

City of Ann Arbor

2019 Annual Crash Review

DRAFT

Calendar Years 2014-2018



September 2019

Introduction

City staff have prepared this report to provide the Transportation Commission with an understanding of the City's recent crash history and crash trends. This report is the first version of a report the Transportation Section intends to provide the Transportation Commission on an Annual basis. The report provides a snapshot of recent crash history and trends experienced over the past five years. This report supplements and compliments the regional crash analyses produced by the Southeast Michigan Council of Governments (SEMCOG).

The report is broken up into three distinct subject areas:

- Introduction
- 5 Year Crash Trends
- 5 Year Priority Locations

Data Source

The data used in this report comes from the Michigan Certified Crash Data. This data is available for viewing by the public through the Office of Highway Safety Planning's (OHSP) online data tool: www.michigantrafficcrashfacts.org.

The City of Ann Arbor's engineering utilize this data through the Roadsoft software package. Roadsoft provides a variety of analysis tools that can be used to better understand traffic crash patterns. The City's engineering staff have been utilizing this software package for over 10 years to conduct analyses similar to those presented in this report. However, this is the first time a comprehensive report has been prepared by staff.

Crash analyses have traditionally been prepared and used in the course of:

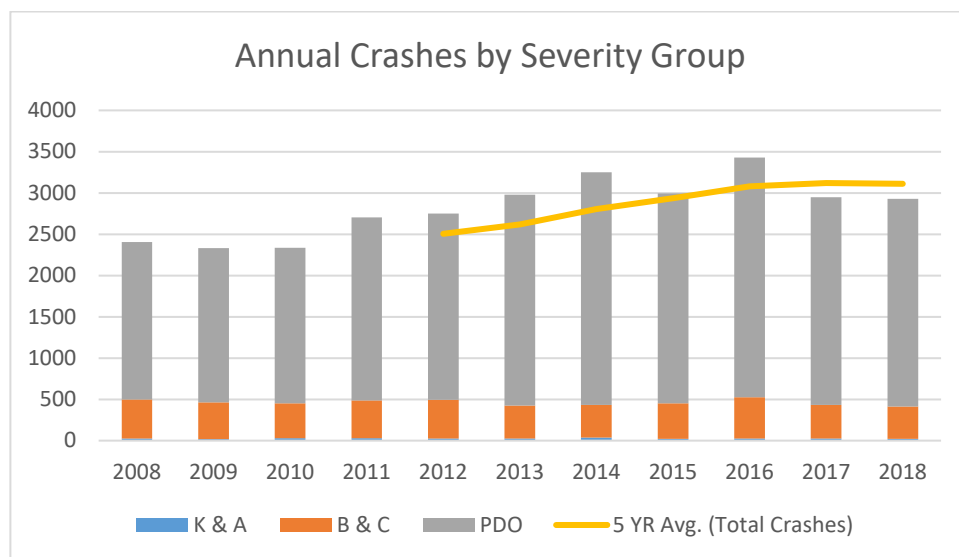
- Responding to a variety of resident requests
- Developing prioritizations for items such as sidewalk gaps
- Identifying needs as part of project design

The data provided in this report has been filtered to remove crashes that are outside of the City's control or influence. Freeways and private roads have been eliminated from the data reports. The Michigan Department of Transportation (MDOT) controlled streets, such as Business US-23, have been included in this analysis as the City controls approaches to these intersections. Additionally, animal crashes are excluded from all crash analyses except for the specific animal crash graphs.

Crash Performance by Severity

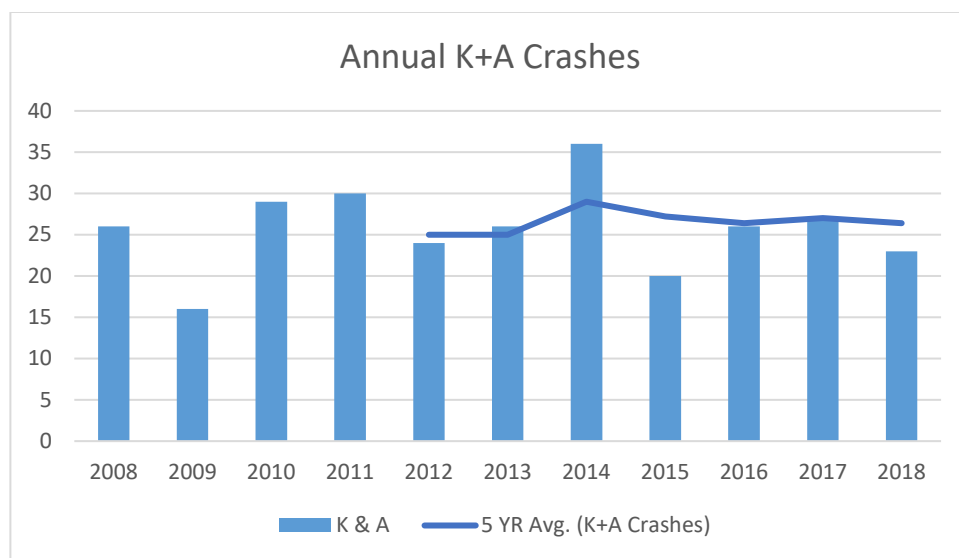
The following sections review crash data based on the severity of injuries. Data are presented as all crashes, pedestrian involved crashes, and bicyclist involved crashes.

All Crashes



Observations:

- The overall number of crashes has an upward trend line from 2012 to 2016.
- The Five Year Average trend line shows stabilization between 2016 and 2018
- 85% of the Five Year Average Crashes result in no injury.
- 14% of the Five Year Average Crashes result in non-severe injury.
- 1% of the Five Year Average Crashes result in serious injury.
- 0.1% of the Five Year Average Crashes result in fatal injury.



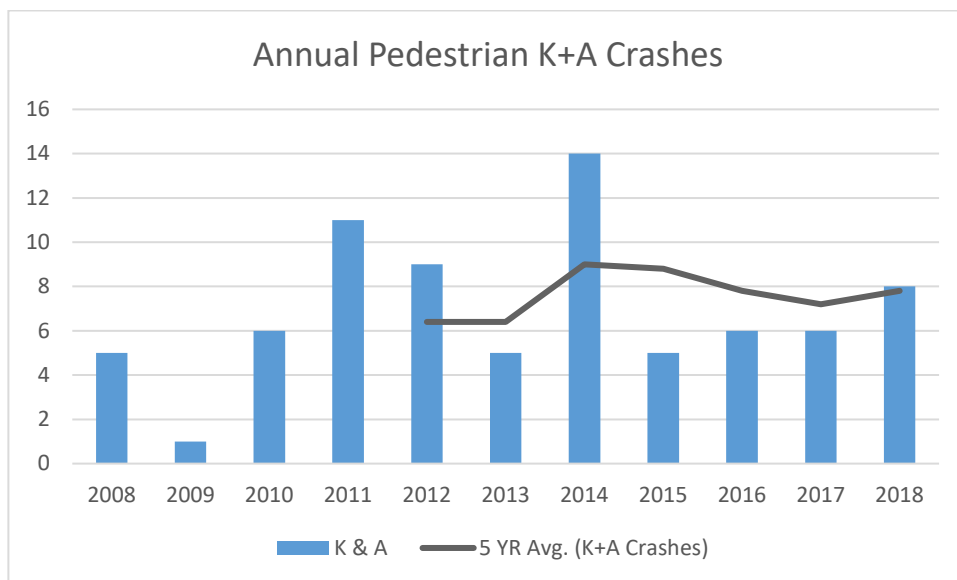
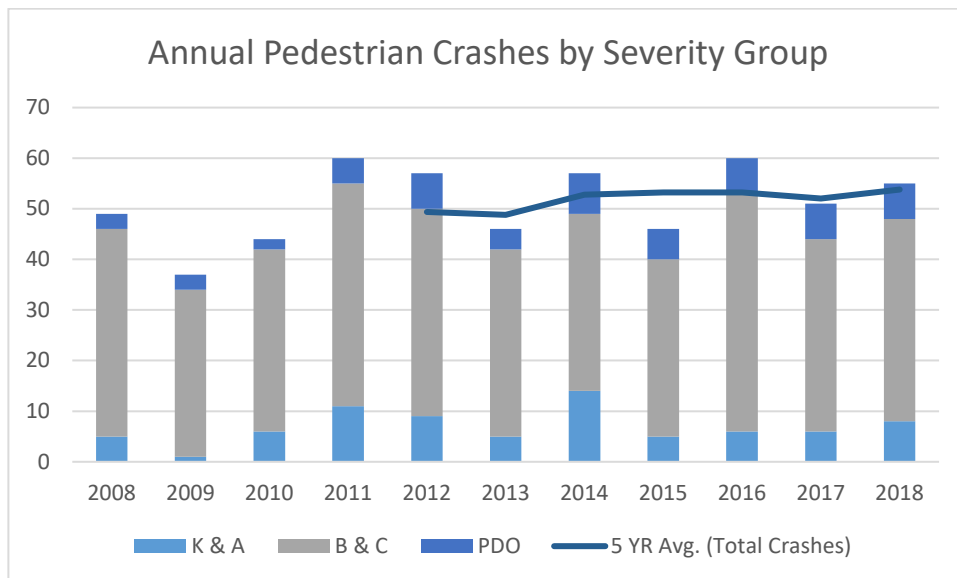
Observations:

- This graph presents annual crash history for all severe injury crashes.
- While 2014 had a significant increase in severe injury crashes, creating a spike in the rolling five year average trend line, the overall trend line shows a steady average.
- The trend line analysis indicates an expected 25 – 30 serious injury crashes based on current conditions.
- The steady trend results in a lower severe injury crash rate per capita, see the following table.

The following table uses the number of reported crashes and the US Census estimated population data to develop per capita crash rates for the City. These rates show a point in time for each year. Although percent change has been reported, please note that these may not be reliable trends.

	2010	2018	% Change
U.S. Census Population Estimate	11,3973	121,890	6.9%
Total Crashes	2,337	2,928	25.29%
Crash Rate per Capita	0.020505	0.024022	17.15%
Crash Rate per 1,000 Residents	20.50486	24.02166	17.15%
Severe Injury Crashes	29	23	-20.69%
Crash Rate per Capita	0.000254	0.000189	-25.59%
Crash Rate per 1,000 Residents	0.254446	0.188695	-25.84%

Pedestrian Involved Crashes



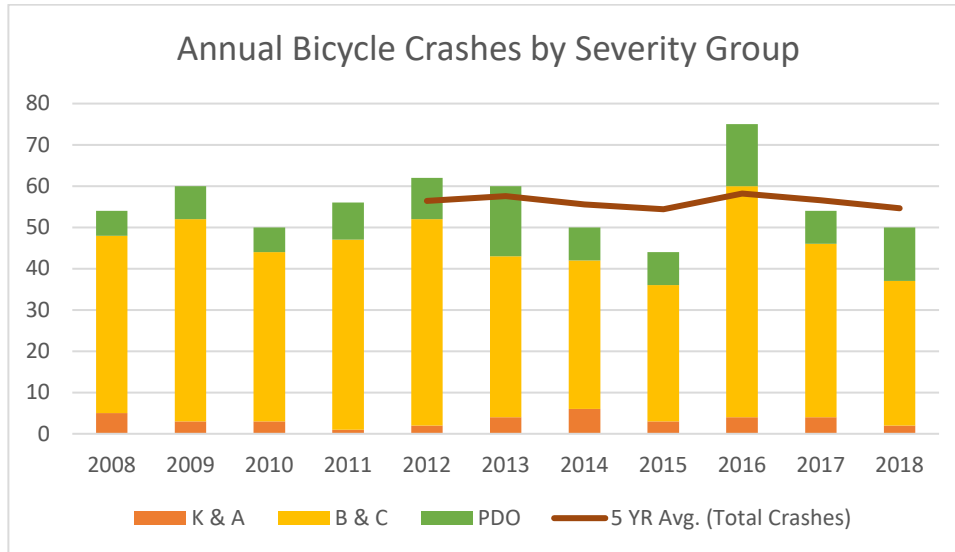
Observations:

- The overall number of pedestrian crashes elevated after 2009.
- The overall crash occurrence trend has remained steady since 2014.
- The City's crash trend of increased severity of crashes after 2011 is consistent with the national trend.
- 85% of the Five Year Average Crashes result in no injury.
- 14% of the Five Year Average Crashes result in non-severe injury.
- 1% of the Five Year Average Crashes result in serious injury.
- 0.1% of the Five Year Average Crashes result in fatal injury.

Observations:

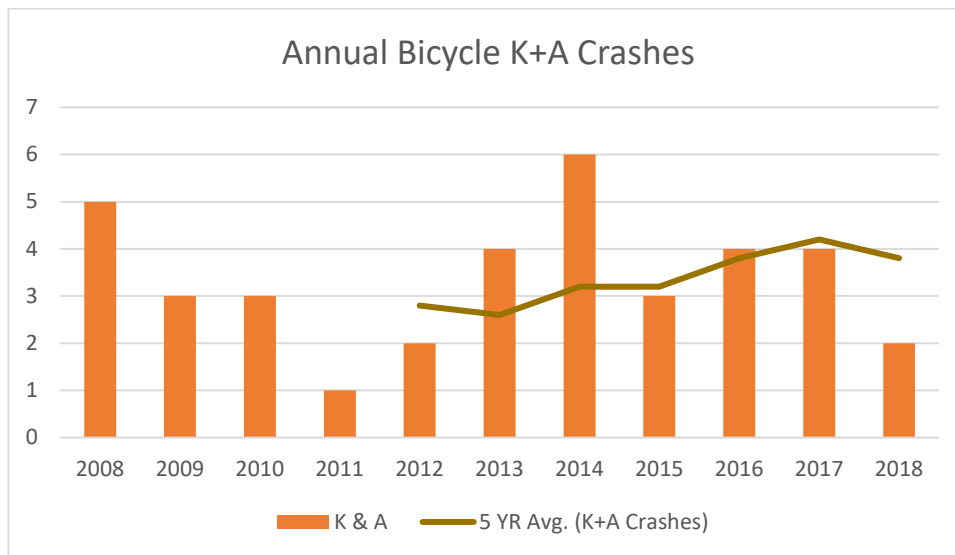
- 2014 had a significant increase in severe injury crashes, 14 crashes.
- The years following 2014 have had significantly fewer occurrences with severe injury crashes ranging from 5-8 crashes annually.

Bicyclist Involved Crashes



Observations:

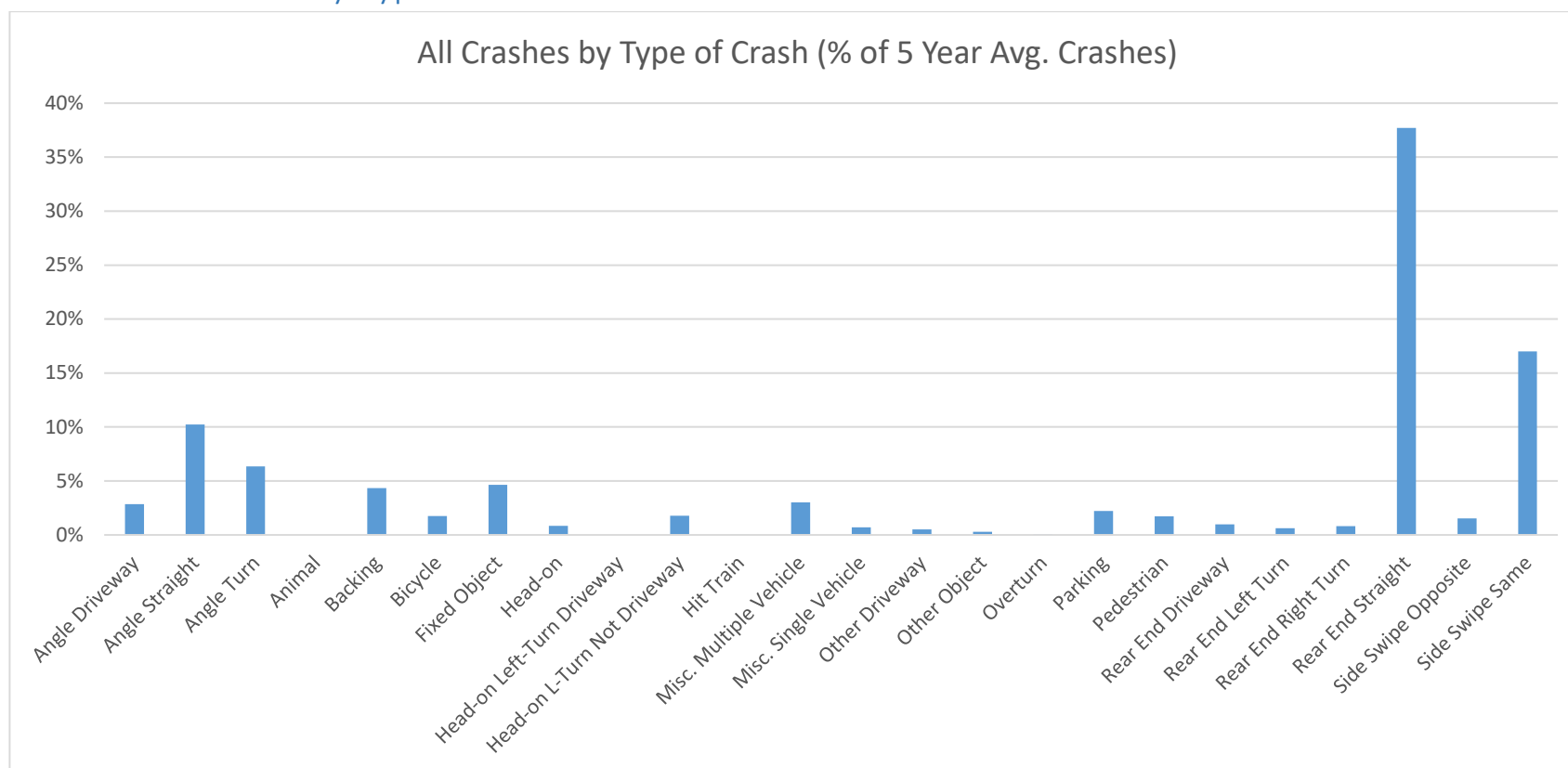
- The overall number of bicyclist crashes does not result in an upward or downward stable trend as the overall number of bicycle crashes varies widely from year to year.
- The five year rolling average trend line shows a fairly stable average crash history ranging between 54 and 59 crashes in any given year.



Observations:

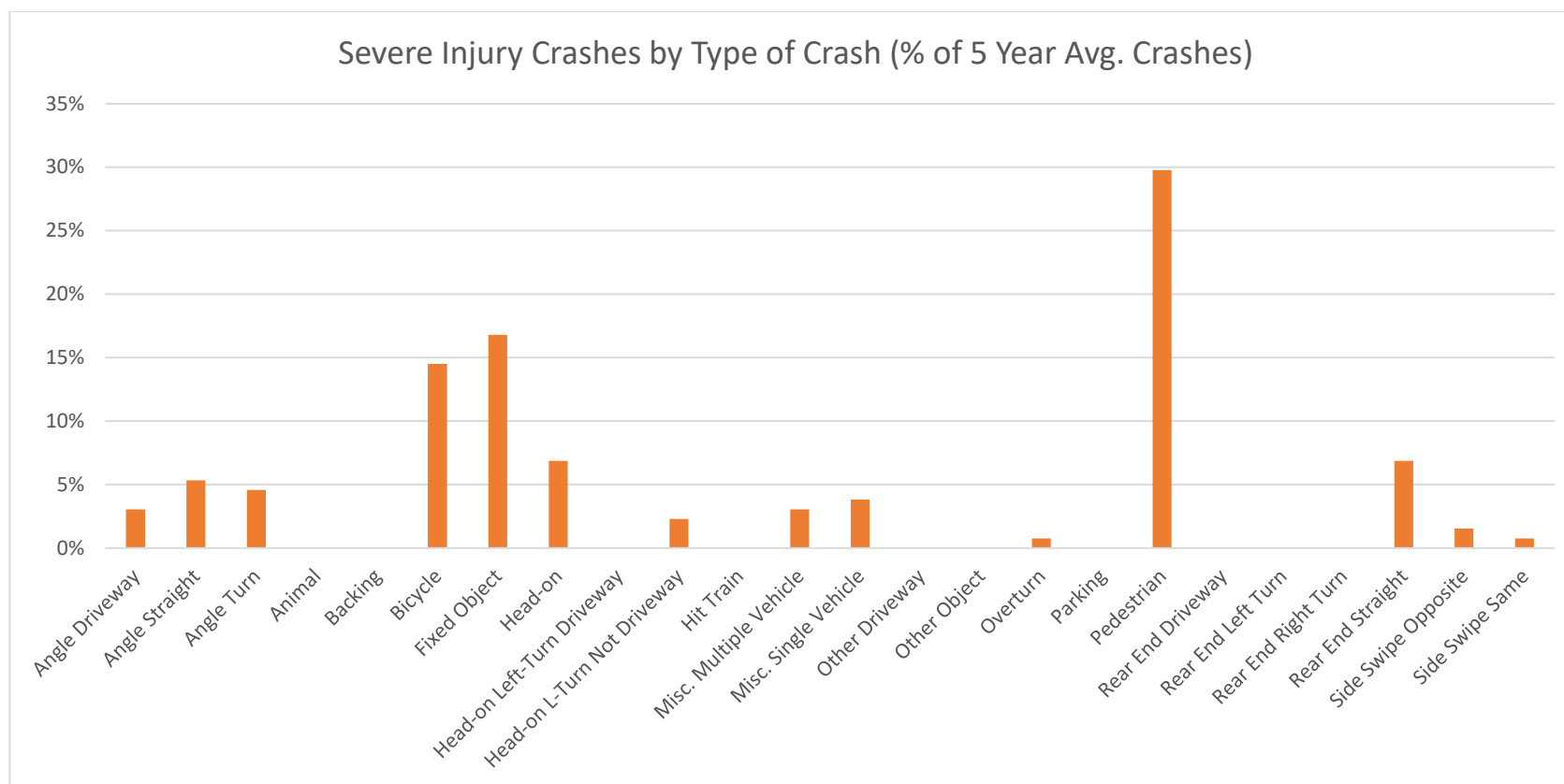
- The overall number of serious injury crashes with people who ride bikes also varies widely from year to year.
- However, unlike overall crashes, the five year rolling average trend line shows a distinctly upwards trend of severe injury crashes.
- 2014 experienced an unusually high number of serious injury crashes (6).
- 2018 experienced the second lowest number of serious injury crashes (2).

Crash Performance by Type



Observations:

- The overall crash pattern is dominated by rear end collisions.
 - 40% of all crashes are rear-end type.
- The second highest type of crash is sideswipe same.
 - 17% of all crashes are side swipe same type.
- The third highest type of crash is angle straight.
 - 10% of all crashes are angle straight.

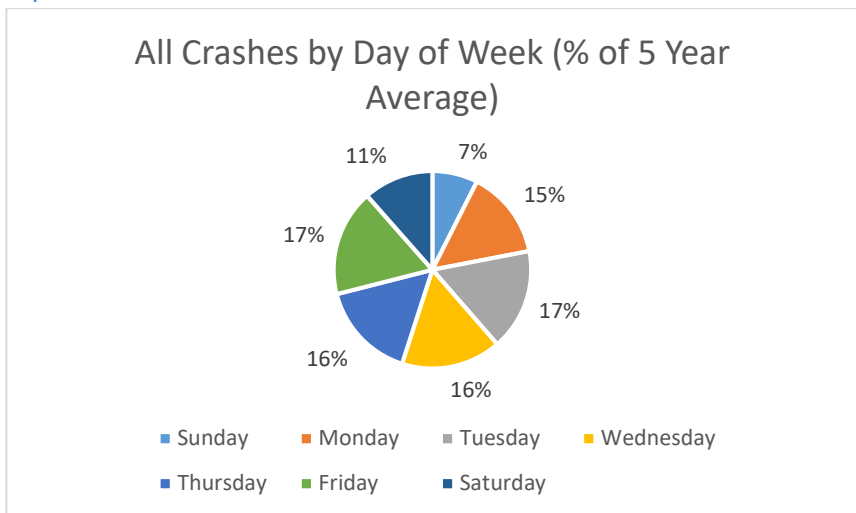


Observations:

- The severe injury crash pattern is dominated by vulnerable road user crashes
 - 30% of all serious injury crashes involve a person walking.
 - 15% of all serious injury crashes involve a person bicycling.
- The second highest severe injury crash type involves crashes with a fixed object.
 - 17% of all serious injury crashes result from striking a fixed object.

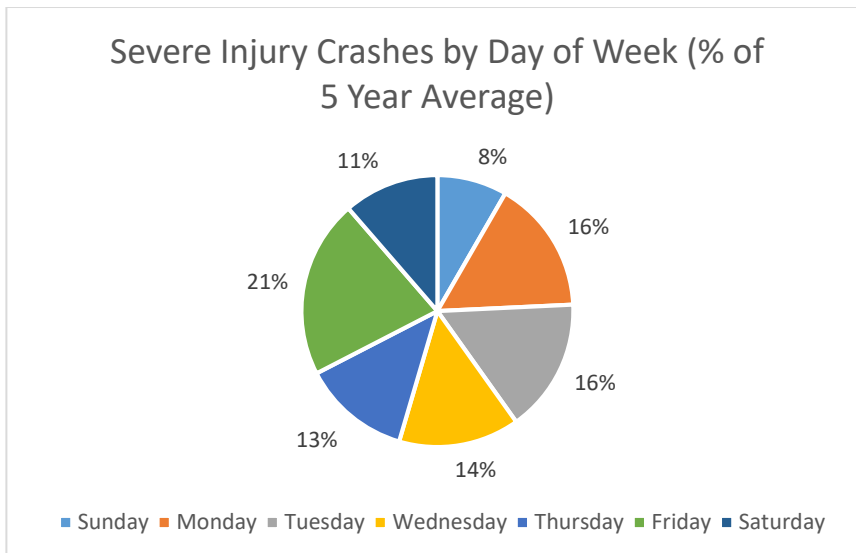
Crash Performance by Temporal Conditions

Day of Week



Observations:

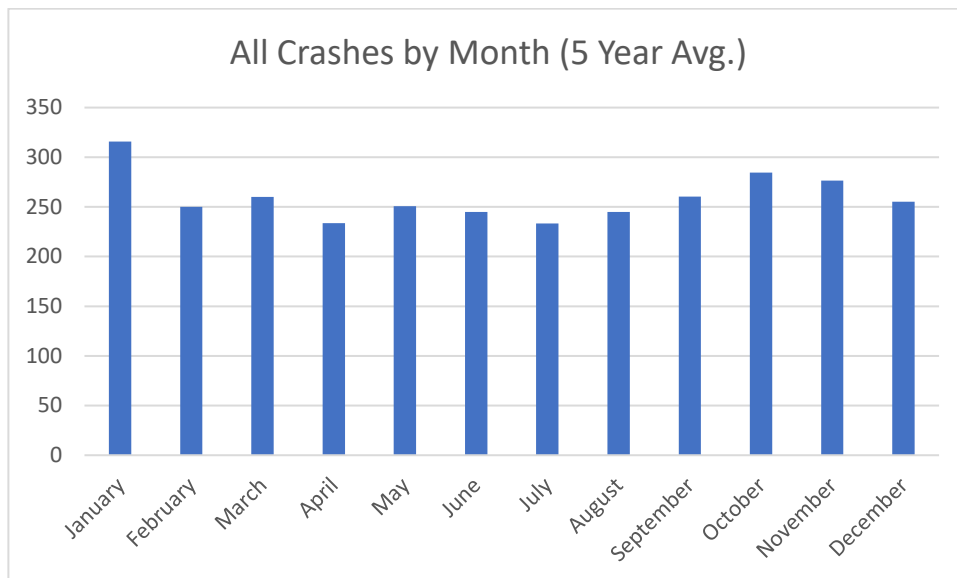
- Sunday receives a slightly lower occurrence of crashes. This result is expected as traffic volumes tend to be significantly lower on Sundays.
- Friday receives a slighter higher occurrence of crashes.



Observations:

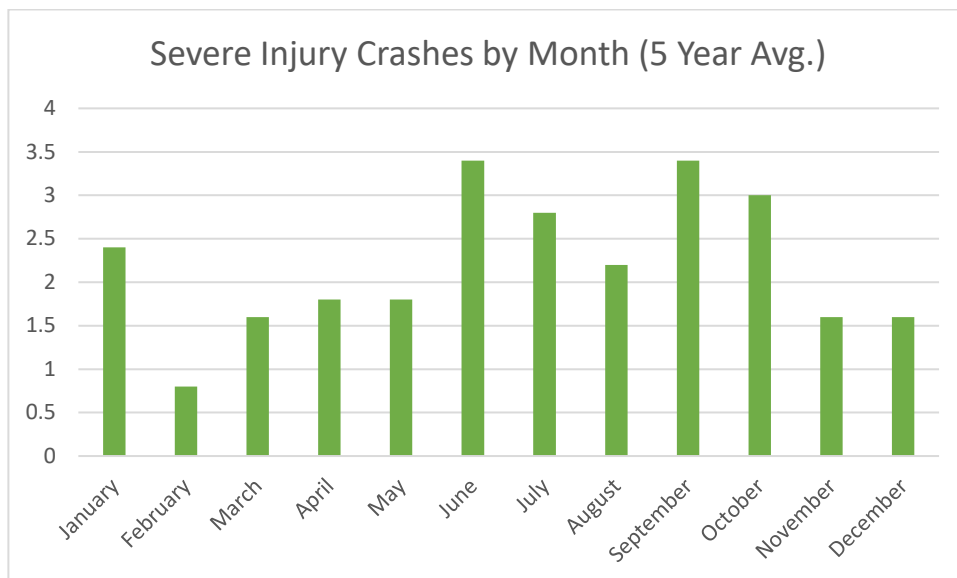
- Severe injury crashes have a similar distribution to the overall crash pattern.

Month of Year



Observations:

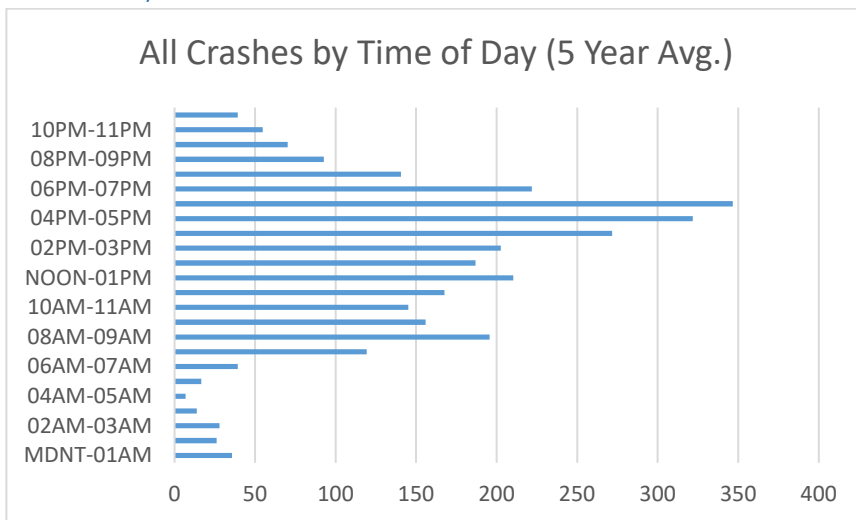
- April and July have the lowest occurrence of crashes over the past five years.
- Crash occurrences elevate in the fall, including September, October, and November. This trend is to be expected as the fall combines generally favorable weather conditions with shortened daylight hours.
- January has the most number of overall crash occurrences; this may be contributed to weather conditions.
- Overall the number of crashes is evenly distributed throughout the year.



Observations:

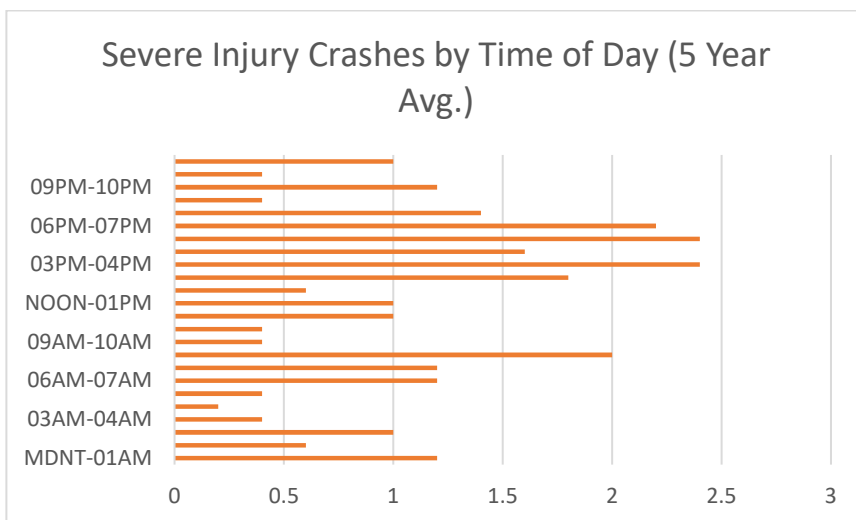
- Severe injury crash occurrences do not following the same trends as the overall crash pattern.
- Severe injury crashes are concentrated in the months between June and October, which is consistent with the highest activity months for vulnerable road users. Additionally, the fall months combine generally favorable weather conditions with shortened daylight hours.
- Severe injury crashes also have a slightly higher occurrence in January.

Time of Day



Observations:

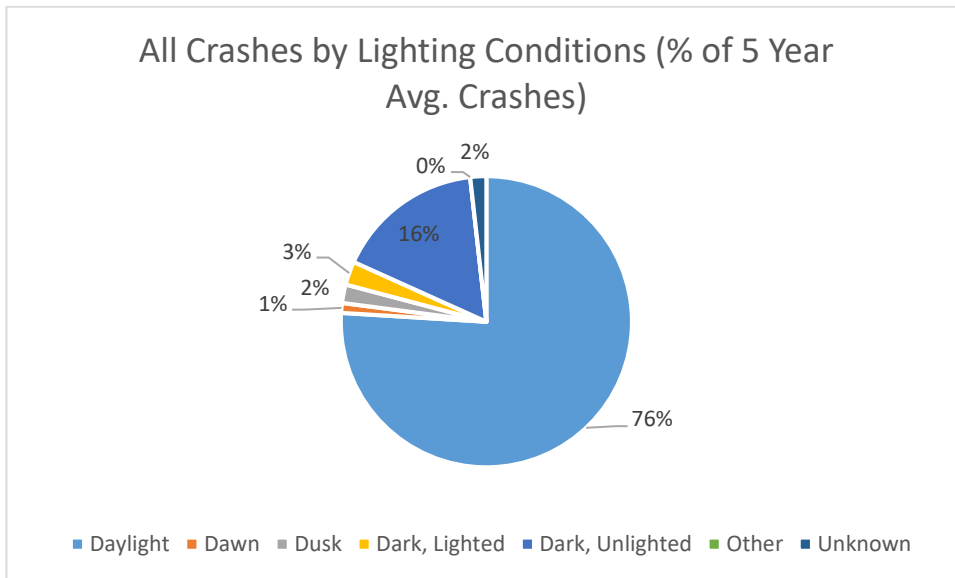
- Overall crash occurrences throughout the day follow a pattern consistent with the general trends of traffic volumes throughout the day.
- The highest number of crashes occur during the hours associated with traditional PM peak travel.



Observations:

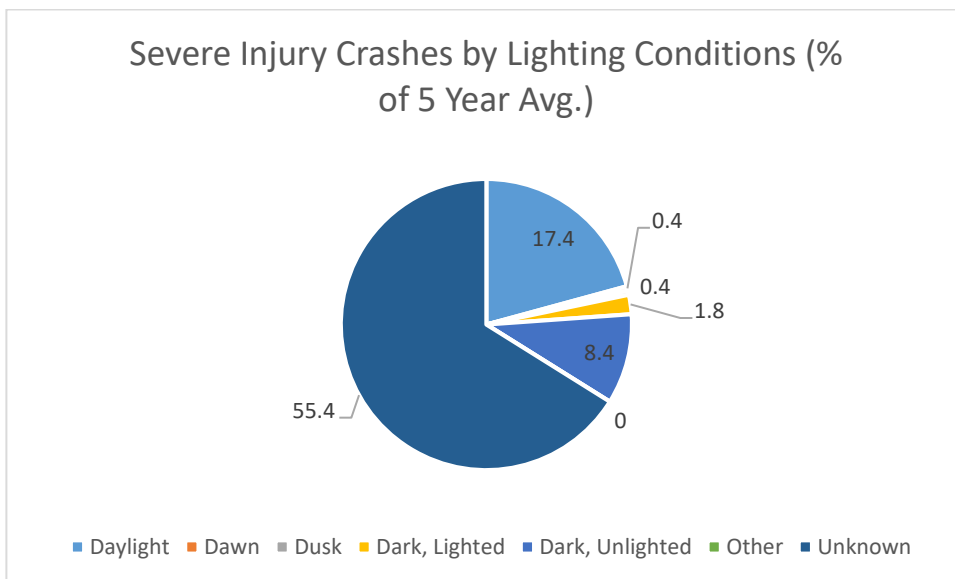
- Overall severe injury crash occurrences throughout the day follow a pattern consistent with daily traffic volumes.
- The increase in severe injury crashes occurring during the traditional AM peak hour is more pronounced than in the overall crash pattern.
- Overnight severe injury crash occurrences are at a level more consistent with mid-day crash occurrences, unlike the overall crash pattern.

Light Conditions



Observations:

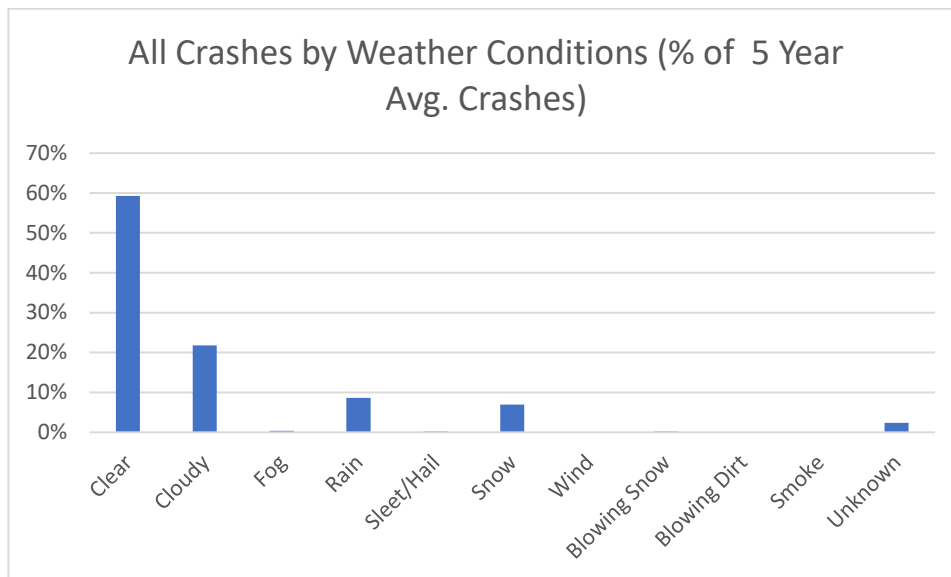
- The majority of crashes occur during daylight hours



Observations:

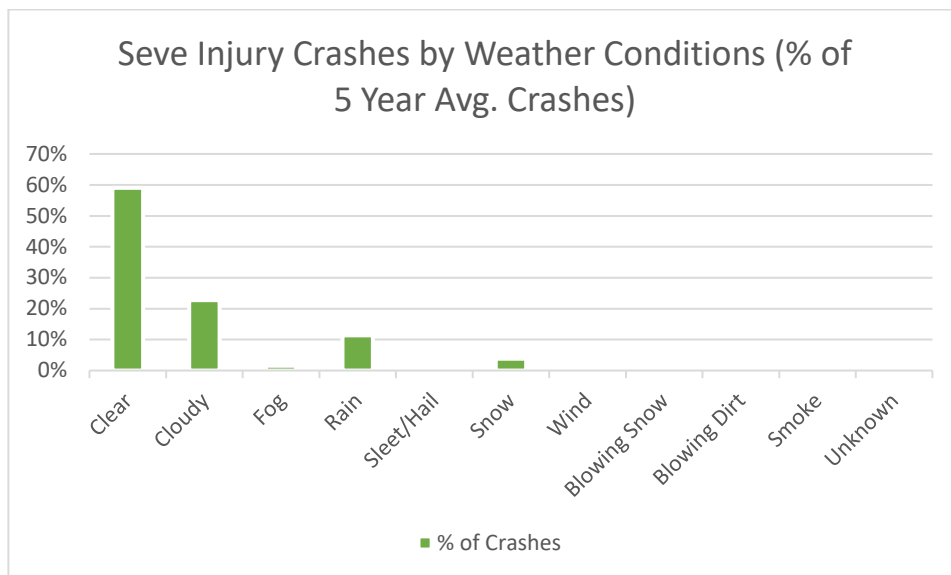
- The majority of severe injury crashes do not have an accurate accounting of lighting conditions.

Weather Conditions



Observations:

- The majority of crashes occur during non-inclement weather



Observations:

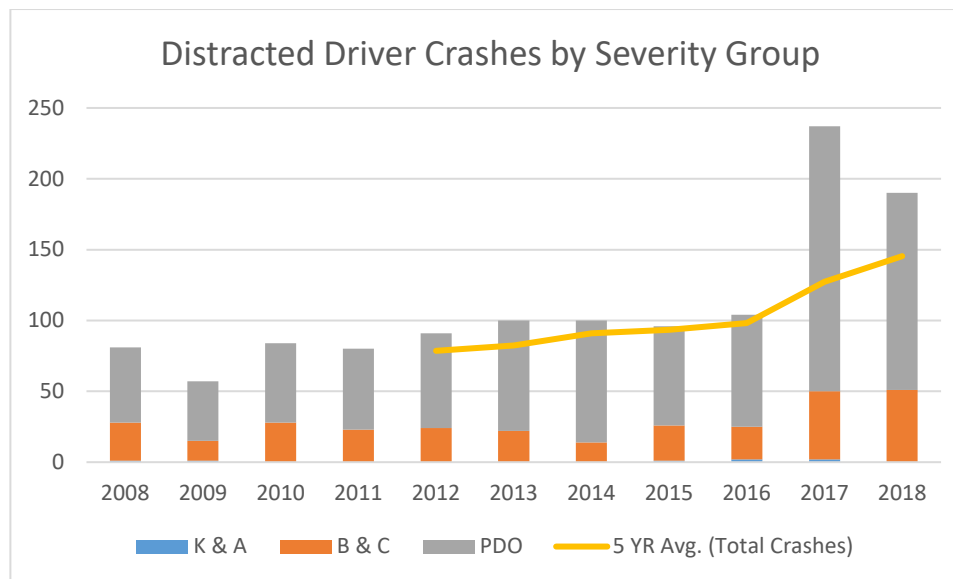
- Severe injury crashes occur in a similar pattern.

Crash Performance by Special Consideration

The following sections present crash results by special consideration. These considerations are being provided at the request of the Transportation Commission. The considerations include:

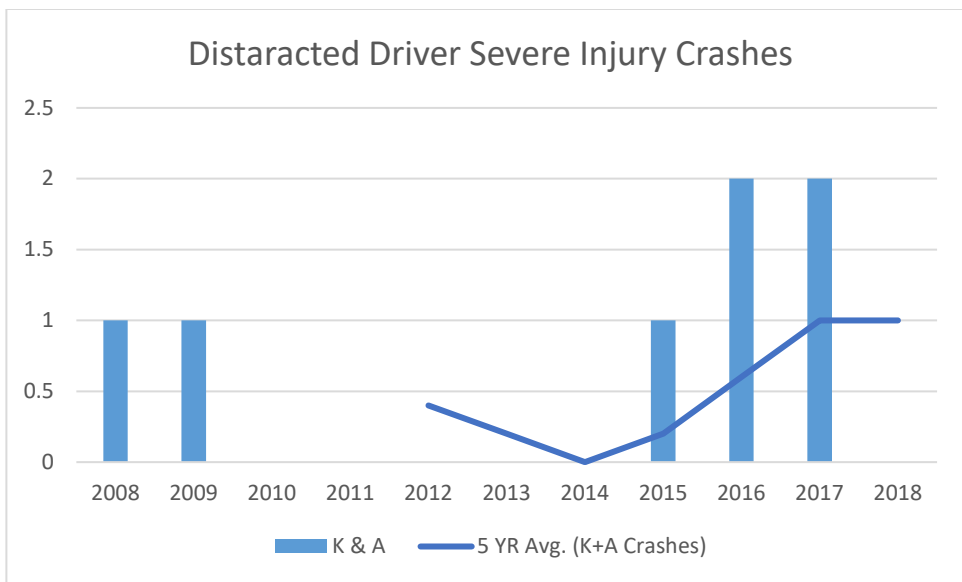
- Crashes noted as including distracted driving
- Crashes by the type of violation (citation) noted
- Crashes with drug or alcohol use noted

Distracted Driving



Observations:

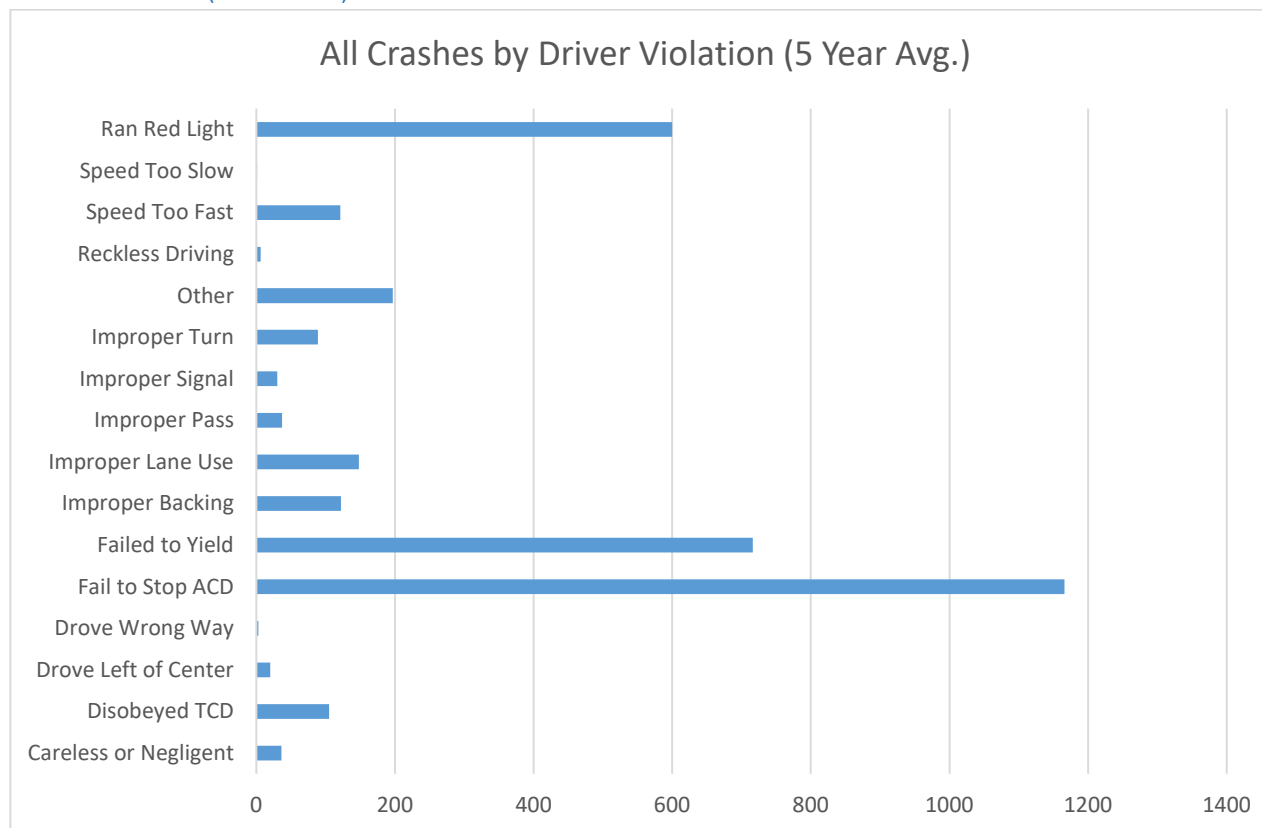
- The number of crashes involving a distracted driver has increased over time.
- The rolling five year average shows a slow, but steady increase between 2012 and 2016.
- Strikingly higher numbers of distracted drivers were reported in 2017 and 2018. However, it is difficult to understand if this is a true increase in behavior or an increase in reporting practice.



Observations:

- Very few severe injury crashes are reported as involving distracted driving.

Driver Citation (Violation)

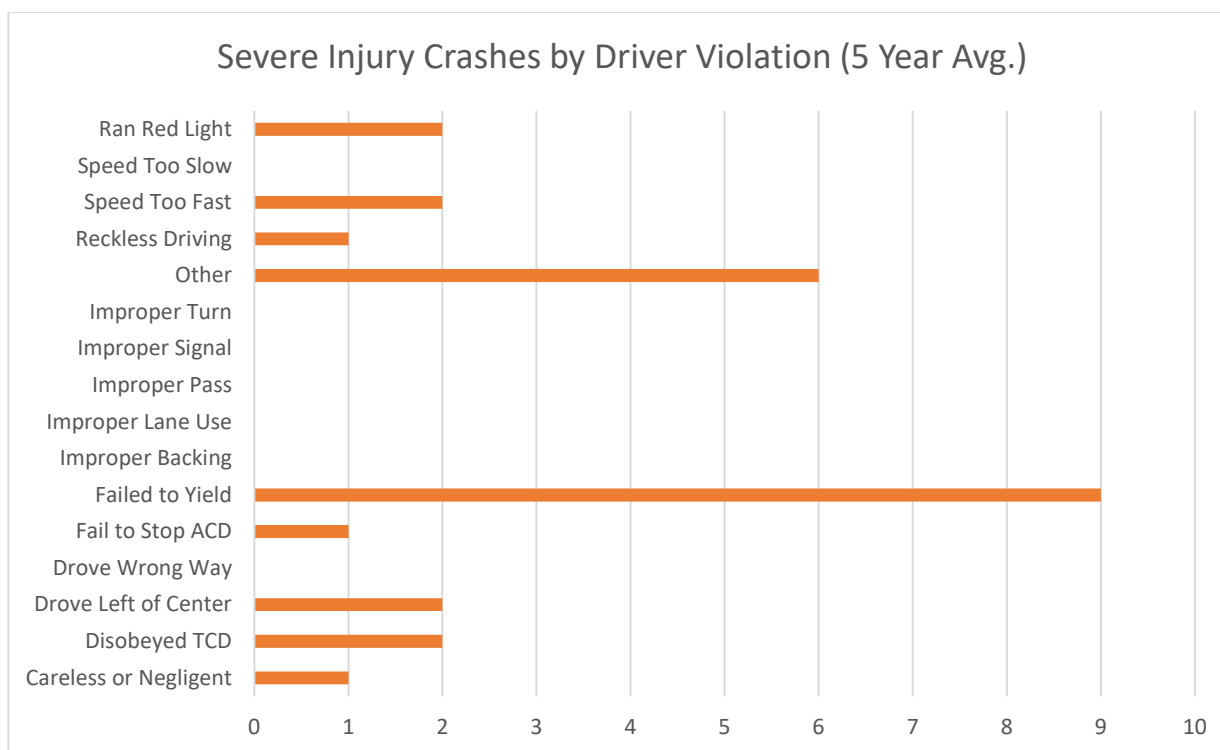


Notes:

- ACD – Assured Clear Distance
- TCD – Traffic Control Device

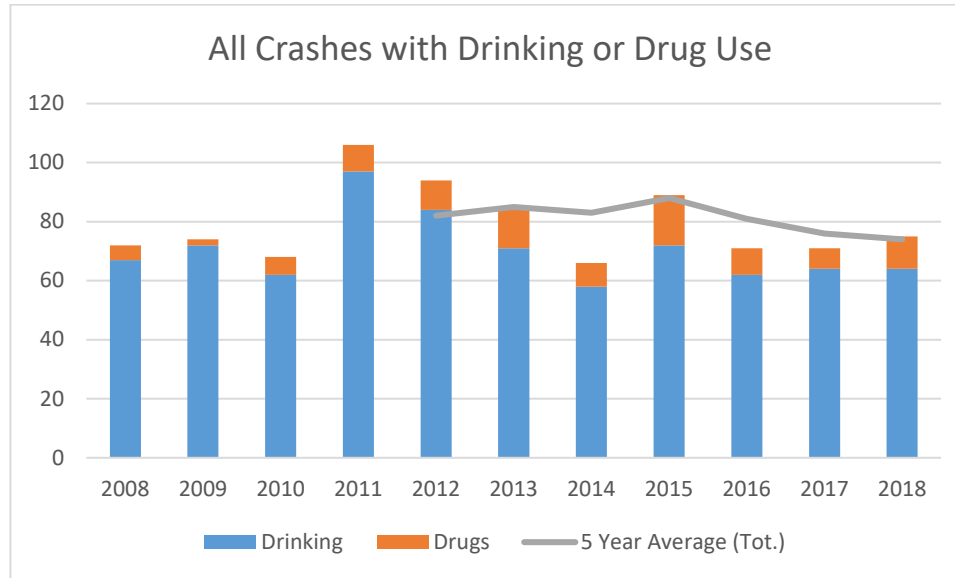
Observations:

- The most frequent violation reported is failure to stop in assured clear distance. The high occurrence of this violation type corresponds with the high rate of rear-end crashes.
- Failure to yield and running the red light are the other most frequent violations noted.

**Observations:**

- The most frequent violation among severe injury crashes is failure to yield. The high occurrence of this violation type corresponds with the high proportion of serious injury crashes involving people riding bikes or walking.

Driving While Under the Influence



Observations:

- Drug and alcohol involvement in crashes has fluctuated over the last 10 years with a significant spike in 2011.
- The rolling five year average trend line shows a distinct decrease over time of crashes including drug or alcohol use.

Crash Location Maps

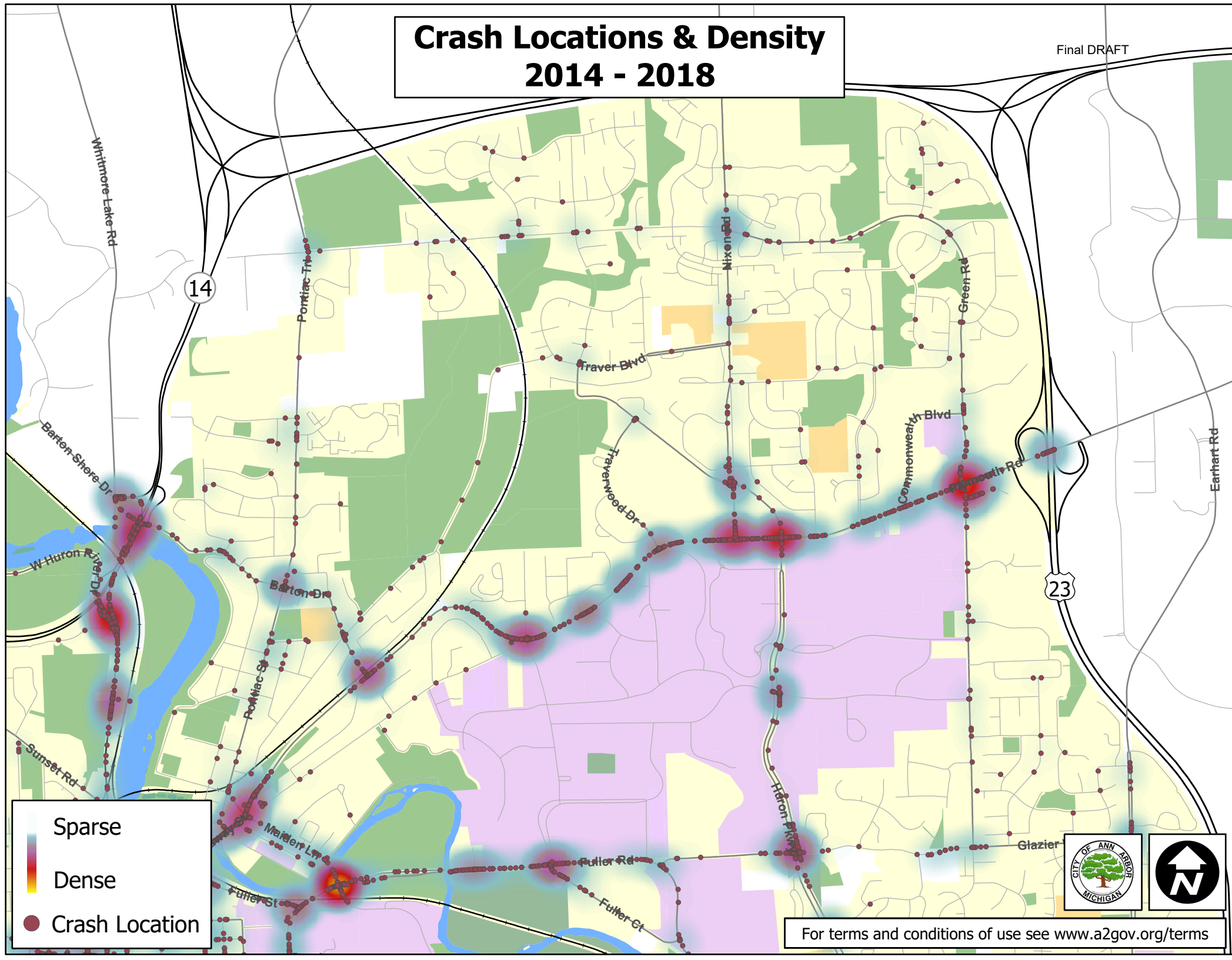
The following maps have been produced by the City Geographical Information Services (GIS) group. The maps provide a way to visualize crash patterns throughout the City.

The first set of maps show overall crash occurrences. These maps are presented in a heat map style. Heat maps provide visual weighting to areas where higher concentrations of crashes occur by use of changing colors. The advantage these maps have over location point style maps is that the frequency of crashes is easier to quickly understand.

The second set of maps show special consideration crashes overlaid on the all-crash heat maps. The areas of special consideration include severe injury locations and non-motorized crash locations.

Crash Locations & Density 2014 - 2018

Final DRAFT



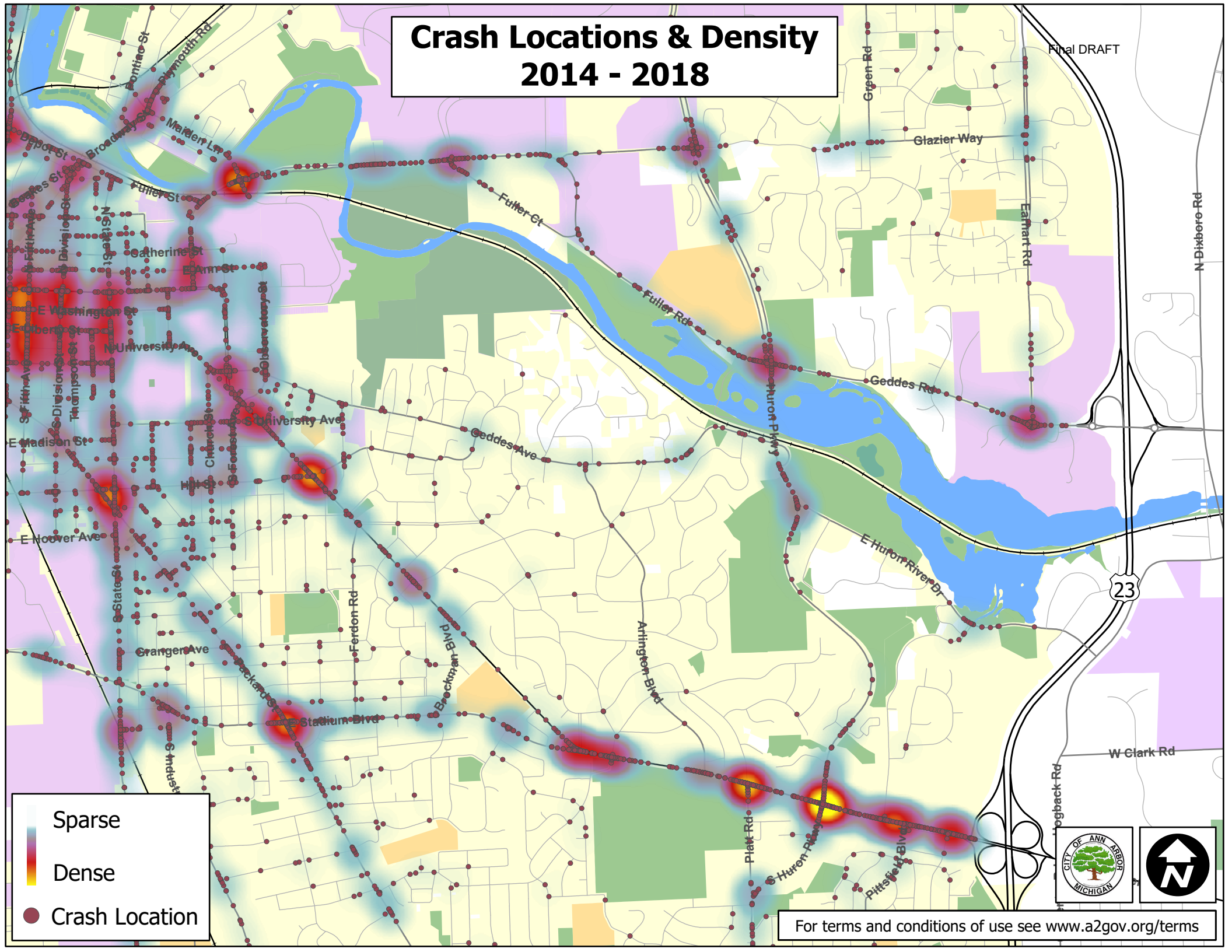
Sparse
Dense
Crash Location



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Crash Locations & Density 2014 - 2018

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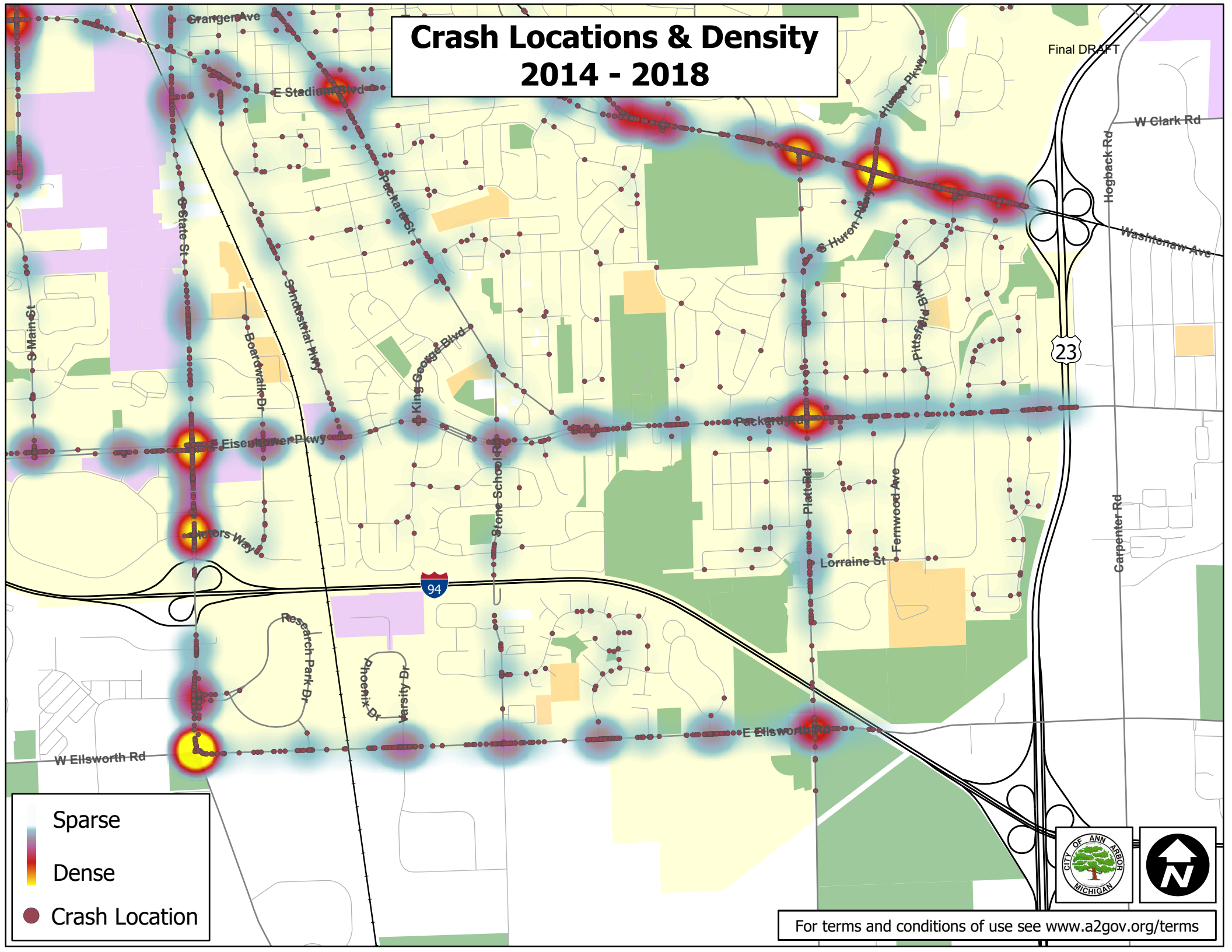
- Sparse
- Dense
- Crash Location



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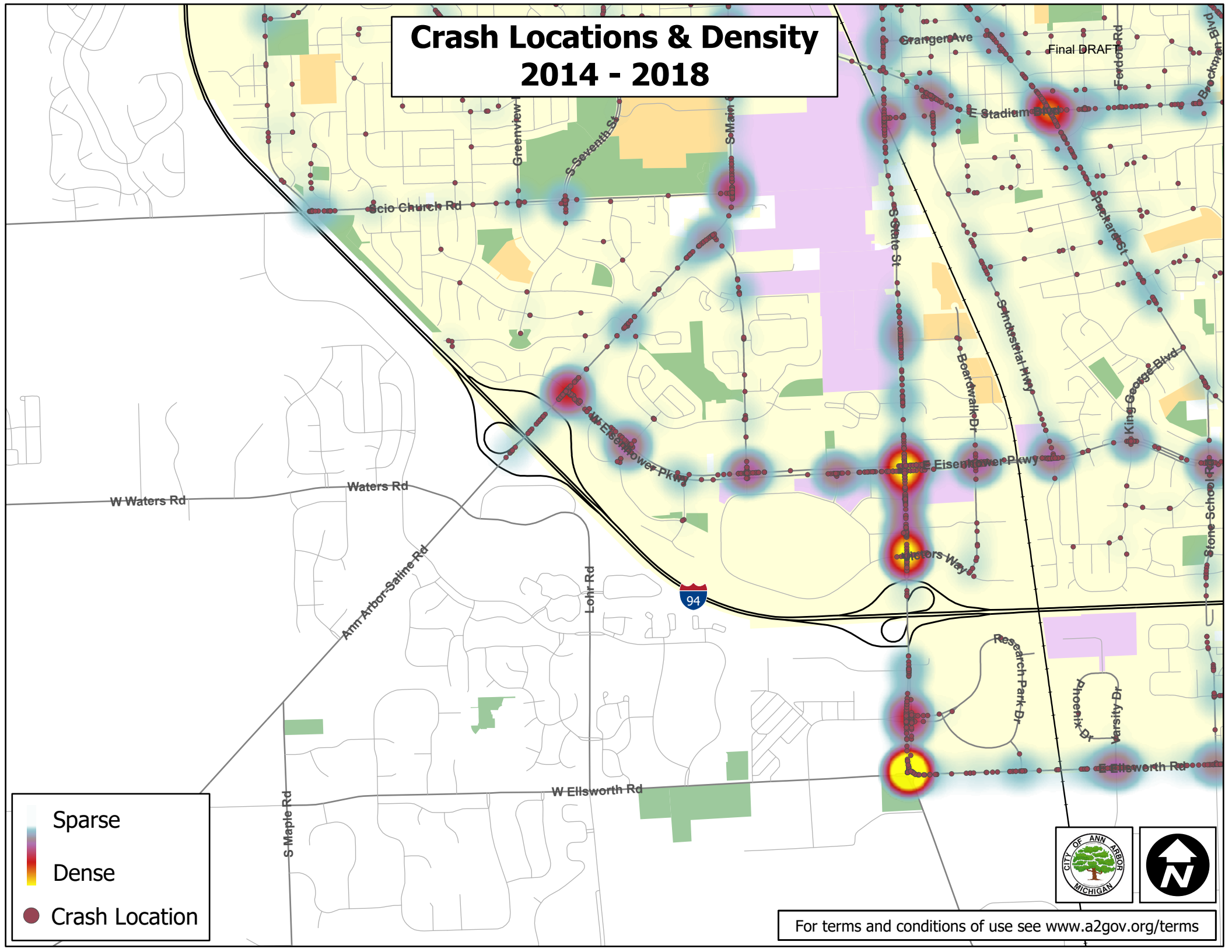
Crash Locations & Density 2014 - 2018

Final DRAFT



Sparse
Dense
Crash Location

Crash Locations & Density 2014 - 2018



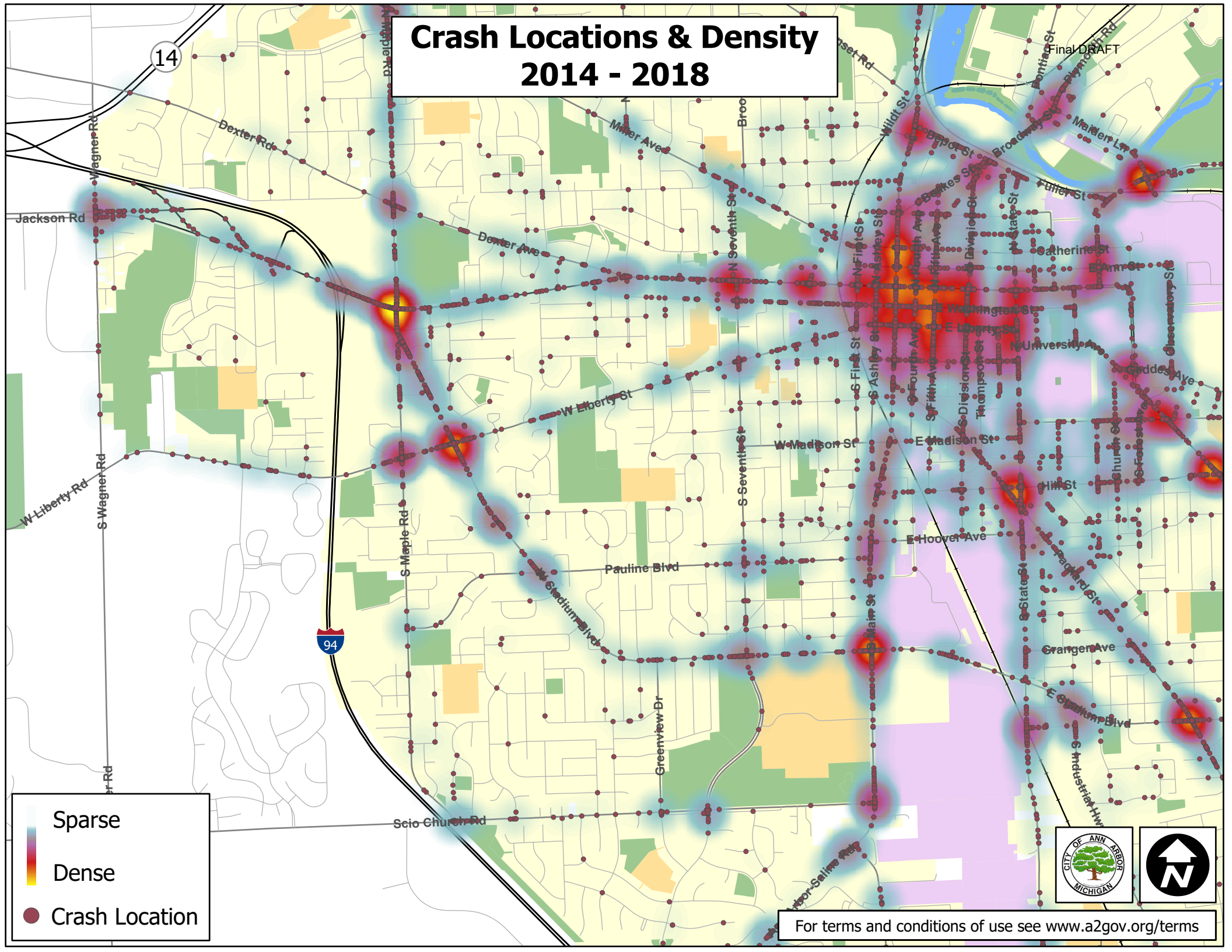
Sparse
Dense
Crash Location






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Crash Locations & Density 2014 - 2018

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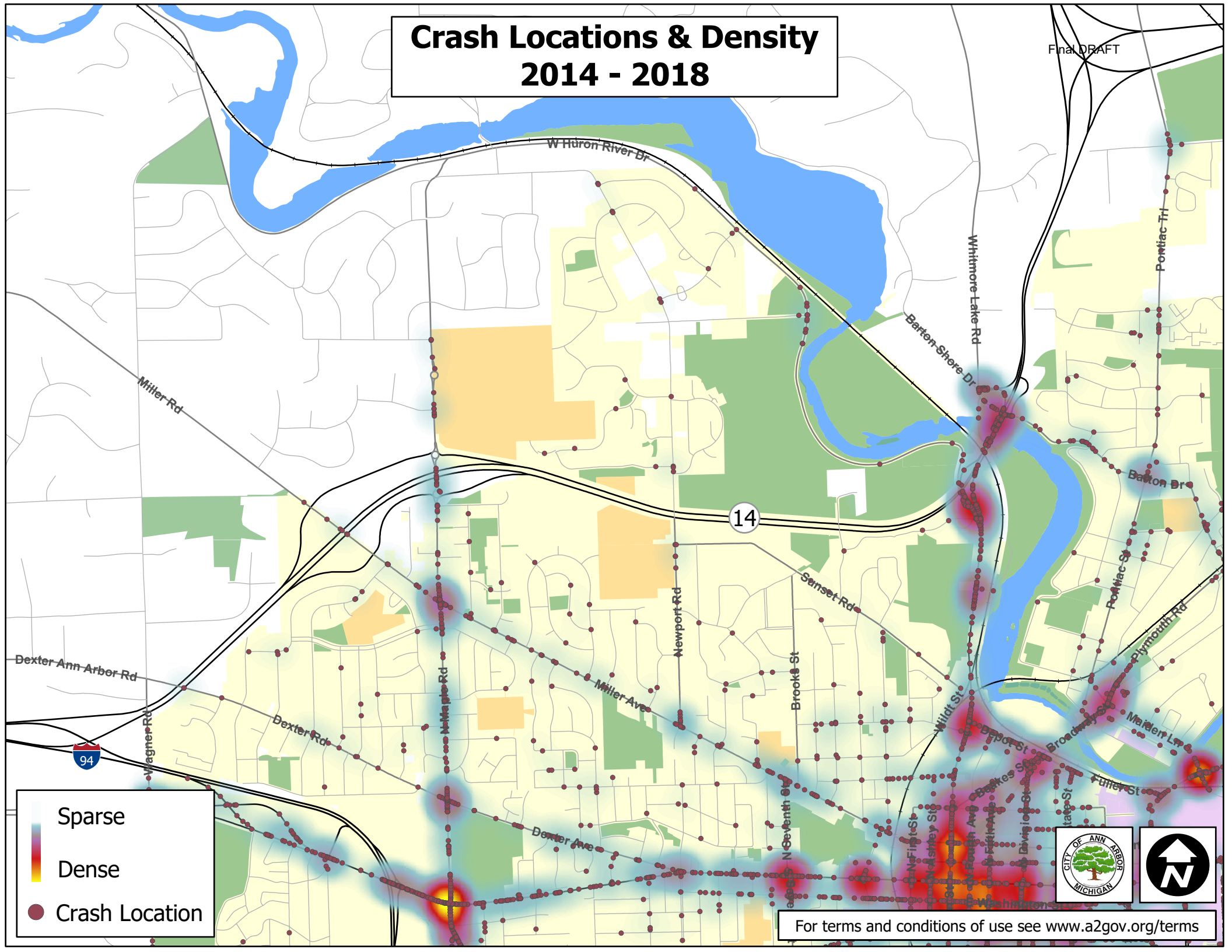
-  Sparse
-  Dense
-  Crash Location



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Crash Locations & Density 2014 - 2018

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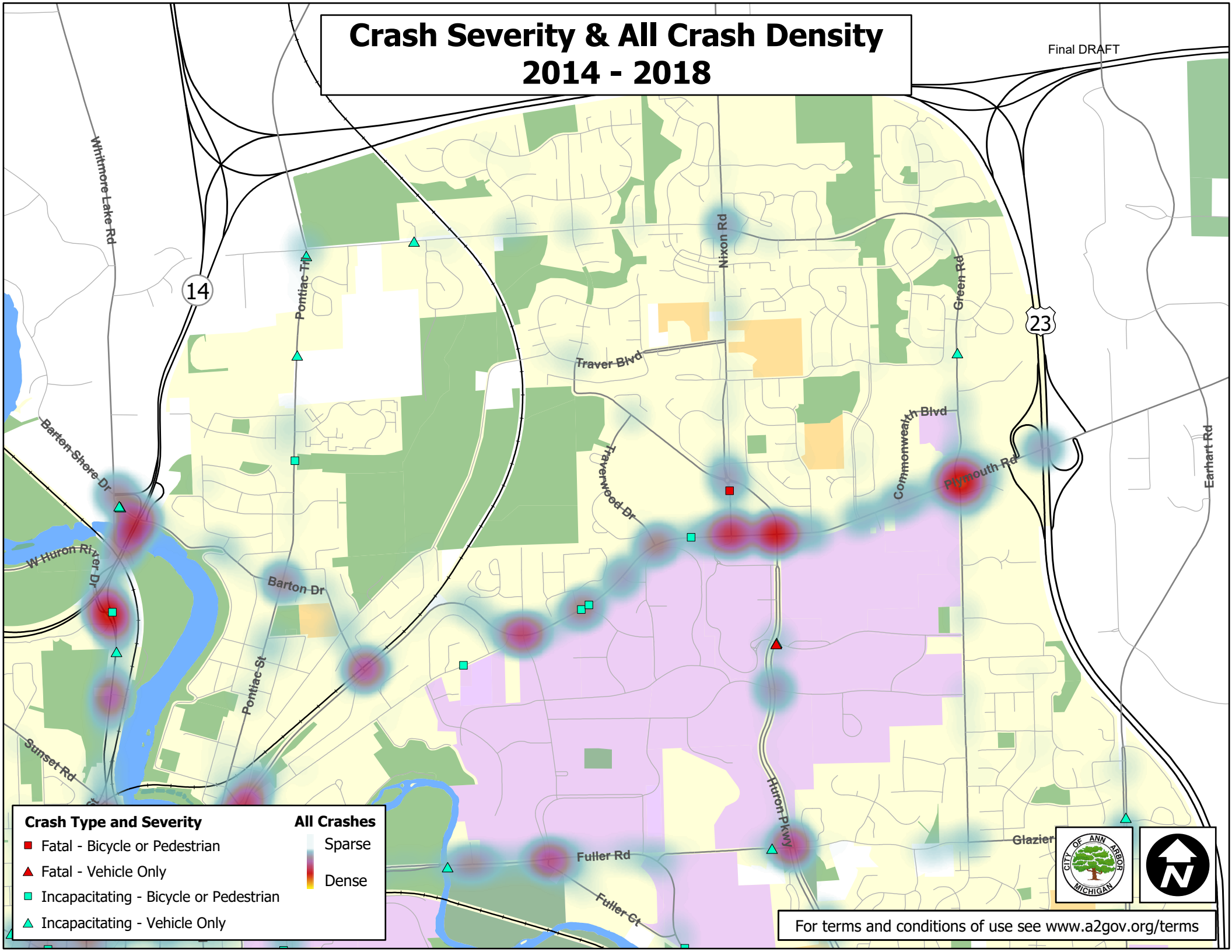
Sparse
Dense
Crash Location



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Crash Severity & All Crash Density 2014 - 2018

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Crash Type and Severity

- Fatal - Bicycle or Pedestrian
- ▲ Fatal - Vehicle Only
- Incapacitating - Bicycle or Pedestrian
- ▲ Incapacitating - Vehicle Only

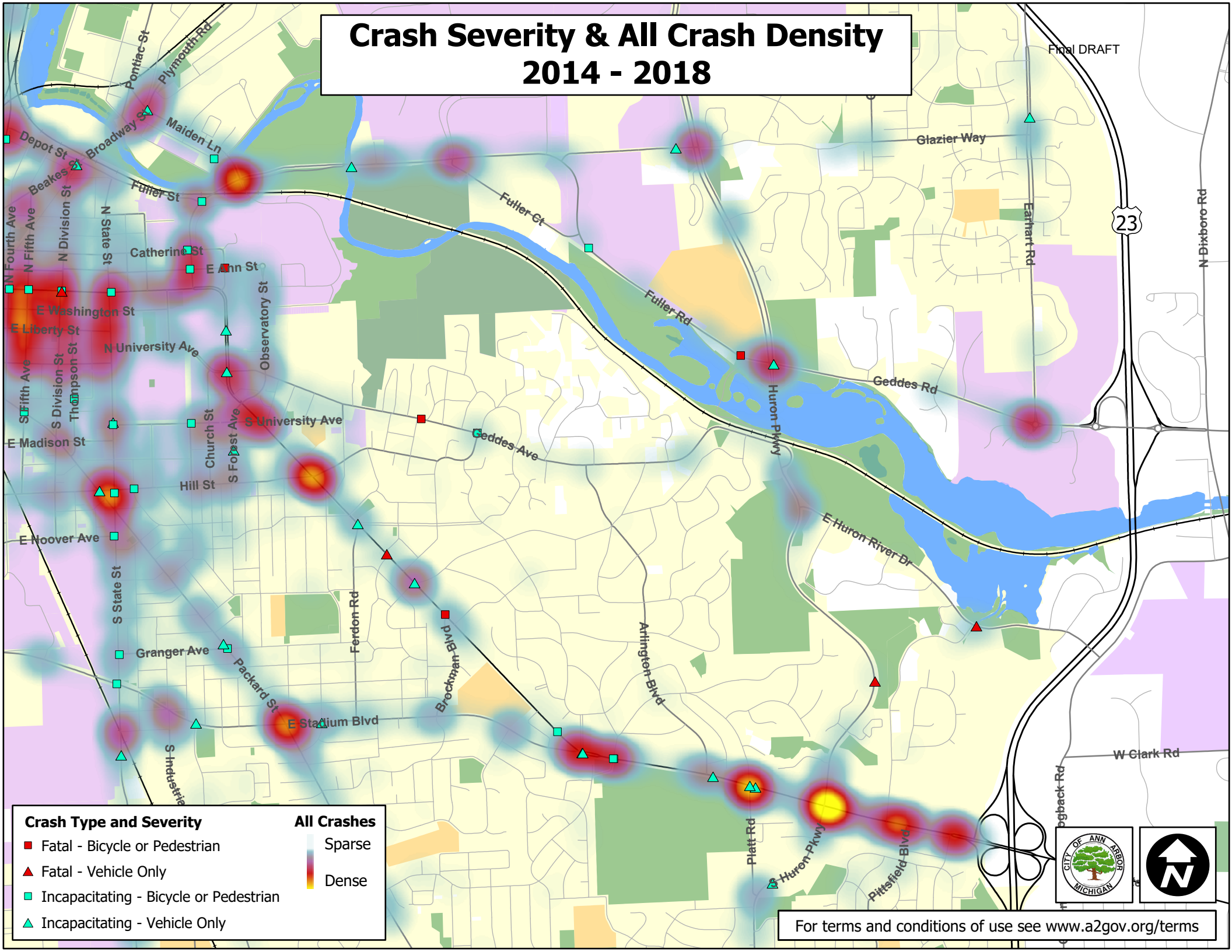
All Crashes

Sparse
Dense



Crash Severity & All Crash Density 2014 - 2018

Final DRAFT



Crash Type and Severity

- Fatal - Bicycle or Pedestrian
- ▲ Fatal - Vehicle Only
- Incapacitating - Bicycle or Pedestrian
- ▲ Incapacitating - Vehicle Only

All Crashes

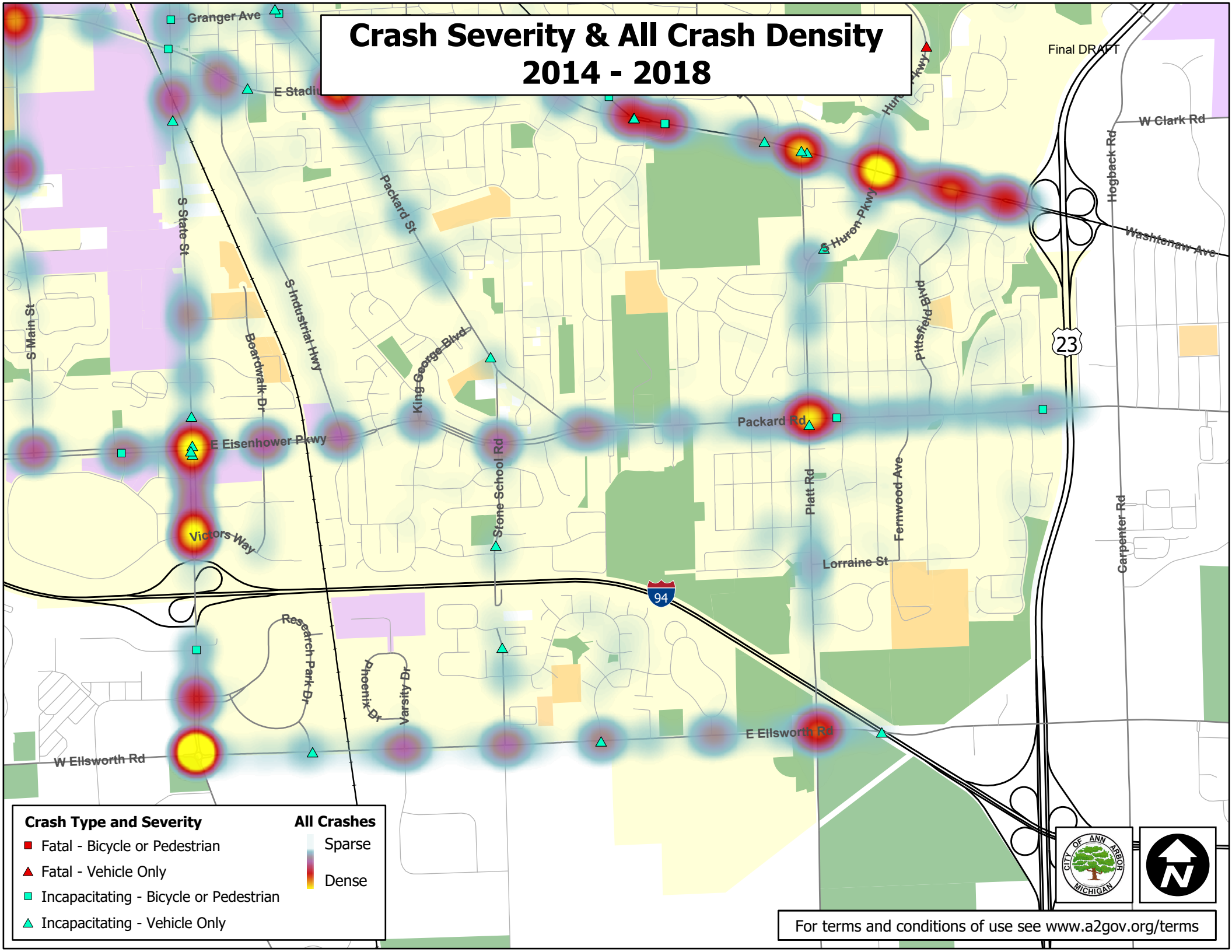
- Sparse
- Dense



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Crash Severity & All Crash Density 2014 - 2018

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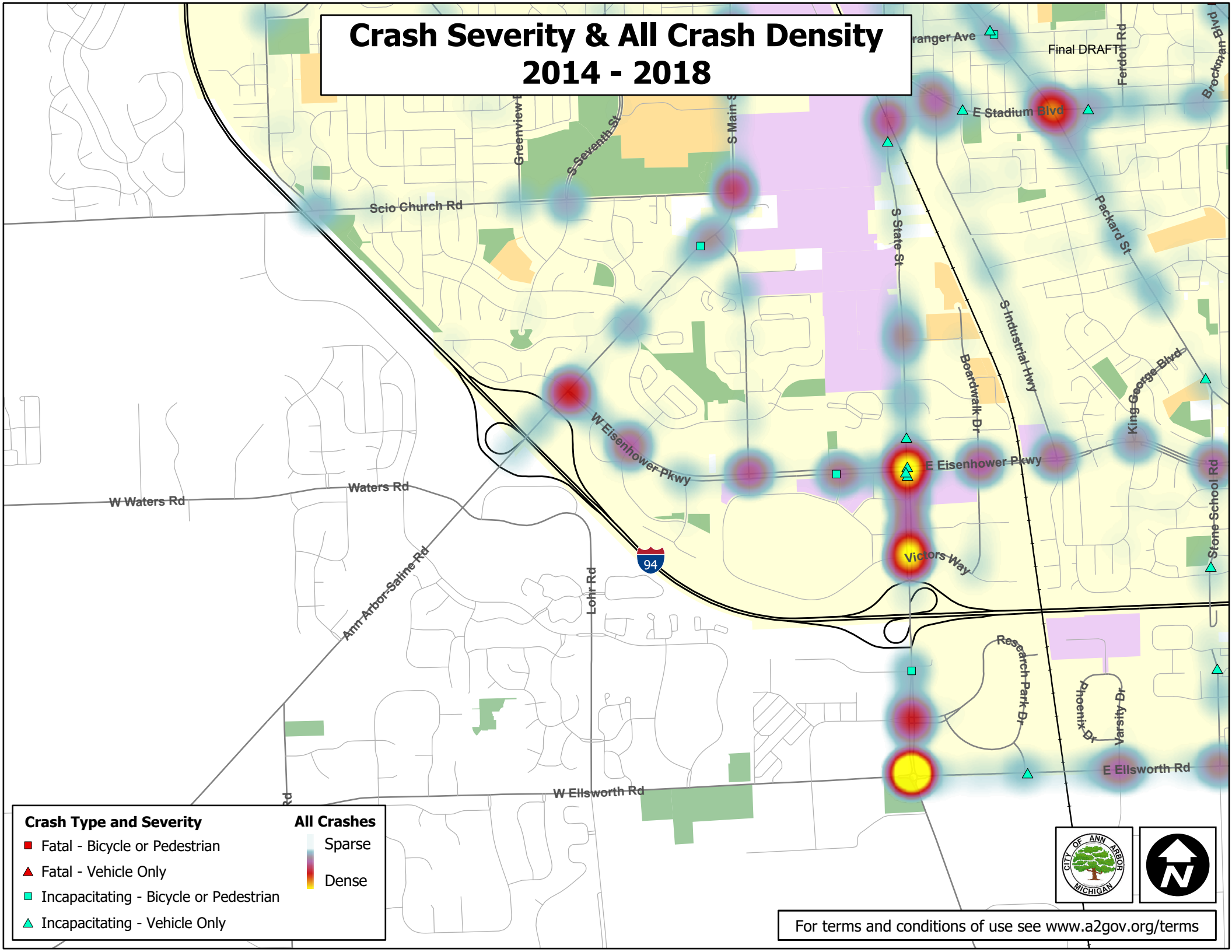


Crash Type and Severity		All Crashes	
■	Fatal - Bicycle or Pedestrian		Sparse
▲	Fatal - Vehicle Only		Dense
■	Incapacitating - Bicycle or Pedestrian		
▲	Incapacitating - Vehicle Only		



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Crash Severity & All Crash Density 2014 - 2018



Crash Type and Severity

- Fatal - Bicycle or Pedestrian
- ▲ Fatal - Vehicle Only
- Incapacitating - Bicycle or Pedestrian
- ▲ Incapacitating - Vehicle Only

All Crashes

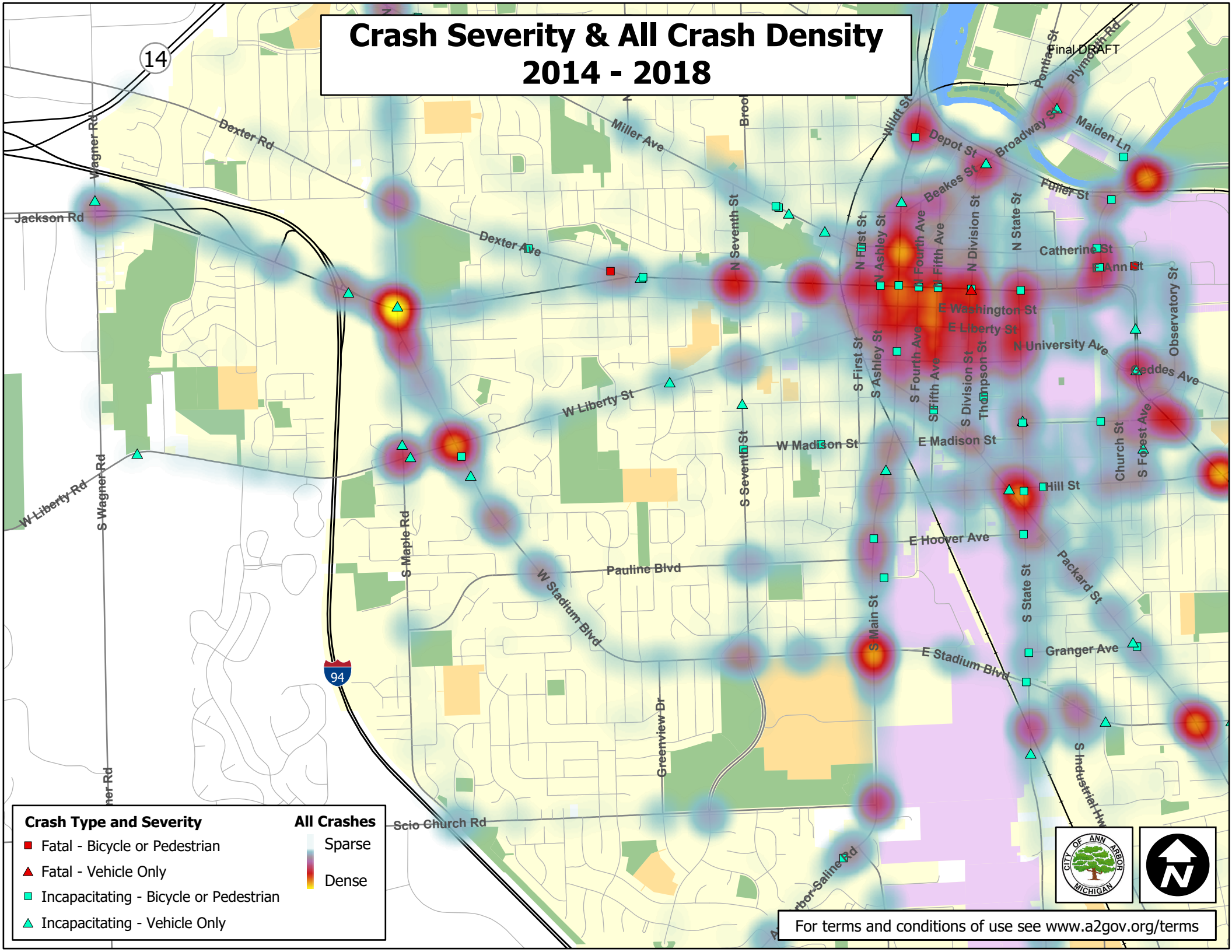
Sparse

Dense



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Crash Severity & All Crash Density 2014 - 2018



Crash Type and Severity

- Fatal - Bicycle or Pedestrian
- ▲ Fatal - Vehicle Only
- Incapacitating - Bicycle or Pedestrian
- ▲ Incapacitating - Vehicle Only

All Crashes

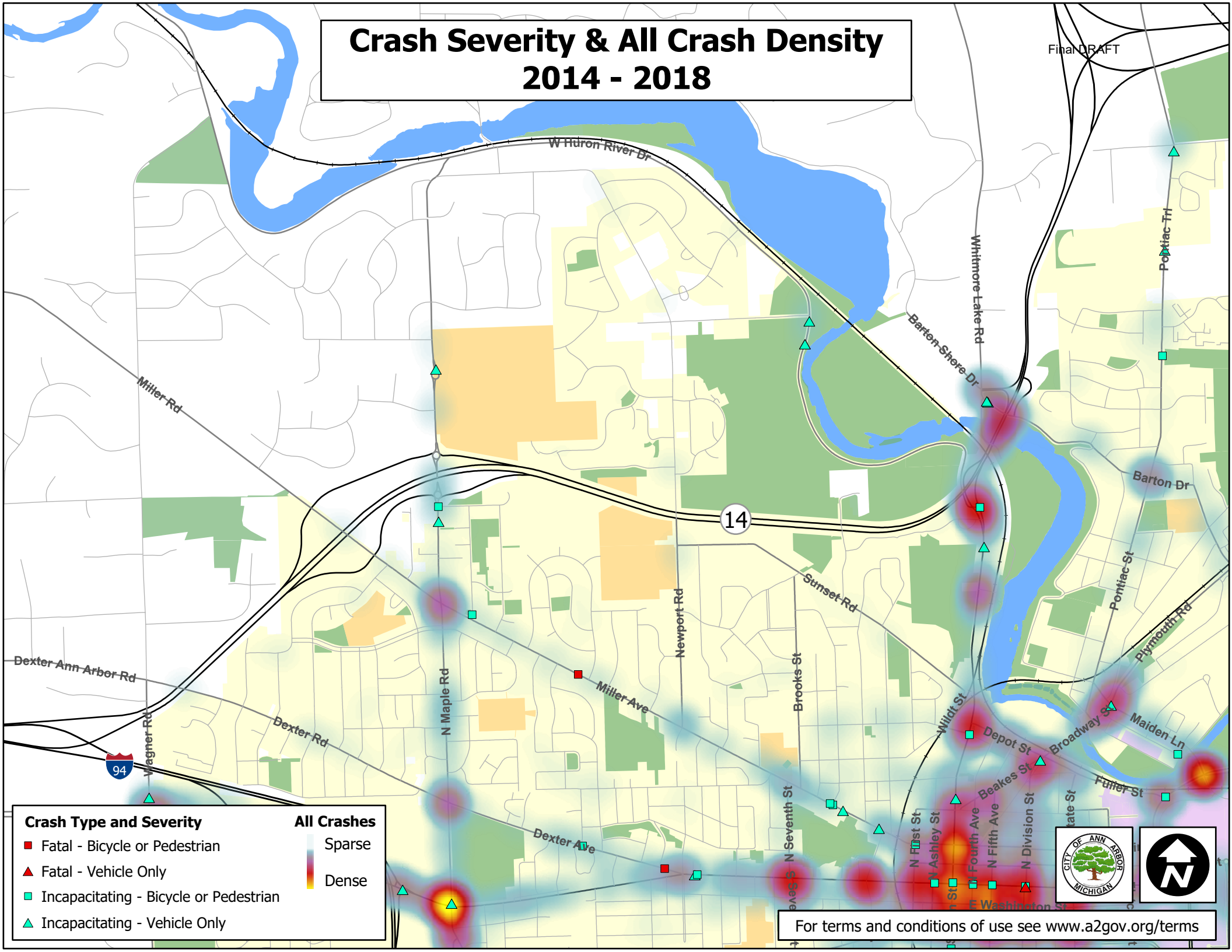
- Sparse
- Dense



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Crash Severity & All Crash Density 2014 - 2018

Final DRAFT



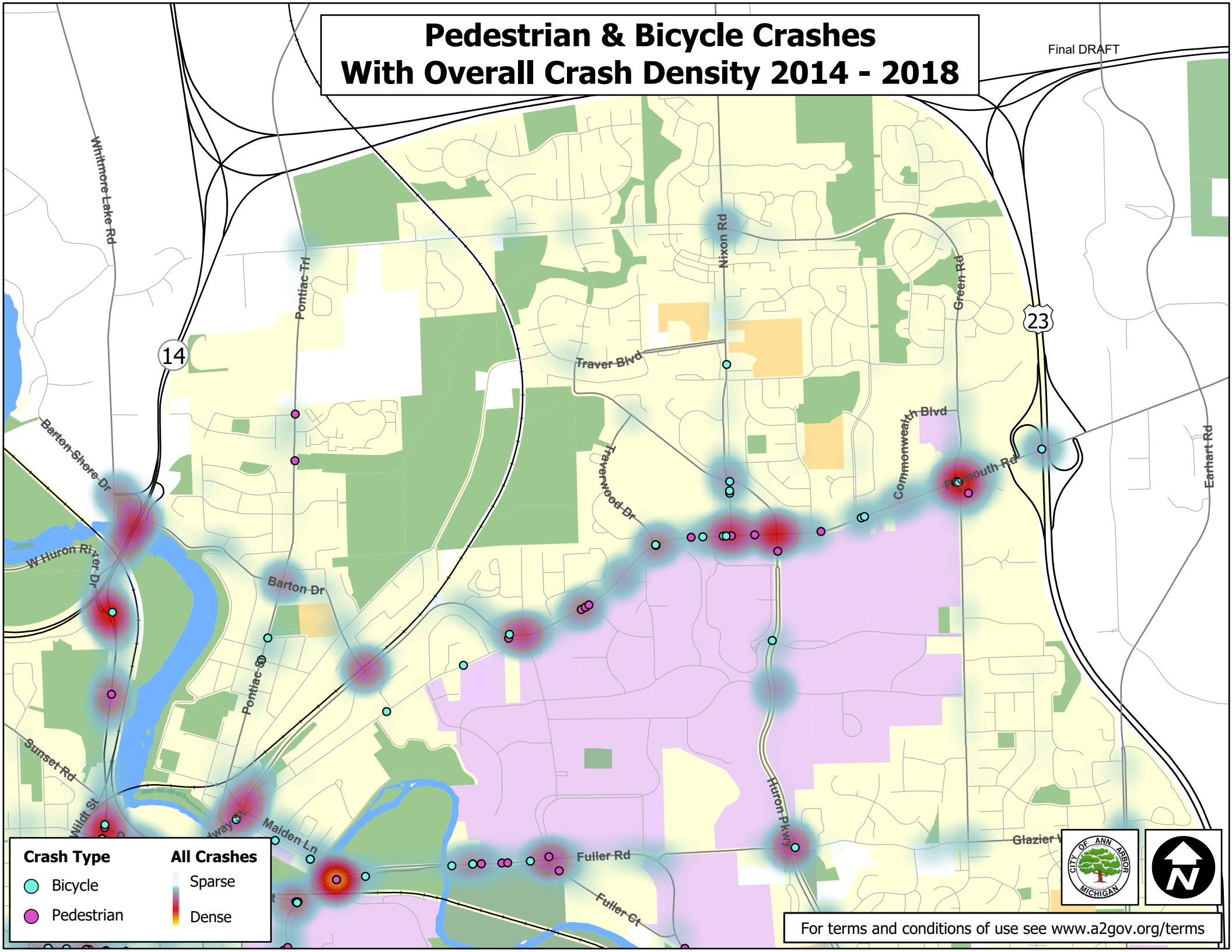
Crash Type and Severity		All Crashes	
■	Fatal - Bicycle or Pedestrian	Light Blue	Sparse
▲	Fatal - Vehicle Only	Yellow	Dense
■	Incapacitating - Bicycle or Pedestrian	Orange	
▲	Incapacitating - Vehicle Only	Red	



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Pedestrian & Bicycle Crashes With Overall Crash Density 2014 - 2018

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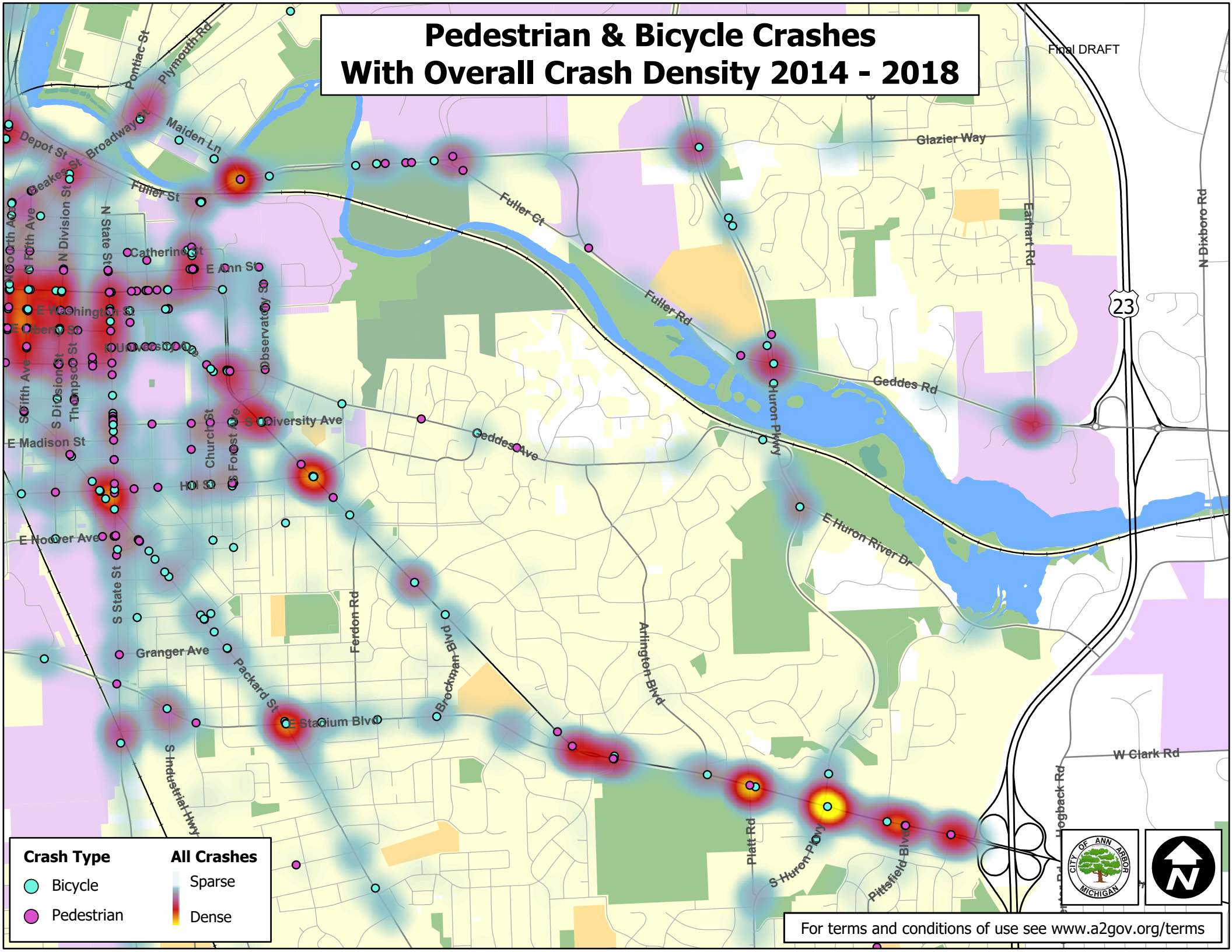
Crash Type		All Crashes	
●	Bicycle		Sparse
●	Pedestrian		Dense



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Pedestrian & Bicycle Crashes With Overall Crash Density 2014 - 2018

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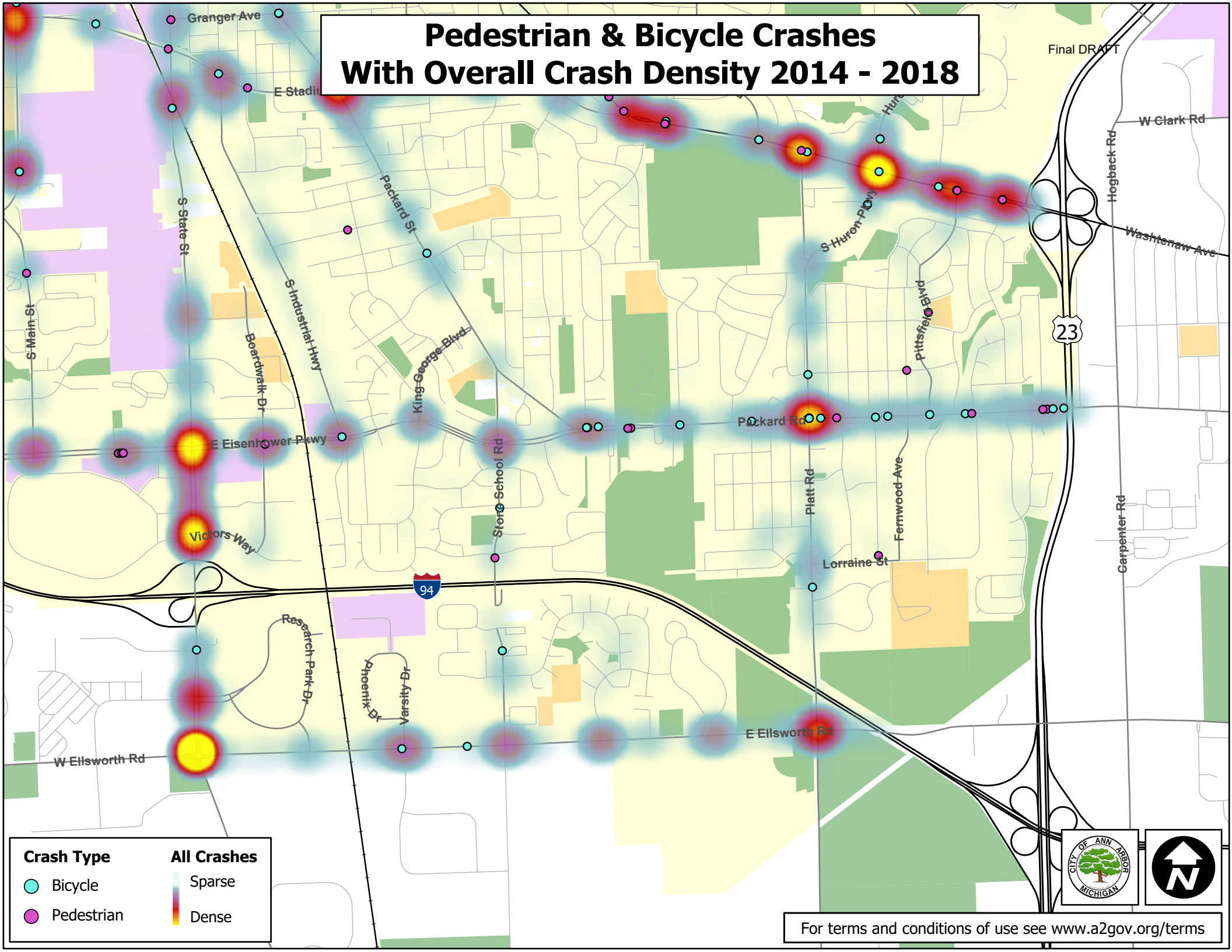
Crash Type		All Crashes	
●	Bicycle		Sparse
●	Pedestrian		Dense



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Pedestrian & Bicycle Crashes With Overall Crash Density 2014 - 2018

Final DRAFT

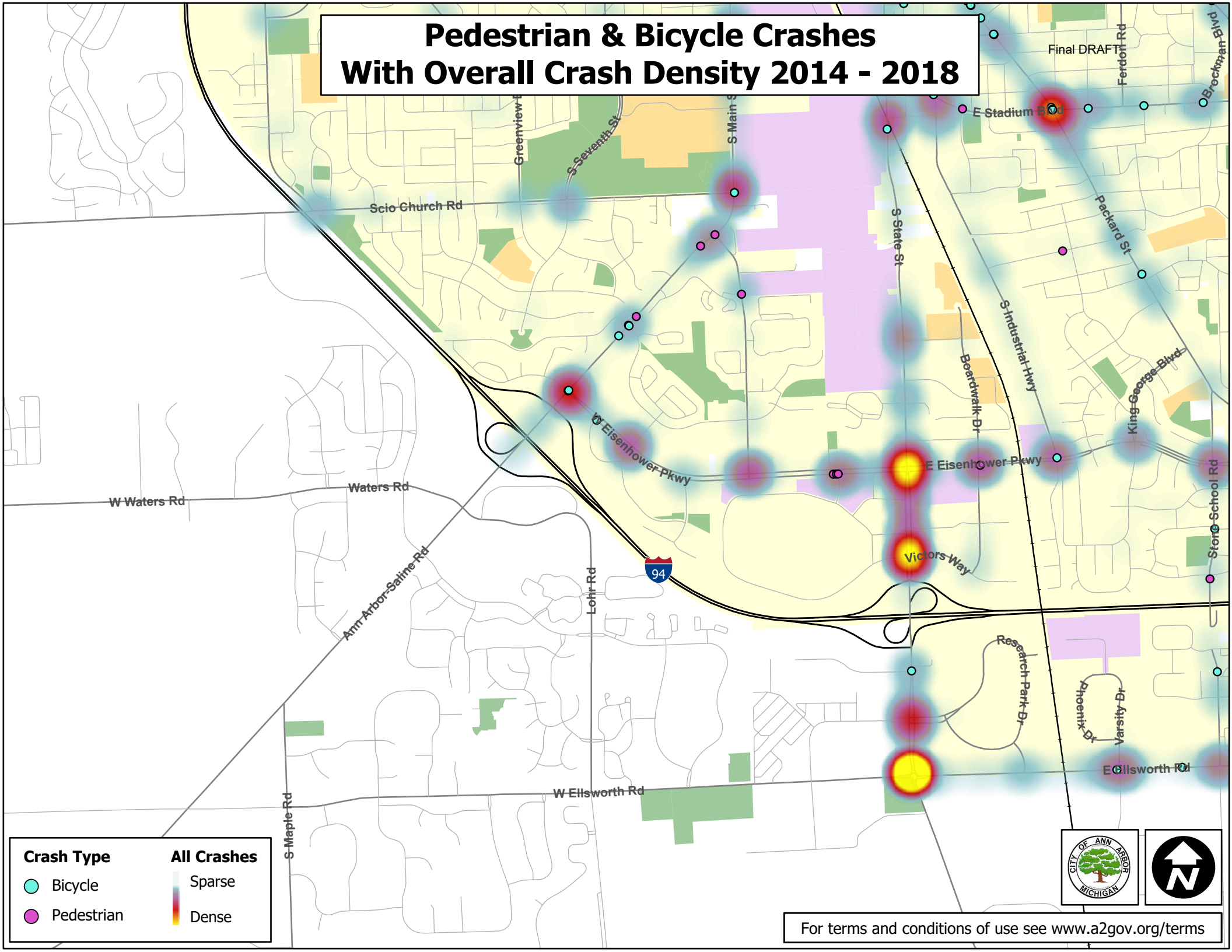


Crash Type		All Crashes	
●	Bicycle		Sparse
●	Pedestrian		Dense



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Pedestrian & Bicycle Crashes With Overall Crash Density 2014 - 2018

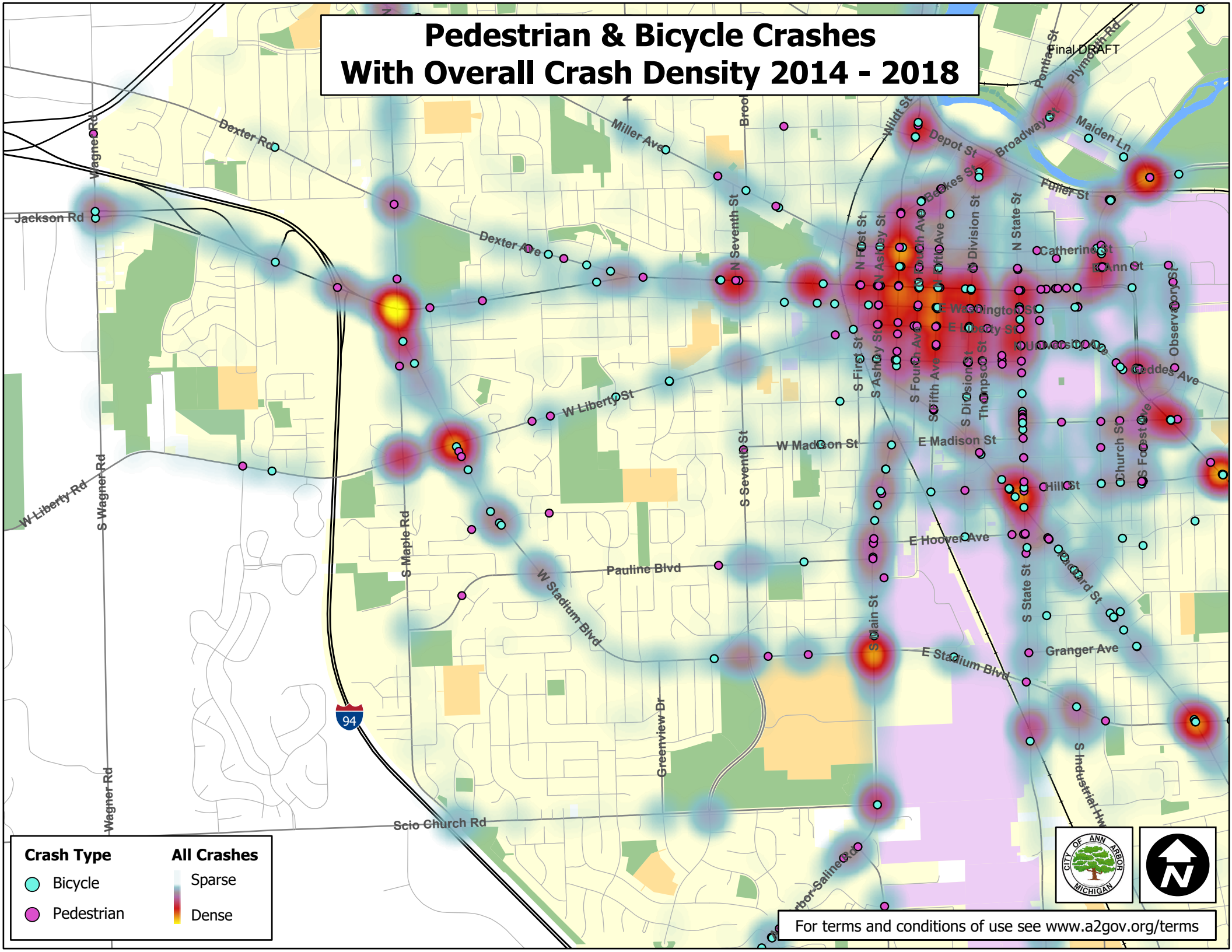


Crash Type		All Crashes	
●	Bicycle		Sparse
●	Pedestrian		Dense



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Pedestrian & Bicycle Crashes With Overall Crash Density 2014 - 2018



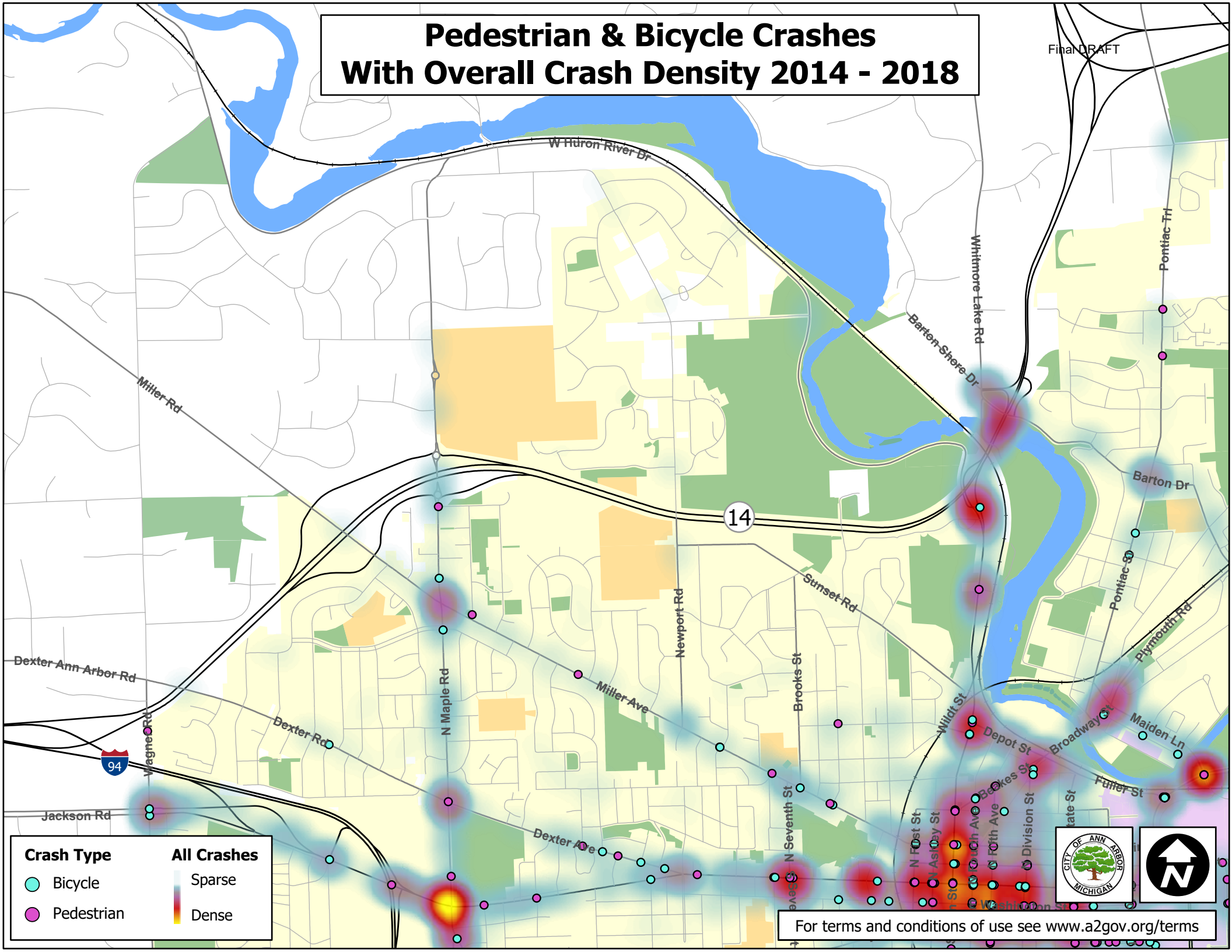
Crash Type		All Crashes	
●	Bicycle		Sparse
●	Pedestrian		Dense





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Pedestrian & Bicycle Crashes With Overall Crash Density 2014 - 2018

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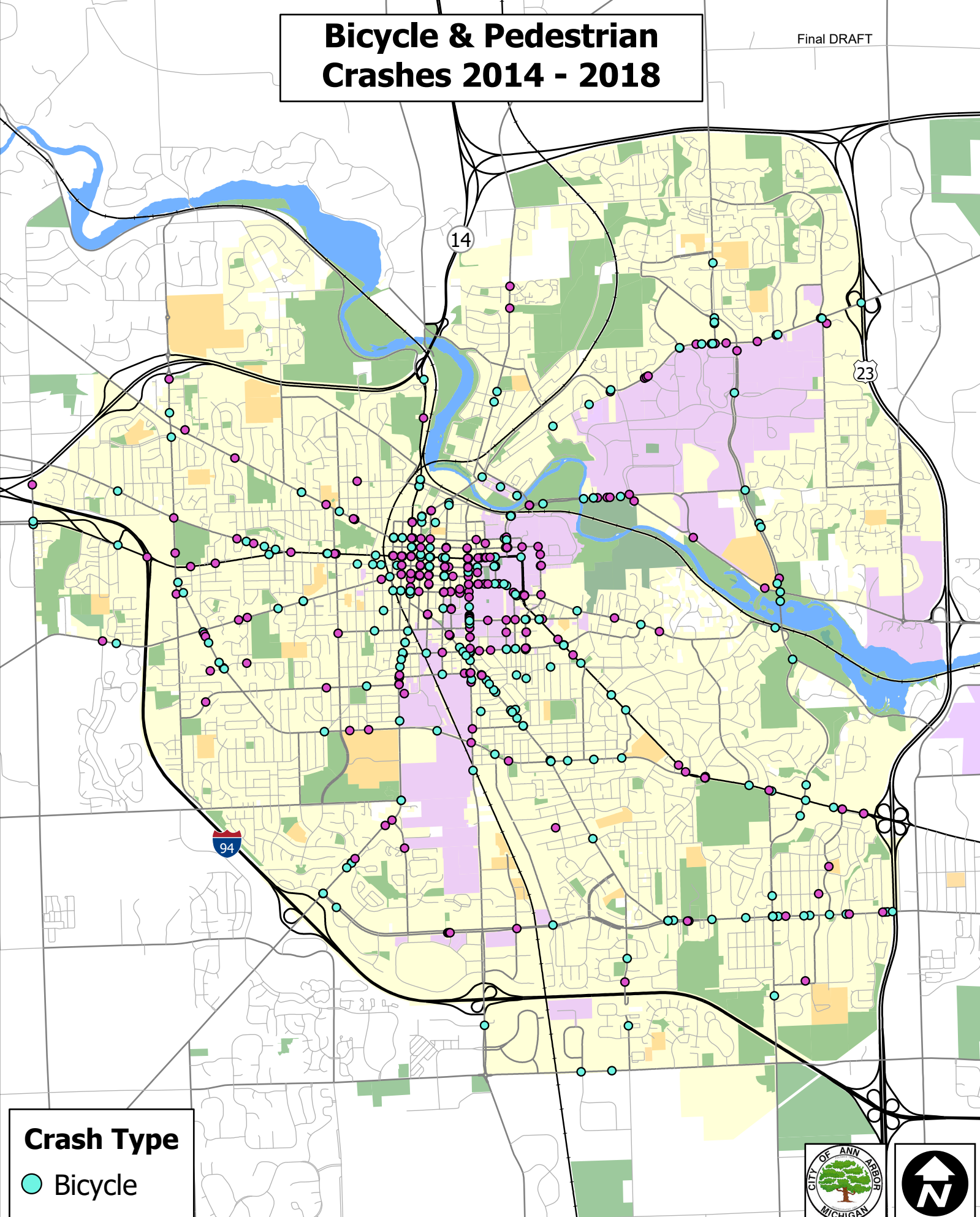
Crash Type		All Crashes	
	Bicycle		Sparse
	Pedestrian		Dense



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Bicycle & Pedestrian Crashes 2014 - 2018

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Crash Type

 Bicycle

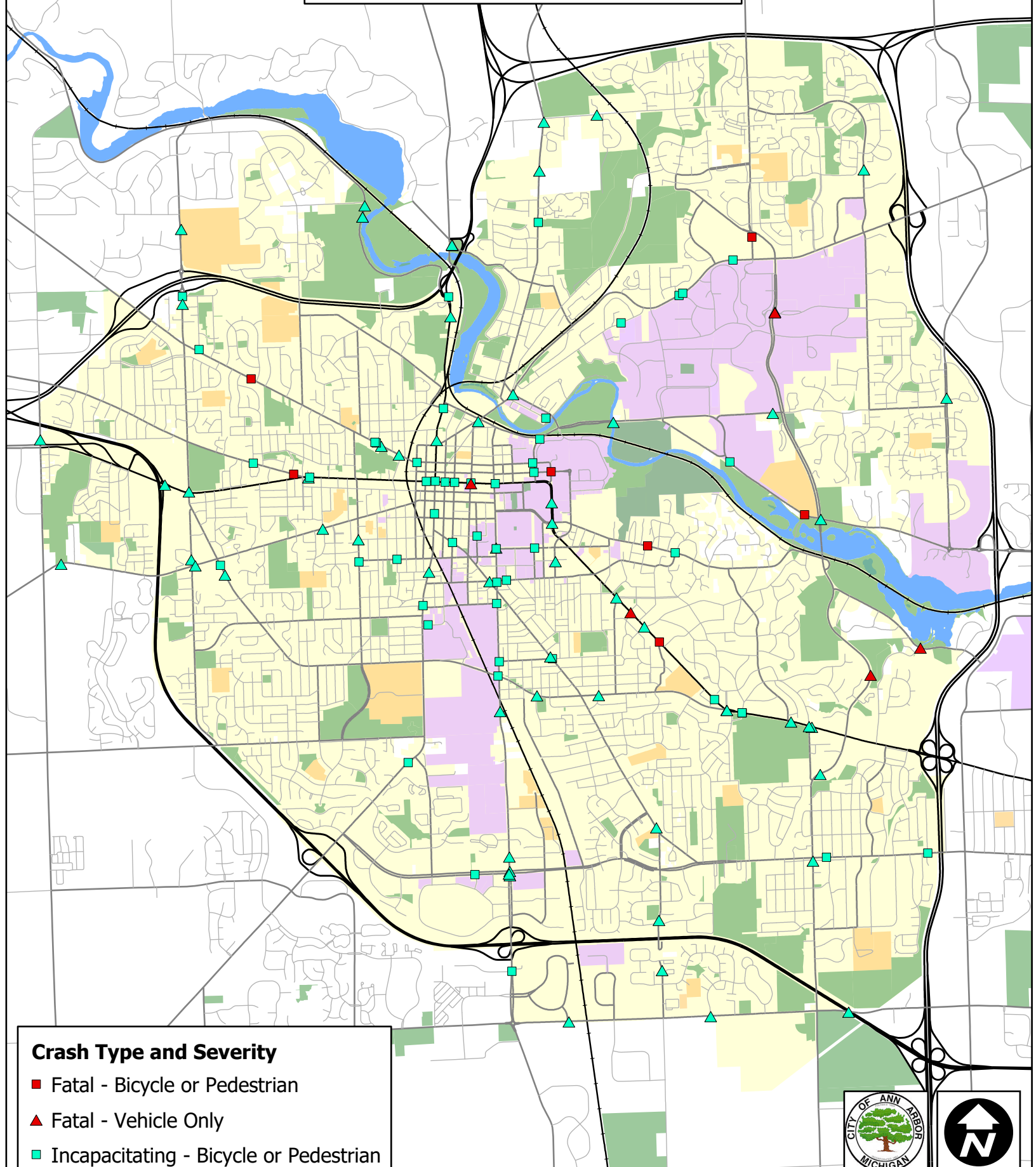
 Pedestrian



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Fatal or Incapacitating Crashes 2014 - 2018

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Crash Type and Severity

- Fatal - Bicycle or Pedestrian
- ▲ Fatal - Vehicle Only
- Incapacitating - Bicycle or Pedestrian
- ▲ Incapacitating - Vehicle Only



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