

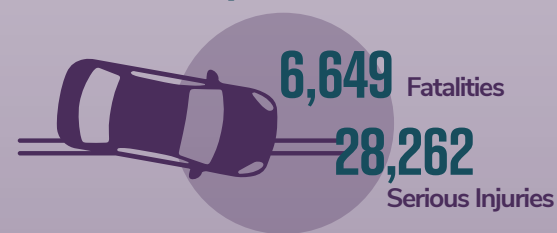


Lane departure crashes are a top emphasis area of Florida's Strategic Highway Safety Plan. The Root Cause Analysis is a methodology to identify top contributing factors present in lane departure crashes to help inform strategic investments and decisions to improve our effectiveness toward Florida's target of ZERO roadway fatalities and serious injuries.

## OVERVIEW

### 2017-2021 Crash Data

#### Number of People



#### Statewide

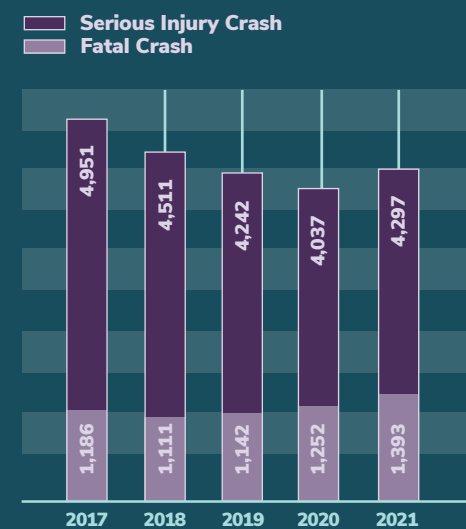


#### Daily Average



### When Did Crashes Occur?

#### Fatal and Serious Injury Crashes by Year



Crashes Commonly Occur on

**FRI - SUN**



Crashes Commonly Occur from

**2 PM - 8 PM**

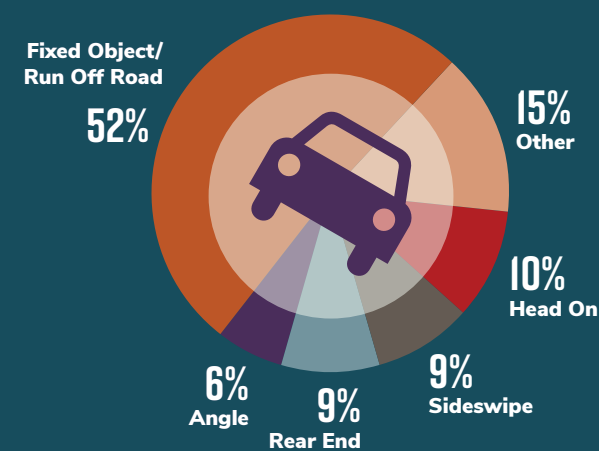


52% Day

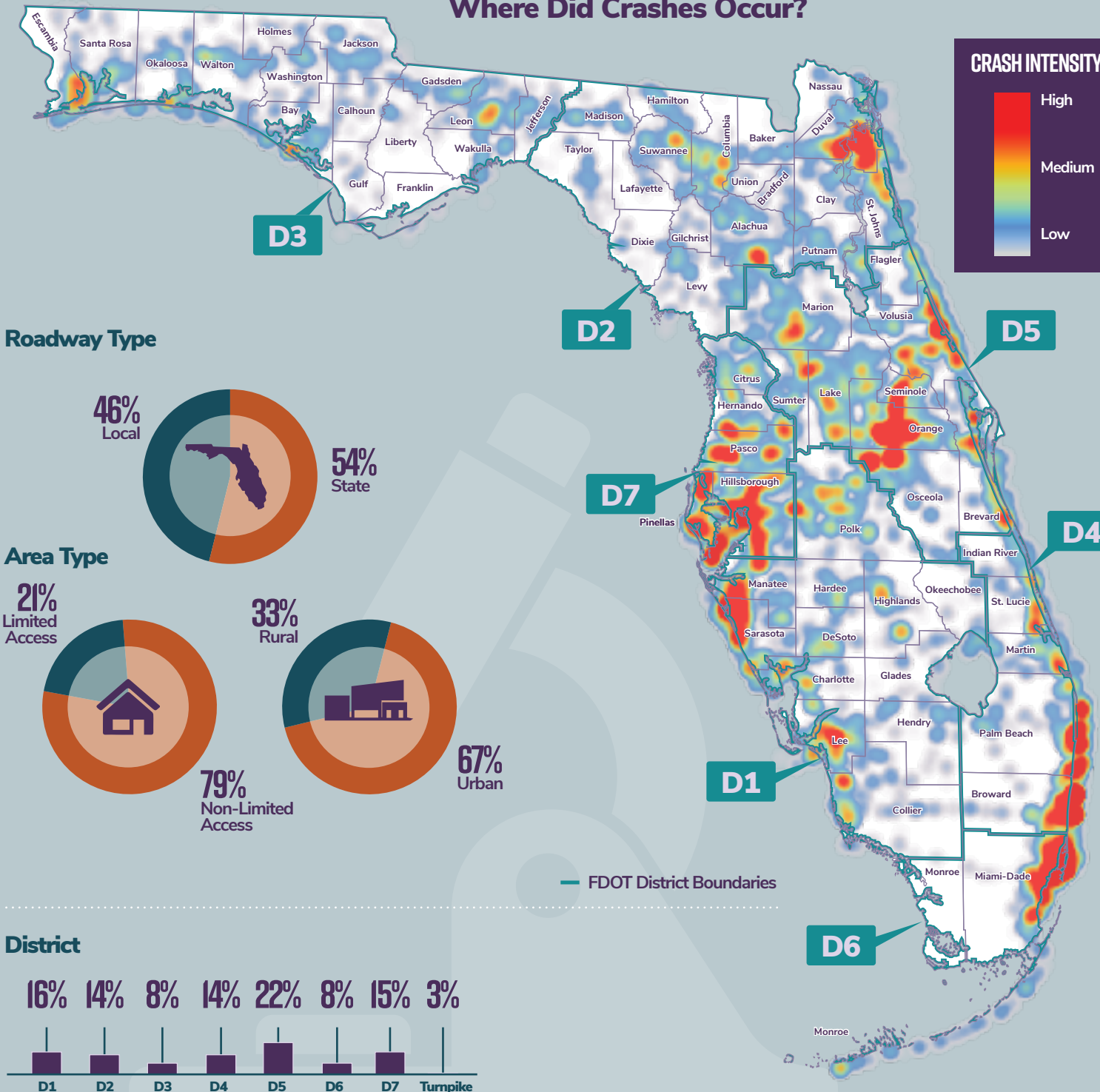
48% Night

### Vehicle Maneuver

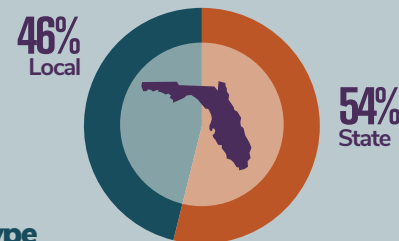
Lane Departure crashes are made up of following crash types



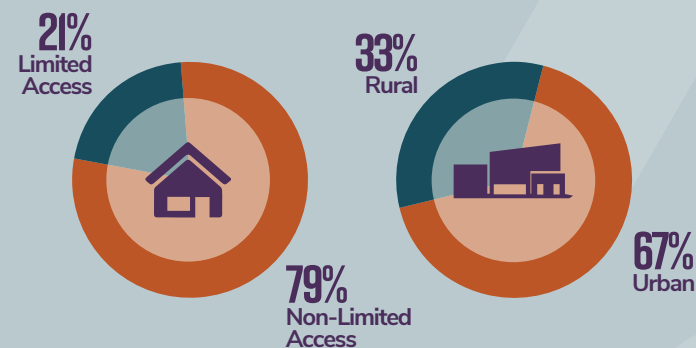
### Where Did Crashes Occur?



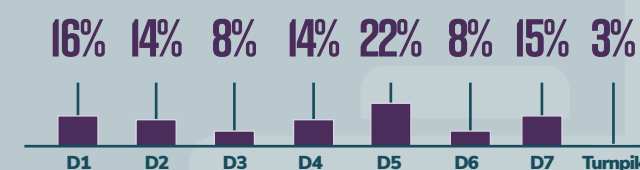
#### Roadway Type



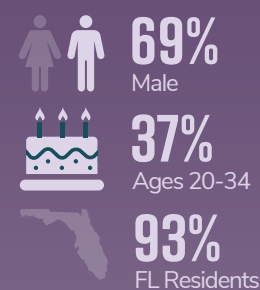
#### Area Type



#### District

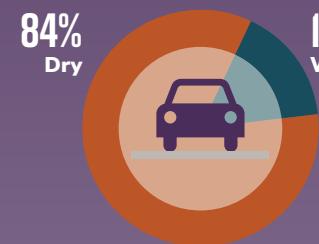


### Driver

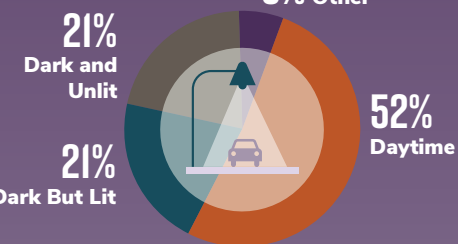


### Environment

#### Road Surface Conditions

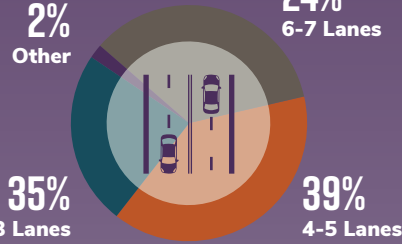


#### Lighting Conditions

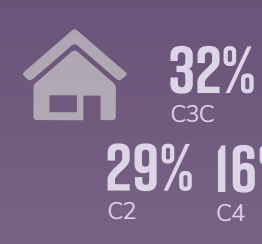


### Roadway - SHS Only

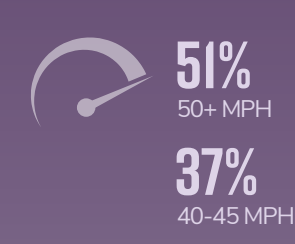
#### Number of Lanes\*



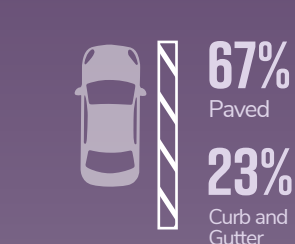
#### Context Classification\*



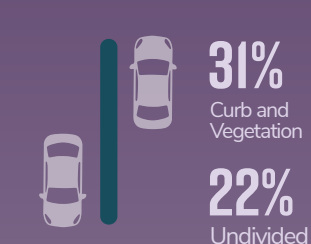
#### Posted Speed\*



#### Shoulder Type\*



#### Median Type\*



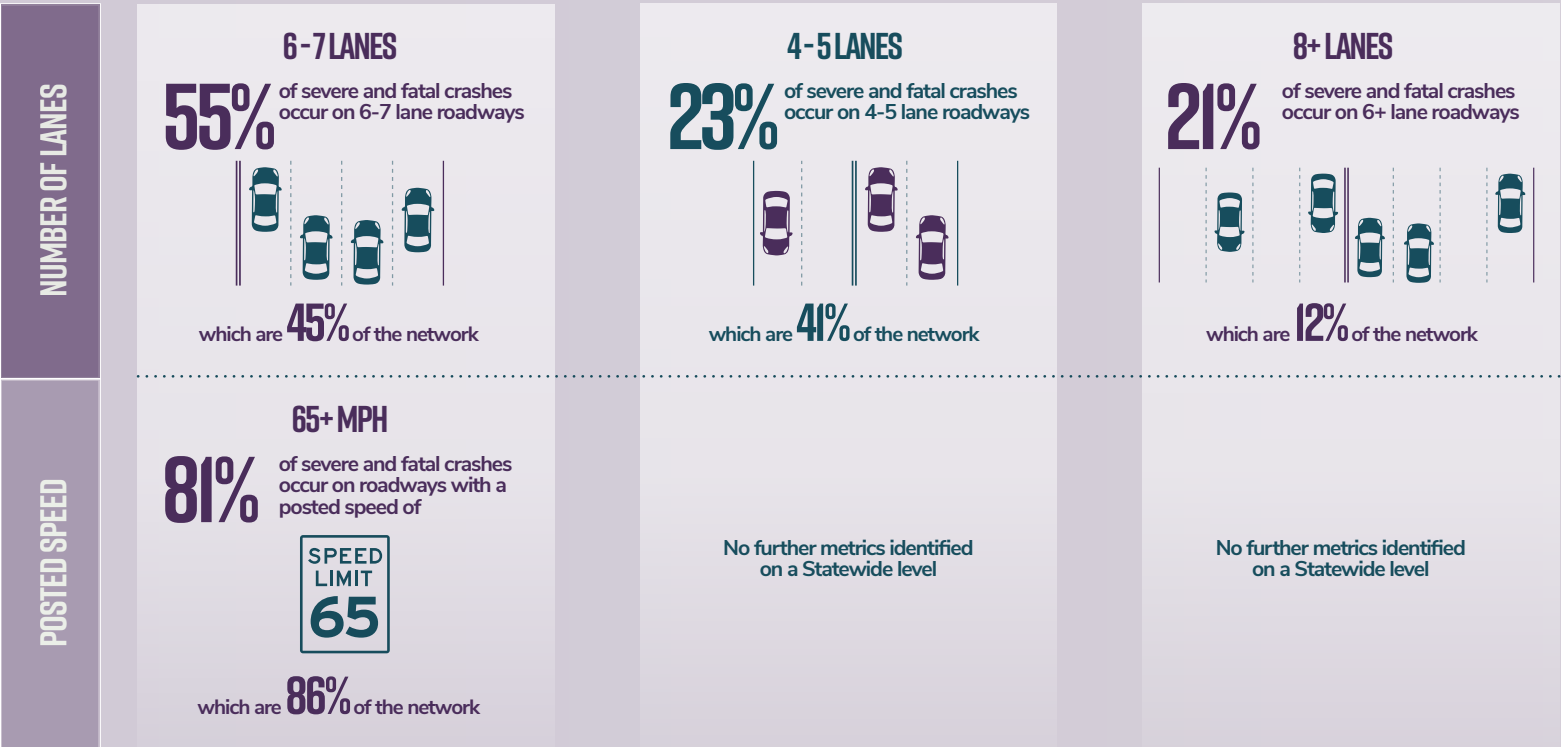
\* Metrics for SHS only. Roadway data for Non-SHS roadways is not as comprehensive as data for SHS roads.

## CRASH PROBLEM #1: FIXED OBJECT/RUN-OFF ROAD CRASHES

52% of lane departure fatal and serious injury crashes occur when a driver departs the roadway and strikes a fixed object. Statewide Risk Factors identified for Fixed Objects/Run-Off Road crashes on Limited Access and SHS Non-Limited Access facilities includes:



### LIMITED ACCESS



### SHOULDER TYPE AND WIDTH

#### OUTSIDE SHOULDER 10-12' PAVED WITH WARNING DEVICE

**73%** of severe and fatal crashes occur on roadways with a paved outside shoulder of 10-12 feet with warning devices



which are **77%** of the network

#### INSIDE SHOULDER 10-12' PAVED WITH WARNING DEVICE

**58%** of severe and fatal crashes occur on roadways with a paved inside shoulder of 10-12 feet with warning devices



which are **76%** of the network

### MEDIAN TYPE AND WIDTH

#### >30' VEGETATION

**70%** of severe and fatal crashes occur on roadways with this type of median



which are **74%** of the network

### SHS NON-LIMITED ACCESS



### SHOULDER TYPE AND WIDTH

#### OUTSIDE SHOULDER 1-5' PAVED

**41%** of severe and fatal crashes occur on roadways with a paved outside shoulder of 1-5 feet



are **61%** of the network

#### INSIDE SHOULDER CURB AND GUTTER

**17%** of severe and fatal crashes occur on roadways with an inside shoulder of curb and gutter



which are **14%** of the network

#### MEDIAN >= 22' CURB AND VEGETATION OR VEGETATION ONLY

**44%** of severe and fatal crashes occur on roadways with this type of median



which are **30%** of the network

#### UNDIVIDED

**30%** of severe and fatal crashes occur on undivided roadways



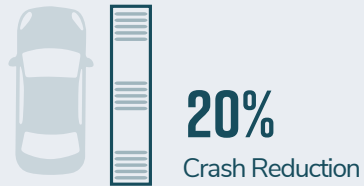
which are **48%** of the network

## CRASH PROBLEM #1: FIXED OBJECT/RUN-OFF ROAD CRASHES



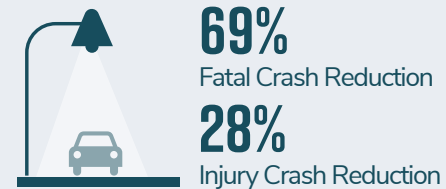
The following countermeasures can be used to reduce Fixed Object/Run-Off Road lane departure fatal/serious injury crashes:

### Center Line and Edge Line Rumble Strips



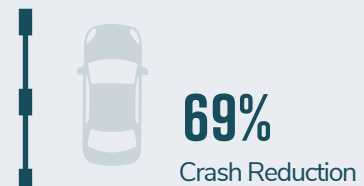
Rumble strips are milled or raised elements on the pavement intended to alert drivers through vibration and sound that their vehicle has left the travel lane. Edge line rumble strips are where the pavement marking is placed over the rumble strip.

### Lighting



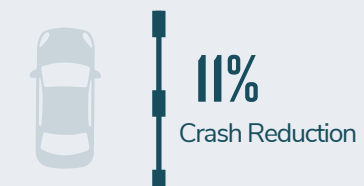
Research indicates that continuous lighting on both Rural and Urban highways (including freeways) has an established safety benefit for motorized vehicles.

### W-Beam Guardrail - Median



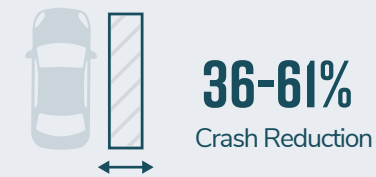
Semi-rigid barriers that, when impacted, are designed to deform and deflect, absorbing some of the crash energy and redirecting the vehicle. Very few head-on crashes were observed on limited access facilities in Florida, but W-beam guardrails in the median can shield vehicles from vegetation and unmovable objects. Providing median barrier on limited access facilities where wider medians with vegetation and no guardrail is currently present could help reduce median-related fatal/serious injury crashes.

### W-Beam Guardrail - Roadside



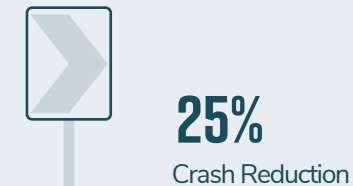
Not all roadside hazards can be removed, relocated, or redesigned at curves, installing roadside barriers to shield unmovable objects or steep embankments may be an appropriate treatment.

### Widen Shoulder by 4 Feet



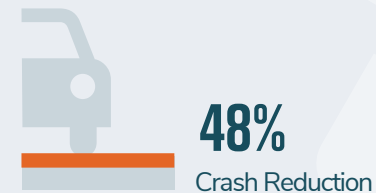
Widening shoulder gives drivers more recovery area to regain control in the event of a roadway departure.

### Chevron Signs



Enhanced delineation treatments such as chevron signs, can alert drivers to upcoming direction and sharpness of the curve. This is especially effective in reducing nighttime crashes.

### High Friction Treatment



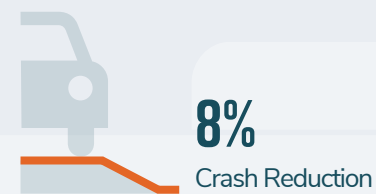
High Friction Treatment consists of a layer of durable, anti-abrasion, and polish-resistant aggregate over a thermosetting polymer resin binder that locks the aggregate in place to restore or enhance friction and skid resistance.

### Safety Edge



The SafetyEdgeSM technology shapes the edge of the pavement at approximately 30 degrees from the pavement cross slope during the paving process. This safety practice eliminates the potential for vertical drop-off at the pavement edge.

### Flatten Side Slope from 1V:6H to 1V:7H



In cases where a vehicle leaves the roadway, having strategic roadside design elements, including flattened sideslopes, can provide drivers with an opportunity to regain control and re-enter the roadway in their lane or come to a safe stop before rolling over or encountering a fixed object.


## CRASH PROBLEM #2: HEAD-ON CRASHES



**10% of lane departure fatal and serious injury crashes result in head-on collisions. Statewide Risk Factors identified for Head-On crashes on SHS Non-Limited Access below include:**

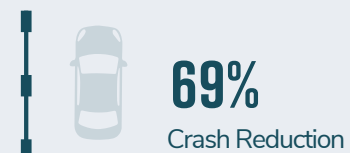
No Risk Factors were identified for Limited Access due to a low number of Head-On Crashes

### SHS NON-LIMITED ACCESS

CONTEXT CLASS	<p><b>RURAL (C2)</b></p> <p><b>35%</b> of severe and fatal crashes occur on C2 roadways</p>  <p>which are <b>38%</b> of the network</p>	<p><b>SUBURBAN COMMERCIAL (C3C)</b></p> <p><b>25%</b> of severe and fatal crashes occur on C3C roadways</p>  <p>which are <b>21%</b> of the network</p>	<p><b>URBAN GENERAL (C4)</b></p> <p><b>18%</b> of severe and fatal crashes occur on C4 roadways</p>  <p>which are <b>10%</b> of the network</p>
	CONTEXT CLASS	<p><b>2-3 LANES</b></p> <p><b>62%</b> of severe and fatal crashes occur on 2-3 lane roadways</p>  <p>which are <b>52%</b> of the network</p>	<p><b>4-5 LANES</b></p> <p><b>26%</b> of severe and fatal crashes occur on 4-5 lane roadways</p>  <p>which are <b>32%</b> of the network</p>
POSTED SPEED	<p><b>&lt;=45 MPH</b></p> <p><b>58%</b> of severe and fatal crashes occur on roadways with a posted speed of</p>  <p>which are <b>42%</b> of the network</p>	<p><b>50+ MPH</b></p> <p><b>42%</b> of severe and fatal crashes occur on roadways with a posted speed of</p>  <p>which are <b>53%</b> of the network</p>	<p>No further metrics identified on a Statewide level</p>
	MEDIAN TYPE	<p><b>UNDIVIDED</b></p> <p><b>30%</b> of severe and fatal crashes occur on roadways with a posted speed of</p>  <p>which are <b>48%</b> of the network</p>	<p>No further metrics identified on a Statewide level</p>

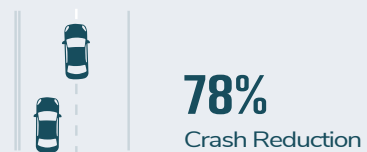
The following countermeasures can be used to reduce Head-On lane departure fatal/serious injury crashes:

### W-Beam Guardrail - Median



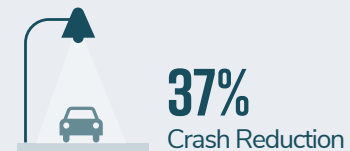
Semi-rigid barriers that, when impacted, are designed to deform and deflect, absorbing some of the crash energy and redirecting the vehicle. Very few head-on crashes were observed on limited access facilities in Florida, but W-beam guardrails in the median can shield vehicles from vegetation and unmovable objects. Providing median barrier on limited access facilities where wider medians with vegetation and no guardrail is currently present could help reduce median-related fatal/serious injury crashes.

### Passing Lane



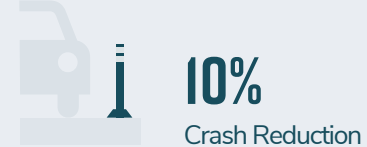
Period passing lanes on rural two-lane roadways allows passing of slower vehicle. This reducing instances where a vehicle may overtake another by crossing the center line into oncoming traffic.

### Lighting



Research indicates that continuous lighting on both Rural and Urban highways (including freeways) has an established safety benefit for motorized vehicles.

### Post Mounted Delineators



A delineation is a retro-reflective device mounted above the roadway surface in a series to indicate roadway alignment. Placed in the center of the roadway to separate opposing traffic, can reduce crossover-median crashes.

### Center Line Rumble Strips



Rumble strips are milled or raised elements on the pavement intended to alert drivers through vibration and sound that their vehicle has left the travel lane. Edge line rumble strips are where the pavement marking is placed over the rumble strip.