DELAWARE STRATEGIC HIGHWAY SAFETY PLAN: TOWARD ZERO DEATHS

Median Barrier Program

Tuesday, July 31, 2018
Newark Senior Center

Agenda

- Strategic Highway Safety Plan Overview
- Emphasis Areas
- Median Barrier Program
- Other Roadway Departure Countermeasures
- Next Steps

Strategic Highway Safety Plan (SHSP) Overview

What is an SHSP?

- Comprehensive transportation safety plan with a goal of reducing highway fatalities and serious injuries on all public roads

- Establishes consistent statewide goals, objectives, emphasis areas, priorities, and countermeasures with stakeholders and other transportation plans

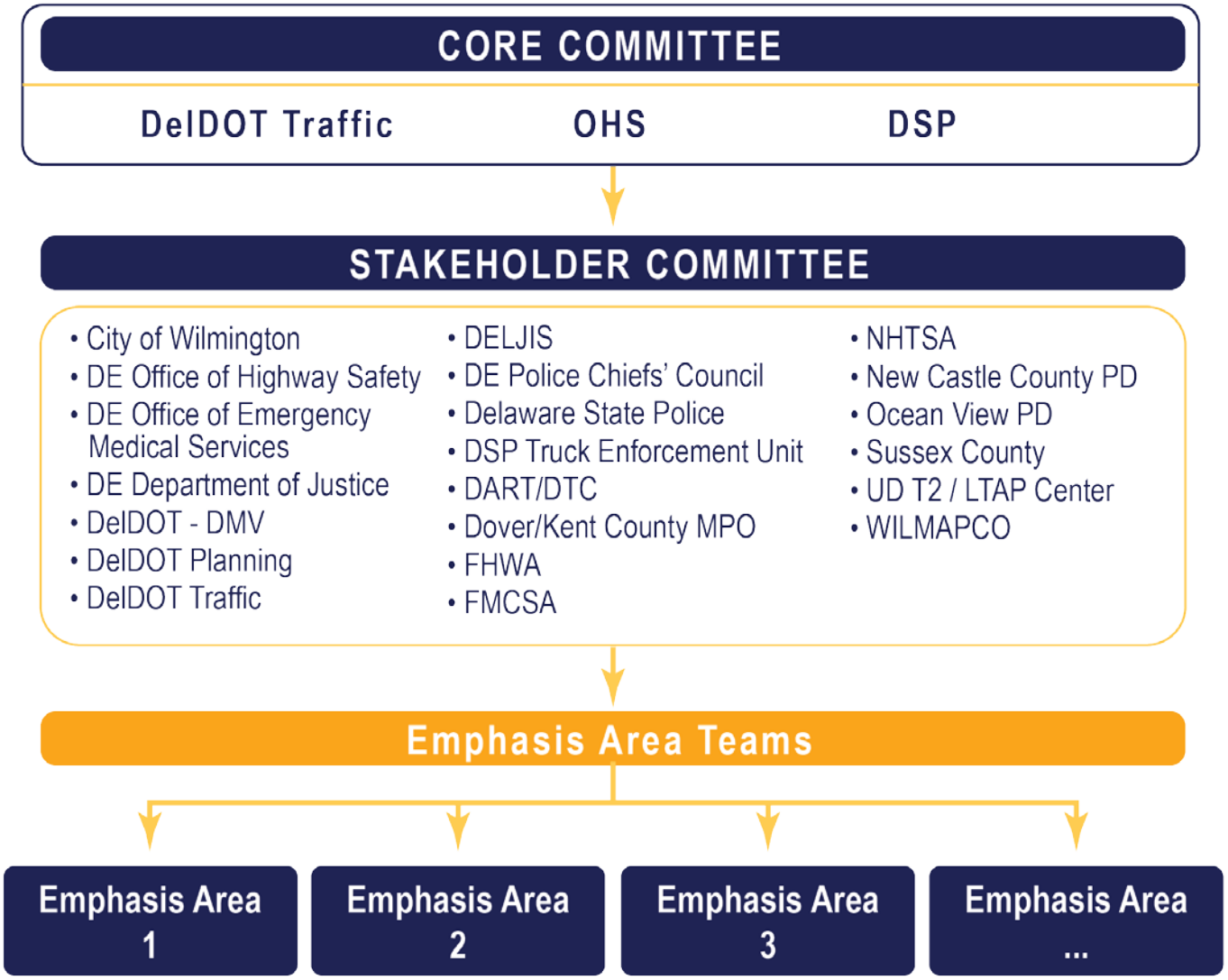
- Makes effective use of State, regional, and local crash data and determines priorities based on crash data

- Addresses engineering, management, operation, education, enforcement, and EMS

Key Federal Requirements

- SHSP must be evaluated and updated regularly (full updates at least every 5 years)
- States must develop the SHSP in consultation with the stakeholders
- To identify safety problems and priorities, States should analyze crash (both fatalities and serious injuries), roadway, and traffic data
- Coordinate SHSP with other transportation and safety plans
- States must set performance-based goals

Stakeholder Involvement



2015 SHSP Mission & Overall Goal Statements

MISSION

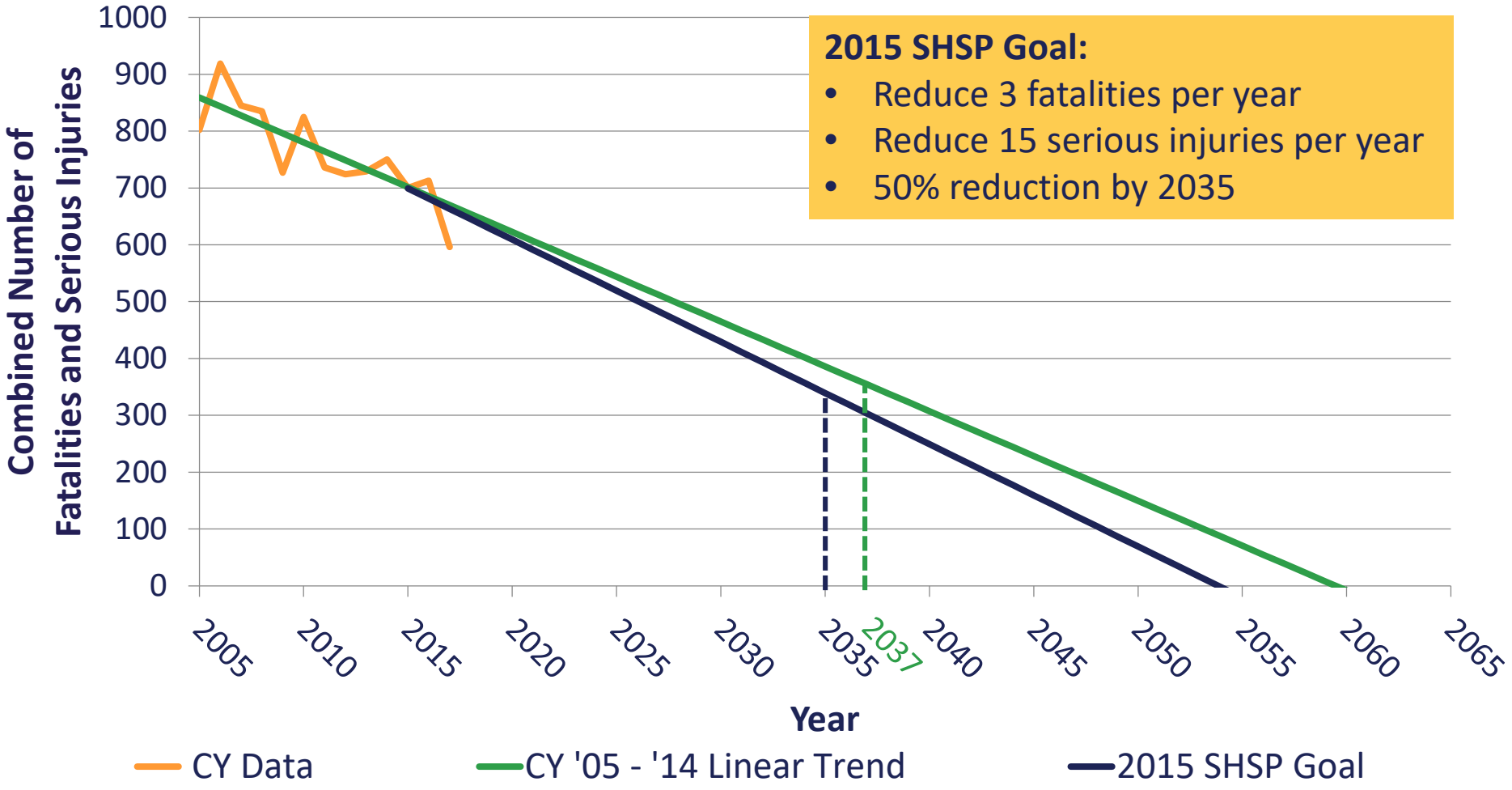
The *Delaware Strategic Highway Safety Plan: Toward Zero Deaths* aims to eliminate fatalities and serious injuries on Delaware's roadways through a multi-agency approach that utilizes education, enforcement, engineering and emergency medical service strategies.

OVERALL GOAL

The goal of the *Delaware Strategic Highway Safety Plan: Toward Zero Deaths* is to achieve a reduction of at least 3 fatalities and 15 serious injuries annually and continue to reduce the total number of fatalities and serious injuries to achieve at least a 50 percent reduction by 2035.

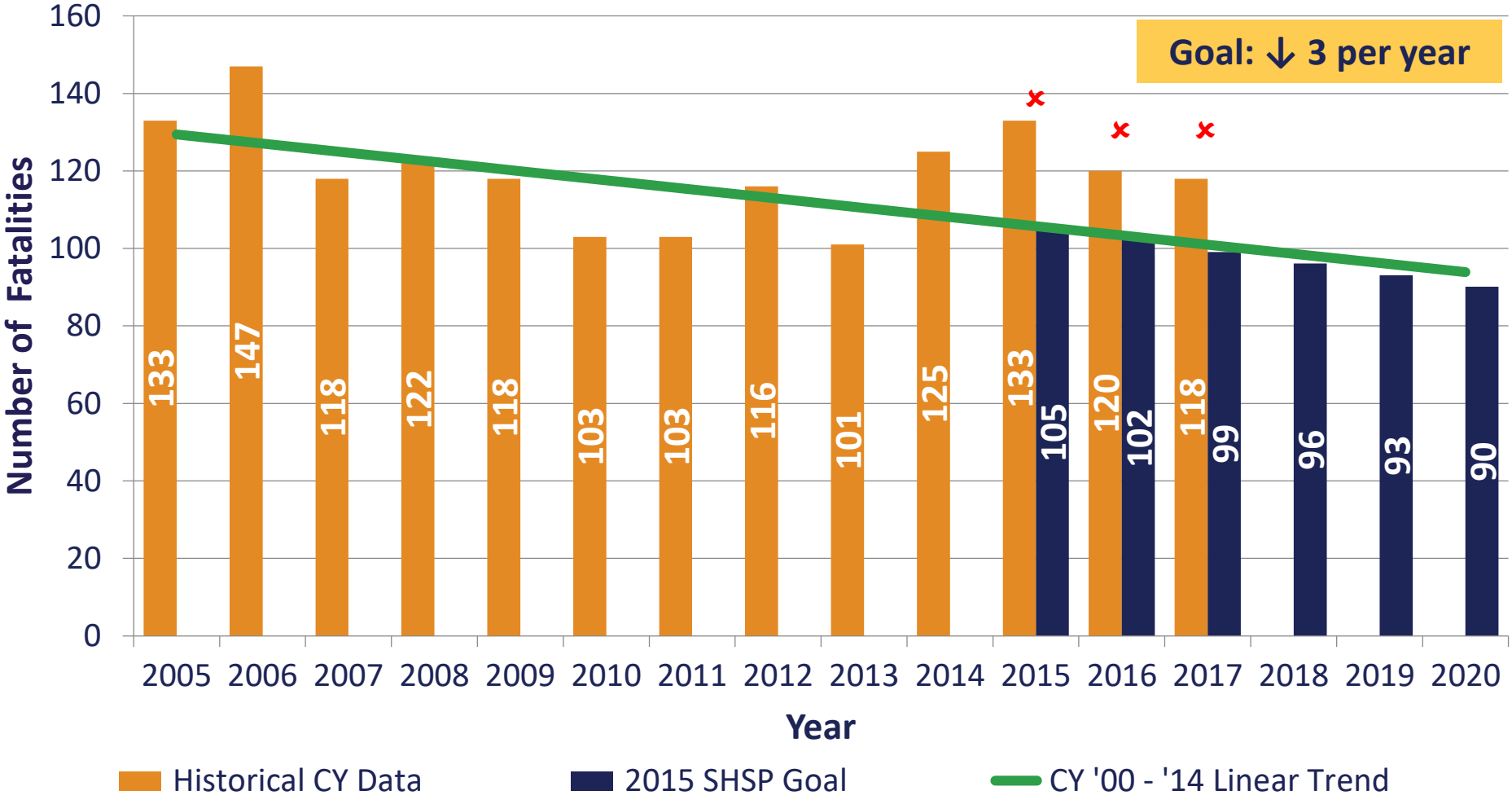
2015 SHSP Overall Goal

(Combined Fatalities & Serious Injuries)



Source: CARS (2017 data is preliminary)

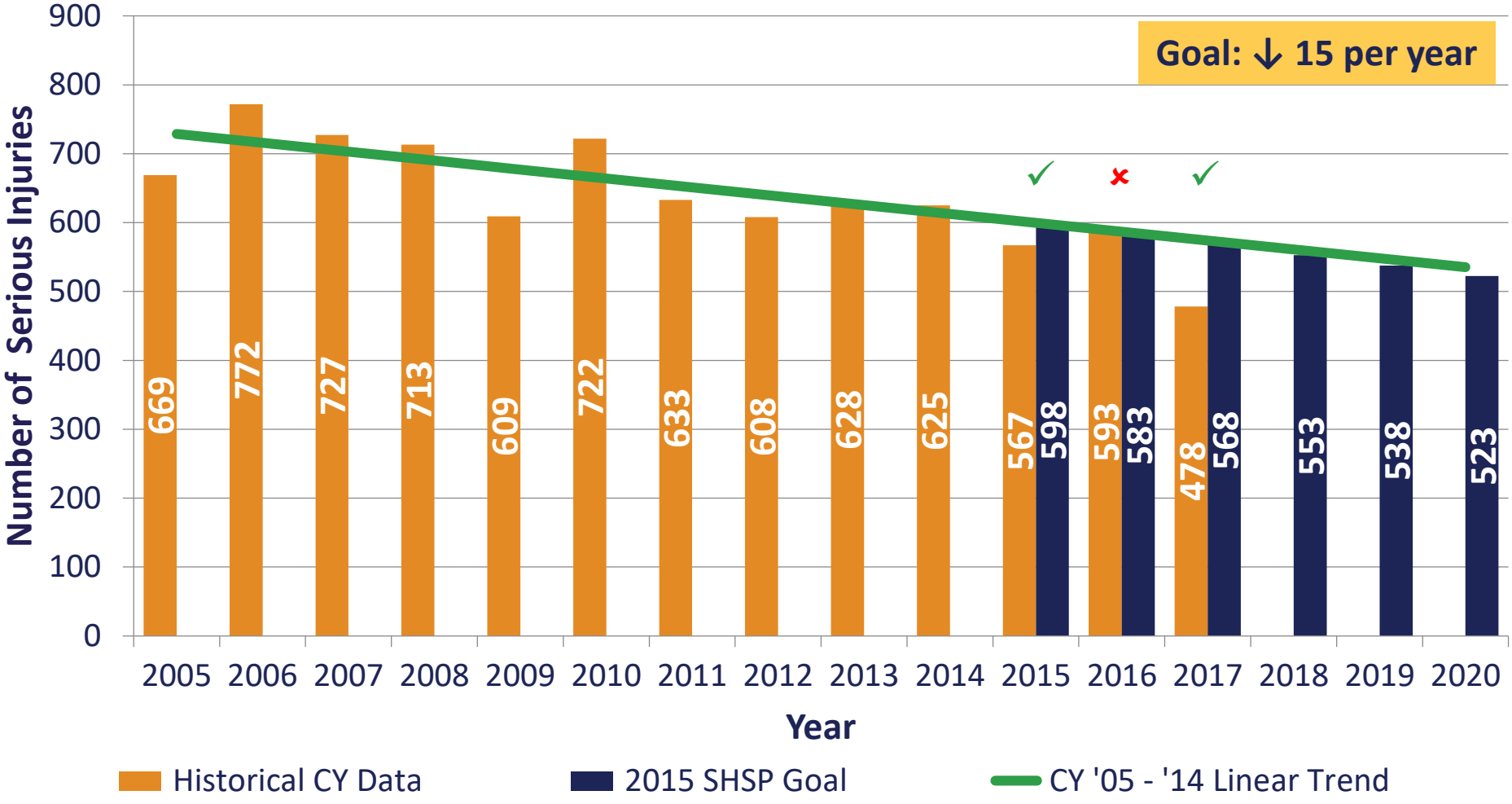
Number of Fatalities



Source: CARS (2017 data is preliminary)

✓ Goal Met × Goal Not Met

Number of Serious Injuries



Source: CARS (2017 data is preliminary)

✓ Goal Met ✗ Goal Not Met

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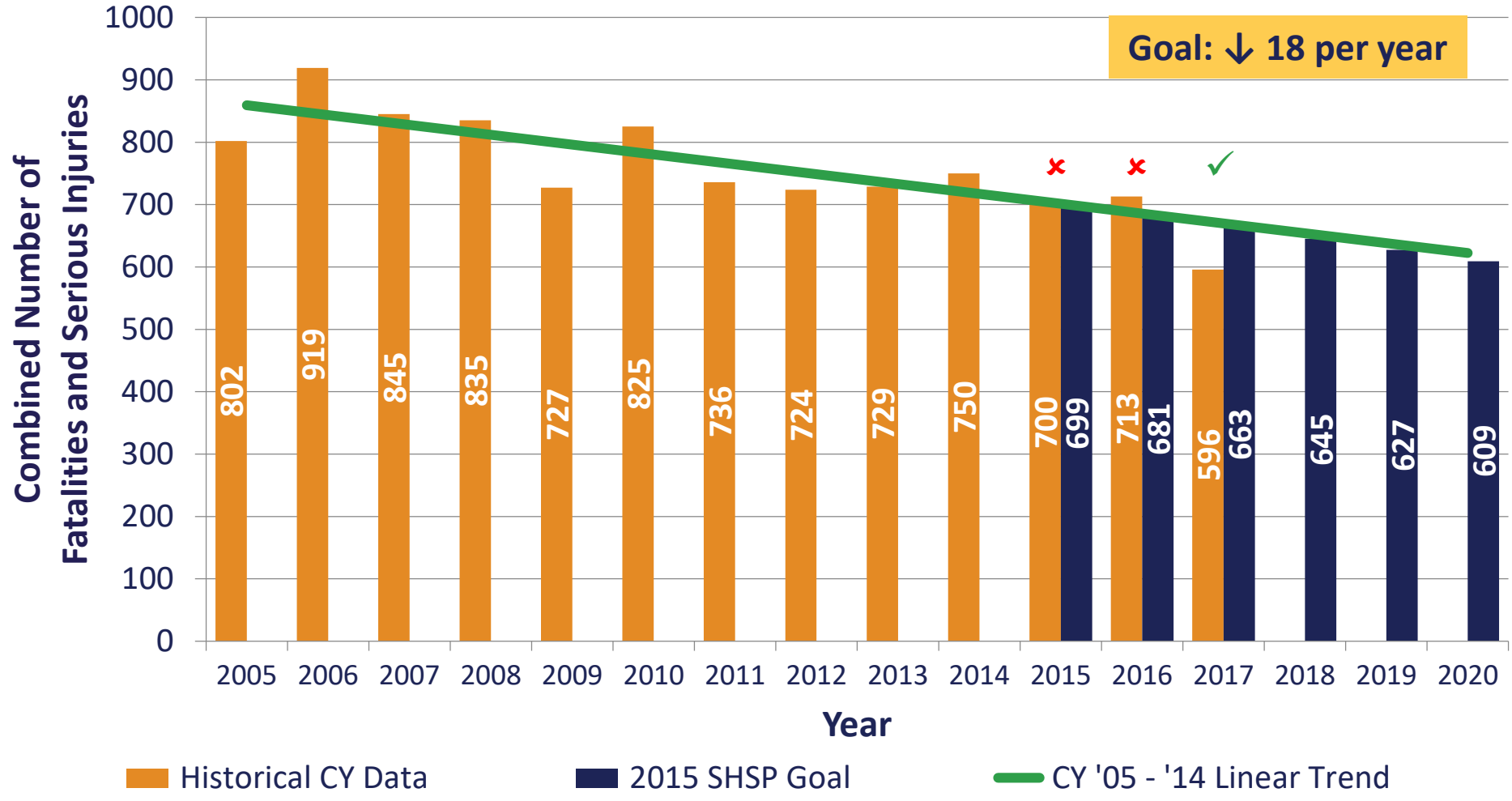


Source: CARS

✓ Goal Met × Goal Not Met

2018 Fatalities

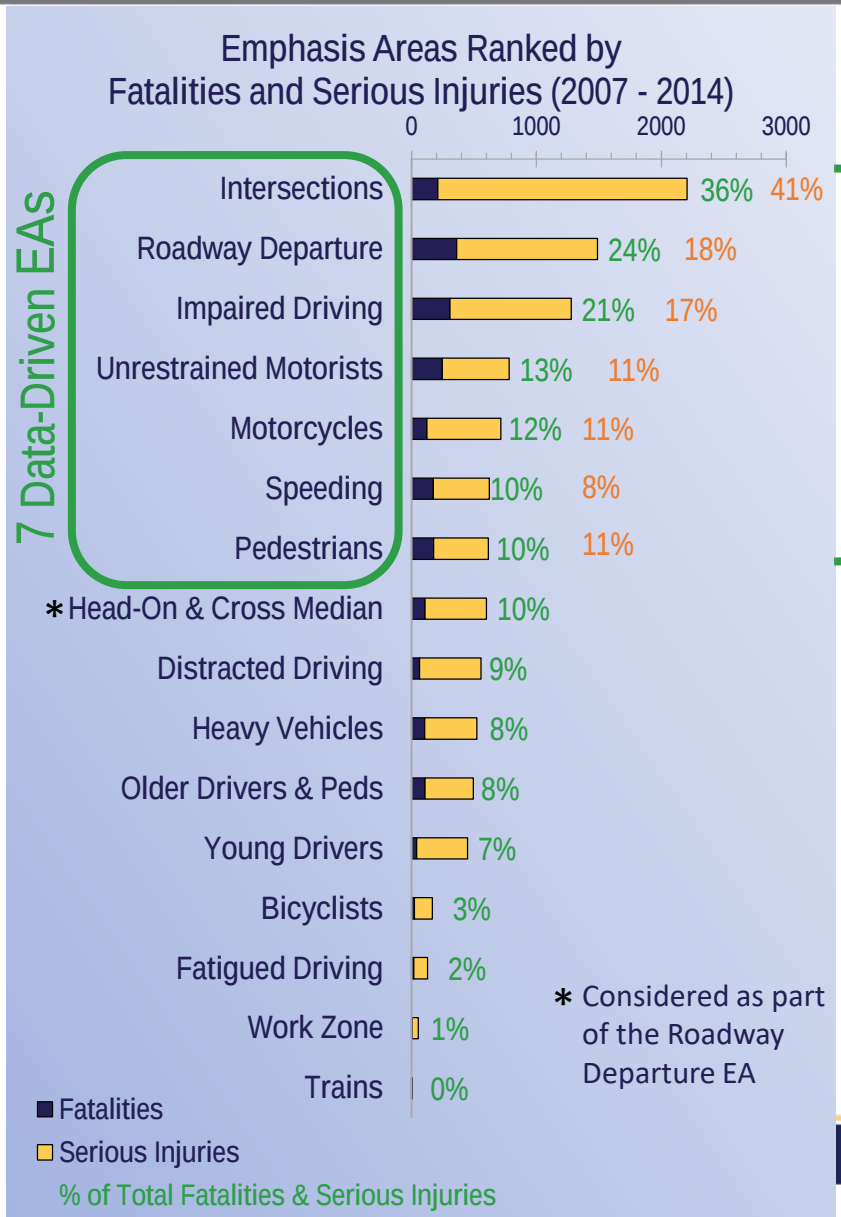
(as of July 24, 2018)

	2017	2018	2018 - 2017
Total Fatalities	**49**	**62**	**+13 (+27%)**
Person Type			
Vehicle Occupants	24	39	+15 (+63%)
Seat Belts Worn	9	17	+8 (+89%)
Seat Belts Not Used	14	19	+5 (+36%)
Seat Belt Use Unknown	1	3	+2 (n/a)
Motorcyclists	7	7	0 (0%)
Pedestrians	15	13	-2 (-13%)
Bicyclists	3	3	0 (0%)
Crash Involvement			
Alcohol/Drug Related	29	10	-19 (-66%)
Roadway Departure	17	27	+10 (+59%)
Work Zones	0	3	+3 (n/a)

Source: OHS and DelDOT based on analysis of CARS and fatal crash notices;
Current year count is unofficial and could rise as fatal investigations are completed

Emphasis Areas

Delaware's 2015 SHSP Emphasis Areas (EA)

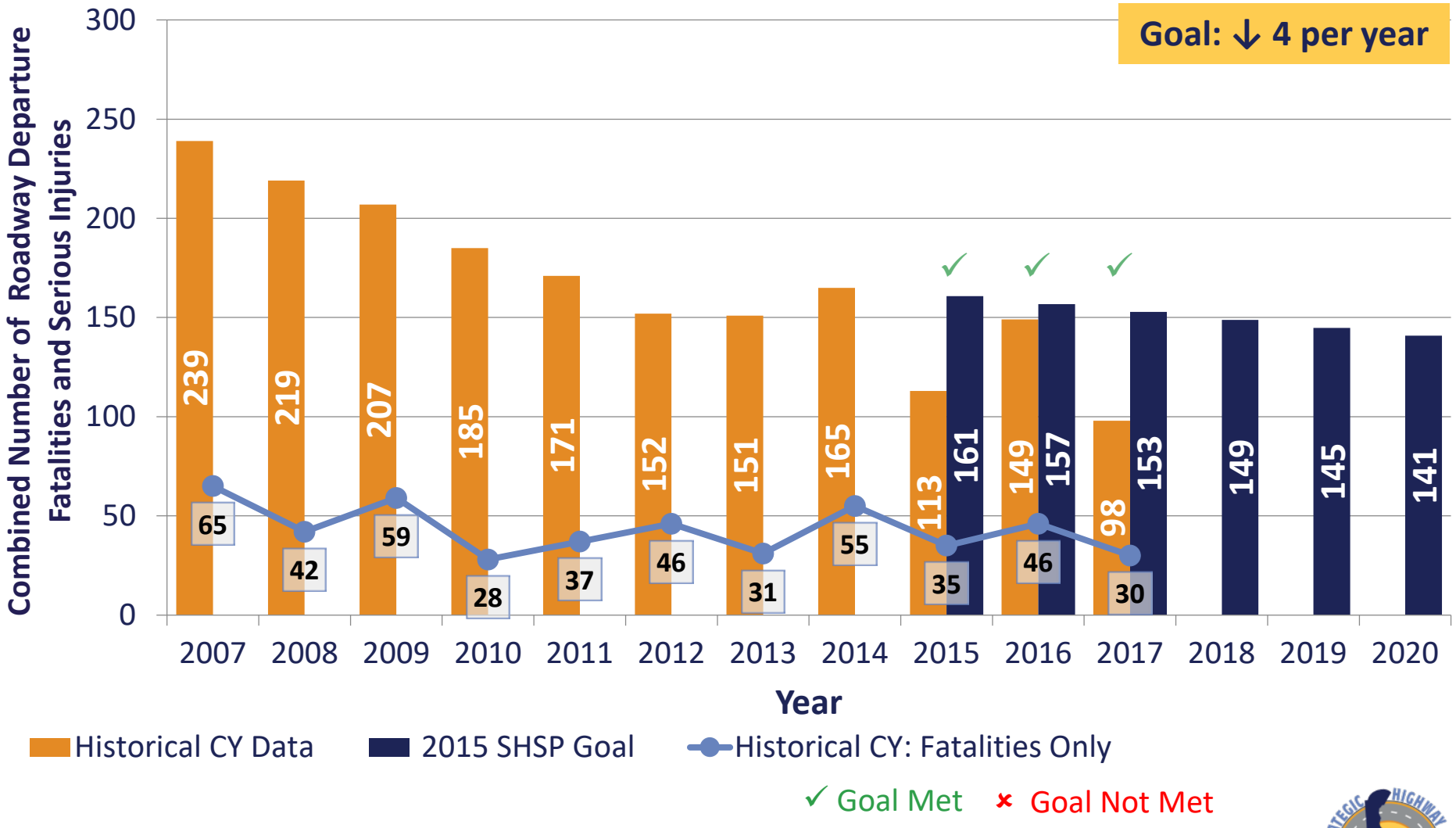


Account for
94% (91%) of fatalities and
81% (75%) of serious injuries

(2007 – 2014 data)
(2015 – 2017 data)

SHSP EA 2: Roadway Departure

(Combined Fatalities and Serious Injuries)



Source: CARS

SHSP EA 2: Roadway Departure

Data Trends of Fatal and Serious Injury Persons (2015-2017 Crashes)

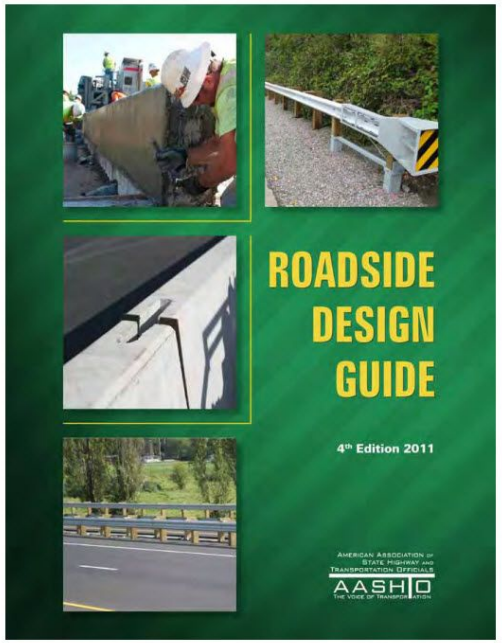
- 77% were single-vehicle crashes
- 68% were male
- 58% occurred along collector and local roadways
- 55% occurred in rural areas
- 43% occurred during dark, unlit conditions
- 37% involved impaired driving
- 36% occurred on a Saturday or Sunday
- 28% were 20 to 29 years old
- 27% were unrestrained motorists
- 19% occurred on wet/snowy/icy roadways
- 18% involved speeding
- 21% occurred between 12 AM and 3 AM
- 19% involved striking a tree(s)
- 6% were cross median crashes

Median Barrier Program

National Guidelines for Median Barrier

AASHTO Roadside Design Guide (2011) establishes guidelines to determine the need for median barrier on freeways based on average daily traffic (ADT) and median width

- Median width > 50 ft, barrier is optional
- Median width < 30 ft, barrier is recommended
- Median width between 30 and 50 feet, barrier should be considered
- ADT < 20,000, barrier is optional, regardless of median width



Median Barrier Program

- Median barrier existed along many freeway segments prior to inception of SHSP; the first high tension cable barrier installation was in 2009 along SR 1
- Prioritization Process
  - Assessment of potential locations for median barrier along freeway sections of SR 1 and I-95 was initiated in 2014
  - Considered all freeway segments that did not have existing or planned median barrier
  - Locations were ranked based on daily traffic volumes, horizontal curvature, and crash history from 2005 to 2013

Segment					Length[2] (mi)	Rank[3]
Road - Segment #	Begin Description	End Description	Begin MP	End MP		
I95 - 7	0.43 mile south of Harvey Road	0.1 mile south of Darley Drive	20.87	22.51	1.19	1
I95 - 9	0.12 mile south of SR 92/Naamans Road	DE/PA State Line	23.00	23.43	0.32	2
SR1 - 6	0.07 mile north of Black Diamond Road	0.37 mile north of US 13	3.93	5.67	1.49	3
I95 - 1	0.08 mile north of MD/DE State Line	0.06 mile south of Otts Chapel Road	0.08	0.41	0.27	4
SR1 - 1	0.87 mile south of SR 9	0.64 mile north of SR 9	13.66	15.18	1.37	5
I95 - 6	0.21 mile north of Shipley Road	0.08 mile south of Silverside Road	18.72	20.31	1.00	6
I95 - 4	0.14 mile south of SR 273	0.11 mile south of SR 273	6.49	6.52	0.03	7
SR1 - 2	0.26 mile south of S. Bay Road	0.08 mile south of White Oak Road	17.80	20.55	2.06	8
SR1 - 8	0.08 mile north of Pine Tree Road	HTCB terminus located south of SR 299	8.18	11.28	2.54	9
SR1 - 4	Bridge east of Garrisons Lake	0.21 mile north of SR 6/E. Commerce Street (i.e., Kent/New Castle County Line)	27.10	31.77	4.14	10
I95 - 5	0.34 mile south of Talley Road	0.16 mile south of Talley Road	17.68	17.86	0.08	11
SR1 - 3	0.15 mile north of Leipsic Road	Bridge east of Garrisons Lake	22.47	26.87	3.98	12
I95 - 8	0.09 mile north of Darley Drive	0.19 mile north of Darley Drive	22.71	22.81	0.10	13
SR1 - 5	0.5 mile north of SR 6/E. Commerce Street (i.e., Kent/New Castle County Line)	0.06 mile south of Black Diamond Road	0.20	3.80	3.34	14
I95 - 2	0.45 mile north of SR 72	Salem Church Road	3.56	5.06	1.33	T15
SR1 - 7	0.58 mile north of US 13	0.08 mile south of Pine Tree Road	5.88	8.02	1.97	T15
I95 - 3	0.42 mile south of SR 273	0.36 mile south of SR 273	6.21	6.27	0.06	17
		TOTAL LENGTH			25.27	

Median Barrier Options

- Concrete barrier (rigid)
  - ✓ Less maintenance required when struck
  - ✓ Can be used in very narrow medians
  - × Least forgiving upon impact
  - × Most expensive to install


Concrete barrier

- Steel guardrail (semi-rigid)
  - ✓ Less expensive to install compared to concrete barrier
  - × More expensive to install compared to cable barrier
  - ✓ More forgiving upon impact compared to concrete barrier
  - × Less forgiving upon impact compared to cable barrier
  - ✓ Can be used in narrow medians and for protection of fixed objects


Steel guardrail

- High tension cable barrier (HTCB)
  - ✓ Less expensive to install than steel guardrail (typically)
  - ✓ More forgiving upon impact (reducing the potential for injury or fatality)
  - ✓ Easier to maintain compared to steel guardrail and concrete barrier
  - × Used in wider medians due to the greater deflection on impact; not typically used for protection of fixed objects


HTCB

Concrete Barrier Crash Testing

Steel Guardrail Crash Testing

HTCB Crash Testing

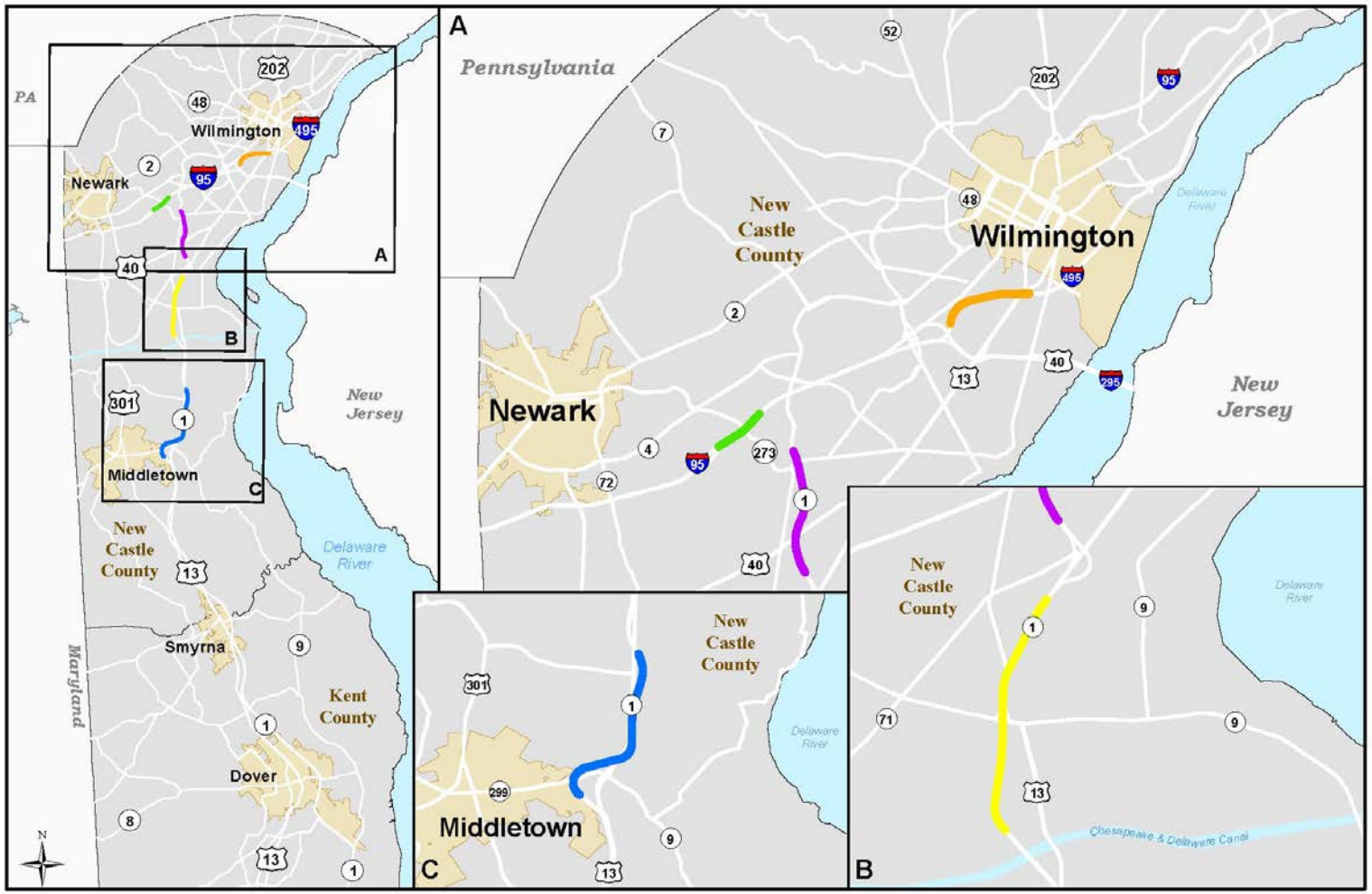
Median Barrier Implementation

- Median barrier installations since 2009:
  - SR 1 – 4.2 miles of HTCB from SR 299 to SR 896 *(2009)*
  - SR 1 – 2.9 miles of steel guardrail from north of Tybouts Corner to north of SR 273 *(2009/2010)*
  - I-495 – 0.85 miles of HTCB from I-95 to US 13 *(2013)*
  - SR 1 – 2.3 miles of HTCB from Roth Bridge to US 13 *(2014)*
  - I-95 – 1.2 miles of steel guardrail from north of Rest Area to north of SR 273 *(2017)*

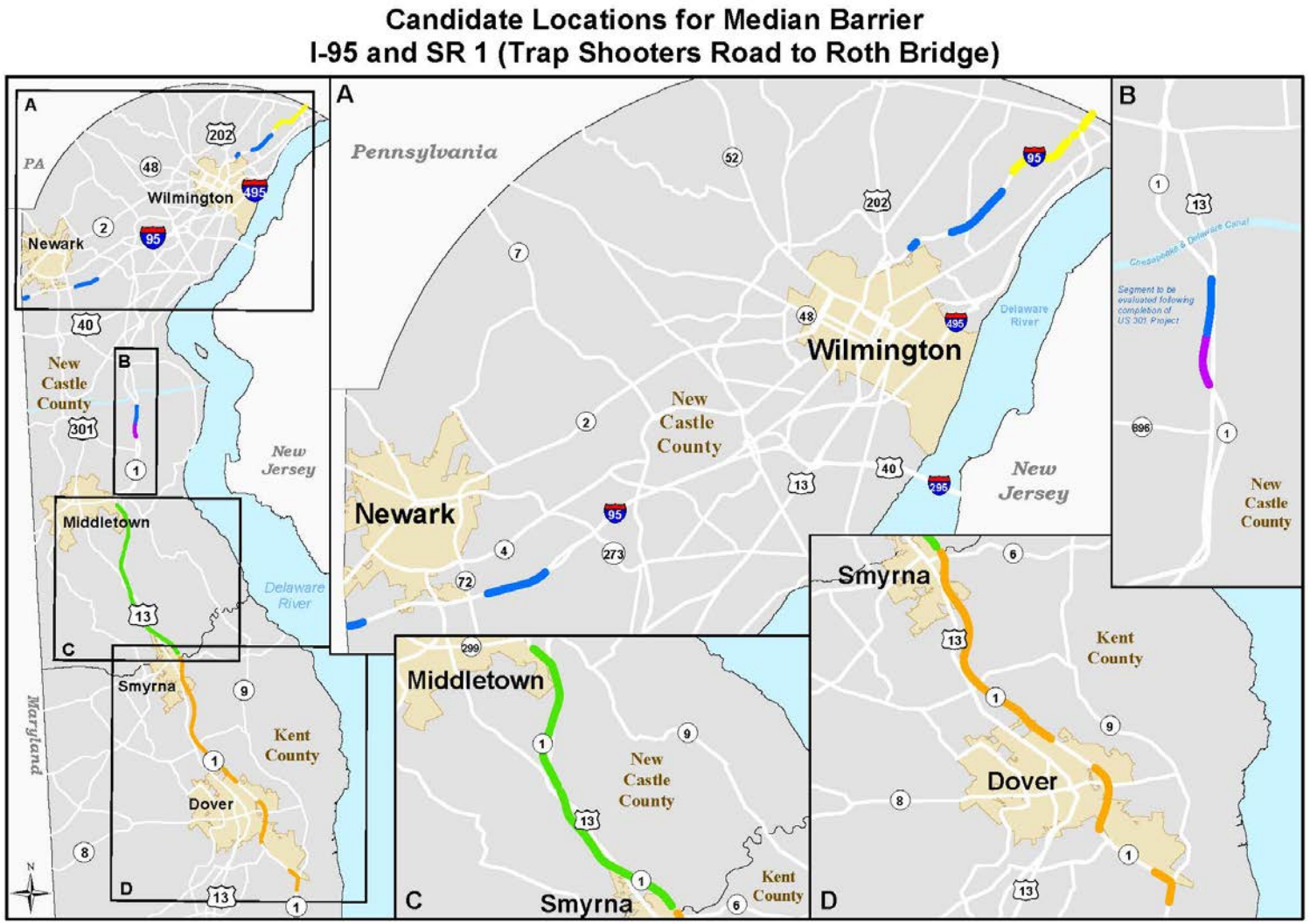
- Additional median barrier design underway/planned:
  - I-95 – Approx. 2.5 miles from ½ mile south of Harvey Rd to the PA State Line
  - SR 1 – Approx. 12 miles from south of SR 9 to south of Smyrna
  - SR 1 – Approx. 11.5 miles from Smyrna to Odessa
  - SR 1 – Approx. 1 mile from north of SR 896 to south of Biddles Toll Plaza
  - Installations will be primarily HTCB with small sections of steel guardrail
  - Construction will occur in segments under on-call contract

Implementation to Date

DelDOT Freeway Median Barrier Installations since 2009



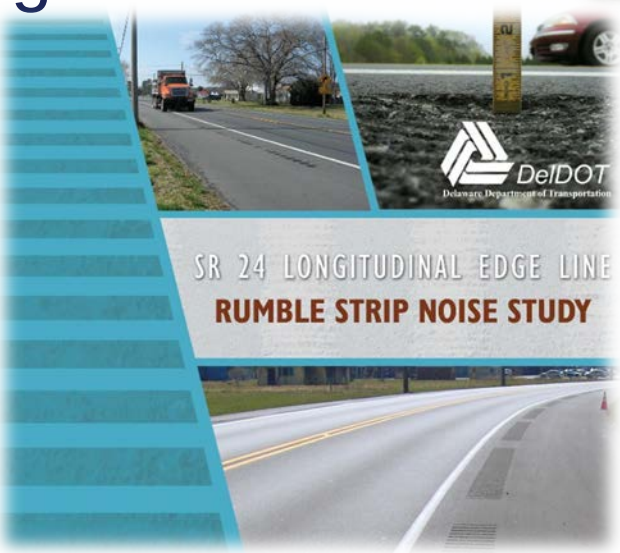
Planned Implementation



Other Roadway Departure Countermeasures

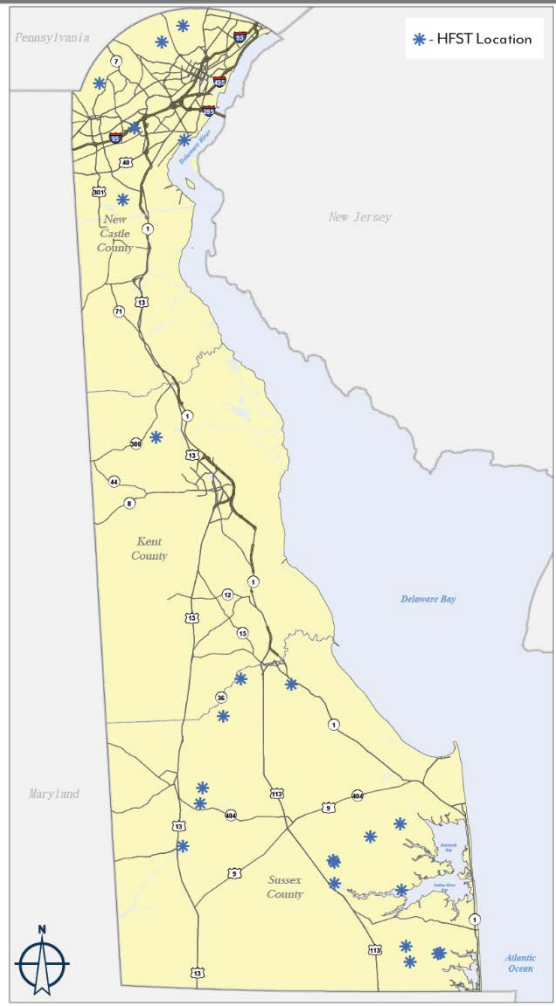
Rumble Strips

- Rumble Strip Open-End Contract:
  - 223 miles of center line installed
  - 133 miles of edge line installed
- Upcoming testing of new, quieter rumble strip design



High Friction Surface Treatments (HFST)

- Candidate locations identified using data-driven process and screening based on several factors
- After testing, 34,500 SF was installed at over 25 locations (thru 2017)
- Before/after evaluation
  - Reduced wet-weather crashes per year by 55%
  - Reduced total crashes per year by 21%
  - Reduced roadway departure crashes by 56%
- DelDOT is currently evaluating the durability of the locations with HFST and pending those findings, will award a new open-end contract for installation



National Roadway Safety Award for Infrastructure and Operational Improvements Award Winner

Other Roadway Departure Initiatives

- Horizontal Curve Safety Project (ongoing)
  - Arterial and collector roadways with greater than 1,000 daily traffic volume
  - 3,400 locations statewide
- Investigating feasibility/benefits of increasing yellow centerline width to 10” within curves (pilot will be implemented at a speed transition area)
- DelDOT working with utility companies to relocate and/or improve delineation of utility poles in locations with crash histories

Next Steps

Next Steps

- **Median Barrier Program**
  - Complete design and construct median barrier:
    - I-95 – ½ mile south of Harvey Rd to the PA State Line
    - SR 1 – Smyrna to Odessa
    - SR 1 – South of SR 9 to south of Smyrna
    - SR 1 – North of SR 896 to south of Biddles Toll Plaza
  - Begin design of median barrier at remaining locations along I-95
- **Strategic Highway Safety Plan**
  - Continue to implement roadway departure countermeasures
  - Spring 2019: SHSP Core Agencies (DelDOT, OHS, DSP) initiate 2020 SHSP development
  - Spring 2020: Crash data review
  - September 2020: Adopt 2020 SHSP

Thank You