

# Local Road Safety Plans Virtual Workshop



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Technical Services Manager, WSDOT Local Programs

February 8, 2023  
Virtual Workshop

**Roger Millar**

Secretary of Transportation



# Agenda

- 2023 County Safety Program Basics
- Safety Trends
- Local Road Safety Plans (7 steps)
- Resources
- Federal Safety Action Plans
- LRSP Step 1+ Exercise

## Local Road Safety Plan

A data-driven, risk-based analysis and prioritization of an agency's roadways.



# 2023 County Safety Program



- **Key Dates**

- Call for projects opened 11/16/22
- Applications due **3/15/23**
- Funding to be awarded summer 2023
- 100% funding for all phases authorized prior to 4/30/26

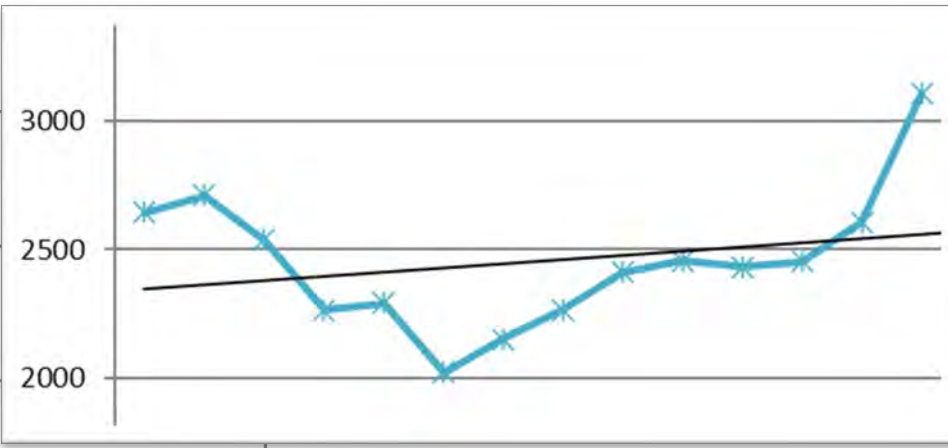
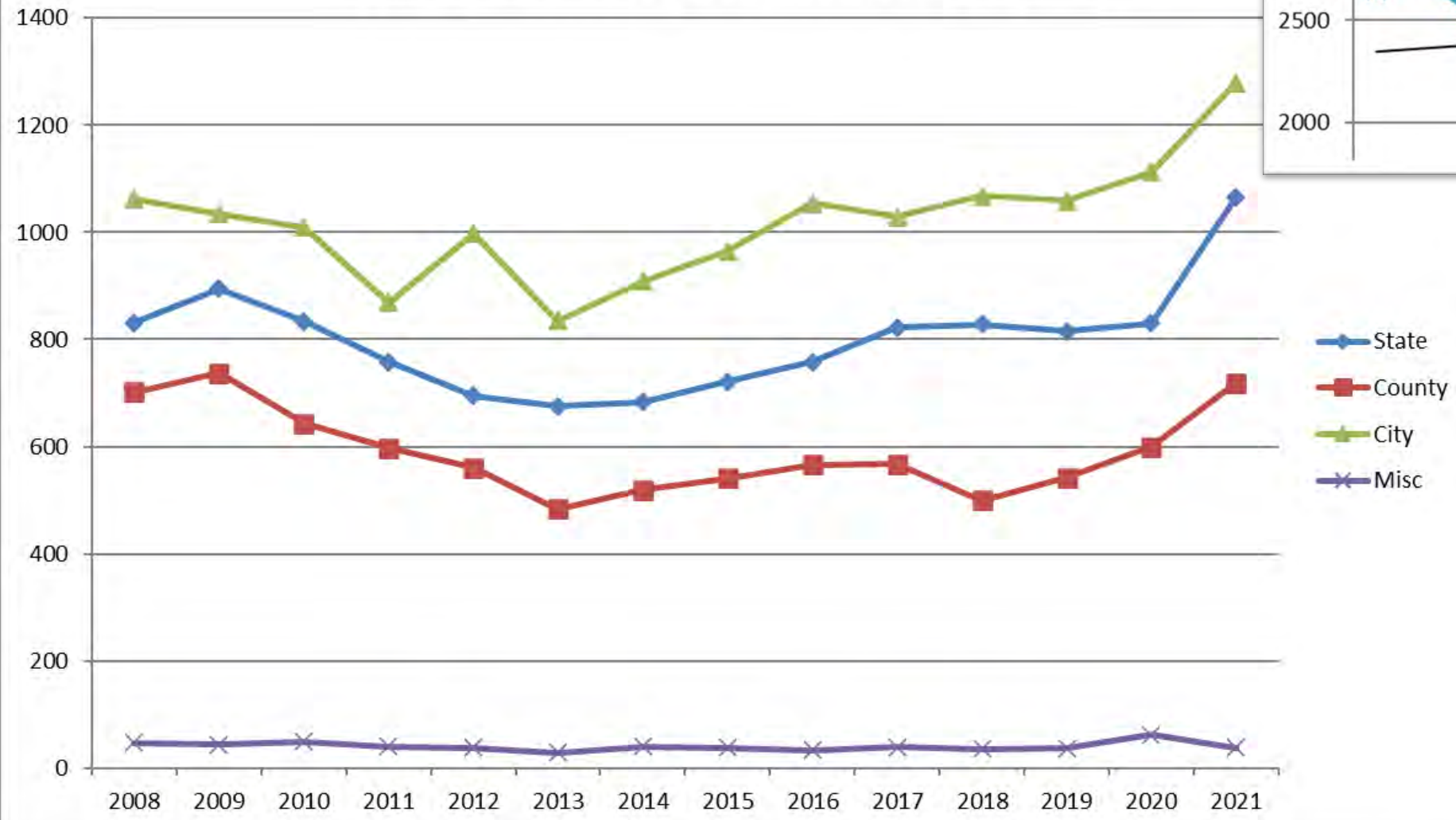
- **Estimated Funds: \$35 million** in federal Highway Safety Improvement Program (HSIP) funds and **\$4 million** in state Reducing Rural Roadway Departures funds

- **Call for Projects**

<https://wsdot.wa.gov/business-wsdot/support-local-programs/funding-programs/highway-safety-improvement-program/highway-safety-improvement-program-call-projects>

# Safety Trends

## Fatal / Suspected Serious Injury Crashes



In 2013 the number of fatalities was 436.

The 2022 *preliminary* number of fatalities is 745, the highest since 1990 (a 70% increase from 2013).

# Local Road Safety Plans

Local Road Safety Plan Step		Plan Element
1	Analyze data to identify focus/priorities	List of crash priorities based on data
2	Analyze individual fatal/serious crashes to identify risk factors	Description of risk factors & selection process
3	Select most common risk factors	
4	Analyze roadway network for presence of risk factors	Prioritized list of roadway locations
5	Create a prioritized list of roadway locations	
6	Identify countermeasures to address prioritized locations	Description of countermeasures & selection process
7	Develop a prioritized list of projects	Prioritized list of projects

# LRSP Step 1

Local Road Safety Plan Step		Plan Element
1	Analyze data to identify focus/priorities	List of crash priorities based on data
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# Step 1: Analyze Summary Data to Identify Focus/Priorities

2017-2021 County X Data	Fatal/Serious Injury Crashes Only																	
	All Roads		All Co		East Co		County X											
	2017-2021	%	2017-2021	%	2017-2021	%	2017-2021	%	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
<b>Overall Numbers</b>																		
Total # of Collisions	13,051		2,928		810		198		40	44	34	32	48	32	35	36	41	37
<b>By Collision Type</b>																		
Hit Fixed Object	3,636	27.9%	1,254	42.8%	356	44.0%	61	30.8%	17	10	8	10	16	13	15	14	11	15
Angle (T)	1,569	12.0%	339	11.6%	100	12.3%	43	21.7%	7	10	9	7	10	3	3	4	9	5
Overturn	858	6.6%	259	8.8%	126	15.6%	25	12.6%	3	10	4	3	5	8	4	10	8	4
Hit Pedestrian	2,198	16.8%	241	8.2%	42	5.2%	16	8.1%	3	3	2	3	5	2	0	2	2	1
<b>By Junction Relationship</b>																		
Non-Intersection (Not Related)	7,435	57.0%	1,960	66.9%	583	72.0%	120	60.6%	26	27	18	20	29	22	26	24	25	29
Intersection-Related	4,177	32.0%	659	22.5%	160	19.8%	59	29.8%	11	12	11	10	15	4	6	10	9	4
<b>By Functional Class</b>																		
Rural Major Collector	1,266	15.3%	946	32.3%	389	48.0%	115	58.1%	24	26	16	20	29	16	19	16	20	22
Rural Local Access	459	5.6%	459	15.7%	181	22.3%	38	19.2%	3	18	8	5	4	5	4	7	7	3
Rural Minor Collector	255	3.1%	254	8.7%	104	12.8%	32	16.2%	7	0	3	7	15	7	6	10	12	

MM

# LRSP Step 2

Local Road Safety Plan Step		Plan Element
1	Analyze data to identify focus/priorities	List of crash priorities based on data
2	<b>Analyze individual fatal/serious crashes to identify risk factors</b>	Description of risk factors & selection process
3	Select most common risk factors	
4	Analyze roadway network for presence of risk factors	
5	Create a prioritized list of roadway locations	Prioritized list of roadway locations
6	Identify countermeasures to address prioritized locations	Description of countermeasures & selection process
7	Develop a prioritized list of projects	Prioritized list of projects



# Step 2: Analyze Individual Fatal/Serious Crashes to Identify Risk Factors

## Lane Departure

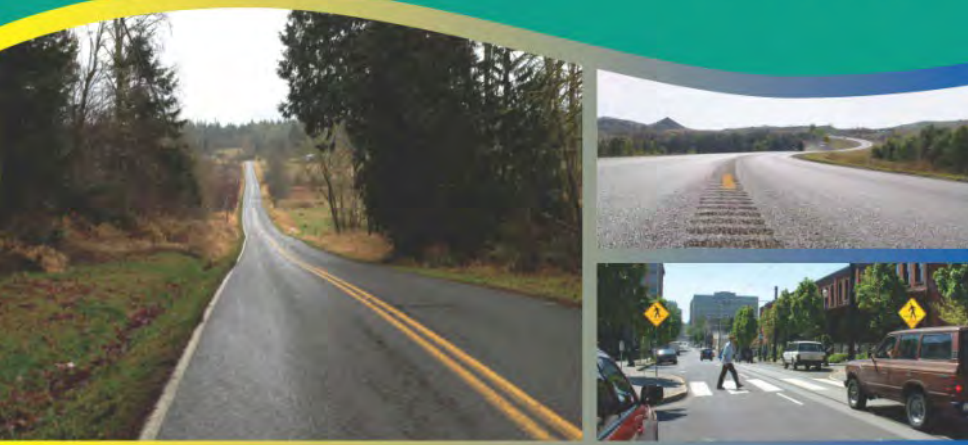
- Crash 1
- Crash 2
- Crash 3
- Crash 4
- Crash 61, etc.



# Risk Factors

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## Systemic Safety Project Selection Tool



## Roadway and Intersection Features

- Number of lanes
- Lane width
- Shoulder surface width and type
- Median width and type
- Horizontal curvature, superelevation, delineation, or advance warning devices
- Horizontal curve density
- Horizontal curve and tangent speed differential
- Presence of a visual trap at a curve or combinations of vertical grade and horizontal curvature
- Roadway gradient
- Pavement condition and friction
- Roadside or edge hazard rating (potentially including sideslope design)
- Driveway presence, design, and density
- Presence of shoulder or centerline rumble strips
- Presence of lighting
- Presence of on-street parking
- Intersection skew angle
- Intersection traffic control device
- Number of signal heads vs. number of lanes
- Presence of backplates
- Presence of advanced warning signs
- Intersection located in or near horizontal curve
- Presence of left-turn or right-turn lanes
- Left-turn phasing
- Allowance of right-turn-on-red
- Overhead versus pedestal-mounted signal heads
- Pedestrian crosswalk presence, crossing distance, signal head type

## Traffic Volume

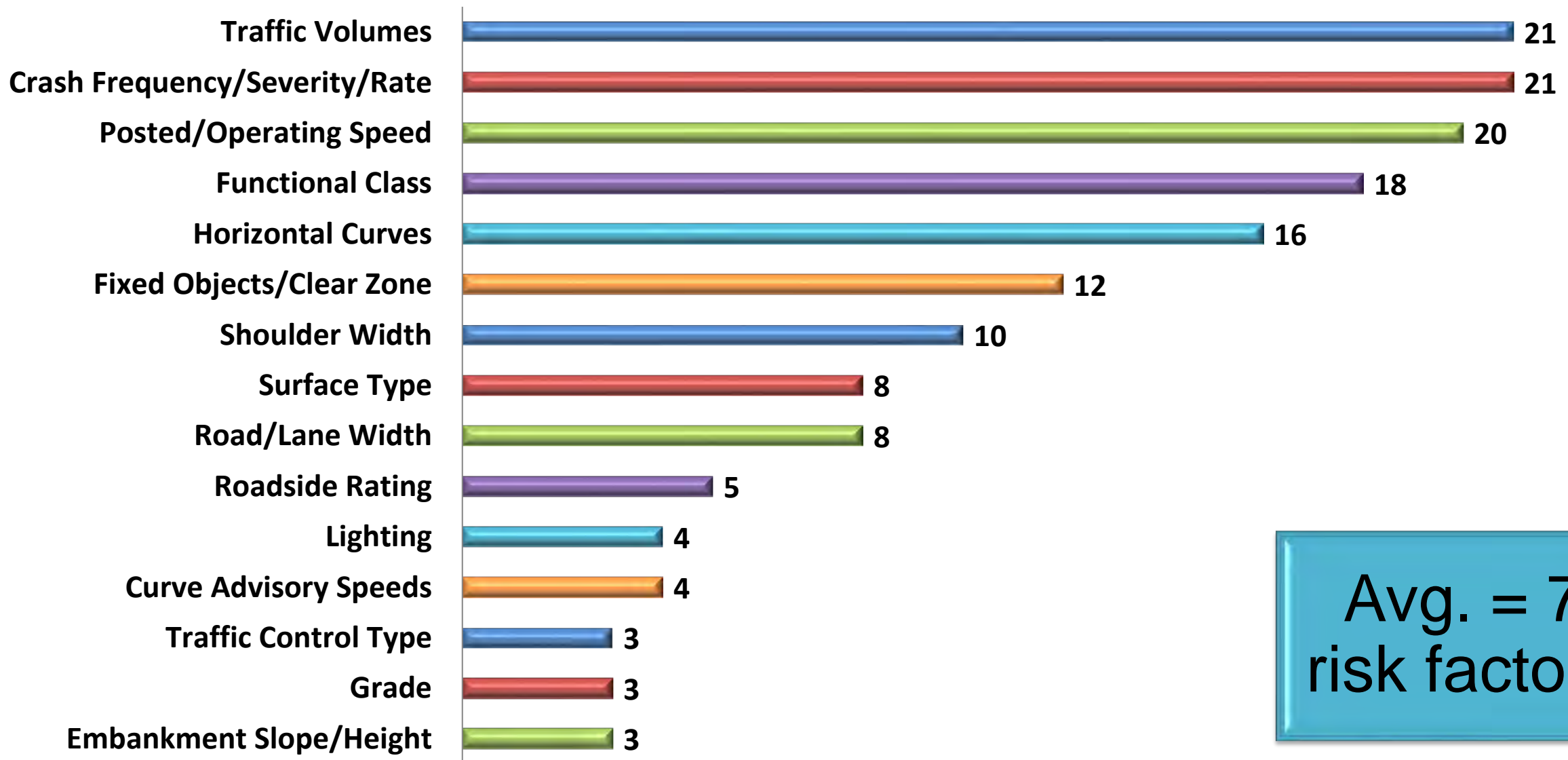
- Average daily traffic volumes
- Average daily entering vehicles
- Proportion of commercial vehicles in traffic stream

## Other Features

- Posted speed limit or operating speed
- Presence of nearby railroad crossing
- Presence of automated enforcement
- Adjacent land use type (e.g., schools, commercial, or alcohol-sales establishments)
- Location and presence of bus stops



# Risk Factors Used (# Counties in 2021)



Avg. = 7  
risk factors







# LRSP Step 3

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# Step 3: Select Most Common Risk Factors

## Lane Departure

- Roadside Environment
- Shoulder Width/Type
- Posted Speed
- Traffic Volume
- Horizontal Curves

## Intersection

- Traffic Control Type
- Traffic Volume
- Illumination
- Turn Lanes
- Signing

# Qualitative Data

- **Use the data that you have**
- **Use qualitative ratings when needed**
  - Good, Fair, Not-So-Good (curve radius, roadside, etc.)
  - Number per segment, mile, roadway (curves, driveways, intersections, etc.)
  - High, Medium, Low (traffic volumes, pedestrian volumes, crash frequency, etc.)
- **It is important to include the risk factors that are key to your roadway network**

## Roadway Departure

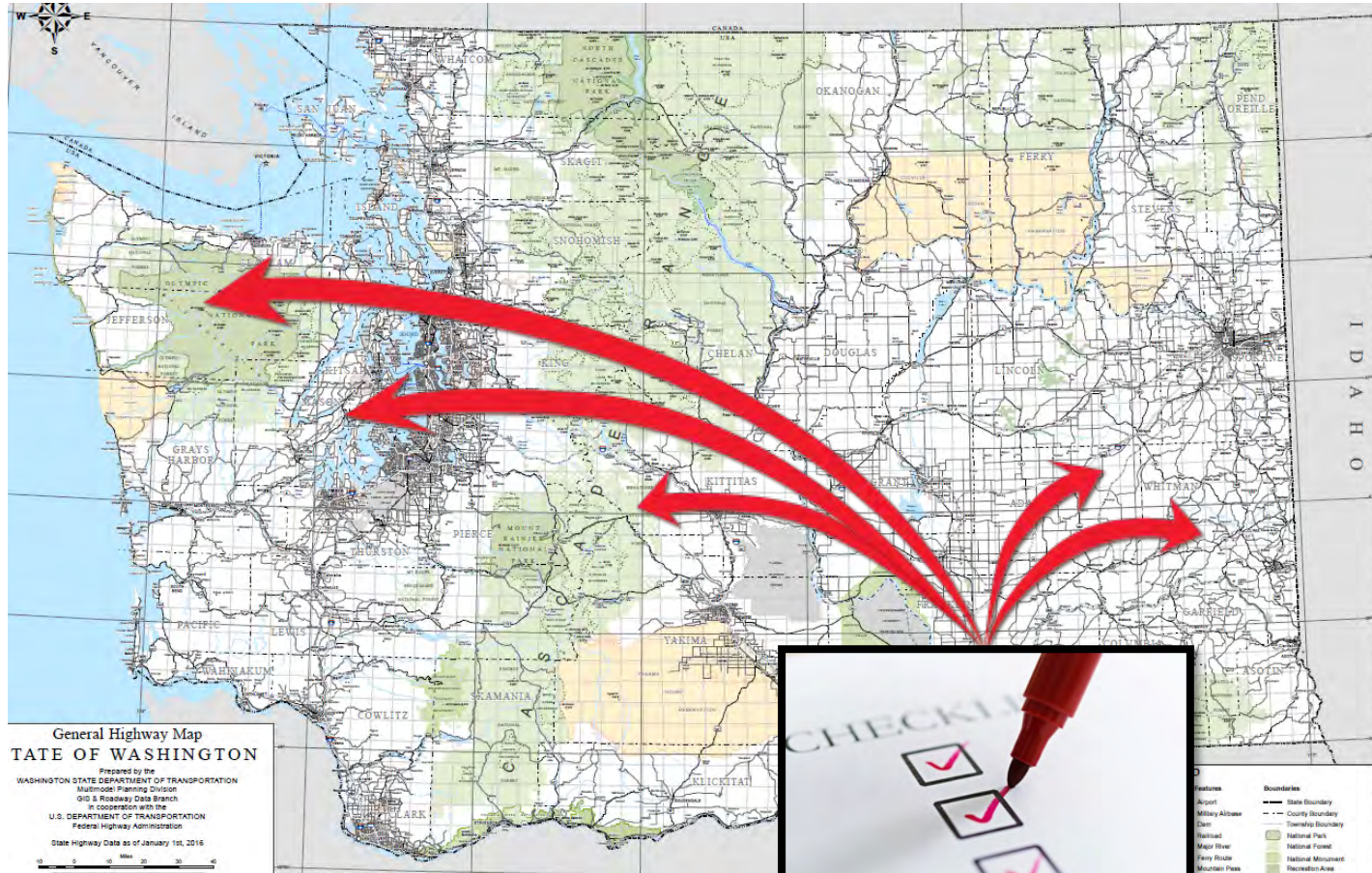
- **Roadside Environment**
- Shoulder Width/Type
- Posted Speed
- **Traffic Volume**
- **Horizontal Curves**



# LRSP Step 4

Local Road Safety Plan Step		Plan Element
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# Step 4: Analyze Roadway Network for Presence of Risk Factors



monster.com

# Segmenting Your Network

- Curve by curve
  - Mile by mile
  - Road by road
- 
- Short segments are more uniform
  - Long segments use more average values



*shutterstock.com*

# LRSP Step 5

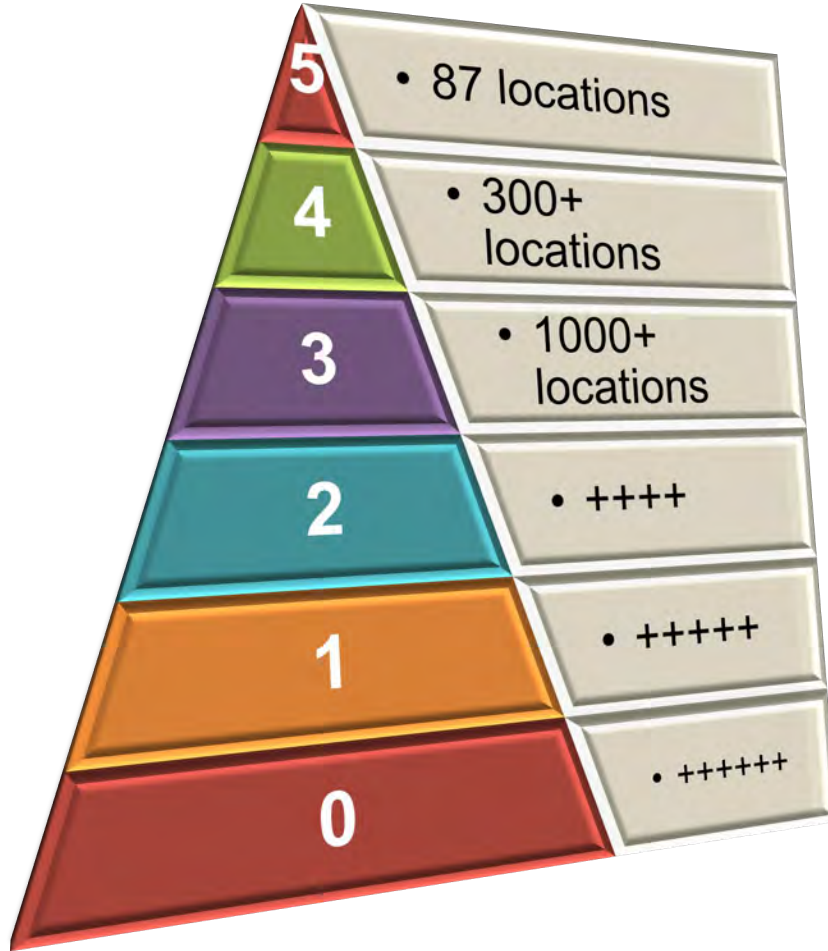
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# Step 5: Create Prioritized List of Roadway Locations



1. Road X, MP 0.00-1.00, 5 risk factors
2. Road Y, MP 4.53-6.00, 5 risk factors
3. Road Z, MP 18.10-18.89, 5 risk factors
4. Road A, MP 3.33-4.40, 4 risk factors
5. Road B, MP 2.01-3.00, 4 risk factors
6. Road C, MP 7.65-8.89, 4 risk factors
7. Road Y, MP 6.01-6.76, 4 risk factors
8. Road A, MP 14.21-15.66, 4 risk factors
9. Road D, MP 0.00-1.21, 4 risk factors
10. Road E, MP 12.02-15.98, 4 risk factors
11. Road Z, MP 17.01-18.09, 4 risk factors
12. Road F, MP 3.63-4.44, 4 risk factors
13. Road Z, MP 1.70-3.00, 4 risk factors
14. Road G, MP 6.00-6.99, 3 risk factors
15. Etc.

# Number of Risk Factors



Add more risk factors!

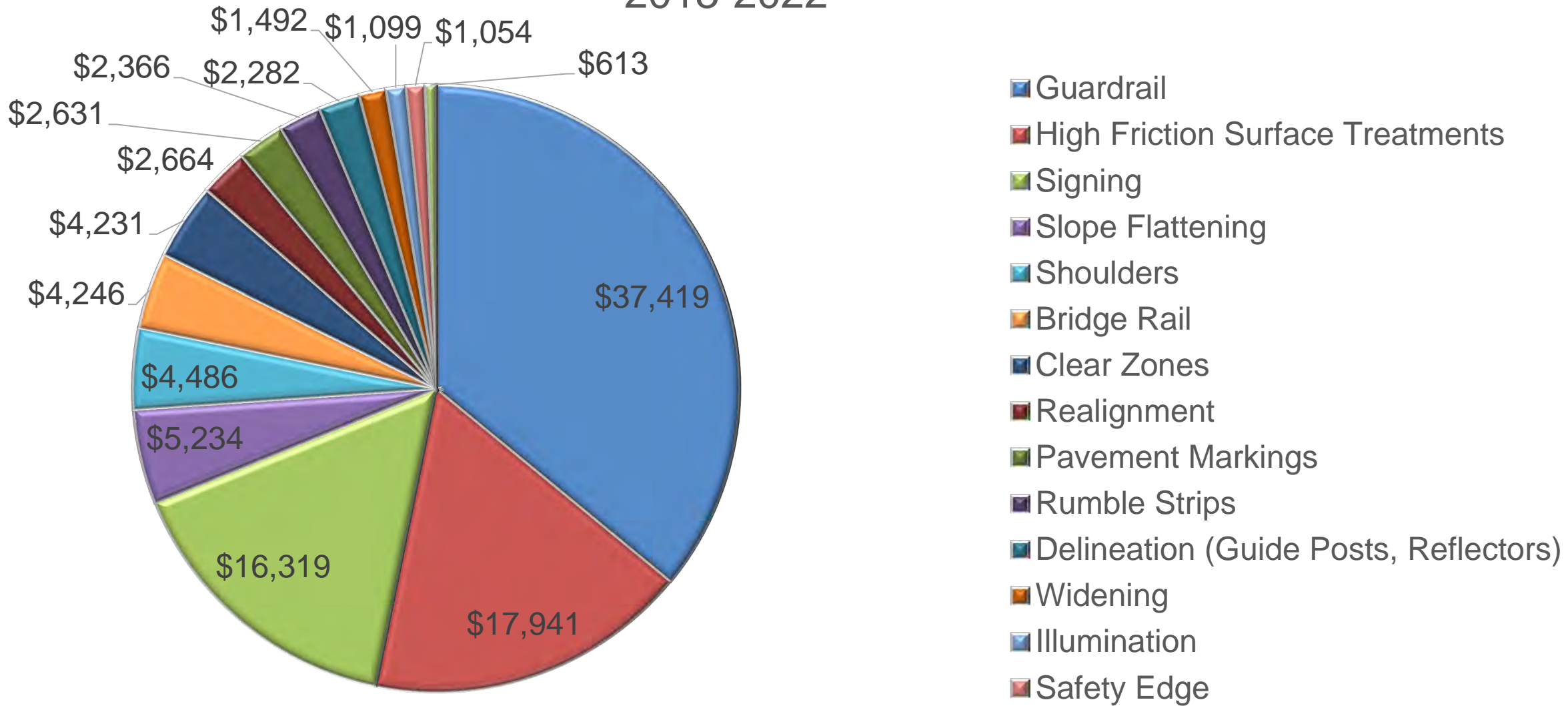


# LRSP Step 6

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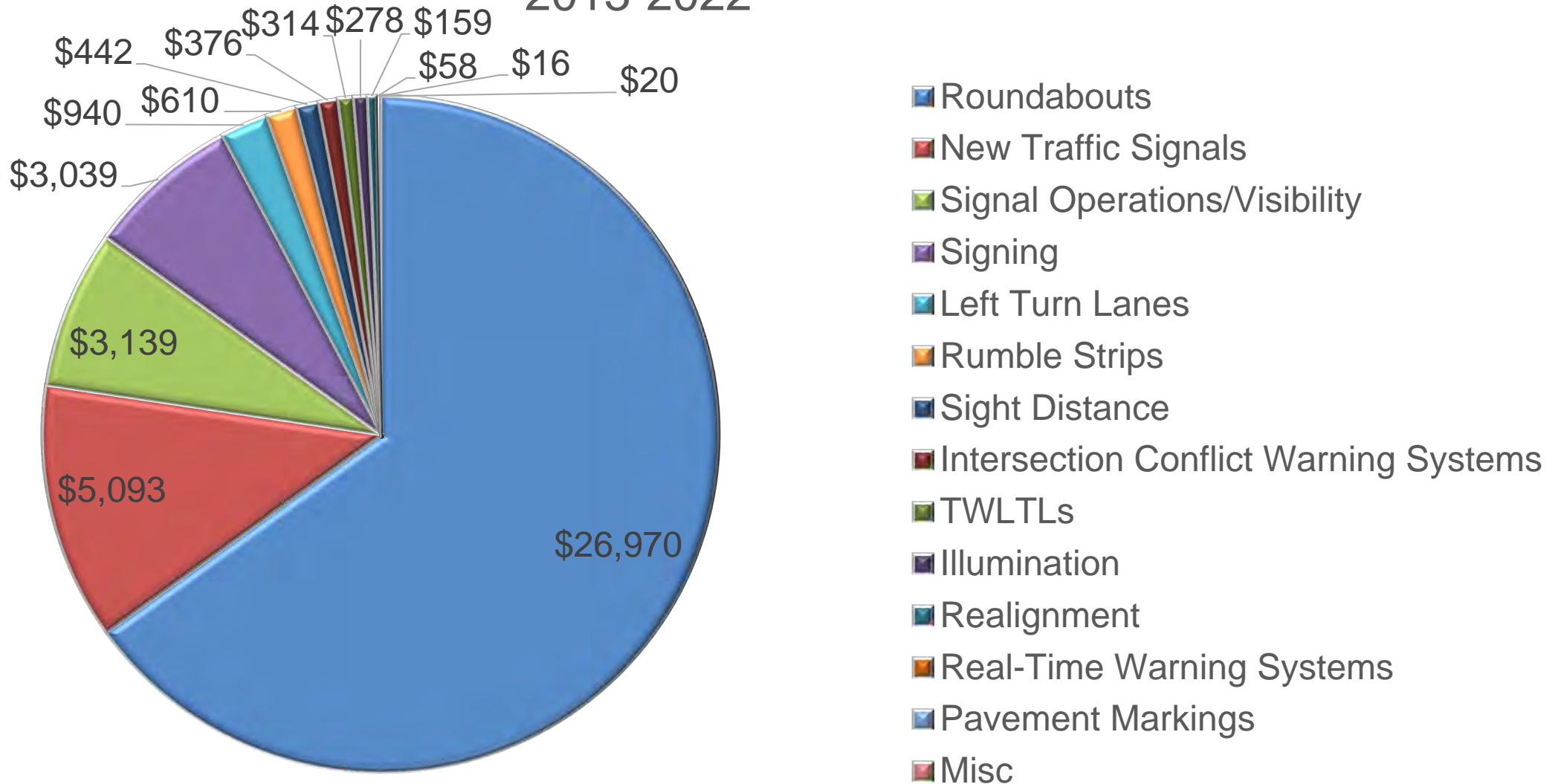
# County Safety Program

## Lane Departure Countermeasures Funded (in \$1000s) 2013-2022



# County Safety Program

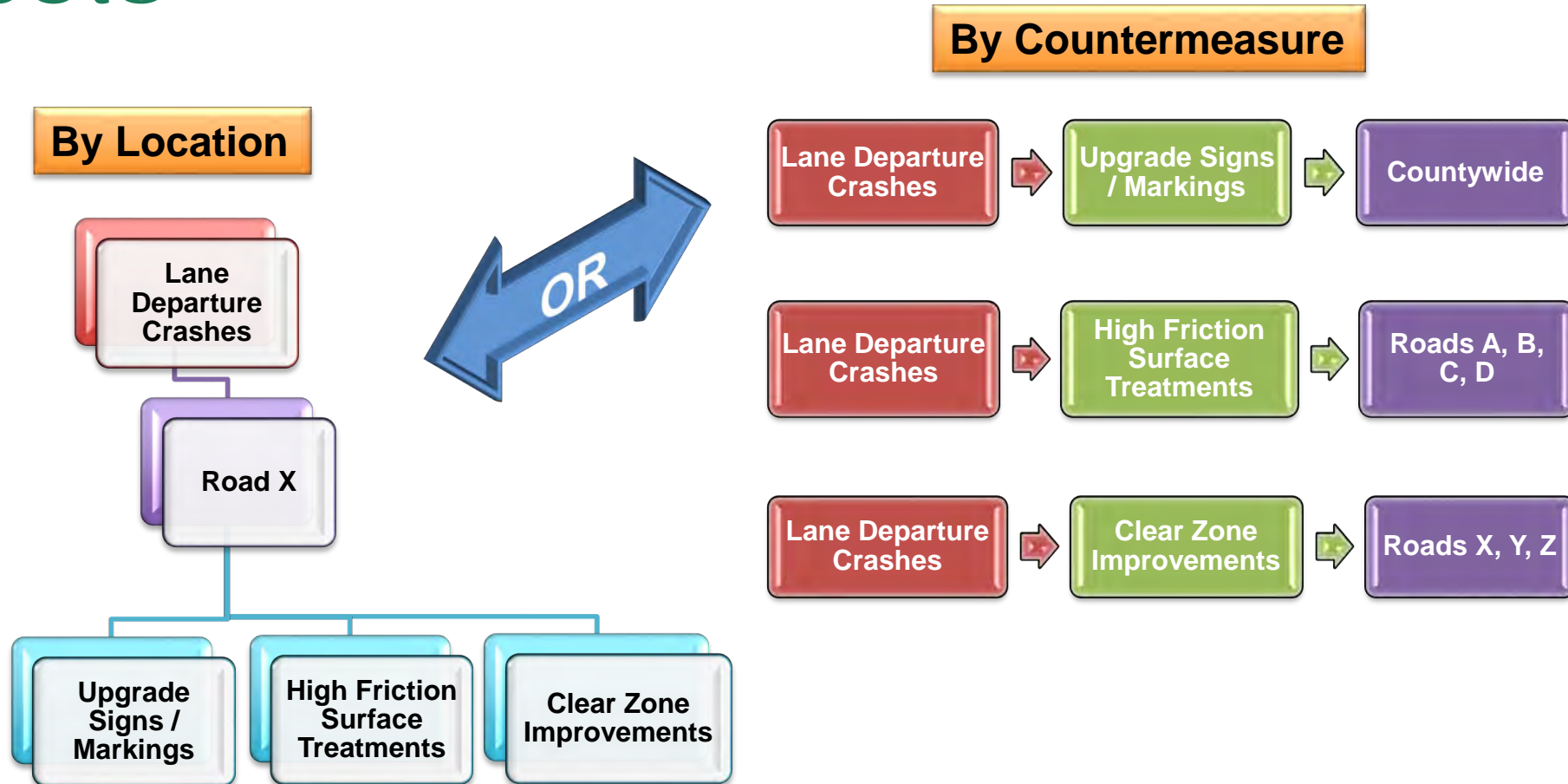
## Intersection Countermeasures Funded (in \$1000s) 2013-2022



# LRSP Step 7

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7	<b>Develop a prioritized list of projects</b>	Prioritized list of projects

# Step 7: Develop a Prioritized List of Projects



# Resources

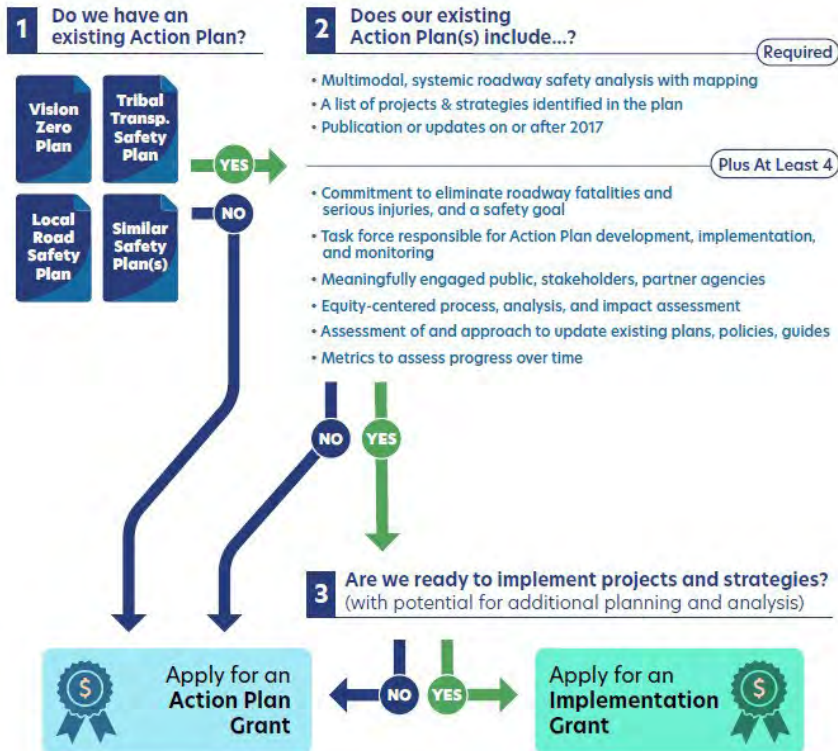
- Systemic Safety Project Selection Tool
  - <https://safety.fhwa.dot.gov/systemic/fhwasa13019/>
- Target Zero
  - <http://www.targetzero.com/>
  - Lane Departure (page 98)
  - Intersections (pages 107-108)
  - Pedestrians & Bicycles (pages 137-139)
- CMF Clearinghouse
  - <http://www.cmfclearinghouse.org/>
- FHWA Systemic Safety website
  - <http://safety.fhwa.dot.gov/systemic/>
- FHWA LRSP DIY website
  - <https://highways.dot.gov/safety/local-rural/local-road-safety-plans>



# Safe Streets and Roads for All (SS4A)

## SS4A Safe Streets and Roads for All Application Decision Flow Chart

This flowchart is not meant to replace the NOFO. Applicants should follow the instructions in the NOFO to correctly apply for a grant. See the SS4A website for more information: <https://www.transportation.gov/SS4A>



U.S. Department of Transportation

Still have questions? Visit the [SS4A website](https://www.transportation.gov/SS4A)

SS4A Application Decision Flow Chart | Page 1 of 1

## 2 Does our existing Action Plan(s) include...?

Required

- Multimodal, systemic roadway safety analysis with mapping
- A list of projects & strategies identified in the plan
- Publication or updates on or after 2017

Plus At Least 4

- Commitment to eliminate roadway fatalities and serious injuries, and a safety goal
- Task force responsible for Action Plan development, implementation, and monitoring
- Meaningfully engaged public, stakeholders, partner agencies
- Equity-centered process, analysis, and impact assessment
- Assessment of and approach to update existing plans, policies, guides
- Metrics to assess progress over time

# Safe Streets and Roads for All (SS4A)

An applicant is eligible to apply for an Action Plan Grant that funds supplemental action plan activities, or an Implementation Grant, only if the following two conditions are met:

- Answer “yes” to Questions **3** **7** **9**
- Answer “yes” to at least four of the six remaining Questions **1** **2** **4** **5** **6** **8**

If both conditions are *not met*, an applicant is still eligible to apply for an Action Plan Grant that funds creation of a new action plan.



# SS4A – Must Meet All 3

- 3** Does the Action Plan include all of the following?
  - Analysis of existing conditions and historical trends to baseline the level of crashes involving fatalities and serious injuries across a jurisdiction, locality, Tribe, or region;
  - Analysis of the location where there are crashes, the severity, as well as contributing factors and crash types;
  - Analysis of systemic and specific safety needs is also performed, as needed (e.g., high risk road features, specific safety needs of relevant road users; and,
  - A geospatial identification (geographic or locational data using maps) of higher risk locations.
  
- 7** Does the plan identify a comprehensive set of projects and strategies to address the safety problems in the Action Plan, time ranges when projects and strategies will be deployed, and explain project prioritization criteria?
  
- 9** Was the plan finalized and/or last updated between 2017 and 2022?

# SS4A – Must Meet 4 of 6

## 1 Are both of the following true?

- Did a high-ranking official and/or governing body in the jurisdiction publicly commit to an eventual goal of zero roadway fatalities and serious injuries?
- Did the commitment include either setting a target date to reach zero, OR setting one or more targets to achieve significant declines in roadway fatalities and serious injuries by a specific date?

## 2 To develop the Action Plan, was a committee, task force, implementation group, or similar body established and charged with the plan's development, implementation, and monitoring?

## 4 Did the Action Plan development include all of the following activities?

- Engagement with the public and relevant stakeholders, including the private sector and community groups;
- Incorporation of information received from the engagement and collaboration into the plan; and
- Coordination that included inter- and intra-governmental cooperation and collaboration, as appropriate.

# SS4A – Must Meet 4 of 6

## 5 Did the Action Plan development include all of the following?

- Considerations of equity using inclusive and representative processes;
- The identification of underserved communities through data; and
- Equity analysis, in collaboration with appropriate partners, focused on initial equity impact assessments of the proposed projects and strategies, and population characteristics.

## 6 Are both of the following true?

- The plan development included an assessment of current policies, plans, guidelines, and/or standards to identify opportunities to improve how processes prioritize safety; and
- The plan discusses implementation through the adoption of revised or new policies, guidelines, and/or standards.

## 8 Does the plan include all of the following?

- A description of how progress will be measured over time that includes, at a minimum, outcome data.
- The plan is posted publicly online.

## Washington

Lead Applicant	Project Title	Type of Plan	Urban/ Rural	Funding Award
City of Ellensburg	Action Plan for the City of Ellensburg and Surrounding Urban Growth Area	Action Plan	Rural	\$160,000.00
City of Lacey	Lacey Safety Action Plan	Action Plan	Rural	\$68,000.00
City of Montesano	Action Plan for the City of Montesano t	Action Plan	Rural	\$200,000.00
City of Toppenish	SS4A Action Plan Grant	Action Plan	Rural	\$80,000.00
Cowlitz-Wahkiakum Council of Governments	Comprehensive Safety Action Plans for Cowlitz County and five incorporated cities.	Action Plan	Rural	\$200,000.00
Grant County	Grant County Safety Action Plan	Action Plan	Rural	\$280,000.00
Island Regional Planning Organization	Island Regional Transportation Planning Organization - Comprehensive Action Plan	Action Plan	Rural	\$403,200.00
King County Road Services Division	Safe Streets and Roads for All: King County Road Services Division Action Plan	Action Plan	Urban	\$800,000.00
Kittitas County Department of Public Works	Snoqualmie Pass Comprehensive Safety Action Plan	Action Plan	Rural	\$429,504.00
Northeast Washington Regional Transportation Planning Organization	Northeast Washington Regional Transportation Planning Organization (NEW RTPO) Safety Action Plan	Action Plan	Rural	\$352,000.00

Lead Applicant	Project Title	Type of Plan	Urban/ Rural	Funding Award
Puget Sound Regional Council	Safety Action Plan for the Central Puget Sound Region	Action Plan	Urban	\$4,860,363.00
Southwest Washington Regional Transportation Council	Southwest Washington Regional Transportation Council Comprehensive Safety Action Plan	Action Plan	Urban	\$300,000.00
Spokane Regional Transportation Council	SS4A Action Planning Grant for the Spokane, WA Region	Action Plan	Urban	\$400,000.00
Thurston County	Thurston County Action Plan	Action Plan	Rural	\$264,000.00
Walla Walla County Department of Public Works	Develop comprehensive Safety Action Plan in Walla Walla County, Washington	Action Plan	Rural	\$201,696.00
Whatcom Council of Governments	Whatcom Regional Safety Action Plan Development	Action Plan	Rural	\$200,000.00
<b>Total Washington</b>				<b>\$9,198,763.00</b>

## Urban

## Seattle Safe Streets

Applicant: City of Seattle

*Seattle, Washington*

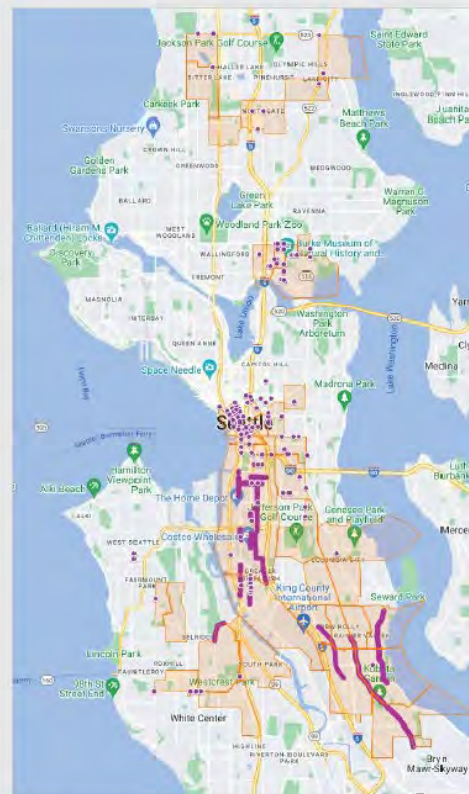
SS4A Award: \$25,654,000

## Project Description

The City of Seattle will implement a vast array of safety treatments to address pedestrian collisions at intersections, including unsignalized intersections, and bicycle crashes.

The project will apply low-cost, high impact strategies on arterial streets in the southeast SODO neighborhood of Seattle, focused on the highest number of serious injury and fatal collisions.

The project will implement approximately 60 signalized intersection treatments, 6 unsignalized intersection treatments, 4 miles of protected bike lanes, 1.5 miles of new sidewalks, and 4.5 miles of arterial traffic calming treatments.



Purple: Planned project locations for SS4A  
Orange: SS4A Underserved Communities census tracts

# Step 1 (with hints of Steps 2, 3, and 4) Simple Exercise



Lane Departure = 63%

Intersections?

Pedestrians?

2017-2021 All County Data	Fatal/Serious Injury Crashes Only						
	All County						
	2017- 2021	%	2021	2020	2019	2018	2017
<b>By Collision Type</b>							
Hit Fixed Object	1,254	42.8%	295	272	237	215	235
Angle (T)	339	11.6%	91	64	59	62	63
Overturn	259	8.8%	59	63	44	46	47
Hit Pedestrian	241	8.2%	61	43	47	43	47
Head On	171	5.8%	44	37	29	24	37
Angle (Left Turn)	137	4.7%	39	26	26	21	25
Rearend	132	4.5%	39	19	26	25	23
Hit Cyclist	71	2.4%	16	13	12	14	16
Sideswipe (Same Direction)	70	2.4%	23	15	10	7	15
Sideswipe (Opposite Direction)	62	2.1%	15	12	14	11	10
Wildlife	41	1.4%	8	8	7	4	14
Hit Parked Car	30	1.0%	6	4	9	4	7
Hit Train	4	0.1%	0	1	0	2	1
Other	117	4.0%	23	23	22	22	27



Dark = 38%

Intersections

Horizontal Curves

2017-2021 All County Data	Fatal/Serious Injury Crashes Only						
	All County						
	2017-2021	%	2021	2020	2019	2018	2017
<b>By Roadway Surface</b>							
Dry	2,216	75.7%	535	456	419	382	424
Wet	574	19.6%	154	116	101	87	116
Ice	67	2.3%	11	17	12	15	12
Snow / Slush	26	0.9%	8	6	3	5	4
Other	45	1.5%	11	5	7	11	11
<b>By Light Condition</b>							
Daylight	1,612	55.1%	401	323	285	287	316
Dark - No Street Lights	823	28.1%	198	177	152	139	157
Dark - Street Lights On	264	9.0%	61	51	60	39	53
Dusk	108	3.7%	30	21	23	13	21
Dawn	66	2.3%	14	13	13	14	12
Dark - Street Lights Off	22	0.8%	5	3	6	4	4
Other	33	1.1%	10	12	3	4	4
<b>By Junction Relationship</b>							
Non-Intersection (Not Related)	1,960	66.9%	473	410	368	336	373
Intersection-Related	659	22.5%	165	126	123	112	133
Driveway-Related	176	6.0%	45	41	33	26	31
<b>By Roadway Curvature</b>							
Straight & Level	1,269	43.3%	300	262	229	226	252
Horizontal Curve ★	1,046	35.7%	240	219	200	174	213
Straight & Grade	363	12.4%	98	67	66	65	67
Vertical Curve	127	4.3%	33	29	18	19	28
Unknown	173	5.9%	58	37	35	24	19





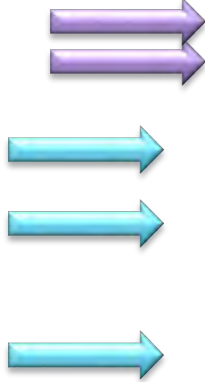
2017-2021 All County Data	Fatal/Serious Injury Crashes Only						
	All County						
	2017-2021	%	2021	2020	2019	2018	2017
<b>Hit Fixed Object Crashes Only - By Fixed Object Hit</b>							
Tree / Stump (Stationary) ★	293	23.4%	72	64	48	49	60
Roadway Ditch	208	16.6%	48	46	44	37	33
Earth Bank	139	11.1%	31	32	24	24	28
Utility Pole ★	126	10.0%	33	26	19	23	25
Over Embankment	91	7.3%	22	19	21	18	11
Fence	80	6.4%	18	21	18	6	17
Guardrail	72	5.7%	18	10	15	15	14
Boulder (Stationary)	31	2.5%	6	6	7	5	7
Mail Box	30	2.4%	5	7	7	7	4
Retaining Wall	25	2.0%	8	5	3	5	4
Wood Sign Post	25	2.0%	2	7	6	4	6
Culvert	20	1.6%	4	4	6	3	3
Metal Sign Post	18	1.4%	6	3	3	2	4
Linear Curb	14	1.1%	2	4	1	4	3
Utility Box	8	0.6%	4	2	0	1	1
Bridge Rail	8	0.6%	2	1	1	2	2
Rock Bank	7	0.6%	1	2	1	1	2
Falling Rock / Tree Fell on Vehicle	6	0.5%	3	0	0	1	2
Building	6	0.5%	1	1	1	2	1
Concrete Barrier	6	0.5%	3	1	0	1	1
Into River / Lake	5	0.4%	1	0	2	0	2

2017-2021 All County Data	Fatal/Serious Injury Crashes Only						
	All County						
	2017-2021	%	2021	2020	2019	2018	2017
<b>By Functional Class</b>							
Rural Major Collector ★	946	32.3%	218	184	175	183	186
Rural Local Access	459	15.7%	60	160	104	56	79
Urban Minor Arterial	377	12.9%	119	46	57	70	85
Urban Major Collector	313	10.7%	58	81	91	45	38
Rural Minor Collector	254	8.7%	94	14	8	59	79
Urban Local Access	175	6.0%	37	36	37	29	36
Urban Other Principal Arterial	147	5.0%	69	1	8	32	37
Rural Minor Arterial	132	4.5%	34	24	25	23	26
Rural Other Freeway/Expressway	65	2.2%	6	38	21	0	0

Intersections

Crossovers

2017-2021 All County Data	Fatal/Serious Injury Crashes Only						
	All County						
	2017- 2021	%	2021	2020	2019	2018	2017
<b>By Contributing Circumstance</b>							
Exceeding Safe / Stated Speed	956	25.7%	233	198	169	184	172
Inattention / Distraction	700	18.8%	119	94	160	154	173
Under Influence of Alcohol / Drugs	606	16.3%	134	132	116	107	117
Failing to Yield	257	6.9%	70	58	44	38	47
Disregard Traffic Signs / Signals	135	3.6%	31	31	28	19	26
Apparently Asleep / Fatigued	105	2.8%	26	18	17	20	24
Over Centerline	103	2.8%	0	0	34	25	44
Operating Defective Equipment	86	2.3%	22	21	13	16	14
Improper Passing	82	2.2%	19	16	17	8	22
Operating Recklessly / Aggressively	76	2.0%	32	43	1	0	0
Overcorrecting / Oversteering	60	1.6%	28	30	2	0	0
On Wrong Side of Road	58	1.6%	2	1	17	16	22
Improper Turn	45	1.2%	20	8	11	2	4
Following Too Close	40	1.1%	12	8	3	7	10
Failing to Yield to Ped / Cyclist	36	1.0%	5	7	11	7	6
Apparently Ill	25	0.7%	7	6	6	4	2



# Motorcycles



2017-2021 All County Data	Fatal/Serious Injury Crashes Only						
	All County						
	2017-2021	%	2021	2020	2019	2018	2017
<b>By Vehicle Type</b>							
Light Truck / SUV	1,781	42.5%	452	356	355	283	335
Passenger Car	1,515	36.2%	384	303	270	271	287
Motorcycle	625	14.9%	148	120	114	113	130
Heavy Truck	133	3.2%	30	31	23	22	27
School Bus	7	0.2%	2	0	2	3	0
Bus	5	0.1%	1	0	1	2	1
Other	123	2.9%	30	33	17	19	24
<b>By Speed Limit</b>							
20 MPH	17	0.5%	3	2	4	3	5
25 MPH	258	7.0%	65	47	41	53	52
30 MPH	99	2.7%	24	24	20	15	16
35 MPH	1,373	37.5%	378	266	247	234	248
40 MPH	367	10.0%	84	83	74	51	75
45 MPH	444	12.1%	124	89	91	66	74
50 MPH	919	25.1%	225	198	156	149	191
55 MPH	156	4.3%	30	38	28	31	29
60 MPH	31	0.8%	7	3	5	10	6
<b>By Roadway Surface Type</b>							
Blacktop	3,602	85.9%	900	731	664	613	694
Concrete	212	5.1%	56	35	47	30	44
Gravel	70	1.7%	14	22	14	8	12
Dirt	44	1.0%	14	8	7	6	9
Brick/Wood Block	2	0.0%	0	2	0	0	0
Other	167	4.0%	35	29	28	40	35
Unknown	96	2.3%	28	16	23	17	12



# Step 1 Takeaways

## More Investigation

- Lane Departure crashes (63%)
- Dark conditions (38%)
  - No street lights (28%)
- Intersections (23%)
- Horizontal Curves (36%)
- Motorcycle crashes (15%)

## Risk Factors (so far)

- Areas with trees near the road
- Areas with utility poles near the road
- Rural Major Collectors
- 35 MPH posted roads

# Lane Departure Details

Hit Fixed Object	1152	71.9%
Head On	165	10.3%
Overturn	137	8.5%
Sideswipe (Opposite Direction)	58	3.6%
Hit Parked Car	23	1.4%

Rural Major Collector	605	38.6%
Rural Local Access	302	19.3%
Rural Minor Collector	165	10.5%
Urban Minor Arterial	142	9.1%
Urban Major Collector	130	8.3%
Urban Local Access	83	5.3%
Rural Minor Arterial	77	4.9%
Rural Other Freeway/Expressway	32	2.0%
Urban Other Principal Arterial	31	2.0%

68%

Daylight	816	50.9%
Dark - No Street Lights	559	34.9%
Dark - Street Lights On	93	5.8%
Dusk	59	3.7%
Dawn	43	2.7%

28%

Horizontal Curve 	869	54.2%
Straight & Level	450	28.1%
Straight & Grade	168	10.5%
Vertical Curve	69	4.3%

36%

25 MPH	107	6.2%
30 MPH	40	2.3%
35 MPH	592	34.3%
40 MPH	194	11.2%
45 MPH	227	13.2%
50 MPH	474	27.5%
55 MPH	67	3.9%

# Crashes During Darkness

Hit Fixed Object	569	50.4%	42%
Hit Pedestrian	146	12.9%	8%
Overturn	87	7.7%	
Angle (T)	74	6.6%	
Head On	55	4.9%	
Angle (Left Turn)	42	3.7%	

Non-Intersection (Not Related)	822	72.9%	23%
Intersection-Related	193	17.1%	
Driveway-Related	47	4.2%	

Rural Major Collector	354	32.1%
Urban Minor Arterial	172	15.6%
Rural Local Access	164	14.9%
Urban Major Collector	129	11.7%
Rural Minor Collector	74	6.7%
Urban Local Access	72	6.5%
Urban Other Principal Arterial	58	5.3%
Rural Minor Arterial	52	4.7%
Rural Other Freeway/Expressway	28	2.5%

Straight & Level	490	43.4%	36%
Horizontal Curve	422	37.4%	
Straight & Grade	124	11.0%	
Vertical Curve	34	3.0%	

# Horizontal Curves

Hit Fixed Object	661	63.2%
Overturn	122	11.7%
Head On	86	8.2%
Hit Pedestrian	27	2.6%
Angle (T)	26	2.5%
Sideswipe (Opposite Direction)	25	2.4%
Hit Cyclist	20	1.9%

53% of all HFO  
47% of all Overturn  
50% of all Head On

Daylight	565	54.0%
Dark - No Street Lights	348	33.3%

28%

Vertical Curve	50	4.8%
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Motorcycle	269	20.6%
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43% of all MC

Rural Major Collector	380	37.2%
Rural Local Access	194	19.0%
Urban Minor Arterial	104	10.2%
Rural Minor Collector	102	10.0%
Urban Major Collector	93	9.1%
Urban Local Access	63	6.2%
Rural Minor Arterial	46	4.5%

Tree / Stump (Stationary)	165	25.0%
Roadway Ditch	108	16.3%
Earth Bank	71	10.7%
Utility Pole	57	8.6%
Guardrail	55	8.3%
Over Embankment	48	7.3%
Guardrail (Face)	41	6.2%
Fence	29	4.4%
Boulder (Stationary)	22	3.3%
Wood Sign Post	15	2.3%
Mail Box	13	2.0%
Retaining Wall	10	1.5%
Culvert	10	1.5%
Metal Sign Post	9	1.4%
Guardrail (Through/Over/Under)	9	1.4%
Linear Curb	8	1.2%
Rock Bank	7	1.1%

56% of all Tree  
52% of all Ditch  
51% of all Earth Bank  
45% of all Utility Pole  
53% of all Over Emb.

35 MPH	446	38.5%
40 MPH	130	11.2%
45 MPH	146	12.6%
50 MPH	272	23.5%

38%

# Step 1 Takeaways part 2

## Risk Factors (so far)

- Areas with trees near the road
  - or
- Areas with utility poles near the road
- Rural Major Collectors
  - Rural Minor Collector ½ Weight
  - Rural Local Access ½ Weight
- ~~35 MPH posted speed~~
- Horizontal Curves

## Next Steps

- Plot crash locations on a map
- Traffic Volumes
- Shoulders & Road Width
- Define Clear Zone Areas
  - Trees
  - Utility Poles

## Likely Priorities

- Lane Departure Crashes
  - Horizontal Curves
  - Rural Collectors & Local Roads



# Questions?



# Contact Info

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