

CHAPTER 2

COUNTYWIDE COLLISION TRENDS



INTRODUCTION

This section presents a description of the safety approach for the Waco MPO CSAP. This safety action plan evaluates conditions on all roadway types in McLennan County, at the countywide level and for local jurisdictions, except for private roads and parking lots.

The collision-based safety assessment is based on 10 years of collision data obtained from the Crash Records Information System (CRIS) database maintained by the TxDOT. The CRIS database includes collisions on TxDOT facilities as well as local police or sheriff reported collisions that occurred between 2014 and 2023.

Before commencing the analysis, collision records that took place on private roads, parking lots, or lacked either geo-coordinates or collision severity information were eliminated from the database. These excluded collisions accounted for approximately 11 percent of the total collisions. The collision data was then analyzed and plotted using ArcMap Geographic Information Systems (GIS) software to identify high-risk intersections and roadway segments across McLennan County.

The data-driven process included:

- Examination of Collision Trends: Review of collision statistics to evaluate when, where, and why collisions occur and what modes are involved.
- Development of Collision Profiles: Combination of collision factors to identify prevalent collision types.
- Development of a Countermeasure Toolbox: Identification of effective, nationally proven countermeasures applicable to different collisions.
- Identification of Priority Safety Project Locations: Identification of priority project locations based on collision density and community, stakeholder and community verification.

The analysis began with a comparative evaluation of total injury collisions throughout the county. Factors examined included: collisions within various timeframes, collision type, primary contributing factor, vehicle type, harmful event during collision, collision distribution by posted speed limit, and lighting conditions. This was followed by a comprehensive analysis of all injury collisions to identify collision profiles. Later in the safety plan, the evaluation of injury collisions also identified High Injury Network locations, consisting of intersections and corridors with more frequent injury collisions.

COUNTYWIDE COLLISION DATA ANALYSIS FINDINGS

The countywide findings summarize the collision trends in overall McLennan County from 2014 to 2023. This analysis aims to identify key patterns, risk factors, and emphasis areas to inform the development of targeted countermeasures and safety improvements.

A series of graphs and charts illustrating trends across various factors are included on the following pages. These visualizations provide an overview of collision characteristics and contributing factors. Key findings are summarized below:

- Overall, from 2014-2023, there were a total of 54,400 countywide collisions of which 36,356 (67 percent) were non injury or property damage collisions and 18,044 (33 percent) were injury collisions. Of the total collisions, 1,945 (approximately 4 percent) resulted in KSI collisions.
- A total of 18,044 injury collisions resulted in 27,302 people being injured. Of those injured, 15,452 suffered possible injuries, 9,528 had minor injuries, 1,962 sustained severe injuries, and 360 resulted into fatalities.
- The highest number of collisions occurred in 2021.
- Month of July had the highest KSI collisions over the 10 year period (10 percent of all KSI collisions).
- Collisions peak during typical evening commute hours, 4 p.m. to 6 p.m. In particular, 8.5 percent of total collision occurred during 5 p.m. to 6 p.m. Pedestrian collisions rise sharply between 8 p.m. and 9 p.m., while bicycle collisions peak from 5 p.m. to 6 p.m.
- In McLennan County, broadside collisions (42 percent) account for the highest number of injury collisions followed by hit object (28 percent) and rear end (24 percent) collisions.
- The top factors that contribute to these injury collisions are unsafe speed (23 percent), automobile right-of-way violations (22 percent) and traffic signal and sign violations (12 percent).
- Roadways with a posted speed limit of 30 mph have the highest percentage of injury collisions at 28 percent. This is followed by roadways with a 55 mph speed limit at 19 percent, and roadways with a 60 mph speed limit at 14 percent.
- Out of all injury collisions, 30 percent of all injury collisions occurred during low light conditions at dusk, dawn, and in the night. 11 percent of all injury collisions took place at night on streets without lighting.

Additional detailed collision statistics are summarized in the following pages.

McLENNAN COUNTY COMPARISON TO STATEWIDE COLLISION TRENDS

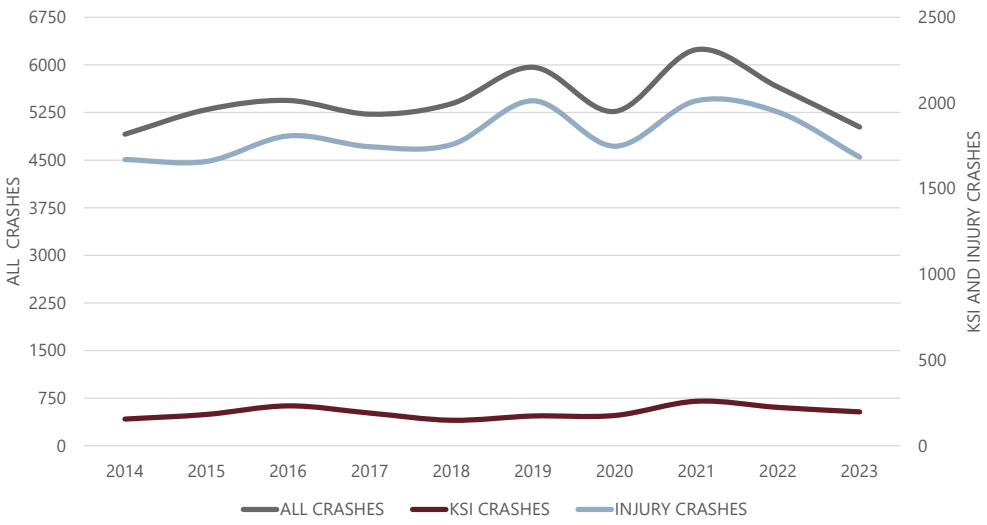
While McLennan County experienced fluctuations in the number of KSI collisions over the 10-year period, the State of Texas as a whole saw an increase in KSI collisions during this time. The share of KSI collisions (3.5 percent) and all injury collisions (33 percent) out of the total collisions appeared to be approximately the same for both the statewide and McLennan County data.

Similar to the statewide trend, McLennan County also saw its peak number of collisions in 2021. Analyzing the monthly distribution of collisions over the ten year period, October recorded the highest number of collisions statewide, while for McLennan County, July had the most prominent number of injury collisions.

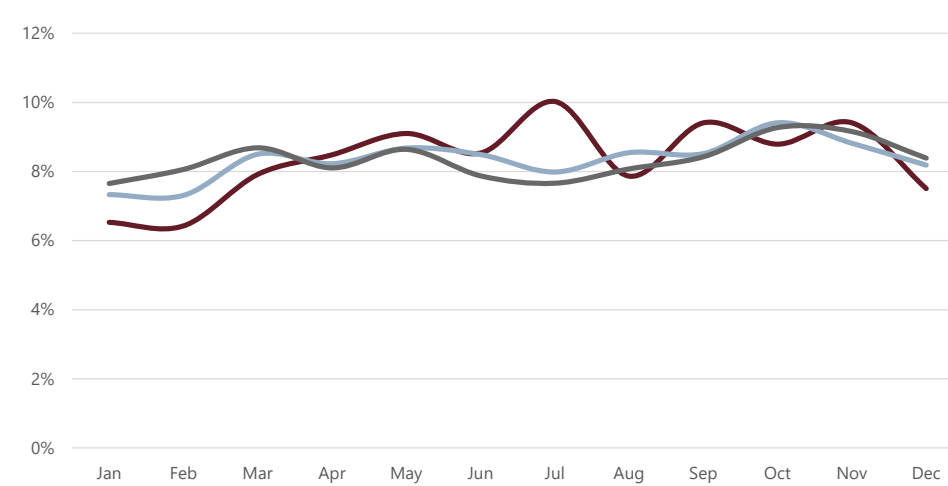
The evening commute hour from 5 p.m. to 6 p.m. was identified as a peak period for injury collisions in both the statewide and McLennan County data. In contrast, the peak hour for pedestrian and bicycle injury collisions differed, with the statewide data showing the highest occurrence from 9 p.m. to 10 p.m., while for McLennan County, it was from 8 p.m. to 9 p.m. Unsafe speed was a common top contributing factor for injury collisions, both at the statewide and countywide levels.

These shared findings highlight the need for the Waco MPO to closely align its safety strategies and interventions with broader statewide efforts to address the persistent transportation safety issues impacting the region.

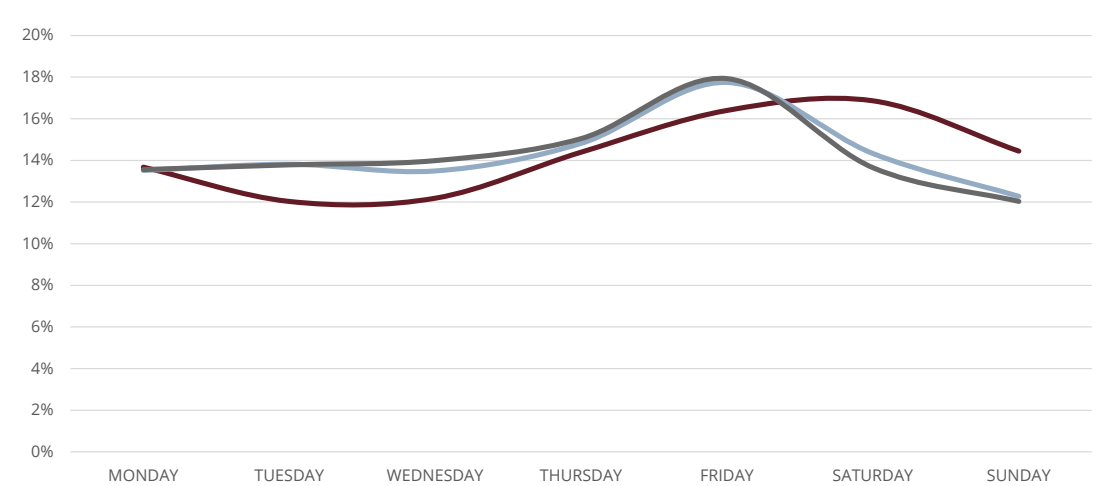
YEARLY TRENDS



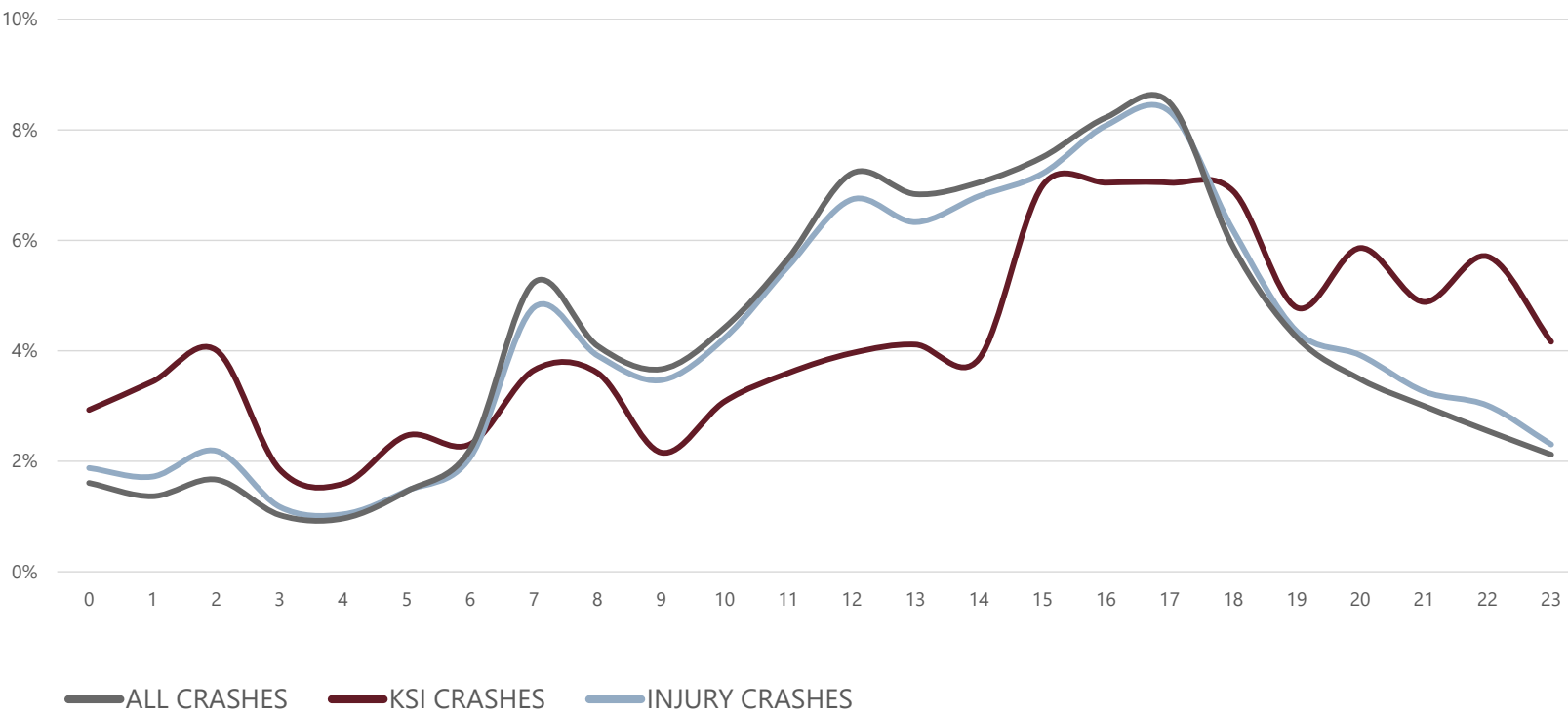
MONTHLY TRENDS



DAILY TRENDS



HOURLY TRENDS

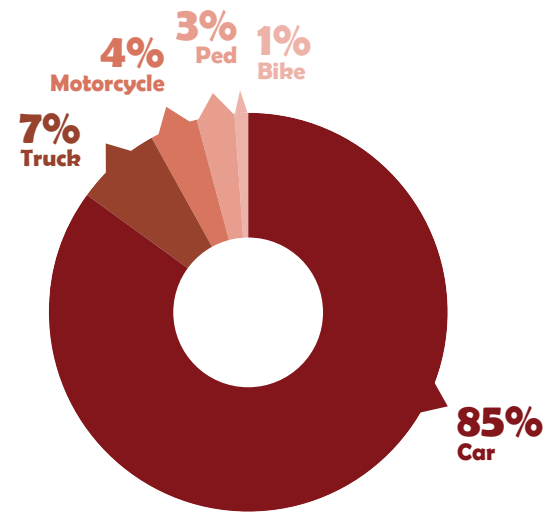


COLLISIONS BY SEVERITY

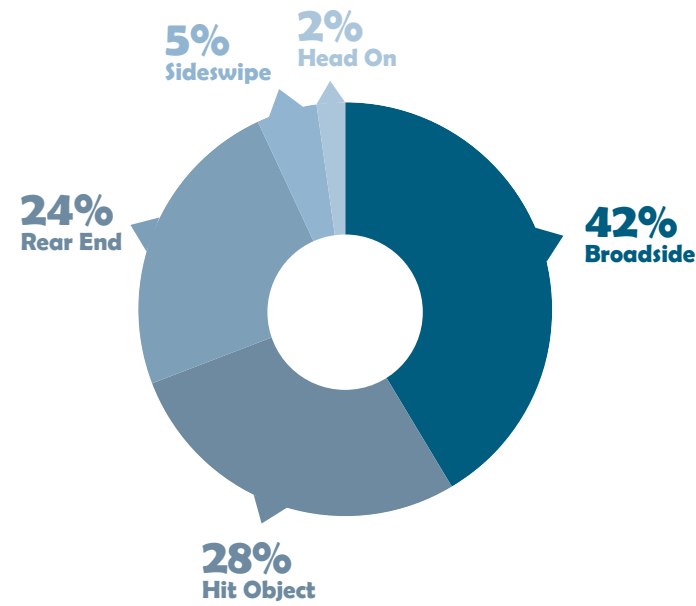
COLLISIONS BY SEVERITY

	COLLISIONS	
FATAL INJURY	330	1%
SERIOUS INJURY	1,615	3%
MINOR INJURY	6,769	12%
POSSIBLE INJURY	9,330	17%
NOT INJURED	36,356	67%
TOTAL	54,400	100%

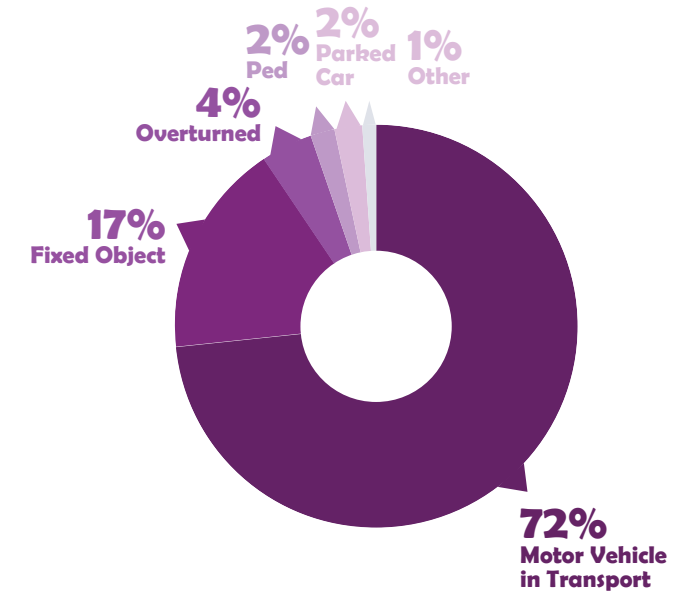
MODE



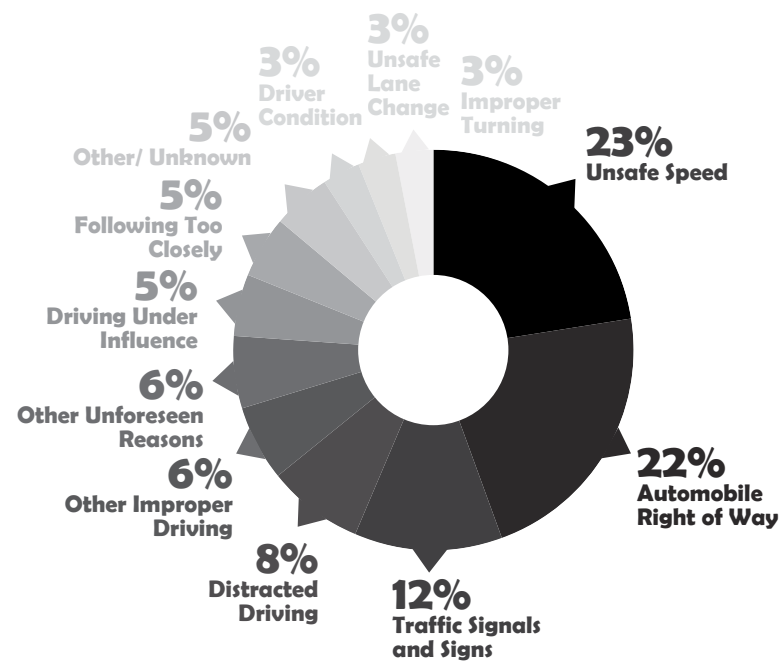
MANNER OF COLLISION



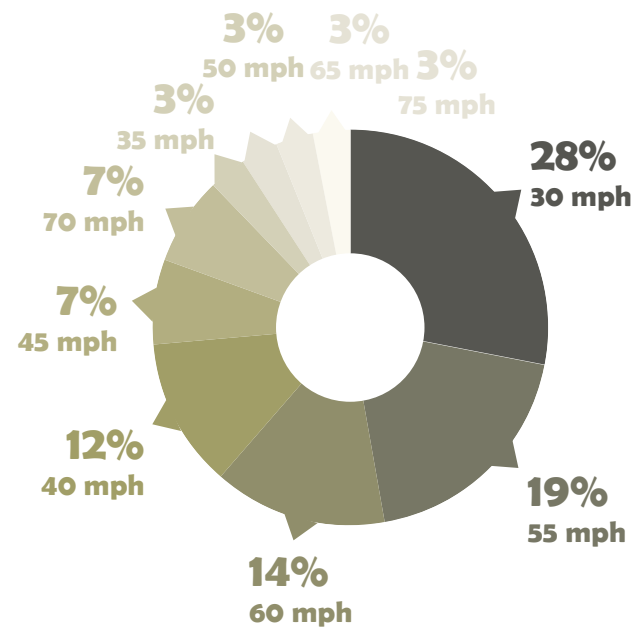
FIRST HARMFUL EVENT



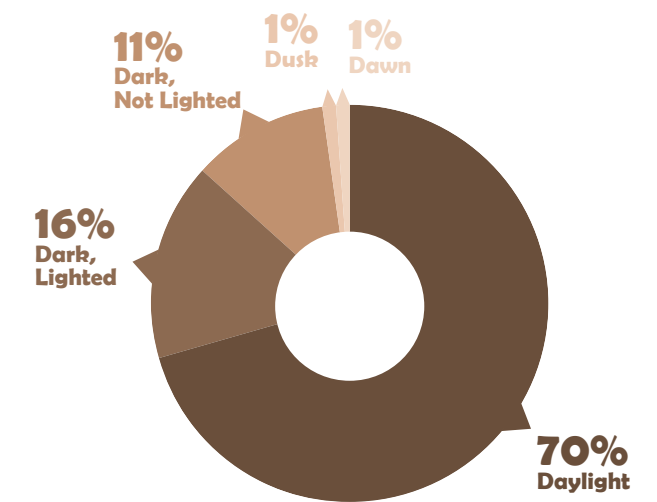
VIOLATION CATEGORY



SPEED



LIGHTING CONDITION



FINDINGS BY JURISDICTION

The following is a summary of the key findings in the evaluation of collision data for individual McLennan County jurisdictions:

- The City of Waco experienced the highest concentration of KSI collisions when compared to other areas of the county, accounting for 38 percent of fatal collisions and 48 percent of KSI collisions countywide.
- Unincorporated areas outside of city limits also saw a substantial share of the collisions, comprising 36 percent of fatal collisions and 30 percent of KSI collisions. This indicates the rural/unincorporated parts of the county were also hotspots for collisions.
- Following the City of Waco and unincorporated areas, The City of Bellmead experienced the third highest number of these types of collisions, making up eight percent of fatal collisions and five percent of KSI collisions.

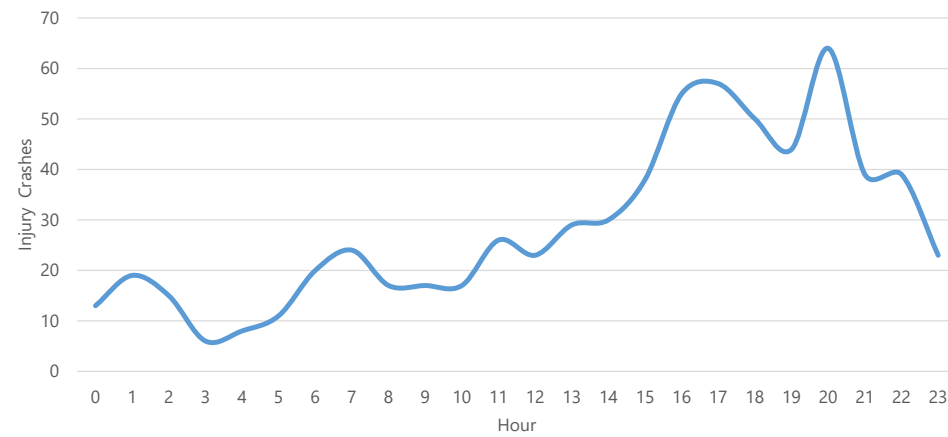
Other cities like Lacy Lakeview and Robinson, also had relatively elevated crash numbers comparison to smaller jurisdictions. Other examined smaller cities and towns experienced much lower incidences of KSI collisions overall.

INJURY COLLISIONS BY JURISDICTION

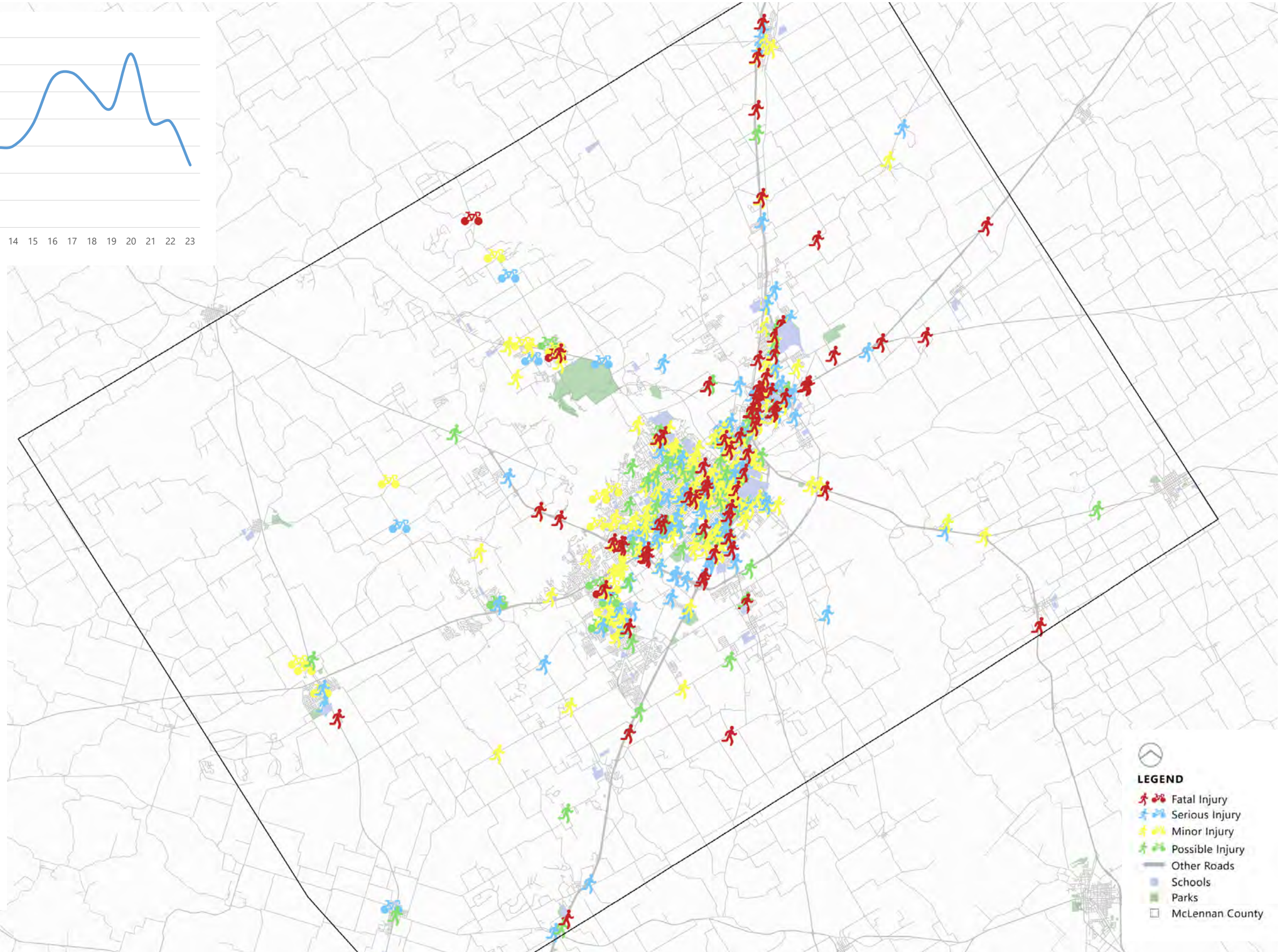
JURISDICTION	TOTAL INJURY COLLISIONS BY JURISDICTION						TOTAL INJURY COLLISIONS BY JURISDICTION - BY MODE				
	FATAL INJURY COLLISIONS		KSI		ALL INJURY COLLISIONS		PEDESTRIAN	BIKE	MOTORCYCLE	CAR	TRUCK
	COUNT	PERCENT	COUNT	PERCENT	COUNT	PERCENT					
BELLMEAD	28	8%	100	5%	971	5%	43	13	46	748	121
BEVERLY HILLS	1	0%	7	0%	106	1%	4	2	1	94	5
BRUCEVILLE-EDDY	5	2%	18	1%	145	1%	4	0	4	101	36
CRAWFORD	0	0%	2	0%	7	0%	0	0	1	6	0
GHOLSON	0	0%	1	0%	17	0%	0	0	2	14	1
GOLINDA	0	0%	1	0%	4	0%	0	0	0	4	0
HALLSBURG	0	0%	1	0%	8	0%	1	0	0	6	1
HEWITT	6	2%	35	2%	384	2%	16	5	16	324	23
LACY LAKEVIEW	10	3%	82	4%	458	3%	18	4	22	355	59
LEROY	0	0%	6	0%	21	0%	1	0	2	16	2
LORENA	5	2%	22	1%	151	1%	2	0	4	116	29
MART	0	0%	0	0%	9	0%	0	0	0	9	0
MCGREGOR	5	2%	33	2%	190	1%	4	3	7	164	12
MOODY	0	0%	1	0%	33	0%	1	1	1	28	2
OUTSIDE CITY LIMITS	120	36%	581	30%	2,521	14%	36	7	116	2,080	282
RIESEL	3	1%	3	0%	48	0%	1	0	5	35	7
ROBINSON	11	3%	74	4%	519	3%	7	1	25	417	69
ROSS	3	1%	7	0%	30	0%	0	0	1	22	7
VALLEY MILLS	2	1%	4	0%	10	0%	0	0	0	8	2
WACO	126	38%	935	48%	12,154	67%	328	173	406	10,617	630
WEST	1	0%	7	0%	49	0%	3	0	1	38	7
WOODWAY	4	1%	25	1%	209	1%	5	1	9	181	13
TOTAL	330	100%	1,945	100%	18,044	100%	474	210	669	15,383	1,308

Note: KSI - Fatal and Severe Injury Collisions

PEDESTRIAN & BICYCLE INJURY COLLISIONS



The McLennan Countywide Pedestrian and Bicycle Collision Map shows clusters of collisions, particularly along major roadways and intersections. From 2014 to 2023, 684 injury collisions were reported involving pedestrians, bicyclists, or both. Of those, 82 collisions resulted in fatalities, and 170 collisions resulted in serious injuries. Approximately nine percent of pedestrian and bicycle collisions occurred from 8 p.m. to 9 p.m., which is the highest for any one-hour period. The common factors for these pedestrian and bicycle collisions generally include high vehicle speeds, lack of dedicated pedestrian and bicycle infrastructure, and poor visibility or lighting. Potential countermeasures to address these issues could include reducing speed limits, installing pedestrian signals and crosswalks, adding bike lanes or shared-use paths, improving street lighting, and launching public education campaigns to promote visibility and safe sharing of the roads between vehicles, pedestrians, and cyclists. Implementing a combination of engineering, enforcement, and education strategies tailored to the specific collision patterns in McLennan County could help improve safety for vulnerable road users.

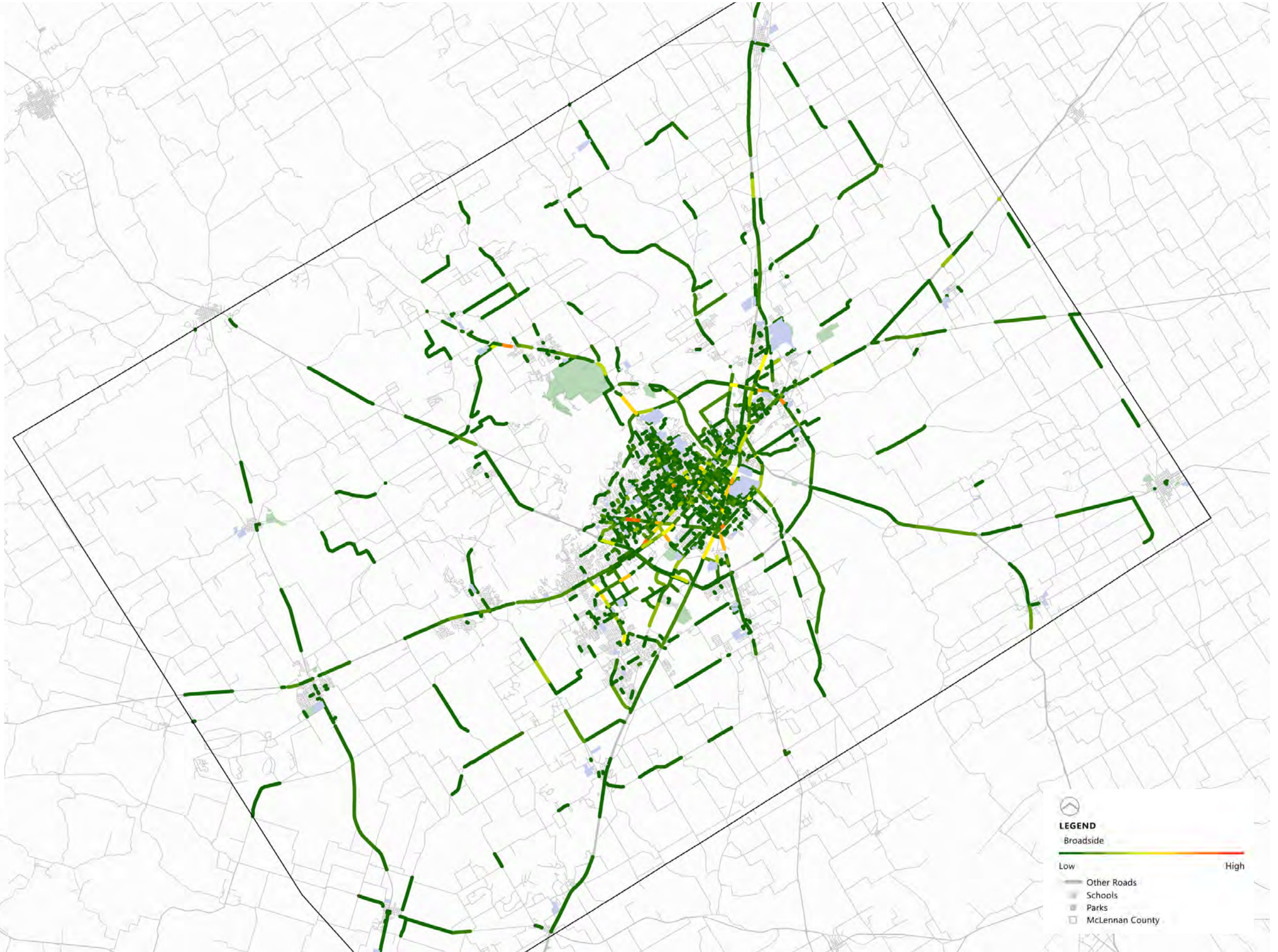


PROFILE 1: BROADSIDE COLLISIONS

Broadside collisions are the most common type of collision in McLennan County. These collisions account for 42 percent of countywide injury collisions. Broadside collisions, also known as T-bone or angle collisions, occur when the front of one vehicle strikes the side of another. These types of collisions can be hazardous due to the lack of structural protection on the sides of vehicles, often resulting in serious injuries or fatalities.

The high frequency of broadside collisions in McLennan County is a concerning trend that deserves focused attention and mitigation efforts. Factors contributing to the elevated rates of these collisions could include driver inattention, failure to yield the right-of-way, running red lights or stop signs, and unsafe speeds. Distracted driving, such as using a cell phone, can also be a significant contributor to broadside collisions, as the driver's attention is diverted from the task of safe driving.

A multi-faceted approach involving education, enforcement, and infrastructure improvements may be warranted to address this issue. Public awareness campaigns highlighting the dangers of broadside collisions and the importance of attentive, cautious driving could help change driver behavior. Increased traffic enforcement at high-risk intersections and strict penalties for violations can also serve as a deterrent. Additionally, engineering solutions such as improved signage, traffic signals, and intersection design could enhance safety and reduce the likelihood of broadside collisions.



LEGEND

- Broadside
- Low High
- Other Roads
- Schools
- Parks
- McLennan County

PROFILE 2: UNSAFE SPEED COLLISIONS

Collisions due to unsafe speed account for 23 percent of injury collisions within McLennan County, highest among any other contributing factor. Speed-related collisions can have devastating consequences, often resulting in severe injuries or fatalities due to the increased force of impact.

In order to reduce unsafe speed collisions, a multi-pronged approach can be considered. This approach includes enhanced traffic enforcement focused on high-risk corridors and intersections as well as infrastructure improvements. Such improvements might include traffic calming measures, increased signage, and road design changes that encourage safer speeds.

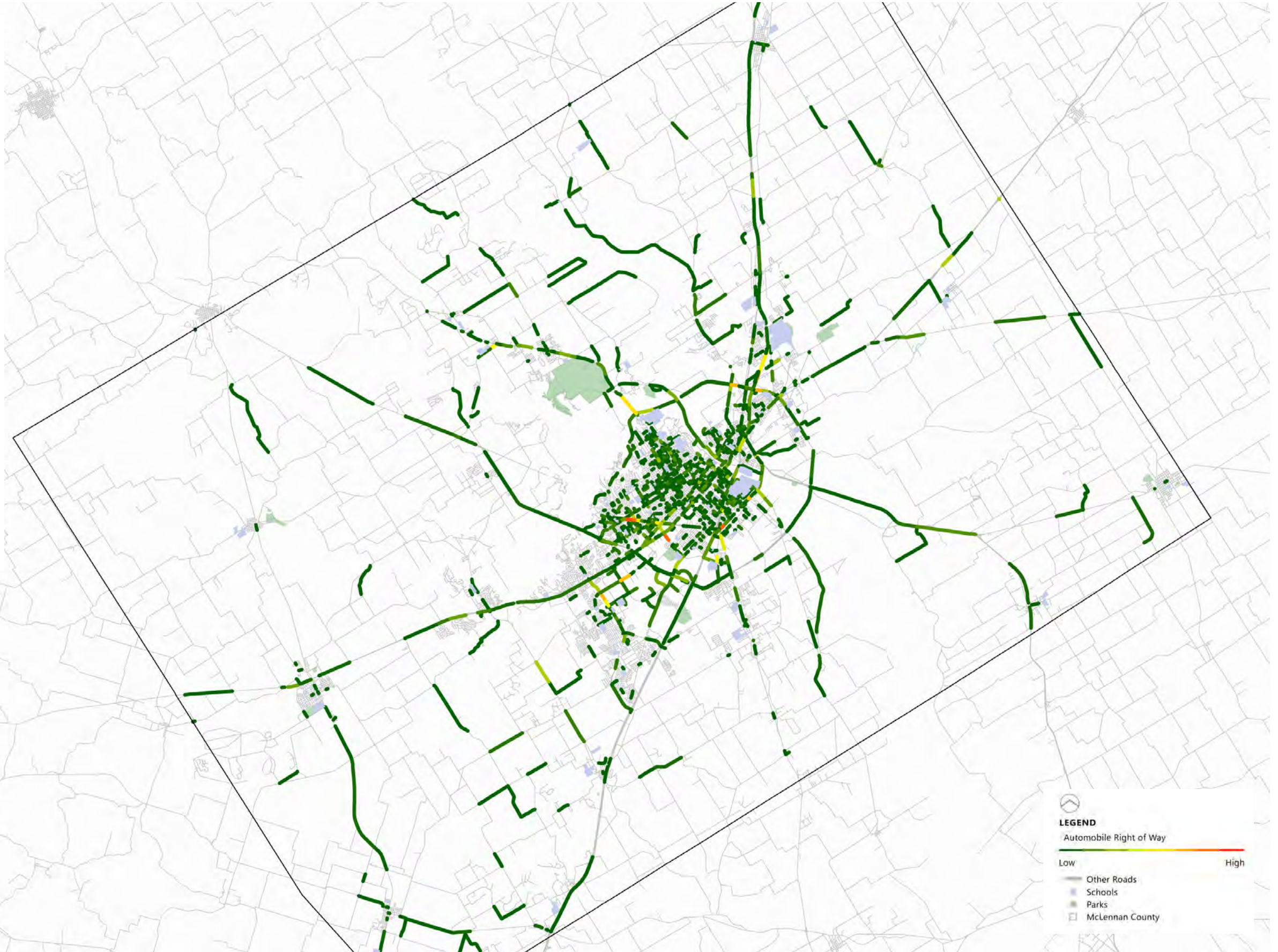
Comprehensive public education campaigns that highlight the dangers of driving at unsafe speeds, the importance of obeying speed limits, and the consequences of speed-related collisions can also play an essential role in changing driver behavior. By raising awareness and fostering a culture of safe driving, the community can work together to reduce the number of speed-related collisions and improve overall road safety in McLennan County.



PROFILE 3: AUTOMOBILE RIGHT-OF-WAY COLLISIONS

The collision data for McLennan County indicates that right-of-way violations by automobile drivers are a significant safety concern. Approximately, 22 percent of countywide injury collisions involves automobile right-of-way violations. Failure to yield, running red lights or stop signs, and other right-of-way infractions appear to be major contributing factors to the high frequency of collisions in the county. These types of right-of-way violations usually lead to broadside or angle collisions.

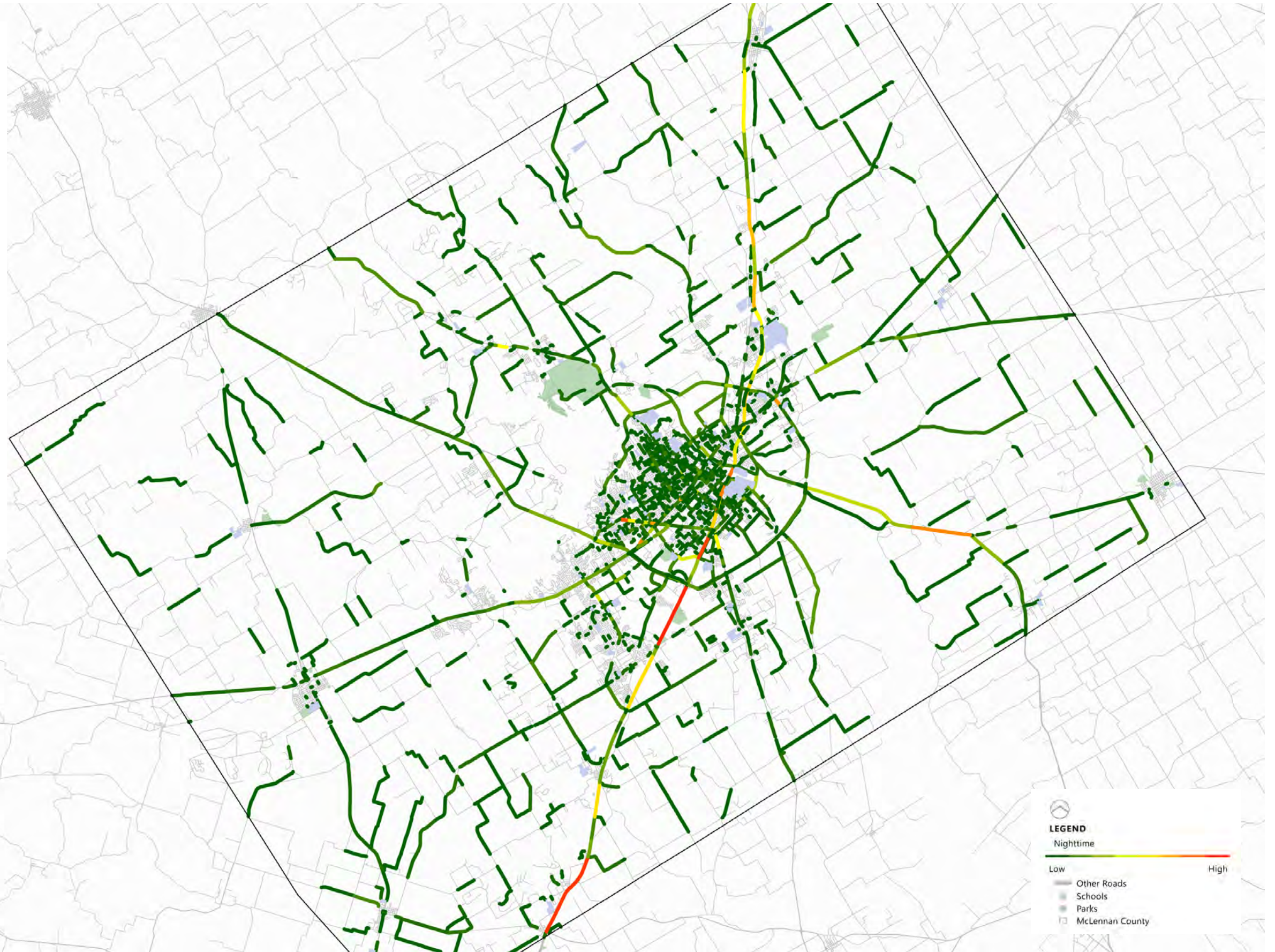
Factors like driver inattention, aggressive driving, and inadequate enforcement at problem areas may be exacerbating this issue. To reduce these type of collisions, a comprehensive strategy should include enhanced traffic enforcement focused on high-risk intersections as well as infrastructure improvements. Such improvements might include enhanced signage, improved traffic signal visibility and intersection design changes, and public education initiatives that highlight the dangers of right-of-way violations and the consequences of these types of collisions.



PROFILE 4: NIGHTTIME COLLISIONS

Nighttime collisions are also a significant safety concern, accounting for 30 percent of all injury collisions countywide. Collisions occurred during low light conditions at dusk, dawn, and in the night (with or without streetlights) are considered nighttime collisions. Driving in dark conditions presents additional challenges and hazards for motorists, including reduced visibility, driver fatigue, and the potential for impaired driving.

Enhanced nighttime traffic enforcement focuses on identifying and deterring dangerous driving behaviors like impaired or fatigued driving to reduce nighttime collisions. Improved roadway lighting, particularly at intersections and other high-risk areas, can enhance visibility and help drivers navigate roads more safely after dark. Public education campaigns emphasizing the importance of maintaining vigilance, slowing down, and avoiding distractions when driving at night can help change driver behavior and foster a safe nighttime driving culture.



PROFILE 5: HIT OBJECT COLLISIONS

The collision data for McLennan County indicates that hit object collisions account for 28 percent of all injury collisions in the county. Hit object collisions involve vehicles colliding with fixed objects such as trees, utility poles, guardrails, or other roadside infrastructure. Factors that may be contributing to the prevalence of hit object collisions include distracted or impaired driving, excessive speeds, poor road design or maintenance, and inadequate safety features along the roadways.

In order to mitigate the prevalence and severity of hit object collisions, a multi-faceted approach is recommended. This may include enhanced traffic enforcement and the targeting of behaviors such as speeding and distracted driving in order to decrease the likelihood of loss-of-control incidents. Infrastructure improvements, such as rumble strips, wider shoulders, improved lighting, and better roadside barriers, can also help provide more recovery space and protection for errant vehicles. Public education campaigns focused on the importance of attentive, sober, and cautious driving can also play a crucial role in changing driver behavior and reducing the frequency of hit object collisions.

