Safety Countermeasures, Best Practices and Safety Research

Gabe Priebe, Traffic & Safety Engineer
Montana Department of Transportation
2022 Annual Transportation Safety Meeting
October 11 & 12, 2022

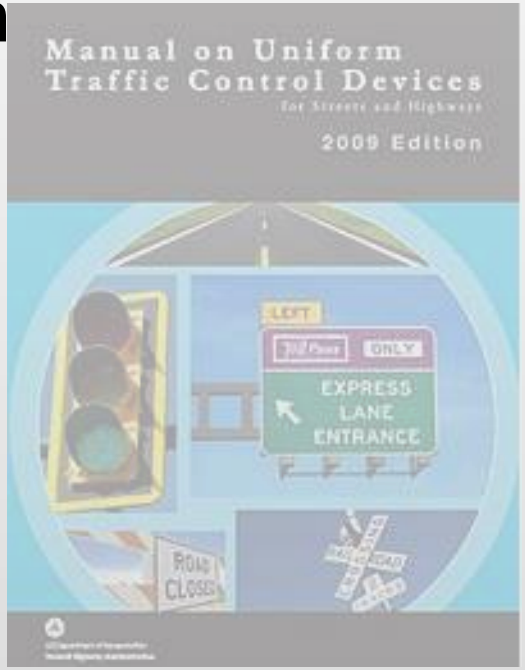
zero deaths
zero serious injuries

Safety Countermeasures, Best Practices and Safety Research

AKA

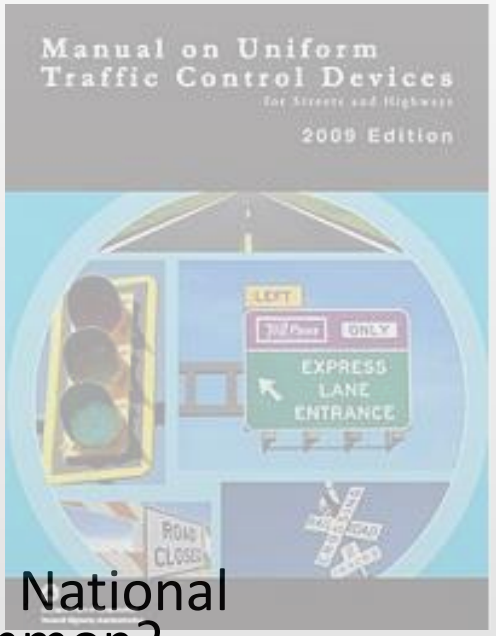
- Target Specific Crashes (Reactive)
- Develop Standards (Proactive)
- Analyze Results for Continuous Improvement

Safety Countermeasures, Best Practices and Safety Research



Trivia –

What do Lyndon B. Johnson, Vietnam and National Design Standards (MUTCD) have in common?



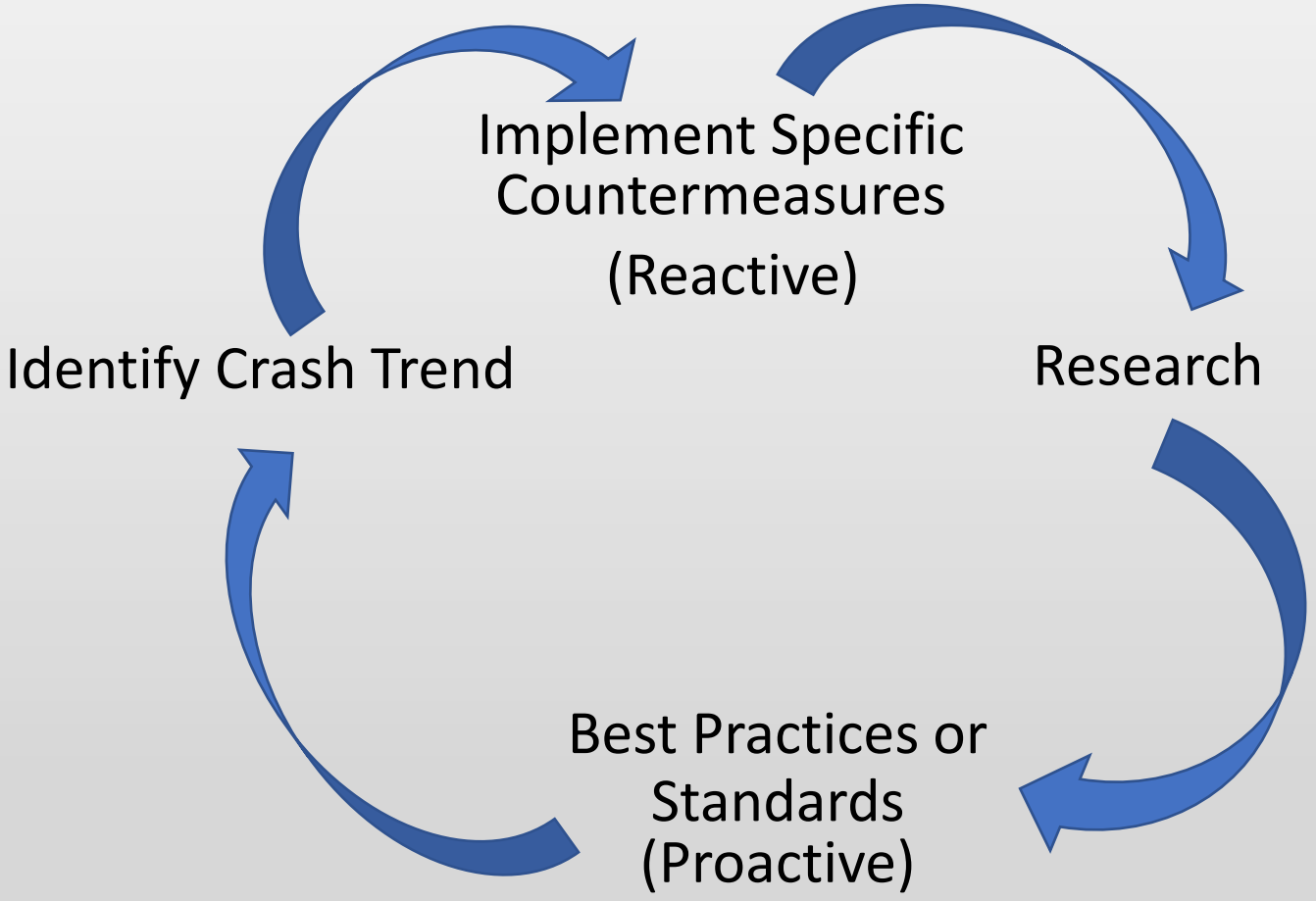
Trivia –

What do Lyndon B. Johnson, Vietnam and National Design Standards (MUTCD) have in common?

"Over the {1966} Labor Day weekend, 29 American servicemen died in Vietnam. During the same Labor Day weekend, 614 Americans died on our highways in automobile accidents."

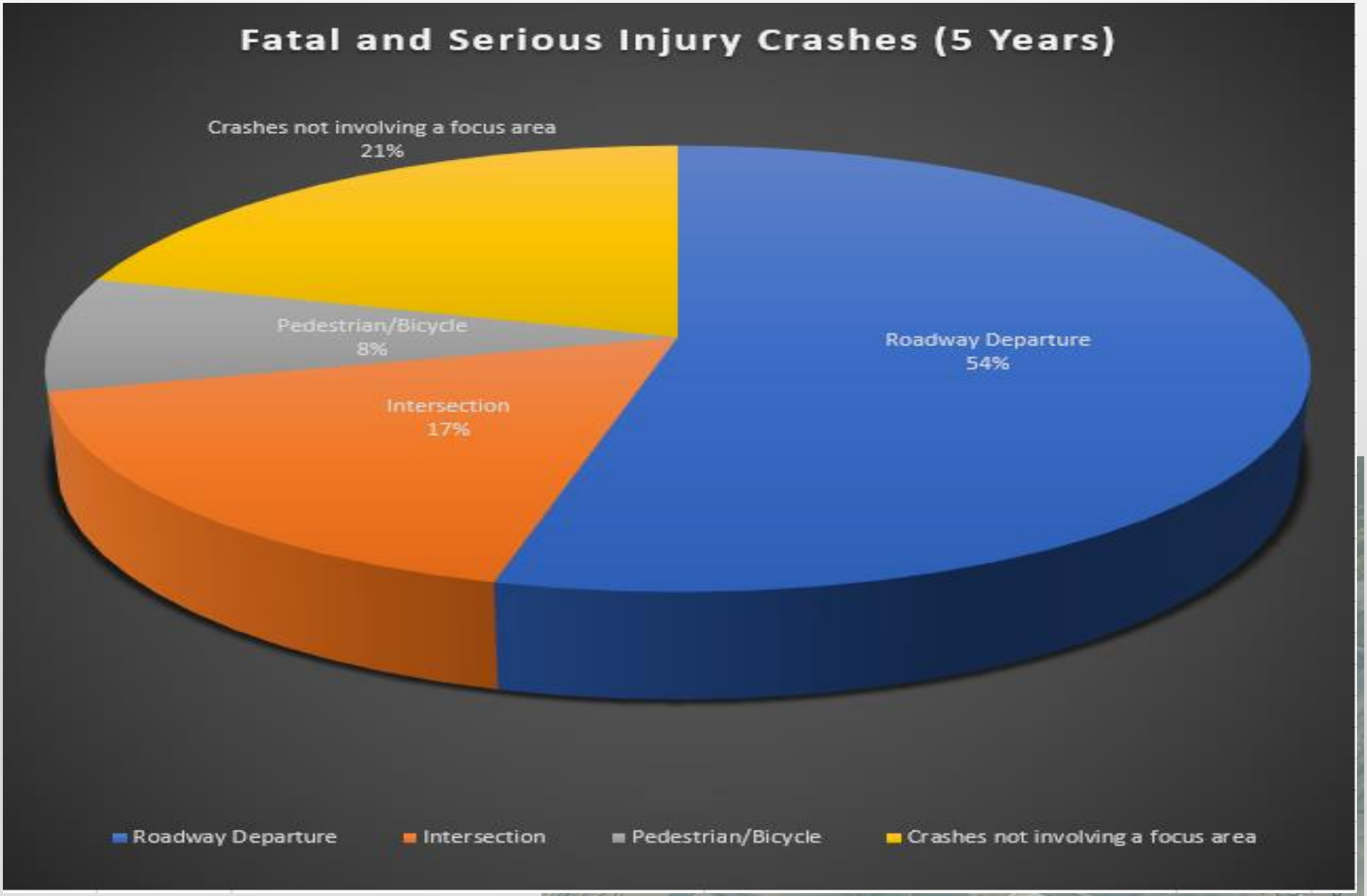
-LBJ while signing the Highway Safety Act
(Req'd Conformance w/ MUTCD)

Safety Feedback Loop



Implement Specific Countermeasures

Two Main Categories

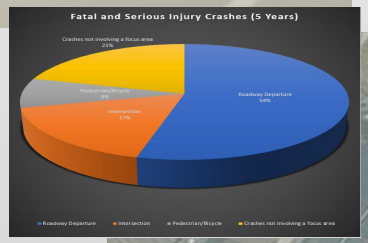


Implement Specific Countermeasures

Two Main Categories

Roadway Departure Crashes

Prevent or mitigate vehicles leaving the traveled way



Intersection Crashes

Prevent Crashes related to Intersecting Roadways

Proven Safety Countermeasures

FHWA's Proven Safety Countermeasures initiative (PSCi) is a collection of countermeasures and strategies effective in reducing roadway fatalities and serious injuries on our Nation's highways. Transportation agencies are strongly encouraged to consider widespread implementation of PSCs to accelerate the achievement of local, State, and National safety goals.

ROADWAY DEPARTURE

INTERSECTIONS

For Each:

- Implementation status in MT
- What Research shows for Crash Reduction

https://safety.fhwa.dot.gov/provencountermeasures/

Roadway Departure Crashes

Prevent or mitigate vehicles leaving the traveled way

ROADWAY DEPARTURE

Wider Edge Lines

Enhanced Delineation for Horizontal Curves

Longitudinal Rumble Strips and Stripes

SafetyEdge[SM]

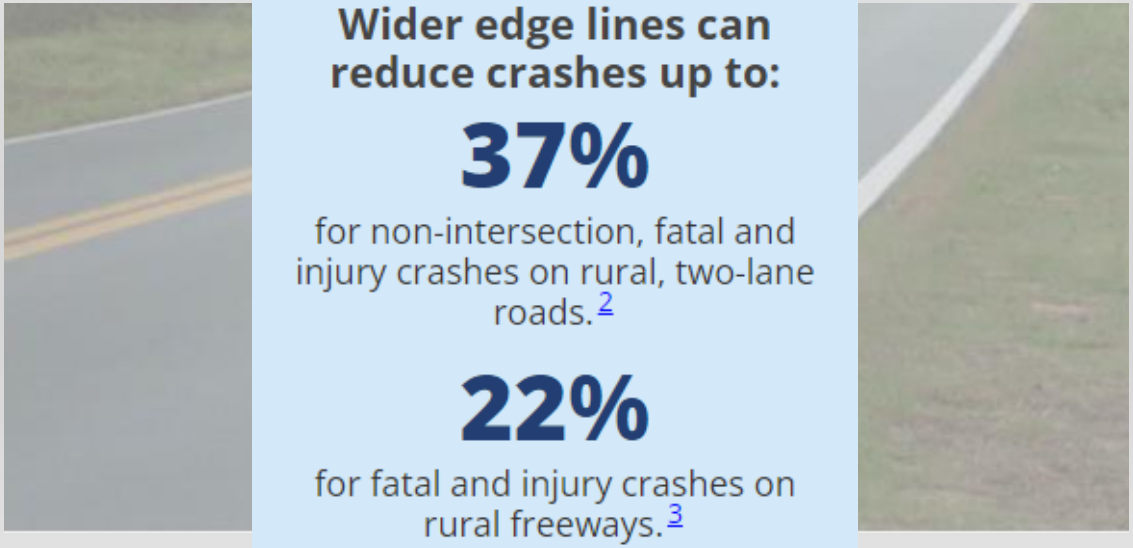
Roadside Design Improvements at Curves

Median Barriers

Roadway Departure Crashes

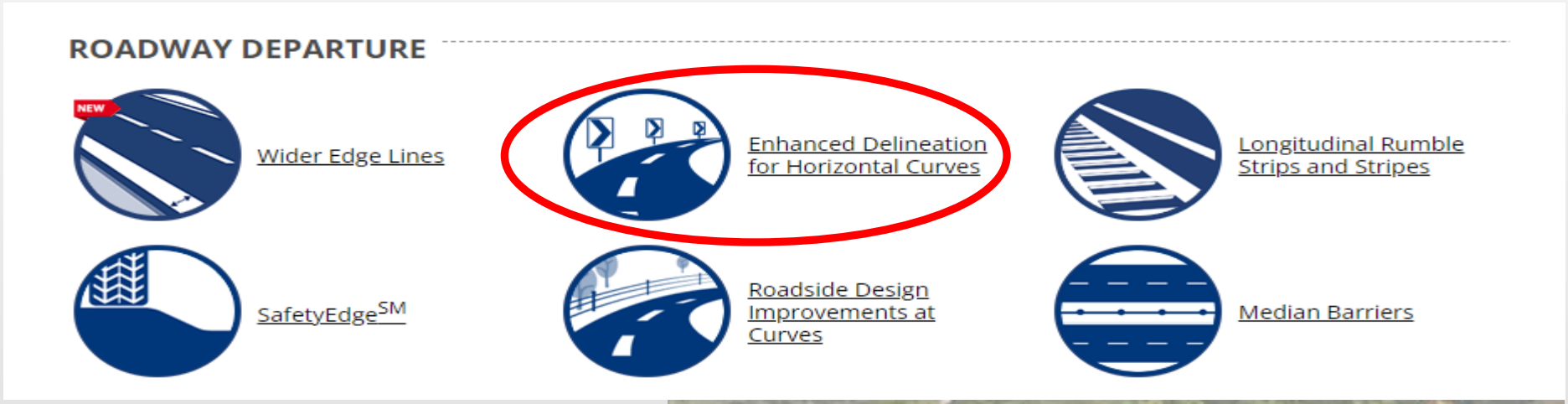
Wider Edge Lines

Consideration for Future



Roadway Departure Crashes

Enhanced Delineation for Horizontal Curves



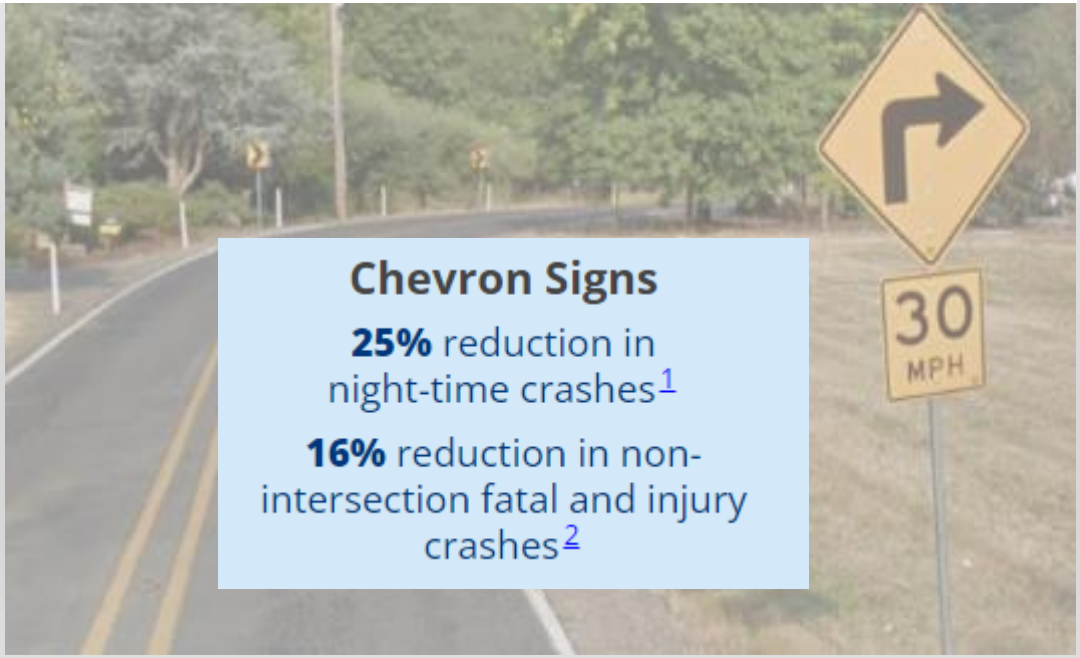
Standard

Advisory Signs, Chevrons, Delineators

Location Specific

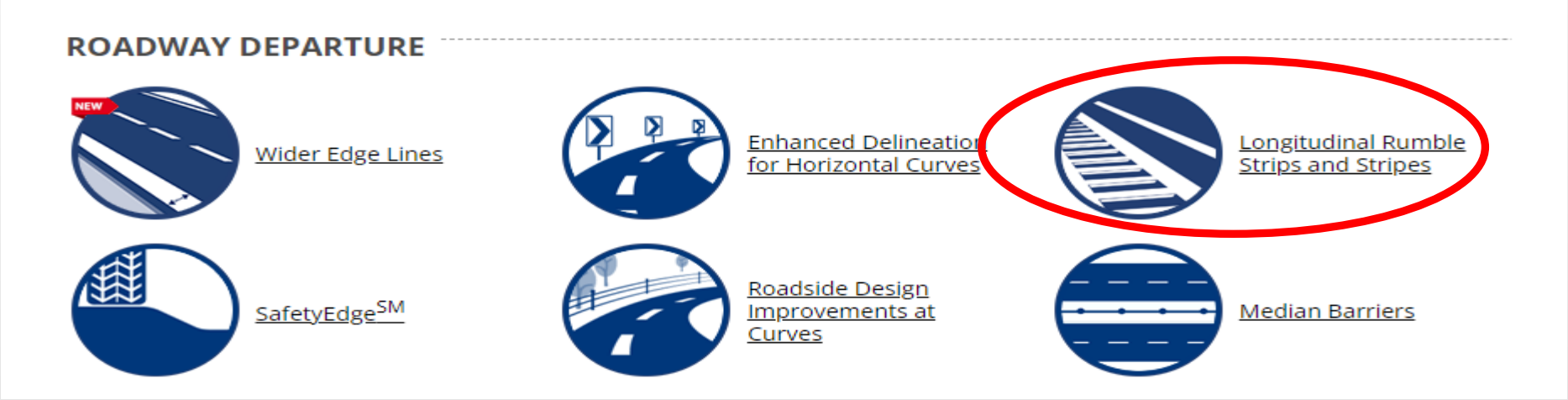
Enhanced Delineation, Dynamic Warning Signs,

Retroreflective Strips on Sign and Delineator Posts



Roadway Departure Crashes

Longitudinal Rumble Strips



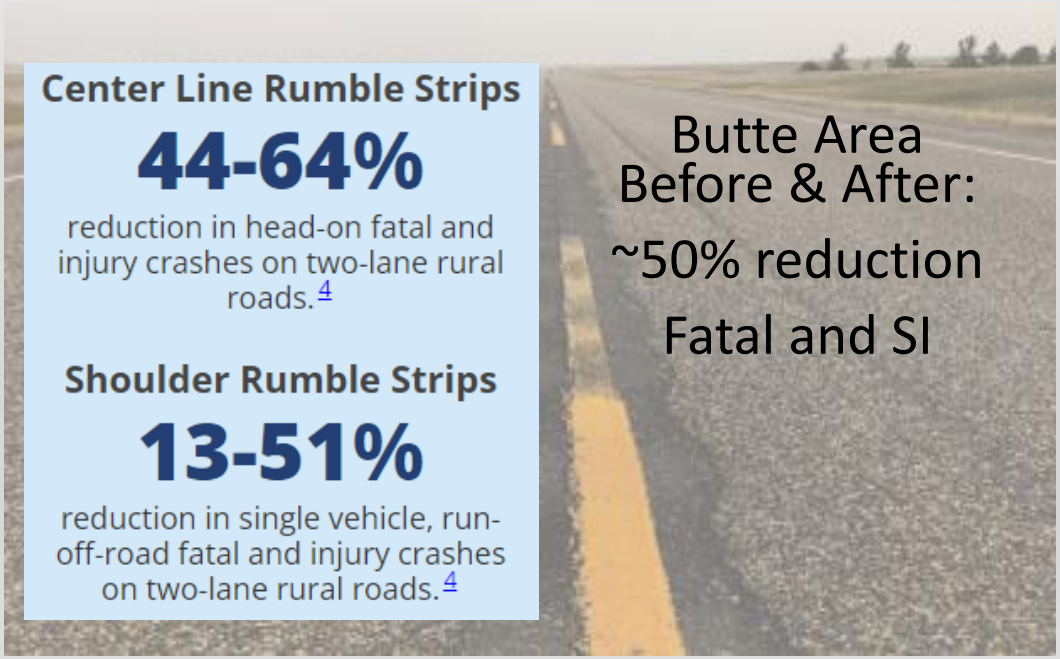
Standard

Conventional shoulder & CLRS

Location Specific

Sinusoidal (Low Noise) Rumble Strips

(Ongoing Research Project)



Roadway Departure Crashes

Improved Pavement Edge

11%

reduction in fatal and injury crashes.[2]

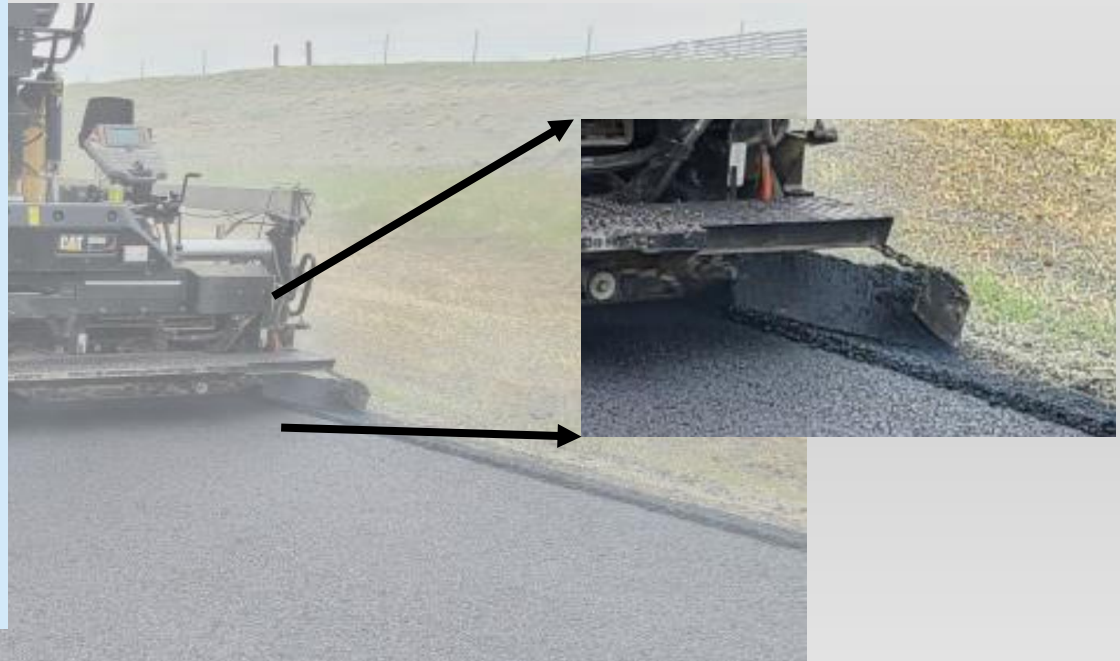
21%

reduction in run-off-road crashes.[2]

19%

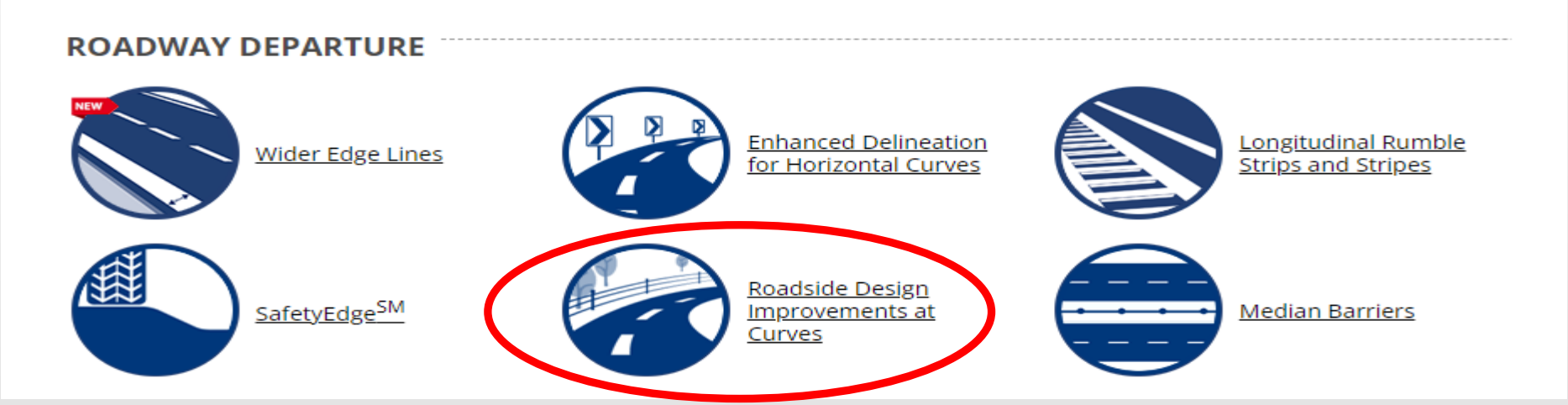
reduction in head-on crashes.[2]

Standard



Roadway Departure Crashes

Roadside Design Improvements at Curves



Location Specific

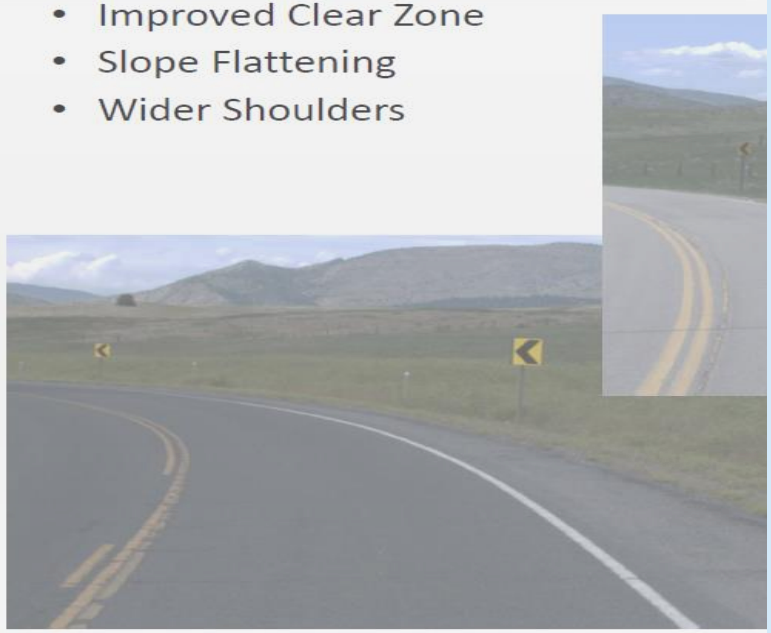
Spot Crash Locations

Standard

Reconstruction

Projects

- Improved Clear Zone
- Slope Flattening
- Wider Shoulders



Flatten sideslope from 1V:3H to 1V:4H:

8%

reduction for single-vehicle crashes.[2]

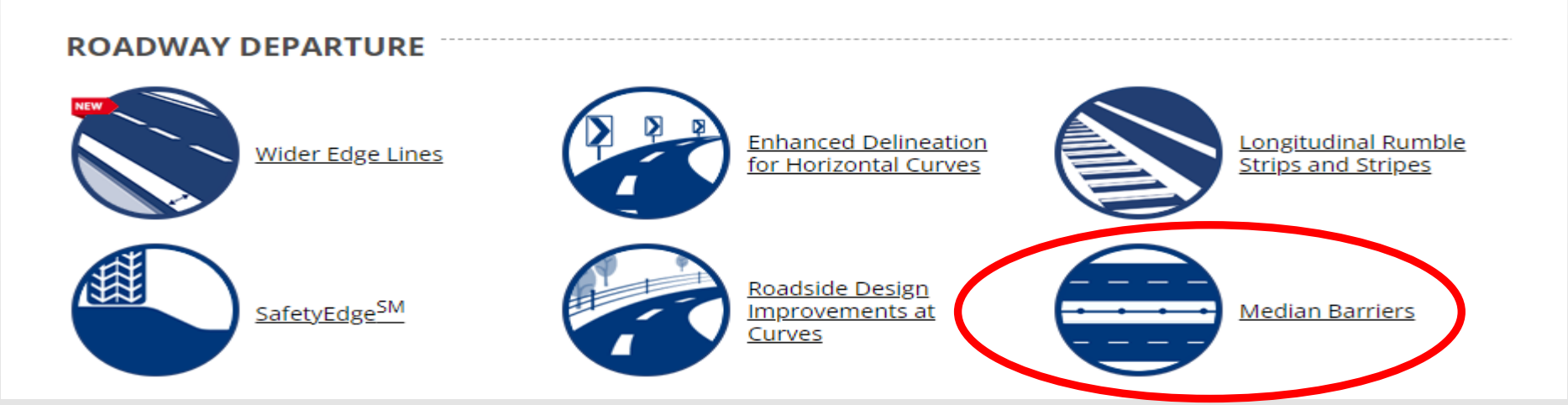
Flatten sideslope from 1V:4H to 1V:6H:

12%

reduction for single-vehicle crashes.[2]

Roadway Departure Crashes

Median Barriers



Location Specific

High Tension Cable Rail

Select Locations based on Crash History and Median Width

8%

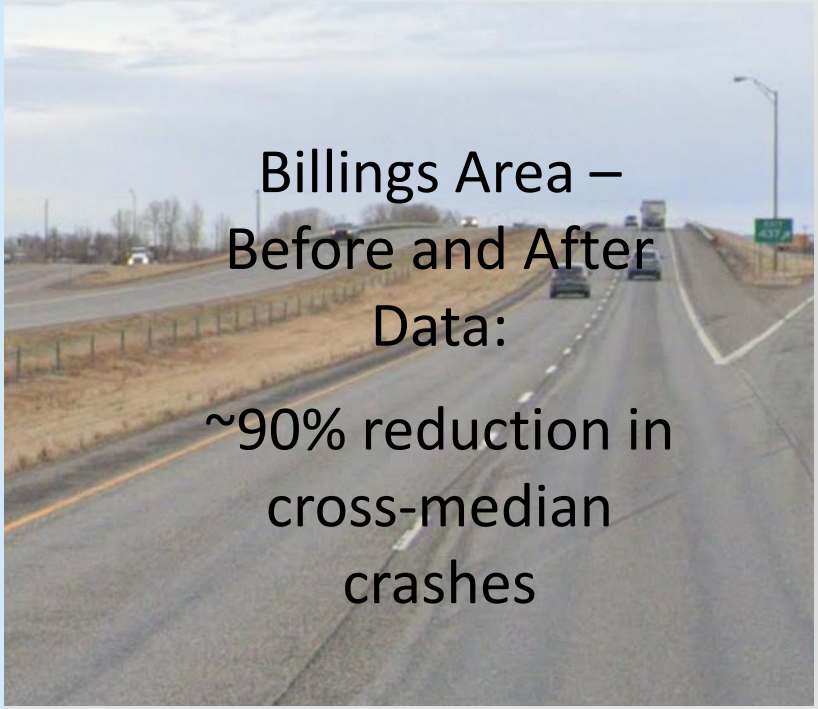
of all fatalities on divided highways are due to head-on crashes.[1]

Safety Benefits:

Median Barriers Installed on Rural Four-Lane Freeways

97%

reduction in cross-median crashes.[2]

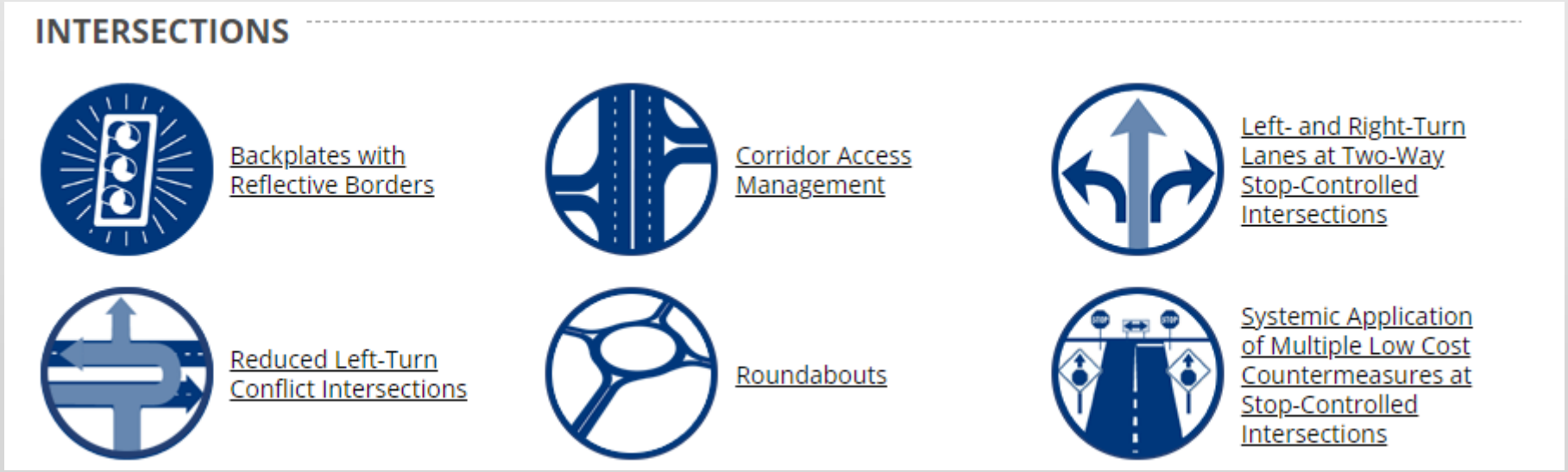


Billings Area – Before and After Data:

~90% reduction in cross-median crashes

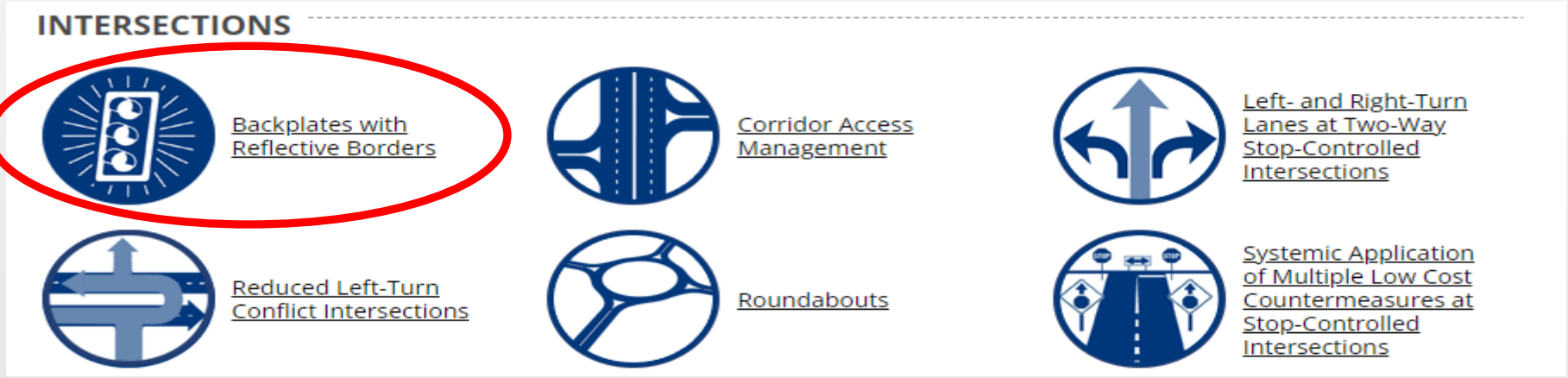
Intersection Crashes

Prevent Crashes related to
Intersecting Roadways



Intersection Crashes

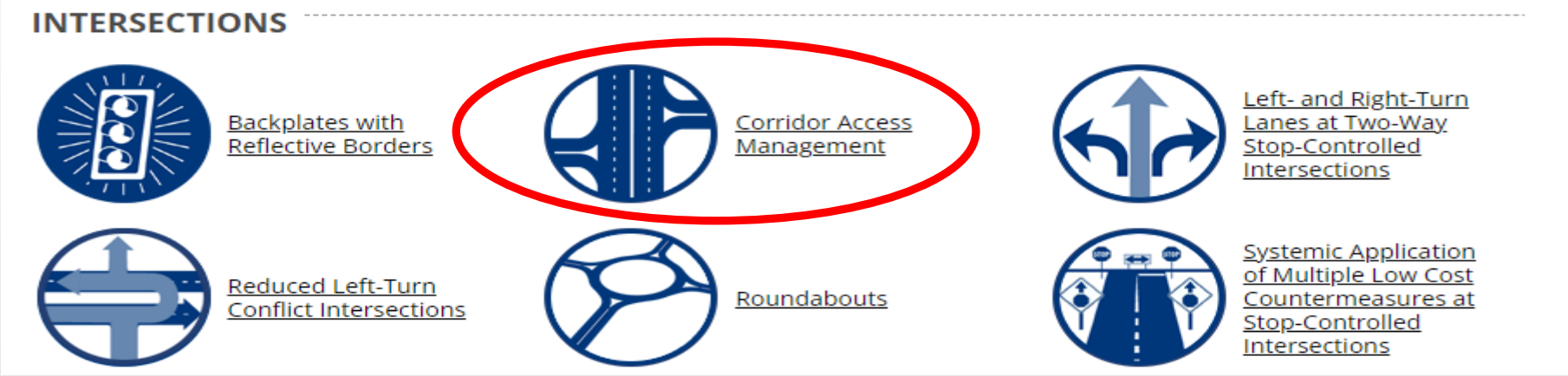
Reflective Backplates



Now Standard

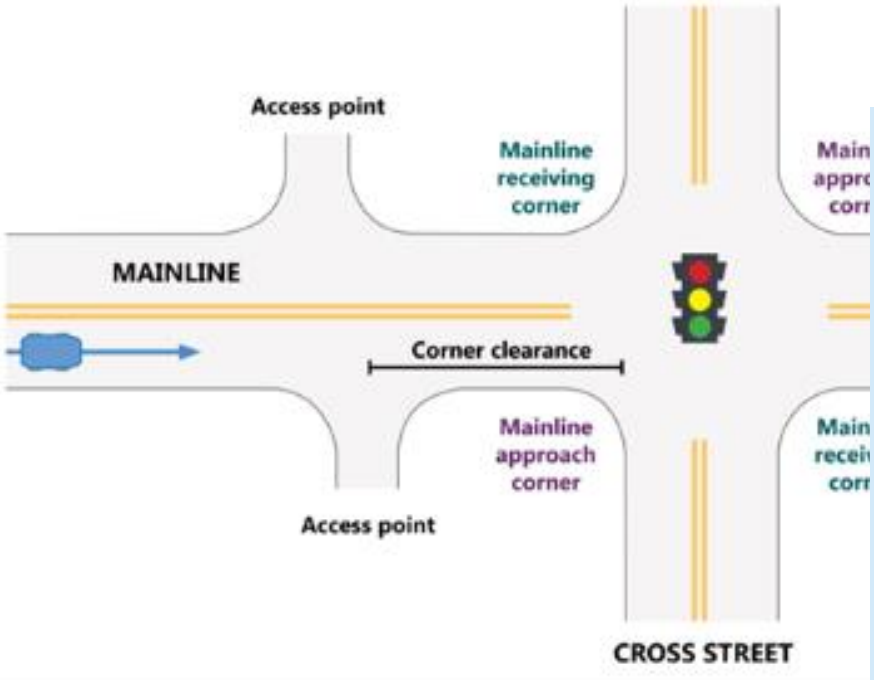
Intersection Crashes

Corridor Access Management



Select Corridors

Throughout the State



Schematic of an intersection and adjacent access points. Source: FHWA

Reducing driveway density

5-23%

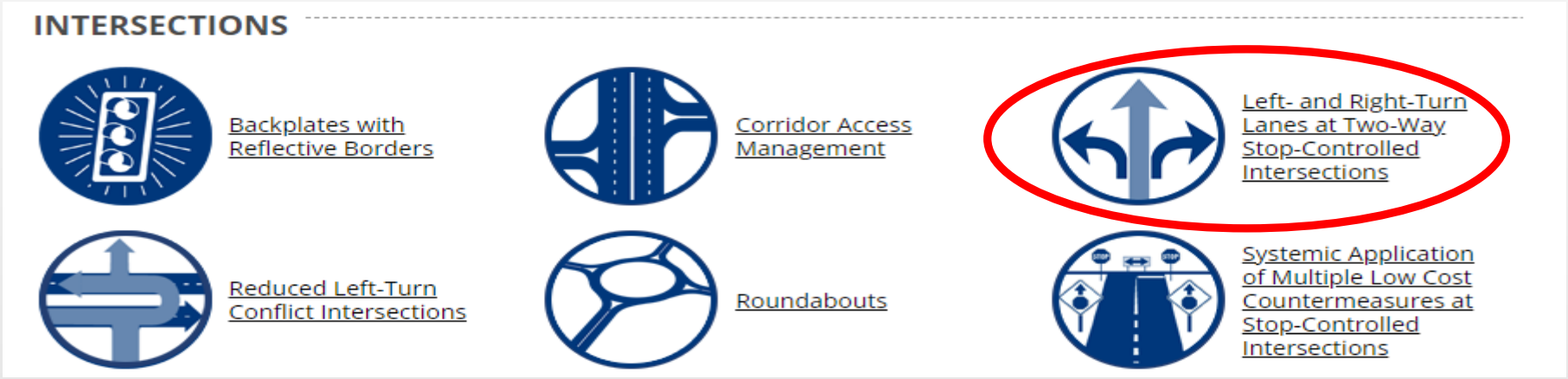
reduction in total crashes along 2-lane rural roads.[3]

25-31%

reduction in fatal and injury crashes along urban/suburban arterials.[4]

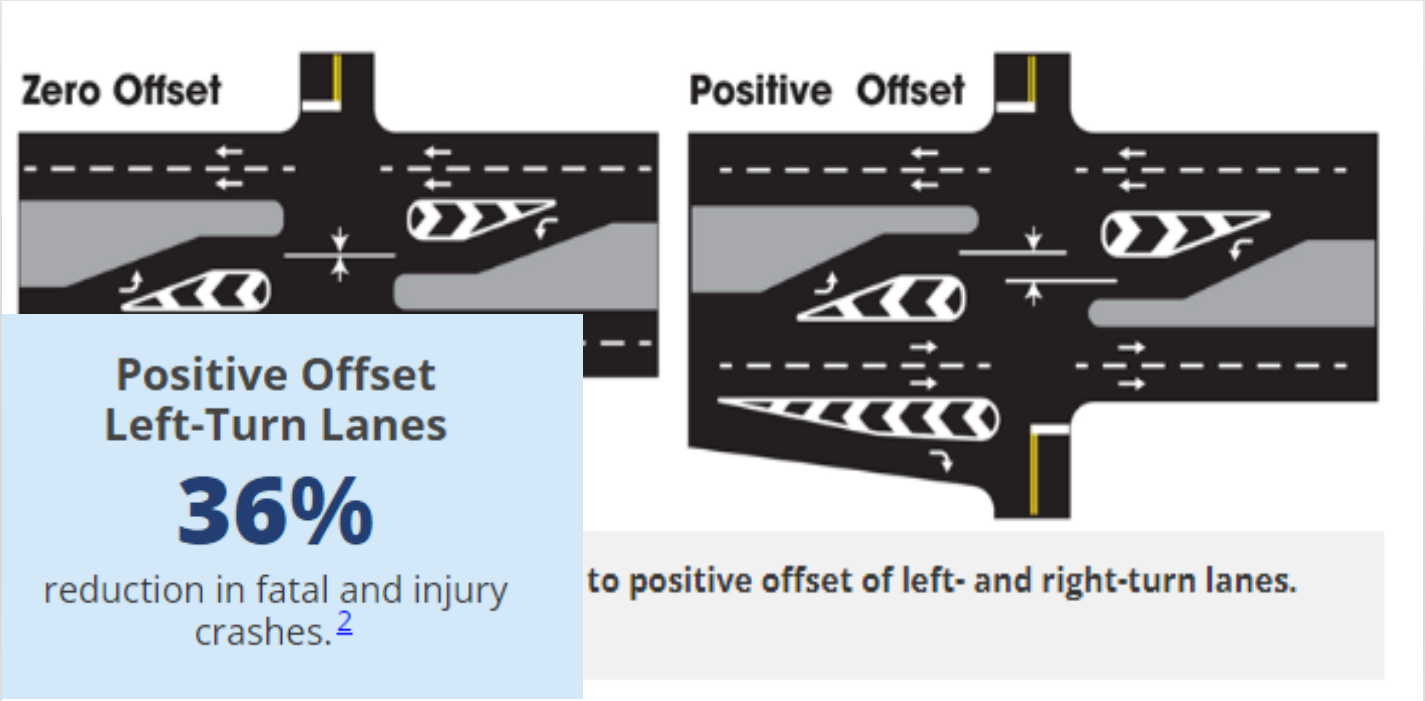
Intersection Crashes

Dedicated Left and Right Turn Lanes



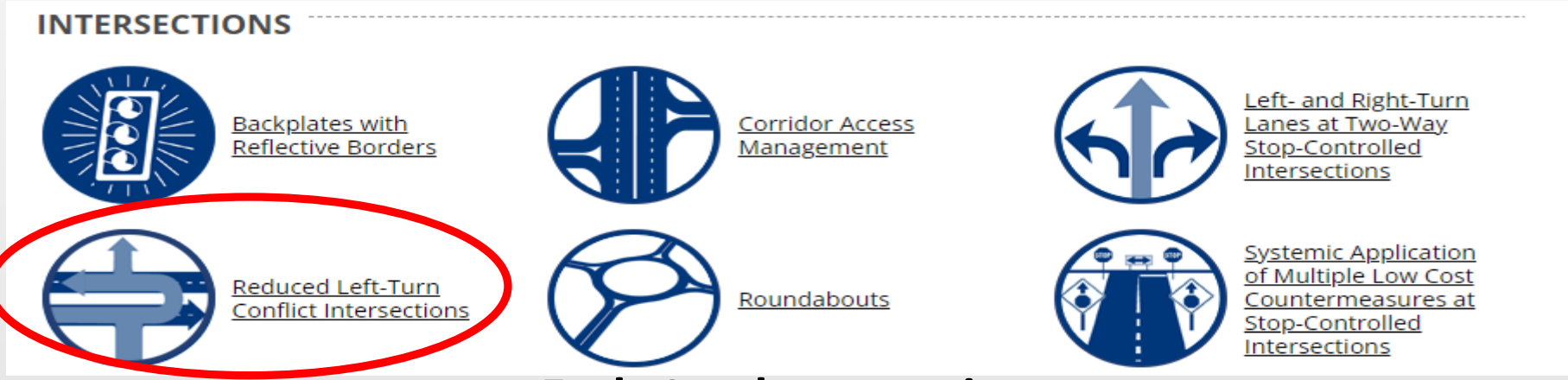
Select Intersections

Throughout the State



Intersection Crashes

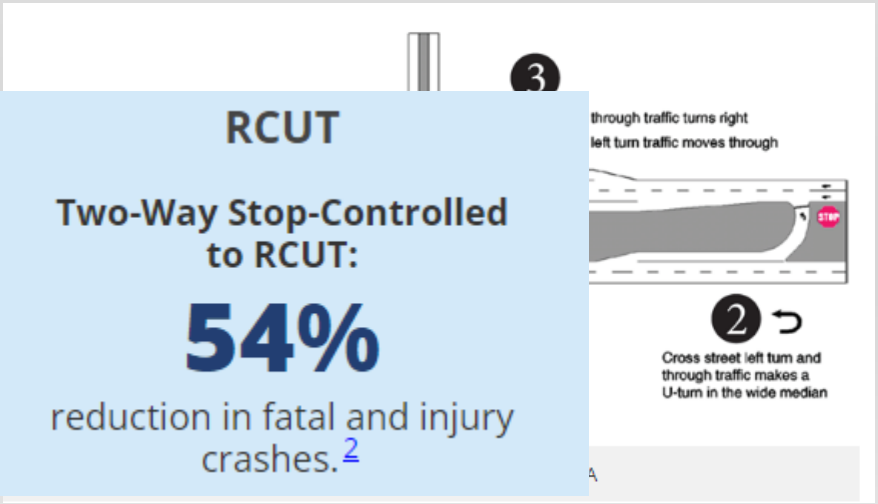
Reduced Left-Turn Conflict Intersections



Early Implementation

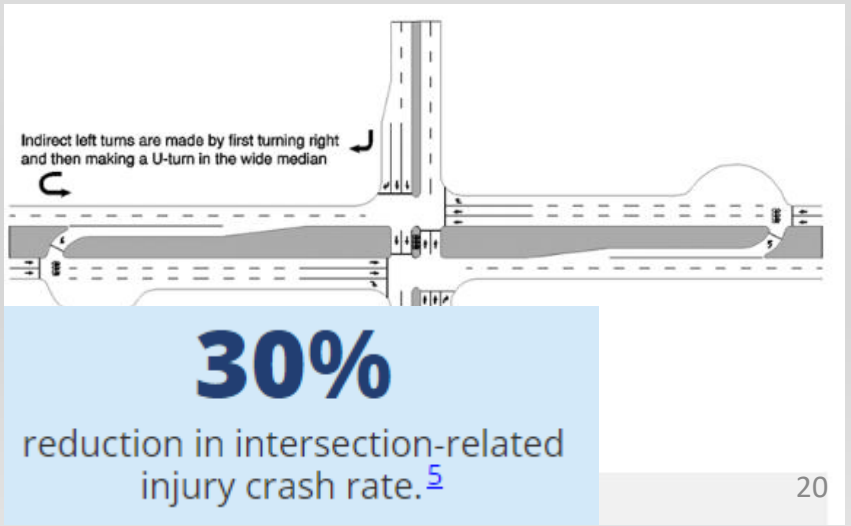
Restricted Crossing U-turn:

Minor road traffic turns right followed by a U-turn at a designated location



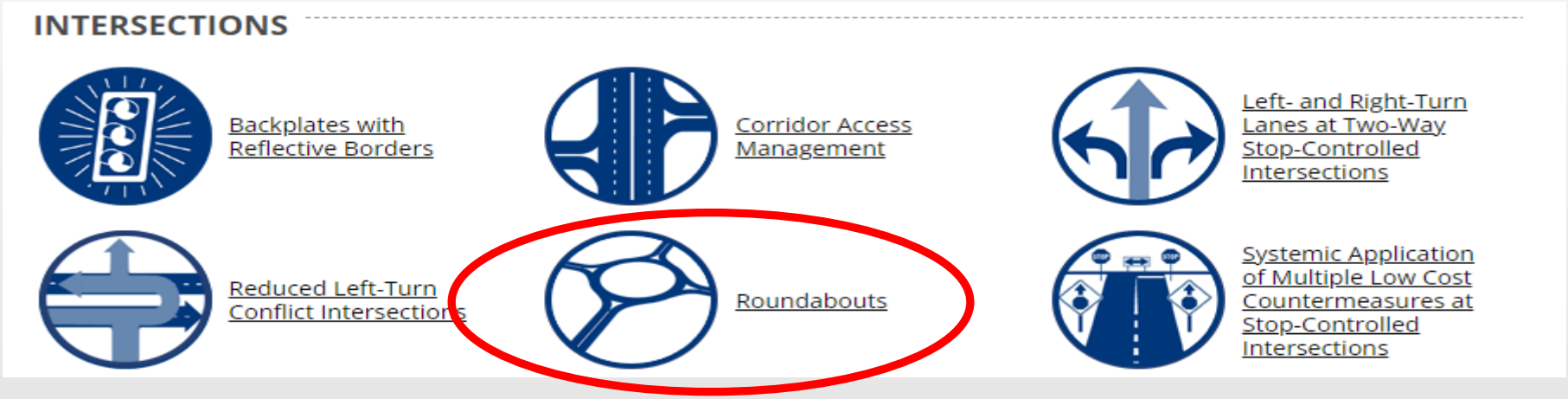
Median U-turn:

Minor road traffic turns right followed by a U-turn at a designated location

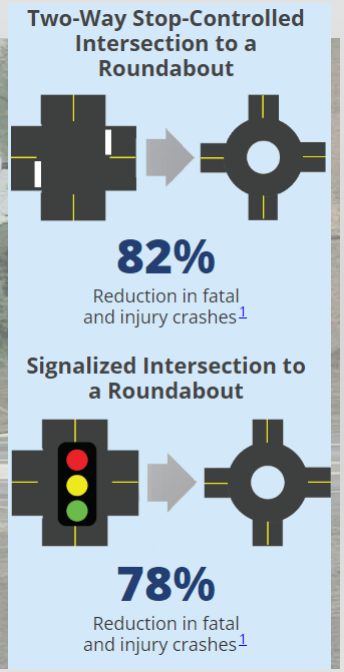


Intersection Crashes

Roundabouts



Select Locations Throughout State

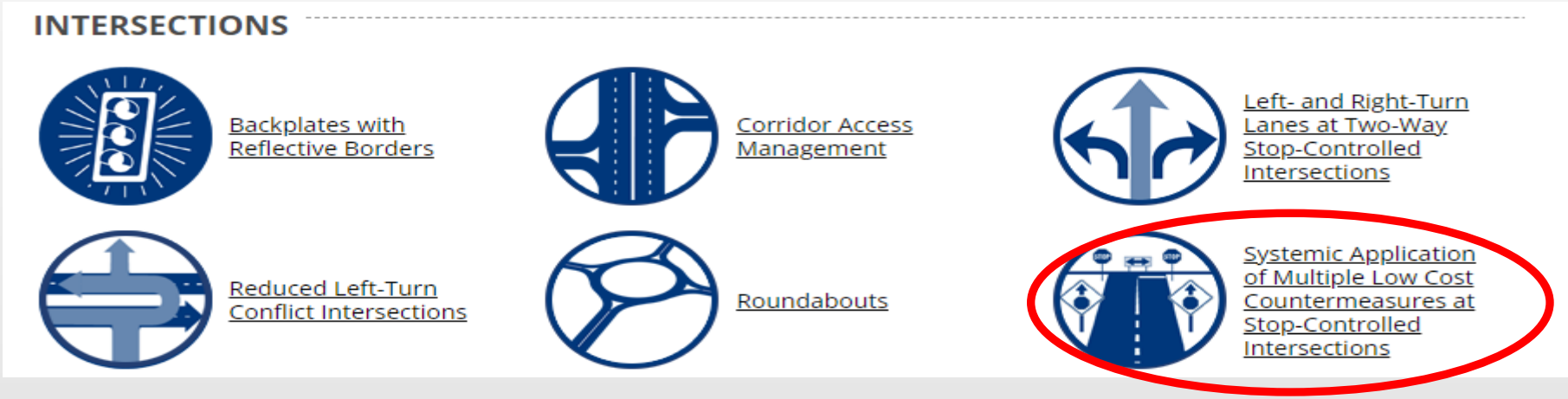


Canyon Ferry & Lake Helena

- **10 years Before** – 2 Fatal Crashes, 15 injury crashes, 31 total crashes.
- **10 years After** – No fatal crashes, 2 injury crashes, 23 total crashes.

Intersection Crashes

Low-Cost Countermeasures at Stop-Control Intersections



Individual Locations and Future Systemic Application

10%
reduction of fatal and injury crashes at all locations/types/areas.

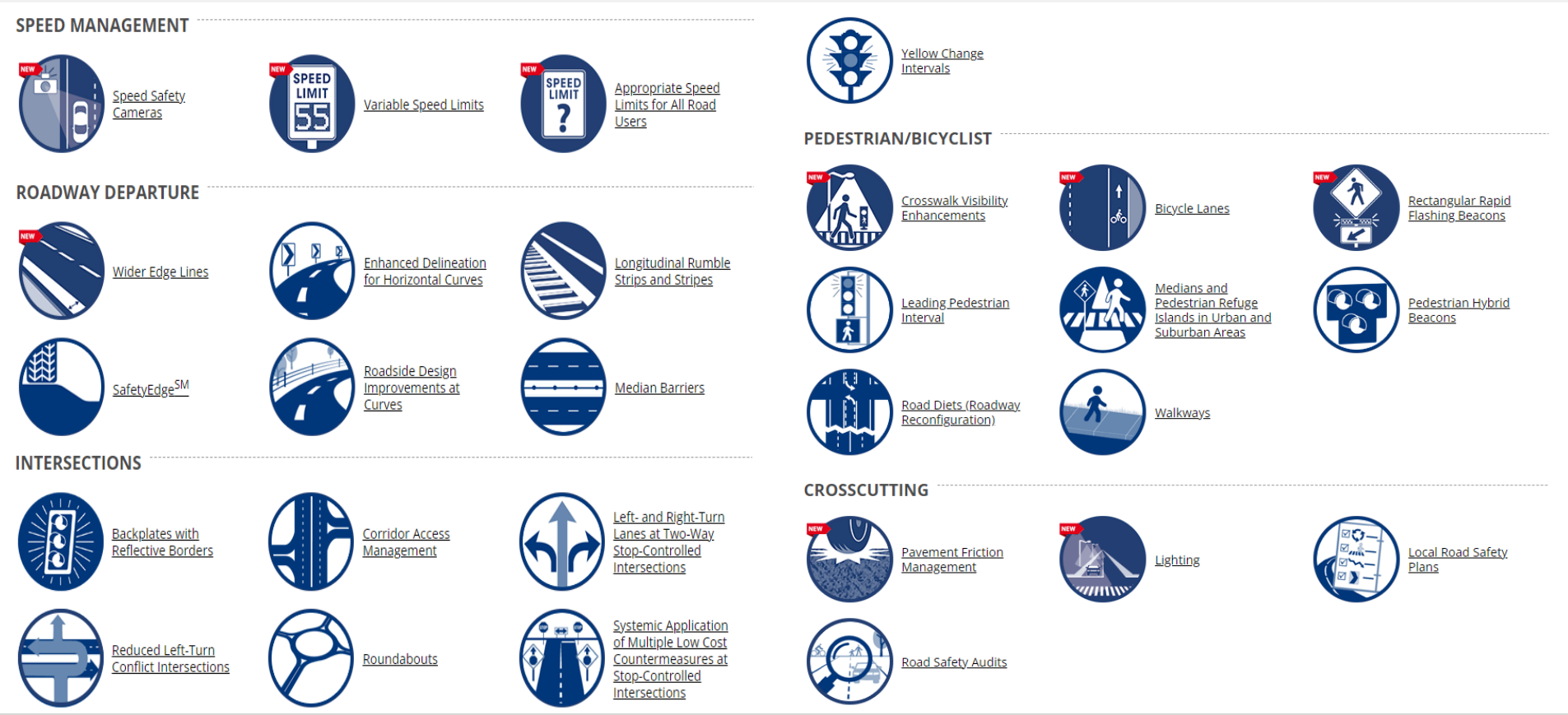
15%
reduction of nighttime crashes at all locations/types/areas.

27%
reduction of fatal and injury crashes at rural intersections.

19%
reduction of fatal and injury crashes at 2-lane by 2-lane intersections.

FHWA Basic Package for Intersections (Left) and MDT Double Arrow Sign (Right)

FHWA's Proven Safety Countermeasures Initiative



28 PSC in All

https://safety.fhwa.dot.gov/provencountermeasures/

Safety Countermeasures, Best Practices and Safety Research Recap

- Target Specific Crashes (Reactive)
- Develop Standards (Proactive)
- Analyze Results for Continuous Improvement

MT-Specific Before and After Data

Agree w/ National Stats

Safety Countermeasures, Best Practices and Safety Research

Questions?

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zero serious injuries

VISION ZERO