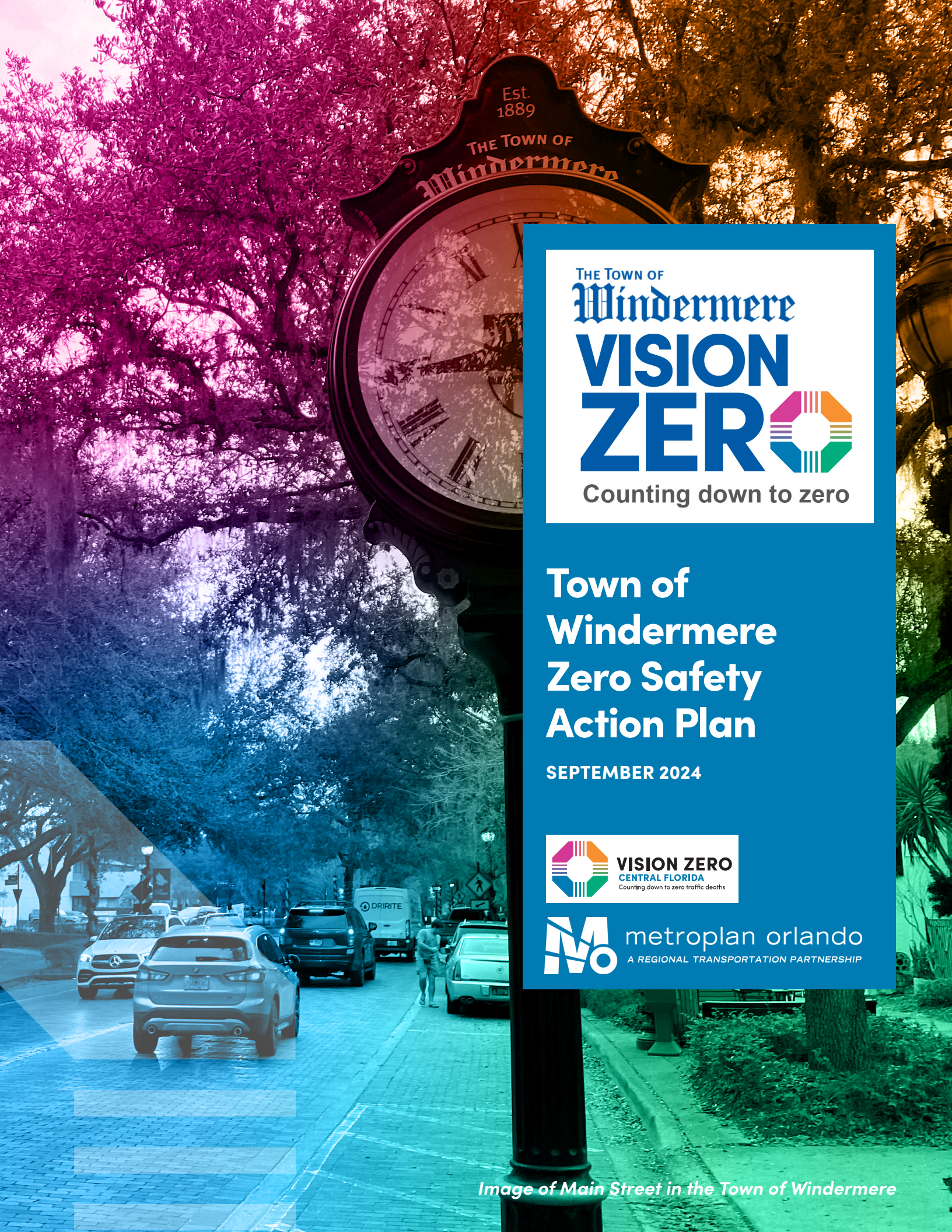

THE TOWN OF
Windermere
VISION ZERO
Counting down to zero

Town of Windermere Zero Safety Action Plan

SEPTEMBER 2024

VISION ZERO
CENTRAL FLORIDA
Counting down to zero traffic deaths

metroplan orlando
A REGIONAL TRANSPORTATION PARTNERSHIP

Image of Main Street in the Town of Windermere



Image of Town Square in the Town of Windermere



Image of Main Street in the Town of Windermere

Preparation of this Safety Action Plan was funded by a $3.79 million Safe Streets and Roads for All Federal grant that was awarded to MetroPlan Orlando.

Statement of Protection of Data from Discovery and Admissions

SECTION 148 OF TITLE 23, UNITED STATES CODE REPORTS DISCOVERY AND ADMISSION INTO EVIDENCE OF CERTAIN REPORTS, SURVEYS, AND INFORMATION — Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for any purpose relating to this Vision Zero Safety Action Plan, shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at the location identified or addressed in the reports, surveys, schedules, lists, or other data.

Key Terms

Crash/Collision – An occurrence where a road user collides with another road user, such as a car or truck, motorcyclist, bicyclist, pedestrian, animal, road debris, or other moving or stationary obstruction, such as a tree, pole or building, that may result in in injury or loss of life, trauma, and/or property damage. Crashes can involve a single party or multiple parties.

Serious Injury – May also be referred to as an incapacitating injury. Serious injuries may include broken bones, severed limbs, burns, traumatic brain injuries, and other major injuries. These injuries usually require hospitalization and transport to a medical facility.

High Injury Network – The mapping of corridors where high numbers of people have been killed and severely injured in traffic crashes.

KSI Crash – A crash that results in someone being killed or seriously injured.

Transportation Underserved Communities – Communities where people experience greater transportation inequities to access jobs, housing, food, health care, education and other destinations due to overlapping factors, including demographics, features of the built environment, and in some instances a lack of prior investment in the transportation system.

Vision Zero – A road safety philosophy which states that no loss of life or incapacitating injury due to traffic crashes is acceptable.

Safe System Approach – a guiding safety approach that builds and reinforces multiple layers of protection to both prevent crashes from occurring and minimize the harm caused to those involved when a crash does occur.

Vulnerable Road User – for the purposes of this Action Plan, a person outside of a car or truck, which includes pedestrians, bicyclists, or motorcyclists. This also includes people in wheelchairs and on e-mobility devices, like scooters.

List of Abbreviations

ADA – Americans with Disabilities Act

ATP – Active Transportation Plan

CAC – Community Advisory Committee

CAV – Connected and Autonomous Vehicle

CBO – Community–Based Organization

CIP – Capital Improvement Plan

DUI – Driving Under the Influence

EMS – Emergency Medical Services

ETC – Equitable Transportation Community

FDOT – Florida Department of Transportation

FHP – Florida Highway Patrol

FHWA – Federal Highway Administration

HIN – High Injury Network

HISP – Highway Safety Improvement Plan

ITS – Intelligent Transportation Systems

KSI – Killed or Severely Injured

LPI – Leading Pedestrian Interval

MTP – Metropolitan Transportation Plan

NHTSA – National Highway Traffic Safety Administration

PPL – Prioritized Project List (PPL)

PHB – Pedestrian Hybrid Beacon

RRFB – Rectangular Rapid Flashing Beacon

SRTS – Safe Routes to School

SS4A – Safe Streets and Roads for All

SSA – Safe System Approach

TIP – Transportation Improvement Plan

TAC – Technical Advisory Committee

USDOT – United States Department of Transportation

Town of Windermere

Vision Zero Safety Action Plan

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Executive summary: Safer streets for everyone

Overview of key takeaways from the Action Plan.

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Chapter 1: Windermere Has a Vision of Zero Crashes

Introduction to Vision Zero and the Safe System Approach.

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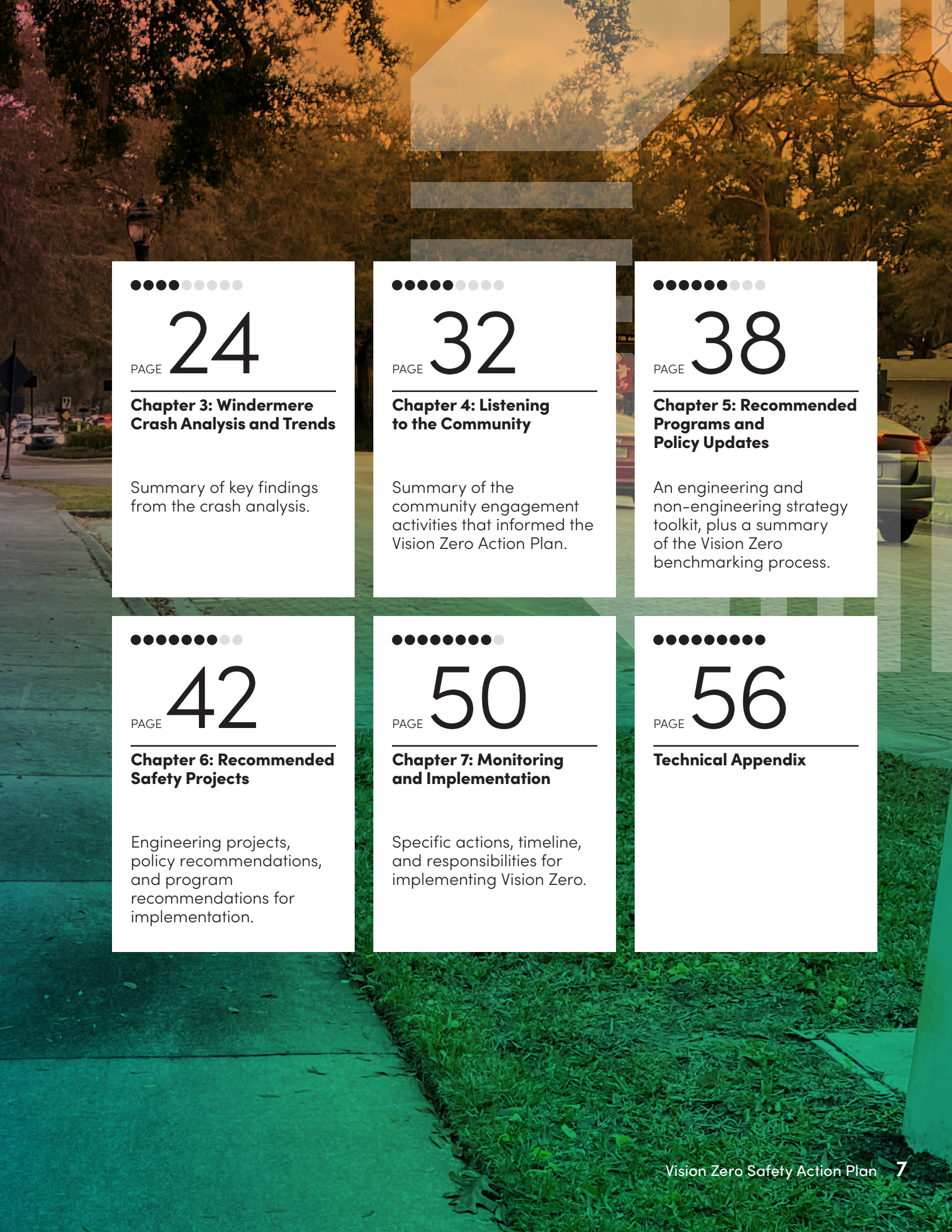
Chapter 2: Vision Zero Statement and Plan Framework

Overview of components, actions, next steps, and key takeaways from the Action Plan.

Image of a sidewalk along Main Street in the Town of Windermere



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Chapter 3: Windermere Crash Analysis and Trends

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Chapter 6: Recommended Safety Projects

Engineering projects, policy recommendations, and program recommendations for implementation.

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Chapter 7: Monitoring and Implementation

Specific actions, timeline, and responsibilities for implementing Vision Zero.

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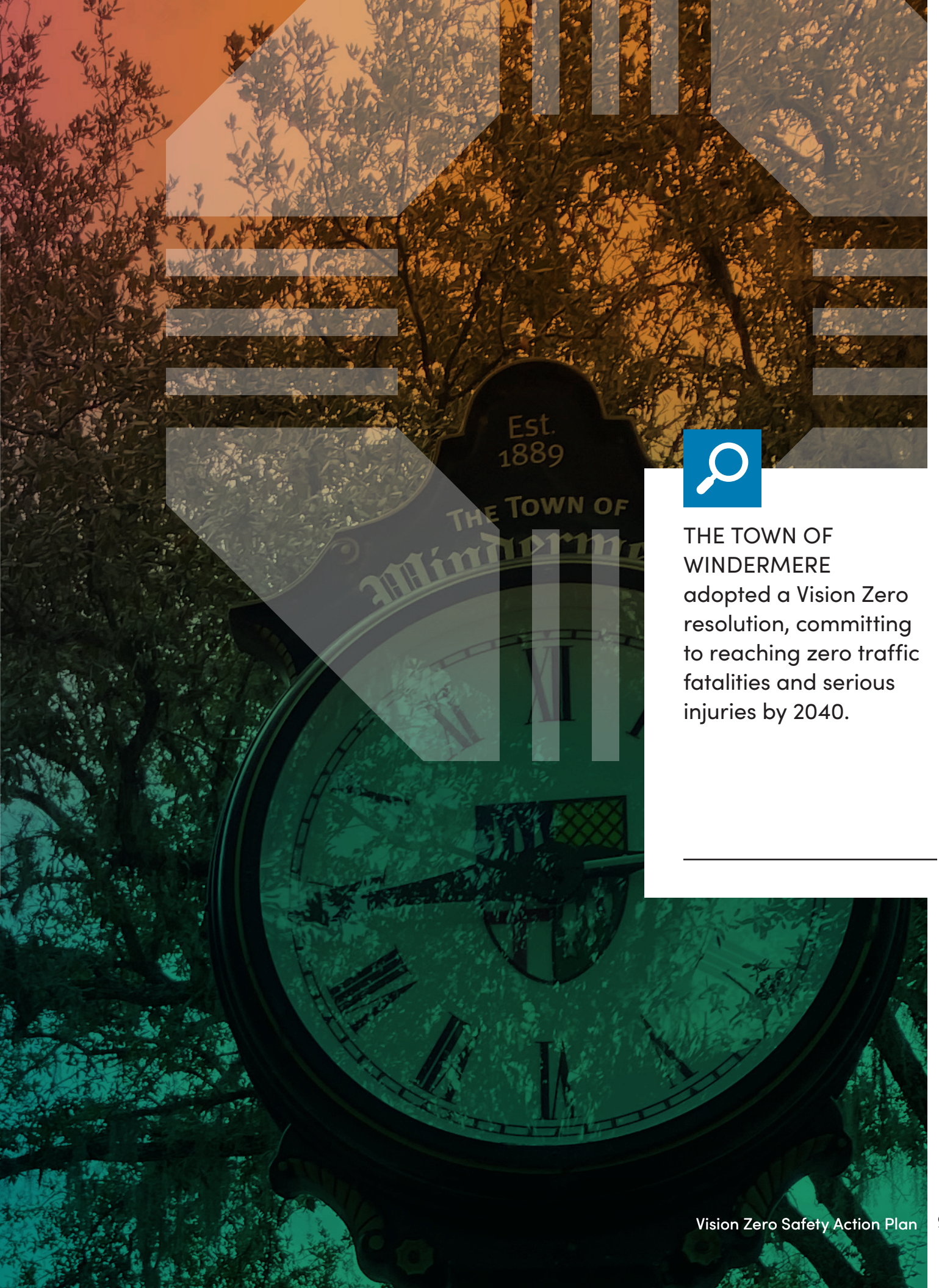
Technical Appendix

Safer streets for everyone

Image of lorem ipsum dolor sit in Town of Windermere



THE TOWN OF WINDERMERE adopted a Vision Zero resolution, committing to reaching zero traffic fatalities and serious injuries by 2040.

Vision Zero is a road safety philosophy stating no loss of life or incapacitating injury due to traffic crashes is acceptable. The **Town of Windermere adopted a Vision Zero policy on November 23, 2023**. This Vision Zero Safety Action Plan is the Town's roadmap to reaching the goal of zero.

This plan is part of a larger regional safety effort funded by a $3.9 million Safe Streets for All (SS4A) grant and conducted by MetroPlan Orlando, the metropolitan planning organization for Orange, Osceola, and Seminole Counties. MetroPlan guides the region toward envisioning a 25-year plan for transportation for all Central Floridians.

Safety is a primary focus of this Safety Action Plan; during a typical year in the MetroPlan Orlando Region, **230 people are killed and 1,219 people are seriously injured** in traffic crashes on our roads. In the last five years in Windermere, **0 people have been killed and three serious injury traffic crashes occurred**. To address this reality, this Safety Action Plan turns to the core elements of **Vision Zero** and the **Safe Systems Approach**.

What are the Transportation Safety Issues?

A large share of fatal or serious injury crashes happens on a small percentage of the overall roadway network. While most crashes only involve people in motor vehicles, crashes that result in a fatality or severe injury disproportionately involve someone walking, bicycling or riding a motorcycle. Compared with the rest of the region, Windermere did not experience many fatal or serious injury crashes in the past five years (2018 to 2022), as shown in **Figure 1** and **Figure 2**.

Figure 1: % of Fatal and Serious Injuries in Orange County

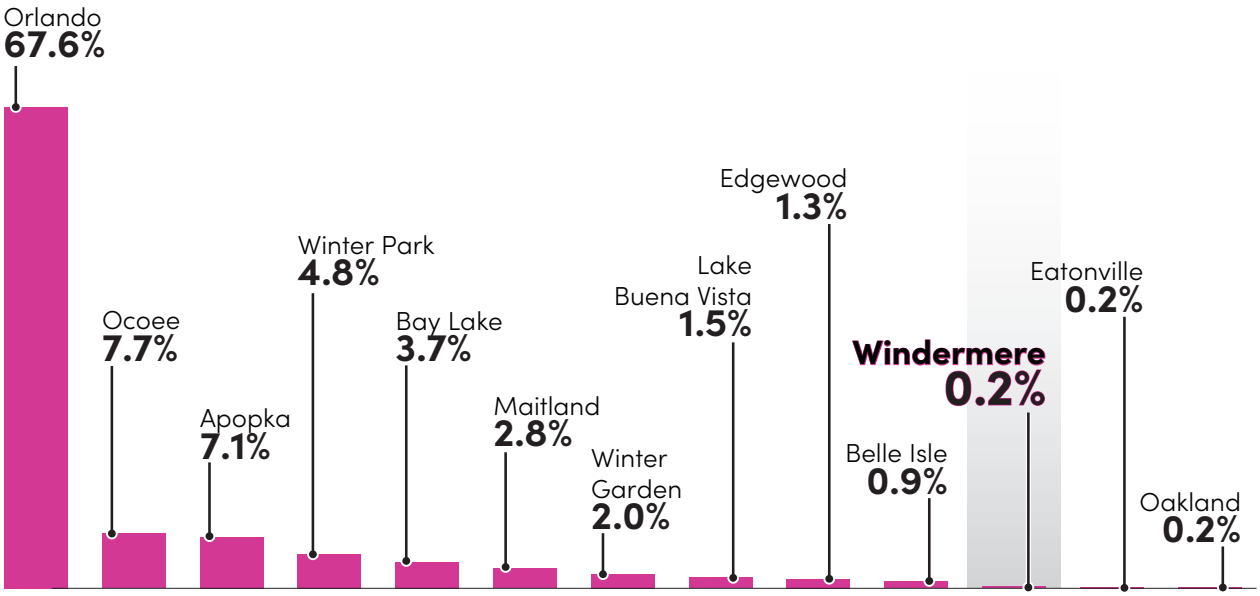
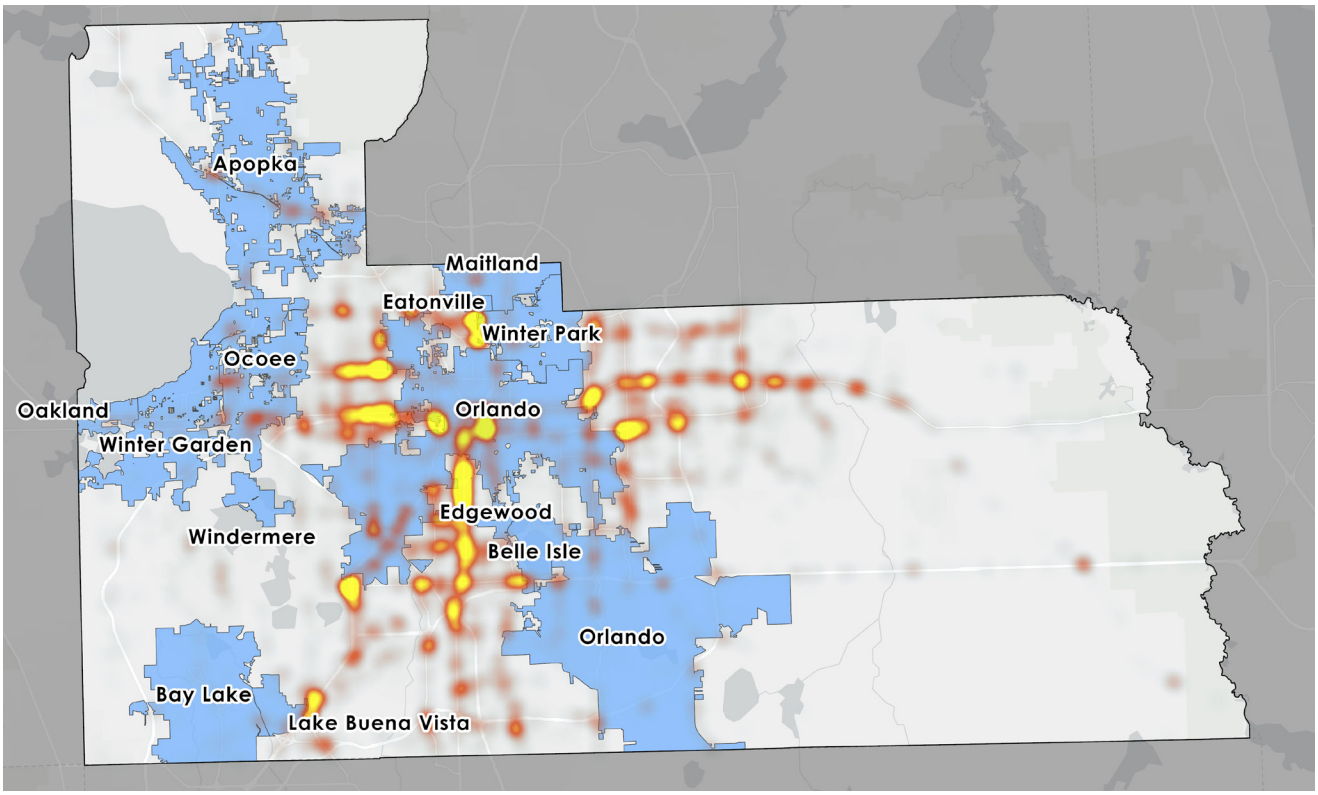


Figure 2: Heat Map of Fatal and Serious Injury Crashes (2018 to 2022) in Orange County



This plan identifies Windermere's **High Injury Network (HIN)**, which is a mapping of corridors where people have been severely injured in traffic crashes in the past five years. All of the Town's traffic serious injuries occurred on 8 percent of the centerline miles within the Town.

Getting to Zero

There is no one solution to reach zero traffic deaths and serious injuries in the region. Rather, it will require a multidisciplinary and collaborative approach.

Community outreach was a component of identifying transportation safety issues in Windermere. This plan summarizes the community outreach that was conducted as a part of this plan and how that feedback was incorporated.

This plan also provides tailored, SSA-compliant non-engineering and engineering countermeasures Windemere can take in collaboration with MetroPlan Orlando and others in the region. Finally, this plan provides monitoring strategies the Town can use to track its progress toward zero and, in **Appendix A**, a 2024 SS4A Action Plan Component Checklist that demonstrates this plan qualifies for Supplemental Planning and Demonstration as well as Implementation Grant funds through the SS4A program.

Vision Zero Policy

The Town of Windermere's Vision Zero Policy adopted Vision Zero as the policy for road and traffic safety and commits to zero fatalities and zero severe injuries by 2050. A copy of the resolution is provided in **Appendix B**.

Vision Zero Action Items

The actions in this plan are organized around the Vision Zero Core Elements in the Safe System Approach. This Plan recognizes that infrastructure alone cannot solve the transportation safety crisis and it will take a combination of actions that trigger road modifications, road user behavior change, improved post crash care, travel speed reductions, and safer vehicles.

Prioritized projects include a variety of countermeasures including signal timing modifications, roadway lighting, and access management modifications. The Action Plan draws from these sources to focus on key countermeasures and strategies for the Town of Windermere which are included in **Chapter 6: Recommended Safety Projects**.

Some of the potential countermeasures proposed in the Town of Windermere projects include:

- Installing high visibility crosswalks
- Enhancing multimodal connections by constructing Ward Trail
- Adding speed feedback signage
- Constructing sidewalks where there are existing gaps







Action Plan development included a comprehensive policy and plan review to identify opportunities for actions to help reach Vision Zero and are provided in **Chapter 5: Recommended Programs and Policy Updates**. Some of the actions to explore included:



Safer People:

- Sharing educational content about safety countermeasures
- Developing an educational program focused on providing the latest information about safety countermeasures



Safer Roads:

- Update the Bicycle and Pedestrian Master Plan
- Developing a Quick-build program



Safer Speeds:

- Formalize the Town's current approach to setting speed limits based upon context

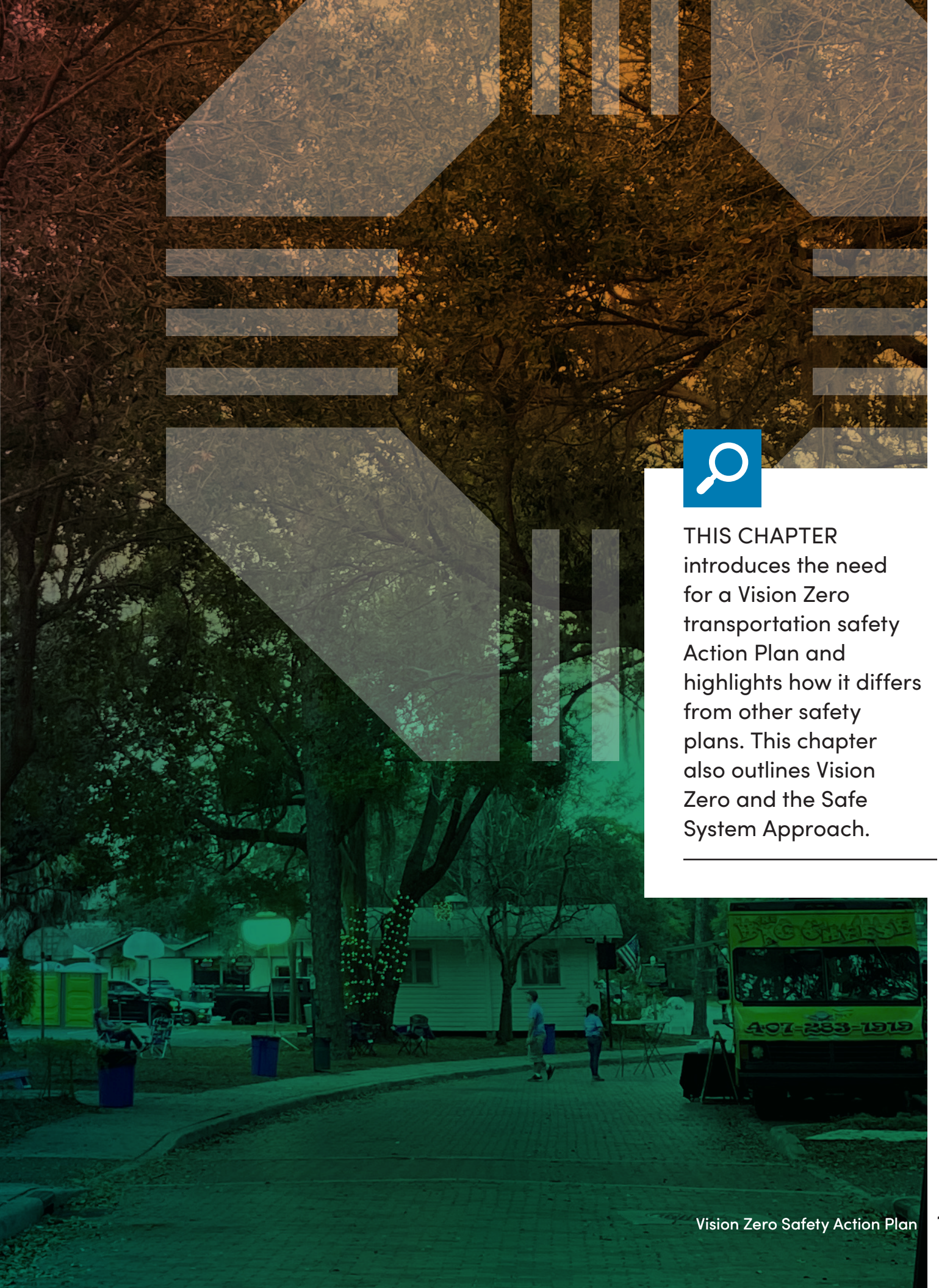
There are also actions related to monitoring of progress recommended in this Plan in **Chapter 7: Monitoring and Implementation**.

CHAPTER 1

Windermere Has a Vision of Zero Crashes



Image of Town Square in the Town of Windermere



THIS CHAPTER introduces the need for a Vision Zero transportation safety Action Plan and highlights how it differs from other safety plans. This chapter also outlines Vision Zero and the Safe System Approach.

This **Vision Zero Safety Action Plan** is based on concrete, data-backed safety solutions.

Vision Zero Makes Our Roads Safer

Vision Zero is a road safety philosophy that views a**ny loss of life or incapacitating injury due to traffic crashes as unacceptable**. Vision Zero aims to eliminate crashes that result in death and serious injuries on our roads by anticipating human mistakes and minimizing impacts on the human body when crashes do occur. To accomplish this goal, Vision Zero draws from the **Safe System Approach (SSA)**.

How Is Vision Zero Different?

1. ***Reframes traffic deaths as preventable.***
2. ***Integrates human failure into the approach.***
3. ***Focuses on preventing fatal and severe injury crashes rather than eliminating all crashes.***
4. ***Aims to establish safe systems rather than relying on individual responsibility.***
5. ***Applies data-driven decision-making.***
6. ***Establishes road safety as a social equity issue.***

What Does a Vision Zero Safety Action Plan Include?

High Injury Network: Data analysis to identify places on the transportation system with the greatest risk for fatal and serious injury crashes.

Equity: Efforts to identify and prioritize disadvantaged communities that are disproportionately affected by traffic crashes.

Priority Streets and Intersections: A list of feasible projects that could significantly improve safety for the region.

Educational and Enforcement Programs: Key behavioral changes needed to reduce crashes and ways to encourage people to make those changes.

Sustained Effort: A defined process and organization responsible for carrying out, updating, and monitoring progress.

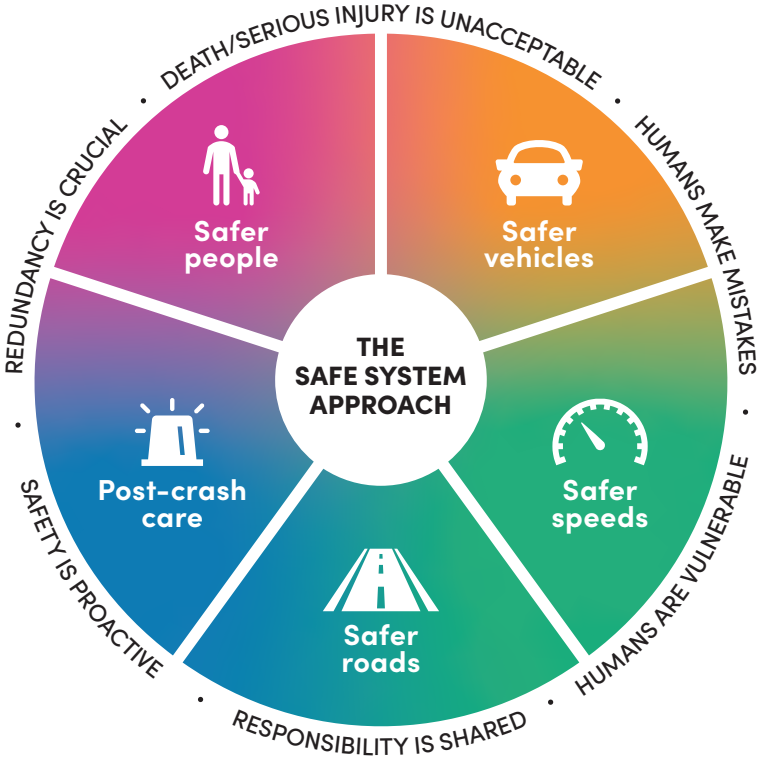
Public Engagement: Lessons learned from the local community.

Outcome: Identified projects for MPO or local jurisdiction priority projects lists for funding and implementation.

Vision Zero Relies on the Safe System Approach

As an engineering strategy, the SSA insists the responsibility for safety must be shared between all road users, including drivers, motorcyclists, bicyclists, and pedestrians, and those who plan, design, maintain, and enforce the transportation system.

The SSA defines the five elements of a safe transportation system—**safer people, safer vehicles, safer speeds, safer roads, and post-crash care**—and treats these elements as interrelated. The approach relies on layering interventions in each of these areas atop one another to provide cumulative, redundant safety for all users.



Source: Adapted from Federal Highway Administration, 2024.



Safer people: Encourage safe, responsible driving, bicycling, and walking behavior by people who use the roads and create conditions that prioritize their ability to reach their destination unharmed.

Safer vehicles: Proactively plan for a connected and autonomous vehicle fleet and encourage the purchase of vehicles that feature crash prevention technology.

Safer speeds: Use a multidisciplinary approach that induces drivers to travel at speeds appropriate for the context, thus reducing injuries even when human error leads to a crash.

Safer roads: Prioritize roadway design changes, inclusive of bike lanes, sidewalks, crosswalks, and intersections, that address the factors contributing to severe injury and fatal crashes.

Post-crash care: Partner with law enforcement and emergency response to identify strategic investments in crash response and to clearly prescribe protocols for uniform, comprehensive, and consistent crash assessment and crash reporting.

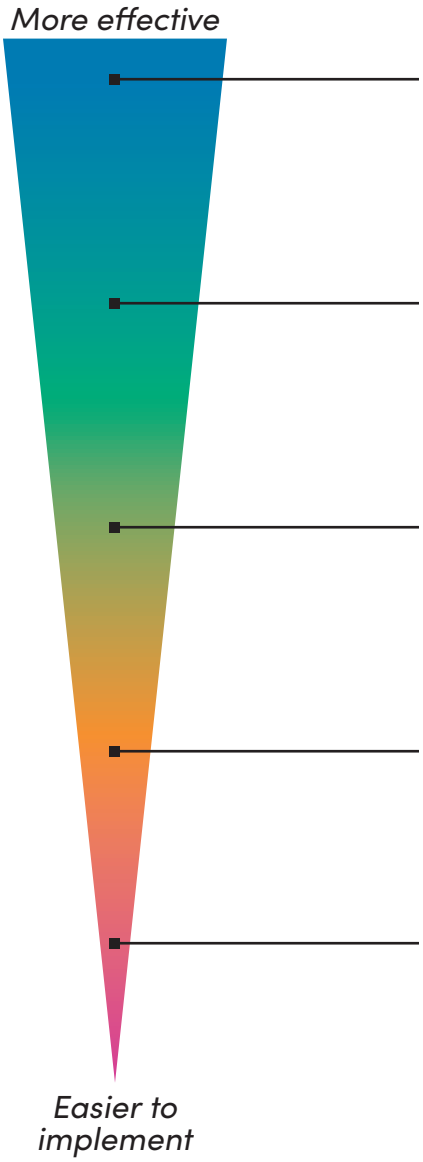
Safe System Approach Framework

Achieving a safe system requires the coordination of planning, design, operations, and law enforcement to anticipate human error and proactively compensate for human vulnerabilities.

As shown by **Figure 3** to the right, the SSA tiers roadway interventions broadly by their impact. While this hierarchy offers a general prioritization of safety projects, the SSA does not present a one-size-fits-all solution to roadway safety officials. Instead, the approach prioritizes context-sensitive design. Every site in a region's HIN will require a different combination of countermeasures depending on what the crash trends reveal at those locations.

The SSA treats safety as a systemic quality and requires regional partners to work together. As such, this Action Plan is meant to work in tandem with MetroPlan Orlando's Regional Vision Zero Safety Action Plan and other concurrent safety efforts being undertaken by Orange, Osceola and Seminole Counties.

Figure 3: FHWA Safe Systems Solutions Hierarchy



Remove severe conflicts

Eliminate the most severe conflicts between road users, such as by relocating a utility pole, constructing a roundabout, or adding a median barrier.

Manage vehicle speeds

Reduce the speed of vehicles to align with the context of the road, hazards, and conflicts between road users; include horizontal and vertical deflection elements.

Manage conflicts in time

Where conflicts cannot be removed, consider if they can be separated temporally through signal timing or by providing dedicated space for other road users.

Increase attentiveness and awareness

Where conflicts cannot be removed, work to improve the visibility of the conflicts.

Implement enforcing features to slow traffic

Features like speed feedback signs can help enforce the desired speed.

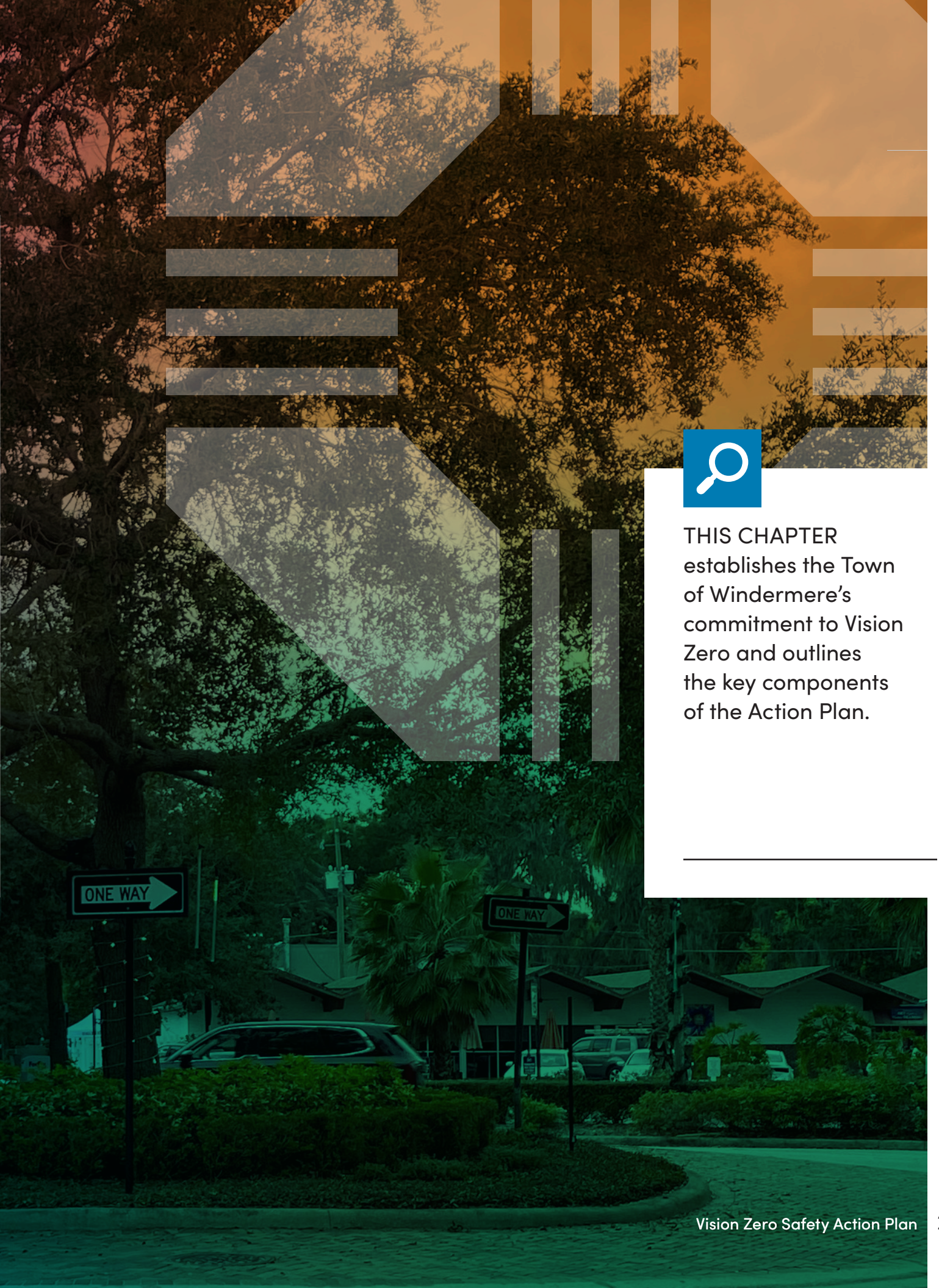
Source: Modified from Federal Highway Administration, 2024.

CHAPTER 2

Vision Zero Statement and Plan Framework



Image of Main Street in the Town of Windermere



THIS CHAPTER establishes the Town of Windermere's commitment to Vision Zero and outlines the key components of the Action Plan.



Image of the roundabout on Main Street in the Town of Windermere

The Town of Windermere is committed to eliminating deaths and serious injuries by 2050 through a local and regional safety approach that is proactive, data-informed, and community-based. Implementing the projects and strategies identified in the **Vision Zero Safety Action Plan** will help us achieve the vision of **safer, accessible**, and **convenient** travel in Windermere for all road users, especially the most vulnerable road users. As of 2023, only three serious injury crashes and zero fatal crashes occurred in Windermere from 2018 to 2022.

Vision Zero Safety Action Plan Outline

This Safety Action Plan plays a key role in eliminating fatal and serious injury crashes. The subsequent sections will:

1. **Identify Windermere's HIN**, which is a network comprised of area roads that pose the highest risk of death and serious injury crashes. We know that 41 percent of the region's deaths occur on 2 percent of our roads. In Windermere, 100 percent of the Town's serious injury crashes occur on 8 percent of the roads.

2. **Prioritize feasible projects** that will have the greatest safety impacts.

3. **Recommend policy updates** that will support design and maintenance of safe roads.

4. **Define next steps** so the Town can begin working with MetroPlan Orlando, the Florida Department of Transportation (FDOT), and Orange County to implement changes and monitor long-term progress towards roadway safety.

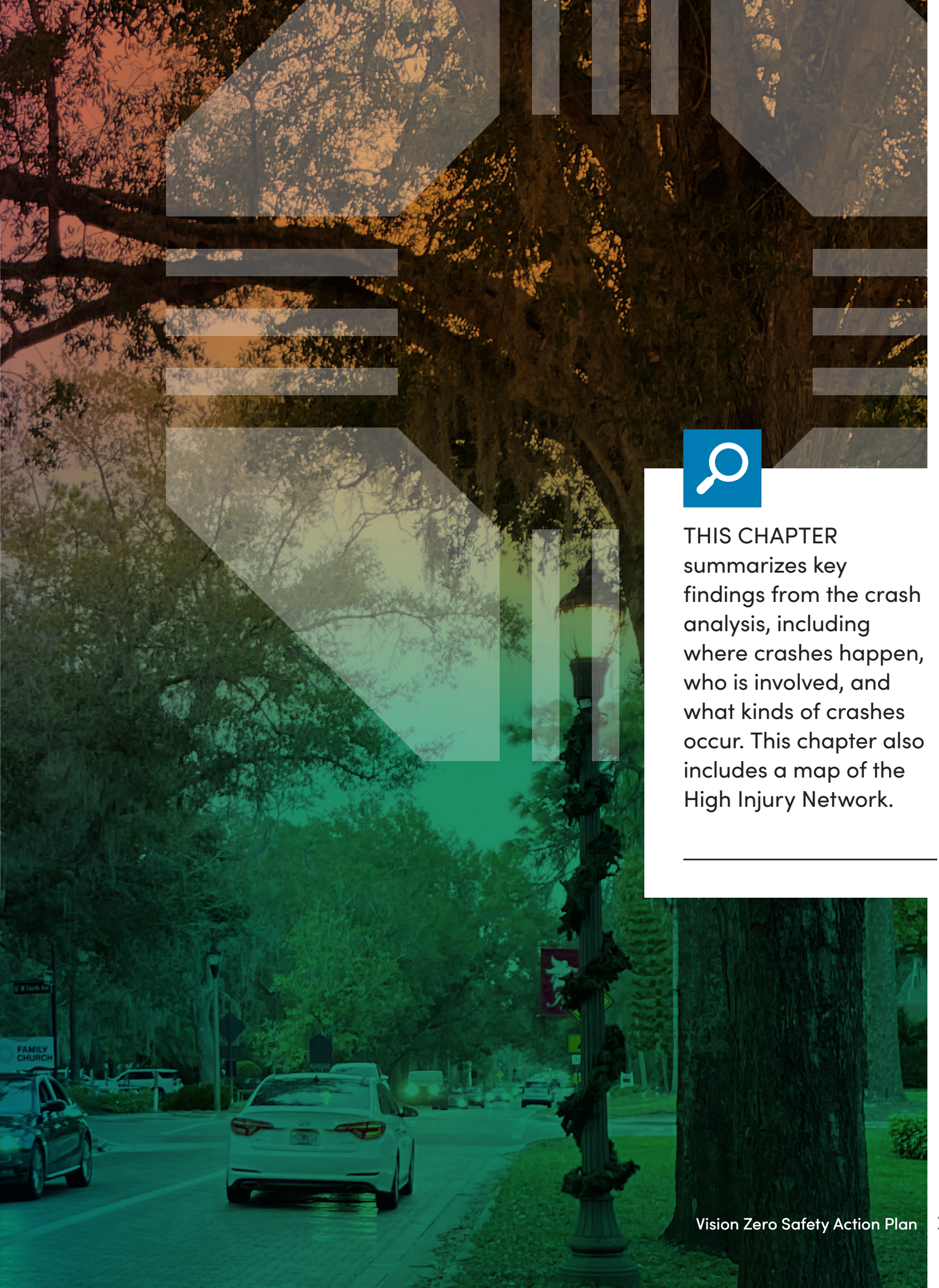
This Safety Action Plan is the result of a coordinated planning effort led by the Town of Windermere Working Group and supported by MetroPlan Orlando, local governments, and the Florida Department of Transportation.

CHAPTER 3

Windermere Crash Analysis and Trends



Image of Main Street in the Town of Windermere



THIS CHAPTER summarizes key findings from the crash analysis, including where crashes happen, who is involved, and what kinds of crashes occur. This chapter also includes a map of the High Injury Network.

To provide Windermere's residents, visitors, and businesses with the most impact, this plan identifies the areas of the Windermere roadway network that pose the greatest safety threats to users. This section identifies trends in Windermere crash data to form the Town's **High Injury Network (HIN)**.

Who Is Involved in Crashes?

The MetroPlan Orlando Region experiences an **annual average** of:

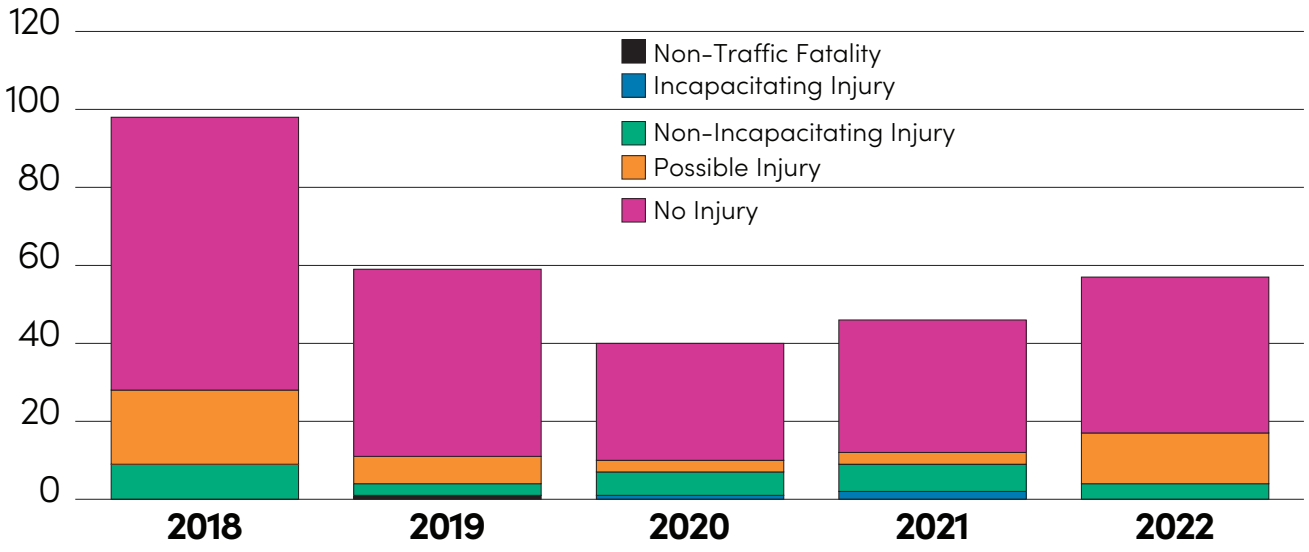
- **1,900** serious injury crashes
- **300** fatalities from crashes[1]

Windermere experiences around 60 crashes each year. Between 2018 and 2022, Windermere had:

- **3** severe injury crashes
- **29** non-incapacitating injury severe crashes
- **45** possible injury crashes
- **222** property damage crashes
- **98%** of crashes involved automobiles

Windermere represents only **a fraction** of all fatal and serious injury crashes within the region. A review of all crashes in Windermere by severity is shown in **Figure 4**.

Figure 4: All Crashes by Year, Town of Windermere[2]



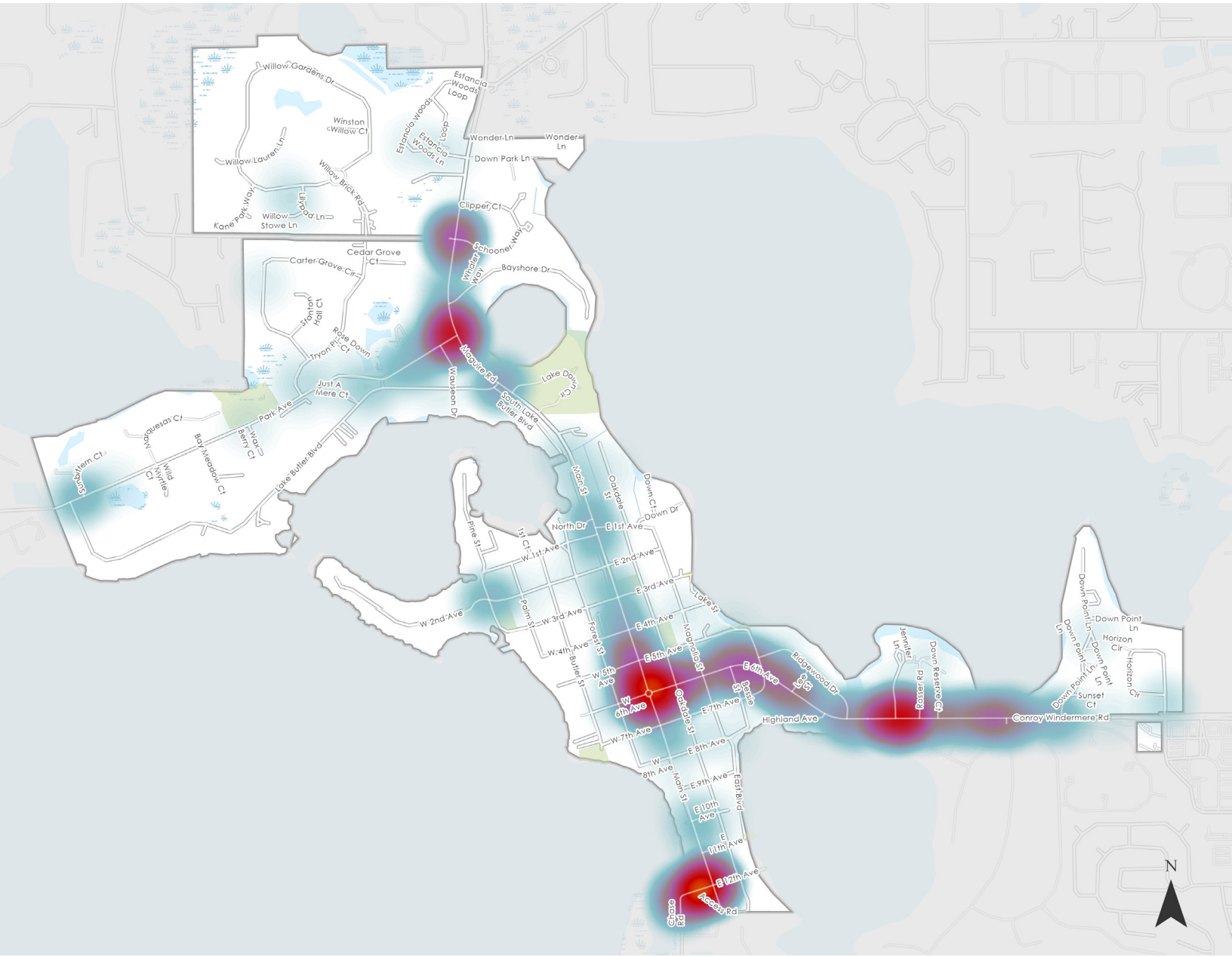
1 Crash data is primarily obtained from Signal 4 Analytics (Signal 4), with Signal 4 data based on data from Florida's statutory custodian of records, the Florida Department of Highway Safety and Motor Vehicles (FLHSMV). This crash analysis included data from Signal 4 Analytics from 2018-2022.

2 Includes Limited Access Facilities based on data from Signal 4 Analytics from 2018 to 2022.

Where Are Crashes Happening?

Most crashes in Windermere occur along major collector roads, including Main Street and 6th Avenue/ Conroy Windermere Road. Some crashes also occur along minor collector roads such as Park Avenue. Crashes are most frequent at the intersections of these collector roads. Crash locations are presented in **Figure 5**.

Figure 5: Crash Locations in Windermere

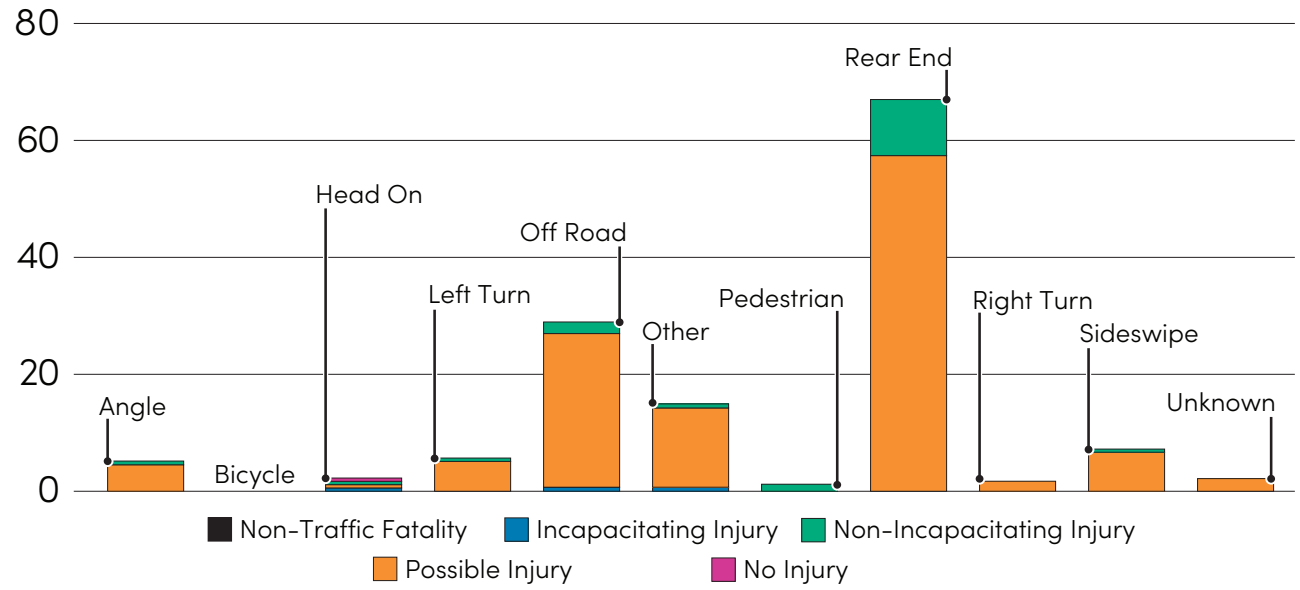


What Type of Crashes Are Happening?

The types of crashes occurring in Windermere are summarized in **Figure 6**. There is a high percentage of off-road crashes in the Town.

- **52%** are rear-end crashes
- **19%** are off-road crashes
- **1%** are pedestrian or bicycle crashes

Figure 6: Types of Crashes (2018 to 2022)



What Behaviors Contribute to Crashes?

A combination of behavioral factors can contribute to a crash and a summary is provided in **Table 1**.

Table 1: Factors Contributing to Crash Outcomes in Windermere

BEHAVIOR	TOTAL NUMBER OF CRASHES	% OF ALL CRASHES
Alcohol or drugs involved	16	5%
Distraction	76	25%
Aggressive driving	15	5%
Not wearing a seatbelt	3	1%

Note: Some crashes may have multiple factors.

Transportation and Safety in Underserved Communities

Every community has its unique transportation advantages and disadvantages based on a variety of factors, such as land use, road network characteristics, and demographics.

Sometimes, access to transportation varies wildly between communities. To better understand where transportation disadvantage occurs—that is, where people are unable to access their daily transportation needs regularly, reliably, and safely—the U.S. Department of Transportation developed several factors to identify transportation-disadvantaged communities which serve as the basis of MetroPlan Orlando's Transportation for All: Overcoming Obstacle report.

In the MetroPlan Orlando region, 25 percent of the regional population lives in a community considered to be transportation disadvantaged, and half of crashes occur in transportation-underserved communities, with more of those crashes leading to a severe injury or fatality. Windermere does not include any transportation-disadvantaged communities identified within MetroPlan Orlando's Transportation for All: Overcoming Obstacle report or by US Department of Transportation's Justice40 areas.

High Injury Network

A High Injury Network (HIN) represents the corridors and intersections in Windermere where a disproportionate number of fatal or serious injury crashes occur, with added emphasis on crashes involving people walking, bicycling, and motorcycling. The network assists the Town of Windermere and its partner jurisdictions in prioritizing locations where safety improvements will bring the largest benefit. The High Injury network segments and intersections are shown in **Figure 7** and **Figure 8**. Details of the HIN's development are provided in the **Appendix C**.

Figure 7: Map of High Injury Network

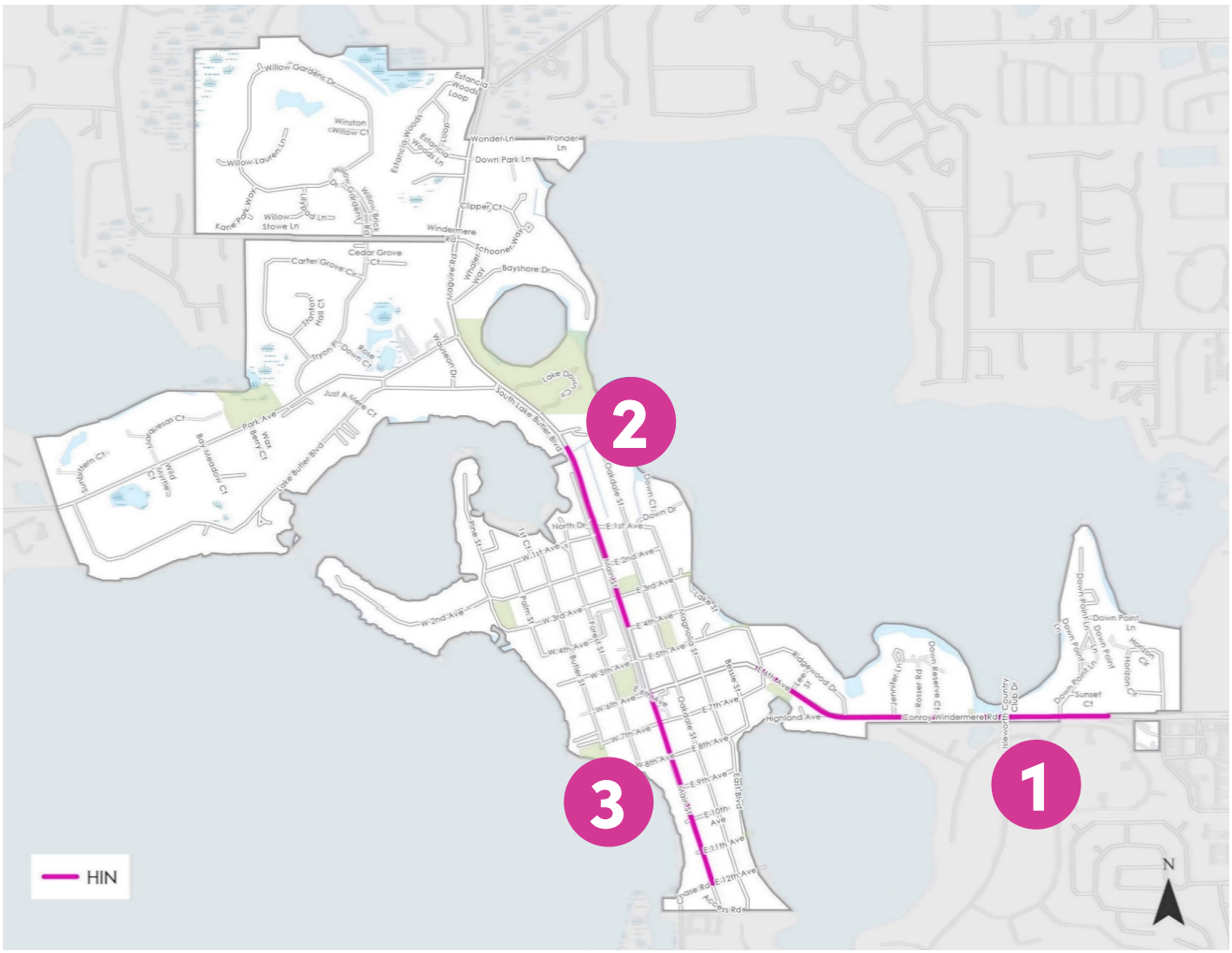


Table 2: High Injury Network Segments

ROADWAY NAME (EXTENTS)	LENGTH	SERIOUS INJURY CRASHES	NON-INCAPACITATING/ POSSIBLE INJURY CRASHES	NO INJURY CRASHES	BIKE/PED CRASHES
1. E 6th Ave (Lake Street to Town Border)	0.95 mi	1	22	57	1
2. Main Street (Maguire Rd to E 4th Ave)	0.49 mi	1	2	7	1
3. Main Street (6th Ave to Chase Rd)	0.52 mi	1	5	47	0

Figure 8: Map of High Injury Network Intersections

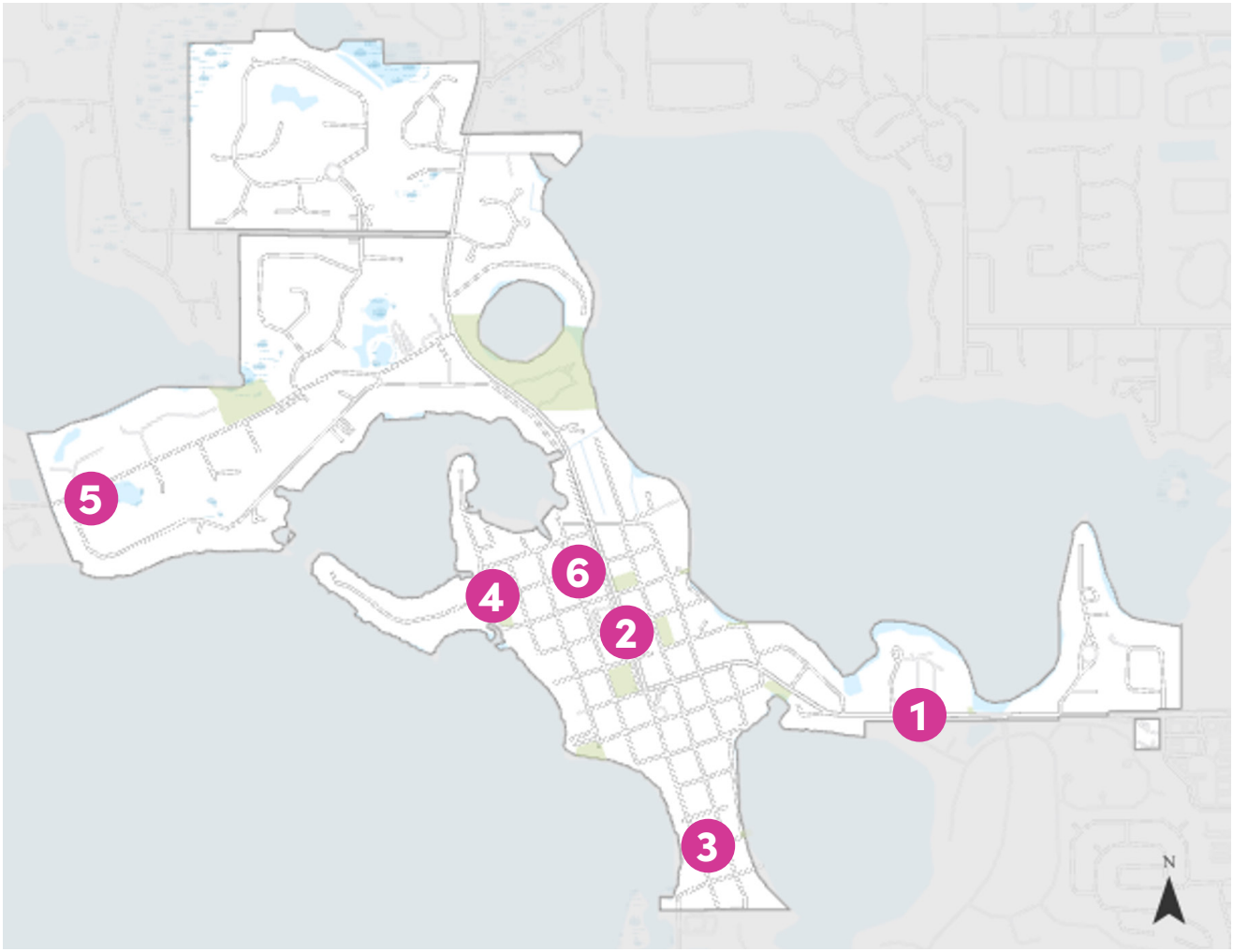


Table 3: Summary of High Injury Network Intersections

INTERSECTION	SERIOUS INJURY	LENGTH	SERIOUS INJURY CRASHES	NON-INCAPACITATING/ POSSIBLE INJURY CRASHES
1. Conroy Windermere Rd & Rosser Rd	1	4 mi	3	1
2. Main St & E 4th Ave	0	1 mi	4	1
3. Main St & E 11th Ave	1	0 mi	0	0
4. Pine Street & W 2nd Avenue	0	1 mi	3	1
5. Park Ave & Sunbittern Ct	0	1 mi	3	1
6. Forest St & W 2nd Ave	0	0 mi	1	1

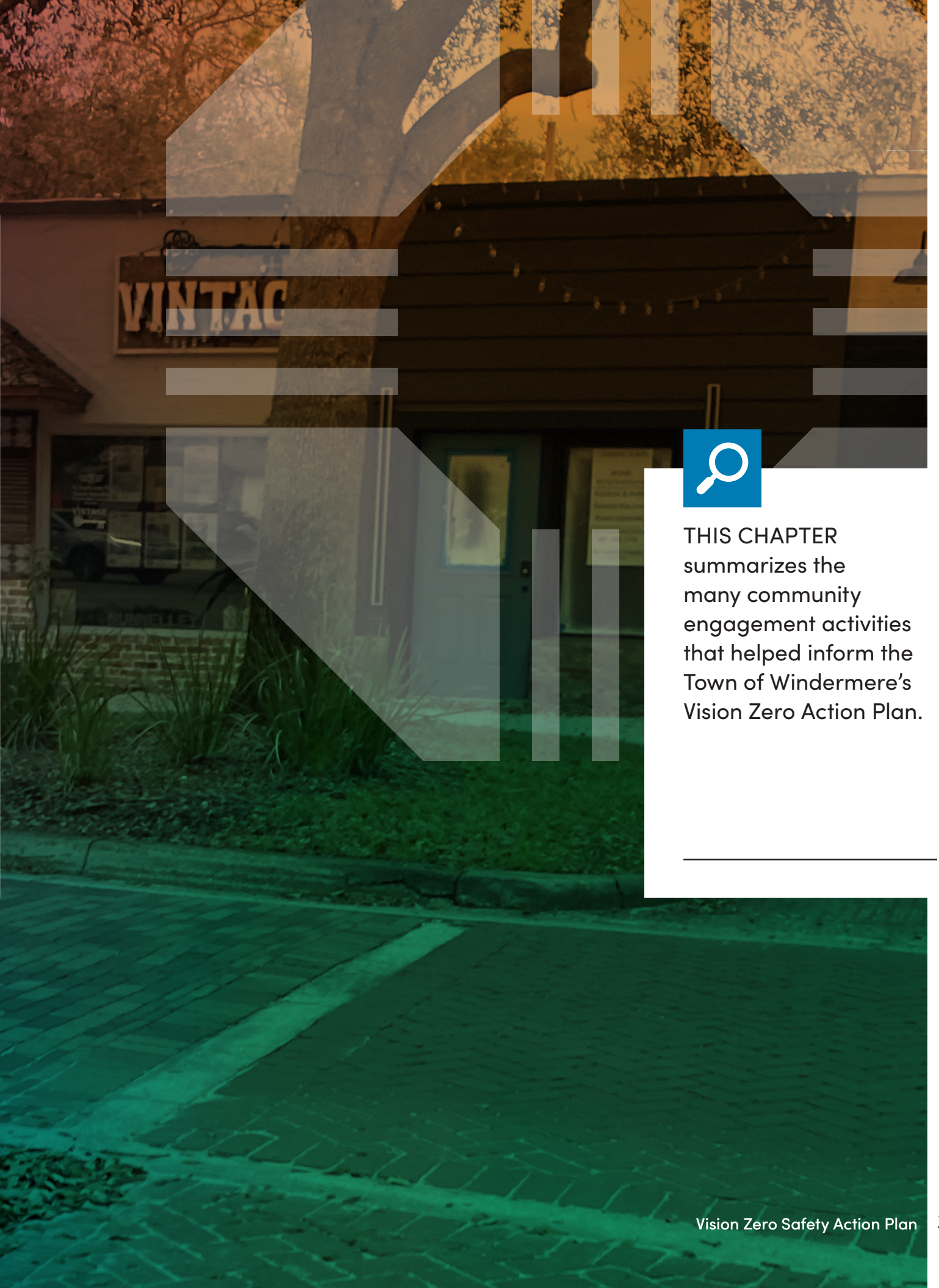


CHAPTER 4

Listening to the Community



Image of Main Street in the Town of Windermere



THIS CHAPTER summarizes the many community engagement activities that helped inform the Town of Windermere's Vision Zero Action Plan.

MetroPlan Orlando reached out to regional stakeholders (including local agency staff, elected officials, safety partners, law enforcement, and first respondents), as well as residents and visitors, to gain an understanding of how the people who live, work, and visit the region and Windermere experience its roadways.

Regional Engagement Efforts

The engagement strategies deployed as part of the MetroPlan Orlando Regional Vision Zero Safety Action Plan complement strategies at the county and local plan levels. Cumulatively, these strategies spread awareness and engagement much more broadly than any single agency could.

Task Force, Steering Committees and Working Group

A regional **Vision Zero Task Force** provided feedback and strategic guidance throughout the preparation of the plan. This task force included people representing local agencies, FDOT, public health officials, medical professionals, bicycling and pedestrian advocacy groups, and members of the public. The Task Force provided key feedback on the technical analysis, public engagement strategies, policy benchmarking, action plan elements, and project prioritization criteria.

Hub Site

To supplement information provided on the MetroPlan Orlando website, a Hub Space was developed to provide one centralized location for sharing of safety information. The site provides an overview of the Vision Zero Safety Action Plan process and purpose, an interactive HIN dashboard, and crash data by jurisdiction. The hub also allows visitors to provide feedback, comments, testimony, and specific locations of concern.

The site is intended to live on beyond the preparation of this action plan and serve as a clearinghouse for information and Vision Zero updates. The site can be accessed at VisionZeroCFL.gov or by using the QR code. The crash dashboard will be updated on an annual basis as part of progress monitoring.

Public Feedback

The hub has collected over 650 comments from 350 people were provided as of April 2024. Of the feedback received, the majority were from Orange County (84 percent), with Osceola and Seminole Counties having lower response rates (7 percent and 9 percent, respectively).

Approximately 30 percent of comments were made about transportation facilities within transportation-underserved communities, slightly higher than the regional percentage of people who live in transportation underserved communities (25 percent).

Common themes that emerged from the feedback:

Improved infrastructure

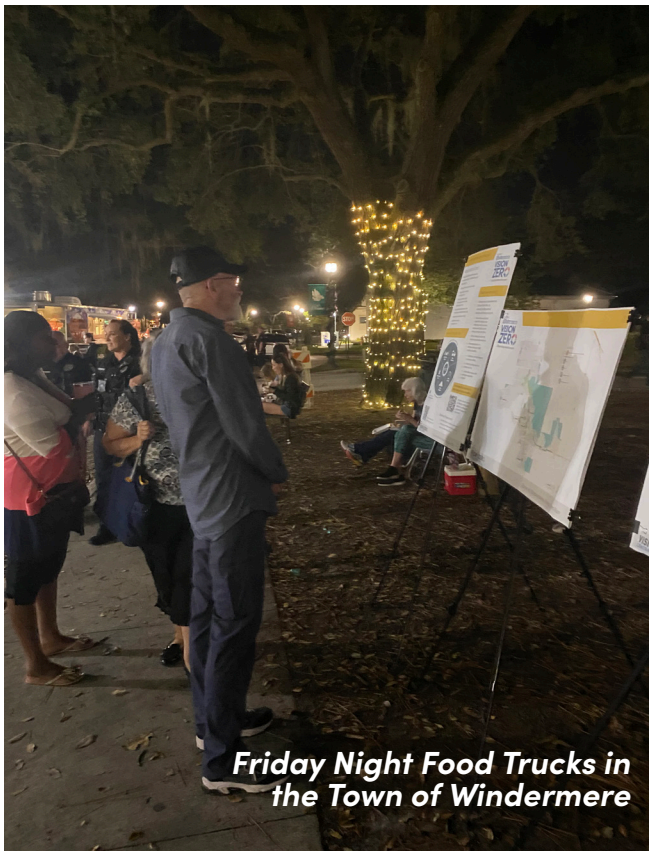
- Especially for people walking, bicycling and taking transit

More education

- Directed at all road users to cultivate safe walking, bicycling, and driving habits

More enforcement of prevalent behaviors such as:

- Excessive speeding
- Driving golf carts on sidewalks
- Phone use while driving



Friday Night Food Trucks in the Town of Windermere

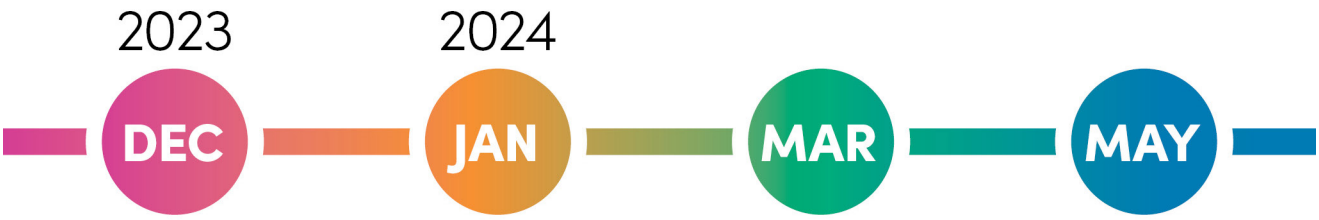


Friday Night Food Trucks in the Town of Windermere

Town of Windermere Engagement

Working Group

The Working Group led the planning effort for the Town of Windermere. It included representatives from public services and police departments. The Working Group met at key points in the development of the Vision Zero Safety Action Plan.



December 1, 2023
Overview of the project approach

January 17, 2024
Development of the High Injury Network

March 26, 2024
Draft projects and programs

May 23, 2024
Finalize projects and prioritization

Working Group meeting notes are provided in **Appendix F**. An overview of engagement strategies is provided in **Appendix E**.

Community Events

The Town conducted the following public outreach to learn about local roadway safety concerns.

January 26, 2024
Food Truck Friday at Town Square Park

April 26, 2024
Farmer's Market at Town Square Park

These events were also occasions to inform the community about Vision Zero and about potential countermeasures. Summaries of community events are provided in **Appendix F**.

Policy Benchmarking

A policy review of the following documents was conducted with a focus on identifying gaps in safety policies:

- Multimodal Safety Analysis (2015)
- Downtown Speed Limit Recommendations (2019)
- Comprehensive Plan (2030)

Recommendations for policy updates are included in the following sections and provided in **Appendix G**.

Vision Zero Resolutions

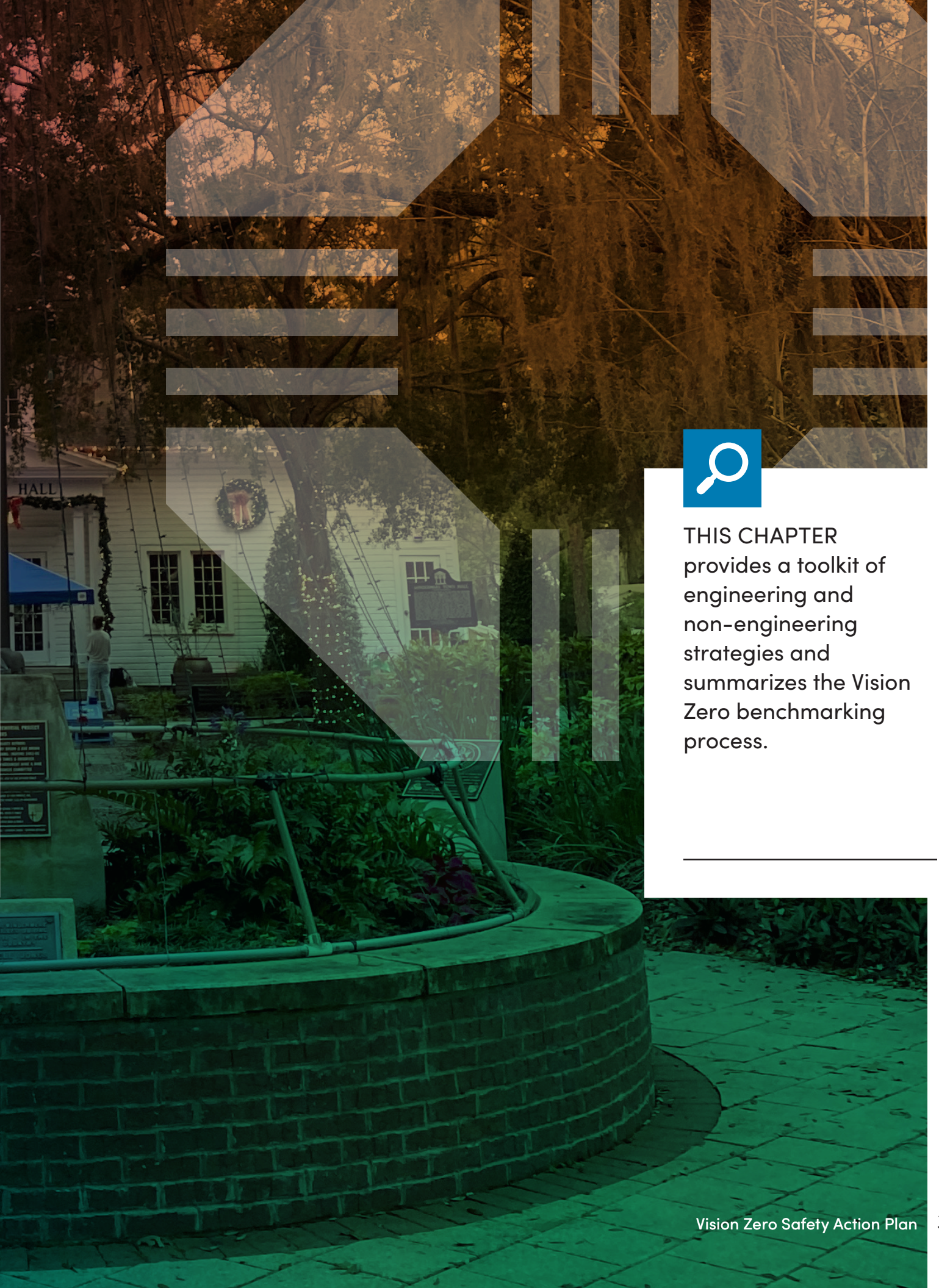
The Town of Windermere presented to the Town Council and adopted a resolution on Vision Zero on November 23, 2023. The resolution is included in **Appendix B**.

CHAPTER 5

Recommended Programs and Policy Updates



Image of Main Street in the Town of Windermere



THIS CHAPTER provides a toolkit of engineering and non-engineering strategies and summarizes the Vision Zero benchmarking process.

The Windemere Vision Zero Safety Action Plan addresses roadway safety holistically, pairing engineering countermeasures with non-engineering programs and policies geared toward improving road user behavior.

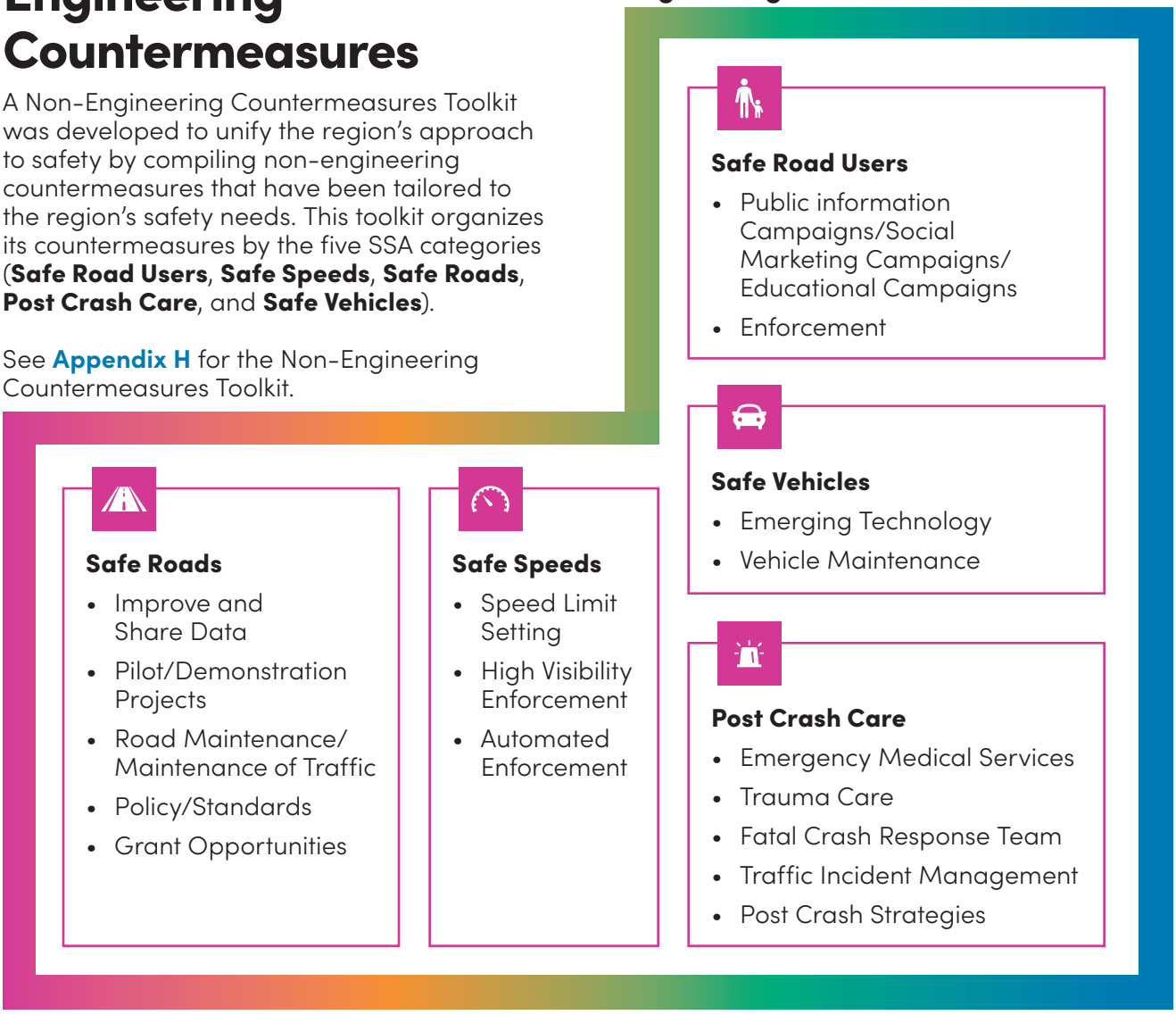
These **non-engineering countermeasures** include efforts like educational campaigns, high-visibility enforcement of driving speeds, and publicized sobriety checkpoints. They can target at-risk audiences (like teens).

Regional Non-Engineering Countermeasures

A Non-Engineering Countermeasures Toolkit was developed to unify the region's approach to safety by compiling non-engineering countermeasures that have been tailored to the region's safety needs. This toolkit organizes its countermeasures by the five SSA categories (**Safe Road Users**, **Safe Speeds**, **Safe Roads**, **Post Crash Care**, and **Safe Vehicles**).

See **Appendix H** for the Non-Engineering Countermeasures Toolkit.

Figure 9: Organization of Non-Engineering Countermeasures Toolkit



Potential Town-Led Programs

The Town developed the following roster of programs that could reduce fatal and serious injury crashes locally:

- **Expand road safety education for children**, especially those walking, bicycling, or taking the bus to school. This program would work with schools and parent organizations to organize supervised walking and cycling groups to school. This introduces children to the rules of the road in a safe environment, provides an opportunity for exercise and community building, and builds a habit of walking and cycling at an early age.
- **Increase speed enforcement in school zones**. Consider high-visibility enforcement in school zones.
- **Develop a quick-build program.** Quick-builds are flexible, temporary, low-cost projects that let people test roadway infrastructure that could create safer, more livable public spaces before committing to it. The Town could develop a program that outlines the appropriate location for quick-builds, materials to use, public engagement used, and before/after analysis.

The Town can consider further developing the non-engineering countermeasures as part of their Transportation Plan update.

Potential Town-Led Policies

The policy benchmark review led to the identification of potential policies that could be developed as part of the upcoming Transportation Plan update or as a separate effort to reduce fatal and severe injury crashes. Recommendations include:

Update to the Bicycle and Pedestrian Master Plan

- The Bicycle and Pedestrian Master Plan provides a framework that guides both public investments and private development.

Online Outreach

- Consider creating a website page to show the public commitment to the goal of eliminating traffic fatalities and serious injuries within a specific timeframe. Consider linking to MetroPlan or Vision Zero network to provide more information.
- Consider linking to information about FHWA countermeasures resources.

Comprehensive Plan Updates

- Consider including other best practice elements such as the Public Right-of-Way Accessibility Guidelines (PROWAG), Americans with Disability Act (ADA), AASHTO Roadside Design Guides, NACTO Urban Street Design Guide, NACTO Urban Bikeway Design Guide, NACTO Don't Give Up at the Intersections into the Comprehensive Plan.
- Consider adopting specific language for multimodal performance measure targets such as Level of Traffic Stress or Quality of Service measures.
- Consider formalizing the Town's current approach to setting speed limits based upon context.

Development of an Educational Program/ Campaign

- Develop an educational program/ campaign related to roundabout safety.
- Safety Action Plan Recommendations
- Formalize the working group to continue meeting and discuss bicycle and pedestrian safety and Vision Zero.
- Develop policy to ensure FHWA proven countermeasures are included in prioritization of projects.
- Track overall crashes within the Town and provide annual updates. Consider reporting trends from collision data to the public.
- Document instances where common collision patterns were addressed by adequate countermeasures and include before/after data for safety projects.

CHAPTER 6

Recommended Safety Projects



Image of Main Street in the Town of Windermere



THIS CHAPTER lists engineering projects, policy recommendations, and program recommendations identified for implementation.

MetroPlan Orlando's Engineering Countermeasures Toolkit

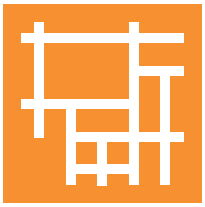
An Engineering Countermeasure Toolkit was provided with key strategies available to address roadway safety issues that align with the SSA strategy. The key objectives of the Engineering Countermeasure Toolkit are to:

1. **Inform partner jurisdictions** about safety treatment options and their appropriate uses and contexts,
2. **Communicate safety tools** using easy-to-understand language and graphics,
3. **Facilitate coordination** between staff, contractors, developers, and the community when discussing transportation safety improvements, and
4. **Create a shared understanding** and realistic expectations around safety treatments.

A copy of the Engineering Countermeasures Toolkit is provided in **Appendix I**.

Project Development

The following process was used to identify specific countermeasures for high crash segments and intersections:



Analyzed HIN Segments/Intersections: A detailed analysis was conducted, including crash summaries, and other contextual information. Prevailing crash types were summarized, and crash locations were mapped. Additional contextual information was gathered, such as the number of travel lanes, location of signalized intersections, locations of bus stops, posted speeds, and the context classification or functional classification.



Identified Planned Improvements: For each roadway segment/ intersection included in the countermeasure selection process, planned projects (if any) along the segment were identified.



Prioritized Projects: Based on the prioritization criteria, projects were prioritized for implementation and other purposes, such as grant applications.



Identified Potential Countermeasures: For each segment corridor, potential countermeasures were identified using input from the Town's Working Group, the Engineering Countermeasures Toolkit, FDOT, and Federal Highway Administration (FHWA) guidelines, as well as professional judgment. An opinion of probable cost was developed for each project.

Project Prioritization Process

Project prioritization criteria were developed based on the goals identified throughout MetroPlan Orlando literature and in this Vision Zero Safety Action Plan. For detail on how these criteria were developed, see **Appendix J**.

These criteria help identify projects that could be included in a regional SS4A grant application or another safety-focused grant program. High-priority safety improvements identified through this process may also be added to the 2050 Metropolitan Transportation Plan (MTP) or incorporated into an already planned project in the Prioritized Project List (PPL) or Transportation Improvement Plan (TIP). In the future Windermere can continue to use these criteria or a modified version for a project prioritization process.

Key prioritization criteria include:

50%	15%	15%	10%	10%
Safety History	Transportation Underserved	Safety Benefit	Regional Benefit	Timeline

Safety History (50%) – Based on the safety score calculated for each corridor and intersection, this criterion prioritizes projects where the most fatal and severe injury crashes occur.

Transportation Underserved (15%) – This criterion considers where people might be disproportionately affected by traffic crashes and benefit the most from transportation safety improvements.

Safety Benefit (15%) – This considers the potential safety benefit of identified improvements.

Regional Benefit (10%) – If a project is on multiple high injury networks, it is likely to have a regional benefit.

Implementation Timeline (10%) – Projects start saving lives when they are implemented, so projects that can be implemented quickly are prioritized.

A sidewalk gap in the Town of Windermere

Projects

Figure 10 provides a map of the segment and intersection projects. **Table 4** summarizes these projects, ranks them by priority, and includes the following information:

- Crash summary
- Identification of potential project countermeasures
- Planning level of cost estimate
- Prioritization score

More information on the projects and cost estimation is provided in **Appendix K** and **Appendix L**.

Figure 10: Project Map

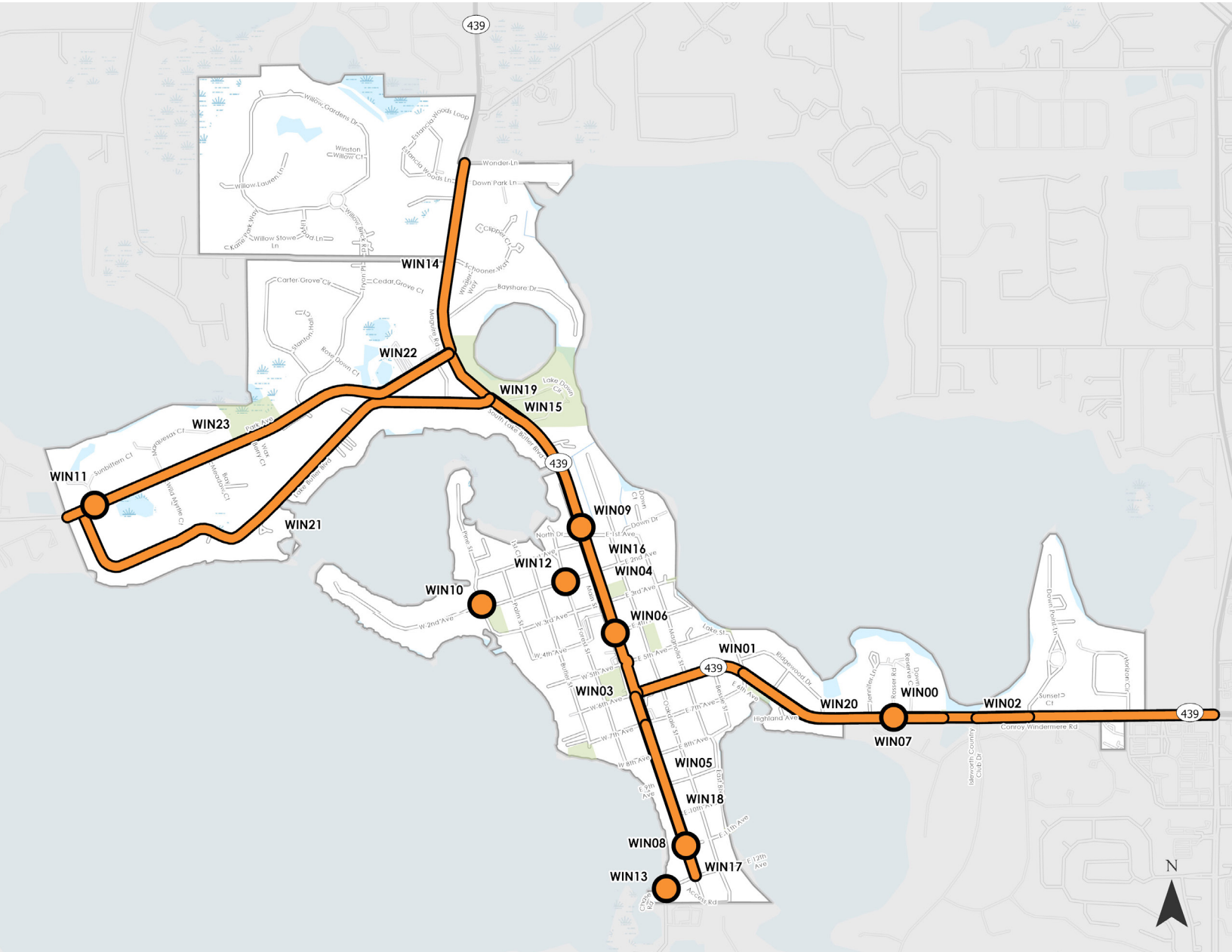


Table 4: Project List

PROJECT ID AND LOCATION	IMPROVEMENT TYPE	LENGTH	COST-ESTIMATE	# OF CRASHES	PRIORITIZATION SCORE
WIN00 – E 6th Ave/Conroy Windermere Rd from Lake St to Town Border	Widen Existing Sidewalk	1.1 mi	$600,000	84	21.25
WIN01 – E 6th Ave/Conroy Windermere Rd from Lake St to Town Border	Add Lighting (including review of pedestrian scale lighting)	--	--	75	25
WIN02 – E 6th Ave/Conroy Windermere Rd from Isleworth Country Club Dr to Down Point Ln	Add Crosswalk with RRFB	--	$14,000	15	26.25
WIN03 – Main St from Canal to Chase Rd	Widen Existing Sidewalk to Multi-Use Path	1.5 mi	$800,500	82	27.5
WIN04 – Main St from Canal to E 4th Ave	Fill Sidewalk Gap, Add Curb Ramp, Upgrade Sign-age to W5-2, Upgrade School Zone Markings, Add Advance Pavement Stop Markings	--	$86,500	17	60
WIN05 – Main St from 6th Ave to Chase Rd	Fill Sidewalk Gap, Add Curb Ramp, Upgrade to High-Visibility Crosswalk	0.48 mi	$100,000	55	61.25
WIN06 – Main St & E 4th Ave	Refresh Crosswalk (West Leg), Convert Existing Crosswalk to RRFB	--	$20,000	5	63.75
WIN07 – Conroy Windermere Rd & Rosser Rd	Add Raised Median	--	$52,000	8	62.5

PROJECT ID AND LOCATION	IMPROVEMENT TYPE	LENGTH	COST-ESTIMATE	# OF CRASHES	PRIORITIZATION SCORE
WIN08 – Main St & E 11th Ave	Add Crosswalk and Curb Ramp (East Leg), Install Speed Feedback Sign	--	$79,300	1	63.75
WIN09 – Main St & North Dr	Install Pavement Speed Legends, Review Clear Zone	--	$3,500	5	60
WIN10 – Pine St & W 2nd Ave	Add Sidewalk (near Palmer Park) Install Two-Way Stop Control	0.01 mi	$47,500	4	21.25
WIN11 – Park Ave & Sunbittern Ct	Add Crosswalk and Receiv-ing Ramp (South Leg), Add Crosswalk (near Red Cen-ter/ Wax Berry Ct), Review Clear Zone, Install Speed Feedback Sign	--	$85,800	4	26.25
WIN12 – Forest St & W 2nd Ave	Add Stop Bars, Add High-Visibility Reflective Tape on Stop Signs	--	$2,600	1	22.5
WIN13 – Chase Road (at bend)	Add Warning Beacon, Add Safety Edge, Add Lighting	--	$23,400	15	30
WIN14 – Ward Trail - Segment 4E	Construct segment of Ward Trail	0.75 mi	$760,000	40	30
WIN15 – Ward Trail - Segment 4D	Construct segment of Ward Trail	0.42 mi	$275,000	8	30
WIN16 – Ward Trail - Segment 4C	Construct segment of Ward Trail	0.48 mi	$275,000	17	30

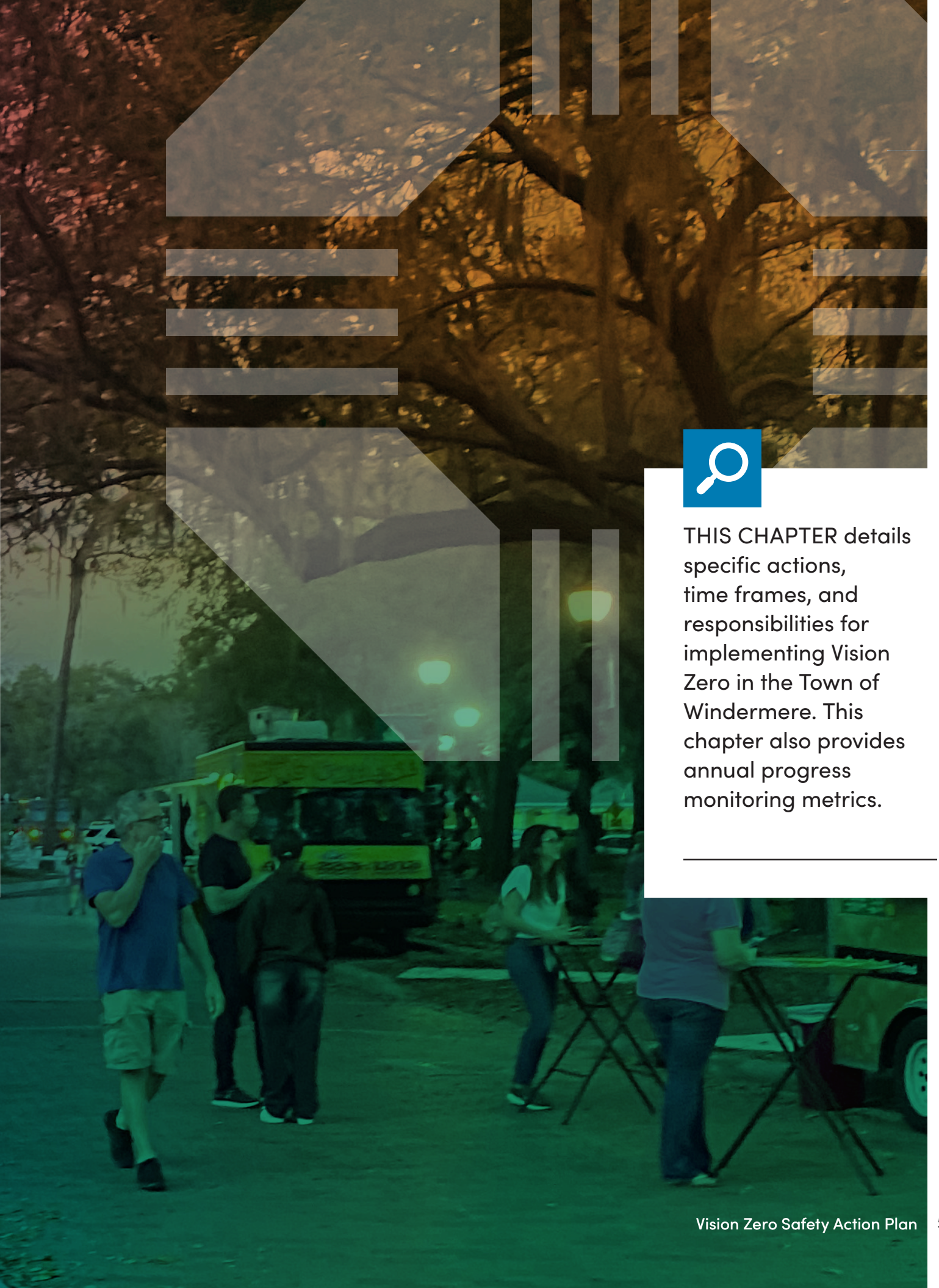
PROJECT ID AND LOCATION	IMPROVEMENT TYPE	LENGTH	COST-ESTIMATE	# OF CRASHES	PRIORITIZATION SCORE
WIN17 – Ward Trail - Segment 4A	Construct segment of Ward Trail	0.09 mi	$50,000	25	30
WIN18 – Ward Trail - Segment 4B	Construct segment of Ward Trail	0.35 mi	$190,000	8	30
WIN19 – Ward Trail - Segment 5 (Conroy Windermere)	Construct segment of Ward Trail	0.4 mi	$765,000	28	30
WIN20 – Conroy Windermere Rd from Lake St to east of Down Reserve Ct	Construct sidewalk to fill existing sidewalk gap	0.08 mi	$50,000	66	26.25
WIN21 – Lake Butler Dr from Park Ave to Maguire Rd	Construct sidewalk	1.25 mi	$367,500	14	21.25
WIN22 – Park Ave at School Driveway	Enhance existing crosswalk to include RRFBs	--	$14,000	30	21.25
WIN23 – Park Ave from Main St to Town Border	Convert Existing Crosswalk to RRFB	--	$14,000	38	21.25

CHAPTER 7

Monitoring and Implementation



Image of Town Square in the Town of Windermere



THIS CHAPTER details specific actions, time frames, and responsibilities for implementing Vision Zero in the Town of Windermere. This chapter also provides annual progress monitoring metrics.

The recommendations offered in this Vision Zero Safety Action Plan can only make area roadways safer if they are implemented. For that reason, both MetroPlan and the Town of Windermere have created a system of accountability dedicated to tracking the progress of regional and local safety efforts.

Monitoring Committees

MetroPlan Orlando's Safety Action Committee

Upon the adoption of this plan, the regional Vision Zero Task Force will continue their work as the newly formed **Safety Action Committee**. This committee will help with the implementation of the various action items of the plan by:

- Providing feedback
- Identifying resources
- Holding other jurisdictions accountable for their role in reaching zero
- Overseeing the annual safety progress report

MetroPlan Orlando Vulnerable Users Safety Working Group

MetroPlan Orlando hosts a **Vulnerable Users Safety Working Group**, which focuses on decreasing corridor driving speeds and on decreasing fatal and serious injuries involving pedestrians and bicyclists.

Elected Official Guides

MetroPlan Orlando has created a guide for elected officials. The guide highlights why we need Vision Zero and how we can all work together in Central Florida to reach Zero. The guide is attached in **Appendix M**.

Town of Windermere Progress Monitoring

The Town will use the performance metrics outlined above to evaluate the effectiveness of this Action Plan as it seeks to reach zero traffic fatalities and serious injuries by 2050.

Each July, MetroPlan Orlando will update the regional crash dashboard and provide regional and jurisdictional summaries of key information. Windermere can use this data prepared at the regional level to help support their progress monitoring. The annual monitoring process should begin with reviewing the most recent year of crash data. Using the data, a variety of metrics should be calculated, as presented in **Table 5**. In addition to the crash data, a list of safety improvements implemented in the prior calendar year should be developed.

Table 5: Annual Progress Monitoring Metric

PERFORMANCE METRIC	DATA SOURCE
Total fatalities	Signal 4
Fatality rate	Signal 4, Census
Total serious injuries	Signal 4
Serious injury rate	Signal 4, Census
Non-motorized fatalities and serious injuries	Signal 4
Percentage change in KSI crash types	Signal 4
KSI crashes by Functional Classification	Signal 4, Roadway Network Data
Impaired Driving Assessment (percent of people killed or severely injured in a DUI crash as compared to prior year)	Signal 4
Citations for Key Behaviors	Signal 4, Florida Highway Patrol, Local Law Enforcement
Implemented safety improvements in prior calendar year	All jurisdictions in region
Progress made on specific actions	Safety Action Committee, MetroPlan Orlando, All jurisdictions in region
Before/After Study Completion	Various studies
Number and outcome of Non-Engineering Countermeasures	FDOT, Best Foot Forward, and local jurisdictions

Source: MetroPlan Orlando, 2024

The **safety dashboard** hosted at VisionZeroCFL.gov will be updated on an annual basis to reflect new data as well as highlight key findings from the crash analysis. A data management plan that details the process to obtain, review and upload data to the crash dashboard is provided in **Appendix N**.

As safety projects are implemented and before and after studies are completed, these results shall also be shared as part of the annual progress reporting.

Additional Accountability Measures

Action Plan Updates

From plan adoption, the Town of Windermere Vision Zero Safety Action Plan should provide an update every five years.

Federal Funding Opportunities

No one funding source will be able to pay for all the safety improvements identified in this plan. In addition to the traditional **Highway Safety Improvement Program (HSIP)**, the MetroPlan funding progress, and other local funding sources, such as developer fees, the following table summarizes potential Federal funding sources related to transportation safety.

MetroPlan Orlando will also continue to look for opportunities to layer safety-related projects onto other capital improvement projects, as well as maintenance projects and through review and approval of projects in the PPL and TIP.

Table 6: Federal Funding Sources

POTENTIAL FUNDING SOURCE	ADDITIONAL INFORMATION
Safe Streets and Roads for All (SS4A)	The SS4A program funds regional, local, and Tribal initiatives through grants to prevent roadway deaths and serious injuries. The Fiscal Year (FY) 2024 Notice of Funding Opportunity (NOFO) for the SS4A grants offers funding for two distinct types of grants: 1. Planning and Demonstration Grants: These grants allocate federal funds to develop, complete, or enhance a Safety Action Plan. Demonstration activities are temporary safety improvements that inform comprehensive safety action plans (referred to as "Action Plans") by testing proposed project and strategy approaches to determine future benefits and future scope. 2. Implementation Grants: These grants provide federal funds to execute projects and strategies outlined in an Action Plan, specifically aimed at addressing roadway safety issues. Eligible projects and strategies may encompass infrastructure, behavioral, and operational activities.
Rebuilding American Infrastructure with Sustainability & Equity (RAISE) Discretionary Grant Program	The program funds multimodal, multi-jurisdiction projects that have significant local or regional impact but are more difficult to support through traditional DOT programs.
Transportation Alternatives Program (TAP)	The TAP provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, and environmental mitigation; recreational trail program projects; safe routes to school projects; and projects for planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former Interstate System routes or other divided highways.
Carbon Reduction Program (CRP)	Provides funds for projects designed to reduce transportation emissions, defined as carbon dioxide (CO2) emissions from on-road highway sources.

POTENTIAL FUNDING SOURCE	ADDITIONAL INFORMATION
Infrastructure for Rebuilding America Discretionary Grant Program (INFRA)	Funds available for multimodal freight and highway projects of national or regional significance to improve the safety, efficiency, and reliability of the movement of freight and people in and across rural and urban areas.
Reconnecting Communities Pilot Program (RCP)	Planning grants and capital construction grants, as well as technical assistance, to restore community connectivity through the removal, retrofit, mitigation, or replacement of eligible transportation infrastructure facilities.
Federal Transit Administration Capital Funds (FTA)	Funds transit capital investments, including heavy rail, commuter rail, light rail, streetcars, and bus rapid transit.
Areas of Persistent Poverty Program (AoPP)	Funds projects that provide access to transit in disadvantaged communities, including safety improvements.
Congestion Mitigation and Air Quality Improvement Program (CMAQ)	Provides funds to States for transportation projects designed to reduce traffic congestion and improve air quality, particularly in areas of the country that do not attain national air quality standards.
Highway Safety Improvement Program (HSIP)	HSIP is a core Federal-aid program with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads with a focus on performance.
Railway-Highway Crossings (Section 130) Program (RHCP)	The Railway-Highway Crossings (Section 130) Program provides funds for the elimination of hazards at railway-highway crossings.
National Highway Performance Program (NHPP)	Provides support for the condition and performance of the National Highway System (NHS), for the construction of new facilities on the NHS, and to ensure that investments of Federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a state's asset management plan for the NHS.
Promoting Resilient Operations for Transformative, Efficient, and Cost Saving Transportation (PROTECT)	Used to help make surface transportation more resilient to natural hazards, including climate change, sea level rise, flooding, extreme weather events, and other natural disasters through support of planning activities, resilience improvements, community resilience and evacuation routes, and at-risk coastal infrastructure.
Surface Transportation Block Grant Program (STBG)	Provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals.
Safe Routes to School Program (SRTS)	Projects that improve safety for students going to school.

Source: MetroPlan Orlando, 2024

CHAPTER 8

Technical Appendix



Image of Main Street in the Town of Windermere



A-Vision Zero Checklist, B-Vision Zero Resolution, C-Regional High Injury Network, D-Working Group Materials, E-Public Engagement Strategy, F-Public Engagement Boards, G-Policy Benchmarking Guide, H-Non-Engineering Countermeasures Toolkit, I-Engineering Countermeasures Toolkit, J-Project Prioritization Criteria, K-Project Cost Estimates, L-Project Details, M-Elected Officials Guide

CHAPTER 8

Technical Appendix

A- Vision Zero Checklist

Image of Main Street in the Town of Windermere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SS4A 2024 Action Plan Component Checklist

ITEM #	DESCRIPTION	HOW PLAN ACHIEVES COMPONENT
1	Governing body in the jurisdiction publicly committed to an eventual goal of zero roadway fatalities and serious injuries.	Resolution adopted on January 11, 2024 and included in appendix.
	Set targets to achieve significant declines in roadway fatalities and serious injuries.	Target set for 2040, as noted in the resolution in appendix.
2	To develop the Action Plan, a committee, task force, implementation group, or similar body established and charged with the plan's development, implementation, and monitoring.	See Chapter 3 for overview of engagement activities and Chapter 7 for Implementation and monitoring actions.
3	Analysis of existing conditions and historical trends to baseline the level of crashes involving fatalities and serious injuries across a jurisdiction, locality, Tribe, or region.	See Chapter 2 and technical appendix.
	Analysis of systemic and specific safety needs is performed as needed (e.g., high risk).	See Chapter 2 and technical appendix.
	Analysis of the location where there are crashes, the severity, as well as contributing factors and crash types.	See Chapter 2 and technical appendix.
	A geospatial identification (geographic or locational data using maps) of higher risk locations.	See Chapter 2 and technical appendix.
4	Engagement with the public and relevant stakeholders, including the private sector and community groups.	See Chapter 3 for overview of engagement activities.
	Incorporation of information received from the engagement and collaboration into the plan.	See Chapter 3 for overview of engagement activities and how feedback was incorporated into Action Plan.
	Coordination that included inter and intragovernmental cooperation and collaboration, as appropriate.	See Chapter 3 for overview of level of intergovernmental collaboration.

ITEM #	DESCRIPTION	HOW PLAN ACHIEVES COMPONENT
5	Considerations of equity using inclusive and representative processes.	See Chapter 2, 5, 6 and 7 for descriptions of how equity was incorporated into analysis and process.
	Identified underserved communities through data.	See Chapter 2 for description of how transportation underserved data was incorporated into analysis.
	Equity analysis in collaboration with appropriate partners, focused on initial equity impact.	See Chapters 2 and 3 for equity analysis and collaboration.
6	The plan development included an assessment of current policies, plans, guidelines, and/or standards to identify opportunities to improve how processes prioritize safety.	See Chapter 6 and technical analysis for policy benchmarking and Action Plan Elements.
5	The plan discusses implementation through the adoption of revised or new policies, guidelines, and/or standards.	See Chapter 6 and technical analysis for policy benchmarking and Action Plan Elements.
7	The plan identifies a comprehensive set of projects and strategies to address the safety problems in the Action Plan, time ranges when projects and strategies will be deployed, and explain project prioritization criteria.	See Chapter 5.
8	A description of how progress will be measured over time that includes, at a minimum, outcome data.	See Chapter 7.
	The plan is posted publicly online.	Plan will be available here: VisionZeroCFL.gov
9	The plan was finalized and/or last updated between 2018 and 2024.	Plan was finalized in 2024.

CHAPTER 8

Technical Appendix

B- Vision Zero Resolution



Image of Main Street in the Town of Windermere


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RESOLUTION 2023-08

of the

Town Council

for the

Town of Windermere, Florida

establishing

ADOPTING A VISION ZERO POLICY

WHEREAS, the State of Florida is one of the most dangerous states for pedestrians, consistently ranking high on the Pedestrian Danger Index by Smart Growth America, with the metro area of Orlando-Kissimmee-Sanford, Florida ranking as one of the most dangerous metropolitan areas for pedestrians in the country; and

WHEREAS, Town of Windermere, is responsible for the operation and maintenance of the continuing transportation planning process designed to prepare and adopt transportation plans and programs; and

WHEREAS, fatal and severe crashes are preventable, and death and severe injury are not an acceptable cost for using our public roadway system; and

WHEREAS, roadways have historically been designed to prioritize vehicle throughput at high speeds to the detriment of health and safety; and

WHEREAS, vehicle speeds and lack of safe facilities for people walking and biking have been identified as major causes of traffic fatalities; and

WHEREAS, communities of color, low-income communities, youth, and seniors are disproportionately impacted by traffic fatalities; and

WHEREAS, pedestrians and bicyclists are the most vulnerable road users and

WHEREAS, measures to make Town of Windermere streets safer for all road users, particularly those who are most physically vulnerable, such as seniors, youth, and people with disabilities, will further encourage people of all ages and abilities to walk, bike and take transit; and

WHEREAS, it is critical for Town of Windermere to develop a Vision Zero plan to build complete streets and begin to ensure the safety of our pedestrians, cyclists and road users of all ages and abilities;

WHEREAS, Vision Zero is a data-driven strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all; and

WHEREAS, Vision Zero is founded on a Safe System approach that recognizes that people will make mistakes and roadway systems and policies should be designed to protect them through redundancies and shared responsibilities; and

WHEREAS, there are over 50 Vision Zero jurisdictions in the United States, which is expected to increase significantly in the coming years; and

WHEREAS, the U. S. Department of Transportation has adopted the Safe System approach; and

WHEREAS, the Florida Department of Transportation has adopted a Target Zero Initiative; and

WHEREAS, Vision Zero should create opportunities to invite meaningful input from the community, including residents that are disproportionately burdened by traffic collisions, and historically have been underserved;

NOW THEREFORE, BE IT RESOVED by the Town of Windermere Town Council adopts the Vision Zero goal of eliminating traffic deaths and severe injuries by 2050. The Town Council adopts Vision Zero as the policy for road and traffic safety in Town of Windermere and makes this part of this Resolution effective immediately.

BE IT RESOLVED THAT Town of Windermere will develop a Vision Zero Action Plan following the passage of this resolution.

Resolved this 14th day of NOVEMBER, 2023

TOWN OF WINDERMERE, FLORIDA
By: Town Council

By: _____
Jim O'Brien, Mayor

Attest: _____
Dorothy Burkhalter, MMC, FCRM
Town Clerk



CHAPTER 8

Technical Appendix

C- Regional High Injury Network



Image of Main Street in the Town of Windermere

Town of Windermere



Vision Zero Safety Action Plan

Draft Memorandum

Date: September 12, 2023

To: Vision Zero Central Florida Partners

From: Mighk Wilson, MetroPlan Orlando
Kathrin Tellez, Fehr & Peers

Subject: Vision Zero Central Florida – Regional High Injury Network

Introduction

The MetroPlan Orlando metropolitan area has the unfortunate distinction of having the one of the highest pedestrian fatality rates in the country, with transportation safety affecting all roadway users as the region has an overall fatal crash rate 15 percent higher than the national average and 10 percent higher than the statewide average. To understand where and why crashes that result in fatalities and serious injuries are most likely to occur and how to reduce the severity and frequency of these crashes, MetroPlan Orlando is preparing a Regional Vision Zero Action Plan, rooted in the core elements of Vision Zero and the Safe System approach. The overall purpose of the Action Plan is to identify projects, programs and strategies that will eliminate fatalities and serious injuries on the regions roadways by taking advantage of implementation funding through the Safe Streets for All (SS4A) grant program. The SS4A program is also funding the preparation of County and Local Vision Zero action plans in the region.

This memo summarizes the methodology to analyze collision trends and develop a high-injury network (HIN) for the MetroPlan Orlando region, with a focus on the non-access-controlled Federal Aid (MPO) network. The HIN is a collection of streets where a disproportionate number of collisions that result in someone being killed or severely injured (KSI) occur. Together, these collision types are referred to as KSI collisions throughout this memo. In addition to identifying corridors where a disproportionate number of KSI crashes occur, top KSI crash intersections are also identified.

This work will culminate in the preparation of a Safety Action Plan for the region. Additionally, separate HINs will be prepared for each County and each local jurisdiction that reflects:

1. All roadways within the jurisdiction regardless of ownership
2. All roadways maintained by the jurisdiction

Based on the preliminary data analysis, about 47 percent of KSI crashes occur on about 4 percent of centerline miles of non-access-controlled roadways in Orange, Osceola, and Seminole County, and about 13 percent of the Federal Aid System centerline miles.

The following describes the data sources that were used and explains the methodology employed by Fehr & Peers to develop the HIN.

Data Inputs

Roadway Network

The roadway network that served as the basis for this analysis was obtained from the xGeographic Wave database, which is a land use, transportation, environmental and demographic mapping database, usable across GIS mapping platforms, that has been built for the Orlando Metropolitan Area. For the purposes of developing the high injury network, limited access, and toll facilities (e.g., I-4 and the Turnpike) and their corresponding on/off ramps were removed from the network prior to the HIN analysis. Ramp terminal intersections were included in the analysis, including the ramp influence area of 100 feet. Preparation of the initial HIN included all non-limited access facilities in the network with non-Federal Aid roadways removed from the final HIN for the regional HIN. This process identified the primary roadways where a disproportionate number of crashes that result in a KSI occur in the region on roadways where MetroPlan Orlando can provide funding for safety improvements through the Metropolitan Transportation Plan (MTP) process as well as support regional grant applications for implementation funding through future SS4A applications.

Collision Severity Weighting

The goal of Vision Zero within the Safe System approach is to eliminate all serious and fatal injury crashes on roadways within the MetroPlan Orlando region, recognizing that while it is not feasible to prevent all crashes, implementation of safe system strategies can reduce the severity of crashes. To prioritize efforts at locations where crashes result in a fatality or severe injury, KSI crashes where assigned a weight factor. As presented in **Table 1**, collision weights are derived from comprehensive crash costs from the 2023 FDOT Design Manual, with the Highway Safety Manual (HSM) Equivalent Property Damage Only (EPDO) weighting applied.

Comprehensive crash costs include both economic costs and monetized pain and suffering costs. Economic costs are monetary costs associated with emergency services deployment, medical services, productivity loss due to victim injury, insurance, and legal costs, cost associated congestion impacts because of the collision, and property damage costs. Monetized pain and suffering costs are an assumption of the costs associated with lost quality-of-life (or Quality-Adjusted Life Years), accounting for reductions in life expectancy and quality of life changes because of a crash.

Application of the EPDO weighting (dividing the cost of each crash type by the cost of a property damage only crash) approach results in different crash types receiving a different weight factor. As shown in Table 1, application of the EPDO weight results in fatal crashes receiving a significantly higher weight which could skew the HIN. In many instances, a crash that results in a severe injury could have been a fatality under slightly different circumstances, such as a victim with underlying health issues. Conversely, a fatal crash involving someone not wearing a seatbelt could have been injury only if the victim was wearing a seatbelt. Additionally, only fatalities that occur within 30 days are reported in the crash dataset. If a serious injury crash resulted in a fatality more than 30 days after the crash, it would not be reflected in this analysis as a fatality. Consequently, a modified EPDO method was used that groups fatal and serious injury crashes together and groups non-incapacitating injuries together. This approach has been used by agencies across the county. The approach to develop the regional HIN also includes all crashes – given the low weight applied to

property damage only crashes, only locations where there is high frequency of crashes would affect the HIN.

Table 1: Crash Costs[1] and EPDO Weight Factors

Severity	Crash Cost	EPDO Weight	Modified EPDO Weight[2]
Fatal (K)	$10,890,000	1,414	317
Incapacitating Injury (A)	$888,030	115	
Non-Incapacitating Injury (B)	$180,180	23	17
Possibly Injury (C)	$103,950	14	
No Injury (0)	$7,700	1	1

1. Source: FDOT Design Manual, Table 122.6.2 FDOT KABCO Crash Costs
2. Based on an average weighted KA crash cost in Orange, Osceola and Seminole Counties of $2,438,850 for 2018 – 2022 and an average weighted BC crash cost in Orange, Osceola and Seminole Counties of $129,725.

Collision Mode Weighting

In addition to applying a weight factor based on the severity of a crash, a weight factor was developed and applied based on the travel mode of crash victims. Review of the data indicates that people walking, bicycling, and riding motorcycles are disproportionately represented in crashes that result in a KSI. People outside of vehicles are involved in about 3.7 percent of all reported crashes but represent 54 percent of all fatalities, 31 percent of all KSI crashes and 10 percent of all injury crashes. For the region, the resulting weight factor, based on the proportion of overall crashes involving someone outside a vehicle to crashes that resulted in an injury, is 3. **All crashes involving a person walking, bicycling, or riding a motorcycle were weighed by a factor of 3** in the development of the Regional HIN for the MetroPlan Orlando region. The factor, while based on local data, is in-line with weight factors used by other jurisdictions in the development of their HINs.

HIN Development

Sliding Window Approach

The HIN analysis was conducted using a sliding window approach, which uses overlapping windows to account for errors in collision location reporting. For a specific window length, performance measures are calculated for that window along a corridor (e.g., the number of fatal or serious injury collisions). The window is shifted along the corridor for a given offset distance and the analysis is repeated for the shifted window. Using this approach, a single location would be evaluated in several different windows, so any inaccuracies inherent within collision location reporting can be accounted for. Windows with the highest values for the segment or facility are identified as candidate HIN locations.

Sliding Window Parameters

A 1-mile window length with a 0.2-mile offset distance was chosen for the regional HIN analysis. Analyses prepared for a smaller geography should consider a smaller scale, such as a 0.5-mile window and 0.1-mile offset for a city boundary. Any segment less than 1-mile in length was treated as a single segment without any offset shifting.

Collision Summary for Each Window

Collisions were summarized for each window using a 100-ft search radius. This radius was chosen by inspecting collision locations relative to the centerline network at various locations throughout the network. The collision summary for each window consisted of summing all weighted collision values within the search radius. For example, a window with 15 property-damage only, 10 minor injury collisions and 5 KSI collisions within 100 feet would receive a weighted score of 1,770 (15*1+10*17+ 5*317), presuming no pedestrians, bicyclists or motorcyclists were involved. For that same window, if a pedestrian, bicyclist, or motorcyclist was involved in 1 of the 15 property-damage only crashes, 3 of the 10 minor injury collisions and 3 of the 5 KSI collisions, that window would receive a weighted score of 3,776 (14*1+1*3*1+7*17+ 3*3*17+2*317+3*3*317).

HIN Development

After summarizing collisions all windows throughout the network, the HIN draft was built using the weighted score of each window. By visualizing the weighted score throughout the network, potential HIN corridors could be identified, as shown on **Figure 1**.

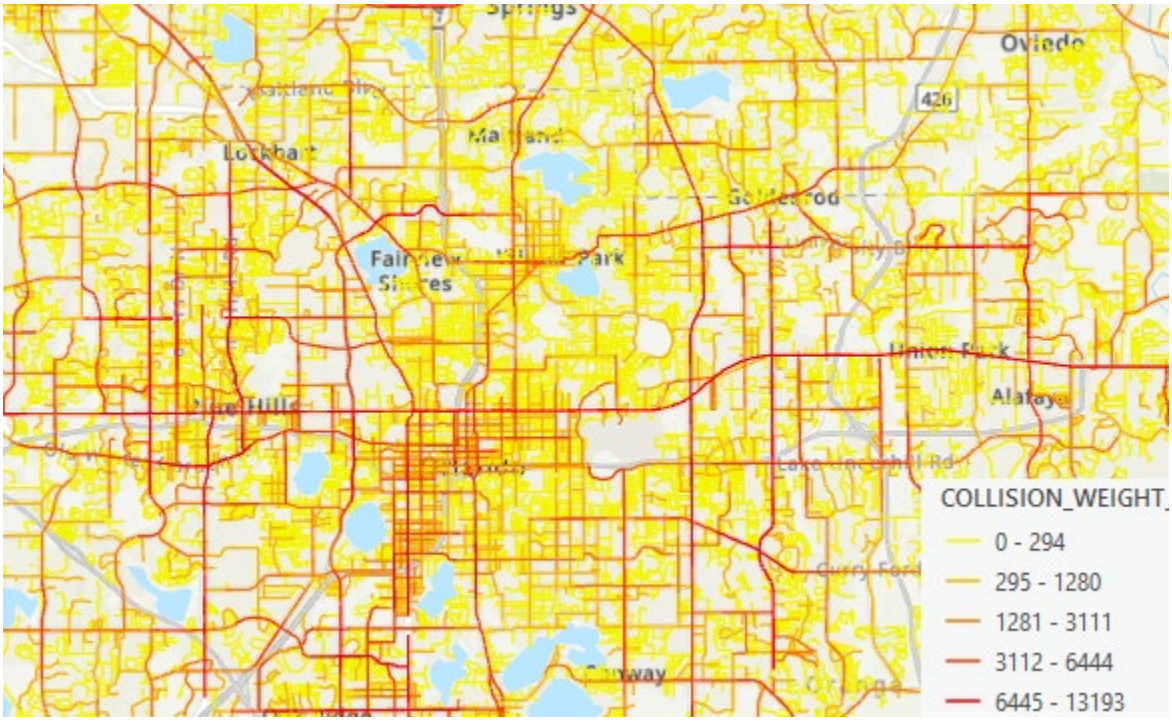

Figure 1: Initial visualization of Collision Weight Summaries Throughout Network

The HIN draft was built by using the following iterative process, with the goal of achieving a network that accounted for approximately 50 percent of the KSI collisions in the region:

1. Select/flag window segments throughout the network with collision weight values above a certain threshold.
2. Adjacent high-scoring windows (flagged in the previous step) are aggregated into longer corridor segments (greater than 1 mile in length) when appropriate.
3. Cleaning/reasonableness check:
    a. Some high scoring windows on local roads which intersect with major ones were removed from consideration if it was discovered that the collision score was being skewed by the number of collisions on the major leg of the intersection.
    b. Any small gaps (<1/2 mile) in between the aggregated corridor segments in step 2 were added to the draft HIN for continuity.

HIN and HIN Statistics

The resulting HIN can be viewed through this weblink. The MetroPlan Orlando Regional HIN contains about 260 centerline miles and includes roadway segments in all three counties, with a disproportionate number of roadways in Orange County. Crashes that occur on the HIN segments account for 47 percent of all KSI crashes in the region. 61 percent of pedestrian KSI, 50 percent of bicyclist KSI, and 44 percent of motorcyclist KSI crashes also occur on these roadways, as summarized in **Table 2**.

Table 2: MPO Network HIN Statistics

	All Roadways*	All Federal Aid Roadway*	Draft Regional HIN	HIN % All Roadways	HIN % of Federal Aid Roadways
Centerline miles	7,461	1,966	258	4%	13%
All collisions	272,500	229,280	98,987	36%	43%
KSI (All modes)	7,146	6,398	3,3378	47%	53%
Ped KSI	949	854	576	61%	67%
Bike KSI	327	285	164	50%	58%
Motorcycle KSI	953	864	416	44%	48%

Source: Signal 4 Analytics, Fehr & Peers.
Notes: * Excluding Toll facilities and access-controlled facilities

The 10 corridors on the HIN that received the highest weighted score on a per mile basis is summarized in **Table 3,** with the full list provided as an attachment.

Table 3: Top 10 HIN Corridors

Roadway Name	From	To	Location	Total Weighted Score per Mile
1. John Young Parkway	SR 50	Orange Center Blvd.	Orlando	17,478
2. Sand Lake Road/ McCoy Road	Turkey Lake Rd.	Universal Blvd.	Orlando	17,104
3. Chickasaw Trail	Frontage Rd.	Lake Underhill Rd.	Orange County	14,589
4. Hiawassee Road	SR 438/Silver Star Rd.	SR 50	Orange County	14,547
5. Oakridge Road	Millenia Blvd.	S. Orange Blossom Trail	Orlando	14,296
6. SR 435	SR 50	Raleigh St.	Orange County	14,130
7. SR 551	SR 50	Lake Underhill Rd.	Orange County	14,129
8. SR 436	Lee Vista Rd.	TG Lee Blvd.	Orlando	14,088
9. Pine Hills Road	SR 50	Old Winter Garden Rd.	Orange County	13,941
10. Alafaya Trail	SR 50	Lake Underhill Rd.	Orange County	13,564

Source: Signal 4 Analytics, Fehr & Peers.
Notes: * Excluding Toll facilities and access-controlled facilities

Top Intersections

In addition to developing a HIN, the intersections with the highest weighted crash were also identified based on a similar process as the HIN development. For this analysis, any crash that was within 250 feet of an intersection was considered as attributed to that intersection, except for crashes in downtown areas where short blocks reduce the intersection influence area. For crashes in those contexts, crashes within 50 feet of an intersection were considered. The top 30 intersections are also shown on the HIN network, with a summary in **Table 4**. Of the top 30 intersections, none are off the HIN. Intersections where a disproportionate share of the KSI crashes involved a person outside a vehicle are noted in ***bold italics***.

Table 4: Top 30 HIN Intersections[1]

Intersection	Total Weight	Intersection	Total Weight
1. John Young Parkway at Sand Lake Road[2]	10,140	16. Colonial Drive at Econlockhatchee Trail	6,480
2. Alfaya Trail at Colonial Drive	***10,103***	17. Powers Drive at Silver Star Road	6,415
3. Orange Blossom Trail at Holden Avenue	***10,055***	18. Orange Blossom Trail at Conroy Road/Americana Boulevard	6,401
4. Hiawassee Road at Silver Star Road	***9,630***	***19. Old Cheney Highway/Tucker Avenue at Colonial Drive***	***6,386***
5. N Poinciana Boulevard at Irlo Bronson Memorial Highway	***9,399***	20. Goldenrod Road at University Boulevard	6,224
6. Pine Hills Road at Silver Star Road	8,673	21. Alfaya Trail at Lokanotosa Trail	5,905
7. Semoran Boulevard at Old Cheney Hwy	***8,509***	22. Semoran Boulevard at Curry Ford Road	5,504
8. W Colonial Drive at N Kirkman Road	7,097	23. S French Street at W 25th Street	5,459
9. Goldenrod Road at Colonial Drive	7,040	24. Hastings Street at Silver Star Road	5,368
10. Simpson Road at Irlo Bronson Memorial Highway	6,946	25. Orange Blossom Trail at Orlando Central Parkway	5,160
11. Orange Blossom Trail at Gore Street	***6,769***	26. Orange Blossom Trail at Michigan Street	4,924
12. N Kirkman Road at Old Winter Garden Road	6,724	***27. Irlo Bronson Memorial Highway at Club Sevilla***	***4,812***
13. Goldenrod Road at Curry Ford Road	6,715	28. Forsyth Road at University Boulevard	4,722
14. John Young Parkway at Conroy Road	6,699	29. N French Avenue at W 1st Street (US 17/92)	4,294
15. Pine Hills Road at North Lane	6,651	30. Orange Blossom Trail at Premier Row	3,919

Source: Signal 4 Analytics, Fehr & Peers.
Note: 1. Intersections where a disproportionate share of the KSI crashes involved a person outside a vehicle are noted in ***bold italics***.
2. At the intersection of John Young Parkway at Sand Lake Road, improvements were completed in late 2019/early 2020 to convert an at-grade intersection to a single-point urban interchange (SPUI). The number of KSI crashes per year has reduced from approximately 9 per year (2018/2019) to an average of 3 per year (2020-2022). This intersection could be a candidate for more detailed analysis as part of the County plan to document the safety benefit associated with the SPUI and potentially identify additional countermeasures that could be implemented at the intersection.

Next Steps

Using the same process that was used to identify the Regional HIN, County and Local HINs will be developed, which will include:

- County (all roadways included in the analysis) – this will identify the roadways in each county where a disproportionate number of fatal and serve injury crashes are reported. This will likely overlap with the regional HIN, but this map will provide focus locations for each county and the respective local jurisdiction(s). A secondary HIN of only roadways within the County jurisdiction will also be prepared.
- Jurisdictional – this will identify the roadways in each jurisdiction regardless of ownership where a disproportionate number of fatal and serve injury crashes are reported. For example, for the City of Kissimmee, an initial HIN may include roadways such as John Young Parkway and Vine Street which are maintained by the County. A secondary HIN of only roadways within the city jurisdiction will be prepared.
- Top Intersections – this will identify the intersections in each jurisdiction where a disproportionate number of fatal and serve injury crashes are reported.

If you have questions, please contact Mighk Wilson at mighk.wilson@metroplanorlando.gov.

Attachments: Roadways in HIN

Central Florida Vision Zero
Regional HIN Segments
September 2023

Corridor Number	Road Name	Location	Total Weighted Score per Mile	From	To
1	John Young Parkway	Orlando	17,478	SR 50	Orange Center Blvd.
2	Sand Lake Road/McCoy Road	Orlando	17,104	Turkey Lake Rd.	University Blvd.
3	Chickasaw Trail	Orange County	14,589	Frontage Rd.	Lake Underhill Rd.
4	Hiawassee Road	Orange County	14,547	SR 438/Silver Star Rd.	SR 50
5	Oakridge Road	Orlando	14,296	Millenia Blvd.	S. Orange Blossom Trail
6	SR 435	Orange County	14,130	SR 50	Raleigh St.
7	SR 551	Orange County	14,129	SR 50	Lake Underhill Rd.
8	SR 436	Orlando	14,088	Lee Vista Rd.	TG Lee Blvd.
9	Pine Hills Road	Orange County	13,941	SR 50	Old Winter Garden Rd.
10	Alafaya Trail	Orange County	13,564	SR 50	Lake Underhill Rd.
11	SR 435	Orlando	13,466	LB Mcleod Rd.	Major Blvd.
12	Colonial Drive	Orlando	13,415	Orange Blossom Trail N.	N Bumby Ave.
13	North Lane	Orange County	12,946	Westgate Rd.	N Pine Hills Rd.
14	Hiawassee Rd	Orange County	12,344	SR 50	Old Winter Garden Rd.
15	SR 434	Orange County	12,284	McCulloch Rd.	SR 50
16	CR 506	Orange County	12,054	S. Orange Blossom Trail	Orange Ave S.
17	SR 423	Orange County	11,972	N. Orange Blossom Trail	N. Wymore Rd.
18	University Blvd.	Orange County	11,938	SR 436	Lake Mirage Blvd.
19	Rosalind Ave	Orlando	11,526	E. Livingston St.	S. Lucerne Cir.
20	Semoran Boulevard	Orlando	11,419	Lake Underhill Rd.	Lake Margaret Dr.
21	US 192/Vine St	Osceola County	11,347	Celebration Ave.	Four Winds Blvd.
22	Goldenroad Road	Orange County	11,182	Lake Underhill Rd.	Beatty Dr.
23	N Ronald Regan Blvd	Seminole County	10,951	Eldersprings Cir.	Jones Ave.
24	W First Street (US 17/92)	Sanford	10,856	N. Persimmon Ave.	N. Frence Ave.
25	Edgewater Dr/Highland Ave	Orange County	10,652	Clarcona Ocoee Rd.	Lee Rd.
26	Conway Road	Orlando	10,570	Curry Ford Rd.	E. Michigan St.
27	Pershing Ave.	Orlando	10,554	Woodgate Blvd.	Goldenrod Rd. S.
28	John Young Pkwy	Orange County	10,510	SR 528 Ramps	Lazio Ln.
29	East Lake Mary Blvd	Seminole County	10,477	North of Celery Ave.	SR 46
30	Poinciana Blvd	Osceola County	10,431	US 192	Siesta Lago Dr.
31	Holden Ave	Orange County	10,402	Rio Grande Ave. S.	Lake Holden Hills Dr.
32	S Orange Blossom Trail	Kissimmee	10,376	E. Osceola Pkwy.	Ridgewood Ave.
33	US-192/Vine St	Kissimmee	10,356	South of Four Winds Blvd.	N. John Young Pkwy.
34	CR 435/Apopka Vineland Rd	Orange County	10,310	Balboa Dr.	SR 50
35	Texas Ave	Orange County	10,255	Americana Blvd.	W. Oak Ridge Rd.
36	Vineland Road	Orange County	10,156	I-4	South of LBV Factory Shores Dr.
37	Orange Avenue	Orlando	10,131	S. Lucerne Cir.	Gatlin Ave.
38	Orange Blossom Trail	Orange County	9,988	Overland Rd.	Rosamond Dr.
39	Ivey Ln	Orlando	9,944	Edgemoor St.	Raleigh St.
40	Orange Blossom Trail	Apopka	9,928	Drage Dr.	S. McGee Ave.
41	Orange Blossom Trail	Orlando	9,902	Lee Rd.	Shader Rd.
42	Lancaster Road	Orange County	9,900	S. Orange Blossom Trail	Orange Ave. S.
43	Goldenroad Road	Orange County	9,875	North of Dwell Well Way	SR 50
44	John Young Pkwy.	Orlando	9,873	LB McLeod Rd.	W. Sand Lake Rd.
45	US-17/92/Orlando Ave	Seminole County	9,853	South St.	Spartan Dr.
46	S Orange Blossom Trail	Kissimmee	9,546	Ridgewood Ave.	Neptune Rd.
47	Conroy Rd/Americana	Orlando	9,495	West of President Barack Obama Pkwy.	S. Orange Blossom Trail
48	John Young Pkwy	Orange County	9,488	Deerfield Blvd.	South of Town Loop Blvd.
49	University Blvd.	Orange County	9,410	Bibb Ln.	Rouse Rd.

Central Florida Vision Zero
Regional HIN Segments
September 2023

Corridor Number	Road Name	Location	Total Weighted Score per Mile	From	To
50	W Colonial Dr/Martin Luther King B	Orange County	9,406	Economic Ct.	Good Homes Rd.
51	Westmoreland Drive	Orlando	9,377	SR 526/Washington Street	W. Gore St.
52	West 25th Street	Sanford	9,328	Club Rd.	S. Mellonville Ave.
53	Osceola Pkwy	Kissimmee	9,281	N. Orange Blossom Trail	Florida's Turnpike
54	US-17/92/Orlando Ave/French Ave	Seminole County	9,122	North of Longdale Ave.	SR 434
55	E Bronson Hwy/13 St/Vine St	Osceola County	9,118	Neocity Way	Pecan St.
56	Semoran Boulevard	Altamonte Springs	9,083	Montgomery Rd.	Palm Springs Dr.
57	Silver Star Road	Orange County	9,070	Mercy Dr.	East of N. John Young Pkwy.
58	Orange Avenue	Orange County	9,055	Prince St.	Spruce Ave.
59	Orange Blossom Trail	Orange County	9,038	Consulate Dr.	Town Center Blvd.
60	Old Winter Garden Rd	Orange County	8,868	N. Hiawassee Rd.	Takoma St.
61	SR 434	Seminole County	8,843	West of E. Lake Brantley Dr.	Oak St.
62	Fairbanks Avenue	Winter Park	8,816	Clay St.	Pennsylvania Ave. S.
63	Old Winter Garden Rd	Orlando	8,698	SR 408 Exit Ramp	Orange Blossom Trail N.
64	Aloma Avenue	Orange County	8,691	West of St. Andrews Blvd.	West of Tangerine Ave.
65	SR 434	Orange County	8,672	Pembrook Dr.	Edgewater Dr.
66	Michigan Ave.	Kissimmee	8,545	E. Donegan Dr.	E. Vine St.
67	Powers Drive	Orange County	8,540	Indian Hill Rd.	SR 438
68	Semoran Boulevard	Casselberry	8,485	US 17-92	Kewannee Trl.
69	John Young Pkwy.	Orange County	8,451	Sand Lake Rd.	South of SR 528 Ramps
70	Rio Grande Avenue	Orange County	8,446	W. Gore St.	Holden Ave.
71	US-17/92/French Ave	Sanford	8,421	W. 20th St.	W. 27th St.
72	Chickasaw Trl	Orange County	8,374	SR 50	Valencia College Ln.
73	Curry Ford Rd	Orange County	8,218	West of Frederica Dr.	East of Excalibur Dr.
74	Orlando Avenue	Winter Park	8,217	Lake Ave.	W. Fairbanks Ave.
75	Buenaventura Blvd.	Osceola County	8,171	County Boundary	Simpson Rd.
76	Simpson Rd	Osceola County	8,139	Harbor Town Dr.	US 192
77	Wetherbee Rd	Orange County	8,093	Orange Blossom Trail S.	Orange Ave. S.
78	Clark Road	Ocoee	8,093	Sparrow Song Ln.	White Rd.
79	Hoffner Avenue (SR 15)	Orange County	8,083	Conway Rd.	Goldenrod Rd. S.
80	SR 434	Longwood	8,076	S. Ronald Reagan Blvd.	US 17-92
81	Semoran Boulevard	Orlando	8,053	Lake Margaret Dr.	Hoffner Ave.
82	Lake Underhill Rd	Orange County	7,611	S. Oxalis Ave.	Econlockhatchee Trl. N.
83	Conway Road	Orange County	7,501	Caitlin Ave.	Hoffner Ave.
84	Hiawassee Rd.	Orange County	7,437	Beggs Rd.	SR 438/Silver Star Rd.
85	Semoran Boulevard	Casselberry	7,388	Lake Howell Ln.	County Boundary
86	Colonial Drive	Orange County	7,358	N. Avalon Park Blvd.	SR 520
87	Robinson Street	Orlando	7,204	N. Rosalind Ave.	N. Primrose Rd.
88	John Young Pkwy	Kissimmee	7,052	West of Ham Brown Rd.	Palmetto Ave.
89	Turkey Lake Rd	Orange County	6,854	Toscana Blvd.	South of Hillenmeyer Way
90	Clarcona-Ocoee Rd.	Orange County	6,815	Apopka Vineland Rd. N.	Powers Dr. N.
91	Landstar/Fairway Wds	Orange County	6,702	Fairway Woods Blvd.	County Boundary
92	Sand Lake Rd.	Orange County	6,682	Dr. Phillips Blvd.	Turkey Lane Rd.
93	Irlo Bronson Memorial Highway	Orange County	6,653	Westside Blvd.	East of Inspiration Dr.
94	Colonial Drive	Orange County	6,645	Econlockhatchee Trl. N.	N. Avalon Park Blvd.
95	International Drive	Orange County	6,622	West of Universal Blvd.	Destination Pkwy.
96	Rock Springs Rd N	Orange County	6,606	Faye St.	Welch Rd. E.
97	Semoran Boulevard	Orange County	6,531	Sheeler Ave. S.	Bear Lake Rd.

Central Florida Vision Zero
Regional HIN Segments
September 2023

Corridor Number	Road Name	Location	Total Weighted Score per Mile	From	To
98	Boggy Creek Rd	Orlando	5,949	Tradeport Dr.	E. Wetherbee Rd.
99	Narcoossee Road	Orange County	5,777	Tavistock Lake Blvd.	County Boundary
100	Colonial Drive	Orange County	5,662	N. Bumby Ave.	Econlockhatchee Trl. N.
101	Avalon Park Blvd	Orange County	5,630	SR 50	South of Timber Springs Blvd.
102	US-17/92/Orlando Ave/French Ave	Sanford	5,568	W. 27th St.	W. Lake Mary Blvd.
103	SR 531	Osceola County	5,405	Marsh Rd.	South of Granada Blvd.
104	E Bronson Hwy/13 St/Vine St	St. Cloud	5,168	West of Florida's Turnpike	Eastern Ave.
105	Winter Garden Vineland Road	Orange County	5,147	Fiquette Rd.	Overstreet Rd.
106	Winter Garden Vineland Road	Orange County	4,590	E. Buena Vista Dr.	S. Apopka Vineland Rd.
107	Boggy Creek Rd	Osceola County	4,451	E. Osceola Parkway	Buenaventura Blvd.
108	W Colonial Drive	Orange County	4,233	Apopka Vineland Rd. N.	Orange Blossom Trail N.
109	Apopka Vineland Road	Orange County	4,003	North of Buena Vista Woods Blvd.	North of Vineland Ave.
110	Apopka Vineland Road	Orange County	3,983	Windy Ridge Rd.	Sandberry Blvd.
111	Alafaya Trail	Orange County	3,161	Golfway Blvd.	Innovation Way
112	SR 438	Orange County	3,031	Apopka Vineland Rd. N.	Chantelle Ave.
113	Sand Lake Road	Orange County	2,646	Mandarin Dr.	Jetport Dr.
114	Orange Blossom Trail	Orlando	2,530	SR 50	Holden Ave.
115	Semoran Boulevard	Orange County	2,417	County Boundary	SR 408
116	Orange Blossom Trail	Orange County	2,315	Holden Ave.	Florida's Turnpike
117	SR 50	Orange County	1,667	Fort Christmas Rd S.	County Boundary
118	Pine Hills Road	Orange County	1,410	Pinto Way	SR 50

CHAPTER 8

Technical Appendix

D- Working Group Materials



Image of Main Street in the Town of Windermere

Town of Windermere



Vision Zero Safety Action Plan

Windermere Working Group Meeting 1

Agenda

Town of Windermere – Vision Zero Action Plan

Working Group Meeting 1 – Agenda

1:00 – 2:30 PM

Teams

1. Working Group Member Introductions
2. What to Expect from the Plan
3. What is Vision Zero?
4. Crash Trends
5. Safe System Approach
6. Overview of Key Tasks
7. Project Schedule
8. Next Steps
9. Discussion

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Meeting Materials

WORKING GROUP MEETING #1

TOWN OF WINDERMERE



DECEMBER 1, 2023

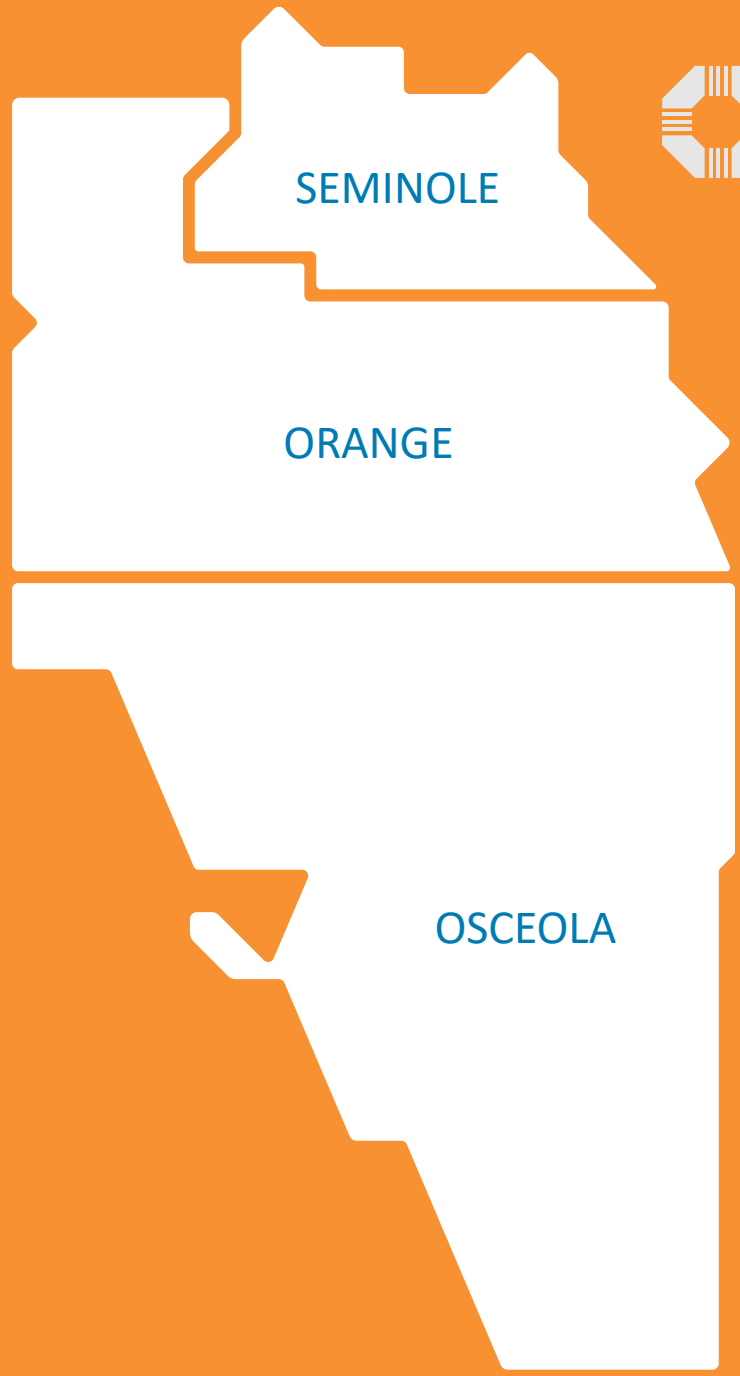
metroplan orlando
A REGIONAL TRANSPORTATION PARTNERSHIP

Agenda

1. Working Group Member Introductions
2. What to Expect from the Plan
3. What Is Vision Zero?
4. Crash Trends
5. Safe System Approach
6. Overview of Key Tasks
7. Project Schedule
8. Next Steps
9. Discussion

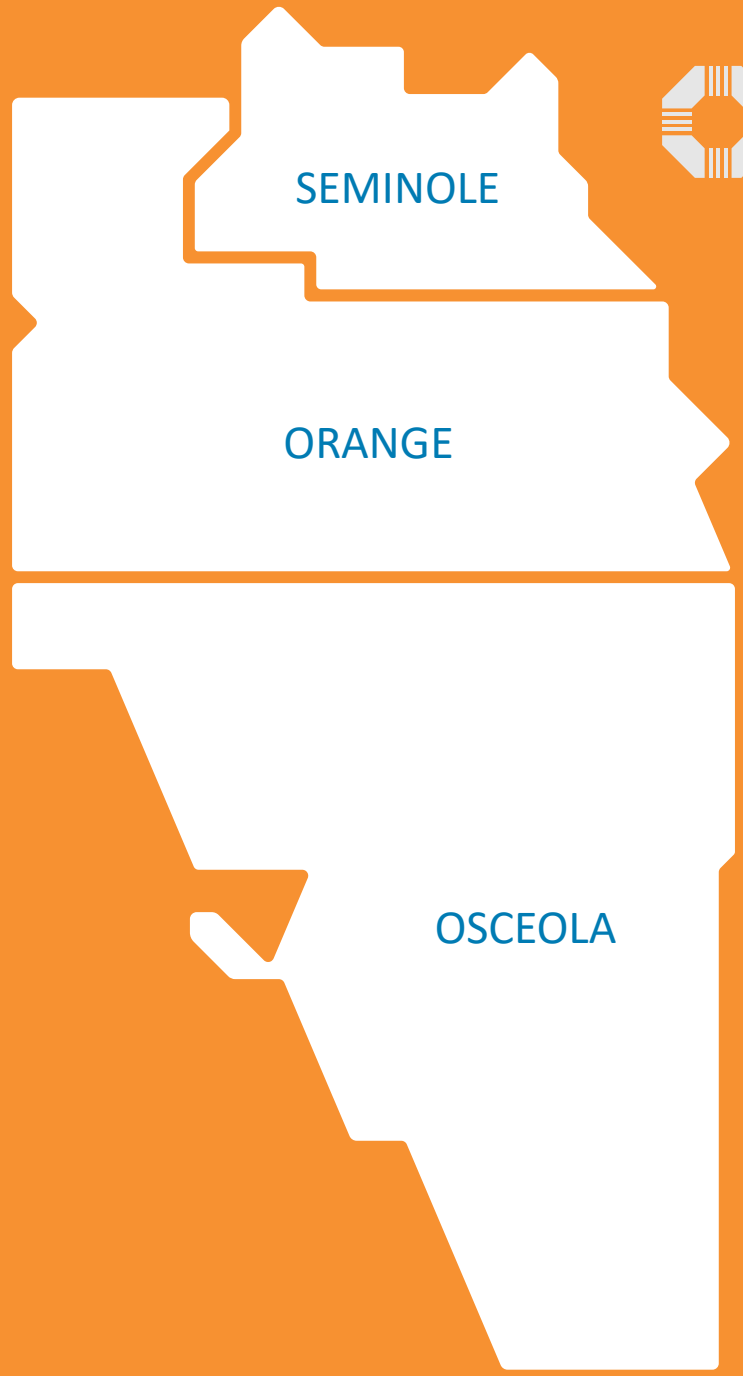
What can we expect from the plan and what is MetroPlan Orlando's role?

- MetroPlan Orlando won grant funding for Vision Zero safety analysis (Regional and County/City plans)
- Detailed **assessment** of transportation safety issues in Windermere
- Identification of **new feasible safety improvements** to provide on Windermere roadways



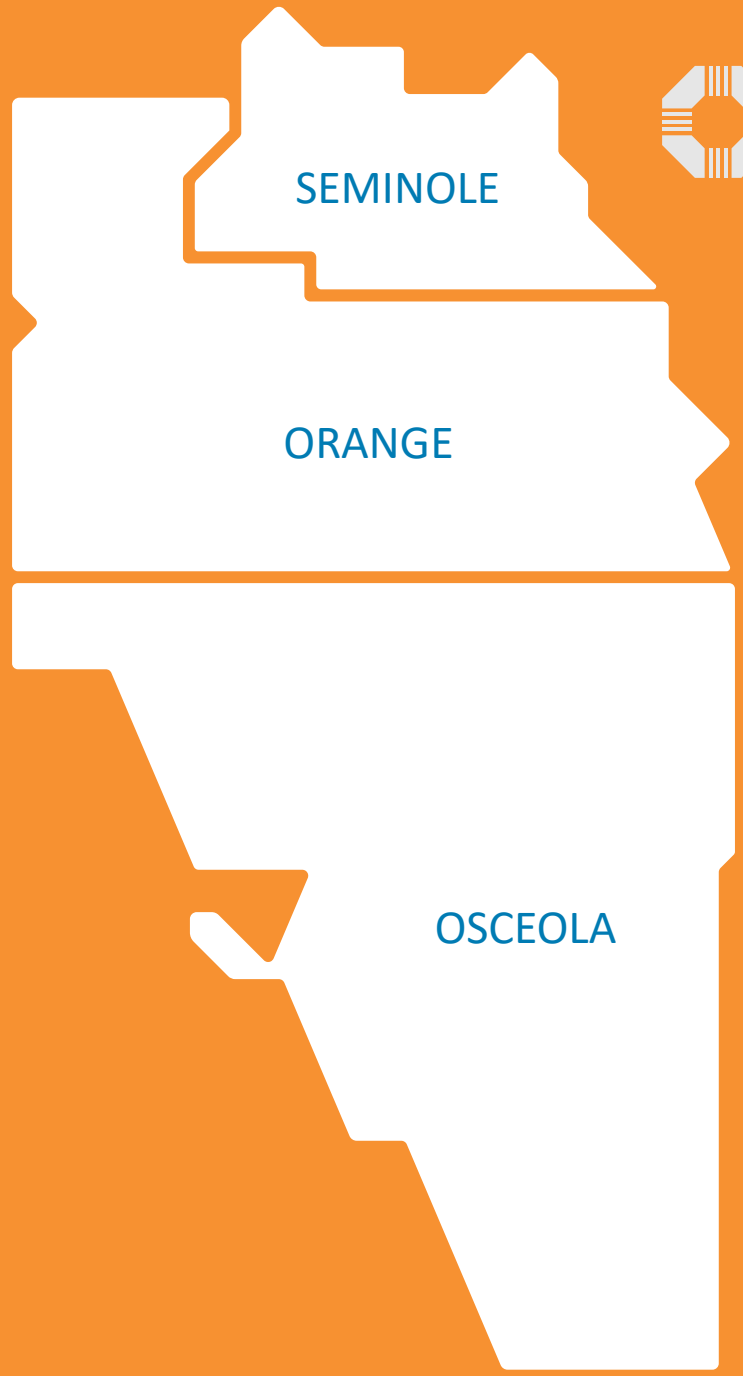
What is the Town's role?

- Support development of Town plan, including public engagement, development of High Injury Network, countermeasure identification, and policy changes
- Adopt Vision Zero Action Plan and Vision Zero Resolution



What happens after the plan is adopted?

- Upon adoption, new Windermere safety projects will be incorporated into the 2050 Metropolitan Transportation Plan for **prioritization** and regional funding allocations.
- MetroPlan Orlando **application support** for either supplemental planning or implementation funds for next round of **SS4A funding**.



WHAT IS VISION ZERO?



What is Vision Zero?



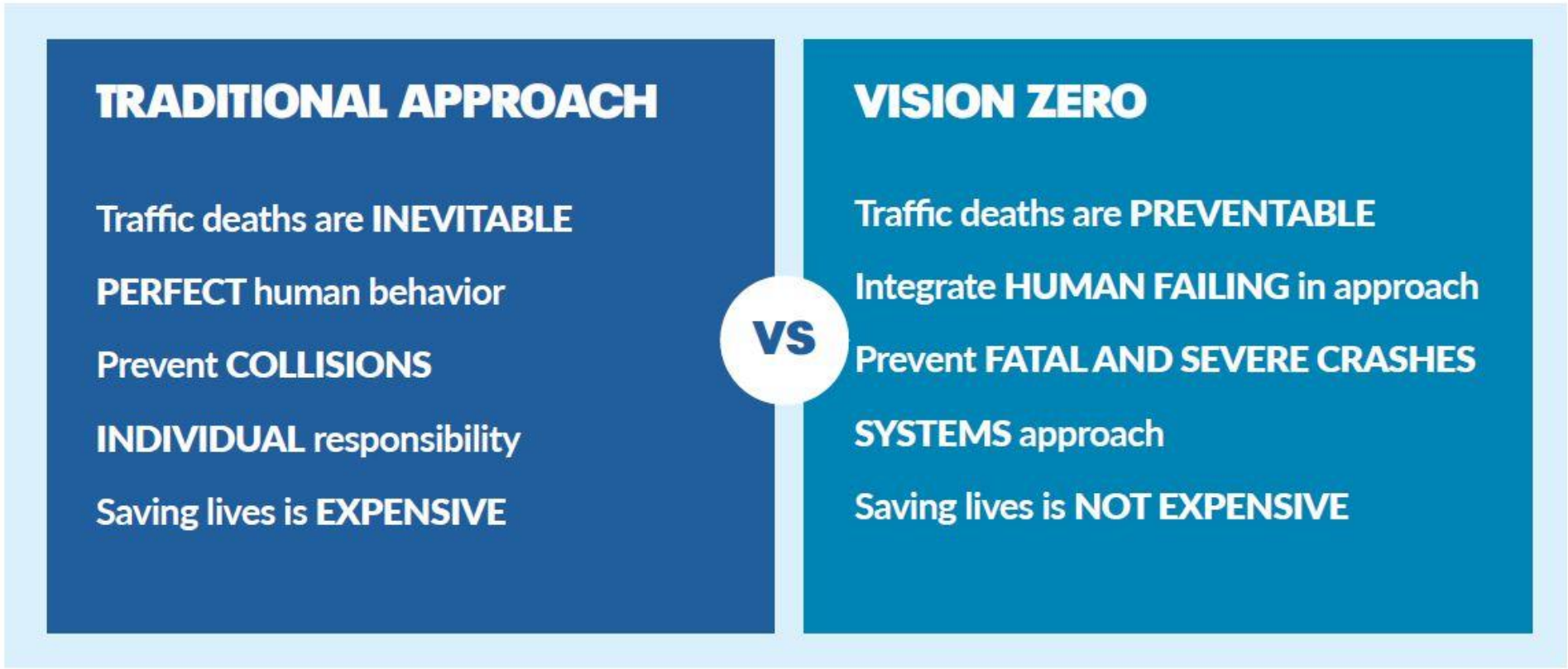
Memorial to people killed in traffic crashes. Source: Vision Zero Network

- Loss of life is not an acceptable price to pay for mobility.
- Eliminate traffic deaths and severe injuries on the transportation system.
- Proactive and preventive approach.

Vision Zero Approach

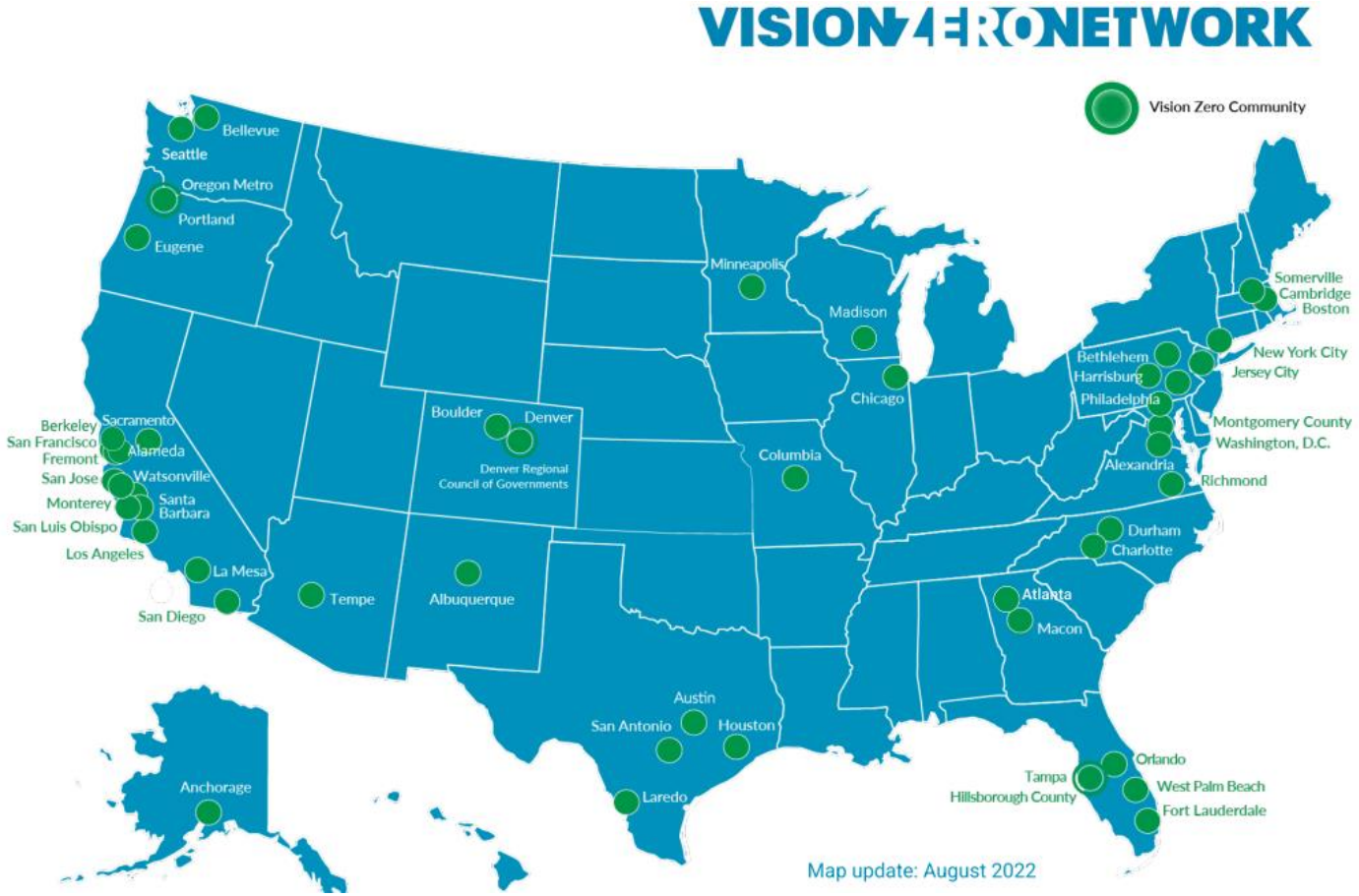
1. Reframes traffic deaths as **preventable**.
2. Integrates **human failing** into the approach.
3. Focuses on preventing **fatal and severe** crashes rather than eliminating all crashes.
4. Aims to establish **safe systems** rather than relying on individual responsibility.
5. Applies **data driven** decision making.
6. Establishes road safety as a **social equity issue**.

How is it different than what we have been doing?



Source: Vision Zero Network

Vision Zero in the US



Source: Vision Zero Network

Core Elements of Vision Zero Communities

A Vision Zero Community meets the following minimum standards:

- Sets Clear Goal of **eliminating** traffic fatalities and serve injuries
- Elected officials have **committed publicly** to Vision Zero

Core Elements – Leadership and Commitment

1. Public, High Level, and Ongoing Commitment
2. Authentic Engagement
3. Strategic Planning
4. Project Delivery

Core Elements of Vision Zero Communities

A Vision Zero Community meets the following minimum standards:

- **Actionable** Strategies are developed, including:
  - Prioritize Roadway Design
  - Focus on Speed Management

Core Elements – Safe Roadways and Safe Speeds

5. Complete Streets for All
6. Context Appropriate Speeds

Core Elements of Vision Zero Communities

A Vision Zero Community meets the following minimum standards:

- Key **agency departments** (including police, transportation, public health) are engaged
- **Data driven** decision making

Core Elements – Data-Driven Approach, Transparency and Accountability

7. Equity-Focused Analysis and Programs
8. Proactive, Systemic Planning
9. Responsive, Hot Spot Planning
10. Comprehensive Evaluation and Adjustments

What do you think?

- What do you think are the barriers/challenges to reaching zero traffic fatalities and serious injuries in Windermere?

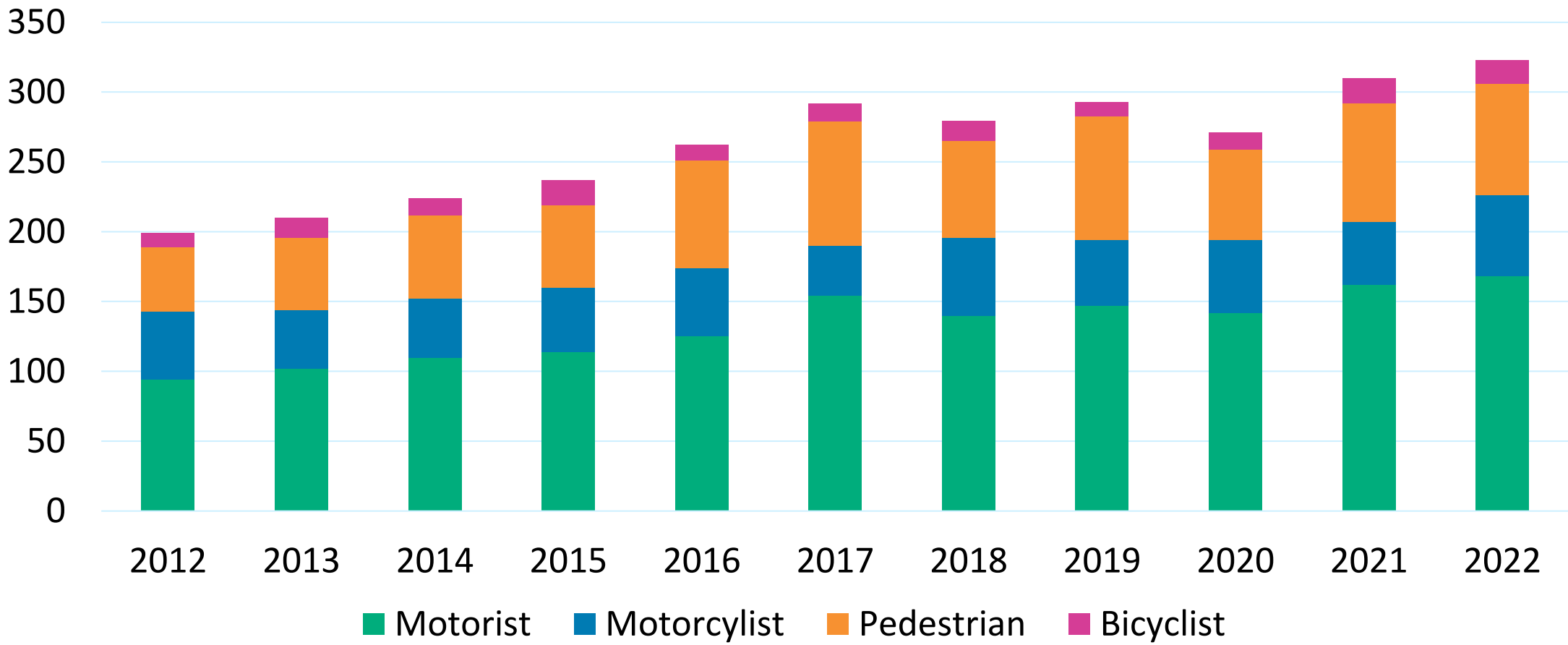
CRASH TRENDS

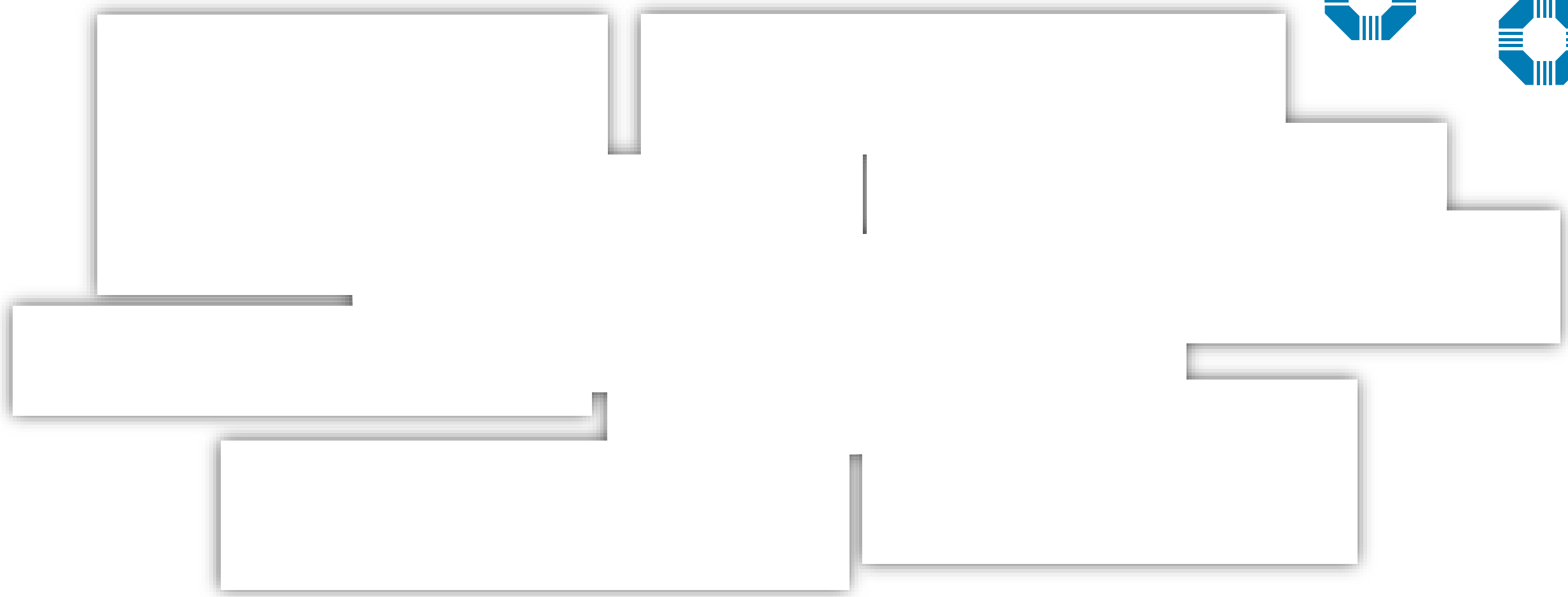






MetroPlan Orlando Region – Fatalities



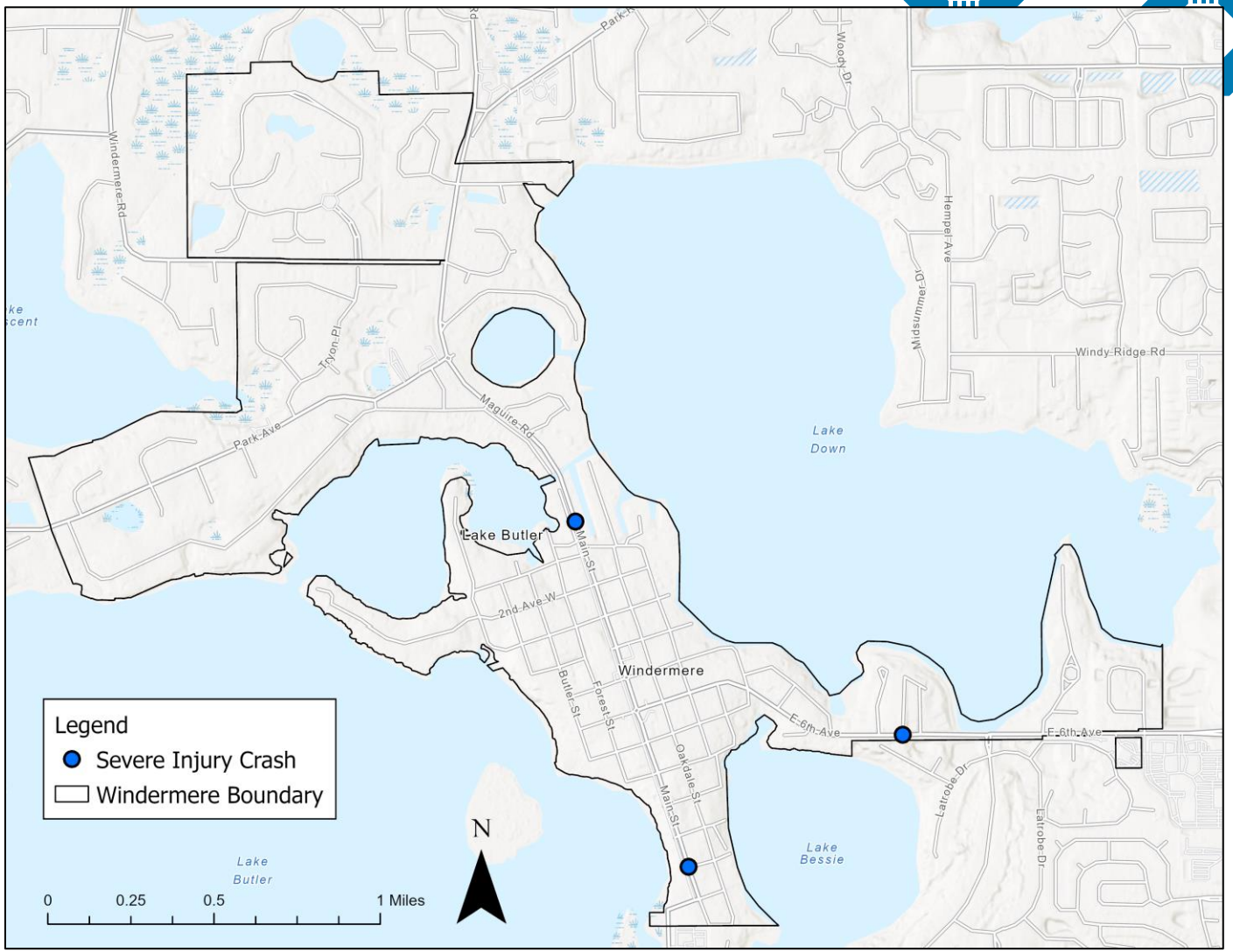


Crash Overview
Windermere | 2018-2022 (Data from S4)

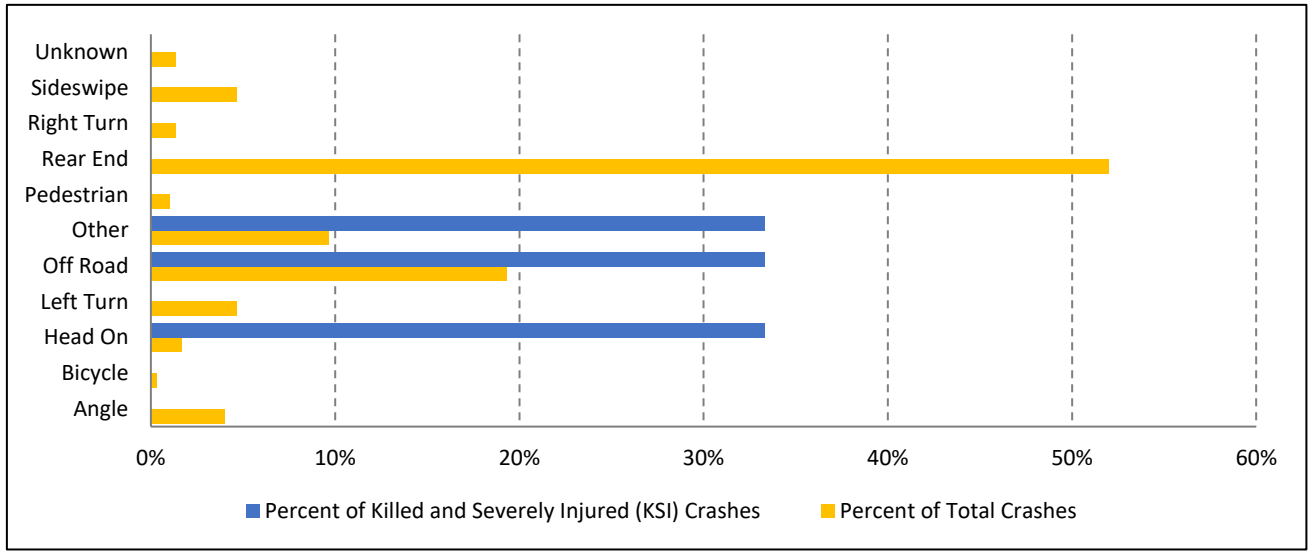
- **3 severe injury crashes** and **0 fatalities**
- **29 non-incapacitating injury** crashes and **45 possible injury crashes** occurred
- A total of **300 crashes occurred**
- **Pedestrian and bicycle** were involved in **2%** of all crashes

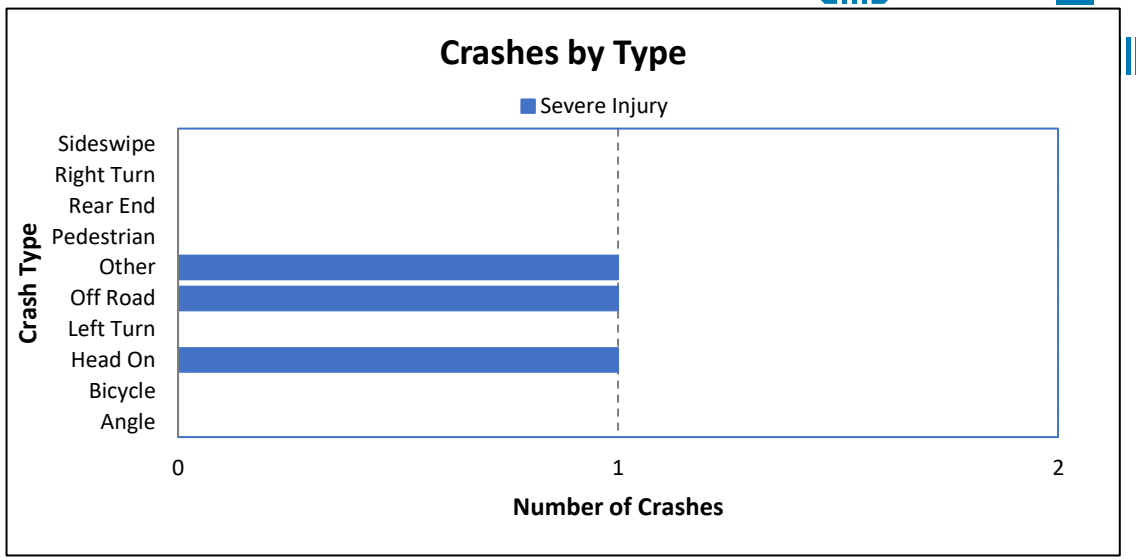
KSI Crashes | Windermere

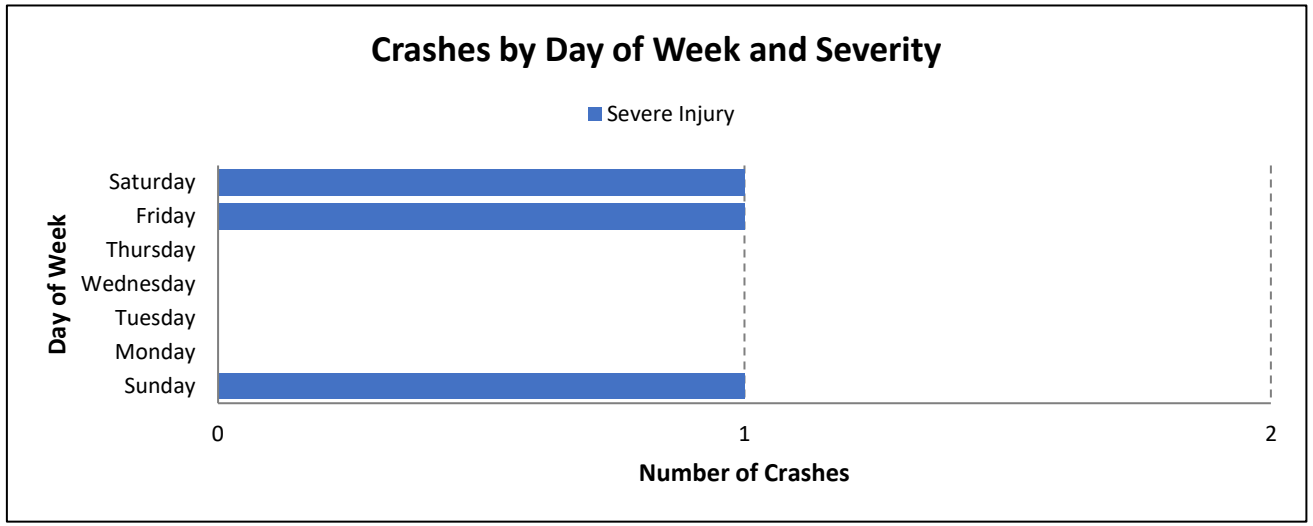
- 3 serious injury crashes
- 0 fatal crashes

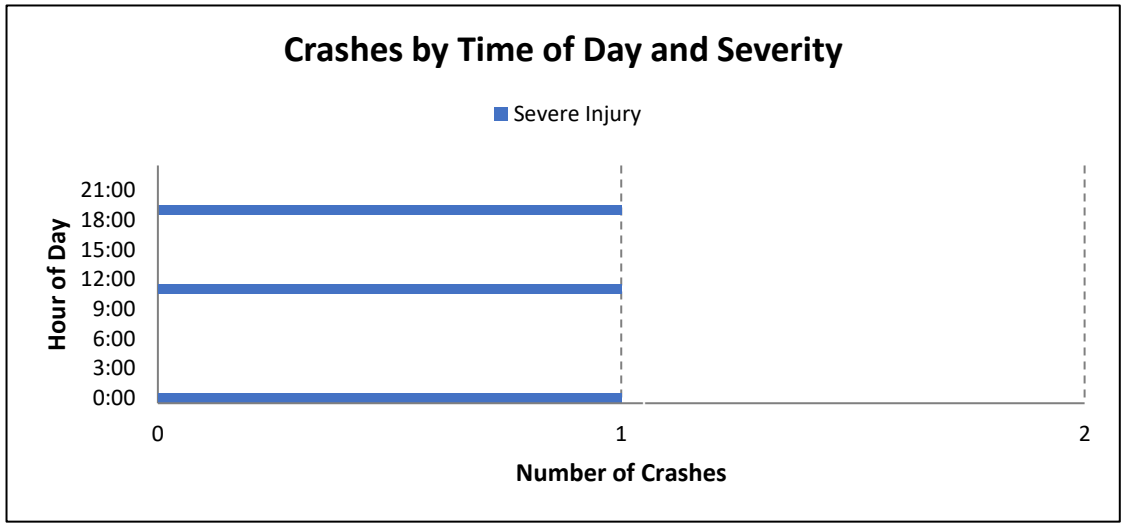


Crash Summary by Type
Windermere | 2018-2022

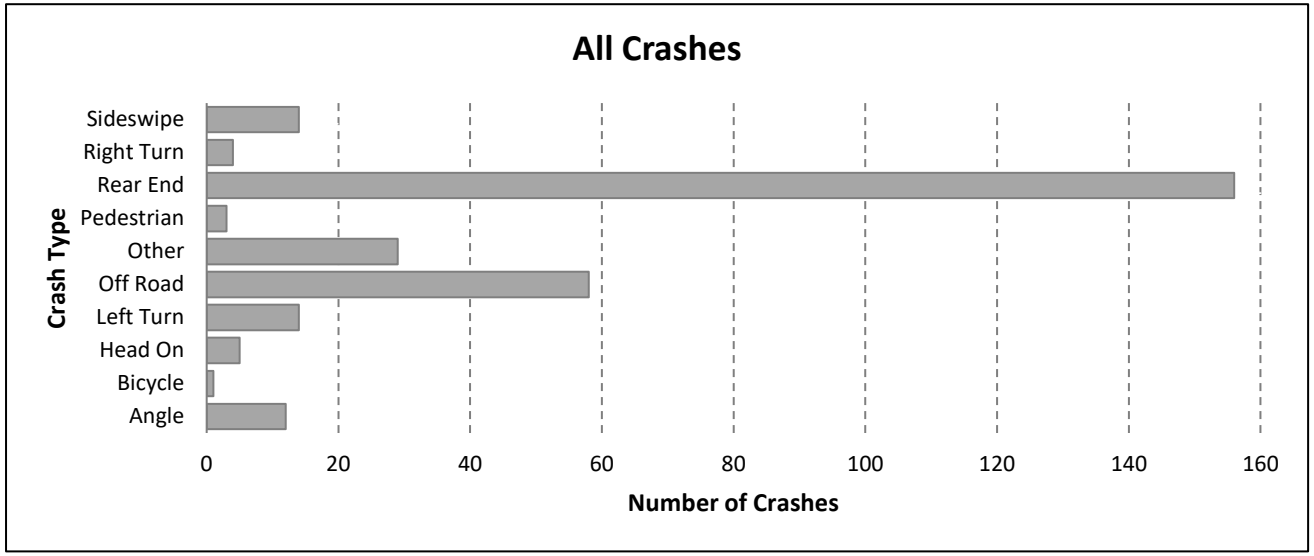


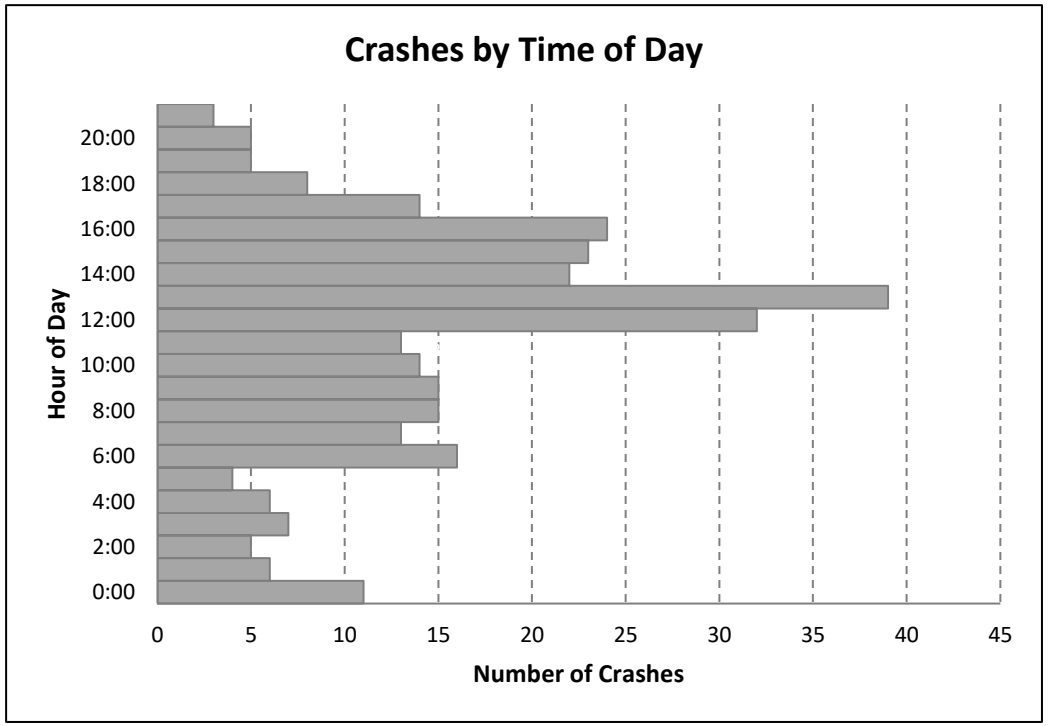






Crash Summary by Time
Windermere | 2018-2022





SAFE SYSTEM APPROACH



Zero is our goal. A Safe System is how we will get there.



U.S.Department of Transportation
Federal Highway Administration

The Safe System/Vision Zero approach aims to eliminate fatal and serious injuries for all road users by:

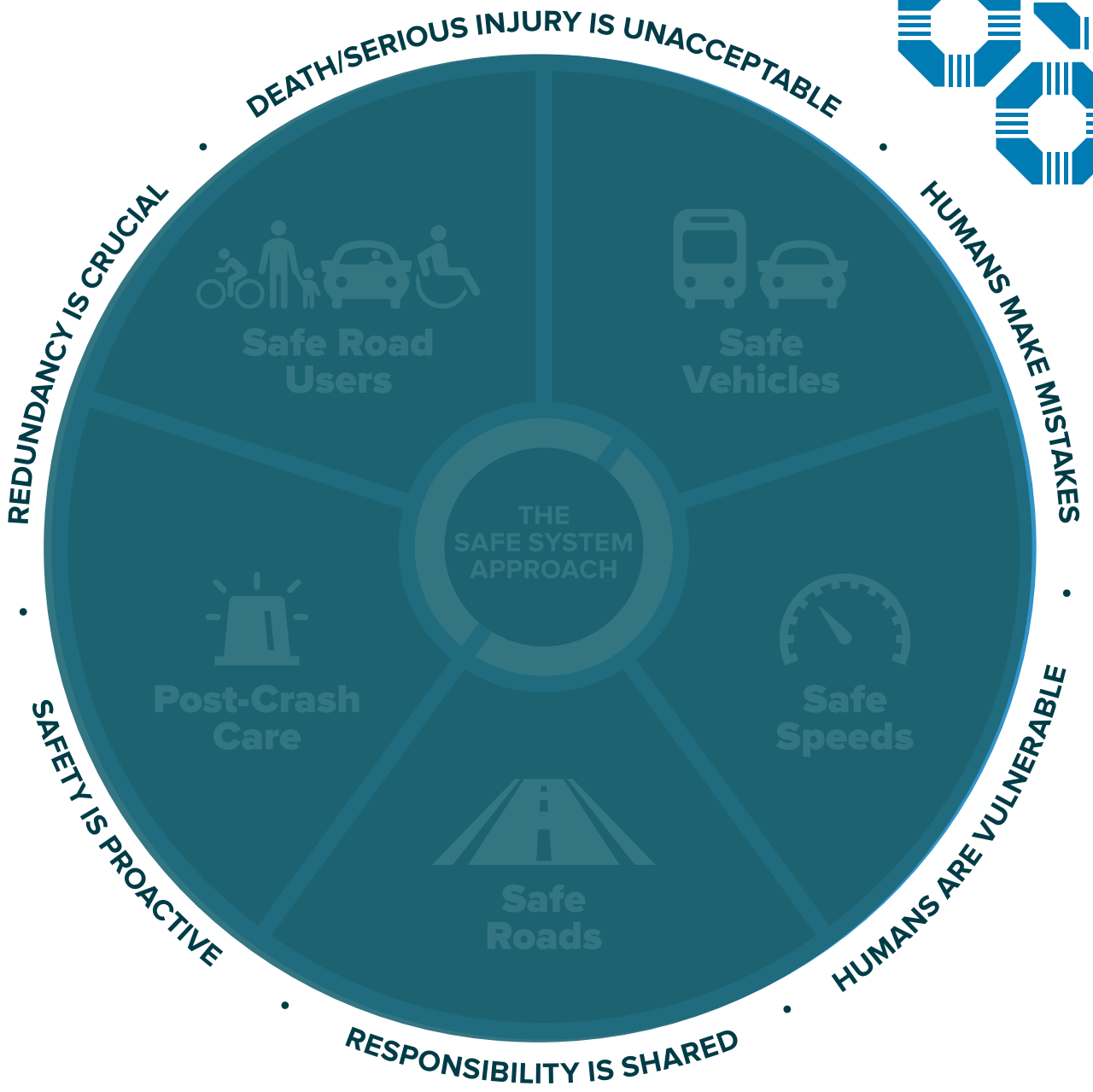


Accommodating human mistakes.



Keeping impacts on the human body at tolerable levels.

The 6 Safe System Principles

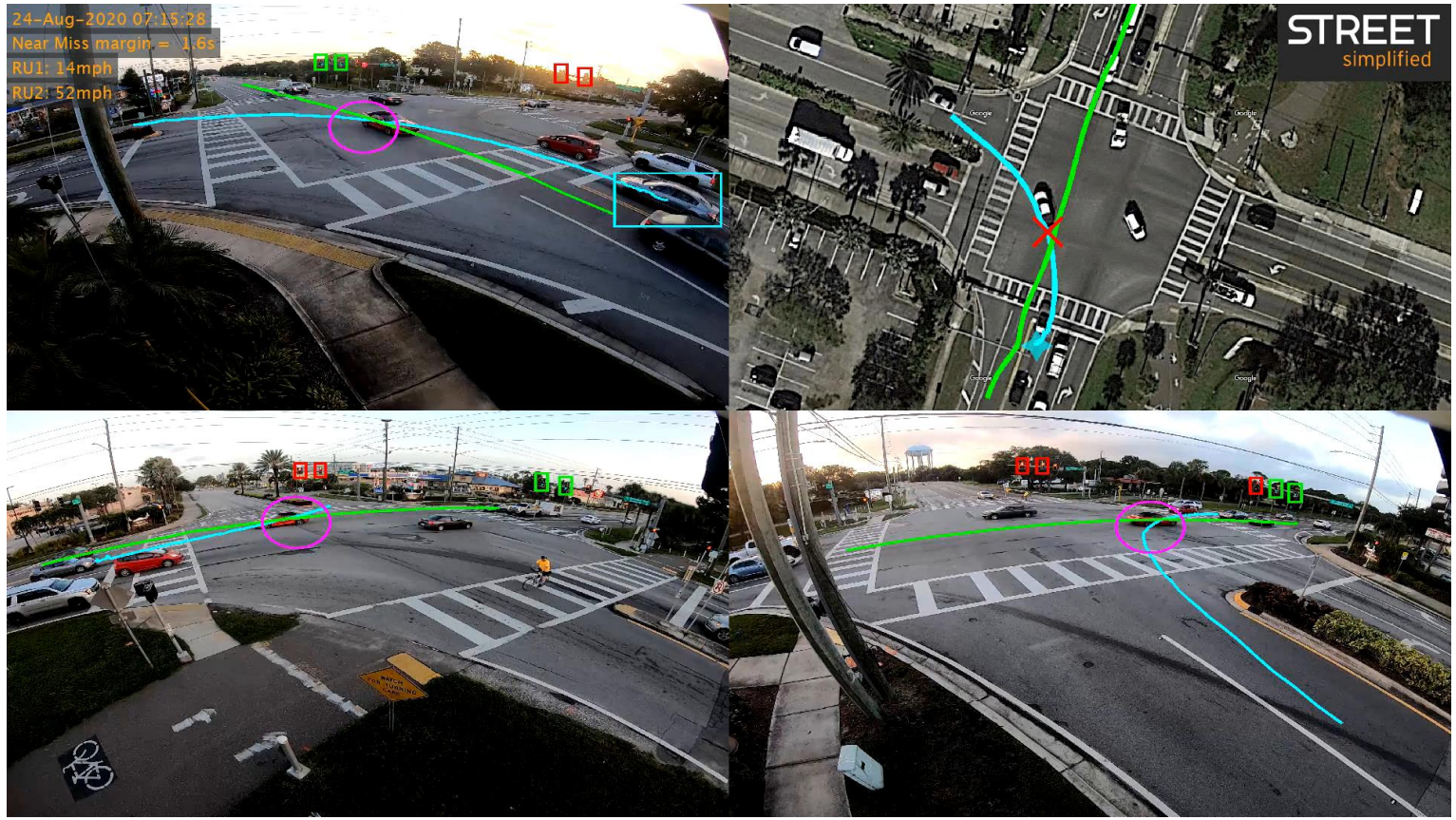


Death/Serious Injury is Unacceptable



Source: Massachusetts Bicycle Coalition

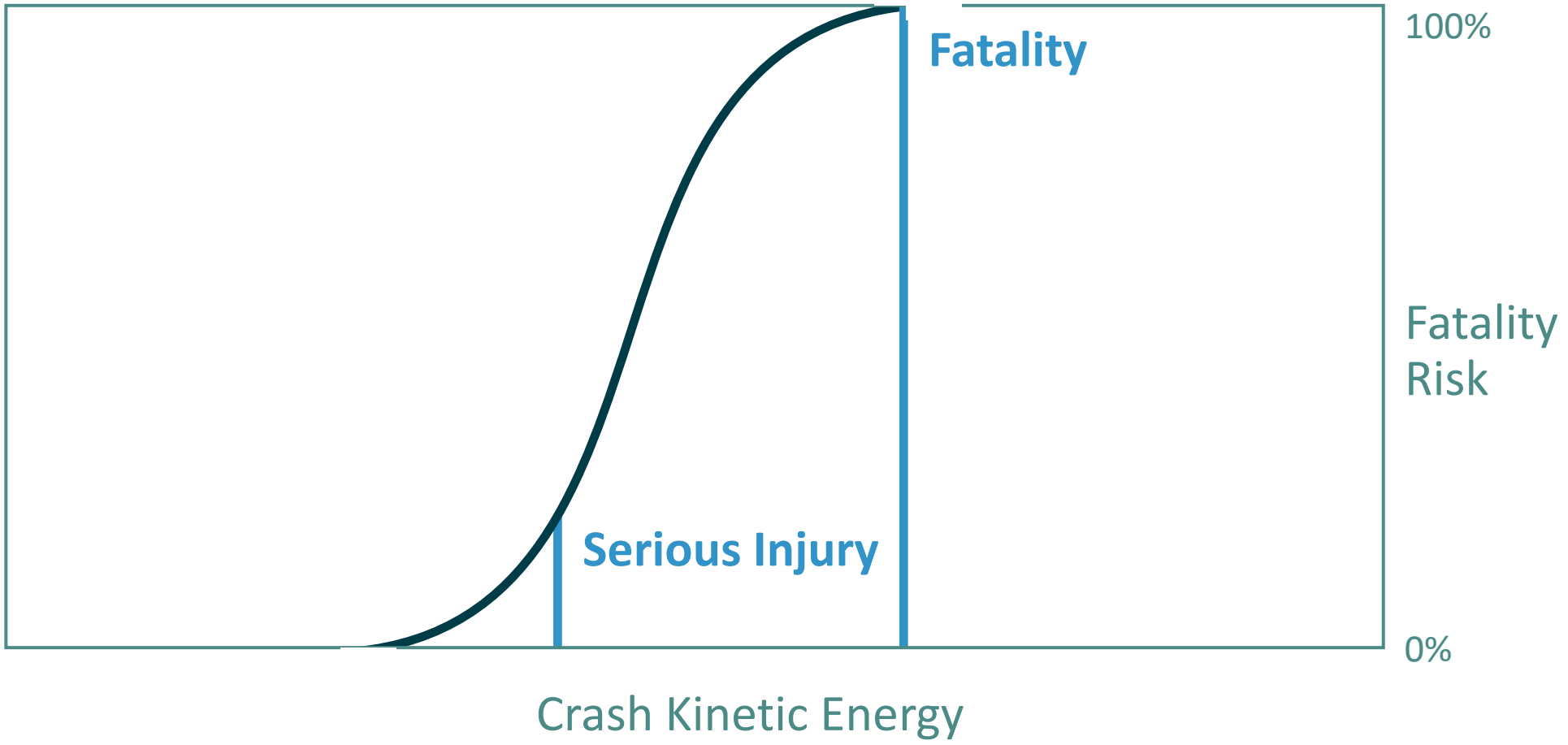
Humans Make Mistakes



Source: Fehr & Peers and Forward Pinellas

Humans are vulnerable





Responsibility is Shared

System managers

Planners, designers, builders, operators, maintenance workers

Vehicle manufacturers

Law enforcement personnel

Post-crash personnel

System users





Source: City of Orlando

Safety is Proactive

Identify Risks

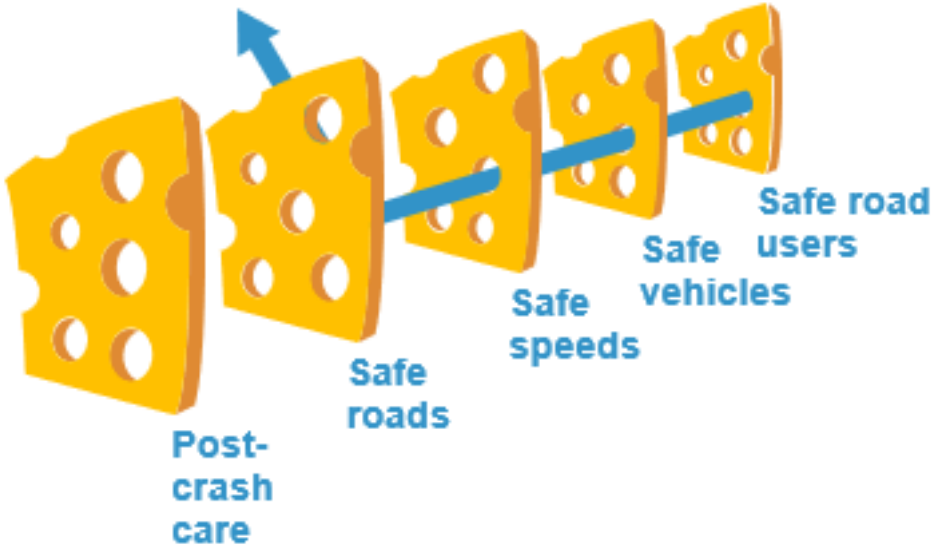
Mitigate Risks



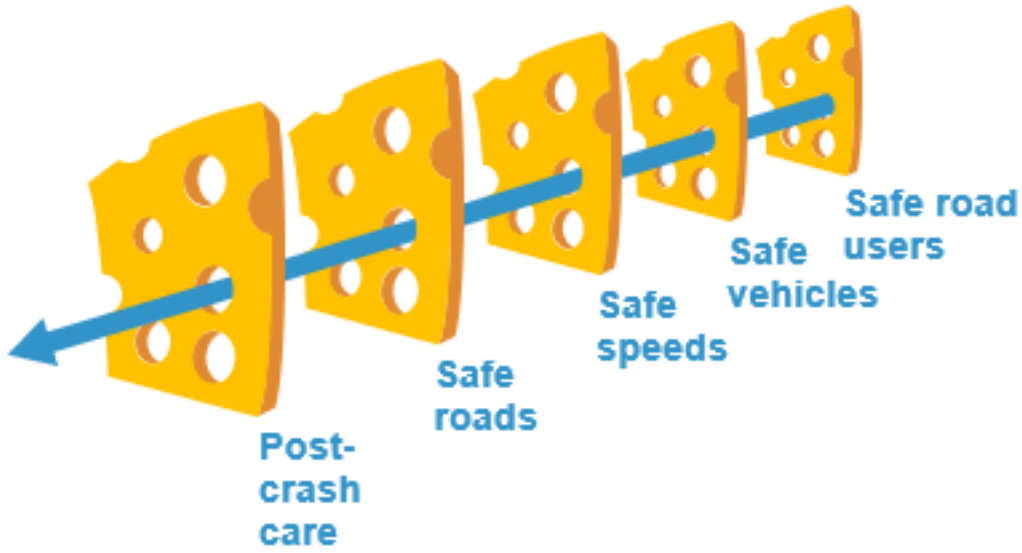
Source: Florida Department of Transportation

Redundancy is Critical

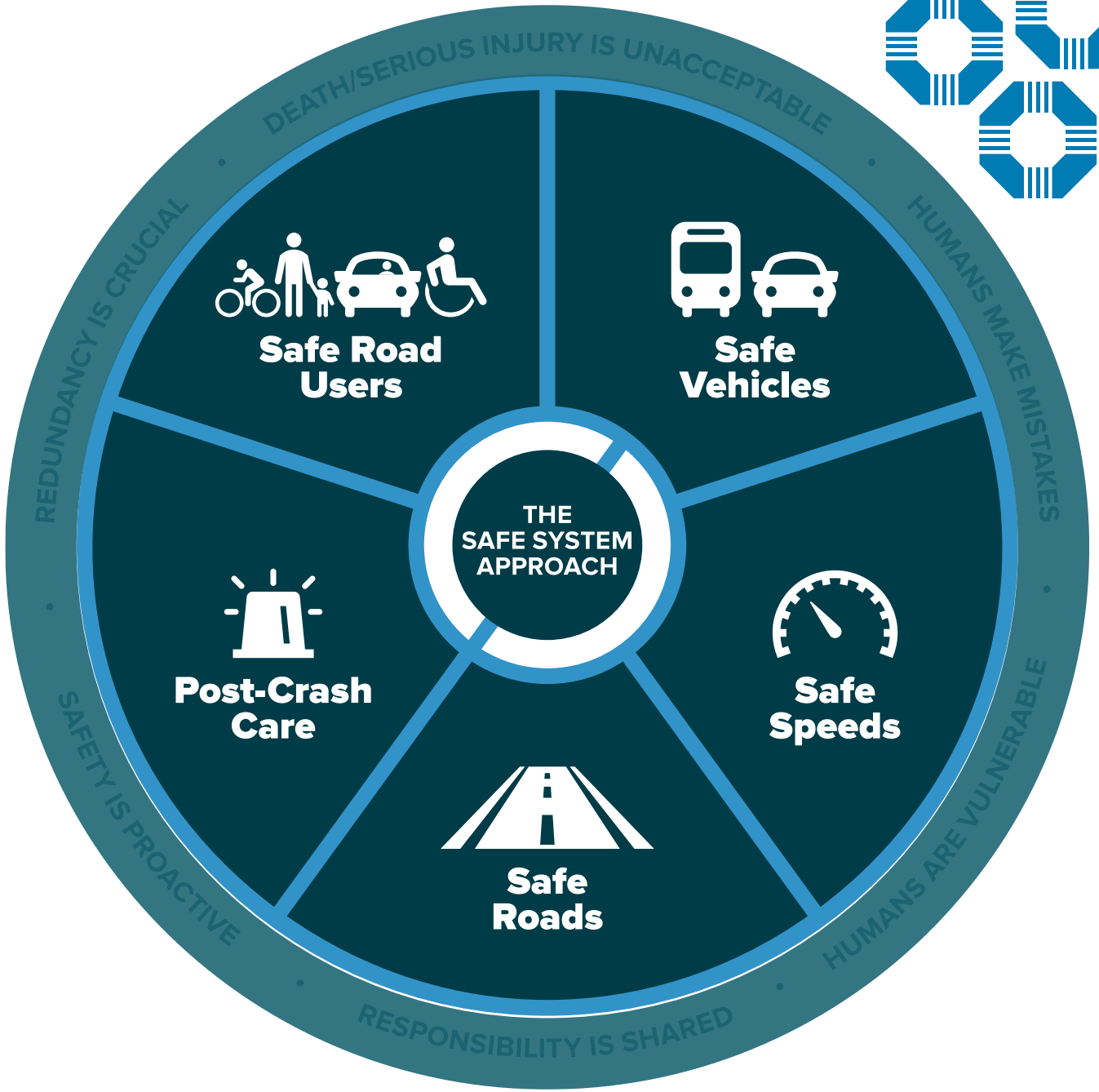
The "Swiss Cheese Model" of redundancy creates layers of protection



Death and serious injuries only happen when all layers fail



The 5 Safe System Elements



Safe Road Users









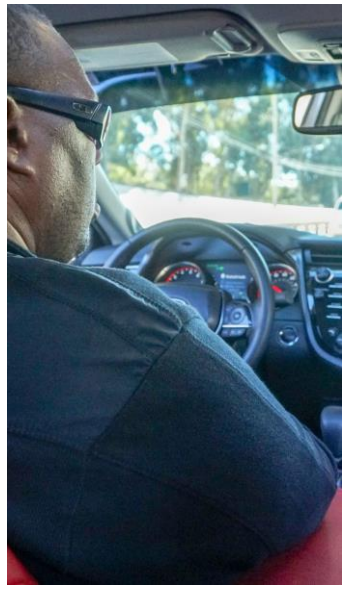




Walk



Bike



Drive



Transit



Other

Safe Vehicles

- Active Safety
- Passive Safety



Safe Speeds



"Speed is at the heart of a forgiving road transport system. It transcends all aspects of safety: without speed there can be no movement, but with speed comes kinetic energy and with kinetic energy and human error come crashes, injuries, and even deaths."

-Organization for Economic Co-operation and Development-

Safe Roads

Managing crash kinetic energy involves:

Managing Energy Crash Distribution



Managing Speed



Managing Mass



Modifying Crash Angles



Post-Crash Care

Vital post-crash actions include:





First responders



Medical care



Crash investigation



Traffic incident management



Justice

Implementing Vision Zero/Safe System

…and we all have a role.









What do you think?

- How would you describe the roadway safety culture in your agency/community?

OVERVIEW OF KEY TASKS







KEY TASKS

- Public Engagement
- High Injury Network
- Crash Profiles
- Countermeasure Identification
- Project/Strategy Prioritization
- Action Plan Development
- Integration w/Regional, County, & City/Town VZ Plans

KEY TASKS

- **Public Engagement**
- High Injury Network
- Crash Profiles
- Countermeasure Identification
- Project/Strategy Prioritization
- Action Plan Development
- Integration w/Regional, County, & City/Town VZ Plans

Public Engagement includes:

- Working Group Meetings
- Project Brand
- Pop-up Events
- Engagement Plan
- Hub Site/Safety Dashboard
- Online Public Engagement
  - https://metroplanorlando.gov/safety/vision-zero-central-florida/
- Communication Toolkit

Engagement Schedule

Winter 2023

Working Group #1
December 1

Kick-off

Winter 2024

Stakeholder Engagement Plan
December 2023

Draft Complete

Winter 2024

Winter 2024

Working Group #2

HIN & Crash Data

January 17

Jan 26, 2024

Pop-Up Event #1
Food Truck Friday
January 26, 2024

Spring 2024

Working Group #3
February 2024

Policy and Countermeasures

Spring 2024

Pop-up Event #2

Event to be determined
March/April

Spring 2024

Spring 2024

Working Group #4
May 2024

Project Prioritization

What do you think?

- How has Windermere conducted succesful public outreach in the past?

KEY TASKS

- Public Engagement
- **High Injury Network**
- Crash Profiles
- Countermeasure Identification
- Project/Strategy Prioritization
- Action Plan Development
- Integration w/Regional, County, & City VZ Plans

High Injury Network

By Geography

- All Roads
- Local Roads

By Travel Mode

- People walking/people with disabilities
- People biking/micromobility
- People motorcycling
- People in cars

What do you think?

- Our next meeting will focus on the crash analysis. Are there specific transportation safety questions you would like us to be able to answer?

KEY TASKS

- Public Engagement
- High Injury Network
- **Crash Profiles**
- Countermeasure Identification
- Project/Strategy Prioritization
- Action Plan Development
- Integration w/Regional, County, & City/Town VZ Plans

Crash Profiles

Identify Risk Factors Based on:

- Roadway Characteristics
- Environmental Conditions
- Behavior

KEY TASKS

- Public Engagement
- High Injury Network
- Crash Profiles
- **Countermeasure Identification**
- Project/Strategy Prioritization
- Action Plan Development
- Integration w/Regional, County, & City/Town VZ Plans

<u>Countermeasure Toolbox</u>

Engineering Measures

- By crash type
- Systemic
- Low cost/quick-build

Non-Engineering Measures

- Education
- Targeted enforcement
- Safety campaigns

KEY TASKS

- Public Engagement
- High Injury Network
- Crash Profiles
- Countermeasure Identification
- **Project/Strategy Prioritization**
- Action Plan Development
- Integration w/Regional, County, & City/Town VZ Plans

Prioritization factors to be identified based on feedback from the working group, but could include:

- Crash Rates
- Equity
- Speed Management Network
- Vulnerable Roadway Users
- Regional or Local Significance

What do you think?

- Are there treatments the Town has successfully implemented in the past? Are there projects or locations we should discuss at the next working group?

KEY TASKS

- Public Engagement
- High Injury Network
- Crash Profiles
- Countermeasure Identification
- Project/Strategy Prioritization
- **Action Plan Development**
- Integration w/Regional, County, & City/Town VZ Plans

Action Plan Development

- Vision Zero Resolution
- Prioritized List of Projects
- Policy and Process Changes

KEY TASKS

- Public Engagement
- High Injury Network
- Crash Profiles
- Countermeasure Identification
- Project/Strategy Prioritization
- Action Plan Development
- **Integration w/Regional, County, & City/Town VZ Plans**

Integration

Coordination with Regional and County Plans for regional consistency and amplification

Project Schedule

Winter 2023

Project Kick-off and Establish Working Group

Winter 2024

Develop Materials to Share with Partners

Early Spring 2024

Policy Review

Spring/Early Summer 2024

Action Plan Document

Crash Analysis

Winter 2023

Engineering/Non-Engineering Countermeasures

Early Spring 2024

Identify and Prioritize Projects and Strategies

Late Spring 2024

Next Steps

Working Group Meetings

Next meeting planned for mid January 2024

Regional Plan

Regional plan efforts are ongoing

Engagement

Pop-up event on January 26, 2024

Stakeholder engagement plan

Crash Analysis

Detailed crash analysis

Hub Site with regional crash data and other project information available

What do you think?

- Who else should be on the working group?

VISION ZERO
CENTRAL FLORIDA

Questions?

Contact Information:

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407-876-2563

Kelly Fearon–
kfearon@kittelson.com
813-710-9517

Sarah Larsen –
sarah.larsen@metroplanorlando.gov
321-732-8230

Meeting Notes

Town of Windermere – Vision Zero Action Plan

Working Group #1 Meeting Notes

Date: December 1, 2023
Time: 2:00 – 3:00 PM
Meeting Location: Virtual

Attendees

- Tonya Elliot-Moore (Windermere, Director of Public Works)
- John Fitzgibbon (Windermere, Civil Engineer)
- Mike Woodworth (Kimley-Horn, Traffic Engineer)
- Jason Bonk (Windermere, Police Chief)
- Robert Smith (Windermere, Town Manager)
- Kelly Fearon (Kittelson)
- Roxane Van Horn (Kittelson)

Meeting Notes

Introduction

- Kelly Fearon walked through the scope, defined Vision Zero and described how the project fits into the larger context of Metro Plan Orlando.

Vision Zero

- Town of Windermere staff noted several barriers and challenges to reaching zero serious injury and fatal crashes including:
    - Council member concern (i.e., a few council members expressed questions about the Vision Zero Resolution focused on the responsibility/liability that it will place on the Town)
    - Acquiring funding for infrastructure especially noting the Town's size and budget
    - Public engagement will likely not reach those who contribute to cut-through traffic.
        - Kelly mentioned the ongoing regional efforts for public engagement
    - Noted the importance of avoiding implementing solutions that will cause cut-through traffic to drive on local roads.
    - Majority of streets are local streets at 15 MPH and only a few collectors including 6th Avenue, Main Street, Park Ave, and Conroy Windermere Road which are low speed roads currently.

Crash Trends and Roadway Safety Culture

- Town staff noted several crash trends they have encountered including:
    - Most Town roads are residential, low-speed dirt roads that do not experience fatal and severe injury crashes
    - Rear-end crashes are the most common crash type
    - Sideswipe crashes were surprising to see and may occur at the roundabouts.
    - Locals often perceive high vehicle speeds (of up to 70 MPH on local roads). However, the Town's recorded speeds do not reflect the speeding complaints.
    - Would like to see more information on the "Run off road" type crashes as focus area
    - Overall there is a very supportive safety culture

Past Safety Improvements

- Town staff noted past safety improvements that have been successful, including:
    - The midblock crosswalk on Main Street
    - Roundabouts have had a positive impact on travel flow and safety
    - Several pedestrian safety improvements (including adding RRFBs)
    - Have LED lighting in a majority of downtown
    - Continue to receive requests for more crosswalks
    - Police and Public Works coordinate on using temporary speed feedback sign
    - Police currently do speed enforcement as resources allow

Public Engagement

- Town staff noted that their citizens are highly responsive
- The Town has had success with virtual public meetings as opposed to in-person meetings

Public Engagement Schedule

- The first pop-up event will take place at Windermere's Food Truck Night on 1/26/2024
- The second pop-up event will likely take place at a Windermere's farmer's market

Meeting Schedule

- The second Working Group Meeting will take place on 1/17/2024 at 10:00 AM

Next Steps

- Kittelson & Associates to send calendar invite to Town for the Working Group Meeting #2 which will take place on 1/17/2024 at 10:00 AM
- Kittelson & Associates to attend the first pop-up event (Windermere's Food Truck Night) on 1/26/2024

Windermere Working Group Meeting 2

Agenda

Town of Windermere – Vision Zero Action Plan

Working Group Meeting 2 – Agenda

10:00 – 11:00 AM

Teams

1. Welcome
2. Recap of Working Group Meeting #1
3. High Injury Network
4. Crash Trends
5. Hub Site Demonstration
6. Public Engagement Efforts
7. Upcoming Tasks and Next Steps
8. Discussion

Contact Information:
Kelly Fearon, Kittelson & Associates, Senior Engineer
kfearon@kittelson.com, 813-710-9517

Sarah Larsen, MetroPlan Orlando, Transportation Planner
sarah.larsen@metroplanorlando.gov, 321-732-8230

Meeting Materials

THE TOWN OF Windermere

WORKING GROUP MEETING #2



JANUARY 17, 2024

metroplan orlando
A REGIONAL TRANSPORTATION PARTNERSHIP

Agenda

1. Welcome
2. Recap of Working Group Meeting #1
3. High Injury Network
4. Crash Trends
5. Hub Site
6. Public Engagement Efforts
7. Upcoming Tasks and Next Steps
8. Discussion

Working Group Meeting #1 Highlights

What do you think are the biggest barriers to reaching zero traffic fatalities and serious injuries in our region?

- Funding
- Public engagement will not reach the cut-through traffic
- Majority of streets are already posted at slow speed (15 MPH)
- Avoid implementing solutions that will cause cut-through traffic to drive on local roads

Regional Task Force Meeting #1 Highlights

What do you think are the biggest barriers to reaching zero traffic fatalities and serious injuries in our region?

- Limits of education
- Drivers not understanding the consequences of their poor driving habits
- Distracted driving
- Not enough support of law enforcement in the courts
- Inconsistent design
- Lack of personal responsibility
- Development patterns
- Political will
- Funding
- Culture and behavior



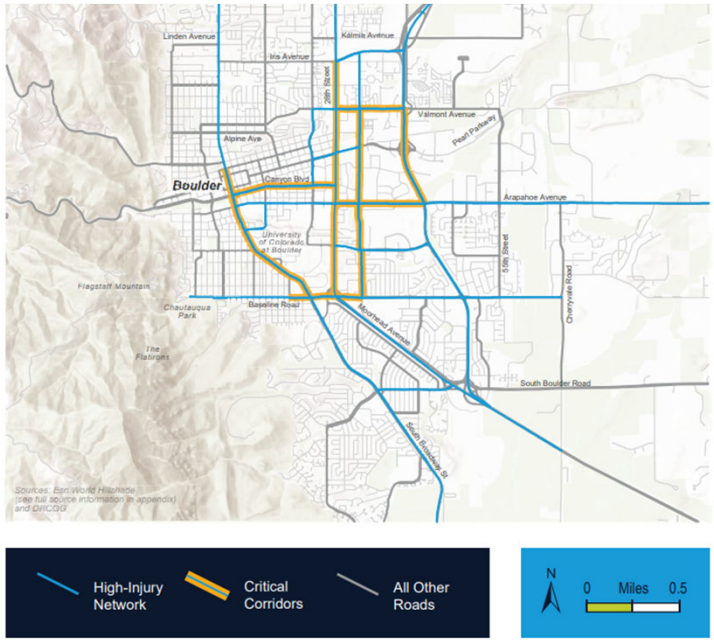
HIGH INJURY NETWORK



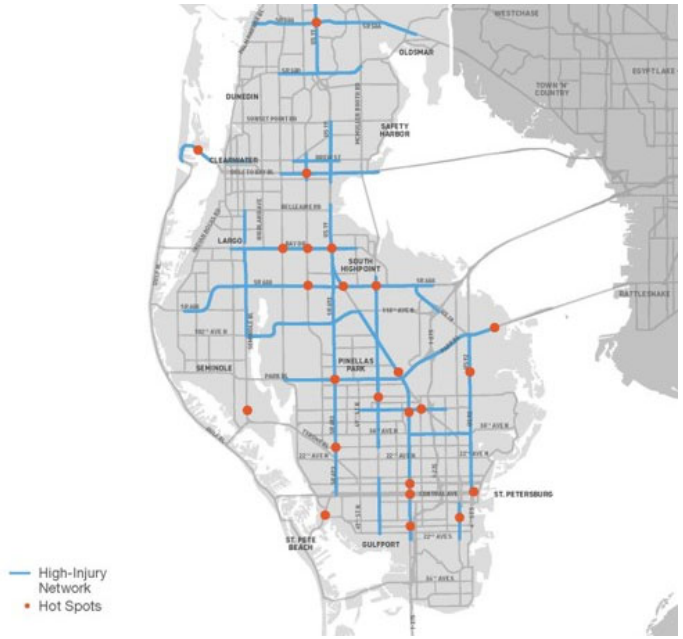
What is a High Injury Network?

Collection of roads where a disproportionate number of fatal and severe injury crashes occur.

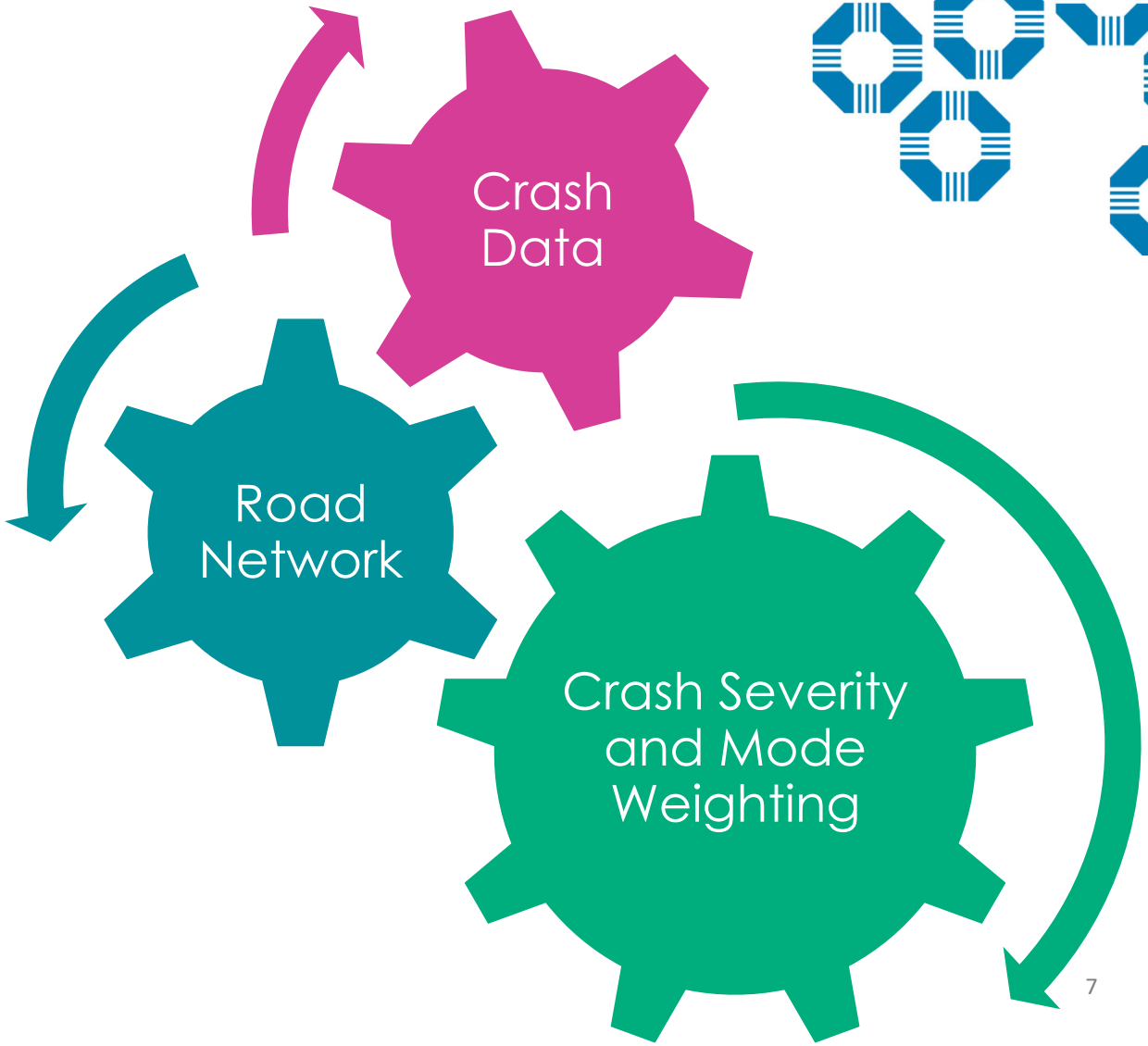
DRCOG, Colorado



Forward Pinellas, Florida



How is it Developed?

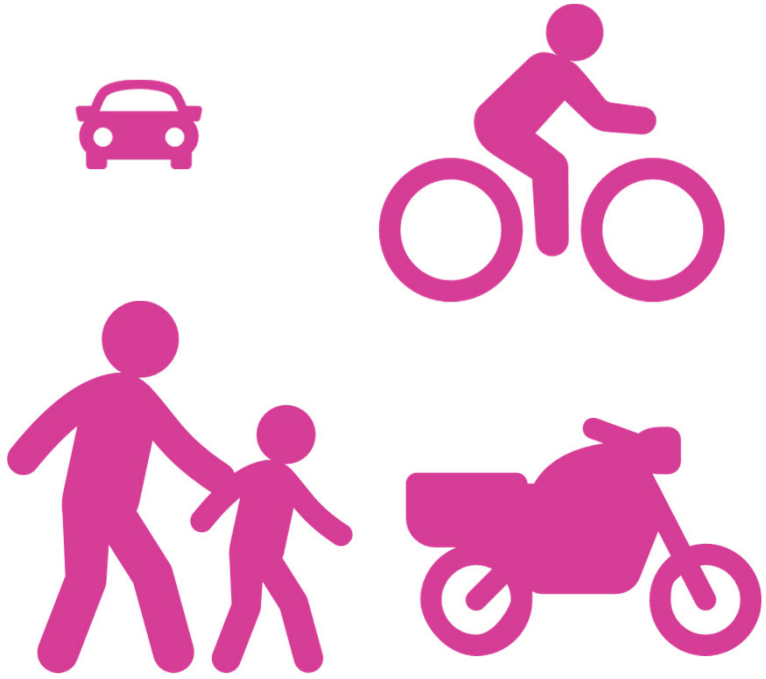


Crash Weighting

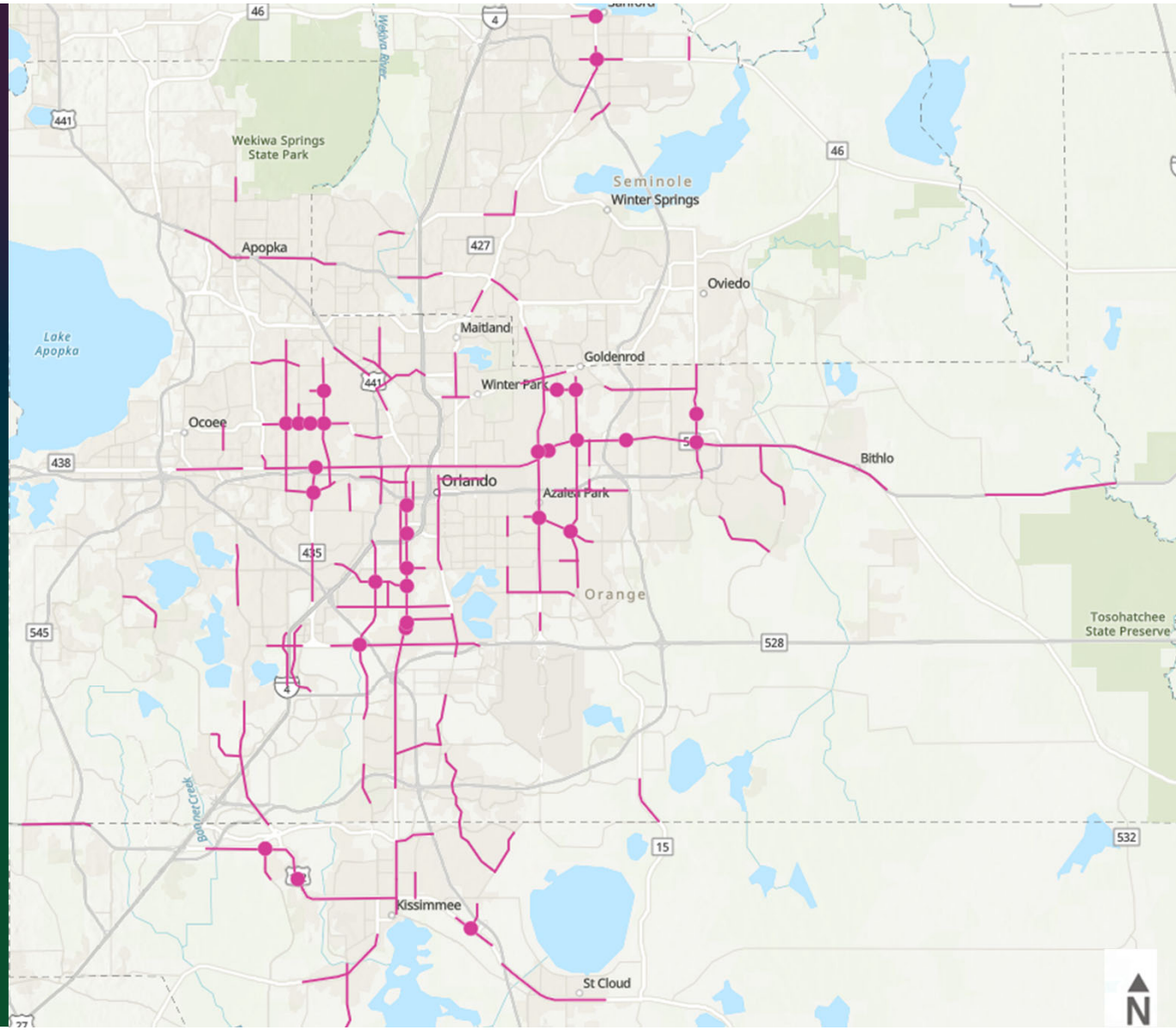
Based on crash severity and travel mode

All crashes involving a person walking, bicycling, or riding a motorcycle were weighed by a factor of 3

Severity	Crash Weight
Fatal (K)	317
Incapacitating Injury (A)	
Non-Incapacitating Injury (B)	17
Possibly Injury (C)	
No Injury (0)	1



Regional HIN Network and Top 30 Intersections

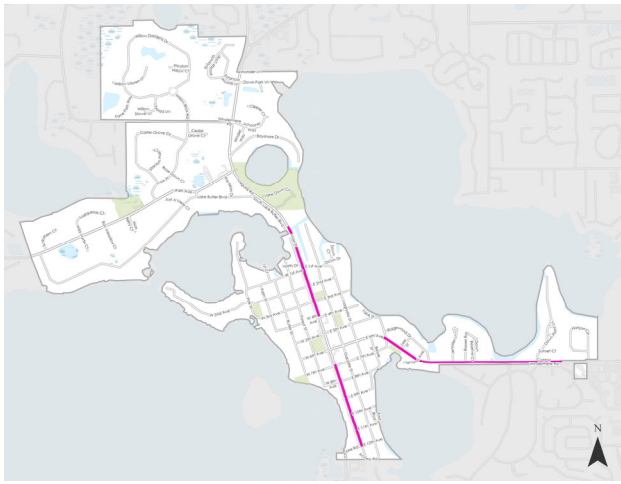


Top Intersections 2018 - 2022 (Total Collision Weight)

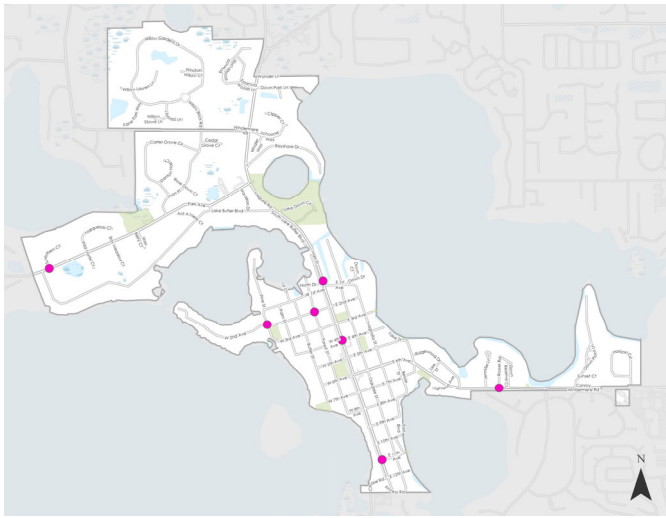
HIN Draft MetroPlan 2023 08 04 - Total Weighted Score per Mile

HIN: 3 Corridors Windermere 2018-2022

Road	Extents	Length	KSI Crashes	Non-Incapacitating /Possible Injury Crashes	No Injury Crashes	Bike/Ped Crashes
1. E 6th Ave	Lake Street to Town Border	0.98 mi	1	22	57	1
2. Main Street	Maguire Rd to E 4th Ave	0.49 mi	1	2	7	1
3. Main Street	W 7th Ave to Chase Rd	0.44 mi	1	4	14	0



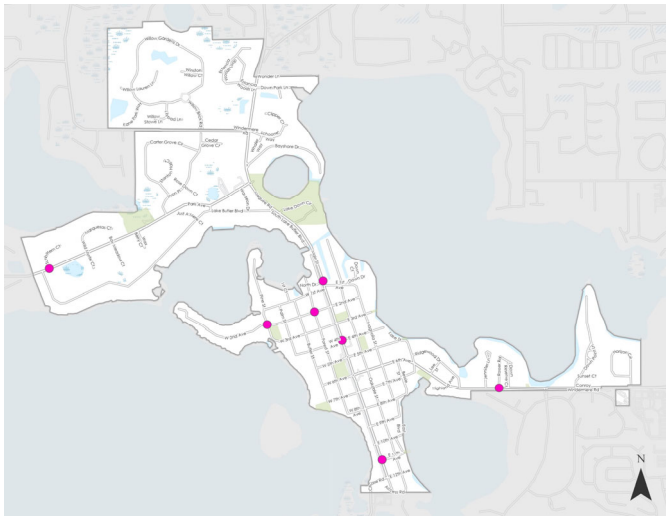
Top Crash Intersections
Windermere
2018-2022



1) Conroy Windermere Rd & Rosser Rd (8 crashes, 12 injuries)
2) Main St & E 4th Ave (5 crashes, 2 injuries)
3) Sunbittern Ct & Lake Butler Blvd/ Park Ave (4 crashes, 2 injuries)
4) Pine Street & W 2nd Avenue (4 crashes, 2 injuries)
5) Main St & North Dr (4 crashes, 2 injuries)
6) Main St & E 11th Ave (1 crash, 2 injuries)
7) Forest St & W 2nd Ave (1 crash, 0 injuries)

HIN: Crash Intersections Windermere

Intersection	KSI Crashes	Non-Incapacitating/ Possible Injury Crashes	No Injury Crashes	Bike/Ped Crashes
Conroy Windermere Rd & Rosser Rd	1	4	3	1
Main St & E 4th Ave	0	1	4	1
Main St & E 11th Ave	1	0	0	0
Main St & North Dr	0	1	3	0
Pine Street & W 2nd Avenue	0	1	3	1
Sunbittern Ct & Lake Butler Blvd/ Park Ave	0	1	3	1
Forest St & W 2nd Ave	0	0	1	1



What do you think?

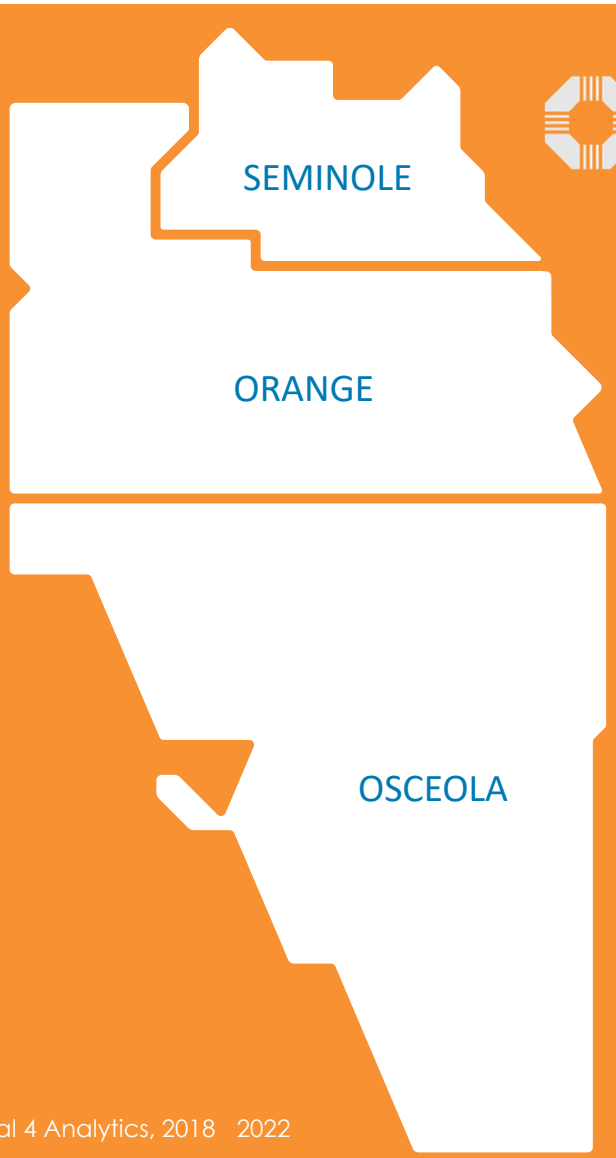
- Do you think any adjustments are needed to the High Injury Network?

CRASH TRENDS



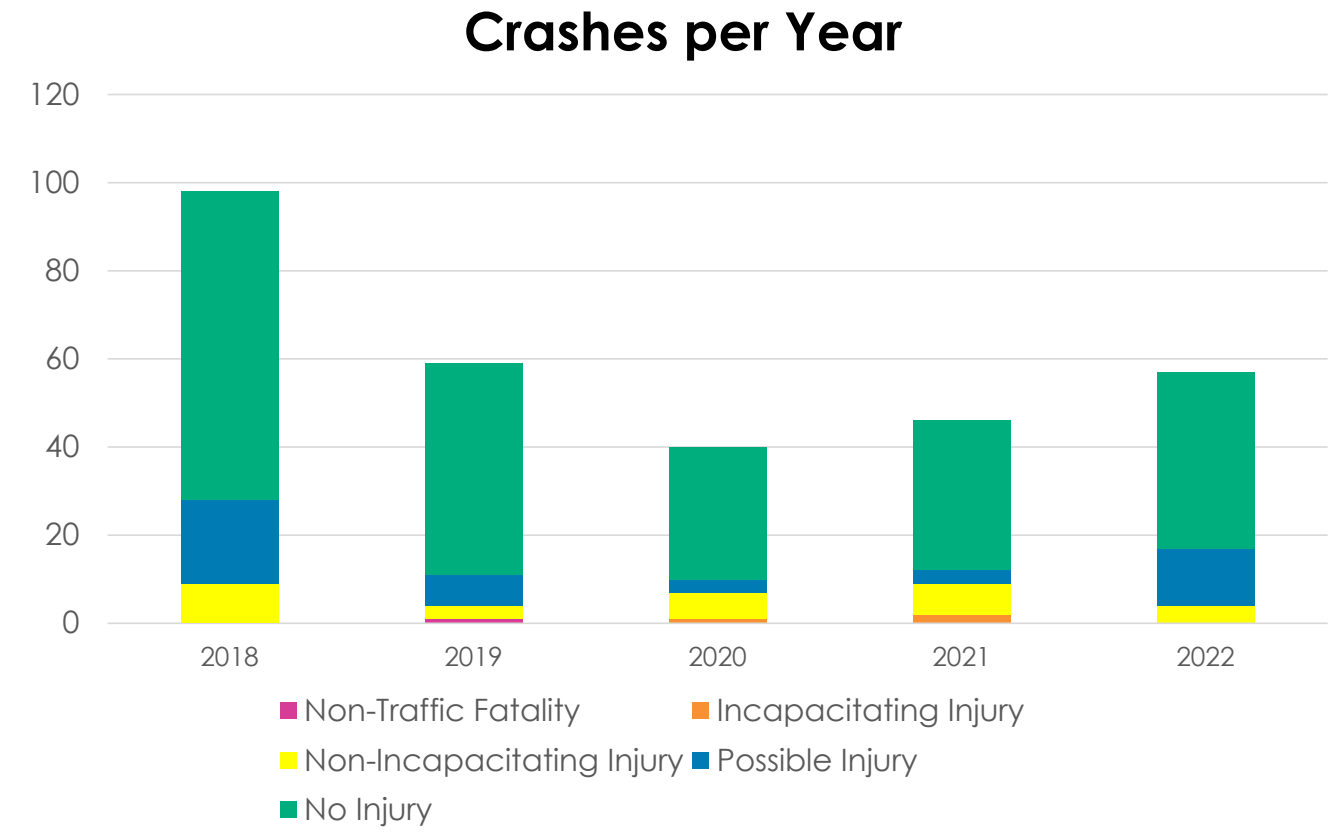
Crash Trends
Windermere
2018-2022

- **299 total crashes**
- **222 no injury crashes**
- **74 minor injury crashes**
- **3 serious injury crashes**
- **0 fatal crashes**

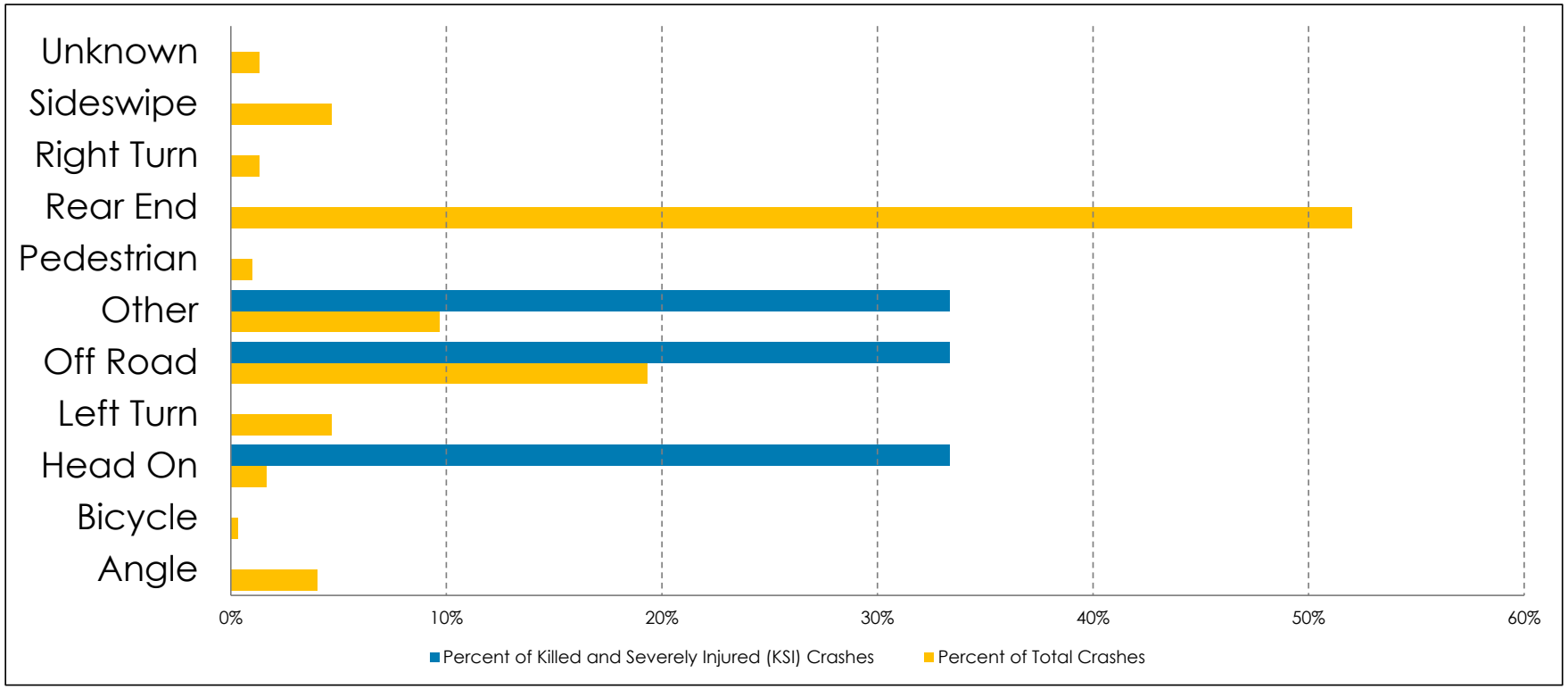


Source: Signal 4 Analytics, 2018 2022

Trends

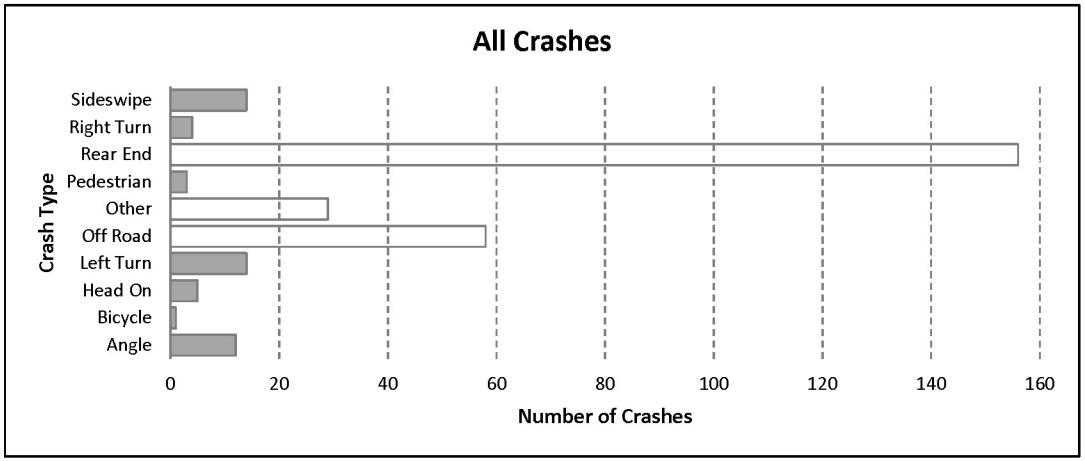

Crashes per Year
120
100
80
60
40
20
0
2018
2019
2020
2021
2022
Non-Traffic Fatality
Incapacitating Injury
Non-Incapacitating Injury
Possible Injury
No Injury

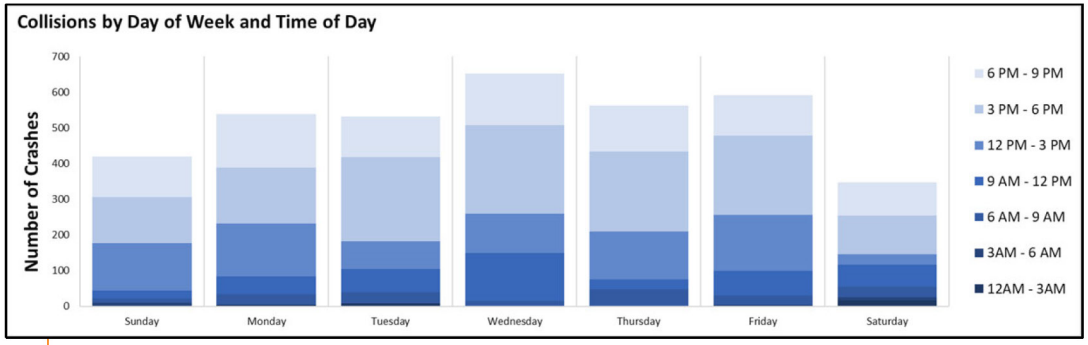
Crash Summary by Type
Windermere | 2018-2022

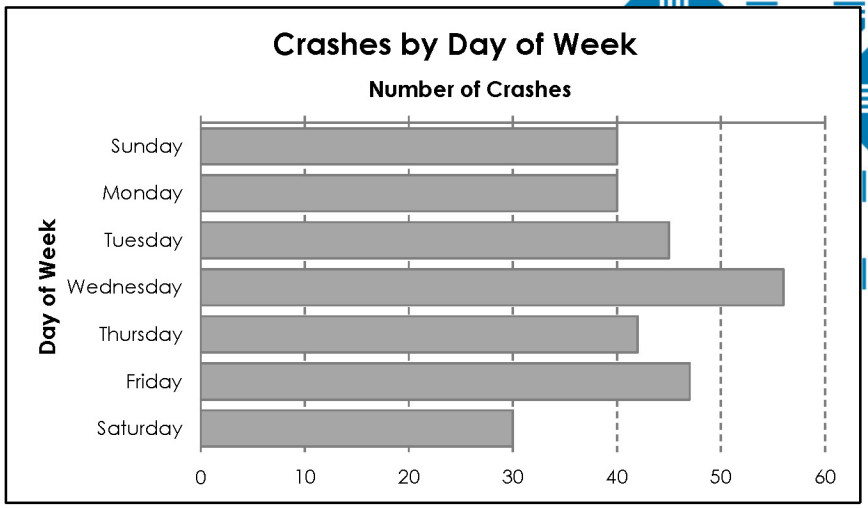


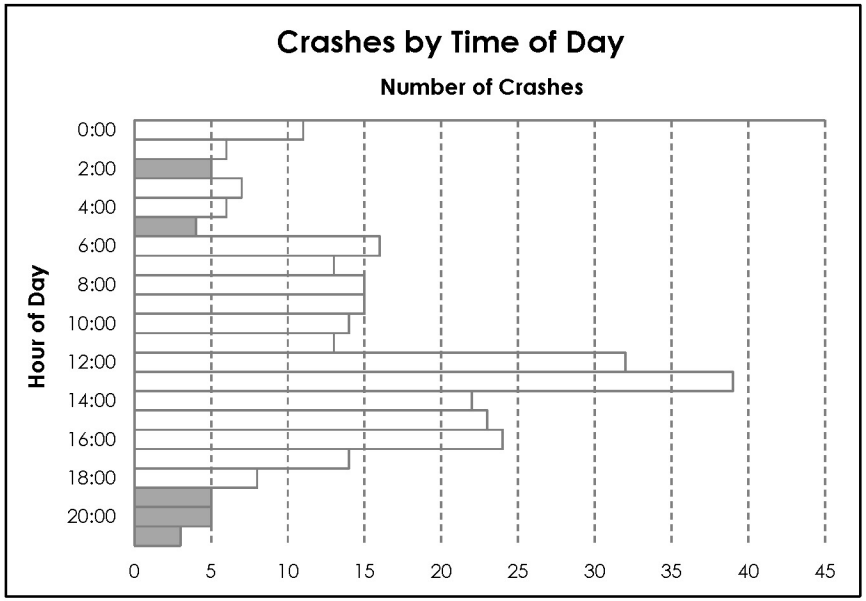
Source: Signal 4 Analytics, 2018 – 2022; excludes limited access facilities

Crash Summary by Time
Windermere | 2018-2022



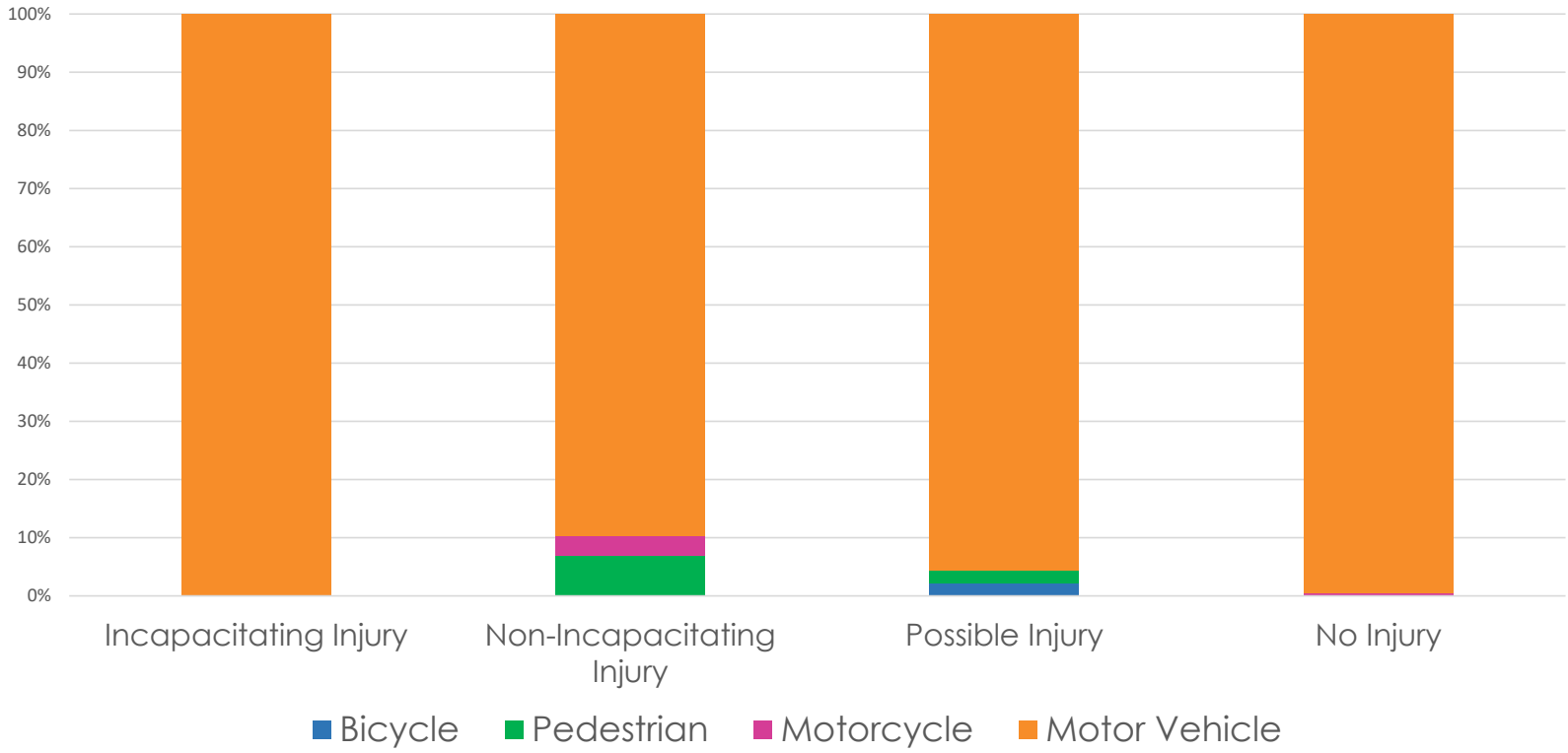






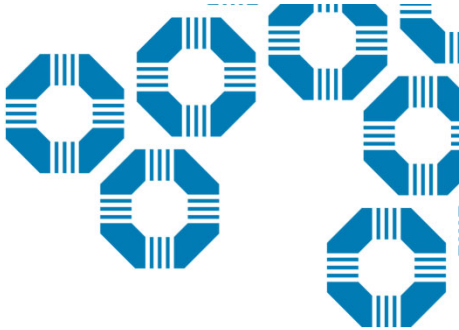
VISION ZERO CENTRAL FLORIDA

Mode Share by Crash Severity Windermere |2018-2022



Source: Signal 4 Analytics, 2018 - 2022

Data Included



Crash Data

- Signal 4 Analytics (2018 – 2022)

Road Data

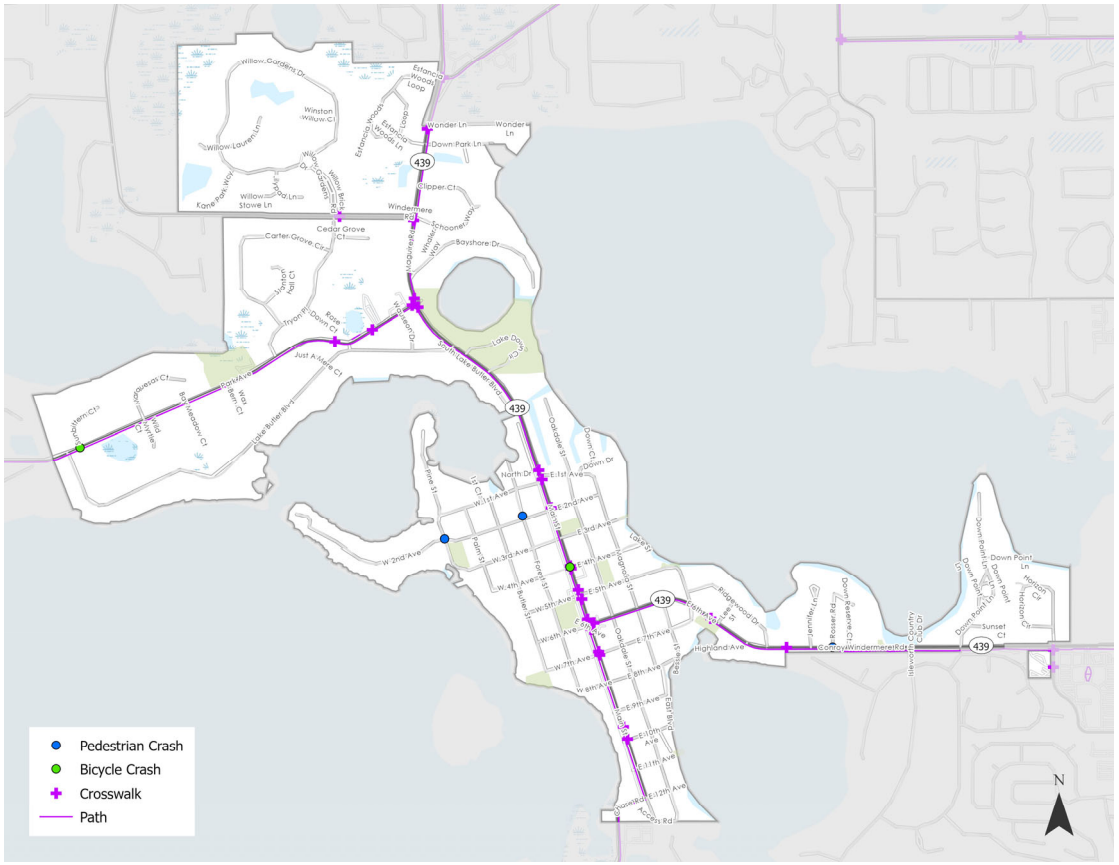
- Road network information
- Posted speed
- Presence of walking and biking facilities
- Functional Classification
- Crosswalk locations

Contextual Data

- Underserved community designation

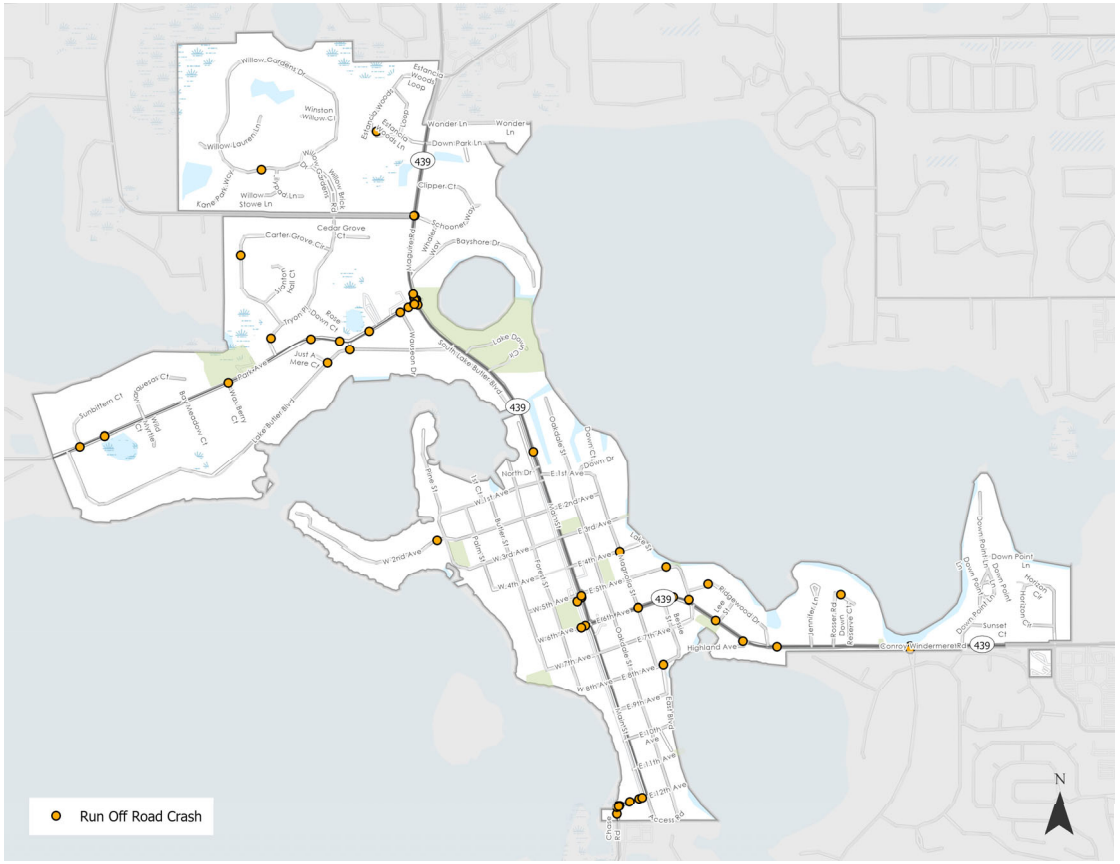
Bike/Pedestrian Crashes Windermere 2018-2022

Road	Extents
CR-439/ Main Street	*@ E 4th Avenue*
CR-49 / Main Street	*@ Rosser Road*
2nd Avenue W	*@ Forest Street*
2nd Avenue W	*@ Pine Street*
Park Avenue	*@ Sunbittern Court*



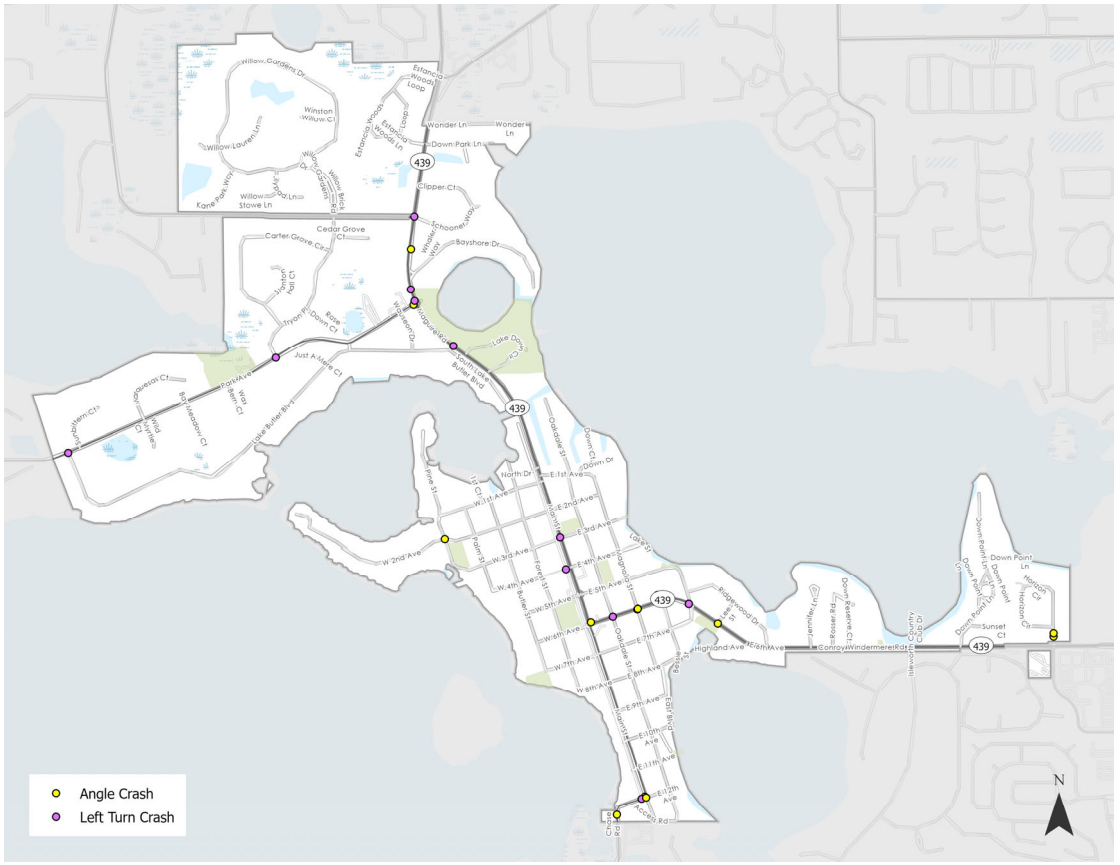
Run off Road Crashes Windermere 2018-2022

Year	Number of Crashes
2018	*17*
2019	13
2020	*9*
2021	*8*
2022	*11*
Total	***58***



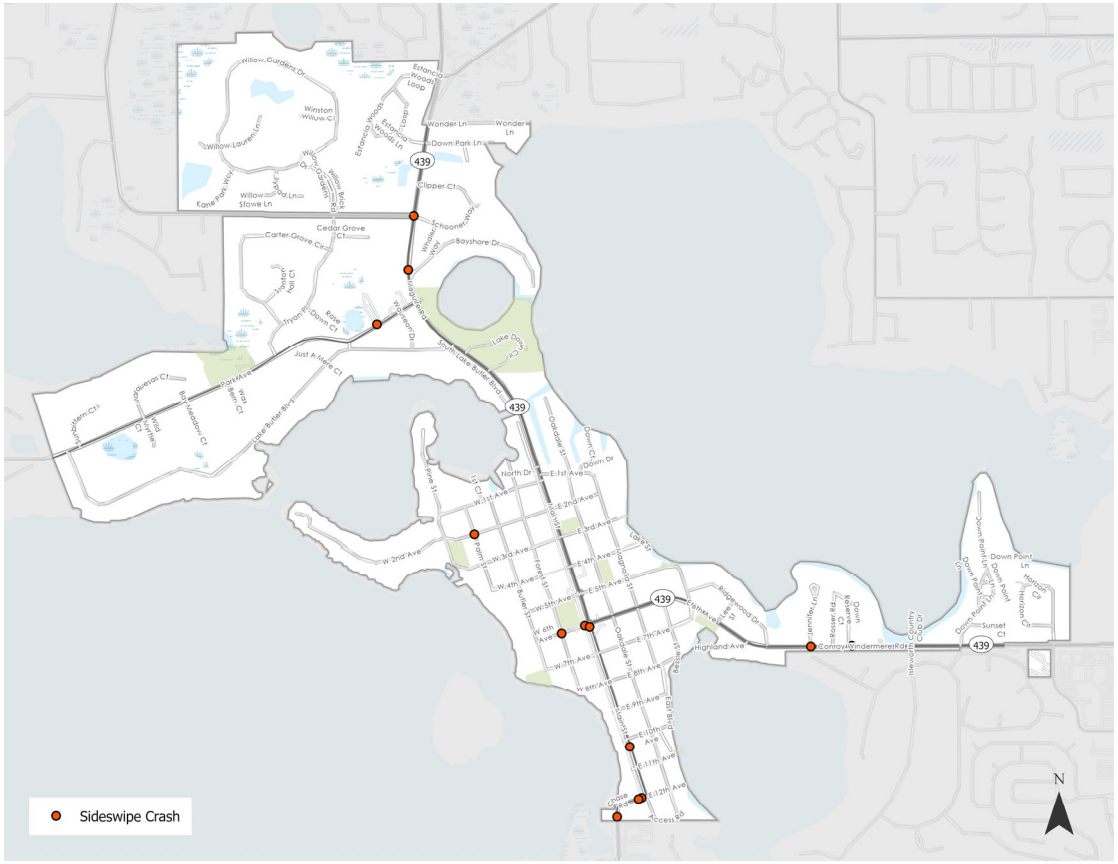
Angle & Left Turn Crashes Windermere 2018-2022

Year	Number of Crashes
2018	*10*
2019	3
2020	3
2021	*4*
2022	6
Total	**26**

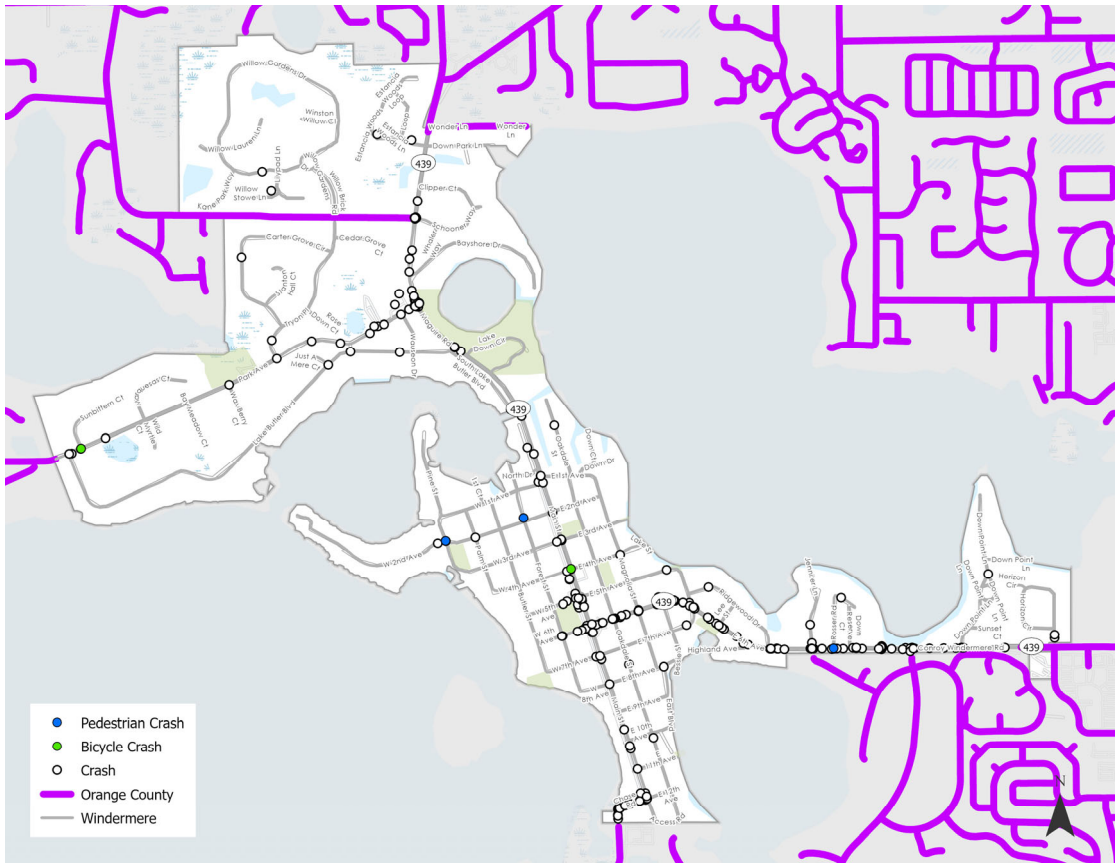


Sideswipe Crashes Windermere 2018-2022

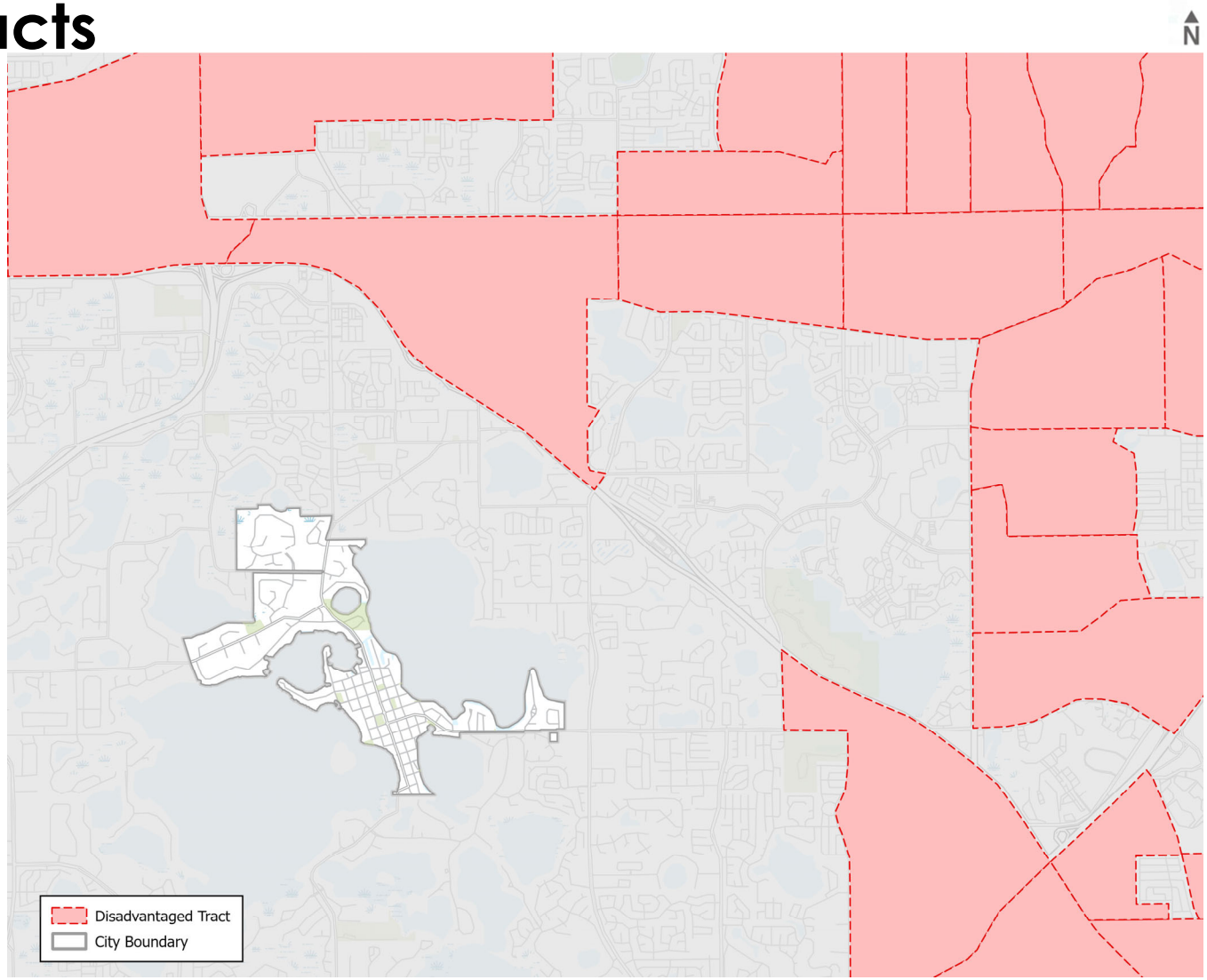
Year	Number of Crashes
2018	*2*
2019	*2*
2020	*3*
2021	*4*
2022	*3*
Total	***14***



Crashes by Road Ownership
Windermere
2018-2022



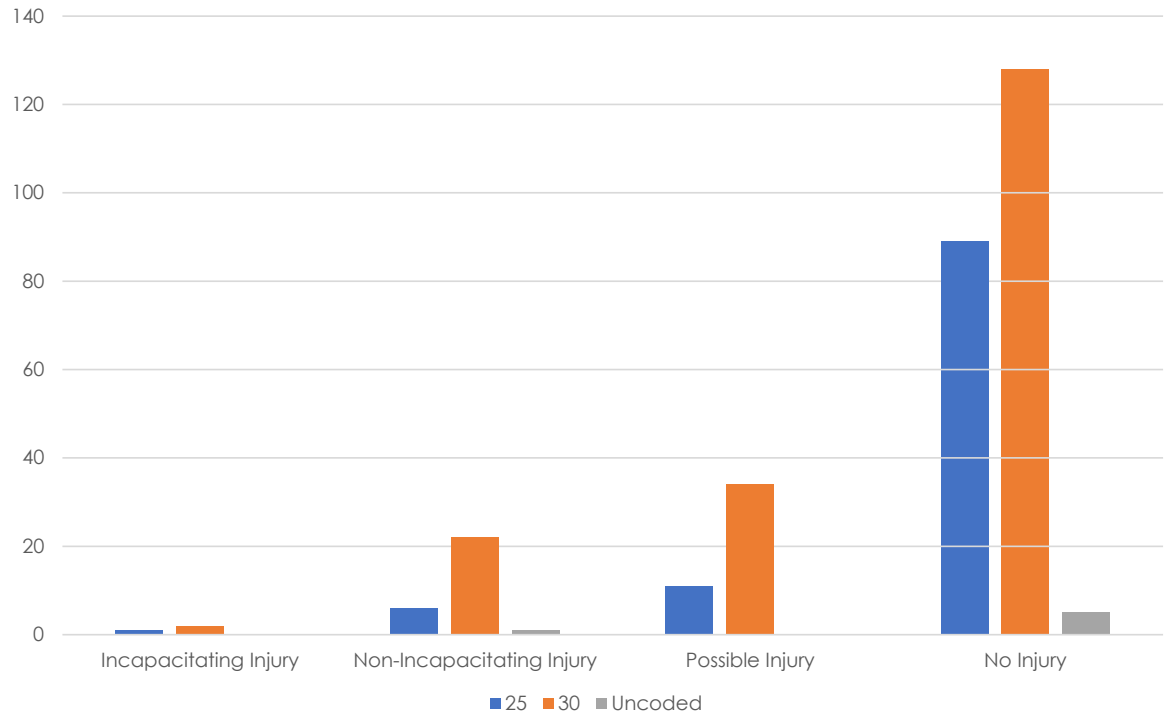
Disadvantaged Tracts
Windermere
2018-2022

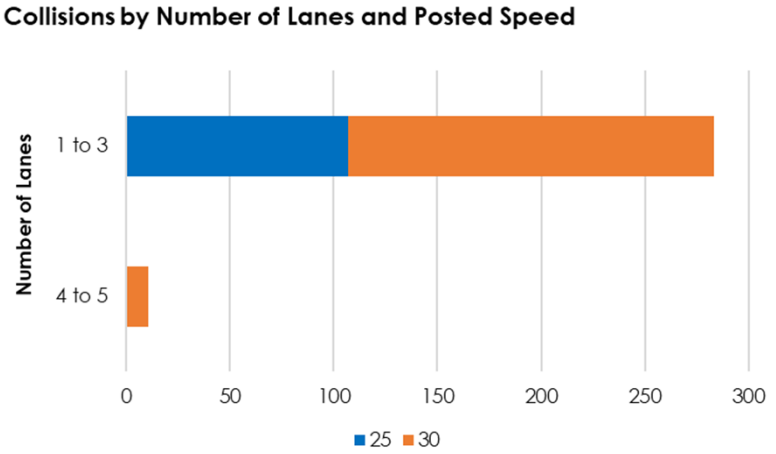


What do you think?

- Did any of the data shown surprise you?

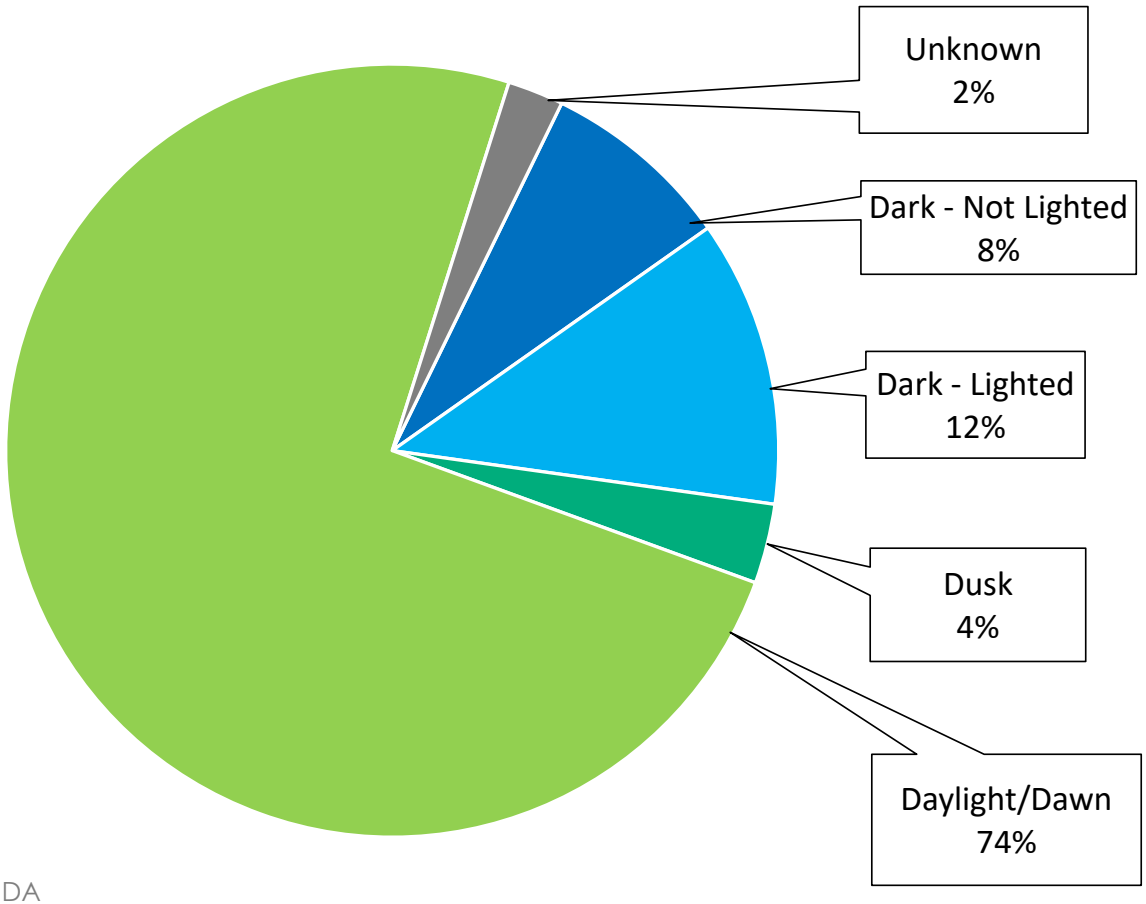
Crashes by Posted Speed
Windermere | 2018-2022



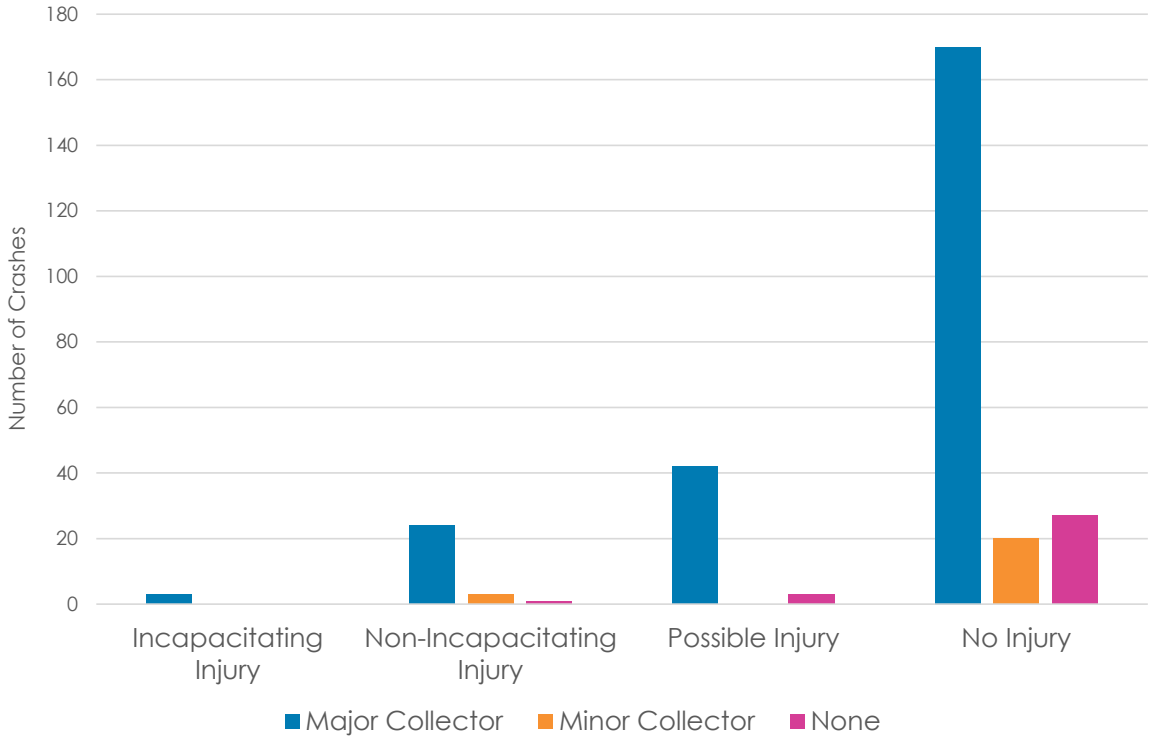


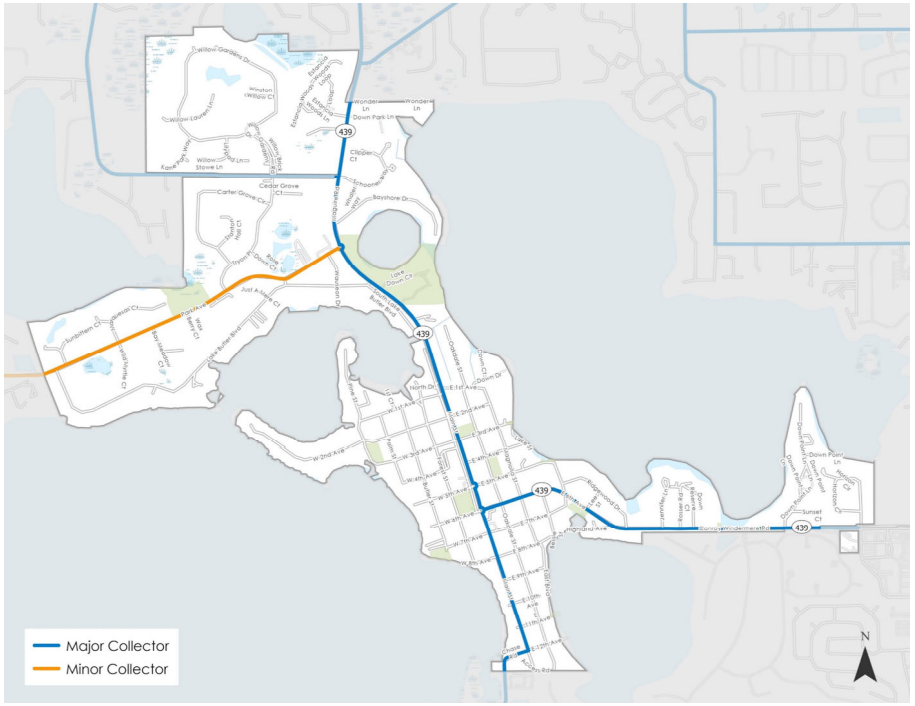
Source: Signal 4 Analytics, 2018 – 2022; excludes limited access facilities

Lighting Condition Crashes
Windermere
2018-2022

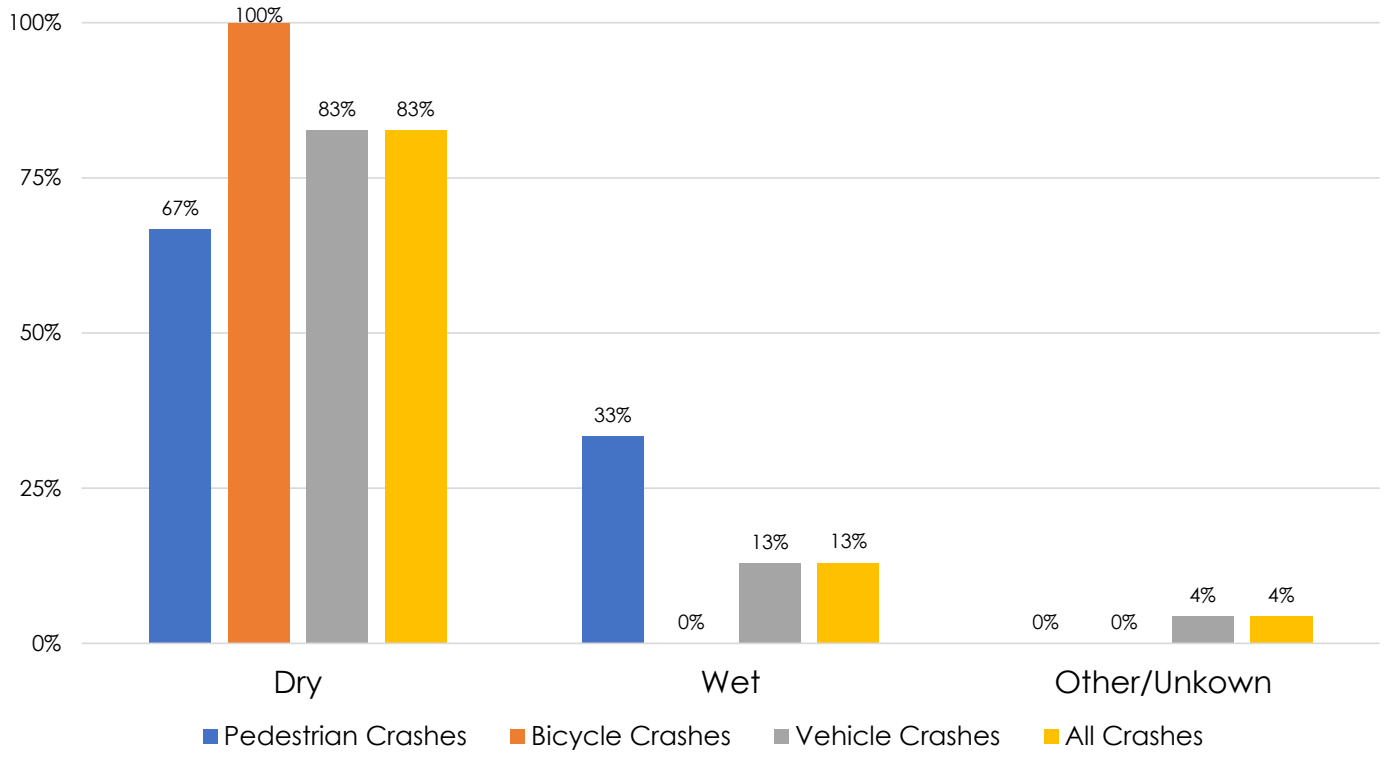


Functional Classification
Windermere
2018-2022

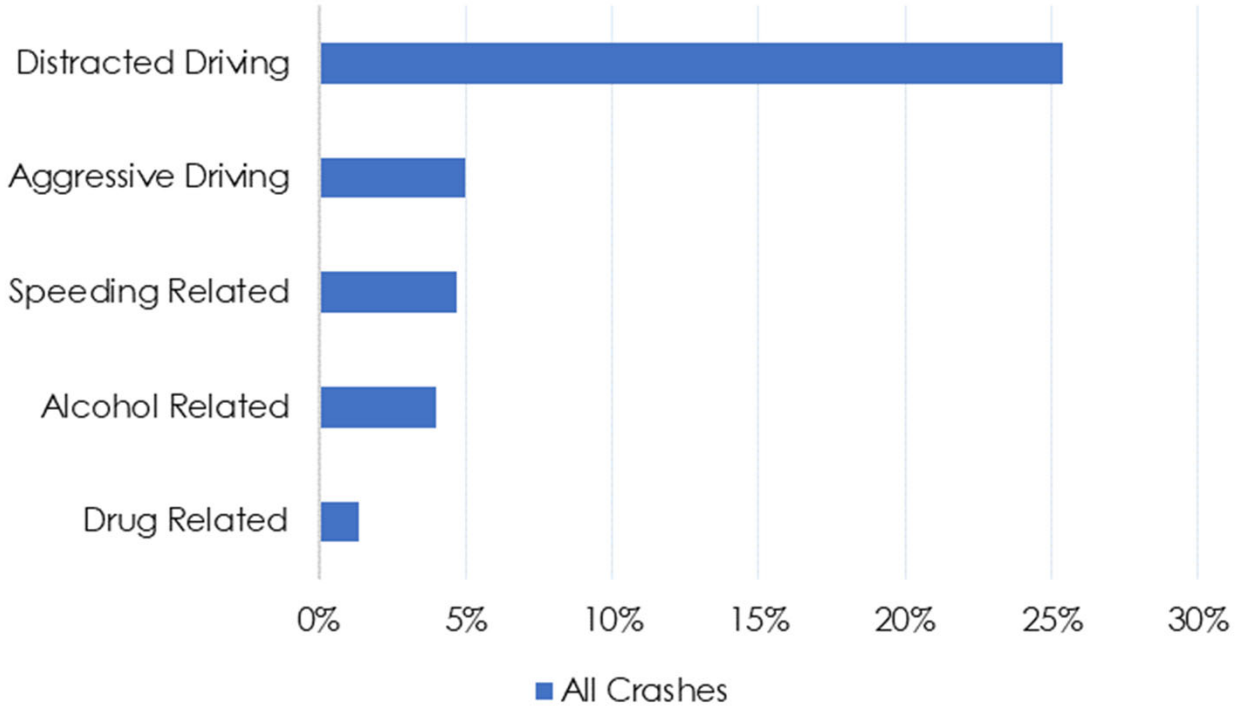




Road Condition Crashes
Windermere
2018-2022



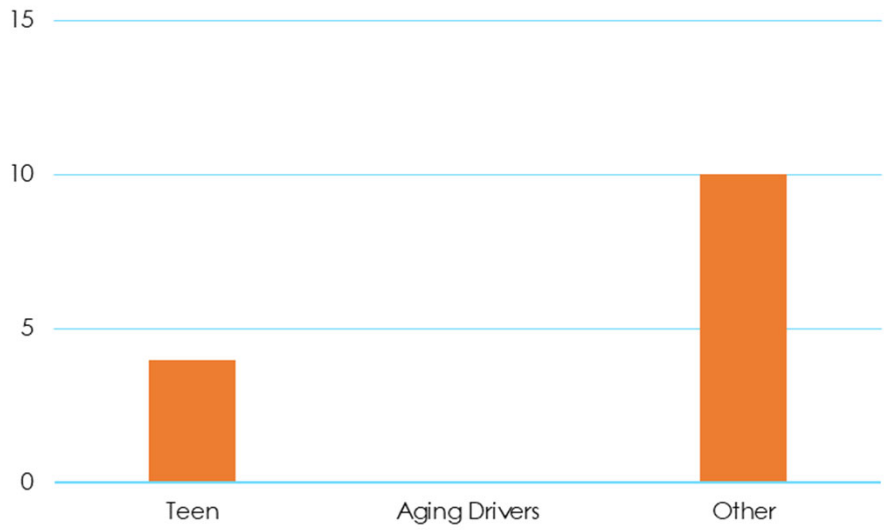
Road User Behavior Windermere | 2018-2022

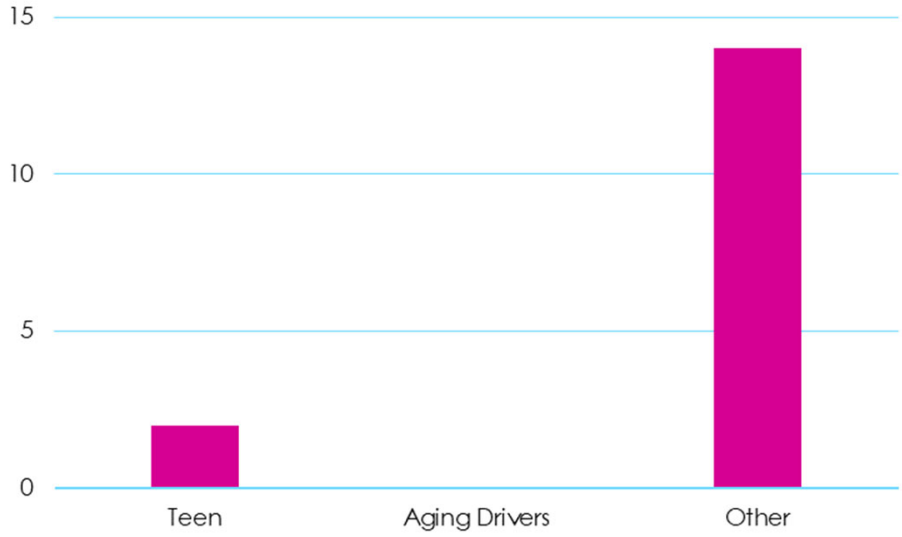


Behaviors such as speeding, drinking/using drugs and driving, aggressive, and distracted driving are more likely to result in a serious injury or fatal crash.

Source: Signal 4 Analytics, 2018 – 2022.

Behavior By Age
Windermere | 2018-2022





Source: Signal 4 Analytics, 2018 – 2022; excludes limited access facilities and non-FDOT facilities

What do you think?

- Did any of the results surprise you?
- Is there anything that you would like more information about?

HUB SITE DEMONSTRATION

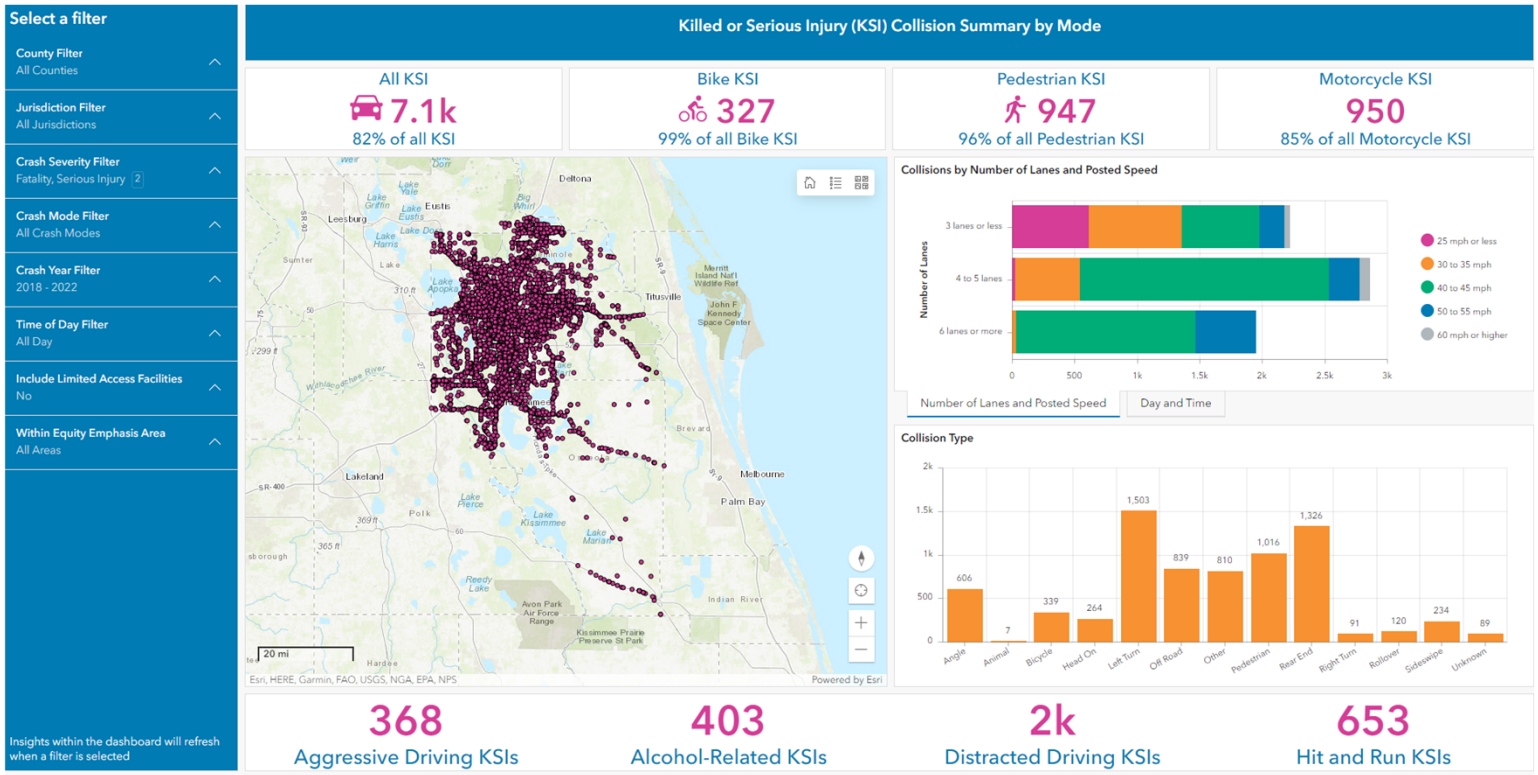


What is the Hub Site?

- Information sharing platform
- Vision Zero dashboard
- Links to project documents (access restricted)
- Links to helpful resources
- Calendar of Vision Zero events
- Public engagement



Data Dashboard Framework



PUBLIC ENGAGEMENT EFFORTS

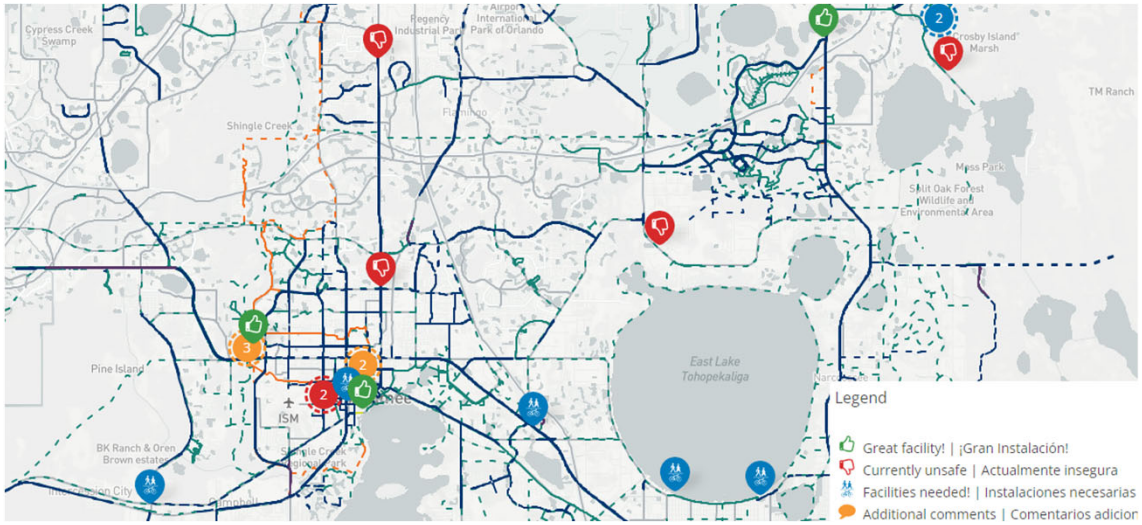


Planned Outreach Efforts

- Pop-Up Events – Friday, January 26

Regional Outreach:

- Survey
- Map based feedback
- Safety messaging



Source: Fehr & Peers and MetroPlan Orlando

What do you think?

- If you could ask the public anything about safety, what would it be?

UPCOMING TASKS



Safer Road Strategies
Policy Framework - Benchmarking



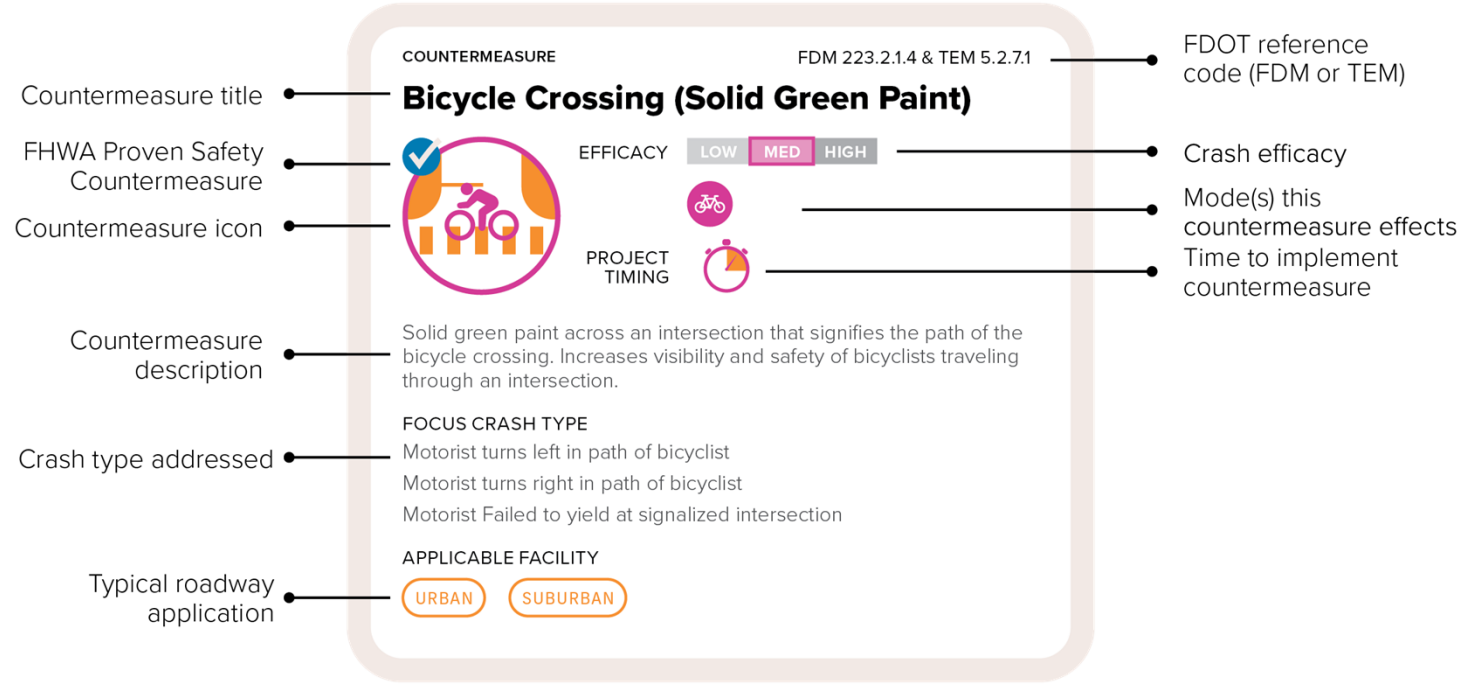
1. Identify and review relevant documents and procedures
2. Review and refine benchmarks
3. Initial benchmarking conducted by consultant team and agency staff
4. Identify opportunities for policy enhancements and barriers to change
5. Incorporate findings into Action Plan

Benchmarking Example

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice
Category: Safe Roads and Safe Speeds				
Complete Streets for All	The agency has allocated adequate funding for complete streets projects.			
	The agency has a complete streets plan.			
	Complete Street elements have been incorporated into Comprehensive Plans and other planning documents.			
	Vulnerable users are prioritized in project planning and implementation.			
	The agency actively coordinates with neighboring municipalities to provide connections for people walking and biking.			
	Appropriate practices are followed to set speed limits based on context.			

Safer Road Strategies
Engineering Countermeasures

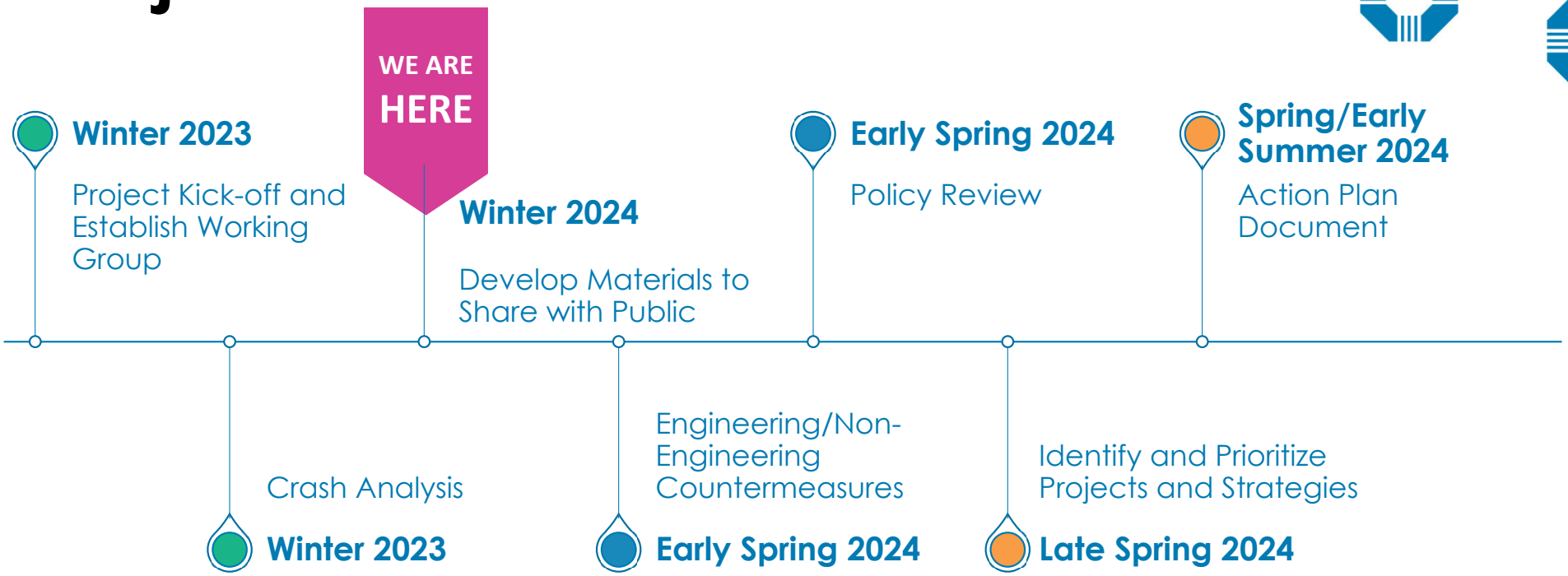
What You'll See Inside:



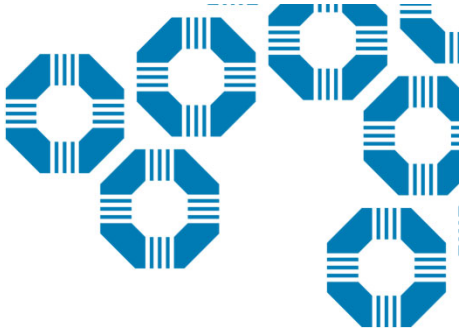
NEXT STEPS



Project Schedule



Next Steps



Working Group Meetings

Next meeting planned for March 2024

Regional Plan

Regional plan efforts are ongoing

Engagement

Pop-up event on January 26, 2024 & April 2024

Policy Review

Policy Review

What do you think?

- Next step is a review of transportation and local land use policies, plans, guidelines, and standards that could be a barrier to reaching Vision Zero. What materials should we review?

What do you think?

- What questions or comments do you have?

VISION ZERO
CENTRAL FLORIDA

Questions?

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813-710-9517

Sarah Larsen –
sarah.larsen@metroplanorlando.gov
321-732-8230

Crash Report Number	Intersection Name	Injury Severity	Ped/Bike	Description
86392556	Conroy Windermere Rd & Green Isle Way	Non-Incapacitating Injury	Pedestrian Involved	Two pedestrians walking eastbound on the sidewalk on the north side of Conroy Windermere Rd attempted to cross the entrance to the Green Isle subdivision. A vehicle exiting the subdivision attempted to make a right-hand turn and bumped into the pedestrians within the marked crosswalk. As a result, the pedestrians sustained non-incapacitating injuries.
86392567	Park Ave & Sunbittern Ct	No Injury		A vehicle crashed into a utility pole, knocking it over and severely damaged it. The vehicle then fled the scene.
86392615	Conroy Windermere Rd & Rosser Rd	No Injury		Vehicle One and Vehicle Two were both traveling eastbound on Conroy Windermere Road approaching Rosser Road. When Vehicle Two was slowing for traffic, Vehicle One failed to stop in time and collided into the rear of Vehicle Two. Both drivers of Vehicle One and Vehicle Two advised of no injuries. Both Vehicle One and Vehicle Two were driven away by the owners.
86392621	W 2nd Ave (Address 205)	No Injury		Vehicle struck mailbox at 205 W 2nd Avenue and fled the scene.
86578260	Forest St	No Injury		Driver of Vehicle One (school bus) was attempting to get around Vehicle Two when a small light on the passenger side rear of the school bus scratched the passenger side rear of Vehicle Two, causing minimal damage to both vehicles.
86578267	Conroy Windermere Rd & Jennifer Lane	No Injury		Vehicle One stated that he was traveling westbound on Conroy Windermere Road approaching Jennifer Lane. Vehicle One stated that the vehicle in front of him stopped in traffic and he crashed into the rear bumper. Vehicle Two stated that he stopped in the roadway due to traffic and was struck in the rear bumper by Vehicle One. No injuries observed or stated. No citations issued. Both vehicles removed by the owners.
86578297	Pine St & W 2nd Ave	No Injury		Vehicle One was traveling northbound on Pine St. at the intersection of 2nd Ave. Vehicle One was coming off a side street and failed to yield right of way to Vehicle Two. No injuries & minor damages to both vehicles. Both vehicles were driven away by the drivers.
86578360	Main St & North St	Possible Injury		Vehicle Three was stopped in traffic Northbound on Main Street in order to turn left onto North Street. Vehicle One was traveling north on Main Street at approximately 30 mph. Vehicle Two slowed for Vehicle 3. Vehicle One failed to notice the slowing traffic causing the front of Vehicle One to collide with the rear of Vehicle Two. As a result, the front of Vehicle Two collided with the rear of Vehicle Three.
86578410	Main St & 4th Ave	No Injury		Vehicle One was traveling west on 4th Avenue. Vehicle Two was traveling north on Main Street. Vehicle One driver made a left turn onto Main Street. Vehicle One had damage to the left front quarter panel and left door and Vehicle Two had damage to the left front bumper/ light area and left front quarter panel.
86578446	Pine St & W 2nd Ave	No Injury		Vehicle 1 slowly navigated around a parked landscape truck. One of the workers was using a backpack blower, and failed to notice her, backing into the side of her vehicle as she went past. This left a series of large scratches on the passenger side of her vehicle.
86578478	Park Ave & Lake Bulter Blvd	No Injury		Vehicle One's front right bumper struck the right rear side panel of Vehicle Two. Vehicle One sustained minor right front-end damage to the bumper. No injuries occurred
86578482	6th Ave & Rosser Rd	No Injury		Vehicle One failed to notice Vehicle Two had come to a stop at the intersection of 6th Avenue and Rosser Road and as a result, crashed into the rear bumper of Vehicle Two.

Crash Report Number	Intersection Name	Injury Severity	Ped/Bike	Description
86578495	Main St & 1st Ave	No Injury		A vehicle travelling south on Main Street swerved out of the northbound to avoid colliding with two stopped vehicles, however, the vehicle then struck the left rear of another vehicle.
87021065	Conroy Windermere Rd & Rosser Rd	Possible Injury		Vehicle Two and Vehicle One were traveling westbound on Conroy Windermere Road approaching Rosser Road. While Vehicle Two was slowing for traffic, Vehicle One failed to stop and collided into the rear of Vehicle Two. Vehicle One needed to be removed by tow truck as the hood was pushed up into the air and could not be secured.
87021072	Main Street (Address Number 428)	No Injury		Vehicle One stated as he was backing out of his parking spot, he failed to notice Vehicle Two and struck the right rear bumper. His vehicle had a few minor scratches on the left rear bumper.
87021079	Main St & North Dr	No Injury		Driver One was an uber driver on her way to pick up someone from Main Street, when she realized she had driven past her pickup point, and not seeing any cars coming in the opposite lane, decided to try to make a U-turn midblock. As she made the turn, she realized that she could not make the entire u-tur, so without looking for any oncoming traffic in the north or south lanes, she put it in reverse, backing into Vehicle Two in the process.
87021090	Conroy Windermere Rd & Rosser Rd	Non-Incapacitating Injury		Vehicle One and Vehicle Two were traveling eastbound on Conroy Windermere, when Vehicle Two came to stop for a vehicle in front of him making a left turn on Rosser Rd when, Vehicle One failed to see Vehicle Two stop and collided with the rear right side of Vehicle Tow. Vehicle One sustained disabling damage due to the front driver and passenger airbags deploying. Vehicle One sustained major damage to the Driver side front headlight, bumper, and fender.
87021128	Park Ave & Sunbittern Ct	Non-Incapacitating Injury	Bicyclist Involved	A bicyclist crossing eastbound at the intersection of Park Avenue and Sunbittern Court was struck in the marked crosswalk by a vehicle traveling southbound on Sunbittern Court. As a result, the bicyclist sustained a non-incapacitating injury to his leg.
87021156	Main St (430 Main Street, Tim's Wine Market)	No Injury		Vehicle One improperly backed into Vehicle Two in the parking lot of Tim's Wine Market located at 430 Main Street. Vehicle One fled the scene and was later found and issued a citation for improper backing and failure to report the accident.
87021158	Main St & 4th Ave	No Injury		Vehicle one was traveling south on Main Street and attempted to turn too quickly east bound onto E. 4th Avenue when Vehicle One's driver side front corner collided into the driver side (side swiped) of vehicle two which was stopped at a stop sign and not moving facing west bound on E 4th Avenue at Main Street.
87021182	Conroy Windermere Rd & Rosser Rd	Incapacitating Injury		Investigation revealed Vehicle 1 was traveling westbound on Conroy Windermere Road at approximately 30 miles per hour when for an unknown reason, the vehicle drifted to the left and entered the eastbound lanes of Conroy Windermere Road near Rosser Road, on the downhill side of a blind hill. The Vehicle 2 was traveling eastbound on Conroy Windermere Road at approximately 30 miles per hour, traveling downhill, when Vehicle One collided head-on with Vehicle Two causing Vehicle Two to spin and leave the roadway and come to rest on the south side of Conroy Windermere Road. There was no evidence that either vehicle braked prior to the impact, and both vehicles suffered extensive disabling damage.

Crash Report Number	Intersection Name	Injury Severity	Ped/Bike	Description
87021186	Main St & Chase Rd	Incapacitating Injury		The Driver of Vehicle One was traveling southbound on Main Street when she observed several cars in front of her pulled off over to the side of the road. The driver stated that at that time they decided to pull over to the side of the road too. The front of Vehicle One made contact with the left rear of Vehicle Two causing minor damage before continuing Northbound on Main Street. It was later determined the driver of Vehicle One had a diabetic emergency, impairing the driver of Vehicle One and causing the crash.
87021194	Main St & E 4th St	Possible Injury		A bicyclist crossing eastbound on 4th Avenue at Main Street struck the vehicle driving southbound on Main Street at E 4th Avenue. It was determined that the driver of the vehicle had already passed the designated crosswalk area before the bicyclist had proceeded to strike the rear right fender. As a result, the bicyclist sustained possible injuries and the handlebars of the bike were moderately damaged.
87021205	Pine St & W 2nd Ave	No Injury		The Driver of Vehicle One, in a careless manner, failed to yield and drive with due care when Vehicle Two entered the intersection area of W 2nd Avenue and Pine Street. Vehicle One left the sole eastbound travel lane and attempted to pass Vehicle Two on the left side utilizing the oncoming westbound travel lane. This resulted in Driver One being unable to avoid a collision with Vehicle Two.
87021244	Main St & North Dr	Incapacitating Injury		Driver of the vehicle had a seizure and blacked out whilst traveling northbound on Main Street near North Drive, causing the vehicle to swerve and crash into a utility pole located at 25 Main Street.
87021257	Park Ave & Lake Butler Blvd	No Injury		The driver of Vehicle One was distracted while looking down to change the radio station and when she looked up she struck the rear of Vehicle Two.
89954721	Conroy Windermere Rd & Rosser Rd	Possible Injury		Vehicle One and Vehicle Two were traveling westbound on Conroy Windermere Road at Rosser Road when the driver of Vehicle One rear ended Vehicle Two due to being blinded by sun.
89954774	Main St & 1st Ave	No Injury		Vehicle One and Vehicle Two were traveling southbound on Main Street at E 1st Avenue when Vehicle One failed to stop for traffic in front of him and collided into Vehicle Two.

Meeting Notes

Town of Windermere – Vision Zero Action Plan

Working Group #2 Meeting Notes

Date: January 17, 2024
Time: 10:00 – 11:00 AM
Meeting Location: Virtual

Attendees

- Tonya Elliot-Moore (Windermere, Director of Public Works)
- John Fitzgibbon (Windermere, Civil Engineer)
- Mike Woodworth (Kimley-Horn, Traffic Engineer)
- Jason Bonk (Windermere, Police Chief)
- Kelly Fearon (Kittelson)
- Roxane Van Horn (Kittelson)
- Sarah Larsen (MetroPlan Orlando)

Meeting Notes

Introduction

- Kelly Fearon provided a general overview of the first Working Group Meeting in order to clarify potential barriers to Vision Zero solutions

HIN

- The Town of Windermere expects the segment on Main Street to extend from 6th Avenue to Chase Street as opposed to 7th Avenue to Chase Street
- Instead of Maguire Avenue, consider if the HIN segment should extend from 5th Avenue or 6th Avenue to Park Avenue. The Town said it could also make sense to extend the limit to the canal
- A guardrail located near 8 Chase Road has been hit multiple times – this is also shown in the crash data
- Kittelson to review crash reports for serious injury crashes

Crash Trends

- The Town confirmed a decrease in the number of crashes post Covid-19
- The Town noted that many citizens believe safety is a major concern and that perceived speeding levels are high

Public Engagement Schedule

- The first pop-up event will take place at Windermere's Food Truck Night on 1/26/2024

- The second pop-up event will likely take place at a Windermere's farmer's market in April

Meeting Schedule

- The second Working Group Meeting will take place on 1/17/2024 at 10:00 AM

Next Steps

- Kittelson to adjust HIN segments and intersections based on feedback from the Town
- Town to send relevant planning documents to Kittelson for review for next task of benchmarking
- Kittelson to schedule Working Group Meeting #3 for Thursday, March 28th, 2024 at 9:00 am

Windermere Working Group Meeting 3

Agenda

Town of Windermere Vision Zero Action Plan

Working Group Meeting 3 – Agenda

March 28, 2024

9:00 – 10:00 AM

Teams

1. Welcome
2. Working Group Meeting Recap
3. High Injury Network
4. Policy Review
5. Countermeasures
6. Projects
7. Public Engagement Update
8. SS4A Grant Cycle Updates
9. Upcoming Tasks and Next Steps
10. Discussion

Contact Information:
Kelly Fearon, Kittelson & Associates, Senior Engineer
kfearon@kittelson.com, 813-710-9517

Sarah Larsen, MetroPlan Orlando, Transportation Planner
sarah.larsen@metroplanorlando.gov, 321-732-8230

Meeting Materials

VISION ZERO
CENTRAL FLORIDA
Counting down to zero traffic deaths

WORKING GROUP MEETING #3



MARCH 28, 2024

metroplan orlando
A REGIONAL TRANSPORTATION PARTNERSHIP

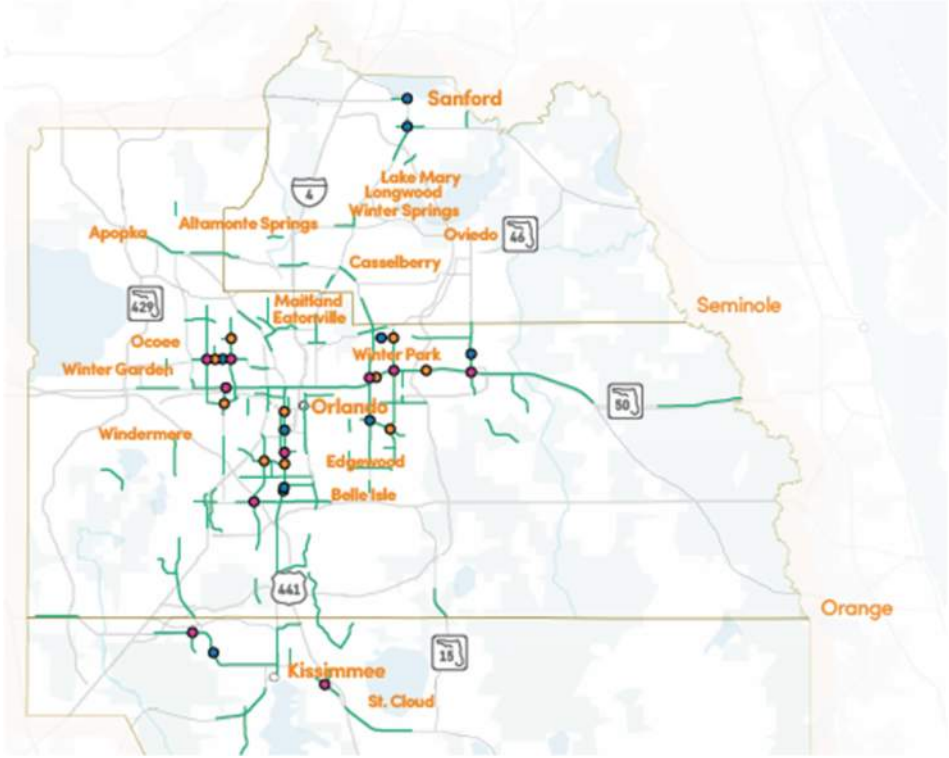
Agenda

1. Welcome and Recap from Last Meeting
2. HIN Highlights
3. Policy Benchmarking
4. Countermeasures
5. Projects
6. Public Engagement Update
7. SS4A Grant Cycle Updates
8. Next Steps
9. Discussion

HIN HIGHLIGHTS



High Injury Network Highlights MetroPlan Orlando Region



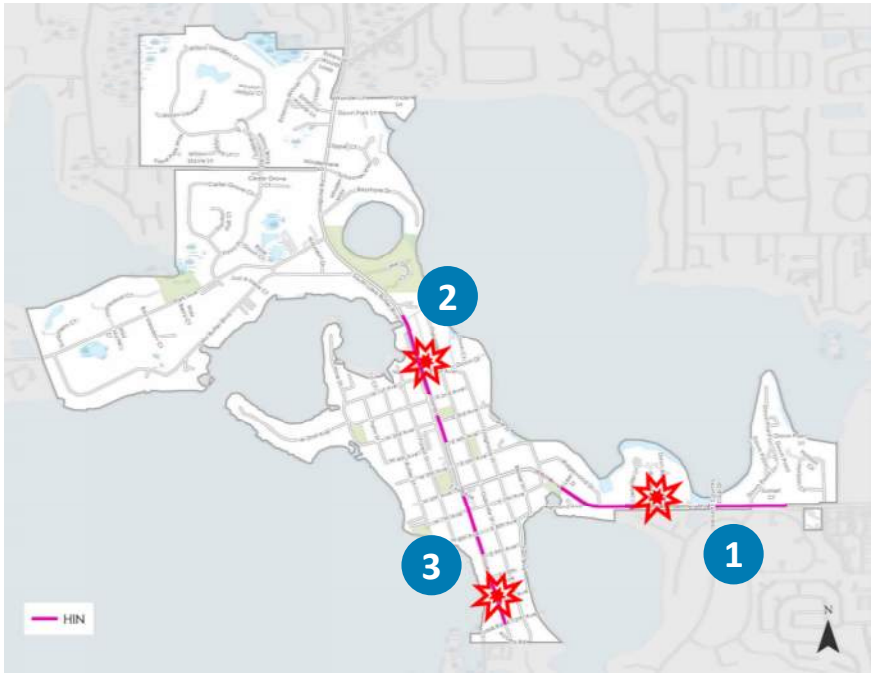
Regional HIN is 258 miles long (centerline)

59.5% FDOT, **30% County**, **10.5% local** agency roadways

41% percent of traffic **deaths** occur on **2%** of our roadways

47% of **KSI** crashes occurred on **2%** percent of our roadways

High Injury Network Highlights

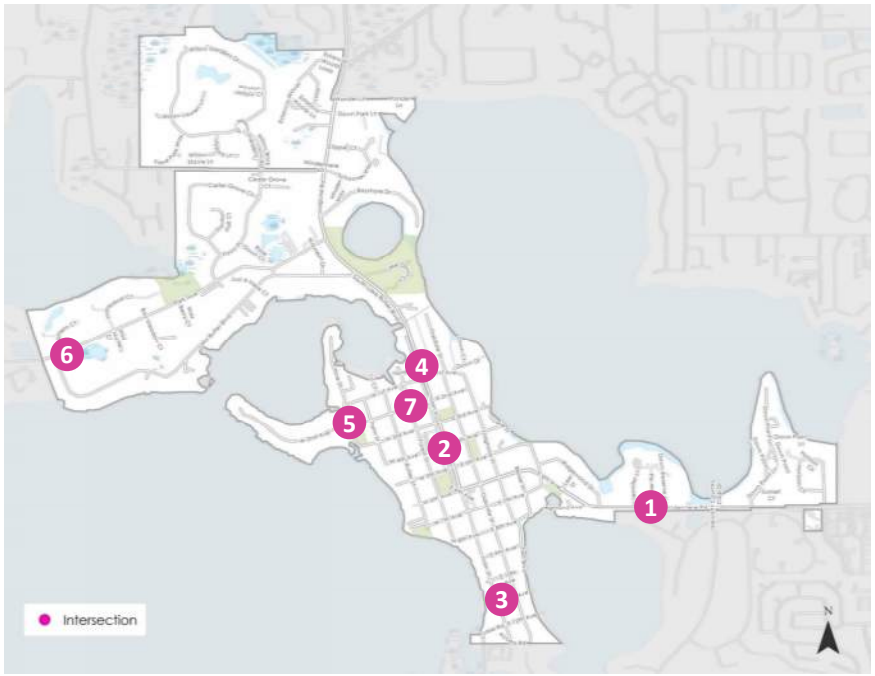


Roadway Name	Extents	Length	KSI Crashes	Non Incapacitating/ Possible Injury Crashes	No Injury Crashes	Bike/Ped Crashes
1. E 6th Ave	Lake Street to Town Border	0.95 mi	1	22	57	1
2. Main Street	Maguire Rd to E 4th Ave	0.49 mi	1	2	7	1
3. Main Street	6th Ave to Chase Rd	0.52 mi	1	5	47	0

Crash data from 2018 to 2022

Serious Injury Crash

Top Crash Intersections



Intersection	KSI Crashes	Non Incapacitating/ Possible Injury Crashes	No Injury Crashes	Bike/Ped Crashes
1. Conroy Windermere Rd & Rosser Rd	1	4	3	1
2. Main St & E 4th Ave	0	1	4	1
3. Main St & E 11th Ave	1	0	0	0
4. Main St & North Dr	1	0	0	0
5. Pine Street & W 2nd Avenue	0	1	3	1
6. Park Ave & Sunbittern Ct	0	1	3	1
7. Forest St & W 2nd Ave	0	0	1	1

Crash data from 2018 to 2022

COUNTERMEASURES



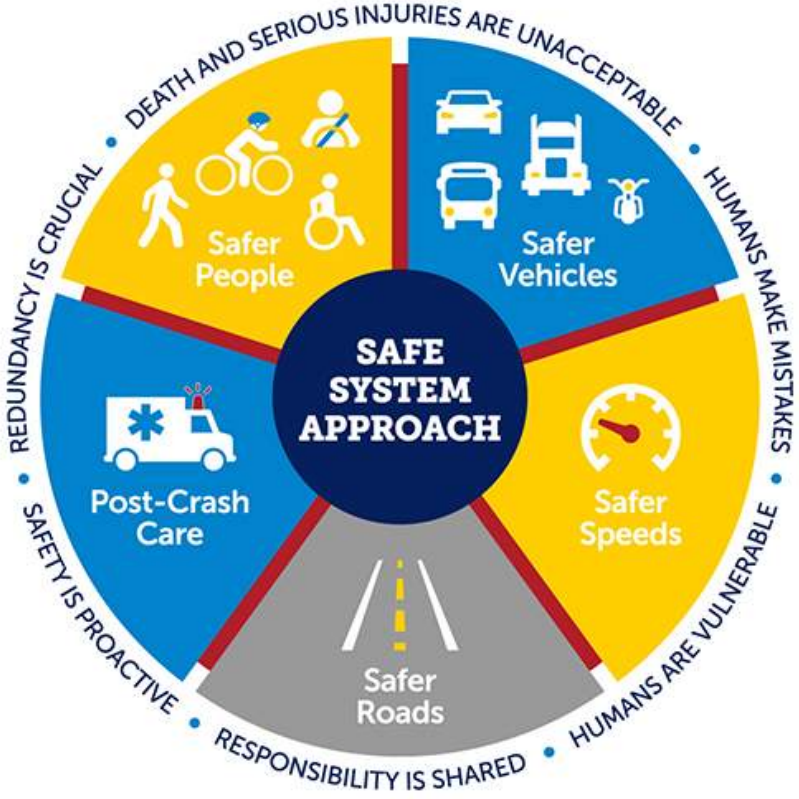
Countermeasures in Safe System Framework

Anticipate Human Error

- Remove Severe Conflicts
- Manage Conflicts in Time
- Increase Awareness and Attentiveness

Accommodate Human Injury Tolerance

- Manage Vehicular Speeds
- Implement Enforcing Features to Slow Traffic



Engineering Strategy Countermeasure Toolkit

- Signing and Striping
- Pedestrian Facilities
- Intersections and Roadways
- Speed Management
- Other Engineering Strategies



FDMTABLE 212.12.3

Curb-Return Radius Reduction

This refers to the curvature of the curb line when two streets intersect. Reducing the size of the curb return radius can decrease the speed of turning vehicles and reduce the length of crossings.

EFFICACY LOW MED HIGH CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY URBAN

IMPLEMENTATION TIMELINE

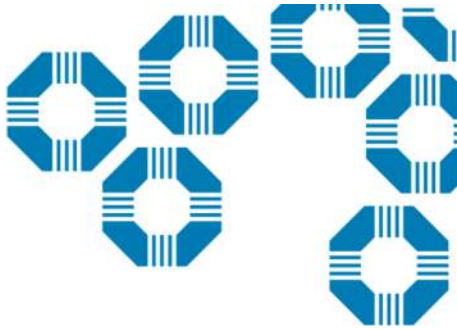
COST

FOCUS CRASH TYPE
Speed related crashes, Pedestrian struck by turning vehicle, Bicyclist struck by turning vehicle

SAFE SYSTEM STRATEGY
Manage Vehicular Speeds

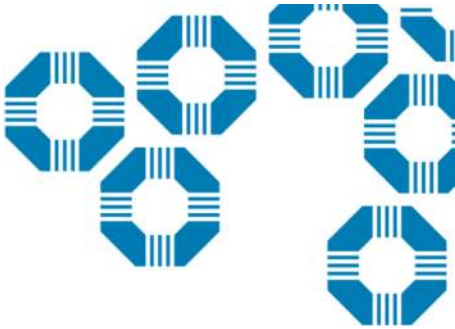
CONSIDERATIONS
Can create drainage problems; emergency vehicles would need to be considered in design; may be difficult for large trucks to navigate

HIN Project Identification Windermere



- Identify what is already planned on the network
- Review crash types and identify appropriate countermeasures
- Identify if there are near-term quick-build opportunities
- Estimate the project cost and identify what funding might be available
- Determine if the project is a good candidate for SS4A Grant Funding

Countermeasures



Pavement Markings:

- Advance stop bars for pedestrian crossings
- Pavement speed legends
- High visibility crosswalks

Signs:

- Flashing beacon as advance warning
- Yield to Pedestrians signs

Pedestrian Facilities:

- Add sidewalk along Main Street and E 6th Avenue
- Implement Ward Trail

Traffic Calming:

- Speed Feedback Signs
- Speed Humps
- Raised Crosswalks

Other:

- Remove Obstructions for Sightlines
- Increase Clear Zone
- Intersection Lighting

Multi-Modal Facilities – Ward Trail



Source: Ward Trail Plans

Long Range Transportation Plan Projects:

- Windermere Pedestrian/Multimodal Bridge Project
- Windermere Ward Trail (Phase 1)
- Windermere Safe Routes to School Project (Sidewalk)
- Main Street at Windermere Road Safety Improvements

E 6th Avenue
from Lake Street to Town Border

KSI Crashes	Non Incapacitating/Possible Injury Crashes	No Injury Crashes	Bike/Ped Crashes
1	22	57	1

Mid Term:
Add crossing

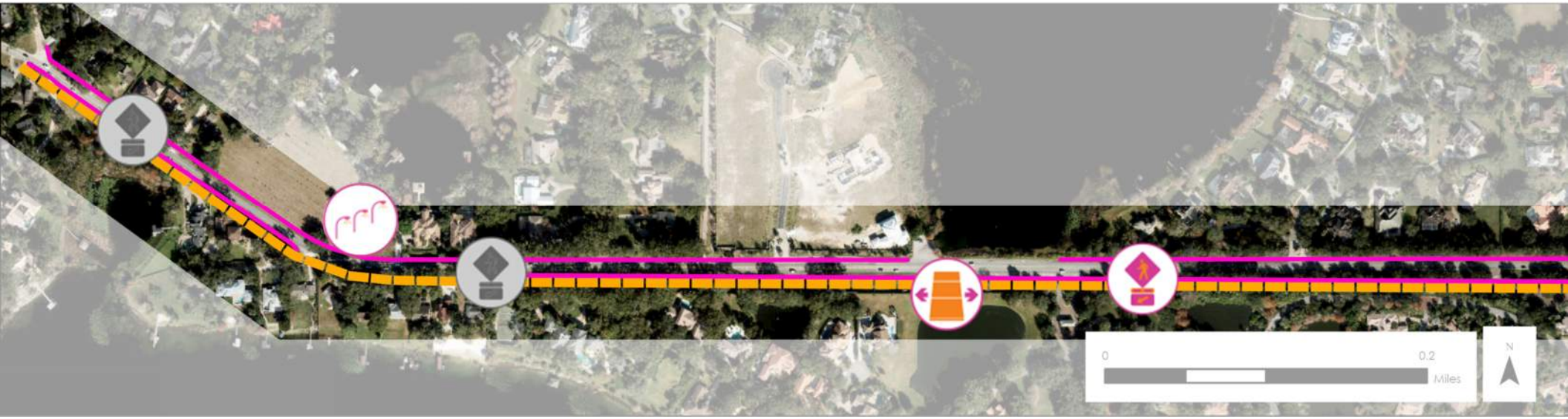
Long Term:
Widen existing sidewalk on south side

Add lighting with focus on crosswalks

Existing Sidewalk

Proposed Multiuse Path

Existing Crossing



Main Street
from Canal to E 4th Avenue

KSI Crashes	Non Incapacitating/Possible Injury Crashes	No Injury Crashes	Bike/Ped Crashes
1	2	7	1

Existing Sidewalk

Proposed Multiuse Path

Proposed Sidewalk

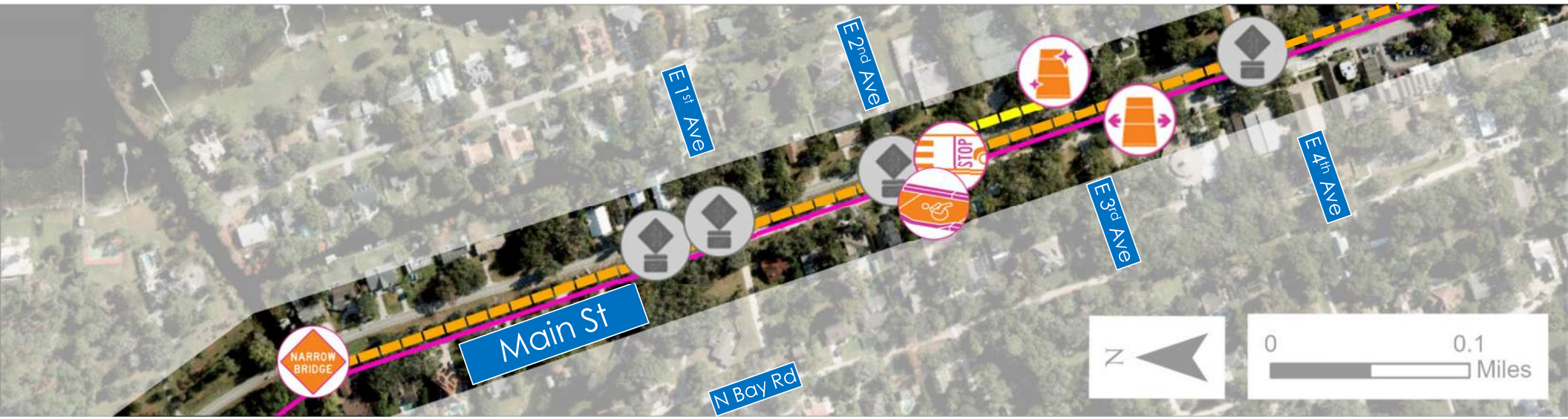
<u>Mid Term</u>:
Add advance pavement stop markings

Add curb ramp at E 2nd Ave

Upgrade sign to W5-2

<u>Long Term</u>:
Widen existing sidewalk on west side

Add sidewalk on east side



Main Street
from 6th Avenue to Chase Road

KSI Crashes	Non Incapacitating/Possible Injury Crashes	No Injury Crashes	Bike/Ped Crashes
1	5	47	0

Short Term:
Add curb ramp and upgrade to high visibility crosswalk at 10th Ave

Long Term:
Widen existing sidewalk on west side (Ward Trail)
Add sidewalk on east side to fill in gap

Planned Roundabout

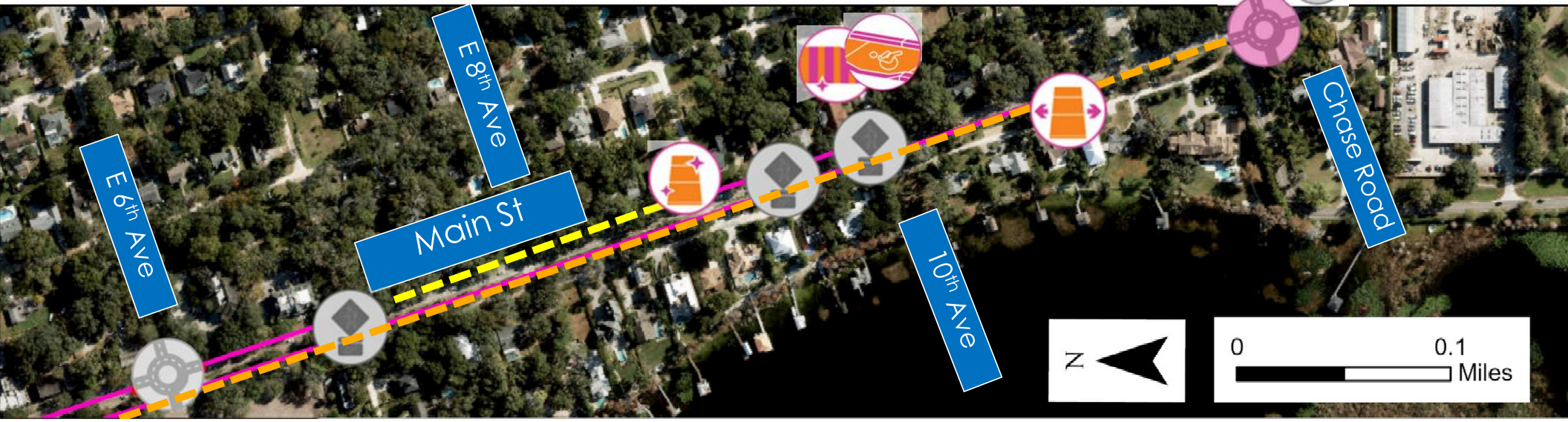
Existing Roundabout

Existing Crossing

Existing Sidewalk

Proposed Multiuse Path

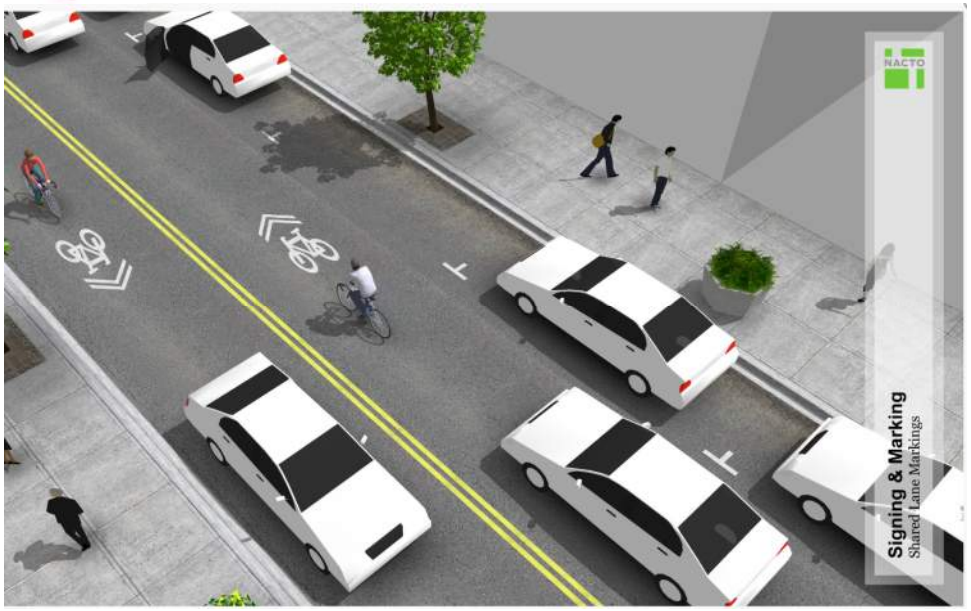
Proposed Sidewalk



Bicycle Facilities



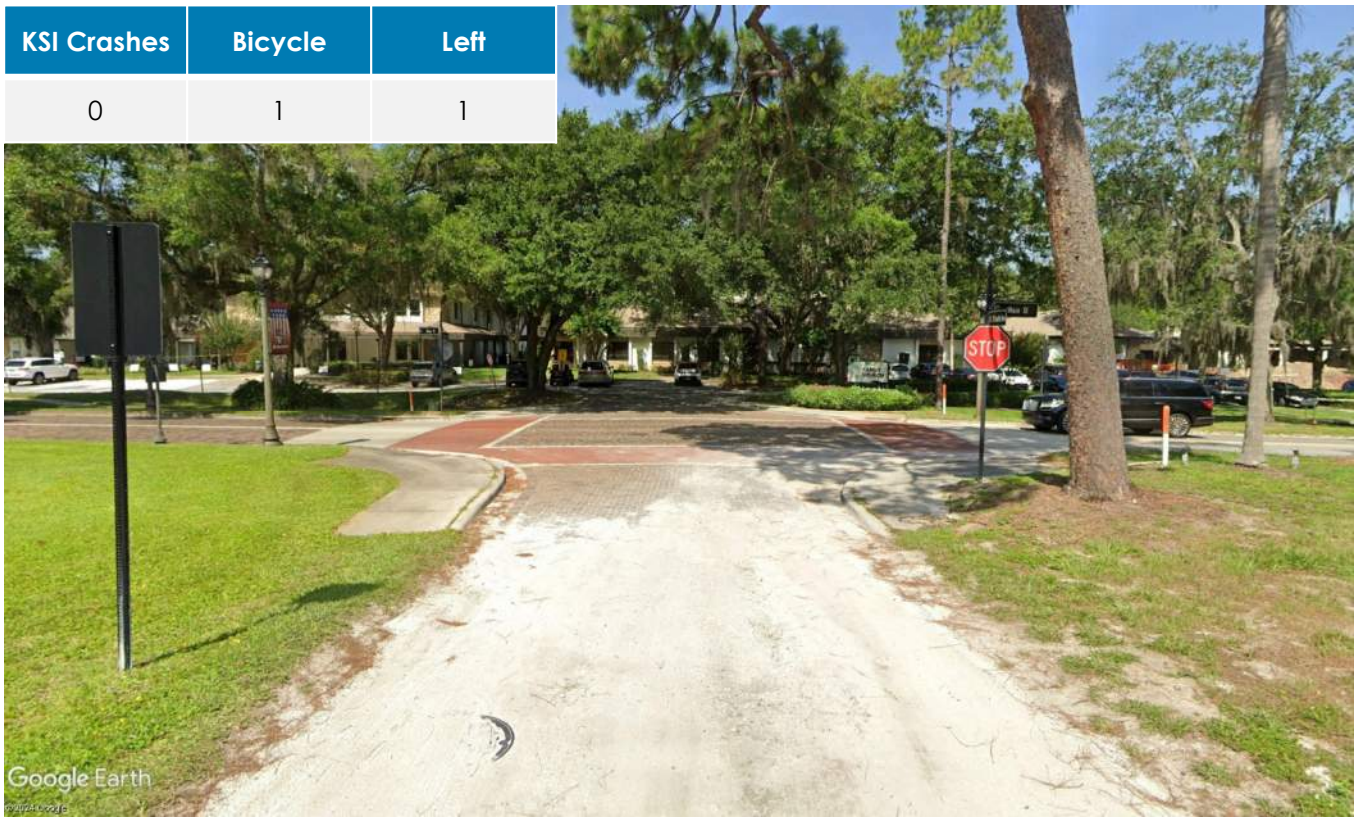


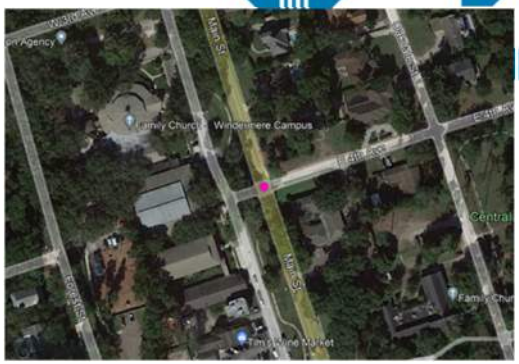




Main Street & E 4th Avenue

KSI Crashes	Bicycle	Left
0	1	1



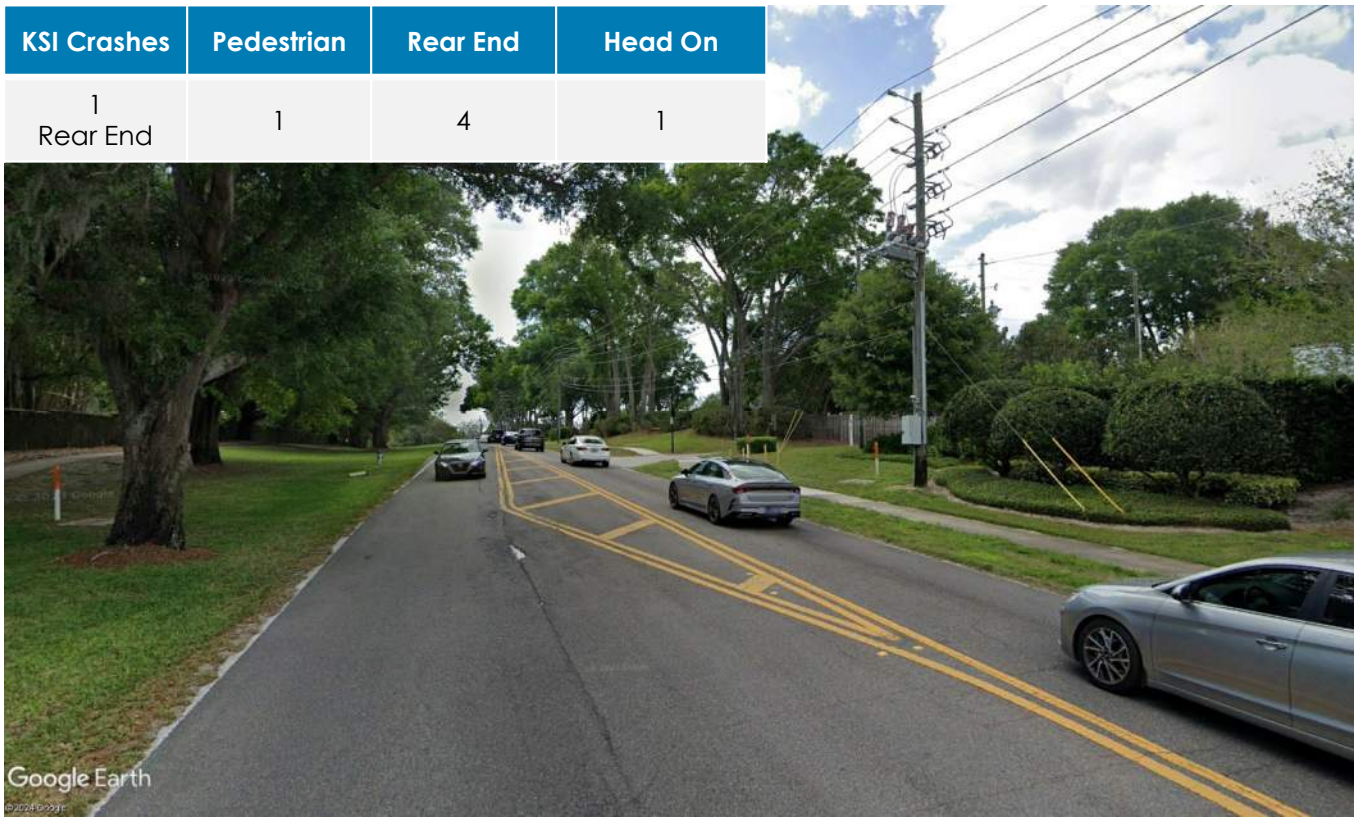


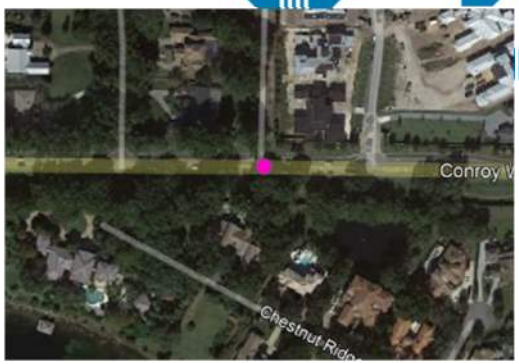
Mid Term:
Refresh crosswalk on west leg

Upgrade signage to RRFB

Conroy Windermere Road & Rosser Road

KSI Crashes	Pedestrian	Rear End	Head On
1 Rear End	1	4	1

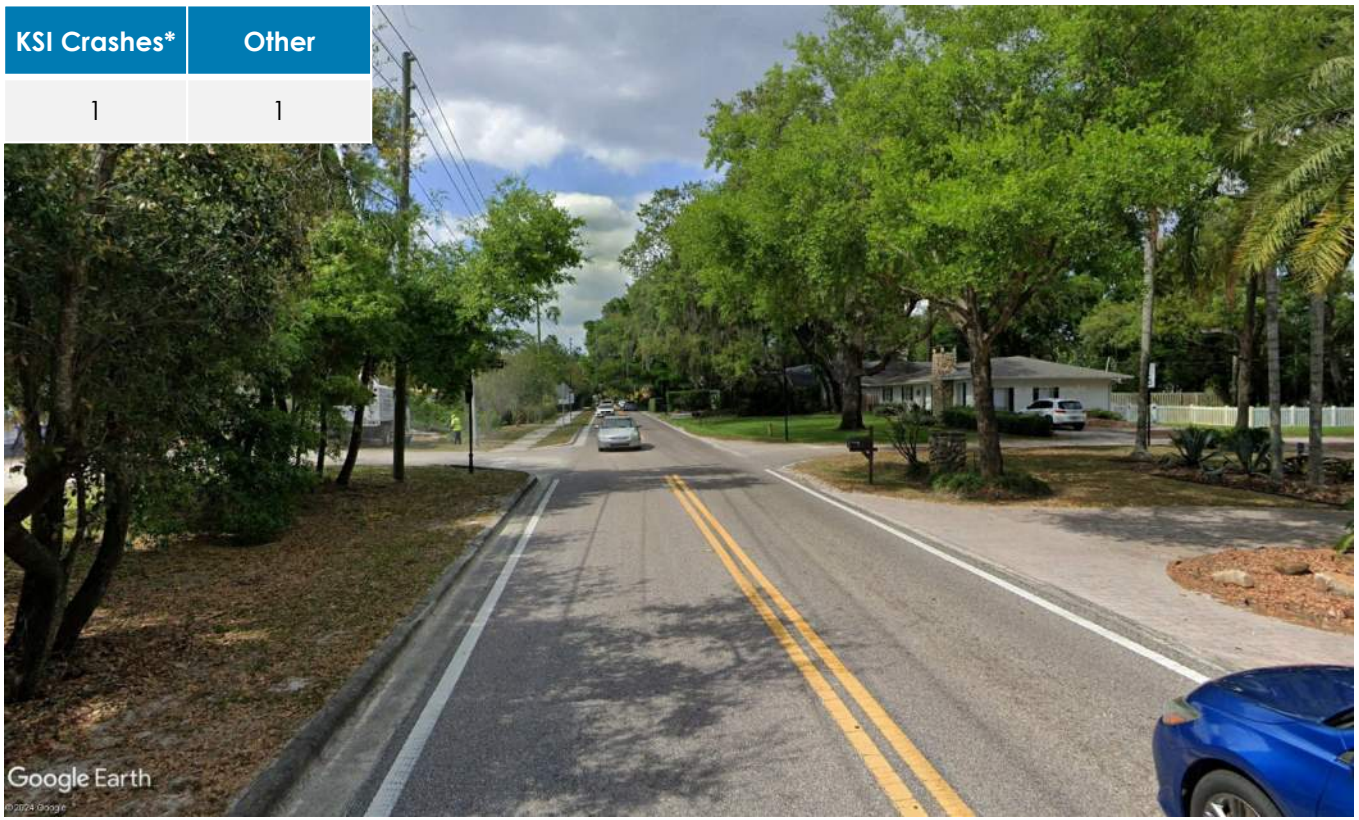




Mid Term:
Add raised median

Main Street & E 11th Avenue

KSI Crashes*	Other
1	1



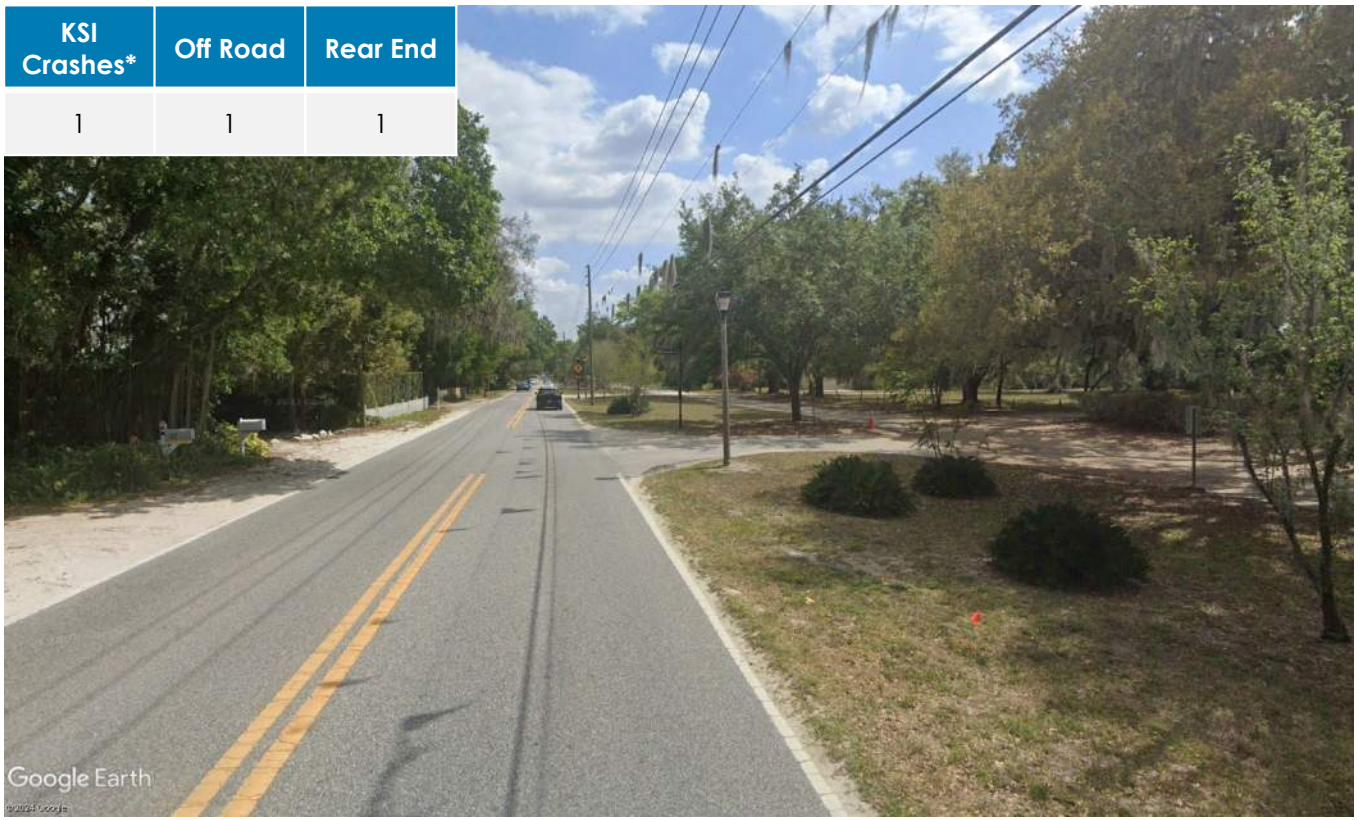


Short Term:
Add crosswalk on east leg and receiving ramp

Speed feedback sign

Main Street & North Drive

KSI Crashes*	Off Road	Rear End
1	1	1

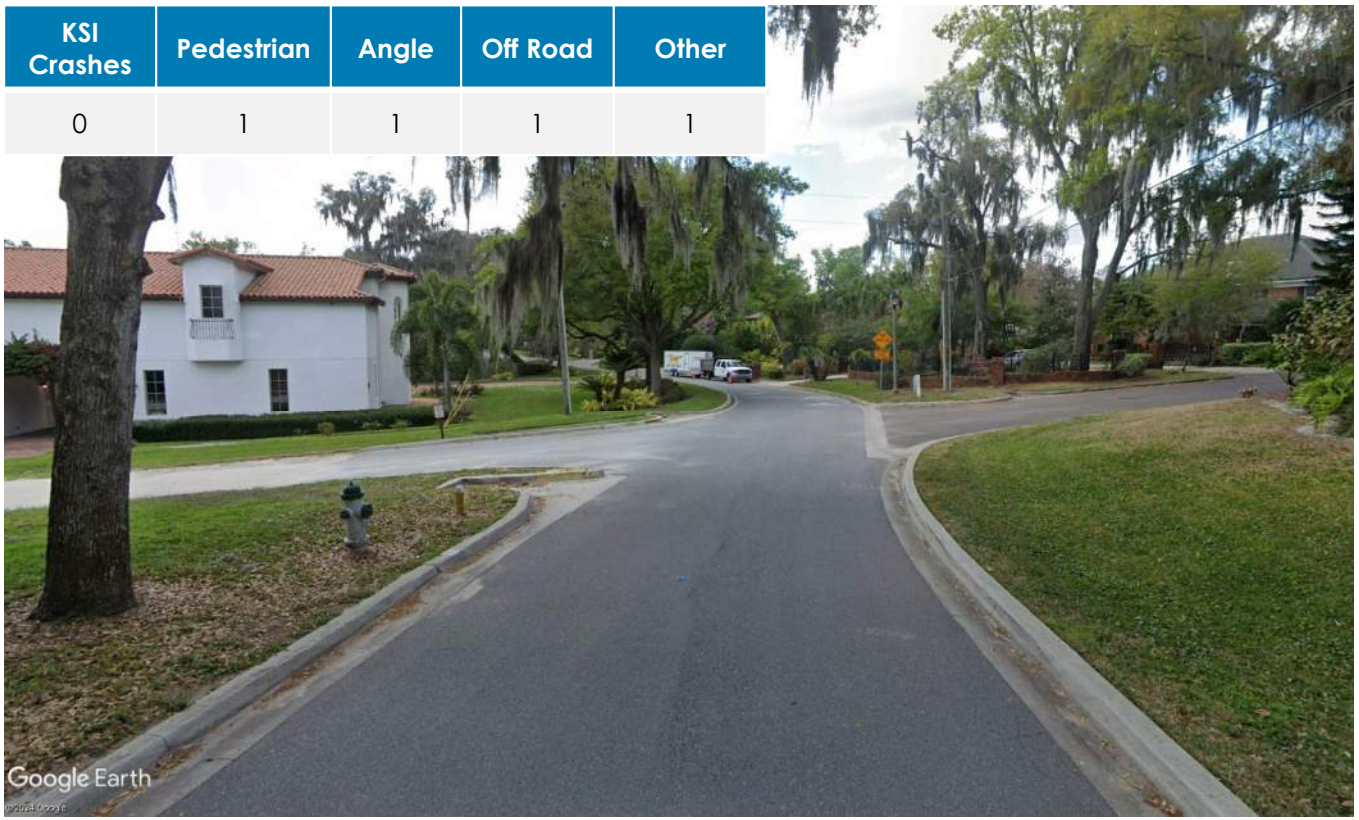




Short Term:
Install pavement speed legends and review clear zone

Pine Street & W 2nd Avenue

KSI Crashes	Pedestrian	Angle	Off Road	Other
0	1	1	1	1



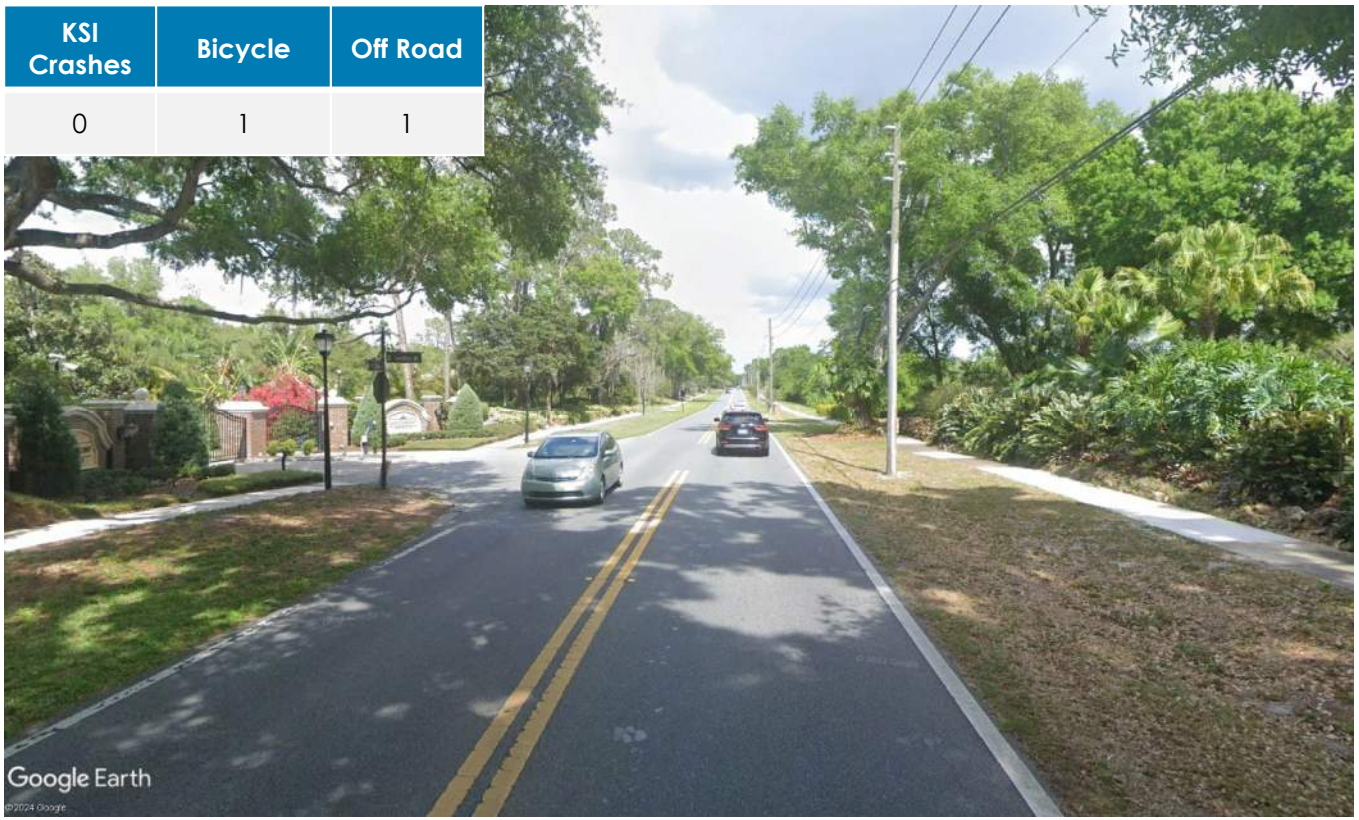


Short Term:
Add sidewalk along edge of Palmer Park

Install two-way stop control

Park Avenue & Sunbittern Court

KSI Crashes	Bicycle	Off Road
0	1	1





Short Term:
Add crosswalk on south leg at Lake Butler Boulevard and receiving ramp

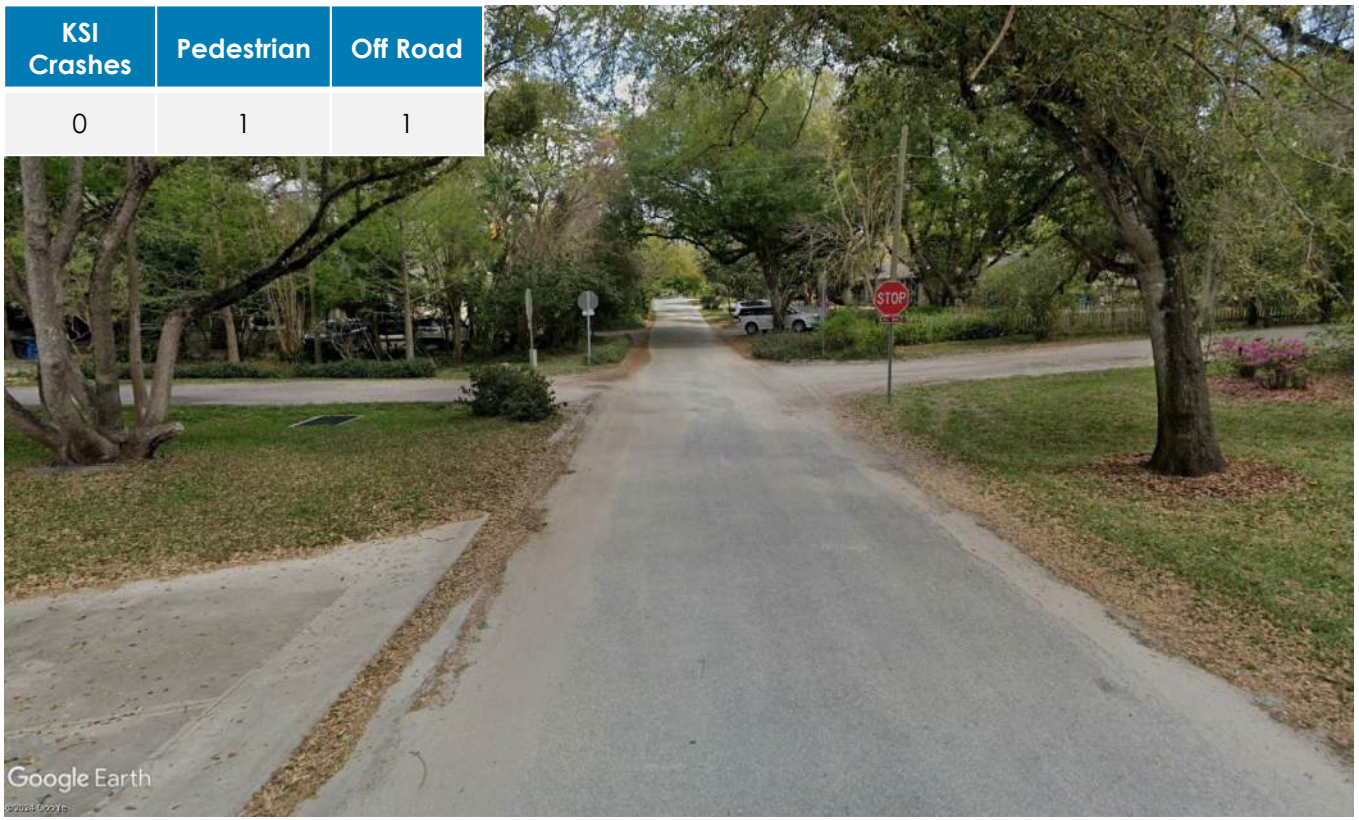
Review clear zone

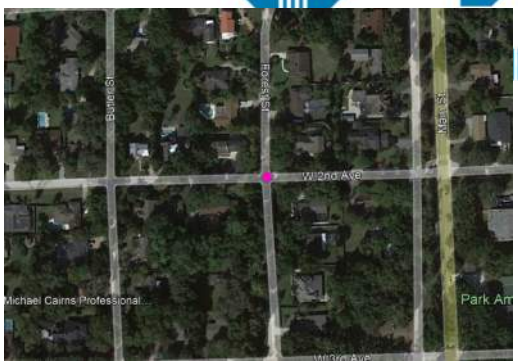
Speed feedback sign

Mid Term
Add crossing on Park Avenue (by Recreation Center/Wax Berry Ct)

Forest Street & W 2nd Avenue

KSI Crashes	Pedestrian	Off Road
0	1	1



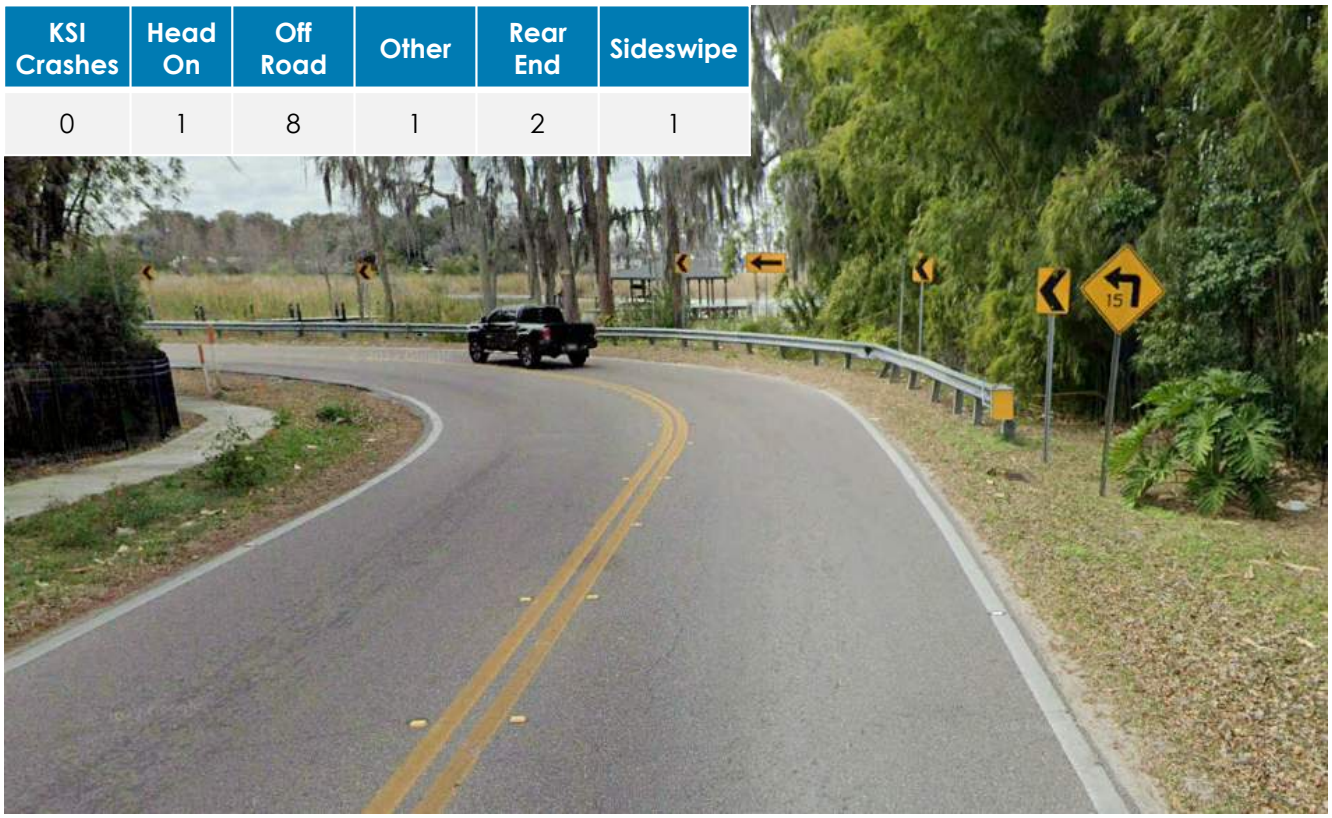


Short Term:
Add stop bars on pavement

Add high visibility reflective tape on stop signs

Chase Road (at bend)

KSI Crashes	Head On	Off Road	Other	Rear End	Sideswipe
0	1	8	1	2	1





Mid Term:
Add warning beacon

Add safety edge

Long Term:
Evaluate adding lighting
(10 night time crashes)

Strategies

- Safe Routes to School Programs
- Targeted Enforcement and Deterrence
- Education Campaigns
- Bicycle Safety Education Programs
- Public Information Campaigns
- Update Agency Policies and Standards
- Pilot Projects



Corrine Drive Pilot Project
Photo Credit: City of Orlando

BENCHMARKING



Benchmarking Process Windermere

Reviewed Relevant Plans

- Comprehensive Plan 2030
- Downtown Speed Limit Recommendations Study (2019)
- Multi-Modal Safety Analysis (2015)

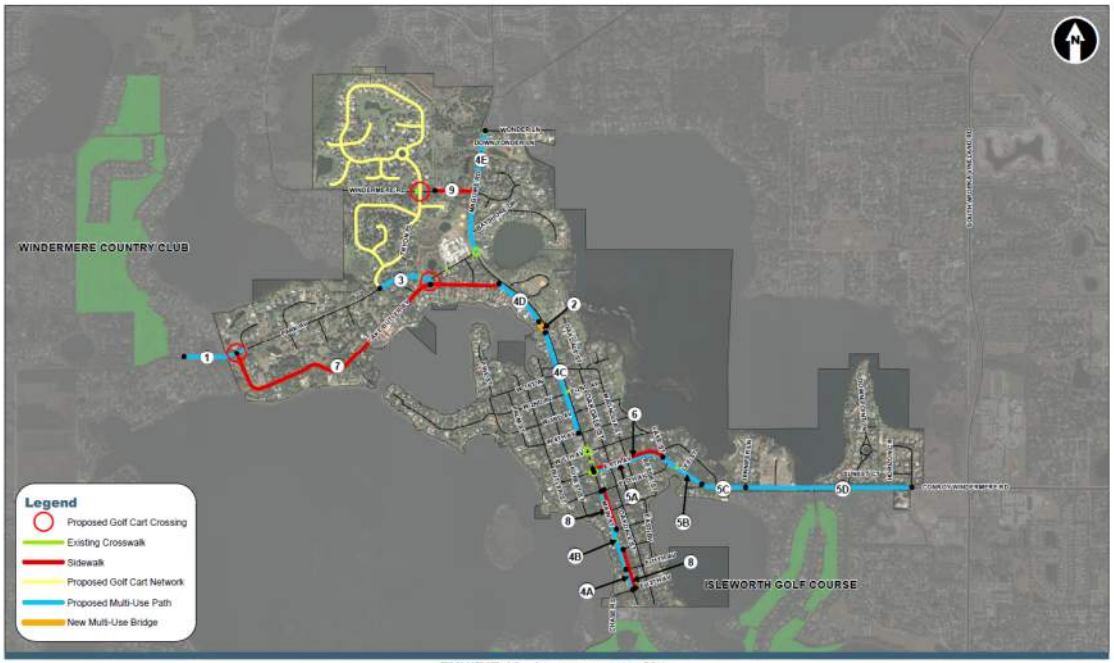
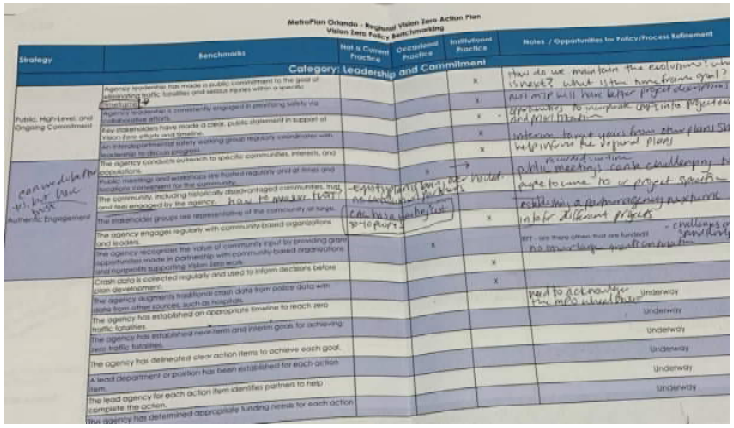


EXHIBIT 12 : Improvements Map
Windermere Multi-Modal Study

Benchmarking Process Windermere

Discussion Prompts Aligned with Core Elements of Vision Zero

- Public, High-Level, and Ongoing Commitment
- Authentic Engagement
- Strategic Planning
- Project Delivery
- Complete Streets for All
- Context-Appropriate Speeds
- Equity-Focused Analysis and Program
- Proactive, Systemic Planning
- Responsive, Hot Spot Planning
- Comprehensive Evaluation and Adjustments

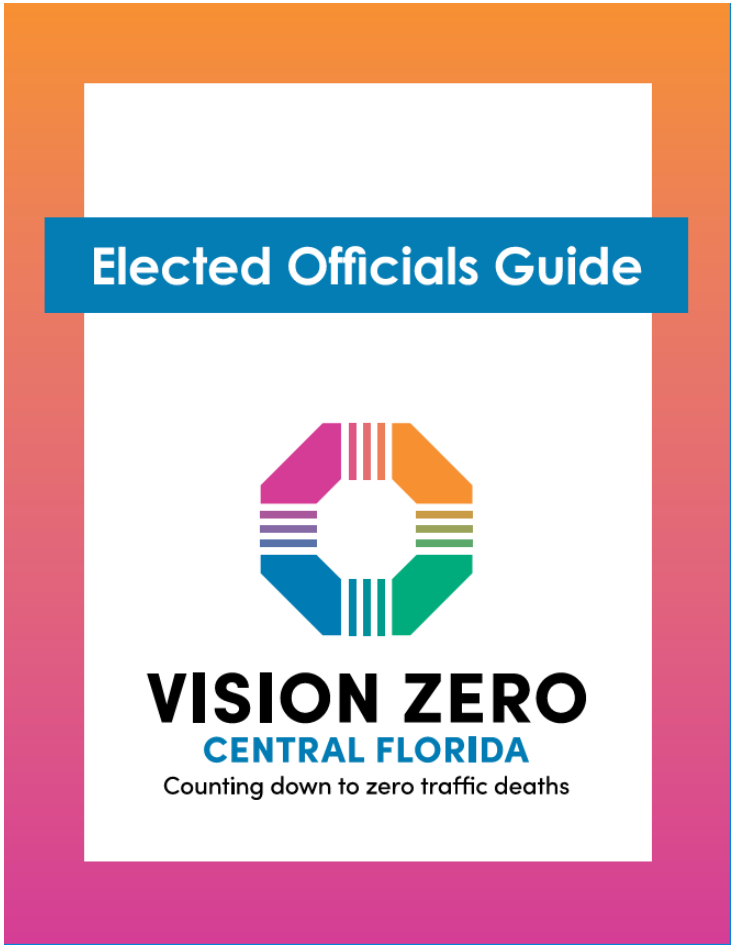


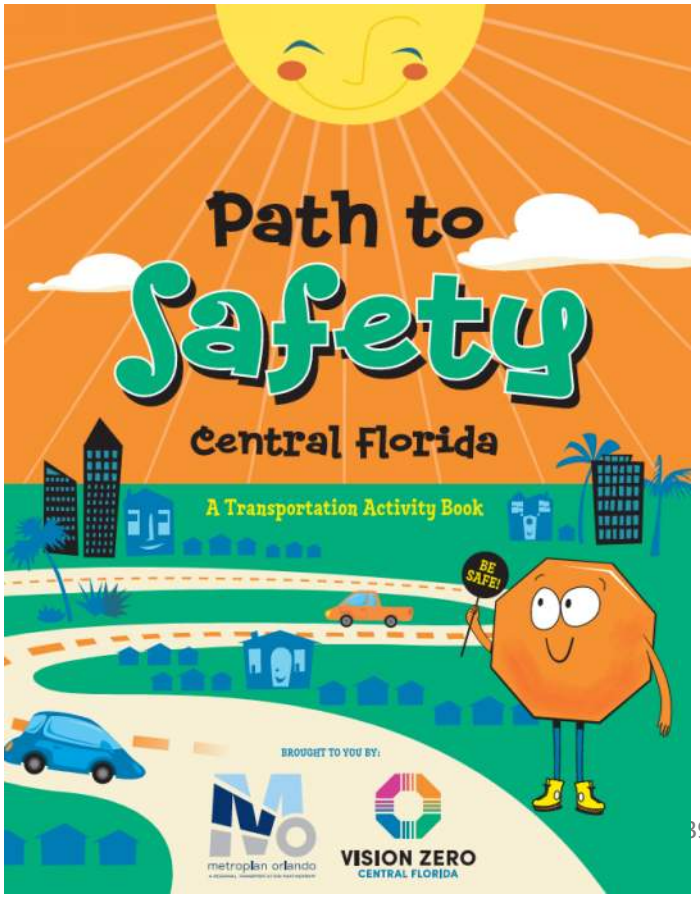
Strategy	Actions
Public, High-Level, and Ongoing Commitment	Create a website page to show the public commitment to the goal of eliminating traffic fatalities and serious injuries within a specific timeframe. Consider linking to MetroPlan or Vision Zero network to provide more information
Strategic Planning	Consider adopting specific language for multimodal performance targets such as Level of Traffic Stress or Quality of Service Measures in Comprehensive Plan
Strategic Planning	Consider adopting best practices to be used by Town for design such as Public Right-of-Way (PROWAG), Americans with Disability Act (ADA), NACTO Urban Street Design Guide
Strategic Planning	Establish near-term and interim goals for achieving zero traffic fatalities.
Strategic Planning	Incorporate specific language related to multimodal transportation as a priority in Comprehensive Plan
Context Appropriate Speed	Consider formalizing the Town's current approach to setting speed limits based upon context
Context Appropriate Speed	Develop an education program/campaign related to roundabout safety
Project Delivery	Consider linking to information about FHWA countermeasure resources on Town website
Project Delivery	Establish a working group that continues to meet to discuss Vision Zero
Proactive / Systemic	Develop HIN and incorporate into project prioritization criteria
Proactive / Systemic	Document instances where common collision patterns were addressed by adequate countermeasures
Reactive / Hot Spot	Consider reporting trends from collision data to the public.

PUBLIC ENGAGEMENT



Public Engagement Resources

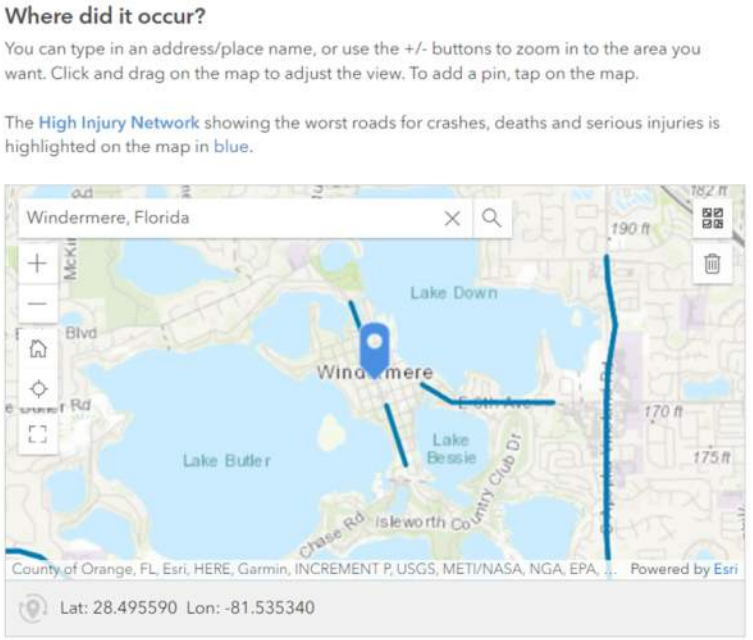




Public Engagement Efforts

- Social Media
- Comment Map
- Speaker Series
- Press Conference
- Fact Sheets
- Elected officials guide
- Local Agency Events
- Safety Summit
- Collect personal stories

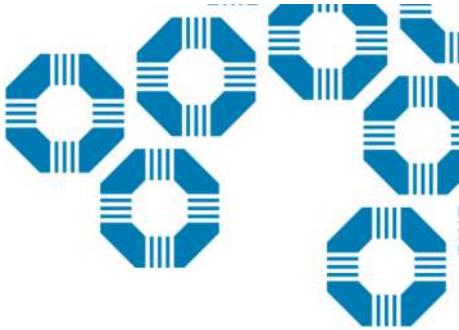
VisionZeroCFL.gov
bit.ly/VZCFvideo



SS4A GRANT CYCLE UPDATES



What Types of Projects



Planning & Demonstration

- Developing a comprehensive safety action plan (Action Plan)
- Conduct supplemental safety planning to enhance an Action Plan
- Carry out demonstration activities to inform the development of, or an update to, an Action

First two cycles of grant awards emphasized awards to planning grant applications.

Implementation

- Any activities required to advance projects and strategies identified in an Action Plan towards implementation
- Implementation applications can also include funds to do supplemental planning in support of an established Action Plan

SS4A Results: Cycle 2/FY 2023

Planning & Demonstration

572 Awards out of 579 Applications

Award Amounts

- Average: $515,000
- Largest : $12 million
- Smallest: $30,000

$290 million total awarded

99%

Success Rate for Applications

Implementation

48 Awards out of 159 Applications

Award Amounts

- Average $12.6 million
- Largest $30 million
- Smallest 1.2 million

$605 million total awarded

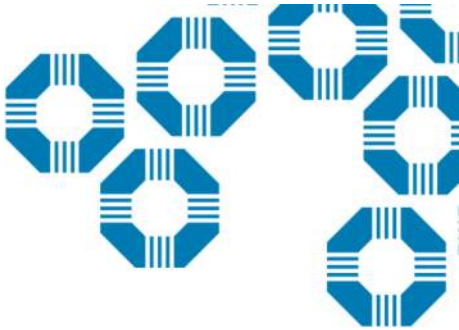
30%

Success Rate for Applications

SS4A Results: Cycle 2/FY 2023

State	Planning & Demonstration Projects			Implementation Projects			Total Funds Awarded
	Submitted	Awarded	Success Rate	Submitted	Awarded	Success Rate	
Florida	38	38	100%	5	1	20%	$45.4M
California	69	69	100%	39	7	18%	$150M
Texas	26	26	100%	6	3	50%	$55.6M
New York	20	20	100%	6	3	50%	$49.8M
Arizona	11	11	100%	2	2	100%	$39.5M
South Carolina	13	13	100%	2	1	50%	$15.3M
Georgia	21	20	95%	3	0	0%	$7.1M

SS4A Results: Florida



Planning & Demonstration

38 Awards out of 38 Applications

Award Amounts

- Average: $9,880,000
- Largest : $12 million
- Smallest: $80,000

$29 million total awarded

Implementation

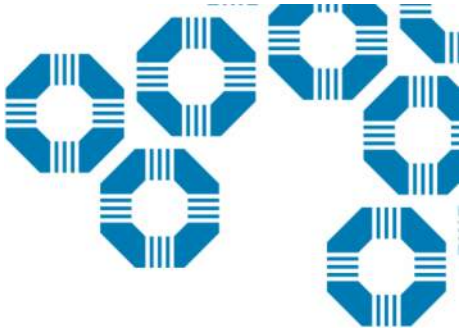
1 Award out of 5 Applications

- $16M to Miami-Dade County

4 out of 5 not awarded

- Port St. Lucie Floresta Drive Safety Improvement Project ($17.4 million)
- Tallahassee: Pedestrian and Street Safety Improvements ($9.6 million)
- Manatee County: 15th Street E / 301 Boulevard Corridor between ($25 million)
- St. Augustine: Old St. Augustine Sidewalk Project ($5.9 million)

Application Requirements



Planning & Demonstration

- 20% Local Match
- Four Standard Forms
- Population information & fatality rate
- Two-page narrative responding to one selection criteria
- High-level budget
- Map of jurisdiction

Implementation

- Comprehensive Safety Action Plan (self-certify)
- 20% Local Match
- Four Standard Forms
- Population information & fatality rate
- 12-page narrative responding to 5 selection criteria
- Moderately specific budget
- Project readiness information

SS4A Cycle 3/FY 2024 Timing

Notice of Funding Opportunity (NOFO) Expected to be released in February

Prior applications were due approximately 2 months after NOFO

For Implementation Grants, Action Plans need to be adopted by time application is due

https://www.transportation.gov/grants/ss4a/how-to-apply

NEXT STEPS



Potential Project Prioritization Criteria Windermere

- HIN Score (weights vulnerable roadway users higher)
- Jurisdictional and Community Support
- Ease of implementation
- Potential effectiveness
- Low Cost / Quick Build
- What other quantifiable metrics should be considered?



Project Schedule

WE ARE HERE

Winter 2023

Project Kick-off and Establish Working Group

Winter 2024

Develop Materials to Share with Public

Spring 2024

Policy Review

Spring/Early Summer 2024

Action Plan Document

Crash Analysis

Winter 2023

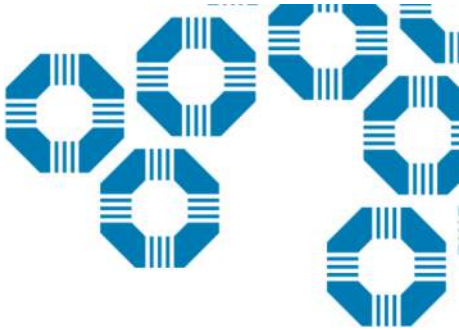
Engineering/Non-Engineering Countermeasures

Early Spring 2024

Identify and Prioritize Projects and Strategies

Late Spring 2024

Next Steps



WORKING GROUP

Final Working Group Meeting in May

ENGAGEMENT

Friday, April 26 at **Farmer's Market** and **Hub site** is open for feedback with new content added regularly

KEY TASK IN PROGRESS

Finalize and prioritize project list

PROJECT DELIVERABLES

Develop Action Plan Policies

WORKING GROUP DISCUSSION



VISION ZERO
CENTRAL FLORIDA

Questions?

Contact Information:

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Kelly Fearon
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813-710-9517

Sarah Larsen
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321-732-8230

Meeting Notes

Town of Windermere – Vision Zero Action Plan

Working Group #3 Meeting Notes

Date: March 28, 2024
Time: 9:00 – 10:00 AM
Meeting Location: Virtual

Attendees

- Tonya Elliot-Moore (Windermere, Director of Public Works)
- John Fitzgibbon (Windermere, Civil Engineer)
- Mike Woodworth (Kimley-Horn, Traffic Engineer)
- Jason Bonk (Windermere, Police Chief)
- Kelly Fearon (Kittelson)
- Roxane Van Horn (Kittelson)
- Sarah Larsen (MetroPlan Orlando)

Meeting Notes

Introduction

- KAI provided a general overview of the second Working Group Meeting.

HIN Highlights

- KAI noted that one incapacitating crash was due to a medical emergency at Main Street & North Drive and considered whether or not to remove the crash from the analysis. Town staff agreed this crash should be removed as the circumstances were a medical emergency.
- Town staff discussed the desire to compare Windermere to other jurisdictions in the region. They mentioned that this could show residents the few number of serious injury crashes that occur in Windermere as compared to other cities/towns within the region.
- Town staff said the incapacitating crash at Conroy-Windermere Road and Rosser Road was due to the driver fleeing from a police officer.
- Town staff said the Town recently added a new RRFB crosswalk with pavement markings near the eastern edge of the park along Park Avenue.
- Town staff said that W 2nd Avenue improvements will include widening to accommodate drainage improvements and adding curb ramps. The signage improvements can be included in project to increase visibility.

HIN Project Identification

- Town staff said they have done a good job of implementing speed feedback signs in the past and continue to move the sign as needed.
- Town staff said that the Ward Trail has been approved and awarded funding. They anticipated that construction may begin as early as summer of 2024.
- Town staff said the Town received a grant to implement a seawall along E 6th Avenue from Lake Street to the Town Border. The Town said this is a high priority, however, they are struggling to find funding currently.
- Town staff noted the need for improved north-south bicycle and pedestrian connectivity along Main Street from the canal to E 4th Avenue. They said the Ward Trail would help to achieve this.
- Town staff said that the Town's LRTP includes a planned crosswalk between 9th Street and 10th Street.
- KAI and Town staff briefly discussed factors for project prioritization. Prioritization factors discussed included but weren't limited to: HIN score, jurisdiction, and cost.

Miscellaneous

- Town staff asked if MetroPlan would apply for planning/demonstration grants on behalf of municipalities. MetroPlan staff noted they are not ready for this cycle because the NOFO came out earlier than expected. Grant specifics will be discussed later on in the process.

Next Steps

- KAI to prioritize potential projects based on the feedback from this meeting.
- The third Working Group Meeting will take place on 5/23/2024 at 9:00 AM.
- The next Public Engagement event will take place at the Windermere Farmer's Market on 4/26/2024.

Windermere Working Group Meeting 4

Agenda

Town of Windermere Vision Zero Action Plan

Working Group Meeting 4 – Agenda

May 23, 2024

9:00 – 10:00 AM

Teams

1. Welcome and Working Group Meeting Recap
2. HIN Highlights
3. Project Prioritization Criteria
4. Projects
5. Benchmarking
6. Public Engagement
7. Next Steps
8. Discussion

Contact Information:
Kelly Fearon, Kittelson & Associates, Senior Engineer
kfearon@kittelson.com, 813-710-9517

Sarah Larsen, MetroPlan Orlando, Transportation Planner
sarah.larsen@metroplanorlando.gov, 321-732-8230

Meeting Materials

VISION ZERO
CENTRAL FLORIDA
Counting down to zero traffic deaths

WORKING GROUP MEETING #4



MAY 23, 2024

metroplan orlando
A REGIONAL TRANSPORTATION PARTNERSHIP

Agenda

1. Welcome and Recap from Last Meeting
2. HIN Highlights
3. Project Prioritization Criteria
4. Projects
5. Benchmarking
6. Public Engagement
7. Next Steps
8. Discussion

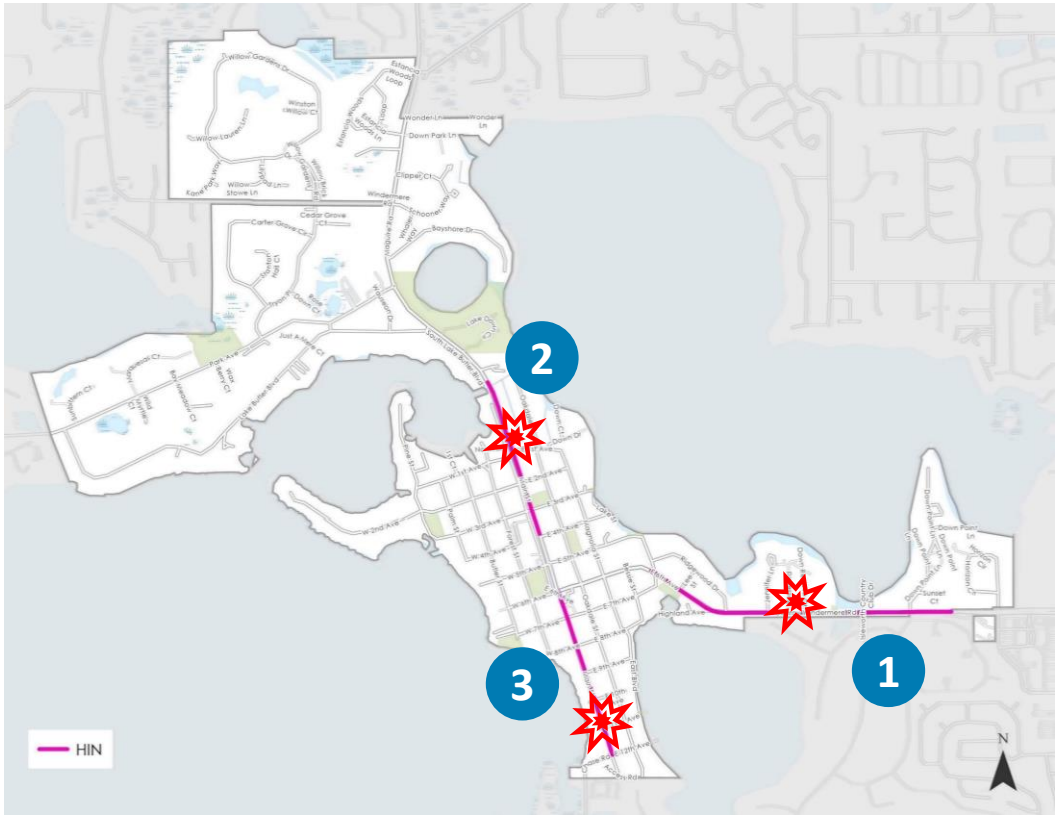
HIN HIGHLIGHTS







High Injury Network Highlights

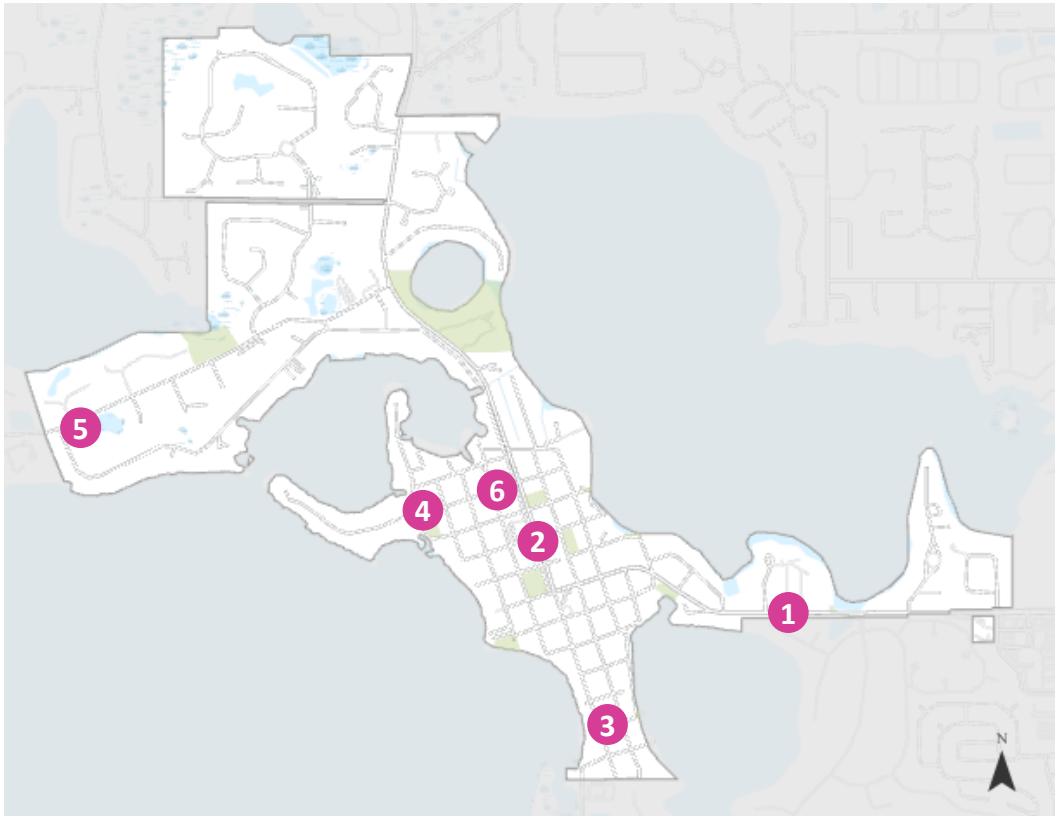


Roadway Name	Extents	Length	KSI Crashes	Non Incapacitating/ Possible Injury Crashes	No Injury Crashes	Bike/Ped Crashes
1. E 6th Ave	Lake Street to Town Border	0.95 mi	1	22	57	1
2. Main Street	Maguire Rd to E 4th Ave	0.49 mi	1	2	7	1
3. Main Street	6th Ave to Chase Rd	0.52 mi	1	5	47	0

Crash data from 2018 to 2022

Serious Injury Crash

Top Crash Intersections



Intersection	KSI Crashes	Non Incapacitating/ Possible Injury Crashes	No Injury Crashes	Bike/Ped Crashes
1. Conroy Windermere Rd & Rosser Rd	1	4	3	1
2. Main St & E 4th Ave	0	1	4	1
3. Main St & E 11th Ave	1	0	0	0
4. Pine Street & W 2nd Avenue	0	1	3	1
5. Park Ave & Sunbittern Ct	0	1	3	1
6. Forest St & W 2nd Ave	0	0	1	1

Crash data from 2018 to 2022

PROJECT PRIORITIZATION CRITERIA



MetroPlans' Project Prioritization Criteria Summary

Criteria	Description	Criteria Weighting
Safety Score	Project ranked based on **crash severity data** used as basis for the HIN/Top Intersection identification	50%
Transportation Underserved Communities	Project ranked based **on proximity to underserved transportation communities**	15%
Safety Benefit	Project ranked based on whether **safety issues identified in crash data are addressed by countermeasures**	15%
HIN Network Inclusion	Project ranked by whether the **project is located on HIN**	10%
Implementation Timeline	Project ranked by how **quickly the project can be implemented**	10%

Safety Score on Project Corridor

Project Type	Safety Score	Criteria Scoring	Criteria Weighting
Corridor Projects	>10,424	1.00	50%
	8,953 to 10,424	0.75	
	6,903 to 8,953	0.50	
	<6,903	0.25	
Intersection Projects	> 1,050	1.00	
	299 to 1,050	0.75	
	36 to 299	0.50	
	<36	0.25	

Project Impact on Transportation Underserved Communities

ETC* Criteria Met	Criteria Scoring	Criteria Weighting
4-5	1.00	15%
2-3	0.75	
1	0.50	
Is within the top 50th percentile of the region but does not meet any of the ETC Criteria	0.25	
0	0.00	

- ETC Criteria include:
  - Transportation Insecurity Percentile Rank
  - Health Vulnerability Percentile Rank
  - Environmental Burden Percentile Rank
  - Social Vulnerability Percentile Rank
  - Climate & Disaster Risk Burden Percentile Rank

*Additional information can be found on the USDOT Equitable Transportation Community (ETC) Explorer website: *https://www.transportation.gov/priorities/equity/justice40/etc-explorer*

Project Safety Benefit

Safety Benefit Criteria	Criteria Scoring	Criteria Weighting
Target Speed set for the lowest allowable for context classification or functional classification (corridor project).	1.00	15%
Project is on a C3C, Principal Arterial, Minor Arterial, or Major Collector and includes major speed reduction elements (corridor project).	0.75	
Project is on a C3C, Principal Arterial, Minor Arterial, or Major Collector and includes minor speed reduction elements (corridor project).	0.50	
Project includes features that **slow vehicles through an intersection** (roundabout, reduced curb radii, protected intersection elements, etc.) (intersection project).	1.00	
Project primarily includes elements that are tied to **safety history** (such as lighting, high friction surface treatment, signal phasing modifications, outreach/ engagement) (intersection or corridor project).	1.00	

Project Overlap with High Injury Networks

Project Overlap with HINs	Criteria Scoring	Criteria Weighting
Regional and Local	1.00	10%
Local	**0.50**	
No HIN	0.00	

Project Implementation Timeline

Implementation Criteria	Criteria Scoring	Criteria Weighting
Project primarily includes low-cost / quick build elements, or	1.00	10%
A publicly available concept plan that included public engagement has been prepared; or	1.00	
At least 50% of project extents are in an adopted plan that included public engagement specific to the project corridor; or	0.75	
Project can be completed within 5-years; or	1.00	
Project is identified as an unfunded need in the MTP.	0.50	

PROJECTS







Countermeasures

Pavement Markings:

- Advance stop bars for pedestrian crossings
- Pavement speed legends
- High visibility crosswalks

Signs:

- Flashing beacon as advance warning
- Yield to Pedestrians signs

Pedestrian Facilities:

- Add sidewalk along Main Street and E 6th Avenue
- Implement Ward Trail

Traffic Calming:

- Speed Feedback Signs
- Raised Crosswalks

Other:

- Remove Obstructions for Sightlines
- Increase Clear Zone
- Intersection Lighting

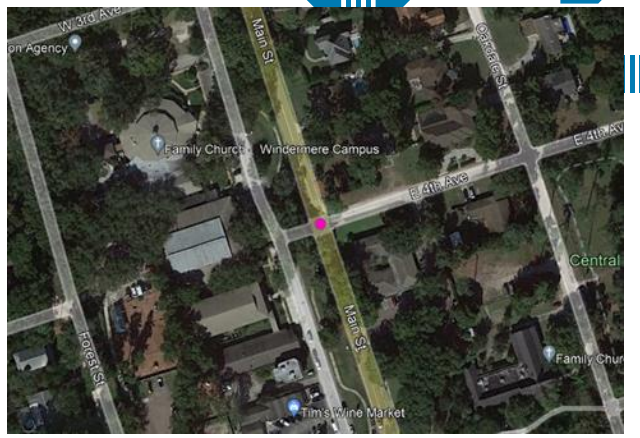
Main Street & E 4th Avenue

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Initial Score	0.75	0	0.75	0.5	1
Weighted Score	37.5	0	11.25	5	10
Total Score / Rank	63.75* / 1st (tied)				
Opinion of Probable Cost	$19,500**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.





Mid Term:

Refresh crosswalk on west leg

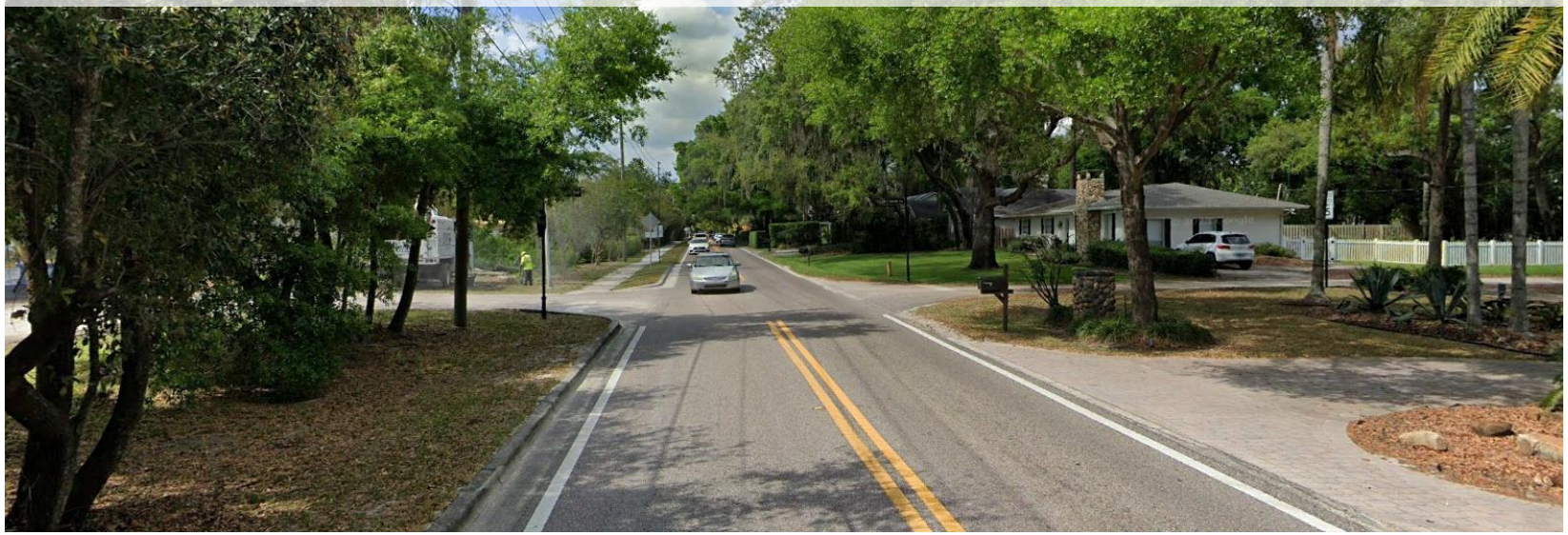
Upgrade signage to RRFB

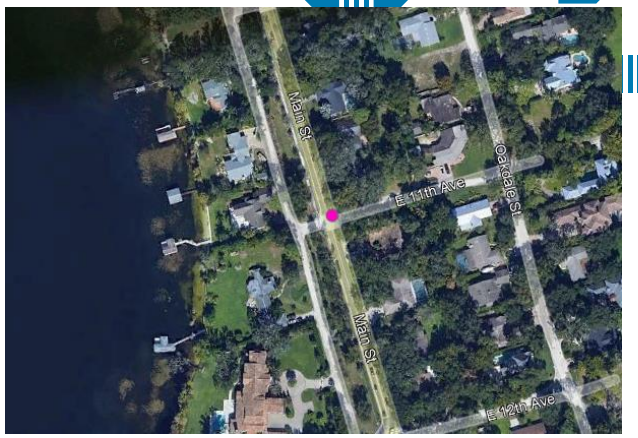
Main Street & E 11th Avenue

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Initial Score	0.75	0	0.75	0.5	1
Weighted Score	37.5	0	11.25	5	10
Total Score / Rank	63.75* / 1st (tied)				
Opinion of Probable Cost	$79,500**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.





Short Term:
Add crosswalk on east leg and receiving ramp

Speed feedback sign

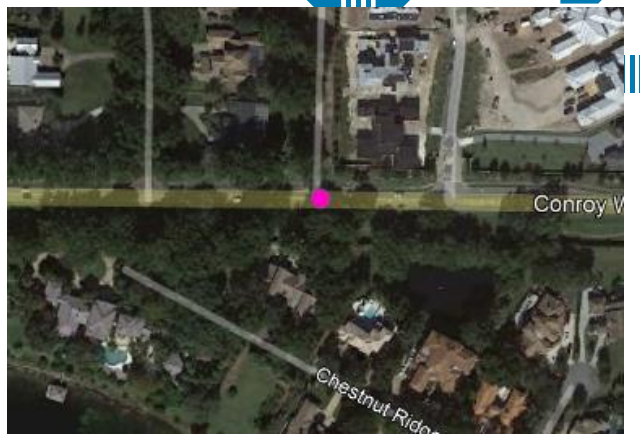
Conroy Windermere Road & Rosser Road

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Initial Score	0.75	0	1	0.5	0.5
Weighted Score	37.5	0	15	5	5
Total Score / Rank	62.5* / 2nd				
Opinion of Probable Cost	$52,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.







Mid Term:
Add raised median

Main Street
from 6th Avenue to Chase Road

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Initial Score	0.75	0	0.75	0.5	0.75
Weighted Score	37.75	0	11.25	5	7.5
Total Score / Rank	61.25* / 3rd				
Opinion of Probable Cost	$132,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Short Term:
Add curb ramp and upgrade to high visibility crosswalk at 10th Ave

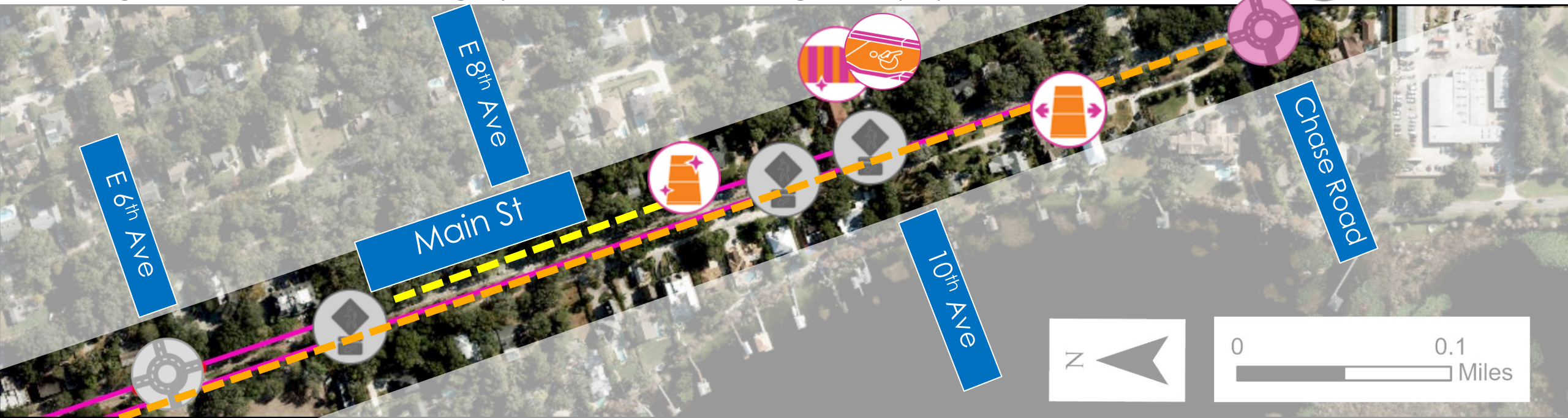


Long Term:
Widen existing sidewalk on west side (Ward Trail)
Add sidewalk on east side to fill in gap

Planned Roundabout

Existing Roundabout

Existing Crossing



Main Street
from Canal to E 4th Avenue

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Initial Score	0.75	0	0.5	0.5	1
Weighted Score	37.5	0	7.5	5	10
Total Score / Rank	60* / 4th (tied)				
Opinion of Probable Cost	$58,800.00**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.

Mid Term:
Add advance pavement stop markings

Project planned on 2nd Ave
Add curb ramp at E 2nd Ave

Upgrade sign to W5-2

Long Term:
Widen existing sidewalk on west side

Add sidewalk on east side



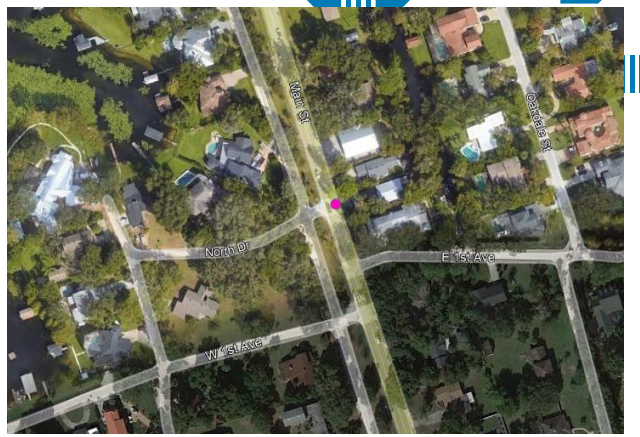
Main Street & North Drive

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Initial Score	0.75	0	0.5	0.5	1
Weighted Score	37.5	0	7.5	5	10
Total Score / Rank	60* / 4th (tied)				
Opinion of Probable Cost	$3,500				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.





<u>Short Term</u>:
Install pavement speed legends and review clear zone

Chase Road (at bend)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Initial Score	0	0	1	0.5	1
Weighted Score	0	0	15	5	10
Total Score / Rank	30* / 5th				
Opinion of Probable Cost	$23,500**				

*Total Score is out of 100
**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.







Mid Term:
Add warning beacon



Add safety edge

Long Term:
Evaluate adding lighting (10 night time crashes)



Main Street
from Canal to Chase Road (Ward Trail)

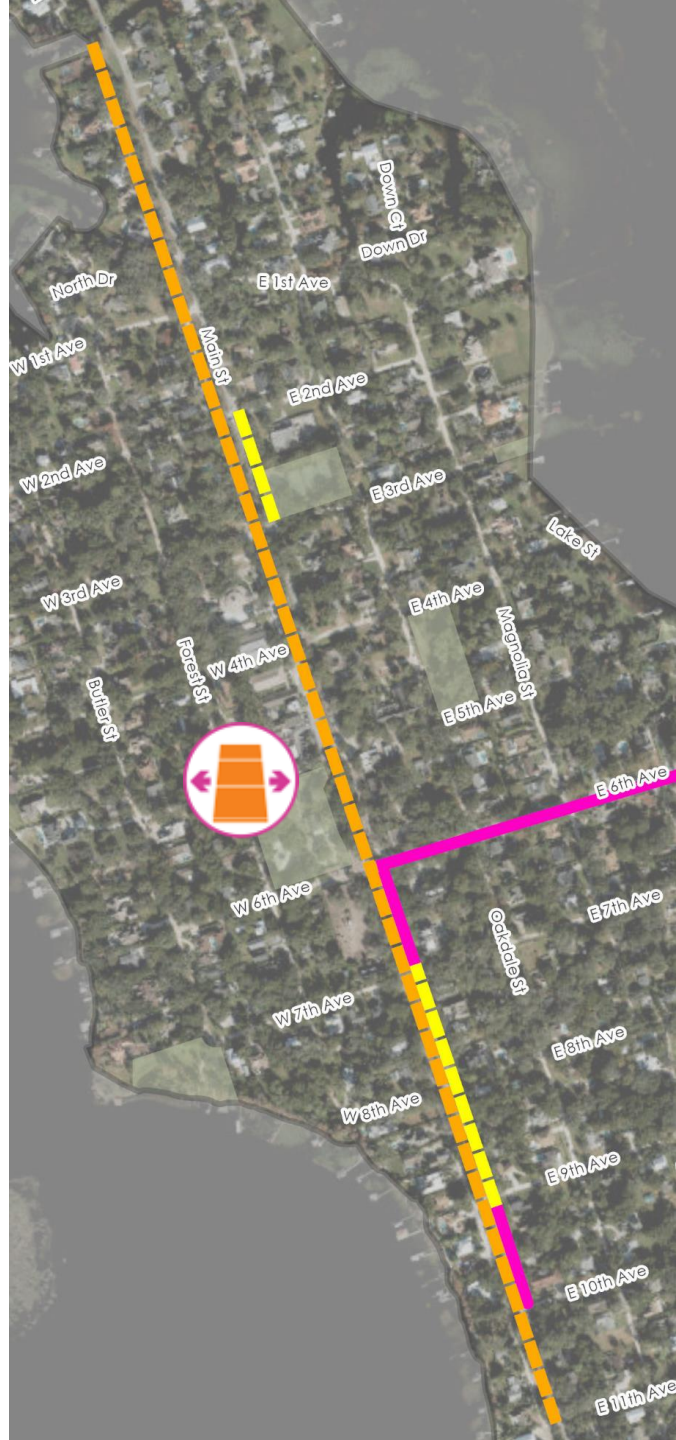
	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Initial Score	0	0	1	0.5	0.75
Weighted Score	0	0	15	5	7.5
Total Score / Rank	27.5* / 6th				
Opinion of Probable Cost	$587,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Long Term:
Widen existing sidewalk on west side (Ward Trail)
Add sidewalk on east side to fill in gap



Proposed Multiuse Path

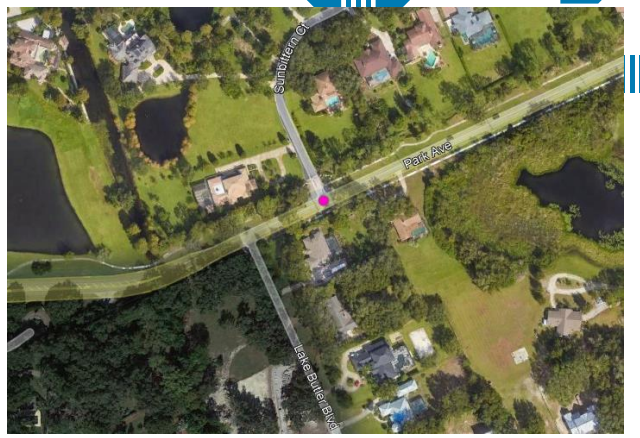
Park Avenue & Sunbittern Court

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Initial Score	0	0	0.75	0.5	1
Weighted Score	0	0	11.25	5	10
Total Score / Rank	26.25* / 7th				
Opinion of Probable Cost	$85,500**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.







Short Term:
Add crosswalk on south leg at Lake Butler Boulevard and receiving ramp



Review clear zone



Speed feedback signs

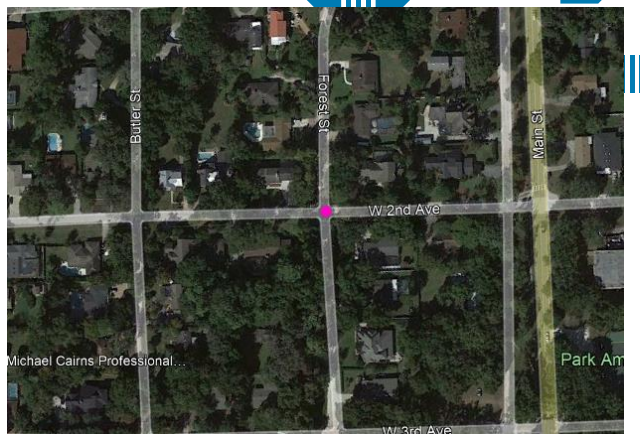
Forest Street & W 2nd Avenue Programmed Project

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Initial Score	0	0	0.5	0.5	1
Weighted Score	0	0	7.5	5	10
Total Score / Rank	22.5* / 8th				
Opinion of Probable Cost	$3,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.





Short Term:

Add stop bars on pavement

Add high visibility reflective tape on stop signs

E 6th Avenue
from Lake Street to Town Border

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Initial Score	0	0	0.75	0.5	0.5
Weighted Score	0	0	11.25	5	5
Total Score / Rank	21.25* / 9th (tied)				
Opinion of Probable Cost	$600,500**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.

Mid Term:
Add crossing

Long Term:
Widen existing sidewalk on south side

Add lighting with focus on crosswalks



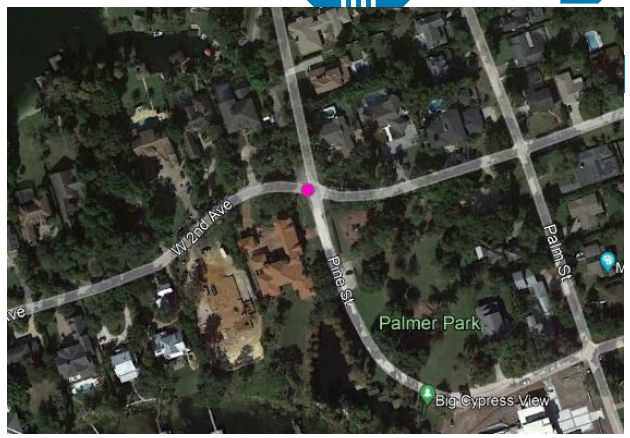
Pine Street & W 2nd Avenue

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Initial Score	0	0	0.75	0.5	0.5
Weighted Score	0	0	11.25	5	5
Total Score / Rank	21.25* / 9th (tied)				
Opinion of Probable Cost	$47,500**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.





Short Term:
Add sidewalk along edge of Palmer Park

Install two-way stop control

Strategies

- Safe Routes to School Programs
- Targeted Enforcement and Deterrence
- Education Campaigns for Vulnerable Groups
- Youth Education
- Bicycle Safety Education Programs
- Public Information Campaigns
- Update Agency Policies and Standards
- Pilot Projects



Corrine Drive Pilot Project
Photo Credit: City of Orlando

BENCHMARKING



Benchmarking Process Windermere

Reviewed Relevant Plans

- Comprehensive Plan 2030
- Downtown Speed Limit Recommendations Study (2019)
- Multi-Modal Safety Analysis (2015)

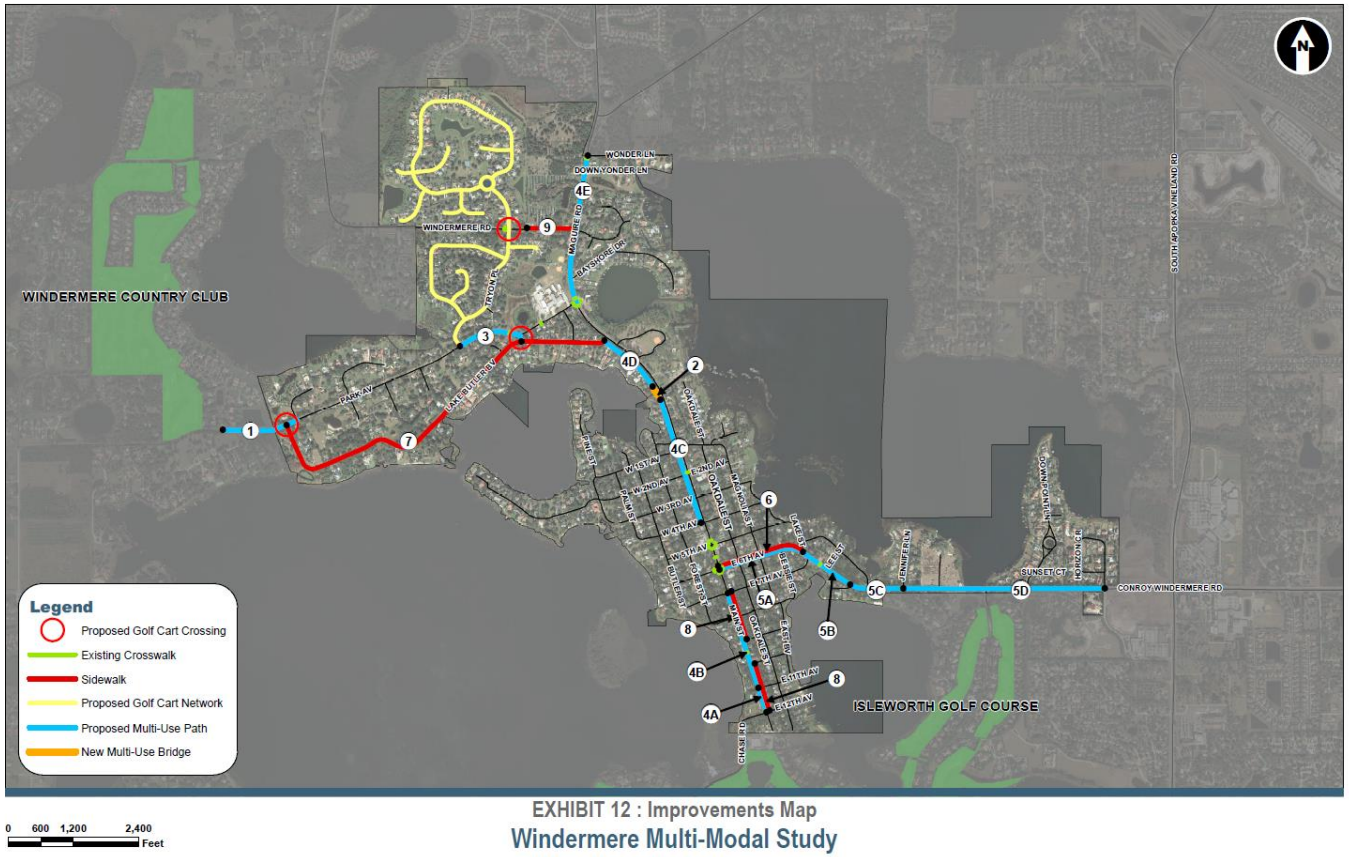


EXHIBIT 12 : Improvements Map
Windermere Multi-Modal Study

Strategy	Actions
Public, High-Level, and Ongoing Commitment	Create a website page to show the public commitment to the goal of eliminating traffic fatalities and serious injuries within a specific timeframe. Consider linking to MetroPlan or Vision Zero network to provide more information
Strategic Planning	Consider adopting specific language for multimodal performance targets such as Level of Traffic Stress or Quality of Service Measures in Comprehensive Plan
Strategic Planning	Consider adopting best practices to be used by Town for design such as Public Right-of-Way (PROWAG), Americans with Disability Act (ADA), NACTO Urban Street Design Guide
Strategic Planning	Establish near-term and interim goals for achieving zero traffic fatalities.
Strategic Planning	Incorporate specific language related to multimodal transportation as a priority in Comprehensive Plan
Context Appropriate Speed	Consider formalizing the Town's current approach to setting speed limits based upon context
Context Appropriate Speed	Develop an education program/campaign related to roundabout safety
Project Delivery	Consider linking to information about FHWA countermeasure resources on Town website
Project Delivery	Formalize the working group to continue to meet to discuss Vision Zero/crashes
Project Delivery	Provide educational materials about roundabouts
Proactive / Systemic	Document instances where common collision patterns were addressed by adequate countermeasures
Reactive / Hot Spot	Consider reporting trends from collision data to the public.

PUBLIC ENGAGEMENT

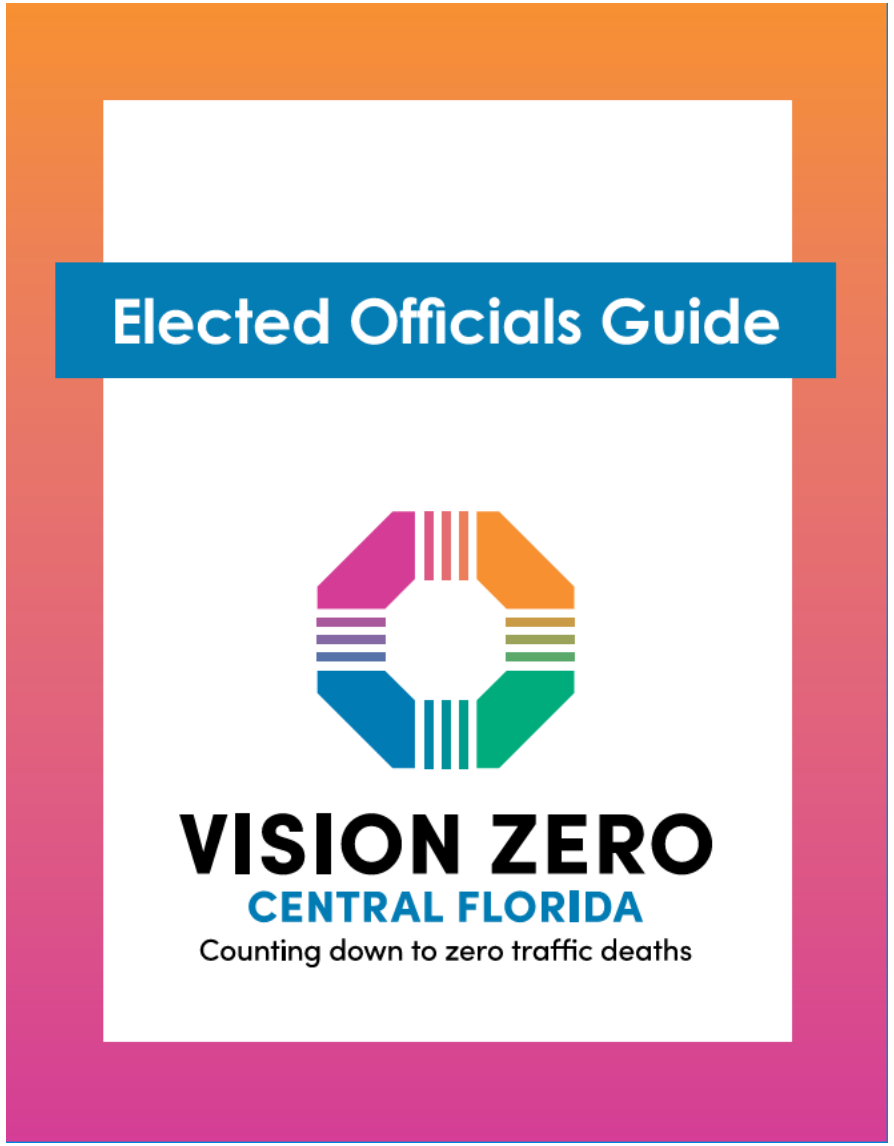


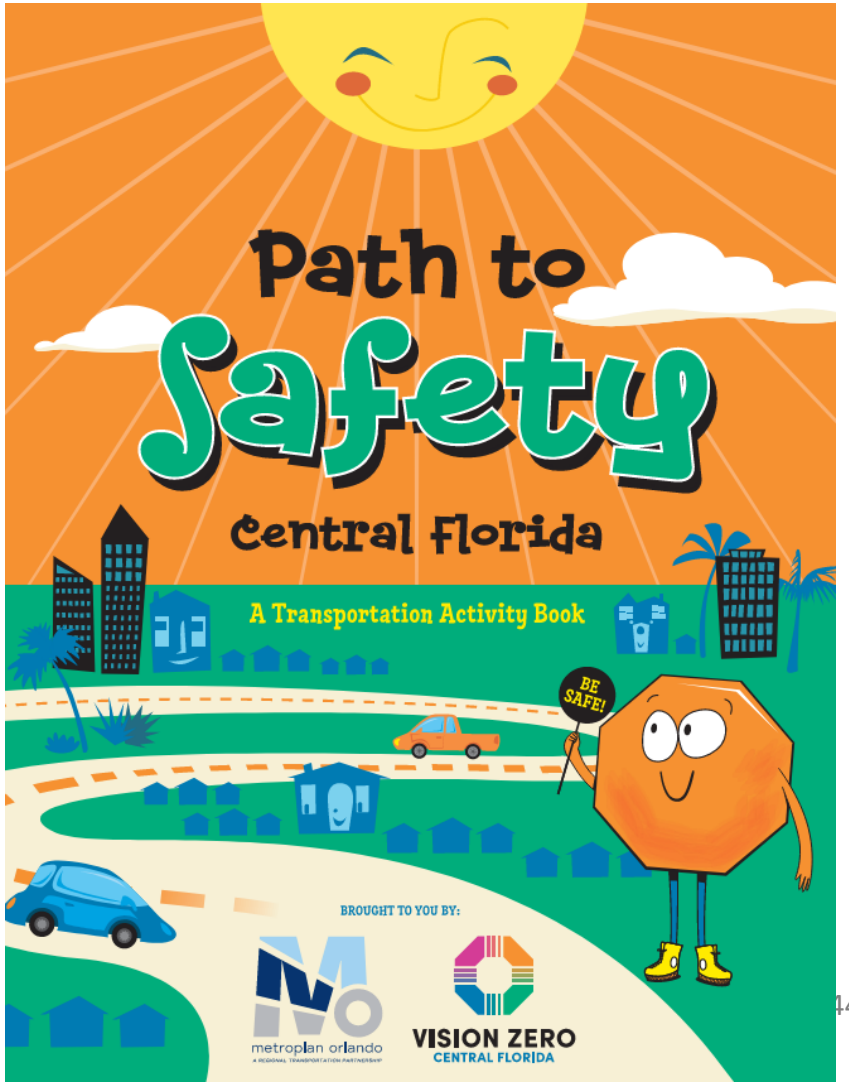
Public Engagement Efforts





Public Engagement Resources





NEXT STEPS







Project Schedule



Winter 2023

Project Kick-off and Establish Working Group

Winter 2023

Crash Analysis

Winter 2024

Develop Materials to Share with Public

Early Spring 2024

Engineering/Non-Engineering Countermeasures

Spring 2024

Policy Review

Late Spring 2024

Identify and Prioritize Projects and Strategies

Spring/Early Summer 2024

Action Plan Document

Next Steps



WORKING GROUP

Final Working Group Meeting

KEY TASK IN PROGRESS

Draft Safety Action Plan

KEY TASK IN PROGRESS

Working Group Review Safety Action Plan

PROJECT DELIVERABLES

Finalize and Adopt Action Plan

WORKING GROUP DISCUSSION







VISION ZERO
CENTRAL FLORIDA

Questions?

Contact Information:

Tonya Elliott–Moore
tmoore.@town.windermere.fl.us
407-876-2563

Kelly Fearon–
kfearon@kittelson.com
813-710-9517

Sarah Larsen –
sarah.larsen@metroplanorlando.gov
321-732-8230

Meeting Notes

Town of Windermere – Vision Zero Action Plan

Working Group #4 Meeting Notes

Date: May 23, 2024
Time: 9:00 – 10:00 AM
Meeting Location: Virtual

Attendees

- Tonya Elliot-Moore (Windermere, Director of Public Works)
- John Fitzgibbon (Windermere, Civil Engineer)
- Jayson Bonk (Windermere, Police Chief)
- Robert Smith (Windermere, Town Manager)
- Mike Woodworth (Kimley-Horn, Traffic Engineer)
- Kelly Fearon (Kittelson)
- Roxane Van Horn (Kittelson)
- Sarah Larsen (MetroPlan Orlando)

Meeting Notes

Projects

- Town staff confirmed that the project at the intersection of Main St & 2nd Ave will include upgrading the curb ramp. KAI to remove the cost estimate associated with the curb ramp.
- Town staff agreed with adding the proposed pavement marking for the project at Main St & North Dr. This location serves as a gateway and provides a reminder of the speed limit after people enter the Town.

Miscellaneous

- Town staff restated their desire to compare Windermere to other municipalities in Orange County. Report will include information regarding the few serious injury crashes in Windermere.
- There was a discussion regarding local jurisdictions combining projects to submit for SS4A Implementation grant funding and receiving support from MetroPlan.

Next Steps

- Kittelson will provide a copy of the Action Plan to the Working Group members to review.
- There was a discussion of the adoption of the Action Plan. MetroPlan staff will attend the July 9 Town Commission meeting to present the project. Kittelson will provide the presentation material (5 to 10 minutes) before the meeting.

CHAPTER 8

Technical Appendix

E- Public Engagement Strategy



Image of Main Street in the Town of Windermere

Town of Windermere



Vision Zero Safety Action Plan

Memorandum

Date: December 6, 2023

To: Town of Windermere

From: Kelly Fearon, Kittelson

Subject: **Vision Zero Central Florida – Public Engagement Strategy Guidance – Local Level**

Introduction

The MetroPlan Orlando region has an overall fatal crash rate 15 percent higher than the national average and 10 percent higher than the statewide average. MetroPlan Orlando, the Metropolitan Planning Organization, is preparing a Regional Vision Zero Action Plan to understand where crashes are most likely to occur, why crashes result in fatalities and serious injuries, and how to reduce the severity and frequency of these crashes. This effort will be rooted in the core elements of Vision Zero and the Safe System approach. The purpose of the Action Plan is to identify projects, programs, and strategies to eliminate fatalities and serious injuries on the region's roadways.

In coordination with the Regional Vision Zero Action Plan, the Town of Windermere will prepare its own Vision Zero Action Plan, which will also be rooted in the core elements of Vision Zero and the Safe System approach. The purpose of the Action Plan is to identify projects, programs, and strategies to eliminate roadway related fatalities and serious injuries within the Town.

The following memorandum outlines potential stakeholder and public engagement opportunities for the Town of Windermere to further Vision Zero efforts in Central Florida that complement the regional strategies.

Funding for this effort is provided by the U.S. Department of Transportation's Safe Streets for All (SS4A) grant program. The SS4A grant program is funding the preparation of regional, county, and all local agency Vision Zero action plans in the MetroPlan Orlando region.

Core Elements of Vision Zero

The Vision Zero Network has established ten core elements that communities must meet to become a designated Vision Zero community. Meeting these elements opens the way to pursue supplemental planning and implementation funds through the USDOT's SS4A program. The ten core elements are structured in three primary categories, as summarized in **Table 1** along with their applicability to the Plan Approach. The elements noted in *blue italics* directly relate to Stakeholder and Public Engagement.

Table 1 | Core Elements of Vision Zero and Applicability to Regional and Local Plans

General Strategy	Strategy Details	Plan Approach
Category: Leadership and Commitment		
Public, High-Level, and Ongoing Commitment	*Key elected officials and leaders within public agencies, including transportation, public health, and police, commit to a goal of eliminating traffic fatalities and serious injuries within a specific timeframe. Leadership across these agencies consistently engages in prioritizing safety via a collaborative working group and other resource sharing efforts.*	***Resolution guidance will be provided to support local agency adoption. All agencies in the region are expected to adopt a Vision Zero Resolution.***
Authentic Engagement	*Meaningful and accessible community engagement toward Vision Zero strategy and implementation is employed, with a focus on equity.*	*A variety of engagement activities have been identified as part of the regional and local Vision Zero action plans, as described in this document.*
Strategic Planning	A Vision Zero Action Plan is developed, approved, and used to guide work. The Plan includes explicit goals and measurable strategies with clear timelines, and it identifies responsible stakeholders.	The primary end product of this process is a Vision Zero Action Plan.
Project Delivery	Decision-makers and system designers advance projects and policies for safe, equitable multimodal travel by securing funding and implementing projects, prioritizing roadways with the most pressing safety issues.	The primary components of project identification and prioritization will include safety and equity.
Category: Safe Roadways and Safe Speeds		
Complete Streets for All	Complete Streets concepts are integrated into communitywide plans and implemented through projects to encourage a safe, well-connected transportation network for people using all modes of transportation. This prioritizes safe travel of people over expeditious travel of motor vehicles.	Safety projects will be developed through the Complete Street lens to balance the competing needs of all roadway users, prioritizing the most vulnerable.
Context-Appropriate Speeds	Travel speeds are set and managed to achieve safe conditions for the specific roadway context and to protect all roadway users, particularly those most at risk in crashes. Proven speed management policies and practices are prioritized to reach this goal.	Speed is one of the leading contributors to fatal crashes in the region and identifying appropriate target speeds on high crash corridors will be a key strategy.

General Strategy	Strategy Details	Plan Approach
Category: Data-driven Approach, Transparency, and Accountability		
Equity-Focused Analysis and Program	*Commitment is made to an equitable approach and outcomes, including prioritizing engagement and investments in traditionally under-served communities and adopting equitable traffic enforcement practices.*	*Equity factors will be incorporated into the analysis and project prioritization.*
Proactive, Systemic Planning	A proactive, systems-based approach to safety is used to identify and address top risk factors and mitigate potential crashes and crash severity.	A detailed crash analysis will be conducted to identify top crash locations and causes.
Responsive, Hot Spot Planning	A map of the community's fatal and serious injury crash locations is developed, regularly updated, and used to guide priority actions and funding.	The mapped data will help inform project prioritization and will be used in the prioritization of improvements.
Comprehensive Evaluation and Adjustments	Routine evaluation of the performance of all safety interventions is made public and shared with decision makers to inform priorities, budgets, and updates to the Vision Zero Action Plan.	MetroPlan Orlando will take the lead on updating crash data in a safety dashboard annually and reevaluating the high injury network every 3 to 5 years.

Note: The elements noted in *blue italics* directly relate to Stakeholder and Public Engagement.
Source: Vision Zero Network, 2023

Stakeholder Engagement Strategies

The Town of Windermere has identified representatives from local agency staff and safety partners to take part in a Local Agency Working Group. **Local Agency Working Group meetings** will be organized around the topics of Vision Zero and Safe Systems Approach, Community Crash Profiles, Policy Assessment and Countermeasures, and Priority Projects. Members of the Working Group may also participate in the following: use

- Facilitate focused **Stakeholder conversations** with stakeholders that may not be on the Working Group.
- **Presentations to Town Boards and Commissions** will provide opportunities for feedback from jurisdictional leaders as the plans progress to ensure political support.

The Town of Windermere will reach out to residents and business owners using the following tools:

- **Post project materials** and a link to the Regional Safety Dashboard with local safety information on the **Town web site**; this will provide access to the regional feedback map and online survey.
- Have a project information booth at two local community events or other venues where large groups of people are expected. These **Pop-up Events** will host engaging and interactive activities to inform, educate and receive feedback and are anticipated to include Friday Food Truck Night in January and Farmers Market in April.

Within the Action Plan, a summary of public engagement activities and feedback received throughout the process will be provided, as well as a summary of how that feedback was incorporated into the plan. Additional information about stakeholder and public engagement strategies is provided in **Table 2** and a schedule is provided in **Table 3**.

Table 2 | Stakeholder and Public Engagement Strategies

Strategy	Description	Goal	Considerations
Working Group	The working group will include staff from key departments that have responsibility for some aspect of the transportation system, with periodic feedback from elected officials.	Obtain feedback on plan analyses and materials as they are prepared to understand concerns and perspectives of others in the local jurisdiction.	**The consultant team will lead four Working Group meetings**.
Project Website	A project website or page hosted by the Town of Windermere that can be linked to the MetroPlan Orlando SS4A site developed for the project.	Website can serve as a landing page for project materials, links to resources, and links to on-line mapping and survey.	MetroPlan Orlando is developing a regional website which includes a Crash Database with information for all jurisdictions in the region, online mapping tool, and online surveys. **The Town of Windermere can use their local website to host local documents and link to the regional website for additional information.**
Pop-up Events	Host engaging and interactive activities at key community locations. Example could include a sidewalk pop-up with a community input activity adjacent to a park or in a major pedestrian serving commercial area.	Reach people where they are and reach those who are not typically engaged in the planning process.	**The consultant team will attend two pop-up events which are anticipated to include Friday Food Truck Night and Farmer's Market.**
Social Media Posts	A series of project branded social media posts, including a variety of materials and messages, and developing a social media calendar.	Reach people through social networks, encourage residents to share with their social network.	Using a diversity of platforms to maximize reach. **The Town of Windermere can consider posting on social media platforms about the project.**
Passive Engagement Opportunities	Passive engagement opportunities such as flyers at community centers and libraries, social media posts directing the public to the project website, branded comment boxes that allow community members to submit their concerns, sidewalk decals/stickers temporary installed at high pedestrian generator locations.	Meet people where they are and provide project information.	**The consultant team will develop a flyer describing overall project goals and links to the website for the Town.**

Source: Fehr & Peers and MetroPlan Orlando, 2023

Table 3 | Stakeholder and Public Engagement Schedule

Strategy	November	December	January	February	March	April	May	June
Kick-Off Meeting	■							
Working Group #1: Vision Zero & Safe Systems Approach		■						
Working Group #2: Community Crash Profiles			■					
Working Group #3: Policy Assessment & Countermeasures					■			
Working Group #4: Priority Projects							■	
Project Website			■	■	■	■	■	■
Pop-up Events			■			■		
Social Media Posts			■			■		
Passive Engagement Opportunities			■	■	■	■	■	■
Regional Online Mapping		■	■	■	■	■	■	

CHAPTER 8

Technical Appendix

F- Public Engagement Boards



Image of Main Street in the Town of Windermere

Town of Windermere



Vision Zero Safety Action Plan

Town of Windermere – Vision Zero Action Plan
Pop-up Event #1 Summary

Date: January 26, 2024
Time: 6:00 – 9:00 PM
Event Location: Windermere Town Square Park

A pop-up event for the Town of Windermere Vision Zero Action Plan was held at Town Square Park (W 6th Ave, Windermere, FL 34786) during Food Truck Friday from 6:00 PM to 9:00 PM on January 26, 2024. The focus of the pop-up event was to educate the public about Vision Zero and seek input on safety concerns. Project information, including the regional survey, was available for public comment.

Three project boards were displayed during the event:

- Background of Vision Zero Board
- Traffic Safety Questions Board
- Crash Data Board

Attendees of the In-Person Pop-up Event

A total of 40 people expressed interest in and/or provided written comments during the pop-up event. Staff members of the project team that attended the pop-up event include:

Kittelson & Associates, Inc.

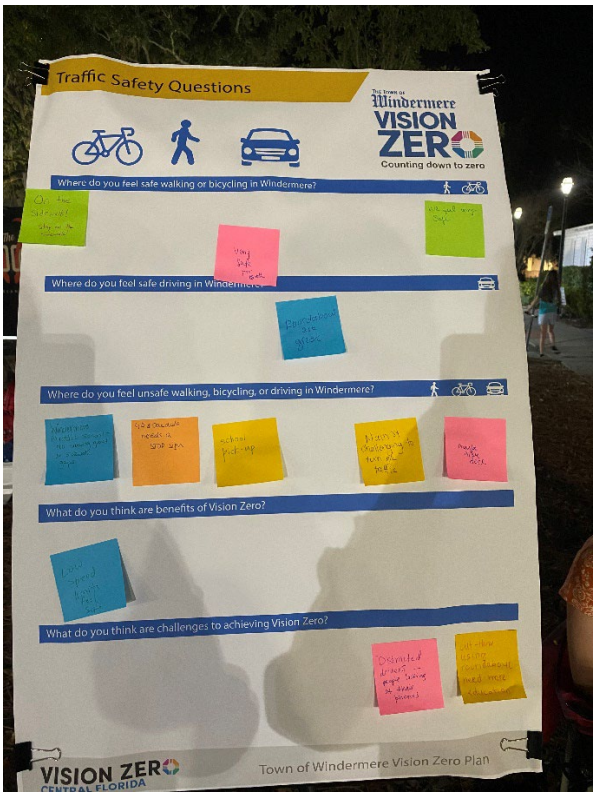
- Kelly Fearon
- Roxane Van Horn

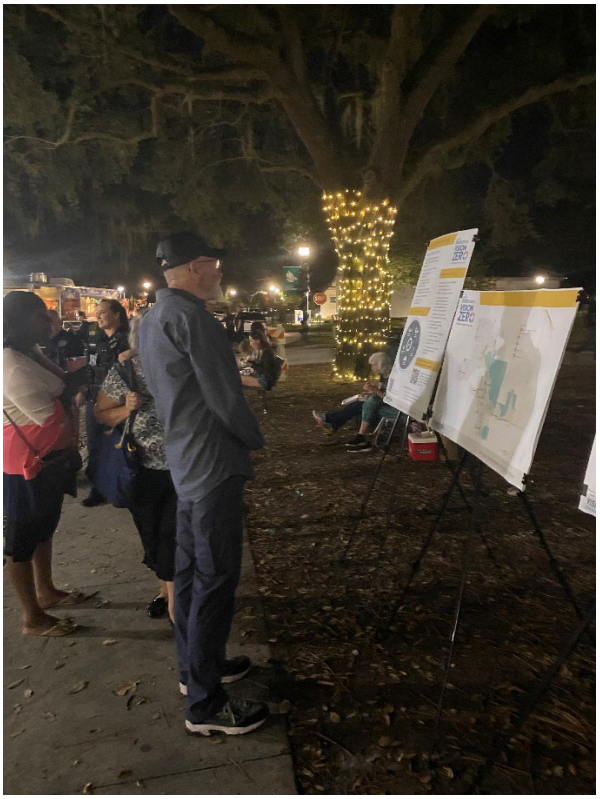
Summary of Public Comments

A total of 13 written responses were posted on the Traffic Safety Questions Board. Other participants either engaged in verbal discussion and some reported safety problems via the regional survey on MetroPlan's Vision Zero website.

A high-level overview of concerns are as follows:

- **Most participants expressed feeling relatively safe walking, bicycling, or driving in Windermere because of low speed limits;**
- **Participants noted safety concerns outside of Windermere and were encouraged to take the regional survey to provide detailed input on locations;**
- **Some participants felt unsafe bicycling due to lack of bicycle lanes or expressed concerns with sharing the road with bicyclists;**
- **Some participants expressed concerns and noted they would like to see safety improvements around school zones;**
- **About half of the participants supported roundabouts and felt safe interacting with them, while the other half felt that lack of user knowledge of how to use a roundabout is needed; and**
- **Many participants noted driver distractedness as a major challenge to achieving Vision Zero**





Zero deaths and serious injuries on our roads is our goal

THE TOWN OF Windermere
VISION ZERO
Counting down to zero

What is Vision Zero?

Vision Zero is Windermere's approach to eliminate traffic-related fatalities and serious injuries:

- Reframes traffic deaths as **preventable.**
- Integrates **human failings** into the approach.
- Focuses on preventing **fatal and severe crashes** rather than eliminating all crashes.
- Aims to establish **safe systems** rather than relying on individual responsibility.
- Applies **data-driven** decision making.
- Establishes road safety as a **social equity issue.**

Elements of a Vision Zero Plan



U.S.Department of Transportation
Federal Highway Administration

What are we doing?

Developing a Comprehensive Safety Action Plan to eliminate traffic-related fatalities and serious injuries.

- Data-driven analysis to identify the High Injury Network, which is where serious and fatal crashes are occurring most often.
- Public outreach to identify issues and possible solutions.
- Recommendations to reduce serious and fatal crashes, including:
  - Systemic countermeasure to reduce crashes
  - Specific road projects to reduce crashes
  - Actionable, measurable strategies and policy changes

Help us develop a Vision Zero plan so we can all travel safely!

Visit our interactive map to identify existing safety problems or tell us how you would improve the city streets

Visit the Vision Zero Website to learn more

Questions? Please Contact:

Kelly Carson: kcarson@cwdgn.com
Sarah Larsen: sarah.larsen@metroplanorlando.gov
Kelly Fearon: kfearon@kittelson.com

VISION ZERO CENTRAL FLORIDA

Town of Windermere Vision Zero Plan

Traffic Safety Questions



THE TOWN OF Windermere
VISION ZERO
Counting down to zero

Where do you feel safe walking or bicycling in Windermere?

Where do you feel safe driving in Windermere?

Where do you feel unsafe walking, bicycling, or driving in Windermere?

What do you think are benefits of Vision Zero?

What do you think are challenges to achieving Vision Zero?

THE TOWN OF
Windermere
VISION ZERO

Counting down to zero



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THE TOWN OF Windermere
VISION ZERO
Counting down to zero

Help us develop a vision zero plan so we can all travel safely!

Visit the Vision Zero website to learn more!

https://www.visionzerocfl.gov/

Questions?

Contact information:

Tonya Elliott-Moore
tmoore@town.windermere.fl.us

Sarah Larsen
sarah.larsen@metroplanorlando.gov

Kelly Fearon
kfearon@kittelson.com

What Is Vision Zero Central Florida & Why Do We Need to Take Action?

Every week, 5 people die and 35 people are seriously injured in Central Florida crashes. Vision Zero is an international movement to reach zero traffic fatalities.

Vision Zero Central Florida's goal is simple: saving lives. Zero traffic deaths. Everyone should be able to travel safely around Central Florida without the fear of death or serious injury.

This coordinated planning effort led by MetroPlan Orlando in partnership with local agencies will result in a comprehensive **Vision Zero Safety Action Plan** for our three-county region (Orange, Osceola, Seminole), as well as additional action plans tailored for each county and city.

VISION ZERO
CENTRAL FLORIDA
Counting down to zero traffic deaths

THE TOWN OF Windermere

This work is being funded by a $3.79 million Safe Streets and Roads for All federal grant.

What will the Vision Zero Safety Action Plan Include?

The regional plan and each county or city action plan will include the following:

- **High Injury Network:** Analyzing data to identify places on the transportation system with the highest risk for fatal and serious injury crashes so that we can focus on our most important problem areas.
- **Equity Component:** Identifying and prioritizing efforts in disadvantaged communities that are disproportionately affected by traffic crashes.
- **List of Priority Streets and Intersections:** Producing a list of feasible projects that have the most safety impact for the region.
- **Educational and Enforcement Programs:** Identifying key behavioral changes needed to reduce crashes and methods for encouraging those changes.
- **Sustained Effort:** Establishing a defined process and identifying an organization responsible for carrying out, updating, and monitoring progress.
- **Public Meetings:** Public engagement is a key part of the study.

Outcome: Identified projects will be included in MPO or local jurisdiction priority projects list for funding/implementation.

3-COUNTY REGION (2018-2022)

325,775 total crashes

1,466 deaths

9,500 serious injuries

WINDERMERE (2018-2022)

0 people were killed on our roadways, including:

- **0** motorist deaths
- **0** pedestrian deaths
- **0** motorcyclist deaths
- **0** bicyclist deaths

excludes limited access facilities

metroplan orlando
A REGIONAL TRANSPORTATION PARTNERSHIP

Orange County
Vision Zero Action Plan Schedule

Fall 2023
Task Force #1
Kickoff

Fall 2023
Task Force #2
Crash Analysis

Spring 2024
Continue Public
Engagement

Spring 2024
Task Force #5
Final Action Plan

Fall 2023
Begin Public
Engagement

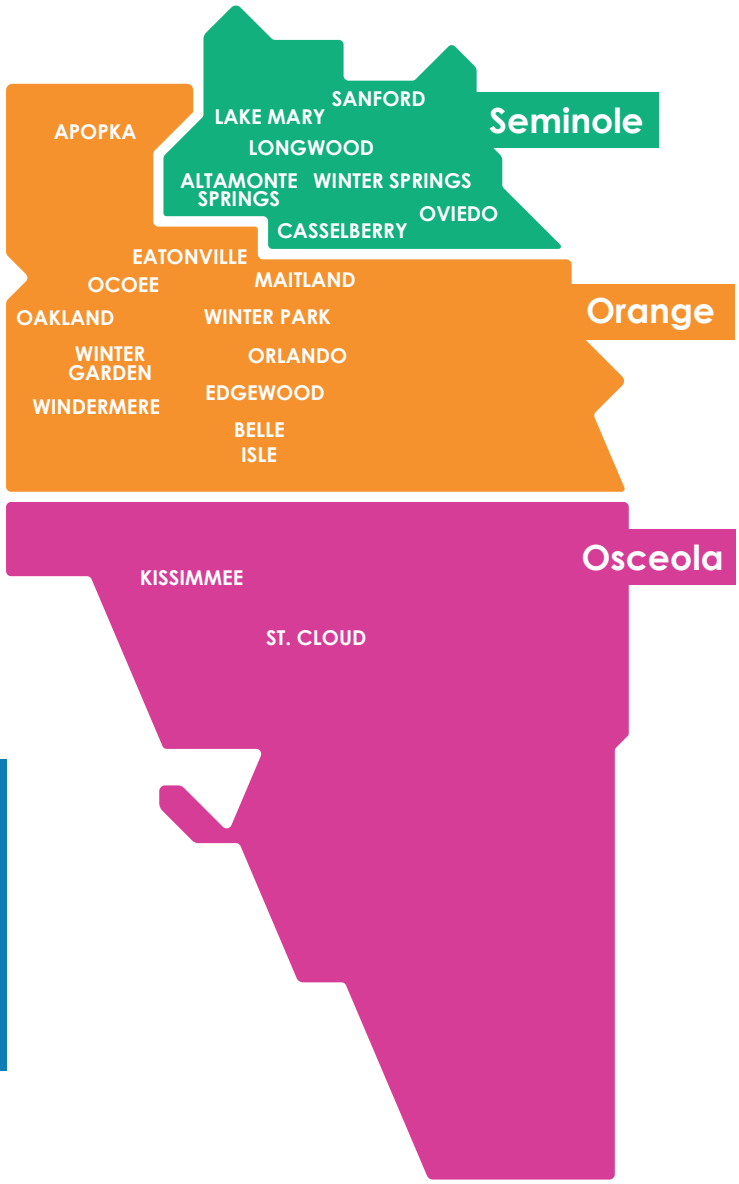
Winter 2023
Task Force #3
Countermeasures and
Policies

Spring 2024
Task Force #4
Project Prioritization

HOW CAN YOU GET INVOLVED?

This planning initiative is designed to encourage participation from all members of our region, including community leaders, residents, visitors, and people both young and old. Join us in this quest to eliminate deaths and serious injuries on Central Florida's roads.

We can make progress and save lives in the fight for safety by working together and each doing our part.



Visit our website to review crash data, learn information about the study, and find out about upcoming events:
VisionZeroCFL.gov

metroplan orlando
A REGIONAL TRANSPORTATION PARTNERSHIP

MetroPlan Orlando Project Manager: Sarah Larsen - slarsen@metroplanorlando.org
Consultant Project Manager: Jorge Barrios - jbarrios@kittelson.com

Town of Windermere – Vision Zero Action Plan
Pop-up Event #2 Summary

Date: April 26, 2024
Time: 9:00 – 11:30 AM
Event Location: Windermere Town Square Park

A pop-up event for the Town of Windermere Vision Zero Action Plan was held at Town Square Park (W 6th Ave, Windermere, FL 34786) during Farmers Market from 9:00 AM to 11:30 AM on April 26, 2024. The focus of the pop-up event was to educate the public about Vision Zero, project countermeasures, and seek input on safety concerns. Project information, including the regional survey, was available for public comment.

Four project boards were displayed during the event:

- Background of Vision Zero Board
- Potential Corridor Countermeasures
- Potential Corridor Countermeasures
- Map with High Injury Network Board

Attendees of the In-Person Pop-up Event

A total of 20 people expressed interest in and/or provided written comments during the pop-up event. Staff members of the project team that attended the pop-up event include:

Kittelson & Associates, Inc.

- Kelly Fearon

Summary of Public Comments

Participants either engaged in verbal discussion and some were interested in reporting safety problems via the regional survey on MetroPlan's Vision Zero website.

A high-level overview of concerns are as follows:

- **Most participants expressed feeling relatively safe walking, bicycling, or driving in Windermere because of low speed limits;**
- **Participants noted safety concerns outside of Windermere and were encouraged to take the regional survey to provide detailed input on locations;**
- **A few participants were very interested in the regional survey and one mentioned the need to implement projects;**
- **Several participants asked about status of constructing a bypass road that would go around Windermere to reduce traffic through center of Town;**
- **A few participants mentioned roundabouts and felt that lack of user knowledge of how to use a roundabout is needed; and**
- **One participant mentioned the use of red light cameras in the area.**





Zero deaths and serious injuries on our roads is our goal

VISION ZERO

What is Vision Zero?

Vision Zero is an approach to eliminate traffic-related fatalities and serious injuries:

- Reframes traffic deaths as **preventable.**
- Integrates **human failings** into the approach.
- Focuses on preventing **fatal and severe crashes** rather than eliminating all crashes.
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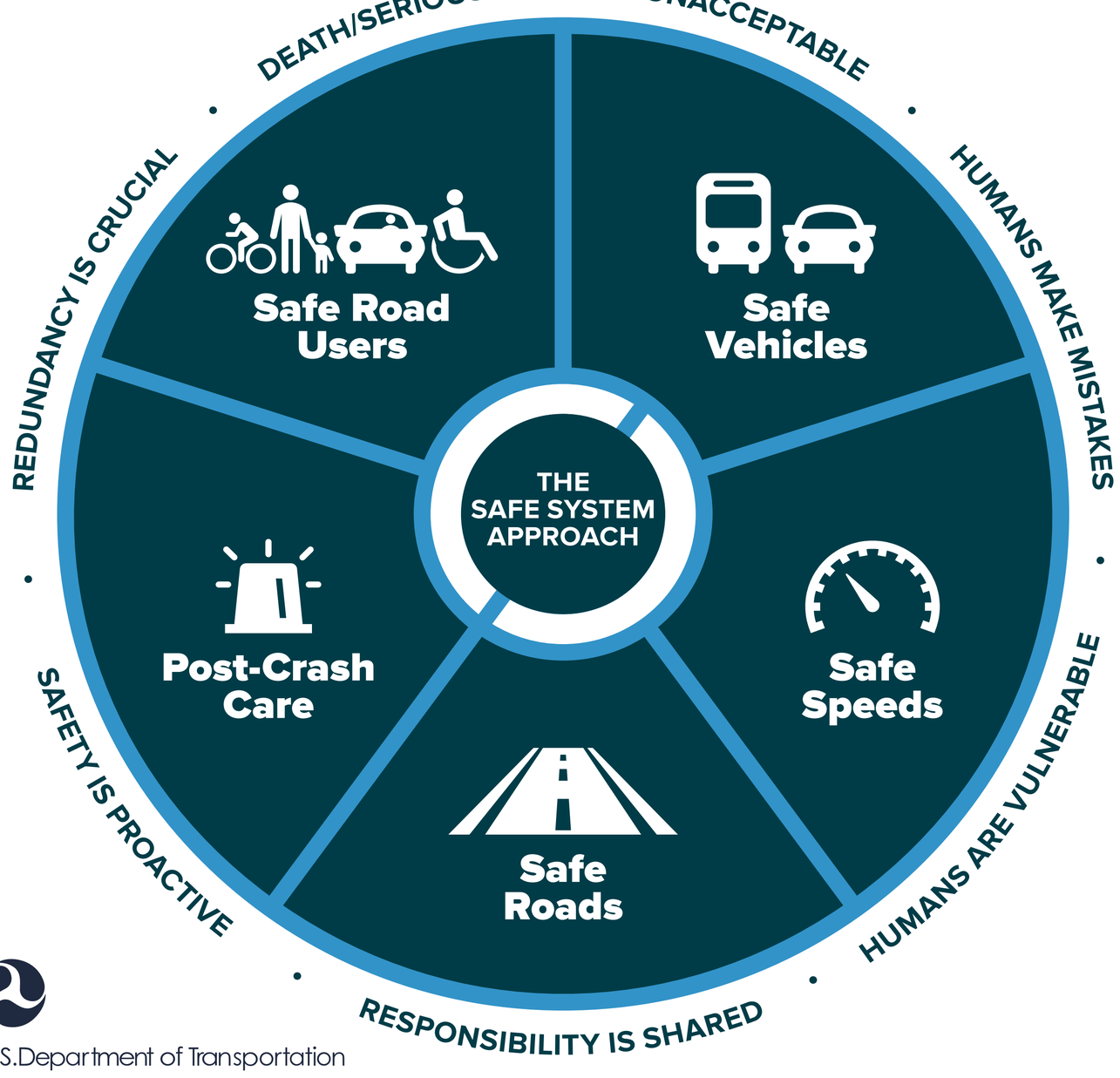
- Applies **data-driven** decision making.
- Establishes road safety as a **social equity issue.**

Elements of a Vision Zero Plan



U.S.Department of Transportation
Federal Highway Administration

What are we doing?

Developing a Comprehensive Safety Action Plan to eliminate traffic related fatalities and serious injuries.

- Data-driven analysis to identify the High Injury Network, which is where serious and fatal crashes are occurring.
- Public outreach to identify issues and possible solutions.
- Recommendations to reduce serious and fatal crashes, including:
  - Systemic countermeasure to reduce crashes
  - Specific road projects to reduce crashes
  - Actionable, measurable strategies and policy changes

Help us develop a vision zero plan so we can all travel safey!

Visit our interactive dashboard to observe local crash trends

Visit the Vision Zero Website to learn more

Questions?

Contact information:

Sarah Larsen: sarah.larsen@metroplanorlando.gov

Kelly Fearon: kfearon@kittelson.com

VISION ZERO CENTRAL FLORIDA

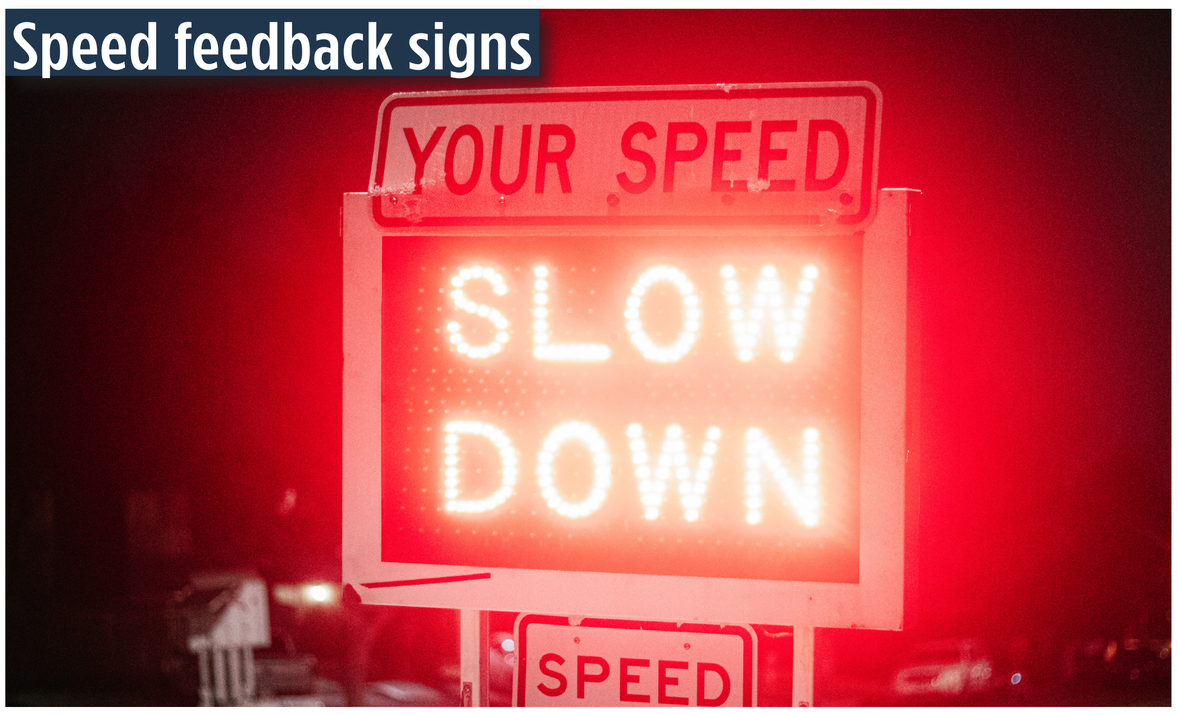
Countermeasures

VISION ZERO

Potential Corridor Countermeasures







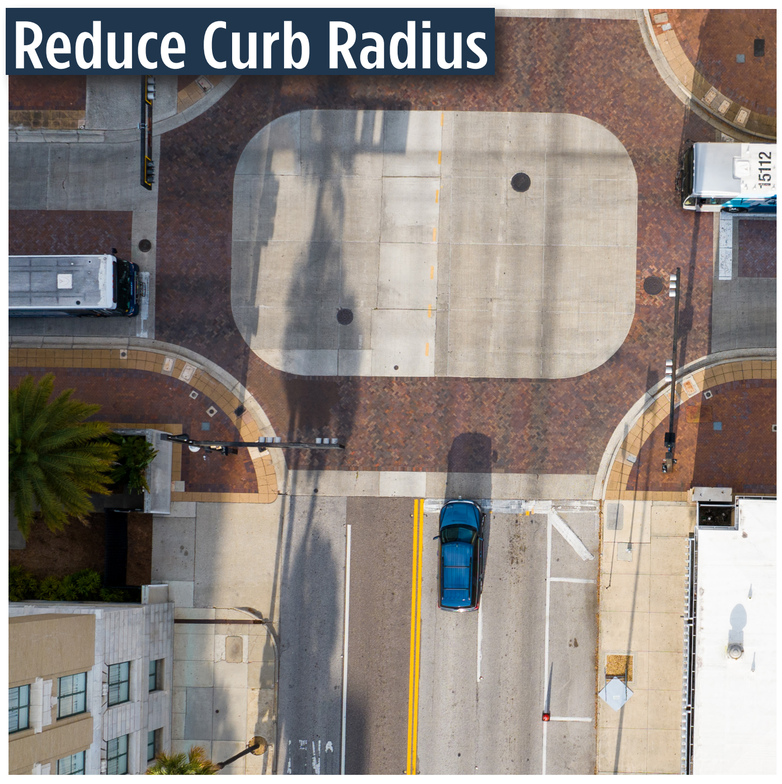






Potential Intersection Countermeasures







VISION ZERO
CENTRAL FLORIDA

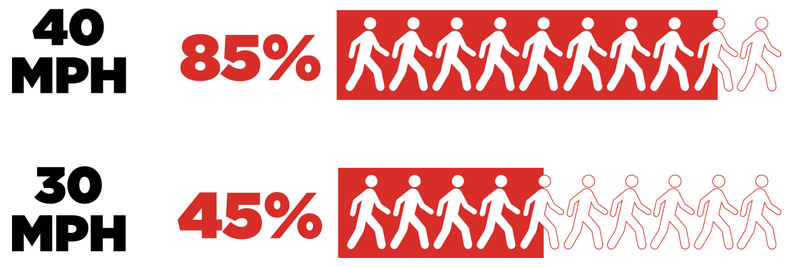
Countermeasures

VISION ZERO

Speed Influences Drivers' Cone of Vision



Pedestrian's Risk of Death or Serious Injury



Potential Pedestrian Countermeasures

Shared Use Path



Midblock Pedestrian Crossing



Curb Extension



High Visibility Crosswalks



Add Sidewalk



Widen Sidewalk



Rectangular Rapid Flashing Beacon



Potential Bicycle Countermeasures

Sharrows



Shared Use Path



VISION ZERO
CENTRAL FLORIDA

High Injury Network

VISION ZERO

The High Injury Network is a collection of roadways where a disproportionate number of fatal and severe injury crashes occur.

Focusing efforts on these roadways can have a large impact on reducing severe injuries and fatalities on our roadway system.



LEGEND

- High Injury Crash Network *(2018-2022)*
- High Crash Intersection *(24 total crashes from 2018-2022)*
- Parks
- Schools
- Windermere Town Hall
- Windermere Recreation Area

CHAPTER 8

Technical Appendix

G- Policy Benchmarking Guide

Image of Main Street in the Town of Windermere

Town of Windermere



Vision Zero Safety Action Plan

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice	Notes / Opportunities for Policy/Process Refinement
Category: Leadership and Commitment					
Public, High-Level, and Ongoing Commitment	Agency leadership has made a public commitment to the goal of eliminating traffic fatalities and serious injuries within a specific timeframe.			X	Adopted VZ Resolution
	Agency leadership is consistently engaged in prioritizing safety via collaborative efforts.			X	
	Key stakeholders have made a clear, public statement in support of Vision Zero efforts and timeline.			X	Adopted VZ Resolution & Ongoing VZ Action Plan
	An interdepartmental safety working group regularly coordinates with leadership to discuss progress.			X	Traffic calming process - PD & Public Works work together on this and report to Town Council
Authentic Engagement	The agency conducts outreach to specific communities, interests, and populations.			X	
	Public meetings and workshops are hosted regularly and at times and locations convenient for the community.			X	
	The community, including historically disadvantaged communities, trust and feel engaged by the agency.			X	
	The stakeholder groups are representative of the community at large.			X	
	The agency engages regularly with community-based organizations and leaders.			X	
	The agency recognizes the value of community input by providing grant opportunities made in partnership with community-based organizations and nonprofits supporting Vision Zero work.	X			Not current practice and limited budget to implement
Strategic Planning	Crash data is collected regularly and used to inform decisions before plan development.			X	Comprehensive Plan (Transportation Element, Policy 1.2.4)
	The agency augments traditional crash data from police data with data from other sources, such as hospitals.			X	PD tracks data and has own reports and the Town has consultants to analyze data as needed
	The agency has established an appropriate timeline to reach zero traffic fatalities.			X	VZ Resolution
	The agency has established near-term and interim goals for achieving zero traffic fatalities.			X	VZ Resolution

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice	Notes / Opportunities for Policy/Process Refinement
Strategic Planning	The agency has delineated clear action items to achieve each goal.	X			Will have after completion of this plan; CIP includes comprehensive list of all needs
	A lead department or position has been established for each action item.	X			Will have after completion of this plan
	The lead agency for each action item identifies partners to help complete the action.	X			Will have after completion of this plan
	The agency has determined appropriate funding needs for each action item.			X	CIP & budget planning provide this item
	The agency has maintained a Vision Zero website to inform the public about the initiative's progress; this could include a link to regional resources from the agency's home page.	X			Recommendation to create website
	A third-party audits Vision Zero progress and reports outcomes on the website.	X			Future item to consider
	Departments and staff are provided resources for safety related training and staff development.			X	Participate in regional training programs
	Staff at multiple levels and in multiple departments are safety champions to ensure continuity when a safety champion departs.			X	PW and PD coordinate regularly
	Adequate policies related to equitable transportation have been formulated.				Not a written and adopted policy
	The agency has determined suitable performance measures to assess equitable transportation.				Not a written and adopted policy
	Adequate policies related to multimodal transportation have been formulated.		X		Could include further language in Comprehensive Plan specific to multi-modal transportation as a priority
	Suitable performance measures to assess multimodal transportation have been established.		X		Performance measures were considered in Multi-Modal Safety Analysis (2015)
	The agency has developed policies to maintain bicycle and pedestrian facilities during construction projects that affect roadway operations.			X	ROW application process provides MOT Plan - Agency follows FDOT standards
	The agency has established an efficient citizen request process and a methodology for evaluating requests.			X	Existing citizen request process
Project Delivery	Adequate policies related to transportation safety have been formulated.			X	KHA conducted a study on stop signs and roundabouts

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice	Notes / Opportunities for Policy/Process Refinement
Project Delivery	The agency has determined suitable performance measures to assess transportation safety.			X	Multi-Modal Safety Analysis (2015)
	Transportation safety is incorporated into every Capital Improvement Project to the extent applicable.			X	
	FHWA's proven countermeasures are implemented in projects.			X	Follow FDOT design standards
	The agency implements NHTSA's Countermeasures that Work.			X	Follow FDOT design standards
	The agency shares project outcomes and effectiveness with the public.			X	Town of Windermere Website
	The agency provides funding for projects that reduce fatal and serious injury collisions.			X	Comprehensive Plan (Transportation Element, Policy: 1.10.3); (Roundabouts example- injury at four-way stop)
	There is sufficient funding allocated for future projects that may reduce fatal and serious injury collisions.				In Budget Presentation (FY 23/24); Outside funding sources are essential to all of the projects
	The agency applies for grants to fund safety projects from traditional sources.			X	Multi-Modal Safety Analysis (2015)
	The agency applies for grants to fund safety projects from non-traditional sources.			X	
	Projects incentivizing transit, biking, walking, and carpooling over single-occupant vehicles are prioritized and implemented.			X	Every project looks at adding items in implementation
Category: Safe Roadways and Safe Speeds					
Complete Streets for All	The agency has allocated adequate funding for complete streets projects.				Supplement needs with outside funding sources
	The agency has a complete streets plan.	X			Multi-modal master plan; Majority of roads are dirt roads.
	Complete Street elements have been incorporated into planning documents.			X	Incorporated into multi-modal master plan
	Vulnerable users are prioritized in project planning and implementation.			X	Incorporated into multi-modal master plan

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice	Notes / Opportunities for Policy/Process Refinement
Complete Streets for All	The agency actively coordinates with neighboring member agencies and neighboring municipalities to provide connections for people walking and biking.			X	Comprehensive Plan (Transportation Element, Objective: 1.9)
	Appropriate practices are followed to set speed limits based on context.			X	Downtown Speed Limit Recommendations Report (2019), Code of Ordinances (Sec. 6.02.02)
Context Appropriate Speed	The agency suggests specific rules to set speed limits near schools and areas with a high number of vulnerable road users.			X	Speed limit is mainly 15 MPH throughout entire Town
	Appropriate procedures are followed to enforce speed limits.			X	Comprehensive Plan (Transportation Element, Policy 1.2.3)
	There are ongoing education programs/campaigns related to traffic speeds.	X			Conducted public meetings when roundabouts were instituted & provided information on website
	The agency follows proper methods to modify existing roadways to achieve safe speeds.			X	Comprehensive Plan (Transportation Element, Policy 1.6.1)
Category: Data Driven Approach, Transparency and Accountability					
Equity Focused Analysis and Programs	Equity is a factor in project prioritization.				Do not have any areas classified as disadvantaged per FHWA's Justice40 standards
	The agency reports safety outcomes demographically.			X	Town is only 2.2 square miles so projects do consider entire area
	Important information and education materials are provided in common languages spoken by residents whose first language is not English.	X			Can translate if needed, but Town has not been asked for this item
	The agency uses data to identify and systematically address trends and risk factors to prevent severe collisions.			X	Traffic data reviewed by safety engineer and then projects are recommended (i.e., diverter project at Oakdale & 9th); Speeds have not been an excessive issue in the past

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice	Notes / Opportunities for Policy/Process Refinement
Proactive / Systemic	Common collision patterns have been matched with adequate countermeasures.			X	Roundabout examples (i.e. two more roundabouts are proposed at Main & Chase, and Main & Windermere Rd; No Right-Turn allowed in some areas during certain times of the day
	The agency works to continuously improve the accuracy of crash reports.			X	PD tracks this data
	The agency uses the High Injury Network (HIN) in project prioritization.	X			Could utilize after this project is complete
Reactive / Hot Spot	A demographic analysis of the HIN has been conducted.	X			To be complete as part of this project
	The agency routinely monitors and reports collision data to the public.		X		Projects - report on it as part of public meetings (Safety data) or request data (informal)
Evaluation and Adjustment	Intersection design and control decisions are evaluated to reduce kinetic energy transfer to vulnerable users.			X	Agency wants to prioritize a pedestrian friendly downtown and have slow speeds throughout Town, while maintaining sufficient traffic flow
	Demonstration projects are used to test the strategies and get feedback from the public.			X	Diverter project used temporary material and ultimaetly made permanent with concrete and landscaping; Support the use of pilot materials

Strategy	Actions	Near Term Action	Action to be Included in Plan	Longer-Term Consideration
Public, High-Level, and Ongoing Commitment	Create a website page to show the public commitment to the goal of eliminating traffic fatalities and serious injuries within a specific timeframe. Consider linking to MetroPlan or Vision Zero network to provide more information	x		
Strategic Planning	Consider adopting best practices to be used by Town for design such as Public Right-of-Way (PROWAG), Americans with Disability Act (ADA), NACTO Urban Street Design Guide	x	x	
Strategic Planning	Consider adopting specific language for multimodal performance targets such as Level of Traffic Stress or Quality of Service Measures		x	x
Strategic Planning	Establish near-term and interim goals for achieving zero traffic fatalities.	x	x	
Strategic Planning	Establish a working group that continues to meet to discuss Vision Zero	x	x	
Strategic Planning	Incorporate specific language related to multimodal transportation in Comprehensive Plan		x	x
Context Appropriate Speed	Consider formalizing the Town's current approach to setting speed limits based upon context	x	x	
Context Appropriate Speed	Develop an education program/campaign related to roundabout safety	x	x	
Project Delivery	Consider linking to information about FHWA countermeasure resources on Town website	x	x	
Project Delivery	Develop policy to consider FHWA proven countermeasures first in project prioritization		x	x
Project Delivery	Develop metrics to evaluate speed-related severe crashes	x	x	
Proactive / Systemic	Develop HIN and incorporate into project prioritization criteria	x	x	
Proactive / Systemic	Document instances where common collision patterns were addressed by adequate countermeasures	x	x	
Reactive / Hot Spot	Consider reporting trends from collision data to the public.	x	x	

CHAPTER 8

Technical Appendix

H- Non-Engineering Countermeasures Toolkit



Image of Main Street in the Town of Windermere

Town of Windermere



Vision Zero Safety Action Plan

Non-Engineering Countermeasures Toolkit

VISION ZERO

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Updated April 2024

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Overview

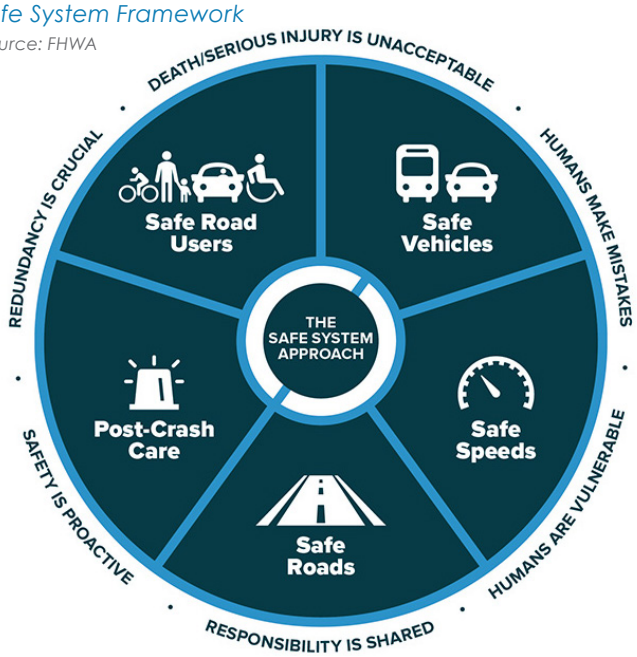
Introduction & How to Use this Toolkit

The MetroPlan Orlando Regional Vision Zero Action Plan identifies engineering and non-engineering countermeasures to implement around the region to reach the goal of zero traffic fatalities or serious injuries on our roadways by 2050. Engineering countermeasures aim to change roadway features to remove hazards, manage speeds, separate roadway users in space and time, and increase visibility and awareness. An **Engineering Countermeasure Toolkit** was developed as a part of this process and will aid in the selection of appropriate engineering countermeasures throughout the region.

Non-engineering countermeasures aim to influence users by changing the social environment to encourage or enforce the desired behavior. Strategies can be employed at scale to influence large segments of the community, like through marketing campaigns, and high-visibility enforcement and publicized sobriety checkpoints that affect the social environment by increasing the perceived risk of being caught, or can be focused on specific roadway user types, like teen drivers or motorcyclists. Non-engineering countermeasures fall under the Vision Zero Core Elements of **Authentic Engagement, Strategic Planning, Project Delivery, Equity Focused Analysis and Program, and Proactive, Systemic Planning.**

This toolkit presents non-engineering countermeasures organized into the five categories of the Safe System approach, which include **Safe Road Users, Safe Speeds, Safe Roads, Post Crash Care, and Safe Vehicles.** The non-engineering countermeasures outlined below are not intended to be an exhaustive list of strategies but serve as a framework for identification of non-engineering countermeasures as a part of Action Plan development. As agencies implement non-engineering countermeasures, they should consider how they will reach the most vulnerable populations. References to source documents are provided and users of this guide are encouraged to review applicable source documents related to their specific safety issues and goals.

Safe System Framework
Source: FHWA



ORGANIZATION OF THE TOOLKIT

A. SAFE ROAD USERS
- Public Information Campaigns/Social Marketing Campaigns/Educational Campaigns
- Enforcement

B. SAFE SPEEDS
- Speed Limit Setting
- High Visibility Enforcement
- Automated Enforcement

C. SAFE ROADS
- Improve and Share Data
- Pilot/Demonstration Projects
- Road Maintenance/Maintenance of Traffic
- Policy/Standards
- Grant Opportunities

D. POST CRASH CARE
- Emergency Medical Services
- Trauma Care
- Fatal Crash Response Team
- Traffic Incident Management
- Post Crash Strategies

E. SAFE VEHICLES
- Emerging Technology
- Vehicle Maintenance

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A. Safe Road Users

Transportation safety education plays an important role in shaping and shifting behavior. Many jurisdictions across the country are increasing community engagement and education to make streets safer for all. For example, the Florida Department of Transportation (FDOT) has educational campaigns centered on their Target Zero framework under the slogan of ***Arrive Alive*** that includes TV, radio, social media and in-person outreach.

Strategies included in this section are:

1. Public Information Campaigns / Social Marketing Campaigns / Educational Campaigns
2. Enforcement

Public Information Campaigns / Social Marketing Campaigns / Educational Campaigns

Public Information Campaigns focusing on discouraging risky behavior like drinking and driving and/ or speeding can complement the engineering countermeasures that are designed to target primary risk factors in the MetroPlan Orlando region. These types of campaigns should also be used to encourage positive behaviors such as seat belt usage, increased awareness of pedestrians and bicyclists, and appropriate crosswalk behaviors.

Targeted education, such as on buses and bus shelters, on billboards, at movie theaters, or on local radio stations, may be directed at vulnerable populations with the help of local partners, and at certain behaviors of drivers, pedestrians, and bicyclists to deter risky behaviors that result in specific collision types. Specific locations on the high-injury network, as well as partner agency campaigns with FDOT may also be appropriate for concentrated educational messages. MetroPlan Orlando will consider joint efforts with FDOT and other local partners to develop outreach campaigns focusing on discouraging common violations leading to fatalities and severe injuries on our roadways, based on the collision profiles identified in the Safety Analysis. Education and outreach campaigns should target the behaviors that are most likely to result in crashes where someone is killed or severely injured (referred to as KSI crashes), and/or vulnerable populations including:

1. **Reducing driving under the influence as 6% of KSI crashes involve someone driving under the influence of alcohol, 3% of KSI crashes involve someone driving under the influence of drugs, 21% of fatal crashes involve someone driving under the influence of alcohol and 16% of fatal crashes involve someone driving with a drug impairment.**
2. **Enforcing seatbelt laws and encouraging helmet use as 9% of KSI crashes included a vehicle occupant not wearing a seatbelt, while 38% of motor vehicle occupants who died were not wearing a seatbelt. For motorcycle crashes, 5% of KSI crashes and 43% of fatal crashes involved a motorcyclist not wearing a helmet.**
3. **Providing education around driver behavior, as 24% of KSI collisions were caused by a failure to yield the right-of-way, with another 10% caused by running a redlight or stop sign; aggressive driving was a factor in 5% of KSI crashes; distracted driving was a factor in 29% of KSI crashes; and speeding was a factor in 4% of KSI crashes.**
4. **Teens are disproportionately represented in KSI crashes – they comprise 5.5% of licensed drivers and are involved in 12.5% of KSI crashes.**
5. **Education focused on people outside of cars and trucks, sometimes referred to as 'vulnerable road users', since crashes involving pedestrians, bicyclists and motorcyclists accounted for about 3% of overall crashes, 25% of serious injury crashes and 48% of fatal crashes in the region.**
6. **Almost 20% of pedestrian KSI and 19% of bicyclist KSI crashes were hit and run, as compared to 9% of all crashes.**

Some examples of educational programs include:

Partner with Local Schools on Transportation Safety

Partnering with local school districts to promote safe road user behavior. Programs can provide education to students based on grade level to teach safe walking and biking strategies, as well as safe driving strategies to older students. The importance of wearing seatbelts and bicycle helmets could also be included in the curriculum. There could be opportunities for schools to support walking school buses, bike rodeos and other strategies that teach students how to walk and bike to school safety, based on the context surrounding their school.

Education campaigns could also **involve students** promoting safer driving to their parents by holding signs during pick-ups and drop-offs, and providing educational materials aimed at parents who might not be aware of seatbelt, cell phone and move-over laws.

Expanding existing **youth programs** presents an opportunity to provide ongoing Safe Routes to School education to all students each year. There are a variety of existing resources available that could be promoted through schools to students taking on-line driver education, including the Teen Driver Challenge (https://www.flsheriffs.org/law-enforcement-programs/teen-driver-challenge), free and low cost behind the wheel training provided by the Florida Safety Council (https://www.floridasafetycouncil.org/categories), as well as resources that teens can provide to others to promote safe driving (https://flteensafedriver.org/). There are also other programs available to high school students to teach them about the dangers of alcohol and driving, including Every 15 Minutes, Sober Graduation, and DUI mock trials, which provide opportunities for local agencies and law enforcement to partner with schools to deliver educational campaigns.

Educational Materials on New Roadway Design Changes

Temporary demonstrations, like pop-up installations, can physically showcase proposed safety infrastructure and emergency response to the public in a tangible way. Using social media platforms and neighborhood community groups to promote materials and videos focused on new types of roadway designs and the region's major violation issues could direct community conversations for meaningful outcomes.

Educational Materials on Traffic Safety Laws

Partnering with the Florida Highway Safety and Motor Vehicles department as well as FDOT to develop materials to send to drivers upon renewal of their driver's license or vehicle registration related to new traffic safety laws, how to use traffic control devices, and sharing the dangers of driving under the influence of drugs or alcohol, or not wearing seatbelts or helmets. These materials could be customized at the regional level based on the most pressing crash issues.

Partner with Local Experts

Local partners should serve as community liaisons between MetroPlan Orlando, counties and cities, and the public. Working with community partners and public institutions that have relationships with residents strengthens the engagement process by building trust and drawing on an established base of stakeholders. Local partners could help tailor the engagement process or incorporate engagement into existing programs and resources to educate people more effectively about roadway safety. These local experts could share information about how to report a crash to law enforcement, how to file an insurance claim, provide bicycle lights and reflective gear to communities who ride in dark conditions, provide helmet fittings and car seat installations, and identify alternative transportation options for aging people or people with disabilities who are no longer able to drive.



Share the Road/Bicyclists May Use Full Lane Awareness Programs

The purpose of these programs is to increase drivers' awareness of bicyclists' rights and the need for mutual respect of bicyclists on the roadway. Educational efforts are intended to improve the safety of all road users, including bicyclists, and to enhance understanding and compliance with relevant traffic laws. These programs should be coupled with providing the appropriate signage and pavement markings depending on the roadway characteristics. ***Bicycles May Use Full Lane*** signs have been shown to be effective in conveying to motorists that bicyclists may use the travel lane. Placement of road signs and pavement markings along roads that do not have separated bicycle facilities should consider the road context, traffic volumes and prevailing speeds.



Promote Motorcyclist Safety Programs

Motorcyclist safety includes motorcycle safety awareness for non-motorcyclists, such as ***Look Twice*** campaigns as well as education, including classroom and on-roadway training to help motorcyclists ride more defensively and develop the skills to operate their motorcycle under a variety of conditions, including evasive maneuvers. More information can be found here: https://www.fdot.gov/Safety/motorcyclesafety.shtm and https://www.flhsmv.gov/driver-licenses-id-cards/motorcycle-rider-education-endorsements/florida-rider-training-program-courses/.

DUI Strategies and Considerations

Crashes involving someone driving under the influence are more likely to result in a fatality or serious injury. As detailed in the Crash Analysis, 21% of fatal crashes involve someone driving under the influence of alcohol and 16% of fatal crashes involve someone driving under the influence of drugs. Considerations for addressing DUI collisions also extend beyond the transportation profession and increasing funding for efforts that focus on prevention and education, such as alcohol problem assessment and treatment programs, would support less-punitive measures to reduce DUI collisions. Strategies generally fall under three categories:

1. **Deterrence policies focus on raising the actual and perceived risk of detection of driving under the influence. These policies should be highly visible to increase awareness of the risks of driving under the influence. Publicized sobriety checkpoints, saturation patrols, and other forms of high-visibility enforcement are effective for safety outcomes.**

2. **Prevention and education policies focus on mobilizing and educating the community and intervening before driving under the influence takes place. According to NHTSA research, drug use problem assessment and treatment programs, as well as alcohol intervention in settings such as a doctor's office, are highly effective strategies for improving safety outcomes. NHTSA educational campaigns include materials for driving under the influence of alcohol, marijuana, and other drugs, including prescription drugs.**

3. **Limited access policies focus on making underage access to alcohol and drugs more difficult and seek to limit excessive alcohol consumption.**

Additionally, there are organizations who provide free rides or tows to people who are impaired, such as the ***AAA Tow to Go Program*** (https://www.acg.aaa.com/drivers-safety/tow-to-go.html). NHTSA has developed a ***SaferRide App*** (https://youth.gov/federal-links/saferride-app-could-save-your-life) that allows users to call a taxi or pre-programmed friend. In some communities, there are also organizations and businesses that provide free or subsidized rides, like the Drunk Driving Prevention Program that serves military bases (https://www.ddpp.us/) and local law firms that offer tow service and free ride shares around holidays. When communities have events that include drinking, like around St. Patrick's Day, Fourth of July and New Years, consider partnering with local organizations that can pay for and promote free rides.

Enforcement

When educational campaigns do not yield the desired behavior change, there is a role for the **enforcement of traffic safety laws consistently and fairly**, focused on behaviors that are most likely to result in a severe injury or fatality. In many instances, the enforcement activity can be coupled with education and support, like providing bike lights to people seen riding bikes at night without lights, or people under seen riding a bike without a helmet can be provided with a free helmet along with educational material (people under the age of 16 are required to wear a helmet).



A data driven approach can be used to identify roadways and time of day/days of week when people may be more likely to speed or engage in other undesired behaviors, like driving under the influence. This allows for law enforcement to focus their limited resources, such as along a high injury network corridor or around a cluster of alcohol serving establishments. Additional information about high visibility enforcement and automated enforcement is provided in subsequent sections.

BEST FOOT FORWARD PROGRAM

Best Foot Forward (BFF) focuses on one simple, measurable goal: to get more drivers to yield and stop for pedestrians in marked crosswalks, as Florida law requires. Best Foot Forward works to accomplish this goal using the proven, "Triple-E" approach of combining community education with low-cost engineering changes and high-visibility enforcement.

Within the MetroPlan Orlando Region, the BFF program has resulted in increased yielding rates for pedestrians at 100's of crosswalks and has worked to improve dozens of crossing locations in partnership with local agencies.

For more information visit: https://www.iyield4peds.org/.

B. Safe Speeds

Streets and roads within the MetroPlan Orlando region should address the safety of all road users, including those who walk, bike, roll, drive, and take transit. Although engineering countermeasures such as lane narrowing, road diets, and speed feedback signs, can reduce the travel speeds of most drivers to appropriate levels, they should be accompanied by policy and enforcement strategies.

Strategies included in this section are:

1. Speed Limit Setting
2. High Visibility Enforcement
3. Automated Enforcement

Speed Limit Setting

Speed limits and operating speeds are connected, so speed limits are a relevant factor in traffic safety outcomes. As part of the previous version of MUTCD (Section 2B.13), speed limits on roadways were generally set by the 85th percentile travel speed based on an engineering study; the 85th percentile speed represents the speed at which 85 percent of people are driving at or below. The latest version of the MUTCD (Section 2B.21) and the Manual on Speed Zoning for Highways, Roads, and Streets in Florida (Chapter 9) provide some flexibility in setting speed limits where the context of the roadway plays a greater role in setting speed limits that are consistent with the surrounding land use. According to FHWA's Safe System Approach for Speed Management, lowering the speed limit on high-speed roads has a greater effect on mean operating speeds than lowering the speed limits on low-speed roads (even for the same reduction in speed limit). However, even changes in lower speed environments can produce safety benefits, especially for vulnerable road users.

Setting appropriate speed limits for roadways based on their context, accompanied by the appropriate engineering and non-engineering countermeasures, will have the greatest potential to reduce fatal and severe injury outcomes. A holistic approach throughout the region should be employed such that drivers in the region become accustomed to driving at slower speeds. Changes in how traffic signals are operated can help maintain overall travel times along corridors, even when people are driving slower between intersections. Collaboration between agencies, including MetroPlan Orlando, FDOT, counties and local agencies is a critical component.

High Visibility Enforcement

According to National Highway Traffic Safety Administration (NHTSA) research, ***High Visibility Enforcement*** (HVE) is one of the most effective enforcement strategies for safety outcomes. The goal of HVE is to promote voluntary compliance with traffic laws by providing a multifaceted approach to enforcement that garners public attention through highly visible patrols, such as checkpoints, saturation patrols, or message boards. FDOT provides resources related to HVE through the ***Alert Today*** initiative. More information and how to apply for HVE activities is provided here: https://alerttodayflorida.com/HVE.



Automated Enforcement

Automated enforcement uses cameras and other technology to detect when someone has committed a roadway violation. A strictly data-driven approach to automated enforcement places cameras in locations on the HIN with the highest number of severe collisions. In Florida, the following forms of automated enforcement are legal:

Red-light Cameras

Detects when a vehicle has entered an intersection on a red-light and a citation is mailed to the registered owner of the vehicle, who may not have been the person driving. The first notice of violation does not result in points on your license provided the citation is paid. Angle crashes are the most common crash type related to red-light running, with a disproportionate number resulting in a severe injury or fatality.



School Bus Cameras

Detects when a person illegally passes a school bus in a vehicle. This law went into effect in July 2023, as detailed in Senate Bill 766 (https://www.flsenate.gov/Session/Bill/2023/766). Several jurisdictions and school districts are piloting the technology.

School Zone Speed Cameras

Detects people speeding in school zones. This law went into effect in July 2023, as detailed in HB 657 (https://www.flsenate.gov/Session/Bill/2023/657). Tickets are sent in the mail to the registered owner of vehicles captured traveling more than 10 miles per hour over the posted school zone limit while the school zone is activated. Several communities and school districts are piloting the technology.

Wrong Way Detection

Detects when a vehicle enters a limited access facility against the flow of traffic. FDOT has deployed wrong way driving technology at numerous off-ramps throughout the region. The system detects when a vehicle is traveling the wrong way on a facility and starts a cascading series of actions, including alerting the driver to their mistake using flashing lights, notifying law enforcement, and notifying other drivers through message boards along the freeway.

Automated speed enforcement outside of school zones is not currently allowed in the State of Florida. Other states have passed legislation to allow for automated speed enforcement in specific circumstances, such as on high crash corridors where speeding is a contributing factor. MetroPlan Orlando will continue to monitor potential changes to state legislation for future use of speed cameras outside of school zones.

C. Safe Roads

Safe Road strategies are typically related to engineering countermeasures (see Engineering Toolkit for details related to engineering countermeasures). However, a non-engineering framework can support implementation of appropriate engineering countermeasures. Strategies that can help supplement road improvements are included in this section.

Strategies included in this section are:

1. Improve and Share Data
2. Pilot/Demonstration Projects
3. Road Maintenance/Maintenance of Traffic
4. Policy/Standards
5. Grant Opportunities

Improve and Share Data

Numerous pieces of data can help inform appropriate engineering and non-engineering countermeasures, including crash data, roadway system data, and population and land use data. Incomplete or inconsistent datasets can also affect the ability of countermeasures to be deployed equally throughout the region. Collaboration with local law enforcement and providing feedback to the Office of Safety, such as noting additional data needs (e.g. better data on scooter or wheelchair usage) can help improve the quality of data collected as part of crash reports. Maintaining a regional Geographic Information System (GIS) database with transportation system information can help identify the characteristics of roadways where a disproportionate number of KSI crashes occur. Near-miss analyses can also help provide a more nuanced review of safety issues at specific locations. Connected vehicle data can also provide regional speed and other roadway system operations data, such as locations of hard braking, that could be used to further identify root causes of crashes or identify locations for enforcement of speeding.

Pilot/Demonstration Projects

There may be unique or innovative transportation safety solutions proposed in some communities where the public and/or elected officials are hesitant to implement a solution new to the community. By implementing a project on a pilot basis (one to three years, with before, during and after evaluations) or a demonstration basis (a very short timeframe ranging from a few hours to a few months), the public and elected officials can learn more about the potential benefits of a treatment before a more permanent installation is completed. Pilots and demonstration projects can also help identify design changes or educational outreach that should be included in the final implementation.

Before and After Studies

Understanding the actual safety benefits of engineering countermeasures deployed across the region can help communities deploy limited resources to strategies that work best to reduce fatal and severe injury crashes.

Road Maintenance/Maintenance of Traffic

Improperly maintained roads can lead to crashes, with vulnerable roadway users disproportionately impacted, such as loose gravel on a roadway that could affect the turning and stopping ability of someone on a motorcycle, or debris in the bike lane that causes a bicyclist to potentially lose control or veer into an adjacent travel lane to avoid a bike lane hazard. Heaved/sinking sidewalks can also pose a trip hazard for pedestrians.

When a roadway or lane closure is required for a land development project, a roadway project, or maintenance, maintenance of traffic (MOT) plans are typically prepared. In some instances, bike lanes and sidewalks are closed with no advance warning, or the detours may be excessively long and then not used, which can lead to negative safety outcomes. Chapter 6 of the 11th Edition of the Manual on Uniform Traffic Control Devices includes additional guidance for how to accommodate bicyclists and pedestrians in work zones.



Policy/Standards

A change in policies and standards may be necessary to change transportation safety outcomes. A separate policy benchmarking process was conducted to identify MetroPlan Orlando policies that could be a barrier to Vision Zero. In some jurisdictions, changing roadway design standards, level of service policies, site development policies and parking policies, may be needed. As Action Plans across the region are adopted and implemented, there will be opportunities to measure progress, identify strategies that are working, and identify new strategies for implementation.

Grant Opportunities

Funding will be a limiting factor in the implementation of engineering countermeasures. Understanding what grant programs are available and their respective requirements can help to provide additional safety funding in addition to the Safe Streets and Roads for all (SS4A) program. **Appendix B** provides preliminary information on available transportation safety funding sources.

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D. Post Crash Care

Post-crash care is more than just medical care. It also includes the training of personnel, design of roadway infrastructure, and availability and location of emergency vehicles. Post-crash care also includes providing additional resources to the victims and their families such as resources for physical and mental rehabilitation. People who have a traumatic injury are more likely to survive if they receive an appropriate level of care within one hour, and positive outcomes diminish significantly after that hour.

Strategies included in this section are:

1. Emergency Medical Services
2. Trauma Care
3. Fatal Crash Response Team
4. Traffic Incident Management
5. Post Crash Strategies

Emergency Medical Services

People involved in a collision have a higher chance of survival if they can quickly receive medical care. In many cases, law enforcement officers and fire department staff are the first responders to arrive at a collision location. Collisions can also put the lives of first responders and other road users at risk due to increased congestion during the crash response, which may lead to secondary crashes.

MetroPlan Orlando could coordinate with local partners to improve response times and ensure safety in both arriving and attending to patients at the scene. Strategies include ensuring emergency vehicles are highly visible (e.g., retroreflective striping and chevrons, high-visibility paint, and built-in passive lights) and implementing emergency vehicle signal preemption, which allows emergency vehicles to break a normal signal cycle and proceed through an intersection.

Trauma Care

Effective emergency trauma care coordination can significantly increase crash survival rates and reduce fatalities. MetroPlan Orlando could work with local partners to identify funding sources to improve their existing infrastructure to be able to provide the highest care for victims. Recommended strategies to improve trauma care include providing funding for appropriate first responder equipment (e.g., hydraulic, and pneumatic extrication tools), research for and adoption of technology aimed at reducing triage time (e.g., automatic vehicle reporting of severe crashes to EMS, EMS vehicle collision avoidance systems, and geolocation of nearest EMS vehicles), and promotion of federal- and state-certified training programs.

STOP THE BLEED

Orlando Health offers a community training class called Stop the Bleed that is designed for bystanders who have little or no medical training but who may be called upon as immediate responders to provide initial trauma care and bleeding control to a victim of traumatic injury prior to the arrival of emergency medical services (EMS).



D. Post Crash Care

Fatal Crash Response Team

In the event of a traffic fatality, analysis and evaluation of relevant contributing factors are crucial in reducing the risk of a severe crash at that location. One strategy would be for the formation of a cross-agency group that mobilizes after each fatal crash, including law enforcement, transportation professionals, and public health officials. This would assist with accurate investigation and documentation of potentially relevant infrastructural and environmental crash factors, while identifying additional factors that may have contributed to the fatal crash outcome. It can also expedite interventions to improve the crash location/circumstances and address similar risk factor locations and situations. The selection of appropriate engineering countermeasures sound consider emergency response time; however, a slight potential increase in emergency vehicle response time would need to be considered in context with the potential to reduce crash frequency and severity, which could reduce overall calls for service in the region.

Traffic Incident Management

Traffic crashes increase the likelihood of secondary crashes and pose a threat to the safety of incident responders as well as the traveling public. Crashes also affect travel reliability, commerce, and transportation system performance. **Traffic Incident Management (TIM)** consists of a planned and coordinated multi-disciplinary process to detect, respond to, and clear traffic incidents so that traffic flow may be restored as safely and quickly as possible. Effective TIM reduces the duration and impacts of traffic incidents; improves the safety of motorists, crash victims, and emergency responders; and reduces the frequency of secondary crashes. TIM is an integral component of the United States Department of Transportation (USDOT) National Roadway Safety Strategy (NRSS), and is specifically called out as a key element for the **post-crash care** objective.

FDOT is primarily responsible for TIM in the region and utilizes their traffic management centers (TMCs) in each of their districts to manage traffic on the state highway system. Several local jurisdictions also have traffic management centers. The incorporation of TIM on additional high crash corridors where systems are not currently deployed could also be considered. FDOT and the University of Central Florida are also working on traffic incident predictions that could provide advanced warnings to first responders when a crash may be imminent based on conditions to allow for first responders to stage closer to potential crash locations or to deploy enforcement teams to prevent the crash.

Post Crash Strategies

When individuals are injured in collisions, they rely on first responders to quickly locate them, stabilize their injuries, and transport them to medical facilities. Post-crash care also includes forensic analysis at the crash site and traffic incident management, so that traffic flow may be restored as safely and quickly as possible. Policy action through the justice system and appropriate design of roadways to lessen the risk of future crashes can also help inform safety programs.

Crash reporting practices, such as complete data collection and documentation of road user behavior and infrastructure, and sharing data across agencies or organizations (e.g., law enforcement, health officials, transportation officials, and hospitals) can help lead to a greater understanding of the holistic safety landscape, and thus lead to improved investments in safety.

To ensure a crash survivor receives the care needed to recover and restore body and mind to an active life within society, they require medical rehabilitation with specialists that can range from orthopedics, neurosurgery, physical and occupational therapy, and prosthetics to psychology and neuropsychology.

Severe and fatal collisions not only affect the victim involved, but their family and friends as well. Across the nation and in Canada, there are chapters of Families for Safe Streets. Individual chapters advocate at their state capitol and work with lawmakers and non-profits like Mothers Against Drunk Driving to share their stories and testify before legislative committees and congress. Supporting victims' families can come in many forms. World Day of Remembrance for Road Traffic Victims is an annual event held on the third Sunday in November in remembrance of those who have died or have been affected by motor vehicle collisions, and to draw attention to the goal of Vision Zero.

E. Safe Vehicles

Safe vehicles are another element of the Safe System approach and will increasingly add more redundancy or avoidance features to the system. MetroPlan Orlando and its local partners do not have an influence on vehicle design but could keep vehicle technology advances in mind as part of their future policy and design considerations. For example, smart signal technology, which communicates with devices embedded in newer vehicles, will allow agencies to collect data at multiple intersections, providing a better understanding of how people are using the network in real time.

Strategies included in this section are:

1. Emerging Technology
2. Vehicle Maintenance

Emerging Technology

Leveraging **connected and autonomous vehicle (CAV)** technology and crash-avoidance systems are a key part of the "Safe Vehicles" category. Connected vehicles wirelessly communicate with other vehicles and infrastructure (like signals) to provide data for instantaneous decision-making (e.g., reporting driver speed or collisions). Data from signals in combination with data from vehicles could allow the agencies within the MetroPlan Orlando area to deploy real time speed-related signal operations, allowing for enhanced safety through adaptable systems. The City of Lakeland is using a red-light running detection system to identify when a person driving is likely to run a red light, and the traffic signal automatically extends the all-red time at the intersection to prevent a crash.



Some states are exploring requirements that new vehicles sold after a certain date must include **speed limiter systems** that electronically prevent drivers from driving more than 10 miles per hour over the posted speed limit. The National Transportation Safety Board (NTSB) has also issued a recommendation that speed assistance technology be deployed more widely. The Federal Motor Safety Carrier Safety Administration (FMCSA) is exploring a potential speed limiter mandate for heavy duty trucks. While there are not currently national or State of Florida speed limiter technology requirements, this could change in the future as the technology evolves, and if more traditional approaches to transportation safety (engineering and behavioral strategies) do not yield the desired outcomes.

Vehicle Maintenance

Vehicle maintenance issues can also contribute to traffic crashes, including:

Cracked Windshields

Cracked windshields can obstruct a driver's vision. In a crash situation, seconds count and even a small obstruction can make a difference in the driver's response time.

Lights and Wipers

Light and wipers play a role in safe driving. If you cannot see or be seen, your chances of being involved in a crash increase.

Faulty Brakes

Faulty brakes can increase the distance it takes a person to slow or stop a vehicle.

Improperly Maintained Tires

Improperly maintained tires can increase your chance of roll over crash, especially for trucks and sport utility vehicles. Balding tires can also reduce friction between the tire and roadway surface, increasing the stopping distance, which can be exacerbated on wet pavement.

Approximately 18 people outside of a vehicle were killed on our highways between 2018 and 2022, with most of these people outside a disabled vehicle. The Federal Motor Carrier Safety Administration is conducting a research study on the impact of vehicle maintenance on traffic crashes (https://www.fmcsa.dot.gov/research-and-analysis/research/impact-vehicle-maintenance-safety). Community based organizations can be a resource to provide low and no-cost vehicle maintenance to people who are not able to afford basic vehicle maintenance and repairs but are reliant on a vehicle to get to work and provide care for family members.



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Appendix A - Resources and References

1. http://www.floridatim.com/
2. https://alerttodayflorida.com/HVE
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Appendix B - Federal Funding Opportunities

Grant Name	Awarding Entity	Website	Typical Projects Funded	Standalone	Available Funding	Matching Requirements	Most recent/ Upcoming NOFO Dates	Notes of Interest
Rebuilding American Infrastructure with Sustainability and Equity (RAISE)	USDOT	https://www.transportation.gov/RAISEgrants/raise-nofo	Surface transportation projects that have significant local or regional impact; could include projects with a safety component.	No	$2.2B 2022-26; $113.75M was for planning, preparation, or design of projects last round	20% match	Nov-23	https://www.transportation.gov/sites/dot.gov/files/2022-09/RAISE%202022%20Award%20Fact%20Sheets_1.pdf
Infrastructure for Rebuilding America Discretionary Grant Program (INFRA)	USDOT	https://www.transportation.gov/grants/infra-grants-program	Primarily freight related.	No	awards range from $9M to $150M. Average award is $40M.	20% match	Mar-23	For projects that improve safety, generate economic benefits, reduce congestion, enhance resiliency, and hold the greatest promise to eliminate freight bottlenecks and improve critical freight movements.
Reconnecting Communities Pilot Program (RCP)	USDOT	https://www.transportation.gov/grants/reconnecting-communities	Highway removal projects, through disadvantaged communities. Would fund replacement infrastructure and includes safety components.	No	$1B 2022-2026; $250M for planning; $750M capital construction	20% match	Sep-23	
Safe Streets and Roads for All (SS4A)	USDOT	https://www.transportation.gov/grants/SS4A	Transportation safety projects.	Yes	$5B 2022-2026	20% match	Feb-24	Projects must be identified in a comprehensive safety action plan to receive implementation funding.
Federal Transit Administration Capital Funds (FTA)	Federal Transit	https://www.transit.dot.gov/funding/grants/urbanized-area-formula-grants-5307	Funds safe access to transit projects	Yes	$6.9B in 2022	20% match		See Bicycles and Transit, Flex Funding for Transit Access, the FTA Final Policy Statement on the Eligibility of Pedestrian and Bicycle Improvements Under Federal Transit Law, and FTA Program & Bicycle Related Funding Opportunities
Areas of Persistent Poverty Program (AoPP)	Federal Transit	https://www.transit.dot.gov/grant-programs/areas-persistent-poverty-program	Funds projects that provide access to transit in disadvantaged communities, including safety improvements.	Yes	$20 M	Minimum federal share is 90%	Jan-23	
Carbon Reduction Program (CRP)	FHWA	https://www.fhwa.dot.gov/environment/sustainability/energy/	Planning, bicycle and pedestrian facilities, bike share programs, road diets, etc.	Yes	Around $1.2B per year (2022-2026)			Project must be part of the state TIP and consistent with LRSTP and Metropolitan Transportation Plan; does not fund recreational trails
Congestion Mitigation and Air Quality Improvement Program (CMAQ)	FHWA	https://www.fhwa.dot.gov/environment/air_quality/cmaq/	Projects, including bicycle and pedestrian facilities, that reduce emissions.	Yes	Around $2.4B per year (2022-2026), 2022 Funding for Florida was $148M			Project for planning, feasibility analyses, and revenue forecasting associated with the development of a project that would subsequently be eligible to apply for assistance under the BIP
Highway Safety Improvement Program (HSIP)	FHWA	https://highways.dot.gov/safety/hsip/shsp	Safety projects on the highway system.	Yes*	$3B per year (2022-2026)			Projects must be consistent with a state's Strategic Highway Safety Plan, funding is only for Highway projects, public transportation, and port facilities, Small local agencies also eligible

Appendix B - Federal Funding Opportunities

Grant Name	Awarding Entity	Website	Typical Projects Funded	Standalone	Available Funding	Matching Requirements	Most recent/ Upcoming NOFO Dates	Notes of Interest
Railway-Highway Crossings (Section 130) Program (RHCP)	FHWA	https://highways.dot.gov/safety/hsip/xings/railway-highway-crossing-program-overview	Railroad crossing improvements.	Yes*	$245 M per year			Set aside from HSIP, Small local agencies also eligible
National Highway Performance Program (NHPP)	FHWA	Implementation Guidance for the National Highway Performance Program (NHPP) as Revised by the Bipartisan Infrastructure Law (dot.gov)	Could include safety improvements as part of other improvements.	Yes	$29B per year (2022-2026)	No match required		Only for Highway projects; Administered by the State
Promoting Resilient Operations for Transformative, Efficient, and Cost Saving Transportation (PRO TECT)	FHWA	https://www.fhwa.dot.gov/environment/sustainability/resilience/	Protecting transportation facilities from flooding.	No	$1.4B (2022-2026)	20% match, can be combined		Funds can only be used for activities that are primarily for the purpose of resilience or inherently resilience related. With certain exceptions, the focus must be on supporting the incremental cost of making assets more resilient.
Surface Transportation Block Grant Program (STBG)	FHWA	https://www.fhwa.dot.gov/specialfunding/stp/	Planning, bicycle and pedestrian facilities, bike share programs, road diets, etc.	Yes	Around $14B per year (2022-2026)			If called a bicycle facility, it must be primarily for transportation instead of recreation, but recreational trails are also permitted, Small local agencies also eligible
Transportation Alternatives (TA) Set-Aside	FHWA	https://www.fhwa.dot.gov/environment/transportation_alternatives/	Planning, bicycle and pedestrian facilities, bike share programs, road diets, etc.	Yes	Around $1.4B per year (2022-2026)	20% match		Part of STBG; Administered by the State, Local agencies also eligible
Recreational Trails Program (RTP)	FHWA	https://www.fhwa.dot.gov/environment/recreational_trails/	Recreational trails	Yes	2022 Funding for Florida was $2.6M	20% match; Flexibility may apply		Part of STBG; Administered by the State
Safe Routes to School Program (SRTS)	FHWA	https://www.fhwa.dot.gov/environment/safe_routes_to_school/	Projects that improve safety for students going to school	No		20% match; Flexibility may apply		Part of STBG; Administered by the State

Appendix C -
FDOT Funding Opportunities

Grant Name	Website	Typical Projects Funded	Standalone	Available Funding	Matching Requirements	Anticipated Solicitation	Notes of Interest
Transportation Alternatives Program (TAP)	https://www.fdot.gov/planning/systems/tap/default.shtm	Bicycle/pedestrian facilities, recreational trails, SRTS projects	Yes	$49M annually	FDOT covers 20% match with toll credits	District 5 To be determined and announced	Part of the Federal TA set aside of the STBG https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/planning/systems/systems-management/document-repository/tap/ta_set-aside-program_fl_overview-highlights_2015-2021.pdf?sfvrsn=7c0d8522_2
Shared-Use Nonmotorized (Sun) Trail Program	https://www.fdot.gov/planning/systems/suntrail/guidance.shtm	Shared use trails	Yes	$25M annually		Likely September 2024	Project must be within the Suntrail network, a priority of the applicable jurisdiction, and consistent with applicable plans. Local agency must commit to operation and maintenance of trail. Separate Request for Funding, but must be included in FDOT Work Plan https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/planning/systems/suntrail/guidance/suntrail_guidanceforsubmittaloffundingrequest_ppt.pdf?sfvrsn=3ac9b7ba_2
Highway Safety Improvement Program	Reports and Plans (fdot.gov)	Transportation safety projects	Yes	$148M in 2022		Jan-24	Must show how project improves safety; part of FHWA HSIP funding
Safe Routes to School	https://www.fdot.gov/Safety/programs/safe-routes.shtm	Transportation safety projects that improve safety for student going to/from school	No	$7M annually	100% funded, cost-reimbursement	Jan-24	Funded through HSIP

CHAPTER 8

Technical Appendix

I- Engineering Countermeasures Toolkit

Image of Main Street in the Town of Windermere

Town of Windermere



Vision Zero Safety Action Plan

Engineering Countermeasures Toolkit

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Overview

Introduction and How to Use this Toolkit

MetroPlan Orlando will complete its first comprehensive Vision Zero Action Plan in Spring 2024. The Plan outlines actions that MetroPlan Orlando, including its 3 counties and incorporated cities, will take in the next five years and beyond to eliminate deaths and serious injuries on the region's roadways by 2050. The purpose of this Engineering Countermeasure Toolkit is to establish a shared understanding of key strategies available to address roadway safety issues in our community that align with the Safe System Approach. The key objectives of this Toolkit are to:

1. Inform partner jurisdictions about safety treatment options and their appropriate uses and contexts,
2. Communicate safety tools using easy-to-understand language and graphics,
3. Facilitate coordination between staff, contractors, developers, and the community when discussing transportation safety improvements, and
4. Create a shared understanding and realistic expectations around safety treatments.

The Toolkit describes a variety of engineering countermeasures, how they can be applied to address safety, and their expected effectiveness i.e., crash reduction, when available. The expected crash reduction is based on Crash Modification Factors from the Federal Highway Administration's (FHWA) Crash Modification Clearinghouse or other published studies. The Toolkit also includes general information about each tool's application, typical placement, estimated costs, and delivery timelines.

This Toolkit is meant to provide guidance for engineering countermeasures applicable to crashes and safety concerns identified in the MetroPlan Orlando region; it does not provide an exhaustive list of all safety countermeasures. This Toolkit is not meant to replace engineering investigation, feasibility evaluation, and design. The selection of engineering countermeasures for a specific location is always subject to professional judgement and context-sensitive design.

The Engineering Countermeasure Toolkit is also not intended to be a menu from which community members can request safety tools for their street. Before staff consider a tool or tools to use in a certain situation, they must first conduct an analysis to understand the existing safety issue. Therefore, to achieve desired safety benefits, community-reported concerns should focus on observing and communicating safety issues rather than asking for specific tools. Non-engineering countermeasures are identified in a separate document.

Safe System Framework



Sou

Systemic Treatments

The implementation of systemic treatments is a common Vision Zero approach that implements low-cost safety measures on a network level to reduce the risk of severe and fatal crashes. The treatments that are typically considered for systemic implementation are relatively effective, lower cost, and well-suited for implementation at multiple locations. Some systemic treatments can be implemented with limited study and design, such as retroreflective signal backplates, high-visibility crosswalks or curb extensions created with paint, bollards, and turn wedges. Although systemic treatments are often discussed in contrast with spot treatments, some treatments may be useful in both spot and systemic safety.

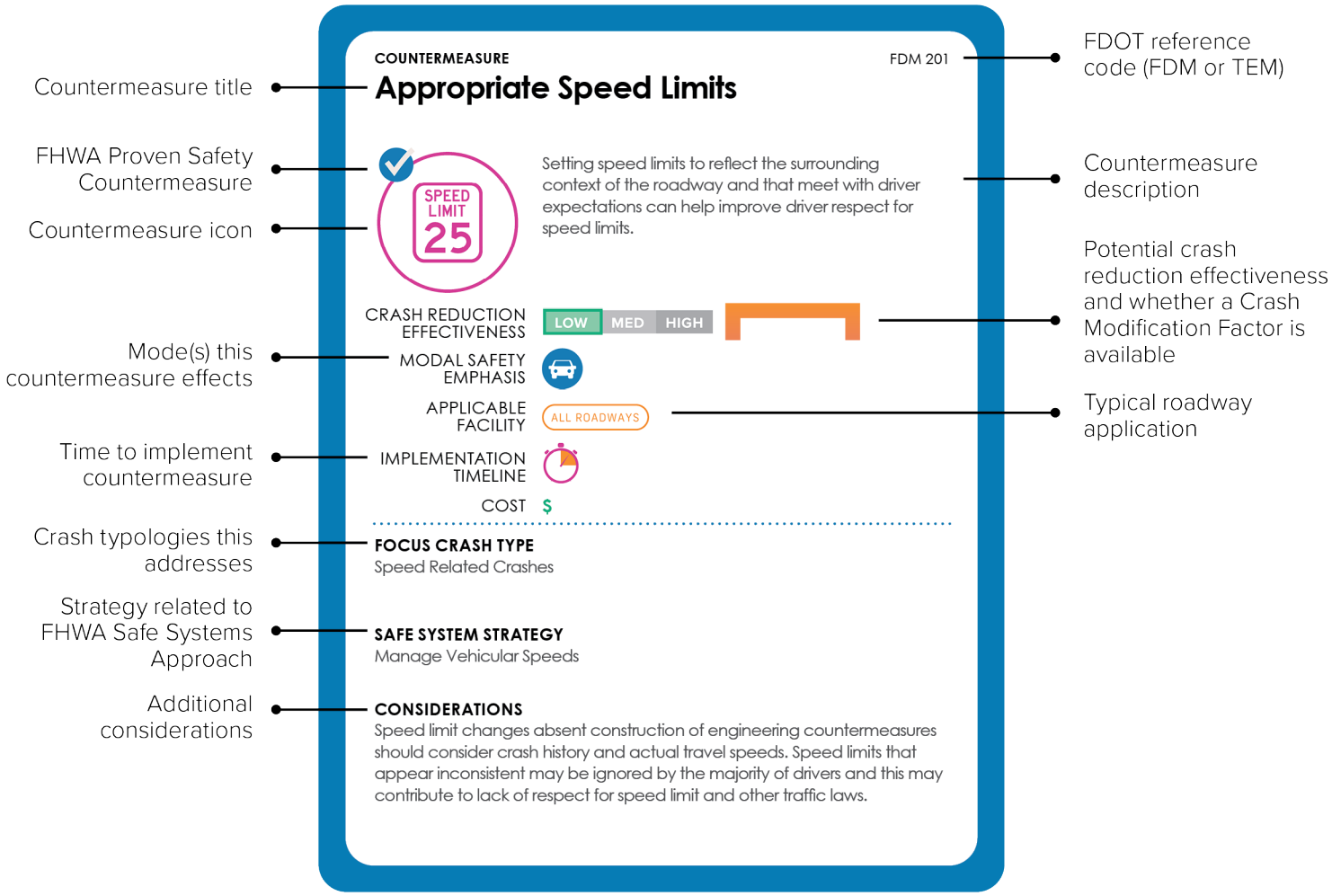
Organization of the Toolkit

The countermeasures are organized into the following categories:

A. Signals
B. Signing and Striping
C. Bikeways
D. Pedestrian Facilities
E. Intersections and Roadways
F. Speed Management
G. Other Engineering Strategies

For each engineering countermeasure, the following information is provided, with a description of select sections provided below.

What You'll See Inside:



Organization of the Toolkit

Modal Safety Emphasis

Closely related to the countermeasure categories is the "Modal Safety Emphasis" which represents the user group that predominantly benefits from the implementation of the countermeasure. The classification of user groups is not meant to include every possible mode with the understanding that certain countermeasures will benefit modes with closely related travel characteristics. For example, a countermeasure that is designed to reduce left-turn crashes at an intersection will benefit motor vehicles and motorcycles alike. The Modal Safety Emphasis areas include the following user groups:

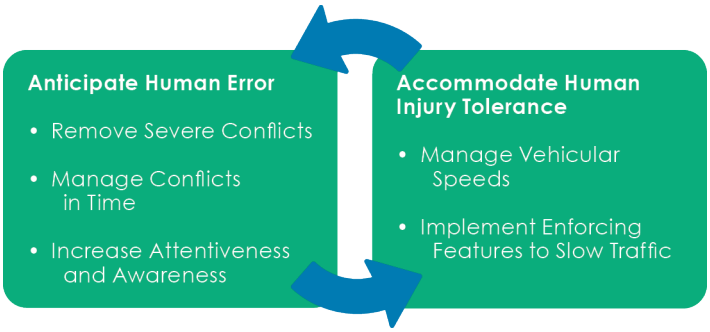
- **Pedestrians**
- **Bicycles**
- **Motor Vehicles**

Safe System Strategy

Within the Safe System Approach Framework, how we plan, construct, and operate our roadways should anticipate human error and consider human vulnerabilities. Strategies to achieve those goals are highlighted below.

Roads should be designed to encourage appropriate roadway user behavior for the context.

These principles provide a system with built-in redundancies to eliminate or greatly reduce the likelihood of death or serious injury when a crash occurs. However, strategies have varying levels of effectiveness, feasibility, and implementation time frames. FHWA has further developed a draft Safe Systems Solutions Hierarchy (as of July 2023) within the Safe System element of Safe Roads, as described below. Within that framework, the most effective strategies include removing conflicts and minimizing hazards, and where that is not feasible, better management of the conflict through speed reductions and managing conflicts in time.

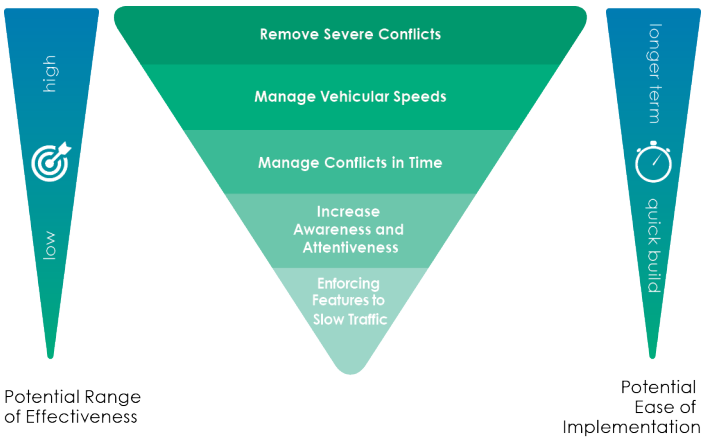


- **Remove Conflicts**: Eliminate the most severe conflicts between roadway users, such as through the relocation of a utility pole, construction of a roundabout or provision of a median barrier.
- **Manage Vehicular Speeds**: Reduce the speed of vehicles to align with the context of the roadway, the hazards, and conflicts between roadway users; includes horizontal and vertical deflection elements.
- **Manage Conflicts in Time:** Where conflicts cannot be removed, can they be separated in time, through signal timing strategies or providing dedicated space for other roadway users.
- **Increase Attentiveness and Awareness**: Where conflicts cannot be removed, improve the visibility of the conflicts.
- **Implement Enforcing Features to Slow Traffic**: Similar to managing vehicular speeds, these are roadway features that help enforce the desired speed, like speed feedback signs.

Applicable Facility Type

The applicable facility types represent general characteristics for land use and users where each countermeasure might be appropriate. The applicable facilities are categorized using a preliminary context classification system of:

- **Urban Streets** (FDOT Context Classification C4, C5, C6 and CT2)



Organization of the Toolkit

- **Suburban Streets** (C4, C3C and C3R)
- **Rural Roads** (C2)

For purposes of this toolkit, countermeasures for both urban and suburban roadways could be considered on C4 roadways. For strategies related to C1 facilities, please refer to the FDOT Context Classification Guide and the Florida Design Manual (FDM). Some treatments are more appropriate for use on urban arterial streets with higher traffic volumes and a mix of different users, while others are better used on rural roads where speeds tend to be higher. However, choosing the best tool for a location will depend on location-specific characteristics like number of travel lanes, geometry, vehicle speeds, and volumes. The selection of countermeasures should also consider the future roadway context.

Crash Reduction Effectiveness

The potential effectiveness of each countermeasure was based on published research, including information from FHWA's Crash Modification Factor (CMF) Clearinghouse, FHWA's Proven Safety Countermeasures, and other published references (see complete list of references at end of this section). The CMF Clearinghouse provides peer reviewed studies and a link to the applicable study. As this toolkit is intended to be a quick resource guide to help identify the range of potential countermeasures, the anticipated effectiveness of various treatments was summarized into the following categories:

- **Unknown**: No quantitative data is available
- **Low**: Expected Crash Reduction ≤ 30%
- **Medium**: 31%≤ Expected Crash Reduction ≤ 60%
- **High:** Expected Crash Reduction ≥ 61%

The expected crash reduction represents a multiplicative factor indicating the proportion of crashes that are expected to be reduced after the implementation of a countermeasure with the reduction only applying to crashes affected by the countermeasure. For example, changing left-turn phasing would only apply to left-turn crashes on the approach where the countermeasure is being implemented. For locations where more than one countermeasure is being considered, the interaction between countermeasures should be considered. For more information on the application of multiple CMFs, refer to the "Using CMFs" section of the Crash Modification Clearinghouse (https://www.cmfclearinghouse.org/using_cmfs.php)

Some countermeasures may result in a decrease in some types of crashes and an increase in others. For example, installing a traffic signal may reduce fatal and serious injuries for motorists turning to/from the major roadway, but increase rear end crashes, which tend to result in fewer injuries.

Detailed crash analysis based on the most current crash modification factor is recommended as the intent of the factors provided in this document is to allow for a quick comparison of the expected effectiveness of specific countermeasures relative to their cost as well as highlight the need for additional data to document the effectiveness of specific improvements that may be implemented regionally. The estimated effectiveness of each tool is only applicable to the crash type being mitigated i.e., the Focus Crash Type.

Included in FHWA Proven Safety Countermeasures

This field refers to whether the countermeasure is included in FHWA's Proven Safety Countermeasures Initiative (PSCi). The PSCi is a collection of 28 countermeasures and strategies effective in reducing roadway fatalities and serious injuries. Each countermeasure addresses at least one safety focus area – speed management, intersections, roadway departures, or pedestrians/bicyclists – while others are crosscutting strategies that address multiple safety focus areas.

Cost

The cost information is meant to convey an overall order of magnitude to help compare potential strategies; the cost data does not necessarily reflect the cost of each improvement as a standalone construction project. Most countermeasures would not likely be implemented as a standalone project but incorporated into a larger intersection or corridor enhancement project. For example, many elements could be incorporated into routine resurfacing, restoration, and rehabilitation (RRR) projects. Additionally, costs do not include elements that might be unique to specific projects, such as right-of-way acquisition, need to upgrade drainage systems, retaining walls to facilitate sidewalk construction, need to upgrade other roadway elements to meet Americans with Disabilities Act (ADA) or Public Rights of Way

Organization of the Toolkit

Access requirements (PROWAG) requirements, and other factors. Therefore, actual costs could vary significantly.

The assigned cost ratings for countermeasures are as follows:

- **Low ($)**: Typically, $10,000 or less
- **Medium ($$)**: Typically, $10,000 to $100,000
- **High ($$$)**: Typically, $100,000 +

The appendix provides more detailed cost estimates for some countermeasures where recent cost data is available from FDOT other local partners; not all countermeasures are included. These costs can be used to develop high-level cost estimates of projects for regional prioritization such that projects across the region can be compared.

Implementation Timeline

This field represents the typical time to implement the countermeasure. It should be noted that there may be some variability in implementation timeline based on whether the countermeasure can be implemented using "Quick Build" materials or permanent materials. The assigned timeline thresholds for implementation are as follows:


Quick Build; Typically, within 1 year


Short: Typically, within 1 to 3 years


Medium: Typically, 3 to 5 year s


Long: Typically, 5 years and more

Considerations

This section provides some additional information about the countermeasure that need to be part of the evaluation about whether the countermeasure is appropriate for selection. For example, some countermeasures may affect drainage or require additional maintenance.

Where the countermeasure is included or mentioned in the FDOT Design Manual (FDM) or FDOT's Traffic Engineering Manual, the appropriate section is noted.

Additional sources of the countermeasures include:

- CMF Clearinghouse (Federal Highway Administration, 2023) (http://www.cmfclearinghouse.org/)
- Application of Pedestrian Crossing Treatments for Streets and Highways (NCHRP, 2016) (https://www.researchgate.net/publication/316091509_Application_of_Pedestrian_Crossing_Treatments_for_Streets_and_Highways)
- Development of Crash Modification Factors for Uncontrolled Pedestrian Crossing Treatments (NCHRP, 2017) (https://www.nap.edu/catalog/24627/development-of-crash-modification-factors-for-uncontrolled-pedestrian-crossing-treatments)
- Evaluation of Pedestrian-Related Roadway Measures (Pedestrian and Bicycle Information Center, 2014) (http://www.pedbikeinfo.org/cms/downloads/PedestrianLitReview_April2014.pdf)
- Evolution of the Protected Intersection (Alta Planning and Design, December 2015) (https://altago.com/wp-content/

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Target Speed

The selection of countermeasures should also consider the target speed of the roadway. To establish a target speed based on the roadway context and the goal of improving transportation safety outcomes, the FDOT Context Based Design Speeds for Arterials and Collectors should be used as a starting point, as presented in Table 1.

Table 1: Allowable Design Speed Range by Context Classification

Context Classification	Allowable Design Speed Range (MPH)	SIS Minimum (MPH)
C1 Natural	55-70	65
C2 Rural	55-70	65
C2T Rural Town	25-45	40
C3 Suburban	35-55	50
C4 Urban General	25-45	45
C5 Urban Center	25-35	35
C6 Urban Core	25-30	30

Source: FDOT Context Classification Guide, February 2022

Guidance from FDOT Central Office related to target speed setting recommends setting an initial target speed on the low end of the allowable range, and then providing justification for increases. From there, the following factors should be used to establish a recommended target speed:

- Fatal and severe injury collision history
- Potential crash risk
- Existing and potential future context classification
- Number of lanes
- Type and density of surrounding land uses
- Number of access points and signal spacing
- Presence and characteristics of on-street parking
- Total pavement width available
- Presence of transit, pedestrian generators, and bicycle activity
- Bicycle facility type
- Posted speeds on surrounding roadways
- Types of travelers (regional or local)
- Level of truck traffic

Additional guidance can be found in the *FDOT Context Classification Guide, February 2022* as well as the Speed Management section of the 2024 FDOT *Design Manual*.

Different Types of Speed

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.*

Design Speed *is the speed that is used to determine the geometric features of a road or street, such as curves, slopes, lane width, intersection spacing, sight distance and other features.*

Speed Limits *specify the maximum speed people are permitted to drive on a road, typically shown on signs along the road, and usually determined based on an engineering study that considers the prevailing travel speeds.*

Operating Speed *refers to the speed at which people are observed driving under free-flow conditions.*

Under ideal conditions, target, design, posted and operating speeds all align. When there are discrepancies, roadway design elements may need to be changed to achieve the desired speed outcomes.

References

uploads/Evolution-of-the-Protected-Intersection_ALTA-2015.pdf)

- Manual for Selecting Safety Improvements on High Risk Rural Roads (FHWA, 2014) (https://safety.fhwa.dot.gov/hsip/hrrr/manual/)
- Pedestrian Safety Guide and Countermeasure Selection System (FHWA) (http://www.pedbikesafe.org/pedsafe/)
- Proven Safety Countermeasures (FHWA), (https://highways.dot.gov/safety/proven-safety-countermeasures)

Transportation safety countermeasure information is quickly evolving and users of this document are encouraged to use the most current information available.

Cost information based on FDOT cost per mile model reports:

https://www.fdot.gov/programmanagement/estimates/documents/costpermilemodelsreports)

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Countermeasure List

SUMMARY OF COUNTERMEASURES

✓ FHWA PROVEN SAFETY COUNTERMEASURE

A. SIGNALS

Advanced Dilemma Zone Detection
Audible Push Button Upgrade
Bicycle Signal/Exclusive Bike Phase
Bike Detection
Extend Green Time For Bikes
Extend Pedestrian Crossing Time
Extend Yellow and All Red Time ✓
Extended Time Pushbutton
Flashing Yellow Turn Phase
Leading Pedestrian Interval and Pedestrian Recall ✓
Pedestrian Countdown Timer
Pedestrian Detection
Pedestrian Scramble
Prohibit Right-Turn-on-Red
Prohibit Turns During Pedestrian Phase
Protected Left Turns
Red Light Camera
Separate Right-Turn Phasing
Shorten Cycle Length
Signal Interconnectivity and Coordination / Green Wave
Signal Preemption
Supplemental Signal Heads
Traffic Signal
Upgrade Signal Head

B. SIGNING AND STRIPING

Advance Stop Bar
Advance Yield Markings
Chevron Signs on Horizontal Curves ✓
Curve Advance Warning Sign ✓
Flashing Beacon as Advance Warning
LED-Enhanced Sign
Painted Centerline and Raised Pavement Markers at Curves
Pavement Speed Legends
Prohibit Left Turn
Striping Through Intersection
Time-Based Turn Restriction
Upgrade Intersection Pavement Markings
Upgrade Signs with Fluorescent Sheeting
Upgrade Striping
Upgrade to Larger Warning Signs
Wayfinding
Yield To Pedestrians Sign

C. BIKEWAYS

Bicycles May Use Full Lane Sign
Bike Lane/Buffered/Separated Bike Lane ✓
Floating Transit Island
Mixing Zone
Parking Buffer
Separated Bikeway ✓
Two-Stage Turn Queue Bike Box

D. PEDESTRIAN FACILITIES

Add Sidewalk ✓
Co-Locate Bus Stops and Pedestrian Crossings
Curb Extensions
High-Visibility Crosswalk
Install/Upgrade Pedestrian Crossing at Uncontrolled Locations
Pedestrian Hybrid Beacon ✓
Rectangular Rapid Flashing Beacon ✓
Restripe Crosswalk
Shared Use Path
Widen Sidewalk

E. INTERSECTIONS AND ROADWAYS

All-Way Stop Control
Bicycle Crossing (Solid Green Paint)
Bike Box
Centerline Hardening
Close Slip Lane
Crosswalk Density
Curb-Return Radius Reduction
Delineators, Reflectors, and/or Object Markers
Directional Median Openings to Restrict Left Turns
Doubled-up, Oversized Stop Signs ✓
Enhanced Daylighting/Slow Turn Wedge
Extend Bike Lane to Intersection
Gateway Treatments
Green Conflict Striping
Guardrail
Hardened Median Nose Extension
High Friction Surface Treatment ✓
Impact Attenuators
Intersection Reconstruction and Tightening
Lane Repurposing ✓
Median Barrier ✓
On-Street Parking
Paint and Plastic Median
Paint and Plastic Mini Circle/Mini Roundabout
Partial Closure/Diverter
Protected Intersection
Raised Crosswalk
Raised Intersection
Raised Median ✓
Reduced Left-Turn Conflict Intersection ✓
Refuge Island ✓
Retroreflective Signal Backplates ✓
Roundabout ✓
Rumble Strips ✓
Safety Edge ✓
Speed Hump, Speed Table or Speed Cushion
Straighten Crosswalk
Superelevation at Horizontal Curve Locations
Widen/Pave Shoulder

F. SPEED MANAGEMENT

Appropriate Speed Limits ✓
Chicane
Landscape Buffer
Lane Narrowing
Speed Cameras ✓
Speed Feedback Sign
Speed Sensitive Rest on Red
Variable Speed Limits ✓

G. OTHER ENGINEERING STRATEGIES

Access Management/Close Driveway ✓
Create or Increase Clear Zone
Far-Side Bus Stop
Intersection Lighting ✓
Relocate Select Hazardous Utility Poles
Remove Obstructions For Sightlines
Segment Lighting ✓
Upgrade Lighting to LED

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A. Signals

Under the signal timing and phasing category, strategies relate to changing signal timing based on local context, such as extending the pedestrian time if there are large volumes of pedestrians, or if pedestrians are not able to cross the intersection within the time allotted. Extending yellow and red time can help clear the intersection and reduce the potential for red light running. Additional signal heads can increase visibility. In locations where there are high pedestrian and bicycle volumes, right-turning vehicles may not be able to turn when they have a green light due to pedestrians in the crosswalk. Providing a separate right-turn phase could help clear right-turning vehicles and reduce conflicts with pedestrians.

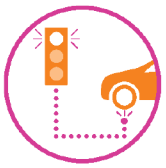
Sometimes giving people walking a head start can make them more visible to people driving. Installing a new traffic signal or pedestrian signal can help allocate the right-of-way, reduce conflicting movements, and provide pedestrians a protected crossing. In heavy pedestrian areas, installing a pedestrian scramble where all vehicles must stop, and pedestrians can cross diagonally can be a more efficient way to operate the intersection and reduce vehicle conflicts with pedestrians. Pedestrian recall provides a WALK signal each cycle without pedestrians having to push buttons.

Other strategies such as converting permissive lefts to protected lefts (at least when the pedestrian crossing is activated) can be highly effective in reducing conflicts with pedestrians. Reducing cycle length can decrease pedestrian delay which can reduce the occurrence of pedestrians crossing against the signal and red-light running.

Strategies included in this section are:

1. Advanced Dilemma Zone Detection
2. Audible Push Button Upgrade
3. Bicycle Signal/Exclusive Bike Phase
4. Bike Detection
5. Extend Green Time For Bikes
6. Extend Pedestrian Crossing Time
7. Extend Yellow and All Red Time
8. Extended Time Pushbutton
9. Flashing Yellow Turn Phase
10. Leading Pedestrian Interval and Pedestrian Recall
11. Pedestrian Countdown Timer
12. Pedestrian Detection
13. Pedestrian Scramble
14. Prohibit Right-Turn-on-Red
15. Prohibit Turns During Pedestrian Phase
16. Protected Left Turns
17. Red Light Camera
18. Separate Right-Turn Phasing
19. Shorten Cycle Length
20. Signal Interconnectivity and Coordination / Green Wave
21. Signal Preemption
22. Supplemental Signal Heads
23. Traffic Signal
24. Upgrade Signal Head

Advanced Dilemma Zone Detection



System that adjusts the start time of the yellow-signal phase (i.e. earlier or later) based on observed vehicle locations and speed, improving safety by minimizing the number of drivers that are faced with the dilemma of determining if they should stop or drive through the intersection.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Angle crashes and red-light running crashes.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS

Home

TEM 3.7

Audible Push Button (APB) Upgrade



Push buttons must comply with the Americans with Disability Act (ADA) standards and Public Right-of-Way Accessibility Guidelines (PROWAG) for accessibility. Accessible pedestrian signals, including audible push buttons, improve access for pedestrians who are blind or have low vision.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Through vehicles at signalized intersection and pedestrian struck by turning vehicle.

SAFE SYSTEM STRATEGY
Manage conflicts in time, and increase attentiveness and awareness.

CONSIDERATIONS
Accessible Pedestrian Signals (APS) is now required on any new or modified traffic signal with a pedestrian crossing.

Home

FDM 223.2.4.5

Bicycle Signal/Exclusive Bike Phase



A separate bicycle signal or phase reduces conflicts between motor vehicle, transit vehicles, and pedestrian movements.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$$

FOCUS CRASH TYPE
Motorist turns left in path of bicyclist, motorist turns right in path of bicyclist, and motorist failed to yield at signalized intersection.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
Signal phasing strategies should balance the trade-offs between comfort and convenience for bicyclists, pedestrians and motorists.

Home

FDM 223.2.1.5 , TEM 5.2.7.5

Bike Detection



Loops, cameras, or infrared cameras that call green lights for cyclists, discouraging red light running and reducing bicyclist delay.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Motorist turns left in path of bicyclist, motorist turns right in path of bicyclist, motorist failed to yield at signalized intersection and bicyclist violating signal.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
At large intersections, integrate with signal operations to extend all red time when bicyclists are detected.

Home

Extend Green Time For Bikes



Prolonged green light time for cyclists when detected, allowing for more time to cross.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE:

COST: $

FOCUS CRASH TYPE
Motorist turns left in path of bicyclist, motorist turns right in path of bicyclist, and motorist failed to yield at signalized intersection.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
When used in a coordinated system, different timing plans may be needed. Topography should be considered in clearance time.

Home

Extend Pedestrian Crossing Time



Increases time for pedestrian walk phases, especially to accommodate vulnerable populations, such as children and the elderly.

CRASH REDUCTION EFFECTIVENESS: LOW MED HIGH CMF Available

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE:

COST: $

FOCUS CRASH TYPE
Through vehicle at signalized intersection.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
May need to be implemented as part of an overall retiming project.

Home

Extend Yellow and All Red Time



Extending yellow and all red time provides additional time for drivers, bicyclists and pedestrians to cross through a signalized intersection before conflicting traffic movements are permitted.

CRASH REDUCTION EFFECTIVENESS: LOW MED HIGH CMF Available

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE:

COST: $

FOCUS CRASH TYPE
Angle crashes and red light running crashes.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
May need to be implemented as part of an overall retiming project.

Home

FDM 232.6

Extended Time Pushbutton



A pushbutton that can be pressed to request extra time for using the crosswalk.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE:

COST: $

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle, and through vehicle at signalized intersection.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
May require education for full benefit. Candidate locations are in communities with high populations of people with mobility challenges.

Home

Flashing Yellow Turn Phase



Flashing yellow turn arrow alerts drivers to proceed with caution and decide if there is a sufficient gap in oncoming traffic to safely make a turn.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN — SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Left turn crashes.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
Should only be used when a pedestrian walk phase is not called.

Home

TEM 3.11.5.2

Leading Pedestrian Interval and Pedestrian Recall



Signal timing that allows pedestrians to enter intersections before vehicles are given a green indication allowing them to better establish their presence and increase their visibility.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN — SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle and motorist turns right in path of bicyclist.

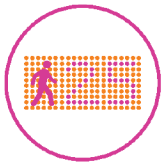
SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
If intersection is part of a coordinated system, consideration should be given to signal timing changes at upstream and downstream intersections.

Home

FDM 232.6

Pedestrian Countdown Timer



Displays "countdown" of seconds remaining on the pedestrian signal, discouraging pedestrians from starting a crossing with little time remaining.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle, and through vehicle at signalized intersection.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
Countdown timers are required for all newly installed traffic signals where pedestrian signals are installed.

Home

FDM 232.6, TEM 5.2.7.5

Pedestrian Detection



A device that detects when a pedestrian is waiting at a crosswalk and automatically triggers the pedestrian "WALK" phase.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN — SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle and through vehicle at signalized intersection.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
Selection of appropriate detection system that reduces the potential for false detection is recommended.

Home

TEM 3.11.3

Pedestrian Scramble



A form of pedestrian "WALK" phase at a signalized intersection in which all vehicular traffic is required to stop, allowing pedestrians to cross in any direction.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Pedestrian crashes.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
Significant levels of crossing activity may be required to justify phasing type.

Home

Prohibit Right-Turn-on-Red



Prohibiting right-run-on-red movements can be used in locations where obstructions prevent right-turning vehicles from seeing on-coming traffic or where high pedestrian volumes are present.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle, and motorist failed to yield at signalized intersection.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
May require provision of right-turn-only lane if there are conflicts between right-turning vehicles and pedestrians.

Home

Prohibit Turns During Pedestrian Phase



Restricts left or right turns during the pedestrian crossing phase at locations where a turning vehicle may conflict with pedestrians in the crosswalk.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle, motorist turned left in path of bicyclist, and motorist failed to yield at signalized intersection.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
This restriction may be displayed with a blank-out sign. May affect operations for right-turn vehicles. May require extending storage to avoid spillback into adjacent through lane

Home

FDM 232.2

Protected Left Turns



Converting a permissive left-turn to a protected left turn phase can reduce angle crashes involving left turning, opposing through vehicles, and non-motorized road users.

CRASH REDUCTION EFFECTIVENESS: **LOW** | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Left turn crashes, pedestrian struck by turning vehicle, and motorist turned left in path of bicyclist.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
May require an increase in left-turn queue storage or green time. If new or modified signal heads are required, or if traffic controller equipment needs to be upgraded, cost could be significantly higher.

Home

Red Light Camera



A red light camera enforces traffic signal compliance by capturing the image of a vehicle that has entered an intersection during the red phase with the photographic evidence used to issue a traffic violation to registered owner of vehicle.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Angle crashes and left turn crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness, and implement enforcing features to slow traffic.

CONSIDERATIONS

Home

FDM 223.2.1.4

Separate Right-Turn Phasing



Provides a green arrow phase for right-turning vehicles, reducing conflicts between right-turning traffic and bicyclists or pedestrians crossing the intersection.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$$

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle and motorist failed to yield at signalized intersection.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
May need to be implemented as part of an overall retiming project. U-Turns may need to be prohibited for movements affected by right-turn phasing.

Home

TEM 3.11.4

Shorten Cycle Length



Shorter cycle lengths can reduce the frequency of violations of the traffic control device.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Dart/dash.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
Should be implemented as part of a corridor or area wide traffic signal retiming program. Short cycle lengths of 60–90 seconds are ideal for urban areas.

Home

FDM 201.1.1

Signal Interconnectivity and Coordination/Green Wave



The emphasis of improving signal coordination for this countermeasure is to provide an opportunity for signal coordination for a desired speed outcome.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Speed related crashes.

SAFE SYSTEM STRATEGY
Manage vehicular speeds and implement enforcing features to slow traffic.

CONSIDERATIONS
Coordinating signals to allow for bicyclist progression, also known as a 'green wave,' gives bicyclists and pedestrians more time to safely cross through the 'green wave' intersections. Emergency vehicle preemption and phasing extensions under other strategies may need to be considered.

Home

Signal Preemption



Allows an authorized operator to override the normal operation of traffic lights, mostly used in the path of an emergency vehicle to reduce conflicts and decrease emergency vehicle response time.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Varies depending on application context.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
Other applications include at railroad crossings as well as school zones where there can be high volumes of pedestrians/bicyclists for short periods of time.

Home

FDM 232.1.6, FDM 232.2

Supplemental Signal Heads



Additional signal heads allow drivers to anticipate signal changes farther away from intersections or when there a visibility issues, such as a curve or bridge structure.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Angle crashes and left turn crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
When new signal heads are added, structural analysis may be required due to the added wind load. Supplemental traffic signals may be placed on the near side of an intersection, far-left, far-right, or very high.

Home

FDM 232

Traffic Signal



Traffic signals allocate the right-of-way to different traffic movements and provide controlled crossings for non-motorized users.

CRASH REDUCTION EFFECTIVENESS: LOW MED HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $$$

FOCUS CRASH TYPE
Angle crashes and left turn crashes.

SAFE SYSTEM STRATEGY
Remove severe conflicts and manage conflicts in time.

CONSIDERATIONS
While traffic signals have been shown to reduce the most severe types of crashes, they can result in an increase in rear-end collisions.

Home

Upgrade Signal Head



Replacing 8-inch signal heads with 12-inch signal heads improves visibility of signals and aiding drivers' advanced perception of upcoming intersections.

CRASH REDUCTION EFFECTIVENESS: LOW MED HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Angle crashes and left turn crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Structural analysis may be required due to the added wind load.

Home

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B. Signing and Striping

Installing additional signs and pavement markings can be a low-cost way to improve safety outcomes. However, to be effective, they often need to be implemented with other roadway modifications for maximum effectiveness, and sign clutter should be avoided. These types of projects can often be implemented with planned Resurfacing, Restoration and Rehabilitation (RRR) projects.

Strategies included in this section are:

1. Advance Stop Bar
2. Advance Yield Markings
3. Chevron Signs on Horizontal Curves
4. Curve Advance Warning Sign
5. Flashing Beacon as Advance Warning
6. LED-Enhanced Sign
7. Painted Centerline and Raised Pavement Markers at Curves
8. Pavement Speed Legends
9. Prohibit Left Turn
10. Striping Through Intersection
11. Time-Based Turn Restriction
12. Upgrade Intersection Pavement Markings
13. Upgrade Signs with Fluorescent Sheeting
14. Upgrade Striping
15. Upgrade to Larger Warning Signs
16. Wayfinding
17. Yield To Pedestrians Sign

FDM 230.6

Advance Stop Bar



Stop lines placed in advance of pedestrian crossings increasing visibility of pedestrians and reducing crossing encroachment.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Multiple threat/trapped.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Creating a wider stop bar or setting the stop bar further back may be appropriate for locations with known crosswalk encroachment issues.

Home

FDM 230.6

Advance Yield Markings



A yield line placed in advance of pedestrian crossings to indicate where a vehicle stop is intended, increasing visibility of pedestrians and reducing crossing encroachment.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Multiple threat/trapped.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Can be paired with other treatments, like RRFBs and/or high visibility crosswalks.

Home

TEM 4.5.4

Chevron Signs on Horizontal Curves



Signs that warn drivers of an approaching curve and provide tracking information.

CRASH REDUCTION EFFECTIVENESS: LOW, MED, HIGH, CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: SUBURBAN, RURAL

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Collision with fixed objects, and run off the road crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Can be paired with other treatments, like rumble strips.

Home

TEM 2.41.3

Curve Advance Warning Sign



Signage that notifies drivers of an approaching curve providing additional reaction time to slow down.

CRASH REDUCTION EFFECTIVENESS: LOW, MED, HIGH, CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: SUBURBAN, RURAL

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Collision with fixed objects and run off the road crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
This warning sign is ideally combined with other infrastructure that alerts drivers of the curve, such as chevron signs, delineators, and flashing beacons.

Home

FDM 202.3.13, TEM 3.1

Flashing Beacon as Advance Warning



Device paired with signage can notify motorists of an upcoming intersection or crosswalk, providing additional reaction time.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE:

COST: $$

FOCUS CRASH TYPE
Angle crashes, through vehicle at signalized intersection, and right turn crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Solar powered units can reduce construction costs associated with providing electricity. Beacon can also be used as an advance warning for red light ahead (typically when visibility to the signal is compromised by horizontal or vertical curve).

Home

LED-Enhanced Sign



Signage with LED lights embedded in the outline increasing sign visibility and are most effective at locations with visibility limitations or with a documented history of drivers failing to see or obey the sign.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE:

COST: $

FOCUS CRASH TYPE
Angle crashes, motorist failed to yield at unsignalized intersection, and through vehicle at unsignalized intersection.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
The LEDs may be set to flash or operate in a steady mode.

Home

Painted Centerline and Raised Pavement Markers at Curves



A raised pavement marker is a small device attached to the road and used as a positioning guide for drivers.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: RURAL

IMPLEMENTATION TIMELINE:

COST: $

FOCUS CRASH TYPE
Head on, collision with fixed objects, and run off the road crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS

Home

FDM 202.3.10

Pavement Speed Legends



Speed legends are numerals painted on the roadway indicating the current speed limit in mph, usually placed near speed limit signposts.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE:

COST: $

FOCUS CRASH TYPE
Speed related crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS

Home

Prohibit Left Turn



Prohibitions of left turns at locations where a turning vehicle may conflict with pedestrians in the crosswalk or where opposing traffic volume is high and there is not sufficient room for a separate turn lane.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Left turn crashes, pedestrian struck by turning vehicle, and motorist turned left in path of bicyclist.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
U-turns may need to be accommodated elsewhere on the corridor.

Home

FDM 230

Striping Through Intersection



Pavement markings that guide vehicles through intersections which helps drivers remain in their lanes throughout an intersection.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Sideswipes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS

Home

Time-Based Turn Restriction



Restricts left-turns or right-turns during certain time periods when there may be increased potential for conflict (e.g., peak periods, school hours).

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle, motorist turned left in path of bicyclist, and motorist turned right in path of bicyclist.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
If not enforced, could limit effectiveness.

Home

Upgrade Intersection Pavement Markings



Upgrading intersection pavement markings can improve safety by increasing the visibility of intersections for drivers approaching and at the intersection.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Angle crashes, through vehicle at unsignalized intersection, and motorist failed to yield at unsignalized intersection.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Upgrading intersection pavement marking can include "Stop Ahead" markings and the addition of centerlines and stop bars.

Home

Upgrade Signs with Fluorescent Sheeting



Upgrading to signs with retroreflective sheeting improves safety by increasing visibility of signs to drivers at night.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE: 

COST: $

FOCUS CRASH TYPE
Nighttime crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Depending on sign locations, a structural/wind analysis may need to be conducted.

Home

Upgrade Striping



Restripe lanes with reflective striping to improve striping visibility and clarify lane assignment, especially where the number of lanes changes.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE: 

COST: $

FOCUS CRASH TYPE
Sideswipes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS

Home

Upgrade to Larger Warning Signs



Upgrading to larger warning signs improves safety by increasing visibility of the information provided, particularly for older drivers.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE: 

COST: $

FOCUS CRASH TYPE
Crashes involving older drivers.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS

Home

FDM 223.6, TEM 2.36

Wayfinding



A network of signs that highlight nearby pedestrian and bicycle facilities and guide users to the most appropriate crossing locations.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE: 

COST: $

FOCUS CRASH TYPE
Pedestrian and bicycle crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS

Home

TEM 2.39

Yield To Pedestrians Sign



"Yield Here to Pedestrians" signs alert drivers about the presence of pedestrians. These signs are required with advance yield lines. Other sign types can be placed on the centerline in the roadway.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Through vehicle at unsignalized intersection, motorist failed to yield at unsignalized intersection.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
May need to be paired with education and enforcement.

Home

C. Bikeways

In the MetroPlan Orlando region, people bicycling are overrepresented in collisions where someone is seriously injured or killed. Providing dedicated space for cyclists separate from high-speed vehicle traffic can improve safety outcomes. Where dedicated space cannot be provided or there is a high density of conflict areas such as driveways or side streets, managing vehicle speeds, increasing visibility, and improving the predictability of roadway users can help to manage and reduce those conflicts and is critical to improving safety outcomes.

One of the most effective measures is a dedicated pathway separate from vehicle travel. While bike lanes may help to reduce the potential for a collision by making drivers aware of the likely presence of bicyclists, they are not as effective as a separate path with minimal conflicts with side-streets or driveways especially on higher speed roadways. People bicycling are particularly vulnerable in conflict zones.

Some countermeasures aim to increase cyclist visibility in conflict zones and provide clear direction to other roadway users. In areas where there is constrained right-of-way, signing and pavement markings can be effective. However, like most strategies these are context specific. For example, shared lane markings are appropriate on roadways with vehicle travel speeds of less than 25 mph and daily traffic volumes of less than 2,000. As speeds and traffic volumes increase, additional separation should be provided between vehicles and cyclists. The strategies below assume that other roadway design elements are incorporated to manage vehicle speeds to an appropriate level for the proposed bicycle facility.

Strategies included in this section are:

1. Bicycles May Use Full Lane Sign
2. Bike Lane/Buffered/Separated Bike Lane
3. Floating Transit Island
4. Mixing Zone
5. Parking Buffer
6. Separated Bikeway
7. Two-Stage Turn Queue Bike Box

TEM 2.11.3

Bicycles May Use Full Lane Sign



Signage that indicates cyclists may use the full lane, discouraging unsafe motorist passage.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Vehicle overtakes bicycle, motorist turns right in path of bicyclist, and bicycle crashes at driveways.

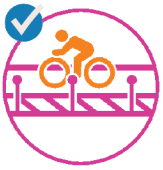
SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Volumes and number of conflicts need to be considered in the selection of this treatment.

Home

FDM 223.2.1

Bike Lane/Buffered/Separated Bike Lane



Separate lanes marked with symbols and signs specifically for bicycles, reducing bike/vehicle conflicts and slowing vehicle speeds via the road-narrowing effect.

CRASH REDUCTION EFFECTIVENESS: LOW MED HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Vehicle overtakes bicycle.

SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIDERATIONS
Consult FHWA Bikeway Selection Guide.

Home

FDM 210.3.2.3

Floating Transit Island



Separates the bike facility and transit boarding area, reducing conflict between the two modes, and lowering the risk of collision.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Bike/pedestrian crashes.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
Drainage and ADA requirements should be considered.

Home

Mixing Zone



Lane markings to delineate space for bicyclists and motorists within the same lane and indicate the intended path for bicyclists to reduce conflict with turning motor vehicles.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Motorist turns right in path of bicyclist.

SAFE SYSTEM STRATEGY
Manage conflicts in time, and increase attentiveness and awareness.

CONSIDERATIONS
May not be appropriate at intersections with very high peak automobile right turn demand.

Home

FDM 223.4

Parking Buffer



Pavement markings denoting door zone of parked vehicles to help bicyclists maintain safe positioning on the roadway

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Dooring.

SAFE SYSTEM STRATEGY
Remove severe conflicts, manage conflicts in time, and increase attentiveness and awareness.

CONSIDERATIONS
Door zones should be a minimum of 3 feet.

Home

FDM 223.2.4

Separated Bikeway



A bikeway with physical separation (horizontal and vertical) from vehicle traffic, designated lane markings, pavement legends, and signage, which reduces conflicts between bicycles and vehicles on the road.

CRASH REDUCTION EFFECTIVENESS: LOW, MED, HIGH

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$$

FOCUS CRASH TYPE
Vehicle overtakes bicycle.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
A raised barrier of plastic posts and painted pavement is a low-cost/ quick build option. Special treatments may be needed at driveways/ intersections.

Home

FDM 223.2.1.5

Two-Stage Turn Queue Bike Box



Roadway treatment for left turns at signalized intersections from the right-side bike lane protecting bicyclists from traffic.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Motorist failed to yield at signalized intersection, and bicyclist turned left into path of motorist.

SAFE SYSTEM STRATEGY
Manage conflicts in time and increase attentiveness and awareness.

CONSIDERATIONS
Prohibition of right turns on red may be required.

Home

D. Pedestrian Facilities

People walking are also overrepresented in collisions in the MetroPlan Orlando region where someone is killed or seriously injured. Providing more visible and frequent marked and controlled crossings, decreasing pedestrian crossing distance, and extending the amount of time to cross the street can help to reduce collisions. Many of these strategies also benefit other modes of travel although the primary benefit is to people walking.

Lighting is also a key element and can improve the visibility of all roadway users. Pedestrian detection can be used at trail crossings where users might not activate the crossing signal. Installing a median barrier can be a way to discourage pedestrian crossings, however a review of the pedestrian desire lines in the area should be conducted as there may be a reason, such as a bus stop on one side of the street and a shopping center or apartment complex on the other side. It is unlikely and unrealistic to expect pedestrians to walk a significant distance out of their way to use a protected crossing, especially in Florida weather. Typically, people are not willing to walk more than 300 to 400 feet to a crossing and while it may not be practical to install a pedestrian crossing every 600 to 800 feet (such that you are never farther than 300 to 400 feet from the nearest crossing), other strategies such as relocating a bus stop could also be part of the solution.

Strategies included in this section are:

1. Add Sidewalk
2. Co-Locate Bus Stops and Pedestrian Crossings
3. Curb Extensions
4. High-Visibility Crosswalk
5. Install/Upgrade Pedestrian Crossing at Uncontrolled Locations
6. Pedestrian Hybrid Beacon
7. Rectangular Rapid Flashing Beacon
8. Restripe Crosswalk
9. Shared Use Path
10. Widen Sidewalk

FDM 222.2.1

Add Sidewalk



Adding sidewalks provides a separated and continuous facility for people to walk along the roadway, and reduces the potential for people walking in the roadway, conflicting with vehicle travel.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Pedestrian walking along roadway.

SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIDERATIONS
In combination with new sidewalks, appropriate marked and controlled crossing locations should be identified.

Home

FDM 222.2.8

Co-Locate Bus Stops and Pedestrian Crossings



Place bus stops and pedestrian crossings in close proximity to allow transit riders to cross the street safely.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Dart/dash and multiple threat/trapped.

SAFE SYSTEM STRATEGY
Remove severe conflicts, and increase attentiveness and awareness.

CONSIDERATIONS
Could include relocation of existing bus stops, or installation of new crossing treatments.

Home

FDM 202.3.12, TEM 5.2.7.5

Curb Extensions



A traffic calming measure that extends the sidewalk for a short distance at a crossing location to reduces the crossing distance and increase visibility.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN | SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Dart/dash, multiple threat/trapped, pedestrian struck by turning vehicle, through vehicle at unsignalized intersection, and through vehicle at signalized intersection.

SAFE SYSTEM STRATEGY
Manage vehicular speeds, and increase attentiveness and awareness.

CONSIDERATIONS
Drainage and ADA requirements should be considered. Paint and plastic curb extensions are a low-cost/quick build option.

Home

FDM 230.3.1

High-Visibility Crosswalk



Crosswalks made from high-visibility material, such as thermoplastic tape, instead of paint, improving safety by increasing the visibility of marked crosswalks.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle, and through vehicle at signalized intersection.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Crosswalk treatments should consider wear patterns and maintenance requirements.

Home

FDM 222.2.3

Install/Upgrade Pedestrian Crossing at Uncontrolled Locations (Signs and Markings Only)



Marked crossings can channelize pedestrian travel and alert drivers that people may be crossing the roadway.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle, and through vehicle at unsignalized intersection.

SAFE SYSTEM STRATEGY
Manage conflicts in time, and increase attentiveness and awareness.

CONSIDERATIONS
Crossing locations should consider pedestrian destinations on both sides of roadway, pedestrian desire lines, as well as vehicle travel patterns.

Home

FDM 215.2.9, TEM 5.2.5.2

Pedestrian Hybrid Beacon



A pedestrian-hybrid beacon (PHB) notifies oncoming motorists to stop with a series of red and yellow lights. Unlike a traffic signal, the PHB rests in dark until a pedestrian activates it via pushbutton or other form of detection.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$$

FOCUS CRASH TYPE
Dart/dash, multiple threat/trapped, and through vehicle at unsignalized intersection.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
May require driver and pedestrian education.

Home

FDM 230.2.9, TEM 5.2.5.2

Rectangular Rapid Flashing Beacon



A rectangular rapid flashing beacon (RRFB) is a pedestrian-activated flashing light with signage to alert motorists of a pedestrian crossing. It improves safety by increasing the visibility of marked crosswalks and provides motorists a cue to slow down and yield to pedestrians.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Through vehicle at unsignalized intersection, dart/dash, and multiple threat/trapped.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
RRFBs should be reserved for use at locations with pedestrian safety issues as their overuse could diminish the effectiveness.

Home

Restripe Crosswalk



Periodic restriping of crosswalks is necessary to ensure the traffic markings are visible. Crosswalk may be restriped with high visibility markings.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle, through vehicle at signalized intersection, and through vehicle at unsignalized intersection.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Crosswalk treatments should consider wear patterns and maintenance requirements.

Home

FDM 224

Shared Use Path



A 12' foot facility that is separated from the vehicular travel way for use by bicyclists, pedestrians, skaters, wheelchair users, joggers, and other users. When adjacent to a travel lane, these are referred to as side paths.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: SUBURBAN, RURAL

IMPLEMENTATION TIMELINE:

COST: $$$

FOCUS CRASH TYPE
Vehicle/pedestrian crashes and vehicle/bicyclist crashes.

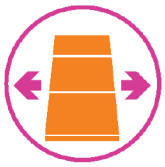
SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIDERATIONS
May require right-of-way.

Home

FDM 222.2.1.1

Widen Sidewalk



Widening sidewalks provides a more comfortable space for pedestrians and provides space to accommodate people in wheelchairs.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE:

COST: $$

FOCUS CRASH TYPE
Pedestrian walking along roadway.

SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIDERATIONS
May require right-of-way.

Home

VISION ZERO
CENTRAL FLORIDA
Counting down to zero traffic deaths

E. Intersections and Roadways

Changing intersection and roadway design features such as eliminating turn lanes where people driving do not have to stop (sometimes known as slip lanes) to slow vehicle turning movements, narrowing travel lanes to promote slower speeds, and constructing sidewalks are some effective methods. Many intersection and roadway design measures may require public outreach and detailed analysis. For example, partially closing a roadway could result in community concerns about increased traffic on other streets or the need to make improvements at other locations.

Some improvements such as a protected intersection where setbacks, dedicated lanes, and curbs protect people walking and bicycling, and force slow turns for people driving, can be expensive and might need to be programmed as a capital improvement project. There are often opportunities to take advantage of reallocating right-of-way, especially as part of planned resurfacing projects. For instance, lane repurposing to add/enhance bicycle and pedestrian facilities are good candidates for inclusion with other planned roadway projects. For many of the roadway design changes noted below, there are opportunities for cost savings when incorporated as part of routine maintenance projects, like resurfacing.

Strategies included in this section are:

1. All-Way Stop Control
2. Bicycle Crossing (Solid Green Paint)
3. Bike Box
4. Centerline Hardening
5. Close Slip Lane
6. Crosswalk Density
7. Curb-Return Radius Reduction
8. Delineators, Reflectors, and/or Object Markers
9. Directional Median Openings to Restrict Left Turns
10. Doubled-up, Oversized Stop Signs
11. Enhanced Daylighting/Slow Turn Wedge
12. Extend Bike Lane to Intersection
13. Gateway Treatments
14. Green Conflict Striping
15. Guardrail
16. Hardened Median Nose Extension
17. High Friction Surface Treatment
18. Impact Attenuators
19. Intersection Reconstruction and Tightening
20. Lane Repurposing
21. Median Barrier
22. On-Street Parking
23. Paint and Plastic Median
24. Paint and Plastic Mini Circle/Mini Roundabout
25. Partial Closure/Diverter
26. Protected Intersection
27. Raised Crosswalk
28. Raised Intersection
29. Raised Median
30. Reduced Left-Turn Conflict Intersection
31. Refuge Island
32. Retroreflective Signal Backplates
33. Roundabout
34. Rumble Strips
35. Safety Edge
36. Speed Hump, Speed Table or Speed Cushion
37. Straighten Crosswalk
38. Superelevation at Horizontal Curve Locations
39. Widen/Pave Shoulder

FDM 212.2.3

All-Way Stop Control



An all-way stop-controlled intersection requires all vehicles to stop before crossing the intersection and better allocates the right-of-way between roadway users.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | **HIGH** — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Angle crashes.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
Consider incorporating with high visibility crosswalks. Advanced signage may be necessary depending on speed and other roadway characteristics. Installation of unwarranted AWSC can lower stopping compliance.

Home

FDM 223.2.1.4, TEM 5.2.7.1

Bicycle Crossing (Solid Green Paint)



Green paint across an intersection that enhances bicycle safety and visibility.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Motorist turns left in path of bicyclist, motorist turns right in path of bicyclist, and motorist failed to yield at signalized intersection.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
In high travel areas, green paint can degrade and a maintenance plan should be developed.

Home

FDM 233.2.1.5

Bike Box



An area at an intersection with a signal where cyclists can move ahead of stopped traffic providing a designated and visible way to get ahead of queuing traffic.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Motorist failed to yield at signalized intersection and bicyclist turned left into path of motorist.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
In high travel areas, green paint can degrade and a maintenance plan should be developed.

Home

Centerline Hardening



Physical elements on the centerline, like bollards and rubber curbs, that encourage slower vehicle turns.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle.

SAFE SYSTEM STRATEGY
Manage vehicular speeds.

CONSIDERATIONS
Design should consider truck volumes and resulting wheel track in placement of hardening features.

Home

Close Slip Lane



Modification of an intersection to remove the sweeping right turn lane resulting in shorter pedestrian crossings, reduced turning speeds, and better sight lines.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE:

COST: $$$

FOCUS CRASH TYPE
Right turn crashes, pedestrian struck by turning vehicle, motorist turns left in path of bicyclist, and motorist turns right in path of bicyclist.

SAFE SYSTEM STRATEGY
Remove severe conflicts, manage vehicular speeds, and increase attentiveness and awareness.

CONSIDERATIONS
Drainage and ADA requirements should be considered.

Home

FDM 202.3.7

Crosswalk Density



Short blocks (500 feet or less) can manage speed by limiting driver acceleration distance between intersections. If used in conjunction with marked crosswalks, short blocks also create engagement. Where short-blocks do not exist, mid-block crosswalks can be used to simulate the short block effect.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: URBAN, RURAL

IMPLEMENTATION TIMELINE:

COST: $$

FOCUS CRASH TYPE
Vehicle/pedestrian crashes and vehicle/bicyclist crashes.

SAFE SYSTEM STRATEGY
Manage conflicts and increase attentiveness and awareness.

CONSIDERATIONS
May be challenging to retrofit buildout areas. Policy framework that requires increased intersection/crossing density as areas redevelop could be considered.

Home

FDM TABLE 212.12.3

Curb-Return Radius Reduction



This refers to the curvature of the curb line when two streets intersect. Reducing the size of the curb return radius can decrease the speed of turning vehicles and reduce the length of crossings.

CRASH REDUCTION EFFECTIVENESS: LOW, MED, HIGH — CMF Available

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE:

COST: $$

FOCUS CRASH TYPE
Speed related crashes, pedestrian struck by turning vehicle, and bicyclist struck by turning vehicle.

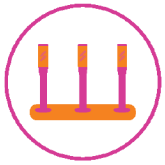
SAFE SYSTEM STRATEGY
Manage vehicular speeds.

CONSIDERATIONS
Can create drainage problems, emergency vehicles would need to be considered in design, and may be difficult for large trucks to navigate.

Home

FDM 230.2.7

Delineators, Reflectors, and/or Object Markers



Devices that warn drivers of an approaching curve or fixed object providing additional reaction time to slow down.

CRASH REDUCTION EFFECTIVENESS: LOW, MED, HIGH — CMF Available

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE:

COST: $

FOCUS CRASH TYPE
Run off the road and collision with fixed objects.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
The selection of adhesive should be carefully considered when installing delineators in hot climates.

Home

FDM 212.14.5

Directional Median Openings to Restrict Left Turns



A median with selective openings that limits the number of turning movement and reduces the number of conflict points.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE: 

COST: $$

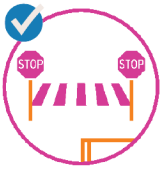
FOCUS CRASH TYPE
Angle crashes, and left turn crashes.

SAFE SYSTEM STRATEGY
Remove severe conflicts, and increase attentiveness and awareness.

CONSIDERATIONS
Need for U-Turns should be evaluated and accommodated along the corridor.

Home

Doubled-up, Oversized Stop Signs



Treatment provides for left and right, oversized advance intersection warning signs. Retroreflective sheeting on sign posts and enhanced pavement markings that delineate through lane edge lines are typically provided.

CRASH REDUCTION EFFECTIVENESS: **LOW** | MED | HIGH

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: RURAL

IMPLEMENTATION TIMELINE: 

COST: $

FOCUS CRASH TYPE
Run off the road, collision with fixed objects, angle crashes, and motorist failed to yield at unsignalized intersection.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Can also be paired with flashing beacons.

Home

Enhanced Daylighting/Slow Turn Wedge



Paint and bollards that extend the curb and slow turns at intersections which increases safety by expanding driver field of vision and slowing vehicle travel.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE: 

COST: $

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle and motorist turns left in path of bicyclist.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Quick curb and other treatments can be used with minor impacts to drainage under quick build conditions.

Home

FDM 223.2.4.5

Extend Bike Lane to Intersection



Where a bike lane is dropped due to a right turn lane, the intersection approach is restriped to allow for bicyclists to move to the left side of right turning vehicles ahead of reaching the intersection.

CRASH REDUCTION EFFECTIVENESS: **LOW** | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE: 

COST: $

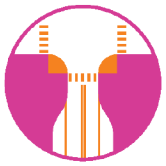
FOCUS CRASH TYPE
Motorist turns right in path of bicyclist.

SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
In locations with high right-turn volumes, consider bike ramp to sidewalk/ side path.

Home

Gateway Treatments



Gateway treatments are intended to alert roadway users that they are entering a different context and that they should expect pedestrians/bicyclists.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE:

COST: $

FOCUS CRASH TYPE
Vehicle/pedestrian crashes and vehicle/bicyclist crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness, and implement enforcing features to slow traffic.

CONSIDERATIONS
Examples of gateway treatments include signage, delineators, curb extensions, roundabouts, textured pavements, or other treatments intended to visually signal a changed condition to drivers.

Home

FDM 223.2.1.4

Green Conflict Striping



Dashed green markings in bike lanes near or through intersections increasing bicyclist visibility and identifying potential conflict points so both bicyclists and motorists use caution when traversing the area.

CRASH REDUCTION EFFECTIVENESS: LOW MED HIGH CMF Available

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE:

COST: $

FOCUS CRASH TYPE
Motorist turns left in path of bicyclist, motorist turns right in path of bicyclist, and motorist failed to yield at signalized intersection.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
In high travel areas, green paint can degrade and a maintenance plan should be developed.

Home

FDM 215

Guardrail



A device that reduces the severity of lane departure crashes by redirecting a vehicle away from embankment slopes or fixed objects and dissipating the energy of an errant vehicle.

CRASH REDUCTION EFFECTIVENESS: LOW MED HIGH CMF Available

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: RURAL, SUBURBAN

IMPLEMENTATION TIMELINE:

COST: $$

FOCUS CRASH TYPE
Run off the road crashes and collisions with fixed objects.

SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIDERATIONS
There are several different types of guardrail designs that should be considered based on the area context.

Home

FDM 210.3.3

Hardened Median Nose Extension



An extension of the median nose can reduce pedestrian exposure and can improve the crossing experience of multi-lane roadways. Median noses that extend past the crosswalk protect people waiting in the median and slow turning drivers.

CRASH REDUCTION EFFECTIVENESS: LOW MED HIGH

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE:

COST: $

FOCUS CRASH TYPE
Vehicle/pedestrian crashes, vehicle/bicyclist crashes, and left-turn crashes.

SAFE SYSTEM STRATEGY
Manage conflicts and increase attentiveness and awareness.

CONSIDERATIONS
Design should consider truck volumes and resulting wheel track in placement of median nose extension.

Home

High Friction Surface Treatment



High friction surface treatments can improve pavement friction under all conditions and help reduce the frequency of crashes by allowing motorists to stop faster than on non-treated pavement.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Run off the road crashes, and collisions with fixed objects.

SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIDERATIONS
Treatments can last for 8-12 years so a maintenance schedule outside the RRR process may need to be developed.

Home

FDM 215.4.3

Impact Attenuators



A device that brings an errant vehicle to a more-controlled stop or redirects the vehicle away from a rigid object, typically used to shield rigid roadside objects such as concrete barrier ends, steel guardrail ends and bridge pillars.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: RURAL

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Run off the road, and collision with fixed objects.

SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIDERATIONS
Can be used in permanent or temporary (construction zone) applications. Attenuators should only be installed where it is impractical for the objects to be removed.

Home

Intersection Reconstruction and Tightening



Reconstructing irregular intersections should can provide better visibility for all road users, and may also reduce high speed turns and pedestrian crossing lengths.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN | SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$$

FOCUS CRASH TYPE
Right turn crashes, pedestrian struck by turning vehicle, and motorist turns right in path of bicyclist.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Drainage and ADA requirements should be considered, in addition to the turn movements of trucks.

Home

FDM 202.1.1

Lane Repurposing



A right of way reallocation can modify the space dedicated to vehicle travel to create space for bicycle facilities, add a buffer to existing bicycle facilities, wider sidewalks, or center turn lanes.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN | SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Speed related crashes, pedestrian walking along roadway, and vehicle overtaking bicycle.

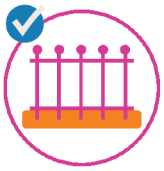
SAFE SYSTEM STRATEGY
Manage vehicular speeds and manage conflicts in time.

CONSIDERATIONS
There may be concerns about traffic diversion to other streets.

Home

FDM 215.4.6.4

Median Barrier



Barrier in the center of the roadway that physically separates opposing vehicular traffic and controls access to and from side streets and driveways, reducing conflict points.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE: 

COST: $$$

FOCUS CRASH TYPE
Run off the road, collison with fixed objects, head on, and median crossover crashes.

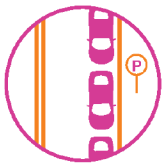
SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIBERATIONS
Median breaks should be identified to allow maintenance and emergency vehicles to cross the median at appropriate locations. Consideration should also be given to potential diversion of pedestrians.

Home

FDM 202.3.2, FDM 210.2.3

On-Street Parking



On-street parking can provide a buffer between pedestrians/ bicyclists and the travel lane, increasing safety and comfort. It can also be used to manage speeds when adjacent to a travel lane as parking maneuvers and driving next to parked vehicles creates friction that slows drivers.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE: 

COST: $$$

FOCUS CRASH TYPE
Vehicle/pedestrian crashes.

SAFE SYSTEM STRATEGY
Implement enforcing features to slow traffic.

CONSIBERATIONS
If there are bike lanes or high volumes of bicyclists, a minimum of 3 feet should be provided to prevent "dooring". Providing the appropriate separation between the bicycle facility, travel way, and parking lane is critical.

Home

Paint and Plastic Median



A painted median with plastic posts between the two directions of travel, reducing vehicular speeding and discourages risky turning movements.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE: 

COST: $

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle and motorist turns left in path of bicyclist.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness, and implement enforcing features to slow traffic.

CONSIBERATIONS
If posts are routinely being knocked down, a different treatment may be warranted.

Home

Paint and Plastic Mini Circle/ Mini Roundabout



Mini circles use paint and soft hit posts to replace stop-controlled intersections with a circular design that slows traffic and eliminates left turns and reduces conflicts. Mini roundabouts use curb treatments for a more permanent installation.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE: 

COST: $$

FOCUS CRASH TYPE
Angle crashes and left turn crashes.

SAFE SYSTEM STRATEGY
Remove severe conflicts and implement enforcing features to slow traffic.

CONSIBERATIONS
These should only be considered on low volume, low speed streets where trucks are not routinely expected to be.

Home

Partial Closure/Diverter



A roadway treatment that restricts select vehicle movements using physical diversion while allowing bicyclists and pedestrians to proceed.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

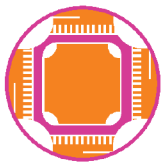
FOCUS CRASH TYPE
Pedestrian and bicycle crashes.

SAFE SYSTEM STRATEGY
Remove severe conflicts and implement enforcing features to slow traffic.

CONSIDERATIONS
Should be implemented as part of a larger traffic calming plan to minimize effects of diverted traffic to residential streets.

Home

Protected Intersection



Protected intersections use corner islands, curb extensions, and colored paint to delineate bicycle and pedestrian movements across an intersection, slowing driving speeds and providing shorter crossing distances.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$-$$$

FOCUS CRASH TYPE
Pedestrian struck by turning vehicle, motorist turns right in path of bicyclist, and motorist failed to yield at signalized intersection.

SAFE SYSTEM STRATEGY
Remove severe conflicts, manage vehicular speeds, manage conflicts in time, and increase attentiveness and awareness.

CONSIDERATIONS
Drainage and ADA requirements should be considered.

Home

FDM 202.3.8, TEM 5.2.7.5

Raised Crosswalk



Raised crosswalks are typically elevated 3-6 inches above the road or at sidewalk level and improves safety by increasing crosswalk and pedestrian visibility and slowing down motorists.

CRASH REDUCTION EFFECTIVENESS: LOW MED HIGH CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Through vehicle at signalized intersection, through vehicle at unsignalized intersection, and pedestrian struck by turning vehicle.

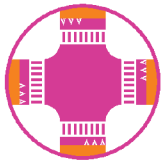
SAFE SYSTEM STRATEGY
Manage vehicular speeds, and increase attentiveness and awareness.

CONSIDERATIONS
Drainage and ADA requirements should be considered.

Home

FDM 202.3.8

Raised Intersection



Elevates the intersection to bring vehicles to the sidewalk level. Serves as a traffic calming measure by extending the sidewalk context across the road.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$$

FOCUS CRASH TYPE
Through vehicle at signalized intersection, through vehicle at unsignalized intersection, and pedestrian struck by turning vehicle.

SAFE SYSTEM STRATEGY
Manage vehicular speeds, and increase attentiveness and awareness.

CONSIDERATIONS
Drainage and ADA requirements should be considered.

Home

TEM 5.2.7.5

Raised Median



Curbed sections in the center of the roadway that are physically separated from vehicular traffic. Raised medians can also help control access to and from side streets and driveways, reducing conflict points.

CRASH REDUCTION EFFECTIVENESS: LOW MED **HIGH** — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Angle crashes, head on, and dart/dash.

SAFE SYSTEM STRATEGY
Manage vehicular speeds.

CONSIDERATIONS
Need for U-Turns should be evaluated and accommodated along the corridor.

Home

FDM 212.1.1

Reduced Left-Turn Conflict Intersection



Geometric designs that alter how left-turn movements occur can simplify decisions and minimize the potential for related crashes.

CRASH REDUCTION EFFECTIVENESS: **LOW** MED HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: SUBURBAN, RURAL

IMPLEMENTATION TIMELINE

COST: $$$

FOCUS CRASH TYPE
Left turn crashes and angle crashes.

SAFE SYSTEM STRATEGY
Manage conflicts in time, and increase attentiveness and awareness.

CONSIDERATIONS
Two highly effective designs that rely on U-turns to complete certain left-turn movements are known as the restricted crossing U-turn (RCUT) and the median U-turn (MUT). These treatments may require additional ROW.

Home

FDM 210.3.2.3, TEM 5.2.7.5

Refuge Island



Provides a raised barrier in the center of the roadway restricting certain turning movements and providing a place for pedestrians to wait if they are unable to finish crossing the intersection. It reduces the number of potential conflict points and the exposure of pedestrians crossing the roadway.

CRASH REDUCTION EFFECTIVENESS: LOW **MED** HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Dart/dash, through vehicle at signalized intersection, and through vehicle at unsignalized intersection.

SAFE SYSTEM STRATEGY
Manage conflicts in time, and increase attentiveness and awareness.

CONSIDERATIONS
Pedestrian refuge areas can be constructed from paint and plastic as part of a low-cost/quick build project.

Home

FDM 232.1.5, TEM 3.9

Retroreflective Signal Backplates



Backplates added to a traffic signal head improve the visibility of the illuminated face of the signal by introducing a controlled-contrast background, which can be retroreflective.

CRASH REDUCTION EFFECTIVENESS: **LOW** MED HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Angle crashes and left turn crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
When an entire backplate is added, structural analysis may be required due to the added wind load.

Home

FDM 231.3.3

Roundabout



A circular non-signalized intersection where traffic flows in one direction that reduces conflict points.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE: 

COST: $$$

FOCUS CRASH TYPE
Severe crashes, angle crashes, and left turn crashes.

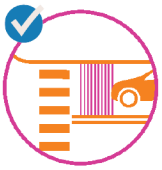
SAFE SYSTEM STRATEGY
Remove severe conflicts and manage vehicular speeds.

CONSIDERATIONS
Typically requires more right-of-way than traditional intersection and can be challenging for visually impaired people to navigate. Additional pedestrian treatments may be needed at some roundabouts.

Home

FDM 210.4.6 , TEM 5.2.7.5

Rumble Strips



Pavement treatments that create noise and vibration inside the vehicle that alert a driver as they cross the center or edge line to get the attention of a distracted or drowsy driver or under low visibility conditions.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: RURAL

IMPLEMENTATION TIMELINE: 

COST: $

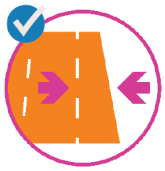
FOCUS CRASH TYPE
Run off the road crashes and collisions with fixed objects.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Can create noise pollution and may not be appropriate near residential uses. May also pose problems for bicyclists and motorcyclists.

Home

Safety Edge



A safety edge is intended to minimize drop-off-related crashes as the shoulder pavement edge is sloped at an angle (30-35 degrees) to make it easier for a driver to safely reenter the roadway after inadvertently driving onto the shoulder.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: RURAL

IMPLEMENTATION TIMELINE: 

COST: $

FOCUS CRASH TYPE
Run off the road crashes and collisions with fixed objects.

SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIDERATIONS
Drainage and added impervious surface would need to be evaluated.

Home

FDM 202.3.8

Speed Hump, Speed Table or Speed Cushion



Vertical deflection device to raise the entire wheelbase of a vehicle and encourage motorists to travel at slower speeds.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: URBAN SUBURBAN

IMPLEMENTATION TIMELINE: 

COST: $

FOCUS CRASH TYPE
Speed related crashes.

SAFE SYSTEM STRATEGY
Manage vehicular speeds and implement enforcing features to slow traffic.

CONSIDERATIONS
Drainage and emergency vehicle access will need to be considered. Speed cushions may be more appropriate on roadways with frequent emergency response vehicles.

Home

FDM 222.2.3

Straighten Crosswalk



Alignment of crosswalks to be perpendicular to the sidewalk, reducing pedestrian cross time and increasing sight lines.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Pedestrian crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Location of drainage inlets may affect curb ramp placement.

Home

FDM 240.2.1.4

Superelevation at Horizontal Curve Locations



A rotation and rising of pavement as the road curves that offsets sideways vehicular momentum preventing motorists from losing control.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: RURAL

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Run off the road crashes and collisions with fixed objects.

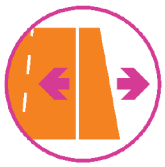
SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIDERATIONS
Design speed should be evaluated as part of any geometric design change.

Home

FDM 210.4

Widen/Pave Shoulder



Widened and paved shoulders create a separated space for bicyclists and provide a breakdown lane. Paved shoulders can help to reduce run-off-road crashes and are most beneficial on rural roads without paved shoulders.

CRASH REDUCTION EFFECTIVENESS: LOW MED HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: RURAL

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Run off the road, collision with fixed objects, vehicle overtakes bicycle.

SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIDERATIONS
Adding paved shoulders within horizontal curve sections may help agencies maximize benefits of the treatment while minimizing costs as opposed to adding paved shoulders to an entire corridor.

Home

F. Speed Management

Speed is an overarching contributing factor to many fatal and serious-injury crashes across all collision types in the region, with most fatal and severe injury crashes occurring on high-speed roadways. Therefore, a focus of engineering countermeasures is context appropriate speeds. A variety of proven techniques can be applied to reduce travel speed that are also considered as cross cutting strategies:

- Lane Repurposing – Reallocating the right-of-way to serve all roadway users can result in a reduction in the number of travel lanes on a street, which can enable the slowest driver to set the operating speed on a street, rather than the fastest driver. (See discussion in intersection and roadways)
- Traffic calming – Vertical devices such as speed humps and speed tables, horizontal devices such as bulbouts, chicanes, or mini traffic circles/roundabouts all have documented speed-reduction effects. These treatments are typically limited to local and collector roads, but sometimes are installed on arterial roadways depending on the context. (Traffic calming measures, such as speed humps and raised intersections are provided in the intersection and roadways section)
- Signal Coordination – Traffic signal coordination to maintain desired operating speeds along corridors. This strategy can reduce the incentive for people to drive more than the posted speed limit between intersections as it removes the potential for travel time savings. (See discussion in signals)
- Realigning skewed intersections – Broad, wide-radius turns can be made at high speeds. Tighter turns, closer to 90 degrees with a small radius are made at lower speeds. This strategy can also have the added benefit of reducing intersection crossing distances and increasing overall visibility. (See discussion in intersection and roadways)
- Reducing travel lane widths – Narrower travel lanes encourage lower vehicle speeds. Recent updates to the American Association of State Highway Transportation Official's (AASHTO) A Policy on Geometric Design of Highways and Streets included allowances for narrow travel lanes in recognition of safety research that showed little or no difference in crash history in a variety of contexts.
- Roundabouts – By introducing horizontal deflection onto otherwise straight roadways, roundabouts can reduce operating speeds. Additionally, roundabouts have proven safety benefits compared to standard intersections. (See information related to roundabouts in Intersection and roadway design)

Strategies included in this section are:

1. Appropriate Speed Limits
2. Chicane
3. Landscape Buffer
4. Lane Narrowing
5. Speed Cameras
6. Speed Feedback Sign
7. Speed Sensitive Rest on Red
8. Variable Speed Limits

FDM 201

Appropriate Speed Limits



Setting speed limits to reflect the surrounding context of the roadway and that meet with driver expectations can help improve driver respect for speed limits.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Speed related crashes.

SAFE SYSTEM STRATEGY
Manage vehicular speeds.

CONSIDERATIONS
Speed limit changes absent construction of engineering countermeasures should consider crash history and actual travel speeds. Speed limits that appear inconsistent may be ignored by the majority of drivers and this may contribute to lack of respect for speed limit and other traffic laws. Cost does not include implementation of engineering countermeasures to achieve desired speeds.

Home

FDM 202.3.3

Chicane



Uses centerline deflection within existing curb by placing vertical barriers (e.g., curbs, on-street parking) to require vehicle operators to make frequent horizontal movements, which typically reduces vehicular speeds.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN | SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Speed related crashes.

SAFE SYSTEM STRATEGY
Manage vehicular speeds, and implement enforcing features to slow traffic.

CONSIDERATIONS
Can create drainage problems, Potential for head-on collisions increases depending on context , May be difficult for large trucks to navigate

Home

FDM 270.2

Landscape Buffer



Landscape separating drivers from bicyclists and pedestrians increases space between the modes and can produce a traffic calming effect by encouraging drivers to drive at slower speeds.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN | SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Speed related crashes.

SAFE SYSTEM STRATEGY
Manage vehicular speeds and implement enforcing features to slow traffic.

CONSIDERATIONS
Maintenance plan for landscaping may need to be developed.

Home

FDM 202.3.4

Lane Narrowing



Lane narrowing can encourage motorists to travel at slower speeds, which can reduce the severity of crashes.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN | SUBURBAN

IMPLEMENTATION TIMELINE

COST: $

FOCUS CRASH TYPE
Speed related crashes.

SAFE SYSTEM STRATEGY
Manage vehicular speeds and implement enforcing features to slow traffic.

CONSIDERATIONS
Lane narrowing through restriping can provide opportunities to widen bike lanes.

Home

Speed Cameras



These devices can capture the speed of a vehicle and a license plate to supplement traditional methods of enforcement. Signage should be installed to warn drivers in advance of the first speed camera on a corridor.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Speed related crashes.

SAFE SYSTEM STRATEGY
Manage vehicular speeds and implement enforcing features to slow traffic.

CONSIDERATIONS
These are allowed in Florida in school zones.

Home

FDM 202.3.9

Speed Feedback Sign



Notifies drivers of their current speed, usually followed by a reminder of the posted speed limit, providing a cue for drivers to check their speed and slow down.

CRASH REDUCTION EFFECTIVENESS: **LOW** | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $

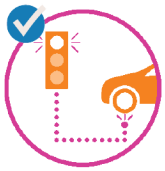
FOCUS CRASH TYPE
Speed related crashes.

SAFE SYSTEM STRATEGY
Implement enforcing features to slow traffic.

CONSIDERATIONS
Some units can collect data to identify the most prevalent times of day/ week for speeding to aim in law enforcement activities.

Home

Speed Sensitive Rest on Red



At certain hours (e.g. late night) a signal remains red for all approaches or certain approaches until a vehicle approaches the intersection. If the vehicle is going faster than the desired speed, the signal will not turn green until after the vehicle stops. If the vehicle is going the desired speed the signal will change to green before the vehicle arrives.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: URBAN | SUBURBAN

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Speed related crashes.

SAFE SYSTEM STRATEGY
Manage vehicular speeds and implement enforcing features to slow traffic.

CONSIDERATIONS
Can be paired with variable speed warning signs.

Home

SPEED ZONING 10.1

Variable Speed Limits



Variable speed limits (VSLs) can improve safety performance and traffic flow by reducing speed variance (i.e., improving speed harmonization). The speed limit changes according to the current environmental and road conditions and is displayed on an electronic traffic sign.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | **HIGH** — CMF Available

MODAL SAFETY EMPHASIS

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE

COST: $$

FOCUS CRASH TYPE
Speed related crashes, secondary crashes, and work zone.

SAFE SYSTEM STRATEGY
Manage vehicular speeds.

CONSIDERATIONS
VSLs may also improve driver expectation by providing information in advance of slowdowns and potential lane closures, which could reduce the probability for secondary crashes. VSLs can mitigate adverse weather conditions or slow faster-moving traffic as it approaches a queue or bottleneck. Particularly effecti[illegible]nd rural freeways and high-speed arterials with posted spe[illegible]er than 40 mph.

Home

G. Other Engineering Strategies

Several other strategies are not focused on a singular mode and can benefit all roadway users. For example, consolidating driveways and improving lighting can benefit all roadway users. Curbside management is most commonly needed in urban areas where there is high competition for curb space, where effective management strategies can reduce passenger loading from travel lanes, reduce double parked delivery vehicles, and increase transit reliability.

Strategies included in this section are:

1. Access Management/Close Driveway
2. Create or Increase Clear Zone
3. Far-Side Bus Stop
4. Intersection Lighting
5. Relocate Select Hazardous Utility Poles
6. Remove Obstructions For Sightlines
7. Segment Lighting
8. Upgrade Lighting to LED

FDM 223.2.4.5

Access Management/Close Driveway



Driveway movements may create conflicts between pedestrians, bicyclists and vehicles, especially within 250 feet of intersections. Closing or modifying driveways, may reduce potential conflicts.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | **HIGH**

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE:

COST: $$

FOCUS CRASH TYPE
Driveway related pedestrian crashes, angle crashes, left turn crashes, and right turn crashes.

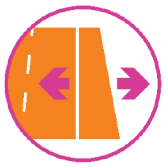
SAFE SYSTEM STRATEGY
Remove severe conflicts, and increase attentiveness and awareness.

CONSIDERATIONS
Need for U-Turns should be evaluated and accommodated along the corridor, and reciprocal access may be required.

Home

FDM 215.2.3

Create or Increase Clear Zone



A clear zone is an unobstructed roadside area that allows a driver to regain control of a vehicle that has left the road.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | **HIGH** — CMF Available

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: RURAL

IMPLEMENTATION TIMELINE:

COST: $$

FOCUS CRASH TYPE
Run off the road and collision with fixed objects.

SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIDERATIONS
Creating or increasing clear zones within horizontal curve sections may help agencies maximize benefits of the treatment while minimizing costs, as opposed to providing a clear zone throughout an entire corridor.

Home

FDM 225.3

Far-Side Bus Stop



Located immediately after an intersection, allowing the bus to pass through the intersection before stopping, encourages pedestrians to cross behind the bus for greater visibility and can improve transit service reliability.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: URBAN, SUBURBAN

IMPLEMENTATION TIMELINE:

COST: $

FOCUS CRASH TYPE
Dart/dash and multiple threat/trapped.

SAFE SYSTEM STRATEGY
Remove severe conflicts, and increase attentiveness and awareness.

CONSIDERATIONS
Bus stops should be located in proximity to marked and controlled crossings, especially in circumstances when destinations are on opposite side of the street. Coordination with transit agency is required.

Home

FDM 231

Intersection Lighting



Lighting improves safety by increasing visibility of all road users, and is most effective at reducing or preventing collisions at night.

CRASH REDUCTION EFFECTIVENESS: **LOW** | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS:

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE:

COST: $$

FOCUS CRASH TYPE
Nighttime crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Location of landscaping that could affect lighting levels on the street should be evaluated.

Home

FDM 215.4.7

Relocate Select Hazardous Utility Poles



Relocating or removing utility poles from within the clear zone alleviates the potential for fixed-object crashes.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: RURAL

IMPLEMENTATION TIMELINE: 

COST: $$

FOCUS CRASH TYPE
Run off the road and collisions with fixed objects.

SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIDERATIONS
Public Right-of-Way Accessibility Guidelines (PROWAG) require 48-inch pedestrian clear zone which may accelerate the need to relocate utility poles within pedestrian paths of travel.

Home

Remove Obstructions For Sightlines



Remove objects that may prevent drivers and pedestrians from having a clear sightline, such as installing red curb at intersection approaches to remove parked vehicles (also called "daylighting"), trimming or removing landscaping, or removing or relocating large signs.

CRASH REDUCTION EFFECTIVENESS: LOW | **MED** | HIGH — CMF Available

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE: 

COST: $

FOCUS CRASH TYPE
Angle crashes, pedestrian struck by turning vehicle, motorist failed to yield at unsignalized intersection, motorist failed to yield at signalized intersection, and bicycle sidewalk crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Landscaping obstructions may require more routine maintained.

Home

FDM 231

Segment Lighting



Lighting along roadways that improves visibility at night.

CRASH REDUCTION EFFECTIVENESS: **LOW** | MED | HIGH — CMF Available

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE: 

COST: $$

FOCUS CRASH TYPE
Nighttime crashes.

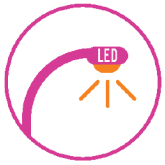
SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
Location of landscaping that could affect lighting levels on the street should be evaluated.

Home

FDM 231.3.2.1.1

Upgrade Lighting to LED



Replacing high-pressure sodium light bulbs with LED lights improves safety by increasing the visibility of pedestrians in crosswalks through greater color contrast and larger areas of light distribution.

CRASH REDUCTION EFFECTIVENESS: UNKNOWN

MODAL SAFETY EMPHASIS: 

APPLICABLE FACILITY: ALL ROADWAYS

IMPLEMENTATION TIMELINE: 

COST: $$

FOCUS CRASH TYPE
Nighttime crashes.

SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

CONSIDERATIONS
May require installation of additional lighting fixtures to meet lighting goals.

Home

VISION ZERO
CENTRAL FLORIDA

Counting down to zero traffic deaths

VISION ZERO
CENTRAL FLORIDA
Counting down to zero traffic deaths

Appendix A - Cost Estimate Details

Primary Safe System Strategy	Secondary Safe System Strategy (if applicable)	Countermeasure	Cost Considerations	Cost Estimate Range
Remove severe conflicts	Enforcing feature to slow traffic	Roundabout/Mini Roundabout	Extent of overall roadway reconstruction, drainage, landscaping and pedestrian amenities can affect overall cost. Does not include Right of Way.	"Neighborhood: $25-100K Collector: $150-$250k Arterial: $250k+ Multilane: $500k+"
Remove severe conflicts	Enforcing feature to slow traffic	Mini Traffic Circle	Drainage, landscaping and pedestrian amenities can affect overall cost.	$8,000-$15,000
Remove severe conflicts	-	Sidewalk Network Enhancements (close gaps)	Does not include utility relocation/ drainage.	$226,150/mile (5' one side, 4" depth)
Remove severe conflicts	Increase attentiveness and awareness	Corridor Access Management	Cost varies depending on strategies, such as median construction, closing/ reconfiguring driveways, etc.	Varies
Remove severe conflicts	Increase attentiveness and awareness	Median U-turn	Costs of the lower end of range if a minor modification; costs on the upper end of the range roadway if reconstruction is required.	$50,000-$1,000,000
Remove severe conflicts	-	Shared Use Path	Depending on number of driveways, additional treatments may be necessary to increase visibility of people on path at conflict locations. May require right-of-way, drainage improvements, and a landscaping plan.	$410,483/mile, 12' path, bidirectional
Remove severe conflicts	-	Buffered/Separated Bike Lanes	Cost of Paint Only; other treatments may be needed.	$11.50/sf
Remove severe conflicts	-	Median Barriers	Depends on materials selected - cable barrier can be about a third of the cost as a concrete barrier	$10,000-20,000 per 100 ft
	-	High Friction Surface Treatment	Depends on the overall composition of the overlay.	$42,000-$190,000/lane/ mile
Manage speed	-	Appropriate Speed Limits	Cost considerations include engineering study to target speed, identifying appropriate countermeasures to achieve desired speed, and implementing engineering countermeasures as applicable.	Varies
Manage speed	Enforcing feature to slow traffic	Speed Cameras	Depends on existing infrastructure along corridor. Currently these are only allowed in school zones and upgrades to school zone extents, signage and other equipment may be necessary. Does not include educational outreach campaign costs.	$60,000-$80,000

APPENDIX A - COST ESTIMATE DETAILS

Primary Safe System Strategy	Secondary Safe System Strategy (if applicable)	Countermeasure	Cost Considerations	Cost Estimate Range
Manage speed	-	Variable Speed Limits	Often implemented as part of a TSMO program; cost for signage only. Should roadway reconstruction be required, cost could be significantly higher.	$25,000-$30,000/mile
Manage speed	Enforcing feature to slow traffic	Speed Hump	Drainage could affect overall cost.	$1,500-5,500
Manage speed	Enforcing feature to slow traffic	Speed Table	Drainage could affect overall cost.	$2,000-20,000
Manage speed	Enforcing feature to slow traffic	Chicanes	Drainage could affect overall cost.	$2,500-16,000
Manage speed	-	Curb-Return Radius Reduction	Drainage and ADA requirements could affect overall cost.	$15,000-40,000
Manage speed	Increase attentiveness and awareness	Raised Crossing	Drainage and ADA requirements could affect overall cost.	$39,000 - $45,500
Manage speed	Increase attentiveness and awareness	Raised Intersection	Drainage and ADA requirements could affect overall cost.	$106,500 - $124,000
Manage speed	Enforcing feature to slow traffic	Lane Narrowing	Based on cost to mill and restripe roadway to provide marked parking. Actual cost could be lower if milling and resurfacing are not required.	$334,500/lane/mile
Manage speed	Enforcing feature to slow traffic	Landscape Buffer	Maintenance plan for landscaping may need to be developed. Cost considerations include right-of-way, drainage, irrigation, and maintenance.	Varies
Manage speed	Manage conflicts	Signal Retiming	Depends on existing signal hardware/ software and if it is implemented as part of a larger retiming program.	$0-$5,440
Manage speed	Manage conflicts	Lane Repurposing	Cost could be significantly higher if curbs are being moved and drainage is affected.	$334,500/lane/mile
Manage speed	-	Corner Radius Reduction	Drainage and ADA requirements can affect overall cost.	$15,000-40,000
Manage speed	Increase attentiveness and awareness	Curb Extension	Materials (concrete vs asphalt), landscaping, drainage, ADA requirements, and extent of other required roadway changes can affect overall cost; cost is for one corner; may be economies of scale if constructed at all corners of the intersection.	$2,000-20,000
Manage conflicts in time	Increase attentiveness and awareness	Crosswalk Density	If new RRFBs or other treatments are being considered, please consult those items for cost.	$100 for a regular striped cross-walk, $300 for a ladder crosswalk and $3,000 for patterned concrete crosswalk.
Manage conflicts in time	Increase attentiveness and awareness	Medians and Pedestrian Refuge Islands	Materials (concrete vs asphalt), landscaping, drainage, ADA requirements, and extent of other required roadway changes can affect overall cost; cost is for one refuge; may be economies of scale if constructed at multiple locations along the same corridor.	$10,000-$40,000

APPENDIX A - COST ESTIMATE DETAILS

Primary Safe System Strategy	Secondary Safe System Strategy (if applicable)	Countermeasure	Cost Considerations	Cost Estimate Range
Manage conflicts in time	Increase attentiveness and awareness	Median Nose Extension	Cost can very significantly depending on linear feet, materials (paint vs asphalt), drainage requirements, ADA requirements and other site specific factors. Cost is per leg.	$500-20,000
Manage conflicts in time	-	Leading Pedestrian Intervals (LPI)	Depends on existing signal hardware/ software and if it is implemented as part of a larger retiming program.	$0-$5,440
Manage conflicts in time	-	No Right Turn on Red blank-out signs	Cost depends on existing signal hardware/ software. Cost per sign.	$4,500-$15,000
Manage conflicts in time	-	Pedestrian Hybrid Beacons (PHBs)	Depends on the size of crossing, type of mast arm required, and other site specific features.	$75,000-$265,000/unit
Manage conflicts in time	-	Rectangular Rapid Flashing Beacons (RRFBs)	Solar powered units can reduce cost of running electricity. Costs only include RRFB system. If implemented in conjunction with high visibility crosswalks, median refuge and other elements, costs would be higher.	$4,500-$52,00
Manage conflicts in time	Increase attentiveness and awareness	Restricted Crossing U-turn	Costs of the lower end of range if a minor modification; costs on the upper end of the range roadway if reconstruction is required.	$50,000-$1,000,000
Manage conflicts in time	Increase attentiveness and awareness	Hardened Centerlines and Turn Wedges	Cost depends on selected treatments/ materials, size of intersection and number of approaches where countermeasure is installed. Cost is per approach.	$1,000 - $2,000
Manage conflicts in time	-	Retime Signals: Yellow Change Intervals	Depends on existing signal hardware/ software and if it is implemented as part of a larger retiming program.	$0-$5,440
Increase attentiveness and awareness	Enforcing feature to slow traffic	Gateway Treatments	Cost depends on extent of treatments	$10,000-65,000
Increase attentiveness and awareness	-	High Visibility Crosswalk	Depends on the size the size the crosswalk, and the paint used.	$600-5,700
Increase attentiveness and awareness	-	Bike Box	Cost of Paint Only; other treatments may be needed.	$11.50/sf
Increase attentiveness and awareness	-	Lighting	Cost depends on a number of variables, including type of fixtures, frequency of lighting,, and presence of electricity in corridor.	Varies
Increase attentiveness and awareness	-	Improving Sight Lines	Cost depends on type of strategy, such as landscaping maintenance, closing of slip lanes, removal of on-street parking or straightening of crosswalk.	Varies
Increase attentiveness and awareness	-	Backplates with Retroreflective Borders	A structural/wind analysis should be conducted.	"$35/head to add reflective tape to existing backplates $110/head to install new backplates with integrated retroreflective material"

APPENDIX A - COST ESTIMATE DETAILS

Primary Safe System Strategy	Secondary Safe System Strategy (if applicable)	Countermeasure	Cost Considerations	Cost Estimate Range
Increase attentiveness and awareness	-	Enhanced Signing and Pavement Markings	Cost depends on the types of signage and pavement marking treatments.	$800 - $1,300 per location
Increase attentiveness and awareness	Remove conflicts	Bicycle Lanes Enhancements	Cost depends on the range of treatments applied and if right-of-way is needed.	Varies
Increase attentiveness and awareness	-	Refresh pavement markings	Overall cost per location can be reduced when implemented along a corridor or areawide.	$22-600 each ($180 avg)
Increase attentiveness and awareness	-	Doubled-up (left and right), oversized advance intersection warning signs, with supplemental street name plaques (can also include flashing beacon).	Flashing beacon cost is not included.	$50-150/sign
Increase attentiveness and awareness	-	Retroreflective sheeting on sign posts.	Depends on size of sign.	$50-250/sign
Increase attentiveness and awareness	-	Enhanced pavement markings that delineate through lane edge lines.	Overall cost per location can be reduced when implemented along a corridor or areawide.	$1-10/linear foot
Increase attentiveness and awareness	-	Doubled-up (left and right), oversized Stop signs.	Can also be paired with flashing beacons that are not included in cost estimate.	$50-150/sign
Increase attentiveness and awareness	-	Properly placed stop bar / Advance stop bar	Not limited to stop control intersections.	$500
Increase attentiveness and awareness	-	Removal of vegetation, parking, or obstructions that limit sight distance.	Similar to improving sight-lines. Cost can vary depending on elements included.	Varies
Increase attentiveness and awareness	-	Double arrow warning sign at stem of T-intersections.	Depends on size of sign.	$50-150/sign
Increase attentiveness and awareness	-	Chevron Signs for Horizontal Curves or other advanced delineation.	Can be paired with other treatments, like rumble strips.	$1-10/linear foot
Increase attentiveness and awareness	-	Longitudinal Rumble Strips and Stripes on Two-Lane Roads	Best when implemented as part of an overall resurfacing project for cost effectiveness.	$5000-$6,000/mile
Enforcing feature to slow traffic	-	Mobile Speed Feedback Signs	Solar powered units can reduce cost of running electricity.	$7,000-18,000
Enforcing feature to slow traffic	-	On-Street Parking	Based on cost to mill and restripe roadway to provide marked parking. Actual cost could be lower if milling and resurfacing are not required.	$334,500/lane/mile

CHAPTER 8

Technical Appendix

J- Project Prioritization Criteria

Image of Main Street in the Town of Windermere

Town of Windermere



Vision Zero Safety Action Plan

Memorandum

Date: April 26, 2024

To: Vision Zero Central Florida Partners

From: Mighk Wilson, MetroPlan Orlando
Kathrin Tellez, Fehr & Peers

Subject: Vision Zero Central Florida – Project Prioritization

Introduction

A core element of Vision Zero Action Plans is ***Project Delivery*** where decision-makers and system designers advance projects and policies for safe, equitable multimodal travel by securing funding and implementing projects, prioritizing roadways with the most pressing safety issues. As part of the Regional Vision Zero Action Plan, transportation safety countermeasures will be identified for the top 30 high injury network (HIN) segments, identified using the Safety Score, which is calculated based on the total number of crashes, the highest level of injury sustained in each crash, and the travel mode of victims. As a part of the County and jurisdictional action plans being prepared concurrently, transportation safety countermeasures will also be identified for their top corridors.

This document outlines the process to develop criteria that can be used to prioritize roadway improvements that have transportation safety benefits. The criteria will be used to identify projects to incorporate into the typical MetroPlan Orlando project funding process through the Metropolitan Transportation Plan (MTP), as well as select projects that could be a part of a regional implementation grant application through the U.S. Department of Transportation's Safe Streets and Roads for All (SS4A) grant program. This document summarizes prioritization criteria used by MetroPlan Orlando on other planning projects and presents Vision Zero Action Plan prioritization criteria.

Existing Criteria

As the regional planning agency, MetroPlan Orlando has developed evaluation criteria based on goals articulated in the 2045 MTP to prioritize transportation system improvements. Most recently, a prioritization process was completed for the Prioritized Project List (PPL) and the Active Transportation Plan (ATP) project. The criteria from the PPL is summarized in **Table 1** and the criteria from the ATP project is summarized in **Table 2**, along with its potential applicability to the regional Vision Zero Action Plan as the criteria used for Vision Zero project prioritization should have some alignment with the criteria used for other regional planning purposes. Based on the review, all criteria used in the PPL and ATP prioritization processes have some applicability to Vision Zero.

Table 1: Prioritized Project List Evaluation Criteria and Applicability to Vision Zero Action Plan

Goal Area / Weight	PPL Evaluation Criteria	Applicable to Vision Zero	Notes
Safety and Security / 33%	Crash Rate	Yes	Improving safety is the primary goal of the Vision Zero Action Plan.
	Fatal & Serious Injury Crash Rates	Yes	
	Number of Pedestrian & Bicycle Crashes	Yes	
	Evacuation Route Designation	Yes	Potential changes on designated evacuation routes would need to be reviewed to assess if changes could negatively affect the evacuation process.
Reliability and Performance / 13%	Travel Time Reliability (Auto)	Yes	While safety projects can reduce crashes, thereby reducing non-recurring congestion and increasing auto travel time reliability, these metrics are traditionally focused on congestion relief projects. As these metrics are not included as a part of the Vision Zero Action Plan, these effects may be best measured as part of the Congestion Management Process (CMP) or other auto-focused study.
	Unreliability on Constrained Corridor	Yes	
	Fiber Optic Presence	Yes	
	Segment Actively Monitored/Managed	Yes	
	Relative Change: Future Congested Speeds	Yes	
Access & Connectivity / 27%	Transit System Headways	Yes	Safety projects in areas with a high density of destinations have the potential to benefit multiple trip types.
	Population: ½ Mile of Non-Transit Corridor	Yes	
	Jobs: ½ Mile of Non-Transit Corridor	Yes	
	Food & Healthcare Locations: ½ Mile of Corridor	Yes	
	Cultural & Recreational Locations: ½ Mile of Corridor	Yes	
	MTP Centrality Analysis Score (Critical Sidewalk Need)	Yes	Closing sidewalk gaps could improve safety outcomes.

Goal Area / Weight	PPL Evaluation Criteria	Applicable to Vision Zero	Notes
Health & Environment / 7%	Bicycle Level of Traffic Stress (LTS)	Yes	Projects that improve the bicycle level of traffic stress would either have a separation component (such as a shared use path) or a speed reduction element. Would need to bring LTS into the analysis.
	Residential Density: ¼ Mile of Multimodal Facility	Yes	Projects in areas with a high density of destinations have the potential to benefit multiple trip types.
	Non-Residential Density: ¼ Mile of Multimodal Facility	Yes	Projects in areas with a high density of destinations have the potential to benefit multiple trip types.
	Public Health Indicator Rates	Yes	While safety projects are likely to improve public health outcomes, this can be difficult to measure.
	Intensity & Proximity: Environmental Justice Populations	Yes	Safety projects can improve mobility choices for Environmental Justice populations.
	Relative Change: Vehicle Miles Traveled (VMT) (2020 vs. 2045)	Yes	A reduction in VMT on a per capita basis could reduce per capita crash exposure. While safety projects and providing other transportation options are likely to reduce vehicle miles of travel on a per capita basis, this can be difficult to measure.
Investment & Economy / 20%	Percentage of Commercial Vehicle Traffic	Yes	Transportation safety projects on truck routes may need additional considerations.
	Statewide Truck Bottlenecks	Yes	Reducing or eliminating truck bottlenecks could have a safety benefit.
	Intensity & Proximity: Freight Intensive Land Uses	Yes	Transportation safety projects in the vicinity of freight intensive land uses may need additional considerations.
	Relative Change: Vehicle Hours Traveled	Yes	A reduction in total vehicle hours of travel could reduce crash exposure and improve crash outcomes.
	Cost Burdened Households: ¼ Mile of Corridor	Yes	Safety projects can improve mobility choices for cost burdened households.
	Percentage of Visitor Traffic	Yes	Transportation safety projects in high visitor areas may need additional considerations, like wayfinding.
	Cost of Congestion	Yes	Safety projects can reduce non-recurring congestion caused by traffic crashes.

Source: MetroPlan Orlando; Fehr & Peers, 2024

Table 2: Active Transportation Plan Evaluation Criteria and Applicability to Vision Zero Action Plan

Goal Area / Weight	ATP Evaluation Criteria	Applicable to Vision Zero	Notes
Transportation Disadvantaged / Historically Underserved Areas[1] / 15%	Meets 4 or 5 of the ETC[1] Criteria **or** in an area with > 18% of households identified as Zero Car Households	Yes	The effects of traffic crashes disproportionately affect people who live in transportation disadvantaged communities.
	Meets 2 or 3 of the ETC Criteria **or** in an area with ≥ 12% of households identified as Zero Car Households		
	Meets 1 of the ETC Criteria **or** in an area with ≥ 6. 3% of households identified as Zero Car Households		
Bicycle and Pedestrian Safety / 30%	More than 5 crashes involving a person walking or biking **or** any pedestrian / bicycle fatalities	Yes	Improving safety outcomes is a key goal of the Vision Zero Action Plan, but not limited to bicyclists and pedestrians.
	4 - 5 bike/ped crashes		
	2 - 3 bike/ped crashes		
	1 bike/ped crash		
Accessibility and Connectivity, Comfort[4]	Percent improvement in walking access to destinations	Yes	Safety projects in areas with a high density of destinations have the potential to benefit multiple trip types. However, these criteria may be difficult to consistently measure across the region. Would need to bring LTS into the analysis.
	Percent improvement in biking access to destinations.	Yes	
	Number of people for whom access is improved for walking trips.	Yes	
	Number of people for whom access is improved for biking trips.	Yes	
	New or improved PLOC[2] for a walking facility	Yes	
	New or improved LTS[3] for a biking facility	Yes	
Jurisdictional Significance	Qualitative low/medium/high ranking by local jurisdiction on the proposed project's local significance	Yes	This factors local preferences and priorities.
Regional Impact	Facility eligible for inclusion in the SunTrail or Coast to Coast Network	No	

Draft Vision Zero Prioritization Criteria

Based on the priorities identified by the MetroPlan Orlando Board in various MetroPlan Orlando policy documents, the goals of the Vision Zero Action Plan and the criteria used in other recent projects, such as the Active Transportation Plan, an **initial** set of prioritization criteria was developed and shared with the Regional Task Force for feedback. Initial feedback from the Task Force was incorporated into an updated set of draft prioritization criteria that was then discussed with a subset of key stakeholders, including the consultant teams working on county and local plans, as well as representatives from Orange, Osceola and Seminole counties.

Potential evaluation criteria presented in **Table 3** primarily focus on safety and transportation disadvantage, with some additional prioritization criteria to consider, such as incorporation of the Federal Highway Administration's (FHWA) proven safety countermeasures, potential effectiveness, and regional impact. Some criteria presented in **Table 3** may be more applicable for a local agency to include as a part of their plan to differentiate between projects. Key considerations for each of the potential criteria include ease of analysis and replicability of the prioritization are provided to help inform the selection of the final prioritization criteria.

Table 3: Potential Evaluation Criteria Regional Vision Zero Action Plan

Performance Indicator	Description	Scoring Considerations
Transportation Underserv Communities	Meets 4 or 5 of the ETC Criteria	The effects of traffic crashes disproportionately affect people who live in transportation underserved communities. These criteria will also be a factor in future SS4A applications. However, this factor may not be relevant for state funding sources. As more than 50% of the HIN is through a transportation underserved community, disadvantage is accounted for in some of the other potential prioritization criteria. This data is readily available for all roadways in the region and can be consistently measured. The ETC criteria measure different aspects of transportation disadvantage and there are opportunities for jurisdictions to weigh different criteria as part of a local prioritization process, if desired.
	Meets 2 or 3 of the ETC Criteria	
	Meets 1 of the ETC Criteria	
Safety Score	Divide scores into quartiles, with the highest quartile receiving all points, second quartile receiving 75% of points, etc.	e Safety Score was the basis of the HIN/Top Intersection identification and weights crashes including people outside a vehicle higher than car and truck occupants. This data is readily available for all roadways in the region and can be consistently measured.

Performance Indicator	Description	Scoring Considerations
Do proposed improvements include FHWA's proven safety countermeasures?	Points allocated based on a proportion of project that includes proven safety countermeasures.	A focus on only FHWA proven safety countermeasures could limit application of innovative approaches as well as other countermeasures that have a proven crash reduction benefit. However, use of these proven strategies could result in projects that are eligible for additional funding sources. Use of this performance indicator would need to identify a method to consistently evaluate potential safety benefit of projects for comparison purposes.
Reduction in Target Speed/ Design Speed (for segment improvements)	Points allocated based on reduction in Target Speed.	Points would be allocated based on overall reduction in Target Speed within the allowable range for the context classification/ designation; projects with target speed already at the lowest end of the range would receive full points. At a planning stage, there may be insufficient information to set target speed that can be kept throughout the entirety of the planning, design and construction process. For new roadways, points could potentially be allocated on a sliding scale depending on target speed and context (100% for target speed at lowest end of allowable range).
Number of KSI crashes per mile linked to the safety concern that the countermeasure addresses.	Scaled point application based on the highest to lowest.	This criterion was in the 2023 SS4A Grant application. The criteria would ensure that identified improvements have a connection to the crashes on a corridor.
Project is on multiple high injury networks.	Scaled point application based on the overlap of networks, with a 100% overlap receiving all points.	A project on both the regional HIN and a county HIN, or county HIN and a local HIN would potentially have regional and local significance that could make it a good candidate for SS4A funding. This data is readily available and could measure the potential regional impact of an improvement.
Road already has planned improvements	Scaled point application based on level of planning/ construction readiness.	Could be an opportunity to leverage already committed funds to accelerate project delivery. May be difficult to measure consistently.
Would the proposed project provide secondary benefits to the community?	This performance standard would prioritize projects that could have co-benefits, such as providing reciprocal access that reduces trips on the regional network or creates a new connection between land uses.	The metric could include a discussion of land uses, surrounding community characteristics with clear connection to proposed improvement, and includes community input and support received. May be difficult to measure consistently at the regional scale.

Performance Indicator	Description	Scoring Considerations
Project includes vehicular capacity increasing elements.	Scaled point application based on the amount of vehicle capacity provided, with no additional capacity receiving 100% of points.	This performance indicator could penalize projects in rapidly growing areas where roadway expansions are needed to accommodate growth and have been planned for. To support development of safer streets in growing communities, criteria could include considerations for roadways developed with low Target Speeds that incorporate appropriate bicycling and pedestrian facilities for the context, frequent crossing locations, street lighting and other features that are shown to promote transportation safety. Could include considerations for providing new parallel facilities rather than widening existing corridors. Converting a conventional intersection to a roundabout would not count as adding capacity.
Improvements include low cost/quick build improvements of proven effectiveness	Points could be allocated based on how quickly improvements could be implemented (0-2 years, 2-5 and beyond 5 years)	One of the goals of SS4A is the implementation of low cost / quick build strategies. These should be implemented at a number of locations as there could be significant administrative costs if only implemented at a few locations.

Source: MetroPlan Orlando; Fehr & Peers, 2024

Based on the considerations presented in **Table 3**, initial prioritization criteria, feedback from the Task Force, and focused conversations with stakeholders, prioritization criteria were developed and goal area weights established, as presented in **Table 4**. The primary purpose of this criteria is to identify projects that could be included in a regional SS4A grant application or other safety-focused grant program. Once projects throughout the region are identified, they will be ranked for prioritization.

High priority safety improvements identified through this process may also be added to the 2050 MTP or incorporated into an already planned project in the PPL or TIP. Local jurisdictions can also use these criteria or a modified version for their own project prioritization process. For projects selected for inclusion in a regional SS4A grant application, additional information will be needed for the grant application, requiring a greater level of planning than is occurring for this initial screening. Information related to potential SS4A grant application criteria is provided at the end of this memorandum.

CHAPTER 8

Technical Appendix

K- Project Cost Estimates

Image of Main Street in the Town of Windermere

Town of Windermere



Vision Zero Safety Action Plan

Project ID	Location	Location	Improvement Type	Quantity/Length	Duration	Cost-Estimate
0	E 6th Ave from Lake St to Town Border	E 6th Ave from Lake St to Town Border	Widen Existing Sidewalk (on south side)	1.1 mi	Long-Term	$ 600,000.00
1	E 6th Ave from Lake St to Town Border	E 6th Ave	Review Lighting (with a Focus on Crosswalks)	1.1 mi	Long-Term	--
2	E 6th Ave from Lake St to Town Border	E 6th Ave from Isleworth Country Club Dr to Down Point Ln	Add Crossing with RRFB	1	Mid-Term	$ 14,000.00
3	Main St from Canal to Chase Rd	Main St from Canal to Chase Rd	Fill in sidewalk gap and widen existing sidewalk	1.5 mi	Long-Term	$ 800,500.00
4	Main St from Canal to E 4th Ave	Main St & Canal	Upgrade Signage to W5-2 & Upgrade school zone marki	1	Mid-Term	$ 200.00
		Main St & E 2nd Ave	Add Curb Ramp	2	Mid-Term	$ 25,000.00
		Main St & E 2nd Ave	Add Advance Pavement Stop Markings	2	Short-Term	$ 1,300.00
		Main St from E 1st St to E 3rd St	Fill Sidewalk Gap	0.1 mi	Long-Term	$ 60,000.00
5	Main St from 6th Ave to Chase Rd	Main St from E 7th St to E 9th St	Fill Sidewalk Gap	0.2 mi	Long-Term	$ 56,000.00
		Main St & 10th Ave	Add Curb Ramp	2	Short-Term	$ 25,000.00
		Main St & 10th Ave	Upgrade to High-Visilibility Crosswalk	1	Short-Term	$ 19,000.00
6	Main St & E 4th Ave	Main St & E 4th Ave	Refresh Crosswalk (West Leg)	1	Mid-Term	$ 6,000.00
		Main St & E 4th Ave	Upgrade Signage to RRFB	1	Mid-Term	$ 14,000.00
7	Conroy Windermere Rd & Rosser Rd	Conroy Windermere Rd & Rosser Rd	Add Raised Median	1	Mid-Term	$ 52,000.00
8	Main St & E 11th Ave	Main St & E 11th Ave	Add Crosswalk and Receiving Ramp (East Leg)	1	Short-Term	$ 32,500.00
		Main St & E 11th Ave	Speed Feedback Sign	1	Short-Term	$ 46,800.00
9	Main St & North Dr	Main St & North Dr	Install Pavement Speed Legends	2	Short-Term	$ 3,500.00
		Main St & North Dr	Review Clear Zone	N/A	Short-Term	--
10	Pine St & W 2nd Ave	Pine St & W 2nd Ave	Add Sidewalk (near Palmer Park)	0.01 mi	Short-Term	$ 47,100.00
		Pine St & W 2nd Ave	Install Two-Way Stop Control	2	Short-Term	$ 400.00
11	Park Ave & Sunbittern Ct	Park Ave & Sunbittern Ct	Add Crosswalk and Receiving Ramp (South Leg)	1	Short-Term	$ 25,000.00
		Park Ave & Sunbittern Ct	Review Clear Zone	N/A	Short-Term	--
		Park Ave & Sunbittern Ct	Speed Feedback Signs	1	Short-Term	$ 46,800.00
		Park Ave & Sunbittern Ct	Add Crossing (near Rec Center/Wax Berry Ct)	1	Mid-Term	$ 14,000.00
12	Forest St & W 2nd Ave	Forest St & W 2nd Ave	Add Stop Bars	2	Short-Term	$ 1,300.00
		Forest St & W 2nd Ave	Add High-Visiblity Reflective Tape on Stop Signs	2	Short-Term	$ 1,300.00
13	Chase Road (at bend)	Chase Road (at bend)	Add Warning Beacon	1	Mid-Term	$ 23,400.00
		Chase Road (at bend)	Add Safety Edge	1	Mid-Term	--
		Chase Road (at bend)	Add lighting	N/A	Long-Term	--
14	Ward Trail - Segment 4E	Ward Trail	Construct trail	0.75	Long-Term	$ 760,000.00
15	Ward Trail - Segment 4D	Ward Trail	Construct trail	0.42	Long-Term	$ 275,000.00
16	Ward Trail - Segment 4C	Ward Trail	Construct trail	0.42	Long-Term	$ 257,000.00
17	Ward Trail - Segment 4A	Ward Train	Construct trail	0.4	Long-Term	$ 50,000.00
18	Ward Trail - Segment 4B	Ward Train	Construct trail	0.35	Long-Term	$ 190,000.00
19	Ward Trail - Segment 5 (Conroy Windermere)	Ward Trail - Segment 5 (Conroy Windermere)	Construct trail	1.43	Long-Term	$ 765,000.00
20	Conroy Windermere Rd (East of Boat Ramp)	Town boundary to Down Reserve Ct	Fill Sidewalk Gap	0.08	Long-Term	$ 50,000.00
21	Lake Butler Drive	Park Ave to Maguire Rd	Construct sidewalk (one side)	1.25	Long-Term	$ 367,500.00
22	Park Ave - School Crossing	Park Ave at School Driveway	Convert existing crosswalk to RRFB	2	Mid-Term	$ 14,000.00
23	Park Ave & Park Ave	Park Ave	Convert existing crosswalk to RRFB	2	Mid-Term	$ 14,000.00

Project ID	Location	Location	Improvement Type	Quantity/Length	Duration	Cost-Estimate	Safety Score	Transportation Underserved	Safety Benefit	HIN	Implementation Timeline	Total Score	Rank
0	E 6th Ave from Lake St to Town Border	E 6th Ave from Lake St to Town Border	Widen Existing Sidewalk (on south side)	1.1 mi	Long-Term	$ 600,000.00	0	0	11.25	5	5	21.25	10
1	E 6th Ave from Lake St to Town Border	E 6th Ave	Review Lighting (with a Focus on Crosswalks)	1.1 mi	Long-Term	--	0	0	15	5	5	25	8
2	E 6th Ave from Lake St to Town Border	E 6th Ave from Isleworth Country Club Dr to Down Point Ln	Add Crossing with RRFB	1	Mid-Term	$ 14,000.00	0	0	11.25	5	10	26.25	7
3	Main St from Canal to Chase Rd	Main St from Canal to Chase Rd	Fill in sidewalk gap and widen existing sidewalk	1.5 mi	Long-Term	$ 800,500.00	0	0	15	5	7.5	27.5	6
4	Main St from Canal to E 4th Ave	Main St & Canal	Upgrade Signage to W5-2 & Upgrade school zone marl	1	Mid-Term	$ 200.00	37.5	0	7.5	5	10	60	4
		Main St & E 2nd Ave	Add Curb Ramp	2	Mid-Term	$ 25,000.00							
		Main St & E 2nd Ave	Add Advance Pavement Stop Markings	2	Short-Term	$ 1,300.00							
		Main St from E 1st St to E 3rd St	Fill Sidewalk Gap	0.1 mi	Long-Term	$ 60,000.00							
5	Main St from 6th Ave to Chase Rd	Main St from E 7th St to E 9th St	Fill Sidewalk Gap	0.2 mi	Long-Term	$ 56,000.00	37.5	0	11.25	5	7.5	61.25	3
		Main St & 10th Ave	Add Curb Ramp	2	Short-Term	$ 25,000.00							
		Main St & 10th Ave	Upgrade to High-Visilibility Crosswalk	1	Short-Term	$ 19,000.00							
6	Main St & E 4th Ave	Main St & E 4th Ave	Refresh Crosswalk (West Leg)	1	Mid-Term	$ 6,000.00	37.5	0	11.25	5	10	63.75	1
		Main St & E 4th Ave	Upgrade Signage to RRFB	1	Mid-Term	$ 14,000.00							
7	Conroy Windermere Rd & Rosser Rd	Conroy Windermere Rd & Rosser Rd	Add Raised Median	1	Mid-Term	$ 52,000.00	37.5	0	15	5	5	62.5	2
8	Main St & E 11th Ave	Main St & E 11th Ave	Add Crosswalk and Receiving Ramp (East Leg)	1	Short-Term	$ 32,500.00	37.5	0	11.25	5	10	63.75	1
		Main St & E 11th Ave	Speed Feedback Sign	1	Short-Term	$ 46,800.00							
9	Main St & North Dr	Main St & North Dr	Install Pavement Speed Legends	2	Short-Term	$ 3,500.00	37.5	0	7.5	5	10	60	4
		Main St & North Dr	Review Clear Zone	N/A	Short-Term	--							
10	Pine St & W 2nd Ave	Pine St & W 2nd Ave	Add Sidewalk (near Palmer Park)	0.01 mi	Short-Term	$ 47,100.00	0	0	11.25	5	5	21.25	10
		Pine St & W 2nd Ave	Install Two-Way Stop Control	2	Short-Term	$ 400.00							
11	Park Ave & Sunbittern Ct	Park Ave & Sunbittern Ct	Add Crosswalk and Receiving Ramp (South Leg)	1	Short-Term	$ 25,000.00	0	0	11.25	5	10	26.25	7
		Park Ave & Sunbittern Ct	Review Clear Zone	N/A	Short-Term	--							
		Park Ave & Sunbittern Ct	Speed Feedback Signs	1	Short-Term	$ 46,800.00							
		Park Ave & Sunbittern Ct	Add Crossing (near Rec Center/Wax Berry Ct)	1	Mid-Term	$ 14,000.00							
12	Forest St & W 2nd Ave	Forest St & W 2nd Ave	Add Stop Bars	2	Short-Term	$ 1,300.00	0	0	7.5	5	10	22.5	9
		Forest St & W 2nd Ave	Add High-Visiblity Reflective Tape on Stop Signs	2	Short-Term	$ 1,300.00							
13	Chase Road (at bend)	Chase Road (at bend)	Add Warning Beacon	1	Mid-Term	$ 23,400.00	0	0	15	5	10	30	5
		Chase Road (at bend)	Add Safety Edge	1	Mid-Term	--							
		Chase Road (at bend)	Add lighting	N/A	Long-Term	--							
14	Ward Trail - Segment 4E	Ward Trail	Construct trail	0.75	Long-Term	$ 760,000.00	0	0	15	5	10	30	5
15	Ward Trail - Segment 4D	Ward Trail	Construct trail	0.42	Long-Term	$ 275,000.00	0	0	15	5	10	30	5
16	Ward Trail - Segment 4C	Ward Trail	Construct trail	0.42	Long-Term	$ 257,000.00	0	0	15	5	10	30	5
17	Ward Trail - Segment 4A	Ward Train	Construct trail	0.4	Long-Term	$ 50,000.00	0	0	15	5	10	30	5
18	Ward Trail - Segment 4B	Ward Train	Construct trail	0.35	Long-Term	$ 190,000.00	0	0	15	5	10	30	5
19	Ward Trail - Segment 5 (Conroy Windermere)	Ward Trail - Segment 5 (Conroy Windermere)	Construct trail	1.43	Long-Term	$ 765,000.00	0	0	15	5	10	30	5
20	Conroy Windermere Rd (East of Boat Ramp)	Town boundary to Down Reserve Ct	Fill Sidewalk Gap	0.08	Long-Term	$ 50,000.00	0	0	11.25	5	10	26.25	7
21	Lake Butler Drive	Park Ave to Maguire Rd	Construct sidewalk (one side)	1.25	Long-Term	$ 367,500.00	0	0	11.25	0	10	21.25	10
22	Park Ave - School Crossing	Park Ave at School Driveway	Convert existing crosswalk to RRFB	2	Mid-Term	$ 14,000.00	0	0	11.25	0	10	21.25	10
23	Park Ave & Park Ave	Park Ave	Convert existing crosswalk to RRFB	2	Mid-Term	$ 14,000.00	0	0	11.25	0	10	21.25	10

CHAPTER 8

Technical Appendix

L- Project Details



Image of Main Street in the Town of Windermere

Town of Windermere



Vision Zero Safety Action Plan

E 6th Avenue (WIN 0)
from Lake Street to Town Border

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	11.25	5	5
Total Score / Rank	21.25* / 10th (tied)				
Opinion of Probable Cost	$600,000**				



Long Term:
Widen existing sidewalk on south side

*Total Score is out of 100
**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



E 6th Avenue (WIN 1)
from Lake Street to Town Border

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	15.0	5	5
Total Score / Rank	25.0* / 8th				
Opinion of Probable Cost	--				

Long Term:
Add lighting with focus on crosswalks

*Total Score is out of 100
**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



E 6th Avenue (WIN 2)
from Lake Street to Town Border

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	11.25	5	10
Total Score / Rank	26.25* / 7th				
Opinion of Probable Cost	$14,000**				

Mid Term:
Add crossing

*Total Score is out of 100
**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Main Street (WIN 3)
from Canal to Chase Road

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	15	5	7.5
Total Score / Rank	27.5* / 6th				
Opinion of Probable Cost	$800,500**				

*Total Score is out of 100
**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Long Term:
Widen existing sidewalk on west side (Ward Trail – Segment 4 C)



Add sidewalk on east side to fill in gap



Proposed Sidewalk
Proposed Multiuse Path

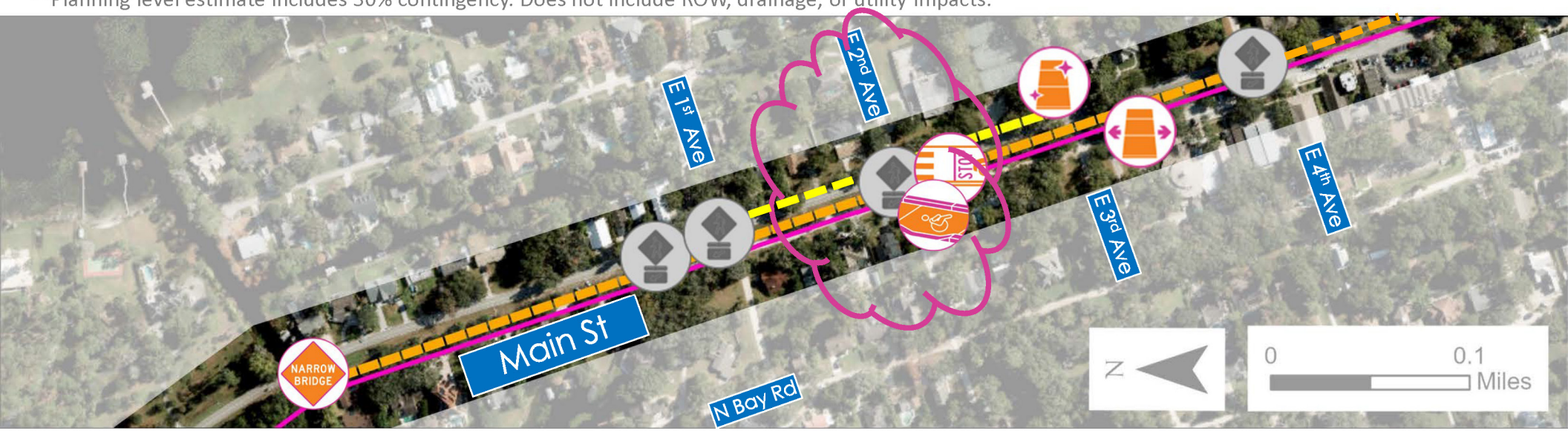
VISION ZERO CENTRAL FLORIDA

Main Street (WIN 4)
from Canal to E 4th Avenue

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	37.5	0	7.5	5	10
Total Score / Rank	60.0* / 4th (tied)				
Opinion of Probable Cost	$86,500.00**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Mid Term:
Add advance pavement stop markings

Project planned on 2nd Ave
Add curb ramp at E 2nd Ave

Upgrade sign to W5-2

Long Term:
Widen existing sidewalk on west side

Add sidewalk on east side

Main Street (WIN 5)
from 6th Avenue to Chase Road

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	37.75	0	11.25	5	7.5
Total Score / Rank	61.25* / 3rd				
Opinion of Probable Cost	$100,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Short Term:
Add curb ramp and upgrade to high visibility crosswalk at 10th Ave



Long Term:
Widen existing sidewalk on west side (Ward Trail)
Add sidewalk on east side to fill in gap



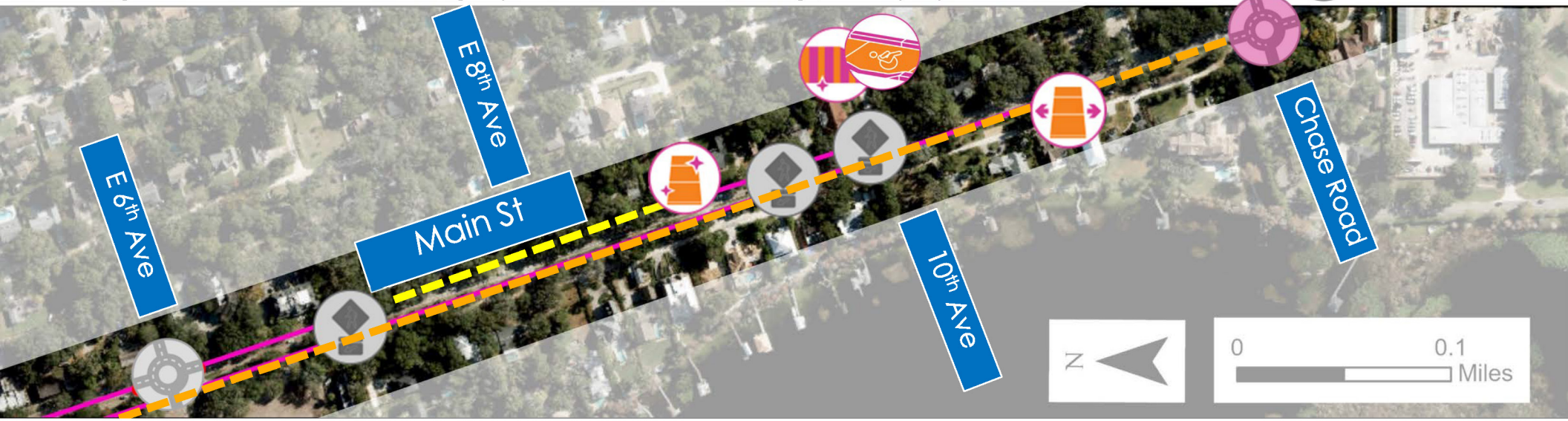
Planned Roundabout



Existing Roundabout



Existing Crossing

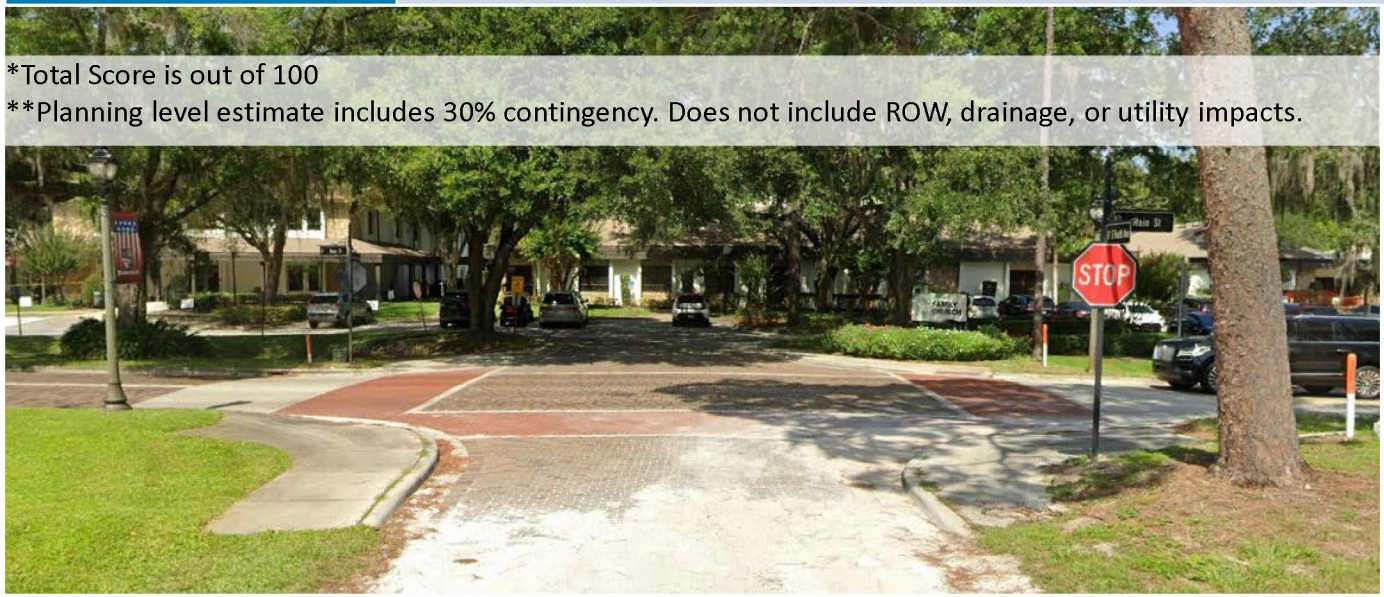


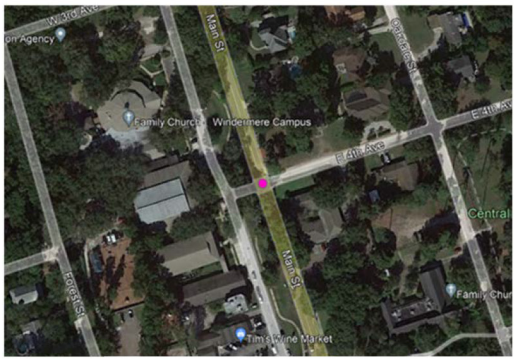
Main Street & E 4th Avenue (WIN 6)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	37.5	0	11.25	5	10
Total Score / Rank	63.75* / 1st (tied)				
Opinion of Probable Cost	$20,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.





Mid Term:

Refresh crosswalk on west leg

Upgrade signage to RRFB

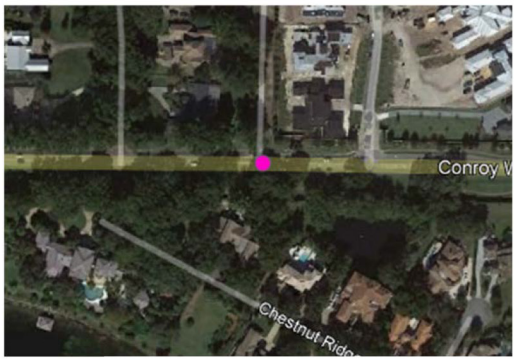
Conroy Windermere Road & Rosser Road (WIN 7)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	37.5	0	15	5	5
Total Score / Rank	62.5* / 2nd				
Opinion of Probable Cost	$52,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.





Mid Term

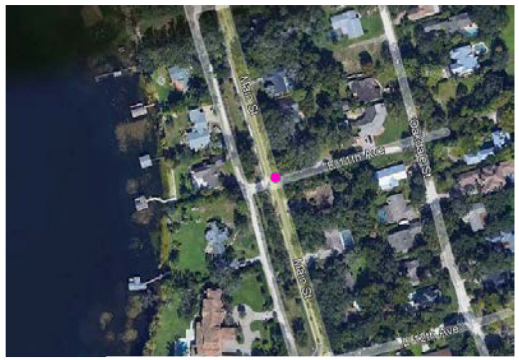
Main Street & E 11th Avenue (WIN 8)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	37.5	0	11.25	5	10
Total Score / Rank	63.75* / 1st (tied)				
Opinion of Probable Cost	$79,300**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.





Short Term:
Add crosswalk on east leg and receiving ramp

Speed feedback sign

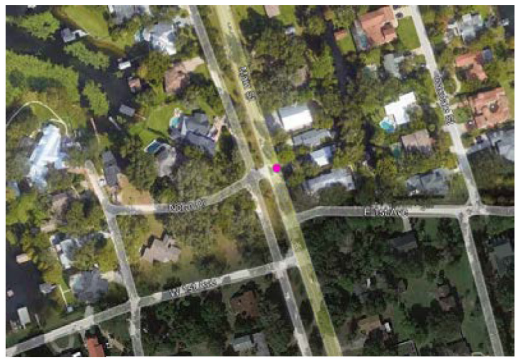
Main Street & North Drive (WIN 9)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	37.5	0	7.5	5	10
Total Score / Rank	60* / 4th (tied)				
Opinion of Probable Cost	$3,500				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.





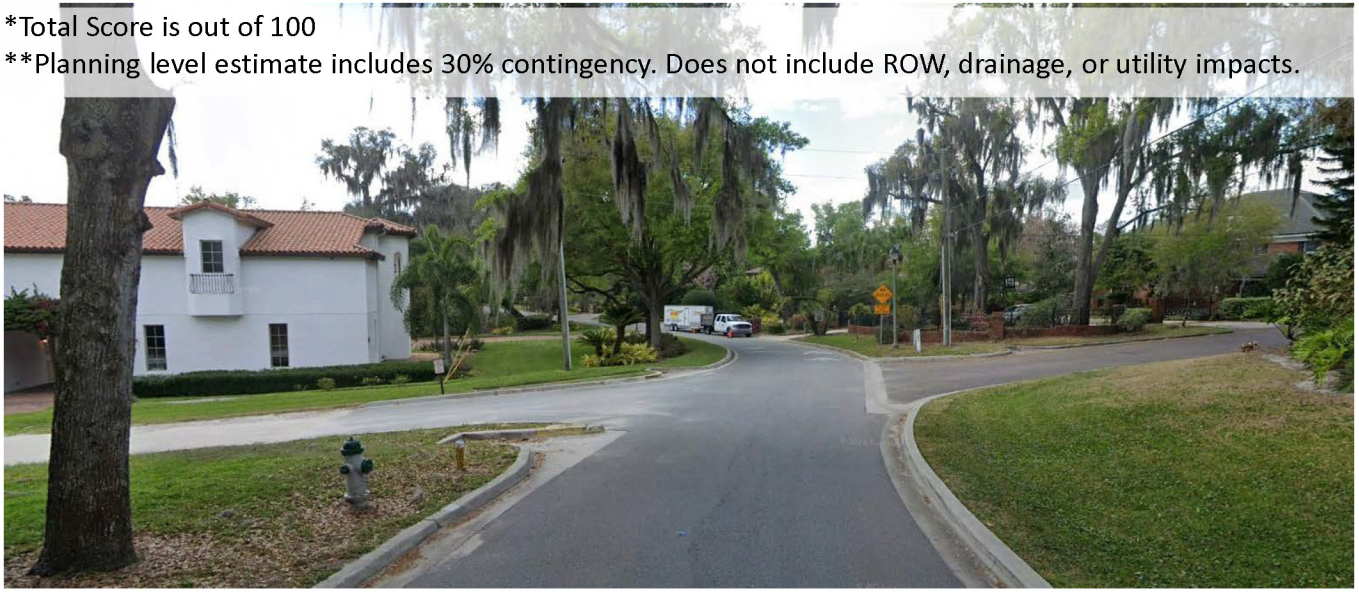
Short Term:
Install pavement speed legends and review clear zone

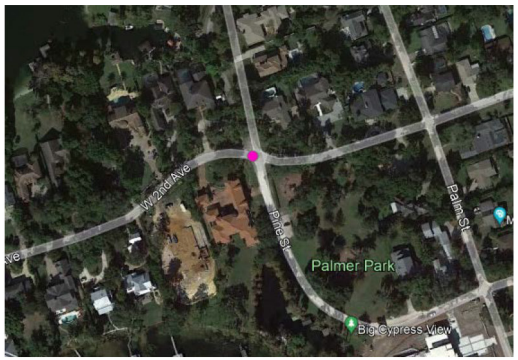
Pine Street & W 2nd Avenue (WIN 10)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	11.25	5	5
Total Score / Rank	21.25* / 10th (tied)				
Opinion of Probable Cost	$47,500**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.





Short Term:
Add sidewalk along edge of Palmer Park

Install two-way stop control

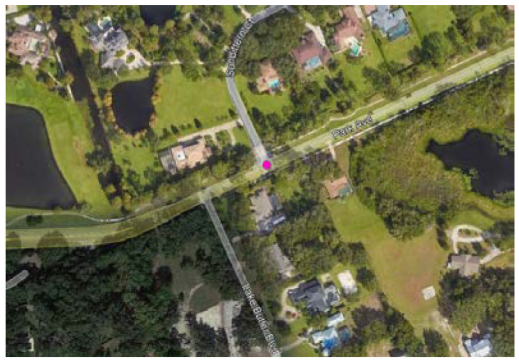
Park Avenue & Sunbittern Court (WIN 11)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	11.25	5	10
Total Score / Rank	26.25* / 7th (tied)				
Opinion of Probable Cost	$85,800**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.





<u>Short Term</u>:
Add crosswalk on south leg at Lake Butler Boulevard and receiving ramp

Review clear zone

Speed feedback signs

Forest Street & W 2nd Avenue (WIN 12)

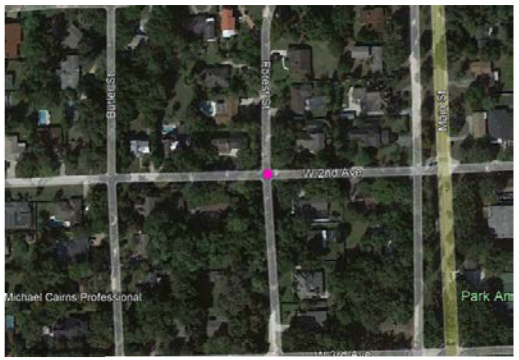
Programmed Project

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	7.5	5	10
Total Score / Rank	22.5* / 9th				
Opinion of Probable Cost	$2,600**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.





Short Term:

Add stop bars on pavement

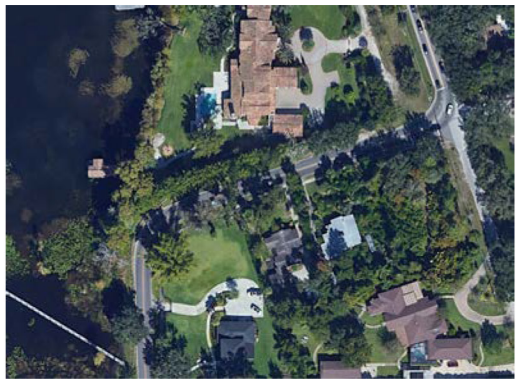
Add high visibility reflective tape on stop signs

Chase Road (WIN 13)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	15	5	10
Total Score / Rank	30* / 5th				
Opinion of Probable Cost	$23,400**				

*Total Score is out of 100
**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.







Mid Term:
Add warning beacon



Add safety edge

Long Term:
Evaluate adding lighting (10 night time crashes)



Ward Trail Segment 4E (WIN 14)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	15	5	10
Total Score / Rank	30* / 5th				
Opinion of Probable Cost	$760,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Source: Windermere Multi-Modal Study

Long Term:
Construct Ward Trail segment

Ward Trail Segment 4D (WIN 15)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	15	5	10
Total Score / Rank	30* / 5th				
Opinion of Probable Cost	$275,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Source: Windermere Multi-Modal Study

Long Term:
Construct Ward Trail segment

Ward Trail Segment 4A (WIN 16)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	15	5	10
Total Score / Rank	30* / 5th				
Opinion of Probable Cost	$50,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Source: Windermere Multi-Modal Study

Long Term:
Construct Ward Trail segment

Ward Trail Segment 4C (WIN 17)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	15	5	10
Total Score / Rank	30* / 5th				
Opinion of Probable Cost	$257,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Source: Windermere Multi-Modal Study

Long Term:
Construct Ward Trail segment

Ward Trail Segment 4B (WIN 18)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	15	5	10
Total Score / Rank	30* / 5th				
Opinion of Probable Cost	$760,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Source: Windermere Multi-Modal Study

Long Term:
Construct Ward Trail segment

Ward Trail Segment 5 (WIN 19)

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	15	5	10
Total Score / Rank	30* / 5th				
Opinion of Probable Cost	$760,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Source: Windermere Multi-Modal Study

Long Term:
Construct Ward Trail segment

Conroy Windermere Rd (WIN 20)

from Lake Street to Town Border

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	11.25	5	10
Total Score / Rank	26.25* / 7th (tied)				
Opinion of Probable Cost	$50,000**				

Long Term:

Fill sidewalk gap on north side

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



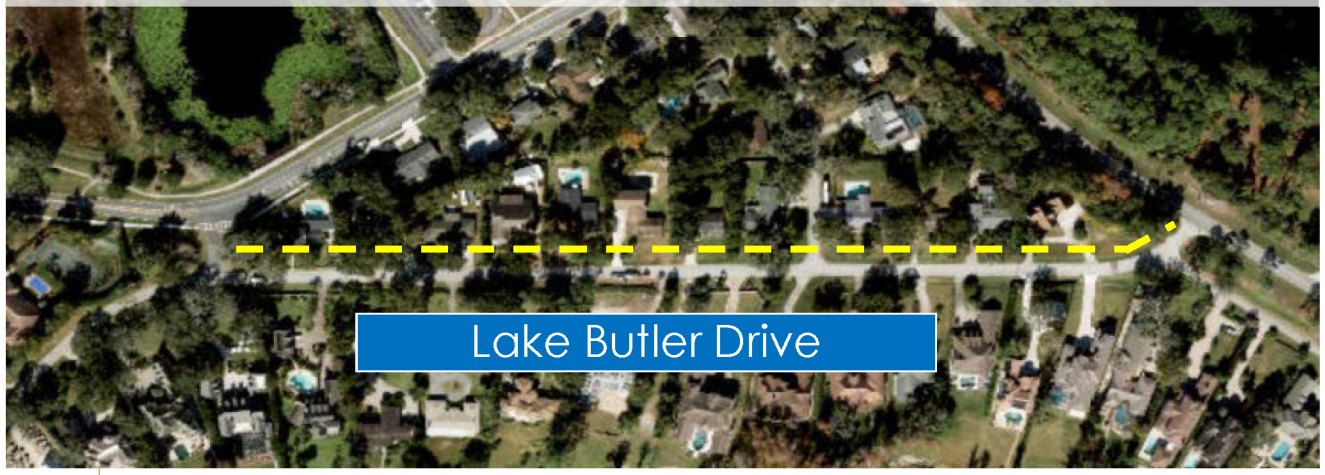
Lake Butler Drive (WIN 21)

from Park Avenue to Maguire Road

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	11.25	0	10
Total Score / Rank	21.25* / 10th (tied)				
Opinion of Probable Cost	$367,500**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Mid Term:

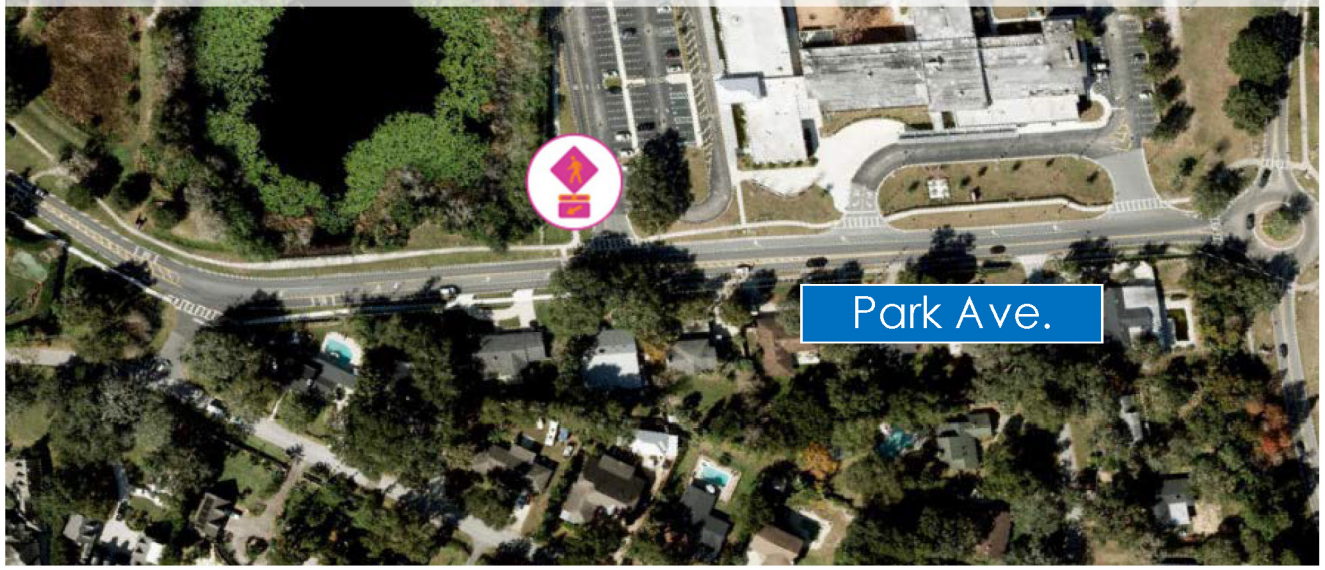
Construct sidewalk

Proposed Sidewalk

Park Ave (WIN 22)
at School

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	11.25	0	10
Total Score / Rank	21.25* / 10th (tied)				
Opinion of Probable Cost	$14,000**				

*Total Score is out of 100
**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Mid Term:

Convert crosswalk to RRFB

Park Ave (WIN 23)

west of Park Avenue

	Safety Score	Underserved Communities	Safety Benefit	HIN	Implementation
Weighted Score	0	0	11.25	0	10
Total Score / Rank	21.25* / 10th (tied)				
Opinion of Probable Cost	$14,000**				

*Total Score is out of 100

**Planning level estimate includes 30% contingency. Does not include ROW, drainage, or utility impacts.



Mid Term:

Convert crosswalk to RRFB

CHAPTER 8

Technical Appendix

M- Elected Officials Guide



Image of Main Street in the Town of Windermere

Town of Windermere



Vision Zero Safety Action Plan

Elected Officials Guide

VISION ZERO

CENTRAL FLORIDA

Counting down to zero traffic deaths

Why We Need Vision Zero

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More people die on Central Florida roads each year, outpacing even the rapid population growth in our region. Traditional ways of addressing transportation safety clearly are not working, and we need a culture shift. **The good news is we can eliminate traffic deaths**, if we make safety a part of all we do. Vision Zero is a global movement to end traffic deaths and serious injuries by taking a systemic approach to road safety. Traffic deaths and injuries are unacceptable -- and preventable. **We CAN reach our goal of zero deaths** and serious injuries, if we all work together. As elected officials, you have an important role. This guide offers background data, along with some ways you can help Central Florida get to zero.

In Our Region

CRASHES ON HIGH-SPEED ROADS

72%
of crashes that result in a death or serious injury occur on roads with a posted speed of 40 mph or greater

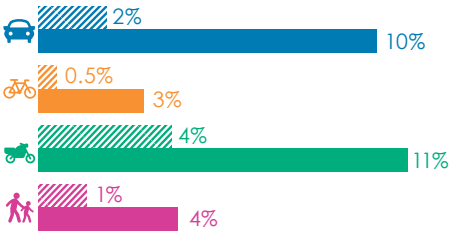
LATE NIGHT CRASHES

Crashes that happen between
midnight - 6 AM
are more likely to result in a death or serious injury

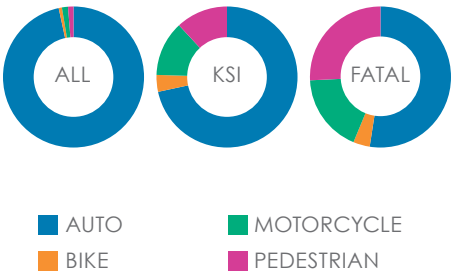
CRASHES ON MULTI-LANE ROADS

74%
of crashes involving death or serious injury to a pedestrian occur on roads with four or more lanes

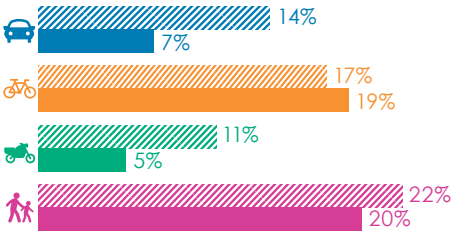
ALCOHOL-INVOLVED CRASHES



ALL CRASHES BY MODE



HIT AND RUN CRASHES



How Vision Zero Approaches Crashes

TRADITIONAL APPROACH

- Traffic deaths are inevitable
- Human behavior needs to be perfect
- We should prevent all crashes
- Individual responsibility is the key to saving lives
- Incorporating safety improvements is too expensive

VS

VISION ZERO APPROACH

- Traffic deaths are preventable
- Plans should anticipate human mistakes
- We should concentrate on preventing fatal and severe crashes
- A safe systems approach is the key to saving lives
- Eliminating deaths and serious injuries is not expensive

Your Role as an Elected Official

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How do we get to Vision Zero?

Vision Zero is holistic and includes a variety of strategies, including behavior, infrastructure, legislative, and policy changes.

Vision Zero evaluation establishes a high injury network (HIN) where most serious crashes happen and identifying root causes of crashes that may be infrastructure or behavior based.

Vision Zero also identifies short-term fixes and strategies where they're most needed, along with long-term projects that will transform infrastructure.

What is your part in the solution?

You are a community influencer.
Share the Vision Zero message with the media, your constituents, community groups and at community events and encourage people to tell their stories.

You set local policy and strategic direction.
Actively participate in creation of your jurisdiction's plan and look for ways to infuse Vision Zero into all actions (ordinances, development review, long range plans, etc.).

You can advocate at the state level for legislative changes that will give local governments more tools in the safety toolbox.

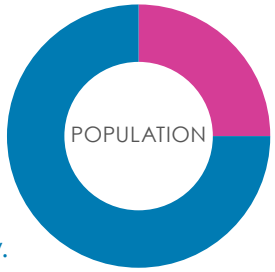
Different Populations Face Different Impacts

Constituents in your community may face the effects of crashes in very different ways or more profoundly than others, leading to social equity issues which elected officials should be prepared to address. One way to understand this issue is through the lens of ***transportation disadvantaged communities***, which are designated through consideration and analysis of many factors, including poverty rates, motor vehicle ownership, and access to destinations.

Although only

25%

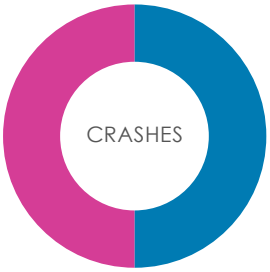
of the regional population lives in a designated transportation disadvantaged community.



Almost

50%

of all crashes and 54% of fatal crashes occur within or adjacent to these communities.



Tools to Help You Support Safety

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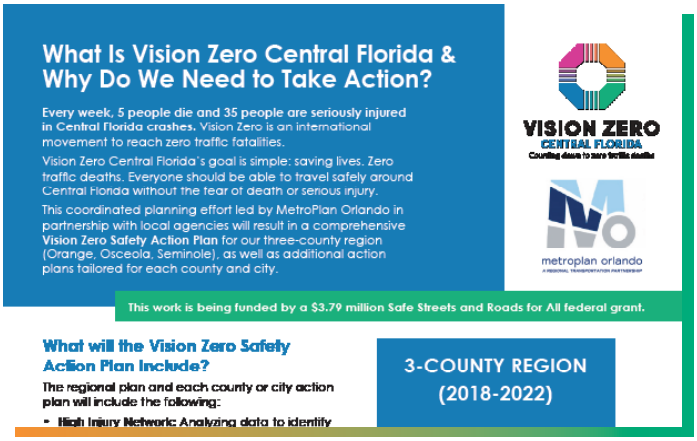
Hub Site

View local crash statistics for your jurisdiction and see who the contact person is for your Vision Zero Action Plan: visionzerocfl.gov



Fact Sheets and Communication Tools

Download studies, one-pagers, and other tools for the region at-large and for each county: visionzerocfl.gov/pages/project-resources



Safety Videos

Understand the perspectives of locals impacted by crashes, and learn what we can do next as a region: youtube.com/@metroplan_orlando



Story Sharing

Encourage constituents to share personal stories online of loss or survival: drivingdownheartache.org/



QUESTIONS?

MetroPlan Technical Project Manager: Mighk Wilson - Mighk.Wilson@MetroPlanOrlando.gov

MetroPlan Community Outreach Strategist: Mary Ann Horne - MaryAnn.Horne@MetroPlanOrlando.gov

General Inquiries: VisionZeroCFL@MetroPlanOrlando.gov

Take Action

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Step Up as a Safety Champion

Commit to supporting the **Vision Zero principles** for eliminating traffic deaths and serious injuries by the year 2050. More information is provided on the next page and at https://visionzeronetwork.org/

Learn more about safety by attending a Vision Zero **speaker series webinar**. More information is provided at https://www.visionzerocfl.gov/pages/project-resources

Familiarize yourself with the parts of your jurisdiction that lie within or close to the **High-Injury Network**.

Promote traffic safety to your constituency through email messages, newsletters, social media, speaking engagements, etc.

Support your jurisdiction's Vision Zero Resolution and **Vision Zero Action Plan**.

Pledge to use the word crash or collision **instead of Accident**.

Familiarize yourself with the Vision Zero Action plan for **the entire region**.

Be a Voice for Change

Support a **Vision Zero event** sponsored by MetroPlan Orlando or your local jurisdiction – or organize one of your own!

Hold conversations with residents about the fundamentals and benefits of Vision Zero – particularly among underserved communities along the High Injury Network.

Submit a **guest column** to your community paper or other local media outlet.

Incorporate **Vision Zero messages** when you speak to community groups.

More About Vision Zero

VISION ZERO
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DEFINITION

Vision Zero is an international movement to reach zero traffic fatalities. Vision Zero Central Florida's goal is simple: saving lives. Zero traffic deaths. Everyone should be able to travel safely around Central Florida without the fear of death or serious injury.

Vision Zero recognizes that humans make mistakes and therefore the transportation system should be designed to minimize the consequences of human error. The Vision Zero approach is fundamentally different from the traditional traffic safety approach in American communities in **six key ways.**

SOURCE: VISION ZERO NETWORK

2 Integrates **human failing** into the approach.

3 Focuses on preventing **fatal and severe crashes** rather than eliminating all crashes.

4 Aims to establish **safe systems** rather than relying on individual responsibility.

5 Applies **data driven** decision making - using facts and metrics to guide strategic choices aligned with goals.

Establishes road safety as a **social equity issue**, identifying the need for improved impartiality, fairness and justice.

How Speed Affects Traffic Crashes

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SPEED IS A FUNDAMENTAL PREDICTOR OF CRASH

SURVIVAL.

IF HIT BY A PERSON DRIVING AT...

20 MPH



DEATH RISK
10%

30 MPH



DEATH RISK
50%

40 MPH



DEATH RISK
90%

RESEARCH SHOWS

Increasing vehicle speeds from **20 MPH** to **40 MPH** increases the likelihood of a pedestrian death when hit from **10%** to **90%**.

Lower speeds increase a driver's [field of vision] and allow for more time to react to unexpected situations in the road.

SOURCES: PROPUBLICA, VISION ZERO NETWORK

Vehicle Stopping Distances

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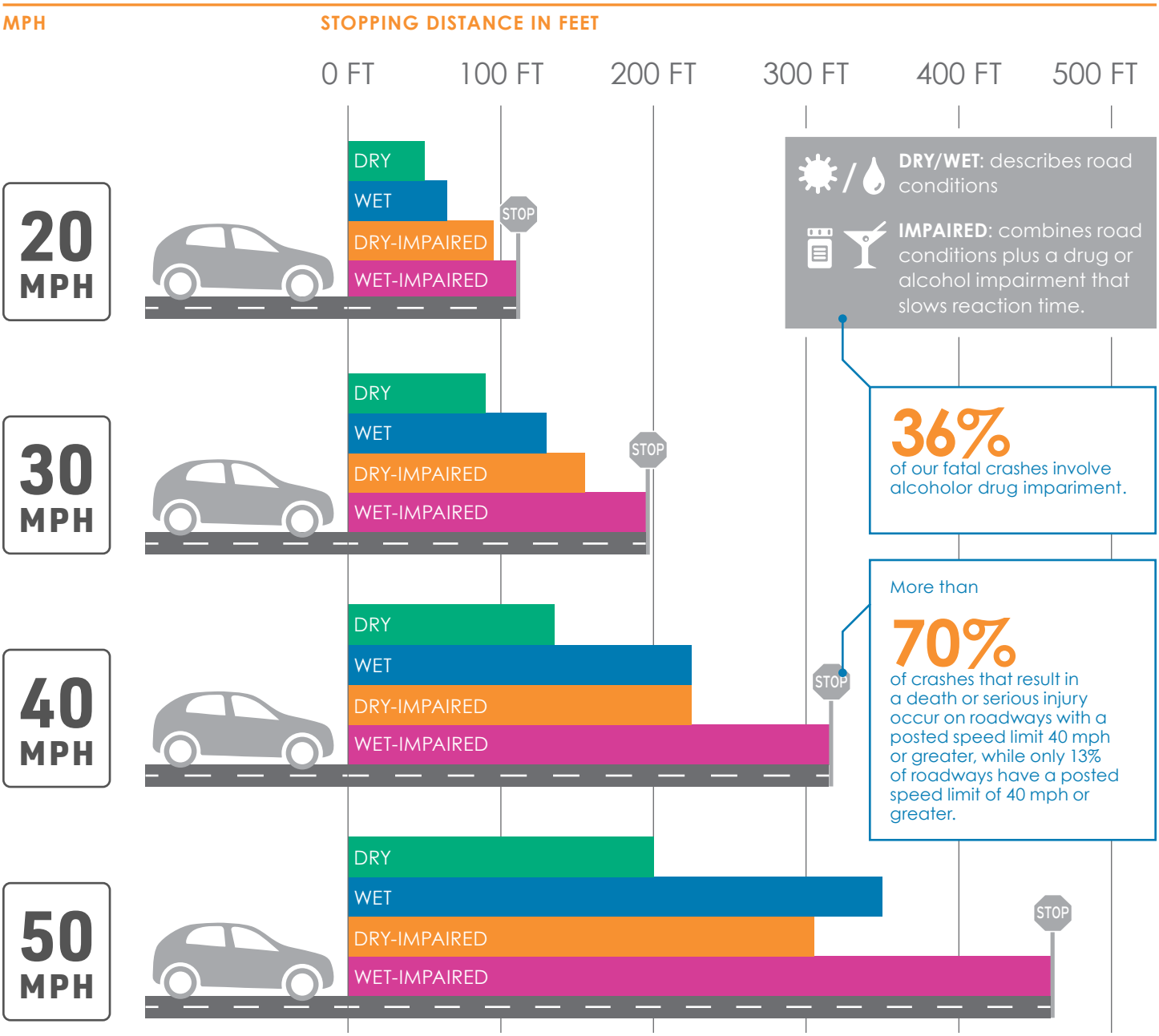
CONDITIONS PLUS SPEED IMPACT CHANCE OF CRASH.

Depending on speed and roadway conditions, the distance needed to fully stop and prevent a crash can vary. Note that this distance includes perception or reaction time; actual distances will also vary based on the type of vehicle and its condition.



Words Matter

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All too often our news media and crash reporting refer to **preventable crashes as accidents**. This word choice implies that nothing could have been done to prevent a crash.

Let's commit to using the word "crash" or "collision" not "accident" to acknowledge that roadway crashes can be systematically addressed as the reality is that we can prevent these tragedies by taking a proactive, preventative approach which prioritizes transportation safety as a public health issue.

Changing How We Speak Based on the Data

Research conducted at the University of South Florida[1] related to framing of media reports in bicycle crashes found that news reports:

> *"...largely functioned to **remove blame from the motorist** and to highlight the bicyclist's actions. These linguistic strategies reflect the **assumption that responsibility for safety rests on the bicyclist** and detracts attention from potential social policy reform that would lead to fewer bicyclist fatalities."*

Rethinking Traditional Approaches

"Before the labor movement, factory owners would say 'it was an accident' when American workers were injured in unsafe conditions.

Before the movement to combat drunk driving, intoxicated drivers would say 'it was an accident' when they crashed their cars.

Planes don't have accidents. They crash. Cranes don't have accidents. They collapse. And as a society, we expect answers and solutions." [2]

[1] HTTPS://JOURNALS.SAGEPUB.COM/DOI/ABS/10.1177/0361198119839348

[2] HTTPS://CRASHNOTACCIDENT.COM/

Vision Zero Key Terms

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High Injury Network (HIN) A collection of streets where a disproportionate number of crashes that result in someone being killed or severely injured (KSI) occur.

KSI An acronym that refers to crashes where someone was killed or suffered a serious injury.

Safe System Approach The Safe System approach aims to eliminate death and serious injuries for all roadway users. It takes a holistic view of the transportation system that anticipates human mistakes and seeks to keep impacts of crashes at levels the human body can withstand.

Serious Injury Crash A crash that results in severe laceration, broken or distorted extremities, crush injuries, significant burns, unconsciousness when taken from crash scene, suspected skull, chest, or abdominal injury or paralysis.

Signal Four Analytics Source of crash data for the region, based on data received from the Florida Department of Highway Safety and Motor Vehicles (FLHSMV). Also known as Signal4.

SS4A The Bipartisan Infrastructure Law (BIL) established the Safe Streets and Roads for All (SS4A) discretionary program with $5 billion in appropriated funds over 5 years, 2022-2026. The SS4A program funds regional, local, and Tribal initiatives through grants to prevent roadway deaths and serious injuries. Preparation of this plan is funded with a $3.79 million SS4A grant.

Underserved Community As defined by the USDOT, disadvantaged communities experience a disproportionate burden as a result of underinvestment in transportation, based on the following five components: Transportation Insecurity, Climate and Disaster Risk Burden, Environmental Burden, Health Vulnerability, and Social Vulnerability.

Vision Zero A strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all.

Vulnerable Road User (VRU) A term used to describe those unprotected by an outside shield as they sustain greater risk of injury in any crash with a vehicle, e.g., people walking, people bicycling and people motorcycling.

CHAPTER 8

Technical Appendix

N- Data Management Plan

Image of Main Street in the Town of Windermere

Town of Windermere



Vision Zero Safety Action Plan

Memorandum

Date: November 10, 2023

To: Vision Zero Central Florida Partners

From: Mighk Wilson, MetroPlan Orlando
Stephen Spana, Fehr & Peers
PJ Smith, xGeographic

Subject: Vision Zero Central Florida – Data Management Plan

VISION ZERO CENTRAL FLORIDA
Counting down to zero traffic deaths

metroplan orlando
A REGIONAL TRANSPORTATION PARTNERSHIP

Introduction

This data management plan provides information that will assist MetroPlan Orlando in maintaining the Vision Zero Central Florida hub site on an annual and ongoing basis. Information is provided on critical GIS layers, associated instructional documents, and information on document storage, sources and methods of data management. Updates to crash data on the hub site are expected to occur in the third quarter of each calendar year as data within the Signal Four Analytics (S4) database becomes finalized for the prior calendar year.

Critical GIS Layers

The ArcGIS Hub Site will be refreshed annually with new crash data downloaded from the Signal Four Analytics online tools. As part of the annual process to refresh the crash data, numerous input files are used to transform the raw crash data into a formatted database that can be appended to the existing online layer. The GIS layers that are used to update the S4 database are described in this section of the report along with important metadata and data storage information. The listing below does not include municipality-specific files that were generated in 2023 and 2024.

Layer Listing

Layer	Source	Update Frequency	Next Refresh
Signal 4 Analytics Crashes File Name: S4.gdb	Signal 4 Analytics	Annual	June 2024
MetroPlan Coverage Area File Name: MetroPlan_Area.shp	F.G.D.L.	None	None
MetroPlan Jurisdictions File Name: MetroPlan_Juris.shp	MetroPlan Orlando	Annual	June 2024

Wave Roadways File Name: xWave.shp	xGeographic	Annual	June 2024
Federal Aid Highway System File Name: Federal_Aid_Highway_System_TDA.shp	F.H.W.A.	Annual	June 2024
ETC Indicator File Name: ETC_Indicator.shp	U.S.D.O.T.	Annual	June 2024

Additional Data

Crashes between rail vehicles and non-motorized vehicles are not included within the S4 database. The Florida Department of Transportation (FDOT) District 5 Rail Administration Manager (part of the Modal Development office) maintains a record of incidents that occur along rail lines and at railroad crossings in the region. The incidents from the prior calendar year will need to be requested and geocoded into the database for consideration in crash analysis. This information can also be supplemented by information from the Federal Railroad Administration (https://safetydata.fra.dot.gov/OfficeofSafety/default.aspx).

Data from the Florida Injury Surveillance System (FISS) dataset can be used to document deaths, emergency room visits and hospitalizations for people who were injured while walking and biking, including information for people who were injured or killed while walking or bicycling when a vehicle was not involved. While this information cannot be geocoded to a specific location, the overall trends should be documented.

Metadata

All of the GIS files that are used to generate the final Signal Four Analytics crash file are populated with important metadata. This includes information on how the data was created, what the layer data fields include (including field value descriptions), and update frequency information. The five GIS files described in the Layer Listing are already embedded with this necessary information, so Metadata does not need to be updated on an annual basis.

Data Storage Locations

The Signal Four Analytics crash file is stored on ArcGIS Online with a static geodatabase name of S4.gdb. This file can be downloaded for use from the ArcGIS Online account at any time by project team members and partnering organizations.

Source files, including the MetroPlan Coverage Area, MetroPlan Jurisdictions, Wave Roadways, Federal Aid Highway System and ETC Indicators are maintained by third parties and are stored in various locations. The four source (input) files that are updated annually can be found in the following locations or by contacting the following stakeholders:

- MetroPlan Coverage Area: This file is stored on the MetroPlan Orlando server. This file will not update unless the underlying MetroPlan Orlando coverage area changes in the future.

- MetroPlan Jurisdictions: This file is stored on the MetroPlan Orlando server. This file is updated semi-regularly by MetroPlan Orlando as municipal boundaries change.

- Wave Roadways: This file is stored by xGeographic and is updated four times annually, ensuring that road features, demographic data, and proximity data is as accurate as possible at the time that the crash data cross-reference is made. Contact pjsmith@xgeographic.com to obtain this file.

- Federal Aid Highway System: This file is stored online and is maintained by the Federal Highway Administration. The file can be downloaded by clicking on "Federal Aid Highway System Shapefile" at the following link: https://www.fdot.gov/statistics/fedaid/default.shtm

- ETC Indicator: This file is stored online and is maintained by the U.S. Department of Transportation. The file can be downloaded by following the instructions at the following link: https://experience.arcgis.com/experience/0920984aa80a4362b8778d779b090723/page/Homepage/

Critical Documents

Along with this data management plan, numerous documents are stored on the MetroPlan Orlando server that serve as critical analytical tools and data management files for the project team. These files are explained below.

- Regional Projects Data Directory
    - The regional projects data directory is an excel spreadsheet that provides instructions for municipalities to develop GIS files that can be easily merged to form a regional file. This includes field names and specific field values.

- S4.atbx (GIS Toolbox)
    - This toolbox file is used to generate formatted crash data to be appended to the existing crash data on ArcGIS Online.

- MetroPlan VZ Systemic Matrix
    - The systemic matrix includes detailed crash analytics that are used in official Vision Zero Central Florida plan documents. The project team will review the need to update these statistics in future years.

- Source Layer Information
    - The source layer information document provides more in-depth information in excel format pertaining to the input files used as part of this project.

Signal Four Data Update Procedures

On an annual basis, a GIS analyst will run the S4.atbx ArcGIS toolbox to generate a new set of crash data to be appended to the existing online layer. Steps to set up and run this toolbox are included

below. Note: It is critical that the steps outlined below are followed while running the tool, as certain manual data edits are made while the tool is executed.

Annual Data Integration Steps

1. Log into https://signal4analytics.com/analysis

2. Download the latest full year of crash data
    a. Insert a custom date range (01/01/XXXX through 12/31/XXXX)
    b. Set the geographic boundary to MetroPlan Orlando
    c. Download the Crash Event csv and the GIS Geolocation

3. Conduct QA/QC of crash data:
    a. Map all crash data within the geographic boundary of MetroPlan Orlando to identify crashes that are being mapped outside the region.
    b. A list of crashes that resulted in a fatality or serious injury that are unmapped shall be prepared, and based on data within the crash report, the analyst shall attempt to identify the location for mapping. A list of all crashes in the region that are unmapped shall be prepared for forwarding to the agency for further review.

4. In ArcGIS, run models 1.01-1.03 in the S4 Toolbox (S4.atbx)
    a. Model 1.01 removes crashes located outside of the MetroPlan geographic boundary
        i. The MetroPlan_Area file, which is used to run Model 01.01, can be requested from PJ Smith at pjsmith@xgeographic.com
    b. Model 1.02 removes fields which are unnecessary to the analysis.
    c. Model 1.03 transforms the bicycle and pedestrian typing data from the download into a useable format (i.e., replaces numerical data categories with text descriptions)

5. In ArcGIS, run model 2.01 in the S4 Toolbox (S4.atbx) to join crash event, and bike/ped typing data to the crash locations.

6. In ArcGIS, run model 03.01 in the S4 Toolbox (S4.atbx) to append jurisdictions to the database.
    a. The MetroPlan_Juris file, which is used to run Model 02.01, can be requested from MetroPlan Orlando.
    b. If the Spatial Join is taking a long time to run, temporarily add MetroPlan_Juris to the working GDB file.

7. In ArcGIS, run model 03.02 in the S4 Toolbox (S4.atbx) to remove redundant fields.

8. In ArcGIS, run models 04.01 and 04.02 in the S4 Toolbox (S4.atbx) to tag crashes near the federal aid network.
    a. Crashes selected within 100 feet of the Federal Aid network layer and populated with "Y" if within the radius, and a "N" if not within the radius. Roadways on "Private Road" or "Parking Lot" are provided a value of "N".

9. In ArcGIS, run model 05.01 in the S4 toolbox (S4.atbx). The output file is named S4_Crashes.

10. Run model 06.01 to add the KSI and MODE classifications to the crash data.

11. Run model 07.01. This flags all collisions occurring on Limited Access facilities (i.e., Interstates, Toll Roads) using the ROAD_SYSTEM_IDENTIFIER field in the Signal4 data (where ROAD_SYSTEM_IDENTIFIER = Interstate or Turnpike/Toll). After running this model, manually inspect the collisions where LIMITED_ACCESS_1 = 1, as some will be incorrectly classified as occurring on Interstates or Toll Roads. To do this, query the xGeographic Wave database to show roads where ROAD_TYPE = "FDOT – Limited Access". Change LIMITED_ACCESS_1 = 1 to LIMITED_ACCESS_1 = 0 for any of these cases (estimated time 1-2 hours).

12. Create field called LIMITED_ACCESS_2 (Type: Short Integer). The previous step will NOT capture all collisions occurring on Limited Access facilities, because some occurring on Interstates/Toll Roads are classified using ROAD_SYSTEM_INDENTIFIER = State or US. Since we cannot query Limited Access facility collisions using the State or US ROAD_SYSTEM_IDENTIFIER field (since many state or US roads are not limited access facilities) we need to flag them manually using the LIMITED_ACCESS_2 field. Set a Definition Query of LIMITED_ACCESS_1 = 0 (to view all collisions not deemed to be Limited Access collisions in the previous step) and visually inspect collisions occurring along Interstates/Toll roads. Any collisions occurring along these facilities with the ON_STREET_ROAD_HIGHWAY field representing the facility name (e.g. I-4, Interstate 4, I4, etc.) should be given a value of LIMITED_ACCESS_2 =1.

13. Run model 07.02, which creates a final limited access field, LIMITED_ACCESS_FINAL, showing whether a collision occurs on a limited access facility (if LIMITED_ACCESS_1 = 1 OR LIMITED_ACCESS_2 =1).

14. Run model 08.01, which flags all collisions occurring on private roadways and/or parking lots.

15. Run models 09.01 through 09.17. To obtain the xWave_Major and xWave_Minor files, contact PJ Smith at pjsmith@xgeographic.com. The ETC_Index file should be provided pre-formatted.

16. Create a new GDB titled "S4.gdb" in a folder marked with a year; for example, the folder name for the 2018-2022 data addition is titled "2022", and the folder for the appended 2023 data will be titled "2023". Export S4_Crashes into S4.gdb.

17. Append the S4.gdb file to the existing crash database on ArcGIS Online.