

LOCAL ROAD SAFETY PLAN, SEPTEMBER 2019 WEBINAR

10 ADT or local 00 ADT non-local 00 ADT non-local 01 - 25,000 ADT 01 - 15,000	O ADT O AD	
27,000 ADT or local 27,000 ADT non-local 2,001 - 15,000 ADT 15,001 - 25,000 ADT 7 001 - 15,000 ADT T or local	2,000 ADT non-local 2,000 ADT 1 1,000 ADT non-local 2,000 ADT non-	5
5 9 21 10 ntrol Violation other movements 4 3 3 8 ntrol Violation through movement 1 2 4 3 ntrol Violation turning movement 2 tering from minor facility 1 5 liure to Yield 1 hers 6 sestrian not in dedicated areas 6 safe Turning Left 6 safe Turning other 6 safe Turning Right 6 safe Turning other	1 3 1 2 8 11 4 1 2 1 3 1 1 2 1 3 1 3 1 1 1 2 1 3 1 3 1	3 2 1

CITY OF SAN DIEGO SSARP PRESENTED BY JULIO FUENTES SENIOR TRAFFIC ENGINEER



3 years – 24,000 total crashes (22/day on average)

12,000 property damage

12,000 injury crashes

1,700 pedestrian crashes

1,350 bicycle crashes

541 fatal & severe crashes

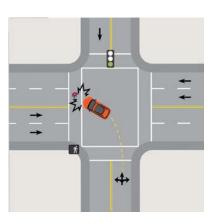


Crash Reports In

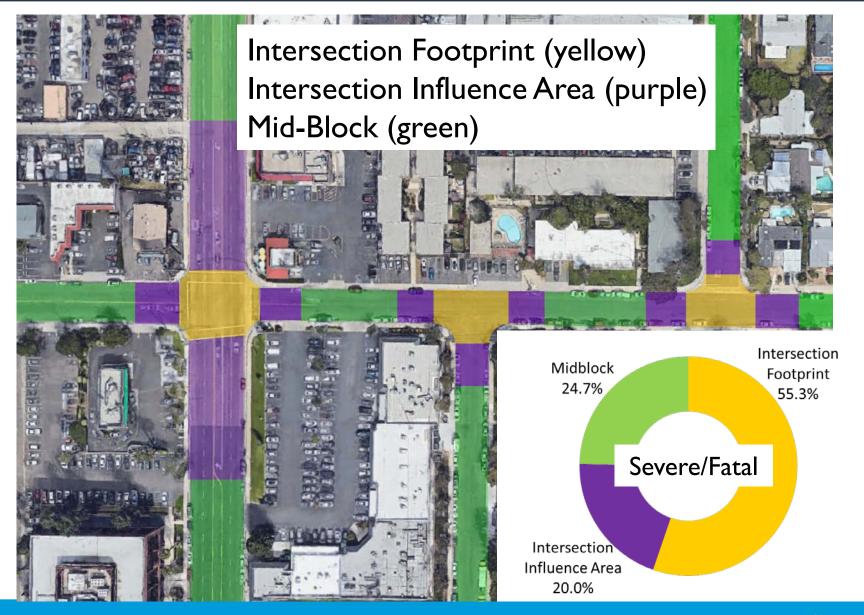


Statistical Analysis Hot Spots

		gnali																		
	Th	_	nes	2+2	4+	4+	_			_	4+	4				6+	2			
	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	7,001-15,000	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	>25,000	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	>25,000	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	35,000
Control Violation other movements		2	1	1			2	1	4	4	1		9	10	3			1	1	
Control Violation through movement		1	3			1	2	8	11	4		1	7	3	2		2	1	1	
Control Violation turning movement			1					3	3	1			1	2						
Entering from minor facility							1	1	1				3						1	Т
Failure to Yield																				
Crossing In Crosswalk At Intersection																				
Making Left Turn	1	5	12	5		6	8	14	29	14	7	3	33	14	1	1	1	1	6	
Proceeding Straight				1			2	3	3	3	1	1	4	1	2			1	3	
Making Right Turn			2			7	2	7	17	4	1	2	8	6	5	1		1	1	
Other		1	1				3	4	6	4	$\overline{}$		4	1	2			1		
Crossing In Crosswalk Not At Intersection	1								2					1						Т
Crossing Not In Crosswalk	2		2	1		1		3	4	2		1		2	1					
In Road			2			2			1				1							
Not In Road			1				1			2		1	2	1		1	1			
Not Stated	1		1	3			1		2	1			1							Т
Others	4	3	3	8		6	5	12	21	7	6		22	15	3		1		5	
Pedestrian not in dedicated areas	1	2	4	3	1	2	2	6	11	6			7	4	7					
Unsafe Speed				2		1	1	2	4	2			2	1			1		1	_
Unsafe Turning Left		1	5			4	2	5	10	1			5	1	3	1		1		Т
Unsafe Turning other			1					1	2	1		1		2	3			1		
Unsafe Turning Right							1	2	1	2				1	1					
irand Total	10	18	39	24	1	30	35	75	133	59	16	10	110	66	33	4	7	8	19	1

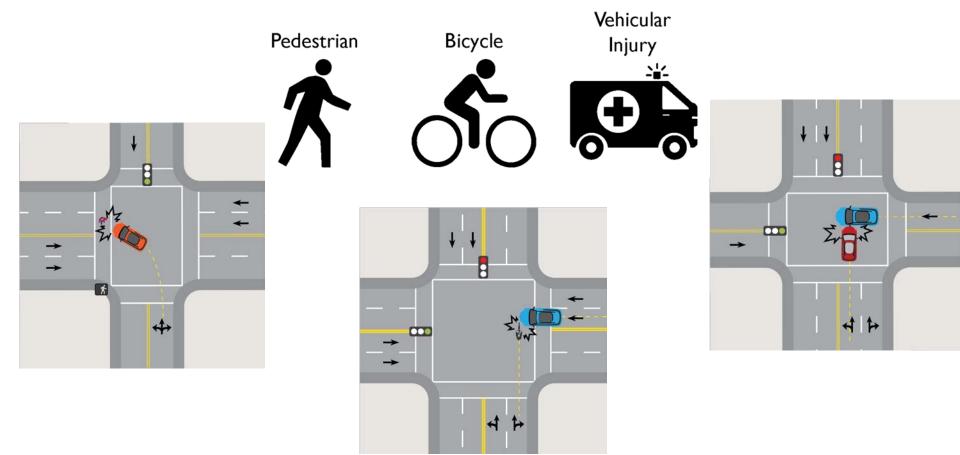








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Sample Matrix: Pedestrian Collisions within intersections

	Signalized Intersection			All-Way Stop 2-way stop Of	thers Grand Total
	Thru Lanes 2+2 4 4+2	4+4	6+2	6+4 6+6 Thru Lanes 2+2 4+2 4+4 Thru Lanes 2+2 4+2 4 6+2	
	7,000 ADT or local 7,000 ADT non-local 7,001 - 15,000 ADT 15,001 - 25,000 ADT 7,001 - 15,000 ADT 7,000 ADT or local 7,000 ADT non-local		 7,000 ADT non-local 7,001 - 15,000 ADT 	725,000 ADT 7,001 - 15,000 ADT 7,000 ADT or local 7,001 - 15,000 ADT	
Control Violation other movements	4 4 4	2 4 4 4 5 10	<u>.</u> 1	4 1 1 1 1	49
Control Violation through movement	1 3 1 2	2 8 11 4 1 7 3	2 2 1 1	4 1 2 3 2 2 3 1 1 1 1	69
Control Violation turning movement	1	3 3 1 1 2		1	13
Entering from minor facility		1 1 1	1	1 1 1 5	16
Failure to Yield	5 9 21 10 16 19	9 34 65 31 9 8 54 27 1	1 3 3 4 10	8 4 6 9 2 29 27 25 8 8 6 37 18 13 17 11 3 16 23 10 1	5 626
Others	4 3 3 8 6 5	5 12 21 7 6 22 15	3 1 5	3 2 5 3 1 3 14 6 3 1 1 2 1 31 8 9 4 8 3 1 9 2 3	3 247
Pedestrian not in dedicated areas	1 2 4 3 1 2 2	2 6 11 6 7 4	7	2 1 1 3 1 4 6 2 14 6 3 3 3 1 4 9 3 2 1	125
Unsafe Speed	2 1 1	1 2 4 2 2 1	1 1	1 3 3 1 1 6 6 1 1	2 43
Unsafe Turning Left	1 5 4 2	2 5 10 1 5 1	3 1 1	1 3 1 1 3 3 1 1	54
Unsafe Turning other	1	1 2 1 1 2	3 1	1 1 1 2 1 8 2 2 1 2 2 1	1 37
Unsafe Turning Right		1 2 1 2 1	1	2 1 3 1 1	17
Grand Total	10 18 39 24 1 30 35	5 75 133 59 16 10 110 66 3	3 4 7 8 19	18 1 7 15 26 2 7 54 49 37 1 9 9 10 1 2 105 47 29 26 25 7 24 51 16 1 1 3 5	11 1296

Si	gnali	zed I	nter	secti	on				27.0					-270	100			
TI	nru La	anes	2+2	4-	4+	-2				4+	-4				6+	-2		
<7,000 ADT or local	<7,000 ADT non-local	7,001 - 15,000 ADT	15,001 - 25,000 ADT	7,001 - 15,000 ADT	<7,000 ADT or local	<7,000 ADT non-local	7,001 - 15,000 ADT	15,001 - 25,000 ADT	>25,000 ADT	<7,000 ADT or local	<7,000 ADT non-local	7,001 - 15,000 ADT	15,001 - 25,000 ADT	>25,000 ADT	<7,000 ADT or local	<7,000 ADT non-local	7,001 - 15,000 ADT	15,001 - 25,000 ADT



Sample Matrix: Pedestrian Collisions within intersections

	Signaliz	ed In	tersect	tion																	All-W	ay Stop	p				2	-way s	stop								Other	Gran	d Total
	Thru La	nes 2	+2 4	4 4	+2			44	-4			6+	2			6+	4		6+	6	Thru I	anes 2	2+2	4+2		4+4	Т	hru La	nes 2	+2	4+2			4	6+2	?		7	
		7,001 - 15,000 ADT	15,001 - 25,000 ADT 7,001 - 15,000 ADT	O ADT or lo	<7,000 ADT non-local	15,000 A	15,001 - 25,000 ADT		00 ADT non	7,001 - 15,000 ADT	>25,000 ADT	العا	0 ADT non	7,001 - 15,000 ADT	DADT	<7,000 ADT non-local	- 15,000 A	15,001 - 25,000 ADT >25,000 ADT	7,001 - 15,000 ADT	>25,000 ADT	<7,000 ADT non-local	7,001 - 15,000 ADT	5, 5	<7,000 ADT or local			<7,000 ADT or local	<7,000 ADT non-local	7,001 - 15,000 ADT	15,001 - 25,000 ADT	<7,000 ADT non-local	7,001 - 15,000 ADT		>25,000 ADT <7,000 ADT or local	7,001 - 15,000 ADT	15,001 - 25,000 ADT >25,000 ADT			
Control Violation other movements	2	1	1		2	1	4	4 1		9 1	0 3			1	1			4	1	1	1						1				1								49
Control Violation through movement	1	3		1	2	8 :	11	4	1	7	3 2		2	1	1 4	1	1	2 3	1		2 2	3			1		1	. 1					2						69
Control Violation turning movement		1				3	3	1		1	2										1							1											13
Entering from minor facility					1	1	1			3					1							1					1	. 1		1			5						16
Failure to Yield	5 9	21	10	16	19	34	65 3	1 9	8	54 2	7 11	. 3	3	4 1	0 8	3	4	6 9)	2 2	29 27	25		8 8	6		37	18	13	17 1	l1 3	16	23	10 1	Ĺ	1		5	626
Others	4 3	3	8	6	5	12	21	76		22 1	5 3	l .	1		5 3	3	2	5 3	1	3 1	.4 €	3		1 1	. 2	1	31	. 8	9	4	8 3	3 1	9	2		3		3	247
Pedestrian not in dedicated areas	1 2	4	3 1	1 2	2	6 :	11	6		7	4 7	•			- 2	1		1 3		1	4 6	2					14	6	3	3	3 1	4	9	3		2 1			125
Unsafe Speed			2	1	. 1	2	4	2		2	1		1		1						1 3	3	1				1 6	6	1				1			1		2	43
Unsafe Turning Left	1	5		4	2	5	10	1		5	1 3	1		1				1			3 1				1		3	3			1	1		1					54
Unsafe Turning other		1				1	2	1	1		2 3	l I		1	- 1	L		1 1			2	2					1 8	2	2	1		2	2		1			1	37
Unsafe Turning Right					1	2	1	2			1 1							2			1						3	1	1		1								17
Gran	10 18	39	24 1	1 30	35	75 1	33 5	9 16	10 1	10 €	6 33	4	7	8 1	9 18	1	7	15 26	2	7 5	49	37	1	9 9	10	1	2 105	47	29	26 2	25 7	24	51	16 1	1 1	3 5	1	1	1296

Collision Violation Categories (Enhanced by driver movement)

Control Violation other movements
Control Violation through movement
Control Violation turning movement
Entering from minor facility
Failure to Yield
Others
Pedestrian not in dedicated areas
Unsafe Speed
Unsafe Turning Left
Unsafe Turning other
Unsafe Turning Right



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Concentrated under "Failure to Yield" violation

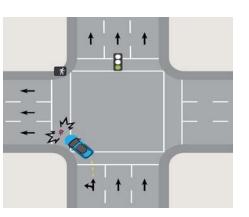
	Signalized Intersection All-	-Way Stop 2-way stop	Others Grand Total
			Others Grand Total
	Thru Lanes 2+2 4 4+2 4+4 6+2 6+4 6+6 Thr	ru Lanes 2+2	
	7-7,000 ADT non-local 7-7,000 - 15,000 ADT 7-7,001 - 15,000 ADT 7-7,001 - 15,000 ADT 7-7,000 ADT non-local	7,000 ADT non-loca 15,001 - 15,000 ADT 7,001 - 15,000 ADT or local 7,000 ADT non-loca 7,000 ADT non-loca 7,001 - 15,000 ADT 7,001 - 15,000 ADT	
Control Violation other movements	2 1 1 2 1 4 4 1 9 10 3 1 1 4 1 1	1 1	49
Control Violation through movement	1 3 1 2 8 11 4 1 7 3 2 2 1 1 4 1 2 3 2	2 3 1 1 1	69
Control Violation turning movement	1 3 3 1 1 2	1	13
Entering non-times recently			20
Failure to Yield	5 9 21 10 16 19 34 65 31 9 8 54 27 11 3 3 4 10 8 4 6 9 2 29	27 25 8 8 6 37 18 13 17 11 3 16 23 10 1	5 626
- Cincia		0 0 1 1 2 1 01 0 7 1 0 0 1 7 2	
Pedestrian not in dedicated areas	1 2 4 3 1 2 2 6 11 6 7 4 7 2 1 1 3 1 4	6 2 14 6 3 3 3 1 4 9 3 2 1	125
Unsafe Speed	2 1 1 2 4 2 2 1 1 1	3 3 1 1 6 6 1 1 1	2 43
Unsafe Turning Left	1 5 4 2 5 10 1 5 1 3 1 1 1 3	1 1 3 3 1 1 1	54
Unsafe Turning other	1 1 2 1 1 2 3 1 1 1 1	2 1 8 2 2 1 2 2 1	1 37
Unsafe Turning Right	1 2 1 2 1 1	1 3 1 1	17
Grand Total	10 18 39 24 1 30 35 75 133 59 16 10 110 66 33 4 7 8 19 18 1 7 15 26 2 7 54	49 37 1 9 9 10 1 2 105 47 29 26 25 7 24 51 16 1 1 3 5	11 1296

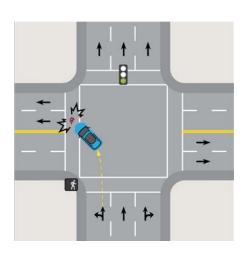
	0.1	- 12													
	_	gnali		_						_					
	Th	iru La	anes	2+2	44	4+	2				4+	4			
	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	7,001-15,000	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	>25,000	<7,000 - local	<7,000 - non-local	7,001-15,000	15,001-25,000	>25,000
Control Violation other movements		2	1	1			2	1	4	4	1		9	10	3
Control Violation through movement		1	3			1	2	8	11	4		1	7	3	2
Control Violation turning movement			1					3	3	1			1	2	
Entering from minor facility							1	1	1				3		
Failure to Yield															
Crossing In Crosswalk At Intersection															
Making Left Turn	1	5	12	5		6	8	14	29	14	7	3	33	14	1
Proceeding Straight				1			2	3	3	3	1	1	4	1	2
Making Right Turn			2			7	2	7	17	4	1	2	8	6	5
Other		1	1				3	4	6	4			4	1	2

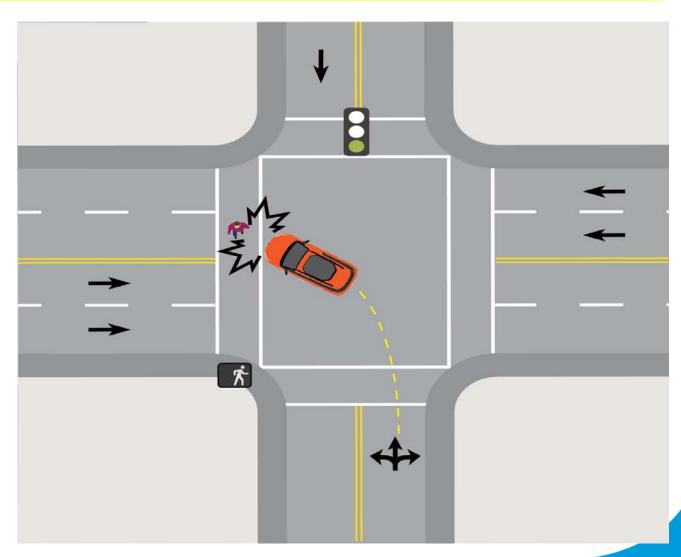


Pedestrians at Intersections #1

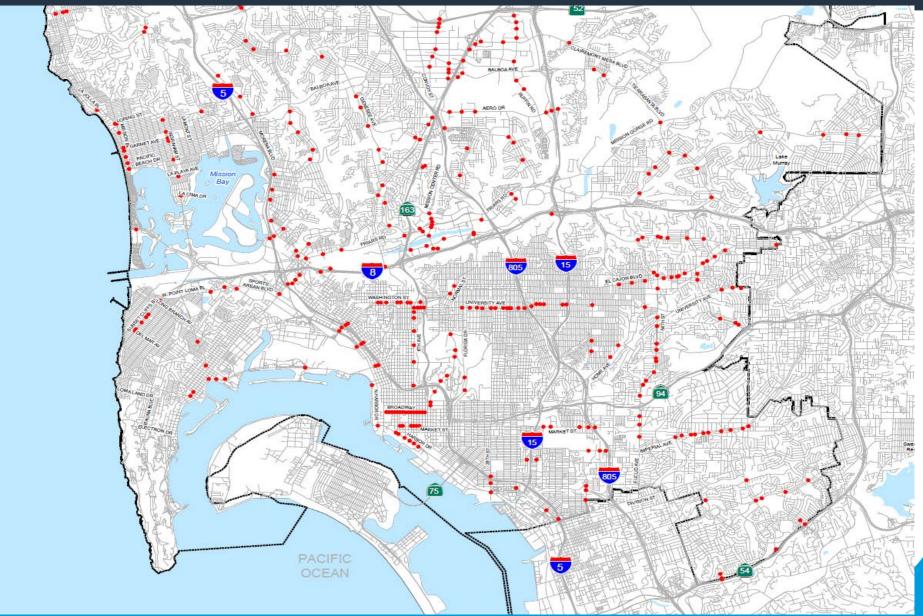
Signalized, No Turn Arrow, Driver at fault, Primary Road: 7,001 – 25,000 cars/day





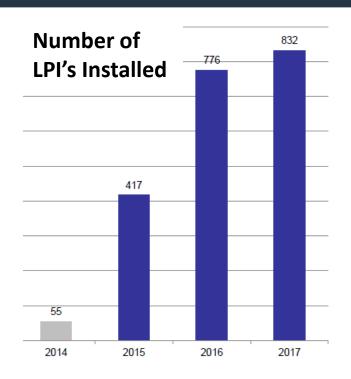








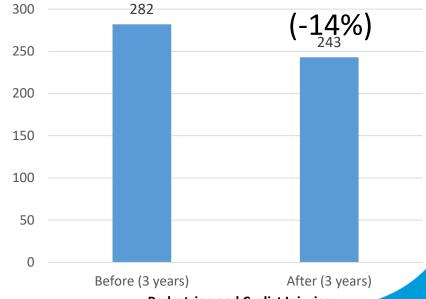
Effectiveness of LPIs: New York City







Leading Pedestrian Interval



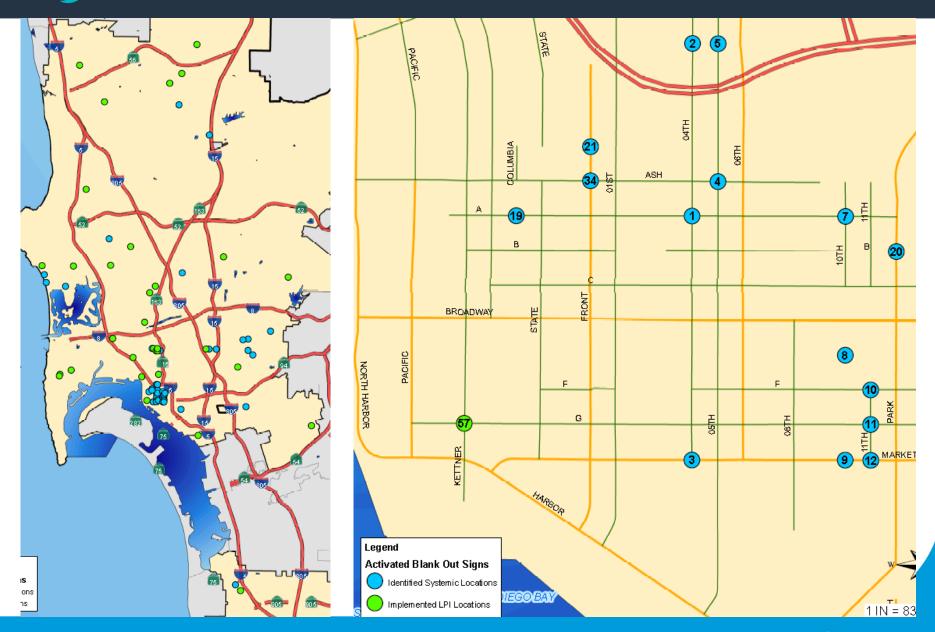
Pedestrian and Cyclist Injuries



COUNTERMEASURE: LEAD PEDESTRIAN INTERVAL

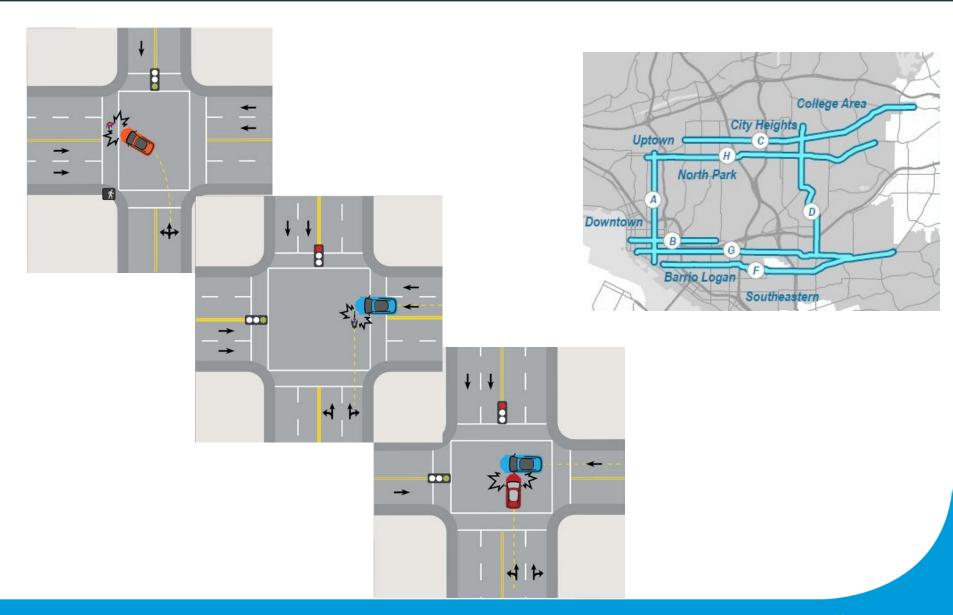


INITIAL LPI DEPLOYEMENT 66 INTERSECTIONS





Focus on Systemic Spots instead of Network





Countermeasure Shortcut – FHWA



Roadside Design Improvement at Curves



Reduced Left-Turn Conflict Intersections



Systemic Application of Multiple Low Cost Countermeasures at Stop-Controlled Intersections



Leading Pedestrian Interval



Local Road Safety Plan



USLIMITS2



Enhanced Delineation and Friction for Horizontal Curves



Longitudinal Rumble Strips and Stripes on Two-Lane Roads



Median Barrier



Safety EdgesM



Backplates with Retroreflective Borders



Corridor Access Management



Dedicated Left- and Right-Turn Lanes at Intersections



Roundabouts



Yellow Change Intervals



Medians and Pedestrian Crossing Islands in Urban and Suburban Areas



Pedestrian Hybrid Beacon



Road Diet



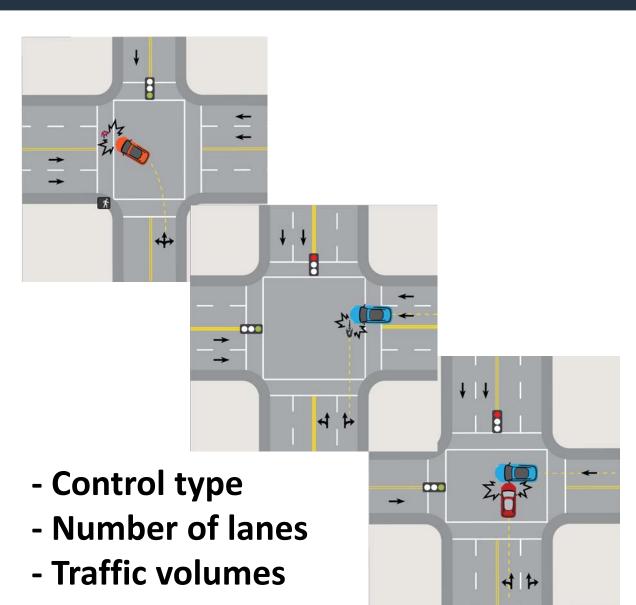
Walkways



Road Safety Audit



Hot Spot Shortcut – San Diego











at Intersections



Roundabouts



QUESTIONS?

City of San Diego/Vision Zero/Safety Initiatives

https://www.sandiego.gov/sites/default/files/systemic-safety-the-data-driven-path-to-vision-zero.pdf

Special thanks to

Safe Transportation Research and Education Center



and Chen-Ryan Associates