FEHR PEERS

Memorandum

Date: June 27, 2025

To: Jennifer Donlon Wyant and Jeff Jelsma, City of Sacramento

From: Erin Ferguson, Sonia Anthoine, and Ashlee Takushi, Fehr & Peers

Subject: City of Sacramento Vision Zero Safety Action Plan: Collision Landscape Summary and Collision Profiles

SA24-0279.00

Conventional safety practice has focused on reacting to collisions and recommendations based on the siloed categories of the Es (engineering, enforcement, education, and emergency services). Since collision reports focus on the moment of impact and time immediately preceding it, and because the purpose of such collision reports is to determine "fault" among the involved parties (such as for insurance claims or criminal prosecution), the "cause" of the collision is often attributed to the behavior of one of both parties. This can miss the contributing factors that preceded the collision by five hours, five years, or even five decades, especially as relates to built environment (street design and operations) and exposure conditions (why and where travel occurs, where people live and work and why, what modes they have access to and why, etc.).

Additionally, while collision data can give historical knowledge on collision trends, a reactive approach to safety based on collision data alone can miss other areas of the city that may have similar risk factors for severe and fatal injuries if a collision occurs there. Because the root cause of fatalities and serious injuries occurring on the city's roadways is the result of kinetic energy exceeding the human body's tolerable amount of force, identifying locations with high kinetic energy risk potential can be an important proactive approach to safety. An object's mass and speed, as well as the angle of collision impact, determines how much force is applied to a vulnerable human body and the severity of the resulting injury. Kinetic energy risk is a combination of exposure to the risk, presence of conflicts (likelihood), and level of severity (based on speed, mass, and angle).

This memo summarizes the collision landscape summary, contextual risk factors, and Collision Profiles developed as part of the City of Sacramento's Vision Zero Safety Action Plan Update.

Collision Data and Collision History

Collision data for the City of Sacramento Vision Zero Action Plan (VZAP) Update includes a ten (10) year collision dataset from 2013-2022, available through the City's Crossroads collision database provided by Sacramento Police Department records. This data focuses on injury collisions (i.e., it excludes collisions that only resulted in property damage). The data provides information on the location, parties, primary collision factors, environmental conditions, and other key characteristics of reported collisions. Collision reporting forms do not include micromobility options such as electric bicycles, electric skateboards, and electric scooters. Collision data is geolocated and is valuable for mapping and identifying collision patterns, particularly for fatal and severe injury collisions. The analysis solely includes collisions that occurred on city roadways and excludes collisions that occurred on state highway facilities and privately maintained streets.

While collision databases like Crossroads remain an excellent source of collision data, it has been found that collision data like this can have certain reporting biases, including:

- Collisions involving people walking, on bicycles, or on motorcycles are less likely to be reported than collisions with people driving.
- Younger victims are less likely to report collisions.
- Alcohol-involved collisions may be underreported.

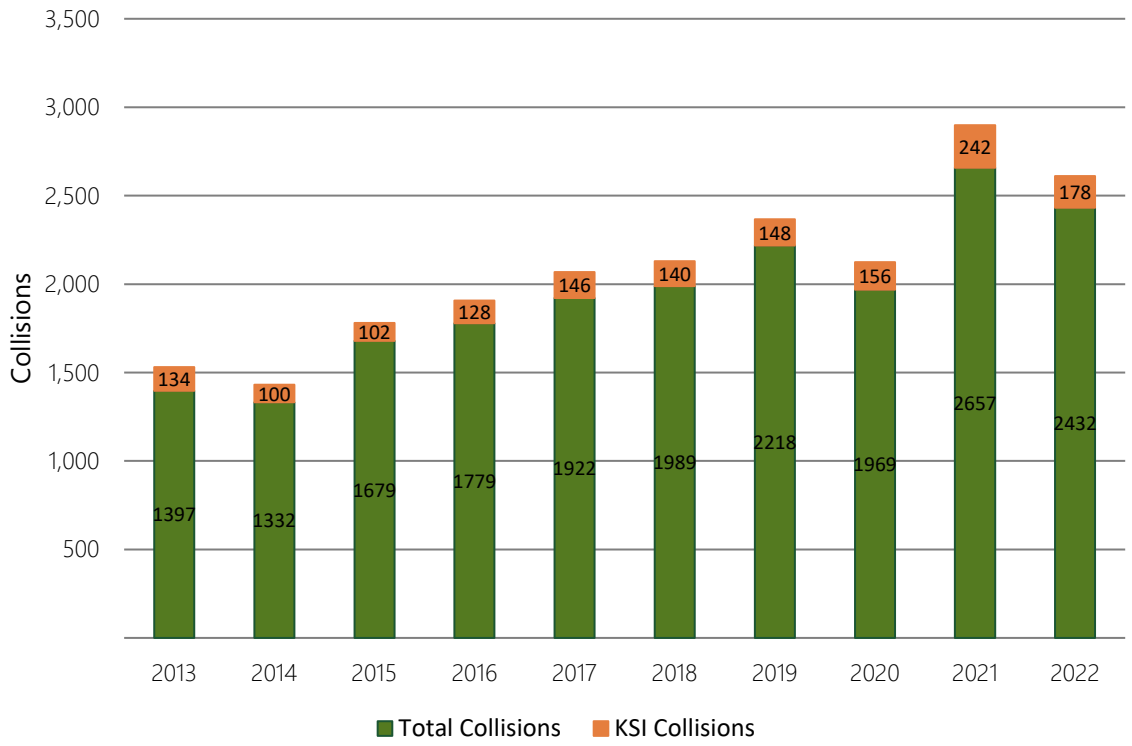
Collision data may also include bias as reports are based on a number of different factors, such as an officer's perception of the race of those involved, the accuracy of bystander witness reports, and emergency service arrival. However, there is currently limited research on the frequency and effect of reporting biases.

The 2018 Vision Zero Action Plan, which included analysis of collisions between 2009 and 2015, served as a reference point for this updated analysis, providing a basis for comparison to better understand if and how collision patterns have evolved over time.

Summary

Between 2013 and 2022, there were 19,374 reported collisions resulting in injuries across the City of Sacramento. While total reported collisions decreased in 2020, associated with the COVID-19 Pandemic, the number of collisions the following year (2021) was the highest recorded in the 10-year time frame. Of the total number of injury collisions, 1,474 resulted in fatalities or serious injuries (KSI collisions). While total reported collisions decreased in 2020, Killed and Severe Injury (KSI) collisions increased slightly during the first period of the COVID-19 pandemic in 2020, and continued to increase in the following year. Collisions involving people walking and bicycling have reverted to pre-pandemic levels. Although collisions declined during the COVID-19 pandemic, KSI collisions across all modes of travel have increased compared to pre-pandemic levels over the ten-year period.

Figure 1 : Total and KSI Collisions



Source: City of Sacramento, Crossroads Data, 2013-2022.

Table 1 displays the collision summary in the City of Sacramento between 2013 and 2022, separated by modes and fatal and severe injury (KSI) collisions.

Table 1: Collision Summary

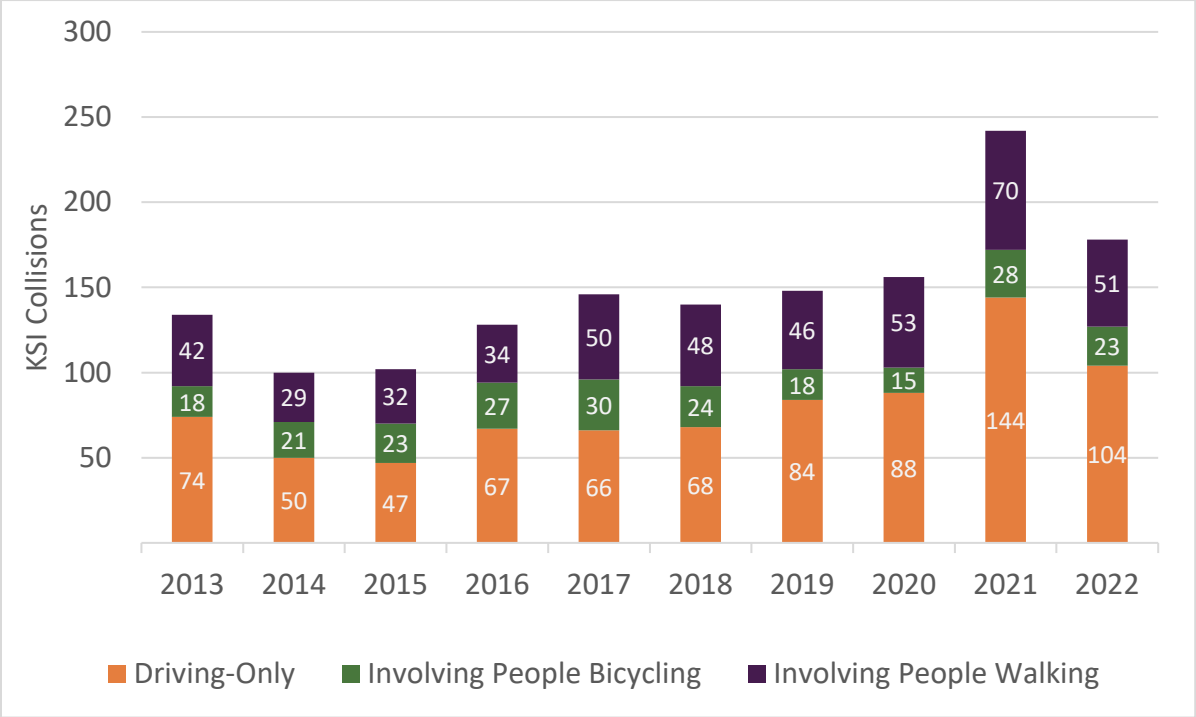
Category	Vehicle-only	Bicycle-involved	Pedestrian-involved	Total
Non-KSI Collisions	15,003	1,645	1,254	17,900[1]
KSI Collisions	792	227	455	1,474
Total	**15,795**	**1,872**	**1,709**	**19,374**

Source: City of Sacramento, Crossroads, 2013-2022.

[1] Total Non-KSI Collisions is 2 trips less than the sum of Non-KSI Collisions for Vehicle-only, Bicycle-involved, and Pedestrian-involved collisions due to the presence of two bicycle-pedestrian collisions from 2013 to 2022.

Between 2013 and 2022, there were 19,374 reported collisions across the City of Sacramento. During those years, the number of collisions resulting in a person being killed or seriously injured (KSI) represented 1,474 of the total collisions (**Table 1**). KSI collisions followed a similar pattern as total injury collisions after the first year of the pandemic with an increase in collisions in 2021 (**Figure 2**).

Figure 2: Collisions Resulting in Fatality or Serious Injury (KSI Collisions)



Source: City of Sacramento, Crossroads, 2013-2022.

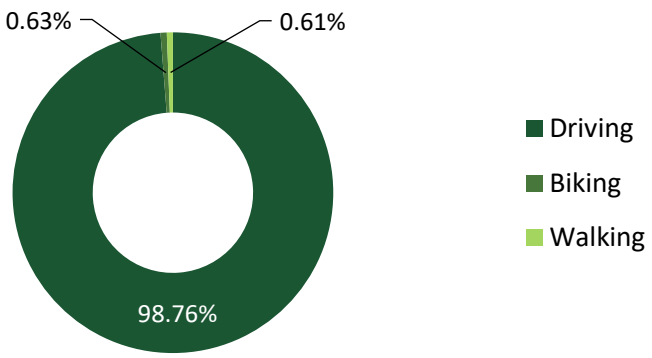
From **Figure 2**, while the total number of KSI (Killed or Seriously Injured) collisions began to increase slightly during the onset of the pandemic in 2020, continuing a general upward trend from previous years, an increase occurred in 2021 across all modes, particularly in vehicle-only KSI collisions (with an increase of 56 incidents). In 2022, the total number of KSI collisions started to decline compared to 2021, with decreases observed across all categories. Notably, vehicle-only KSI collisions dropped from 144 to 104, though collisions involving people walking remained elevated compared to pre-2020 levels.

Vulnerable Road Users

A Vulnerable Road User (VRU) refers to a person walking, bicycling, rolling, or using other modes of travel besides a motor vehicle or motorcycle[1], making them more susceptible to fatal and serious injuries. While VRU trips are usually shorter in length, they are disproportionately involved in collisions.

To estimate miles travelled by mode as a proxy measurement for level of VRU exposure, a new data source called Replica was utilized. Replica is a nationwide activity-based travel demand model with detail down to the local street level. Replica uses a number of data sources to inform its model, including connected vehicle, location-based services, and public traffic data. Replica simulates people's activities on a typical weekday and tracks travel of individuals throughout the day in "trip tours" to calculate miles traveled by mode or person. **Figure 3a** shows that, according to Replica data, excluding freeways, bicycling and walking constitute a combined 1.24% of miles traveled in the City on the average weekday, with driving as the dominant mode.

Figure 3a: Miles Traveled by Travel Mode

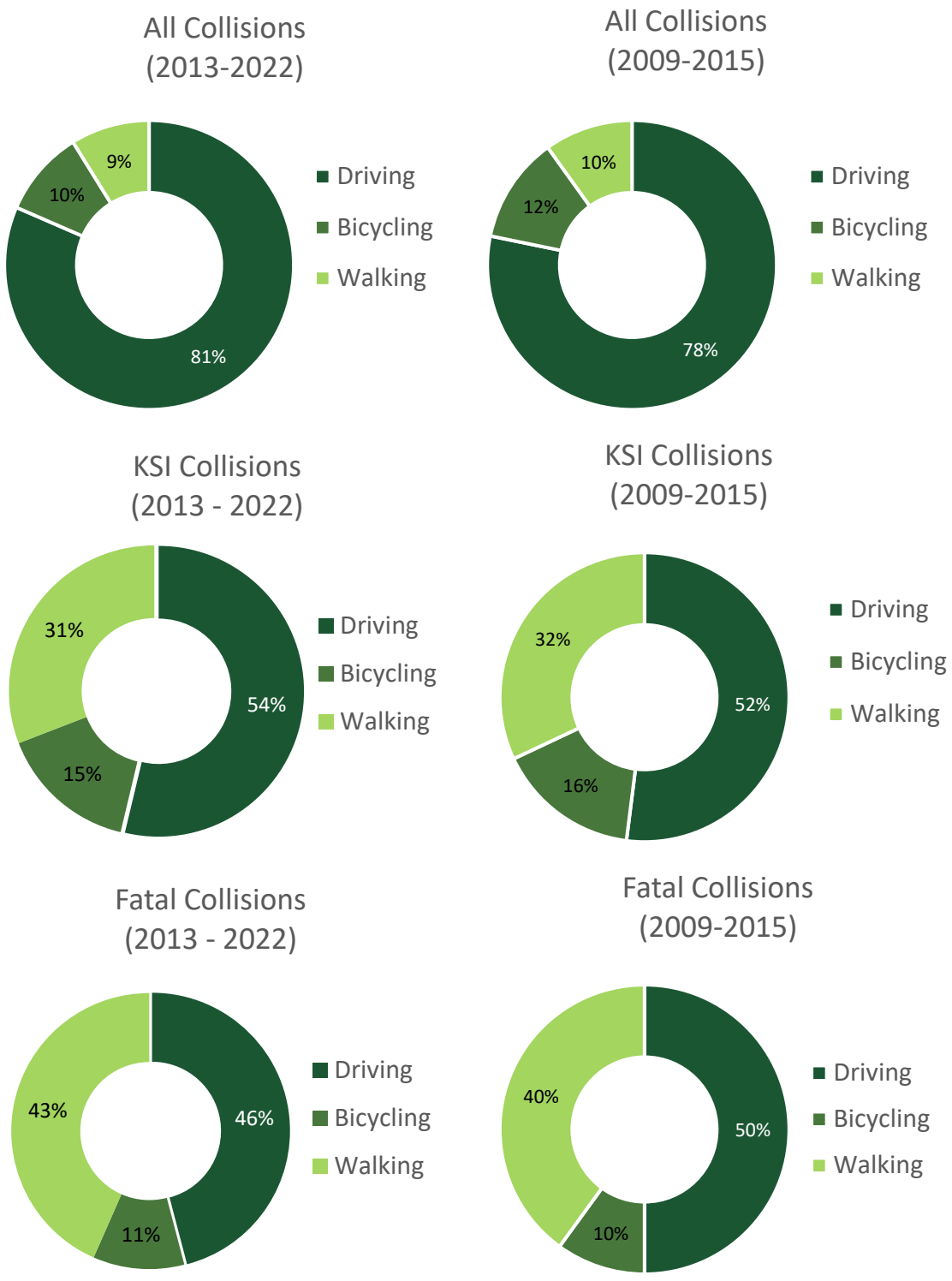


Source: Replica, Fall 2024.

As shown in **Figure 3b**, although walking and bicycling each account for less than 1% of the miles traveled in Sacramento, collisions involving walking and bicycling accounted for 9% and 10% of total injury collisions respectively. Furthermore, these groups were disproportionately involved in fatal collisions**,** with 43% involving a person walking and 11% involving a person bicycling. Comparatively, in the 2018 Vision Zero Action Plan, representing data from 2009 - 2015, collisions involving people bicycling accounted for 12% of total injury collisions and 16% of KSI collisions and collisions involving people walking accounted for 10% of total injury collisions and 32% of KSI collisions. The overall involvement rate of these vulnerable road users in injury collisions remained similar across the two study periods, and VRU risk of severe injury or death remains high, emphasizing the continued need for targeted safety measures.

[1] See the Federal Highway Administration's official definition here: VRU Safety Assessment Guidance, page 3.

Figure 3b: Collisions by Travel Mode



Source: City of Sacramento, Crossroads, 2013 - 2022; City of Sacramento Vision Zero Action Plan (2018).

Table 2 shows the annual collision rates per million miles traveled, revealing the discrepancy between driving and VRUs. This data shows that, per mile of travel, people bicycling and walking are approximately 27 – 29 times more likely to be involved in a collision.

Table 2: Annual Collision Rates by Mode

Mode	Collision Type	Collisions per year	Annual Miles Traveled (1,000,000)	Annual Collision Rate per 1M Miles Traveled
Driving	Vehicle-Only	1580	14,232.60	**0.11**
Bicycling	Involving a Person Bicycling	187	58.64	**3.19**
Walking	Involving a Person Waling	171	56.76	**3.01**

Notes: Collisions per year calculated as an average of the ten-year study period.
Source: City of Sacramento, Crossroads, 2013-2022; Replica, Fall 2024.

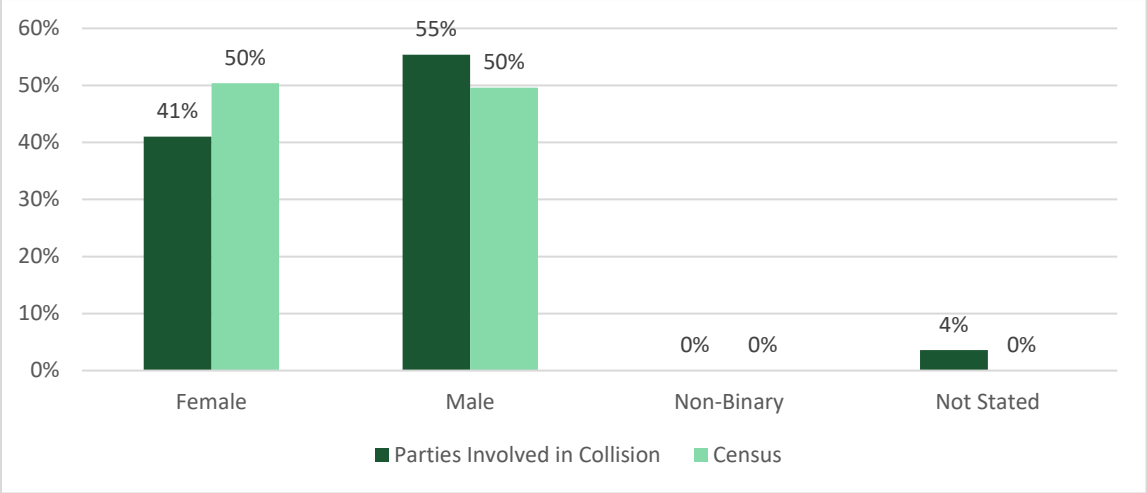
Collision Parties

Analyzing collision parties' demographics provides insights into which populations are most affected. Comparing parties' data with census demographics reveals disparities in risk exposure. Note that the Crossroads data only includes the two primary parties involved in the collision, without vehicle passengers. Therefore, there is an underrepresentation in populations that are typically passengers rather than drivers, such as children and the elderly.

Gender

Based on collision parties by gender in **Figure 4**, men are disproportionally involved in collisions compared to women.

Figure 4: Collision Parties by Gender



Source: City of Sacramento, Crossroads, 2013-2022. U.S. Census Bureau, American Community Survey, DP05 2023 5-Year Estimate for the City of Sacramento.

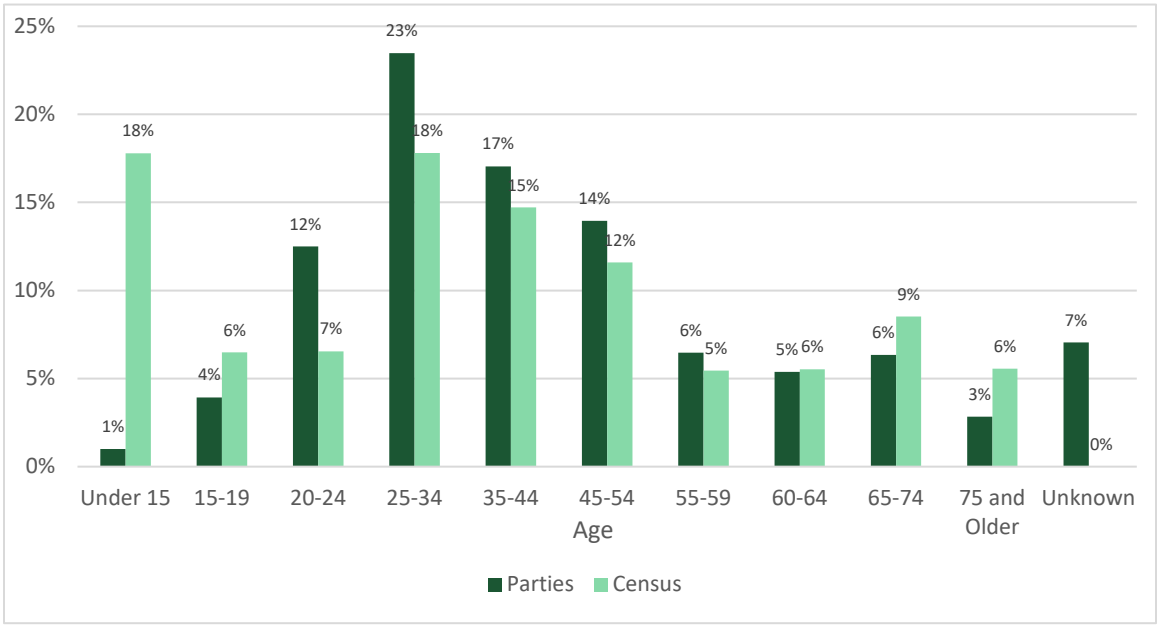
Age

Based on **Figure 5a**, primary parties involved in collisions are concentrated among younger people, with age groups 20 – 35 representing 35% of collisions during the 10-year collision period. In fact, people ages 20 – 55 were over-represented in collision involvement as compared to U.S. Census data for the city. Both children and the elderly make up higher portions of the Sacramento population than in the collision data. Children under 15 are 18% of Sacramento's population but made up 1% of primary parties involved in collisions, while people 65 and older make up 15% of the city's population and 9% of parties involved in collisions. As stated previously, this discrepancy is likely due to lower rates of driving in these populations.

Figure 5b shows the primary collision parties by age compared to their share of miles traveled in the city, as estimated from the Replica data source described in the Vulnerable Road Users section above. This data shows that people under 34 are disproportionately involved in collisions compared to their travel exposure (as measured by miles traveled by any mode).

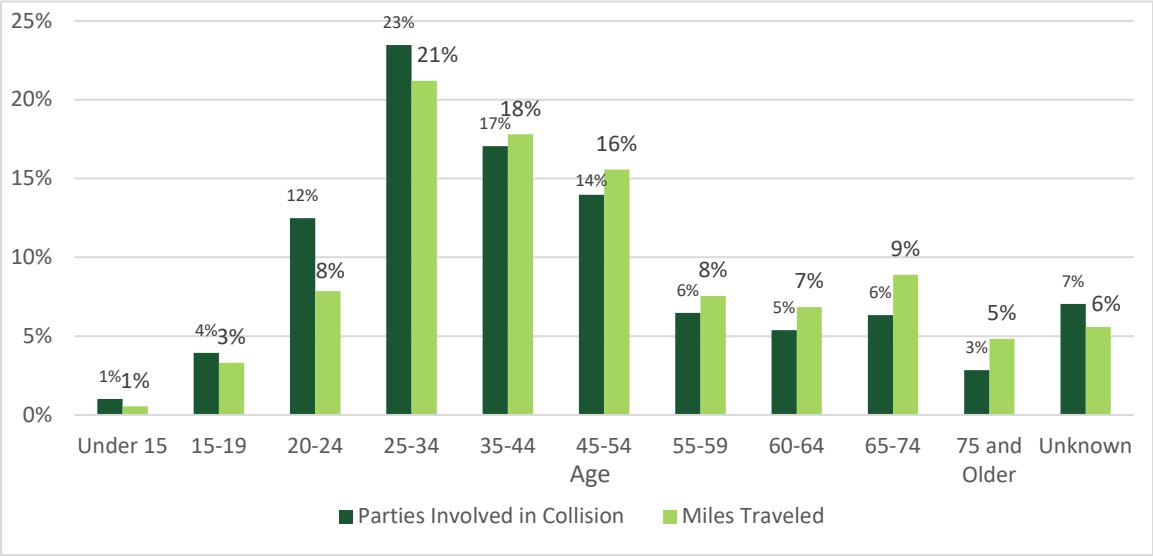
Data from the Transportation Injury Mapping System from UC Berkeley SafeTREC was used as secondary source due to its distinction between parties and victims. In this dataset (which represents 2018 – 2022 data due to lack of victim data collection in prior periods), 66% of victims are drivers, 25% are vehicle passengers, 5% are pedestrians, and 4% are bicyclists. In terms of ages, 3% of victims are under 15, 4% are 15 – 19, and 4% are 65 and over.

Figure 5a: Primary Collision Parties by Age vs. Census



Source: City of Sacramento, Crossroads, 2013-2022. U.S. Census Bureau, American Community Survey, DP05 2023 5-Year Estimate for the City of Sacramento.

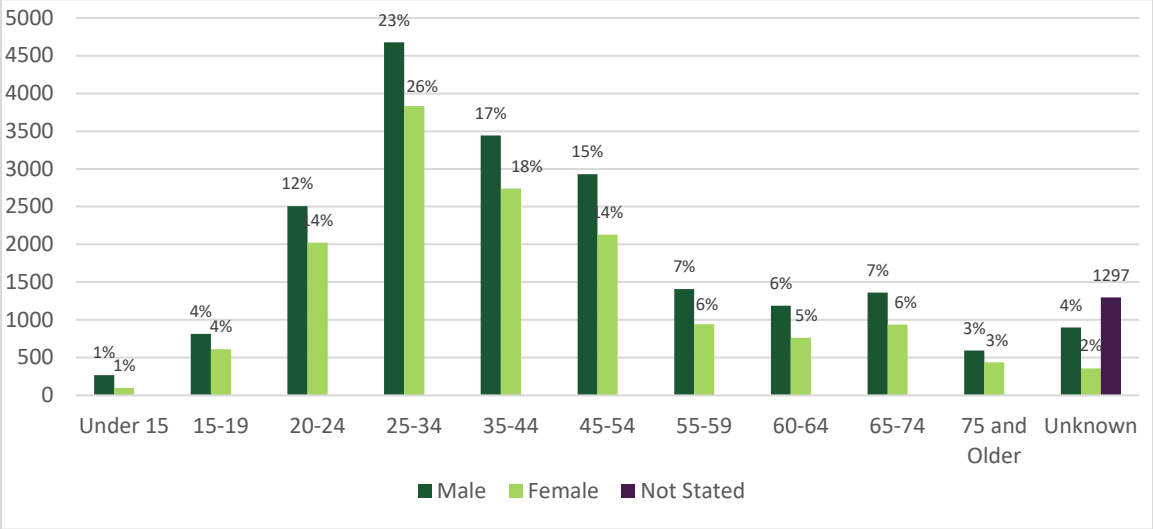
Figure 5b: Primary Collision Parties by Age vs. Miles Traveled



Source: City of Sacramento, Crossroads, 2013-2022. Replica, Fall 2024.

The 2018 Plan analysis focused on victims rather than all parties and had a more restricted set of age ranges, so a comparison is not able to be made. **Figure 6** shows collision parties by age and gender, showing that men outnumber women as primary collision parties in every age group.

Figure 6: Collision Parties by Age and Gender



Source: City of Sacramento, Crossroads, 2013-2022. U.S. Census Bureau, American Community Survey, DP05 2023 5-Year Estimate for the City of Sacramento.

Primary Collision Factors

Collision reports categorize collisions based on the primary collision factor (PCF) as designated by the responding police officer. PCFs do not include contextual information related to the design of the location that could have been a primary or secondary contributor to the collision, or any upstream factors as noted previously. The most common PCFs in Sacramento for KSIs, as shown in **Table 3**, are unsafe speed, vehicle right-of-way violation, traffic signs and signals violation, improper turning, and driving or bicycle under the influence of alcohol or drugs.

1. **Unsafe Speed** – Refers to motorists operating a vehicle at a speed that exceeds what is considered safe given roadway conditions, including weather, visibility, traffic volume, and road surface characteristics. This violation does not only mean exceeding the posted speed limit but driving at a speed that poses a risk to other road users. Even when it is not cited as the primary cause of a collision, speed contributes to the severity of collisions, including those resulting in serious injuries or fatalities.

2. **Vehicle Right-of-Way Violations** – Occurs when a driver fails to properly yield to another road user who has the legal right-of-way. Failing to yield to oncoming traffic when making a turn, not stopping properly at stop signs, and improperly entering a roadway. These violations can also involve interactions with people walking and bicycling such as failing to yield when turning right on red or not stopping for a person in a crosswalk.

3. **Traffic Signs and Signals Violations** – Indicates failures to comply with traffic control devices, including stop signs and traffic signals. Typical violations include running red lights, failing to stop at limit lines, and proceeding through an intersection without following posted signs.

4. **Improper Turning** – Refers to any turn made that violates traffic regulations or safety guidelines. This includes executing an illegal turn, failing to use a turn signal, or making a turn that interrupts traffic flow. Improper turning violations frequently lead to conflicts at intersections and driveways, increasing the risk of collisions.

5. **Driving or Bicycling Under the Influence of Alcohol or Drug** – Involves operating a motor vehicle or bicycle while impaired by alcohol or drugs, including cases where the driver's blood alcohol concentration (BAC) exceeds legal limits or their ability to drive is otherwise compromised. Impaired driving significantly increases collision risk by reducing reaction time, impairing judgment, and affecting motor coordination, contributing to a higher likelihood of severe or fatal collisions.

This 2013-2022 period also reveals a shift towards more right-of way violations and traffic signal violations as major contributors to KSI collisions. In the 2018 Plan analysis (representing collision data from 2009 – 2015), the top primary collision factors for KSI collisions were the same, with

similar proportions of pedestrian violation (16%), unsafe speed (14%), vehicle right of way violations (14%), and driving or bicycling under the influence (13%).

Table 3: Primary Collision Factors of Total Collisions and KSI Collisions

Category	Total Collisions	%	KSI Collisions	%
Unsafe Speed	4,991	26%	224	15%
Vehicle Right of Way Violation	3,685	19%	156	11%
Traffic Signals and Signs	3,228	17%	174	12%
Improper Turning	2,192	11%	122	8%
Driving or Bicycling Under the Influence of Alcohol or Drugs[1]	1,324	7%	187	13%
Not Stated	770	4%	134	9%
Pedestrian Violation*	675	3%	243	16%
Wrong Side of Road	616	3%	71	5%
Pedestrian Right of Way Violation*	542	3%	60	4%
Unsafe Lane Change	440	2%	36	2%
Other Hazardous Movement	291	2%	21	1%
Unsafe Starting or Backing	150	1%	6	0%
Improper Passing	118	1%	16	1%
Other Improper Driving	112	1%	5	0%
Following Too Closely	107	1%	0	0%
Other Than Driver	90	0%	17	1%
Lights	17	0%	2	0%
Brakes	10	0%	0	0%
Hazardous Parking	6	0%	0	0%
Other	6	0%	0	0%
Impeding Traffic	2	0%	0	0%
Other Equipment	2	0%	0	0%
Total	**19,374**	**100%**	**1,474**	**100%**

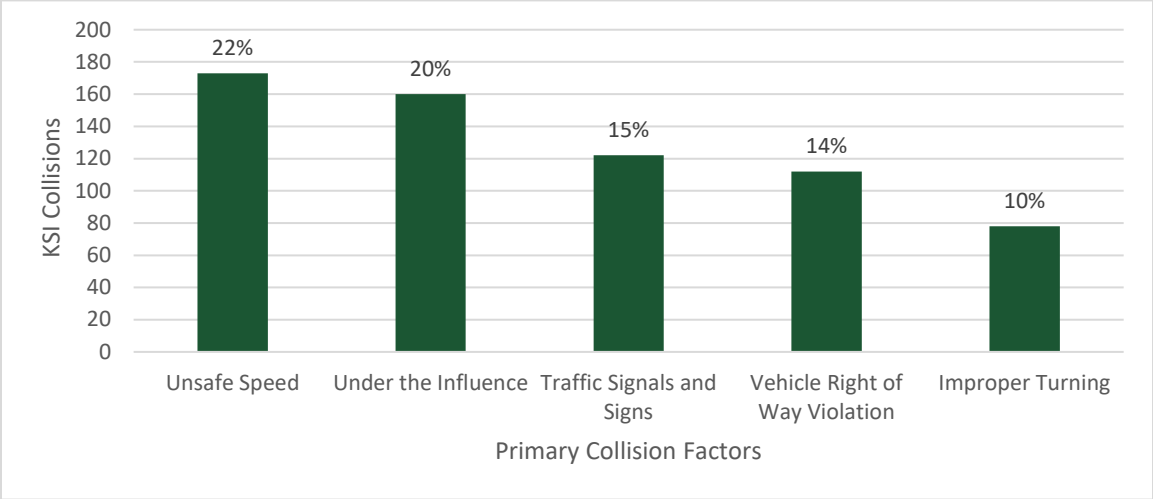
Source: City of Sacramento, Crossroads, 2013-2022.

Note:
1. Crossroads data does not indicate who was at fault. Of the total DUI collisions, 26 were bicycle-involved collisions.
*Pedestrian Violation indicates that the pedestrian violated a rule of the road, such as crossing outside of a crosswalk. The Pedestrian Violation category may be overrepresented due to a lack of clear information related to collision circumstances and the increased likelihood that the pedestrian party may be unable to provide their side of the incident at the time of the collision. In contrast, in a Pedestrian Right of Way Violation, the driver of a vehicle violated the pedestrian's right of way.

KSI Collisions Involving People Driving Only

As shown in **Figure 7**, the prevalence of unsafe speed as a primary collision factor for vehicle-only collisions indicates vehicle speed continues to be an important contributing factor in the occurrence of, as well as the severity of, collisions. The root cause of fatalities and serious injuries occurring on the city's roadways is the result of kinetic energy exceeding the human body's tolerable amount of force.

Figure 7: Primary Collision Factors of KSI Collisions involving Only Vehicles

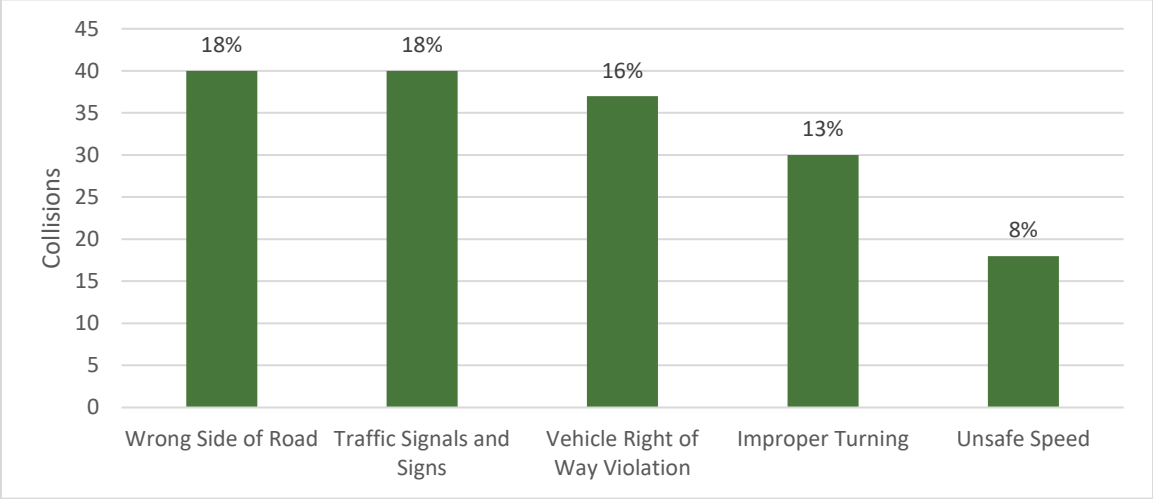


Source: City of Sacramento, Crossroads, 2013-2022.

KSI Collisions Involving People Bicycling

Wrong Side of Road and Traffic Signals and Signs are both cited as the most prevalent primary collision factor for KSI collisions involving people bicycling as shown in **Figure 8**. When bicyclists travel against the flow of traffic, the risk of conflicts with turning vehicles and oncoming traffic increases, especially in areas with incomplete bicycling infrastructure. The lack of separated bikeways, one-way street grid in some areas of the City, or clear modal separation may lead cyclists to ride on the wrong side of the road to better see approaching vehicles or navigate limited crossing options at intersections. Similarly, challenges with navigating signalized intersections—such as unclear signal phasing, poor visibility of bicycle signals, or lack of dedicated bicycle detection—can result in misjudgment of signal timing or failure to yield, increasing the likelihood of severe collisions at intersections.

Figure 8: Primary Collision Factors of KSI Collisions Involving People Biking

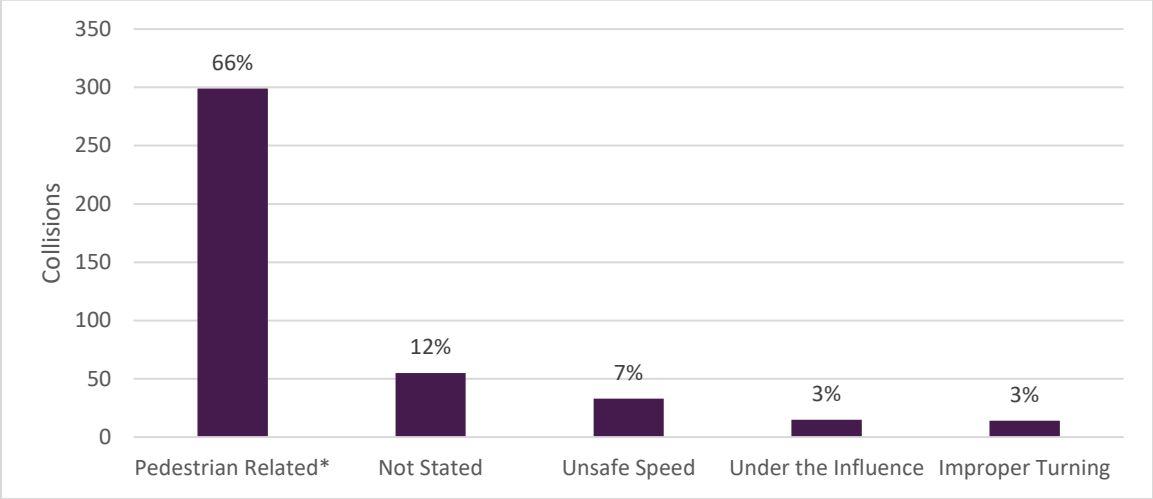


Source: City of Sacramento, Crossroads, 2013-2022.
Note: Crossroads data does not identify who is at fault.

KSI Collisions Involving People Walking

As shown in **Figure 9**, pedestrian-related factors—such as right-of-way and other pedestrian violations—along with unsafe speed, are among the leading primary collision factors for KSI collisions involving only people driving, aside from the substantial number of collisions with an unspecified primary factor. This implies that KSI collisions involving people walking often occur on high-speed, high-volume roadways in areas lacking a dense street grid and frequent crossings, where unsafe speeds reduce drivers' ability to react to pedestrians, contributing to both violations and increased collision severity. The party associated with the primary collision factor could be either the motorist or the person walking.

Figure 9: Primary Collision Factors of Collisions Involving People Walking



Source: City of Sacramento, Crossroads, 2013 - 2022.

Note: *The **"Pedestrian Related"** category shown here combines two PCF categories: Pedestrian Violation and Pedestrian Right of Way Violation. The former indicates that the pedestrian violated a rule of the road, such as crossing outside of a crosswalk. In contrast, the latter indicates the driver of a vehicle violated the pedestrian's right of way. The Pedestrian Violation category may be overrepresented due to a lack of clear information related to collision circumstances and the increased likelihood that the pedestrian party may be unable to provide their side of the incident at the time of the collision. For this reason, we have elected not to show the distinction between these tallies but instead show all pedestrian-related collisions in one single category.

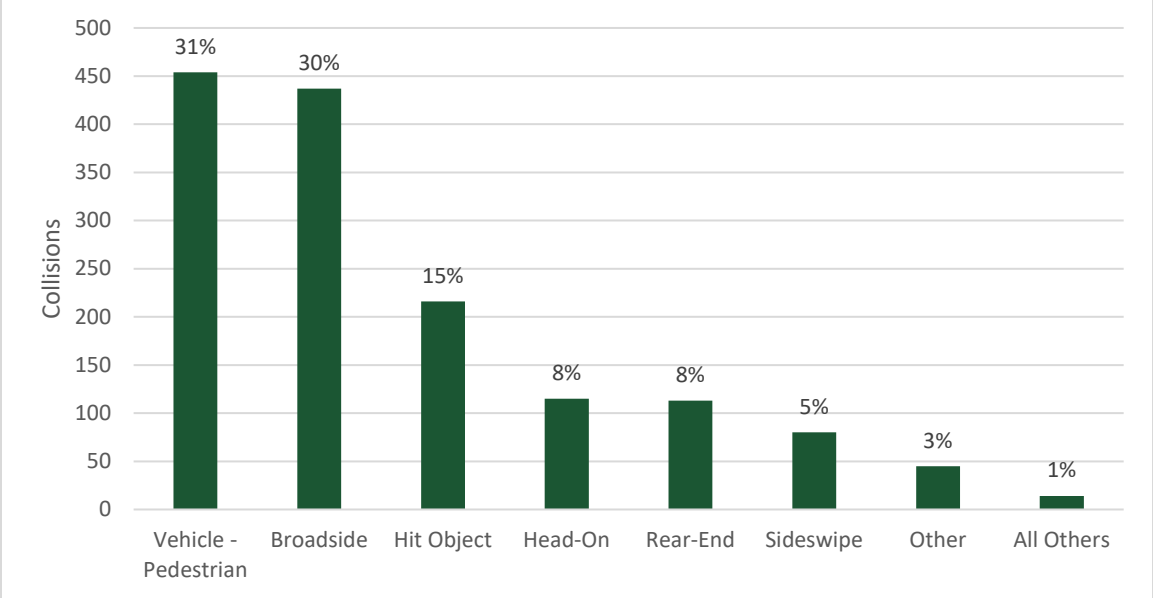
Injury Collisions by Type

Collision types describe how a collision is reported by law enforcement based on the parties involved and generally describe how contact was made between the involved parties, as shown in **Figure 10**. The top three collision types are further described as:

- **VEHICLE-PEDESTRIAN COLLISIONS** – Includes any collision involving both a motor vehicle and a pedestrian.
- **BROADSIDE COLLISIONS** – Refers to collisions between two vehicles on conflicting paths where the front of one vehicle contacts the side of another.
- **HIT OBJECT COLLISIONS** – Involves a vehicle and a non-vehicular object in or near the roadway.

The top three collision types account for 76% of KSI collisions between 2013 and 2022. Collisions associated with higher kinetic energy risk (mass and speed), along with the angle of collision impact (e.g. broadside), tend to have a higher percentage of KSI collisions.

Figure 10: KSI Collision Types



Source: City of Sacramento, Crossroads, 2013-2022.

Note: Categories representing fewer than 3% are grouped into "All Others"

Action Before Collision

As shown in **Table 4**, the most common action either party made before a collision was proceeding straight on a roadway, indicating that many collisions occur during typical and predictable movements rather than turning, merging, or other more complex maneuvers. This trend suggests that factors such as right-of-way violations and unsafe speeds contribute to most collisions.

Table 4: Actions Before Collisions

Movement	All Parties	%	At-Fault Parties	%	Non-Fault Parties	%
Proceeding Straight	22,206	60%	10,655	58%	10,415	62%
Making Left Turn	5,251	14%	3,556	19%	1,410	8%
Stopped In Road	3,022	8%	217	1%	2,699	16%
Making Right Turn	1,416	4%	902	5%	445	3%
Parked	842	2%	22	0%	786	5%
Slowing/Stopping	740	2%	214	1%	507	3%
Entering Traffic	641	2%	522	3%	88	1%
Other	636	2%	271	1%	286	2%
Changing Lanes	426	1%	374	2%	39	0%
Making U Turn	417	1%	355	2%	49	0%
Ran Off Road	387	1%	354	2%	8	0%
Other Unsafe Turning	344	1%	322	2%	5	0%
Traveling Wrong Way	217	1%	198	1%	12	0%
Backing	154	0%	128	1%	15	0%
Passing Other Vehicle	134	0%	113	1%	13	0%
Crossed Into Opposing Lane - Unplanned	118	0%	104	1%	9	0%
Merging	69	0%	53	0%	15	0%
Not Stated	34	0%	14	0%	19	0%
Parking Maneuver	23	0%	13	0%	9	0%

Source: City of Sacramento, Crossroads, 2013 - 2022.

As shown in **Table 5**, the most common action either party made before a KSI collision was proceeding straight on a roadway. This trend once again indicates that speeding and right-of-way violations contributed to most KSI collisions.

Table 5: Actions Before KSI Collisions

Movement	All Parties	%	At-Fault Parties	%	Non-Fault Parties	%
Proceeding Straight	1,667	61%	726	53%	837	72%
Making Left Turn	301	11%	181	13%	95	8%
Other	205	8%	100	7%	79	7%
Ran Off Road	78	3%	72	5%	0	0%
Making Right Turn	74	3%	50	4%	23	2%
Stopped in Road	68	2%	14	1%	51	4%
Entering Traffic	62	2%	50	4%	6	1%
Parked	54	2%	3	0%	46	4%
Other Unsafe Turning	45	2%	37	3%	1	0%
Traveling Wrong Way	38	1%	36	3%	0	0%
Crossed Into Opposing Lane - Unplanned	27	1%	25	2%	2	0%
Making U Turn	25	1%	21	2%	3	0%
Not Stated	17	1%	10	1%	6	1%
Slowing/Stopping	16	1%	6	0%	8	1%
Passing other Vehicle	16	1%	16	1%	0	0%
Changing Lanes	15	1%	11	1%	3	0%
Backing	8	0%	7	1%	0	0%
Merging	5	0%	3	0%	2	0%
Parking Maneuver	1	0%	1	0%	0	0%

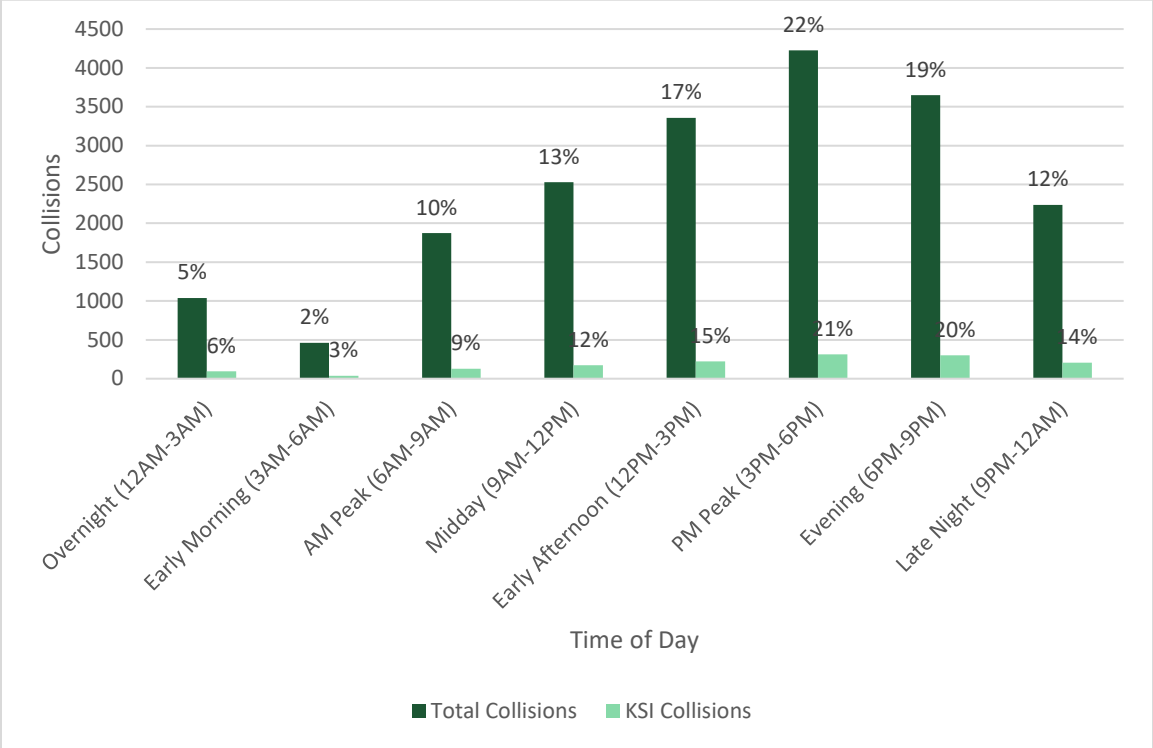
Source: City of Sacramento, Crossroads, 2013 - 2022.

When & Where

Time of Day

As shown in **Figure 11**, the most common time for injury collisions is during the PM peak hours (3 PM – 6 PM). Increased traffic volumes, lower visibility, and a mix of travel modes during commute periods contribute to elevated collision rates during this period. The PM peak period remained the most common time frame for total collisions when compared to the 2018 Plan analysis, with similar rates of collisions throughout the day.

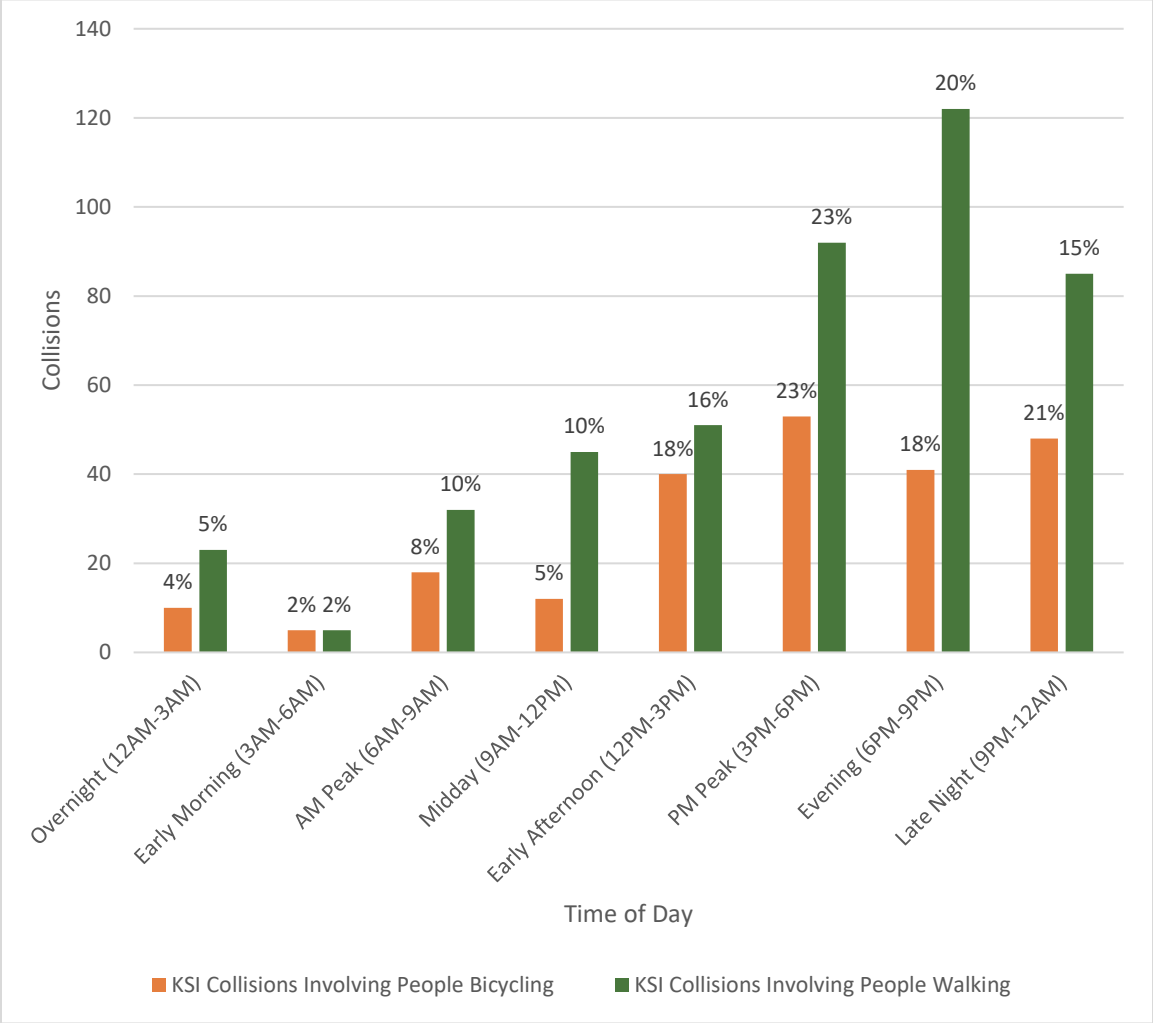
Figure 11: Total Collisions by Time of Day



Source: City of Sacramento, Crossroads, 2013-2022.

As shown in **Figure 12**, the most common time for KSI collisions involving people bicycling and walking is during the PM peak period (3PM - 6PM) and evening period (6PM - 9PM), accounting for 41% of total KSI incidents involving people bicycling and 43% of total KSI collisions involving people walking. This trend likely reflects higher bicycling and walking activities along with higher traffic volumes during commute hours, indicating a greater risk of severe outcomes during the evening period. Late night also represents a disproportionate share of KSI collisions (21% of KSI collisions involving people bicycling, and 15% of KSI collisions involving people walking), highlighting elevated risk during hours of reduced visibility and potentially higher travel speeds.

Figure 12: Collisions Involving People Bicycling and Walking by Time of Day, 2013-2022

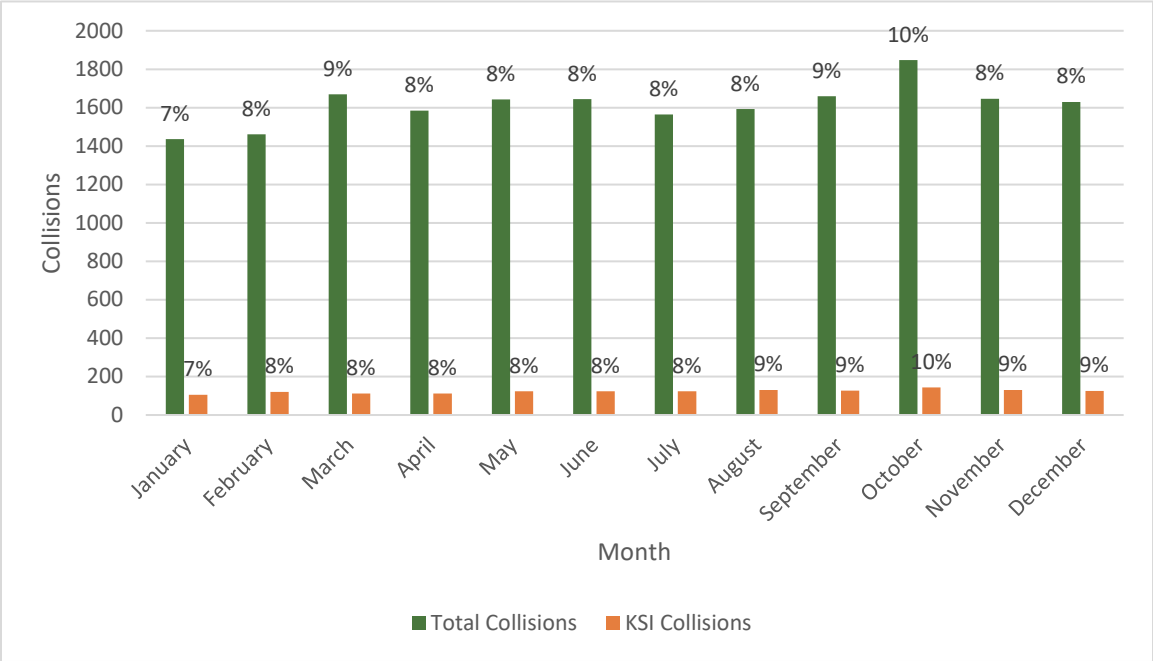


Source: City of Sacramento, Crossroads, 2013-2022.

By Month

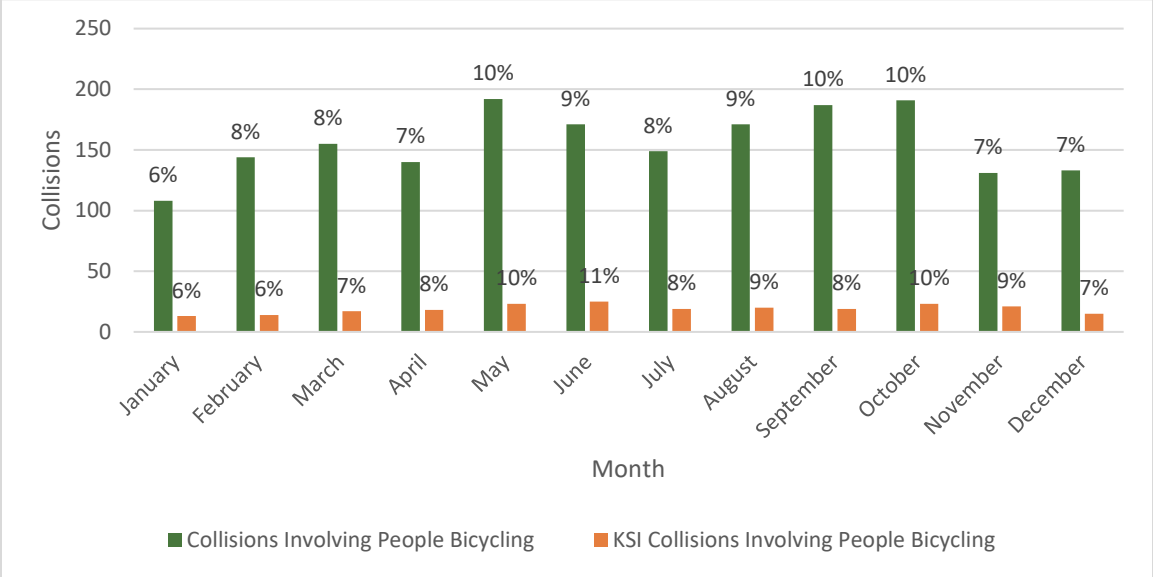
As shown in **Figure 13**, **Figure 14**, and **Figure 15**, total collisions and KSI collisions are relatively distributed evenly throughout the year for all modes (ranging from 7% to 10%), bicycling (ranging from 6% to 11%), and walking (ranging from 5% to 11%). This suggests that seasonal or monthly factors may not play a substantial role in influencing overall collision trends in the study area.

Figure 13: Total Collisions by Month



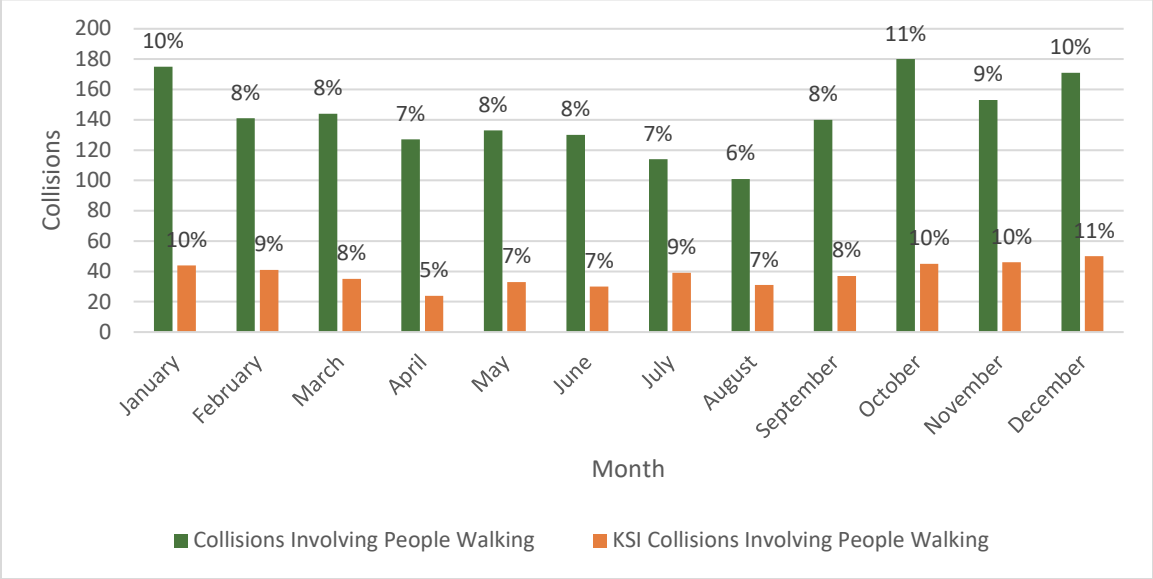
Source: City of Sacramento, Crossroads, 2013 – 2022.

Figure 14: Collisions Involving People Biking by Month



Source: City of Sacramento, Crossroads, 2013 – 2022.

Figure 15: Collisions Involving People Walking by Month



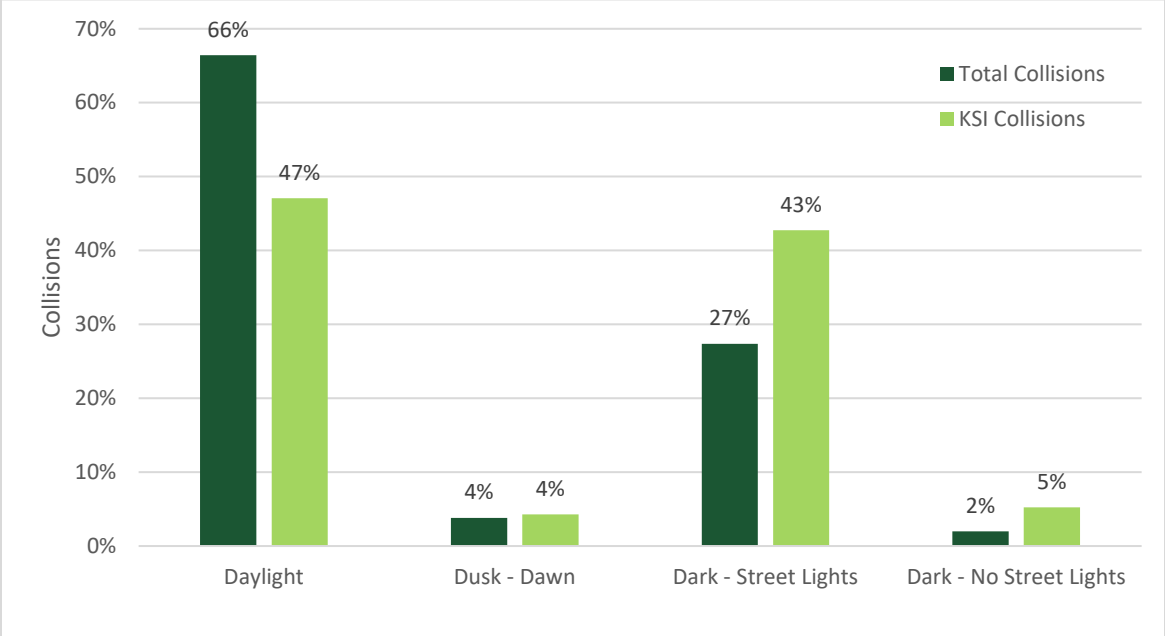
Source: City of Sacramento, Crossroads, 2013 – 2022.

Lighting

Based on **Figure 16**, most collisions occurred while there was lighting. Over 60% of total collisions occurred during daylight. The volume of vehicles on the roadway during peak hours contributed to the collisions. Nearly half of the total collisions occurred at night in locations where streetlights were present, while 2% of reported collisions occurred in the dark where there were no streetlights present. This may indicate that despite providing lighting, other roadway features may be contributing to increased collision risk and/or the lighting present was not adequate.

For KSI collisions, both conditions of daylight and nighttime with streetlight each account for about 40% of collisions. However, the proposed of KSI collisions that occur in dark conditions is greater. This indicates that nighttime collisions are often linked to reduced visibility and the challenges of street lighting, and emphasizes the need for enhanced safety measures in the nighttime settings.

Figure 161: Collisions by Lighting Conditions



Source: City of Sacramento, Crossroads, 2013 – 2022.

Contextual Trends

Collision data is paired with geographic data provided by the City of Sacramento to reveal collision profiles with collision locations, land use types, and roadway characteristics.

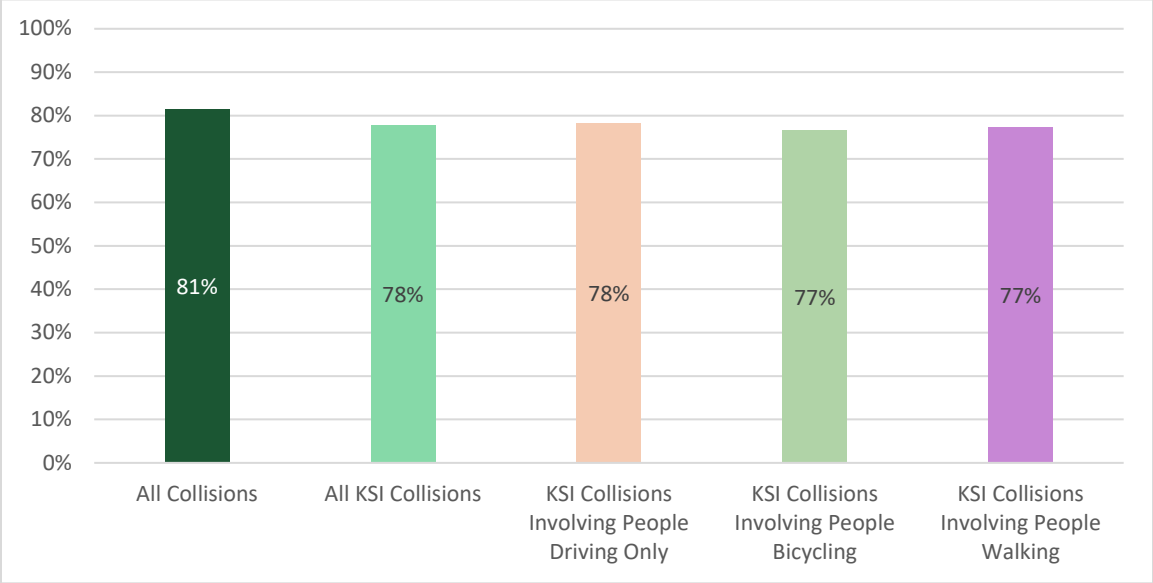
Collision Location

Figure 17 shows that the majority of collisions in Sacramento from 2013 to 2022 occurred within 150 feet of intersections (81% of all collisions, 78% of all KSI collisions). This pattern is consistent across travel modes, with 78% of KSI collisions involving only people driving, and 77% of those involving people bicycling or walking occurring near intersections, underscoring the importance of prioritizing safety improvements near intersections for all road users.

Compared to the 2018 Plan, which defined intersection-related collisions as those within 100 feet, the most recent 10-year data show a higher overall share of collisions near intersections. This is likely due to the use of a larger 150-foot threshold, expanded to be more consistent with the typical size of intersections in the City[2]. The 2018 Plan also shows greater variation by mode, with a higher share of KSI collisions involving people bicycling (85%) and a lower share involving people walking (66%).

[2] Caltrans allows crashes within 250 feet to be counted as intersection crashes as part of HSIP grant funding. However, given typical sizes of intersections in Sacramento, using 150 feet was deemed most appropriate.

Figure 172: Share of Collisions Occurring Near Intersections (Within 150 ft)

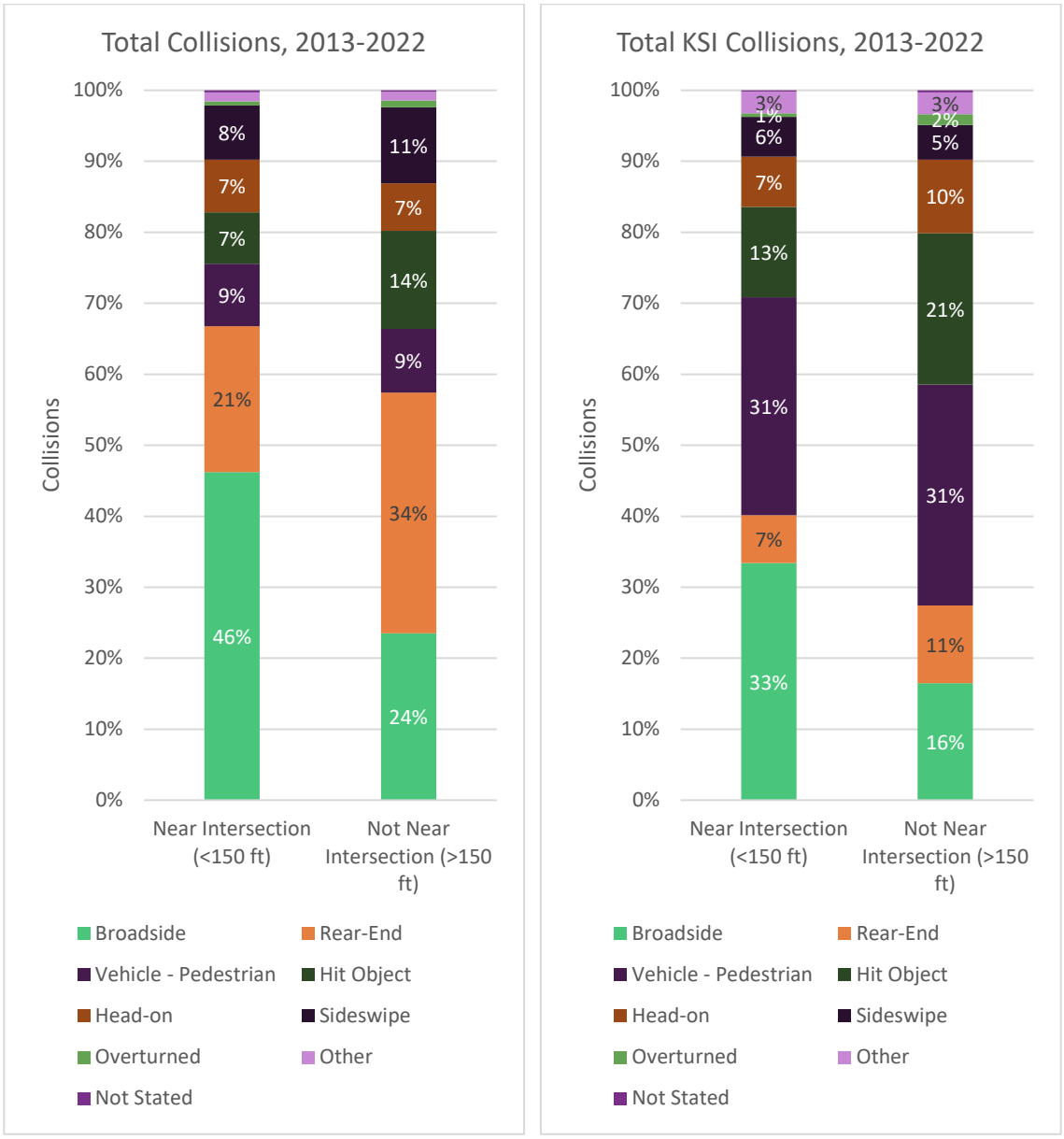


Source: City of Sacramento, Crossroads, 2013 – 2022.

While a similar share of collisions occurred near intersections for both total and KSI collisions, the distribution of collision types differs notably (See **Figure 18**). For total collisions, broadside collisions were most common near intersections (46%), while rear-end collisions were most common away from intersections (34%).

Among KSI collisions near intersections, broadside (33%) and vehicle-pedestrian (31%) collisions occurred at nearly equal rates, indicating a higher severity risk for pedestrian-involved crashes in these areas. Away from intersections, vehicle-pedestrian collisions became the most prevalent KSI type (31%), followed by hit-object (21%) and broadside collisions (16%).

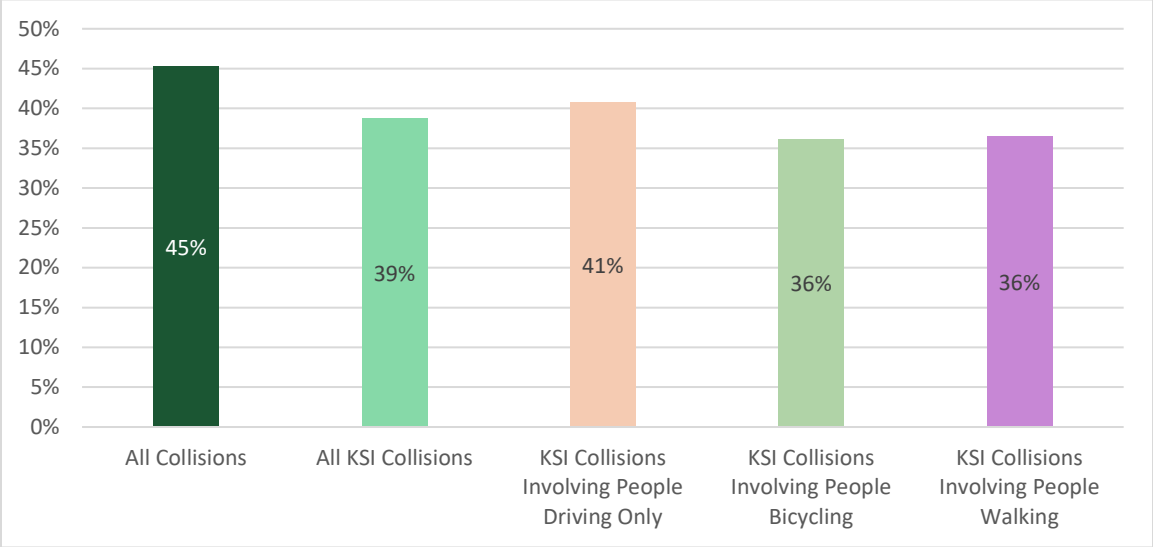
Figure 183: Collision Type of All Collisions and All KSI Collisions Occurring Near Intersections (Within 150 ft)



Source: City of Sacramento, Crossroads, 2013 – 2022.

As shown in **Figure 19**, 45% of all collisions and 39% of KSI collisions occurred within 150 feet of signalized intersections. The share of KSI collisions near signals was similar across modes, with a slightly higher share of KSI collisions involving people driving only (41%), and a relatively lower share for both bicycling and walking (36%).

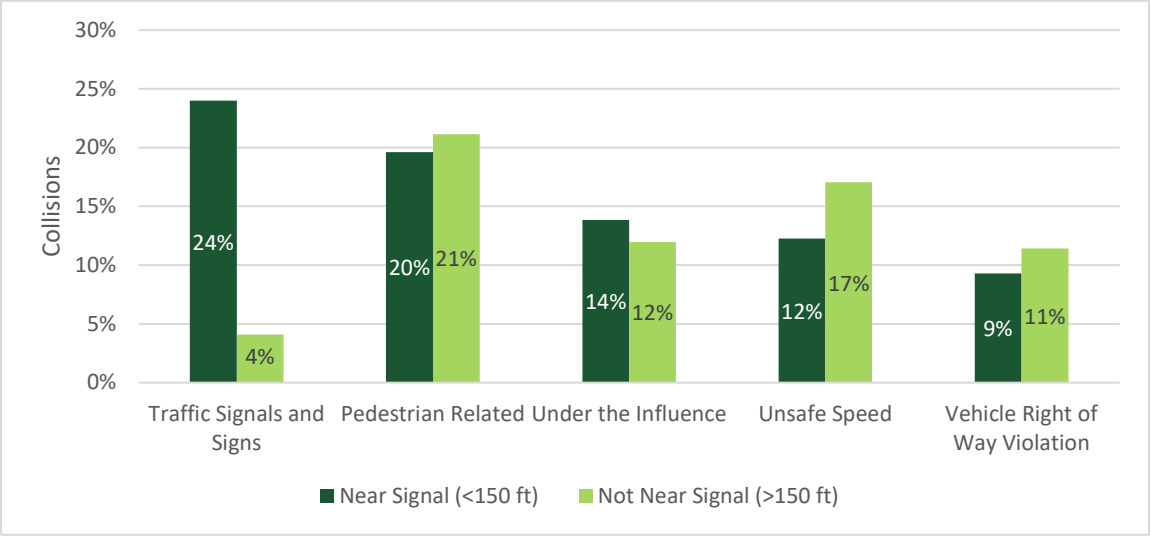
Figure 194: Share of Collisions Occurring Near Signals (Within 150 ft)



Source: City of Sacramento, Crossroads, 2013 – 2022.

As shown in **Figure 20**, "Traffic Signals and Signs" and "Pedestrian Related" factors are the leading primary collision factors for KSI collisions occurring near signals, accounting for 24% and 20% of such collisions, respectively. While pedestrian-related factors remain prominent beyond 150 feet of signals, the influence of traffic signals and signs factors drops to just 4%. In contrast, collisions involving unsafe speed become more prominent, contributing to 17% of KSI collisions away from signals.

Figure 205: Top Five Primary Collision Factors of All KSI Collisions Occurring Near Signals (Within 150 ft)



Source: City of Sacramento, Crossroads, 2013 – 2022.

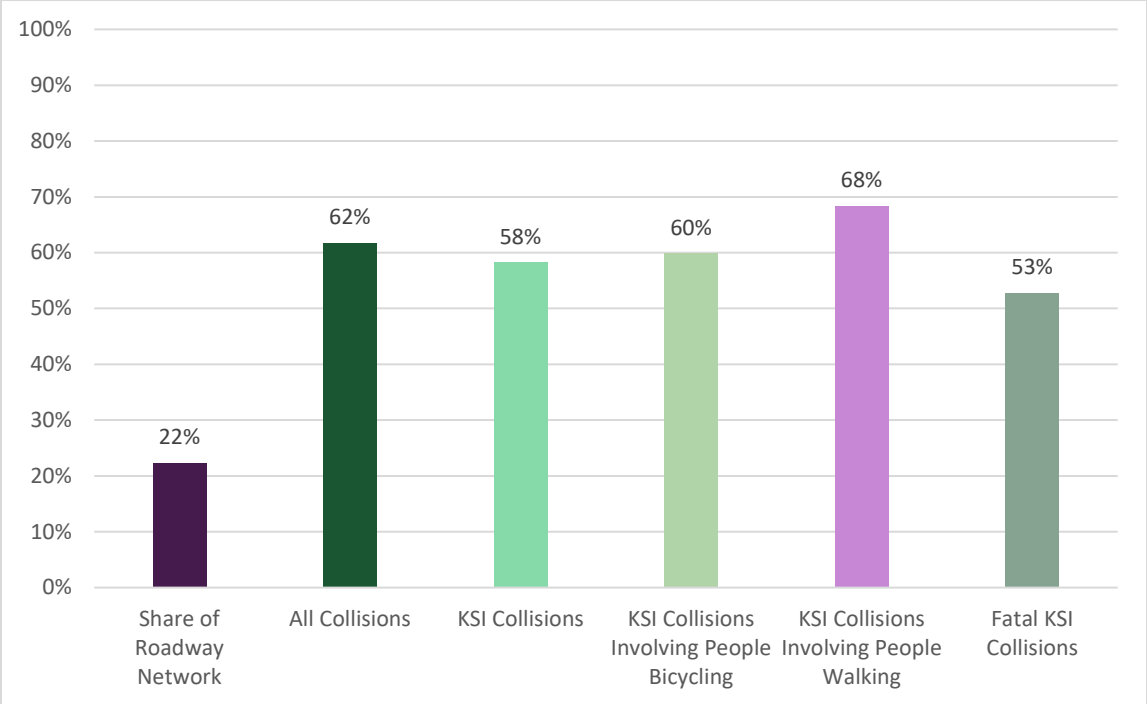
Land Uses

Figures 21 to 25 compare the share of collisions occurring within 250 feet of various land use types.

Collisions are most concentrated near commercial areas (See **Figure 20**), with only 22% of the roadway network falling within commercial areas, but 62% of all collisions and 68% of KSI collisions involving people walking occurring nearby. While only 13% of roadways are within 150 feet of transit stations, 43% of all collisions and 48% of KSI collisions involving a person walking (See **Figure 24**) occurred nearby. Multifamily areas follow, with 34% of all collisions and 37% of KSI collisions involving bicyclists (See **Figure 23**) occurring on only 22% of the total roadway network.

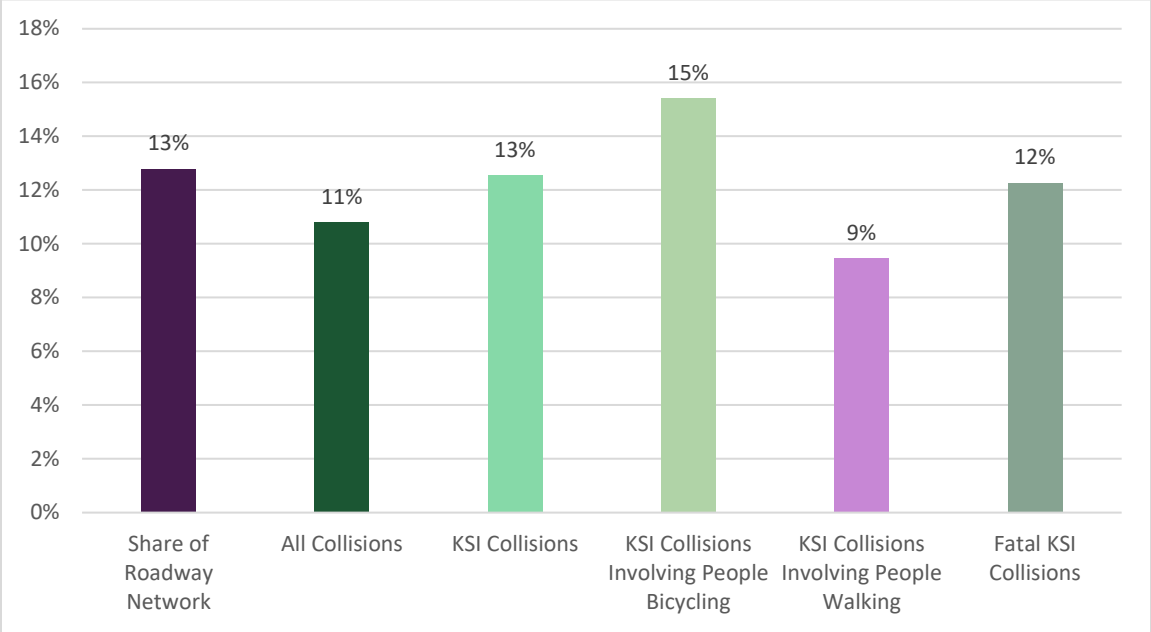
In contrast, parks and schools account for smaller shares (See **Figure 21** and **Figure 22**). Near parks, 15% of KSI bicyclist collisions occur, while near schools, 11% of KSI collisions involving a person walking are reported. These patterns suggest higher collision risk near commercial, transit, and multifamily areas, particularly for people walking and biking.

Figure 21: Share of Collisions Near Commercial Areas (<250ft)



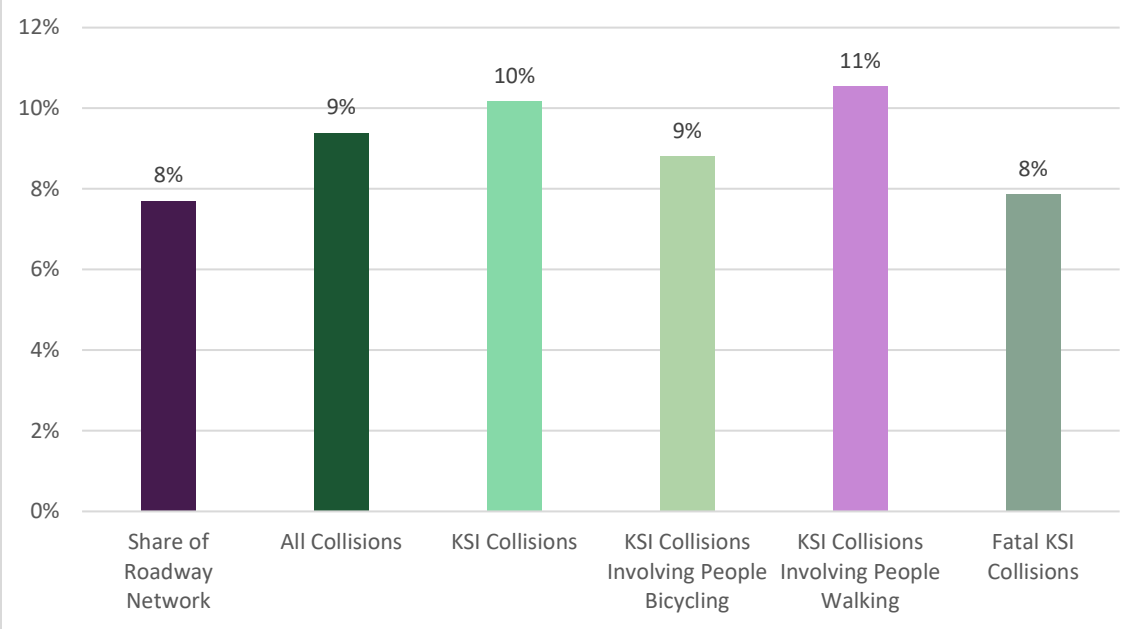
Source: City of Sacramento, Crossroads, 2013 - 2022.

Figure 22: Share of Collisions Near Parks (<250ft)



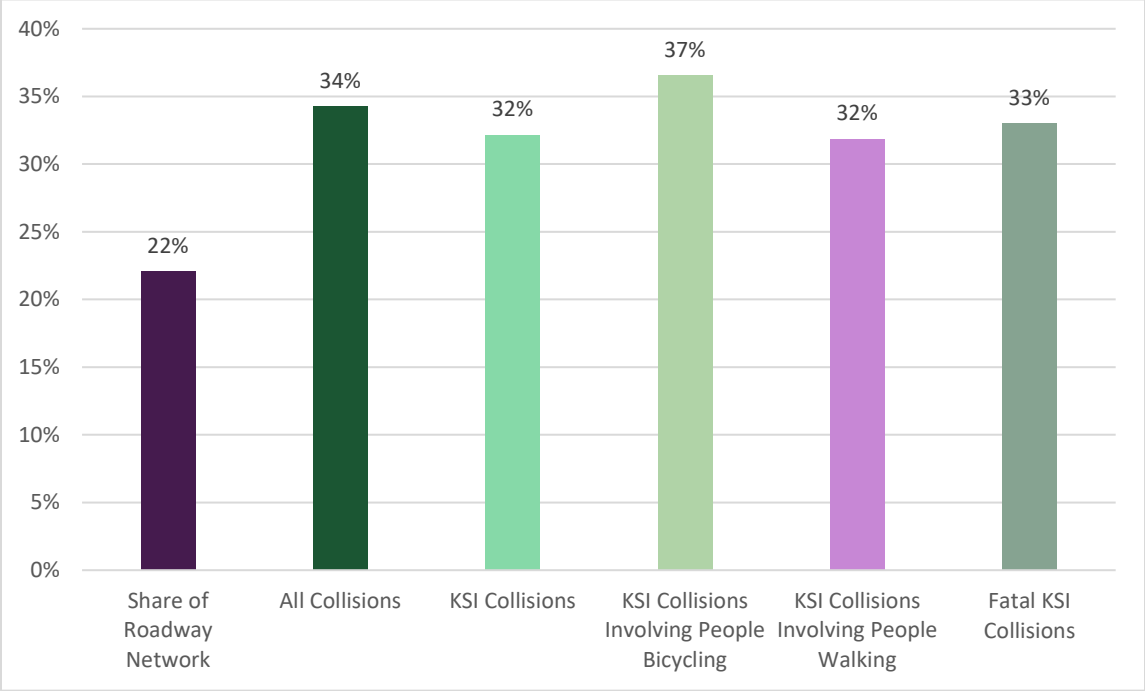
Source: City of Sacramento, Crossroads, 2013 - 2022.

Figure 23: Share of Collisions Near Schools (<250ft)



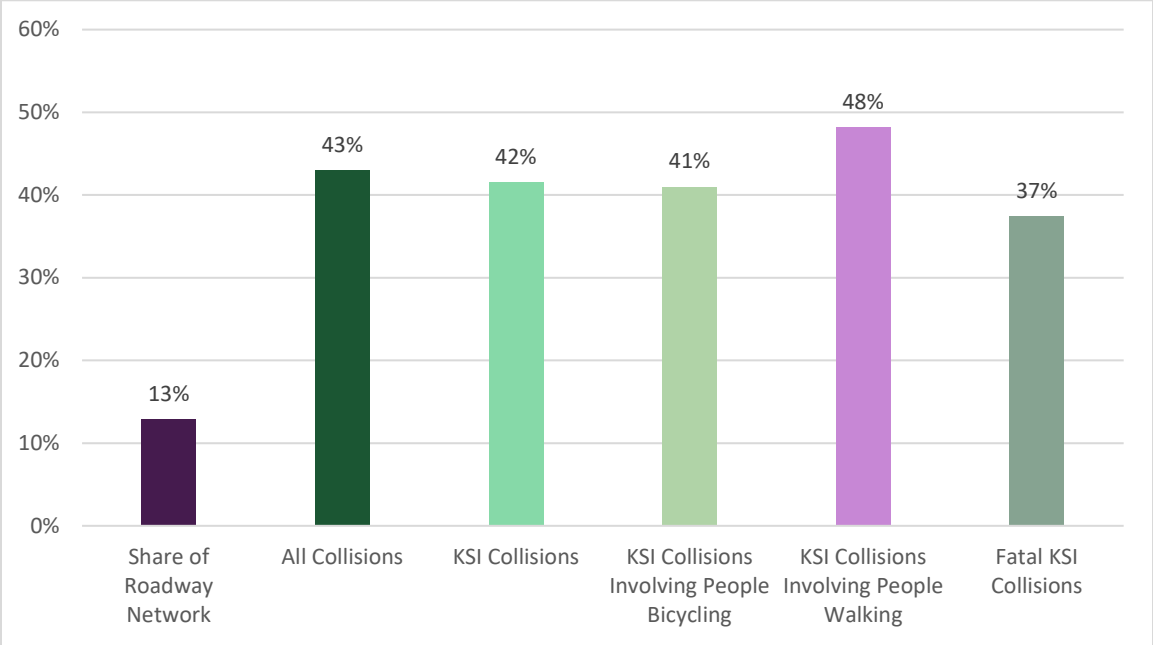
Source: City of Sacramento, Crossroads, 2013 - 2022.

Figure 24: Share of Collisions Near Multifamily Areas (<250ft)



Source: City of Sacramento, Crossroads, 2013 - 2022.

Figure 25: Share of Collisions Near Transit Stations (<250ft)

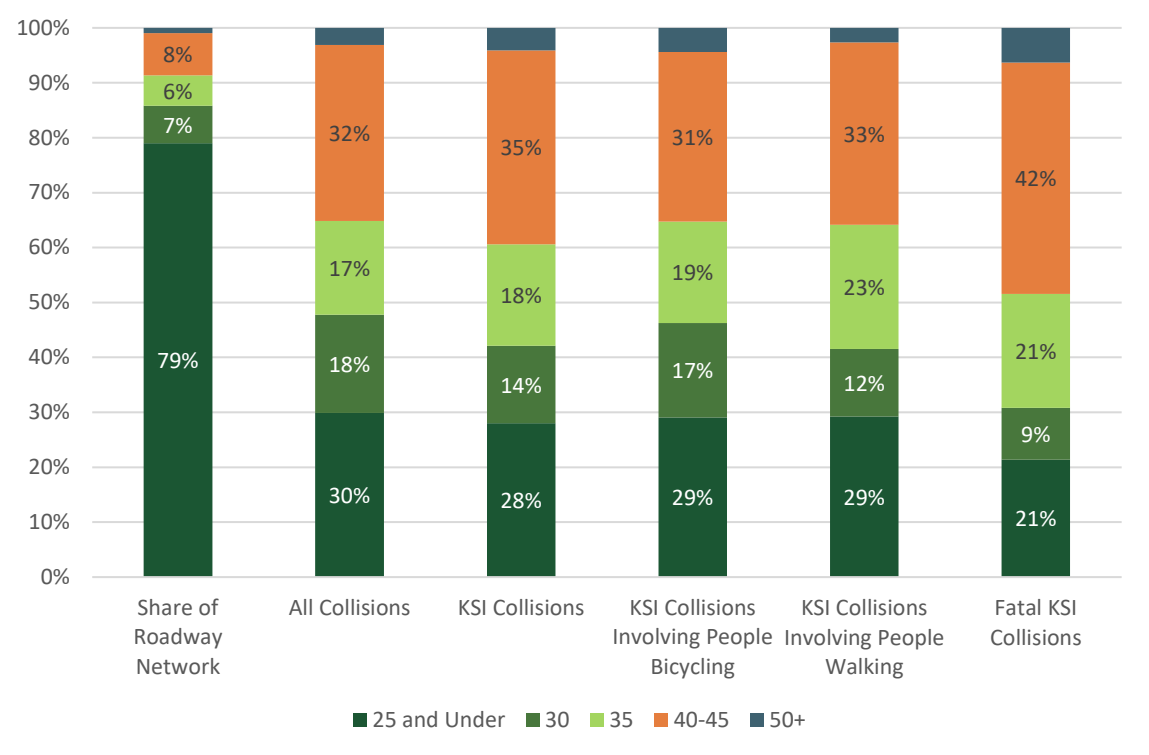


Source: City of Sacramento, Crossroads, 2013 - 2022.

Roadway Characteristics

As shown in **Figure 26**, most collisions, including KSI collisions and fatal KSI collisions, occur on roadways with posted speed limits between 40–45 mph, even though these roadways make up a smaller share of the overall roadway network (8%), highlighting the strong relationship between unsafe speed and collisions. This speed range accounts for the highest proportion across all categories, including 35% of KSI collisions and 42% of fatal KSI collisions, underscoring the strong relationship between unsafe speed and collision severity. Roadways with posted speed limits at 25 mph and lower represent the second-highest share of collisions (30% of all collisions), likely due to higher volumes of vulnerable road users and frequent conflict points in low-speed, urban environments, despite their lower risk of severe outcomes compared to higher-speed corridors.

Figure 26: Share of Collisions by Posted Speed Limit



Source: City of Sacramento, Crossroads, 2013 - 2022.

Collisions were also analyzed based on the City's roadway classifications/designations. These classifications are based on level of connectivity, daily volumes, and design speeds, adjacent land uses, and level of access control, as specified in the City of Sacramento's *Street Design Standards*[3].

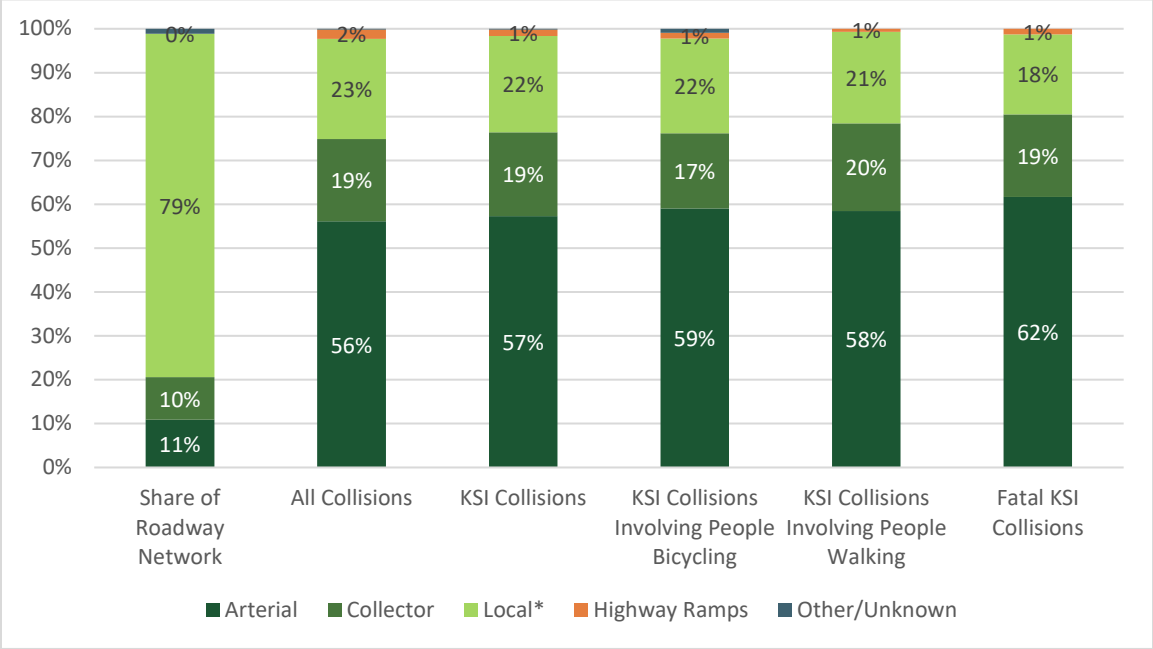
According to the *Street Design Standards*, the roadway classifications have the following purposes:

- Alley: Provide access to the rear of parcels and public utilities.
- Local:
    - Local residential serves residential land uses. Residential streets "should discourage speeds in excess of 25 mph" and "should result in traffic volumes less than 4,000 vehicles per day" (pg. 4)
    - Local commercial serves commercial land uses.
    - Local industrial serves industrial land uses.
- Collector - Minor & Major: Connects local streets to arterials.
- Arterial: Provides mobility and regional connectivity.

Figure 27 shows that the majority of collisions in the City occur on arterial roadways, although arterial roadways only make up 11% of the total roadway network, consistently accounting for over half of the collisions across all collision types. Local roadways represented the second-largest share, contributing approximately 23% of collisions, which is likely due to the large share of local roadways in the roadway network (79%).

[3] Section 15.5, https://www.cityofsacramento.gov/content/dam/portal/pw/Publications/Engineering/Development-Engineering/Design-Procedures-Manual/section15-street-design-standards.pdf

Figure 27: Share of Collisions by Roadway Classification

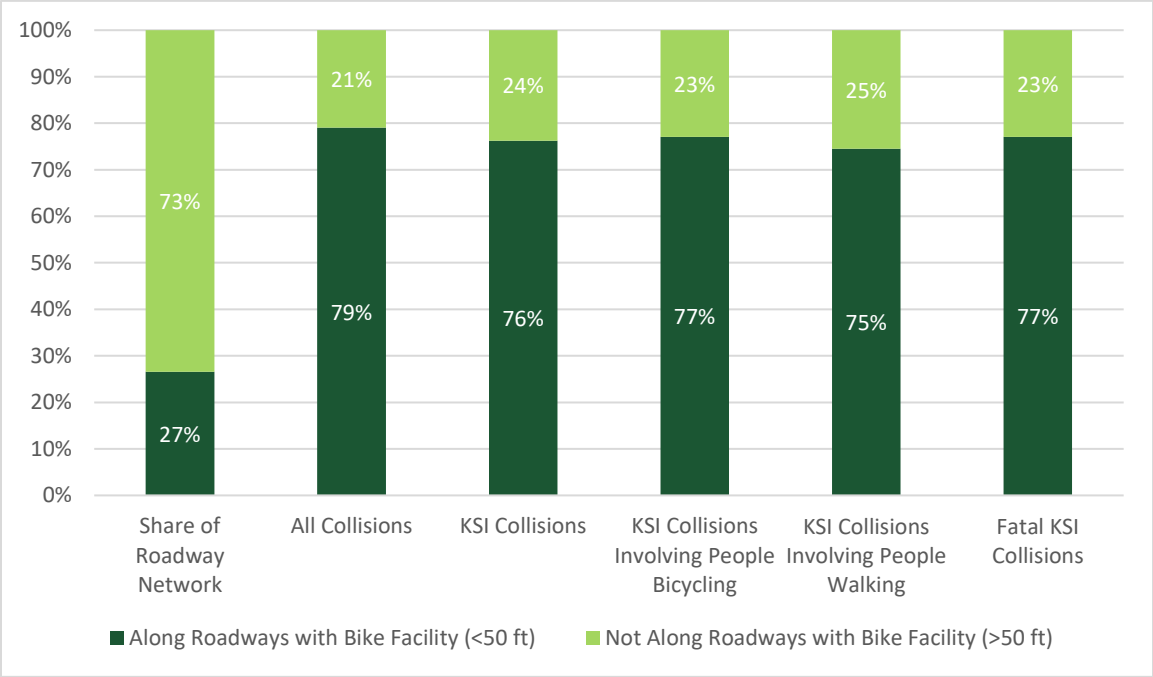


Source: City of Sacramento, Crossroads, 2013 - 2022.

Note: *Local includes Roadway Classification "Local" and "Alley".

Figure 28 shows that the majority of collisions, including KSI collisions, occurred along roadways with bike facilities, accounting for 75% to 79% across all categories, including KSI collisions involving people walking and bicycling. While the share of roadways that have bike facilities only makes up 27% of the total roadway network, this suggests that collisions are more likely to occur along roadways with bike facilities due to a higher number of people bicycling and walking along these facilities and potentially inadequate separation from vehicle traffic.

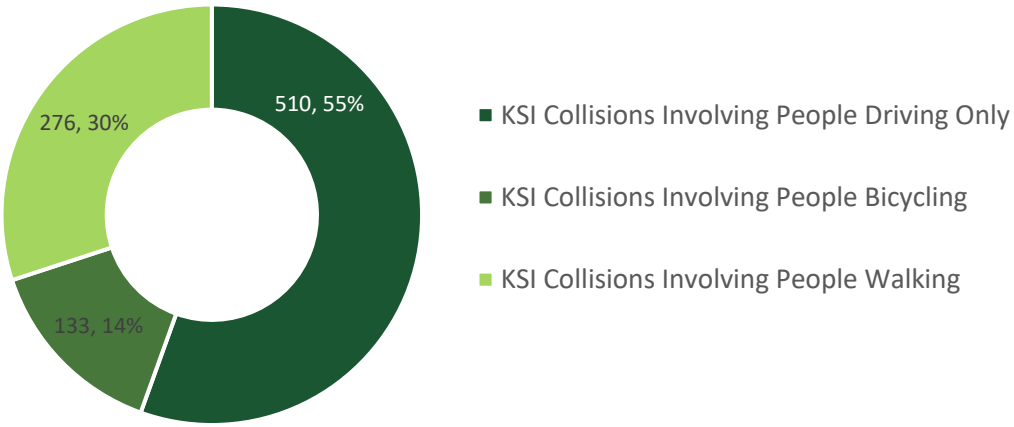
Figure 28: Share of KSI Collisions on Bike Facilities



Source: City of Sacramento, Crossroads, 2013 - 2022.

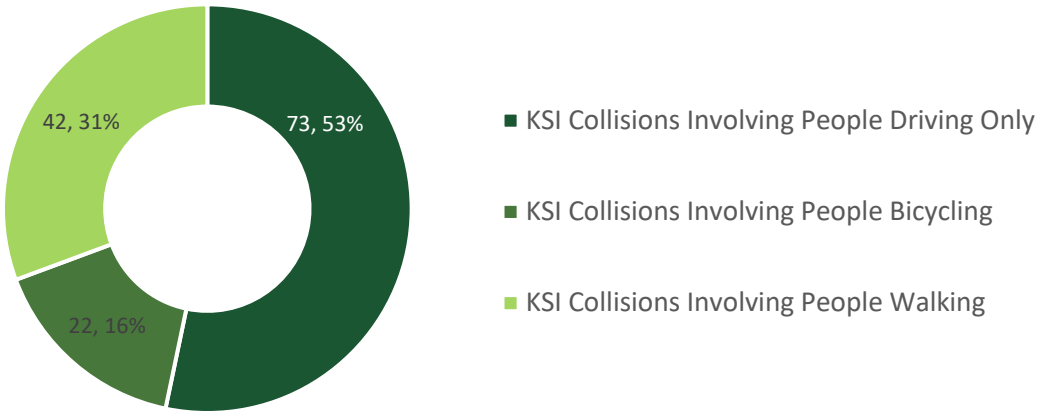
Figure 29 shows that of all KSI collisions on roadways along Class II Bike Facilities, the majority of collisions involve people driving only (55%), followed by people walking (30%), and people bicycling (14%). A similar trend is observed for KSI collisions on roadways along Class III Bike Facilities (See **Figure 30**), even though the total number of KSI collisions has dropped.

Figure 29: Share of KSI Collisions on Class II Bike Lanes



Source: City of Sacramento, Crossroads, 2013 - 2022.

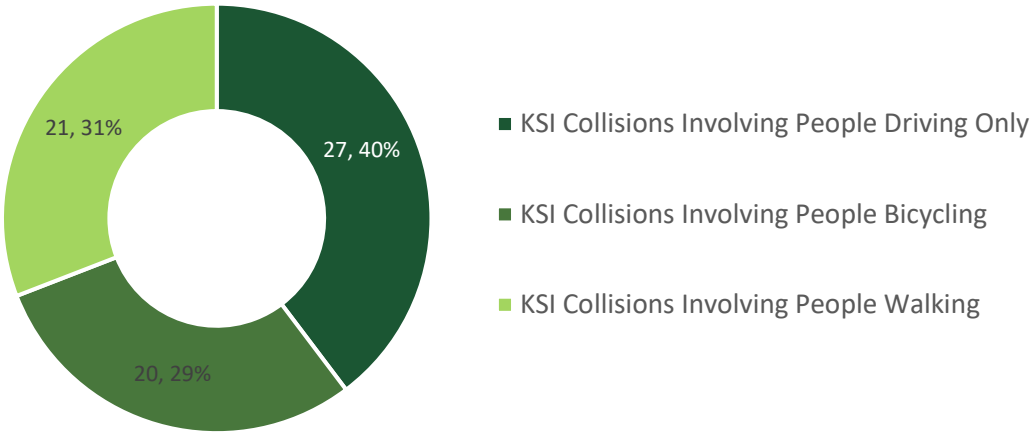
Figure 30: Share of KSI Collisions on Class III Bike Routes



Source: City of Sacramento, Crossroads, 2013 - 2022.

KSI collisions on roadways along Class IV bike facilities show a more evenly distributed pattern across travel modes, with 40% involving only people driving, 29% involving people bicycling, and 31% involving people walking (See **Figure 31**).

Figure 31: Share of KSI Collisions on Class IV Separated Bikeways



Source: City of Sacramento, Crossroads, 2013 - 2022.

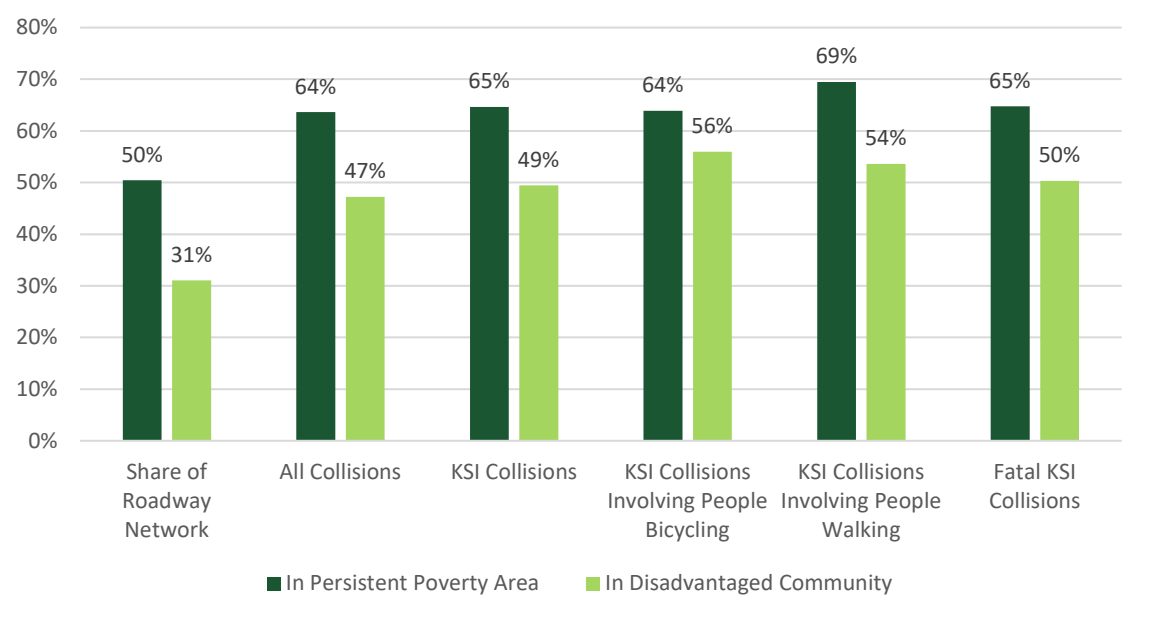
Disadvantaged Community Data

Figure 32 shows that the majority of collisions in Sacramento from 2013 to 2022 occurred within *areas of persistent poverty* (64% of all collisions, 65% of all KSI collisions). Areas of persistent poverty are defined by the Bipartisan Infrastructure Law as Census Tracts in with a poverty rate of at least 20 percent as measured by the 2014-2018 5-year data from the Census American Community Survey. The rate of collisions occurring in areas of persistent poverty is consistent across travel modes, with 64% of KSI collisions involving people bicycling, and 69% of those involving people walking, underscoring the importance of prioritizing safety improvements in areas of persistent poverty for all road users.

Figure 32 also shows that approximately half of collisions in Sacramento from 2013 to 2022 occurred within *disadvantaged community areas*, as designated by SB 535 (47% of all collisions, 49% of all KSI collisions). The disadvantaged community definition includes census tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0 for pollution burden and socioeconomic factors, census tracts identified in the 2017 DAC designation as disadvantaged, and lands under the control of federally recognized Tribes. The rate of collisions occurring in disadvantaged communities is consistent across travel modes, with 56% of KSI collisions involving people bicycling, and 54% of those involving people walking.

Compared to the 2018 Plan analysis which also analyzed disadvantaged community areas, the most recent decade of data shows a higher overall share of collisions in disadvantaged communities across all modes. Although the general trends are similar, the 2018 Plan shows greater variation by mode, with a higher share of KSI collisions involving people walking (50%) and a lower share involving people bicycling (38%).

Figure 32: Share of Collisions in Disadvantaged Community and Persistent Poverty Area, 2013-2022



Source: City of Sacramento, Crossroads, 2013 - 2022.

As shown in **Table 6,** roadways in disadvantaged communities had nearly double the amount of crashes during the 10-year study period compared to roadways outside of disadvantaged communities, and over double the amount of KSI crashes during the 10-year study period compared to roadways outside of disadvantaged communities

Table 6: Annual Collision Rates by Mode

Mode	Miles	Collisions (10-year period)	KSI Collisions (10-year period)	Collisions per mile	KSI Collisions per mile
Roadways in Disadvantaged Communities	514.98	9,145	729	17.76	1.42
Roadways outside of Disadvantaged Communities	1,144.08	10,229	745	8.94	0.65
All Roadways	1,659.06	19,374	1,474	11.68	0.89

Source: City of Sacramento, Crossroads, 2013-2022; Fehr & Peers, 2025.

Systemic Analysis

Using the collision data and geographic analysis above, a systemic matrix that cross tabulated collision factors (e.g., severity, time of day, violation, type) and contextual factors (e.g., roadway characteristics, land use, location type) was created.

The systemic matrix allows the project team to consider different ways in which 'collision profiles (defined below) may emerge:

- Collision typing to understand the number of different types of collisions that occur on different roadways and location types.
- Identification of systemic trends with a high number of total collisions or proportion of KSI collisions.
- Uncovering disproportionality in the percentage of different roadway and location types with the percentage of collisions that occur on those roadways.
- Identifying the top locations where collisions profiles occur.
- Countermeasure pairing and project development.

Collision Profiles

Crash profiles describe the crash characteristics and contextual factors associated with notable collision types. Identifying these profiles is a part of the systemic analysis to proactively identify locations which have similar contexts but may have experienced fewer collisions. Individual collisions may fall under multiple profiles (i.e., collision may be speed related and involve DUI but are different profiles).

When identifying crash profiles, we look for:

- Number of collisions and severe collisions
- Overrepresentation of KSI
- Geographic overrepresentation (e.g., collisions are larger % than share of roadway network- like percent of roadway miles by speed/classification/etc. or percent of intersections by land use)
- Combination of factors that are related and can lead to countermeasure recommendations

The profiles identified during this process are as follows:

1. **Collisions Involving People Walking and Biking**
   18% of injury collisions (3,581) and 46% of KSI collisions (682) meet this profile.
2. **Broadside Collisions Near Intersections in Commercial Areas**
   25% of injury collisions (4,758) and 17% KSI collisions (244) meet this profile.

3. **Conflict Management at Intersections** (Auto Right of Way & Traffic Signals and Signs Primary Collision Factors within 150 feet of an intersection)
   33% of injury collisions (6,328) and 21% of KSI collisions (307) meet this profile
4. **Collisions Near Transit Stops** (within 250 feet)
   43% of injury collisions (8,329) and 42% of KSI collisions (612) meet this profile.
5. **Collisions Near Parks and Schools** (within 250 feet)
   19% of injury collisions (3,716) and 21% of KSI collisions (312) meet this profile.
6. **Unsafe Speed Collisions on Arterial Roadways** (Unsafe Speed Primary Collision Factor and Arterial or highway ramp location)
   17% of injury collisions (3,315) and 8% of KSI collisions (120) meet this profile.

Some of these profiles are similar to those in the 2018 Action Plan. A comparison is provided in **Table 7** below.

Table 7: Collision Profile Comparisons: 2025 vs 2018

2025 Collision Profile	2018 Collision Profile
1. Collisions Involving People Walking and Biking	60+ Year Old Pedestrians; Pedestrian Crashes Near Transit Stops; Broadside Crashes - Bicycle Involved; Driver Making Left or Right Turn - Bicycle/ Pedestrian Involved; Pedestrian Crossing Outside of an Intersection or Crosswalk
2. Broadside Collisions at Intersections in Commercial Areas	Crashes in Commercial Areas; Broadside Crashes - Bicycle Involved
3. Conflict Management at Intersections (Auto ROW & Traffic Signals and Signs Primary Collision Factors)	Driver Making Left Or Right Turn - Bicycle/ Pedestrian Involved
4. Collisions Near Transit Stops	Pedestrian Crashes Near Transit Stops
5. Collisions Near Parks and Schools	
6. Unsafe Speed Collisions on Arterials	Unsafe Speed on Non-Local Streets; 35+ MPH Streets

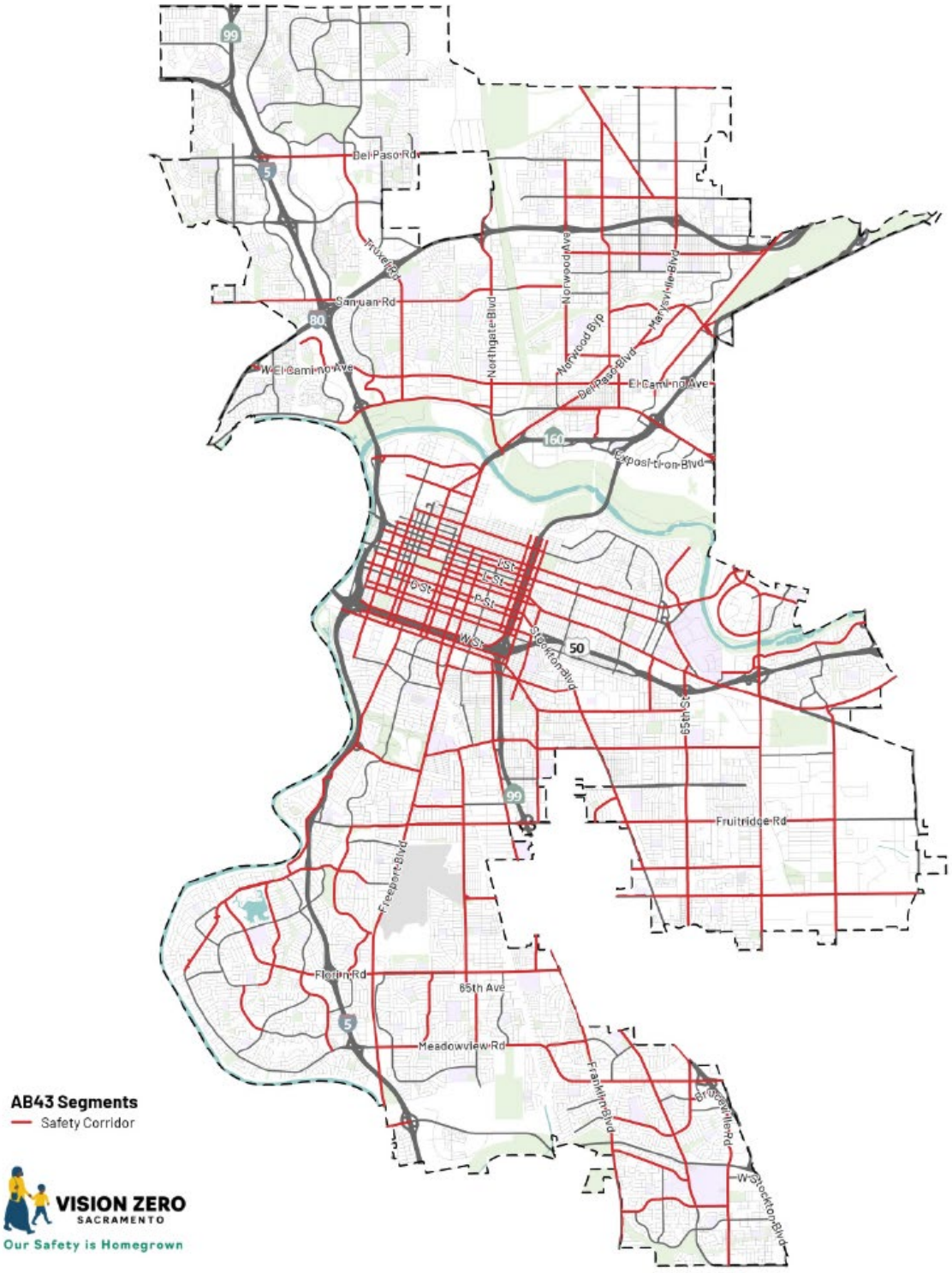
The profiles will be paired with safety countermeasures most relevant for the crash and location context. Together, these engineering, education, and enforcement countermeasures make up a toolbox of safety interventions the City will utilize to implement projects tailored to unique safety issues.

Safety Corridors

The City is evaluating its current posted speed limits to identify where speed limits may be feasible to reduce in alignment with new provisions that were passed under Assembly Bill 43 (AB 43). One of the criteria within AB 43 that allows the posted speed limit to be set lower than the 85th percentile speed limit, is if the street is located on a local agencies "Safety Corridor Network" Safety corridors are defined in the California MUTCD as those with the highest levels of fatal and severe collisions for all travel modes (i.e., vehicle, bicycle, and pedestrian) to better understand existing transportation traffic safety challenges in the City.

Figure 33 shows the AB 43 study segments mapped for the City of Sacramento, created with data from DKS. The Safety Corridors identified by DKS and the City as part of the AB 43 evaluation are shown in red. The Safety Corridors generally include arterial streets throughout the City and the major roadways within the Downtown/Midtown street grid. This analysis from January 2018-December 2022 (TIMS database). Fehr & Peers will be re-identifying the Safety Corridors after receiving crash data for 2023 and 2024 from the City.

Figure 33: AB 43 Roadway Safety Corridors



Source: City of Sacramento, DKS, 2024.

Conclusion

In the 10-year period between the start of 2013 and end of 2022, a total of 19,374 collisions resulting in injury and 1,474 collisions resulting in KSI were reported across the City of Sacramento. This represents the same proportion of KSI collisions of total collisions from the 2018 Vision Zero Action Plan.

The proportion of injury collisions involving people bicycling and walking has decreased in comparison to the 2018 Plan analysis, with collisions with people bicycling dropping from 12% to 10% of total injury collisions and collisions with people walking from 10% to 9%. However, their share of KSI collisions remains high, with 15% involving people bicycling and 31% involving people walking.

Additionally, the top five primary collision factors (PCFs) have changed, with Unsafe Speed and Driving or Bicycling Under the Influence remaining as key factors, but other primary collision factors such as right-of-way violations and traffic signal violations emerging.

Geographic trends in the data reveal that collisions and KSI incidents are concentrated near intersections, commercial areas, multifamily housing, and transit stations—locations with higher walking and biking activity. Arterial roadways and streets with 40–45 mph speed limits account for the highest share of severe collisions.