



Safety Assessment - I-270 Corridor Improvements

Environmental Impact Statement

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Acronyms and Abbreviations

Acronym	Definition
AADT	Average Annual Daily Traffic
AM	morning
BNSF	BNSF Railway
CDOT	Colorado Department of Transportation
CFR	Code of Federal Regulations
EB	Eastbound
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FOIA	Freedom of Information Act
HOV	High-occupancy Vehicle
I-25	Interstate 25
I-270	Interstate 270
I-70	Interstate 70
I-76	Interstate 76
ITS	Intelligent Transportation Systems
LOSS	Level of Service of Safety
MP	Milepost
mph	miles per hour
NEPA	National Environmental Policy Act
PDO	Property Damage Only
PM	afternoon
RTD	Regional Transportation District
RTM	Regression to the Mean
SPF	Safety Performance Function
UPRR	Union Pacific Railroad
U.S.C.	United States Code
VZS	Vision Zero Suite
WB	Westbound

1.0 Introduction

CDOT is dedicated to providing an accessible experience for everyone. While we are continuously improving our standards, some complex items in this document, such as certain figures and images, are difficult to create with fully accessible parameters to all users. If you need help understanding any part of this document, we are here to assist and have resources to provide additional accessibility assistance to any requests. Please email us at CDOT_Accessibility@state.co.us to request an accommodation, and a member of our I-270 Engineering Program will schedule a time to review the content with you. To learn more about accessibility at CDOT, please visit the [Accessibility at CDOT webpage on the CDOT Website](#).

The Federal Highway Administration (FHWA) and Colorado Department of Transportation (CDOT) are preparing an Environmental Impact Statement (EIS) to evaluate potential improvements to the Interstate 270 (I-270) corridor. FHWA and CDOT are the lead agencies for this National Environmental Policy Act (NEPA) process, which was initiated in 2020, initially anticipating an Environmental Assessment. Moving into 2023, CDOT determined a more detailed environmental review was needed and requested that an EIS be prepared.

This technical report evaluates and documents all safety analyses conducted to support the I-270 EIS, including:

- Review of recent crash history
- Evaluation of safety performance of mainline I-270
- Review of safety conditions on cross streets, interchange ramps, and frontage roads within the I-270 project area

1.1 Project Description

I-270 in Colorado is a controlled-access interstate highway with two through lanes in each direction between Interstate 25 (I-25) and Interstate 70 (I-70) in central Denver and Commerce City (Figure 1). It has a posted speed limit of 55 miles per hour (mph). The project limits include the I-270 interchanges with Interstate 76 (I-76), York Street, Vasquez Boulevard, and Quebec Street. The project will tie into the I-25 and I-70 system interchanges, but improvements to these interchanges are part of projects on I-25 and I-70 and will be designed and approved separately.

The purpose of the I-270 Corridor Improvements Project is to implement transportation solutions that modernize the I-270 Corridor to accommodate existing and forecasted transportation demands. The project needs are:

- Traveler safety on the corridor
- Travel time and reliability on the corridor
- Transit on the corridor
- Bicycle and pedestrian connectivity across I-270
- Freight operations on the corridor

In addition to addressing project needs, CDOT, FHWA, and Cooperating and Participating Agencies have established a key project goal: to minimize environmental and community impacts resulting from the project.

Figure 1. I-270 Corridor Improvements Project Limits



2.0 Alternatives

CDOT developed a range of potential alternatives for I-270 improvements. The alternatives ranged from no improvements to minimal infrastructure improvements without added highway capacity to alternatives that added one or two travel lanes in each direction, which could be operated as transit, general-purpose, or Express Lanes.

A two-level alternatives evaluation process was used to screen the alternatives based on the project's purpose and need and goal, and two build alternatives were carried forward for detailed analysis in the EIS:

- Three General-Purpose Lanes Alternative
- Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative

The No Action Alternative is also fully evaluated as a baseline for comparison.

Additional information on the alternatives development and evaluation process is included in the Alternatives Development Technical Report.

2.1 No Action Alternative

The No Action Alternative evaluates the operations of I-270 if a build alternative would not occur along the corridor. It does not address the project's purpose and need but is carried forward as a baseline for comparison. This alternative would maintain the existing highway configuration of two general-purpose travel lanes in each direction. Bridges and pavement would be maintained and repaired continuously, but underlying infrastructure deficiencies would remain.

The No Action Alternative would include substantial ongoing maintenance and the rehabilitation of 19 existing structures, including seven locations that have structures that are or will be reaching the end of their useful life. The age of the structure, recent bridge inspections, and current ongoing maintenance costs, both planned and emergency maintenance, determine if a structure is or will be reaching the end of its useful life. The seven structure locations along the I-270 corridor that are or will be reaching the end of their useful life are as follows:

- Vasquez Bridge over Sand Creek (E-17-AT)
- York Street Bridge over I-270 (E-17-IC)
- I-270 over South Platte River Eastbound and Westbound Bridges (E-17-IE & E-17-ID)
- I-270 over Burlington Ditch Eastbound and Westbound Bridges (E-17-IG & E-17-IF)
- I-270 over Brighton Boulevard, Union Pacific Railroad (UPRR), and BNSF Railway (BNSF) Eastbound and Westbound Bridges (E-17-II & E-17-IH)
- I-270 over 60th Avenue & BNSF Eastbound and Westbound Bridges (E-17-IK & E-17-IJ)
- I-270 over East 56th Avenue Eastbound and Westbound (E-17-IO & E-17-IN)

The cross section would remain unchanged along I-270 under the No Action Alternative. The No Action Alternative cross sections are shown on Figure 2 and Figure 3.

Figure 2. No Action Alternative (west of Vasquez Boulevard)

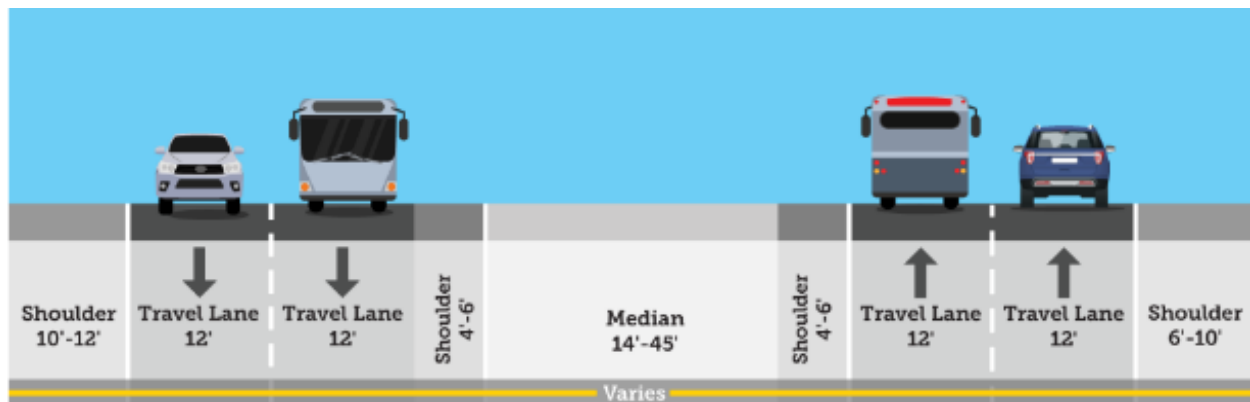
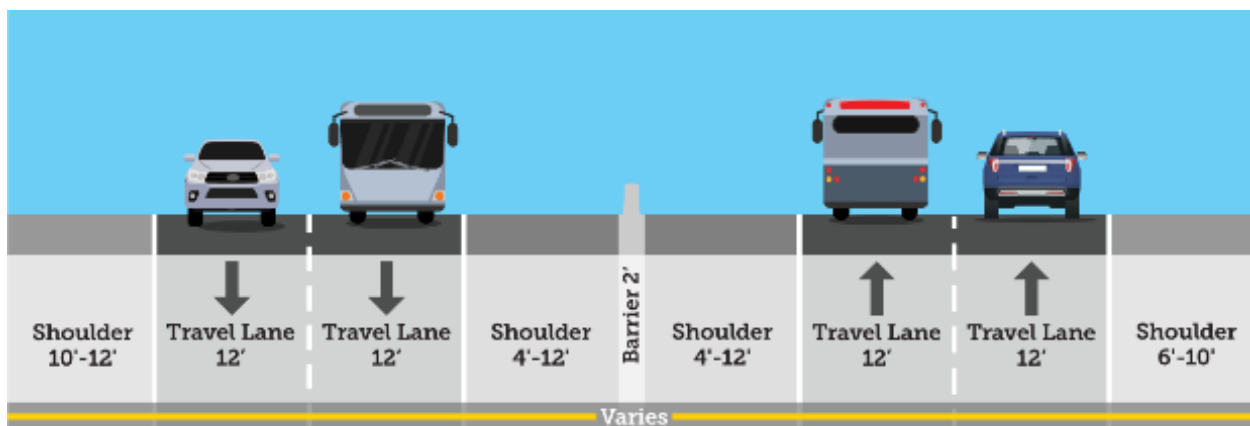


Figure 3. No Action Alternative (east of Vasquez Boulevard)



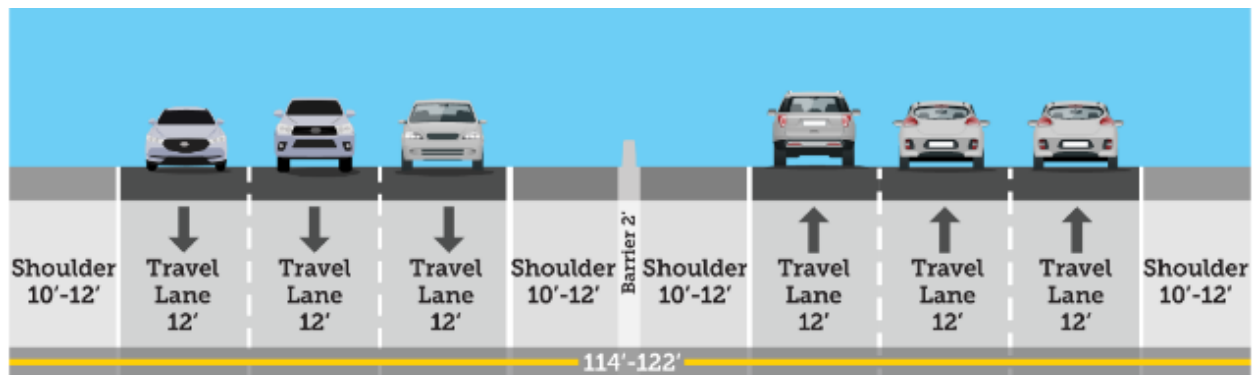
2.2 Build Alternatives

The build alternatives include improving the operational and physical conditions of the I-270 highway; reconfiguring interchanges and ramps; enhancing transit on the corridor; improving bicycle and pedestrian access across I-270; replacing deficient bridges and other infrastructure; and providing modern drainage, water quality, intelligent transportation systems (ITS), and other supporting infrastructure. Both add one new travel lane in each direction and have similar footprints, varying primarily on how the additional travel operates.

2.2.1 Three General-Purpose Lanes Alternative

This alternative would reconstruct I-270 to provide three general-purpose lanes in each direction as shown in Figure 4.

Figure 4. Three General-Purpose Lanes Alternative



This alternative includes:

Mainline Improvements

- Providing three general-purpose lanes in each direction
- Widening shoulders to meet current standards
- Restriping of the westbound I-270 to northbound I-25 off-ramp to provide dual-exit lane capacity
- Adding emergency turnouts and turnaround
- Adding one continuous auxiliary lane in each direction between the I-76 and Vasquez Boulevard on-ramps and off-ramps

Interchange Improvements

- Adding an eastbound collector ramp to consolidate incoming movements from the I-76 on-ramps
- Separating the westbound I-270 York Street and I-76 off-ramps
- Improving the Vasquez Boulevard interchange design with improved westbound on-ramp acceleration lanes and the eastbound off-ramp deceleration lanes
- Improving the Quebec Street interchange ramp acceleration and deceleration lengths

Bridge Improvements

- Reconstructing bridges that are at, or will be reaching, the end of their useful life. Bridges carrying travel lanes on I-270 include widening to accommodate additional lanes
 - Replacing the existing York Street bridge over I-270 to meet current bridge standards, accommodate an additional travel lane in each direction on York Street, include a 10-foot multi-use path and a 5-foot sidewalk, and enhance lighting
 - Replacing the existing I-270 bridges over the South Platte River Trail to meet current bridge standards, accommodate this project's bicycle and pedestrian improvements on the South Platte River Trail, and enhance lighting
 - Replacing the existing I-270 bridges over the Burlington Ditch to meet current bridge standards, accommodate future bicycle and pedestrian improvements, and enhance lighting



- Replacing the existing I-270 bridges over Brighton Boulevard to meet current bridge standards, accommodate this project's bicycle and pedestrian improvements on Brighton Boulevard and future bicycle and pedestrian improvements by others, and enhance lighting
- Replacing the existing I-270 bridges over East 60th Avenue and the BNSF crossing to meet current bridge standards, accommodate future bicycle and pedestrian improvements, and enhance lighting
- Replacing the existing I-270 bridges over East 56th Avenue to meet current bridge standards, accommodate this project's bicycle and pedestrian improvements, and enhance lighting
- Replacing the existing Vasquez Boulevard bridge over Sand Creek to meet current bridge standards and accommodate this project's bicycle and pedestrian improvements

Bicycle and Pedestrian Improvements

- Improving the York Street I-270 ramp terminal intersections with crosswalks, curb ramps, and pedestrian indicators at the ramp terminal traffic signals
- Adding a new 5-foot sidewalk on the west side and reconstructing a 6-foot sidewalk on the east side of Brighton Boulevard under I-270
- Reconstructing East 56th Avenue under I-270 and adding an on-street bicycle lane, a 10-foot multi-use path, and 6-foot sidewalk connecting to existing sidewalks
- Improving the intersection at East 56th Avenue and South Sandcreek Drive to include curb ramps, crosswalks, and lighting that meet current standards
- Improving the intersection at East 56th Avenue and Eudora Street to include curb ramps, crosswalks, and lighting that meet current standards
- Adding attached sidewalks on the west side of South Sandcreek Drive. The new sidewalks would be 8 feet wide from Quebec Street to East 47th Avenue Drive and 6 feet wide from East 47th Avenue Drive to East 49th Avenue, with a pedestrian crosswalk across East 47th Avenue Drive connecting the two segments
- Improving wayfinding at key locations, guiding bicyclists and pedestrians to the nearest Regional Transportation District (RTD) bus stops, major road connections, or distances to the next trailhead to avoid out-of-direction travel

Trail Improvements

- Reconfiguring the South Platte River Trail crossing under I-270 to improve bicycle and pedestrian visibility around tight curves and increase vertical clearance from the I-270 overpass
- Improving bicycle and pedestrian visibility on the Sand Creek Trail by straightening out tight curves, adding a center stripe, and enhancing lighting at the Vasquez Boulevard bridge over the Sand Creek Trail
- Adding a multi-use path with bicycle and pedestrian underpasses crossing under two free-flow interchange ramps on the east side of Vasquez Boulevard through the interchange with enhanced lighting
- Adding a multi-use path on the east and west sides of the Vasquez Boulevard bridge over Sand Creek, connecting users from the East 56th Avenue and Vasquez Boulevard intersection to a new connection to the Sand Creek Trail

- Adding a multi-use trail spur, connecting the proposed north-south Vasquez Boulevard multi-use trail to the East 56th Avenue and South Sandcreek Drive intersection
- Adding a multi-use path in the southeast corner of East 56th Avenue and South Sandcreek Drive
- Adding a 10-foot-wide bicycle and pedestrian overpass over I-270 and South Sandcreek Drive approximately halfway between East 56th Avenue and Quebec Street

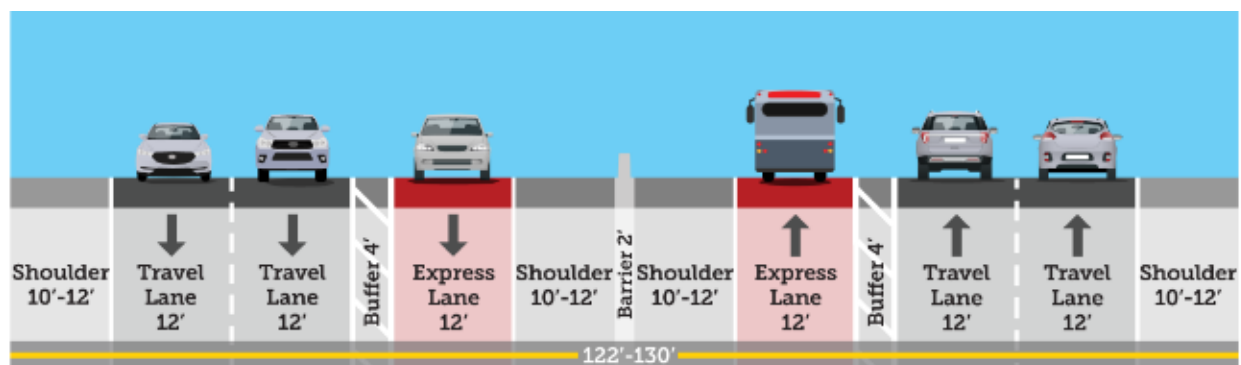
Transit Improvements

- Adding four new bus stops with connecting sidewalks and curb ramps on Quebec Street and South Sandcreek Drive near the I-270/Quebec Street interchange to improve access to RTD routes 88 and 37

2.2.2 Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative

This alternative would reconstruct I-270 with two general-purpose lanes and one Express Lane in each direction, as shown in Figure 5. Transit vehicles and high-occupancy vehicles (HOV) (three or more people) could travel in the Express Lane, free of charge. Other travelers, including freight trucks, who choose to pay a fee could also use the new Express Lane.

Figure 5. Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative



This alternative includes:

Mainline Improvements

- Providing two general-purpose lanes and one Express Lane that accommodates transit in each direction
- Remainder of mainline improvements identified in the Three General-Purpose Lanes Alternative

Interchange Improvements

This alternative includes the same interchange improvements identified in the Three General-Purpose Lanes Alternative.

Bridge Improvements

This alternative includes the same bridge improvements identified in the Three General-Purpose Lanes Alternative.

Bicycle, Pedestrian, Trail, and Transit Improvements

This alternative includes the same bicycle, pedestrian, trail, and transit enhancements identified in the Three General-Purpose Lanes Alternative.

3.0 Regulatory Context

3.1 Federal Context

The regulatory context for evaluating safety within an EIS is governed by federal law, particularly 23 United States Code (U.S.C.) 111, which mandates that any new or modified access points to the interstate require approval from FHWA. FHWA's oversight ensures that these changes do not compromise the safety, efficiency, or integrity of the system.

Additionally, the EIS must comply with NEPA, ensuring that safety considerations are integrated with environmental and planning goals. This regulatory framework ensures that any proposed modifications to the interstate are not only justified and necessary but also maintain the highest standards of safety for the traveling public.

4.0 Methods

4.1 Data Collection

Crash history data for the I-270 EIS project area was collected and evaluated using the DiExSys *Vision Zero Suite* (VZS) crash database for the period between 2014 and 2022. This period is longer than typically used for a safety analysis to account for the impacts of unusual traffic and safety patterns observed during the COVID-19 pandemic.

The corridor is split into two different segments for the analysis:

- I-270 A - the portion of I-270 between I-70 and I-76
- I-270 B - the portion of I-270 between I-76 and I-25

Location specific crash data is referenced in this technical report by segment and mile marker. Corridor-wide crash metrics and statistics have been summed across both segments. Figure 6 illustrates the corridor segments and mile markers.

Figure 6. I-270 Corridor Segments and Mile Markers

In addition to the crash data analysis, the safety assessment for the I-270 corridor was informed by field observations and input from project stakeholders. This feedback provided valuable insights into safety concerns, which were integrated into the safety analysis and project alternatives. Public involvement and stakeholder engagement were critical components of the data collection process, ensuring that local knowledge and concerns were fully considered alongside quantitative crash data.

Public and agency input was gathered through various engagement opportunities, including:

- **Public Meetings:** Held to gather input on safety concerns, the purpose and need for the project, and initial alternatives. Feedback on specific problem areas and safety issues along the corridor was collected from community members.

- **Stakeholder Workshops:** Focused workshops with local agencies, industry representatives (including freight operators), and community organizations were conducted to identify key safety challenges along the I-270 corridor.
- **Online Surveys and Comment Forms:** Virtual platforms allowed broader public participation, with surveys and comment forms enabling residents and commuters to share their concerns about safety hotspots, intersections, and interchange design.

This feedback was used to complement the crash data analysis, helping to identify safety issues that may not have been fully captured in the statistical crash data.

4.2 Analysis Methodology

The analysis methodology for this I-270 Corridor Improvements EIS Safety Assessment Report integrates both data-driven techniques and insights from public and stakeholder input. This approach ensures that the crash analysis reflects both quantitative crash data and the real-world experiences and concerns of those who regularly use the corridor.

Data for this analysis includes crash history, traffic volumes, and roadway conditions, but it was supplemented by valuable feedback collected from the public, local agencies, and other stakeholders during public scoping meetings, stakeholder workshops, and focused task force sessions. This public input was instrumental in identifying potential safety issues that may not have been fully captured by crash data alone, such as localized driver behaviors, perceptions of unsafe intersections, and concerns about pedestrian and cyclist safety.

The crash data was analyzed using the following methods:

- **Safety Performance Function (SPF):** SPFs were applied to assess the relationship between traffic exposure and crash frequency. These functions estimate the expected number of crashes based on traffic volumes. Public input helped to validate and contextualize the findings from SPFs, particularly in areas where the community raised concerns about recurring safety hazards or near-misses that are less likely to appear in crash records.
- **Level of Service of Safety (LOSS):** LOSS was used to compare actual crash frequencies against expected safety performance.
- **Pattern Recognition and Diagnostics:** Crash types, severity, and contributing factors (e.g., time of day, road conditions) were analyzed to identify patterns. Public feedback on specific safety concerns—such as dangerous crosswalks, inadequate signage, and tight weaving segments—provided additional context for recognizing safety concerns not reflected in reported crash patterns and expanded the identification of potential improvements.

By incorporating stakeholder input into the analysis, the methodology was able to capture a more complete picture of safety conditions along the I-270 corridor. This combination of data and real-world insights has led to a more thorough understanding of the safety issues that need to be addressed in the project's alternatives and mitigation strategies.

Additional details summarizing the statistical methodologies and diagnostic tools used in the detailed safety assessment can be found in the subsequent sections of this report.

4.2.1 Safety Performance Functions

The magnitude of existing safety problems on interstate segments was assessed by using SPFs. The SPF reflects the relationship between traffic exposure, measured in average annual daily traffic (AADT), and crash frequency measured in crashes per mile per year. The SPF models provide an estimate of the expected crash frequency and severity for a range of AADT among similar intersection types.

Two kinds of SPFs were used: the first addressed the total crash frequency, while the second only considered the frequency of crashes involving an injury or fatality (severe crashes). These SPFs aid in assessing the magnitude of existing safety problems from the frequency and severity standpoint.

4.2.2 Level of Service of Safety

The development of SPFs leads to the formulation of the LOSS. The concept of level of service uses a robust data set to estimate expected safety performance (i.e., expected norm). If the observed safety data is higher than expected, it is considered to have the potential for crash reduction. If the observed safety data is lower than expected, it is considered to have limited potential for crash reduction. LOSS boundaries are calibrated by computing the 20th and the 80th percentiles using the Gamma Distribution Probability Density Function. A gradual change in the degree of deviation of the LOSS boundary line from the fitted model mean reflects the observed increase of variability in crash frequency as AADT increases. This increase is consistent with a Gamma Distribution error structure.

- LOSS I - Below 20th Percentile
 - Indicates low potential for crash reduction.
- LOSS II - 20th Percentile to Mean
 - Indicates low-to-moderate potential for crash reduction.
- LOSS III - Mean to 80th Percentile
 - Indicates moderate-to-high potential for crash reduction.
- LOSS IV - Above 80th Percentile
 - Indicates high potential for crash reduction.

LOSS reflects safety performance, with respect to its expected crash frequency and severity at a specific level of AADT. It only provides a crash frequency and severity comparison with the expected norm. It does not provide any information related to the nature of the safety problem itself. If the safety problem is present, LOSS will only describe its magnitude from the frequency and severity standpoint.

The SPF used in this study is a Colorado-specific SPF for urban, four-lane freeways, as shown in Figure 7 for total crashes and Figure 8 for injury and fatal crashes.



Figure 7. The Urban Four-Lane Divided Freeway Safety Performance Functions and Level of Service of Safety Mean and Boundary Curves - Total Crashes

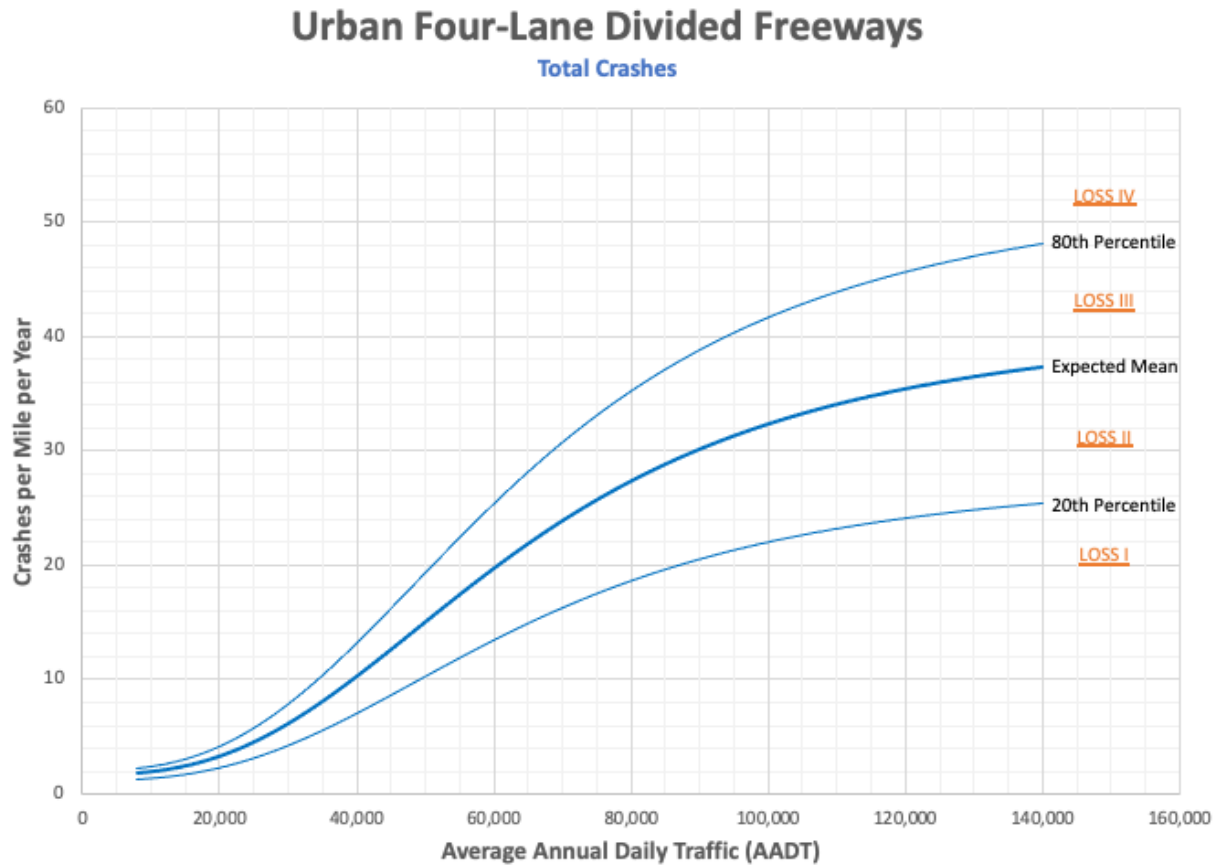
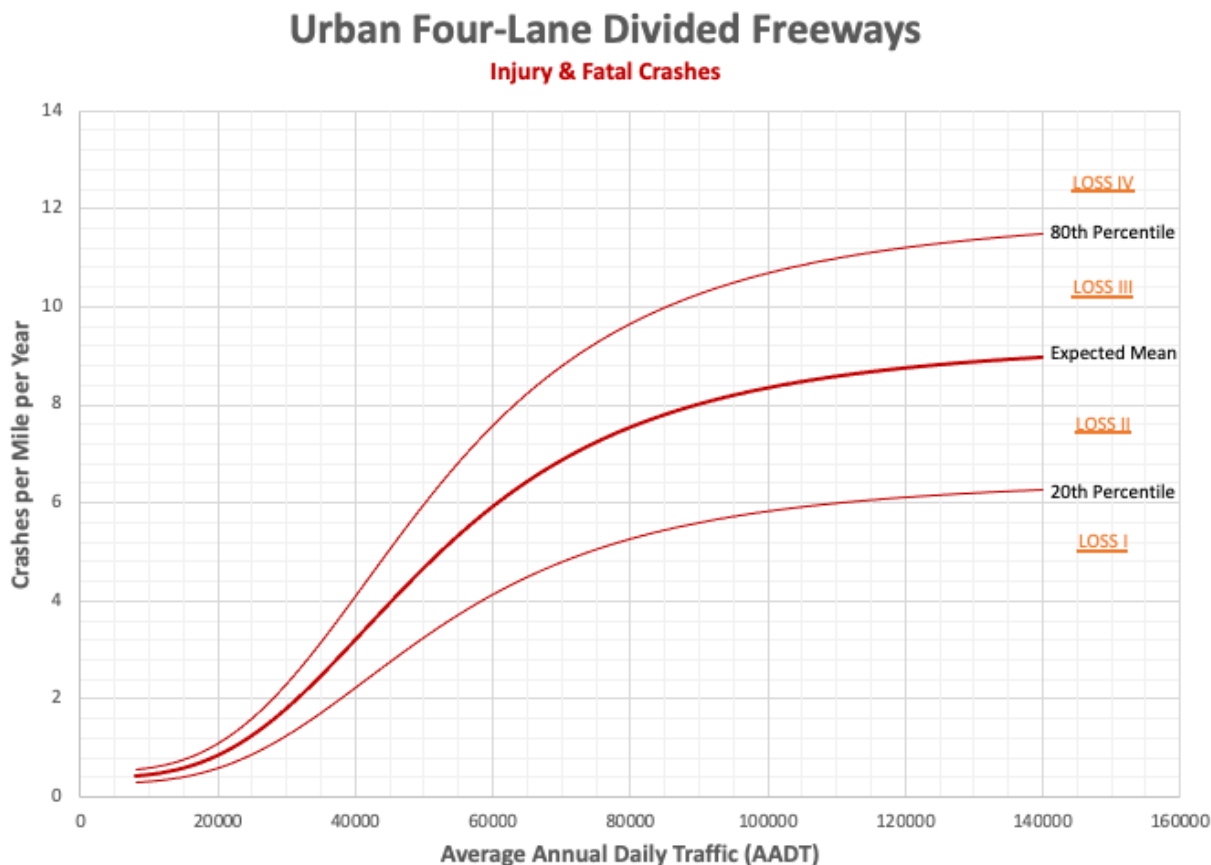


Figure 8. The Urban Four-Lane Divided Freeway Safety Performance Functions and Level of Service of Safety Mean and Boundary Curves - Injury and Fatal Crashes



4.2.3 Correcting for Regression to the Mean Bias

The average of several years of crash history provides an estimate of what is likely to be observed in the future. The precision of this estimate, however, can be improved by correcting for the Regression to the Mean (RTM) bias. RTM phenomenon reflects the tendency for random event occurrences, such as crashes, to move toward the average during an experiment or over time. For instance, if a location exhibits unusually high or unusually low crash frequency in a particular year, RTM bias recognizes that over the long run; the true average is closer to the mean.

The existence of the RTM bias has been long recognized and is now effectively addressed by using the Empirical Bayes method. The Empirical Bayes method is based on combining the information contained in the known crash history with information regarding the safety of similar intersection types by using the expected mean value and over-dispersion parameter associated with the SPF. Empirical Bayes-corrected values of frequency and severity of crashes are used in the SPF analysis to assess the magnitude of the existing safety problems.

4.2.4 Diagnostics and Pattern Recognition

While LOSS is effective for identifying locations with more than expected crashes, it is best complemented with a thorough diagnostic examination of crashes to identify correctable crash patterns that may exist across the spectrum of the LOSS metric.

I-270 mainline, ramps, and select ramp terminal roadways were tested for the presence of patterns related to crash type, severity, direction of travel, road conditions, spatial distribution of collisions, time of day, and behavioral attributes. A pattern recognition analysis uses normative percentages to diagnose safety problems of the subject roadway relative to typical conditions in Colorado. These diagnostic norms were developed using the same data points as those graphed in the SPF analysis and used as the basis for performing pattern recognition on roadway segments and intersections.

Any crash type or factor with five occurrences and exceeding the 95 percent confidence level is considered a pattern. This threshold is intended to focus on statistically significant crash types and/or contributing factors that occur frequently enough to indicate a potential safety issue. A standard practice is to use a crash frequency threshold equal to the number of years of crash data analyzed. As previously noted, the safety assessment covered nine years (2014-2022) and therefore, could have selected a minimum of nine crashes for the crash frequency threshold, and the safety assessment was expanded to include COVID-19 and available post-pandemic crash data. Recognizing potential anomalies in travel patterns during the pandemic, the five-crash threshold was selected to ensure the diagnostics and pattern recognition analysis capture potential patterns for further evaluation while minimizing the likelihood of evaluating isolated and/or one-off safety issues.

5.0 Existing Conditions

This section provides an overview of the current safety issues along the I-270 corridor. It includes a summary of the crash history in the area, focusing on where and how often crashes occur. This section breaks down the analysis into key areas, like the main highway, interchange ramps, and prevalent safety issues. This section also discusses how recent changes in travel patterns—particularly after the pandemic—have affected crash rates.

This section helps to identify the main safety challenges that need to be addressed. In general, I-270 experiences more crashes than the state average for similar urban, four-lane freeways in Colorado. These crashes cause unpredictable and unavoidable traffic congestion, which add to or worsen the already existing congestion from travel demand that exceeds the normal roadway capacity. The unpredictable nature of traffic congestion on I-270 increases safety concerns for freight carriers, employers, manufacturers, and business interests in the region, as well as commuters, and residents.

5.1 Crash History

In the project study area, 2,999 crashes were reported from 2014 to 2022; 718 crashes resulted in injury (997 persons injured) and 14 crashes resulted in a fatality (14 persons killed). Table 1 displays an annual summary of crashes by severity.

**Table 1. Summary of Annual Crash History**

Year	PDO ¹ Crashes	Injury Crashes	Fatal Crashes	Total Crashes	Number of Persons Injured	Number of Persons Killed
2014	221	75	1	297	102	1
2015	276	92	1	369	134	1
2016	251	75	2	328	94	2
2017	269	71	1	341	101	1
2018	299	84	1	384	120	1
2019	333	96	0	429	129	0
2020	198	71	1	270	97	1
2021	185	87	3	275	131	3
2022	235	67	4	306	89	4
Total	2,267	718	14	2,999	997	14

¹PDO = Property Damage Only

As shown in the table, total crash frequency generally increased from 2014 (297 crashes per year) to 2019 (429 crashes per year) but decreased during the period from 2020 to 2022 during the COVID pandemic. Severe crash frequency (injury and fatal) generally remained constant over the study period (between 70 and 100 crashes per year).

5.1.1 Fatal Crashes

Fourteen fatal crashes were recorded in the I-270 project area between 2014 and 2022: 11 fatal crashes were reported on mainline I-270, two crashes occurred on the Sandcreek Drive frontage road, and one fatal crash was reported on the I-270 ramps.

Additional details of each fatal crash during the study period are shown in Table 2. As shown in the table, several different crash types resulted in fatalities, including Fixed Object (3), Overturning (3), Pedestrian (3), Sideswipe (2), Head On (2), and Rear End (1).

**Table 2. Summary of Fatal Crash History**

Date and Time	Crash Type	Location	Conditions	Contributing Factors
9/10/14 10:37 PM (afternoon)	Pedestrian	WB I-270 A at MP 3.1	Curve, Dark- Unlighted, No Weather	Prior PDO Crash, Pedestrian in Roadway, Aggressive Driving
5/2/15 4:27 PM	Fixed Object (Guard Rail)	EB I-270 A at MP 5.3	Daylight, No Weather	Physical Disability
3/6/16 3:44 AM (morning)	Sideswipe	EB I-270 A at MP 2.3	Dark-Lighted, No Weather	Alcohol, Unrestrained
7/18/16 8:20 PM	Overtaking	WB I-270 A at MP 4.9	Dusk, No Weather	Motorcycle - No Protection, Weaving
4/21/17 7:18 PM	Overtaking	WB I-270 A at MP 2.8	Daylight, Rain	Preoccupied, Changing Lanes, Speeding, Ran off Road, Unrestrained
10/4/18 4:16 AM	Pedestrian	WB I-270 A at MP 1.7	Dark-Unlighted, No Weather	Pedestrian in Roadway
8/18/20 1:09 AM	Sideswipe	Vasquez Blvd WB-to-SB Loop Ramp	Dark-Lighted, No Weather	Motorcycle - No Protection, Inexperience
5/7/21 10:15 PM	Fixed Object (Guard Rail)	EB I-270 A at MP 3.8	Unknown Lighting, No Weather	Unrestrained
7/20/21 8:25 AM	Overtaking	EB I-270 A at MP 1.6	Daylight, No Weather	Motorcycle - Helmet & Eye Protection, Emotionally Upset
11/14/21 3:06 AM	Head On	Sandcreek Drive east of 56th Avenue	Curve, Dark- Unlighted, No Weather	Alcohol and Drugs, Driving Wrong Way
1/2/22 10:11 AM	Pedestrian	EB I-270 A at MP 1.4	Daylight, No Weather, Wet Road	Incident on Shoulder, Preoccupied, Avoiding Vehicle/Object in Roadway
1/20/22 4:05 AM	Rear End	WB I-270 A at MP 0.8	Curve, Dark- Lighted, No Weather	Secondary Run off Road, Fixed Object(s)
11/14/22 5:15 AM	Fixed Object (Concrete Barrier)	WB I-270 A at MP 0.7	Dark-Lighted, No Weather	Preoccupied, Changing Lanes, Concrete Barrier Endcap
11/18/22 6:45 PM	Head On	Sand Creek Drive east of 56th Avenue	Curve, Dark- Unlighted, No Weather	Alcohol & Drugs, Driving Wrong Way

WB - Westbound

EB - Eastbound

MP - Milepost

The fatal crash history on this section of I-270 from 2014 to 2022 shows a variety of crash types and contributing factors. While the number of fatal crashes fluctuates from year to



year, there are notable spikes, including in the post-pandemic period (2021 and 2022), which saw three and four fatal crashes, respectively. These fatal crashes include pedestrian incidents, collisions with fixed objects, like guardrails or barriers, sideswipes, vehicles overturning, and head-on collisions.

The fatal crashes in 2021 and 2022 show a recurring pattern of human factors, such as distraction, emotional distress, alcohol or drug use, and failure to use seat belts or protective gear. These crashes involved a mix of fixed-object collisions, overturning vehicles, and head-on crashes, with several occurring at night in dark, unlit areas or on curves. While driver behavior was the dominant factor, design improvements could help mitigate some of these risks. For instance, enhanced lighting, wider shoulders, and roadside barriers meeting modern design standards could reduce the likelihood of vehicles leaving the roadway or striking fixed objects. In areas with curves, better signage and lane markings might also reduce crash severity. However, many of these crashes stemmed from behaviors, like impaired driving and speeding, which are less likely to be fully addressed by design alone, emphasizing the need for ongoing driver education and enforcement to complement design improvements.

The pedestrian crashes on I-270 in 2014, 2018, and 2022 highlight substantial safety issues, particularly in dark, unlit areas, where visibility is low. These incidents involved pedestrians being struck while on the highway—often at night—underscoring the dangers in areas not designed for foot traffic. Contributing factors include poor lighting, wet road conditions, and pedestrians entering the highway to address incidents, like vehicle breakdowns. Wider shoulders could provide a safer space for people to handle breakdowns or crashes without entering traffic and improved lighting could aid visibility.

The overturning-vehicle crashes indicate similar trends involving driver behavior, such as speeding, lane weaving, and unsafe conditions for motorcyclists. Two crashes involved motorcycles where lack of protection and emotional distress contributed to fatal outcomes. While these crashes occurred in daylight or dusk, driver behavior, rather than visibility, likely played a key role, particularly in wet road conditions, in the 2017 crash. Design improvements, like better road markings, signage, and addressing wet surface risks, could help reduce overturn crashes. However, behavior-driven factors, like speeding, could potentially be influenced by enforcement efforts but are challenging to mitigate with design improvements.

The fixed object crashes were influenced by factors, such as physical disability, distraction, and lack of seatbelt use. These crashes typically occurred in clear weather, indicating that driver error or impairment was the primary factor. Design improvements, such as enhanced guardrails, barriers, and wider shoulders, could help reduce the severity of these crashes; but driver behavior, particularly related to restraint use and avoiding distractions, would have played a significant role in avoiding these fatalities.

The head-on crashes on I-270 reveal trends involving serious driver errors: alcohol and drug impairment and wrong-way driving. Both crashes took place on Sandcreek Drive, east of 56th Avenue, in dark, unlit areas, and involved drivers under the influence, contributing to the severity of these incidents. The fact that both crashes involved vehicles going the wrong way highlights potential signage or roadway-marking deficiencies that may need to be addressed. While driver impairment was a major factor in both cases, design improvements, like better lighting, clearer signage, and enhanced road markings, particularly at intersections and areas

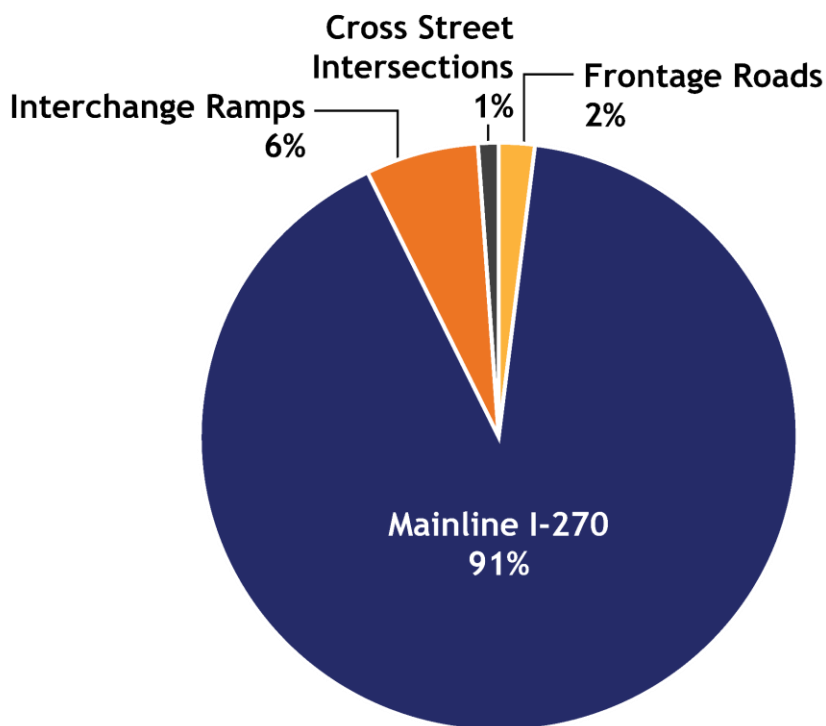
prone to wrong-way driving, could help reduce the likelihood of similar future crashes. However, since impairment played a significant role, addressing this issue would also require ongoing efforts in education and enforcement.

Improving road design can address some of the observed safety issues. Installing better lighting (in dark areas) can help improve visibility and prevent crashes. Strengthening barriers and guardrails can reduce the severity of crashes when vehicles leave the road or hit objects. However, many crashes result from human factors, like distracted driving, substance use, or emotional distress, which design changes alone cannot solve and require additional measures, like education and enforcement.

5.1.2 Crash Locations

Figure 9 displays the distribution of crashes within the study area by location type. As shown in the figure, most crashes occurred along mainline I-270 (91 percent of total crashes). Interchange ramps were the next most common crash location (6 percent of total crashes), followed by frontage roads (2 percent of total crashes), and cross street intersections (1 percent of total crashes).

Figure 9. I-270 Project Area Crashes by Location



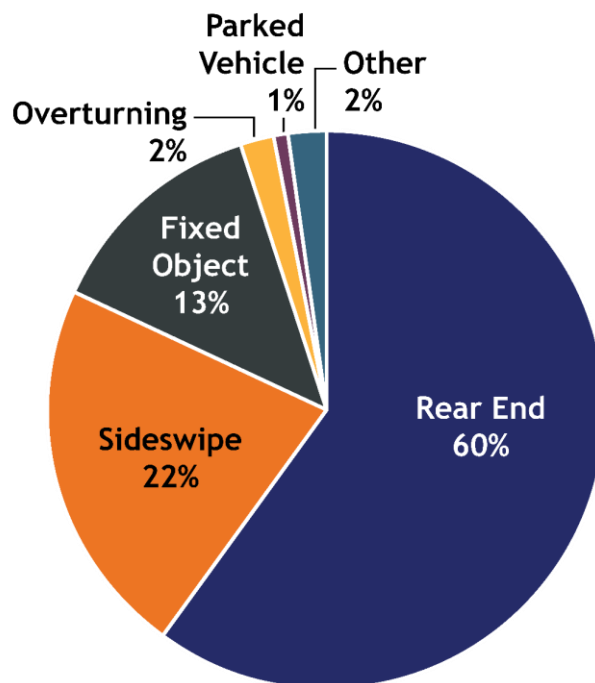
5.2 I-270 Mainline Crash Analysis

As shown in Figure 9, over 90 percent (2,741 of 2,999) of the crashes within the project area occurred on mainline I-270. This section provides an overview of the evaluation of crash frequency and patterns specifically related to the mainline.

Figure 10 and Figure 11 display the distribution of mainline I-270 crashes by crash type and fixed object type, respectively. Rear end crashes are most common (60 percent of mainline crashes), followed by sideswipe crashes (22 percent of mainline crashes) and fixed object crashes (13 percent of mainline crashes).

Stakeholder comments frequently note that congestion, especially during rush hours, is a major cause of rear end crashes. Bottlenecks, particularly around the I-25 and I-70 interchanges, were frequently identified as problem areas. Drivers, both in passenger vehicles and freight trucks, also raised concerns about the short distances between on-ramps and off-ramps, especially at congested interchanges, like Vasquez Boulevard. The close spacing makes merging difficult, which leads to more rear end and sideswipe crashes. Many comments suggest the need for longer merging lanes and better separation of lanes to improve safety. The data collection process for the development of the traffic models included several days of field observations. The project team observed many of the safety challenges experienced by stakeholders during field observations. The project team also includes individuals who frequently use the I-270 corridor and noted similar experiences to those shared by stakeholders.

Figure 10. Mainline I-270 Crashes by Type



Among fixed object crashes, guard rail (36 percent of fixed object crashes), concrete barrier (26 percent of fixed object crashes), and cable rail (16 percent of fixed object crashes) crashes were most common.

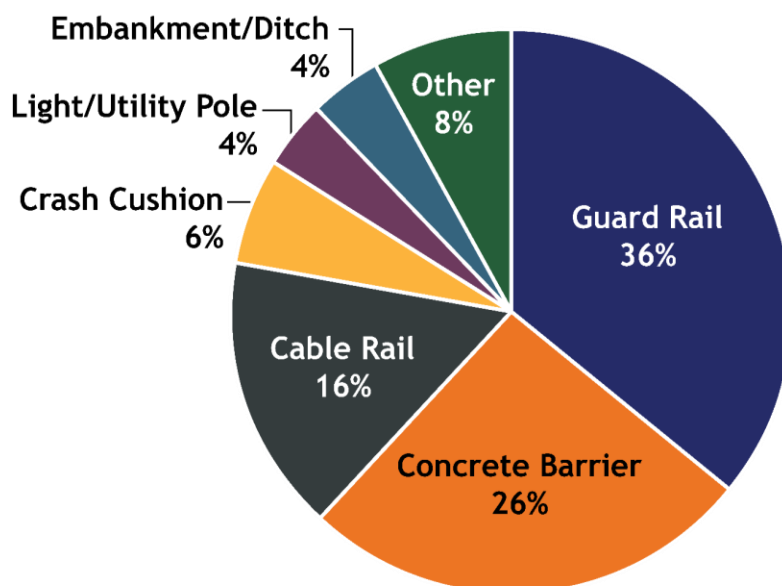
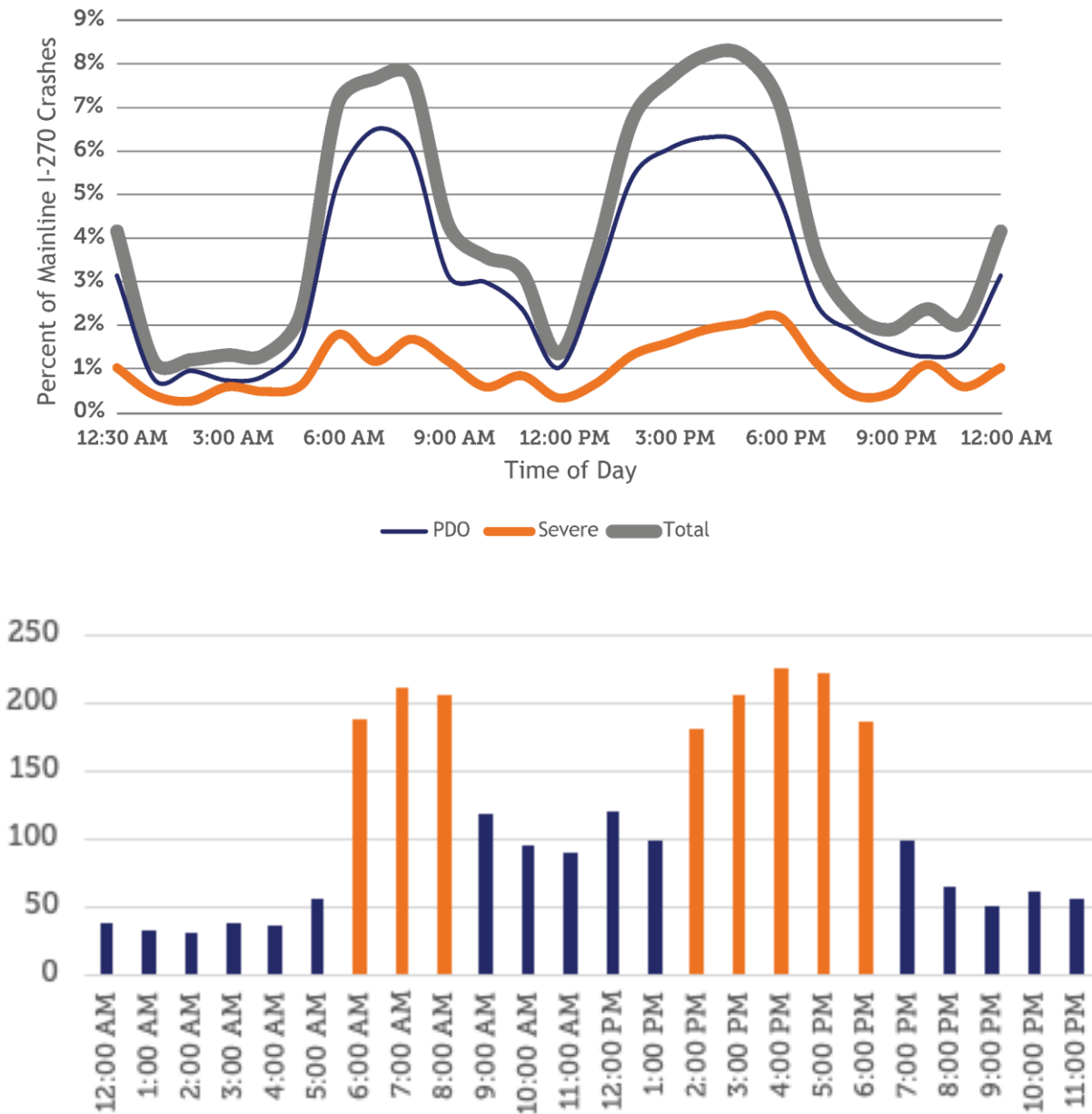
Figure 11. Mainline I-270 Fixed Object Crashes by Type

Figure 12 displays the distribution of mainline I-270 crashes by time of day. As shown in the figure, crashes are most common during morning and evening peak travel periods (6 AM to 9 AM and 2 PM to 6 PM), the most congested periods of the day. The high volume of vehicles during morning and evening rush hours leads to frequent stop-and-go conditions, increasing the likelihood of rear end collisions, which account for 60 percent of crashes on the mainline. Public feedback frequently highlighted peak hour bottlenecks at key interchanges, like I-25, I-70, and Vasquez Boulevard as areas where traffic backups are most severe, exacerbating crash risks.

Figure 12. Mainline I-270 Total Crashes by Time of Day

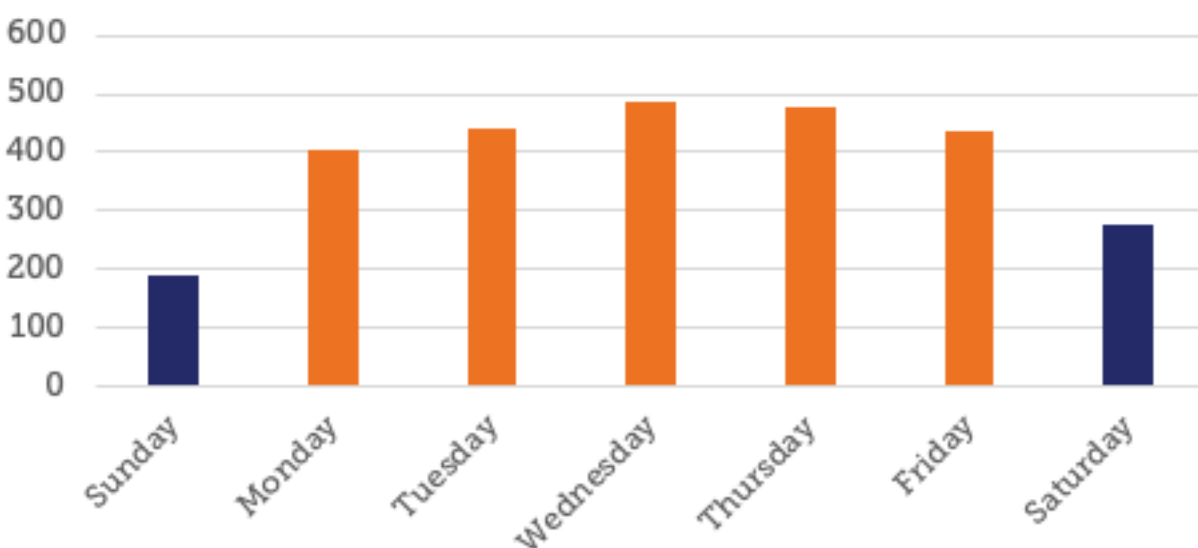


Short distances between on-ramps and off-ramps, especially at these congested interchanges, make merging difficult. Drivers noted they often struggle to safely enter or exit the highway, which can lead to more sideswipe and rear end crashes, as vehicles compete for limited space in crowded conditions. The lack of sufficient merging lanes and closely spaced exits and entrances puts pressure on drivers to make quick lane changes, which increase crash frequency. Freight trucks, which require more space to maneuver, are particularly vulnerable in these conditions.

The data also shows that crashes spike during peak travel periods, reinforcing the strong link between congestion and crash frequency. Design interventions, such as lengthening merging lanes, adding clearer lane separation, and improving traffic flow at bottleneck points, could help mitigate the crash risks associated with congestion. Enhanced traffic management strategies, like ramp metering or dynamic lane usage, could also reduce congestion-related crashes by better managing the flow of vehicles through busy interchanges.

Figure 13 illustrates total crash frequency by day of the week. Combined with the time-of-day crash data, the day-of-week data shows a higher weekday than weekend crashes. This aligns with comments and information heard from stakeholders that crashes most frequently occur during commuting peak hours (6-9 AM and 2-7 PM).¹

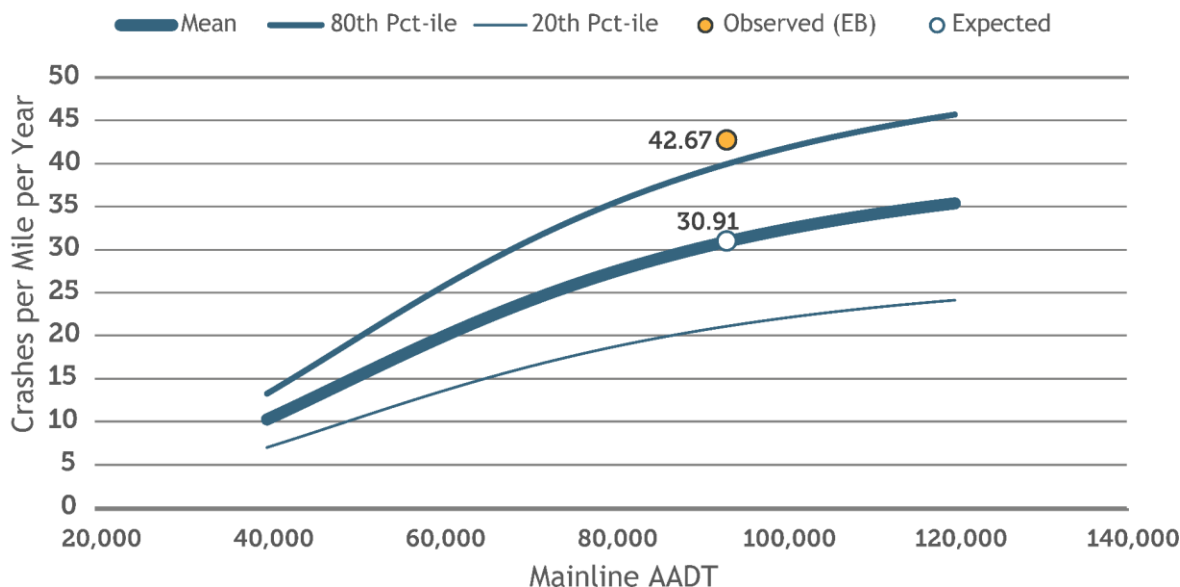
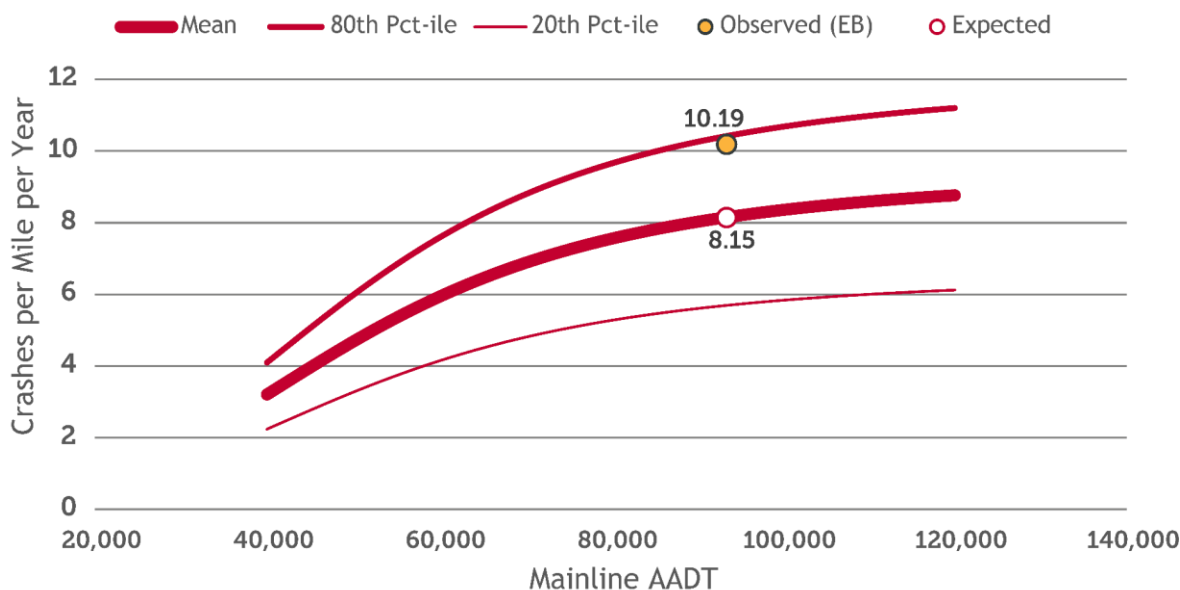
Figure 13. Mainline I-270 Total Crashes by Day of Week



5.2.1 Crash Frequency

Figure 14 and Figure 15 illustrate the static SPF for the entire I-270 mainline corridor using the SPF for urban, four-lane freeways in Colorado.

¹The traffic modeling evaluated the 6-9 AM and 2-7 PM peak periods.

Figure 14. I-270 Safety Performance Function for Total Crashes on I-270

Figure 15. I-270 Safety Performance Function for Injury and Fatal Crashes on I-270


Across the corridor, I-270 exhibits LOSS IV and LOSS III for total and severe crash frequency, respectively. The SPF curve indicates a typical urban, four-lane freeway in Colorado would be expected to experience, on average, 30.91 total crashes per mile, per year; whereas 42.67 crashes per mile, per year were reported (Empirical Bayes, corrected) on I-270 during the analysis period. Similarly, a typical urban, four-lane freeway in Colorado would be expected to experience, on average, 8.15 injury or fatal crashes per mile, per year; whereas 10.19 crashes per mile, per year were reported on I-270 (Empirical Bayes, corrected).



There are several other ways to apply SPFs, to better understand and evaluate crash patterns. The analysis also calculated crash frequency for segments between interchanges to refine the understanding of where there are critical areas of safety concern.

Figure 16 and Figure 17 plot multiple segments representing mainline I-270 between interchanges to provide a more refined understanding of the relationship between crash frequency and segment-specific AADT on the SPF curve for urban, four-lane freeways in Colorado.

Figure 16. I-270 Safety Performance Function for Total Crashes on I-270 - by Freeway Segment

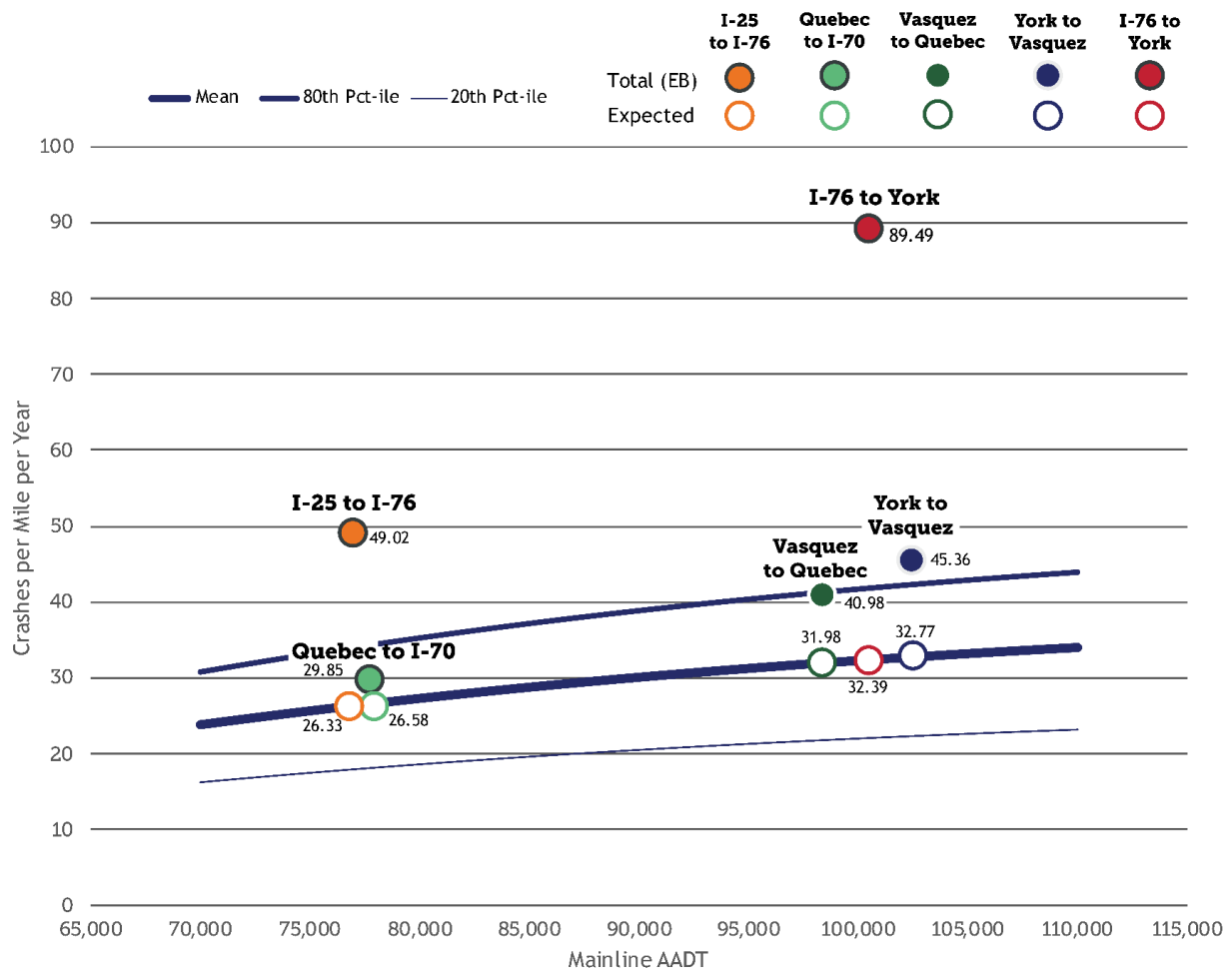
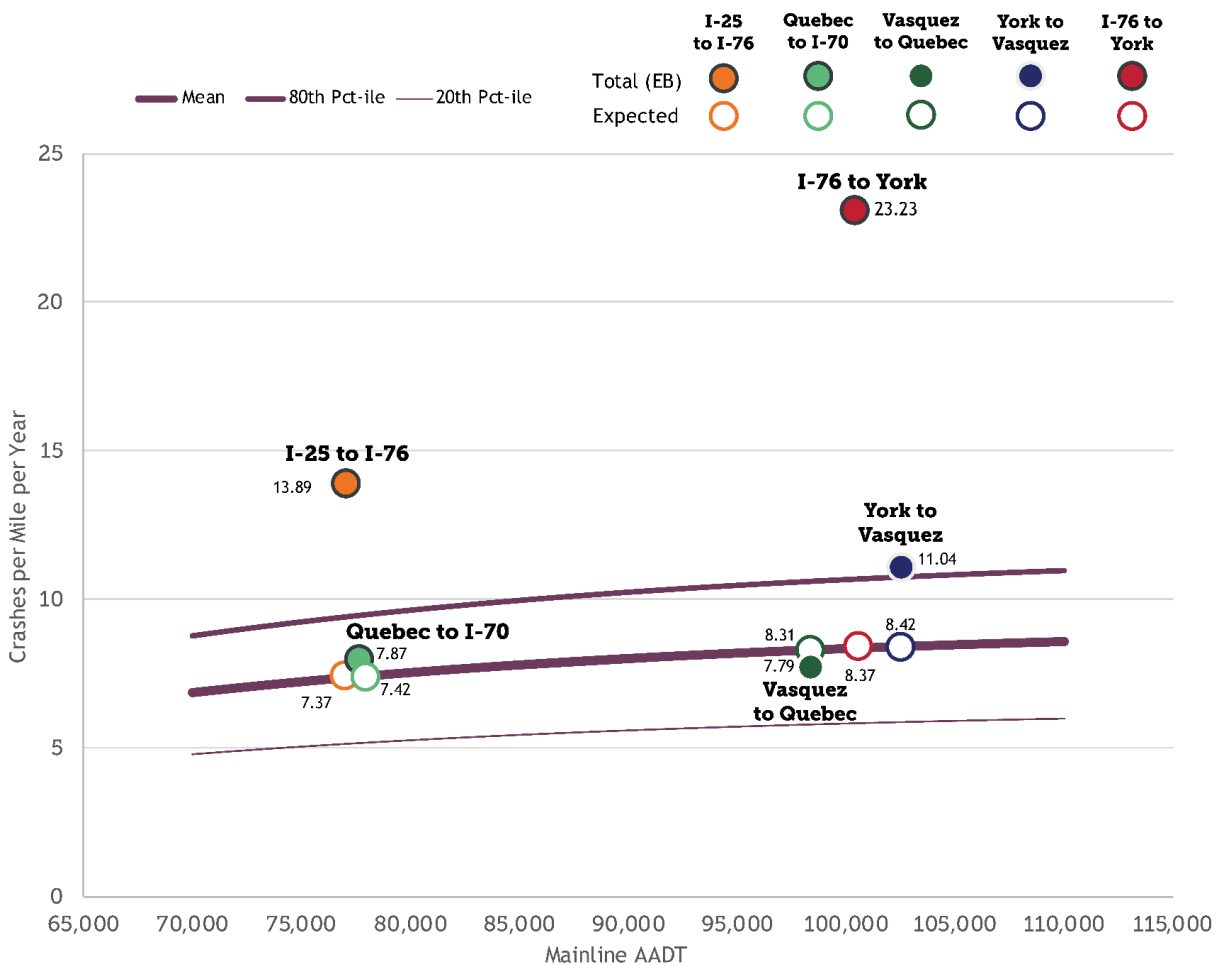


Figure 17. I-270 Safety Performance Function for Fatal and Injury Crashes on I-270 - by Freeway Segment



As shown in Figure 16 and Figure 17 above, the mainline I-270 segments between I-25 and I-76, between I-76 and York Street, and between York Street and Vasquez Boulevard exhibit LOSS IV conditions for both total and severe crash frequency. The segment between Vasquez Boulevard and Quebec Street exhibits LOSS III and LOSS II for total and severe crash frequency, respectively. The segment between Quebec Street and I-70 exhibits LOSS III for both total and severe crash frequency.

Lastly, crash frequency along mainline I-270 was evaluated using 0.5-mile segments at 0.1-mile increments. This methodology allows the analyst to further refine and understand the start and end points of the critical areas of safety concern.

Figure 18 displays this more detailed SPF for I-270 A (from I-76 to I-70). Figure 19 displays the more detailed SPF for I-270 B (from I-25 to I-76). As shown in the figures, total and severe observed crash frequencies exhibit similar patterns relative to typical conditions for four-lane freeways in Colorado.



Notably, I-270 A exhibits LOSS III or LOSS IV conditions for both total and severe crash frequency from approximately MP 0.0 to MP 1.2 (I-76 to South Platte River bridge), MP 1.7 to MP 3.0 (Vasquez Boulevard interchange area), MP 4.0 to MP 4.7 (Pontiac Street to Quebec Street interchange), and MP 5.2 to MP 6.0 (I-70 interchange area). I-270 B generally exhibits LOSS III or IV conditions from MP 0.0 to MP 1.1 (I-25 to I-76). These locations have higher potential for crash reduction.

Figure 18 and Figure 19 illustrate the I-270 A and I-270 B segments, to highlight critical areas of safety concern along the I-270 corridor. Locations where the red and blue lines are higher than the norm (dotted red line), the SPF indicates a moderate to high potential for crash reduction. Locations where the lines exceed the 80th percentile (orange line), the SPF indicates a high potential for crash reduction.

The LOSS metric underscores the need for targeted safety improvements in these high-risk segments, to improve overall safety outcomes for all travelers on the corridor.

Figure 18. I-270 A Safety Performance Function (I-76 to I-70)

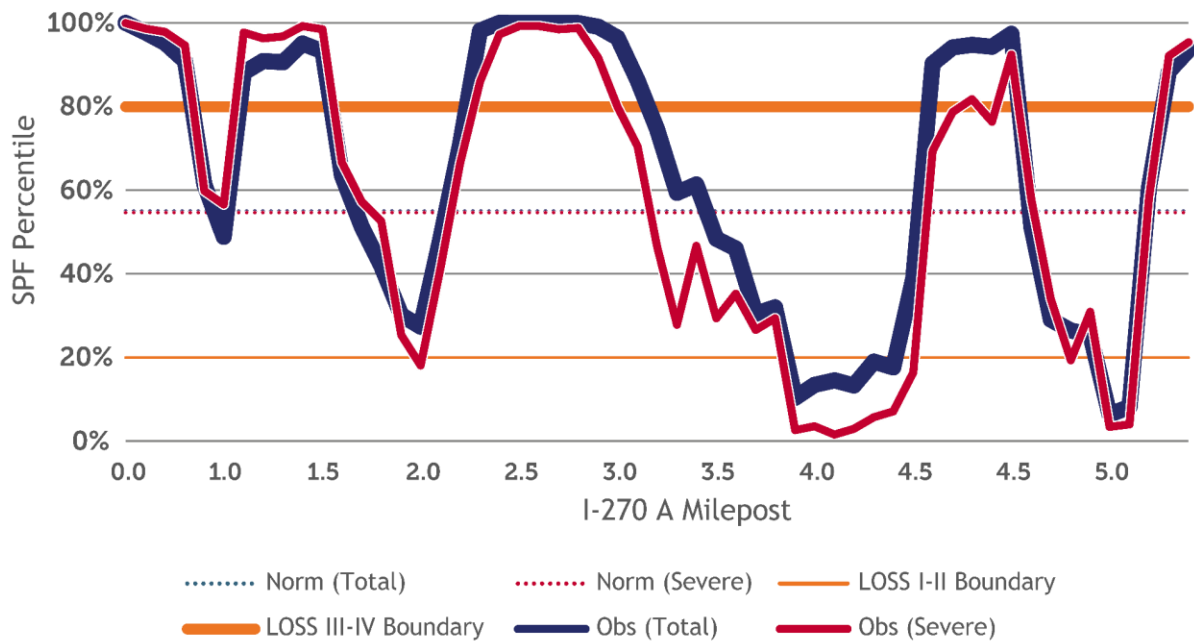
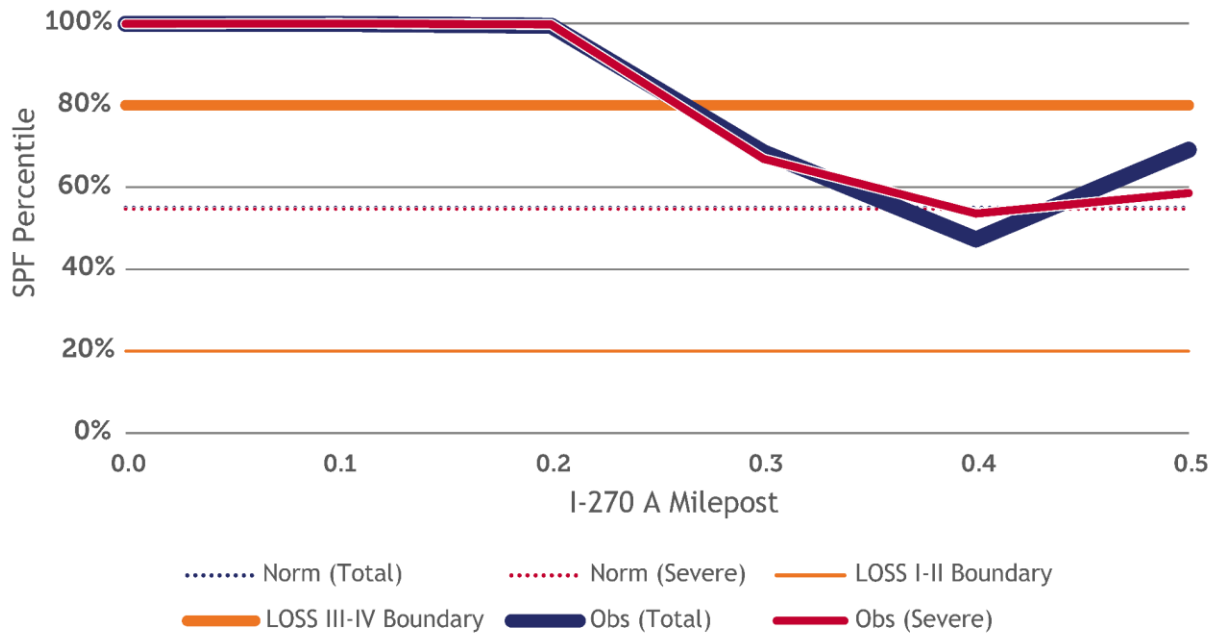


Figure 19. I-270 B Safety Performance Function (I-25 to I-76)



SPFs only describe the bi-directional crash frequency of a facility compared to typical conditions. Directional crash frequency (measured in crashes per mile, per year) was examined over mainline I-270 and is shown in Figure 20 (total crashes) and Figure 21 (severe crashes).

Figure 20. I-270 Directional Crash Frequency (Total Crashes)

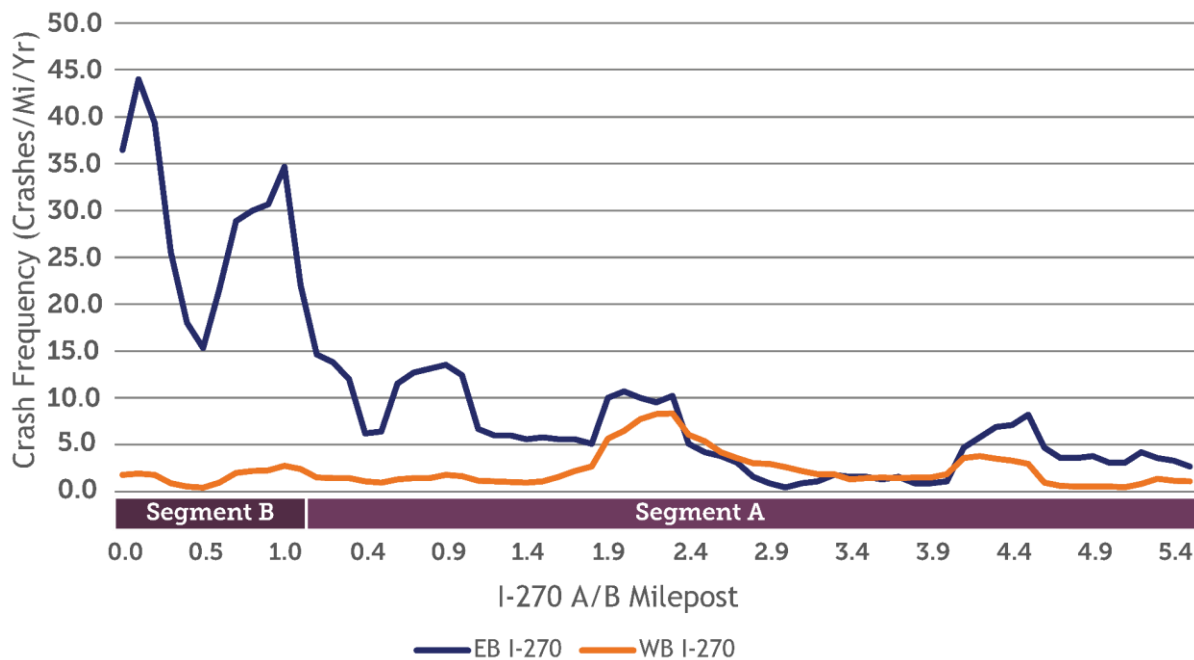
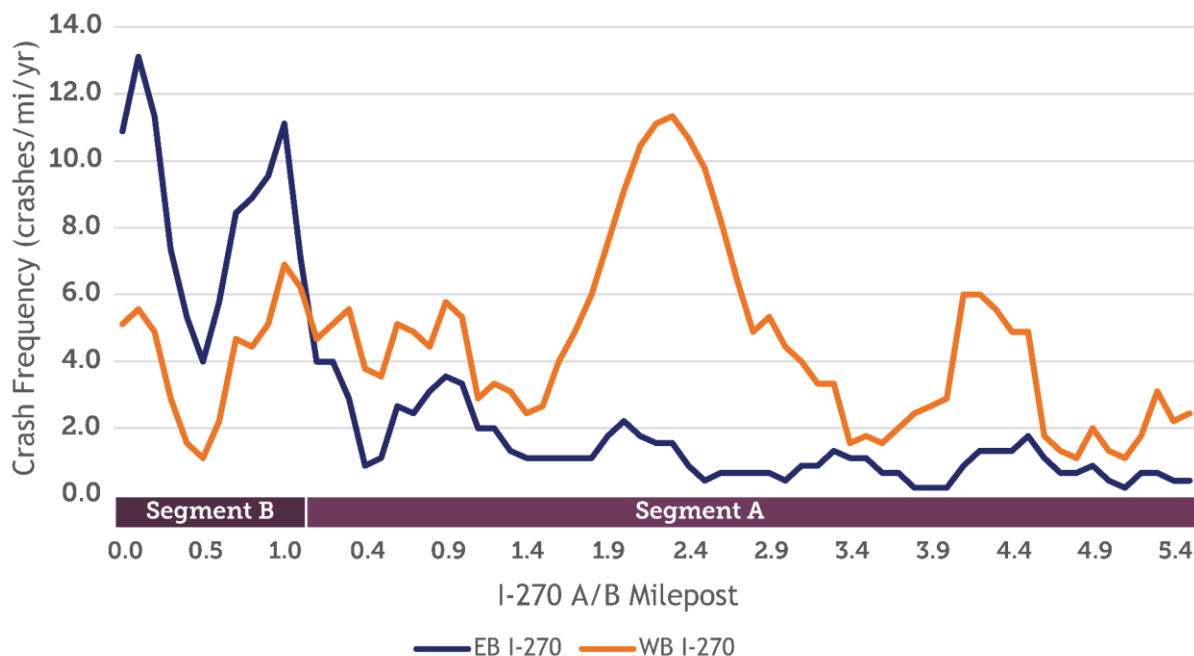


Figure 21. I-270 Directional Crash Frequency (Severe Crashes)


As shown in the figures, total crash frequency is generally higher on eastbound I-270 than westbound I-270, especially between I-25 (I-270 B MP 0.0) and Vasquez Boulevard (I-270 A MP 2.4). Additionally, severe crash frequency is higher on eastbound I-270 between I-25 (I-270 B MP 0.0) and I-76 (I-270 B MP 1.1/I-270 A MP 0.0). However, westbound I-270 exhibited a higher severe crash frequency near the Vasquez Boulevard (I-270 A MP 1.9 to MP 2.8) and Quebec Street (I-270 A MP 4.1 to MP 4.5) interchange areas.

5.2.2 Crash Diagnostics and Patterns

The frequency of specific crash types, road conditions, and driver attributes in crashes along mainline I-270 were evaluated using normative percentages of similar four-lane freeways in Colorado. Figure 22 and Figure 23 display the crash types and causal factors that were identified as patterns, and the segments of I-270 where they were overrepresented.

Figure 22. I-270 A Crash Patterns (I-76 to I-70)

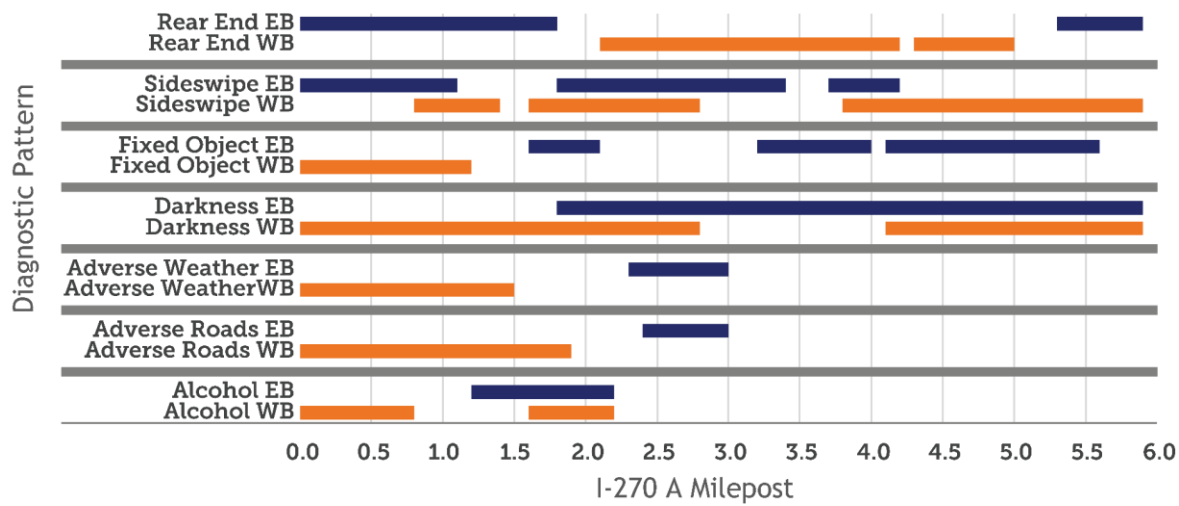
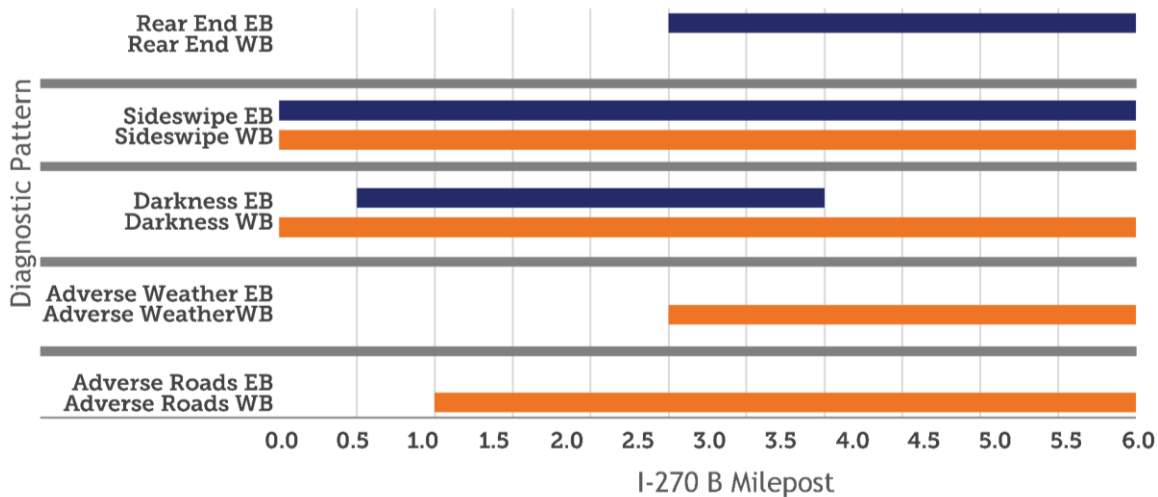


Figure 23. I-270 B Crash Patterns (I-25 to I-76)



As shown in the figures, crash types that made up the majority of mainline I-270 crashes, including rear ends, sideswipes, and fixed objects were statistically overrepresented in specific areas.

Rear End Crashes

Rear end crash pattern locations correspond to segments of I-270 that experience elevated levels of congestion. This is a common phenomenon for freeways, but the prevalence of rear end crashes suggests that overall crash frequency in these segments may be higher than typical conditions.

Eastbound I-270

- I-76 interchange area (I-270 B MP 0.5) to Brighton Boulevard bridge (I-270 A MP 1.8)



- I-70 interchange area (I-270 A MP 5.3 to MP 5.9)

Rear end crashes are particularly common in the eastbound direction near the I-76 interchange, primarily due to high levels of congestion and frequent merging activity. The close spacing of the on-ramps from westbound and eastbound I-76 as well as York Street creates significant friction in this area. This congestion often leads to sudden braking and rear end collisions, especially during peak travel times. Public feedback highlighted concerns about the short-merging distances and the need for better lane separation to reduce these types of crashes.

The pre-pandemic safety analysis (2014-2020) identified a high concentration of crashes, particularly rear end and sideswipe crashes in the eastbound direction, approaching I-70. These crashes were attributed to congestion, high speed differentials, and complex merging and weaving sections; this pattern was not identified in the 2021-2022 data. One improvement that has likely contributed to reduced crash frequencies was the reconstruction of the eastbound I-270 bridge over I-70, completed in late 2019. This project improved safety performance between the Quebec Street and I-70 interchanges by addressing key design deficiencies, including better lane separation and improved merging areas. Since the reconstruction, total and severe crash frequencies have shown a marked decrease at this location.

Westbound I-270

- Vasquez Boulevard interchange area (I-270 A MP 2.1) to I-70 interchange area (I-270 A MP 5.0)

The Vasquez Boulevard interchange area consistently showed a high concentration of rear end crashes, primarily due to congestion and the closely spaced on-ramps and off-ramps. Merging and weaving sections, particularly during peak hours, resulted in frequent sudden stops, which led to rear end collisions. The area between MP 1.9 and MP 2.8 on westbound I-270 exhibited the highest frequency of severe rear end crashes. Public feedback highlighted the difficulty drivers face when navigating these short-merging distances—especially with high-speed differentials between vehicles traveling through an interchange—exiting and entering.

Stakeholders also pointed out the need for improved signage and longer merging lanes to help reduce driver confusion and create safer transition points, particularly for trucks. The feedback emphasized that addressing these design issues could lead to a significant reduction in rear end crashes at this interchange.

Public comments highlighted the deteriorating pavement conditions along the I-270 corridor, particularly around the Vasquez Boulevard interchange. Drivers reported frequent encounters with potholes and rough road surfaces which not only caused vehicle damage (e.g., flat tires) but resulted in hard braking and swerving, contributing to slower travel speeds and increased congestion. These poor surface conditions compounded typical congestion issues by making the roadway difficult to navigate, particularly for trucks and heavy vehicles that require more distance to accelerate or decelerate. Additionally, narrow shoulders in the area exacerbate these problems by leaving little room for vehicles to avoid potholes and/or to pull over safely following a crash or a flat tire, further contributing to congestion and the risk of secondary crashes.

Sideswipe Crashes

Like rear end crashes, sideswipe crash pattern locations correspond to segments of I-270 that experience the elevated levels of congestion. The prevalence of sideswipe crashes suggests that overall crash frequency in these segments may be higher than typical conditions.

Eastbound I-270

- I-25 interchange area (I-270 B MP 0.0) to Burlington Ditch bridge (I-270 A MP 1.1)
- Brighton Boulevard bridge (I-270 A MP 1.8) to 50th Avenue (I-270 A MP 4.2)

Westbound I-270

- I-25 interchange area (I-270 B MP 0.0) to I-76 interchange area (I-270 B MP 1.1)
- South Platte River bridge (MP 0.8) to Vasquez Boulevard interchange area (MP 2.8)
- Newport Street (MP 3.8) to I-70 interchange area (MP 5.9)

Sideswipe, same-direction crashes are frequently observed in the same locations as rear end crashes along the I-270 corridor, particularly in areas with high congestion and short-merging distances. These crashes are most common where vehicles are required to change lanes quickly, often at interchanges, like Vasquez Boulevard, York Street, and I-76, where rear end crashes are also prevalent. Public comments highlighted that sudden lane changes, caused by closely spaced ramps and insufficient signage, contribute to both sideswipe and rear end collisions. Drivers, especially truck operators, reported difficulty merging safely in these areas due to the high volume of traffic and frequent lane shifts. Notably, in the eastbound direction approaching the I-70 interchange, the previously discussed roadway improvements have resulted in a reduction of both sideswipe and rear end crashes. The improved lane separation and longer merging areas introduced by the 2019 reconstruction of the eastbound I-270 bridge over I-70 contributed to a safer flow of traffic and fewer conflicts between merging and through-traffic vehicles.

Fixed Object Crashes

On eastbound I-270, fixed object crash pattern locations correspond to locations with narrower shoulders on bridges west of Vasquez Boulevard. The segment of eastbound I-270 west of I-70 has wider shoulders, but higher speeds and horizontal curves may contribute to the fixed object crash pattern.

Eastbound I-270

- West of Vasquez Boulevard interchange (I-270 A MP 1.6 to I-270 A MP 2.1)
- Kearney Street (I-270 A MP 3.2) to I-70 interchange area (I-270 A MP 5.6)

On westbound I-270, fixed object crash pattern locations correspond to locations with narrower shoulders on bridges west of Vasquez Boulevard as well as concrete barriers separating collector-distributor roads.

Westbound I-270

- I-76 interchange area (I-270 A MP 0.0) to South Platte River bridge (I-270 A MP 1.2)

Concrete barrier crashes were commonly observed in areas with closely spaced ramps, such as near the I-76 and York Street interchanges. Public feedback consistently highlighted safety and operational concerns at the combined westbound off-ramp to I-76/York Street. The combined ramp causes driver confusion, and concerns about high-speed differentials between vehicles exiting to York Street and those continuing to the I-76 system ramps. Many crashes were attributed to the lack of adequate signage and short decision-making time for drivers to choose their exit.

Nighttime (Darkness) Crashes

Nighttime crashes, particularly those occurring under low-light or unlit conditions, were a recurring issue along I-270. Crashes occurring at night make up 24 percent of the mainline I-270 crash history but were overrepresented at several locations along mainline I-270, classified as under dark-lighted or dark-unlighted conditions. The highest frequency of nighttime crashes is between 6 PM and 11 PM, corresponding to evening travel periods.

Eastbound I-270

- I-25 interchange area (I-270 B MP 0.1) to Highway 224 bridge (I-270 B MP 0.7)
- Brighton Boulevard bridge (I-270 A MP 1.8) to I-70 interchange area (I-270 A MP 5.9)

Westbound I-270

- I-25 interchange area (I-270 B MP 0.0) to Vasquez Boulevard interchange area (I-270 A MP 2.8)
- Quebec Street interchange area (I-270 A MP 4.1) to I-70 interchange area (I-270 A MP 5.9)

These crashes were most often associated with poor visibility and the absence of adequate lighting, which increased the likelihood of rear end and sideswipe collisions. Public comments repeatedly emphasized the need for improved street lighting, particularly at high-traffic interchanges and on ramps where merging is common. Community members expressed concerns about the difficulty in navigating poorly lit areas, especially during peak traffic times in the early morning and evening. Many suggested that better lighting could substantially reduce nighttime crashes by enhancing visibility and making it easier for drivers to spot vehicles and changing road conditions.

Other Patterns

Adverse weather and road conditions were identified as contributing factors in some crashes along I-270. The adverse weather category can be further segmented into various weather condition categories, such as wind, rain, snow/sleet/hail, fog, etc. Upon further review, there were no statistically significant patterns identified by weather condition, warranting no further detailed analysis. Similarly, the road condition category also includes subcategories, such as slushy, icy, snowy, and muddy, both with and without road treatment from maintenance vehicles. There were no statistically significant patterns observed under specific roadway condition categories that warranted a further detailed analysis.

Additionally, alcohol use was noted in less than 4 percent of crashes, also not meeting the threshold for detailed analysis. However, a high-level evaluation of alcohol-related crashes found most crashes resulted in no injuries, with 59 crashes classified as PDO. However, there

were 24 crashes with minor injuries, 11 with non-incapacitating injuries, 8 with incapacitating injuries, and 3 fatal crashes. These crashes occurred most frequently on weekends (particularly on Saturdays and Sundays), with a notable number of crashes occurring on Fridays as well, suggesting higher instances of impaired driving during weekend activities. Many of the crashes happened late at night or in the early morning hours (around midnight to 3 AM).

5.2.3 Heavy Vehicle Crashes

Crashes involving at least one vehicle over 10,000 pounds or carrying more than 15 passengers make up 400 of the 2,741 total crashes (15 percent) and 73 of the 664 severe crashes (11 percent). Mainline I-270 serves approximately 8 to 17 percent heavy vehicles on typical weekdays, within the range of recorded crash frequency.

Figure 24 displays the distribution of mainline I-270 heavy vehicle crashes by crash type. Unlike the total mainline crash history, heavy vehicle crashes mostly include sideswipes (53 percent) and rear ends (39 percent). As shown in the figures, rear end crashes are most common (60 percent), followed by sideswipe crashes (22 percent), and fixed object crashes (13 percent). Among fixed object crashes, guard rail (36 percent), concrete barrier (26 percent), and cable rail (16 percent) crashes were most common.

These crashes are concentrated in key segments, such as the eastbound direction between I-25 and Vasquez Boulevard and around the Quebec Street interchange. Additionally, some areas saw higher frequencies in both directions near the Vasquez Boulevard interchange and Quebec Street.

Figure 24. Mainline I-270 Heavy Vehicle Crashes by Type

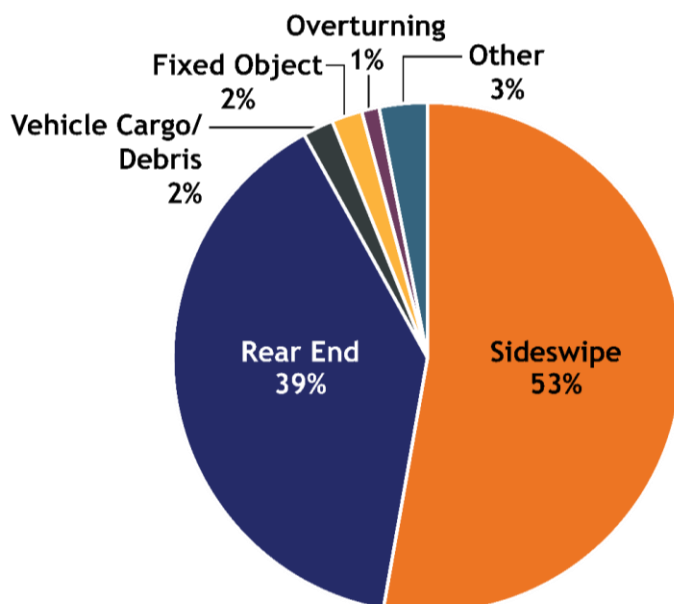




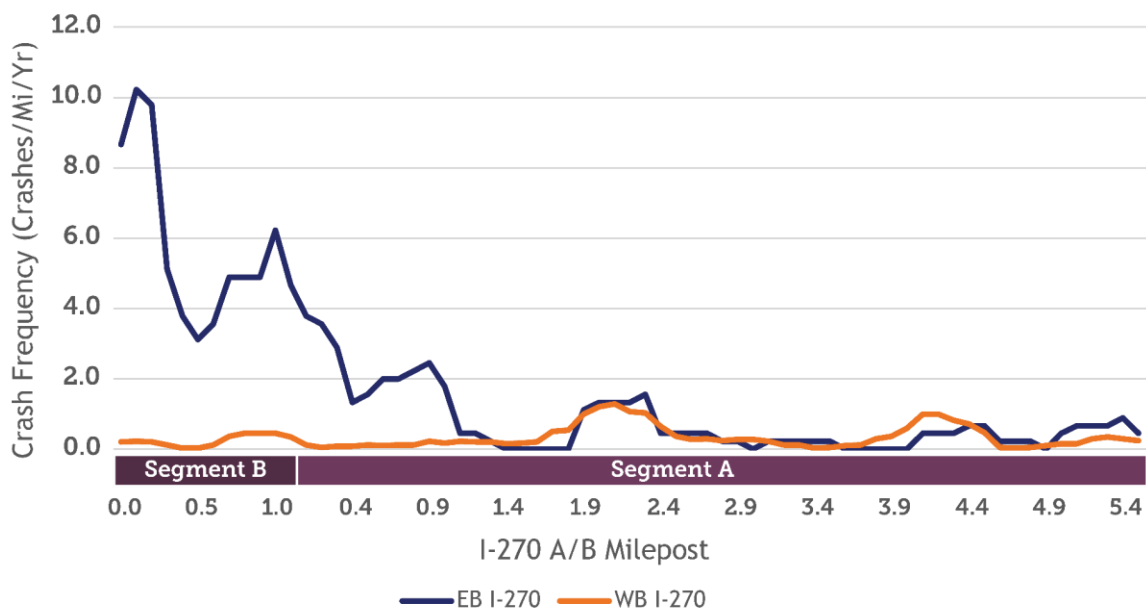
Figure 25 displays the distribution of heavy vehicle crashes on mainline I-270 by direction. As shown, heavy vehicle crash frequency displays similar patterns to total crash frequency, notably:

- Highest on eastbound I-270 between I-25 (I-270 B MP 0.0) and Vasquez Boulevard (I-270 A MP 2.4)
- Slight increases in frequency for both directions near the Vasquez Boulevard interchange (I-270 A MP 1.9 to MP 2.4) and the Quebec Street interchange (I-270 A MP 4.1 to MP 4.5)

Freight stakeholders shared several safety-related concerns on the I-270 corridor, focusing on issues specific to freight operations. One of the key concerns was narrow shoulders which make it difficult for trucks to pull over in case of breakdowns, increasing the risk of secondary crashes.

Another major concern was the short acceleration and deceleration lanes at key interchanges, particularly at Vasquez Boulevard and Quebec Street. Freight operators pointed out that these short ramps force trucks to merge into faster moving traffic with insufficient space, creating dangerous conditions and contributing to rear end and sideswipe crashes. They advocated for extending these lanes to allow trucks more time to safely reach highway speeds when merging or to decelerate safely when exiting. Additionally, interchange designs—particularly the tight loops at the Vasquez Boulevard interchange—pose challenges for freight vehicles, especially large trucks. These sharp turns increase the risk of rollovers and crashes. Freight stakeholders identified the redesign of the Vasquez Boulevard interchange to better accommodate the size and maneuverability needs of freight vehicles would be a high priority safety improvement and that would also reduce operational hazards for freight vehicles.

Freight industry representatives also stressed the importance of improving pavement conditions on this designated freight route. The poor road surface, including potholes and rough patches, causes additional wear and tear on heavy vehicles, leading to slower speeds and congestion as trucks attempt to avoid damaged sections of the roadway.

Figure 25. I-270 Directional Heavy Vehicle Crash Frequency (Total Crashes)


5.2.4 Effects of Post-Pandemic Travel Conditions

The most recent portion of crash history (2021-2022) was evaluated to understand changes to safety performance, as a result of changes in travel patterns from the COVID-19 pandemic.

Crash Frequency

Crash frequency between Vasquez Boulevard (I-270 A MP 2.5) and I-70 (I-270 A MP 5.9) showed a decrease in crash frequency from 2021 to 2022 compared to previous years (see Figure 18). Figure 26 displays the SPF for I-270 A (from I-76 to I-70) from 2021 to 2022, Figure 27 displays the SPF for I-270 B (from I-25 to I-76). As shown in Figure 26, total and severe crash frequency decreased to below the 20th percentile, where it was previously in the 40 to 60th percentile between I-270 A MP 2.5 and MP 3.5 (Vasquez Boulevard to Locust Street) compared to the SPF result in Figure 18. Similarly, total and severe crash frequency decreased between MP 4.0 and MP 4.7 (Pontiac Street to Quebec Street interchange) from above the 80th percentile to just above the 50th percentile. Lastly, where there were ramp improvements between MP 5.2 and MP 6.0 (near the I-70 interchange area) there is a significant decrease in both the total and injury fatal crashes that prior to 2021 had SPFs in over the 80th percentile to below the 20th percentile for injury and fatal crashes and below the 40th percentile for total crashes.

Figure 26. 2021-2022 I-270 A Safety Performance Function (I-76 to I-70)

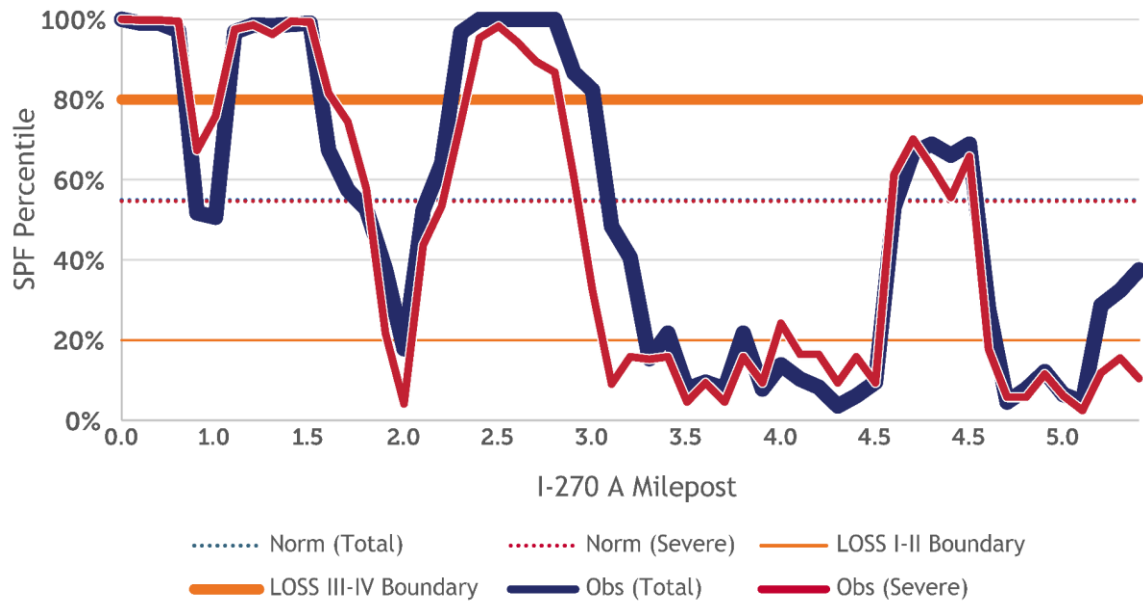
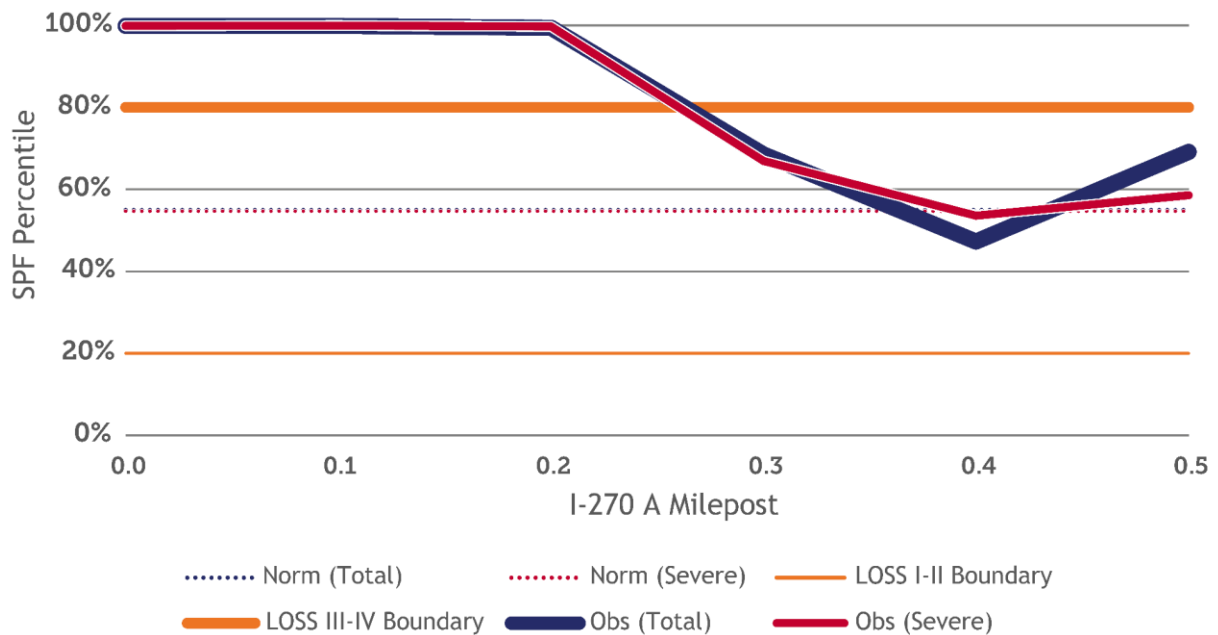


Figure 27. 2021-2022 I-270 B Safety Performance Function (I-25 to I-76)



Reconstruction of the eastbound I-270 bridge over I-70 was completed in late 2019. The improved design of this bridge is likely contributing to the observed improvements in safety performance between Quebec Street and I-70.



Directional crash frequency from 2021 to 2022 is shown in Figure 28 (total crashes) and Figure 29 (severe crashes). As shown in the figures, several changes to total and severe crash frequency were observed in the most recent two years of crash history. While crash frequency is still generally higher on eastbound I-270, the total and severe westbound crash frequency has increased, especially near the Vasquez Boulevard interchange area (I-270 A MP 1.9 to MP 2.8).

Figure 28. 2021-2022 I-270 Directional Crash Frequency (Total Crashes)

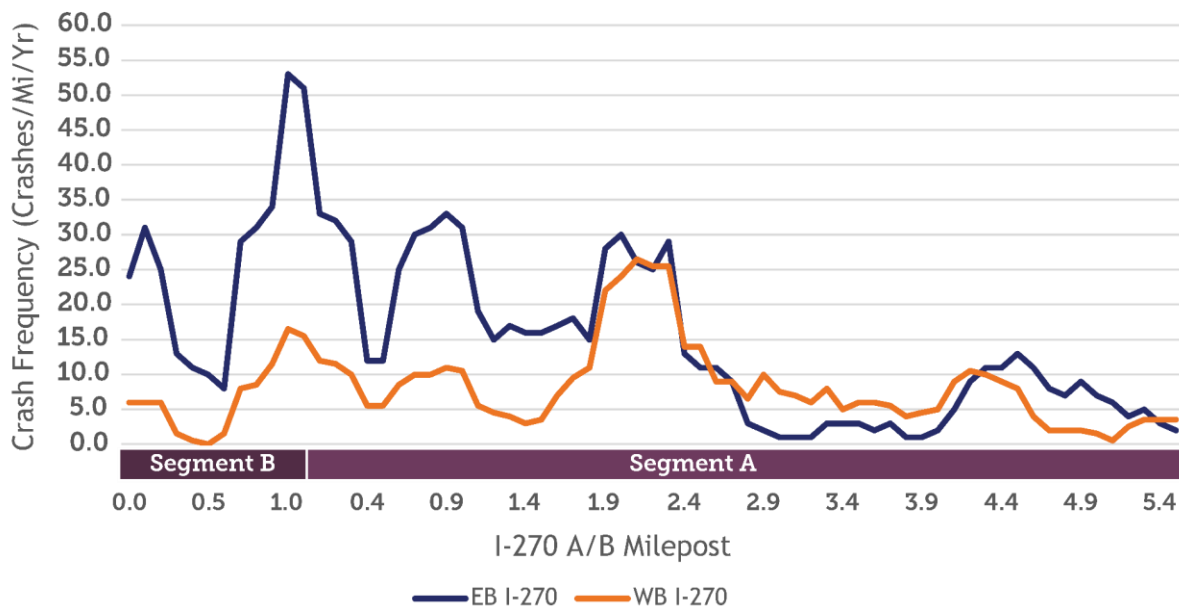
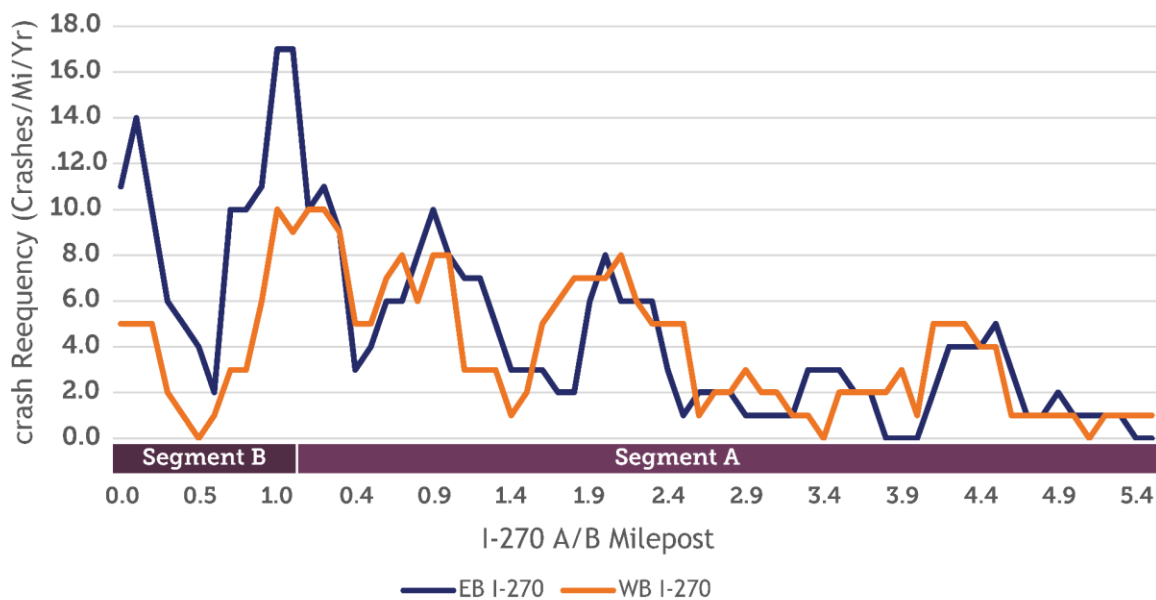


Figure 29. 2021-2022 I-270 Directional Crash Frequency (Severe Crashes)



Crash Patterns

Figure 30 and Figure 31 display the crash types and causal factors that were identified as patterns between 2021 and 2022, and the segments of I-270 where they were overrepresented. Many crash types and causal factors that were reflected on Figure 22 and Figure 23 are no longer statistical patterns compared to previous years of crash history, especially east of the Vasquez Boulevard interchange (I-270 A MP 3.0). Adverse weather is no longer an overrepresented causal factor for crashes reported from 2021 to 2022.

Figure 30. 2021-2022 I-270 A Crash Patterns (I-76 to I-70)

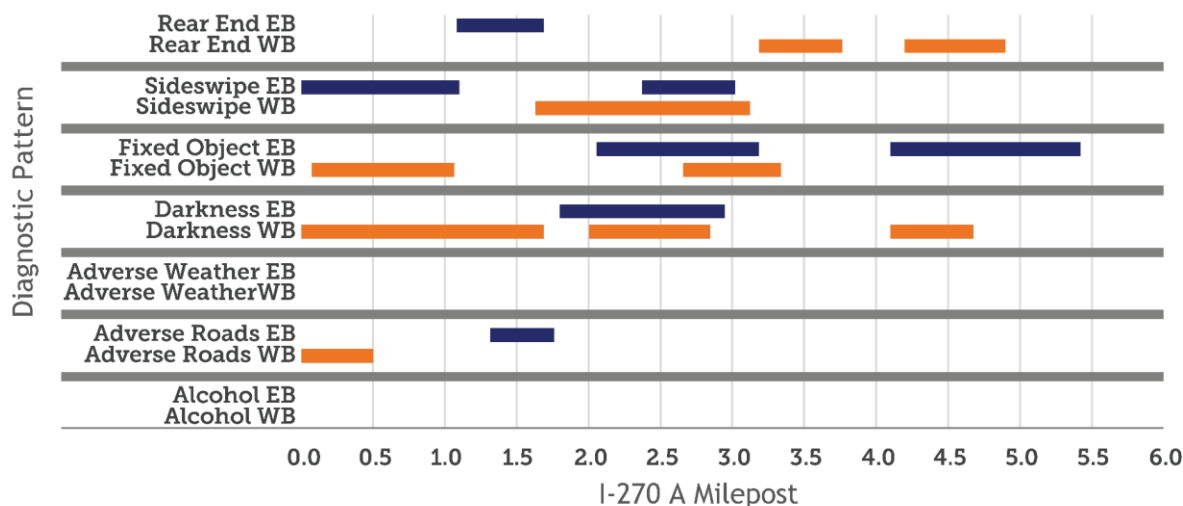
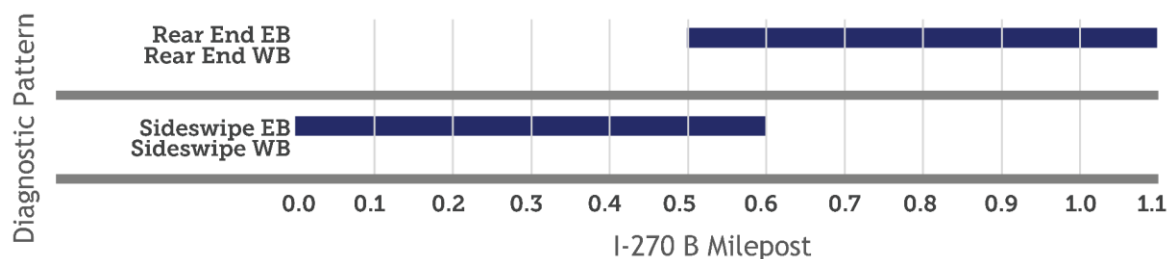


Figure 31. 2021-2022 I-270 B Crash Patterns (I-25 to I-76)



5.3 I-270 Interchange Ramp Crash Analysis

About 6 percent (184 of 2,999) of crashes within the project area occurred on interchange ramps to and from I-270. Of the 184 crashes, 42 resulted in injury or fatality (23 percent), which is lower than the rate of severe crashes on mainline I-270 (32 percent).

Figure 32 and Figure 33 display the distribution of I-270 interchange ramp crashes by crash type and fixed object type, respectively. Like on mainline I-270, rear end crashes are the most common crash type on interchange ramps (43 percent). Fixed object crashes make up a significantly higher proportion of crashes on ramps compared to mainline I-270: 32 percent

versus 14 percent. Guard rail (42 percent) and concrete barrier (19 percent) were the most common fixed object crash types.

The following sections discuss crash history at three interchanges within the I-270 EIS project area: I-76, Vasquez Boulevard, and Quebec Street.

Figure 32. I-270 Interchange Ramp Crashes by Type

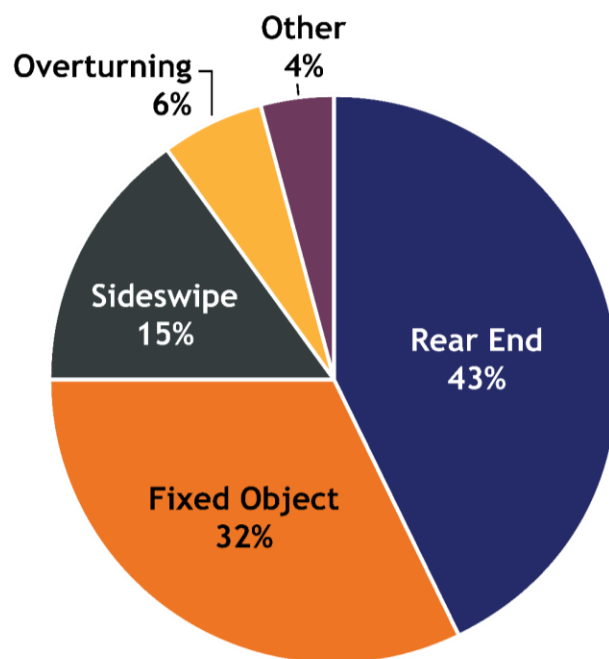
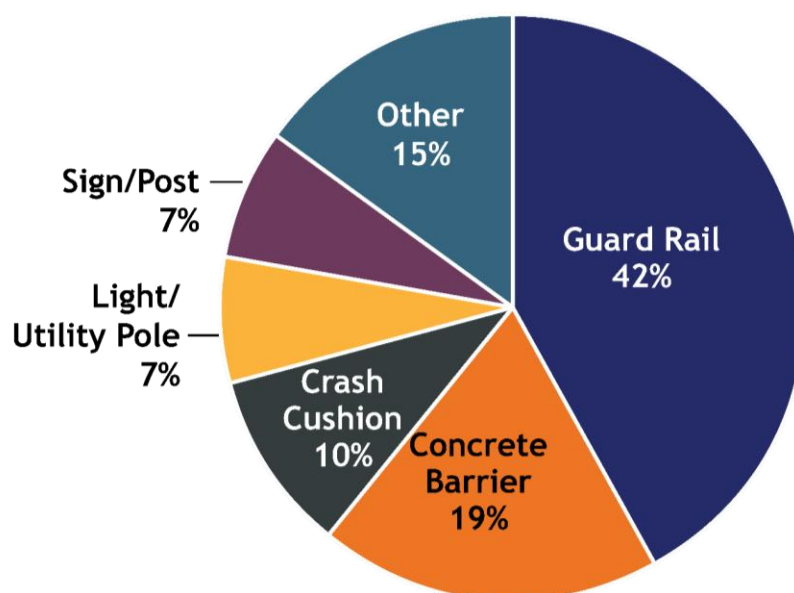


Figure 33. I-270 Interchange Ramp Fixed Object Crashes by Type



5.3.1 I-76 Interchange Ramps

Eleven (11) crashes occurred on the I-76 interchange ramps during the study period—an average of 1.2 crashes per year; one crash resulted in injury. Table 3 displays a summary of I-76 interchange crashes by ramp location.

Table 3. Summary of I-76 Ramp Crash History

Ramp Description	PDO ¹ Crashes	Injury Crashes	Fatal Crashes	Total Crashes
EB I-76 to EB I-270	0	0	0	0
WB I-270 to EB I-76	4	0	0	4
WB I-76 to WB I-270	0	0	0	0
WB I-76 to EB I-270	1	0	0	1
EB I-270 to EB I-76	3	0	0	3
WB I-270 to WB I-76	2	1	0	3
Total	10	1	0	11

¹PDO = Property Damage Only

Crashes were most common on the westbound I-270 to eastbound I-76 ramp (3), the eastbound I-270 to eastbound I-76 flyover ramp (3), and the westbound I-270 to westbound I-76 ramp (3). Fixed object crashes (5) and sideswipe crashes (4) were most common.

5.3.2 Vasquez Boulevard Interchange Ramps

In total, 71 crashes occurred on the Vasquez Boulevard interchange ramps during the study period—an average of 7.9 crashes per year; 10 crashes resulted in injury, and one resulted in a fatality. Table 4 displays a summary of Vasquez Boulevard interchange crashes by ramp location.

Table 4. Summary of Vasquez Boulevard Ramp Crash History

Ramp Description	PDO ¹ Crashes	Injury Crashes	Fatal Crashes	Total Crashes
EB I-270 to SB Vasquez Blvd	14	0	0	14
WB I-270 to NB Vasquez Blvd	9	2	0	11
SB Vasquez Blvd to WB I-270	11	1	0	12
WB I-270 to SB Vasquez Blvd	4	1	1	6
SB Vasquez Blvd to EB I-270	9	4	0	13
EB I-270 to NB Vasquez Blvd	7	1	0	8
NB Vasquez Blvd to WB I-270	6	1	0	7
Total	60	10	1	71

¹PDO = Property Damage Only

Several ramps at the Vasquez Boulevard interchange had over 10 crashes during the study period, including:

- Eastbound I-270 to southbound Vasquez Boulevard - 14 crashes

- Southbound Vasquez Boulevard to eastbound I-270 (loop) - 13 crashes, 4 injury crashes
- Southbound Vasquez Boulevard to westbound I-270 - 12 crashes, 1 injury crash
- Westbound I-270 to northbound Vasquez Boulevard - 11 crashes, 2 injury crashes

Fixed object crashes (31) and rear end crashes (26) were the most common crash types recorded on the Vasquez Boulevard interchange ramps.

5.3.3 Quebec Street Interchange Ramps

Thirty-nine (39) crashes occurred on the Quebec Street interchange ramps during the study period—an average of 4.3 crashes per year; five crashes resulted in injury. Table 5 displays a summary of Quebec Street interchange crashes by ramp location.

Table 5. Summary of Quebec Street Ramp Crash History

Ramp Description	PDO ¹ Crashes	Injury Crashes	Fatal Crashes	Total Crashes
EB I-270 Off-ramp	11	4	0	15
WB I-270 On-ramp	23	1	0	24
Total	34	5	0	39

¹PDO = Property Damage Only

The westbound I-270 on-ramp had more total crashes (24), but the eastbound I-270 off ramp had more severe crashes (4). Rear end crashes (22) were most common, especially on the westbound I-270 on-ramp (16 of 22). Fixed object crashes (10) and sideswipe crashes (7) were also recorded on the interchange ramps.

6.0 Impacts Assessment

The safety implications of the I-270 Corridor Improvements Project are a critical component of the overall alternatives' evaluation. This section examines the safety impacts and anticipated benefits associated with three alternatives identified in the alternatives' development and evaluation process for full evaluation in the EIS: the No Action Alternative, the Three General-Purpose Lanes Alternative, and the Two General-Purpose Lanes and One Express Lane Alternative.

The analysis evaluates the potential for crash reduction, conflict points, and overall corridor safety enhancements.

6.1 No Action Alternative

Under the No Action Alternative, the corridor would remain in its current state, with no substantial improvements beyond routine maintenance and programmed rehabilitation. As such, the No Action Alternative does not improve safety and would be expected to continue to contribute to a high frequency of crashes, particularly at key interchanges. This alternative has been retained for comparison to the build alternatives.

6.2 Improvements Common Across Build Alternatives

There are several improvement elements common to both the Three General-Purpose Lanes Alternative and the Two General-Purpose Lanes and One Express Lane Alternative. These improvements include the following:

- Reconstruction of pavement and existing and new I-270 travel lanes to improve roadway conditions and durability. Crashes at several locations throughout the corridor were often attributed to potholes and uneven pavement that resulted in hard braking, abrupt lane changes, and increased congestion. Improved pavement quality is expected to reduce the incidence of secondary crashes, vehicle breakdowns (such as flat tires), and sudden deceleration behaviors.
- Widening the shoulders to a minimum of 10 feet to improve safety by providing greater space for disabled vehicles to move out of the flow of traffic, reducing the risk of collisions with stopped vehicles, and offering additional recovery area for errant vehicles, thereby decreasing the likelihood of crashes.
- Adding continuous auxiliary lanes in each direction between the I-76 and Vasquez Boulevard interchanges. This area was identified as having a high concentration of sideswipe and rear end crashes, particularly near merge and diverge zones. Continuous auxiliary lanes will mitigate congestion-related conflicts by lengthening merge distances, allowing for smoother lane changes, and reducing the likelihood of abrupt braking resulting in rear end crashes.
- Interchange upgrades: Improvements to interchanges at I-76, York Street, Vasquez Boulevard, and Quebec Street. These upgrades will include enhanced acceleration and deceleration lanes to improve safety and meet design standards. Interchange upgrades will address several deficiencies contributing to crash patterns at these locations, including short acceleration and deceleration lanes, tight turning radii, and confusing ramp configurations.
 - The Vasquez Boulevard interchange, in particular, was associated with frequent merging conflicts and driver confusion, leading to high crash rates. Redesigning this interchange to a partial cloverleaf with improved ramp geometry will improve lane discipline, reduce driver decision-making time, and lower the potential for both rear end and sideswipe crashes.
- Bridge and structure reconstruction: Both alternatives propose the reconstruction of bridges that have reached the end of their useful life, including critical structures, like the York Street bridge over I-270 and others along the corridor.
- Bicycle and pedestrian improvements: The inclusion of upgraded pedestrian and bicycle paths across major crossings, such as York Street, Vasquez Boulevard, and the South Platte River Trail. Upgraded crossings, along with new multi-use paths and curb ramps designed to current standards, will separate non-motorized users from high-speed traffic and provide safer, more visible crossing opportunities. These improvements directly address community concerns about limited pedestrian connectivity and safety in the corridor.



- Lighting enhancements: Improved lighting along the I-270 corridor, especially at key interchanges and crossings, to enhance visibility and safety for both vehicles and pedestrians.

The safety impacts of these elements are discussed in the following sections.

6.3 Three General-Purpose Lanes Alternative

From 2014 to 2022, the I-270 corridor experienced nearly 3,000 crashes, including 14 fatalities and 718 injury crashes. Over 90 percent of these crashes occurred on the mainline, with rear end crashes making up 60 percent and sideswipe crashes accounting for 22 percent of all mainline collisions. These crash types are strongly correlated with congestion, sudden braking, and frequent lane changing conditions exacerbated by closely spaced ramps and limited merging space. These findings emphasize the need for additional lanes and improved ramp designs to reduce conflict points.

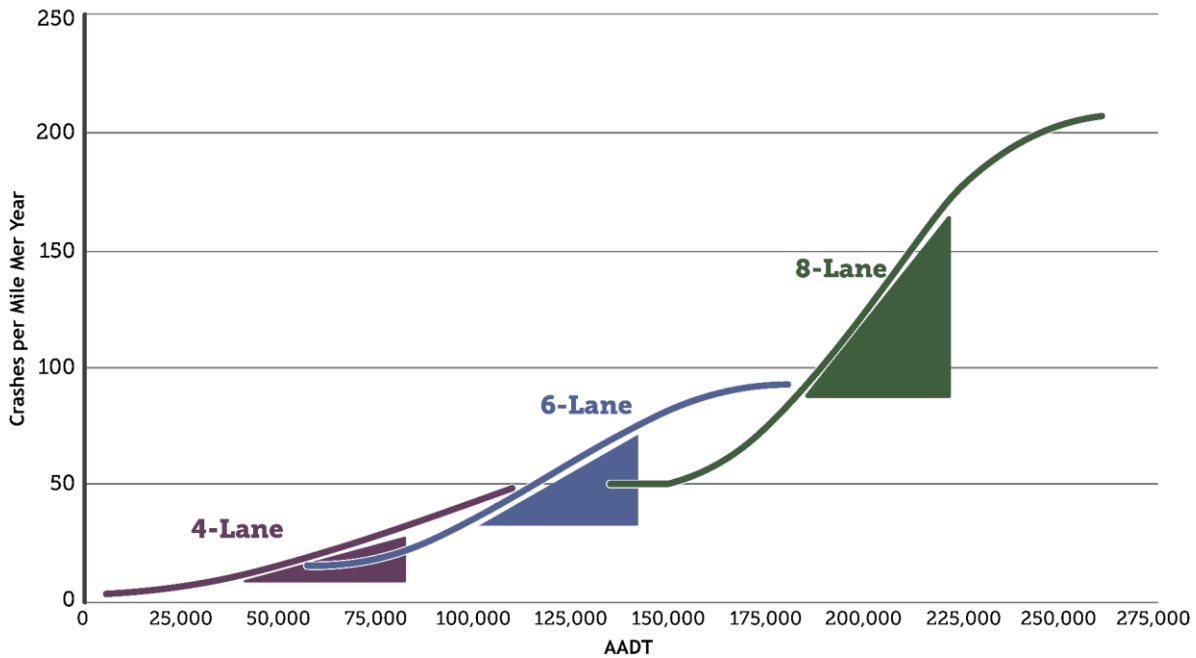
The SPF in Figure 34 illustrates the relationship between daily traffic volumes and predicted crashes based on the number of freeway lanes based on safety data from across Colorado. As previously noted, I-270 experiences more crashes than a typical four-lane facility.

As shown, at volumes over 60,000 vehicles per day, there are safety benefits that emerge with a six-lane facility compared to a four-lane facility at higher volumes. The four-lane facility safety performance function does not extend much past 100,000 vehicles per day, because 100,000 vehicles per day exceeds the typical carrying capacity of a four-lane facility.

I-270 is expected to carry approximately 125,000 vehicles per day in 2050. This is in the optimal range for a six-lane facility (the blue triangle), and well below the demand needed to merit an eight-lane facility.

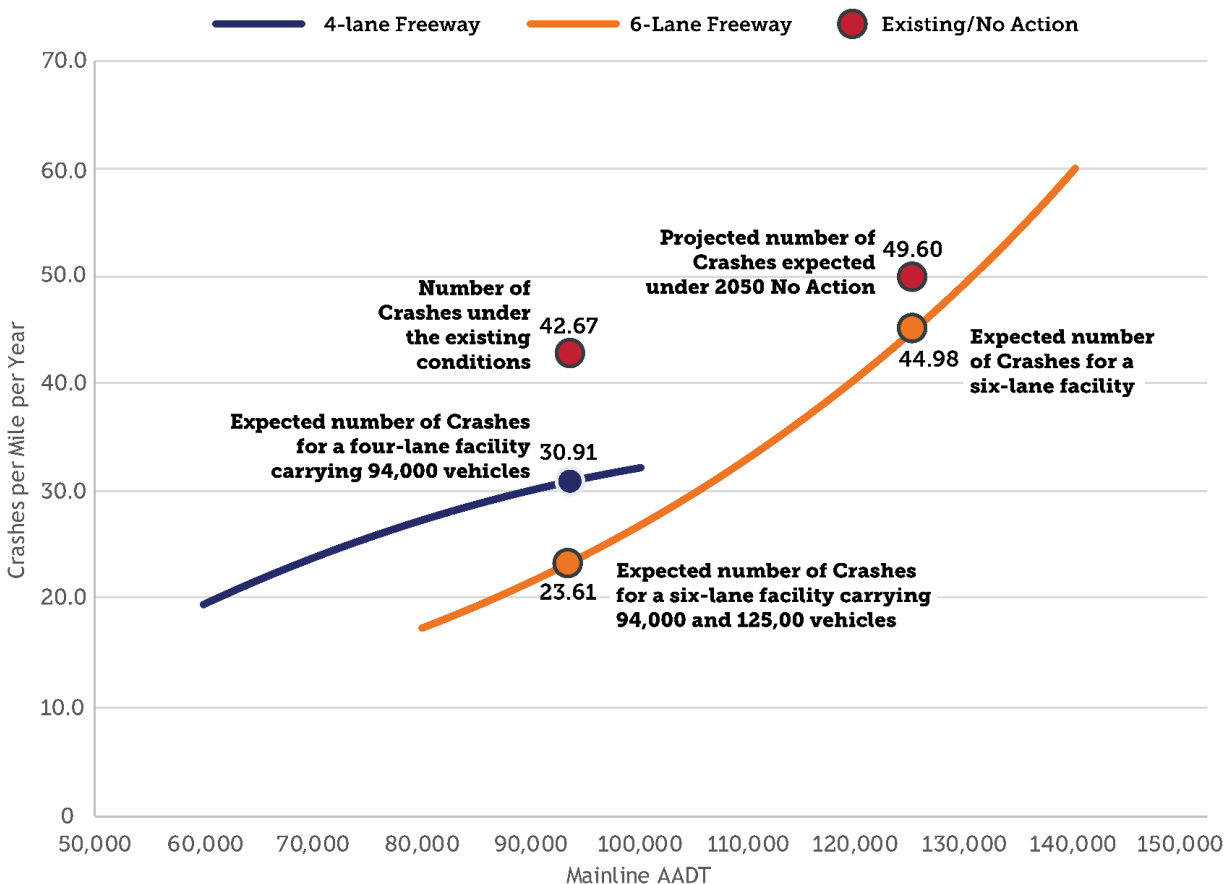
The addition of a third lane in each direction as part of the Three General-Purpose Lanes Alternative increases capacity and helps smooth traffic flow, reducing stop-and-go conditions that lead to rear end crashes. The extension of acceleration and deceleration lanes at interchanges reduces abrupt lane changes and allows safer merging and exiting, mitigating both sideswipe and rear end crash risks. These benefits are especially critical in high-crash areas, such as the Vasquez Boulevard and Quebec Street interchanges, which exhibited LOSS IV conditions, indicating a high potential for crash reduction.

Figure 34. Safety Performance Functions



As shown in Figure 35, given the observed relationship between corridor-wide crash frequency and AADT, the corridor would be expected to experience 49.6 crashes per mile, per year under the No Action Alternative four-lane condition. This has been calculated assuming a proportionate increase, given the relationship between existing crash frequency and the mean value of the SPF curve for the typical urban, four-lane facility in Colorado. Under the Three General-Purpose Lanes Alternative six-lane configuration, the corridor would be expected to experience a crash frequency of 44.98 crashes per mile, per year. At the forecasted 125,000 vehicles per day under the 2050 horizon, the proposed Three General-Purpose Lanes Alternative would experience fewer crashes per mile than would be expected under the No Action Alternative.

Figure 35. Safety Performance Function Comparison - Three General-Purpose Lanes and No Action Alternatives



6.4 Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative

The corridor safety assessment demonstrated that the I-270 corridor experiences a disproportionately high number of rear end and sideswipe crashes, primarily caused by congestion, short merge distances, and lane-changing behavior.

The Two General-Purpose Lanes and One Express Lane Alternative includes an Express Lane in each direction, designed to improve traffic flow and enhance safety by providing a dedicated lane for HOVs, transit, and toll-paying vehicles. By offering a managed Express Lane in each direction, this alternative is expected to reduce traffic volumes in general-purpose lanes, separate traffic streams, and minimize lane-changing pressure, particularly in bottleneck segments, such as between I-25 and I-76 and at the Vasquez Boulevard and Quebec Street interchanges, which exhibited LOSS IV conditions.

This alternative may be particularly effective in mitigating weaving-related sideswipe crashes, which were observed in the westbound direction near Vasquez Boulevard (MP 1.9-2.8) and the I-25/I-270 interchange, where multiple closely spaced ramps create high-friction conflict zones. By channeling HOV, transit, and toll-paying users into the Express Lane, the

frequency of lane changes and weaving behavior in the general-purpose lanes is expected to decrease, resulting in smoother traffic flow and reduced crash risk.

While there is no existing SPF for a two general-purpose lane and one Express Lane configuration, national research reflects potential safety benefits associated with Express Lanes. The FHWA Managed Lanes Primer notes that managed lane facilities separate traffic streams to reduce turbulence and a Florida Department of Transportation study of the I-95 Express Lanes found a 17 percent reduction in overall crash rates after introducing Express Lanes. The study attributed much of the safety improvement to smoother traffic flow and reduced lane changing.

As reported, total crash frequency on I-270 currently averages 42.67 crashes per mile, per year—far exceeding the state average of 30.91 crashes/mile/year for similar facilities. The addition of Express Lanes is expected to reduce volume in the general-purpose lanes and improve flow—particularly during peak travel hours. These reductions in congestion are expected to address the root causes of the LOSS IV safety conditions observed on most segments of the corridor.

Additionally, like the Three General-Purpose Lanes Alternative, the Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative also includes improvements to interchange designs and the widening of shoulders, which are anticipated to further enhance corridor safety by reducing crash risks associated with merging, exiting, and emergency stops.

The Express Lane configuration may also enhance freight safety and reliability by relieving general-purpose lanes, which serve most truck traffic. Additionally, the lane's accommodation of transit vehicles supports project needs for ensuring safer and more efficient travel for all users.

6.5 Implications of the Timing of the Direct Connect Projects

As mentioned earlier, the No Action and Build Alternatives include consideration of several planned, independent projects. The timing of the I-25/US 36 and I-70 direct connect projects could impact how the I-270 improvements are implemented. For the long-term 2050 plan, it is assumed that both the No Action Alternative programmed improvements and the I-270 build alternatives will be completed. The preliminary design of I-270 improvements is based on how they will connect with the I-25/US 36 and I-70 direct connects by using the available designs for those projects.

However, since I-270 improvements might be constructed before the direct connect projects, the project team created alternative designs to link the build alternatives to the existing roadway layout. The following sections explain these design changes and their potential safety impacts on the I-270 corridor.

6.5.1 Three General Purpose Lanes Alternative

The build alternatives have been adjusted to fit the current roadway configuration without the direct connect ramps. In the eastbound direction at the I-25/I-270/US 36 interchange, two through lanes come from US 36, and two on-ramp lanes from southbound I-25 merge onto

eastbound I-270 from the left. These two on-ramp lanes gradually merge into the two through lanes from US 36 before reaching the I-76 interchange.

Figure 36 shows the lane configuration for the southbound I-25 ramp merging onto eastbound I-270 both with and without the I-25/I-270/US 36 interchange direct connects project. Without direct connects, the new third general-purpose lane is added from the existing two lane on-ramp from southbound I-25. This means vehicles merging onto eastbound I-270 only need to merge across one lane to continue on I-270. Vehicles coming from southbound I-25 and heading to eastbound I-76 will still have to merge across two to three lanes to exit to I-76. This weaving movement will likely continue to cause congestion and friction and contribute to conditions that have yielded a higher-than-expected number of sideswipe and rear end crashes if the current setup remains in place.

Figure 36. Southbound I-25 to Eastbound I-270 - Three General-Purpose Lanes Alternative

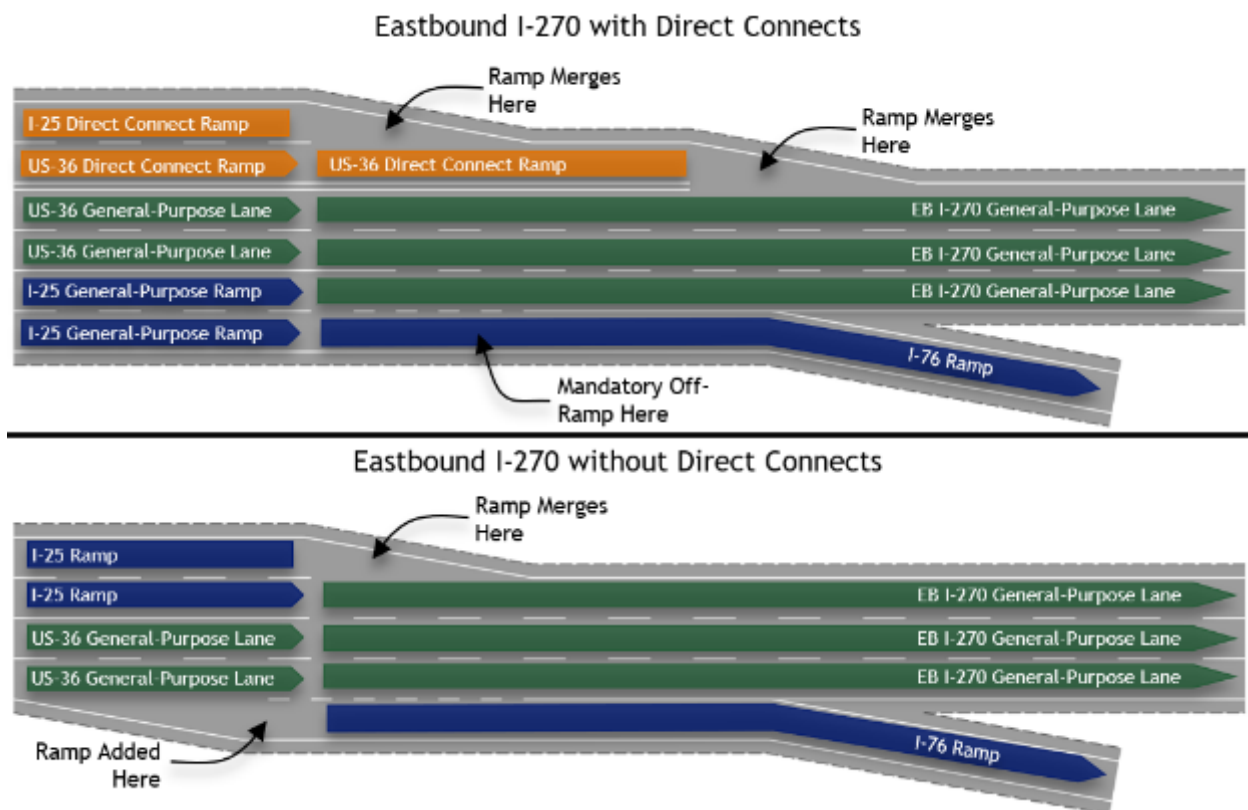
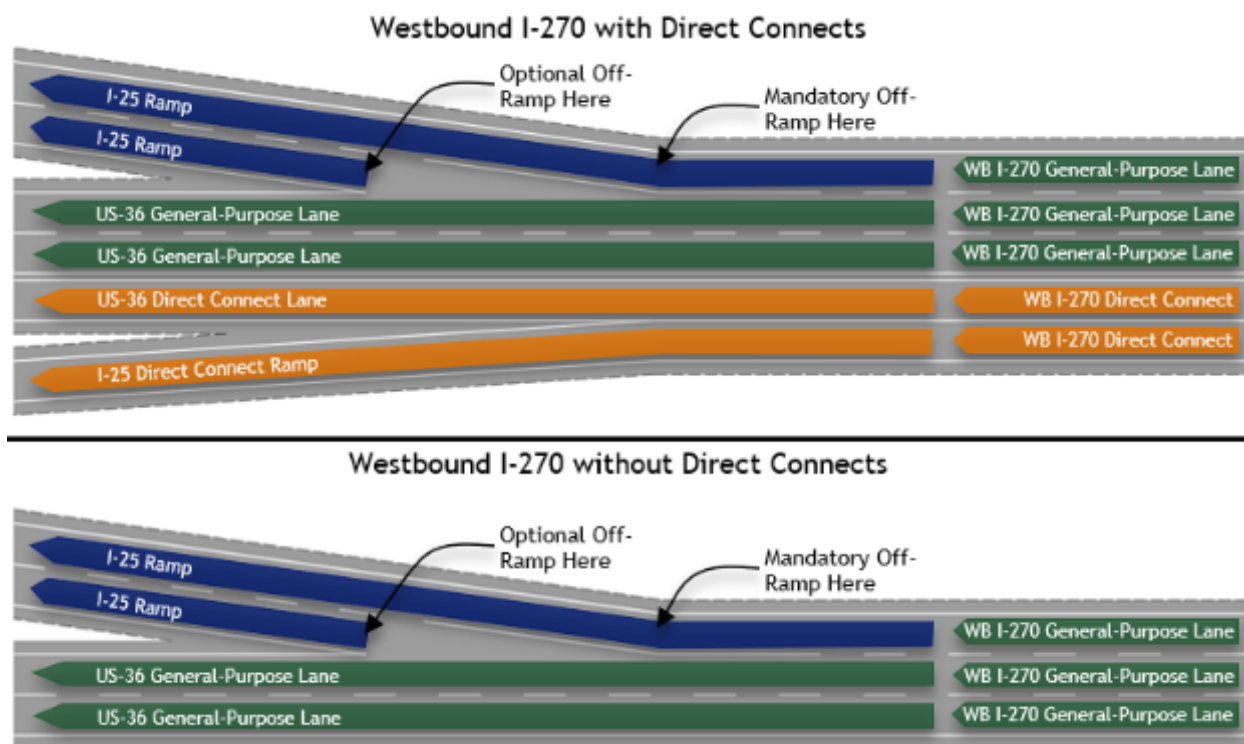


Figure 37 shows the lane configuration for westbound I-270 approaching I-25, both with and without the I-25/I-270/US 36 interchange direct connects project. In the westbound direction, the new third general-purpose lane ends as the mandatory exit lane to northbound I-25. There is no change to this configuration, with or without direct connects.

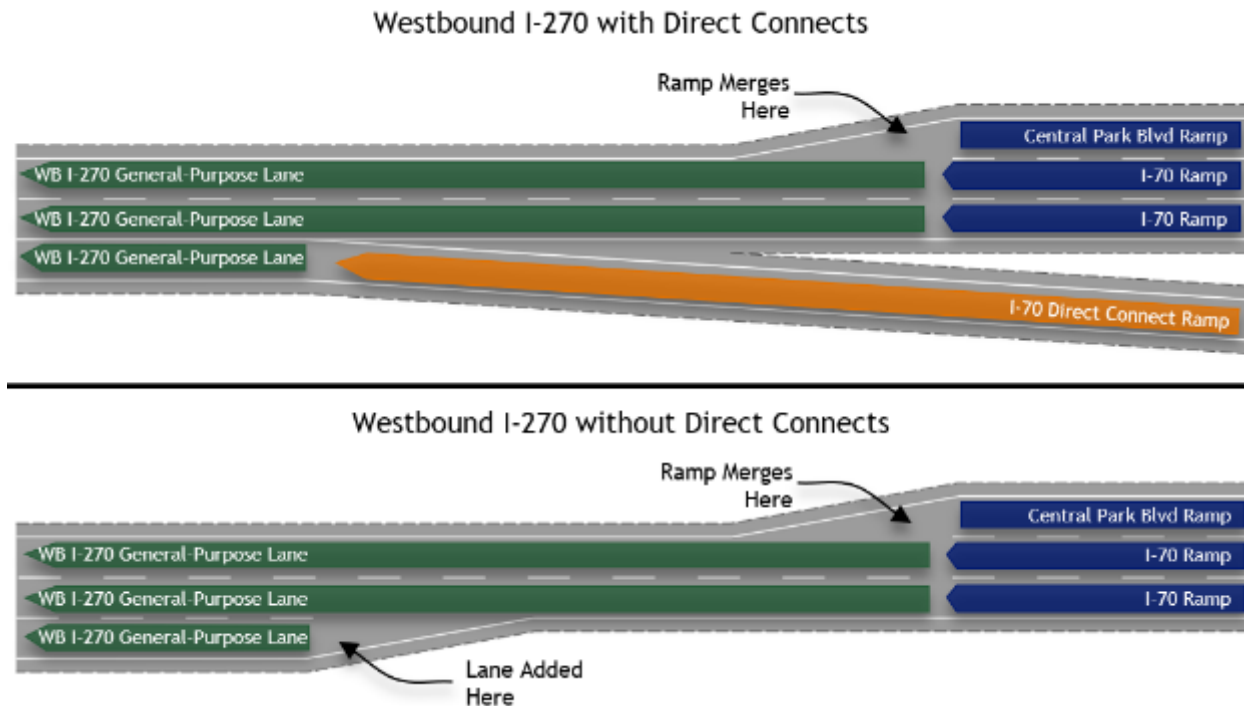
Figure 37. Westbound I-270 Approaching I-25 - Three General-Purpose Lanes Alternative



On the east (I-70) end of the corridor, the new third eastbound general-purpose lane ends as the mandatory exit to Quebec Street. There is no change to this configuration, with or without direct connects.

Figure 38 shows the lane configuration for where the third westbound general-purpose lane would start, both with and without the I-70 direct connect project. Without the direct connect project, the third general-purpose lane is added approximately 0.5 miles east of the Quebec Street bridge. If the I-70 direct connect ramp is built, the new third general-purpose lane would start where the I-70 westbound direct connect lane merges onto I-270, allowing for a smoother transition and improved traffic flow for vehicles coming from I-70.

Figure 38. Start of the Third Westbound General Purpose Lane - Three General-Purpose Lanes Alternative

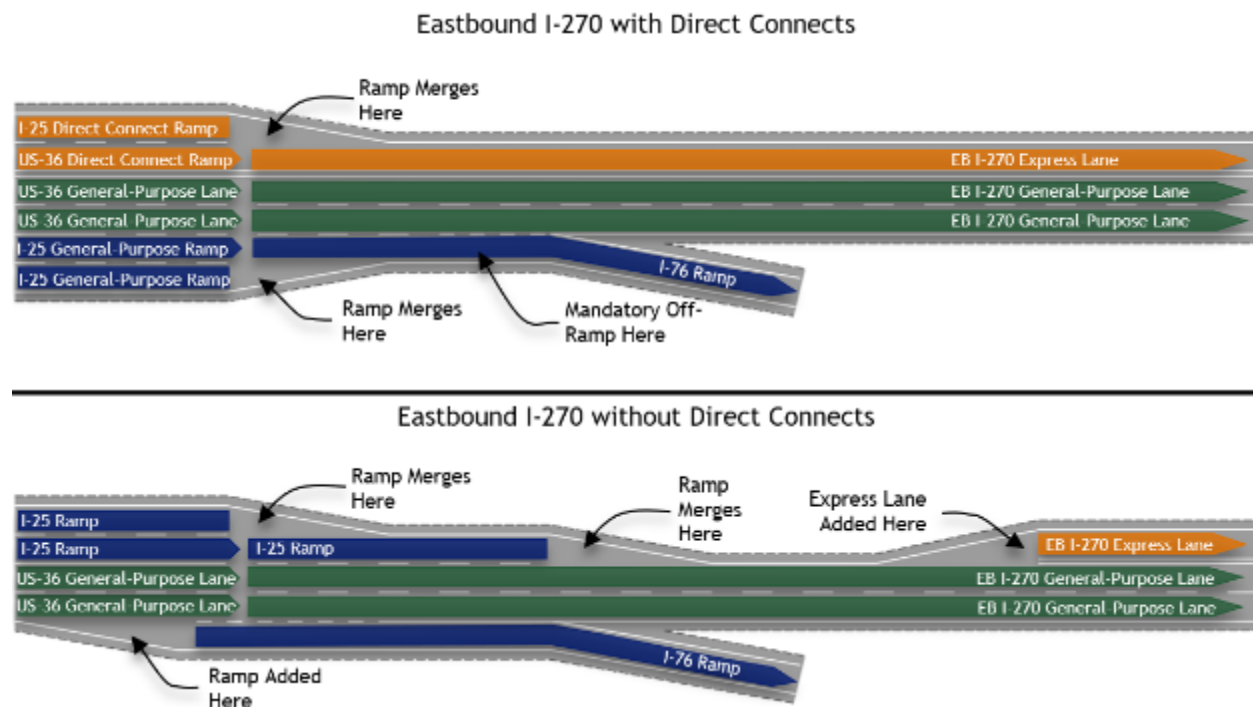


Although the configurations, with and without the direct connects, are not expected to have a significant impact to safety along I-270, the absence of the I-70/I-270 direct connect could continue to impact safety on I-70. In the current condition (and the without direct connects configuration), the last chance for vehicles in the westbound I-70 Express Lane to exit before I-270 is at the ingress/egress zone near the Peoria Street interchange. Vehicles exiting the Express Lane must merge across three to four lanes of traffic to reach the exit to westbound I-270, which can lead to safety risks due to weaving and lane changes across heavy traffic.

6.5.2 Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative

At the west end of the corridor, the new eastbound Express Lane starts under the I-76 bridge over I-270. This is the earliest possible point for the Express Lane to begin, as it provides adequate space for traffic from US 36 and I-25 to merge together. Two on-ramp lanes from US 36 and I-25 gradually merge into the two through lanes before the I-76 interchange. In this setup, significant merging activity occurs in the leftmost lane, which can lead to congestion and friction just before the first opportunity for vehicles to enter the new eastbound Express Lane. Figure 39 shows the lane configuration for the southbound I-25 general-purpose and Express Lane traffic merging onto eastbound I-270, both with and without the I-25/I-270/US 36 interchange direct connects project.

Figure 39. Southbound I-25 to Eastbound I-270 - Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative

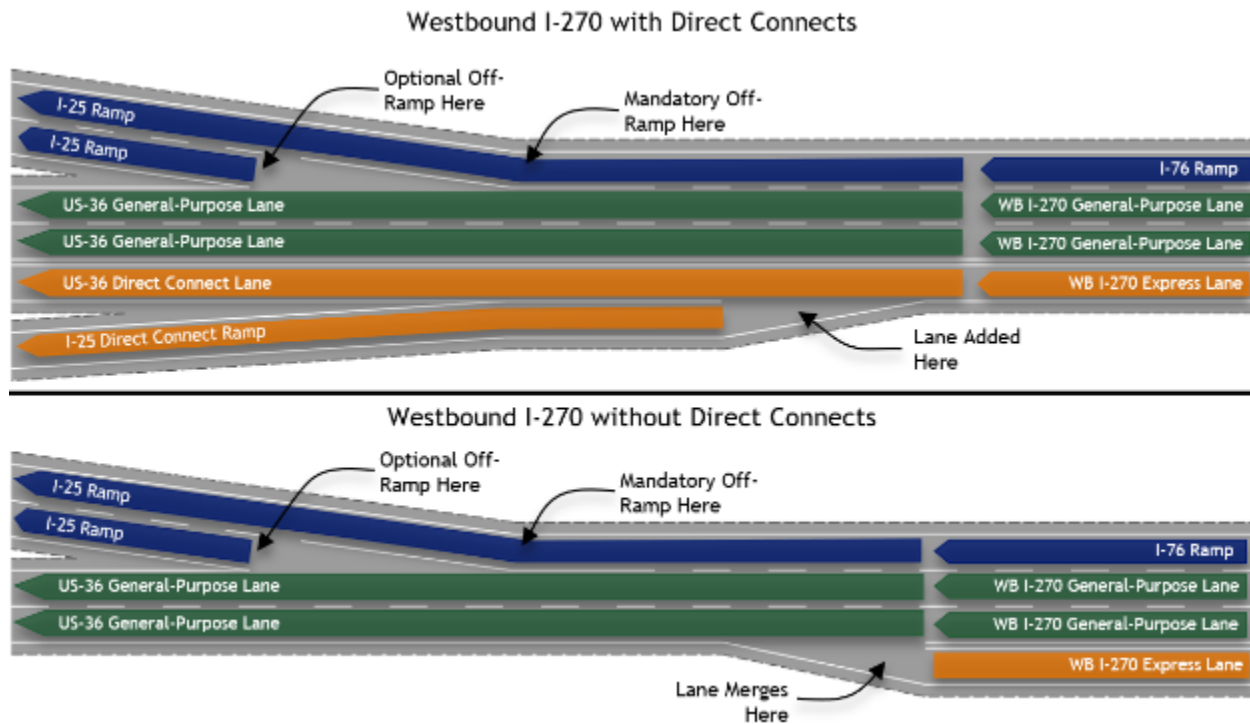


Additionally, without the US 36 to I-270 direct connect, vehicles traveling in the current eastbound US 36 Express Lanes will need to merge into the two general-purpose lanes on US 36 that continue onto I-270. This will expose these vehicles to the congestion and merging conflicts in the general-purpose lanes, before they have a second opportunity to enter the new eastbound Express Lane further along the corridor. This scenario is expected to cause greater congestion and more merging conflicts than would occur with the direct connect ramps in place. Figure 39 shows the lane configuration for both eastbound US 36 general-purpose and Express Lane traffic to continue across I-25 to the eastbound I-270 general-purpose and/or Express Lanes, both with and without the I-25/I-270/US 36 interchange direct connects project.

Like the Three General-Purpose Lanes Alternative without direct connects, vehicles traveling in general-purpose lanes from southbound I-25 to eastbound I-76 will still need to merge across two or three lanes to reach the exit. This weaving movement will likely continue to create congestion and friction, contributing to the higher-than-expected number of sideswipe and rear end crashes currently experienced in this area.

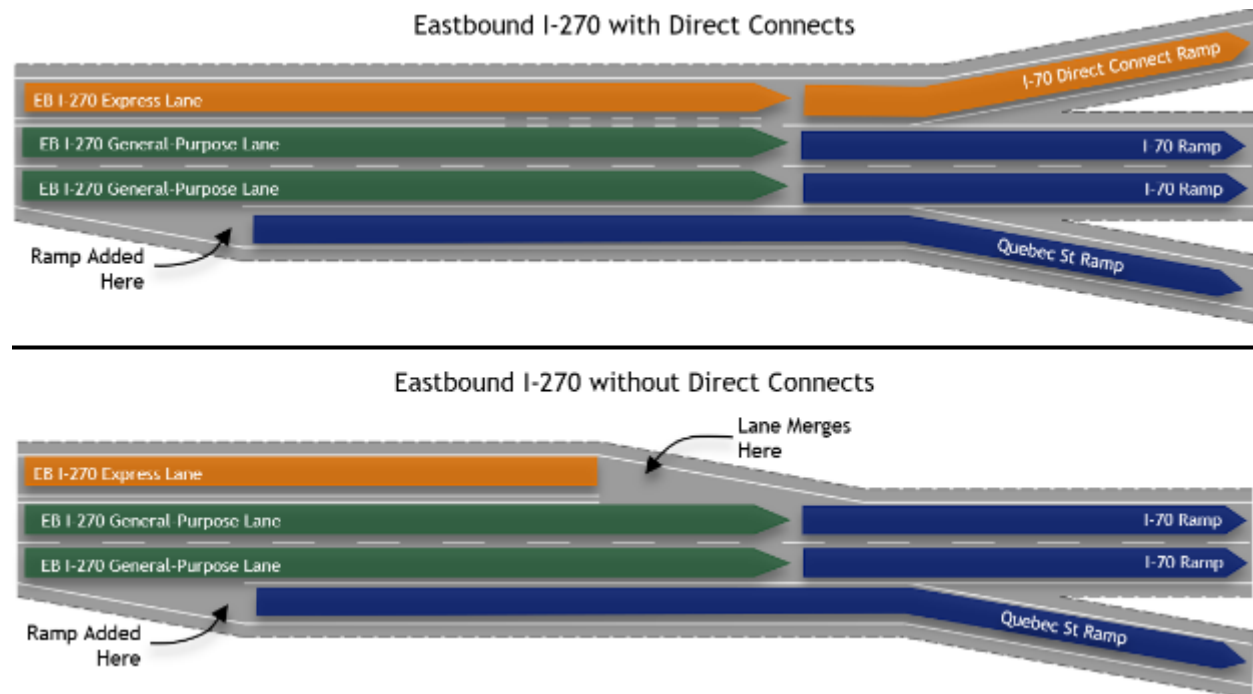
Figure 40 shows the lane configuration for westbound I-270 approaching I-25, both with and without the I-25/I-270/US 36 Interchange direct connects project. In the westbound direction without direct connects, the new Express Lane merges into the through general-purpose approximately 2000 feet before the off-ramp to northbound I-25. This is the latest possible point the Express Lane can end under the without direct connections condition, as it provides adequate space for traffic to merge right one lane to use the optional off-ramp to northbound I-25.

Figure 40. Westbound I-270 Approaching I-25 - Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative



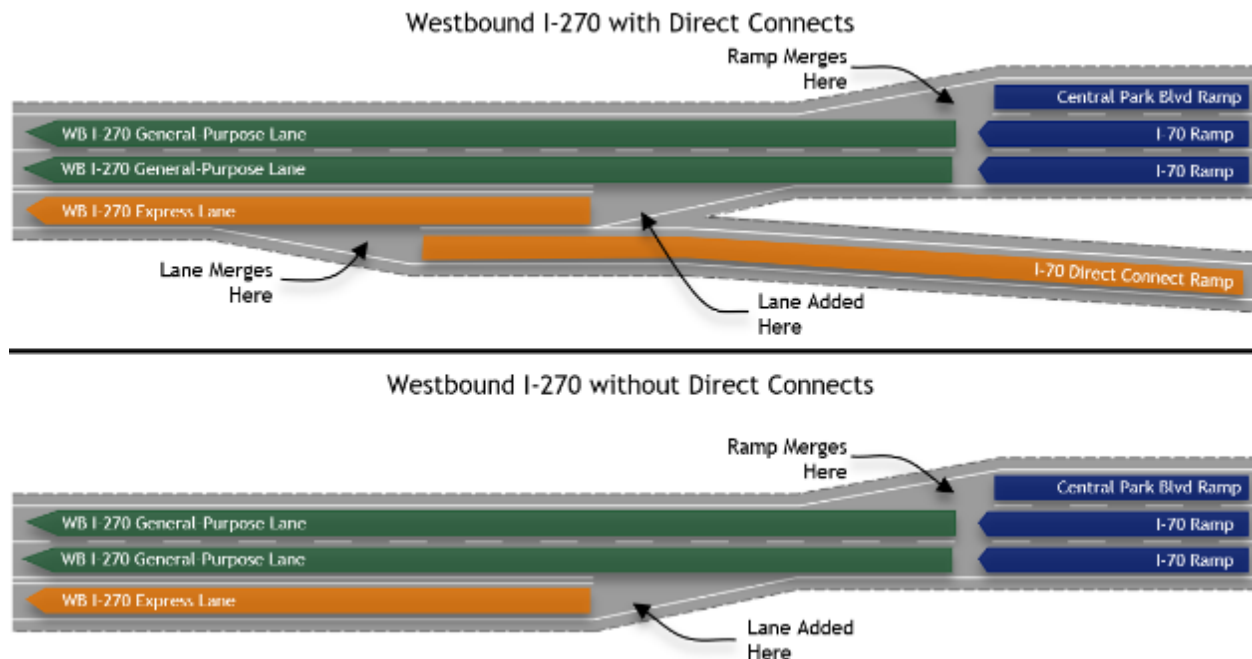
In the eastbound direction for the Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative without direct connects, the new eastbound Express Lane would merge back into the general-purpose lanes just before the Quebec Street interchange. Unlike the Three General-Purpose Lanes Alternative without direct connects where the new lane ends as the mandatory exit to Quebec Street, this alternative would instead include a new deceleration lane for vehicles exiting at Quebec Street. This would be expected to provide a safer condition by providing dedicated space for exiting vehicles to decelerate after exiting the general-purpose lanes and safely navigate the off-ramp. Figure 41 shows the lane configuration for where the new Express Lane would end, both with and without the I-70 direct connect project.

Figure 41. End of the New Westbound Express Lane - Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative



At the east end of the corridor, without the direct connect, the new westbound Express Lane could start at the same location as in the Three General-Purpose Lanes Alternative without direct connects. Without the direct connect project, the third general-purpose lane is added approximately 0.5 miles east of the Quebec Street bridge. With the I-70/I-270 direct connect in place, the new I-270 Express Lane would merge with the direct connect ramp from westbound I-70. This merge location is designed to allow enough space for the two streams of Express Lane traffic to safely combine, but it could still create a potential hotspot for sideswipe crashes in the Express Lanes that would not exist, without the direct connect ramp. Figure 42 shows the lane configuration for where the new Express Lane would start, both with and without the I-70 direct connect project.

Figure 42. Start of the New Westbound Express Lane - Two General-Purpose Lanes and One Express Lane that Accommodates Transit Alternative



Although the configurations, with and without the direct connects, are not expected to have a significant impact to safety along I-270, the absence of the I-70/I-270 direct connect could continue to impact safety on I-70. In the current condition (and the without direct connects configuration), the last chance for vehicles in the westbound I-70 Express Lane to exit before I-270 is at the ingress/egress zone near the Peoria Street Interchange. Vehicles exiting the Express Lane must merge across three to four lanes of traffic to reach the exit to westbound I-270, which can lead to safety risks due to weaving and lane changes across heavy traffic.

7.0 References

Florida Department of Transportation (FDOT). (2015). "I-95 Express Lanes: Operational and Safety Impact Report." *FDOT Express Lanes Operations Study*.

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