



New SHSP 2024-2028 & Vulnerable Road Users Assessment

Meeting East Region
August 29, 2023

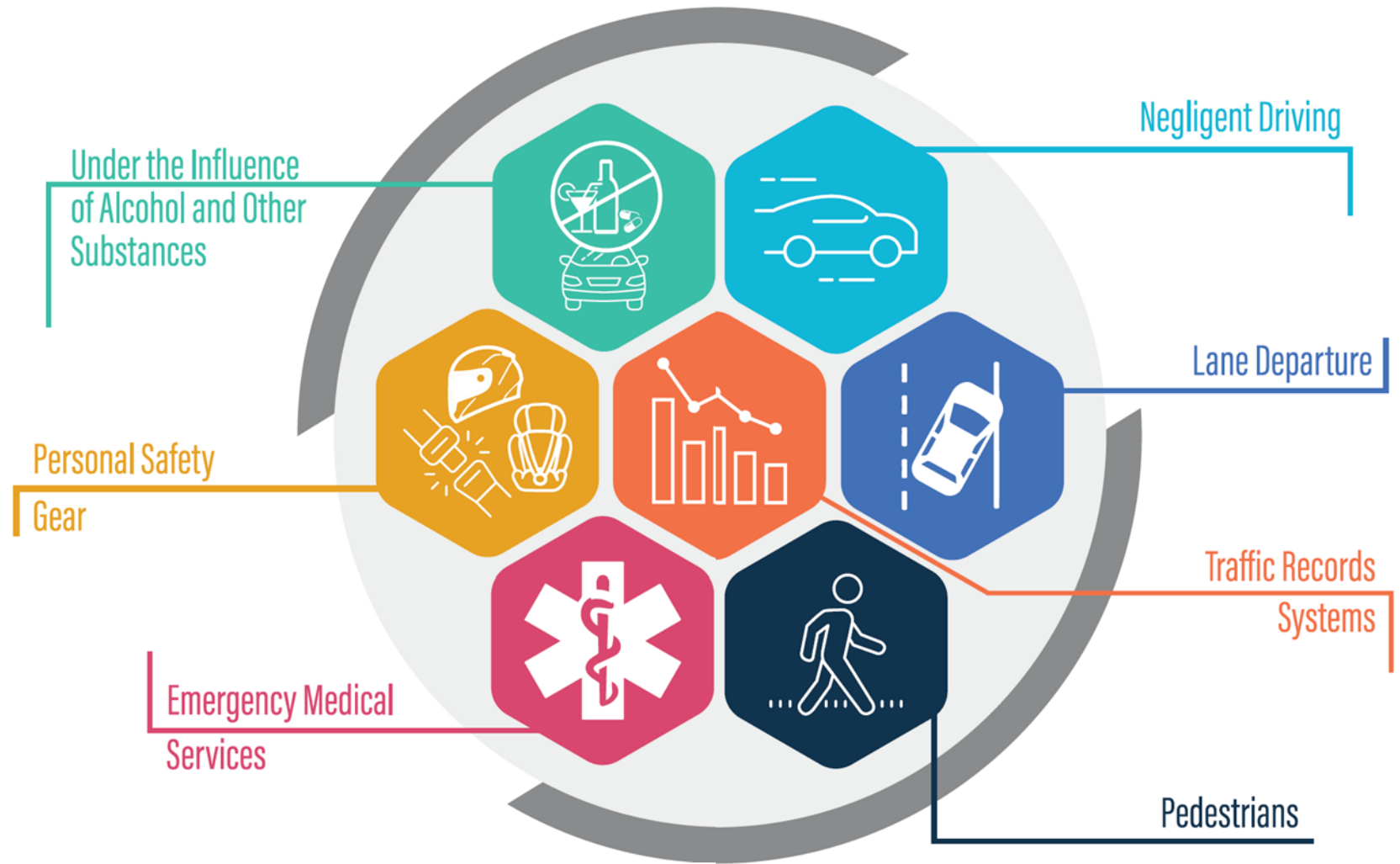


SHSP
STRATEGIC HIGHWAY SAFETY PLAN

1

SHSP 2024-2028 Overview

Current 2019-2023 Emphasis Areas



New Emphasis Areas (2024-2028)

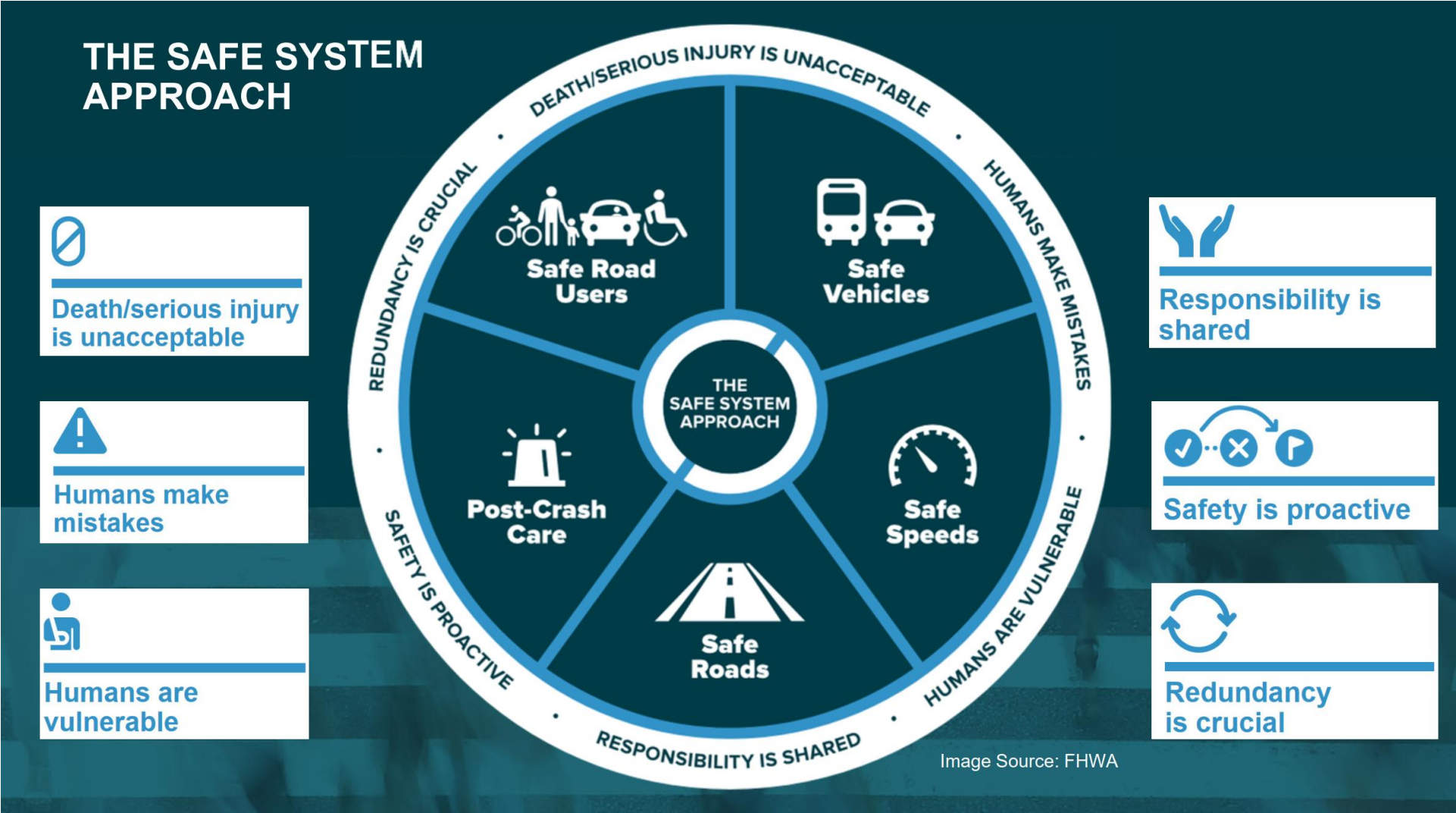
High Priority Areas

- Vulnerable Road Users
- Speed Management
- Impaired Driving
- Occupant Protection
- Lane Departure
- Communication Integration

Focus Areas

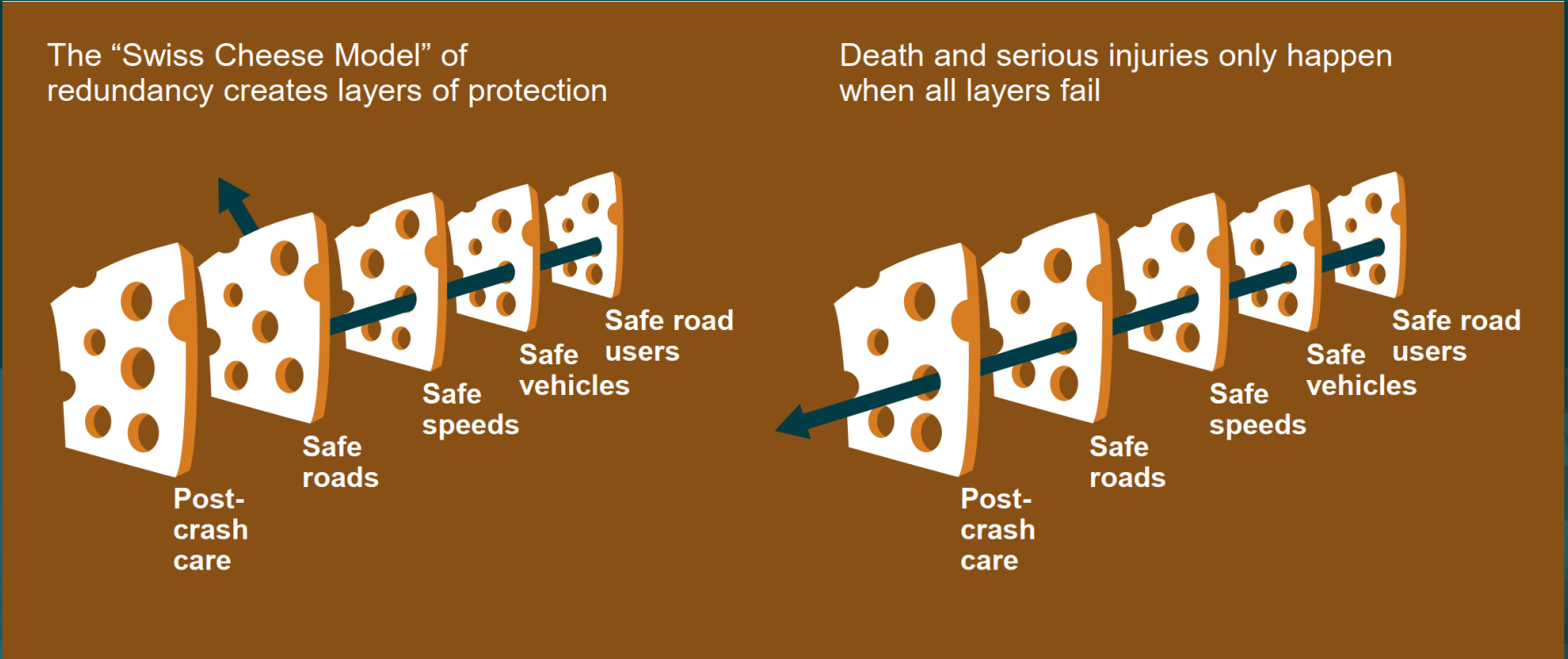
- Traffic Records Systems
- Motorcyclists
- Aging Drivers (65+)
- Legislations & Procedures

The Safe System Approach



The Safe System Approach (Cont.)

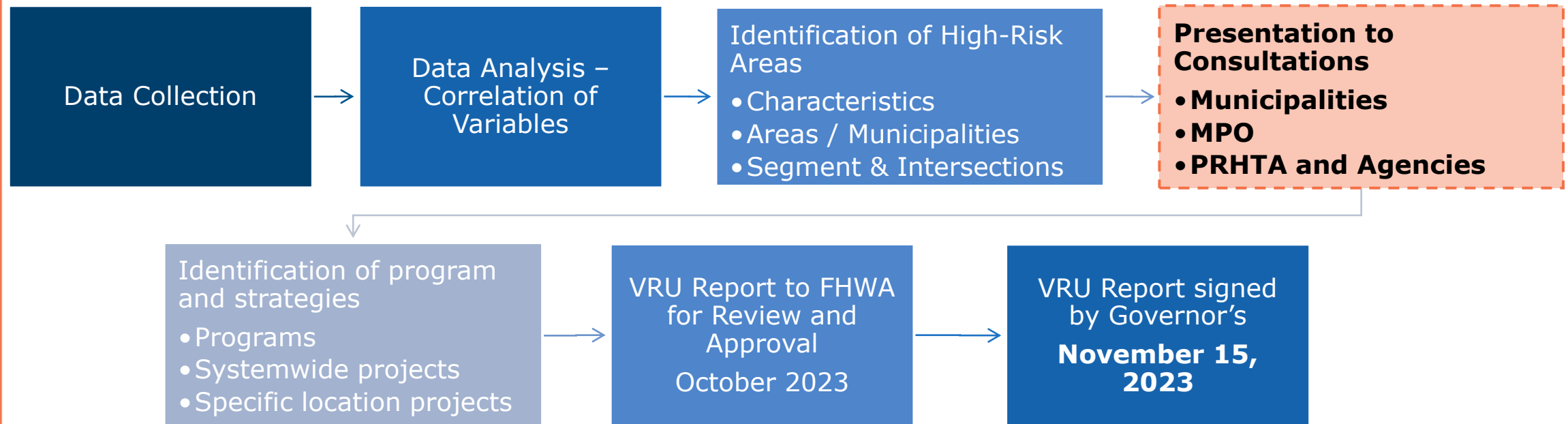
THE 5 SAFE SYSTEM ELEMENTS CREATE REDUNDANCY



2

VRU Assessment: Development Process

Development Process



PR VRU Assessment Data

Data Base

Crash Data
(Observatorio de
Seguridad Vial
OSV)

2019 to 2022

Fatal and Severe Injury

Pedestrian and Bikes

Age of Victim

Time of Day

Month

Location

Intersection vs Non intersection

Highway
Performance
Monitoring System
(HPMS)

Functional Classification

Speed

Annual Average Daily Traffic (AADT)

Number of Lanes

Kilometers of road by area

PR VRU Assessment Data (Cont.)

Data
Base

Geographic
Area

Urban vs Rural

PRHTA Regional Areas

DTPW Areas

Municipalities

Transit

Bus routes (AMA) and stop locations

Transit route (TU) and stop locations

Census

Population

Ethnicity and Race

Income

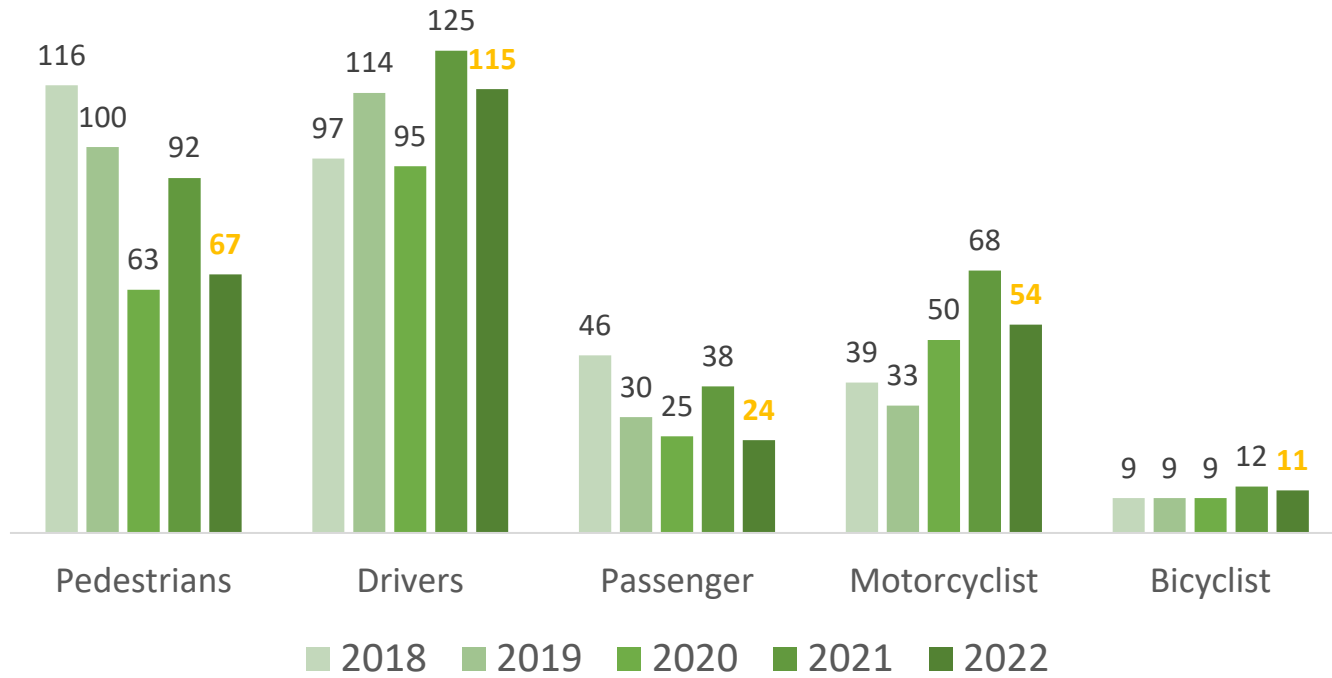
Zero Car Households

Disability

3

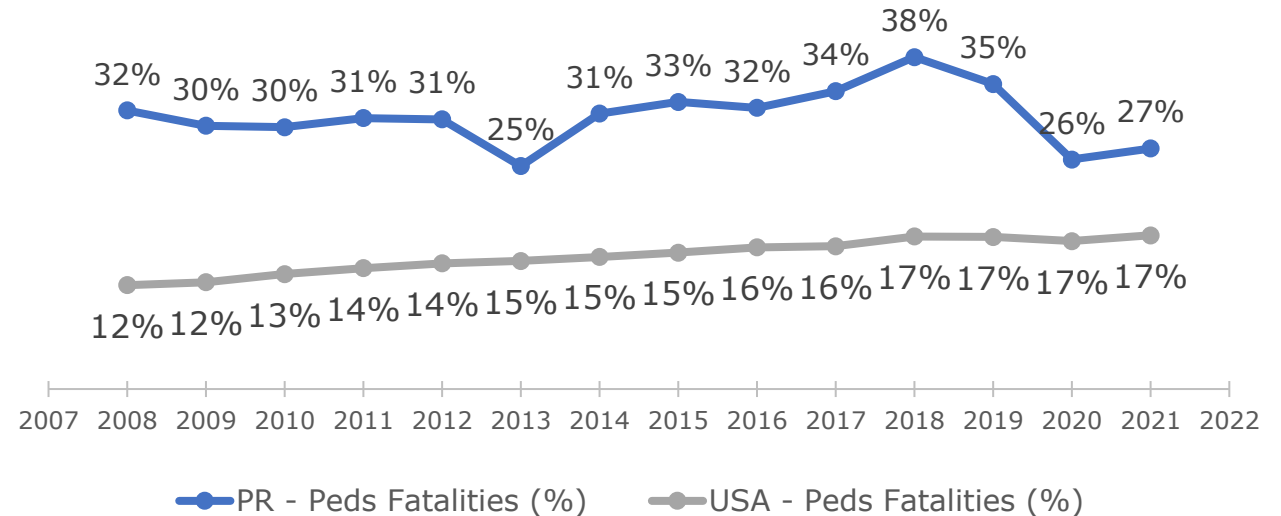
VRU Assessment: Preliminary Results

Fatalities by Users



PR Fatalities by Users

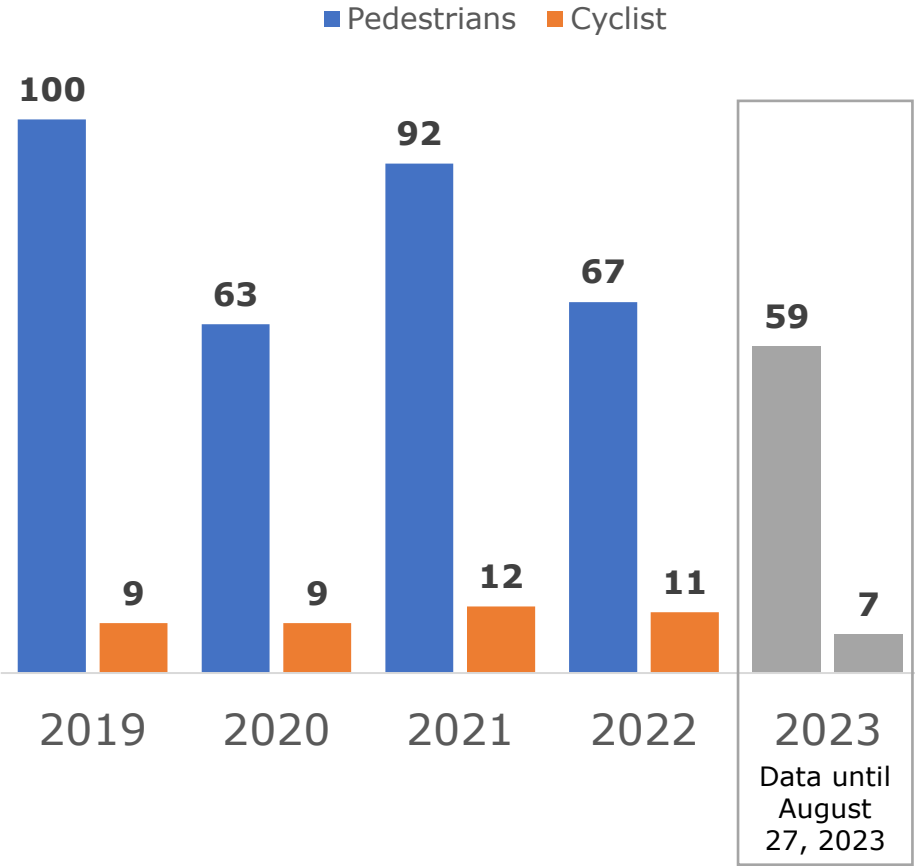
Pedestrian Fatality Percent (PR vs US)



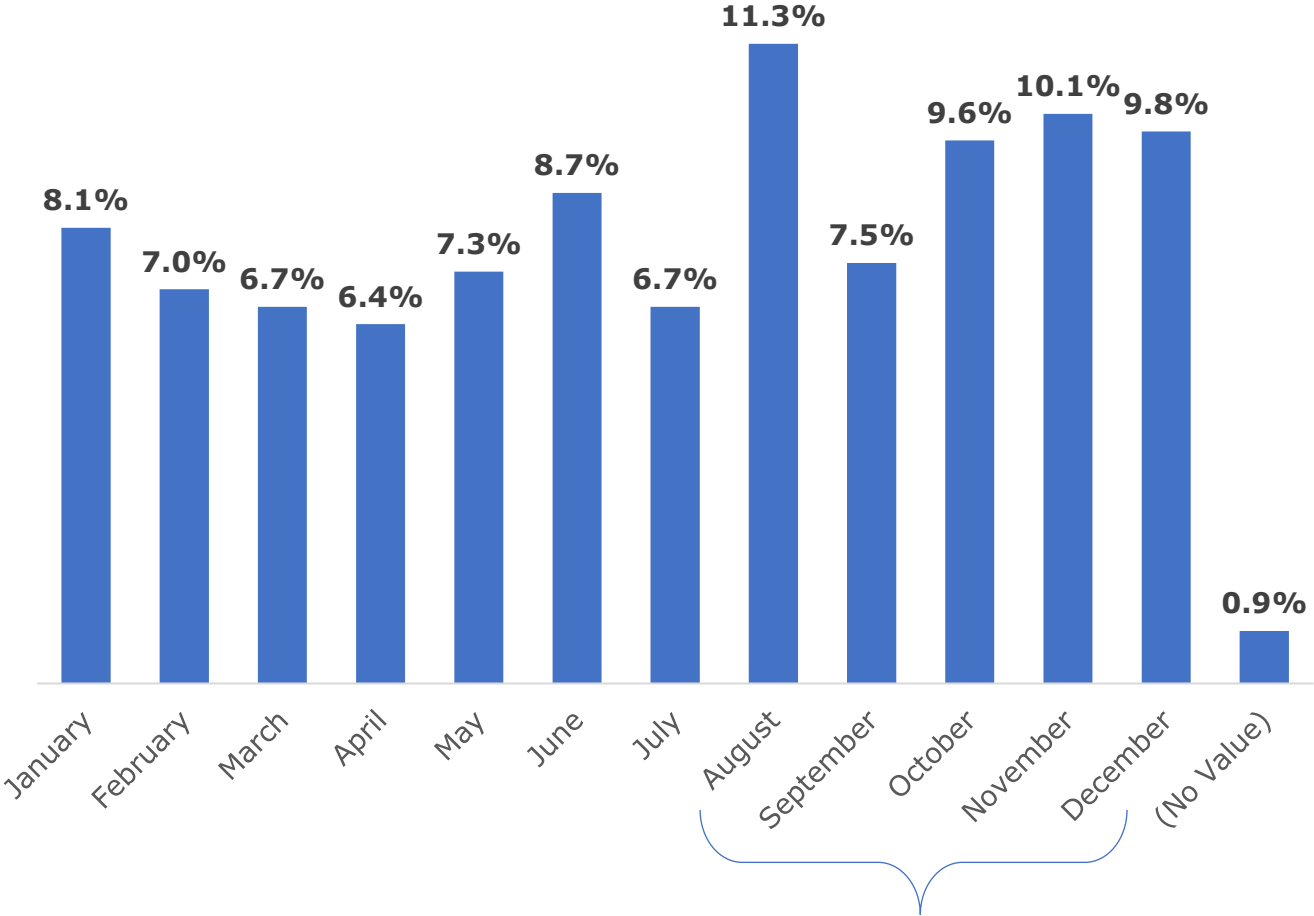
PR VRU Data Results

Fatal & Severe

VRU Fatalities by Year



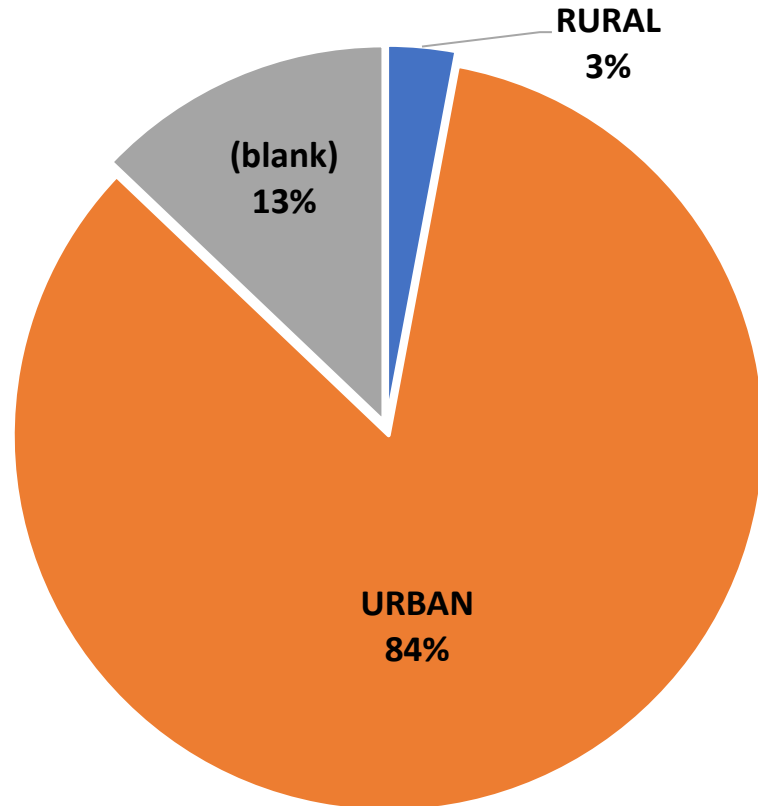
VRU Crash Data by Month



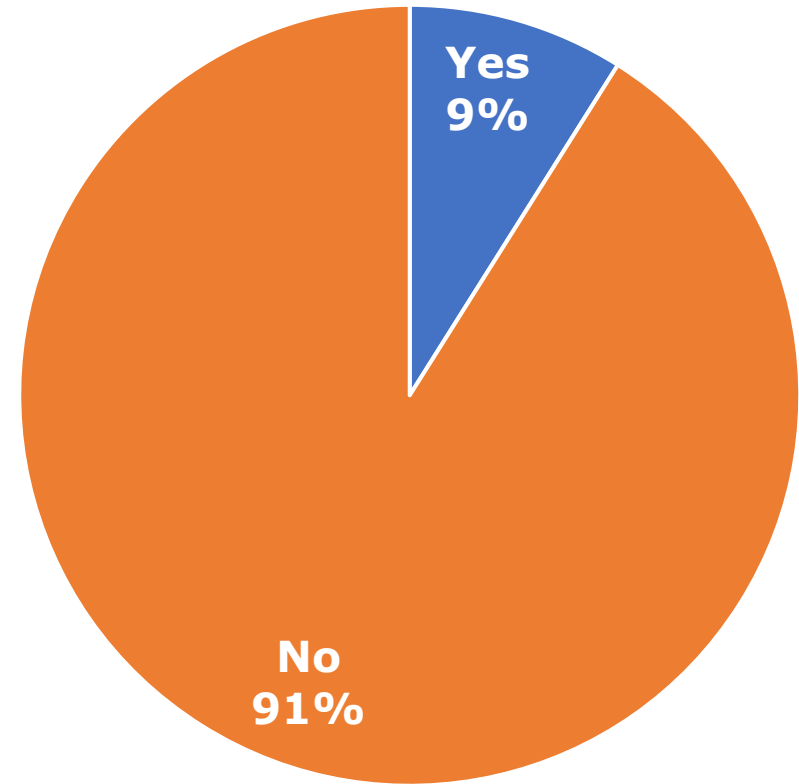
**August to December
48.3%**

Urban vs Rural and Intersection

VRU Crashes Urban vs Rural

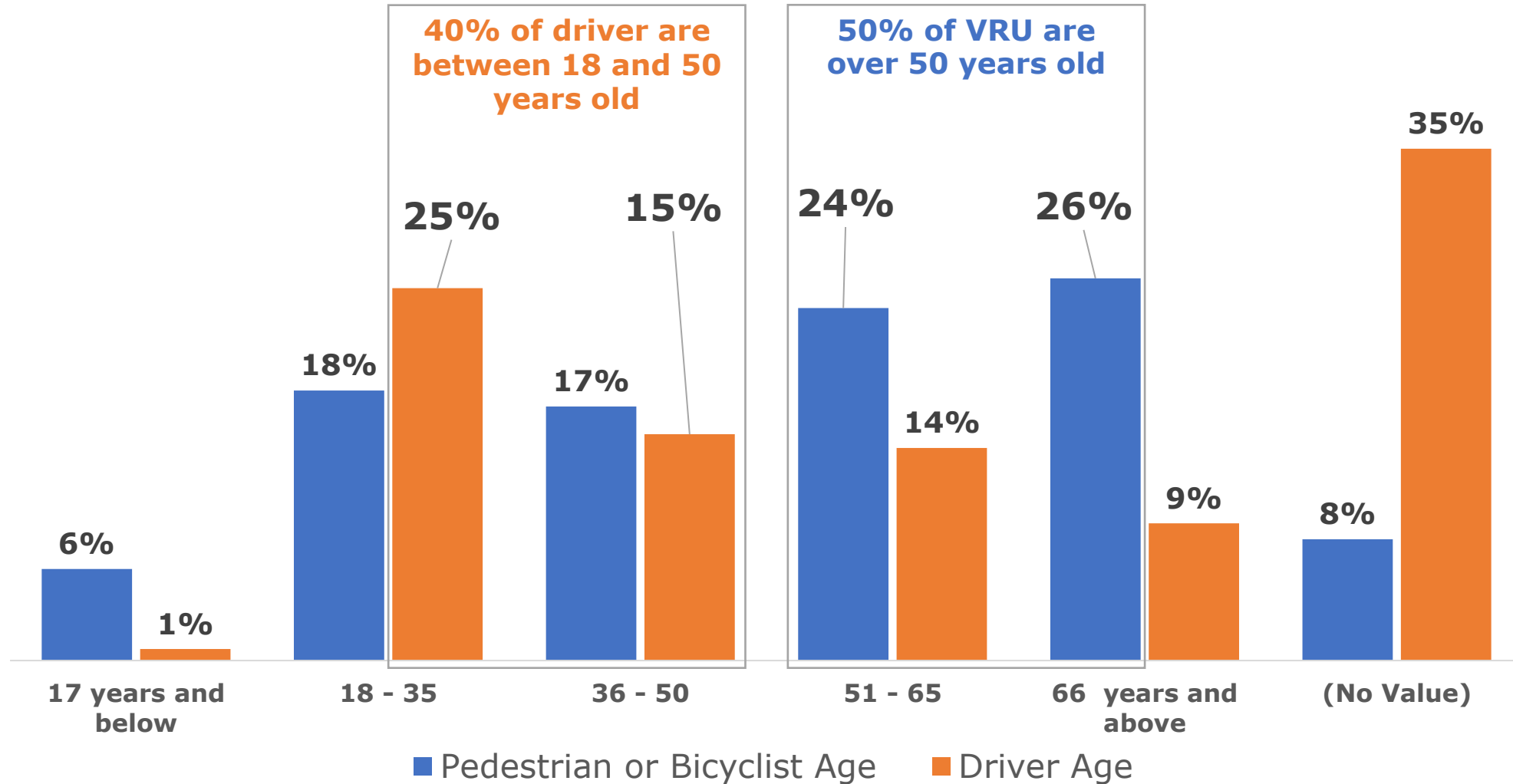


Intersection Related Crashes



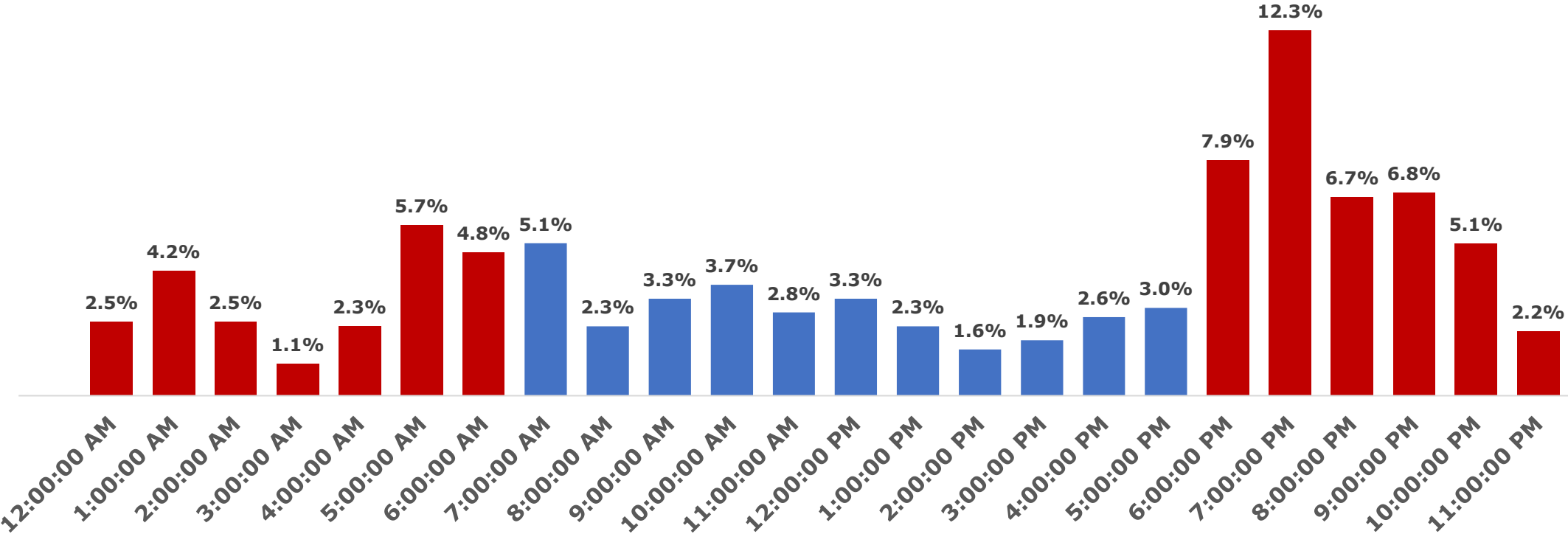
VRU Age vs. Driver Age

Fatal & Severe



Time of Day

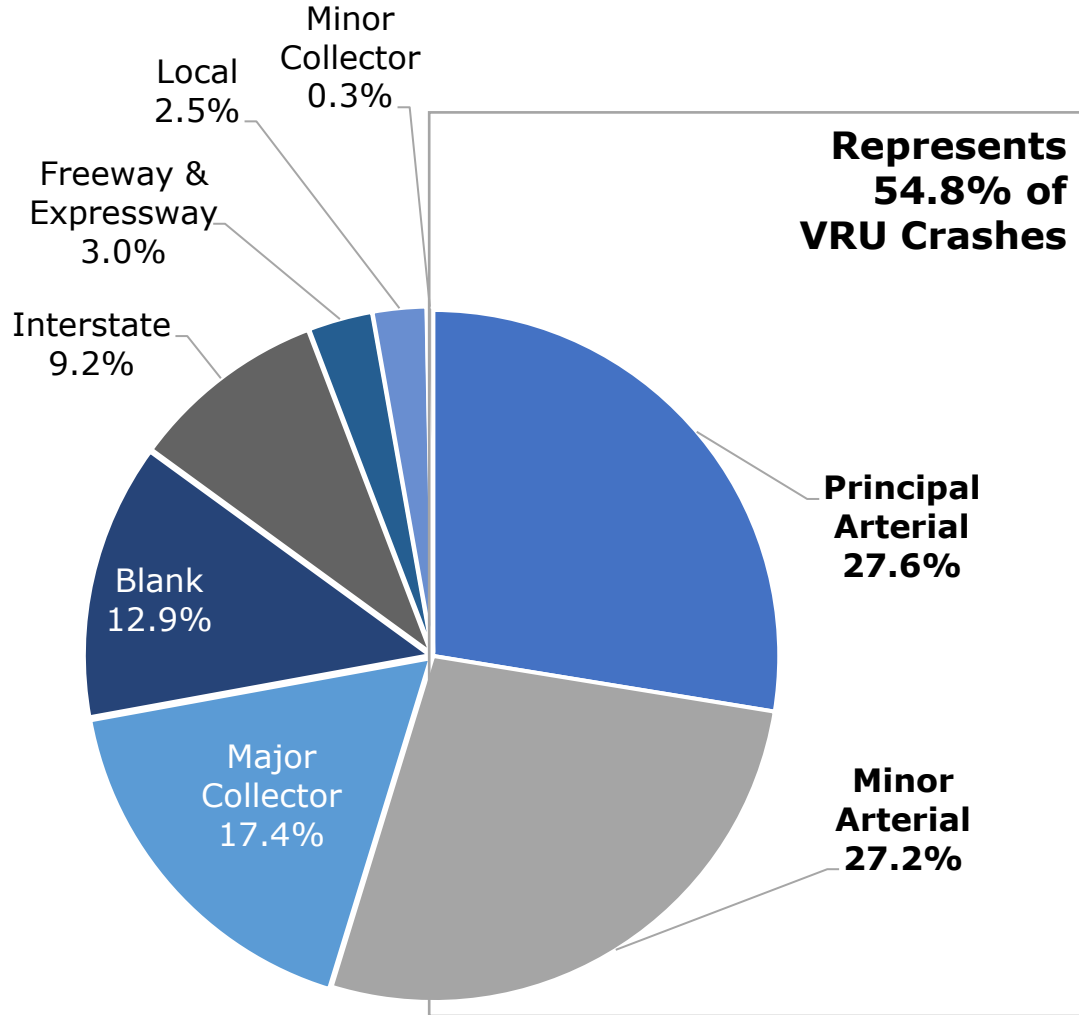
VRU Crash Percentage by Time of Day



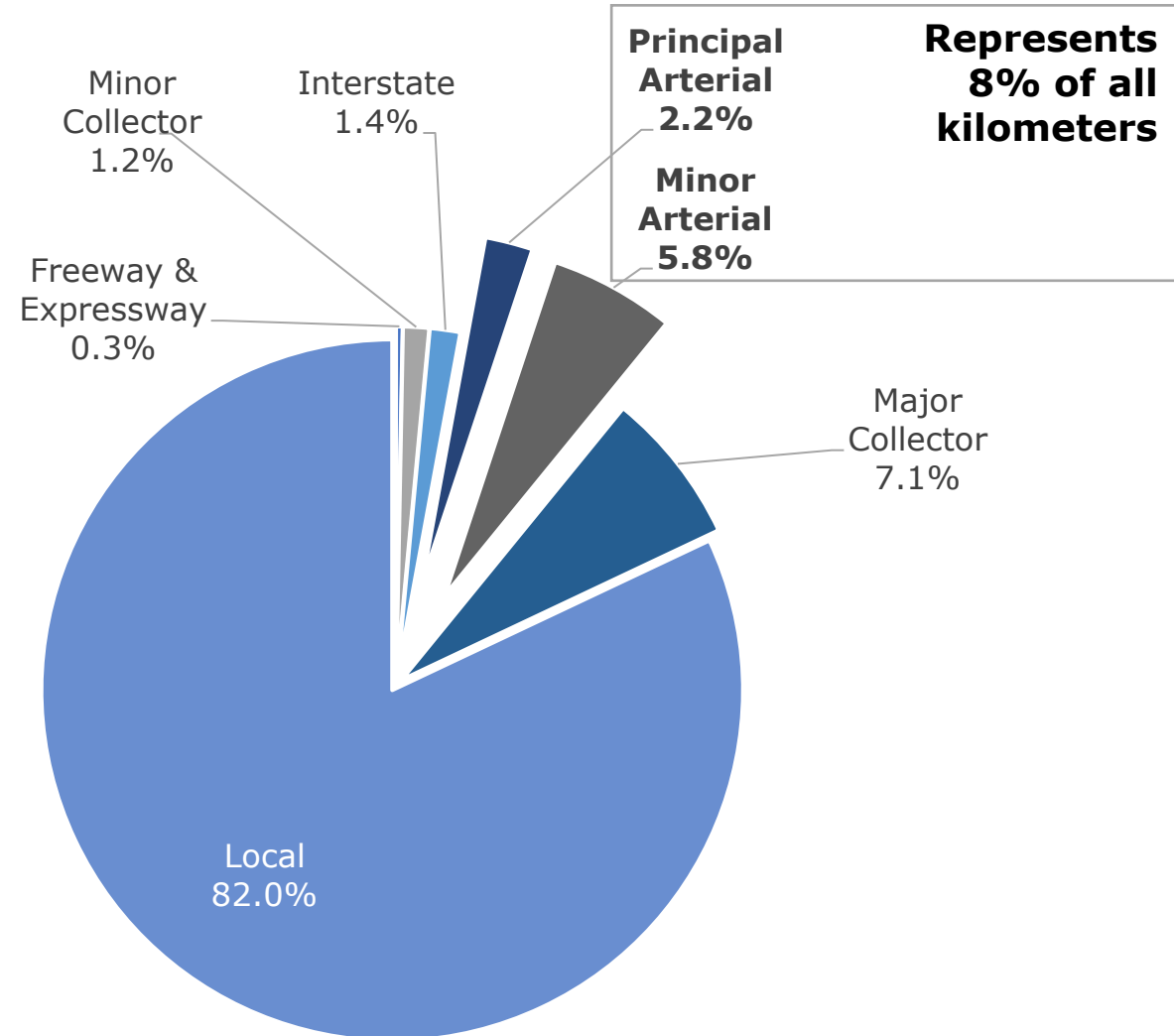
59% of VRU Fatal and Severe occurred from 6:00pm to 6:00am (i.e., nighttime conditions)

Roadway Functional Classification

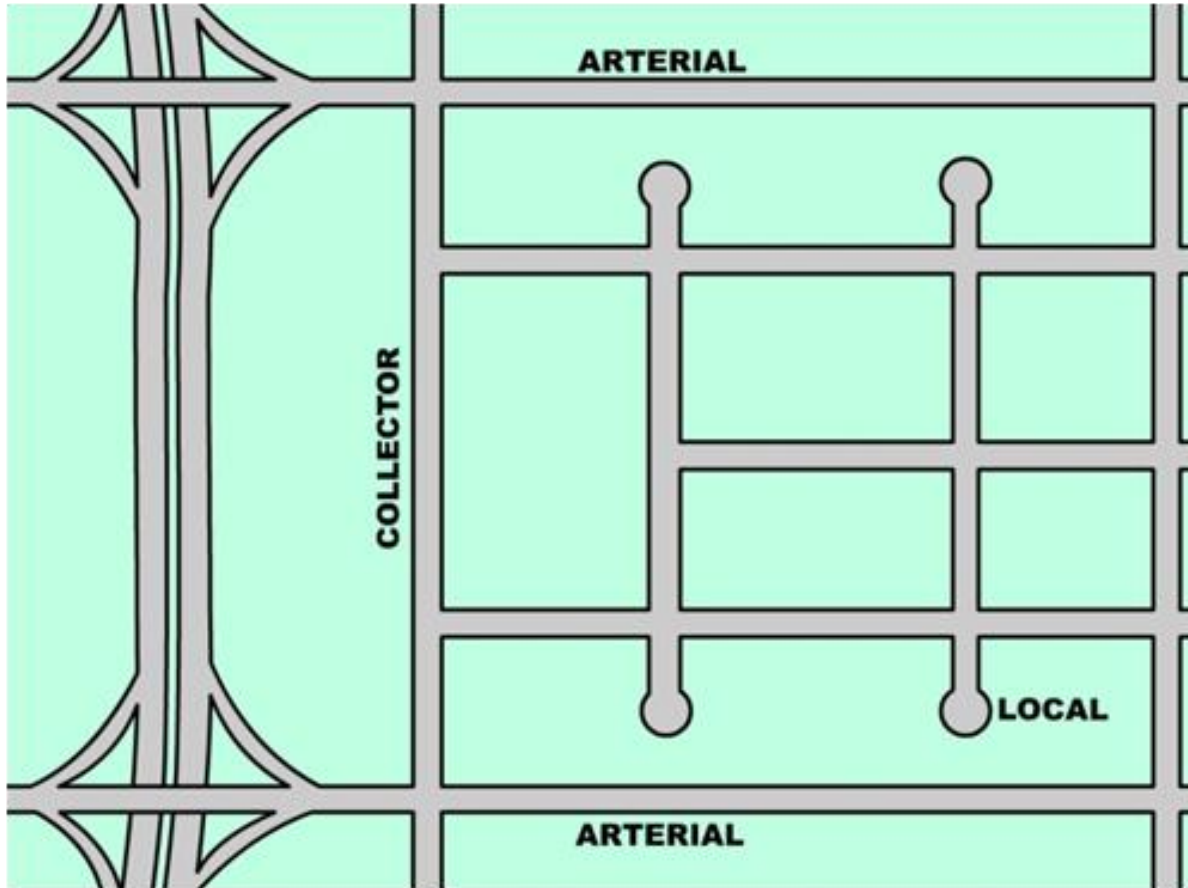
VRU Crash Percentage vs Functional Classification



Kilometers % vs Functional Classification



Roadway Functional Classification



Principal and Minor Arterials:

- Mid-high volume roads
- 2 or more lanes
- Major intersections some with signal controlled
- Direct vehicular access to properties from the road
- Some sidewalk presence
- No cycling infrastructure

Roadway Functional Classification



PR 1 – Caguas Source: PR Complete Streets Plan and Design Guidelines



PR 3 – Rio Grande Source: Google Maps



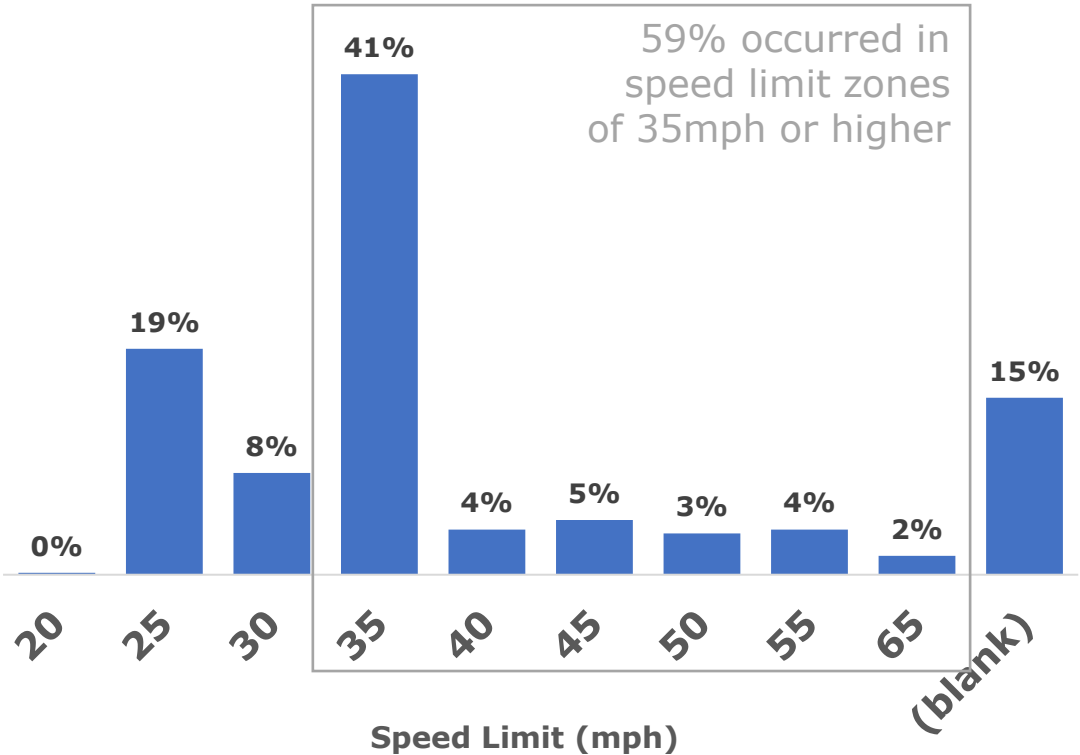
PR 183 – San Lorenzo Source: Google Maps



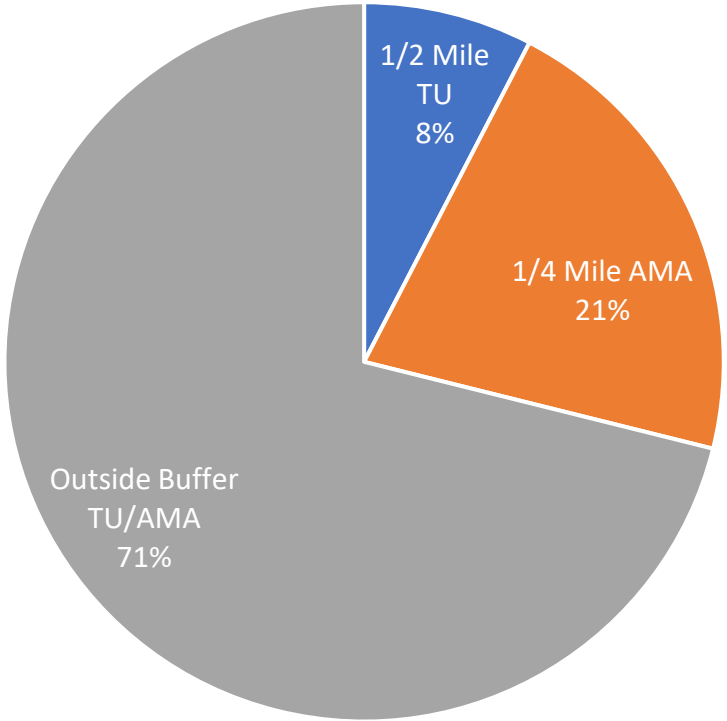
PR 987 – Fajardo Source: Google Maps

Speed Limit and Transit

VRU Crash Percentage by Speed Limit



VRU Crashes and Transit Stops



VRU High-Risk Areas

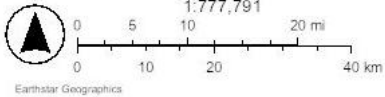
SHSP VRU Assessment Interactive Map



Areas

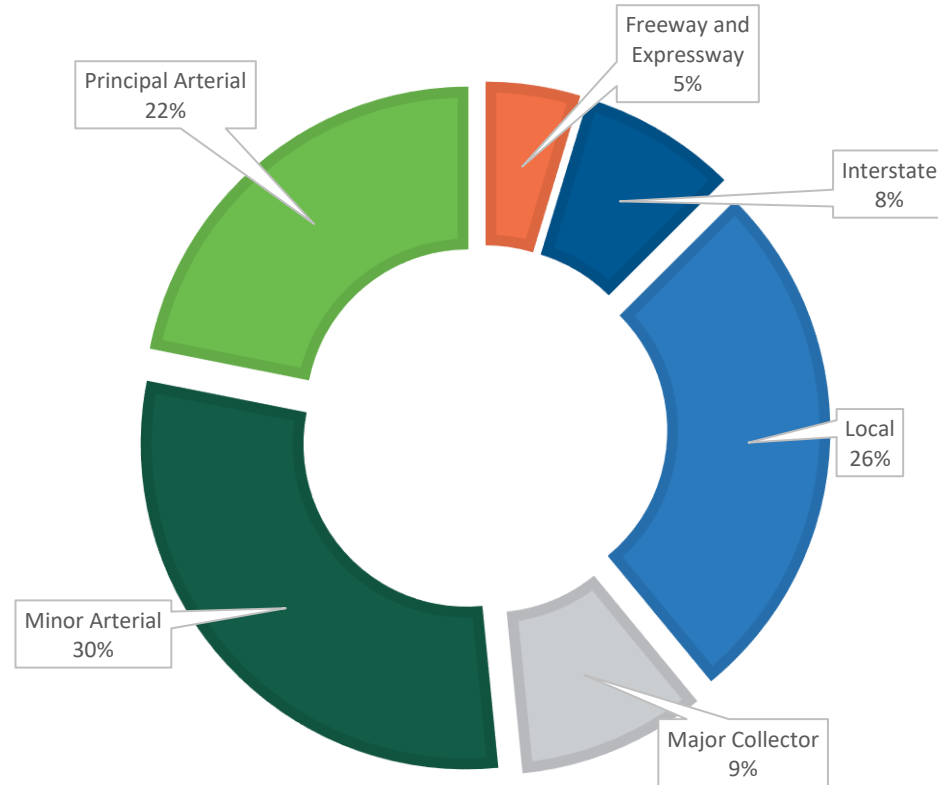
- By PRHTA Region
- Population
- Kilometers
- Hundred Million Vehicle Miles Travel

8/9/2023
VRU Crash Corridors by Weight
1
2.5
5
7.5
10
PRHTA_OFFICIAL_REGIONS
North
East
South
West
Low
High
World Imagery

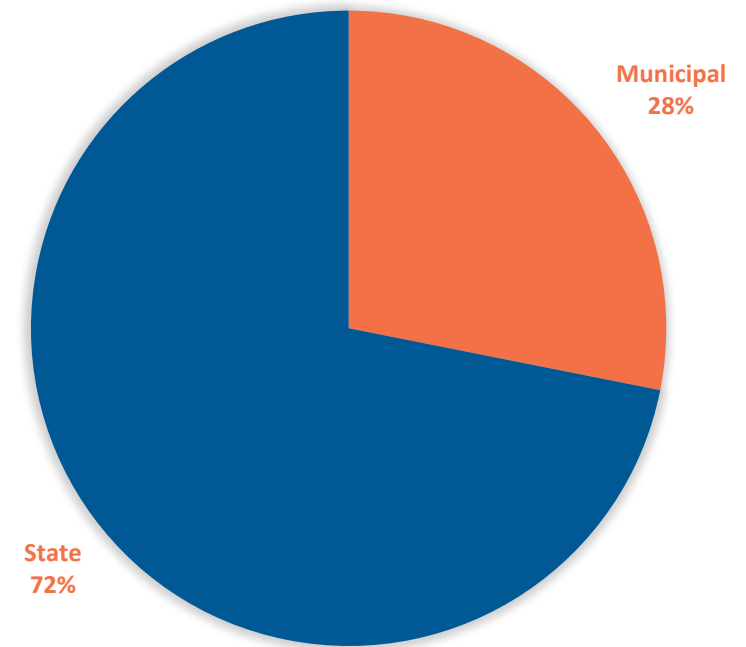


VRU East Region

PRHTA REGION EAST FUNCTIONAL CLASSIFICATION

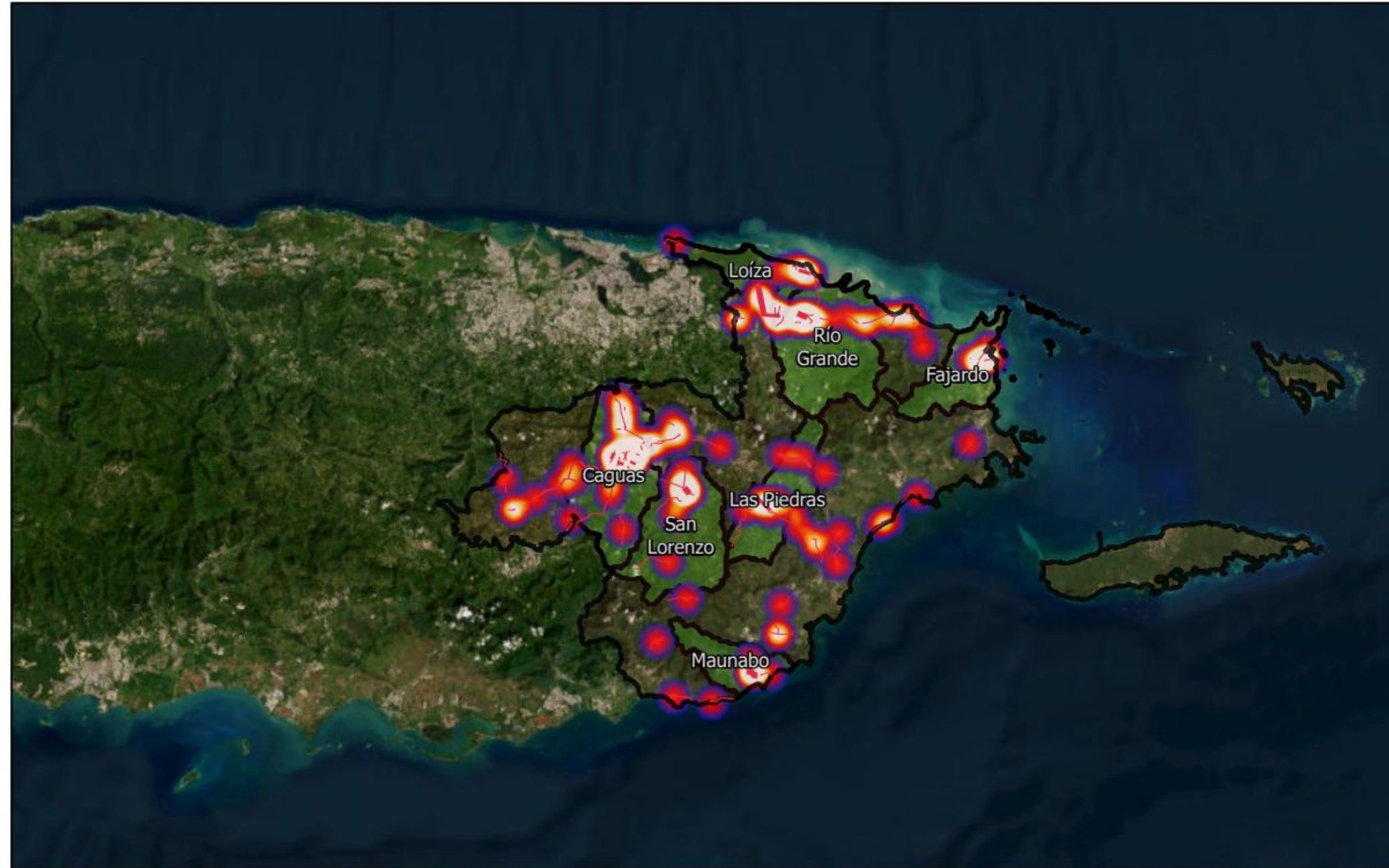


PRHTA EAST REGION JURISDICTION



SHSP VRU Assessment Interactive Map

VRU East Region



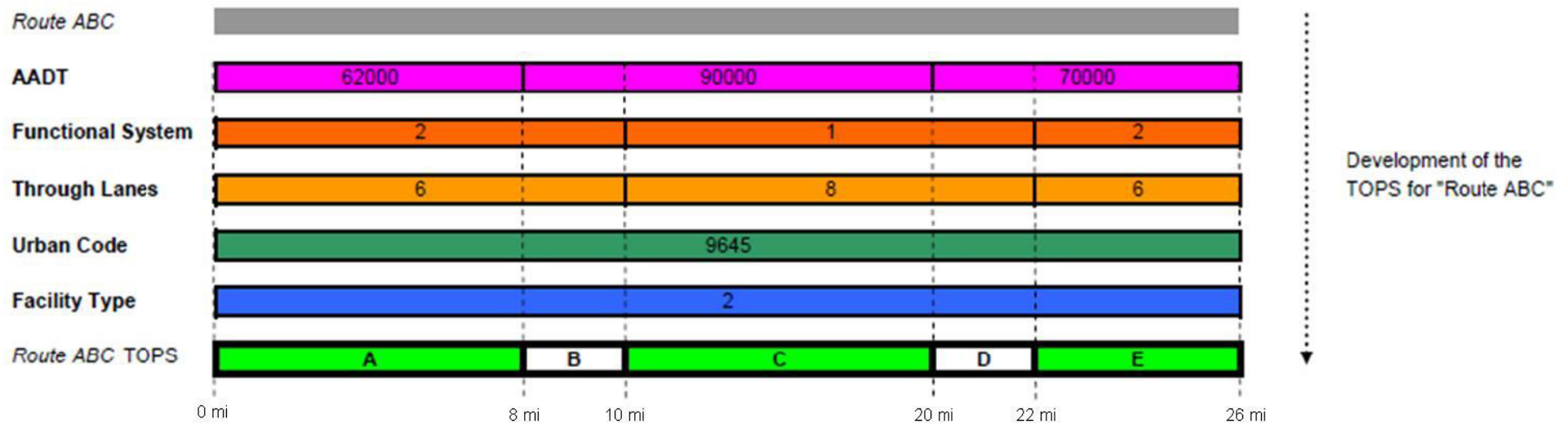
[SHSP VRU
Assessment
Interactive Map
\(arcgis.com\)](#)

VRU Corridor Selection - HPMS

Chapter 6

HPMS Field Manual
December 2016

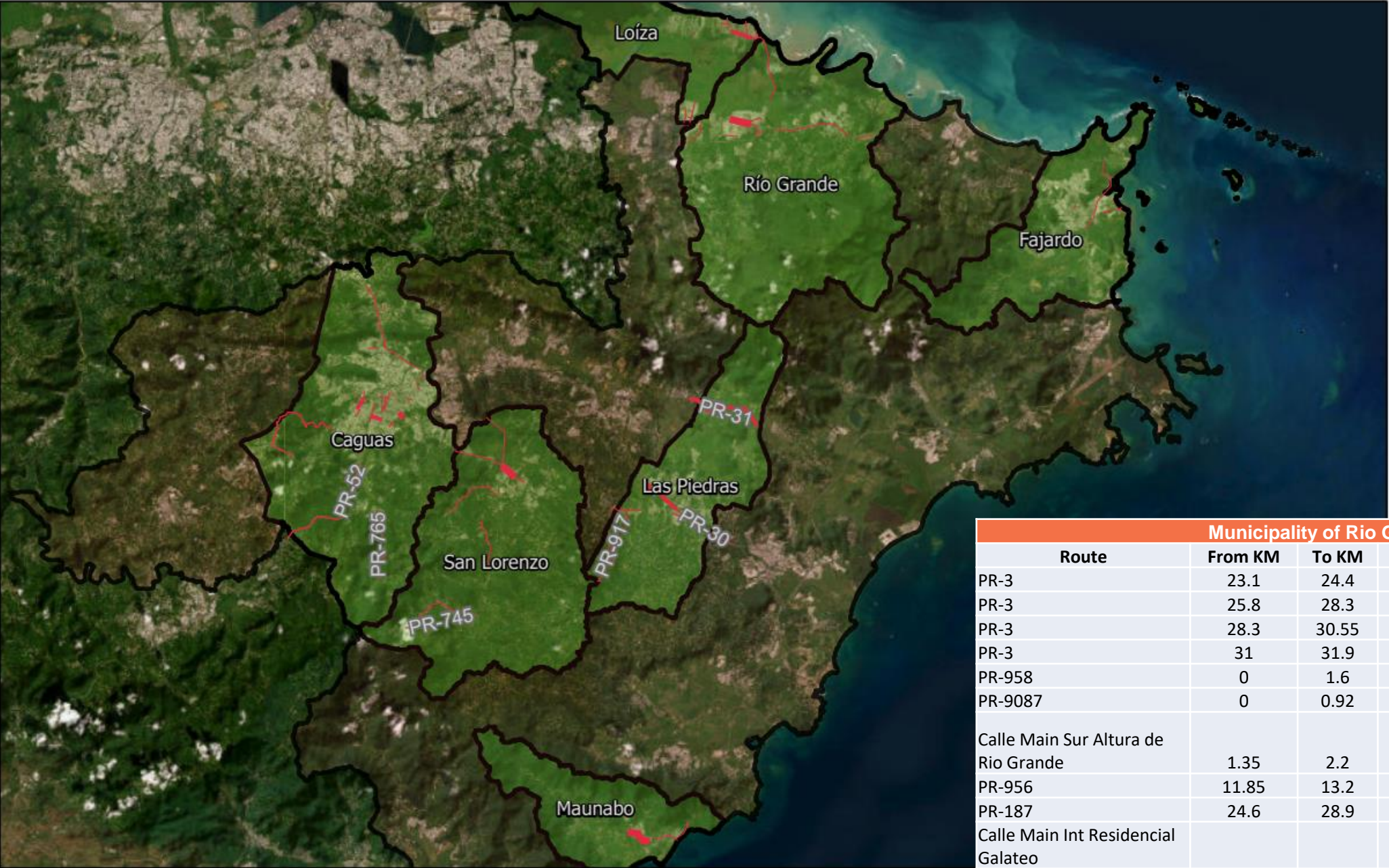
Figure 6.1 TOPS Development Process



SHSP VRU Assessment Interactive Map

VRU East Region

[SHSP VRU
Assessment
Interactive Map
\(arcgis.com\)](https://arcgis.com)



Municipality of Rio Grande					
Route	From KM	To KM	Length KM	Fatal	Severe
PR-3	23.1	24.4	1.30	2	1
PR-3	25.8	28.3	2.50		1
PR-3	28.3	30.55	2.25	1	
PR-3	31	31.9	0.90	1	
PR-958	0	1.6	1.60		1
PR-9087	0	0.92	0.92		1
Calle Main Sur Altura de Rio Grande	1.35	2.2	0.76	1	
PR-956	11.85	13.2	1.34		1
PR-187	24.6	28.9	4.30		1
Calle Main Int Residencial Galateo			0.14		1

4

VRU Assessment: Strategies, Implementation Examples and Potential Projects

Safety Countermeasures

Pedestrian/Bicyclist



[Bicycle Lanes](#)



[Crosswalk Visibility Enhancements](#)



[Leading Pedestrian Interval](#)



[Medians and Pedestrian Refuge Islands in Urban and Suburban Areas](#)



[Pedestrian Hybrid Beacons](#)



[Rectangular Rapid Flashing Beacons \(RRFB\)](#)



[Road Diets \(Roadway Configuration\)](#)



[Walkways](#)

Additional reference: [Pedestrian Safety Guide and Countermeasure Selection System \(pedbikesafe.org\)](#)

SAFE ROADS: AVOIDING CRASHES

Elements of the Safe System Approach



Avoiding crashes involves:



Separating users in space



Separating users in time

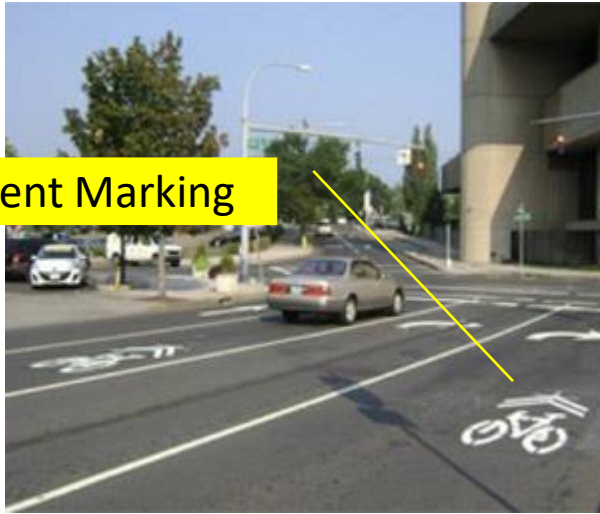


Increasing attentiveness and awareness

Bike Lanes

Example #1

Pavement Marking



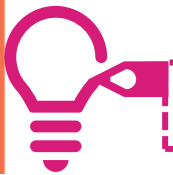
Traffic Delineator

Pavement Marking

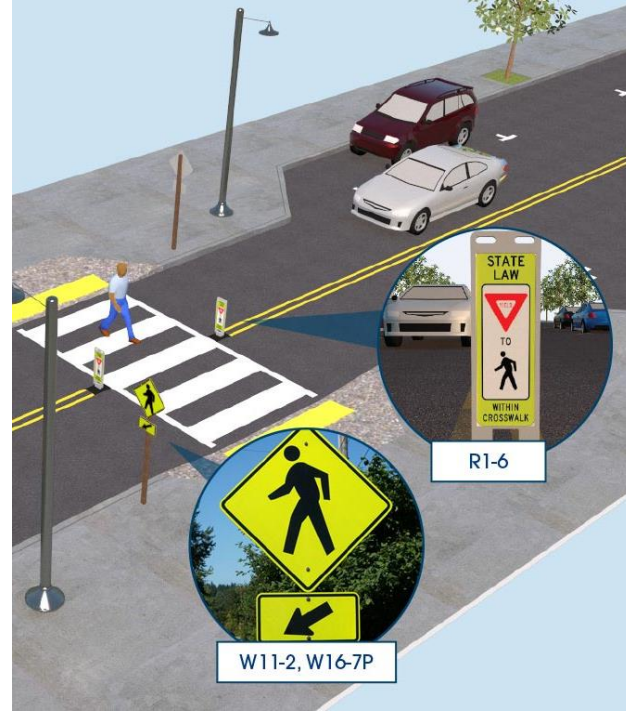
Pavement Resurfacing



Raised Island



Is this part of the project for the safety of VRUs?

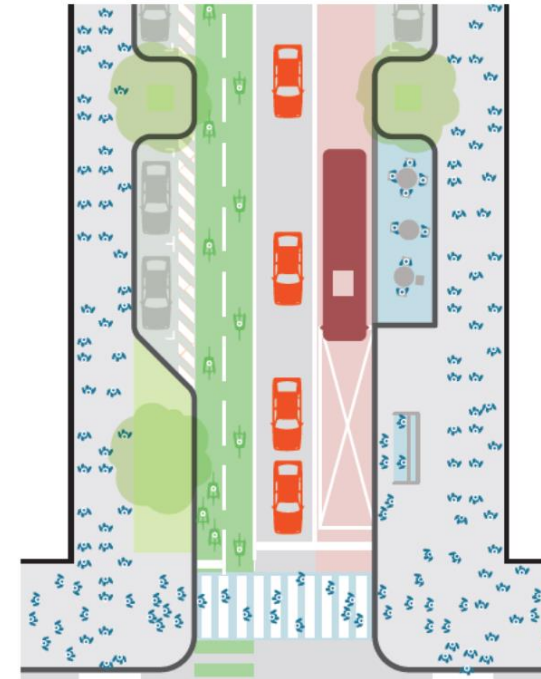
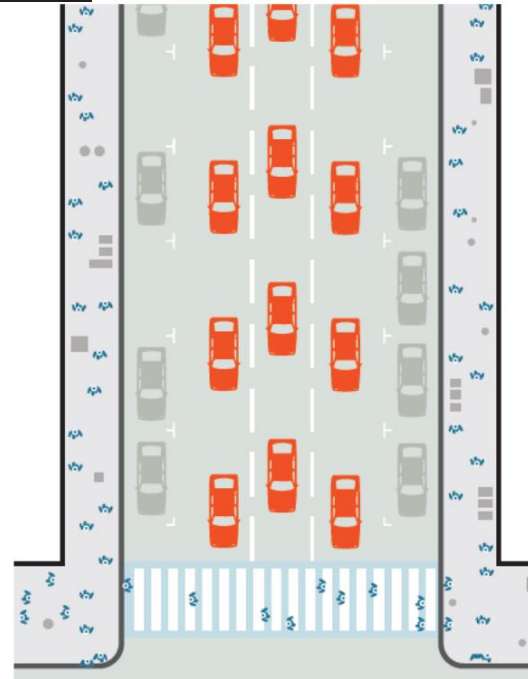
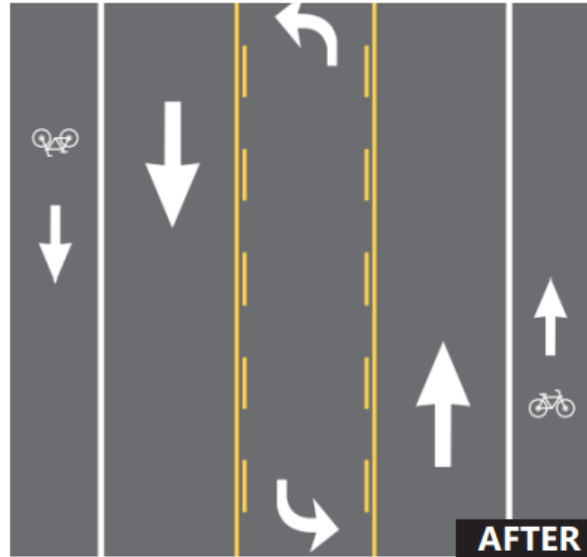
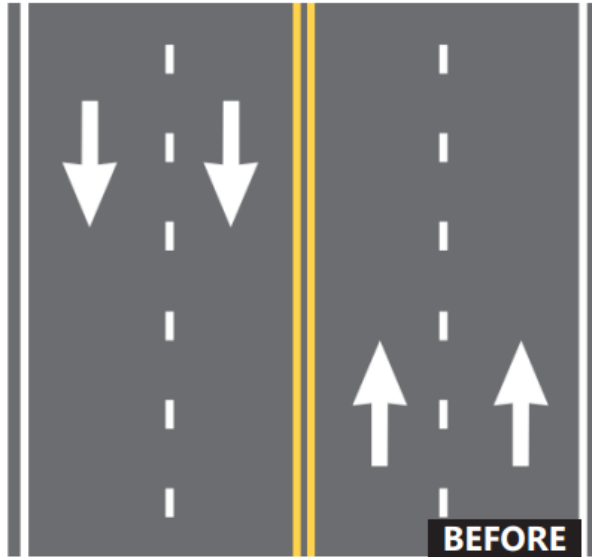


Example # 2

Pedestrian Crossings & Walkways

Road Diet

Example #3



Traffic Signals APS and Peds Signals

Example #4



SAFE ROADS: CRASH KINETIC ENERGY

Elements of the Safe System Approach



Managing crash kinetic energy involves:



Source: Fehr & Peers

Managing speed



Source: City of Carmel, IN

Managing crash angles



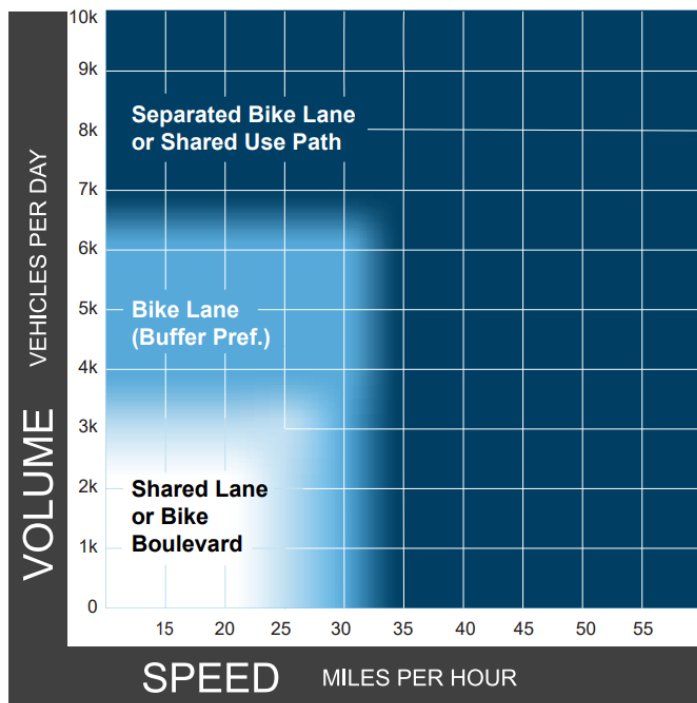
Source: FHWA

Managing crash energy distribution

VRU Assessment Strategies

Guiding principles design

- PR Complete Street Plan and Design Guidelines (Adopted MPO 2018 – PRHTA Website)
- PR Bicycle and Pedestrian Plan (Adopted MPO 2018 – PRHTA Website)
 - Consider safe bikeway accommodations on all transportation projects specially in urban areas.
 - Optimize bike lane widths and separation from travel lanes for safety.



Source: FHWA bikeway selection guide

Complete Street Vision

Successful urban roads should provide reliable major routes through cities with vibrant, safe, secure and well maintained urban environments, and make shops and services easily accessible. Urban Streets Complete Street vision includes:

- Maintain automobile priority but improve provisions for other modes;
- Reduce width of travel lanes where appropriate;
- Comfortable and sheltered waiting areas for transit users;
- Comfortable sidewalk width of 1.5 - 2.1 meters /5-7 feet;
- Crossings to match wider pedestrian network, including at mid-block where appropriate;
- Buffered, separated or off-road bikeways (Class I, II or IV – for Class definitions see Bikeways, Section 3 Part B);
- High quality landscape character;
- Provide shade trees along sidewalks and bikeways; and
- Provide street lighting that relates to pedestrians and cyclists.

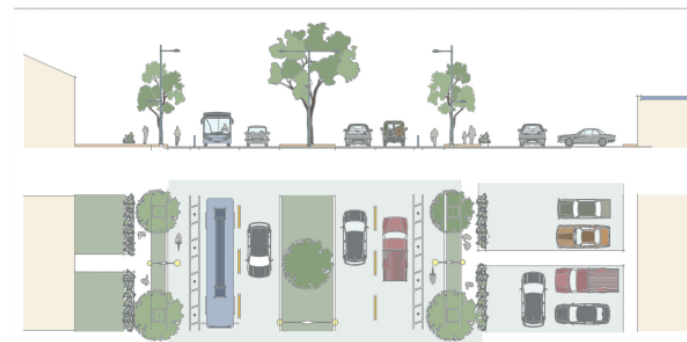
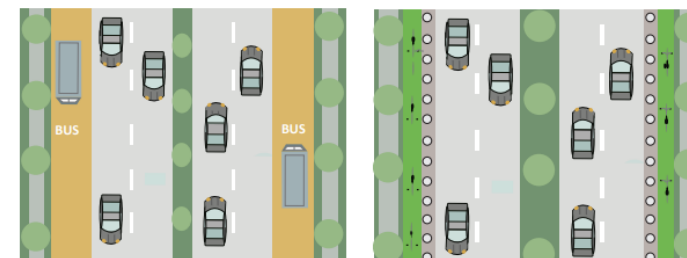


Figure 2.5: Urban Road Complete Street Vision

Source: SDG



Transit priority

Non-motorized priority

Source: PR Complete Streets Plan & Design Guidelines

VRU Assessment Strategies

Project Development

Bicycle and pedestrian considerations a full component of Puerto Rico project planning and development.

- Pedestrian and Bicycle data consideration
- Include ped and bike performance measures as part of project selection processes
- Advanced implementation plan from pedestrian and bicycle plan and complete streets guidelines
- Design directives to include ped and bike criteria and potential measures
- Include ped and bike contract language for all design and construction projects
- Include ped and bike needs in traffic control plans (MOT & detours)

Systemic approach

High-Risk roadway features – Arterial (Principal and minor), Multilane, Speed limit > 35 mph

- Intersection – (i.e., pedestrian push buttons and proper time to cross, ADA ramps, sidewalks)
- Segments – Road diets, speed management such as traffic calming, roundabouts, mid block crossings, sidewalks repairs, protected bike lanes, shared use path, and pedestrian and bikes signage

VRU Potential Projects

Systematic Safety Project Selection by Region

- Based on High-VRU Fatal and Severe Crash Location
- Per Capita / Population
- HMMVT
- KM of road
- Above average ranking

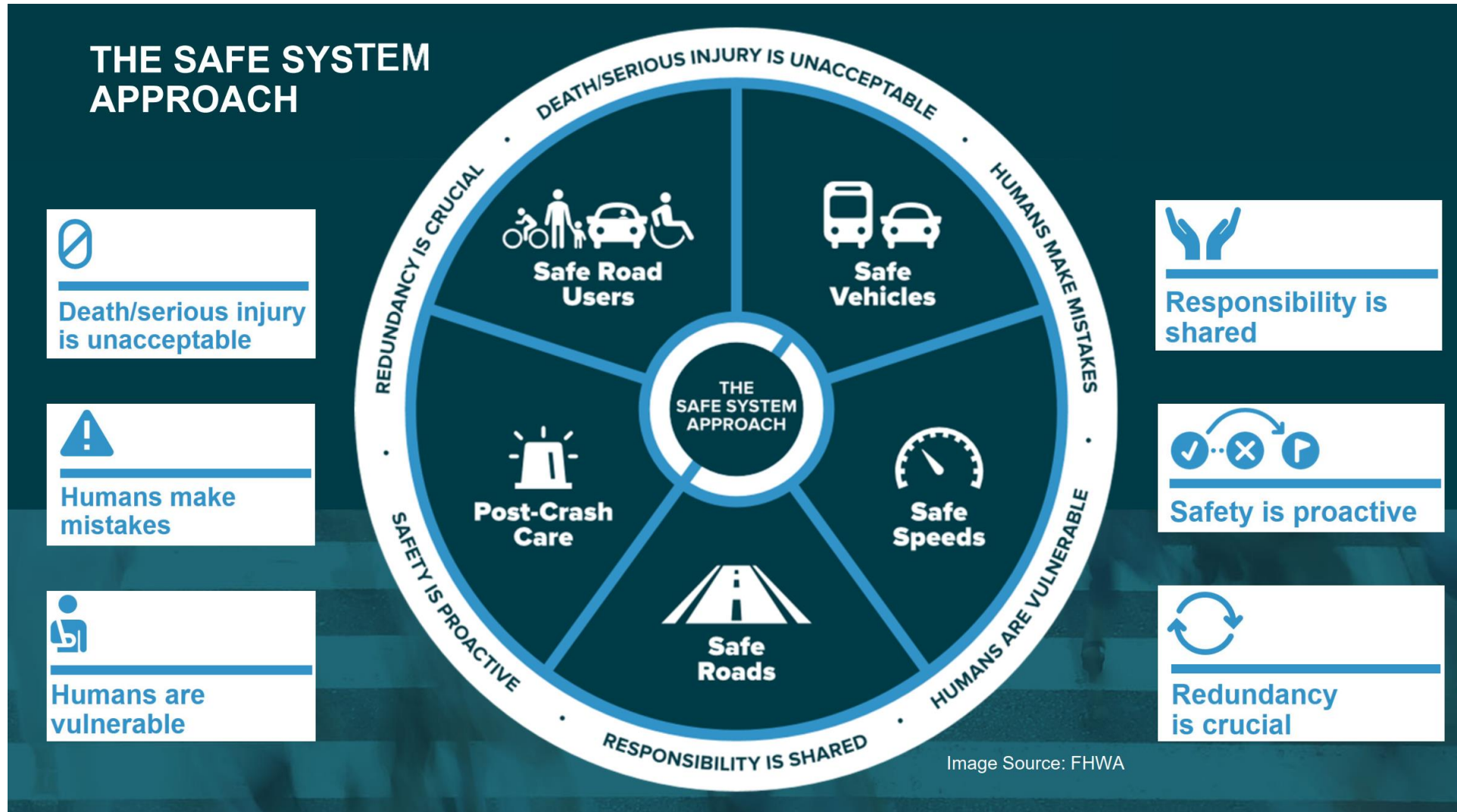
PRHTA Region:

- **East** – Loiza, Rio Grande, Maunabo, Caguas, San Lorenzo, Las Piedras and Fajardo
- **Metro** – San Juan, Bayamon, Carolina, and Cataño
- **North** – Hatillo, Toa Baja, Vega Alta, Arecibo, Camuy, Manatí, and Dorado
- **West** – Aguadilla, Rincon, Quebradillas, Añasco, and Mayaguez
- **South** – Ponce, Arroyo, Juana Diaz, Cayey, Villalba and Coamo

Next Steps:

- Identification of Roadway by the high-roadway features for potential projects
- Evaluation of site crash report conditions including crash report review and road safety audits.
- Identify countermeasures, design, implement and evaluate.

The Safe System Approach



Responsibility is Shared



LLEGA SEGURO. SÉ UN PEATÓN RESPONSABLE.

Evita distracciones mientras estás caminando

PEATÓN RESPONSABLE

COMISIÓN PARA LA SEGURIDAD EN EL TRÁNSITO

GOBIERNO DE PUERTO RICO



¡PIENSA EN EL PEATÓN!

NO REBASES UN VEHÍCULO QUE ESTÉ CEDIENDO EL PASO A UN PEATÓN.

PONTE EN SUS ZAPATOS.

Detente antes del cruce peatonal. Evite ser multado.

SOMOS RESPONSABLES

COMISIÓN PARA LA SEGURIDAD EN EL TRÁNSITO

GOBIERNO DE PUERTO RICO

15 MINUTES BREAK

Encuesta - Grupos consultivos en
seguridad vial (Región Este)



Thank You!

