AUGUST 2024

ORANGE COUNTY VISION ZERO
ACTION PLAN

VISION ZERO
COUNTDOWN TO ZERO

ORANGE COUNTY GOVERNMENT
FLORIDA

Thank you to everyone who helped with this plan!

Steering Committee Members

Humberto Castillero - Orange County
Alissa Torres - Orange County
Brian Sanders - Orange County
Raymond Williams - Orange County
Hadil Jardaneh - Orange County
Eduardo Avellaneda - Orange County
Fernando Gudino - Orange County
Daniel Marlette - Orange County
Matthew Kalus - Orange County
Simone Babb - Orange County
Jeff Williamson - Orange County
Alberto Vargas - Orange County
Carrie Black - Orange County
Vibhuti H Patel - Orange County
Masood Mirza - Orange County
Brett Blackadar - Orange County
Joseph Kunkel - Orange County
Dale Mudrak - Orange County
Mark Davis - OCSO
Dennis Ela - OCSO

Orange County Commissioners

Nicole Wilson - District 1
Christine Moore - District 2
Maya Uribe - District 3
Maribel Gomez Cordero - District 4
Emily Bonilla - District 5
Mike Scott - District 6

Carlos Torres - OCSO
Loreen Bobo - FDOT
James Boyle - Bike Walk Central Florida
Emily Hannah - Bike Walk Central Florida
Patrick Panza - Bike Walk Central Florida
Eric Grimmer - YIMBY
Mohamed Abdel-Aty - UCF
Adam Zubritsky - OCPS
Scott Danjou - OCSO
Miguel Rosario - OCSO
Laith Kareem - OCSO
Cody Johnson - LYNX

Steering Committee Facilitators

Roberta Fennessy - VHB
Babuji Ambikapathy - VHB
James Hartsfield - VHB
Katie Shannon - VHB
Christine Lofye - Ardurra
Poorna Bhattacharya - ASHA
Alex Trauger - MetroPlan Orlando
Adriana Rodriguez - MetroPlan Orlando
Mighk Wilson - MetroPlan Orlando

Project Team

Orange County Public Works, Traffic Engineering Division - Lead Agency
VHB – Lead Consultant
Ardurra
ASHA Planning Consultancy Inc.

Key terms

Crash – 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 injury or loss of life, trauma, and/or property damage. Crashes can involve a single-party or multiple parties.

High Injury Network - A collection of streets where a disproportionate number of crashes that result in someone being seriously injured or killed occur.

Kinetic Energy -In the safety context, Kinetic Energy refers to the combination of mass and speed of a vehicle or other road user, like a bicyclist, involved in a collision. Depending on the angle of the crash, the higher the combination of mass and speed, the more likely the crash is to result in a serious injury or death, with the impact severity increasing exponentially as the speed o vehicle is driven increases.

Disadvantaged Community – A US Department of Transportation designation for 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.

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.

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

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

Vulnerable road user – For the purposes of this Safety 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

ITS – Intelligent transportation systems

KSI - Fatal or serious injury crash

LPI – Leading pedestrian interval

NHTSA – National Highway Traffic Safety Administration

PHB – Pedestrian hybrid beacon

RRFB – Rectangular rapid-flashing beacon

SRTS – Safe Routes to School

TAC – Technical advisory committee

USDOT – United States Department of Transportation

Final Draft

Orange County Vision Zero

Action Plan

Table of Contents

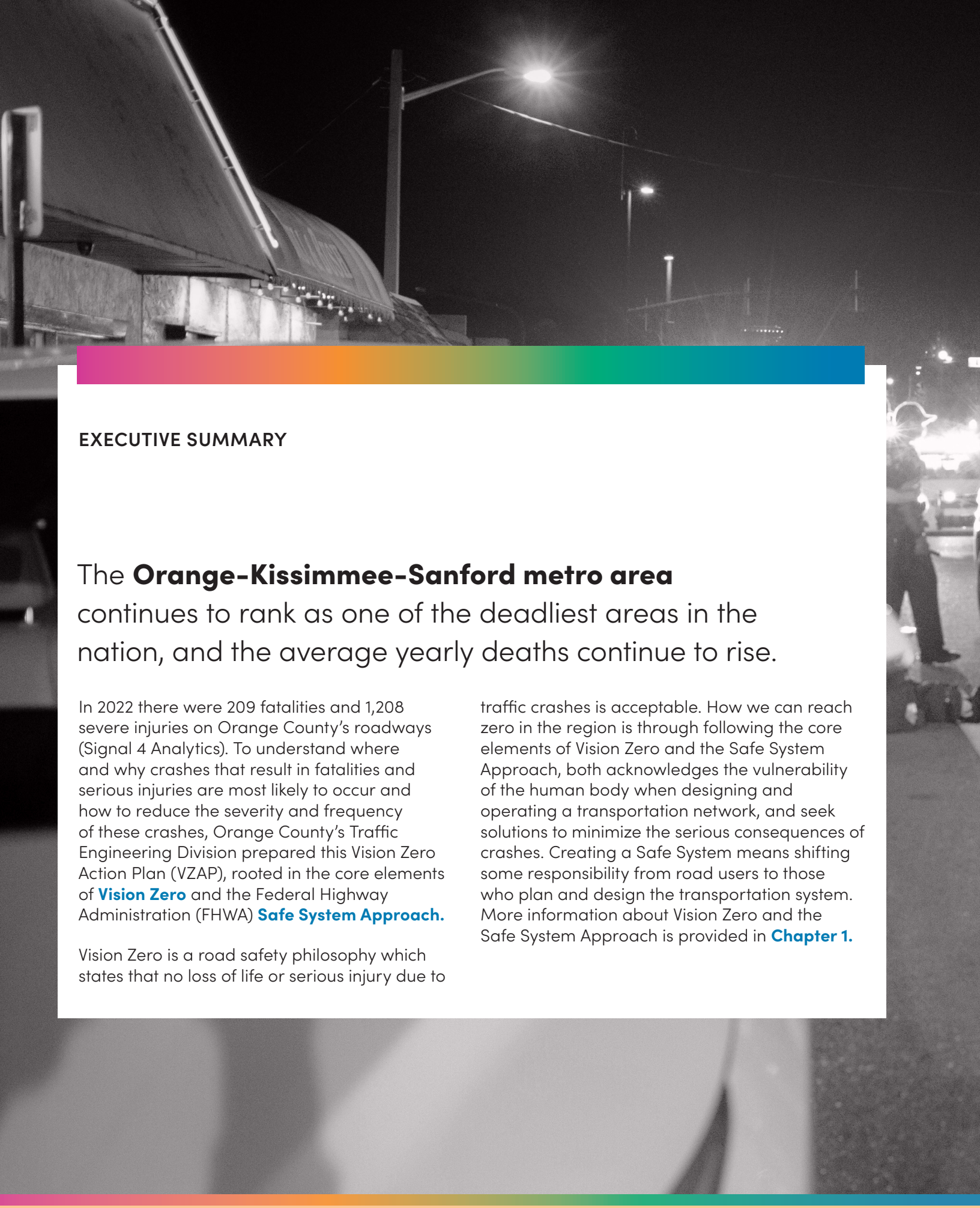
Statement of Protection of Data from Discovery and Admissions

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 section, 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.

Executive Summary

On August 9, 2022, the Orange County Board of County Commissioners (BCC) took a significant step by passing a resolution to develop a Vision Zero Action Plan - a comprehensive initiative aimed at enhancing transportation safety in Orange County. In 2023, MetroPlan Orlando secured a $3.8 million federal Safe Streets for All (SS4A) grant to address serious safety concerns within the region. These funds are being utilized to cover the cost of coordinated Vision Zero Action Plans in their three-county service area, including Orange County, with the goal of eliminating traffic fatalities and severe injuries and creating safer roads for both the 2.2 million residents and 75 million tourists who visit Central Florida annually.

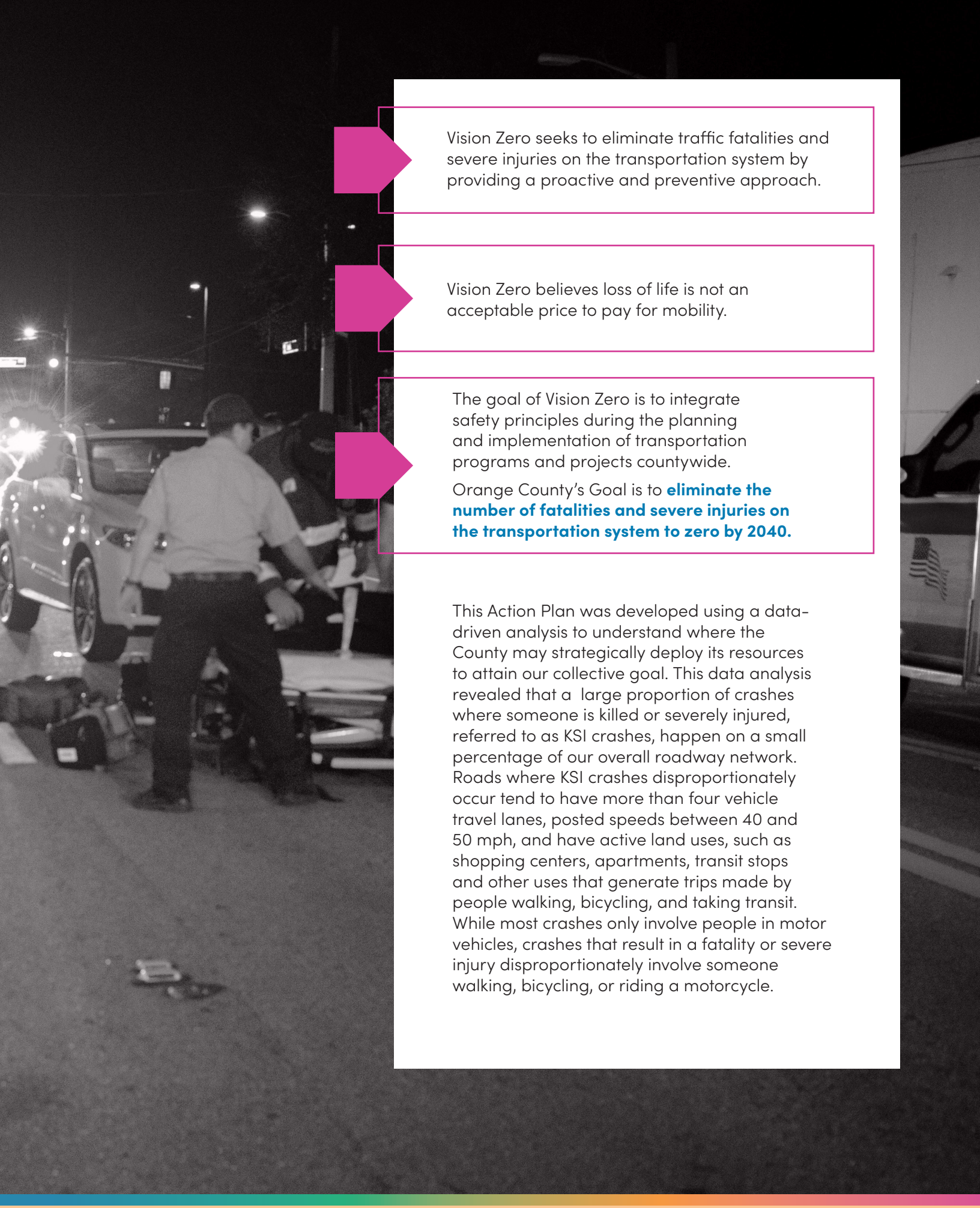


EXECUTIVE SUMMARY

The **Orange-Kissimmee-Sanford metro area** continues to rank as one of the deadliest areas in the nation, and the average yearly deaths continue to rise.

In 2022 there were 209 fatalities and 1,208 severe injuries on Orange County's roadways (Signal 4 Analytics). 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, Orange County's Traffic Engineering Division prepared this Vision Zero Action Plan (VZAP), rooted in the core elements of **Vision Zero** and the Federal Highway Administration (FHWA) **Safe System Approach.**

Vision Zero is a road safety philosophy which states that no loss of life or serious injury due to traffic crashes is acceptable. How we can reach zero in the region is through following the core elements of Vision Zero and the Safe System Approach, both acknowledges the vulnerability of the human body when designing and operating a transportation network, and seek solutions to minimize the serious consequences of crashes. Creating a Safe System means shifting some responsibility from road users to those who plan and design the transportation system. More information about Vision Zero and the Safe System Approach is provided in **Chapter 1.**



Vision Zero seeks to eliminate traffic fatalities and severe injuries on the transportation system by providing a proactive and preventive approach.

Vision Zero believes loss of life is not an acceptable price to pay for mobility.

The goal of Vision Zero is to integrate safety principles during the planning and implementation of transportation programs and projects countywide.

Orange County's Goal is to **eliminate the number of fatalities and severe injuries on the transportation system to zero by 2040.**

This Action Plan was developed using a data-driven analysis to understand where the County may strategically deploy its resources to attain our collective goal. This data analysis revealed that a large proportion of crashes where someone is killed or severely injured, referred to as KSI crashes, happen on a small percentage of our overall roadway network. Roads where KSI crashes disproportionately occur tend to have more than four vehicle travel lanes, posted speeds between 40 and 50 mph, and have active land uses, such as shopping centers, apartments, transit stops and other uses that generate trips made by people walking, bicycling, and taking transit. 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.

Within the analysis period of **2018 – 2022**, in Orange County there were a total of **213,553** crashes, including **893** that resulted in a fatality and **5,588** that resulted in a serious injury. This resulted in approximately **three people per day** killed or seriously injured in traffic crashes. Additional details about crash trends in Orange County are provided in **Chapter 2.**

This Action Plan is firmly grounded on a rigorous and comprehensive data-driven approach and vetted in feedback received from regional partners and community stakeholders. A foundational element of developing this plan lies in analyzing crash trends, along with community and roadway characteristics, to understand road user behavior, and elements of the built environment that are leading to severe crashes. Data was compiled, analyzed, and mapped to identify causational relationships and then corresponding solutions to empower decision makers to thoroughly understand safety concerns and take action to mitigate them. By identifying and focusing on high-crash locations (known as the High Injury Network) or recurring types of crashes, Orange County can pinpoint areas where investment of resources in each District will have the most significant impact in terms of lives saved and injuries prevented. In addition to physical changes to the roadway system including lighting upgrades, intersection improvements, and pedestrian or bicycle improvements, additional behavioral interventions like public safety campaigns are shared in this report.

This Action Plan was developed through a robust public outreach campaign in order to collect feedback from the community and a multi-disciplinary group of stakeholders on the topic of transportation safety. Community outreach was a core component of identifying transportation safety issues within the County and developing a consistent foundation for all local agencies needed to establish important change. County commissioners advocated for the Action Plan by supporting the plan development process and educating the public about the importance of traffic safety and the goal of reducing traffic fatalities to zero. The plan specifically called upon each commissioner to champion the public engagement process by hosting districtwide public meetings. **Chapter 3** describes the community outreach that was conducted as a part of this plan with a focus on each commissioner district, and how that feedback was incorporated.

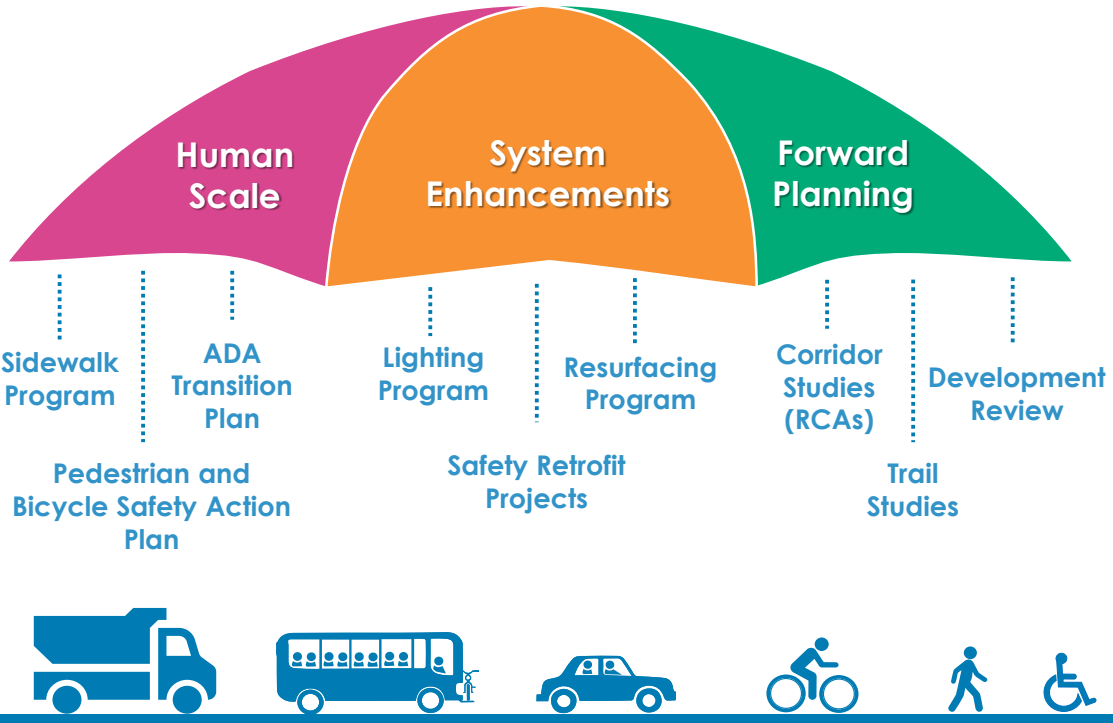
There is no single solution to reach zero traffic deaths and serious injuries. Rather, it will require a multidisciplinary and collaborative approach. **Chapters 4, 5 and 6** provide details on the engineering and non-engineering countermeasures, such as enforcement and engagement, that the County will implement to help reach its goal. These chapters also outline an implementation plan to understand where future improvements will be prioritized.

Monitoring progress will continue to be an important part of the process. On an annual basis, Orange County will reflect on progress toward reaching zero traffic deaths and serious injuries through an assessment of the crash trends from the prior year and comparing them to the trends documented in the Action Plan. Progress will be shared at an Annual Safety Summit hosted by MetroPlan Orlando where best practices and lessons learned from across the region will be shared.

In coordination with the development of Vision Zero Central Florida Safety Action Plan prepared by MetroPlan Orlando, this Action Plan identifies the HIN for Orange County and highlights the characteristics of the top 25 most dangerous corridors, so that awareness and future project consideration may be given to these corridors in future transportation planning and decision making. (Chapter 4)

As a result of the collaborative support and participation by County Commissioners during plan development, the Orange County Action Plan further identifies and prioritizes the top 4 most dangerous corridors in each Commissioner District and presents recommendations for engineering countermeasures that may be deployed in each corridor. These are summarized in the following two pages, and presented in detail in Chapter 6.

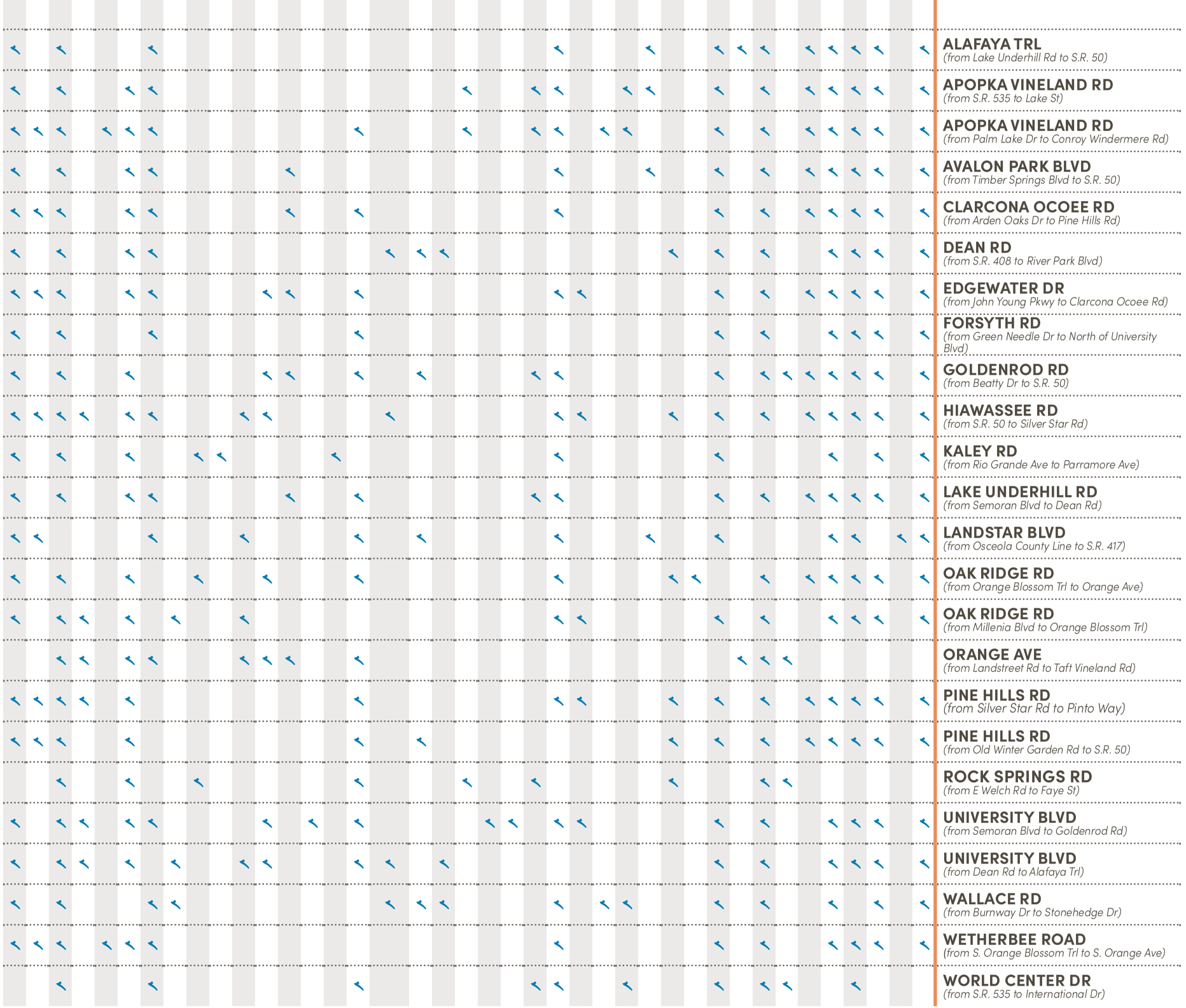
This prioritization approach empowers the County's elected officials to continue their advocacy for Vision Zero within each of their Districts, through the organizational umbrella approach to integrate safety principles during the implementation of transportation programs and projects, countywide.



The goal is to integrate safety principles during the implementation of transportation programs Countywide

Prioritized Engineering Countermeasures and Corridors

- Install leading pedestrian intervals
- Eliminate right-turns on red
- Prohibit turns when pedestrian signal is activated
- Install retroreflective backplates
- Upgrade to audible push button pedestrian crossing signals
- Implement speed sensitive traffic signals
- Review signalization for protected phasing for all road users
- Upgrade to roundabouts or signalized intersections at unsignalized intersections
- Consider restricting left turns from minor side streets
- Tighten curb radii at intersections, side streets, major driveways and/or trail crossings
- Construct median islands at midblock locations, especially in front of schools
- Consider adding paved median with directional left turn lanes where warranted
- Extend median nose into crosswalk
- Evaluate need for channelized right turns
- Consider pedestrian level street lighting
- Install raised midblock crosswalks or upgrade existing crosswalks to raised crosswalk
- Install high visibility crosswalks at all side streets and major driveways
- Evaluate feasibility of shared use path
- Evaluate alternative crossing opportunities (i.e. ped bridge)
- Widen sidwalks
- Add crosswalks on all legs of intersections
- Consider the use of sidewalk stenciling to relay safety messages to students walking/biking
- Install raised crosswalk with advanced warning signs and yield markings at specific intersections
- Upgrade crosswalk near schools to raised crosswalks with rectangular rapid flashing beacon, advanced warning signs, yield markings, and in-pavement lighting
- Install high-emphasis mid-block crosswalks and conduct warrant study for pedestrian hybrid beacon(s)
- Consider installing off-road/separated bicycle facilities (cycle track)
- Provide trail connectivity
- Install bike boxes and/or or green bike lanes at major intersections
- Co-locate bus stops with crosswalks at midblocks and intersections
- Relocate bus stops to intersections with existing crosswalks and/or far side of intersections
- Update worn detectable landing pads throughout the corridor
- Install sidewalk shading where possible
- Install speed cameras in school zones
- Reduce lane widths
- Consider target speed reduction
- Install speed feedback sign(s)
- Evaluate access management/driveway strategies corridorwide
- Lighting upgrades at segments and intersections
- Perform Road Safety Audit to identify safety improvements
- Update worn pavement markings throughout corridor



ALAFAYA TRL
(from Lake Underhill Rd to S.R. 50)

APOPKA VINELAND RD
(from S.R. 535 to Lake St)

APOPKA VINELAND RD
(from Palm Lake Dr to Conroy Windermere Rd)

AVALON PARK BLVD
(from Timber Springs Blvd to S.R. 50)

CLARCONA OCOEE RD
(from Arden Oaks Dr to Pine Hills Rd)

DEAN RD
(from S.R. 408 to River Park Blvd)

EDGEWATER DR
(from John Young Pkwy to Clarcona Ocoee Rd)

FORSYTH RD
(from Green Needle Dr to North of University Blvd)

GOLDENROD RD
(from Beatty Dr to S.R. 50)

HIAWASSEE RD
(from S.R. 50 to Silver Star Rd)

KALEY RD
(from Rio Grande Ave to Parramore Ave)

LAKE UNDERHILL RD
(from Semoran Blvd to Dean Rd)

LANDSTAR BLVD
(from Osceola County Line to S.R. 417)

OAK RIDGE RD
(from Orange Blossom Trl to Orange Ave)

OAK RIDGE RD
(from Millenia Blvd to Orange Blossom Trl)

ORANGE AVE
(from Landstreet Rd to Taft Vineland Rd)

PINE HILLS RD
(from Silver Star Rd to Pinto Way)

PINE HILLS RD
(from Old Winter Garden Rd to S.R. 50)

ROCK SPRINGS RD
(from E Welch Rd to Faye St)

UNIVERSITY BLVD
(from Semoran Blvd to Goldenrod Rd)

UNIVERSITY BLVD
(from Dean Rd to Alafaya Trl)

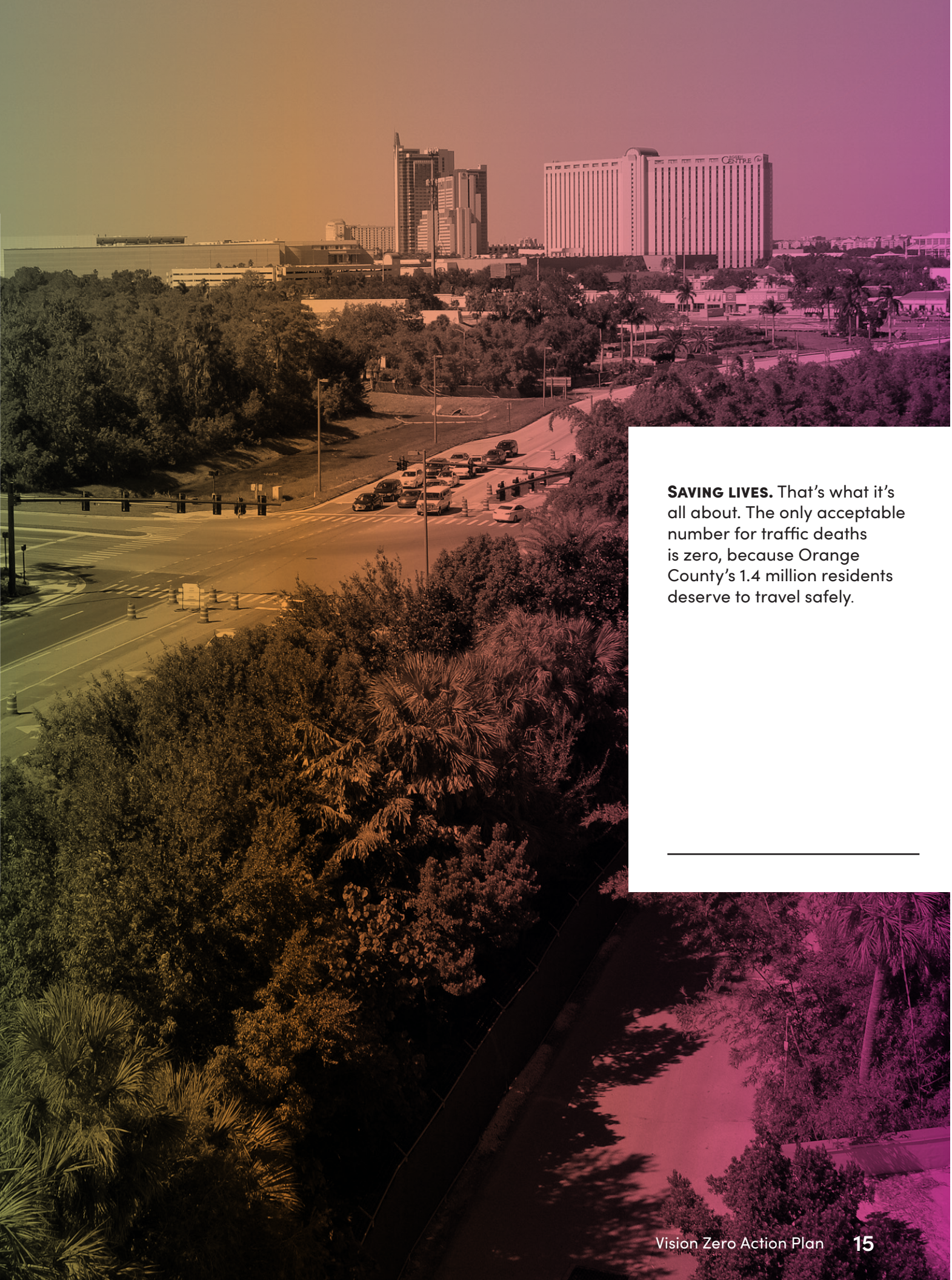
WALLACE RD
(from Burnway Dr to Stonehedge Dr)

WETHERBEE ROAD
(from S. Orange Blossom Trl to S. Orange Ave)

WORLD CENTER DR
(from S.R. 535 to International Dr)

CHAPTER 1

Introduction



SAVING LIVES. That's what it's all about. The only acceptable number for traffic deaths is zero, because Orange County's 1.4 million residents deserve to travel safely.

The purpose of the Orange County Vision Zero Action Plan is to articulate the County's commitment towards achieving zero road fatalities and serious injuries in Orange County and continue to support its municipalities to accomplish the same. This plan outlines a comprehensive, data-driven approach to improving road safety for all users, utilizing the **Safe System Approach**. We acknowledge that every life is valuable, and no loss of life is acceptable on our roads. Our vision is not just to reduce but to systematically eliminate fatalities and serious injuries (KSI) caused by road traffic crashes. We pledge to put safety at the core of our decision-making processes, working collaboratively with local partners, stakeholders, and the community to achieve our collective goal.

No one entity or agency can fix road safety problems alone. This **Vision Zero Action Plan** results from a coordinated planning effort led by **Orange County's Public Works Department and Traffic Engineering Division**, in partnership with MetroPlan Orlando, the Florida Department of Transportation (FDOT), and other local stakeholder groups. With this Action Plan, Orange County has joined communities around the world that are working to stop traffic deaths through the Safe System Approach. This plan:

- **Identifies the High Injury Network (HIN)** –roads with the highest risk of death and serious injury crashes. **The identified High Injury Network is comprised of approximately 290 centerline miles and includes approximately 45% of all crashes and 65% percent of KSI crashes that occurred in Orange County between 2018 and 2022.**

- **Layers a qualitative analysis** by engaging stakeholders and the community and incorporating their feedback and review of the HIN and safety concerns.

- Identifies barriers and opportunities to reaching zero fatalities by reviewing County policy and benchmarks.

- **Accounts for transportation underserved communities** that have been disproportionately affected by traffic crashes. **The Justice40 Initiative encompasses 58% of the All Roads HIN, 69% of the County Roads HIN, and 65% of the HIN intersections. Orange County's Environmental Justice Composite score captures 72% of the All Roads HIN, 86% of the County Roads HIN, and 73% of the HIN intersections.**

- **Prioritizes feasible projects** that will have the greatest safety impacts. Orange County will work with our regional partners to implement changes and monitor long-term progress on safety.

Safe System Principles

The Safe System Approach acknowledges the vulnerability of the human body when designing and operating a transportation network to minimize serious consequences of crashes. Creating a Safe System means shifting some responsibility from road users to those who plan and design the transportation system. While road users are responsible for their own behavior, there is a shared responsibility with those who design, operate, and maintain the transportation network, including the automotive industry, law enforcement, elected officials, and government agencies. In a Safe System, road system designers and operators take on the highest level of ethical responsibility to design and build our transportation system in a way that encourages safer behavior and provides redundancies.

The Safe System Is Built On The Following Principles:

DEATH AND SERIOUS INJURY ARE UNACCEPTABLE

This plan focuses on eliminating crashes resulting in death and serious injuries in Maitland by 2050.

HUMANS MAKE MISTAKES

Everyone (people walking, bicycling, driving, etc.) makes mistakes that can lead to a crash. The goal of the SSA is to design and operate our transportation system to ensure these mistakes don't have life-altering impacts.

HUMANS ARE VULNERABLE

Human bodies can only withstand a limited amount of impact from a crash before death or serious injuries occur.

RESPONSIBILITY IS SHARED

Every person in the transportation system, from elected officials to everyday users, to planners and engineers, has a role to play in reaching zero fatalities and serious injuries.

SAFETY IS PROACTIVE

Rather than waiting for a crash to occur, transportation agencies should seek to proactively identify and address dangerous situations.

REDUNDANCY IS CRUCIAL

Redundancy means making sure there are multiple layers of the transportation system working together towards safer outcomes so that if one layer fails, people are still protected.

Five Elements of the Safe System Approach

The SSA addresses the five elements of a safe transportation system—safer people, safer vehicles, safer speeds, safer roads, and post-crash care—in an integrated manner, through a wide range of interventions.

SAFER PEOPLE

Encourage safe, responsible driving and behavior by people who use our 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.

POST-CRASH CARE

Partner with law enforcement and emergency response to identify strategic investments in crash response, crash assessment, and crash reporting.

SAFER ROADS

Prioritize roadway design changes throughout the Orange County that address the factors contributing to severe injury and fatal crashes.

SAFER SPEEDS

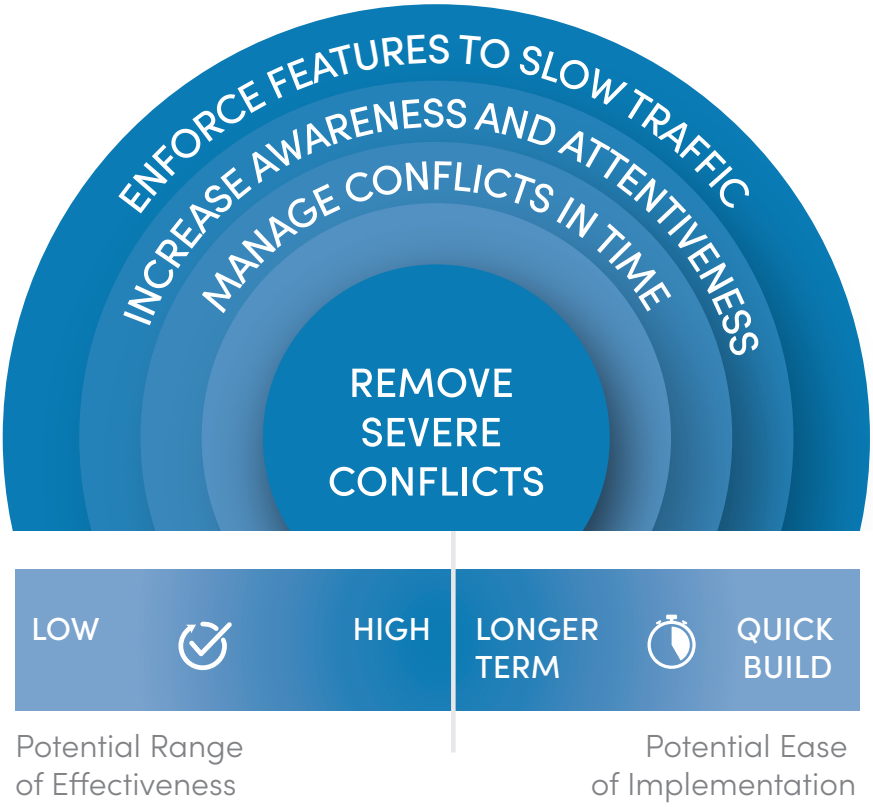
Use a multidisciplinary approach that induces drivers to travel at speeds appropriate for the context of the roadway that will reduce injuries even when human error leads to crash.

Safe System Strategy

Consistent with the Safe System Approach Framework, the planning, design, and operation of facilities within Orange County should anticipate human error and consider human vulnerabilities. The Institute of Transportation Engineers (ITE) and the Road to Zero Coalition's Safe Systems Explanation and Framework articulate that to anticipate human mistakes, a Safe System seeks to:

- Separate users in space by providing road users moving at different speeds or different directions, such as turning vehicles, dedicated space to minimize conflicts with other road users.
- Separate users in time when road users need to occupy the same space on the roadway, such as an exclusive pedestrian crossing phase or a dedicated turn phase.
- Alert users to potential hazards – through strategies that increase visibility and attentiveness, as well as reduce impairment.
- Accommodate human injury tolerance through interventions that reduce speed or impact force, like physical design treatments and occupant protection.

These elements 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 timeframes. FHWA has further developed a draft Safe System Solutions Hierarchy (January 2024) within the Safe System Elements of Safe Roads. Following this framework, the most effective strategies are those that remove severe conflicts and minimize conflict and speed, providing adequate reaction time for drivers to make adjustments and save lives.



CHAPTER 2

Crash Trends and Analysis

A comprehensive strategy to improve roadway safety requires an understanding of local crash trends and the various factors contributing to such incidents. The primary data for this analysis was sourced from the University of Florida's Signal Four (S4) Analytics crash data, offering a solid foundation for the Project Team's research. This crash data was supplemented with data from the Florida Injury Surveillance System (FISS) and the Florida Department of Transportation (FDOT) Modal Office, to provide more detailed injury information for non-motor vehicle injuries. The crash analysis included those crashes that occurred within the five-year period between 2018 – 2022, for all non-limited access facilities.

Other relevant contextual information was incorporated with the base crash data to better understand contributing factors that may be leading to crashes. This involved factors such as road characteristics, aspects of the built environment, and social vulnerability factors which can influence both traffic crashes and guide the demand for specific safety improvements. These layers of data help to us understand crash patterns better and categorize different crashes into a group of 'collision profiles' that show the factors most common for crashes resulting in fatalities or serious injuries.

ORANGE COUNTY CRASH TRENDS

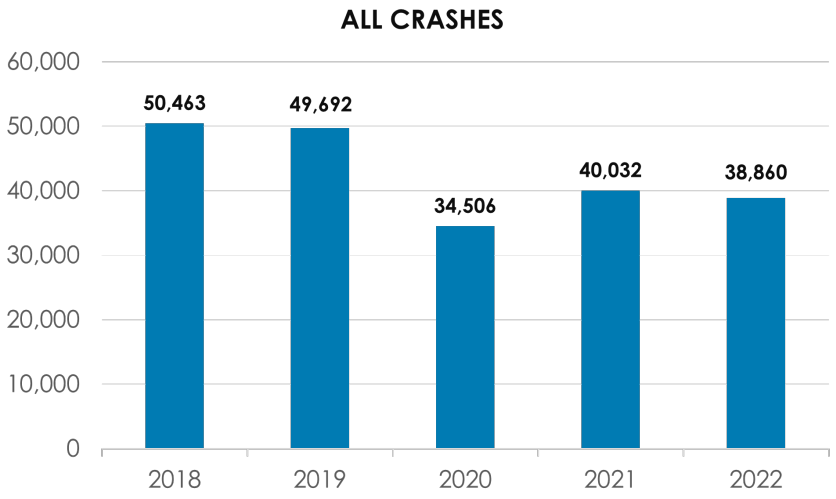
The following represents an overview of the crash trends on the roadway network in Orange County:

YEARS OF CRASH DATA:	TOTAL CRASHES:	TOTAL FATAL CRASHES:	TOTAL SERIOUS INJURY CRASHES:
2018-2022	213,553	893	5,588

CRASHES BY YEAR:

Overall, the County has seen progress in the last 5 years toward reaching its Vision Zero goal.

Within the 5-year analysis period, the total number of crashes has declined with the highest number of annual crashes (50,463) occurring in 2018. The lowest number of crashes (34,506) was in 2020, likely due to the lower number of trips that occurred in the pandemic year.

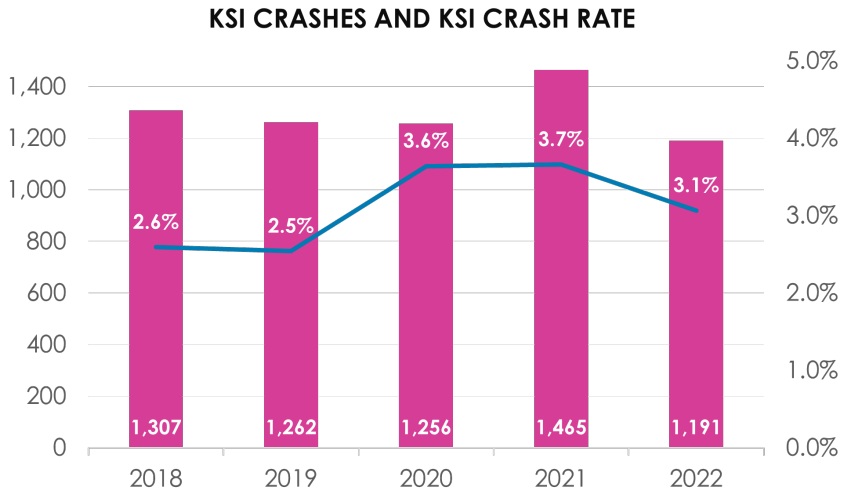


*There has been a **22.9% decrease** in overall crashes in the five year period.*

CRASHES BY INJURY SEVERITY:

KSI crashes accounted for just 3% of all crashes in the County; however, as shared in the crash analysis by mode of transportation, people walking, bicycling, or travelling via motorcycle are much more at risk of a fatality or serious injury in instance of a crash.

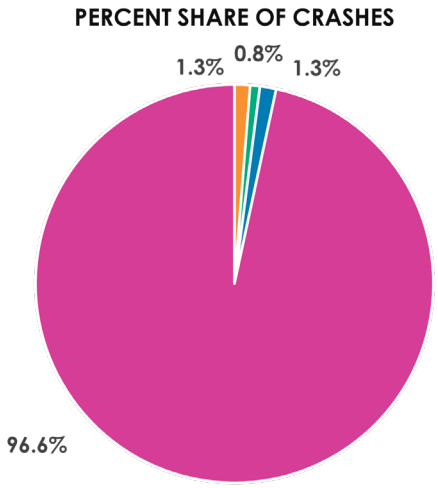
In review of KSI crashes, the highest number of KSI crashes (1,465) occurred in 2021 and the lowest number of KSI crashes occurred in 2022 (1,191). Despite the continued decrease in both overall and KSI crashes, the rate of crashes resulting in serious injury or fatality has risen since the beginning of the analysis period. Where 2.6% of all crashes resulted in a serious injury or fatality in 2018, that trend rose to 3.7% in 2021.

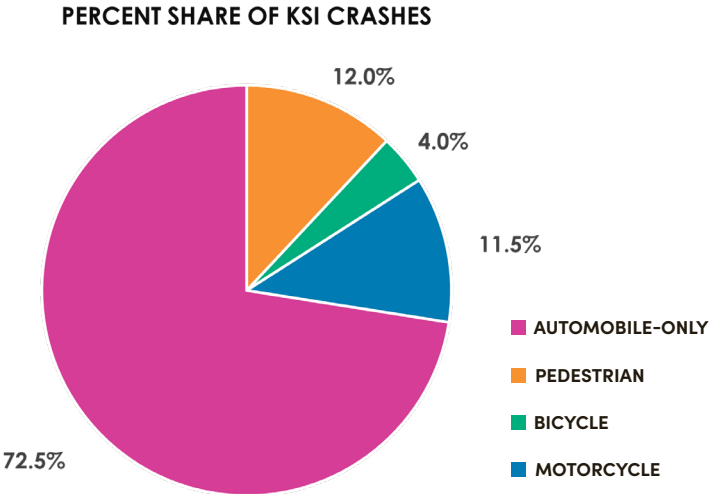


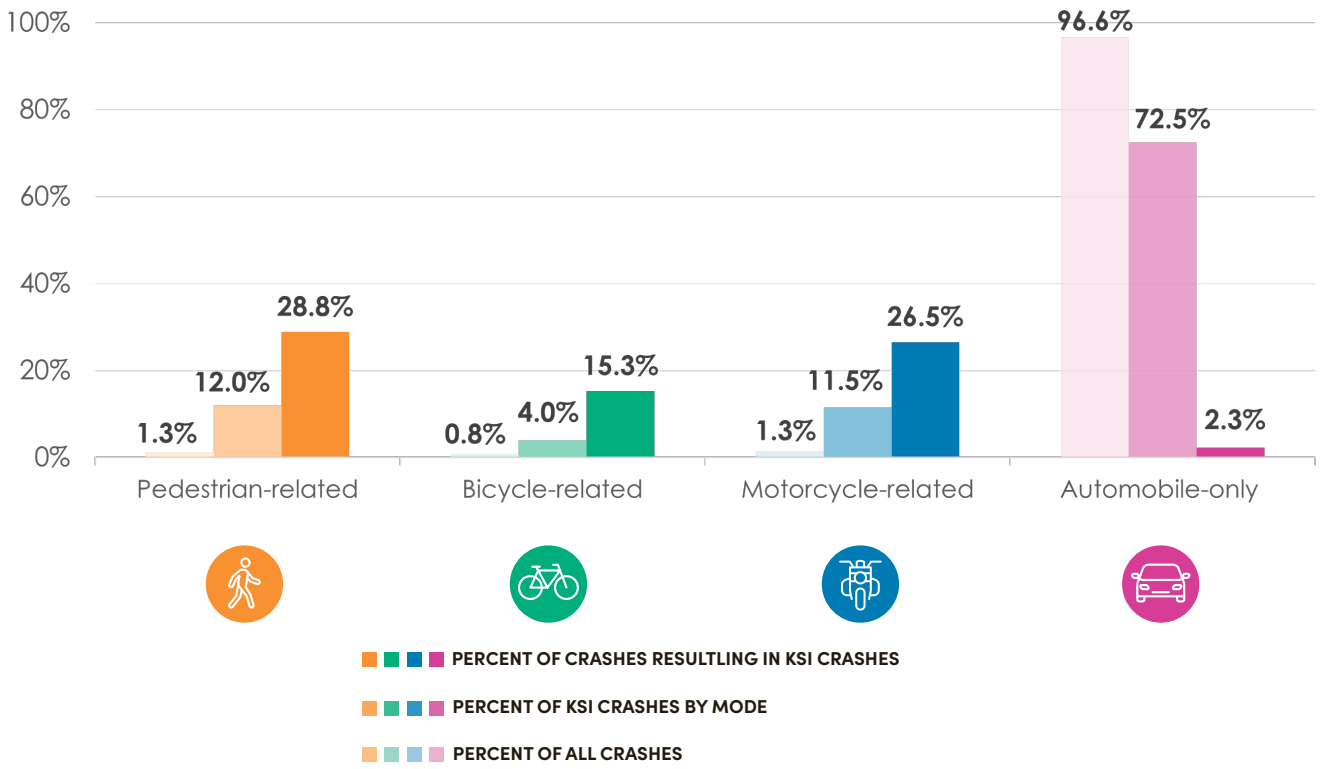
*There has been a **8.9% decrease** in KSI crashes in the five year period.*

CRASHES BY MODE:

- **PEDESTRIAN-INVOLVED:** Pedestrian-involved crashes made up 1.3% of all crashes, but 12.0% of KSI crashes, and 28.8% of every pedestrian-involved crash resulted in a fatality or serious injury.
- **BICYCLE-INVOLVED:** Bicycle-involved crashes made up 0.8% of all crashes and 4.0% of KSI crashes, but 15.3% of every bicycle-involved crash resulted in a fatality or serious injury.
- **MOTORCYCLE-INVOLVED:** Motorcycle-involved crashes made up 1.3% of all crashes, but 11.5% of KSI crashes, and 26.5% of every motorcycle-involved crash resulted in a fatality or serious injury.
- **AUTOMOBILE-ONLY:** Automobile-only crashes made up 96.6% of all crashes and 72.5% of KSI crashes, but only 2.3% of automobile-only crashes resulted in a fatality or serious injury.

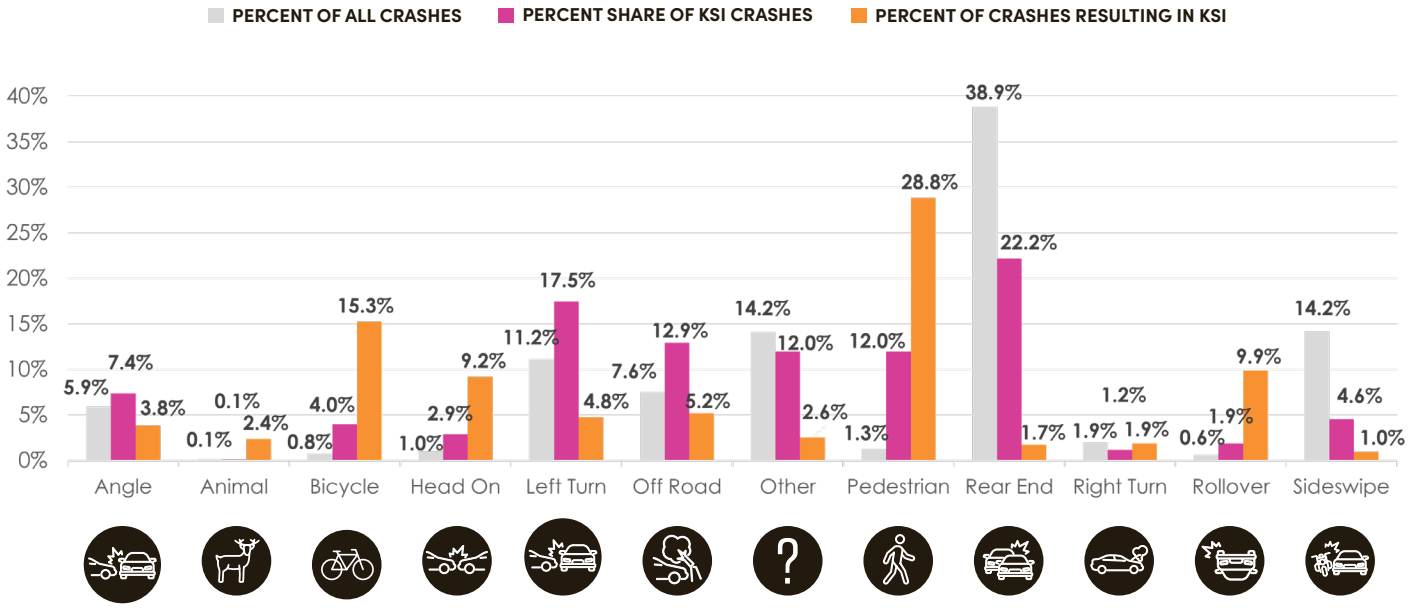




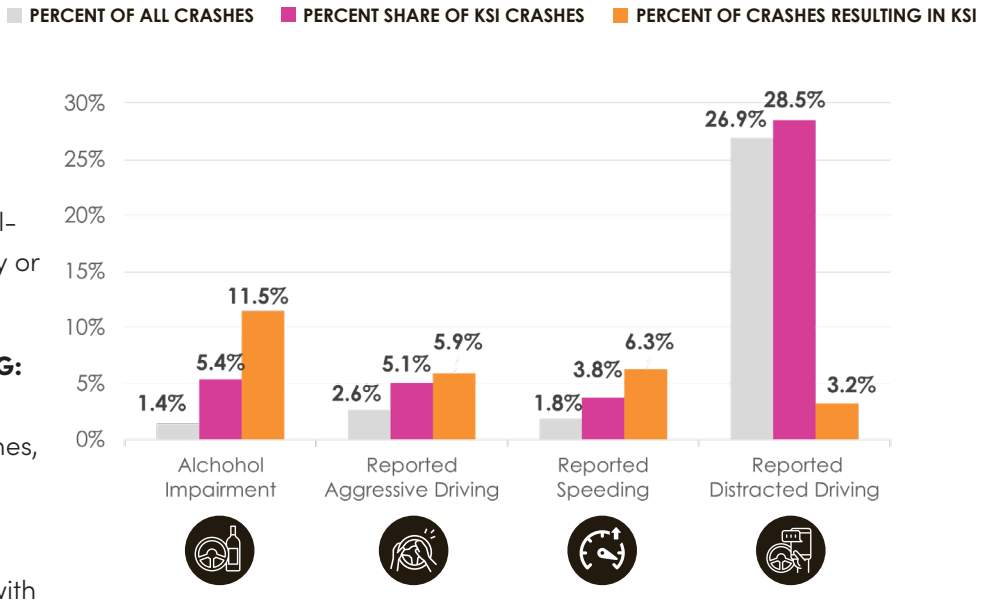


CRASHES BY TYPE:

Rear end crashes were the most common type of crash with 38.9% of the crashes. Angle or left turn crashes, while comprising 17.1% of total crashes, were the most common to result in a fatality or serious injury, constituting 24.9% of all KSI crashes. The second and third crash types most likely to result in a KSI crash were rear end crashes (22.2%) and off road crashes (12.9%). The top two crash types to occur that result in a KSA are first pedestrian and then bicycle crashes, which have an increased likelihood of resulting in a KSI, with 28.8% and 15.3% of this crash type resulting in a KSI, respectively.



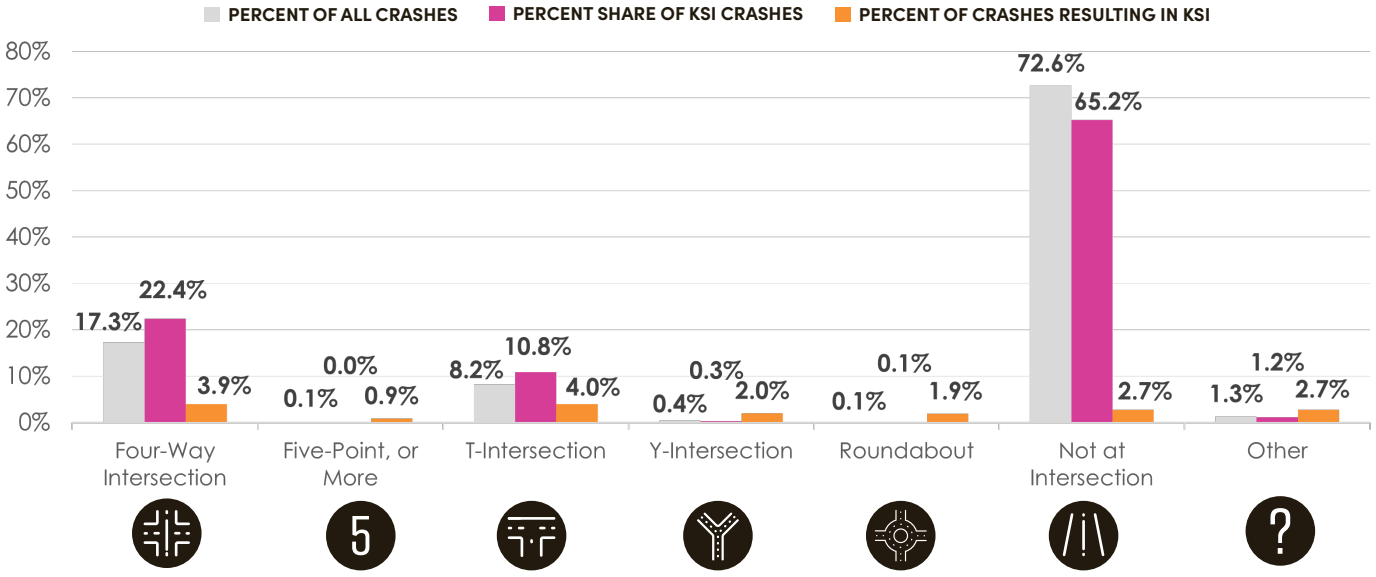
BEHAVIORAL FACTORS:



- **ALCOHOL IMPAIRMENT:** Crashes that involved alcohol impairment comprised 1.4% of all crashes, however, comprised 3.4% of KSI crashes, and 11.5% of every alcohol-involved crash resulted in a fatality or serious injury.
- **REPORTED AGGRESSIVE DRIVING:** Crashes that involved aggressive driving comprised 2.6% of all crashes, however, 5.9% of these crashes resulted in a KSI.
- **REPORTED SPEEDING:** Crashes with reported speeding comprised 1.8% of all crashes, however, 6.3% of these crashes resulted in a KSI.
- **REPORTED DISTRACTED DRIVING:** Crashes with reported distracted driving comprised 26.9% of all crashes and 28.5% of KSI crashes.

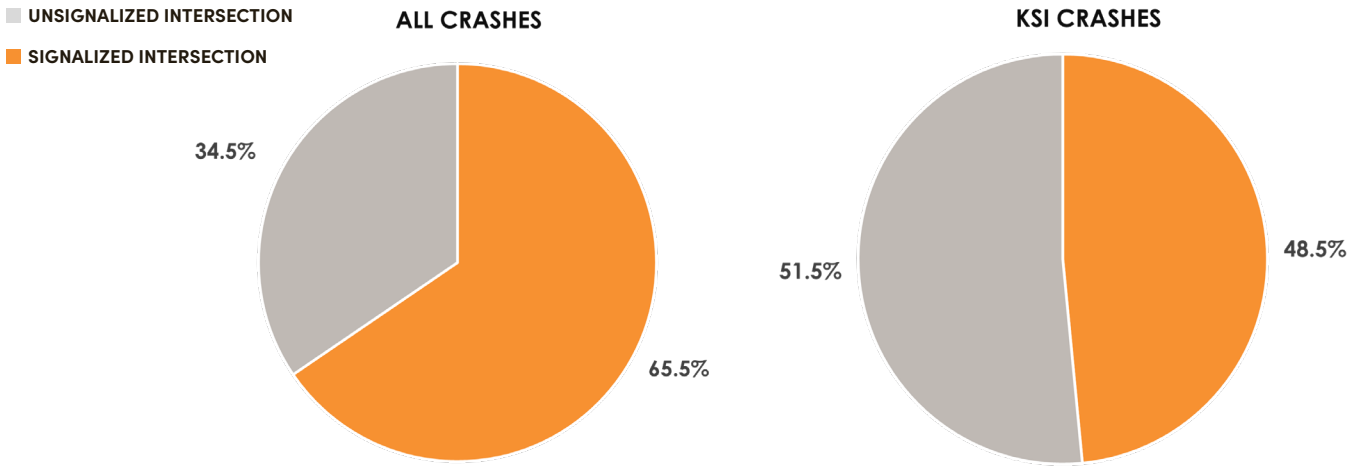
CRASHES BY LOCATION:

- **FOUR-WAY INTERSECTION:** 17.3% of all crashes and 22.4% of total KSI crashes occurred at a 4-way intersection.
- **FIVE-POINT OR MORE INTERSECTION:** 107 crashes occurred at a five-way or more intersection, with 1 KSI crash.
- **T-INTERSECTION OR Y-INTERSECTION:** 8.6% of all crashes and 11.1% of total KSI crashes occurred at a T- or Y-intersection.
- **ROUNDABOUT:** 252 crashes occurred in a roundabout, with 5 KSI crashes.
- **NOT AT INTERSECTION OR "SEGMENT":** 72.6% of total crashes and 65.2% of total KSI crashes occurred on a roadway segment.



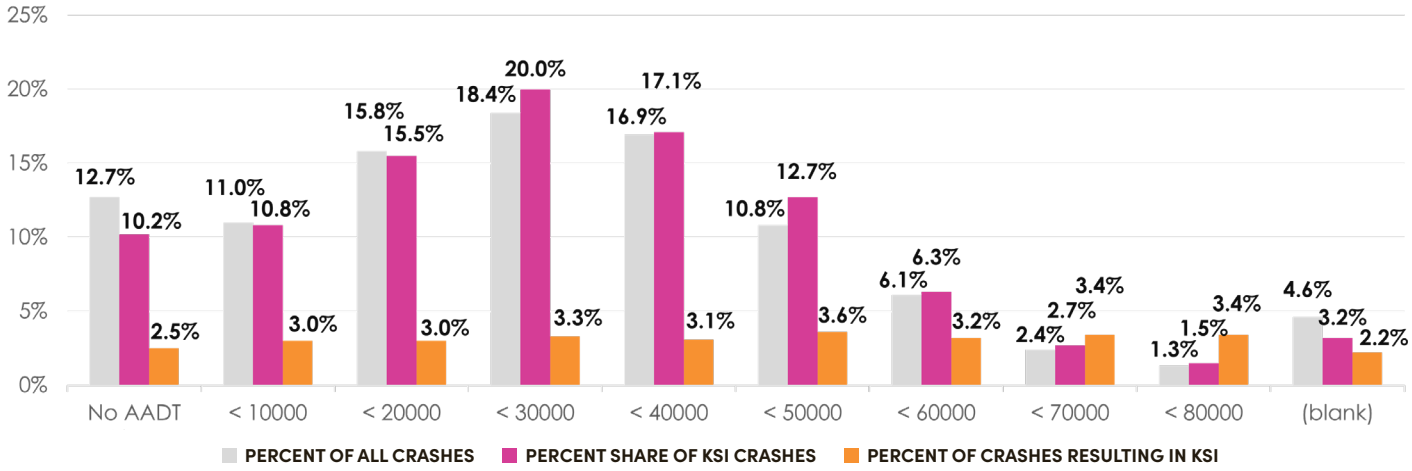
TYPE OF INTERSECTION (SIGNALIZED VS. UNSIGNALIZED):

- As a subset to the crashes by location, a review of crashes within a 250 ft buffer of an intersection was conducted. Review of crashes in these locations reveals that a greater percentage of intersection-related crashes occurred at signalized intersections (65.5%); however, unsignalized intersections are shown to have a greater percentage of KSI crashes (51.5%).



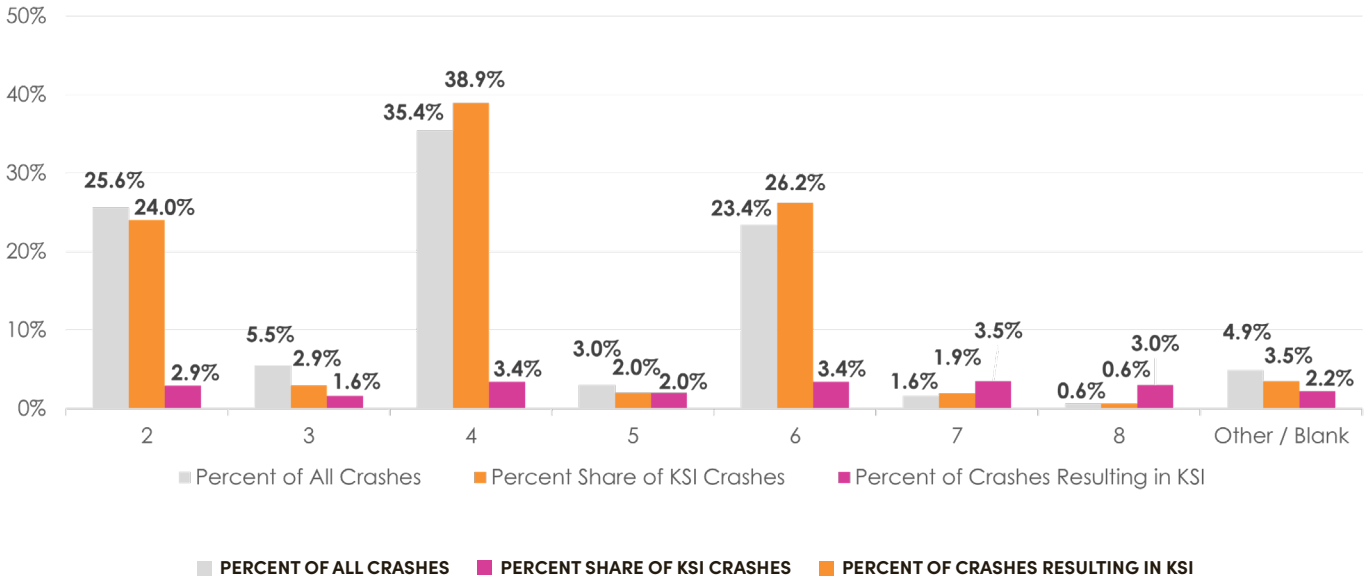
ROADWAY VOLUME (AADT):

Approximately 37.5% of all crashes occurred on roadways with traffic volumes between 20,000 and 40,000 daily trips and 40.1% of KSI crashes occurred on roadways with traffic volumes between 20,000 and 40,000 daily trips.



NUMBER OF TRAVEL LANES:

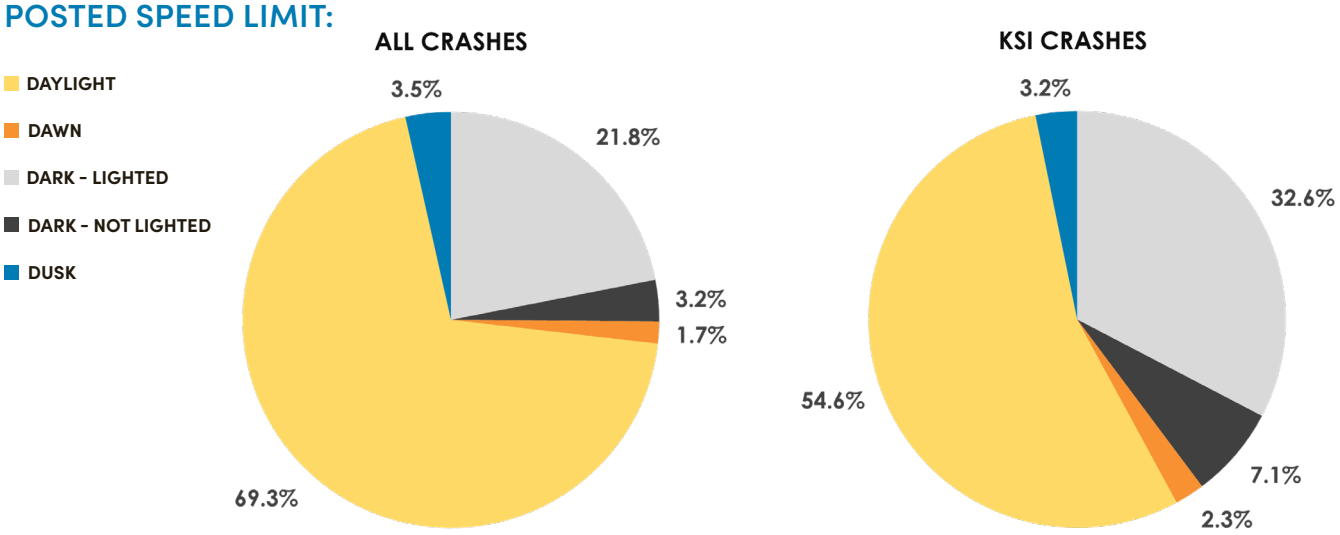
Approximately 58.8% of all crashes in the County occur on roadways with either 4 or 6 travel lanes. The proportion of KSI crashes also increased as the number of lanes increased, with approximately 65.1% of KSI crashes occurring on roadways with 4 or 6 travel lanes.



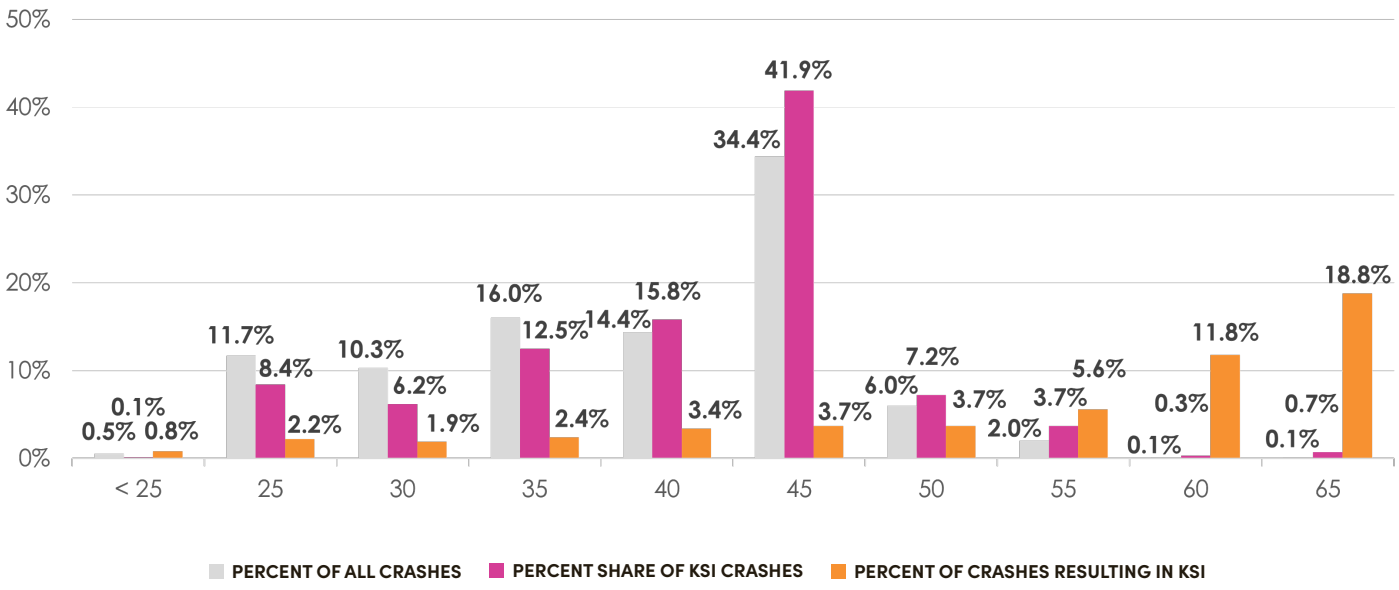
LIGHTING CONDITIONS:

Most crashes occurred during daylight hours (69.3%); however, crashes that occurred during dark conditions were more likely to result in a serious injury or fatality. Dark – lighted conditions were reported for 32.6% of KSI crashes in Orange County, and dark – not lighted conditions were reported for 7.1% of KSI crashes.

POSTED SPEED LIMIT:



Crashes disproportionately occurred on roadways with higher speeds. 34.4% of crashes in the County occurred on roadways with a posted speed limit of 45 mph and 53.8% of the County's KSI crashes occurred on roadways where the posted speed is 45 mph or greater. Review of both the countywide and unincorporated crash trends reveals that as speeds increase, there was a higher chance that the crash resulted in a KSI, with speeds of <25 miles per hour resulting in less than a 0.8% chance of a KSI; whereas, 18.8% of crashes resulted in a fatality or serious injury where the speed limit was 65 mph.



CONTEXT CLASSIFICATION: At 31.3% of all crashes, crashes disproportionately occurred on Suburban Commercial Corridors (C3C). These are large volume roadways that service non-residential land uses. These roadways also recorded 34.5% of KSI crashes in the County. However, 50.3% of crashes and 49.9% of KSI crashes occurred on roadways that do not have a context classification.

ROADWAY SURFACE CONDITION: Approximately 87% of total crashes and 88% of KSI crashes occurred in dry conditions.

WEATHER CONDITION: Approximately 76% of total crashes occurred in dry conditions; however KSI crashes were more likely to result in fog, smog, or smoke conditions or sleet, hail, freezing rain conditions at 7.1% and 16.7% respectively.

MEDIAN WIDTHS: At 33.8%, the median type with the most reported KSI crashes is grass; however, the number of crashes that occurred on roadway segments without the presence of a median was also high, consisting of 36.5% of all crashes and 33.5% of KSI crashes.

TIME OF DAY: At 23.1%, crashes were most likely to occur between 3 and 6 PM; however, KSI crashes were most likely to occur between the hours of 6 and 9 PM with (16.3%). The rate of KSI crashes is highest between the hours of 3 to 6 AM, with 5.9% of crashes during these hours having resulted in a KSI.

BICYCLE LANES AND LEVEL OF TRAFFIC STRESS (LTS): Level of Traffic Stress (LTS) examines and quantifies the comfort level of bicyclists in traffic ranging from Level 1, most comfortable, to Level 4, least comfortable. Approximately 70% of bicycle crashes and KSI crashes occurred in areas with Level 4 LTS classification and 86.5% of the bicycle KSI crashes occurred where no bicycle lanes were present.

SOCIAL VULNERABILITY: In general, a review of social vulnerability indicators and the location of associated community venues such as libraries, mobile home communities, and nursing homes reveals that there are higher populations of potentially vulnerable communities along the following HIN corridors:

- Curry Ford Rd / Dean Rd
- John Young Pkwy
- Oak Ridge Rd
- Rio Grande Ave
- Lee Rd
- W Colonial Dr
- Forsyth Rd
- Hiawassee Rd
- Lake Underhill Rd
- Pine Hills Rd
- Semoran Blvd
- Goldenrod Rd
- Westmoreland Dr

This type of analysis will continue to provide important insight into the targeted transportation safety needs of the Orange County community and served as important information leading to the identificatoni of countermeasures, advancing solutions where people may need them the most.

High Injury Network

The next step in creating the Vision Zero Action Plan was to identify the High-Injury Network (HIN) for the roadways in Orange County. The HIN is a key tool for prioritizing countermeasures and helps Orange County target safety improvements where they are most needed. The HIN for Orange County was based on a thorough review and analysis of crash data to find locations with a high number of severe injuries and fatalities in the past five years (2018-2022). The Project Team also checked the quality and accuracy of crash citation records to verify the location of crashes occurred only on the roadway system instead of parking lots. The approach to developing the HIN, as well as the associated collision profiles from the crash analysis, intentionally excludes limited access (LA) facilities such as Interstate 4, the Florida Turnpike, or other tolled roadways and corresponding on-off ramps.

In total, the identified HIN covers 238 centerline miles, includes 76 roadway corridors, and 202 separate segments. These roadways account for approximately 54% of total KSI crashes in the County.

In addition to the identification of the HIN, a supplementary analysis was completed based on a combination of equity and crash factors to prioritize segments for future action. This establishes alignment with the ultimate goal of targeting solutions where they will have the most direct impact in reaching zero fatalities and serious injuries. The top countywide 25 HIN corridors are identified in the table below.

OVERALL RANK	LOCAL NAME	FROM	TO	SEGMENT LENGTH (MI)	TOTAL CRASHES (KSI CRASHES)	PED CRASHES (KSI CRASHES)	BIKE CRASHES (KSI CRASHES)	MOTORCYCLE CRASHES (KSI CRASHES)	MOTOR VEHICLE CRASHES (KSI CRASHES)
1	KIRKMAN RD	Carrier Dr	Colonial Dr	4.39	2,249 (69)	34 (15)	9 (1)	34 (12)	2,156 (41)
2	SILVER STAR RD	Savoy Dr	Maguire Rd	4.01	1,447 (123)	71 (27)	28 (3)	16 (6)	1,302 (87)
3	WASHINGTON ST/ Garland Ave / Robinson St	Terry Ave	Mills Ave	4.02	1,686 (24)	31 (8)	18 (1)	28 (4)	1,600 (11)
4	PINE HILLS RD	Old Winter Garden Rd	Pinto Way	5.10	1,318 (88)	46 (18)	22 (5)	20 (6)	1,207 (59)
5	CURRY FORD / DEAN RD	Fredrica Dr	River Park Blvd	5.48	1,183 (49)	24 (4)	16 (3)	27 (7)	1,109 (36)
6	COLONIAL DR	Orange Blossom Trail	Brevard County Line	24.92	4,777 (207)	71 (27)	55 (14)	87 (23)	4,523 (143)
7	ORANGE BLOSSOM TRL	Colonial Dr	Drage Dr	6.50	1,826 (84)	50 (22)	13 (3)	34 (10)	1,704 (49)
8	W COLONIAL DR	Economic Ct	Orange Blossom Trail	8.30	2,630 (122)	62 (25)	26 (5)	34 (8)	2,478 (84)
9	WESTMORELAND DR	Gore St	Washington St	0.87	165 (10)	8 (2)	4 (1)	2 (1)	148 (6)
10	ORANGE BLOSSOM TRL	Town Center Blvd	Colonial DR	12.84	5,735 (265)	153 (67)	81 (18)	107 (22)	5,309 (158)
11	CENTRAL BLVD	Division Ave	Rosalind Ave	0.51	164 (2)	3 (0)	6 (1)	5 (1)	149 (0)

OVERALL RANK	LOCAL NAME	FROM	TO	SEGMENT LENGTH (MI)	TOTAL CRASHES (KSI CRASHES)	PED CRASHES (KSI CRASHES)	BIKE CRASHES (KSI CRASHES)	MOTORCYCLE CRASHES (KSI CRASHES)	MOTOR VEHICLE CRASHES (KSI CRASHES)
12	OAKRIDGE RD	Millenia Blvd	Orange Blossom Trail	2.79	1,249 (47)	41 (11)	12 (2)	13 (5)	1,170 (29)
13	GOLDENROD RD	Beatty Dr	Glenmoor Blvd	8.44	2,600 (143)	31 (9)	51 (14)	66 (18)	2,429 (102)
14	SAND LAKE RD / MCCOY RD	Turkey Lake Rd	Jetport Dr	6.64	2,315 (112)	40 (20)	2 (0)	30 (5)	2,223 (87)
15	FAIRBANKS AVE / OSCEOLA AVE / ALOMA AVE	Park Ave	Tangerine Ave	1.05	448 (10)	3 (2)	1 (0)	10 (2)	432 (6)
16	JOHN YOUNG PKWY	Town Loop Blvd	Colonial Dr	10.54	3,254 (135)	38 (18)	11 (3)	38 (11)	3,146 (103)
17	KALEY ST	Rio Grand Ave	Division Ave	1.01	178 (11)	2 (1)	4 (1)	2 (1)	168 (8)
18	CLARCONA RD	Colonial Dr	Silver Star Rd	1.76	696 (25)	8 (4)	3 (0)	8 (1)	673 (20)
19	POWERS DR	Gamble Dr	Indian Hill Rd	2.28	405 (20)	11 (4)	6 (1)	11 (4)	372 (11)
20	ROCK SPRINGS RD	Welch Rd	Faye St	0.89	229 (11)	10 (1)	1 (0)	5 (1)	212 (9)
21	N ROSALIND AVE	Orange Ave	Livingston St	0.92	257 (9)	12 (4)	1 (1)	6 (1)	233 (3)
22	JOHN YOUNG PKWY / LEE RD	Colonial Dr	Gloriosa Ave	2.88	1,330 (42)	18 (9)	9 (1)	15 (9)	1,278 (23)
23	FAIRBANKS AVE	Park Ave	Tangerine Ave	2.52	758 (27)	9 (5)	8 (0)	18 (8)	718 (14)
24	RIO GRANDE AVE	W Gore St	Holden Ave	2.52	586 (34)	15 (6)	6 (1)	2 (0)	556 (27)
25	NORTH LN	Westgate Rd	Pine Hills Rd	0.53	60 (7)	7 (2)	0	1 (1)	50 (4)

In order to prioritize safety projects to locally controlled segments, and encourage local engagement with safety projects, a set of top 4 local road segments were identified for each commissioner district. Specific safety improvements at these locations, identified in Chapter 6 of this Action Plan, have the potential to provide the highest crash reductions and enhanced safety for the most vulnerable users throughout the County, and as such are given the greatest priority for safety improvements.

Recognizing that the safety improvements are an ongoing goal that extend beyond this plan, there are many instances where state-controlled HIN sections intersect with local HIN sections. Many of these corridors are represented in other jurisdictions' High Injury Networks, and while these segments are not addressed in this Action Plan with specific interventions they do represent good opportunities to identify and pursue multiple funding sources for safety improvements on some of the most dangerous roadways in the County in subsequent projects. With this in mind, the top 20 FDOT roadway segments that intersect local HIN roadways are included in the Appendix, and may be reflected in the Central Florida Region Safety Action Plan.

Crash Profiles

Through the crash trends analysis, the Project Team identified 10 collision profiles that provide insight on contributing factors leading to fatal and serious injuries on Orange County's roads. These profiles are based on greater representation in the total crashes, reported KSI crashes, or the percentage of crashes within each crash type that resulted in a KSI. The collision profiles are reflected in the table below.

For each of the identified collision profiles, a supplemental decision tree analysis was completed to examine other factors that contributed to KSI crashes. This is an important analysis that will lead to the identification of context-sensitive safety solutions. For example, if a collision profile shows a pattern of left turn crashes in areas without dedicated turn lanes, a proposed change could be made for signalization timing or adding protected turn lanes. Instead of treating crashes as separate incidents, the crash profiles reflect a more attuned understanding of dangerous crashes given a multitude of factors, allowing County staff to use resources effectively to deal with systemic issues and offer targeted solutions.

CRASH PROFILE	TOTAL CRASHES	% OF TOTAL CRASHES	KSI CRASHES	% SHARE OF KSI CRASHES	% OF CRASHES RESULTING IN KSI
Angle + Left Turn	36,376	**17.0%**	1,610	**24.8%**	4.4%
Rear End	83,030	**38.9%**	1,439	**22.2%**	1.7%
Speed - 45MPH	59,908	**28.1%**	2,241	**34.6%**	3.7%
Distracted Driving	57,510	**26.9%**	1,847	**28.5%**	3.2%
Pedestrian - Intersections	876	0.4%	247	3.8%	**28.2%**
Pedestrian – Non-intersections	937	0.4%	366	5.6%	**39.1%**
Bicycle - Intersections	861	0.4%	127	2.0%	**14.8%**
Bicycle – Non-intersection	654	0.3%	100	1.5%	**15.3%**
Motorcycle - Intersections	804	0.4%	259	4.0%	**32.2%**
Motorcycle - Non-intersection	1,687	0.8%	421	6.5%	**25.0%**

Modal Crash Trends

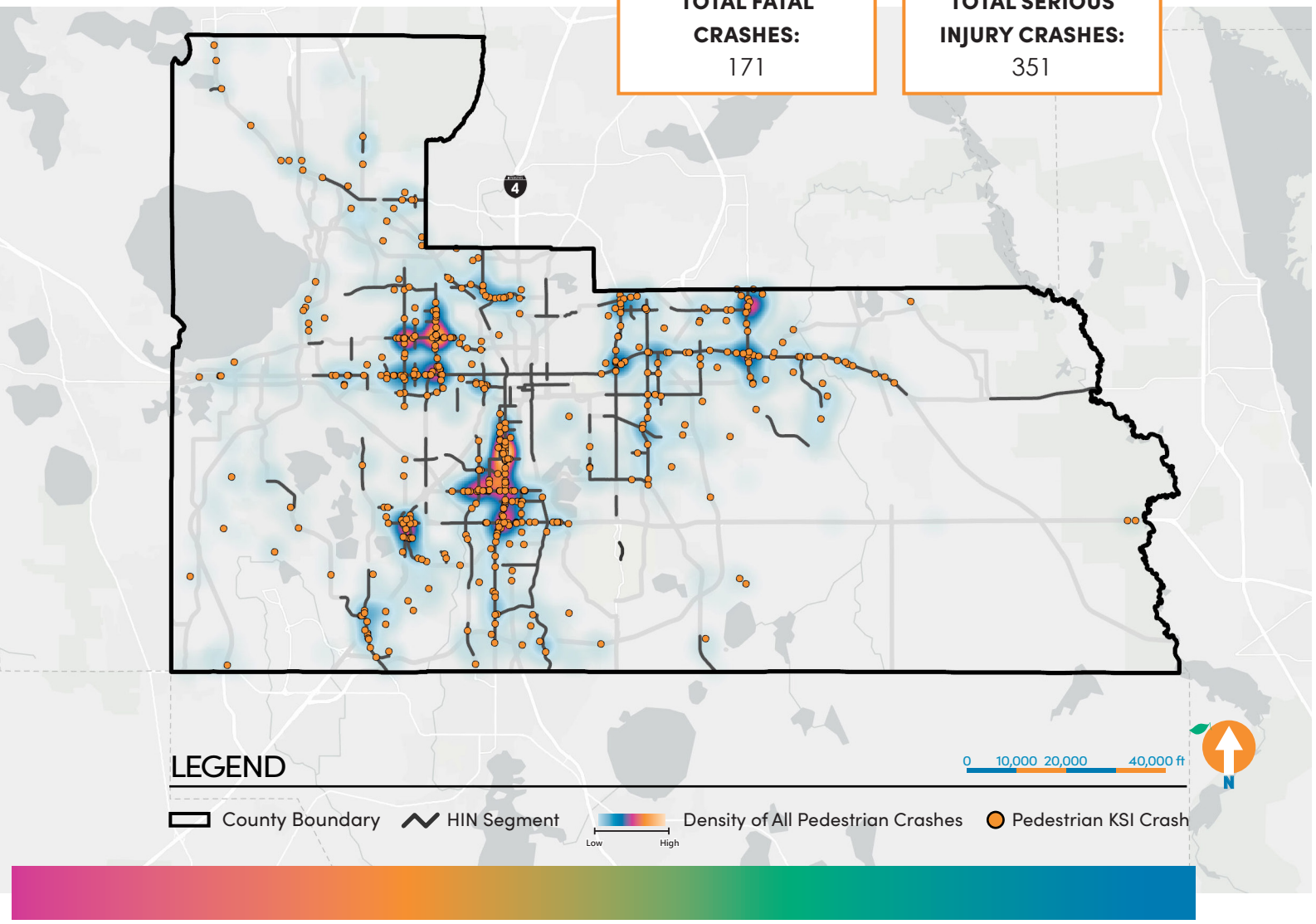
This section provides an overview of crash trends by mode that occurred in the unincorporated area of Orange County, revealing the most common factors specific to pedestrian, bicycle, motorcycle, and automobile-only crashes, with emphasis place on identifying the contributing factors most likely to result in a fatality or serious injury. The maps on the following pages share an HIN specific to each mode, as well as the top contributing factors as determined through a decision-tree analysis. A decision-tree analysis is a useful tool that can help understand the complicated interactions between different factors, such as roadway features, socioeconomic factors, and community needs like school proximity and park access. By finding common elements and situations that cause severe crashes, Orange County can better recognize patterns and trends that allow us to focus on and more proactively address specific behaviors, locations, types of road users, and/or specific roadway characteristics that have higher risks.

PEDESTRIAN HIN AND CRASH TRENDS

The following represents an overview of the **1,619** pedestrian-involved crashes that occurred in the unincorporated area of Orange County:

TOTAL FATAL CRASHES: 171

TOTAL SERIOUS INJURY CRASHES: 351

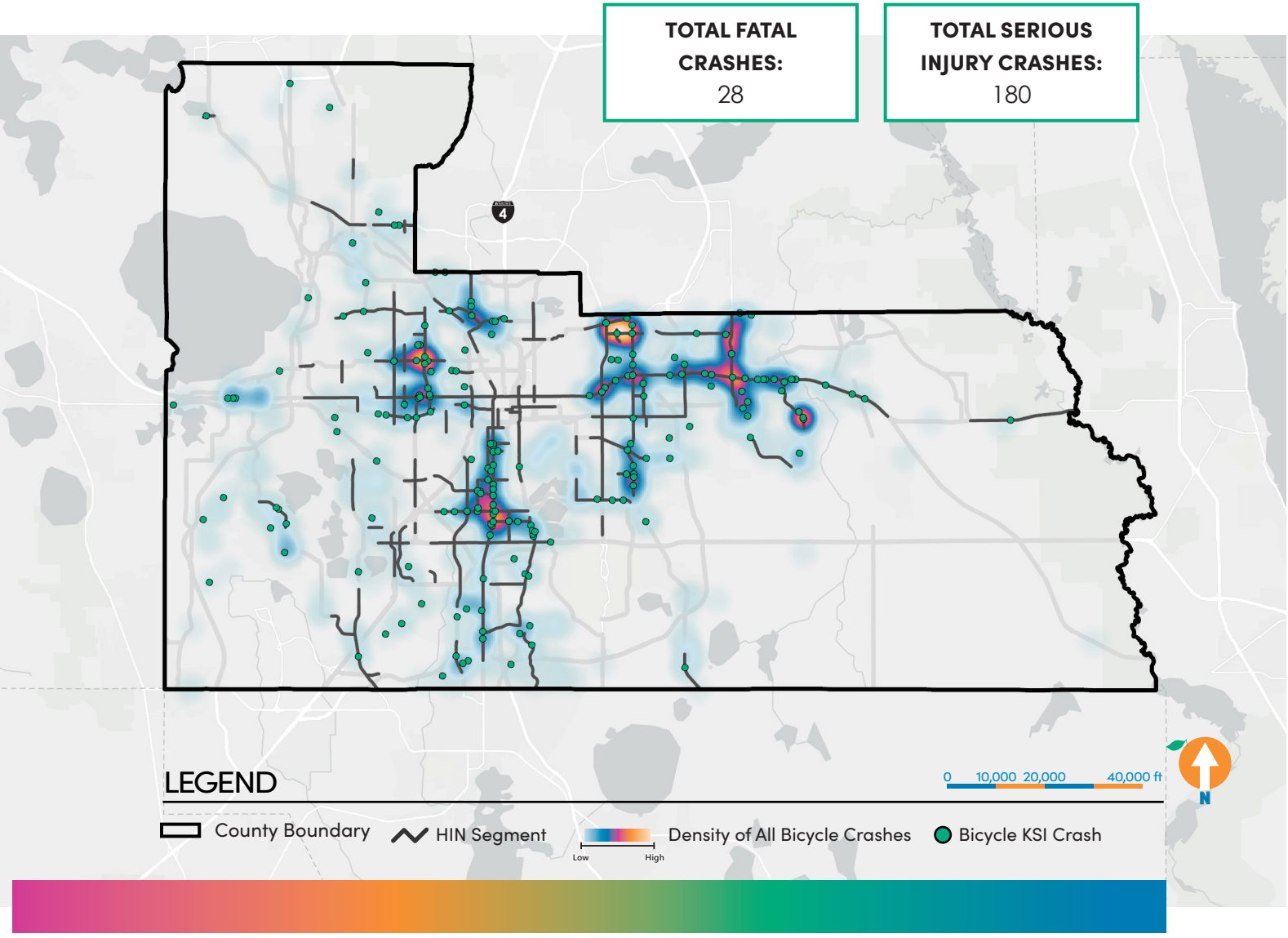


TOP CONTRIBUTING FACTORS FOR PEDESTRIAN-INVOLVED KSI CRASHES:

- Bus-related, with **75%** of these crashes resulting in a KSI
- On a roadway segment, comprised of **74.3%** of all pedestrian KSI crashes
- While crossing the roadway in unknown circumstances, with **69.2%** of these crashes resulting in a KSI
- While crossing the roadway with vehicle not turning, comprising **51.7%** of all pedestrian KSI crashes
- In dark-lighted conditions, comprised of **46.9%** of all pedestrian KSI crashes
- In locations with the posted speed limit of 45 mph, comprising **46.9%** of all pedestrian KSI crashes

BICYCLE HIN AND CRASH TRENDS

The following represents an overview of the **1,106** bicycle-involved crashes that occurred in the unincorporated area of Orange County.



TOP CONTRIBUTING FACTORS FOR BICYCLE-INVOLVED KSI CRASHES

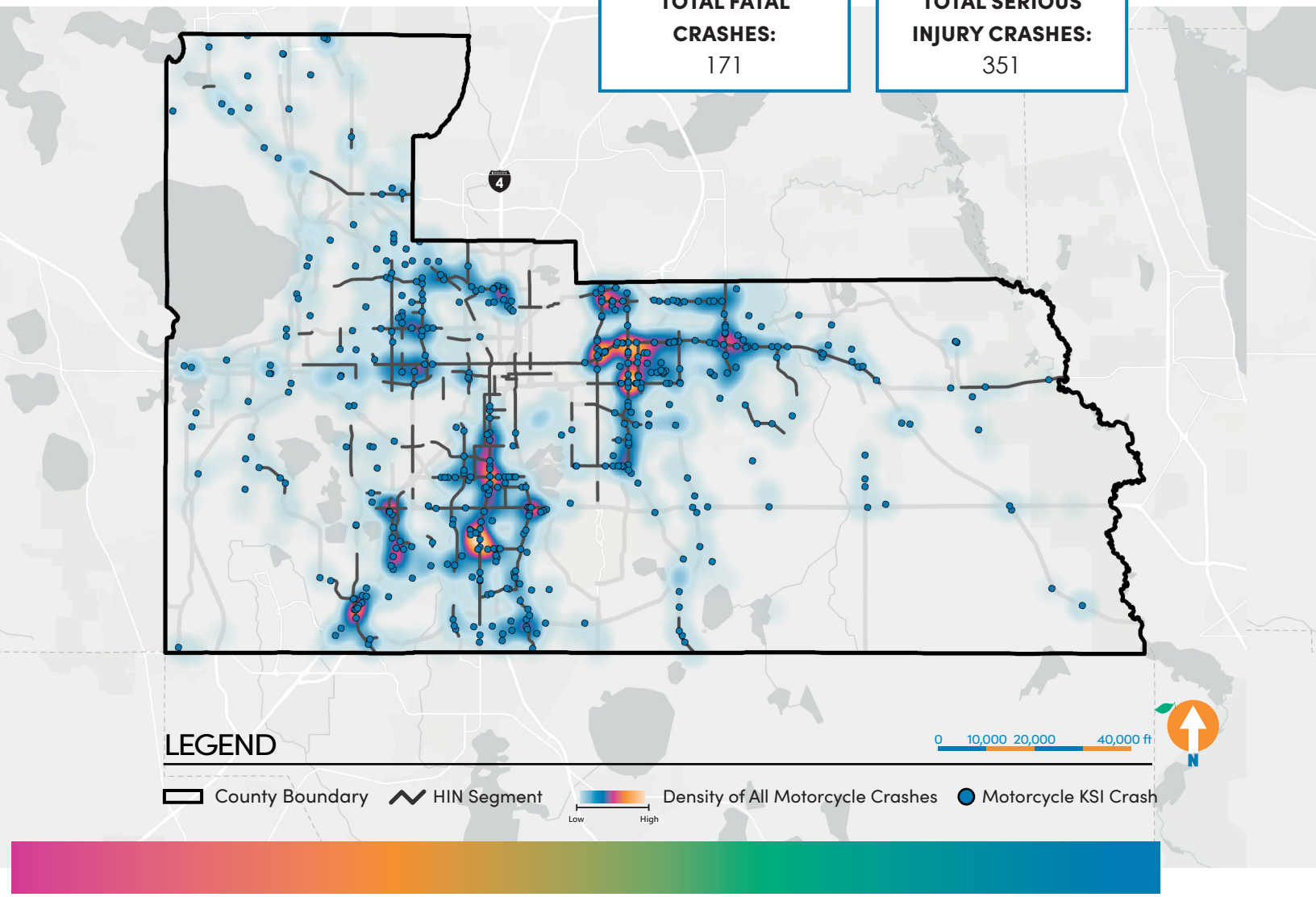
- With reported alcohol impairment, with **100%** of these crashes resulting in a KSI
- In dark-lighted conditions, with **100%** of these crashes resulting in a KSI
- Without bicycle lanes, comprised of **86.5%** of all bicycle KSI crashes
- In locations with a Level of Stress Level 4, comprised of **69.7%** of all bicycle KSI crashes
- On a roadway segment, comprised of **63.5%** of all bicycle KSI crashes
- Between the hours of 12 AM to 3 AM, with **55.0%** of these crashes resulting in a KSI

MOTORCYCLE HIN AND CRASH TRENDS

The following represents an overview of the **1,690** motorcycle-involved crashes that occurred in the unincorporated area of Orange County.

TOTAL FATAL CRASHES: 171

TOTAL SERIOUS INJURY CRASHES: 351



TOP CONTRIBUTING FACTORS FOR MOTORCYCLE-INVOLVED KSI CRASHES:

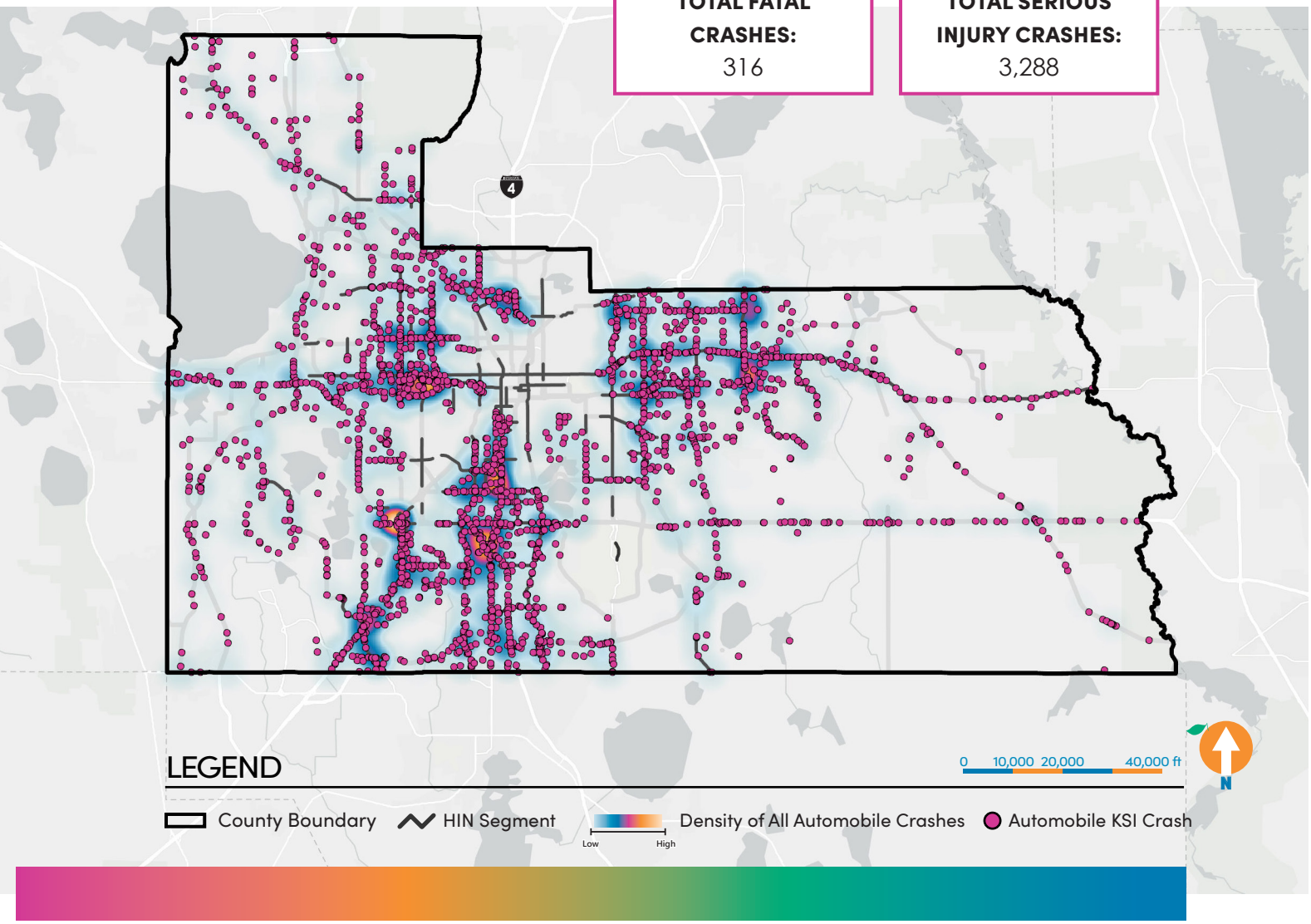
- In the C1 (Natural Lands) Context Classification, with **100%** of these crashes resulting in a KSI
- Without bicycle lanes, comprised of **78.8%** of all motorcycle KSI crashes
- With reported alcohol impairment, with **76.2%** of these crashes resulting in a KSI
- On a roadway segment, comprised of **64.2%** of all motorcycle KSI crashes
- With reported speeding, with **57.1%** of these crashes resulting in a KSI

AUTOMOBILE-ONLY HIN AND CRASH TRENDS

The following represents an overview of the **112,289** automobile-only crashes that occurred in the unincorporated area of Orange County.

TOTAL FATAL CRASHES: 316

TOTAL SERIOUS INJURY CRASHES: 3,288



TOP CONTRIBUTING FACTORS FOR AUTOMOBILE-ONLY KSI CRASHES

- Without bicycle lanes, comprised of **68.9%** of all automobile-only KSI crashes
- In the C3C (Suburban Commercial) Context Classification, comprised of **66.3%** of all automobile-only KSI crashes
- On a roadway segment, comprised of **66.3%** of all automobile-only KSI crashes
- In locations with the posted speed limit of 45 mph, comprised of **39.8%** of all automobile-only KSI crashes

CHAPTER 3

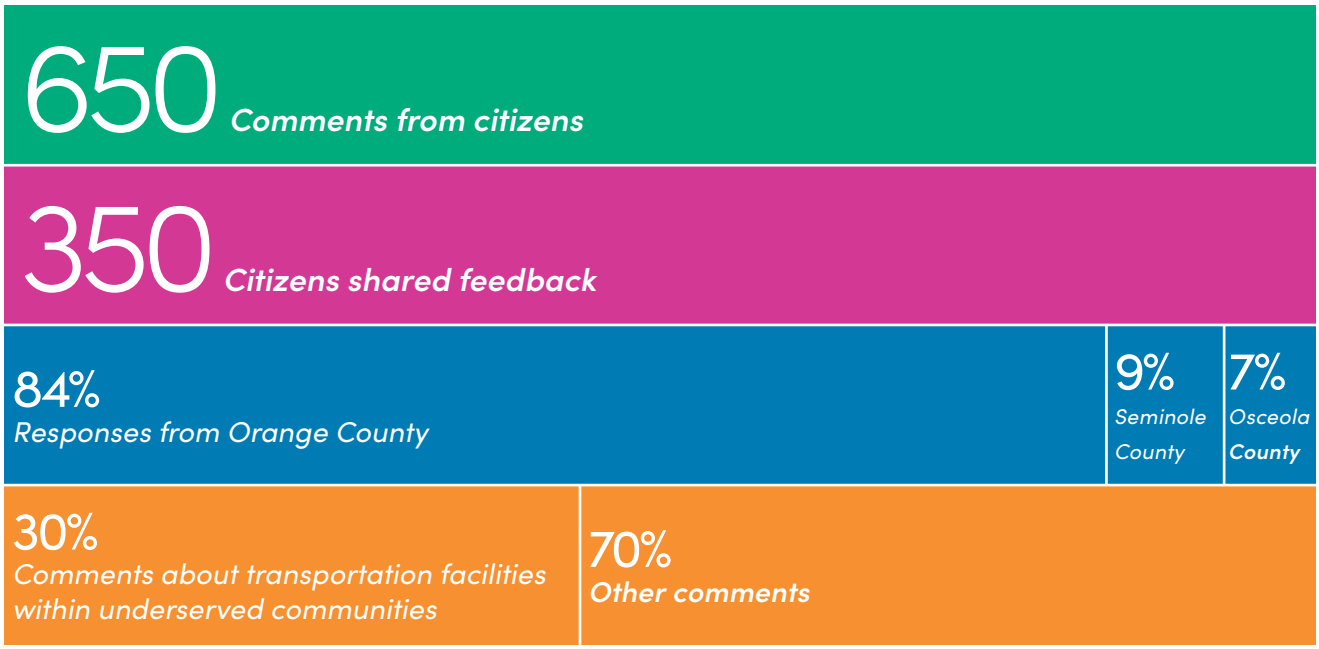
Public Engagement

Vision Zero is a strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all. This process requires a multidisciplinary approach, bringing together diverse and necessary stakeholders to address this complex problem. Cross-disciplinary collaboration is required to ensure all aspects of the problem are engaged in a meaningful and equitable manner; and that diverse voices are heard. To that end, successful development and implementation of the Action Plan included robust involvement from the community, County leadership, and a variety of local stakeholders.

The Action Plan's **public engagement plan** is organized around an incremental and layered approach, where members of the project team established a Steering Committee made up of key stakeholders, and collaborated with community partners and elected officials. **In-person engagement** was supplemented by **virtual** and **digital campaigns** designed to bring awareness to the plan itself, as well as engagement related activities.

Brand Development

The Orange County Vision Zero Action Plan brand was developed to generate visibility and familiarity in an effort to achieve plan participation community-wide. The Orange County brand evokes the image of the roadside memorial, an all too familiar reminder of the personal impact roadway crashes can have on individuals and communities. This brand underlines the importance of joining the vision zero effort, reminding us of the cost of inaction because even one death is too many.



Source: Central Florida Regional Vision Zero Action Plan

Orange County Vision Zero Action Plan Website

As part of the Public Engagement Process, a website was created for the Vision Zero Action Plan. The website details project background, data analysis and links, and provides important project updates. This website will also be an important avenue for continued engagement with the public after plan implementation.

Social Media Marketing Campaign

In coordination with the Orange County Communications Department, social media content was generated for spreading awareness of the public meetings on the county's various outlets. The complete Social Media package is included in the Appendix. Future use of these assets may include ongoing educational and awareness campaigns and notification to the public of important project updates and implementation measures.

In Person Engagement

Project Team

The Project Team was responsible for facilitating the development of the Action Plan and initiating the ongoing implementation of the plan. The Project Team was comprised of County leadership and key staff along with the Consultant Team, creating a successful platform for coordinated efforts and cross-collaboration from a diverse range of perspectives.

County Steering Committee

The County Steering Committee consisted of a core group of stakeholders tasked with guiding the Action Plan development process, providing insight on key project milestones and deliverables. The Steering Committee will also continue to guide implementation of the Action Plan and act as plan ambassadors to ensure the principles of Vision Zero are at the forefront of future transportation planning decisions and progress toward the County's goals continues to be made. Following the Vision Zero approach, the committee consisted of a diverse group of County staff, local agency professionals from organizations such as LYNX and FDOT, transportation safety advocacy groups such as Bike/Walk Central Florida, and additional members that represent Orange County from a diverse range of perspectives.

The Steering Committee convened in five interactive working sessions over the course of the plan development process, providing insight on the following topics:

Meeting 1

Introductions and Overview of the Scope, Vision Zero, and Safe System Approach

Meeting 2

Review of Crash Trends, Draft High Injury Network, and Public Engagement Activities

Meeting 3

Review of Revised High Injury Network and Collision Profiles, and Updates on Public Engagement

Meeting 4

Updates on Policy Review, Review of MetroPlan Orlando Countermeasures Toolkit, and Consideration of Draft Prioritization Criteria, Public Engagement

Meeting 5

Discussion on Orange County Vision Zero Resolutions, Review of HIN Corridor List Cut Sheets

A series of **districtwide community workshops** were held from January to March 2024. A community workshop kit was developed and is included in the Appendix.

A variety of **pop-up events** were done throughout the county to further engage the community while receiving local feedback.

December 6, 2023

Light the Way

Belle Isle City Hall

January 27, 2024

Maitland Police Department Fun Day

Maitland City Hall

February 10, 2024

Run 4 Love 4 Mile

Showalter East Fields

February 15, 2024

Belle Isle Citywide Workshop

Belle Isle City Hall

February 22, 2024

Take Over the Trails Day 2024 Pop-Up Event

Healthy West Orange Arts and Heritage Center

March 1, 2024

First Friday

March 10, 2024

Maitland Farmer's Market

Downtown Maitland

March 23, 2024

Winter Park Farmer's Market

Downtown Winter Park

March 23, 2024

Edgewood Centennial Event

Edgewood City Hall

March 26, 2024

Citywide Hybrid Workshop

May 8, 2024

Avalon Park Fiesta Themed Night Market Event

Downtown Avalon Park

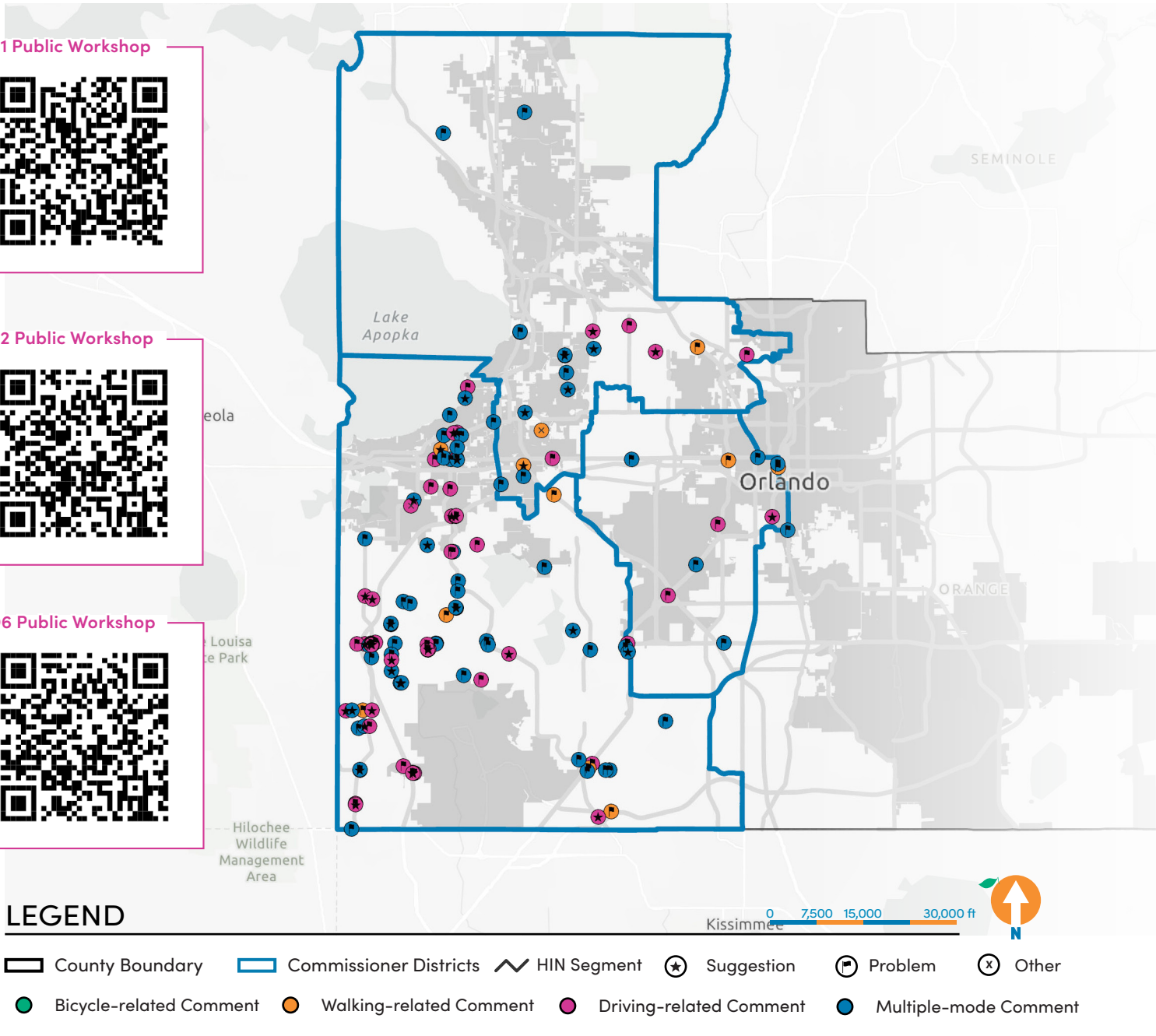
West Orange County Public Engagement Summary

Community feedback on transportation safety concerns and ideas for improvement were collected through diverse means, including public workshops, attendance at pop-up events, and via a public survey shared by MetroPlan Orlando. The following pages provide summaries of these engagement activities by each commissioner district in west Orange County. Video recaps of each workshop can be found via the QR codes shared below, highlighting key takeaways from Orange County commissioners, Orange County staff in attendance, and feedback from community members. Public survey responses received can be found on the map below, in addition to the location of each outreach event. The full public engagement summary can be found as an Appendix to this report.

D1 Public Workshop

D2 Public Workshop

D6 Public Workshop



District 1 Engagement Summary

The District 1 community workshop was held on **January 18, 2024** at the **Rosen JCC** in Dr. Phillips. The video recap highlights key takeaways from Commissioner Nicole Wilson, Orange County staff in attendance, and feedback from community members. The project team also attended the **Take Over the Trails Day 2024** in coordination with Bike/Walk Central Florida. Overall, people expressed concerns over speed and access management, providing suggestions to set appropriate speed limits or implement speed management techniques such as speed bumps, increase bicycle lanes, provide better access management, and road diets where applicable.

District 2 Engagement Summary

The District 2 community workshop was held on **January 25, 2024** at the **John Bridges Community Center** in South Apopka. The video recap highlights key takeaways from Commissioner Christine Moore, Orange County staff in attendance, and feedback from community members. Feedback from the community placed particular attention to the ongoing Orange County transportation planning efforts for Clarcona-Ocoee Road in the District. Overall, people expressed concerns over bicycle and pedestrian safety, especially on rural roads with anticipated future growth and no or inadequate lighting.

District 6 Engagement Summary

The District 6 community workshop was held on **February 22, 2024** at the **Orange County Multicultural Center** in Pine Hills. The video recap highlights key takeaways from Commissioner Michael Scott, Orange County staff in attendance, and feedback from community members. Overall, people expressed concerns over bicycle and pedestrian safety, requesting that adequate protection and distance be provided for bicyclists from vehicular traffic, that additional transit service options be provided to enhance frequency of service, and that high-emphasis crosswalk improvements be made with the assistance of local artists as a low-cost, quick-build option.

> *We need speed bumps or speed cameras or traffic lights to **slow down drivers**.*

> *Roads in Horizon West have too many lanes...**road diets** are needed.*

> ***Multiple driveways** to access business are very close and create dangerous conditions.*

> *Tangerine needs **sidewalks**, people are walking on grass or roads.*

> *Kids waiting for the bus are **in the dark** in the morning on Hiawassee and Clarcona Ocoee. Lighting improvements are requested.*

> *I see many **trucks speeding**.*

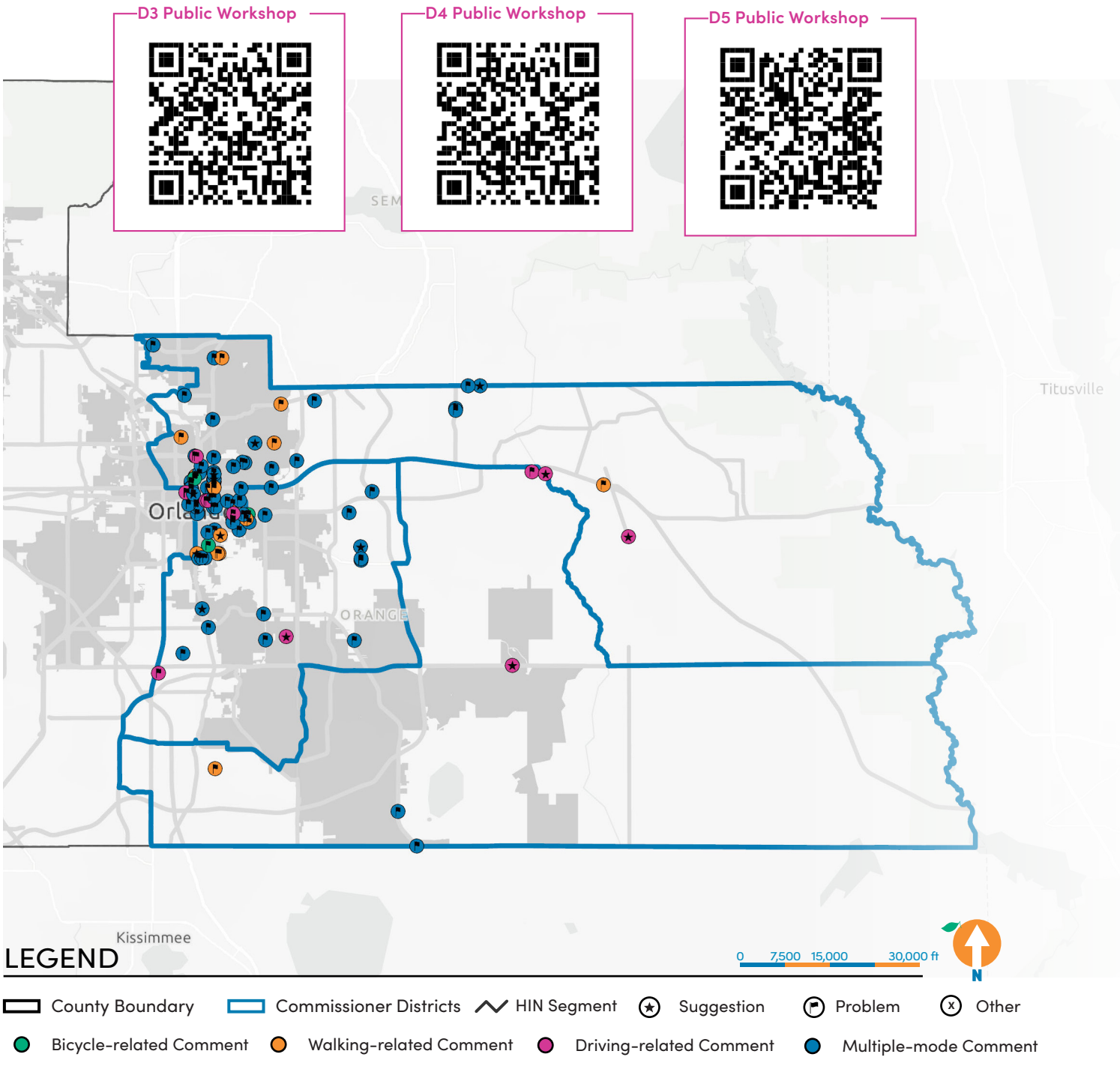
> ***Lower the speed** limit on arterial roads.*

> *I would like to see **quick build solutions** at Powers Drive and Silver Star Road, referencing the City of Orlando Quick Build Guide to provide artistic crosswalk murals.*

> *West Lake has a **great grid of streets** - connect it with bike lanes.*

East Orange County Public Engagement Summary

The following pages provide summaries of engagement activities by each Commissioner District in east Orange County. Video recaps of each workshop can be found via the QR codes provided below. In addition, the public survey responses received can be found on the map below, in addition to the location of each outreach event.



District 3 Engagement Summary

The District 3 community workshop was held on **February 27, 2024** at the Christ the King Episcopal Church in Azalea Park. The video recap highlights key takeaways from Commissioner Mayra Uribe, Orange County staff, and feedback from community members. Overall, people expressed concerns on pedestrian safety, especially in proximity to schools or along high traffic corridors such as Curry Ford Road and Semoran Boulevard. Opportunities identified to improve safety included an array of traffic calming measures such as on-street parking, restricted left turns, and protective measures for pedestrians including high visibility or raised crosswalks, pedestrian refuge islands, and sidewalks where there are gaps.

District 4 Engagement Summary

The District 4 community workshop was held on **February 1, 2024** at the Meadow Woods Recreation Center. The video recap highlights key takeaways from Commissioner Maribel Gomez Cordero's staff, Orange County staff, and feedback from the community. In addition to the public workshop, the Project Team hosted an event at the **Avalon Park Fiesta Themed Night Market Event.** Overall, people expressed concerns over high volume traffic and in particular, large vehicular traffic surrounding the airport and other heavy industrial areas. Opportunities identified to improve safety included more investment in public transit, installation of protected bike lanes, and speed management strategies to better protect pedestrians on high volume roadways.

District 5 Engagement Summary

The District 5 community workshop was held on **February 29, 2024** at the Goldenrod Road Recreation Center in Winter Park. The video recap highlights key takeaways from Commissioner Emily Bonilla, Orange County staff, and feedback from community members. Feedback from the community placed particular attention to pedestrian safety concerns near the University of Central Florida Main Campus, and in the communities of Winter Park and Downtown Orlando. In addition, people expressed concerns over heavy truck traffic and inadequate lighting on rural roads. Opportunities identified to improve safety included the installation of pedestrian signalization with high emphasis crosswalks, lighting improvements, and intersection improvements including roundabouts.

> *Conway Gardens needs a more **complete sidewalk network**, especially for wheelchair users.*

> *Curry Ford Road should have parking on street to **slow down cars** - also should add **raised crosswalks**.*

> *I promote pedestrian advancement countywide within a mile of school. In general, we need **trees and other layers of protection**.*

> *I would like to see **high emphasis crosswalks** with pedestrian recall signalization in Avalon Park.*

> ***Single lane roads** makes trucks go through Southchase, which puts kids at risk.*

> *Invest in more **public transit** to get cars off the road.*

> *Traffic gets **so congested** at Colonial, would be nice to have **roundabouts**.*

> *Mills 50, needs **designated crosswalks**, where there is currently poor lighting, not enough crosswalks, fast traffic, and tons of pedestrians.*

> *Schools need **speed camera enforcement**.*

CHAPTER 4

Policy Review & Benchmarking

The Orange County Vision Zero Action Plan works towards eliminating traffic fatalities and severe injuries on our roadways through alignment with the national and global Vision Zero movement, which prioritizes safety in all transportation planning and policy decisions. The following chapter provides an in-depth review of existing policies, plans, guidelines, and standards under the County's purview, highlighting opportunities for alignment with Vision Zero principles.

Review Methodology

In preparing this policy review, the project team conducted a thorough examination of various local, state, and national documents. The focus was on identifying opportunities to strengthen consistency between these documents and the Vision Zero initiative, as well as pinpointing any barriers to achieving zero fatalities and severe injuries. The documents reviewed included Orange County's local policies and plans, relevant state and federal guidance, and best practices from adopted Vision Zero Action Plans across the nation.

Local Policy Review

The review encompassed several key Orange County documents, including the Orange County Code Draft 4.0, the Draft Vision 2050 Comprehensive Plan, the Orange County Pedestrian and Bicycle Safety Action Plan (PBSAP), and the Americans with Disabilities Act (ADA) in the Public Rights-of-Way Transition Plan. Each document was assessed for its safety policies and goals, data analysis, and potential countermeasures.

Orange County Code Draft 4.0

The Orange County Code implements the objectives of the Comprehensive Plan by providing regulations for the physical development of the County. It includes provisions that promote public health, safety, and welfare, emphasizing improved mobility networks for pedestrians, cyclists, and transit users.

Orange County Pedestrian and Bicycle Safety Action Plan (PBSAP)

The PBSAP outlines specific countermeasures and strategies to enhance pedestrian and bicycle safety across the County. It serves as a resource for staff to find applicable safety improvements and maintain up-to-date standards.

Draft Vision 2050 Comprehensive Plan

The Draft Vision 2050 Plan is an ongoing update to the County's comprehensive planning efforts, focusing on sustainability and safety. It incorporates goals related to the Safe System Approach and the USDOT National Road Safety Strategy (NRSS), aiming to create safer, more inclusive transportation networks.

Americans with Disabilities Act (ADA) Transition Plan

This plan establishes procedures for achieving ADA compliance on Orange County roadways, ensuring accessibility for all users. The Transition Plan is reviewed and updated periodically to reflect changes in federal guidelines and local needs.

State and National Guidance Review

The consulting team also reviewed relevant state and national guidance documents to ensure alignment with broader safety goals and best practices. These documents included:

USDOT FHWA Lessons Learned from the Development of Vision Zero Action Plans

This document provides insights from various communities that have implemented Vision Zero Action Plans, highlighting effective strategies and common challenges.

FDOT Strategic Highway Safety Plan and Complete Streets Implementation Plan

These state-level documents outline Florida's approach to highway safety and the implementation of complete streets, providing a framework for local adaptation.

USDOT FHWA Strategies to Coordinate Zero Deaths Efforts for State and Local Agencies

This guidance emphasizes the importance of coordination between state and local agencies to achieve zero fatalities, offering strategies for integrated planning and implementation.

MetroPlan Orlando Plans

MetroPlan Orlando's long-range transportation plans and health strategic plans offer regional insights and strategies that complement the Vision Zero goals of Orange County.

Best Practices from Adopted Vision Zero Action Plans

In addition to local and state documents, the review included an analysis of adopted Vision Zero Action Plans from other jurisdictions, such as Vision Zero Orlando, Vision Zero Tampa, and Vision Zero Hillsborough. These plans provided valuable benchmarks and actionable strategies that can be adapted to Orange County's unique context.

Summary of Findings

The review identified numerous opportunities for Orange County to enhance its policies and practices in alignment with Vision Zero principles. Key areas of focus include improving mobility networks, ensuring ADA compliance, leveraging data for informed decision-making, and fostering inter-agency coordination. The following sections present a detailed list of potential policy changes and recommendations derived from this review, organized by the respective documents and guidelines they pertain to.

Policy Review Findings

The comprehensive policy review conducted in Technical Memorandum Task 5.1 examined various Orange County documents, identifying opportunities to align them with Vision Zero principles. Key findings and recommendations from this review are summarized below.

ORANGE COUNTY CODE DRAFT 4.0

The Orange County Code implements the objectives of the Comprehensive Plan through regulations for the County's physical development. The following recommendations aim to strengthen the Code's alignment with Vision Zero goals.

1 Reference the Vision Zero Action Plan in review criteria, especially goals, strategies, and countermeasures.

- **Core Department:** PEDS
- **Section:** 1-1.1.3 (a)

2 Suggest that minimum sidewalk widths correlate with FDM context classification/County transects, rather than 5-foot minimum.

- **Core Department:** PEDS
- **Section:** 4-7.10.4 (g)(iv)

3 Suggest an ICE analysis be required when a signal is warranted, and that the school board shall install the traffic control improvements resulting from the ICE analysis.

- **Core Department:** Public Works/PEDS
- **Section:** 4-7.10.4 (g)(viii)

4 Consider maintaining sidewalks and crosswalks on County-maintained roadways, or provide a method or procedure for ensuring that crosswalks are properly maintained by the applicant and/or opportunities for crosswalk improvements are continually assessed.

- **Core Department:** Public Works/PEDS
- **Section:** 5-2.1.8 (d)(ii & v)

5 Suggest identifying the reference to the FDOT Standards.

- **Core Department:** Public Works/PEDS
- **Section:** Table 5-2.7(1)

DRAFT VISION 2050 COMPLETE BOOK

The Draft Vision 2050 Plan outlines the County's comprehensive planning efforts with a focus on sustainability and safety. These suggestions ensure the plan fully incorporates Vision Zero principles.

1 Reference the USDOT National Road Safety Strategy (NRSS) and the Safe System Approach in the Vision Zero objectives.

- **Core Department:** Public Works
- **Section:** Draft Vision 2050 Complete Book

2 Consider including automated enforcement and advanced signal technologies to improve safety.

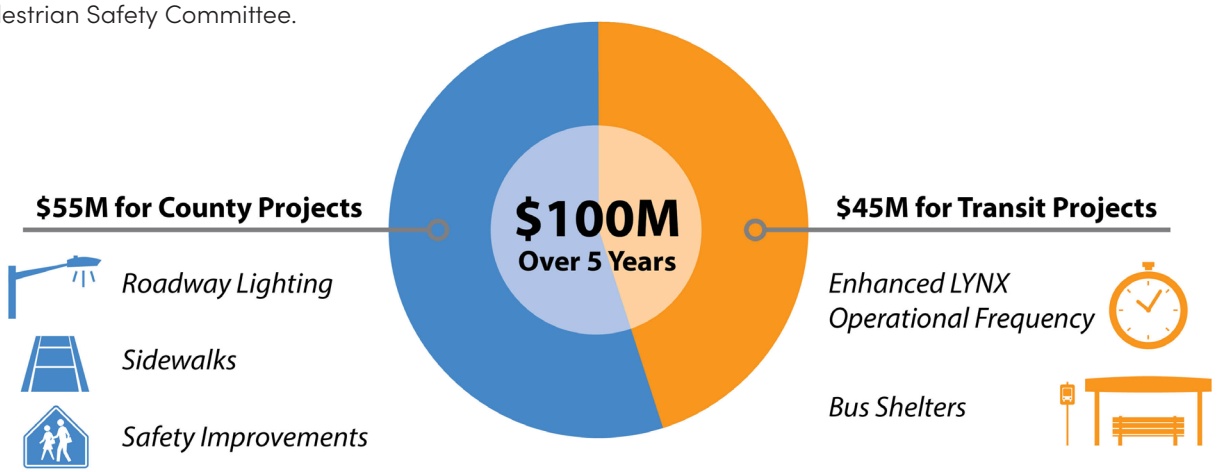
- **Core Department:** PEDS/Public Works
- **Section:** Goal T1.4.4

Accelerated Transportation Safety Program

Although the Orange County Sales Tax Referendum did not pass in 2022, the need for investment in transportation persists. The Accelerated Transportation Safety Program aims to address critical pedestrian, bicycle, and motorist safety issues with a focus on utilizing existing revenue sources. The program, coordinated by Orange County and LYNX, allocates $100 million over five years for county and transit projects. $55 million will go to county projects such as: roadway lighting, sidewalks, and safety improvements; and $45 million will go to transit projects such as: enhanced LYNX operational frequency and bus shelters.

This investment is meant to reflect a commitment to prioritize regional transportation needs and the County's Vision Zero Strategy.

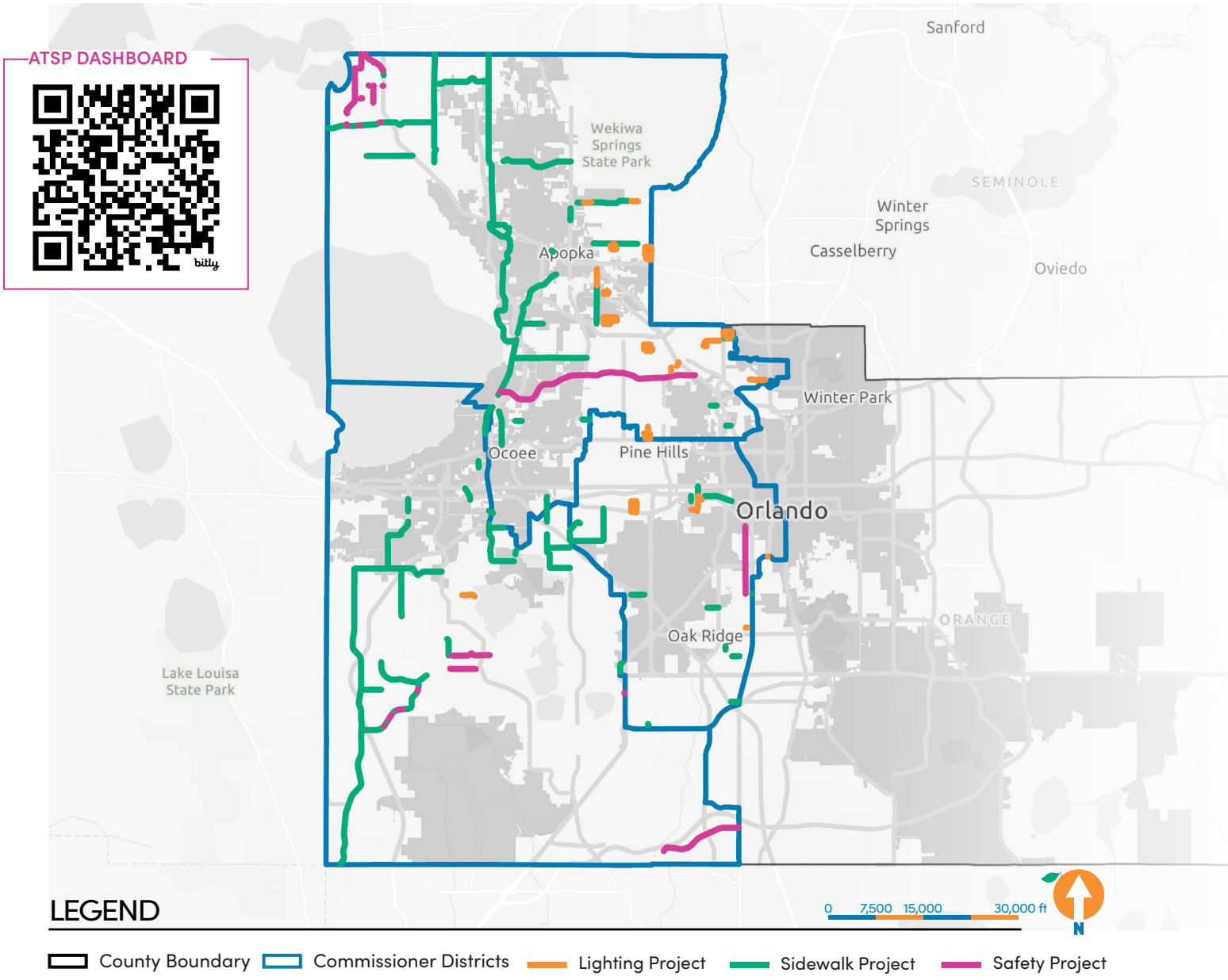
- **Lighting** - $15 million would go to install 131 miles of new lighting on arterial, collector or functionally classified roads only. This would address approximately 79% of the functionally classified roads under the original sales tax initiative and provide the most impact to the safety of road users, with projects being selected based on safety based ranked criteria.
- **Sidewalks** - $25 million would go to address 26 miles of sidewalk, addressing 15% of the 173 miles of unmet sidewalk needs identified in the current sidewalk program. Orange County focused on projects that received higher prioritization scores from the Student Pedestrian Safety Committee.
- **Safety Improvements** - $15 million would go to improvements classified as either speed management, pedestrian safety, access management, or traffic calming measures. Examples of projects include protected bike lanes, roundabouts, narrowing lanes (road diets), raised crosswalks, median separators, and speed cushions.
- **LYNX** - $45 million will go to enhance operational frequency of LYNX buses on major corridors and provide bus shelters with 44 new proposed bus stops. New bus stops will include maps and passenger information, bicycle parking, solar lighting, and ADA accessibility.



ACCELERATED TRANSPORTATION SAFETY PROGRAM (ATSP) IN WEST ORANGE COUNTY

The ATSP aims to primarily address sidewalk and lighting improvements to enhance pedestrian safety throughout Orange County, but will also advance other necessary improvements to meet the County's Vision Zero goal to eliminate serious injuries and fatalities on our roadways. In total, the program plans to address 26 miles of sidewalks, representing about 15% of unmet sidewalk needs. The proposed lighting program will provide $15 million to install 131 miles of new lighting. The selection of additional safety projects is based on criteria including urbanization levels and the extent of connectivity to existing infrastructure to target high-frequency crash areas.

An overview of how this program is supporting safety concerns in Commissioner Districts 1, 2, and 6 is provided below, with the identification of proposed improvements over the course of the next 5 years. To learn more about these projects, scan the ATSP Dashboard QR code provided below.



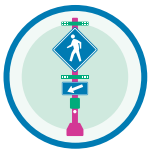
DISTRICT 1 ATSP IMPROVEMENTS AND IMPACT

There are currently **34 ATSP projects** identified for future improvement in Orange County Commissioner District 1. Currently, sidewalk improvements will be made to W Lake Butler Road and extensive lighting improvements are planned for Avalon Road, Seidel Road, Tiny Road, Tilden Road, Windermere Road, and Summerlake Park Boulevard, among others. Mid-term safety improvements in the Horizon West Area include installing permanent raised medians on Tattant Boulevard, creating a double-lane queue line at Horizon West Middle School, implementing raised medians, chicanes, and street lighting on Overstreet Road, and introducing a temporary roundabout on Tattant Boulevard.

ATSP Category	Allocated 5-Year District Funding
Lighting	$3,741,800
Sidewalks	$1,622,995
Safety Improvements	$9,510,900

DISTRICT 2 ATSP IMPROVEMENTS AND IMPACT

There are currently **89 ATSP projects** identified for future improvement for Orange County Commission District 2. Planned sidewalk improvements have been identified for Sheeler Ave and extensive lighting improvements are planned for Plymouth Sorrento Road, Ocoee Apopka Road, Binion Road, and Sadler Road among others. Short-term safety improvements include installing 22 speed feedback signs on Clarcona-Ocoee (one of the top HIN corridors in District 2) and both speed feedback signs and general sign replacement in the Tangerine Rural Settlement.



ATSP Category	Allocated 5-Year District Funding
Lighting	$4,514,200
Sidewalks	$5,609,773
Safety Improvements	$7,664,400

DISTRICT 6 ATSP IMPROVEMENTS AND IMPACT

There are currently **24 ATSP projects** identified for future improvement for Orange County Commission District 6. Currently, sidewalk improvements are planned to be made to Ortman Drive and Orlo Vista Heights. Lighting improvements are planned on Turkey Lake Road, Old Winter Garden Road and Mercy Drive, among others. Mid-term safety improvements include adding sidewalks, updated pavement and striping on Rio Grande Avenue, where there were 27 fatal or serious injury crashes in the analysis period.

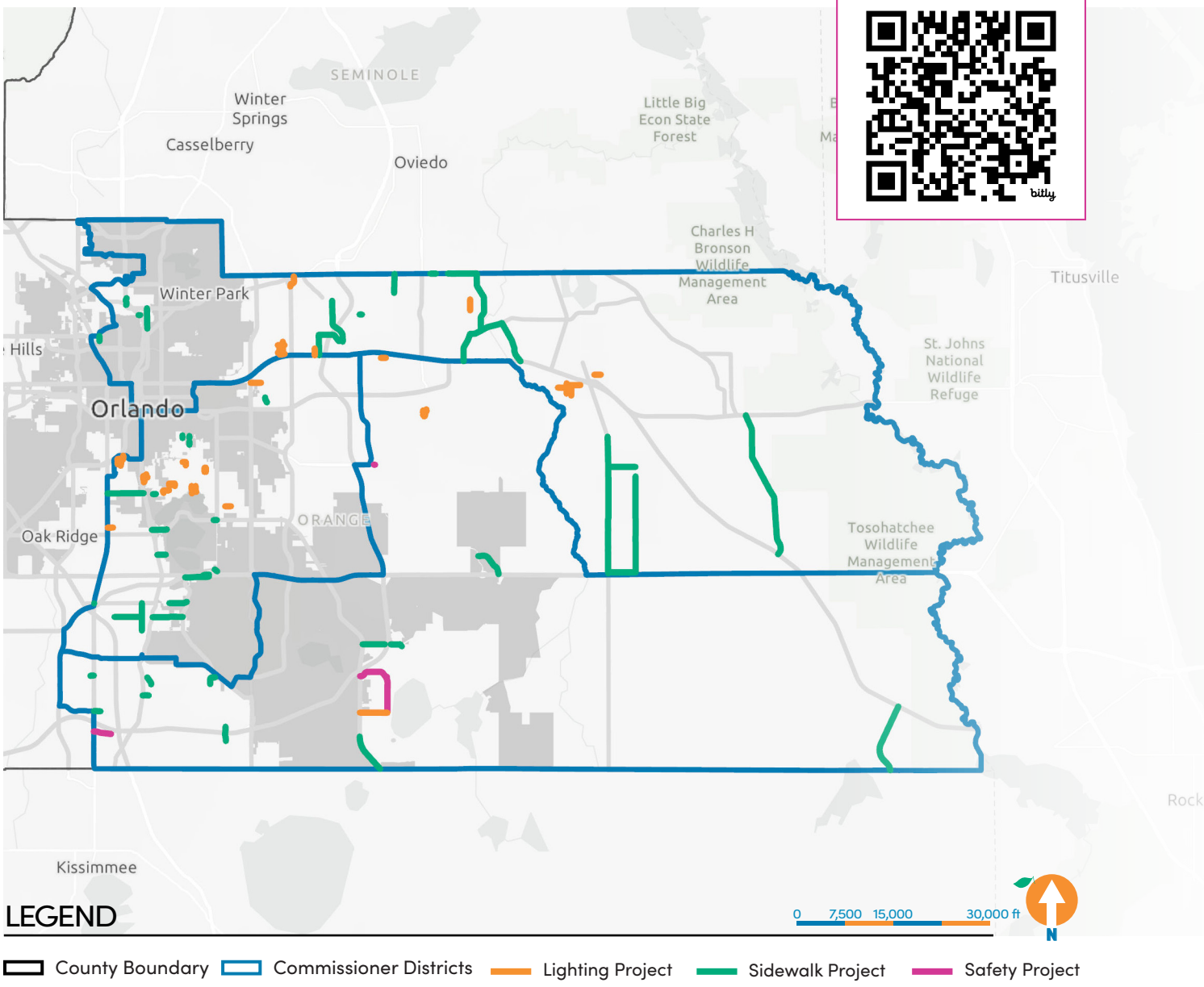
ATSP Category	Allocated 5-Year District Funding
Lighting	$890,200
Sidewalks	$3,611,320
Safety Improvements	$924,800

ACCELERATED TRANSPORTATION SAFETY PROGRAM (ATSP) IN EAST ORANGE COUNTY

Across all of Orange County, ATSP will continue to improve pedestrian and safety infrastructure by systematically addressing unmet sidewalk and lighting needs. Continued community engagement will be pivotal in identifying new areas of concern and adapting strategies to allocate comprehensive safety enhancements across our diverse neighborhoods. With these foundational improvements in place, future funding from the Safe Streets and Roads for All (SS4A) initiative can be redirected to additional transportation projects along the High Injury Network, further enhancing community safety and mobility beyond the initial scope of the ATSP.

An overview of how this program is supporting safety concerns in Commissioner Districts 3, 4, and 5 is provided below, with the identification of proposed improvements over the course of the next 5 years. To learn more about these projects, scan the ATSP Dashboard QR code provided below.

ATSP DASHBOARD



DISTRICT 3 ATSP IMPROVEMENTS AND IMPACT

There are currently **38 ATSP projects** identified for future improvement for Orange County Commission District 3. Future sidewalk improvements will occur in the community of Holden Shores, south of Michigan Street, as well as several improvement in the cities of Belle Isle and Edgewood. Additionally, lighting improvements are planned on Jetport Drive, Holden Avenue, Mccoy Road and S Oxalis Drive, among others. Outside of the sidewalk and lighting improvements, there are no additional safety projects planned for Orange County Commission District 3.

ATSP Category	Allocated 5-Year District Funding
Lighting	$884,600
Sidewalks	$2,722,850

DISTRICT 4 ATSP IMPROVEMENTS AND IMPACT

There are currently **16 ATSP projects** identified for future improvement for Orange County Commission District 4. Currently, sidewalk improvements are planned to be made to Tyson Road. Lighting improvements are planned in high-growth areas near Lake Nona, including on Kirby Smith Road, Moss Park Road, Wyndham Lakes Boulevard, and Narcoossee Road, among others. Short term safety improvements include installing speed feedback sign assemblies with speed tables on Town Center Boulevard through the community of Hunters Creek and into Commissioner District 1.

ATSP Category	Allocated 5-Year District Funding
Lighting	$1,949,500
Sidewalks	$4,050,390
Safety Improvements	$1,390,100

DISTRICT 5 ATSP IMPROVEMENTS AND IMPACT

There are currently **32 ATSP projects** identified for future improvement for Orange County Commission District 5. Currently, sidewalk improvements will be made in the community of Bithlo Ranches and along Goldenrod Road in north Orange County. Lighting improvements are planned on Econlockhatchee Trail, McCulloch Road, Tanner Road, Lake Pickett Road, and in the Wedgefield Community, among others. Outside of the sidewalk and lighting improvements, there are no additional safety projects planned for Orange County Commission District 5.

ATSP Category	Allocated 5-Year District Funding
Lighting	$3,032,000
Sidewalks	$7,530,898

ORANGE COUNTY PEDESTRIAN AND BICYCLE SAFETY ACTION PLAN (PBSAP)

The PBSAP provides a framework for enhancing pedestrian and bicycle safety in Orange County. These recommendations build upon the plan's existing strategies to further support Vision Zero implementation.

1 Actively coordinate with MetroPlan Orlando and local municipalities on pedestrian and bicycle facility improvements. Request access to facility GIS layers if not already available.

- **Core Department:** Public Works/PEDS
- **Section:** PBSAP

2 Evaluate whether pedestrian and bicycle data provided by MetroPlan Orlando is sufficient or whether Orange County should further expand its count program. Review current status of Eco-Counter Pyro Box use.

- **Core Department:** Public Works
- **Section:** PBSAP

3 Develop 311 GIS mapping of citizen request locations for use by Public Works in safety planning and engineering. Develop a process for reviewing and incorporating this data on a regular basis.

- **Core Department:** 311/Public Works
- **Section:** PBSAP

4 Document the response to the data analysis and recommendations contained in these technical memoranda.

- **Core Department:** Public Works
- **Section:** PBSAP

5 Review Countermeasures annually and update based on updated design guidance/best practices (FDOT/other), including references.

- **Core Department:** Public Works
- **Section:** PBSAP

6 Ensure staff are aware of the County countermeasures standards. Place the document in a standard location (County server) where all Public Works staff can access it. Consider posting it on the County website.

- **Core Department:** Public Works
- **Section:** PBSAP

AMERICANS WITH DISABILITIES ACT (ADA) IN THE PUBLIC RIGHTS-OF-WAY TRANSITION PLAN

The ADA Transition Plan establishes procedures for achieving ADA compliance on Orange County roadways. The following actions will ensure the plan remains up-to-date and aligns with Vision Zero efforts.

1 Include ADA statements in all Vision Zero Action Plan HIN project descriptions for projects with ADA improvements.

- **Core Department:** Public Works
- **Section:** ADA Transition Plan

2 Ensure that a monitoring process is being carried out to confirm that ADA reviews are being conducted through maintenance programs as well as new projects, according to the Transition Plan. Design variations to ADA elements should require documentation through a Formal Design Variation.

- **Core Department:** Public Works
- **Section:** ADA Transition Plan

3 Update the Transition Plan, incorporating reference to the Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) and based on significant changes to the final rule text, published 8/8/2023 and effective 9/7/2023 as a best practice in advance of DOJ/USDOT adoption of guidelines. Additionally, update to include minimum sidewalk width requirements per the Orange County Code Draft 4.0.

- **Core Department:** Public Works
- **Section:** ADA Transition Plan

4 Update the Transition Plan in a recommended five-year cycle and include progress toward achieving compliance.

- **Core Department:** Public Works
- **Section:** ADA Transition Plan

ORANGE COUNTY SUSTAINABLE OPERATIONS & RESILIENCE ACTION PLAN

The Sustainable Operations & Resilience Action Plan outlines the County's efforts towards sustainability and environmental preservation. These recommendations integrate Vision Zero considerations into the plan's goals

1 Add a publish date to the Action Plan. The Plan states it will be updated every 5 years.

- **Core Department:** PEDS
- **Section:** Orange County Sustainable Operations & Resilience Action Plan

2 Provide transparent progress online toward multimodal transportation system integration and other sustainability initiatives.

- **Core Department:** PEDS
- **Section:** Orange County Sustainable Operations & Resilience Action Plan

Vision Zero Benchmarks Overview

As part of the Vision Zero Action Plan development process, the project team conducted a benchmarking exercise to assess its current practices against key Vision Zero strategies. This process involved evaluating the County's performance across various categories, identifying areas of strength, and highlighting opportunities for improvement. The benchmarking results provide valuable insights into Orange County's readiness to embark on its Vision Zero journey and serve as a foundation for setting priorities and action items.

Benchmark Categories

The following table summarizes Orange County's performance across the main benchmark categories:

CATEGORY	DESCRIPTION	ASSESSMENT
Leadership and Commitment	Assesses agency leadership's commitment to Vision Zero goals and engagement with stakeholders.	Moderate Progress
Safe Roadways and Safe Speeds	Evaluates policies and practices related to complete streets, speed management, and vulnerable road user safety.	Needs Improvement
Data-Driven Approach, Transparency, and Accountability	Examines the use of data to inform decision-making, progress monitoring, and public reporting	Substantial Progress

Leadership and Commitment

Orange County has demonstrated leadership commitment to Vision Zero through the adoption of a Vision Zero Resolution by the Board of County Commissioners on August 9, 2022. The Orange County Community Traffic Safety Team (CTST) also meets regularly to address safety issues in collaboration with agency partners in enforcement, education, and engineering. However, there are opportunities to strengthen interdepartmental coordination and establish a dedicated Safety Office to oversee Vision Zero efforts. Key actions include:

- Forming an interdepartmental safety working group to regularly discuss progress and collaborate on initiatives.
- Expanding outreach efforts to engage specific communities, interests, and populations in the Vision Zero process, building upon existing initiatives like the annual Hunter's Creek meeting.

Safe Roadways and Safe Speeds

While Orange County has made some progress in implementing complete streets and speed management strategies, there is significant room for improvement in prioritizing the safety of vulnerable road users. The County has initiated the development of a Complete Streets plan, which should be prioritized for completion. Traffic Engineering is using tools like USLimits2 to set context-appropriate speed limits, and a County-wide Context Classification Map is being developed. However, additional actions are needed to fully embrace Vision Zero principles:

- Consistently prioritizing vulnerable road users in project planning and implementation, building upon the High Injury Network (HIN) methodology that weighted crashes involving pedestrians, bicyclists, and motorcyclists.
- Expanding the use of speed management strategies, such as speed feedback signs, traffic calming measures, and education campaigns, in collaboration with the Sheriff's Office.

Data-Driven Approach, Transparency, and Accountability

Orange County has demonstrated substantial progress in using data to inform decision-making and support engineering solutions. The County has access to Signal Four Analytics and regularly collects crash data. However, there are opportunities to enhance data collection, analysis, and reporting practices:

- Augmenting crash data with information from hospitals to better capture underreported crashes, especially those involving vulnerable road users.
- Conducting a demographic analysis of the HIN to ensure equitable prioritization of projects.
- Routinely monitoring and reporting collision data to the public through the Vision Zero website and annual progress reports.

Conclusion

The Vision Zero benchmarking exercise has revealed that Orange County has a solid foundation to build upon, with notable strengths in leadership commitment and data-driven approaches. However, significant work remains to fully align the County's policies and practices with Vision Zero principles, particularly in the areas of safe roadways, safe speeds, and equity-focused analysis. By addressing the identified gaps and implementing the recommended actions and the countermeasures presented in the following chapter, Orange County can continue to make progress towards its goal of eliminating traffic fatalities and serious injuries.

Policy and Standard Operating Procedure Recommendations

The following policy and Standard Operating Procedures recommendations emerged from the Action Plan's policy review and interviews with County staff and leadership.

ROADWAY RESURFACING

Collector and arterial roadways scheduled to be resurfaced during the year should be reviewed for potential safety improvements, ADA compliance, as well as upgraded to current standards. Examples include lane narrowing, widening or buffering bike lanes, adding or upgrading crosswalks, pavement markings for wrong way treatment, railroad dynamic envelopes, and removing SCHOOL pavement messages outside of designated school zones. Other safety improvements now permitted, such as speed limit sign pavement markings, and pedestrian and bicycle crossing warning sign pavement markings should be considered at appropriate locations. Any roadway features not in compliance with ADA, such as curb ramps, detectable warning mats, and obstructions to pedestrian access routes, should be addressed.

Core Department: *Public Works*

UTILITY RELOCATIONS RELATED TO SAFETY PROJECTS

Strongly request or negotiate that Utilities become subordinate to the County for needed utility relocations. Agreements with Orange County Utilities should provide flexible terms so that safety projects can proceed.

Core Department: *Public Works/ Orange County Utilities*

Coordinate a County-wide Vision Zero outreach, education, and transparency plan, identifying annual opportunities and standard messaging. Request agencies such as the Orange County Sheriff's Office, which hosts the Senior Academy and Citizen Police Academy, to partner in the effort.

Core Department: *Communications Department*

VISION ZERO OUTREACH, EDUCATION, AND TRANSPARENCY

Coordinate a County-wide Vision Zero outreach, education, and transparency plan, identifying annual opportunities and standard messaging. Request agencies such as the Orange County Sheriff's Office, which hosts the Senior Academy and Citizen Police Academy, to partner in the effort.

Core Department: *Communications Department*

DATA SHARING

Crash data for trail crossings or crashes along trails within County right-of-way should be provided to the Parks & Recreation Division on at least an annual basis.

Core Department: *Traffic Engineering Division or Transportation Planning Division/Public Works*

Emergency Management should provide records on trail emergency call locations for those related to crashes to both the Parks & Recreation Division and Public Works.

Core Department: *Emergency Management*

ST.ART SOMETHING TRAFFIC SIGNAL CABINET WRAPS

Use the St.ART Something program to provide an opportunity for communities to provide safety-themed art in alignment with the Vision Zero initiative. Remove the prohibition from using logos and allow use of the Orange County Vision Zero logo with safety-themed art.

Core Department: *Neighborhood Services Division/Public Works*

SAFETY AUDITS

Road Safety Audits (RSAs) are recommended to be conducted for all roadway segments on the High Injury Network (HIN).

Core Department: *Transportation Planning Division or a Traffic Engineering Division, incuding a multidisciplinary audit team from other divisions.*

Trail audits are a proactive practice that should extend beyond the West Orange Trail to other County trails, focusing on those segments and trail crossings within public right-of-way. Segments and trail crossings on High-Injury Network roadways should be prioritized.

Core Department: *Parks & Recreation Division including a multi-disciplinary audit team from other divisions.*

PEDESTRIAN AND BICYCLE COUNTS

Trail counts could be summarized into an annual report for data sharing and as a planning tool. Count locations could be added to the County's pedestrian and bicycle count GIS map on the County website.

Core Department: *Parks & Recreation Division*

Coordination with FDOT should continue to identify additional permanent count locations furnished and installed by FDOT.

Core Department: *Parks & Recreation Division*

The Traffic Engineering Division's annual count program has made significant progress in establishing levels of pedestrian and bicycle activity. The Division should compare the current count locations to the 2017 Orange County Bicycle and Pedestrian Count Program Design and Implementation Report for additional recommended count locations, as well as recommendations for the development of adjustment factors. The Division should supplement this data with pedestrian and bicycle counts at signalized intersections where the capability exists to do so. A list of intersections where this capability exists should be shared within the Department and data reports produced on an as-needed basis.

Core Department: *Traffic Engineering Division*

DEVELOPMENT REVIEW

Create a procedure for reviewing and approving new bus stop locations with permit applications to install bus stop signs, benches, and shelters within County right-of-way, with designs adhering to the standards outlined in Sec 21, Division 4 of the Orange County Code. Updates should be included in the design standards as new guidance is developed.

Core Department: *Public Works, Development Engineering, Traffic Engineering Division*

Train staff in FDOT's Accessing Transit handbook and the new ITE resource Centering Transit and Ped Safety expected to be published soon.

Core Department: *Public Works, Development Engineering, Traffic Engineering Division*

CIP PROJECTS, DEVELOPMENT INFRASTRUCTURE PROJECTS, AND MAINTENANCE ACTIVITY

All CIP projects, development infrastructure projects, and maintenance activity projects shall consider implementing Vision Zero aspects or countermeasures as part of that project. A checklist shall be submitted to identify those standard countermeasures that have been considered and are being implemented. If no countermeasures are implemented, the checklist shall provide justification.

Core Department: *Public Works*

STAFFING NEEDS AND TIME CONSTRAINTS

Assess the need for augmented staff to accomplish the HIN projects and strategies identified in the Vision Zero Action Plan. Approach County Administration regarding the need for a Vision Zero augmented staff contract or the ability to expand current contracts for this use, including the budget to do so.

Core Department: *Public Works, Real Estate Management*

Consider the use of existing continuing services contracts to accomplish some tasks. The Transportation Planning continuing services contract includes a provision which allows in-house consultant support up to 40 hours per week. Request additional operations budget to do so.

Core Department: *: Public Works, Real Estate Management*

Consider advertisement of a General Engineering Consultant (GEC) contract or General Planning Consultant (GPC) contract to assist County staff with ongoing needs related to carrying out and monitoring the action plan.

Core Department: *Public Works, Real Estate Management*

DEPARTMENTAL COORDINATION AND COLLABORATION

When coordinating with Administrative Services, Public Works should prioritize projects that provide a safety benefit over strictly capacity projects. Safety projects identified on the High Injury Network through the Action Plan should be prioritized in both ranking and funding. The Department should identify projects that can be accomplished within existing right-of-way for faster implementation and realization of safety benefits while right-of-way acquisition is underway for others. Demonstration of safety benefit through benefit/cost and net present value analysis should be a factor in project prioritization rather than project cost alone without consideration of societal safety benefits.

Core Department: *Public Works, PEDS, Utilities*

Established and regularly scheduled inter-departmental coordination meetings, such as those between Public Works and PEDS and between Public Works and Utilities, provide the necessary opportunities for collaboration on project issues. Meeting attendees should communicate decisions, action items and other meeting outcomes to other critical staff members across applicable divisions within each department.

Core Department: *Public Works, PEDS, Utilities*

CHAPTER: 5

Toolkit and Prioritization

The first part of this chapter describes the toolkit of strategies development by MetroPlan Orlando and utilized as the basis of this Action Plan's recommendations. While a summary of both the non-engineering and engineering countermeasures are described below, the full countermeasure toolkit is presented in the Regional Plan.

The second part of this chapter discusses the Action Plan's process for Project Prioritization and the identification of recommended safety countermeasures.

The **Non-Engineering** and **Engineering Countermeasure Toolkits** were developed to help inform various safety solutions around the region. The toolkits are provided in the appendix with a high-level summary provided in this chapter.

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 via marketing campaigns, high-visibility enforcement and publicized sobriety checkpoints - which 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.

The 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 included in the toolkit 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. The toolkit provides references to source documents and users of the guide are encouraged to review applicable source documents related to their specific safety issues and goals.

Non-engineering countermeasure toolkit organization

Safer people

- Public information, social marketing, and educational campaigns
- Enforcement

Safer speeds

- Speed limit setting
- High-visibility enforcement
- Automated enforcement

Safer vehicles

- Emergency technology
- Vehicle maintenance

Safer roads

- Improved data sharing
- Pilot and demonstration projects
- Road maintenance and maintenance of traffic
- Policies and standards
- Grant opportunities

Post-crash care

- Emergency medical services
- Trauma care
- Fatal crash response team
- Traffic incident management
- Post-crash strategies

ENGINEERING COUNTERMEASURES

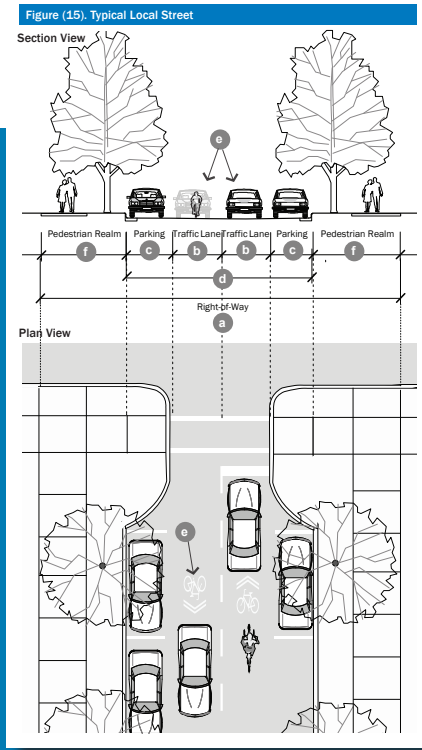
The purpose of the Engineering Countermeasure Toolkit is to establish a shared understanding of key strategies available to address roadway safety issues in our community that align with the Safe System strategy. The key objectives of the Toolkit are to:

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 Factors Clearinghouse or other published studies. The Toolkit also includes general information about each tool's application, typical placement, estimated costs, and delivery timelines. The Engineering Countermeasure Toolkit is not intended to be a menu from which community members can request safety tools for their street. Before a specific countermeasure is selected, analysis must be conducted to understand the existing safety issue.

Signing and Striping

Pedestrian safety countermeasures are crucial in creating safe roadways for all users. The implementation of engineering solutions such as crosswalk enhancements (high-visibility crosswalk markings), signal improvements (pedestrian countdown timers, leading pedestrian intervals) together will help to save lives. The introduction of suitable signage and striping to enhance visibility and integration of advanced technology can also support ongoing pedestrian and bicycle safety. Alongside these, education programs and enforcement of traffic laws contribute to cultivating safer behaviors. These countermeasures, when executed in a comprehensive and context-sensitive manner, can significantly improve vulnerable roadway user safety on Orange County's streets.



ORANGE COUNTY SIGNING AND STRIPING SAFETY SPOTLIGHT: I-DRIVE DISTRICT OVERLAY ZONE

Orange County has adopted specific bicycle/pedestrian signing and striping regulation in the I-Drive District Overlay to support complete streets for all roadway users. As outlined in Sec. 38-862. Street Types of the Form Based Code, bicycle accommodations must be provided on certain street types, such as sharrow markings on local streets and minimum 10' wide crosswalks at stop-controlled intersections, comprised of thermoplastic markings. In the district, textured/colored pavement is permitted provided that it is privately maintained. These improvements will continue to enhance safety within the popular entertainment destination.

Speed Management

Addressing speed is fundamental to the Safe System Approach to making streets safer, and a growing body of research shows that speed limit changes alone can lead to measurable declines in speeds and crashes. The first step to identifying appropriate speeds involves identifying potential conflicts on the road, which may include sharp bends, high-traffic zones, location of community assets such as schools, or areas with a large number of vulnerable roadway users. Once these potential safety concerns have been identified, comprehensive analyses need to be carried out to identify an appropriate design speed and target speed.

Determined safe speeds can be implemented through continuous observation of roads, conditions, and speeds, and making necessary adjustments, thus ensuring careful and considerate driving. Continuous monitoring and enforcement may be undertaken, making sure that the selected speed is suitable for the circumstances. Regular reviewing of the effectiveness of the speed choice is essential, as it will assist in identifying necessary amendments to be made.

Other Engineering Strategies

Other engineering strategies represent cross-cutting transportation safety countermeasures that apply a broad approach to enhance safety across multiple modes of transport, addressing the needs of motorists, cyclists, and pedestrians alike. These countermeasures, implemented in an integrated manner, can contribute significantly to making transportation systems safer and more efficient such as lighting and access management.

Design speed and target speed are two critical terms that come into play when considering traffic safety and road design. Both design speed and target speed play a key role in promoting safe, efficient, and user-friendly transportation systems for all roadway users.

Design speed is essentially the maximum safe speed that can be maintained on a particular section of the roadway when conditions are most favorable. It is the speed used by engineers during the geometric design of a roadway. This encompasses the determination of features such as horizontal and vertical alignment, lane width, and separation distances.

On the other hand, target speed, also known as 'operating speed', refers to the speed at which drivers feel comfortable driving on a certain road segment under normal conditions. It is not necessarily the legal speed limit, but rather, is based on factors such as the route's physical characteristics, surrounding environment, and the vehicle's capabilities.

While design speed ensures the road is constructed to cater to a certain speed, the target speed is essential to understand driver behavior and safety. Therefore, the setting of appropriate target speeds must consider the road environment, roadside development, vulnerable road users, and the function of the road to help traffic move smoothly and safely.

In an ideal scenario, the design speed and target speed should be closely aligned to ensure that the road infrastructure can safely cope with the speeds at which drivers choose to travel. However, if there's a significant disparity between the two, it may lead to increased risks of crashes, necessitating modifications to the road design or adjustments to speed limits and other traffic management measures to enhance safety.

Pedestrian Facilities

Pedestrian safety countermeasures are crucial in creating safe roadways for all users. The implementation of engineering solutions such as crosswalk enhancements (high-visibility crosswalk markings, raised crosswalks, pedestrian refuge islands), signal improvements (pedestrian countdown timers, leading pedestrian intervals) together will help to save lives. The introduction of suitable signage and lighting to enhance visibility and integration of advanced technology can also support ongoing pedestrian safety. Alongside these, education programs and enforcement of traffic laws contribute to cultivating safer behaviors among drivers and pedestrians alike. These countermeasures, when executed in a comprehensive and context-sensitive manner, can significantly improve pedestrian safety on Orange County's streets.

ORANGE COUNTY PEDESTRIAN SAFETY SPOTLIGHT: I-DRIVE PEDESTRIAN BRIDGE

The I-Drive Pedestrian Bridge funded by Community Redevelopment Area (CRA) dollars is planned to span over 400 feet from the Hyatt Regency Hotel to the Orange County Convention Center (OCCC) West Building. The bridge will feature escalators, stairs, and elevators for accessibility, the bridge is designed to alleviate traffic control needs during large events and serve as a gateway to International Drive.

Bikeways

Ensuring bicycle safety is an essential part of building safer roads. Deploying countermeasures such as the creation of dedicated bike lanes, bike boxes, and bicycle-specific traffic signals can help cater to the need of cyclists on the road and better protect them from harm. Intersection improvements, enhanced signage, and protected paths particularly along popular biking routes are important to ensure good visibility for both cyclists and motorists. Innovative technology and regular road maintenance together can also help to ensure direct, smooth and obstacle-free bike travel to substantially foster safer bike travel. By incorporating these bicycle safety improvements in a comprehensive transportation safety framework, Orange County can become more bike-friendly and safer for all road users.

SPOTLIGHT ON WALK-RIDE-THRIVE!

*The goal of **Orange County's Walk-Ride-Thrive! Pedestrian Safety Initiative** is to establish and maintain a coordinated, comprehensive and consistent response to pedestrian and bicycle safety issues. Orange County is currently investing in pedestrian safety through various programs, including a **Community Traffic Safety Team**, a **Student-Pedestrian Safety Committee**, and substantial annual funding for new sidewalk projects and repairs. The initiative will further expand by improving coordination, updating capital planning and codes, to implement the **Pedestrian Bicycle Safety Action Plan** and **Complete Streets Policy.***

Intersection and Roadways

Intersection enhancements are a crucial aspect of enhancing road safety since intersections frequently serve as points of conflict among pedestrians, cyclists, and motorized vehicles. Measures such as enhancing lighting, using larger or reflective signage, creating high visibility crosswalks, and removing sight obstructions at intersections can significantly minimize collisions. The geometric design of the intersection, too, plays a pivotal role in road safety. Configurations such as roundabouts, traffic islands, raised intersections, and adequate turning lanes streamline traffic flow and minimize points of conflict.

Roadway countermeasures can be designed specifically to prevent roadway departures, where a vehicle unintentionally strays away from its designated lane. Roadway departures account for over half of all traffic fatalities in the United States. If drivers cannot clearly identify the edge of the travel lanes and see the road alignment ahead, the risk of roadway departure may be greater. Tools such as roadside barriers, which include guardrails and median barriers, play an essential role in preventing vehicles from colliding with fixed objects or veering off steep slopes. Furthermore, the utilization of rumble strips or wider edge lines offer effective methods to alert possibly distracted or fatigued drivers when their vehicle begins to divert out of its lane and space to react accordingly.

Signals

Improvements in signalization are a significant factor in ensuring safer roadways. Enhancing elements of traffic control can considerably impact driver behavior, reducing confusion, uncertainty, and errors that may lead to accidents. Safe roadways rely heavily on clear, visible signage and signalization. Updated signs providing drivers with information about road conditions, speeds, and directions are crucial in helping them make informed decisions. Implementing dynamic signs that change based on real-time conditions, such as digital warning signs can further enhance safety.

ORANGE COUNTY SIGNALIZATION SAFETY SPOTLIGHT: OBT / 37TH STREET PEDESTRIAN IMPROVEMENTS

The Orange Blossom Trail / 37th Street Pedestrian Improvements spearheaded by the FDOT incorporates road lighting, upgraded pedestrian features in line with the American with Disabilities Act, enhanced signage, and raised crosswalks. The projects highlights an innovative pedestrian crossing system with the implementation of a High-Intensity Activated Crosswalk (HAWK) system, providing clear crossing signals for pedestrians. In collaboration with LYNX, needs of bus riders were considered to make bus stops more accessible and safer.

A focus on technology

Technology plays an important role in improving transportation safety, preventing crashes from happening, contributing to faster emergency response times, and providing more detailed analytics about why crashes are happening. This all helps identify and apply the most appropriate crash countermeasures. Some examples of safety technology in the region include:

- Wrong-way detection
- Emergency vehicle preemption
- Near-miss analysis
- Red light cameras
- Automated speed enforcement
- Automated school bus enforcement
- IP targeted safety messaging
- Ignition interlock devices
- Traffic incident management programs

The MetroPlan Orlando Transportation Systems Management & Operations (TSM&O) Master Plan identifies specific technologies that are being planned for in the region, with this plan periodically updated to evaluate and incorporate new technologies.

*As more autonomous and connected vehicles join the region's vehicle fleet, there are opportunities for **ADDITIONAL SAFETY TECHNOLOGIES** to be implemented:*

PedSafe

This pedestrian and bicycle crash avoidance system is designed to operate via connected vehicle technologies. Drivers will be alerted when a pedestrian or cyclist is in the area. Also, traffic signals will be designed to become aware of pedestrians crossing the road or intersection.

Speed harmonization

Mobile traffic sensors send real-time conditions at a congested location to a traffic management center. A computer uses this information to calculate optimal speeds for vehicles approaching congestion and sends the speeds to connected vehicles. The drivers receive the recommended speeds and can adjust accordingly, or, in an automated vehicle, the vehicle could adjust to the recommended speed automatically.

Crash prediction and response deployment

Mobile traffic sensors send real-time conditions to a traffic management center where conditions are evaluated to determine if a crash is likely based on past crash patterns in the region. Law enforcement or emergency response can be deployed before a crash occurs, which can prevent a crash from happening, or place a first responder in closer proximity to improve response times.

Project Prioritization

Road safety interventions are more effective when they are strategically planned to optimize the use of resources. Corridor prioritization is essential as it helps to achieve the highest possible crash reduction, which in turn saves more lives, reduces more injuries, and lowers economic losses due to crashes. The prioritization of specific corridors for safety projects helps ensure that countermeasures are both meaningful and cost-effective. Moreover, a focus on corridors with high crash rates along with considerations for vulnerable populations can significantly improve community well-being and ensure that the benefits of improved safety are fairly distributed.

This plan ranked road segments based on a scoring system that considered safety and equity factors. It assigned higher scores to segments that had more crashes per mile and higher crash rates, which accounts for roadways with differing traffic volumes. It also favored those segments with more KSI crashes, as well as those roadways with more crashes involving pedestrians, bicyclists, and motorcyclists. These roadways are depicted in this section as aerials that display the location of each crash, the crash type, and top factors associated with crashes in this section. The crash data visualized on these cut sheets, combined with the available roadway information, helps to visualize what specific interventions will be most valuable as well as where they should be located.

District Transportation Safety Snapshots

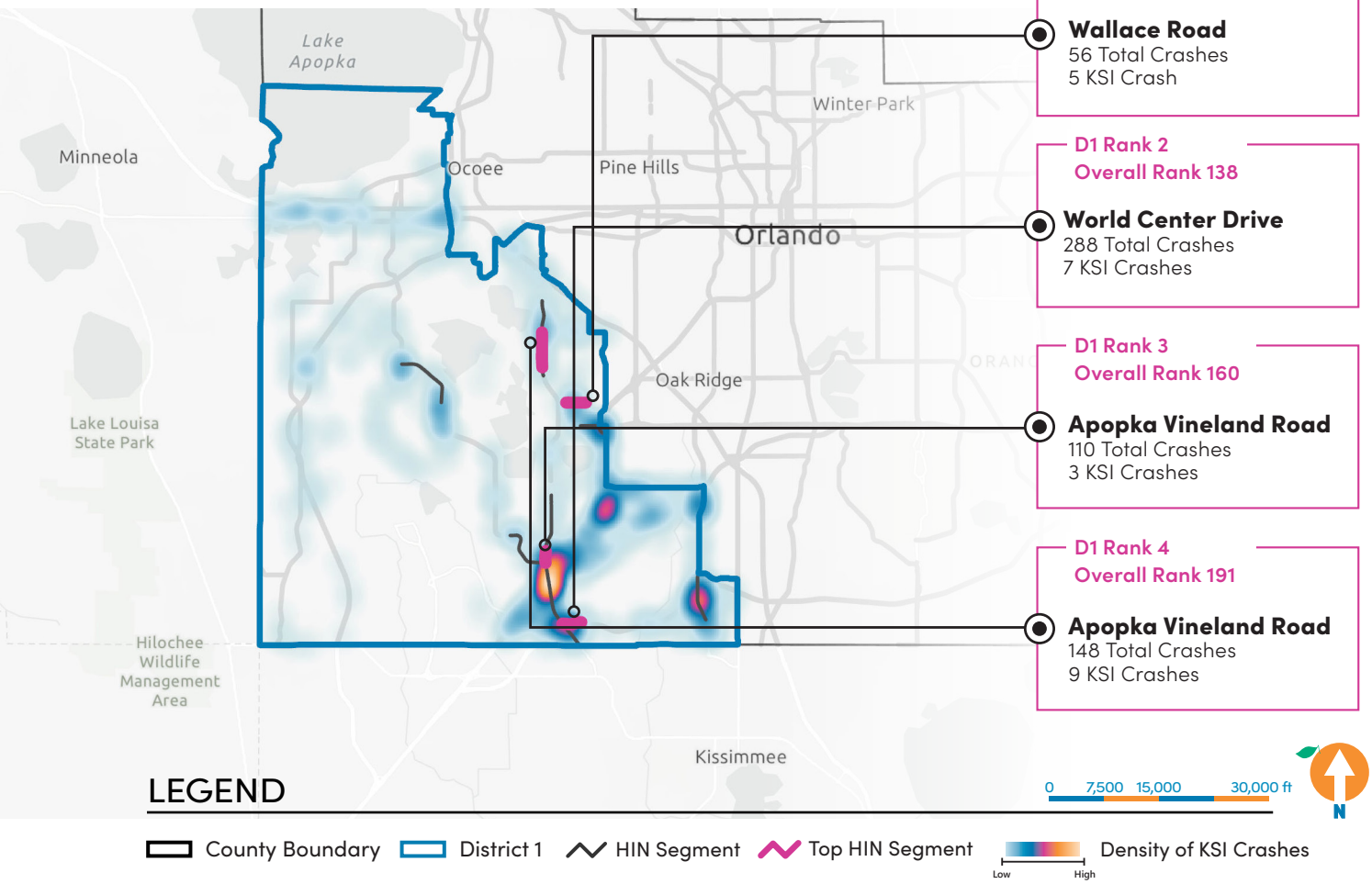
This Action Plan uses countermeasures that aim to address high-risk areas in a strategic way, based on the data-driven solutions that can avoid certain kinds of fatal and serious crashes. For instance, the specific segments may reveal that many pedestrians or bicyclists are over-represented in the crash statistics. This data helps us choose to focus on countermeasures like pedestrian safety improvements at these locations. It is important to note that the HIN is an adaptable tool for setting short and long-term safety goals. We will assess the progress over time by monitoring the changes in the number and severity of crashes that occur within the identified network, especially as we implement countermeasures in the short, medium or long-term. The selected segments below represent the four highest ranking segments for each Commission District in Orange County, which have been selected to identify safety countermeasures.

OVERALL RANK	LOCAL NAME	FROM	TO	BCC DISTRICT	OWNERSHIP	SEGMENT LENGTH (MI)	TOTAL CRASHES (KSI CRASHES)	PED CRASHES (KSI CRASHES)	BIKE CRASHES (KSI CRASHES)	MOTORCYCLE CRASHES (KSI CRASHES)	MOTOR VEHICLE CRASHES (KSI CRASHES)
102	WALLACE RD	Burnway Dr	Stonehedge Dr	1	Non-State	0.64	56 (5)	1 (1)	2 (0)	3 (1)	50 (3)
138	WORLD CENTER DR	SR 535	International Dr	1	Non-State	0.62	262 (6)	1 (0)	0 (0)	3 (1)	258 (5)
160	APOPKA-VINELAND RD	SR 535	Lake St	1	Non-State	0.38	106 (3)	4 (2)	1 (0)	0	101 (1)
191	APOPKA-VINELAND RD	Palm Lake Dr	Conroy Windermere Rd	1	Non-State	1.13	146 (9)	2 (1)	4 (0)	1 (0)	139 (8)
39	ROCK SPRINGS RD	E Welch Rd	Faye St	2	Non-State	0.89	229 (11)	10 (1)	1 (0)	5 (1)	213 (9)
84	PINE HILLS RD	Silver Star Rd	Pinto Way	2	Non-State	2.56	515 (38)	22 (9)	7 (3)	10 (5)	476 (21)

OVERALL RANK	LOCAL NAME	FROM	TO	BCC DISTRICT	OWNERSHIP	SEGMENT LENGTH (MI)	TOTAL CRASHES (KSI CRASHES)	PED CRASHES (KSI CRASHES)	BIKE CRASHES (KSI CRASHES)	MOTORCYCLE CRASHES (KSI CRASHES)	MOTOR VEHICLE CRASHES (KSI CRASHES)
115	CLARCONA OCOEE RD	Arden Oaks Dr	Pine Hills Rd	2	Non-State	2.90	530 (28)	6 (1)	9 (0)	7 (3)	508 (24)
176	EDGEWATER DR	John Young Pkwy	Orange Blossom Trl	2	Non-State	2.24	311 (12)	2 (2)	5 (1)	2 (0)	302 (9)
6	DEAN RD	Semoran Rd	Goldenrod Rd	3	Non-State	0.50	498 (16)	6 (0)	4 (1)	7 (3)	481(13)
31	S ORANGE AVE	E Landstreet Rd	Taft Vineland Rd	3	Non-State	1.08	275 (16)	1 (0)	2 (0)	7 (2)	265 (14)
51	OAK RIDGE RD	Orange Blossom Trl	Orange Ave	3	Non-State	1.67	283 (24)	8 (5)	7 (1)	10 (5)	258 (13)
109	LAKE UNDERHILL RD	San Juan Blvd	S Dean Rd	3	Non-State	4.51	1041 (31)	3 (1)	7 (1)	20 (9)	1011 (20)
117	ALAFAYA TRL	Lake Underhill Rd	SR 50	4	Non-State	1.43	598 (17)	7 (3)	3 (0)	7 (1)	581 (13)
124	FAIRWAY WINDS BLVD	Osceola CL	SR 417	4	Non-State	1.52	280 (18)	2 (0)	2 (0)	7 (3)	269 (15)
133	AVALON PARK BLVD	Timber Springs Blvd	SR 50	4	Non-State	2.80	291 (22)	2 (0)	13 (4)	4 (1)	272 (17)
145	WETHERBEE RD	S. Orange Blossom Trl	S. Orange Ave	4	Non-State	1.88	276 (15)	3 (1)	2 (0)	6 (4)	265 (10)
64	FORSYTH RD	Green Needle Dr	N. of University Blvd	5	Non-State	0.72	95 (7)	1 (1)	6 (1)	6 (4)	82 (2)
104	UNIVERSITY BLVD	Semoran Blvd	Goldenrod Rd	5	Non-State	1.78	539 (15)	11 (1)	13 (1)	7 (2)	508 (11)
116	UNIVERSITY BLVD	Dean Rd	Alafaya Trl	5	Non-State	2.24	657 (36)	8 (4)	5 (1)	15 (5)	629 (26)
120	DEAN RD	SR 408	River Park Blvd	5	Non-State	2.10	364 (15)	8 (2)	7 (1)	9 (1)	340 (11)
5	PINE HILLS RD	Old Winter Garden Rd	SR 50	6	Non-State	0.73	335 (29)	10 (3)	5 (0)	4 (0)	316 (26)
21	OAK RIDGE RD	Millenia Boulevard	Orange Blossom Trial	6	Non-State	2.79	1249 (47)	41 (11)	12 (2)	13 (5)	1183 (29)
32	KALEY ST	Rio Grande Ave	Parramore Ave	6	Non-State	0.75	51 (8)	1 (0)	1 (1)	2 (1)	47 (6)
34	HIAWASSEE RD	SR 50	Silver Star Rd	6	Non-State	1.76	696 (25)	8 (4)	3 (0)	8 (1)	677 (20)

DISTRICT 1 TRANSPORTATION SAFETY OVERVIEW

District 1 is one of the fastest growing districts in Orange County. It contains several of the County's municipalities including Winter Garden, Oakland, Windemere, and Bay Lake. Several growing and established master developments are also located in District 1, Horizon West, Hunter's Creek, Williamsburg, and Metrowest. This area of the County is characterized by rural areas transitioning to suburban locales. District 1 is also a major tourist destination with International Drive, Dr. Phillips, Walt Disney World, Universal Studios, and several other attractions. There are **14 HIN segments** in District 1 accounting for **2,498 crashes** and **105 KSI crashes** on these roadways, with the most dangerous corridors located on International Drive, Wallace Road, and segments of Apopka Vineland Road.

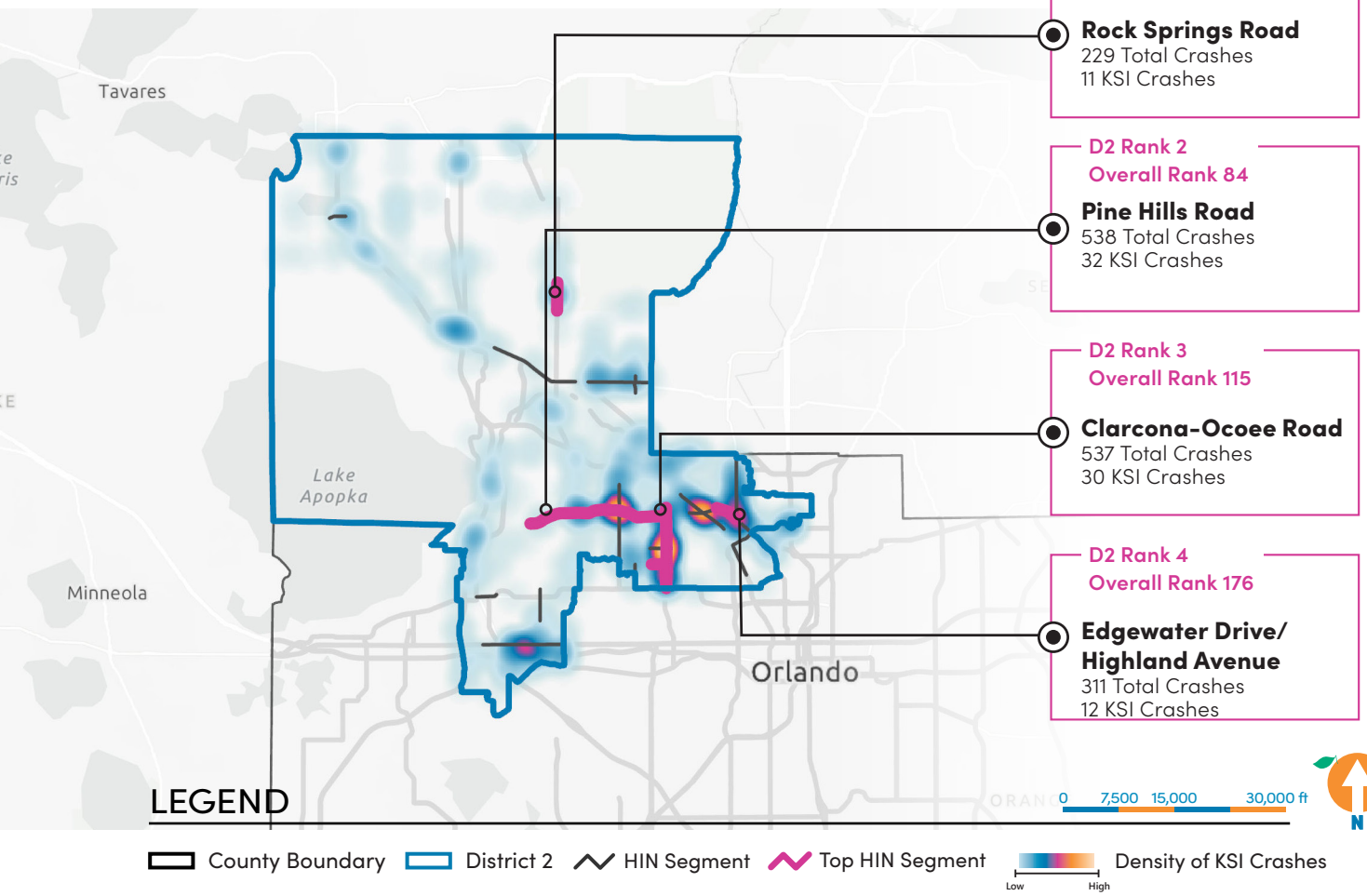


DISTRICT 1 SAFETY SPOTLIGHT: HORIZON WEST TRAIL

The Horizon West Trail is an undeveloped 4.4-mile path with a 3-mile connection extending northeast from Daniels Road/CR 535 to West Orange Park, linking multiple trails and parks in west Orange County. The trail will enhance safe pedestrian and bicycle access to residential communities, commercial centers, and Downtown Winter Garden, connecting with the regional trail network for widespread use and enjoyment.

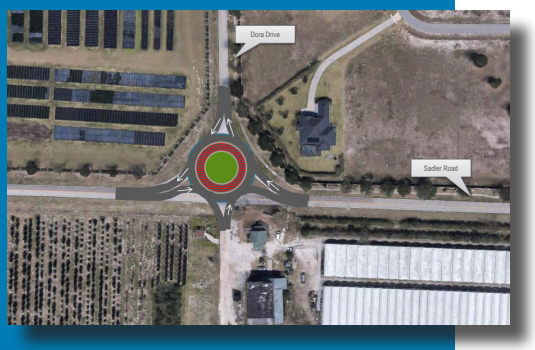
DISTRICT 2 TRANSPORTATION SAFETY OVERVIEW

District 2 is the most northern district in Orange County, bordering Lake County and Seminole County. The District is primarily rural and suburban in character with three municipalities: the City of Ocoee, City of Apopka, and Town of Eatonville. District 2 is home to a number of established communities including Pine Hills, Clarcona, South Apopka, Zellwood, and Tangerine. Lake Apopka, Wekiva Springs State Park, and Rock Springs Run State Preserve are the major attractions in this district. There are **21 HIN segments** in District 2 accounting for **5,710 crashes** and **282 KSI crashes** on these roadways, with the most dangerous corridors located on Pine Hills Road, Rock Springs Road, Edgewater Drive/Highland Avenue, and Clarcona-Ocoee Road.



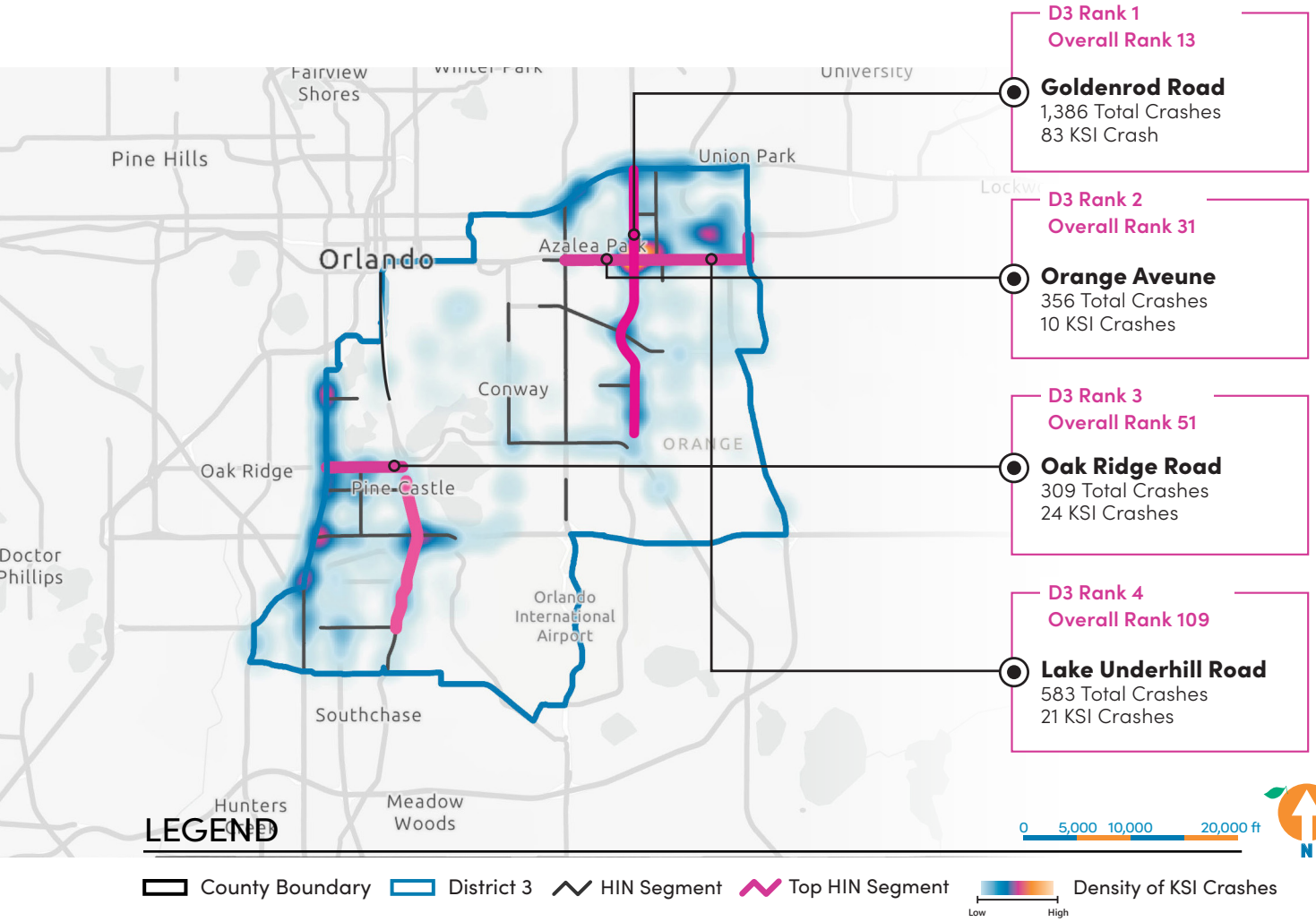
DISTRICT 2 SAFETY SPOTLIGHT: TANGERINE COMMUNITY TRAFFIC CALMING AND SAFETY ANALYSIS

This study aims to address multiple requests for traffic calming through a comprehensive approach. Bounded by Dora Ave on the west, Orange Blossom Tr on the east and Sadler Rd on the south, the study includes field assessments, crash data analysis, and identification of improvement strategies to create a holistic plan for the neighborhood's traffic management and safety.



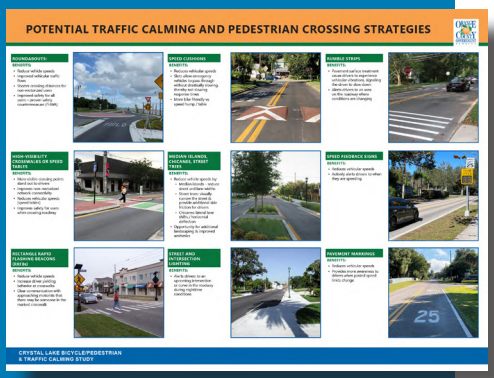
DISTRICT 3 TRANSPORTATION SAFETY OVERVIEW

District 3 is centrally located in Orange County and contains portions of the City of Orlando, as well as two smaller municipalities, the City of Edgewood and the City of Belle Isle. There are also a number of census designated communities in District 3 including Holden Heights, Conway, Pine Castle, Taft, and Azalea Park. Orlando International Airport and the Orlando Executive Airport are both in District 3 and development ranges from urban to suburban in character. There are **37 HIN segments** in District 3 accounting for **14,603 crashes** and **680 KSI crashes** on these roadways, with the most dangerous corridors located on Dean Road, Orange Aveune, Lake Underhill Road, and Oak Ridge Road.



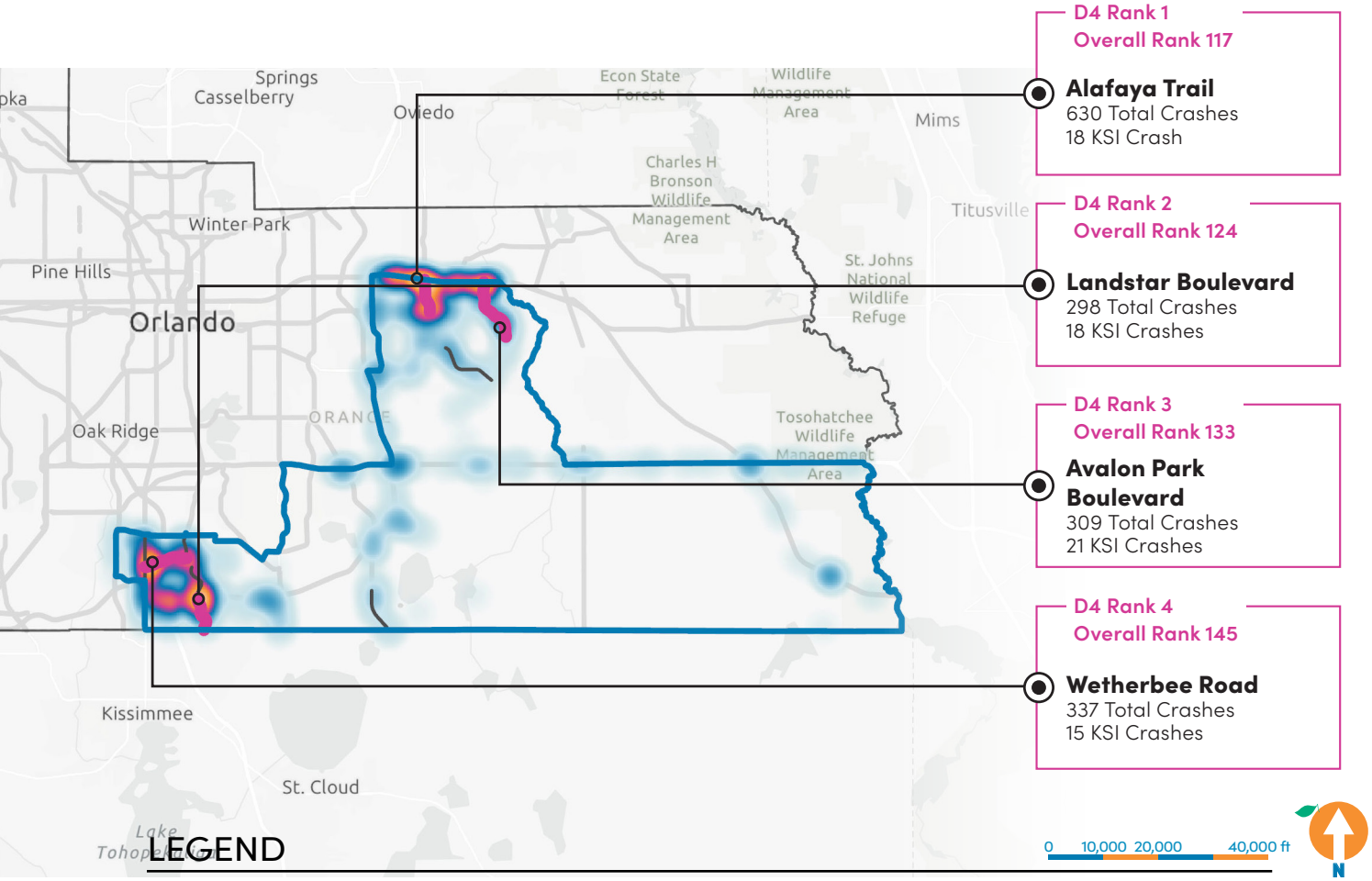
DISTRICT 3 SAFETY SPOTLIGHT: CONWAY AREA BICYCLE/PEDESTRIAN AND TRAFFIC CALMING STUDY

This study intends to respond to growth and development by enhancing conditions for bicyclists and pedestrian, all while managing vehicular speeds in the Conway area. The study encompasses a defined area bounded by Grant Street/Triangle Avenue, Gatlin Avenue, Fern Creek Avenue, and Conway Road and provides spot safety improvements and traffic calming.



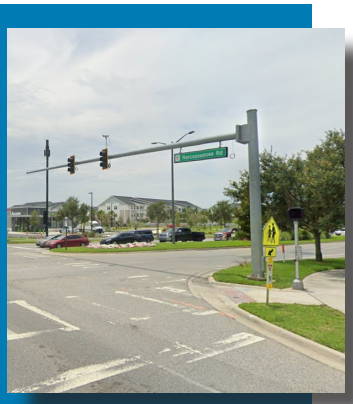
DISTRICT 4 TRANSPORTATION SAFETY OVERVIEW

District 4 is located in the southeastern portion of the County. Due to the Urban Service Boundary much of the eastern side of the District in the Middle St. Johns River Basin is either rural or undeveloped. The western side of District 4 contains a portion of Orlando International Airport, as well as the communities of Lake Nona, Southchase, Waterford Lakes, Avalon Park, and Meadow Woods. There are **15 HIN segments** in District 4 accounting for **5,766 crashes** and **271 KSI crashes** on these roadways, with the most dangerous corridors located on Alafaya Trail, Avalon Park Boulevard, Landstar Boulevard, and Wetherbee Road.



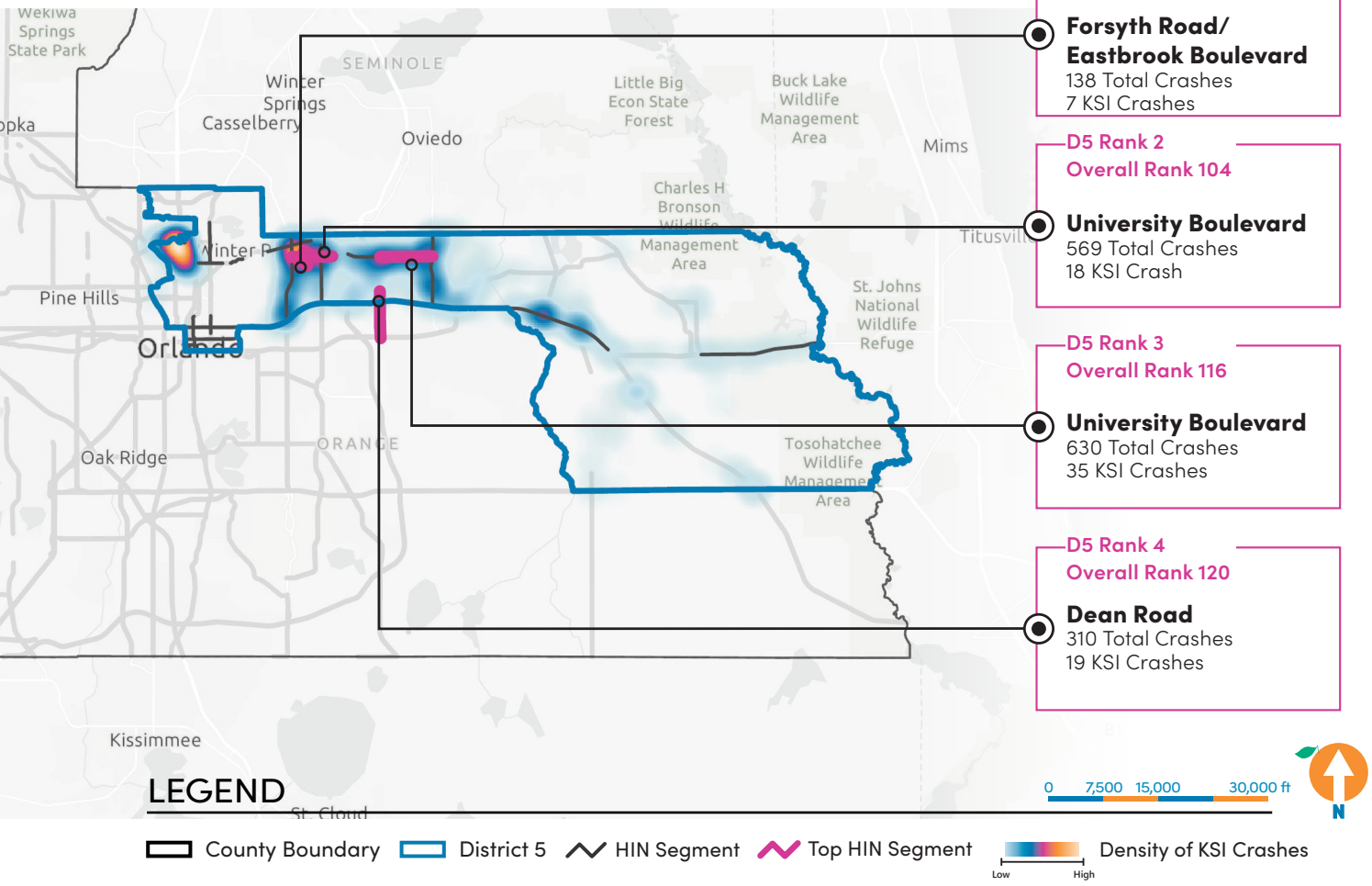
DISTRICT 4 SAFETY SPOTLIGHT: NARCOOSSEE ROAD LIGHTING IMPROVEMENTS

This lighting improvement project provides a proactive response to safety concerns and growth in southeast Orange County from the County Line to Selten Way. After a resident expressed concern with the absence of streetlights for his son biking to Lake Nona Middle School, the Orange County Accelerated Transportation Safety Program is overseeing these improvements, and underground work has already begun. provides spot safety improvements and traffic calming.



DISTRICT 5 TRANSPORTATION SAFETY OVERVIEW

District 5 is located in the northeastern portion of the County. Similar to District 4, the Urban Service Boundary limits the amount of development that can occur in the eastern portion of the district. Development in District 5 ranges from urban on the western side to suburban and rural in character as you head east. District 5 contains portions of the City of Orlando, the City of Winter Park, and the City of Maitland within it's boundary, as well as the communities of Bithlo, Christmas, and Wedgefield. Orlando's Central Business District, the University of Central Florida Main Campus, and Rollins College are located in District 5. There are **43 HIN segments** in District 5 accounting for **13,574 crashes** and **532 KSI** crashes, with the most dangerous corridors located on Dean Road, Forsyth Road/Eastbrook Boulevard, and segments of University Boulevard.

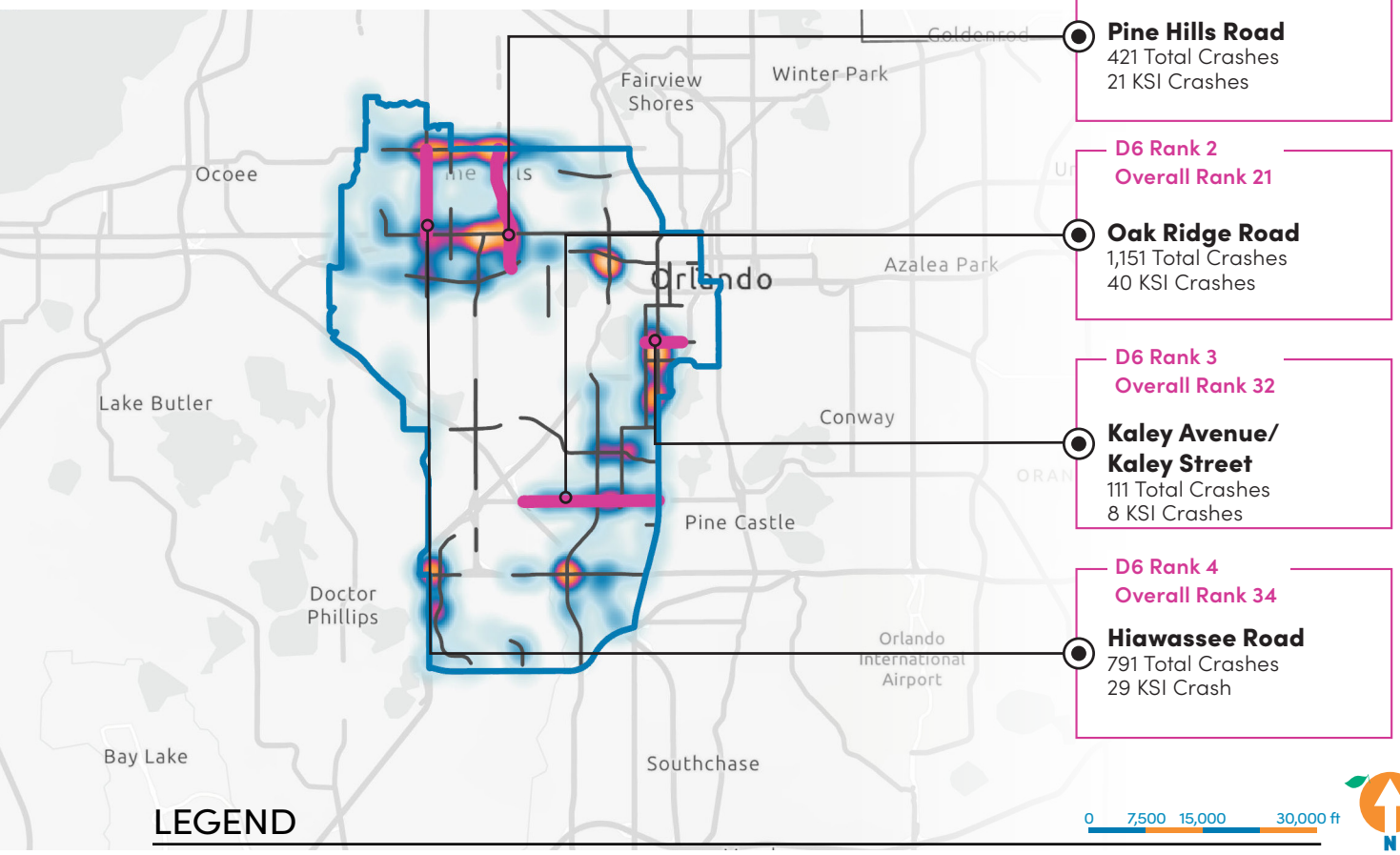


DISTRICT 5 SAFETY SPOTLIGHT: UNIVERSITY BOULEVARD ROAD SAFETY AUDIT

The University Boulevard bicycle-pedestrian safety audit is a study focusing on University Boulevard between South Semoran Boulevard and North Goldenrod Road. The study aims to evaluate the need for enhancements with existing and future development, including Full Sail University's Master Plan, and will assess traffic signal operations, signage, and accommodations to facilitate safe crossings for bicyclists and pedestrians. provides spot safety improvements and traffic calming.

DISTRICT 6 TRANSPORTATION SAFETY OVERVIEW

District 6 is located centrally in Orange County. It contains a portion of the City of Orlando, and a number of designated communities including Pine Hills, Orlo Vista, Oak Ridge, and Hiawassee. Development types ranges from urban to suburban throughout in character. District 6 is home to a number of major sports venues including Camping World Stadium, Exploria Stadium, and the Kia Center, as well as the University of Central Florida's Downtown Campus. There are **72 HIN segments** in District 6 accounting for **24,422 crashes** and **1,040 KSI crashes** on these roadways, with the most dangerous corridors located on Hiawassee Road, Oak Ridge Road, Pine Hills Road, and Kaley Avenue/Kaley Street.



D6 Rank 1
Overall Rank 5

Pine Hills Road
421 Total Crashes
21 KSI Crashes

D6 Rank 2
Overall Rank 21

Oak Ridge Road
1,151 Total Crashes
40 KSI Crashes

D6 Rank 3
Overall Rank 32

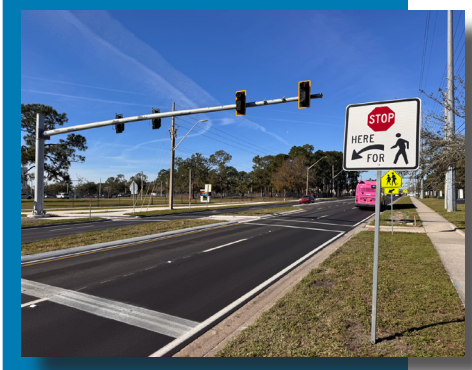
Kaley Avenue/ Kaley Street
111 Total Crashes
8 KSI Crashes

D6 Rank 4
Overall Rank 34

Hiawassee Road
791 Total Crashes
29 KSI Crash

DISTRICT 6 SAFETY SPOTLIGHT: OAK RIDGE PEDESTRIAN SAFETY IMPROVEMENTS

The Oak Ridge Road Pedestrian Safety project, spanning from Millennia Boulevard to Orange Blossom Trail, aims to enhance pedestrian and bicycle safety. Recommendations from a 2017 safety study are currently being implemented, including milling and resurfacing, widening sidewalks, adding special road features, crosswalk markings, mid-block crossings, bus stop relocations, and improved signage. provides spot safety improvements and traffic calming.



CHAPTER: 6

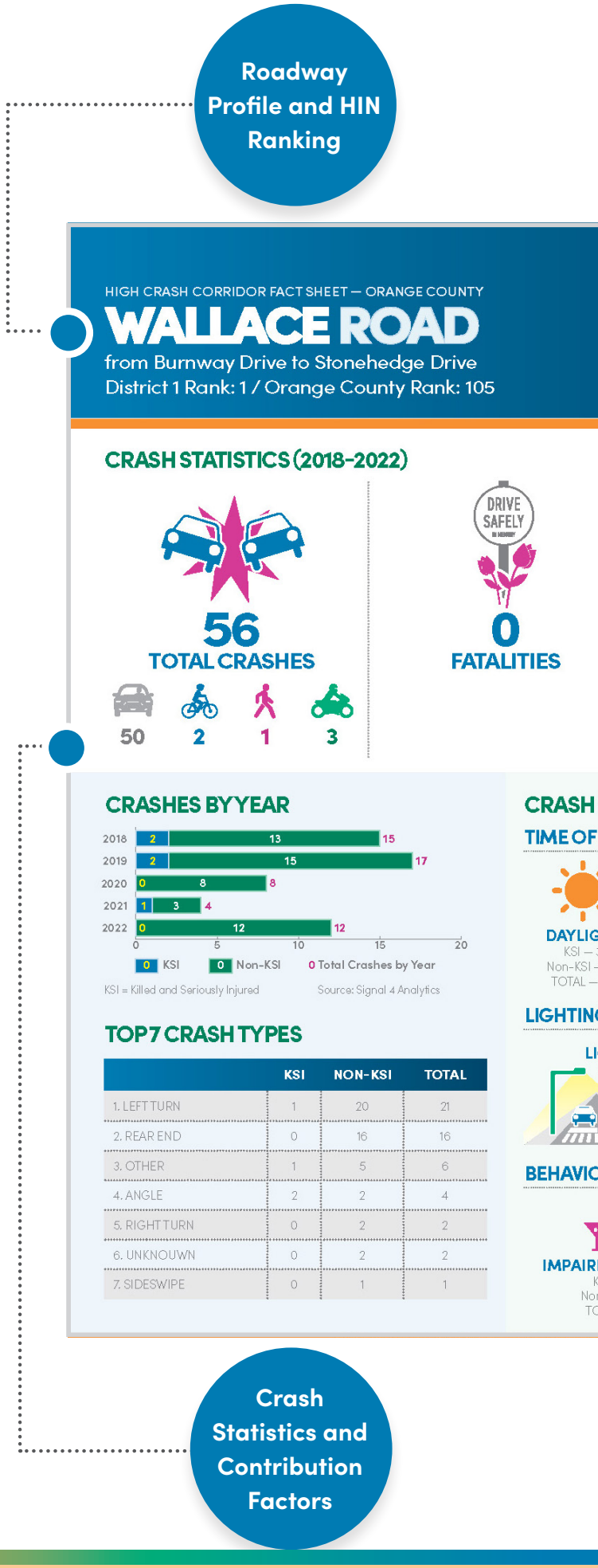
Plan Recommendations

Project Prioritization: HIN Corridor Profiles and Proposed Countermeasures

Road safety interventions are more effective when they are strategically planned to optimize the use of resources. Corridor prioritization is essential as it helps to achieve the highest possible crash reduction, which in turn saves more lives, reduces more injuries, and lowers economic losses due to crashes. The prioritization of specific corridors for safety projects helps ensure that countermeasures are both meaningful and cost-effective. Moreover, a focus on corridors with high crash rates along with considerations for vulnerable populations can significantly improve community well-being and ensure that the benefits of improved safety are fairly distributed.

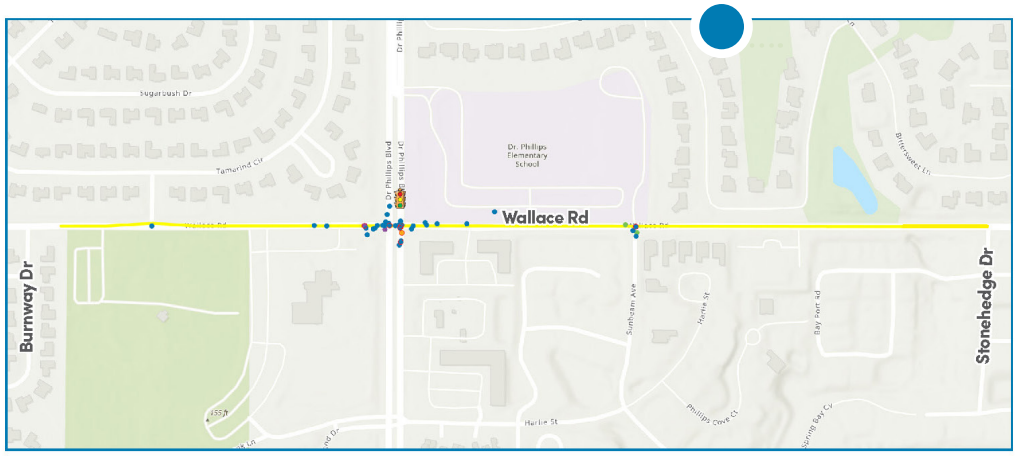
The following roadway profile pages provide a comprehensive summary of the characteristics, crash data, rankings, and prioritized countermeasures identified in this Vision Zero Action Plan. The pages highlight specific elements of each corridor, such as length, location, design, traffic volume, and other physical characteristics. An overview of crash type data and crash profile data offers vital insight into the frequency, type and severity of accidents that have occurred on these corridors, along with determining high-risk zones. The profile pages are organized to reflect the rankings, a measure of corridor safety that takes into account various elements identiied in the corridor prioritization framework. Lastly, a prioritized list of countermeasures has been identified for future improvement of safety along each corridor.

The crash data visualized on these cut sheets, combined with the available roadway information, helps to visualize what specific interventions will be most valuable as well as where they should be located.



Map With Location of Crashes

VISION ZERO
COUNTDOWN TO ZERO



N

LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

KSI Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

5
SERIOUS INJURIES

3 | 1 | 10

CONTRIBUTION FACTORS

DAY

DUSK–DAWN
KSI — 0
Non-KSI — 4
TOTAL — 4

NIGHT
KSI — 2
Non-KSI — 12
TOTAL — 14

G CONDITION

NON-LIGHTED
KSI — 0
Non-KSI — 0
TOTAL — 0

DRAL FACTORS

DISTRACTED DRIVING
KSI — 3
Non-KSI — 18
TOTAL — 21

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MAJOR COLLECTOR

CONTEXT CLASSIFICATION
SUBURBAN COMMERCIAL (C3C)

CORRIDOR LENGTH
0.64 MILES

AVERAGE POSTED SPEED
42 MPH

AVERAGE PREVAILING SPEED
47.9 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
0%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
NONE

TRAVEL LANES / MEDIAN TYPE
2 LANES / UNDIVIDED

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Prohibit turns when ped signal is activated ($)

INTERSECTION AND ROADWAYS
- Consider intersection reconstruction and tightening at Dr. Phillips Boulevard ($$$)
- Consider pedestrian level street lighting ($$)

PEDESTRIAN/BICYCLE FACILITIES
- Install raised crosswalk at Teasel Drive with advanced warning signs and yield markings ($$$)
- Install marked crosswalks at all side streets and major driveways ($$$)
- Upgrade crosswalk at school to a raised crosswalk with rectangular rapid flashing beacon, advanced warning signs, yield markings and in-pavement lighting ($$$)

SPEED MANAGEMENT
- Reduce lane widths ($)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.

Roadway Characteristics

Proposed Countermeasures

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

WALLACE ROAD

from Burnway Drive to Stonehedge Drive
District 1 Rank: 1 / Orange County Rank: 102

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018-2022)

56
TOTAL CRASHES

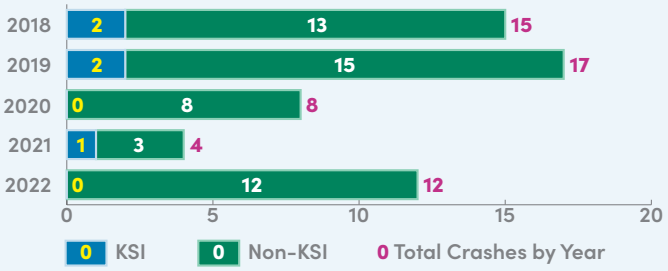
50 | 2 | 1 | 3

0
FATALITIES

5
SERIOUS INJURIES

3 | 1 | 1

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 7 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. LEFT TURN	1	20	21
2. REAR END	0	16	16
3. OTHER	1	5	6
4. ANGLE	2	2	4
5. RIGHT TURN	0	2	2
6. UNKNOUWN	0	2	2
7. SIDESWIPE	0	1	1

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 3
Non-KSI — 35
TOTAL — 38

DUSK–DAWN
KSI — 0
Non-KSI — 4
TOTAL — 4

NIGHT
KSI — 2
Non-KSI — 12
TOTAL — 14

LIGHTING CONDITION

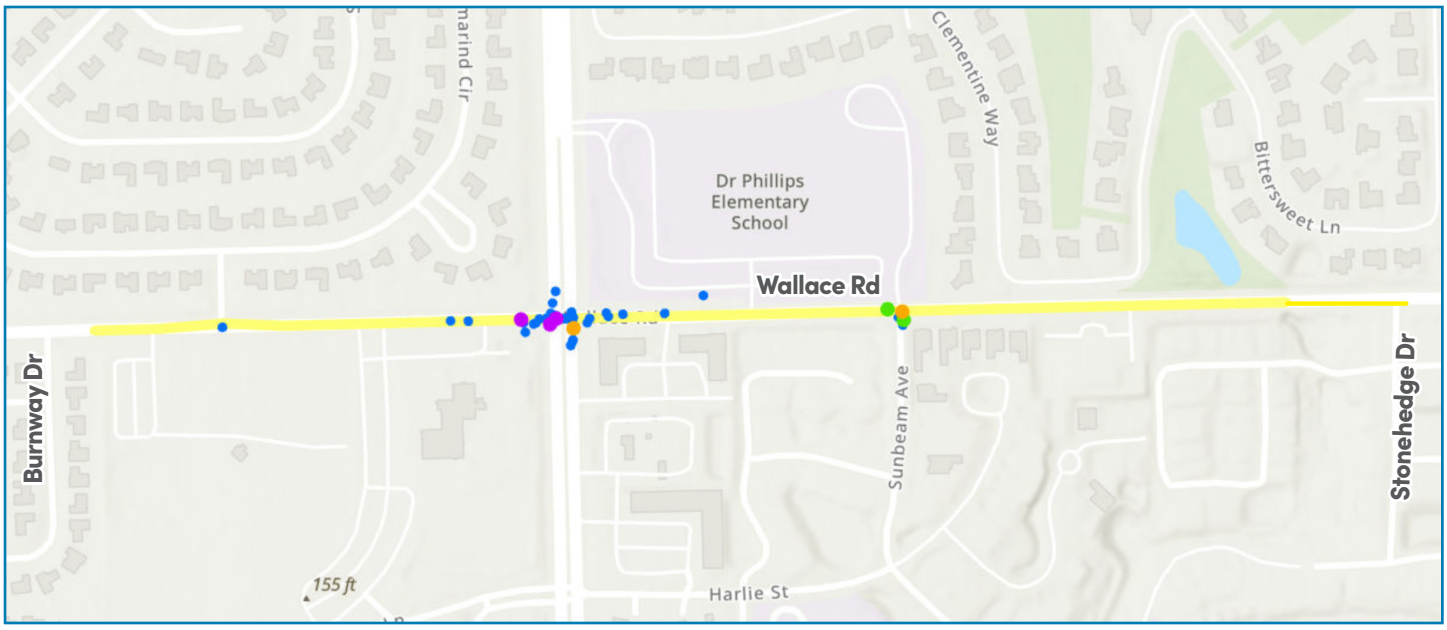
LIGHTED
KSI — 2
Non-KSI — 12
TOTAL — 14

NON-LIGHTED
KSI — 0
Non-KSI — 0
TOTAL — 0

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 0
Non-KSI — 1
TOTAL — 1

DISTRACTED DRIVING
KSI — 3
Non-KSI — 18
TOTAL — 21



LEGEND

N

HIN Corridor

Bus Stop

Traffic Signal

Crashes by Mode

Pedestrian

Bicycle

Motorcycle

Motor Vehicle

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MAJOR COLLECTOR

CONTEXT CLASSIFICATION
SUBURBAN COMMERCIAL (C3C)

CORRIDOR LENGTH
0.64 MILES

AVERAGE POSTED SPEED
42 MPH

AVERAGE PREVAILING SPEED
47.9 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
0%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
NONE

TRAVEL LANES / MEDIAN TYPE
2 LANES / UNDIVIDED

PROPOSED SAFETY COUNTERMEASURES

SIGNALS

- Install leading pedestrian intervals ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Prohibit turns when ped signal is activated ($)

INTERSECTION AND ROADWAYS

- Consider intersection reconstruction and tightening at Dr. Phillips Boulevard ($$$)

PEDESTRIAN/BICYCLE FACILITIES

- Consider pedestrian level street lighting ($$)
- In coordination with target speed reduction, install raised crosswalk at Teasel Drive with advanced warning signs and advance stop bars ($$$)
- Install new or upgrade to high-emphasis crosswalks at intersections and major driveways ($$$)
- Upgrade crosswalk at school to a raised crosswalk with Upgrade crosswalk at school to a raised crosswalk with rectangular rapid flashing beacon, advanced warning signs, advance stop bars, and in-pavement lighting ($$$)
- Consider the use of sidewalk stenciling to relay safety messages to students walking/biking ($)

SPEED MANAGEMENT

- Reduce lane widths ($)
- Consider target speed reduction to 30-35 mph ($)

SIGNING AND STRIPING

- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

WORLD CENTER DRIVE

from S.R. 535 to International Drive
District 1 Rank: 2 / Orange County Rank: 138

VISION ZERO
COUNTDOWN TO ZERO

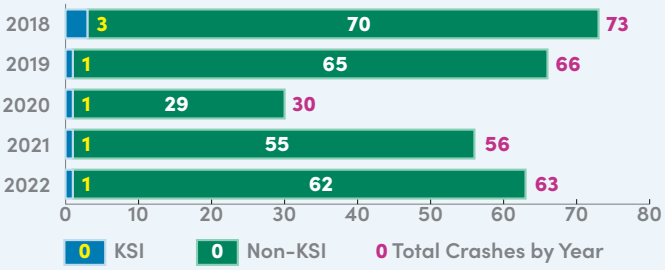
CRASH STATISTICS (2018–2022)

288
TOTAL CRASHES
284 | 4

0
FATALITIES

7
SERIOUS INJURIES
6 | 1

CRASHES BY YEAR



KSI = Killed and Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. LEFT TURN	4	106	110
2. REAR END	0	88	88
3. SIDESWIPE	1	49	50
4. OTHER	1	13	14
5. ANGLE	0	13	13
6. OFF ROAD	0	5	5
7. UNKNOWN	0	5	5
8. RIGHT TURN	1	2	3

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 5
Non-KSI — 204
TOTAL — 209

DUSK–DAWN
KSI — 1
Non-KSI — 23
TOTAL — 24

NIGHT
KSI — 1
Non-KSI — 54
TOTAL — 55

LIGHTING CONDITION

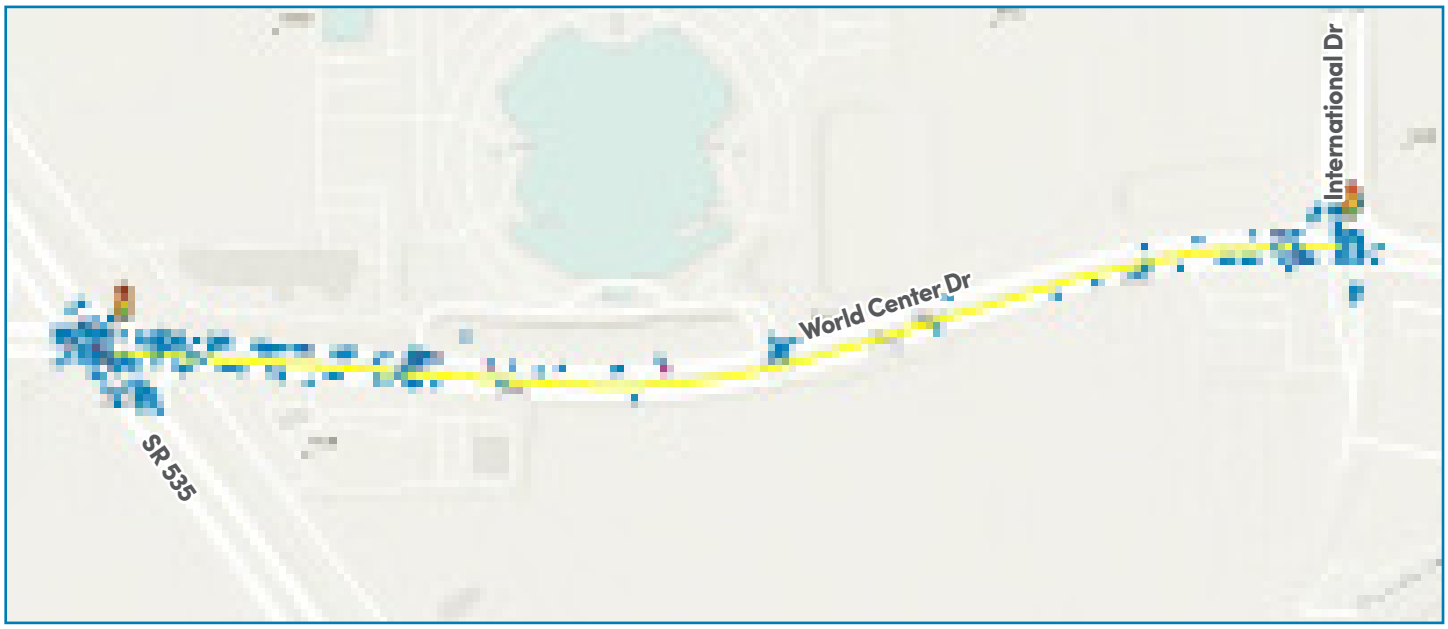
LIGHTED
KSI — 1
Non-KSI — 42
TOTAL — 43

NON-LIGHTED
KSI — 0
Non-KSI — 12
TOTAL — 12

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 0
Non-KSI — 2
TOTAL — 2

DISTRACTED DRIVING
KSI — 2
Non-KSI — 105
TOTAL — 107



N

LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN COMMERCIAL (C3C)

CORRIDOR LENGTH
0.61 MILES

AVERAGE POSTED SPEED
45 MPH

AVERAGE PREVAILING SPEED
55.1 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
0%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
LINK 304/ N/A

TRAVEL LANES / MEDIAN TYPE
6 LANES / CURB & VEGETATION

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install retroreflective back plates ($)
- Review signal phasing for left turn safety countermeasures ($)

INTERSECTION AND ROADWAYS
- Consider intersection reconstruction and tightening at I-Drive and SR 535, and evaluate need for channelized right turns ($$$)

PEDESTRIAN/BICYCLE FACILITIES
- Install crosswalk along eastern leg of I-Drive intersection and along SR 535 ($)
- Consider a shared use path ($)
- Consider the feasibility of a midblock crosswalk with pedestrian hybrid beacon at plaza east of SR 535 ($)

SPEED MANAGEMENT
- Reduce lane widths ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

APOPKA VINELAND ROAD

from S.R. 535 to Lake Street
District 1 Rank: 3 / Orange County Rank: 160

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

110
TOTAL CRASHES

105 | 4 | 1

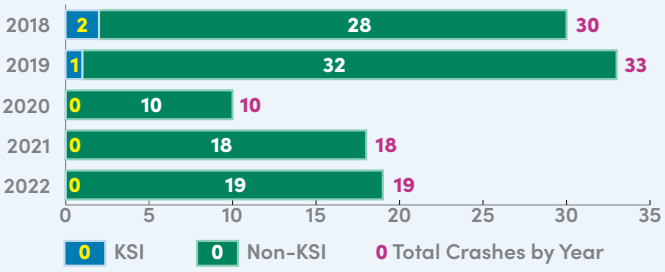
2
FATALITIES

2

1
SERIOUS INJURY

1

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. LEFT TURN	1	33	34
2. REAR END	0	34	34
3. SIDESWIPE	0	16	16
4. ANGLE	0	9	9
5. OTHER	0	7	7
6. PEDESTRIAN	2	2	4
7. RIGHT TURN	0	2	2
8. ANIMAL	0	1	1

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 0
Non-KSI — 60
TOTAL — 60

DUSK–DAWN
KSI — 0
Non-KSI — 8
TOTAL — 8

NIGHT
KSI — 3
Non-KSI — 39
TOTAL — 42

LIGHTING CONDITION

LIGHTED
KSI — 3
Non-KSI — 39
TOTAL — 42

NON-LIGHTED
KSI — 0
Non-KSI — 0
TOTAL — 0

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 0
Non-KSI — 1
TOTAL — 1

DISTRACTED DRIVING
KSI — 0
Non-KSI — 54
TOTAL — 54

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN COMMERCIAL (C3C)

CORRIDOR LENGTH
0.38 MILES

AVERAGE POSTED SPEED
40 MPH

AVERAGE PREVAILING SPEED
57.4 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
0%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
NONE

TRAVEL LANES / MEDIAN TYPE
4 LANES / CURB & VEGETATION

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Implement speed sensitive on rest during nighttime periods ($)

INTERSECTION AND ROADWAYS
- Consider intersection reconstruction and tightening at major intersections and eliminating channelized right turn lanes ($$$)
- Extend median into crosswalks at Vikings Way Boulevard and at S.R. 535 ($$)
- Tighten curb radii at intersections, side streets, major driveways and/or trail crossings ($$$)

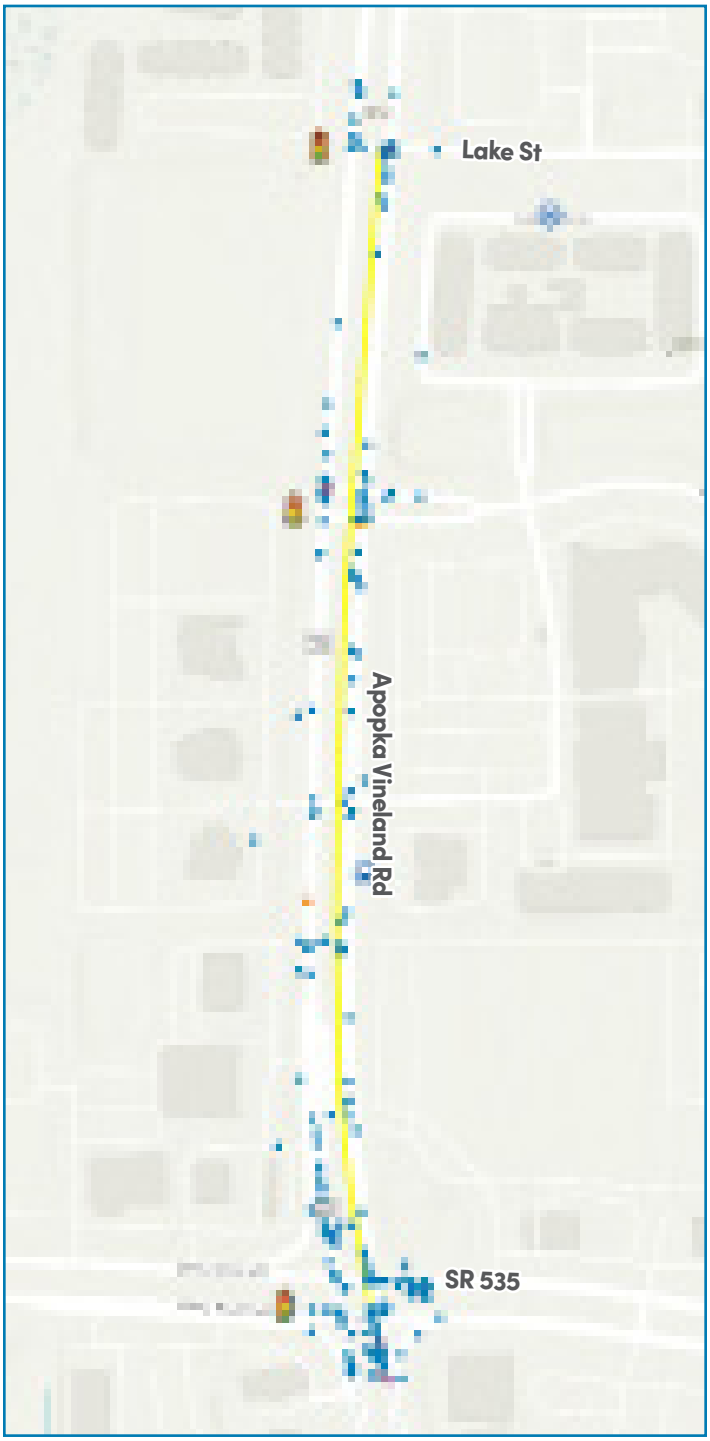
PEDESTRIAN/BICYCLE FACILITIES
- Install new or upgrade to high-emphasis crosswalks at intersections and major driveways and add crosswalks on all legs of Vikings Way Boulevard intersection ($)
- Evaluate feasibility of shared use path ($)

SPEED MANAGEMENT
- Consider target speed reduction to 35 mph ($)
- Reduce lane widths ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

N

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

APOPKA VINELAND ROAD

from Palm Lake Drive to Conroy Windermere Road
District 1 Rank: 4 / Orange County Rank: 191

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

148
TOTAL CRASHES

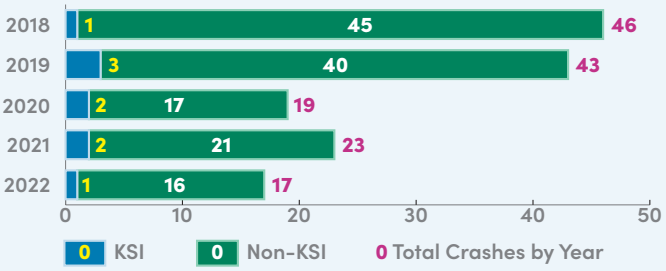
145 | 2 | 1

0
FATALITIES

9
SERIOUS INJURIES

8 | 1

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	3	86	89
2. LEFT TURN	3	11	14
3. SIDESWIPE	0	13	13
4. OTHER	1	8	9
5. ANGLE	1	5	6
6. OFF ROAD	0	5	5
7. RIGHT TURN	0	5	5
8. PEDESTRIAN	1	1	2

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 5
Non-KSI — 102
TOTAL — 107

DUSK–DAWN
KSI — 0
Non-KSI — 7
TOTAL — 7

NIGHT
KSI — 4
Non-KSI — 30
TOTAL — 34

LIGHTING CONDITION

LIGHTED
KSI — 4
Non-KSI — 28
TOTAL — 32

NON-LIGHTED
KSI — 0
Non-KSI — 2
TOTAL — 2

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 0
Non-KSI — 1
TOTAL — 1

DISTRACTED DRIVING
KSI — 4
Non-KSI — 54
TOTAL — 58

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN RESIDENTIAL (C3R)

CORRIDOR LENGTH
1.13 MILES

AVERAGE POSTED SPEED
45 MPH

AVERAGE PREVAILING SPEED
60.8 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
0%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
NONE

TRAVEL LANES / MEDIAN TYPE
4 LANES / CURB & VEGETATION

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Install speed sensitive traffic signals ($)

INTERSECTION AND ROADWAYS
- Consider intersection reconstruction and tightening or roundabout at Conroy Windermere Road and major intersections ($$$)

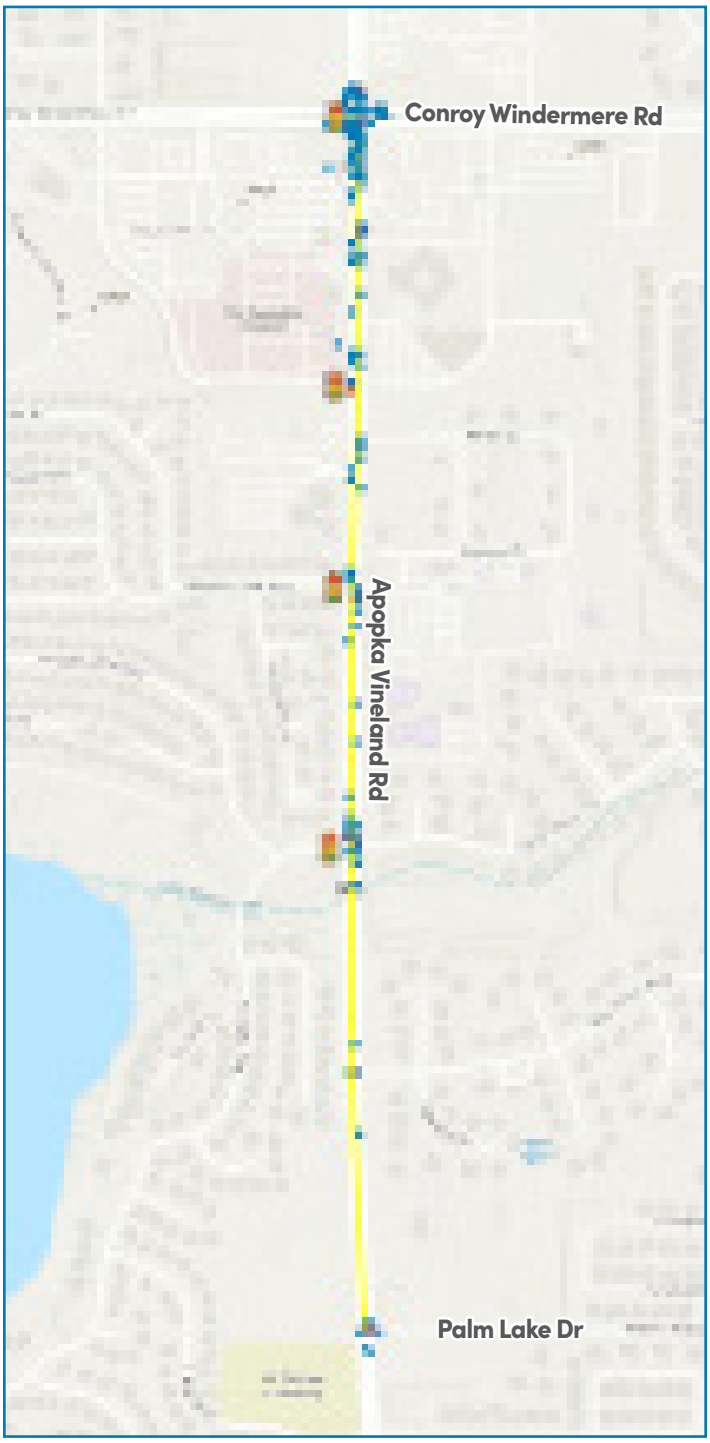
PEDESTRIAN/BICYCLE FACILITIES
- Install midblock crosswalk south of Conroy Windermere Road, with pedestrian hybrid beacon, advanced warning signs and advance stop bars ($$$)
- Install new or upgrade to high-emphasis crosswalks at intersections and major driveways ($)
- Evaluate feasibility of shared use path ($)
- Add crosswalks on all legs of signalized intersections ($)

SPEED MANAGEMENT
- Consider target speed reduction to 35–40 mph ($)
- Reduce lane widths ($)
- Install speed feedback signs south of Torrey Pines Terrace ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)
- Perform road safety audit to identify safety improvement

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

N

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

ROCK SPRINGS ROAD

from E. Welch Road to Faye Street
District 2 Rank: 1 / Orange County Rank: 39

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

229
TOTAL CRASHES

213	2	10	4

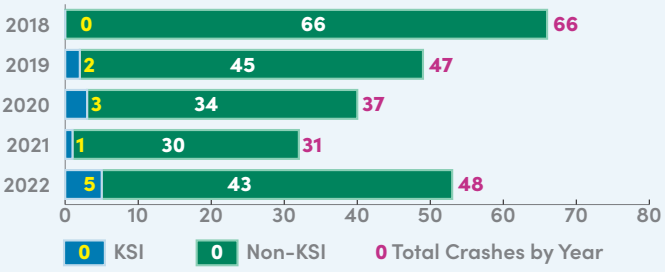
1
FATALITIES

1

10
SERIOUS INJURIES

1	1	0

CRASHES BY YEAR



KSI = Killed and Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	2	94	96
2. LEFT TURN	6	38	44
3. OTHER	0	19	19
4. SIDESWIPE	0	17	17
5. ANGLE	1	11	12
6. RIGHT TURN	0	10	10
7. PEDESTRIAN	1	9	10
8. UNKNOWN	0	9	9

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 6
Non-KSI — 162
TOTAL — 168

DUSK–DAWN
KSI — 1
Non-KSI — 16
TOTAL — 17

NIGHT
KSI — 4
Non-KSI — 40
TOTAL — 44

LIGHTING CONDITION

LIGHTED
KSI — 4
Non-KSI — 37
TOTAL — 41

NON-LIGHTED
KSI — 0
Non-KSI — 3
TOTAL — 3

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 1
Non-KSI — 3
TOTAL — 4

DISTRACTED DRIVING
KSI — 2
Non-KSI — 90
TOTAL — 92

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MAJOR COLLECTOR

CONTEXT CLASSIFICATION
NONE

CORRIDOR LENGTH
0.89 MILES

AVERAGE POSTED SPEED
45 MPH

AVERAGE PREVAILING SPEED
45.8 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
0%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
NONE

TRAVEL LANES / MEDIAN TYPE
4 LANES / TWO-WAY CENTER TURN LANE

PROPOSED SAFETY COUNTERMEASURES

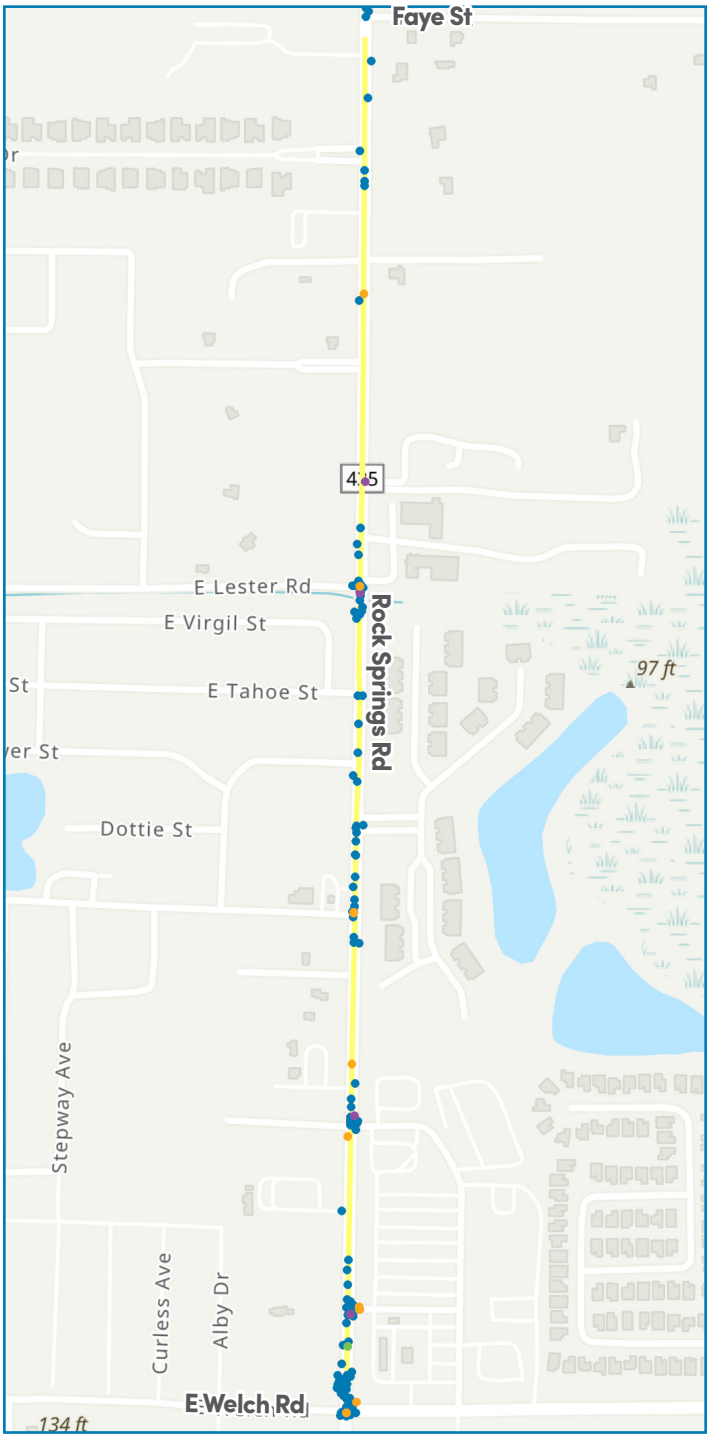
SIGNALS
- Review signalization for protected phasing for all road users($)

INTERSECTION AND ROADWAYS
- Upgrade to roundabouts or signalized intersections ($$$)
- Consider adding paved median with directional left turn lanes where warranted ($$)
- Add crosswalks on all legs of intersections ($$)

PEDESTRIAN/BICYCLE FACILITIES
- Install high-emphasis mid-block crosswalks and conduct warrant study for pedestrian hybrid beacon(s) ($$$)
- Evaluate feasibility of shared use path ($$)
- Install sidewalk shading where possible ($)

SPEED MANAGEMENT
- Consider target speed reduction ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

N

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

PINE HILLS ROAD

from Silver Star Road to Pinto Way
District 2 Rank: 2 / Orange County Rank: 84

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

538
TOTAL CRASHES

503	18	9	8

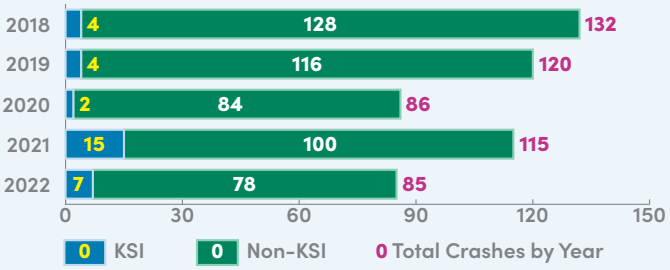
7
FATALITIES

2	3	1	1

25
SERIOUS INJURY

18	4	1	2

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	2	196	198
2. LEFT TURN	11	80	91
3. SIDESWIPE	2	72	74
4. OTHER	1	63	64
5. OFF ROAD	3	26	29
6. ANGLE	1	18	19
7. PEDESTRIAN	7	11	18
8. RIGHT TURN	1	14	15

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 16
Non-KSI — 374
TOTAL — 390

DUSK–DAWN
KSI — 1
Non-KSI — 31
TOTAL — 32

NIGHT
KSI — 15
Non-KSI — 101
TOTAL — 116

LIGHTING CONDITION

LIGHTED
KSI — 14
Non-KSI — 96
TOTAL — 110

NON-LIGHTED
KSI — 1
Non-KSI — 5
TOTAL — 6

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 1
Non-KSI — 6
TOTAL — 7

DISTRACTED DRIVING
KSI — 8
Non-KSI — 160
TOTAL — 168

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN COMMERCIAL (C3C)

CORRIDOR LENGTH
2.56 MILES

AVERAGE POSTED SPEED
40 MPH

AVERAGE PREVAILING SPEED
53.9 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
80%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
LINK 09, 49, 302 / 146,060

TRAVEL LANES / MEDIAN TYPE
4 LANES / TWO-WAY CENTER TURN LANE

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Install speed sensitive traffic signals ($)

INTERSECTION AND ROADWAYS
- Consider tightening turning radii at intersections ($$$)
- Upgrade to roundabouts or signalized intersections at unsignalized intersections ($$$)

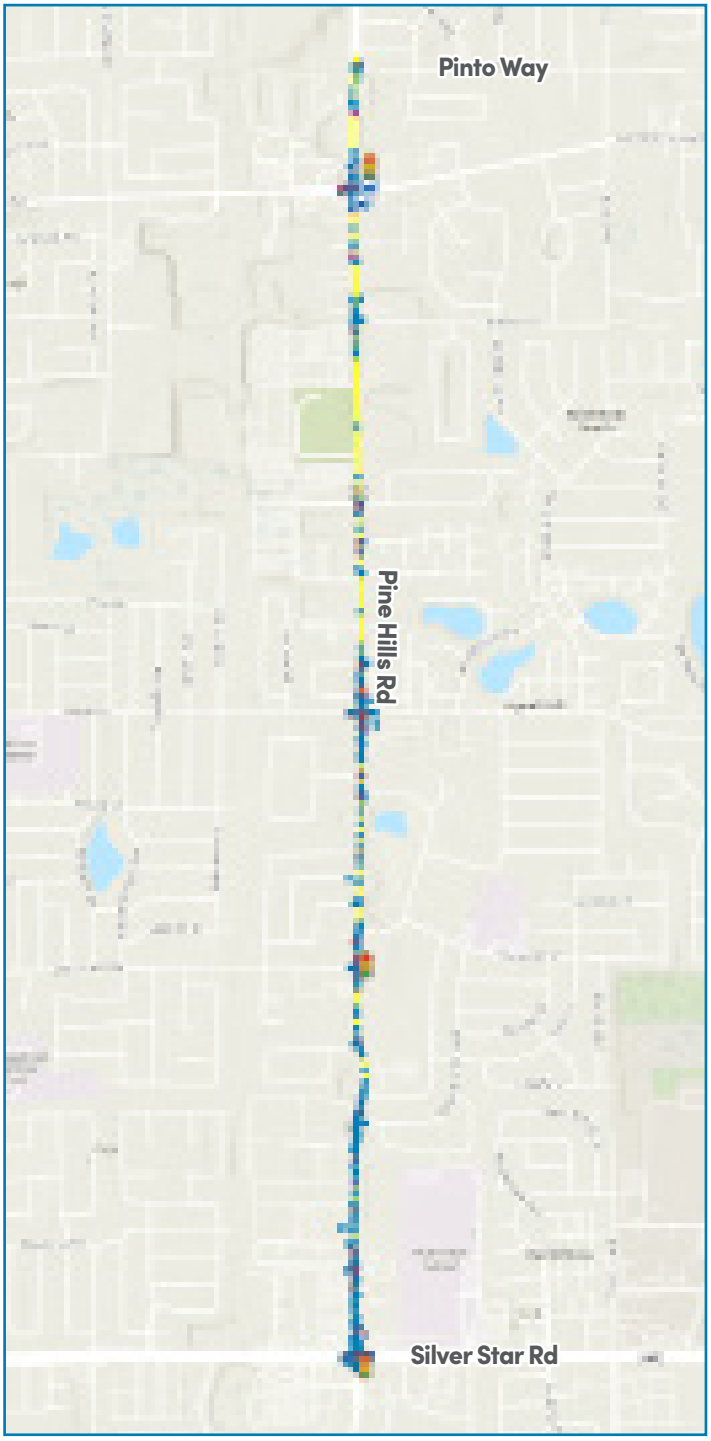
PEDESTRIAN/BICYCLE FACILITIES
- Install raised midblock crosswalks ($$)
- Install high-emphasis mid-block crosswalks and conduct warrant study for pedestrian hybrid beacon(s) ($$$)
- Install marked crosswalks at all side streets and major driveways($)

SPEED MANAGEMENT
- Consider target speed reduction to 30 mph ($)
- Install speed feedback signs ($)

OTHER ENGINEERING STRATEGIES
- Conduct Road Safety Audit to identify safety countermeasures ($)
- Lighting upgrades at segments and intersections ($$)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

N

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

CLARCONA OCOEE ROAD

from Arden Oaks Drive to Pine Hills Road
District 2 Rank: 3 / Orange County Rank: 115

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

537
TOTAL CRASHES

516	9	6	6

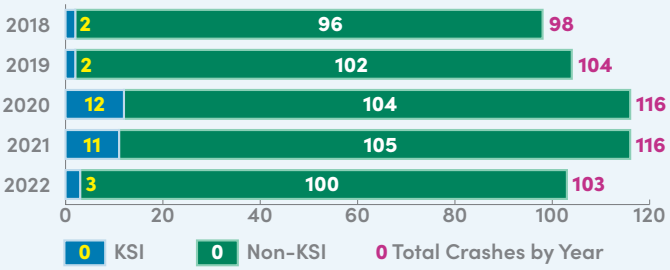
5
FATALITIES

3	2

25
SERIOUS INJURIES

22	1	1	1

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	10	172	182
2. LEFT TURN	9	115	124
3. SIDESWIPE	1	68	69
4. OTHER	4	48	52
5. OFF ROAD	2	30	32
6. ANGLE	1	26	27
7. RIGHT TURN	0	23	23
8. BICYCLE	1	8	9

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 18
Non-KSI — 332
TOTAL — 350

DUSK–DAWN
KSI — 1
Non-KSI — 38
TOTAL — 39

NIGHT
KSI — 11
Non-KSI — 136
TOTAL — 147

LIGHTING CONDITION

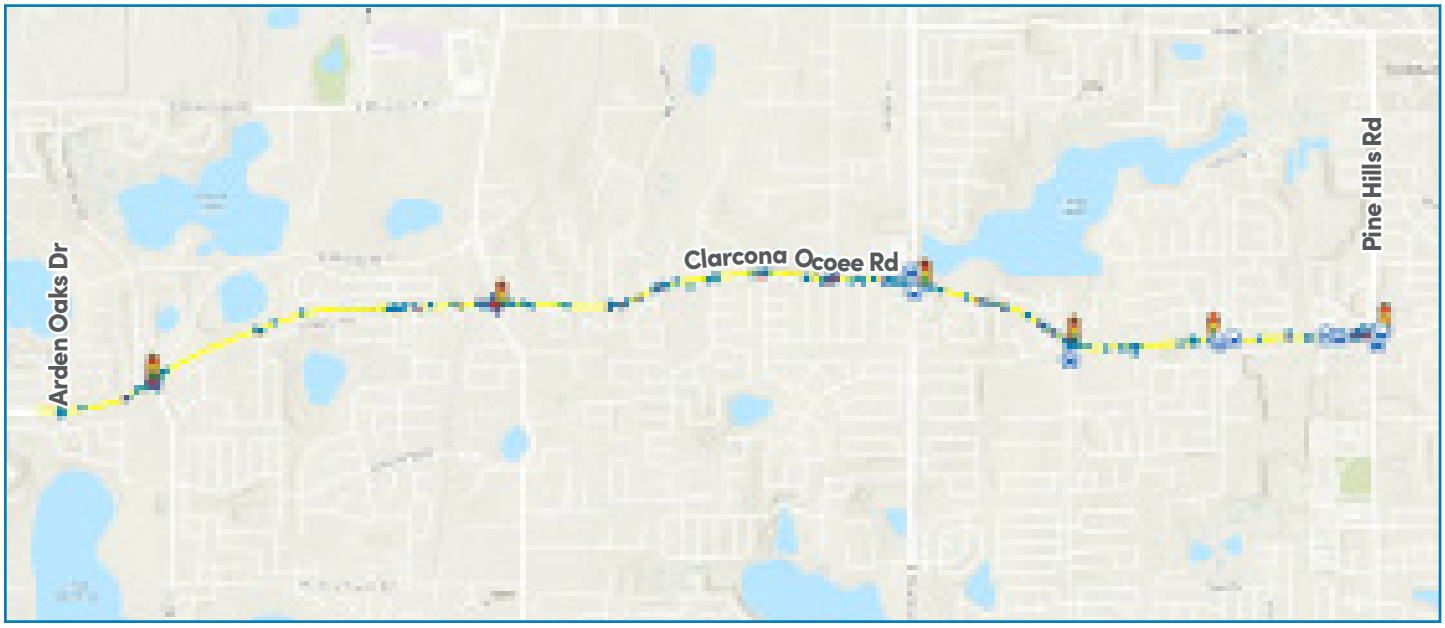
LIGHTED
KSI — 11
Non-KSI — 127
TOTAL —138

NON-LIGHTED
KSI — 0
Non-KSI — 9
TOTAL — 9

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 2
Non-KSI — 7
TOTAL — 9

DISTRACTED DRIVING
KSI — 9
Non-KSI — 167
TOTAL — 176



LEGEND

N

HIN Corridor

Bus Stop

Traffic Signal

Crashes by Mode

Pedestrian

Bicycle

Motorcycle

Motor Vehicle

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MAJOR COLLECTOR

CONTEXT CLASSIFICATION
SUBURBAN RESIDENTIAL (C3R)

CORRIDOR LENGTH
4.44 MILES

AVERAGE POSTED SPEED
45 MPH

AVERAGE PREVAILING SPEED
57.7 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
79.27%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
LINK 443/33, 166

TRAVEL LANES / MEDIAN TYPE
4 LANES / CURB & VEGETATION

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Install speed sensitive traffic signals ($)

INTERSECTION AND ROADWAYS
- Upgrade to roundabouts at major intersections or signalized intersections at unsignalized intersections ($$$)
- Tighten curbs at side streets, major driveways and trail crossings ($$$)

PEDESTRIAN/BICYCLE FACILITIES
- East of Hiawassee Road, install high-emphasis mid-block crosswalks and conduct warrant study for pedestrian hybrid beacon(s) ($$$)
- Install new or upgrade to high-emphasis crosswalks at intersections and major driveways ($)
- Install bike boxes at signalized intersections ($)
- Install green bike lanes at major intersections ($)

SPEED MANAGEMENT
- Reduce lane widths ($)
- Consider target speed reduction to 35-40 mph ($)

OTHER ENGINEERING STRATEGIES
- Conduct Road Safety Audit to identify safety countermeasures ($)
- Lighting upgrades at segments and intersections ($$)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

EDGEWATER DRIVE

from John Young Parkway to Orange Blossom Trail
District 2 Rank: 4 / Orange County Rank: 176

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

311
TOTAL CRASHES

302	5	2	2

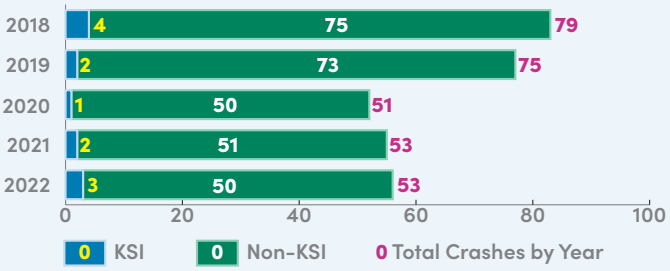
2
FATALITIES

7

10
SERIOUS INJURIES

7	1	1

CRASHES BY YEAR



KSI = Killed and Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	2	95	97
2. LEFT TURN	5	51	56
3. SIDESWIPE	1	47	48
4. OTHER	0	33	33
5. ANGLE	0	26	26
6. RIGHT TURN	0	17	17
7. OFF ROAD	0	12	12
8. UNKNOWN	0	8	8

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 8
Non-KSI — 224
TOTAL — 232

DUSK–DAWN
KSI — 0
Non-KSI — 15
TOTAL — 15

NIGHT
KSI — 4
Non-KSI — 60
TOTAL — 64

LIGHTING CONDITION

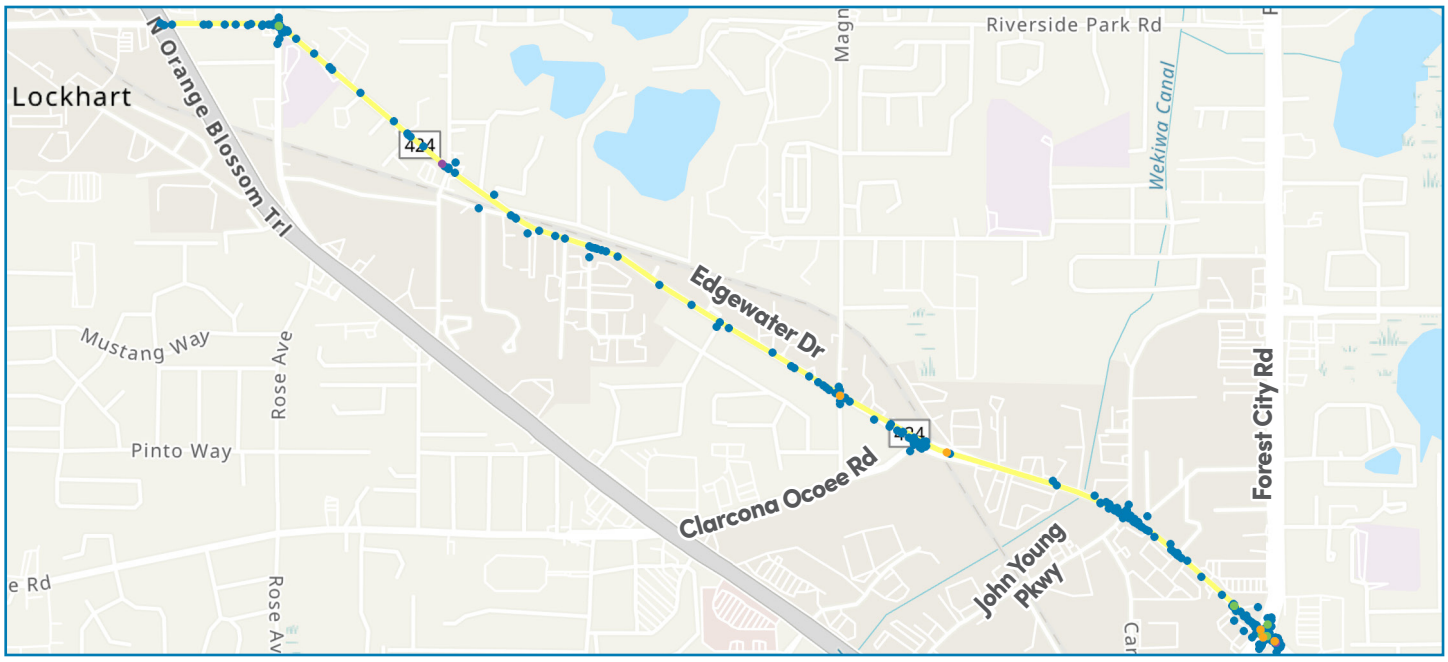
LIGHTED
KSI — 4
Non-KSI — 45
TOTAL — 49

NON-LIGHTED
KSI — 0
Non-KSI — 14
TOTAL — 14

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 1
Non-KSI — 4
TOTAL — 5

DISTRACTED DRIVING
KSI — 3
Non-KSI — 125
TOTAL — 128



LEGEND

N

HIN Corridor

Bus Stop

Traffic Signal

Crashes by Mode

Pedestrian

Bicycle

Motorcycle

Motor Vehicle

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN COMMERCIAL (C3C)

CORRIDOR LENGTH
2.24 MILES

AVERAGE POSTED SPEED
40 MPH

AVERAGE PREVAILING SPEED
50.1 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
61.3%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
LINK 23, 443/16, 669

TRAVEL LANES / MEDIAN TYPE
4 LANES / TWO-WAY CENTER TURN LANE

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.

PROPOSED SAFETY COUNTERMEASURES

There are several FDOT and Orange County projects funded and planned along the corridor

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Implement speed sensitive on rest during nighttime periods ($)

INTERSECTION AND ROADWAYS
- Install raised midblock crosswalks ($$)
- Consider intersection reconstruction and tightening at major intersections ($$$)
- Tighten curbs at side streets, major driveways and trail crossings ($$$)

PEDESTRIAN/BICYCLE FACILITIES
- Install high visibility mid-block crosswalks with pedestrian hybrid beacons ($$$)
- Install marked crosswalks at all side streets and major driveways ($)
- Install bike boxes at green bike lanes at major intersections ($)

SPEED MANAGEMENT
- Reduce lane widths ($)
- Consider target speed reduction to 35 mph ($)

OTHER ENGINEERING STRATEGIES
- Conduct Road Safety Audit to identify safety countermeasures ($)
- Lighting upgrades at segments and intersections ($$)
- Colocate bus stops with crosswalks at midblocks and intersections ($)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

GOLDENROD ROAD

from Beatty Drive to S.R. 50
District 3 Rank: 1 / Orange County Rank: 13

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

1386
TOTAL CRASHES

1299	26	21	40

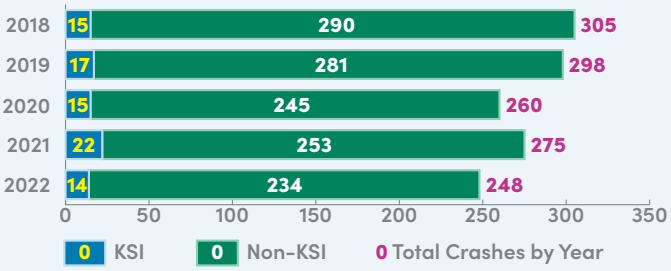
13
FATALITIES

7	2	4

70
SERIOUS INJURIES

54	4	3	9

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 7 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	25	642	667
2. LEFT TURN	22	154	176
3. SIDESWIPE	2	159	161
4. OTHER	10	117	127
5. OFF ROAD	7	61	68
6. RIGHT TURN	0	65	65
7. ANGLE	3	41	44

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 46
Non-KSI — 902
TOTAL — 948

DUSK–DAWN
KSI — 7
Non-KSI — 69
TOTAL — 76

NIGHT
KSI — 29
Non-KSI — 333
TOTAL — 362

LIGHTING CONDITION

LIGHTED
KSI — 29
Non-KSI — 312
TOTAL — 341

NON-LIGHTED
KSI — 1
Non-KSI — 20
TOTAL — 21

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 4
Non-KSI — 11
TOTAL — 15

DISTRACTED DRIVING
KSI — 31
Non-KSI — 532
TOTAL — 563

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
FDOT

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN RESIDENTIAL (C3R)

CORRIDOR LENGTH
5.95 MILES

AVERAGE POSTED SPEED
41.9 MPH

AVERAGE PREVAILING SPEED
56.5 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
0%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
LINK 3, 15/94, 476

TRAVEL LANES / MEDIAN TYPE
4 LANES / RAISED TRAFFIC SEPARATOR

PROPOSED SAFETY COUNTERMEASURES

Note: There are plans to widen Goldenrod Road from 4 to 6 lanes from Beatty Drive to SR 408, and an unfunded safety improvements project.

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Install speed sensitive traffic signals ($)
- Review signalization for protected phasing for all road users ($)

INTERSECTION AND ROADWAYS
- Upgrade to roundabouts or signalized intersections at unsignalized intersections ($$$)
- Co-locate bus stops with high-emphasis crosswalks or mid-block crosswalks and pedestrian refuge islands ($)
- Consider tightening turning radii at intersections, side streets, and driveways ($$$)

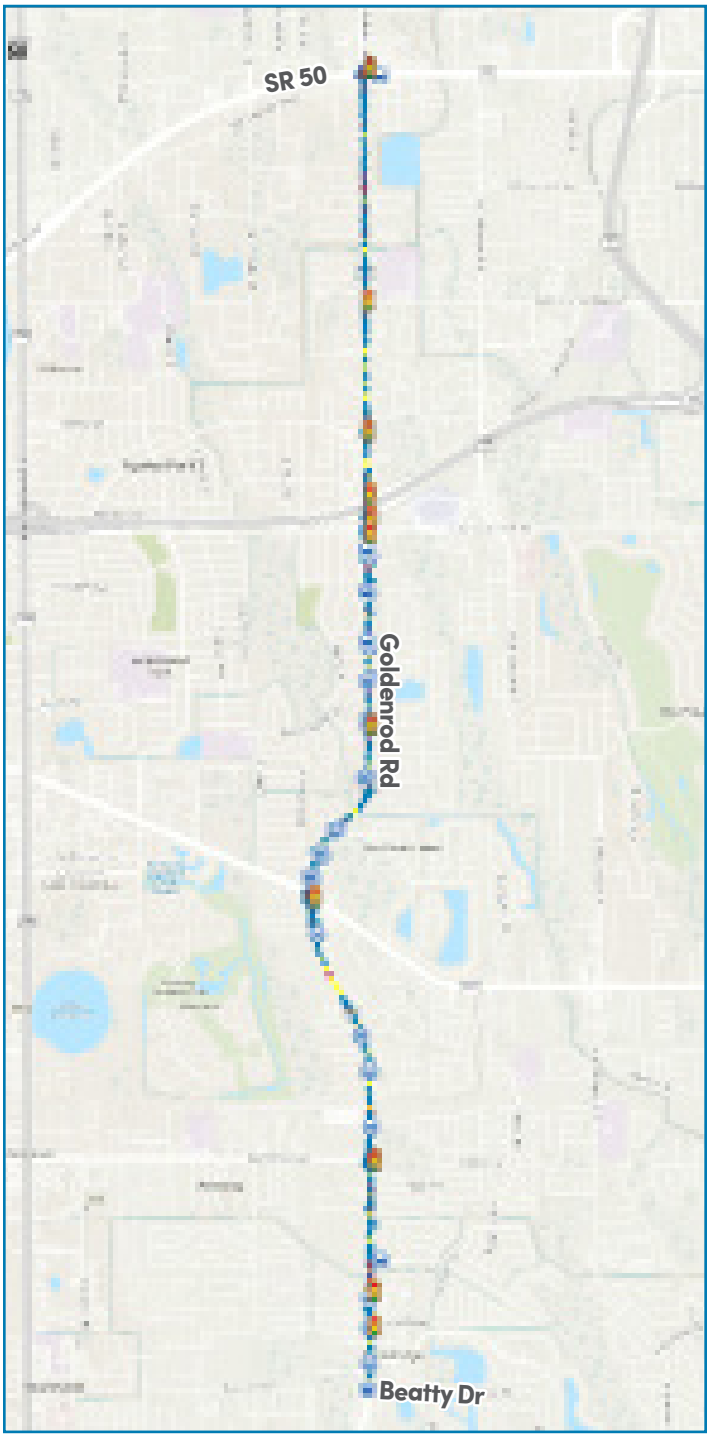
PEDESTRIAN/BICYCLE FACILITIES
- Install marked crosswalks at all side streets and major driveways ($)
- Evaluate feasibility of shared use path ($)
- Install high-emphasis mid-block crosswalks and conduct warrant study for pedestrian hybrid beacon(s) ($$$)
- Install raised crosswalks, advanced warning signs and advance stop bars with pedestrian hybrid beacons near schools ($$$)
- Install green bicycle lanes at intersections with bike boxes ($)

SPEED MANAGEMENT
- Consider target speed reduction to 35-40 mph ($)
- Install speed cameras in school zones ($)
- Install speed feedback signs ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

N

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

ORANGE AVENUE

from E. Landstreet Road to Taft Vineland Road
District 3 Rank: 2 / Orange County Rank: 31

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

275
TOTAL CRASHES

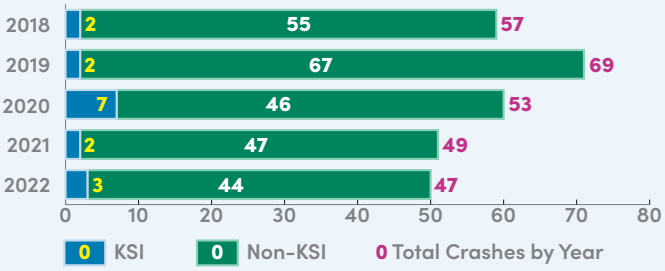
265	2	1	7

0
FATALITIES

16
SERIOUS INJURIES

14	2

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 7 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	3	110	113
2. SIDESWIPE	1	47	48
3. LEFT TURN	5	38	43
4. OTHER	0	27	27
5. ANGLE	2	11	13
6. OFF ROAD	3	5	8
7. RIGHT TURN	0	7	7

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 12
Non-KSI — 196
TOTAL — 208

DUSK–DAWN
KSI — 0
Non-KSI — 26
TOTAL — 26

NIGHT
KSI — 4
Non-KSI — 37
TOTAL — 41

LIGHTING CONDITION

LIGHTED
KSI — 3
Non-KSI — 30
TOTAL — 33

NON-LIGHTED
KSI — 1
Non-KSI — 6
TOTAL — 7

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 0
Non-KSI — 1
TOTAL — 1

DISTRACTED DRIVING
KSI — 5
Non-KSI — 92
TOTAL — 97

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN COMMERCIAL (C3C)

CORRIDOR LENGTH
1.08 MILES

AVERAGE POSTED SPEED
40 MPH

AVERAGE PREVAILING SPEED
50.4 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
66.6%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
LINK 18/36,244

TRAVEL LANES / MEDIAN TYPE
4 LANES / PAVED

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Review signal timing to improve traffic progression and safety for all roadway users ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Implement speed sensitive on rest during nighttime periods ($)

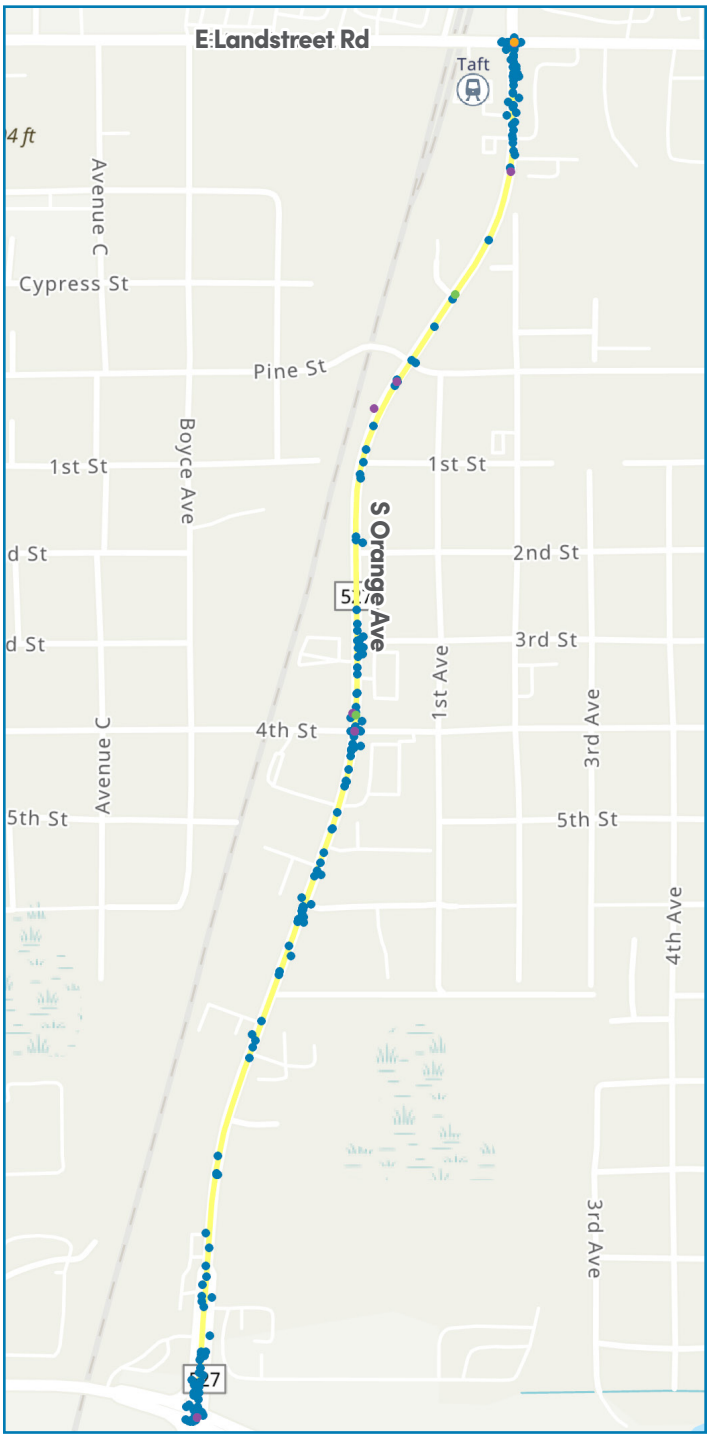
INTERSECTION AND ROADWAYS
- Conduct study to improve access management with median treatments and reduction in driveway conflicts ($$)
- Upgrade to roundabouts or signalized intersections at unsignalized intersections ($$$)
- Reduce lane widths to accommodate buffered bicycle lane ($$$)
- Upgrade two-way turn lane to provide landscaped medians and restrict left turns ($$)

PEDESTRIAN/BICYCLE FACILITIES
- Install high-emphasis mid-block crosswalks and conduct warrant study for pedestrian hybrid beacon(s) ($$$)
- Relocate bus stops to intersections with existing crosswalks and/or far side of intersections ($$)
- Co-locate bus stops with crosswalks at midblock crossings and intersections, locate bus stops to far side of signalized intersections ($$)

SPEED MANAGEMENT
- Consider target speed reduction ($)

OTHER ENGINEERING STRATEGIES
- Address gaps in roadway lighting and/or upgrade to LEDs ($$)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

N

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

OAK RIDGE ROAD

from Orange Blossom Trail to Orange Avenue
District 3 Rank: 3 / Orange County Rank: 51

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

309
TOTAL CRASHES

285	7	7	10

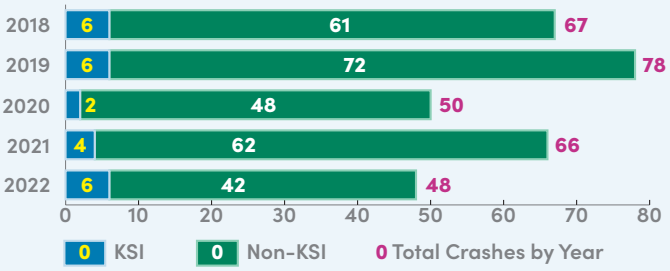
5
FATALITIES

3	2

19
SERIOUS INJURIES

13	1	2	3

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	5	99	104
2. LEFT TURN	6	73	79
3. SIDESWIPE	5	39	44
4. ANGLE	1	21	22
5. OTHER	1	20	21
6. OFF ROAD	0	8	8
7. BICYCLE	1	6	7
8. PEDESTRIAN	5	2	7

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 13
Non-KSI — 181
TOTAL — 194

DUSK–DAWN
KSI — 1
Non-KSI — 20
TOTAL — 21

NIGHT
KSI — 10
Non-KSI — 84
TOTAL — 94

LIGHTING CONDITION

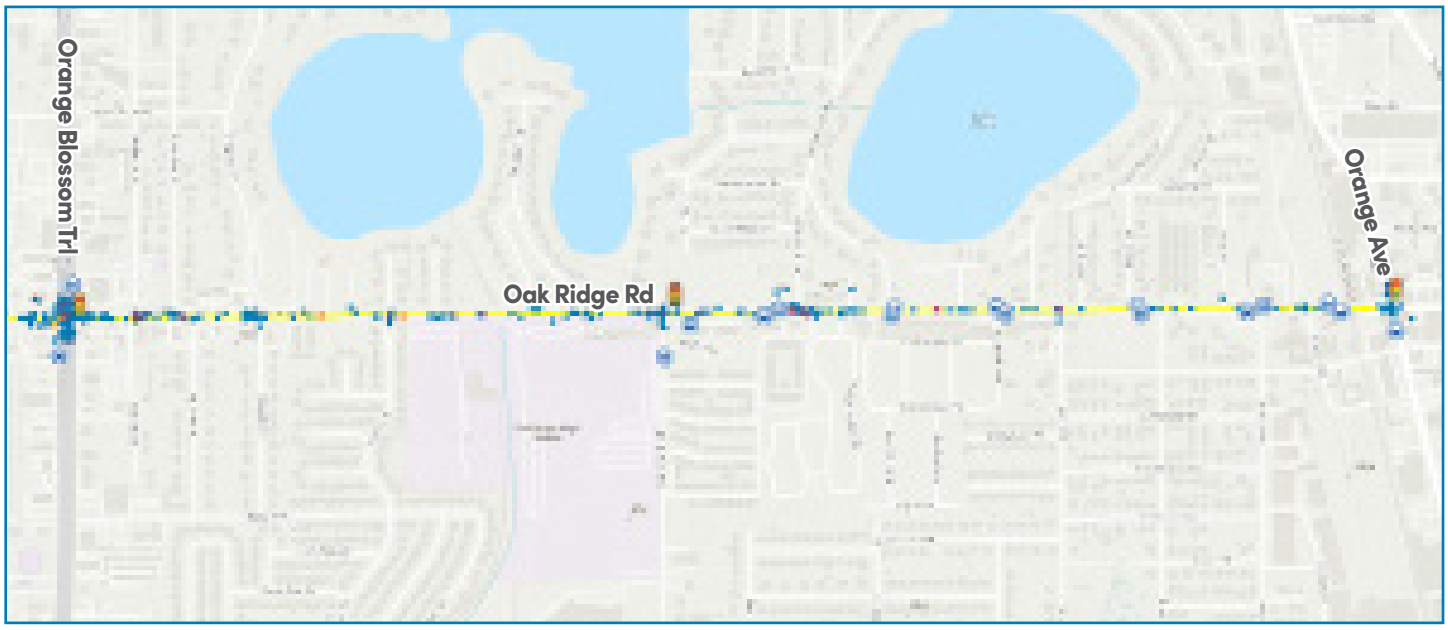
LIGHTED
KSI — 9
Non-KSI — 77
TOTAL — 86

NON-LIGHTED
KSI — 1
Non-KSI — 7
TOTAL — 8

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 3
Non-KSI — 5
TOTAL — 8

DISTRACTED DRIVING
KSI — 5
Non-KSI — 99
TOTAL — 104



N

LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

KSI Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MAJOR COLLECTOR

CONTEXT CLASSIFICATION
SUBURBAN COMMERCIAL (C3C)

CORRIDOR LENGTH
1.67 MILES

AVERAGE POSTED SPEED
41.4 MPH

AVERAGE PREVAILING SPEED
49.2 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
76.5%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
LINK 7,8,42,304/1,169,954

TRAVEL LANES / MEDIAN TYPE
4 LANES / RAISED TRAFFIC SEPARATOR

PROPOSED SAFETY COUNTERMEASURES

SIGNALS

- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Install speed sensitive traffic signals ($)

INTERSECTION AND ROADWAYS

- Consider tightening turning radii at intersections, side streets, and driveways ($$$)
- Upgrade to roundabouts or signalized intersections at unsignalized intersections ($$$)
- Construct pedestrian refuge islands islands at midblock locations and in front of high school ($$$)
- Co-locate bus stops with high-emphasis crosswalks or mid-block crosswalks and pedestrian refuge islands ($)

PEDESTRIAN/BICYCLE FACILITIES

- Install marked crosswalks at all side streets and major driveways ($)
- In coordination with target speed reduction, install raised crosswalks, advanced warning signs and advance stop bars with pedestrian hybrid beacons near schools ($$$)

SPEED MANAGEMENT

- Consider target speed reduction to 30-35 mph ($)

OTHER ENGINEERING STRATEGIES

- Lighting upgrades at segments and intersections ($$)
- Add sidewalk shading where possible ($)

SIGNING AND STRIPING

- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

LAKE UNDERHILL ROAD

from San Juan Boulevard to S. Dean Road
District 3 Rank: 4 / Orange County Rank: 61

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

1041
TOTAL CRASHES

1011	7	3	20

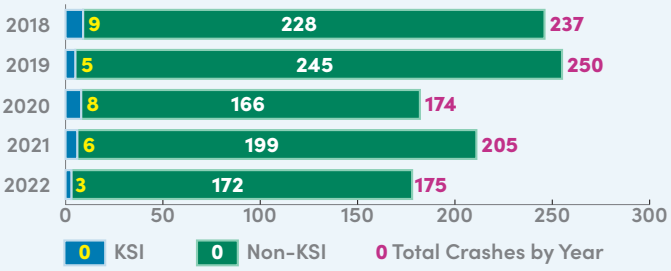
5
FATALITIES

1	1	3

26
SERIOUS INJURIES

19	1	6

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 7 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	11	607	618
2. LEFT TURN	10	142	152
3. SIDESWIPE	0	75	75
4. OTHER	5	53	58
5. ANGLE	0	47	47
6. RIGHT TURN	0	34	34
7. OFF ROAD	3	10	13

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 20
Non-KSI — 747
TOTAL — 767

DUSK–DAWN
KSI — 2
Non-KSI — 56
TOTAL — 58

NIGHT
KSI — 9
Non-KSI — 207
TOTAL — 216

LIGHTING CONDITION

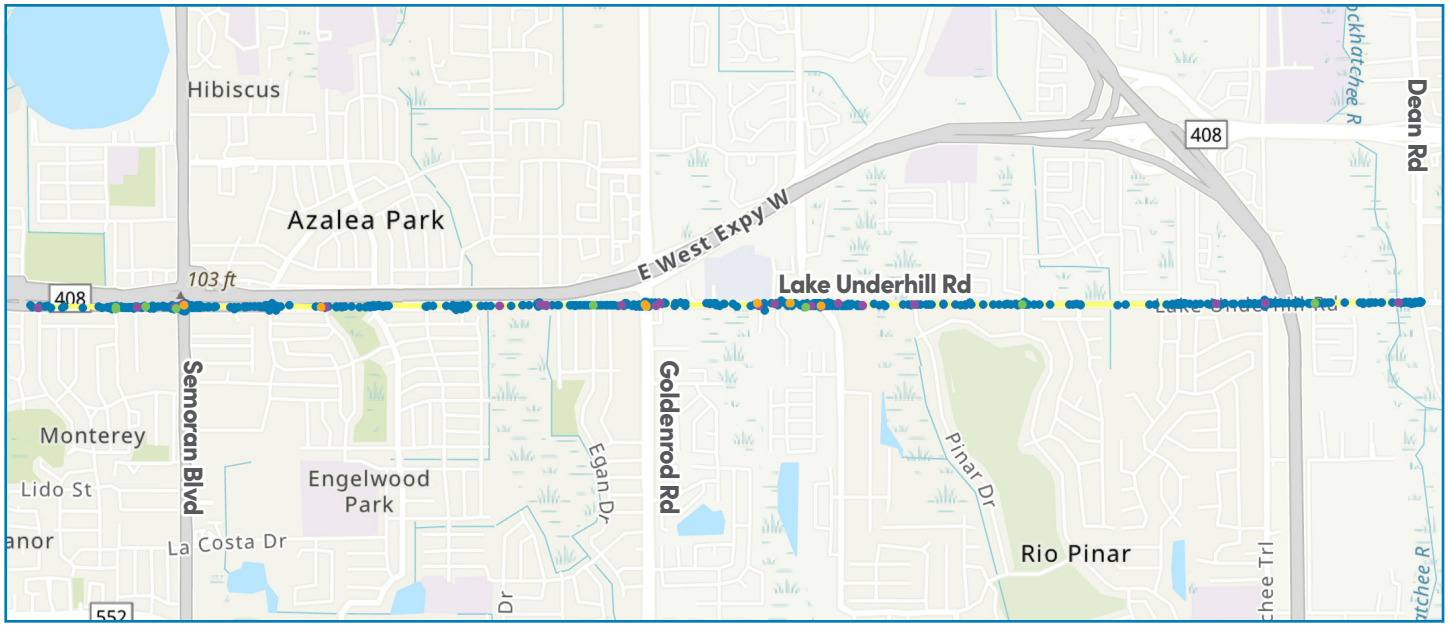
LIGHTED
KSI — 8
Non-KSI — 184
TOTAL — 192

NON-LIGHTED
KSI — 1
Non-KSI — 22
TOTAL — 23

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 0
Non-KSI — 6
TOTAL — 6

DISTRACTED DRIVING
KSI — 12
Non-KSI — 294
TOTAL — 306



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN RESIDENTIAL (C3R)

CORRIDOR LENGTH
1.51 MILES

AVERAGE POSTED SPEED
41.1 MPH

AVERAGE PREVAILING SPEED
46.9 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
58.4%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
NONE

TRAVEL LANES / MEDIAN TYPE
2 LANES / PAVED

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Implement speed sensitive on rest during nighttime periods ($)

INTERSECTION AND ROADWAYS
- Reduce curb radius at side streets and driveways to slow right-turning vehicles ($$$)
- Consider intersection reconstruction and tightening at signalized intersections ($$$)
- Evaluate converting non-signalized intersections to roundabouts ($$$)

PEDESTRIAN/BICYCLE FACILITIES
- Install marked crosswalks at all side streets and major driveways ($)

SPEED MANAGEMENT
- Reduce lane widths ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

ALAFAYA TRAIL

from Lake Underhill Road to S.R. 50
District 4 Rank: 1 / Orange County Rank: 117

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

630
TOTAL CRASHES

612	4	6	8

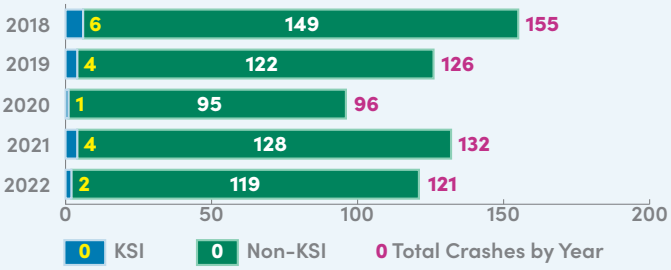
1
FATALITIES

1

16
SERIOUS INJURIES

13	2	1

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	8	271	279
2. LEFT TURN	4	103	107
3. SIDESWIPE	0	84	84
4. OTHER	0	49	49
5. ANGLE	0	38	38
6. RIGHT TURN	1	33	34
7. OFF ROAD	0	17	17
8. PEDESTRIAN	3	3	6

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 11
Non-KSI — 451
TOTAL — 462

DUSK–DAWN
KSI — 0
Non-KSI — 22
TOTAL — 22

NIGHT
KSI — 6
Non-KSI — 139
TOTAL — 145

LIGHTING CONDITION

LIGHTED
KSI — 6
Non-KSI — 130
TOTAL — 136

NON-LIGHTED
KSI — 0
Non-KSI — 9
TOTAL — 9

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 0
Non-KSI — 8
TOTAL — 8

DISTRACTED DRIVING
KSI — 7
Non-KSI — 262
TOTAL — 269

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN PRINCIPAL ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN COMMERCIAL (C3C)

CORRIDOR LENGTH
1.43 MILES

AVERAGE POSTED SPEED
45 MPH

AVERAGE PREVAILING SPEED
52.9 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
69.1%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
NONE

TRAVEL LANES / MEDIAN TYPE
6 LANES / CURB & VEGETATION

PROPOSED SAFETY COUNTERMEASURES

The 2045 MTP includes a safety project and a shared use path project for the entire length of the corridor

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Install speed sensitive traffic signals ($)
- Review signalization for protected phasing for all road users ($)

INTERSECTION AND ROADWAYS
- Consider tightening turning radii at intersections, side streets, and driveways ($$$)
- Upgrade to roundabouts or signalized intersections at unsignalized intersections ($$$)
- Extend median nose into crosswalk ($)
- Consider restricting left turns from minor side streets ($)

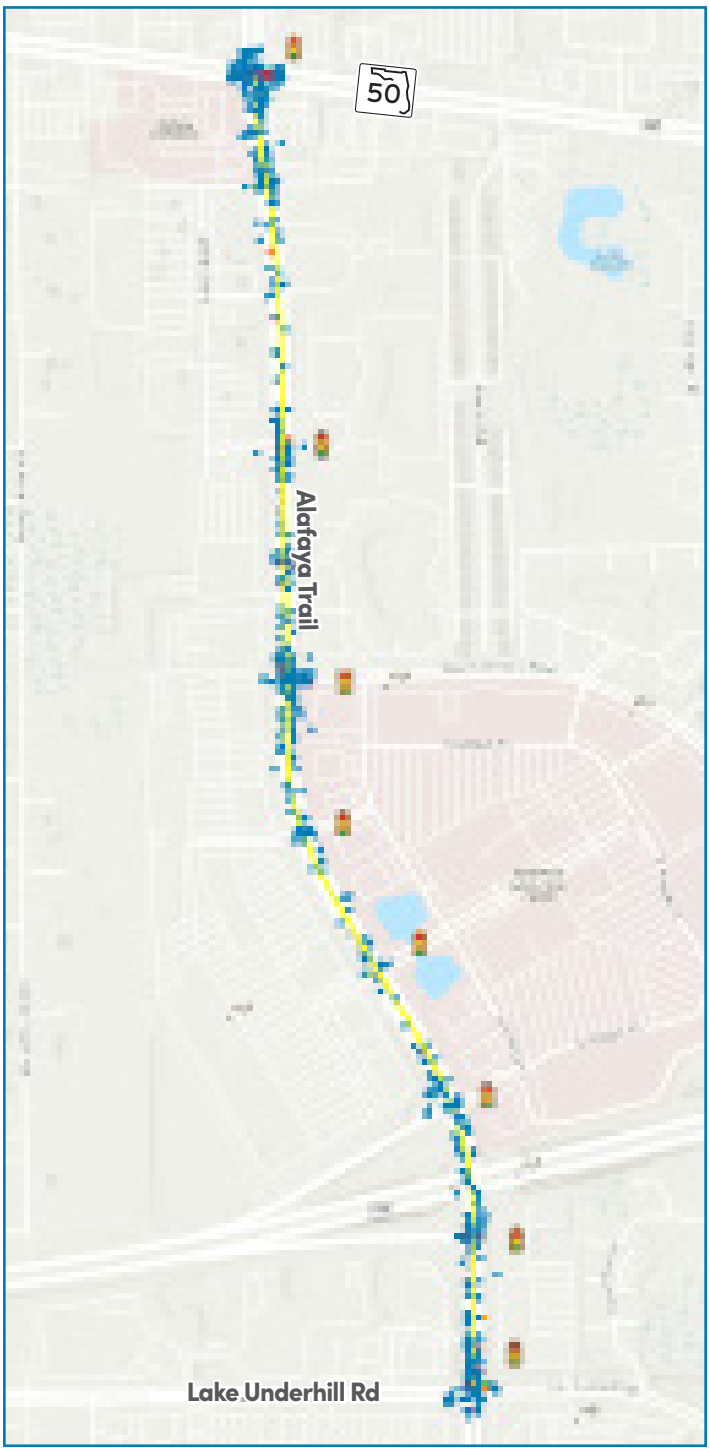
PEDESTRIAN/BICYCLE FACILITIES
- Install marked crosswalks at all side streets and major driveways ($)

SPEED MANAGEMENT
- Reduce lane widths ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

N

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

LANDSTAR BOULEVARD

from Osceola County Line to S.R. 417
District 4 Rank: 2 / Orange County Rank: 124

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

298
TOTAL CRASHES

287 | 2 | 2 | 7

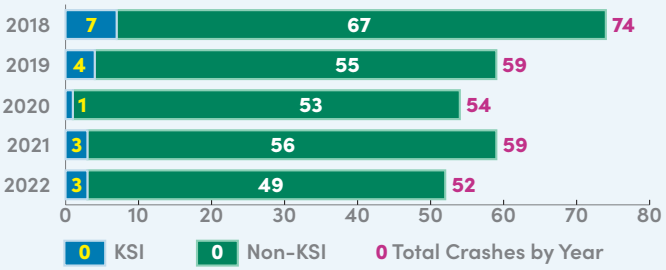
1
FATALITIES

1

17
SERIOUS INJURIES

14 | 3

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	6	92	98
2. LEFT TURN	6	72	78
3. SIDESWIPE	1	43	44
4. ANGLE	1	19	20
5. OTHER	3	16	19
6. RIGHT TURN	0	16	16
7. OFF ROAD	1	14	15
8. UNKNOWN	0	3	3

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 8
Non-KSI — 179
TOTAL — 187

DUSK–DAWN
KSI — 3
Non-KSI — 17
TOTAL — 20

NIGHT
KSI — 7
Non-KSI — 84
TOTAL — 91

LIGHTING CONDITION

LIGHTED
KSI — 7
Non-KSI — 74
TOTAL — 81

NON-LIGHTED
KSI — 0
Non-KSI — 10
TOTAL — 10

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 1
Non-KSI — 0
TOTAL — 1

DISTRACTED DRIVING
KSI — 4
Non-KSI — 115
TOTAL — 119

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN RESIDENTIAL (C3R)

CORRIDOR LENGTH
1.52 MILES

AVERAGE POSTED SPEED
45 MPH

AVERAGE PREVAILING SPEED
49.7 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
73.8%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
LINK 18, 407, 418 / 24, 671

TRAVEL LANES / MEDIAN TYPE
4 LANES / CURB & VEGETATION

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when pedestrian signal is activated ($)
- Install retroreflective backplates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Install speed sensitive traffic signals ($)

INTERSECTION AND ROADWAYS
- Consider tightening turning radii at intersections, side streets, and driveways ($$$)
- Upgrade to roundabouts or signalized intersections at unsignalized intersections ($$$)
- Extend median nose into crosswalks ($)

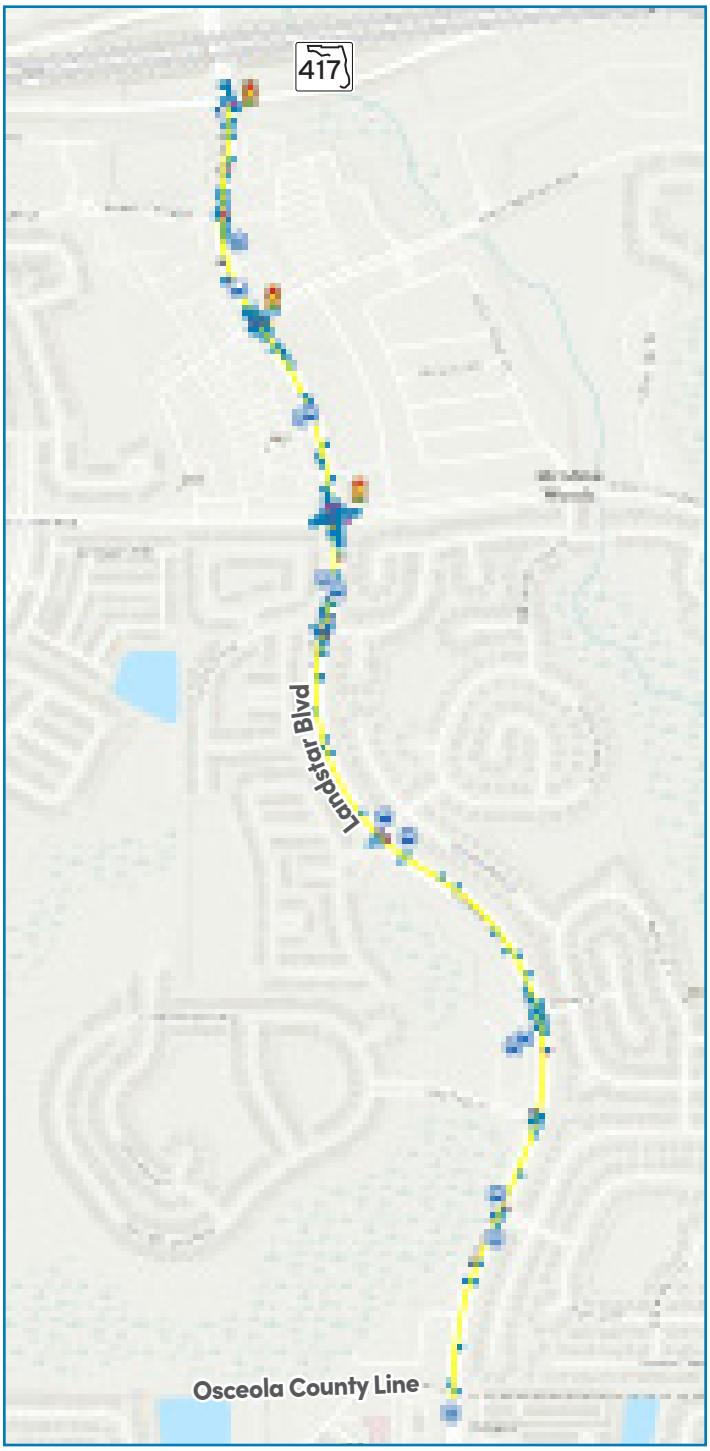
PEDESTRIAN/BICYCLE FACILITIES
- Install green bicycle lanes at intersections with bike boxes ($)
- Install marked crosswalks at all side streets and major driveways ($)

SPEED MANAGEMENT
- Reduce lane widths ($)
- Consider target speed reduction to 35-40 mph ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

N

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

AVALON PARK BOULEVARD

from Timber Springs Boulevard to S.R. 50
District 4 Rank: 3 / Orange County Rank: 133

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

309
TOTAL CRASHES

291	12	2	4

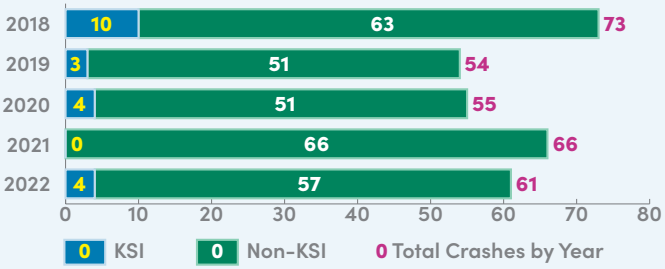
3
FATALITIES

3

18
SERIOUS INJURIES

14	3	1

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	1	109	110
2. LEFT TURN	5	66	71
3. ANGLE	2	25	27
4. SIDESWIPE	0	26	26
5. OFF ROAD	3	18	21
6. OTHER	2	13	15
7. BICYCLE	3	9	12
8. RIGHT TURN	2	9	11

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 10
Non-KSI — 216
TOTAL — 226

DUSK–DAWN
KSI — 1
Non-KSI — 13
TOTAL — 14

NIGHT
KSI — 10
Non-KSI — 59
TOTAL — 69

LIGHTING CONDITION

LIGHTED
KSI — 8
Non-KSI — 54
TOTAL — 62

NON-LIGHTED
KSI — 2
Non-KSI — 5
TOTAL — 7

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 2
Non-KSI — 1
TOTAL — 3

DISTRACTED DRIVING
KSI — 2
Non-KSI — 121
TOTAL — 123

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MAJOR COLLECTOR

CONTEXT CLASSIFICATION
SUBURBAN RESIDENTIAL (C3R)

CORRIDOR LENGTH
2.8 MILES

AVERAGE POSTED SPEED
45 MPH

AVERAGE PREVAILING SPEED
53.7 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
49.7%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
NONE

TRAVEL LANES / MEDIAN TYPE
4 LANES / CURB & VEGETATION

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when pedestrian signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Install speed sensitive traffic signals ($)

INTERSECTION AND ROADWAYS
- Consider tightening turning radii at intersections, side streets, and driveways ($$$)
- Upgrade to roundabouts or signalized intersections at unsignalized intersections ($$$)
- Extend median nose into crosswalk ($)

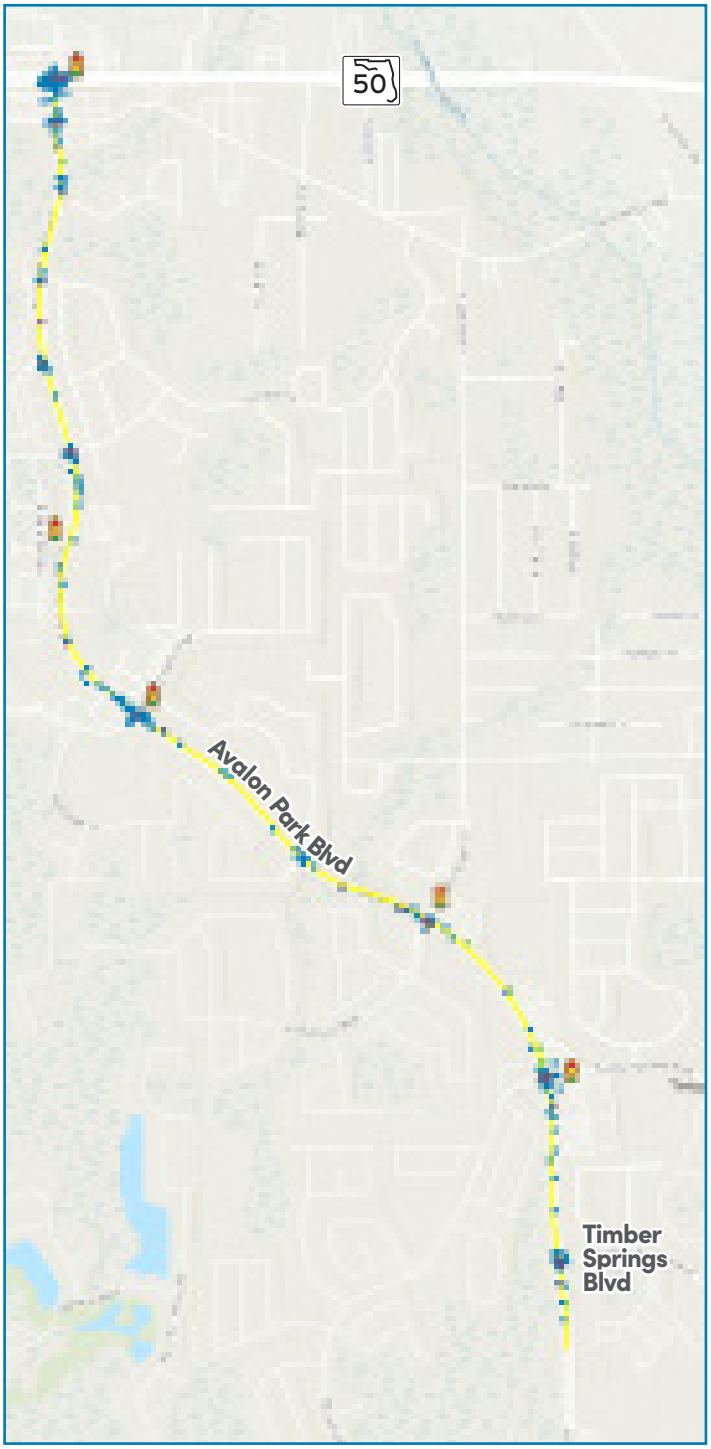
PEDESTRIAN/BICYCLE FACILITIES
- Install green bicycle lanes at intersections with bike boxes ($)
- Install marked crosswalks at all side streets and major driveways ($)

SPEED MANAGEMENT
- Reduce lane widths ($)
- Consider target speed reduction to 35-40 mph ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

N

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

WETHERBEE ROAD

from S. Orange Blossom Trail to S. Orange Avenue
District 4 Rank: 4 / Orange County Rank: 145

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

337
TOTAL CRASHES

326	2	3	6

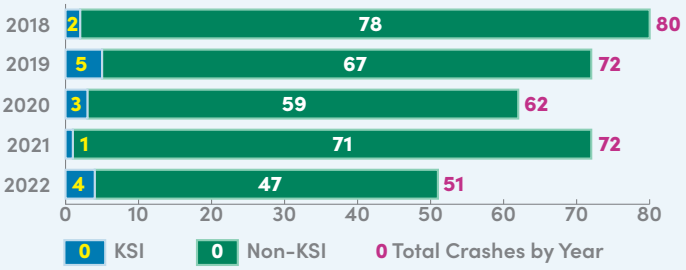
3
FATALITIES

1	2

12
SERIOUS INJURIES

9	1	2

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	3	135	138
2. LEFT TURN	4	70	74
3. SIDESWIPE	0	39	39
4. ANGLE	1	30	31
5. OFF ROAD	2	10	12
6. UNKNOWN	1	5	6
7. PEDESTRIAN	1	2	3
8. HEAD ON	1	1	2

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 3
Non-KSI — 250
TOTAL — 253

DUSK–DAWN
KSI — 0
Non-KSI — 15
TOTAL — 15

NIGHT
KSI — 4
Non-KSI — 57
TOTAL — 61

LIGHTING CONDITION

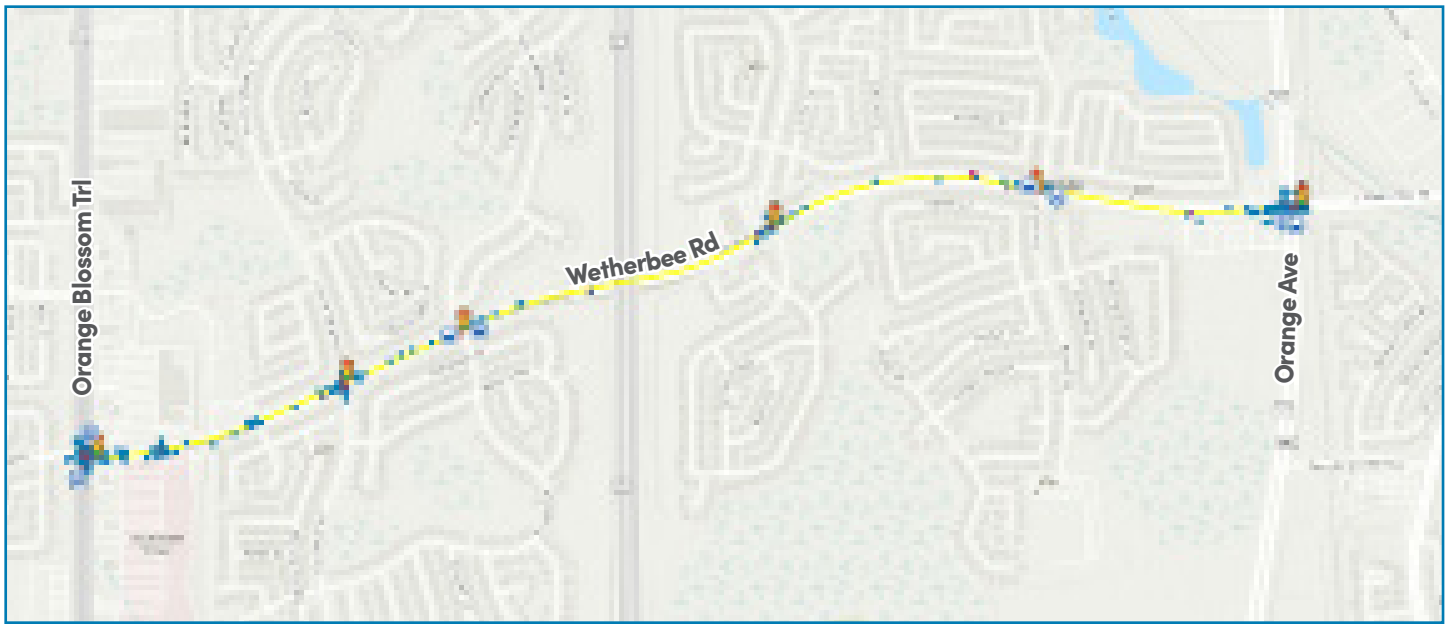
LIGHTED
KSI — 3
Non-KSI — 52
TOTAL — 55

NON-LIGHTED
KSI — 1
Non-KSI — 5
TOTAL — 6

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 1
Non-KSI — 4
TOTAL — 5

DISTRACTED DRIVING
KSI — 6
Non-KSI — 122
TOTAL — 128



N

LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MAJOR COLLECTOR

CONTEXT CLASSIFICATION
SUBURBAN RESIDENTIAL (C3R)

CORRIDOR LENGTH
1.88 MILES

AVERAGE POSTED SPEED
45 MPH

AVERAGE PREVAILING SPEED
55.1 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
68.2%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
LINK 418 / 4, 587

TRAVEL LANES / MEDIAN TYPE
6 LANES / CURB & VEGETATION

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Review signalization for protected phasing for all road users ($)

INTERSECTION AND ROADWAYS
- Consider intersection reconstruction and tightening at Orange Bloossom Trail and at Orange Avenue ($$$)

PEDESTRIAN/BICYCLE FACILITIES
- Install marked crosswalks at all side streets and major driveways ($)

SPEED MANAGEMENT
- Consider target speed reduction to 35 mph ($)
- Reduce lane widths ($)
- Install speed feedback signs ($)

OTHER ENGINEERING STRATEGIES
- Conduct Road Safety Audit to identify safety countermeasures ($)
- Lighting upgrades at segments and intersections ($$)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

FORSYTH ROAD

from Green Needle Drive to North of University Boulevard
District 5 Rank: 1 / Orange County Rank: 64

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

138
TOTAL CRASHES

125	6	1	6

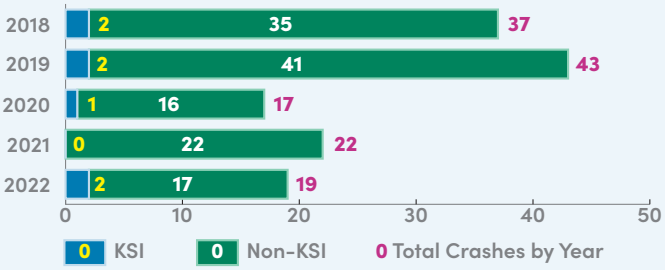
1
FATALITY

1

6
SERIOUS INJURIES

1	1	4

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 7 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	0	46	46
2. LEFT TURN	1	18	19
3. SIDESWIPE	0	18	18
4. OTHER	1	13	14
5. RIGHT TURN	0	11	11
6. OFF ROAD	3	6	9
7. ANGLE	0	8	8

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 4
Non-KSI — 108
TOTAL — 112

DUSK–DAWN
KSI — 0
Non-KSI — 4
TOTAL — 4

NIGHT
KSI — 1
Non-KSI — 1
TOTAL — 2

LIGHTING CONDITION

LIGHTED
KSI — 2
Non-KSI — 18
TOTAL — 20

NON-LIGHTED
KSI — 13
Non-KSI — 650
TOTAL — 663

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 1
Non-KSI — 1
TOTAL — 2

DISTRACTED DRIVING
KSI — 4
Non-KSI — 40
TOTAL — 44

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MAJOR COLLECTOR

CONTEXT CLASSIFICATION
SUBURBAN COMMERCIAL (C3C)

CORRIDOR LENGTH
0.64 MILES

AVERAGE POSTED SPEED
35 MPH

AVERAGE PREVAILING SPEED
48.5 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
66.6%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS
LINK 29/11,168

TRAVEL LANES / MEDIAN TYPE
4 LANES / TWO-WAY CENTER TURN LANE

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)

INTERSECTION AND ROADWAYS
- Consider tightening turning radii at intersections ($$$)
- Upgrade to roundabouts or signalized intersections at unsignalized intersections ($$$)

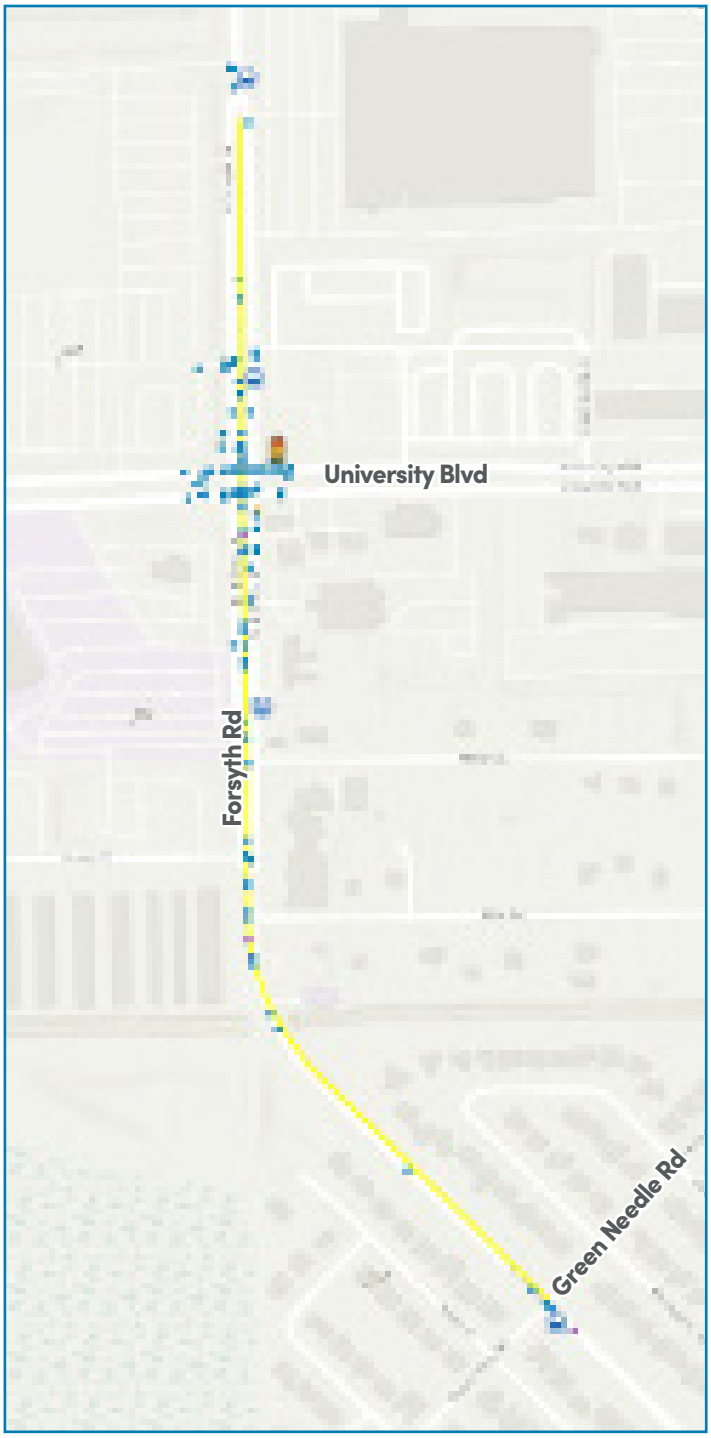
PEDESTRIAN/BICYCLE FACILITIES
- Evaluate installing raised midblock crosswalks with rectangular rapid flashing beacons, in-ground lighting, advanced warning signs and advance stop bars ($$$)

SPEED MANAGEMENT
- Reduce lane widths ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

N

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

UNIVERSITY BOULEVARD

from Semoran Boulevard to Goldenrod Road
District 5 Rank: 2 / Orange County Rank: 116

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

569
TOTAL CRASHES

538	16	5	10

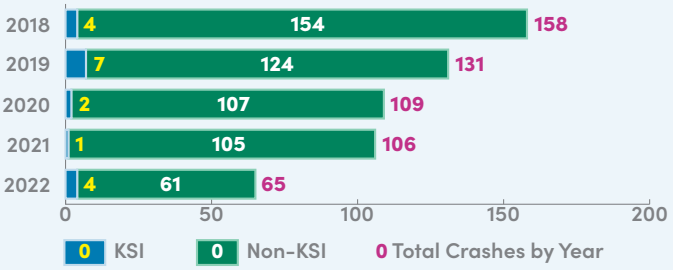
1
FATALITY

1

17
SERIOUS INJURIES

10	3	1	3

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	2	307	309
2. SIDESWIPE	0	82	82
3. LEFT TURN	4	64	68
4. OTHER	3	25	28
5. ANGLE	3	18	21
6. RIGHT TURN	0	17	17
7. BICYCLE	3	13	16
8. OFF ROAD	2	10	12

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 11
Non-KSI — 439
TOTAL — 450

DUSK–DAWN
KSI — 0
Non-KSI — 28
TOTAL — 28

NIGHT
KSI — 7
Non-KSI — 84
TOTAL — 91

LIGHTING CONDITION

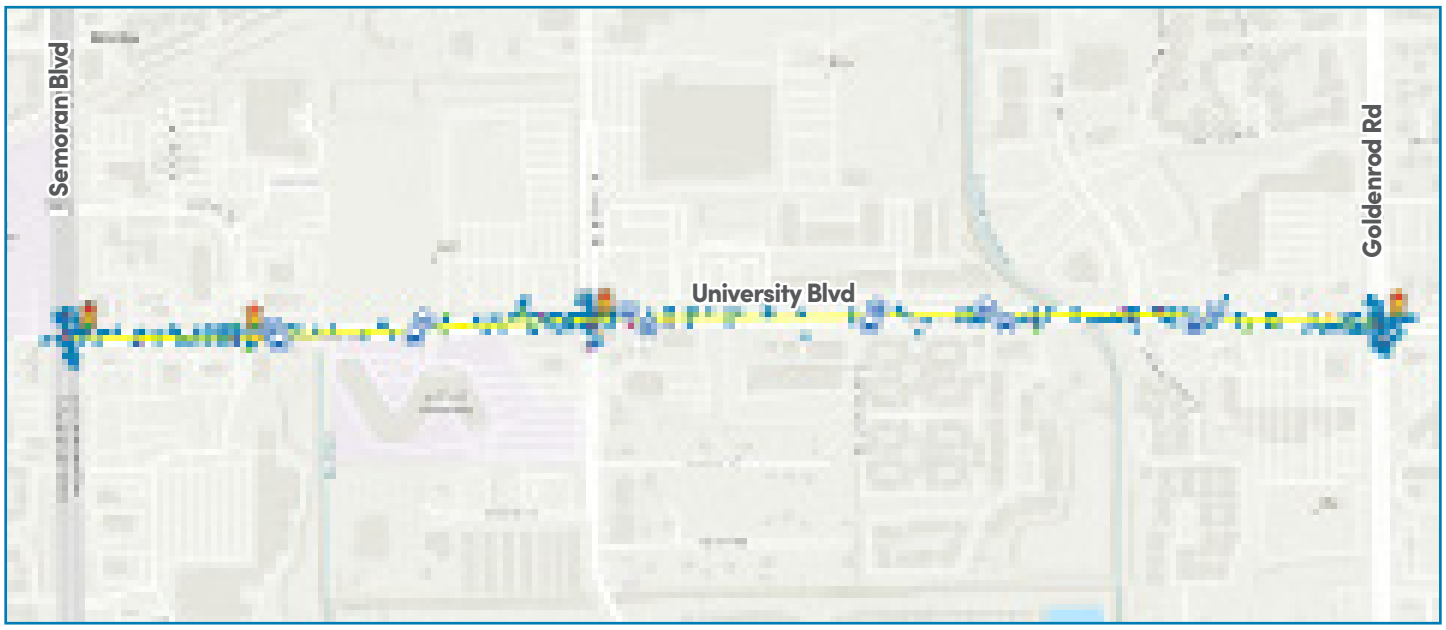
LIGHTED
KSI — 7
Non-KSI — 83
TOTAL — 90

NON-LIGHTED
KSI — 0
Non-KSI — 1
TOTAL — 1

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 0
Non-KSI — 4
TOTAL — 4

DISTRACTED DRIVING
KSI — 6
Non-KSI — 234
TOTAL — 240



LEGEND

N

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN COMMERCIAL (C3C)

CORRIDOR LENGTH
1.74 MILES

AVERAGE POSTED SPEED
45 MPH

AVERAGE PREVAILING SPEED
53.3 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
71.3%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
LINK 13/41,018

TRAVEL LANES / MEDIAN TYPE
6 LANES / CURB & VEGETATION

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.

PROPOSED SAFETY COUNTERMEASURES

Note: Corridor is curently being evaluated by Orange County. This corridor should be monitored to ensure the recommendations address the multimodal corridor needs.

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)

INTERSECTION AND ROADWAYS
- Upgrade to roundabouts or signalized intersections at unsignalized intersections ($$$)
- Consider tightening turning radii at intersections, side streets, and driveways ($$$)

PEDESTRIAN/BICYCLE FACILITIES
- Install high-emphasis mid-block crosswalks and conduct warrant study for pedestrian hybrid beacon(s) ($$$)
- Consider pedestrian facilities at Lake Twylo Road intersection ($)
- Consider the use of sidewalk stenciling to relay safety messages to students walking/biking ($)

SPEED MANAGEMENT
- Consider target speed reduction to 35-40 mph ($)
- Reduce lane widths ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)
- Evaluate access management/driveway strategies corridorwide ($$)
- Relocate bus stops to intersections/existing crosswalks ($)
- Add sidewalk shading where possible ($)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

UNIVERSITY BOULEVARD

from Dean Road to Alafaya Trail
District 5 Rank: 4 / Orange County Rank: 118

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

630
TOTAL CRASHES

605	3	7	15

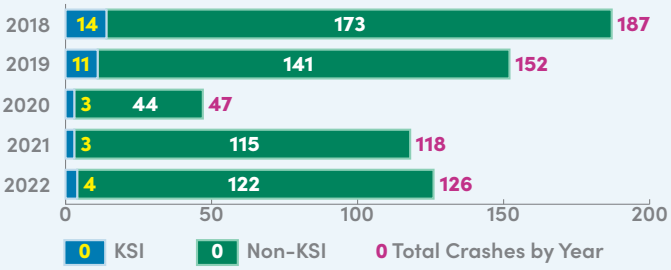
4
FATALITIES

4

31
SERIOUS INJURIES

24	1	6

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	13	342	355
2. LEFT TURN	11	65	76
3. SIDESWIPE	0	59	59
4. RIGHT TURN	1	32	33
5. ANGLE	1	31	32
6. OTHER	4	28	32
7. OFF ROAD	0	21	21
8. HEAD ON	0	7	7

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 26
Non-KSI — 417
TOTAL — 443

DUSK–DAWN
KSI — 1
Non-KSI — 35
TOTAL — 36

NIGHT
KSI — 8
Non-KSI — 143
TOTAL — 151

LIGHTING CONDITION

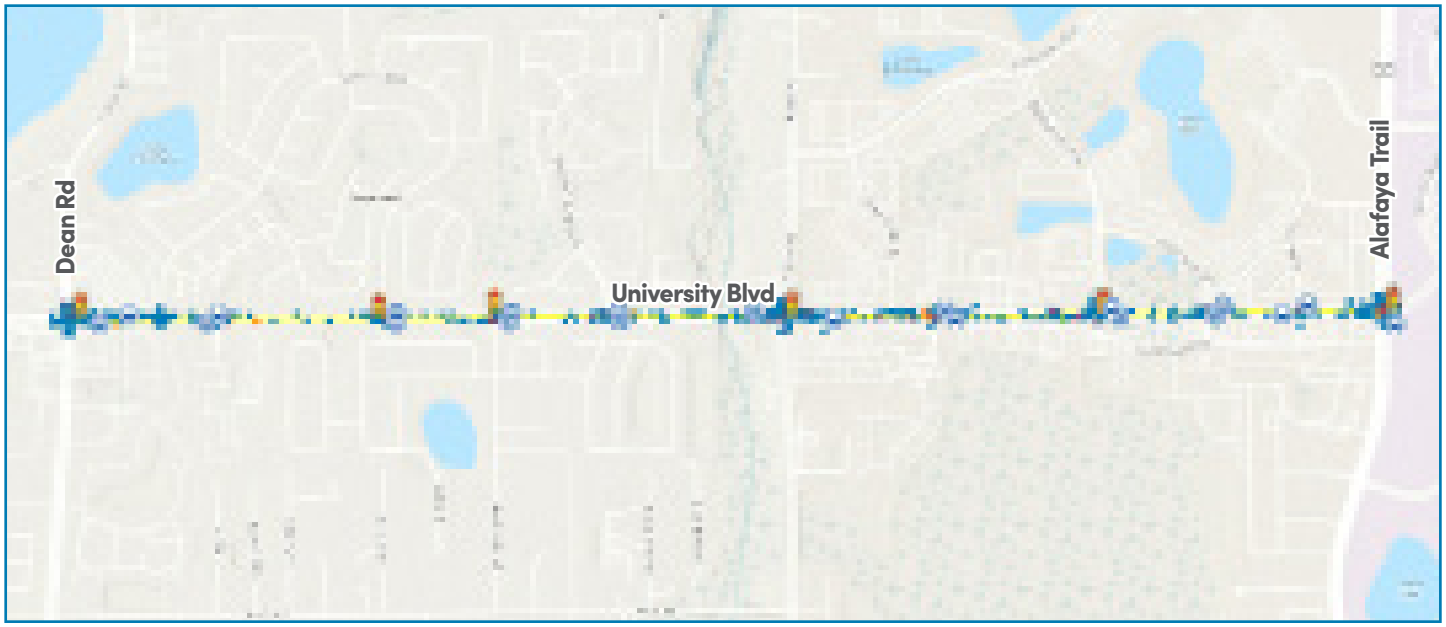
LIGHTED
KSI — 7
Non-KSI — 132
TOTAL — 139

NON-LIGHTED
KSI — 1
Non-KSI — 10
TOTAL — 11

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 0
Non-KSI — 8
TOTAL — 8

DISTRACTED DRIVING
KSI — 18
Non-KSI — 265
TOTAL — 283



N

LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

KSI Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN COMMERCIAL (C3C)

CORRIDOR LENGTH
2.24 MILES

AVERAGE POSTED SPEED
45 MPH

AVERAGE PREVAILING SPEED
55.7 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
0%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
LINK 13/58,224

TRAVEL LANES / MEDIAN TYPE
6 LANES / CURB & VEGETATION

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)

INTERSECTION AND ROADWAYS
- Consider intersection reconstruction and tightening at major intersections
- Reduce lane widths ($)

PEDESTRIAN/BICYCLE FACILITIES
- Evaluate installing raised midblock crosswalks with pedestrian hybrid beacons every 660-800 feet ($$$)
- Consider ped facilities at Lake Twylo Road intersection ($$)
- Consider the use of sidewalk stenciling to relay safety messages to students walking/biking ($)

SPEED MANAGEMENT
- Consider target speed reduction to 35-40 mph ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)
- Evaluate access management/driveways corridorwide ($$)
- Relocate bus stops to far side of intersections ($)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

DEAN ROAD

from S.R. 408 to River Park Boulevard
District 5 Rank: 4 / Orange County Rank: 120

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

310
TOTAL CRASHES

293	6	5	6

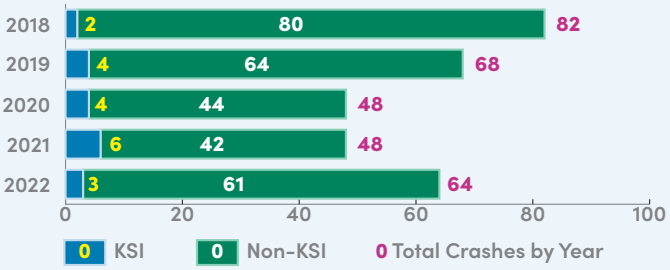
2
FATALITIES

1	1

17
SERIOUS INJURIES

14	1	2

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. LEFT TURN	10	118	128
2. REAR END	4	90	94
3. SIDESWIPE	0	28	28
4. ANGLE	0	15	15
5. OTHER	0	13	13
6. OFF ROAD	1	9	10
7. RIGHT TURN	0	8	8
8. BICYCLE	1	5	6

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 13
Non-KSI — 208
TOTAL — 221

DUSK–DAWN
KSI — 0
Non-KSI — 15
TOTAL — 15

NIGHT
KSI — 6
Non-KSI — 68
TOTAL — 74

LIGHTING CONDITION

LIGHTED
KSI — 6
Non-KSI — 61
TOTAL — 67

NON-LIGHTED
KSI — 0
Non-KSI — 7
TOTAL — 7

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 1
Non-KSI — 3
TOTAL — 4

DISTRACTED DRIVING
KSI — 9
Non-KSI — 120
TOTAL — 129

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN RESIDENTIAL (C3R)

CORRIDOR LENGTH
2.02 MILES

AVERAGE POSTED SPEED
45 MPH

AVERAGE PREVAILING SPEED
56.3 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
0%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
NONE

TRAVEL LANES / MEDIAN TYPE
4 LANES / TWO-WAY CENTER TURN LANE

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)

INTERSECTION AND ROADWAYS
- Consider tightening turning radii at intersections, side streets, and driveways ($$$)
- Upgrade to roundabouts or signalized intersections at unsignalized intersections ($$$)
- Consider adding paved median with directional left turn lanes ($$$)

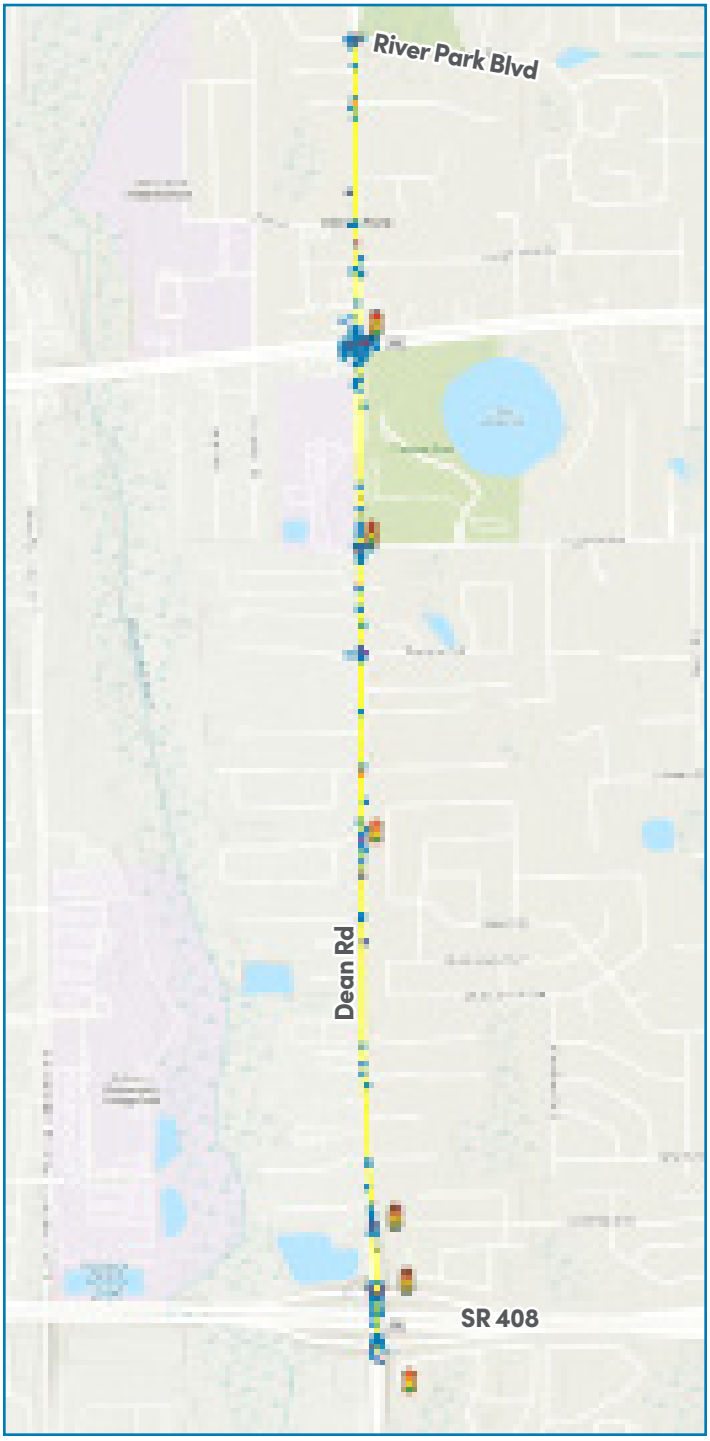
PEDESTRIAN/BICYCLE FACILITIES
- Upgrade crosswalk at school to a high-visibility crosswalk with advanced warning signs, yield markings and in-pavement lighting and and conduct warrant study for pedestrian hybrid beacon(s) ($$$)
- Consider the use of sidewalk stenciling to relay safety messages to students walking/biking ($)
- Identify other midblock crossing opportunities south of Flowers Avenue ($)

SPEED MANAGEMENT
- Consider target speed reduction to 35-40 mph ($)
- Reduce lane widths ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

N

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

PINE HILLS ROAD

from Old Winter Garden Road to S.R. 50
District 6 Rank: 1 / Orange County Rank: 5

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

245
TOTAL CRASHES

235	3	5	2

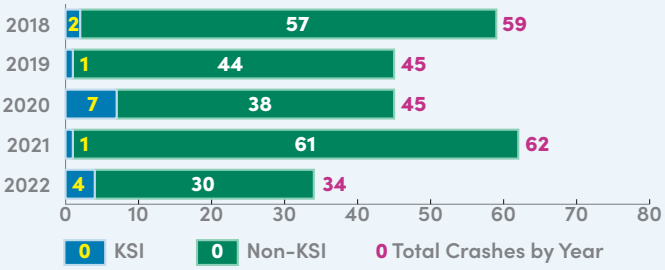
1
FATALITIES

1

14
SERIOUS INJURIES

12	1	1

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 8 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	2	74	76
2. SIDESWIPE	0	41	41
3. OTHER	0	35	35
4. LEFT TURN	3	30	33
5. ANGLE	5	16	21
6. RIGHT TURN	0	10	10
7. OFF ROAD	2	7	9
8. UNKNOWN	0	9	9

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 9
Non-KSI — 177
TOTAL — 186

DUSK–DAWN
KSI — 0
Non-KSI — 6
TOTAL — 6

NIGHT
KSI — 6
Non-KSI — 47
TOTAL — 53

LIGHTING CONDITION

LIGHTED
KSI — 5
Non-KSI — 42
TOTAL — 47

NON-LIGHTED
KSI — 1
Non-KSI — 4
TOTAL — 5

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 1
Non-KSI — 0
TOTAL — 1

DISTRACTED DRIVING
KSI — 6
Non-KSI — 72
TOTAL — 78

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN RESIDENTIAL (C3R)

CORRIDOR LENGTH
0.73 MILES

AVERAGE POSTED SPEED
38.3 MPH

AVERAGE PREVAILING SPEED
47.2 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
64.6%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
NONE

TRAVEL LANES / MEDIAN TYPE
2 LANES / TWO-WAY CENTER TURN LANE

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Implement speed sensitive on rest during nighttime periods ($)

INTERSECTION AND ROADWAYS
- Install raised midblock crosswalks ($$)
- Consider intersection reconstruction and tightening at major intersections ($$$)
- Evaluate roundabouts at Livingston and at Robinson Streets ($)
- Consider adding paved median with directional left turn lanes ($$$)

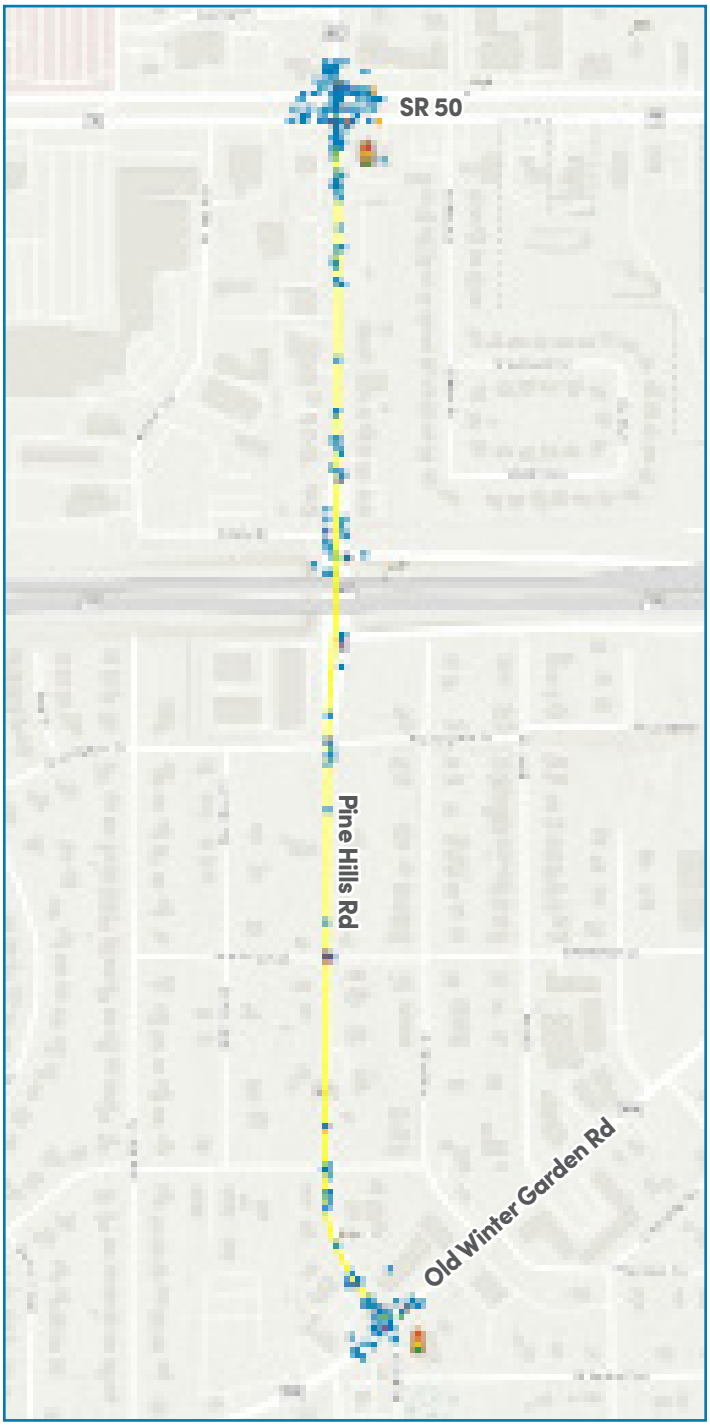
PEDESTRIAN/BICYCLE FACILITIES
- Install high visibility mid-block crosswalks with rectangular rapid flashing beacons every 660-800 feet ($$$)
- Install marked crosswalks at all side streets and major driveways ($)

SPEED MANAGEMENT
- Consider target speed reduction to 30 mph ($)

OTHER ENGINEERING STRATEGIES
- Conduct Road Safety Audit to identify safety countermeasures ($)
- Lighting upgrades at segments and intersections ($$)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

N

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

OAK RIDGE ROAD

from Millenia Boulevard to Orange Blossom Trail
District 6 Rank: 2 / Orange County Rank: 21

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

1,151
TOTAL CRASHES

1,097	9	35	10

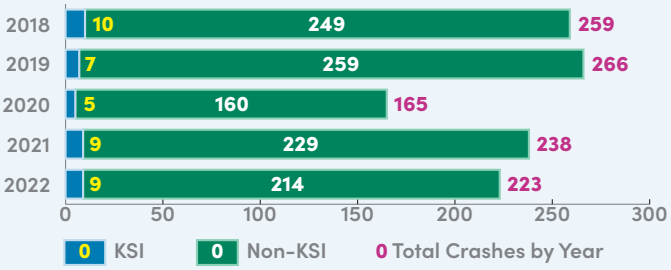
6
FATALITIES

1	1	1	3

34
SERIOUS INJURIES

23	1	8	2

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 9 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	7	400	407
2. LEFT TURN	17	342	359
3. SIDESWIPE	0	109	109
4. OTHER	1	66	67
5. ANGLE	2	59	61
6. PEDESTRIAN	9	26	35
7. UNKNOWN	0	35	35
8. RIGHT TURN	1	33	34
9. HEAD ON	1	16	17

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 21
Non-KSI — 691
TOTAL — 712

DUSK–DAWN
KSI — 3
Non-KSI — 81
TOTAL — 84

NIGHT
KSI — 16
Non-KSI — 339
TOTAL — 355

LIGHTING CONDITION

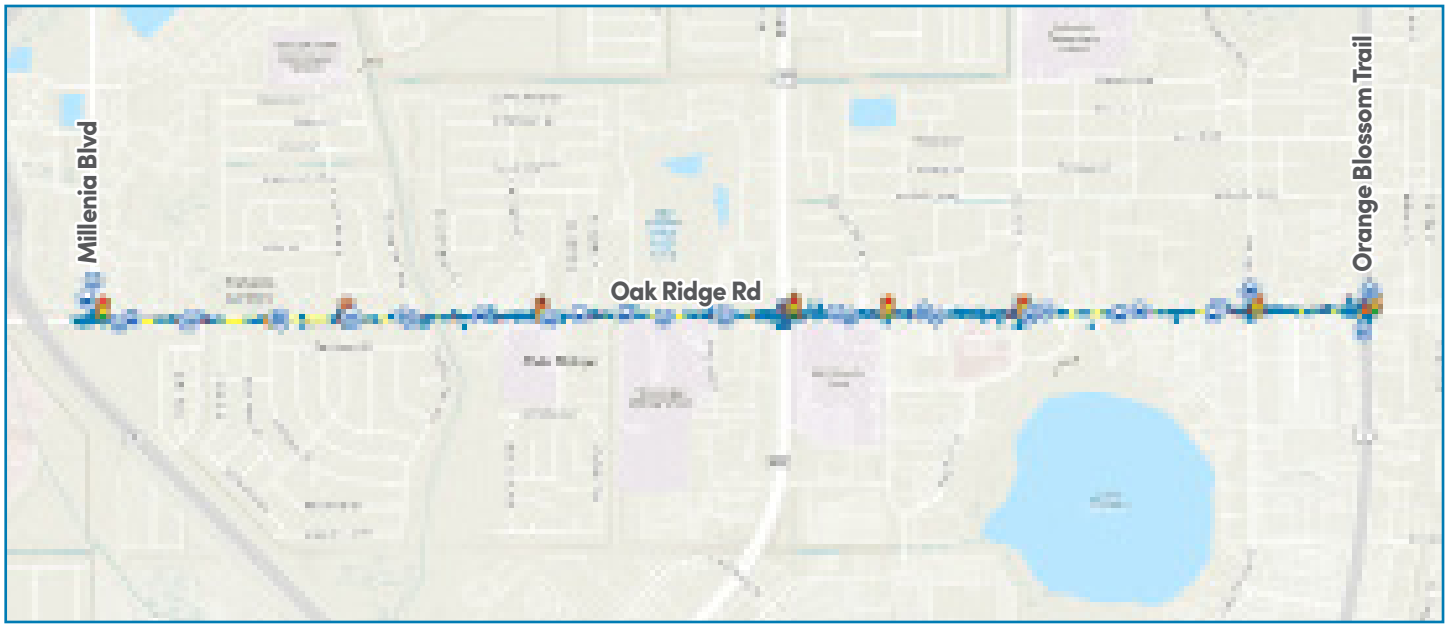
LIGHTED
KSI — 14
Non-KSI — 315
TOTAL — 329

NON-LIGHTED
KSI — 2
Non-KSI — 24
TOTAL — 26

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 1
Non-KSI — 9
TOTAL — 10

DISTRACTED DRIVING
KSI — 9
Non-KSI — 366
TOTAL — 375



LEGEND

N

HIN Corridor

Bus Stop

Traffic Signal

Crashes by Mode

Pedestrian

Bicycle

Motorcycle

Motor Vehicle

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MAJOR COLLECTOR

CONTEXT CLASSIFICATION
SUBURBAN COMMERCIAL (C3C)

CORRIDOR LENGTH
2.79 MILES

AVERAGE POSTED SPEED
39.6 MPH

AVERAGE PREVAILING SPEED
50.5 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
79.1%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
LINK 8, 42, 304 / 1,146,327

TRAVEL LANES / MEDIAN TYPE
4 LANES / TWO-WAY CENTER TURN LANE

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.

PROPOSED SAFETY COUNTERMEASURES

Improvements are currently under construction by Orange County. This corridor should be monitored to determine the effectiveness of the improvements, and additional improvements implemented as needed.

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)

INTERSECTION AND ROADWAYS
- Consider upgrading existing midblock crosswalks to raised crosswalks ($$$)
- Consider intersection reconstruction and tightening at major intersections ($$$)
- Consider adding paved median with directional left turn lanes ($$$)
- Colocate bus stops with crosswalks at midblocks and intersections ($)

PEDESTRIAN/BICYCLE FACILITIES
- Install marked crosswalks at all side streets and major driveways ($)

SPEED MANAGEMENT
- Consider target speed reduction to 35 mph ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)
- Evaluate access management/driveway strategies corridorwide ($$)
- Relocate bus stops to far side of intersections/existing crosswalks ($)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

KALEY AVENUE

from Rio Grande Avenue to Parramore Avenue
District 6 Rank: 3 / Orange County Rank: 32

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

111
TOTAL CRASHES

107	1	1	2

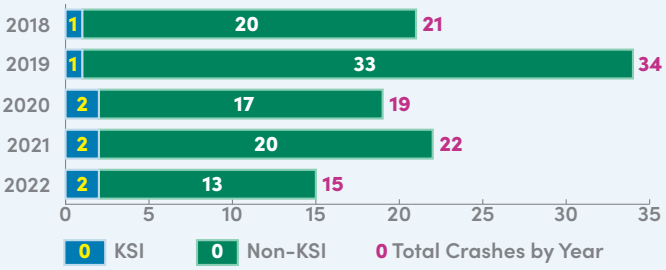
2
FATALITIES

1	1

6
SERIOUS INJURIES

5	1

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 9 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. ANGLE	4	43	47
2. LEFT TURN	2	20	22
3. REAR END	0	19	19
4. OTHER	1	6	7
5. OFF ROAD	0	5	5
6. UNKNOWN	0	4	4
7. RIGHT TURN	0	3	3
8. BICYCLE	1	0	1
9. HEAD ON	0	1	1

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 5
Non-KSI — 71
TOTAL — 76

DUSK–DAWN
KSI — 2
Non-KSI — 6
TOTAL — 8

NIGHT
KSI — 1
Non-KSI — 25
TOTAL — 26

LIGHTING CONDITION

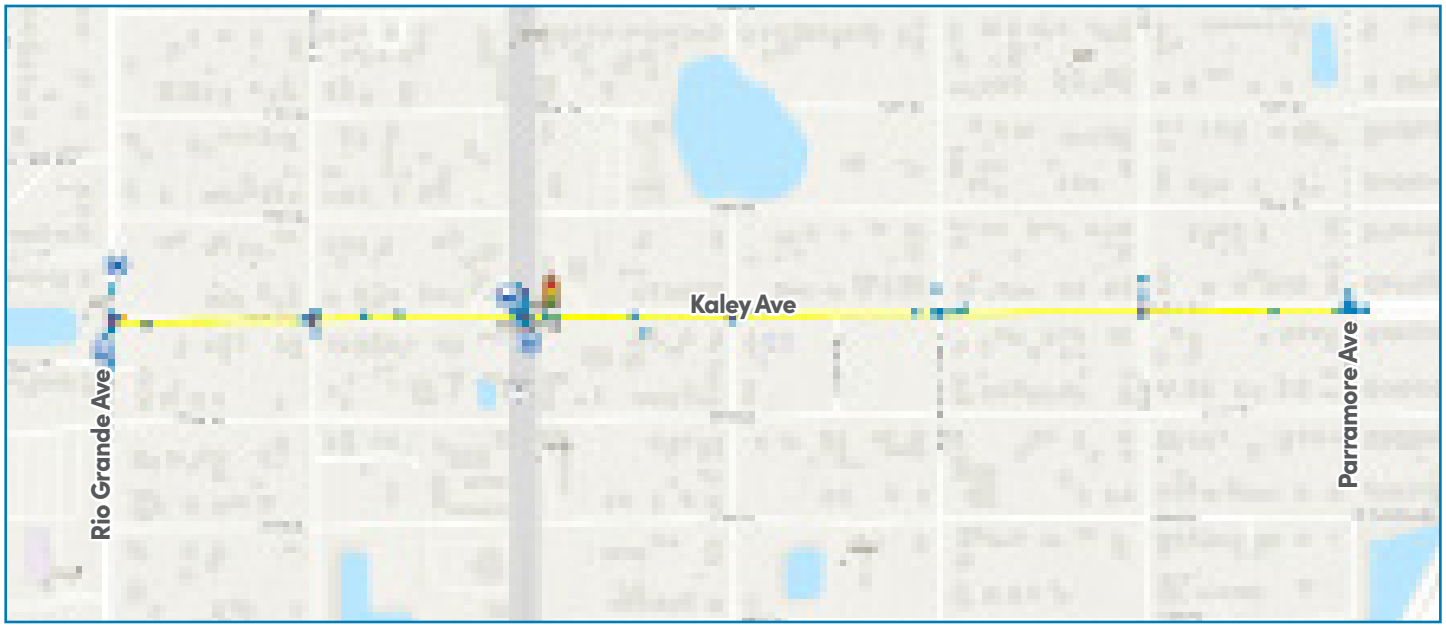
LIGHTED
KSI — 1
Non-KSI — 22
TOTAL — 23

NON-LIGHTED
KSI — 0
Non-KSI — 3
TOTAL — 3

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 0
Non-KSI — 1
TOTAL — 1

DISTRACTED DRIVING
KSI — 3
Non-KSI — 45
TOTAL — 48



N

LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MAJOR COLLECTOR

CONTEXT CLASSIFICATION
SUBURBAN RESIDENTIAL (C3R)

CORRIDOR LENGTH
0.75 MILES

AVERAGE POSTED SPEED
30 MPH

AVERAGE PREVAILING SPEED
42.5 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
56.8%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
NONE

TRAVEL LANES / MEDIAN TYPE
2 LANES / UNDIVIDED

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when pedestrian signal is activated ($)
- Upgrade to audible push button pedestrian crossing signals ($)

INTERSECTION AND ROADWAYS
- Consider tightening turning radii at Rio Grande and at Parramore Avenues ($$$)

PEDESTRIAN/BICYCLE FACILITIES
- Install high-emphasis mid-block crosswalks and conduct warrant study for pedestrian hybrid beacon(s), with advanced warning signs, and advanced stop bars ($$)
- Consider installing off-road/separated bicycle facilities (cycle track) ($$$)
- Install marked crosswalks at all side streets and major driveways ($)

OTHER ENGINEERING STRATEGIES
- Lighting upgrades at segments and intersections ($$)
- Update worn detectable landing pads throughout corridor ($)
- Add sidewalk shading where possible ($)

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

HIGH CRASH CORRIDOR FACT SHEET — ORANGE COUNTY

HIAWASSEE ROAD

from S.R. 50 to Silver Star Road
District 6 Rank: 4 / Orange County Rank: 34

VISION ZERO
COUNTDOWN TO ZERO

CRASH STATISTICS (2018–2022)

791
TOTAL CRASHES

772	2	12	5

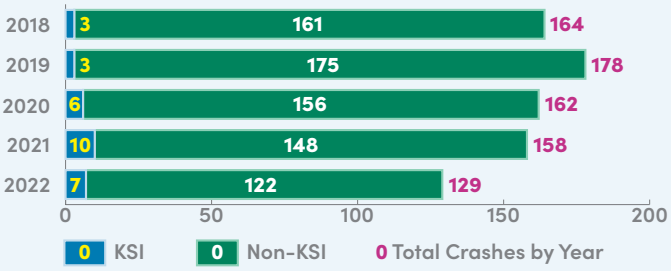
3
FATALITIES

1	1	1

26
SERIOUS INJURIES

20	6

CRASHES BY YEAR



KSI = Killed or Seriously Injured

Source: Signal 4 Analytics

TOP 9 CRASH TYPES

	KSI	NON-KSI	TOTAL
1. REAR END	7	385	392
2. LEFT TURN	7	118	125
3. SIDESWIPE	0	120	120
4. ANGLE	3	28	31
5. OTHER	2	28	30
6. RIGHT TURN	0	29	29
7. OFF ROAD	2	18	20
8. UNKNOWN	0	18	18
9. PEDESTRIAN	7	5	12

CRASH CONTRIBUTION FACTORS

TIME OF DAY

DAYLIGHT
KSI — 20
Non-KSI — 536
TOTAL — 556

DUSK–DAWN
KSI — 0
Non-KSI — 41
TOTAL — 41

NIGHT
KSI — 9
Non-KSI — 284
TOTAL — 293

LIGHTING CONDITION

LIGHTED
KSI — 9
Non-KSI — 178
TOTAL — 187

NON-LIGHTED
KSI — 0
Non-KSI — 6
TOTAL — 6

BEHAVIORAL FACTORS

IMPAIRED DRIVING
KSI — 1
Non-KSI — 7
TOTAL — 8

DISTRACTED DRIVING
KSI — 6
Non-KSI — 283
TOTAL — 289

HIGH INJURY NETWORK (HIN) FACTS

JURISDICTION
ORANGE COUNTY

FUNCTIONAL CLASSIFICATION
URBAN MINOR ARTERIAL

CONTEXT CLASSIFICATION
SUBURBAN RESIDENTIAL (C3R)

CORRIDOR LENGTH
1.76 MILES

AVERAGE POSTED SPEED
45 MPH

AVERAGE PREVAILING SPEED
55.8 MPH

% OF CORRIDOR IN TRANSPORTATION DISADVANTAGED AREA
79.1%

TRANSIT ROUTES /ANNUAL BOARDINGS & ALIGHTINGS (2022)
LINK 37/201, 267

TRAVEL LANES / MEDIAN TYPE
4 LANES / TWO-WAY CENTER TURN LANE

PROPOSED SAFETY COUNTERMEASURES

SIGNALS
- Install leading pedestrian intervals ($)
- Prohibit turns when ped signal is activated ($)
- Install retroreflective back plates ($)
- Upgrade to audible push button pedestrian crossing signals ($)
- Implement speed sensitive traffic signals ($)

INTERSECTION AND ROADWAYS
- Consider tightening turning radii at intersections, side streets, and driveways ($$$)
- Consider paved median with directional left turn lanes($$$)

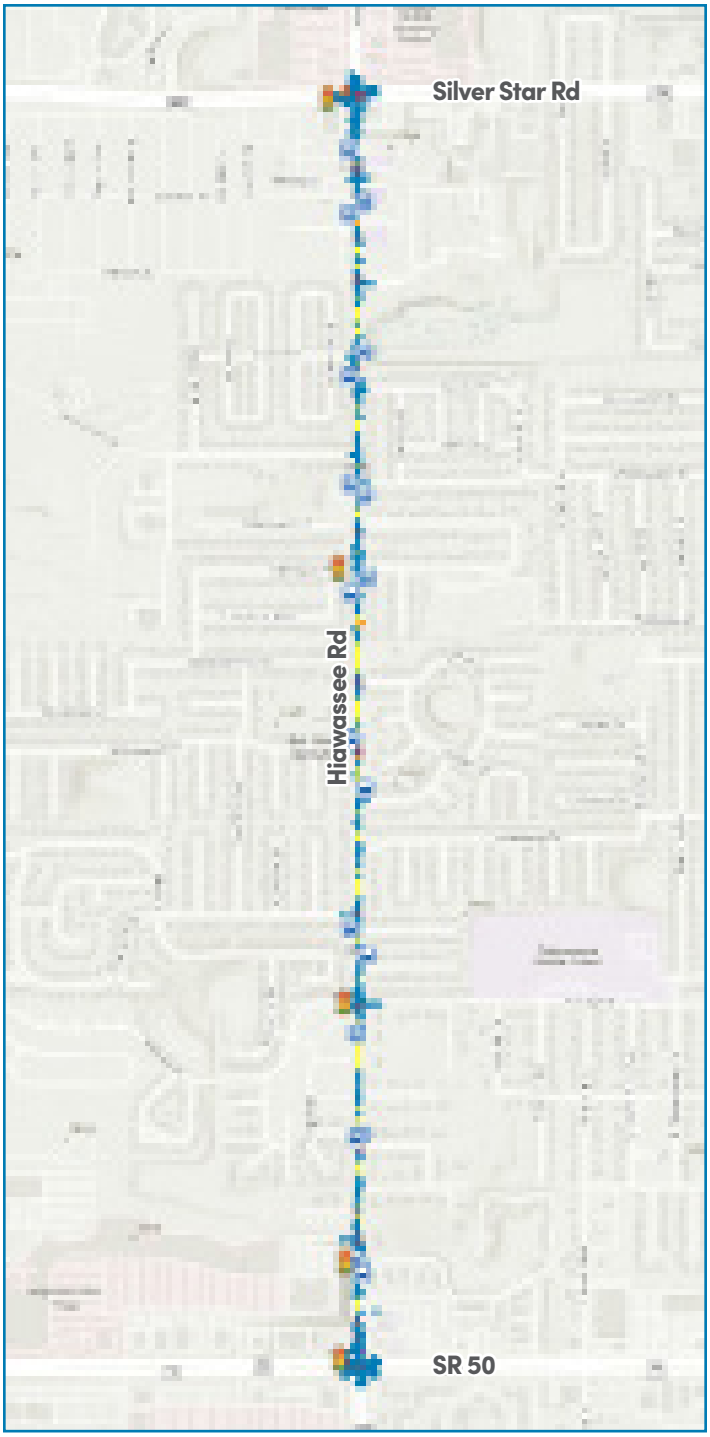
PEDESTRIAN/BICYCLE FACILITIES
- Install high-emphasis mid-block crosswalks and conduct warrant study for pedestrian hybrid beacon(s) ($$$)
- Co-locate bus stops with crosswalks at midblocks and intersections ($)
- Install marked crosswalks at all side streets and major driveways ($)

SPEED MANAGEMENT
- Consider reducing lane widths to 10.5-11 feet ($)
- Consider target speed reduction to 35-40 mph ($)

OTHER ENGINEERING STRATEGIES
- Conduct Road Safety Audit to identify safety countermeasures ($)
- Lighting upgrades at segments and intersections ($$)
- Evaluate access management/driveway strategies for roadway segment south of Silver Star Road ($$)
- Relocate bus stops to far side of intersections/existing crosswalks

SIGNING AND STRIPING
- Update worn pavement markings throughout corridor ($)

Note: Not for construction purposes. All projects will require more detailed planning, engineering and community engagement.



LEGEND

- HIN Corridor
- Bus Stop
- Traffic Signal

Crashes by Mode

- Pedestrian
- Bicycle
- Motorcycle
- Motor Vehicle

N


vhb
ASHA
SM
ARDURRA
metroplan orlando
A REGIONAL TRANSPORTATION PARTNERSHIP

APPENDIX A

Executed Resolution

APPROVED BY ORANGE
COUNTY BOARD OF COUNTY
COMMISSIONERS

BCC Mtg. Date: August 27, 2024

RESOLUTION

of the

ORANGE COUNTY BOARD OF COUNTY COMMISSIONERS

regarding

ORANGE COUNTY'S ADOPTION OF A VISION ZERO ACTION PLAN

Resolution No. 2024-M-24

WHEREAS, traffic crashes are among the leading causes of death and serious injury within the United States, the State of Florida, and Orange County, Florida ("Orange County"); and

WHEREAS, traffic deaths and injuries in the United States have disproportionately impacted cyclists, pedestrians, and vulnerable, underserved, disadvantaged, and low-income populations; and

WHEREAS, within the analysis period of 2018-2022, there were 213,553 crashes in Orange County, including 893 that resulted in a fatality and 5,588 that resulted in a serious injury; and

WHEREAS, the Orange County Board of County Commissioners (the "Board") believes that deaths and serious injuries on our streets are unacceptable and that fatal and serious injury crashes can be eliminated by 2040; and

WHEREAS, the Board hereby declares that these crash statistics are unacceptable for residents, commuters, and tourists who live, work, and play in Orange County; and

WHEREAS, the U.S. Department of Transportation has adopted the 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, the Board previously adopted Resolution 2022-M-42 (the "Previous Resolution"), marking Orange County's commitment to eliminating deaths and serious injuries on its streets and roadways by 2040 and directing staff to develop a "Vision Zero Action Plan"; and

WHEREAS, this Resolution is intended to further the purposes of the Previous Resolution; and

WHEREAS, Orange County hereby re-commits to endorsing Vision Zero, which is founded on the Safe System Approach, as the strategy to eliminate all traffic fatalities and serious

injuries on the transportation system, while increasing safe, healthy, and equitable mobility for all; and

WHEREAS, Orange County will implement the Safe System Approach by adopting the Vision Zero Action Plan and continuing to utilize a data-driven approach and innovation in the transportation system to enhance infrastructure resilience, technology readiness, and vehicle, bicycle, and pedestrian safety; and

WHEREAS, the Vision Zero Action Plan has identified transportation safety countermeasures appropriate for implementation in Orange County; and

WHEREAS, the Vision Zero Action Plan has identified Orange County's highest priority corridors for safety improvements.

NOW THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF ORANGE COUNTY, FLORIDA:

Section 1. Vision Zero Action Plan. Orange County hereby adopts the Vision Zero Action Plan to achieve a goal of eliminating traffic deaths and serious injuries by 2040 and endorses Vision Zero as the strategy by which that goal will be achieved. The Board further directs the Orange County Public Works Department to implement the Vision Zero Action Plan, including designation of a Vision Zero Coordinator, in order to achieve this goal and to work comprehensively and collaboratively with all applicable County departments in the implementation of such Vision Zero Action Plan.

Section 2. Progress Monitoring. The County will annually review vehicle, pedestrian, bicycle, motorcycle, and commercial vehicle crash data to measure progress and strategically adjust the approach through Vision Zero Action Plan updates every five years to meet the 2040 goal of zero traffic deaths and serious injuries.

Section 3. Vision Zero Priorities. The Vision Zero Action Plan prioritizes vehicle, bicycle, and pedestrian roadway safety, ADA accessibility, and resiliency through technology retrofits. Traffic deaths and serious injuries will be addressed through a combination of engineering, enforcement, education, equity, and evaluation.

Section 4. Funding Commitment. To create a safe, accessible, and multimodal transportation network for all users, Orange County commits to seek funding through grants or other sources, to implement safety improvements identified within the Vision Zero Action Plan for Orange County's highest priority corridors through 2040 and will identify these projects in capital improvements planning during the annual budget process.

Section 5. Vision Zero Commitment. Orange County further commits to evaluation and documentation of Vision Zero aspects and/or transportation safety countermeasures for implementation as part of all transportation capital improvement projects, development infrastructure projects, and roadway maintenance projects, based on standard operating procedures to be developed by the Public Works Department. Orange County specifically commits to completing the County's sidewalk network to improve pedestrian safety.

Section 6. Effective date. This Amended and Restated Resolution shall take effect upon the date of its adoption.

ADOPTED this _____ day of AUG 2 7 2024, 2024.

BOARD OF COUNTY COMMISSIONERS · ORANGE COUNTY FLORIDA ·

ORANGE COUNTY, FLORIDA
By: Board of County Commissioners

By: _____
for Jerry L. Demings
Orange County Mayor

ATTEST: Phil Diamond, CPA, County Comptroller
As Clerk of the Board of County Commissioners

By: _____
Deputy Clerk

APPENDIX B

Project Prioritization and Cost Estimates

TECHNICAL MEMORANDUM TASK 6.2

Date: August 16, 2024

To: Humberto Castillero, PE, PTOE, Manager, Orange County Traffic Engineering Division

Subject: Orange County Vision Zero Action Plan – Order of Magnitude Cost Estimates

INTRODUCTION

In the context of the Orange County Vision Zero Action Plan, a focused effort is required to address the top 24 High Injury Network corridors, where the frequency of traffic-related serious injuries and fatalities is notably high. Comprehensive roadway safety improvements have been proposed to mitigate these risks, and the order of magnitude cost estimates for these improvements have been outlined to guide budgeting and planning needs. The Vision Zero Action Plan considers diverse infrastructure enhancements, such as sidewalk improvements and pedestrian crossings, the implementation of bicycle infrastructure, other traffic calming measures like speed feedback signs and curb extensions, signalization and lighting upgrades. Additionally, the cost for full complete street improvements has been comprehensively estimated by the Orange County Traffic Engineering Division, as reflected in **Table 1**. Each of these countermeasures are proposed in light of for future Safe Streets and Roads for All (SS4A) implementation grant funding.

Proposed cost estimates are provided in alignment with those proposed by the larger MetroPlan Orlando regional Vision Zero effort. Each estimate includes a 20% contingency cost to accommodate potential variances in material costs, labor rates, unforeseen site conditions, and design modifications. The inclusion of this contingency cost is vital as it addresses uncertainties and ensures adequate funding allocation to cover all potential expenditures, aligning with best practices in project management and financial planning. It provides a necessary buffer to manage cost overruns and project complexities, ensuring project timelines and quality standards are maintained while mitigating risks effectively. These cost estimates serve as a foundational basis for future budgeting and planning efforts as Orange County progresses towards achieving its Vision Zero goals.

Table 1: Order of Magnitude Present Day Cost Estimates for Plan Recommendations

HIN Segment	From / To	Commissioner District	Planning Level Cost for Proposed Improvements	Orange County Complete Street Cost Estimate
Alafaya Tr	from Lake Underhill Rd to S.R. 50	4	$5,528,400.00	$11,442,792.00
Apopka Vineland Rd	from S.R. 535 to Lake St	1	$3,036,000.00	$2,068,977.60
Apopka Vineland Rd	from Palm Lake Dr to Conroy Windermere Rd	1	$4,032,000.00	$6,088,267.80
Avalon Park Blvd	from Timber Springs Blvd to S.R. 50	4	$5,727,600.00	$15,103,800.00
Clarcona Ocoee Rd	from Arden Oaks Dr to Pine Hills Rd	2	$5,571,600.00	$23,976,000.00
Dean Rd	from S.R. 408 to River Park Blvd	5	$4,579,200.00	$10,908,000.00
Edgewater Dr	from John Young Pkwy to Orange Blossom Tr	2	$6,510,000.00	$12,096,000.00
Forsyth Rd	from Green Needle Dr to North of University Blvd	5	$1,710,000.00	$1,664,000.00
Goldenrod Rd	from Beatty Dr to S.R. 50	3	$8,706,000.00	$32,130,000.00
Hiawassee Rd	from S.R. 50 to Silver Star Rd	6	$7,264,800.00	$14,040,000.00
Kaley Rd	from Rio Grande Ave to Parramore Ave	6	$1,320,000.00	$1,950,694.20
Lake Underhill Rd	from Semoran Blvd to Dean Rd	3	$7,898,400.00	$10,504,000.00
Landstar Blvd	from Osceola County Line to S.R. 417	4	$3,146,400.00	$8,201,730.60
Oak Ridge Rd	from Orange Blossom Trl to Orange Ave	3	$3,890,400.00	$8,996,400.00
Oak Ridge Rd	from Millenia Blvd to Orange Blossom Trl	6	$4,999,200.00	$15,087,600.00
Orange Ave	from Landstreet Rd to Taft Vineland Rd	3	$3,152,400.00	$5,832,000.00
Pine Hills Rd	from Silver Star Rd to Pinto Way	2	$3,423,600.00	$13,842,424.80
Pine Hills Rd	from Old Winter Garden Rd to S.R. 50	6	$2,562,000.00	$3,965,916.60
Rock Springs Rd	from E Welch Rd to Faye St	2	$2,882,400.00	$4,806,000.00
University Blvd	from Semoran Blvd to Goldenrod Rd	5	$9,133,200.00	$13,920,000.00
University Blvd	from Dean Rd to Alafaya Trl	5	$4,268,400.00	$17,942,120.00
Wallace Rd	from Burnway Dr to Stonehedge Dr	1	$1,496,400.00	$1,669,200.00
Wetherbee Rd	from S. Orange Blossom Trl to S. Orange Ave	4	$3,118,800.00	$10,157,400.00
World Center Dr	from S.R. 535 to International Dr	1	$2,098,800.00	$4,924,912.00
TOTAL			**$106,056,000**	**$251,318,236**

TECHNICAL MEMORANDUM TASK 6.1

Date:	August 2024
Prepared For:	Humberto Castillero, PE, PTOE, Manager, Orange County Traffic Engineering Division
Subject:	**Orange County Vision Zero Action Plan – HIN Corridor Prioritization, Crash Analysis, and Action Plan Outcomes**

CORRIDOR PRIORITIZATION AND CRASH ANALYSIS

Regional Action Plan Prioritization Criteria

Based on the priorities identified by MetroPlan Orlando in various policy documents, the Regional Vision Zero Action Plan established a set of prioritization criteria that were shared with the Regional Task Force. Initial feedback from the Task Force was incorporated into a revised draft of these criteria, which was then reviewed with key stakeholders, including the consultant team working on the Orange County Vizion Zero Action Plan and representatives from Orange County. The Safety Project Evaluation Criteria Scoring and Weight measurements are herein included as **Table A**, at the end of this document.

The evaluation criteria outlined in the Regional Plan are primarily focused on transportation disadvantage and safety with the identification of a 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. The Regional Action Plan Prioritization criteria also include additional considerations such as the inclusion of the Federal Highway Administration's (FHWA) proven safety countermeasures, potential effectiveness, and regional impact. The Regional Action Plan recognizes that these criteria may be applicable to varying extents for local agencies but allowed local agencies to establish their own prioritization standards to differentiate between projects. Orange County has developed a supplemental prioritization methodology to both focus mitigation efforts on county-controlled roadways within each Commissioner District with the identification of a top four (4) corridors in each

district and include supplemental equity analysis with the Orange County Environmental Justice Composite Score.

Corridor Prioritization Framework

Road safety interventions benefit from strategic planning though the optimization of resource allocation. Corridor prioritization is crucial as it helps to maximize the anticipated crash reduction, which in turn maximizes lives saved, minimizes injuries, and minimizes economic losses due to crashes. The prioritization of specific corridors for safety projects helps ensure that countermeasures are both impactful and cost-efficient. Additionally, an emphasis on corridors with high crash rates combined with considerations for vulnerable populations can significantly enhance community well-being and ensure that the benefits of improved safety are equitably distributed.

Scoring System

The Corridor Prioritization Framework (CPF) scoring system depicted in the following **Table 1** offers a sound approach to address this challenge. It assigns varying weights to different metrics to output a final score that reflects the overall safety and equity considerations of transportation corridors. To maximize the positive impact of countermeasures, two main crash statistics are prioritized in the scoring. 'Crash Frequency per Mile', emphasizing the total number of accidents per mile, and 'Crash Rate', as it accounts for traffic volumes to gauge the impact of road characteristics more accurately without skewing for exposure. In alignment with the County's goal to eliminate fatal and serious injury crashes by 2040, metrics focused on KSI crashes were weighted more heavily than non-KSI crashes.

Weights are given based on the percentile ranking for overall crashes and KSI crashes, as well as specific mode-involved crashes for pedestrians, bicyclists, and motorcyclists. The additional modal categories give more weight to corridors that experience more crashes involving vulnerable or at-risk commuters. The pedestrian, bicyclist, and motorcyclist statistics also reflect impacts to disadvantaged users, as they are more likely to use alternative, more affordable modes of transportation. In addition to the crash statistics, two equity measures were used to identify and provide additional weight to segments in underserved areas of the County. The 'USDOT Disadvantaged Communities Index' (DCI) underscores the federal government's Justice40 Initiative's goal to channel investments into areas historically affected by underinvestment, and the Orange County Environmental Justice Composite (OCEJ) indicates communities with higher likelihood of vulnerable residents.

The overall score for each metric is determined by the percentile rank of each segment in that metric. For example, if Segment A had the highest crash frequency per mile (placing it in the 100th percentile), it would receive 100% of the possible points for that metric. Conversely, if Segment B was in the 50th percentile for the same metric, it would receive 50% of the possible points. Segments that fell within the boundaries of the DCI or OCEJ were accounted for the full score for their respective weights. This ensures that the segments with the highest community needs and crash risks are identified and prioritized for safety enhancements.

The benefits of using this system are two-fold:

1. The data-driven approach enables Orange County to garner insights from the scoring system's associated metrics, enhancing targeted countermeasure recommendations

through a deeper understanding of impacted modes. These metrics will be considered in the high-level countermeasure recommendations as part of this Vision Zero Action Plan.

2. The scoring system serves as a generalizable, easy-to-use strategic tool to prioritize effective and equitable investments for enhancing safety for the roadway system, while also being applicable to any subset of corridors for ongoing and future safety planning studies.

Table 1: Corridor Prioritization Framework (CPF) Scoring System

Metric	Maximum Weight*	Description
Overall Crash Statistics		
Crash Frequency per Mile	5%	Crash frequency per mile is quantified as the number of crashes occurring each year for every centerline mile. Essentially, crash frequencies represent the total number of crashes occurring in a specific area over a given period of time. KSI statistics include only fatal and serious injury crashes, highlighting the severity of crashes occurring on those segments. While crash frequency can be skewed higher on roads with high traffic volumes, it is still an important metric in gauging the overall quantity of crashes on a segment.
KSI Crash Frequency per Mile	15%	
Crash Rate	10%	Crash rates are quantified as the number of crashes occurring per hundred-million miles of vehicle travel per year. Higher volume roads will typically experience higher crash frequencies as a result of higher exposure. Unlike crash frequencies, crash rate calculations account for traffic volumes to adjust for exposure. Therefore, crash rates can more accurately gauge the impacts of specific roadway characteristics, while not being skewed by low or high traffic volumes. Traffic volume data for each segment was retrieved from the FDOT Florida Traffic Information Database.
KSI Crash Rate	15%	
Pedestrian and Bicyclist Crash Statistics		
Pedestrian Crash Frequency per Mile	5%	Pedestrian and Bicyclist crash statistics include all crashes involving a pedestrian or bicyclist. These statistics are given a higher weight as they involve vulnerable road users and are significantly more likely to result in KSI outcomes. Furthermore, Pedestrian and Bicyclist crash statistics also reflect transportation disadvantaged areas, as commuters in these areas are less likely to be able to afford a motor vehicle. KSI crash rates and frequency were not included as individual metrics for bicyclists, pedestrians, and motorcyclists due to these crashes being included in the overall crash statistics. Bicyclist and pedestrian crash rates are calculated based on vehicular traffic data and therefore only account for individual bicyclist and pedestrian exposure to vehicles. This metric does not account for bicyclist and pedestrian volumes on these roadways and therefore does generate some bias towards roadways with lower traffic volumes that may be outliers in overall bicyclist/pedestrian activity.
Bicyclist Crash Frequency per Mile	5%	
Pedestrian Crash Rate	10%	
Bicyclist Crash Rate	10%	
Motorcycle Crash Statistics		
Motorcycle Crash Frequency per Mile	5%	Motorcycle crash statistics include all crashes involving a motorcycle. Similarly with pedestrian and bicyclist crashes, motorcyclist crashes are significantly more likely to result in an KSI outcome.
Motorcycle Crash Rate	10%	
USDOT Disadvantaged Communities Statistics (USDOT Equitable Transportation Community - ETC Data)		
USDOT Disadvantaged Communities Index (DCI)	5%**	The Disadvantaged Communities Index was developed as part of the Justice40 Initiative by the federal government in order to address gaps in transportation infrastructure and public services. The initiative aims to prioritize the flow of investment towards communities that have historically suffered from underinvestment in infrastructure by synthesizing US Census data for the following five components: Transportation Insecurity, Climate and Disaster Risk Burden, Environmental Burden, Health Vulnerability, and Social Vulnerability. Incorporating this statistic ensures that priority is given to facilities and residents most in need of those improvements.
Orange County Environmental Justice Composite Score	5%**	Orange County developed this tool in 2022 to identify areas of the County where poverty and household overcrowding rates, minority, disabled or aging populations, and populations with lower English proficiency are higher than the County average. Incorporating this statistic ensures traditionally vulnerable populations benefit from the enhanced focus on safety improvements within their communities.

**Scoring for each category is proportional to the percentile rank for each segment corresponding to that statistic. For instance, for the Crash Rate, the 100th percentile segment is the one with the highest CFPM. That segment receives the full 10% score for the Crash Rate statistic. The 50th percentile segment receives a 5% score. The segment with the lowest value for CFRPM receives a zero score, etc.*

***For the DCI and OCEJ weighting, the percentile distribution only includes segments that intersect or border a designated Disadvantaged Community (DC) per the USDOT, or fall within a census tract with 3 or more OCEJ indicators. Segments that do not intersect or border these features are given a score of 0%. Segments that do intersect or border a DC are given the maximum 5% weighting, to ensure this statistic is strongly represented.*

Crash Analysis

The statistical results from the crash analysis are given the most weight toward the prioritization of corridors and segments recommended for future safety improvements. Therefore, the results are critical in determining which corridors require immediate attention for safety improvements, while also pinpointing the specific segments and modes which are most at-risk in each corridor. Focusing on higher ranked corridors ensures a more targeted approach that directs investment towards corridors and segments where countermeasures can have the most impact. This data-driven strategy not only promotes the efficient use of resources but also aligns with broader goals of reducing crashes, enhancing mobility, and protecting vulnerable road users. The following sections summarize the methodology in developing crash statistics and discuss the results of the analysis and final CPF rankings.

Segmentation Methodology

In addition to the inclusion and weighting of crash rate statistics, one of the more advanced aspects of the crash analysis methodology is the 'Worst Segment' approach used in evaluating corridor crash statistics. More simplified overall corridor statistics, such as crashes per mile, across full corridors that may span upwards of 20 miles are too imprecise to inform efficient decision making and prioritized locations for specific improvements. While action plans are intended to be high-level evaluations, these simplified methods result in statistics that are easily skewed by variations in traffic volumes, land uses, and roadway characteristics or function. These variations can be accounted for by splitting each corridor into shorter segments based on the FDOT cosite (traffic counter) segments used to record traffic volumes, where a costite (x) is associated with specific mile posts along each corridor, allowing for the evaluation of crash statistics in shorter increments along each segment. Generally, this created more manageable roadway sections with approximately 60% of the recorded segments being one mile or less, and 87% being two or less miles long. At 3% of the total HIN miles, seven segments are outliers with lengths longer than 3 miles. The benefits of segmentation can be summarized as follows:

1. Segmentation minimizes the effect of variations throughout longer corridors, by evaluating shorter segments.
2. By evaluating corridors at a higher resolution, segmentation identifies which specific areas along each corridor are most at-risk, allowing for more targeted recommendations of safety strategies and countermeasures in this Action Plan and future corridor-level studies.
3. By evaluating segments that are more uniform, this method also accommodates a generalizable, systemic approach to consider similar safety interventions along segments with similar crash and roadway characteristics.
4. Segmentation also helps in identifying projects that are shorter in length and can be carried out sooner.

The next step is to score segments according to the CPF scoring system in **Table 1** and rank them based on the final score. Finally, the final score and ranking for each overall corridor is determined based on the score and ranking for the 'Worst Segment' on that corridor. A figure reflecting the steps to identify the HIN corridor ranking is shared in **Figure 1**.

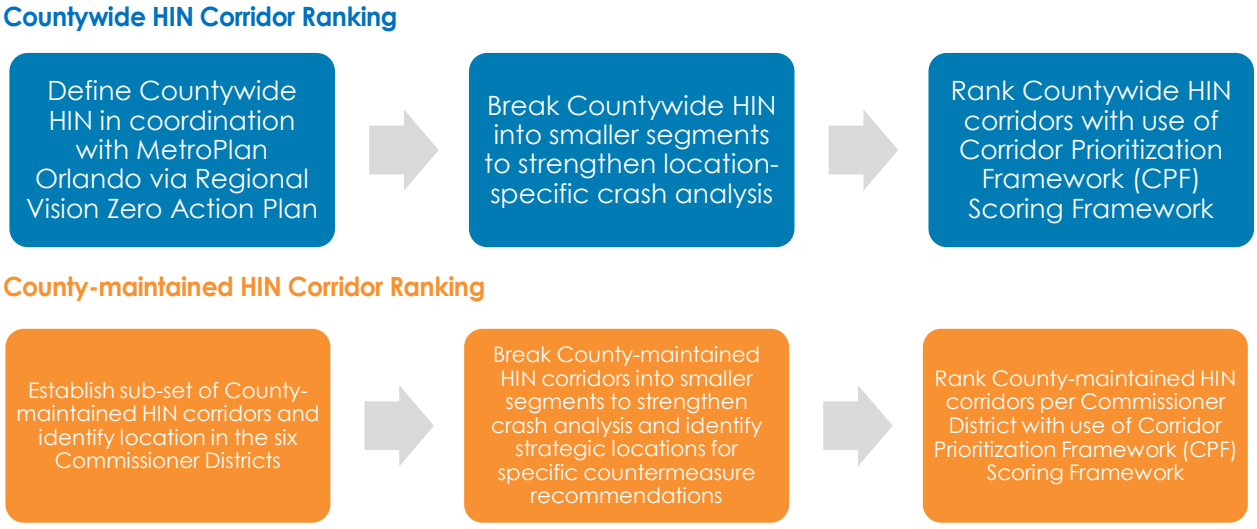


Figure 1: Steps to Prioritize HIN Segments

Table 2 lists the top 25 HIN corridors in Orange County, ranked by the worst ranked, or most dangerous, segment. Many of the corridors listed in **Table 2** span several miles and are under FDOT control.

Table 2: Top 25 Corridors (Worst Ranked Segment)

Overall Rank (Worst Segment)	Local Name	From	To	Average Score	Worst Corridor	BOCC District	Length (mi)	Total Crashes (KSI Crashes)	Pedestrian Crashes (KSI Crashes)	Bicyclist Crashes (KSI Crashes)	Motorcycle Crashes (KSI Crashes)	Motor Vehicle Crashes (KSI Crashes)
1	KIRKMAN RD	Carrier Dr	Colonial Dr	0.551	0.947	6	4.39	2,249 (69)	34 (15)	9 (1)	34 (12)	2,156 (41)
2	SILVER STAR RD	Savoy Dr	Maguire Rd	0.773	0.945	Multi	4.01	1,447 (123)	71 (27)	28 (3)	16 (6)	1,302 (87)
3	WASHINGTON ST/ GARLAND AVE / ROBINSON ST	Terry Ave	Mills Ave	0.564	0.926	Multi	4.02	1,686 (24)	31 (8)	18 (1)	28 (4)	1,600 (11)
4	PINE HILLS RD	Old Winter Garden Rd	Pinto Way	0.675	0.901	Multi	5.10	1,318 (88)	46 (18)	22 (5)	20 (6)	1,207 (59)
5	CURRY FORD / DEAN RD	Fredrica Dr	River Park Blvd	0.698	0.901	Multi	5.48	1,183 (49)	24 (4)	16 (3)	27 (7)	1,109 (36)
6	COLONIAL DR	Orange Blossom Trail	Brevard County Line	0.517	0.868	Multi	24.92	4,777 (207)	71 (27)	55 (14)	87 (23)	4,523 (143)
7	ORANGE BLOSSOM TRL	Colonial Dr	Drage Dr	0.560	0.866	Multi	6.50	1,826 (84)	50 (22)	13 (3)	34 (10)	1,704 (49)
8	W COLONIAL DR	Economic Ct	Orange Blossom Trail	0.487	0.850	Multi	8.30	2,630 (122)	62 (25)	26 (5)	34 (8)	2,478 (84)
9	WESTMORELAND DR	Gore St	Washington St	0.662	0.827	6	0.87	165 (10)	8 (2)	4 (1)	2 (1)	148 (6)
10	ORANGE BLOSSOM TRL	Town Center Blvd	Colonial Dr	0.673	0.821	Multi	12.84	5,735 (265)	153 (67)	81 (18)	107 (22)	5,309 (158)
11	CENTRAL BLVD	Division Ave	Rosalind Ave	0.626	0.806	3	0.51	164 (2)	3 (0)	6 (1)	5 (1)	149 (0)
12	OAKRIDGE RD	Millenia Blvd	Orange Blossom Trail	0.765	0.789	Multi	2.79	1,249 (47)	41 (11)	12 (2)	13 (5)	1,170 (29)
13	GOLDENROD RD	Beatty Dr	Glenmoore Blvd	0.589	0.780	Multi	8.44	2,600 (143)	31 (9)	51 (14)	66 (18)	2,429 (102)
14	SAND LAKE RD / MCCOY RD	Turkey Lake Rd	Jetport Dr	0.527	0.769	Multi	6.64	2,315 (112)	40 (20)	2 (0)	30 (5)	2,223 (87)
15	FAIRBANKS AVE / OSCEOLA AVE / ALOMA AVE	Park Ave	Tangerine Ave	0.535	0.757	5	1.05	448 (10)	3 (2)	1 (0)	10 (2)	432 (6)
16	JOHN YOUNG PKWY	Town Loop Blvd	Colonial Dr	0.461	0.755	Multi	10.54	3,254 (135)	38 (18)	11 (3)	38 (11)	3,146 (103)
17	KALEY ST	Rio Grand Ave	Division Ave	0.686	0.742	6	1.01	178 (11)	2 (1)	4 (1)	2 (1)	168 (8)
18	CLARCONA RD	Colonial Dr	Silver Star Rd	0.756	0.732	6	1.76	696 (25)	8 (4)	3 (0)	8 (1)	673 (20)
19	POWERS DR	Gamble Dr	Indian Hill Rd	0.658	0.727	Multi	2.28	405 (20)	11 (4)	6 (1)	11 (4)	372 (11)
20	ROCK SPRINGS RD	Welch Rd	Faye St	0.678	0.717	2	0.89	229 (11)	10 (1)	1 (0)	5 (1)	212 (9)
21	N ROSALIND AVE	Orange Ave	Livingston St	0.611	0.709	Multi	0.92	257 (9)	12 (4)	1 (1)	6 (1)	233 (3)
22	JOHN YOUNG PKWY / LEE RD	Colonial Dr	Gloriosa Ave	0.574	0.705	Multi	2.88	1,330 (42)	18 (9)	9 (1)	15 (9)	1,278 (23)
23	FAIRBANKS AVE	Park Ave	Tangerine Ave	0.464	0.686	5	2.52	758 (27)	9 (5)	8 (0)	18 (8)	718 (14)
24	RIO GRANDE AVE	W Gore St	Holden Ave	0.615	0.680	6	2.52	586 (34)	15 (6)	6 (1)	2 (0)	556 (27)
25	NORTH LN	Westgate Rd	Pine Hills Rd	0.588	0.664	2	0.53	60 (7)	7 (2)	0	1 (1)	50 (4)

Data Collection and Crash Rate Calculation

As previously noted, one of the major roadway characteristics that may vary across a corridor are the vehicular traffic volumes (AADT – Average Annual Daily Traffic). Traffic volumes are one of the main variables used in crash rate calculations. These volumes can vary significantly over the length of a corridor or even across two sides of a single intersection. For instance, the 5-year average AADT (2018-2022) on Powers Dr is 10,240 from Old Winter Garden Rd to Silver Star Rd (Segment 1), increasing to 15,140 between Silver Star and Clarcona/ Ocoee Road (Segment 2).

Historic AADT data for each segment was retrieved from the FDOT Florida Traffic Information Database, which includes cosite (traffic counter) data corresponding to individual segments. For most segments, only one cosite was available, however, a few of the segments with more available cosites were given the average of historical AADTs from multiple cosites.

Crash data was collected and assigned to each individual HIN segment based on a 250 foot buffer from the centerline on both sides of the roadway (500 feet across the roadway), for the five (5) year period between January 1st, 2018, to December 31st, 2022. A total of 27,183 crashes were reported within the study area and time period. Finally, modal crash rates were computed based on the following formula (source: the AASHTO Highway Safety Manual 1st edition 2014):

$$R = \frac{C * 100{,}000{,}000}{V * 365 * N * L}$$

Where:

- **R** = Crash rate for the road segment expressed as crashes per 100 million vehicle-miles of travel
- **C** = Total number of Category-specific crashes in the study period (CPF categories include All Crashes, KSI Crashes, Pedestrian Crashes, Bicyclist Crashes, Motorcyclist Crashes, and CMV Crashes)
- **V** = Traffic volumes using Average Annual Daily Traffic (AADT) volumes, averaged over 5 years
- **N** = Number of years of data (5 years)
- **L** = Length of the roadway segment in miles

Crash Rate Results and Corridor Prioritization Scoring and Ranking

In order to prioritize safety projects to locally controlled segments, and encourage local engagement with safety projects, **Table 3** illustrates the top 4 county-maintained* roadway segments for each Commission District. Some segments exhibit higher crash rates across multiple modes. Therefore, safety improvements at these locations have the most potential to provide the highest crash reductions and enhanced safety for the most vulnerable users. However, even some of the lower ranked corridors may experience significantly high crash rates for a specific category or mode. To illustrate how these statistics should be interpreted, the following sections summarize how crash statistics were evaluated at a high-level to recommend potential countermeasures.

In addition to local roadways, several opportunities exist where FDOT-controlled HIN roadways intersect with locally controlled HIN sections, the top 20 FDOT roadway segments that intersect local HIN roadways is illustrated in **Table 4**. Many of these corridors are represented on MetroPlan Orlando's Regional HIN, so these segments represent good opportunities to identify and pursue multiple funding sources for safety improvements on some of the most dangerous roadways in the County.

Table 3: Top 4 County-Maintained* Segments Per Commission District

Overall Rank	Local Name	BOCC District	Segment Length	From	To	Avg AADT	Total crashes (KSI Crashes)	Ped Crashes (KSI Crashes)	Bicyclist Crashes (KSI Crashes)	Motorcycle Crashes (KSI Crashes)	Motor Vehicle Crashes (KSI Crashes)	Crash Freq Rank	KSI Crash Freq Rank	Crash Rate Rank	KSI Crash Rate Rank	Ped Crash Freq/mile Rank	Bicyclist Crash Freq /mile Rank	Ped Crash Rate Rank	Bicyclist Crash Rate Rank	Motor-cyclist Crash Freq /mile Rank	Motor-cyclist Crash Rate Rank	US DOT DCI	OC EJ Index	Total Score	Worst Segment
												5%	15%	10%	15%	5%	5%	10%	10%	5%	10%	5%	5%		
102	WALLACE RD	1	0.64	Burnway Dr	Stonehedge Dr	9780	56 (5)	1 (1)	2 (0)	3 (1)	50 (3)	16	51	99	168	35	125	105	186	101	185	0	0	0.513	0.513
138	WORLD CENTER DR	1	0.62	SR 535	International Dr	25000	262 (6)	1 (0)	0 (0)	3 (1)	258 (5)	143	86	162	107	41	1	49	1	104	120	1	0	0.426	0.363
160	APOPKA-VINELAND RD	1	0.38	SR 535	Lake St	28500	106 (3)	4 (2)	1 (0)	0	101 (1)	102	52	107	64	164	101	165	109	1	1	0	0	0.363	0.363
191	APOPKA-VINELAND RD	1	1.13	Palm Lake Dr	Conroy Windermere Rd	36300	146 (9)	2 (1)	4 (0)	1 (0)	139 (8)	28	60	16	42	44	133	42	114	15	13	0	0	0.218	0.220
176	EDGEWATER DR	2	2.24	E Welch Rd	Faye St	22260	229 (11)	10 (1)	1 (0)	5 (1)	213 (9)	32	24	50	50	23	91	34	116	15	21	1	1	0.300	0.300
39	KELLY PARK RD	2	0.89	Silver Star Rd	Pinto Way	16920	515 (38)	22 (9)	7 (3)	10 (5)	476 (21)	94	119	157	162	166	62	187	90	120	163	1	1	0.712	0.608
84	PINE HILLS RD	2	2.56	Arden Oaks Dr	Pine Hills Rd	35400	530 (28)	6 (1)	9 (0)	7 (3)	508 (24)	69	137	43	117	155	109	141	100	79	71	1	1	0.564	0.567
115	CLARCONA OCOEE RD	2	2.90	John Young Pkwy	Orange Blossom Trl	25100	311 (12)	2 (2)	5 (1)	2 (0)	302 (9)	58	85	70	105	55	124	60	131	50	60	1	1	0.468	0.468
13	GOLDENROD RD	3	5.95	Beatty Dr	SR 50	36880	1386 (83)	21 (5)	26 (4)	40 (13)	1299 (54)	134	160	114	138	78	113	67	101	160	141	1	0	0.588	0.780
109	LAKE UNDERHILL RD	3	4.51	E Landstreet Rd	Taft Vineland Rd	18940	275 (16)	1 (0)	2 (0)	7 (2)	265 (14)	184	154	196	175	104	90	140	122	184	195	1	1	0.805	0.491
51	OAK RIDGE RD	3	1.67	Orange Blossom Trl	Orange Ave	24700	283 (24)	8 (5)	7 (1)	10 (5)	258 (13)	50	133	58	147	111	144	128	151	129	135	1	1	0.647	0.647
31	S ORANGE AVE	3	1.08	San Juan Blvd	S Dean Rd	39300	1041 (31)	3 (1)	7 (1)	20 (9)	1011 (20)	146	183	128	165	115	183	87	167	194	183	1	0	0.744	0.556
117	ALAFAYA TRL	4	1.43	Lake Underhill Rd	SR 50	50900	598 (17)	7 (3)	3 (0)	7 (1)	581 (13)	142	116	91	47	113	89	68	61	105	59	1	1	0.467	0.471
124	FAIRWAY WINDS BLVD	4	1.52	Osceola CL	SR 417	29900	280 (18)	2 (0)	2 (0)	7 (3)	269 (15)	60	115	49	110	29	64	39	66	98	105	1	1	0.454	0.454
133	AVALON PARK BLVD	4	2.80	Timber Springs Blvd	SR 50	17680	291 (22)	2 (0)	13 (4)	4 (1)	272 (17)	19	53	46	124	21	153	35	179	29	51	1	1	0.437	0.437
145	WETHERBEE RD	4	1.88	S. Orange Blossom Trl	S. Orange Ave	21200	276 (15)	3 (1)	2 (0)	6 (4)	265 (10)	40	58	62	103	37	61	56	74	65	99	1	1	0.411	0.411
64	FORSYTH RD	5	0.72	Green Needle Dr	N. Of University Blvd	18300	95 (7)	1 (1)	6 (1)	6 (4)	82 (2)	30	87	68	141	31	185	57	191	155	181	1	1	0.612	0.612
104	UNIVERSITY BLVD	5	1.78	Semoran Blvd	Goldenrod Rd	37700	539 (15)	11 (1)	13 (1)	7 (2)	508 (11)	112	68	86	44	130	174	110	161	81	67	1	1	0.513	0.513
116	UNIVERSITY BLVD	5	2.24	Dean Rd	Alafaya Trl	46200	657 (36)	8 (4)	5 (1)	15 (5)	629 (26)	108	148	51	95	79	91	58	72	137	96	1	0	0.467	0.472
120	DEAN RD	5	2.10	SR 408	River Park Blvd	21960	364 (15)	8 (2)	7 (1)	9 (1)	340 (11)	52	41	83	87	87	130	115	144	91	122	1	0	0.461	0.466
5	PINE HILLS RD	6	0.73	Old Winter Garden Rd	SR 50	16640	335 (29)	10 (3)	5 (0)	4 (0)	316 (26)	153	190	186	197	177	170	193	187	116	162	1	1	0.899	0.899
34	HIAWASSEE RD	6	1.76	SR 50	Silver Star Rd	15940	696 (25)	8 (4)	3 (0)	8 (1)	677 (20)	137	132	183	176	108	76	152	116	97	149	1	1	0.727	0.727
21	OAK RIDGE RD	6	2.79	Millenia Boulevard	Orange Blossom Trial	24000	1249 (47)	41 (11)	12 (2)	13 (5)	1183 (29)	152	153	172	160	178	147	184	156	100	119	1	1	0.786	0.786
32	KALEY ST	6	0.75	Rio Grande Ave	Parramore Ave	2600	51 (8)	1 (0)	1 (1)	2 (1)	47 (6)	10	101	184	201	30	65	181	193	56	200	1	1	0.738	0.738

Table 4: Top 20 FDOT / Local HIN Segments (Intersection)

Overall Rank	Local Name	BOCC District	Segment length	Cosite Segment (From)	Cosite Segment (To)	Total Crashes	Total KSI Crashes	Ped Crashes	Bicyclist Crashes	Motor-cycle Crashes	Crash Freq Rank	KSI Crash Freq Rank	Crash Rate Rank	KSI Crash rate Rank	Ped Crash Freq/mile Rank	Bicyclist Crash Freq/mile Rank	Ped Crash Rate Rank	Bicyclist Crash Rate Rank	Motor-cyclist Crash Freq /mile Rank	Motor-cyclist Crash Rate Rank	US DOT DCI	OC EJ Index	Total Score
2	KIRKMAN RD	6	0.13	INTERNATIONAL DR	Bridge No-750042	275	6	8	3	2	202	197	194	179	202	202	196	190	189	152	1	1	0.938
3	SEMORAN BLVD	3	0.63	HOFFNER AVE	CURRY FORD RD	1176	25	16	10	18	200	195	189	162	195	200	172	180	201	182	1	1	0.919
6	SEMORAN BLVD	3	0.79	SR-50 WB	FROM UNIVERSITY BLVD	681	41	20	8	17	187	200	173	189	194	192	183	170	198	183	1	0	0.880
7	ORANGE BLOSSOM TRL	2	0.32	EDGEWOOD DR	CR-435/PARK AVE	264	9	11	3	3	185	183	176	166	201	189	194	172	161	129	1	1	0.872
8	COLONIAL DR	5	1.00	US17/92/441SR500/600	SR 527 / ORANGE AVE	889	32	28	8	13	190	188	185	183	198	180	195	174	178	174	1	0	0.870
9	SILVER STAR RD	6	0.99	POWERS DR	PINE HILLS RD	458	31	22	6	9	159	185	149	184	192	165	188	157	159	145	1	1	0.856
10	N GARLAND AVE	6	0.12	GARLAND AVE/SR526	GARLAND AVE	134	1	4	1	1	194	71	200	167	200	181	201	197	153	192	1	1	0.847
12	COLONIAL DR	3	1.21	N/A	EAST RIVER FALCON WY	891	59	10	23	18	180	198	166	192	147	201	131	192	185	167	1	0	0.840
13	COLONIAL DR	4	0.70	N/A	N/A	418	24	8	10	9	174	190	136	163	169	197	139	182	177	140	1	1	0.834
15	ORANGE BLOSSOM TRL	6	0.69	I-4 / SR-400 EB	KALEY AVE	317	11	8	5	6	157	158	158	153	170	173	170	178	158	155	1	1	0.820
17	ORANGE BLOSSOM TRL	4	1.52	CENTRAL FLORIDA PKWY	N/A	862	28	18	8	20	169	165	152	142	172	158	154	140	179	164	1	1	0.796
18	ORANGE BLOSSOM TRL	6	2.58	CR-506 / OAKRIDGE RD	I-4 / SR-400 EB	1191	68	58	21	33	158	182	100	149	193	182	173	146	176	137	1	1	0.795
19	S ORANGE AVE	5	0.13	SR-527 SB/ORANGE AVE	HOLDEN AVE	173	8	1	1	2	198	202	191	196	142	177	127	160	187	176	0	0	0.793
20	ORANGE BLOSSOM TRL	6	1.00	GORE ST	ROBINSON ST	609	15	18	7	8	175	149	161	130	188	171	179	162	152	128	1	1	0.787
26	JOHN YOUNG PKWY	6	0.39	CHURCH ST	CR 526/WINTER GDN RD	202	20	7	1	3	163	199	120	187	187	96	164	75	149	104	1	1	0.762
30	COLONIAL DR	5	0.64	SR 551 /GOLDENROD RD	SR 417	336	25	11	9	10	164	194	110	170	183	196	158	181	188	151	0	0	0.747
33	SILVER STAR RD	6	0.97	PINE HILLS RD	SR-438/PRINCETON ST	331	23	15	8	3	122	180	102	161	180	183	171	171	62	56	1	1	0.734
34	S ORANGE AVE	5	1.26	HOLDEN AVE	MICHIGAN ST	487	20	10	8	10	133	156	124	137	145	166	138	153	151	127	1	1	0.731
36	ORANGE BLOSSOM TRL	3	2.39	SR-417 SB	CENTRAL FLORIDA PKWY	1260	57	21	23	17	165	181	108	136	156	190	108	154	147	88	1	1	0.723
40	S ORANGE AVE	3	1.20	SR-482/MC COY RD	SR-527 SB/ORANGE AVE	521	22	6	10	22	146	164	128	141	114	184	84	167	194	181	1	0	0.710

ACTION PLAN OUTCOMES

Crash Countermeasure Discussion and Recommendations

Recommended countermeasures are based on a limited set of crash statistics and a high-level understanding of corridor contexts. Corridor-level planning studies are necessary to refine and design recommendations specific to individual intersections and segments. Such studies should be prioritized based on the CPF rankings and should take advantage of the crash data, statistics, and recommendations provided in the Vizion Zero Action Plan.

These crash metrics and corridor prioritization shall be considered for the forthcoming recommendations of safety strategies and countermeasures in the final Action Plan.

Finalized Action Plan Cut-Sheets

The finalized Action Plan "Corridor Cut-Sheets," presented in Chapter 6 of the Action Plan, illustrate the prioritization rankings, crash metrics (including modal crash rates, modal rankings, crash profiles, crash types, and worst segments), and countermeasure recommendations for the segments identified in **Table 3**.

Table A: MetroPlan Orlando Safety Project Evaluation Criteria Scoring and Weight

Performance Indicator	Description	Criteria Scoring	Goal Area Weight
Safety Score – Corridor Projects Source: Signal 4 Analytics, MetroPlan Orlando HIN Calculations. Analysis Notes: Reflects score weighted on a per mile basis for corridors. See notes below for scoring of intersections.	> 10,424 to 17,478	1.0	50%
	> 8,953 to 10,424	0.75	
	> 6,903 to 8,953	0.50	
	1,410 to 6,903	0.25	
Safety Score – Intersection Projects Source: Signal 4 Analytics, MetroPlan Orlando HIN Calculations.	> 1,050 to 10,140	1.0	
	> 299 to 1,050	0.75	
	> 36 to 299	0.50	
	1 to 36	0.25	
Transportation Underserved Source: Regional Equity Profiles, MetroPlan Orlando. Analysis Notes: A buffer of 100 feet should be applied to each corridor to identify if it is with a census tract that meets the criteria. For corridors that cross multiple census tracts, use data from census tract that at least 50% of corridor travels through.	Meets 4 or 5 of the ETC Criteria	1.0	15%
	Meets 2 or 3 of the ETC Criteria	0.75	
	Meets 1 of the ETC Criteria	0.50	
	Is within the top 50th percentile of the region but does not meet any of the ETC Criteria	0.25	
Safety Benefit Notes: Based on the FDOT context classification guidelines, where applicable. Where a context classification has not been set, use proposed reduction in speed or resulting target speed to determine scoring. Potential countermeasures to achieve the desired target speed would need to be conceptually identified.	Target Speed set for the lowest allowable for context classification or functional classification (corridor project).	1.0	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	

Source: MetroPlan Orlando; Fehr & Peers, 2024

Performance Indicator	Description	Criteria Scoring	Goal Area Weight
	Project includes features that slow vehicles through an intersection (roundabout, reduced curb radii, protected intersection elements, etc.) (intersection project).	1.0	
	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).	1.0	
Project is on multiple high injury networks [Regional, County (all roads), County (County roads), Local (all roads), Local (local roads) or high-risk network] Notes: Overlapping HINs can be found on visionzerocfl.gov.	Project is on 2 networks	1.0	10%
	Project is on 1 network	0.5	
Implementation Timeline Notes: assessment of implementation time should also consider agency coordination.	Project primarily includes low-cost / quick build elements, or	1.0	10%
	A publicly available concept plan that included public engagement has been prepared; or	1.0	
	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	1.0	
	Project is identified as an unfunded need in the MTP.	0.5	

Source: MetroPlan Orlando; Fehr & Peers, 2024

APPENDIX C

Review of Existing Policies and Standard Operating Procedures

TECHNICAL MEMORANDUM TASK 5.1

Date: January 15, 2024

Prepared by: Christy Lofye, PE, PTOE, RSP1, Inwood Consulting Engineers
Conroy Jacobs, AICP, PMP, Inwood Consulting Engineers

Prepared for: Humberto Castillero, PE, PTOE, Manager, Orange County Traffic Engineering Division

CC: Roberta Fennessy, AIA, AICP, VHB
Katie Shannon, AICP, CNU-a, LEED GA, VHB

Subject: Orange County Vision Zero Action Plan - Review of Existing Policies and Guidelines

INTRODUCTION

Task 5.1 required a review of existing local transportation and land use policies, plans, guidelines, and standards, with a focus on documents under the County's purview. The goal of this review was to identify opportunities to develop or strengthen consistency between these documents and the Vision Zero initiative and to identify any barriers within these documents to reaching zero fatal and severe injuries on the transportation system within Orange County.

Federal, state, and regional guidance documents were also reviewed with the purpose of aligning Orange County's VZAP with best practices and to identify opportunities to integrate data, contents, and recommendations into the Vision Zero Action Plan (VZAP) that the County may consider for adoption.

In addition, five adopted Vision Zero Action Plans were reviewed, with data and indicators collected by each community and best management practices summarized. This memorandum outlines potential countermeasures or strategies to reduce severe injury and fatal crashes, as well as draft recommendations for potential transferability to the County's VZAP.

REVIEW OF ORANGE COUNTY DOCUMENTS

The Consultant reviewed the following Orange County documents:

- Orange County Code Draft 4.0
- Draft Vision 2050 Complete Book – 7.25 BCC (Draft 4/11/2023), including draft proposed revisions
- The Orange County Pedestrian and Bicycle Safety Action Plan (PBSAP)
    - PBSAP Task 1 Overview Technical Memorandum
    - PBSAP Stakeholder Workshop Presentation
    - Orange County Bicycle Safety Action Plan, August 2019
    - Orange County Pedestrian Countermeasures, November 2018
- Americans with Disabilities Act (ADA) in the Public Rights-of-Way Transition Plan, April 2016
- Orange County Sustainable Operations & Resilience Action Plan, January 2021

The Orange County Code update is underway, as well as the Vision 2050 comprehensive plan update, providing a strategic opportunity to view both from the Vision Zero safety lens. Both were found to include a number of policies, goals, objectives, and standards that will advance the County's safety and mobility goals. As Vision 2050 is still a work in progress, draft proposed revisions recommended by County staff that address Complete Streets and Context Sensitive Design were also reviewed.

The PBSAP review included four Task 1 documents, as well as a clearer understanding of the connections between them if combined into a single comprehensive document, perhaps with appendices. The PBSAP is a great resource for staff to find pedestrian and bicycle countermeasures, as well as Orange County's standards for their applications. The Consultant recommends that the County document plans to address consultant recommendations, and routinely review and update the PBSAP to incorporate more recent document references and modifications to County standards and applications.

The ADA Transition Plan establishes a plan and procedures for attaining ADA compliance on Orange County's roadways. This plan should also be updated, document progress toward compliance, and incorporate changes included in the recent Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) Final Rule, effective September 7, 2023, as a best practice until its adoption by the Department of Justice and the United States Department of Transportation.

For each of these documents, the safety policies and goals, safety data and analysis, and countermeasures were described; and the Vison Zero Network's Vision Zero Core Element link and FHWA Safe System Element link were identified. In addition, potential policy changes for each document were provided, along with the likely core department that would be responsible for the change, if accepted. The summary table is provided as **Table 1, Orange County Documents Review Summary**.

REVIEW OF GUIDANCE DOCUMENTS

The Consultant reviewed the following national guidance documents, state safety documents, and MetroPlan Orlando plans:

- USDOT FHWA Lessons Learned from the Development of Vision Zero Action Plans (January 2021)

- USDOT Safe Streets for All (SS4A) Notice of Funding Opportunity (NOFO) Grant Program Requirements (August 2022)
- USDOT FHWA Strategies to Coordinate Zero Deaths Efforts for State and Local Agencies (November 2020)
- FDOT Strategic Highway Safety Plan (March 2021)
- FDOT and Smart Growth America's Complete Streets Implementation Plan; M2D2 Multimodal Development and Delivery (December 2015)
- FDOT Pedestrian and Bicycle Root Cause Analysis (March 2023)
- FDOT Smart Work Zone Initiative Case Study (March 19, 2021)
- FDOT Smart Work Zone Transportation Symposium Webinar (January 19, 2021)
- MetroPlan Orlando 2040 Long Range Transportation Plan: Bicycle and Pedestrian Plan (January 2016)
- MetroPlan Orlando's Health Strategic Plan (January 2022)
- MetroPlan Orlando's 2045 Metropolitan Transportation Plan (MTP)(Adopted December 9, 2020, revised December 14, 2022)

For each of these documents, identified safety policies and goals, safety data and analysis, and strategies or countermeasures were described; and the Vision Zero Core Element link and Safe System Element link were identified. In addition, potential actions for incorporation into Orange County's VZAP for each document were provided, along with the likely core department that would be responsible for the action, if accepted. The summary table is provided as **Table 2, Guidance Document Review Summary**.

REVIEW OF ADOPTED VISION ZERO ACTION PLANS

The Consultant reviewed the following five adopted VZAPs:

- Vision Zero Orlando, City of Orlando Vision Zero Action Plan (Spring 2020)
- Vision Zero Tampa, City of Tampa Vision Zero Action Plan (December 2021)
- Vision Zero Hillsborough, Hillsborough County Vision Zero Action Plan (December 2017)
- Miami-Dade County Vision Zero 2021 Framework Plan
- One Albuquerque, Albuquerque's Vision Zero Action Plan (2021)

Four of the five VZAPs are for agencies within Florida, and all but Miami-Dade County are recognized by the Vision Zero Network as Vision Zero Communities. These are communities who are taking demonstrable and significant actions to advance the principles of Vision Zero to ensure safe mobility for all people.

For each of the VZAPs, the review included notation of the type of safety data collected and safety analysis conducted as part of the plan, as well as the Action Plan's safety policies, goals, strategies, and

countermeasures. Vision Zero Core Element and Safe System Element links were identified. In addition, actions from each VZAP that may be considered for incorporation into Orange County's VZAP were provided, along with the likely core department that would be responsible for the action, if accepted. The summary table is provided as **Table 3, Adopted VZAP Review Summary**.

SUMMARY

Task 5.1 review tasks have been completed resulting in both suggestions for revisions to existing Orange County documents, and potential actions for transferability and incorporation into Orange County's VZAP. Potential actions summarized from other agency VZAPs have been tailored to Orange County's programs and preferences. The Consultant requests review of the draft suggestions and recommendations included in the summary tables, and a follow-up meeting will be scheduled to establish the local data, metrics, and indicators to be collected and assessed for future tasks.

Table 1
Orange County Documents Review Summary
Orange County Vision Zero Action Plan

Document Name	Description	Safety Policies and Goals	Safety Data and Analysis	Countermeasures	VZ Core Element Link	Safe System Element Link	Potential Policy Change by Core Department
Orange County Code Draft 4.0	The Code implements the objectives of the Comprehensive Plan by providing regulations for the physical development of the County.	1-1.1.3 (a) Promote the public health, safety, morals, prosperity, and general welfare of Orange County and its residents.	Traffic studies are required for some review criteria and for some waivers to standards.	Clear lines of sight within the sight triangle.	Complete Streets for All	Safe Roads	Reference Vision Zero Action Plan in review criteria, especially goals, strategies and countermeasures. (PEDS)
		1-1.1.3 (f) Provide improved mobility networks, including promoting safety for all people of all ages and abilities, with better pedestrian, cycling, transit and freight environments through an enhanced public realm.	Traffic studies are required for traffic signals requested by OCPS.	Cross-connections for pedestrian safety and walkability if a school is located across from a residential neighborhood.	Proactive, Systemic Planning	Safe Speeds	4-7.10.4 (g)(iv) Suggest that minimum sidewalk widths correlate with FDM context classification/County transects, rather than 5-foot minimum. (PEDS/Public Works)
			Bike facilities must comply with County bicycle plans and safety studies on file.	Minimum 5-foot sidewalks on local roads, and minimum 6-foot on collectors and arterials. Additional sidewalk requirements are outlined in 5-2.4.2.	Context Appropriate Speeds		4-7.10.4 (g)(viii) Suggest an ICE analysis be required when a signal is warranted, and that the school board shall install the traffic control improvements resulting from the ICE analysis. (Public Works/PEDS)
			Traffic studies are required for a minor deviation from access spacing requirements.	Completion of sidewalk systems along hazardous walking routes to school			5-2.1.8 (d)(ii and v) Difficult to tell if this applies to public or private roadways. Consider maintaining sidewalks and crosswalks on County-maintained roadways, or provide a method or procedure for ensuring that crosswalks are properly maintained by the applicant and/or opportunities for crosswalk improvements are continually assesed. (Public Works/PEDS)
							Table 5-2.7(1) Suggest identifying the reference to the FDOT Standards. (Public Works/PEDS)
				Maximum Speed limits established for local roads and circulation ways			
				Access Management			
				Pedestrian Scramble			
				Raised crosswalks			

Table 1
Orange County Documents Review Summary
Orange County Vision Zero Action Plan

Document Name	Description	Safety Policies and Goals	Safety Data and Analysis	Countermeasures	VZ Core Element Link	Safe System Element Link	Potential Policy Change by Core Department
Orange County Pedestrian and Bicycle Safety Action Plan (PBSAP) Task 1: Overview Technical Memorandum	This memorandum summarizes the pedestrian and bicycle safety projects and activities undertaken by the County, in partnership with regional agencies and other stakeholders, sources of safety data, County and regional safety plans, as well as pedestrian safety capital projects.	The PBSAP serves as a resource to County staff, consultants, and the public for the County's safety analysis.	For this analysis, 2011 - 2015 ped/bike crash data from Signal Four Analytics was used. Generally, Signal Four Analytics crash data is used on a regular basis by County staff.	Low-stress Bike Network	Complete Streets for All	Safe Roads	Actively coordinate with MetroPlan Orlando and local municipalities on pedestrian and bicycle facility improvements. Request access to facility GIS layers if not already available. (Public Works/PEDS)
PBSAP Stakeholder Workshop Presentation	This presentation summarizes the pedestrian and bicycle crash data analysis with recommendations.	The PBSAP provides a toolbox of design countermeasures and planning/engineering approaches with insight into their appropriateness for the County.	Pedestrian and bicycle facility data is limited.	Median Landscaping	Context Appropriate Speeds	Safe Speeds	Evaluate whether pedestrian and bicycle data provided by MetroPlan Orlando is sufficient or whether Orange County should further expand its count program. Review current status of Eco-Counter Pyro Box use. (Public Works)
Orange County Bicycle Safety Action Plan, August 2018	This memorandum summarizes the pedestrian and bicycle crash data, including in-depth crash typing analysis, and countermeasures by type.	The PBSAP facilitates a comprehensive approach and continuity with the organization.	Pedestrian and bicycle count program has begun.	Corridor Roadway Lighting	Responsive, Hot Spot Planning		Develop 311 GIS mapping of citizen request locations for use by Public Works in safety planning and engineering. Develop a process for reviewing and incorporating this data on a regular basis. (311/Public Works)
Orange County Pedestrian Countermeasures, November 2018	This document details specific pedestrian safety countermeasures, their purpose, if each countermeasure is used by the County, and the County standard.		County 311 reports are used for individual citizen concern resolution, but not systematically incorporated into planning and engineering efforts.	Road Safety Audits (RSAs)			Document the response to the data analysis and recommendations contained in these technical memoranda. (Public Works)
			FDOT Data: crash typing, Florida Traffic Online, and TransPed.	Narrow Travel Lanes			Review Countermeasures annually and update based on updated design guidance/best practices (FDOT/ other), including references. For example, FDOT Standard Indices are now Standard Plans. (Public Works)
			PBSAP Workshop Presentation included top crash locations by varying factors with recommendations.	Roundabouts			Ensure staff are aware of the County countermeasures standards. Place the document in a standard location (County server) where all Public Works staff can access it. Consider posting it on the County website. (Public Works)
				Access Management			
				Engineering recommendations			
				Education recommendations			
				Enforcement recommendations			
				Evaluation & Planning recommendations			

Table 1
Orange County Documents Review Summary
Orange County Vision Zero Action Plan

Document Name	Description	Safety Policies and Goals	Safety Data and Analysis	Countermeasures	VZ Core Element Link	Safe System Element Link	Potential Policy Change by Core Department
Americans With Disabilities Act (ADA) in the Public Rights-of-Way Transition Plan, April 2016	The Transition Plan is a component of the County's efforts to improve pedestrian mobility. It outlines a self-assessment of existing County infrastructure, includes cost estimates to mitigate identified barriers, and provides an implementation plan and schedule.	To ensure that existing and future pedestrian facilities within the public rights-of-way are accessible for all.	Inventory of ADA features within the public rights-of-way of selected corridors were collected through data imagery using a Mobile Mapping Vehicle (MMV).	New 5' sidewalk to fill sidewalk gaps	Complete Streets for All	Safe Roads	Section 3.1.1 states that the CIP will publish short project descriptions for each project in the CIP and will include a component focusing on providing ADA compliance to ensure that ADA features are reviewed and implemented during resurfacing or initial construction. The current adopted CIP does not include these ADA statements. At a minimum, consider including ADA statements with internal resurfacing lists and project descriptions for public outreach and information. (Public Works)
				Add 5' sidewalk panel for passing/turning	Proactive, Systemic Planning		Include ADA statements in all Vision Zero Action Plan HIN project descriptions for projects with ADA improvements. (Public Works)
				Add/replace curb ramps	Equity-focused Analysis and Program		Ensure that a monitoring process is being carried out to confirm that ADA reviews are being conducted through maintenance programs as well as new projects, according to the Transition Plan. Design variations to ADA elements should require documentation through a Formal Design Variation. (Public Works)
				Add detectable warnings	Project Delivery		Update the Transition Plan, incorporating reference to the Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG) and based on significant changes to the final rule text, published 8/8/2023 and effective 9/7/2023 as a best practice in advance of DOJ/USDOT adoption of guidelines. Additionally, update to include minimum sidewalk width requirements per the Orange County Code Draft 4.0. (Public Works)
				Remove obstacles			
				Cross-slope or running slope correction			Update the Transition Plan in a recommended five year cycle and include progress toward achieving compliance. (PublicWorks)
				Install handrail			
				Replace damaged sidewalk			
				Remove trip hazards			

Table 1
Orange County Documents Review Summary
Orange County Vision Zero Action Plan

Document Name	Description	Safety Policies and Goals	Safety Data and Analysis	Countermeasures	VZ Core Element Link	Safe System Element Link	Potential Policy Change by Core Department
Draft Vision 2050 Complete Book - 7.25 BCC (Draft 4/11/2023).	Vision 2050 includes the County's new Guiding Principles and Planning Framework, contains 10 chapters/subject areas, each with goals, objectives, and policies. The Plan also identifies 6 geographic planning areas with goals, objectives, and policies specific to each of these Market Areas.	Goal LMN 6: Land Use and Mobility - A multimodal transportation system that integrates land use, transportation strategies, and the provision of infrastructure will be established to provide a sustainable transportation and mobility infrastructures for all users.		LMN 6.2.2 TSM&O Enhancements, intersection improvements, and transit-oriented design. High-visibility pavement markings, pedestrian refuge islands, shared-use paths, landscaping, bicycle facilities	Complete Streets for All	Safe Roads	LMN 6.1 Mention "safe" when describing the mobility system. (PEDS)
		Goal LMN 7: Neighborhood Character and Development - Our neighborhoods will be shaped by smart growth, sustainable development, and green infrastructure.		LMN 6.3.4 Traffic calming measures	Proactive, Systemic Planning	Safe Speeds	LMN 6.12, 6.15 Reference Multimodal Quality/Level of Service. (PEDS)
		Goal T1: Multimodal Transportation System (including proposed revisions) - Orange County will design a safe, accessible and financially feasible multimodal transportation system for roadways, rail, transit, major bicycle and pedestrian facilities, trails, and aviation to increase healthy and equitable mobility for all and reduce environmental impacts and greenhouse gas emissions.		LMN 7.3.8 Narrowed roadway and lane widths, on-street parking, reduced posted speeds, horizontal deflection, speed cushions, roundabouts, raised crosswalks	Equity-Focused Analysis and Program		LMN 6.4.13 Consider also referencing planned pedestrian/bicycle network. (PEDS)
		Goal T2: Mobility Standards (includes proposed revisions) - The County shall establish and maintain a concurrency management system and mobility strategies that ensure the multimodal transportation network and services needed to suppport the land use designations established in the Land Use, Mobility , and Neighborhoods Chapter of the Comprehensive Plan are available concurrent with development and respect the context of areas traversed by transporation corridors.		T 1.4.4 Automated Speed Enforcement, Signal Synchronization, Transit Signal Priority	Comprehensive Evaluation and Adjustments		LMN 6.4.1.4 Consider listing potential design countermeasures such as high emphasis crosswalks, pedestrian warning signs, RRFBs, PHBs, pedestrian signals, advance stop bars. (PEDS)
		Goal T3; Technology and Sustainability (includes proposed revisions) - The County shall use state-of-the-art and energy-efficient infrastructure, vehicles, materials,technologies, and methodologies, where financially feasible, to develop and operate transportation corridors that increase efficiency within the multimodal transportation network, enhance safety, accommodate new transportation technologies, and facilitate the movement of goods and people.					

Table 1
Orange County Documents Review Summary
Orange County Vision Zero Action Plan

Document Name	Description	Safety Policies and Goals	Safety Data and Analysis	Countermeasures	VZ Core Element Link	Safe System Element Link	Potential Policy Change by Core Department
Draft Vision 2050 Complete Book - 7.25 BCC (Draft 4/11/2023).	Vision 2050 includes the County's new Guiding Principles and Planning Framework, contains 10 chapters/subject areas, each with goals, objectives, and policies. The Plan also identifies 6 geographic planning areas with goals, objectives, and policies specific to each of these Market Areas.	New Goal T4: Vision Zero and Safety - Orange County will design a safe and accessible multimodal transportation system to eliminate all traffic fatalities and severe injuries (Vision Zero). The multimodal system will promote equitable access to all communities and prioritize a safe, comfortable, and attractive pedestrian environment.			Public, High-Level, and Ongoing Commitment	Safe Roads Safe Speeds	T4: Reference the USDOT National Road Safety Strategy (NRSS) and the Safe System Approach in the Vision Zero objectives. (Public Works)
Orange County Sustainable Operations & Resilience Action Plan	The document outlines Orange County's efforts to promote sustainability, resilience, and environmental preservation.	Goal 12 - Improve vehicle, bicycle and pedestrian roadway safety, resilience, and interoperability through traffic technology retrofits at 300 intersections by 2025.		UPS Battery Backup upgrades Advanced Transportation Controllers ADA retrofits Markings, signage, and lighting targeted towards pedestrian safety and wayfinding. Special emphasis crosswalks on major intersection arterials on all 4 approaches. Internally illuminated signs on all 4 approaches. Traffic signal mast arm conversions	Complete Streets for All Proactive, Systemic Planning	Safe Roads	Add a publish date to the Action Plan. The Plan states it will be updated every 5 years. (PEDS) Provide transparent progress online toward meeting short-term actions. (Public Works)

Table 2
Guidance Document Review Summary
Orange County Vision Zero Action Plan

Document Name	Description	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
FHWA Lessons Learned From the Development of Vision Zero Action Plans	This report examines and summarizes two different communities' approach to developing a Vision Zero Action Plan and identifies challenges and opportunities addressed by both communities. This report highlights best practices in developing a Vision Zero Action Plan.	KSI data for a 5 year period	Reduce transportation-related fatalities and serious injuries across the transportation system.	Pass a Vision Zero Resolution	Public, High-Level and Ongoing Commitment	Safe Roads	Jurisdictions should be proactive to involve various communtiy leaders and agencies. (All Departments)
				Convene a Vision Zero Working Group / Identify a Champion	Authentic Engagement	Safe People	Include champions from both inside the agency and within the broader community. (All Departments)
		Roadway networks and GIS data combined with KSI data to develop crash densities (crashes/mile)		Adopt the Safe System Approach and Safety Culture	Complete Streets For All		Share resources with internal agency staff and other stakeholders. Close coordination among various plans is recommended to ensure findings and actions are consistent. (All Departments)
				Involve Stakeholders	Equity-Focused Analysis and Program		Include stakeholder representatives from the five Safe System Elements. (Public Works)
		Network screening to identify sites that are expected to benefit the most from targeted, low-cost treatments		Review Existing Plans and Policies	Comprehensive Evaluation and Adjustments		Review the road maintence schedule to implement treatments that would otherwise be longer term. (Public Works)
				Analyze Crash Data	Responsive, Hot Spot Planning		Public comments can be collected through an online interactive tool which allows the public to pinpoint areas of concern. (Public Works)
		Land Use and Equity Analysis is the analysis of the environment surrounding crash locations through a socioeconomic lens to identify Communities of Concern		Conduct a Vision Zero Workshop	Authentic Engagement		Training and workshops may be used to engage participants and be a platform to humanize traffic safety issues. (All Departments)
				Identify Emphasis Areas	Proactive, Systemic Planning		Safe System Approach can be used as guidance when selecting countermeasures. The FDOT Strategic Highway Safety Plan is a great starting point. (Public Works)
		Utilize crash data normalization to understand over-representation		Develop the Vision Zero Action Plan	Strategic Planning		Agencies can proactively plan quick-build projects when developing a Vision Zero Action Plan to be ready when the plan is adopted. (Public Works)

Table 2
Guidance Document Review Summary
Orange County Vision Zero Action Plan

Document Name	Description	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
2022 USDOT Safe Streets for All (SS4A) NOFO Grant Program Requirements	This document outlines the eligibility requirements for applying for planning and demonstration grants as well as the required components of an action plan to qualify for funding.	An analysis of existing conditions and historical trends is required, including an analysis of locations, severity of crashes, and contributing factors	Improve roadway safety by significantly reducing or eliminating roadway fatalities and severe injuries through safety action plan development and refinement and implementation focused on all users, including pedestrians, bicyclists, public transportation users, motorists, personal conveyance and micromobility users, and commercial vehicle operators.	Leadership Commitment and Goal Setting	Public, High-Level and Ongoing Commitment; Complete Streets for All	Safe Roads	Overlapping jurisdictions are included in the process and plans/processes are coordinated with other governmental plans to the extent practicable. (Public Works)
		An analysis of systemic safety needs is also performed such as through the analysis of the built environment and demographics		Safety Analysis	Responsive, Hot Spot Planning	Safe People	Consider how safety strategies support strategic goals of climate change and sustainability, economic strength, and global competitiveness. (PEDS)
	All award recipients shall submit a report with data collection requirements.	All roadways within the jurisdiction regardless of ownership are analyzed and a geospatial identification of high-risk locations are developed (High Injury Network)		Equity Considerations	Equity-Focused Analysis and Program	Post-Crash Care	All project and strategies must have equity at their foundation, including traffic enforcement strategies, which must be data-driven and demonstrate a process in alignment and with goals around community policing. (FHP, OCSO)
				Policy and Process Changes	Proactive, Systemic Planning		
		Analysis should include population characteristics and initial equity impact assessments of proposed projects/strategies		Strategy and Project Selections	Context-Appropriate Speeds; Project Delivery		Employ low-cost, high-impact strategies to improve safety. (Public Works)
				Progress and Transparency	Comprehensive Evaluation and Adjustments		A method to measure progress after an Action Plan is developed and updated to include outcome data, and must include at a minimum annual public reporting. (Public Works)

Table 2
Guidance Document Review Summary
Orange County Vision Zero Action Plan

Document Name	Description	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
USDOT FHWA Strategies to Coordinate Zero Deaths Efforts for State and Local Agencies	This report highlights strategies through the Safe System Approach to help communities coordinate their zero death efforts.	Data on where and how crashes happen and examine additional inputs such as demographics, injury data from medical institutions, transportation attitudes, and data from traffic cameras	Coordinate Speed Management Efforts	States should empower local authorities to set speed limits	Context Appropriate Speeds	Safe Speeds	Use USLIMITS2 to review existing posted speed limits on key corridors, as well as in response to speed limit change requests by citizens and elected officals, by systematically incorporating crash statistics and other factors, such as context calssification, in addition to the 85th percentile speed. The MUTCD 11th Edition (December 2023) requires that roadway context be considred during the engineering study for setting speed zones. (Public Works)
			Coordinate on Development of a Safety Culture	Prioritize effective countermeasures to manage speed	Authentic Engagement	Safe People	State and local agencies can collaborate on effective countermeasures, including FHWA's Proven Safety Countermeasures related to speed management, to address the disproportionate problem of unsafe speeds on state-owned roads. (Public Works)
		Performance measures including the number and rate of fatalities and serious injuries	Coordinate Data and Prioritization	Communities should measure and share speeding-related data to make policy and design change	Proactive, Systemic Planning	Safe Roads	Collect speed data on the HIN. By assessing speed-related crashes, localities can document and advocate for safety improvements at the State level. (Public Works)
		Speeding-related data		MPOs can share safety resources with the local jurisdictions			Communities can collaborate with peers in other local communities on similar issues. (All Departments)
				Communities can convene peer networks and coordinate on improvements statewide			When developing HINs and the prioritization process, commmunity members can provide input on areas of concern. (Public Works)
				Communities can help humanize traffic safety issues and support community based advocacy			States and local agencies should jointly develop a project prioritization approach that addresses equity and regional and local High Injury Networks. (Public Works, FDOT)
				States should coordinate on data collection, sharing, analysis, and use			Align the Vision Zero effort with local or regional health plans. (Health Services)
				MPOs can help bridge data gaps between state and local agencies			
				Communities can use public health tools to advance safety planning efforts			

Table 2
Guidance Document Review Summary
Orange County Vision Zero Action Plan

Document Name	Description	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
MetroPlan Orlando 2040 Long Range Transportation Plan: Bicycle and Pedestrian Plan	This report describes MetroPlan Orlando's process for the prioritization of bicycle and pedestrian projects.	A quantitative GIS-based scoring process is used to evaluate projects based on existing conditions, socioeconomic data, and transit emphasis data	Project Prioritization	The prioritization process for pedestrian and bicycle projects includes ranking based on existing conditions, socioeconomic data, and transit emphasis data	Equity-Focused Analysis and Program	Safe Roads	Create a scoring system, or adopt the MPO's scoring system, that prioritizes HIN roadway projects with pedestrian and bicycle components. (Public Works)
		An existing conditions inventory score is developed based on the percent of sidewalk and bicycle lane coverage			Complete Streets For All		Create a scoring system that prioritizes a separate pedestrian and bicycle HIN. (Public Works)
		A Socioeconomic score was determined based on the ratio of attractions to productions and population and employment density					
		A transit emphasis score is based on the proximity of segments to a SunRail Station and/or LYNX High Emphasis Corridors					
		A trails and network connectivity analysis was also conducted based on socioeconomic data and transit emphasis data					
FDOT and Smart Growth America's Complete Streets Implementation Plan	This document was developed to guide in FDOT's implementation of the Complete Streets Approach.		Updating Decision-Making Process	Change Decision-Making Culture	Public, High-Level and Ongoing Commitment	Safe People	Provide ongoing education and training to staff, consultants, and other external partners. (Transportation Planning Division)
			Modifying Approaches for Measuring Performance	Use Performance Measurement to Help Make the Case for Complete Street Investments	Comprehensive Evaluation and Adjustments	Safe Roads	Collecting and reporting information on the outcomes of Complete Streets investments can make the case for these investments in terms that decision-makers and the Department's customers care about. (Public Works)
			Manage Internal and External Communication and Collaboration During Implementation	Establish a Central Website for Sharing Information About the Process	Comprehensive Evaluation and Adjustments		A website can be built to provide a public-facing portal for sharing updates on the progress throughout the implementation process (Public Works)
				Define Stakeholder Roles During Implementation	Authentic Engagement	Safe People	Stakeholders' roles and levels should be identified by who should provide input upfront, who should review and provide feedback, who should provide input on specific sections, who will approve updates, and whether a specific stakeholder will be asked to endorse updates or just provide feedback. (Public Works)

Table 2
Guidance Document Review Summary
Orange County Vision Zero Action Plan

Document Name	Description	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
FDOT Stategic Highway Safety Plan	This document outlines Florida's Strategic Highway Safety Plan and discusses key strategies in addressing emphasis areas.	Crash data analysis was performed for years 2015-2019 to identify key emphasis areas that should be addressed with corresponding countermeasures and strategies	Emphasis Area: Intersections	Insight into Communities	Complete Streets For All	Safe Roads	Match intersection design, improvements, and operations to the needs and surrounding land uses. Improve travel options and network connectivity so users can have alternatives to heavily used intersections. (PEDS, Public Works)
				Education Strategies	Authentic Engagement	Safe People	Develop outreach targeted for older adults, youth, and vulnerable road users to increase understanding of how to share intersections safely. (Public Works, Communications, Community & Family Services, Office on Aging, Commission on Aging)
			Emphasis Area: Lane Departures	Engineering Strategies	Complete Streets For All	Safe Roads	Implement speed management techniques, curve delineations, high friction surface treatment, horizontal curve design, the use of rumble strips, and the elimination of vertical drop-offs. (Public Works)
				Education Strategies	Authentic Engagement	Safe People	Expand education efforts on driver risk factors that may cause lane departure crashes (speeding, distracted, impaired driving). (Public Works, PEDS, PIOs/Commissioner Aides)
			Emphasis Area: Pedestrians and Bicyclists	Engineering Strategies	Complete Streets for All	Safe Roads	Implement refuge islands, walkways, pedestrian crossing islands, road diets, seperated bike lanes, LPIs, median channelization, marking enhancments, lighting, and innovative signals and beacons. (Public Works)
				Insight into Communities	Equity-Focused Analysis and Program	Safe People	Reduce disparity in transportation safety risks by ensuring all projects provide safety, mobility, and accessbility to all users. Create environments that support safe walking and biking. (Public Works, PEDS)
			Emphasis Area: Aging Road Users	Engineering Strategies	Complete Streets for All	Safe Roads	Improve intersection lighing and sight distance, retroflective pavement markers, signal phasing and signing, and advance warning of work zones at locations that have greatest exposure to risk for aging road users. (Public Works, Office on Aging, Commission on Aging)
			Emphasis Area: Motorcyclists and Motor Scooter Riders	Engineering Strategies	Complete Streets for All		Address motorcycle and motor scooter specific infrastructure issues and mitigation approaches ncluding drainage and shoulders, communication of road conditions, pavement conditions, enhanced roadway delineation, and traffic control devices. (Public Works)
				Investments and Policies	Public, High-Level and Ongoing Commitment	Post-Crash Care	Identify and support legislation that acknowledge the importance of safety gear and address penalties for riding without an endorsement and unsafe behaviors. (Legislative Affairs)

Table 2
Guidance Document Review Summary
Orange County Vision Zero Action Plan

Document Name	Description	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
FDOT Stategic Highway Safety Plan				Education Strategies	Authentic Engagement	Safe People	Develop outreach to promote safe riding behavior, especially among aging riders, young riders, and motor scooter riders. (Public Works, PEDS, Communications, Community & Family Services, Office on Aging, Commission on Aging)
			Emhasis Area: Commerical Vehicle Operators	Insight into Communities	Complete Streets for All	Safe Roads	Accommodate urban/neighborhood goods delivery by using context sensitive design approaches, and collaborate with trucking industries on programs to improve safety. (Public Works)
				Enforcement Strategies	Public, High-Level and Ongoing Commitment	Safe People	Focus enforcement in high crash locations associated with commerical vehicles and promote compliance with driver rest, parking, and vehicle weight requirements. (FHP, OCSO)
			Emhasis Area: Teen Drivers	Insight into Communities	Authentic Engagement	Safe People	Create safer communities through greater interaction of parents and caregivers in the license process, and engage caregivers during caregiver-targeted functions. (Community & Family Services)
			Emphasis Area: Impaired Driving	Engineering Strategies	Complete Streets for All	Safe Roads	Deploy best practices and solutions for wrong way driving, lane departures, and intersection crashes. (Public Works)
				Investments and Policies	Project Delivery	Post-Crash Care	Prioritize projects that demonstrate reduction in repeat impaired driving including targeted enforcement and prosecution, improved screening, and treatment of substance abuse. Support legislation that enhance penalities, expand diversion and treatment programs, and improve collection of evidence of impairment. (OCSO, Legislative Affairs)
			Emphasis Area: Distracted Driving	Engineering Strategies	Complete Streets for All	Safe Roads	Mitigate distracted driving by using rumble strips and striped, flashing beacons, traffic calming, lighting, and dynamic warning signs. (Public Works)
			Emphasis Area: Traffic Records and Information Systems	Innovation	Proactive, Systemic Planning		Expand data collection to incorporate emerging mobility options like micromobility and automated vehicles. (Public Works, Community & Family Services Parks & Rec.)

Table 2
Guidance Document Review Summary
Orange County Vision Zero Action Plan

Document Name	Description	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
FDOT's Smart Work Zone Initiative Case Study	This document describes emerging safe work zone practices and ongoing/upcoming projects related to the development and testing of safe work zone processes and technologies.	Crash trends related to work zones were identified	Utilizing Technology to Create a Safe and Smart Work Zone	Implement queue detection and warning systems Implement speed monitoring and management systems Implement reduced speed alert systems	Complete Streets for All Context Apropriate Speeds	Safe Roads	Enhance safety training in consideration of construction needs and transportation safety in particular. (Public Works) Consider consulting with the Risk Management, Traffic Engineering, and Roads and Drainage divisions and construction inspection when implementing work zones. (Development Engineering, Highway Construction)
FDOT's Smart Work Zone Webinar	This webinar describes previously conducted projects that utilized safe work zone technologies and approaches, and describes steps to implement a safe work zone.	Crash trends related to work zones were identified.	Developing a Smart Work Zone to Protect Road Users	Develop and test emerging technologies to create a safe work zone Know when and how to use safe work zone strategies	Complete Streets for All	Safe Roads	Emerging technologies include CV2X communication systems, queue warnings, construction vehicle merge assist technologies, and AI powered signal control. (Public Works) Utilize decision flow charts, safe work zone warrants and scoring procedures to determine when to use safe work zone strategies. Utilize the Work Zone ITS Implementation guide as guidance and consider performance-based specifications that put safety responsiblity on the contractor to increase safety strategies as incidents increase. (Public Works)
FDOT Pedestrian And Bicycle Crash Root Cause Analysis	Root Cause Analysis summarizes a methodology to identify top contributing factors present in pedestrian and bicycle crashes.	2016 - 2020 fatal and serious injury pedestrian and bicycle crashes on all public roads collected from the Crash Analysis Reporting System	To Inform strategic investments and decisions	Develop factors based on where crashes occurred: district, roadway location, maintaining agency, roadway type Develop factors based on when crashes occurred: by month, by year,day of the week, time of day Develop factors based on crash severity by crash type Develop factors based on environmental factors and lighting conditions Develop factors based on who was involved in crashes: age, gender, ped, bike, vehicle type Develop factors related to roadway characteristics of over-represented and highest crashes: by context classification, posted speed, number of lanes, and transit frequency	Proactive, Systemic Planning	Safe Roads Safe People Safe Seeds Safe Vehicles	Incorporate similar root cause analysis for the County's VZAP priority crash types in order to identify focus areas. (Public Works)

Table 3
Adopted VZAP Review Summary
Orange County Vision Zero Action Plan

Document Name	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
Vision Zero Tampa	2 Tiers of HIN. Highest tier of severe crash corridors (mostly state roads). Second tier of lower-volume roads (mostly city and county-owned roads).	Safer Streets - Design streets to guide appropriate road user behavior and forgive predictable mistakes	Create safer streets for all road users	Complete Streets for All	Safe Roads	Develop a Quick-Build Program to support cost-effective rapid deployment of safety and multimodal treatments. (Public Works)
	Comments were recived from the public regarding the Vision Zero initiatve and the public's perception on different crash contributing factors.					Integrate systemic safety best practices into all aspects and processes of the transportation department. (Public Works)
	Crash trends based on factors such as age, mode of travel, driver behavior, and lighting were identified.					Continuously assess and enhance traffic signal operations on the HIN. (Public Works)
	Communities of concern were identified based on the presence of a census block group with a greater than one standard deviation above the county average for certain demographic characteristics.		Expand the City's walk, bike, and transit network	Complete Streets for All		Elevate the walking and biking experience by increasing the comfort/convenience of choosing active transportation. (PEDS, Community & Family Services Parks & Rec.)
						Celebrate and promote use of multimodal system. (Public Works, PEDS, Communications)
			Prioritize vulnerable road users	Complete Streets for All		Conduct Walk/Bike Road Safety Audits on all of the corridors on the HIN. (Public Works)
			Change codes, policies, and laws to support Vision Zero	Public, High-Level, and Ongoing Commitment		Create a Vision Zero Development Review and Safe Site Access Checklist. (Public Works)
						Host an annual legislative round table with local state legislators. (Legislative Affairs)
						Champion automated speed enforcement camera legislation in Florida. (Legislative Affairs)

Table 3
Adopted VZAP Review Summary
Orange County Vision Zero Action Plan

Document Name	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
Vision Zero Tampa, Cont'd		Safer Speeds- Prevent deadly and life-altering crashes by managing vehicle speeds	Update codes, manuals and guidance to support speed reductions	Context-Appropriate Speeds	Safe Speeds	Formalize a Neighborhood Traffic Management Program. (Public Works)
			Lower posted speeds and implement road designs to achieve target speeds			Create an implementation plan for speed managment on the HIN and other roads in need of lower posted speeds to align with land use context. (Public Works)
			Work with the police department and FDOT to inform and implement speed reduction efforts			Conduct high visiblity enforcement efforts to reduce speeding on HIN streets and others with reported concerns. (FHP, OCSO)
						Collect speed data from speed feedback signs to inform engineering and enforcement efforts. (Public Works)
		Safer People- Empower Tampanians to spread Vision Zero messaging, take community action, and promote a culutre of safe mobility	Empower citizens to be Vision Zero stewards	Authentic Engagement	Safe People	Produce annual Vision Zero public education campaigns based on crash data to raise awareness. (Public Works, Communications)
						Incorporate Vision Zero into community classes and education programs sponsored by the Mayor's office (Mayor's Office)
						Support senior citizens with safe mobility for life and through aging in place efforts. (PEDS, Community & Family Services, Office on Aging, Commission on Aging)
			Create a culture of roadway safety and understanding throughout the City of Tampa organization			Develop an internal staff communication and education plan to expand awareness of the County's Vision Zero effort and how each department is involved. (Public Works, Communications)
			Host community focused activities and events			Develop an Open Streets progam and host events annually. (Public Works, PEDS, Community & Family Services, Fire-Rescue)
						Implement a tactical urbanism and placemaking program that engages the community and spreads messaging regarding traffic safety, similar to the Paint Saves Lives program implemented by the City of Tampa, and using guidance such as the City of Orlando's recently released Quick Build Project Guide. (Public Works, PEDS)

Table 3
Adopted VZAP Review Summary
Orange County Vision Zero Action Plan

Document Name	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
Vision Zero Tampa, Cont'd		Safer Vehicles- Address the City's role in regulating and maintaining a state-of-the-art vehicle fleet and providing city streets with infrastructure that supports future emerging technologies	Manage a safe fleet of city drivers and vehicles	Authentic Engagement	Safe Vehicles	Use County vehicles as moving billboards for Vision Zero. (Administrative Services, Fleet) Provide regular training and a feedback loop for County drivers. (All Departments)
			Leverage technological innovations in mobility and micromobility			Continue to implement and evaluate a curb management program in accordance with Sec. 30-255, Orange County Code, and the development of mobility hubs per the 2023 Orange County Mobility/Electric Vehicle Hub Feasibility Study. (PEDS, Public Works)
			Expand and elevate the role of public transit in creating a safer transportation system	Complete Streets for All		Create a Safe Routes to Transit "First Mile/Last Mile" program. (PEDS, Public Works, LYNX) Collaborate on implementing safe transit infrastructure and operations. (Public Works, LYNX)
		Safety Data and Post-Crash Care- Use quality data and the latest analytical tools to prioritize actions and track Vision Zero progress. Coordinate efforts with other related departments, such as Tampa Police Department and Tampa Fire Rescue to ensure rapid response to serve crashes and address known safety concerns	Collect, evaluate and manage data to support Vision Zero Success	Comprehensive Evaluation and Adjustments	Post-Crash Care	Develop a public-facing crash dashboard. (Public Works) Track and report out on Vision Zero activities. (Public Works)
		Implementation Success- Ensure the success of the Vision Zero Action Plan through funding and accountability measures	Augment funding for Vision Zero Programs and projects	Project Delivery	Safe Roads	Identify a permanent, dedicated amount of funding each year for Vision Zero. (All Departments, BCC) Continue to pursue available grant funds. (Public Works)
			Convene recurring meetings of Vision Zero Leadership, the Multi-Agency Task Force, and implementation team	Public, High-Level, and Ongoing Commitment		Convene the Vision Zero leadership team at least once per year. (Public Works) Convene the Vision Zero Steering Committee on a quarterly basis. (Public Works) Form and convene a Vision Zero Implementation Team. (Public Works)
			Measures of success, metrics, and targets	Comprehensive Evaluation and Adjustments		Identify and implement metrics of success and targets. (Public Works)

Table 3
Adopted VZAP Review Summary
Orange County Vision Zero Action Plan

Document Name	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
Vision Zero Hillsborough	Risk factors contributing to severe crashes were analyzed within the limits of the county. Severe crash corridors were created and anlayzed, including crash corridors for crashes involving vulnerable users as well as aggressive driving and dark, no lighting conditions. A crowdsourcing map tool was created to allow the public to pinpoint locations of safety concerns. A Facebook page was also created to engage the public on road safety and to share information regarding events and news.	Paint Saves Lives- Low cost retrofits and pop-up treatments	Raise driver awareness of people walking and biking by using high-visibility markings on the transportation network	Complete Streets for All	Safe Roads	Install crosswalk markings where they are missing or in poor conditions. (Public Works) Install green bike lane markings and additional safety countermeasures along high-crash corridors in communites of concern. (Public Works)
				Authentic Engagement	Safe People	Hold a contest with high school students inviting them to design wraps for traffic control boxes. (PEDS Neighborhood Services)
			Implement low-cost treatments to improve safety of roadway, particularly for vulnerable users	Complete Streets for All	Safe Roads	Add Leading Pedestrian Intervals (LPI) to signalized intersections. (Public Works)
				Authentic Engagement	Safe People	Engage neighborhood organizations to hold events around pop-up treatments for traffic calming. (PEDS Neighborhood Services)
		One Message, Many Voices- Public education strategies	Increase awareness of vision zero to influence safer behaviors on roadways	Authentic Engagement	Safe People	Create and sustain a Facebook page to broaden reach of Vision Zero message. (Communications) Hold a Safe Streets Summit. (Public Works/PEDS) Create a Speakers Bureau with a calender of speaking engagements. (Public Works, PEDS Neighborhood Services, Mayor's Office) Incorporate Vision Zero into educaton programs and classes sponsored by the County, such as the Citizen Planner Academy or similar programs. (PEDS) Provide governmental staff an orientation on Vision Zero to integrate it into the lexicon and institutional knowledge of all government departments and agencies. (Public Works) Develop a coordinated progam to brand Vision Zero-consistent projects. (Public Works, Communications)

Table 3
Adopted VZAP Review Summary
Orange County Vision Zero Action Plan

Document Name	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
Vision Zero Hillsborough, Cont'd			Engage with victims of traffic Violence and their familes to provide them with a support sytem and a platform to be heard	Authentic Engagement	Safe People	Hold a press conference on Vision Zero with familes of victims of traffic violence. (Communications) Work with the media and hospitals to identify methods for learning about victims of crashes and personalize the stories and elevate the discussion. (Communications)
		Consistent and Fair- Community-oriented law enforcement	Leverage the capabilities and existing resources of the community traffic safety team as a community law enforcement partnership	Equity-Focused Analysis and Program	Safe People	Engage law enforcement and the Community Traffic Safety Team in Vision Zero. (OCSO, Public Works) Develop and implement a media plan to publicize the Community Traffic Safety Team's periodic enforcement activities as part of the Vision Zero initiative. (Communications)
			Establish a Vision Zero "Consistent and Fair" corridor program	Equity-Focused Analysis and Program	Safe People	Ensure that Vision Zero corridors are percieved as fair and consistent and sensitive to concerns among minority communities regarding policing practices. (FHP, OCSO) Announce designation of Vision Zero Corridors and conduct targeted enforcement details on actions the County is seeking to reduce, such as enforcement of vehicular speeding and driver yielding behavior. (FHP, OCSO)
		The Future will not be like the Past- Facilitating culture change through policies and programs	Update policies, standards and procedures to foster culture of safety in planning and design of the Transportation System	Strategic Planning	Safe Roads	Develop context classifications and target speeds within identified Vision Zero Corridors, consistent with FDOT Complete Street Guidelines. (PEDS, Public Works)
			Create a safe multimodal transportation system though good design, lighting, and connected facilities	Proactive, Systemic Planning	Safe Roads	Construct new bicycle facilities in locations with high bicycle crash fatalities and no bicycle facilities, and with high pedestrian crash fatalities and no sidewalk or crosswalk facilities. (Public Works) Evaluate implementation of modern roundabouts at intersections with high crash rates. (Public Works)

Table 3
Adopted VZAP Review Summary
Orange County Vision Zero Action Plan

Document Name	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
Albuquerque's Vision Zero Action Plan	High Fatal and Injury Network (HFIN) consists of most dangerous corridors and intersections and also the most dangerous areas for vulnerable road users. Vulnerable Communities were identified via eight different socio-economic indicators. Top Contributing Factors were identified from police reports on fatal and severe injury crashes. Monthly crash analyses were performed to review fatal crash reports and identify trends. Input from the community on action items was received through a prioritization survey.	Engineering and Design	Develop and implement a Vision Zero framework for transportation and infrastructure planning Implement road design, redesign and construction projects that prioritize safety and equity using HFIN, vulnerable communities map, and safety countermeasures Improve and eliminate gaps and barriers in pedestrian and bicycle networks	Strategic Planning Equity-Focused Analysis and Program Complete Streets for All	Safe Roads Safe Roads Safe Roads	Incorporate Vision Zero principles in planning, scoping, implementation and evaluation for engineering and design projects. (Public Works) Prioritize projects along the HIN and in vulnerable communities. (Public Works) Implement low-cost, rapid implementation projects where improvements are needed but require significant time to procure funding for more permanent projects. (Public Works) Engage with the community to gather feedback on effectiveness and potential future improvements. (Public Works) Improve and increase pedestrian crossing opportunities along HIN, vulnerable communities, schools/parks etc. (Public Works) Construct/reconstruct corridors and intersections with proven safety countermeasures to prioritize safety and vulnerable road users. (Public Works) Fill bike/ped infrastructure gaps by focusing on connections between multi-use trail and on street facilities, locations where most non-motorist crashes occur, and opportunites to improve comfort levels. (Public Works, Community & Family Services Parks & Rec.)

Table 3
Adopted VZAP Review Summary
Orange County Vision Zero Action Plan

Document Name	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
Albuquerque's Vision Zero Action Plan, Cont'd		Safe Speeds	Reduce posted speeds, prioritizing areas along the HFIN, in vulnerable communities, and near community facilities	Context-Appropriate Speeds	Safe Speeds	Evaluate speed limits by land use/context, safety, and vulnerability; develop critera and recommendations for speed limit reductions. (Public Works)
			Implement equitable enforcement techniques using emerging best practices	Equity-Focused Analysis and Program	Safe People	Educate communities about the benefits of safe speeds. (PEDS, Public Works)
						Explore automated enforcement options by identifying legal implications, developing policy, and using crash data to recommend locations to implement. (Legislative Affairs, Public Works)
		Policy, Regulation, and Practice	Establish a Vision Zero Program	Strategic Planning	All Elements	Dedicate staff to implementing Vision Zero. (All Departments)
			Incorporate Vision Zero principles into citywide programs that impact traffic safety	Public, High-Level, and Ongoing Commitment		Develop enforcement best practices focused on most dangerous behaviors and locations. (FHP, OCSO)
						Increase collaboration between implementing departments and agencies to improve safety outcomes and use funds effectively. (All Departments)
			Update local and state policy to reflect Vision Zero goals	Public, High-Level, and Ongoing Commitment		Develop an interagency working group to evaluate and make local/state law and policy recommendations. (Legislative Affairs)
						Develop policy and design criteria for road projects and speed setting that consider alternatives to LOS and 85th percentile. (Public Works)

Table 3
Adopted VZAP Review Summary
Orange County Vision Zero Action Plan

Document Name	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
Albuquerque's Vision Zero Action Plan, Cont'd		Education and Encouragement	Use education and encouragment to engage road users in efforts to create a culture of care and safety	Authentic Engagement	Safe People	Communicate how people can support these efforts and engage in the process to improve outcomes by pairing education with roadway design projects and law enforcement. (Public Works, PEDS, OCSO, FHP) Develop an educational marketing and engagement campaign that addresses Top Contributing Factors and raises awareness about traffic safety, promoting active transportation and the health/environmental benefits. (Communications)
		Walking and Rolling	Increase transportation options and create safe, comfortable opportunities for people to walk, ride a bike, use mobility devices, and take transit	Complete Streets for All	Safe Roads	Increase walking and biking infrastructure, particularly buffered bike lanes and multiuse paths. (Public Works, Community & Family Services, Parks & Rec)
		Data and Transparency	Engage stakeholders in data collection and creation to increase data soverignty and expand understanding of traffic safety issues and solutions	Authentic Engagement	All Elements	Conduct regular Vision Zero workshops with community groups, especially with vulnerable road user groups. (Public Works)
			Make information related to Vision Zero initiatives available to the public	Comprehensive Evaluation and Adjustments		Create an interactive map where residents can provide feedback on areas where they feel unsafe. (Public Works)
			Improve available data to better understand transportation options and choices and what behaviors lead to crashes	Comprehensive Evaluation and Adjustments		Convene monthly fatal crash review meetings to understand design, enforcement, and education needed to reduce fatal crashes. (Public Works)

Table 3
Adopted VZAP Review Summary
Orange County Vision Zero Action Plan

Document Name	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
Miami-Dade County Vision Zero	Road-safety indicators in the U.S. and Miami-Dade were identified based on locations, travel modes, and demographic information.	Structural Momentum Within the County	Cultivate system leadership using a collaborative style	Public, High-Level, and Ongoing Commitment	Safe People	Cultivate external leadership to create momentum: establish an Equity Task Force with representatives from communities of concern, health organizations, schools, etc. (PEDS, Public Works)
	A High Injury Network (HIN) was developed using crash scores. Crash scores were calculated for drivers, pedestrians, and bicyclists and distributed using Jenks natural breaks. Crashes involving people driving under the influence were not included.	Strategic Shift to Focus on Preventing only Fatal and Severe Injury Crashes	Leadership in speed management strategies to support safe mobility of vulnerable-modes and vulnerable-users	Context-Appropriate Speeds	Safe Speeds	Use public heath tools to advance the county's Vision Zero efforts. (Public Works, Health Services, Fire-Rescue)
	Crash-contributing factors in the U.S. and Miami-Dade were identified based on roadway design/classification and driver behavior.		Utilize substantive safety approach on transportation projects to provide safe mobility of vulnerable travel-modes and users	Complete Streets for All	Safe Roads	Collaborate with Fire-Rescue on balancing the infrastructure needs of emergency access and the safety and mobility needs of the vulnerable roadway users. (Public Works, Fire-Rescue)
		Systemic Changes to Integrate Paradigm Shift into Existing Processes within the County	Continously educate system designers and contributing staff to reduce crash-risk for vulnerable users	Authentic Engagement	Safe People	New Employee on-boarding on the Vision Zero approach. (All Departments)
			Expand understanding using a complete crash dataset	Responsive, Hot Spot Planning	Safe Roads	Future County transportation-related injury crash analyses should include data from hospital trauma records and transit safety records in addition to the police incident records. (Public Works, LYNX, Health Services)
			Conduct meaningful community engagement	Authentic Engagement	Safe People	Engagement should be conducted throughout the project life cycle. (Public Works)
			Evaluate performance	Comprehensive Evaluation and Adjustments	Safe Roads	Conduct project before and after studies. (Public Works)

Table 3
Adopted VZAP Review Summary
Orange County Vision Zero Action Plan

Document Name	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
Vision Zero Orlando	The High Injury Locations were identifed using crash data analyzed by the Commissioner District and did not include limited access roadways.	Adopt a safe system approach in roadway design, operation and maintenance	Identify and implement proven countermeasures to address crash types that most often lead to fatalities and serious injuries in Orlando	Strategic Planning	Safe Roads	Identify a targeted toolbox of countermeasures from FHWA's Proven Safety Countermeasures with flexibility for additional countermeasures to be considered, such as those being developed for the region's Countermeasures Toolkit. Train staff on implementation of countermeasures. (Public Works)
	The High Injury Network was created using a blended dataset that did not include limited access facilities.		Prioritize sites where systemic safety treatments should be implemented and implement the countermeasures	Proactive, Systemic Planning	Safe Roads	Incorporate equity into the prioritization method to target areas with transportation disadvantaged populations. Develop an annual list of priority sites for the implementation of countermeasures or interventions, considering the County Equity Priority Areas identified in the County's Title VI Nondiscrimination Policy and Plan. (Public Works)
	The scoring methodology allowed for geographic extent for the locations of the crashes to overlap one another to create a heat map.		Modify the land development code and/or policies to include safe multimodal accommodations, specifically target speeds	Complete Streets for All	Safe Speeds	Incorporate target speeds. (Public Works, PEDS)
	Crash trends were identified through a Risk-Based Analysis (RBA) to determine the root cause, with crashes involving pedestrians, bicyclists, motorcyclists, and automobiles all analyzed separately. Contributing factors were identified.	Increase everyone's understanding of the leading causes of crashes resulting in fatalities and serious injuries	Develop a public education campaign to explain the relationship between individual behaviors and crashes	Authentic Engagement	Safe People	Develop educational materials. Create a multi-platform and multi-lingual marketing and distribution plan to support Vision Zero outreach efforts. Promote Vision Zero in press releases. (Communications)
			Create partnerships with allied agencies to distribute campaign messages and materials			Leverage the Vision Zero Network, FDOT Alert Today, Alive Tomorrow campaign resources and ReThink program resources for community outreach events. (All Departments)
	Communites of Concern were identified via seven socio-economic indicators.		Raise awareness of Vision Zero Orlando within the city and with the public. Encourage city staff to lead by example in promoting the Vision Zero safety culture.			Provide annual Vision Zero-focused traffic safety training to all staff. This could consist of a video for all employees for safe driving for both personal and County purposes, and include Vision Zero progress updates. (All Departments)
	Proximity of communities of concern to the HIN were anlyzed, as well as the proximity of schools to the HIN.	Support law enforcement efforts to eliminate behaviors leading to fatal and serious injury crashes	Provide resources and training to law enforcement on the importance of accurate crash reports, laws related to vulnerable road users and positive enforcement methods	Proactive, Systemic Planning	Safe People	Increase the number of officers and businesses attending training on pedestrian/bicycle crash laws, causes/factors, and Vision Zero strategies. (OCSO)

Table 3
Adopted VZAP Review Summary
Orange County Vision Zero Action Plan

Document Name	Safety Data and Analysis	Safety Policies and Goals	Strategy or Countermeasure	VZ Core Element Link	Safe System Element Link	Potential Actions for Incorporation into OC VZAP
Vision Zero Orlando, Cont'd	An open forum for dialogue was created to allow the public to share issues and opportunities for improvement.		Conduct ongoing law enforcement campaigns along high-crash corridors and report changes in crash type, severity and contributing behaviors over time	Context-Appropriate Speeds	Safe Speeds	Monitor and maintain speed reduction on high-crash corridors. Develop enforcement operations plans for priority sites. (Public Works, OCSO)
			Identify, budget and purchase new technology to reduce undesirable behaviors such as speeding, red-light running and distracted driving	Project Delivery	Safe People	Purchase and install behavior-influencing technologies for use at priority sites; document outcomes where the technology is being used. (Public Works)
		Demonstrate Continuous Continuous Progress Towards Vision Zero Orlando	Monitor transportation system user behavior over time	Comprehensive Evaluation and Adjustments	Safe People	Conduct observational surveys at priority sites annually. (Public Works)
			Anually review, refine and re-evaluate strategies and performance measures for effectiveness		Safe Roads	Create interagency Vision Zero team to meet annually to review, refine and re-evaluate performance measures and update strategies. (Public Works)
			Report changes in fatality and serious injury rates using the webpage and annual evaluation reports			Update the Vision Zero webpage and provide annual reports to reflect changing behaviors, trends and outreach strategies. (Public Works)
		Improve access and travel time to Level 1 Trauma Center and other hospitals	Identify corridors that have barriers/impediments to the Level 1 Trauma Center and other hospitals	Proactive, Systemic Planning	Post-Crash Care	Integrate new technology to allow for emergency access route alternatives per real-time traffic data. (Public Works, Fire-Rescue, Health Services EMS)
			Partner with medical and public health community to obtain available health data and correlate to crash locations			Maintain and enhance real-time communication system for police, Emergency Management services and hospitals to improve coordination during severe injury crashes. (OCSO, Fire-Rescue, Health Services EMS)
		Prioritize investments and programs in communities of concern	Break down cultural and socio-economic barriers to traffic safety	Equity-Focused Analysis and Program	Safe People	Convene focus groups or citizen task forces in communities of concern to discuss barriers to traffic safety. (PEDS, Community & Family Services)
						Validate equitable project implementation at priority sites based on crash analysis and socioeconomic indicators. (Public Works)
			Conduct ongoing campaigns in communities of concern			Incorporate implicit bias training for law enforcement. (OCSO)

TECHNICAL MEMORANDUM TASK 5.2

Date: January 15, 2024

Prepared by: Christy Lofye, PE, PTOE, RSP1, Inwood Consulting Engineers
Conroy Jacobs, AICP, PMP, Inwood Consulting Engineers

Prepared for: Humberto Castillero, PE, PTOE, Manager, Orange County Traffic Engineering Division

CC: Roberta Fennessy, AIA, AICP, VHB
Katie Shannon, AICP, CNU-a, LEED GA, VHB

Subject: Orange County Vision Zero Action Plan - Review of Standard Operating Procedures

INTRODUCTION

Task 5.2 involved conducting interviews with County staff to discuss applicable Orange County Standard Operating Procedures (SOPs) for key County departments and evaluation of various options on how best to integrate Vizion Zero's "Safety First" concept into the County's planning, engineering, and maintenance work. The goal of this review was to identify strategic opportunities to alter existing operations, permitting, or planning processes to consider transportation safety alternatives that better align each department to Vizion Zero and allow for greater collaboration while implementing the Safe System Approach.

Eight meetings were held with Orange County department leaders and their invited management staff to discuss their roles in the Vision Zero initiative, potential challenges, and solutions. Additionally, one written SOP and one application were provided and reviewed.

This memorandum outlines staffing and management responsibilities, continuous improvement methods, and a list of recommendations to update the County's operational processes for an integrated Vizion Zero program.

DEPARTMENT LEADER MEETINGS

The following department meetings were held:

- Neighborhood Services Division: September 20, 2023
- Medical Examiner's Office: September 21, 2023
- Public Works Department: September 22, 2023
- Administrative Services Department: September 25, 2023
- Parks and Recreation Division: September 27, 2023
- Planning, Environmental and Development Services Department: September 29, 2023
- Fire Rescue: October 4, 2023
- Utilities Engineering Division: October 6, 2023

Each meeting began with a presentation to introduce and explain the Vision Zero initiative, Vision Zero core elements, and the Safe System Approach. This was followed by discussions related to where the department might fit into the County's Vision Zero initiative, as well as existing policies and procedures, and any potential barriers to reaching zero fatal or serious injury crashes on the roadway system. Attendees also discussed potential areas for improvement through coordination, collaboration, and data collection/sharing. Each meeting concluded by asking if any had personally known someone who experienced a serious injury or fatality as the result of a crash and how they were affected by it. Each department leader was also asked to think about who the Vision Zero champion for the department will be.

Meeting minutes from each of the eight department leader meetings are attached.

REVIEW OF STANDARD OPERATING PROCEDURES

The Consultant reviewed the following SOPs:

- Orange County Corridor Resurfacing – provided by the Public Works Department
- St.ART Something application – provided by Neighborhood Services Division, PEDS Department

Building on feedback gained from the department leader meetings and review of the abovementioned documents, a list of recommendations was developed. These recommendations were linked to Vision Zero core elements and the Safe System Approach elements, with a potential lead department named for implementation and continuous improvement. The summary table is provided as **Table 1, Policy and Standard Operating Procedure Recommendations**.

BENCHMARKING

The Consultant conducted a comprehensive review of existing Orange County policies and programs for alignment with Vision Zero core elements and identification of where gaps may exist. The purpose of this review is to help assess where the County is doing well related to Vision Zero and where potential changes to policies, programs, and practices could be considered as part of the development of the Orange County Vision Zero Action Plan.

Each benchmark, based on a Vision Zero core element, was evaluated and identified as either "not a current practice", an "occasional practice", or an "institutional practice". Notes providing examples or suggestions for actions that could be taken to strengthen alignment to the Vision Zero core elements are included for consideration. The summary table is provided as **Table 2, Vision Zero Benchmarks**.

SUMMARY

Steps completed in Task 5.2 resulted in suggestions and recommendations for modifications to existing Orange County policies and standard operating procedures, as well as the suggested primary department responsible for plan implementation and the achievement of the County's goal. The results of the benchmarking of Orange County policies and programs to Vision Zero core elements are also provided.

The following summarizes key take-aways related to the County's top five strengths and barriers identified as part of this work effort:

Strengths:

- Integration of "smart" technologies
- Potential future Transportation Sales Tax
- Availability of SS4A Implementation Grant funding
- Existing safety improvements (speed cushions, raised crosswalks, etc.)
- Project Assessment Team

Barriers:

- Maintenance/construction crew safety
- Land use compatibility
- ROW acquisition
- Data management
- Staffing/Time

The Consultant requests a review of the draft suggestions and recommendations included in the summary tables, and a follow-up meeting to discuss them further.

DEPARTMENT LEADER MEETING MINUTES

NEIGHBORHOOD SERVICES DIV.

Date: September 20, 2023, @ 4PM
Virtual, MS Teams

Prepared by: Christy Lofye, Inwood Consulting Engineers

Attendees: Jason Reynolds, Neighborhood Services
Christy Lofye, Inwood
Brenna Boylan, Inwood

Subject: Orange County Vision Zero Action Plan – SOP Review

WHAT IS VISION ZERO?

A. The Vision Zero Approach

B. Differences from the Traditional Approach

C. Core Elements

SAFE SYSTEM APPROACH

A. Six Principles

B. Five Elements

OVERVIEW OF KEY TASKS

A. Action Plan Development

B. Policy and Process Changes

WHERE DOES THE DEPARTMENT FIT IN VISION ZERO?

A. Which Safe System Element?

a. Safe People

B. Policies and Procedures Currently in Place

a. The Neighborhood Services Division oversees code enforcement and handles code complaints such as high grass or installation of structures without a permit.

b. This Division is not able to address issues within the Right of Way.

C. Perceived Barriers to Reaching Zero

a. Concerns were mentioned about the approach of accommodating pedestrians and bicyclists on heavy volume truck routes, rather than discouraging vulnerable users from utilizing such roads.

D. Where can we improve procedures, coordination, collaboration, or data collection/sharing?

a. Coordination with Law Enforcement and Public Works is frequent to enforce the Code.

b. Data collection in the Neighborhood Services Division is primarily related to code violations.

STANDARD OPERATING PROCEDURES (SOP) REVIEW/DISCUSSION

A. How does the Neighborhood Services Division promote and influence safety?

a. The Code process is grounded in public safety and supports the CEPTED principles.

b. Two workshops and one conference are hosted by the division:

i. The Community Conference is held annually. Vision Zero is a topic for this year's conference;

ii. Community Connections is a workshop which involves cultivating neighborhood leadership by informing and connecting citizens to a variety of topics; and

iii. the Citizen Planner Academy educates the public on planning for a sustainable community and holds classes focusing on land development, economic development, and mobility.

B. Suggested Standard Operating Plans to Review

a. The Traffic Signal Cabinet Art program hosted by the Neighborhood Services Division has an application process that details what steps are needed to install artwork or wraps around cabinet boxes.

C. Potential Outreach Activities

a. Host and answer questions at a Citizen Planner Academy workshop class about the Vision Zero initiative

b. Participate in the Traffic Signal Cabinet Art Program and incorporate Vision Zero messaging on cabinet wraps.

c. Attend and participate in the State of the County, Economic Summit, the Mayor's Open House, back-to-school events, and BCC hearings to expose a wide range of citizens to the Vision Zero initiative and garner support.

D. Potential Champions from the Department

a. To be named.

DEPARTMENT LEADER MEETING MINUTES

MEDICAL EXAMINER'S OFFICE

Date: September 21, 2023, @ 3PM
Virtual, MS Teams

Prepared by: Christy Lofye, Inwood Consulting Engineers

Attendees: Joshua Stephany, County Medical Examiner's Office
Christy Lofye, Inwood
Brenna Boylan, Inwood

Subject: Orange County Vision Zero Action Plan – SOP Review

WHAT IS VISION ZERO?

A. The Vision Zero Approach

B. Differences from the Traditional Approach

C. Core Elements

SAFE SYSTEM APPROACH

A. Six Principles

B. Five Elements

OVERVIEW OF KEY TASKS

A. Action Plan Development

B. Policy and Process Changes

WHERE DOES THE DEPARTMENT FIT IN VISION ZERO?

A. Which Safe System Element?

a. The representative believes the Emergency Medical Services department may be better suited to aid in the Vision Zero Initiative

Policies and Procedures Currently in Place

a. The Medical Examiner's office is responsible for determining the cause and manner of death, as well as filing autopsies and death certificates.

   i. Autopsies are kept as hardcopies in the office and are recorded as part of public records.

   ii. Death certificates are created and filed through the Electronic Death Registration System (EDRS).

B. Perceived Barriers to Reaching Zero

a. Dr. Stephany felt pessimistic toward the realization of the Vision Zero goals, but not for lack of trying.

b. He believes that too much human error is involved and that the best way to accomplish the Vision Zero goal is with the sole use of automated vehicles on roadways.

c. Dr. Stephany stated that major challenges to reaching zero were the predominance of distracted and inattentive drivers on roadways, as well as the presence of drivers unfamiliar with the roads, such as tourists.

d. Speed and the use of drugs/alcohol are huge factors regarding vehicle crashes.

C. Where can we improve procedures, coordination, collaboration, or data collection/sharing?

a. The data produced by the Medical Examiner's office involves solely the cause of death and the manner of death, which is blunt force trauma in the case of crashes.

b. Additional information is received from law enforcement and EMS, including locations, helmet-use, seatbelt-use, etc.

c. Issues with the accuracy of police reports were mentioned, as well as the timeliness of when they receive such information.

d. Dr. Stephany was not aware of the National Highway Traffic Safety Administration (NHTSA) Crash Outcome Data Evaluation System (CODES).

STANDARD OPERATING PROCEDURES (SOP) REVIEW/DISCUSSION

A. Suggested Standard Operating Plans to Review

a. Dr. Stephany believes none of the department's SOPs pertain to traffic safety.

B. Additional Points of Contact

a. Dr. Stephany believes that the EMS office is better suited to help accomplish Vision Zero goals and provided Christian Zoober as a point of contact.

b. He also suggested that Mike Hudson from FDOT and Lauren Pierson from the District 5 Regional Transportation Management Center (RTMC) would be able to provide better input.

DEPARTMENT LEADER MEETING MINUTES

PUBLIC WORKS DEPARTMENT

Date: September 22, 2023, @ 8 AM
Virtual, MS Teams

Prepared by: Christy Lofye, Inwood Consulting Engineers

Attendees: Joe Kunkel, Public Works
Christy Lofye, Inwood
Brenna Boylan, Inwood

Subject: Orange County Vision Zero Action Plan – SOP Review

WHAT IS VISION ZERO?

A. The Vision Zero Approach

B. Differences from the Traditional Approach

C. Core Elements

SAFE SYSTEM APPROACH

A. Six Principles

B. Five Elements

OVERVIEW OF KEY TASKS

A. Action Plan Development

B. Policy and Process Changes

WHERE DOES THE DEPARTMENT FIT IN VISION ZERO?

A. Which Safe System Element?

a. Safe Roads and Safe People are the primary safe system elements that would apply to Public Works.

b. Public Works is involved with the Safe Speeds element via modifying speed limits, but not as much with hard construction methods.

   i. They have modified their approach of using the 85th percentile speed to set speed limits and are using USLimits2.

c. Mr. Kunkel does not believe the department is significantly involved in the Safe Vehicles and Post-Crash Care elements, aside from the fact that they are involved with limiting congestion which may help with emergency response times and access.

d. Mr. Kunkel stated that Publics Works is the driver for the Vision Zero Initiative.

B. Policies and Procedures Currently in Place

a. The current procedure involving resurfacing projects is focused just on milling and resurfacing, and matching the existing striping based on aerials.

b. Previously, there was focus on implementing new opportunities to improve the roadway, especially regarding safety, but it has fallen off in recent years.

   i. An example mentioned by Mr. Kunkel was the resurfacing of Howell Branch Rd and how the resurfacing project did not consider widening the existing bike lanes and safety for bicyclists.

C. Perceived Barriers to Reaching Zero

a. One of the challenges Mr. Kunkel mentioned to requiring safety reviews prior to resurfacing certain functional classifications of roads (similar to what FDOT is currently doing) was the lack of staff and time to be able to do so.

   i. Potential solutions to this problem were discussed including the addition of a new safety office or offshoot of Traffic Engineering, as well as bringing in an in-house consultant to work on traffic review tasks.

   ii. Mr. Kunkel mentioned the augmented staff contract for the Mayor's Accelerated Transportation Safety Program, which is a 5-year program with a funding of $55 million over the course of the program.

iii. There is also the potential for funding from federal SS4A implementation grants.

b. Mr. Kunkel mentioned the need for buy-in from management as well as the need for the creation of an internal safety culture.

i. This can be done through internal education and the internal acknowledgment of the Vision Zero goals and the priority of safety.

c. Mr. Kunkel believes that OCPS should be involved in transportation safety by constructing safety infrastructure to serve new schools.

D. Where can we improve procedures, coordination, collaboration, or data collection/sharing?

a. Suggested improvements to the standard procedure of resurfacing projects to include a safety review.

STANDARD OPERATING PROCEDURES (SOP) REVIEW/DISCUSSION

A. Suggested Standard Operating Plans to Review

a. Mr. Kunkel believes the SOP for resurfacing projects needs to be reviewed with another potential SOP review to be decided upon at a later date.

b. Further potential SOPs were briefly discussed:

i. Discussion was held on potentially examining standard procedures involving the approval of bus stops due to the significant number of crashes located near transit stops.

ii. Discussion was held on the potential for creating a quick review document for the implementation of crosswalks within non-gated subdivisions so that Development Engineering will be able to determine if a proposed crosswalk needs further review by Traffic Engineering.

iii. Discussion was held about utilizing data from the traffic management center to examine new performance measures.

iv. Examining speed management on an area-wide basis rather than a street-by-street basis was mentioned.

B. Potential Outreach Activities

a. Mr. Kunkel mentioned that Vision Zero was included in the Hunter's Creek annual meeting this year. It was discussed that these are great opportunities for public outreach for the Vision Zero message.

DEPARTMENT LEADER MEETING MINUTES

ADMINISTRATIVE SERVICES DEPT.

Date: September 25, 2023, @ 11 AM
Virtual, MS Teams

Prepared by: Christy Lofye, Inwood Consulting Engineers

Attendees: Anne Kulikowski, Administrative Services Dept.
Mindy Cummings, Real Estate Management Div.
Christy Lofye, Inwood
Brenna Boylan, Inwood

Subject: Orange County Vision Zero Action Plan – SOP Review

WHAT IS VISION ZERO?

A. The Vision Zero Approach

B. Differences from the Traditional Approach

C. Core Elements

SAFE SYSTEM APPROACH

A. Six Principles

B. Five Elements

OVERVIEW OF KEY TASKS

A. Action Plan Development

B. Policy and Process Changes

WHERE DOES THE DEPARTMENT FIT IN VISION ZERO?

A. Which Safe System Element?

a. Ms. Kulikowski and Ms. Cummings believe that their department mostly serves a support role and provides services to other departments and divisions.

b. Ms. Kulikowski determined that the divisions within Administrative Services most likely to be able to assist in the Vision Zero goals are the Real Estate Management Division and their Fiscal and Operational Support Division; however, upon further thought, felt like Real Estate Management was the division most likely to have a role in Vision Zero.

B. Policies and Procedures Currently in Place

a. The Real Estate Management Division handles the acquisition of land and negotiates with utility services for easements. Their Fiscal and Operations Division oversees the Capital Improvement Projects for the county, with the exception of utilities and the Convention Center.

b. The timeline of land acquisition varies on a project-by-project basis.

c. For the SCALE (Safety, Cost, Alternatives, Long Range Planning, Environmental) process, it is about an 8-year process, including the engineering and design components as well as public meetings.

    i. The process to construct a roadway project may take less time to complete for projects involving existing roads with little need for right-of-way acquisition.

d. Acquisition Under Threat or Condemnation has a set timeline built into the process due to the involvement of lawyers and required mediation.

e. Advance acquisitions take about 570 days for due diligence and completing what needs to be done for closing.

f. Negotiations for easements may also be complicated due to the first-in-time, first-in-right property law, and the reluctance of utilities companies willing to relinquish their superiority to the County and become subordinate.

    i. A Phase 1 Environmental Site Assessment is not needed for an easement.

g. Furthermore, all properties must be appraised by approved appraisers twice, and many appraisers are 90 days out.

h. The consensus of the department leaders is that the process is the process, and very little can be done to speed it up as the human element (like negotiations and waiting for responses) takes time.

i. Currently, the department has INVEST staff augmentation contracts, which have been expanded in the past to accommodate in-house staff.

    i. This requires communication with the County Administration to adjust the budget to allow for it.

    ii. Any additions to staff for the Vision Zero initiative will need to be approached from a budget standpoint and be communicated with County Administrations.

C. Perceived Barriers to Reaching Zero

a. On the Administrative Services side, time, staffing, and funding appear to be major barriers in aiding with the Vision Zero Initiative.

    i. Potentially, SS4A implementation grants may be able to help with funding.

    ii. Utilizing staff contracts and bringing on in-house staff may help with staffing concerns.

    iii. By focusing on projects within existing right-of-way, the timeline may be sped up regarding tasks Administrative Services is responsible for.

D. Where can we improve procedures, coordination, collaboration, or data collection/sharing?

a. Adding flexibility to the language within the Certificate of Necessity may help with accomplishing Vision Zero goals.
b. Focusing on projects within existing right-of-way may save time.

STANDARD OPERATING PROCEDURES (SOP) REVIEW/DISCUSSION

A. Suggested Standard Operating Plans to Review

a. There are no SOP procedures recommended to review.

B. Additional Discussion

a. Discussion was held on the differences between Fiscal and Business Services and Fiscal and Operational Support.
    i. Fiscal and Operational Support within the Administrative Services Department deals with all term contracts, the entire capital improvement projects except for utilities and Convention Center, and coordinates CIP with Fire Rescue.
    ii. Fiscal and Business Services deals with general topics such as bond finance, commercial paper, FEMA, etc.

DEPARTMENT LEADER MEETING MINUTES

PARKS & RECREATION DIVISION

Date: September 27, 2023, @ 2 PM
Virtual, MS Teams

Prepared by: Christy Lofye, Inwood Consulting Engineers

Attendees: Matt Suedmeyer, Parks & Recreation
Regina Ramos, Parks & Recreation
Cedric Moffet, Parks & Recreation
Christy Lofye, Inwood
Brenna Boylan, Inwood

Subject: Orange County Vision Zero Action Plan – SOP Review

WHAT IS VISION ZERO?

A. The Vision Zero Approach

B. Differences from the Traditional Approach

C. Core Elements

SAFE SYSTEM APPROACH

A. Six Principles

B. Five Elements

OVERVIEW OF KEY TASKS

A. Action Plan Development

B. Policy and Process Changes

WHERE DOES THE DEPARTMENT FIT IN VISION ZERO?

A. Which Safe System Element?

a. The Parks & Recreation Division is involved with the Safe Roads, Safe People, Safe Speeds, and Post-Crash Care elements of the Safe System approach.

b. In relation to Post-Crash Care, trails have emergency markers every 10th of a mile that contain coordinates so that trail users can provide their location to emergency responders if an emergency were to occur.

   i. GIS information regarding these markers is provided to Emergency Management.

c. The Parks & Recreation Division maintains some trails within the Right of Way.

   i. An example was given of Horizon West, which has some trails within the right-of-way that are maintained by Parks & Recreation.

B. Perceived Barriers to Reaching Zero

a. Safe People - There is a Trail Smarts initiative already in place that aims to inform users how to stay safe while on Orange County trails.

b. Designing for user comfort is already an established practice by including shade trees, benches, bike repair stations, and water fountains along trails.

   i. Around four to five projects to come out of the Healthy West Orange collaboration included re-vegetation.

   ii. Bike repair stations and water fountains are planned for about every mile or so along trails.

   iii. Ms. Ramos mentioned there are challenges with including vegetation along trails as there is the need for continuous maintenance.

c. There is a current collaboration with Health West Orange and Bike/Walk Central Florida with trail audits being performed.

d. Crash data regarding trails is not examined by Parks & Recreation. Crash data was analyzed by VHB for the planned trails for the Trails Master Plan, but crash data analysis was not performed for existing trails.

e. Parks & Recreation also currently does not provide input regarding the type of traffic control used for trail intersections and relies on consultants to determine the traffic control type.

f. Pedestrian and bicycle counts are collected by Parks & Recreation and are used mainly for internal purposes, including justifying staff and resources. These counts have also been used in feasibility studies and for pedestrian bridge projects.

    i. Permanent pedestrian and bicycle counters are also being implemented by FDOT.

C. Perceived Barriers to Reaching Zero

a. Funding, procurement, and staffing issues were listed as potential challenges and may impact the timeline of projects.

b. Staffing concerns within Public Works Engineering were mentioned, as well as the potential need for more staffing in the future at the Parks & Recreation Division as new trails continue to be constructed.

c. Discussion was also held on how implementation grants may be able to help with funding.

D. Where can we improve procedures, coordination, collaboration, or data collection/sharing?

a. The Parks & Recreation Division emphasized the idea of implementing trail audits county-wide to aid in identifying and prioritizing projects.
b. Parks & Recreation also agreed in the discussion that trails along the High Injury Network should be prioritized for trail audits.
c. It may also be beneficial for information from Emergency Management to be shared regarding emergencies occurring on trails, of which locations were identified using the emergency markers.
d. Collaboration with Traffic Engineering may be established regarding collecting and analyzing crash data, potentially quarterly to annually.
e. It is also recommended for the Parks & Recreation Division to continue to collaborate with FDOT to identify pedestrian and bicycle count locations that can aid in the planning of safe crossings.

STANDARD OPERATING PROCEDURES (SOP) REVIEW/DISCUSSION

A. Suggested Standard Operating Plans to Review

a. There are standards within the Trails Master Plan for addressing minor intersections, such as driveways, that can be examined.

DEPARTMENT LEADER MEETING MINUTES

PEDS DEPARTMENT

Date: September 29, 2023, @ 8 AM
Virtual, MS Teams

Prepared by: Christy Lofye, Inwood Consulting Engineers

Attendees: Andres Salcedo, PEDS Department
Alan Marshall, PEDS Department
Alberto Vargas, Planning Division
Alissa Torres, Transportation Planning,
Olan Hill, Planning Division
Christy Lofye, Inwood
Conroy Jacobs, Inwood
Brenna Boylan, Inwood

Subject: Orange County Vision Zero Action Plan – SOP Review

WHAT IS VISION ZERO?

A. The Vision Zero Approach

B. Differences from the Traditional Approach

C. Core Elements

SAFE SYSTEM APPROACH

A. Six Principles

B. Five Elements

OVERVIEW OF KEY TASKS

A. Action Plan Development

B. Policy and Process Changes

WHERE DOES THE DEPARTMENT FIT IN VISION ZERO?

A. Which Safe System Element?

a. The PEDS Department is primarily involved with safety as it relates to transportation planning.

b. The County was invited to participate in the City of Orlando's Vision Zero Initiative as a task force member but did not accept the role. However, they did provide the data the City needed and attended City Council meetings.

c. Discussion was held on the percentage of fatal and severe injuries occurring on County roads versus State roads.

   i. While State roads tend to have a higher percentage of fatal and severe injuries, as part of the Vision Zero Initiative, roadways from all jurisdictions within the County's boundary are addressed.

d. Design and construction are already underway on some roads identified on the draft High-Injury Network in Orange County.

B. Policies and Procedures Currently in Place

a. A sales tax plan was developed that was based on many of the principles the Vision Zero initiative emphasizes, with a number of projects outlined to tailor to different types of crashes.

b. In Vision 2050, the department incorporated a goal focusing on Vision Zero safety and corresponding policies including equity and traffic calming.

c. Also included was a policy for capital improvement planning that prioritized safety and equity.

d. There was collaboration with the Transportation Planning Division to review proposed place types and their transitions away from industrial uses to residential and mixed use in order to avoid land use compatibility conflicts.

i. An urban freight plan was also included to examine it from a compatibility perspective.

e. Transportation Planning is working with Public Works on comments for the Orange County Code and has requested revisions to Draft 4 to reference Vision Zero in the intent as well as in the components of the transportation studies and countermeasures in the development review process.

f. Alissa Torres said that Joe Kunkel from Public Works mentioned adding amendments to the existing Orange County Code to reference the Vision Zero Initiative.

g. Potential adoption of the Orange County Code can occur as early as the end of March to May of next year.

h. Currently, coordination with Public Works occurs on a project-by-project basis.

i. A new Project Assessment Team within Development Services was established to operate above the permitters and aid in identifying problems before they occur.

j. The team consists of three members from Public Works and six members from PEDS, with meetings occurring every two weeks.

C. Perceived Barriers to Reaching Zero

a. Funding through implementation grants was discussed as a benefit in developing a Vision Zero Action Plan.

b. Discussion was held regarding the difficulty of securing staff involvement, particularly in events and outreach activities occurring outside of business hours, due to a lack of overtime pay or comp time offered for non-exempt employees.

D. Where can we improve procedures, coordination, collaboration, or data collection/sharing?

a. Mr. Salcedo believes there is already good coordination established, but that there is always room for improvement, especially with communication regarding the development of Orange County Code.

STANDARD OPERATING PROCEDURES (SOP) REVIEW/DISCUSSION

A. Potential Areas for Outreach and Opportunities

a. Funding to help support the Vision Zero goals may potentially be obtained through Board of County Commissioner tax approvals to help address safety needs county-wide.
b. PEDS community meetings may provide a platform for outreach to promote the Vision Zero goals and initiatives.
c. Compensation or time off for staff participating in events and outreach activities after business hours should be implemented to help with engagement and the demonstration of high-level commitment.
d. Potential collaboration may be held with the newly established Project Assessment Team.

DEPARTMENT LEADER MEETING MINUTES

FIRE-RESCUE DEPARTMENT

Date: October 4, 2023, @ 3:30 AM
Virtual, MS Teams

Prepared by: Christy Lofye, Inwood Consulting Engineers

Attendees: Martis M. Mack, Fire-Rescue
Kimberly L. Buffkin, Fire-Rescue
Christy Lofye, Inwood
Adam Burnett, Inwood

Subject: Orange County Vision Zero Action Plan – SOP Review

WHAT IS VISION ZERO?

A. The Vision Zero Approach

B. Differences from the Traditional Approach

C. Core Elements

SAFE SYSTEM APPROACH

A. Six Principles

B. Five Elements

OVERVIEW OF KEY TASKS

A. Action Plan Development

B. Policy and Process Changes

WHERE DOES THE DEPARTMENT FIT IN VISION ZERO?

A. Which Safe System Element?

a. The Fire-Rescue Department fits in the Post-Crash Care element of the safe system approach, but the department also has a Safe People component with its fire truck drivers.

b. They are the first responders to assess the scene and provide fire suppression and emergency medical services.

B. Policies and Procedures Currently in Place

a. Procedures for fire truck drivers are in place for how they are expected to respond to calls, ensuring a rapid and safe response.

b. They are keenly aware of the statistics and use a drive cam system to monitor employees' driving performance.

c. The Orange Code specifies that the Fire Marshal review and approve certain development features that may impact response times, such as roadway or lane widths.

d. The Traffic Engineering Division has been using crash cushions for neighborhood traffic calming that do not impact response times.

C. Perceived Barriers to Reaching Zero

a. Fire-Rescue Department leaders did not identify any perceived barriers to reaching zero from within the Department.

b. Human error - Deputy Chief Buffkin indicated that autonomous vehicles could improve crashes removing human error as a factor of the Safe System Approach. Infrastructure is

currently moving toward accommodating this type of technology; however, this process is going to take some time to fully build-out.

D. Where can we improve procedures, coordination, collaboration, or data collection/sharing?

a. No needs were identified.
b. The Traffic Engineering Division provides emergency vehicle pre-emption on most signals (Opticom) and they are not aware of any corridors or intersections where pre-emption is still needed.

STANDARD OPERATING PROCEDURES (SOP) REVIEW/DISCUSSION

A. Recommended SOPs to Review

a. The Fire-Rescue Departments has no SOPs recommended to review.

DEPARTMENT LEADER MEETING MINUTES

UTILITIES DEPARTMENT

Date: October 6, 2023, @ 9 AM
Virtual, MS Teams

Prepared by: Christy Lofye, Inwood Consulting Engineers

Attendees: Lindy Wolfe, Utilities Engineering Division
Laura Tatro, Utilities Engineering Division
Brian Matejcek, Utilities Field Services
Tad Parker, Utilities CIP
Christy Lofye, Inwood
Conroy Jacobs, Inwood

Subject: Orange County Vision Zero Action Plan – SOP Review

WHAT IS VISION ZERO?

A. The Vision Zero Approach

B. Differences from the Traditional Approach

C. Core Elements

SAFE SYSTEM APPROACH

A. Six Principles

B. Five Elements

OVERVIEW OF KEY TASKS

A. Action Plan Development

B. Policy and Process Changes

WHERE DOES THE DEPARTMENT FIT IN VISION ZERO?

A. Which Safe System Element?

a. Utilities works in the roadway, so the department fits in the Safe Roads element.

B. Policies and Procedures Currently in Place

a. Public Works shares their roadway resurfacing layer and Utilities tries to coordinate utility work from those so that manhole rehabs and other work can get done ahead of resurfacing.

b. Since they know when resurfacing is scheduled, they try to time and coordinate their work so that they can work concurrently within the right-of-way so as not to disturb traffic twice.

c. The pull permits for capital projects through Public Works and turnaround time is pretty good, usually a couple of weeks for small projects and 30 days for a larger project. They tell their contractors to plan for this.

d. If Utilities work in subdivision right-of-way impacts an ADA ramp, they replace it. They also install them where needed if they are working within an intersection.

e. Public Works provides design plans at 60% design for relocates.

f. If Utilities damages sidewalks or roadways, they repair it. They also properly maintain traffic (MOT) for both vehicles and pedestrians/bicyclists.

g. If utilities are in the right-of-way, then they have to move them for a roadway project; however, if moving a larger utility is needed sometimes that is not cost-effective. If the utilities are within a utility easement, then others have to pay for the relocation.

C. Perceived Barriers to Reaching Zero

a. Utilities is currently reviewing the recent Orange Code draft. Right-of-way for some new roadways is going from 60 feet to 50 feet, so more is going on in the roadway. This means that utilities maintenance workers are in the roadway more which is less safe than working in green space.

D. Where can we improve procedures, coordination, collaboration, or data collection/sharing?

a. There is a group within Utilities that currently coordinates with Public Works regularly for various projects.
b. There seem to be silos in Public Works, almost like different businesses.
c. There seem to be conflicting opinions on the Orange Code. Planning wants smaller roadways, buildings close to the roadway, and improved walkability. Utilities want solid waste vehicles to be able to maneuver to collect the trash, which is difficult in alleys. Maintenance needs do not seem to be taken into consideration.

STANDARD OPERATING PROCEDURES (SOP) REVIEW/DISCUSSION

A. Potential Areas for Outreach and Opportunities

a. The Utilities Department has no SOPs recommended for review.

Table 1
Policy and Standard Operating Procedure Recommendations
Orange County Vision Zero Action Plan

Description	Existing Procedure	Recommendation	VZ Core Element Link	Safe System Element Link	Challenge(s)	Suggested Lead Department or Division
Roadway Resurfacing	Public Works Roads & Drainage Division prepares a list of roadways to be resurfaced annually. The contractor replaces pavement markings according to Google Maps, which may be dated.	Collector and arterial roadways scheduled to be resurfaced during the year should be reviewed for potential safety improvements, ADA compliance, as well as upgraded to current standards. Examples include lane narrowing, widening or buffering bike lanes, adding or upgrading crosswalks, pavement markings for wrong way treatment, railroad dynamic envelopes, and removing SCHOOL pavement messages outside of designated school zones. Other safety improvements now permitted, such as speed limit sign pavement markings, and pedestrian and bicycle crossing warning sign pavement markings should be considered at appropriate locations. Any roadway features not in compliance with ADA, such as curb ramps, detectable warning mats, and obstructions to pedestrian access routes, should be addressed.	Complete Streets for All Context-Sensitive Speeds	Safe Roads Safe Speeds	Staffing, time	Public Works
Utility Relocations related to Safety Projects	First-in-time, first-in-right property law requires the County to pay the Utility for relocations if the Utility was there first, which can impact the ability of the County to construct safety improvements. This includes Orange County Utilities.	Strongly request or negotiate that Utilities become subordinate to the County for needed utility relocations. Agreements with Orange County Utilities should provide flexible terms so that safety projects can proceed. Practice design avoidance related to utlitiy relocations whenever possible.	Complete Streets for All	Safe Roads	Most utilities are reluctant to relinquish their first-in-time position and become subordinate to the County. Funding for utility relocations if the County is subordinate.	Public Works/Orange County Utilities
St.ART Something Traffic Signal Cabinet Wraps	Communities submit an application with proposed artwork for a signal cabinet wrap to the Neighborhood Services Division. The application is also reviewed by Public Works prior to approval.	Use the St.ART Something program to provide an opportunity for communities to provide safety-themed art in alignment with the Vision Zero initiative. Remove the probihibition from using logos and allow use of the Orange County Vision Zero logo with safety-themed art wraps.	Authentic Engagement	Safe People	None known.	Neighborhood Services Division/Public Works
Vision Zero Outreach, Education, and Transparency	Each department conducts their own individual outreach efforts. Neighborhood Services Division/PEDS hosts the Community Conference, Community Connections, and the Citizen Planner Academy. Public Works and PEDS hold community meetings, including the annual Hunter's Creek meeting. There are Take your Child to Work Day opportunities. The Mayor hosts the State of the County, Economic Summit, Mayor's Open House, and other events.	Coordinate a County-wide Vision Zero outreach, education, and transparency plan, identifying annual opportunities and standard messaging. Request agencies such as the Orange County Sheriff's Office, which hosts the Senior Academy and Citizen Police Academy, to partner in the effort.	Authentic Engagement	Safe People	Staffing, time	Communications Department
Data Sharing	The Public Works Traffic Engineering Division and Transportation Planning Division have access to crash data through Signal Four Analytics.	Crash data for trail crossings or crashes along trails within County right-of-way should be provided to the Parks & Recreation Division on at least an annual basis.	Responsive, Hot Spot Planning	Safe Roads	Staffing, time	Traffic Engineering Division or Transportation Planning Division/Public Works
	Emergency Management has emergency call records from Orange County trail markers.	Emergency Management should provide records on trail emergency call locations for those related to crashes to both the Parks & Recreation Division and Public Works.	Responsive, Hot Spot Planning	Safe Roads	Staffing, time	Emergency Management

Description	Existing Procedure	Recommendation	VZ Core Element Link	Safe System Element Link	Challenge(s)	Suggested Lead Department or Division
Safety Audits	The Parks & Recreation Division has been collaborating with Healthy West Orange and Bike/Walk Central Florida on trail safety audits for the West Orange Trail.	Trail audits are a proactive practice that should extend beyond the West Orange Trail to other County trails, focusing on those segments and trail crossings within public right-of-way. Segments and trail crossings on High-Injury Network roadways should be prioritized. Road Safety Audits (RSAs) are recommended to be conducted for all roadway segments on the High Injury Network (HIN).	Proactive, Systemic Planning	Safe Roads	Staffing, time Funding, if conducted by consultants	Trail audits -Parks & Recreation Division including a multi-disciplinary audit team from other divisions. RSAs - Transportation Planning Division or Traffic Engineering Division, incuding a multi-disciplinary audit team from other divisions.
Pedestrian and Bicycle Counts	The Parks & Recreation Division collects pedestrian and bicycle counts at locations along County trails and produces	Trail counts could be summarized into an annual report for data sharing and as a planning tool. Count locations could be added to the County's pedestrian and bicycle count GIS map on the County website.	Complete Streets for All	Safe Roads	Staffing, time	Parks & Recreation Division
	The Parks & Recreation Division has started coordinating with FDOT on additional permanent trail counting stations	Coordination with FDOT should continue to identify additional permanent count locations furnished and installed by FDOT.	Complete Streets for All	Safe Roads	Staffing, time	Parks & Recreation Division
	The Traffic Engineering Division's annual traffic count contract includes county-wide pedestrian and bicycle counts and annual report. These counts are displayed on a GIS map on the County's website. The Traffic Engineering Division has a very limited number of portable pedestrian and bicycle counting devices used as needed. In addition, some video detection cameras at signalized intersections have the capability to count pedestrians and bicyclists.	The Traffic Engineering Division's annual count program has made significant progress in establishing levels of pedestrian and bicycle activity. The Division should compare the current count locations to the 2017 Orange County Bicycle and Pedestrian Count Program Design and Implementation Report for additional recommended count locations, as well as recommendations for the development of adjustment factors. The Division should supplement this data with pedestrian and bicycle counts at signalized intersections where the capability exists to do so. A list of intersections where this capability exists should be shared within the Department and data reports produced on an as-needed basis.	Complete Streets for All	Safe Roads	Staffing, time	Traffic Engineering Division
Development Review	The Public Works Development Engineering Division is currently creating written SOPs for review tasks.	Create a procedure for reviewing and approving new bus stop locations with permit applications to install bus stop signs, benches, and shelters within County right-of-way, with designs adhering to the standards outlined in Sec 21, Division 4 of the Orange County Code. Updates should be included in the design standards as new guidance is developed. Train staff in FDOT's Accessing Transit handbook and the new ITE resource Centering Transit and Ped Safety expected to be published soon.	Complete Streets for All	Safe Roads		Public Works Development Engineering, Traffic Engineering
CIP projects, Development Infrastructure Projects, and Maintenance Activity	Safety countermeasures are currently considered in CIP and development infrastructure projects, although not systematically or consistently.	All CIP projects, development infrastructure projects, and maintenance activity projects shall consider implementing Vision Zero aspects or countermeasures as part of that project. A checklist shall be submitted to identify those standard countermeasures that have been considered and are being implemented. If no countermeasures are implemented, the checklist shall provide justification.	Proactive, Systemic Planning	Safe Roads		Public Works Department

Description	Existing Procedure	Recommendation	VZ Core Element Link	Safe System Element Link	Challenge(s)	Suggested Lead Department or Division
Staffing Needs and Time Constraints	The Mayor's Accelerate Transportation Safety Program will use an augmented staff contract. The Administrative Services Division uses an INVEST staff augmentation contract, which has been expanded in the past toinclude in-house staff. This requires communication with the County Administration to adjust the budget.	Assess the need for augmented staff to accomplish the HIN projects and strategies identified in the Vision Zero Action Plan. Approach County Administration regarding the need for a Vision Zero augmented staff contract or the ability to expand current contracts for this use, including the budget to do so. Consider the use of existing continuing services contracts to accomplish some tasks. The Transportation Planning continuing services contract includes a provision which allows in-house consultant support up to 40 hours per week. Request additional operations budget to do so. Consider advertisement of a General Engineering Consultant (GEC) contract or General Planning Consultant (GPC) contract to assist County staff with ongoing needs related to carrying out and monitoring the action plan.	Project Delivery	All Safe System Elements	Funding	Public Works, Real Estate Management
Departmental Coordination and Collaboration	Public Works coordinates with the Administrative Services Department Real Estate Management Division and sets priorities for right-of-way acquisition as well as CIP projects. Public Works and PEDS have created a Project Assessment Team with 6 members from PEDS and 3 members from Public Works. This team coordinates every two weeks on issues related to new projects and permitting. Public Works and Utilities coordinate regularly for engineering projects that include utility relocations.	When coordinating with Administrative Services, Public Works should prioritize projects that provide a safety benefit over strictly capacity projects. Safety projects identified on the High Injury Network through the Action Plan should be prioritized in both ranking and funding. The Department should identify projects that can be accomplished within existing right-of-way for faster implementation and realization of safety benefits while right-of-way acquisition is underway for others. Demonstration of safety benefit through benefit/cost and net present value analysis should be a factor in project prioritization rather than project cost alone without consideration of societal safety benefits. Established and regularly scheduled inter-departmental coordination meetings, such as those between Public Works and PEDS and between Public Works and Utilities, provide the necessary opportunities for collaboration on project issues. Meeting attendees should communicate decisions, action items and other meeting outcomes to other critical staff members across applicable divisions within each department.	Complete Streets for All	Safe Roads	None known.	Public Works, PEDS, Utilities

Table 2
Vision Zero Benchmarks
Orange County Vision Zero 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	A Vision Zero Resolution has been approved by the BCC on August 9, 2022.
	Agency leadership is consistently engaged in prioritizing safety via collaborative efforts.		X		The Orange County Community Traffic Safety Team (CTST) meets regularly to address safety issues with agency partners (enforcement, education, engineering). Regular/ongoing professional development related to safety topics, methods, and strategies, as well as an openness to consider practices or strategies successfully implemented by other agencies, could lead to greater collaboration across divisions and departments.
	Key stakeholders have made a clear, public statement in support of Vision Zero efforts and timeline.			X	Stakeholder meetings have begun for the Vision Zero Action Plan.
	An interdepartmental safety working group regularly coordinates with leadership to discuss progress.	X			The County could create a Safety Office to conduct focused coordination with leadership.
Authentic Engagement	The agency conducts outreach to specific communities, interests, and populations.			X	Ex: The County hosts an annual Hunter's Creek meeting.
	Public meetings and workshops are hosted regularly and at times and locations convenient for the community.			X	The County includes a meeting calendar on its website and provides opportunities for public comment.
	The community, including historically disadvantaged communities, trust and feel engaged by the agency.			X	Ex: Neighborhood Services regularly meets with "Safe Neighborhoods" representatives and the Pine Hills Community Council.
	The stakeholder groups are representative of the community at large.			X	An effort is made toward diverse representation.
	The agency engages regularly with community-based organizations and leaders.			X	The County has numerous advisory boards and also hosts an annual Community Conference.
	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	Ex: Traffic Engineering provides an annual grant to Bike/Walk Central Florida for support with safety outreach and education.

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice	Notes / Opportunities for Policy/Process Refinement
Strategic Planning	Crash data is collected regularly and used to inform decisions before plan development.			X	The County has access to Signal Four Analytics and collects data to support engineering decisions.
	The agency augments traditional crash data from police data with data from other sources, such as hospitals.		X		Information obtained from hospitals should be used to supplement crash reports, especially related to the under-reporting of crashes involving vulnerable road users.
	The agency has established an appropriate timeline to reach zero traffic fatalities.			X	A goal of zero traffic fatalities by 2040 has been established through the Vision Zero resolution.
	The agency has established near-term and interim goals for achieving zero traffic fatalities.	X			The County has adopted a goal of zero traffic fatalities by 2040, but no near-term or interim goals have been established. The Vision Zero Action Plan will establish performance measures.
	The agency has delineated clear action items to achieve each goal.	X			This will be achieved through the Vision Zero Action Plan.
	A lead department or position has been established for each action item.	X			This will be achieved through the Vision Zero Action Plan.
	The lead agency for each action item identifies partners to help complete the action.	X			This will be achieved through the Vision Zero Action Plan.
	The agency has determined appropriate funding needs for each action item.	X			This will be achieved through the Vision Zero Action Plan.
	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			This will be achieved through the Vision Zero Action Plan.
	A third-party audits Vision Zero progress and reports outcomes on the website.	X			This could be achieved through non-County members of the Vision Zero Steering Committee after Action Plan completion.
	Departments and staff are provided resources for safety related training and staff development.		X		Staff training is provided periodically and Internal staff training will be included as part of the Vision Zero initiative; however, a focused training plan should be developed, implemented, and continue after plan completion.
	Staff at multiple levels and in multiple departments are safety champions to ensure continuity when a safety champion departs.	X			The Vision Zero Steering Committee should recruit for and maintain a list of safety champions.

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice	Notes / Opportunities for Policy/Process Refinement
Strategic Planning, continued	Adequate policies related to equitable transportation have been formulated.		X		Equity is addressed throughout the County's Vision 2050 and the County's Ped/Bike Safety Action Plan, with the County's Title VI Nondiscrimination Policy and Plan identifying County Equity Priority Areas; however, a focused effort on developing specific policies to ensure transportation equity should be pursued. For example, funding should be aligned with prioritized HIN projects (methodology considered equity)
	The agency has determined suitable performance measures to assess equitable transportation.	X			This will be achieved through the Vision Zero Action Plan.
	Adequate policies related to multimodal transportation have been formulated.		X		Multimodal transportation is addressed throughout the County's Vision 2050; however a focused effort on developing specific policies should be pursued. Ex: Policies for evaluation of signal timing strategies for pedestrian safety, transit signal priority, etc., based on context. Also, improvements to ensure ADA compliance should be incorporated into the County's resurfacing program.
	Suitable performance measures to assess multimodal transportation have been established.	X			This will be achieved through the Vision Zero Action Plan.
	The agency has developed policies to maintain bicycle and pedestrian facilities during construction projects that affect roadway operations.			X	These policies should apply to both County and non-County contractors as well as internal staff performing maintenance work.
	The agency has established an efficient citizen request process and a methodology for evaluating requests.			X	The County's 311 system provides multiple methods for citizens to submit requests (app, online, call). Additional staff or consultant support is needed to investigate and respond in a timely manner.
Project Delivery	Adequate policies related to transportation safety have been formulated.		X		The County's Pedestrian/Bicycle Safety Action Plan outlines policies for implementation of countermeasures. These policies should be revisited and updated as necessary. Similar policies should be developed for vehicular safety.
	The agency has determined suitable performance measures to assess transportation safety.	X			This will be achieved through the Vision Zero Action Plan.

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice	Notes / Opportunities for Policy/Process Refinement
Project Delivery, continued	Transportation safety is incorporated into every Capital Improvement Project to the extent applicable.		X		Safety reviews go beyond those projects identified as "safety projects", and should be incorporated into all CIP projects, including capacity projects. This can be accomplished through design road safety audits (RSAs).
	FHWA's proven countermeasures are implemented in projects.		X		Many proven safety countermeasures are consistenly implemented, such as reflective border signal backplates; however, engineers should identify opportunities to consistently evaluate others for inclusion as well.
	The agency implements NHTSA's Countermeasures that Work.		X		Recommend discussing this resource with the Community Traffic Safety Team (CTST).
	The agency shares project outcomes and effectiveness with the public.	X			The Vision Zero website will provide safety outcomes based on performance measures. Reporting on at least an annual basis should continue after completion of the Action Plan. The Traffic & Transportation" section of the County website also includes project web-pages. Consider maintaining project websites after construction and monitoring and displaying safety outcomes on a project-by-project basis.
	The agency provides funding for projects that reduce fatal and serious injury collisions.			X	The County has several projects underway focused on improving safety on corridors with fatal and severe injury crash history.
	There is sufficient funding allocated for future projects that may reduce fatal and serious injury collisions.	X			County projects are historically underfunded and the Mayor's Penny Sales Tax Initiative failed at the ballot. Although not sufficient to cover needs, the BCC has options available right now to approve additional methods of revenue, such as the ninth-cent fuel tax and an increase to the local option fuel tax.
	The agency applies for grants to fund safety projects from traditional sources.		X		The County has pursued grant opportunities such as USDOT's BUILD grant, and the SS4A action plan grant through MetroPlan Orlando. The County should actively pursue other grant opportunities such as Safe Routes to School (SRTS) and Highway Safety Improvement Program (HSIP) grants. FDOT also provides speed enforcement grants to local law enforcement agencies. Additionally, the Office of Management and Budget should consider a grant matching fund account.

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice	Notes / Opportunities for Policy/Process Refinement
Project Delivery, continued	The agency applies for grants to fund safety projects from non-traditional sources.		X		The County should investigate sources of grants other than FDOT and USDOT grants. Ex: AAA Roadside Emergency Responder Safety Grant or AARP Community Challenge Grant.
	Projects incentivizing transit, biking, walking, and carpooling over single-occupant vehicles are prioritized and implemented.	X			The County should consider providing incentives such as increased density/intensity or expedited permitting, for the provision of on-site ped/bike improvements beyond that required by Code or for development near transit locations. In addition to projects, the County could incentivize transit, biking, walking, and carpooling to work in partnership with FDOT's ReThink Your Commute program.

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice	Notes / Opportunities for Policy/Process Refinement
Category: Safe Roadways and Safe Speeds					
Complete Streets for All	The agency has allocated adequate funding for complete streets projects.	X			County projects are historically underfunded and the Mayor's Penny Sales Tax Initiative failed at the ballot. Although not sufficient to cover needs, the BCC has options available right now to approve additional methods of revenue, such as the ninth-cent fuel tax and an increase to the local option fuel tax.
	The agency has a complete streets plan.		X		The County initiated the develoment of a Complete Streets plan and should prioritize its completion.
	Complete Street elements have been incorporated into planning documents.			X	Complete Streets objectives are incorporated throughout the County's Vision 2050. Incorporate consideration of the addition of Complete Street improvements through the PD review and approval process, as was done for The Grow and Horizon West.
	Vulnerable users are prioritized in project planning and implementation.		X		The County should more consistently prioritize vulnerable road users. The Vision Zero HIN was developed using a methodology that weighted roadway segments with higher frequency of fatal and severe injury pedestrian, bicycle, and motorcycle crashes.
	The agency actively coordinates with neighboring member agencies and neighboring municipalities to provide connections for people walking and biking.		X		The County's School Safety Committee meets monthly with OCPS,OCSO, FDOT, and municipalities within Orange County to address the needs of students walking and biking to school. The County should actively engage with adjacent counties similarly.

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice	Notes / Opportunities for Policy/Process Refinement
Complete Streets for All, continued	Appropriate practices are followed to set speed limits based on context.			X	Traffic Engineering is using USLimits2, an online tool developed and recommended by FHWA, and considering context to supplement the 85th percentile speed in setting speed limits. The MUTCD 11th Edition (December 2023) allows for the consideration of the 50th percentile speed as well as other factors when setting speed limits, and requires that the engineering study to set speed limits consider the roadway context. A County-wide Context Classification Map is currently being developed by Transportation Planning for the Concurrency Management System's proper application of FDOT' s 2023 Q/LOS standards. This roadway classification map should be based on current and future context, and be updated every three years or based on the rate of change in future land use, zoning, economic activity, and crashes etc. in a neighborhood or along a corridor.
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	Traffic Engineering uses a point system for determining reduced speed school zones.
	Appropriate procedures are followed to enforce speed limits.		X		OCSO is not staffed to enforce speed limits countywide, but will conduct focused enforcements when requested.
	There are ongoing education programs/campaigns related to traffic speeds.		X		Traffic Engineering sets speed trailers upon request and has a speed feedback sign program. The County should supplement these efforts with an education campaign and coordinate with the Sheriff's Office on a focused speed enforcement campaign.
	The agency follows proper methods to modify existing roadways to achieve safe speeds.		X		Speed cushions with wheel cutouts for emergency vehicles are now part of the County's traffic calming contract. Both single-lane and two-lane roundabouts should be evaluated as alternatives to traffic signals. Other speed management strategies appropriate for collectors and arterials (see FDOT FDM) should be applied as appropriate for speed, volume, and context.

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice	Notes / Opportunities for Policy/Process Refinement
Category: Data Driven Approach, Transparency and Accountability					
Equity Focused Analysis and Programs	The agency has developed effective programs and strategies to help people without housing, and low-income individuals access jobs and services.			X	The County's Community Action Division provides a variety of community action programs (Family Self-Sufficiency Program, energy bill assistance, employment assistance, etc.) and 7 Community Centers where residents can access programs and services.
	Equity is a factor in project prioritization.	X			This will be achieved through the Vision Zero Action Plan.
	Equity is reflected in the agency's vision and goals for safety.			X	Vision 2050 Objective T 1.2 addresses equity in safety throughout the transportation network.
	Geographic inequity is considered in the agency's data analysis.		X		Consideration is given to Commissioner districts to balance resources across the County.
	The agency reports safety outcomes demographically.	X			This will be achieved through the Vision Zero Action Plan.
	Data on distribution of stops and ticketing is analyzed demographically.	X			The OCSO could share available demograhic ticketing data with the Orange County Community Traffic Safety Team (CTST).
	The agency has formulated effective policies to mitigate the disproportionate impact of fines for minor violations on low-income individuals.				The OCSO should be engaged in discussions related to equity.
	Important information and education materials are provided in common languages spoken by residents whose first language is not English.			X	Educational materials and translation services are often provided in Spanish and Haitian Creole.
	The agency uses data to identify and systematically address trends and risk factors to prevent severe collisions.		X		Traffic Engineering has used data to systemically address road departure crashes on horizontal curves, pedestrian crashes at designated school crossings, and other risks. The Vision Zero Action Plan will identify further strategies to address crashes systemically.
Proactive / Systemic	Common collision patterns have been matched with adequate countermeasures.		X		The Pedestrian/Bicycle Safety Action Plan includes ped/bike crash typing matched to appropriate countermeasures. A similar exercise could be performed for other crash types, or a reference document produced with a compilation of links to resources for identification of countermeasures such as NCHRP 500 series reports by crash type, the CMF Clearinghouse, the Highway Safety Manual, NHTSA's Countermeasures that Work, FHWA Proven Safety Countermeasures, etc., and provided to staff.

Strategy	Benchmarks	Not a Current Practice	Occasional Practice	Institutional Practice	Notes / Opportunities for Policy/Process Refinement
Proactive / Systemic, Cont'd	The agency works to continuously improve the accuracy of crash reports.		X		The County had an assigned staff position with Signal Four Analytics editing privileges. These duties should be re-assigned and/or errors reported for correction.
	The agency uses the High Injury Network (HIN) in project prioritization.		X		The County uses crash severity data in prioritizing projects; however, a HIN will be developed as part of the Vision Zero Action Plan.
Reactive / Hot Spot	A demographic analysis of the HIN has been conducted.	X			This will be achieved through the Vision Zero Action Plan.
	The agency routinely monitors and reports collision data to the public.		X		The County currently monitors and reports collision data through corridor or area-wide traffic studies. Countywide collision monitoring and reporting will be achieved through the Vision Zero Action Plan
Evaluation and Adjustment	Intersection design and control decisions are evaluated to reduce kinetic energy transfer to vulnerable users.	X			Training on the Safe System Approach will be provided as part of the Vision Zero initiative. Further training on the Intersection Control Evaluation (ICE) Safe System for Intersections (SSI) analysis should also be provided so that engineers understand and consider kinetic energy transfer when making decisions related to intersections.
	Demonstration projects are used to test the strategies and get feedback from the public.	X			The County should be willing to take measured risks and be prepared to justify decisions to citizens with the support of elected officials for demonstration projects.
	The agency has a process to address underreporting of collisions, especially for vulnerable road users.	X			The County should supplement data obtained from crash reports with hospital data.

APPENDIX D

Safety Countermeasures Toolkit

Engineering Countermeasures Toolkit

VISION ZERO

CENTRAL FLORIDA

Counting down to zero traffic deaths

Updated April 2024

VISION ZERO
CENTRAL FLORIDA

Counting down to zero traffic deaths

Overview

Introduction and How to Use this Toolkit

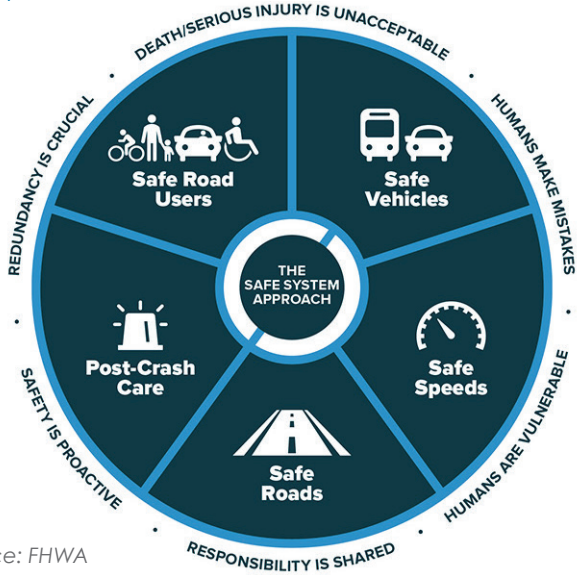
MetroPlan Orlando completed its first comprehensive Vision Zero Action Plan in Spring 2024. The Plan outlines actions that MetroPlan Orlando, including its 3 counties and incorporated cities, will take in the next five years and beyond to eliminate deaths and serious injuries on the region's roadways 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.

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



Source: FHWA

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.

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.

VISION ZERO
CENTRAL FLORIDA
Counting down to zero traffic deaths

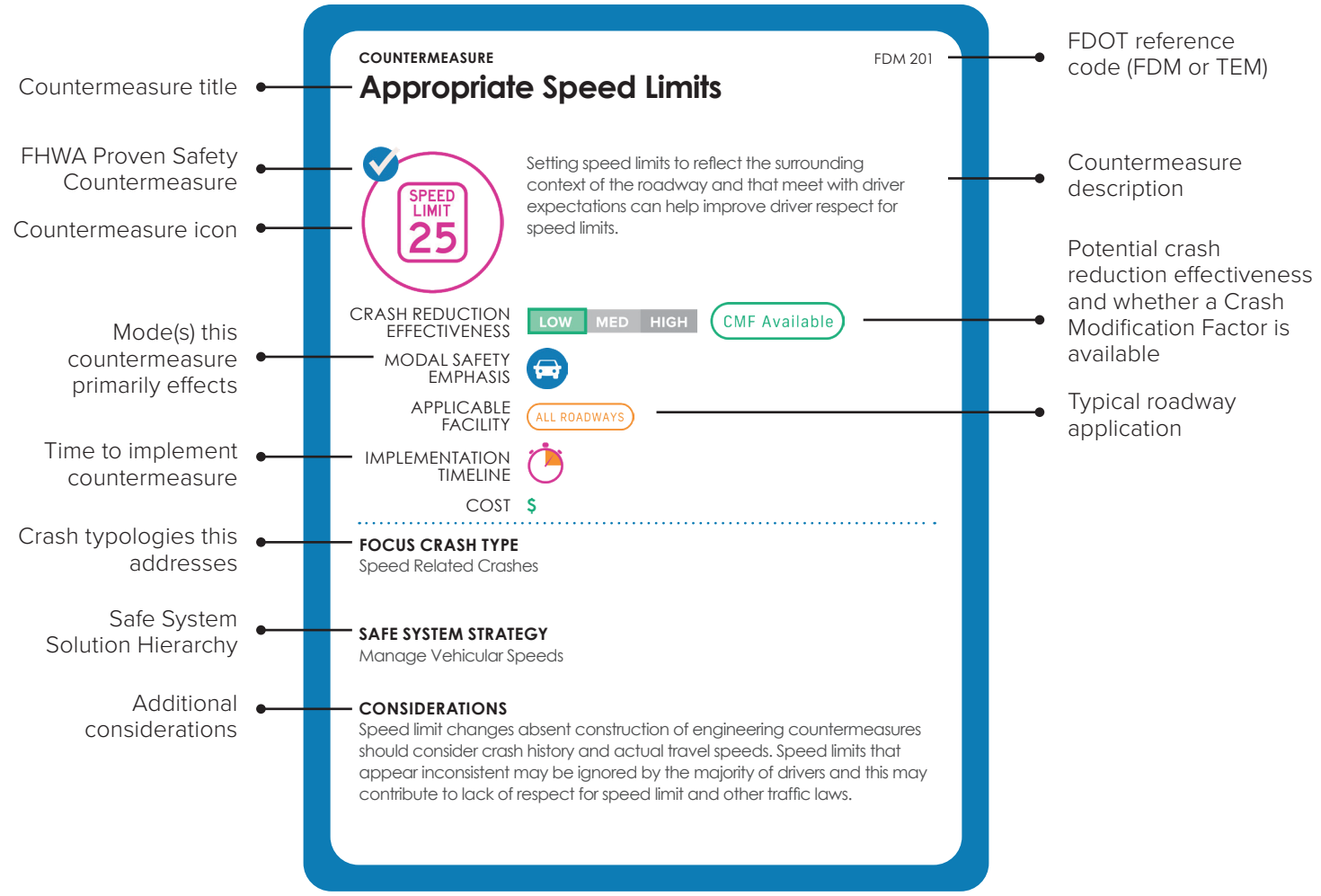
Organization of the Toolkit

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:

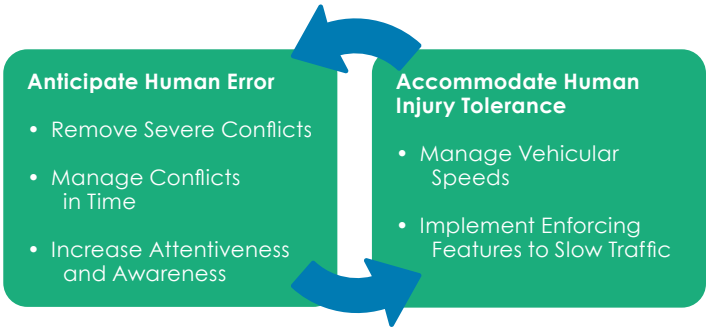
- **Pedestrians**
- **Bicycles**
- **Motor Vehicles**

Safe System Strategy

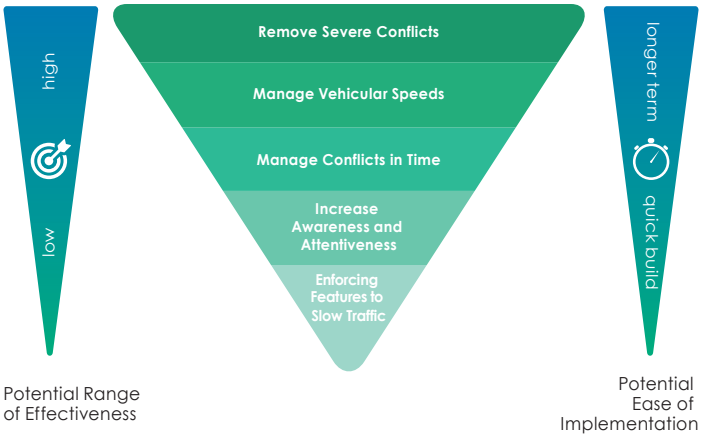
Within the Safe System Approach Framework, how we plan, construct, and operate our roadways should anticipate human error and consider human vulnerabilities. Strategies to achieve those goals are highlighted below.

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 timeframes. FHWA has further developed a Safe Systems Solutions Hierarchy (January 2024) 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 Severe 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:

Organization of the Toolkit

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

For purposes of this toolkit, countermeasures for both urban and suburban roads could be considered on C4 roads. 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 road 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

Organization of the Toolkit

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 road elements to meet Americans with Disabilities Act (ADA) or Public Rights of Way 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 years


Long: Typically, 5 years and more

Larger agencies with maintenance teams and sign shops may be able to implement projects faster than smaller agencies, so a

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)

VISION ZERO
CENTRAL FLORIDA
Counting down to zero traffic deaths

Target Speed

The selection of countermeasures should also consider the target speed of the roadway. To establish a target speed based on the road 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

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.

- 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*.

References

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/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)
- National Association of City Transportation Official's Urban Street Design Guide (https://nacto.org/publication/urban-street-design-guide/)

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)

VISION ZERO CENTRAL FLORIDA
Counting down to zero traffic deaths

Countermeasure List

SUMMARY OF COUNTERMEASURES

✓ FHWA PROVEN SAFETY COUNTERMEASURE

A. SIGNALS

B. SIGNING AND STRIPING

C. BIKEWAYS

D. PEDESTRIAN FACILITIES

E. INTERSECTIONS AND ROADWAYS

F. SPEED MANAGEMENT

G. OTHER ENGINEERING STRATEGIES

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. Accessible Pedestrian Signals (APS) Upgrade
2. Advanced Dilemma Zone Detection
3. Bicycle Signal/Exclusive Bike Phase
4. Bike Detection
5. Extend Green Time For Bikes
6. Extend Pedestrian Crossing Time
7. Extended Time Pushbutton
8. Extend Yellow and All Red Time
9. Leading Pedestrian Interval
10. Pedestrian Countdown Timer
11. Pedestrian Detection
12. Pedestrian Recall
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

TEM 3.7

Accessible Pedestrian Signals (APS) 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
Once the USDOJ/DOT adopts PROGAG, Accessible Pedestrian Signals (APS) will be required at all new and altered pedestrian signal heads.

Home

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
Drivers could learn this tool and will expect the yellow to be longer and therefore increase red-light running. This treatment could be paired with red-light cameras.

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 delay for all road users.

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

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

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

TEM 3.11.5.2

Leading Pedestrian Interval

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.

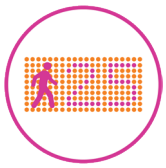
SAFE SYSTEM STRATEGY
Manage conflicts in time.

CONSIDERATIONS
The length of the LPI should consider the crossing length and the amount and type of pedestrian traffic (age, ability, etc).

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

Pedestrian Recall

Pedestrian recall is a traffic signal timing function that results in a pedestrian phase to be automatically activated every cycle.

CRASH REDUCTION EFFECTIVENESS: LOW | MED | HIGH

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. Can be paired with a LPI for increased effectiveness.

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. Can be paired with no right-turn on-red.

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

VISION ZERO
CENTRAL FLORIDA
Counting down to zero traffic deaths

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. Stop for Pedestrians Sign
11. Striping Through Intersection
12. Time-Based Turn Restriction
13. Upgrade Intersection Pavement Markings
14. Upgrade Signs with Fluorescent Sheeting
15. Upgrade Striping
16. Upgrade to Larger Warning Signs
17. Wayfinding

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

TEM 2.39

Stop for Pedestrians Sign

"Stop for Pedestrians" signs alert drivers about the presence of pedestrians. These signs are required with advance stop 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

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: ALL ROADWAYS

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
Should be implemented with a route naming system. Can consider including travel time information.

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 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 Bike Lane

Lanes marked with symbols and signs specifically for bicycles, reducing bike/vehicle conflicts and slowing vehicle speeds via the road-narrowing effect. May or may not include a painted buffer space.

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. Mark/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

Mark/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.

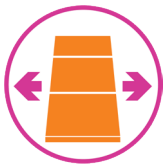
SAFE SYSTEM STRATEGY
Remove severe conflicts.

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: $

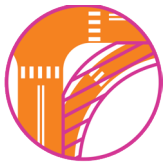
FOCUS CRASH TYPE
Pedestrian struck by turning vehicle.

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: $

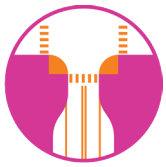
FOCUS CRASH TYPE
Motorist turns right in path of bicyclist.

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.

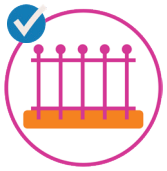
SAFE SYSTEM STRATEGY
Manage vehicular speeds and manage conflicts in time.

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. This may or may not have the intent of preventing pedestrian crossings. The potential for pedestrian diversion should be a primary factor in determining if this is an appropriate treatment.

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.

CONSIDERATIONS
Median breaks should be identified to allow maintenance and emergency vehicles to cross the median at appropriate locations.

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.

CONSIDERATIONS
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.

CONSIDERATIONS
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: $$

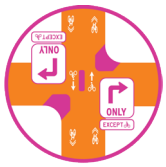
FOCUS CRASH TYPE
Angle crashes and left turn crashes.

SAFE SYSTEM STRATEGY
Remove severe conflicts and implement enforcing features to slow traffic.

CONSIDERATIONS
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: $

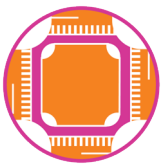
FOCUS CRASH TYPE
Pedestrian and bicycle crashes.

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.

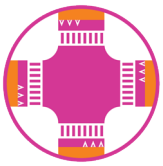
SAFE SYSTEM STRATEGY
Manage vehicular speeds, and increase attentiveness and awareness.

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.

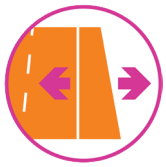
SAFE SYSTEM STRATEGY
Remove severe conflicts.

CONSIDERATIONS
Design speed should be evaluated as part of any geometric design change.

Home

FDM 210.4

Widen/Pave Shoulder



Widened and paved shoulders provide a breakdown lane and 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. While widening/paving shoulders can provide a space for bicyclists, it should not be considered a replacement for a designated bicycle facility appropriate for the context.

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.

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: $

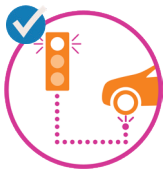
FOCUS CRASH TYPE
Speed related crashes.

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 effective on urban and rural freeways and high-speed arterials with posted speed limits greater than 40 mph.

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.

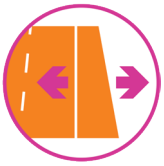
SAFE SYSTEM STRATEGY
Remove severe conflicts, and increase attentiveness and awareness.

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.

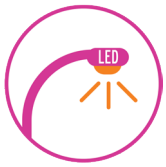
SAFE SYSTEM STRATEGY
Increase attentiveness and awareness.

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

Non-Engineering Countermeasures Toolkit

VISION ZERO

CENTRAL FLORIDA

Counting down to zero traffic deaths

Updated April 2024

VISION ZERO
CENTRAL FLORIDA

Counting down to zero traffic deaths

VISION ZERO
CENTRAL FLORIDA
Counting down to zero traffic deaths

Overview

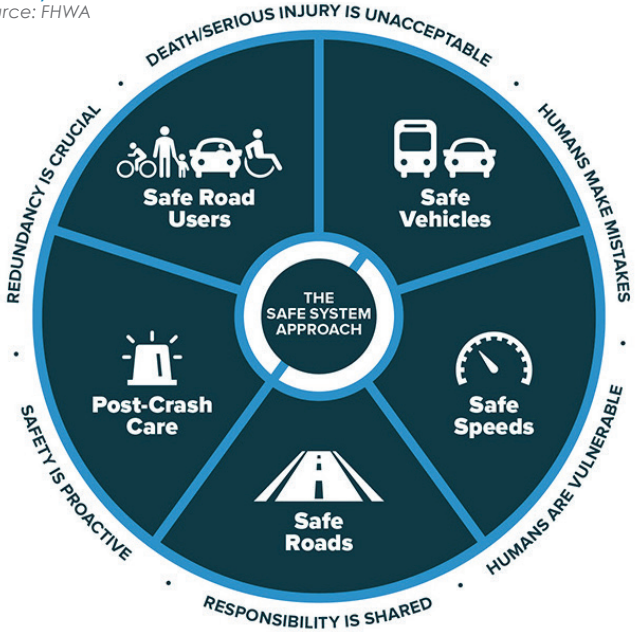
Introduction & How to Use this Toolkit

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

VISION ZERO
CENTRAL FLORIDA
Counting down to zero traffic deaths

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.

VISION ZERO
CENTRAL FLORIDA
Counting down to zero traffic deaths

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.

VISION ZERO
CENTRAL FLORIDA

Counting down to zero traffic deaths

Appendix A - Resources and References

1. http://www.floridatim.com/
2. https://alerttodayflorida.com/HVE
3. https://flteensafedriver.org/
4. https://flteensafedriver.org/72-safe-driving-tips-that-could-save-your-life/
5. https://ops.fhwa.dot.gov/tim/
6. https://roadwarrior.app/blog/10-safe-driving-tips/
7. https://www.fdot.gov/Safety/motorcyclesafety.shtm
8. https://www.fdot.gov/traffic/teo-divisions.shtm/cav-ml-stamp/Wrong-Way-driving
9. https://www.flhsmv.gov/driver-licenses-id-cards/motorcycle-rider-education-endorsements/florida-rider-training-program-courses/
10. https://www.flhsmv.gov/resources/handbooks-manuals/
11. https://www.flhsmv.gov/safety-center/driving-safety/
12. https://www.floridasafetycouncil.org/categories,
13. https://www.flsenate.gov/Session/Bill/2023/657
14. https://www.flsenate.gov/Session/Bill/2023/766
15. https://www.flsheriffs.org/law-enforcement-programs/teen-driver-challenge
16. https://www.fmcsa.dot.gov/research-and-analysis/research/impact-vehicle-maintenance-safety
17. https://www.geico.com/information/safety/auto/teendriving/top-ten-tips/
18. https://www.nhtsa.gov/book/countermeasures/countermeasures-that-work
19. https://www.nhtsa.gov/book/countermeasures-that-work/bicycle-safety/countermeasures/unproven-further-evaluation/share-road
20. https://www.safemotorist.com/articles/defensive-driving/
21. https://www.trustedchoice.com/insurance-articles/wheels-wings-motors/defensive-driving-tips/
22. National Academies of Sciences, Engineering and Medicine (2005). A Guide for Reducing Alcohol-Related Collisions. Retrieved from https://doi.org/10.17226/23419. pg. 106.
23. https://mutcd.fhwa.dot.gov/pdfs/11th_Edition/part6.pdf

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