VILLAGE OF BELLWOOD: TECHNICAL ASSISTANCE SAFETY PLANNING

25th Avenue
and Illinois Prairie Path

EXISTING CONDITIONS REPORT

PREPARED FOR:

Chicago Metropolitan Agency for Planning
and Village of Bellwood

Date: 3/7/2022

Contents

Tables

Figures

1. Introduction

Overview

With a vision to improve its infrastructure and the quality of life of its residents, the Village of Bellwood is taking advisement, via technical assistance, to identify and propose countermeasures to improve safety performance at the intersection of 25th Avenue and the Illinois Prairie Path (IPP). Through the support of the Chicago Metropolitan Agency for Planning (CMAP), this effort will foster collaboration with residents and local stakeholders to identify and equitably address challenges and traffic safety concerns at this intersection—for all road users.

This evaluation takes a proactive approach to understanding and addressing the traffic safety needs of local residents. As observed in the Village of Bellwood, as communities grow and evolve, so do their transportation facilities and movement patterns, and so must their plans to achieve safe operations. By leveraging contemporary traffic safety research, historical safety performance data, and the invaluable insights of those who drive, walk, and bike this facility every day, the project team and stakeholder team will identify practical goals for the intersection, as well as holistic strategies for achieving those goals.

The goal of identifying and proposing countermeasures to address safety issues must be based on a complete understanding of the target intersection, such as is provided in this Existing Conditions Report (ECR). This report represents a thorough, data-driven evaluation of the current state of the Village of Bellwood's transportation facilities at the intersection of 25th Avenue and the IPP, in terms of traffic safety performance.

Purpose

The Village of Bellwood is located on the west side of Cook County, Illinois, west of Chicago's city limits (Figure 1-1). Home to nearly 19,000 residents, the Village is 2.4 square miles, with over 6,200 households. To help better serve the needs of its residents, the Village of Bellwood updated its Comprehensive Plan in 2013 and outlined the following major mobility goals:

1. Balance the need for traffic flow with the desire to create a pedestrian-friendly environment and access to adjacent development.
2. Create an environment to foster and facilitate Transit-Oriented Development (TOD).
3. Expand the locations of gateways into Bellwood which communicate the Village's brand and identity to locations on primary travel routes including the Interstate 290 and rail routes.
4. Enhance all modes of transportation.

In order to continue building on the vision of the 2013 Comprehensive Plan, the Village is embarking on a safety study addressing safety concerns at the intersection of 25th Avenue and the IPP. Since the IPP is a regionally significant trail, the Village of Bellwood will take into account the safety recommendations provided in the study to improve transportation safety for all road users at this location. The intention of the recommendations is to increase the attractiveness and use of using the IPP, along with improving the safety for all of its users.

While moving forward to identify and implement new and exciting strategies to improve safety for all road users, it is important to allow past and future efforts to inform the decision-making process. Through past efforts initiated by the Village of Bellwood and its colleagues, the 25th Avenue corridor has

undergone a major transformation with the addition of an overpass bridge roughly 1 mile north of the study area. There are also plans to widen 25th Avenue north of the study area, along with additional industrial development in the immediate area that is expected to increase truck traffic throughout the area. With the likely increase in truck traffic, conflicts with other roadway users are also expected to increase. These are the types of efforts that will enable 25th Avenue to carry a higher volume of both truck and passenger vehicle traffic, resulting in a direct impact on the study area.

To provide a strong background for the safety study and ultimately improve safe mobility for bicyclists and pedestrians, this report will explore the transportation environment of the Village of Bellwood and the surrounding area at the intersection of 25th Avenue and the IPP. First, an overview of historical traffic safety performance will be presented, illustrating crash patterns at the intersection and opportunities for safety improvement.

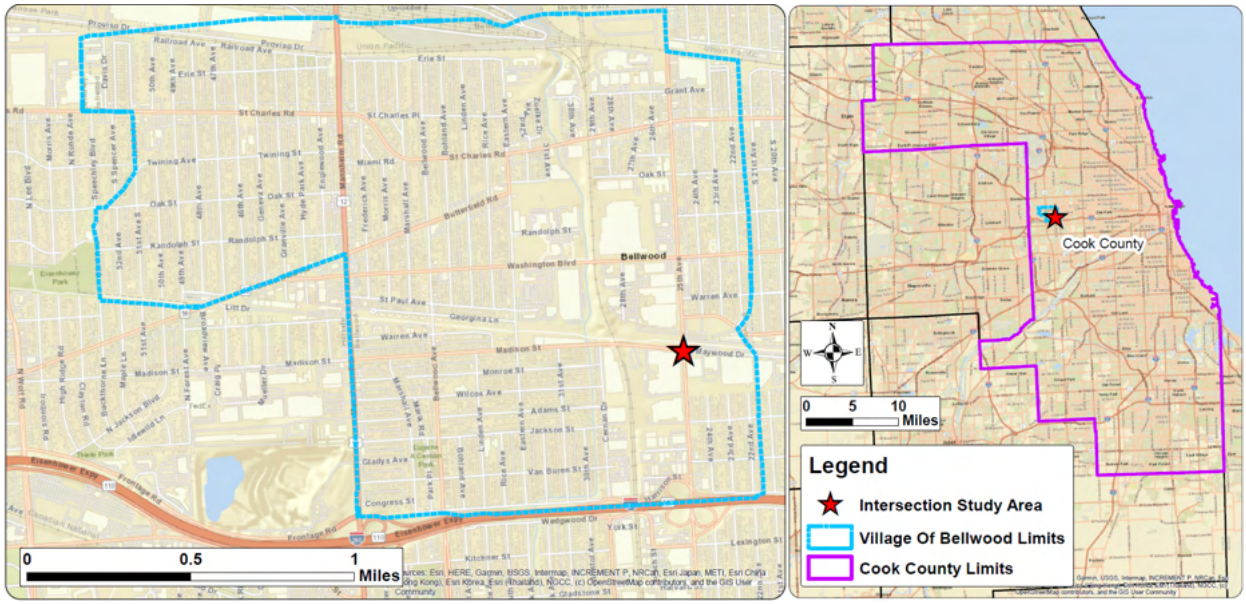

Figure 1-1. Village of Bellwood Location Map & Safety Study Area

2. Safety Evaluation

Before beginning the safety evaluation process, it is important to develop an understanding of the safety performance of the intersection of 25th Avenue and the IPP under current conditions. The most essential metric used to quantify this performance level is crash frequency data—that is, the number of crashes of a given type and severity over the course of a 5-year timeline. A timeline of 5 years is preferred in order to acquire a robust sample size that yields statistical significance, but also prevent the inclusion of crashes that occurred under different geometric conditions of the past.

Though no crash is an acceptable outcome, safety studies commonly focus on higher-severity crashes, such as fatal and injury (F+I) crashes. This prioritizes treatments that can save more lives and minimize crash-related injuries, while also striving to minimize crashes that only result in property damage (PDO). For this reason, many figures in this report will distinguish between F+I crashes and total (i.e., F+I and PDO) crashes. One thing to note early in this document is the crash dataset for the safety study area does not have any fatal crashes, hence, our focus will be on injury crashes. A further description of the KABCO injury scale is included below.

- **K: Fatal Crash** – anyone involved in the crash dies within 30 days of the crash, due to injuries sustained in the crash
- **A: Incapacitating or severe injury/A-Injury**: any injury that is unrecoverable or prevents the injured person from returning to their pre-crash physical state. EX: brain damage, amputated limbs, paralysis
- **B: Capacitating injury/B-Injury**: any evident injury that is considered recoverable. EX: broken arm, bruises, cuts/lacerations, abrasions
- **C: Possible injury/C-Injury**: any injury that is claimed by the injured person but is not visually confirmed. EX: neck/back pain, headaches, limping, dizziness
- **O: Property Damage Only (PDO)/No apparent injuries**: No complaints of injuries or pain; all parties included in the crash retail normal body functions/movements and no medical attention is requested. EX: fender benders

All crash data analyzed and presented in the following sections were obtained from the Illinois Department of Transportation via their Safety Portal and were sourced from the Illinois State Police and other local and regional enforcement agencies. Crash data represents the years of 2016 to 2020, was obtained on December 16, 2021, and was used as-is for analysis purposes and should be interpreted accordingly. To obtain a representative sample of crashes for the purposes of this analysis, a 550-foot buffer was used to capture all crashes within the limits of the intersection of 25th Avenue and Madison Street/South Maywood Drive - the IPP is located roughly 100 feet north of this intersection. This ensures that intersection-related crashes that occurred beyond the intersection, along the legs of the intersection, are included in the analysis.

Crash Data Overview

Between 2016 and 2020, 93 total crashes occurred within 550 feet of the intersection of 25th Avenue and Madison Street/South Maywood Drive in the Village of Bellwood (Table 2-1). As mentioned previously, none of these crashes resulted in fatalities.

Of these 93 crashes between 2016 and 2020 at the study area, 25 resulted in at least one injury. The crash severity location map (Figure 2-1) shows the location of each crash in relation to the overall

intersection. The red star, orange box, and yellow circle all correspond to the different injury severities that are defined in the section above. Figure 2-2 shows only injury crashes, but the location of the crash is represented by a crash type symbol. Although there does not appear to be any overrepresentation of pedestrian and bicyclist crashes at the study area, it is suspected that 25th Avenue acts as a barrier for some types of pedestrians and bicyclists, which could contribute to lower exposure of these trail users.

Table 2-1. Crashes by Severity (2016-2020)

Reference Area	Village of Bellwood - Study Area		Cook County, Illinois		State of Illinois	
Severity	***Crash Count***	***% of Total***	*Crash Count*	*% of Total*	*Crash Count*	*% of Total*
Fatal	**0**	**0.0%**	1,389	0.2%	4,972	0.3%
Injury	**25**	**26.9%**	146,978	19.0%	317,119	20.9%
No Injuries	**68**	**73.1%**	625,595	80.8%	1,193,782	78.8%
Total	**93**	**100.0%**	773,962	100.0%	1,515,873	100.0%

As observed in both Figure 2-1 and Figure 2-2, a cluster of crashes at the exact center of the intersection is displayed - two faint, grey lines that represent the centerline of the roadways meet here. Often times during the process of cataloging each crash, the crash will be spatially 'snapped' to the intersection of these two grey lines. However, the exact location of the crash may *not* have been directly at the center of the intersection.

In the best-case scenario, each crash would be spatially located at the exact point the crash occurred, not at the intersection point of the two grey lines (unless the crash occurred directly at the point the two grey lines intersect). For this reason, it is important to read the responding officer's narrative and crash diagram drawing to interpret exactly where the crash occurred and the sequence of events surrounding the crash.

Figure 2-1. Bellwood Project Study Area: Crash Severity Location Map

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/16/2021.

During the same 5-year period, nearly 775,000 crashes occurred across Cook County, including 1,389 fatal crashes, and over 1.5 million crashes occurred across the State of Illinois, including 4,972 fatal crashes (Table 2-1). Considering proportions of crashes that were of fatal or injury severity, crashes that occurred within the Village of Bellwood at the study area appear to have a tendency toward greater severity when compared to Cook County. Of all crashes that occurred at the intersection of 25th Avenue and the IPP in Bellwood during the study period, 26.9 percent involved a fatality or injury compared to 19.2 percent at within Cook County and 21.2 percent within the State of Illinois.

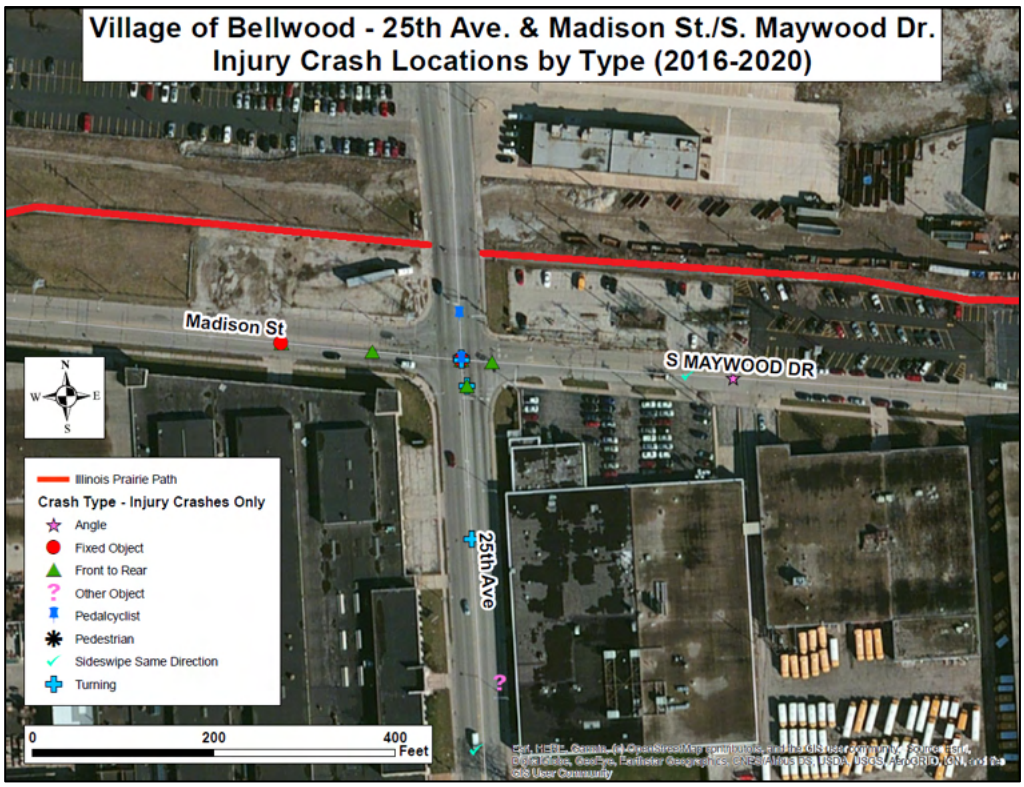

Figure 2-2. Bellwood Project Study Area: Injury Crashes by Crash Type

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/16/2021.

While Figure 2-1 and Figure 2-2 show the crashes in a spatial manner, Figure 2-3 displays the fairly consistent annual crash frequency for injury crashes, other than the year 2020. The drop in 2020 is likely due to the reduced travel demand as a result of the COVID-19 pandemic and associated stay-at-home order. It is important to study the nature of these crashes to determine where the greatest potential for safety improvement (i.e., reducing crashes) may lie. The following sections further detail current safety conditions of the intersection of 25th Avenue and the IPP.

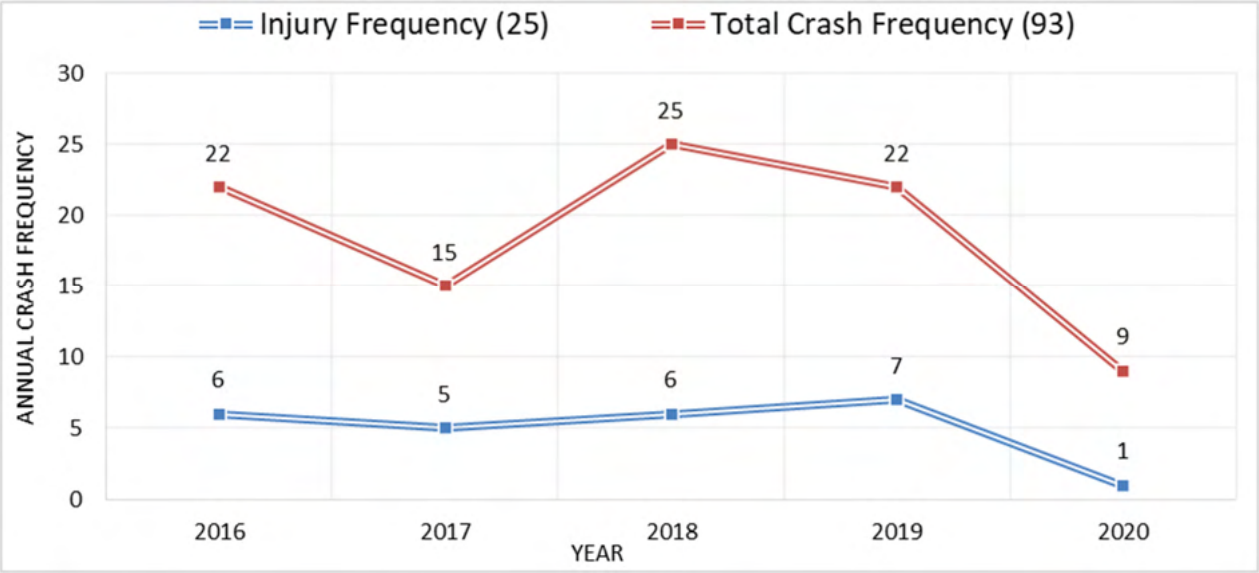

Figure 2-3. Bellwood Project Study Area: Crash History Trendline

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/16/2021.

Emphasis Areas

Emphasis areas were identified to focus the direction of safety study at our location. Emphasis areas are defined categories of crashes, road user behaviors, or infrastructure improvements that represent a unique need within a study area and which should be specifically targeted to produce the greatest safety impact. They are typically selected based on patterns in crash data, local policies, and community need, and are intended to guide and unify strategic planners and stakeholders toward the ultimate goal of reducing fatal and injury crashes and improving traffic safety for all road users.

Based on the crash data analysis in this section, the following emphasis areas have been highlighted for the Village of Bellwood as a starting place for the safety study area:

Pedestrians and Bicyclists. With fatalities of vulnerable road users on the rise across the United States, many agencies are exploring opportunities to make their cities more pedestrian- and bike-friendly through safer infrastructure, increased connectivity, and the elevation of active transportation as an essential form of movement. Recognizing the IPP, a multi-use nature trail, as a critical component of the target intersection, this as a primary area of emphasis for the Village's safety study. In addition to the IPP, the presence of a Pace bus stop on the northwest corner of the intersection serves as a pedestrian generator. Treatments for this EA intend to protect the most vulnerable roadway users and support a reliable, sustainable, and safe culture of active and multi-modal transportation. Additionally, through the implementation of Complete Streets and other treatments that elevate non-motorized road users and increase connectivity between valuable community destinations, our public roads can become safer for all.

Speeding/Aggressive Driving. Most severe crashes involve elevated vehicle speed or aggressive driving maneuvers. With an increase in driving speed, there is a similar increase in the severity of any potential crash, especially when vulnerable road users are involved. To improve safety performance, addressing speeding and aggressive driving behavior must be a focus for the Village of Bellwood's safety study. Speed management can be achieved through infrastructure improvements, such as lane narrowing, traffic calming, and more, which guide motorists toward safer speeds that are in accordance with posted

speed limits where speeding or aggressive driving is prominent. Policy and enforcement treatments may be considered based on identified needs, community input, and research-based assessment of existing facilities. Due to new traffic patterns and driving behaviors resulting from the COVID-19 pandemic, including reduced traffic volumes and increased driving speeds in some areas, this issue is more pertinent than ever.

Heavy Vehicles. Crashes between heavy vehicles and vulnerable users or passenger vehicles can be particularly devastating due to the massive difference in size and weight and are more likely to result in a fatality as a result Heavy trucks take a considerably longer distance to come to a safe and controlled stop, especially in wet or snowy conditions. If pedestrians or bicyclists attempt an unwarranted 'quick' crossing of a roadway, heavy vehicles typically will not have enough time or stopping distance to avoid a crash. Sharing the roadway and respecting the driving capabilities of heavy vehicles will help mitigate the frequency of crashes that involve heavy vehicles.

Crash Types and Conditions

Crash Types

Crashes can generally be categorized into one of several common crash types that help safety analysts understand the roadway conditions and traffic phenomena involved with each crash. These crash types are assigned at the time of the crash by the enforcement officer who is responsible for documenting the crash in a detailed, standardized crash report. The following are the primary crash types found within the study area over 2016–2020:

Angle crashes are multivehicle crashes where one vehicle collides with another at or near a right-angle (e.g., "T-bone" crashes). These tend to be high severity, occurring primarily at intersections.

Fixed-Object crashes involve a single vehicle colliding with a stationary, rigid object on the roadside or in the roadway median (e.g., a roadside barrier or a utility pole). These tend to be the highest severity on other high-speed roadways.

Front to Front crashes are multivehicle crashes where two vehicles moving in opposite directions collide, head on. These are often high severity, occurring primarily on undivided roadways and on horizontal curves.

Front to Rear crashes involve one motor vehicle colliding with another from behind. These tend to be lower severity, though can be high severity especially when higher speeds are involved. These crashes occur most commonly at intersections and increase significantly as congestion increases.

Other crashes include all crashes that were not assigned a crash type by the reporting officer or that were assigned a crash type that represents a very small share of all crashes.

Parked Motor Vehicle crashes involve a moving vehicle colliding with at least one parked motor vehicle along the roadway. These tend to be low severity, occurring primarily on lower-speed roadways where parking is common.

Pedalcyclist crashes involve a motor vehicle colliding with at least one bicyclist or other similar non-motorized road user. These are often high severity because of the vulnerability of bicyclists and similar road users who do not have the protection of a full motor vehicle.

Pedestrian crashes involve a motor vehicle colliding with at least one pedestrian. These are often high severity because of the vulnerability of pedestrians and the high impact exerted on pedestrians by

vehicles during a crash. The severity of these crashes is strongly correlated with motorist speeds, with the probability of severe injury or death for pedestrians increasing significantly with vehicle speed.

Sideswipe opposite direction crashes involve two motor vehicles colliding side-to-side while moving in the opposite directions. These tend to be lower severity.

Sideswipe same direction crashes involve two motor vehicles colliding side-to-side while moving in the same directions. These tend to be lower severity.

Turning crashes are multivehicle crashes where one turning vehicle is hit by another vehicle either moving straight-ahead through an intersection or turning in a conflicting movement. These tend to be higher severity depending on the nature of conflicting movements involved with the crash.

Figure 2-4 presents the distribution of crashes by crash type. This figure illustrates several key features of the safety study's traffic safety performance profile. As expected, the majority of crashes at the safety study location are crash types commonly associated with intersections (e.g., front to rear, turning, and angle). Additionally, though front to rear crashes are generally lower severity than some other prominent crash types, they represent a large proportion of all injury crashes. These insights together may indicate safety concerns related to congestion at the intersection, where the potential for severe front to rear crashes is elevated.

Similar to front to rear crashes, angle, fixed object, and turning-related crashes represent a large proportion of severe crashes. These crashes might commonly be addressed through thorough reviews of intersection geometry and signal timing. These types of treatments can be used to identify and address instances where turning motorists may not be able to adequately identify gaps in their opposing traffic, intersection dilemma zones where there is an elevated chance for red-light running, and similar infrastructure-related cases. Similarly, through the use of targeted enforcement or other policy-related means, improved intersection compliance may be achieved.

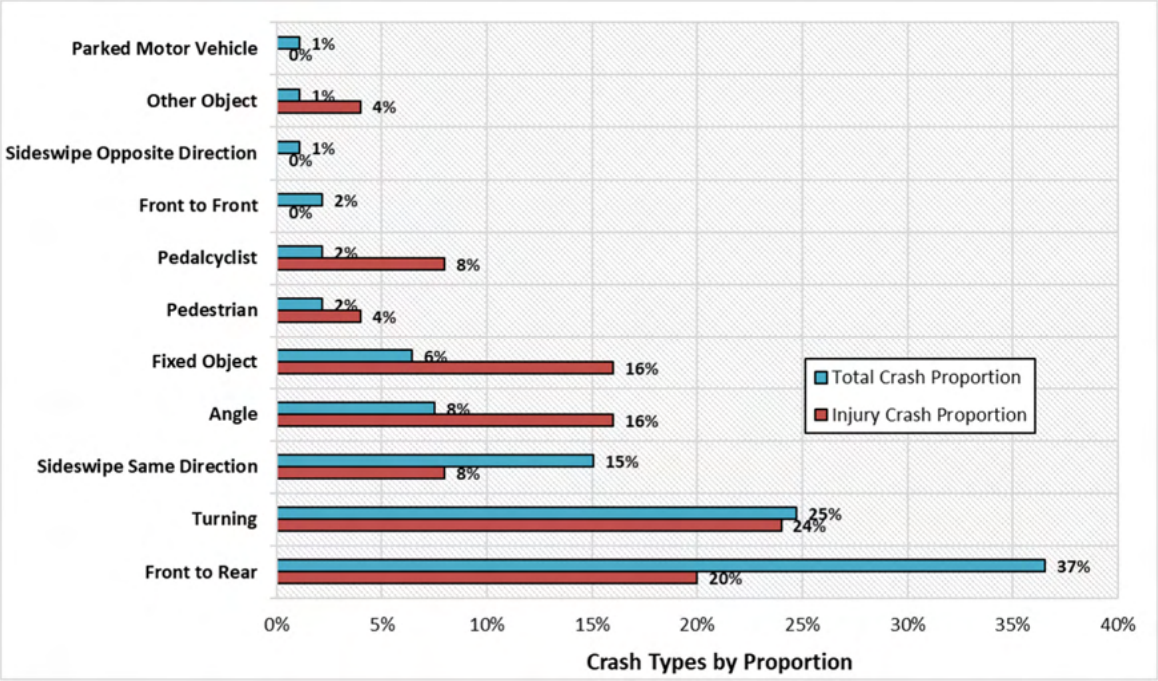

Figure 2-4. Bellwood Project Study Area: Crash Type Distribution

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/16/2021.

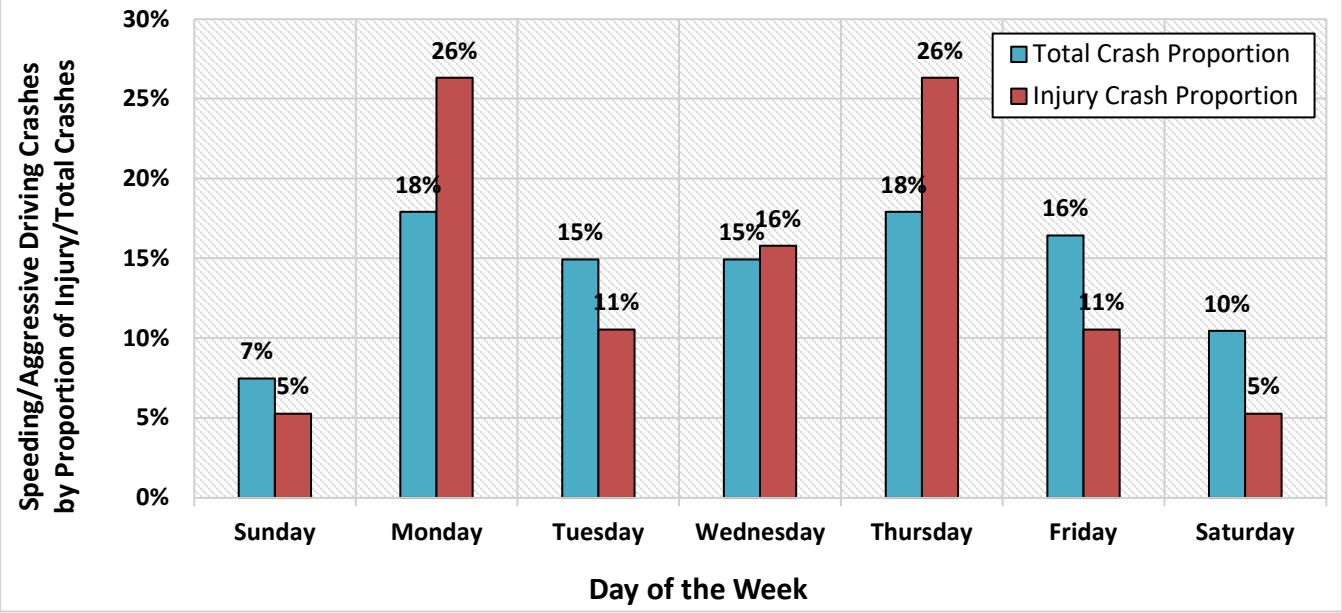

Figure 2-5. Bellwood Project Study Area: Proportion of Speeding/Aggressive Driving Crashes by Day of the Week

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/16/2021.

The frequency of crashes that involved a driver that was behaving in a speeding or aggressive manner is displayed in Figure 2-5. The crash falls into the speeding/aggressive category if the responding officer cites the driver for any of the following:

- Following too closely
- Failing to yield right of way
- Failing to reduce speed to avoid crash
- Disregarding traffic signals
- Exceeding authorized speed limit
- Exceeding Safe Speed For Conditions

Though another emphasis area that involves vulnerable road users (e.g., pedestrians and pedalcyclists) represents a small proportion of total crashes, these crash types have a strong tendency to be severe, resulting in significant injury. Within the 5-year study period, there were two pedestrian and two bicycle-related crashes. None of these interactions resulted in a fatality. However, of the two pedestrian-related crashes one was a B-Injury and the other was, interestingly, a property damage only interaction.

For the two bicycle-related crashes, one resulted in a B-Injury crash while the other was a C-Injury crash. Though no fatalities have been reported in these crashes during the study period, the potential for such interactions remains high considering the presence of the IPP just north of the intersection.

These vulnerable user types of crashes are commonly addressed through improvements to intersections and mid-block crossing facilities, installation of bike lanes and advanced pavement markings, and speed management through traffic calming, enforcement, and lowering speed limits.

In order to gain a better understanding of the crashes that involved pedestrians and bicyclists, the four of them are described below.

- Pedestrian crash 1
    - A 46-year-old pedestrian was struck by a vehicle as the pedestrian was crossing from the east side of 25th Avenue to the west side, on the north side of the intersection. The vehicle then left the scene prior to the arrival of the responding officer.
    - This crash is represented in Figure 2-6 by callout P1.
- Pedestrian crash 2
    - The driver of the vehicle stopped east of 25th Avenue on South Maywood Drive to let their passenger out of the vehicle. The passenger exited the vehicle and started to walk around the rear of the vehicle when the driver put the vehicle into reverse and made contact with their former passenger.
    - This crash is represented in Figure 2-6 by callout P2.
- Bicyclist crash 1
    - The bicyclist was riding along the IPP in the eastbound direction approaching 25th Avenue. The bicyclist had issues with the brakes on the bike and continued from the IPP, past the sidewalk and into traffic on 25th Avenue, crashing into the side of the southbound vehicle.
    - This crash is represented in Figure 2-6 by callout B1.
- Bicyclist crash 2
    - The bicyclist was riding south on 25th Avenue against the flow of traffic in the curb lane. The vehicle was traveling westbound on South Maywood Drive with the intention to make a right-hand turn for northbound 25th Avenue. The driver of the vehicle did not come to a complete stop, The bicyclist continued their path, eventually hitting the front passenger side quarter panel of the vehicle.
    - This crash is represented in Figure 2-6 by callout B2.

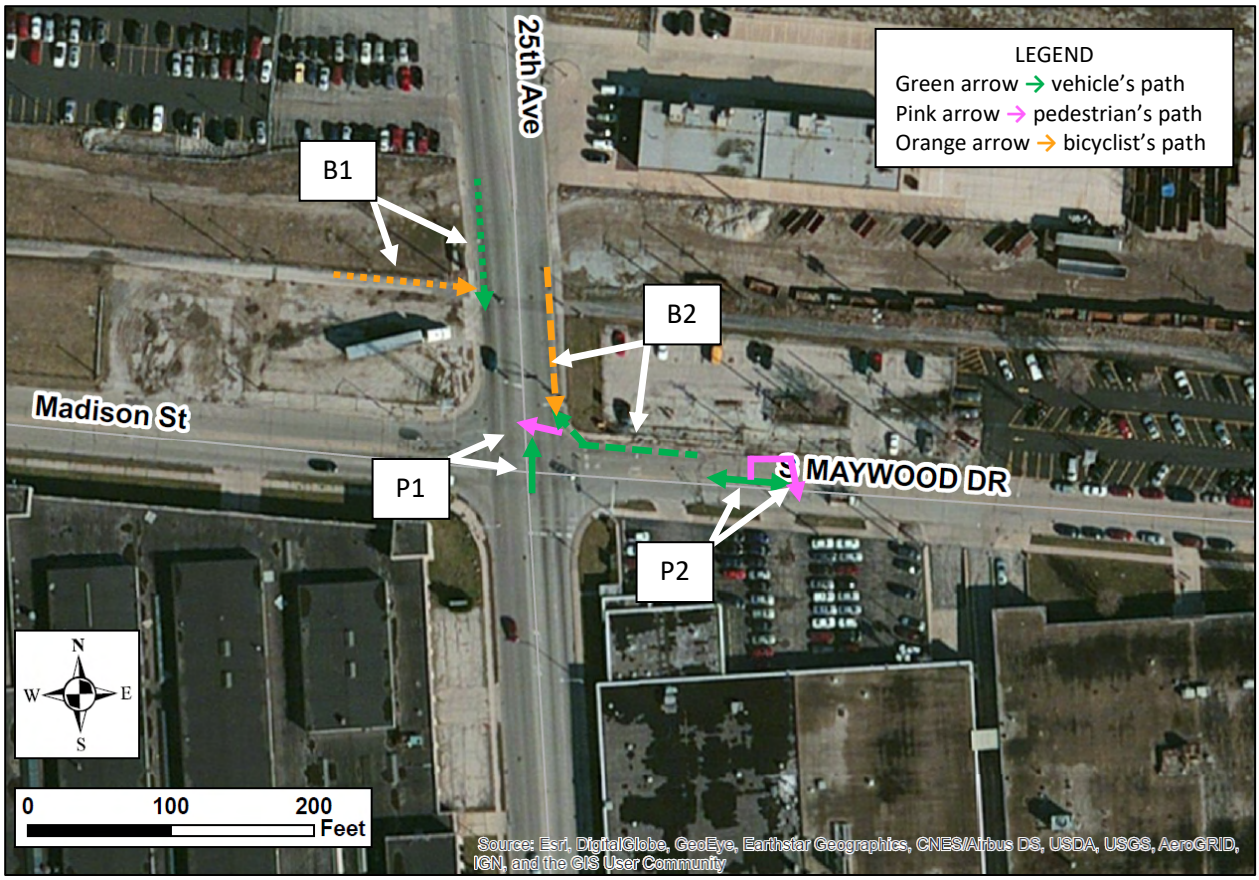

Figure 2-6. Bellwood Project Study Area: Crash Diagram for Pedestrian and Bicyclist Crashes

Roadway Conditions

The roadway conditions present at the time of a crash are crucial to understanding its influence and how similar crashes may be prevented in the future. Though there are many conditions that may be observed, two in particular have been identified through research and extensive experience to be the most impactful: roadway surface condition and roadway lighting condition.

As any motorist in the Village of Bellwood can attest, driving when roads are covered in snow, slush, or ice can be challenging due to reduced vehicle traction among other things. Roads can also be difficult to maneuver during rain or when roads are otherwise wet, requiring additional time to react to hazards or other vehicles by breaking or evading. For this reason, it is helpful to understand the extent to which such factors influence crash frequency and how they may be mitigated through infrastructure or other traffic safety treatments. Figure 2-7 breaks down of the number of total crashes that occurred under different roadway conditions throughout the study period. Most crashes occurred on dry roadways, with about 20 percent occurring on roadways with ice, snow, or wet conditions. This indicates that surface condition is not a major contributing factor for crashes across the Village but could be addressed with countermeasures like high-friction surface treatments.

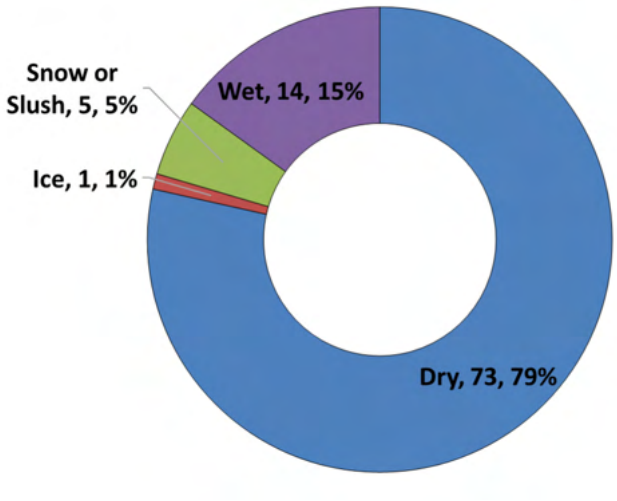

Figure 2-7. Bellwood Project Study Area: Crash Distribution by Surface Condition

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/16/2021.

Similar to roadway surface condition, lighting condition is a common focus when assessing the safety performance of a specific site. Under dark conditions, many things like pavement markings, signs, and roadway features may be more difficult to see, making it challenging to react and maneuver effectively. Additionally, low lighting may make it difficult for motorists to see pedestrians or bicyclists, increasing the probability of a crash. Around the hours of sunset and sunrise, the sun may create glare, impairing the vision of some road users and creating another conditional hazard. Figure 2-8 breaks down total crashes by roadway lighting condition, indicating that a two-thirds of crashes occurred during daylight, with almost 30 percent occurring under dark conditions. This indicates a concern for street lighting as a contributing factor for some crashes, with a potential safety treatment involving upgrades of lighting at the intersection and along the legs of the intersection.

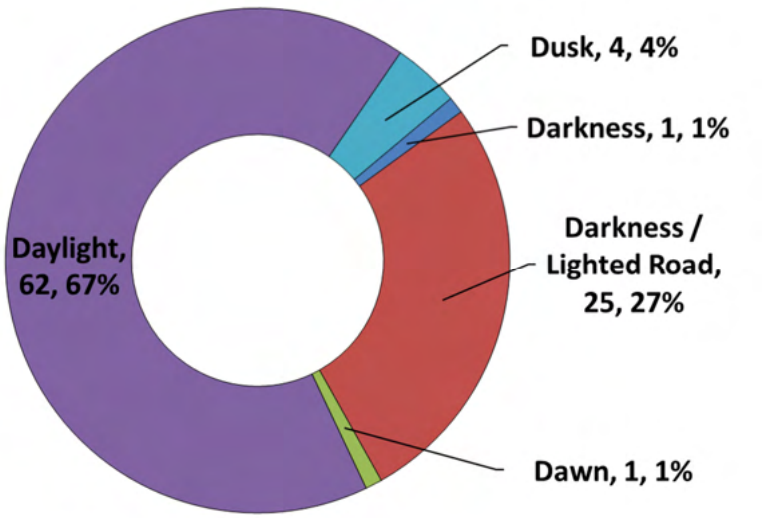

Figure 2-8. Bellwood Project Study Area: Crash Distribution by Lighting Condition

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/26/2021.

Time and Day

To understand the context of historical crash data, it is valuable to consider the distribution of crashes by time of day. Patterns or abnormalities in such distributions may provide insights into underlying causes or potential options for mitigation of crashes. Figure 2-9 shows the distribution of crashes at the intersection by time of day, considering both total and injury crashes. The hours that represent the greatest proportions of crashes occur at the end of the typical lunch break (9 percent) and during the evening rush around 6 PM (9 percent). This is a common pattern in urban environments, where there are spikes in traffic volume (i.e., number of cars on the roadway) at these times, creating more opportunity for crashes than at other times of day.

Though data is limited, an additional insight may be drawn from this distribution related to crash severity. Throughout daylight hours, when there are generally more vehicles on the roadway, crashes have a tendency to be lower severity. Conversely, during nighttime hours, injury crashes tend to outweigh total crashes, indicating a general trend toward higher severity. This may be attributed to higher driving speeds at night associated with lower traffic volume, reduced visibility at night, as well as the greater proportion of intoxicated drivers during the evening hours.

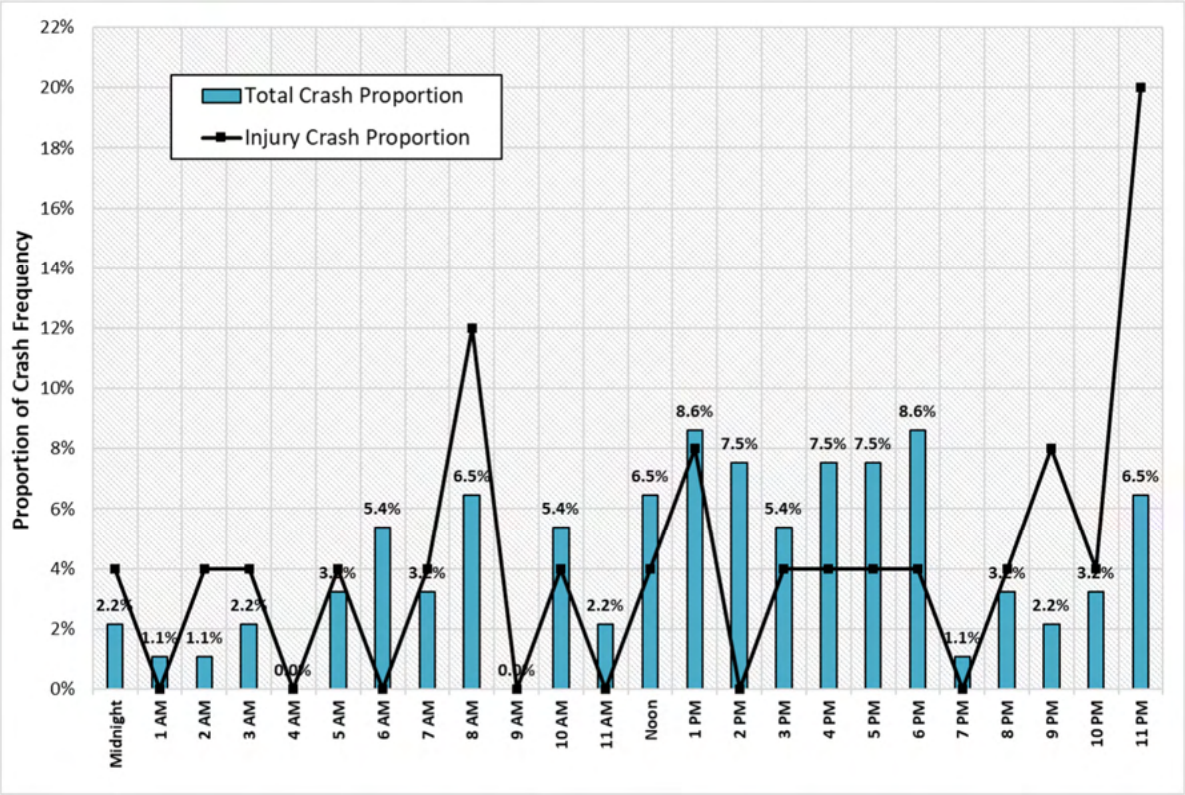

Figure 2-9. Bellwood Project Study Area: Crash Distribution by Time of Day

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/16/2021.

As shown in Figure 2-10, crash data is fairly consistent across days of week with no extreme fluctuations. There is, however, a moderate dip in both injury and total crash frequency on Saturdays and Sundays, perhaps related to lower traffic volumes or less general driving activity. Additionally, there is an unusual bump, even though small, of injury crashes on Mondays and Thursdays. Between this and the crash distribution by time of day, there appears to be a trend of higher-severity crashes occurs on evenings on Mondays and Thursdays.

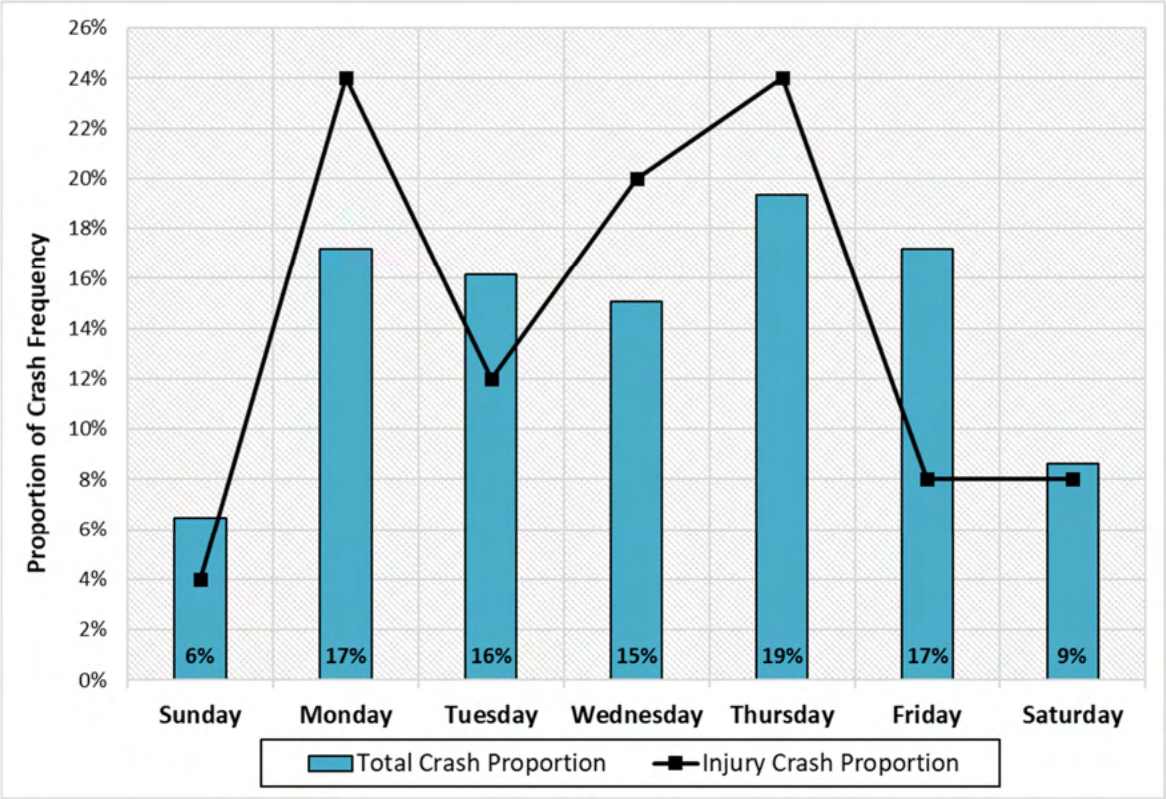

Figure 2-10. Bellwood Project Study Area: Crash Distribution by Day of Week

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/16/2021.

Persons Involved

In addition to understanding the nature and conditions of a crash, it is valuable to study the people involved with the crash. Knowing more about these road users, particularly drivers, can help with focusing mitigation efforts in a way that best serves the road users who are overrepresented in crash patterns. For example, younger drivers with less driving experience may require additional time to interpret and respond to roadway markings or signing, while older drivers, who may have visual impairment, may have challenges maneuvering complex intersection geometries or traffic patterns. Additionally, by studying driver behaviors involved in crashes, such as intoxication or reckless driving, specific treatments may be identified as most suited for a given study area.

Driver Demographics

Drivers of different ages may behave somewhat differently and often have different needs and limitations when using roadway facilities. Similarly, data has shown that men and women sometimes have different safety performance at different ages. Figure 2-11 shows the distribution of drivers involved in total crashes between 2016 and 2020. Men in their thirties are involved in the highest number of crashes. As age and experience increase, the number of crashes by age group generally decreases, except for an additional spike for men relative to women in their early thirties, which, according to studies, is largely due to persistent risky behavior by this group.

There is an additional drop-off in crash frequency above age 70, when generally fewer drivers are regularly on the road. However, drivers at this age tend to exhibit some additional risks due to reduced vision, increased perception-reaction times, and other factors associated with aging. For this reason, it is

important to provide the necessary infrastructural features to ensure that this population of drivers remains capable of using the roadway effectively and safely. Examples of this include increased visibility of traffic signal heads, increased font size for signing, improved roadway and intersection geometry, and reduced speed limits.

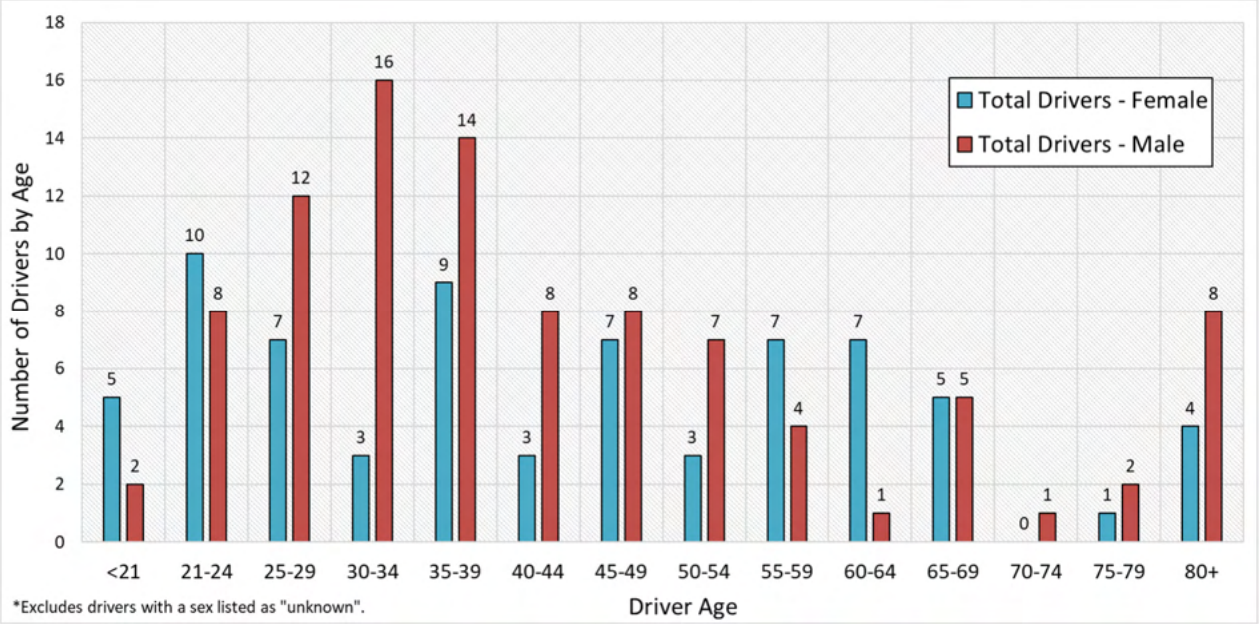

Figure 2-11. Bellwood Project Study Area: Driver Distribution by Age and Gender for All Crashes

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/16/2021.

Driver Condition

Figure 2-12 visualizes the distribution of drivers involved in crashes by their physical conditions as noted by reporting officers. The data shows that though the majority of drivers involved in crashes were reported as being normal, a small portion (6) of these drivers were found to be impaired with alcohol, drugs, or other substances (e.g., medication) that can critically reduce a driver's capacity to drive safely. These crashes also tend to be higher severity due to reduced inhibitions often resulting in higher speed, riskier behavior, and poorer reaction times. Additionally, three drivers were noted by the responding officer as 'had been drinking'.

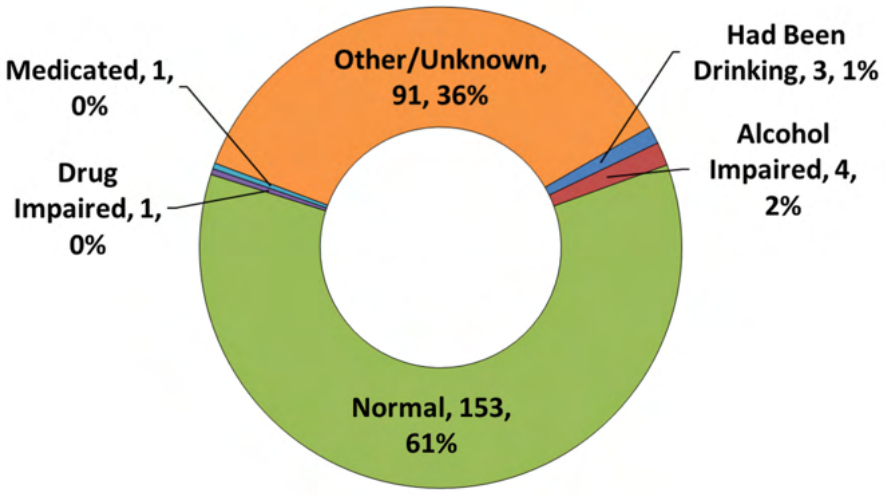

Figure 2-12. Bellwood Project Study Area: Distribution of Involved Drivers by Condition

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/16/2021.

Vehicles Involved

An additional consideration for understanding the safety needs of a transportation network is the role of vehicle type in crash frequency. That is, are there overrepresentations of vehicle types, such as heavy vehicles (trucks, buses, etc.), motorcycles, or others, and what traffic safety strategies might be identified to help address this overrepresentation? Based on the distribution of all vehicles involved in the study period, crashes in the Village of Bellwood at the study area (Figure 2-13), heavy vehicles represent a small proportion of the vehicles involved in all crashes—just 5 percent of total crashes. Meanwhile, heavy vehicles were involved in 2.3 percent of injury crashes. Additionally, over the course of the study period, only one motorcycle crash was reported. Notably, the average severity of crashes involving SUVs is higher than that of other passenger vehicles. This may be, in part, due in part to the heavier weight of these vehicles, which produces a higher energy crash that may elevate the severity of a crash.

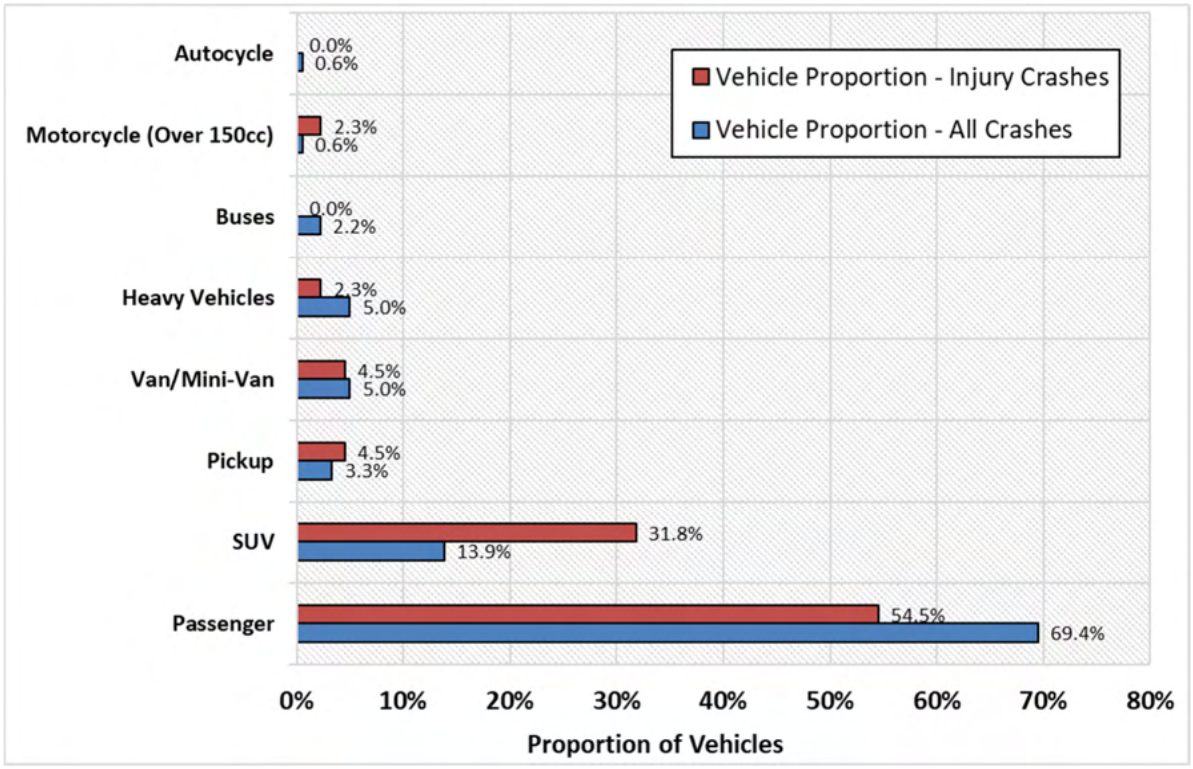

Figure 2-13. Bellwood Project Study Area: Distribution of Crashed Vehicles by Type

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/16/2021.

3. Intersection Characteristics

In many ways, the intersection of 25th Avenue and Madison Street/South Maywood Street is similar to many urban, signalized intersections. However, the presence of the IPP to the north gives this intersection a very unique characteristic. Some of the other characteristics of the intersection are described in the bullets below.

- Intersection Peer Group: Local, urban, signalized
- AADT (source: gettingaroundillinois.com)
    - 25th Avenue: northern leg – 23,800
    - 25th Avenue: southern leg – 23,900
    - Madison Street/South Maywood Drive – 5,300
- Speed Limit
    - 25th Avenue: 30MPH
    - Madison Street (western leg) – 25MPH
    - South Maywood Drive (eastern leg) – 30MPH
- Functional Class
    - 25th Avenue: Minor Arterial
    - Madison Street (western leg): Major Collector
    - South Maywood Drive (eastern leg): Local Street
- Northbound/southbound legs have two through lanes and a dedicated left turn lane
- Eastbound/westbound legs each have one through lane and one dedicated left turn lane
- All legs of the intersection have a jurisdictional responsibility of 'Municipality'
- Pedestrian countdown signals with push-button activation are present on all crossing movements besides the east leg
- Sidewalks and ADA pads present on both sides of all legs
- Two transverses/longitudinal crosswalk pavement markings on each crossing movement
- Red light running cameras are present for the southbound direction
- No street parking available
- No bike lanes are present on any leg
- Street lighting is present
- Public transit
    - Pace bus
        - Two routes service the intersection - 310 and 317
        - One covered bus stop on the northern leg
    - Metra train
        - Electric Line passes over 25th Avenue approximately 0.9 miles north of the IPP. The nearest Metra stations are 0.4 miles east and 0.9 miles west of 25th Avenue along the Metra tracks.

4. Population Characteristics

The Village of Bellwood has a population of 18,789 according to CMAP's community snapshot, representing approximately 0.2 percent of the metropolitan area's total population. Since the year 2000, the Village has experienced a decrease in population (-8.5 percent), with a smaller decrease over the past decade. The majority of Bellwood's residents identify as Black, Non-Hispanic (74.1 percent), with 4.8 percent identifying as White, Non-Hispanic. The median age of residents is 36.5, which is slightly lower than that of the CMAP region, which is 37.5.

Table 4-1. General Population Characteristics, 2020

	BELLWOOD	COOK COUNTY	CMAP REGION
TOTAL POPULATION	18,789	5,275,541	8,577,735
TOTAL HOUSEHOLDS	6,351	2,086,940	3,266,741
AVERAGE HOUSEHOLD SIZE	2.9	2.5	2.6
% POPULATION CHANGE, 2010-2020	-1.5	+1.6	+1.7
% POPULATION CHANGE, 2000-2020	-8.5	-1.9	+5.3

Source: https://www.cmap.illinois.gov/documents/10180/102881/Bellwood.pdf

Table 4-2. Race and Ethnicity, 2015-2019

	BELLWOOD	COOK COUNTY	CMAP REGION
WHITE NON-HISPANIC	907 (4.8%)	2,198,122 (42.3%)	4,331,282 (51.1%)
HISPANIC OR LATINO	3,532 (18.6%)	1,314,796 (25.3%)	1,952,500 (23.0%)
BLACK NON-HISPANIC	14,070 (74.1%)	1,199,175 (23.1%)	1,406,500 (16.6%)
ASIAN NON-HISPANIC	169 (0.9%)	375,635 (7.2%)	610,365 (7.2%)
ALL OTHER CATEGORIES	318 (1.7%)	110,547 (2.1%)	182,620 (2.2%)

Source: https://www.cmap.illinois.gov/documents/10180/102881/Bellwood.pdf

Table 4-3. Age Cohorts, 2015-2019

	BELLWOOD	COOK COUNTY	CMAP REGION
19 AND UNDER	4,786 (25.2%)	1,268,278 (24.4%)	2,162,217 (25.5%)
20 TO 34	4,363 (23.0%)	1,191,506 (22.9%)	1,794,152 (21.1%)
35 TO 49	3,293 (17.3%)	1,032,143 (19.9%)	1,701,494 (20.1%)
50 TO 64	3,695 (19.5%)	965,178 (18.6%)	1,635,766 (19.3%)
65 TO 74	1,938 (10.2%)	421,947 (8.1%)	691,947 (8.2%)
75 TO 84	743 (3.9%)	221,513 (4.3%)	346,833 (4.1%)
85 AND OLDER	178 (0.9%)	97,710 (1.9%)	150,858 (1.8%)
MEDIAN AGE	36.5	36.8	37.5

Source: https://www.cmap.illinois.gov/documents/10180/102881/Bellwood.pdf

Country of Birth and Language

Within the Village of Bellwood, approximately 91.7 percent of residents were born within the United States. Of the Village's residents, 83.7 percent speak English exclusively, with about 7 percent speaking English less than "very well" according to census data. Understanding these factors may be very important to the developing practical countermeasures for the intersection of 25th Avenue and the IPP, ensuring that strategies employed to improve roadway safety account for cultural, linguistic, and other needs of all motorists who use the Village's roadway network.

Table 4-4. Country of Birth, 2015-2019

	BELLWOOD	COOK COUNTY	CMAP REGION
NATIVE	17,422 (91.7%)	4,099,447 (78.9%)	6,857,017 (80.8%)
FOREIGN BORN	1,574 (8.3%)	1,098,828 (21.1%)	1,626,253 (19.2%)

Source: https://www.cmap.illinois.gov/documents/10180/102881/Bellwood.pdf

Table 4-5. Ability to Speak English, 2015-2019

	BELLWOOD	COOK COUNTY	CMAP REGION
ENGLISH ONLY	14,687 (83.7%)	3,155,615 (64.7%)	5,462,068 (68.6%)
LANGUAGE OTHER THAN ENGLISH	2,853 (16.3%)	1,720,467 (35.3%)	2,503,134 (31.4%)
SPEAK ENGLISH LESS THAN "VERY WELL"	1,239 (7.1%)	670,652 (13.8%)	946,875 (11.9%)

Source: https://www.cmap.illinois.gov/documents/10180/102881/Bellwood.pdf

Socioeconomic Information

Residents of the Village of Bellwood tend to have a lower level of education than residents of the whole CMAP region, with 4.3 percent of residents having a graduate or professional degree, compared to 157. of the CMAP region (Table 4-6). This correlates with a significantly lower median income for the Village's households, $56,557 compared to $73,572 across the CMAP region. Similarly, over 8.5 percent of Bellwood's households have an income of over $150,000, significantly lower than the 19.4 percent represented by the CMAP region.

Table 4-6. Educational Attainment, 2015-2019

	BELLWOOD	COOK COUNTY	CMAP REGION
LESS THAN HIGH SCHOOL GRADUATE	1,850 (14.4%)	461,880 (12.9%)	663,242 (11.5%)
HIGH SCHOOL GRADUATE OR EQUIVALENCY	4,386 (34.2%)	829,451 (23.1%)	1,314,011 (22.8%)
SOME COLLEGE, NO DEGREE	3,302 (25.8%)	666,607 (18.6%)	1,100,596 (19.1%)
ASSOCIATE DEGREE	999 (7.8%)	237,123 (6.6%)	404,417 (7.0%)
BACHELOR'S DEGREE	1,721 (13.4%)	825,673 (23.0%)	1,377,160 (23.9%)
GRADUATE OR PROFESSIONAL DEGREE	557 (4.3%)	566,842 (15.8%)	906,665 (15.7%)

Source: https://www.cmap.illinois.gov/documents/10180/102881/Bellwood.pdf

Table 4-7. Household Income, 2015-2019

	BELLWOOD	COOK COUNTY	CMAP REGION
LESS THAN $25,000	1,181 (19.0%)	401,095 (20.3%)	529,858 (17.0%)
$25,000 TO $49,999	1,649 (26.5%)	386,225 (19.6%)	567,834 (18.2%)
$50,000 TO $74,999	1,213 (19.5%)	310,795 (15.8%)	490,586 (15.7%)
$75,000 TO $99,999	1,021 (16.4%)	240,315 (12.2%)	395,676 (12.7%)
$100,000 TO $149,999	626 (10.1%)	301,087 (15.3%)	533,771 (17.1%)
$150,000 AND OVER	531 (8.5%)	332,591 (16.9%)	605,605 (19.4%)
MEDIAN INCOME	$56,557	$64,660	$73,572

Source: https://www.cmap.illinois.gov/documents/10180/102881/Bellwood.pdf

Transportation

Transportation patterns and commuting behaviors compose another key set of demographics for consideration for the safety study. 90.8 precent of Bellwood's residents own at least one vehicle,

compared to 87.2 percent of CMAP region residents. Additionally, of the Village of Bellwood's 8,752 regular commuters, 77.5 percent drive alone as their mode of travel to work, with 9.0 percent using public transit and only 2.1 percent walking or biking. These factors translate into an overall higher number of resident drivers from Bellwood. In terms of average vehicles miles traveled by car for Bellwood residents, they are slightly higher annually at 17,316 compared to 17,165 vehicle miles traveled each year for the CMAP region's residents.

These factors, along with the further context provided in other sections about transportation and mobility data, will be crucial in determining the most appropriate safety measures given the Village's roadway network and its residents' needs and driving patterns.

Table 4-8. Vehicles Available per Household, 2015-2019

	BELLWOOD	COOK COUNTY	CMAP REGION
NO VEHICLES AVAILABLE	574 (9.2%)	351,428 (17.8%)	399,783 (12.8%)
1 VEHICLE AVAILABLE	2,361 (38.0%)	798,186 (40.5%)	1,111,243 (35.6%)
2 VEHICLES AVAILABLE	2,031 (32.6%)	588,020 (29.8%)	1,098,207 (35.2%)
3 OR MORE VEHICLES AVAILABLE	1,255 (20.2%)	234,474 (11.9%)	514,097 (16.5%)

Source: https://www.cmap.illinois.gov/documents/10180/102881/Bellwood.pdf

Table 4-9. Mode of Travel to Work, 2015-2019

	BELLWOOD	COOK COUNTY	CMAP REGION
WORK AT HOME*	115 (1.3%)	123,570 (4.9)	226,183 (5.4)
DRIVE ALONE	6,875 (77.5%)	1,539,061 (61.1%)	2,865,893 (68.4%)
CARPOOL	659 (7.4%)	200,588 (8.0%)	323,457 (7.7%)
TRANSIT	802 (9.0%)	480,559 (19.1%)	557,002 (13.3%)
WALK OR BIKE	188 (2.1%)	136,631 (5.4%)	164,065 (3.9%)
OTHER	228 (2.6%)	37,304 (1.5%)	53,525 (1.3%)
TOTAL COMMUTERS	8,752 (98.7%)	2,394,143 (95.1%)	3,963,942 (94.6%)
MEAN COMMUTE TIME (MINUTES)	27.7	33.4	32.5

Source: https://www.cmap.illinois.gov/documents/10180/102881/Bellwood.pdf
*Not included in total commuters or mean commute time.

Table 4-10. Annual Vehicle Miles Traveled per Household, 2017

	BELLWOOD	COOK COUNTY	CMAP REGION
AVERAGE VEHICLE MILES TRAVELED	17,316	14,123	17,165

Source: https://www.cmap.illinois.gov/documents/10180/102881/Bellwood.pdf

5. Red Light Running Citation Summary

There is a Red Light Running (RLR) Photo Enforcement System installed at the intersection of 25th Avenue and Madison Street/South Maywood Street on October 12, 2007. The RLR Photo Enforcement System monitors violations occurring on the southbound approach of the intersection. Figure 5-1 shows a sign similar to the "RED LIGHT PHOTO ENFORCED" sign that is located on all traffic poles facing each leg of the intersection. Data on citations was obtained from RedSpeed International for the years of 2017-2021.

Figure 5-1. Example of Signage for Intersections with Red Light Photo Enforcement

Source: https://www.dailyherald.com/news/20200226/partial-ban-of-red-light-cameras-passes-illinois-house

Figure 5-2 shows the number of citations issued for "disregarding traffic control signal" at the intersection by the red-light running cameras. The general trend shows a significant increase from 2017 to 2021; the number of citations issues in 2021 is more than 4 times higher than the number of citations issues in 2017. A notable observation is the large increase in 2020 and a continuation of the rise in 2021.

The impact of the global pandemic and 'shutdowns' generally resulted in less vehicles on the road for much of 2020 and portions of 2021 (source). Some drivers may have observed this and changed their behavior to be more willing to take risks since less vehicles were on the road. A prime example of this risky behavior would be entering an intersection after the traffic signal had already turned red, resulting in a citation being issued.

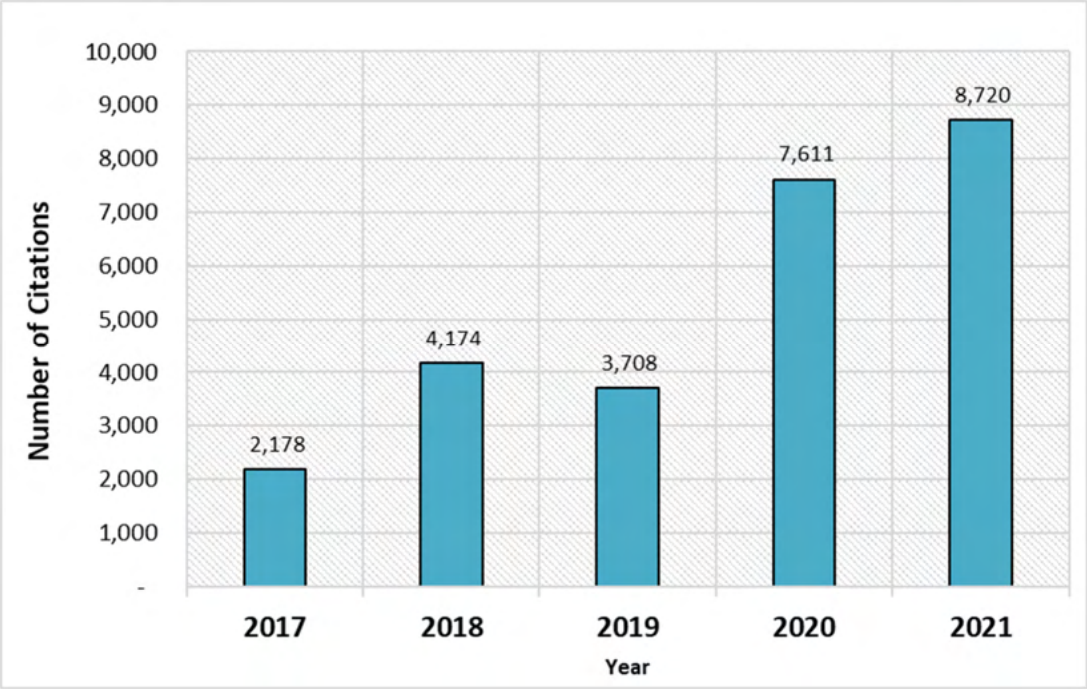

Figure 5-2. Bellwood Project Study Area: Red-Light Running Citations by Year at 25th Avenue and Madison Street/South Maywood Drive

Source: RedSpeed International, years 2017-2021, received 1/19/2022.

Additional information associated with the citations like time of day, vehicle make and model was not available. However, we can compare the number of citations to the number of angle and turning crashes occurring from 2016 through 2020, as shown in Figure 5-3. When observing these two crash types – crash types that red-light cameras intend to decrease – we see that there is no apparent trend from 2016 to 2020.

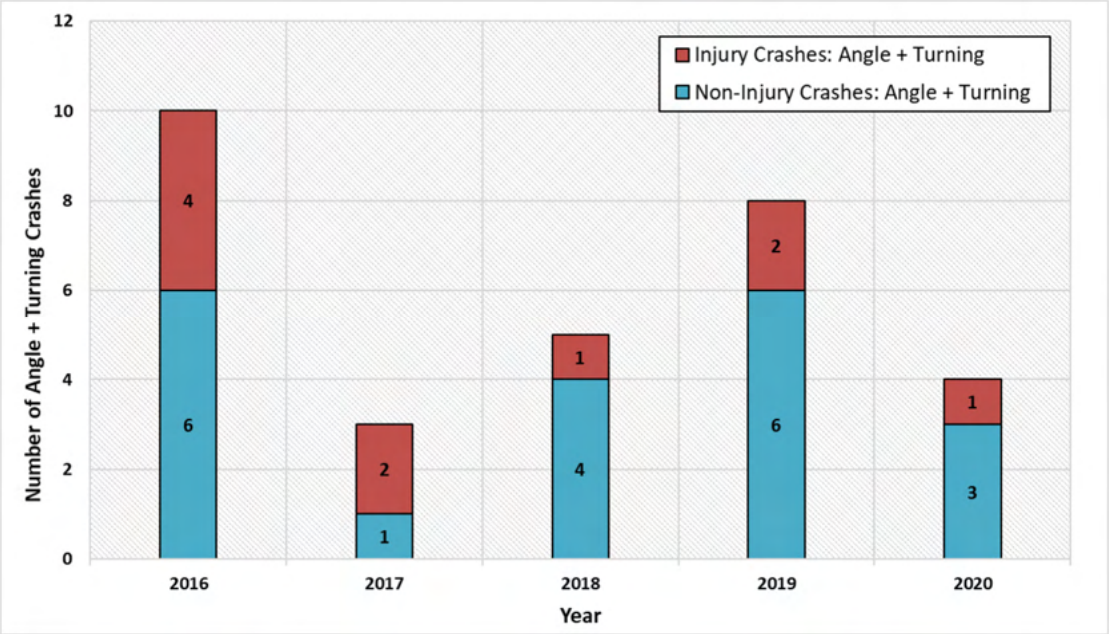

Figure 5-3. Bellwood Project Study Area: Turning and Angle Crashes by Year

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/16/2021.

With the addition of red-light running cameras at signalized intersections, the frequency of drivers disregarding the traffic signal generally decreases due to the fear of a monetary fine. The possibility of monetary fines causes more rear-end crashes to occur – the hard braking of the lead vehicle attempting to come to a stop when they observe a traffic signal changing from green to yellow catches the trailing vehicle off-guard, resulting in a rear-end crash if the trailing vehicle follows too closely.

The implementation of the red-light running cameras at the intersection does not appear to be having the desired impact of crash reductions and decreasing citations year over year. Ideally, the number of turning and angle crashes displayed in Figure 5-3 would show minimal frequency or a relatively constant decrease in the trend. Additionally, the frequency of both injury and total rear-end crashes at the intersection of 25th Avenue and Madison Street/South Maywood Drive is shown in Figure 5-3.

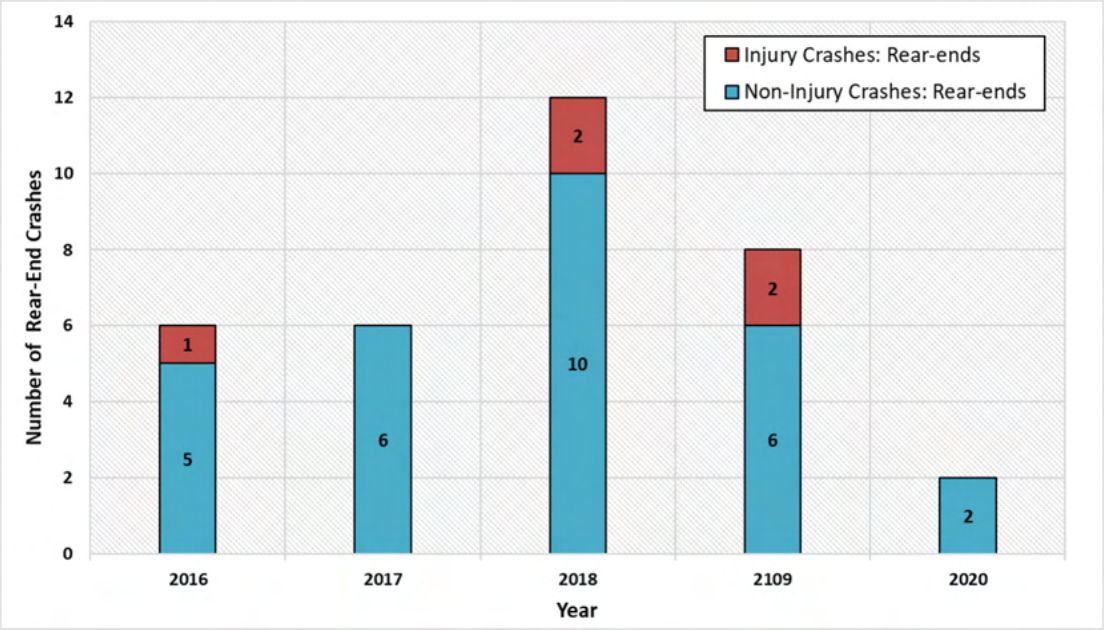

Figure 5-4. Bellwood Project Study Area: Rear-end Crashes by Year

Source: Illinois Department of Transportation's historic crash database, years 2016-2020, received 12/16/2021.

6. Stakeholder Interviews

The project team held interviews with a variety of different stakeholders to present many questions and gather feedback on January 28, 2022. More information on the stakeholders and the questions that were presented is in the Outreach Plan. Three groups were interviewed and their responses were categorized. A summary of each response is found below.

Land Use and Infrastructure Surrounding the Trail

The Village of Bellwood stakeholders frequently mentioned on-going and future development in the area surrounding the safety study area.

The bicyclists and pedestrian stakeholders were more concerned with creating a safe environment for path users and beautifying the surrounding area to encourage use. There is a large residential area both to the north and the south that would benefit from an improved crossing at 25th Avenue. It was mentioned that the intersection area looks abandoned with undeveloped land on the northwest quadrant and parking lots on the eastern leg. Other items that were mentioned include the following:

- Poor lighting in the general area to help drivers spot pedestrians and bicyclists
- Litter: “Adopt-a-Trail” programs for trash pick-up and trail maintenance
- Adding trees, water fountains, and/or benches to make the trail more attractive and user-friendly
- The need for smoother and wider walking surfaces
- A lack of ADA compliance

Property owners voiced many concerns about impacts to the economy and businesses in the area. Concerns with building an overpass or underpass included funding, impacts on the economy and/or local businesses, and concern over whether pedestrians would be attracted to an overpass or underpass.

Bike/Pedestrian Crossing

It was mentioned that planners should keep in mind the different types of trail users: bus riders, bicyclists, joggers, people with strollers, etc. A frequent comment was that many of these users are walking directly across 25th Avenue at the intersection with IPP instead of using the crosswalk at the traffic signal about 100 feet to the south. Along with some other pedestrian and bicycle-focused comments, a number of reasons were given for pedestrians crossing mid-block rather than at the designated signalized crosswalk. These comments are included below.

- It takes more time to properly cross at the signal
- The narrow sidewalks make it feel like pedestrians/cyclists are leaving the pathway
- The signal is not properly timed for bikes and pedestrians
- Pavement marking is fading on the crosswalks
- There is poor signage/wayfinding
- During winter, there is no snow removal on the path

To resolve some of the issues shown in the bullets directly above, the stakeholders proposed some solutions that include:

- Refresh the pavement marking at all crosswalks
- Improving the signage or wayfinding for IPP users
    - Ex: Signage that indicates 'Intersection Ahead' or 'Prepare to Stop'
- Implementing a leading pedestrian phase at the existing signal
- Widening sidewalks to allow for safe passage of concurrent trail users, pedestrians, and transit rider use
- Using some channelizing devices, or physical barriers, to encourage using existing crosswalk at the signal
- Relocate the IPP to align with the existing signalized crosswalk
- Grade separation (overpass or underpass)

Roadway Infrastructure

Speeding was a concern throughout all breakout groups, including:

- Traffic congestion on the roadways due to development, population growth
- Southbound traffic was observed to back up during the morning and afternoon peak periods.
- Recent increases in pedestrian and bicyclist traffic. There are running and fitness groups that use the IPP on the weekend and during the morning rush hour. The Tour de Proviso bike event uses the IPP from 9th Ave to Eastern Ave.

Stakeholders believed some potential solutions to this includes implementation of:

- Red light cameras
- Speed feedback trailers
- Traffic calming measures, including narrowing the street, adding a pedestrian refuge island or 'pork chops'

7. Conclusion

Review of the existing conditions at the intersection of 25th Avenue and the IPP was performed by observing crash data trends, holding discussions with Village staff, and completing other in-office tasks. Several challenges to provide all roadway users with means of safe travel were observed. Stakeholder interviews also provided observations and feedback on the behavior of the safety study area. A few of the major overlaps of the in-office efforts and the stakeholder interviews are noted in the bullet points below.

- Pedestrian facilities need improvement
    - Signage/wayfinding
    - Sidewalks
    - Alignment of the IPP in relationship to the signalized intersection to the south
- Expected increase in heavy vehicle travel
- Traffic signal improvements
    - Signal timing concerns
- Speeding and aggressive driving
    - Red light running

The next step of the safety study will be to recommend infrastructure improvements to address the concerns described in the ECR. The feedback and opportunities listed in the ECR will serve as guidance for the Key Recommendations Memorandum (KRM). The extensiveness of the KRM will remain high-level, as the final safety study serves as the primary deliverable to present a more thorough explanation of the possible solutions for the safety study area.