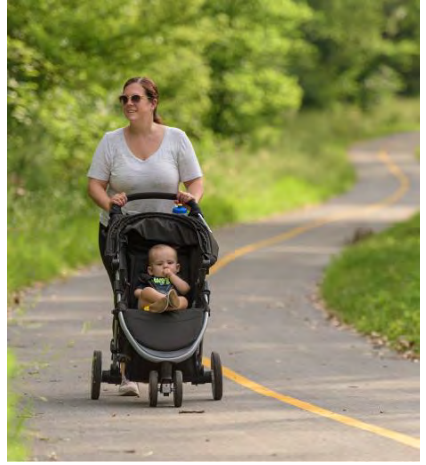
Chicago Metropolitan Agency for Planning

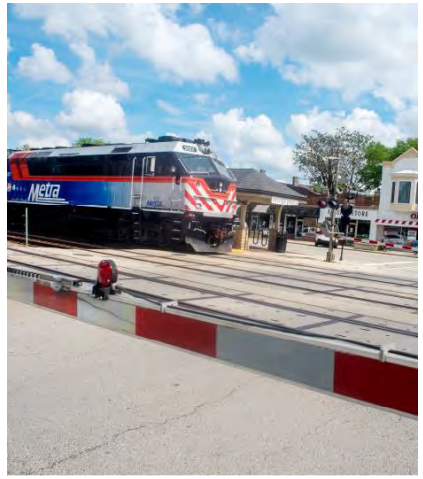
Transportation Technology and Operations Coalition

May 5, 2023

9:30 – 11:30 a.m.

When you are not speaking, please mute your microphone to reduce background noise.





1.0 Welcome

Stephen Zulkowksi, KDOT (Chair)

2.0 Agency updates

Open discussion among TTOC members regarding current work projects, topics of interest for upcoming meetings, etc.

3.0 CMAP announcements

Aaron Brown and Noah Harris, CMAP

4.0 Speed policy and safety

Victoria Barrett, CMAP

Kyle Armstrong, IDOT

David Smith, CDOT

Brian Roberts, Cook County DOTH

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Managing speed to improve travel safety

Victoria Barrett

Senior Transportation Planner

@cmapillinois

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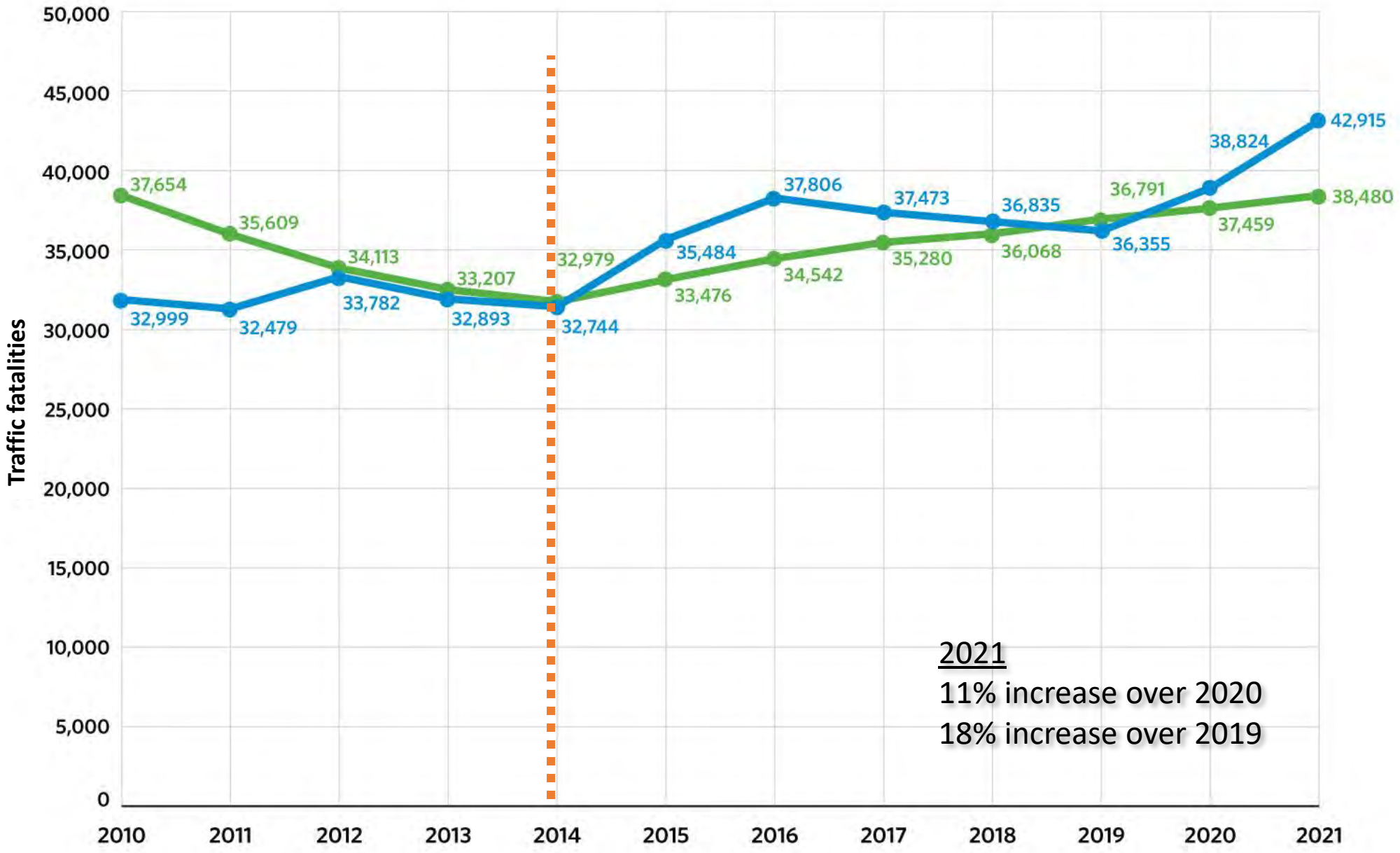
Setting the stage with safety data

Traffic fatalities

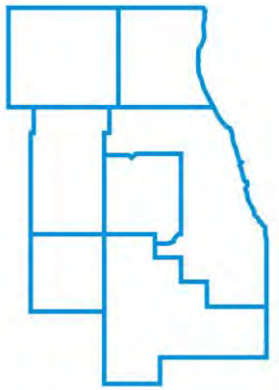
Nationwide
2010–2021



Source: Fatality Analysis Reporting System, National Highway Traffic Safety Administration Note: 2021 values are NHTSA estimates

Traffic Fatalities

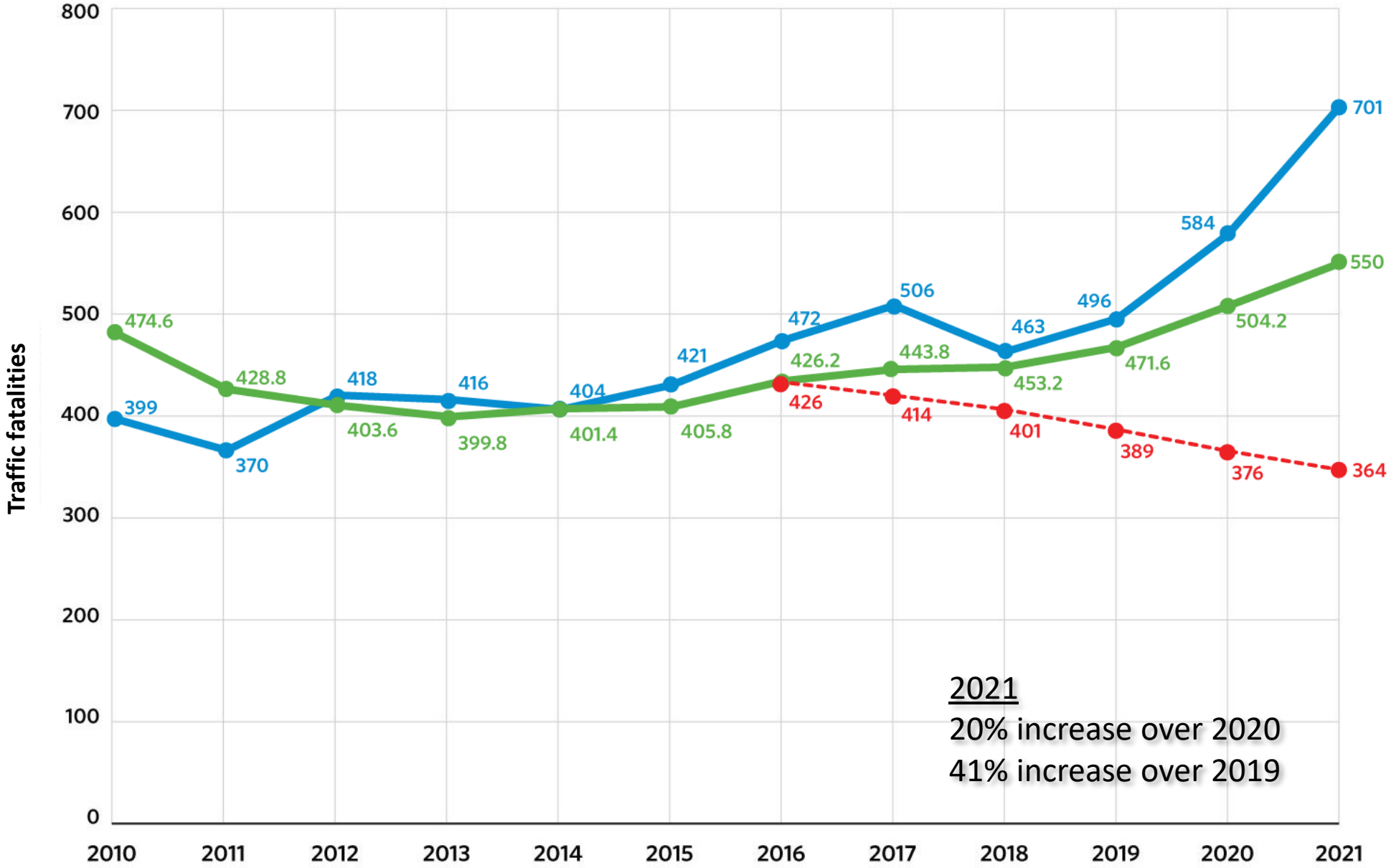
CMAP region
2010–2021



Annual fatalities

5-year average fatalities

Target 5-year average



Source: CMAP analysis of Illinois Department of Transportation data

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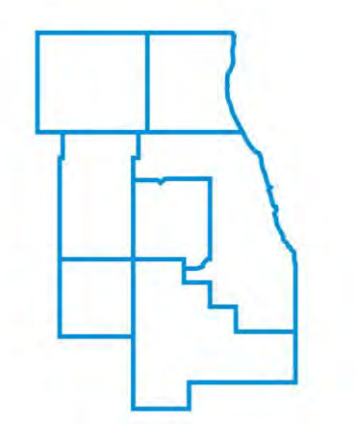
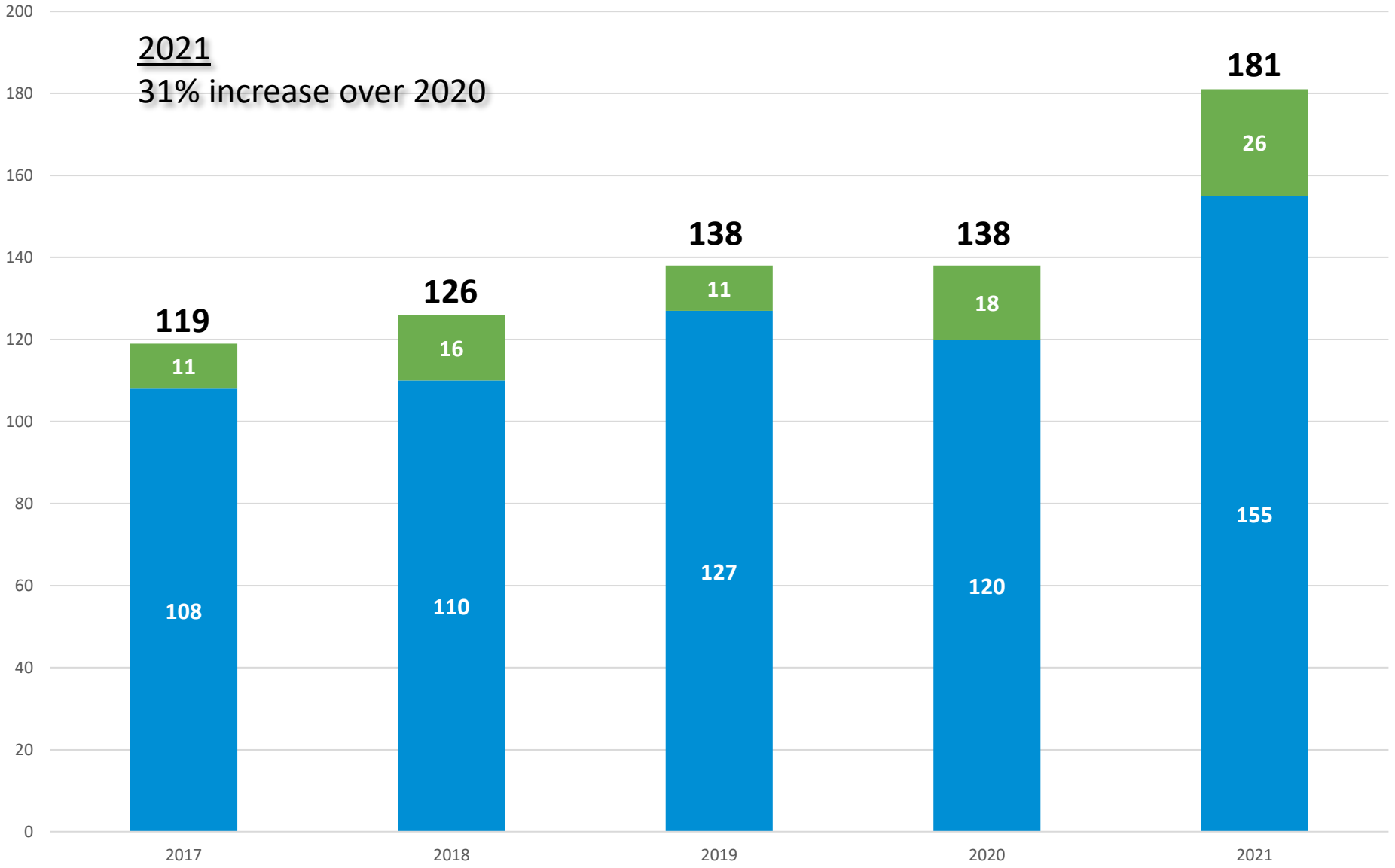
Pedestrian and bicyclist fatalities

CMAP region
2017–2021





Source: CMAP analysis of Illinois Department of Transportation data

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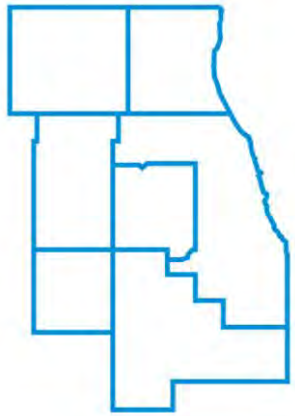
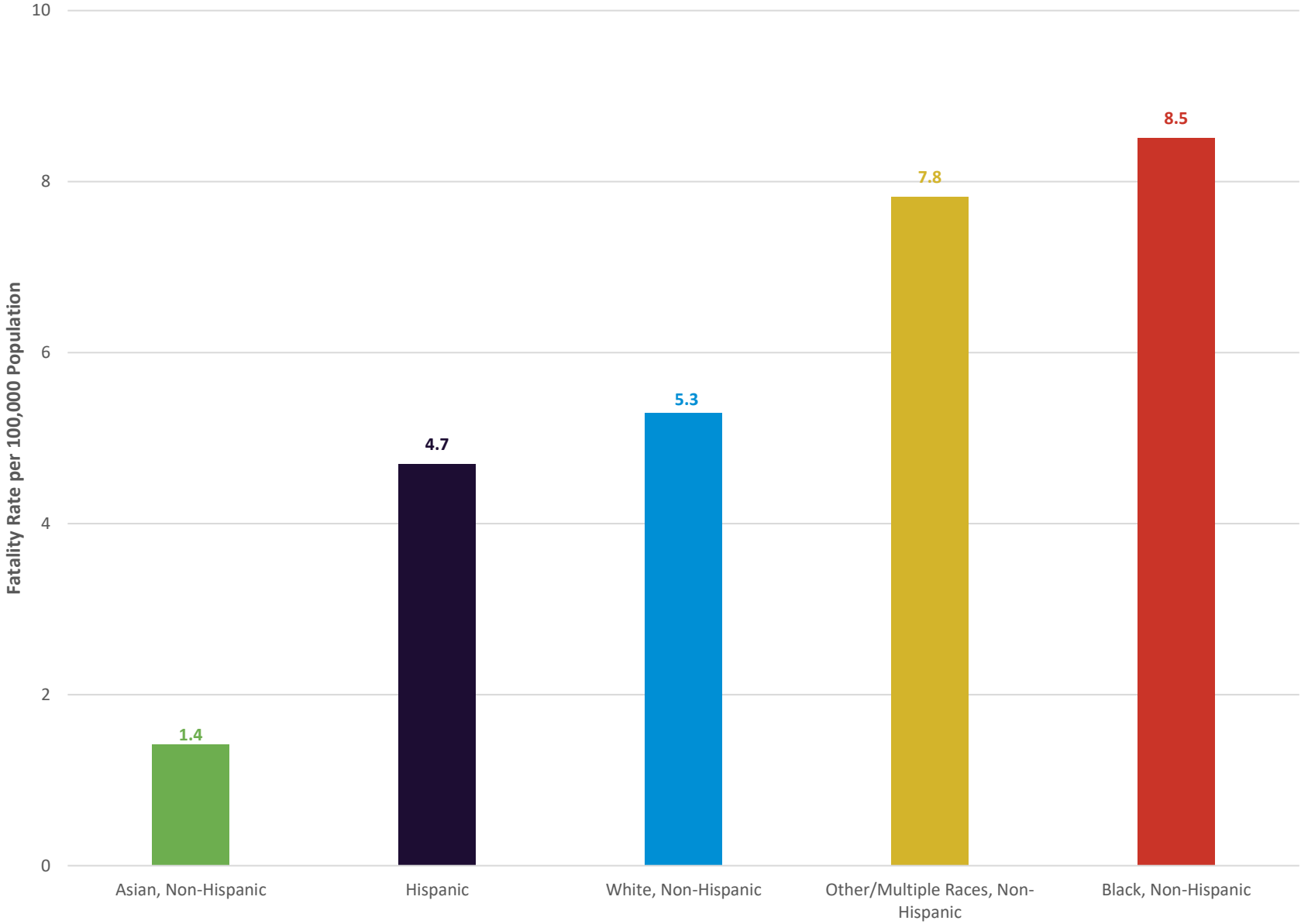
Traffic fatality rates by race, 5-year average

CMAP region
2015–2019





Note: Fatalities that did not have race information by year 2019: 23; 2018: 1;2017: 1; 2016: 5; in 2015: 3.

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Speeding is a deadly epidemic

Share of fatal and serious injuries involving speeding or aggressive driving

CMAP region, 2019

Nationally, the National Highway Traffic Safety Administration reports 29% of traffic fatalities are speeding-related

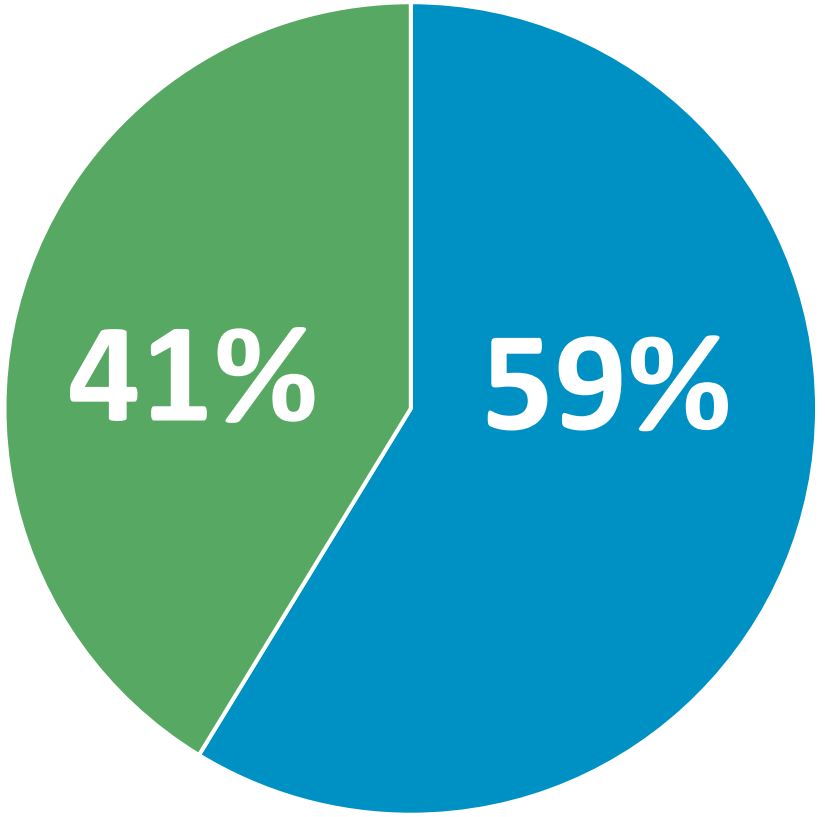

Chart reports the share of crashes involving speeding or aggressive driving where the causes of crashes are known in crash reporting.
Source: CMAP analysis of Illinois Department of Transportation data

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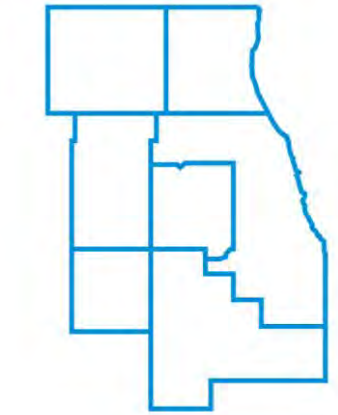
Fatal and serious injury rates for speeding-related crashes by county and road jurisdiction

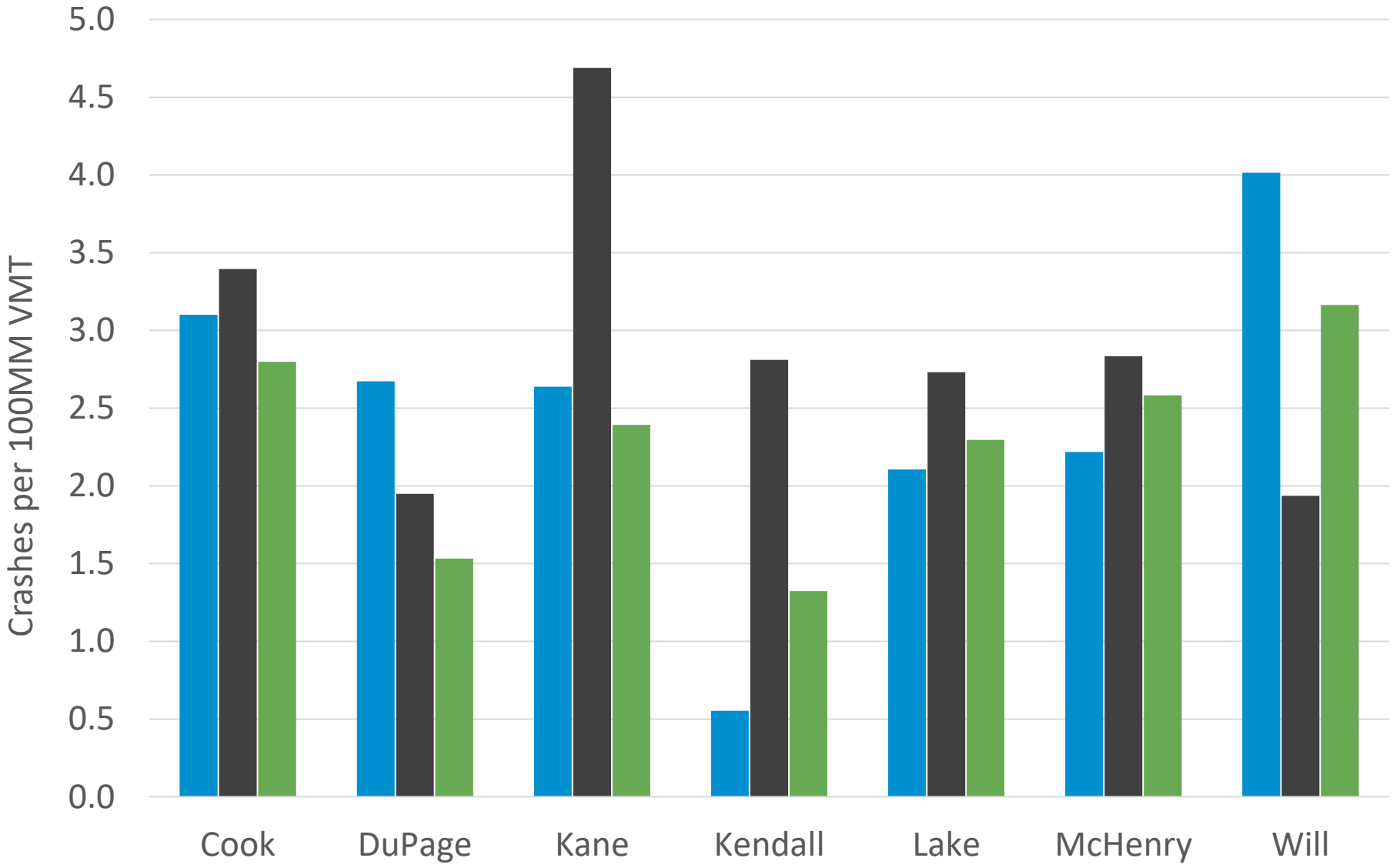
CMAP region, 2019



County

Municipal

State and toll



Total municipal VMT for the region is approximately half with a functional class of "local roads" and the other half arterials and collectors.
Share of VMT on arterials and collectors varies within each county.
Source: CMAP analysis of Illinois Department of Transportation and HERE Technologies data

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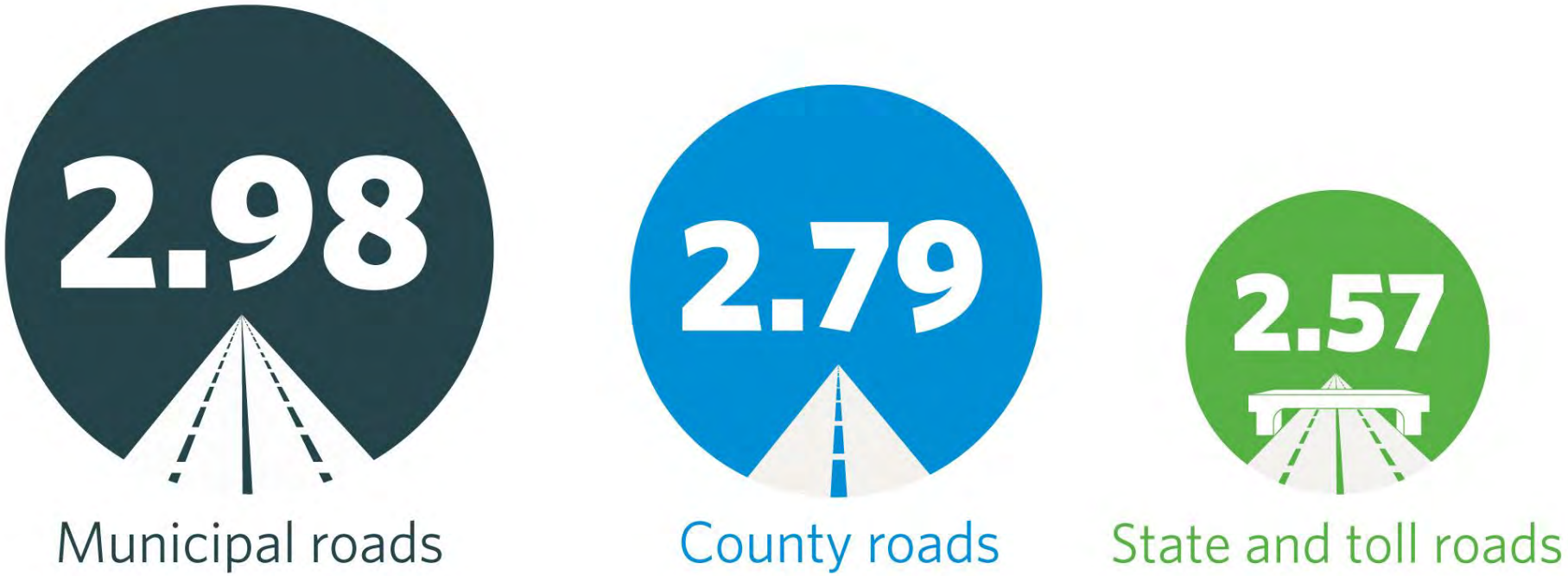
Where are crashes occurring?

Rate of fatal and serious injuries by road type



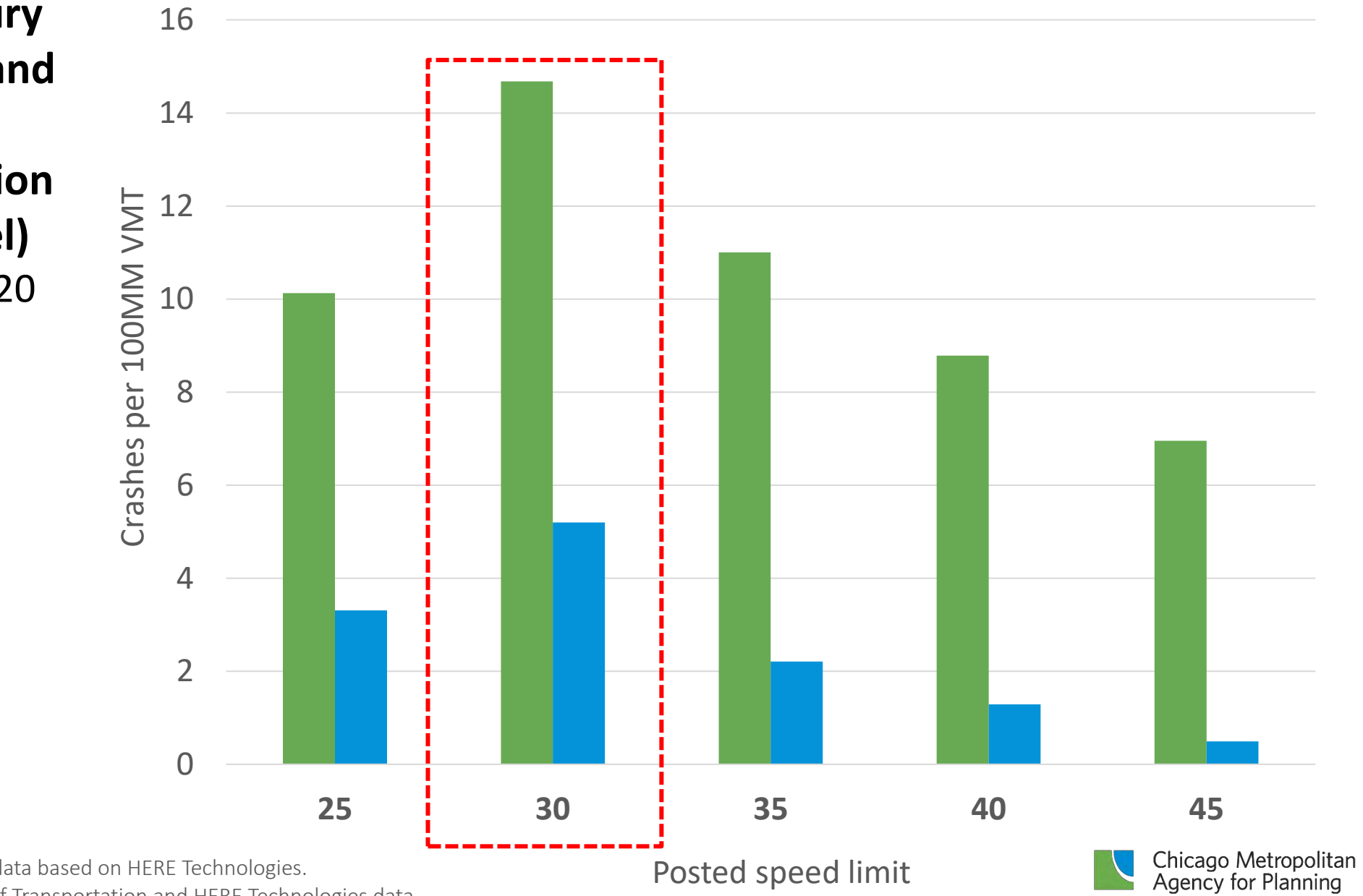
Speeding-related crashes per 100 million vehicle miles traveled in northeastern Illinois

STAR
Safe Travel for All Roadmap

Chicago Metropolitan Agency for Planning

Fatal and serious injury rate by travel mode and posted speed limit (crashes per 100 million miles of vehicle travel)

CMAP region, 2015–2020



Estimated annual VMT in sample. Speed limit data based on HERE Technologies.

Source: CMAP analysis of Illinois Department of Transportation and HERE Technologies data

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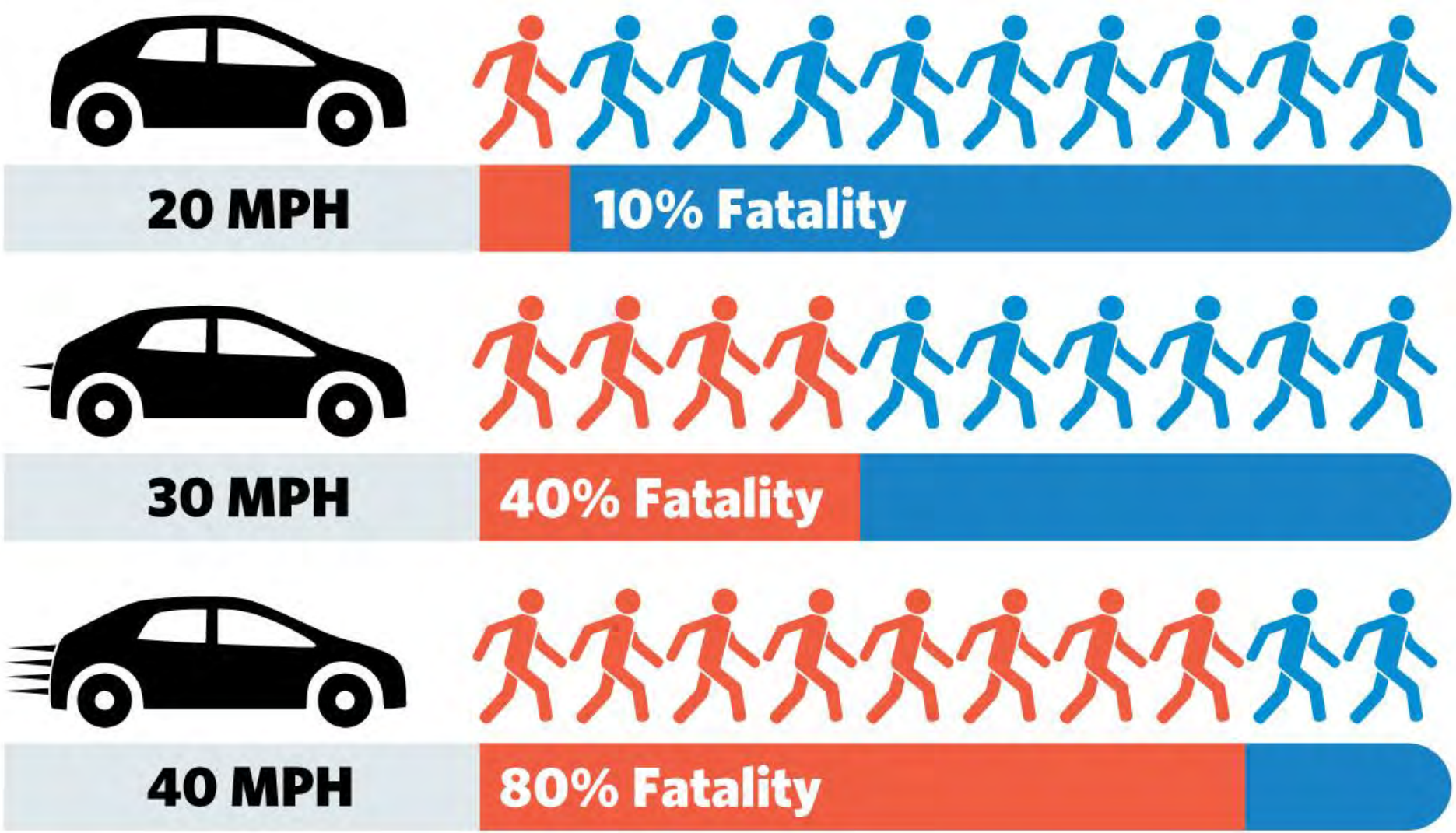
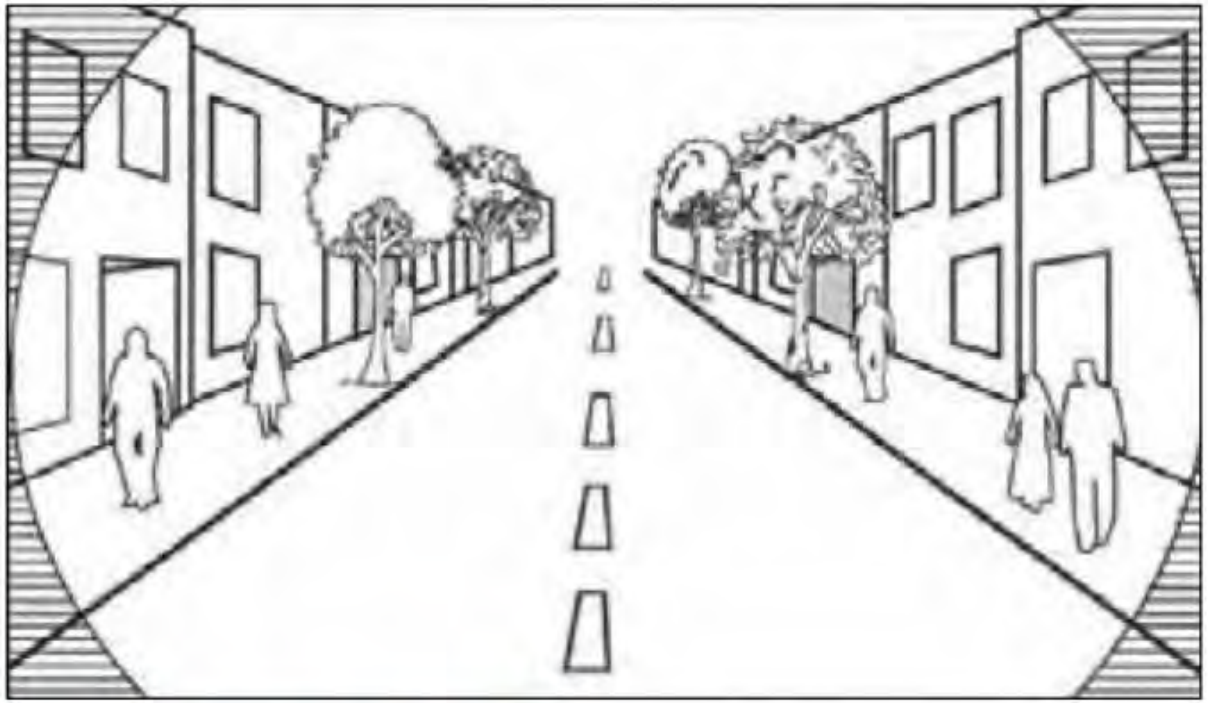
If hit by a car traveling:

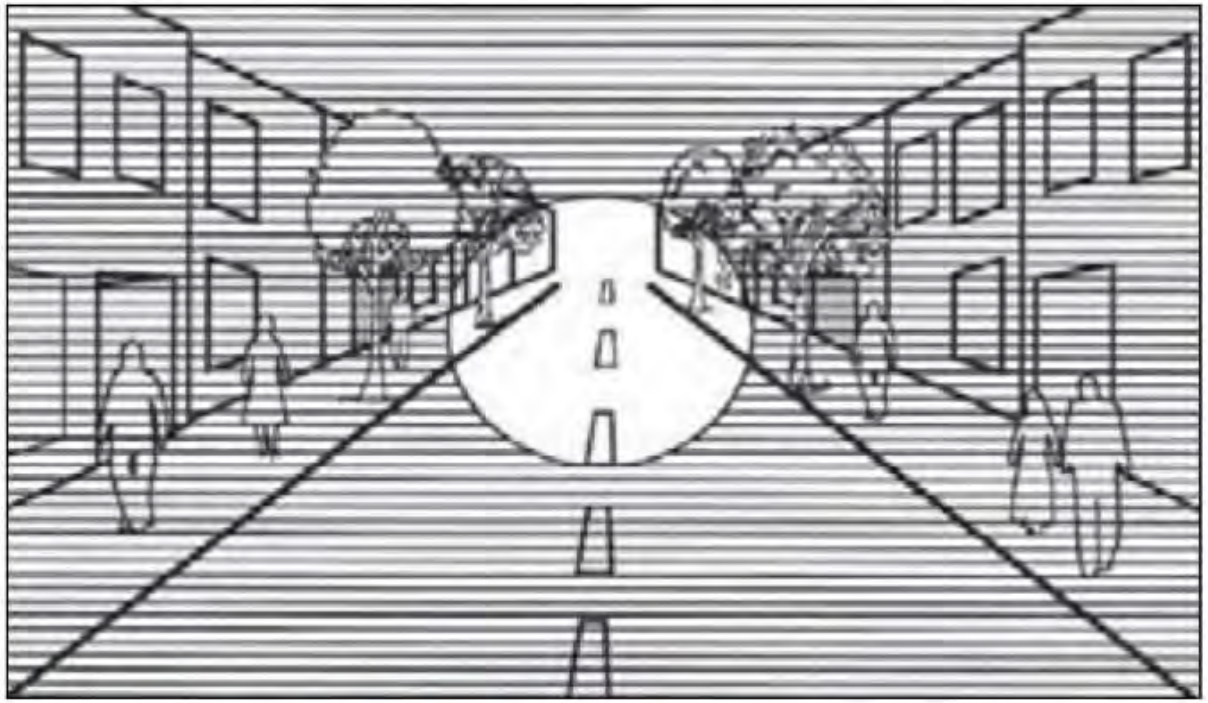


Source: U.S. Department of Transportation

Speed decreases a driver's field of vision

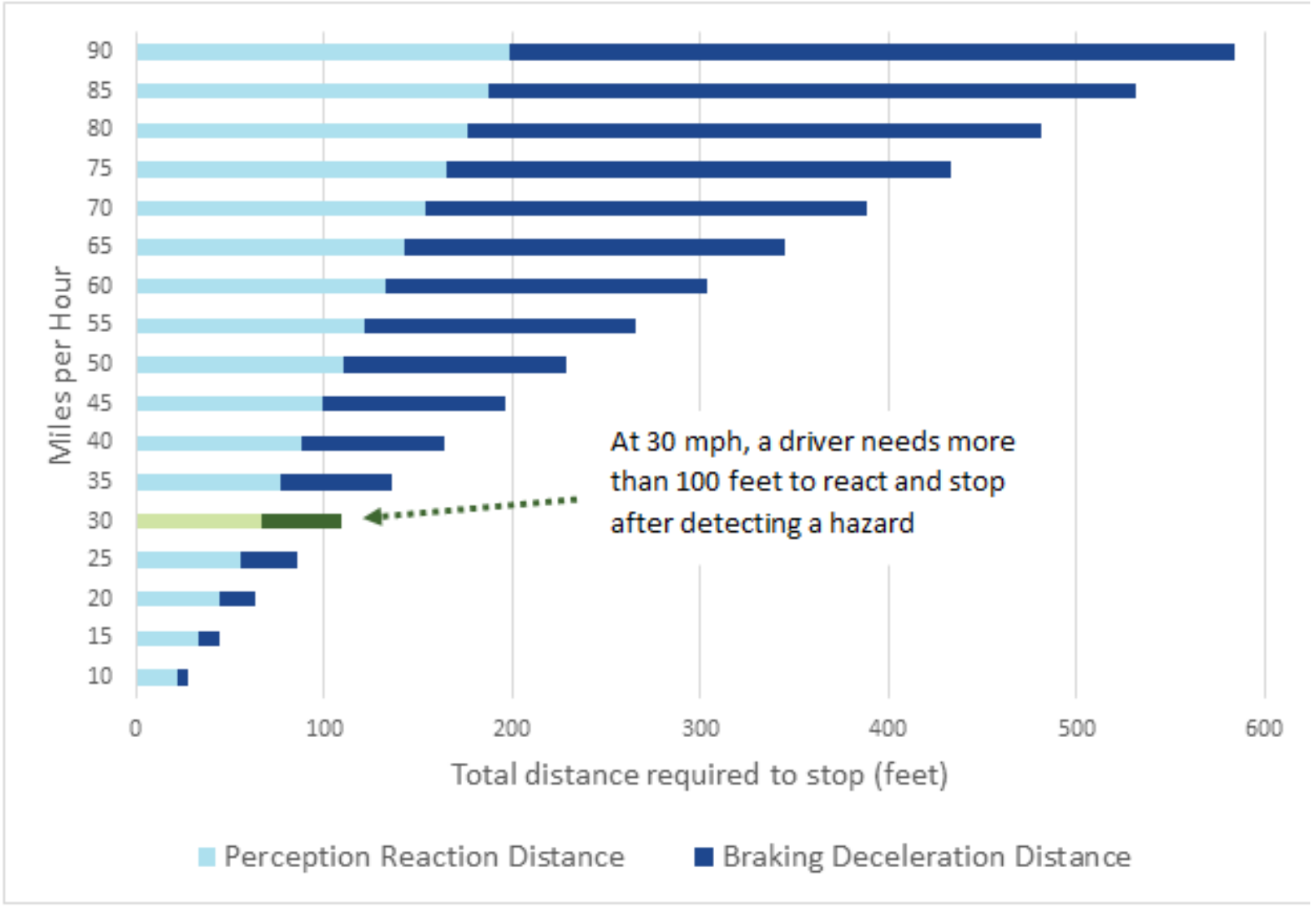


Field of vision at 15 MPH



Field of vision at 30 to 40 MPH

Higher speeds increase the distance required for a driver to stop *

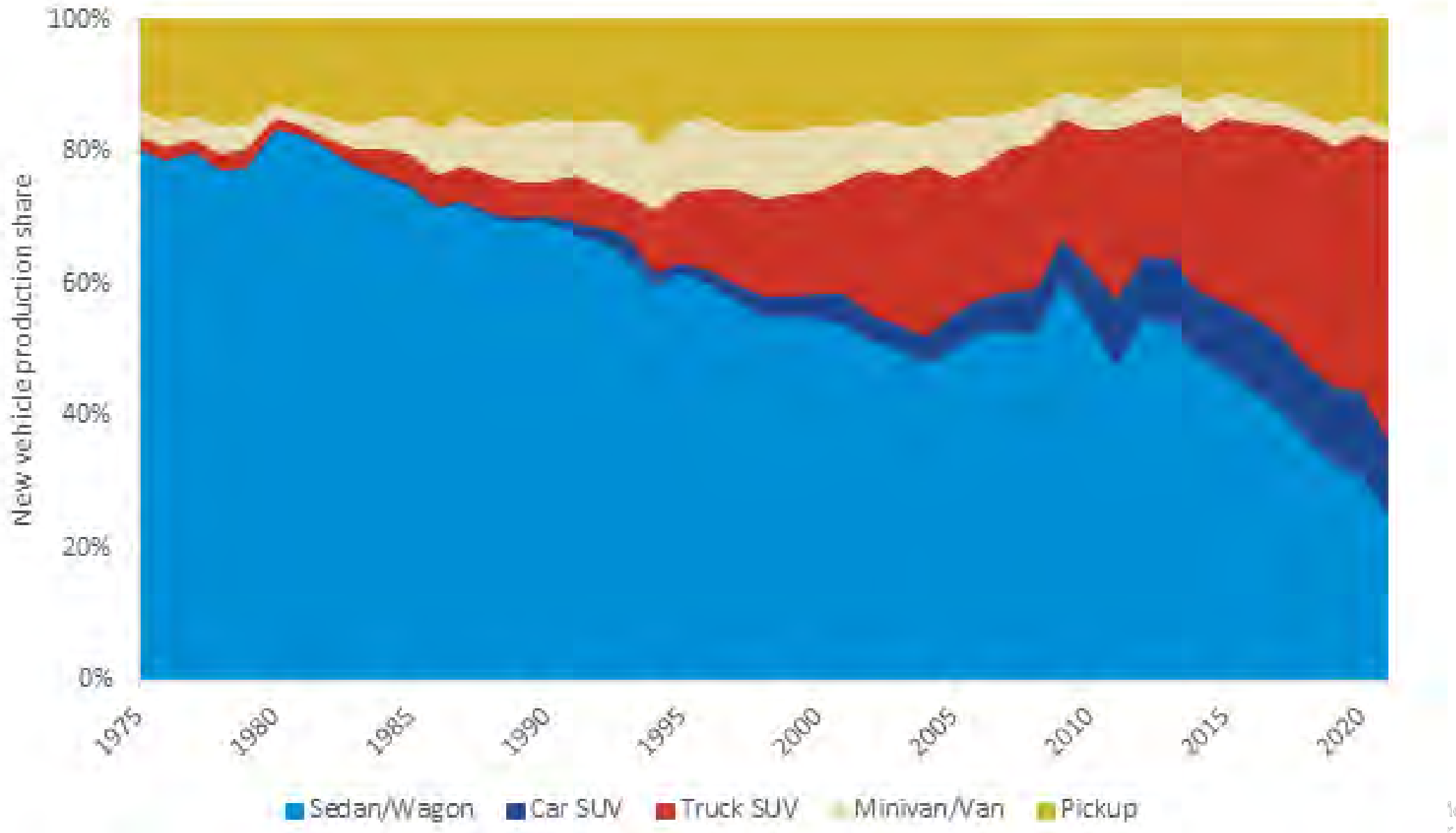


Distance required for a driver to react and stop a vehicle by travel speed.

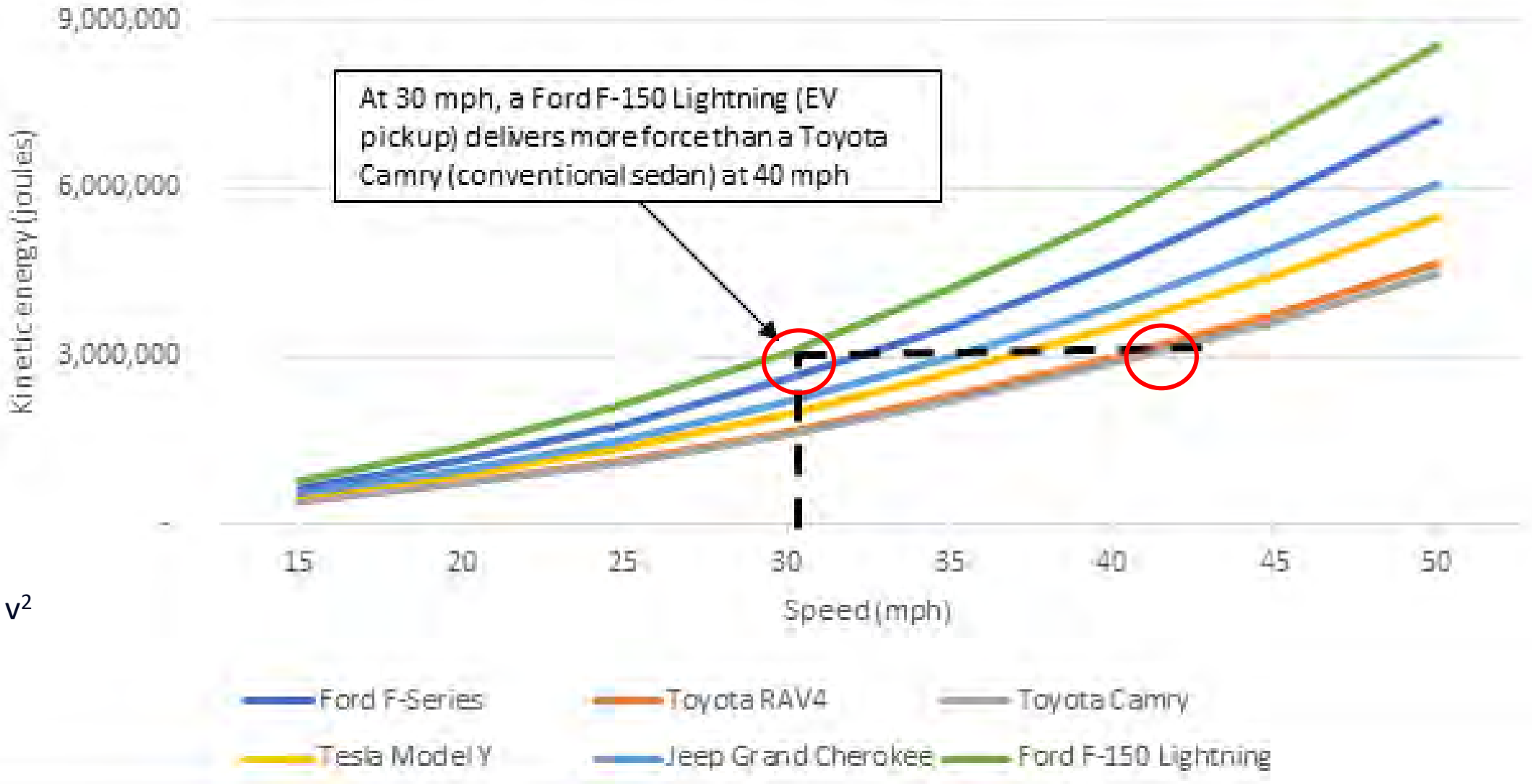
Source: CMAP analysis of NACTO report "Vehicle Stopping Distance and Time"

*average vehicle weight ~2013

Vehicles are larger and heavier today



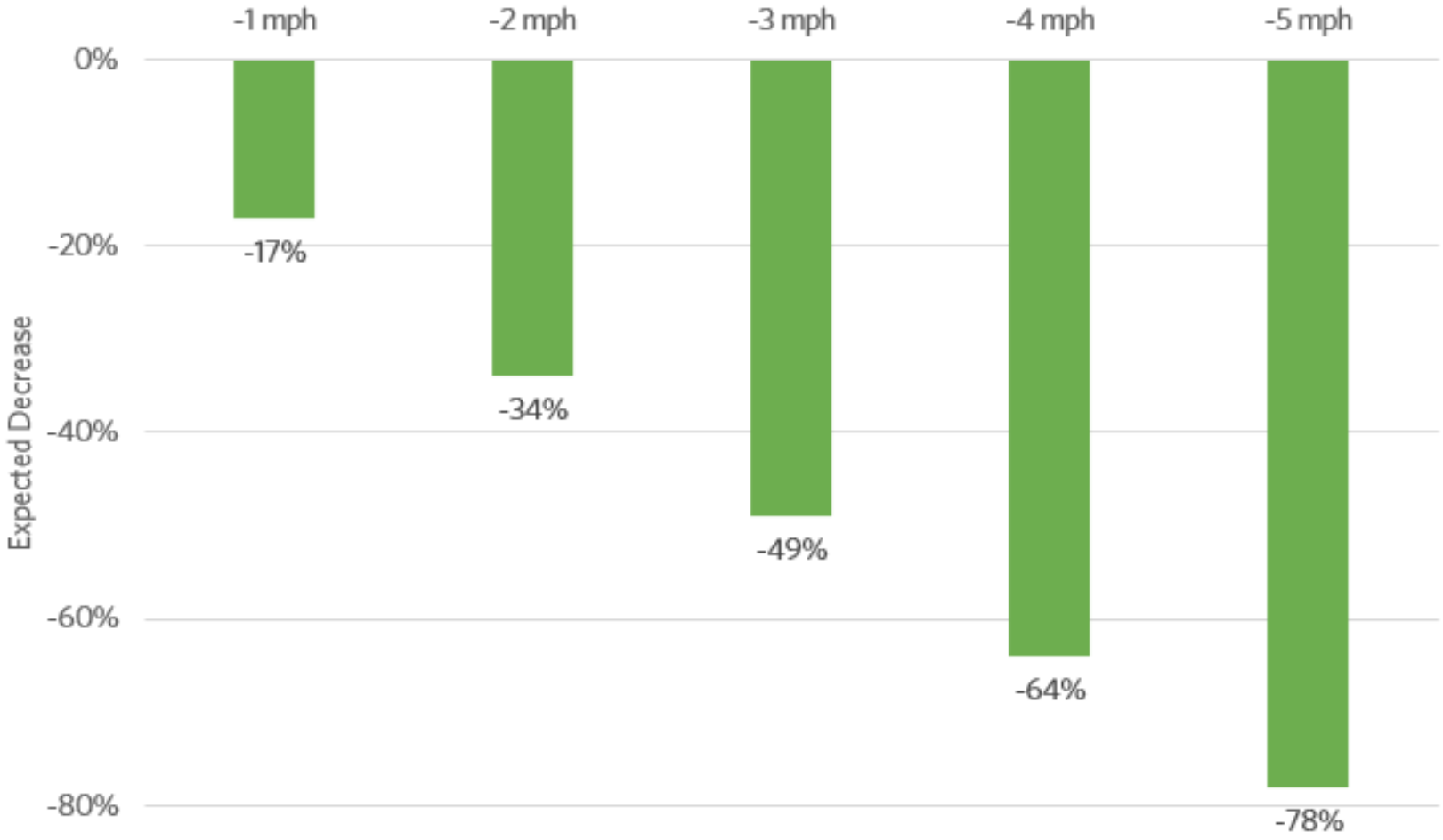
Kinetic energy increases with vehicle weight and speed



K.E. = 1/2 m v^2

Speed management makes a big difference in reducing the risk of fatal crashes

Figure 10. Small reductions in operating speeds from 30mph can significantly decrease the likelihood of fatal crashes



Expected decrease in fatal crashes based on reduced operating speeds

Note: Figure based on "Crash Modification Factors for Changes in Average Operating Speed" from the Highway Safety Manual, 1st Edition. The figures show how small reductions of 1 or 2 mph in average motor vehicle speed, especially at lower initial speeds, can significantly improve safety by reducing crash rates by the estimated percent (AASHTO, 2010). Crash effects are also expressed as crash modification factors (CMFs) or multipliers of baseline crashes. So, a crash reduction factor (CRF) of 17% or 0.17 would be a CMF of 0.83 (or 1 – 0.17).

Source: Chicago Metropolitan Agency for Planning depiction of Pedestrian and Bicycle Information Center data.

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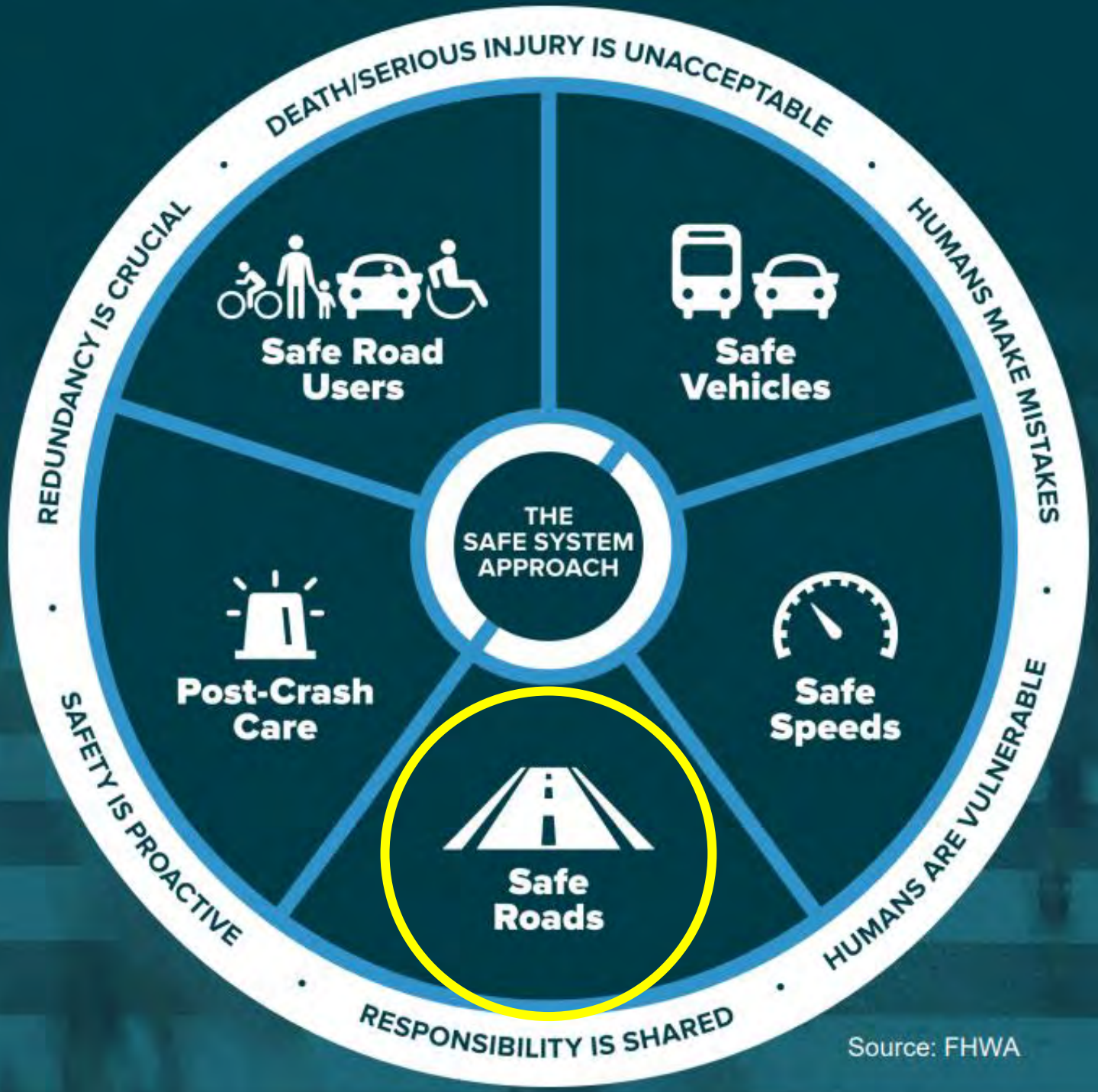
Strategies to Manage Speeding

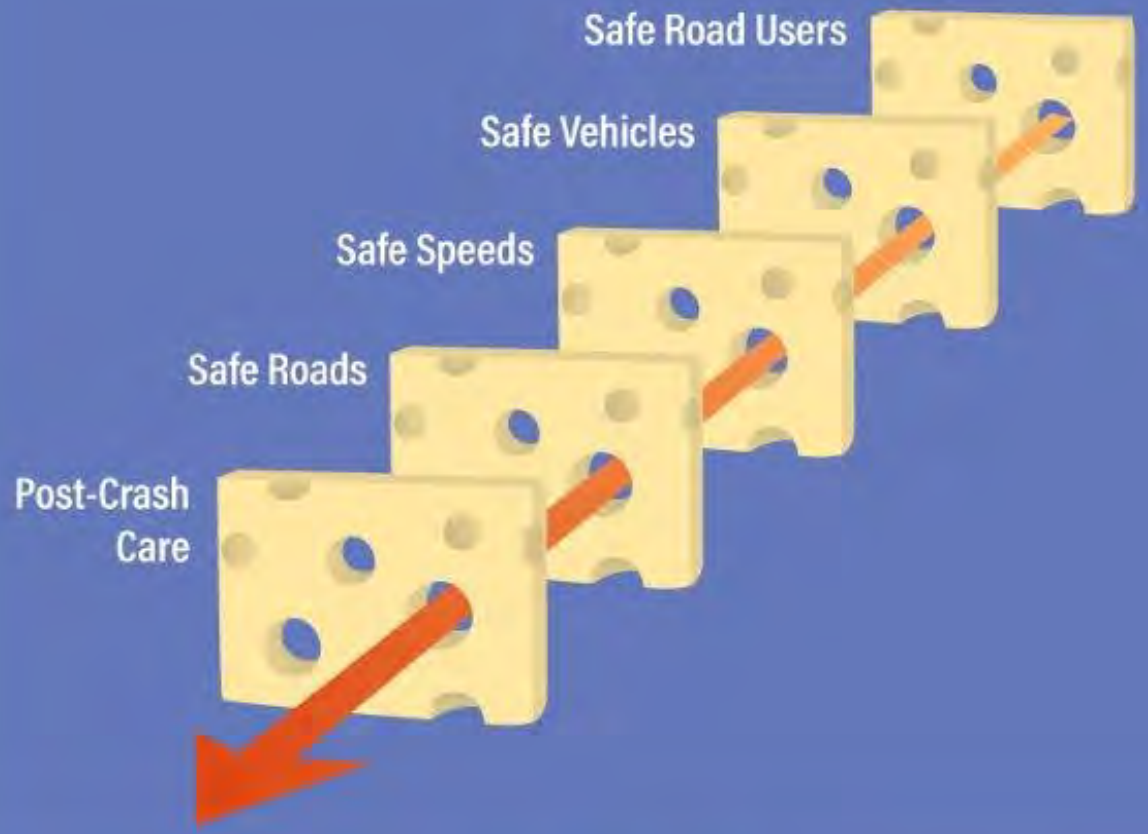
THE SAFE SYSTEM APPROACH



Source: FHWA

The "Swiss Cheese Model" of redundancy creates layers of protection.

Death and serious injuries only happen when all layers fail.



The Safe System Approach

CAMBRIDGE SYSTEMATICS

GHSA
Governors Highway Safety Association
The States' Voice on Highway Safety

Self-Enforcing Streets

"A self-enforcing road (sometimes referred to as a "self-explaining roadway") is **a roadway that is planned and designed to encourage drivers to select operating speeds in harmony with the posted speed limit**."

- Self-Enforcing Roadways Guidance Report (FHWA, 2018)

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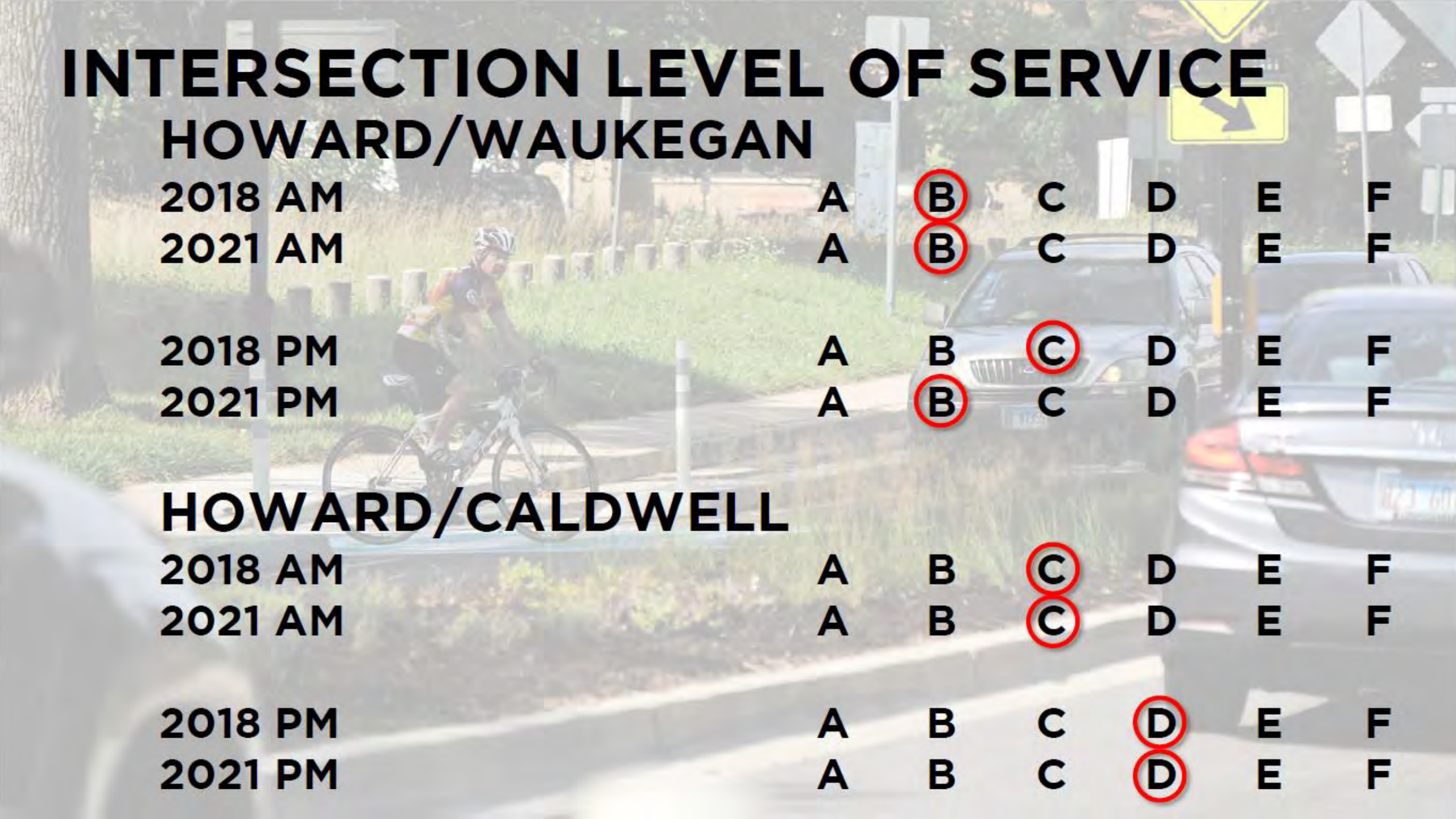
Figure 19. A recently completed road diet in Niles has improved safety by reducing travel lanes and adding features that support lower speeds.

Note: The intersection of Howard Street and the North Branch Trail in the Village of Niles

Credit: Christopher Burke Engineering



INTERSECTION LEVEL OF SERVICE

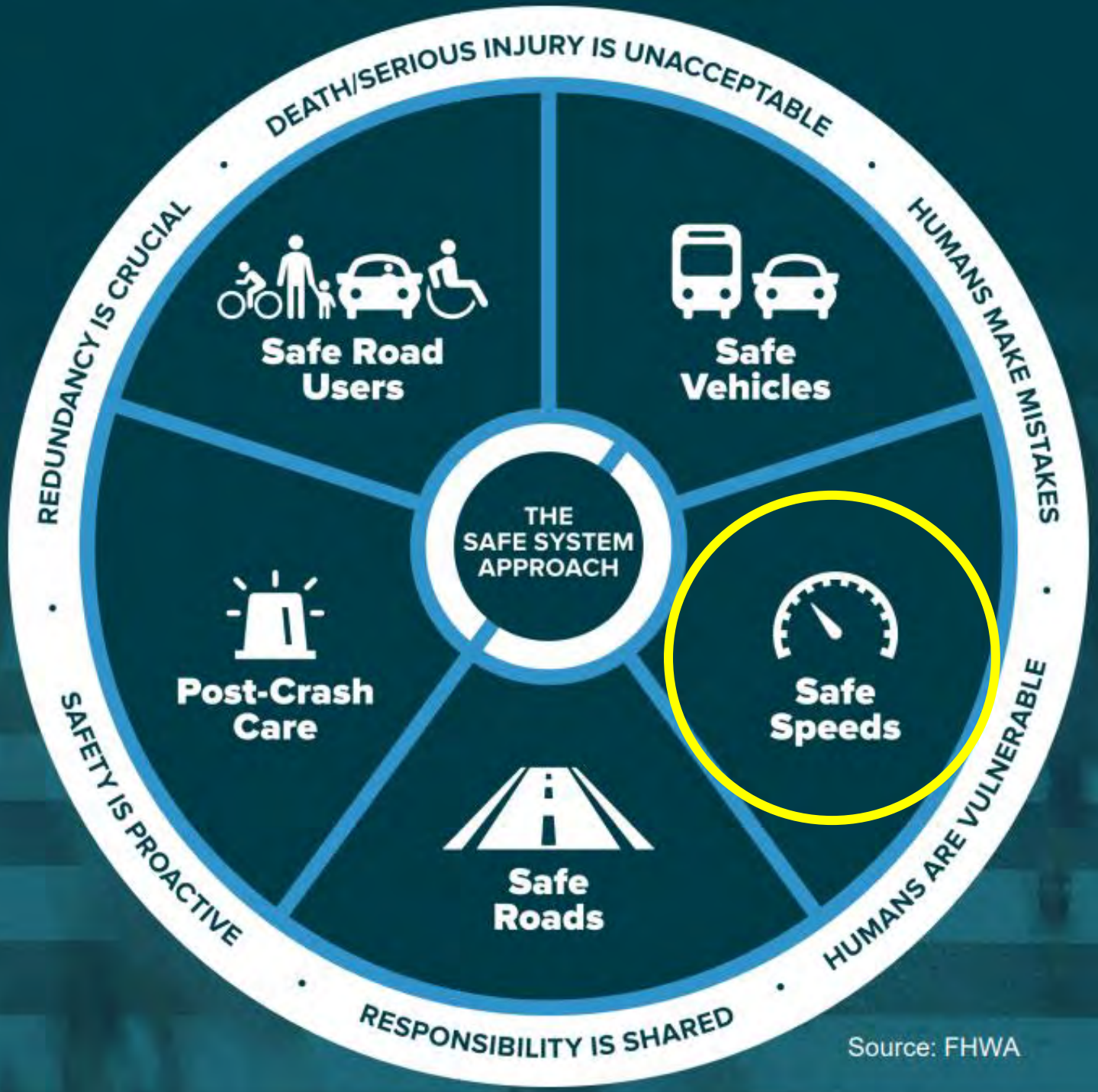
HOWARD/WAUKEGAN

2018 AM	A	**B**	C	D	E	F
2021 AM	A	**B**	C	D	E	F
2018 PM	A	B	**C**	D	E	F
2021 PM	A	**B**	C	D	E	F

HOWARD/CALDWELL

2018 AM	A	B	**C**	D	E	F
2021 AM	A	B	**C**	D	E	F
2018 PM	A	B	C	**D**	E	F
2021 PM	A	B	C	**D**	E	F

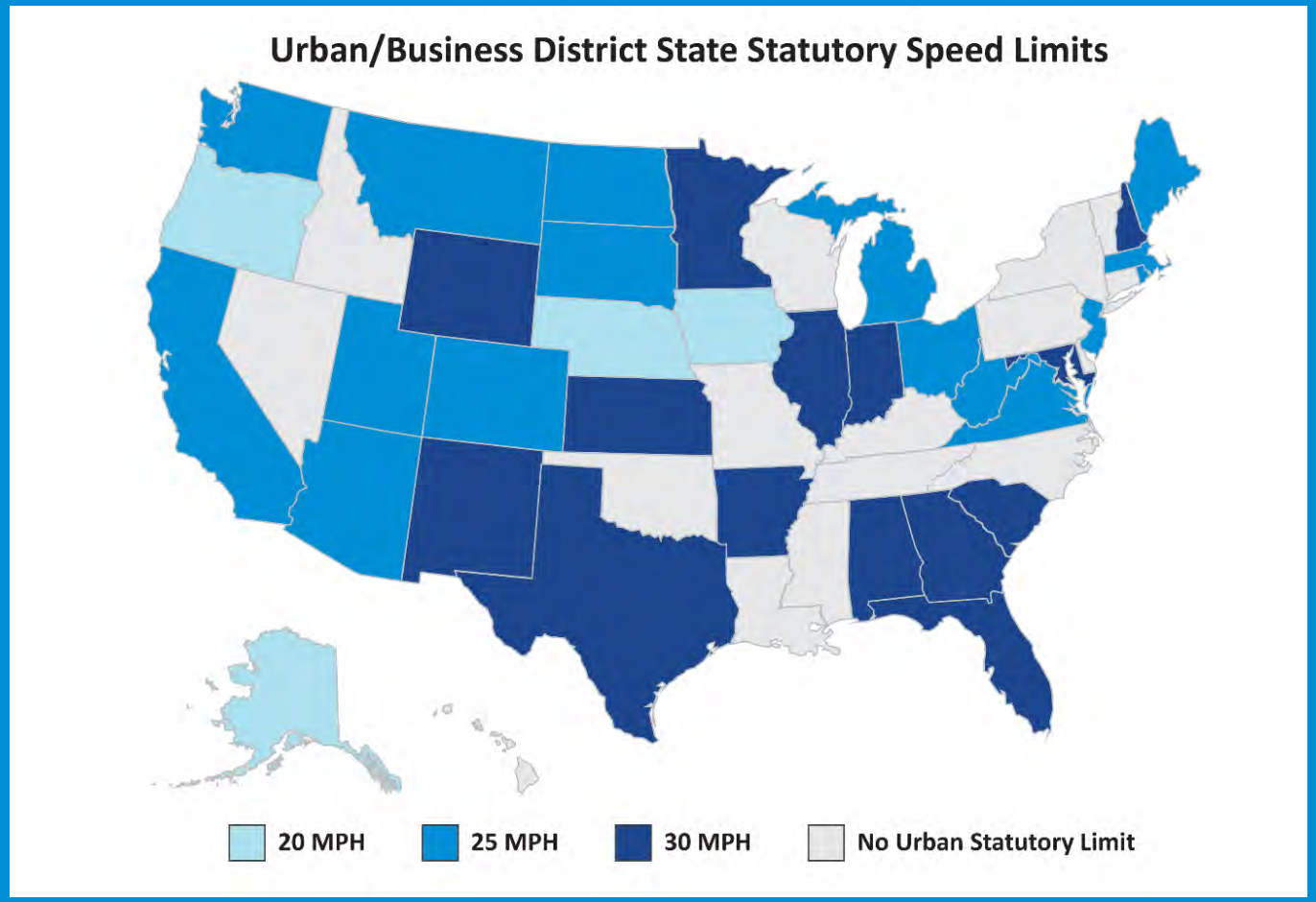
THE SAFE SYSTEM APPROACH



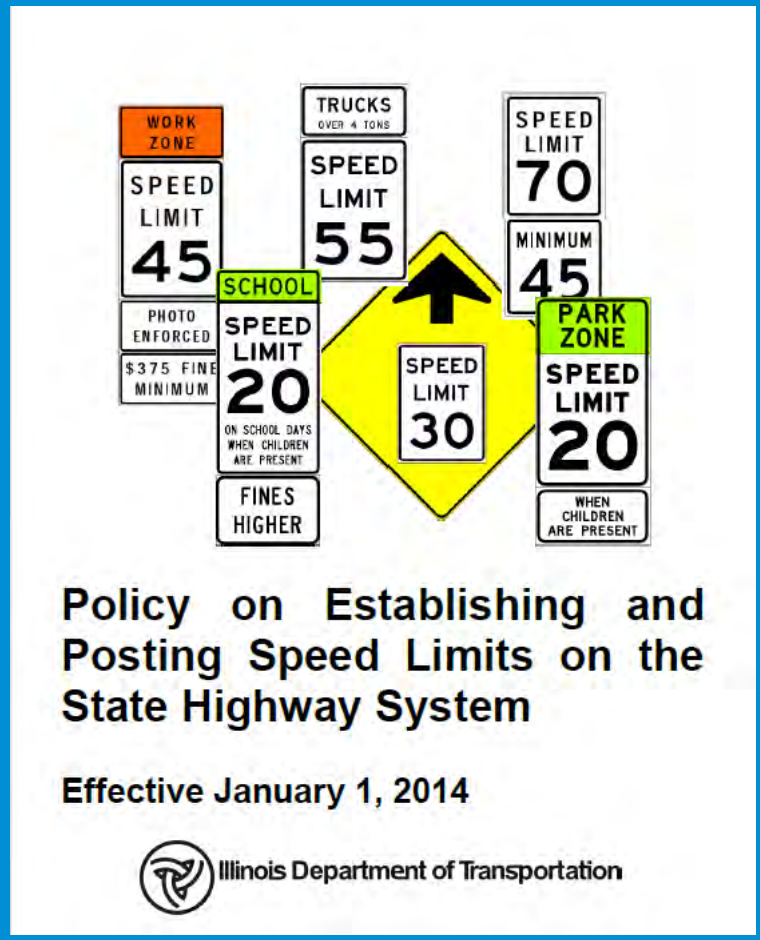
Source: FHWA

Reduce speed limits

1. Legislative



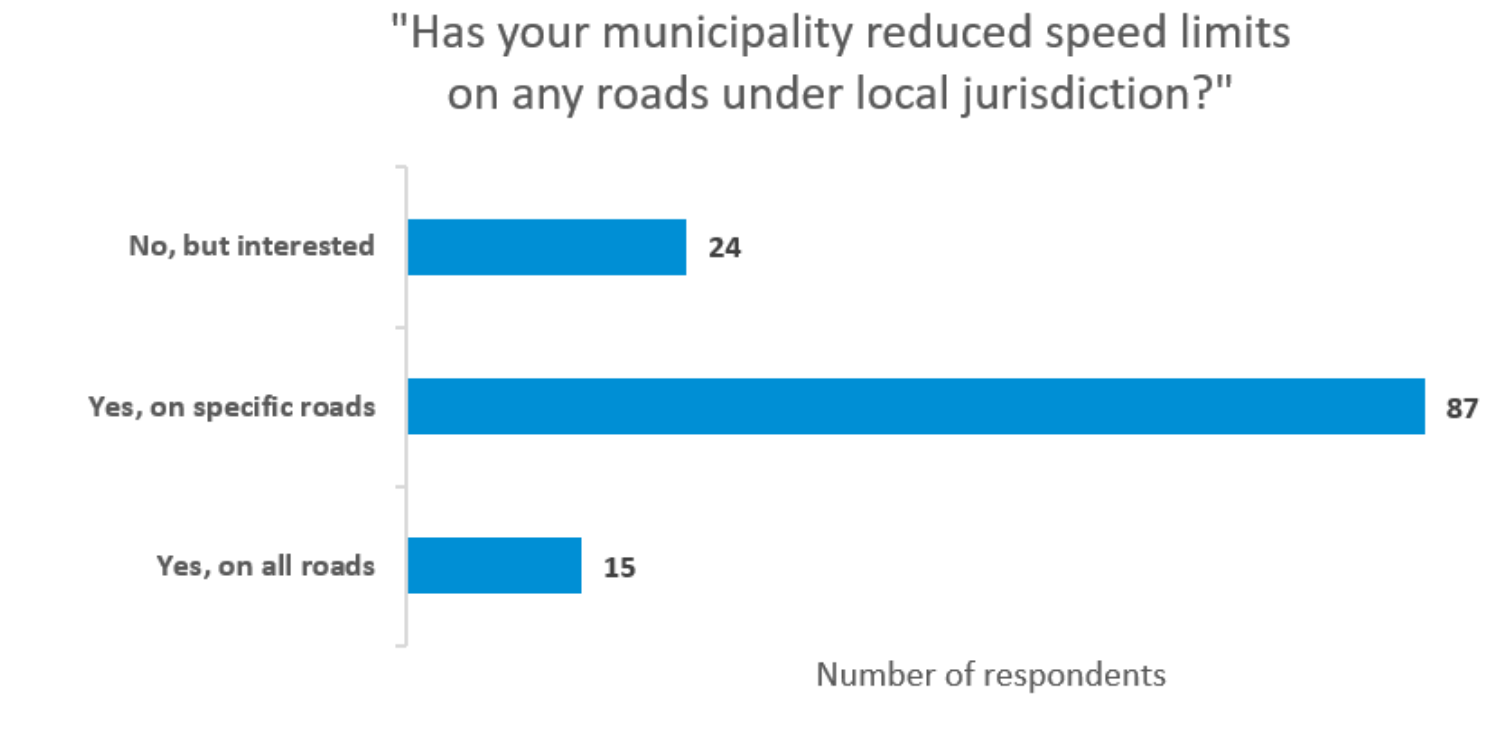
2. Policy



Reduce speed limits

3. Local ordinance

Figure 27. Municipalities in northeastern Illinois are taking action to lower speed limits under their jurisdictions



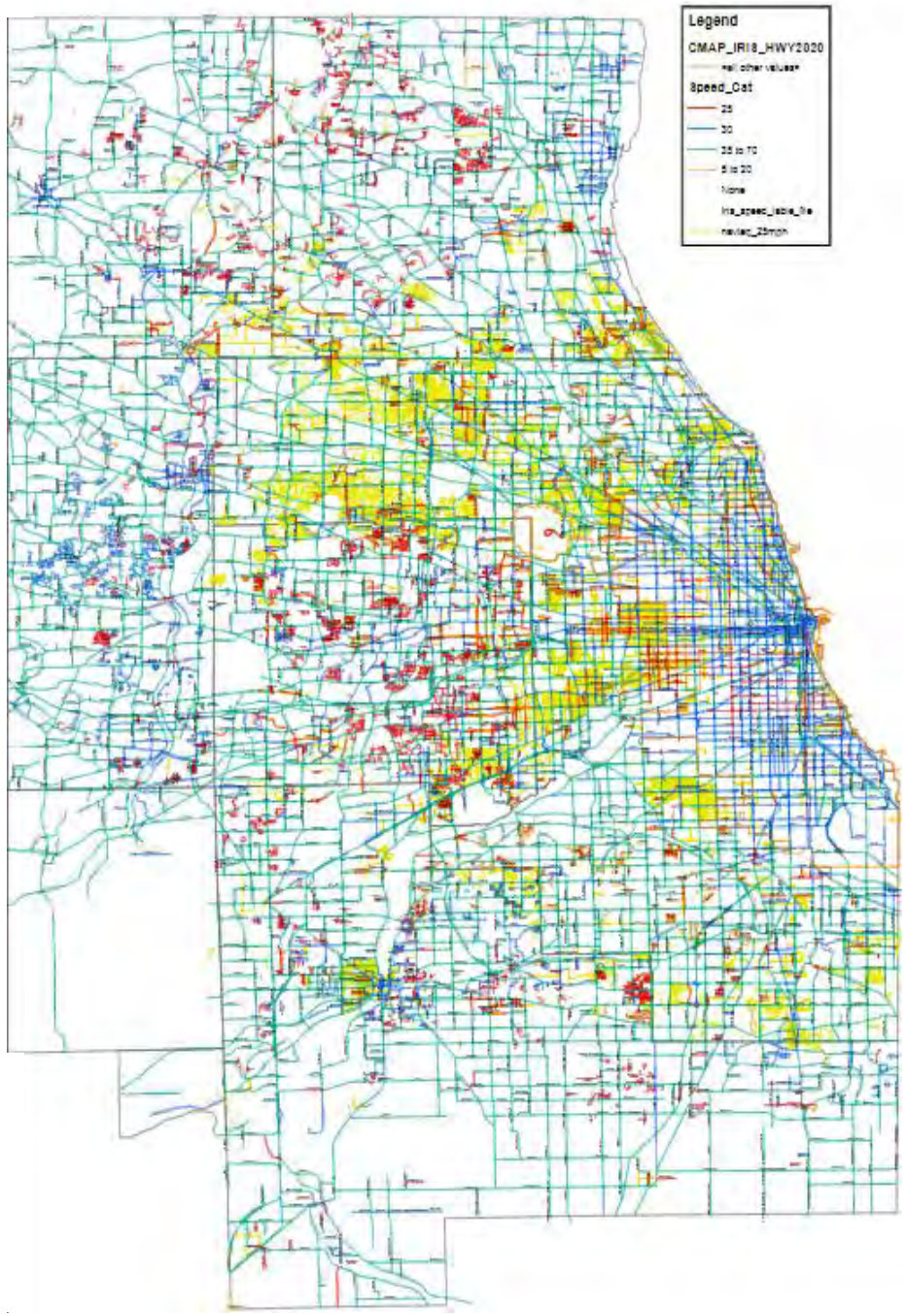
Source: CMAP Municipal Survey, 2022

THE SAFE SYSTEM APPROACH

Source: FHWA

Lessons in managing speed with safe road users

- Create a culture around safe speeds
  - increase awareness of dangers of speeding
  - media campaigns with positive social norms
  - increase content related to speeding in driver's education programs, commercial and personal
- Center enforcement programs in safety, equity, and deterrence
  - expand automated enforcement as a tool for local partners
  - create an equity framework for the use of AE and fines resulting from citations
- Improve data around speeding
  - increase quality and frequency of crash report training for police officers
  - analyze and provide data for local partners about speeding



Significant data gaps in understanding speeding in the region

Regional Speed Data project to:

- Purchase extensive third-party speed probe data
- Analyze and compile that data into actionable speed insights using computer science techniques

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Safe Streets and Roads for All: Planning grant

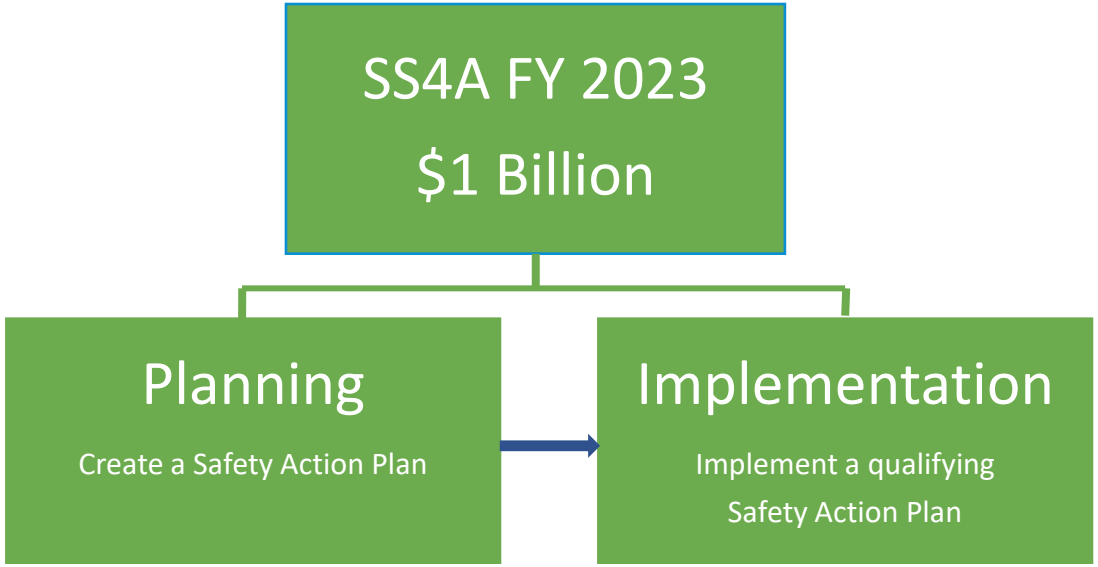
CMAP awarded a planning grant on February 1!

county-wide safety action plans based on a regional framework

- Finalizing the grant agreement with FHWA now
- 24-month grant period, $4.87M (80/20 match)
- Designed to meet SS4A implementation eligibility
- Regional framework and equitable engagement and Justice 40 approach
- Some will be updates and some will be new plans; all will build on existing plans

Safe Streets and Roads for All: New: Notice of Funding for FY 2023

Applications due Monday, July 10, 2023



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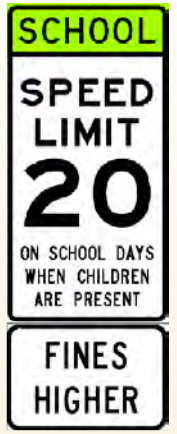
Chicago Metropolitan Agency for Planning

Chicago Metropolitan
Agency for Planning

Thank you!

@cmapillinois

Establishing Speed Limits



Illinois Statutes and Regulations

- Section 11-604 of the Illinois Vehicle Code
  - Local Agencies may alter statutory speed limits on all streets which are under their jurisdiction.
  - An engineering or traffic investigation is required to alter a statutory speed limit.

- Local Agencies are not required to obtain IDOT approval to establish speed zones on roads under their jurisdiction and are not required to follow IDOT procedures for establishing speed limits.

Statutory Speed Limits

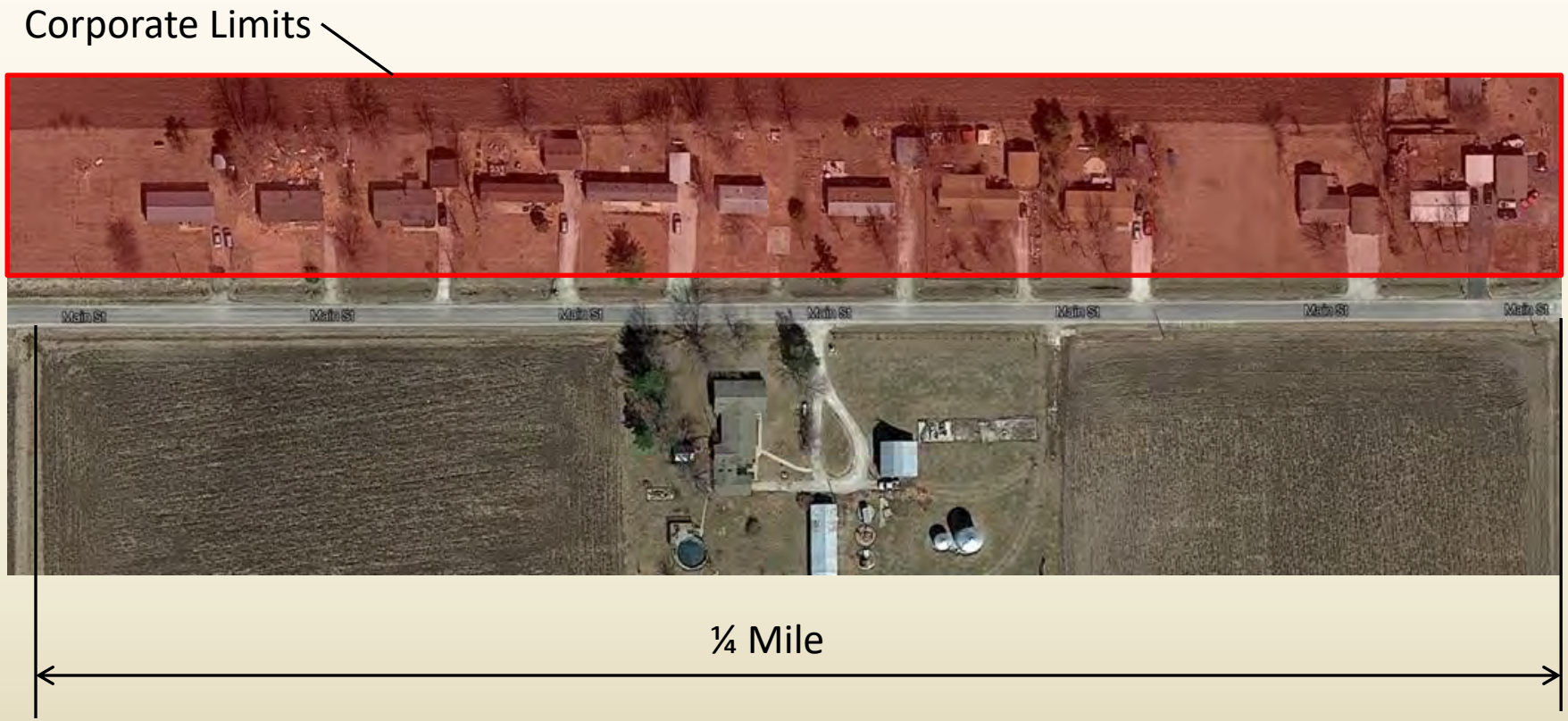
- Established by Section 11-601 of the Illinois Vehicle Code and are enforceable without signing.
  - Non-Freeway/Expressway roads outside of urban districts – 55 mph (all vehicle types)
  - All streets and highways inside urban districts – 30 mph (all vehicle types)
  - Alleys – 15 mph (All vehicle types)
  - Urban district limits and not corporate limits determine these speeds.

Urban District and Residence District

- Urban district
  - The territory contiguous to and including any street which is built up with structures devoted to business, industry or dwelling houses situated at intervals of less than 100 feet for a distance of a quarter of a mile or more.

- Residence district
  - For purposes of establishing maximum speed limits, a residence district shall be at least a quarter of a mile long with residences or residences and buildings in use for businesses spaced no more than 500 feet apart.

Urban District vs. Corporate Limits



Altered Speed Limits

Altered Speeds (park districts and municipalities):

- Cannot be less than 20 mph or greater than 55 mph in an urban district
- Outside of an urban district – cannot be less than 35 mph unless within a residence district.
- Cannot be less than 25 mph in a residence district
- No more than 6 alterations per mile
- Cannot have more than 10 mph difference between adjacent *altered* speed zones

Signs stating ‘Speed Limit XX on city streets unless otherwise posted’ are not allowed on State-route entrances to cities.

Altered Speed Limits

Altered Speeds (Counties):

- County board may declare an altered speed limit based on engineering study from County Engineer.

- Cannot be greater than 55 mph.

  All altered speed limits must have signs posted regardless of jurisdiction in order to be enforceable.

School Speed Limits

- 20 mph school speed limits may be established on streets and highways passing schools or upon any street or highway where children pass going to and from school.

- School speed limits are in effect “On a school day when school children are present and so close thereto that a potential hazard exists because of the close proximity of the motorized traffic...”

- School days begin at 6:30 a.m. and end at 4 p.m. School speed zones may be established for public, private and religious nursery, primary or secondary schools.

IDOT speed policy procedures

- An altered speed limit is primarily based on prevailing speed of free-flowing traffic. Nationally accepted premise that the majority of motorists will drive at a speed they judge to be safe and proper

- Prevailing speed is based on the average of:
  - 85^{th} percentile speed
  - Upper limit of the 10 mph pace
  - Average test run speed

IDOT speed policy procedures (Cont.)

- 85th percentile speed
  - Based on spot speed studies with radar equipment
  - Measured as close to the middle of the zone being studied as practicable
  - Studied zones limited to 1 mile length in rural areas and ½ mile length in urban areas
  - Measurements taken during normal conditions (dry weather, daylight, outside of peak periods, no weekends)
  - At least 100 vehicles per lane per direction or after 3 hours. Trucks over 4 tons not measured

IDOT speed policy procedures (Cont.)

- 10 mph Pace
  - 10 mph range that contains the most measurements.
  - Use the upper limit of the 10 mph range.
- Average Test Run Speed
  - 5 vehicle runs in each direction over the length of the studied zone.
  - Match the speed of traffic.
  - Optional for low-volume roads and for short zones.

Supplementary Investigations

- High-Crash Locations:
  - Reduction if the studied zone contains a high-crash location.
- Access Control:
  - Reduction based on the number of entrances/intersections within the studied zone.
- Pedestrian Activity:
  - Reduction with certain pedestrian volumes and if sidewalks are not present or if directly behind curb.
- Parking:
  - Reduction where parking is allowed next to traffic lanes.

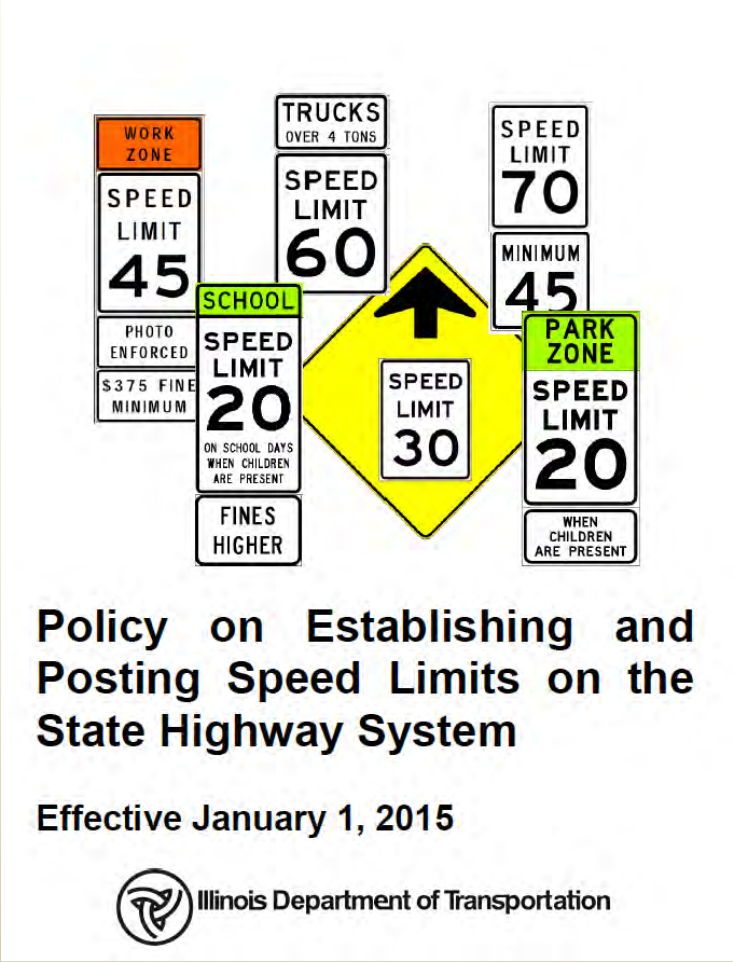
Selection of Altered Speed Limits

- Begin with calculated prevailing speed and apply percentage reductions based on the supplementary investigations.
- Select the closest 5 mph increment.
- Percentage reductions should not change the calculated prevailing speed by more than 9 mph or 20%.
- The selected speed should be increased in 5 mph increments if necessary so that the majority of measured traffic speeds are at or below the selected speed.

NCHRP Project 17-76

- National research was conducted to develop updated guidelines in establishing speed limits.
- Research was published in 2021 and contains recommendations including using different percentile speeds based on the type of roadway and type of surrounding area.
- Recommendation of 50th percentile in urban core areas rather than 85th percentile.
- IDOT is reviewing this publication for potential revisions to speed limit policy including use of different percentile speeds and including bicyclists in our pedestrian reduction factor.
- https://nap.nationalacademies.org/catalog/26200/development-of-a-posted-speed-limit-setting-procedure-and-tool

Details for speed study procedures may be found in Policy on Establishing and Posting Speed Limits on the State Highway System January 2015



Questions?

Kyle Armstrong, P.E., PTOE
Engineer of Operations
IDOT Bureau of Operations
Kyle.armstrong@illinois.gov
217/782-2076

LEFT TURN TRAFFIC CALMING TREATMENTS IN CHICAGO

David Smith, AICP

Complete Streets Director

CDOT
Chicago Department
of Transportation

AGENDA

- Dangers of Left Turns
- Existing Left Turn Traffic Calming Treatments
- Design Considerations
- 2022 Program – Location Methodology
- Program Findings
- Next Steps

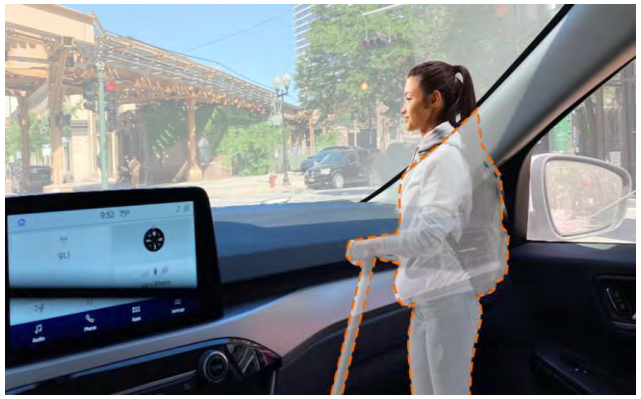
CDOT

DANGERS OF LEFT TURNS

WIDE TURNING RADII

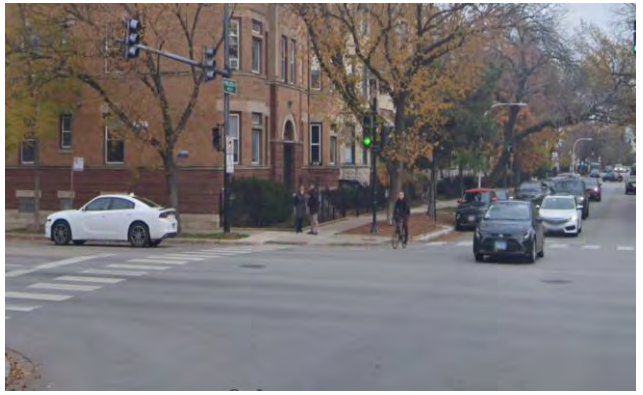
- Higher turning speeds compared to right turns
- Greater exposure for pedestrians in the crosswalk

VISIBILITY



- Driver visibility is limited by the vehicle's A-pillar
- Obscures seven linear feet of the driver's view of pedestrians*

COMPLEX MANUEVERS



- Drivers must search for gaps in oncoming traffic (cars, bicyclists, crossing pedestrians)
- Pressure from through vehicles behind driver

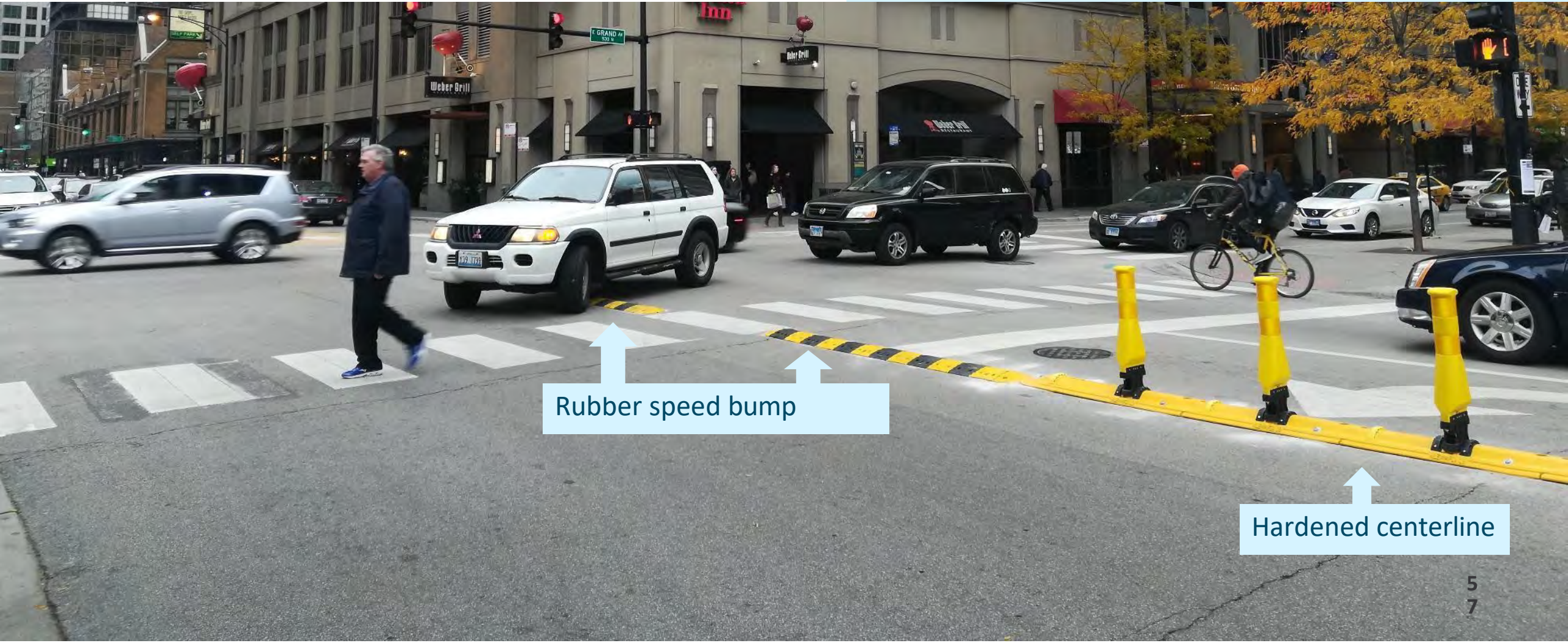
CDOT

*Reed, Matthew. "Intersection Kinematics: A Pilot Study of Driver Turning Behavior with Application to Pedestrian Obscuration by A-Pillars" November, 2008. University of Michigan Transportation Research Institute

LTTC TREATMENTS

Hardened Centerline / Rubber Speed Bumps

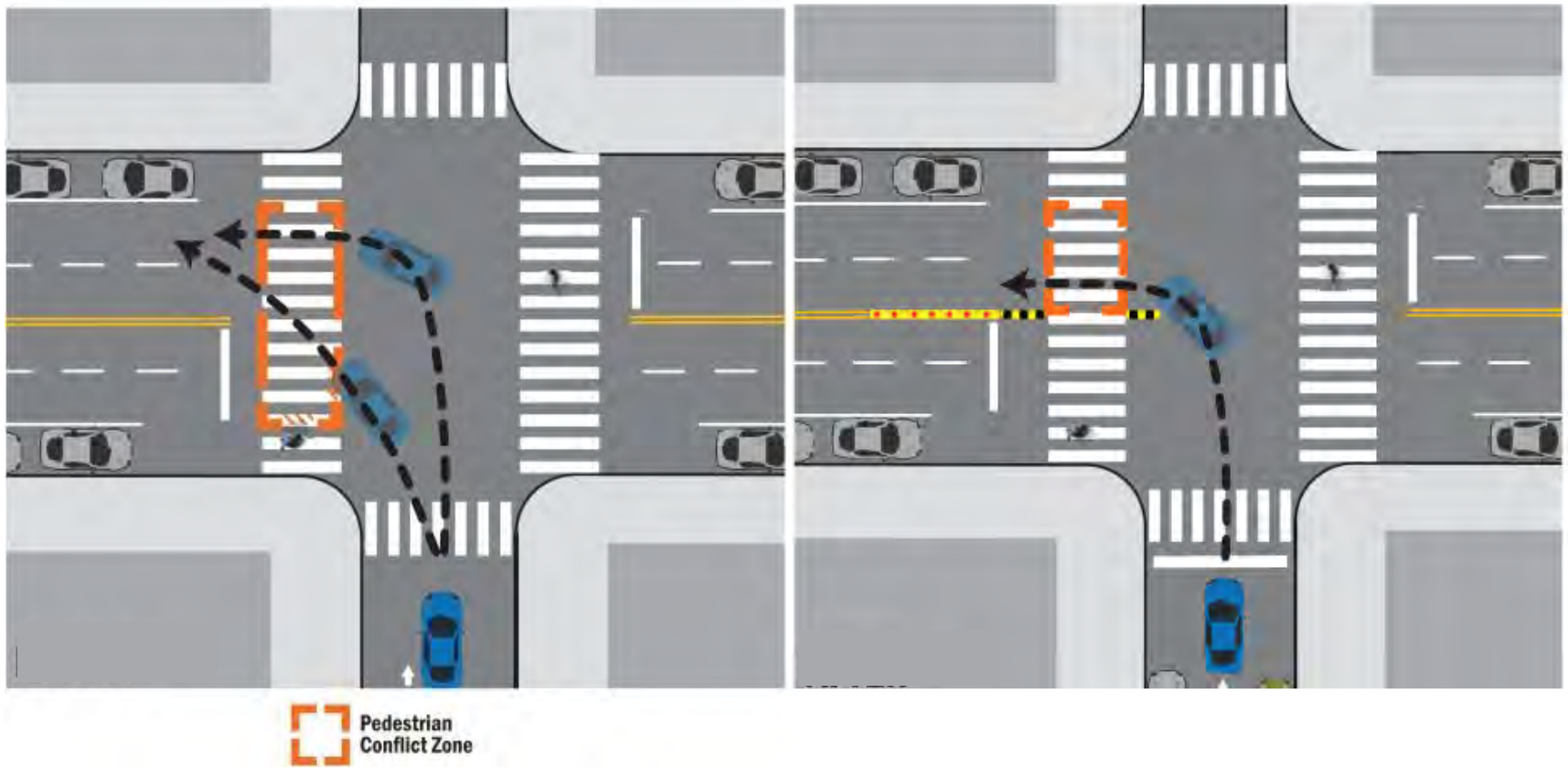
- **Treatment:** Rubber curb with plastic bollards often coupled with a rubber speed bump extending into the intersection
- **Benefits:** Guides approaching drivers and requires a slower turn, decreases pedestrian exposure and improves visibility



LEFT TURN TRAFFIC CALMING (LTTC)

WHAT ARE LTTC?

Left turn traffic calming (LTTC) treatments, such as speed bumps or flexible posts, “harden” the centerline of the intersection



BEFORE

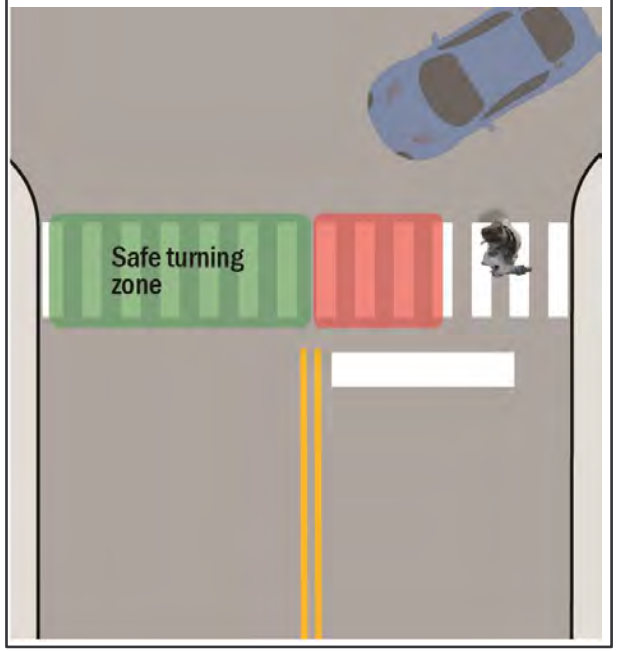
AFTER

CDOT

LEFT TURN TRAFFIC CALMING BENEFITS

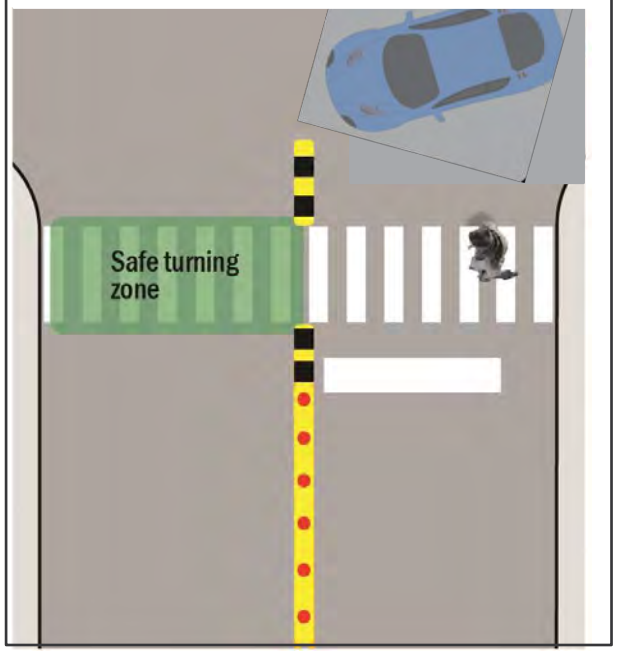
Before

Drivers can take a turning path that exposes pedestrians throughout the crosswalk.



After

Installation encourages drivers to take a turning path that intersects the crosswalk in the safe turning zone.



WHY SHOULD THEY BE INSTALLED?

- Encourages drivers to take turns at slower speeds.
- Improves drivers' visibility of pedestrians crossing the street.
- Guides drivers to take a safer path when turning left.
- Low-cost, rapid delivery option for a pilot project or can be installed prior to more costly, permanent solutions

CDOT

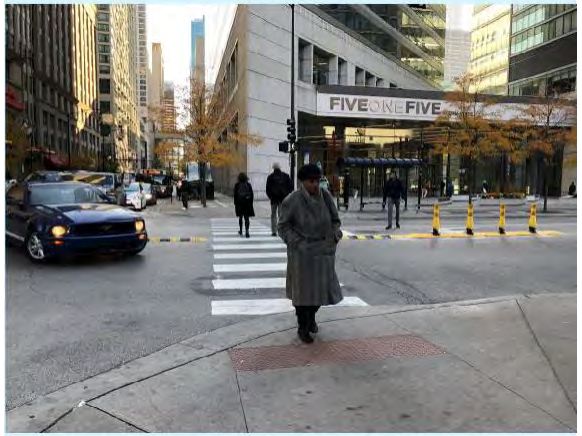
LTTC TREATMENTS

- **Benefits:** Guides approaching drivers and requires a slower, tighter turn and mitigates visibility issues
- **Treatment:** No parking yellow markings with flexible posts or rubber speed bumps.

Slow Turn Wedge / Rapid Delivery Bump-outs

PRE-2022 INSTALLATIONS

Chicago – State St



Findings

- Proportion of drivers yielding to pedestrians **rose 12%**

New York City, NY

Findings

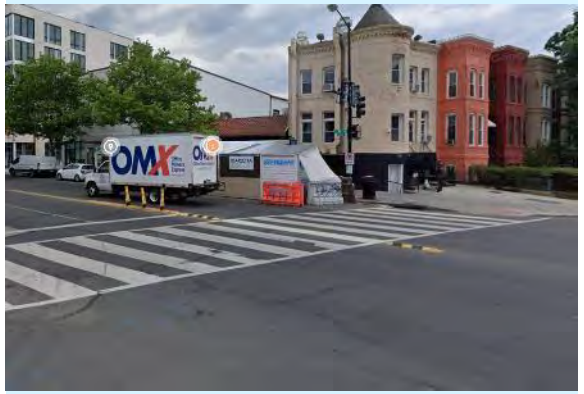
- Left turn **speeds reduced 10-20%**
- Pedestrian injuries **reduced 20%**

Portland, OR

Findings

- Turning speeds **reduced by an average of 13%**

Washington, DC

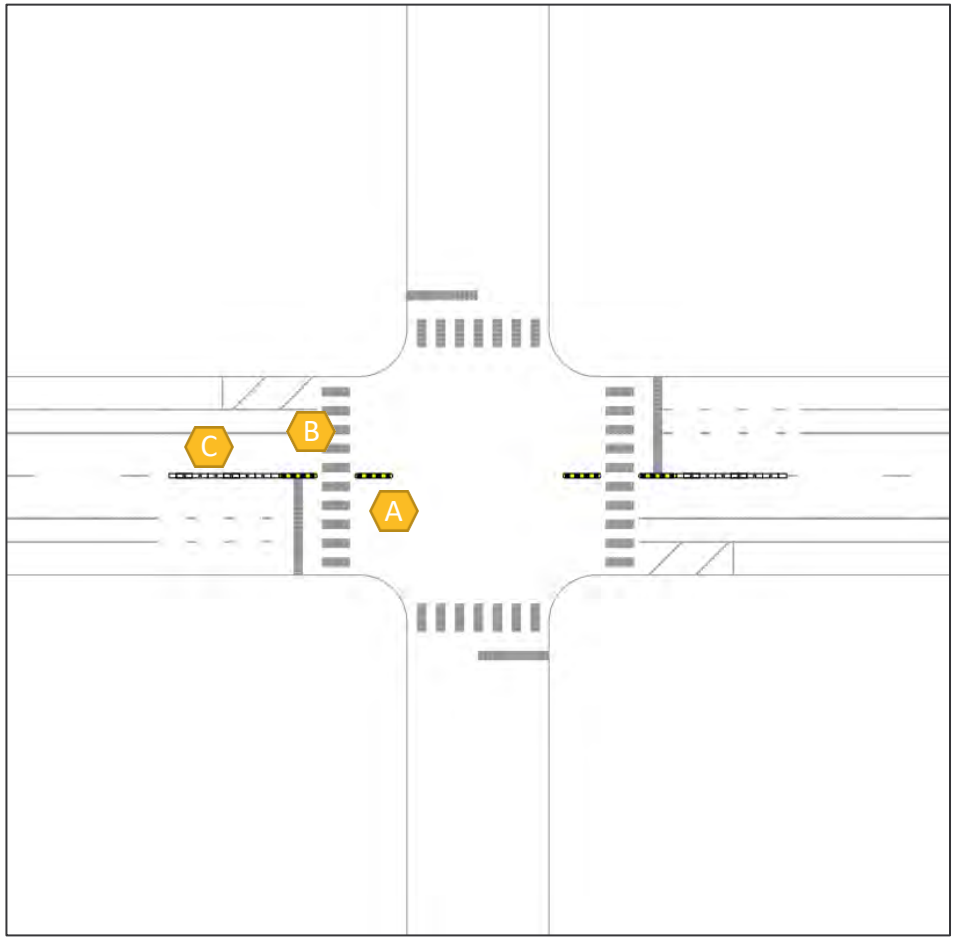


Findings

- Left turn conflicts with pedestrians **reduced 70%**
- Speeds **reduced 10%**

CDOT

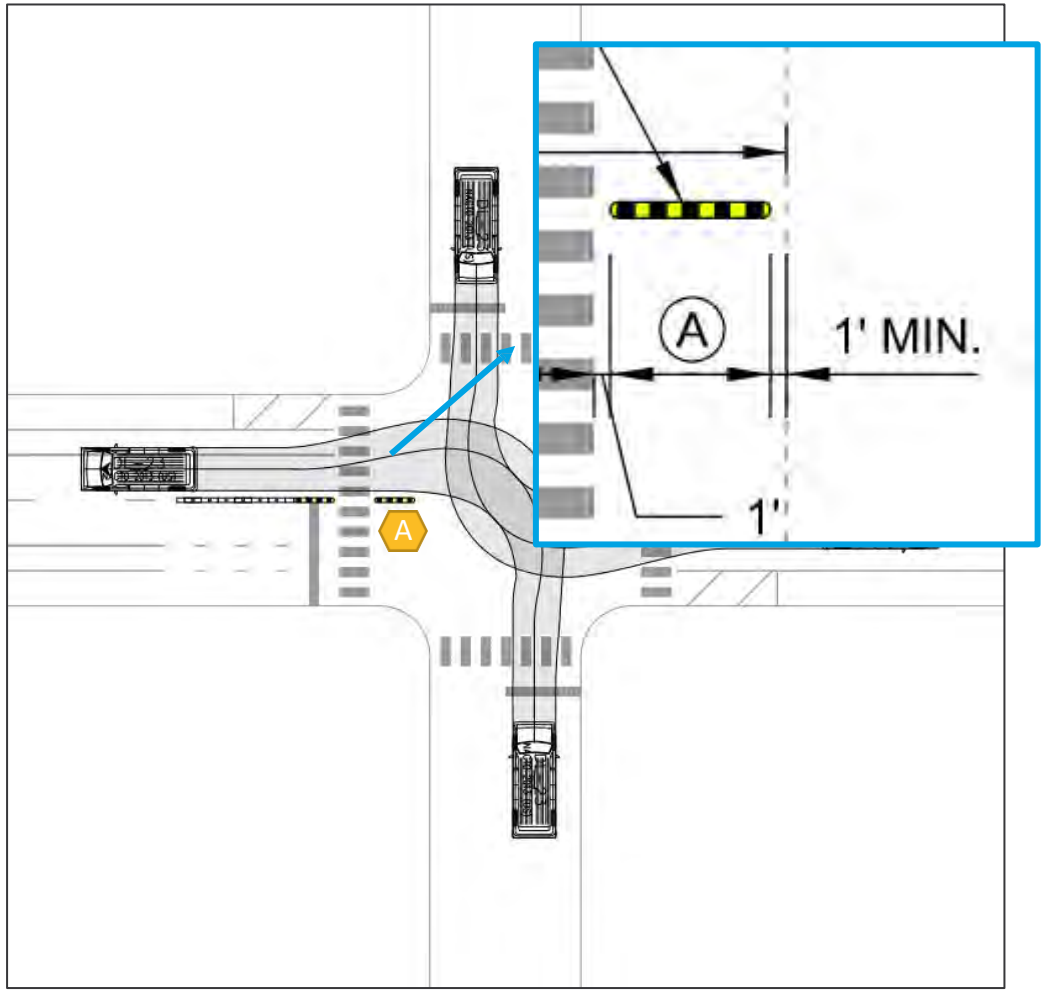
DESIGN CONSIDERATIONS – LTTC ELEMENTS



- A Rubber speed bump (RSB) within intersection
- B RSB in advance of crosswalk
- C Hardened Centerline (HCL) Offset

CDOT

DESIGN CONSIDERATIONS

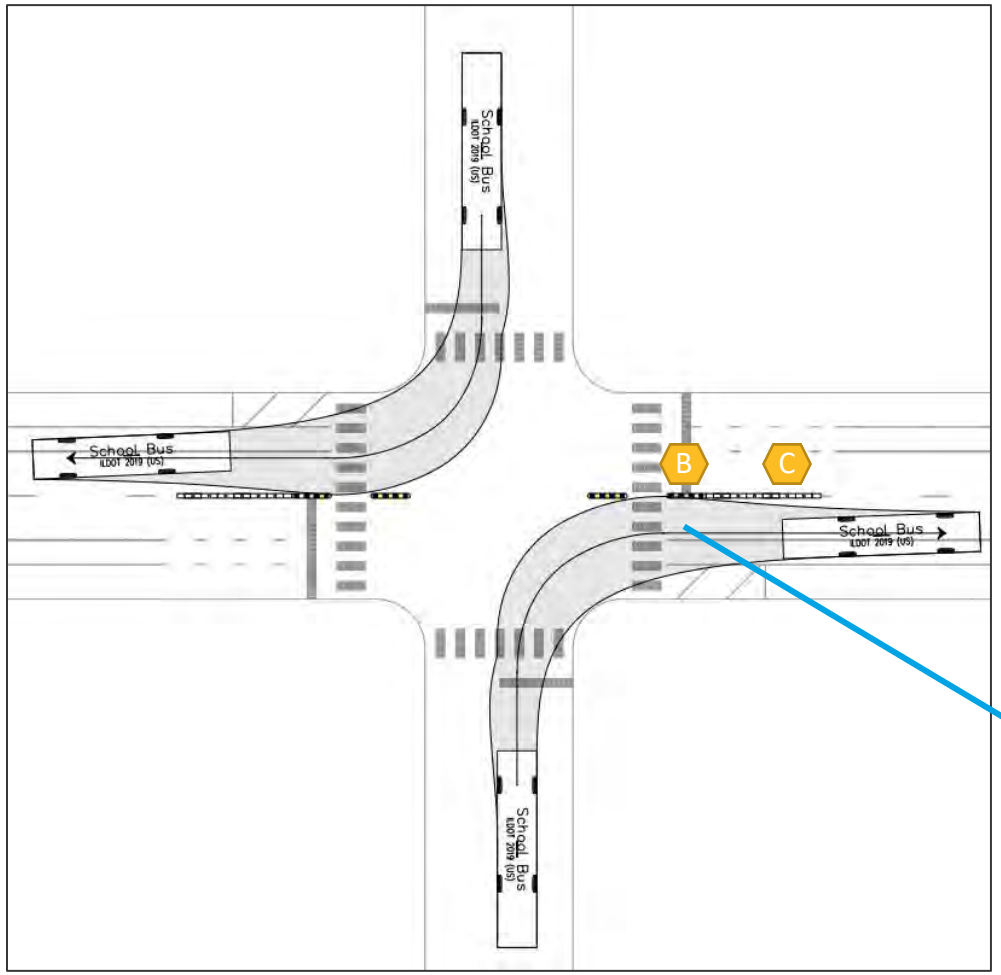


RSB WITHIN INTERSECTION A

- Typical Design Vehicle: DL-23 (typical size of a FedEx or UPS truck)
- RSB should be placed a minimum of 1’ from the FOC of the minor street
- Length of A should be determined such that the design vehicle turning path does not encroach on the RSB

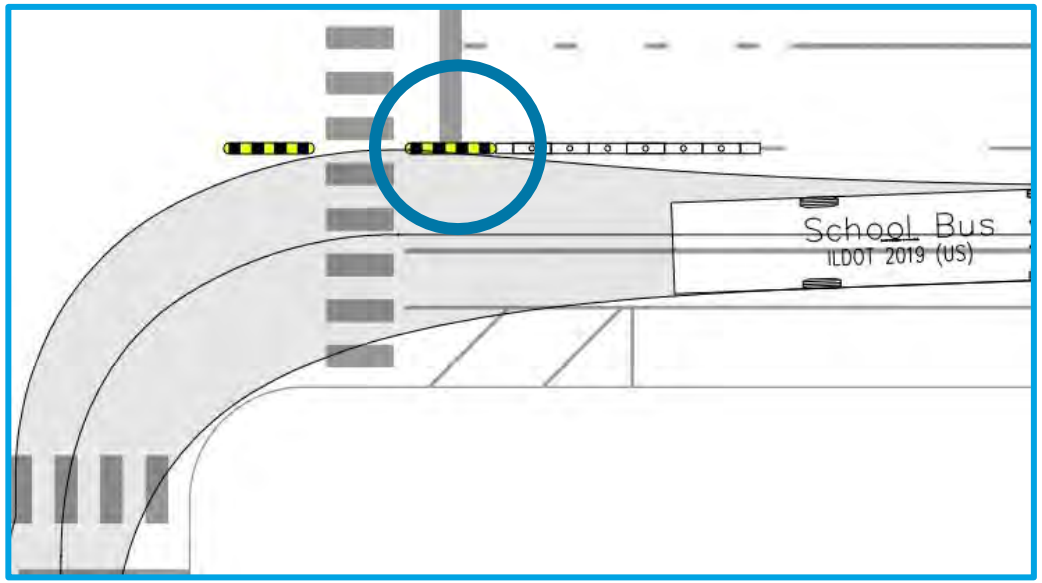
CDOT

DESIGN CONSIDERATIONS



Hardened Centerline (HCL) Offset B C

- Typical Control Vehicle: School Bus
- Length of B should be determined such that the control vehicle turning path does not encroach on the HCL



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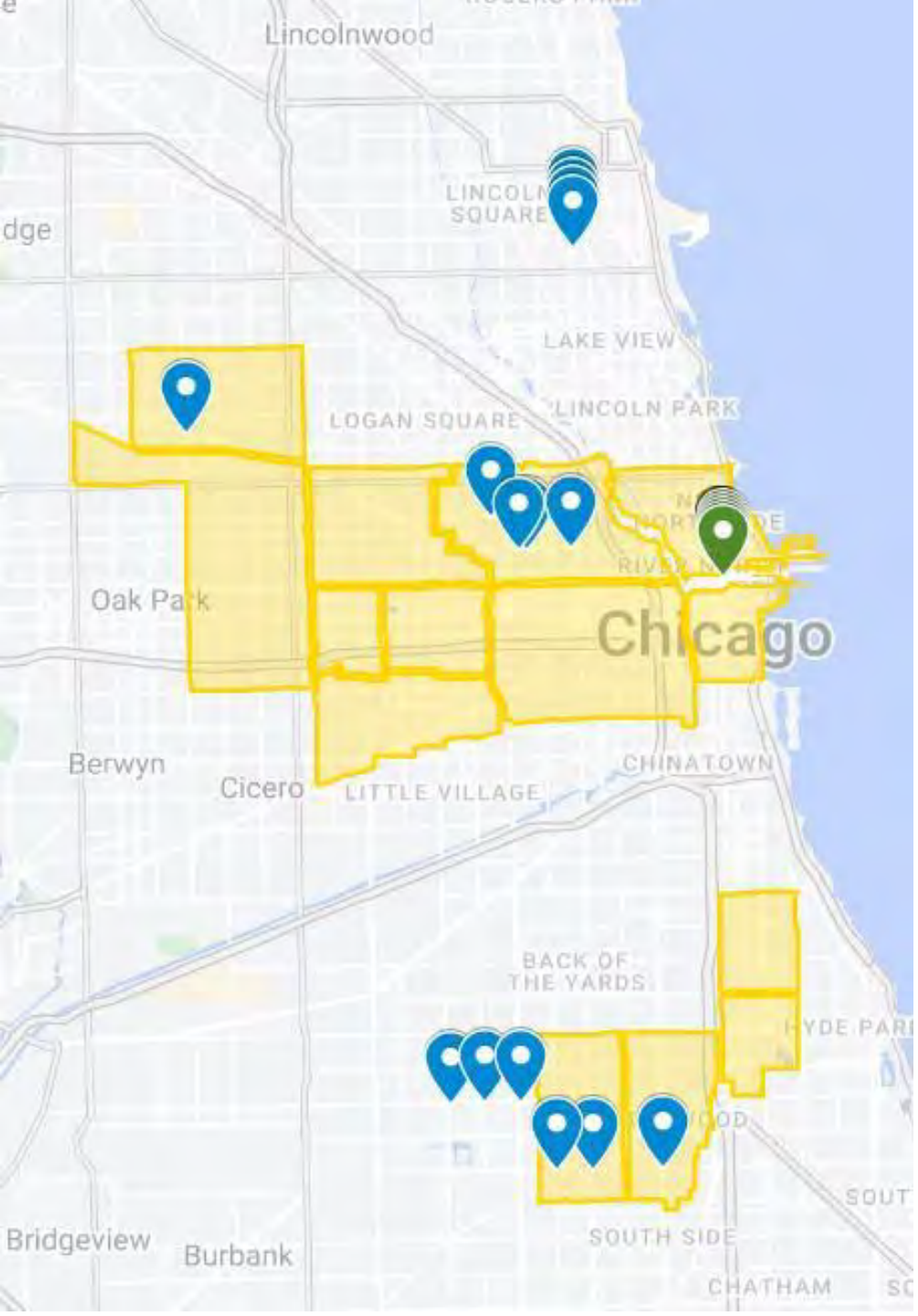
IDENTIFYING LOCATIONS

- Left turn crash data between January 2019 – November 2021 was evaluated (CPD)
- For select pilot areas, the following intersection types were identified:
  - Intersections with the greatest number of all left turn crashes
  - Intersections with the greatest number of left turn crashes involving a bicyclist or pedestrian
  - Intersections with the greatest number of left turn crashes resulting in serious or fatal injury



2022 LTTC LOCATIONS

Ashland Avenue
- Wilson Ave
- Sunnyside Ave
- Montrose Ave
- Cullom Ave

Grand Avenue & Austin Avenue

Division Street & Rockwell Street

Chicago Avenue
- Leavitt St
- Oakley Ave
- Paulina St

63rd Street
- Kedzie Ave
- California Ave
- Western Ave

71st Street
- Halsted St
- Ashland Ave
- Damen Ave

2019 State Street Installations

Vision Zero High Crash Community Areas

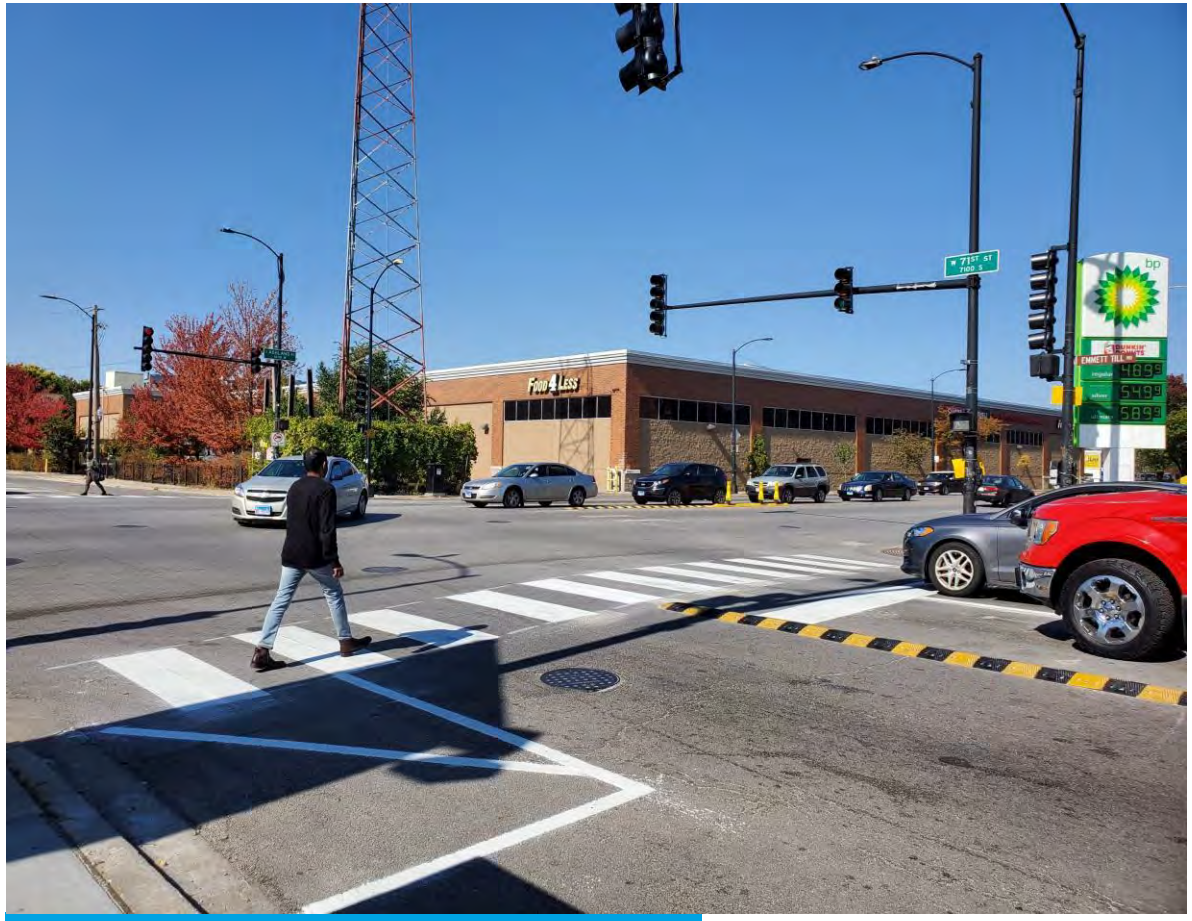
2022 INSTALLATIONS

Division Street & Rockwell Street

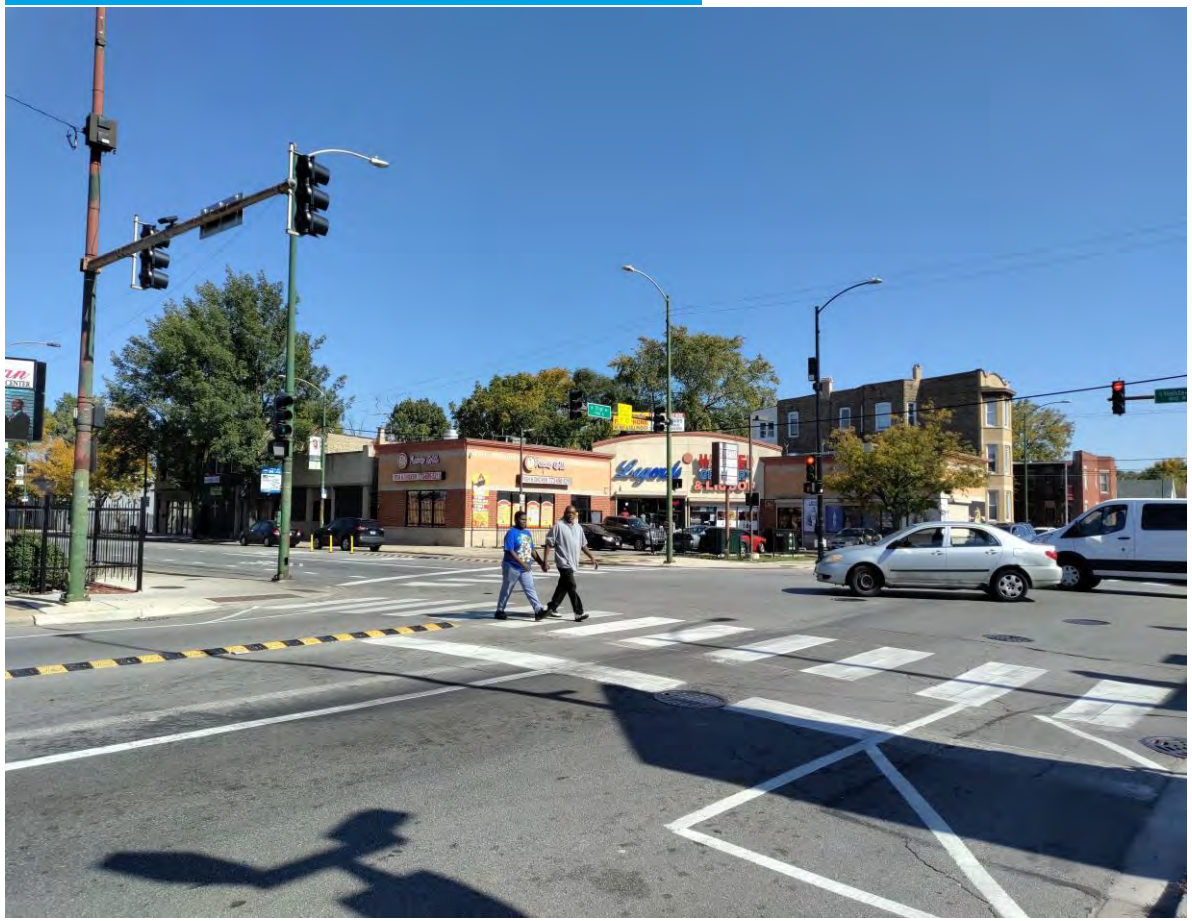
Ashland Avenue & Montrose Avenue

CDOT

2022 INSTALLATIONS



71st Street & Ashland Avenue



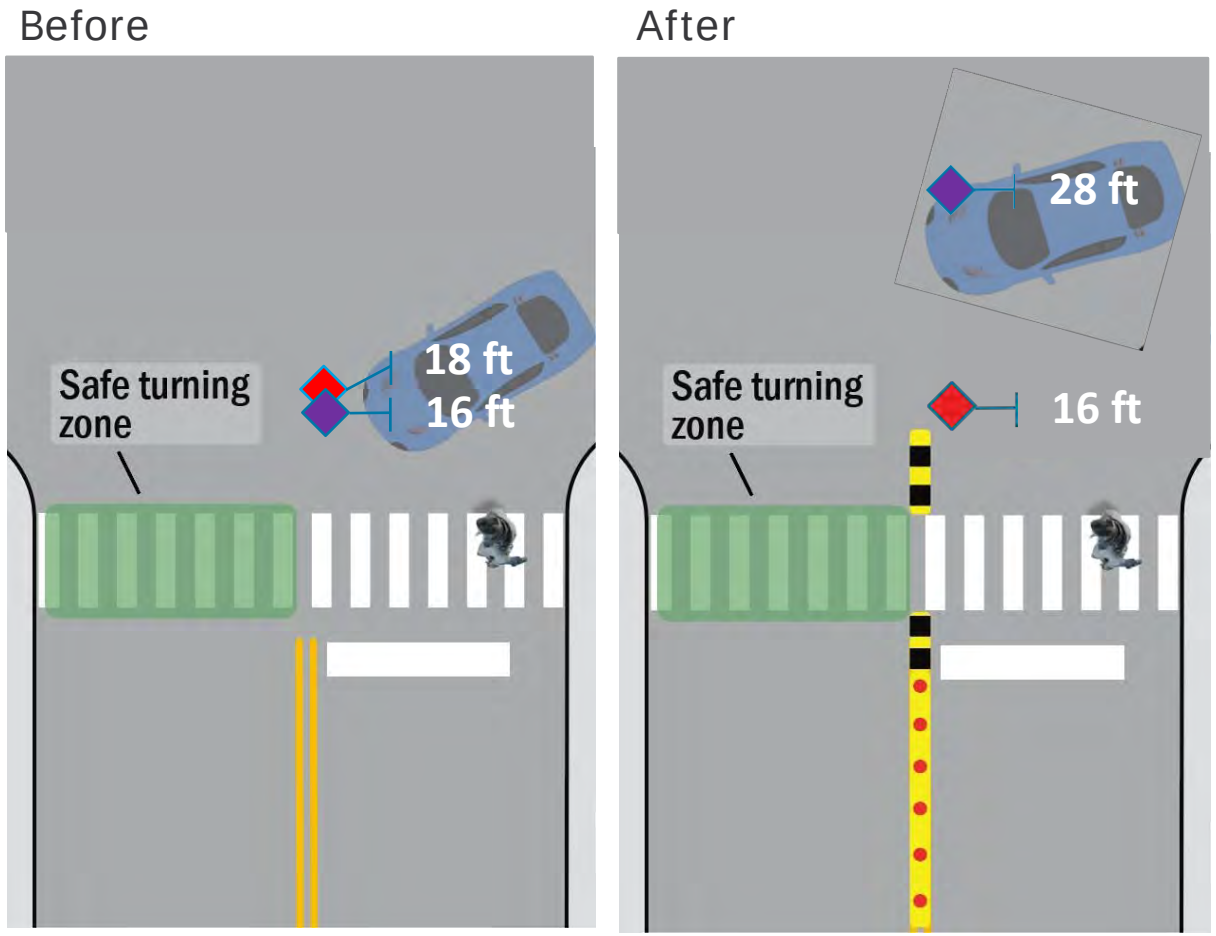
71st Street & Halsted Street

CDOT

2022 INSTALLATIONS – ONGOING EVALUATION

CDOT

TURNING PATH EVALUATION



LOCATION:
ASHLAND/WILSON

CDOT

SAFETY RESULTS – STATE STREET PILOT

Drivers are more likely to yield to people walking:

Before installation, **80%** of drivers yielded to pedestrians.

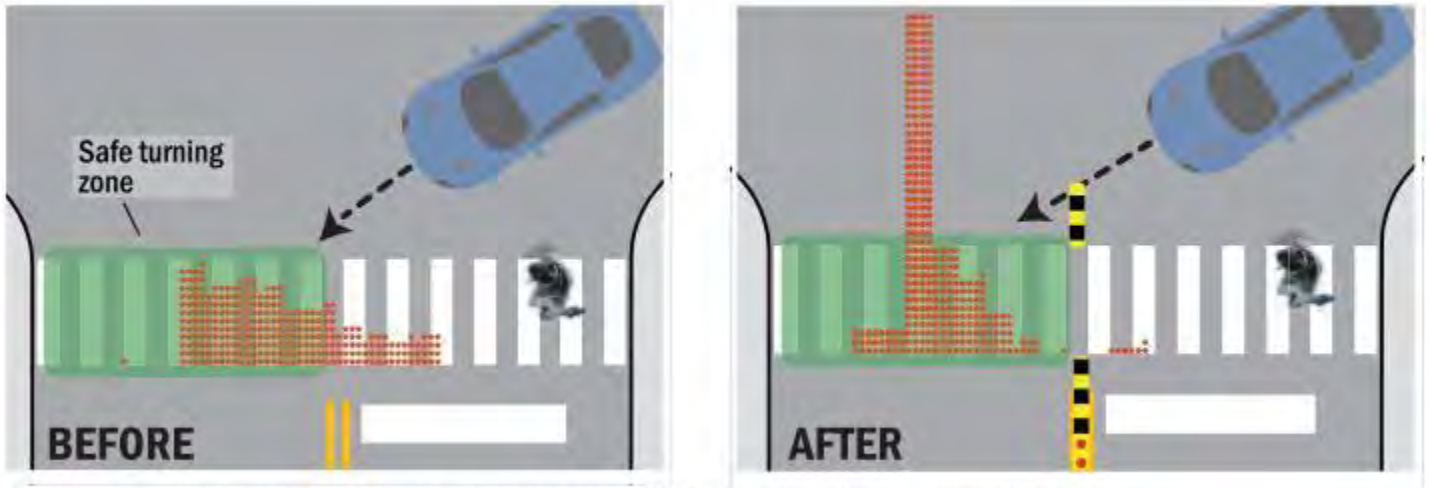
After installation, **95%** of drivers yielded to pedestrians.

Drivers take safer turning paths:

Before installation, **85%** of drivers traveled through the safe turning zone.

After installation, **98%** of drivers traveled through the safe turning zone.

Left-turning Vehicle Paths across Crosswalk



Frequency distribution of where drivers crossed the crosswalk (representational).

↓ 24% reduction in left turn crashes

↓ 24% reduction in total crashes

CDOT

SAFETY RESULTS: 2022 LOCATIONS

Portion of drivers yielding to people walking:

73% of interactions before installations → **94%** of interactions after installations

Portion of drivers turning within the safe zone:

73% before installations → **97%** after installations

> "I walk my dog across Ashland daily... With the [left turn traffic calming] improvements, I can safely step forward and look for oncoming vehicles. Also, because I am more visible crossing the street, vehicles are much more likely to slow down, and many even stop."
>
> *Ravenswood resident, regarding LTTC installations at N Ashland Ave & W Sunnyside Ave*

CDOT

HARDENED CENTERLINE (HCL) / RUBBER SPEED BUMP (RSB) DESIGN CONSIDERATIONS

Ⓐ LENGTH OF RSB WITHIN INTERSECTION. RSB SHOULD BE PLACED A MINIMUM OF 1' FROM THE FOC OF MINOR STREET AND EXTEND TO 1' FROM CROSSWALK. LENGTH OF Ⓐ SHOULD BE DETERMINED SUCH THAT THE DESIGN VEHICLE TURNING PATH DOES NOT ENCROACH ON THE RSB.

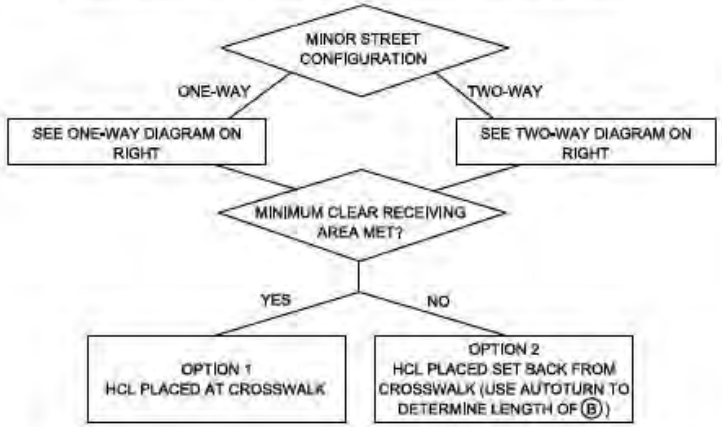
Ⓑ HARDENED CENTERLINE OFFSET. LENGTH OF Ⓑ SHOULD BE DETERMINED SUCH THAT THE CONTROL VEHICLE TURNING PATHS DO NOT ENCROACH ON THE HCL. SEE HCL PLACEMENT DECISION TREE BELOW.

Ⓒ ON-STREET PARKING SHALL BE RESTRICTED FOR A MINIMUM OF 20' DOWNSTREAM OF INTERSECTION, PER CDOT STANDARD DETAILS.

Ⓓ CORNER RADII ASSUMED TO BE 10' OR GREATER.

Ⓔ WHERE BIKE LANES ARE PRESENT, THE TYPICAL MINIMUM LANE WIDTH BETWEEN THE EDGE OF THE BIKE LANE AND THE HCL IS 10'.

HARDENED CENTERLINE (HCL) PLACEMENT DECISION TREE



STREET CONFIGURATION NOTES

1. CROSSWALKS ASSUMED TO BEGIN AT THE EDGE OF ROW WITH A STANDARD 6' WIDTH.
2. MAJOR AND MINOR STREETS ASSUMED TO INTERSECT AT RIGHT ANGLES.
3. STREETS WITH PARKING PROTECTED BIKE LANES WILL REQUIRE ADDITIONAL AUTOTURN ANALYSIS.

DESIGN/CONTROL VEHICLE CONSIDERATIONS

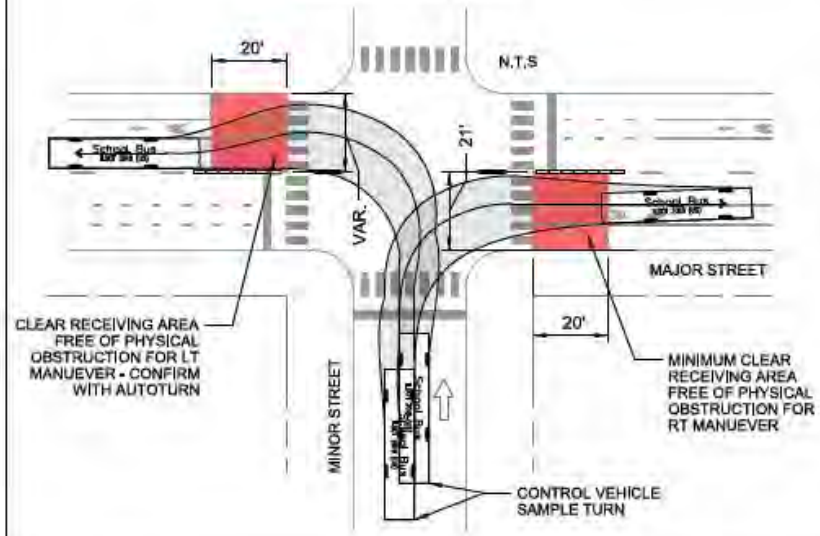
TYPICAL DESIGN VEHICLE: DL-23

TYPICAL CONTROL VEHICLE: SCHOOL BUS

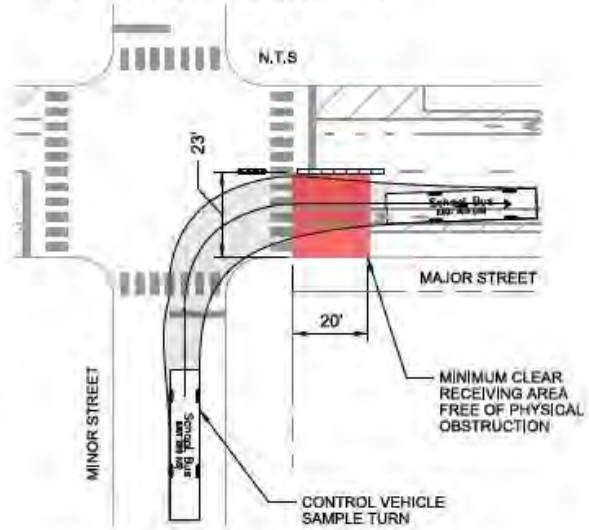
1. DESIGN VEHICLE SHOULD BE ABLE TO MAKE LEFT TURNS FROM MINOR STREET ONTO MAJOR STREET WITHOUT ENCROACHING ONTO THE RSB WITHIN THE INTERSECTION Ⓐ.
2. CONTROL VEHICLE SHOULD BE ABLE TO MAKE LEFT TURNS OR RIGHT TURNS FROM MINOR STREET ONTO MAJOR STREET WITHOUT ENCROACHING ONTO THE HCL.
3. IF THERE ARE HIGH VOLUMES OF LARGE TRUCKS TURNING FROM MINOR STREET, CONSIDER INSTALLING RSB ONLY.

MINIMUM CLEAR RECEIVING AREA

ONE-WAY MINOR STREET

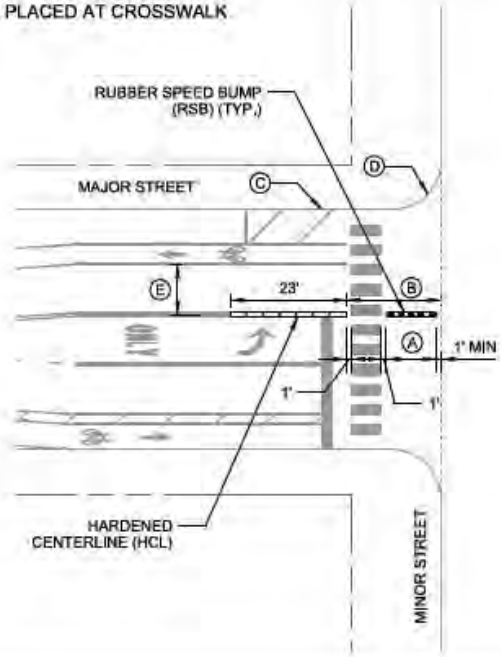


TWO-WAY MINOR STREET
CONTROLLING FACTOR: RIGHT TURNS



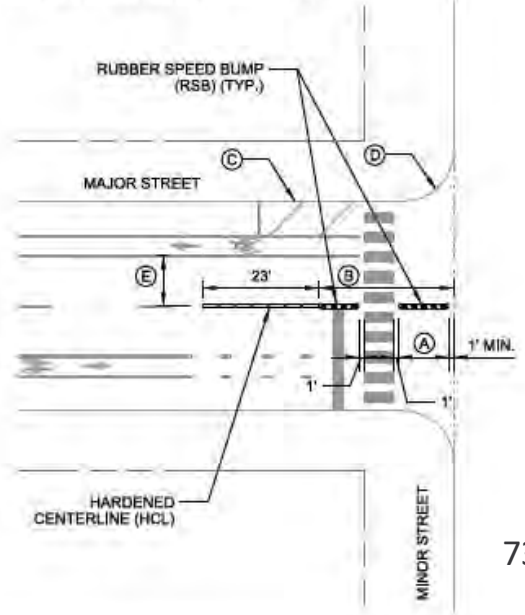
OPTION 1

HCL PLACED AT CROSSWALK



OPTION 2

HCL SET BACK FROM CROSSWALK

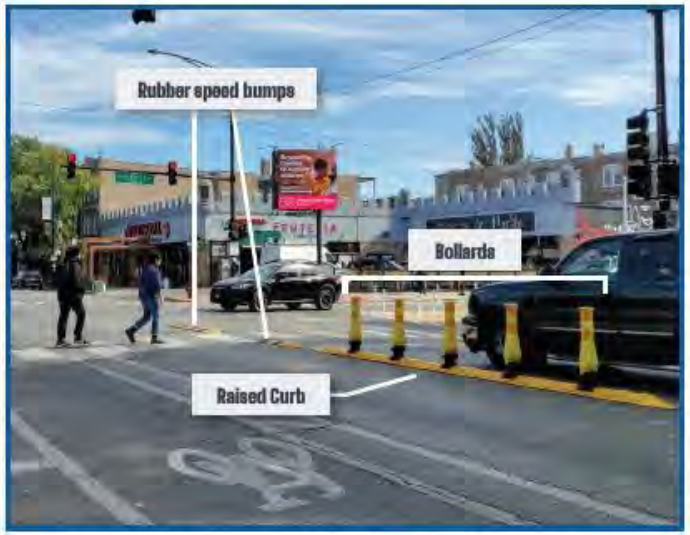


Left Turn Traffic Calming

Left Turn Traffic Calming (LTTC) **encourages safer turning behaviors from drivers and boosts pedestrian safety at intersections.** Beginning with the State Street corridor in the busy River North area, CDOT installed LTTC at five intersections in 2019. Seeing positive results, 13 more locations were installed at high pedestrian crash intersections. Data from LTTC intersections show drivers making safer turning movements, yielding to people in crosswalks, and overall crash reduction. LTTC treatments are an emerging national best practice, showing tangible results in New York, Portland, Washington, DC, and now in Chicago.

How does it work?

LTTC treatments "harden" the centerline at an intersection with raised curbs, bollards, and rubber speed bumps. Some locations may call for a rubber speed bump extending into the intersection or shortened pedestrian crossing distances with paint-and-post curb extensions. This design discourages left turning drivers from cutting across the centerline, guiding them to **turn at a safer angle with slower speeds** and better visibility of people walking. This way, **drivers more intuitively complete their left turns within the safe turning zone**, reducing conflicts with pedestrians.
See diagram on next page.



New LTTC infrastructure at W Division St. and N Rockwell St.

Why focus on left turns?

Reducing traffic crashes is an urgent matter for CDOT. In 2021, more than 500 people were seriously injured or killed in traffic crashes while walking in Chicago. Between 2017 and 2021, **left turning motorists were involved in 40% of crashes where a pedestrian was severely injured or killed at an intersection**. Left turns are more complex than right turns. Drivers must search for gaps in oncoming traffic, pedestrians can be blocked from view by the vehicle's "A-pillar", and the wider turning path enables higher speeds.

Complex Maneuvers

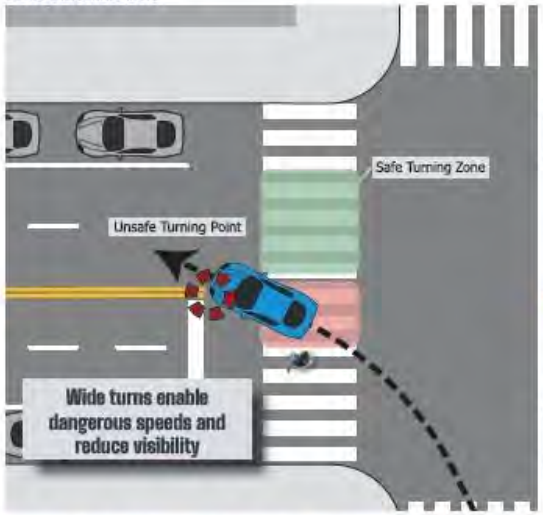
Low Visibility

Wider Turning Paths

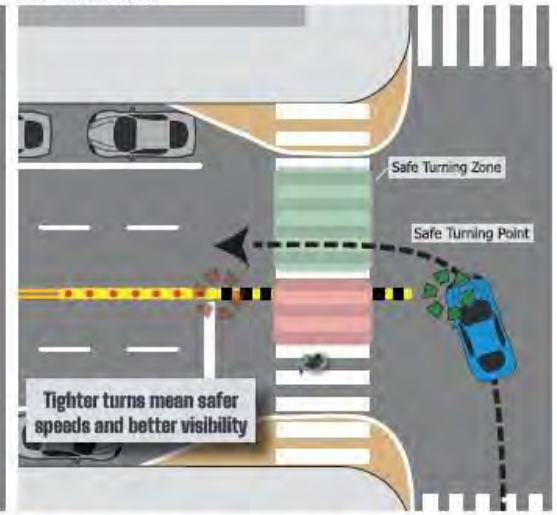
Measuring success

CDOT has installed LTTC at 18 intersections across the city, including neighborhoods such as Belmont Cragin, Englewood, Humboldt Park, and Ravenswood. Observations at eight pilot locations showed **97% of vehicles turning within the Safe Turning Zone, up from 73% before the installations.**

Before Installations



After Installations



Portion of drivers yielding to people walking:

73% of interactions before installations → **94%** of interactions after installations

Portion of drivers turning within the safe zone:

73% before installations → **97%** after installations

Reduction in traffic crashes on State Street:

↓ **24%** reduction in left turn crashes

↓ **24%** reduction in total crashes

Chicago's first LTTC treatments were installed at five adjacent pilot intersections along State Street in the River North area.

Crashes at these intersections reduced by 24% whereas similar intersections on the same corridor did not see any reduction in crashes involving left turning vehicles.

> "I walk my dog across Ashland daily... With the [left turn traffic calming] improvements, I can safely step forward and look for oncoming vehicles. Also, because I am more visible crossing the street, vehicles are much more likely to slow down, and many even stop."
>
> *Ravenswood resident, regarding LTTC installations at N Ashland Ave & W Sunnyside Ave*

LTTC installations at N State St & E Grand Ave

NEXT STEPS

2023 Intersection Identification

- Continued evaluation of installations
- Conduct crash and context analyses to identify future locations

Formalize Program

- Standardize as a form of traffic calming across programs
- Develop a permanent design

THANK YOU!

Dave Smith, AICP

David.smith3@cityofchicago.org

CDOT

Cook County Safety Studies

>Countywide Crash Analysis

>Lanes Repurposing Projects

CMAP Transportation Technology & Operations Coalition (TTOC)

May 4, 2023

CONNECTING COOK COUNTY
Beyond Transportation

HONORABLE TONI PRECKWINKLE
PRESIDENT, COOK COUNTY
BOARD OF COMMISSIONERS

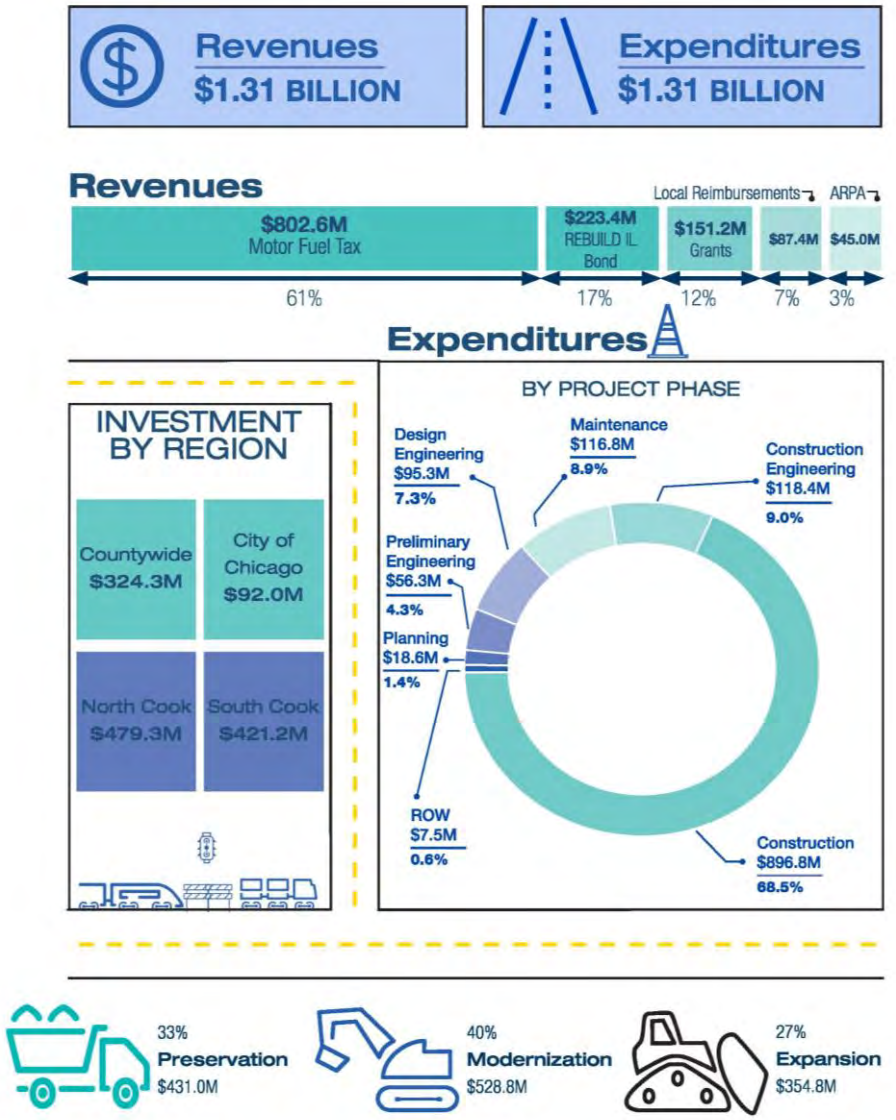
JENNIFER "SIS" KILLEN, P.E., PTOE, SUPERINTENDENT
DEPARTMENT OF TRANSPORTATION & HIGHWAYS

>Countywide Crash Analysis

Study Objectives

1. Inventory current system
   a. Segments
      - Number of Lanes
      - Posted Speed Limit
      - Access Density
   b. Single attribute features
      - Horizontal Curves
      - Railroad At-Grade Crossings
      - Traffic Signals
      - All-Way Stop-Controlled Intersections
      - T-intersections
      - Viaducts
      - Crosswalks
      - School Zones
2. Develop predictive crash models
3. Develop ranked lists of safety performance (expected vs. observed)
   a. Segments: Are certain roadway characteristics correlated with higher crash rates?
   b. Other features – Create ranked lists of safety performance
4. Inform CCDOTH design practices
5. Add safety component to CCDOTH's five-year Transportation Improvement Program (TIP)

CCDOTH Five-Year TIP (2023-2027)

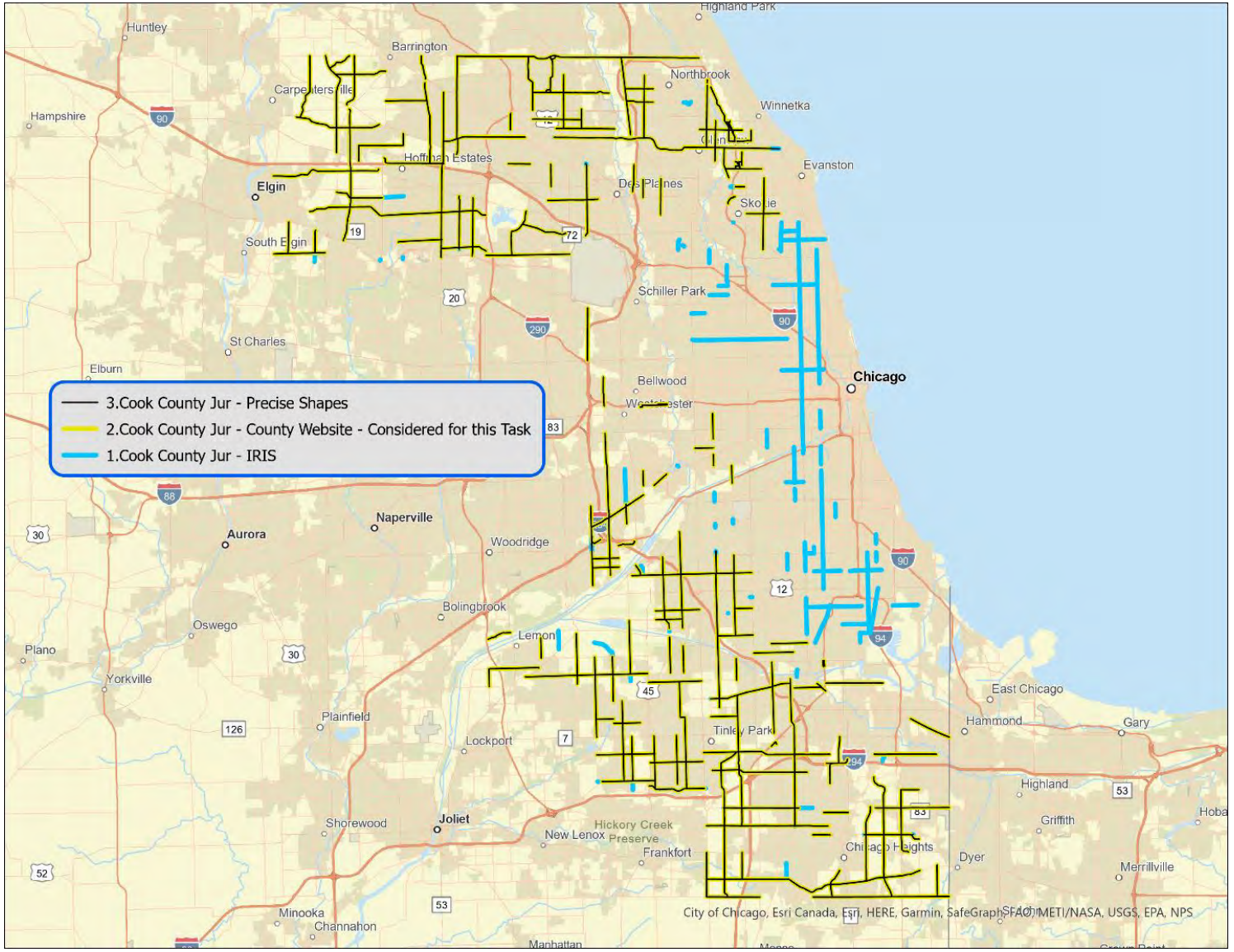


Step 1: Inventory

Study Area: Segments

Roadways

- 487 miles of CCDOTH jurisdiction roadways (excludes mileage in the City of Chicago)



Data Sources

- Cook County Open Data Portal
- IDOT Roadway Information System (IRIS)

Route Segmentation

- Divided 487 miles of roads into segments based on number of lanes and speed limits.
- Max length of 3 miles
- Assigned access point density as a characteristic of each segment
- 418 total segments

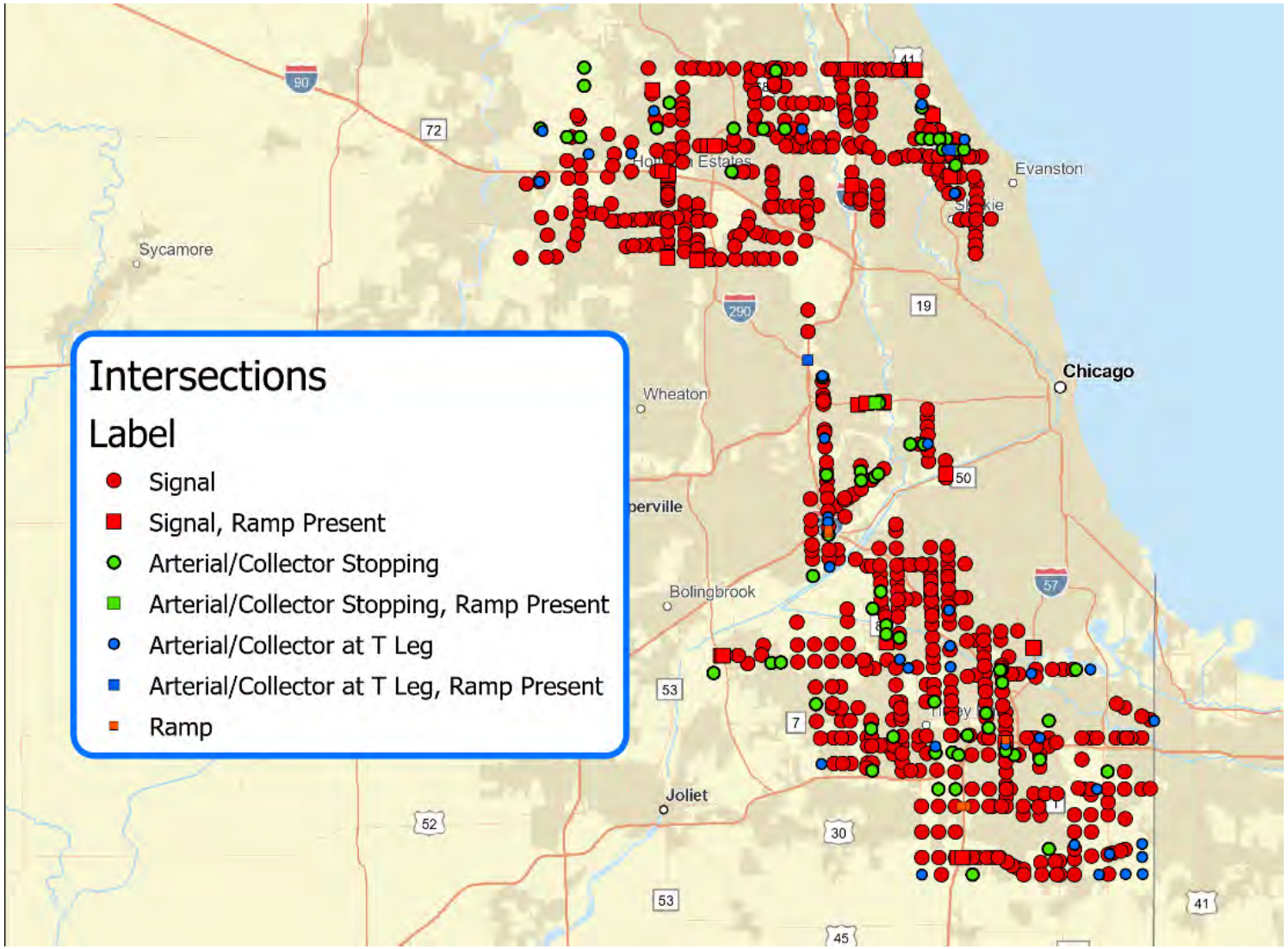
Total mileage by number of lanes, speed limit, and access point density

Access Point Tier	Low						Medium					High					Total
Speed Limit	20	25	30	35	40	45	25	30	35	40	45	25	30	35	40	45	
Number of Lanes																	
2	0.59	3.89	9.78	34.16	38.28	71.08	1.44	6.51	36.63	12.59	16.93	-	4.85	21.61	1.64	2.52	262.5
2+TWLTL	-	-	-	-	1.43	-	-	-	-	-	2.39	2.02	-	5.38	-	1.28	12.50
3	-	-	-	-	-	0.58	-	-	-	-	-	-	-	-	-	-	0.58
3+TWLTL	-	-	-	-	-	-	-	0.54	-	-	-	-	-	-	-	-	0.54
4	-	-	-	9.10	6.46	23.32	-	8.32	15.72	30.31	30.90	-	5.00	27.45	26.57	8.70	191.85
4+TWLTL	-	-	-	0.42	-	0.60	-	0.82	2.47	1.24	-	-	-	1.00	1.02	-	7.57
5	-	-	-	-	0.86	-	-	-	-	-	-	-	-	-	-	-	0.86
6	-	-	-	-	-	3.77	-	-	-	0.46	1.22	-	-	-	-	-	5.45
Total	0.59	3.89	9.78	43.68	47.03	99.35	1.44	16.19	54.82	44.6	51.44	2.02	9.85	55.44	29.23	12.50	481.85

Study Area: Intersections

Intersections

- 788 intersections
  - 674 signalized (367 maintained by CCDOTH)
  - 109 with stop sign on arterial or collector street
  - 5 additional intersections with expressway ramps



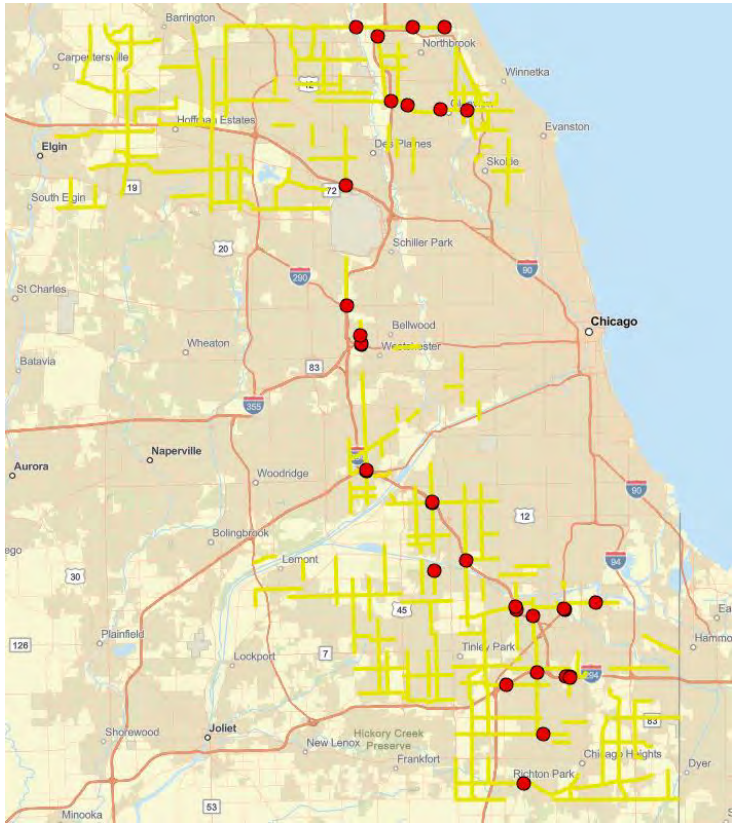
Study Area: Viaducts/Rail

Viaducts

- 35 viaducts (i.e., CCDOTH route under bridge structure)

Rail At-Grade Crossings

- 72 crossings



Viaducts

Highway-Rail At-Grade Crossings

Study Area: Pedestrian Crosswalks

Pedestrian Crossings at Unsignalized Intersections

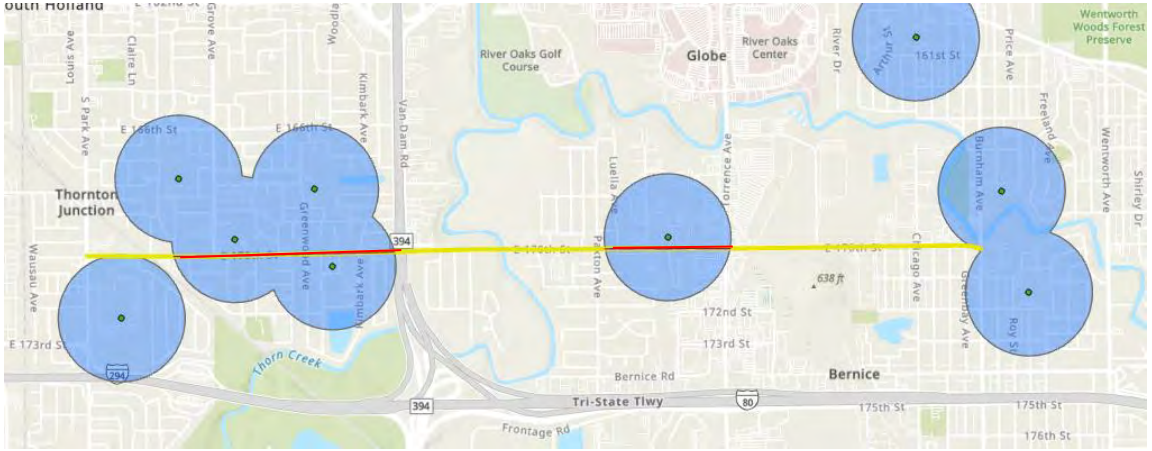
- 261 marked crosswalks
- 657 unmarked crosswalks
- 95 marked trail crossings (includes signalized intersections)

Crossing Type	Marking	Closest Intersection (within 150 Feet)	Marked Crosswalks at All-Way Stop intersections	Other	Signalized Marked Trail Crossings	Uncontrolled Marked Crosswalks	Unsignalized Marked Trail crossings	Total
Standard	Continental	All-Way Stop Intersection	46	0	0	0	0	250
		Minor Stop Intersection	0	0	0	169	0	
		None (Mid-Block)	0	0	0	35	0	
	No Marking	All-Way Stop Intersection	0	7	0	0	0	657
		Minor Stop Intersection	0	623	0	0	0	
		None (Mid-Block)	0	27	0	0	0	
	Transverse	All-way Stop Intersection	1	0	0	0	0	11
		Minor Stop Intersection	0	0	0	10	0	
Trail	Trail Marking	All-way Stop Intersection	0	0	0	0	3	95
		Minor Stop Intersection	0	0	0	0	17	
		None (Mid-Block)	0	0	0	0	18	
		Signalized Intersection	0	0	57	0	0	
Total			47	657	57	214	38	1013

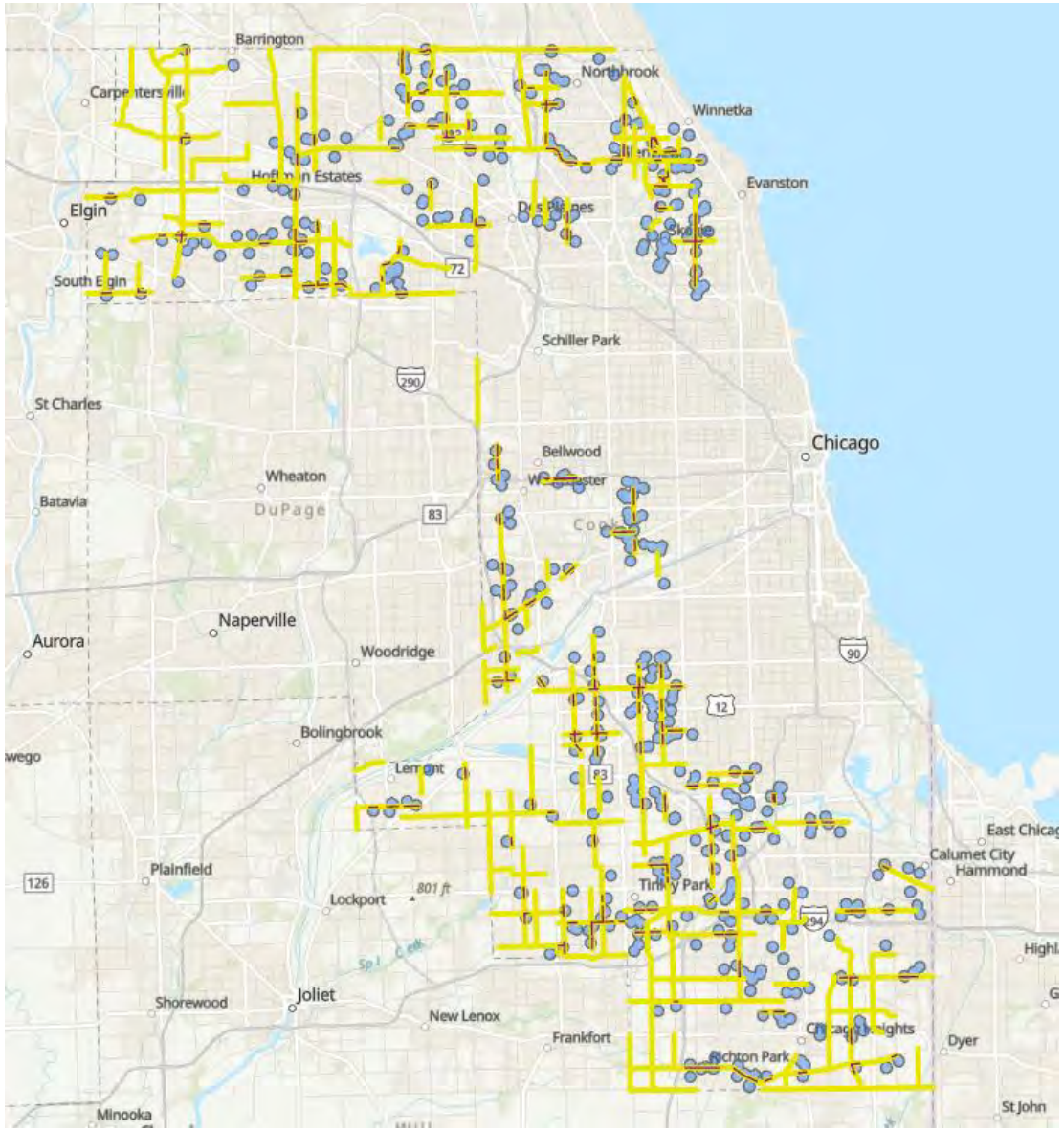
Study Area: School Zones

School Zones

- Any segment longer than 700 feet that is within ¼ mile buffer of 522 schools
- Includes 237 segments
- Total length of 90.6 miles



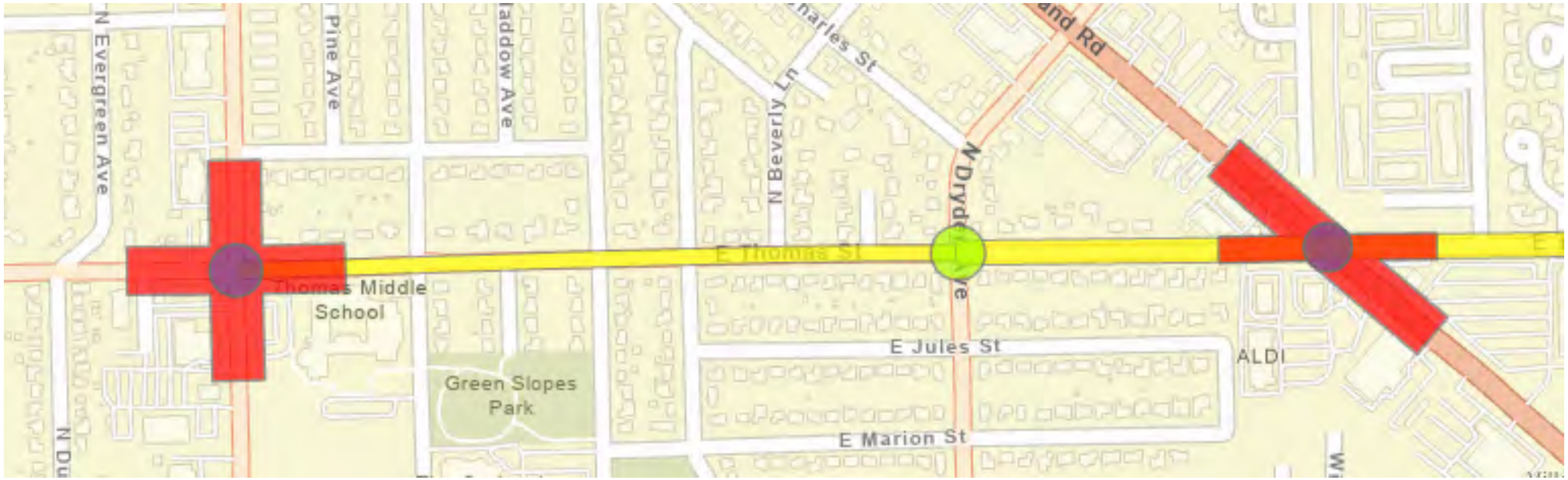
Example School Zone



All School Zones

Step 2: Define Safety Influence Areas

- Segments – Buffer (see yellow shapes) defined as 15 feet x number of through lanes.
- Stop-controlled intersections – 100-foot radius circular buffer (see green circle)
- Signalized intersections – Centered at intersection. Diameter matches largest segment buffer.
- Signal influence area – Length of buffer (see red shapes) varies by functional classification
  - 300 feet for local roads
  - 400 feet for minor arterials, collectors, and ramps
  - 500 feet for “other principal arterials”



Step 3: Crash Assignment

- Segments
  - All crashes intersecting with only the segment buffer
  - All crashes intersecting the related stop-controlled intersection buffers
  - A selection of crashes intersecting the signal influence area buffers.
- Signalized Intersections
  - All crashes intersecting the purple “at intersection” buffer
  - A selection of crashes intersecting the signal influence area buffers.

Crash Locations			Number	Percentage
Segment Buffer Only			12,092	25%
Signal Influence Areas	At-Intersection	Multiple Roads	11,753	24%
		One Road Only	15,426	31%
	On Signal Approaches		9,824	20%
Total			49,095	

Step 4: Crash Severity Weighting

Cook County Crashes by Severity and Type (2017-2021)

KABCO	Ped/Bike	Rear-End - SSSD	Turning/Angle	Run Off Road	Other	Total
K	26	9	31	38	2	106
A	141	243	597	212	21	1,214
B	356	1,654	2,484	594	84	5,172
C	189	3,068	2,524	414	78	6,273
O	19	18,622	12,664	3,191	1,834	36,330
Total	731	23,596	18,300	4,449	2,019	49,095

- K: Fatal Crashes
- A: Severe Injury Crashes (left scene by ambulance)
- B: Injury Crashes (left scene on own)
- C: Reported Injury Crashes (injury reported, but not readily apparent to officer)
- O: Property Damage Only (no injuries)

Step 4: Crash Severity Weighting

Cook County Crashes by Severity and Type – 2017-2021

KABCO	Ped/Bike	Rear-End - SSSD	Turning/Angle	Run Off Road	Other	Total
K	3.6%	0.0%	0.2%	0.9%	0.1%	0.2%
A	19.3%	1.0%	3.3%	4.8%	1.0%	2.5%
B	48.7%	7.0%	13.6%	13.4%	4.2%	10.5%
C	25.9%	13.0%	13.8%	9.3%	3.9%	12.8%
O	2.6%	78.9%	69.2%	71.7%	90.8%	74.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

- Pedestrian and bicycle crashes have higher percentages of K and A crashes
- Prioritization - Want to account for crash severity and disparities in crash severity by crash type, but not *exclusively* on severe crashes (K and A).

Step 4: Crash Severity Weighting

- HSIP weighting practices and costs used for different crash types vary significantly across states

Table 39. State crash costs.

State	K	A/*Major**	B/*Minor**	C	O	Source	Dollar Year
AL	$190,200	$190,200	$190,200	$54,000	$8,900	Questionnaire	2015
AK	$2,003,000	*$1,001,000*	*$200,000*	N/A	$20,000	Questionnaire	2016
AZ	$5,800,000	$400,000	$0	$0	$0	Literature	2008
AR	$5,666,000	$302,000	$110,000	$63,000	$10,000	Questionnaire	2016
CA	$9,600,000	$459,120	$125,050	$63,854	$3,235	Questionnaire	2016
CO	$1,500,000	$80,700	$80,700	$80,700	$9,300	Questionnaire	2013
CT	$5,740,100	$304,400	$111,200	$62,700	$10,100	Questionnaire	2016
DE	$651,000	$651,000	$651,000	$651,000	$2,920	Questionnaire	UNK
DC	$1,542,000	$90,000	$26,000	$21,400	$11,400	Questionnaire	2015
FL	$10,100,000	$818,636	$163,254	$99,645	$6,500	Literature	2013
GA	$9,100,000	$955,500	$955,500	$955,500	$27,300	Questionnaire	2013
HI	Unknown	Unknown	Unknown	Unknown	Unknown	N/A	UNK
ID	$6,391,502	$318,302	$89,155	$59,097	$6,842	Literature	2013
IL	$6,245,736	$336,521	$123,079	$0	$0	Questionnaire	2016
IN	$373,000	$373,000	$35,200	$35,200	$6,300	Questionnaire	2009
IA	$4,500,000	$325,000	$65,000	$35,000	$7,400	Questionnaire	2014
KS	$4,733,650	$402,550	$80,500	$42,500	$3,250	Questionnaire	2016
KY	$257,890	$257,890	$257,890	$6,793	$6,793	Questionnaire	2015
LA	$1,712,721	$488,947	$173,599	$58,640	$24,982	Questionnaire	2015
ME	$5,740,100	$304,400	$111,200	$62,700	$10,100	Questionnaire	2016
MD	$9,200,000	$505,000	$121,400	$68,700	$12,480	Questionnaire	2014
MA	$5,740,100	$304,400	$111,200	$62,700	$10,100	Questionnaire	2016
MI	$1,512,000	$88,500	$25,600	$11,300	$11,300	Questionnaire	2014
MN	$1,140,000	$570,000	$170,000	$84,000	$7,600	Questionnaire	2015
MS	$9,145,998	$1,001,206	$276,010	$127,768	$42,298	Questionnaire	2010
MO	$9,200,000	*$313,869*	*$81,606*	N/A	$4,565	Questionnaire	2014
MT	$5,628,500	$298,700	$109,100	$61,600	$10,000	Questionnaire	UNK
NE	$1,500,000	$88,500	$25,600	$21,000	$4,200	Literature	2013
NV	$5,665,555	$301,035	$109,990	$62,076	$10,067	Questionnaire	2016
NH	$5,740,100	$304,400	$111,200	$62,700	$10,100	Literature	2016
NJ	$5,740,100	$304,400	$111,200	$62,700	$10,100	Questionnaire	2016
NM	N/A	N/A	N/A	N/A	N/A	Questionnaire	N/A
NY	$3,686,232	$91,316	$91,316	$91,316	$4,443	Literature	2015
NC	$10,133,000	$564,000	$176,000	$96,000	$6,700	Questionnaire	2013
ND	$10,082,000	$1,103,000	$304,000	$141,000	$46,600	Questionnaire	2014
OH	$336,145	$336,145	$56,146	$38,056	$8,576	Questionnaire	2014
OK	$9,600,000	$2,553,600	$451,200	$28,800	$4,200	Questionnaire	2016
OR	$870,000	$870,000	$72,400	$72,400	$19,400	Questionnaire	2012
PA	$6,568,966	$1,429,846	$95,699	$7,620	$3,048	Literature	2008
PR	$4,002,800	$89,200	$89,200	$89,200	$0	Literature	UNK
RI	$1,322,600	$1,322,600	$112,600	$63,400	$10,200	Questionnaire	2016
SC	$9,600,000	$459,120	$125,050	$63,854	$3,235	Questionnaire	2016
SD	$374,724	$374,724	$374,724	$374,724	$17,528	Questionnaire	2013
TN	N/A	N/A	N/A	N/A	N/A	Questionnaire	N/A
TX	$3,300,000	$3,300,000	$475,000	$0	$0	Questionnaire	2014
UT	$2,064,800	$2,064,800	$128,900	$65,800	$3,300	Questionnaire	2015
VT	$338,272	$291,200	$106,400	$60,000	$9,700	Questionnaire	2016
VA	$4,008,885	$216,059	$56,272	$56,272	$7,428	Literature	2001
WA	$2,900,000	$2,900,000	$155,000	$60,000	$10,000	Questionnaire	2010
WV	$5,289,928	$285,022	$104,244	$59,248	$9,765	Questionnaire	2012
WI	$210,000	$210,000	$210,000	$60,000	$10,000	Questionnaire	UNK
WY	$2,237,000	$2,237,000	$98,000	$98,000	$39,000	Questionnaire	2013

Source: *Crash Costs for Highway Safety Analysis*, FHWA, 2018 (https://safety.fhwa.dot.gov/hsip/docs/fhwasa17071.pdf)

Step 4: Crash Severity Weighting

2018 FHWA Crash Costs Study:

IL	$6,245,736	$336,521	$123,079	$0	$0	Questionnaire	2016

Illinois HSIP Website:

Safety 1-06
Effective: November 1, 2006
Page 225

STATE-WIDE AVERAGE (1999-2003) ACCIDENT COSTS BY FATALITY AND INJURIES (REFERENCE ONLY)

SIGNALIZED INTERSECTIONS

	Fatalities	A-Injury	B-Injury	C-Injury	PDO
Fatals	1.07	0.48	0.64	0.23	1.10
A-crashes	0.00	1.37	0.37	0.22	1.20
B-crashes	0.00	0.00	1.45	0.23	1.44
C-crashes	0.00	0.00	0.00	1.39	1.64
PDO	0.00	0.00	0.00	0.00	0.00

Cost/Fatality,Injuries
$3,760,000
$188,000
$48,200
$0
$0

	Fatalities	A-Injury	B-Injury	C-Injury	PDO	Total cost
Fatals	$4,011,599	$89,457	$30,999	$0	$0	$4,132,054
A-crashes	$0	$258,225	$17,928	$0	$0	$276,153
B-crashes	$0	$0	$69,947	$0	$0	$69,947
C-crashes	$0	$0	$0	$0	$0	$0
PDO	$0	$0	$0	$0	$0	$0

UNSIGNALIZED INTERSECTIONS

	Fatalities	A-Injury	B-Injury	C-Injury	PDO
Fatals	1.13	0.65	0.59	0.15	0.76
A-crashes	0.00	1.36	0.36	0.17	1.11
B-crashes	0.00	0.00	1.42	0.19	1.38
C-crashes	0.00	0.00	0.00	1.37	1.62
PDO	0.00	0.00	0.00	0.00	0.00

Cost/Fatality,Injuries
$3,760,000
$188,000
$48,200
$0
$0

	Fatalities	A-Injury	B-Injury	C-Injury	PDO	Total cost
Fatals	$4,238,226	$122,628	$28,403	$0	$0	$4,389,257
A-crashes	$0	$255,285	$17,562	$0	$0	$272,847
B-crashes	$0	$0	$68,440	$0	$0	$68,440
C-crashes	$0	$0	$0	$0	$0	$0
PDO	$0	$0	$0	$0	$0	$0

URBAN HIGHWAYS

	Fatalities	A-Injury	B-Injury	C-Injury	PDO
Fatals	1.10	0.39	0.31	0.10	0.73
A-crashes	0.00	1.28	0.23	0.13	1.11
B-crashes	0.00	0.00	1.32	0.14	1.33
C-crashes	0.00	0.00	0.00	1.33	1.60
PDO	0.00	0.00	0.00	0.00	0.00

Cost/Fatality,Injuries
$3,760,000
$188,000
$48,200
$0
$0

	Fatalities	A-Injury	B-Injury	C-Injury	PDO	Total cost
Fatals	$4,151,917	$72,431	$15,089	$0	$0	$4,239,438
A-crashes	$0	$240,652	$10,981	$0	$0	$251,633
B-crashes	$0	$0	$63,738	$0	$0	$63,738
C-crashes	$0	$0	$0	$0	$0	$0
PDO	$0	$0	$0	$0	$0	$0

RURAL HIGHWAYS

	Fatalities	A-Injury	B-Injury	C-Injury	PDO
Fatals	1.13	0.51	0.35	0.06	0.33
A-crashes	0.00	1.31	0.26	0.06	0.51
B-crashes	0.00	0.00	1.31	0.07	0.66
C-crashes	0.00	0.00	0.00	1.24	1.03
PDO	0.00	0.00	0.00	0.00	0.00

Cost/Fatality,Injuries
$3,760,000
$188,000
$48,200
$0
$0

	Fatalities	A-Injury	B-Injury	C-Injury	PDO	Total cost
Fatals	$4,261,333	$96,625	$16,740	$0	$0	$4,374,698
A-crashes	$0	$246,058	$12,521	$0	$0	$258,578
B-crashes	$0	$0	$63,041	$0	$0	$63,041
C-crashes	$0	$0	$0	$0	$0	$0
PDO	$0	$0	$0	$0	$0	$0

Existing Illinois HSIP KABCO Weighting System (Equivalent PDO crashes):

- K: 850
- A: 50
- B: 15
- C: 0
- O: 0

(assumes $5,000 PDO)

Step 4: Crash Severity Weighting

Illinois HSIP
Existing KABCO Weighting System
(equivalent PDO crashes):

- K: 850
- A: 50
- B: 15
- C: 0
- O: 0

Step 4: Crash Severity Weighting

Illinois HSIP
Existing KABCO Weighting System
(equivalent PDO crashes):

- K: 850
- A: 50
- B: 15
- C: 0
- O: 0

CCDOTH Countywide Crash Analysis
Proposed KABCO Weighting System
(equivalent PDO crashes)

- K: 50
- A: 25
- B: 10
- C: 5
- O: 1

KABCO	Ped/Bike	Rear-End - SSSD	Turning/Angle	Run Off Road	Other	Total
K	26	9	31	38	2	106
A	141	243	597	212	21	1,214
B	356	1,654	2,484	594	84	5,172
C	189	3,068	2,524	414	78	6,273
O	19	18,622	12,664	3,191	1,834	36,330
Total	731	23,596	18,300	4,449	2,019	49,095
Weighted Average Severity	**12.8**	**2.4**	**3.6**	**4.1**	**1.8**	**3.2**

Step 5: Crash Prediction Models - Segments

- Evaluated several different functional forms and parameters
  - Length
  - AADT
  - Number of lanes
  - Number of signals
  - Speed limit and access point density were not found to be statistically significant

- Proposed Model:

$$N_{CPM} = e^{0.7614 + f_{lanes} + f_{signals}} \times \mathrm{AADT}^{0.2851} \times \mathrm{L}^{0.3787}$$

N_{CPM}: KABCO Weighted Crashes per year

f_{lanes}: Regression factor for number of through lanes (lookup table)

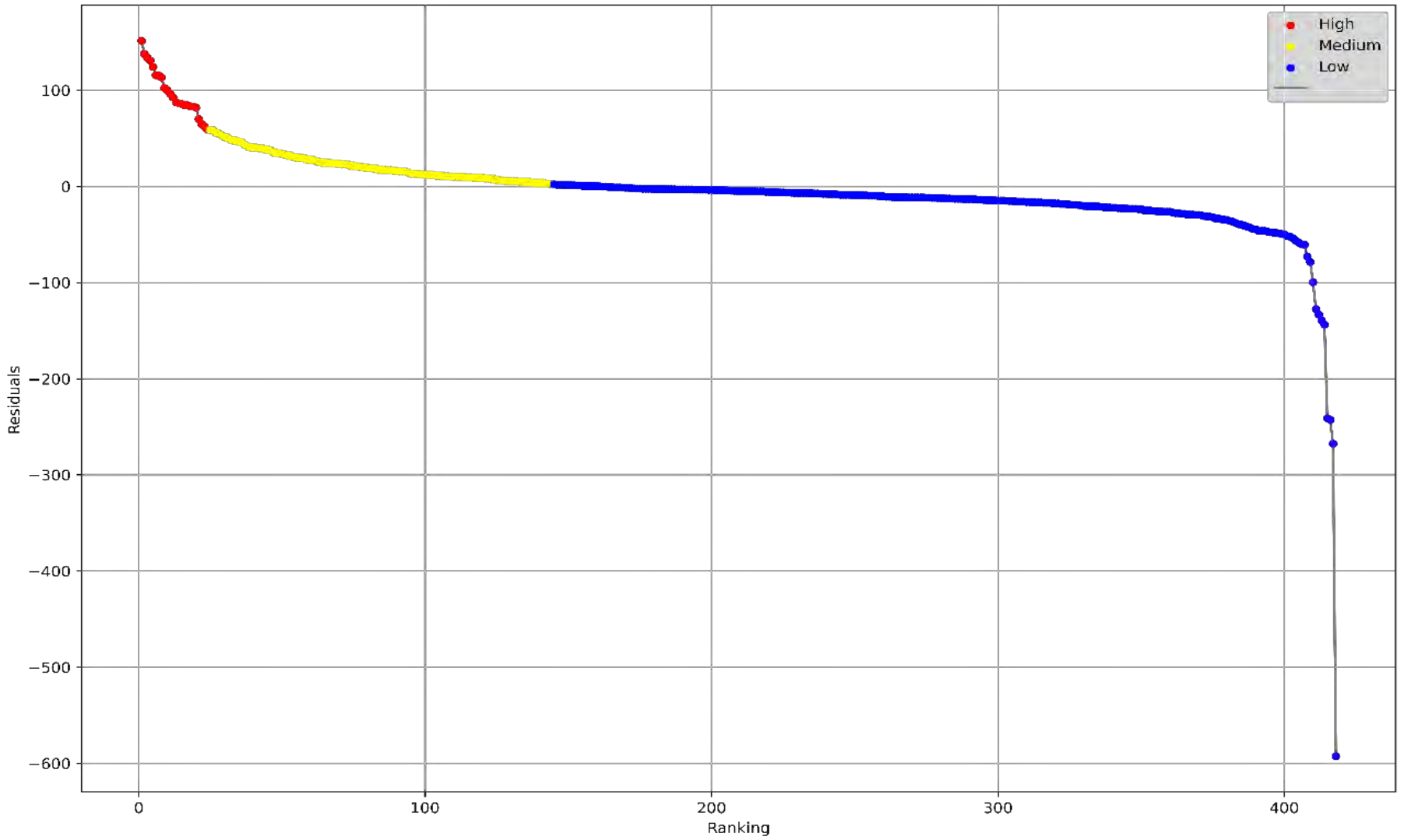
$f_{signals}$: Regression factor for signalized intersections (separate formula)

AADT: Average Annual Daily Traffic

L: Segment length in miles

Step 5: Crash Prediction Models - Segments

Identify High, Medium, and Low Crash Locations (Segments)



Step 5: Crash Prediction Models - Signals

- Includes only CCDOTH-maintained signals
- Proposed model accounts for
  - AADT volumes
  - Number of through lanes on major approaches (lookup table)
  - Number of legs (lookup table)

$$N_{CPM} = e^{-5.1131+f_{legs}+f_{lanes}} \times \mathrm{AADT}_{Major}{}^{0.7114} \times \left(\frac{\mathrm{AADT}_{Minor}}{\mathrm{AADT}_{Major}}\right)^{1.1559}$$

N_{CPM}: KABCO Weighted Crashes per year

f_{legs}: Regression factor for number of legs

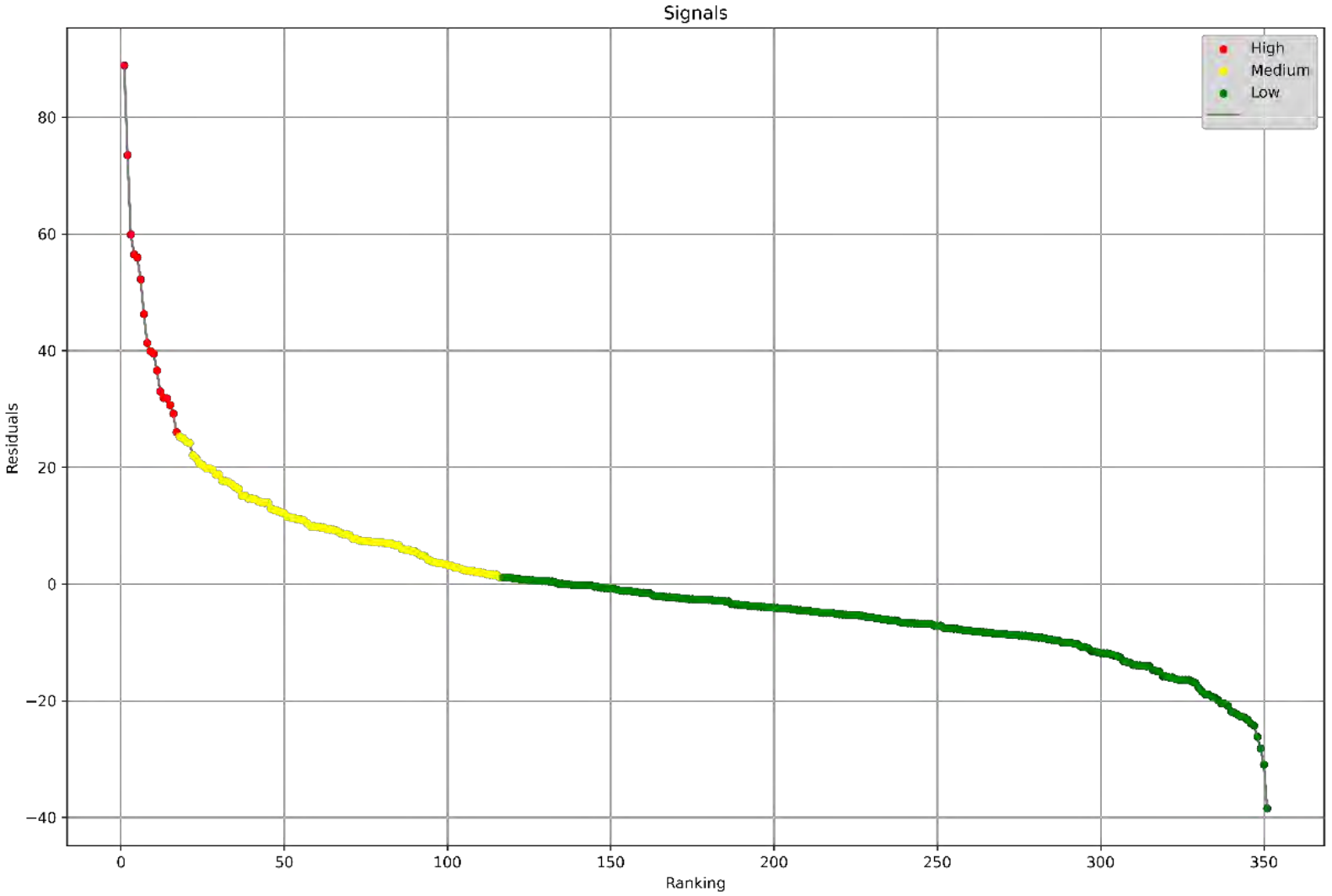
f_{lanes}: Regression factor for number of lanes on major approach

AADT_{Major}: AADT on major approach (<50,000)

AADT_{Minor}: AADT on minor approach (<26,000 and < AADT Major)

Step 5: Crash Prediction Models - Signals

Identify High, Medium, and Low Crash Locations (Signals)



Countywide Crash Analysis Next Steps:

- Finalize Crash Prediction Models
- Finalize Ranked Priority Lists
- Finalize Final Report
- Integrate into CCDOTH design guidance
- Integrate into CCDOTH 5-Year TIP

>Lanes Repurposing Projects

Lane Repurposing Projects - Summary

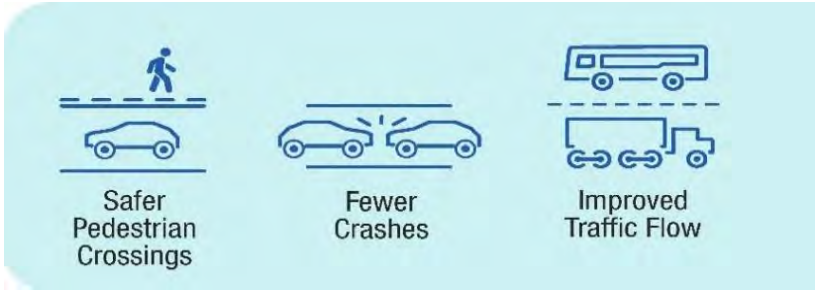
Summary

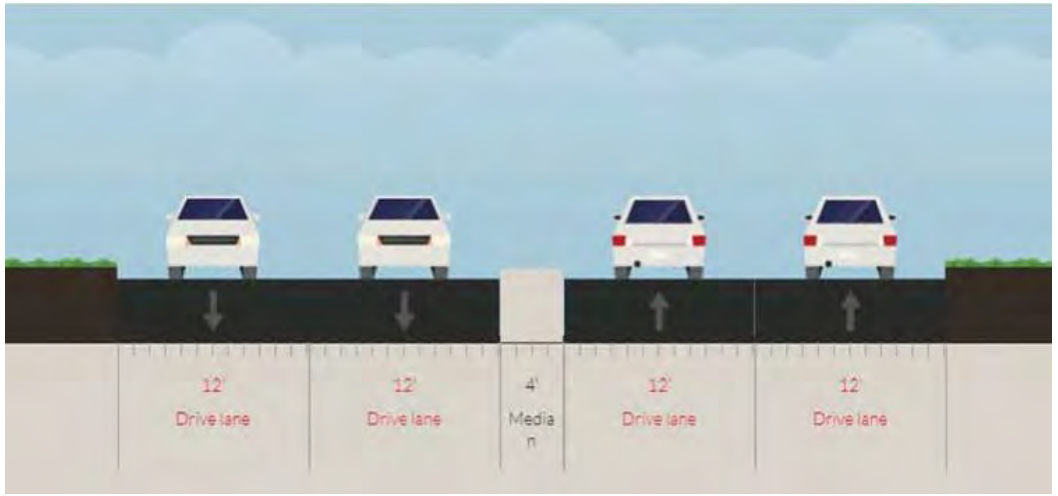
- Many existing Cook County roadways are 52 feet wide, with four through lanes and a mountable median
- CCDOTH is actively converting four-lane cross-sections to five-lane cross-sections as opportunities arise through pavement rehabilitation projects.
- Creates opportunities for left turn lanes and pedestrian refuge islands.

Based on research, converting four-lane segments to five-lane segments results in a

31%-57% reduction

in all crash types.





Current Cross-Section (12'-12'-4'-12'-12')

Proposed Cross-Section (11'-10'-10'-10'-11')

Lane Repurposing Projects

Example – Before Construction

Dempster/Thacker Street & Marshall Drive Before

Euclid Ave & Burning Bush Ln (Google StreetView, Sept. 2019)

Dempster/Thacker Street & Marshall Drive
(Google StreetView, Oct. 2018)

Lane Repurposing Projects

Example – After Construction

Dempster/Thacker Street & Marshall Drive After

Euclid Ave & Burning Bush Ln (After Construction)

Dempster/Thacker Street & Marshall Drive (After Construction)

Lane Repurposing Projects - Results

Euclid Ave

Wolf Rd to River Rd (0.8 miles)

- 44 residential driveways
- 9 non-residential driveways
- 4 minor cross-streets

Year	Crashes
2015	16
2016	14
2017	17
2018	17
2019	18
Average (2015-2019)	**16.4 crashes/year**

Dempster/Thacker St

Elmhurst Rd (IL 83) to Wolf Rd (1.6 miles)

- 84 residential driveways
- 8 non-residential driveways
- 9 minor cross-streets

Year	Crashes
2015	16
2016	18
2017	16
2018	18
2019	9
Average (2015-2019)	**15.4 crashes/year**

Lane Repurposing Projects - Results

Euclid Ave

Wolf Rd to River Rd (0.8 miles)

- 44 residential driveways
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Year	Crashes
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2020	***Construction***

Dempster/Thacker St

Elmhurst Rd (IL 83) to Wolf Rd (1.6 miles)

- 84 residential driveways
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2020	***Construction***

Lane Repurposing Projects - Results

Euclid Ave

Wolf Rd to River Rd (0.8 miles)

- 44 residential driveways
- 9 non-residential driveways
- 4 minor cross-streets

Year	Crashes
2015	16
2016	14
2017	17
2018	17
2019	18
Average (2015-2019)	16.4 crashes/year
2020	*Construction*
2021 (After)	**2**
Crash Reduction	**88%**
Crash Severity	

Dempster/Thacker St

Elmhurst Rd (IL 83) to Wolf Rd (1.6 miles)

- 84 residential driveways
- 8 non-residential driveways
- 9 minor cross-streets

Year	Crashes
2015	16
2016	18
2017	16
2018	18
2019	9
Average (2015-2019)	15.4 crashes/year
2020	*Construction*
2021 (After)	**8**
Crash Reduction	**48%**
Crash Severity	

Q & A

Cook County Department of Transportation & Highways
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Hwy.Supt@cookcountyil.gov
312-603-1601

Brian Roberts, P.E., PTOE, Traffic Manager
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6.0 Adjournment

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Transportation Technology and Operations Coalition

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Chicago Metropolitan
Agency for Planning

Thank you!

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