2

collisions

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A2.1 Purpose of Collisions Documentation

Documenting crash trends, contributing factors, and spatial patterns in Bridgeport using reported crash data, this appendix provides the analytical foundation for understanding safety challenges addressed in the Bridgeport SS4A Safety Action Plan and supports the prioritization of systemic, preventive countermeasures.

Because Bridgeport is a small, rural community with low annual crash volumes, this analysis emphasizes severity, exposure, and recurring risk factors rather than raw crash totals alone, consistent with FHWA SS4A guidance.

A2.2 Crash Data Overview

Crash data used in this analysis were obtained from the Nebraska Department of Transportation (NDOT) and include all reported crashes occurring between 2014 and 2023 within:

- Bridgeport corporate limits, and
- An extended analysis area including the City and a 1-mile jurisdictional buffer.

The dataset includes crashes of all severities, including property damage only (PDO), injury crashes, and fatal crashes.

Study Period: 2014–2023
Geographic Extent: Corporate limits + 1-mile jurisdiction
Data Source: NDOT crash database

CRASHES BY YEAR AND SEVERITY						
Year	Fatal	Inj-A	Inj-B	Inj-C	PDO	**Totals**
2014					21	**21**
2015	1	1	1	3	17	**23**
2016			3	1	16	**20**
2017				1	12	**13**
2018			2	1	15	**18**
2019			1		15	**16**
2020	1				5	**6**
2021			2		12	**14**
2022			4		15	**19**
2023		1	4		16	**21**
Totals	***2***	***2***	***17***	***6***	***144***	***171***

Table A2-1. Crashes by Year and Severity (2014–2023)

A2.3 Crash Summary by Year and Severity

Table A2-1 summarizes total reported crashes by year and injury severity over the study period.

Key observations include:

- Annual crash totals are relatively low and fluctuate year-to-year.
- Property damage only crashes account for the majority of reported incidents.
- Fatal and serious injury crashes are rare but present.

Due to low annual volumes, single-year changes are not interpreted as trends. Instead, severity distribution and exposure patterns are emphasized.

A2.4 Crash Severity Distribution

Across the full study period:

- 84.2% of crashes resulted in property damage only.
- 13.5% involved minor or moderate injury.
- 2.3% involved serious injury or fatal outcomes.

While the absolute number of severe crashes is low, their consequences are high—particularly when they occur on higher-speed corridors or involve vulnerable users. This reinforces the plan's focus on preventing severe outcomes rather than reacting to isolated events.

A2.5 Crashes by Mode

Reported crashes were evaluated by mode to understand risk to vulnerable road users. (See Table A2-2.)

Note: Table A2-2 was generated using the First Harmful Event field of crashes. Any differences in Single Vehicle data between this table and Table A2-5 is the result of Single Vehicle crashes initially categorized as "Other" or "N/A" in the "Crash Type" crash reporting field used for Table A2-5.

Key findings:

- Pedestrian and bicycle crashes are infrequent in reported data.
- Low crash counts do not equate to low risk; community input and field observations indicate meaningful exposure due to sidewalk gaps, crossing challenges, and state highway crossings.
- School-age pedestrian exposure is higher than crash history alone would suggest.

As recommended by FHWA, the plan does not interpret low pedestrian or bicycle crash counts as an absence of risk.

Table A2-2. Crashes by Crash Mode (2014–2023)

CRASHES BY CRASH MODE						
Crash Mode	Fatal	Inj-A	Inj-B	Inj-C	PDO	**Totals**
Single Vehicle	0	2	2	0	51	**55**
Two or More Motor Vehicles	1	0	12	6	93	**112**
Bicycle/Pedalcycle	1	0	2	0	0	**3**
Pedestrian	0	0	1	0	0	**1**
Totals	***2***	***2***	***17***	***6***	***144***	***171***

A2.6 Contributing Factors & Driver Behavior

Crash records were reviewed for contributing factors and behaviors. (See Table A2-3.)

Due to limitations of the crash data reported, some data is incomplete or non-existent. This means that the factors listed in Table A2-3 are not exhaustive of contributing factors to crashes.

Although not able to be succinctly summarized in table format, by reading through crash reports, it was determined that **additional common contributing factors in Bridgeport include:**

- Speed and speed-related behavior
- Failure to yield
- Distraction and inattention
- Visibility constraints

These findings align with concerns raised through public surveys and stakeholder engagement, reinforcing the need for integrated engineering, education, and enforcement strategies.

Table A2-3. Crashes by Contributing Driver Behaviors (2014–2023)

CRASHES BY CONTRIBUTING FACTOR AND DRIVER BEHAVIOR						
Contributing Factor	Fatal	Inj-A	Inj-B	Inj-C	PDO	**Totals**
Proper Restraints/Helmet Use - Partial	0	0	5	2	14	**21**
Proper Restraints/Helmet Use - None	1	0	2	0	4	**7**
Proper Restraints/Helmet Use - Yes	1	2	8	4	43	**58**
Proper Restraints/Helmet Use - Unknown/Blank	0	0	2	0	83	**85**
Totals	***2***	***2***	***17***	***6***	***144***	***171***

Contributing Factor	Fatal	Inj-A	Inj-B	Inj-C	PDO	**Totals**
Semi Involved - Yes	1	0	6	0	7	**14**
Semi Involved - No	1	2	11	6	87	**107**
Semi Involved - Unknown/Blank	0	0	0	0	50	**50**
Totals	***2***	***2***	***17***	***6***	***144***	***171***

Contributing Factor	Fatal	Inj-A	Inj-B	Inj-C	PDO	**Totals**
Alcohol Related - Yes	1	0	0	0	7	**8**
Alcohol Related - No	1	1	16	6	124	**148**
Alcohol Related - Unknown/Blank	0	1	1	0	13	**15**
Totals	***2***	***2***	***17***	***6***	***144***	***171***

Contributing Factor	Fatal	Inj-A	Inj-B	Inj-C	PDO	**Totals**
Drug Related - Yes	0	0	0	0	1	**1**
Drug Related - No	2	1	16	6	94	**119**
Drug Related - Unknown/Blank	0	1	1	0	49	**51**
Totals	***2***	***2***	***17***	***6***	***144***	***171***

CRASHES BY FIRST HARMFUL EVENT						
Crash Type	Fatal	Inj-A	Inj-B	Inj-C	PDO	**Totals**
Animal					1	**1**
Animal (Live)					20	**20**
Bicycle	1		1			**2**
Ditch					1	**1**
Fence					3	**3**
Fire/Explosion					1	**1**
Guardrail End Terminal					1	**1**
MV Transport	1		12	6	68	**87**
Overturn					1	**1**
Overturn/Rollover		2	2		3	**7**
Parked MV					25	**25**
Pedalcycle			1			**1**
Pedestrian			1			**1**
Sign Post					1	**1**
Traffic Sign Support					3	**3**
Tree					1	**1**
Tree (standing)					2	**2**
Utility Pole					2	**2**
Utility Pole/Light Support					1	**1**
Work Zone/Maintenance Equipment					1	**1**
Other Fixed Object					4	**4**
Other Fixed Object (wall, building, tunnel, etc.)					1	**1**
Other Moveable Object					1	**1**
Other Non-Fixed Object					1	**1**
Other Post					1	**1**
Other Post, Pole, or Support					1	**1**
Totals	***2***	***2***	***17***	***6***	***144***	***171***

Table A2-4. Crashes by First Harmful Event (2014–2023)

A2.7 First Harmful Event

The first harmful event (FHE) is defined as the first collision between a vehicle and its surrounding environment. (See Table A2-4.)

FHE is useful for determining risk and crash patterns city-wide, as well as at specific intersections.

For the FHE of the 2014-2023 crashes in Bridgeport's ETJ:

- The vast majority of FHE are motor vehicles (51.0%)
- 14.6% are Parked Motor Vehicles (MV); no injury crashes
- Animals account for 12.3%; no injury crashes
- Vulnerable road users (pedestrians, bicycles, and pedalcycles), make up 2.3%
- Injury crash FHEs include MV Transport (70.4% of injury crashes), Vulnerable Road Users (14.8% of injury crashes), and overturn/rollover crashes (14.8% of overturn/rollover crashes)

A2.8 Heat maps of Crash Locations

The crash density (heat) map illustrates the relative concentration of reported crashes citywide. Given Bridgeport's low crash volumes, heat patterns should be interpreted as relative clustering rather than absolute frequency.

Areas with higher crash density generally correspond to higher traffic volumes, complex intersections, and state highway corridors, reinforcing the importance of managing exposure and conflict points rather than responding solely to crash history.

In addition to showing heat maps of crash density for all crashes in the city, crashes were broken into crash type. The following pages contain full page images of the crash type heat maps. A full description of countermeasures and common causes can be found in Chapter 3 of the plan.

A table view of crash type breakdown by severity and year can be viewed in Table A2-5.

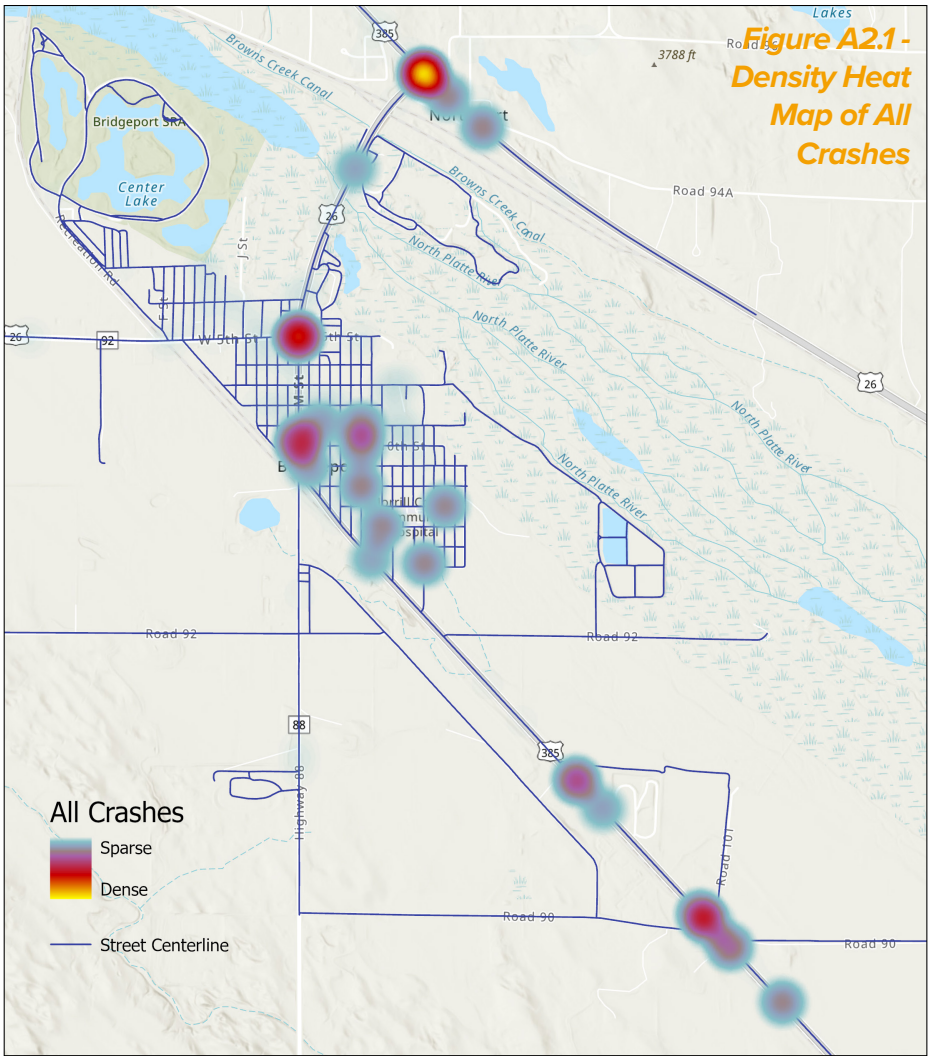


Figure A2.1 - Density Heat Map of All Crashes

CRASHES BY CRASH TYPE

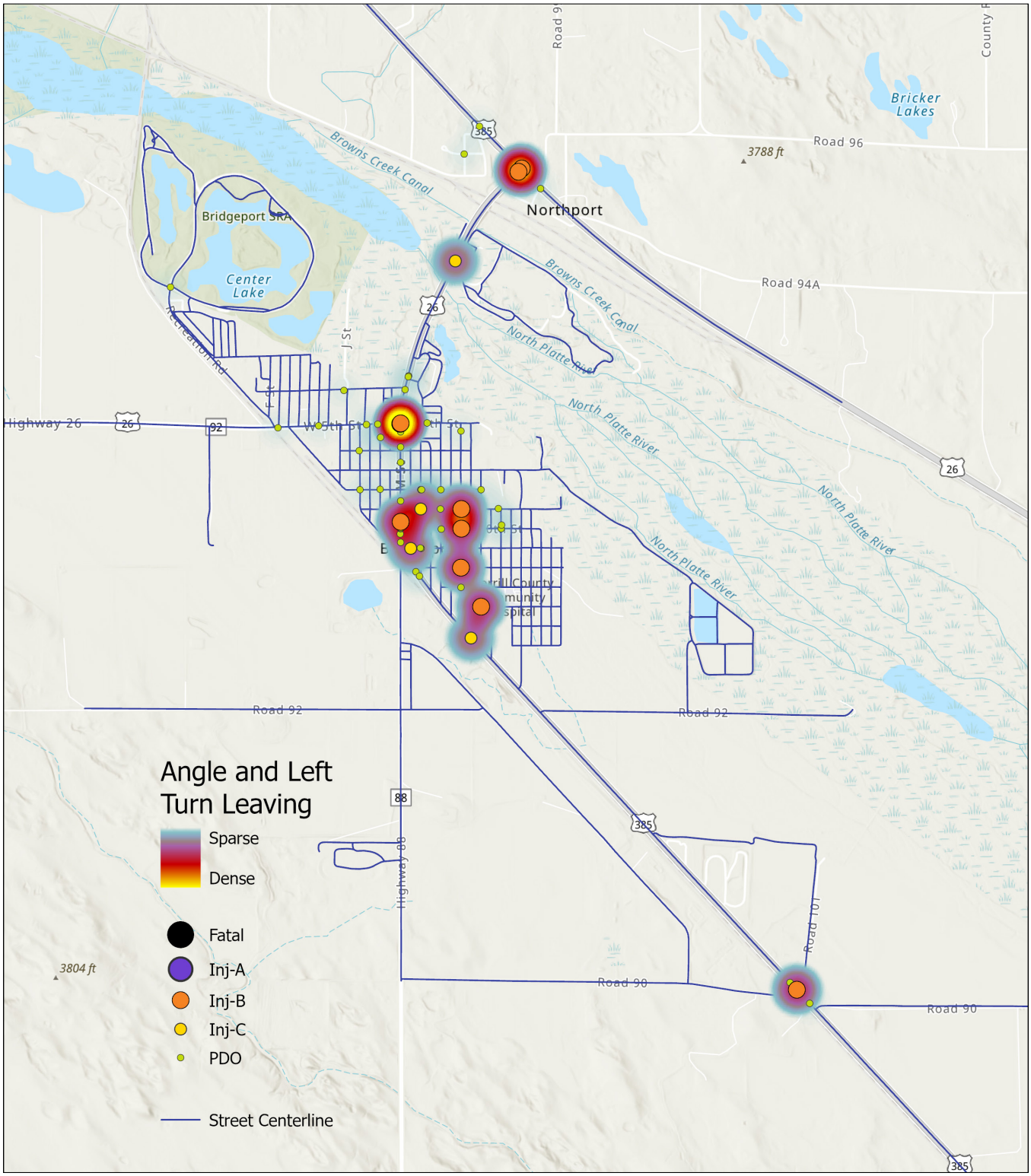
Crash Type	Fatal	Inj-A	Inj-B	Inj-C	PDO	**Totals**
Angle			10	4	54	**68**
Backing					3	**3**
Front-Rear			2	1	5	**8**
Left-Turn Leaving				1	4	**5**
Rear-End					2	**2**
Rear-Side					2	**2**
Sideswipe (Opposite)					1	**1**
Sideswipe (Same)	1				5	**6**
Single Vehicle		2	4		40	**46**
N/A	1		1		26	**28**
Other					2	**2**
Totals	***2***	***2***	***17***	***6***	***144***	***171***

Table A2-5. Crashes by Crash Type (2014–2023)

A2.8.1 Crashes by Crash Type

Figure A2.2 - Angle and Left Turn Leaving

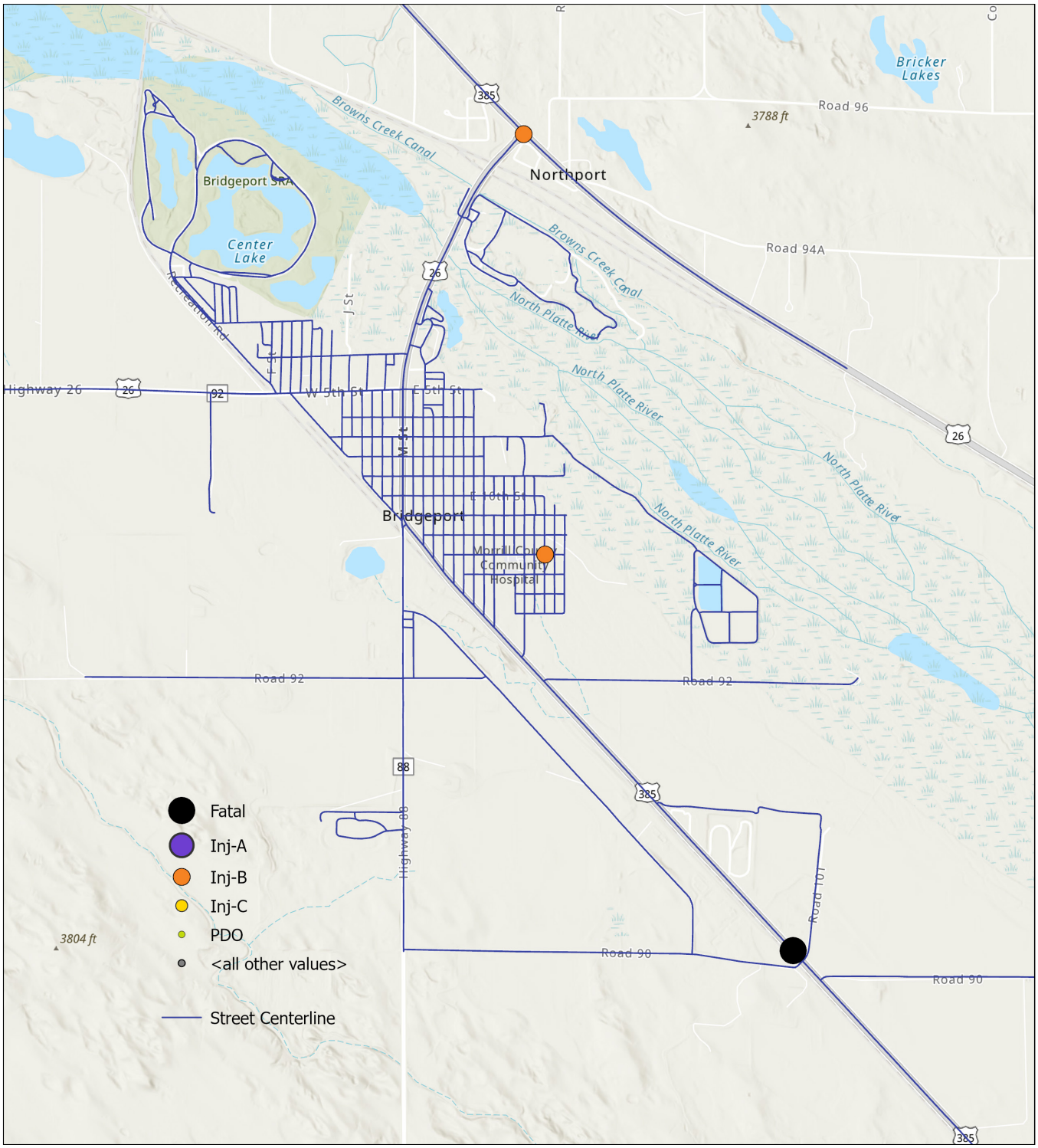
73 Crashes, 0 KSIs



A2.8.2 Crashes by Crash Type

Figure A2.3 - Bicycle Crashes

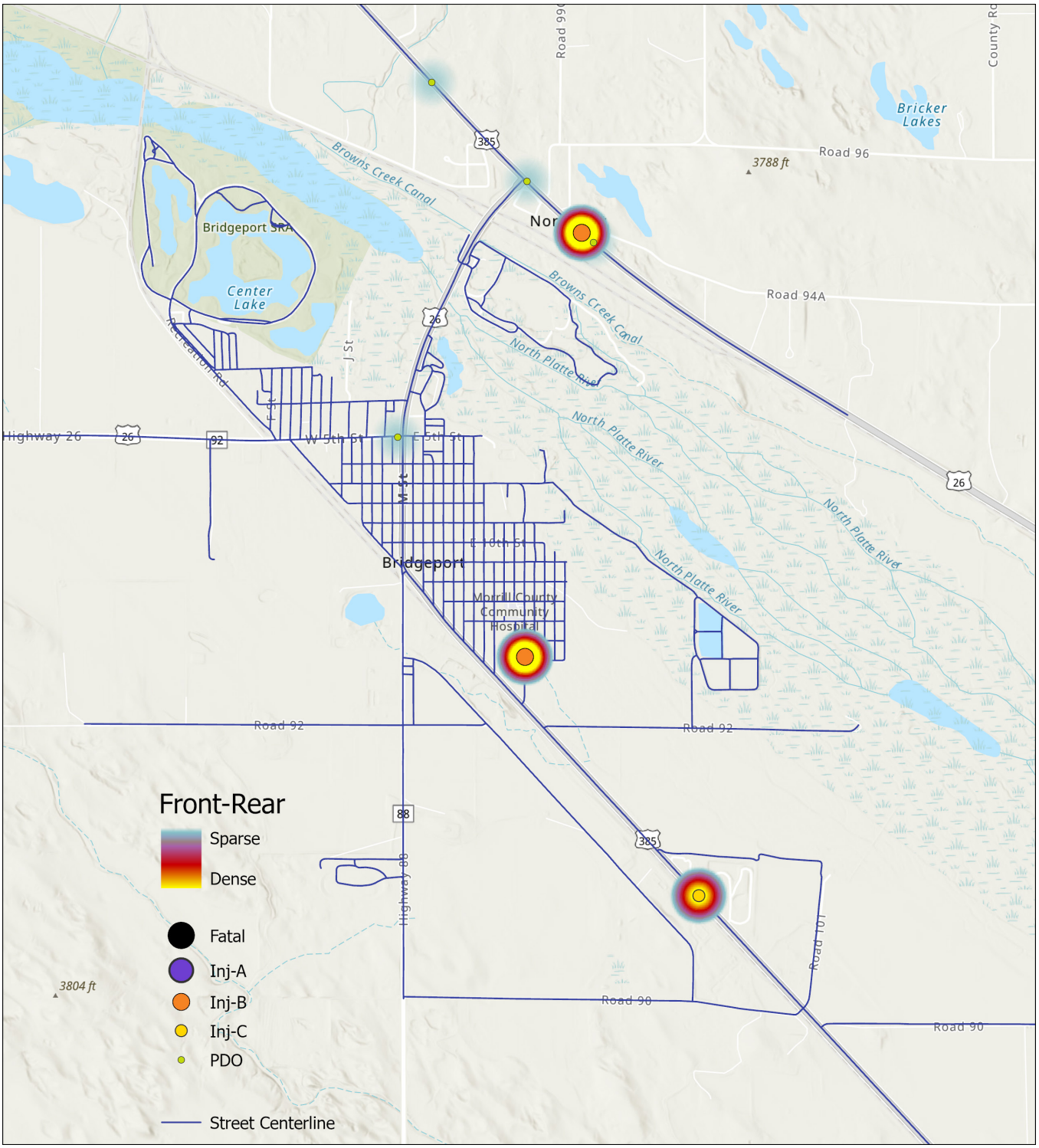
3 Crashes, 1 KSI



A2.8.3 Crashes by Crash Type

Figure A2.4 - Front-Rear

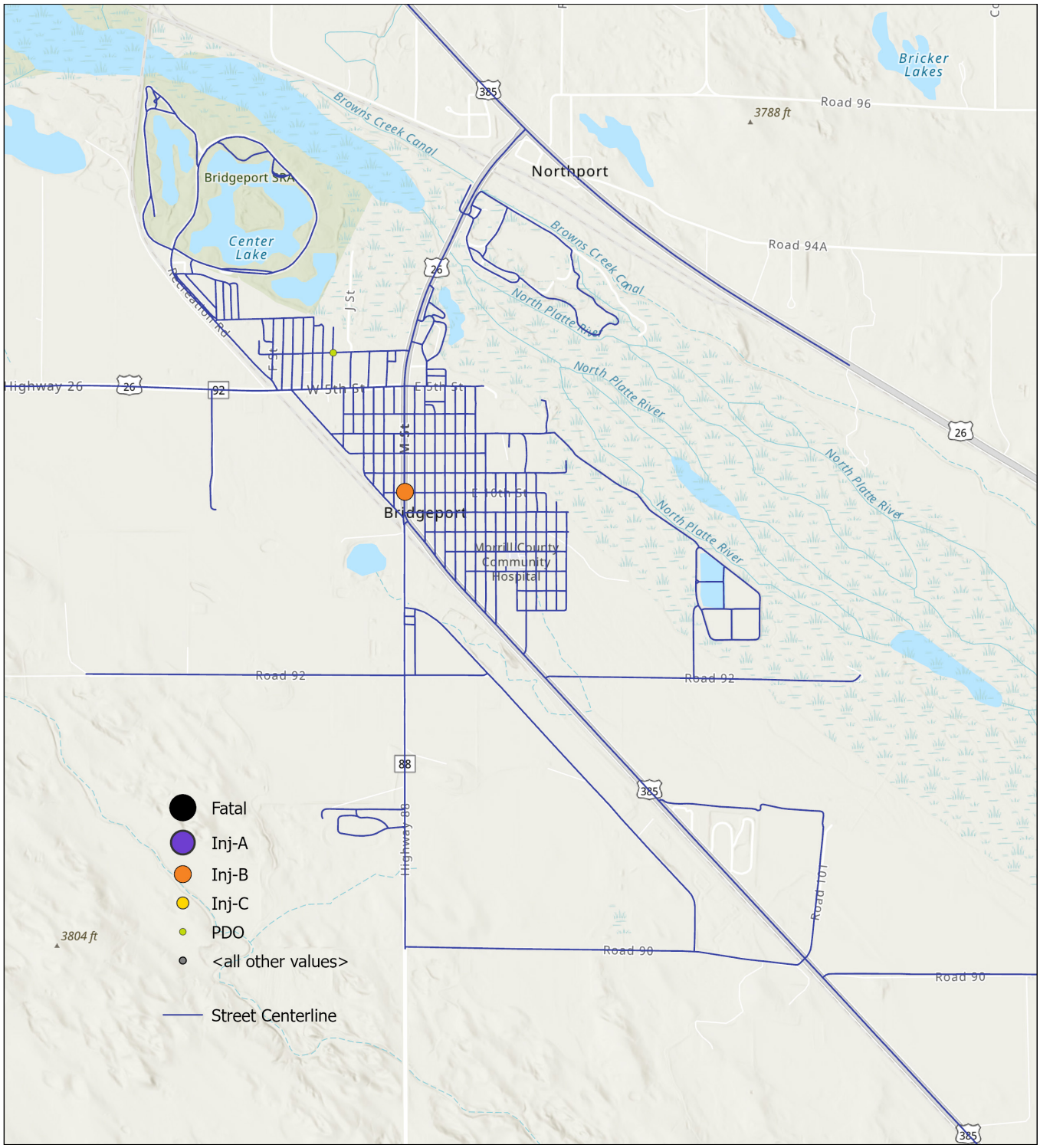
10 Crashes, 0 KSIs



A2.8.4 Crashes by Crash Type

Figure A2.5 - Pedestrian

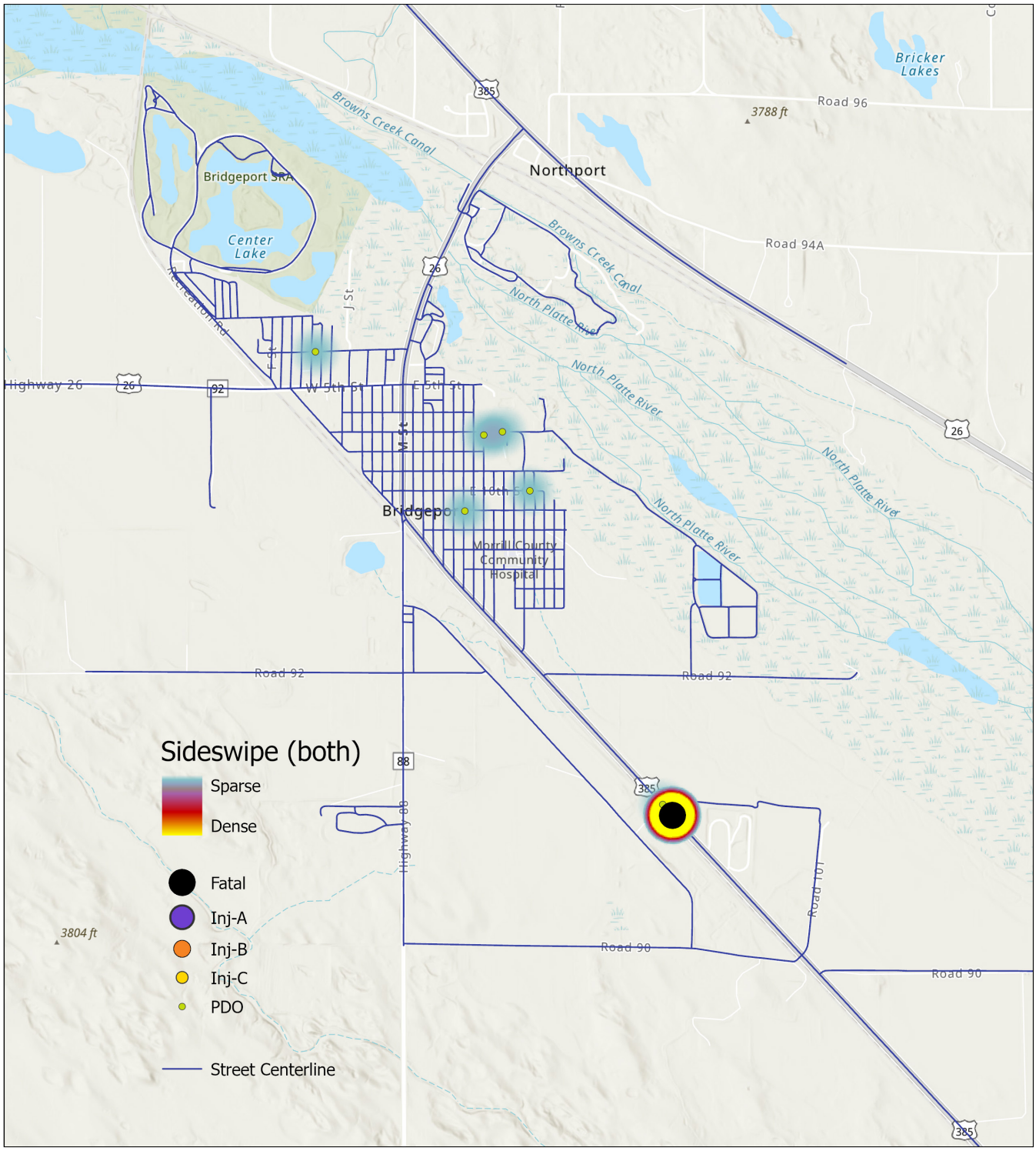
2 Crashes, 0 KSIs



A2.8.5 Crashes by Crash Type

Figure A2.6 - Sideswipe (same and opposite)

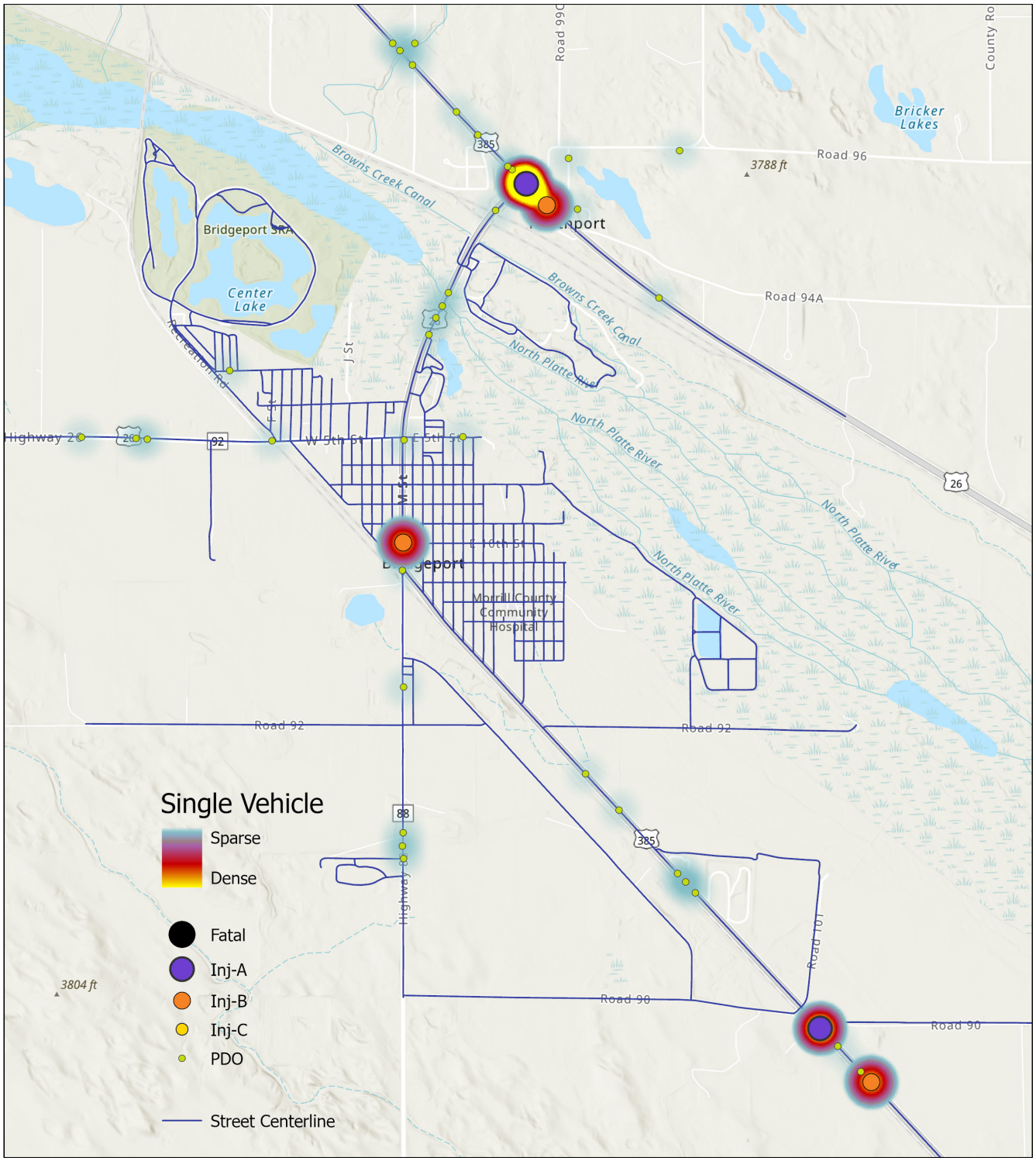
7 Crashes, 1 KSI



A2.8.6 Crashes by Crash Type

Figure A2.7 - Single Vehicle

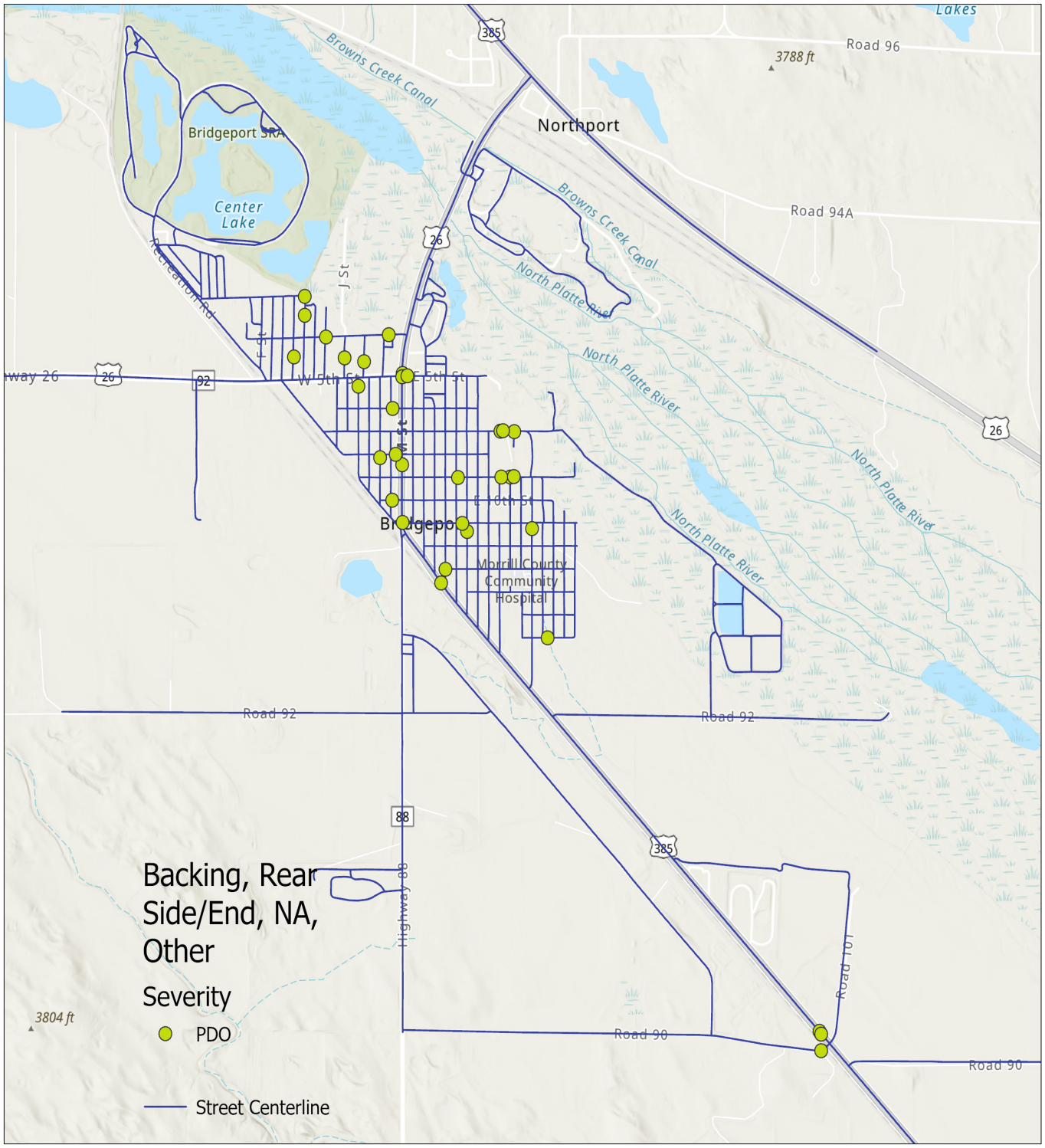
46 Crashes, 2 KSIs



A2.8.7 Crashes by Crash Type

Figure A2.8 - Other Crashes

35 Crashes, 0 KSIs



A2.9 Spatial Patterns & High-Risk Locations

Crash locations are distributed across the community, with higher concentrations along:

- US-26 and US-385 corridors
- Downtown intersections (including 5th & Main; 10th/11th & Main)
- Higher-volume access routes

Systemic analysis methods were used, including:

- Intersection buffers (40-meter radius)
- Corridor segments (100-meter length)
- Hexagon grid analysis

This approach identified a limited High Injury Network reflecting the community's low crash volumes but high exposure on a small portion of the roadway network.

Key finding:

- 100% of fatal and injury crashes occur on approximately 2.52% of the roadway network, underscoring the value of targeted corridor-based safety strategies.

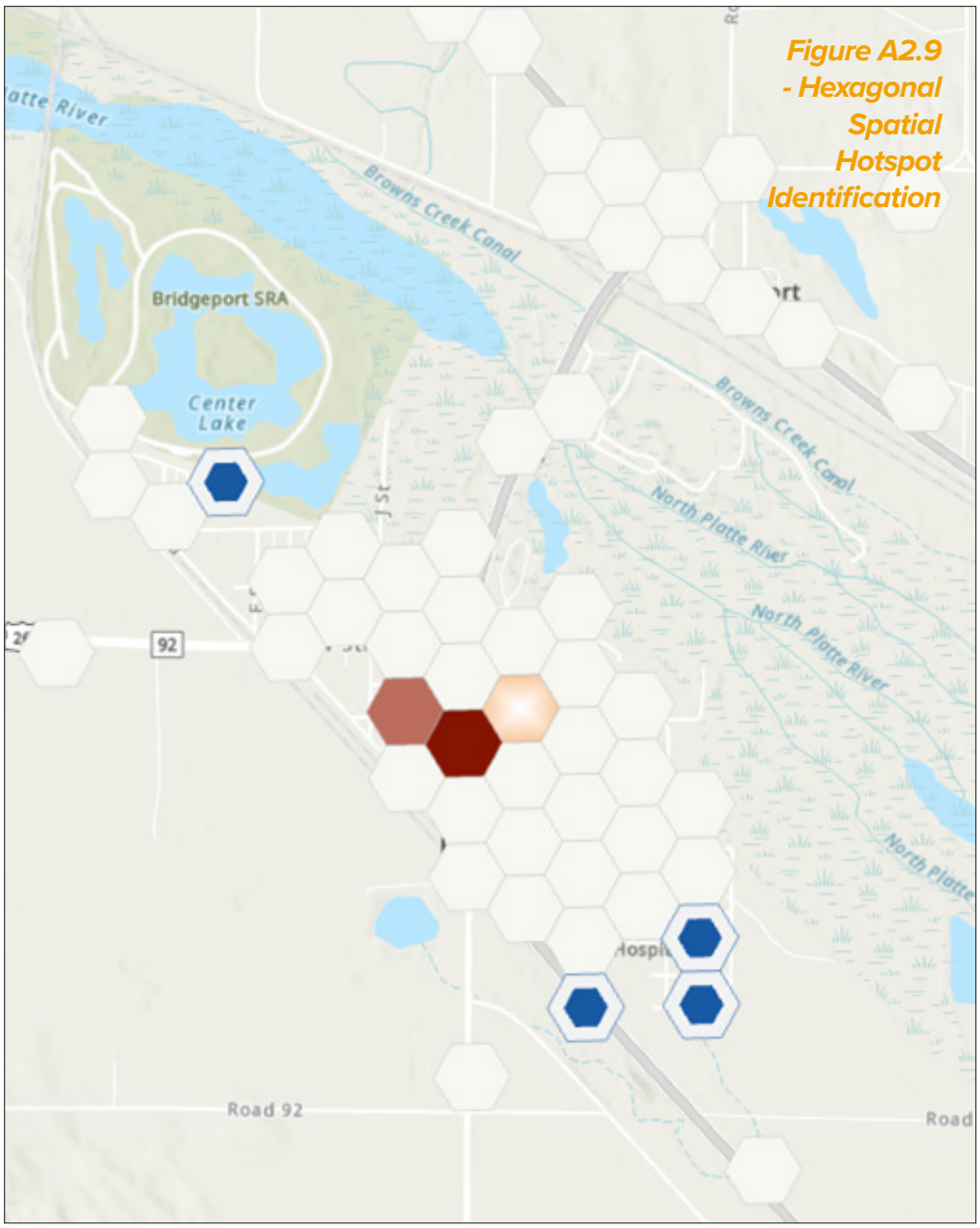


Figure A2.9 - Hexagonal Spatial Hotspot Identification

A2.10 Hexagon Grid – Crash Intensity & Persistence Classification

This hexagon grid map classifies crash locations based on both relative intensity (cold to hot) and temporal persistence, providing a nuanced view of crash patterns in a low-volume crash environment. Rather than relying solely on point density, the analysis evaluates how often crashes recur within the same spatial area across multiple years.

The resulting categories help distinguish between locations with consistent, long-term risk, locations with changing or emerging patterns, and areas where crashes appear to be isolated or non-recurring.

> *Hexagon grid colors and symbols reflect a combination of crash frequency and consistency over time. "Hotter" and more persistent categories indicate locations where crashes recur across multiple years, while cooler or sporadic categories indicate isolated events or declining patterns.*

Persistent Hotspots

Persistent hotspots represent areas where crashes consistently occur across multiple years and remain elevated relative to surrounding locations. In a community with low overall crash counts, these areas indicate meaningful, recurring exposure rather than random variation.

Emerging / Intermittent Areas

Emerging or intermittent areas show crash activity in some years but not others. These locations may reflect changes in traffic patterns, seasonal activity, or evolving roadway conditions and are appropriate candidates for monitoring and flexible, low-cost safety treatments.

> *Locations identified as persistent or emerging hotspots informed the prioritization of corridor-based speed management, crossing visibility improvements, and operational safety projects identified in the Safety Action Plan.*

Cooling Areas

Cooling areas indicate locations where crash activity has declined over time. These areas may reflect the effects of previous safety actions, changes in travel behavior, or natural variation and provide useful context for evaluating system performance.

Sporadic Locations

Sporadic locations represent isolated crashes without temporal persistence. While important for understanding overall safety conditions, these locations do not indicate a consistent spatial risk pattern and are not prioritized for location-specific interventions.

> *The cold-to-hot hexagon grid analysis supports SS4A's emphasis on proactive, systemic safety planning by identifying locations with recurring exposure despite low crash volumes.*

Why This Matters for Bridgeport

Because Bridgeport experiences relatively few crashes overall, traditional hotspot mapping alone can overemphasize single events. The cold-to-hot hexagon grid analysis provides a more stable, systemic view of risk, helping the City focus on locations where safety improvements are most likely to prevent future crashes or serious injuries.

Relationship to Other Crash Maps

When viewed alongside the High Injury Network, crash density maps, and intersection-level crash summaries, this hexagon grid analysis reinforces the plan's emphasis on corridor-based and context-based safety strategies, particularly along state highways and in downtown areas with higher exposure.

A2.11 Temporal Patterns (Time, Day, Season)

Crash occurrences follow expected small-community temporal patterns:

- Higher activity during daytime and early evening hours
- Lower activity overnight
- Seasonal variation associated with travel patterns and winter conditions

See Table A2-6, Crashes by Time of Day and Table A2-7, Crashes by Month.

These patterns suggest that exposure and activity levels—rather than unusual temporal risk—drive crash occurrence.

CRASHES BY MONTH

Month	Fatal	Inj-A	Inj-B	Inj-C	PDO	**Totals**
January			1		15	**16**
February		1			8	**9**
March			3	1	11	**15**
April			2	1	12	**15**
May	1		2		10	**13**
June			4	2	9	**15**
July	1		2		8	**11**
August		1			6	**7**
September			1		15	**16**
October			2	1	14	**17**
November				1	18	**19**
December					18	**18**
Totals	***2***	***2***	***17***	***6***	***144***	***171***

Table A2-7. Crashes by Month (2014–2023)

CRASHES BY TIME OF DAY

Hour	Fatal	Inj-A	Inj-B	Inj-C	PDO	**Totals**
0		1			12	**13**
1	1				1	**2**
2					1	**1**
4					1	**1**
5					3	**3**
6			1		4	**5**
7			3	1	17	**21**
8					5	**5**
9		1			8	**9**
10					4	**4**
11			2		6	**8**
12				1	10	**11**
13	1		1		6	**8**
14			1		11	**12**
15			1	1	15	**17**
16			2		5	**7**
17			2		7	**9**
18			2	1	2	**5**
19					5	**5**
20			1	1	5	**7**
21					4	**4**
22					5	**5**
23					1	**1**
Blank/Unknown			1	1	6	**8**
Totals	***2***	***2***	***17***	***6***	***144***	***171***

Table A2-6. Crashes by Time of Day (2014–2023)

A2.12 Crash Trends Summary Narrative

Crash trends in Bridgeport are characterized by low overall volumes, limited severe crashes, and year-to-year variability typical of small communities. Analysis therefore emphasizes systemic risk factors—such as speed, visibility, and exposure—rather than single-year crash counts. This approach aligns with FHWA guidance for proactive safety planning in low-crash environments and supports the plan's focus on targeted, risk-based countermeasures.

Overall crash volumes have remained relatively stable over the analysis period, with year-to-year variation reflecting changes in traffic activity, seasonal conditions, and random

variability rather than sustained increases or decreases. Severe and fatal crashes remain infrequent but represent significant community impact when they occur.

The majority of crashes are property-damage-only, yet the presence of serious injury and fatal crashes—particularly on higher-speed corridors—reinforces the need for preventive, system-level safety actions. Spatial analysis confirms that crashes cluster by exposure and activity rather than recurring single-point failures.

A2.13 Equity & Context Considerations

Due to Bridgeport's small population and limited census resolution, traditional demographic crash rate analysis is constrained. Instead, geographic equity was evaluated by comparing crash patterns and public input across multiple community areas.

This approach ensured that:

- Input and crash data represented all parts of the community
- Safety concerns in lower-volume residential and school areas were not overlooked
- Investment decisions considered exposure and vulnerability, not just crash counts

CRASHES BY PROJECT AREA						
Project Area	Fatal	Inj-A	Inj-B	Inj-C	PDO	**Totals**
0	0	0	0	0	13	**13**
1	0	0	1	0	15	**16**
2	1	0	1	0	5	**7**
3	0	0	6	4	49	**59**
4	0	0	3	0	13	**16**
5	1	2	6	2	49	**60**
Totals	***2***	***2***	***17***	***6***	***144***	***171***

Table A2-8. Crashes by Project Area (2014–2023)

A2.14 Implications for Safety Planning

The crash analysis supports a safety strategy focused on:

- Speed management on higher-speed corridors
- Pedestrian visibility and crossing safety
- Lane clarity and driver expectancy
- Reducing exposure near schools, parks, and community facilities
- Preventive action in areas where consequences would be severe

These findings directly informed the High Injury Network, countermeasure selection, and project prioritization presented in **CHAPTER 3** and **CHAPTER 4**.

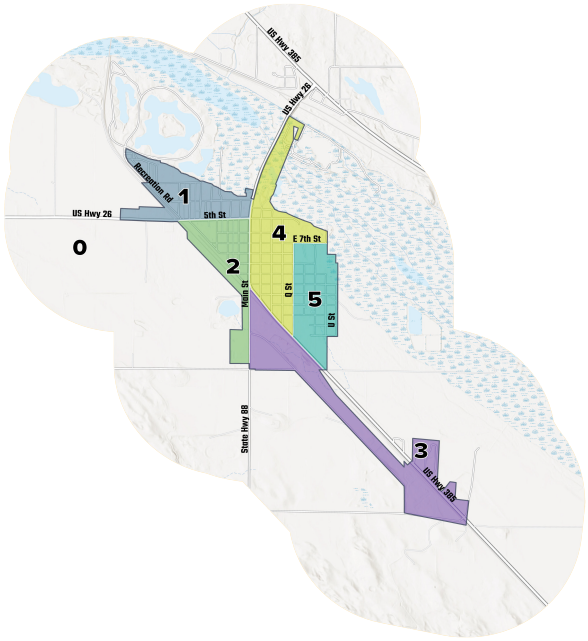


Figure A2.10 - Project Area Map

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