GLENDORA PEOPLE MOVEMENT PROJECT: SAFETY ANALYSIS

A Project

Presented to the

Faculty of

California State Polytechnic University, Pomona

In Partial Fulfillment

Requirements for the Degree

Master of Urban and Regional Planning

By

Omar Monsalvo

2025

Table of Contents

Table of Figures

List of Tables

Abstract

This report evaluates whether the People Movement Project effectively addresses pedestrian and bicyclist safety concerns in Glendora, CA. People Movement Project (PMP) is a proposal featuring two miles of first/last-mile connections and eight miles of new pedestrian and bike infrastructure seeking grant funding for environmental review. Using a multi-layered research approach, the analysis incorporates roadway classifications, collision data from 2018 to 2022, demographic indicators such as vehicle access, and qualitative observations from Strava heat maps. The study examines the alignment between proposed improvements and areas of known infrastructure gaps, high injury rates, and vulnerable populations. Findings aim to assess PMP responsiveness to existing safety risks.

Introduction

The focus of this project is a Pedestrian and Bicycle Safety Assessment for the City of Glendora, developed alongside city staff beginning in Fall 2024. The initial point of contact was Steven Mateer, Glendora's then-Director of Transportation, who emphasized the importance of linking this safety assessment with the city's broader active transportation initiative: the People Movement Project (PMP) that primarily envisions to provide efficient and safe transportation options for all users, connecting them to key destinations across the City. After Steven transitioned to a new agency, Valerie Velazquez-Santoya, Glendora's Assistant Director of Public Works, took over as the client representative.

The assessment centers on active transportation which means walking, biking, and other human-powered modes of travel like running, skateboarding, and rollerblading. This is more than safety and mobility; it's about public health, air quality, and quality of life. According to the CDC, physical activity can cut the risk of chronic diseases like obesity and diabetes by 30–50%. At the same time, the U.S. Department of Energy estimates that nearly a third of car trips are under a mile, many of which could be replaced by walking or biking. Improving conditions for active transportation offers a real opportunity to shift travel behavior in healthier, more sustainable directions.

The People Movement Project in Glendora proposes a network of over ten miles of pedestrian and bicycle infrastructure across Glendora. It includes two core components: (1) a first/last mile connection to the future Metro A Line station, and (2) approximately eight miles of new bike and pedestrian facilities, many of them along flood control channels and city streets. Design features include Glendora's first protected bike lanes, curb extensions to calm traffic, and

the county's first protected intersection (also known as a Dutch-style intersection). The project supports their long-term goals around environmental sustainability, local economic development, and increased transit ridership. The client project strives to assess the overall safety implications of PMP.

This safety assessment asks: **Does the People Movement Project reflect current safety needs based on existing conditions and historical collision data?** This question is explored using both quantitative and qualitative methods, including spatial analysis of collision data, demographic indicators, Census data, and observational insights from Strava activity heat maps.

A key part of the analysis is looking at pedestrian and bicycle collisions together. While the two modes are distinct, they often face similar risks, especially near intersections, on road shoulders, or along corridors with inadequate infrastructure.

Ultimately, this assessment fits into a broader planning framework that prioritizes equity, sustainability, and safety. It helps ensure that Glendora's future investments in active transportation are data-informed, responsive to current conditions, and aligned with long-term goals such as Vision Zero, a commitment to eliminate traffic deaths and serious injuries. This report aims to support that vision by providing a clearer picture of where risks exist today and where future improvements will matter most.

Literature Review

Research consistently underscores the importance of aligning transportation infrastructure with pedestrian and cyclist safety needs, particularly in car-oriented communities. The People Movement Project (PMP) aims to improve safety in Glendora through the introduction of protected bike lanes and first/last-mile connections. However, literature suggests that to be effective, such projects must be guided by robust data on collision patterns, user vulnerability, and multimodal demand.

The Federal Highway Administration (2019) and the National Association of City Transportation Officials (2013) advocate for analyzing pedestrian and bicycle data collectively to better capture overlapping safety risks. This combined approach, as adopted in this report, is supported by Vision Zero frameworks which emphasize eliminating traffic-related deaths and serious injuries through design interventions and policy changes (FHWA, 2019; NACTO, 2013).

Equity in transportation planning is also a central theme in the literature. Studies show that communities with high rates of zero-vehicle households are disproportionately affected by unsafe walking and biking conditions (University of Massachusetts Amherst, 2018). These findings align with the report's demographic analysis, which reveals that areas with low car ownership also experience higher rates of pedestrian and bicycle collisions. This affirms the importance of targeting safety interventions in communities with the highest dependency on active transportation.

Finally, the California Complete Streets Act (AB 1358) mandates that cities plan for all modes of travel, not just vehicles. The report identifies a disconnect between Glendora's current roadway classifications and the multimodal principles outlined in the Act, echoing concerns from

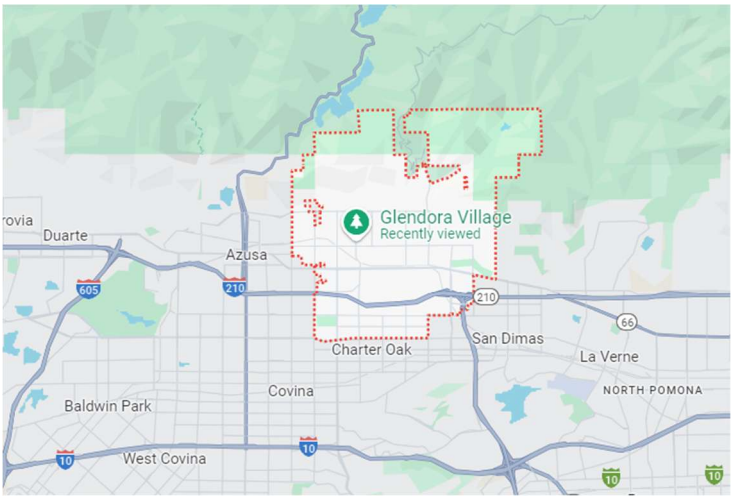
transportation scholars that traditional auto-centric planning frameworks marginalize non-motorized users (California Legislature, 2008).

In sum, PMP's success hinges on its ability to reflect the empirical and policy-driven insights found throughout the transportation safety literature, that data-informed, equity-oriented, and multimodal planning leads to safer, more inclusive streets.

Methodology

This assessment uses a mixed-methods approach to evaluate whether the People Movement Project addresses current safety concerns for people walking and biking. The methodology combines spatial analysis, demographic data, collision records, and observational insights to understand how well the proposed PMP aligns with existing conditions and needs in Glendora shown in Figure 1.

Figure 1: Regional View of Glendora



Roadway Classifications

The roadway classification analysis began by referencing the Glendora Community Plan 2025, which outlines four roadway types: freeway, arterial (major and minor), and collector in Table 1.

To assess the project's commitment to safety, roadway classification was used to see if they conflict with the PMP proposed enhancements. A layered network approach was used conceptually to identify demand.

Bikeways were also identified as part of the roadway in the safety analysis. I used the 2007 Glendora Circulation Element to identify official routes. Proposed bikeway enhancements were also identified using the City's website. These routes were digitized and mapped in ArcGIS Pro to visualize the city's long-term vision for bicycle connectivity.

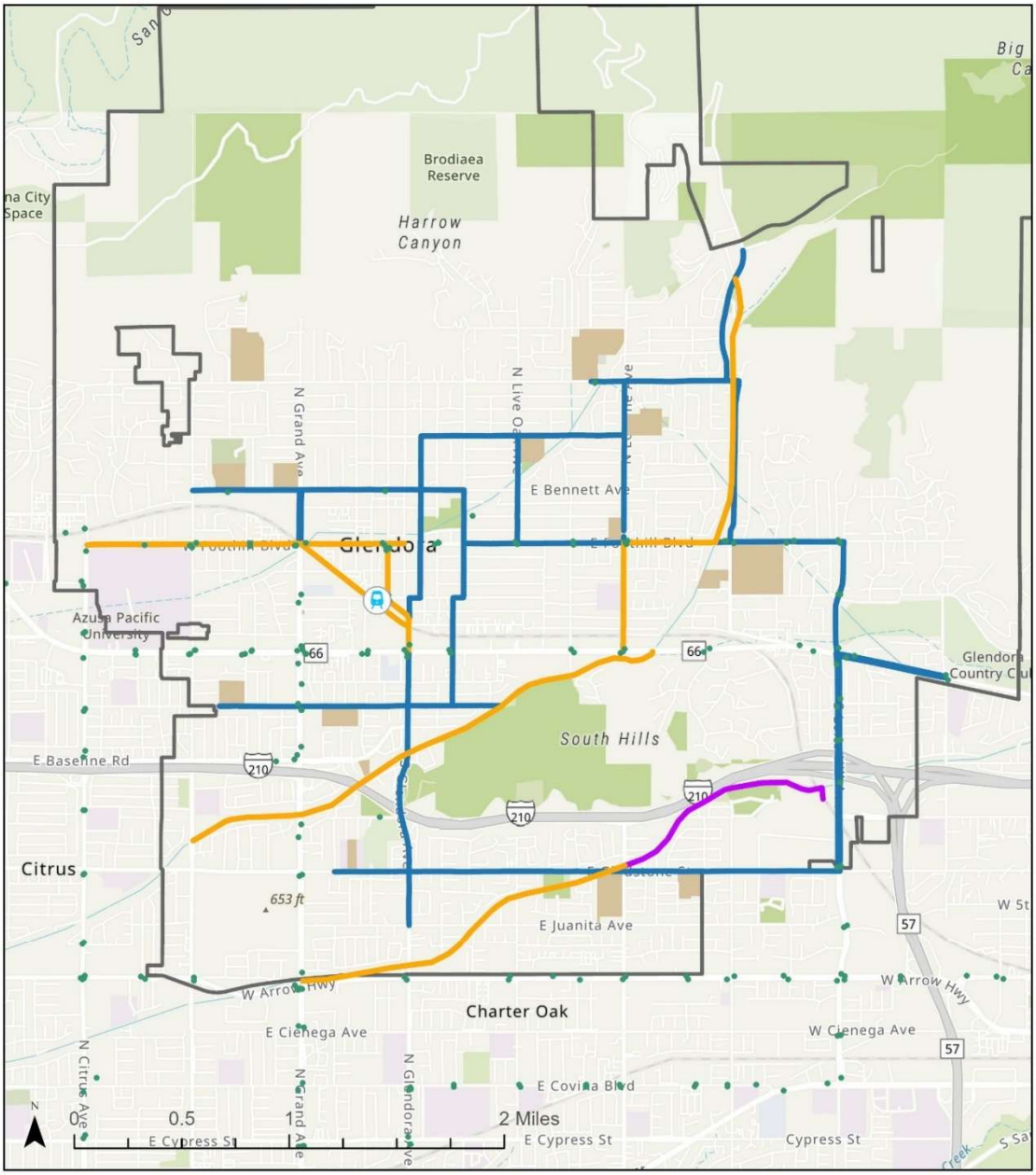
Each bikeway was categorized by type (Class I, II, or III), following California standards in Figure 2. This allowed for a comparison between planned bikeways in the circulation element and those proposed under the People Movement Project. The PMP routes were then overlaid onto this map to examine alignment with safety concerns and identify where the PMP supports or does not address safety concerns.

This process provided a clear framework to evaluate existing physical characteristics of the city.

Table 1: Roadway Designation

Circulation Element		Standard Plan Specification	
Designation	Description	Designation	Specification
Arterial	100' R/W 84' curb-to-curb 4 to 6 lanes, divided	Major	100' R/W 84' curb-to-curb 6 lanes, divided
Collector	60 – 80' R/W 40' curb-to-curb 2 to 4 lanes	Secondary	80' – 84' R/W 64' curb-to-curb 4 lanes undivided
Local Street	50' R/W 36' curb-to-curb 2 lanes	Collector (Local Residential)	60' R/W 40' curb-to-curb 2 lanes
		Local – Residential (24 Lots or Less)	50' R/W 36' curb-to-curb 2 lanes
R/W = right-of way ' = foot			

Figure 2: Existing Bikeways and People Movement Project (Proposed Bikeways)



Collision Data Analysis

This analysis used a GIS-based approach to map and assess pedestrian and bicycle collisions that occurred in the City of Glendora between January 1, 2018, and December 31, 2022. Collision data was sourced from the Statewide Integrated Traffic Records System (SWITRS), and only incidents involving pedestrians and bicyclists were included. The dataset was cleaned to remove duplicates, entries with missing coordinates, and non-injury collisions that didn't meet the threshold for safety relevance.

Rather than analyzing pedestrian and bicycle collisions as separate categories, this project combined them into a single dataset of "active transportation collisions." This decision was based on two key factors. First, while the two modes are different, they often share the same unsafe infrastructure like unprotected crossings, sidewalks, or inadequate buffer zones and are both highly vulnerable to vehicle traffic. Second, several planning agencies, including the Federal Highway Administration (2019) and the National Association of City Transportation Officials (2013), have emphasized the value of analyzing active modes together to better identify overlapping patterns of risk. This combined approach also aligns with the broader goals of complete streets and Vision Zero frameworks, which focus on creating safe environments for all non-motorized road users.

The analysis focused on identifying high-collision locations by breaking the street network into intersections and midblock segments. In ArcGIS Pro, collisions were spatially joined to intersections using a 250-foot buffer from the center of each intersection. This buffer distance was selected to account for minor mapping inaccuracies in collision reporting and to better reflect how people move through street space. Intersections were then scored based on the

number of pedestrian and bicycle collisions falling within each buffer. This helped highlight critical nodes in the network where conflict between vehicles and active users is most concentrated.

Midblock segments, the stretches of road between intersections, were analyzed using 60-foot buffer except at the edge of segments to avoid double counting. 60 feet was used because on spatial analysis software lines are on dimensional and creating a 60 foot creates a polygon. This, more importantly, would allow for the widest road segments (120 ft) in the City to capture collisions within their respective segments. Segments also start at the edge of the intersection's 250ft buffer to avoid double counting and unsafe intersections misleading segment scores. If a collision occurred within 60 feet of a street segment but not within an intersection buffer, it was assigned to that segment to allow the analysis to isolate linear corridors where safety improvements may be needed.

Each segment and intersection were scored based on injury severity, collision density, and proximity to pedestrian areas associated with it.

Injury Severity

- Fatal (K): **10**
- Severe Injury (A): **7**
- Minor Injury (B): **4**
- Possible Injury (C): **2**
- Property Damage Only (PDO): **1**

Injury severity is the most critical factor in determining the urgency of safety interventions. Fatal and severe injury collisions receive the highest weights to prioritize locations where lives are at the greatest risk. Minor injuries and property damage collisions are still

considered, ensuring comprehensive safety assessment. Each point was given a score based on its injury severity.

Collision Density (Within 250 Feet)

- 1 Collision: **0.25**
- 2 Collisions: **1**
- 3 Collisions: **2**
- 4 Collisions: **3**
- 5+ Collisions: **4**

Scores were assigned based on the number of collisions within each buffer, with higher collision counts receiving higher scores,reflecting the criteria commonly used in grant funding evaluations to prioritize safety improvements.

Collision density provides insight into locations with recurring incidents. Higher densities indicate locations with systemic issues, which may benefit from targeted infrastructure or operational improvements. Weighting collision density also ensures areas with frequent crashes are prioritized.

Proximity to High-Pedestrian Areas (Within 0.25 Miles)

- Near a School: **3**
- Near a Park: **2**
- Near an Existing Transit Stop: **0.5**

Locations near schools, parks, and transit stops experience higher pedestrian and bicycle activity, increasing exposure to collisions. Weighting these factors highlights areas where vulnerable road users are most at risk. Transit stops were assigned a lower weight due to the high percentage of collisions already occurring near them.

The weighting system was derived from research in transportation safety (University of Massachusetts, Amherst 2018). Overall, a proximity calculation technique, identifying and

scoring if close to relevant areas) provides a robust safety analysis. When applying for state and federal grants, cost is usually equivalent to property damage, hence the greater weighted factor.

From this scoring system top 10 dangerous intersections and segments were derived as follows:

Top 10 Intersections

Each individual collision was assigned a score based on three factors: high pedestrian activity areas, injury severity, and collision density. These scores were then summed to generate a total score for each collision.

To identify the top 10 intersections in terms of safety concerns, hotspot analysis points were created at every intersection in Glendora. A 250-foot buffer was applied around each intersection to account for sight distance requirements, collision analysis best practices, and established transportation planning standards. This buffer helps capture collisions that were most likely influenced by the intersection's design or characteristics. Once the buffer was applied, the individual collision scores within each area were totaled to produce a weighted score for each intersection. The table 4 below ranks the top 10 intersections based on their total weighted scores.

Top 10 Segments

To find the top 10 segments, the process was similar to that of Top 10 Intersections. First, all segments were derived by removing a 250-foot intersection buffer. This ensured each individual segment analysis focused on areas at least 250 feet away from intersections, avoiding double counting or inflating weighted scores due to intersection-related collisions. The purpose of this was to highlight segments specifically, not intersections. Since segments are lines rather

than points, a 60-foot buffer was applied to reflect the maximum road right-of-way and to make sure all relevant collisions were captured within the segment.

A buffer was not applied at the ends of the segments to prevent overlapping with intersection data. Once all individual collision scores were assigned, they were totaled for each segment and then divided by the segment length to calculate a weighted score. This step ensured longer segments weren't unfairly inflated. Segments were then ranked based on this total weighted score.

DEMOGRAPHICS

To evaluate how well the People Movement Project supports active transportation safety needs, this analysis used U.S. Census Bureau 2022 5-Year Estimates to examine two key datasets: the percentage of zero-car households and the percentage of commuters who walk, bike, or take transit to work. These datasets provide insight into existing travel behavior and help identify areas of high transportation vulnerability. Transportation vulnerability in this safety assessment is defined as communities where people face greater exposure to unsafe travel conditions due to a lack of access to private vehicles or reliable infrastructure for walking, biking, or public transit.

The presence of zero-vehicle households is a strong indicator of reliance on active transportation. By mapping the distribution of these households across Glendora, it becomes possible to assess whether the People Movement Project prioritizes areas where residents are most dependent on walking and biking for daily travel. These households tend to be more sensitive to safety risks, as they do not have the option to avoid hazardous environments by

driving. Therefore, ensuring that planned infrastructure improvements align with where these households are concentrated is a key step toward equitable transportation planning.

In addition, commute mode data was used to understand broader patterns of active transportation demand. While not all walking and biking is work-related, this data captures part of the population that likely depends on non-driving travel modes throughout the day. Transit ridership was also included, since nearly all transit trips begin and end with walking or biking.

Taking together into consideration, these two data sources served as a proxy for identifying where the People Movement Project can have the most meaningful safety impact. Areas with high rates of active commuting and low car ownership represent both the strongest need for safe infrastructure and the highest potential for usage. Incorporating this analysis into the methodology allows planners to determine if the proposed project meets the needs of the most vulnerable residents, those who are most exposed to unsafe conditions and who would benefit most from improved safety investments.

Strava Heat Map Observations

To contextualize another side of existing demand for active transportation in Glendora, a Strava global heat map was reviewed from their website. This map aggregates anonymized recreational activity from GPS-enabled devices and fitness applications and published on their website for member use. While not representative of all users, the Strava map provides a visual reference for areas with relatively higher demand of activity.

This observational review did not involve data extraction or quantitative analysis but was used to complement the full assessment by identifying corridors and neighborhoods with visible

walking and biking activity. These visual observations were integrated as a qualitative approach to help evaluate safety concerns and whether the PMP addresses the concerns.

Findings

Roadway Classifications

Glendora's functional classifications of roadway networks categorize streets by purpose, location, and typical land uses to which they provide access. The functional classification is considered an automobile centric method for planning and should include a variety of classification that consider multimodal priorities.

The Glendora Community Plan 2025 outlines a roadway classification with four types of facilities: freeway, arterial, arterial, and collector (Figure 2). The classification is used as a general description to understand movement of people and vehicles.

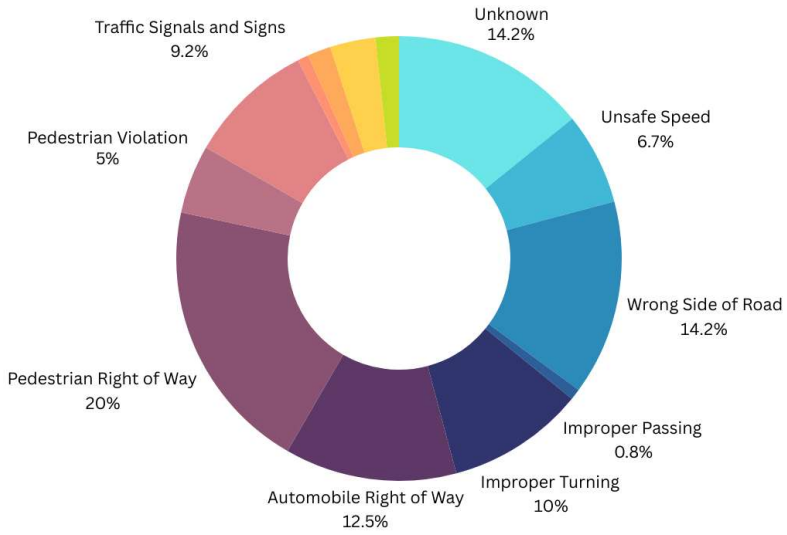
Glendora therefore does not align with state planning requirements, California's Complete Streets Act (AB 1358), which requires cities to consider all modes of transportation in their circulation element. A layered network approach was used conceptually to identify whether different road types might serve different primary modes, such as biking or walking, as part of a multimodal system.

Collision Data Analysis

From 2018 to 2022, there were 642 collisions in Glendora. Excluding interstate collisions, there were 120 (18.7%) of those involved pedestrians or bicyclists. A total of three of the 120 collisions (2.5%) resulting in fatalities.

As shown in Figure 3, the top collision factor violations were Pedestrian Right of Way (20%), Wrong Side of the Road and Unknown (14.2%), and Automobile Right of Way (12.5%).

Figure 3: Violation Categories for Collisions (2018-2022)



Pedestrian Right of Way (20%) – Driver failed to yield to a pedestrian who had the legal right of way.

Automobile Right of Way (12.5%) – Pedestrian or another vehicle failed to yield to an oncoming car with the right of way.

Improper Turning (10%) – Driver made an illegal or unsafe turn (e.g., wrong lane, no signal).

Improper Passing (0.8%) – Vehicle passed unsafely or illegally, especially near pedestrians or other vehicles.

Wrong Side of Road (14.2%) – Driver was traveling against the correct flow of traffic.

Unsafe Speed (6.7%) – Driver was going too fast for road or traffic conditions, even if under the speed limit.

Unknown (14.2%) – Cause of the violation was not recorded or determined.

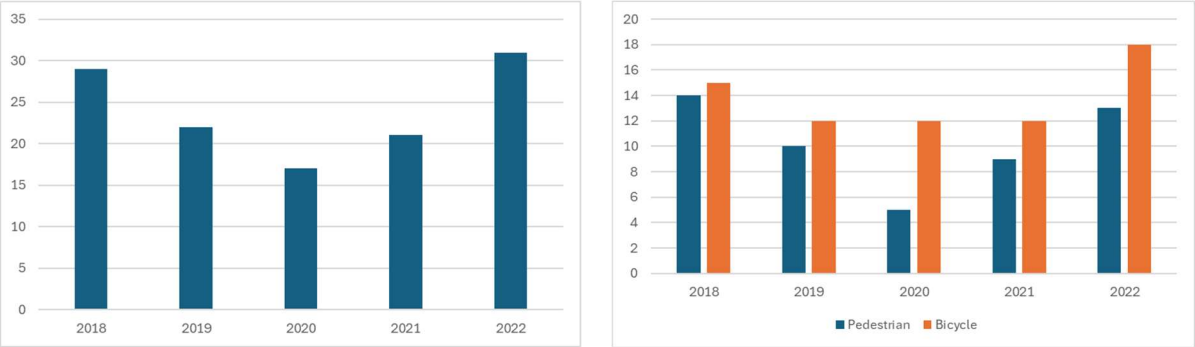
Traffic Signals and Signs (9.2%) – Driver ignored or failed to obey traffic signs or signals (e.g., running red lights, stop signs).

Pedestrian Violation (5%) – Pedestrian broke traffic laws, such as jaywalking or crossing against the light.

The number of collisions ranged from 17 to 31 during the five-year period between 2018-2022, as shown in Figure 4. Most years show a similar number of collisions involving pedestrians or bicyclists except 2020 and 2022. There was a dip in 2020 pedestrian collisions likely due to decreased traffic volumes and pedestrian traffic caused by Covid-19/work from home. A spike in 2022 is likely due to traffic volumes returning to normal.

Bicycle collisions remained constant from 2019 to 2021 and increased in 2022 which could be due to the increased recreational use during Covid-19.

Figure 4: Pedestrian and Bicycle with Vehicle Collisions (2018-2022)



During the five-year period between 2018 and 2022, pedestrian and bicycle collision density was spread out in the City with major intersections seeing a high number of collisions (Figure 5 and 6). Pedestrian collisions are not concentrated in a specific area but occur throughout the City, except in the north eastern residential area. A higher number of pedestrian collisions occurred in the Azusa Pacific University area, Glendora and Foothill, Grand Ave, and Bonnie Cove and Gladstone. Bicycle collisions occurred at specific areas, concentrated on the west side of the City. Route 66, Sierra Madre Ave, Foothill Ave, and Grand Ave are corridors with frequent collisions.

Figure 5: Pedestrian Collision Density (2018-2022)

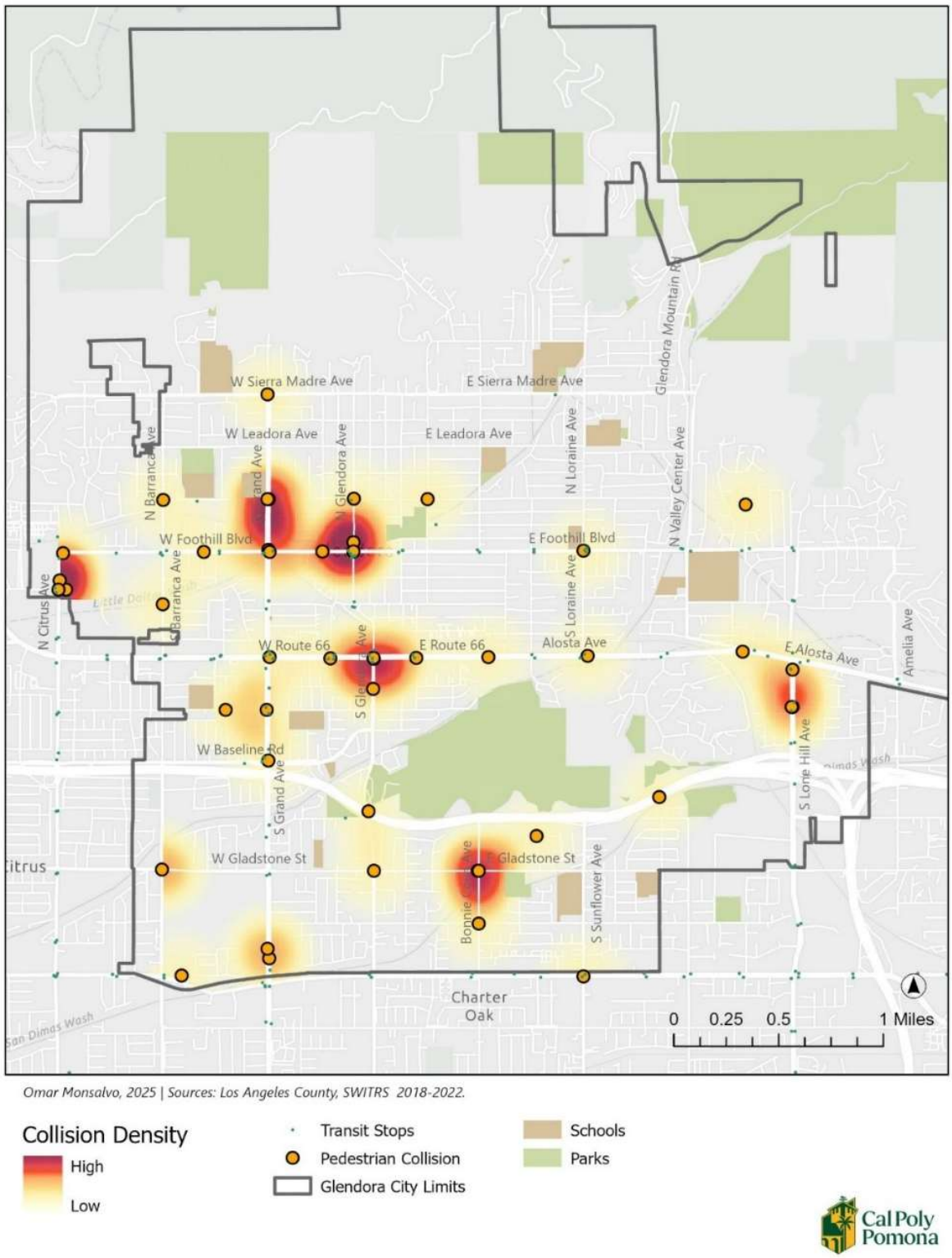


Figure 6: Bicycle Collision Density (2018-2022)

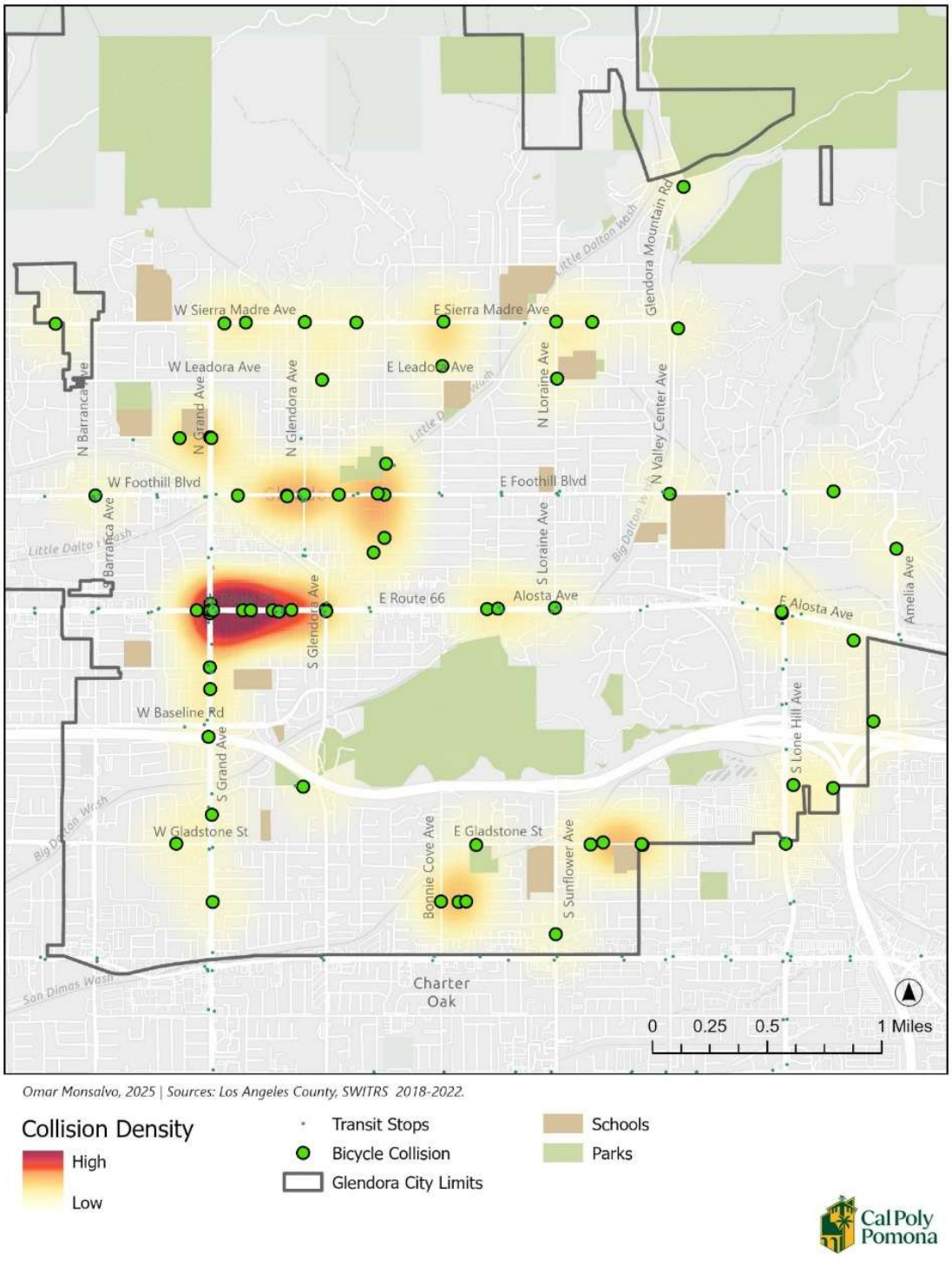


Table 2 provides insights into key intersection collision hotspots in Glendora, emphasizing areas that require safety improvements. Among all intersections analyzed, Route 66 & Grand Ave and Bennett & Grand Ave contain the most collisions with five.

A significant concern highlighted in the table is the lack of bicycle infrastructure. Most intersections lack proper bike lanes according to the National Association of City Transportation Officials (NACTO), limiting safe travel options for cyclists. The exception is Foothill Blvd & Glendora Ave, where a bike lane was installed in 2021, but then removed (only available for about 20% of our study period), a temporary bike lane demonstration because of COVID-19 Pandemic. Bike lane coverage in certain areas is expected to expand although at specific legs of the intersection, it could enhance cyclist safety and encourage alternative transportation.

Speed limits at the intersections vary widely, ranging from 25 mph to 45 mph, with higher speed zones posing greater safety risks. There was a total of 18 pedestrian collisions compared to 15 bicycle collisions. The table highlights Route 66 & Grand Ave as the most critical intersection, with a weighted score of 69.5, reflecting a high collision frequency and severity.

Table 2: Top 10 Intersections Based on Weighted System

Rank	Name	Speed Limit	Pedestrian	Bicycle	Collision Total	Total Weighted Score	Bike Lane?	Proposed Bike Lane?
1	Route 66 & Grand Ave	40	1	4	5	69.5	N	N
2	Bennet & Grand Ave	40 N/S, 35 E/W	3	2	5	64.5	N	Y (2024)[2]
3	Route 66 & Glendora Ave	40	2	2	4	38	N	Y (North)[3]
4	Foothill Blvd & Glendora Ave	25 N, 35 S, 40 E/W	3	1	4	37	Y (2021)[1]	N
5	Bonnie Cove & Gladstone St	25 N/S, 45 E/W	3	0	3	30.5	N	N
6	Route 66 & Vermont	30 N/S, 40 E/W	1	2	3	24	N	N
7	Juanita Ave & Bonnie Cove	25 N/S, 30 E/W	1	1	2	23	N	N
8	Mauna Loa Ave & Grand Ave	40 N/S, 30 E, 25 W	1	1	2	20	N	N
9	Citrus Ave & E Foothill Blvd	35, 15 E	3	0	3	20	N	Y (East)[3]
10	Sierra Madre Ave & Live Oak Ave	25 N/S, 40 E/W	0	2	2	19	N	N
		Total	**18**	**15**	**33**	**345.5**	**-**	**-**

Notes: Some intersections indicate no presence of bike lanes, but there may have been temporary ones established during COVID-19, like parklets. While bike lanes are present today, they may not have existed during the study period, 2018-2022.

1. *There was a temporary bike lane on Glendora Avenue in 2021 to assess public interest. It was removed in 2022.*
2. *A bike lane was proposed during the study period and construction was finalized in 2024.*
3. *Bike lanes are proposed but only on the designated intersection leg.*

Table 3 below provides an overview of various road segments in Glendora, focusing on collisions involving pedestrians and cyclists, along with information about the presence of bike lanes.

The segment of Route 66 between Glendora and Grand Ave stands out with the highest number of total collisions, which includes both pedestrian and bicycle incidents. This segment also has the highest weighted score. Foothill Blvd between Glendora and Grand Ave follows closely with a similar total of collisions but a slightly lower score. This suggests that while the safety issues here are notable, they might not be as severe as on Route 66.

Gladstone St between Bonnie Cove and Lone Hill and Route 66 between Glendora and Lone Hill both have five and seven total collisions, respectively, and higher weighted scores compared to some other segments.

In contrast, Grand Ave between Arrow and 210 has a smaller number of collisions and a lower weighted score. Similarly, Bennett between Barranca and Grand has the lowest number of collisions (one) and the lowest weighted score, and it now contains a bike lane as of 2024.

Sierra Madre between Grand and Glendora Mountain Rd stands out due to the high number of bicycle-related collisions, with a total of 8 incidents. The segment does not currently have a bike lane, which could contribute to the safety issues for cyclists.

Table 3: Top 10 Segments Based on Weighted System

Rank	Segment	Speed Limit	Pedestrian	Bicycle	Collision Total	Total Weighted Score	Segment Length (Mi)	Score per Mile	Bike Lane?	Proposed Bike Lane?
1	Route 66 between Glendora and Grand Ave	40	1	5	6	49.8	0.4	121.9	N	N
2	Foothill Blvd between Glendora and Grand Ave	40	1	3	4	25.5	0.3	84.2	N	N
3	Grand Ave between Route 66 and Baseline	40	1	2	3	26.8	0.4	61.6	N	Y
4	Sierra Madre between Grand and Glendora Mountain Rd	40	0	8	8	63.0	1.9	32.5	N	N
5	Gladstone St between Bonnie Cove and Lone hill	45	0	5	5	43.8	1.4	31.0	N	N
6	Route 66 between Glendora and Lone hill	40	4	3	7	53.8	1.9	28.3	N	N
7	Grand Ave between Arrow and 210	40	2	2	4	25.5	0.9	27.1	N	N
8	Bennett between Barranca and Grand	30	0	1	1	10.8	0.4	26.7	N	Y (2024)[1]
9	Foothill between Glendora and Lorraine	40	0	3	3	23.8	1.0	23.9	N	N
10	Lone hill between Route 66 and Gladstone	40	3	0	3	20.8	0.9	22.7	N	N
Total			12	32	44	-	-	-	-	-

Note: Some intersections indicate no presence of bike lanes, but there may have been temporary ones established during COVID-19, like parklets. While bike lanes are present today, they may not have existed during the study period.

1. A bike lane was proposed during the study period and construction was finalized in 2024

DEMOGRAPHICS

3.4% of households in the Glendora area - approximately 965 households - do not own a car (Figure 7, U.S. Census Bureau, 2022). This may seem like a minute minority, but it represents a the community that relies entirely on walking, biking, or public transportation for daily travel. Most of these zero-vehicle households are in the central region of the city, which also happens to be where a disproportionately high number of collisions occur.

In fact, 41.75% of all pedestrian and bicycle collisions recorded between 2018 and 2022 took place in census tracts with the lowest car ownership rates. This suggests a troubling pattern: the areas where residents are most dependent on active transportation are also the areas with the highest rates of collisions. These findings point to a potential transportation equity gap,where those without access to a private vehicle, often among the most economically vulnerable, are exposed to greater safety risks. Ironically, these same individuals contribute the least to traffic congestion and vehicle emissions yet face the greatest dangers in the public roads.

Addressing this gap is critical not only from a transportation planning perspective but also from a public health standpoint, safety. Ensuring that infrastructure improvements such as the PMP prioritize these high-risk areas can help create a safer, more inclusive transportation system for all Glendora residents

Figure 7: Percent of Households with No Cars by Census Tracts (2022 5-Year Estimates)

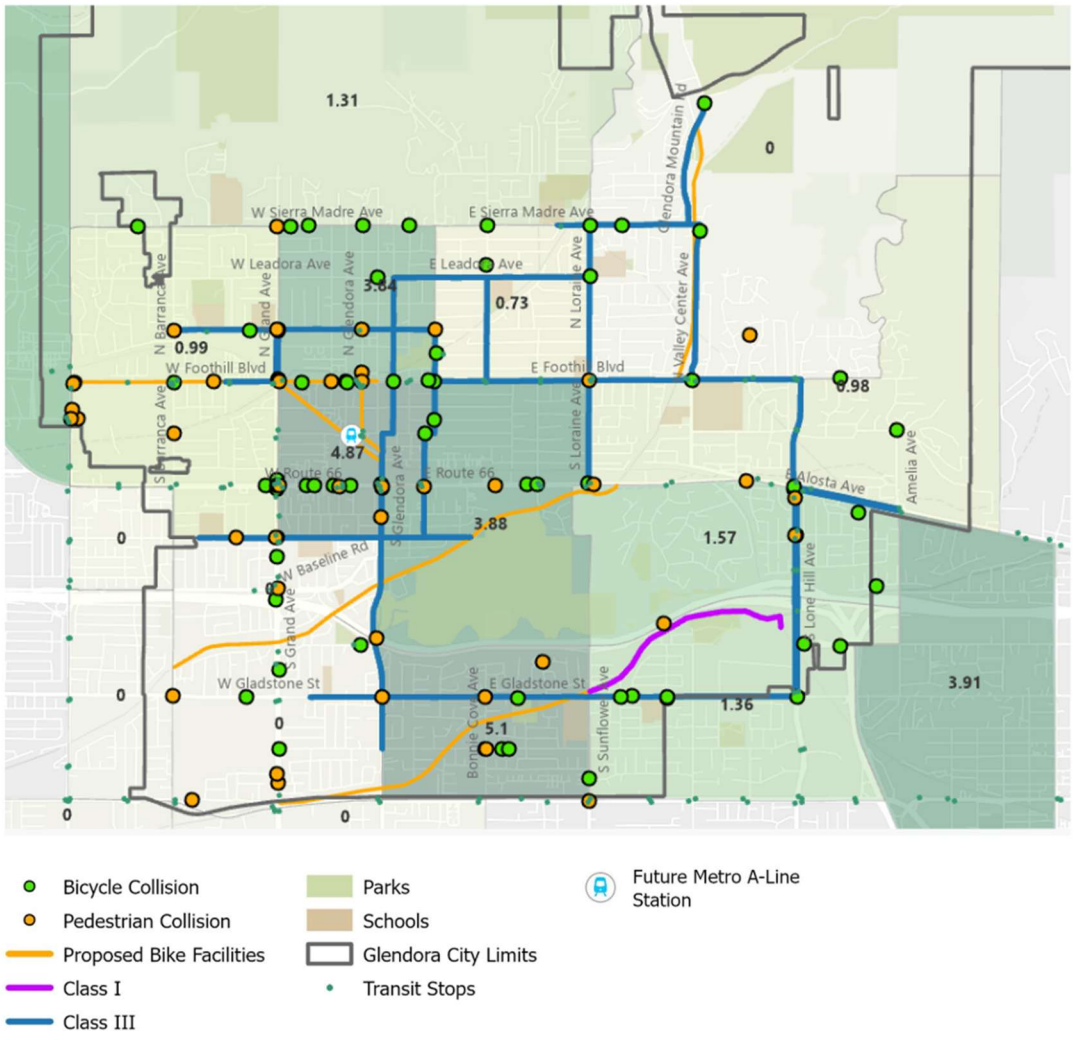
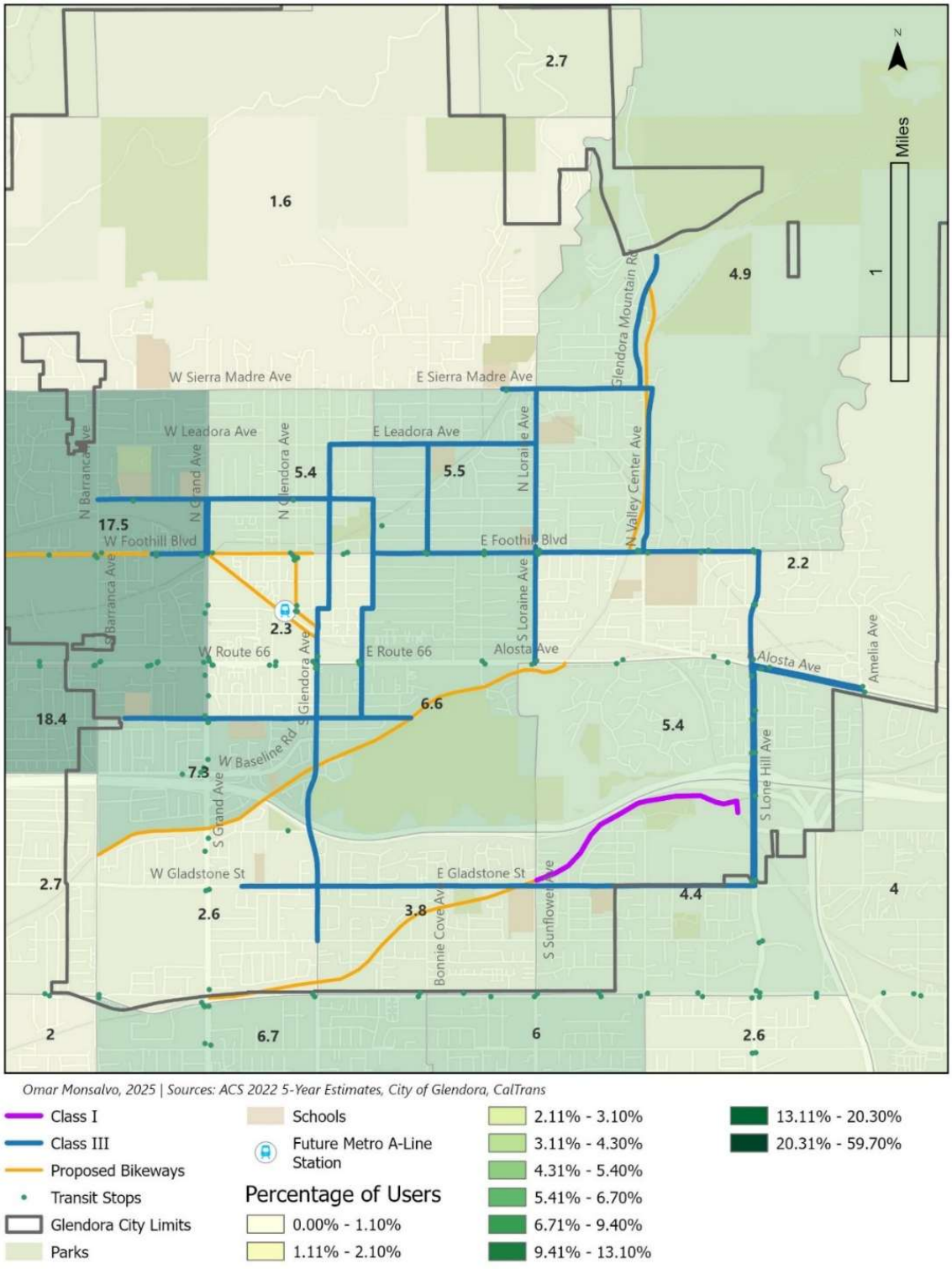


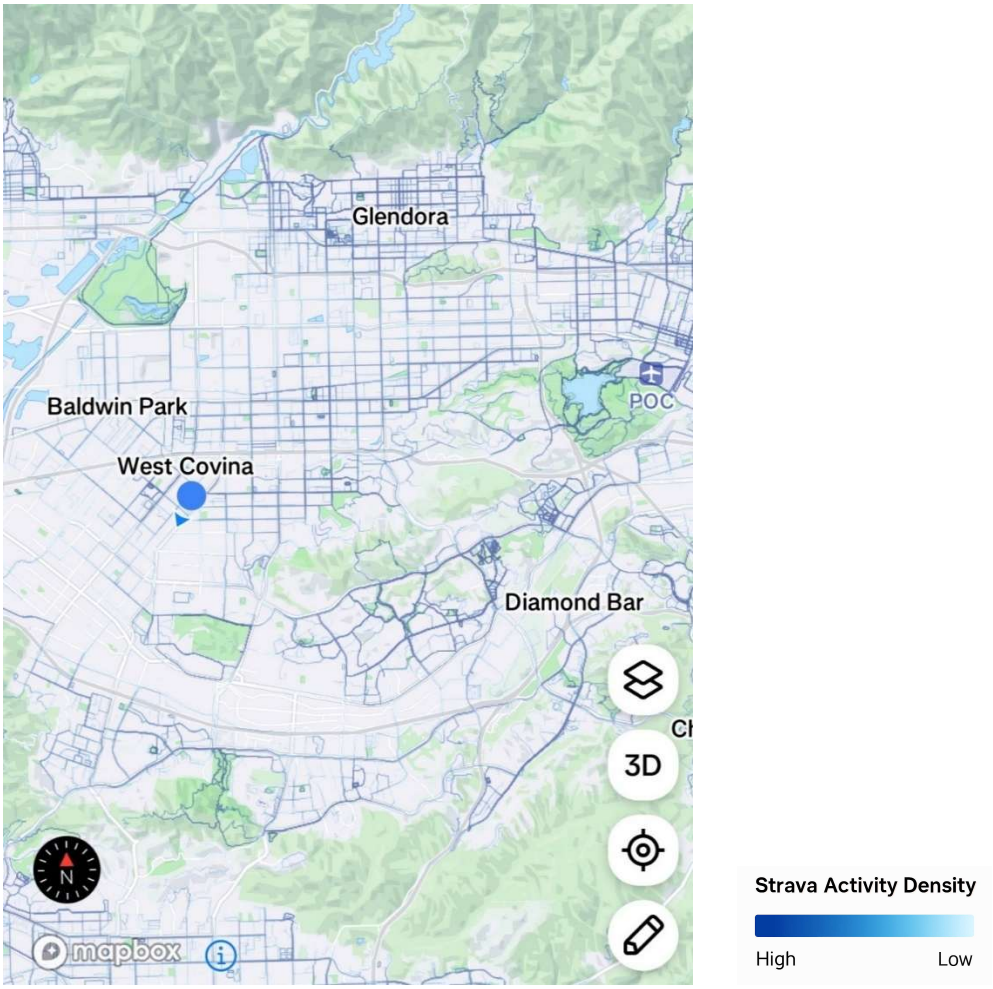
Figure 8 highlights the percentage of residents that use transit or walk/bike to work (U.S. Census Bureau, 2022). Transit and active transportation are interconnected because transit riders usually walk or bike to their stop, a more accurate depiction of active transportation demand. Census tracts with higher percentages could be due to containing Azusa Pacific University and Citrus Community College campuses.

Figure 8: Percent of Workers that take Transit and Walk/Bike (2022 5-Year Estimates)



STRAVA HEAT MAP OBSERVATIONS

Figure 9: Strava Heat Map of Recreational Activities (2024)

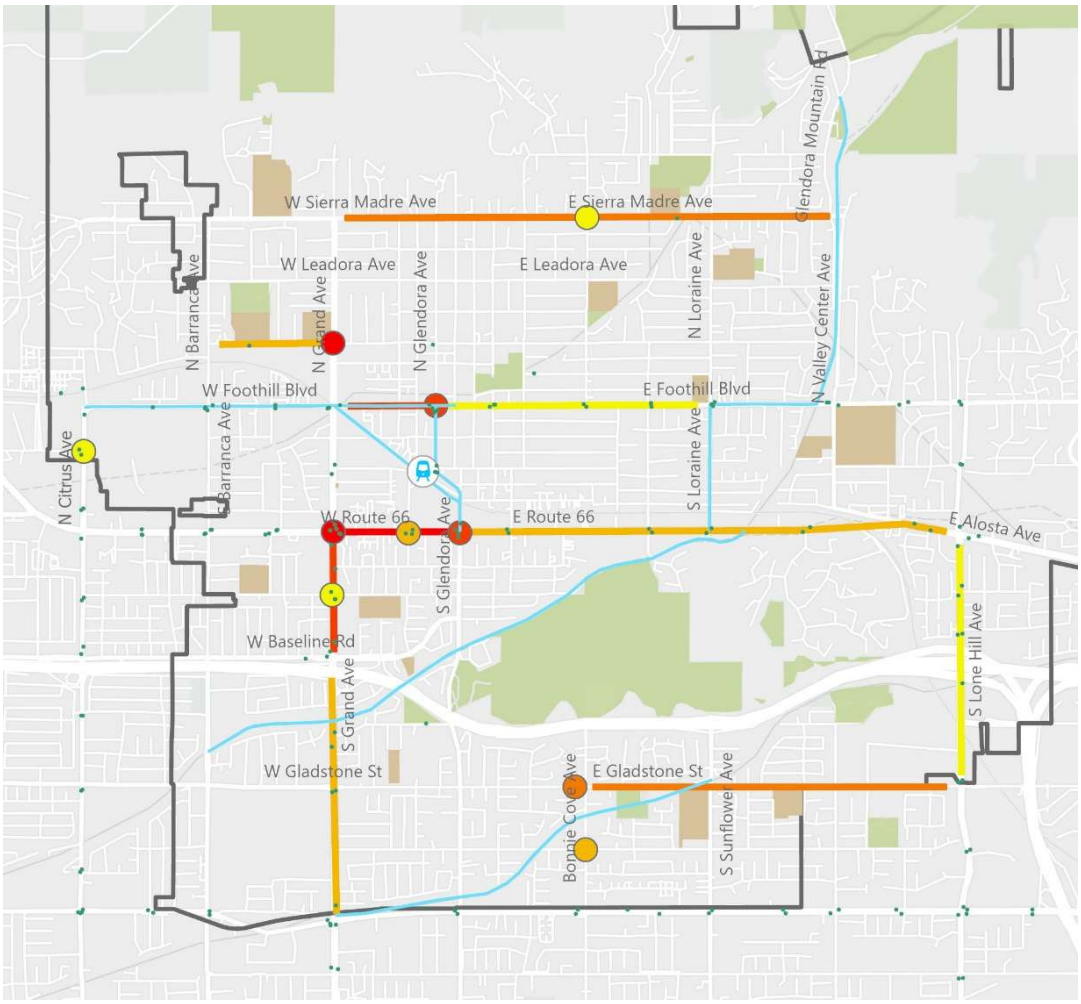


Strava heat map (Figure 9) can be accessed here. It shows high levels of all recreational activity (walking, hiking, running, biking, etc.) across nearly all streets in Glendora, with dark blue lines indicating frequent use. This activity is not limited to the downtown area; active transportation is occurring citywide. In addition to daily mobility, recreational activities are important components of active transportation and safety particularly in the foothill areas, there is strong demand for safe pedestrian and bicycle infrastructure for both recreation and daily mobility. Key corridors with high demand for active transportation (dark blue) are Bennett Ave,

Foothill Ave, and Sierra Madre Ave. Most of Glendora has some tint of blue, indicating demand and preferences.

Given this level of demand, it is essential that the People Movement Project prioritizes safety in these areas. Many residents benefit from active transportation, and ensuring their safety should not be compromised as the project moves forward. The people movement project should enable safe commutes for residents to and from work but also allow a space for recreation use.

Figure 10: Top 10 Locations Based on Weighted System



To assess whether the People Movement Project (PMP) addresses key safety issues, the hot spot collision data was layered with the proposed alignments as shown in Figure 10. Most of

the PMP enhancements are expected to be Class I facilities (the diagonal stretches along the washes), which are physically separated from vehicular traffic and ideal for recreational use

However, a deeper look at the top 10 high-collision segments and intersections tells a different story. Many of the highest-risk locations, especially around Route 66, Grand Avenue, and Sierra Madre Ave are not part of the PMP scope. This is a critical gap.

However, the overlap between the top 10 safety concerns covers a short segment on Foothill Blvd between Glendora Ave and Grand Ave which is the dangerous segment according to the hot spot analysis. These segments and intersections received high weighted scores during analysis, indicating a pattern of collisions involving pedestrians and cyclists. It also covers intersections ranked 3 and 4 (Route 66 and Glendora Ave & Foothill Blvd and Glendora Ave) in the hot spot analysis.

The color coding in the map shows a concentration of red and orange areas in central and southern Glendora, zones where vulnerable users are more likely to be exposed to unsafe conditions.

Discussion

This study evaluated the alignment of the People Movement Project (PMP) with the current safety needs for pedestrians and cyclists in Glendora, using historical collision data as a benchmark. The PMP, which envisions a 10-mile active transportation network through the completion of the an urban trail system and first/last mile improvements, aims to provide safer and more efficient transportation options for pedestrians and cyclists. However, the findings of this study suggest that while the PMP offers improvements in some areas, it overlooks critical locations with the highest collision rates, where infrastructure improvements are needed most. This misalignment raises concerns about the project's potential effectiveness in addressing Glendora's most pressing transportation safety issues.

The analysis revealed that while the PMP targets some areas with high pedestrian and cyclist collision rates, it does not adequately address several of the city's most dangerous corridors and intersections. This section highlights the significant gaps between high-risk locations and proposed PMP improvements.

Overlooked High-Risk Locations

1. Route 66 (Glendora Avenue to Grand Avenue):
    - This segment recorded the highest number of pedestrian and cyclist collisions in Glendora, yet it is not included in the PMP's proposed improvements. Route 66 lacks dedicated bike lanes, making it an inherently unsafe corridor for active transportation users. Its exclusion from the PMP raises concerns about the project's ability to address the most urgent safety needs in the city.

2. Route 66 & Grand Avenue (Intersection):
    - The intersection of Route 66 and Grand Avenue, identified as the most dangerous intersection in the city, similarly lacks any bicycle infrastructure and was not included in the PMP's proposed improvements. Given its high collision rates, including this location in the PMP would directly address a critical safety gap.
3. Sierra Madre Avenue:
    - Ranked fourth among high-risk segments, Sierra Madre Avenue has seen a significant number of pedestrian and cyclist collisions. However, it is also excluded from the PMP, which raises concerns about the comprehensive nature of the project in addressing Glendora's safety needs.
4. Bennett Avenue:
    - As the second most dangerous intersection and the eighth most dangerous segment, Bennett Avenue is another critical location missing from the PMP. The absence of basic bike infrastructure in this area further exacerbates safety issues for vulnerable road users.

Areas Addressed by the PMP

While several critical areas remain unaddressed, the PMP does incorporate improvements in some locations with high collision rates:

1. Foothill Boulevard & Glendora Avenue (Intersection):
    - This intersection, ranked fourth in terms of collision rates, is included in the PMP, and it had bicycle infrastructure briefly installed in 2021. The inclusion of this

location in the PMP signals that the project is responsive to safety needs in select areas. However, the effectiveness of these improvements remains unclear given the limited scope of the initial installation.

2. Route 66 & Glendora Avenue (Intersection):
    - Located adjacent to a proposed bike lane, this intersection is partially aligned with the PMP's proposed infrastructure. While this is a positive step, the partial alignment is insufficient to fully address the area's safety concerns.

Despite these improvements, many other critical corridors remain outside the PMP's scope, indicating that safety needs in these high-risk locations have not been adequately prioritized.

PMP's Scope and Policy Implications

The Urban Trail System and First/Last Mile Improvements proposed by the PMP are promising in creating a more multimodal-friendly environment, especially through the inclusion of protected bike lanes and the first "Dutch" intersection in Los Angeles County. These improvements are essential for making active transportation more accessible and safer for all users, particularly in areas with high levels of pedestrian and cyclist activity. However, these enhancements are limited in their coverage, and the project's focus on the Metro L (Gold) Line station and the surrounding areas falls short of addressing the widespread safety issues in Glendora's most dangerous corridors.

1. Car-Centric Infrastructure:

    Glendora's arterial roads, such as Foothill Boulevard and Glendora Avenue, have been designed to prioritize vehicle throughput, often at the expense of pedestrian and cyclist

safety. This vehicle-first approach directly contradicts California's Complete Streets Act (AB 1358), which mandates that planners consider all users of the roadway. When analyzed through the lens of a "layered network," these roads function as multimodal corridors, but lack the necessary infrastructure to support safe active transportation. This misalignment between infrastructure design and multimodal needs further exacerbates safety concerns for pedestrians and cyclists.

2. Strava Heatmap Data:

   Analysis of the Strava heatmap further supports the demand for safer cycling infrastructure, particularly along high-traffic corridors like Route 66 and Foothill Boulevard, which see elevated levels of recreational cycling. However, without adequate infrastructure,such as protected bike lanes,this activity exposes cyclists to significant safety risks. The lack of safe infrastructure prevents these areas from becoming truly multimodal.

3. Discrepancy Between Infrastructure and Safety Needs:

   The PMP’s focus on the urban trail system and first/last mile improvements is beneficial in enhancing access to key locations such as the Metro station, but it fails to address the existing safety issues in areas like Route 66 and Foothill Boulevard, where the highest numbers of collisions occur. This selective focus suggests a disconnect between the areas identified for improvement and the actual safety needs of the city.

Recommendations

Based on the findings and analysis, the following recommendations are made to ensure that the People Movement Project adequately addresses pedestrian and cyclist safety needs in Glendora:

1. Expand the PMP's Scope:

   The PMP should include more areas with high pedestrian and cyclist collision rates, especially Route 66, Foothill Boulevard, and Grand Avenue. By prioritizing these critical corridors, the city can address its most urgent safety concerns and ensure that the project has a wider impact across the city.

2. Integrate Collision Data More Directly:

   Future planning efforts should incorporate collision data more effectively into infrastructure prioritization. The focus should be on locations with the highest collision rates, particularly those with serious or fatal incidents, to ensure that improvements are made in the most at-risk areas.

3. Adopt a Comprehensive Multimodal Approach:

   The city should prioritize creating safer, multimodal networks that balance the needs of pedestrians, cyclists, and vehicles, in accordance with California's Complete Streets Act. Roads like Foothill Boulevard and Glendora Avenue could be designed to support active transportation, with dedicated bike lanes and pedestrian-friendly infrastructure. This will ensure that these key corridors are accessible and safe for all users.

4. Focus on Vulnerable Road Users:

   The PMP should prioritize safety for vulnerable road users, especially in areas with high pedestrian and cyclist collision rates. This includes the installation of protected bike

lanes, curb extensions, and improvements to intersections that make active transportation safer and more intuitive.

Conclusion

This safety assessment of the People Movement Project (PMP) in Glendora reveals a promising but incomplete response to the city's most pressing active transportation safety needs. While the PMP introduces valuable infrastructure, such as protected bike lanes, first/last-mile improvements, and the county's first Dutch-style intersection, it falls short in addressing several of Glendora's highest-risk corridors and intersections. Spatial analysis shows that locations like Route 66, Grand Avenue, Sierra Madre Avenue, and Bennett Avenue have experienced the highest concentration of pedestrian and bicycle collisions, yet many of these areas are not included in the PMP scope. This disconnect suggests a gap between project goals and on-the-ground safety priorities.

Demographic and Strava data further emphasize the urgency of inclusive infrastructure planning. Neighborhoods with high rates of zero-car households,those most reliant on walking, biking, and transit, also experience a disproportionate share of collisions. The Strava heat map confirms strong demand for recreational and utilitarian active transportation across the city, highlighting the need for safer facilities citywide.

To maximize public safety and equity, the PMP should be expanded, or future projects should prioritize covering these vulnerable, high-risk areas. Integrating collision data and vulnerability indicators into future planning will ensure that infrastructure improvements directly benefit those most exposed to unsafe conditions. Glendora can build a multimodal network, but it must align vision with evidence. This report offers a data-driven foundation to help guide those next steps.

References

1. American Association of State Highway and Transportation Officials. (2012). *Guide for the Development of Bicycle Facilities*.(pedbikesafe.org)
2. Brookshire, K., Kumfer, W., West, A., Thomas, L., Judelman, B., Proulx, F., & Hintze, M. (2025). *Pedestrian and Bicyclist Safety – Literature Review* (Report No. DOT HS 813 568). U.S. Department of Transportation, National Highway Traffic Safety Administration. https://rosap.ntl.bts.gov/view/dot/79217
3. California Bicycle Coalition. (n.d.). *Complete Streets Fact Sheet*. https://www.calbike.org/resources/fact_sheets_and_faq_s/complete_streets_fact_sheet/(calbike.org)
4. California Legislature. (2008). *Assembly Bill No. 1358: Complete Streets Act*.
5. Chrysler, S. T., Fitzpatrick, K., Brewer, M. A., & Cynecki, M. (2011). *Pedestrian and Bicyclist Traffic Control Device Evaluation Methods* (Report No. FHWA-HRT-11-035). Federal Highway Administration.(highways.fhwa.dot.gov)
6. Fitzpatrick, K., & Park, E. S. (2010). *Safety Effectiveness of the HAWK Pedestrian Crossing Treatment* (Report No. FHWA-HRT-10-042). Federal Highway Administration.(highways.fhwa.dot.gov)
7. Fitzpatrick, K., Chrysler, S. T., Iragavarapu, V., & Park, E. S. (2010). *Crosswalk Marking Field Visibility Study* (Report No. FHWA-HRT-10-068). Federal Highway Administration.(highways.fhwa.dot.gov)
8. Federal Highway Administration. (2019). *How to Develop a Pedestrian Safety Action Plan* (Report No. FHWA-SA-05-12).(NHTSA)
9. Federal Highway Administration. (2012). *Proven Safety Countermeasures: Road Diet* (Report No. FHWA-SA-12-013).(pedbikesafe.org)
10. Federal Highway Administration. (2012). *Proven Safety Countermeasures: Medians and Crossing Islands in Urban and Suburban Areas* (Report No. FHWA-SA-12-013).(pedbikesafe.org)
11. Federal Highway Administration. (2005). *Safety Effects of Marked versus Unmarked Crosswalks at Uncontrolled Locations* (Report No. FHWA-HRT-04-100).(highways.fhwa.dot.gov)
12. Federal Highway Administration. (2011). *Safety Strategies Study*. https://highways.fhwa.dot.gov/public-roads/mayjune-2011/safety-strategies-study(highways.fhwa.dot.gov)
13. Hunter, W. W., Thomas, L., Srinivasan, R., & Martell, C. A. (2010). *Evaluation of Shared Lane Markings* (Report No. FHWA-HRT-10-041). Federal Highway Administration.(highways.fhwa.dot.gov)

14. Institute of Transportation Engineers. (2009). *Road Diet Handbook – Setting Trends for Livable Streets*.(pedbikesafe.org)

15. Manual on Uniform Traffic Control Devices for Streets and Highways. (2009). Federal Highway Administration.(pedbikesafe.org)

16. National Association of City Transportation Officials. (2013). *Urban Street Design Guide*.(pedbikesafe.org)

17. National Association of City Transportation Officials. (2018). *Rethinking Safety*. https://nacto.org/publication/city-limits/the-need/rethinking-safety/(NACTO)

18. National Association of City Transportation Officials. (2014). *Vision Zero and the Three E's: Engineering, Enforcement, Education*. https://nacto.org/event/designing-cities-2014-vision-zero-and-the-three-es-engineering-enforcement-education/(NACTO)

19. National Highway Traffic Safety Administration. (2024). *Countermeasures That Work: Bicycle Safety*. https://www.nhtsa.gov/book/countermeasures-that-work/bicycle-safety/references(NHTSA)

20. Pedestrian and Bicycle Information Center. (n.d.). *PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System*. https://pedbikesafe.org/PEDSAFE/references.cfm(pedbikesafe.org)

21. Rosales, J. (2009). *Road Diet Handbook – Setting Trends for Livable Streets*. Institute of Transportation Engineers.(pedbikesafe.org)

22. Schroeder, B. J. (2007). *Crossing Solutions for Pedestrians with Vision Impairments at Roundabouts and Channelized Right Turn Lanes*. Transportation Research Board.(pedbikesafe.org)

23. Shurbutt, J., & Van Houten, R. (2010). *Effects of Yellow Rectangular Rapid-Flashing Beacons on Yielding at Multilane Uncontrolled Crosswalks* (Report No. FHWA-HRT-10-043). Federal Highway Administration.(highways.fhwa.dot.gov)

24. University of Massachusetts Amherst. (2018). *Transportation Equity Study*.

25. Wolfe, E. S., Arabian, S. S., Breeze, J. L., & Salzler, M. J. (2016). Distracted biking: An observational study. *Journal of Trauma Nursing, 23*(2), 65–70.(NHTSA)

26. Wood, J. M., Lacherez, P., & Tyrrell, R. A. (2014). Seeing pedestrians at night: effect of driver age and visual abilities. *Ophthalmic & Physiological Optics, 34*(4), 452–458.(NHTSA)

27. Yamani, Y., Samuel, S., & Fisher, D. (2014). Simulator evaluation of an integrated road safety training program. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 58*(1), 1904–1908.(NHTSA)

28. Yamani, Y., Samuel, S., Knodler, M. A., & Fisher, D. L. (2016). Evaluation of the effectiveness of a multi-skill program for training younger drivers on higher cognitive skills. *Applied Ergonomics, 52*, 135–141.(NHTSA)

29. Zanotto, M., & Winters, M. L. (2017). Helmet use among personal bicycle riders and bike share users in Vancouver, BC. *American Journal of Preventive Medicine, 53*(4), 465–472.(NHTSA)

30. Zegeer, C., Sandt, L., & Scully, M. (2009). *How to Develop a Pedestrian Safety Action Plan* (Report No. FHWA-SA-05-12). Federal Highway Administration.(NHTSA)

31. Zimmerman, S., & Lieberman, M. (2020). *The Safe Routes to School Program Census Project: 2019 National Program Assessment Report*. Safe Routes Partnership.(NHTSA)

32. CalBike. (n.d.). *The Long Road to Complete Streets*. https://www.calbike.org/the-long-road-to-complete-streets/(calbike.org)

33. AP News. (2024, March 2). A New Jersey city that limited street parking hasn't had a traffic death in 7 years. https://apnews.com/article/007dec67706c1c09129da1436a3d9762(AP News)

34. Federal Highway Administration. (2006). *BIKESAFE: Bicycle Countermeasure Selection System* (Report No. FHWA-SA-05-006).(pedbikesafe.org)

35. Federal Highway Administration. (2010). *Evaluation of Shared Lane Markings* (Report No. FHWA-HRT-10-041).(highways.fhwa.dot.gov)

36. Federal Highway Administration. (2010). *Crosswalk Marking Field Visibility Study* (Report No. FHWA-HRT-10-068).(highways.fhwa.dot.gov)

37. Federal Highway Administration. (2010). *Safety Effectiveness of the HAWK Pedestrian Crossing Treatment* (Report No. FHWA-HRT-10-042).(highways.fhwa.dot.gov)

38. Federal Highway Administration. (2010). *Effects of Yellow Rectangular Rapid-Flashing Beacons on Yielding at Multilane Uncontrolled Crosswalks* (Report No. FHWA-HRT-10-043).(highways.fhwa.dot.gov)

39. Federal Highway Administration. (2011). *Pedestrian and Bicyclist Traffic Control Device Evaluation Methods* (Report No. FHWA-HRT-11-035).(highways.fhwa.dot.gov)

40. Federal Highway Administration. (2012). *Proven Safety Countermeasures: Road Diet* (Report No. FHWA-SA-12-013).(pedbikesafe.org)

41. Federal Highway Administration. (2012). *Proven Safety Countermeasures: Medians and Crossing Islands in Urban and Suburban Areas* (Report No. FHWA-SA-12-013).(pedbikesafe.org)

42. Federal Highway Administration. (2005). *Safety Effects of Marked versus Unmarked Crosswalks at Uncontrolled Locations* (Report No. FHWA-HRT-04-100).(highways.fhwa.dot.gov)

43. Federal Highway Administration. (2019). *How to Develop a Pedestrian Safety Action Plan* (Report No. FHWA-SA-05-12).