CENTRAL IOWA REGIONAL
CIRTPA
TRANSPORTATION PLANNING ALLIANCE

COMPREHENSIVE Safety ACTION PLAN

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1. Introduction

1.1 Why Safe Streets for All?

Everyone should be and feel safe on our streets, regardless of age or ability, whether they are walking, bicycling, using a mobility device, taking transit, or driving. That is the core tenant of Safe Streets for All: achieving a safe transportation system for all users of the transportation system devoid of traffic fatalities and serious injuries.

1.2 Safety at a Glance

From 2018 to 2022, the CIRTPA region witnessed a significant number of severe crashes, including those resulting in serious injuries and fatalities (KSI). A total of 31 severe crashes occurred during this period, an increase from 24, or an approximate 6.5% average annual increase. These crashes include not only vehicle-related crashes, but also vulnerable road users (pedestrians, cyclists, and motorcyclists), which underscores the need for focused safety measures. A preliminary review of high-frequency crash locations evaluated the spatial distribution of severe crashes that occur around the CIRTPA region.

1.3 The CIRTPA Region

The Central Iowa Regional Transportation Planning Alliance (CIRTPA) carries out regional transportation planning in coordination with the Iowa Department of Transportation (DOT) for the Central Iowa region, excluding the Des Moines Area Metropolitan Planning Organization (DMAMPO) and the Ames Area Metropolitan Planning Organization (AAMPO). This area specifically includes Boone, Jasper, and Marion Counties and portions of Dallas, Madison, Polk, Story, and Warren Counties.

In 2023, CIRTPA received an Action Plan Grant to develop a Comprehensive Safety Action Plan (CSAP) that meets the eligibility requirements of an Action Plan set forth in the Safe Streets and Roads for All (SS4A) Grant program. The resulting Action Plan will need to meet the specified program criteria required to pursue an SS4A Implementation Grant.

The study area for the CIRTPA CSAP includes all incorporated cities within eight counties (Boone, Dallas, Jasper, Madison, Polk, Story and Warren Counties), excluding the DMAMPO and the AAMPO regions. The unincorporated portions of the counties are part of a separate study led by the Iowa County Engineers Association (ICEA). Figure 1.1 shows the CIRTPA region

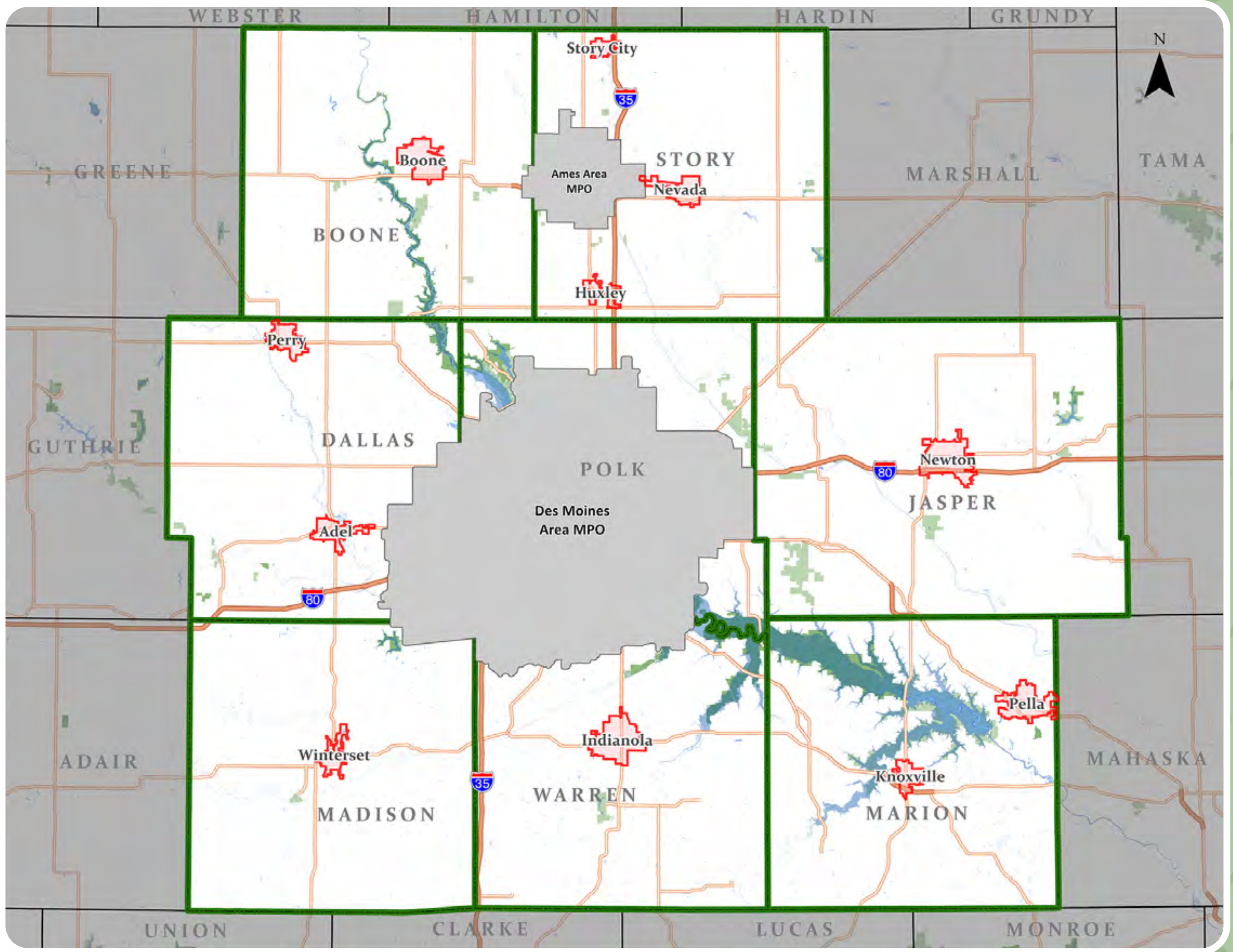


Figure 1.1 CIRTPA Region Map

1.4 What is CSAP?

A Comprehensive Safety Action Plan (CSAP) provides a detailed safety analysis of a project area with a focus on reducing and eliminating fatal and serious injury crashes. The analysis will use roadway characteristics to identify safety problems across the project area to support strategy and project identification to target safety risks. This process covers all streets and roads (except for Interstate Highways) located within the participating CIRTPA municipalities. Additionally, the SS4A program has outlined eight components of a CSAP:

1. Leadership commitment and goal setting
2. Planning structure
3. Safety analysis
4. Engagement and collaboration
5. Equity
6. Policy and process changes
7. Strategy and project selections
8. Progress and transparency

[1] https://www.transportation.gov/grants/ss4a/comprehensive-safety-action-plans

1.5 The Safe System Approach

Traditionally, safety analysis has been a reactive effort, focusing on crashes that have already happened through site-specific and/or systematic safety improvements; however, these approaches may fail to address high-risk locations that might not have a history of crashes. This is especially true for severe crashes, as they tend not to cluster and appear to occur at random locations over time. While they may occur at seemingly random locations, the factors associated with severe crashes are typically quite consistent, and this is where systemic safety analysis and the Safe System Approach come in.

Systemic safety analysis is the process of evaluating safety conditions with an intent to proactively reduce the probability of severe crashes on the transportation system. To do this, the Safe System approach applies a holistic strategy aiming to eliminate fatal and serious injuries for all road users by anticipating human mistakes, accommodating human vulnerability, and proactively addressing risks to reduce crash severity.

There are six Safe System principles, which are as follows:

Death / Serious Injury is Unacceptable

- All crashes are undesirable, but these crashes have the greatest cost to society and should be prevented at all costs.

Humans Make Mistakes

- Human error cannot be completely removed from the equation, but transportation systems can be designed and operated to accommodate this and reduce the impact of humans' mistakes.

Humans are Vulnerable

- Crashes can exert huge amounts of force on the human body, especially at high speeds or when heavy vehicles are involved. It is critical to design and operate transportation systems that are human-centric and accommodate human vulnerability.

Responsibility is Shared

- All stakeholders, including transportation system managers and user, vehicle manufacturers, etc., are responsible for ensuring that crashes do not lead to fatal or serious injuries.

Safety is Proactive

- Rather than waiting for crashes to occur, proactive steps should be taken to reduce risks in the transportation system that could lead to crashes, especially those that could result in fatal or serious injuries.

Redundancy is Critical

- To properly reduce the risk of fatal or serious injuries, all aspects of the transportation system must be strengthened, so that if one part fails, others are still in place to protect transportation system users.

The Safe System approach also identifies five key elements, which are as follows:

Safe Road Users

- Transportation systems should be designed to create a safe system for all road users, including those who walk, bike, drive, ride transit, and travel by other modes.

Safe Vehicles

- Vehicles should be designed and regulated to minimize the occurrence of collisions and the severity collisions that do occur.

Safe Speeds

- As speed increases, so does the likelihood that collisions result in fatal or serious injury; reducing speeds can better accommodate the vulnerability of humans by reducing impact forces, providing more time for road users to react, and improving visibility.

Safe Roads

- Designing roads to accommodate human mistakes and vulnerability can greatly reduce the severity of crashes that do occur; this could include physical separation, separation in time, and providing warnings to road users about hazards and the presence of other types of road users.

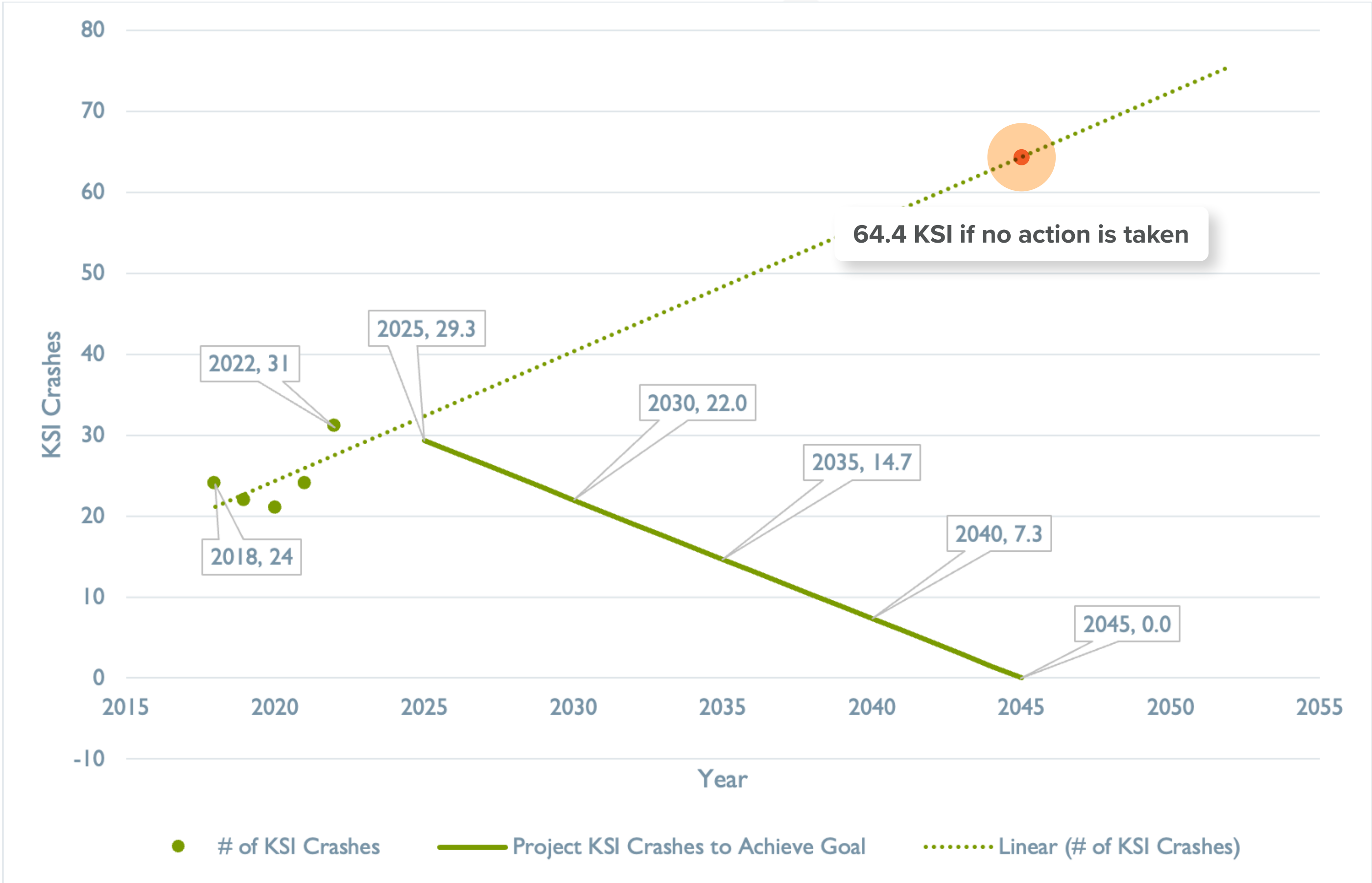
Post Crash Care

- Post crash care includes emergency first responders taking care of any injured road users, but it also includes forensic analysis of the crash to determine contributing factors and traffic incident management to maintain safe transportation systems while the aftermath of the collision is dealt with.

2. Goal

CIRTPA regional leadership has established safety targets that aim to reduce fatalities and serious injuries by 2045. Ultimately, CIRTPA aims to achieve zero roadway fatalities and serious injuries throughout the CIRTPA planning area. Figure 2.1 shows the safety goal for 2045.

Figure 2.1 CIRTPA Safety Goal by 2045



From 2018 to 2022, KSI crashes increased from 24 to 31, resulting in an approximate 6.5% average annual increase; if this pattern does not change, then by 2045, KSI crashes will have more than doubled (64.4 in 2045). To achieve the goal of zero KSI crashes by 2045, crashes would need to decrease by about 5% per year, resulting in a year-over-year drop in KSI crashes of approximately 1.5. Framed this way, the goal of zero KSI crashes by 2045 is much more than merely a slogan, but something to strive after and monitor progress. Through focused analysis and action, the CIRTPA region is committed to reversing the recent trends of increased KSI crashes and advancing toward zero deaths.

3. Engagement and Collaboration

3.1 Methodology

To achieve "safe streets for all," this Plan required a robust and highly inclusive approach to public information and engagement. At the project onset, a communications and engagement plan was developed to support consensus building activities and to gather community feedback to inform the development of a shared community vision for a process-oriented plan, safety framework, toolbox of mitigation concepts and a prioritized implementation approach. To provide accessible information to as much of the public as possible, various communication channels were utilized. A summary of media advertisement can be found in Appendix A, Public Engagement Summary.

3.2 Public Meetings (In-Person Engagement)

Public meetings were held during the second through the fourth weeks of July 2024 in each of the 11 CIRTPA member cities (Figure 3.1). In addition, meetings were held in Earlham and Prairie City to cover other cities in the region. Meetings were held at accessible locations, such as public libraries, during the evenings or mid-day time periods. The project display was set up at the Perry Farmer's Market, and a pop-up event was held for the Adel Sweet Corn Festival.

CIRTPA member provided invaluable assistance as part of the public engagement. City websites, newsletters and social media were utilized to disseminate information to their communities. Multiple press releases were sent throughout the region to recipients, including local media outlets, Chambers of Commerce, the Iowa DOT, and other organizations. The story was picked up by local radio outlets, organizations and individuals. An interview with CIRTPA Executive Director Andrew Collings was aired on KWBG in Boone.

At the public events, attendees were asked to review a series of boards describing the Safe Streets for All program and approach, crash data for the region and member city, and to identify areas of concern on a city map. Attendees also had the opportunity to complete the public online survey at the meetings (Appendix A).

The project team gained insights into safety concerns in each community as a result of the meetings. Many identified areas of concern with pedestrian and vehicle traffic near schools. Dangerous intersections, particularly along highly traveled streets, including some state highway corridors, were also frequently cited. Opportunities to enhance signage, review speed limits, and identify projects for future study and potential improvements were noted throughout the CIRTPA region.

Figure 3.1 Public Meeting Schedule

Date & Time	City	Location	Address
Tuesday, July 9 12-2 PM	Winterset	Winterset Public Library - Main Meeting Room	123 N. Second Street, Winterset
Tuesday, July 9 4-6 PM	Indianola	Wellness Center	306 E. Scenic Valley Avenue, Indianola
Wednesday, July 10 12-2 PM	Prairie City	Prairie City Community Park Building	503 S. State Street, Prairie City
Wednesday, July 10 4-6 PM	Newton	Newton City Council Chambers	Newton
Thursday, July 11 11:30 AM-1:30 PM	Knoxville	Knoxville Public Library (Weiler Room)	213 E. Montgomery Street, Knoxville
Thursday, July 11 3:30-5:30 PM	Pella	Pella Public Library	603 Main Street, Pella
Tuesday, July 16 12-2 PM	Huxley	Nord Kalsem Community Center	204 W. 5th Street, Huxley
Tuesday, July 16 4-6 PM	Nevada	Nevada City Hall	1209 6th Street, Nevada
Wednesday, July 17 12-2 PM	Story City	Story City Bertha Bartlett Public Library	503 Broad Street, Story City
Wednesday, July 17 4-6 PM	Boone	City Hall Auditorium (2nd Floor)	923 8th Street, Boone
Thursday, July 18 12-2 PM	Adel	Adel Public Library	303 10th Street, Adel
Thursday, July 18 4-7 PM	Perry	Perry Farmer's Market - Josh Davis Plaza	1115 2nd Street, Perry
Tuesday, July 23 12-2 PM	Earlham	Council Chambers	140 S. Chestnut Avenue, Earlham
Saturday, August 10 Afternoon	Adel	Adel Sweet Corn Festival	Adel

Community members actively participating in a public engagement session, reviewing project boards to share feedback and discuss transportation and safety improvements for their area.

3.3 Stakeholder Engagement

Prior to the public meetings, individual meetings were held with key city staff from eight of the member cities. Meetings included, but were not limited to, city administrators, public works directors and staff, law enforcement. community development and planning officials, and parks and recreation staff. These meetings were highly beneficial in discussing areas of safety concern, as well as future growth locations, and bicycle-pedestrian related issues. Feedback from the stakeholder meetings often mirrored public comments.

Regular presentations were provided to the CIRTPA Technical and Policy Board meetings throughout the study, beginning in February 2024. These boards are comprised of elected leaders and officials, such as Public Works directors, from the CIRTPA region. Presentations provided updates on study progress, alerted the communities to upcoming activities and events, and served as a forum for stakeholder input.

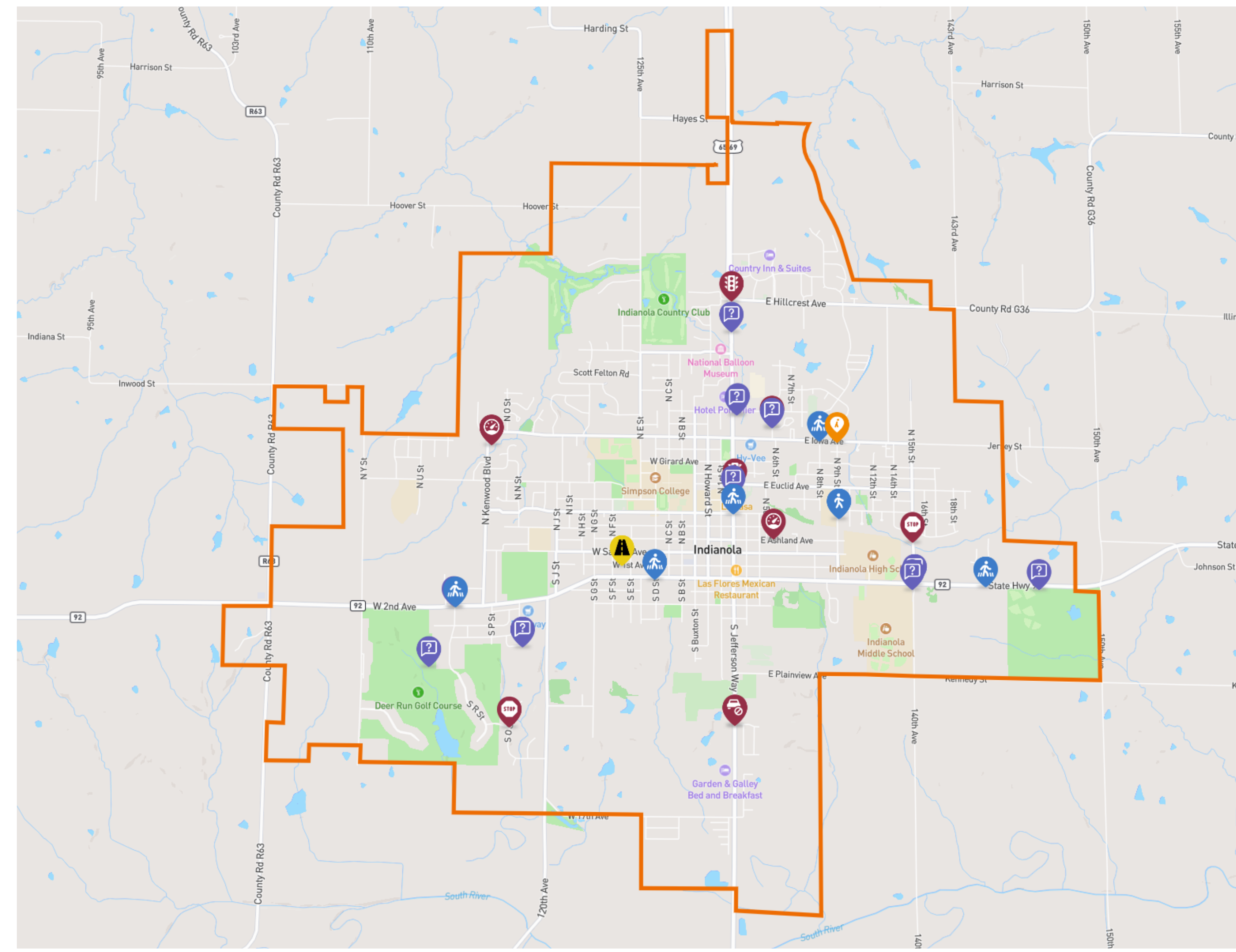
3.4 Digital Engagement

Using Social Pinpoint, a citizen participation platform, a webpage was created for the project. The site educated CIRTPA communities about the goals and intentions of the CSAP and offered meaningful feedback opportunities. A geo-spatial commenting map offered the public an opportunity to indicate where they felt safe or unsafe by the following categories.

Figure 3.2 presents an example map of Indianola showing key transportation and safety features, including pedestrian crossings, stop signs, and other transportation challenges that were identified by respondents. This feedback can be used potentially for areas to consider for safety improvements. Users could submit comments by dropping a pin at specific location (Figure 3.3). This example illustrates comments submitted by the public related to issues such as speeding, inadequate sidewalks, and traffic signal violations, for example.

The CIRTPA website also includes a project webpage with a project description, and a link to the Social Pinpoint website (cirtpa.org/cirtpa-ss4a-safety-action-plan/).

Figure 3.2 Social Pinpoint Comment Map: Safety Features



[2]fhu.mysocialpinpoint.com/central-iowa-safety-action-plan

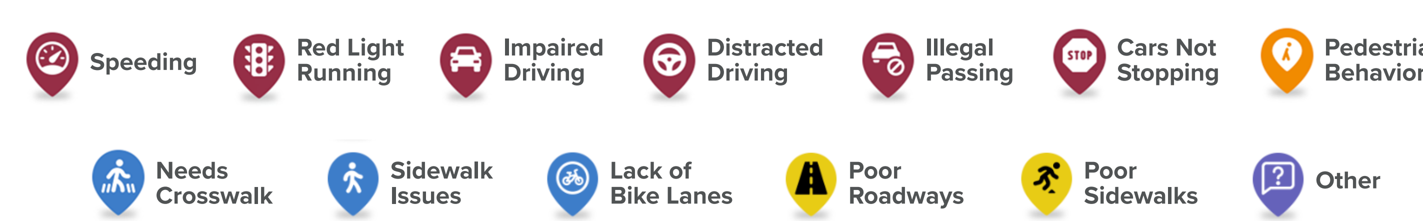
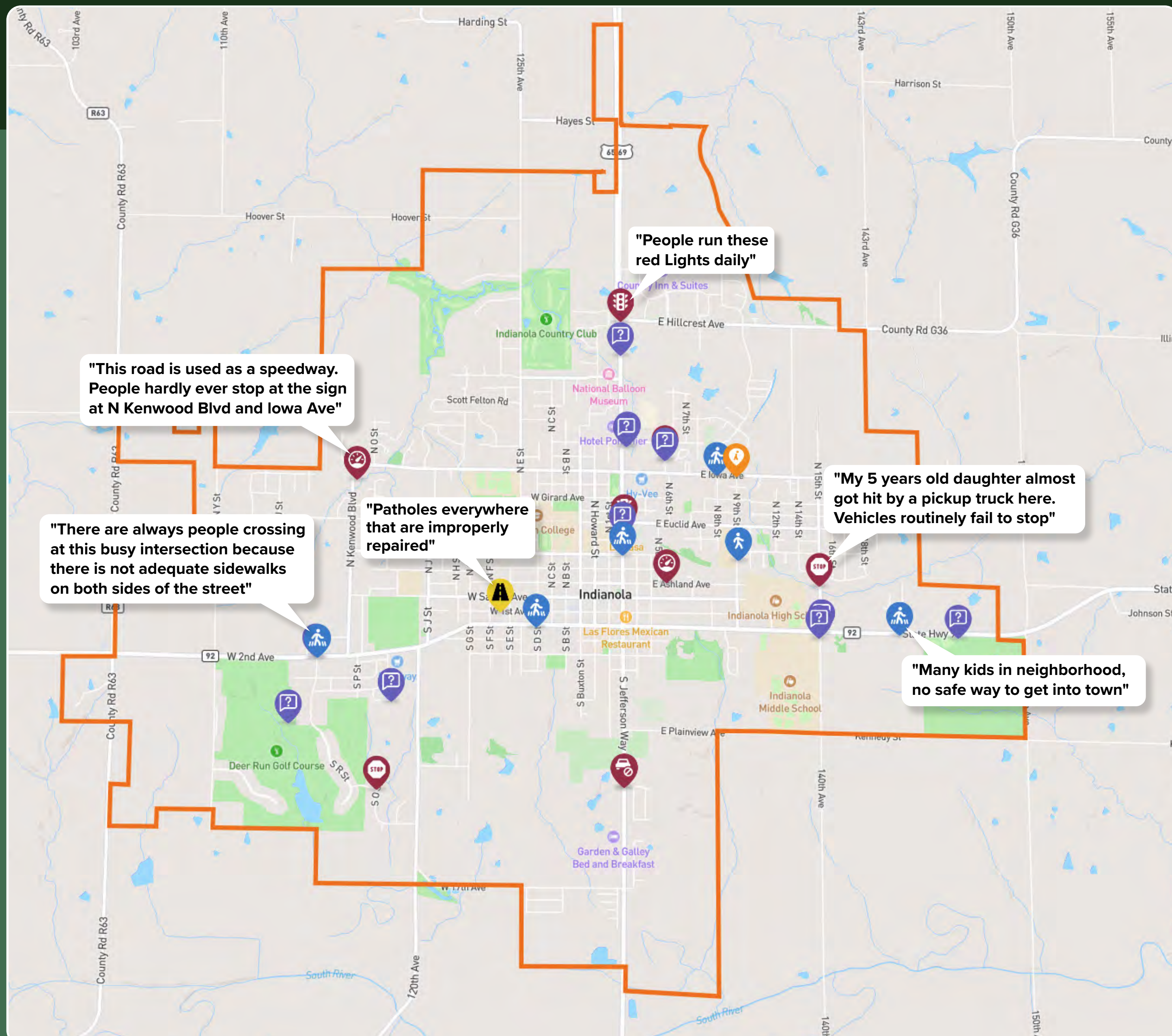


Figure 3.3 Social Pinpoint Comment Map: Safety Comments



The Social Pinpoint site garnered:

1,211 views | **1,077 visits** | **939 unique visitors**

A total of 153 contributions were made (68 survey responses and 85 map comments)

Appendix A include a full set of map comments results.

3.5 Socioeconomic Considerations

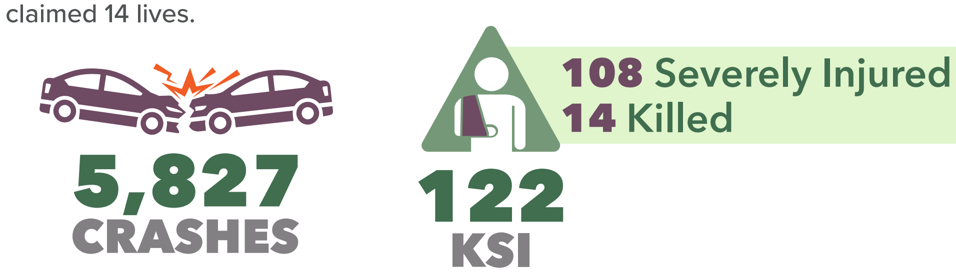
The planning process included a review of the CIRTPA region to account for socioeconomic considerations and impacts. This analysis assessed community impacts on Census tracts throughout the seven-county region. Census tracts that qualified as “historically disadvantaged: are identified below:

Table 3.1 Historically Disadvantaged Census Tracts

Tract ID	Location
19125030600	**SW Marion County**
19099040300	Newton
19099040500	**Newton**
19049050400	Perry
19049050300	Perry
19125030600	**SW Marion County**
19125030500	Knoxville
19099040500	**Newton**
19099040900	SE Jasper County
19121060101	N Madison County
19121060300	SE Madison County
19125030402	Knoxville
19125030600	**SW Marion County**
19169000101	Central Story County
19181020300	NW Warren County
19181020600	surrounding Indianola
19181021100	SE Warren County
19181021200	SW Warren County

4. Safety Trends and Data Analysis

From 2018 to 2022, the CIRTPA area witnessed a total of 5,827 crashes, resulting in minor, serious and fatal injuries. A total of 122 killed or seriously injured crashes (KSI) occurred during this period, which severely injured 108 individuals and claimed 14 lives.



The following analysis breaks down these crashes by travel mode and highlights trends such as vulnerable road users (pedestrians, bicyclists, and motorcyclists). Understanding the impact of these crashes can guide future safety efforts to reduce injuries and fatalities on roadways throughout Central Iowa.

It should be noted that this project was initiated in late 2023, and by the time this action plan was completed, more recent crash data from 2023 and 2024 had become available. This more recent crash data was not incorporated into the analysis summarized in the following sections, as much of it had already been completed by the time the data had become available. If it becomes necessary to incorpate this data into grant funding applications, FHU will compile and process crash data relevant to projects included in grant applications.

4.1 Crashes in Central Iowa

Between 2018 and 2022 (the most recent five-year period for which data was available), the CIRTPA region averaged about 1,160 crashes annually, equating to roughly three crashes every day. The overall trend in recent years has been relatively stable, with a significant jump from 2021 to 2022. It should be noted that the crash history from 2020 through 2021 may be affected by the widespread impacts to travel patterns and subsequently crash frequency stemming from the COVID-19 pandemic.

Crash data for the entire CIRTPA area was obtained using the Iowa Crash Analysis Tool (ICAT) for the five-year period from January 1, 2018, to December 31, 2022. Iowa DOT Vulnerable Road User (VRU) Intersections and Iowa DOT Road Network geocoded data were also used to supplement the ICAT crash data, incorporating additional roadway characteristic information such as traffic control type, median type, and number of lanes. Table 4.1 summarizes the total crashes by severity over the five-year study period.

Table 4.1 Crash Severity by Year (2018-2022)

Year	Fatal (K)	Major (A)	Minor (B)	Possible (C)	PDO (O)	Total Crashes	% of Total Crashes	# of KSI Crashes*	% of KSI Crashes*	% of KSI Crashes per Year*
2018	2	22	102	145	919	1,190	20.4%	24	19.7%	2.0%
2019	2	20	108	169	1,000	1,299	22.3%	22	18.0%	1.7%
2020	2	19	95	118	795	1,029	17.7%	21	17.2%	2.0%
2021	3	21	88	179	859	1,150	19.7%	24	19.7%	2.1%
2022	5	26	117	140	871	1,159	19.9%	31	25.4%	2.7%
Totals	**14**	**108**	**510**	**751**	**4,444**	**5,827**	**100.0%**	**122**	**100.0%**	**2.1%**

**KSI = Killed or Seriously Injured*

Figure 4.1 through Figure 4.3 provide a closer look at the trends in crash severity across the CIRTPA region over the five-year analysis period.

Figure 4.1 CIRTPA Crashes by Year (2018-2022)

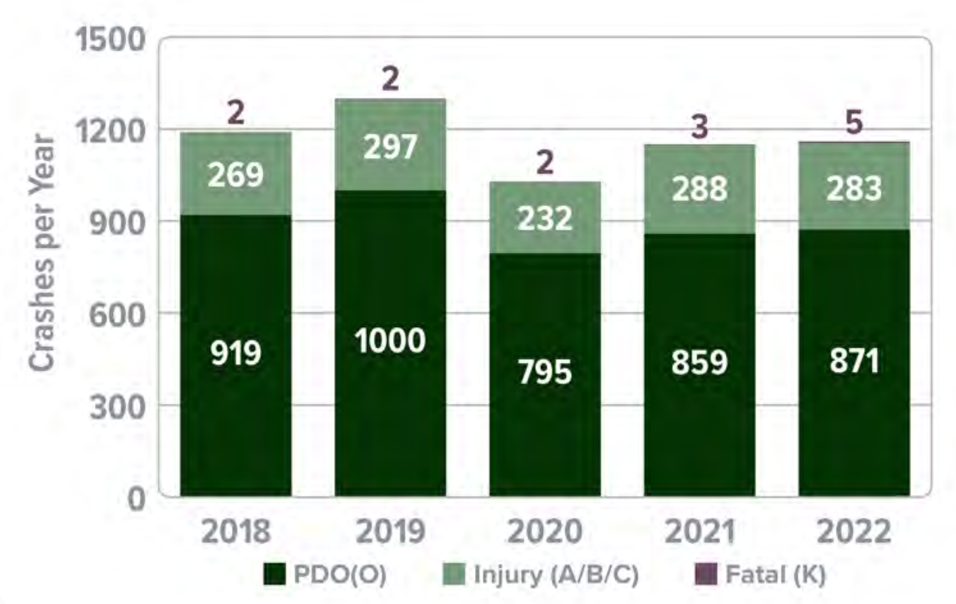


Figure 4.2 Injury Crashes and People Injured by Year (2018-2022)

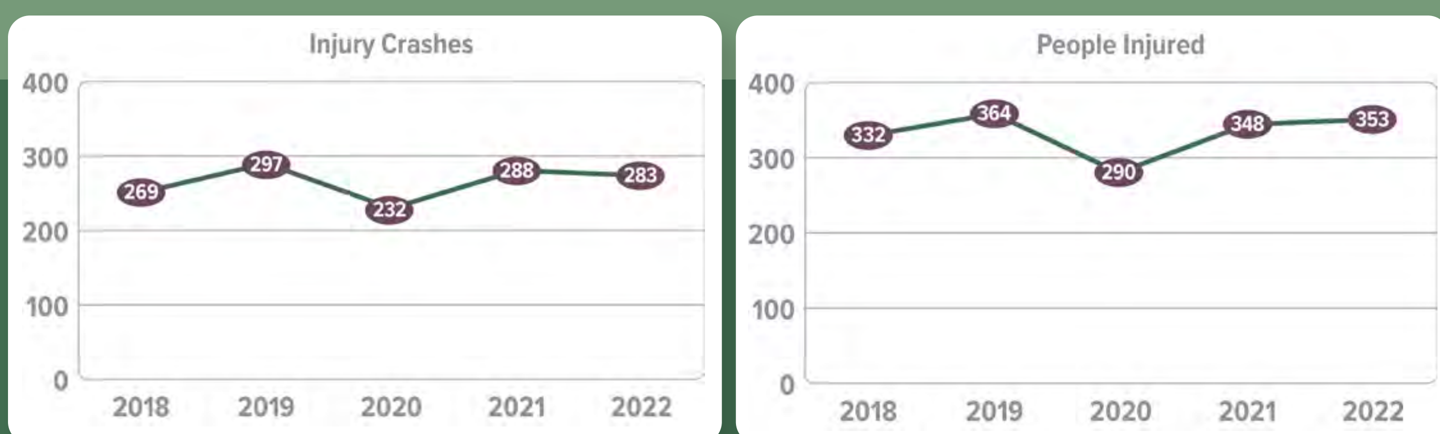
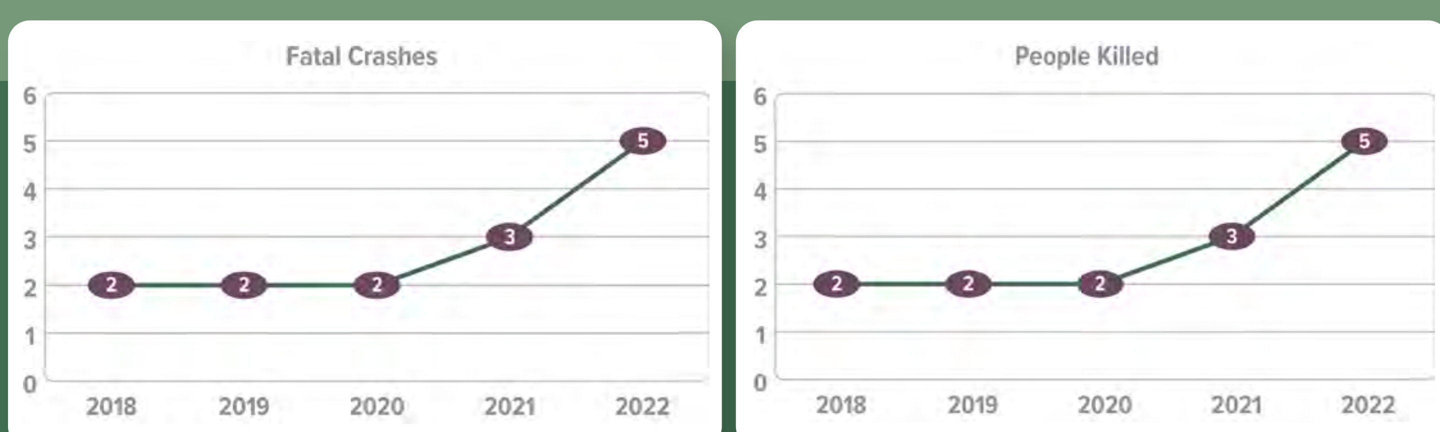


Figure 4.3 Fatal Crashes and People Killed by Year (2018-2022)



4.2 Descriptive Analysis

During the five-year period analyzed, a total of 5,827 crashes were recorded within the study area; 2,480 of these crashes occurred at intersections, and the remaining 3,347 crashes occurred along roadway segments. Of the 5,827 crashes, 122 crashes resulted in a fatality or serious injury (KSI crashes), and 92 of the 5,827 crashes involved a bicyclist, pedestrian, or other vulnerable road user (VRU). 4,444 crashes were recorded as Property Damage Only (PDO) (O), 751 were recorded as Possible (C) injury, 510 were recorded as Minor (B) injury, 108 were recorded as Major (A) injury, and 14 crashes resulted in fatal collisions (K).

Figure 4.4 KSI Crashes by Mode (2018-2022)

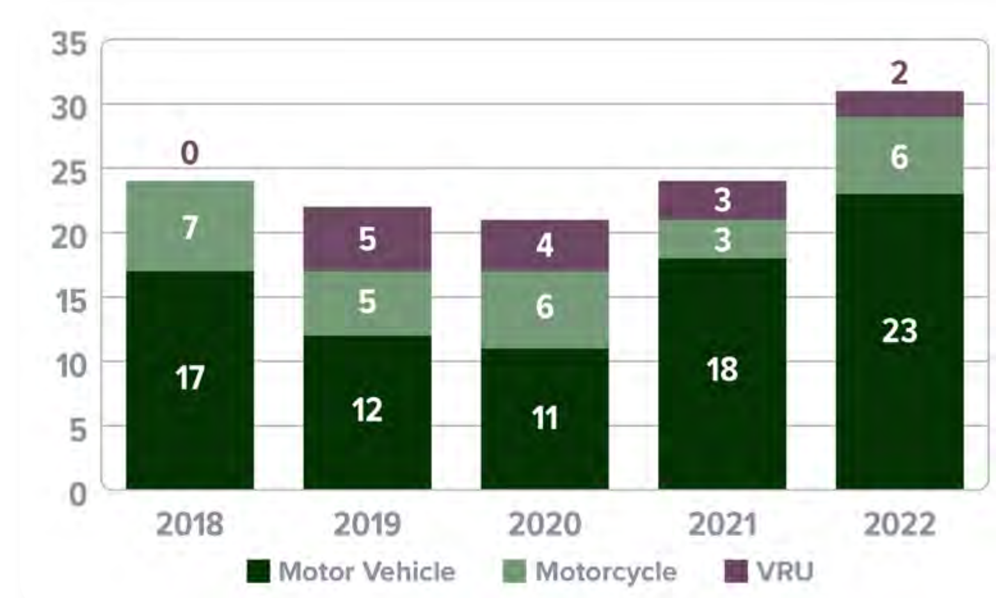


Figure 4.5 KSI Mode-type Trends (2018-2022)

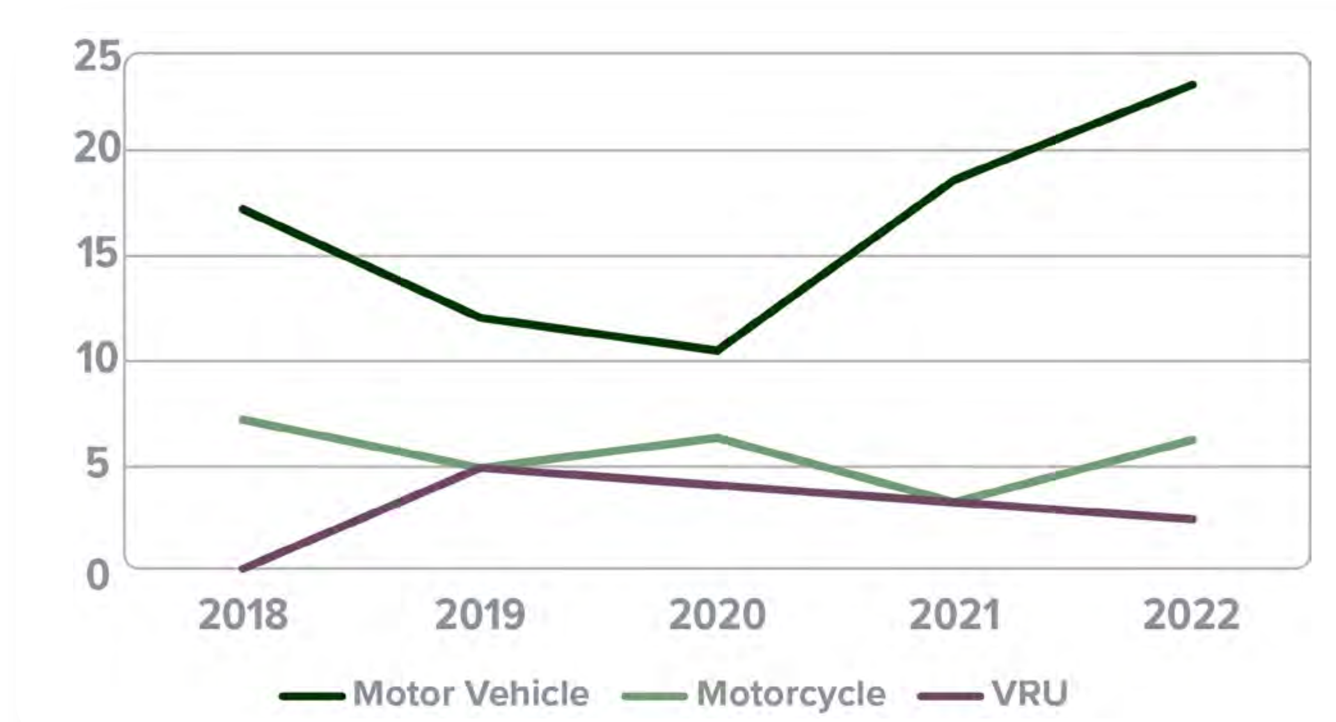
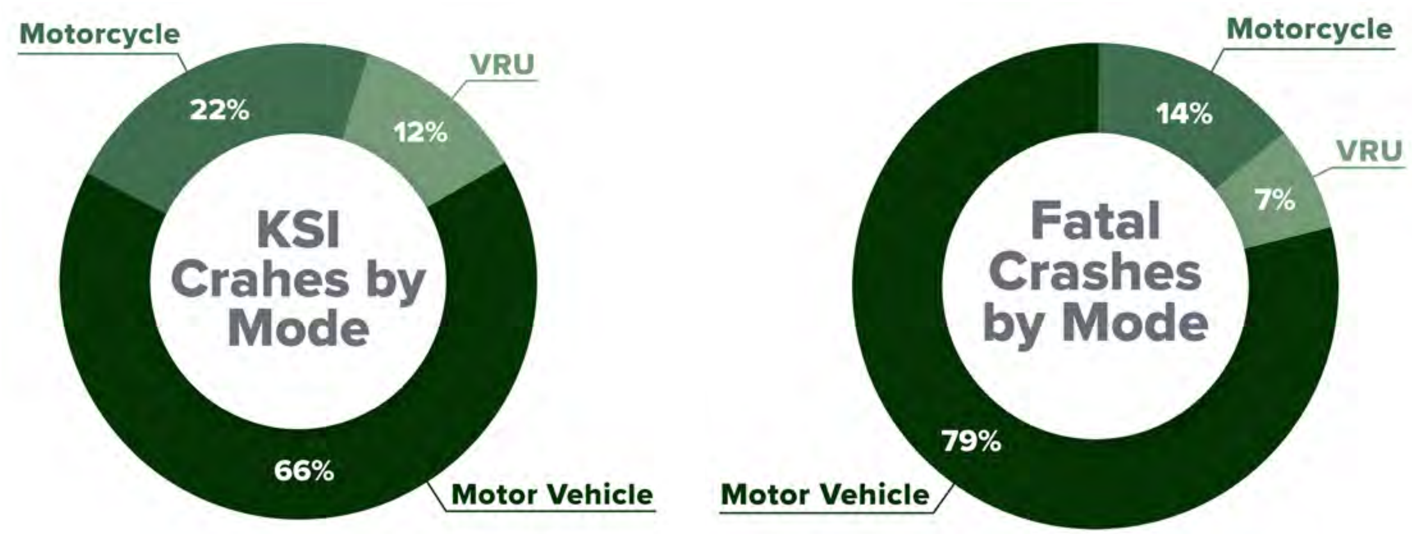


Figure 4.6 KSI and Fatal Crashes by Mode



These crashes were then reviewed based on a number of different criteria, including driver age, roadway classification / facility type and traffic volumes, roadway and lighting conditions, posted speed limits, factors contributing to crashes, crash types, and crash locations.

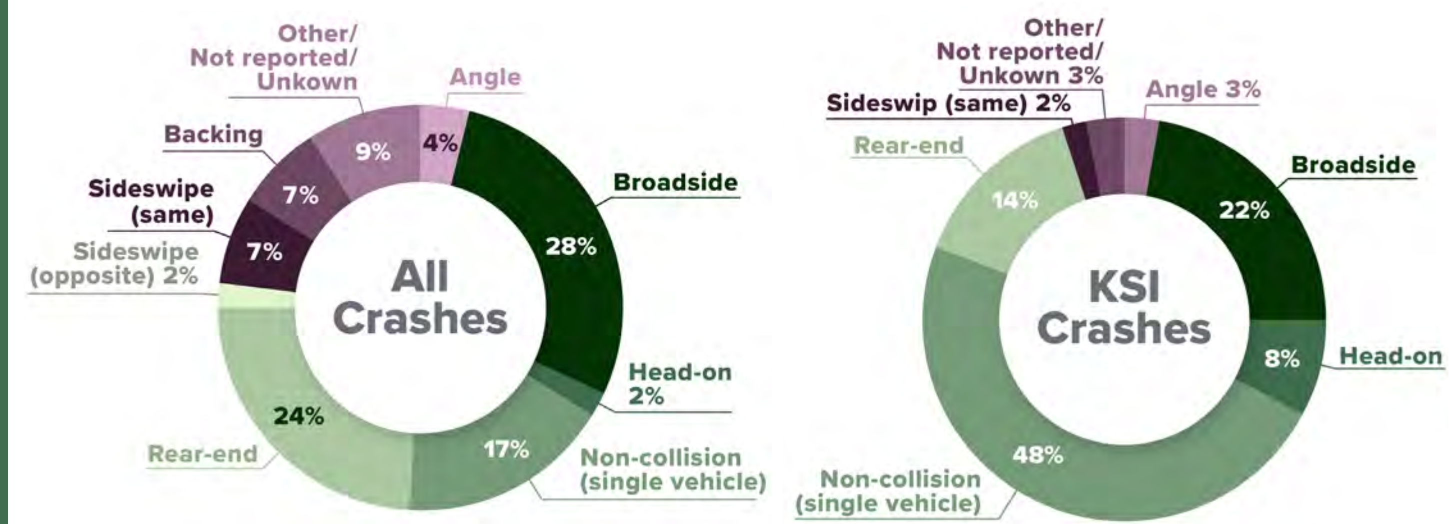
4.2.1. What? | Crash Type

The distribution of crash types and other factors in Central Iowa reveals important patterns that can inform future safety efforts. Among all crash types, broadside (front to side) crashes accounted for more than a quarter (28%) of all crashes, while Rear-end crashes made up 24% of all crashes. Non-collision (single vehicle) crashes accounted for 17% of all crashes, but nearly half (48%) of KSI crashes were Non-collision (single vehicle) crashes; this indicates this crash type may be more likely to result in fatality or serious injury.

Only two crash types, Non-collision (single vehicle) and Rear-end, were reported to involve VRUs; 98% of all crashes and 93% of KSI crashes involving vulnerable users were reported as Non-collision while the remaining 2% of all crashes and 7% of KSI crashes involving vulnerable users were reported as Rear-end crashes.

It should be noted that the Non-collision crash type may be slightly misleading, as "Non-collision" simply refers to the fact that only a single vehicle was involved in the crash. In this case, it would be more accurate to say that most VRU crashes only involve one vehicle. Not enough data was available to determine the manner(s) of collision in which vulnerable users were struck.

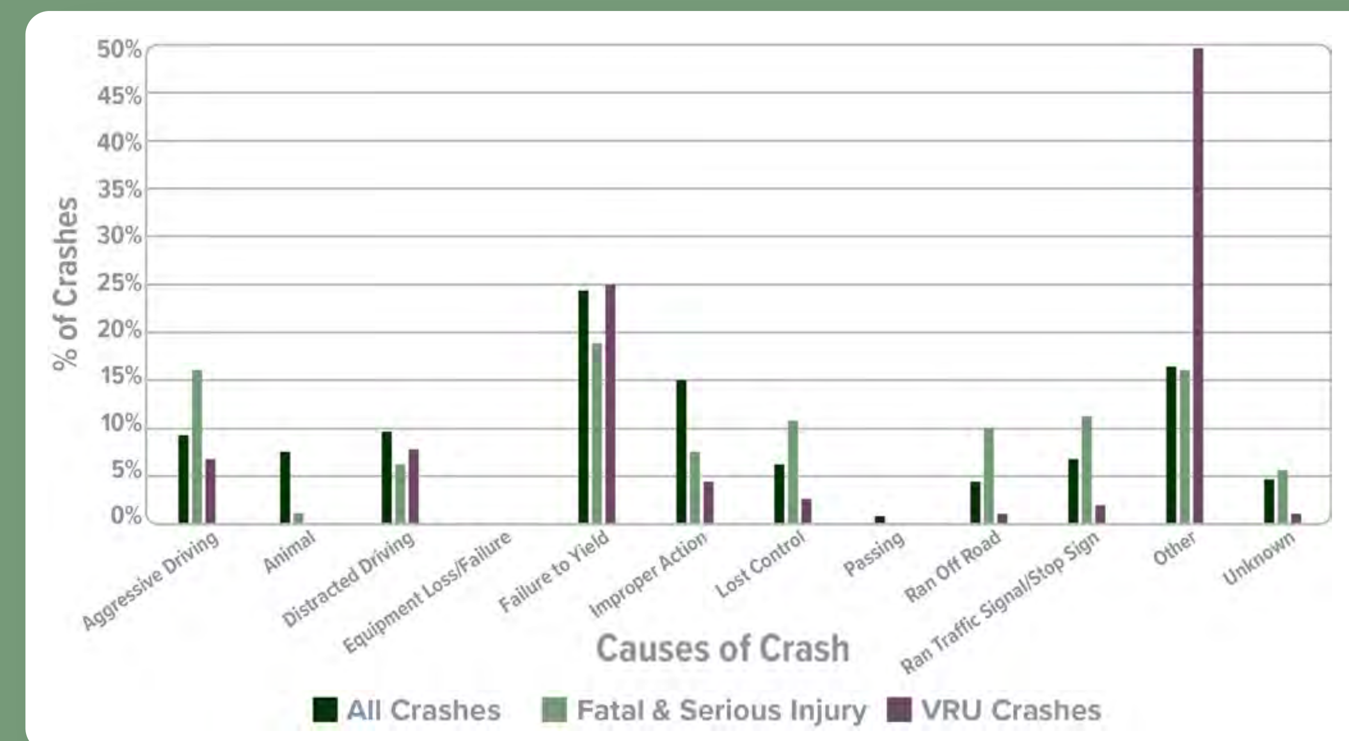
Figure 4.7 Crash Types for All Crashes and KSI Crashes



4.2.2. Why? | Driver Contributing Factors

Failure to yield was cited as a major cause in nearly a quarter (24.0%) of all crashes, just under a fifth (18.0%) of KSI crashes, and a quarter (25.0%) of VRU crashes. Aggressive driving, Lost Control, Ran Off Road, and Ran Traffic Signal / Stop Sign crashes accounted for a higher percentage of the severe (KSI) crash frequency than in the total crash frequency. This indicates that these causes are more likely to result in fatality or serious injury.

Figure 4.8 Causes of Crash



A significant number of VRU crashes (48.9%) reported "Other" as the major cause of crash; many of these crashes were missing specific information about the cause of crash, but approximately two-thirds listed "No Improper Action" for vehicle(s) involved, indicating there was some improper action on the part of the VRU. Only 11 of these "Other" crashes reported any information regarding VRU contributing circumstances.

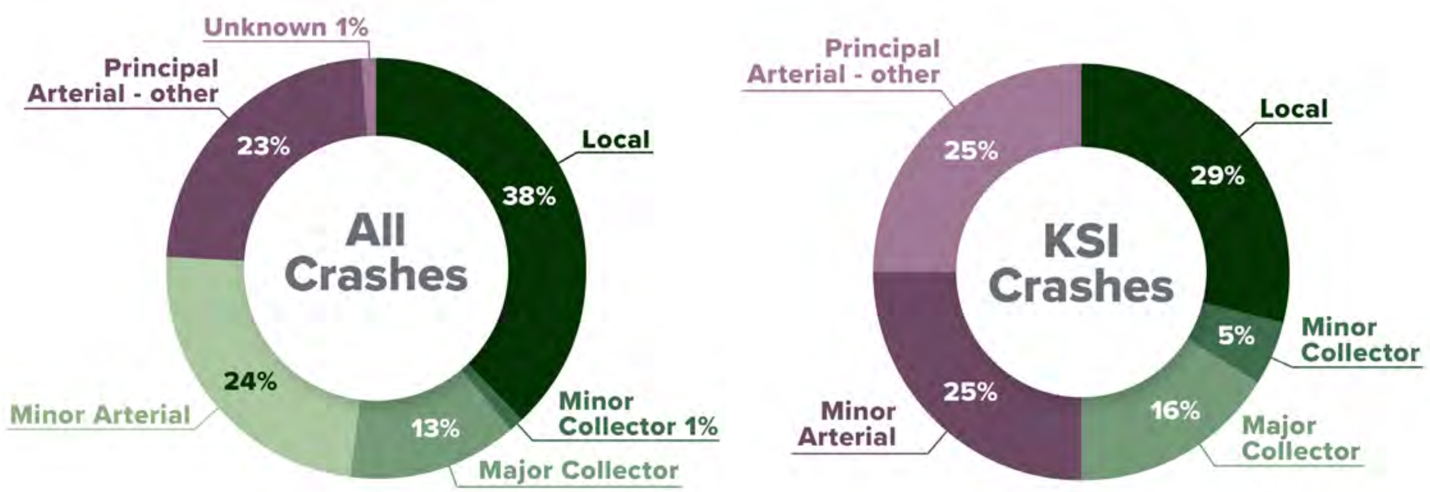
4.2.3. Where? | Crash Location

Fifty-seven percent of all crashes and 62% of severe (KSI) crashes occurred along roadway segments, while the remaining 43% of all crashes and 38% of severe crashes occurred at intersections. While the percentage of severe crashes that occurred along roadways segments is slightly higher than the percentage that occurred at intersections, the difference is not significant. Typically, crashes at intersections can be just as susceptible, if not more so, to injury and fatal crash outcomes.

Roadway Classification and Traffic Volumes

More than one-third (38.5%) of all crashes and nearly half (43.5%) of KSI crashes occurred on Local streets; almost half (43.5%) of VRU crashes occurred on Local streets as well. Minor and Principal Arterials both accounted for nearly a quarter (23.9% and 23.0%, respectively) of all crashes; 25.4% of KSI crashes and 16.3% of VRU crashes occurred on each of these facilities (50.8% and 32.6% in total).

Figure 4.9 Crashes by Roadway Classification



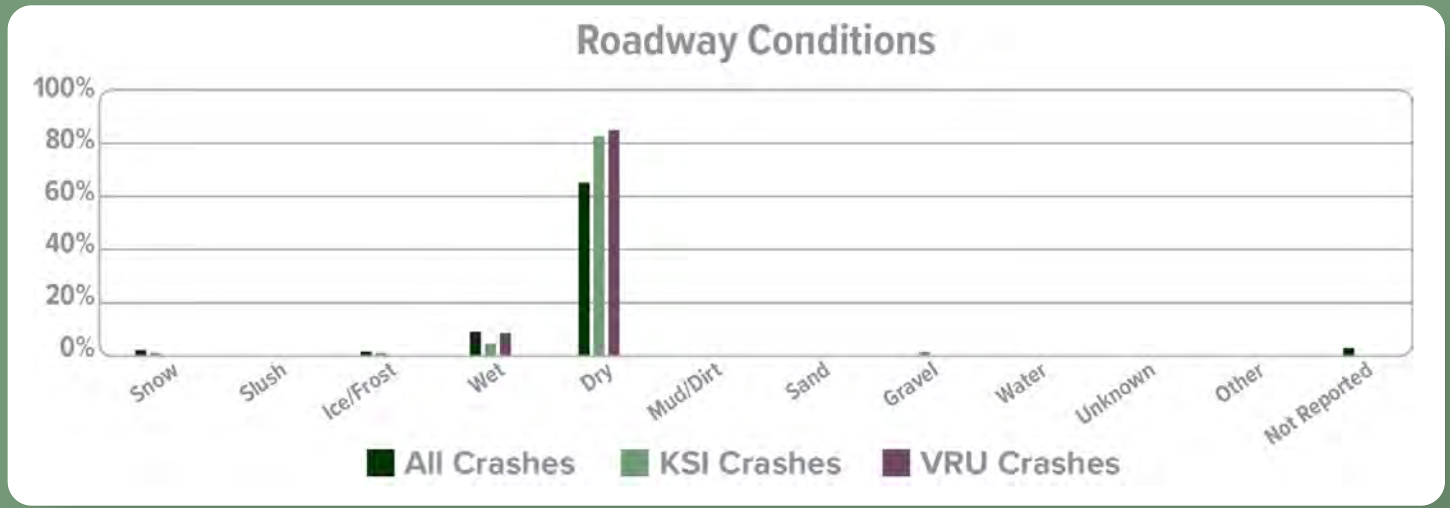
In review, 90.8% of all crashes, 90.2% of KSI crashes, and 96.7% of VRU crashes occurred on roadways with Annual Average Daily Traffic (AADT) volumes less than 10,000 vehicles per day (vpd); a majority of these crashes occurred on roadways with AADTs less than 5,000 vpd.

It should be noted that the crash data reviewed as part of this study only included crashes within the municipal boundaries where most of the streets have low volumes.

Roadway and Lighting Conditions

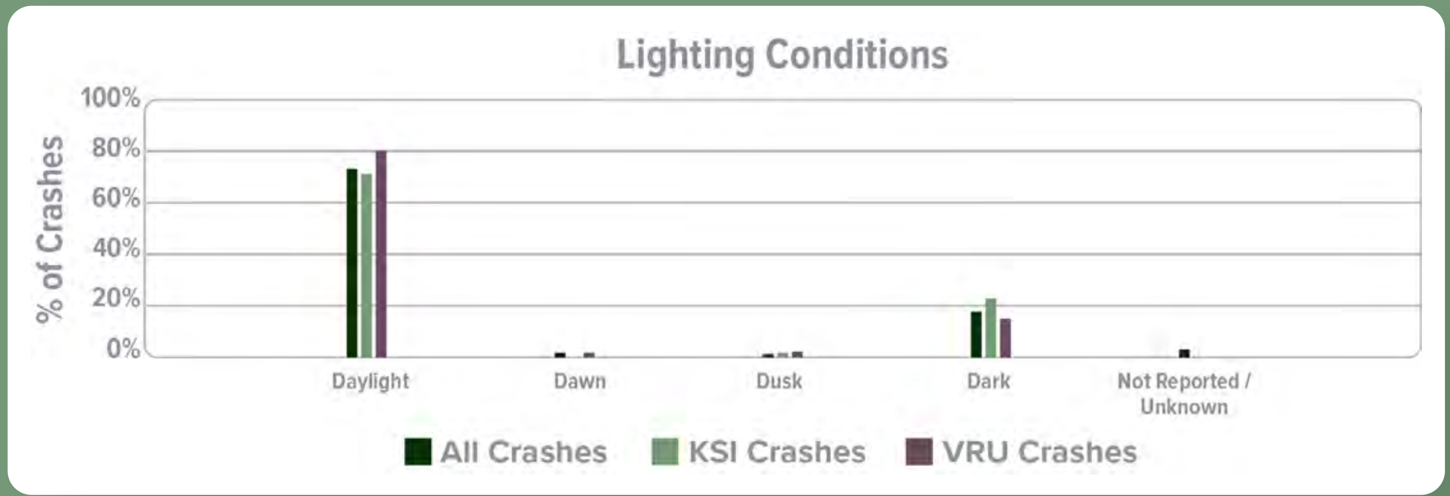
A large majority of all crashes (72.3%) and VRU crashes (90.2%) occurred on roadways with dry surface conditions. Interestingly, an even higher percentage of severe crashes (87.7%) occurred on dry surface conditions than of all crashes. One explanation for this would be that motorists reduce travel speeds during wet or snowy driving conditions which may cause crashes in those conditions to be less severe.

Figure 4.10 Crashes by Roadway Conditions



Approximately three-quarters of all crashes (71.8%), severe crashes (68.9%), and VRU crashes (79.3%) occurred during the daylight. 17.6% of all crashes, 26.2% of KSI crashes, and 15.2% of VRU crashes occurred during dark conditions (nighttime) regardless of lighting conditions.

Figure 4.11 Crashes by Lighting Conditions



Posted Speed Limits

Severe (KSI) crashes on facilities with posted speed limits of 5 mph, 35 mph, 40 mph, 45 mph, 50 mph, 55 mph, 65 mph, and 70 mph had a representation ratio greater than that of all crashes, indicating that serious injury or fatality are more likely to occur at these posted speeds.

> VRU crashes were concentrated around streets with lower speeds, primarily those with speeds posted at 25 mph; VRU crashes had a representation ratio greater than that of all crashes on facilities with speed limits up to 30 mph.

4.2.4. When? | Time of Day

Crash frequency within the CIRTPA region is highest between 3:00 PM and 6:00 PM for all crashes but is highest between 9:00 AM and 12:00 PM for KSI crashes. Total and KSI crash frequencies exhibit similar trends by time of day. However, severe crash frequency is higher (as a percentage) than total crash frequency during overnight hours (9:00 PM to 6:00 AM) and from 9:00 AM to 12:00 PM.

Figure 4.12 VRU Crashes by Speed

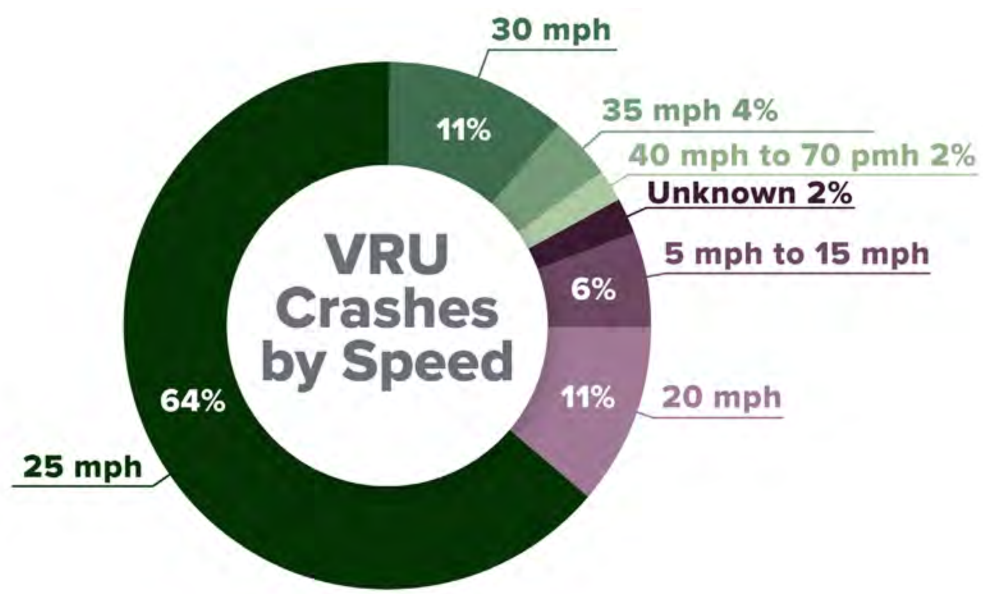
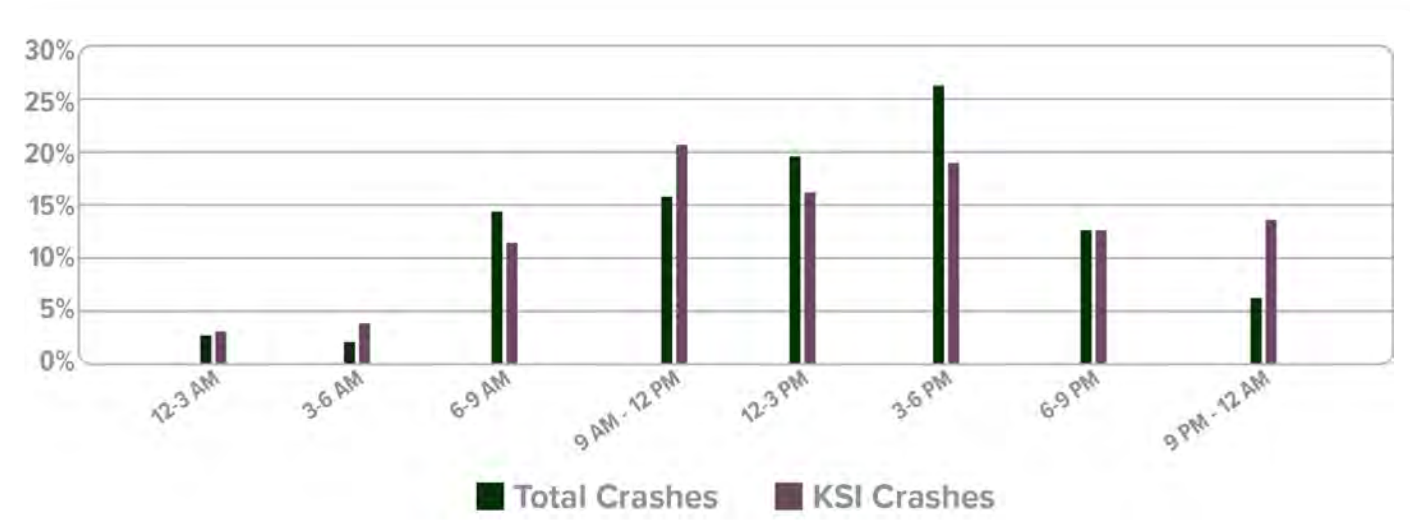


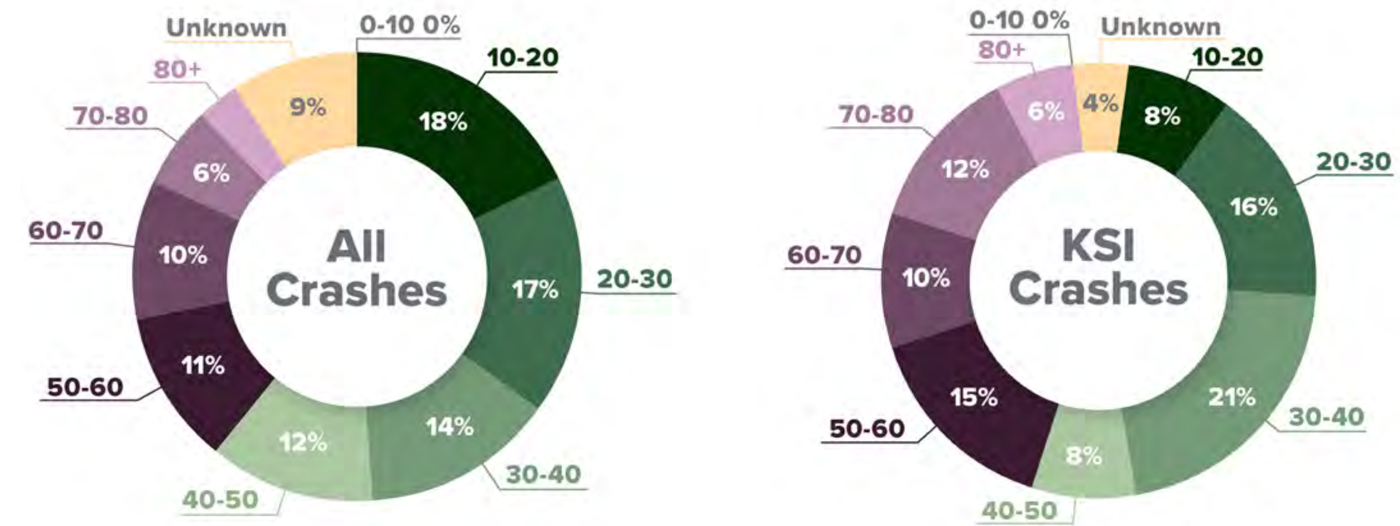
Figure 4.13 Distribution of Crashes by Time of Day



4.2.5. Who? | Driver Age

Nearly one-third (31%) of all crashes and more than one-third (37%) of severe (KSI) crashes involved a driver or operator between the ages of 20 and 40 years old. 22% of KSI crashes involved a driver or operator over the age of 70 years old.

Figure 4.14 Percent of All Crashes and KSI Crashes by Driver Age



4.3 In Summary

The safety analysis and data highlights critical insights into traffic safety in Central Iowa, emphasizing the higher risk of injury and fatality in certain crash types. Broadside and Rear-end collisions account for more than half (52%) of all collisions. Lost control, ran off road, and aggressive driving, coupled with the higher vulnerability of younger and older road users, underscores the need for targeted safety campaigns and infrastructure improvements. Addressing specific trends in a targeted manner is crucial for reducing severe crashes and protecting all road users.

A more detailed summary of the crash data and descriptive analysis is included in Appendix B along with information on focus crash identification and refinement, which led to the development of Focus Areas, which are discussed in the following sections.

5. Systemic Safety Analysis

Systemic safety analysis is the process of evaluating safety conditions with an intent to proactively reduce the probability of severe crashes on the road network. The Safe System Approach aims to reduce fatal and serious crash outcomes by minimizing crash risk across the transportation system, rather than a reactive approach to managing crash risk at locations where severe crashes have occurred. To accomplish this, the systemic safety approach target improvements where there is greater crash risk and where there are vulnerable road users.

5.1 Focus Areas

Focus Areas in the safety action plan refer to specific categories of safety including crash types that have been identified as priorities for targeted safety interventions and countermeasures. These areas identified through crash data analysis exhibit a disproportionately high representation in the overall crash frequency, resulting in higher risks of injury or fatality.

These overrepresented elements were identified by analyzing recent crash data, considering known countermeasures, and consulting stakeholders. If a particular crash type or contributing factor occurs more frequently as a percentage of total severe (KSI) crashes when compared to its percentage of the region-wide total of all crashes, it's considered "overrepresented" and becomes a Focus Area. These critical Focus Areas are further refined to guide safety improvements. The identified Focus Areas are described in the following pages.

Table 5.1 summarizes the Total, KSI and all injury crash frequencies of all overrepresented crashes.

Table 5.1 Summary of Overrepresented Crashes (2018-2022)

Focus Crash	Total Crashes	% of Total Crashes	Severe (KSI) Crashes	% of KSI Crashes	All Injury Crashes	% of All Injury Crashes*
Number of Users						
1-Vehicle Crash	1,228	21.1%	58	47.5%	345	24.9%
3+ Vehicle Crash	199	3.4%	4	3.3%	85	6.1%
Crash Type						
Angle (oncoming left turn)	237	4.1%	4	3.3%	74	5.4%
Broadside (front to side)	1,608	27.6%	27	22.1%	458	33.1%
Head-on (front to front)	126	2.2%	9	7.4%	47	3.4%
Non-collision (single vehicle)	969	16.6%	59	48.4%	350	25.3%
Fixed Object Type						
Building	24	0.4%	2	1.6%	10	0.7%
Ditch	87	1.5%	4	3.3%	37	2.7%
Embankment	7	0.1%	2	1.6%	5	0.4%
Tree	30	0.5%	3	2.5%	13	0.9%
Road Surface Conditions						
Dry	4,214	72.3%	107	87.7%	1,091	78.9%
Gravel	31	0.5%	3	2.5%	15	1.1%
Slush	44	0.8%	0	0.0%	17	1.2%
Weather Conditions						
Clear	3,832	65.8%	91	74.6%	963	69.6%
Lighting Condition						
Dark - roadway lighted	685	11.8%	17	13.9%	190	13.7%
Dark - roadway not lighted	294	5.0%	13	10.7%	84	6.1%
Mode Type						
Pedalcyclist	20	0.3%	0	0.0%	20	1.4%
Pedestrian	21	0.4%	4	3.3%	21	1.5%
Other Non-Motorist	51	0.9%	10	8.2%	50	3.6%
Motorcycle	100	1.7%	27	22.1%	83	6.0%
Vehicle Movement						
Accelerating	28	0.5%	1	0.8%	12	0.9%
Going straight	3,097	53.1%	82	67.2%	926	67.0%
Navigating curve	47	0.8%	4	3.3%	24	1.7%
Driver Contributing Factor						
None-apparent	4,849	83.2%	112	91.8%	1,236	89.4%
Driver/Operator Age						
30-40 years old	837	14.4%	31	25.4%	234	16.9%
Location of VRU						
Intersection: Marked Crosswalk	12	0.2%	0	0.0%	12	0.9%
Intersection: Unmarked Crosswalk	11	0.2%	0	0.0%	11	0.8%
Unknown	50	0.9%	10	8.2%	49	3.5%
Driver Condition						
Driver Impaired	229	3.9%	17	13.9%	89	6.4%

** - All Injury Crashes include Fatal (K), Major (A), Minor (B), and Possible (C) crashes & excludes PDO Crashes. Highlighted values correspond to KSI or All Injury percentages that are greater than Total Crash percentages.*

5.2 Focus Area Consolidation and Refinement

Consolidation and Refinement to the list of overrepresented crashes above was conducted to develop a selection of Focus Areas that would be used for more detailed systemic safety analysis; this was done to remove certain overrepresented crash conditions, contributing factors, and/or types that may represent normal travel conditions or lack of total crash frequency to warrant inclusion as a Focus Area and to consolidate redundant Focus Areas.

5.2.1. Normal Driving Conditions

The following overrepresented crashes were removed from the list of Focus Areas based on their status as a “normal” driving condition:

- Dry Road
- Gravel Road
- Accelerating
- Going Straight
- Clear Weather
- None-apparent (contributing driver factor indicating no driver error contributing to crash)

5.2.2. Total Crash Frequency

The following overrepresented crashes were removed from the list of Focus Areas based on their lack of total crash frequency, as they represent a very small percentage of the overall number of crashes that occurred in the study area:

Slush

Gravel Road

5.2.3. Consolidation due to Redundancy

Embankment & Ditch (combined into single fixed object type for further evaluation)

Pedestrian, Pedalcyclist & Other Non-motorist (combined into single VRU mode type for further evaluation)

It should also be noted that the Unknown VRU Location, which was identified as overrepresented, was removed from the list of Focus Areas as well because of a lack of information; without knowing where these crashes are occurring, meaningful countermeasures could not be identified.

5.3 Roadway Risk Factors and Focus Areas

The following roadway risk factors were identified as overrepresented in the fatal and serious injury (KSI) and/or fatal and injury crash histories compared to the total five-year crash record for the municipalities within the CIRTPA planning area:

- Roadway Classification
- Number of Lanes
- Traffic Volume (AADT)
- Median Type
- Shoulder Type
- Traffic Control Type
- Posted Speed Limit

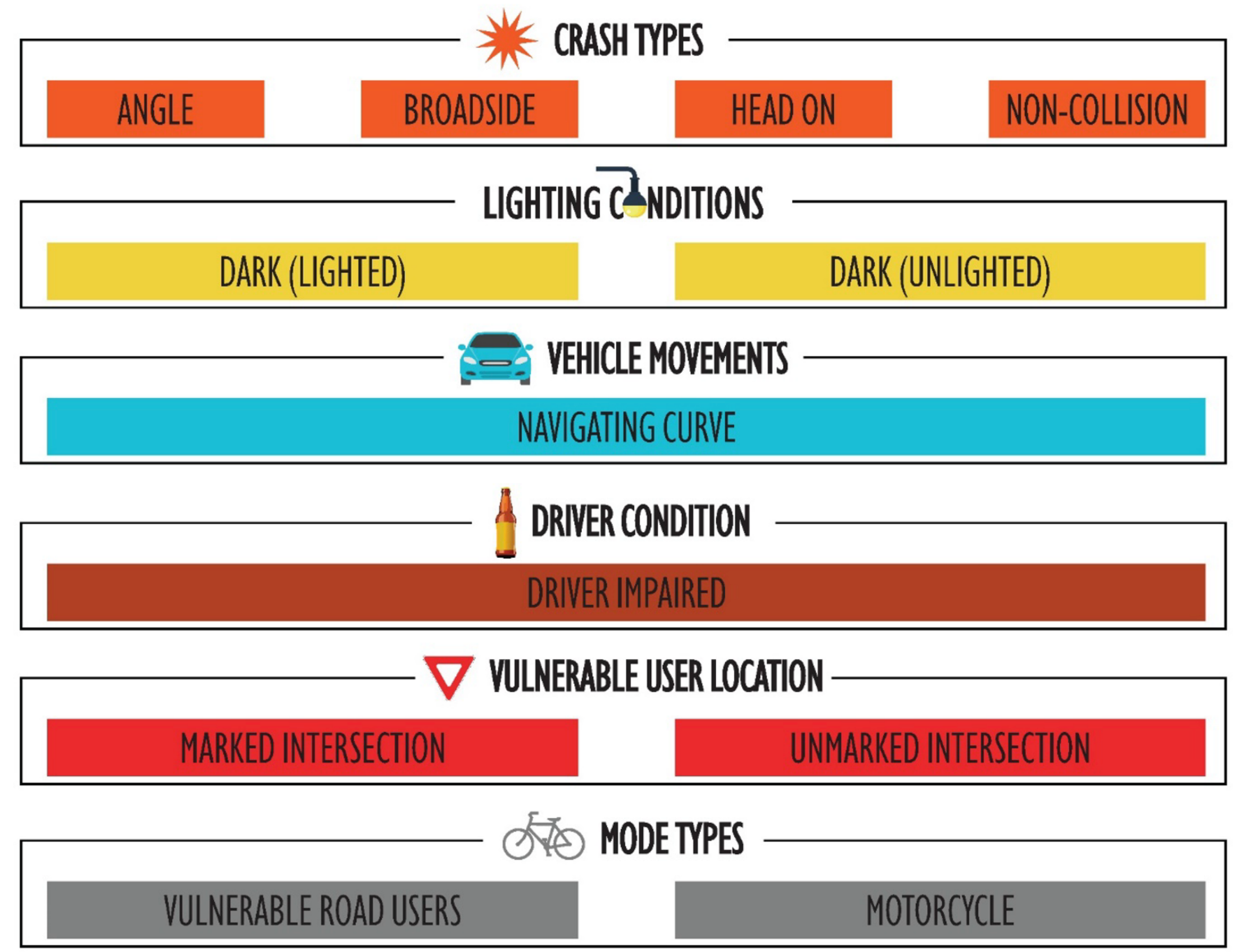
5.3.1. Crash Trees

Crash trees were developed for the refined overrepresented crash types to evaluate the frequency of crashes in specific roadway conditions and eliminate crash types and contributing factors from the list of Focus Crashes if potential countermeasures were beyond the scope of the safety action plan (i.e., high crash frequency on freeways controlled by other jurisdictions).

5.4 Focus Areas

After developing and evaluating crash trees, the critical Focus areas were further refined to guide safety improvements. Figure 5.1 shows the identified focus areas.

Figure 5.1 Focus Areas



6. Development of High Injury Network

A High Injury Network (HIN) within the CIRTPA planning area was determined based on results from the descriptive and systemic crash analyses. The HIN identifies stretches of roads and/or intersections that have a high concentration of accidents resulting in injuries. Data from the Iowa DOT Crash Analysis Tool (ICAT), Iowa DOT Vulnerable Road User Intersections, Iowa DOT Road Network, and Crash Severity Cost Information for Iowa crashes was used to develop a GIS network of intersections and segments that crashes were assigned to using spatial information associated with each crash. To assign crashes to intersections and segments, buffers of 250 feet and 50 to 100 feet were used, respectively; crashes within these buffers were then tied to the intersection or segment buffer that they fell within.

The HIN was developed based on two criteria: the overall crash history at an intersection or on a segment and the societal costs associated with crashes at an intersection or on a segment; an Equivalent Property Damage Only (EPDO) value was used to weight the different crash severities based on the societal costs associated with each crash severity. To be included in the HIN, at least five crashes must have occurred during the five-year period of crashes reviewed as part of this project, and intersections or segments must have an EPDO value ranked in the 80th percentile or higher; intersections or segments with EPDO values in the 90th percentile or higher were classified as Tier 1 locations, and the rest were classified as Tier 2 locations. Additionally, any Tier 2 intersections and segments located within a Historically Disadvantaged Census Tract, were elevated to Tier 1 locations.

A total of 94 high-injury intersections and 82 high-injury roadway segments were included in the HIN. 75 intersections and 62 roadway segments were identified as Tier 1 locations; an additional 19 intersections and 20 roadway segments were identified as Tier 2 locations. Of the 94 HIN intersections, 19 were located within one of the 15 disadvantaged census tracts; two of these intersections were bumped from Tier 2 to Tier 1 because of this disadvantaged status. 32 of the 82 HIN roadway segments were located within a disadvantaged census tract, and 15 of these were elevated from Tier 2 to Tier 1 because of this.

The intersections included in the HIN represent just over 2% of all intersections within the CIRTPA planning area; however, they account for more than 40% of KSI intersection crashes. The segments included in the HIN represent 6% of street miles within the CIRTPA planning area, but these segments account for more than half (55%) of KSI segment crashes. Maps depicting the HIN intersections and segments, locations of fatal and major injury crashes, and locations of non-motorist crashes within each CIRTPA member community are included on the following maps.

Figure 6.1 Adel High Injury Network Map

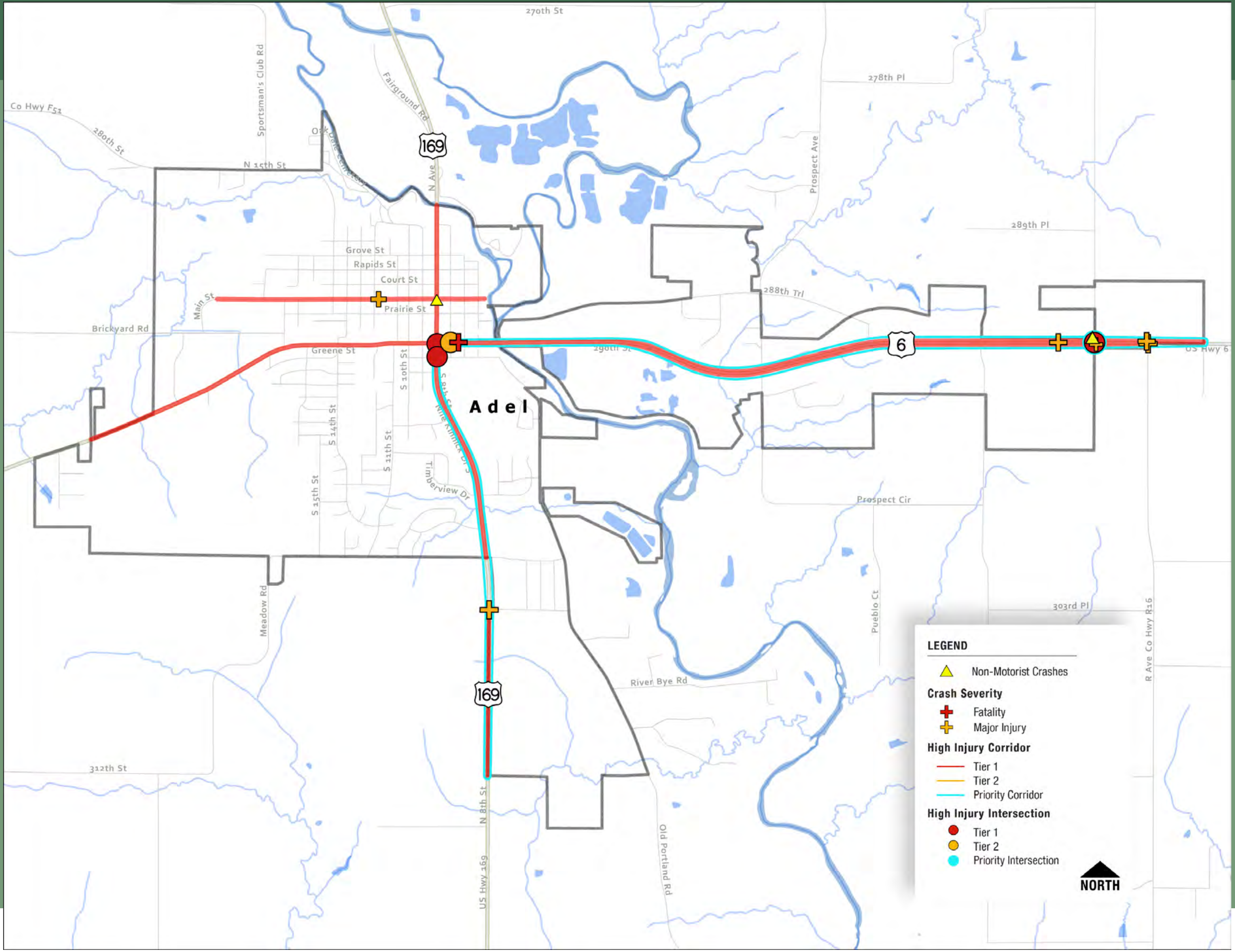


Figure 6.2 Boone High Injury Network Map

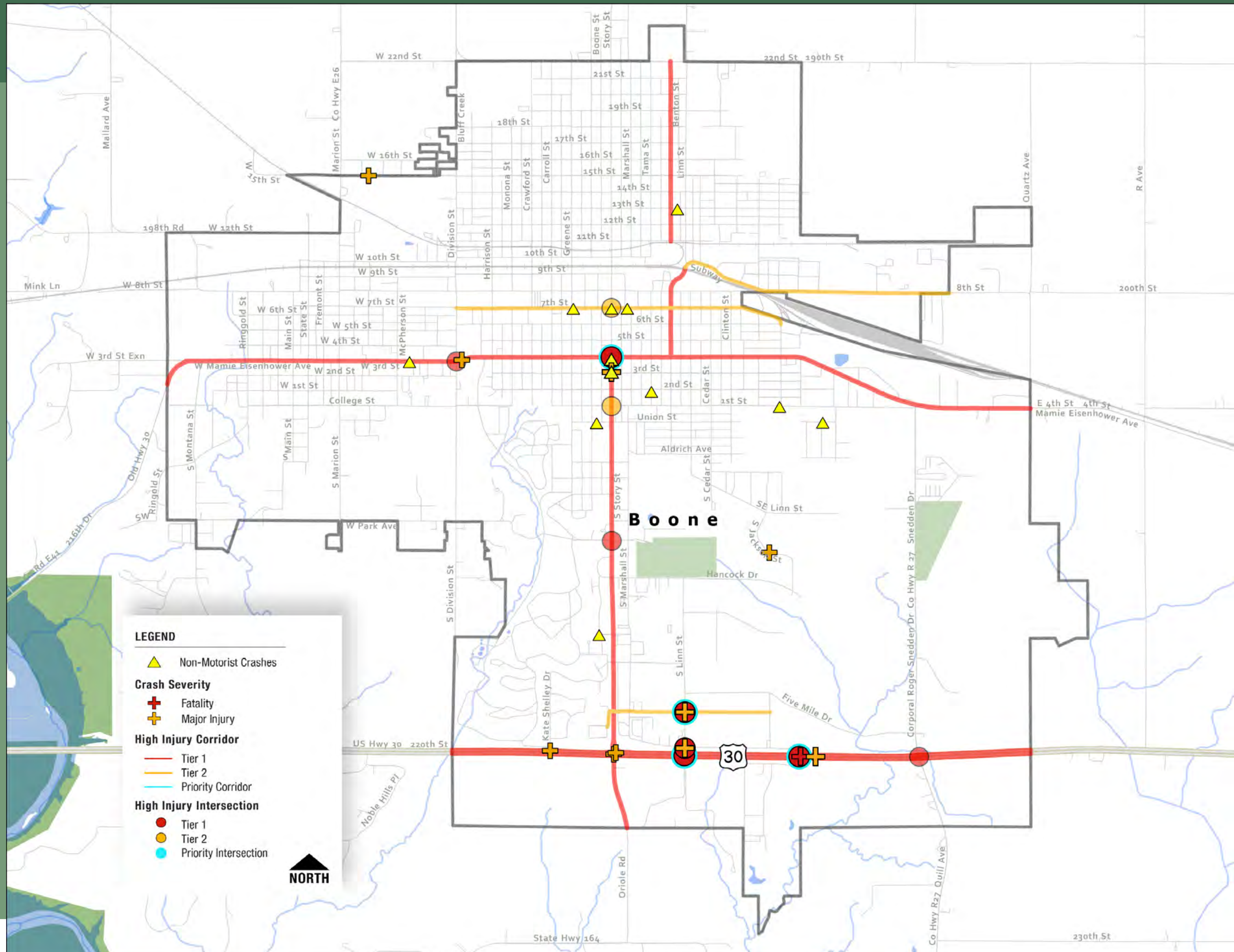


Figure 6.3 Huxley High Injury Network Map

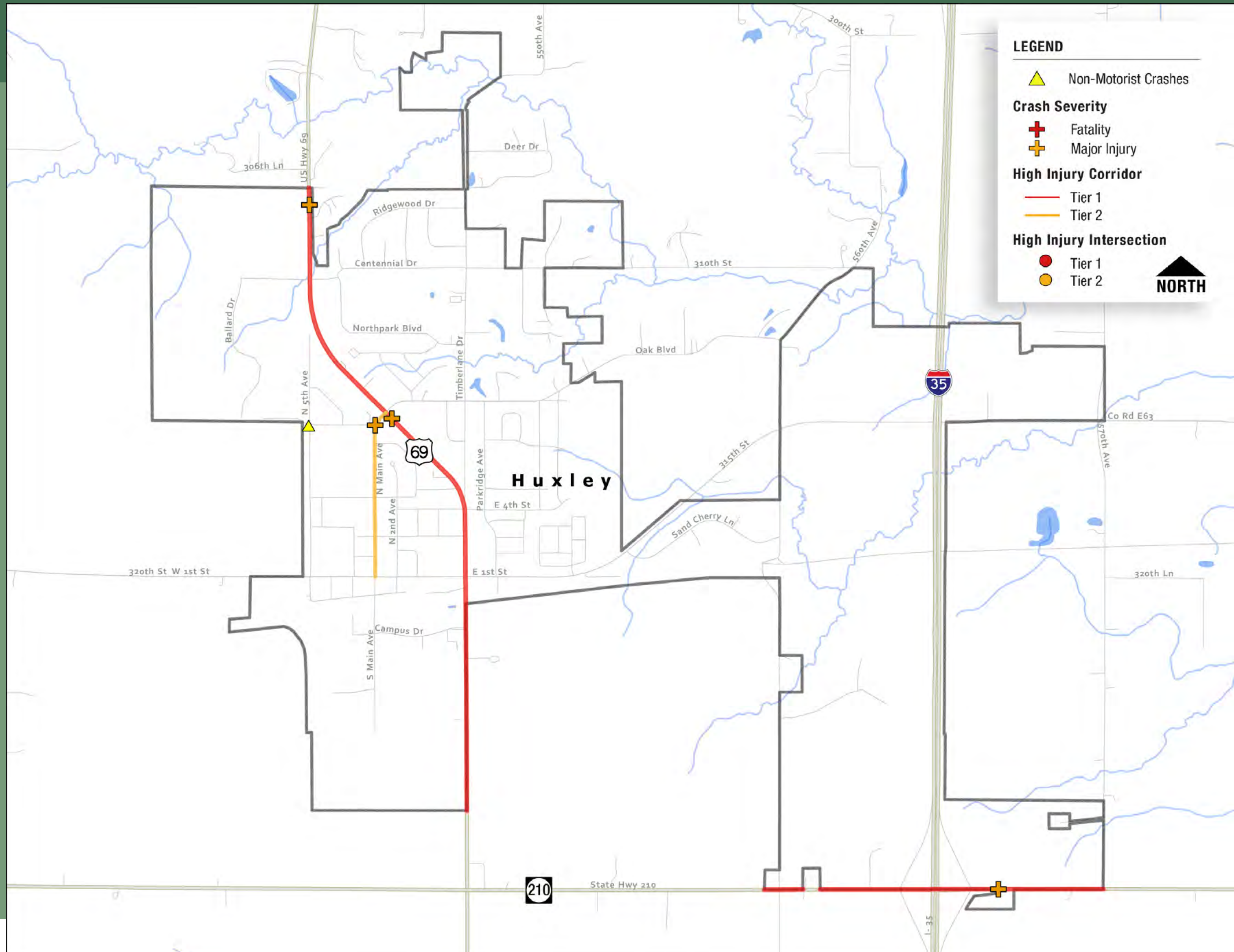


Figure 6.4 Indianola High Injury Network Map

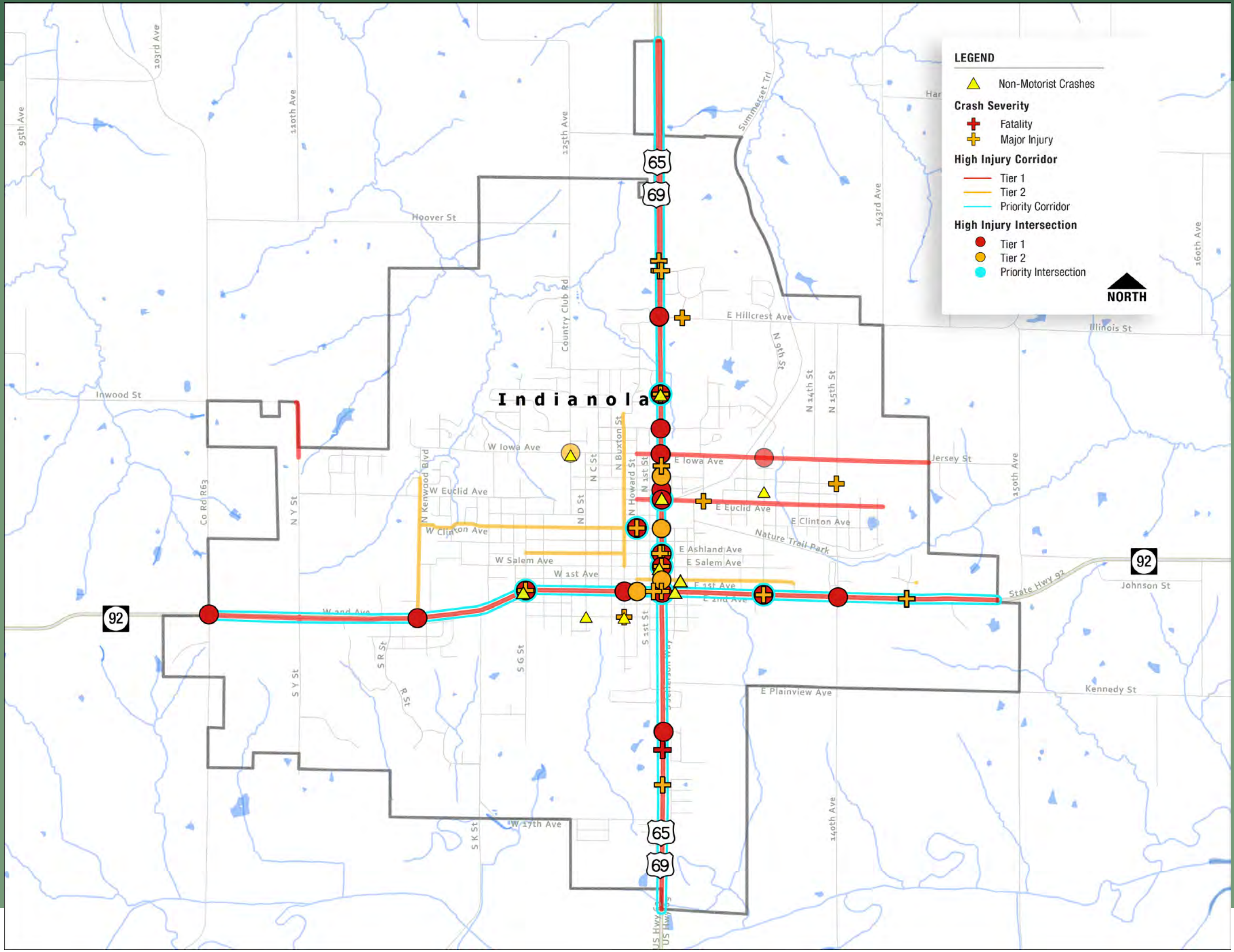


Figure 6.5 Knoxville High Injury Network Map

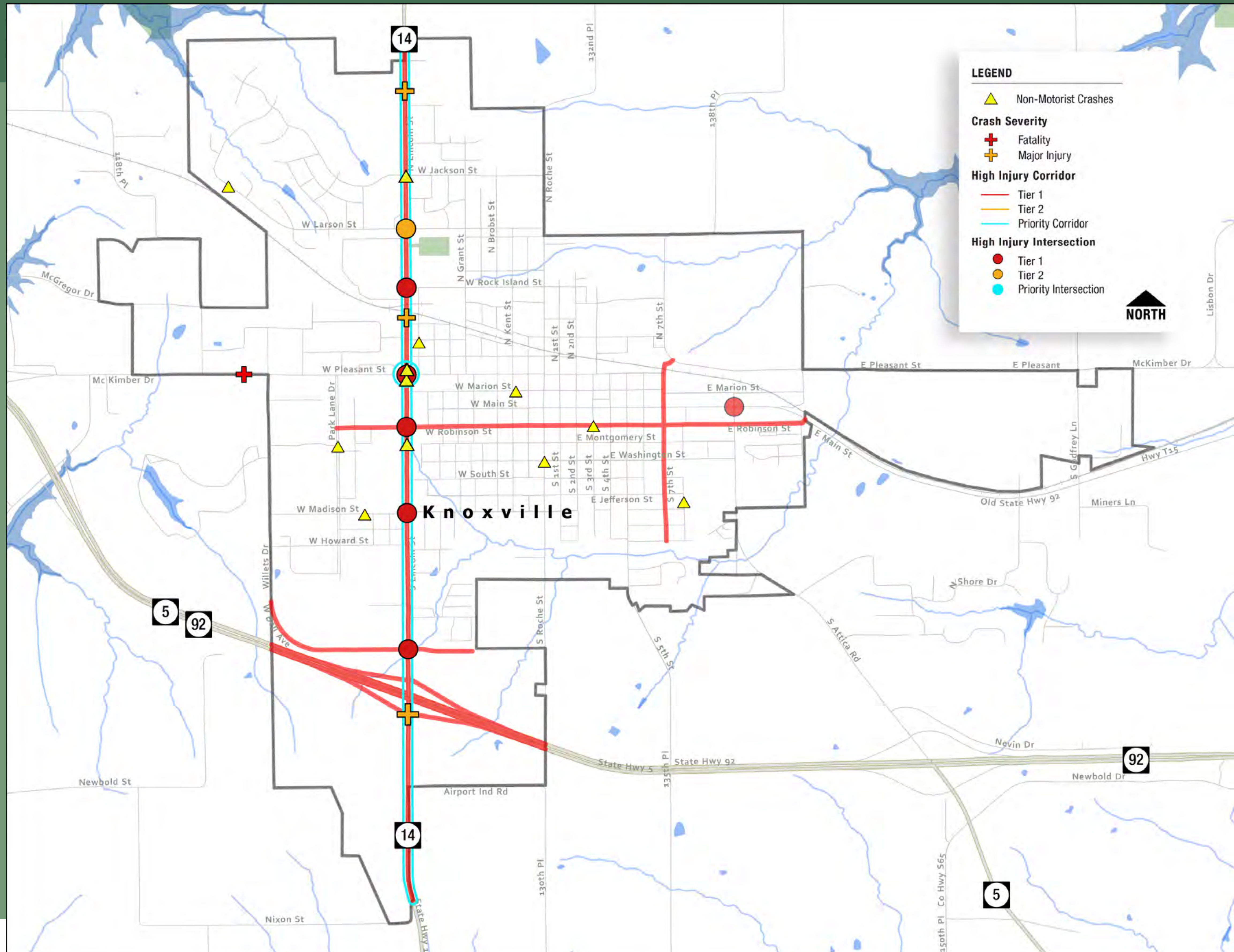


Figure 6.6 Monroe High Injury Network Map

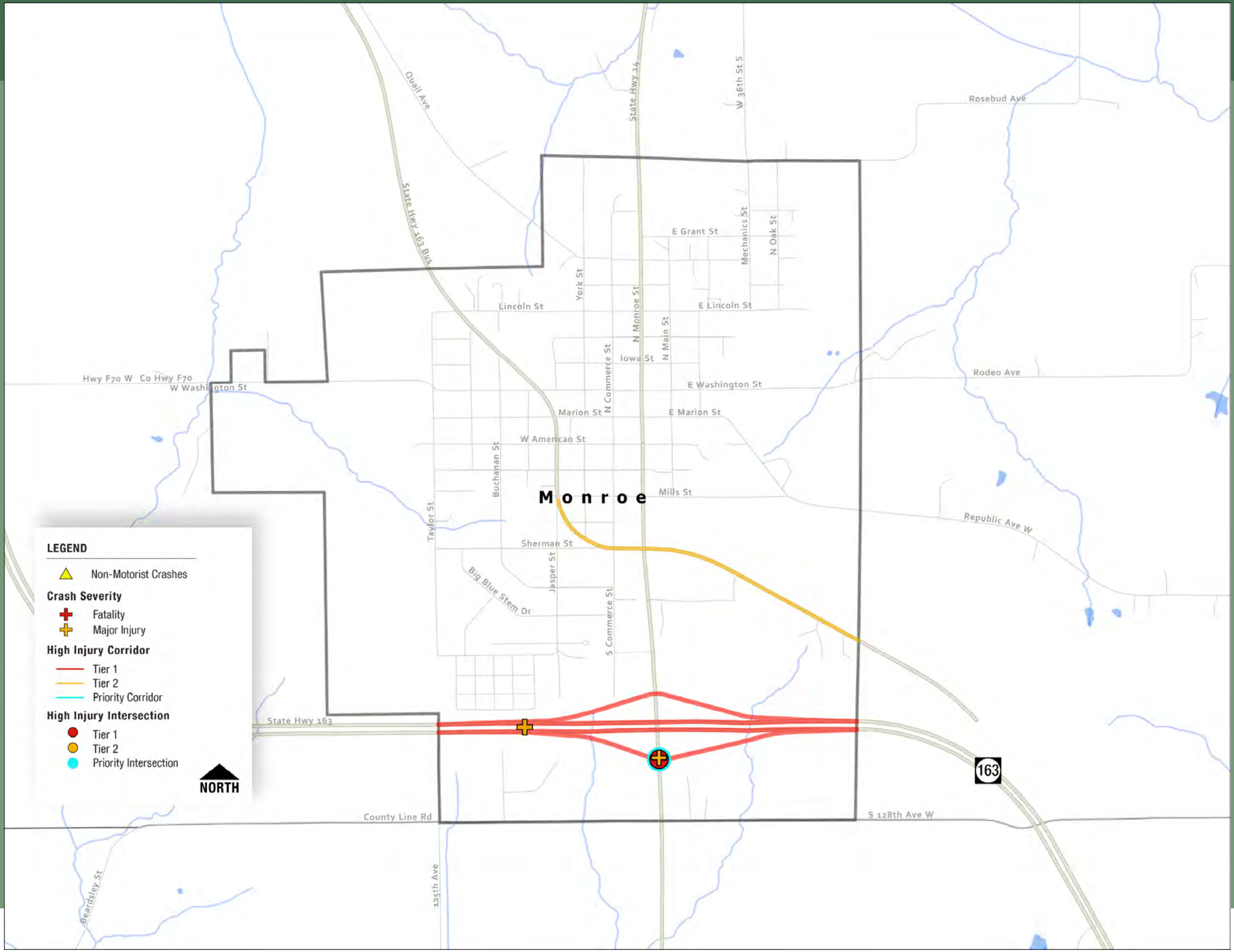


Figure 6.7 Nevada High Injury Network Map

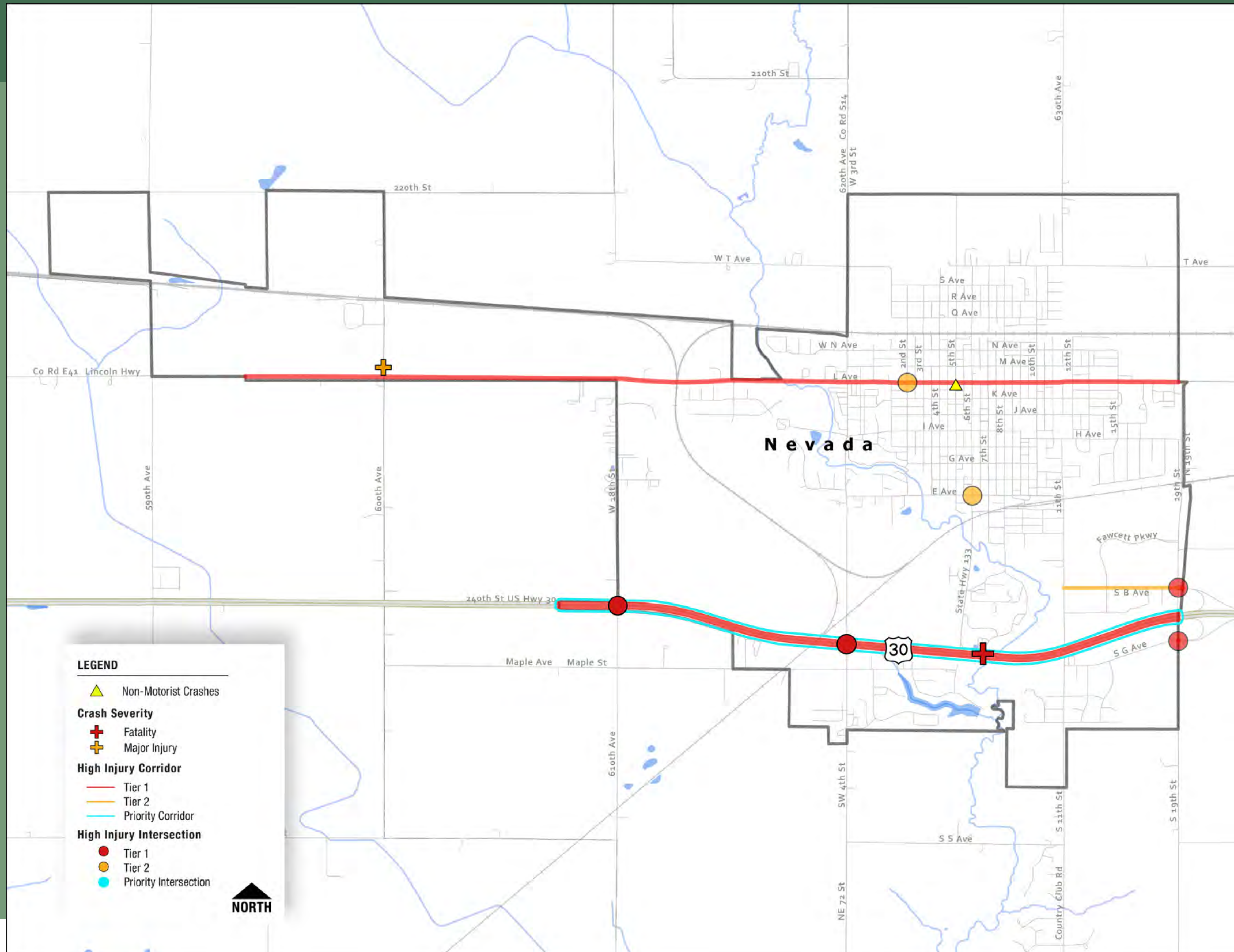


Figure 6.8 Newton High Injury Network Map

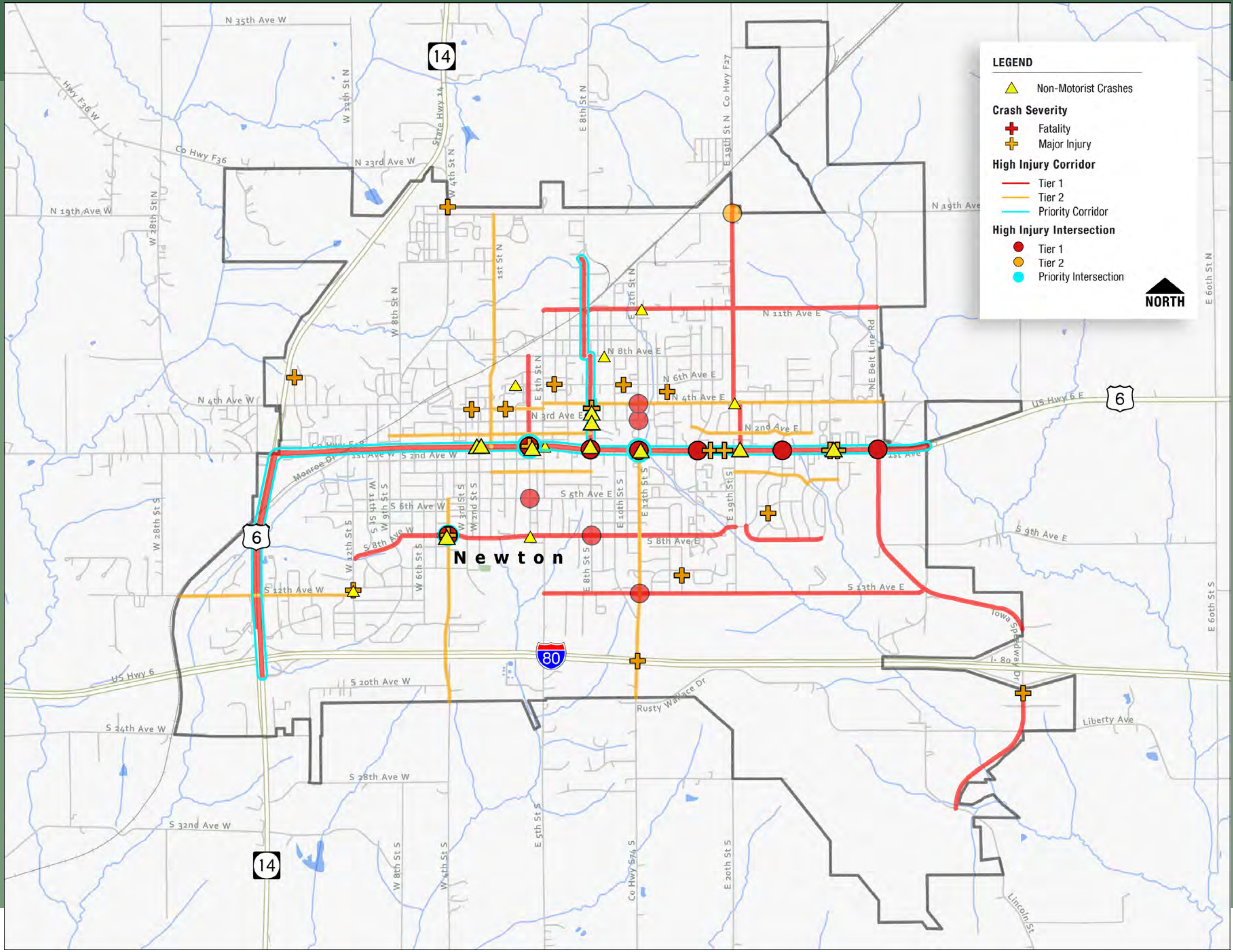


Figure 6.9 Pella High Injury Network Map

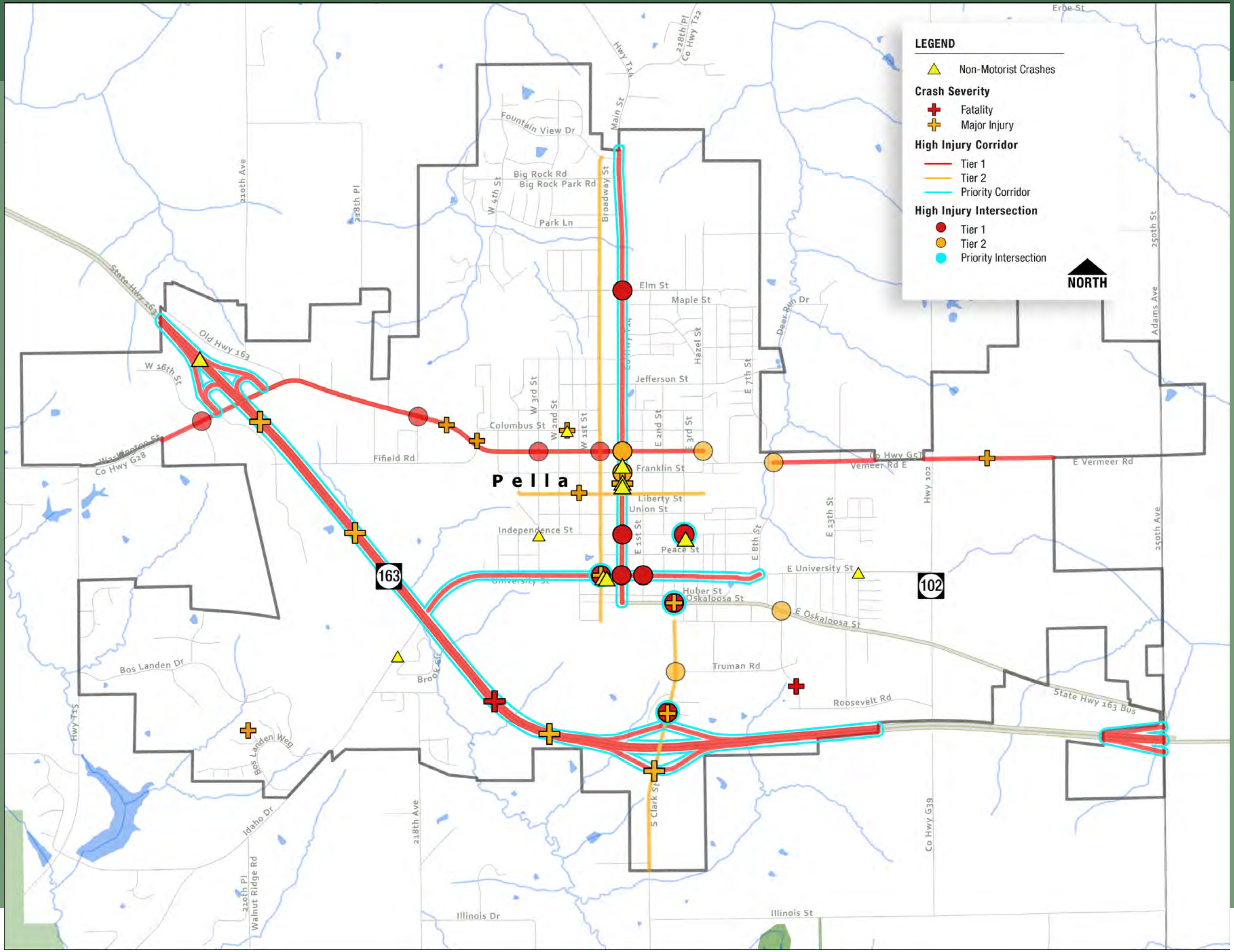


Figure 6.10 Perry High Injury Network Map

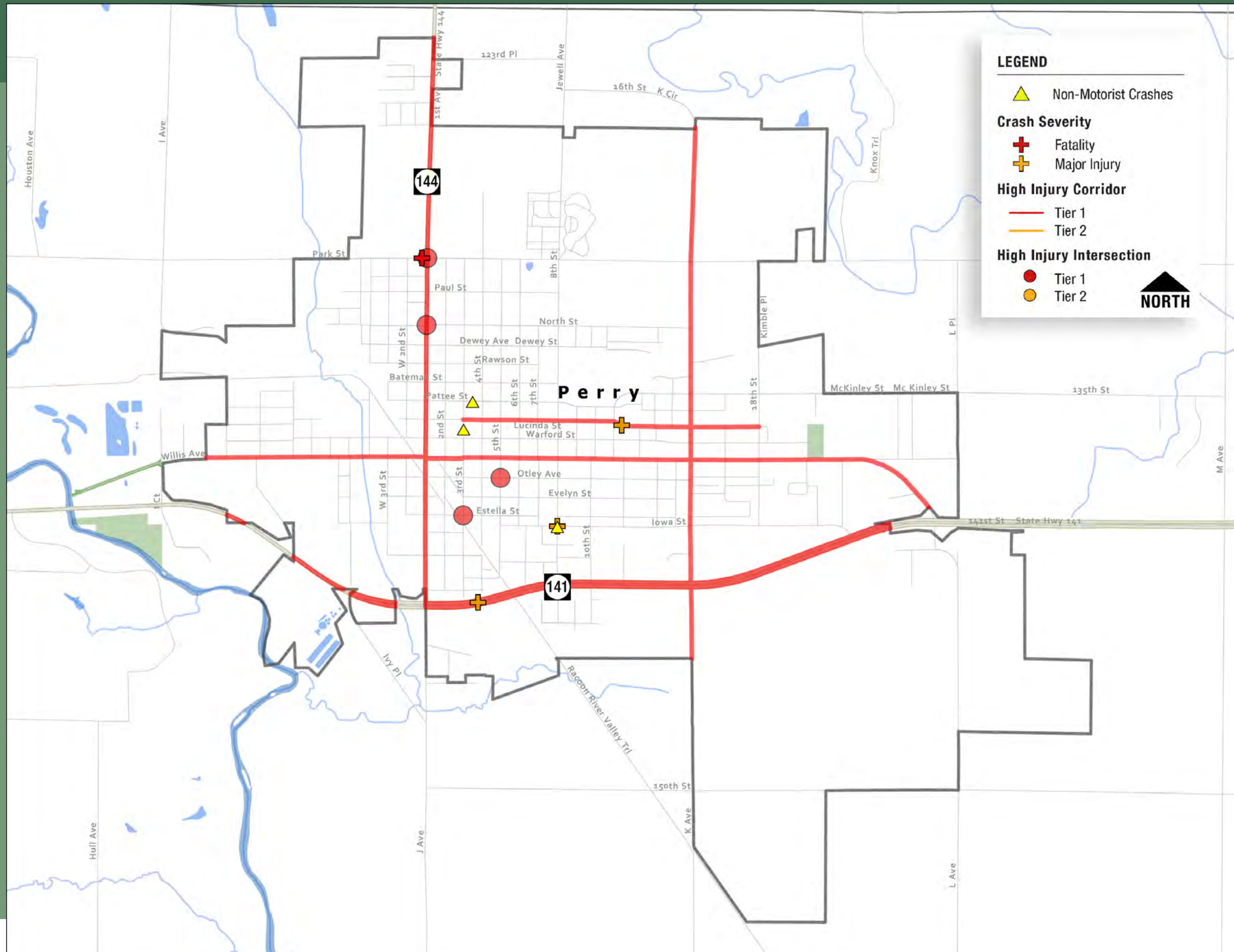


Figure 6.11 Story City High Injury Network Map

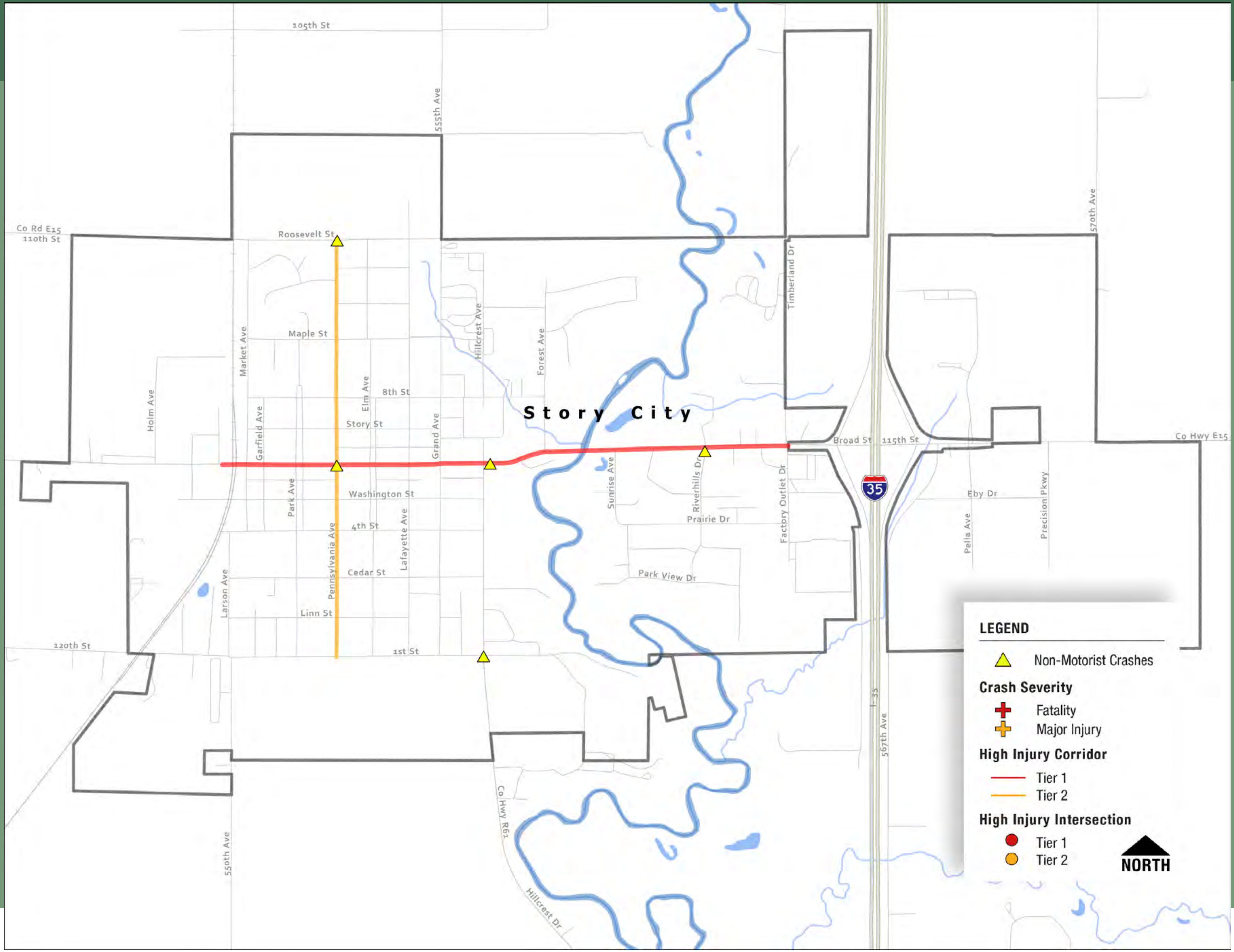


Figure 6.12 Van Meter High Injury Network Map

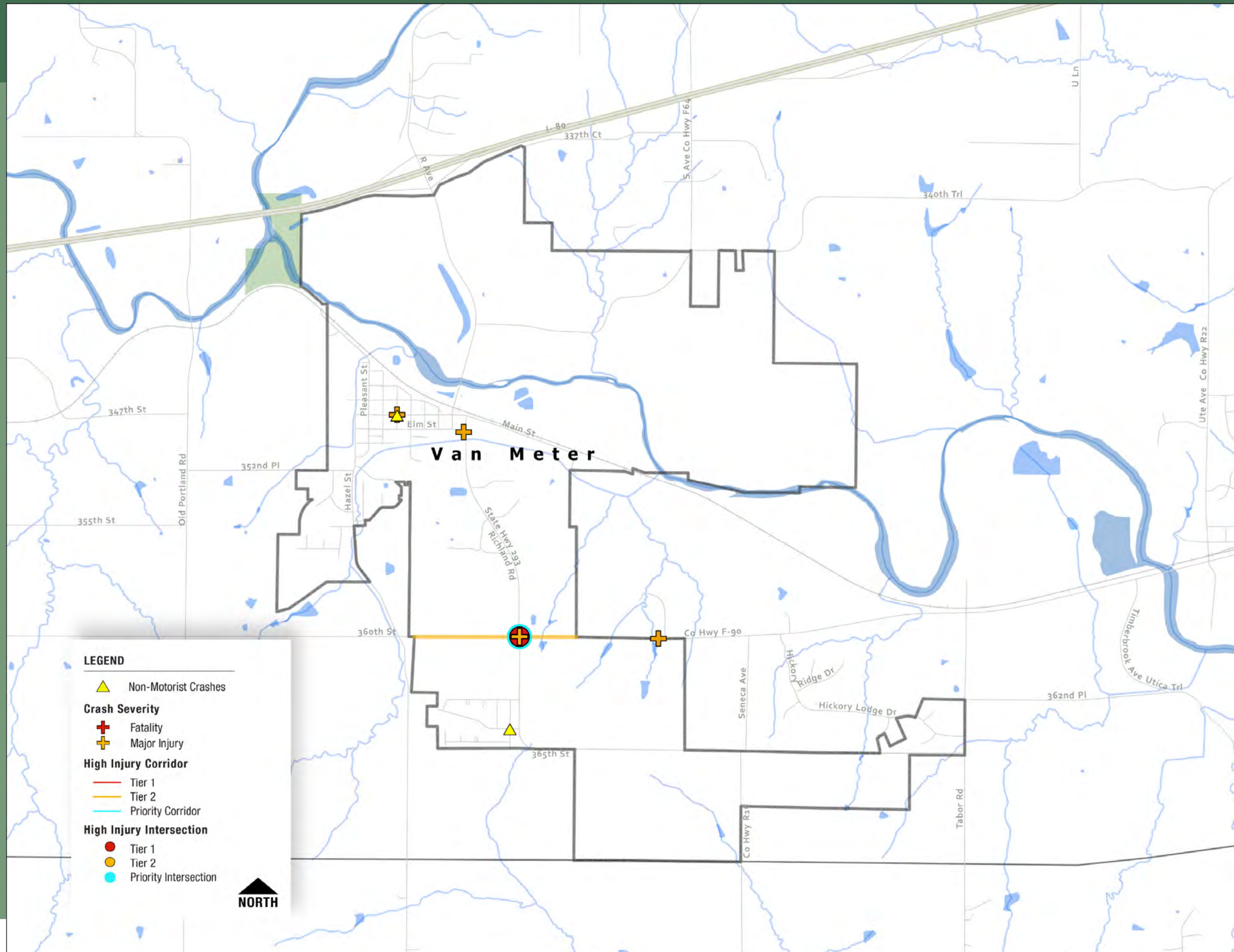
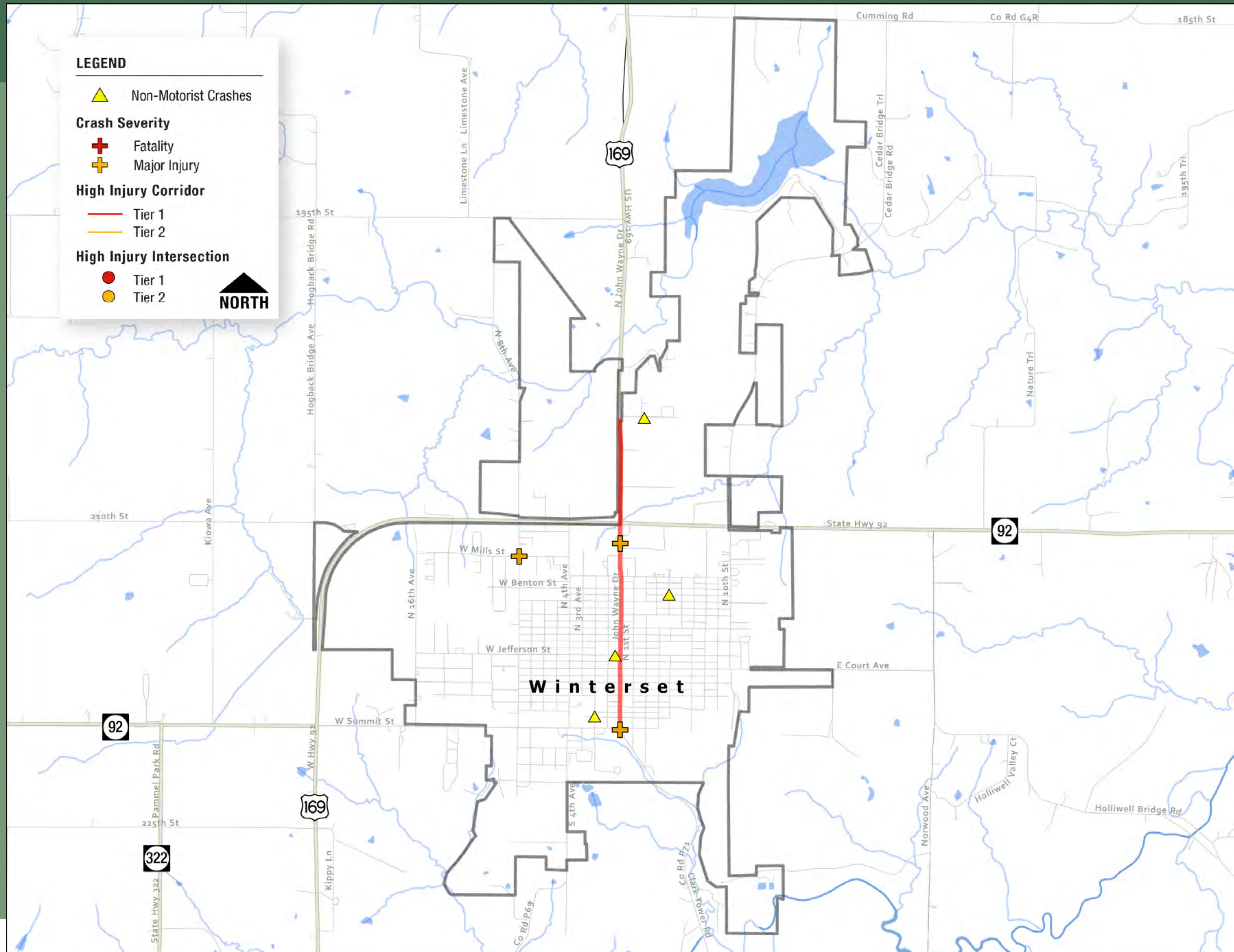


Figure 6.13 Winterset High Injury Network Map



7. Systemic Safety Analysis

7.1 Countermeasures Toolbox

Countermeasures are defined as measures or actions taken to offset or neutralize the effect of another action or situation.

Systemic countermeasures work to reduce risk across the whole transportation network and include equipment and roadway elements such as rectangular rapid flashing beacons (RRFBs), pedestrian hybrid beacons (PHBs), improved lighting, curb bulbouts, and high visibility crosswalks.

Location-specific countermeasures address hazards and crash risks at locations where severe crashes have occurred. Based on the focus area identified through the systemic analysis process, the following countermeasures were selected to be included in the Countermeasures Toolbox:

- Improved Intersection / Roadway Lighting
- Reflective Pavement Markings
- Rumble strips (shoulder and centerline)
- Wider Edge Lines
- Enhanced Delineation for Horizontal Curves
- Road Diet / Reconfiguration
- Conversion of Stop-controlled Intersections to Roundabouts
- Safety Edge
- Crosswalk Visibility Enhancements
- Marked Crosswalks
- Raised Crosswalks
- Medians and Pedestrian Refuge Areas
- Rectangular Rapid Flashing Beacon (RRFB)
- Sidewalks / Shared-use Paths / Bike Lanes
- Signal Backplates (with Retroreflective Borders)
- Variable Speed Limit / Speed Limit Feedback Signs
- Systemic Application of Multiple Low-Cost Countermeasures at Stop-Controlled Intersections
- Education on Target Crashes

Appendix C provides more detail about each of the countermeasures listed above, including focus crashes addressed, a representative cost range to implement, and a countermeasure implementation timeline (short-term, mid-term, long-term). Correlations to federal performance measures are also identified for each countermeasure.

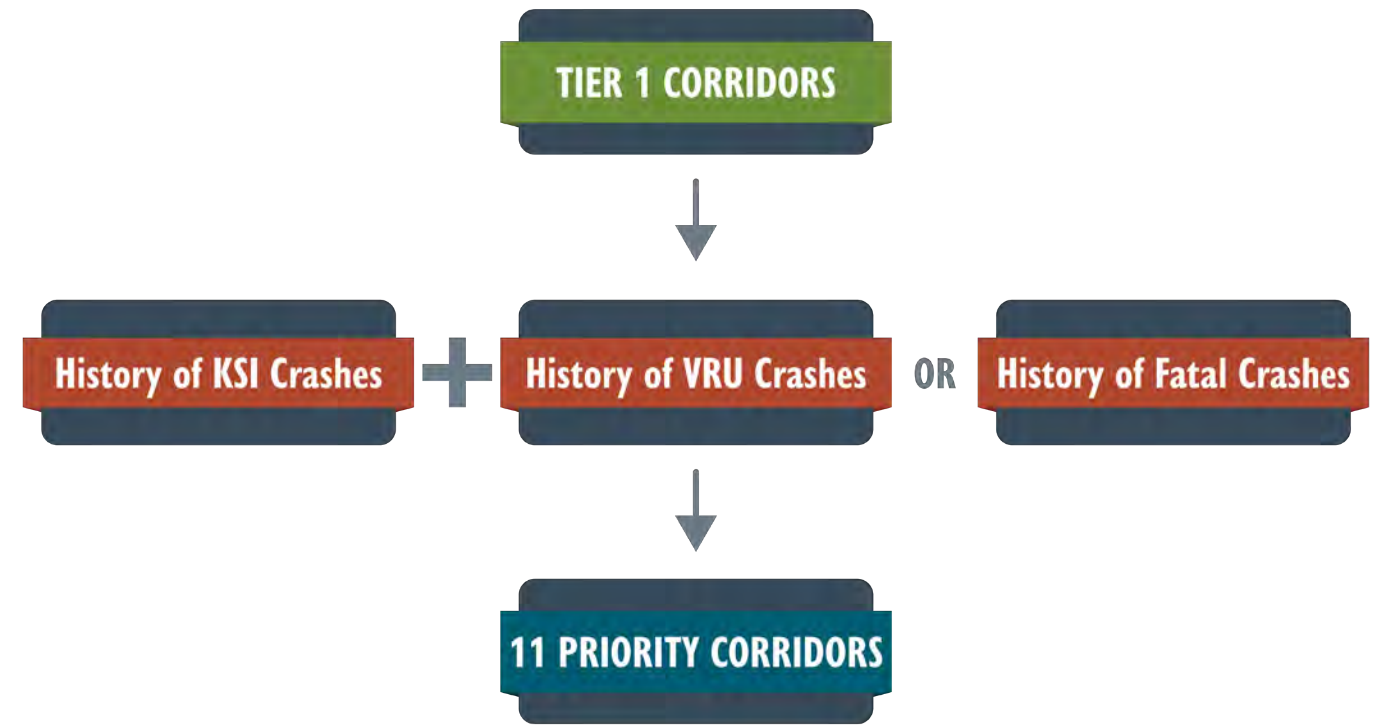
It should be noted that this countermeasures toolbox is not an exhaustive list of options, but a place to start when considering safety improvements for facilities in the CIRTPA region. Resources like FHWA's Proven Safety Countermeasures, some of which are included in this toolbox, should be considered along with FHWA's Pedestrian and Bicycle Safety Guides and Countermeasure Selection Systems and NHSTA's Countermeasures That Work Guide.

7.2 Priority Corridors

From the High Injury Networks described in the Systemic Analysis, priority corridors were identified based on either a history of severe (KSI) crashes and Vulnerable Road User (VRU) crashes (at least one KSI crash AND one VRU crash during the five-year analysis period) or a history of fatal crashes (at least one fatal crash during the five-year analysis period). This prioritization method is depicted graphically in Figure 7.1. Using these prioritization criteria, a total of 11 Priority Corridors were identified.

It should be noted that the addition of a two-way left-turn lane (TWLTL) to two-lane and four-lane undivided roadways is a common improvement identified for several of the corridors. US DOT guidelines regarding SS4A implementation grants states that projects to widen roadways to increase the number of lanes are not eligible for SS4A funding; however, this proposed widening is not to increase capacity. By adding a TWLTL, left-turning traffic is no longer slowing down and sometimes coming to a complete stop in the travel lane as it waits for an adequate gap in traffic to make a turn. This would help address some of the rear-end collisions occurring along many of the corridors and provide safer conditions for left-turning traffic to wait for adequate gaps in oncoming traffic.

Figure 7.1 Corridor Prioritization Flowchart



The 11 Priority Corridors are listed in Table 7.1, along with crash history information relevant to the prioritization process and length of the corridor.

Table 7.1 Summary of Priority Corridors

Route	Community	Total Crashes	KSI Crashes	VRU Crashes	Fatal (A) Crashes	Corridor Length (mi)
US Hwy 30	Nevada***	34	1	0	1	2.74
West St	Colo*	5	1	1	0	1.25
US Hwy 6	Newton	104	2	1	0	4.60
E 8th St N	Newton	12	1	2	0	1.04
IA Hwy 163	Pella	83	4	1	1	5.24
University St	Pella	9	1	1	0	1.53
Main St	Pella	41	1	3	0	1.95
N Lincoln St	Knoxville	55	2	2	0	3.14
IA Hwy 92**	Indianola	93	1	1	0	4.42
US Hwy 65 **	Indianola	206	6	0	1	4.80
US Hwy 6	Adel	134	4	0	1	5.25

** - Colo is not a member community of CIRTPA*

*** - Corridor is within a Disadvantaged Census Tract (Source: CEJST and ETC Explorer from CEQ and USDOT*

**** - US 30 corridor may be addressed with recent project completion*

Highlighted corridors are state facilities

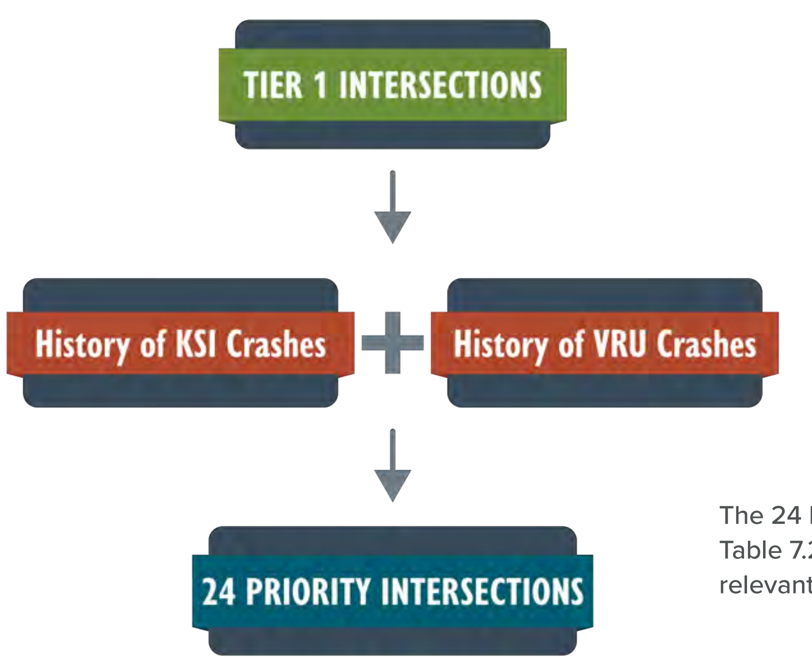
Appendix D summarizes the crash history and potential safety projects identified for each of the 11 Priority Corridors; a relative cost to implement each project is also provided along with information on potential safety benefits (relevant CRF, if available), implementation timelines, and “other criteria” that may be relevant.

It should be noted that relative cost information is an extremely high-level estimate, and that a more in-depth study of each safety project should be conducted before implementation is pursued. Costs for each safety project include a fee for analysis based on the implantation timeline of the project; study costs of $25,000 for Short-Term projects, $150,000 for Mid-Term projects, and $300,000 for Long-Term projects were assumed.

7.3 Priority Intersections

From the HIN, priority intersections were identified based on either a history of KSI Crashes or a history of VRU crashes (at least one KSI crash OR at least one VRU crash during the five-year analysis period). This prioritization method is depicted graphically in Figure 7.2.

Figure 7.2 Intersection Prioritization Flowchart



The 24 Priority Intersections are listed in Table 7.2 along with crash history information relevant to the prioritization process

Table 7.3 Summary of Priority Intersections

Intersection	Community	Total Crashes	KSI Crashes	VRU Crashes
Mamie Eisenhower Ave & Story St	Boone	7	0	1
Hawkeye Dr & S Linn St	Boone	12	1	0
SE Marshall St & S Linn St	Boone	11	1	0
US 30 & Crown Flair Dr	Boone	10	1	0
US 6 & E 12th St	Newton	7	0	1
US 6 & E 4th St	Newton	7	1	1
S 8th Ave W & W 4th St S	Newton	8	0	1
IA 14 S Ramp & S Monroe St	Monroe*	5	1	0
Roosevelt Rd & S Clark St	Pella	5	1	0
Oskaloosa St & Clark St	Pella	6	1	0
University St & Broadway St	Pella	7	0	1
Independence St & E 3rd St	Pella	8	0	1
W Pleasant St & Lincoln St	Knoxville	12	0	2
IA 92 & S G St	Indianola	10	1	0
IA 92 & US 65	Indianola	19	2	0
IA 92 & S 9th St	Indianola	17	1	0
E Salem Ave & US 65	Indianola	18	1	1
E Ashland Ave & US 65	Indianola	18	2	0
E Euclid Ave & US 65	Indianola	16	0	2
Valley Pl Dr & US 65	Indianola	18	1	1
W Clinton Ave & N Howard St	Indianola	9	1	0
360th St & Richland Rd	Van Meter*	7	1	0
Willow St & US 169	De Soto*	5	1	0
US 6 & R Ave	Adel	10	1	0

** - Not CIRTPA Member Community*

Highlighted intersections are on state facilities

Appendix E summarizes the crash history and potential safety improvement projects identified for each of the 24 Priority Intersections; a relative cost to implement each project is also provided along with information on potential safety benefits (relevant CRF, if available), implementation timelines, and “other criteria” that may be relevant.

It should be noted that relative cost information is an extremely high-level estimate, and that a more in-depth study of each safety project should be conducted before implementation is pursued. Costs for each safety project include a fee for analysis based on the implantation timeline of the project; study costs of $25,000 for Short-Term projects, $150,000 for Mid-Term projects, and $300,000 for Long-Term projects were assumed.

7.4 Input from Communities on Prioritization

Upon completion of the draft action plan, meetings were held with several of the CIRTPA communities to discuss priority projects identified in each community and determine interest in pursuing funding for these projects. At these meetings, several planned or ongoing projects were identified that overlapped with the HIN and priority projects identified; the following list summarized items of note from community meetings:

Adel

- A lane reconfiguration project is planned on US 6 from the Raccoon River bridge to the US 6/169 intersection. This project will conver the current four-lane undivided cross-section to a three-lane cross-section with TWLTL. Speed feedback signs have also recently been installed on this roadway segment.
- Signal improvements and lane arrangement modifications are programmed at the intersection of US 6/169 with Greene Street/US 6.
- The City's Masterplan identifies the offset intersections of R Avenue with US 6 for realignment/consolidation to a single intersection.
- A new high school is planned to be constructed on the west side of US 6/169 south of Meadow Road; as part of/related to this construction, Iowa DOT is contributing funds to convert the intersection of US 6/169 with Common Place to a roundabout, which would also serve as an entrance to the new high school. A recent fatality near this interection also played a part in the decision to implement a roundabout on this corridor.

Boone

- Iowa DOT has two roundabouts programmed along the US 30 corridor at Corporal Roger Snedden Drive / Quill Avenue and SE Marshall Street / Crown Flair Drive.
- The intersection of S Linn Street with US 30 has recently been modified to close the median crossover and restrict access to right-in-right-out (RIRO).

Perry

- The intersection of Willis Avenue with IA 141 was noted as a major concern for the community. This facility is located just outside city limits and not included in the analysis for this project; however, Dallas County is also developing a safety action plan, and this location should be included in their plan.
- Iowa DOT is developing / has developed an Access Plan for the IA 141 corridor.

Van Meter

- Several improvements have been implemented at the intersection of 360th Street / F-90 with Richland Road / R16 including enhanced stop signs with flashing LEDs around the perimeter of the sign; the intersection is also programmed to be converted to a roundabout at some point in the future, and a pedestrian undercrossing at the intersection is also planned.
- The speed limit along 360th Street / F-90 through city limits has been reduced and additional signage regarding this speed zone has been installed.

8. Action Plan and Next Steps

8.1 Implementation

This Plan highlights the High Injury Networks and High Injury Intersections that rise to the top for safety improvements. Strategies included in the Countermeasure Toolbox have been proven throughout the nation to move the needle and reduce fatalities and serious injuries.

The specific project recommendations in the foregoing chapter are a great place to start. Safe Streets for All (SS4A) grant funding is available through the US-Department of Transportation for implementation grants. In addition, there are many other federal, state and local funding sources that can be tapped for project implementation. Many federal funding sources provide flexibility to utilize on safety-related projects, such as Surface Transportation Block Grant (STBG) funds and Transportation Alternatives Program (TAP) funds. The Highway Safety Improvement Program (HSIP) is designated specifically to safety improvements.

At the state level most funding programs, including Farm-to-Market (FM) funds, may include safety improvements as part of the project. CIRTPA is an excellent resource to assist jurisdictions with navigating the complex maze of funding streams.

8.2 Monitoring

The framework for tracking progress and evaluating trends as Centennial works toward a safer transportation system. Knowing what to measure is a key step to identifying a baseline and tracking improvements. The US-DOT has been moving toward a Performance-Based Planning (PBP) approach that incorporates adopted performance metrics into the transportation planning system. Iowa DOT has safety targets that follow this approach. An ongoing program to monitor the following metrics, using this safety action plan as a baseline, will allow for data-driven analysis and decision-making:

Number of roadway fatalities

Number of roadway serious injuries

Vulnerable road user serious injuries and fatalities

8.3 Reporting

Transparency is how CIRTPA and the Cities will share information and updates with the public. Regular reporting on safety data to the CIRTPA Technical and Policy Committees will ensure that information gets to elected leaders and public officials throughout the region. A formal report that is produced and posted online will provide added utility to CIRTPA members and provides a level of accountability. Another option is to develop a safety dashboard that tracks performance metrics.

[4] Link to website: https://maps.dsm.city/portal/apps/dashboards/85f92564014648778b9828283dc99fb7

Appendix A. Public Engagement Summary

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HOLDER