Michigan Fitness Foundation Multimedia Pedestrian Safety Education Campaign

TOOLE DESIGN

Pedestrian Crash Analysis

7/11/2022

TOOLE DESIGN

Agenda

- Selection Process
- Key Crash Analysis Findings for Ann Arbor
  - Who?
  - Where?
  - When?
  - Why?

Selection Process

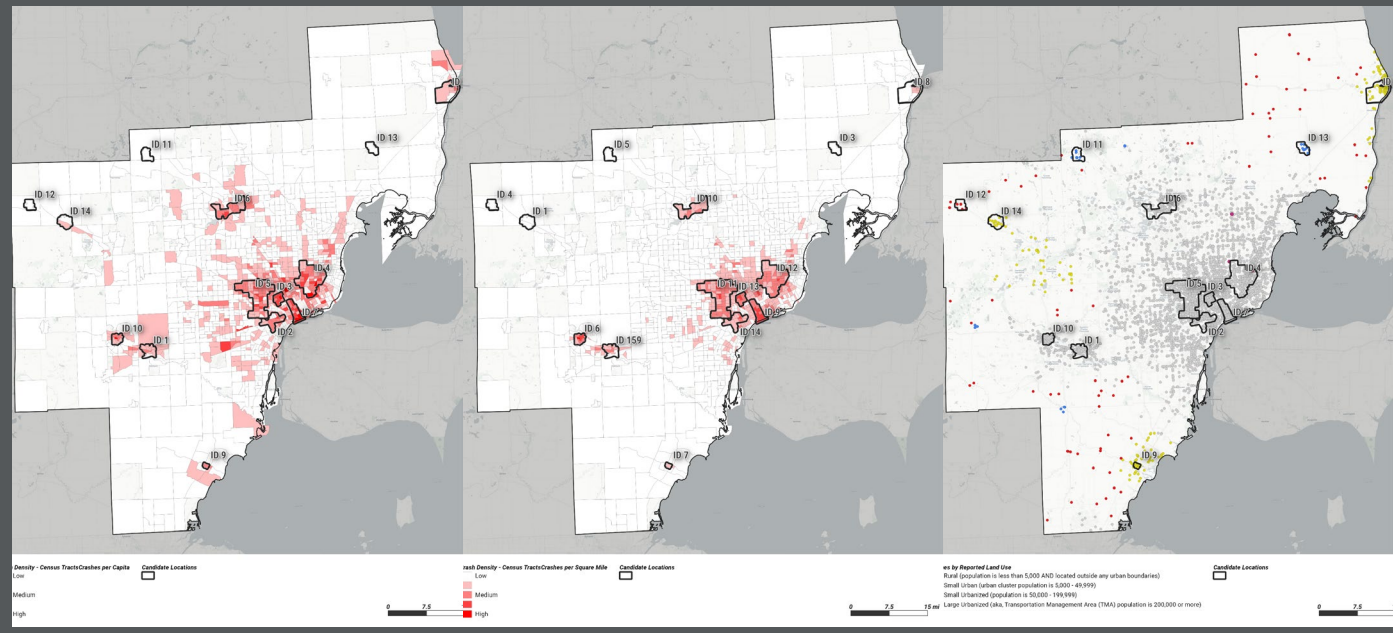
TOOLE DESIGN

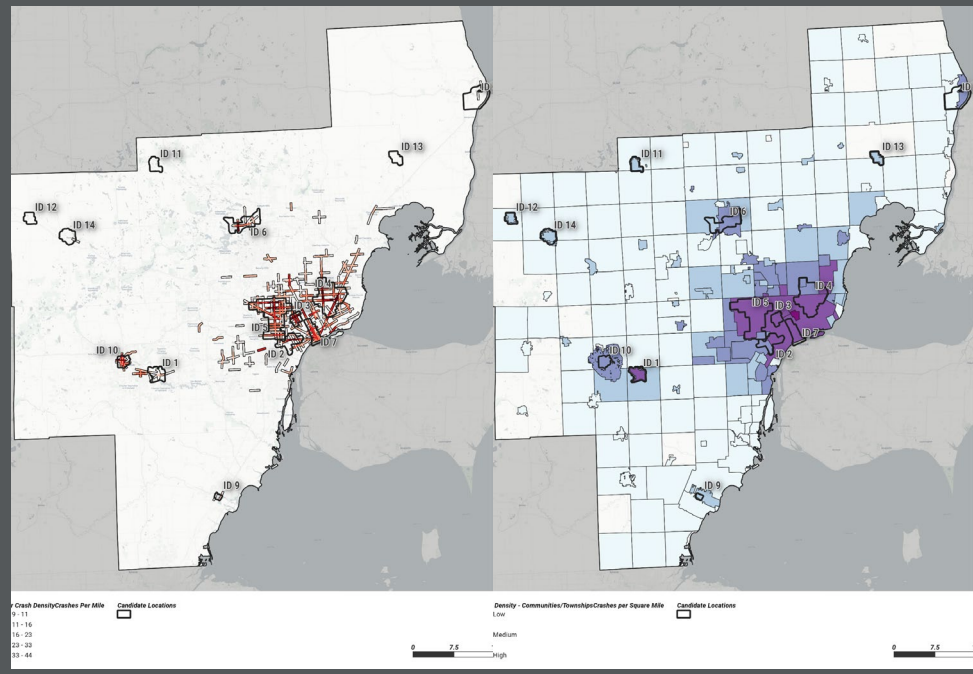
Candidate Locations

Identified 14 initial locations

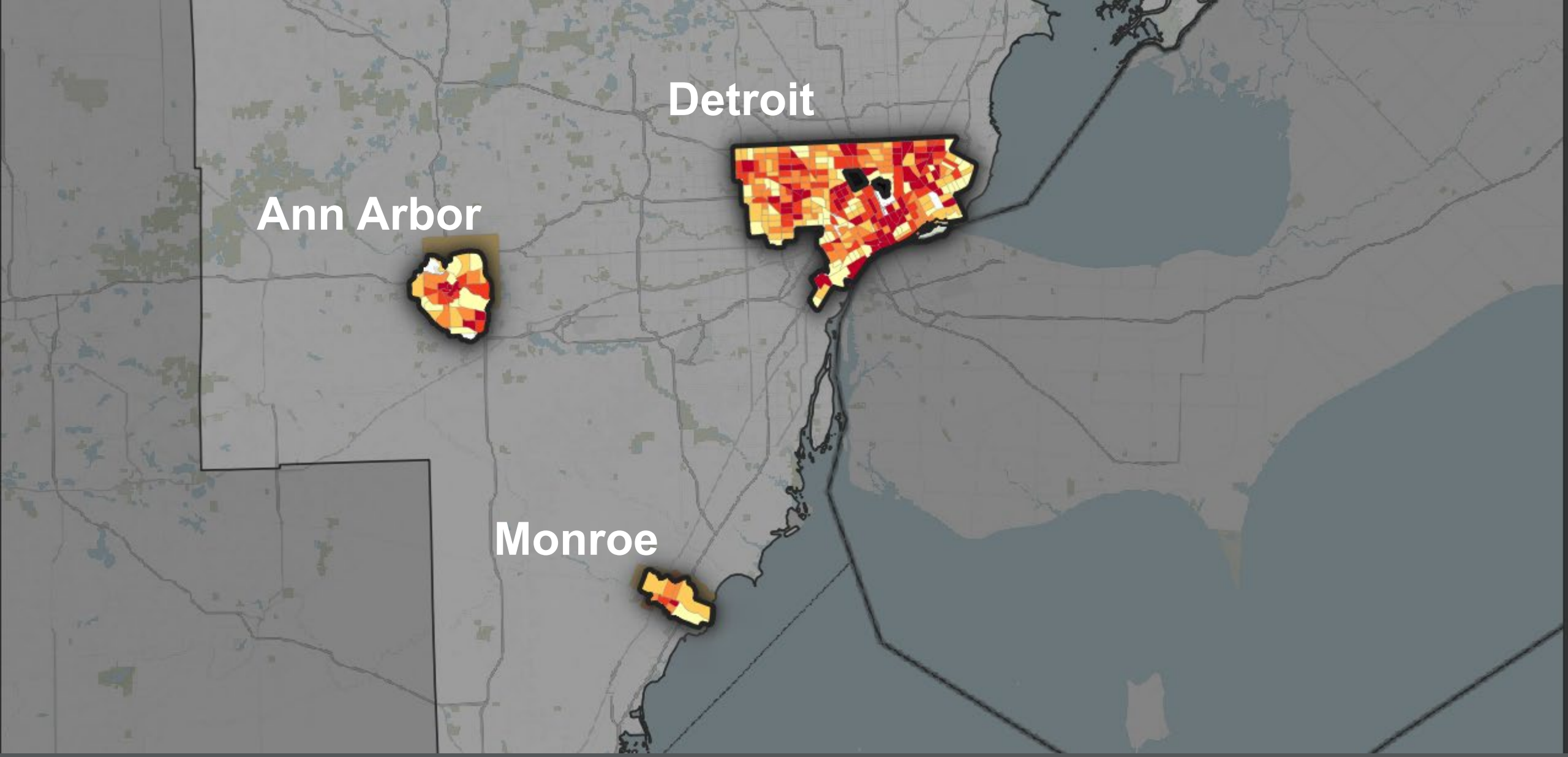
Spatial Analyses:

- Crash density per square mile, Census tracts
- Crashes per capita, Census tracts
- Crash density by community/township
- Linear crash density (sliding windows analysis)
- Crashes by reported land use type





TOOLE DESIGN



TOOLE DESIGN

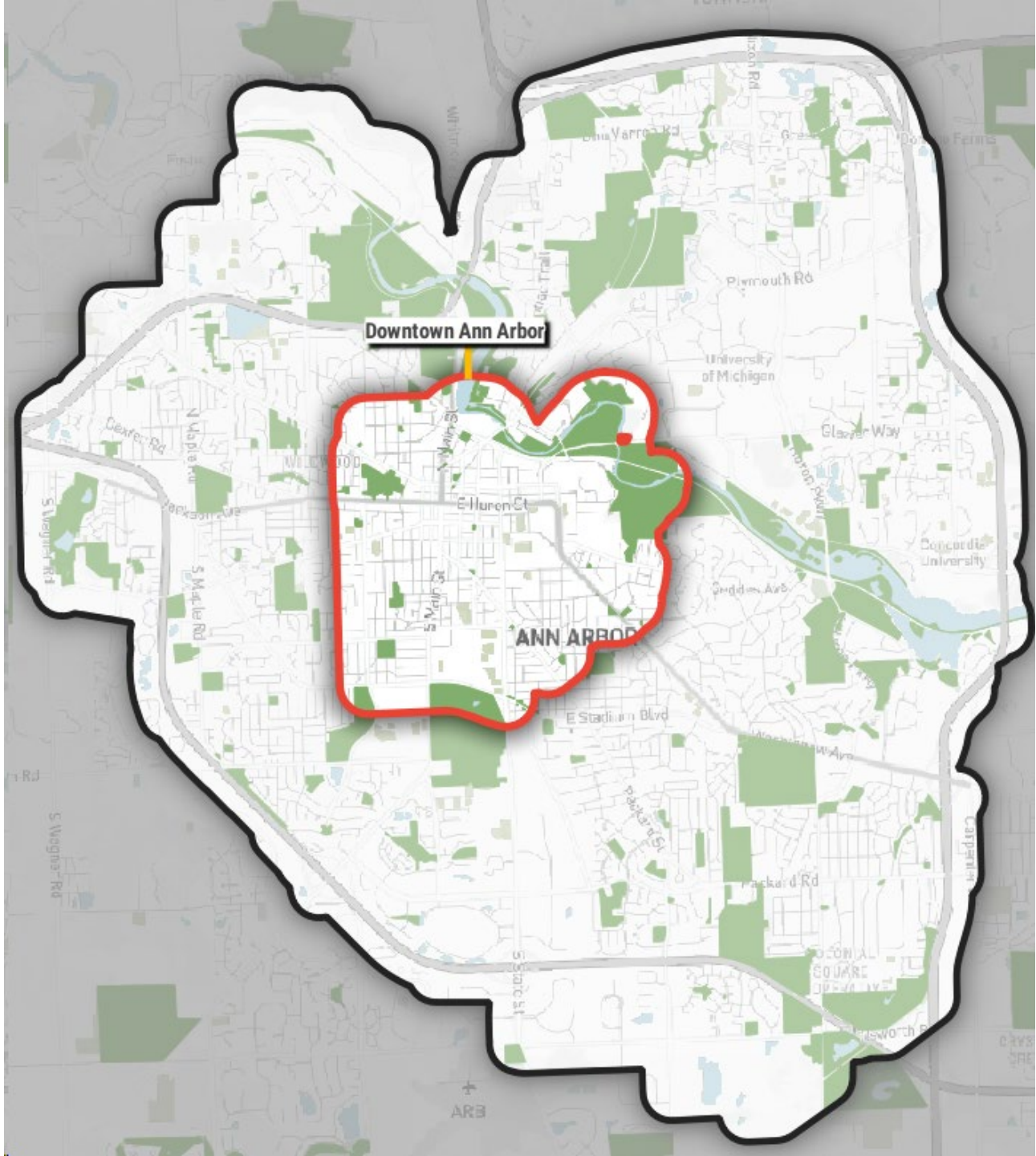
Candidate Communities: *Detroit, Ann Arbor, and Monroe*

Key Crash Analysis Findings for Ann Arbor

TOOLE DESIGN

Focus Communities – Ann Arbor

- Communities with highest weighted crash aggregates
- Ann Arbor 2015-2019.
  - 309 crashes
  - 5 fatal crashes
  - 31 serious injury crashes



TOOLE DESIGN

Key Terms and Concepts

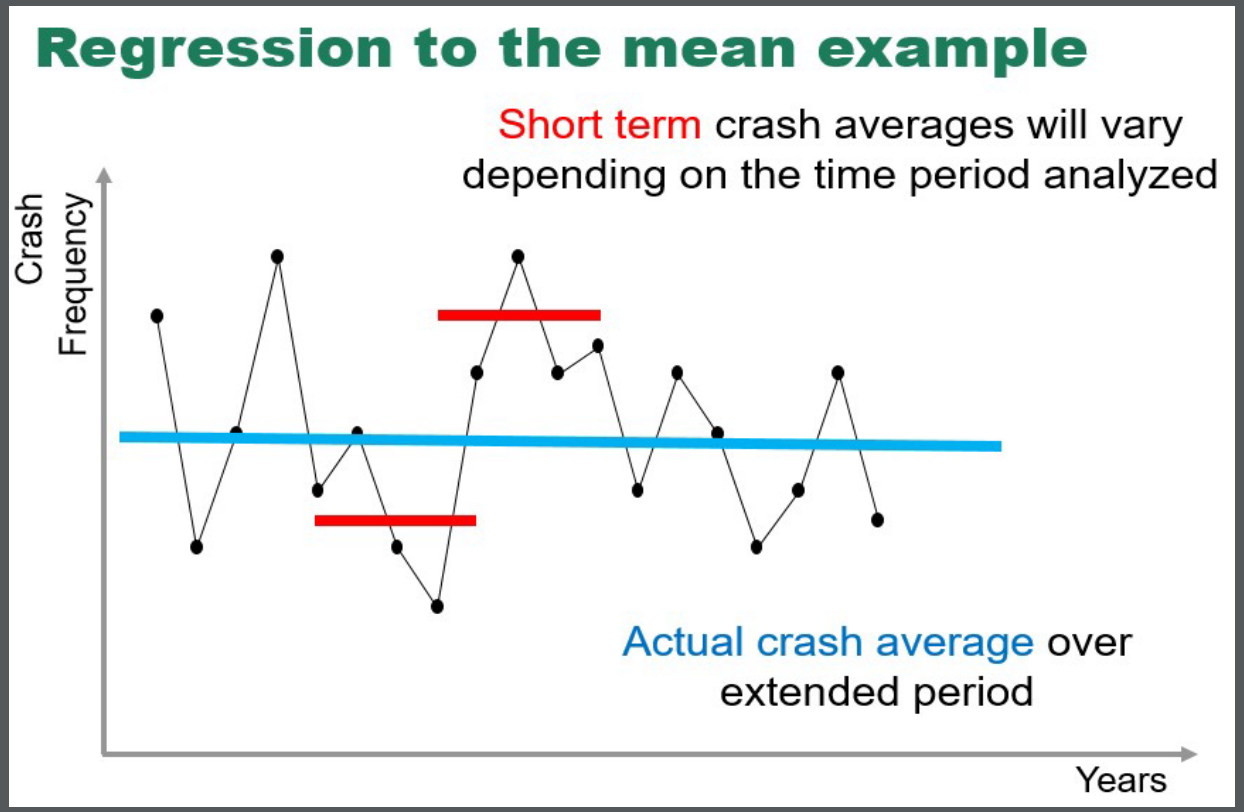
KSI or KA = Killed or Serious Injury

Sample Size = number of reported crashes

Regression Towards the Mean

Crash Data Limitations:

- Reporting rates
- Reporting errors
- Reporting bias



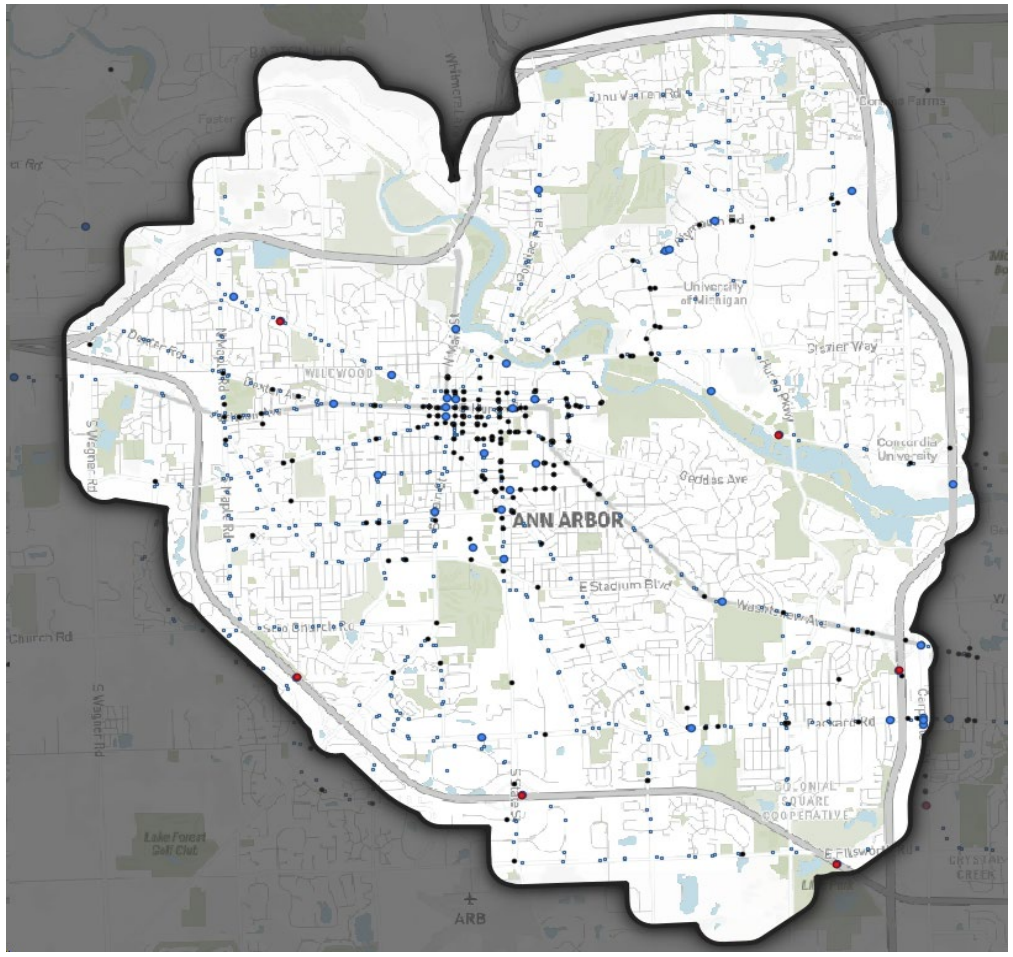
TOOLE DESIGN

Who?

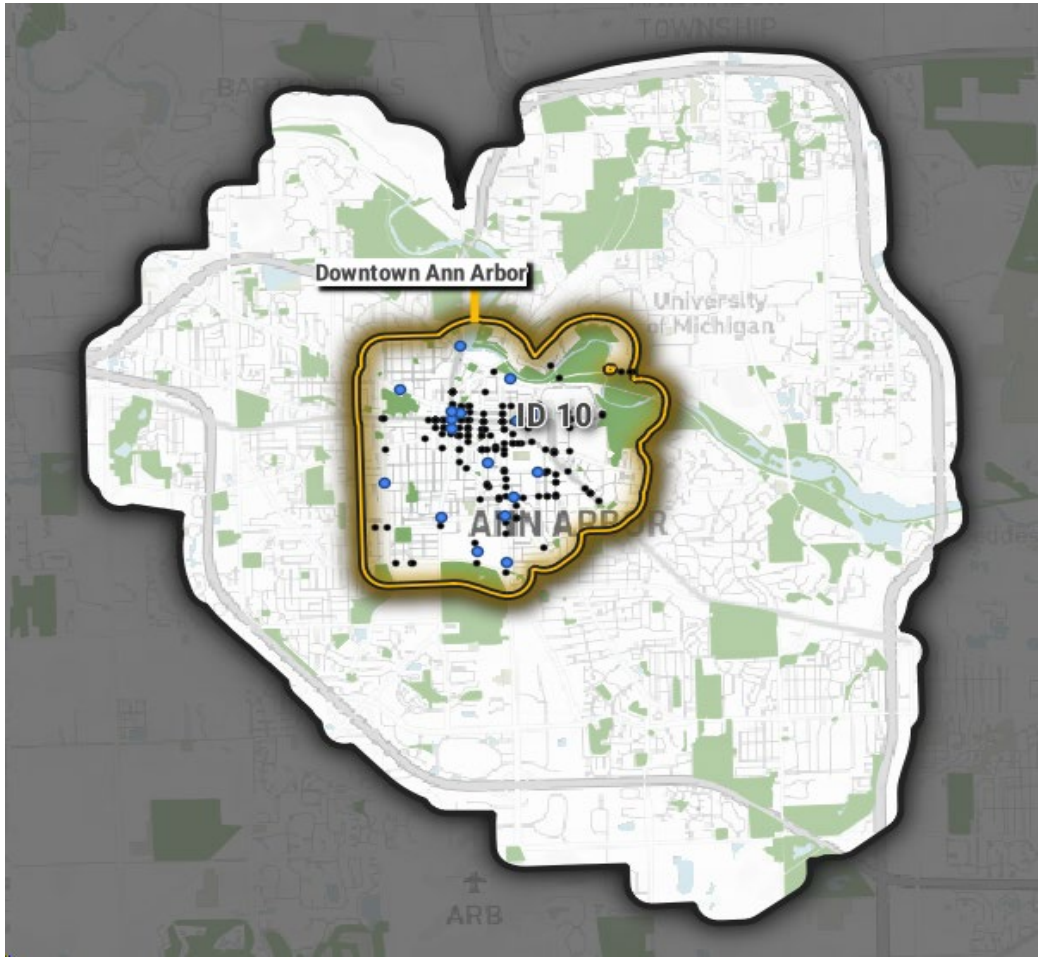
TOOLE DESIGN

Victims/Drivers Characteristics

Citywide Stats



Focus Area Stats



Victim Age

Citywide	Focus Area

• Overrepresented Pedestrian Victims by age cohort
  • 20-29
  • 50-59
• Overrepresented Pedestrian KSI Victims by age cohort
  • 20-24, 40-44, **50-54**, 65-69
	• Closely resembles citywide trend
	• 20-29 and 50-59 aged pedestrians are the most overrepresented age cohorts.

TOOLE DESIGN

Driver Age

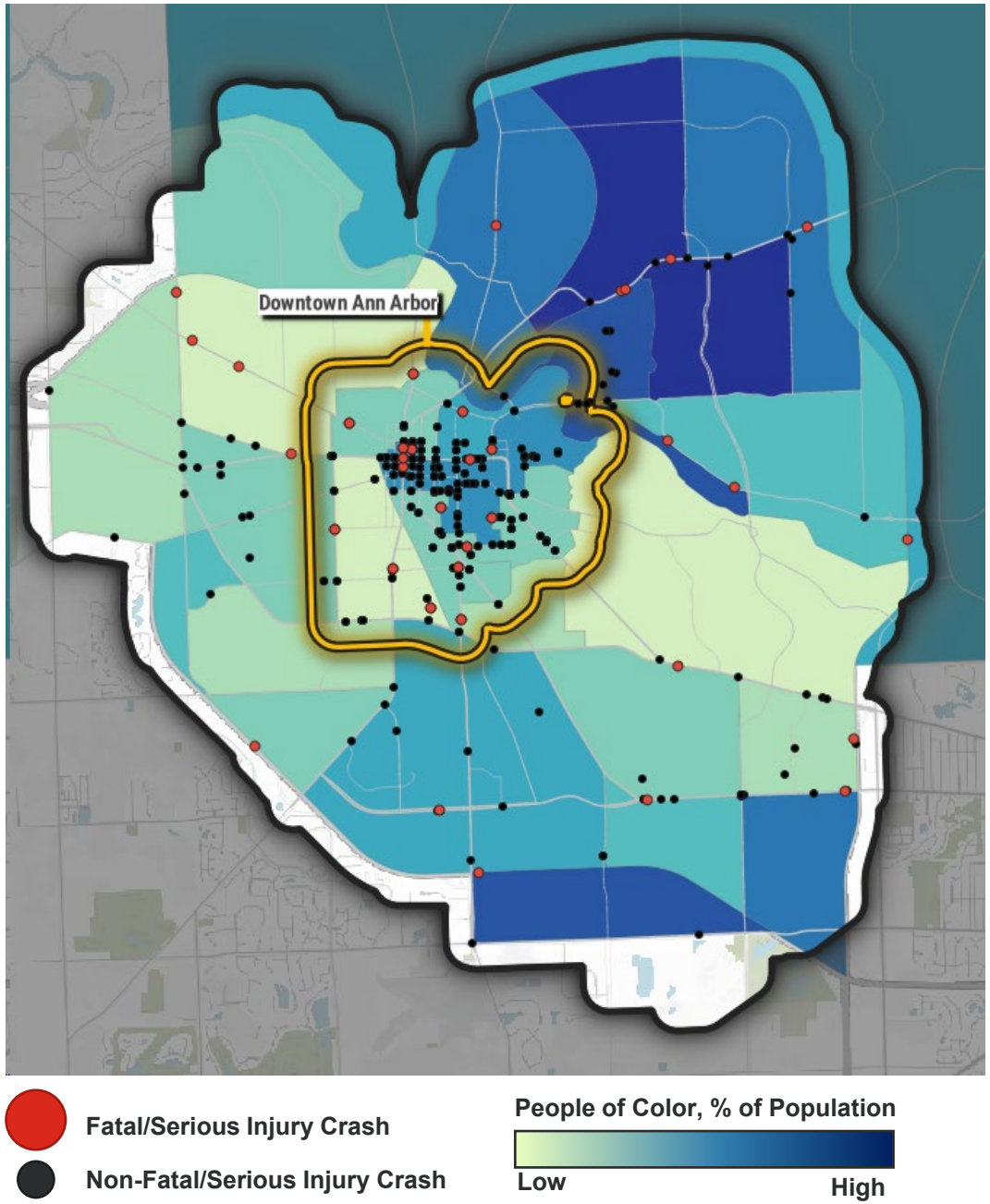
Citywide	Focus Area

• Overrepresented Drivers by age cohort
  • 20-44
• Overrepresented Drivers involved in Pedestrian KSI crash by age cohort
  • 20-39
	• Drivers aged between 35-64 are the most overrepresented age cohort involved in pedestrian crashes
	• Drivers aged between 25-29 and 45-54 are most overrepresented in fatal or serious injury crashes
	• Departure from citywide statistic

TOOLE DESIGN

Communities of Color

- Not strongly associated
- Majority of crashes occurred downtown and near University of Michigan

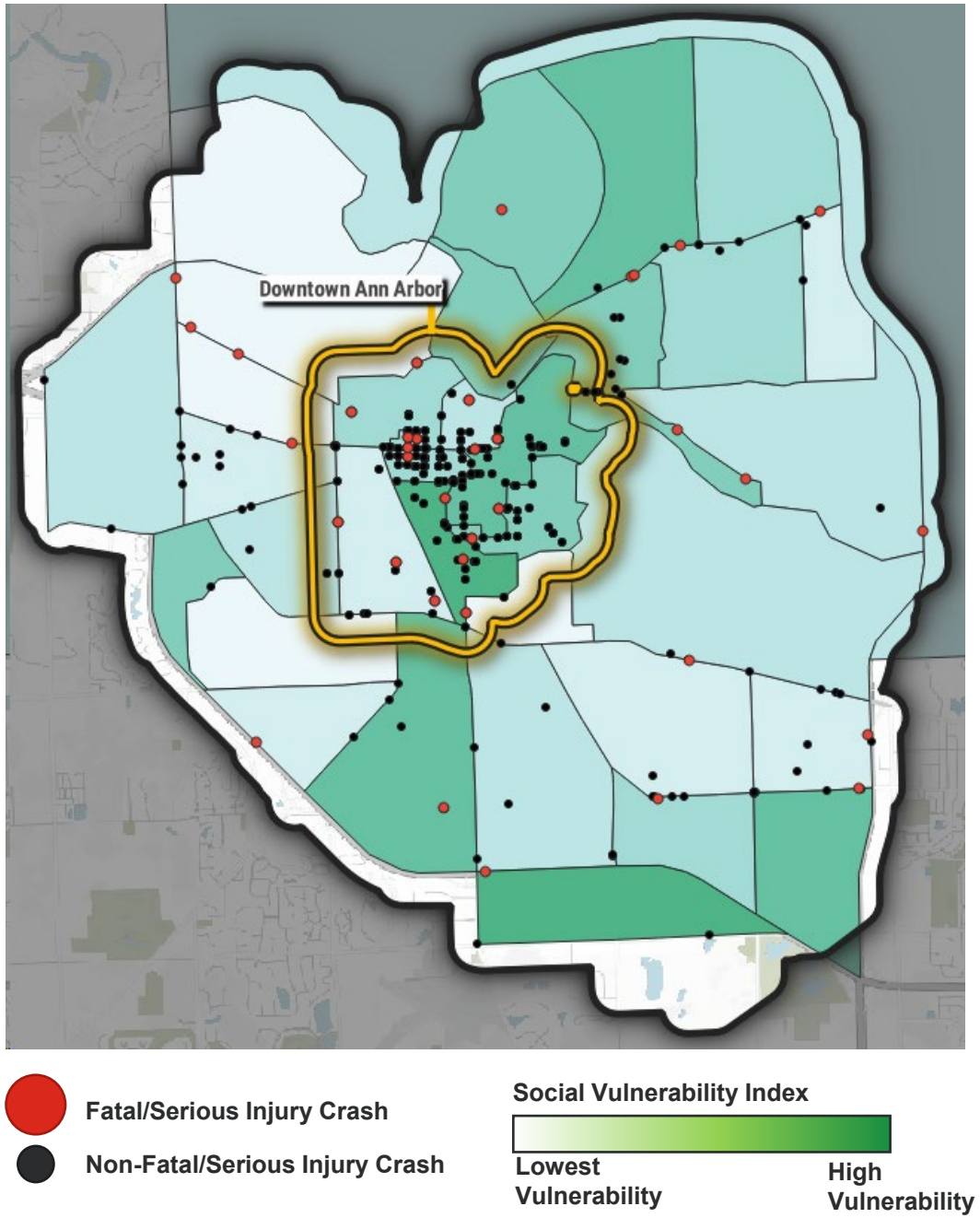


TOOLE DESIGN

CDC Social Vulnerability Index*

- Crashes mostly distributed throughout Social Vulnerability Index.

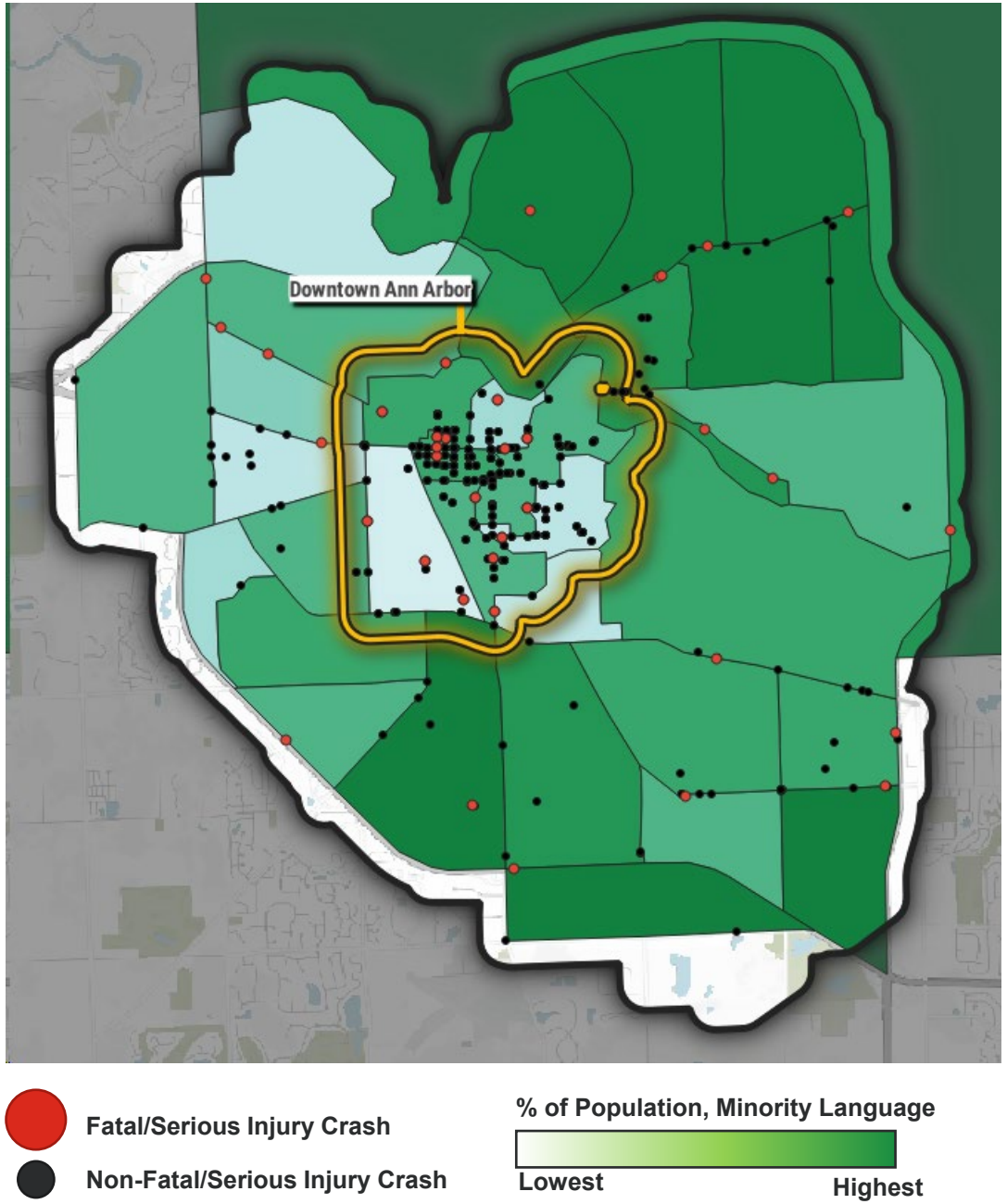
*Refers to the potential negative effects on communities caused by external stresses on human health. Such stresses include natural or human-caused disasters, or disease outbreaks.



TOOLE DESIGN

CDC Minority Language

- Areas with a greater share of non-English speaking community members have a higher frequency of crashes



TOOLE DESIGN

Key Takeaways

- Pedestrians aged 20-29 and 50-59 overrepresented, particularly 50-54 citywide.
- Drivers aged 20-44 years are overrepresented citywide; focus area drivers older.
- Areas with a higher share of non-English speaking community members have a higher frequency of crashes.

TOOLE DESIGN

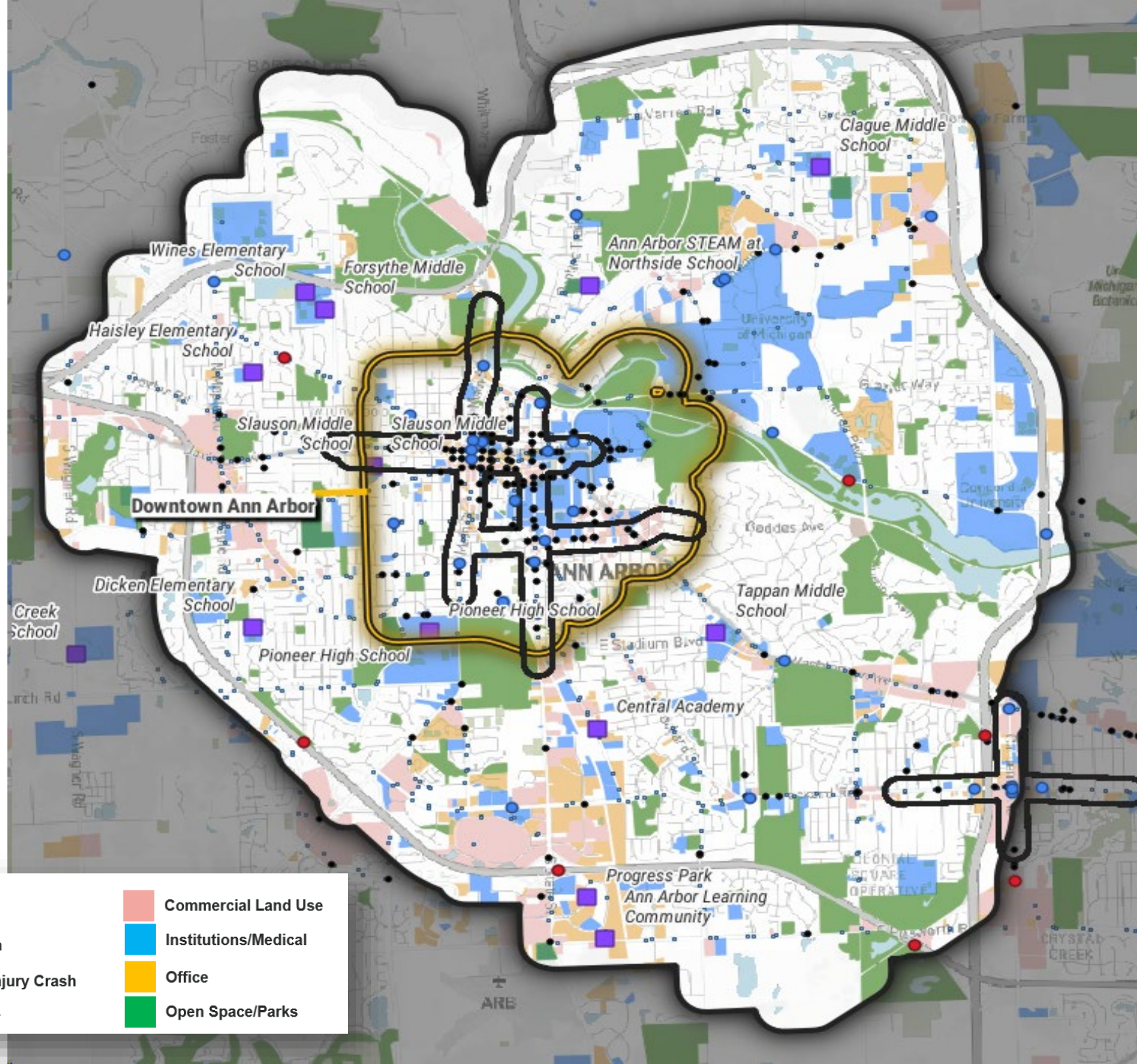
Where?

Where did these crash occur?

TOOLE DESIGN

Land Uses

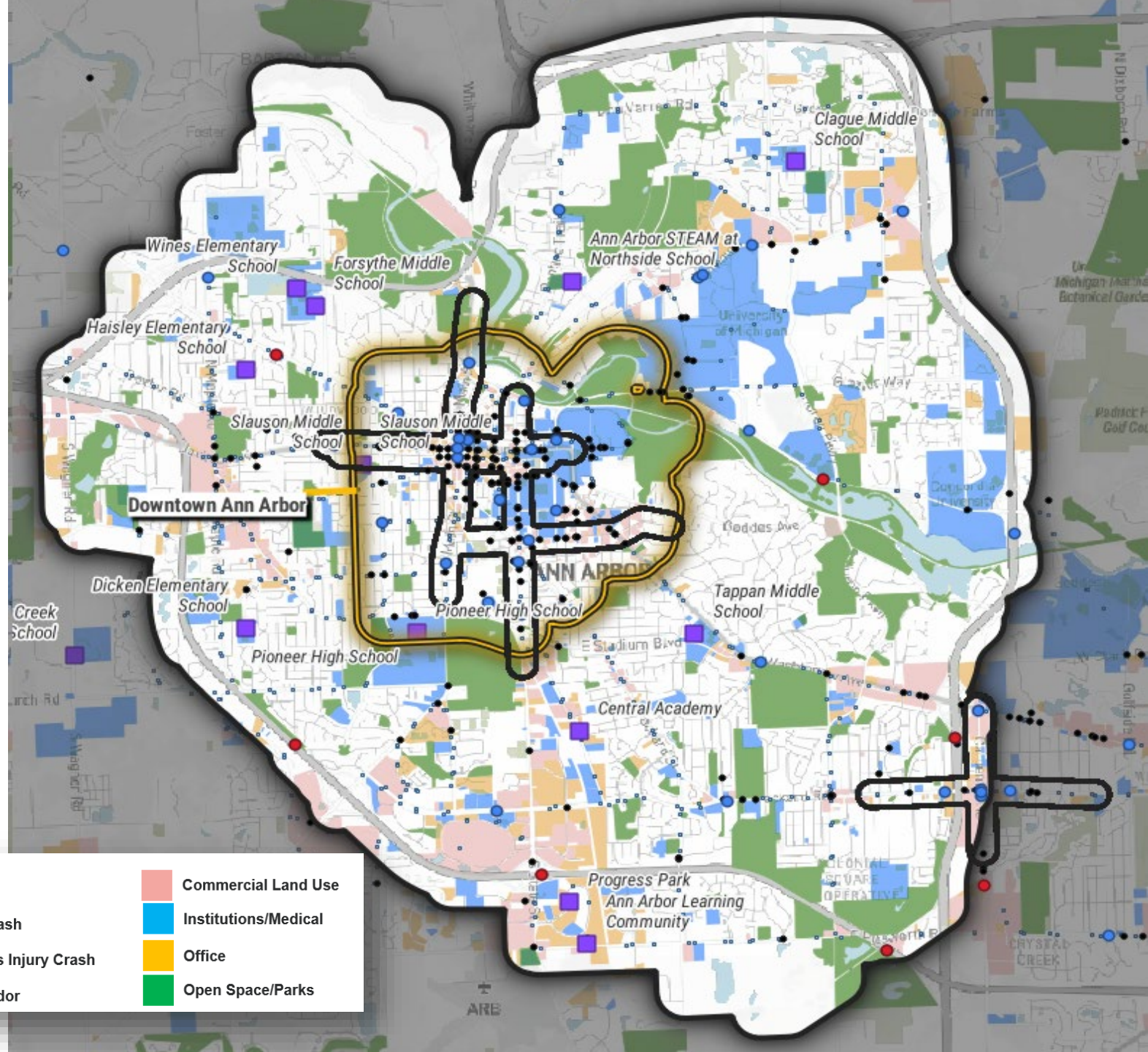
- Trip generating/attracting land uses
- Commercial corridors
- University of Michigan
- Transit stops



TOOLE DESIGN

Transit

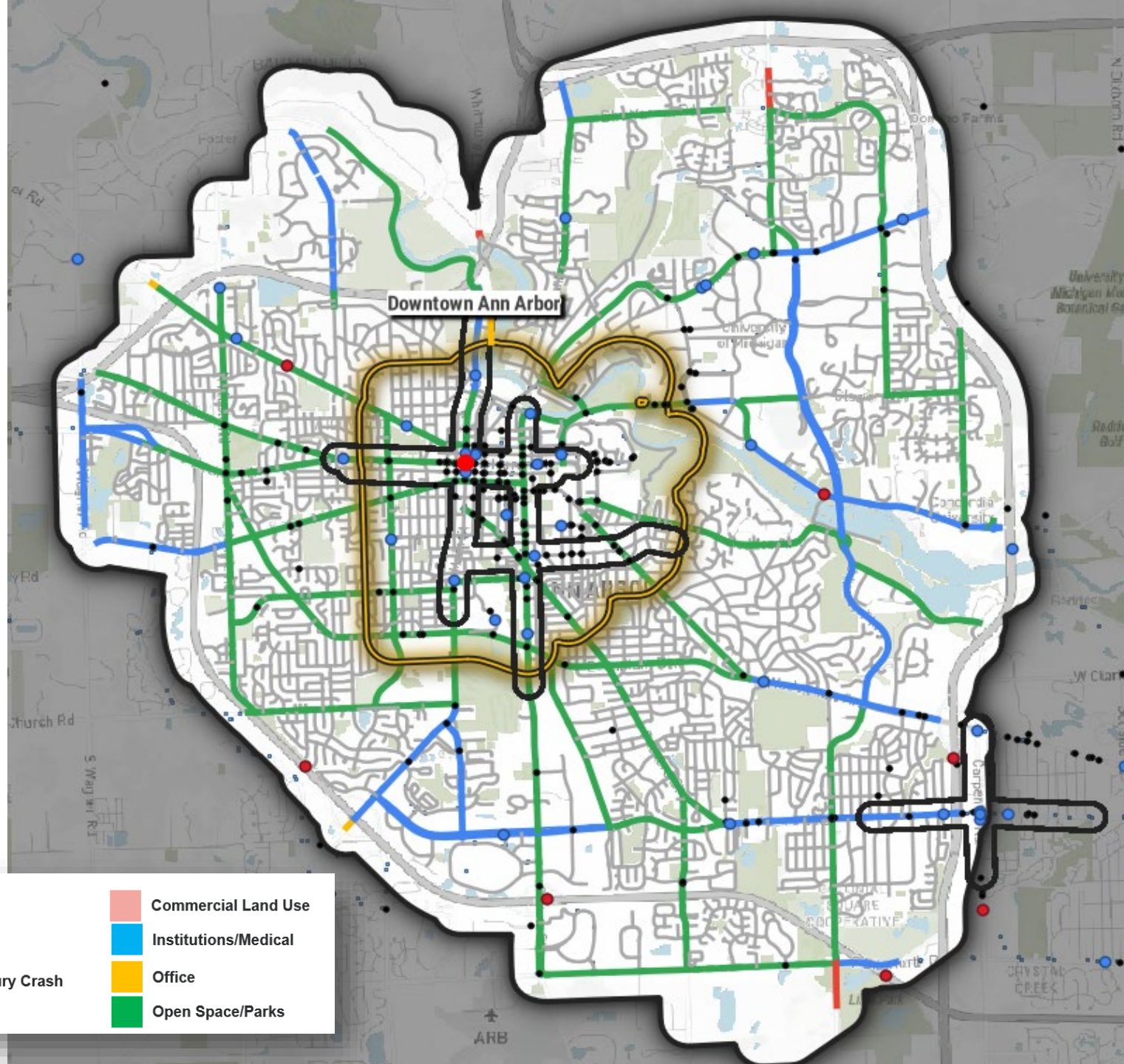
- Inside the focus area, a higher share of crashes occurred at bus stops.



TOOLE DESIGN

Road Speed—Citywide

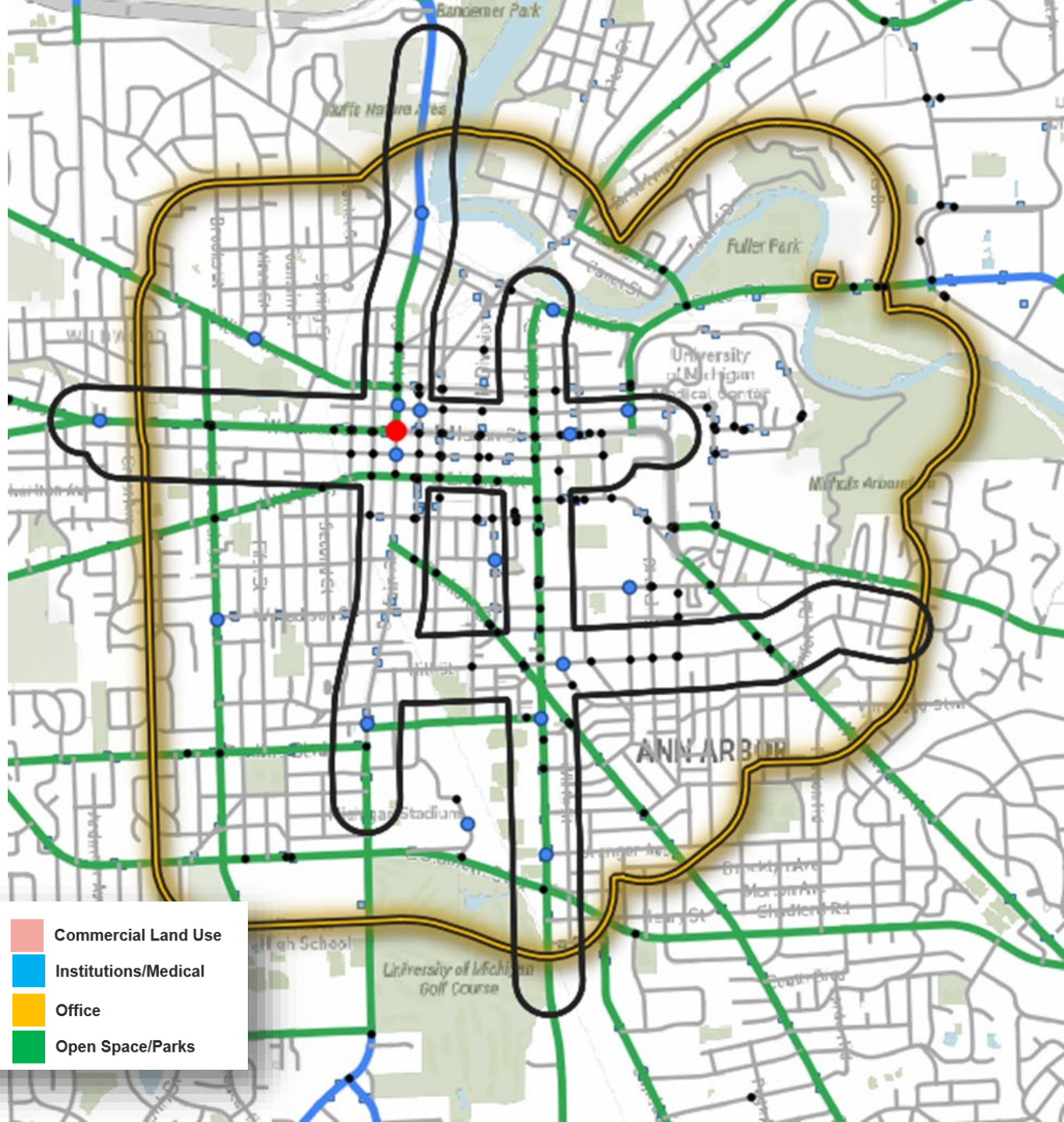
- Higher crashes per mile on higher speed roads.
- More total crashes on lower speed roads but very low crash rate per mile.



TOOLE DESIGN

Road Speed—Focus Area

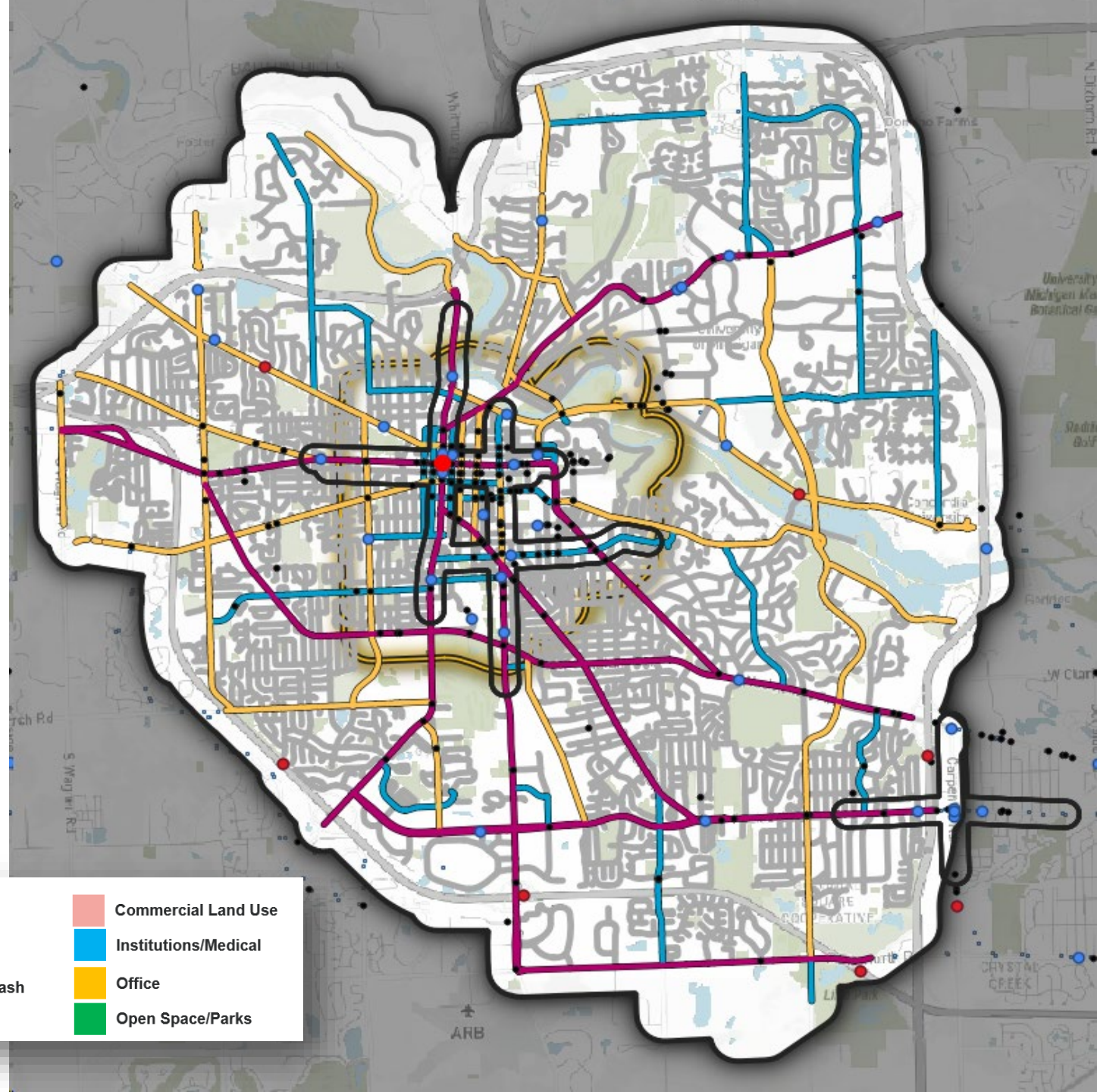
- Higher crashes per mile on higher speed roads.
- More total crashes on lower speed roads but very low crash rate per mile.



TOOLE DESIGN

Arterials—Citywide

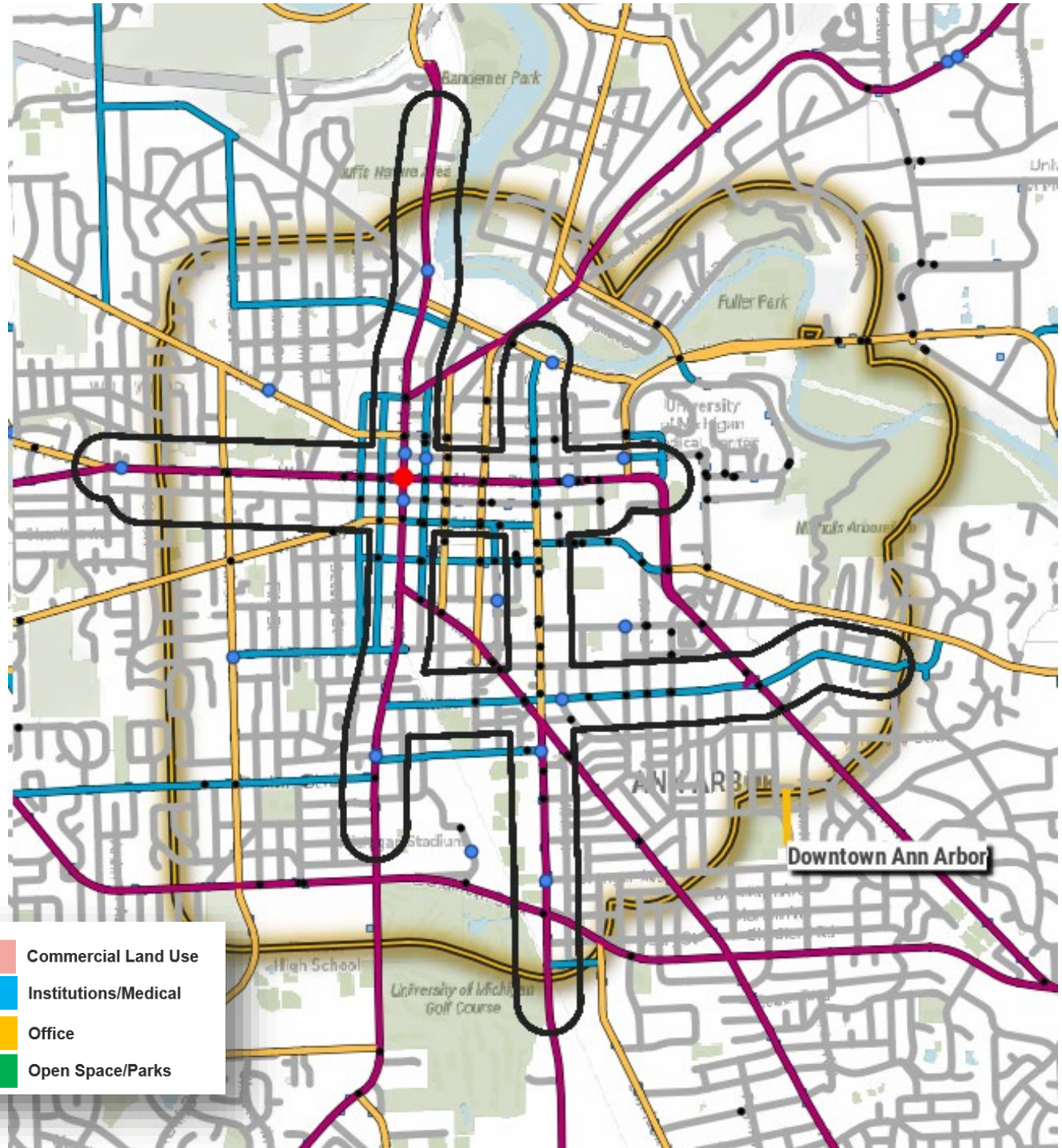
- Largest share of cashes
- Highest rate of crashes per mile



TOOLE DESIGN

Arterials—Focus Area

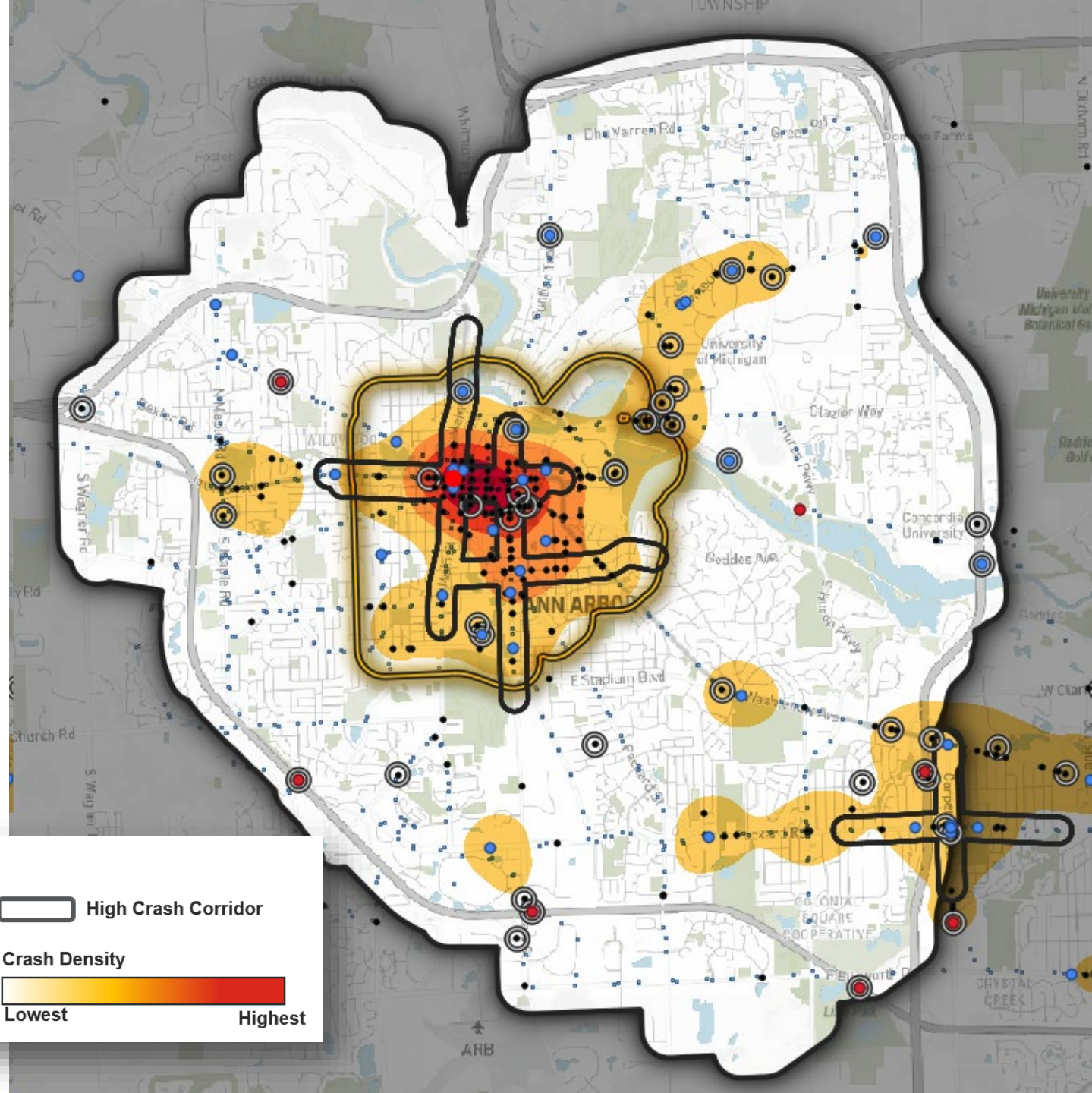
- Largest share of cashes
- Highest rate of crashes per mile



TOOLE DESIGN

Intersections—Citywide

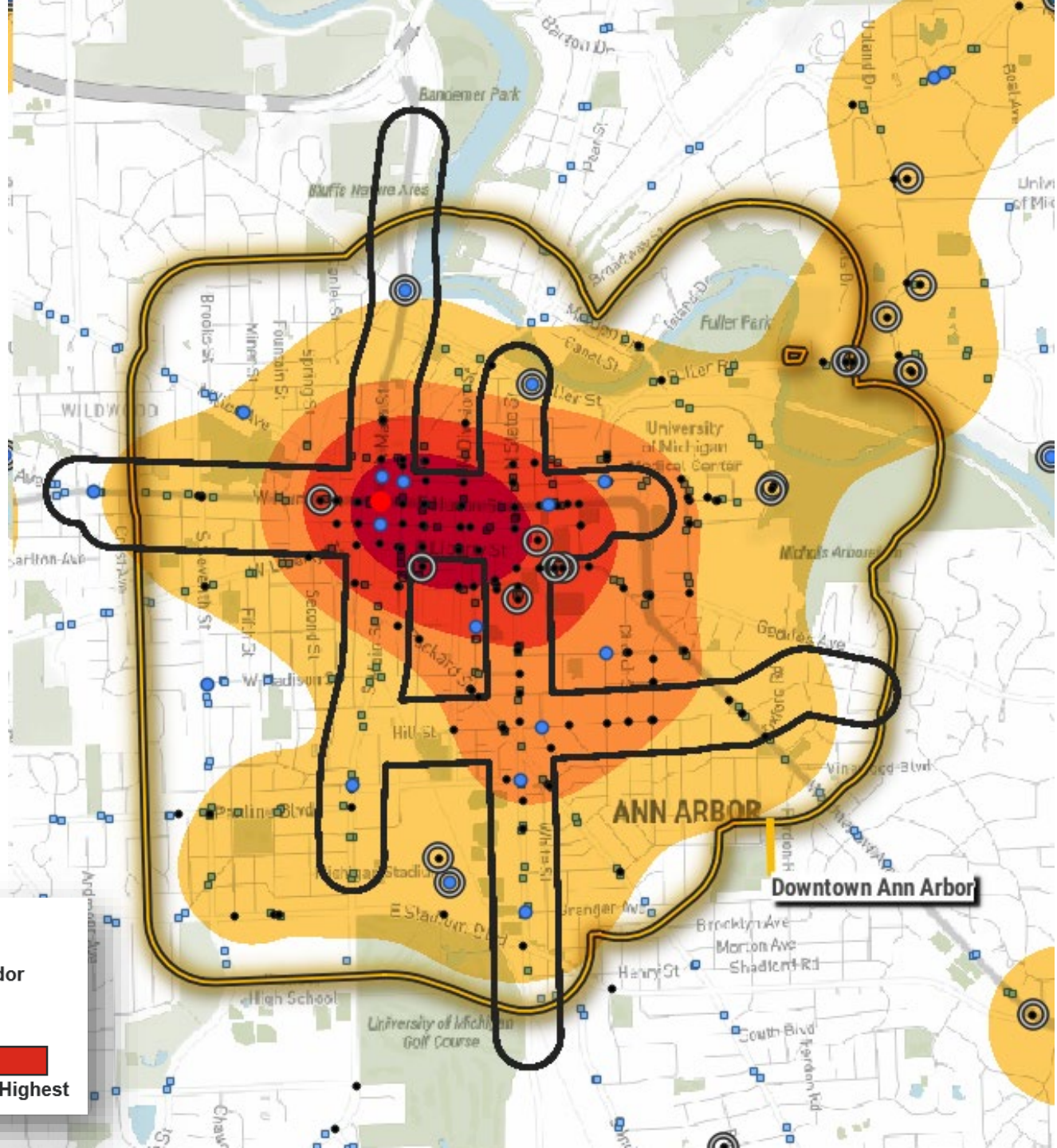
- Intersections had the largest share of crashes
- Signalized intersections – most common control type



TOOLE DESIGN

Intersections—Focus Area

- Intersections had the largest share of crashes
- Signalized intersections – most common control type



Key Takeaways

Pedestrian crashes more likely:

- Near land uses that attract or generate pedestrians
- On high-speed, arterial roads
- At intersections

TOOLE DESIGN

When?

When did these crashes occur?

TOOLE DESIGN

Time of Day, Day of Week

Citywide	Focus Area
• AM/PM commute periods • Weekdays	• AM/PM commute periods • Weekdays

TOOLE DESIGN

Lighting Condition

Lighting Condition	# Crashes	% Crashes	# KSI	% KSI	% Crashes Resulting in KSI
Daylight	102	47%	6	35%	6%
Dark-Lighted	85	39%	10	59%	12%
Dark-Unlighted	12	6%	1	6%	8%
Unknown	7	3%	0	0%	0%
Dusk	6	3%	0	0%	0%
Dawn	4	2%	0	0%	0%
Grand Total	**216**	**100%**	**17**	**100%**	**8%**

TOOLE DESIGN

Month

Crash Month	# Crashes	% Crashes	# KSI	% KSI	% Crashes Resulting in KSI
January	23	11%	3	18%	13%
February	18	8%	1	6%	6%
March	26	12%	1	6%	4%
April	12	6%	1	6%	8%
May	4	2%	1	6%	25%
June	8	4%	0	0%	0%
July	12	6%	1	6%	8%
August	12	6%	1	6%	8%
September	27	13%	2	12%	7%
October	37	17%	3	18%	8%
November	26	12%	1	6%	4%
December	11	5%	2	12%	18%
Grand Total	**216**	**100%**	**17**	**100%**	**8%**

TOOLE DESIGN

Key Takeaways

Pedestrian crashes more likely:

- On weekdays, during AM/PM commute periods
- In dark conditions
- During times of year when school is in session

TOOLE DESIGN

Why?

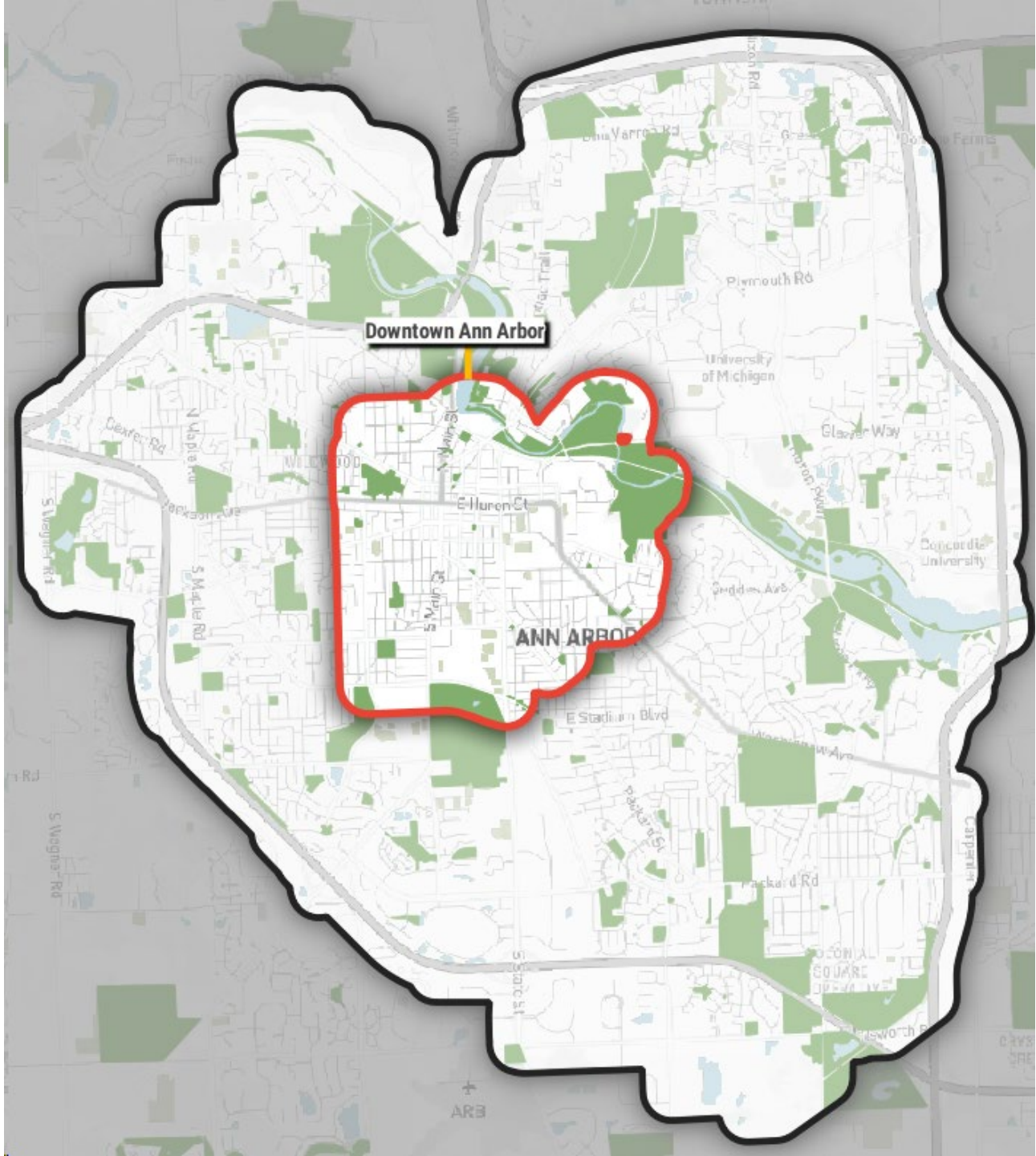
Why or how did these crashes occur?

TOOLE DESIGN

Reported Violations—Focus Area

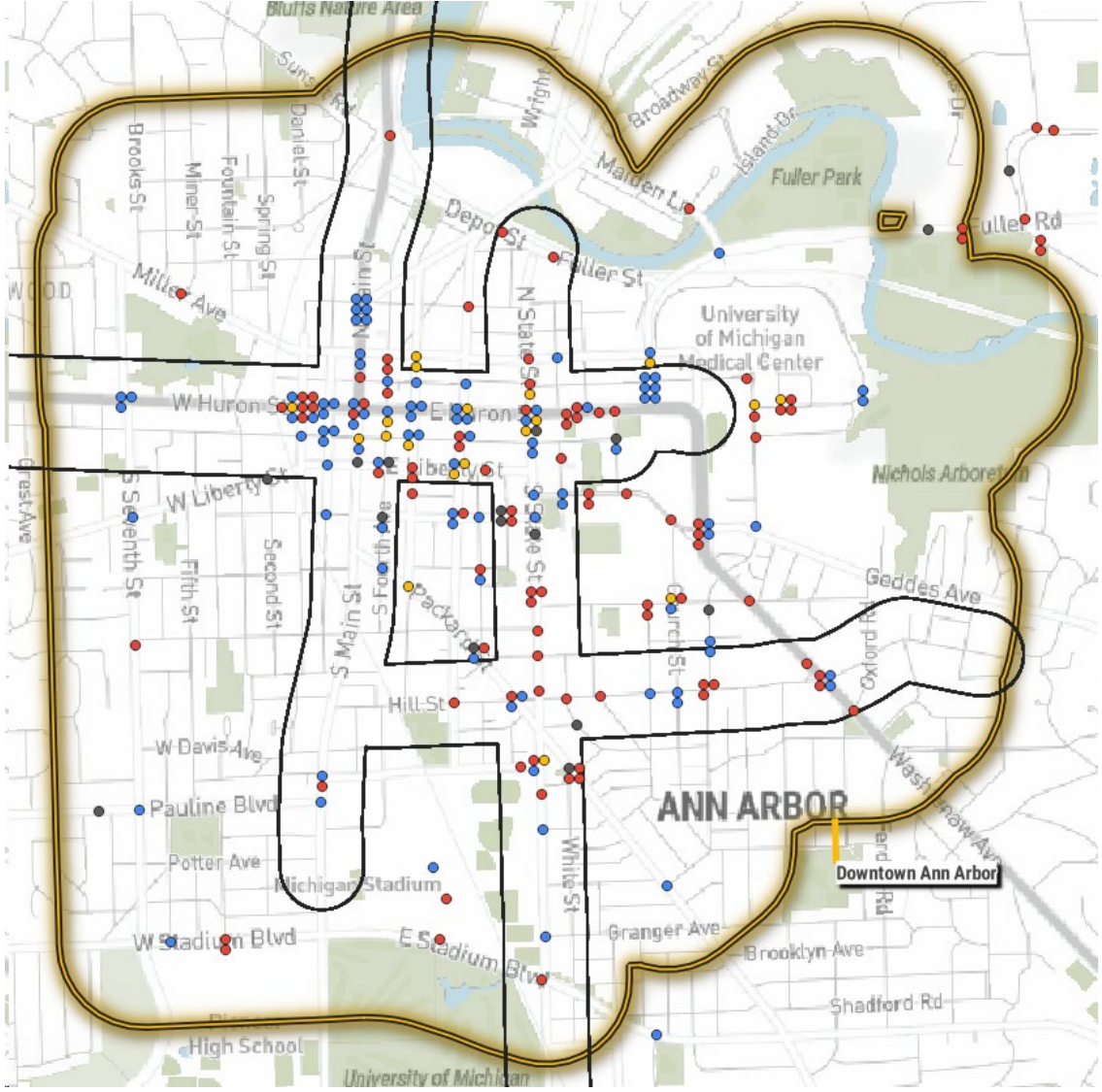
- Very few alcohol (0 driver, 5% ped) and no drug related crashes
- Few reported distracted crashes (6% driver, 2% ped)
- Majority reported contributing factors were driver failed to yield (62%)
- 2/3 of crashes related to motorists not yielding, disregarding traffic control device, or other risky driving behaviors
- 14% hit-and-run crashes

TOOLE DESIGN



Pre-Crash Movements—Focus Area

- Left turn crashes (43%) and straight crashes (41%) are the most frequent
- Left turn crashes occurred most often at signalized intersections along Huron St, Main St, and Glen Ave.
- Right turn crashes are concentrated at intersections along collector or local streets.
- Going straight crashes occurred generally along minor arterials and collector streets. Concentrations within or near University campus.

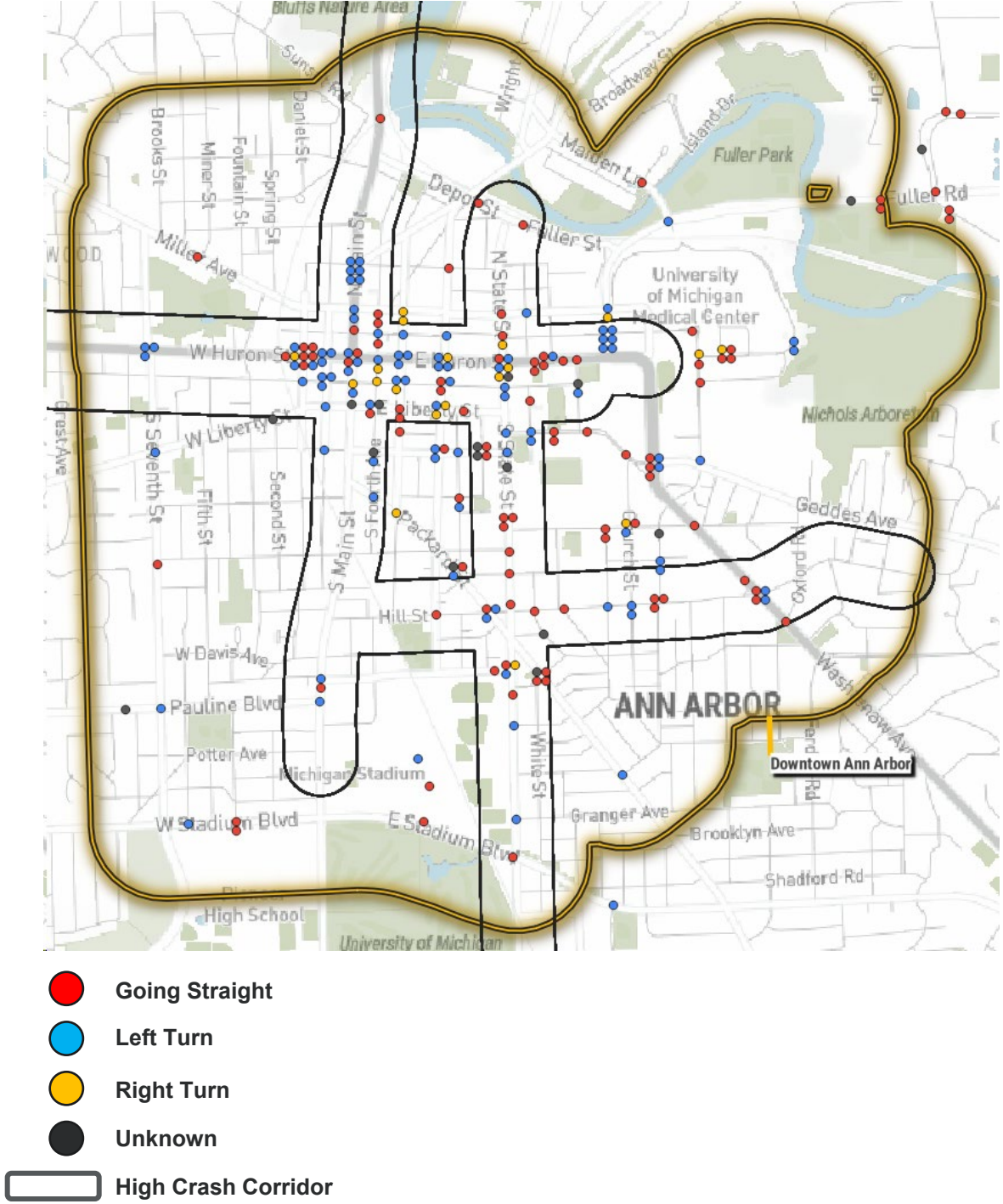


Going Straight
Left Turn
Right Turn
Unknown
High Crash Corridor

TOOLE DESIGN

Pre-Crash Movements—Focus Area

- Most crashes involved a pedestrian crossing the street
  - Largely at signalized intersections
- Few crashes involved a pedestrian walking along the side of a road or crossing a driveway



TOOLE DESIGN

Key Takeaways

- Driver failure to yield is the most reported contributing factor.
- Left turn crashes and straight are most frequent.
- Most crashes involve a pedestrian crossing the street.

TOOLE DESIGN

Discussion

TOOLE DESIGN

Discussion Questions

- Do you have any questions about the crash analysis done for this project?
- Is there anything in the crash analysis that surprises you?
- Is there anything in the crash analysis that seems to be missing?
- What do you believe are the top pedestrian safety issues in Ann Arbor?
- What audiences do you think are particularly important to connect with through the Ann Arbor pedestrian safety education campaign?

TOOLE DESIGN

Thank you!

TOOLE DESIGN