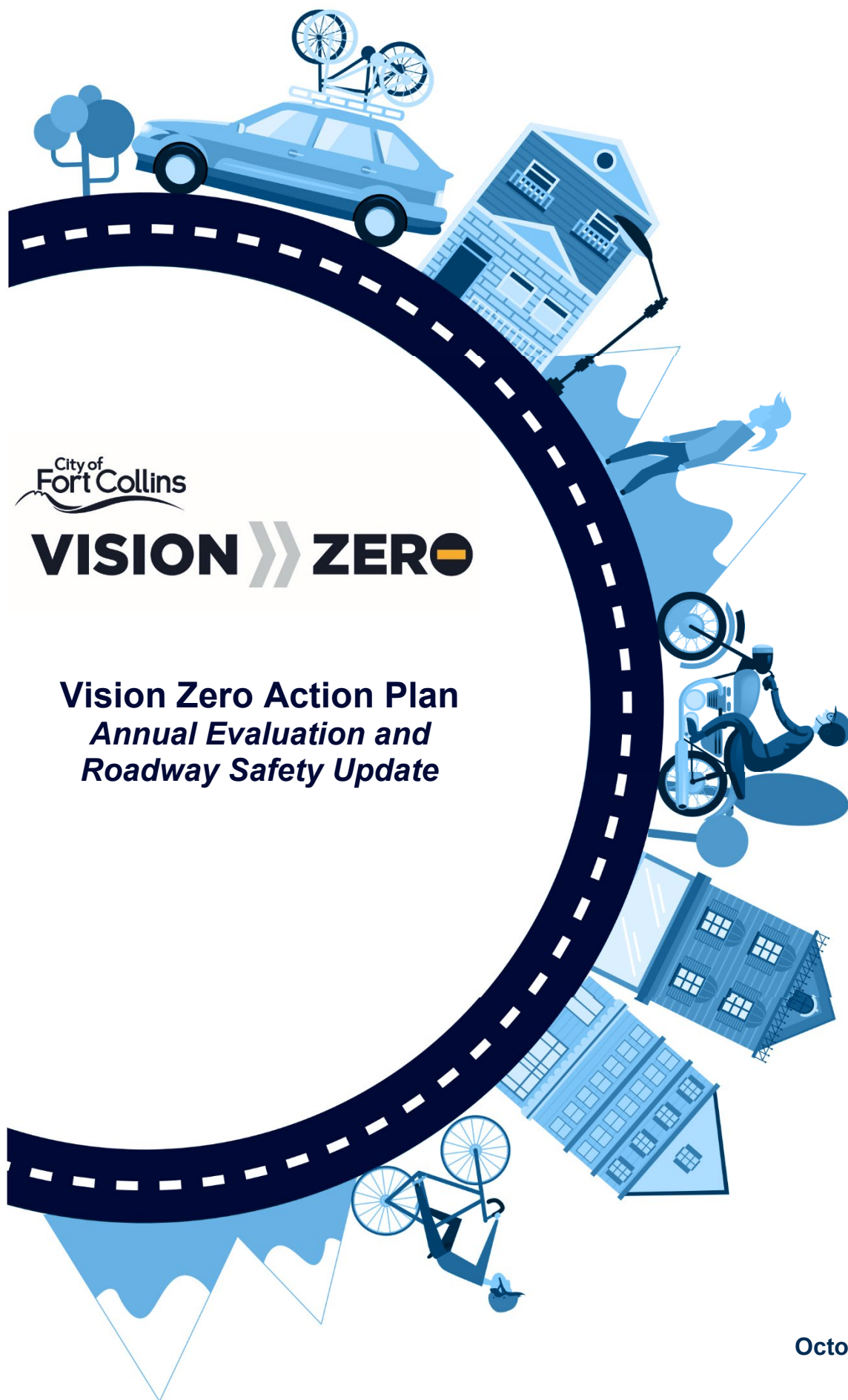




VISION ZERO

Vision Zero Action Plan *Annual Evaluation and Roadway Safety Update*

October 2024

The City of Fort Collins is in the process of making all its documents more accessible. While much progress has been made, some of the more technical and/or graphical elements of this document may be inaccessible for some people. If you would like assistance in reviewing this document, please contact the City of Fort Collins Traffic Operations Department at 970-221-6630. Please know that the City is happy to assist you and do not hesitate to reach out.

Prepared By:



Table of Contents

Introduction	1
Roadway Safety	1
Moving Towards Vision Zero	1
Safety Snapshot	2
Crash Data and Trends	2
Economic Impact	10
Comparison to Other Cities	10
Intersection Evaluation	12
Excess Crash Costs	12
Level of Service of Safety (LOSS)	12
Intersection Comparison	12
Trends In Intersection Safety	14
Vision Zero Safety Efforts	15
Recent Vision Zero Accomplishments	15
Tracking and Measuring Safety Improvements	17
Recent Project Evaluations	18
Ongoing Efforts / Next Steps	19
 Appendix A: Explanation of Crash Data	
Appendix B: Definition and Visual Depiction of Various Crash Types	
Appendix C: Intersection Evaluation Methodology	



INTRODUCTION

The City of Fort Collins is a vibrant city of 170,000 people nestled against the foothills of the Rocky Mountains about an hour's drive north of Denver. This outdoor oriented community is home to Colorado State University and its 33,000 students. The area is known for its high-tech companies, innovation, entrepreneurialism, and beer and bike culture. The Old Town area in the city is a unique, lively downtown with residential areas, historic buildings, retail shops, museums, theaters, and restaurants.

ROADWAY SAFETY

Like other cities, Fort Collins experiences roadway crashes. With an average of almost 3,000 reported crashes each year, the impact of traffic crashes touches every aspect of the physical and emotional well-being of a community including families, workplaces, emergency responders, neighborhoods, livelihoods, mobility and more. In Fort Collins in 2023 alone, the annual societal cost of these crashes was \$230 million. Improving roadway safety by reducing the number and severity of crashes is a priority.

Safety Matters

In 2023, there were 93 crashes involving a serious injury or fatality in Fort Collins

MOVING TOWARDS VISION ZERO

The City of Fort Collins has been reviewing crash records on an annual basis for many years, and beginning in 2015 compiled the information into an annual Roadway Safety Report.

In late 2016, the City of Fort Collins became the first public local entity to join the Colorado Department of Transportation's (CDOT) Moving Towards Zero Deaths initiative. In the spring of 2023, the City adopted a *Vision Zero Action Plan*. The plan outlines the City's commitment to prioritizing data-driven safety projects that improve transportation safety for everyone moving about the City.

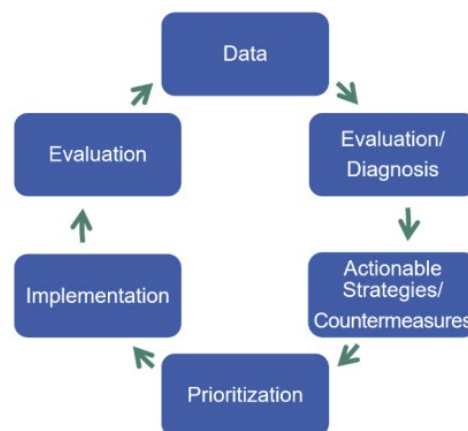


The City has set a goal:

By 2032 no one dies or is seriously injured while traveling in Fort Collins.

This annual document is an evaluation of the efforts of previous years. It serves as the continuous evaluation of progress towards Vision Zero and the implementation of goals in the Fort Collins Vision Zero Action Plan. It identifies how the City is using the national best practice System-Based Transportation Safety Approach to address all aspects of Fort Collins' transportation. The report compiles traffic crash and safety information and tracks trends on public streets within Fort Collins. It analyzes intersection safety, evaluates safety on the High Injury Network, and evaluates previous work to identify project outcomes in terms of improving safety. The final section discusses specific next steps and provides safety-based work items for the City in the coming year.

Improving roadway safety requires commitment and contributions from everyone. City departments including Traffic Operations, FCMoves,



System-Based Transportation Safety Approach



Engineering, Police Services, Streets and others play a vital role in a comprehensive roadway safety improvement program. Other jurisdictions, such as Larimer County and the Colorado Department of Transportation (CDOT) are also important partners as crashes occur on jurisdictional boundaries, or along state highways in the City.

The residents of the community and everyone using the transportation system through any mode also play a critical role in supporting safety. Everyone has a right to travel around Fort Collins safely, and everyone has a responsibility to contribute towards that end. This document provides information that can be used for education and messaging to the greater Fort Collins community.

Finally, Fort Collins has invested in many planning documents and programs, including the Transportation Master Plan, the Active Modes Plan, and the Capital Improvement Plan. The Vision Zero Action Plan and this annual report provide concurrent guidance on utilizing a safety lens for all projects.

SAFETY SNAPSHOT

This section of the report provides an overview of general safety data for the City of Fort Collins. Unless otherwise noted, the data represents a compilation or average of the most recent five years of data (2019-2023).

Notes:

- See Appendix A for explanation of the data.
- See Appendix B for definition and visual depictions of various crash types.

CRASH DATA AND TRENDS

Total crash and serious injury / fatal crash number in the city are shown in **Figure 1** below.

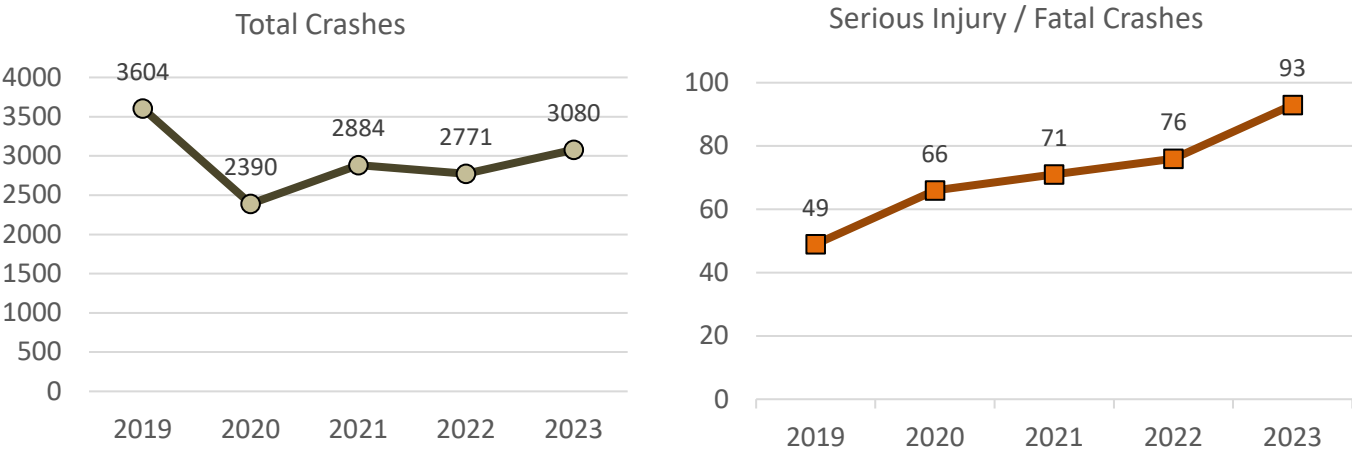


Figure 1. Five Year Crash Trends

There has been a significant increase in serious injury / fatal crashes in the last five years. This is a concerning trend, and one that is a focus for the community and the City to address.

This type of trend is not unique to Fort Collins. Nationally, crash trends have been increasing for a number of years, and especially during the pandemic, serious injury and fatal crashes saw a significant increase despite lower traffic volumes. When compared to statewide data, the increase in serious injury/fatal crashes in Fort Collins follows a similar trend. **Figure 2** shows serious injury and fatal crash trends on a normalized scale (-5 to +5).

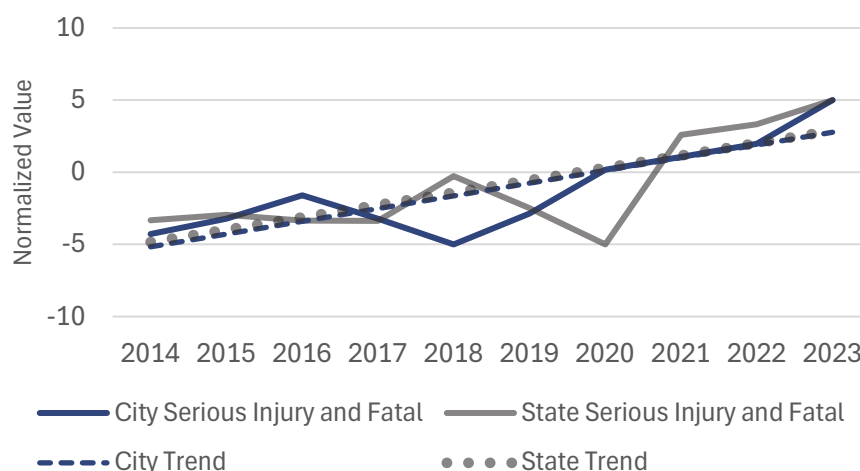


Figure 2. Ten Year Crash Trend Comparison Fort Collins to Colorado

Other contributing factors include the fact that as Fort Collins annexes roadways on its periphery, crashes that occur in those areas are now counted as City crashes. Therefore, the increase in serious injury/fatal crashes may be partially due to the change in the area being reported as Fort Collins crashes. Examples of locations include some of the roadways in proximity to I-25 interchanges.

Travel Modes

Figure 3 shows how vulnerable road users (those traveling on motorcycles, bicycles, and pedestrians) are disproportionately represented in serious injury and fatal crashes.

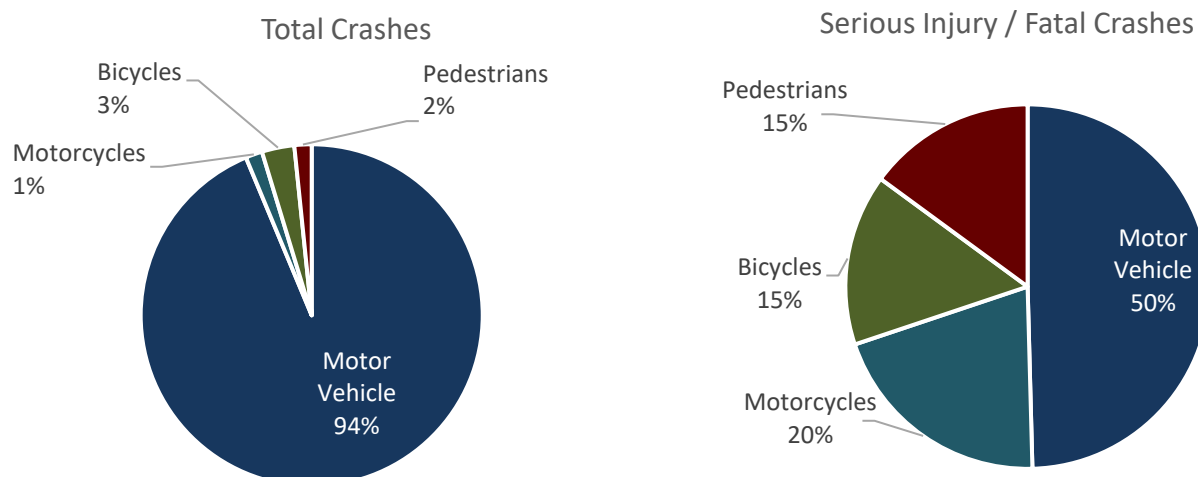


Figure 3. Travel Modes for Total Crashes and Serious Injury / Fatal Crashes

Vulnerable Road Users

Serious injury and fatal crash trends by mode of travel for vulnerable road users are shown in **Figure 4**. All modes of travel for vulnerable road users are experiencing increasing trends.

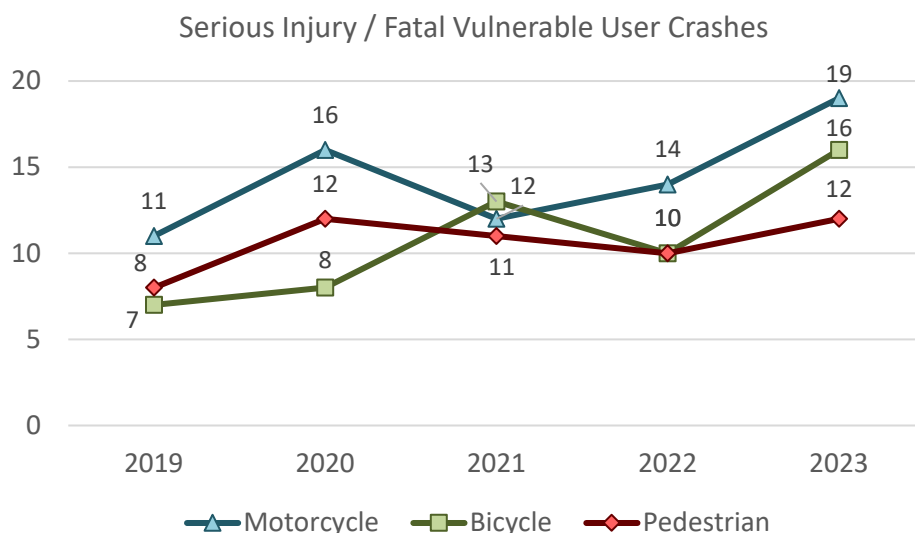


Figure 4. Vulnerable User Crash Trends

Fatal Crashes

The trend in fatal crashes is shown in **Figure 5**. Partially due to the small number of crashes, there can be significant variability in the numbers from year to year. The overall percentage of modes involved in fatal crashes during the past five years are shown in **Figure 6**. Their locations are shown in **Figure 7**.

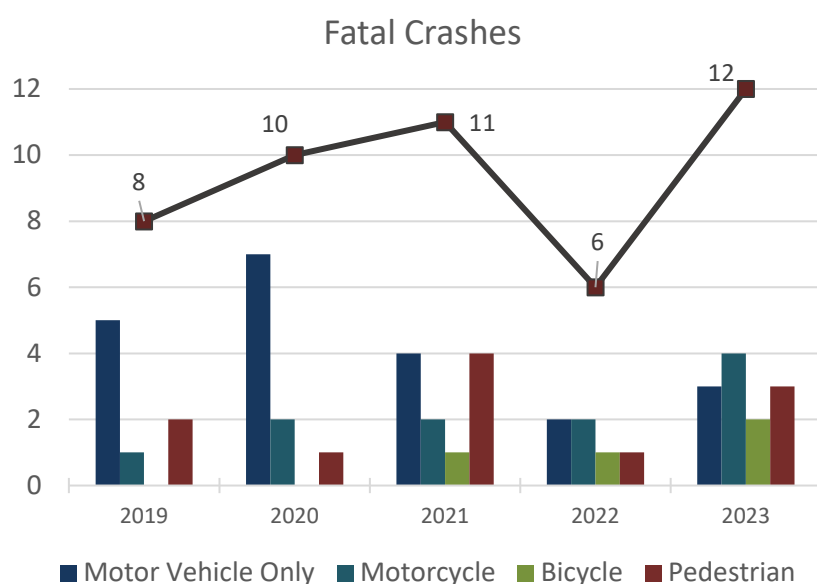


Figure 5. Fatal Crash Trends

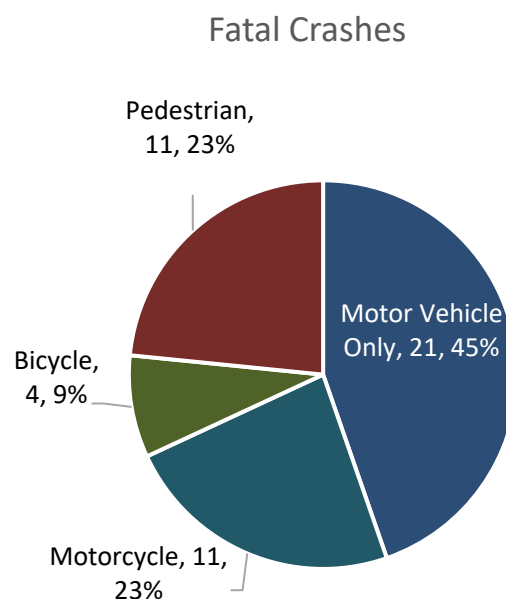


Figure 6. Modes of Travel Involved in Fatal Crashes

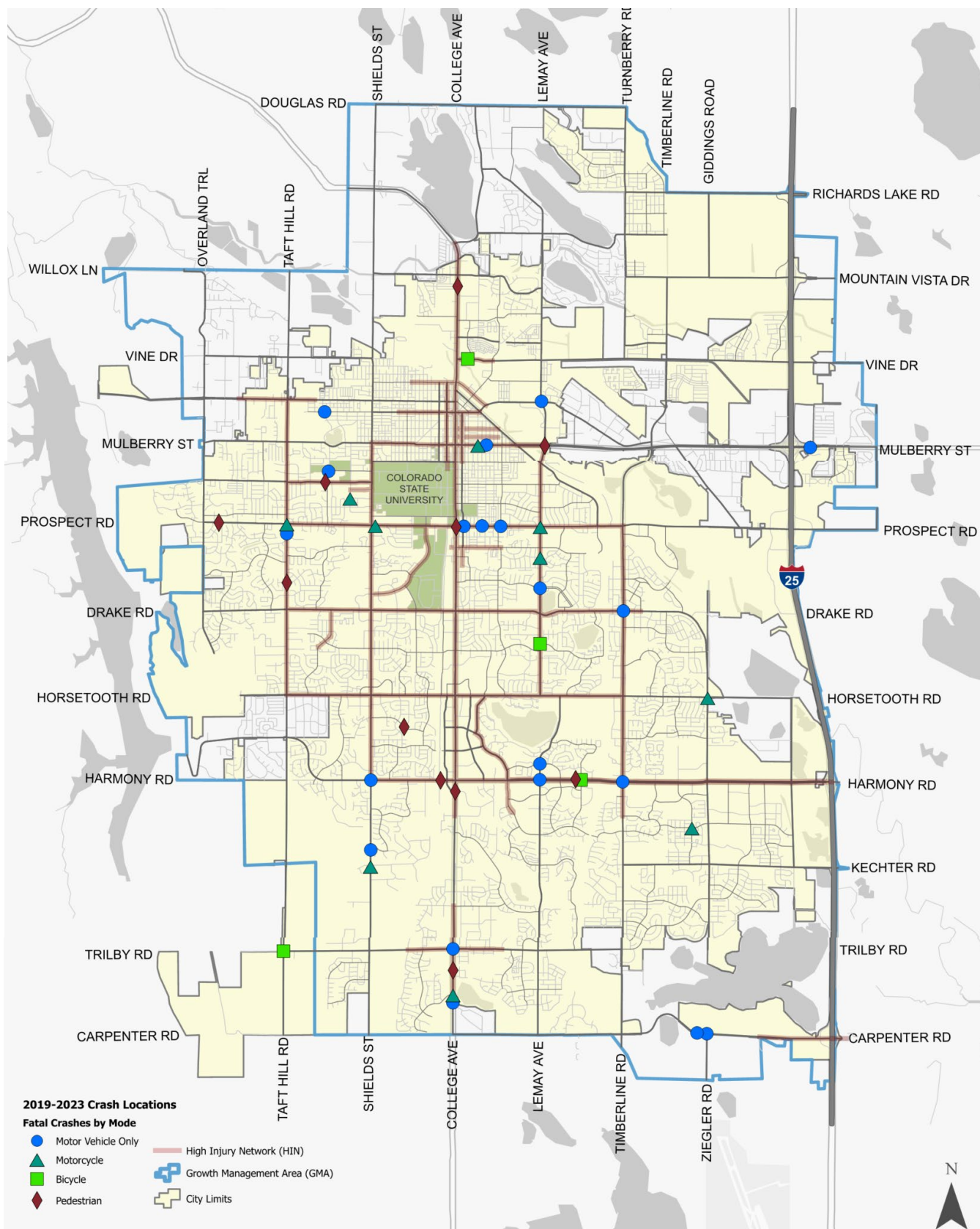


Figure 7. Location and Mode of Travel in Fatal Crashes



While each crash is unique and often has several contributing factors, an exploration of the data identifies some common themes among the crashes by mode. These themes are not intended to place blame, but rather to better understand risk and locations of interest, and target safety improvements, educational outreach and/or enforcement areas. Details on the takeaways and other themes are shown below. Note that some crashes are included in more than one category so the total may exceed 100%.

Table 1. Fatal crashes involving only motor vehicles:

Theme	# crashes in last 5 years	Percent of crashes
Fatal crashes involving only motor vehicles	21	
• Intersection crashes	12	57%
◦ Signalized intersection	6	28%
◦ Unsignalized intersection	6	28%
• Single vehicle run off the road	7	33%
• Approach turn crashes (4 at signalized)	5	24%
• Significant speeding (up to 126 mph)	5	24%
• Medical events prior to the crash	5	24%
• Alcohol / DUI related	5	24%

Table 2. Fatal crashes involving motorcycles:

Theme	# crashes in last 5 years	Percent of crashes
Fatal crashes involving motorcycles	11	
• Male gender of motorcyclist	10	91%
• Intersection crashes	7	63%
◦ Signalized intersection	2	18%
◦ Unsignalized intersection	3	27%
◦ Roundabout (both single vehicle)	2	18%
• Nighttime crashes	6	54%
• Alcohol / DUI related	5	45%
• Significant speeding (2 @100 mph)	5	45%
• Single vehicle run off the road	4	36%

Table 3. Fatal crashes involving bicycles:

Theme	# crashes in last 5 years	Percent of crashes
Fatal crashes involving bicycles	4	
• Crashes in the daylight	4	100%
• Intersection crashes	4	100%
◦ Signalized intersection	1	20%
◦ Unsignalized intersection	3	75%

Table 4. Fatal crashes involving Pedestrians:

Theme	# crashes in last 5 years	Percent of crashes
Fatal crashes involving pedestrians	11	
• Nighttime crashes	8	72%
• Non-intersection (mid-block)	8	72%
• Involved pedestrian darting into road or laying in road	8	72%
• Intersection crashes	3	27%
◦ Signalized intersection	0	0%
◦ Unsignalized intersection	3	27%

The most frequent / common themes involved with fatal crashes are summarized in **Table 5** below for each mode of travel.

Table 5. Summary of Common Themes in Fatal Crashes:

<u>Motor Vehicle Only</u> Intersections Single vehicle Speeding Medical events Alcohol / DUI	<u>Motorcycle</u> Intersections Nighttime (dark) Alcohol / DUI Significant speeding Single vehicle
<u>Bicycle</u> Daytime Unsignalized intersections	<u>Pedestrian</u> Nighttime (dark) Non intersection (midblock)

Serious Injury / Fatal Crash Types

There are six crash types that make up 77% of all serious injury / fatal crashes. They are shown in **Figure 8**.

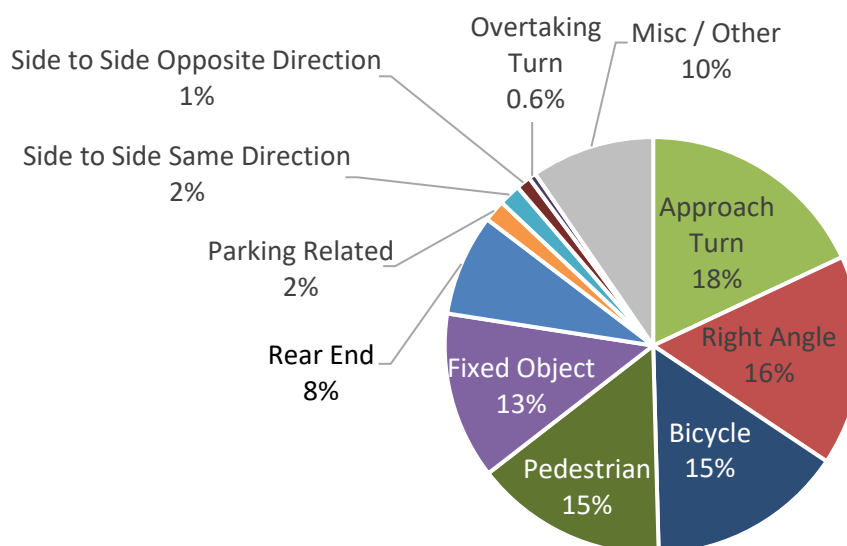
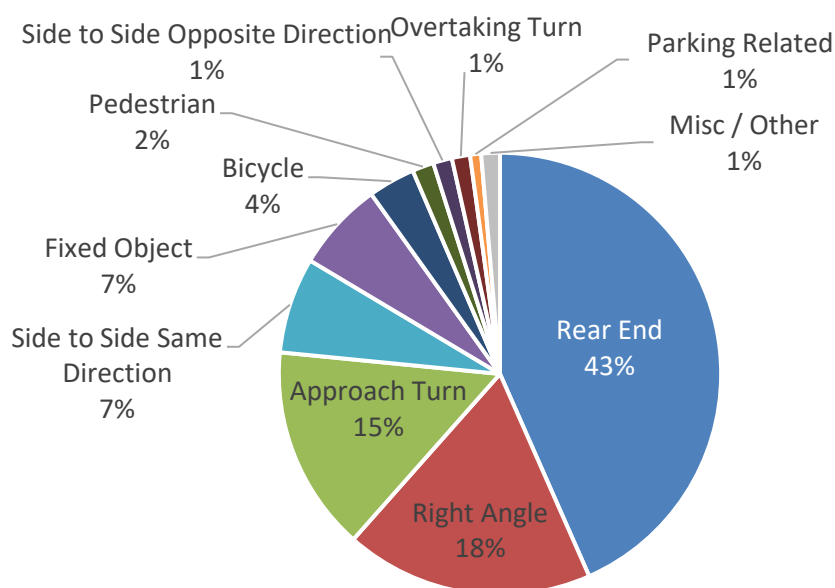


Figure 8. Serious Injury / Fatal Crash Types

Intersection Crashes

Intersections remain the most prevalent crash locations. Seventy percent (70%) of all serious injury / fatal crashes occur at intersections. The type of crashes that occur at intersections are shown in **Figure 9**.

Total Intersection Related Crashes



Serious Injury / Fatal Intersection Related Crashes

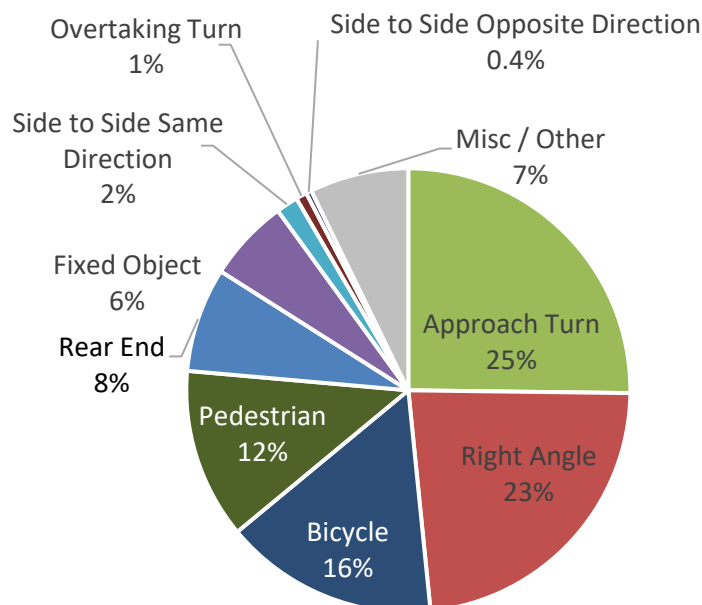


Figure 9. Crash Type for Intersection Crashes

Crash Location and High Injury Network

A map of crash location for serious injury / fatal crashes in the last five years is shown in **Figure 10**.

The map also shows the High Injury Network (HIN). The Vision Zero Action Plan for the City of Fort Collins adopted in 2023 identified street segments with the greatest share of serious injury / fatal crashes. Those streets have been designated as the HIN. The HIN represents 8% of the streets in Fort Collins and is the location of 52% of all serious injury / fatal crashes. The HIN are road segments that are especially targeted for safety focus.

Table 6. Crashes on the High Injury Network

	Citywide Crashes	Crashes on HIN
Total serious injury / fatal crashes	355	183 (52%)
Fatal crashes	47	29 (61%)

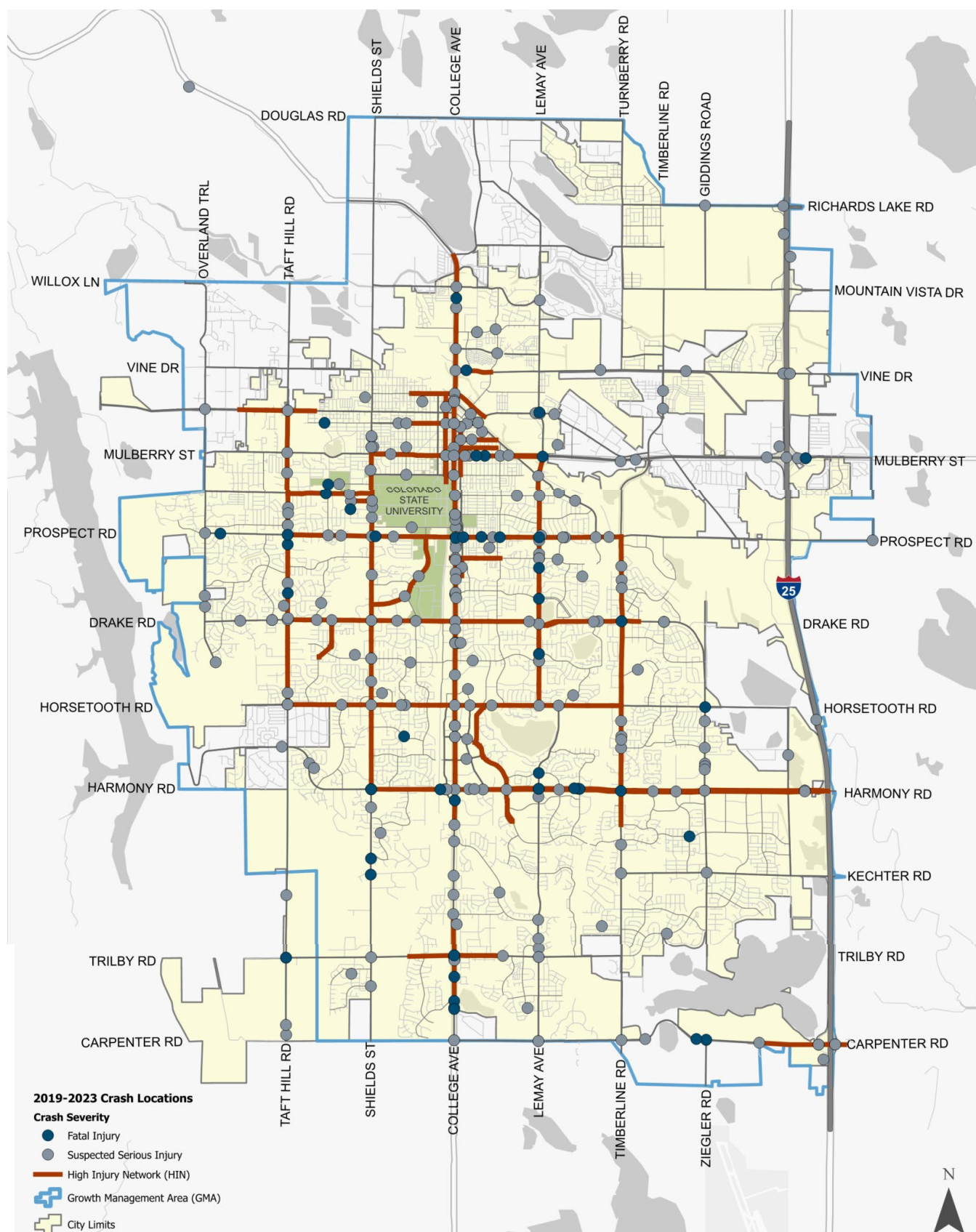


Figure 10. HIN and Location of Serious Injury / Fatal Crashes 2019-2023

ECONOMIC IMPACT

The economic costs of crashes in Fort Collins are estimated to be \$230 million each year (See **Table 7**). Crash costs include monetary losses associated with medical care, emergency services, property damage, and lost productivity. They also include future costs such as insurance premiums, and costs related to the reduction in the quality of life due to injuries. Crash costs use figures determined by the Federal Highway Administration and are adjusted to reflect 2023 values.

Societal cost of crashes
in Fort Collins in 2023:
\$230 million

The extraordinary high costs related to traffic crashes speaks to the profound impact - both personally and financially - that crashes have on those involved, their friends, family, coworkers and the broader community. Note that the small number of fatal crashes has a higher societal cost than thousands of property damage only crashes.

Crash Severity	Number of Crashes	Cost Per Crash	Societal Cost
Property Damage Crashes	2,243	\$ 12,900	\$ 28,934,700
Possible Injury Crashes	378	\$ 79,500	\$ 30,051,000
Non-Incapacitating Injury Crashes	366	\$ 141,000	\$ 51,606,000
Incapacitating Injury Crashes	82	\$ 386,000	\$ 31,652,000
Fatal Crashes	12	\$ 7,277,600	\$ 87,331,200
Total	3,081		\$ 229,574,900

Table 7. *Economic Impact of Traffic Crashes in Fort Collins, 2023*

COMPARISON TO OTHER CITIES

Knowing how Fort Collins crash trends compare to other communities helps identify progress and which communities to look to for effective strategies. The most consistent way to compare Fort Collins' crash frequency with that of other cities is to compare the fatal crash rate (crashes per 100,000 population). Fatal crashes are used for this comparison as they are most consistently reported due to federal reporting requirements. **Tables 8 and 9** are sorted by fatal crash rate and compare Fort Collins to other cities in Colorado and also other peer cities nationwide with similar populations (90,000 to 200,000).

It is important to note that because fatal crashes are rare, there are relatively low numbers to use in the analysis, which can result in some volatility in the results. Therefore, there can be significant swings in the crash rate as the number of fatal crashes varies from year to year.

The City of Fort Collins has a lower fatal crash rate than most of its comparable Colorado counterparts and is about average when compared against similar cities nationwide.



VISION >> ZERO



Colorado Cities							
City	Population	Fatal Crashes, 2019 - 2023					Fatal Crash Rate (Crashes/Year/ 100,000 Pop.)
		2019	2020	2021	2022	2023	
Boulder	107,295	2	4	4	1	3	2.6
Arvada	121,414	3	4	2	5	6	3.3
Fort Collins	174,000	8	10	11	6	12	5.4
Greeley	110,831	4	12	2	5	10	6.0
Avg. CO Cities	126,169	8.8	8.2	8.8	9.0	10.8	7.1
Thornton	145,990	13	8	9	13	9	7.1
Westminster	113,600	5	5	8	13	10	7.2
Longmont	98,630	12	5	9	7	5	7.7
Lakewood	158,656	19	11	18	17	20	10.7
Pueblo	113,969	13	15	16	14	22	14.0

Table 8. Fatal Crash Rate Comparison to Other Colorado Cities

Peer Cities							
City	Population	Fatal Crashes, 2018 - 2022*					Fatal Crash Rate (Crashes/Year/ 100,000 Pop.)
		2018	2019	2020	2021	2022	
Bellevue, WA	151,574	1	4	4	1	3	1.7
Naperville, IL	150,418	1	3	2	5	2	1.7
Overland Park, KS	201,709	2	9	7	5	6	2.9
Olathe, KS	145,536	6	6	3	4	5	3.3
Coral Springs, FL	134,394	3	4	8	7	5	4.0
Broken Arrow, OK	117,911	7	3	4	9	4	4.6
Fort Collins, CO	174,000	9	8	10	11	6	5.1
Cedar Rapids, IA	137,896	9	9	5	6	9	5.5
Avg. Peer Cities	132,280	6.5	6.2	8.5	9.0	9.7	5.9
San Angelo, TX	100,372	5	3	9	10	8	7.0
Richardson, TX	117,528	5	5	9	7	18	7.5
Norman, OK	130,046	9	5	12	10	20	8.6
Boca Raton, FL	97,422	10	6	11	15	15	11.7
Springfield, MO	170,188	18	15	27	27	25	13.2

Table 9. Fatal Crash Rate Comparison to Similar Peer Cities Nationwide

Data sources:

- Colorado crash data is from the Colorado Department of Transportation (CDOT).
- Crash data for communities outside Colorado (peer cities) was obtained from the National Highway Traffic Safety Administration's Fatal Accident Reporting System (FARS) which contains data through 2022.
- Population estimates are from the U.S. Census.

INTERSECTION EVALUATION

Total crash numbers at locations can be informative – on a ‘heat map’ for example. However, because vehicle volumes and other elements at specific locations vary widely, it is difficult to draw relevant and comparative conclusions from total crashes alone. Therefore, an additional analysis is conducted that allows for a data-based intersection comparison so that mitigation efforts can be targeted to places where more severe crashes are occurring than what would be expected based on traffic volumes and other characteristics. These intersections are good candidates for interventions and can have a strong impact on reducing crashes.

The effort follows the national best practice outlined in the *Highway Safety Manual* (HSM) published by the Transportation Research Board (TRB) and the American Association of State Highway and Transportation Officials (AASHTO). The procedure is a statistical process that utilizes inputs including crash numbers, severity, vehicle volumes, roadway geometry and type of control (such as signals or stop signs) at a location. The analysis then accounts for the somewhat random nature of crashes, and the outcome is an evaluation of intersection safety that can be compared from one location to another. It identifies locations that have a higher-than expected crash frequency where there is likely the most opportunity for reduction of crashes. Details on methodology, models, and costs are included in Appendix C. The result of the analysis is provided in two forms:

EXCESS CRASH COSTS

The analysis identifies the expected number of crashes at a particular intersection given the inputs and compares that against the actual number of crashes. The difference in expected crashes and actual crashes can be monetized as ‘excess crash costs’. This is the annual cost associated with crashes that are above the expected number of crashes for an intersection and provides an indication of locations with unusually high numbers of crashes. Locations with high excess crash costs may have significant potential for reducing crashes. Intersection statistics can also be compared against one another. A more detailed explanation of the methodology is in Appendix C.

LEVEL OF SERVICE OF SAFETY (LOSS)

While excess crash cost is a quantitative approach that provides a specific number (dollar amount), CDOT uses a similar analysis and reports results in a more qualitative fashion called Level of Service of Safety (LOSS). LOSS is calculated for both total crashes as well as fatal/injury crashes (FI). LOSS is reported on a scale of 1-4.

- LOSS 1 and 2 reflect locations with less than expected crashes (below the 50th percentile).
- LOSS 3 reflects locations with above average number of crashes (above the 50th percentile).
- LOSS 4 reflects locations with above the 80th percentile number of crashes.

Locations that are identified as LOSS 3 and 4 indicate the highest potential for crash reduction with a mitigating project. Intersections with a crash history that fall into LOSS 1 and 2 may still have a pattern that can be mitigated but may result in lower crash reduction than similar efforts at intersections with a higher LOSS.

The reporting of the LOSS analysis gives the City information needed to determine locations that may score favorably in the review process for CDOT safety funds.

INTERSECTION COMPARISON

The analysis for excess crash costs and LOSS was completed for 307 intersections in Fort Collins using three years of data (2021-2023). The results of excess crash costs and CDOT LOSS are shown in **Table 10** for the 50 intersections with the greatest excess crash costs and the most potential for improvement.



Note that since fatal and injury (FI) crashes have higher crash costs associated with them, the ranking method gives more weight to locations with more severe crashes compared to locations with primarily “fender benders”. The table also identifies whether an intersection is on the High Injury Network identified in the Vision Zero Action Plan (and shown in **Figure 10** on Page 9).

Table 10. Top 50 Intersections by Excess Crash Costs

	Rank	Facility ID	Intersection		Excess Expected Crash Cost (\$)	Level of Service of Safety (LOSS)		Notes	High Injury Network
			North-South Street	East-West Street		LOSS Total Crashes	LOSS Fatal & Injury Crashes		
Top 10 intersections	1	10	College	Drake	\$324,427	LOSS 3	LOSS 4	Capital Project in design	Yes
	2	59	Lemay	Drake	\$256,678	LOSS 3	LOSS 4	Capital Project in design/red light cameras installed	Yes
	3	143	Timberline	Carpenter	\$253,738	LOSS 4	LOSS 4	Capital Project in design	no
	4	145	Timberline	Harmony	\$226,931	LOSS 3	LOSS 3		Yes
	5	162	Lemay	Harmony	\$213,841	LOSS 3	LOSS 4		Yes
	6	80	Mason	Harmony	\$208,108	LOSS 4	LOSS 4		Yes
	7	25	College	Mulberry	\$196,532	LOSS 3	LOSS 3		Yes
	8	35	College	Troutman	\$186,085	LOSS 4	LOSS 4	Signal Improvements completed 2024	Yes
	9	8	College	Columbia	\$179,844	LOSS 4	LOSS 4	Signal Improvements in design	Yes
	10	9402	Lemay	Carpenter	\$179,739	LOSS 3	LOSS 4		no
Next 15 intersections	11	18	College	Kensington	\$178,421	LOSS 4	LOSS 4		Yes
	12	119	Shields	Prospect	\$154,762	LOSS 3	LOSS 3	Planned Protected Intersection TCPSPS	Yes
	13	9380	Timberline	Lincoln	\$135,805	LOSS 4	LOSS 4	Capital Project in design	no
	14	1	Boardwalk	Harmony	\$130,594	LOSS 3	LOSS 3	Protected Left Turns 2019	Yes
	15	6171	Edinburgh	Drake	\$122,312	LOSS 4	LOSS 4		Yes
	16	4	College	Boardwalk	\$111,567	LOSS 4	LOSS 3		Yes
	17	144	Timberline	Drake	\$111,189	LOSS 3	LOSS 3		Yes
	18	55	JFK	Harmony	\$110,698	LOSS 3	LOSS 3		Yes
	19	101	Remington	Mulberry	\$104,971	LOSS 4	LOSS 4		Yes
	20	19	College	Laporte	\$102,318	LOSS 4	LOSS 4		Yes
	21	69	Lemay	Riverside	\$99,021	LOSS 3	LOSS 3	Grant funding obtained for signal improvements	Yes
	22	137	Taft Hill	Horsetooth	\$93,343	LOSS 3	LOSS 3	Capital Project completed 2023	Yes
	23	15	College	Harvard	\$89,301	LOSS 4	LOSS 3	Signal Improvements in design	Yes
	24	9994	Taft Hill	Trilby	\$83,602	LOSS 4	LOSS 4	Signal installed 2023	no
	25	134	Taft Hill	Drake	\$83,389	LOSS 4	LOSS 3	Anticipated changes with Taft project	Yes
	26	7219	Shields	Pitkin	\$83,115	LOSS 4	LOSS 4		Yes
	27	140	Taft Hill	Prospect	\$80,479	LOSS 3	LOSS 3		Yes
	28	5329	College	Plum	\$80,234	LOSS 4	LOSS 4		Yes
	29	37	College	Willcox	\$78,423	LOSS 3	LOSS 3		Yes
	30	7290	College	Mason/Palmer	\$73,596	LOSS 3	LOSS 3		Yes
	31	6666	Mason	Horsetooth	\$73,086	LOSS 4			Yes
	32	124	Shields	Swallow	\$71,208		LOSS 3		Yes
	33	6473	Ziegler	Horsetooth	\$72,366	LOSS 3	LOSS 3		no
	34	9542	College	Smokey	\$68,737	LOSS 4	LOSS 4	Will be RIRO. New signal at College/Bueno	no
	35	125	Shields	Trilby	\$68,507	LOSS 4	LOSS 3		no
	36	8835	Timberline	Kechter	\$67,540	LOSS 4	LOSS 3	Capital Project completed 2023	no
	37	108	Shields	Drake	\$67,249	LOSS 3	LOSS 3		Yes
	38	118	Shields	Plum	\$65,968	LOSS 3	LOSS 3		Yes
	39	25924	Redwood	Suniga	\$65,765	LOSS 4	LOSS 4	Change in control in 2024	no
	40	231	Peterson	Mulberry	\$65,210	LOSS 4	LOSS 4		Yes
	41	14	College	Harmony	\$64,708	LOSS 3			Yes
	42	15033	College	Rutgers	\$62,478	LOSS 4	LOSS 3		Yes
	43	116	Shields	Mountain	\$59,709	LOSS 4	LOSS 4		no
	44	23	College	Monroe	\$59,484	LOSS 4	LOSS 3		Yes
	45	9986	Mathews	Mulberry	\$59,072	LOSS 4	LOSS 4		Yes
	46	109	Shields	Elizabeth	\$58,604	LOSS 4			Yes
	47	193	Stover (East Int.)	Prospect	\$57,712	LOSS 4	LOSS 4		Yes
	48	8656	Shields	Richmond	\$55,759	LOSS 4	LOSS 4		Yes
	49	6417	Timberline	Vine	\$54,210	LOSS 4	LOSS 3	Signal installation planned	no
	50	13	College	Fossil Creek	\$53,219		LOSS 3		no

Legend:

10 high priority locations for review
Additional 15 locations with potential for crash reduction
Recently Improved - safety being monitored
Project In Process

Shading

reflects
LOSS 4

TRENDS IN INTERSECTION SAFETY

In addition to identifying intersections with higher-than-expected crash numbers and severity, reviewing crash trends can identify changing conditions and safety at specific locations. **Table 11 and 12** list the change in excess crash costs both positively and negatively.

As noted earlier, the base calculation includes three years of data (2021-2023) and the comparison is against the previous three years of data (2018-2020). The comparisons take into account the volume changes related to COVID. Locations with the most positive safety trends are shaded green (**Table 11**), while locations with increasing excess crash costs (worsening safety trend) are shaded in red (**Table 12**). Note that in locations with few crashes, a single injury/fatal crash can create a pronounced swing in excess crash costs. In these cases, judgment is needed to determine whether a trend is significant or not.

Table 11. Top 15 Intersections With Improving Safety Trends

Current Rank	Facility ID	Intersection		Crash Trends
		North South Street	East-West Street	2018 - 2020 vs. 2021 - 2023 Change in Crash Cost
76	34	College	Trilby	-\$526,757
41	14	College	Harmony	-\$478,376
n/a	16	College	Horsetooth	-\$364,990
n/a	149	Timberline	Prospect	-\$345,211
14	1	Boardwalk	Harmony	-\$332,221
88	111	Shields	Horsetooth	-\$331,755
n/a	74	Lemay	Vine	-\$286,117
5	162	Lemay	Harmony	-\$161,441
n/a	7	College	Cherry	-\$154,208
12	119	Shields	Prospect	-\$147,209
52	110	Shields	Harmony	-\$138,282
n/a	146	Timberline	Horsetooth	-\$128,494
38	118	Shields	Plum	-\$122,431
7	25	College	Mulberry	-\$117,179
74	240	Timberline	Custer	-\$110,458

Note: Ranks listed as n/a indicate that location is not in the top 187 intersections in Fort Collins

All of the intersections with improving safety trends are signalized intersections. Some of the trends may be related to the random variation of crashes over time or low volumes, while others may involve a specific improvement. For instance, Lemay / Vine is seeing improved safety due to the opening of the Lemay overpass.

For locations with a worsening crash trends, they may also reflect random variation over time or low vehicular volumes that create a pronounced swing in excess costs with a single serious injury or fatal crash but may also be the result of some type of emerging pattern or trend. These locations may be targeted for additional review and potential field safety audits to identify potential countermeasures.

**Table 12. Top 15 Intersections With Worsening Crash Trends**

Current Rank	Facility ID	Intersection		Crash Trends 2018 - 2020 vs. 2021 - 2023 Change in Crash Cost
		North South Street	East-West Street	
9	8	College	Columbia	\$149,944
13	9380	Timberline	Lincoln	\$135,805
16	4	College	Boardwalk	\$109,883
17	144	Timberline	Drake	\$107,120
20	19	College	Laporte	\$101,933
10	9402	Lemay	Carpenter	\$91,071
4	145	Timberline	Harmony	\$86,518
26	7219	Shields	Pitkin	\$82,168
15	6171	Edinburgh	Drake	\$72,663
32	124	Shields	Swallow	\$71,208
39	25924	Redwood	Suniga	\$65,765
23	15	College	Harvard	\$63,586
22	137	Taft Hill	Horsetooth	\$62,743
28	5329	College	Plum	\$61,835
24	9994	Taft Hill	Trilby	\$61,337

VISION ZERO SAFETY EFFORTS

The City of Fort Collins is committed to reducing the number and severity of crashes, and the Vision Zero Action Plan together with this annual evaluation guides the process. The City's FCMoves Department manages a comprehensive spreadsheet to track Vision Zero Transformative Actions and Supporting Actions. The spreadsheet is updated on an ongoing basis and is available upon request from the FCMoves Department.

RECENT VISION ZERO ACCOMPLISHMENTS

There have been a number of recent projects completed in the City that support transportation safety. Some projects are targeted safety countermeasures to address a specific crash trend, while others may be projects with goals in addition to safety, such as comfort and mobility for vulnerable road users, or travel efficiency to reduce emissions. A few examples are listed by project category and year of installation. Before / after comparison is best done with several years of data, so projects as far back as 2020 are included.

Infrastructure Projects

2023

- Taft Hill / Horsetooth – capital intersection project
- South Timberline from Harmony to Trilby - capital roadway project
- Taft Hill / Trilby – new signal
- Lemay / Suniga – new signal

2022

- Lemay / Vine – overpass completed



VISION >> ZERO



- Hampshire / W Drake - new bicycle / pedestrian signal
- Kechter Road at Zach Elementary School – street restriping
- E. Elizabeth / McHugh Street from Lemay to Riverside - added buffered bike lanes
- E. Pitkin Street from College to Stover - advisory bike lane
- Old Mill Road from County Fair to Kechter - added bike lanes and parking removal
- Corbett Drive from Saddle Creek to Kechter - buffered bike lanes and parking removal
- Lemay / Boltz - Converted pedestrian signal to HAWK

2021

- Lemay Avenue overpass over BNSF railroad and Vine Drive
- Shields Street and Magnolia Avenue bicycle / pedestrian signal
- Hampshire and Drake bicycle / pedestrian signal
- Lemay and Columbia bicycle / pedestrian signal
- Ponderosa / Elizabeth - Bicycle / pedestrian signal with new crosswalks
- State Highway 1 and Douglas Road signalization
- Maxwell at CR 42C RRFB

2020

- Taft Hill / Puerta Verde – Rectangular Rapid Flash Beacon (RRFB)
- Ponderosa / Elizabeth – RRFB (Bicycle / pedestrian signal with new crosswalks)
- Woodbridge / Elizabeth – RRFB

Signal Projects

2023-2024

- Citywide left turn phasing review
 - College / Swallow N-S protected left turns
 - College / Carpenter SB protected left turn
 - Taft / Horsetooth SB protected left turn
 - College / Troutman N-S protected left turns
 - Timberline / Horsetooth WB protected left turn
- Shields / Drake pedestrian protected phasing
- Signal remodels / added signal heads / new flashing yellow arrows
 - College / Swallow
 - College / Troutman
 - Shields / Stuart
 - Timberline / Kechter
- Updated signal timing (clearance intervals)

2021-2023

- Added reflective backplates at eight locations
- Signal remodels / added signal heads / new flashing yellow arrows
 - College / Mulberry
 - Riverside / Mulberry
 - Timberline / Mulberry
 - Lemay / Magnolia
 - Lemay / Lincoln
- Added leading pedestrian intervals at signals throughout the city
- Added additional time to pedestrian phases at signals throughout the City
- Replaced older pedestrian signal heads with countdown heads at five locations
- Protected crosswalks from left turning vehicles
 - College / Cherry E-W crosswalks
 - Lemay / Magnolia E-W crosswalks
 - Shields / Trilby west leg crosswalk

2020

- College / Trilby Protected left turns (N-S)
- Signal remodels / added signal heads / new flashing yellow arrows



- College / Foothills
- College / Highway 1
- College / Swallow
- Ziegler / Council Tree

Safety Evaluations - 2023

- Conducted safety audits at 11 intersections identified in 2022 crash analysis work as high priority for safety improvements
- Completed five school transportation operations and safety audits with detailed recommendations.
- Conducted four Vision Zero site visits with community members.

Education and Training - 2023

- Hosted ThinkBike Workshop with Dutch Cycling Embassy to learn principles of improving safety and comfort for bicyclists.
- Held a one-day training on access management for City staff.
- Ran back-to-school traffic safety messaging ads on radio stations.

Enforcement

2023

- Lemay / Drake (E-W) red light camera
- Shields / Harmony (N-S) red light camera

2020

- Shields / Mulberry (E-W) red light camera
- Shields / Prospect (N-S) red light camera

Tracking Progress

- Completed a crash dashboard for information and data transparency to be used by City staff (and now available publicly).

TRACKING AND MEASURING SAFETY IMPROVEMENTS

A key component to a safety toolbox is the ongoing monitoring and continuous safety evaluation of the City's transportation system. In addition to annual data gathering and review shown earlier in this report, monitoring specific efforts/initiatives for their effectiveness and impact on safety can inform future actions and projects.

Before and after evaluations are most informative when a sufficient amount of time has passed following the improvement to provide an adequate amount of 'after' data. Typically, this could be as long as three years. With this approach, before/after studies can be done on projects completed in 2020 (or before) such that after data reflects 2021-2023.

In some cases, before/after studies can be done on more recent projects especially if there were a number of crashes each year and the improvement was a targeted countermeasure.

Finally, there are projects that are completed with a safety perspective that are done pro-actively to support mobility, comfort, and build infrastructure that reflects current best practices for safety. These locations may not have a 'before' crash history, and as such projects will not technically show a crash reduction. They are, however, still an important component of safe transportation in Fort Collins.

Recent Project Evaluations

College / Trilby North-South Protected Left Turns - 2020

In 2020, the north and south left turn phasing on College Avenue for vehicles to turn left onto Trilby Road was changed from 'protected permitted' (a green arrow followed by permissive turning on a gap) to 'protected only' (green, yellow and red arrows only). The change was to address approach turn (left turn) crashes.

Before (2017-2019)

22 approach turn crashes (including 6 injury and 1 fatal crash)

After (2021-2023)

2 approach turn crashes (including 1 injury)

College / Trilby

90% decrease in crashes

6 fewer crashes each year

Boardwalk / Harmony East West Protected Left Turns - 2020

In 2020, the east and west left turn phasing on Harmony for vehicles to turn left onto Boardwalk was changed from 'protected permitted' (a green arrow followed by permissive turning on a gap) to 'protected only' (green, yellow and red arrows only). The change was to address approach turn crashes.

Before (2017-2019)

14 approach turn crashes (including 2 injury)

After (2021-2023)

3 approach turn crashes (including 1 injury)

Boardwalk / Harmony

78% decrease in crashes

3.5 fewer crashes each year

College / Horsetooth Capital Improvement Project- 2018

The intersection of College Avenue at Horsetooth was rebuilt in 2018. The goals of the project were to provide enhanced mobility and improved safety for people using all modes of travel. This included adding additional turn lanes, improving bike facilities, and creating a protected crossing time for bikes / pedestrians on the north leg.

The outcome brought the intersection up to current best practices in design, reduced emissions, increased comfort for vulnerable road users, and **significantly improved safety**. Intersection capital improvement projects are an important countermeasure for safety.

Before (2015-2017)

180 crashes (including 15 injury)

After (2021-2023 - timeframe selected to avoid COVID year)

63 crashes (including 2 injury)

College / Horsetooth

65% decrease in crashes

86% decrease in injury crashes

39 fewer crashes each year



State Highway 1 and Douglas Road Signalization - 2021

The intersection of State Highway 1 and Douglas Road is within the growth management area of Fort Collins. This was a collaborative effort to signalize the intersection to improve safety among CDOT, Larimer County and the City of Fort Collins. The goal was to address approach turn and right-angle crashes.

Before (2018-2019)

9 crashes (including 3 injury)

After (2022-2023)

3 crashes (including 1 injury)

SH1 / Douglas Rd

67% decrease in crashes

3 fewer crashes each year

ONGOING EFFORTS / NEXT STEPS

Each year, City staff uses the information in this report to undertake a variety of projects that support transportation safety. Continued implementation of various adopted plans (including the Transportation Master Plan, and Active Modes Plan) are a guide. In addition, a specific safety-based focus includes the following ongoing efforts:

Infrastructure

- LaPorte Avenue corridor improvements to improve multi-modal facilities
- West Elizabeth Bus Rapid Transit (BRT) project that also includes significant bicycle and pedestrian improvements.
- Power Trail crossing of Harmony Road
- Installation of separated bike lanes on Centre Avenue
- Complete Lake Street demonstration project.
- Highway Safety Improvement Program (HSIP) funding for improvements at Prospect / Welch, Riverside / Lemay and seven Harmony Road intersections.
- Continued work on design/construction of a variety of intersection capital improvement projects.
- Continue identifying non-compliant pedestrian pushbuttons in historically underserved neighborhoods to be replaced.

Planning

- Received \$964,480 Safe Streets for All funding to study bicycle safety improvements for arterials in Northwest Fort Collins.
- Received \$1.7 million Safe Street for All funding to study Harmony Road intersections

Policies and Programs

- Update and refine City policy on the setting of speed limits with Vision Zero in mind.
- Update the High Injury Network (HIN) to reflect current crash trends

Analysis and Operations

- Continued work on safety audits at locations of concern
- Continued work with the school district on Safe Routes to School and Transportation Safety Audits at schools.
- Efforts to address data glitches as data is processed and evaluated.

Enforcement

- Additional red-light cameras and explore implementation of automated speed enforcement



APPENDIX A

EXPLANATION OF DATA

The source for crash information is the City of Fort Collins Traffic Operations Department traffic crash database. The department works cooperatively with Fort Collins Police Services to obtain electronic copies of reports for all crashes on public streets. This includes all crashes investigated and reported by Fort Collins Police Services.

Traffic Operations staff reviews each crash report to ensure that data is as complete, accurate, and consistent as possible. Crash narratives are used to further detail some of the fields.

Population data used in this report was from the U.S. Census Bureau. The Colorado Department of Revenue provided data showing the number of licensed drivers by age in Fort Collins.

There are some crashes that are not included in the data. This includes:

- Crashes on private property (such as grocery store parking lots),
- Crashes that go unreported. This includes crashes on the trail system, or crashes that do not involve a motor vehicle (i.e., single bicycle crashes, or crashes between a pedestrian and bicyclist). Pedestrian crashes that do not involve an injury are also often not reported.
- Some crashes that occur along jurisdictional boundaries if other agencies respond (although efforts are made to add data from others when known),
- Non-injury crashes reported only to the State (such as during 'accident alert' status during bad weather) are not being captured by Fort Collins Police Services, and therefore not included in the analysis.

As new technology is deployed such as micromobility devices, scooters and e-bikes, the consistency with which that information is captured on a crash report varies. The detailed review and quality control done by Traffic Operations staff helps to identify those types of crashes, but it should be noted that fully understanding details may be difficult as they are not always captured on the crash form.

Most of the analyses represent five years of data, from 2019 to 2023. Some instances are noted and may only include three years of analysis, 2021-2023.



APPENDIX B

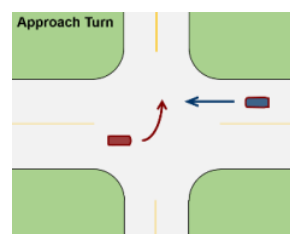
TYPES OF CRASHES

Throughout the document, there is detailed discussion and analysis regarding a variety of crash types. The most frequently noted crash categories are listed below with an explanation and definition for each one. Some are depicted in the diagrams at right. Note that all crashes reported involve some type of motor vehicle.

Crash reports will often indicate “front to side” collisions (also known as broadside). As indicated in the definitions and the diagrams, the circumstances related to the front of a vehicle striking the side of another vehicle can vary, and the mitigation to address these collisions may be very different depending on the type of crash. More detailed descriptions (approach turn, right angle, and overtaking turn) are explained below and used in this report.

Approach Turn

Two vehicles traveling in opposite directions, one turns left (or attempts a U-turn) in front of the oncoming vehicle and is struck.



Bicycle

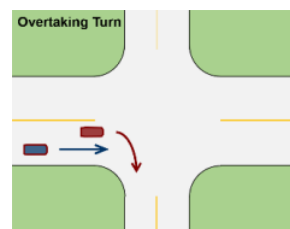
Any crash that involves a bicyclist and a motor vehicle.

Fixed Object

A single vehicle crash where a fixed object other than a parked vehicle is struck. This includes items such as a curb, median, or other roadside feature such as tree, fence, or utility pole.

Overtaking Turn

Two vehicles traveling in the same direction, the front vehicle turns right or left and is hit as the following vehicle tries to pass on the right or left. When this type of crash involves a bicycle traveling straight and a vehicle making a right turn, it is also known as a ‘right hook’ crash.

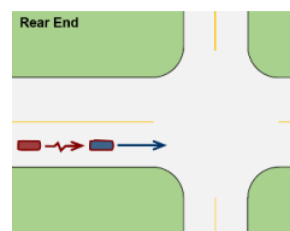


Parking Related

Any crash involving a parked vehicle or a vehicle entering/leaving a parking space.

Pedestrian

Any crash that involves a pedestrian and a motor vehicle.



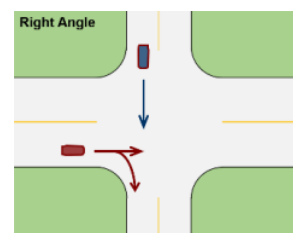
Rear End

Two vehicles traveling in the same direction, leading vehicle struck by following vehicle.



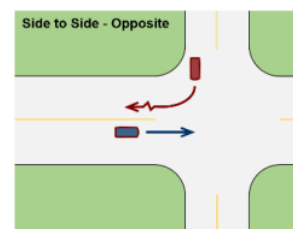
Right Angle

Two vehicles traveling on perpendicular streets one fails to yield or passes a traffic control device and strikes the other.



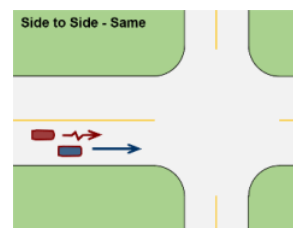
Sideswipe Opposite Direction (also side to side opposite)

Two vehicles traveling in opposite directions, one veers into the wrong lane and strikes the side of the other car. This often occurs where a vehicle waiting at a STOP sign or traffic signal is struck by a vehicle turning right from a perpendicular road (frequently during icy conditions).



Sideswipe Same Direction (also side to side same)

Two vehicles traveling the same direction, one vehicle veers into the other striking it in the side (usually due to improper lane changes).



Other

Other crashes that do not fit into any other category.

Crash Type Diagrams



APPENDIX C

INTERSECTION EVALAUTION ANALYSIS DETAILS

Information in the intersection evaluation section of the report is used to identify specific locations with the anticipated highest potential for crash reduction. The analysis is conducted to identify intersections where there are more crashes than expected considering traffic volumes, roadway geometry, type of traffic control, and crash severity.

INTERSECTIONS BY EXCESS CRASH COST

To identify locations with the most potential for crash reduction, it is important to use methods that account for crash severity, traffic volumes, roadway geometry, and type of control at intersections as those factors have an impact on the number of crashes at a given location.

It is also necessary to acknowledge that even though traffic crashes are partially deterministic (i.e., factors affecting crash potential can be controlled), crashes are, to some extent, random events. This random nature of crashes can make it more difficult to determine if a location is truly a problem versus a location where normal variation led to a high crash frequency during the analysis period. To identify locations that warrant further investigation it is helpful to use a methodology that accounts for the somewhat random nature of crashes.

In 2010 the Transportation Research Board (TRB) and the American Association of State Highway and Transportation Officials (AASHTO) published the *Highway Safety Manual* (HSM). The HSM includes a statistical approach that considers traffic volumes and intersection types while also accounting for the natural fluctuation of data called regression to the mean. The result is the identification of locations that have a higher-than-expected crash frequency even after accounting for random variation.

Crash Prediction Models

The method in the Highway Safety Manual that is applied for this evaluation uses crash prediction models to predict the number of crashes (both total and injury/fatal crashes) at each location given traffic volumes, roadway geometry, and type of control at each intersection. The predictions are then compared to the actual number of crashes at each location (adjusted to account for regression to the mean). The more the actual adjusted number of crashes exceeds the number of predicted crashes (expressed as excess crash cost) the more likely it is that a location might benefit from targeted improvements.

Several crash prediction models were considered including those found in the Highway Safety Manual 1st edition, models developed for the Colorado Department of Transportation (CDOT) in 2009, and models developed for CDOT in 2018. Model results were compared to actual Fort Collins crash data and the models that best matched the data in each intersection category were selected for use (see table on next page).

Once the comparison between model predicted and actual crashes is completed, the numbers can be monetized into 'excess crash costs'. This is the cost of crashes above the model predictions for an intersection and provides an indication of the potential benefit of reducing crashes. Crash costs are weighted by severity and based on information provided in the Highway Safety Manual (Table 4A-1), adjusted to 2023 dollars, and consider Fort Collins' proportion of severe crashes. The costs include monetary losses associated with medical care,



emergency services, property damage and lost productivity. They also include costs related to reduction in quality of life that is related to injuries. See table below for the costs used in this report.

Prediction Model Used in Intersection Analysis

Number of Legs *	Type of Control	Model Used
3	Stop Controlled	CDOT 2018
4	Stop Controlled	CDOT 2018
3	Signalized	CDOT 2018
4	Signalized	CDOT 2009 (total crashes) 2018 (injury crashes)
All	Roundabout	NCHRP 888

2023 Crash Costs

Severity of Crash	Cost
Property Damage Only	\$ 12,900 /crash
Fatal / Injury	\$ 79K - \$141K /crash

Source of cost:
Highway Safety Manual

* Legs: Segments of roadway approaching an intersection