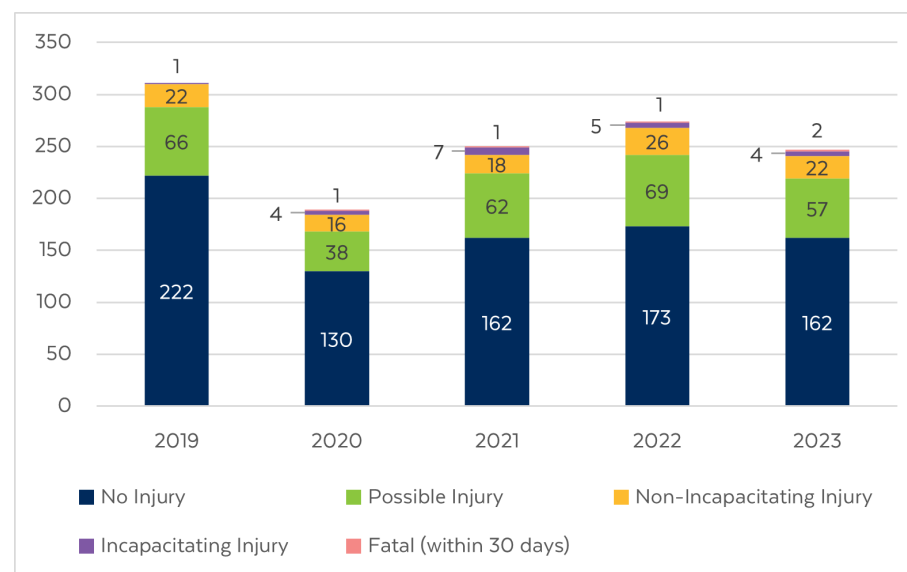


Figure 39: Kirkman Road Corridor – Crash Frequency by Day of Week

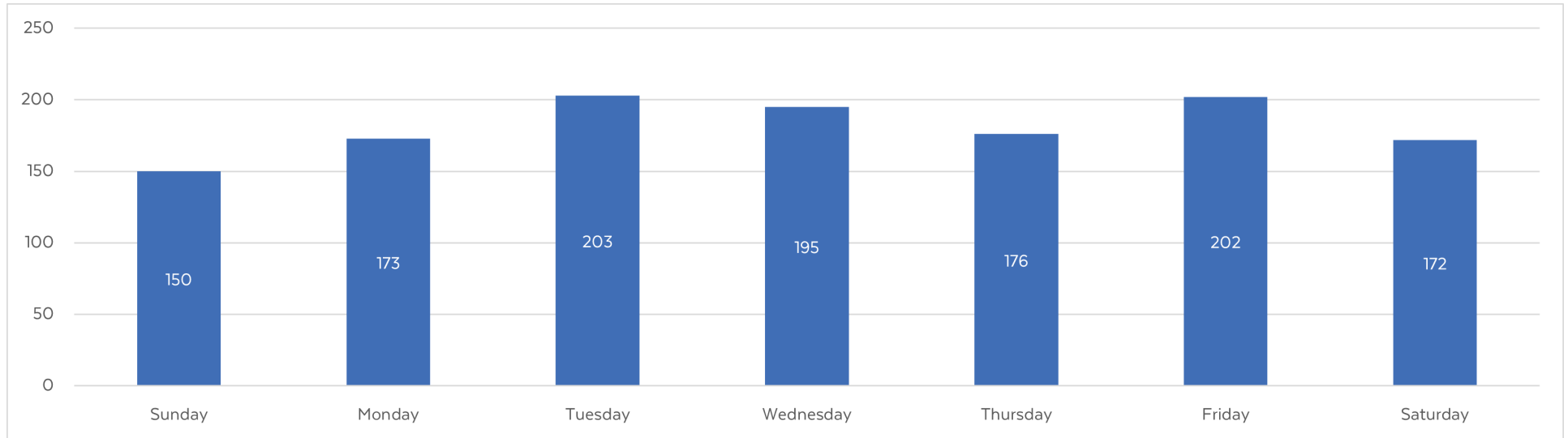


Figure 40: Kirkman Road Corridor – Crash Frequency by Time of Day

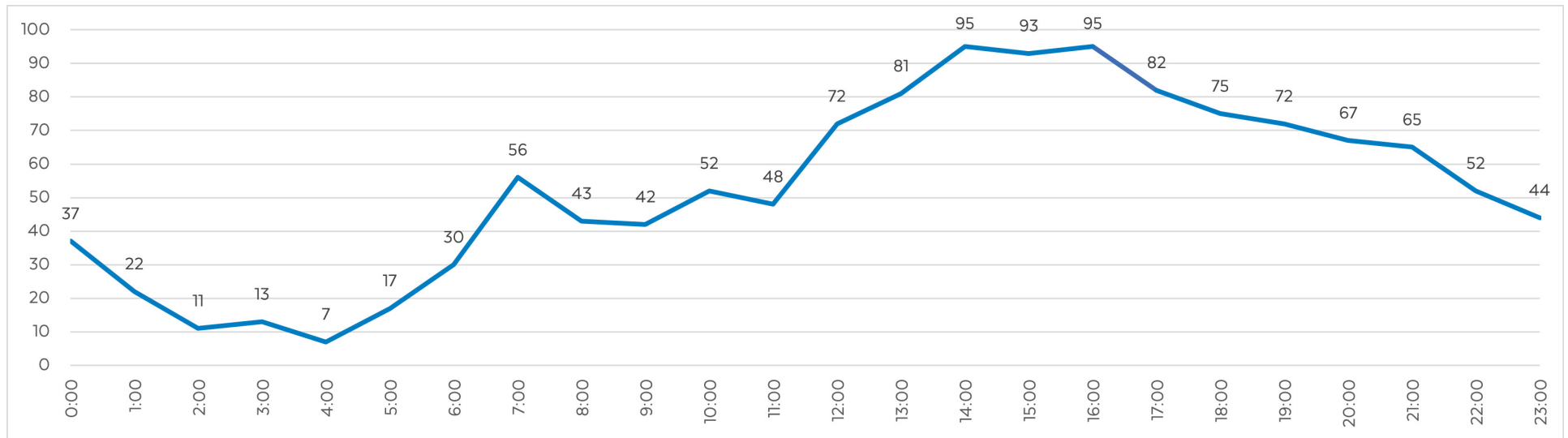


Figure 41: Kirkman Road Corridor – Total Crashes by Milepost

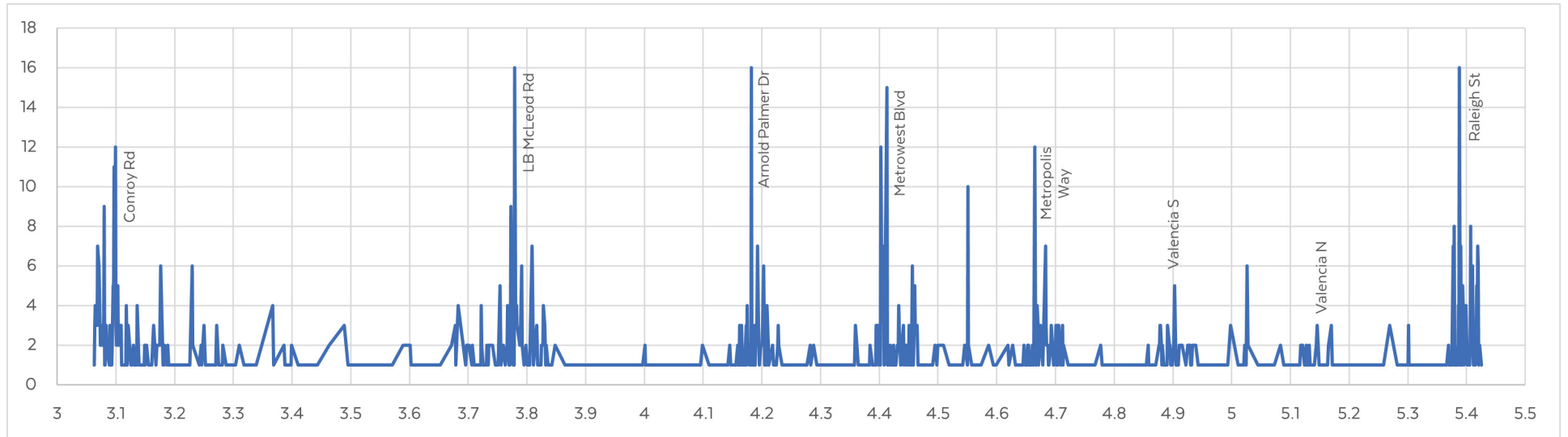


Figure 42: Kirkman Road Corridor – Fatal & Serious Injury Crashes by Milepost

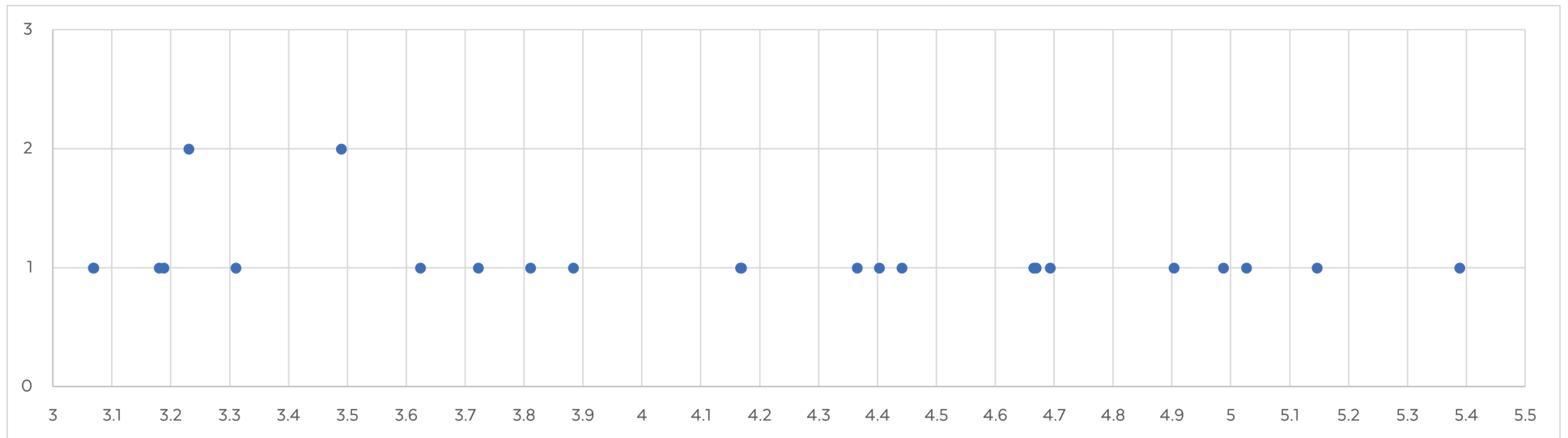


Figure 43: Kirkman Road Corridor – Crashes by Lighting Condition

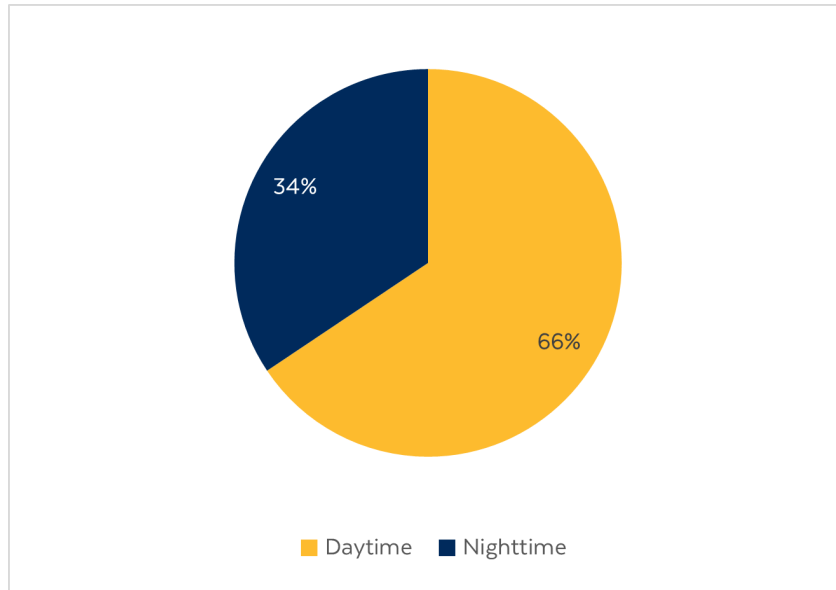


Figure 44: Kirkman Road Corridor – Alcohol/Drug-Related Crashes

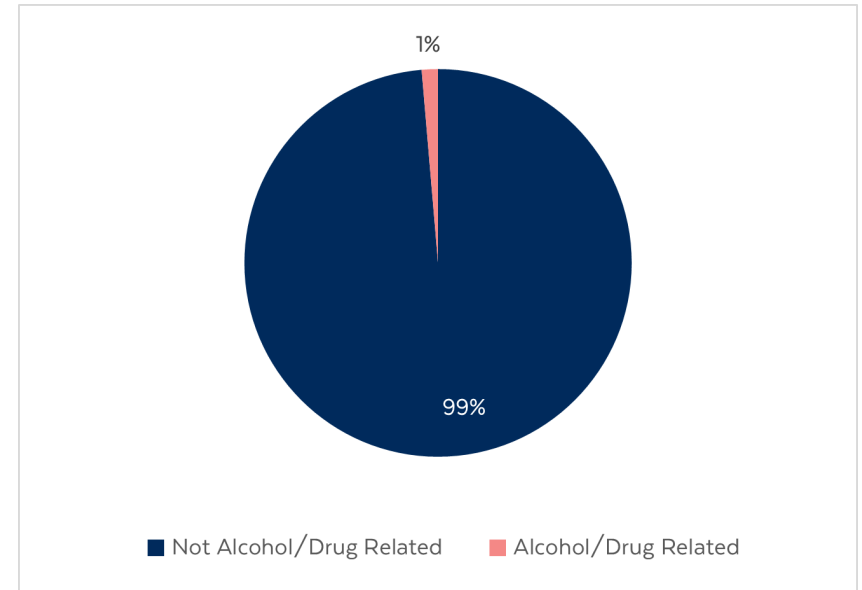


Figure 45: Kirkman Road Corridor – Crashes by Surface Condition

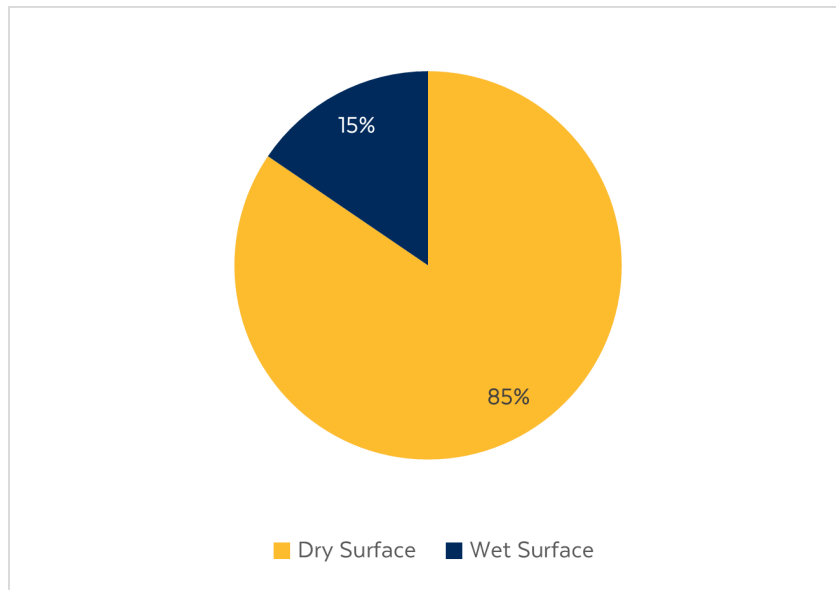


Figure 46: Kirkman Road Corridor – Crashes by Mode of Travel

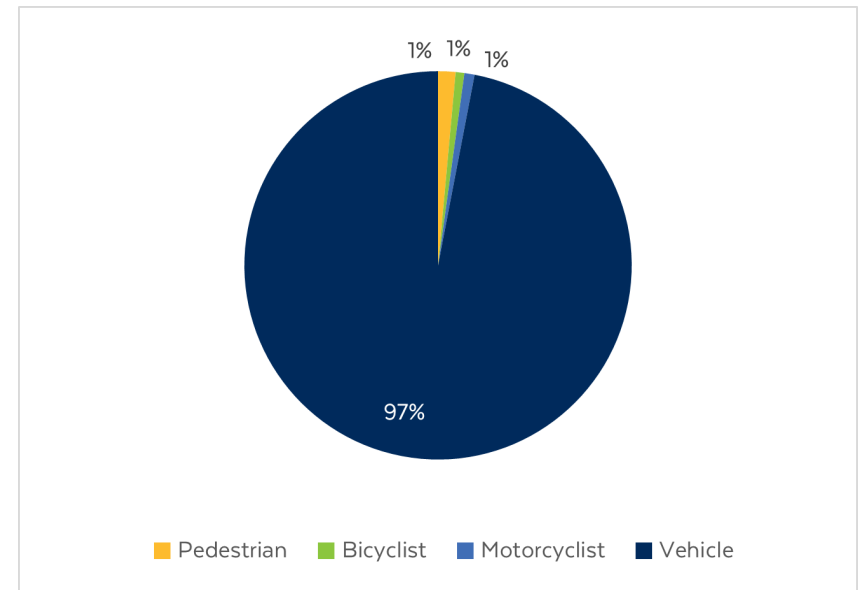


Figure 47: Kirkman Road Corridor – Severity of Crashes by Mode

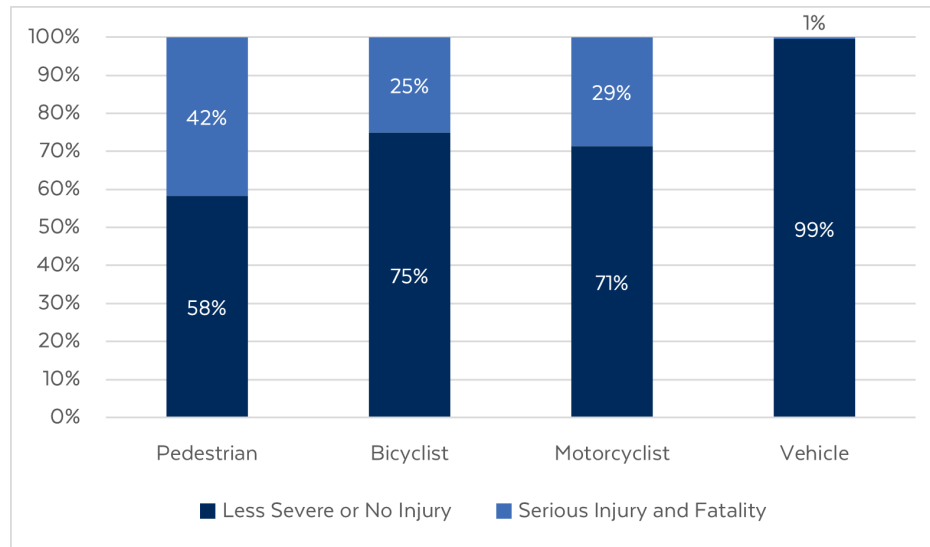
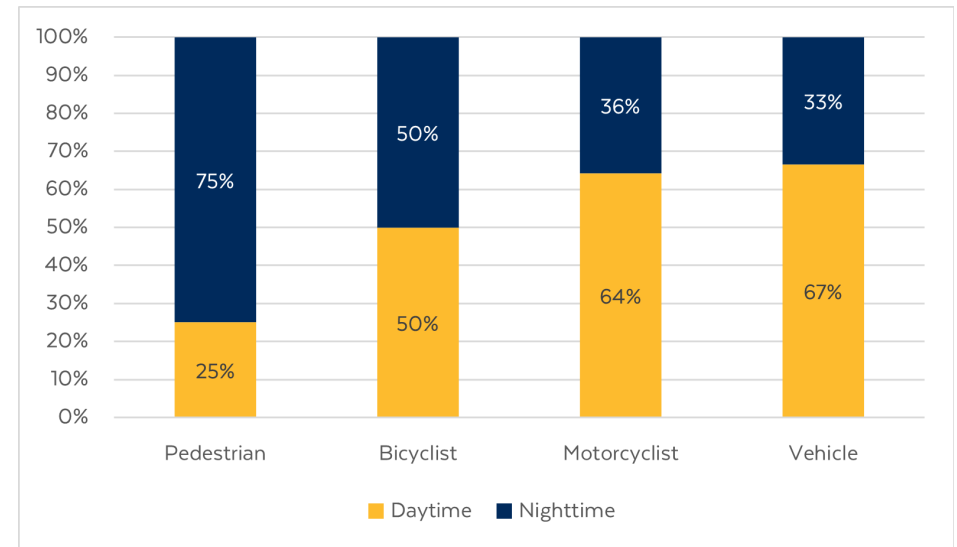


Figure 48: Kirkman Road Corridor – Lighting Condition by Mode



An assessment of crash types and contributing factors was performed to evaluate the predominant conditions involved in both high-severity crashes and total crashes. **Table 8** catalogs the five-year summation of high-severity crashes (including incapacitating injury and fatal crashes) and total crashes (all severities) for each crash type experienced along the corridor. The percentages reflect the proportion that each crash type comprises of the total five-year crash frequency. The table has been sorted in descending order by overall number of high-severity crashes, with the highest frequency at the top. **Table 9** reports on contributing factors using the same breakdown of high-severity crashes and total crashes. An additional breakdown has been added to show the proportion of non-motorist crashes that involved each contributing factor.

$$\% \text{ of Crashes} = \frac{\text{No. of Crashes}}{\text{Five Year Total}}$$

The Severe Crash Ratio shown in both tables is an indicator of how overrepresented the crash type or contributing factor is in high-severity crashes versus total crashes. The higher the ratio, the higher the likelihood that a crash of that type or involving that contributing factor will result in a serious injury or fatality. These are the crashes that, although they do not occur frequently, often have deadly consequences when they do occur.

$$\text{Severe Crash Ratio} = \frac{\% \text{ of Severe+Fatal Crashes}}{\% \text{ of Total Crashes}}$$

Conditional formatting has been applied to highlight the greatest proportions in **red**, transitioning through **yellow** to the lowest proportions in **green**.

Table 8: Kirkman Road Corridor – Severity of Crashes by Type

Crash Type	No. of Severe + Fatal Crashes	% of Severe + Fatal Crashes	No. of Total Crashes	% of Total Crashes	Severe Crash Ratio
Pedestrian	9	34.6%	18	1.4%	24.44
Rear End	7	26.9%	749	58.9%	0.46
Sideswipe	4	15.4%	187	14.7%	1.05
Other	3	11.5%	108	8.5%	1.36
Left Turn	2	7.7%	47	3.7%	2.08
Right Turn	1	3.8%	19	1.5%	2.57
Off Road	0	0.0%	20	1.6%	0.00
Angle	0	0.0%	36	2.8%	0.00
Bicycle	0	0.0%	6	0.5%	0.00
Unknown	0	0.0%	60	4.7%	0.00
Head On	0	0.0%	12	0.9%	0.00
Rollover	0	0.0%	7	0.6%	0.00
Animal	0	0.0%	2	0.2%	0.00
Five-Year Total	26	100%	1,271	100%	-

Table 9: Kirkman Road Corridor – Severity of Crashes by Contributing Factors

Crash Type		No. of Total Crashes	% of Total Crashes	No. of Severe + Fatal Crashes	% of Severe + Fatal Crashes	Severe Crash Ratio	No. of Non-Motorist Crashes	% of Non-Motorist Crashes
Roadway Location	Intersection Related	278	21.9%	6	23.1%	1.06	11	28.2%
	Traffic Signal Related	344	27.1%	8	30.8%	1.14	9	23.1%
	Work Zone Related	17	1.3%	1	3.8%	2.88	0	0.0%
Under the Influence	Alcohol Involved	17	1.3%	1	3.8%	2.88	0	0.0%
	Drugs Involved	6	0.5%	1	3.8%	8.15	0	0.0%
Age-Related	Teenage Driver (15-19)	146	11.5%	1	3.8%	0.33	2	5.1%
	Aging Driver (65+)	133	10.5%	3	11.5%	1.10	3	7.7%
Environmental Factors	Nighttime	437	34.4%	16	61.5%	1.79	26	66.7%
	Adverse Weather	124	9.8%	0	0.0%	-	3	7.7%
	Abnormal Road Surface	197	15.5%	1	3.8%	0.25	5	12.8%
Behavioral Factors	Aggressive Driving	56	4.4%	1	3.8%	0.87	1	2.6%
	Distracted Driving	167	13.1%	4	15.4%	1.17	2	5.1%
	Speeding	37	2.9%	0	0.0%	-	0	0.0%
	Lane Departure	249	19.6%	6	23.1%	1.18	6	15.4%
Vehicle Type	Commercial Vehicle Involved	37	2.9%	1	3.8%	1.32	0	0.0%
	Trailer Involved	27	2.1%	0	0.0%	-	0	0.0%
	School Bus Involved	10	0.8%	0	0.0%	-	0	0.0%
	Motorcycle Involved	15	1.2%	4	15.4%	13.04	0	0.0%

Figure 49: Kirkman Road Corridor – Crash Density Heatmap

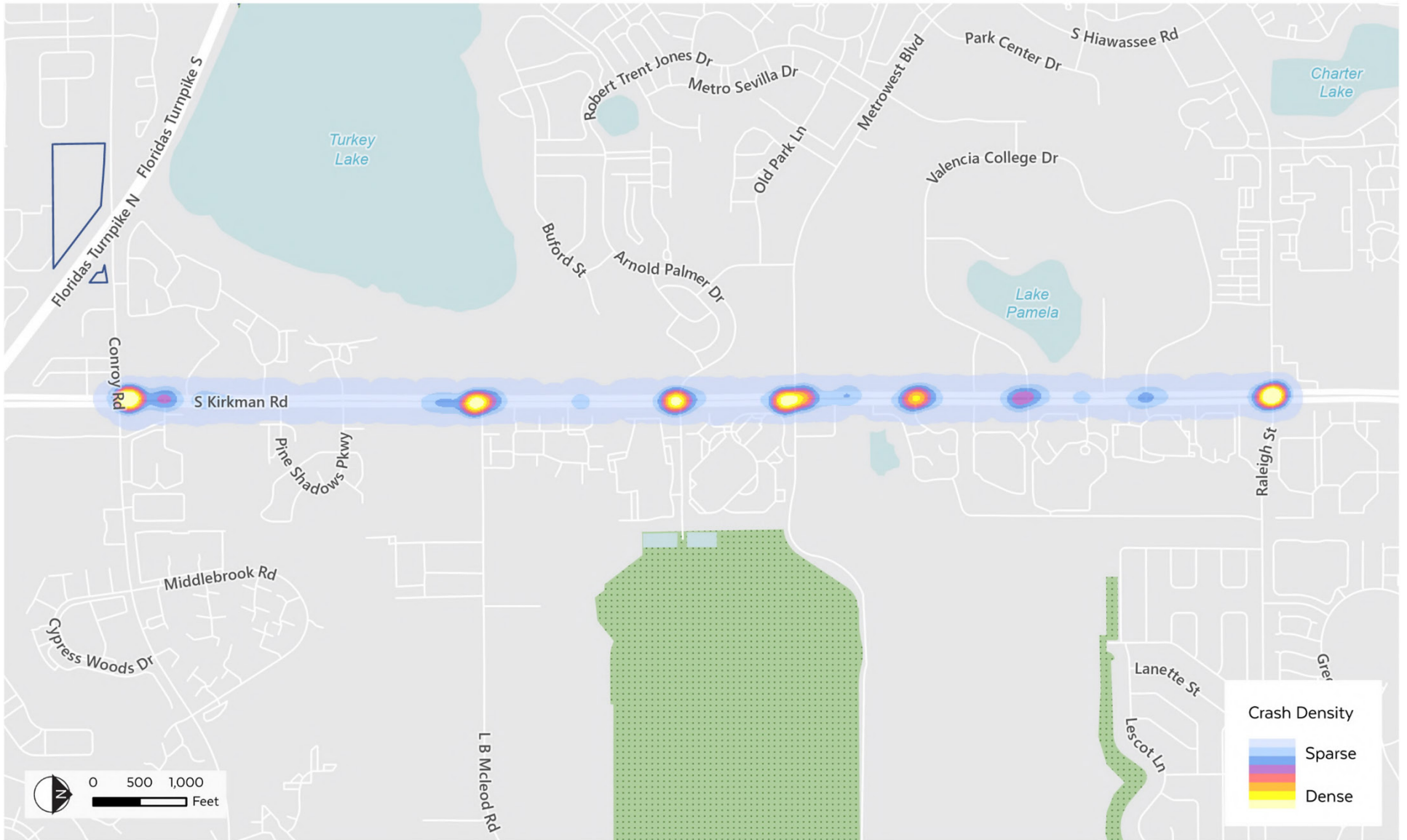


Figure 50: Kirkman Road Corridor – High Severity Crashes Map

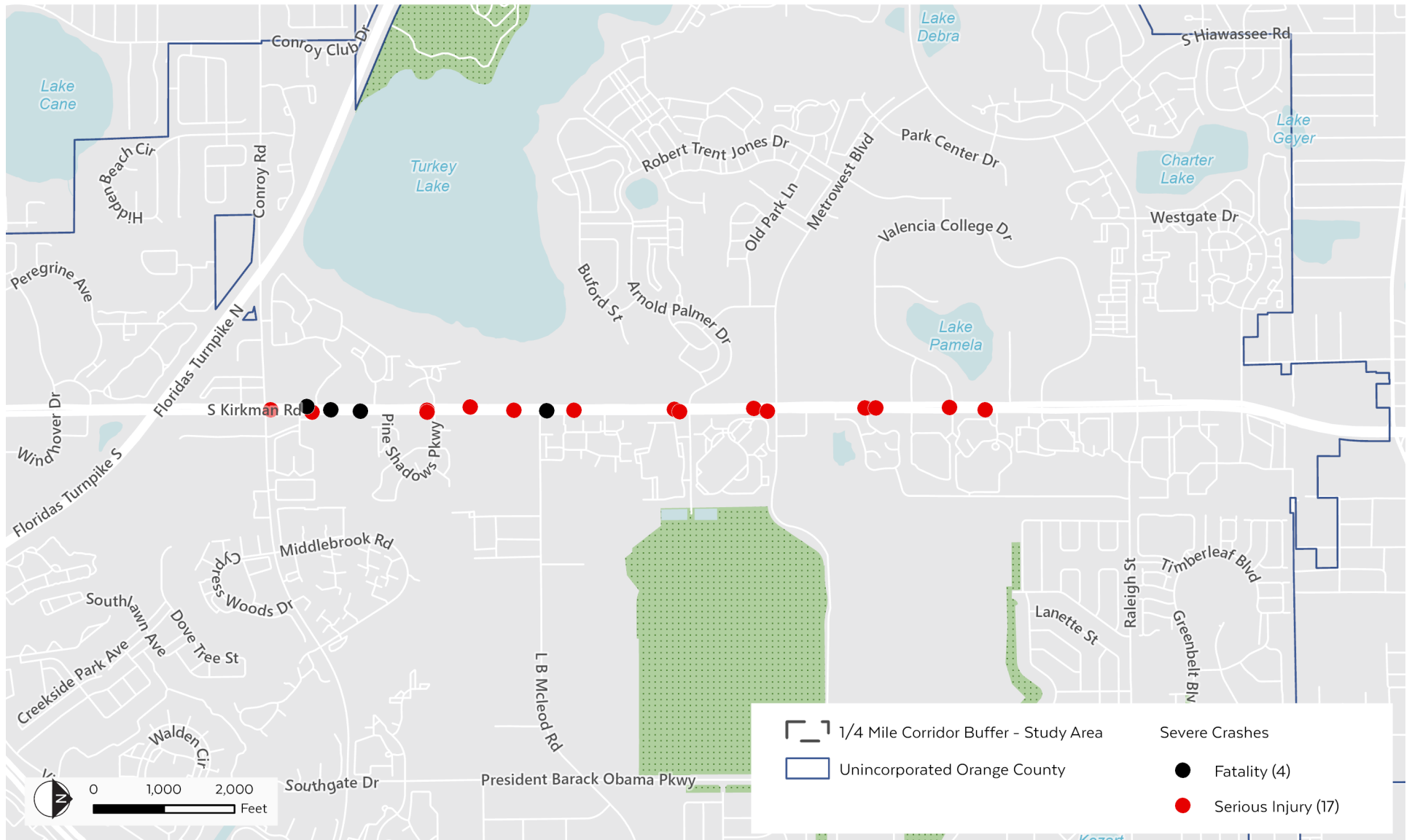
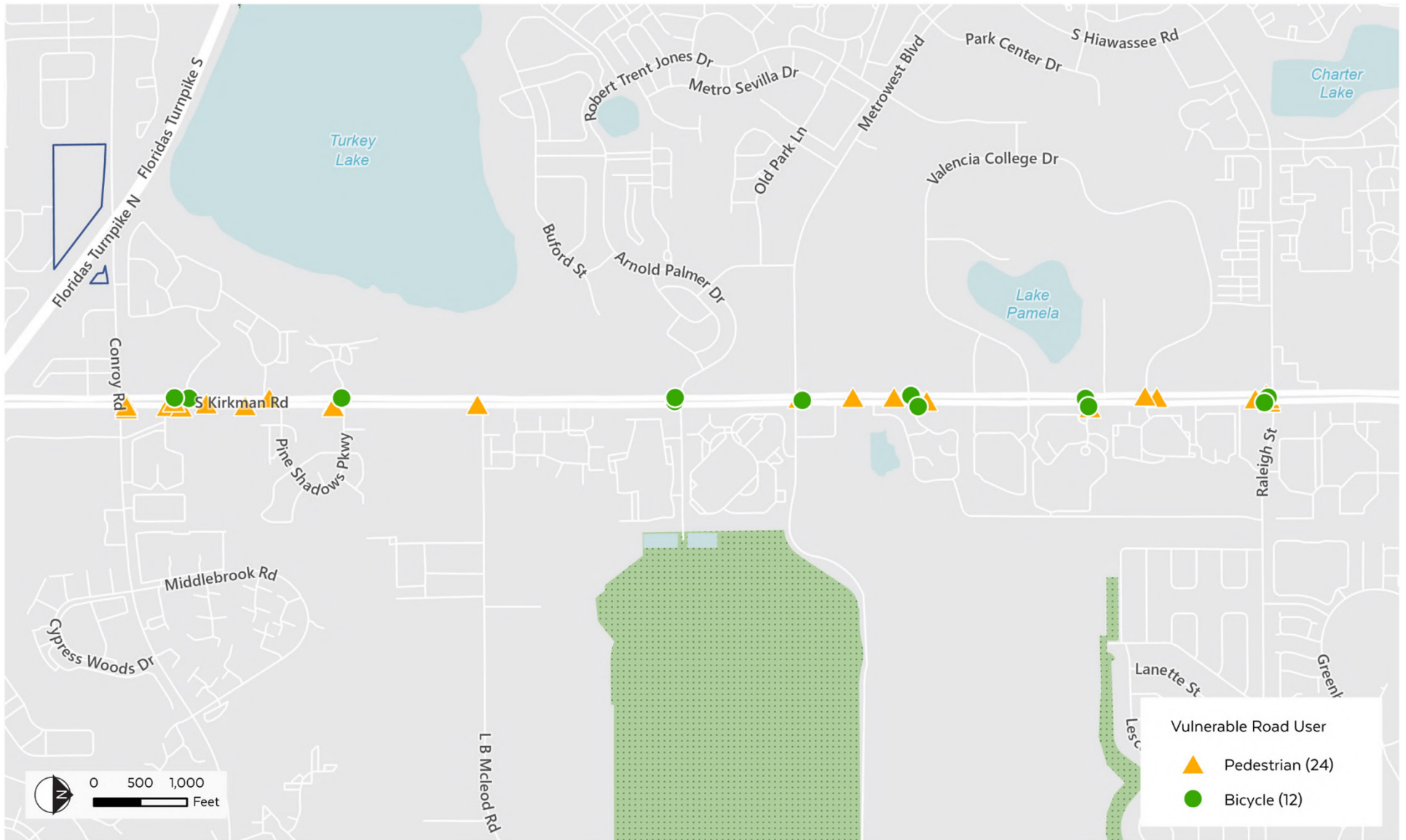


Figure 51: Kirkman Road Corridor – Vulnerable Road User Crashes Map



Kirkman Road: Preliminary Crash Trend Insights

The crash trends depicted in the preceding graphs, tables, and maps were analyzed to isolate the leading characteristics involved in overall crashes, incapacitating injury and fatal crashes, and vulnerable road user crashes. The most notable trends are summarized below:

- Overall crashes generally concentrated at signalized intersections
- Overall crashes generally peaked in the early afternoon from 2:00 p.m. to 4:00 p.m.
- While rear-end crashes were the most prevalent crash type, pedestrian crashes resulted in the highest proportion of incapacitating injury and fatal crashes
- Multiple high-severity non-motorist crashes occurred north of Conroy Road near the Kirkman Oaks Shopping Center
- There is a history of crashes involving midblock crossings near Pine Shadows Parkway between transit stops
- Crashes involving conflicts between turning vehicles and non-motorists in the crosswalks occurred at signalized locations with an emphasis at Raleigh Street
- Several crash report narratives specifically noted that involved parties were service-industry workers traveling as pedestrians, bicyclists, and transit riders
- Over 40% of non-motorist crashes resulted in a high-severity outcome (incapacitating injury or fatality)
- Severe crashes and pedestrian crashes were twice as likely to occur under dark conditions versus the overall crash frequency
 - 34% of overall crashes occurred at night
 - 62% of severe crashes occurred at night
 - 75% of pedestrian crashes occurred at night
 - 50% of bicycle crashes occurred at night

Table 10: Kirkman Road Corridor – Crash Trend Insights

Historic Crash Trend	Mitigation Strategy
High-severity non-motorist crashes north of Conroy Road and near Pine Shadows Parkway transit stops	Provide additional midblock crossing locations for pedestrians
Conflicts between turning vehicles and crosswalk users at signalized intersections	Provide physical or temporal separation between turning movements and pedestrian movements
	Provide enhanced notification to drivers to warn of pedestrian activity
High nighttime crash occurrence for severe crashes and non-motorist crashes	Evaluate existing lighting to ensure adequate horizontal illuminance on segments and horizontal plus vertical illuminance at intersections
Local workforce commuting via walking, biking, and transit involved in crashes	Evaluate system connectivity and missing infrastructure between attractors and generators
	Implement context-appropriate speed management strategies

CHAPTER 4 RECOMMENDATIONS

MetroWest

CITY OF
ORLANDO
WATER RECLAMATION

Background

The Orlando Connecting Residents on Safe Streets Project (“Project” or “CROSS”) aims to develop a comprehensive implementation plan for safety improvements across six Vision Zero corridors in the City of Orlando. Vision Zero is a global initiative embraced by cities committed to eliminating traffic-related deaths and serious injuries, with a focus on access and community engagement. In 2017, Mayor Buddy Dyer solidified Orlando’s commitment to Vision Zero by adopting the Vision Zero Action Plan through an official resolution.

The U.S. Department of Transportation awarded the City of Orlando a Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant to support the CROSS Project. This funding enables a detailed examination of six critical corridors within Orlando, using the city’s established methodology to identify context-specific countermeasures and capital improvements. These efforts are part of Orlando’s goal to eliminate all traffic-related deaths and serious injuries by 2040.

As part of this initiative, Kimley-Horn conducted a comprehensive analysis of six corridors and developed the Recommendations Interim Report in alignment with the prior outreach and evaluation contained in the:

- Public Engagement Plan
- Community Snapshot Interim Report
- Safety Analysis Interim Report

Individual Final Comprehensive Reports for each study corridor will be provided at the conclusion of this project.

Selection Criteria

The selection of corridors for the Project was guided by data-driven methodologies as a part of the City of Orlando’s Vision Zero Resolution, adopted in 2017, and Vision Zero Action Plan, published in 2021.

Key criteria for selecting the six Vision Zero corridors included

- **Crash Frequency and Severity:** Focusing on locations with significant safety concerns, particularly for vulnerable road users.
- **Equity Considerations:** Ensuring underserved communities and high-risk areas were prioritized for improvements.
- **Community Impact:** Targeting corridors with high pedestrian, cyclist, and transit activity to enhance safety outcomes.

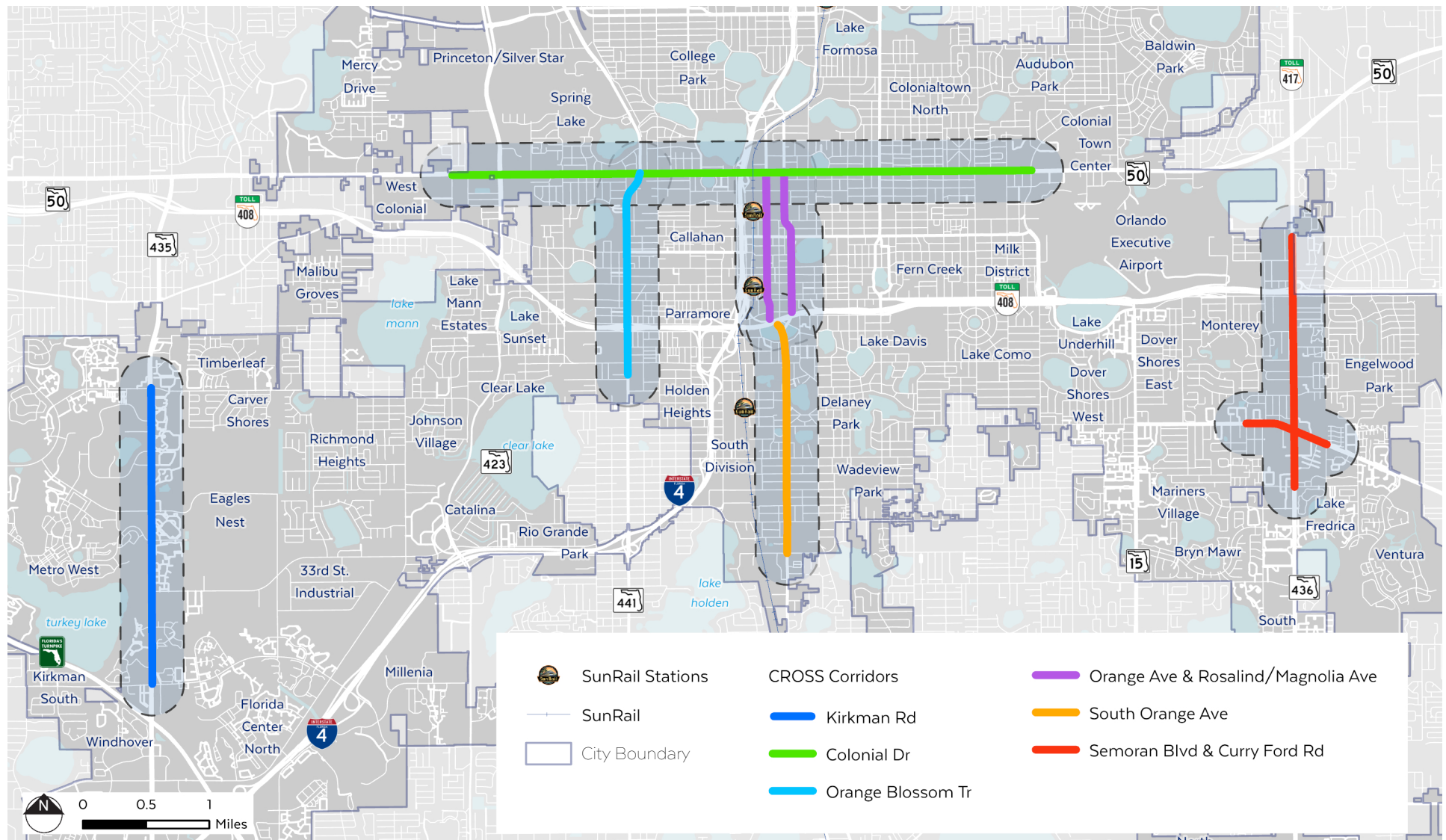
By applying these selection criteria, the Project ensures safety improvements are targeted at the most critical locations, advancing Orlando’s Vision Zero goal of eliminating traffic-related deaths and serious injuries by 2040.

The selected corridors include both on-system FDOT roads and locally managed streets, spanning critical segments within the City of Orlando. These corridors are shown on **Figure 52:**

1. **Kirkman Road:** From Conroy Road to Raleigh Street
2. **SR-50/Colonial Drive:** From Ferguson Drive to Maguire Boulevard
3. **Orange Blossom Trail:** From Winifred Street to SR-50
4. a. **Orange Avenue:** From SR-408 to SR-50
b. **Rosalind/Magnolia Avenue:** From SR-408 to SR-50
5. **Orange Avenue:** From Pineloch Avenue to SR-408
6. a. **Semoran Boulevard:** From Grant Street to Dahlia Drive
b. **Curry Ford Road:** From Larkin Avenue to Bowen Drive

Kirkman Road, Colonial Drive, Orange Blossom Trail, South Orange Avenue, Semoran Boulevard, and Curry Ford Road are FDOT-maintained roadways. Orange Avenue and Rosalind/Magnolia Avenue are city-maintained roadways.

Figure 52: Overview Map of Study Corridors



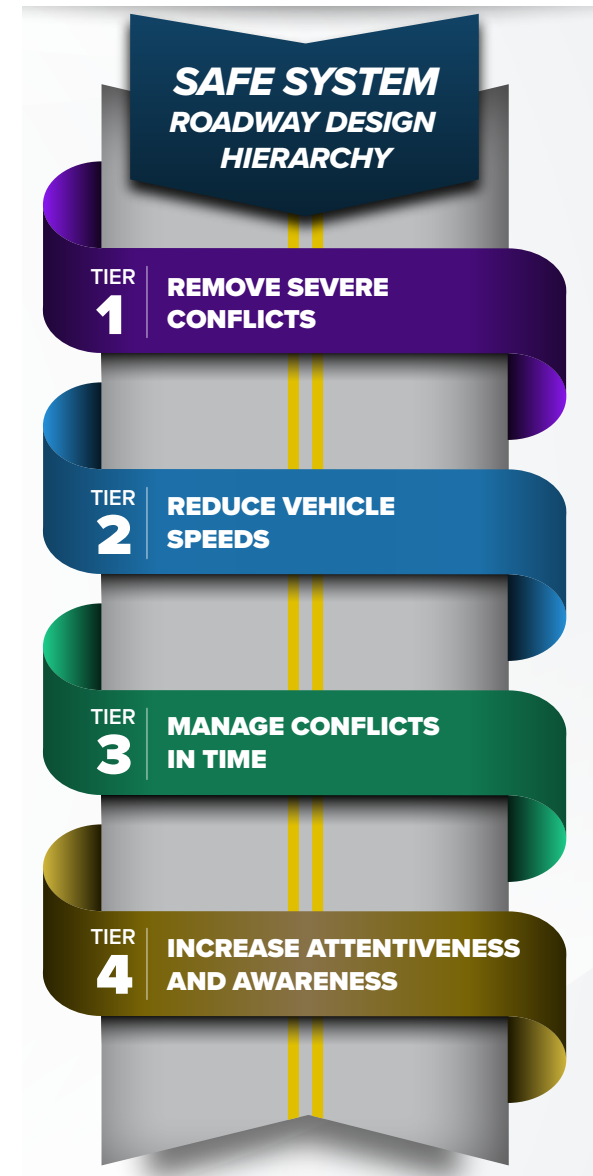
Development of Recommended Improvements

The decision-making process in the development of proposed roadway safety countermeasures began with a thorough assessment of existing conditions along each corridor. This involved analyzing crash data, traffic volumes, and roadway characteristics to identify critical safety concerns and prioritize areas for intervention. Stakeholder input, including feedback from local stakeholders and community members, was also incorporated to ensure that proposed solutions address both technical and community needs. Recommendations were developed for each corridor with the goals of:

1. Mitigating high-severity crash trends,
2. Optimizing pedestrian and bicyclist infrastructure within context-based design, and
3. Providing clear communication to all road users at signalized intersections and conflict points to encourage safe, desired behaviors.

After identifying key issues, potential countermeasures were developed based on their effectiveness, feasibility, cost, and implementation timeline. Recommendations are developed with clear goals such as improving safety, enhancing mobility, supporting long-term corridor planning, and implementing best practice of the Safe System Hierarchy. As shown in **Figure 53**, the Safe System Hierarchy focuses on four tiers in subsequent order to address the most severe conflicts first, then reduce vehicle speeds, manage conflicts in time, and finally increase awareness for road users.

Figure 53: FHWA Safe System Roadway Design Hierarchy¹



¹ FHWA, 2024. Safe System Roadway Design Hierarchy. Accessed on Dec. 19, 2025 at https://highways.dot.gov/sites/fhwa.dot.gov/files/2024-01/Safe_System_Roadway_Design_Hierarchy.pdf

Each improvement is classified according to its expected timeframe and resource requirements, allowing for a strategic rollout of short-term, mid-term, and long-term projects that deliver measurable safety benefits (**Figure 54**).

Classification of Short-Term Improvements

Short-term projects are initiatives that can be implemented quickly, often within a few months up to one year. These projects usually address immediate safety concerns and require minimal design, engineering, or construction efforts. They are often used as interim solutions while more comprehensive projects are planned.

Examples of short-term improvements include:

- Performing off-cycle maintenance
- Adjusting traffic signal timing
- Installing new signage or pavement markings
- Temporary quick-build infrastructure

Classification of Mid-Term Improvements

Mid-term projects generally require a more substantial commitment of time and resources, often taking one to three years to complete. These projects address systemic safety issues and focus on areas with a documented history of crashes or expressed concern. They provide more permanent solutions compared to short-term efforts and may involve moderate design and construction work, but do not require the extensive planning of long-term projects.

Examples of mid-term improvements include:

- Reconfiguring intersections (e.g., adding turn lanes, updating crosswalks, changing radius returns)
- Upgrading traffic control devices (e.g., new traffic signals, pedestrian hybrid beacons)
- Implementing speed management (e.g. narrowing lanes, constructing raised medians)

Classification of Long-Term Improvements

Long-term projects are large-scale initiatives that require significant planning, funding, and construction, typically taking more than three years to complete. These projects often involve major infrastructure changes and are intended to provide lasting safety and operational improvements. They require in-depth environmental reviews, public engagement, and high levels of investment. Their impacts are transformative and enduring.

Examples of long-term improvements include:

- Constructing new roadways, bridges, or interchanges
- Completely reconstructing existing corridors or moving curblines
- Developing comprehensive multimodal transportation networks
- Implementing advanced traffic management systems (e.g. interconnection, motorist notification systems)

Figure 54: Depiction of Recommendation Terms



Applicable References

Throughout the discussion of recommended improvements, references are made to the following guiding criteria and industry-accepted best practices for design elements.

Design Guidelines

FDOT Traffic Engineering Manual (TEM)

<https://www.fdot.gov/traffic/trafficservices/trafficstudies.shtm/traffic-engineering-manual>

FDOT Design Manual (FDM)

<https://www.fdot.gov/roadway/fdm/default.shtm>

FDOT Standard Plans (SPI)

<https://www.fdot.gov/design/standardplans/current>

FDOT Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Florida Greenbook)

<https://www.fdot.gov/roadway/floridagreenbook/fgb.shtm>

FHWA Manual on Uniform Traffic Control Devices (MUTCD)

https://mutcd.fhwa.dot.gov/kno_11th_Edition.htm

NACTO Urban Street Design Guide (USDG)

<https://nacto.org/publication/urban-street-design-guide/>

NACTO Urban Bikeway Design Guide (UBDG)

<https://nacto.org/publication/urban-street-design-guide/>

City of Orlando Engineering Standards Manual (ESM)

<https://www.orlando.gov/files/sharedassets/public/v/2/documents/engineering/platting/engineeringstandardsmanual.pdf>

References are also provided for the anticipated safety benefits of the countermeasures using national resources with aggregated before-and-after data to estimate crash reductions.

Safety Benefits

FHWA Proven Safety Countermeasures

<https://highways.dot.gov/safety/proven-safety-countermeasures>

FHWA Crash Modification Factors Clearinghouse

<https://cmfclearinghouse.fhwa.dot.gov/>

Policy Recommendations

Street Setback Zones

Due to the concentration of commercial, transit, micromobility (e.g. bikes, e-bikes, e-scooters, shared devices), and pedestrian activity along these major corridors, we recommend implementing additional requirements in the land development code to require wider streetscape zones encompassing wider sidewalks and a landscape/furniture zone buffer. Such a requirement is already in place for the SODO Special Plan (Sec. 62.499) and has been effective at improving the walkability and aesthetics of South Orange Avenue (**Figure 55**). Similar improvements on the other corridors have been incorporated through development reviews (**Figure 56**).

Figure 55: Example of Wider Sidewalk on South Orange Avenue



Figure 56: Example of Wider Sidewalk on Orange Blossom Trail



To ensure consistent implementation, the following guidelines are recommended to be adapted and incorporated into the proposed special plans for the corridors:

Street Setback Zone adjacent to [Insert Name] Street.

15-foot Streetscape. From back of curb, 5 feet shall be utilized for a park strip or tree well area in C5/C6 context classifications and 7 feet in C4 context classifications. A 10-foot sidewalk shall be installed adjacent to the park strip or tree well area in C5/C6, or an 8-foot sidewalk in C4. Where the existing right-of-way is less than 15 feet, the owner shall dedicate additional easements to provide a total of 15 feet for city services and sidewalk from the back-of-curb. Modifications to the placement of the sidewalk and park strip may be required by FDOT and/or the City Engineer; however, in no case shall less than 15 feet from travel lanes be provided.

Sidewalk Ramp Widths

Sidewalk ramps are also a potential pinch point for accessibility and micromobility devices. Although [Florida Greenbook Section 8.G.2](#) encourages “curb ramp widths equal to crosswalk widths” and [FDM Section 222.2.2](#) indicates “curb ramp widths to be the same as sidewalk widths where practicable,” the 4-foot minimum curb ramp width is often implemented regardless of the sidewalk width. **The recommended minimum is a 6-foot wide ramp wherever sidewalks are wider than 6 feet, to allow for two-way use of the ramp by micromobility devices or wheelchairs.** Some recommended language for future city standards is in **Table 11**. Shared-use path ramps are required to match the shared-use path width by Florida Greenbook, FDM, and PROWAG.

Table 11: Curb Ramp Widths

Facility	Width	Curb Ramp Width
Sidewalk	5'	5' desirable, 4' minimum
Sidewalk	6'	6' desirable, 4' minimum
Sidewalk	8'	8' desirable, 6' minimum
Sidewalk	10'	10' desirable, 6' minimum
Sidewalk	12'	12' desirable, 6' minimum
Shared-Use Path	8'-12'	Match path width

Figure 57 shows an example of curb ramps that have been constructed along sections of widened sidewalk. The top photo shows an undesirable 4-foot wide sidewalk ramp which is obstructed by a concrete pole. The bottom photo shows a wider ramp that encompasses the width of the crosswalk. Although separate curb ramps are best practice, designers should consider blended transitions in severely constrained areas.

Figure 57: Obstructed and Unobstructed Curb Ramps on Orange Blossom Trail

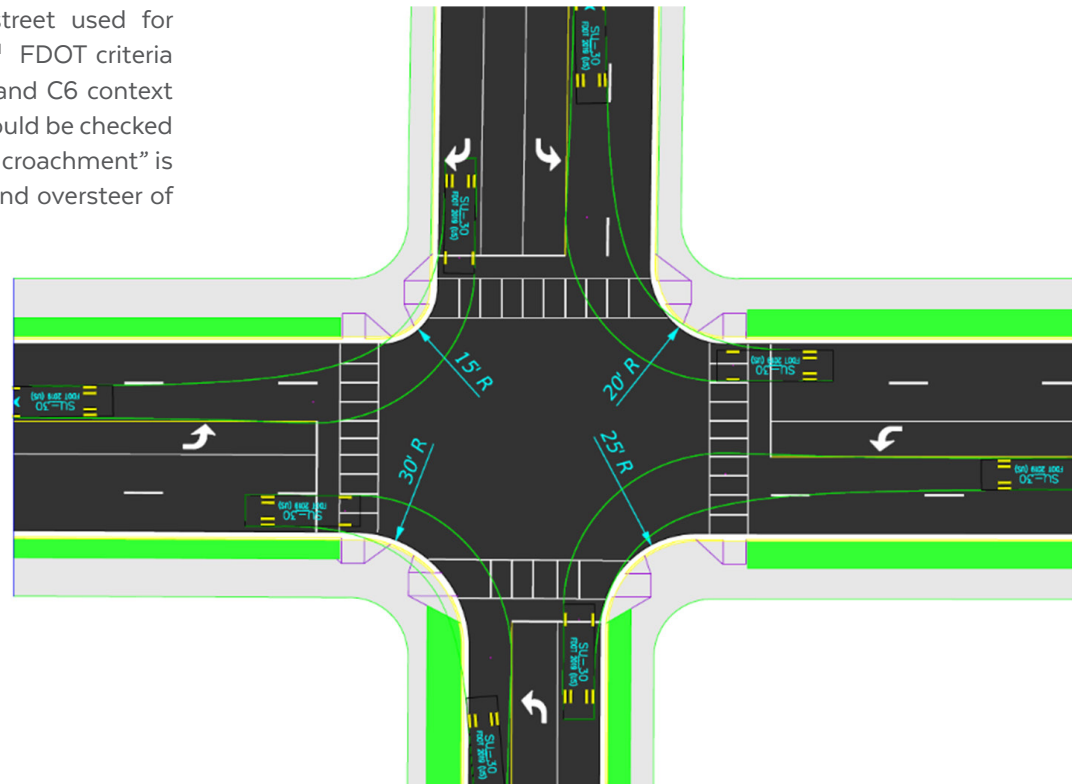


Control Vehicles

NACTO defines a Design Vehicle as a frequent user of the street used for designing turns while a Control Vehicle is an infrequent large user.¹ FDOT criteria in [FDM Chapter 201](#) allows the use of Control Vehicles in C4, C5, and C6 context classifications. The [FDM Table 212.12.3](#) allowable curb return radii should be checked versus the identified Control Vehicle to ensure that only “minimal encroachment” is achieved in the design. **Figure 58** shows how the effective radius and oversteer of the control vehicle can allow for smaller actual radii.

Truck Aprons are another tool to accommodate the Control Vehicle without encouraging faster speeds of a turning Design Vehicle. [FDM Section 212.12.3](#) allows the use of truck aprons with Type RA curb. Buses should be able to navigate intersections without overtopping curbs or truck aprons.

Figure 58: Example Curb Radii with Control Vehicle Swept Paths



1 NACTO, 2025. Urban Street Design Guide. Accessed on Dec. 22, 2025 at <https://nacto.org/publication/urban-street-design-guide/design-controls/design-vehicle/>

Enhanced Pavement Markings

[FDM Table 210.3.1](#) shows black contrast pavement markings as Preferred on concrete pavement and bridge decks. **It is recommended that the City's design standards make high contrast black outline pavement markings compulsory on concrete roadways and intersections when on the high-injury network.** High-contrast black outline pavement markings on concrete significantly improve the visibility of white lane boundaries, crosswalks, and stop bars, especially in low-light or adverse weather conditions. By providing a stark color difference against the typically light-colored concrete, these enhanced markings help guide both drivers and bicyclists more clearly through intersections and crossings. This increased visibility not only reduces the likelihood of missed or ignored traffic controls but also enhances overall safety for all road users by minimizing confusion and promoting compliance.

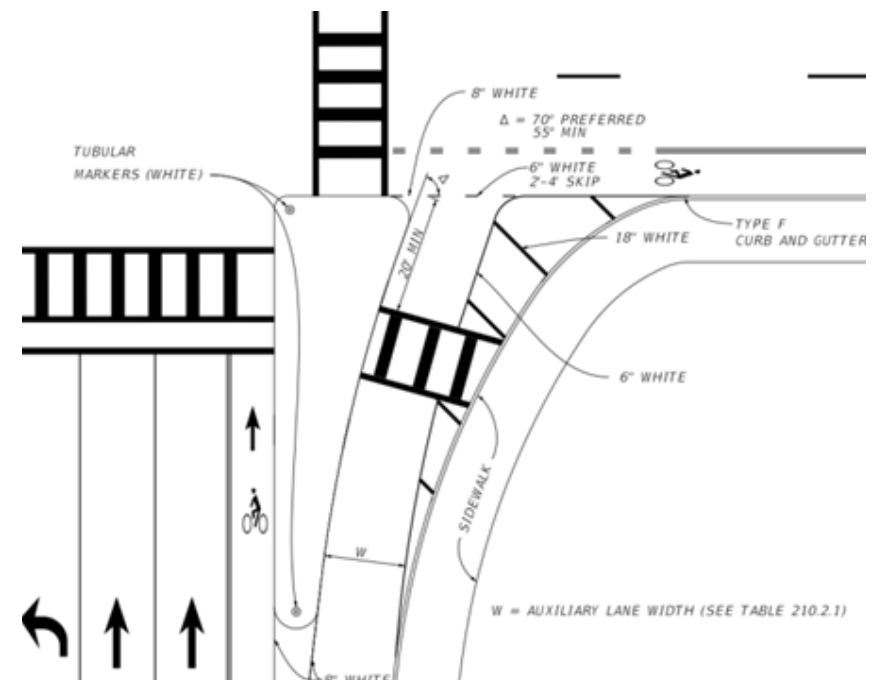
[MUTCD Section 3H.06](#) allows the use of green colored pavement for bicycle facilities. [FDM Section 223.2.1.4](#) requires District Design Engineer approval for the use of green-colored pavement on the state highway system. **It is recommended that the City's design standards make green colored pavement compulsory for bike facilities on the high-injury network.** Green-colored pavement is used to enhance the conspicuity of areas where bicycle paths cross or merge with vehicle lanes, particularly at points of potential conflict. The vivid green color draws the attention of both drivers and bicyclists, signaling to motorists that they should expect bicycle traffic and take extra caution. This treatment improves the visibility of bicycle routes, enhances rider safety, and promotes greater awareness among all road users. The most common locations warranting green-colored pavement is where a bicycle lane crosses a vehicular right-turn lane, a dedicated bus bay, or an intersecting street.

Channelized Right Turn Control

Free-flow right turn lanes are contrary to the speed reduction and pedestrian safety goals of vision zero. New guidance in FDM Section 212.12.2 says that channelized right-turn lanes with a near perpendicular angle of entry are preferred where pedestrian facilities are provided (**Figure 59**). Channelized right-turn lanes with near-perpendicular entry should be compared to a design without a channelizing island to ensure the following objectives:

- Slow turning speed
- Reduce crosswalk length
- Improve pedestrian visibility
- Improve sight distance

Figure 59: Near Perpendicular Right-Turn Lane Schematic (Source: FDOT)



Short-Term Recommendations

Enhanced Maintenance

Regular maintenance of traffic and roadway infrastructure is essential to ensure the safety and efficiency of all road users. By addressing issues such as sidewalk cracks, faded sign panels, debris, and malfunctioning pedestrian buttons, communities can reduce the risk of crashes, enhance visibility, and maintain smooth traffic flow. Well-maintained infrastructure also helps extend the lifespan of assets, minimizes costly repairs, and supports the overall quality of life for residents and visitors. **Figure 60** shows an example of when pedestrian and bicycle facilities are not adequately maintained or enforced for intrusions.

Maintenance on FDOT roads within city limits is typically performed by FDOT maintenance crews or contractors under FDOT supervision. In some cases, cities may have agreements with FDOT to perform certain maintenance activities on state roads within their jurisdiction, but overall responsibility remains with FDOT to ensure that state roads are properly maintained and safe for all users. **It is recommended that the City establish a recurring inventory cycle for city staff to inspect and report maintenance needs to FDOT, with a specific focus on the High Injury Network facilities.** The average service life for signing and pavement markings is 5-7 years versus a resurfacing cycle of 20-25 years. High traffic may further reduce service life.



Critical maintenance items that impact the safety of pedestrians, bicyclists, and drivers should include:

- Repair sidewalk cracks
- Trim landscaping from sidewalks
- Clean gutters and shoulders (routinely and after adverse weather events)
- Replace faded sign panels
- Replace malfunctioning pedestrian buttons
- Restripe thermoplastic crosswalks and stop bars on more frequent intervals than resurfacing projects (average service life is 5 years)
- Replace Raised Pavement Markers (RPMs) on more frequent intervals than resurfacing projects (average service life is 2 years)

Figure 60: Debris and Sediment on Sidewalk; Garbage Receptacle in Bike Lane



Traffic Signal Retrofits

High-Visibility with Flexible Retroreflective Backplates (FRB)

Backplates on traffic signal heads are panels installed behind or around the signal lenses to provide a contrasting background, thereby improving the visibility of the signals to approaching drivers. Traditional backplates help to block bright sunlight conditions that may make it difficult for drivers to look directly at the signal head. The current use of high-visibility backplates with retroreflective borders further enhances this effect, especially under low-visibility or adverse weather conditions, by making signal indications stand out further against cluttered environments or surrounding darkness, as shown on **Figure 61**. This safety measure helps reduce the risk of red-light running and supports the overall effectiveness of intersection control, with an expected **15% reduction in total crashes**. Backplates are now available in flexible materials (Flexible Retroreflective Backplates, or FRBs) that allow for retrofit installation on existing signal heads without requiring structural evaluation. Per [FDM Section 232.1.5](#), retroreflective backplates shall be installed on traffic signals for all approaches.

Supplemental One-Section Red Signals

The minimum requirement for signal indications based on MUTCD Part 4 criteria is two primary signal faces for each approach; however, MUTCD Section 4D.05 states that one signal face per through lane has been shown to provide safer operation and [FDM Section 232.1.6](#) prescribes one signal head per approach lane. This is particularly important in complex intersections or areas with high pedestrian activity where additional emphasis is needed, ensuring that the stop requirement is clear and unmistakable. Many older signals on six-lane roadways have not yet been updated to meet the current standard, and provide fewer than one signal head per lane, with shared signal heads placed in between lanes on lane lines. As a short-term retrofit, the use of a supplemental single-section red rather than a complete three-section red/yellow/green assembly will allow for additional reinforcement of the critical red indication while minimizing overall impact to wind loading and structural capacity. An abbreviated structural evaluation can be performed to ensure that the proposed load increase is less than 10% of the existing load per [FDM Section 261.8](#). The addition of a primary signal head has an expected **17% reduction in total crashes**. A supplemental one-section red signal is shown on **Figure 62**.

Figure 61: Example of High Visibility Backplates with Retroreflective Borders (Source: Grey Means Go)

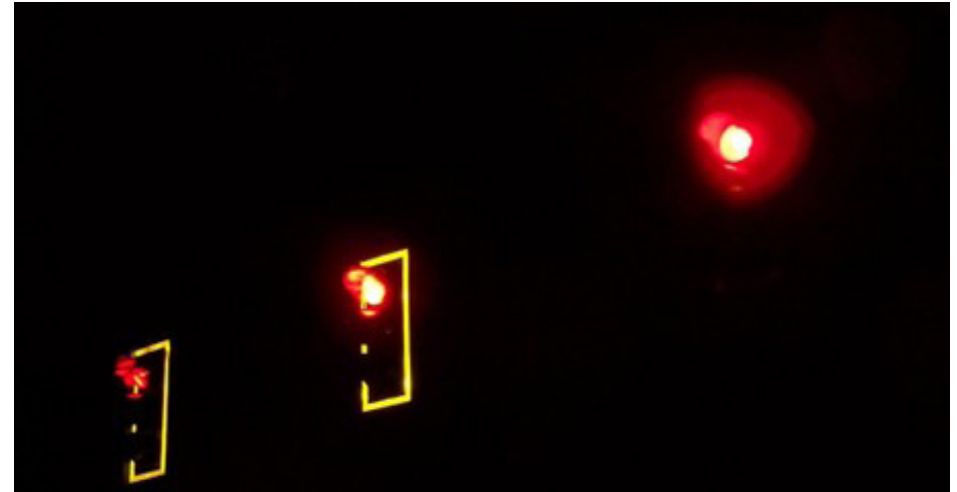


Figure 62: Example of Supplemental One-Section Red Signal (Source: Twin Green Traffic Signals)



Traffic Signal Timing Adjustments

Modifying signal timing is an effective strategy for making impactful safety improvements at signalized intersections without requiring new infrastructure (**Figure 63** and **Figure 64**). Signal timing can be used to separate modes, provide buffers, and assign priority to certain user groups depending on current demands each cycle. Signal timings may also vary throughout the day, with different intersection needs from peak hours to off-peak hours or weekends. Accurate detection equipment for vehicles and pedestrians or bicyclists is key to allowing the traffic controller logic to effectively receive and respond to the presence of various modes. Recommended timing adjustments in this study primarily relate to controlling vehicular turning movements and protecting / prioritizing pedestrian movements. Per TEM Section 3.12, urban corridor signal retiming should take place every 3 years. These retiming projects are an ideal time to assess more complicated safety-based signal timing strategies for compatibility with operational goals.

Figure 63: Observation and Field Adjustment of New Signal Timing Operations



Figure 64: Signal Timing Modifications inside Controller Cabinet



Flashing Yellow Arrow Left Turn by Time of Day

The Flashing Yellow Arrow (FYA) left-turn phase is a traffic signal indication that allows drivers to make a left turn permissively when it is safe to do so, but they must yield to oncoming traffic and pedestrians. During the FYA phase, the signal displays a flashing yellow arrow, clearly communicating to drivers that left turns are permitted with caution, but not protected from opposing traffic. This approach enhances intersection flexibility by providing protected left-turn phases when needed (solid green arrow) and permissive phases (flashing yellow arrow) during other times, which can improve traffic flow efficiency and reduce unnecessary delays. The FYA system has been shown to reduce driver confusion and improve safety by using a consistent and intuitive signal display for left-turn movements. An example of a signal head configuration for the FYA left-turn phase is shown in **Figure 65**.

[TEM Section 3.10.4](#) discusses Flashing Yellow Arrow operations in detail. FYA installation is recommended when:

- There is a single left-turn lane and one or two opposing through lanes
- Sight distance and left-turn lane offset provide adequate visibility
- Fewer than 240 vehicles turn left per hour
- The cross product of left-turning and opposing through volumes is less than 50,000 for one opposing lane, or less than 100,000 for two to three opposing lanes
- Fewer than three left-turn crashes per year have occurred over a three-year period
- *Engineering judgment should be used when considering FYA at intersections with three opposing through lanes and/or opposing traffic with a posted speed limit (or documented 85th percentile speed) of 45 MPH or greater based on [TEM Section 3.2](#) criteria for protected-only left-turn phasing*

One of the benefits of the four-section signal head used with FYA is the ability to run variable mode operation – the programming of different left-turn modes throughout the day in response to varying traffic conditions: permissive-only,

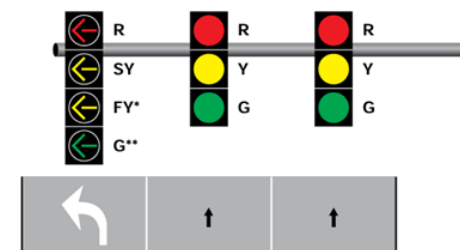
protected/permissive, or protected-only. Per TEM Section 3.10.3, the FYA variable mode may be run if:

- The calculated critical gap is at least 7 seconds during non-peak hours
- There are no fatalities and no more than two left-turn crashes per year

If the traffic volumes or crash history exceed the allowable thresholds for FYA, the left-turning movement can be run in protected-only mode, either during certain hours of the day or 24/7, utilizing the same four-section head with no infrastructure changes. In order to implement FYA protected-only by time of day, hourly volumes are needed. Conversely, the intersection detection system can be programmed to switch to protected-only mode based on real-time detected volume thresholds. If any of the following conditions occur, a review of the FYA protected/permissive operation is warranted:

- If left-turn volumes exceed 240 vehicles per hour or the cross product exceeds 50,000 for one lane or 100,000 for two to three lanes, program protected-only phasing during the hours the volumes exceed the threshold
- If left-turn crashes equal three or more per year or a fatality occurs, eliminate variable mode and provide a consistent protected/permissive phase 24/7
- If left-turn crashes equal four or more per year over a three-year period, evaluate intersection operations and site characteristics to consider exclusive protected-only phasing with no permissive phase
- If left-turn crashes equal six or more over a 12-month period and the crashes can be attributed to the permissive phase, convert to exclusive protected-only phasing

Figure 65: Flashing Yellow Arrow (FYA) Left-Turn Phasing Signal Head Configuration
(Source: MUTCD)



Traffic Signal Timing Adjustments

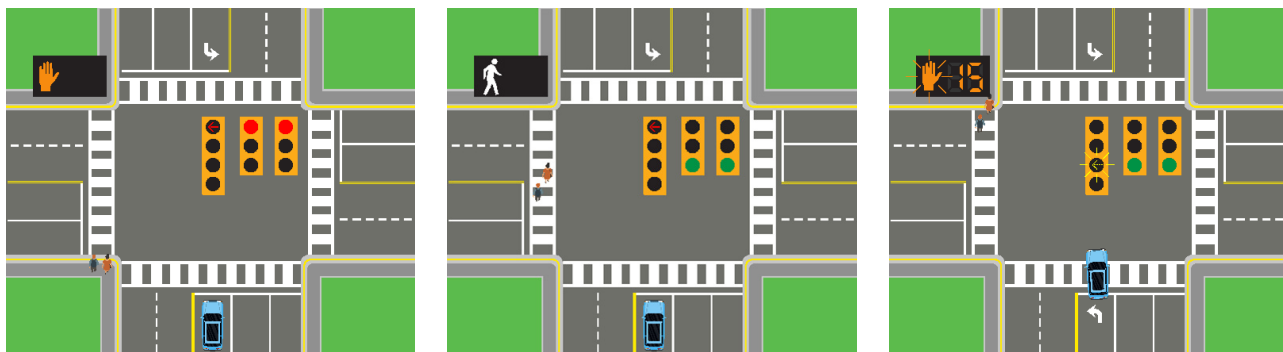
Flashing Yellow Arrow Left Turn with Delayed Turn

Delayed Turn is a signal controller option that holds turning movements with a red indication while releasing concurrent through vehicles and pedestrians. The delay is longer than the standard 2-second start-up prescribed by [TEM Section 3.10.3](#) for all FYAs. This treatment requires exclusive turn lanes, signal heads, and No Turn on Red signage and is beneficial in two situations:

1. To restrict permissive left turns during pedestrian crossings, either for a short duration to give pedestrians a “head start” or through the entire pedestrian phase
2. To mitigate for permissive left-turning movements with constrained geometry and poor sight distance for opposing left-turn lanes

The first application reduces conflicts between vehicles and pedestrians. Left-turn movements are held until after the start of the conflicting pedestrian phase, meaning turning vehicles must wait for pedestrians before receiving a permissive FYA. This delay minimizes the risk of collisions and enhances safety for those walking or biking across intersections. Delayed Turn can be held for a few seconds up to the entirety of the WALK and Flashing DON'T WALK intervals. The calculated duration uses the same [TEM Formula 3.11.5.2-1](#) that the Leading Pedestrian Interval uses. Where LPIs are used for delaying right-turning movements for pedestrian protection, Delayed Turn is a very similar treatment for left turns.

Figure 66: Typical Delayed Turn Operational Sequence



#1: All vehicles and pedestrians on the approach see **RED**.

#2: Through vehicles receive **GREEN** and pedestrians receive WALK; left-turning vehicles continue to see **RED**.

#3: Left-turning vehicles receive permissive **FYA** after pedestrians have initiated crossing.

The flexibility of Delayed Turn allows programming to be tailored to the specific needs and safety concerns of various intersections, especially those with significant pedestrian activity. The typical operational sequence is depicted in **Figure 66**.

Delayed Turn is recommended when:

- A flashing yellow arrow signal head and exclusive left-turn lane are present
- The left-turn movement in question crosses a pedestrian crosswalk
- Crashes have been observed between permissive left-turning vehicles and pedestrians or bicyclists in the crosswalk
- Delayed Turn may be preferable to Omit by Ped where traffic operations are a concern, since it restricts the left turns for a shorter time instead of completely omitting the movement

The second application reduces conflicts between left-turning vehicles and opposing through traffic. Where permissive left turns are allowed with FYA but the sight distance from the left-turn lane is compromised, Delayed Turn can be used to hold the movement during blockages. The most common situation is where opposing left-turn lanes have a negative offset, and the left-turning drivers cannot sufficiently see oncoming through vehicles when there is a left-turning vehicle in the opposing direction. The vehicle detection system can be used to sense the presence of opposing left-turn vehicles at the stop bar and trigger the traffic controller logic to delay or omit the permissive phase.

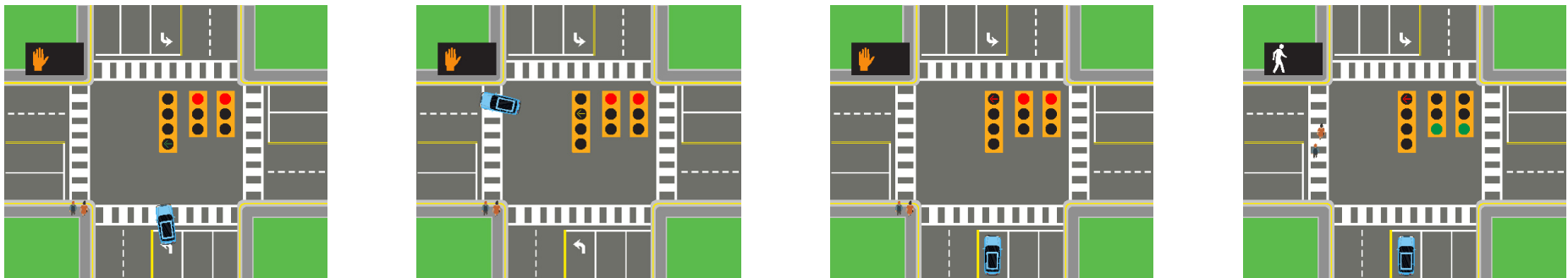
Traffic Signal Timing Adjustments

Flashing Yellow Arrow Left Turn with “Omit by Ped”

Omit by Ped is a signal controller option that excludes the permissive left-turn movement during the conflicting WALK and Flashing DON'T WALK intervals when a pedestrian is detected. If a four-section FYA is present, the left-turning driver would receive a protected-only phase then see a red arrow indication while the adjacent through movement proceeds. The permissive FYA phase is omitted completely, which prevents left-turning vehicles from proceeding while pedestrians are crossing, reducing potential conflicts and enhancing pedestrian safety. Drivers making permissive left turns often focus heavily on looking for a suitable gap in oncoming vehicular traffic and fail to assess conflicting pedestrian movements. By aligning vehicle and pedestrian phases and giving clear indication to both turning vehicles and pedestrians, this method helps ensure that turning drivers do not face ambiguous situations and can more successfully yield the right-of-way to those on foot or bicycle.

If there is time left in the split for the adjacent through movement after the pedestrian WALK and Flashing DON'T WALK intervals are served, the permissive left-turn phase may be served. If there is no time left in the split, the left-turn movement would not be served again until the next cycle, and would return to protected/permissive phasing if no pedestrians are present. The omission may also take place mid-split if a pedestrian call is placed during an active FYA, where the left-turn phase would then revert to a steady red to allow the pedestrian crossing.

Figure 67: Typical Omit by Ped Operational Sequence



Omit by Ped is recommended when:

- A flashing yellow arrow signal head and exclusive left-turn lane are present
- The left-turn movement in question crosses a pedestrian crosswalk
- Crashes have been observed between permissive left-turning vehicles and pedestrians or bicyclists in the crosswalk
- Omit by Ped can be programmed by time of day if there are higher pedestrian volumes, such as school or event venue arrival and dismissal periods
- Given the higher operational impacts of omitting the permissive phase, Omit by Ped is recommended as a second-stage strategy after Delayed Turn has been implemented if crash history or user feedback indicates conflicts continue to exist.
- This strategy should not be used in combination with Rest in Walk or Pedestrian Recall or the result is a protected-only turning movement every cycle. Use Delayed Turn with these features for a less-restrictive alternative.

Figure 67 illustrates the typical operational sequence of Omit by Ped.

#1 through #3: The protected left-turning phase proceeds through normal GREEN, steady YELLOW, and steady RED operation. Adjacent through vehicles and pedestrians are stopped.

#4: Through vehicles receive GREEN and pedestrians receive WALK while left-turning vehicles continue to see RED. No permissive FYA is provided during this cycle.

Traffic Signal Timing Adjustments

Pedestrian Recall

Pedestrian recall signal timing is a strategy in which the pedestrian phase is automatically included in every signal cycle, regardless of whether the push-button is activated. This means the WALK indication appears at regular intervals, ensuring pedestrians always have an opportunity to cross without needing to request it. By consistently providing a crossing phase, pedestrian recall improves accessibility and convenience, especially in areas with high pedestrian volumes or where push-button compliance may be low. This approach not only reduces wait times for those on foot but also increases overall safety and encourages walking by making crossings more predictable and reliable. In highly urban locations in a coordinated grid network, such as along Orange Avenue and Magnolia/Rosalind Avenue, pedestrian pushbuttons are absent and Pedestrian Recall is used on all crosswalk legs.

Pedestrian Recall is recommended when:

- The adjacent vehicular movement green time exceeds the combined duration of the pedestrian WALK and Flashing DON'T WALK indications (typically this would only be feasible for the mainline movements)
- Locations where pedestrian activity is frequent and consistent, such as near schools, transit stops, shopping areas, or downtown corridors
- Areas where push-button compliance may be low, or where accessibility for people with disabilities is a priority, helping to make crossings more predictable, convenient, and accessible for all users

Pedestrian Recall is NOT recommended when:

- The adjacent vehicular movement is insufficient to cover the required pedestrian WALK and Flashing DON'T WALK intervals
- There are low, unpredictable pedestrian volumes
- Signal timing strategies are in use that depend on pedestrian actuation and detection to trigger a specific response:
 - Delayed Turn, Omit by Ped, Leading Pedestrian Intervals, Blank-Out signs

Rest in Walk

Rest in Walk is a signal timing strategy where the pedestrian signal remains in the WALK phase during periods when there is no conflicting vehicle movement, rather than immediately switching to Flashing DON'T WALK. This applies whether the WALK signal is initially activated by the pedestrian pushbutton, passive pedestrian detection, or is set to pedestrian recall. This approach maximizes the WALK display (**Figure 68**) and increases the likelihood that pedestrians arriving at the intersection will encounter a WALK indication, reducing wait times and encouraging compliance with the signal. By maximizing the walk interval during gaps in vehicle traffic, Rest in Walk enhances pedestrian visibility and prioritizes pedestrian movement.

Rest in Walk is recommended when:

- When there are periods without conflicting vehicle movements, allowing the pedestrian signal to remain in the WALK phase longer rather than switching immediately to Flashing DON'T WALK
- Intersections or corridors with high pedestrian activity, where maximizing pedestrian visibility and minimizing wait times are important, especially where pedestrian arrivals are frequent but vehicle movements are intermittent

Figure 68: Photo Example of Walk Signal



Traffic Signal Timing Adjustments

Paced Progression

In paced progression, closely-spaced intersections along a corridor run in a pre-timed operation and phase splits are designed so that vehicles at the leading edge of the progression band are progressed through the system at a specific target speed while vehicles at the trailing end of the progression band are cleared through the system at the same target speed. This accomplishes the following:

- Reduces the desire for speeding at the beginning of the main street greens since all downstream signals will still be displaying a red indication.
- Temporally consolidates mainline vehicular platoons, allowing more efficient use of time for side street vehicular and pedestrian movements and discouraging non-compliant crossings
- Segments between the beginning and end intersections are clear of mainline queued vehicles, simplifying conflicts between side street turning vehicles and main street parking movements

By better utilizing the time available for side street pedestrian and vehicular movements, there is greater ability to temporally separate those movements through leading pedestrian intervals. This strategy is more effective on one-way operations, but can also be applied on two-way operations. An example of paced progression signage is shown in **Figure 69**.

Figure 69: Paced Progression Signage (Source: NACTO)



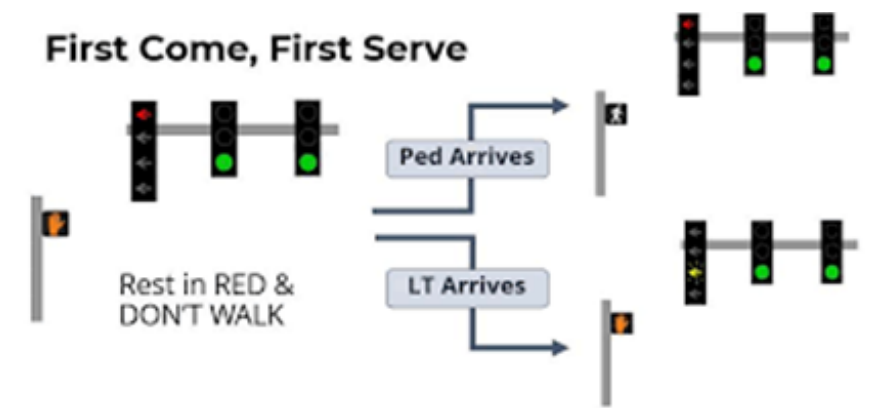
Rest in Red

Rest in Red is a signal timing strategy where the traffic signal defaults to a red indication for vehicles when there is no demand detected, such as during periods of low vehicular activity or overnight. This approach keeps the pedestrian signal in the DON'T WALK phase until a vehicle or pedestrian is detected, at which point the signal changes to accommodate the request. By holding the red indication for vehicles, Rest in Red can help manage unpredictable pedestrian arrivals and reduce unnecessary vehicle movements, especially in areas with intermittent traffic but consistent pedestrian activity. An example of Rest in Red phasing for left-turning movements is shown in **Figure 70**.

Rest in Red is recommended when:

- Locations have frequent or high-volume pedestrian crossings with low vehicle volumes
- It can be applied consistently along a corridor so that vehicles do not see downstream green indications
- It may be used strictly for turning movements and pedestrian movements while allowing the mainline through to rest in green, or it may be used for all movements including the through movement

Figure 70: Example of Rest in Red for Left Turn Phasing (Source: City of Bellevue)



Traffic Signal Timing Adjustments

Leading Pedestrian Intervals

A Leading Pedestrian Interval (LPI) is a traffic signal timing technique that gives pedestrians a head start at signalized intersections — typically 3 to 7 seconds but as much as 10 seconds is allowable — before the parallel vehicle movement receives a green indication. This means pedestrians begin crossing the intersection while all vehicle traffic remains stopped, increasing their visibility and reducing conflicts with turning vehicles. LPIs are especially effective at intersections with high volumes of turning vehicles or where pedestrian safety is a concern, as they help to establish pedestrian priority and improve overall crosswalk safety. LPIs at intersections can reduce pedestrian crashes by 13%. Phasing with and without an LPI is shown in **Figure 71** and **Figure 72**.

LPIs are recommended when:

- Field observations, citizen complaints, crash history, near misses, or risk analysis indicate conflicts between turning vehicles on green and pedestrians
- Marked school crossings
- Sight distance limiting drivers' view of pedestrians

Considerations when implementing LPI:

- Recommended duration between a minimum of 3 seconds and a maximum of 10 seconds, or enough to allow a pedestrian to cross the nearest travel lane
- Best when used with pedestrian actuation and not recommended with Pedestrian Recall to minimize vehicular delays
- Should be paired with Accessible Pedestrian Signals (APS) to facilitate safe crossings by visually-impaired pedestrians who rely on the sound of moving vehicles to determine safe crossing intervals
- Should be paired with actuated blank-out signs that can display a No Turn on Red message during the LPI and a Turning Vehicles Stop for Pedestrians message during the remainder of the WALK and Flashing DON'T WALK intervals
 - A static No Turn on Red sign panel may be used if the preferred blank-out sign cannot be accommodated

Traditional Signal: Vehicle Centered

Vehicles see **GREEN** and pedestrians see **WALK** at the same time

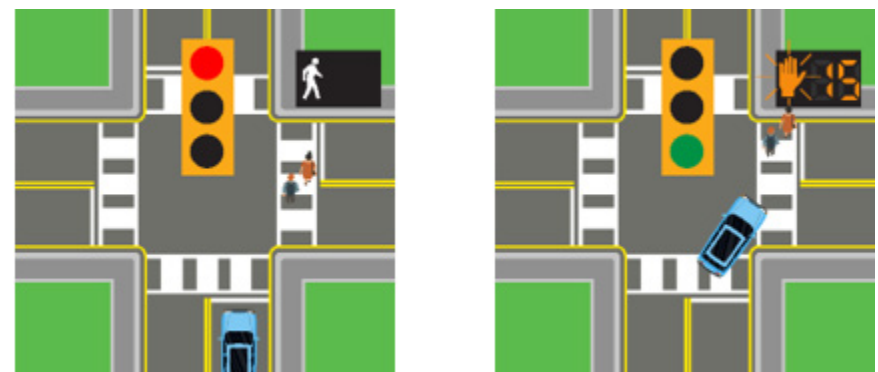
Figure 71: Before Leading Pedestrian Interval (LPI)



Signal with Leading Pedestrian Interval: Pedestrian-Focused

Pedestrians get a head start to **WALK** while turning vehicles see **RED**. Vehicles are given **GREEN** once pedestrians have established themselves in the crosswalk.

Figure 72: After Leading Pedestrian Interval (LPI)



Traffic Signal Timing Adjustments

Shorter Cycle Lengths

Shorter cycle lengths at traffic signals offer several advantages for pedestrians. By decreasing the amount of time between WALK phases, pedestrians experience reduced waiting times, which encourages greater compliance with signal indications and minimizes the temptation to cross against the light (as seen in **Figure 73**). Additionally, shorter cycles create more frequent crossing opportunities, making intersections more accessible and convenient for all users, especially those with mobility challenges or time constraints. These improvements contribute to a safer and more pedestrian-friendly environment by reducing exposure to traffic and fostering a more inviting atmosphere for walking.

For pedestrians, the optimal traffic signal cycle length is generally considered to be less than 90 seconds during most conditions, as this minimizes waiting times and encourages compliance with crossing signals. Shorter cycle lengths, typically ranging from 60 to 90 seconds, provide more frequent crossing opportunities and reduce pedestrian frustration, particularly in urban or high-foot-traffic environments. However, during peak vehicular traffic periods, slightly longer cycles may be necessary to balance pedestrian needs with overall intersection efficiency, but cycle lengths should ideally remain below 120 seconds to maintain a pedestrian-friendly environment.

Adjustments outside of peak hours can further improve pedestrian experience by reducing cycle lengths when vehicle volumes are lower, ensuring that pedestrians do not face unnecessary delays. Tailoring signal timing to local demand helps create safer, more accessible intersections and supports walkability within communities. Cycle lengths may be half-cycled within an existing corridor coordination plan without significantly impacting vehicular progression. Otherwise, it is recommended to evaluate for a consistent cycle length along the entire corridor to preserve operations.

Figure 73: Pedestrians Crossing During DON'T WALK on Orange Avenue



Enhanced Signing and Marking Visibility

Special Emphasis Ladder Crosswalks

Marking crosswalks with bold, reflective materials increases their visibility to drivers, encouraging yielding and reducing crashes. There are several types of crosswalk markings, including standard parallel lines, special emphasis ladder crosswalks, and high-contrast designs that improve visibility and safety for pedestrians at intersections. The FDOT standard for signalized intersections is a special emphasis ladder style crosswalk with 12" transverse lines and 24" longitudinal bars centered on each lane and each lane line. The ESM Section 8.08 further requires all marked crosswalks, whether signalized or unsignalized, to be special emphasis. All signalized intersections should be upgraded to current crosswalk standards. High-visibility crosswalks can reduce pedestrian injury crashes by up to 40%. An example is shown in **Figure 74**.

Figure 74: Special Emphasis Ladder Crosswalk on Colonial Drive



High-Contrast Black Outline Pavement Markings on Concrete

High-contrast black outline pavement markings on concrete significantly improve the visibility of lane boundaries, crosswalks, and stop bars, especially in low-light or adverse weather conditions. By providing a stark color difference against the typically light-colored concrete, these markings help guide both drivers and bicyclists more clearly through intersections and crossings. This increased visibility not only reduces the likelihood of missed or ignored traffic controls but also enhances overall safety for all road users by minimizing confusion and promoting compliance with traffic regulations. Per FDM Table 230.3.1, black contrast is preferred on concrete surfaces for the following pavement markings:

- Longitudinal white solid and skip lane lines (not edge lines)
- Yield and stop lines
- Standard and special emphasis crosswalks
- Railroad dynamic envelopes
- Messages and symbols
- Bicycle and shared-use path markings (arrows, symbols, messages)

An example of black contrast markings is shown in **Figure 75**.

Figure 75: High-Contrast Black Outline Markings on Mills Ave



Enhanced Signing and Marking Visibility

Green-Colored Pavement for Bicycle Conflict Points

Green-colored pavement may be used to enhance the conspicuity of areas where bicycle paths cross or merge with vehicle lanes, particularly at points of potential conflict. The vivid green color draws the attention of both drivers and bicyclists, signaling to motorists that they should expect bicycle traffic and take extra caution. This treatment improves the visibility of bicycle routes, enhances rider safety, and promotes greater awareness among all road users. The most common location warranting green-colored pavement is where a bicycle lane crosses a vehicular right-turn lane or a dedicated bus bay. FDOT requires District Design Engineer approval for the use of green-colored pavement per [FDM Section 223.2.1.4](#) and [FDM Exhibit 223-3](#). Additional bicycle intersection markings, called “crossbikes”, may be used through signalized intersections to further enhance the potential conflict areas, as detailed in the [NACTO UBDG](#) Chapter “Don’t Give Up at the Intersection”. An example of green-colored pavement markings is shown in **Figure 76** and **Figure 77**.

Figure 76: Dotted Green-Colored Bicycle Pavement Markings on Rosalind Avenue

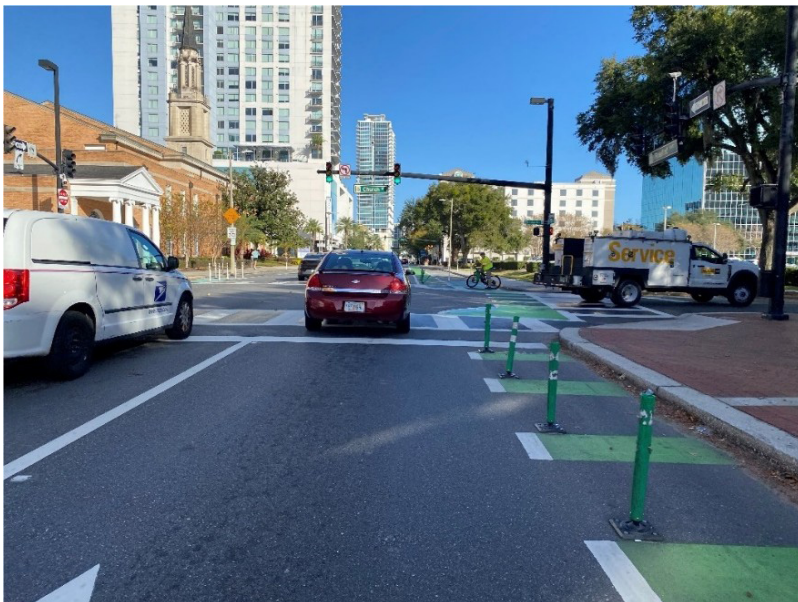


Figure 77: Solid Green-Colored Bicycle Pavement Markings on Rosalind Avenue



Enhanced Signing and Marking Visibility

Intersection Dotted Guide Lines

Intersection dotted guide lines involves the use of dashed markings to clearly indicate the intended path of travel for vehicles as they navigate turns or lane shifts through intersections. These markings provide several key benefits: they help drivers maintain proper alignment, reduce confusion during merging or turning movements, and enhance overall intersection safety by reinforcing lane discipline. Dotted guide lines also improve traffic flow by visually guiding motorists, minimizing erratic lane changes and potential conflicts with other road users. [FDM Section 230.4.6](#) calls for the use of 2'-4' dotted guide lines for left-turn movements where the distance from the side street stop bar to the receiving lane on an arterial is at least 60 feet. Details for dotted guide lines can be found in [SPI 711-001](#). An example of intersection dotted guide lines is shown in **Figure 78**.

Figure 78: Intersection Dotted Guide Lines on Crystal Lake Road



Raised Pavement Markers (RPMs)

Raised pavement markers (RPMs) are reflective devices installed on the roadway surface to enhance lane visibility and guidance, especially during nighttime or adverse weather conditions. They are often used to supplement or delineate lane lines, channelization, or other pavement markings, making lane boundaries and turning paths more prominent for drivers. By providing tactile and visual feedback, raised pavement markers help reinforce lane discipline, alert drivers to changes in alignment, and contribute to improved overall safety at intersections and along corridors. However, RPMs typically have an average service life of about 2 to 4 years under normal roadway conditions. Their longevity can vary depending on factors such as traffic volume, climate, roadway surface, and maintenance practices. Regular replacement of RPMs can significantly increase visibility. RPMs should be placed according to [SPI 706-001](#). An example of RPMs is shown in **Figure 79**.

Figure 79: Photo of Raised Pavement Markers (RPMs) during Wet Nighttime Conditions



Enhanced Signing and Marking Visibility

Turning Vehicles Stop for Pedestrians Signs (R10-15a)

One of the primary conflict types at signalized intersections is between turning drivers and non-motorists. The use of static sign panels can draw added attention to the potential conflict to remind motorists to check for the presence of pedestrians prior to completing their left or right turn. Use of these signs supports Section 316.130(7), F.S., which requires a motorist to stop before entering the crosswalk to allow pedestrians to cross at a signalized intersection or a free-flow channelized turn lane. The Turning Vehicles Stop for Pedestrians (R10-15a) sign is designed to reduce the potential for vehicle-pedestrian conflicts by increasing motorist awareness. The STOP version of this sign (R10-15a) replaces the previous YIELD version (R10-15) and should be used for all new installations and replacements. Standard yellow legend is recommended for most installations; fluorescent yellow-green is recommended for school zones. These signs are shown in **Figure 80**.

Figure 80: Static R10-15 Turning Vehicles Yield to / Stop for Pedestrian Signage



Electronic Speed Feedback Signs

Speed feedback signs display real-time vehicle speeds to approaching drivers, providing immediate awareness of how fast they are traveling compared to the posted speed limit. This visual reminder encourages drivers to self-correct and slow down, especially when their speed exceeds the limit. By increasing driver awareness and accountability, speed feedback signs have proven effective in lowering vehicle speeds and enhancing safety on arterial roads. The signs are most effective at managing operating speeds for short distances (about 1,000 feet) following the sign and when combined with other measures such as special emphasis crosswalk markings and islands. They work well at transition areas where the posted speed is lowering. This strategy may also be coupled with high-visibility enforcement campaigns to maximize efficacy. An example is shown in **Figure 81**.

Figure 81: Electronic Speed Feedback Sign on Thornton Avenue



Geometric Channelization

Quick-Build Channelization, Medians, and Curb Extensions

Quick Build projects use easy-to-procure, low-cost materials in flexible installations to complete safety improvements on a faster schedule than traditional projects. The infrastructure may be intended as a temporary condition to test public acceptance or draw awareness to a concern, or it may be a short-term version of a future long-term project where the permanent design and construction may take longer than desirable. Quick Build is especially useful for implementing geometric channelization in small spaces, such as medians and curb extensions. Types of materials may include flexible posts, tubular delineators, or rubber curbing.

Median channelization and pedestrian refuge islands can be completed using quick build materials to restrict left turns for access management, provide separation between opposing directions of traffic, and provide a visual and physical barrier for pedestrians. These installations help to slow traffic and consolidate erratic vehicle maneuvers. Using quick-build materials also allows for trial and adjustment based on observed outcomes and community input before converting to a permanent installation. Centerline hardening is a form of median channelization used in very constrained situations where it is not possible to provide a full island. Hardened centerlines are an extension of the traffic separator or centerline past the crosswalk, to slow left-turning drivers and create a better angle of visibility between drivers and pedestrians. An example is shown in **Figure 82**.

Curb extensions, also known as bulb-outs, can also be constructed as quick-build. Curb extensions are portions of the curb line extended out into the roadway to provide engagement and deflection. They also shorten crossing distance for pedestrians at intersections or midblock crossings (see [MUTCD Section 3J.07](#)). This design increases their visibility to drivers, and physically narrows the roadway, which encourages drivers to reduce their speed. By providing additional space at corners, curb extensions create safer waiting areas for pedestrians and can accommodate amenities such as landscaping or community aesthetic features. An example is shown in **Figure 83**.

Figure 82: Median Channelization and Pedestrian Refuge on Semoran Blvd



Figure 83: Photo of Curb Extension (Bulb-Out) on Rosalind Avenue



Mid-Term Improvements

Signal Rebuilds for Change in Heads or Phasing

Some of the signal recommendations would result in changes to the structural loads on the existing mast arms or strain poles. At a minimum, a structural evaluation will be needed to assess whether the existing structures can accommodate the increased wind loading from the addition of new signal heads and signs or the relocation of signal heads and signs. The original signal structure is typically designed to support a specific weight and wind load, so any increase in equipment can exceed its design capacity and compromise safety or performance. If the proposed changes cannot be accommodated on the existing structures, reconstruction is necessary. Rebuilding the structure ensures it can safely accommodate the extra load, maintain proper alignment, and withstand environmental stresses, ultimately supporting the enhanced functionality and reliability of the upgraded intersection. A photo of new mast arm construction is shown in **Figure 84**.

A structural evaluation and potential signal rebuild is required when:

- Adding signal heads to provide one signal head per through lane
- Adding overhead sign panels or blank-out signs
- Converting horizontal signal heads to vertical signal heads
- Eliminating diagonal spans for safer maintenance
- Changing the left- or right-turn phasing that requires a different signal head configuration to implement

Figure 84: Example of a New Mast Arm and Foundation during Construction



Changes to Traffic Signal Turn Phasing

Upgrade to Flashing Yellow Arrow for Left-Turn Phase

As discussed under Short-Term Improvements, a Flashing Yellow Arrow (FYA) signal is used to indicate that drivers are permitted to make a left turn, but they must yield to oncoming traffic and pedestrians before proceeding. This signal provides a clear, intuitive indication that left turns are allowed only after yielding, improving safety and efficiency at intersections. It also allows for the use of a range of signal timing applications that protect pedestrians from permissive turning vehicles.

The FYA is used in a four-section signal head and placed over the center of the left-turn lane. It is preferred over five-section cluster signal heads that are shared with the adjacent through movements, making the separate left-turn indication more understandable, reducing confusion for drivers, and allowing more versatility in field application. The conversion from a five-section cluster to FYA is expected to reduce left-turn crashes by 16%. It can be operated in any of the various modes of left-turn operation by time of day and is easily programmed to avoid the yellow trap associated with some permissive turns at the end of the circular green signal display. The differences in signal head layout with a five-section cluster versus the FYA are shown in **Figure 85** and **Figure 86**.

In order to convert an existing permissive-only or protected/permissive five-section cluster to a four-section FYA, the following must be considered:

- A structural evaluation for the increased loading. The FYA removes the shared signal head between the left-turn movement and the through movement, therefore requires an additional signal head to maintain two primary indications for the through lanes. The signal heads also shift further out by one-half lane width. If the loading exceeds the capacity of the existing structures, a signal rebuild is required.
- Confirmation of sufficient vertical clearance above the roadway. The FYA is 14" taller than the other signal heads, with four stacked sections instead of three. If the vertical clearance is inadequate on a mast arm, the FYA may be mounted higher than center to align the bottom of the FYA with the other signal heads. If the vertical clearance is inadequate on a span wire, a signal rebuild is required.

Figure 85: Existing Configuration with Five-Section Cluster (Source: MUTCD)

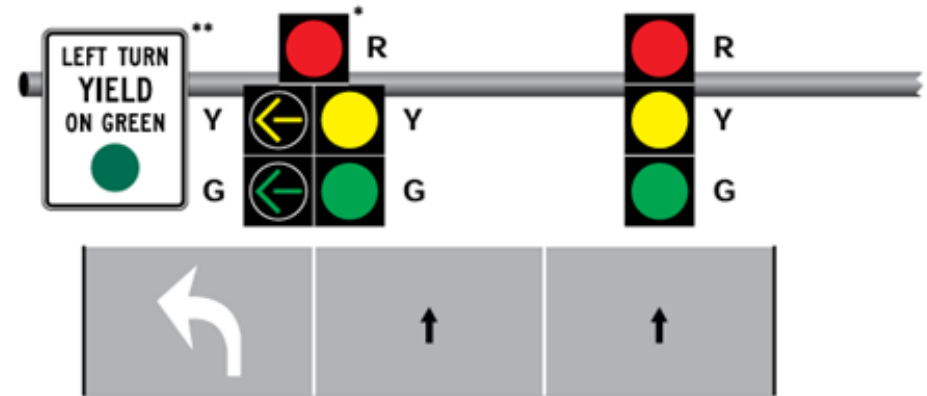
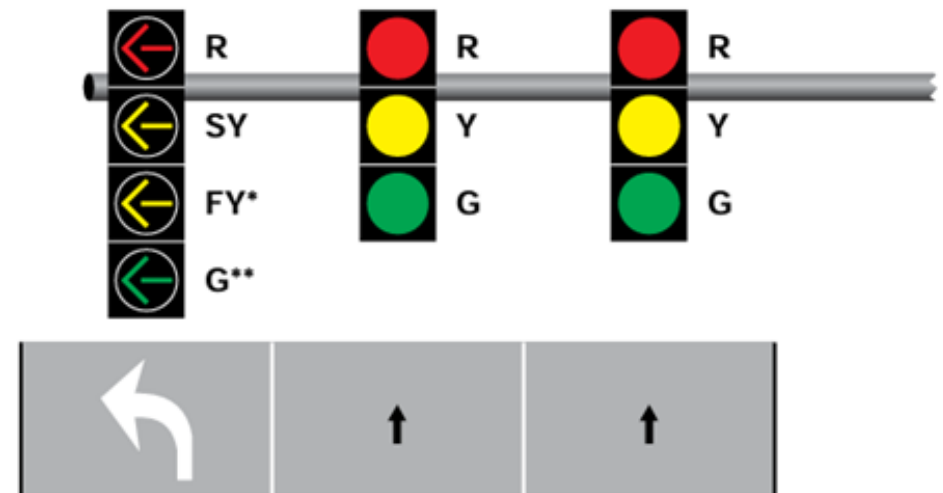


Figure 86: Proposed Configuration with FYA (Source: MUTCD)



Changes to Traffic Signal Turn Phasing

Upgrade to Flashing Yellow Arrow Right-Turn Phase

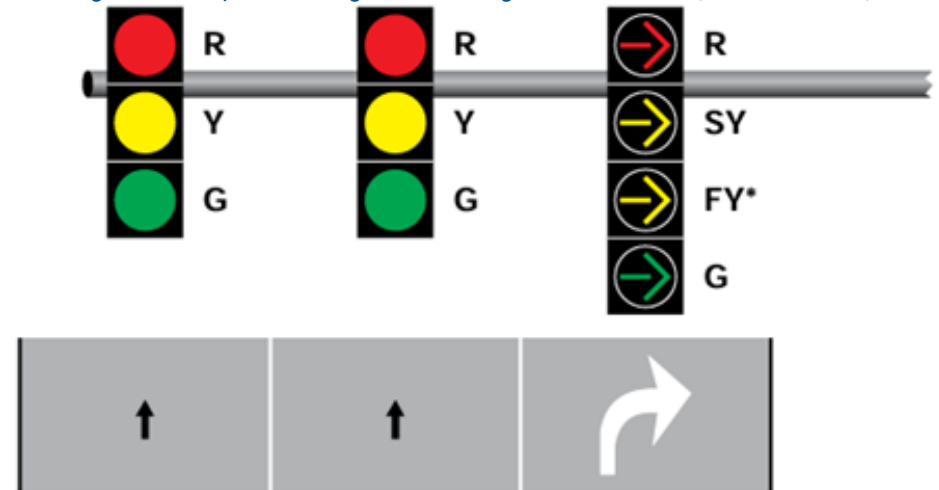
The flashing yellow arrow (FYA) treatment may also be used for right-turn movements. It functions similarly to left-turn applications: to allow drivers to make a right turn after yielding to pedestrians and conflicting traffic. Traditional signal head layouts provide a green ball for right-turn movements at the same time the adjacent pedestrian movements are provided a WALK signal, creating high potential conflict if drivers and pedestrians fail to observe each other. Controlling the right-turn movement with FYA provides a clear and intuitive message that the right turn is permitted, but only when it is safe to do so. **Figure 87** shows the signal head configuration for the right-turn FYA.

The right-turn FYA offers phasing flexibility to optimize right-turn operational efficiency and allow for the use of a range of signal timing applications that protect pedestrians from permissive turning vehicles. The four-section signal head can prohibit turning movements with a red arrow, protect turning movements with a green arrow, or provide enhanced warning to turning movements to be aware of potential conflicts with a flashing yellow arrow. By separating the permissive right-turn phase from other signal indications, the FYA helps reduce driver confusion and supports more predictable traffic and pedestrian interactions at intersections.

FYA right-turn treatments are recommended when:

- There is an exclusive right-turn lane
- There is a history of pedestrian conflicts with right-turning vehicles
- Used in conjunction with No Turn on Red signage
- Used in conjunction with a Leading Pedestrian Interval

Figure 87: Proposed Configuration for Right-Turn with FYA (Source: MUTCD)



Changes to Traffic Signal Turn Phasing

Convert to Protected Left-Turn Phase

Protected-only left turn phasing refers to a traffic signal arrangement where left turns are exclusively restricted to a designated green arrow phase, prohibiting left turns during any other signal indication. This approach eliminates conflicts between left-turning vehicles and oncoming through traffic, as well as pedestrians and bicyclists crossing the intersection. By providing a dedicated phase, protected-only left turn signals enhance intersection safety by reducing the risk of angle and turning-related crashes, which are among the most severe types of collisions. Additionally, this phasing improves traffic flow predictability and clarity for all road users, leading to more orderly and efficient intersection operations. In areas with high volumes of left-turning vehicles or frequent pedestrian activity, protected-only phasing is particularly beneficial for minimizing conflicts and supporting safer crossings. The signal head configuration for protected-only phasing is shown in **Figure 88**.

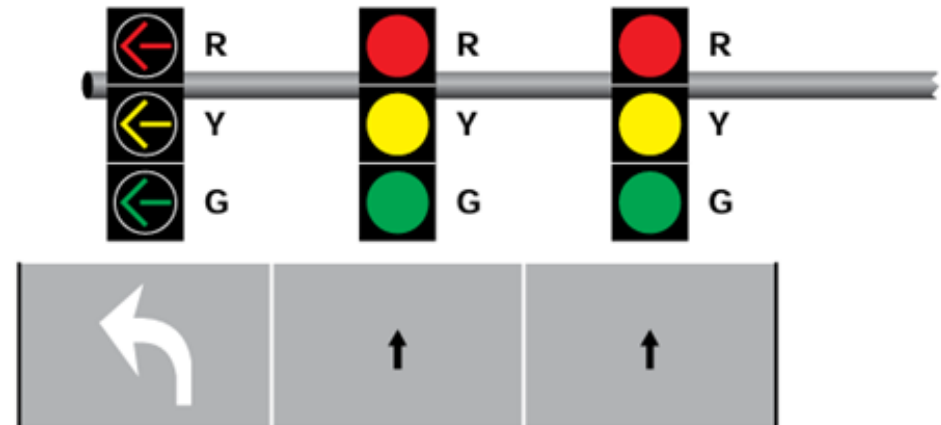
Protected-only left-turn phasing must be used when:

- There is more than one left-turn lane

Protected-only left-turn phasing is recommended for consideration when:

- The opposing speed is higher than 45 MPH
- Left turns must cross three or more lanes of opposing through traffic
- There are more than six left-turn angle crashes during a 12-month period attributed to protected/permissive phasing
- Intersection geometry restricts sight distance due to horizontal or vertical curvature, skew angle, or negative offset

Figure 88: Protected-Only Left-Turn Phasing (Source: MUTCD)



New Marked Crosswalks and Crosswalk Enhancements

Pedestrian crossings at unmarked and uncontrolled locations without signals or pavement markings present significant dangers for pedestrians. The absence of designated crossing points can lead to unsafe behavior, such as pedestrians darting between vehicles or crossing at unsafe locations where they are not visible to drivers. Without clear indicators, drivers may not anticipate pedestrians entering the roadway, especially in locations with limited visibility or high traffic volumes. This unpredictability increases the risk of high-severity collisions. By channeling pedestrians to safer crossing points and informing drivers when to anticipate pedestrian crossings, these treatments enhance overall safety and encourage more predictable behavior from all road users. Using treatments such as Rectangular Rapid Flashing Beacons and Pedestrian Hybrid Beacons, as further described in the following sections, can reduce pedestrian crashes by an average of 50%.

There are multiple types of crosswalk treatments with the appropriate treatment selection depending on the site-specific conditions. The [TEM Section 5.2](#) details the different allowable crosswalk treatments and conditions where each is applicable. For all crosswalk treatments, pedestrian volume demand data is not required to justify treatments in school zones or in Context Classifications C2T, C3C, C4, C5, and C6. This exempts all project corridors within this study from pedestrian volume demand data.

Rectangular Rapid Flashing Beacon (RRFB)

An RRFB, shown in **Figure 89**, is a pedestrian- or bicyclist-actuated traffic control device with two rapidly and alternately flashing rectangular yellow indications that function as a warning beacon. The actuation means that it only flashes when a conflict is present, which improves driver awareness and compliance over a beacon that flashes all the time.

Per [TEM 5.2.5.5](#), RRFBs are an appropriate treatment when:

- The posted speed limit is 35 MPH or less
- The roadway has no more than four through lanes
- Pedestrian refuge islands can be placed in paved medians
- Channelized free-flow right-turn lanes exist and need pedestrian emphasis to manage conflicts, such as interchange ramps (see [FDM Exhibit 230-17](#))

Figure 89: Rectangular Rapid Flashing Beacon Assembly on Primrose Drive



New Marked Crosswalks and Crosswalk Enhancements

Pedestrian Hybrid Beacons (PHB)

A PHB (sometimes known as a HAWK) is an actuated traffic control device typically installed overhead that uses a T-shaped signal head with three signal sections showing only red or yellow. The PHB remains dark until activated by a non-motorist. Once activated, it cycles through steady yellow and steady red indications to stop vehicles, allows the pedestrian or bicyclist to begin a protected crossing with a WALK signal, then switches to a flashing red vehicular signal to allow the pedestrian or bicyclist to finish their crossing during the Flashing DON'T WALK while also allowing vehicles to begin proceeding through the crosswalk if the non-motorist has moved out of conflict. It offers the benefits of a signalized crossing while minimizing vehicular delay. A photo of a PHB installation is shown in **Figure 90** and the operational sequence of the PHB functions is displayed in **Figure 91**.

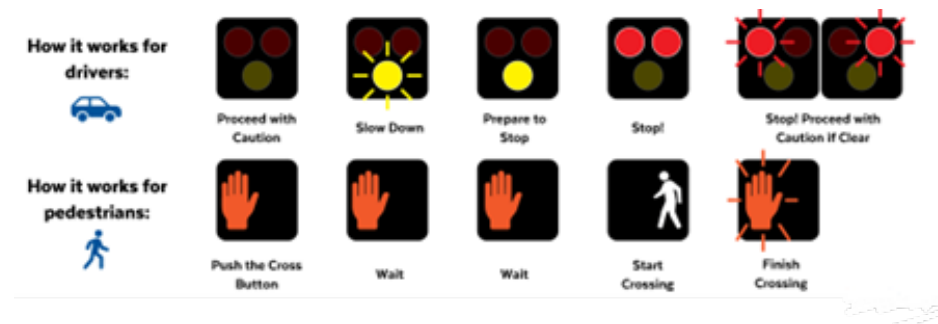
Per [TEM 5.2.5.5](#), PHBs are an appropriate treatment when:

- There is a history of pedestrian crashes at midblock or uncontrolled locations with a pattern of attractors and generators
- Pedestrians experience excessive delay attempting to cross at midblock or uncontrolled locations
- The approaching vehicle speed is too high to permit pedestrians to cross safely
- The minimum pedestrian volume exceeds 20 per hour but is less than the minimum MUTCD volumes needed to justify a full pedestrian traffic control signal
- May be disregarded if the Context Classification is exempt under [TEM Section 5.2.5.1](#)
- The PHB can be placed at least 100 feet away from side streets or driveways
- This can be mitigated if additional signing and marking treatments can be provided to minimize conflicts with turning movements across the crosswalk

Figure 90: Pedestrian Hybrid Beacon Crosswalk on Orange Blossom Trail



Figure 91: Functionality of the Pedestrian Hybrid Beacon Sequence



New Marked Crosswalks and Crosswalk Enhancements

Midblock Pedestrian Signal (MPS)

The MPS is a hybrid non-motorist-actuated traffic control device that is an alternative to the Pedestrian Hybrid Beacon, with the same functionality using a traditional three-section red, yellow, green signal head rather than the T-shaped PHB red and yellow signal head. The MPS directs traffic to stop and flashes a red indication during the pedestrian clearance interval, then rests in green when no activation is called. This traffic control device is currently under an FHWA Request to Experiment (RTE) and requires prior approval coordinated through the State Traffic Engineering and Operations Office before installation. However, it may be possible to implement a more widespread application of MPS in the future after the experimentation period concludes if final approval is given. It is recommended to ensure that any new PHB installations are designed to accommodate future conversion to MPS for maximum flexibility of retrofits. An MPS is shown in **Figure 92**.

Pedestrian Traffic Control Signal

The highest form of traffic control for a marked pedestrian crossing is installation of a full traditional traffic signal. This provides the greatest level of protection for pedestrians yet also induces the highest impact to vehicular operations. To ensure that a full traffic signal is prudent in the proposed conditions, installation is subject to the satisfaction of [MUTCD Chapter 4C](#) signal warrant criteria, which considers factors such as pedestrian volume, crossing distance, vehicular traffic volume, and crash history. Reductions in the minimum warranting criteria may be applied where the pedestrian crossing speed is lower than the standard assumption of 3.5 feet per second or where the 85th percentile speed on the major street is greater than 35 MPH. Ultimately, the decision to install a pedestrian traffic control signal should balance regulatory requirements, observed demand, and the goal of minimizing conflicts between pedestrians and vehicles. A pedestrian traffic control signal is shown in **Figure 93**.

Figure 92: Midblock Pedestrian Signal in Jacksonville



Figure 93: Pedestrian Traffic Control Signal on Robinson Street



Additional Crosswalks at Existing Traffic Signals

There are existing signalized intersections within the study limits that do not provide crosswalks on all legs of the intersection. The decision to omit a crosswalk may have been intentionally made for various reasons, such as signal phasing patterns at T-intersections or constraints on one corner of the intersection that conflict with drainage, utilities, or right-of-way. However, there is a trade off between operations and longstanding safety concerns along the study corridors. Adding crosswalks to all legs of a signalized intersection ensures that pedestrians have safe, designated spaces to cross in every direction, reducing the temptation for unsafe midblock crossings. This comprehensive approach improves accessibility for all users, including those with mobility challenges, and supports equitable access to community amenities and transit stops located on all sides of the intersection. Furthermore, providing crosswalks on each leg clarifies pedestrian expectations and helps drivers anticipate pedestrian movements, which can reduce conflicts and enhance overall safety at the intersection. By accommodating pedestrian desire lines and ensuring complete connectivity, these improvements encourage walking as a viable mode of transportation.

Figure 94: New Signalized Crosswalk and Concrete Refuge on SR 434



Permanent Pedestrian Refuge Islands and Raised Medians

While channelization with quick-build materials is included in Short-Term Improvements, the goal is to turn successful quick-build installations into permanent infrastructure for easier maintenance and longer service life. The channelization constructed with tubular delineators and modular cubing can be replaced with concrete traffic separators and concrete curb. An example of a permanent concrete refuge island for a new crosswalk is shown in **Figure 94**.

In addition to targeted installations of medians in spot locations, converting existing center turn lanes to raised medians offers a higher level of safety benefits for both pedestrians and drivers. Raised medians create a physical barrier between opposing directions of traffic and manage access to driveways and side streets, reducing conflict points from turning movements and enhancing predictability for all road users. For pedestrians, a raised median serves as a refuge island, allowing them to safely cross one direction of traffic at a time and improving overall crossing safety even outside of controlled, signalized locations, especially on wide arterials where there may be continuous attractors and generators inducing crossing desire.

However, there are important considerations to keep in mind. Restricting left-turn movements may impact access for local businesses and residents, requiring thoughtful design and communication with stakeholders. Emergency vehicle access and the needs of transit operations should also be evaluated to ensure that the raised median does not create unintended obstacles. Overall, the conversion should balance safety improvements with the operational needs of the corridor.

Intersection Lighting Enhancements

Intersection lighting offers significant safety and accessibility benefits for all roadway users. Enhanced illumination at intersections, meeting both horizontal and vertical illuminance levels, improves visibility for drivers, making it easier to detect pedestrians, cyclists, and other vehicles, during nighttime conditions. This increased visibility helps reduce the risk of crashes and improves reaction times, especially where vehicles are traveling at higher speeds. For pedestrians, adequate lighting provides a greater sense of personal security as they cross streets and navigate intersections, which is especially important for individuals using wheelchairs, mobility devices, or traveling to transit stops.

Orlando Utilities Commission (OUC) owns and maintains the roadway lighting along the six corridors in this project. OUC also furnishes and installs all the poles, arms, fixtures, electrical circuitry, and power. Corridor and intersection lighting along FDOT and City roadways is required to meet [FDM Chapter 231](#) lighting criteria. Typical LED roadway lighting fixtures/manufacturers that OUC currently uses include Cooper Archeon, EOI, and Autobahn.

Over the past few years, OUC has been upgrading all the roadway cobrahead lighting in the City of Orlando from HPS to LED fixtures. Additionally, the intersection lighting along the five on-system corridor segments has been upgraded within the past few years to meet current lighting criteria as part of multiple FDOT-led projects. **Figure 95** shows the lighting upgrade at the intersection of Semoran Boulevard and Curry Ford Road. The lighting downtown has not been fully upgraded to LEDs, and lighting improvements along the downtown corridors are coordinated with and approved by the Orlando Downtown Development Board.

Since the previously completed upgrades have satisfied current standards, no additional lighting needs have been identified for the existing conditions. However, lighting impacts should be considered for all proposed crosswalks, both at existing signals and new midblock locations. It is recommended to evaluate lighting at these proposed new crosswalk locations to confirm whether existing lighting is sufficient to meet the pedestrian-focused vertical illuminance values or if supplementation is needed with additional light poles to provide adequate vertical illuminance for pedestrian safety.

Figure 95: Intersection Lighting Enhancements on Curry Ford Road



Speed Management

Raised Crosswalks

Raised crosswalks are pedestrian crossings elevated above the roadway surface, often to the same height as the adjacent sidewalk. This design acts as a speed hump, compelling drivers to slow down as they approach intersections or midblock crossings, thereby increasing pedestrian safety and visibility. Raised crosswalks are typically marked with high-visibility materials and may include signage to further alert drivers to the presence of crossing pedestrians. They are only appropriate for design speeds of 35 MPH or less. Raised crosswalks are currently detailed under [Developmental Standard Plan D520-030](#). Several have been successfully implemented on the southern section of Orange Blossom Trail, combined with in-roadway lighting, warning sign pavement markings, and speed reductions, as shown in **Figure 96**.

Figure 96: PHB with Raised Crosswalk on Orange Blossom Trail



Lane Narrowing

Lane narrowing involves reducing the width of vehicle travel lanes below 12 feet, which encourages drivers to reduce their speed since the roadway feels more constrained. This strategy is best when implemented with other features such as wider sidewalks, bike lanes, or landscaping, making the street environment safer and more comfortable for pedestrians and bicyclists. Visually and physically narrowing the lanes effectively calms traffic and enhances overall safety on arterials. Speed management strategies are discussed in [FDM Chapter 202](#).

Incremental 5 MPH Speed Reduction for Target Speed

Per the [FDM Section 201.5.1](#), Target Speed is the highest speed at which vehicles should operate on a thoroughfare in a specific context, consistent with the level of multi-modal activity generated by adjacent land uses, to provide both mobility for motor vehicles and a supportive environment for pedestrians, bicyclists, and public transit users. Establishing an appropriate Target Speed helps guide roadway design and operational decisions, ensuring that features are effective in promoting safer and more predictable driving behavior on arterials. The Target Speed must:

- Be within the range of Design Speeds for the context classification
- (see [FDM Table 201.5.1](#)),
- Reflect the needs of safety, quality of life, and economic development of the corridor, and
- Be established by a team that includes, but is not limited to, Design, Traffic Operations, Safety, Planning, and Forecasting and Performance offices.

Based on the high multimodal activity and the identification of the study corridors on the city's pedestrian and bicycle High Injury Networks, mid-term Design Speeds/Posted Speed are recommended at 5 MPH below the existing posted speed limits. As redevelopment and Context-Based Design occurs, it is recommended to continue to monitor the network for additional reductions in speed consistent with the long-term Target Speed.

KIRKMAN RD

RECOMMENDATIONS

MetroWest



Kirkman Road Corridor

Kirkman Road: Short-Term Improvements

Short-term improvements on Kirkman Road focus on signalization upgrades, signal timing adjustments, and enhanced signing and marking visibility. A summary of signalized intersection improvements is provided in **Table 12**.

The existing traffic signals along Kirkman Road are strain pole and span wire design and the mainline left-turning movements operate under protected-only phasing due to the significant size of the intersections. Most signals do not have backplates and provide only two signal heads controlling three through lanes on the mainline. It is recommended to install flexible retroreflective backplates at all intersections that do not currently have backplates for enhanced signal visibility. It is also recommended to supplement the mainline approaches to all signals with one-section red signals to provide reinforcement of the stop condition on the wide cross section. All signalized intersections have special emphasis crosswalks, and pavement markings are in good condition since the corridor recently completed resurfacing in 2021.

Historic crashes and public feedback indicate that there are conflicts between the side-street turning movements and pedestrians in the crosswalks. Since the average cycle lengths range from 200 to 220 seconds, with most of the time dedicated to the mainline, the minor street traffic tends to rush through the limited green time, failing to yield the right-of-way to pedestrians. Leading Pedestrian Intervals are recommended at Conroy Road and Raleigh Street based on marked school crossings and historic crashes involving permissive right turns. Where LPIs are implemented, actuated blank-out signs should accompany them to restrict turns during the interval. For all other intersections, R10-15a signs are recommended for awareness of potential pedestrian conflicts with turning movements. Pedestrian Recall and Rest in Walk are recommended for the mainline pedestrian movements since there is sufficient green time in the concurrent through movement to cover the WALK and Flashing DON'T WALK intervals without impacting coordination. Pedestrian Recall is not recommended in conjunction with an LPI.

Table 12: Kirkman Road Short-Term Signalized Intersection Improvements

Signalized Intersection	Ex. Signal Type	Ex. Major Phasing	Ex. Minor Phasing	Upgrade to High-Emphasis Crosswalks	Black Contrast Pavement Markings	Install Reflective Backplates	Supplemental Single-Section Red Signals	Add Regulatory or Blank-Out Signs	Implement Leading Pedestrian Interval	Implement Pedestrian Recall	Implement Pedestrian Rest in Walk	Modify Flashing Yellow Arrow
Conroy Rd	Diagonal	Protected	Protected	-	-	-	X	Blank Out	X	-	X	-
LB McLeod Rd	Diagonal	Protected	Exclusive T	-	-	X	X	R10-15aR	-	X	X	-
Arnold Palmer Dr	Diagonal	Protected	Permissive	-	-	X	X	R10-15aR	-	X	X	-
Metrowest Blvd	X Span	Protected	Protected	-	-	-	-	R10-15aR	-	X	X	-
Metropolis Way/ Sterling Crest	Diagonal	Protected	Permissive	-	-	X	X	R10-15aR	-	X	X	-
Valencia College Dr S	Diagonal	Protected	Permissive	-	-	X	X	R10-15aR	-	X	X	-
Valencia College Dr N	Diagonal	Protected	Permissive	-	-	X	X	R10-15aR	-	X	X	-
Raleigh St	Diagonal	Protected	Protected	-	-	X	X	Blank Out	X	-	X	-

Note: "Ex." Indicates an existing condition

Kirkman Road: Mid-Term Improvements

Mid-term improvements on Kirkman Road focus on phasing changes for signalized turning movements, lane emphasis, new pedestrian crossings, and protection for non-motorists. A summary of signalized intersection improvements is provided in **Table 13**.

While the mainline left-turn movements already operate under the most restrictive phasing, protected-only, the side street movements vary in phasing and can be upgraded to four-section FYA to offer better operational flexibility and pedestrian protection. In addition, there are numerous exclusive right-turn lanes that should be considered for right-turn FYA when the traffic signals are rebuilt to offer the same protection to pedestrians from permissive right turns. The left- and right-turn phasing changes will increase structural loading on the existing strain pole and span wire configurations, and will therefore at a minimum require evaluation of the proposed loading change, with the possible need for signal reconstruction to fully accommodate the changes. At the time signals are rebuilt, it is also recommended to increase the number of mainline through signal heads to provide one full signal head per lane.

Since 6-foot buffered bicycle lanes exist adjacent to a posted speed limit of 50 MPH, green-colored pavement markings are recommended at right-turn lanes and dedicated bus bays to draw attention to the potential conflict zones. It is also recommended to extend the existing shared-use path on the east side of the road to south of L.B. McLeod Road.

The intersection geometry was evaluated at the signalized intersections to determine where pedestrian refuge islands or centerline hardening can be constructed to provide median protection to pedestrians crossing the wide cross section. Median extensions for refuge islands are recommended at Conroy Road, L.B. McLeod Road, Arnold Palmer Drive, Metrowest Boulevard, Metropolis Way/Sterling Crest Drive, Valencia College Drive North, and Valencia College Drive South.

Table 13: Kirkman Road Mid-Term Signalized Intersection Improvements

Signalized Intersection	Signal Type	Major Phasing	Minor Phasing	Convert to Protected-Only Left-Turn	Convert to Flashing Yellow Arrow 4-Section	Additional Through Signal Head Per Lane	Side Street Phasing Change	Add Flashing Yellow RIGHT Signal	Add Missing Crosswalk Legs	Evaluate / Reconstruct/ Respan Signal
Conroy Rd	Diagonal	Protected	Protected	-	-	X	-	NB, SB, WB	-	X
LB McLeod Rd	Diagonal	Protected	Exclusive T	-	-	X	-	NB, WB	-	X
Arnold Palmer Dr	Diagonal	Protected	Permissive	-	-	X	X	-	-	X
Metrowest Blvd	X Span	Protected	Protected	-	-	-	-	SB, WB	-	-
Metropolis Way/ Sterling Crest	Diagonal	Protected	Permissive	-	-	X	X	SB	-	X
Valencia College Dr S	Diagonal	Protected	Permissive	-	-	X	X	SB	-	X
Valencia College Dr N	Diagonal	Protected	Permissive	-	-	X	X	SB	-	X
Raleigh St	Diagonal	Protected	Protected	-	-	X	-	All	-	X

Note: "Ex." Indicates an existing condition

Pedestrian crashes were observed in the southern limits of the segment north of Conroy Road in the vicinity of the Kirkman Oaks Shopping Center. Based on high vehicular speeds, high-severity non-motorist crashes, and the presence of commercial attractors and transit stops, new controlled crosswalks are recommended. The existing distance between marked crossings at Conroy Road and L.B. McLeod Road is 0.7 miles (an approximately 18-minute walk). Two crosswalks are proposed, one north of Summeroak Street shown in **Figure 97** and the other at Pine Shadows Parkway North shown in **Figure 98**, that would reduce the maximum distance between crossing opportunities to 0.3 miles (less than an 8-minute walk). It is recommended to reduce the posted speed from Conroy Road to L.B. McLeod Road from 50 MPH to 45 MPH approaching the two new crossing locations, and to control the crosswalks with full pedestrian traffic control signals given the high vehicular volumes, speeds, and 120-foot crossing distance in this section. Pedestrian volume demand data is not required for crosswalks in C3C context classification.

Figure 97: Kirkman Road Proposed Pedestrian Crosswalk North of Summeroak Street

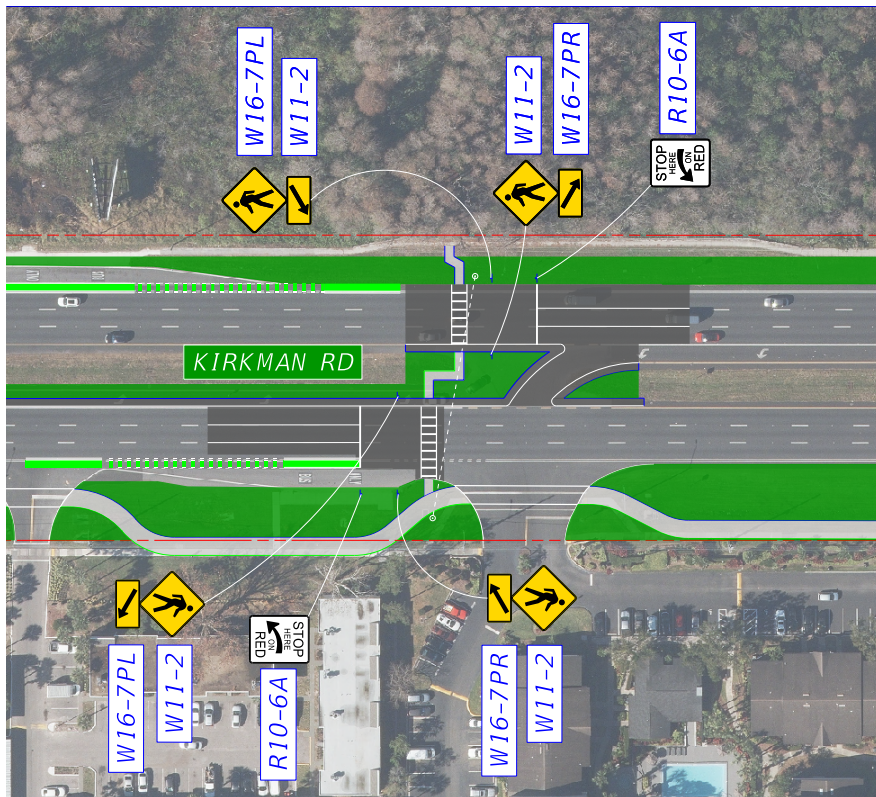


Figure 98: Kirkman Road Proposed Pedestrian Crosswalk at Pine Shadows Parkway North



Kirkman Road: Long Term Improvements

Long-term improvements are depicted on the CROSS Kirkman Road Concept roll plot under separate cover from this report. The proposed context classification and speed limits for the corridor are shown in **Figure 99**. The proposed typical section for the corridor is shown in **Figure 100**.

Future Context Classification

The existing context class throughout the corridor is C3 and it is recommended to retain this classification. Where the proposed context classification is C3, the minimum sidewalk width is 6 feet. However, a wider shared use path is recommended on Kirkman Road to promote walkability and pedestrian activity.

Future Target Speed

The future target speed of 45 MPH is recommended throughout the corridor to enhance safety. The proposed change is informed by factors such as context classification, current speed limits, lane dimensions, and levels of pedestrian and bicycle activity. The existing speed is 50 MPH. A mid-term reduction was proposed to 45 MPH from Conroy Road to L.B. McLeod Road based on proposed pedestrian crossings. Long-term, it is recommended to extend the 45 MPH speed reduction throughout the study limits and north to the existing 45-MPH posted speed zone on Kirkman Road north of Westgate Boulevard. The reduction in posted speed will be reinforced using speed management techniques include narrowing lane widths (from 12 feet wide to 11 feet wide), installing median curb and gutter, and providing median landscaping.

Shared Use Path

There is an existing shared-use path along the east side of the road north of L.B. McLeod Road and it is proposed to extend that path south to Conroy Road in the mid-term. For long-term, a 12-foot wide shared-use path is recommended on the west side of the road as well. This can be accommodated within the existing right-of-way and would serve as an additional pedestrian and cyclist facility. At the existing 50 MPH posted speed or even with the proposed 45 MPH reduced speed, the roadway can feel unsafe from the perspective of a pedestrian or a cyclist. A shared-use path with a buffer from the roadway will minimize potential conflicts between motorist and non-motorist users, increasing the comfort of non-motorists.

Intersection Control Evaluation (ICE)

ICE is a data-driven, performance-based framework to screen intersection alternatives and identify an optimal solution for both safety and performance. The ICE process involves screening potential intersection geometries and traffic controls and then analyzing to determine which solution is best. ICE evaluation is recommended at the intersection of Kirkman Road at Conroy Road given the heavy volumes and turning movements on both roadways. Potential intersection configurations for Conroy Road include a traffic signal (base condition), a partial displaced left turn, a full displaced left turn, a restricted crossing U-turn (R-CUT), a median U-turn, and a partial median U-turn. See the [FDOT ICE website](#) for more information on the benefits of these different control types. Additional intersection control evaluation locations are recommended for Metropolis Way and both Valencia College Drive signals (North and South) to evaluate signalized R-CUT geometry. R-CUT geometry is used to reduce exiting turn lane conflicts. These signals have sufficient alternate access and available downstream u-turn opportunities to offset the restricted turning movements under an R-CUT while providing a safer geometry for minimizing left-turn and non-motorist conflicts. Due to the proximity of Metropolis Way and the Valencia College Drive signals, it is best to evaluate them all together to account for interactions if control changes are implemented. Converting traditional signals to R-CUTs has been shown to reduce fatal and injury crashes by up to 22%.

FDOT, 2026. ICE Manual. Accessed on Dec. 26, 2025 at <https://www.fdot.gov/traffic/trafficservices/intersection-control-evaluation>

Recommended Improvement Concept Plans

The design criteria used to develop the recommended improvements depicted on the CROSS_Kirkman Road Concept roll plot are shown in **Table 14**. The final concept plans show the long-term recommendations and vision for the corridor, incorporating the elements discussed:

- Construct new signalized crosswalks with full traffic signal control at:
 - Summeroak Street
 - Pine Shadows Parkway North
- Lower the posted speed limit from 50 MPH to 45 MPH
- Add green-colored pavement markings at bicycle lane conflicts
- Construct a shared-use path along the east side of the road from Conroy Road to L.B. McLeod Road
- Construct a shared-use path along the west side of the road through the entire study limits
- Provide pedestrian refuge islands at:
 - Conroy Road
 - L.B. McLeod Road
 - Arnold Palmer Drive
 - Metrowest Boulevard
 - Metropolis Way/Sterling Crest Drive
 - Valencia College Drive (North and South)
- Construct median curb and gutter to support speed management
- Install landscaping in existing medians for vertical friction and enclosure (reference [FDM Section 202.3.6](#))
- Resurface and restripe lanes to 11-foot width and buffered bike lane to 7-foot wide (separation optional)
- Plan for ICE evaluations at:
 - Conroy Road
 - Metropolis Way
 - Valencia College Drive (North and South)

Figure 99: Kirkman Road Proposed Context Classification and Speed Limits

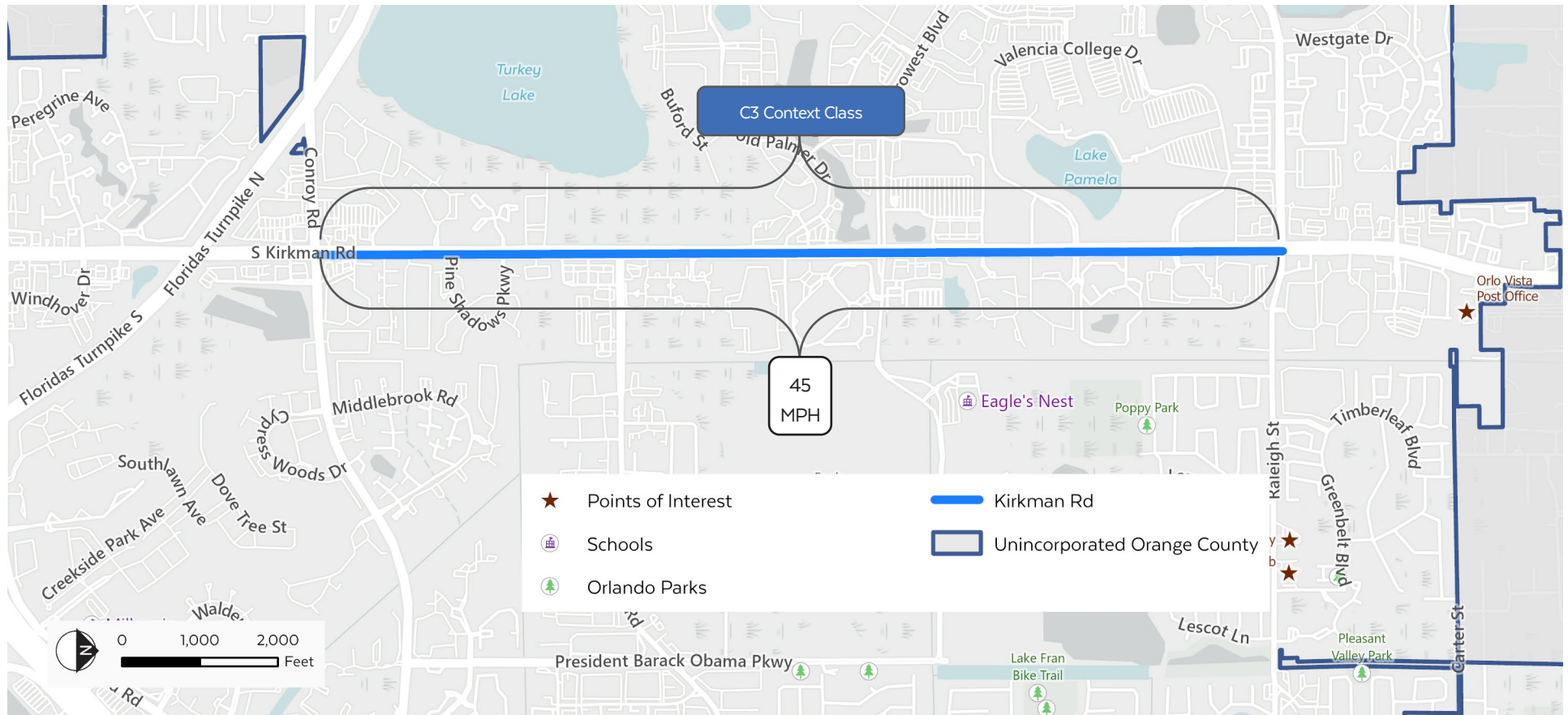


Figure 100: Kirkman Road Recommended Typical Section

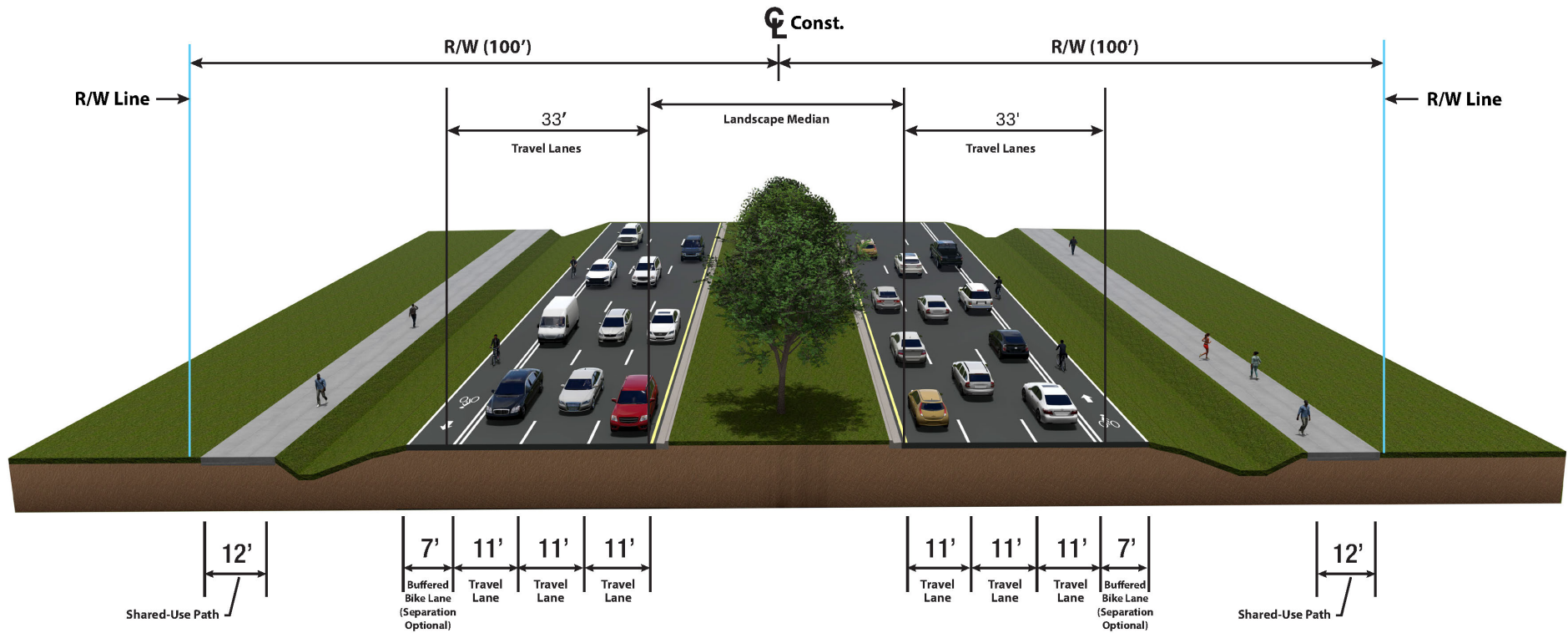


Table 14: Kirkman Road Design Criteria

Design Element	Existing Criteria	Proposed Criteria	Source
Access Management	5	5	FDM Table 201.4.2
Context Classification	C3C	C3C	FDOT Context Classification Guide
Control Vehicle	WB-62FL	WB-62FL	FDM 201.6.2
Target and Design Speed	50 MPH	45 MPH	FDM Table 201.5.1
Design Vehicle	WB-62FL	WB-62FL	FDM 201.6
Functional Classification	Urban Principal Arterial Other	Urban Principal Arterial Other	Federal Functional Classification Map
Posted Speed	50 MPH	45 MPH	Proposed
Number of Lanes	6	6	Match Existing Roadway
Lane Width	12-ft. min.	11-ft. min.	FDM Table 210.2.1
Median Width	30-ft. min.	22-ft. min.	FDM Table 210.3.1
Bicycle Lane Width	7-ft. buffered (5-ft. min.)	7-ft. buffered (5-ft. min.)	FDM 223.2.1.1
Shared Use Path Width	12-ft. standard (10-ft. min.)	12-ft. standard (10-ft. min.)	FDM 224.4
Sidewalk Width	6-ft. min.	6-ft. min.	FDM Table 222.2.1
ROW Width	200-ft.	200-ft.	Existing

CHAPTER 5

IMPLEMENTATION PLAN

MetroWest



Kirkman Road Implementation Plan

Short-Term

Short-term improvements recommended for Kirkman Road are those that can be implemented within a year or less. These projects can be funded through city programs (such as safety funds, bike plan implementation, or economic development funds), the City's Capital Improvements Fund, Bond Packages, State and Federal Grants, or privately funded. **Table 15** shows the recommended short-term improvements for Kirkman Road.

Table 15: Recommended Short-Term Improvements

Location	Location Detail	Improvement	Cost Estimate
Kirkman Rd intersection at Conroy Rd	NB, EB, SB, WB	Supplemental single-section red signals	\$7,360
Kirkman Rd intersection at Conroy Rd	NB, EB, SB, WB	Add blank-out signs	\$42,320
Kirkman Rd intersection at Conroy Rd	NB, EB, SB, WB	Implement leading pedestrian interval	\$9,189
Kirkman Rd intersection at Conroy Rd	NB, EB, SB, WB	Implement pedestrian rest in walk	\$9,189
Kirkman Rd intersection at LB McLeod Rd	NB, SB, WB	Install reflective backplates	\$4,050
Kirkman Rd intersection at LB McLeod Rd	NB, SB, WB	Supplemental single-section red signals	\$5,520
Kirkman Rd intersection at LB McLeod Rd	NB, SB, WB	Add R10-15aR signs	\$4,350
Kirkman Rd intersection at LB McLeod Rd	NB, SB, WB	Implement pedestrian recall	\$6,891
Kirkman Rd intersection at LB McLeod Rd	NB, SB, WB	Implement pedestrian rest in walk	\$6,891
Kirkman Rd intersection at Arnold Palmer Dr	NB, EB, SB, WB	Install reflective backplates	\$5,400
Kirkman Rd intersection at Arnold Palmer Dr	NB, EB, SB, WB	Supplemental single-section red signals	\$7,360
Kirkman Rd intersection at Arnold Palmer Dr	NB, EB, SB, WB	Add R10-15aR signs	\$5,801
Kirkman Rd intersection at Arnold Palmer Dr	NB, EB, SB, WB	Implement pedestrian recall	\$9,189
Kirkman Rd intersection at Arnold Palmer Dr	NB, EB, SB, WB	Implement pedestrian rest in walk	\$9,189
Kirkman Rd intersection at Metrowest Blvd	NB, EB, SB, WB	Add R10-15aR signs	\$5,801
Kirkman Rd intersection at Metrowest Blvd	NB, EB, SB, WB	Implement pedestrian recall	\$9,189
Kirkman Rd intersection at Metrowest Blvd	NB, EB, SB, WB	Implement pedestrian rest in walk	\$9,189
Kirkman Rd intersection at Metropolis Way/Sterling Crest	NB, EB, SB, WB	Install reflective backplates	\$5,400
Kirkman Rd intersection at Metropolis Way/Sterling Crest	NB, EB, SB, WB	Supplemental single-section red signals	\$7,360
Kirkman Rd intersection at Metropolis Way/Sterling Crest	NB, EB, SB, WB	Add R10-15aR signs	\$5,801

Location	Location Detail	Improvement	Cost Estimate
Kirkman Rd intersection at Metropolis Way/Sterling Crest	NB, EB, SB, WB	Implement pedestrian recall	\$9,189
Kirkman Rd intersection at Metropolis Way/Sterling Crest	NB, EB, SB, WB	Implement pedestrian rest in walk	\$9,189
Kirkman Rd intersection at Valencia College Dr S	NB, EB, SB, WB	Install reflective backplates	\$5,400
Kirkman Rd intersection at Valencia College Dr S	NB, EB, SB, WB	Supplemental single-section red signals	\$7,360
Kirkman Rd intersection at Valencia College Dr S	NB, EB, SB, WB	Add R10-15aR signs	\$5,801
Kirkman Rd intersection at Valencia College Dr S	NB, EB, SB, WB	Implement pedestrian recall	\$9,189
Kirkman Rd intersection at Valencia College Dr S	NB, EB, SB, WB	Implement pedestrian rest in walk	\$9,189
Kirkman Rd intersection at Valencia College Dr N	NB, EB, SB, WB	Install reflective backplates	\$5,400
Kirkman Rd intersection at Valencia College Dr N	NB, EB, SB, WB	Supplemental single-section red signals	\$7,360
Kirkman Rd intersection at Valencia College Dr N	NB, EB, SB, WB	Implement pedestrian recall	\$9,189
Kirkman Rd intersection at Valencia College Dr N	NB, EB, SB, WB	Implement pedestrian rest in walk	\$9,189
Kirkman Rd intersection at Raleigh St	NB, EB, SB, WB	Install reflective backplates	\$5,400
Kirkman Rd intersection at Raleigh St	NB, EB, SB, WB	Supplemental single-section red signals	\$7,360
Kirkman Rd intersection at Raleigh St	NB, EB, SB, WB	Add blank-out signs	\$42,320
Kirkman Rd intersection at Raleigh St	NB, EB, SB, WB	Implement leading pedestrian interval	\$9,189
Kirkman Rd intersection at Raleigh St	NB, EB, SB, WB	Implement pedestrian rest in walk	\$9,189
		Subtotal	\$335,352
		MOT (10%)	\$34,000
		Mobilization (10%)	\$37,000
		Project Unknowns (30%)	\$122,000
		Professional Services (30%)	\$159,000
		Short-Term Total	\$687,352

Mid-Term

Mid-term improvements recommended for Kirkman Road are those that can be implemented within 1-3 years. These projects can be funded through city programs (such as safety funds, bike plan implementation, or economic development funds), the City's Capital Improvements Fund, Bond Packages, or State and Federal Grants. **Table 16** shows the recommended mid-term improvements for Kirkman Road.

Table 16: Recommended Mid-Term Improvements

Location	Location Detail	Improvement	Cost Estimate
Kirkman Rd intersection at Conroy Rd	NB, EB, SB, WB	Additional through signal head per lane	\$23,365
Kirkman Rd intersection at Conroy Rd	NB, SB, WB	Add flashing yellow right signal	\$8,639
Kirkman Rd intersection at Conroy Rd	NB, EB, SB, WB	Evaluate/reconstruct/respan signal	\$52,086
Kirkman Rd intersection at LB McLeod Rd	NB, SB, WB	Additional through signal head per lane	\$14,019
Kirkman Rd intersection at LB McLeod Rd	NB, WB	Add flashing yellow right signal	\$5,760
Kirkman Rd intersection at LB McLeod Rd	NB, SB, WB	Evaluate/reconstruct/respan signal	\$39,065
Kirkman Rd intersection at Arnold Palmer Dr	NB, EB, SB, WB	Additional through signal head per lane	\$18,692
Kirkman Rd intersection at Arnold Palmer Dr	EB, WB	Side street phasing change	\$4,673
Kirkman Rd intersection at Arnold Palmer Dr	NB, EB, SB, WB	Evaluate/reconstruct/respan signal	\$52,086
Kirkman Rd intersection at Metrowest Blvd	NB, WB	Add flashing yellow right signal	\$5,760
Kirkman Rd intersection at Metropolis Way/Sterling Crest	NB, EB, SB, WB	Additional through signal head per lane	\$18,692
Kirkman Rd intersection at Metropolis Way/Sterling Crest	EB, WB	Side street phasing change	\$4,673
Kirkman Rd intersection at Metropolis Way/Sterling Crest	SB	Add flashing yellow right signal	\$2,880
Kirkman Rd intersection at Metropolis Way/Sterling Crest	NB, EB, SB, WB	Evaluate/reconstruct/respan signal	\$52,086
Kirkman Rd intersection at Valencia College Dr S	NB, EB, SB, WB	Additional through signal head per lane	\$18,692
Kirkman Rd intersection at Valencia College Dr S	EB, WB	Side street phasing change	\$4,673
Kirkman Rd intersection at Valencia College Dr S	SB	Add flashing yellow right signal	\$2,880
Kirkman Rd intersection at Valencia College Dr S	NB, EB, SB, WB	Evaluate/reconstruct/respan signal	\$52,086
Kirkman Rd intersection at Valencia College Dr N	NB, EB, SB, WB	Additional through signal head per lane	\$18,692
Kirkman Rd intersection at Valencia College Dr N	EB, WB	Side street phasing change	\$4,673
Kirkman Rd intersection at Valencia College Dr N	SB	Add flashing yellow right signal	\$2,880
Kirkman Rd intersection at Valencia College Dr N	NB, EB, SB, WB	Evaluate/reconstruct/respan signal	\$52,086

Location	Location Detail	Improvement	Cost Estimate
Kirkman Rd intersection at Raleigh St	NB, EB, SB, WB	Additional through signal head per lane	\$18,692
Kirkman Rd intersection at Raleigh St	NB, EB, SB, WB	Add flashing yellow right signal	\$11,519
Kirkman Rd intersection at Raleigh St	NB, EB, SB, WB	Evaluate/reconstruct/respan signal	\$52,086
Kirkman Rd from LB McLeod Rd to Conroy Rd	East side of corridor	Extend existing shared use path	\$2,331,374
		Subtotal	\$2,872,809
		MOT (10%)	\$287,000
		Mobilization (10%)	\$316,000
		Project Unknowns (30%)	\$1,043,000
		Professional Services (30%)	\$1,356,000
		Mid-term Total	\$5,874,809

Long-Term

Long-term improvements recommended for Kirkman Road are those that can be implemented within 3 years or more. These projects can be funded through city programs (such as safety funds, bike plan implementation, or economic development funds), the City's Capital Improvements Fund, Bond Packages, or State and Federal Grants. There are opportunities to partner with developers to implement improvements that require Right-of-Way acquisitions. Since it is an FDOT corridor, there are also opportunities to partner with FDOT on FDOT-funded projects. **Table 17** shows the recommended long-term improvements for Kirkman Road.

Table 17: Recommended Long-Term Improvements

Location	Location Detail	Improvement	Cost Estimate
Kirkman Rd intersection at Conroy Rd	NB, EB, SB, WB	Intersection Control Evaluation (ICE)	\$20,000
Kirkman Rd intersection at Conroy Rd	NB, EB, SB, WB	Provide pedestrian refuge islands	\$517,102
Kirkman Rd intersection at LB McLeod Rd	NB, SB, WB	Provide pedestrian refuge islands	\$517,102
Kirkman Rd intersection at Arnold Palmer Dr	NB, EB, SB, WB	Provide pedestrian refuge islands	\$517,102
Kirkman Rd intersection at Metrowest Blvd	NB, EB, SB, WB	Provide pedestrian refuge islands	\$517,102
Kirkman Rd intersection at Metropolis Way/Sterling Crest	NB, EB, SB, WB	Intersection Control Evaluation (ICE)	\$20,000
Kirkman Rd intersection at Metropolis Way/Sterling Crest	NB, EB, SB, WB	Provide pedestrian refuge islands	\$517,102
Kirkman Rd intersection at Valencia College Dr S	NB, EB, SB, WB	Intersection Control Evaluation (ICE)	\$20,000
Kirkman Rd intersection at Valencia College Dr S	NB, EB, SB, WB	Provide pedestrian refuge islands	\$517,102
Kirkman Rd intersection at Valencia College Dr N	NB, EB, SB, WB	Intersection Control Evaluation (ICE)	\$20,000
Kirkman Rd intersection at Valencia College Dr N	NB, EB, SB, WB	Provide pedestrian refuge islands	\$517,102
Kirkman Rd from Conroy Rd to Raleigh St	Both sides of corridor	Reduce speed limit to 45 MPH	\$5,000
Kirkman Rd from Conroy Rd to Raleigh St	West side of corridor	Construct 12-ft shared use path	\$4,891,185
Kirkman Rd from Conroy Rd to Raleigh St	Median of corridor	Construct median curb and gutter to support speed management	\$6,746,635
Kirkman Rd from Conroy Rd to Raleigh St	Median of corridor	Install landscaping in existing medians for vertical friction and enclosure	\$1,613,740
Kirkman Rd from Conroy Rd to Raleigh St	Both sides of corridor	Resurface and restripe lanes to 11-ft and buffered bike lane to 7-ft	\$3,194,705
Kirkman Rd intersection at Summeroak St	NB, EB, SB	Construct signalized crosswalks with full traffic signal control	\$429,947
Kirkman Rd intersection at Pine Shadows Pkwy N	NB, SB, WB	Construct signalized crosswalks with full traffic signal control	\$429,947

Location	Location Detail	Improvement	Cost Estimate
		Subtotal	\$21,010,873
		MOT (10%)	\$2,101,000
		Mobilization (10%)	\$2,311,000
		Project Unknowns (30%)	\$7,627,000
		Professional Services (30%)	\$9,915,000
		Long-term Total	\$42,964,873

VISION ZERO CROSS



CONNECTING RESIDENTS
ON SAFE STREETS



CITY OF
ORLANDO

Report prepared by:

Kimley»Horn

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