



ANN ARBOR
MOVING
TOGETHER

TOWARDS VISION ZERO



City of Ann Arbor Comprehensive Transportation Plan

Mobility in Ann Arbor: Today Factbook

DRAFT FINAL

November 19, 2019

Above illustrations by Pablo Stanley

Table of Contents

Mobility in Ann Arbor: Today **4**

Ann Arbor's Streets **6**

Major Driving Corridors **8**

Commute Patterns **10**

Transit System and Use **12**

Pedestrian Demand **14**

Pedestrian Network **16**

Bicycle Network **18**

Safety	20
Safety Focus Areas	22
Efficiency of Streets	24
Access to Jobs	26
Transportation & the Environment	28
Transportation Equity & Health	30
New Mobility	32
References	34

Mobility in Ann Arbor: Today



The City of Ann Arbor is currently the fifth largest city in the State of Michigan and continues to grow. Population has been growing steadily since 2010, after remaining relatively stable for ten years; the population today is 7% higher than in 2009, when the previous Transportation Master Plan Update was completed. Employers are also increasingly choosing Ann Arbor resulting in a 3%¹ job growth since 2009, and an all-time high in August 2019.

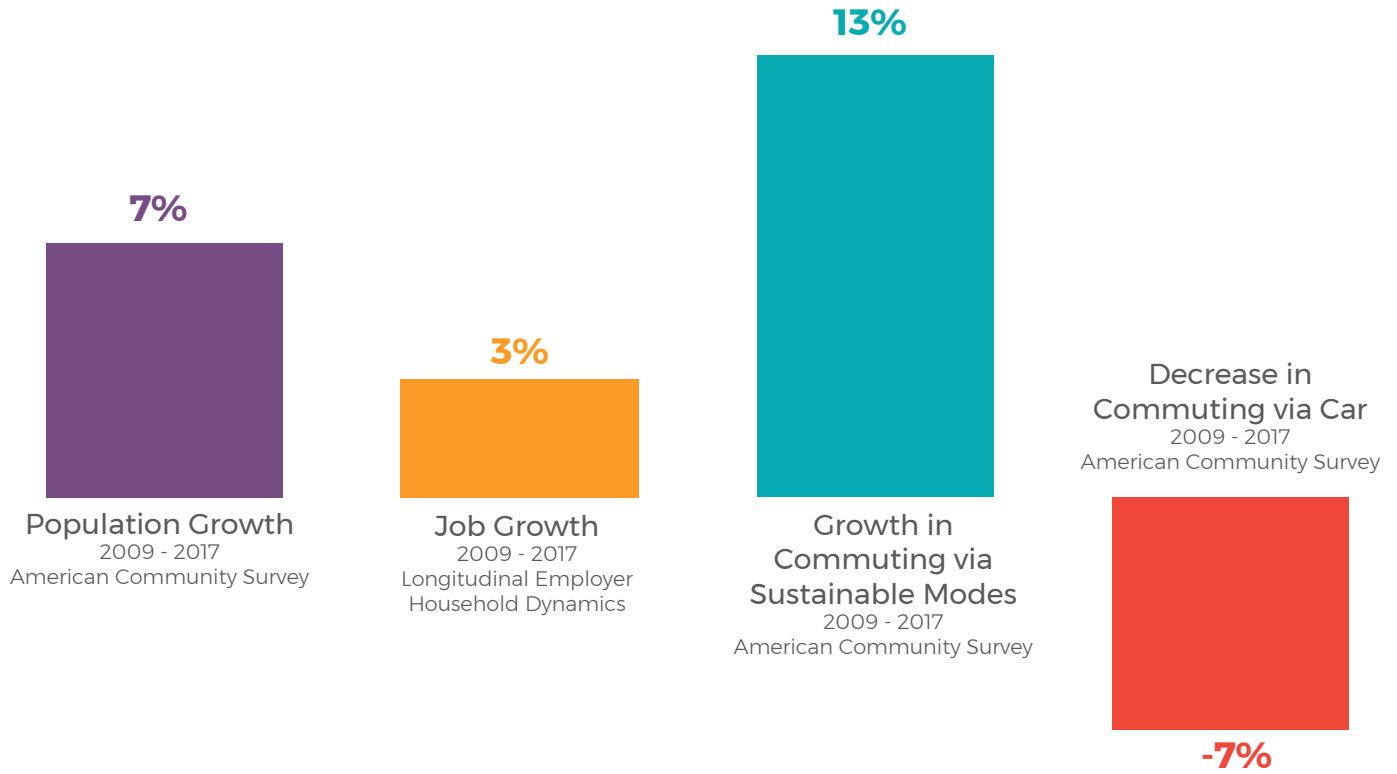
As the city grows and activity increases, Ann Arbor's transportation system is becoming more sustainable and less reliant on cars. The city has made significant investments in making streets safer for people walking and bicycling, providing more choices for residents via more frequent transit service, and improving efficiency through advanced traffic signal technology. Residents are responding to those investments through their actions; fewer residents are driving to work while more are choosing to use public transportation, walk, and bike to work. More households in Ann Arbor are choosing to go car-free and car-light (owning fewer vehicles than the number of workers). However, these behavior shifts are in part counterbalanced by the increase in workforce that has few options but to drive into Ann Arbor, adding strain to the city's transportation network.

Although more people are electing non-car transportation options, transportation remains the largest share of the city's greenhouse gas emissions. In addition, the transportation system must adapt to keep up with current trends, including the growth in jobs, new mobility services such as bikeshare and scooters, and advancing vehicle technology.

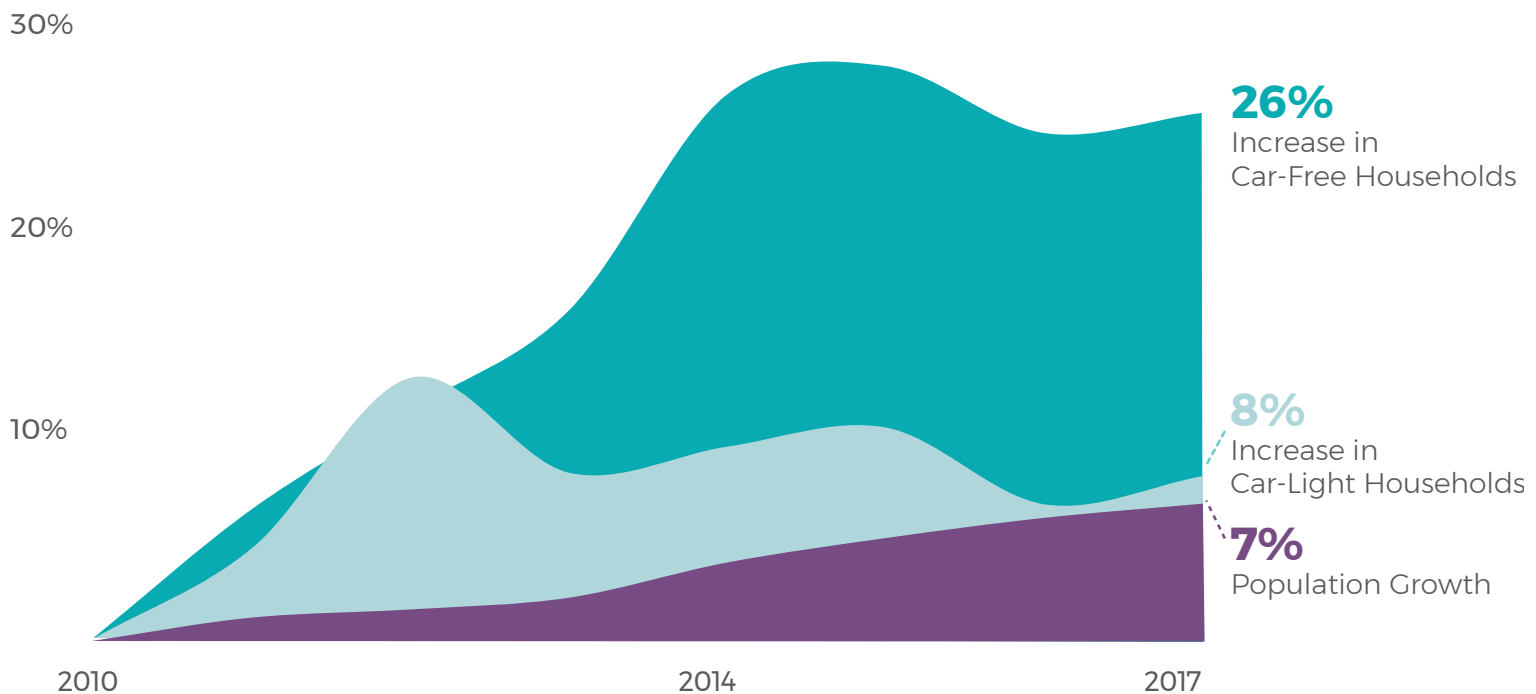
There are also safety challenges that require immediate action: 15 people were killed in traffic crashes from 2014 to 2018.² The city has established a goal of zero deaths caused by traffic crashes by the year 2025.

Ann Arbor Moving Together will update the city's 2009 Transportation Master Plan Update to address Ann Arbor's transportation challenges, build on the successes of the past decade, and react to the changing landscape of transportation. This factbook on "Mobility in Ann Arbor: Today" aims to build a common understanding amongst residents, workers, community leaders, and city staff about existing challenges and opportunities. It explores the transportation network and use from the perspective of people walking, bicycling, taking transit, and driving, as well as how transportation impacts the health and well-being of residents and the environment.

Population and Job Growth vs. Changing Commuting Behavior³



Growth in Car-Free and Car-Light Households⁴

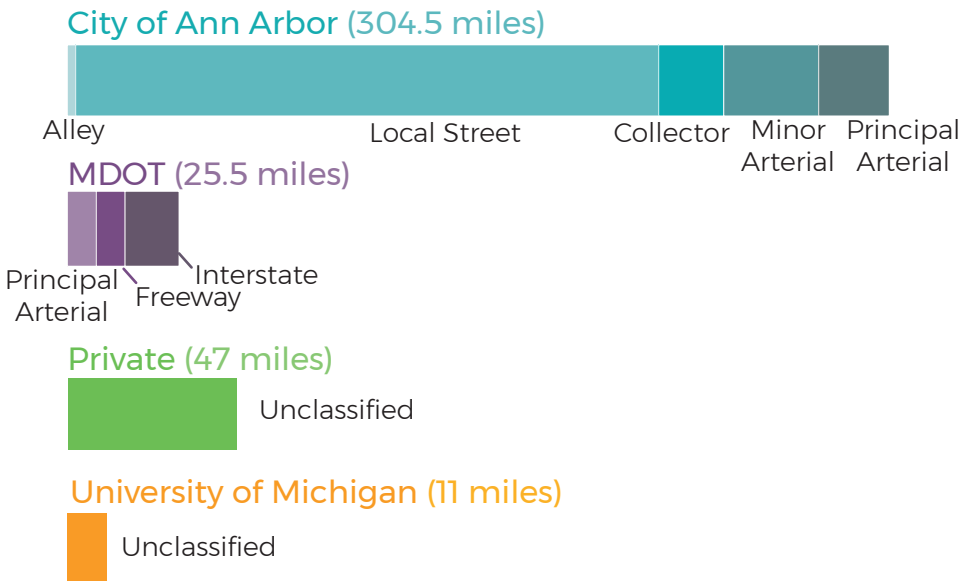


Ann Arbor's Streets

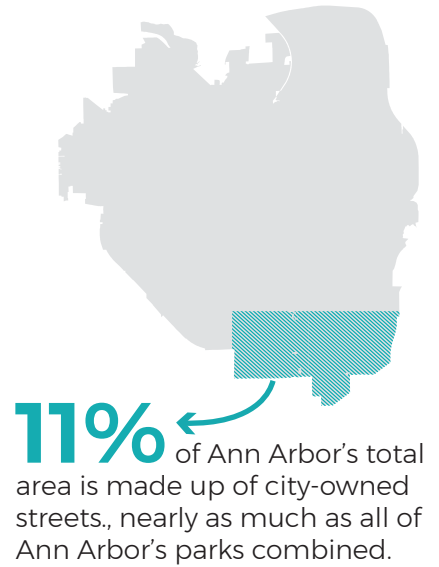
The City of Ann Arbor's street network forms a foundational element of daily life. Ann Arbor's streets connect residents to family and friends, schools and jobs, daily essentials, and opportunities for recreation and entertainment; they move products and goods, enable the city's economy, and provide public spaces where everyone can come together – whether meeting on the sidewalk, attending a street festival, or relaxing at a sidewalk cafe. Streets owned by the city make up 11% of the total land area in Ann Arbor and, as such, have a considerable opportunity to contribute to a welcoming public realm and enhance Ann Arbor's unique quality of place. Due to the many roles the city's streets must play, Ann Arbor uses the concept of 'complete streets'; streets that are designed to balance the needs of all users to guide the planning and design of the street network.

Designing, maintaining, and managing nearly 400 miles of streets involves coordinating numerous city departments with partners throughout Ann Arbor, the region, and the state. Streets in Ann Arbor range in scale from local streets that carry just a few hundred vehicles a day to trunklines that carry tens of thousands of vehicles each day and are owned and managed by the Michigan Department of Transportation (MDOT).

Street Jurisdiction⁵ (by street miles)



Streets as Public Spaces⁶



Speed Limit⁷

(by centerline miles)

81% of streets are 25 MPH.



Number of Lanes⁸

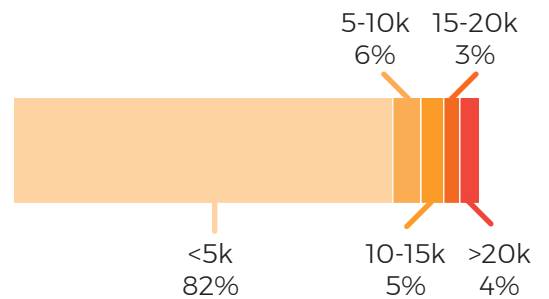
(by street miles)

85% of streets have two lanes.



Traffic Volume⁹

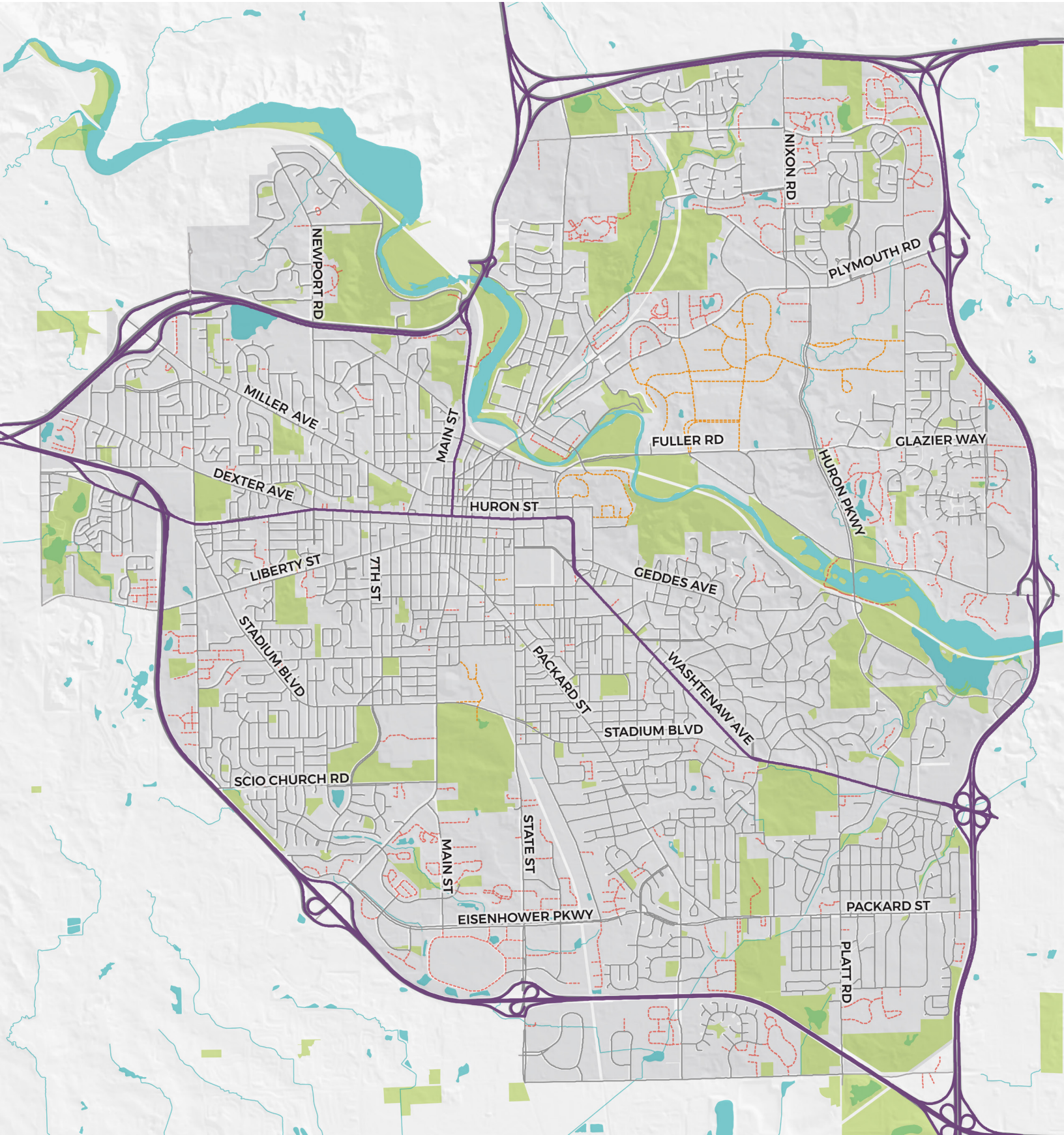
(average vehicles/day by street miles)



Excludes interstates/freeways

Street Jurisdiction

- City of Ann Arbor
- University of Michigan
- Private
- MDOT



Major Driving Corridors

As Ann Arbor grows, its street system is tasked with accommodating more people traveling around the city. Drivers in Ann Arbor face less congestion than drivers in some comparable cities.

Because of the major inflow and outflow of commuters, the volume of traffic in Ann Arbor is heavily concentrated during the morning (7 - 9 a.m.) and evening (3 - 6 p.m.) peak periods. Half of the total vehicle miles traveled (VMT) in Ann Arbor occur during these peak periods and 94% of the total delay Ann Arbor drivers experience happens during these five hours.¹⁰ Additionally, much of the traffic volume and delay occur on just a few major corridors.

Congestion Comparison¹¹ (Travel Time Index)



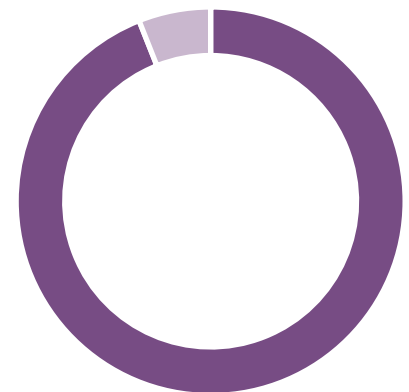
Ann Arbor's Major Corridors



Fuller Rd. corridor includes Geddes Rd. and Glen Ave.
Main St. corridor includes Ann Arbor Saline Rd.

Travel time index (TTI) compares driving speeds during peak periods to speeds with no congestion. A TTI of 1.2 indicates that a trip that takes 10 minutes with no congestion would take 12 minutes during the peak period.

Driver Delay¹²



94%

of all delay experienced by people driving in Ann Arbor occurs between 7-9 AM and 3-6 PM.

Travel Time and Reliability on Major Corridors

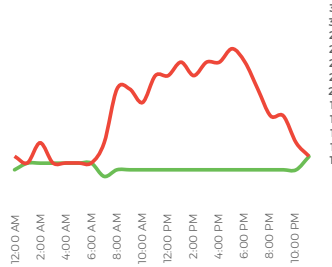
(based on a typical weekday)¹³

- Low-end expected travel time
- High-end expected travel time

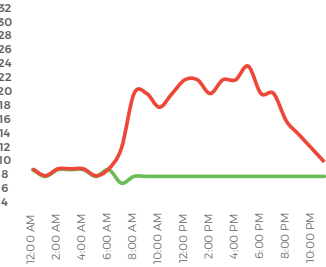
Travel Time (minutes)

Stadium Boulevard

Maple to Washtenaw



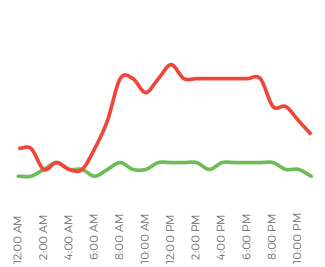
Washtenaw to Maple



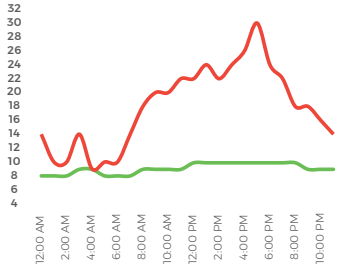
Travel Time (minutes)

State Street

Ellsworth to Huron

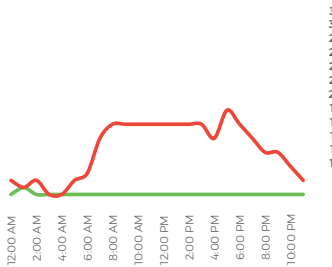


Huron to Ellsworth

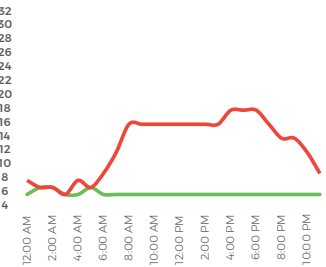


Plymouth Road

US 23 to Depot

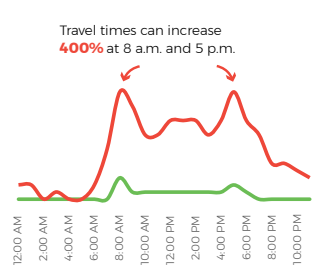


Depot to US 23

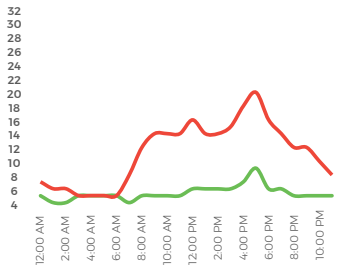


Huron Street

Jackson to Washtenaw

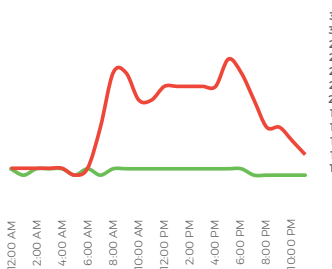


Washtenaw to Jackson

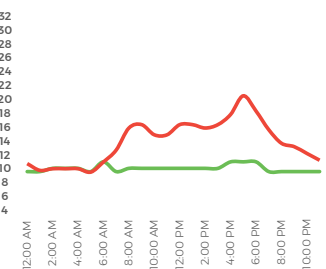


Packard Street

US 23 to Main

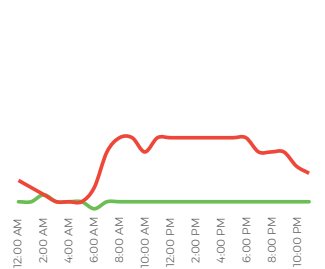


Main to US 23

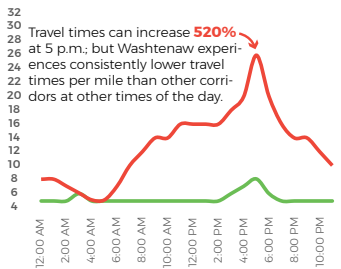


Washtenaw Avenue

US23 to Geddes

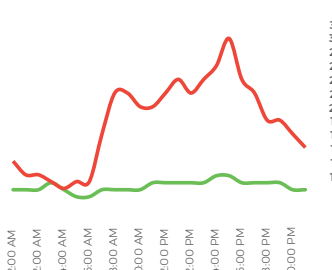


Geddes to US23

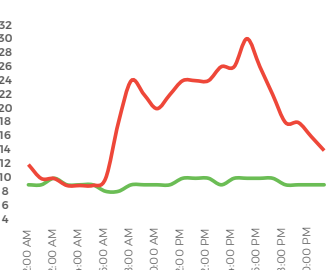


Main Street

I94 to M14

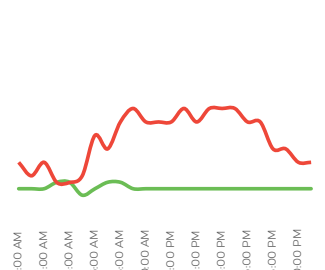


M14 to I94

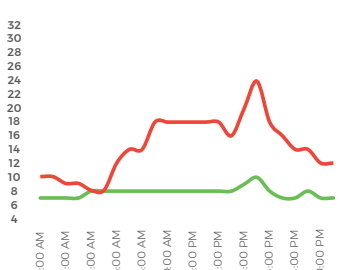


Fuller Road

US23 to Huron



Huron to US23



Commute Patterns

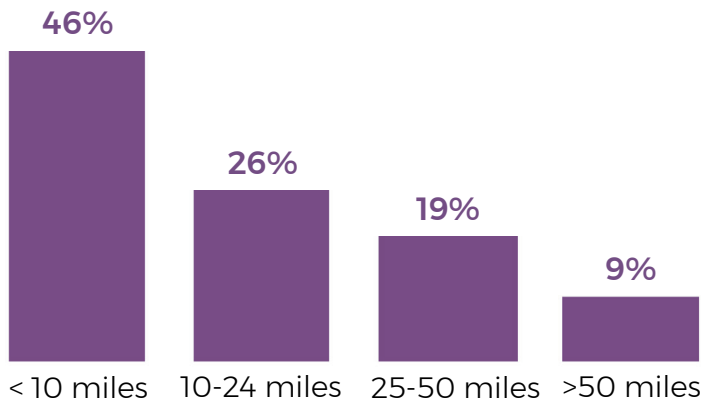
Ann Arbor is a regional job center. One out of every 43 people in Michigan work in Ann Arbor, and more than 83,000 people commute into the city on weekdays¹⁴. This influx of workers places major strains on the city's, and region's transportation systems during peak periods. Half of the people who work in Ann Arbor commute from the easterly directions. Workers who commute less than 10 miles tend to travel from the southeast or east of the downtown (towards Ypsilanti), while nearly 40% of workers who commute more than 50 miles travel from the northwest or westerly directions.¹⁵

Workers outside of the city currently have limited options for getting to work besides driving. A number of TheRide's routes connect to Ypsilanti; however, there are only a handful of connections with other cities in the region. The majority of people working in Ann Arbor commute more than 10 miles, meaning that active transportation is not a viable option for many. TheRide and the city manage a network of Park & Ride lots on Ann Arbor's periphery. Ideally commuters would park in a Park & Ride facility then switch to public transit for the final connection to their job. However, to encourage more commuters to do so, the frequency and speed of transit must increase and/or the price of driving to and parking at the workplace must increase in an equitable manner. Various concepts to improve regional connectivity have been proposed and Ann Arbor has actively supported these efforts, including North-South Commuter Rail (WALLY), a commuter rail connection to Detroit, and more regional rapid buses.

Inflow of Workers¹⁷



Ann Arbor Workers Commuting Distance¹⁶

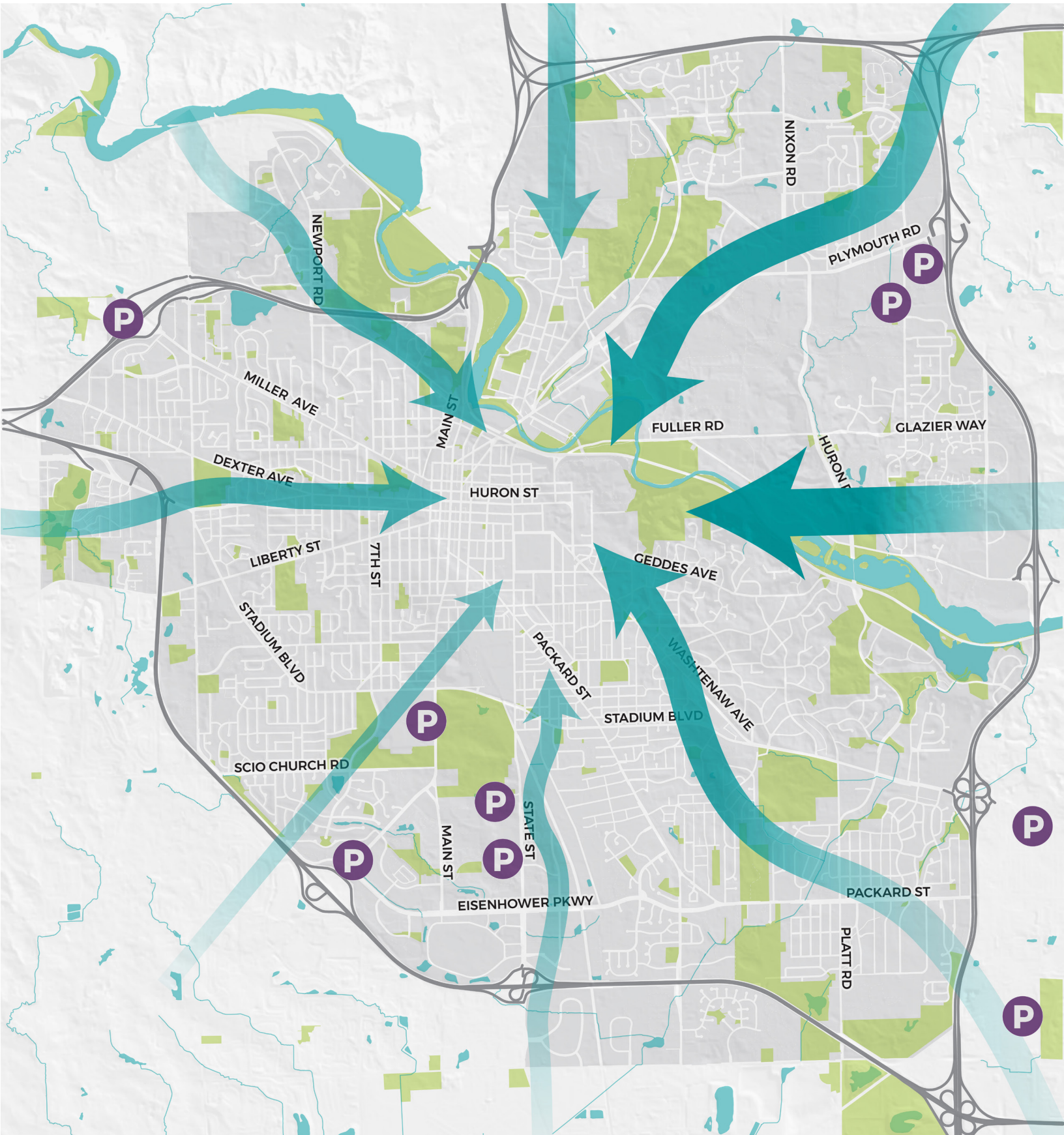


29%

of workers who commute into Ann Arbor come from **outside of Washtenaw County**.¹⁸

Ann Arbor Workers Commute Flow

P Park & Ride lots



Transit System and Use

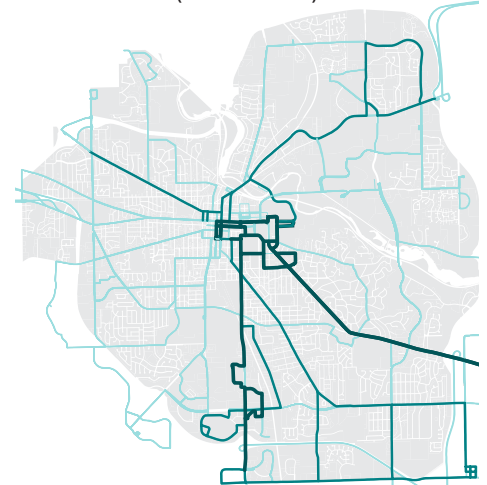
Continuing to build a user-friendly and efficient transit system is essential for Ann Arbor to better connect people to destinations in the city and across the region and achieve the city's climate goals. Over the past five years, the City of Ann Arbor, city residents, and the Ann Arbor Area Transit Authority (AAATA or TheRide) have invested significant resources in expanding transit service across the city and connecting to neighboring communities. Residents overwhelmingly voted to increase their contributions to the transit system in 2014 and 2018, and their decision has led to new transit routes, increased weekend service, extended weekday service later into the evening, and buses running more frequently on many routes.

Overall, through these increased investments, TheRide was able to offer 42% more hours of service in 2017 than in 2013.¹⁹ The city, the Ann Arbor Downtown Development Authority (DDA), and TheRide have also worked together to enhance access to transit via Park and Ride lots and to implement the go!pass program, which offers employees within the DDA free, unlimited use of TheRide fixed-route buses. Increased service and new programs has led to record high ridership; more people used the service in 2018 (6.9 million total trips) than in any previous year.²⁰ Opportunities for the city and TheRide to further improve service include ways to increase the speed and reliability of buses in Ann Arbor, such as installing transit signal priority equipment and dedicating bus-only lanes in key locations, extending service hours, and adding on-demand service.

Beyond expanded service, Ann Arbor and TheRide will continue to work together to provide a more comfortable and high-quality experience for transit riders through amenities such as transit shelters and seating, clear signage, and lighting. Currently, only 12% of bus stops have a transit shelter and 65% have lighting.²¹

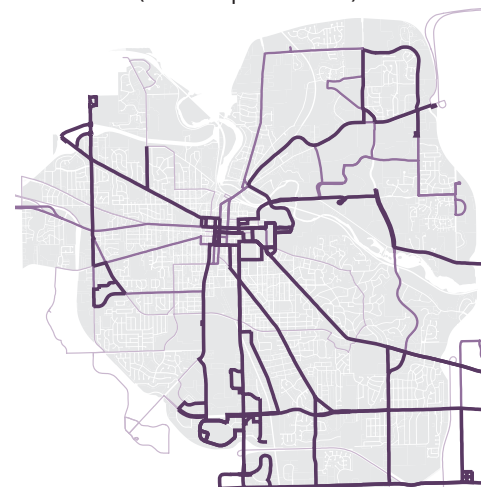
However, the city has made significant progress upgrading stops to meet Americans with Disabilities Act (ADA) standards with 89% of stops meeting ADA standards.

Bus Frequency²² (7 - 9 a.m.)



- Every 10 minutes or less
- Every 10-20 minutes
- > 20 minutes

Weekday Boardings²³ (Feb-April 2018)



- More than 1,000
- 500 - 1,000
- Less than 500

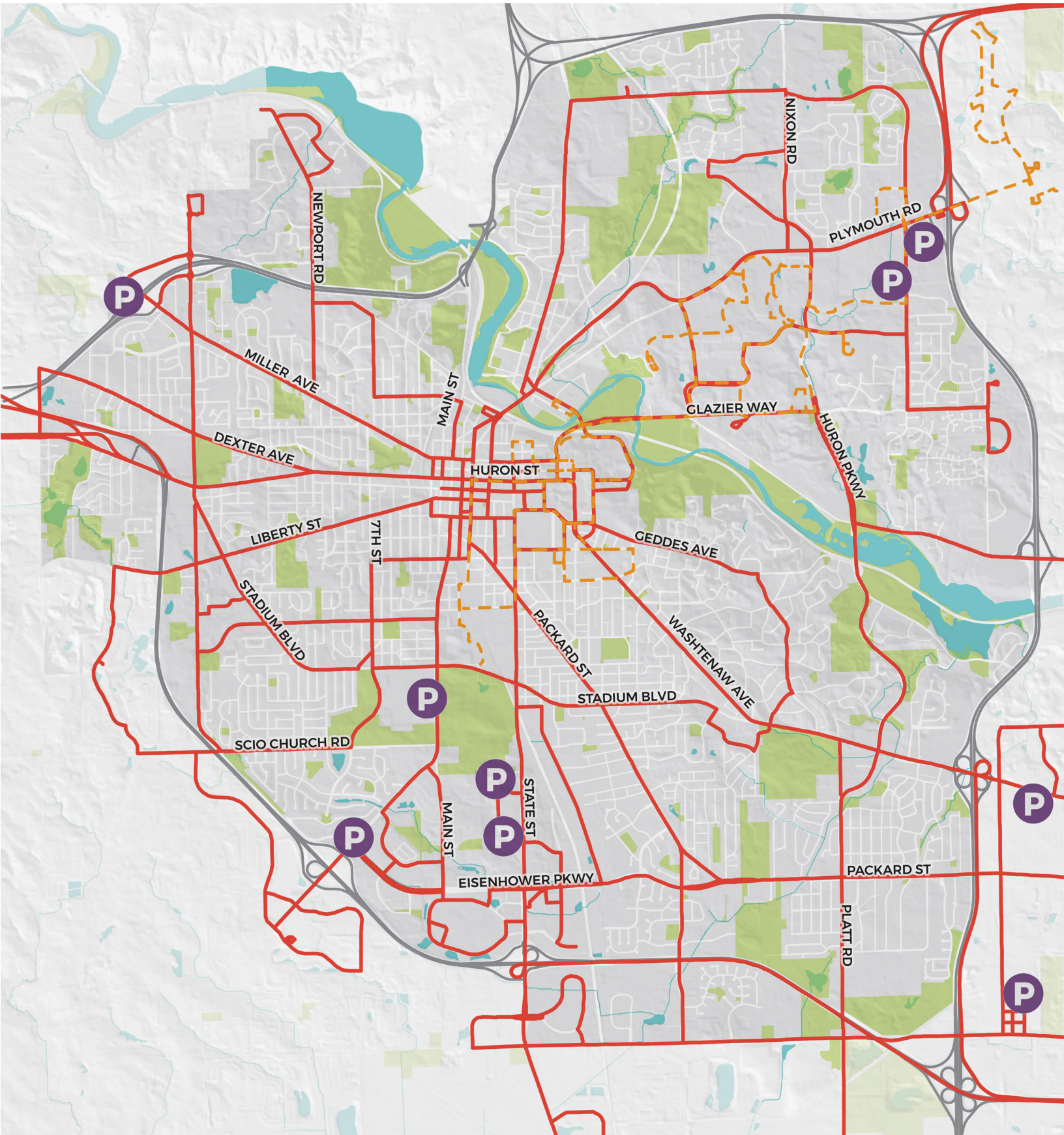
1,324 free parking spaces in Park and Ride lots across the City.

Ann Arbor Transit Routes

— The Ride

P Park & Ride lots

- - - University of Michigan



Pedestrian Demand

Understanding how many people are walking throughout Ann Arbor is difficult. The city and its partners regularly count people biking and walking at key locations but there is not a comprehensive, citywide dataset. In the absence of concrete numbers, a demand index can help the city understand the likelihood of high pedestrian activity and help to prioritize investments. Factors such as land use, nearby destinations and jobs, and certain characteristics of the population (e.g., age, income, and vehicle ownership) influence how much and where people walk. An evaluation of pedestrian demand on Ann Arbor's streets revealed that certain areas have a very high demand for walking trips, most notably downtown and the University of Michigan campus. Counts of people walking in these areas regularly see more than 5,000 people per day and areas with the highest demand can see more than 15,000 pedestrians.

Moving away from downtown and campus areas, pedestrian demand tends to decrease as density decreases and single family land use becomes more common. However, higher pedestrian demand is observed in areas of higher housing density and near schools and commercial centers.

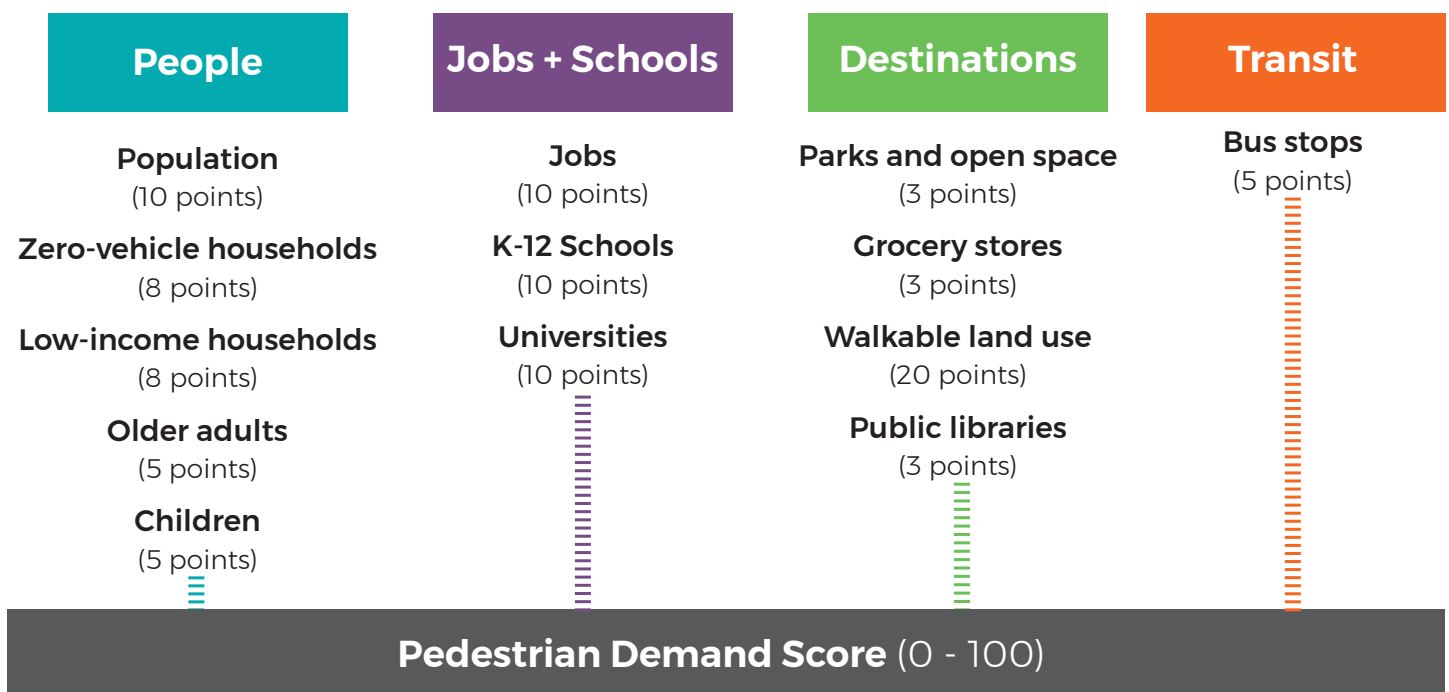
Pedestrian Crashes²⁴

60% of all crashes where a person walking was killed or seriously injured occurred **outside of daylight hours**.

44% of all crashes where a person walking was killed or seriously injured were a result of the driving **failing to yield**.

56% of all people walking who were killed or seriously injured were **under 18 or over 65**.

Pedestrian Demand Index

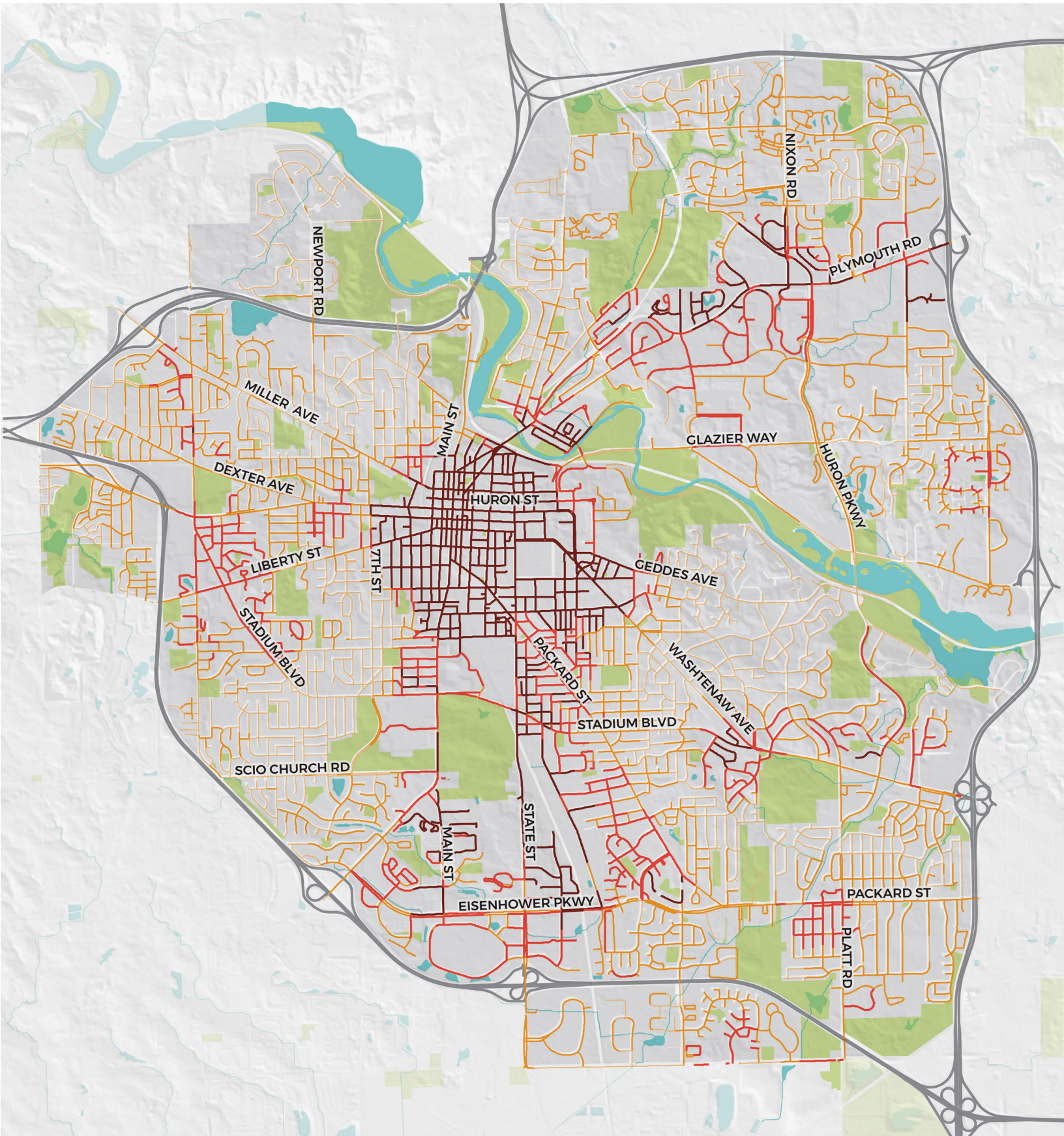


²⁴ Factors were calculated within a 1/4 mile buffer of individual street segments.

Pedestrian Demand

Lowest Demand

Highest Demand



Pedestrian Network



Everyone is a pedestrian at some point in their journey, even if it is only walking from the parking garage to the office. Providing a connected network of sidewalks with frequent, safe opportunities to cross the street can make walking more convenient for everyone. Creating a welcoming environment for people walking contributes to and encourages active living, reduces emissions from motor vehicles, and fosters social cohesion. Sidewalks and crosswalks should be amenable to pedestrians of all abilities: children, older adults, and people with strollers, vision impairments, or mobility devices.

Ann Arbor has made significant efforts to improve pedestrian safety and create a more walkable city. Since 2007, the city has installed 70 mid-block crossings and 35 rectangular rapid flashing beacons (RRFBs).²⁵ The city's 2013 Non-Motorized Transportation Plan identified 25 miles of sidewalk gaps that were crucial to fill in the near-term, and, over the last five years, the city has completed 15 miles of these gaps.

Ann Arbor's crosswalk ordinance mandates drivers to stop for pedestrians standing at the curb or within a crosswalk, and the city has developed Crosswalk Design Guidelines to enhance and standardize all crosswalks.

During winter, property owners are responsible for removing snow and ice from sidewalks and the city proactively enforces the policy in areas with high pedestrian activity (e.g., shopping districts, school walking routes, high ridership bus stops, etc.).

Features at Mid-Block Crosswalks in Ann Arbor²⁶

Mid-block crosswalks are important for providing convenient pedestrian access. Depending on the type of street and context, different features are necessary to ensure people walking are visible and safe.

Functional Classification	# of Crosswalks	% with Signage	% with Lighting	% with Island	% with RRFB	% with Gateway	% with Bumpout
Local	28	39%	7%	7%	4%	0%	7%
Collector	53	57%	17%	15%	6%	9%	21%
Minor Arterial	84	61%	18%	29%	14%	35%	4%
Principal Arterial	53	68%	30%	40%	43%	8%	4%
Total	218	59%	19%	25%	18%	18%	8%

Walkability

Block length and intersection density impact walkability and connectivity to goods and services.

Longest Block Length	Lowest Intersection Density
----------------------	-----------------------------

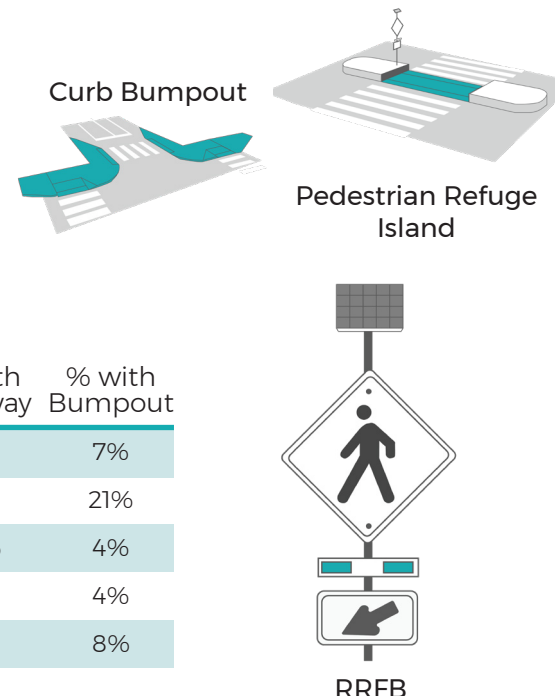
Boardwalk	Newport
Research Park/ Pheasant Run	Leslie Park/ Arrowood
Briarwood	North Campus

Shorter blocks and more intersections create more walking route options which can decrease travel time and distance.

Shortest Block Length	Highest Intersection Density
-----------------------	------------------------------

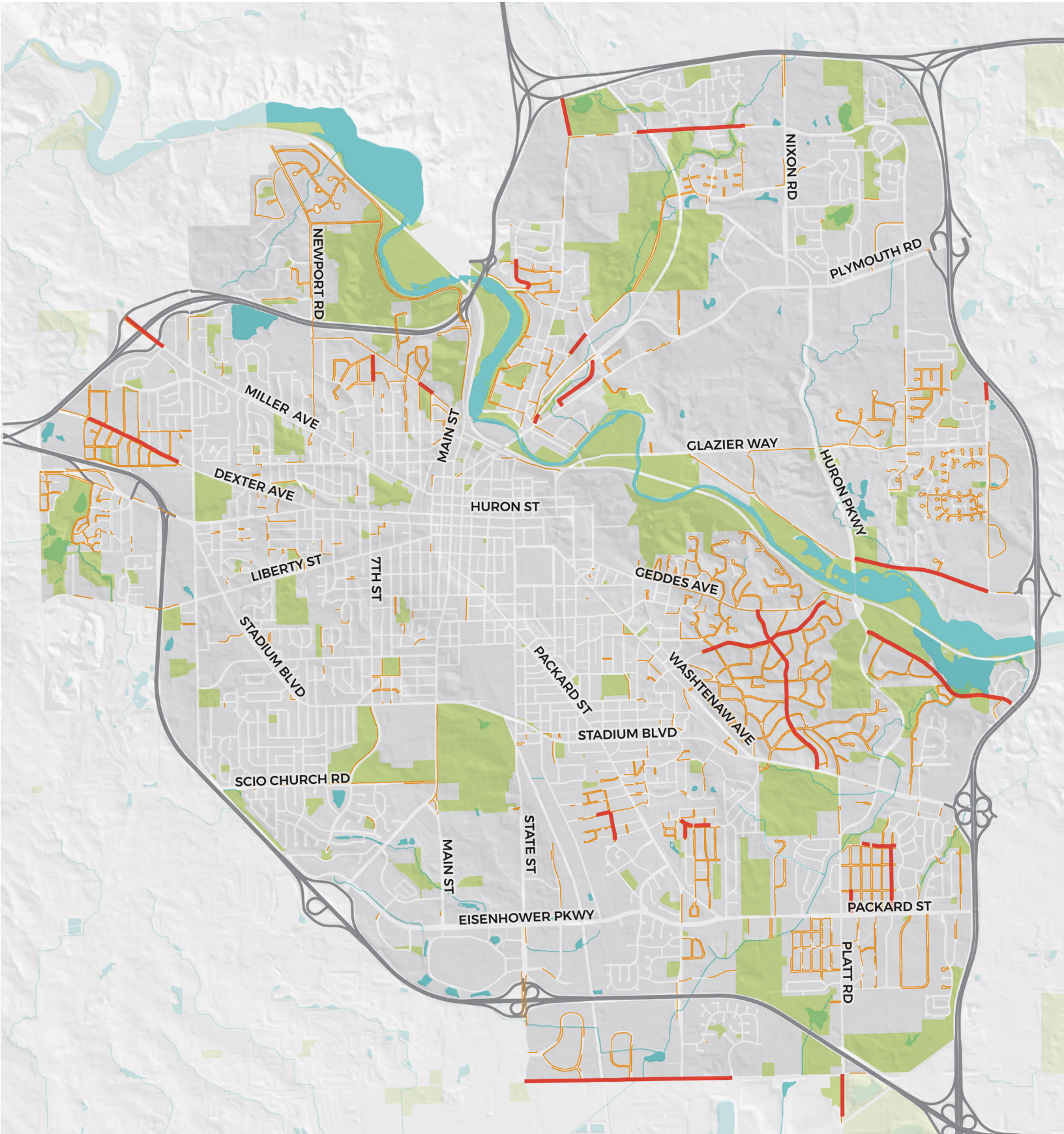
Downtown	Downtown
North Central	Virginia Park
Virginia Park	South University

Examples of Crosswalk Features



Gaps in the Sidewalk System

- Remaining Near-Term Sidewalk Gaps
- All Sidewalk Gaps



Bicycle Network



The City of Ann Arbor's 2009 Transportation Master Plan and 2013 Non-Motorized Transportation Plan both articulated the goal of improving the city's bicycle system to create an environment and culture supportive of active transportation. Providing more and better options for active transportation increases transportation choices for people without access to a car and/or driver's license, provides opportunities for physical activity, improves safety, and reduces harmful emissions. Since 2007, Ann Arbor has nearly doubled the total mileage of designated bike routes in the city, installing 77 miles of bike lanes, shared use paths, and marked shared lanes (sharrows). The number of people bicycling to work grew by 39% from 2009 to 2017 and counts of people bicycling at key locations around the city have increased by as much as 266% between 2006 and 2017 (Packard Road between State Street and Hill Street).^{27, 28}

To continue increasing the number of bicyclists in Ann Arbor, a network of bikeways that are safe and comfortable for people of all ages and abilities is needed. An evaluation of the level of traffic stress experienced by people biking (based on the volume of traffic, speed limit, and type of bike facility), shows that a majority of streets around the city where sufficient data is available are rated as high stress. 72% of all crashes involving a person biking occurred on these high stress streets. Because of the speed and volume of traffic on many major streets around Ann Arbor, the city has the opportunity to provide convenient, low-stress bicycle routes on local streets.

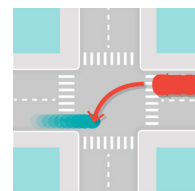
Crashes at Intersections²⁹

80%

of crashes where a person biking was killed or seriously injured occurred at intersections



Crashes where a **vehicle is turning left** are particularly dangerous due to higher speeds and greater exposure.



Access to Jobs via Bike

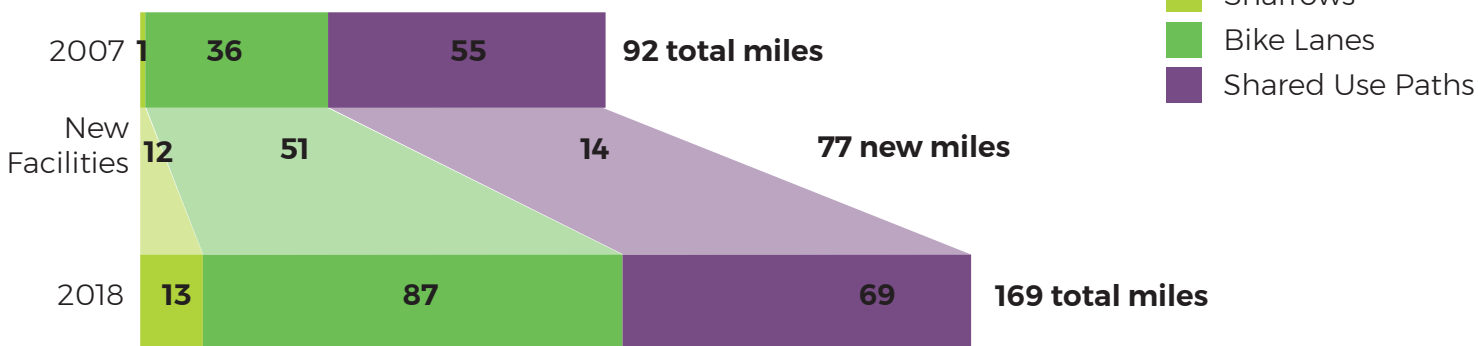
The average Ann Arbor resident can access **42,867 jobs** in 20 minutes via bike, if they are willing to bike on any street...



but can only access **15,231 jobs** using the low-stress network (streets rated LTS 1, 2, and those without data).



Growth in Ann Arbor's Bike Network²⁷ (2007-2018)

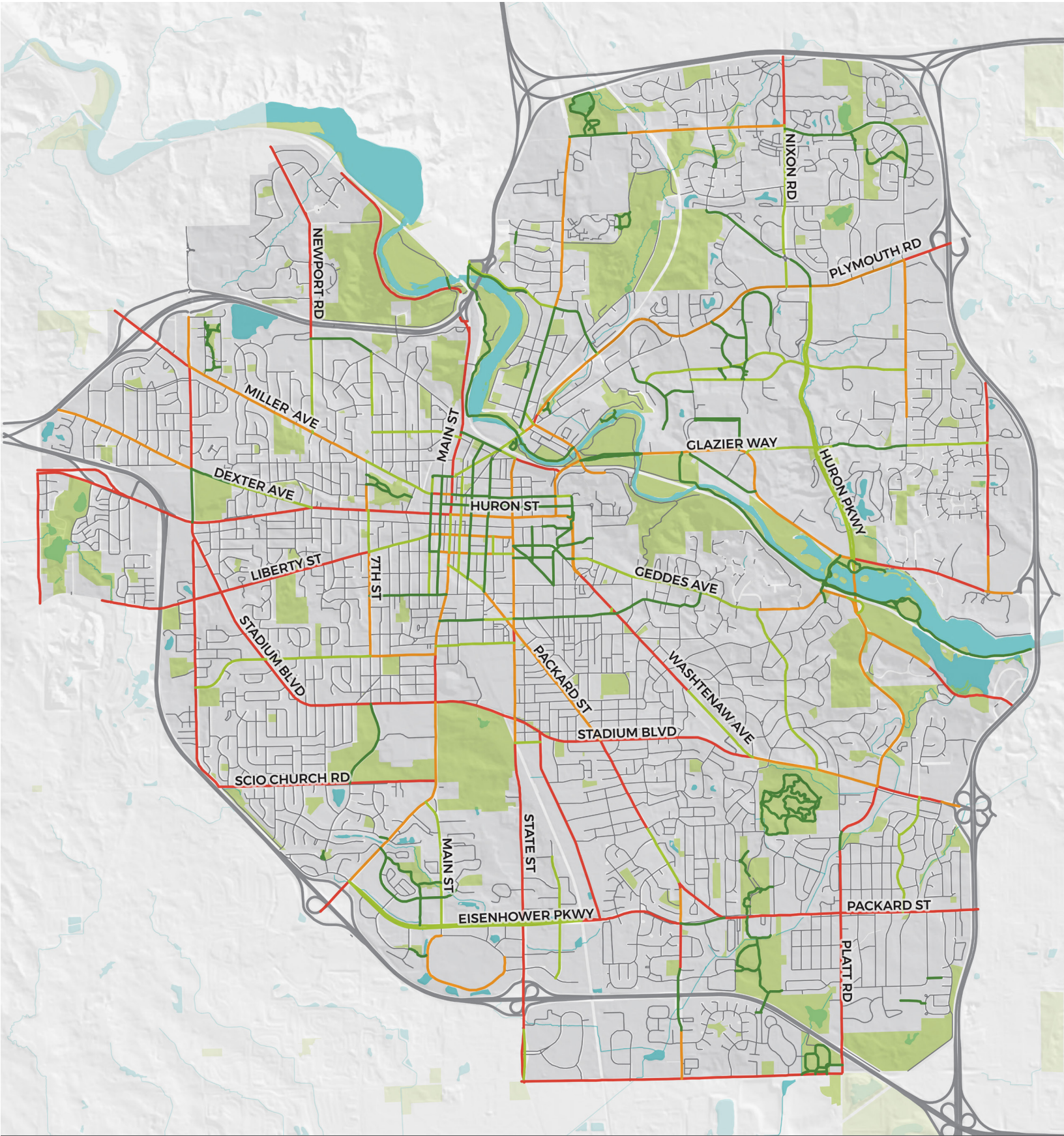


Types of Bike Facilities

- Sharrows
- Bike Lanes
- Shared Use Paths

Level of Traffic Stress (LTS) for People Biking

- Very Low Stress
- High Stress
- Low stress
- Very High Stress
- No Data



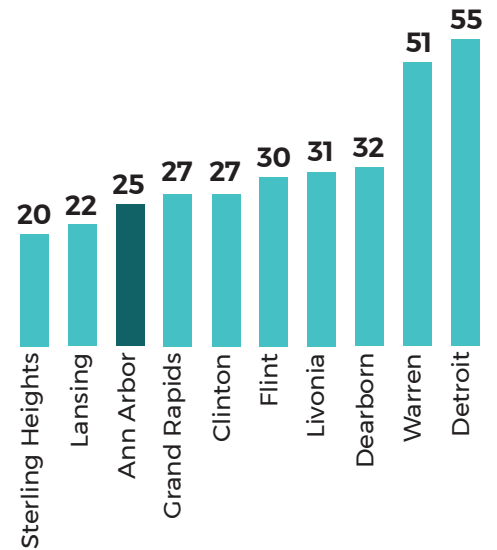
Streets with no data are primarily low-stress residential streets.

Safety

From 2009 to 2018, 23 people were killed in traffic crashes in Ann Arbor and 276 people suffered life altering injuries; Ann Arbor's goal is to reduce this number to zero.³⁰ Over the past 10 years, Ann Arbor has made significant investments to create a safe transportation system for everyone: installing roundabouts at intersections with significant crash histories, filling gaps in the sidewalk network, improving pedestrian crossings, and upgrading traffic signal technology. These investments have yielded positive results; Ann Arbor has one of the lowest rates of serious injuries and fatalities among cities in Michigan and some of the highest rates of walking and biking in the entire country. However, there is more work to be done to ensure Ann Arbor's streets are safe for all users.

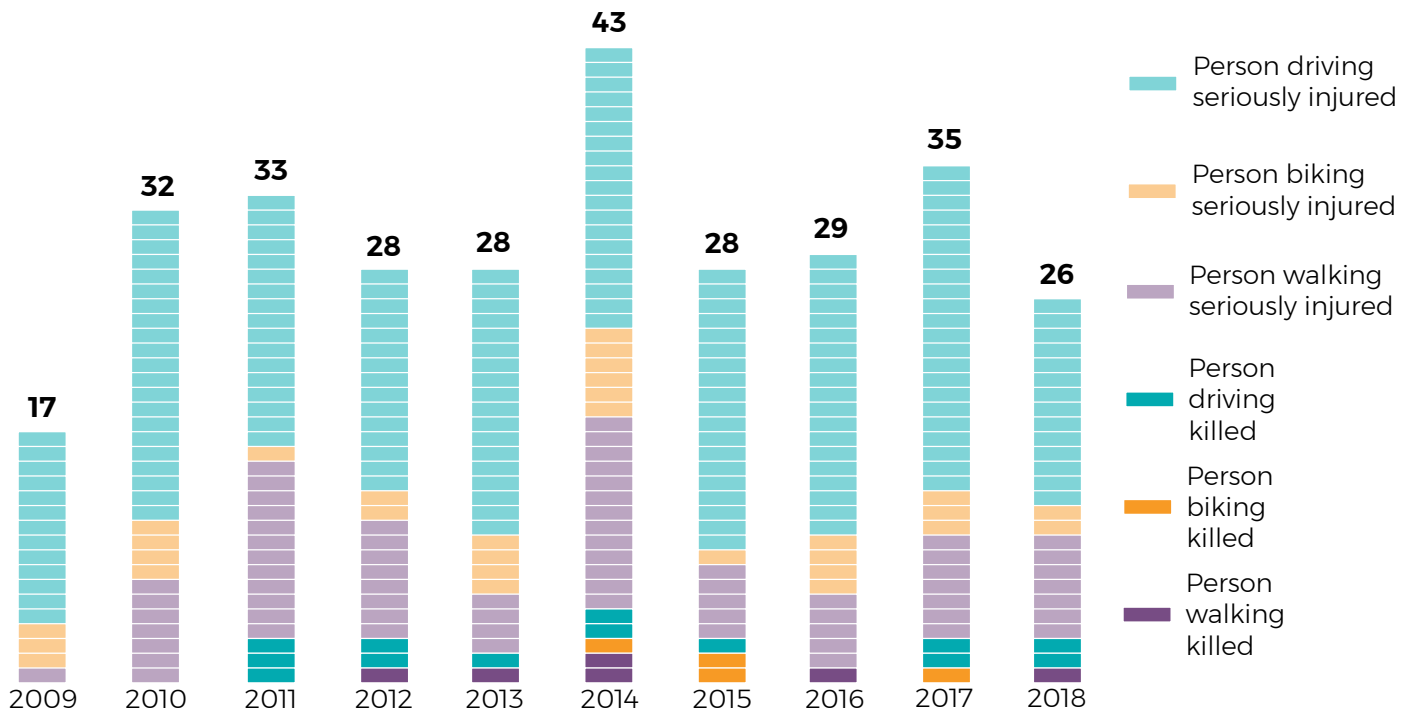
In analyzing crash data and police reports from the last five years, patterns emerge that will allow the city to target investments to combat behaviors causing crashes, protect the most vulnerable users, and redesign streets and intersections where severe crashes are occurring.

Crash Rates for 10 Largest Municipalities in Michigan³¹
(2009-2018 fatalities and serious injuries/100,000 people)



People Killed or Seriously Injured in Traffic Crashes in Ann Arbor³²

(excludes highways/interstates)



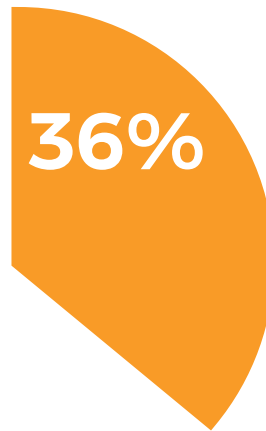
People walking and biking in Ann Arbor are disproportionately affected by traffic crashes (2014-2018 crash data, excludes highways/interstates).

Mode of Transportation to Work



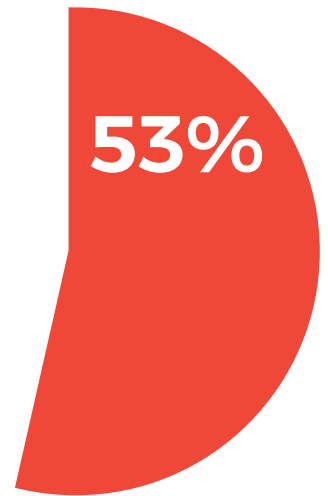
20% of Ann Arbor residents walk or bike to work.

Serious Injuries from Traffic Crashes



36% of people seriously injured in traffic crashes in Ann Arbor are walking or biking.

Fatalities from Traffic Crashes



53% of people killed in traffic crashes in Ann Arbor are walking or biking.

Speed is a major determinant of both the likelihood and severity of traffic crashes.³³

hit by a car driving at...

20 MPH



9.5 out of 10 pedestrians survive.



30 MPH



5 out of 10 pedestrians survive.



40 MPH



1 out of 10 pedestrians survive.



Safety Focus Areas

Historic crash patterns point to specific locations in need of attention and can also reveal general designs or characteristics of streets that lend to less safe conditions. Identification of focus corridors and intersections was based on the total number of crashes, the number of fatalities and injuries, and the number of crashes involving people biking and walking. Across the city, 77% of all the fatalities and serious injuries over the last five years occurred on 30 corridors. Additionally, 12% of all fatalities and serious injuries occurred at 17 intersections.

In addition to focus locations, dangerous driving behaviors account for a large share of severe traffic crashes in Ann Arbor. People walking and biking and children and older adults are particularly vulnerable users who suffer disproportionately from traffic crashes.

Dangerous Driving Behaviors³⁴

70% of all crashes that resulted in a fatality or serious injury involved one or more of the following dangerous behaviors:

- **Failure to yield**
- **Impaired driving**
- **Speeding**
- **Disregarded traffic signs/signals**
- **Reckless/careless driving**

Severe Crashes on Streets over 35 MPH

% of severe crashes on streets over 35 MPH



% of all streets over 35 MPH



Severe Crashes on Streets with 4 or More Lanes

% of severe crashes on streets with 4 or more lanes



% of all streets with 4 or more lanes



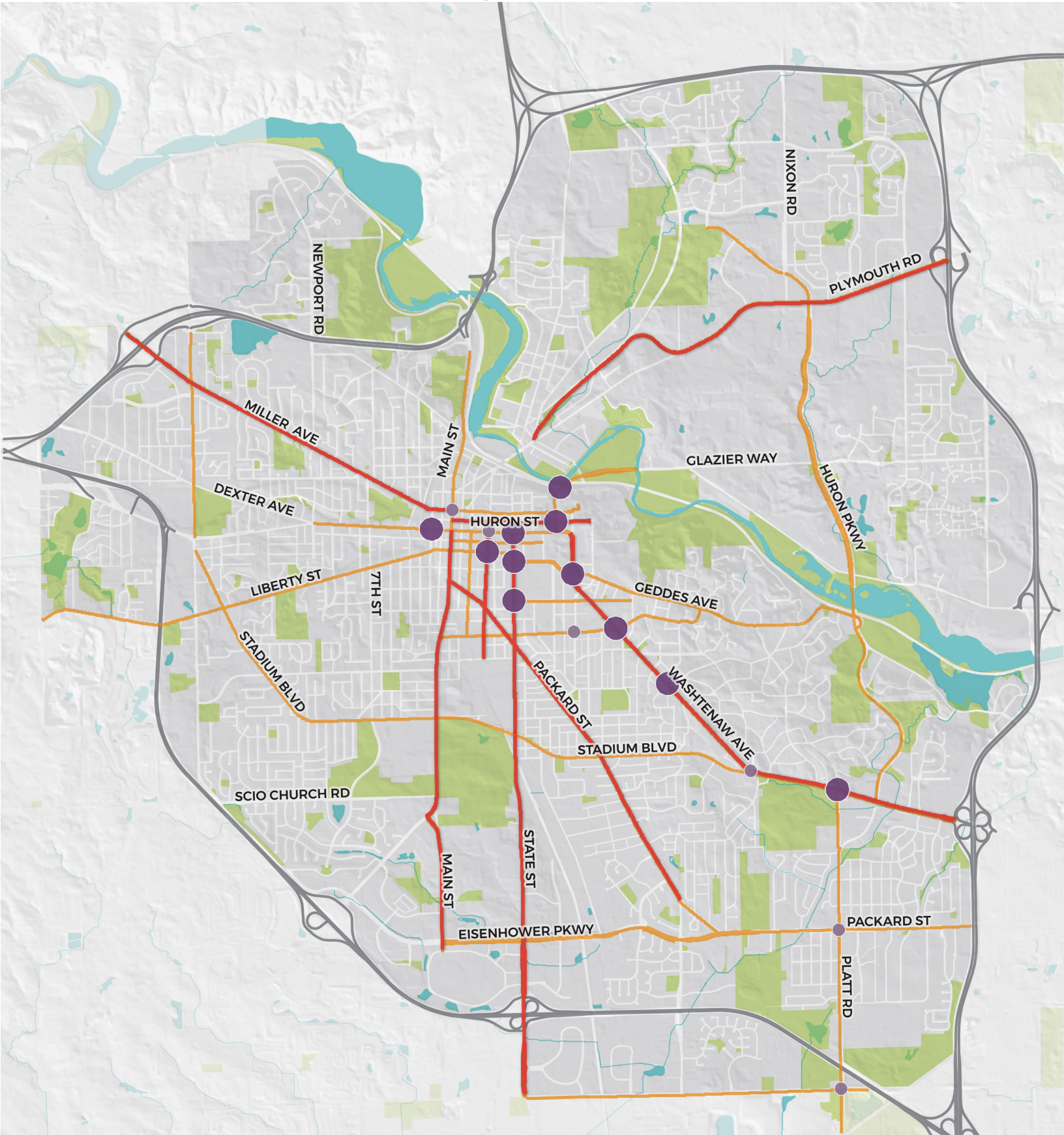
Safety Focus Areas

Focus Intersections		% of all intersection crashes	% of all fatalities and serious injuries at intersections
Tier 1	11 intersections	10%	12%
Tier 2	6 intersections	8%	11%
All	17 intersections	18%	23%

Focus Corridors		% of all crashes	% of all fatalities and serious injuries
Tier 1	7 corridors	34%	37%
Tier 2	23 corridors	40%	40%
All	30 corridors	74%	77%

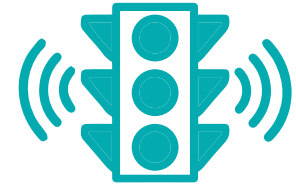
Focus Areas

- Tier 1 Focus Corridors** (Red line)
- Tier 2 Focus Corridors** (Orange line)
- Tier 1 Focus Intersections** (Large purple dot)
- Tier 2 Focus Intersections** (Small purple dot)



Efficiency of Streets

To keep people and goods flowing around Ann Arbor, efficiency improvements are needed to move more people in the same amount of space. Single occupancy vehicles (cars carrying just one person) are the least space-efficient means for moving people around a city; increasing the share of people using transit, walking, and biking can increase a street's capacity to move people but may require re-prioritizing how street space is allocated. On many streets around downtown the majority of people using the street are walking, biking, and using transit. On other streets throughout the city, people using transit and active transportation make up a substantial share of street users, despite the majority of space being devoted to private vehicles.

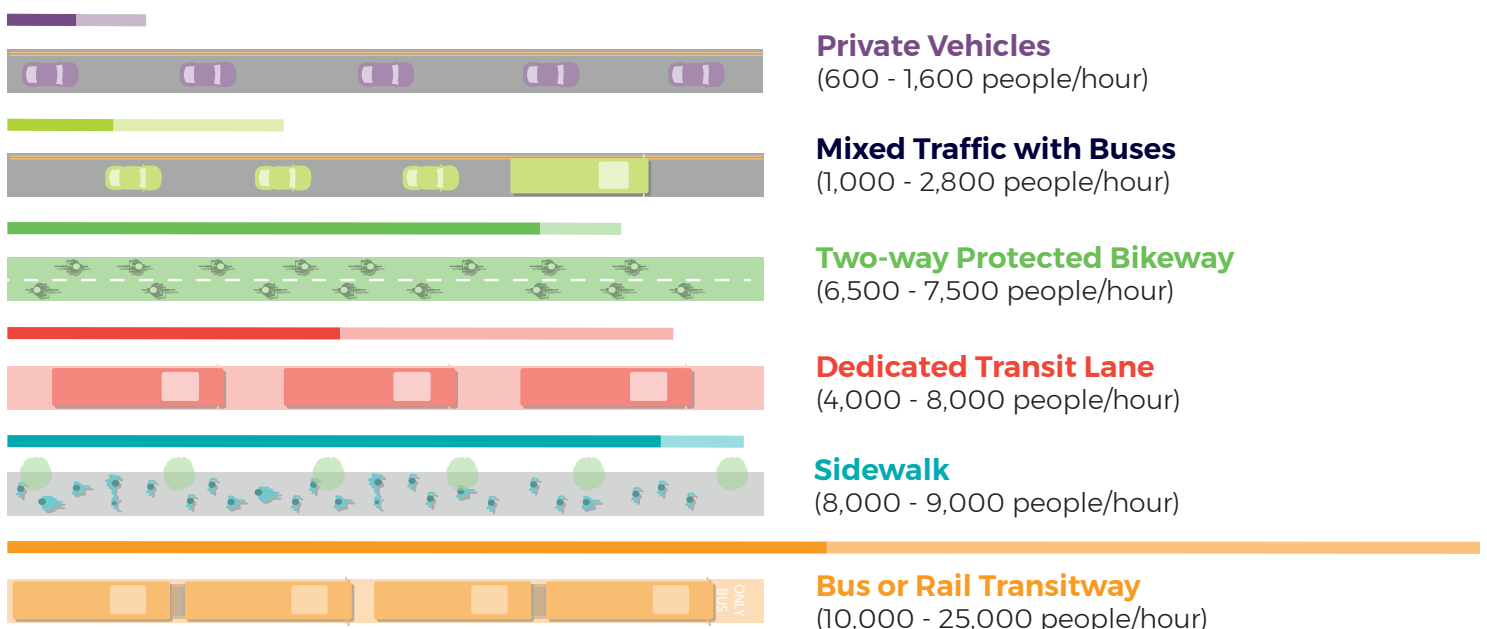


Since 2004, the city has been upgrading traffic signals to a new technology (known as SCOOT) that adjusts signal timing in real-time based on the flow of traffic to minimize delay. SCOOT signals are currently installed on portions of Washtenaw, Plymouth, Ellsworth, State, Stadium, and Packard.

In addition to giving more room to space-efficient means of transportation, upgrading traffic signal technology, as Ann Arbor has been doing, can also improve a street's efficiency. After upgrading the traffic signals along Ellsworth Road in 2015, average travel times on weekdays decreased 12% and reliability improved.³⁵ Ann Arbor has also constructed roundabouts, which improve safety and the flow of traffic, across the city.

Maximum Capacity of Different Modes of Transportation³⁶

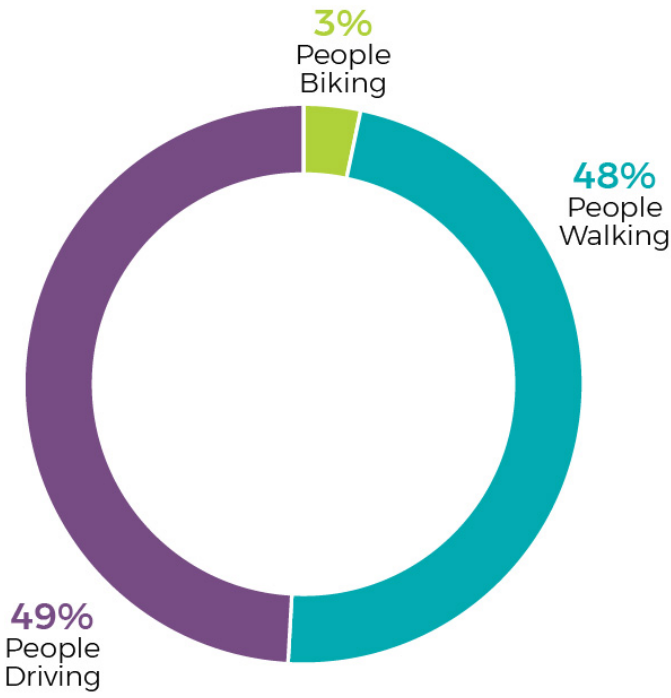
(for a 10-foot lane width — or equivalent — with normal operating conditions)



Breakdown of Users on Streets Around Ann Arbor

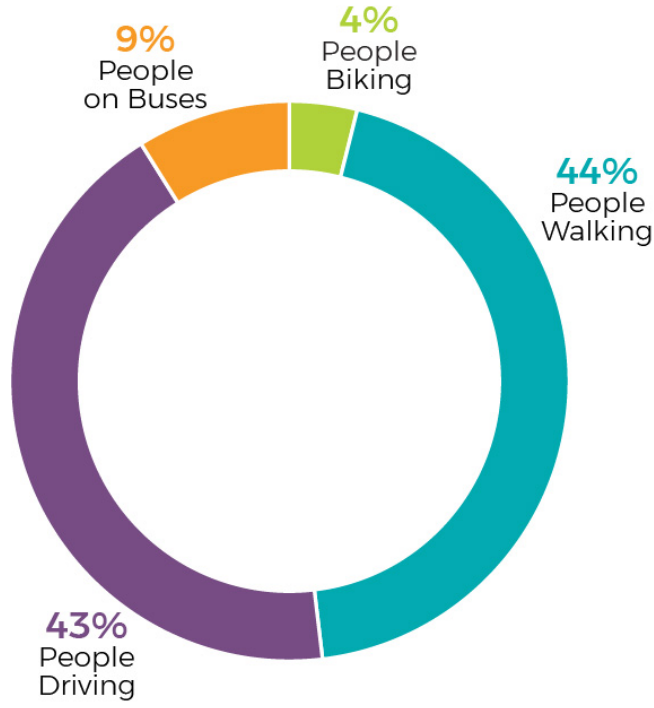
W. Liberty St.

(between State St. and 5th Ave.)



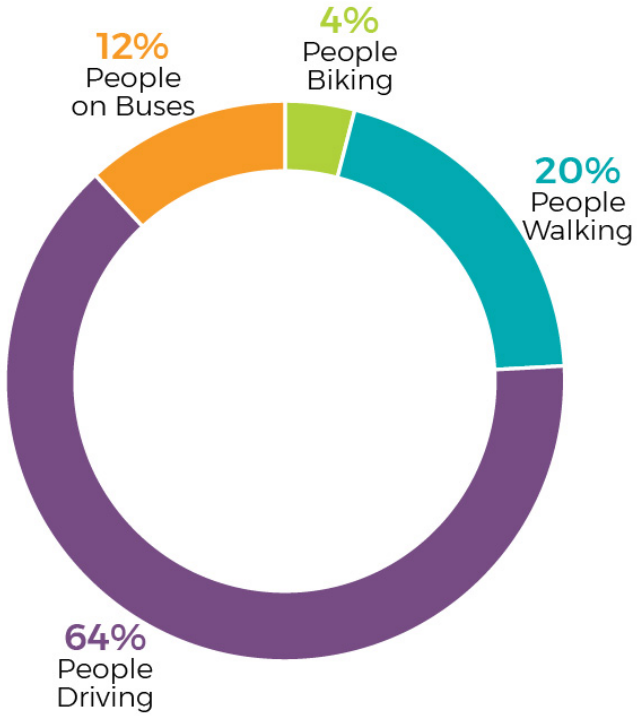
S. State St.

(between E. Huron St. and N. University Ave.)



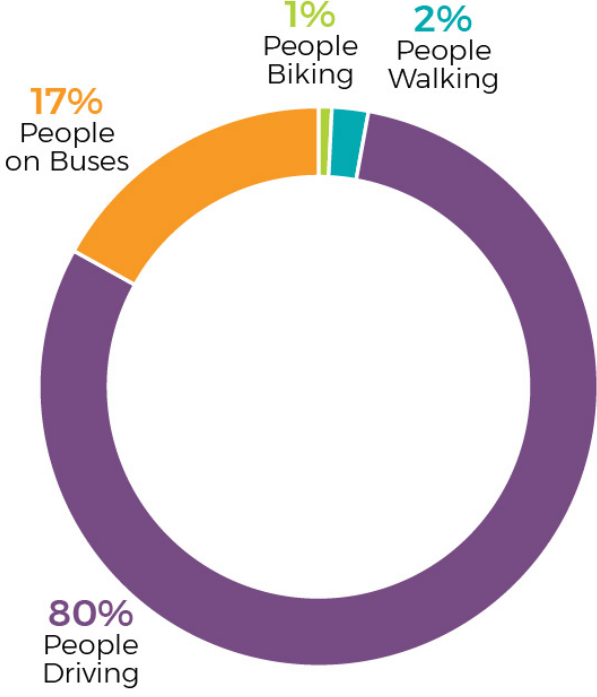
Packard St.

(between Hill St. and Arch St.)



Washtenaw Ave.

(between Hill St. and S. University Ave.)



Access to Jobs

Providing people with reliable, efficient options to get to work is one of the most important roles of Ann Arbor's transportation system. Today, people who drive in Ann Arbor have superior access to jobs compared to those who use other modes of transportation. The average resident can reach over 99% of the jobs in the city within a 20-minute drive, while the average person using transit can only reach 27% of all jobs in 20 minutes. Considering that more than one out of every ten households in Ann Arbor does not have access to a vehicle, the disparity in access to jobs presents a pressing community issue.

The number of jobs residents can access via walking, biking, and transit also varies by neighborhood. Neighborhoods closer to downtown, those with a higher concentration of jobs and housing units, tend to have better access to jobs via non-driving means. Similarly, individuals' confidence using different modes of transportation impacts their ability to access jobs: people comfortable biking on any street can access nearly three times as many jobs as people who only feel comfortable biking on low-stress streets. The number of jobs accessible by transit fluctuates across the day based on schedules and wait times. For those who live outside of Ann Arbor but work in the city, there are relatively few options for getting to work besides driving.

Multimodal Access to Jobs

Neighborhoods with the most jobs within 20 minutes via walking, biking, and transit

- Downtown
- South University
- South Central
- Old West Side
- West Park/Miller
- Old Fourth Ward

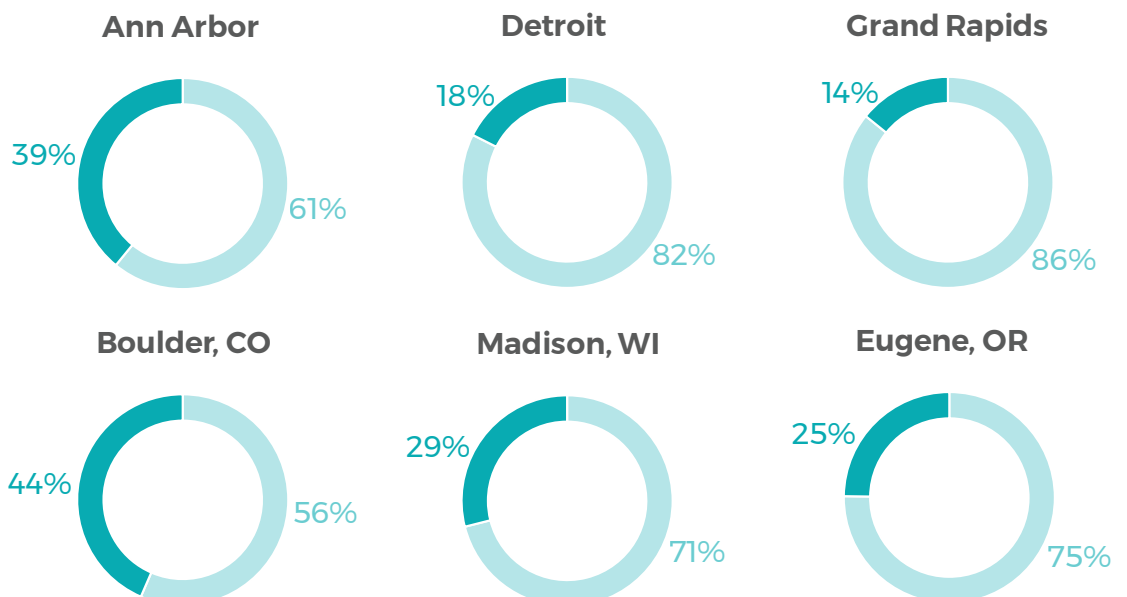
Neighborhoods with the fewest jobs within 20 minutes via walking, biking, and transit

- Northbury/Chapel Hill
- Scarlett/Mitchell
- Earhart/Concordia
- Orchard Hills/Maplewood
- Bryant
- Research Park/Pheasant Run

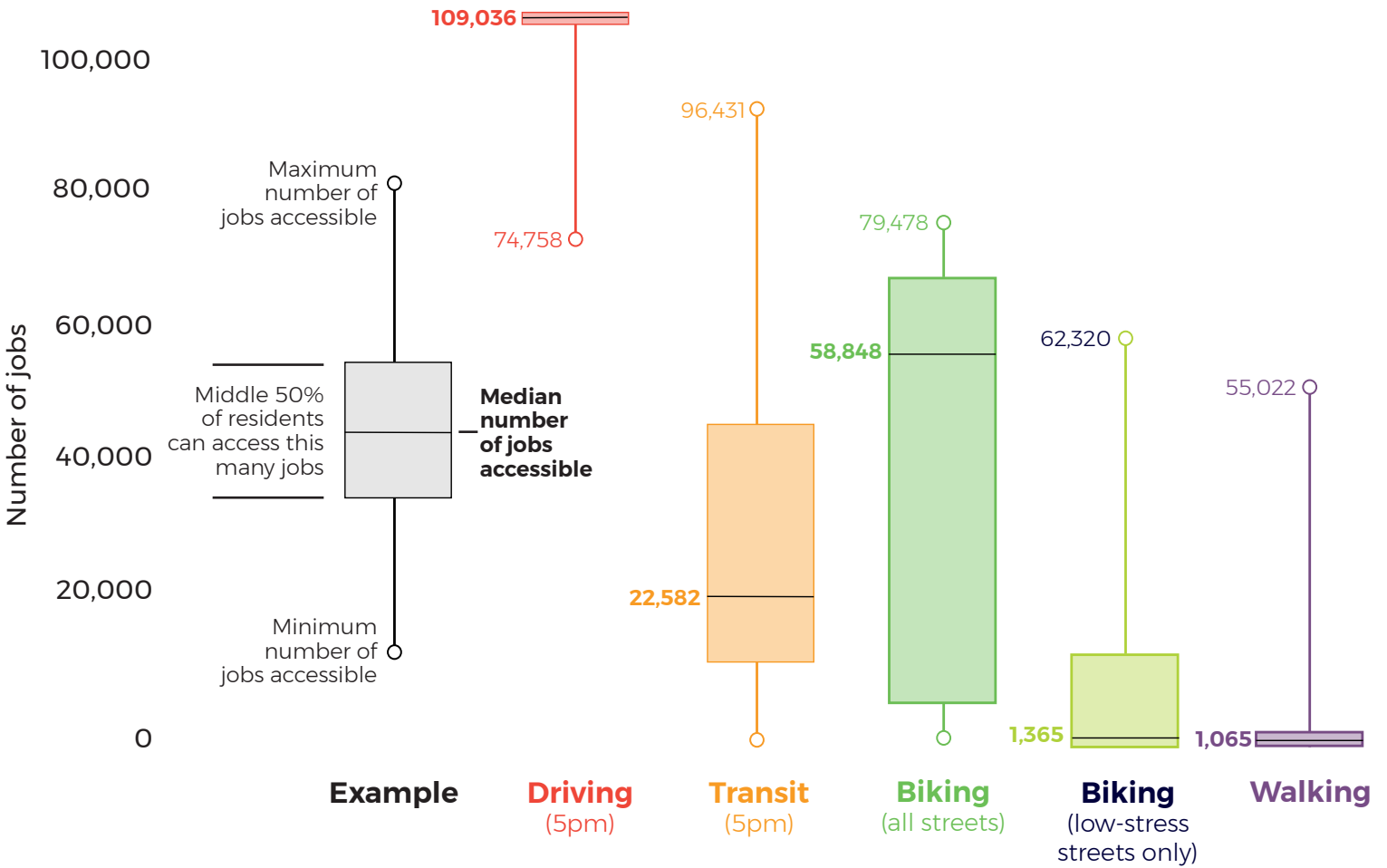
How Residents Get to Work³⁸

(Ann Arbor vs. Peer Cities, 2017)

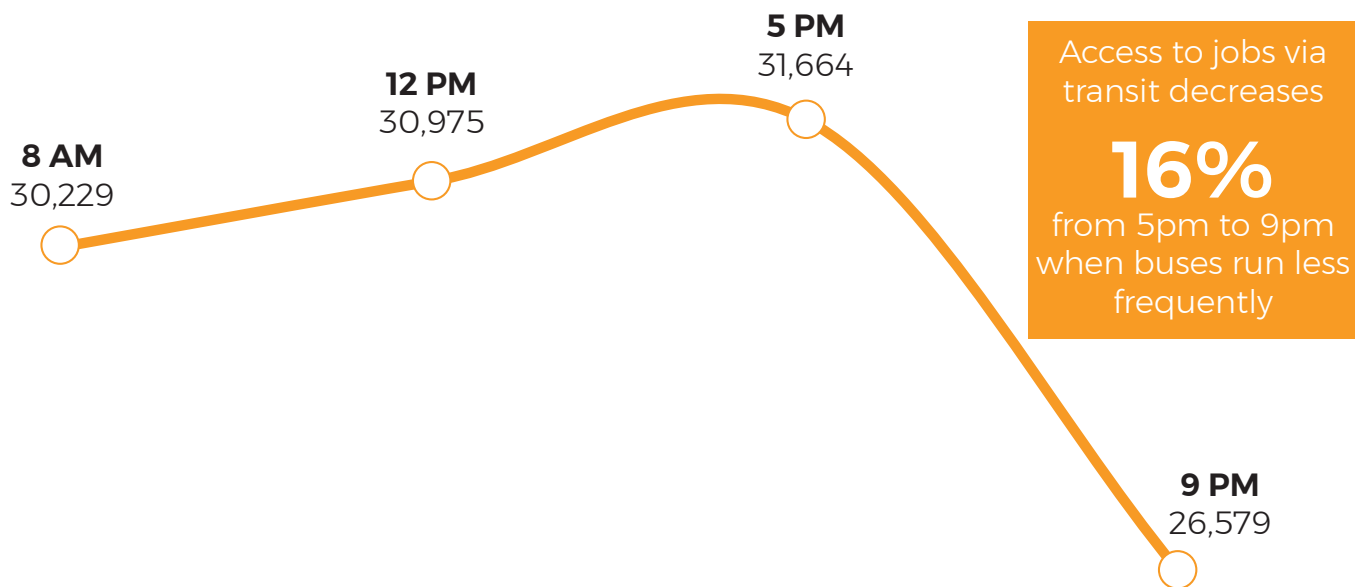
- Cars
- All other modes



Jobs Accessible in 20 Minutes Using Different Modes



Average Number of Jobs Accessible in 20 Minutes Using Transit



Transportation & the Environment



Known as “Tree Town”, Ann Arbor has a history of valuing environmental conservation, sustainability, and of recognizing the serious threats that climate change will pose to the local environment. Adoptions of the 2012 Climate Action Plan and 2013 Sustainability Framework demonstrate Ann Arbor’s commitment to environmental sustainability. The Framework included a transportation system goal of creating transportation options that foster safe, comfortable, and efficient ways for people walking, bicycling, and using public transit to travel throughout the city and region. In addition to more direct environmental benefits, street trees contribute to a more comfortable walking and bicycling environment.

Although the city has reduced community-wide greenhouse gas emissions by 12% within the last two decades, the proportion of transportation emissions remains unchanged at nearly a fifth of all emissions.³⁹ Ann Arbor has already transitioned to using biofuels in city fleets and electric and hybrid service trucks.

However, rapid advances in vehicle technology will offer greater opportunity to reduce greenhouse gas emissions by incentivizing privately-owned electric or low-emission vehicles and expanding their use among city fleets and those of partner agencies. These types of strategies will be critical to enable the city to reach the Climate Action Plan’s goal of a 25% reduction by 2025 and a 90% reduction by 2050.

Citywide % Emissions by Vehicle Type⁴⁰



13%
trucks



2%
buses

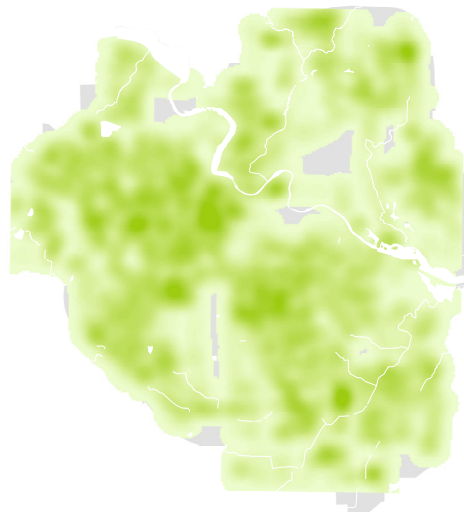
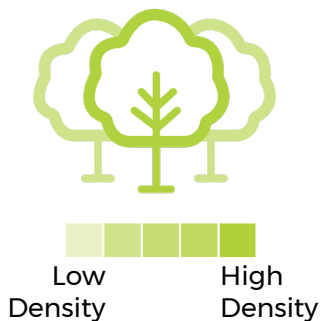


84%
passenger
vehicles

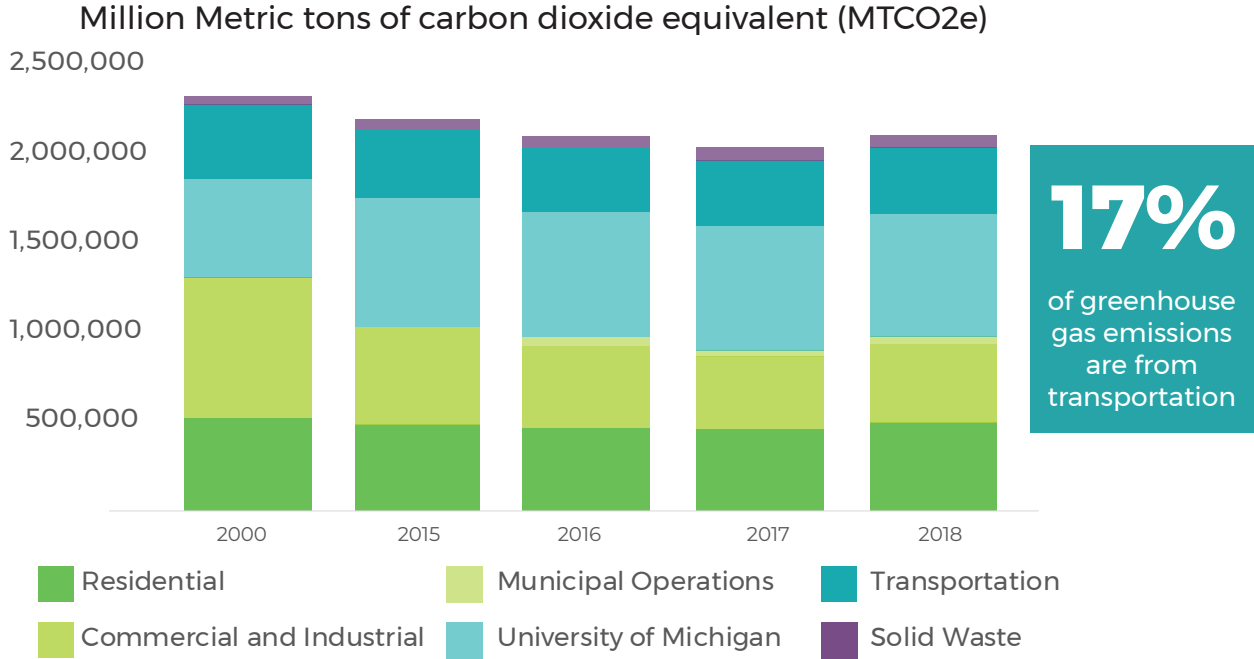


<1%
motorcycles

Street Tree Density

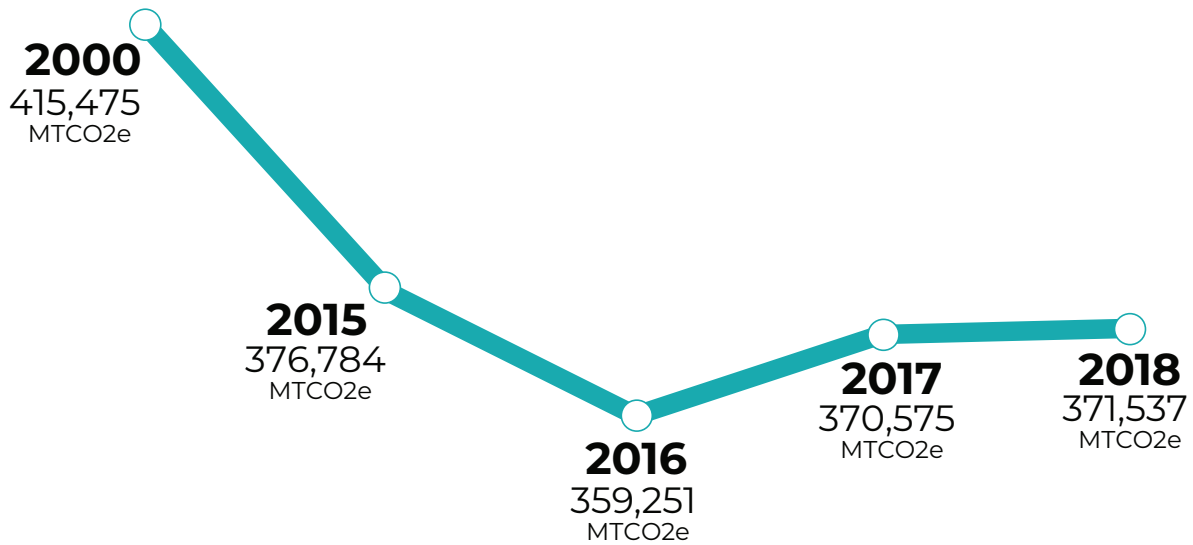


Greenhouse Gas Emissions Over the Years, Citywide⁴¹



Transportation Greenhouse Gases Emissions Over the Years, Citywide⁴²

Million Metric tons of carbon dioxide equivalent (MTCO₂e)



Transportation Equity & Health



How people get around impacts their health and well-being by influencing their physical activity, air quality, safety, and access to opportunities, goods, and services. Although the City of Ann Arbor's transportation system is becoming more sustainable and less reliant on cars, it nonetheless continues to impact the health of residents.

Despite having a population with a low risk of health problems attributed to inactive lifestyles, such as obesity, diabetes, and high blood pressure, Ann Arbor also has a low walkability score as measured by the City Health Dashboard. While current health metrics are positive, achieving good walkability could further improve those and create additional benefits, such as making transportation more affordable for lower income populations.

Populations that are typically more reliant on walking, bicycling, and taking public transit were mapped to reveal concentrations of greater need for multimodal transportation options. This analysis can help target specific types of investments to address the greatest needs in mobility.

Health Indicators⁴⁴ (City Health Dashboard)

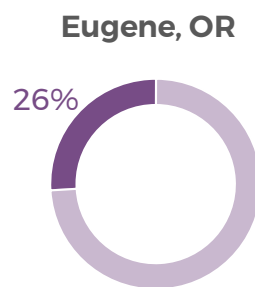
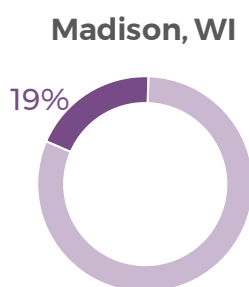
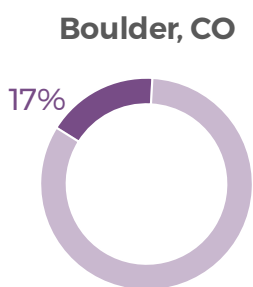
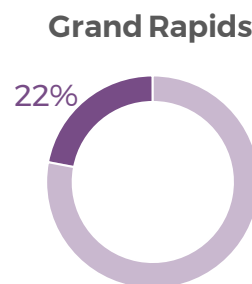
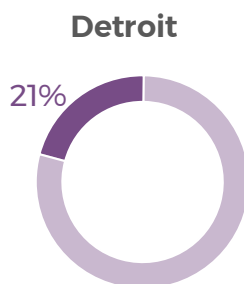
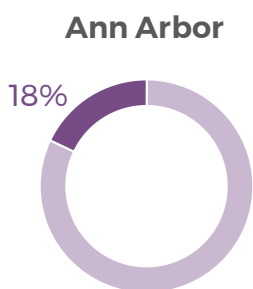
23.4%
obesity citywide

15.7%
physical inactivity citywide

68.3%
limited access to healthy foods citywide

Transportation Costs as % of Income⁴³

(H+T Affordability Index)



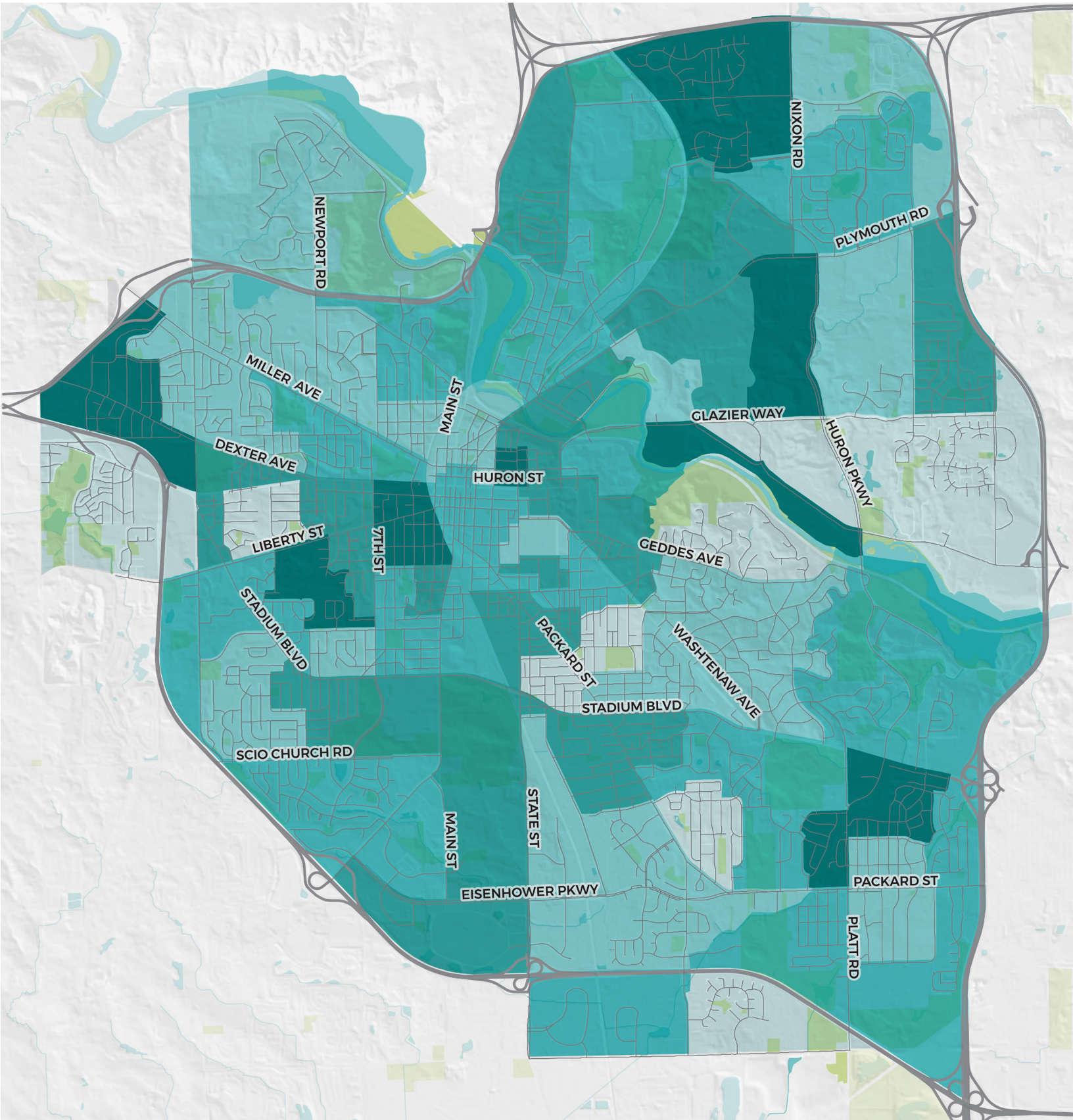
\$11,135

citywide average annual transportation costs in Ann Arbor

The Housing and Transportation Affordability Index is lower in Ann Arbor than many comparable cities, however, a higher median income than the regional and national median income impacts this metric.

Transportation Equity Needs

(U.S. Census Bureau; American Community Survey, 2016)



New Mobility

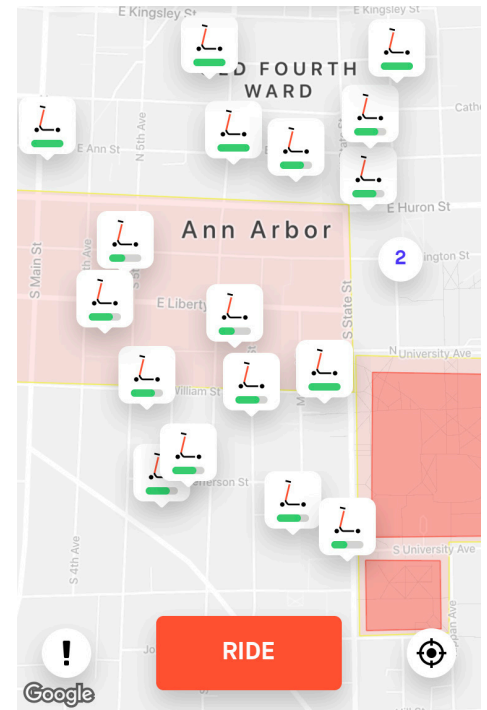
Transportation technologies, services, and business models continue to rapidly evolve and reshape how people move around urban areas. Given the infancy of these new services and technologies, many of the impacts, both good and bad, are still being determined.

Rideshare operators Uber and Lyft began operating in Ann Arbor in 2014 and have become increasingly popular options for getting around the city. According to a user survey by TheRide, in 2015, 75% of respondents had not used either Uber or Lyft in the last 30 days; by 2017, the share of respondents who hadn't used Uber or Lyft shrank to 56% and 15% of people reported using the services more than four times in the last 30 days. While ridesharing services offer users the convenience of on-demand mobility and may enable people to reduce their reliance on private cars, there is significant evidence that these services divert riders away from public transportation and increase congestion. In Ann Arbor, 18% of people said they substituted Uber or Lyft for a trip they would have previously made with TheRide.⁴⁵

Since the fall of 2018, shared electric scooters have been available for rent around Ann Arbor. Shared scooters offer the potential to expand the utility of our existing transit and active transportation networks and replace automobile use for some trips.^{46, 47} They also present a number of challenges, including user and public safety, accessible and appropriate use of the right-of-way, equity considerations, and requirements upon the City to manage negative impacts.

In addition to these new services, advances in technology are poised to change vehicles themselves. The University of Michigan has helped make Ann Arbor a leading center of research on connected and autonomous vehicles. The Mcity facility provides a controlled but realistic environment for testing and refining connected and autonomous vehicle technology. The city and the University are working together to understand the benefits these new technologies offer and how they can be used to improve safety and mobility in Ann Arbor.

Spin Scooters

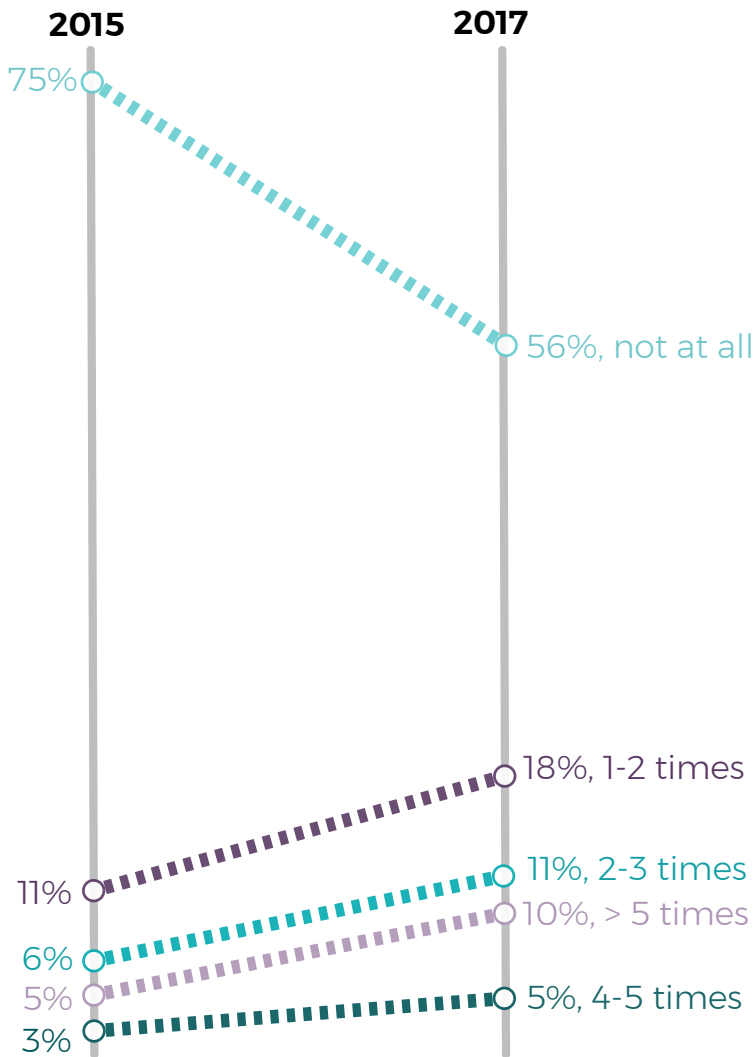


View of Spin scooters available in downtown.



How many times did you use Uber or Lyft in the last 30 days?⁴⁸

(The Ride's 2017 User Survey, n=3,096)



44%

Used Uber or Lyft at least once in the last 30 days



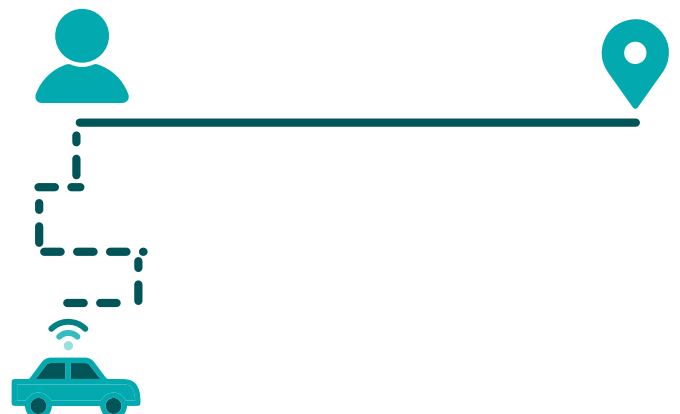
18%

Would have used The Ride for that trip before Uber/Lyft



↑ 58%
vehicle miles/trip

Private trips with Uber or Lyft generate 58% more miles of total driving, accounting for the miles driven waiting for a passenger and driving to pick up a passenger, compared to if the user drove themselves from Point A to Point B.⁴⁹



References

1. U.S Census Bureau (2018). *2017 American Community Survey Five-Year Estimates*.
2. Southeastern Michigan Council of Governments (2018). *2014-2018 Traffic Crash Data*.
3. U.S Census Bureau (2018). *2017 American Community Survey Five-Year Estimates* and U.S. Census Bureau. (2018). *2017 Longitudinal-Employer Household Dynamics Employment Statistics*.
4. U.S Census Bureau (2018). *2017 American Community Survey Five-Year Estimates*.
5. Data provided by the City of Ann Arbor
6. Data provided by the City of Ann Arbor
7. Data provided by the City of Ann Arbor
8. Data provided by the City of Ann Arbor
9. Data provided by the City of Ann Arbor
10. Data provided by the City of Ann Arbor
11. Washtenaw Area Transportation Study. (2015). *2015 WATS Travel Demand Model* and Federal Highway Administration. (2016). *2016 Urban Congestion Reports*.
12. Washtenaw Area Transportation Study. (2015). *2015 WATS Travel Demand Model*
13. Google. (n.d.) [Travel times] Retrieved November 15, 2019.
14. U.S. Census Bureau. (2018). *2017 Longitudinal-Employer Household Dynamics Origin-Destination Employment Statistics*.
15. Census Transportation Planning Package. (2019). *2016 CTPP Data*.
16. U.S. Census Bureau. (2018). *2017 Longitudinal-Employer Household Dynamics Origin-Destination Employment Statistics*.
17. U.S. Census Bureau. (2018). *2017 Longitudinal-Employer Household Dynamics Origin-Destination Employment Statistics*.
18. Census Transportation Planning Package. (2019). *2016 CTPP Data*.
19. National Transit Database (U.S.). (2018). *National Transit Database report 2017*.
20. TheRide. (2019). *TheRide General Transit Feed Specification*. Retrieved from <https://www.theride.org/AboutUs/For-Developers/Developer-Files>
21. TheRide. (2019). *TheRide General Transit Feed Specification*. Retrieved from <https://www.theride.org/AboutUs/For-Developers/Developer-Files>
22. TheRide. (2019). *TheRide General Transit Feed Specification*. Retrieved from <https://www.theride.org/AboutUs/For-Developers/Developer-Files>
23. TheRide. (2019). *TheRide General Transit Feed Specification*. Retrieved from <https://www.theride.org/AboutUs/For-Developers/Developer-Files>
24. Southeastern Michigan Council of Governments (2018). *2014-2018 Traffic Crash Data*.
25. City of Ann Arbor. (2018). *2017 Non-Motorized Progress Report*.
26. City of Ann Arbor. (2018). *2017 Non-Motorized Progress Report*.
27. U.S Census Bureau (2018). *2017 American Community Survey Five-Year Estimates* and City of Ann Arbor (2018). *City of Ann Arbor's Non-Motorized Count Program*.
28. City of Ann Arbor. (2018). *2017 Non-Motorized Progress Report*.
29. Southeastern Michigan Council of Governments (2018). *2014-2018 Traffic Crash Data*.
30. U.S Census Bureau (2018). *2009-2018 American Community Survey Estimates* and Michigan

31. Traffic Crash Facts. (2018). *Crashes for the Years 2009 – 2018*. Retrieved from <https://www.michigantrafficcrashfacts.org>
32. Southeastern Michigan Council of Governments (2018). *2014-2018 Traffic Crash Data*.
33. Leaf, W.A., Preusser, D.F. (1999). *Literature Review on Vehicle Travel Speeds and Pedestrian Injuries*. National Highway Traffic Safety Administration.
34. Southeastern Michigan Council of Governments (2018). *2014-2018 Traffic Crash Data*.
35. Siemens. (2016). *Ann Arbor SCOOT Mobility Study*.
36. National Association of City Transportation Officials (2013). *Global Street Design Guide*
37. Data provided by TheRide. (2018).
38. U.S Census Bureau (2018). *2017 American Community Survey Five-Year Estimates*
39. Data provided by the City of Ann Arbor.
40. Data provided by the City of Ann Arbor
41. Data provided by the City of Ann Arbor
42. Data provided by the City of Ann Arbor
43. Center for Neighborhood Technology. (2015). *Housing and Transportation Affordability Index*.
44. City Health Dashboard. (2015). City Health Dashboard Data. Retrieved from www.cityhealthdashboard.com.
45. TheRide. (2017). *A Survey of Users of TheRide A Service of the Ann Arbor Area Transportation Authority*.
46. PBOT E-Scooter User Survey - <https://www.portlandoregon.gov/transportation/article/700917>
47. > 21% of personal automobile trips in the US are under 1 mile. Federal Highway Administration National Household Travel Survey - <https://nhts.ornl.gov/vehicle-trips>
48. Siemens. (2016). *Ann Arbor SCOOT Mobility Study*.
49. Schaller, B. (2018). *The New Automobility: Lyft, Uber, and the Future of American Cities*.