



02. EXISTING ENVIRONMENT

INTRODUCTION

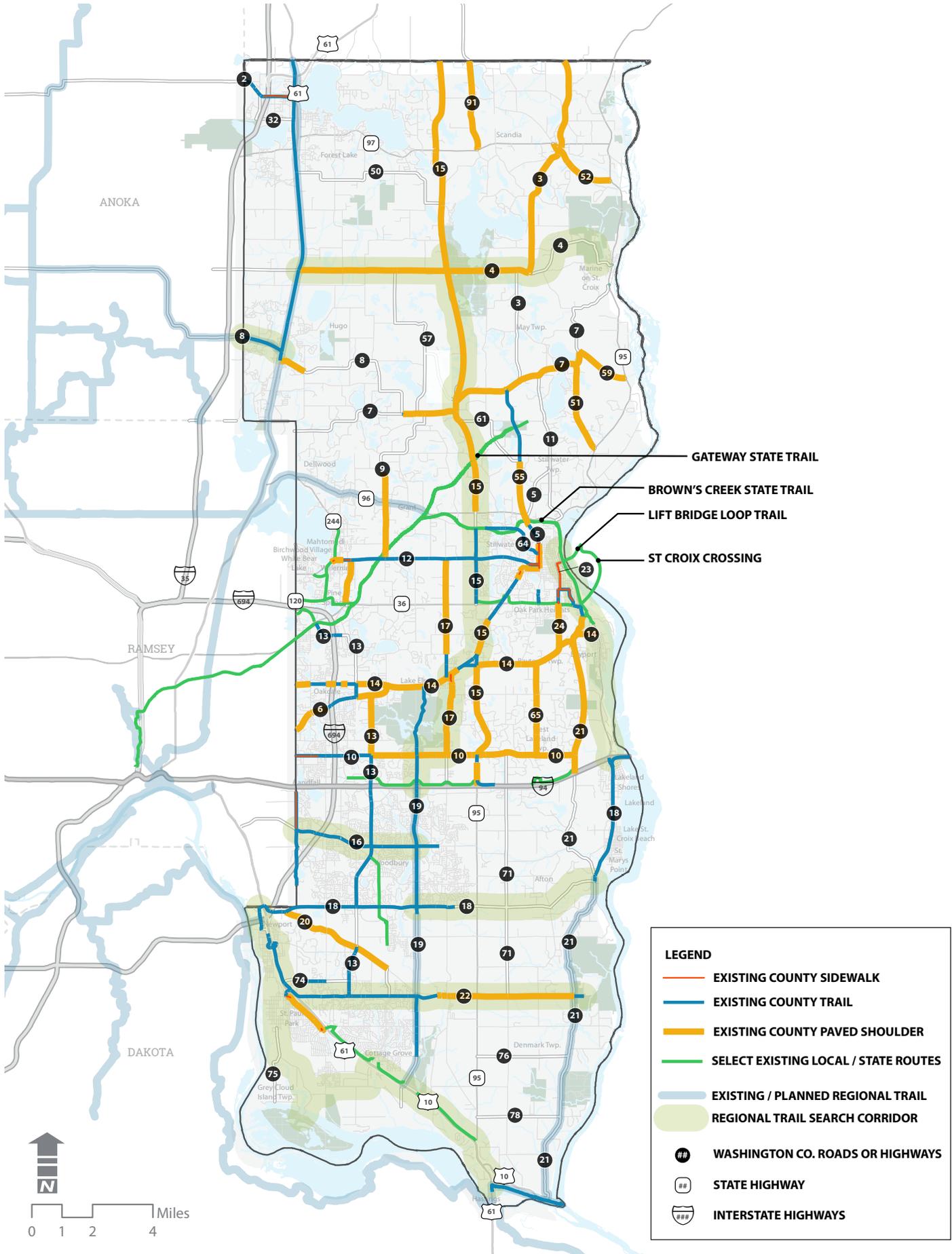
This chapter evaluates the characteristics of the existing transportation and built environment, county demographics and the demand for biking and walking, biking and walking travel behaviors and attitudes, and the safety of those who bike and walk. This analysis was used to help build the Future Network Plan and plan recommendations.

PUBLIC INPUT

During the existing conditions analysis, public input (see Chapter 1) was used to help to 'ground truth' data, as well as inform the factors used in the analysis. Where applicable community feedback is noted in this chapter with grey callout boxes.

WHAT WE'VE HEARD

Figure 2.1 Existing Bike and Pedestrian Facilities in Washington County



POPULATION FORECASTS

Washington County was reported by the State Demographer to be the third fastest growing county between 2010 and 2018. Washington County is expected to continue this type of growth as it looks out to the year 2040 (see Table 2.1). As part of this growth, Washington County and its local partners have been committed to building a multi-modal transportation network. It is also important to recognize Washington County's changing demographics (e.g., an aging population and increased racial/ethnic diversity). Planning for a multi-modal transportation networks will need to take into consideration these changing demographics, which are discussed in the Washington County 2040 Comprehensive Plan.

Table 2.1 Metropolitan Council Forecasts for Washington County

YEAR	POPULATION	HOUSEHOLDS	EMPLOYMENT
2010	238,136	87,859	71,897
2020	269,970	102,590	88,860
2030	305,600	118,620	96,540
2040	336,810	132,500	103,490

SYSTEM CHARACTERISTICS

Washington County's multi-modal network is comprised of over 240 miles of bicycle and pedestrian facilities, which complements the county's 35 miles of state and regional trails (see Figure 2.1 and Table 2.2). The county's network consists of paved shoulders, paved trails, and sidewalks along county roads in some urban areas. Paved shoulders less than 5.5' in width are not considered as part of the existing bicycle and pedestrian network. Table 2.2 does not include local (city) bicycle and pedestrian networks. Combined, the local, county, and regional systems play an important role in moving people throughout the county.

Table 2.2 Washington County Bicycle and Pedestrian Network

TRAIL OR SIDEWALK	LENGTH
County Sidewalks	9.3 Miles
County Trails*	65.0 Miles
Shoulders ≥ 5.5' on county Roads	167.2 Miles **
Regional Trails	19.1 Miles
State Trails	16.5 Miles
Total***	277.1 Miles

* Washington county trail total equals miles of road with county trails alongside them.

** Center lane miles

*** Total does not include county Roads without shoulders and with shoulders less than 5.5' on both sides.

STATE DEMOGRAPHER

According to the State Demographer, the fastest growing counties by population between 2010 and 2018 were Carver (16.4% increase), Scott (12.5%), Washington (9.8%), Wright (9.5%) and Hennepin (9.4%). The counties that added the most residents between 2010 and 2018 on net were Hennepin (+108,679), Ramsey (+43,592), Dakota (+30,006), Anoka (+27,007), Washington (+23,376), and Scott (+16,183). Forty-five counties have lost population since 2010.



WHAT WE'VE HEARD

One of the most prevalent comments received through community engagement regarding the existing bike and pedestrian system is a concern for narrow and inconsistent shoulder widths along county roads.



TRANSPORTATION TRIPS

Transportation trips can be classified as all trips whose primary purpose isn't for exercise and recreation and are destination focused. Examples of transportation trips include trips to:

- » visit friends/family
- » shopping/run errands
- » restaurants, bars, and other entertainment
- » cultural, religious, or community events
- » work
- » school
- » make connections with transit



DATA NOTES

The US Census does not account for partial trips; if a resident decides to bike to the nearest transit stop and take the bus to work, that trip will likely be counted as a transit trip if the transit portion of the trip is longer in length.

Every person, regardless of their main travel mode, is a pedestrian at one point in time whether it's walking (or rolling) from their car to their work entrance, walking to the transit stop, or walking to a neighbors house to carpool to work.



EXISTING TRAVEL BEHAVIOR AND HOUSEHOLD CHARACTERISTICS

Data available through the US Census Bureau and the Minnesota Department of Transportation (MnDOT) help paint a picture of how Washington County residents are currently getting around the county and to other destinations. This section provides a summary of this data.

BIKE AND WALK MODE SHARE

A large majority of daily transportation trips occur between the home and work. Analyzing how residents get to work provides a snapshot of typical mode share. Mode share is the percentage of travelers using a particular type of transportation. Figure 2.2 highlights how Washington County residents get to work most days of the year. Findings from this assessment include:

- » An estimated 83% of Washington County residents drive to work compared to 76% of all US citizens.
- » Approximately 286 people bike to work in Washington County and an estimated 1,340 people walk to work.
- » Non-motorized transportation accounts for 1.2% total in Washington County.
- » Walking and biking as a means of getting to work has stayed relatively the same since 2000 (see Table 2.33) in Washington County.

Figure 2.2 Means of Transportation to Work in Washington County

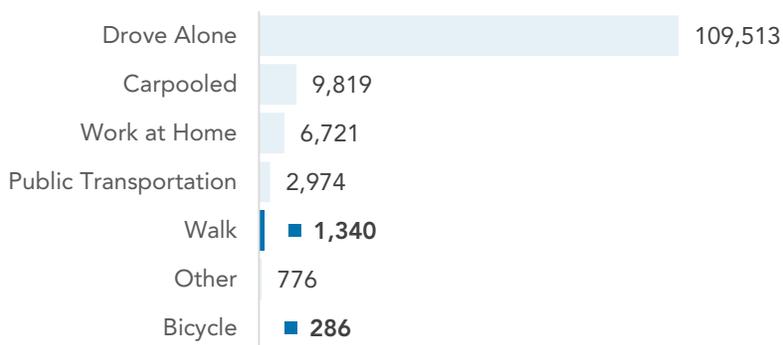


Figure 2.3 Vehicle Competitive Households in Washington County



SELECTED HOUSEHOLD CHARACTERISTICS

When a household has more workers than it has vehicles, it is classified as a vehicle-competitive household. People within a vehicle-competitive household are oftentimes faced with the decision of how they are going to get around, because they do not have the option to drive for every trip. Options for these people include alternative work schedules, or choosing other means of transportation, such as carpooling, transit, walking, or biking.

Other vehicle household characteristics include those who do not own a vehicle (zero vehicle households) by choice or for financial or ability reasons. For example, it costs an average of \$8,849 to operate the average car for 2018, or about \$737 per month¹. This amount factors in all costs of auto ownership over the life of the vehicle. For those living at or below the poverty level, vehicle ownership can be a significant cost burden. This cost burden may be eliminated or significantly lowered if a safe and convenient non-motorized transportation network exists.

Washington County's vehicle household characteristics are highlighted below:

- » **Vehicle-Competitive Households:** Figure 2.3 highlights the number of vehicle-competitive households in Washington County. This data suggests that not every eligible driver in the county needs to own a car, and that some households may be able to supplement some trips by walking or biking to nearby destinations.
- » **Zero Vehicle Households:** There are 2,752 zero vehicle households in Washington County (Table 2.44). These homes are primarily located inside the I-494 beltway. The number of zero vehicle households may be relatively small (3%), but still calls attention to the number of Washington County residents who rely on other modes of transportation.
- » **Poverty Status:** As seen below (Table 2.55), 12,251 (5.0%) Washington county residents live at or below the poverty level. A disproportionate level of minority populations live below the poverty level in Washington County.

Table 2.5 Poverty Status in Washington County

RACE/ETHNICITY	TOTAL POPULATION	BELOW POVERTY LEVEL	% BELOW POVERTY LEVEL
Population Below Poverty Level	247,183	12,251	5.0%
White	214,363	9,241	4.3%
Black or African American	9,462	1,380	14.6%
American Indian	697	67	9.6%
Asian	13,388	526	3.9%
Hispanic or Latino	9,680	1,415	14.6%
Other	9,273	1,037	11.2%

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

¹ Your Driving Costs: How Much Are You Really Paying to Drive? [Brochure]. (2018 Edition) Heathrow, FL: AAA Association Communication

Table 2.3 Bike/Walk Mode Share Over Time in Washington County

MODE	% SHARE		
	2000	2010	2016
Bicycle	0.1%	0.2%	0.2%
Walk	1.1%	1.4%	1.0%

Source: U.S. Census Bureau, Multiple Years

Table 2.4 Zero Car Households in Washington County

HOUSEHOLD TYPE	HOUSEHOLDS	PERCENT
Number of Zero Vehicle Households	2,752	3.0%
Total Households	92,005	100.0%

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

TRAVEL DISTANCE AND DESTINATION

For all modes of transportation, the majority of Washington County residents have a commute to work that is longer than 10 minutes (see Figure 2.66). However, there are almost 13,000 residents that have less than a 10-minute commute. Because such a large gap exists between the amount of people who are currently walking and biking to work (1,626 people) and the amount of people who have less than a 10-minute commute (~13,000 people), there is greater potential to increase the non-motorized transportation mode share through education and improved facilities.

Figure 2.6 Travel Time to Work



Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

ORIGIN-DESTINATIONS

Quantifying the number of people biking and walking is a difficult task to achieve at a county level. New data sources are becoming available to quantify the number of users and pinpointing their routes. These data sets are typically being collected through people who have opted into mobile applications that track their movement (e.g., fitness applications). One data source in particular includes StreetLight® data, which is an aggregate of GPS records collected from cellphone providers. This data set was available to Washington County through the Minnesota Department of Transportation (MnDOT) during the development of this study.

The data set was used to provide a snapshot of bicycle trips starting (origin) and ending (destination) in Washington County. The chords (links) in Figure 2.4 and Figure 2.5 demonstrate the bicycle trips occurring between communities. Most trips are starting or ending in Oak Park Heights, Oakdale, Stillwater, and Woodbury. Figure 2.77 - Figure 2.99 also provide a snapshot of common characteristics associated with these bicycle trips. For example, the average bicycle trip is under 20 minutes (85%), under two miles in length (88%), and under ten miles per hour (90%). These figures suggest most trips are occurring at shorter distances.

Figure 2.7 Average Bicycle Speed in MPH

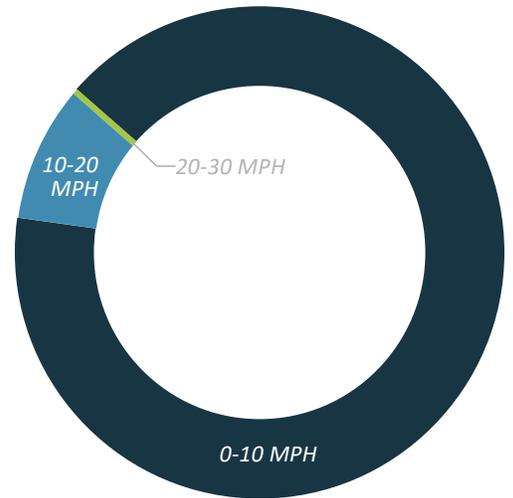


Figure 2.8 Average Bicycle Trip in Miles

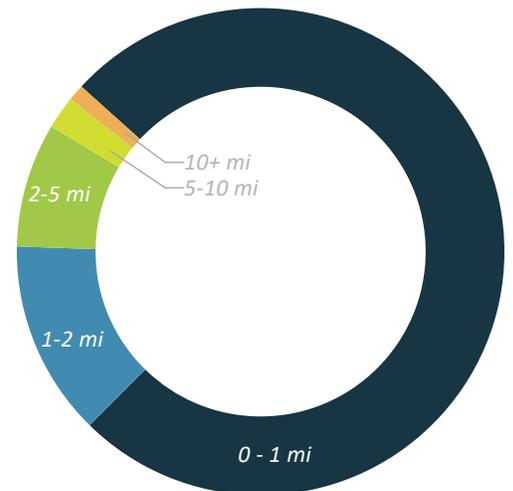
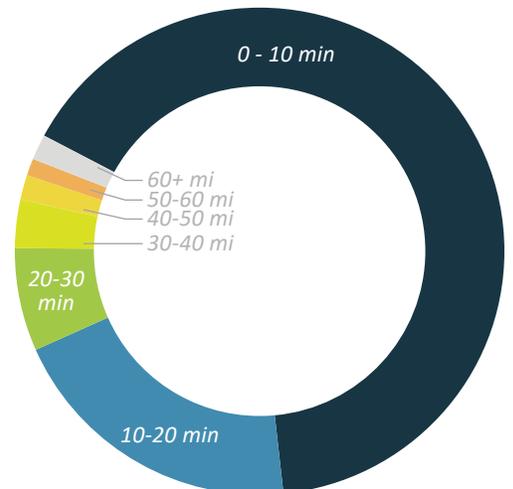


Figure 2.9 Average Bicycle Trip in Minutes



WHAT WE'VE HEARD

The following are top destinations for walking or biking, as identified through community engagement:

- » METRO Gold Line / 494 Transit Station Areas
- » 3M Campus
- » FedEx/Century College
- » All elementary, middle, and high schools
- » Shopping and commercial areas
- » Duluth Junction
- » Regional / County / State Parks
- » Regional and State Trails
- » Lakes and rivers
- » Nature Centers
- » City centers / downtowns
- » Fitness centers
- » District / Community Ed locations

DEMAND FOR WALKING AND BIKING

A demand analysis was performed to identify areas in Washington County that are likely to generate high levels of bicycle and walking activity. This analysis reveals areas where there is potentially a need for pedestrian and bicycle facilities, if they do not already exist today. The demand analysis is based on existing conditions and takes into account the following socioeconomic, connectivity, and destination factors:



SOCIOECONOMIC FACTORS

- » Population density
- » Population density of people younger than 18 years old and older than 65 years old
- » Population density of people who bike, walk, and take transit to work
- » Population density of people who have a commute that is 10 minutes or less
- » Household density of households in poverty
- » Household density of households with zero vehicles



CONNECTIVITY FACTORS

- » Intersection density
- » Bus Stop Locations
- » Future METRO Gold Line BRT Stop Locations



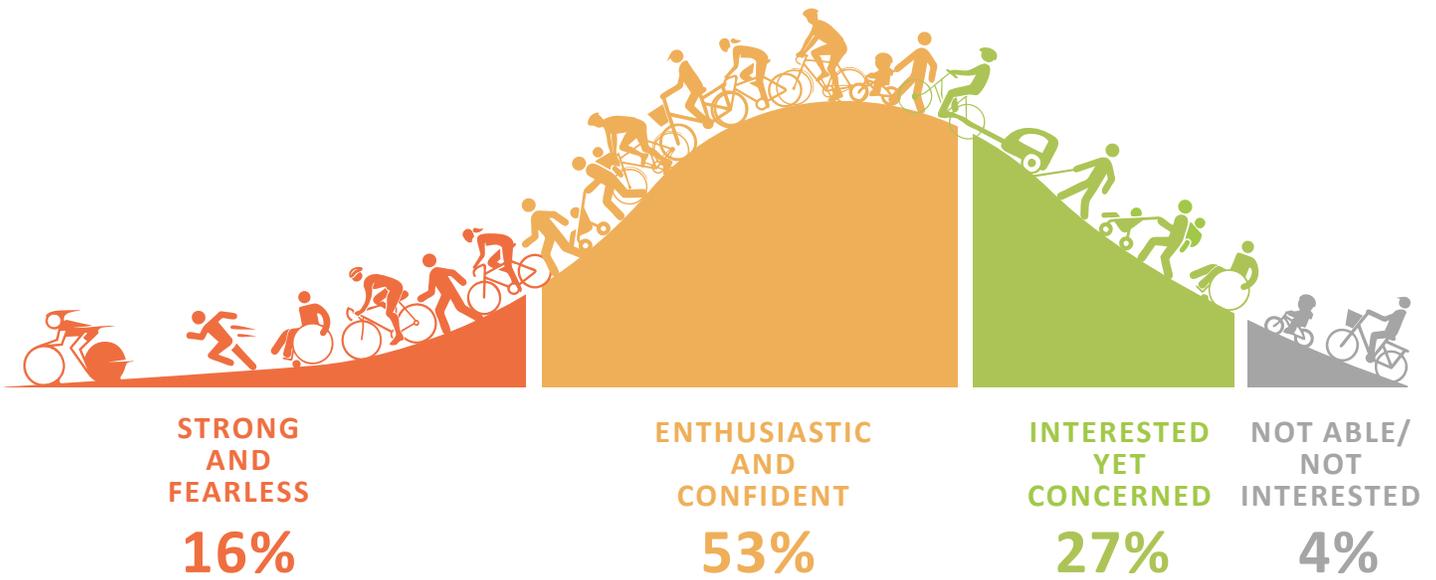
DESTINATION FACTORS

- » Retail property density
- » Schools (grades K-12)
- » Regional Parks, State Parks, and Natural Features
- » Trailheads
- » Job density

The factors above were layered together to produce a heat map (see Figure 2Figure 2.1010). Areas in darker blue indicate higher demand for biking and walking destinations. In general, these areas contain many of the factors described above when layered together. Areas in green contain only a few of the factors, while no color represents areas that do not contain any of the factors. Areas without color still serve as opportunities for future connections between neighborhoods and higher demand destinations. However, these destinations may change over time as the county's population grows and develops.



Figure 2.11 Identified Levels of Comfort (as reported in the Washington County Biking & Walking Survey)



WHAT WE'VE HEARD

Nearly 400 Washington county residents participated in a web survey during the spring/summer of 2020, which gathered information about community preferences for biking and walking. The results show that over half of participants identify as “Enthusiastic and Confident” in their abilities to get around using non-motorized transportation. Approximately 27% of participants identify as “Interested Yet Concerned”. Generally, the filling of gaps in the separated off-road trail network significantly improves the chances that folks in this category will one day consider upgrading their status to “Enthusiastic and Confident” or even to “Strong and Fearless.”

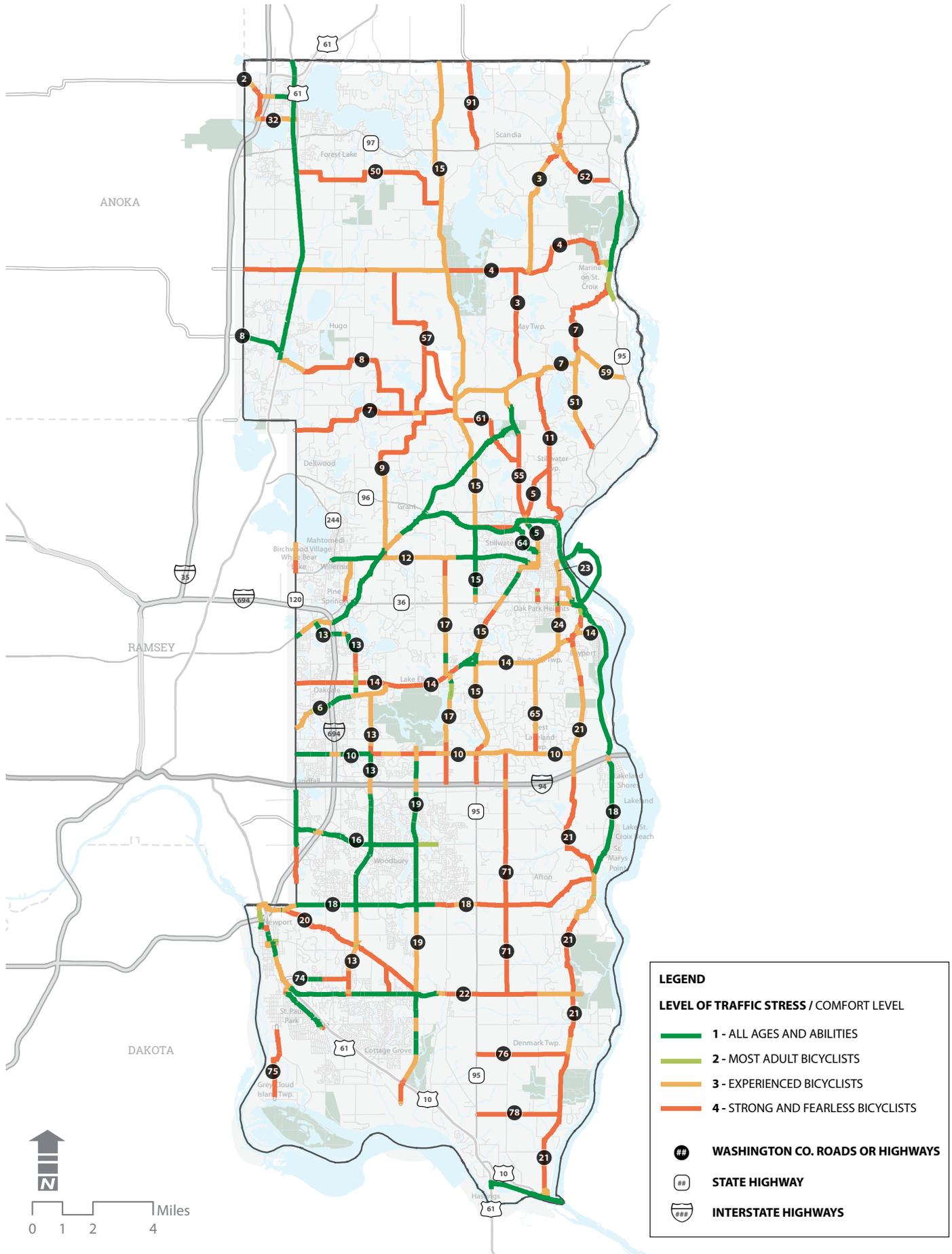
DEFINING COMFORT

Not all people have the same level of comfort when it comes to bicycling. Originally developed by Roger Geller at the City of Portland (OR) the “Four Types of Bicyclists” (see Figure 2.711) are meant to guide efforts in assessing what certain segments of a population require or want in a bikeway facility. Geller suggested that most people can be categorized into the following four groups:

1. Strong and Fearless: People willing to bicycle with limited or no bicycle-specific infrastructure
2. Enthusiastic and Confident: People willing to bicycle if some bicycle-specific infrastructure is in place
3. Interested Yet Concerned: People willing to bicycle if high-quality bicycle infrastructure is in place
4. Not Able or Interested: People unwilling to bicycle even if high-quality bicycle infrastructure is in place

These typologies help us identify which segments of the population need lower stress facilities to try bicycling or to bicycle more often. Most communities find that as they build safer and more comfortable bicycle facilities, the number of people bicycling increases. This is due to the fact that one of the largest groups of bicyclists identify as “Interested Yet Concerned” with biking. When bicycle facilities are built to the needs of the “Interested Ye Concerned”, the results of investment yield the highest number of users. Additionally, when more people start bicycling because of a more comfortable network, biking becomes safer due, to the fact that motorists are more aware of the bicyclists presence.

Figure 2.12 Washington County Level of Traffic Stress / Comfort Analysis



WHAT IS COMFORT?

Comfort and perceived safety are strongly tied to bicycling and walking behavior. If people do not feel comfortable or safe bicycling and walking, they are unlikely to walk or bike for transportation or recreation.



LEVEL OF COMFORT FINDINGS

Overall, most of the county system accommodates the “experienced bicyclist” and the “strong and fearless bicyclists.” This is depicted in Map 1.3 and summarized in the table below.

These findings should not be perceived as a negative, but merely as a benchmark for moving forward. These findings also serve as an opportunity for helping identify improvements on the existing system and opportunities to expand the multi-modal network that accommodates all age groups and abilities.

LEVEL OF COMFORT ANALYSIS

A Level of Comfort analysis was performed to understand the level of comfort or stress bicyclists face on the existing system. While this analysis traditionally focuses on bicyclists, the outcomes are easily translatable for pedestrian experiences. Level of comfort is influenced by the following:

- » **Traffic Volume:** High volume of adjacent traffic is stressful and less desirable for bicyclists, especially when sharing the road with vehicles.
- » **Traffic Speed:** High speed of adjacent traffic is stressful and less comfortable for bicyclists, especially when sharing the road with vehicles.
- » **Separation:** Adjacent vehicle traffic in close proximity is stressful and less comfortable for most bicyclists. Separating bicyclists from the road (e.g., off-street trails) are the most comfortable routes to experience. Off-street trails also provide safer routes for pedestrians.
- » **Crossings:** Unmarked or un-signalized intersections can be stressful and uncomfortable for both pedestrians and bicyclists. Crossing driveways and access roads can also be stressful for pedestrians and bicyclists. Visible and comfortable pedestrian and bicycle crossings require site-specific design elements. Not every crossing is stressful or uncomfortable.

The existing Washington County system, along with state and regional trails, were scored based on these factors to determine a Level of Traffic Stress (LTS). The LTS analysis shows the least and most stressful routes for bicyclists.

The LTS scores for Washington County have been translated to correspond to Level of Comfort (see Figure 2.11 and Table 2.6). For example, the most comfortable facilities (or the least stressful) are referred to as facilities for “all ages and abilities.” These facilities are generally comfortable for people of a wide range of abilities, ages and perceptions of safety. The least comfortable facilities (most stressful) are referred to as facilities for “strong and fearless bicyclists.” These facilities are adjacent to or intersect with high vehicle speeds and multiple traffic lanes. These facilities are generally uncomfortable for most bicyclists and pedestrians, with the exception of highly experienced road cyclists.

Table 2.6 Overall Level of Comfort (LTS) in Washington County

FACILITY IS COMFORTABLE FOR:	MILES	PERCENT
All Ages and Abilities (LTS 1)	82.2	25.8%
Most Adult Bicyclists (LTS 2)	4.3	1.4%
Experienced Bicyclists (LTS 3)	104.4	32.7%
Strong and Fearless Bicyclists (LTS 4)	128.1	40.1%
Total	319.0	100.0%

SAFETY OF BICYCLISTS AND PEDESTRIANS

Crash data was reviewed for crashes involving people walking and bicycling from 2013 - March 2018. The locations of these crashes are illustrated in Figure 2.13. However, existing crashes do not provide a full picture of safety issues for people walking and biking. The lack of documented crashes at certain locations may indicate that people are unwilling to bike or walk in these locations because they do not feel safe. The purpose of this assessment is to provide a general overview of reported crashes (see Table 2.7). It is important to recognize the data presented throughout this section is based on reported crashes and an interpretation of crash reports. Not all crashes are reported by people, so it is unclear on the exact number of pedestrian and bicycle crashes occurring on the system. Findings from this analysis provide a general understanding of pedestrian and bicycle crashes.

LOCATION OF CRASHES

Most bicycle crashes occurred at a stop-controlled intersection (52%) with the second most common location being a signalized intersection (30%)(see Table 2.8). The most common locations for pedestrian crashes were listed as occurring in an other/unknown location or not at an intersection (57%)(see Table 2.9).

Table 2.7 Total Pedestrian and Bicycle Crashes

NUMBER OF CRASHES				
2013	2014	2015	2016	2017
37	44	38	49	50

Table 2.8 Location of Crashes Involving Bicyclists

LOCATION OF BIKE CRASHES	FREQUENCY	PERCENT OF TOTAL CRASHES
Signalized Intersection	31	30%
Stop Controlled Intersection	55	52%
Roundabout	3	3%
Interchange (on Ramp)	1	1%
Driveway Access	3	3%
Other/Unknown/Not at Intersection	12	11%

Table 2.9 Location of Crashes Involving Pedestrians

LOCATION OF PEDESTRIAN CRASHES	FREQUENCY	PERCENT OF TOTAL CRASHES
Signalized Intersection	17	14%
Stop Controlled Intersection	28	24%
Roundabout	1	1%
Driveway Access	5	4%
Other/Unknown/Not at Intersection	68	57%

WHAT WE'VE HEARD

The following are some of the most commonly voiced safety concerns raised by residents through community engagement. Note that most are referring to intersection crossings:

- » Inconsistent, narrow, or missing segments of paved shoulders along roadways
- » Need for pedestrian signals or better signal timing for existing signals at crosswalks
- » Low visibility of pedestrians crossing at intersections
- » Need for more visible crosswalks near schools
- » Vehicle speeds and enforcement of pedestrian crosswalks at roundabouts



TYPE/CAUSE OF CRASHES

Most bicycle crashes were caused by a vehicle turning left or right (45%)(see Table 2.10), where most pedestrian crashes were caused by vehicles or pedestrians failing to follow traffic control or inattention/distracted (50%)(see Table 11).

CRASH SEVERITY

The number to fatal and serious injury (incapacitating) crashes has remained about the same from 2013-2017 for bicycle crashes; however, these types of pedestrian crashes shows an increase every year from 2014-2017 (see Tables 2.12 - 2.13).

Table 2.10 Cause of Bicycle Crash

CAUSE OF BICYCLE CRASH	FREQUENCY	PERCENT OF TOTAL CRASHES
Vehicle Turning Left	22	21%
Vehicle Turning Right	25	24%
Vehicle Failure to follow Traffic Control or Inattention/Distracted	16	15%
Bicycle Failure to follow Traffic Control or Inattention/Distracted	25	24%
Other/Unknown	17	16%

WHAT WE'VE HEARD

“We need to be able to get to practical places without fearing the traffic.”

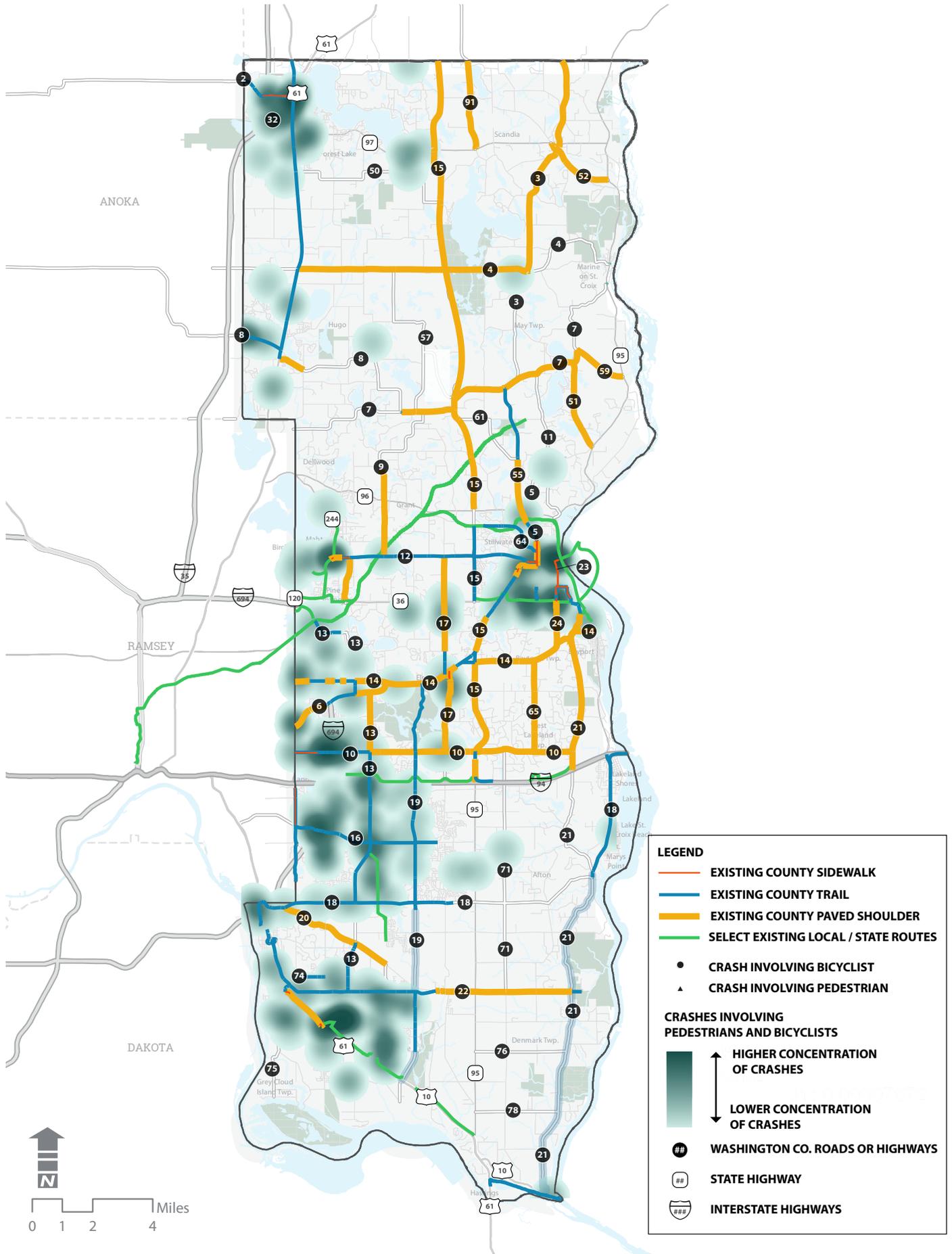
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Table 2.11 Cause of Pedestrian Crash

CAUSE OF PEDESTRIAN CRASH	FREQUENCY	PERCENT OF TOTAL CRASHES
Vehicle Turning Left	16	13%
Vehicle Turning Right	6	5%
Vehicle Failure to follow Traffic Control or Inattention/Distracted	32	27%
Pedestrian Failure to follow Traffic Control or Inattention/Distracted	27	23%
Other/Unknown	38	32%

Figure 2.13 Washington County Crashes Involving Bicyclists and Pedestrians (2013 - March 2018)



SYSTEMATIC SAFETY ANALYSIS

Opportunity for further safety analysis may include identifying patterns and crash risk associated with different infrastructure conditions and environments. This analysis would help support a proactive approach to improving bicycle and pedestrian safety.

Tools such as pedbikesafe.org also provide practitioners with the latest information available for improving the safety and mobility of those who walk and bike. These tools and others should be considered when exploring safety improvements for various infrastructure conditions.

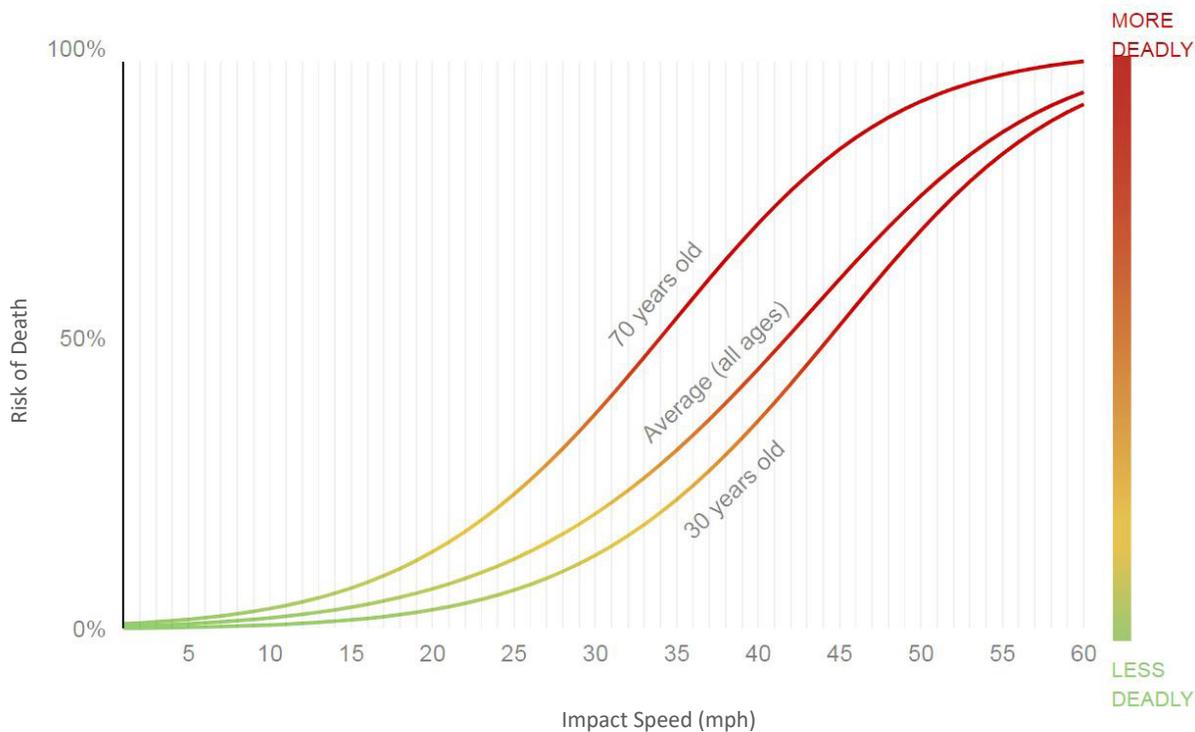
Table 2.12 Severity of Bicycle Crashes

CRASH SEVERITY	2013	2014	2015	2016	2017	2018 (ONLY THRU MARCH)
Fatal	1	1	1	0	1	0
Incapacitating Injury	2	2	0	2	1	0
Non-Incapacitating Injury	7	11	7	11	9	1
Possible Injury	6	11	15	4	8	1
Property Damage Only	0	1	0	0	2	0
Total	16	26	23	17	21	2

Table 2.13 Severity of Pedestrian Crashes

CRASH SEVERITY	2013	2014	2015	2016	2017	2018 (ONLY THRU MARCH)
Fatal	3	0	0	1	2	0
Incapacitating	2	4	5	6	7	1
Non-Incapacitating	11	5	2	17	12	1
Possible Injury	5	9	8	5	3	2
Property Damage Only	0	0	0	3	5	0
Total	21	18	15	32	29	4

Figure 2.14 Impact Speed and Risk of Pedestrian Death



Source: "Unsafe at Many Speeds". Lena Groeger. <https://www.propublica.org/article/unsafe-at-many-speeds>

ISSUES AND CHALLENGES

Pedestrian and bicycle facilities should be designed for use by people of all ages and abilities. There are a variety of issues and challenges in the county that can make bicycling and walking difficult for even the most confident bicyclists and pedestrians.

Man-made and environmental physical barriers within the county that may hinder biking and walking include:

» Rivers, Streams, and Lakes

Washington County is home to many water features for its residents to enjoy. Unfortunately, crossing over these features can be challenging without structures (e.g., bridges and boardwalks), which can be costly.

» Highways and Freeways

Roadways with limited access and high speeds of traffic are difficult to cross and in some cases, illegal to cross as a pedestrian and bicyclist.

» Railroad Corridors

Rail corridors throughout the county can be hazardous to cross at improper locations. Rail crossings require careful coordination with railway companies.



The top locations for crashes involving pedestrians and bicyclists are highlighted in Figure 2.13. Most of these locations occur where there is high demand for walking and biking and major transportation barriers are both present. Most of these locations are destination-rich and come with the challenge of balancing automobile mobility and access with the safety of pedestrians and bicyclists.

While the county may be connected through trails (state, county, regional, and local), county roads, and local roads, only 25% of the county's existing bicycle and walking network is identified as comfortable for all ages and abilities. Vulnerable populations that do not or cannot drive are more affected by missing gaps in the network of comfortable biking and walking facilities. Even places along existing trails, such as the Gateway and Brown's Creek trails, can be uncomfortable for bicyclists and pedestrians because the trails cross high speed highways at grade. Grade separated infrastructure (tunnels or bridges) is often an expensive solution, and may not always be the best solution to address safety. Traffic slowing or calming, increasing visibility and/or providing adequate signals may be just as effective to improving user comfort at crossings and throughout the overall ped/bike network.

Policy and education based issues and challenges such as trail winter maintenance, awareness of trail locations, trail etiquette and driving laws, as well as vehicle speeds also affect the comfort and accessibility for biking and walking in Washington county.

