

MIC Safety Action Plan

Bicycle-Pedestrian Advisory Committee Meeting

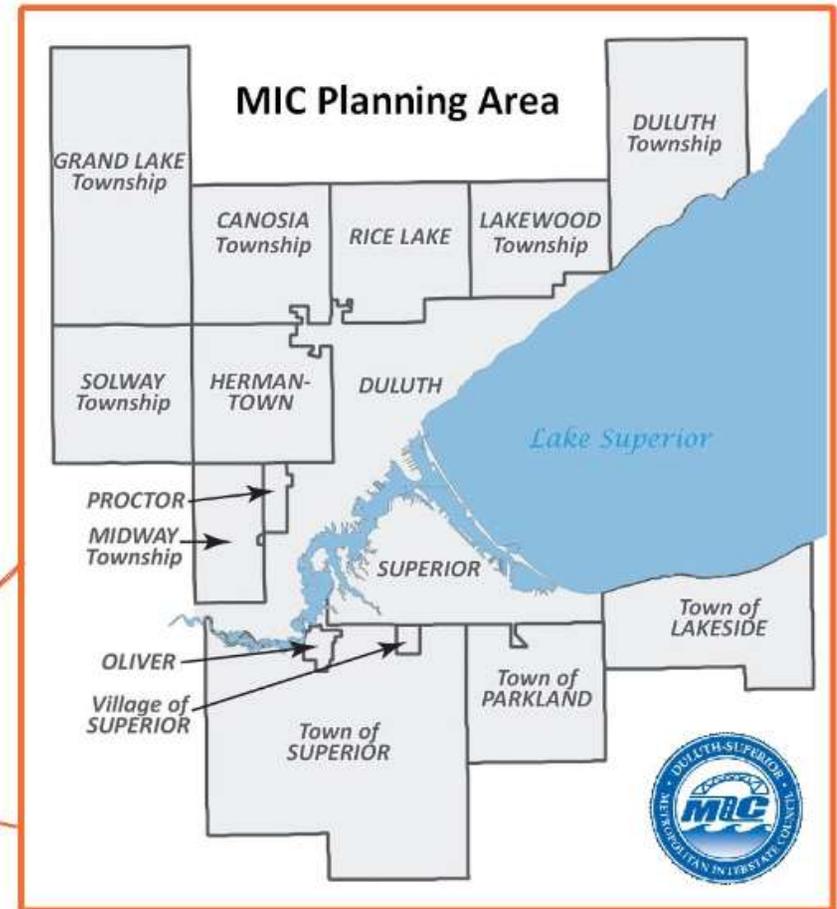
August 1, 2024

Ron Chicka, MIC
Derek Salomonsen, AECOM



Agenda

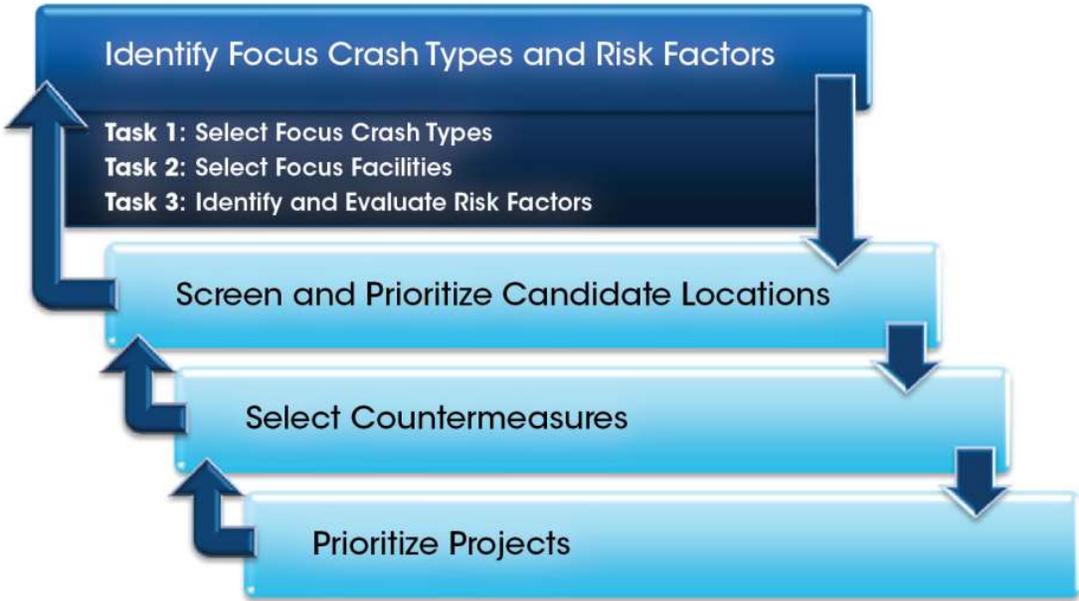
- Overview of Systemic Safety Plan Process
- Crash Tree Overview
- Bike and Pedestrian Crashes
- Safety Emphasis Areas
- Risk Factors & Risk Assessments
- Safety Countermeasures
- Decision Trees for Selecting Countermeasures
- Next Steps
- Questions/Discussion



Systemic Safety Plan Process



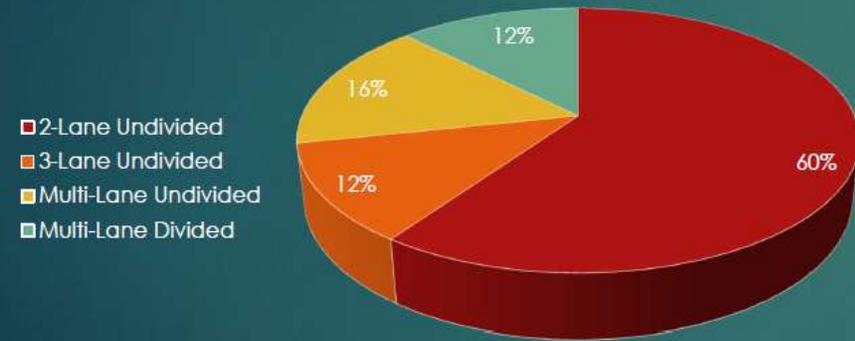
Systemic Safety Plan Process



Overview – Collection/Research of Crash Data

- Collected High Severity (K/A/B) Crashes
 - 5 Years (2017-2021)
 - Only Roads on Functional System (Collectors & Arterials)
 - Validated (vetted) all ped/bike crashes and ~10% of vehicle crashes

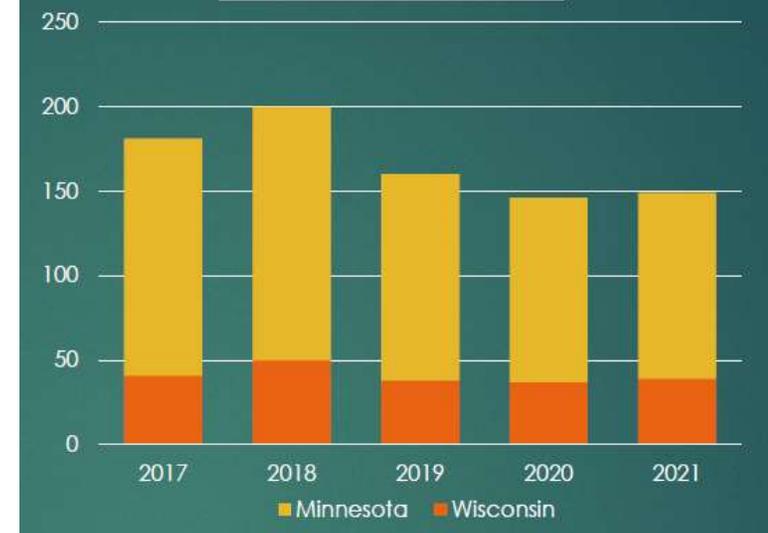
KAB Crashes by Roadway Type



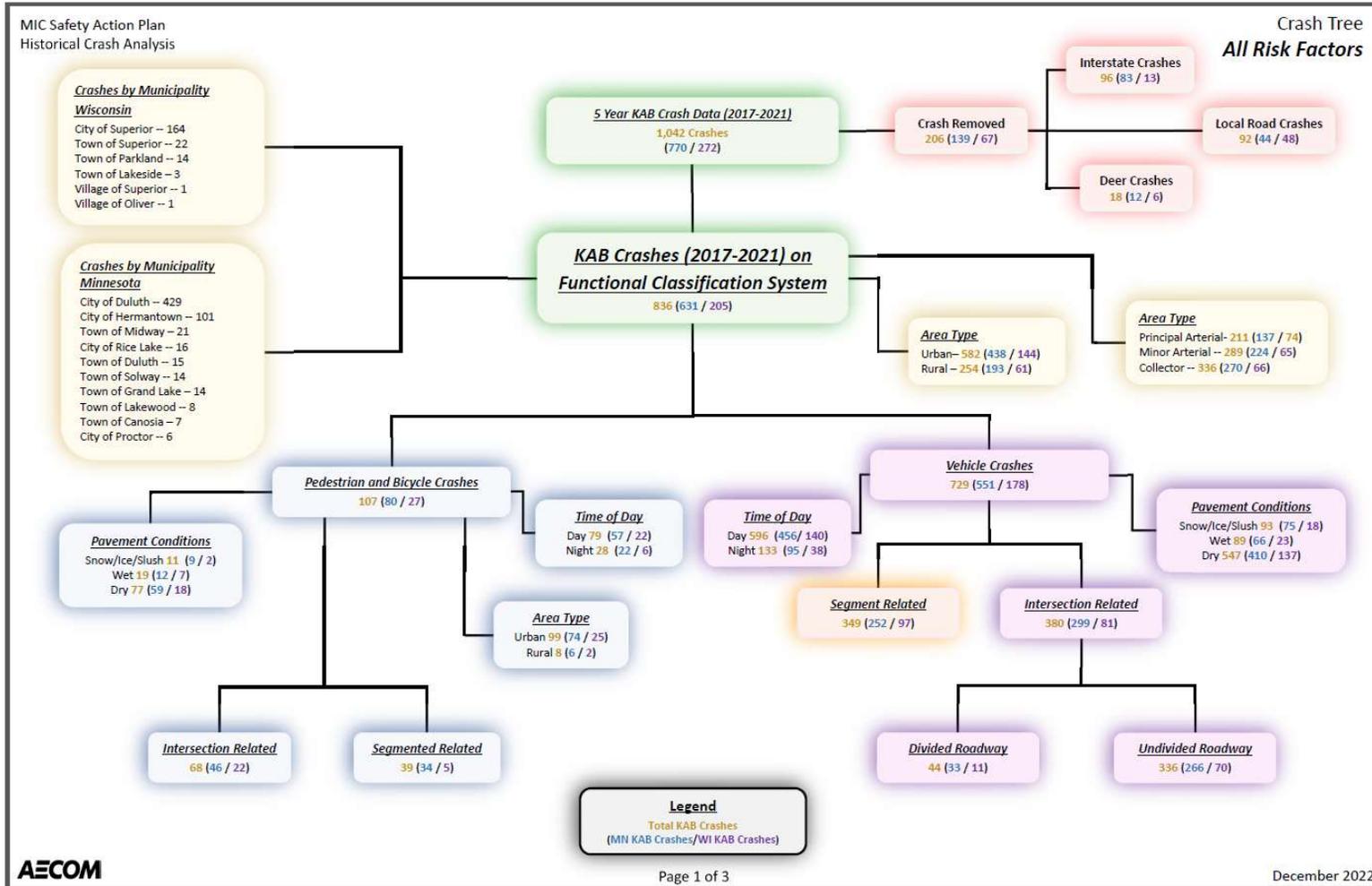
KAB Crashes by Crash Type and Location



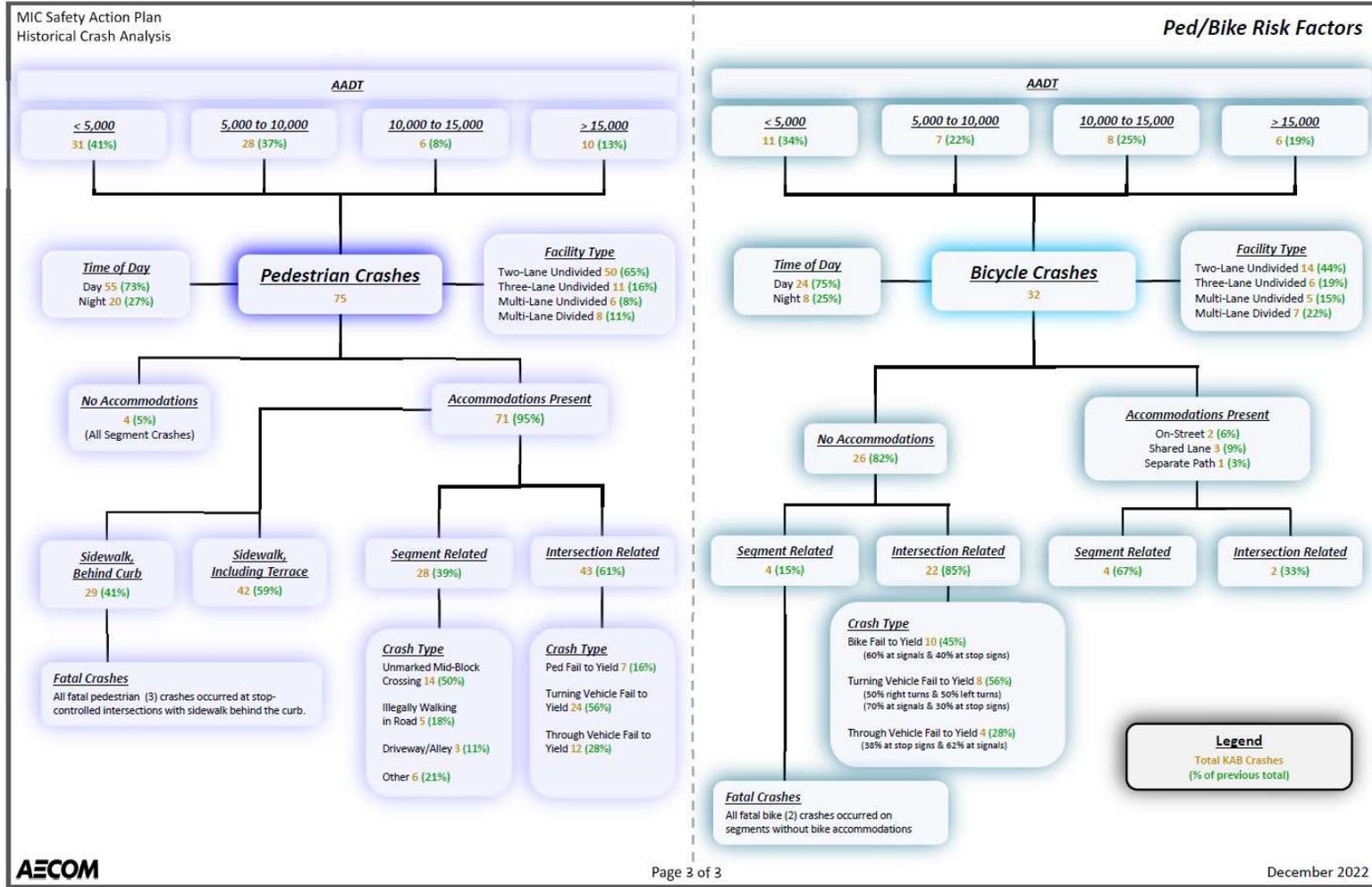
KAB Crashes by Year



Overview – Crash Tree: Overall



Overview – Crash Tree: Bike & Pedestrian Crashes



Safety Emphasis Areas

Safety Emphasis Area 1:

Rural Two-Lane Undivided Roads

With Less Than 5,000 AADT

- 360 miles & 250 curves

Safety Emphasis Area 2:

Urban Intersections Side Road Stop Control

Angle Crashes

- 160 Intersections

Safety Emphasis Area 3:

Signalized Intersections Along Multi-Lane Arterials

- 93 Intersections

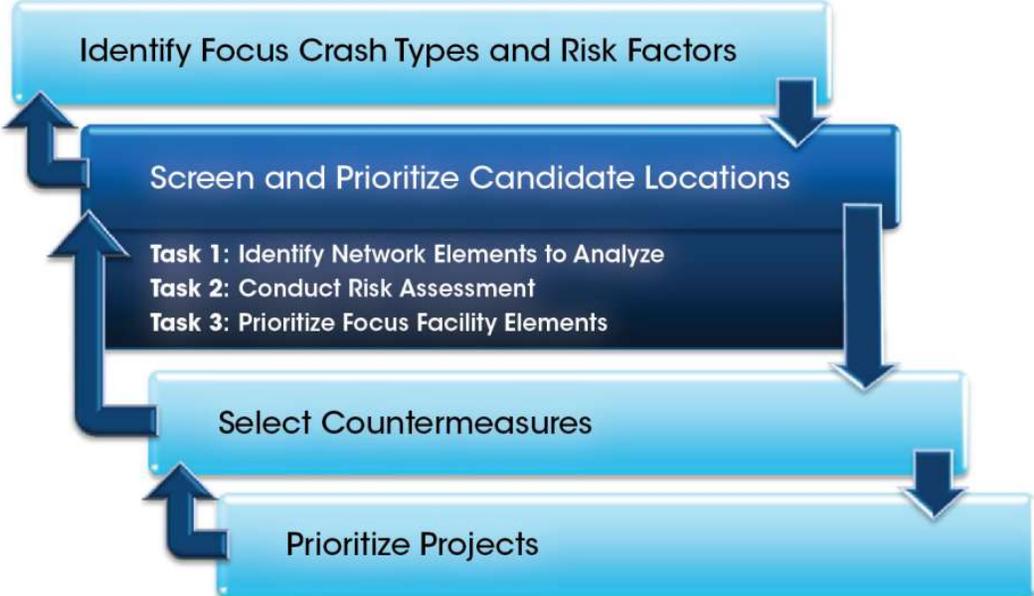
Safety Emphasis Area 4:

Urban Intersections

Pedestrian & Bicycle Crashes

- 722 Intersections

Systemic Safety Plan Process



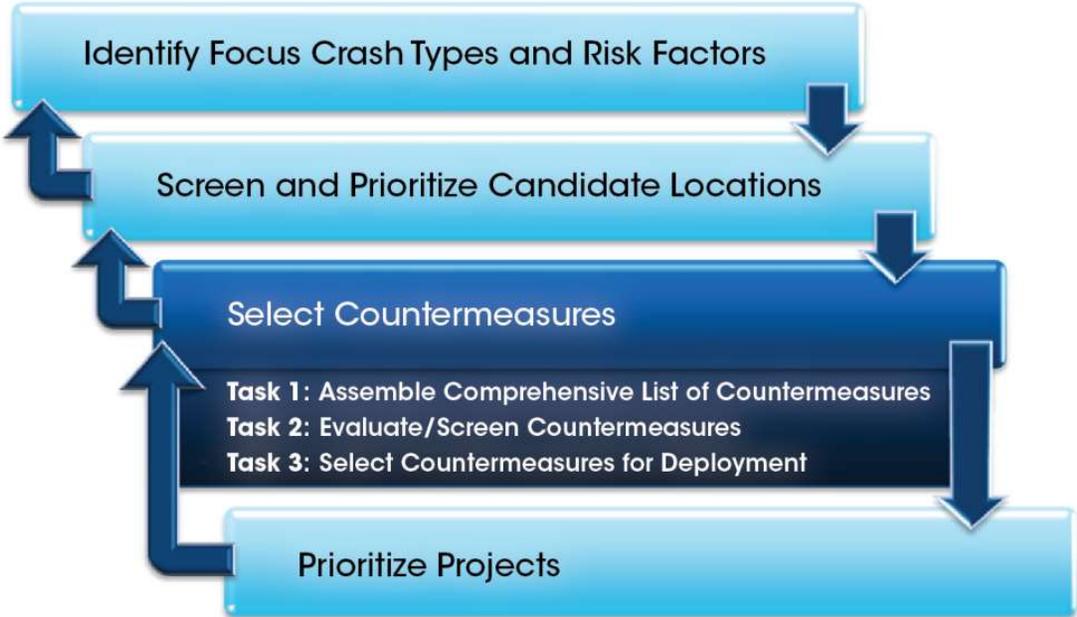
Risk Factors – Safety Emphasis Area 4 – Urban Intersections (Bikes & Peds)

Risk Factor	At-Risk Criteria	Potential Data Source	Include in Study?
Occurrence of Ped/Bike Crashes	★ >=1 crash	Stakeholders	Yes
Mainline AADT	↳ > =5,000 & < 10,000 ★ >=10,000	Stakeholders	Yes
Type of Traffic Control	★ Signalized	Stakeholders	Yes
Speed Limit on Major Road	↳ 30 mph ★ >=35 mph	Stakeholders	Yes
Number of Thru Lane on Major Approach	★ >2-lanes	AECOM	Yes
Presence of Bicycle Facilities (mainline)	↳ Paved Shoulder ★ No Bike Facilities	Stakeholders	Yes
Exposure Length (exclude median refuge)	↳ >=40-ft & <50-ft ★ >=50-ft	AECOM	Yes
Presence of Sidewalk (mainline)	↳ Partial Sidewalk ★ No Sidewalk	Stakeholders	Yes
Presence of Lighting	↳ No Lighting on Minor Approaches ★ No Lighting	Stakeholders	Yes
Presence of On-Street Parking (mainline)	★ Parking	AECOM	Yes
Presence of Pedestrian Generators	↳ Commercial, Parks & School ↳ On DTA Route	Stakeholder	Yes
Disadvantaged Neighborhoods	★ Adjacent to Disadvantaged Community	Stakeholder	Yes
Presence of Bus Stops			No, essentially included in Presence of Pedestrian Generators
Presence of Crosswalks			No, Use as Mitigation Strategy

Risk Assessment – Safety Emphasis Area 4 - Urban Intersections (Bikes & Peds)

RoadName	Lat/Long	Maintaining Agency	Number of Pedestrian Crashes	Mainline AADT	Traffic Control	Posted Speed Limit of Major Roadway	Number of Thru Lanes on Major Roadway	Presence of Bicycle Facilities on the Major Roadway	Length of Pedestrian Exposure on Major Roadway	Presence of Sidewalk on the Major Roadway	Presence of Lighting	Presence of On-Street Parking on Major Roadway	Presence of Pedestrian Generator	Presence of MTU Bus Stop	Disadvantaged Neighborhood	TOTAL STARS
Tower Ave, N 28th Ave, N 28th St, Tower Ave	46.706202-92.104034	City of Superior	★	★	★	★	★	★	★				⌘	⌘	★	★★★★★★★
Tower Ave, N 31st St	46.702589-92.10406	City of Superior	★	★	★	★	★	★	★				⌘	⌘	★	★★★★★★★
Tower Ave, N 21st St, N 21st St, Tower Ave	46.71342-92.104006	City of Superior	★	★	★	★	★	⌘	★				⌘	⌘	★	★★★★★★★
Tower Ave, Tower Ave, N 16th St	46.719309-92.103964	City of Superior	★	★	★	★	★	⌘	★			★	⌘	⌘	★	★★★★★★★
Tower Ave, Tower Ave, N 37th St, N 37th St	46.695387-92.10411	City of Superior	★	★	★	★	★	★	★				⌘	⌘	★	★★★★★★★
S Lake Ave, W Superior St, N Lake Ave, E Superior St	46.786944-92.098145	City of Duluth	★	★	★	★	⌘	★	★			★	⌘	⌘	★	★★★★★★★
Belknap St, Hammond Ave	46.720626-92.097883	City of Superior	★	★	★	★	★	★	★				★	⌘	★	★★★★★★★
Grand Ave, Grand Ave, N 40th Ave W, N 40th Ave W	46.751662-92.15132	City of Duluth	★	★	★	★	⌘	⌘	★			★	⌘	⌘	★	★★★★★★★
E 2nd St - Hwy 53/2, 39th Ave E	46.68907-92.024958	City of Superior	★	★	★	★	★	★	★				⌘	⌘	★	★★★★★★★
Tower Ave, N 18th St	46.717022-92.10396	City of Superior	★	★	★	★	★	★	★			★	⌘	⌘	★	★★★★★★★
Tower Ave, N 20th St	46.714713-92.103983	City of Superior	★	★	★	★	★	★	★				⌘	⌘	★	★★★★★★★
E 2nd St, N 3rd Ave E	46.791129-92.096598	City of Duluth	★	⌘	★	⌘	★	★	★			★	⌘	⌘	★	★★★★★★★
E 4th St, N 5th Ave E	46.794438-92.09629	City of Duluth	★	⌘	★	⌘	★	★	★			★	⌘	⌘	★	★★★★★★★
N Lake Ave, W 1st St, E 1st St	46.787635-92.099302	City of Duluth	★	★	★	★	★	★	★				⌘	⌘	★	★★★★★★★
N 24th Ave W, N 24th Ave W, W 3rd St, W 3rd St	46.766138-92.131292	City of Duluth	★	★	★	⌘	⌘	★	★			★	⌘	⌘	★	★★★★★★★
E 2nd St, N 1st Ave E, N 1st Ave E	46.789237-92.099117	City of Duluth	★	⌘	★	⌘	★	★	★			★	⌘	⌘	★	★★★★★★★
N 2nd Ave W, W 2nd St	46.786435-92.102837	City of Duluth	★	⌘	★	⌘	★	★	★			★	⌘	⌘	★	★★★★★★★
W Central Entrance, Basswood Ave	46.800474-92.135306	City of Duluth	★	★	★	⌘	★	★	★				⌘	⌘	★	★★★★★★★
E 9th St, N Central Entrance, N 6th Ave E	46.798692-92.100577	City of Duluth	★	★	★	⌘	★	★	★				⌘	⌘	★	★★★★★★★
E Central Entrance, S Arlington Ave	46.800418-92.132132	City of Duluth	★	★	★	⌘	★	★	★				⌘	⌘	★	★★★★★★★
N 6th Ave E, E 4th St, N 6th Ave E	46.795355-92.095123	City of Duluth	★	★	★	⌘	★	★	★				⌘	⌘	★	★★★★★★★
Woodland Ave, Summit St	46.817772-92.077898	City of Duluth	★	★	★	⌘	★	★	★				⌘	⌘	★	★★★★★★★
E 2nd St - Hwy 53/2, E 2nd St - Hwy 53/2, E 3rd St	46.67769-92.01047	City of Superior	★	★	★	★	★	★	★				⌘	⌘	★	★★★★★★★
Tower Ave, N 17th St	46.718164-92.103965	City of Superior	★	★	★	★	★	★	★			★	⌘	⌘	★	★★★★★★★
Tower Ave, N 19th St	46.715859-92.103961	City of Superior	★	★	★	★	★	★	★			★	⌘	⌘	★	★★★★★★★
Highway 53, Grand Ave, Grand Ave	46.733759-92.093319	City of Superior	★	★	★	★	★	★	★	★	⌘				★	★★★★★★★
N 1st Ave E, S 1st Ave E, E Superior St, E Superior St	46.787872-92.09695	City of Duluth	★	★	★	★	★	★	★			★	⌘	⌘	★	★★★★★★★
N Lake Ave, E 2nd St, W 2nd St, N Lake Ave	46.788296-92.100372	City of Duluth	★	★	★	⌘	★	★	★			★	⌘	⌘	★	★★★★★★★
S 5th Ave W, N 5th Ave W, W Superior St, W Superior St	46.782185-92.104402	City of Duluth	★	★	★	⌘	★	★	★			★	⌘	⌘	★	★★★★★★★
E Superior St, N 4th Ave E	46.790771-92.093213	City of Duluth	★	★	★	⌘	★	★	★			★	⌘	⌘	★	★★★★★★★
Belknap St, Lamborn Ave, Grand Ave, Belknap St	46.72062-92.09344	City of Superior	★	★	★	⌘	★	★	★			★	⌘	⌘	★	★★★★★★★
Ogden Ave, Belknap St, Belknap St, Ogden Ave	46.720645-92.102379	City of Superior	★	★	★	⌘	★	★	★			★	⌘	⌘	★	★★★★★★★
E Superior St, S 2nd Ave E, N 2nd Ave E, E Superior St	46.788881-92.095628	City of Duluth	★	★	★	⌘	★	★	★			★	⌘	⌘	★	★★★★★★★
N 3rd Ave W, S 3rd Ave W, W Superior St, W Superior St	46.784078-92.101847	City of Duluth	★	⌘	★	⌘	★	⌘	⌘				⌘	⌘	★	★★★★★★★
E Superior St, S 3rd Ave E, N 3rd Ave E	46.789807-92.094437	City of Duluth	★	★	★	⌘	★	⌘	⌘			★	⌘	⌘	★	★★★★★★★
N 6th Ave W, S 6th Ave W, W Superior St	46.781205-92.105671	City of Duluth	★	★	★	⌘	★	★	★			★	⌘	⌘	★	★★★★★★★
N 6th Ave E, E 3rd St, N 6th Ave E, N 6th Ave E, E 3rd St	46.79468-92.094027	City of Duluth	★	★	★	⌘	★	⌘	★				⌘	⌘	★	★★★★★★★

Systemic Safety Plan Process



Safety Countermeasures

Sources of Safety Information

- FHWA Proven Safety Countermeasures
- WisDOT Approved Crash Modification Factors
- MnDOT District Safety Plan Updates “The Big Book of Ideas”
- Crash Modification Clearinghouse



Home / Safety / Proven Safety Countermeasures

Proven Safety Countermeasures

Search Safety Proven Countermeasures

Resources

Proven Safety Countermeasures

FHWA's Proven Safety Countermeasures initiative (PSCI) is a collection of 28 countermeasures and strategies effective in reducing roadway fatalities and serious injuries on our Nation's highways. Transportation agencies are strongly encouraged to consider widespread implementation of PSCs to accelerate the achievement of local, State, and National safety goals. These strategies are designed for all road users and all kinds of roads—from rural to urban, from high-volume freeways to less traveled two-lane State and county roads, from signalized crossings to horizontal curves, and everything in between. Each countermeasure addresses at least one safety focus area – speed management, intersections, roadway departures, or pedestrians/bicyclists – while others are crosscutting strategies that address multiple safety focus areas. [Search Proven Safety Countermeasures.](#)

Speed Management



Pedestrian/Bicyclist



The **Crash Modification Factors Clearinghouse** provides a searchable database of CMFs along with guidance and resources on using CMFs in road safety practice.

ENTER SEARCH TERMS... Countermeasure Name SEARCH

FREQUENT SEARCHES: ROUNDABOUT | SIGNAL | PEDESTRIAN | COMPLETE STREETS | TSMO | BROWSE ALL



Safety Countermeasures - Safety Emphasis Area 4 - Urban Intersections (Bikes & Peds)

Safety Countermeasure	In Response to Which Risk Factor?	MN* Safety Benefit (% Crash Reduction)	WI Safety Benefit (% Crash Reduction)	Source of WI or Other Safety Data	Include in Study?
Rectangular Rapid Flashing Beacon (Unsignalized Intersections)	Traffic Control, Pedestrian Generators	69%: Pedestrian Crashes	48%: Pedestrian Crashes	WisDOT Approved CMF CMF ID 9024	Yes
Raised Crosswalk / Raised Intersection	Traffic Control, Occurrence of Crashes	45%	N/A	CMF ID 135 shows 36%	Yes
Enhanced Transit Stops (seating, shelter, dedicated bus lanes/pullouts)	Presence of Pedestrian Generators (MTU Stops)	45%	N/A	N/A	Yes
Leading Pedestrian Interval (Signalized Intersections)	Traffic Control, Presence of Pedestrian Generators	59% : Bike & Ped Crashes	13%: Ped Crashes	WisDOT Approved CMF CMF ID 9916	Yes
Install Pedestrian Countdown Timer (Signalized Intersections)	Traffic Control	9%: Ped Crashes	8%	WisDOT Approved CMF CMF ID 10115	Yes
Pedestrian Hybrid Beacon (Unsignalized Intersections)	Traffic Control, Presence of Pedestrian Generators	43%: Ped Crashes	55%: Ped Crashes	WisDOT Approved CMF CMF ID 10115	Yes
Install Sidewalk where No Sidewalk Exists	Presence of Sidewalk	N/A FHWA Proven Safety Countermeasure w/ 65-89% reduction in crashes involving a pedestrian walking along roadways	88%: Pedestrian	<u>US DOT Study</u> Only targets pedestrian crashes where the pedestrian is walking along roadways or a pedestrian crossing within 250-ft of an intersection where the intersection did not have sidewalks.	Yes
Green color pavement (Bike Facilities)	Presence of Bicycle Facilities	No Safety Benefit Included, but part of list	<u>NACTO Safety Efficacy Guide (2018)</u> : 10% increase in vehicles which yield to pedestrians. Rate of conflicts decreased from 0.95 to 0.59 conflicts per 100 bicyclists after colored pavement was added to conflict zones.		Yes
Bike Lanes Marked through Intersection	Presence of Bicycle Facilities	No Safety Benefit Included, but part of list	N/A	FHWA Proven Safety Countermeasure w/ 49% Reduction in Bike Crashes	Yes
Provide Flexible Delineator Posts Adjacent to Bike Lane (Existing Bike Lanes)	Presence of Bicycle Facilities	N/A	N/A	FHWA Proven Safety Countermeasure w/ 53% Reduction in Bike Crashes	Yes
Bike Box (Two-Stage Turn Queue Box)	Presence of Bicycle Facilities	No Safety Benefit Included, but part of list	N/A		Yes
Left Turn Calming where No Median Present (See Image on Following Page)	Occurrence of Crashes, Presence of Pedestrian Generators, Exposure Length	No Safety Benefit Included, but part of list	<u>City of Chicago Left Turn Traffic Calming</u> Study indicates 24% Crash Reduction and a 20% increase in left turn vehicles yielding to peds in crosswalks.		Yes

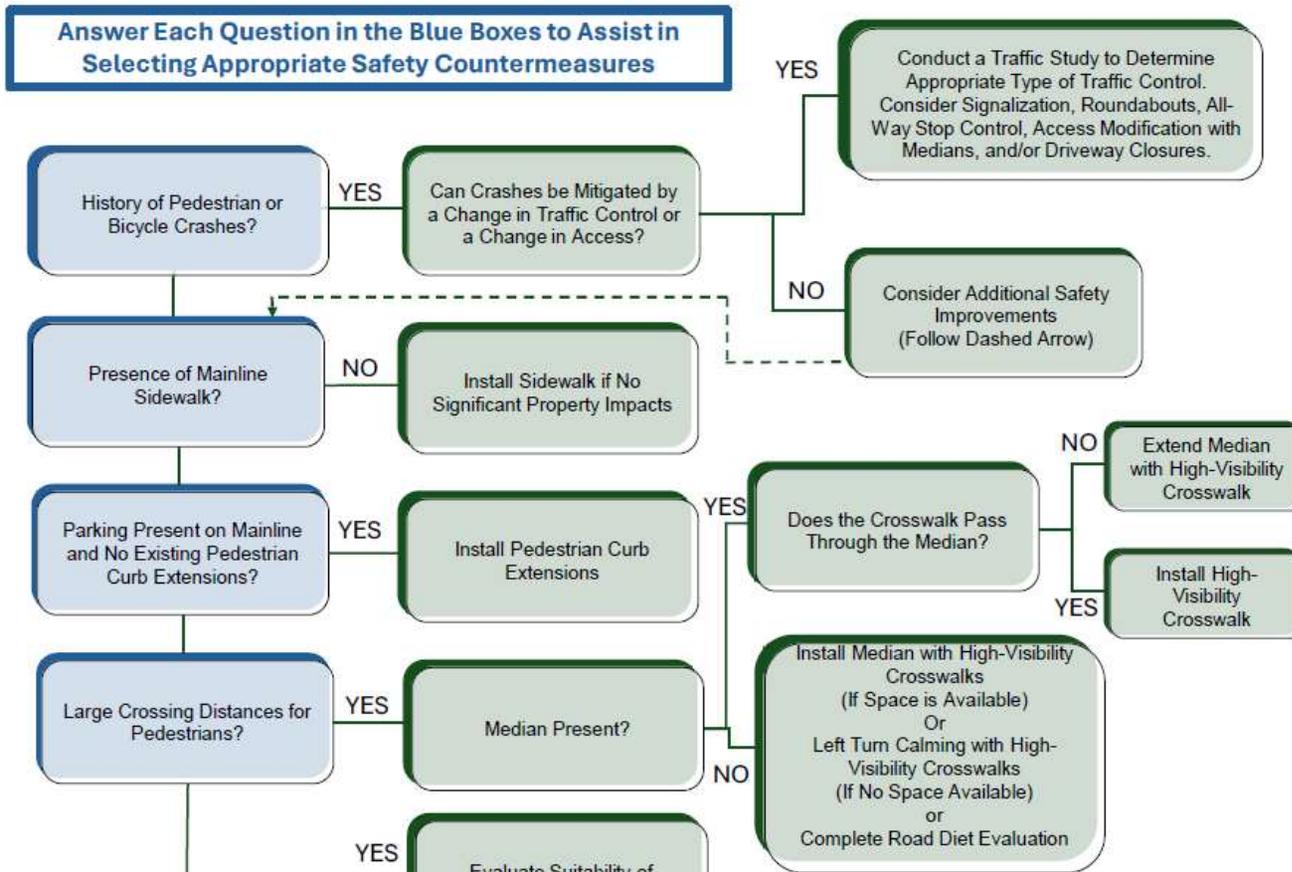
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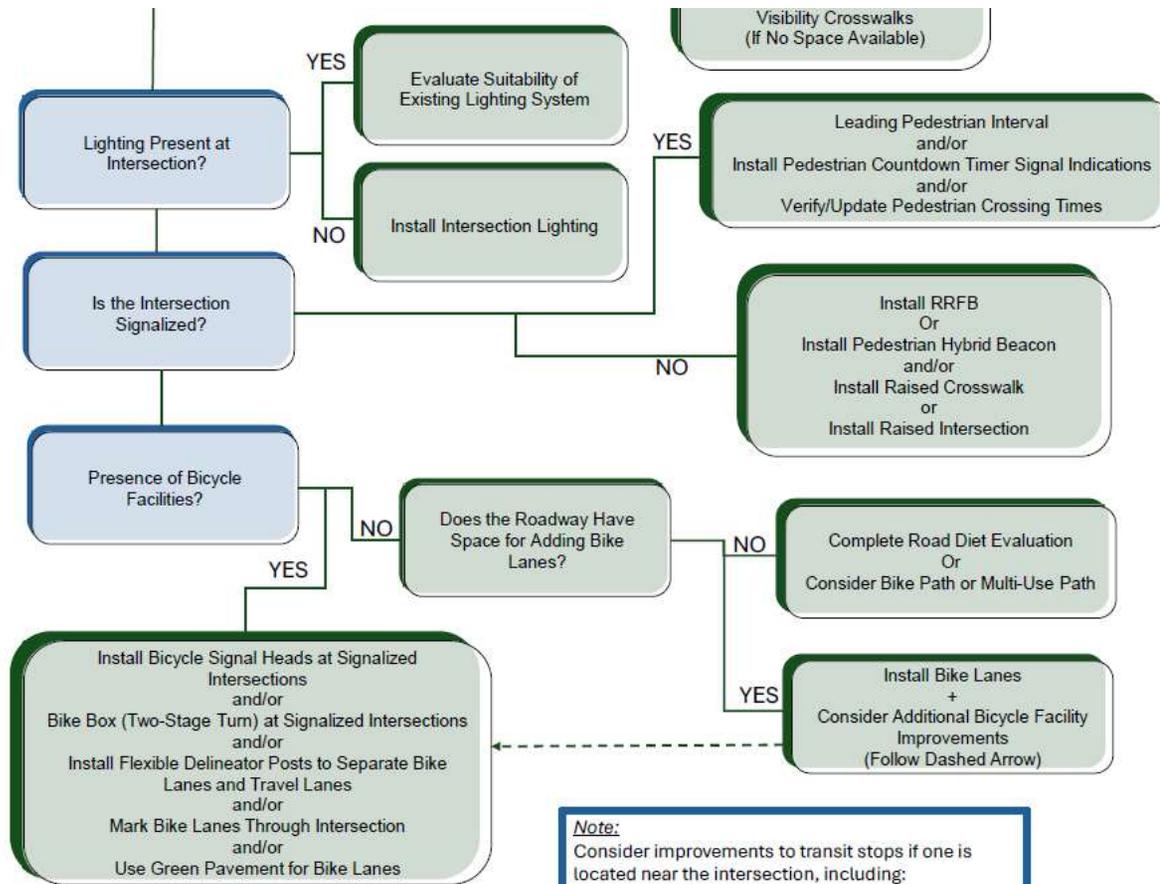
Decision Tree – Safety Emphasis Area 4 - Urban Intersections (Bikes & Peds)

Urban Intersections: Pedestrian and Bicycle Crashes

MIC Safety Action Plan



Decision Tree – Safety Emphasis Area 4 - Urban Intersections (Bikes & Peds)



Visibility Crosswalks
(If No Space Available)

Note:
Consider improvements to transit stops if one is located near the intersection, including:

- Bus Shelter
- Bus Pullouts
- Seating
- Lighting
- Pedestrian Accessibility

Safety Projects: Number of Locations

- Top 5% or minimum of top 20 locations
- Evaluate next 5% or next 20 locations for corridor-wide projects and to see if there is a good representation of different municipalities. Evaluate locations in municipalities that are not well represented in the original top 5%.

SEA 1 Rural Two-Lane Roads, AADT <5,000	SEA 2 Urban Stop Control Intersections	SEA 3 Signalized Intersections along Multi-Lane Arterials	SEA 4 Urban Intersections (Bike/Ped)
273 Total Segments (357 Total Miles)	167 Total Intersections	93 Intersection	722 Intersection
Minimum 20 Segments (40 Miles)	Minimum 20 Intersections	Minimum 20 Intersections	40 Intersections (Top ~5%)
251 Curves			
Minimum 20 Curves			

Next Steps

- Safety Countermeasure Cost Estimates
- Evaluate Safety Projects for Top Locations
- Prioritize Safety Projects
- Final Safety Action Plan

Thank you.

Questions?