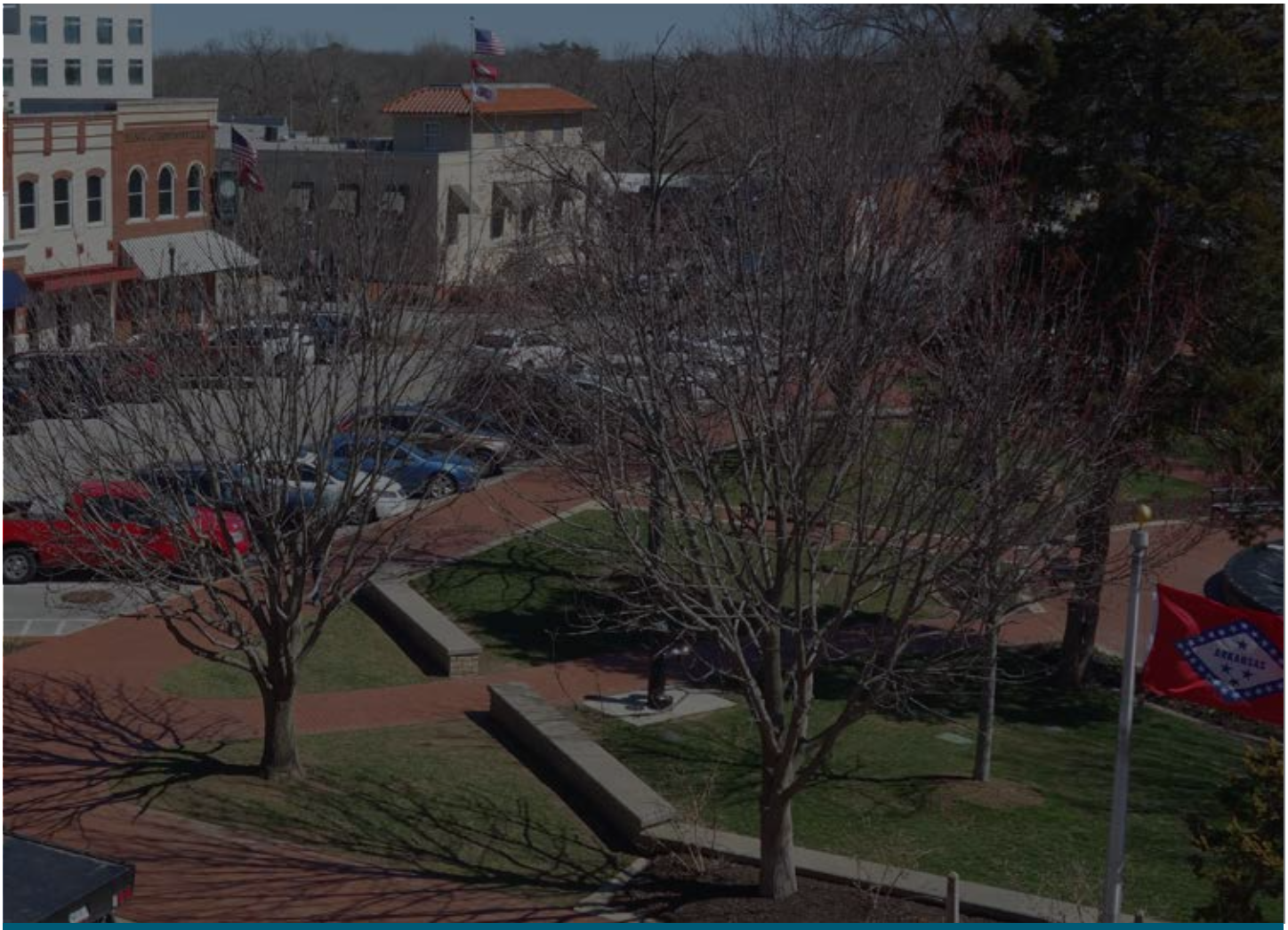
connecting BENTONVILLE

Bentonville Bike & Pedestrian Master Plan

January 2021



ACKNOWLEDGEMENTS

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INTRODUCTION

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Purpose

Home to the Razorback Regional Greenway and world-class mountain biking, Bentonville is an emerging bicycling destination. While ample recreational opportunities encourage tourism in the City, the combination of outdoor attractions, a bustling economy, a variety of employment opportunities, and a high quality of life is compelling more people to call Bentonville home. As part of one of the fastest growing regions in the country, the City of Bentonville realizes the need for a connected network of mobility options that allow people to get where they need and want to go by walking or bicycling.

Currently, most active transportation and recreation trips in Bentonville center around the existing Razorback Regional Greenway, a more than 36-mile shared use paved trail connecting the larger Northwest Arkansas region. *Connecting Bentonville* identifies clear strategies for increasing safety and connectivity for people that bicycle and walk in Bentonville. The Plan employs existing conditions analyses in conjunction with community feedback to propose a network that increases access to key community destinations, as well as encourages bicycling and walking for numerous trip types throughout the community. This network is accompanied by prioritization metrics that outline how the system could be implemented, strategies for moving projects to design and construction, and an action plan to ensure the Plan's overall success. A key component of the Plan is forward-looking, defining progress and success through benchmarking a variety of metrics. *Connecting Bentonville* will serve as a resource and guiding document for future implementation of local bicycle and pedestrian projects that will advance the Plan's vision, as stated below.

Vision Statement

Connecting Bentonville provides the framework and necessary resources to guide the implementation of a safe and connected mobility network, resulting in healthy and convenient alternative access to destinations by walking and bicycling.

Goals

Investing in the future of bicycle and pedestrian mobility benefits everyone when done thoughtfully and with public input and buy-in. *Connecting Bentonville* focuses on recommendations that reflect the values of the community. The goals of this plan were crafted from conversations with a broad cross-section of individuals, organizations, and leaders.

Connecting Bentonville emphasizes a network of safe bikeways and walkways for all users. Safety was paramount to the Plan approach and resulted in recommendations that will be implemented for everyone's enjoyment.

Connecting Bentonville establishes a connected network of low-stress bicycle and pedestrian facilities that provide linkage to important community destinations. Connectivity in Bentonville builds upon the existing networks along with offering a variety of new routing options for bicyclists and pedestrians, increasing mobility for people of all ages and abilities.[1]

Connecting Bentonville develops recommendations that increase access in the community through 1) expanding the network to link more destinations; and 2) connecting people to the larger network. Access to places and to the network are critical to increases bicycle and pedestrian trips.

Connecting Bentonville recognizes that more users will be drawn to a comfortable and convenient network of bikeways and walkways. User comfort/convenience addresses the distance and directness, comfort and perception of safety, and convenience and reliability in how users move from place to place. Bikeways and walkways that are comfortable and convenient can achieve significant growth in mode share. Additionally, facilities that eliminate stress will attract traditionally underrepresented bicyclists, including women, children, and seniors.[2]

Measures of Success

Along with the vision and goals, measures of success, or performance measures, were identified to evaluate the effectiveness of the Plan over time. Promoting ongoing assessment of the bicycle and pedestrian network, policies, and programs will allow for the City to highlight and communicate the value of key changes to mobility. Measures of success for *Connecting Bentonville* are defined below and described in more detail in *Chapter 4: Implementation Action Plan*.

Annual Budget for Bicycle and Pedestrian Infrastructure

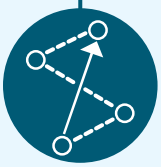
Consistent and growing funding is an indicator of commitment to bicycle and pedestrian facilities. This measure of success could be tracked by the City of Bentonville's per capita spending or percentage of total transportation budget that is invested in bicycle- and/or pedestrian-related projects or the budget as it relates to vehicle focused transportation projects.

Bicycle Friendly Ordinances/Policies

Decision making tools such as ordinances and policies are vital to changing a culture around bicycling and walking for trips. The presence and type of City of Bentonville ordinances that protect and/or create a safer, more welcoming environment for bicyclists and pedestrians will be a key measure of success.

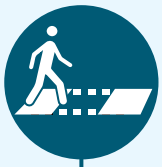
Bikeway Network to Street Network Coverage Ratio

A growing bikeway network in relation to the overall street network may show a commitment bicycle mobility. This can be measured by the percentage of bicycle facilities (on- and off-street) compared to the reported centerline miles of all roadways in Bentonville.



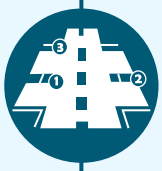
Direct Bikeway Connections Along/Parallel to City Arterial Streets

Major arterial streets with speeds higher than 35 miles per hour are often the most direct streets through the City of Bentonville. While these streets may require a greater degree of separation for bikeways, directness is a valuable benefit for the overall bikeway network. An increase in the percentage of bicycle facilities along these streets will indicate a more direct network in Bentonville.



Filling Sidewalk Gaps

Gaps in the sidewalk network can reduce access and change travel patterns. It will be important to track the percentage of sidewalk completeness (on both sides of the road) by neighborhood or community district in Bentonville, on an annual basis to understand how sidewalk gaps are being eliminated.



Priority Corridors with Bikeways and Sidewalks

Key corridors throughout Bentonville provide access to destinations and major North-South or East-West thoroughfares. The percentage of bicycle facilities and sidewalks that either run along or parallel to these priority corridors may indicate progress for additional mobility.

Quality of Low-Stress Network

The Bicycle Network Analysis (BNA) score for Bentonville through PeopleForBikes provides a metric to describe the comfort and connectivity for bicyclists.[3] The BNA is a data analysis tool that measures how well bike networks connect people to the places they want to go.

Reducing Bicycle and Pedestrian Crash Rate

The number and rate (per capita) of bicyclist and pedestrian crashes can be tracked over time to measure progress towards meeting safety goals. Reducing total crashes and crash densities can be measures along with crashes that result in serious injuries or fatalities.

Reducing Vehicle Speeds

Vehicle speed is a major contributor to safety and perceived comfort for bicyclist and pedestrians along a street or at an intersection. Reducing speed through a speed limit change or new geometry at intersections to reduce turning speeds can make a major impact for more vulnerable users. This performance measure may include a change in the number of projects annually that reduce vehicle speeds along streets with bikeway facilities and at bicycle and pedestrian crossing locations (e.g., speed limit reduction, raised crossings, tighter turn radii).

Short Trip Mode Share

Changing the culture around bicycling and walking may emphasize short trips for residents and visitors. A short trip is defined as 1 mile for pedestrians and 5 miles for people on bikes.[4] The percentage of Bentonville residents making short trips, regardless of trip purpose, by walking and/or bicycling may be one method to judge progress and success.

Walking and Bicycling in Bentonville Today

Bentonville is a community that has embraced bicycling for recreation, continues to build world-class trails for mountain biking, and is expanding regional connectivity via the Razorback Greenway. A review of previous planning efforts and existing conditions illuminates current assets that need to be leveraged and reveals gaps and/or barriers that should be addressed. The following sections provide an overview of existing conditions in the City; these were used as a foundation for network development.

Plan Review

Connecting Bentonville leverages the work that has been completed by previous planning efforts within the City of Bentonville and the Northwestern Arkansas region and desires to build upon these previous endeavors. Table 1 on page 9 illustrates how each plan aligns with the performance measures identified by this Plan. As there is variation in the degree to which previous plans address the countermeasures measures, a complete review of previous planning documents is provided in Appendix A.

FIGURE 1: EXISTING BICYCLE NETWORK

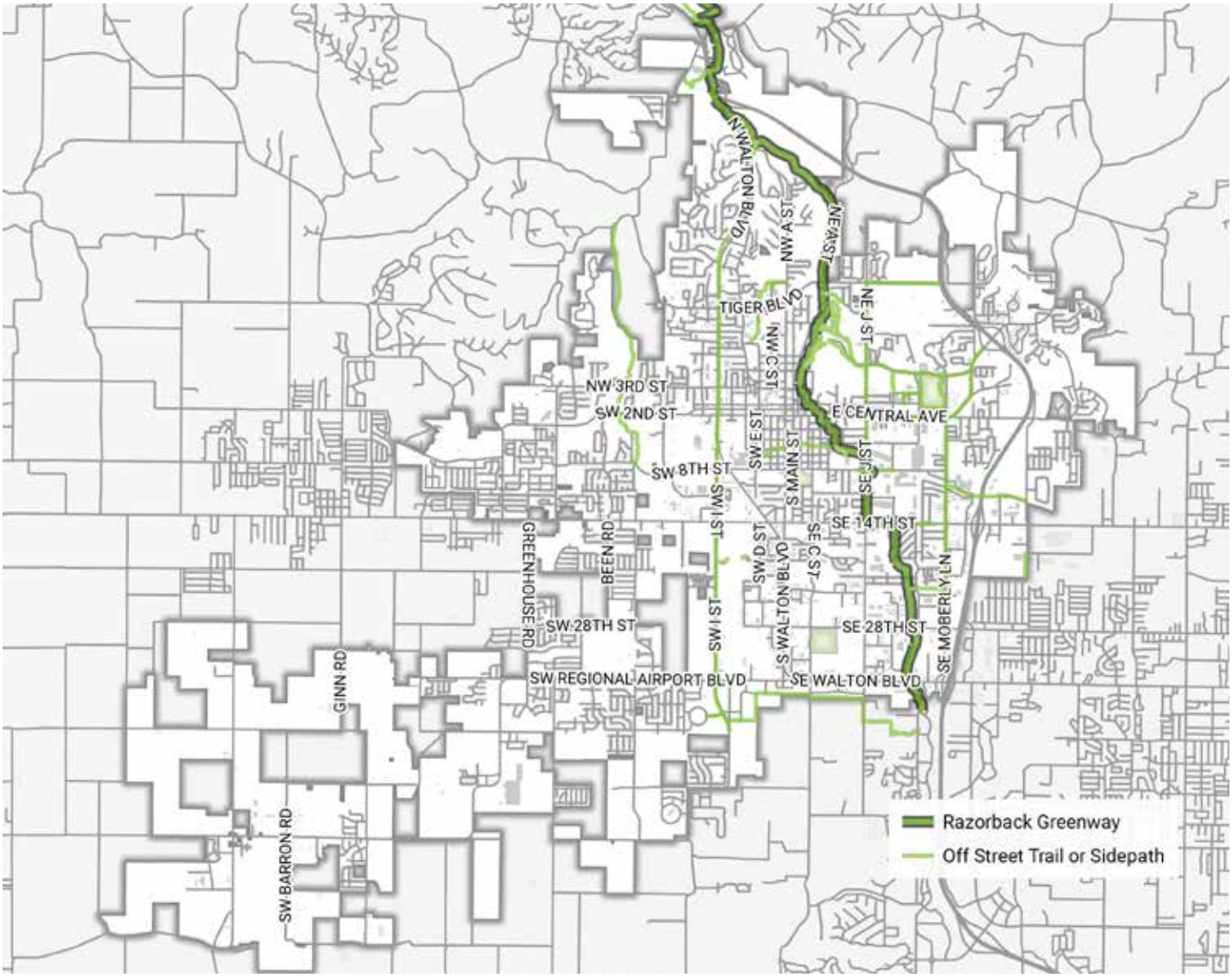


IMAGE 1: BICYCLISTS IN DOWNTOWN

State of Bicycling and Walking

Today, Bentonville's bicycle network consists entirely of off-road facilities (Figure 1). There are some shared lane streets (sharrows) designated for bicyclists and vehicles to share space; however, these are not considered existing facilities, as they do not include additional speed management techniques, traffic calming elements, or intersection treatments for people on bicycles. The Razorback Greenway, a regional shared use paved trail, serves as a spine for most of the City's other off-street trails and sidepaths that connect parks, residential areas, and downtown to the Razorback Greenway. These existing facilities are concentrated in central Bentonville. Without access to bicycle facilities, people that live, work, or play in the City's western and northeastern limits lack safe, comfortable options to bicycle to or from the places they need or want to go.

IMAGE 2: THE RAZORBACK GREENWAY

TABLE 1: PLAN REVIEW

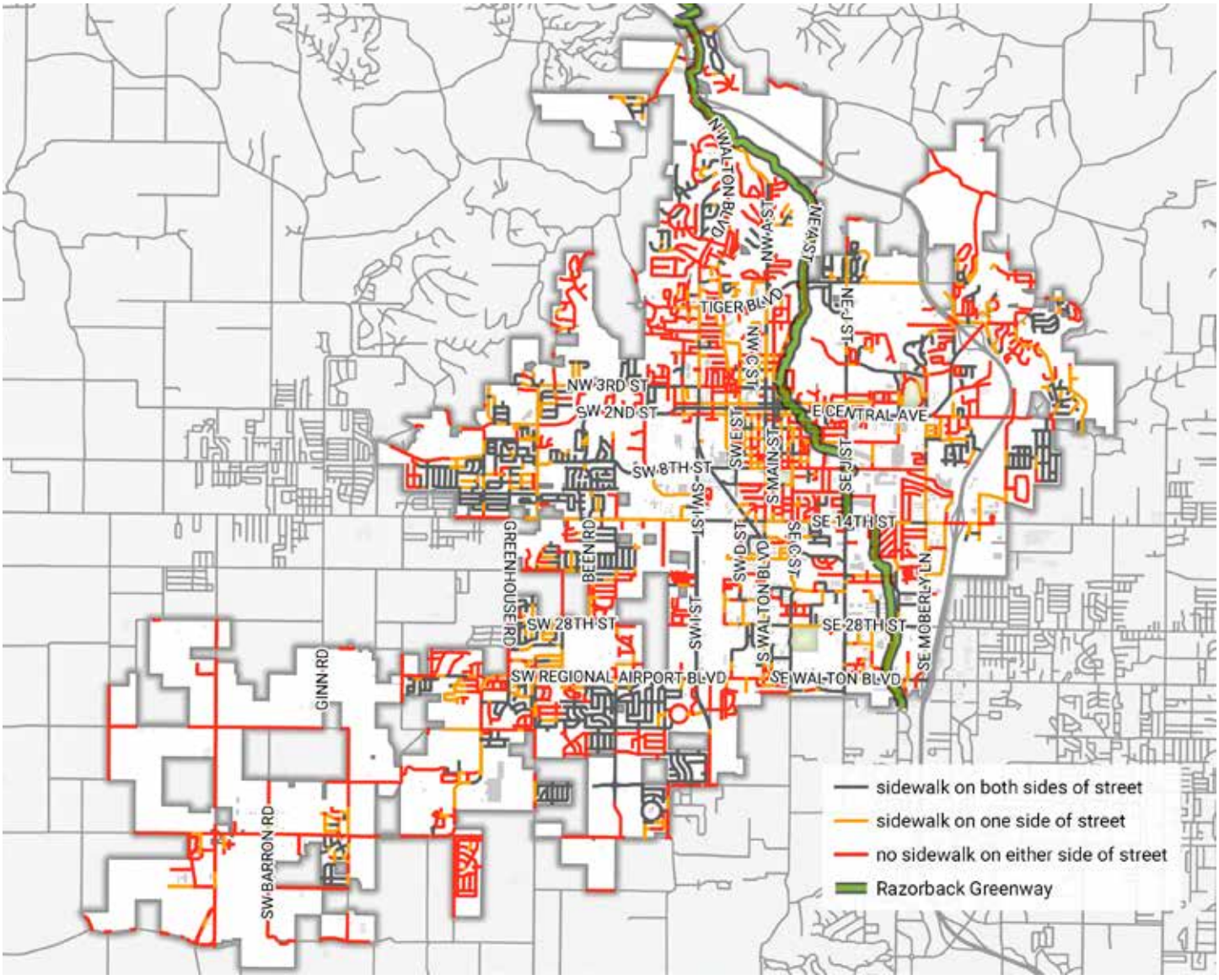
PLAN	YEAR	ANNUAL BUDGET FOR BICYCLE/ PEDESTRIAN INFRASTRUCTURE	BICYCLE FRIENDLY POLICIES	BIKEWAY TO STREET COVERAGE RATIO	DIRECT BIKEWAY CONNECTIONS ALONG ARTERIALS	FILLING SIDEWALK GAPS
LOCAL PLANS						
Bentonville Bike and Pedestrian Plan	2012	X	X	X	X	
Bentonville Bike and Pedestrian Plan Update	2015	X	X	X	X	X
Master Street Plan	2008					
Bentonville Minimum Standard Specifications for Streets	2006					X
North Walton Blvd Corridor Enhancement Plan	2013				X	
Bentonville Community Plan	2018		X	X		X
Downtown Bentonville Master Plan	2004					X
SE Downtown Area Plan	2014					X
REGIONAL PLANS						
NWARPC Walk Bike Northwest Arkansas	2015	X	X	X	X	X
Northwest Arkansas Open Space Plan	2016					
2035 NWA Transportation Plan	2011	X	X	X		X
2040 Metropolitan Transportation Plan	2016	X		X		
NWARPC Congestion Management Process Update	2014					
NWA Transportation Alternatives Analysis	2014					
NWA Transit Development Plan	2010					
Hwy 112 Corridor Study	2015					
NWA Eastern North-South Corridor Study	2011					
NARTS TIP	2018	X				
STATE PLANS						
AR Bicycle and Pedestrian Transportation Plan	2017	X	X	X	X	X
AR Transit Coordination Plan	2018					

TABLE 1: PLAN REVIEW CONTINUED

PLAN	YEAR	PRIORITY CORRIDORS WITH BIKEWAYS & SIDEWALKS	QUALITY OF LOW-STRESS NETWORK	REDUCING BICYCLE & PEDESTRIAN CRASH RATE	REDUCING VEHICLE SPEEDS	SHORT TRIP MODE SHARE
LOCAL PLANS						
Bentonville Bike and Pedestrian Plan	2012	X	X	X	X	X
Bentonville Bike and Pedestrian Plan Update	2015	X	X	X	X	X
Master Street Plan	2008	X				
Bentonville Minimum Standard Specifications for Streets	2006	X				
North Walton Blvd Corridor Enhancement Plan	2013					
Bentonville Community Plan	2018	X	X			
Downtown Bentonville Master Plan	2004		X			X
SE Downtown Area Plan	2014		X			X
REGIONAL PLANS						
NWARPC Walk Bike Northwest Arkansas	2015	X	X	X	X	X
Northwest Arkansas Open Space Plan	2016					
2035 NWA Transportation Plan	2011					
2040 Metropolitan Transportation Plan	2016		X			
NWARPC Congestion Management Process Update	2014					
NWA Transportation Alternatives Analysis	2014					
NWA Transit Development Plan	2010					
Hwy 112 Corridor Study	2015					
NWA Eastern North-South Corridor Study	2011					
NARTS TIP	2018					
STATE PLANS						
AR Bicycle and Pedestrian Transportation Plan	2017		X	X		
AR Transit Coordination Plan	2018					

A complete sidewalk network (sidewalk on both sides of the street) allows Bentonville residents and visitors to reach destinations safely and conveniently by walking or wheeling. For each street in Bentonville, Figure 2 shows whether there is sidewalk on both sides of the street, on only one side of the street, or no sidewalk on either side of the street. There are pockets of complete sidewalk in residential developments throughout Bentonville, with most on the western side of the community. Though a neighborhood may have complete sidewalk, its connectivity to other areas of the City determines whether walking is a viable option from people's homes to other community destinations.

FIGURE 2: EXISTING SIDEWALK INFRASTRUCTURE



There are streets that provide a north-south connection through Bentonville, such as SW I Street and NE J Street, with sidewalk on both sides of the street for most of their length. However, S Walton Boulevard, SE Moberly Lane, and Greenhouse Road could be better utilized for north-south connections for people throughout the City if their sidewalk gaps were filled. A pedestrian east-west connection is less accessible, with sections of SW Regional Airport Boulevard, SE 14th Street, Tiger Boulevard, SW 2nd Street, and E Central Avenue missing sidewalk on one or both sides of the street. While this map shows the presence and lack of sidewalks throughout the City, other factors also contribute to pedestrian comfort, such as ADA curb ramps, striped crosswalks, detectable warning strips, pedestrian signals, traffic speed, and sidewalk condition and width.

IMAGE 3: PEDESTRIAN SIGNS

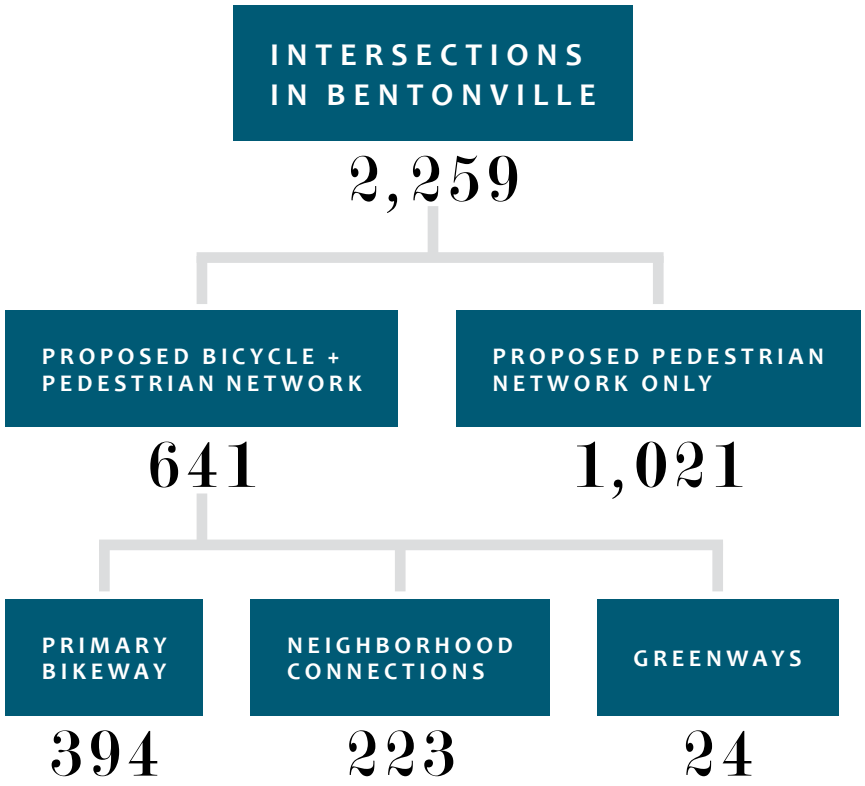
IMAGE 4: SIDEWALK GAP

Substandard Facility Inventory

Summary

An inventory of all intersections in Bentonville, including intersections that are part of the proposed bicycle and pedestrian network, was conducted to assess network completeness and accessibility. The inventory indicates 74% of intersections in the city occur within the proposed bicycle and pedestrian network. This highlights the importance of intersection design to the overall safety of these proposed networks. The remaining 26% of intersections in city limits are either along existing bicycle and pedestrian facilities or are not part of the proposed network.

Intersection Totals



Intersection Inventory

Since the majority of Neighborhood Connections occur along lower-speed, lower-volume neighborhood streets, only Primary Bikeway and Greenway intersections were inventoried for completeness. This inventory includes intersection type, presence of crosswalks, and presence of ADA curb ramps. See *Appendix B* for information regarding intersection type and methods for intersection scoring.

CROSSWALK FINDINGS

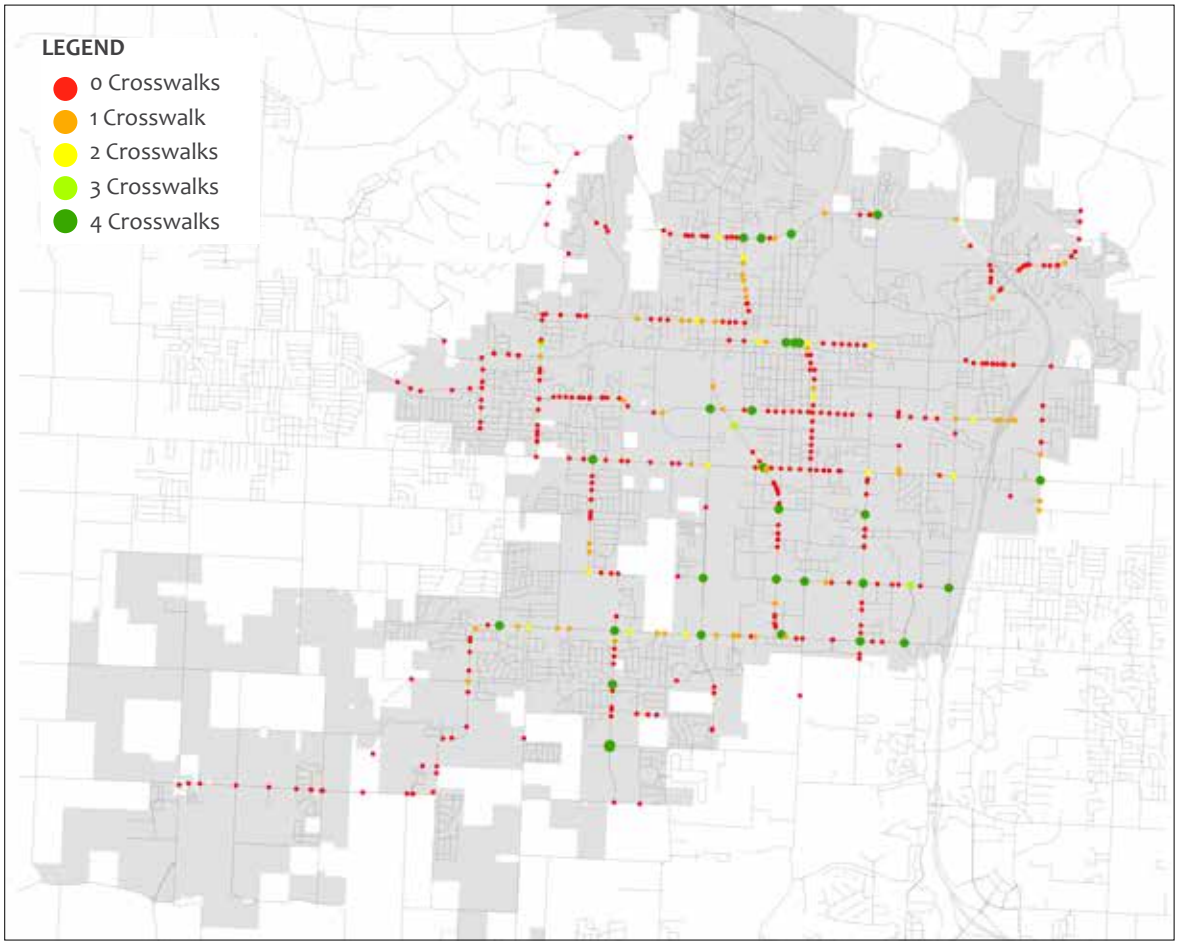
The crosswalk inventory along the Primary Bikeway and Future Greenway networks assessed the number of crosswalks present at each intersection by intersection type. See *Appendix B* for more details. Of in the 298 intersections without crosswalks, the majority were located at "side street stop" intersections or other intersections without sidewalks. Intersections where one crosswalk was present were typically "side street stop" intersections with a sidewalk along the primary bikeway street that crossed the incoming side street. The vast majority of intersections with sidewalks include crosswalks for each street that the sidewalk crosses. Intersections with sidewalks but without crosswalks and intersections in obvious need of crosswalk restriping were noted in the intersection database.

Discrepancies in intersection count totals is attributed to intersections of two Primary Bikeways or a Primary Bikeway with a Future Greenway.

TABLE 2: CROSSWALK COUNTS

NUMBER OF CROSSWALKS	INTERSECTION COUNT
0	298
1	59
2	15
3	3
4	30

FIGURE 3: CROSSWALK INVENTORY



ADA CURB RAMP FINDINGS

Inventory of curb ramps along the Primary Bikeway and Future Greenway networks entailed counting the number of streets served on both sides by curb ramps. Curb ramps were NOT counted individually, as some intersections have a single curb ramp serving two directions of travel. See *Appendix B* for further explanation.

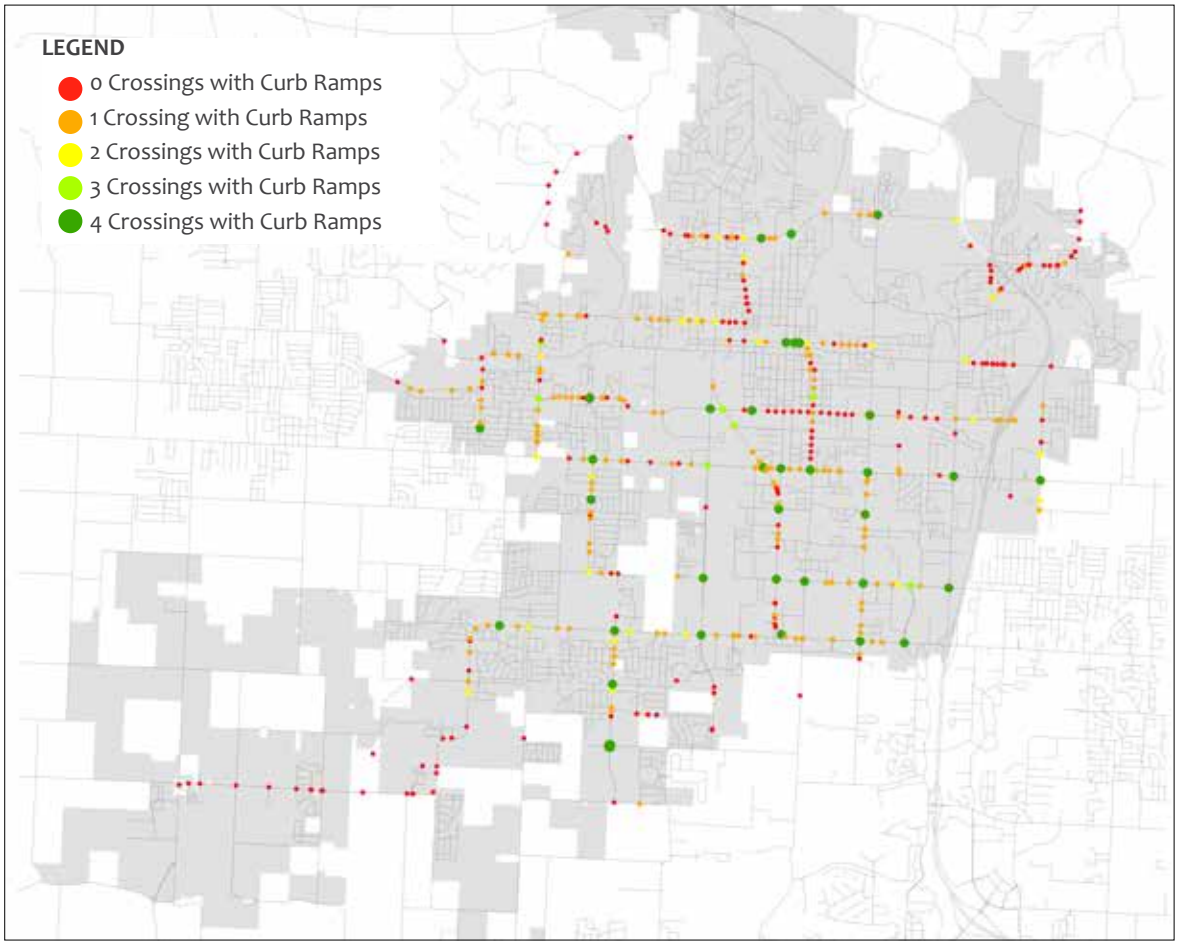
Similar crosswalks, the majority of intersections without curb ramps are along streets without sidewalks. There are more intersections with curb ramps than crosswalks, largely due to the fact curb ramps are installed as part of other intersection improvements. Additionally, there are several "side street stop" intersections with curb ramps that lack crosswalks.

Discrepancies in intersection count totals is attributed to intersections of two Primary Bikeways or a Primary Bikeway with a Future Greenway.

TABLE 3: ADA CURB RAMP COUNTS

DIRECTIONS SERVED BY CURB RAMPS	INTERSECTION COUNT
0	165
1	168
2	27
3	7
4	38

FIGURE 4: ADA CURB RAMP INVENTORY



Chapter 1 Sources:

1) Guidebook for Developing Pedestrian and Bicycle Performance Measures. (2016, March). Retrieved February 11, 2020, from https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/performance_measures_guidebook/

2) Designing for All Ages & Abilities. (2017, December). Retrieved February 11, 2020, from https://nacto.org/wp-content/uploads/2017/12/NACTO_Designing-for-All-Ages-Abilities.pdf

3) People for Bikes. Bicycle Network Analysis. Retrieved from https://peopleforbikes.org/placesforbikes/bicycle-network-analysis/

4) Federal Highway Administration. (2016). Strategic Agenda for Pedestrian and Bicycle Transportation, page 15. https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/strategic_agenda/fhwahep16086.pdf

PUBLIC ENGAGEMENT

02

Summary

Listening to the public as they shared their experiences, needs, and desires laid the foundation for developing recommendations for *Connecting Bentonville*. Additionally, public input influenced the mobility strategies that will be essential for implementation, sustaining momentum, and increasing the number of users for recreation and active transportation trips. The *Connecting Bentonville* planning process used a twofold approach to public outreach:

1) engage a core steering committee to discuss outreach techniques and plan development milestones; and

2) organize events that were informational and interactive to educate the public and gather valuable input from a broad cross-section of people.

The project team conducted a variety of steering committee meetings, online engagement activities, pop-up events, and open house meetings.

Steering Committee

A steering committee was formed to guide the *Connecting Bentonville* planning process and ultimate success of the plan. Committee members were invited to four separate meetings from initial project kickoff to draft plan and recommendations. The committee was comprised of representatives from a variety of organizations who were involved consistently throughout the entire process. Each meeting included a presentation that updated members on the planning process along with opportunities for attendees to provide feedback. The following provides an overview of each steering committee meeting.

May 14, 2019

An introductory workshop provided the committee with information about the project team, the overall Plan approach, and next steps. Participants provided feedback on goals and objectives for the plan and keys to success.

June 24, 2019

The *Connecting Bentonville* brand was revealed to steering committee members along with a robust discussion around creating a successful network for the City of Bentonville.

September 12, 2019

Results from public outreach were reviewed along with gaps and barriers that could prevent more users from bicycling or walking for trips in the City.

January 14, 2020

A draft bikeway and pedestrian network was presented to the steering committee that highlighted project recommendations. Attendees provided feedback on network recommendations, measures of success, strategies for implementation, and next steps in the plan making process.

Open House Meetings

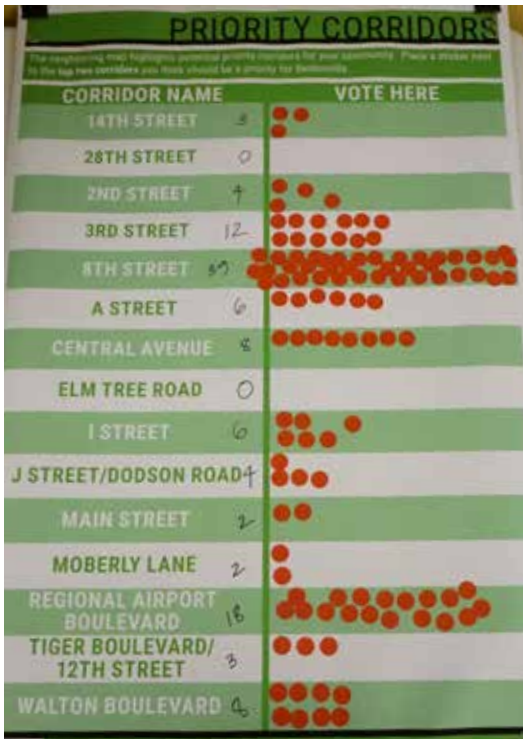
Open house meetings were held to provide information about the plan, promote bicycling and walking for recreational and active transportation trips, and receive valuable input from constituents. An open house meeting was held early in the planning process to listen to the community and then again later in the process to reveal draft recommendations and receive feedback that was used to refine recommendations.

June 24, 2019

Nearly 200 people attended the open house and provided feedback on major destinations, active transportation barriers, facility type preference, and the community's bicycling and pedestrian goals.

February 20, 2020

Attendees reviewed the draft plan recommendations and helped refine recommendations to ensure *Connecting Bentonville* reflects their needs and desires. Over 150 participants provided feedback on network coverage, trail names, and prioritization for select areas in their community for future bicycle and pedestrian infrastructure.



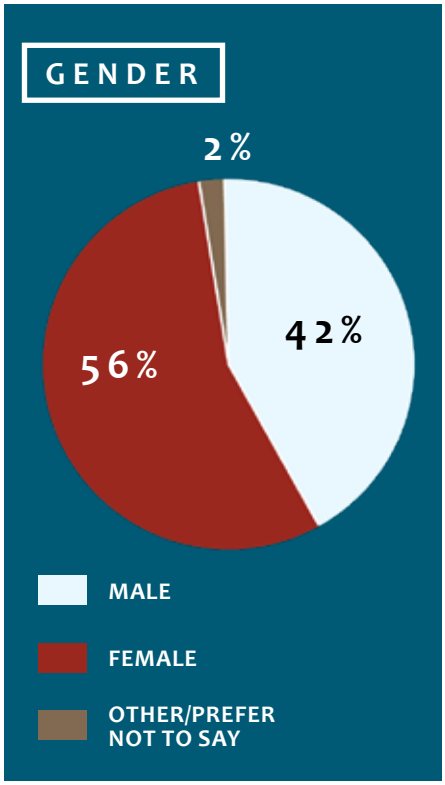
Online Engagement

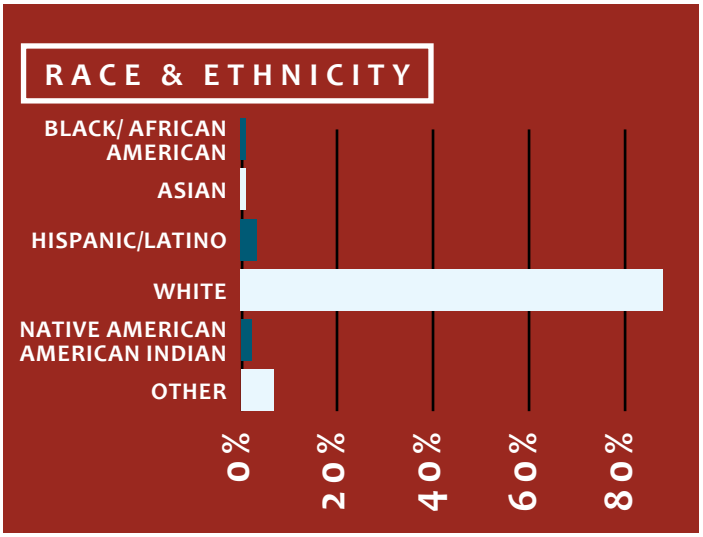
Online Survey

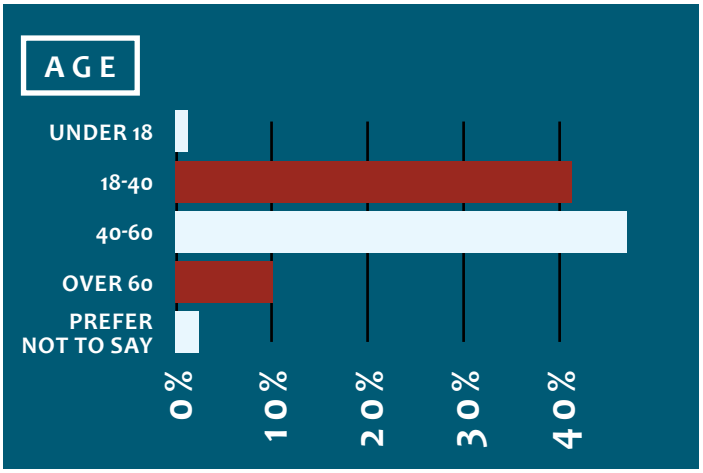
Over 550 survey responses informed the *Connecting Bentonville* planning process. Focus areas for the survey were demographics, user types, and perceptions of active transportation. All responses were critical to shaping the proposed bikeway and pedestrian networks. The survey was available in hardcopy format at each open house meeting and pop-up event as well as via the project website. Key findings are illustrated on the following pages.

Demographics

While 566 residents took the survey, it is important to note that the respondents were not statistically representative of Bentonville demographics. The graphics below illustrate survey respondent demographics during the planning process for *Connecting Bentonville*.

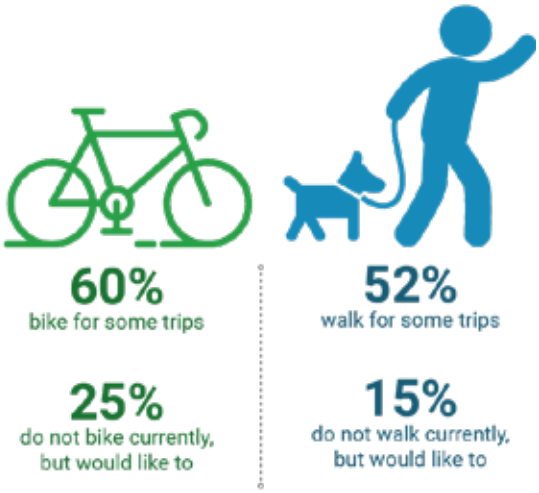




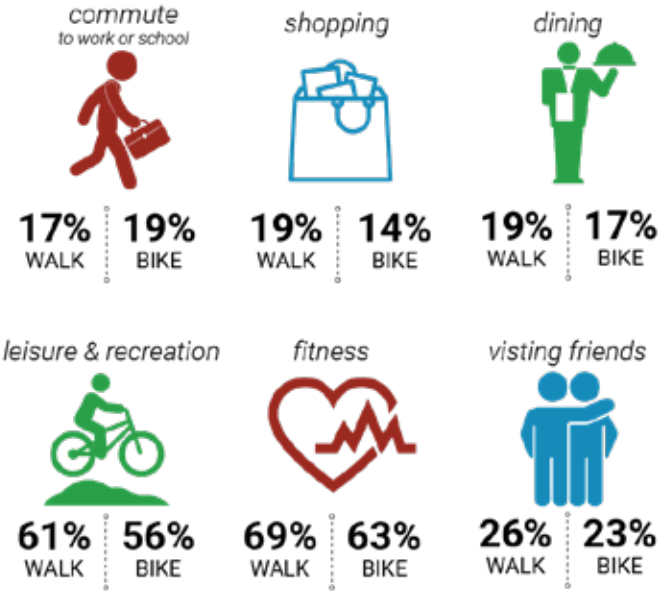


Perceptions and Priorities

What survey respondents say about biking and walking...



Survey respondents reported "almost daily" or "frequently" commuting by biking or walking for the following trip types:



When asked for their highest implementation priority, most survey respondents want to...

- Expand the network for walking paths and trails (24%)
- Connect the bike network to major destinations (23%)

Other priorities included:

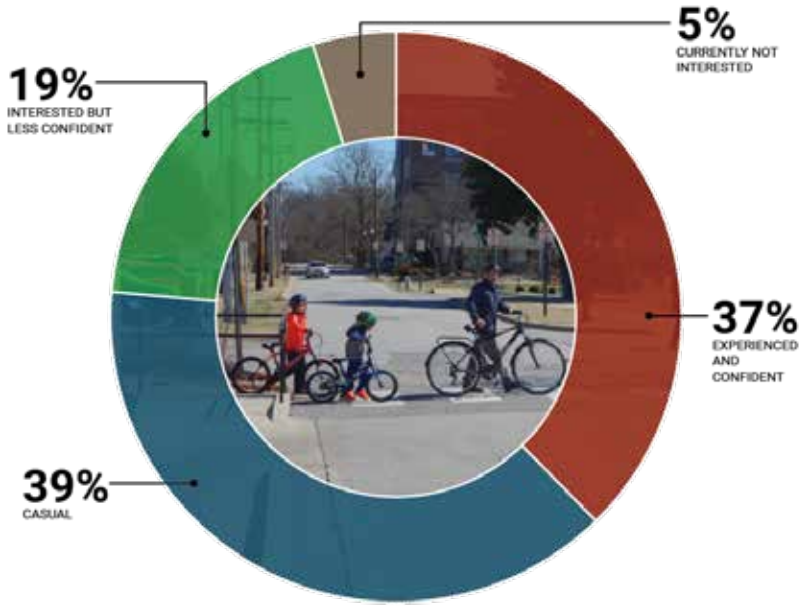
- Implementing safer pedestrian crossings (16%)
- Connecting the sidewalk network (11%)
- Connecting the bike network in neighborhoods (16%)

Types of Bicyclists in Bentonville

To better understand the demand for bicycling in Bentonville, survey respondents were asked to classify themselves into groups based both on their current bicycling behavior and their bicycling comfort level on streets with a variety of characteristics. Results provide insight into who is biking, and their comfort level, so recommended bikeways are tailored to encourage more people to ride.

Half of survey respondents noted they would feel more comfortable riding their bicycle on the road if there was a physically separated bike lane in place, while 21% would be more comfortable if there was a bike lane with a painted buffer.

FIGURE 5: TYPES OF BICYCLISTS



EXPERIENCED AND CONFIDENT:

This group is willing to ride a bicycle on any roadway regardless of traffic conditions. They are comfortable taking the lane and riding in a vehicular manner on major streets without designated bicycle facilities.

CASUAL:

This group consists of people riding bicycles who are confident riding in roadway situations where space is available and traffic is manageable, but they prefer a designated facility.

INTERESTED BUT LESS CONFIDENT:

This group is more cautious and has some inclination towards bicycling but is concerned over sharing the road with cars. They are not very comfortable on major streets, even with a striped bike lane, and prefer separated pathways or low traffic neighborhood streets.

CURRENTLY NOT INTERESTED:

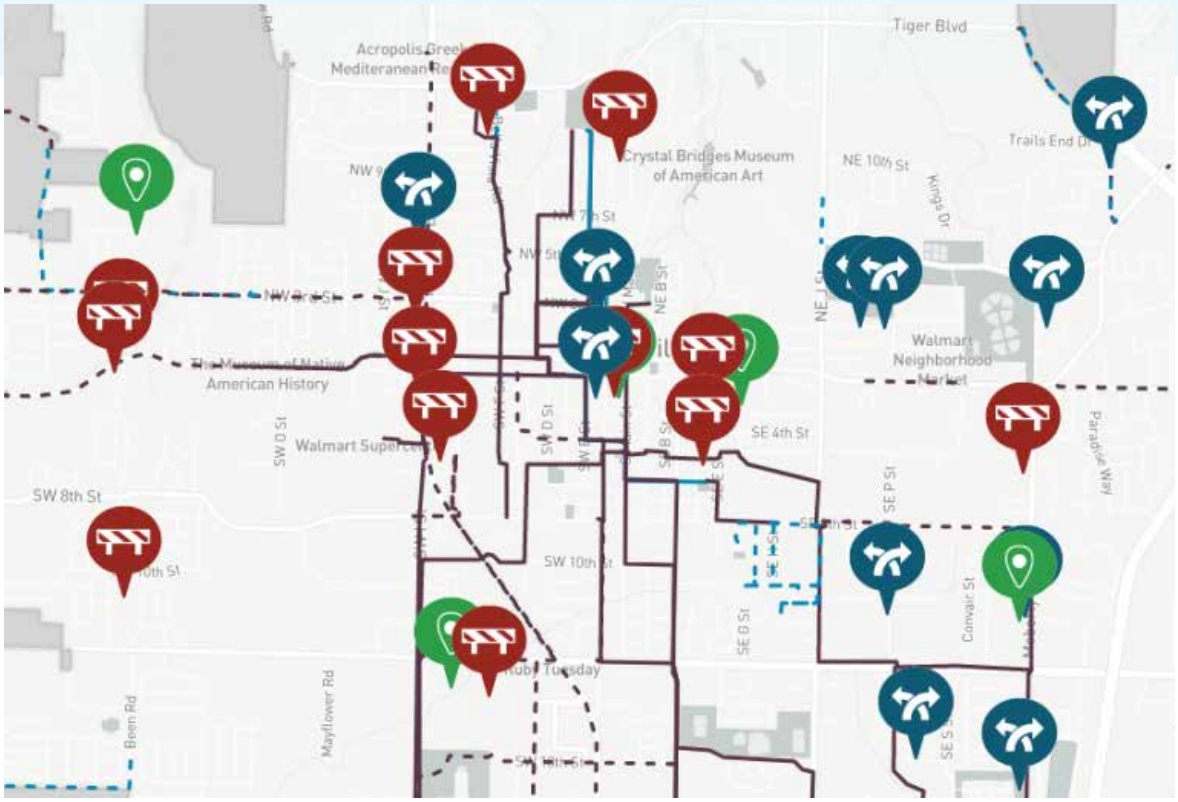
This group is comprised of people who currently are not interested at all in bicycling, may be physically unable or don't know how to ride a bicycle, and/or are currently unlikely to adopt bicycling in any way.

Interactive Maps

A Wikimap, an online interactive map, provided the public the opportunity to identify desired bicycle and walking connections throughout Bentonville. The Wikimap allowed users to note preferred routes, destinations, and barriers to walking and bicycling in the community. Results from the Wikimap were included as one of several layers to analyze during network development.

The proposed network considered the key destinations that users desired to access by bicycling or walking to recommend connections that would increase safety and accessibility for all existing and potential users. Additionally, barriers and problem intersections identified by the public were reviewed for targeted improvements as part of the overall network, as well as serving as a key consideration for prioritization of projects. Figure 6 illustrates results of the online map that collected feedback from participants.

FIGURE 6: ONLINE WIKIMAP



The following themes emerged from the Wikimap:

CONNECTIVITY

Wikimap participants desired more direct, convenient, and safe ways to access the existing trail network and key destinations (e.g., schools, downtown, and community resources). Difficulty crossing the interstate was also mentioned.

FEELING UNSAFE

A desire for safety and comfort while bicycling and walking was a predominant theme among Wikimap participants. The inability to bicycle or walk as a family was emphasized.

VEHICLE SPEED, VOLUME, BEHAVIOR

High posted speed limits and busy streets were commonly mentioned as barriers. In addition, participants felt that people driving cars aren't following the rules - they speed, run stop signs, fail to stop for people walking or bicycling, and park in areas designated for bicyclists.

LIMITED FACILITIES

Participants highlighted areas where they felt there was a lack of infrastructure for people bicycling and walking; these were areas missing bicycle facilities, sidewalks, traffic signals, and/or streetlights. In addition, they discussed areas where they perceive existing infrastructure as being deficient. Specifically, they called out missing signage and ADA signaling, potholes, flooding, and poorly designed facilities that don't offer enough protection as key issues.

TOPOGRAPHY

Areas in the community with steep hills and blind spots were pointed out. Participants mentioned natural blind spots, such as curvy roads or large hills, as well as "man-made" blind spots, such as fencing or parked cars inhibiting their view.

PLANNING EFFORTS WITHOUT ACTION

Some participants felt that there has been inaction on previous planning efforts and minimal consideration of people walking and bicycling during construction. Others voiced concern about inaction to address common complaints, as well as a lack of general maintenance of bicycle and pedestrian facilities.

Pop-Up Events

Casual but crucial conversations with people about bicycling and walking in Bentonville.

Pop-up events are informal opportunities to discuss the state of bicycling and walking in places where those activities are already occurring. These activities were supplemental to open houses and steering committee meetings and gave additional insight into the existing conditions and perceptions of the public for the bicycle and pedestrian network in the community. Two pop-up events were conducted during the *Connecting Bentonville* process.

FARMERS' MARKET

August 10, 2019

The Farmers' Market is an event that brings people that live and visit Bentonville together. The project team set up a ten that provided information about the *Connecting Bentonville* process and asked for feedback. At this pop-up event approximately 36 people visited the tent and participated by reviewing and commenting on map of City and providing input on desired routes and existing physical barriers to the bicycle and pedestrian network.

Input addressed the following issues:

- Concern for the lack of east-west routes.
- Need a traffic signal at NW 3rd and Walton, because there is not a good place to cross Walton in this area. NW 3rd is a popular route since it goes out to Coler Mountain Bike Preserve.
- Add a bike lane on Central Avenue from downtown to Moberly, then to East Battlefield toward Water Tower Road. This is a main route for cyclists that ride to Little Flock or just a common loop around Bentonville.
- Runners and cyclists asked for trails along Water Tower Road, east of NWACC.
- Need access to Thaden school from the square
- Would like access along 8th Street from Walton to NE J Street

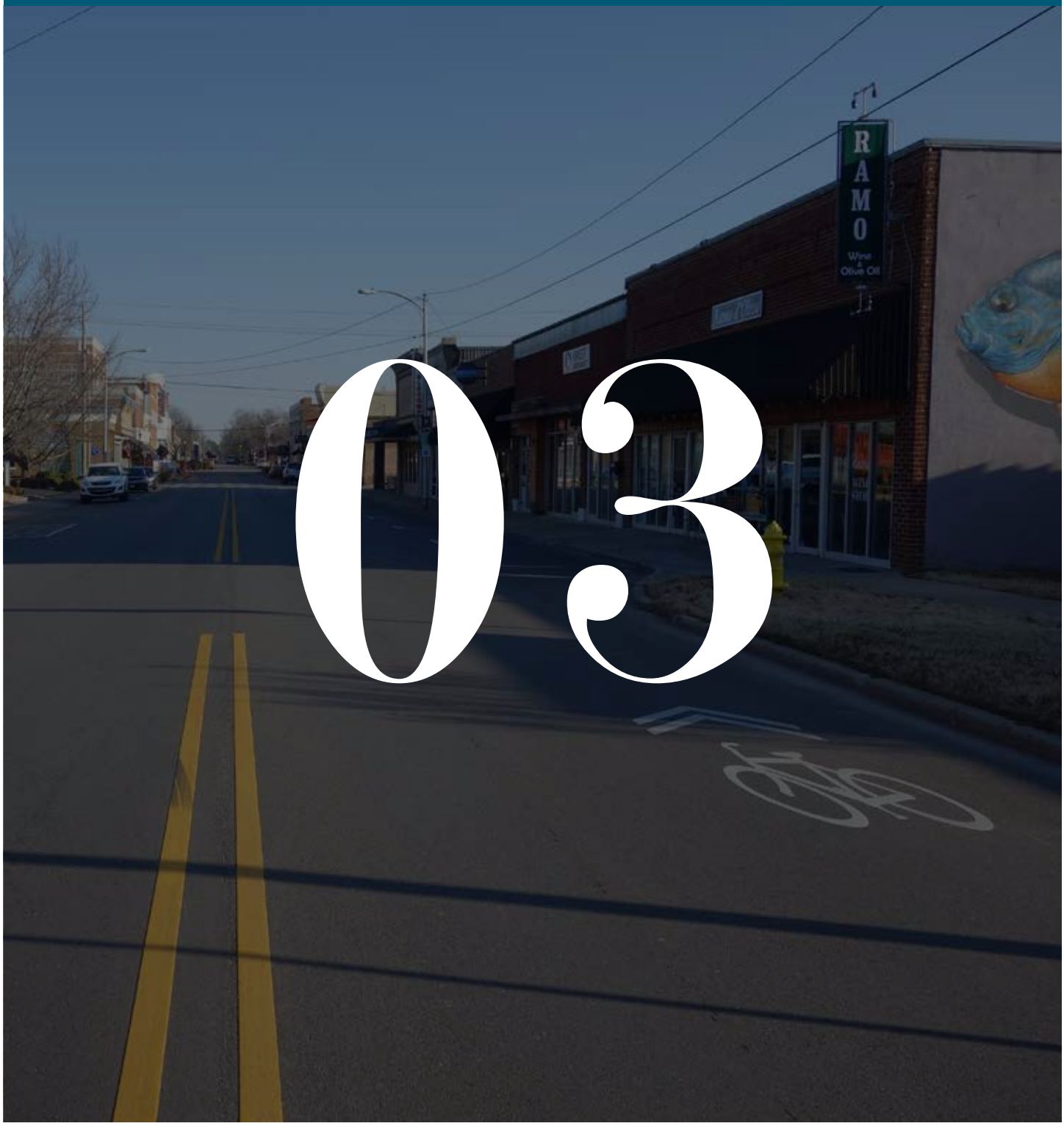
SQUARE-TO-SQUARE BICYCLE RIDE

August 10, 2019

The second pop-up was conducted near the registration and starting line for the Square-to-Square bicycle ride that uses the Razorback Regional Greenway to connect the downtown squares in Bentonville and Fayetteville. While few people offered plan input, participants gave suggestions related to points of interest to assist bicyclists and pedestrian with wayfinding.


TRAIL OF
TWO CITIES

NETWORK DEVELOPMENT



03

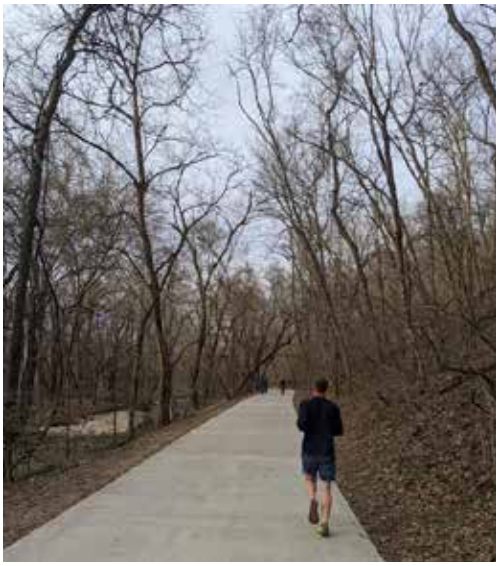
Summary

A bicycle and pedestrian network that aligns with the goals of *Connecting Bentonville* is a critical component for future mobility choices within the City. This chapter identifies the importance of a network along with the layers of quantitative and qualitative analyses that were used to craft that network to expand access for Bentonville residents and visitors.

Why a Network?

Walking and bicycling in Bentonville are important parts of the community's culture and transportation network. To continue to support bicycling and walking, *Connecting Bentonville* proposes a bicycle and pedestrian network that aims to better connect Bentonville residents and visitors with places they need and want to go in a safe and convenient way, leveraging existing facilities as its foundation.

A network of seamlessly connected and continuous bicycle and pedestrian infrastructure is more powerful for increasing mobility and accessibility than isolated projects that do not link into a larger system. A network approach to bicycle and pedestrian facilities—rather than a piecemeal approach—is a more strategic investment for the City of Bentonville; a complete network of facilities serving the entire area enhances mobility more than a single trail, sidewalk, or bike lane alone.



Layers of Analysis

Connecting Bentonville used seven distinct analyses for creating the proposed network: 1) public input, 2) connecting destinations, 3) equity, 4) potential pedestrian activity, 5) level of traffic stress (LTS), 6) bicycle network analysis (BNA), and 7) school commute zone. Together, these analyses provided a multi-layered lens through which the proposed network for the City of Bentonville was crafted and refined. The resulting network emphasizes the goals of the plan through promoting safety and equity, connecting people to places, encouraging new users, and truly enhancing mobility with new opportunities for access.

Public Input

The public's voice helped shape the network of recommended bicycle and pedestrian facilities in *Connecting Bentonville*. Results from the Wikimap, along with other comments from outreach events such as open house meetings and pop-up events, were used comparatively with the other analyses to identify key destinations and routes that are important to residents and visitors, as well as real or perceived barriers to bicycling and walking in Bentonville.

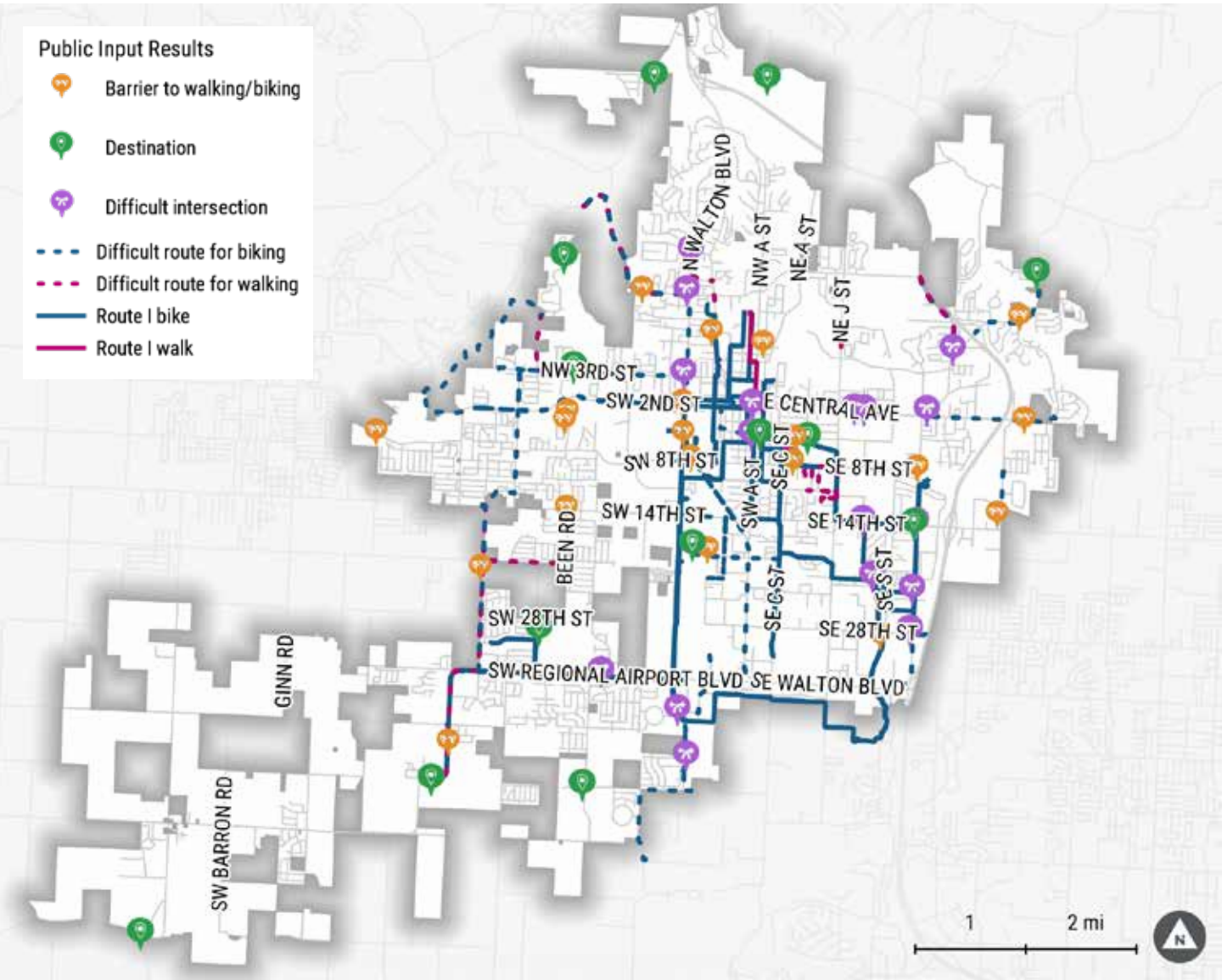


FIGURE 7: WIKIMAP RESULTS

Over 200 people shared comments and/or identified routes and destinations on the Wikimap. The map presented in Figure 7 shows the locations of comments and their associated categories. The proposed network considers the key destinations that users desired to access by bicycle or as a pedestrian to recommend facilities that would increase safety and connectivity for all existing and potential users. Additionally, barriers and problem intersections identified by the public were reviewed to provide a better user experience as part of the overall network.

Connecting Destinations

The destination connectivity analysis highlights trip origin and destination areas that have the potential to generate higher volumes of bicycling and walking. To understand what routes are most necessary and beneficial, destinations that people may travel between were identified. The analysis map below (Figure 8) highlights these locations and scores them to identify clusters of destinations that would benefit from increased connectivity, with places where bicycle and pedestrian infrastructure may be the most impactful receiving higher scores. These resulting clusters provide insight to areas that can serve as connection points for future active transportation infrastructure.

FIGURE 8: DESTINATION CONNECTIVITY ANALYSIS MAP

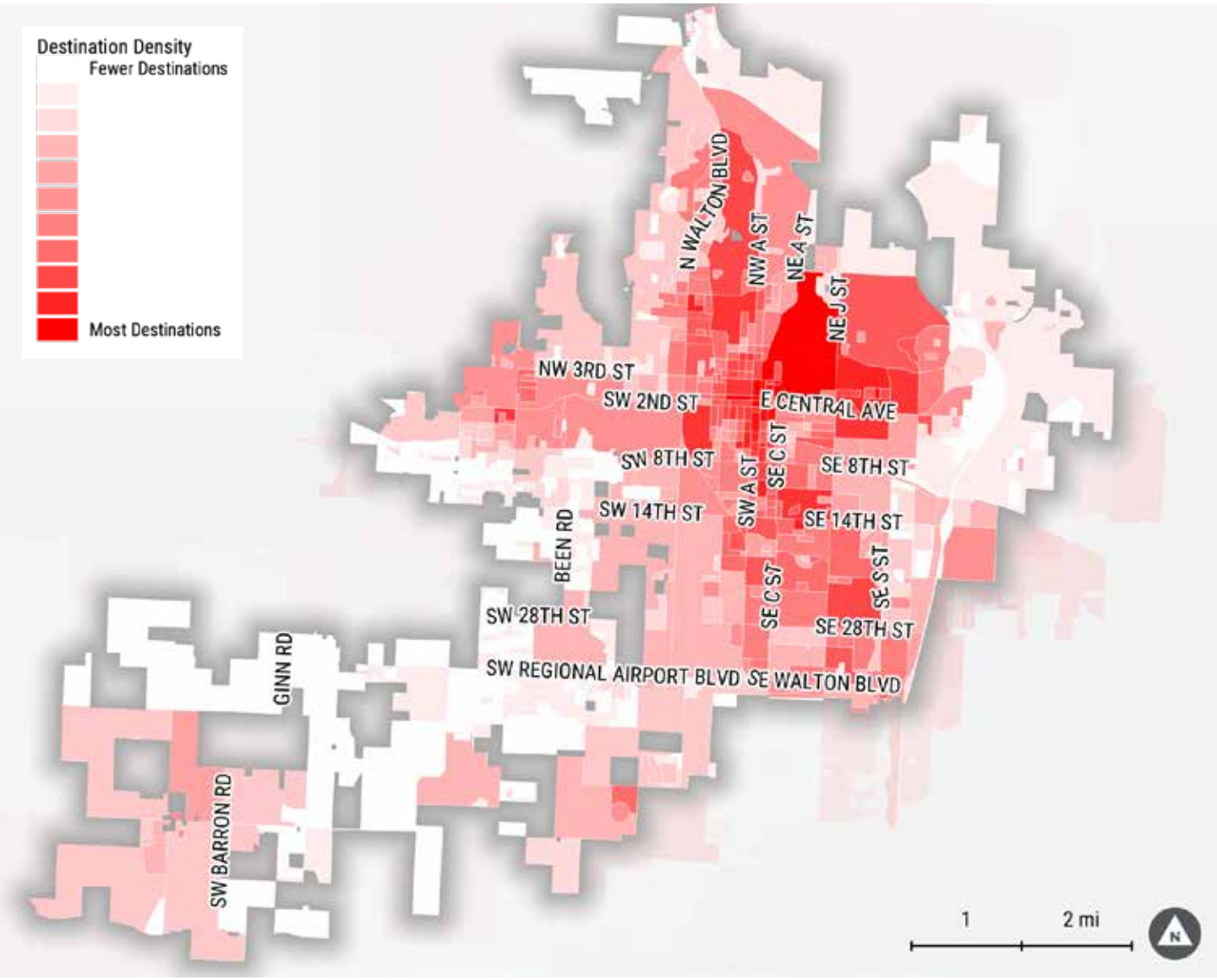


Figure 8 shows key clusters of destinations throughout Bentonville. Census blocks were used to create an aggregate destination score for this analysis. The factors, scoring, and rationale are further explained in Table 4 on the following page.

TABLE 4: CONNECTING DESTINATIONS ANALYSIS SCORING

FACTORS	RATIONALE	SCORING
Proximity to Employment	Employment opportunities serve as key destinations for economic prosperity and livability of a community.	• High = 20 • Medium = 10 • Low = 5 • None = 0
Proximity to Schools	Schools are a major daily destination that attract students, parents, and school staff and could support a high volume of bicycle and walking trips.	• Multiple schools within .25 mile, High = 20 • One school within .25 mile, Medium-High = 15 • At least one school within .5 mile, Medium = 10 • Schools greater than 0.5 miles, Low = 0
Proximity to Downtown	Downtown areas tend to be more compact and, therefore, create a more walkable environment. Also, most effective bicycle and pedestrian networks occur when concentrating on the dense, downtown area first.	• More than one within .25 mile, High = 20 • One within .25 mile, Medium-High = 15 • Any within .5 mile, Medium = 10 • Other, Low = 0
Proximity to Trailheads	Trailheads indicate locations of access points to existing bicycle and pedestrian facilities. Connecting new facilities with existing ones is crucial to creating an integrated bicycle and pedestrian network.	• High = 20 • Medium = 10 • Low = 5 • None = 0
Proximity to Points of Interest	Points of interest in Bentonville (e.g., shopping centers, recreational spaces, historic and educational facilities) serve as necessary destinations for residents.	• High = 20 • Medium = 10 • Low = 5 • None = 0
Proximity to Parks	Parks are essential public spaces that all residents should be able to access.	• Multiple parks within .25 mile, High = 20 • One park within .25 mile, Medium-High = 15 • At least one park within .5 mile, Medium = 10 • Parks greater than 0.5 miles, Low = 0

Equity

Proposed bicycle and pedestrian facilities will be planned to increase access for those who need them most as a basic means of transportation. Results from the following equity analysis identified places within Bentonville that may be underserved and/or may benefit more from a robust pedestrian and bicycle network. The equity analysis used the following social factors that indicate who may benefit from or most need active transportation facilities to identify areas of prioritization:

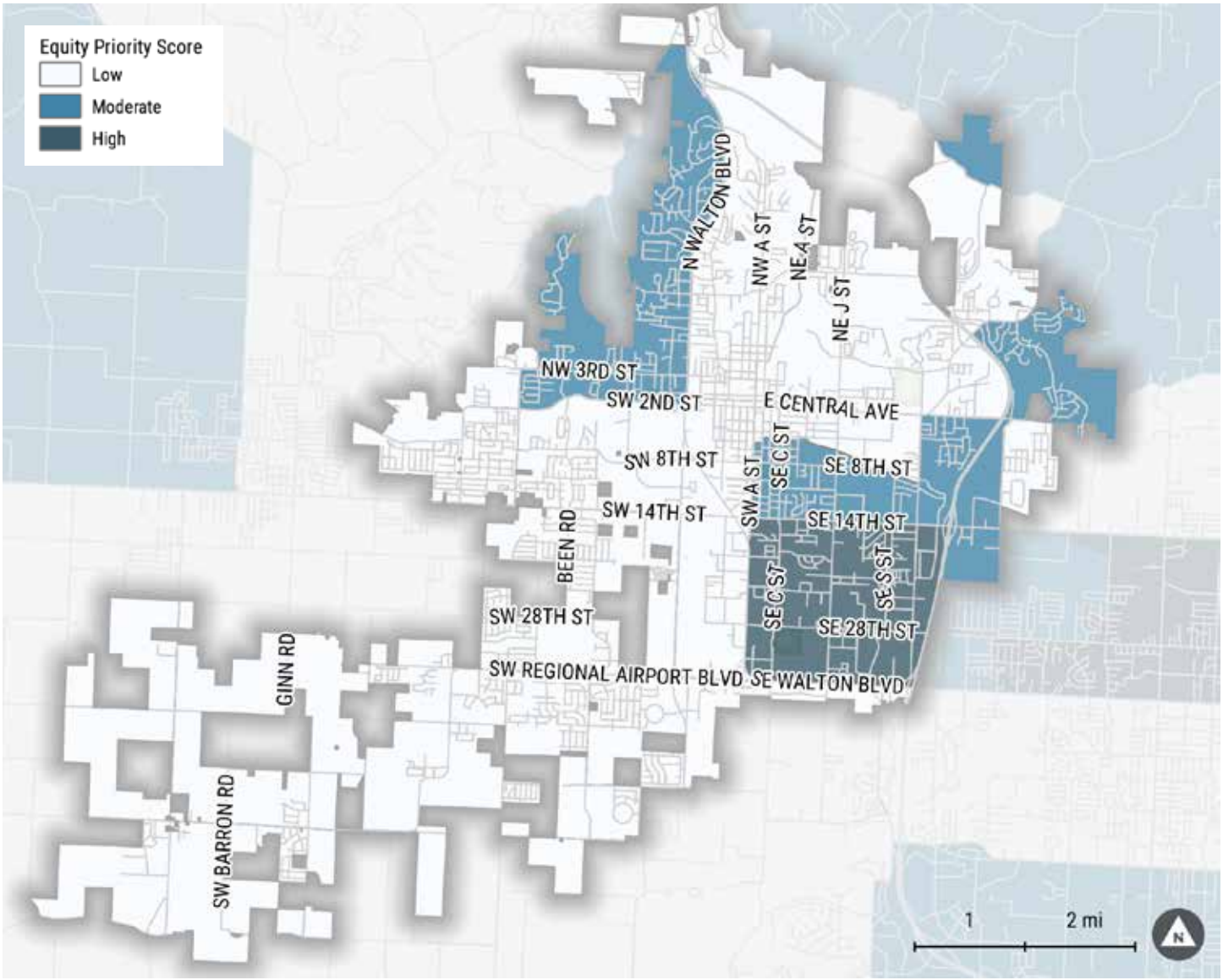
- Zero car households;
- Households in poverty; and
- Percentage of commute to work by transit.

These factors are crucial to understanding where investment in bicycle and pedestrian infrastructure could increase access to employment opportunities and other important community resources. Household poverty impacts the ability to purchase essentials for daily living. Additionally, households without a car are severely limited in the locations they can reach daily. Without a car, it is often unsafe to travel along auto-centric roadways. Furthermore, public transportation is limited in Bentonville. If a resident is only able to utilize that one transportation mode, their mobility is dependent on the transit schedule and network.

The lack of mobility options available can greatly reduce employment opportunities and access to healthcare, greenspace, recreational activities, grocery stores, and shopping. These locations for essential daily goods are not easily accessible to everyone in the Bentonville community, specifically those without a personal vehicle. This analysis highlights areas for which a more well-connected and safer bicycle and pedestrian network would increase accessibility to important community resources, ultimately making Bentonville a more equitable community.

In Figure 9, higher equity priority scores represent locations with greater concentrations of households in poverty, households without a car, and higher percentages of people that commute to work by transit. These pinpointed areas were weighted and factored into final prioritization scores for implementation purposes.

FIGURE 9: EQUITY ANALYSIS MAP



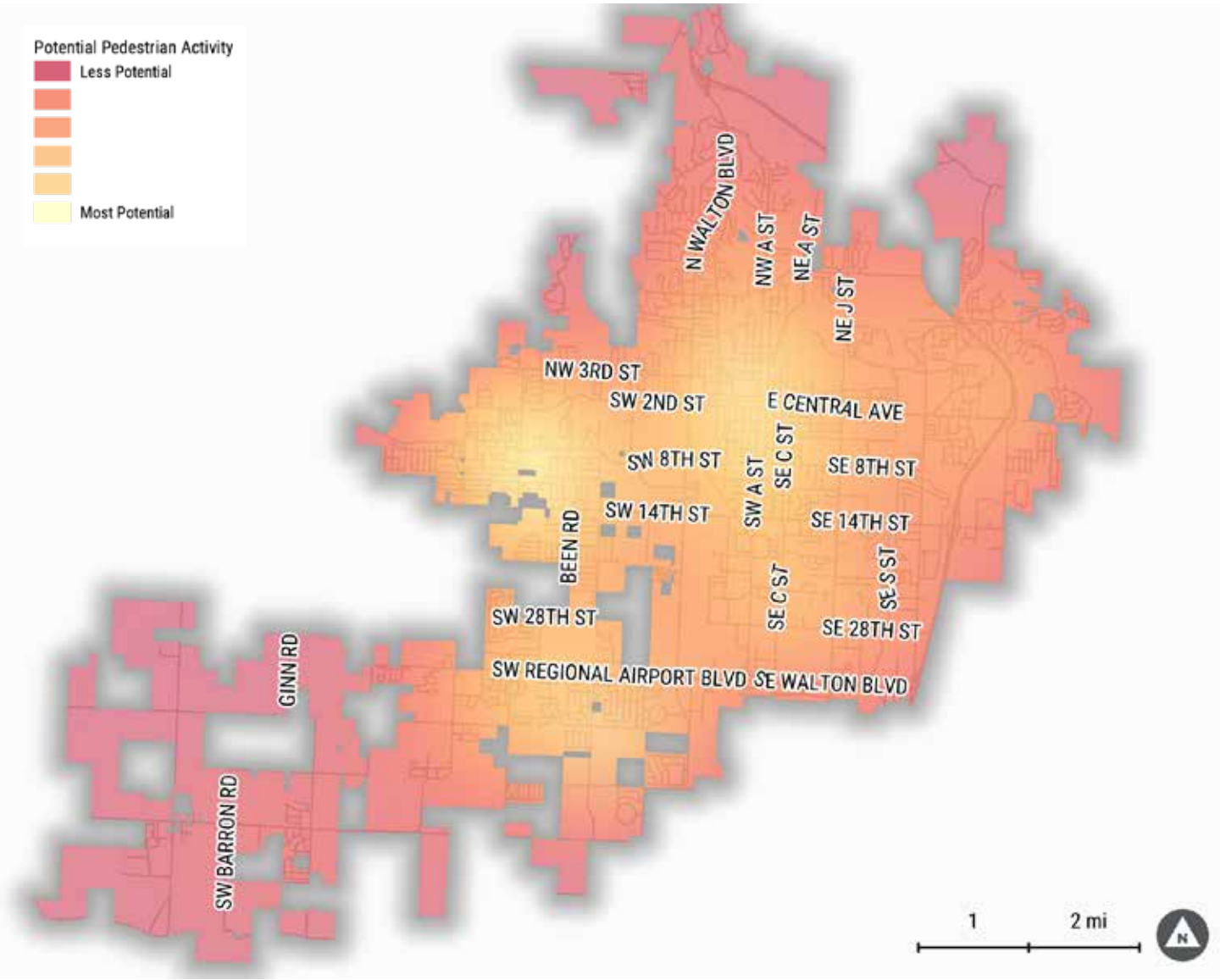
Potential Pedestrian Activity

The urban form of a community – the way streets and adjacent buildings are designed – greatly influences how people feel when walking from place to place. Short block lengths (i.e., generally less than 200'), wide and/or buffered sidewalks, and a continuous network of sidewalks without gaps increase pedestrian safety and comfort. High-quality urban form can both support those who are already walking and encourage others to walk for short trips.

The potential pedestrian analysis for *Connecting Bentonville*, illustrated in Figure 10, highlights areas that may be most suitable for walking today. Suitable walking conditions are based on intersection density (i.e., how close intersections are to one another) and existing complete sidewalks (i.e., sidewalks on both sides of the street) and incomplete sidewalks (i.e., sidewalks on one side of the street). The three factors were weighted equally.

"Hotspots" on the map indicate areas that may be more suitable for walking today. These areas have a higher concentration of intersections in a smaller area and existing sidewalk networks. The potential for higher pedestrian activity levels indicate areas where pedestrian infrastructure may be utilized the most. Areas that are less suitable for walking today are viewed as opportunities to encourage walking through the construction of more sidewalks and trails that connect to the existing sidewalk network along with denser land development.

FIGURE 10: POTENTIAL PEDESTRIAN ACTIVITY ANALYSIS MAP



Level of Traffic Stress

Low-stress, connected bicycle networks have emerged as one of the most important and tangible ways to encourage and support bicycling by people of all ages and abilities. For people to choose to ride a bicycle, safe bikeway facilities that make users feel comfortable at each step of their trip are essential.

Connecting Bentonville utilizes the Level of Traffic Stress (LTS) method, developed by the Mineta Transportation Institute.[1] The analysis quantifies bicyclists' experience using a given segment of road based on the road's conditions. Roadways are sorted into two main categories: high-comfort (i.e., low-stress) and low-comfort (i.e., high-stress) facilities. They are further broken down to scores of 1-4; 1 being highest comfort and 4 being lowest comfort. Understanding the LTS of the current system will provide data-driven results that help to identify which streets need more substantial bicycle facilities if attracting new users or the "interested by concerned" user group to use the network for daily trips. This analysis uses data from Open Streets Maps, a freely available, crowd-sourced database of road conditions.

FIGURE 11: LEVEL OF TRAFFIC STRESS ANALYSIS MAP

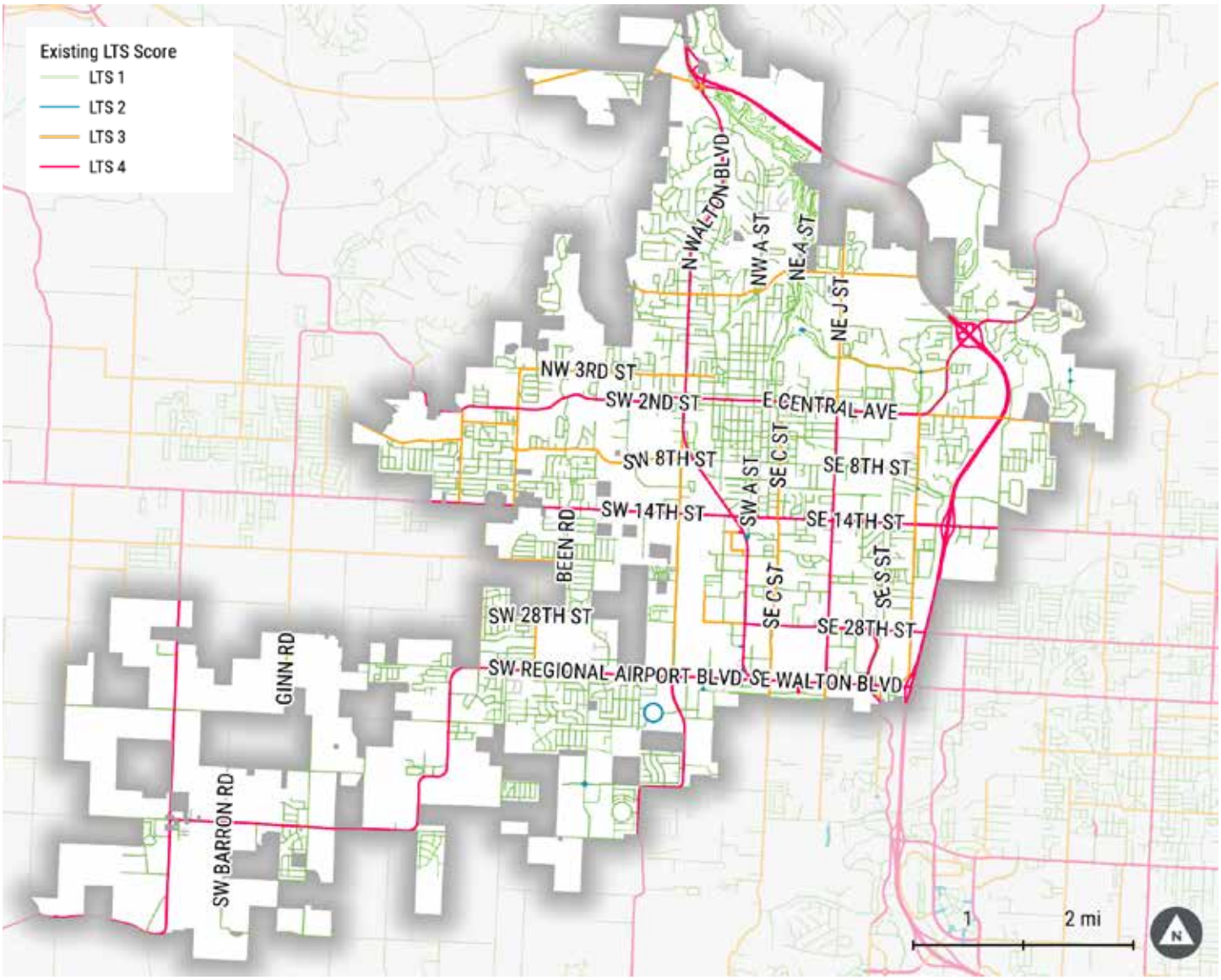


TABLE 5: LEVEL OF TRAFFIC STRESS ANALYSIS

FACTORS	RATIONALE
Number of Lanes	Number of lanes influences crossing lengths for pedestrians, traffic speeds, and whether a crossing environment prioritizes automobiles or people.
Speed Limit	Speed kills. Pedestrian fatality chances increase dramatically as speeds rise above 40 mph. Traffic speeds play a major role in encouraging or discouraging pedestrian and bicycle mode share.
Lane Width	Lane width has a direct impact on the previous factor of traffic speed. Allocating space for bicyclists can change driver behavior and impact comfort for people on bicycles.
Traffic Volume	Volume of traffic impacts the comfort level of pedestrians and bicyclists. Higher numbers of vehicles on the road creates a space that is perceived as car dominant. This lowers awareness for other modes. Additionally, higher volumes create more scenarios for crashes and fatalities.

Bicycle Network Analysis

Connectivity and direct access play an important role in route selection and encouraging/supporting bicycling ridership. Breaks or major gaps in a low-stress network can discourage the "interested but concerned"[2] from bicycling as a mode for trips.

Connecting Bentonville uses a bicycle network analysis (BNA) (develop and used by PeopleForBikes) to measure connectivity of a community's existing transportation network to key destinations from the bicyclists' perspective. The BNA tool builds upon the existing traffic stress analysis. Based on the stress scores for each road segment, the analysis then evaluates every census block in the area to determine how well the road network connects important destinations to one another. Two census blocks are considered connected if there is an unbroken, low-stress street/road between them that does not require a bicycle trip more than 25% longer than the shortest car trip.

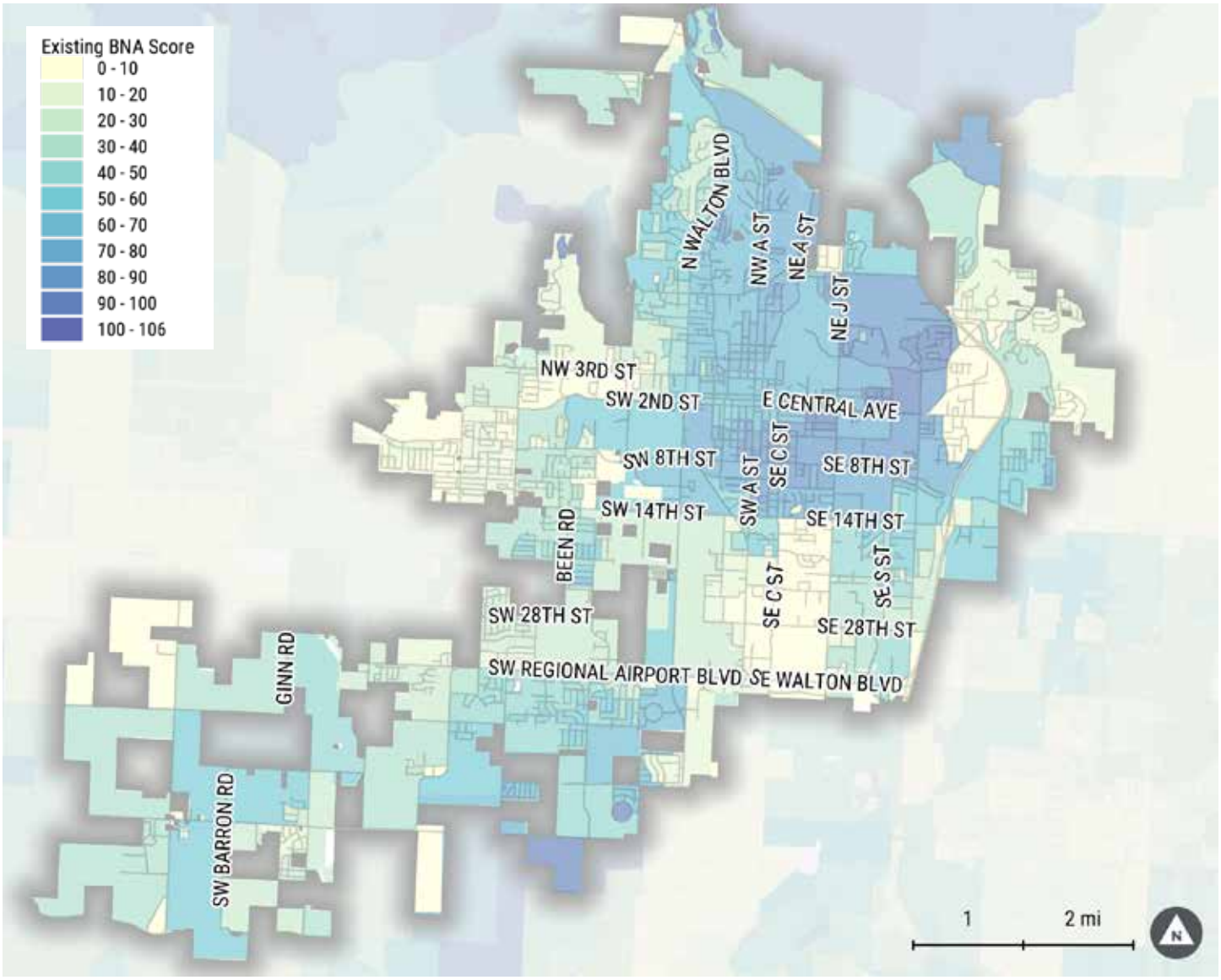
The BNA tool is used to test the impact of potential bikeway improvements aimed at increasing network connectivity and access. It analyzes how comfortable an individual is bicycling to and from desired destinations.

The following destinations were scored based on accessibility and comfort and then were summed to calculate the BNA score:

- Core services;
- Social services;
- Supermarkets;
- Pharmacies;
- Hospitals;
- Dentists;
- Doctors;
- Universities;
- Colleges;
- School;
- Employment options; and
- Number of people.

The higher the score, the more comfortable it is to access destinations within that specific census block. The result provides valuable understanding to guide project prioritization.

FIGURE 12: BICYCLE NETWORK ANALYSIS MAP

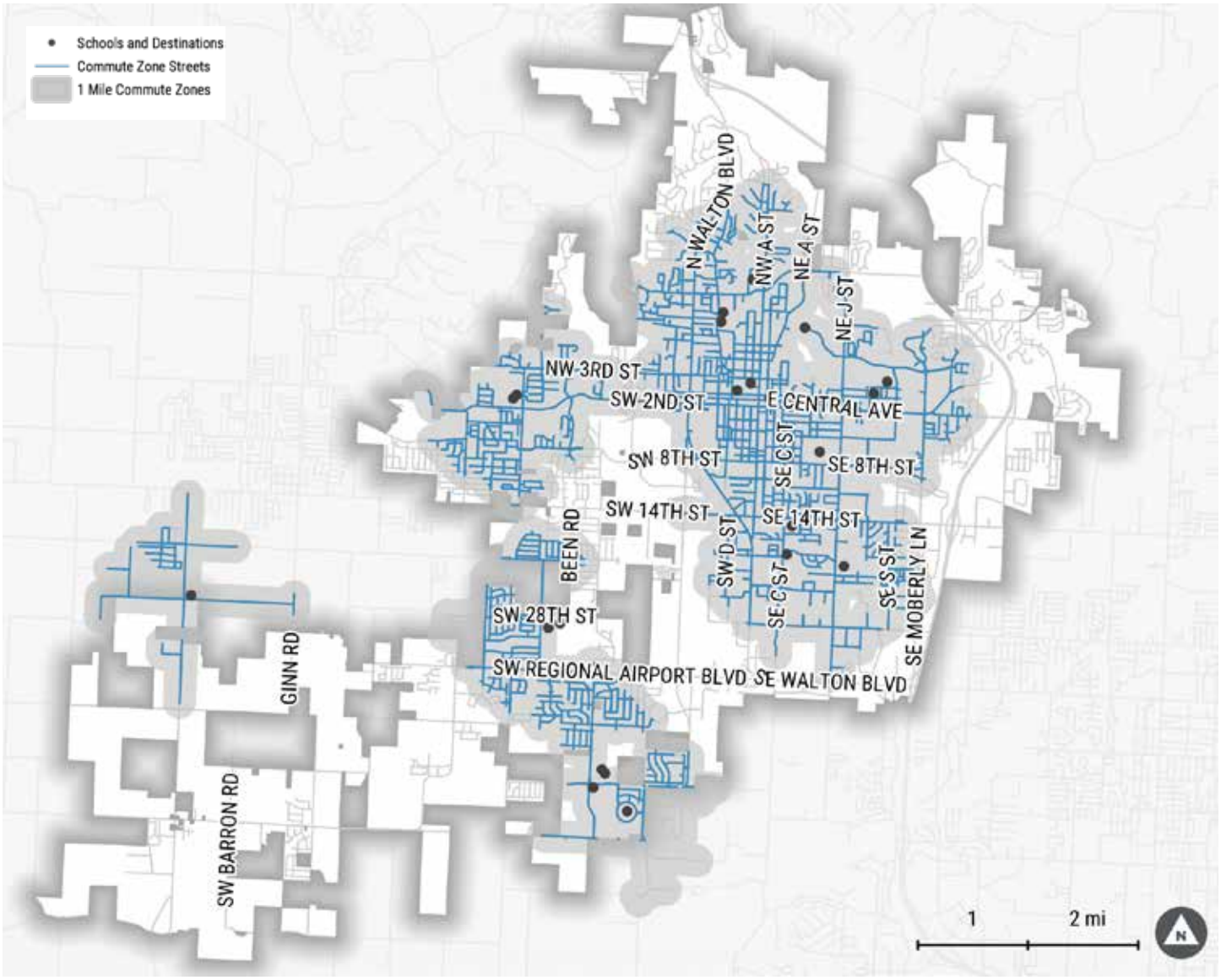


Commute Zones

In October 2019, the Bentonville School Board adopted a policy establishing "non-transport zones," for the purposes of this plan referred to as "commute zones," in which children living within a one-mile radius of a school would no longer be able to ride a school bus to school. Of the Bentonville School District's nearly 18,000 students, 9% live within a commute zone.[3] Without a complete sidewalk network (i.e., sidewalk on both sides of the street), walking to school may not be a safe option for these students.

The street network throughout the City was assessed for sidewalk completeness within the one-mile commute zone for each school in Bentonville. Local destinations that included the Momentary/8th Street Market, Downtown Square, and Crystal Bridges were also assessed as part of this analysis with respect to a one-mile commute zone. In addition, sidewalk completeness was analyzed along all proposed bikeway routes. Figure 13 illustrates all the areas that were assessed for sidewalk completeness, including schools and the aforementioned local destinations in Bentonville. Chapter 4 provides more detail on the level of sidewalk completeness for each commute zone.

FIGURE 13: COMMUTE ZONE ANALYSIS MAP

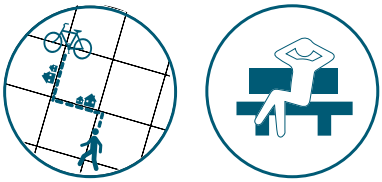


A Successful Network

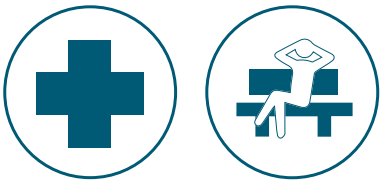
A successful network is one that creates safe, connected infrastructure and allows mobility for all ages, incomes, and abilities within the City of Bentonville. Several factors, directly related to the goals of *Connecting Bentonville*, influence the quality and success of the bicycle and pedestrian network.

HIGH QUALITY INFRASTRUCTURE can make the entire network more accessible and enjoyable for all users, regardless of age or ability and for both residents and visitors. Implementing safe and well-designed bicycle and pedestrian facilities can encourage more people to use the network, building upon the existing culture for active transportation.

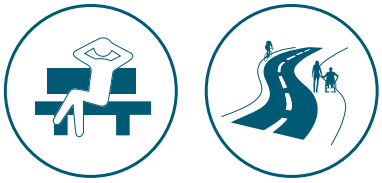
LOCATION OF THE PROPOSED INFRASTRUCTURE should benefit a variety of factors, including existing/future land uses that best support bicycling and walking, the community's needs/ desires, existing facilities, and equity. Infrastructure placement should be well-connected, offering people multiple ways to get where they need and want to go seamlessly by walking or bicycling.



FACILITY TYPES proposed for each route should suit the character and context of the street to enhance experience and provide the highest degree of safety for users.



OVERALL BICYCLE AND PEDESTRIAN NETWORK should provide a pleasant and enjoyable experience for residents and visitors of all ages and abilities and expand access to the network along with access to more destinations along the network.



Connecting Bentonville Network

Figures 14 and 15 illustrate the overall bicycle and pedestrian network recommendations for the City of Bentonville. These recommendations are intended to be used collectively to shape a better environment for bicycling and walking and contribute to the City's overall development of mobility infrastructure. More detail on bikeway types and commute zone statistics throughout the network are described in *Chapter 4: Implementation Action Plan*.

FIGURE 14: RECOMMENDED BIKEWAYS MAP

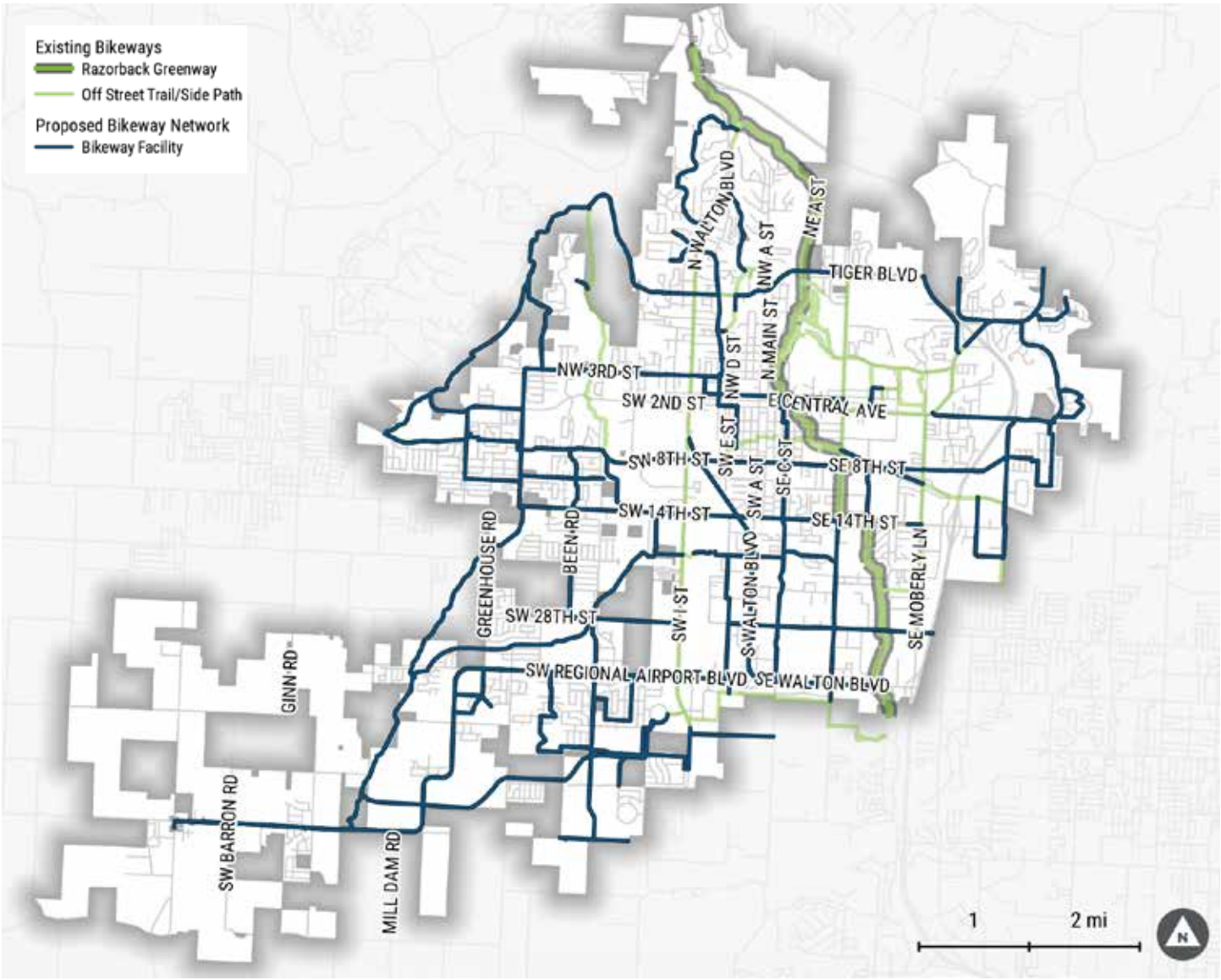
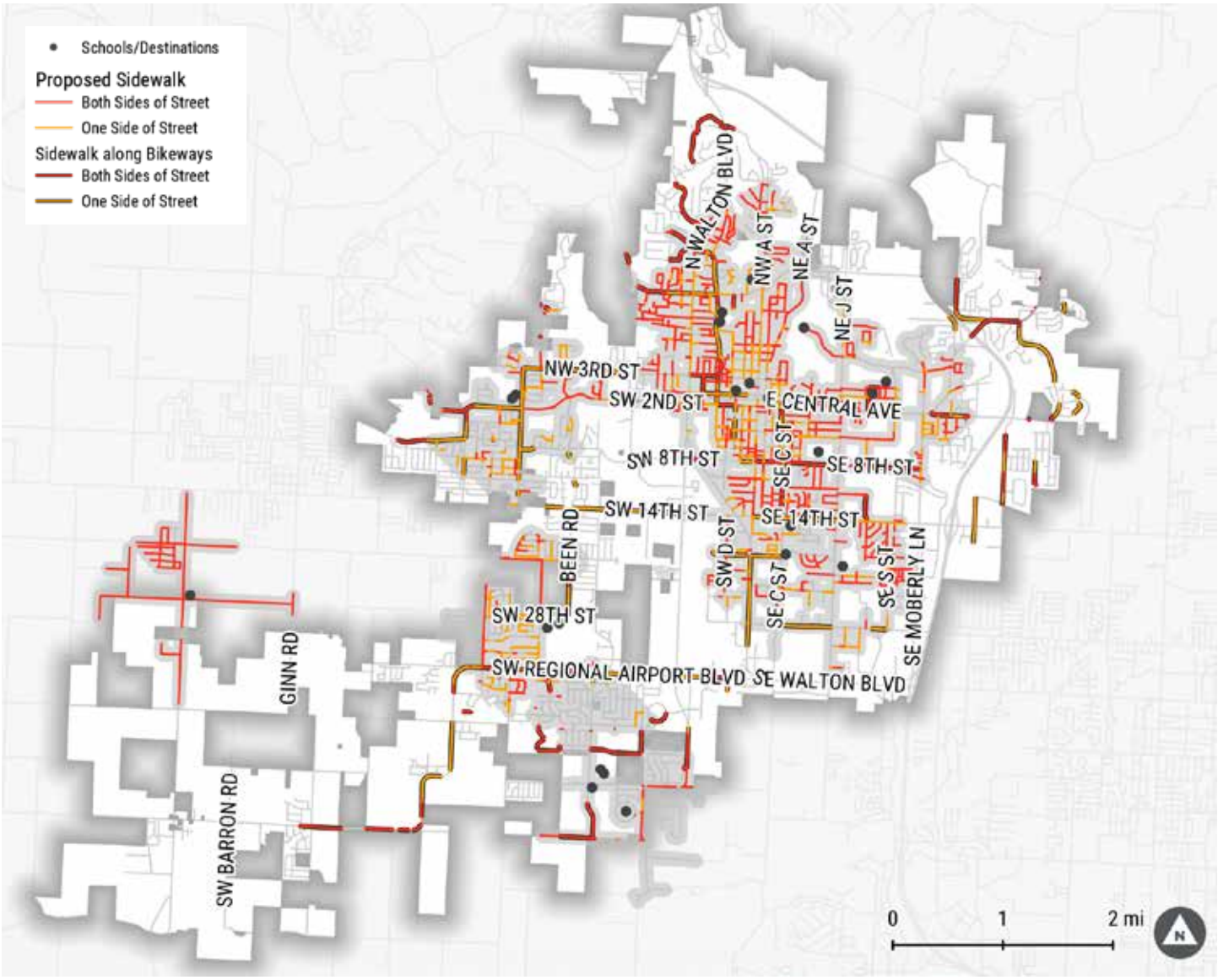
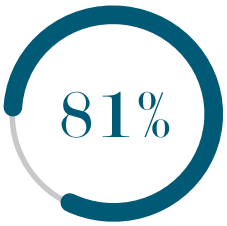


FIGURE 15: RECOMMENDED PEDESTRIAN FACILITIES MAP



The bikeway network was crafted with the intent to increase accessibility for Bentonville community members. Figures 16 and 17 highlight how the proposed bikeway network expands half-mile access to bicycle facilities for Bentonville residents. Recommended bikeway projects along any street segment include recommendations for sidewalk on both sides of the street.

1/2 MILE COVERAGE
of current bikeway facilities



1/2 MILE COVERAGE
with proposed bikeway network

FIGURE 16: CURRENT BIKEWAY COVERAGE 1/2 MILE

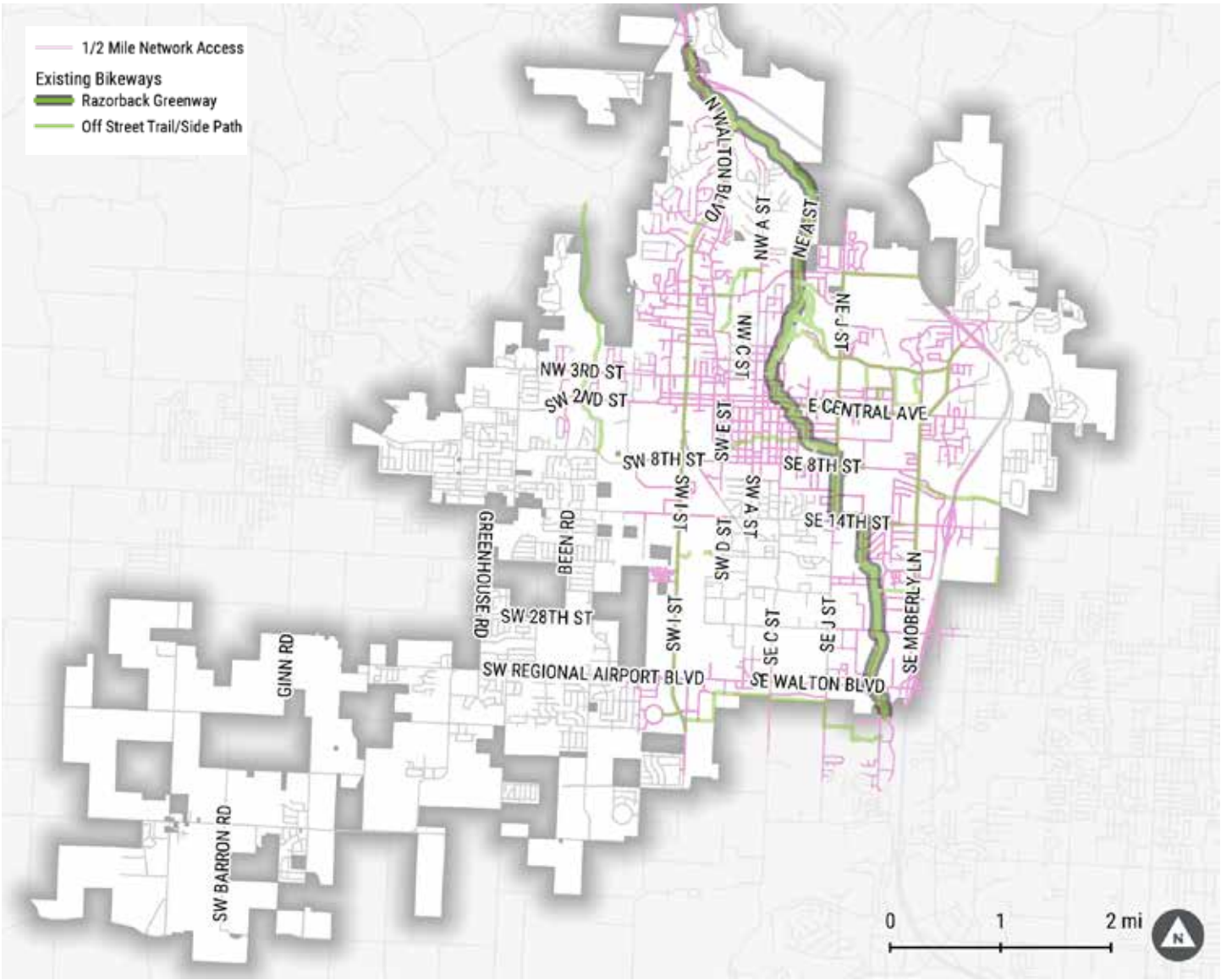
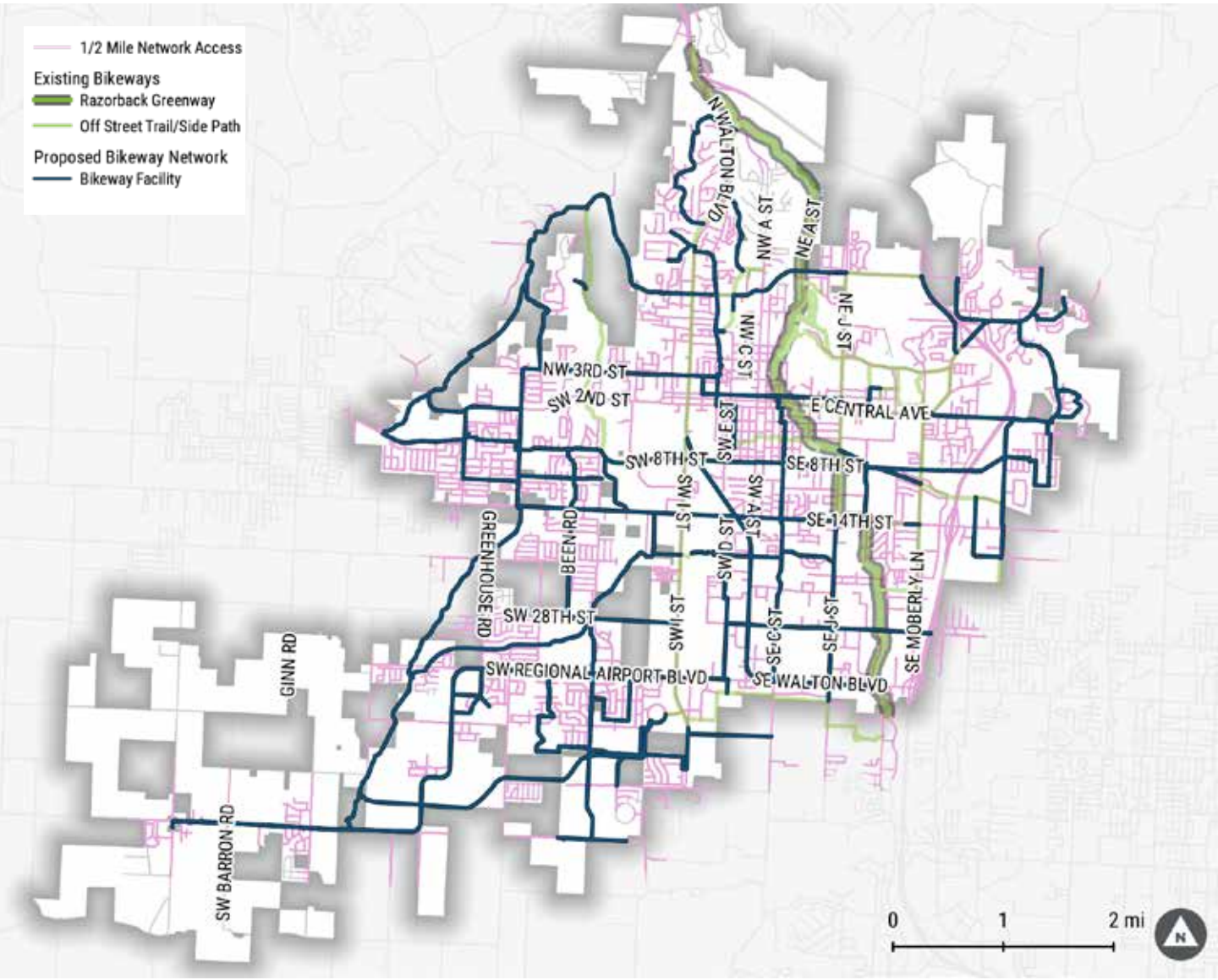


FIGURE 17: PROPOSED BIKEWAY NETWORK COVERAGE 1/2 MILE



Chapter 3 Sources:

1) Mekuria, M.C., P.G. Furth,and H. Nixon. Low-Stress Bicycling and Network Connectivity. MTI Report 11-19. Mineta Transportation Institute, San Jose State University, San Jose, CA, 2012.

2) Dill, D. and McNeil, N. Revisiting the Four Types of Cyclists. In Transportation Research Record 2587. TRB, National Research Council, Washington, DC, 2016.

3) Bentonville School District. 2019. https://www.nwaonline.com/news/2019/oct/23/bentonville-school-board-adopts-policy-/

IMPLEMENTATION ACTION PLAN

04

Summary

Connecting Bentonville is an essential step in advancing a more connected, safe, and convenient active transportation network in the City of Bentonville. However, the process which crafted this document is only the beginning; the conversation must continue and lead to action – real projects being implemented.

While completing *Connecting Bentonville* was important and necessary, implementation of recommendations identified in this document is the real desired outcome. To this end, an Implementation Action Plan has been created and is presented on the pages that follow. This chapter of *Connecting Bentonville* outlines the process for prioritizing projects, presents measures for success, summarizes recommendations, identifies funding and partnership opportunities, lays out a matrix of critical actions, and provides clear direction for realizing early action projects.

Prioritization of Projects/Network

Connecting Bentonville is focused on real change that establishes a better bicycling and walking environment in the City of Bentonville. To begin moving from vision to reality, the Plan prioritizes individual projects within the proposed network and recommends strategies for selecting and building active transportation and recreational trail facilities, creating a clear path toward implementation. The full list of prioritized projects can be found in *Appendix C*.

Previous chapters present the planning process that led to the development of the proposed network for *Connecting Bentonville*. While that network is the framework for bicycle and pedestrian connections throughout the City, implementation begins with the realization of individual projects.

Developing a prioritized project list for *Connecting Bentonville* used a quantitative approach. The criteria shown in Table 6 were used to prioritize projects into multiple tiers that could be used to phase implementation. While not every project can be in the highest tier, each project on the proposed network is a critical piece of increasing connectivity and safety for bicyclists and pedestrians in Bentonville. Projects that rank lower but fill essential gaps in the network may be considered for more rapid implementation or in conjunction with adjacent projects. Additionally, while tiers have been established, these designations are for planning purposes only and it is understood that there will be "projects of opportunity"; therefore, projects should be implemented when opportunities present themselves.

Individual projects were identified by dividing the network at major intersections, crossings of existing bikeways/trails, and access points to local destinations. Each project was further broken down into road segments separated at every intersection. Project segments received weighted scores based on the factors listed in Table 6 to calculate a prioritization score. During the prioritization process, each segment was scored independently then averaged with all other segments within the respective project. Calculating the prioritization score in this way ensured that each factor was captured at a detailed level for scoring of the overall projects.

TABLE 6: PRIORITIZATION CRITERIA

CRITERIA	DESCRIPTION	SCORING METRIC
Proximity to Schools	Projects that are located closer to schools were scored the highest.	• Within 1/2 mile = 10 points • Within 1 mile = 5 points
Proximity to Parks	Projects that are located closer to park properties were scored the highest.	• Within 1/2 mile = 10 points • Within 1 mile = 5 points
Expanding the Network	Projects that connected to existing bikeways or trails leverage previous investments and received a higher score.	• Yes = 5 points
Priority Corridor	Priority Corridors were voted on by the public. The top priority corridors that were identified were: • 8th Street • NW 3rd Street • SW Regional Airport Boulevard	• On/Along Priority Corridor = 8 points • Intersects Priority Corridor = 5 points
Existing Level of Traffic Stress (LTS)	Level of traffic stress may reflect the comfort of the user along that street/route. LTS scores that were higher represent less comfortable routes and therefore received additional points for prioritization.	• LTS 4 = 5 points • LTS 3 = 4 points • LTS 2 = 3 points • LTS 1 = 2 points
Equity	Projects that are within or intersected regions that were identified as high or medium concern with regard to equity were prioritized to assist in providing bicycling and walking facilities for those that need them most.	• Project intersects/is within an area of high concern = 5 points • Project intersects/is within an area of medium concern = 3 points

Performance Measures

Today, pedestrian and bicycle infrastructure exist throughout the City of Bentonville on a variety of scales and in multiple forms. The Action Plan detailed later in this chapter provides a roadmap for advancing the various *Connecting Bentonville* recommendations; it is important to establish measures of success, also called performance measures, that can be used to evaluate and monitor the progress of those individual recommendations. These measures will be valuable in documenting and celebrating success, while also demonstrating the benefits achieved by *Connecting Bentonville*. For each measure of success, the following section provides a definition, benchmarks where Bentonville stands today, and establishes steps for progress. This allows for a more informed decision-making process for implementing *Connecting Bentonville* recommendations and recommendations that come from future planning efforts.

Annual Budget for Bicycle and Pedestrian Infrastructure

Consistent and growing funding is an indicator of commitment to bicycle and pedestrian facilities. This measure of success could be tracked by the City of Bentonville's per capita spending or percentage of total transportation budget that is invested in bicycle- and/or pedestrian-related projects or the budget as it relates to vehicle-focused transportation projects.

Benchmarking: *Where does Bentonville stand today?*

Data for local-level spending on bicycle and pedestrian projects is limited. Nationally, most states spend between $1.50 and $3 per capita of their federal transportation funding on bicycle and pedestrian projects; the top ten states with the highest spending on bicycle and pedestrian projects range from $3.98 per capita (Tennessee) to $11.58 per capita (Alaska).[1] Arkansas, as of 2016, fell slightly above average, spending $2.83 per capita on bicycle and pedestrian projects.1 A detailed transportation budget that separates City spending by mode was not available at the time of writing *Connecting Bentonville*. The City should aspire to record and track this information so a benchmark can be established for future reporting and evaluation efforts.

PROGRESS

- Bentonville-specific benchmark established for per capita spending on bicycle- and pedestrian-related projects
- Based upon current benchmark, increase budget and per capita spending over the next five-year period

SUCCESS

- Annually evaluate per capita spending with routine updates to local goals
- Become a leader in Arkansas for bicycle and pedestrian funding resources
- Create a culture of funding bicycle and pedestrian projects and help Arkansas become one of the top ten states in per capita spending.

Bicycle Friendly Ordinances/Policies

Decision-making tools, such as ordinances and policies, are vital to changing a culture around bicycling and walking for trips. The presence and type of City of Bentonville ordinances that protect and/or create a safer, more welcoming environment for bicyclists and pedestrians will be a key measure of success.

Benchmarking: *Where does Bentonville stand today?*

As a state, Arkansas has passed a variety of laws that impact people on bicycles, including the list below. A complete description of each of these statewide policies is available in *Appendix A*.

- Rights and duties of cyclists (§§27-49-219; 27-49-111)
- Distracted Driving (Act 738)
- E-Bikes (Act 957)
- Reflective Equipment (§27-36-220)
- Passing a cyclist (§27-49-111)
- "Idaho Stops" (Act 650)

The City of Bentonville also has established local ordinances that impact people on bikes, including:

- Helmets – Bicyclists 14 and younger are required to wear helmets on paved and off-road trails in Bentonville.
- Where to Ride – Section 82-84 of the Code of Ordinances allows riding a bicycle or tricycle on sidewalks, except within the two block radius around Bentonville Square.

› The City of Bentonville should evaluate the safety and user experience impacts for existing City ordinances and state laws and determine how they can be refined to be more bicycle- and pedestrian-friendly, while maintaining a high standard for the safety and user experience of people using other modes.

PROGRESS

- Evaluate current design standards to ensure best practices are being implemented
- Create clear restrictions on blocking bicycle and pedestrian facilities and crossings.

SUCCESS

- Adopt a vulnerable road user type ordinance that provides legal protection for people walking and bicycling
- Adopt standards for traffic signals that detect bicyclists
- Eliminate pedestrian push buttons within one-mile commute zones and replace with automatic pedestrian phases

Bikeway Network to Street Network Coverage Ratio

A growing bikeway network in relation to the overall street network may show a commitment to bicycle mobility. This can be measured by the percentage of bicycle facilities (on- and off-street) compared to the reported centerline miles of all roadways in Bentonville.

Benchmarking: *Where does Bentonville stand today?*

Today, the combined bikeway and roadway network in the City of Bentonville covers approximately 115 centerline miles—including off-street trails and limited access highways. The bikeway network contributes to approximately 30% (36 miles) of this total. The Razorback Regional Greenway alone accounts for 25% (9 miles) of the bikeway network in the City of Bentonville.

While it is not recommended to implement bikeways on every street, the City should aim to strategically increase the overall mileage of the bikeway network.

PROGRESS

- Increase bikeway network to street coverage ratio to 35%
- Implement new off-street bikeways that connect to new destinations and/or parts of the community

SUCCESS

- Increase bikeway network to street coverage ratio to 50%
- Focus on bikeways that provide direct routes that are comparable to vehicle directness (a focus of the next performance measure)

Direct Bikeway Connections Along or Parallel to Major Arterials

Major arterial streets with speeds higher than 35 miles per hour are often the most direct streets through the City of Bentonville. While these streets may require a greater degree of separation for bikeways, directness is a valuable benefit for the overall bikeway network. An increase in the percentage of bicycle facilities along these streets will indicate a more direct network in Bentonville.

Benchmarking: *Where does Bentonville stand today?*

MAJOR ARTERIAL STREETS DEFINED:

The City of Bentonville's Master Street Plan 2008 defines arterials as roads that carry high volumes of through-traffic and connect and support the expressways. They link major commercial, residential, industrial, and institutional areas. The main function of an arterial street is to carry traffic within the community and between major activity centers of the region. The arterial system carries most of the traffic entering and leaving the City.

Bentonville has multiple major arterial streets with a speed limits of 35 mph or greater and high volumes of vehicular traffic. The directness offered by arterial streets is an opportunity when implementing safe and separated bikeways. Walton Boulevard is the only arterial that has significant length of separated bikeway adjacent in the form of a sidepath.

PROGRESS

- Implement one primary bikeway along an arterial street in the next 3-5 years
- Update Master Street Plan to include arterial corridors with primary bikeway cross sections

SUCCESS

- Establish an evaluation process to consider primary bikeway facilities along arterials during a capital improvement project
- Implement primary bikeways along arterial streets that connect people from north to south and east to west in Bentonville

Filling Sidewalk Gaps

Gaps in the sidewalk network can reduce access and change travel patterns. It will be important to track the percentage of sidewalk completeness (on both sides of the road) by neighborhood or community district in Bentonville, on an annual basis to understand how sidewalk gaps are being eliminated.

Benchmarking: *Where does Bentonville stand today?*

While sidewalk completeness is pertinent for the City of Bentonville as a whole, *Connecting Bentonville* is focused on sidewalk completeness within one-mile commute zones around schools and other key community destinations. Table 7 highlights commute zones around schools and community destinations in Bentonville. On average, 36% of roads within commute zones have sidewalk on both sides of the road, 10% have sidewalk on one side of the road, and 54% do not have any sidewalk.

PROGRESS

- Increase sidewalks on both sides of the street by a total of 10% across all identified commute zones
- Complete sidewalk on both sides of the street in one commute zone
- Evaluate development ordinances to ensure that sidewalks are developed cohesively and comprehensively

SUCCESS

- Establish annual budget, reporting process, and prioritization criteria for filling small sidewalk gaps—less than 150-feet
- Complete sidewalk on both sides of the street in three commute zones

TABLE 7: SIDEWALK COMPLETENESS

COMMUTE ZONE	% SIDEWALK ON BOTH SIDES	% SIDEWALK ON ONE SIDE	% NO SIDEWALK
Old High Middle School	27.83%	15.01%	57.16%
Fullbright Junior High School	82.86%	0.84%	16.30%
Ardis Ann Middle School	56.79%	14.10%	29.11%
Lincoln Junior High School	19.23%	11.93%	68.83%
Elm Tree Elementary School	54.87%	14.10%	31.03%
Central Park Elementary School	74.60%	0.87%	24.53%
Washington Junior High School	36.86%	11.05%	52.09%
Thomas Jefferson Elementary School	16.31%	13.93%	69.75%
Bentonville High School	35.73%	13.63%	50.65%
Bright Field Middle School/ Willowbrook Elementary School	84.26%	2.32%	13.42%
Sugar Creek Elementary School	14.06%	13.49%	72.45%
Mary Mae Jones Elementary School	29.24%	13.01%	57.75%
R E Baker Elementary School	24.46%	15.21%	60.33%
Apple Glen Elementary School	38.97%	9.66%	51.37%
Downtown Square	24.10%	14.93%	60.97%
Crystal Bridges	38.05%	9.18%	52.66%
8th Street Market and Momentary	24.35%	11.14%	64.52%
Junior High School (Future - August 2020)	0.00%	0.00%	100.00%
Osage Creek Elementary School/Creekside Middle School	41.37%	13.46%	45.17%
Ruth Barker Middle School	34.53%	13.71%	51.76%

Priority Corridors with Bikeways and Sidewalks

Key corridors throughout Bentonville provide access to destinations and major North-South or East-West thoroughfares. The percentage of bicycle facilities and sidewalks that either run along or parallel to these priority corridors may indicate progress for additional mobility.

Benchmarking: *Where does Bentonville stand today?*

Bentonville has a limited number of North-South or East-West priority corridors. Some of these thoroughfares are not continuous while crossing the City (i.e., NW 3rd Street). There are approximately twelve priority corridors noted during the *Connecting Bentonville* public engagement process:

- Walton Boulevard (Business 71)
- SW/SE 8th Street
- NW 3rd Street
- Regional Airport Boulevard
- NE/SE J Street
- NE/SE Moberly Lane
- Main Street
- SW/NW A Street
- SW 2nd Street
- W/E Central Avenue (Highway 72)
- SW/SE 14th Street (Highway 102)
- SE 28th Street

PROGRESS

- Fill sidewalk gaps that exist along priority corridors
- Implement a primary bikeway that connects destinations and existing bikeway infrastructure along one of the priority corridors

SUCCESS

- Construct new sidewalk along priority corridors that currently do not have sidewalk
- Implement bikeways or sidepaths along the entire length of four priority corridors

Quality of Low-Stress Network

The Bicycle Network Analysis (BNA) score for Bentonville through PeopleForBikes provides a metric to describe the comfort and connectivity for bicyclists.[2] The BNA is a data analysis tool that measures how well bike networks connect people to the places they want to go.

Benchmarking: *Where does Bentonville stand today?*

As of Spring 2020, PeopleForBikes assigned the City of Bentonville a BNA score of **41**.

Increasing the quality of a low-stress network relies on both the availability of a comfortable bikeway and the ability to access destinations via a direct route. Both progress and success are built upon these factors that will result in a high BNA score.

PROGRESS

- Implement three neighborhood connections that link residences to existing primary bikeways
- Implement one new primary bikeway that connects across Walton Boulevard (East-West)
- Provide bikeway connectivity from surrounding neighborhoods to Downtown, Crystal Bridges, and The Momentary/8th Street Market

SUCCESS

- Implement new primary bikeways that connect the western neighborhoods to one another (North-South) along with a crossing of Walton Boulevard
- Implement seven neighborhood connections that link to primary bikeways
- Evaluate change in directness of route for bicyclists as new projects are planned, designed, and constructed

Reducing Bicycle and Pedestrian Crash Rate

The number and rate (per capita) of bicyclist and pedestrian crashes can be tracked over time to measure progress towards meeting safety goals. Reducing total crashes and crash densities can be measures along with crashes that result in serious injuries or fatalities.

Benchmarking: *Where does Bentonville stand today?*

Between 2017 and 2019, Bentonville had one (1) fatality and three (3) suspected serious injuries. It is important to note that, in 2019, Bentonville had no reported fatalities or suspected serious injuries. Data on near misses was not available but should be considered for future data collection.

PROGRESS

- Establish a procedure and criteria for evaluating bicycle- and pedestrian-related crash data
- Review characteristics of streets or intersections that have higher densities of bicycle and pedestrian crashes

SUCCESS

- Develop and adopt a Vision Zero Action Plan
- Establish a process for conducting safety audits with an inter-departmental team at any new bicycle- or pedestrian-related crash location
- Identify outreach strategies and educational information that can assist users of the bikeway and pedestrian network to report near misses.[3]

Reducing Vehicle Speeds

Vehicle speed is a major contributor to safety and perceived comfort for bicyclists and pedestrians along a street or at an intersection. Reducing speed through a speed limit change or new geometry at intersections to reduce turning speeds can make a major impact for more vulnerable users. This performance measure may include a change in the number of projects annually that reduce vehicle speeds along streets with bikeway facilities and at bicycle and pedestrian crossing locations (e.g., speed limit reduction, raised crossings, tighter turn radii).

Benchmarking: *Where does Bentonville stand today?*

Information on the total number of bicycle- and pedestrian-related projects, as well as whether or not reducing vehicle speeds was included in the project purpose, was not readily available when *Connecting Bentonville* was developed. The City should aspire to record and track this information so a benchmark can be established for future reporting and evaluation efforts.

PROGRESS

- Include speed reduction and safety as an element of new projects' purpose and need statements
- Consider design treatments that can reduce turning speeds for vehicles at intersections during planning and design

SUCCESS

- Incorporate slower design speeds for a variety of street types in the Master Streets Plan
- Update street design standards to include intersection treatment details that reduce the effective turning speeds of vehicles
- Consider reducing city-wide speed limit to 25 MPH unless otherwise posted

Short Trip Mode Share

Changing the culture around bicycling and walking may emphasize short trips for residents and visitors. A short trip is defined as 1 mile for pedestrians and 5 miles for people on bikes.[4] The percentage of Bentonville residents making short trips, regardless of trip purpose, by walking and/or bicycling may be one method to judge progress and success.

Benchmarking: *Where does Bentonville stand today?*

Census commute data shows that 0.3% of Bentonville's population bicycle and 2.5% walk to work or school. Not every trip, especially short trips, are taken with the purpose of commuting to work or school. While collecting trip data from residents and visitors can be difficult, Bentonville should aspire to understand how people are using the bikeway and pedestrian networks.

The City of Bentonville should develop a community survey to better understand short trip mode share for a variety of trips, to supplement Census data on commuting.

PROGRESS

- Develop a community survey that asks residents about mode choice for short trips
- Establish an annual report that communicates how people access destinations
- Once a baseline short-term mode share is established, increase bicycle and walking mode share for short trips to 2% in the first five-year period

SUCCESS

- Use annual events such as Bike/Walk to Work Day or Square to Square events to promote bicycling and walking for short trips
- Increase bicycle and walking mode share for short trips to 10% in the next five-year period

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Plan Recommendations:
Projects, Policies, Programs, and Funding

Recommendations developed in *Connecting Bentonville* are intended to be a resource for the City for both capital projects and future policy and program decisions. Implementing a variety of recommendations in this plan ensures that Bentonville can track and celebrate success as bicycling and walking become safer and more accessible. This section provides information on projects, policies, and programming that will lead Bentonville to mobility choices that achieve the vision and goals of *Connecting Bentonville*. Information on these recommendation categories are followed by a customized Action Plan (Table 11 on page 84) that provides a phased approach to recommendations along with key partnerships, goals achieved, and corresponding performance measures.

Project Recommendations

Commute Zones

As described in Chapter 3, the one-mile commute zone around each school was assessed for levels of sidewalk completeness (i.e., Is there sidewalk on both sides of the street?). In addition to schools, key destinations in Bentonville--Downtown Square, 8th Street Market, and Crystal Bridges-- were also assessed for sidewalk completeness. The total length of potential sidewalk was calculated for each street by doubling the length of each street. Existing sidewalk lengths—including sidewalk on one and both sides of the street—were divided by the total potential sidewalk for each commute zone to calculate a sidewalk to street ratio.

Many commute zones in Bentonville overlap with one another. Figure 18 demonstrates where two commute zones overlap. Roads that are only within Commute Zone 1 are shown in dark grey, those only within Commute Zone 2 are shown in light grey, and those within both Commute Zone 1 and 2 are shown in medium grey.

FIGURE 18: COMMUTE ZONES

Table 8 (on the following page) details the existing, potential, and missing sidewalk lengths, along with the sidewalk to street ratio for every commute zone evaluated by *Connecting Bentonville.* Lastly, the table highlights commute zones that overlap with each other. Providing a complete sidewalk network and filling key gaps will allow children and people of all ages to access schools and other destinations by walking and, by removing the barrier of a lack of sidewalks, contribute to a more walkable Bentonville. Early action projects within commute zones that were identified as priority by the community are provided later in this chapter.

TABLE 8: SIDEWALK COMPLETENESS OF COMMUTE ZONES

COMMUTE ZONES			SIDEWALK ON BOTH SIDES	SIDEWALK ON ONE SIDE	NO SIDEWALK	TOTAL SIDEWALK TO STREET RATIO
NAME	LINEAR FEET OF POSSIBLE SIDEWALK	OVERLAPPING COMMUTE ZONES				
ELEMENTARY & MIDDLE SCHOOLS						
Elm Tree Elementary	206,938	• Bright Field Middle School/ Willowbrook Elementary School • Fullbright Junior High School	54.87%	14.10%	31.03%	68.97%
Central Park Elementary	71,012	• Fullbright Junior High School	74.60%	0.87%	24.53%	75.47%
Thomas Jefferson Elementary	358,570	• Downtown Square • Lincoln Junior High School • Old High Middle School • R. E. Baker Elementary School • Sugar Creek Elementary School	16.31%	13.93%	69.75%	30.25%
Sugar Creek Elementary	350,936	• Downtown Square • Lincoln Junior High School • Old High Middle School • R. E. Baker Elementary School • Thomas Jefferson Elementary School	14.06%	13.49%	72.45%	24.35%
Mary Mae Jones Elementary	284,796	• 8th Street Market and Momentary • Bentonville High School • Downtown Square • Old High School • R. E. Baker Elementary School • Ruth Barker Middle School	29.24%	13.01%	57.75%	42.25%
R.E. Baker Elementary	411,080	• 8th Street Market and Momentary • Apple Glen Elementary School • Crystal Bridges • Downtown Square • Lincoln Junior High School • Mary Mae Jones Elementary • Old High School • Ruth Barker Middle School • Sugar Creek Elementary School • Thomas Jefferson Elementary School • Washington Junior High School	24.46%	15.21%	60.33%	39.67%

TABLE 8: SIDEWALK COMPLETENESS OF COMMUTE ZONES CONTINUED

COMMUTE ZONES			SIDEWALK ON BOTH SIDES	SIDEWALK ON ONE SIDE	NO SIDEWALK	TOTAL SIDEWALK TO STREET RATIO
NAME	LINEAR FEET OF POSSIBLE SIDEWALK	OVERLAPPING COMMUTE ZONES				
ELEMENTARY & MIDDLE SCHOOLS						
Apple Glen Elementary	161,698	• 8th Street Market and Momentary • Crystal Bridges • Downtown Square • Old High Middle School • R. E. Baker Elementary School • Washington Junior High School	38.97%	9.66%	51.37%	48.63%
Osage Creek Elementary/ Creekside Middle	219,982	• Bright Field Middle School/ Willowbrook Elementary School • Fullbright Junior High School	41.37%	13.46%	45.17%	54.83%
Willowbrook Elementary/ Bright Field Middle	143,538	• Central Park Elementary School • Fullbright Junior High School	84.26%	2.32%	13.42%	86.58%
Old High Middle School	398,538	• 8th Street Market and Momentary • Apple Glen Elementary School • Crystal Bridges • Downtown Square • Old High Middle School • R. E. Baker Elementary School • Ruth Barker Middle School • Sugar Creek Elementary School • Thomas Jefferson Elementary School • Washington Junior High School	27.83%	15.01%	57.16%	42.84%
Ardis Ann Middle School	225,722	• Elm Tree Elementary School	56.79%	14.10%	29.11%	70.89%
Ruth Barker Middle School	317,426	• 8th Street Market and Momentary • Bentonville High School • Downtown Square • Mary Mae Jones Elementary School • Old High School • R. E. Baker Elementary School	34.53%	13.71%	51.76%	48.24%

TABLE 8: SIDEWALK COMPLETENESS OF COMMUTE ZONES CONTINUED

COMMUTE ZONES			SIDEWALK ON BOTH SIDES	SIDEWALK ON ONE SIDE	NO SIDEWALK	TOTAL SIDEWALK TO STREET RATIO
NAME	LINEAR FEET OF POSSIBLE SIDEWALK	OVERLAPPING COMMUTE ZONES				
JUNIOR HIGH & HIGH SCHOOLS						
Fullbright Junior High	117,316	• Bright Field Middle School/ Willowbrook Elementary School • Central Park Elementary School • Osage Creek Elementary/ Creekside Middle School	82.86%	0.84%	16.30%	83.70%
Lincoln Junior High	237,352	• Downtown Square • Old High Middle School • R. E. Baker Elementary School • Sugar Creek Elementary School • Thomas Jefferson Elementary School	19.23%	11.93%	68.83%	31.17%
Washington Junior High	145,428	• 8th Street Market and Momentary • Apple Glen Elementary School • Bentonville High School • Crystal Bridges • Downtown Square • Mary Mae Jones Elementary School • Old High Middle School • R. E. Baker Elementary School	36.86%	11.05%	52.09%	47.91%
Junior High (Future - August 2020)	12,554	N/A	0.00%	0.00%	100.00%	0.00%
Bentonville High	239,514	• 8th Street Market and Momentary • Mary Mae Jones Elementary School • Ruth Barker Middle School • Washington Junior High School	35.73%	13.63%	50.65%	49.35%

TABLE 8: SIDEWALK COMPLETENESS OF COMMUTE ZONES CONTINUED

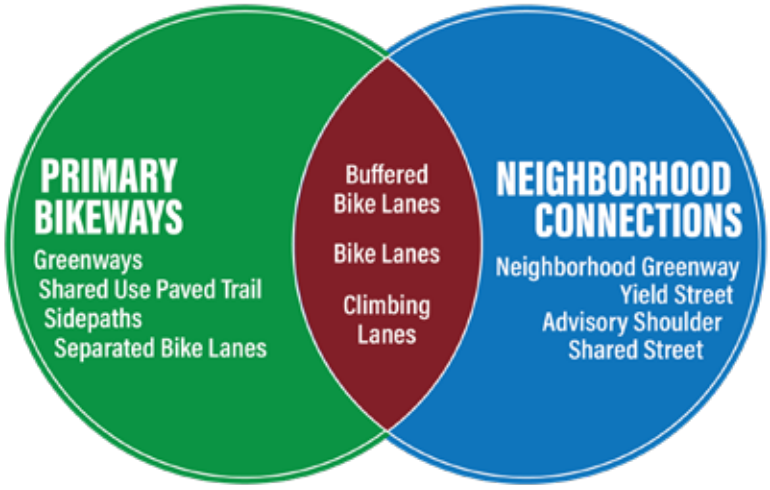
COMMUTE ZONES			SIDEWALK ON BOTH SIDES	SIDEWALK ON ONE SIDE	NO SIDEWALK	TOTAL SIDEWALK TO STREET RATIO
NAME	LINEAR FEET OF POSSIBLE SIDEWALK	OVERLAPPING COMMUTE ZONES				
OTHER LOCATIONS						
Downtown Square	117,316	• Bright Field Middle School/ Willowbrook Elementary School • Central Park Elementary School • Osage Creek Elementary/ Creekside Middle School	**24.10%**	**14.93%**	**60.97%**	**39.03%**
Crystal Bridges	237,352	• Downtown Square • Old High Middle School • R. E. Baker Elementary School • Sugar Creek Elementary School • Thomas Jefferson Elementary School	**38.05%**	**9.18%**	**52.66%**	**47.24%**
8th Street Market and Momentary	260,750	• Apple Glen Elementary School • Bentonville High School • Crystal Bridges • Downtown Square • Mary Mae Jones Elementary School • Old High Middle School • R. E. Baker Elementary School • Ruth Barker Middle School • Washington Junior High School	**24.35%**	**11.14%**	**64.52%**	**35.48%**

Bikeways

Projects within the bikeway network have been split into one of three categories:

- Primary Bikeways
- Neighborhood Connections
- Greenways

The figure below illustrates the relationship between Primary Bikeways and Neighborhood Connections.



Pedestrian facilities are proposed on both sides of all bikeway corridors. Where shared use paths are implemented on one side of a street, a sidewalk is recommended on the opposite side to increase mobility for pedestrians along bikeway corridors. *Appendix C* includes a comprehensive map of all bikeway projects by category. Tables of proposed projects by facility type with information regarding geographic extent and prioritization score for each project are also available in *Appendix C*.

Bikeway Project Prioritization Scores and Tiers

The following maps show the priority bikeway projects identified in *Connecting Bentonville*. Projects are separated by whether they were considered a primary bikeway, greenway, or neighborhood connection. Each project was assigned a tier based on its prioritization score. Tier 1 facilities scored highest, followed by Tier 2 facilities, while Tier 3 facilities scored the lowest. It is important to note that just because a project has been categorized as Tier 2 or Tier 3, it is still a vital component of Bentonville's bikeway network. These tiers can help the City in determining the order and priority of bikeway projects. A complete network necessitates projects that afford residents and visitors safe, convenient, and accessible bikeways that get them to the places they need and want to go.

Understanding Priority Projects

The following pages show a total of 88 priority bikeway projects. Each page highlights an individual bikeway category (primary bikeway, greenway, or neighborhood connection) with a map illustrating the location and priority tier of each proposed project. As shown in the sample map below, projects are color coded by priority tier with Tier 1 projects in purple, Tier 2 projects in red, and Tier 3 projects in blue. The map also includes project ID numbers. This makes it easy to look up the geographic extent and prioritization score of each project in the corresponding tables in Appendix C, a sample of which is provided below.

FIGURE 19: PROPOSED PRIMARY BIKEWAYS (SAMPLE MAP)

TABLE 9: PRIMARY BIKEWAY PROJECT TIERS AND SCORING (SAMPLE TABLE)

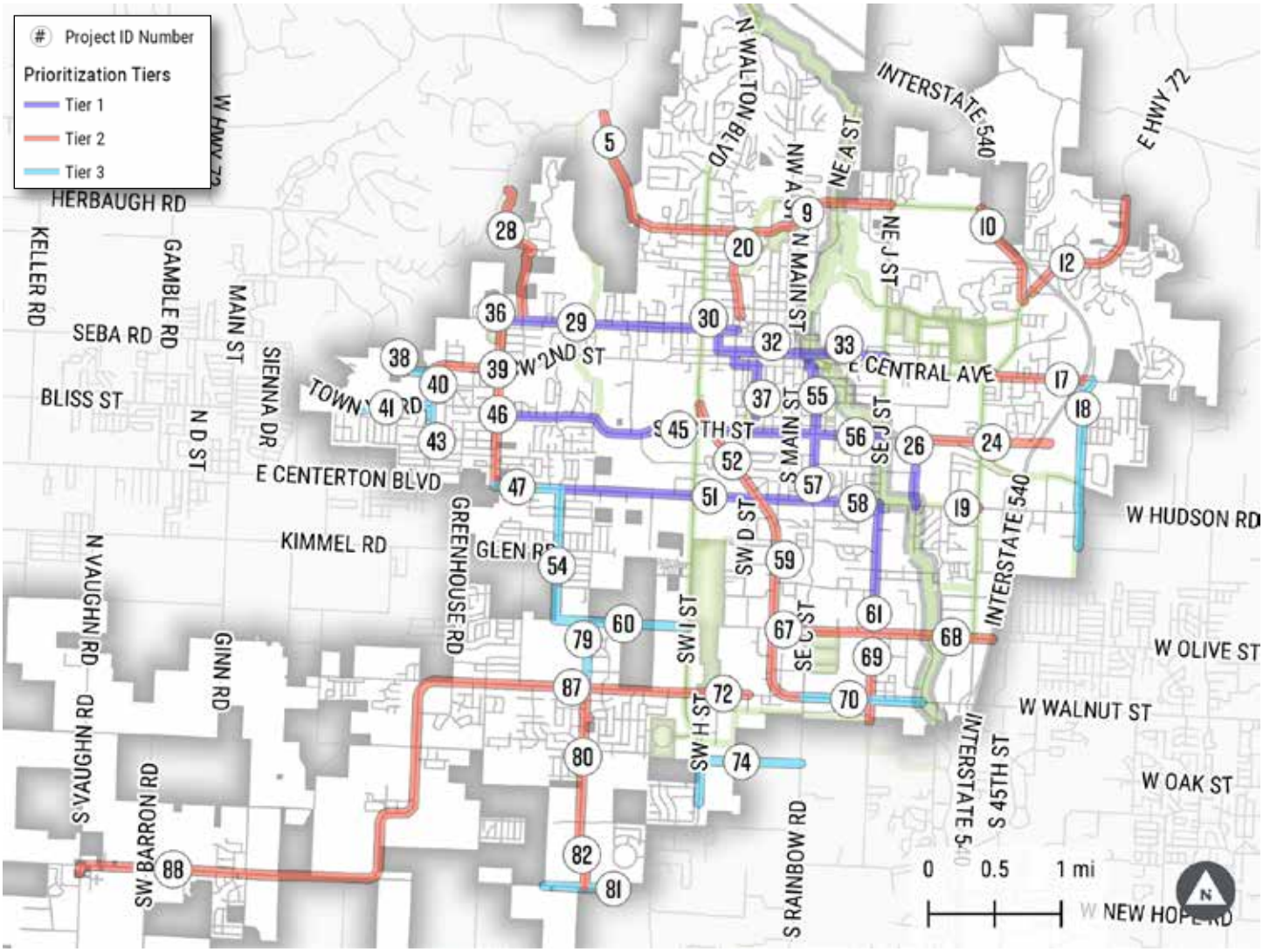
PROJECT ID	STREET NAME(S)	OVERALL SCORE
TIER 1 PROJECTS		
45	SW 8th Street from SW Elm Tree Road to SW I Street	37
55	SE B Street/SE C Street from NW 2nd Street to SE 8th Street	37
TIER 2 PROJECTS		
59	S Walton Boulevard from SE 14th Street to SW Rainbow Road	25
67	SE 28th Street from S Walton Boulevard to SE J Street	25
TIER 3 PROJECTS		
43	SW Tater Black Road from SW Town Vu Road to SW Carriageway Avenue	12
38	W Highway 72 from SW Tater Black Road to proposed greenway	10

Primary Bikeways

Projects that are denoted as "primary bikeways" are those that will serve as primary connections for bicycling between major destinations in Bentonville. These bikeways are envisioned to be beautiful, safe, and comfortable places to bicycle; the bikeways should be designed so that they encourage more users through increased access, comfort, and convenience. Many of the primary bikeway projects are on streets that may be less comfortable for bicycling in their current state and should consider separated facilities for implementation unless vehicular travel conditions are changed.

For the corresponding table of primary bikeway projects including prioritization score and geographic extents, see Appendix C (pages 198-199).

FIGURE 20: PROPOSED PRIMARY BIKEWAYS

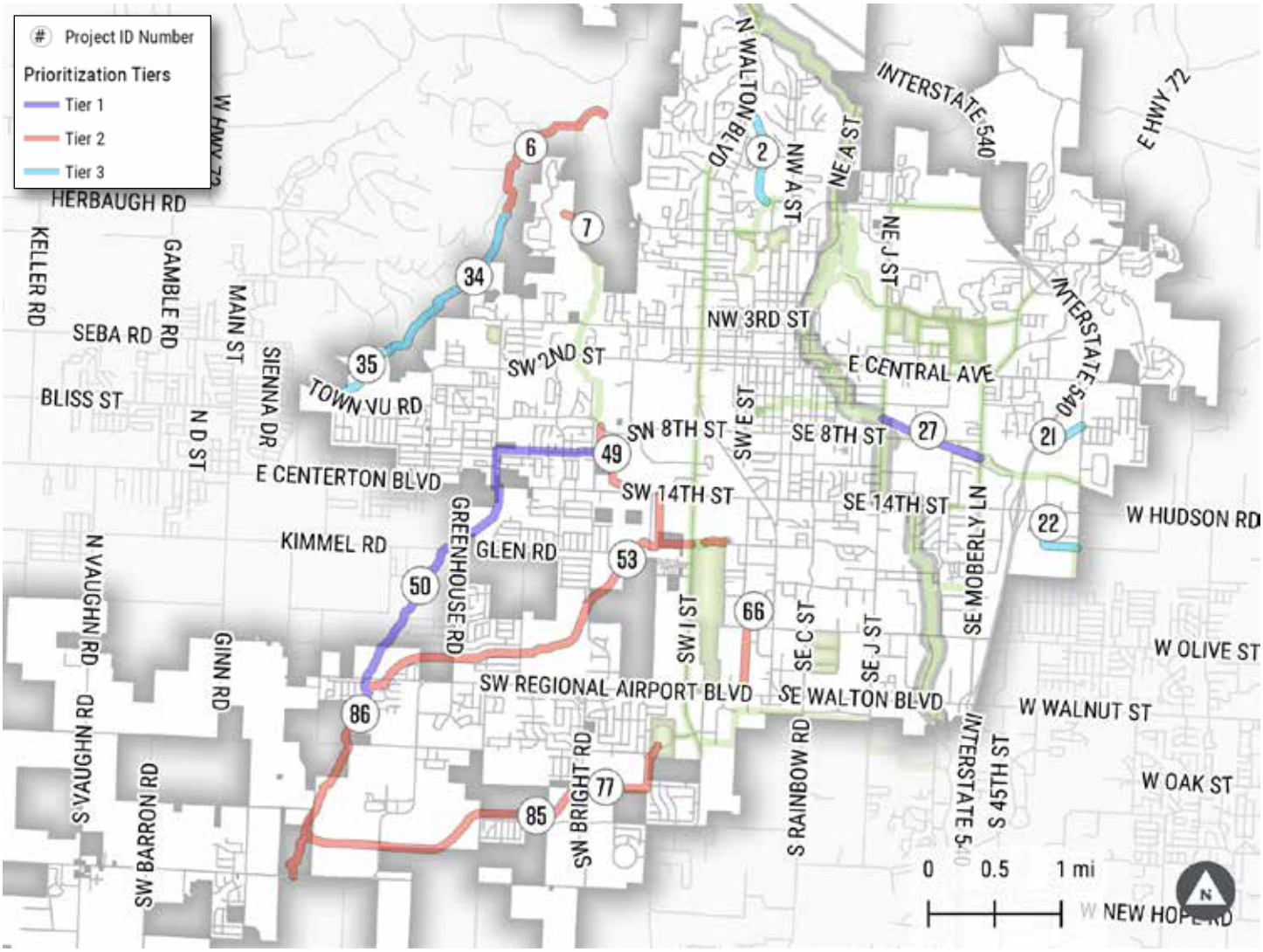


Greenways

Greenway projects provide an off-street facility for people to bicycle, walk, and wheel. Greenways are included in primary bikeways but have a unique category and map symbology due to proposed alignments that follow stream corridors or cut through more natural landscapes rather than being adjacent or parallel to streets like shared use paths and sidepaths. The proposed greenway projects supplement Bentonville's existing greenway and shared use path system by increasing access to high-comfort, off-street facilities throughout the City.

For the corresponding table of greenway projects including prioritization score and geographic extents, see Appendix C (page 200).

FIGURE 21: PROPOSED GREENWAYS

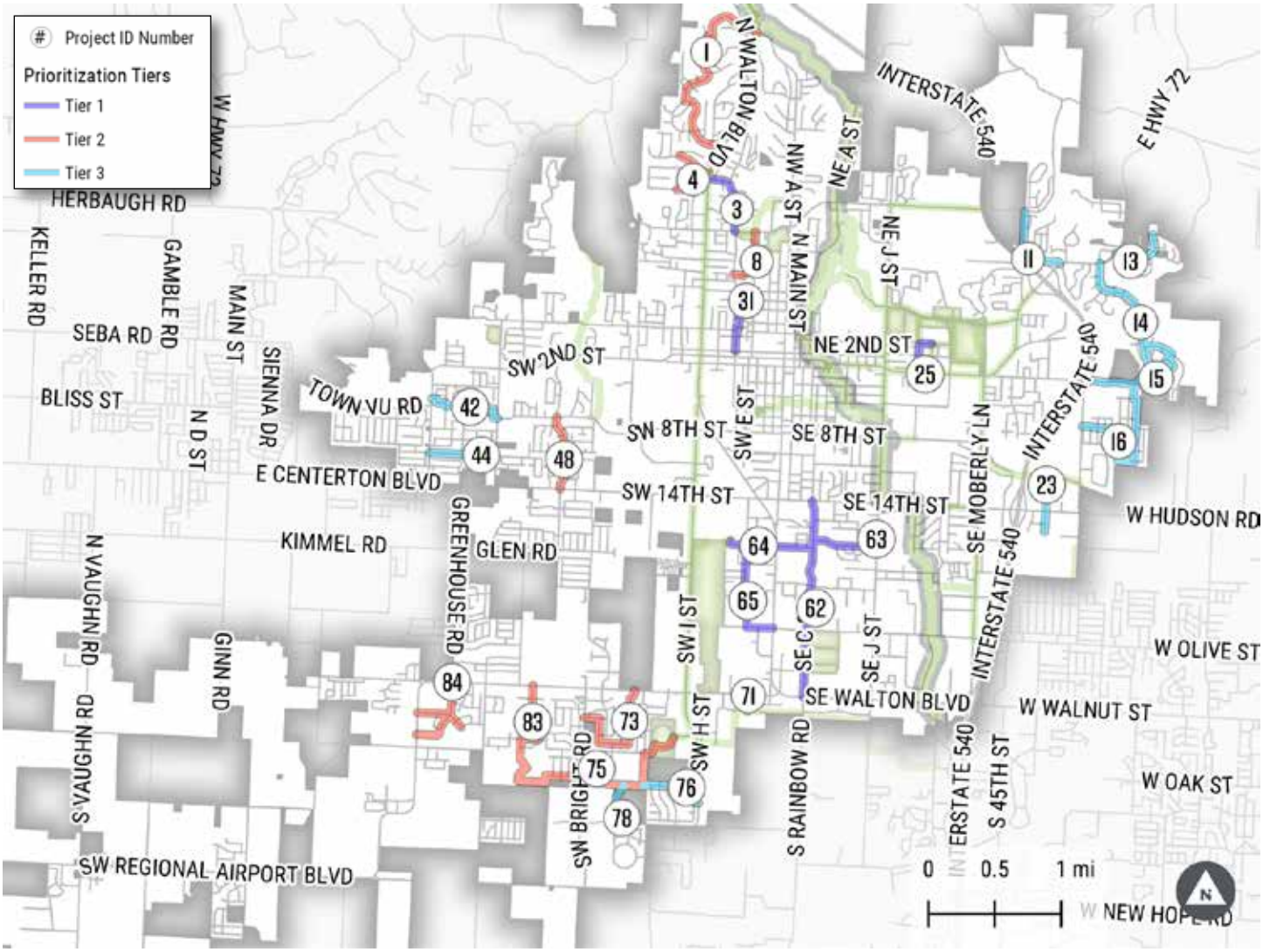


Neighborhood Connections

Neighborhood connection projects will connect neighborhoods to primary routes or existing trails. These streets are envisioned to become neighborhood bikeways also called neighborhood greenways—routes that encourage residential bicycling for connection to primary routes and for recreation. Neighborhood bikeway corridors are primarily residential routes with low traffic speeds and volumes, fewer travel lanes, and higher volumes of people bicycling and walking. Neighborhood connections require striping and other traffic calming elements that deter cut-through vehicular traffic and keep speeds low (i.e., under 25 MPH). Critical to the success of neighborhood connections are major intersection crossings that maintain user comfort for the approach and crossing of streets.

For the corresponding table of neighborhood connection projects including prioritization score and geographic extents, see Appendix C (page 201).

FIGURE 22: PROPOSED NEIGHBORHOOD CONNECTIONS



THE BENTONVILLE "BOOT LOOP"

Bentonville is home to a variety of destinations that include the arts at Crystal Bridges and The Momentary, major employment centers such as the Walmart Home Office, thriving commercial development, and recreation opportunities at facilities and parks throughout the community. *Connecting Bentonville* seeks to establish a network of bicycle and pedestrian facilities that truly connect Bentonville. While the entirety of the network recommendations creates a grid that increases access for almost all City residents, a larger loop of the community is also a formal recommendation of the Plan.

The Bentonville Boot Loop builds upon the existing Razorback Regional Greenways and Applegate Trail to connect the eastern and western sides of the community that have been separated by Walton Boulevard and the lack of safe bikeway infrastructure for crossings. Resembling the shape of a boot, the Bentonville Boot Loop is a tour of many of the destinations that Bentonville has to offer. This 23.2-mile loop will be a powerful amenity for local residents, and it will be a destination in itself for regional and national visitors to Bentonville.

Key points of interest:

- Downtown Square
- Bentonville Community Center
- Crystal Bridges
- Slaughter Pen Mountain Bike Trails
- Coler Creek Mountain Bike Trails
- Applegate Trail
- 8th Street Market/The Momentary
- Park Springs
- Town Branch Park
- Lawrence Plaza
- Future Park at 8th Street and I Street
- Connection to Rogers, Springdale, and Fayetteville via the Razorback Greenway

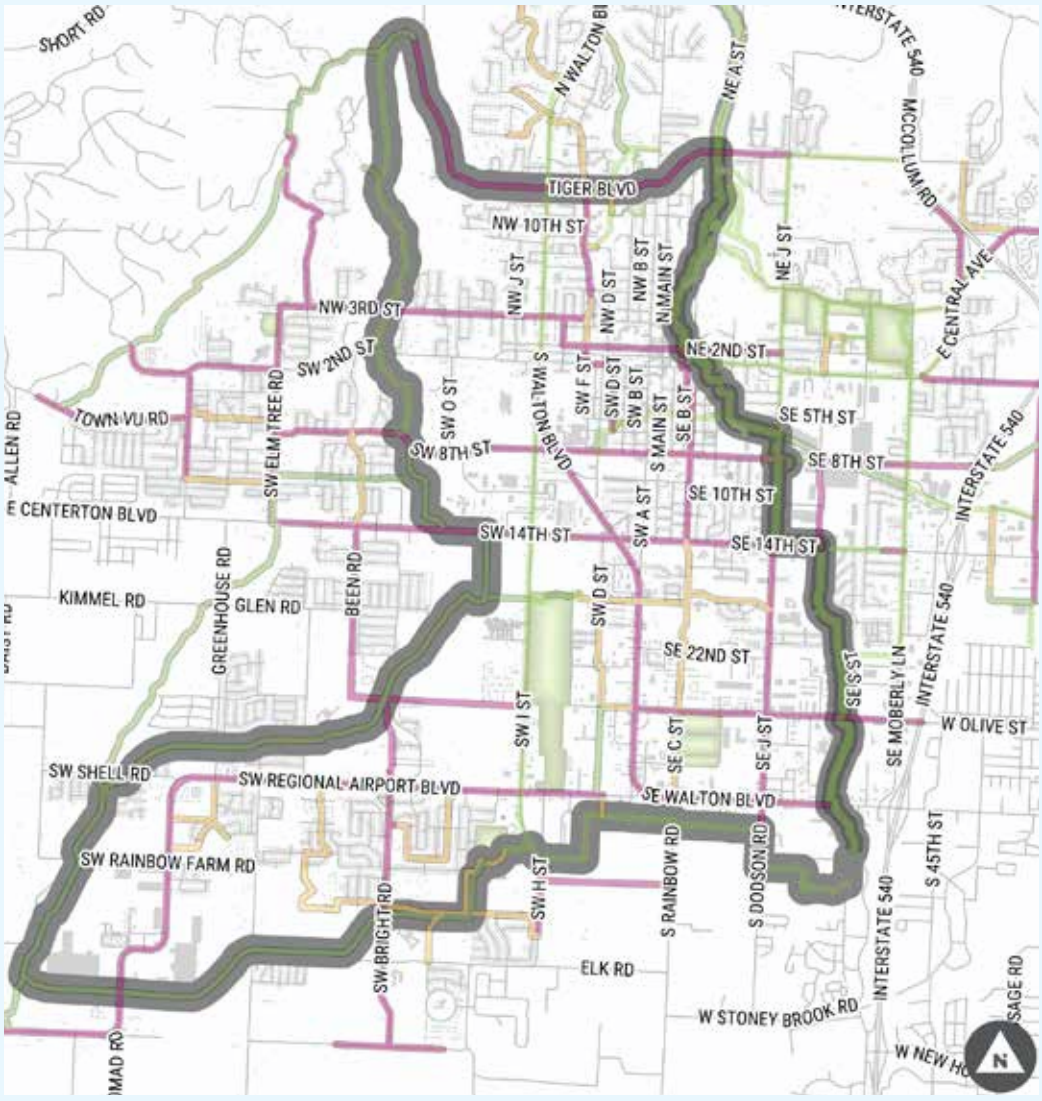


FIGURE 23: PROPOSED BENTONVILLE "BOOT LOOP"

Policies and Programs

In addition to project recommendations presented above, there are several policy and programmatic changes that the City of Bentonville should consider as it desires to shift toward a culture that encourages bicycling and walking for a variety of trip types. While these types of recommendations may not involve large capital expenditures, they can require varying degrees of coordination and cooperation among departments and personnel, as well as political will. The following are a variety of policy and program opportunities that align with the *Connecting Bentonville* goals and performance measures.

Data Collection and Analysis

For many of *Connecting Bentonville's* recommendations to be effective, and for the measures of success to be benchmarked over time, consistent, accurate, and up-to-date data is critical. The City of Bentonville should initiate or expand data collection and analysis efforts to continue to tell the story of changing mobility throughout the community. Data that supports an in-depth analysis of crashes, near-misses, and systemic safety issues should also be collected. Furthermore, counting will ensure a clear understanding of which facilities are attracting new users and various user types. Finally, all data must be accessible, easy to understand and interpret, and readily passed between databases and GIS platforms throughout the Northwest Arkansas region to support regional bicycle and pedestrian initiatives. These steps will enable a data-driven approach to routine refinements to *Connecting Bentonville* and assist with planning and implementation throughout the region.

Adopt a "Safe Systems" or Vision Zero Approach

Safety—both the perception of safety and actual crash numbers and rates experienced in the community--is an important component of *Connecting Bentonville*. If people don't feel safe riding a bicycle or walking for trips, they will not choose to do it. Adopting a "Safe Systems" or Vision Zero approach will allow Bentonville to focus on increasing bicycling, walking, and wheeling without increasing crash rates. This approach establishes a series of essential principles to eliminating deaths and serious injuries on roadways; six key elements set Vision Zero apart from traditional road safety efforts:

- **Traffic deaths are preventable.** Zero is upheld as the only acceptable number of traffic fatalities and the word "accident" is eliminated from the traffic safety vocabulary.
- **System failure is the problem.** In the safe systems framework, individuals are not the problem. It is flaws in the system – from planning through design, construction, and maintenance – which cause conflicts between high-speed motor vehicles and pedestrians and bicyclists.
- **Road safety is a public health issue.** While traditional approaches to transportation safety have prioritized reducing or preventing collisions, Vision Zero focuses on preventing injuries and fatalities.
- **The approach is holistic.** Roadway design is part of the issue, but so are land use and development decisions, school siting choices, housing policies, and many other factors that affect transportation options and choices.
- **Data drives decisions.** Vision Zero demands a relentless focus on eliminating fatalities and serious injuries first.
- **Social equity is a key goal and component of Vision Zero.** Traffic crashes disproportionately affect vulnerable populations, particularly among those who do not have access to a motor vehicle and who are more likely to be dependent on walking, bicycling, and transit. Vulnerable communities must be meaningfully engaged in addressing the safety, accessibility, and larger cultural and societal issues around road safety and community development.

Formally adopting the Safe System Approach will allow the City of Bentonville to increase bicycle mode share while prioritizing the safety of residents and visitors.

CONVENTIONAL APPROACH	VS	VISION ZERO
Traffic deaths are inevitable		Traffic deaths are preventable
Perfect human behavior		Integrate human failing in approach
Prevent collisions		Prevent fatal and severe crashes
Individual responsibility		Systems approach
Saving lives is expensive		Saving lives is not expensive

Support Safe Routes to School Program

A Safe Routes to School program aims to make walking and bicycling safer and more accessible for children, particularly between their homes and schools. Bentonville's mandate that school buses will not serve children who live within one mile of their school limits options for children to reach school. Where safe infrastructure is lacking or has significant gaps, parents may choose to drive their children to school rather than allow them to walk or bike. BikeNWA, a regional nonprofit focused on supporting the creation of a network of active transportation infrastructure for all ages and abilities, is in the process of hiring a regional Safe Routes to School Coordinator to work with schools to plan and implement a Safe Routes to School program throughout the region. The City of Bentonville's support is crucial to the success of this program.

Establish a Bikeshare Program

A bikeshare program would allow residents and visitors the opportunity to experience Bentonville's culture, shopping, dining, and outdoors in a unique way and promote a more bicycle-friendly culture on Bentonville's streets. While a bikeshare program currently exists for Wal-Mart Associates, expanding the program to the greater Bentonville community could have a large impact on bicycling. The City of Bentonville can learn from nearby Fayetteville, who, over a year ago, implemented the first bikeshare program in Northwest Arkansas in collaboration with the University of Arkansas.

Build Momentum through Local Advocates and Committees

As a renowned mountain biking destination, there is an abundance of community outreach and education around bicycling, particularly mountain biking, in Bentonville. The Northwest Arkansas Quality of Life Report (2015)[5] found that parks and trails are the most used amenities in the region, with 81% of Bentonville residents reporting using trails. BikeNWA is based in Bentonville and provides numerous volunteer trail ambassador and maintenance programs, promotional events, pilot projects, and community outreach. The City of Bentonville should build new and strengthen existing partnerships with community organizations to support their efforts to encourage bicycling and walking. In addition, the City should establish a Bicycle and Pedestrian Advisory Committee (BPAC) to engage members of the community in shaping the future of bicycling and walking in Bentonville. Bike Bentonville, a subsidiary

TABLE 10: PEER ENCOURAGEMENT PROGRAMS

LOCATION	POP.	DESCRIPTION
Fayetteville, AR	85k	Provides bike route maps, way-finding signage, special events, and incentive programs. The local business community can encourage more bicycling by becoming a Bicycle Friendly Business. Fayetteville established a citywide VeoRide bike share program and mobile phone app in Fall 2018. *MORE INFO**
Conway, AR	66k	Bicycle & Pedestrian Advisory Board encouraged the City to be an official Bicycle Friendly Community as designated by the League of American Bicyclists and encourages citizens of Conway to increase bicycling through events. *MORE INFO*
Joplin, MO	53k	Joplin mobility programs include Safe Routes to School, sidewalk continuity along major roadways, traffic signal equipment upgrades, and path connectivity to transit stops. The Joplin Police Department utilizes bicycle patrol for RAPID Team response throughout the City. *MORE INFO*
Jefferson City, MO	43k	Jefferson City launched a bikeshare program with SPIN in July 2018. Jefferson City applied for a Bicycle Friendly Community designation through the League of American Bicyclists earlier this year and is encouraging residents to take a survey regarding their bicycling experiences in the community. *MORE INFO*
Stillwater, OK	50k	Stillwater offers a low-cost bike program called Orangeride Bike rental to promote affordable and convenient transportation to the OSU campus and Stillwater community. The League of American Bicyclists awarded Stillwater a Bronze Level Bicycle Friendly Community designation in 2017. *MORE INFO*
Lawton, OK	94k	Lawton participates in Fit Kids Southwest OK which includes a map for activity locations and trails (i.e., soft and hard surfaces). Also, the Duty Rowe trailway, created in 2005-2006 by the late Duty Rowe, who had the idea to construct a bikeway from Cache through the Wichita Mountains Wildlife Refuge and the Town of Medicine Park. The City of Lawton also hosts the Tour of the Wichita annual ride. *MORE INFO*
Jackson, TN	67k	Bikeshare using Zagster began in Jackson in June 2018. *MORE INFO*
Lawrence, KS	79k	The University of Kansas has partnered with VeoRide to bring a fleet of KU bikes to the KU campus (i.e., students, faculty, staff) and the greater Lawrence community who can rent the bikes for half price. *MORE INFO*

* A full list of resources is listed on page 98.

of the City's tourism bureau, can also be leveraged to promote, market, and increase the number of bicycling events and programming that are geared towards active transportation, in addition to recreational trail use (e.g., Open Streets events, pilot projects, and social marketing campaigns). Table 9 shows how other cities of similar size to Bentonville have developed programs designed to encourage bicycling and walking in their communities.

Educate the Community

Creating a more bicycle- and pedestrian-friendly culture requires investing in education to increase the safety of people who walk and bicycle through proper operations and courtesy. The City of Bentonville should establish innovative practices to educate motorists about sharing the road with people who are walking and bicycling, as well as ensuring Bentonville community members know how to safely ride a bicycle and traverse streets as pedestrians. The League of American Bicyclists provides an extensive curriculum for teaching adults safe riding tips and techniques, with trained instructors.[6] The program also has a component for drivers. Educational activities aimed at youth can be part of Bentonville's Safe Routes to School program and Vision Zero plan.[7] Other cities of similar size to Bentonville have successfully administered educational programming in their communities (Table 10).

TABLE 11: PEER EDUCATIONAL PROGRAMS

LOCATION	POP.	DESCRIPTION
Fayetteville, AR	85k	Fayetteville Public Schools include bicycle education at elementary, middle school, and high school levels. All-age safety course taught by local League of American Bicyclist Certified Instructor. *MORE INFO**
Conway, AR	66k	Bicycle & Pedestrian Advisory Board educational efforts help bicyclists and motorists learn to share the road. *MORE INFO*
Joplin, MO	53k	Joplin Schools raised $33K to completely fund bike riding educational program in 126 school buildings. *MORE INFO*
Jefferson City, MO	43k	Local leaders embrace the bikeshare program. JC Parks and Capital Region Healthy Schools Healthy Communities have several bike skills classes designed to help residents feel safe and comfortable on a bicycle. Classes are held by licensed cycling instructors from League of American Bicyclists. *MORE INFO*
Stillwater, OK	50k	Bicycle & Pedestrian Ad Hoc Committee meets once each month to brainstorm ways to advance travel opportunities for all residents, regardless of travel mode choice. *MORE INFO*
Lawton, OK	94k	Lawton began Open Streets events in June 2015, which turns city streets into a temporary public park with activities for the whole family to get people moving. Lawton also hosts a walk/bike school day each year in October. *MORE INFO*
Jackson, TN	67k	Lift, a public wellness clinic, offers cycling classes on stationary bicycles for group fitness, along with therapy and health classes. *MORE INFO*
Lawrence, KS	79k	Lawrence Public Schools offer the Bicycle Lesson and Safety Training (BLAST) program to all fourth- and fifth-grade students as part of its physical education curriculum. The program is possible through Lawrence-Douglas County Health Department, LiveWell Lawrence, City of Lawrence, Lawrence-Douglas County Metropolitan Planning Organization, and Bike Walk KC. *MORE INFO*

* A full list of resources is listed on page 99.

Adopt and Encourage Bicycle- and Pedestrian-Friendly Local Ordinances and Policies

Connecting Bentonville has prioritized strategic bikeway connections and commute zones around schools and other key destinations as a valuable step in creating a great bicycle and pedestrian network. Moving forward, the City should evaluate current development ordinances to determine if additional sidewalk or bikeway infrastructure may be implemented through the development of private property. Updates to development standards should consider sidewalk completeness and determine the process for adding sidewalks and crossings opposite of new development, if needed.[8] Furthermore, the Master Streets Plan should identify streets that are designated for primary bikeways and neighborhood connections to ensure that adequate right-of-way is planned for in the future. Standards for street design should be updated for clarity for both public and private development.[9]

A sidewalk gap policy, along with appropriate yearly funding, may be beneficial to ensuring safety for pedestrians throughout the community. Lastly, the City should educate the public, both residents and visitors, regarding local and state laws and ordinances that encourage bicycling and walking. Education around a state law, such as the Arkansas stop, can help people using a variety of modes for trips better understand one another.

Funding and Partnering Opportunities

A variety of funding and partnering opportunities exist that the City of Bentonville can access and cultivate to realize a stronger active transportation and recreational greenway network. These include opportunities at the local, state, federal, and private levels. Many of these require coordination with regional and state agencies, so it is important for the City of Bentonville to be strategic in how it positions for them. Additionally, with some creative strategies, local, state, and private funding can be leveraged for larger federal dollars. A complete listing of funding and partnering opportunities, with descriptions and eligibility requirements, is included in *Appendix D*.

Action Plan

The Action Plan presented in Table 11 provides a succinct listing of critical recommendations made throughout *Connecting Bentonville*. Each action is categorized as immediate-, near-, mid-, or long-term, depending on the level of need and ease or complexity of implementation. In addition, the goals guiding *Connecting Bentonville* echo throughout the proposed actions; as such, each action is classified under the goal it predominantly works to achieve. Other goals, as well as performance measures, that each action contributes towards are also noted.

TABLE 12: ACTION PLAN

RECOMMENDED ACTION	POTENTIAL PARTNERS	OTHER GOALS ACHIEVED	PERFORMANCE MEASURES ACHIEVED
IMMEDIATE TERM (0-2 YEARS)			
 **ACCESSIBILITY**			
Establish a Bicycle and Pedestrian Advisory Committee.	Bike Bentonville		Bicycle Friendly Ordinances/Policies
Support BikeNWA in establishing a Safe Routes to School program.	BikeNWA		Bicycle Friendly Ordinances/Policies
Host event(s) promoting active transportation (e.g., Open Streets); make these annual or biannual events moving forward.	BikeNWA, Bike Bentonville, NWARPC		Annual Budget for Bicycle and Pedestrian Infrastructure; Bicycle Friendly Ordinances/Policies
 **CONNECTIVITY**			
Develop a plan to establish performance measure benchmarks as detailed in *Connecting Bentonville*; evaluate progress annually.			This is the first step to achieving all performance measures
 **SAFETY**			
Establish program to educate motorists on bicycle and pedestrian safety.	BikeNWA, Bike Bentonville		Annual Budget for Bicycle and Pedestrian Infrastructure; Bicycle Friendly Ordinances/Policies
Make a plan for annual bicycle- and pedestrian-related crash analysis.	NWARPC	N/A	Reducing Bicycle and Pedestrian Crash Rate; Annual Budget for Bicycle and Pedestrian Infrastructure
 **USER COMFORT/ CONVENIENCE**			
Maintain an up-to-date City of Bentonville bike route map and trail map			Annual Budget for Bicycle and Pedestrian Infrastructure; Bicycle Friendly Ordinances/Policies

TABLE 11: ACTION PLAN CONTINUED

RECOMMENDED ACTION	POTENTIAL PARTNERS	OTHER GOALS ACHIEVED	PERFORMANCE MEASURES ACHIEVED
NEAR-TERM (3-5 YEARS)			
ACCESSIBILITY			
Develop and maintain a city-operated bikeshare program.			Annual Budget for Bicycle and Pedestrian Infrastructure; Short Trip Mode Share
Maintain GIS data for routes and maintenance of bicycle routes and trails.		N/A	Annual Budget for Bicycle and Pedestrian Infrastructure
CONNECTIVITY			
Advance three (3) priority bikeway projects.	See Funding and Partnerships section.		Bikeway Network to Street Network Coverage Ratio; Priority Corridors with Bikeways and Sidewalks; Quality of Low-Stress Network
Advance three (3) priority sidewalk projects.	See Funding and Partnerships section.		Filling Sidewalk Gaps; Priority Corridors with Bikeways and Sidewalks; Quality of Low-Stress Network
SAFETY			
Develop an action plan to incorporate a Vision Zero approach in Bentonville.			Bicycle Friendly Ordinances/Policies; Reducing Bicycle and Pedestrian Crash Rate; Reducing Vehicle Speeds
Hire a full or part-time staff member as a Bicycle and Pedestrian Safety Coordinator in either the Parks and Recreation Department or Transportation Department.			Annual Budget for Bicycle and Pedestrian Infrastructure
USER COMFORT/ CONVENIENCE			
Create a bicycle and pedestrian counting program.		N/A	Annual Budget for Bicycle and Pedestrian Infrastructure; Bicycle Friendly Ordinances/Policies
Develop and implement a community transportation survey to measure *Connecting Bentonville* progress on the goals: accessibility, connectivity, safety, and user comfort/ convenience; conduct the survey every three years moving forward and track progress.			Annual Budget for Bicycle and Pedestrian Infrastructure

TABLE 11: ACTION PLAN CONTINUED

RECOMMENDED ACTION	POTENTIAL PARTNERS	OTHER GOALS ACHIEVED	PERFORMANCE MEASURES ACHIEVED
MID-TERM (5-10 YEARS)			
 **ACCESSIBILITY**			
Develop a social marketing campaign for active transportation.	Bike Bentonville, BikeNWA		Annual Budget for Bicycle and Pedestrian Infrastructure
Evaluate accessibility impacts of implemented *Connecting Bentonville* bicycle and pedestrian programs and infrastructure.		N/A	Quality of Low-Stress Network
 **CONNECTIVITY**			
Advance three (3) more priority bikeway projects.	See Funding and Partnerships section.		Bikeway Network to Street Network Coverage Ratio; Priority Corridors with Bikeways and Sidewalks; Quality of Low-Stress Network
Advance three (3) more priority sidewalk projects.	See Funding and Partnerships section.		Filling Sidewalk Gaps; Priority Corridors with Bikeways and Sidewalks; Quality of Low-Stress Network
Evaluate connectivity impacts of implemented *Connecting Bentonville* bicycle and pedestrian programs and infrastructure.		N/A	Bikeway Network to Street Network Coverage Ratio; Direct Bikeway Connections Along/Parallel to City Arterial Streets; Filling Sidewalk Gaps; Priority Corridors with Bikeways and Sidewalks; Short Trip Mode Share
 **SAFETY**			
Evaluate safety impacts of implemented *Connecting Bentonville* bicycle and pedestrian programs and infrastructure.		N/A	Reducing Bicycle and Pedestrian Crash Rate; Reducing Vehicle Speeds
 **USER COMFORT/ CONVENIENCE**			
Evaluate user comfort and convenience impacts of implemented *Connecting Bentonville* bicycle and pedestrian programs and infrastructure.		N/A	Quality of Low-Stress Network; Short Trip Mode Share; Bicycle Friendly Ordinances/Policies

TABLE 11: ACTION PLAN CONTINUED

RECOMMENDED ACTION	POTENTIAL PARTNERS	OTHER GOALS ACHIEVED	PERFORMANCE MEASURES ACHIEVED
LONG-TERM (10+ YEARS)			
 **ACCESSIBILITY**			
Evaluate accessibility impacts of implemented *Connecting Bentonville* bicycle and pedestrian programs and infrastructure.	Bike Bentonville, BikeNWA	N/A	Quality of Low-Stress Network; Bicycle Friendly Ordinances/Policies; Short Trip Mode Share
 **CONNECTIVITY**			
Advance one (1) priority bikeway project annually moving forward.	See Funding and Partnerships section.		Bikeway Network to Street Network Coverage Ratio; Priority Corridors with Bikeways and Sidewalks; Quality of Low-Stress Network
Advance one (1) priority sidewalk project annually moving forward.	See Funding and Partnerships section.		Filling Sidewalk Gaps; Priority Corridors with Bikeways and Sidewalks; Quality of Low-Stress Network
Evaluate connectivity impacts of implemented *Connecting Bentonville* bicycle and pedestrian programs and infrastructure.		N/A	Bikeway Network to Street Network Coverage Ratio; Direct Bikeway Connections Along/Parallel to City Arterial Streets; Filling Sidewalk Gaps; Priority Corridors with Bikeways and Sidewalks; Short Trip Mode Share
 **SAFETY**			
Evaluate safety impacts of implemented *Connecting Bentonville* bicycle and pedestrian programs and infrastructure.		N/A	Reducing Bicycle and Pedestrian Crash Rate; Reducing Vehicle Speeds
 **USER COMFORT/ CONVENIENCE**			
Evaluate user comfort and convenience impacts of implemented *Connecting Bentonville* bicycle and pedestrian programs and infrastructure.		N/A	Quality of Low-Stress Network; Short Trip Mode Share

Early Action Projects

Every project recommended in *Connecting Bentonville* will impact the overall quality of the bicycle and pedestrian network. Expanding the existing system with the appropriate facility types is critical to meeting the goals of safety, connectivity, access, and user comfort/convenience. Projects have been prioritized based upon specific criteria. Using that prioritization criteria and public input, the following pedestrian and bikeway projects are identified for early action (i.e., initial 1-3 years following plan adoption). Implementation of the following will be a catalyst for bicycling and walking in Bentonville and build on the momentum gained during this planning effort.

Early Action Project List

Pedestrian Projects

- 8th Street Market and Momentary
- Apple Glen Elementary School
- Brightfield Middle School and Willowbrook Elementary School
- Downtown Square

Bikeway Projects

- NW 3rd Street/NW 2nd Street to Downtown Square
- 8th Street
- 14th Street
- Community Center Greenway Trail

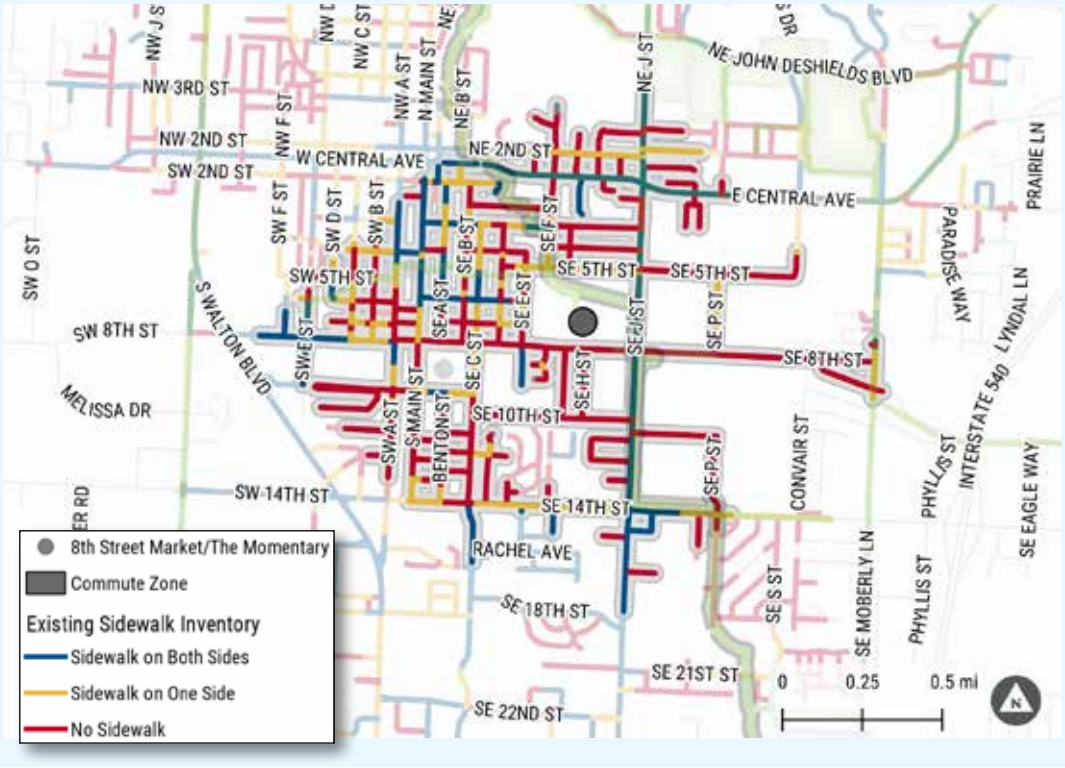
Pedestrian Projects

8th Street Market and Momentary

Overview

Approximately one-quarter of streets in this commute zone have sidewalk on both sides, 11% have sidewalk on one side, and nearly 65% have no sidewalk on either side. In addition to having a large portion of streets without any sidewalk, this commute zone was also prioritized highly by the public, with many people ranking it as their first or second priority among all commute zones. Spanning the entire length of the commute zone, J Street serves as a key North-South corridor with sidewalk on both sides of the street. 8th Street's coverage of the entire width of the corridor also positions it to function as the primary East-West corridor within the commute zone, if investments are made to ensure sidewalk on both sides of the street. In addition, completing sidewalk along C Street and SE 15th Street would increase pedestrian accessibility throughout the commute zone to reach the 8th Street Market and the Momentary.

FIGURE 24: PROJECT MAP - 8TH STREET MARKET & THE MOMENTARY



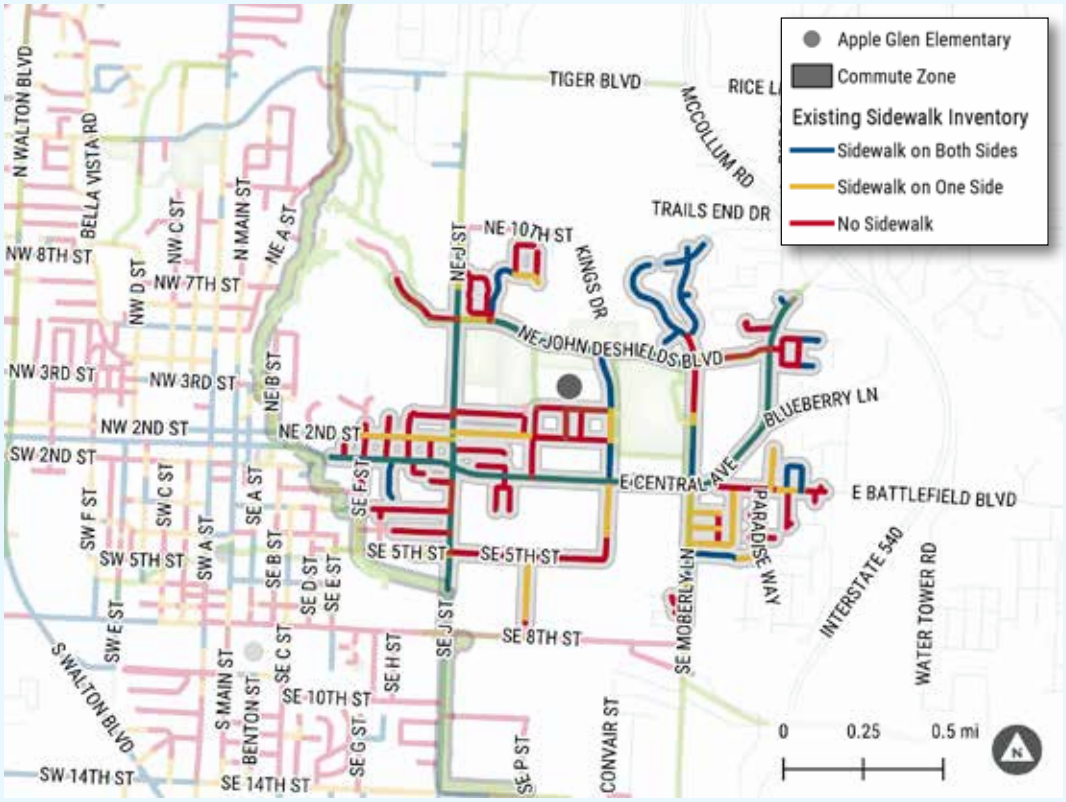
Apple Glen Elementary School

Overview

Almost 40% of streets in this commute zone have sidewalk on both sides, 10% have sidewalk on one side, and a little more than half do not have sidewalk on either side. This commute zone also had the most people select it as their first priority. This commute zone already has complete sidewalk along a primary North-South route (J Street) and East-West route (E Central Avenue); however, filling gaps among streets connecting to these primary routes, such as E Battleview Boulevard and Moberly Lane, will make accessing Apple Glen Elementary safer from neighborhoods within the commute zone. In addition, completing sidewalk throughout the street network around Apple Glen Elementary is vital; the City should focus especially on NE Wildcat Way and NE Brave Lane.

IMAGE 5: CENTRAL AVENUE

FIGURE 25: PROJECT MAP - APPLE GLEN ELEMENTARY SCHOOL

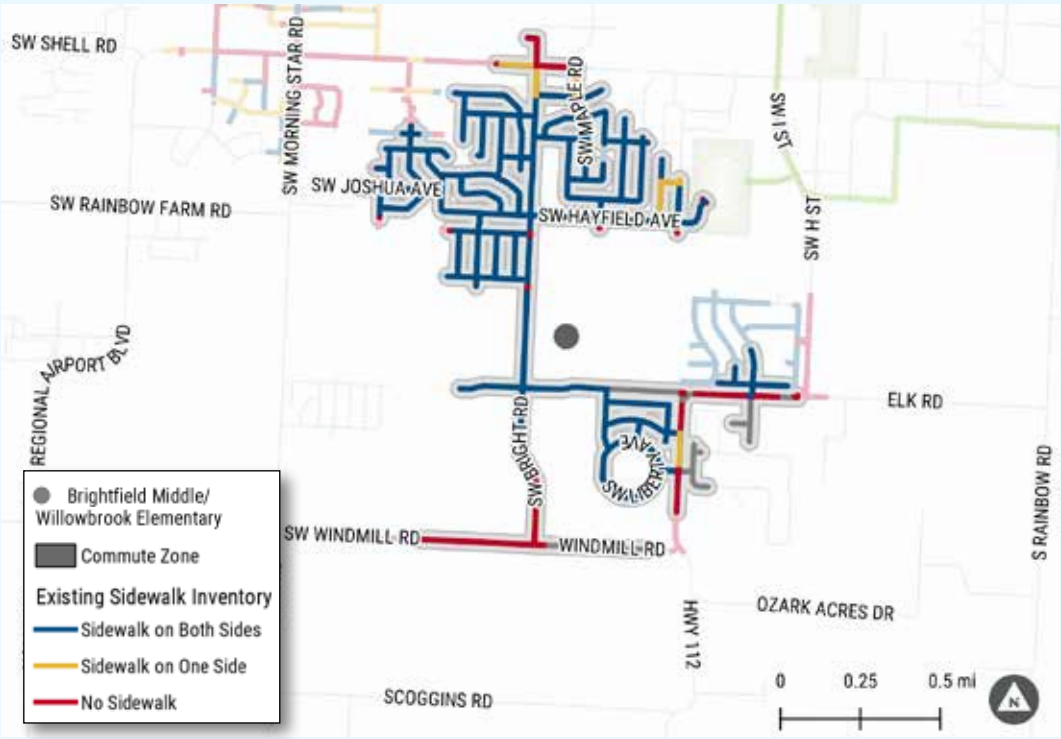


Brightfield Middle School & Willowbrook Elementary School

Overview

While the majority of the streets within this commute zone have sidewalk on both sides (84%), the 16% that only have sidewalk on one side of the street or have no sidewalk at all were identified as first or second priority sidewalk gaps by many members of the Bentonville community. Completing sidewalk on SW H Street, from where it connects to Elk Road continuing beyond where it becomes N Main Street, will increase pedestrian accessibility to Brightfield Middle School and Willowbrook Elementary School for residents living in the southeastern part of the commute zone. Similarly, adding sidewalk along Windmill Road and filling gaps along SW Bright Road will increase accessibility for residents in the southern part of the commute zone.

FIGURE 26: PROJECT MAP - BRIGHTFIELD MIDDLE/WILLOWBROOK ELEMENTARY

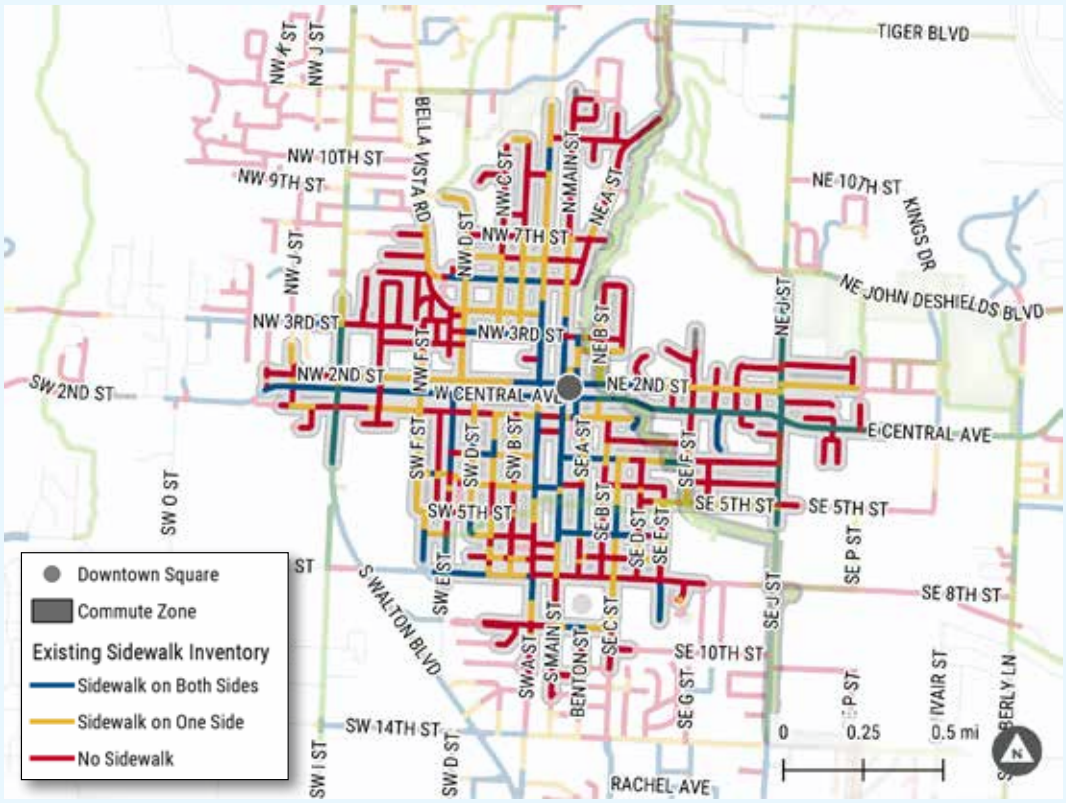


Downtown Square

Overview

A little less than a quarter of streets within this commute zone have sidewalk on both sides, 15% have sidewalk on one side, and 61% have no sidewalk on either side. Downtown Square had the most overall votes from the public, with most people ranking it as their second or third priority. Central Avenue and the portions of Main Street, A Street, 2nd Street, and 3rd Street that are within a few blocks of Downtown Square have complete sidewalk; however, farther away from Downtown Square, these streets have sidewalk gaps on one or both sides of the street. The City should prioritize creating a sidewalk network along heavily traveled streets that provide direct access to Downtown Square. A Street or Main Street serve as clear North-South corridors that can supplement the already complete sidewalk along Central Avenue. Completing sidewalk along 8th Street will connect residents and visitors walking from the southern part of this commute zone to a North-South corridor. Similarly, filling sidewalk gaps on NW 3rd Street can better connect people walking in the northeastern portion of the commute zone to Downtown Square; sidewalk along this street can also connect with existing sidewalk along Walton Boulevard, providing safe access to the northern area of Downtown Square. In addition, pedestrian safety along residential streets should be assessed to further prioritize which streets would best benefit from sidewalk.

FIGURE 27: PROJECT MAP - DOWNTOWN SQUARE



Bikeway Projects

NW 3rd Street/NW 2nd Street to Downtown Square

Significance

As one of the northernmost East-West corridors that can span a majority of the width of the City, this connection links the commercial core of downtown to residential areas, schools, and recreational opportunities such as Slaughter Pen and Coler Creek. This corridor also intersects with the Razorback Greenway to provide regional access.

IMAGE 6: COLER PARK

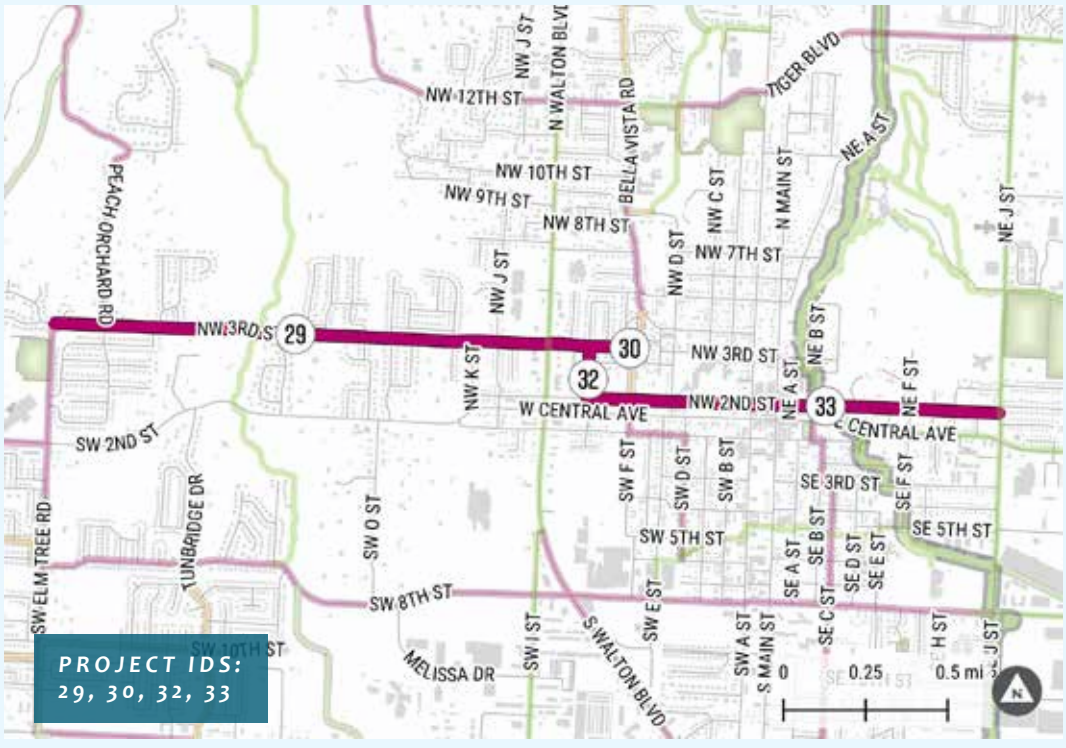
Key Connections

- Coler Park
- Downtown Square
- Near Elm Tree Elementary School
- Old High Middle School
- Applegate Trail

Potential Bikeway Types

- Directional Separated Bike Lane
- Two-way Separated Bike Lane
- Shared Use Path
- Neighborhood Bikeway/Greenway (to link NW 3rd and NW 2nd)

FIGURE 28: PROJECT MAP - NW 3RD STREET/NW 2ND TO DOWNTOWN SQUARE



8th Street

Significance

This corridor is an essential East-West corridor that connects residential neighborhoods to several destinations on either side of Walton Boulevard. Transforming this corridor into a safe and accessible bikeway has the potential to impact people's decisions on mode choice for a variety of trip types.

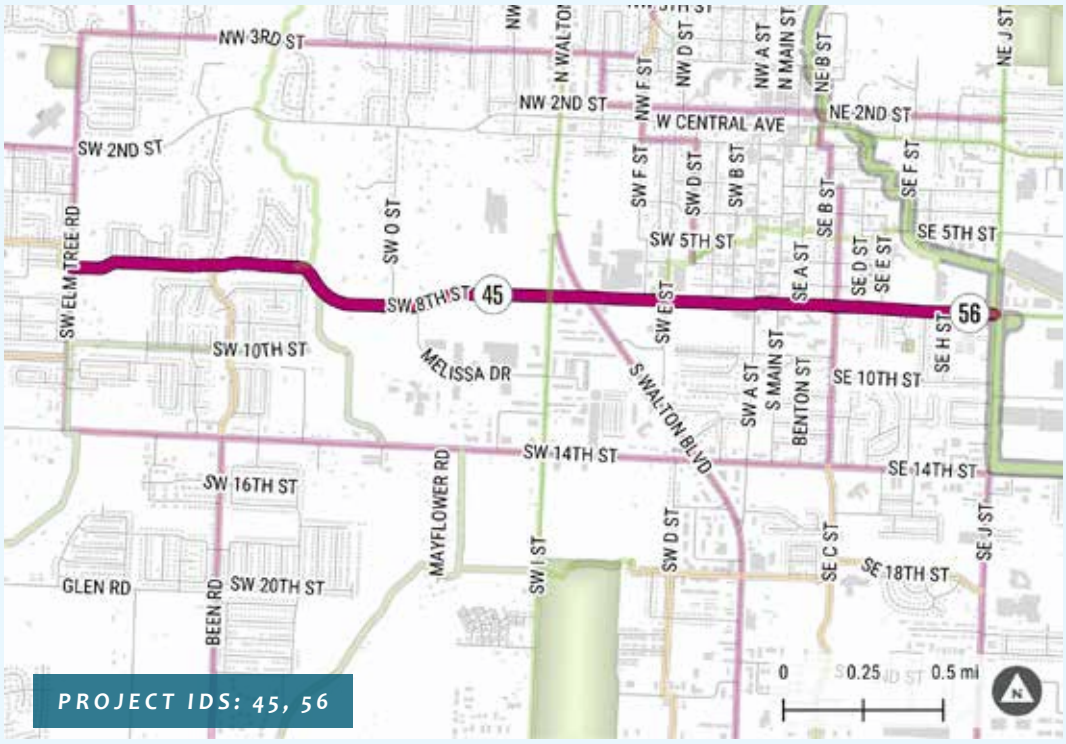
Key Connections

- Walmart Home Office (existing and future)
- Thayden School
- 8th Street Market
- The Momentary
- Future park (currently called Gateway Park)
- Applegate Trail

Potential Bikeway Types

- Directional Separated Bike Lane
- Two-way Separated Bike Lane

FIGURE 29: PROJECT MAP - 8TH STREET



PROJECT IDS: 45, 56

14th Street

Significance

Potential to promote active transportation along this very congested corridor and important East-West connection. It would be highly visible and could assist with culture shift. Additionally, this is a critical corridor for crossing Walton Boulevard.

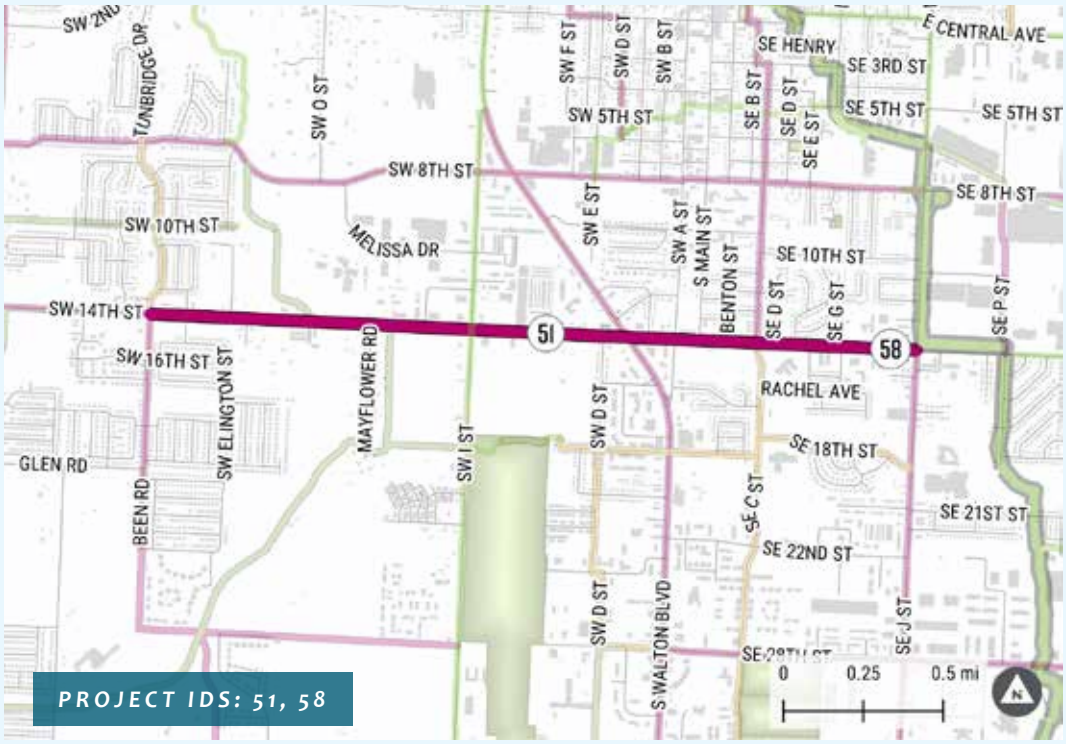
Key Connections

- Walmart Home Office (future)
- Mary Mae Jones Elementary School
- Bentonville High School

Potential Bikeway Types

- Shared Use Path/Sidepath
- Two-way Separated Bike Lane

FIGURE 30: PROJECT MAP - 14TH STREET



Community Center Greenway Trail

Significance

This trail is a key component of the larger *Boot Loop* and the trails that connect western neighborhoods to the community center.

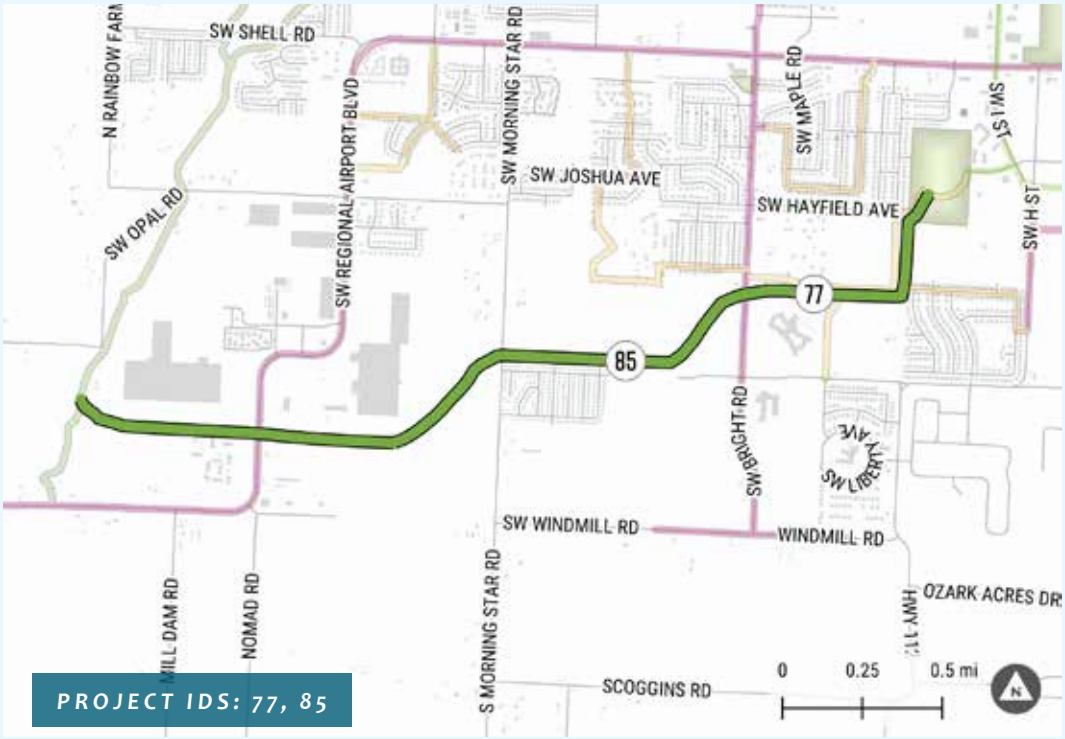
Key Connections

- Bentonville Community Center
- Bright Field Middle School
- Residential neighborhoods
- Little Osage Creek
- Walmart Regional Distribution Center

Potential Bikeway Types

- Shared Use Path/Greenway Trail

FIGURE 31: PROJECT MAP - COMMUNITY CENTER GREENWAY TRAIL



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2) People for Bikes. Bicycle Network Analysis. Retrieved from https://peopleforbikes.org/placesforbikes/bicycle-network-analysis/.

3) "At Work." Near-Miss-Reporting, www.nsc.org/work-safety/tools-resources/near-miss-reporting.

4) Federal Highway Administration. (2016). Strategic Agenda for Pedestrian and Bicycle Transportation, page 15. https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/strategic_agenda/fhwahep16086.pdf.

5) https://8ce82b94a8c4fdc3ea6d-b1d233e3bc3cb10858bea65ff05e18f2.ssl.cf2.rackcdn.com/03/76/ba43663f4acc8797f1b98ac254fb/2015-nwa-quality-of-life-final.pdf

6) https://www.bikeleague.org/ridesmart

7) https://www.bikeleague.org/content/bicycle-friendly-driver-training-page

8) http://www.bentonvillear.com/DocumentCenter/View/153/Development-Code

9) https://www.bentonvillear.com/DocumentCenter/View/1240/Article-900?bidId=

Peer Encouragement Program sources:

Fayetteville, AR

https://www.fayetteville-ar.gov/3470/Bicycle-Fayetteville

https://www.fayetteville-ar.gov/3489/VeoRide-Bike-Share

Conway, AR

https://conwayarkansas.gov/boards/bicycle-pedestrian-advisory/

Joplin, MO

https://mobikefed.org/2019/08/joplin-area-bicycle-and-pedestrian-plan-jatso

https://www.joplinmo.org/664/Bike-Patrol

Jefferson City, MO

https://www.newstribune.com/news/local/story/2019/feb/20/jefferson-city-seeks-input-for-bicycle-friendly-community-designation/766547/

https://www.visitjeffersoncity.com/spin

Stillwater, OK

https://www.bikeleague.org/sites/default/files/bfareportcards/BFC_Fall_2017_ReportCard_Stillwater_OK.pdf

https://www.visitstillwater.org/listing/orangeride-bike-rental/416/

Lawton, OK

https://www.fitkidsofswok.org/fit-kids-maps

https://tourofthewichitas.org/

https://www.mapmyride.com/us/lawton-ok/

Jackson, TN

http://bike.zagster.com/jacksontn/

Lawrence, KS

https://bike.drupal.ku.edu/kubikeshare

https://news.ku.edu/2018/04/03/ku-bike-share-provides-new-option-commuting-recreation

Peer Educational Program sources:

Fayetteville, AR

https://www.fayetteville-ar.gov/3470/Bicycle-Fayetteville

Conway, AR

https://conwayarkansas.gov/boards/bicycle-pedestrian-advisory/

Joplin, MO

https://www.fourstateshomepage.com/news/joplin-schools-raises-33k-to-completely-fund-bike-riding-educational-program/

Jefferson City, MO

https://www.jeffersoncitymo.gov/programs_and_activities/leisure_classes/bicycling_classes.php

https://www.newstribune.com/news/local/story/2018/sep/30/local-leaders-community-embrace-bike-share-program/745710/

Stillwater, OK

http://stillwater.org/page/home/government/departments-divisions/city-engineering/bicyclist-pedestrian-ad-hoc-committee

Lawton, OK

https://www.fitkidsofswok.org/open-streets-1

http://www.walkbiketoschool.org/

Jackson, TN

https://liftjackson.com/classes/cycling

Lawrence, KS

https://www.usd497.org/domain/6864

DESIGN GUIDANCE

05

Summary

Recommendations included in *Connecting Bentonville* will result in a safe, connected, accessible, comfortable, and convenient bicycle and pedestrian network if they are implemented through quality design and construction that works collaboratively with the other plans, policies, and standards of the City of Bentonville. To that end, this design guidance is provided as best practices for implementing bicycle and pedestrian infrastructure within the City. Best practices are presented to set a high bar for design expectations; however, it is understood that individual contexts and project parameters will dictate the degree to which this guidance is feasible and applicable. It is intended that this design guidance will work in concert with the City's Master Street Plan, but, if conflicts arise, the Master Street Plan is the standard that should be followed.

Philosophy of Safe Bicycle and Pedestrian Facility Design

Why design pedestrian infrastructure using these guidelines?

Walking and wheeling (i.e., traveling via wheelchair or other mobility assisting device for people with disabilities) is the most basic and sustainable form of transportation. Walking/wheeling is an affordable way to travel between destinations that is accessible to nearly the entire population.

To encourage walking in the City of Bentonville, infrastructure must be safe, comfortable, visible, and accessible. In most contexts, pedestrian traffic flow should be separated from motorized travel horizontally and/or vertically (i.e., via curb or grade separation). Separation both protects users from high-speed traffic and helps people walking feel more at ease. Also, well-designed pedestrian infrastructure makes people more visible to cars, and vice versa. Finally, all infrastructure should be compliant with guidelines from the Americans with Disabilities Act (ADA) to ensure that the network of routes for people walking/wheeling is accessible to all, regardless of age or ability.

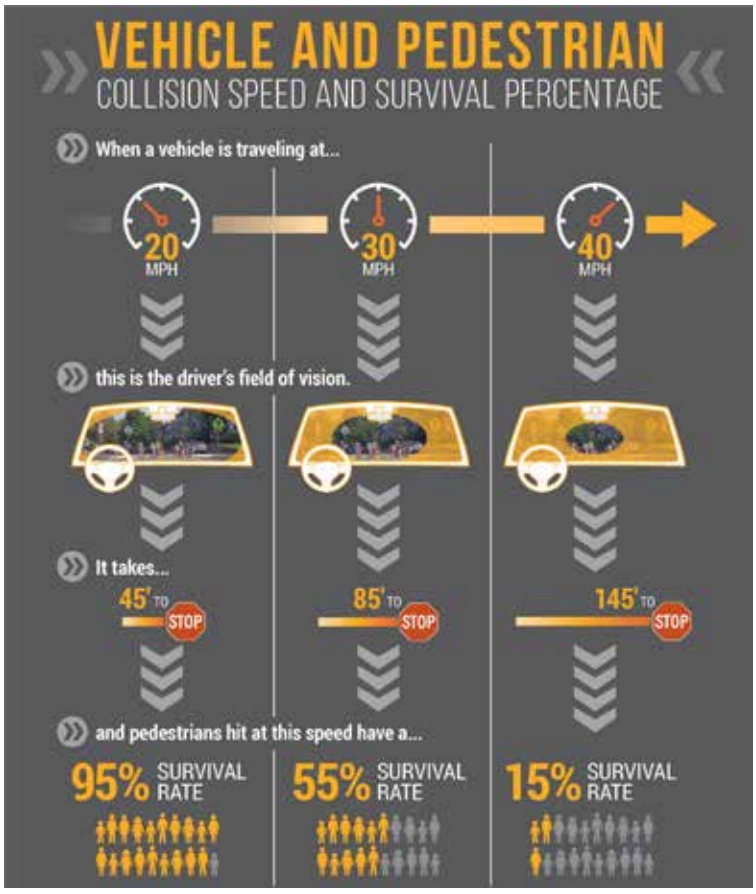


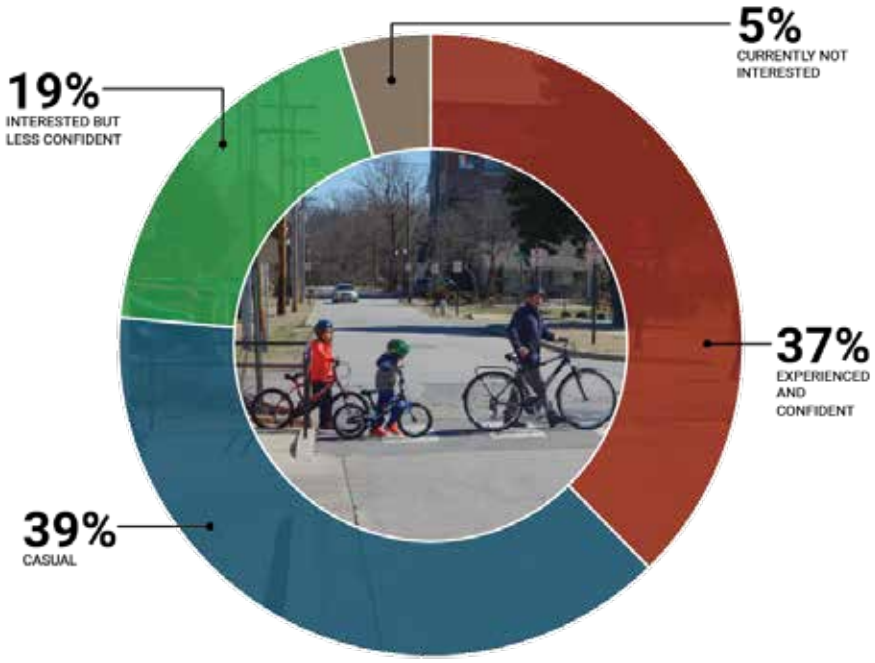
FIGURE 32: VEHICLE SPEED AND PEDESTRIAN SAFETY

Why design bicycle infrastructure using these guidelines?

Estimates show that most of the US population— upwards of 60-70%—would like to bicycle for some trips but are uncomfortable interacting with intense vehicular traffic. This group, commonly identified as the "Interested but Less Confident" category, are most comfortable cycling separated from motorized vehicles.

Conversely, roughly 1% of the US population indicate they are "Experienced and Confident" bicyclists, comfortable sharing the road with motorized vehicles. In the middle, approximately 7% are in the "Casual and Somewhat Confident" category, and they may be comfortable cycling for short distances with motorized vehicles.

FIGURE 33: BENTONVILLE CYCLISTS TYPES

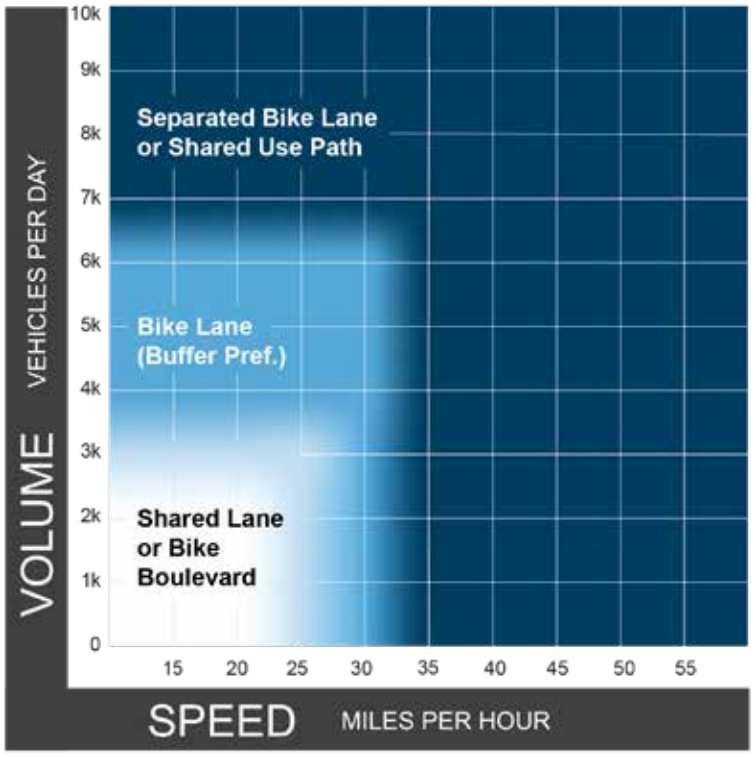


While a survey of residents and visitors tells us that there are more "Experienced and Confident" bicyclists in Bentonville, the largest share fall under the "Casual and Somewhat Confident" category, and there are still many people that identify with the "Interested but Less Confident" category. If the City of Bentonville wants to increase bicycling, particularly for a diverse array of trip types, it is essential to select and design facilities that will allow more people to feel comfortable bicycling for these trips. Less confident bicyclists (i.e., "interested but less confident" and "casual and somewhat confident") prefer physical separation as traffic volumes and speeds increase. The bikeway facility selection chart below identifies bikeway facilities that improve operating environment for users based on vehicle speeds and traffic volumes.

Facility Selection Guidance

The selection of bicycle and pedestrian facilities requires a balance of community priorities of local land use context, analysis, engineering judgment, available funding, and physical constraints based on existing street characteristics. The facility selection process is iterative; as more data about the street and surrounding context is gathered, the type of facility that designers and planners deem most appropriate may change. It is important to consider all priorities previously listed to make the best selection for any given project. The FHWA Bikeway Selection Guide is a valuable resource for bikeway specific selection and uses vehicle speed and traffic volumes to assist practitioners with planning and designing bikeways for all ages and abilities.[1]

FIGURE 34: FHWA SEPARATED BIKE LANE GUIDELINES



Bicycle Facility Overview

Separated Bike Lanes

Separated bike lanes are an exclusive bikeway facility type that combines the user experience of a sidepath with the on-street infrastructure of a conventional bike lane. They are vertically and horizontally separated from motor vehicle traffic and distinct from the sidewalk.

TYPICAL APPLICATION

- Separated bike lanes will generally be considered on any road with one or more of the following characteristics:
  - » Total traffic lanes: 3 lanes or greater
  - » Posted speed limit: 30 mph or more
  - » Average Daily Traffic: 9,000 vehicles or greater
  - » On-street parking turnover: frequent
  - » Bike lane obstruction: likely to be frequent
  - » Streets that are designated as truck or bus routes
- Preferred in higher density areas, adjacent to commercial and mixed-use development, and near major transit stations or locations where observed or anticipated pedestrian volumes will be higher.

Buffered Bike Lanes

Buffered bicycle lanes are designated by painting or otherwise creating a flush buffer zone between a bicycle lane and the adjacent travel lane. While buffers are typically used between bicycle lanes and motor vehicle travel lanes to increase bicyclists' comfort, they can also be provided between bicycle lanes and parking lanes in locations with high on-street parking turnover to discourage bicyclists from riding too close to parked vehicles.

TYPICAL APPLICATION

Buffered bike lanes will generally be considered on any road with one or more of the following characteristics:

- Total traffic lanes: 3 lanes or fewer
- Posted speed limit: 30 mph or lower
- Average Daily Traffic: 9,000 vehicles or fewer
- On-street parking turnover: infrequent.
- Bike lane obstruction: likely to be infrequent
- Where a separated bike lane or sidepath are infeasible or not desirable

Bike Lanes

Bike lanes provide an exclusive space for bicyclists in the roadway. Bike lanes are established through the use of lines and symbols on the roadway surface. Bike lanes are for one-way travel and are normally provided in both directions on two-way streets and/or on one side of a one-way street. Bicyclists are not required to remain in a bike lane when traveling on a street and may leave the bike lane as necessary to make turns, pass other bicyclists, or to properly position themselves for other necessary movements. Bike lanes may only be used temporarily by vehicles accessing parking spaces and entering and exiting driveways and alleys. Stopping, standing and parking in bike lanes is prohibited.

TYPICAL APPLICATION

Conventional bike lanes will generally be considered on any road with one or more of the following characteristics:

- Total traffic lanes: 3 lanes or fewer
- Posted speed limit: 30 mph or lower
- Average Daily Traffic: 9,000 vehicles or fewer
- On-street parking turnover: infrequent
- Bike lane obstruction: likely to be infrequent
- Where a separated bike lane, buffered bike lane, or sidepath are infeasible or not desirable

Advisory Shoulders

Advisory shoulders are used on narrow streets to provide bicyclists the priority movement and compel motorists to yield to bicyclists as well as drivers approaching in the opposing direction. Advisory shoulders use dotted lane lines, allowing motorists to enter them to yield to opposing vehicular traffic, and they are designed using dimensions based on conventional bicycle lanes. They are reserved for use on low-volume, low-speed streets.

TYPICAL APPLICATION

Advisory shoulders can generally be considered on any road with one or more of the following characteristics:

- Traffic lanes: 2 lanes or less
- Posted speed limit: 25 mph or lower
- Average Daily Traffic: 6,000 vehicles per day or less or 300 vehicles or less during the peak hour
- On-street parking turnover: infrequent
- Street is not a designated truck or bus route

Neighborhood Bikeways

Neighborhood bikeways are established on quiet streets, often through residential neighborhoods. These treatments are designed to prioritize bicycle through-travel, while discouraging motor vehicle traffic and maintaining relatively low motor vehicle speeds. Treatments vary depending on context, but often include elements of traffic calming, including traffic diverters, speed attenuators such as speed humps or chicanes, pavement markings, and signs. Neighborhood bikeways are also known as neighborhood greenways and bicycle boulevards, among other locally-preferred terms.

TYPICAL APPLICATION

Neighborhood bikeways can be considered on any road with one or more of the following characteristics:

- Posted speed limit: Target speeds for motor vehicle traffic are typically around 20 mph; there should be a maximum < 15 mph speed differential between bicyclists and vehicles
- Average Daily Traffic: Up to 3,000 vehicles; preferred ADT is up to 1,000 vehicles

Pedestrian Facility Overview

Sidewalks

Sidewalks play a critical role in the character, function, enjoyment, and accessibility of neighborhoods, main streets, and other community destinations. Sidewalks are the place typically reserved for pedestrians within the public right-of-way, adjacent to property lines, or near the building face. In addition to providing vertical and/or horizontal separation between vehicles and pedestrians, the spaces between sidewalks and roadways also accommodate street trees and other plantings, stormwater infrastructure, street furniture and lights, and bicycle racks.

Crosswalks

Legal crosswalks exist at all locations where sidewalks meet the roadway, regardless of whether pavement markings are present. Drivers are legally required to yield to pedestrians at intersections, even when there are no pavement markings. Providing marked crosswalks communicates to drivers that pedestrians may be present and helps guide pedestrians to locations where they should cross the street. In addition to pavement markings, crosswalks may include signals/beacons, warning signs, and raised platforms.

Curb Ramps

The transition for pedestrians from the sidewalk to the street is provided by a curb ramp. The designs of curb ramps are critical for all pedestrians, but particularly for people with disabilities. The ADA Standards require all pedestrian crossings be accessible to people with disabilities by providing curb ramps at intersections and mid-block crossings as well as other locations where pedestrians can be expected to enter the street. Curb ramps also benefit people with strollers, grocery carts, suitcases, or bicycles.

Pedestrian Signals

Signal timing for pedestrians is provided through the use of pedestrian signal heads. Pedestrian signal heads display the three intervals of the pedestrian phase: 1) The Walk Interval, signified by the WALK indication—the walking person symbol—alerts pedestrians to begin crossing the street; 2) The Pedestrian Change Interval—signified by the flashing DON'T WALK indication, the flashing hand symbol accompanied by a countdown display—alerts pedestrians approaching the crosswalk that they should not begin crossing the street; and 3) The Don't Walk Interval, signified by a steady DON'T WALK indication—the steady upraised hand symbol–alerts pedestrians that they should not cross the street.

FIGURE 35: SHARED USE PATH (SUP)

Bike and Pedestrian Facility Overview

Shared Use Paths and Greenways

A shared use path or sidepath, often called a shared use paved trail in other parts of the region, is a two-way facility physically separated from motor vehicle traffic and used by bicyclists, pedestrians, and other non-motorized users. Shared use paths, also referred to as greenways, are often located in an independent alignment, such as a greenbelt or abandoned railroad. However, they are also regularly constructed along roadways; often bicyclists and pedestrians will have increased interactions with motor vehicles at driveways and intersections on these sidepaths.

TYPICAL APPLICATION

- Shared use paths will generally be considered on any road with one or more of the following characteristics:
  - » Total traffic lanes: 3 lanes or greater
  - » Posted speed limit: 30 mph or greater
  - » Average Daily Traffic: 9,000 vehicles or greater
  - » On-street parking turnover: frequent
  - » Bike lane obstruction: likely to be frequent
  - » Streets that are designated as truck or bus routes
- Shared use paths may be preferable to separated bike lanes in low density areas where pedestrian volumes are anticipated to be fewer than 200 people per hour on the path.

Yield Roadways

A "yield" roadway is a local street that allows for one-way vehicle movement due to traffic calming and/or the presence of on-street parking. Yield roadways often have sidewalks buffered by planting strips that support a wide range of treatments, including gardening, green stormwater infrastructure, and large canopy street trees. They also are conducive for neighborhood bikeways.

TYPICAL APPLICATION

Yield roadways can be considered on local roads with one or more of the following characteristics:

- Road width: At least 40 feet in width, with an un-laned travel way narrower than 20 feet
- Posted speed limit: Up to 30 MPH; preferred is up to 20 MPH
- Average Daily Traffic: Up to 2,000 vehicles; preferred ADT is up to 400

FIGURE 36: YIELD ROADWAY[2]

Paved Shoulders

Paved shoulders provide a range of benefits. They reduce motor vehicle crashes, reduce long-term roadway maintenance, ease short-term maintenance such as snow plowing, and provide space for bicyclists and pedestrians (i.e., although paved shoulders typically do not meet accessibility requirements for pedestrians). Paved shoulders are typically reserved for rural road cross sections.

TYPICAL APPLICATION

Paved shoulders can generally be considered on any road without on-street parking and one or more of the following characteristics:

- Total traffic lanes: 3 lanes or fewer
- Average Daily Traffic: Up to 8,000 vehicles
- Shoulder obstruction: likely to be infrequent
- Where a separated bike lane or sidepath is infeasible or not desirable

Resources

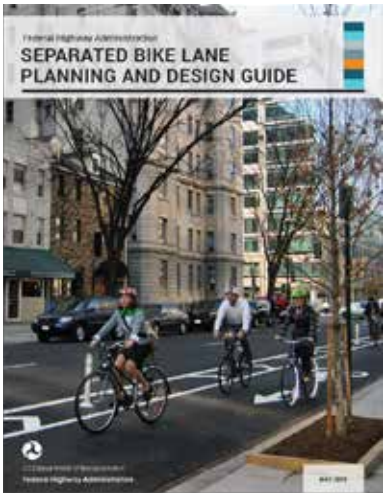
The publications listed here are excellent resources for planning and design guidance in implementing safe, comfortable accommodations for pedestrians and bicyclists in a variety of environments. Many of these resources are available online at no cost.

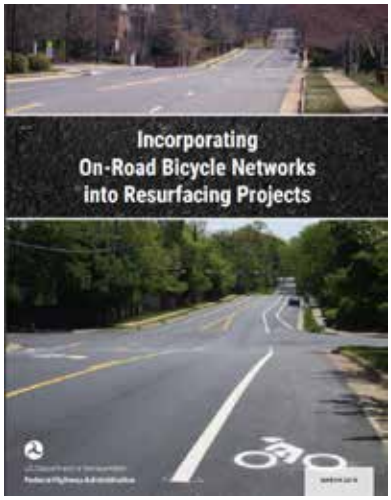
MASSACHUSETTS DEPARTMENT OF TRANSPORTATION (MASSDOT)

- Separated Bike Lane Planning & Design Guide, 2016

FEDERAL HIGHWAY ADMINISTRATION (FHWA)

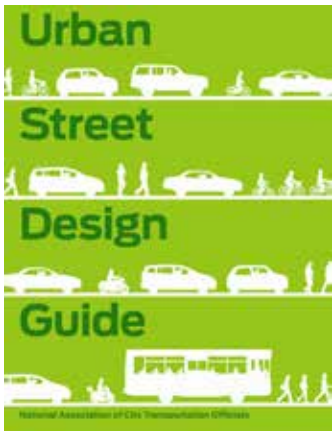
- Separated Bike Lane Planning and Design Guide, 2015
- Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts (2016)
- Incorporating On-Road Bicycle Networks into Resurfacing Projects (2016)

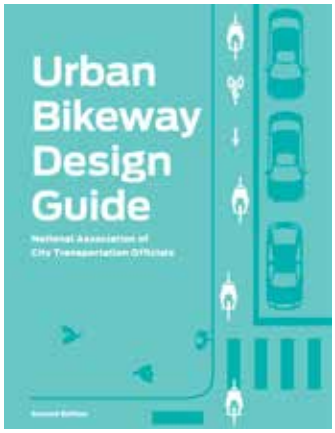




NATIONAL ASSOCIATION OF CITY TRANSPORTATION OFFICIALS (NACTO)

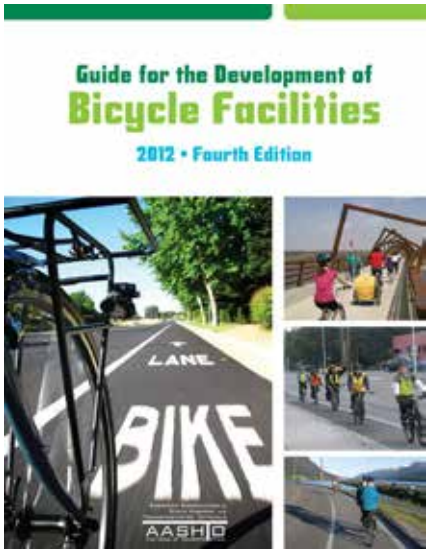
- Urban Street Design Guide
- Transit Street Design Guide
- Urban Bikeway Design Guide

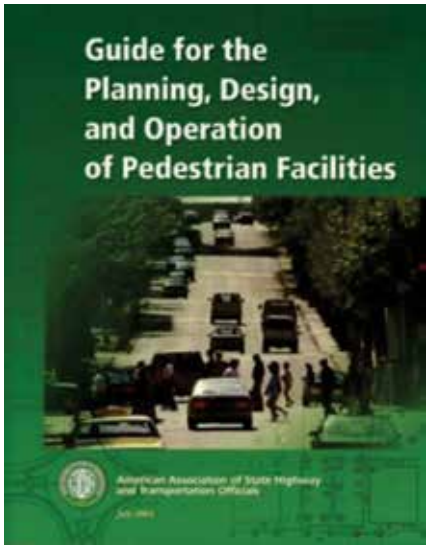




AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

- Guide for the Development of Bicycle Facilities, 2012
- Guide for the Planning, Design, and Operation of Pedestrian Facilities, 2004





Bicycle Facilities

Separated Bike Lanes

Considerations

Separated bike lanes (SBLs) are more attractive to a wider range of bicyclists than conventional bike lanes on higher volume and higher speed roads. They eliminate the risk of a bicyclist being hit by an opening car door and prevent motor vehicles from driving, stopping, or waiting in the bikeway. They also provide greater comfort to pedestrians by separating them from bicyclists operating at higher speeds.

FIGURE 38: CURB SEPARATED DIRECTIONAL SBL

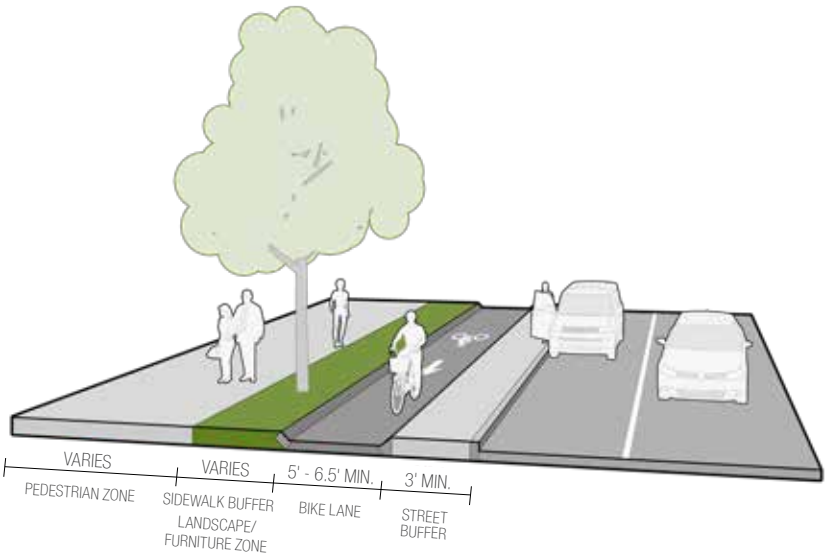
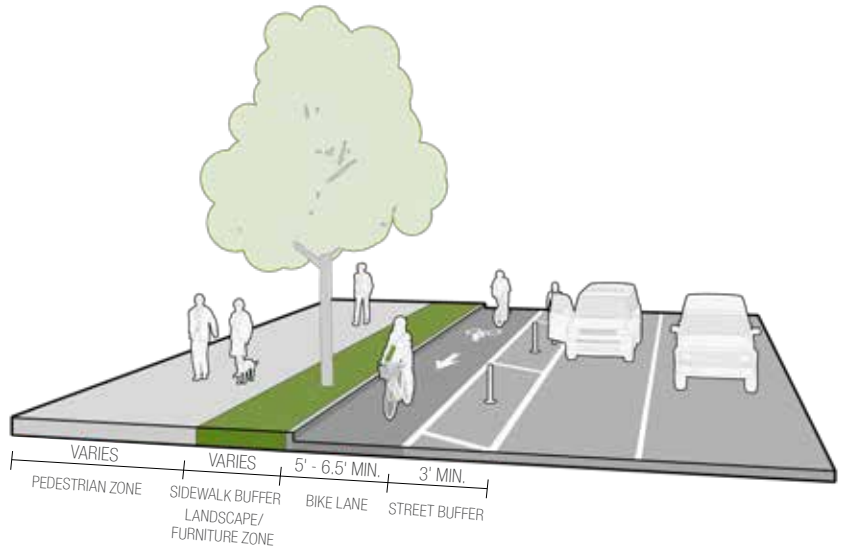


FIGURE 37: DIRECTIONAL SBL WITH FLEX POSTS



Separated bike lanes can provide different levels of separation from traffic:

- Separated bike lanes with flexible delineator posts ("flex posts") alone offer the least separation from traffic and are appropriate as an interim solution.
- Separated bike lanes that are raised with a wider buffer from traffic provide the greatest level of separation from traffic but will often require road reconstruction.
- Separated bike lanes that are protected from traffic by a row of on-street parking offer a high-degree of separation.

FIGURE 39: STREET-LEVEL SBL

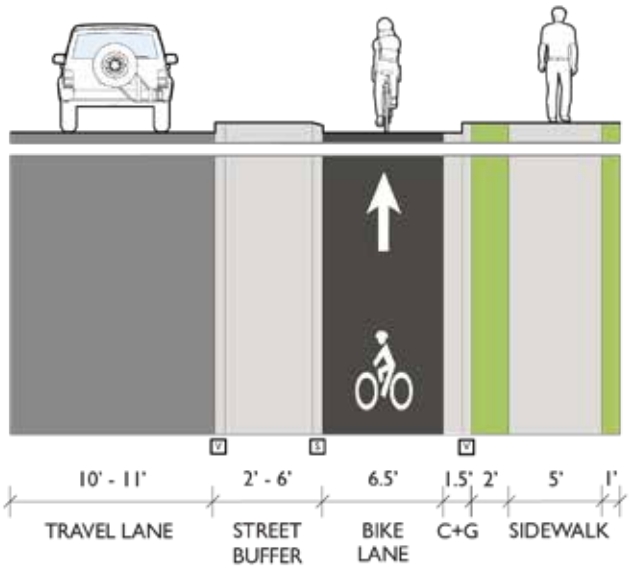


FIGURE 40: SIDEWALK-LEVEL SBL

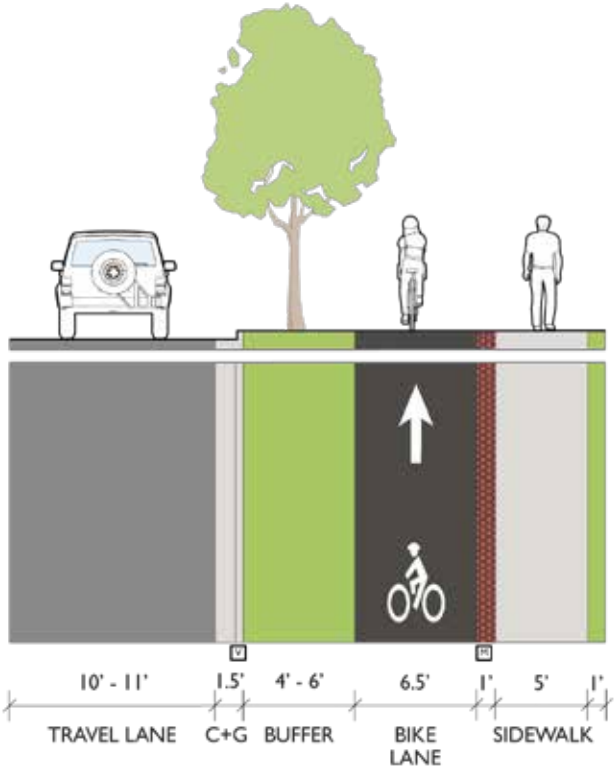
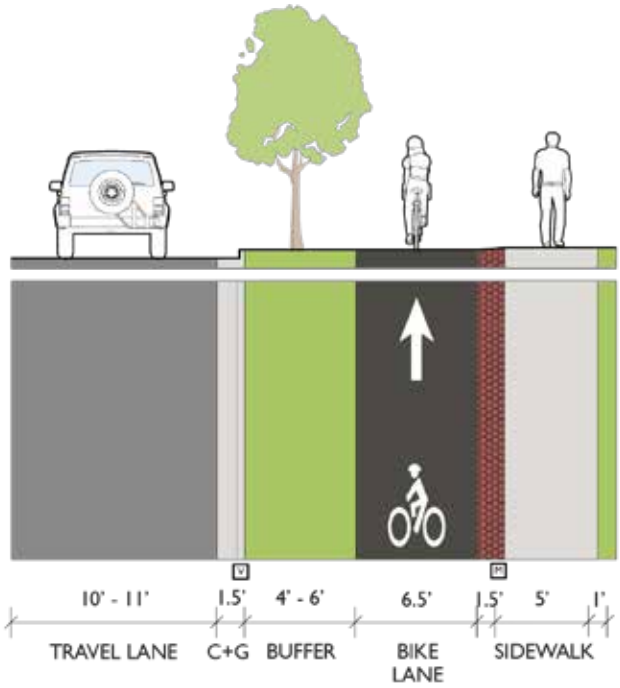


FIGURE 41: INTERMEDIATE-LEVEL SBL



Separated bike lanes can be one-way or two-way facilities

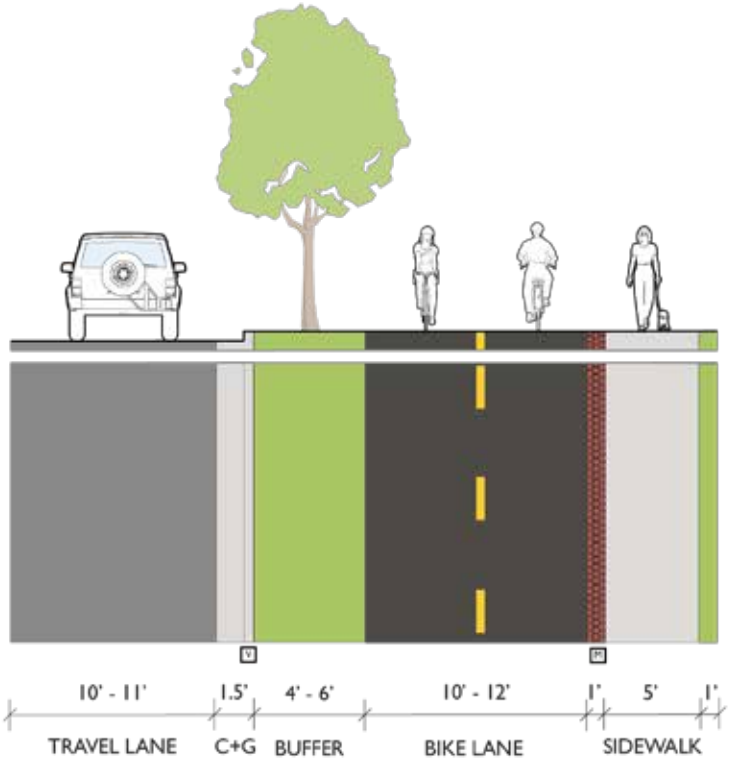
- One-way separated bike lanes in the direction of motorized travel provide intuitive and simplified transitions to existing bike lanes and shared travel lanes.
- Two-way separated bike lanes will require special attention to properly transition the contra-flow bicyclist into existing bike lanes and shared travel lanes.
- Depending on context, motorists may not expect bicyclists to approach crossings from both directions. For this reason, two-way separated bike lanes may require detailed treatments at alley, driveway, and cross street crossings to enhance the safety of these crossings. Additionally, bike signals may be appropriate to ensure proper yielding of right-of-way for two-way facilities.

Separated bike lanes can provide different levels of separation from pedestrians

SIDEWALK-LEVEL SEPARATED BIKE LANES

- Allow separation from motor vehicles in locations with limited right-of-way.
- Maximize usable bike lane width.
- Require no transition for raised bicycle crossings at driveways, alleys, or cross streets.
- May provide level landing areas for parking, loading, or bus stops along the street buffer.
- May reduce maintenance needs by prohibiting debris build-up from roadway runoff.
- May simplify plowing operations.
- May result in pedestrian and bicyclist encroachment, unless a continuous sidewalk buffer is provided.
- Allow bicyclists to use a portion of the sidewalk or street buffer to pass other bicyclists in constrained corridors where sidewalk buffers are eliminated.

FIGURE 42: TWO-WAY SIDEWALK-LEVEL SBL



INTERMEDIATE- OR STREET-LEVEL BIKE LANES

- Preserve separation between bicyclists and pedestrians where sidewalk buffers are eliminated.
- Ensures a detectable edge is provided for people with vision disabilities.
- May increase maintenance needs to remove debris from roadway runoff, unless street buffer is raised.
- May complicate snow plowing operations.
- May require careful consideration of drainage design, and, in some cases, may require catch basins to manage bike lane runoff.

FIGURE 44: TWO-WAY INTERMEDIATE-LEVEL SBL

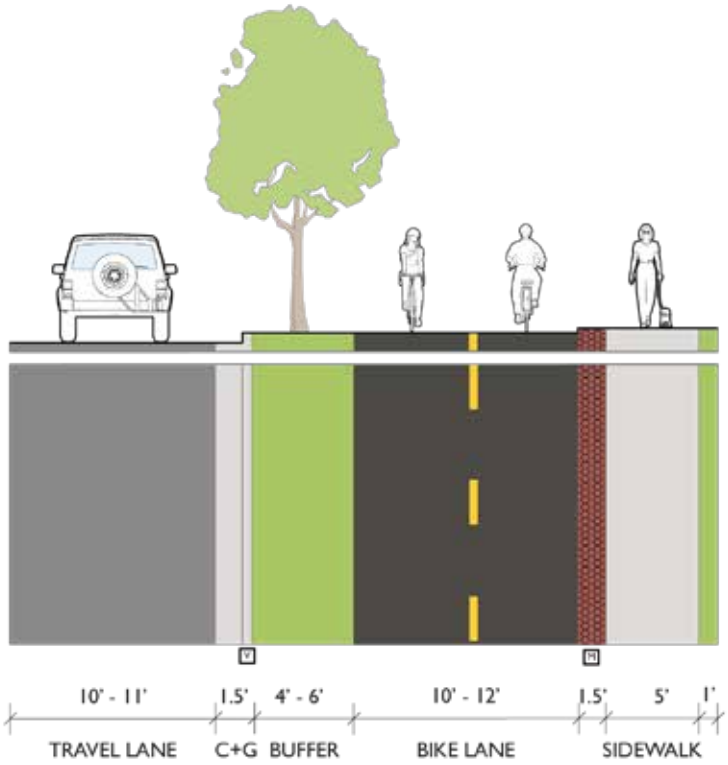
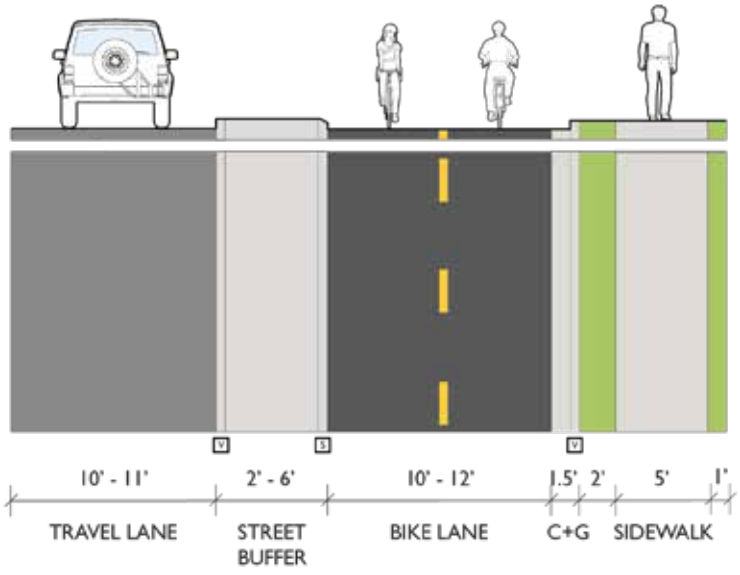


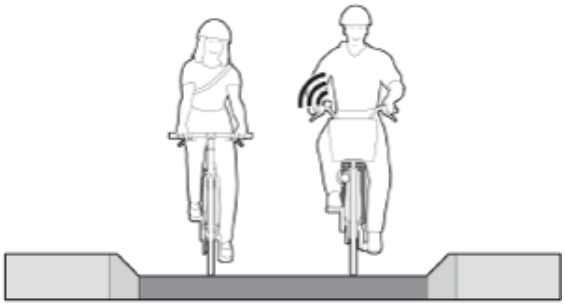
FIGURE 43: TWO-WAY STREET-LEVEL SBL



SEPARATED BIKE LANE GUIDANCE

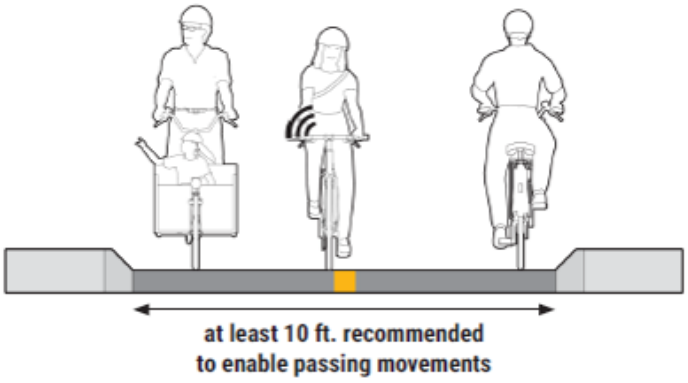
- Even in constrained siuations, street buffer widths should not be reduced below 2 feet at mid-block locations. Buffer widths should be between 6 feet and 20 feet at intersections to provide maximum safety benefits. Where buffer widths are 6 feet or more, vertical separation is preferred to prevent vehicles from parking in the buffer zone. Where the buffer is reduced below 6 feet, a raised bicycle crossing or signal phase separation should be considered.
- The street buffer is critical to the safety of separated bike lanes; narrowing or eliminating it should be avoided wherever possible.
- Bike lane width should be determined by the anticipated peak hour bicycle volume.
- The bike lane width should not be reduced below 5 feet for one-way bike lanes and 8 feet for two-way bikeways, to ensure bicyclists can safely pass other bicyclists.
- A minimum shy distance of 1 foot should be provided between any vertical objects in the sidewalk or street buffer to the bike lane.
- The street buffer is required and should be separated from the street by vertical objects or a median.
- Travel lanes and parking should be narrowed to the minimum widths in constrained corridors.
- Designers should prioritize reduction of the space allocated to the street before narrowing other spaces. This reduction can include decreasing the number of travel lanes, narrowing existing lanes, and/or adjusting on-street parking.
- The sidewalk should not be narrowed beyond the minimum necessary to accommodate pedestrian demand.
- The sidewalk buffer may be eliminated at locations with low pedestrian volume. At locations with increased pedestrian volume, it is desirable to provide vertical separation and/or clear delineation between the bicycle lane and the sidewalk.

FIGURE 45: ONE-WAY RECOMMENDED WIDTHS



Same Direction Bicyclists/ Peak Hour	Bike Lane Width (ft.)	
	Rec.	Min.*
<150	6.5	5.0
150-750	8.0	6.5
>750	10.0	8.0

FIGURE 46: TWO-WAY RECOMMENDED WIDTHS

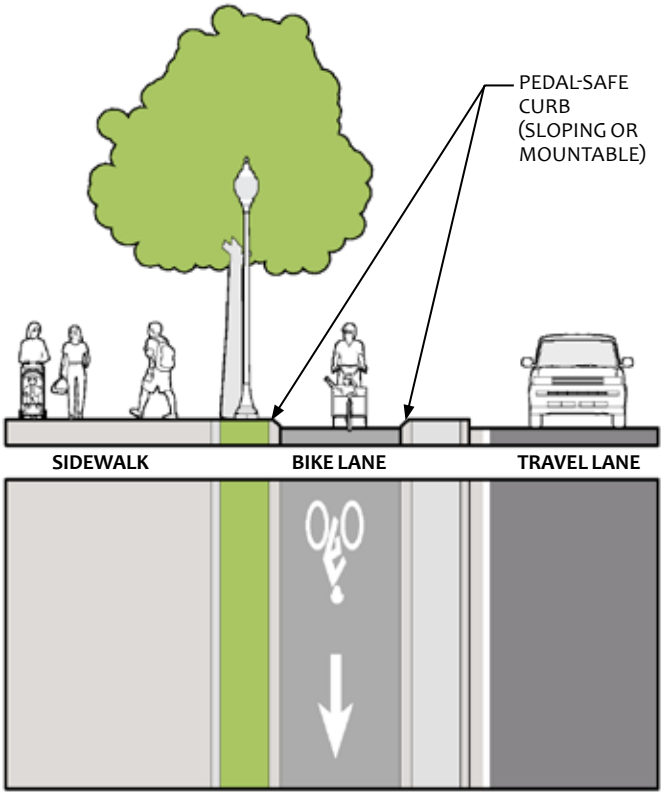


Bidirectional Bicyclists/ Peak Hour	Bike Lane Width (ft.)	
	Rec.	Min.*
<150	10.0	8.0
150-400	11.0	10.0
>400	14.0	11.0

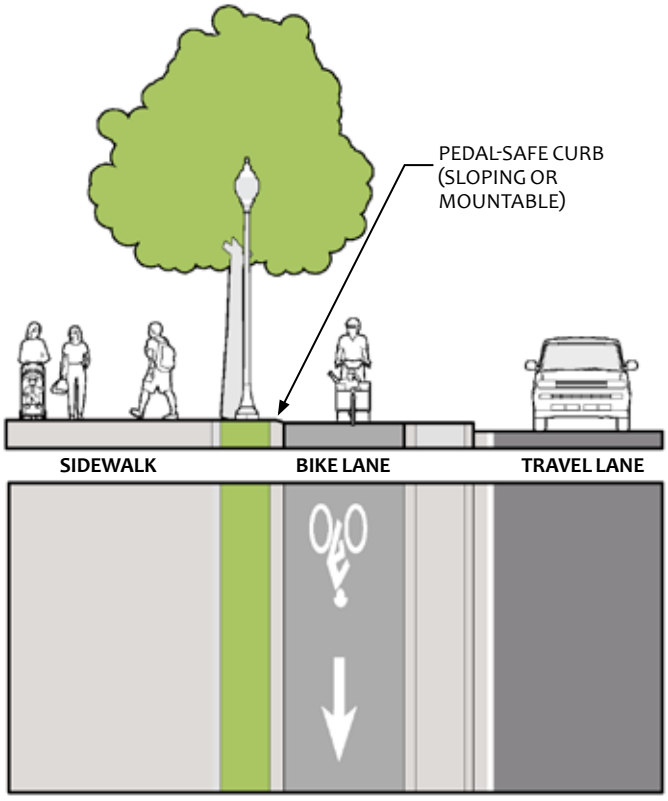
STREET BUFFER TYPES

There are a variety of street buffer types for separated bike lanes. These include raised buffers such as raised islands, flexible delineator posts, rigid bollards, and planters. Parking is another option and can be combined with other raised buffers. Buffer type feasibility depends on available buffer width. See page 118 for buffer width guidance.

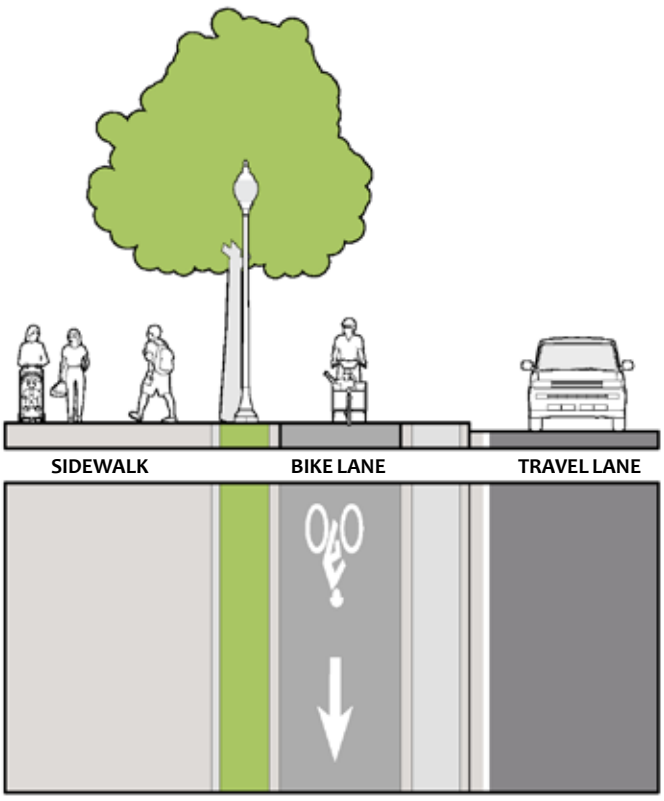
RAISED ISLAND: STREET-LEVEL SBL



RAISED ISLAND: INTERMEDIATE-LEVEL SBL

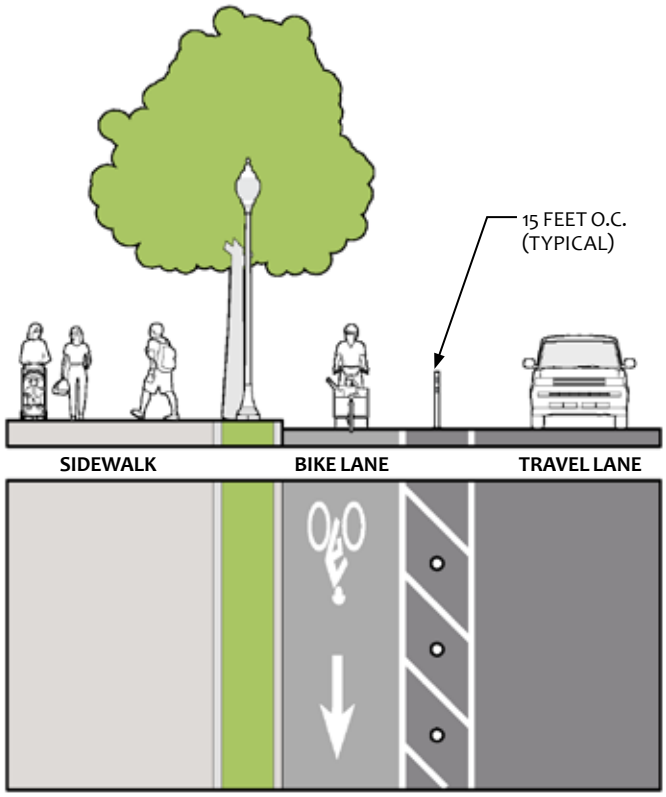


RAISED ISLAND: SIDEWALK-LEVEL SBL

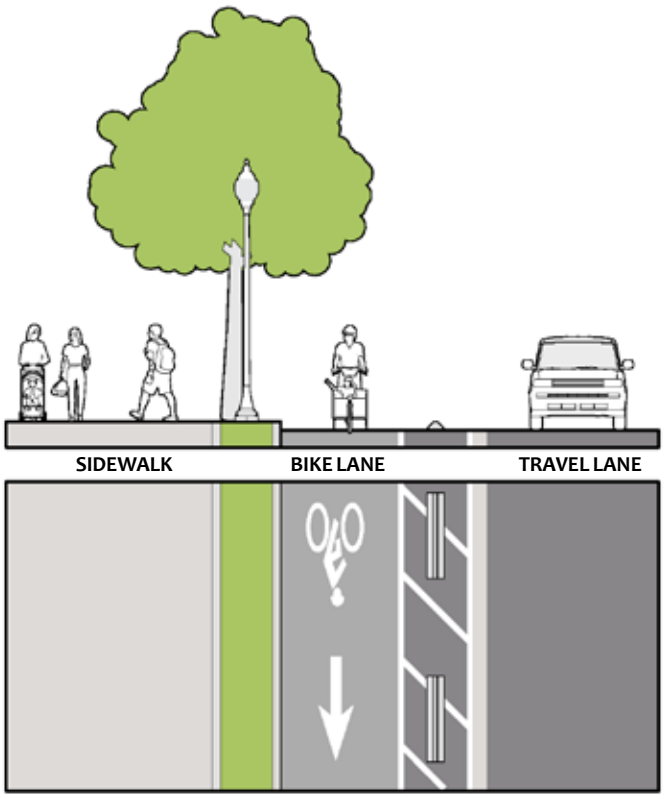


STREET BUFFER TYPES

FLEXIBLE DILENEATOR POSTS/RIGID BOLLARDS

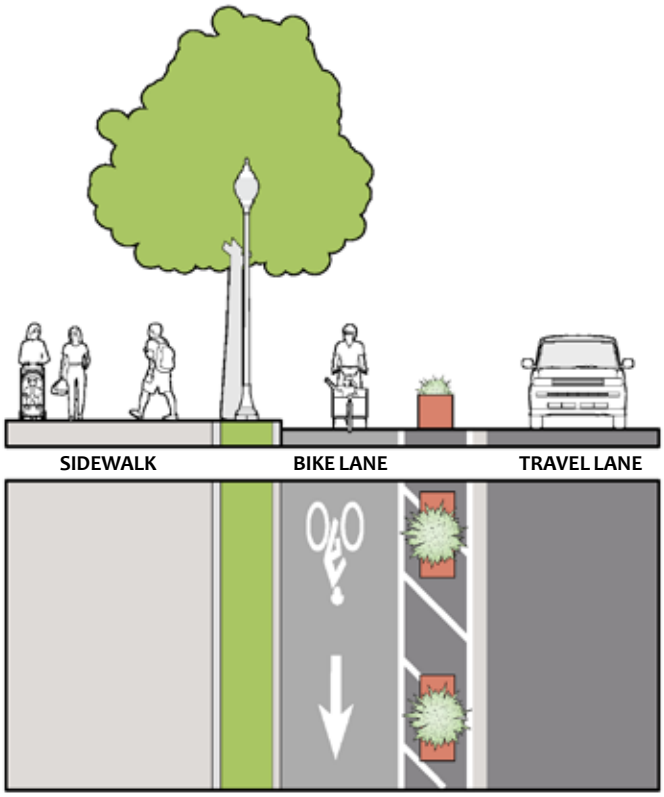


PARKING STOPS

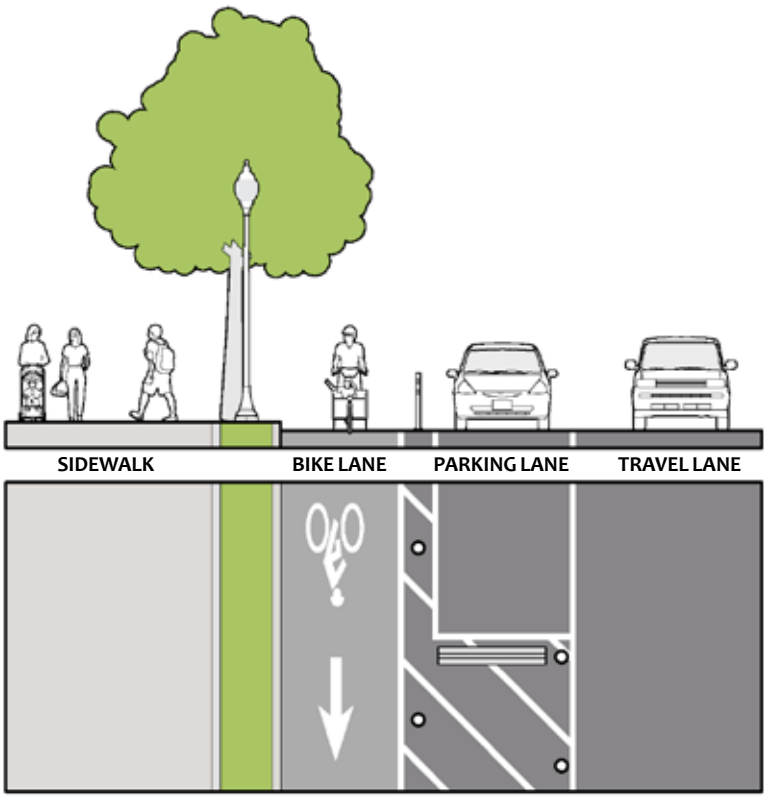


STREET BUFFER TYPES

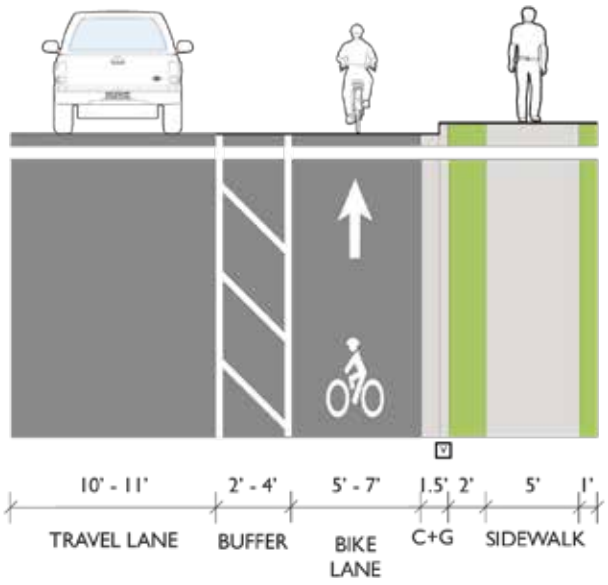
PLANTERS



ON-STREET PARKING



Buffered Bike Lanes



Considerations

- Typically installed by reallocating existing street space.
- Can be used on one-way or two-way streets.
- Consider placing buffer next to parking lane where there is commercial or metered parking.
- Consider placing buffer next to travel lane where speeds are 30 mph or greater or when traffic volume exceeds 6,000 vehicles per day.
- Where there is 7 feet of roadway width available for a bicycle lane, a buffered bike lane should be installed instead of a conventional bike lane
- Buffered bike lanes allow bicyclists to ride side by side or to pass slower moving bicyclists.
- Research has documented buffered bicycle lanes increase the perception of safety.
- Preferable to a conventional bicycle lane when used as a contra-flow bike lane on one-way streets with sufficient pavement width.

BUFFERED BIKE LANE GUIDANCE

- The minimum width of a buffered bike lane adjacent to parking is 4 feet, a desirable width is 6 feet.
- Buffers are to be broken where curbside parking is present to allow cars to cross the bike lane.
- The minimum buffer width is 18 inches. There is no maximum. Diagonal cross hatching should be used for buffers <3 feet in width. Chevron cross hatching should be used for buffers >3 feet in width.
- The use of high visibility paint is encouraged.

FIGURE 47: BUFFERED BIKE LANE WITHOUT PARKING

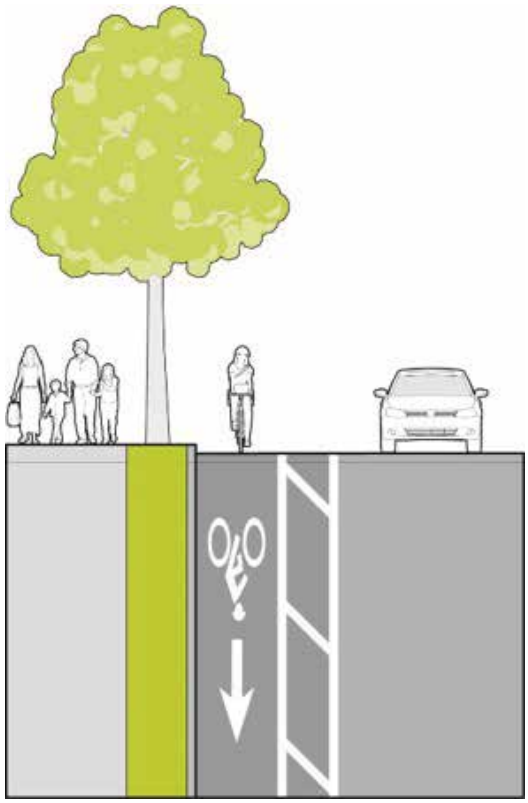
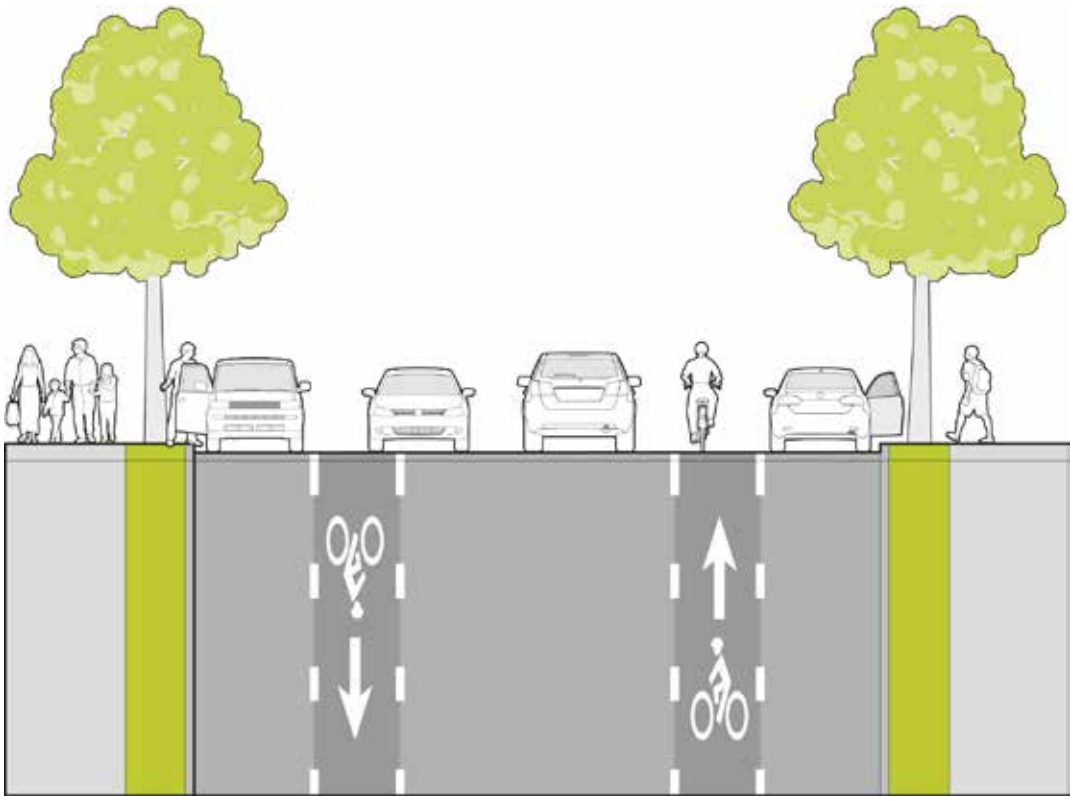
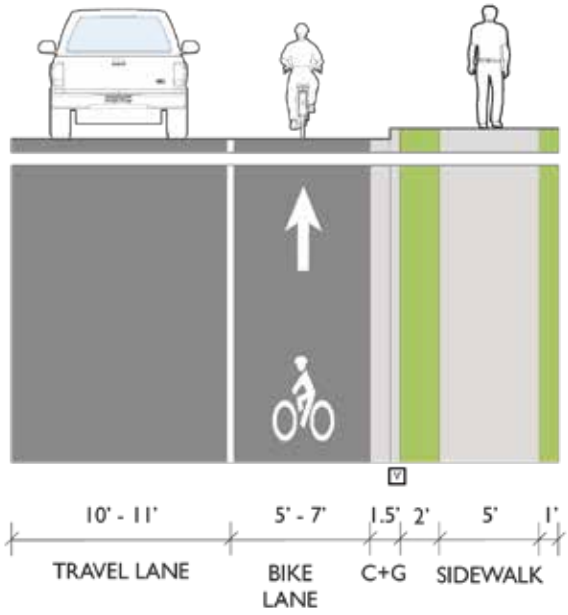


FIGURE 48: BUFFERED BIKE LANE WITH PARKING



Bike Lanes

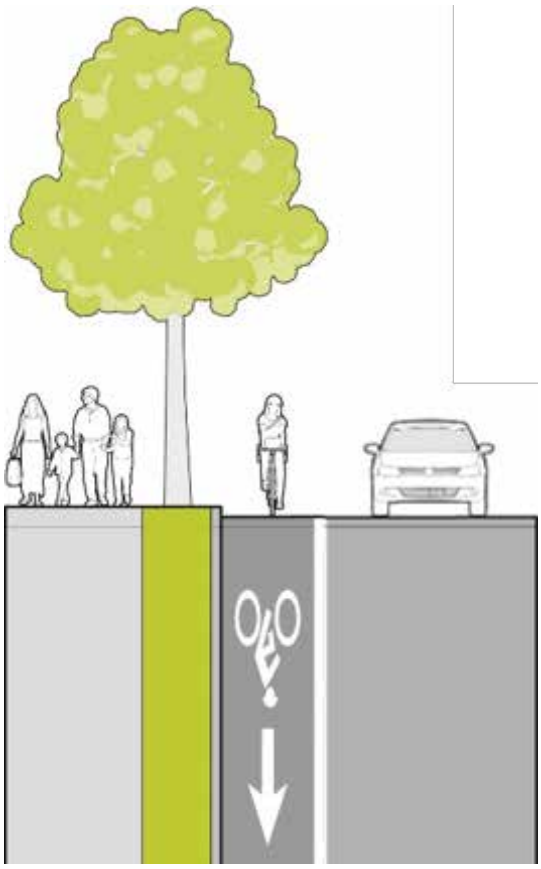


Considerations

Typically installed by reallocating existing street space.

- Can be used on one-way or two-way streets.
- Contra-flow bicycle lanes may be used to allow two-way bicycle travel on streets designated for one-way travel for motorists to improve bicycle network connectivity.
- Stopping, standing, and parking in bike lanes may be problematic in areas of high parking demand and deliveries, especially in commercial areas.
- Wider bike lanes or buffered bike lanes are preferable at locations with high on-street parking turnover.

FIGURE 49: BIKE LANE WITHOUT PARKING



BIKE LANE GUIDANCE

» The minimum width of a bike lane is 5 feet, a desirable width is 6 feet.

» The width of the bike lane must be exclusive of the gutter.

» High on-street parking turnover may inhibit bike lane implementation or require additional width to add a door zone, marked with Parking T's or hatch marks to protect and inform bicyclists.

FIGURE 50: BIKE LANE WITH PARKING

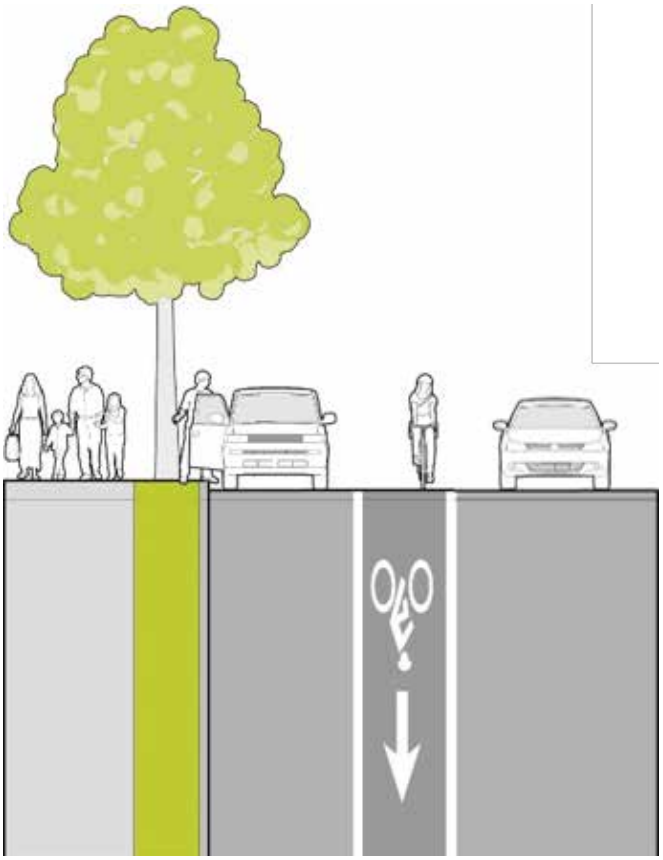
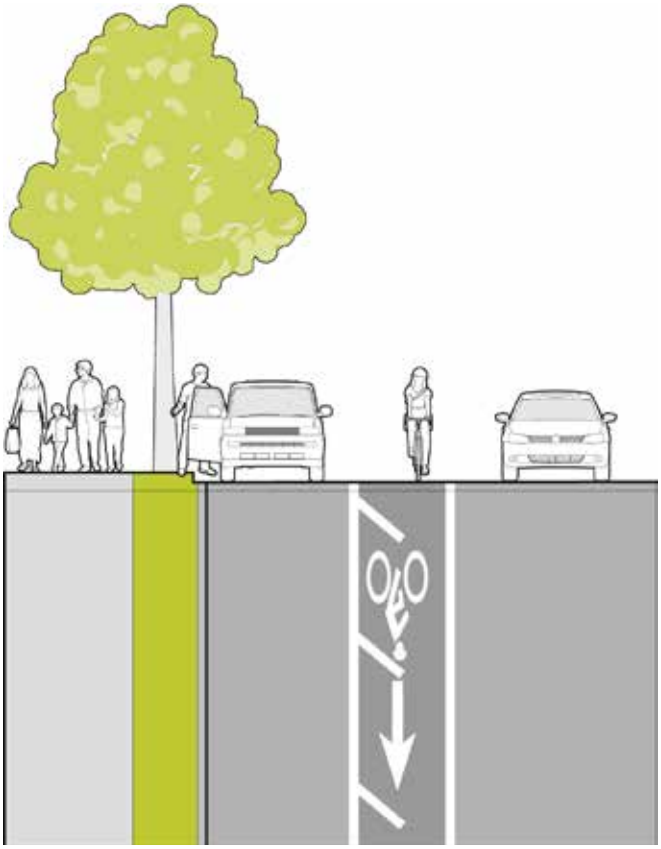


FIGURE 51: BIKE LANE WITH PARKING AND DOOR ZONE



LIFE OF A BIKE LANE

Separated bike lanes have been implemented in many cases as low-cost retrofit projects (e.g. using flex posts and paint within the existing right-of-way). More permanent forms of separation, such as curb-protected bike lanes, cost more and are less flexible once implemented. A phased implementation approach, where "pilot" projects transition to permanent protected bike lanes may solve both of these problems, by implementing the facility slowly and troubleshooting before permanent materials and high costs are necessary.

IMAGE 7: DEMONSTRATION BIKE LANE

CONSIDERATIONS

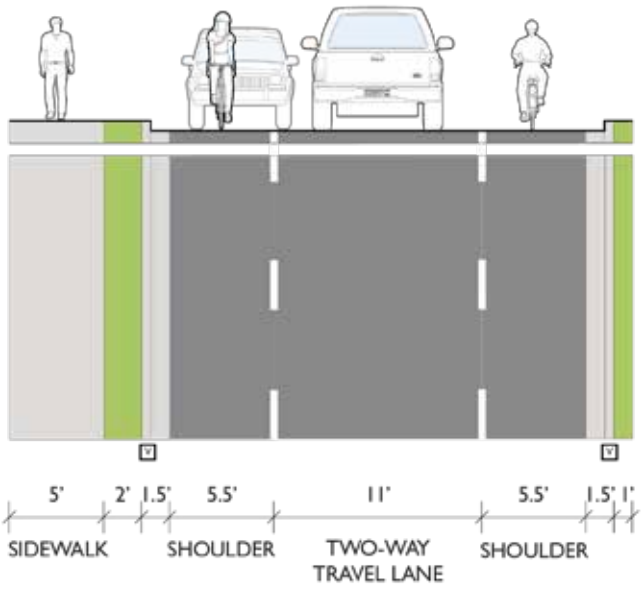
- Lower-cost retrofits or demonstration projects allow for quick implementation, responsiveness to public perception, and ongoing evaluation. Separation types for short-term separated bike lane designs often include non-permanent separation, such as flexible delineator posts, planters, or parking stops. Pilot projects allow the City to:
- Test the separated bike lane configuration for bicyclists and traffic operations
- Evaluate public reaction, design performance, and safety effectiveness
- Make changes if necessary
- Transition to permanent design as funds become available

GUIDANCE

Permanent separation designs provide a high level of protection and often have greater potential for placemaking, quality aesthetics, and integration with features such as green stormwater infrastructure. Communities often implement permanent separation designs by leveraging private development (i.e., potentially through developer contribution), major capital construction, and including protected bike lanes in roadway reconstruction designs. Examples of permanent separation materials include rigid bollards, raised medians, and grade-protected bike lanes at an intermediate or sidewalk level. See Street Buffer Types for additional examples.

IMAGE 8: BUFFERED BIKE LANE WITH CURB STOPS

Advisory Shoulders



Considerations

- Treatment requires FHWA permission to experiment.
- For use on streets too narrow for bike lanes and normal-width travel lanes.
- Provide two separate minimum-width bicycle lanes on either side of a single shared (i.e., unlaned) two-way "yielding" motorist travel space.
- Motorists must yield to on-coming motor vehicles by pulling into the bicycle lane.
- To reduce motorist speeds, and to encourage yielding, the unmarked space between the two advisory bike lanes should be no wider than 18 feet.
- This treatment should only be used on streets with >60% continuous daytime parking occupancy.
- Where parking occupancy is continuously <50%, it is preferable to consolidate parking to one side of the street or remove it.
- A Two-Way Traffic warning sign (W6-3) may increase motorists understanding of the intended two-way operation of the street.

IMAGE 9: TWO-WAY TRAFFIC WARNING SIGN

ADVISORY SHOULDER GUIDANCE

- The center travel lane on roadways with advisory shoulders should between 13 feet and 18 feet. Additional width in the center travel lane may encourage excessive vehicle speeds. Only in places with constrained right-of-way, 10-foot travel lanes are acceptable.
- Advisory shoulders should be at least 6 feet wide. Only in places with constrained right-of-way, a minimum of 4 feet is acceptable. There are several situations in which additional shoulder width should be provided:
  - » Motor vehicle speeds exceeding 50 miles per hour
  - » Moderate to heavy volumes of traffic and/or above-average use by people bicycling
- The placement of rumble strips on advisory shoulders may significantly

FIGURE 52: ADVISORY SHOULDER WITHOUT PARKING

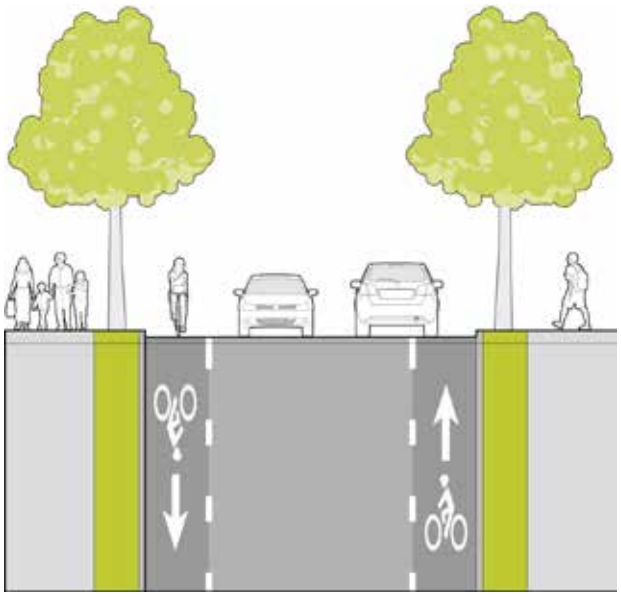
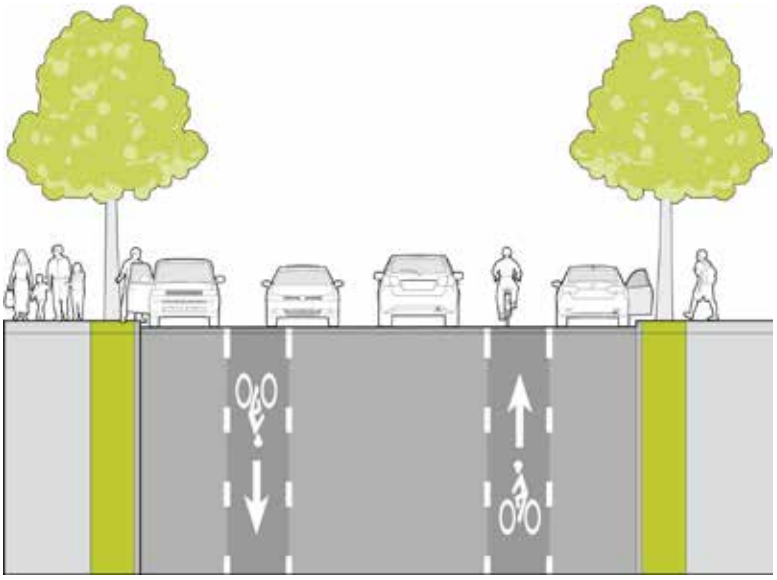
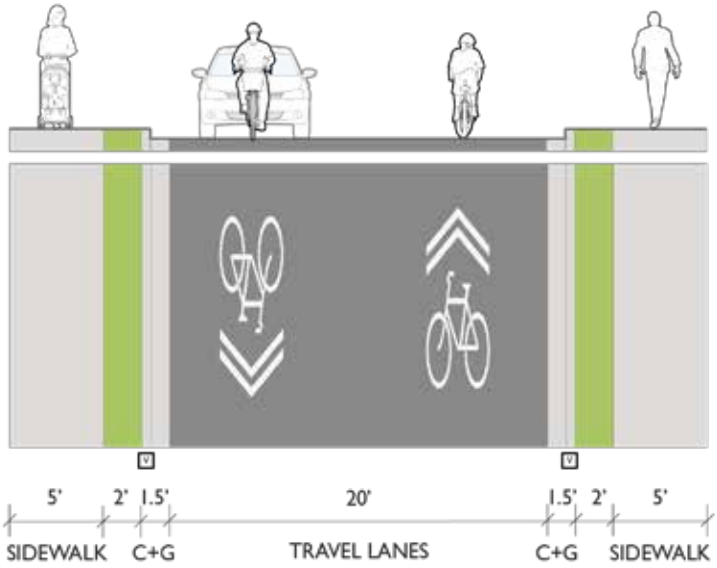


FIGURE 53: ADVISORY SHOULDER WITH PARKING



Neighborhood Bikeways



Considerations

Many cities already have signed bike routes along neighborhood streets that provide an alternative to traveling on high-volume, high-speed arterials. Applying bicycle boulevard treatments to these routes makes them more suitable for bicyclists of all abilities and can reduce crashes as well.

Stop signs or traffic signals should be placed along the neighborhood bikeway in a way that prioritizes the bicycle movement, minimizing stops for bicyclists whenever possible.

Neighborhood bikeway treatments include traffic calming measures such as street trees, traffic circles, chicanes, and speed humps. Traffic management devices such as diverters or semi-diverters can redirect cut-through vehicle traffic and reduce traffic volume while still enabling local access to the street.

The City should begin by implementing neighborhood bikeway treatments on one pilot corridor to measure the impacts and gain community support. The pilot program should include before-and-after crash studies, motor vehicle counts, and bicyclist counts on both the neighborhood bikeway and parallel streets. Findings from the pilot program can be used to justify neighborhood bikeway treatments on other neighborhood streets.

Additional treatments for major street crossings may be needed, such as median refuge islands, rapid flashing beacons, bicycle signals, and HAWK or half signals.

Traffic Calming

Traffic calming aims to slow the speeds of motorists to a "desired speed" (i.e., usually 20 mph or less for residential streets and 25 to 35 mph for collectors and minor arterials). The greatest benefit of traffic calming is increased safety and comfort for all users on and crossing the street. Compared with conventionally designed streets, traffic calmed streets typically have fewer

collisions and far fewer injuries and fatalities. These safety benefits are the result of slower speeds for motorists that result in greater driver awareness, shorter stopping distances, and less kinetic energy during a collision.

Prior to permanently implementing a traffic calming measure, it may be useful to introduce a temporary measure using paint, cones, or street furniture, as changes can easily be made to the design. A formal policy or procedure can help a community objectively determine whether traffic calming measures should be installed on a street or in a neighborhood. Such a procedure should include traffic and speed studies and a way to gather input and approval from neighborhood residents.

Vertical Treatments

Vertical traffic calming treatments compel motorists to slow speeds. By lowering the speed differential between bicyclists and motorists, safety and bicyclist comfort is increased. These treatments are typically used where other types of traffic controls are less frequent, for instance along a segment where stop signs may have been removed to ease bicyclist travel.

IMAGE 10: SPEED CUSHION

IMAGE 11: SPEED HUMP

IMAGE 12: RAISED CROSSWALK

VERTICAL TREATMENT GUIDANCE

- Vertical deflections such as speed humps and speed cushions should have a smooth leading edge, a parabolic rise, and be engineered for a speed of 25 to 30 mph. Speed humps should be clearly marked with reflective markings and signs.
- Typically, speed humps are 22 feet in length, with a rise of 6 inches above the roadway. They should extend the full width of the roadway and be tapered to the gutter to accommodate drainage. Speed humps are not typically used on roads with rural cross sections; however, if they are used on such roads, they should match the full pavement width (i.e., including paved shoulders).
- Speed humps or speed cushions are not typically used on collector or arterial streets.
- Speed humps and raised crosswalks impact bicyclist comfort. The approach profile should preferably be sinusoidal or flat.
- A typical curb radius of 20 feet should be used wherever possible, including where there are higher pedestrian volumes and fewer larger vehicles.
- Where traffic calming must not slow an emergency vehicle, speed cushions or raised tables or crosswalks should be considered. Speed cushions provide gaps spaced for an emergency vehicle's wheelbase to pass through without slowing.
- Consider using raised crosswalks at intersections to slow traffic turning onto a neighborhood bikeway from a major street. Vertical traffic calming will not be necessary on all neighborhood bikeways but should be considered on any road with measured or observed speeding issues (50th percentile of traffic exceeding 25 miles per hour).
- Continuous devices, such as speed humps and raised crosswalks, are more effective to achieve slower speeds than speed cushions.

Horizontal Treatments

Horizontal traffic calming reduces speeds by narrowing lanes, which creates a sense of enclosure and additional friction between passing vehicles. Narrower conditions require more careful maneuvering around fixed objects and when passing bicyclists or oncoming automobile traffic. Some treatments may slow traffic by creating a yield situation where one driver must wait to pass.

IMAGE 13: CURB EXTENSION

HORIZONTAL TREATMENT GUIDANCE

- Horizontal traffic calming treatments must be designed to deflect motor vehicle traffic without forcing the bicycle path of travel to be directed into a merging motorist.
- Neighborhood traffic circles should be considered at local street intersections to prioritize the through movement of bicyclists (i.e., by removing stop control or converting to yield control) without enabling an increase in motorist's speed.
- The size of chicanes will vary based on the targeted design speed and roadway width, but they must be 20 feet wide curb-to-curb at a minimum to accommodate emergency vehicles.
- Infrastructure costs will range depending upon the complexity and permanence of design. Simple, interim treatments, such as striping and flex posts, are low-cost. Curbed, permanent treatments that integrate plantings or green infrastructure are higher cost. Horizontal traffic calming treatments can be appropriate along street segments or at intersections where width contributes to higher motor vehicle speeds. It can be particularly effective at locations where:
  - » On-street parking is low-occupancy during most times of day.
  - » There is a desire to remove or decrease stop control at a minor intersection.
- Horizontal treatments are most effective if they deflect motorists mid-block (e.g., chicanes) or within intersections (e.g., neighborhood traffic circles)

IMAGE 16: CHICANE

IMAGE 14: NECKDOWN

IMAGE 15: NEIGHBORHOOD TRAFFIC CIRCLE

Traffic Diversion

Traffic diversion strategies are used to reroute traffic from a neighborhood bikeway onto other adjacent streets by installing design treatments that restrict motorized traffic from passing through.

IMAGE 17: DIAGONAL DIVERTER

TRAFFIC DIVERSION GUIDANCE

- Diversion necessarily moves trips from the neighborhood bikeway onto adjacent streets. This change in traffic volume on other local streets must be identified and addressed during the planning, design, and evaluation process.
- Other traffic calming tools should be explored for their effectiveness before implementing traffic diversion measures. In communities where the street network is not a traditional grid, the impacts of diversion to the larger street network will be greater due to the inability of traffic to easily disperse and find alternate routes.
- Temporary materials may be used to test diversion impacts before permanent, curbed diverters are installed.
- Consultation with emergency services will be necessary to understand their routing needs.
- Preferred motor vehicle volumes are in the range of 1,000 to 1,500 per day, while up to 3,000 vehicles per day is acceptable.
- Diversion devices must be designed to provide a minimum clear width of 6 feet for a bicyclist to pass through.
- Some treatments may require a separate pedestrian accommodation.

IMAGE 18: PARTIAL TRAFFIC CLOSURE - INTERIM STOP CONTROL

IMAGE 19: PARTIAL TRAFFIC CLOSURE - PERMANENT SIGNAL

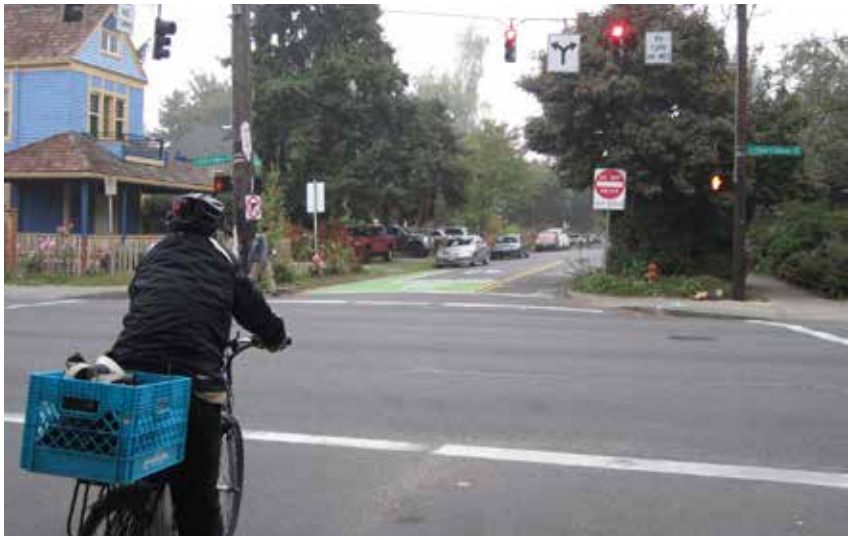
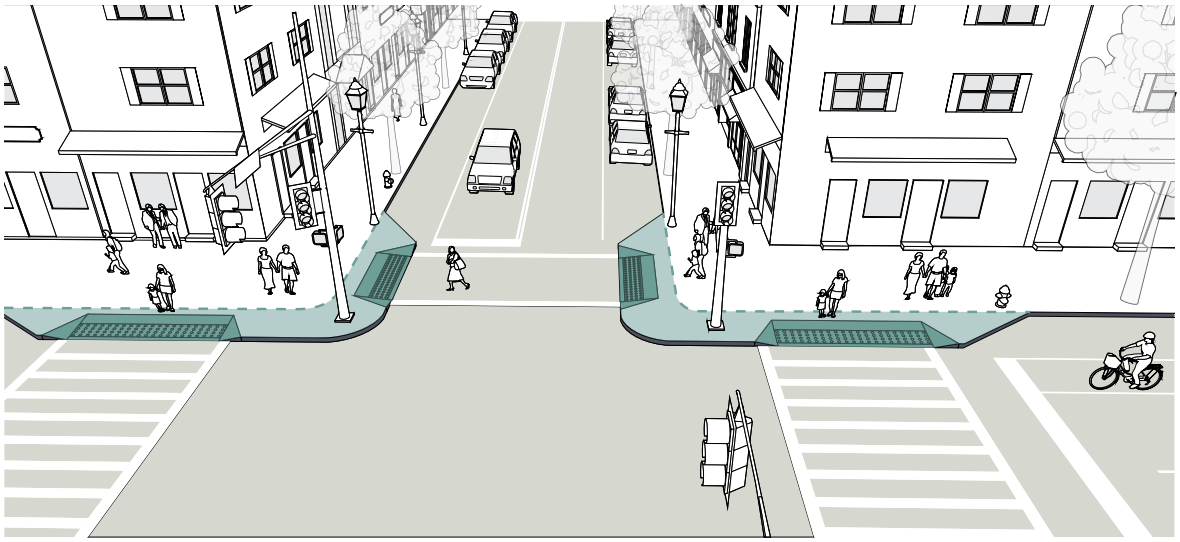


IMAGE 20: FULL TRAFFIC CLOSURE

Curb Extensions

Curb extensions, also known as neckdowns, bulb-outs, or bump-outs, are created by extending the sidewalk at corners or mid-block. Curb extensions are intended to increase safety, calm traffic, and provide extra space along sidewalks for users and amenities.



GUIDANCE

- The turning needs of emergency and larger vehicles should be considered in curb extension design.
- Care should be taken to maintain direct routes across intersections aligning pedestrian desire lines on either side of the sidewalk. Curb extensions often make this possible as they provide extra space for grade transitions.
- Consider providing a 20-foot long curb extension to restrict parking within 20 feet of an intersection.
- When curb extensions conflict with turning movements, the reduction of width and/or length should be prioritized over elimination.
- Emergency access is often improved through the use of curb extensions as intersections are kept clear of parked cars.
- Curb extensions should be considered only where parking is present or where motor vehicle traffic deflection is provided through other curbside uses such as bicycle share stations or parklets.
- Curb extensions are particularly valuable in locations with high volumes of pedestrian traffic, near schools, at unsignalized pedestrian crossings, or where there are demonstrated pedestrian safety issues.
- A typical curb extension extends the approximate width of on-street parallel parking, at least 6 feet from the curb. The standard width of on-street parallel parking in Bentonville is 9 feet.
- The minimum length of a curb extension is the width of the crosswalk, allowing the curvature of the curb extension to start after the crosswalk, which should deter parking; NO STOPPING signs should also be used to discourage parking. The length of a curb extension can vary depending on the intended use (i.e., stormwater management, transit stop waiting areas, restrict parking).
- Curb extensions should not reduce a travel lane or a bicycle lane to an unsafe width.

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Pedestrian Facilities

Sidewalks

Considerations

FRONTAGE ZONE

The Frontage Zone is the area of sidewalk that immediately abuts buildings along the street. In residential areas, the Frontage Zone may be occupied by front porches, stoops, lawns, or other landscape elements that extend from the front door to the sidewalk edge. The Frontage Zone of commercial properties may include architectural features or projections, outdoor retail displays, café seating, awnings, signage, and other intrusions into or use of the public right-of-way. Frontage Zones may vary widely in width from just a few feet to several yards.

PEDESTRIAN ZONE

Also known as the "walking zone," the Pedestrian Zone is the portion of the sidewalk space used for active travel. For it to function, it must be kept clear of any obstacles and be wide enough to comfortably accommodate expected pedestrian volumes, including those using mobility assistance devices, pushing strollers, or pulling carts. To maintain the social quality of the street, the width should accommodate pedestrians passing singly, in pairs, or in small groups as anticipated by density and adjacent land use.

AMENITY ZONE

The Amenity Zone, or "landscape zone," lies between the curb and the Pedestrian Zone. This area is occupied by a number of street fixtures such as street lights, street trees, bicycle racks, parking meters, signposts, signal boxes, benches, trash and recycling receptacles, and other amenities. In commercial areas, it is typical for this zone to be hardscape pavement, pavers, or tree grates. In residential or lower intensity areas, it is commonly a planted strip. The Amenity Zone can provide an emergency repository for snow cleared from streets and sidewalks, although snow storage should not impede access to or use of important mobility fixtures such as parking meters, bus stops, and curb ramps. Stormwater Control Measures (SCMs) are commonly located in the Amenity Zone.

THE CURB

Although not a zone per se, the curb is a unique and vital element of the street. It is the demarcation line between the pedestrian and vehicular domains. The curb is typically a physical barrier providing vertical separation between the street and sidewalk. The curb, coupled with adjacent gutter and stormwater inlets, also plays a specific role in the drainage of the sidewalk and roadway and even of the adjacent property at times.

FIGURE 54: RECOMMENDED SIDEWALK AND AMENITY ZONE WIDTHS

Common City Street Type (varies from Master Street Plan)	Frontage Zone desirable width	Pedestrian Zone desirable width	Landscape/Furniture Zone desirable width	Total desirable width
Downtown	6′ (2′ min.)	10′ (8′ min.)	6′ (5′ min.)	22′ (15′ min.)
Downtown Neighborhood	6′ (2′ min.)	8′ (6′ min.)	6′ (5′ min.)	20′ (13′ min.)
Urban Village Main	6′ (2′ min.)	8′ (6′ min.)	6′ (5′ min.)	20′ (13′ min.)
Urban Village Neighborhood	6′ (2′ min.)	8′ (6′ min.)	6′ (5′ min.)	20′ (13′ min.)
Neighborhood	-	6′ (5′ min.)	6′ (5′ min.)	12′ (10′ min.)
Neighborhood Corridor	-	6′ (6′ min.)	6′ (6′ min.)	12′ (11′ min.)
Urban Center Connector[2]	6′ (3′ min.)	10′ (8′ min.)	8′ (5′ min.)	24′ (16′ min.)
Urban Curbless	-	8′ (7′ min.)	12′ (′ min.)	20′ (15′ min.)
Neighborhood Curbless	-	6′ (5′ min.)	14′ (12′ min.)	20′ (17′ min.)[5]
Industrial Access	-	6′ (5′ min.)	6′ (5′ min.)	12′ (10′ min)
Commercial Alley	-	-	-	-

6′ Curb

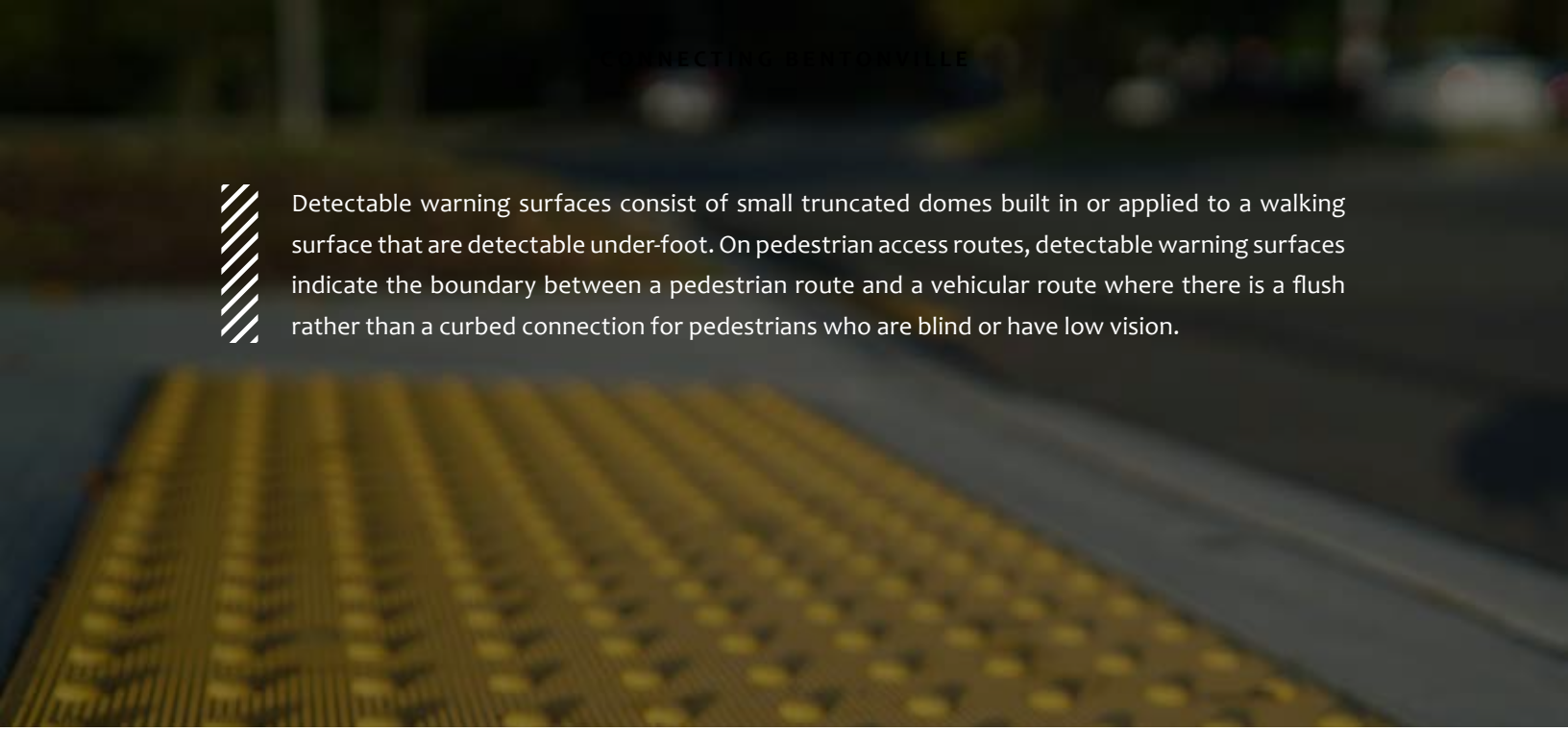
SIDEWALK GUIDANCE

The width of the various sidewalk zones will vary given the street type, the available right-of-way, scale of the adjoining buildings, and the intensity and type of uses expected along a particular street segment. A balanced approach for determining the sidewalk width should consider the character of the surrounding area and the anticipated pedestrian activities. For example, is the street lined with retail that encourages window shopping or does it connect a residential neighborhood to a commercial area where pedestrians frequently need to pass one another? Does the scale of the buildings and the character of the street indicate a need for a wider sidewalk?

Curb Ramps

Considerations

- Furniture zones of 7 feet of width provide just enough space at intersections for curb ramps to gain sufficient elevation to a sidewalk.
- Separate curb ramps should be provided for each crosswalk at an intersection rather than a single ramp at a corner for both crosswalks. The separate curb ramps improve orientation for visually impaired pedestrians by directing them toward the correct crosswalk.
- Curb ramps are required to have landings. Landings provide a level area with a cross slope of 2% or less in any direction for wheelchair users to wait, maneuver into or out of a ramp, or bypass the ramp altogether. Landings are preferred to be 5 feet by 5 feet but, at a minimum, shall be 4 feet by 4 feet.
- Consider providing wider curb ramps in areas of high pedestrian volumes and crossing activities.
- Flares are required when the surface adjacent to the ramp's sides is walkable; however, they are unnecessary when this space is occupied by a landscaped buffer. Excluding flares can also increase the overall capacity of a ramp in high-pedestrian areas.



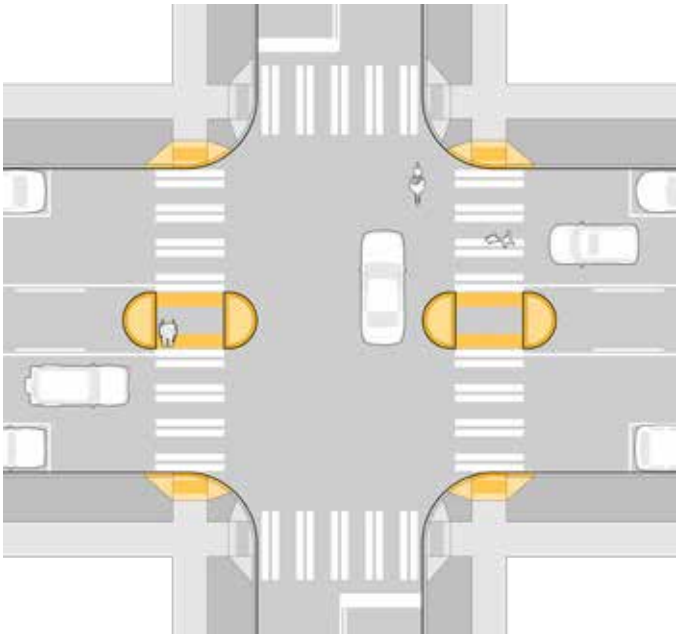
Detectable warning surfaces consist of small truncated domes built in or applied to a walking surface that are detectable under-foot. On pedestrian access routes, detectable warning surfaces indicate the boundary between a pedestrian route and a vehicular route where there is a flush rather than a curbed connection for pedestrians who are blind or have low vision.

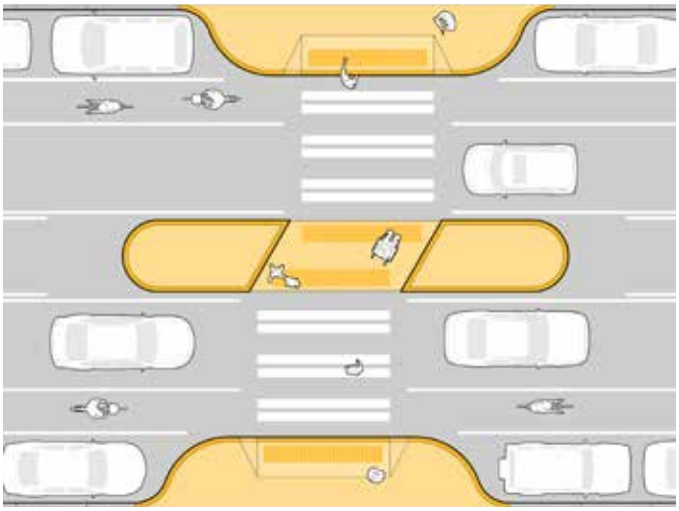
CURB RAMP GUIDANCE

- Maximum slope: 1:12 (8.33%).
- Maximum slope of side flares: 1:10 (10%).
- Maximum cross-slope: 2% (1–2% with tight tolerances recommended).
- Should direct pedestrians into the crosswalk. The bottom of the ramp should lie within the area of the crosswalk.
- Truncated domes (i.e., the only permitted detectable warning device) must be installed on all new curb ramps to alert pedestrians to the sidewalk and street edge.
- Separate curb ramps for each crosswalk are preferred as they allow for a visually impaired user to be most effectively directed to the correct crosswalk when compared to a single ramp that encompasses the whole corner and serves both crosswalks.

Crossing Islands

Crossing islands are raised islands that provide a pedestrian refuge and allow multi-stage crossings of wide streets. They can be located along the centerline of a street, as roundabout splitter islands, or as "pork chop" islands where right-turn slip lanes are present.





Considerations

- There are two primary types of crossing islands. The first provides a cut-through of the island, keeping pedestrians at street-grade. The second ramps pedestrians up above street grade and may present challenges to constructing accessible curb ramps unless they are more than 17 feet wide.
- Crossing islands should be considered where crossing distances are greater than 50 feet to allow multi-stage crossings, which in turn allow shorter signal phases.
- Cut-through widths should equal the width of the crosswalk. Cut-throughs may be wider to allow the clearing of debris and snow, but they should not encourage motor vehicles to use the space for U-turns.
- Crossing islands can be coupled with other traffic calming features, such as partial diverters.
- At mid-block crossings, where width is available, islands should be designed with a stagger, or in a "Z" pattern, encouraging pedestrians to face oncoming traffic before crossing the other side of the street.

CROSSING ISLAND GUIDANCE

» Minimum width: 6 feet

» Preferred width: 8 feet (to accommodate bicyclists and wheelchair users)

» Curb ramps with truncated dome detectable warnings and landing areas are required. Landing areas must be 4 feet by 4 feet (5 feet by 5 feet preferred).

» A "nose" that extends past the crosswalk is not required but is recommended to protect people waiting on the crossing island and to slow turning drivers.

» Vegetation and other aesthetic treatments may be incorporated but must not obscure visibility.

Pedestrian Signals

Considerations

- One of the primary challenges for traffic signal design is to balance the goal of minimizing conflicts between turning vehicles with the goal of minimizing the time required to wait at the curb for a WALK indication.
- Intersection geometry and traffic controls should encourage turning vehicles to yield the right-of-way to pedestrians.
- Requiring pedestrians to wait for extended periods can encourage crossing against the signal. The 2010 Highway Capacity Manual states that pedestrians have an increased likelihood of risk-taking behavior (e.g., jay-walking) after waiting longer than 40 seconds at signalized intersections.
- Opportunities to provide a WALK indication should be maximized whenever possible. Vehicular movements should be analyzed at every intersection to utilize non-conflicting phases to implement Walk Intervals. For example, pedestrians can always cross the approach where vehicles cannot turn at a four-leg intersection with the major road intersecting a one-way street when the major road has the green indication.
- Intersection geometry and traffic controls should encourage turning vehicles to yield the right-of-way to pedestrians. Traffic movements should be analyzed at intersections in order to utilize non-conflicting phases to implement one or more WALK intervals per cycle.
- Free-flowing right-turn lanes are discouraged at signalized intersections. Where they are present and unsignalized, the pedestrian signal and pushbutton should be located on the channelization ("pork chop") island. A yield or crosswalk warning sign should then be placed in advance of the crosswalk.

LEADING PEDESTRIAN INTERVAL

The Leading Pedestrian Interval (LPI) initiates the pedestrian WALK indication three to seven seconds before motor vehicles traveling in the same direction are given the green indication. This signal timing technique allows pedestrians to enter the intersection prior to turning vehicles, increasing visibility between all modes.

GUIDANCE

- The LPI should be used at intersections with high volumes of pedestrians and conflicting turning vehicles and at locations with a large population of older adults or school children who tend to walk slower.
- A lagging protected left arrow for vehicles should be provided to accommodate the LPI.

PEDESTRIAN "SCRAMBLE" AT INTERSECTIONS

Pedestrian crossings in all directions, including diagonally across the intersection, is often called a pedestrian scramble. These facilities include painted crosswalks at all four legs of the intersection and diagonally (i.e., forming an "X" across the center of the intersection), and they are usually supplemented with pedestrian-only phasing.

CONSIDERATIONS

- Pedestrian scrambles should be considered at intersections where there are high volumes of pedestrians in all directions. Intersections near schools, senior housing, recreation areas, medical facilities, or other major vulnerable pedestrian attractors are potential locations for scramble designs and signaling.
- Removing permissive turning movements can have added safety benefits during a pedestrian-only phase.
- Typically, these designs increase wait times for all users, including pedestrians, so scrambles should be considered in places where there is necessity for pedestrian only movements.

GUIDANCE

- These designs are suitable at intersections with significant pedestrian use and high conflicting vehicular movements (i.e., greater than 250 per hour or meeting other local/state requirements).
- Use 3.5 feet per second as a measure of pedestrian travel time to determine timing for pedestrians crossing intersections diagonally.
- All bicycle movements must yield to pedestrian movements at these intersections.
- Designated crossing areas in all directions should be striped, as specified in this guide, and equipped ADA ramps.

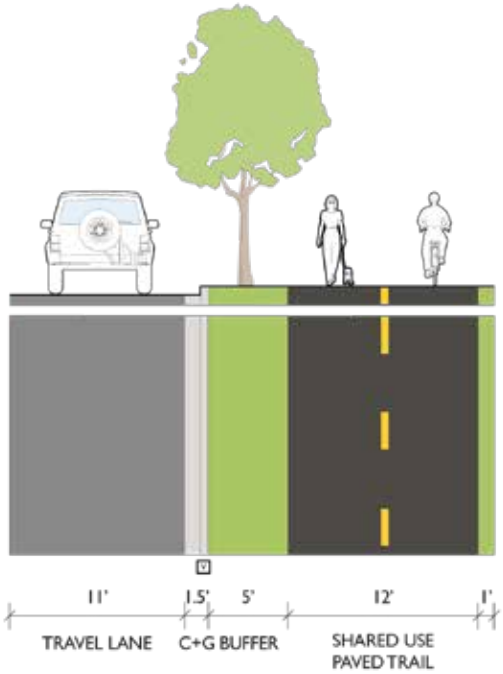
ACCESSIBLE PEDESTRIAN SIGNALS

An accessible pedestrian signal and pedestrian pushbutton is an integrated device that communicates information about the WALK and DON'T WALK intervals at signalized intersections in non-visual formats (i.e., audible tones and vibrotactile surfaces) to pedestrians who are blind or have low vision.[3]

The Manual on Uniform Traffic Control Devices (MUTCD) contains standards for accessible pedestrian signals and pedestrian pushbuttons but does not require that they be provided.

Bicycle and Pedestrian Facilities

Shared Use Paths and Greenways



Considerations

- According to AASHTO, "Shared use paths should not be used to preclude on-road bicycle facilities, but rather to supplement a network of on-road bike lanes, shared roadways, bicycle boulevards, and paved shoulders." In other words, in some situations it may be appropriate to provide an on-road bikeway in addition to a sidepath along the same roadway.
- Many people express a strong preference for the separation between bicycle and motor vehicle traffic provided by paths when compared to on-street bikeways. Sidepaths may be desirable along high-volume or high-speed roadways, where accommodating the targeted type of bicyclist within the roadway in a safe and comfortable way is impractical. However, sidepaths may present increased conflicts between path users and motor vehicles at intersections and driveway crossings. Conflicts can be reduced by minimizing the number of driveway and street crossings present along a path and otherwise providing high-visibility crossing treatments.
- Paths typically have a lower design speed for bicyclists than on-street facilities and may not provide appropriate accommodation for more confident bicyclists who desire to travel at greater speeds. In addition, greater numbers of driveways or intersections along a sidepath corridor can decrease bicycle travel speeds and traffic signals can increase delay for bicyclists on off-street paths compared to cyclists using in-street bicycle facilities such as bike lanes. Therefore, paths should not be considered a substitute to accommodating more confident bicyclists within the roadway.

SHARED USE PATH & GREENWAY GUIDANCE

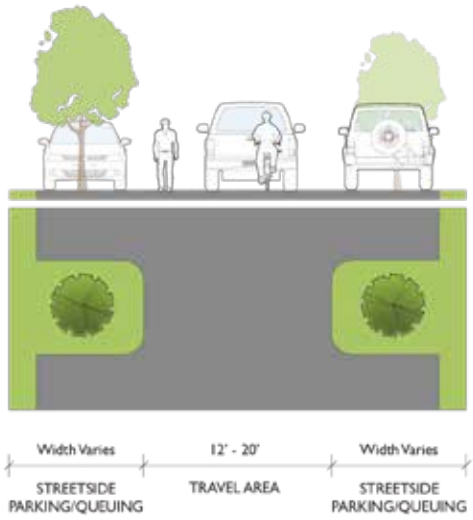
- Widths as narrow as 8 feet are acceptable for short distances under physical constraint. Warning signs should be considered at these locations.
- In locations with heavy volumes or a high proportion of pedestrians, widths exceeding 10 feet are recommended. A minimum of 11 feet is required for a user to pass another user traveling in the same direction when there is also a user traveling in the opposite direction. It may be beneficial to separate bicyclists from pedestrians by constructing parallel paths for each mode.
- Paths must be designed according to state and national standards. This includes establishing a design speed (i.e., typically 18 mph) and designing path geometry accordingly. Consult the AASHTO Guide for the Development of Bicycle Facilities for guidance on geometry, clearances, traffic control, railings, drainage, and pavement design.
- On hard surfaces it can be useful to include soft surface parallel paths which are preferred by some users, such as runners.
- Path clearances are an important element in path design and reducing user conflicts. Vertical objects close to the path edge can endanger users and reduce the comfortable usable width of the path. Along the path, vertical objects should be set back at least two feet from the edge of the path. Path shoulders may also reduce conflicts by providing space for users who step off the path to rest, allowing users to pass one another, or providing space for viewpoints.

Yield Roadways

Considerations

When implementing yield roadways, consider emergency vehicle, pedestrian, and bicyclist access and safety.

FIGURE 55: YIELD ROADWAY



GUIDANCE

» Yield roadways should be local streets at least 40 feet in width. These streets are not appropriate for transit routes or freight routes but should accommodate local deliveries by SU-30.

» Yield roadways should have a travel way narrower than 20 feet. Total travel way width varies between 12 feet and 20 feet. According to the AASHTO *Low Volume Roads* guidelines, streets 15 feet or narrower function as a two-way roadway and should provide pull-out areas every 200-300 feet.

» According to the FHWA *Small Town and Rural Multimodal Networks* guide, parking lanes on yield roadways should be constructed with a contrasting material when possible. Preferred traffic conditions for yield roadways are motor vehicle speeds at or below 20 MPH and AADT at or below 400. Yield roadways may still be appropriate up to 30 MPH speeds and 2,000 AADT.

» The MUTCD does not recommend centerline markings on two-way streets narrower than 16 feet wide or below 3,000 ADT.

Paved Shoulders

Considerations

- Where 4-foot or wider paved shoulders exist already, it is acceptable or even desirable to mark them as bike lanes in various circumstances, such as to provide continuity between other bikeways. If paved shoulders are marked as bike lanes, they need to also be designed as bike lanes at intersections. Where a roadway does not have paved shoulders already, paved shoulders can be retrofitted to the existing shoulder when the road is resurfaced or reconstructed. In some instances, adequate shoulder width can be provided by narrowing travel lanes to 11 feet.
- Reducing travel lane width on existing roads, also known as a "lane diet," is one way to increase paved shoulder width.
- There are several situations in which additional shoulder width should be provided, including motor vehicle speeds exceeding 50 mph, moderate to heavy volumes of traffic, and above-average bicycle or pedestrian use.
- The placement of rumble strips may significantly degrade the functionality of paved shoulders for bicyclists.

GUIDANCE

- Sufficiently wide shoulders can greatly improve bicyclist safety and comfort, particularly on higher-speed, higher-volume roadways. Shoulders are most often found on rural roadways and less often on urban roadways.
- To accommodate bicyclists, provide a minimum 4-foot paved shoulder width, continuous along the length of the roadway and through intersections.
- Use at least 5 feet where guardrails, curbs, or other roadside barriers are present.
- Designers should consider wider shoulders if vehicle speeds are greater than 50 mph. Designers may use the Bicycle Level of Service model, which includes factors for vehicle speeds, traffic volumes, and lane widths to determine the appropriate shoulder width.[4]
- Rumble strips should be placed as close to the edge line as practicable and 4 feet of usable space should be provided for bicyclists. Where rumble strips are present, gaps of at least 12 feet should be provided every 40 to 60 feet.
- If the shoulder is being marked as a bike lane, then it must be marked as a bike lane at intersections as well, especially if the shoulder becomes a right turn lane. They can be reconfigured as:
  - » On-street bike lanes
  - » Separated bike lanes or shared use paths

Intersection Design and Other Crossing Treatments

Separated Bike Lanes and Sidepaths at Intersections (Protected Intersections)

Separated bicycle lanes and sidepaths provide an exclusive travel way for bicyclists alongside roadways that is separate from motor vehicle travel lanes, parking lanes, and sidewalks. Separated bike lane and sidepath designs at intersections should manage conflicts with turning vehicles and increase visibility for all users.

FIGURE 56: SHARED USE PATH STREET CROSSING-A

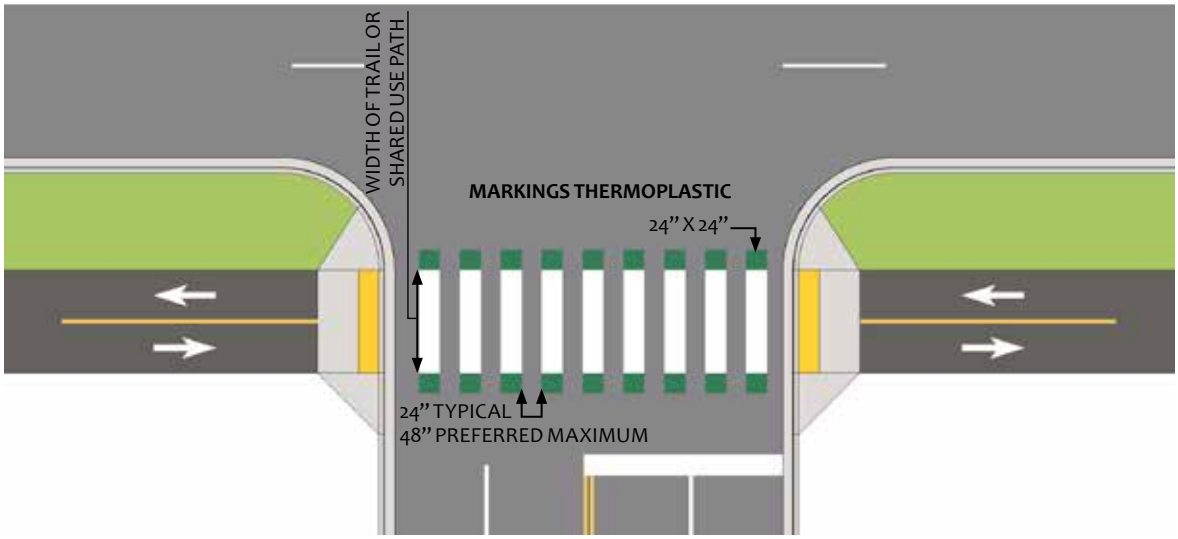


FIGURE 57: SHARED USE PATH STREET CROSSING-B

FIGURE 58: SEPARATED BIKE LANE (SBL) STREET CROSSING

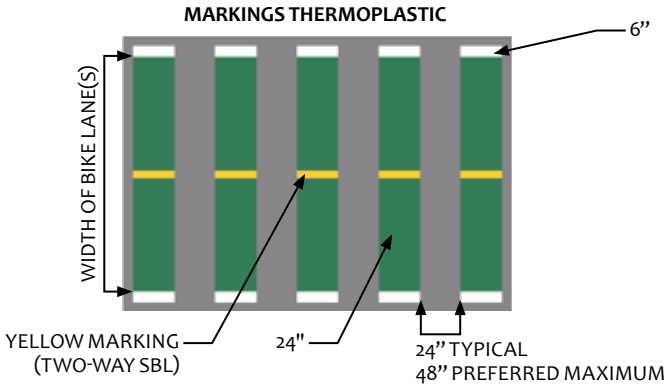


FIGURE 59: BIKE LANE STREET CROSSING

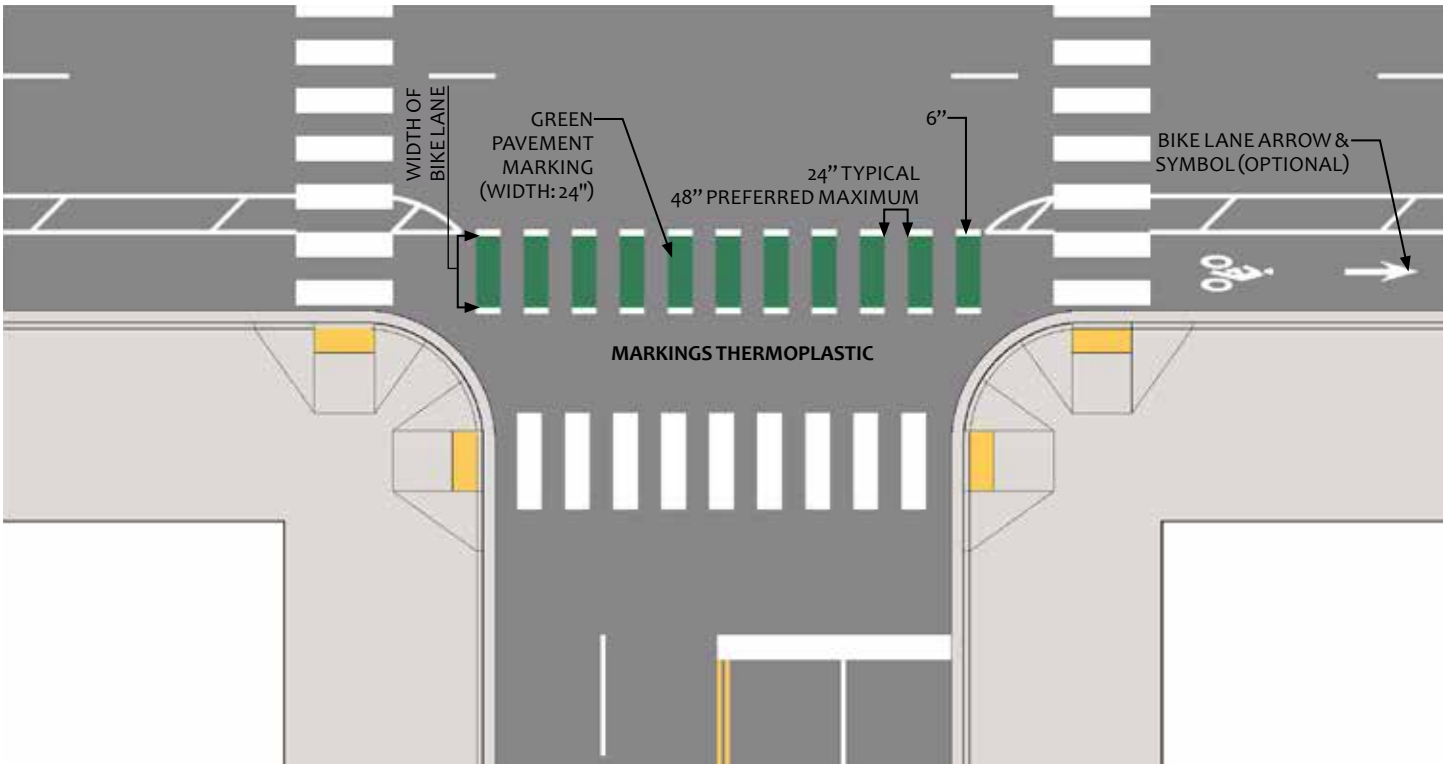
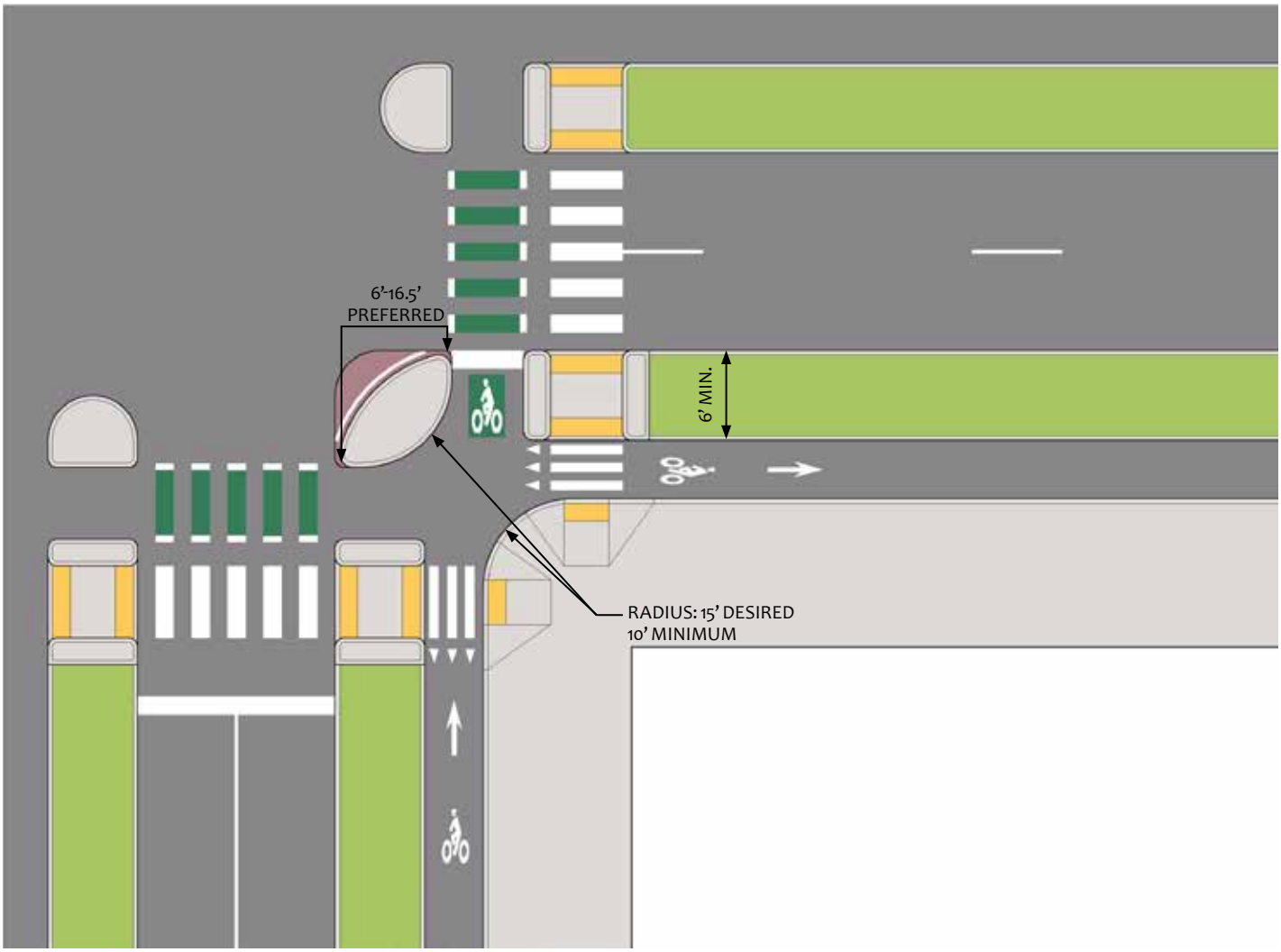


FIGURE 60: PROTECTED INTERSECTION



GUIDANCE FOR SEPARATED BIKE LANES & SIDEPATHS AT INTERSECTIONS (PROTECTED INTERSECTIONS)

- Separated bicycle lane and sidepath designs at intersections should consider signal operation and phasing to manage conflicts between turning vehicles and bicyclists. Bicycle signal heads should be considered to separate conflicts. Shared lane markings and/or colored pavement can supplement short dashed lines to demarcate the protected bike lane through intersections, where engineering judgment deems appropriate. At non-signalized intersections, design treatments to increase visibility and safety include:
  - » Warning signs
  - » Raised intersections
  - » Special pavement markings (including colored surface treatment)
  - » Removal of parking prior to the intersection
- It is preferable to maintain the separation of the bike lane through the intersection rather than introduce the bicyclist into the street with a merge lane. Where this is not possible, see guidance on Mixing Zones.
- Increasing visibility and awareness are two key design goals for separated bike lanes at intersections. In some cases, parking restrictions between 20 feet to 40 feet are needed to ensure the visibility of bicyclists at intersections.
- Separated bike lanes and sidepaths should typically be routed behind transit stops (i.e., the transit stop should be between the bike lane and motor vehicle travel lanes). If this is not feasible, the separated bike lane or sidepath should be designed to include treatments such as signage and pavement markings to alert the bicyclist to stop for buses and pedestrians accessing transit stops.
- Markings and signage should be used at intersections to give priority to separated bicycle lanes and sidepaths.

Bike Boxes

A bike box provides dedicated space between the crosswalk and vehicle stop line where bicyclists can wait during the red light at signalized intersections. The bike box allows a bicyclist to take a position in front of motor vehicles at the intersection, which improves visibility and motorist awareness, and allows bicyclists to "claim the lane" if desired. Bike boxes aid bicyclists in making turning maneuvers at the intersection and provide more queuing space for multiple bicyclists than that provided by a typical bike lane.

GUIDANCE

- Bike boxes are typically painted green and are a minimum of 10 feet in depth.
- Bike box design should be supplemented with appropriate signage according to the latest version of the MUTCD.
- Bike box design should include appropriate adjustment in determining the minimum green time.
- Where right-turn lanes for motor vehicles exist, bike lanes should be designed to the left of the turn lane. If right turns on red are permitted, consider ending the bike box at the edge of the bike lane to allow motor vehicles to make this turning movement.
- In locations with high volumes of turning movements by bicyclists, a bike box should be used to allow bicyclists to shift towards the desired side of the travel way. Depending on the position of the bike lane, bicyclists can shift sides of the street to align themselves with vehicles making the same movement through the intersection.
- In locations where motor vehicles can continue straight or cross through a right-side bike lane while turning right, the bike box allows bicyclists to move to the front of the traffic queue and make their movement first, minimizing conflicts with the turning vehicles. When a bike box is implemented in front of a vehicle lane that previously allowed right turns on red, the right turn on red movement must be restricted using signage and enforcement following installation of the bike box.

Conflict Area Marking

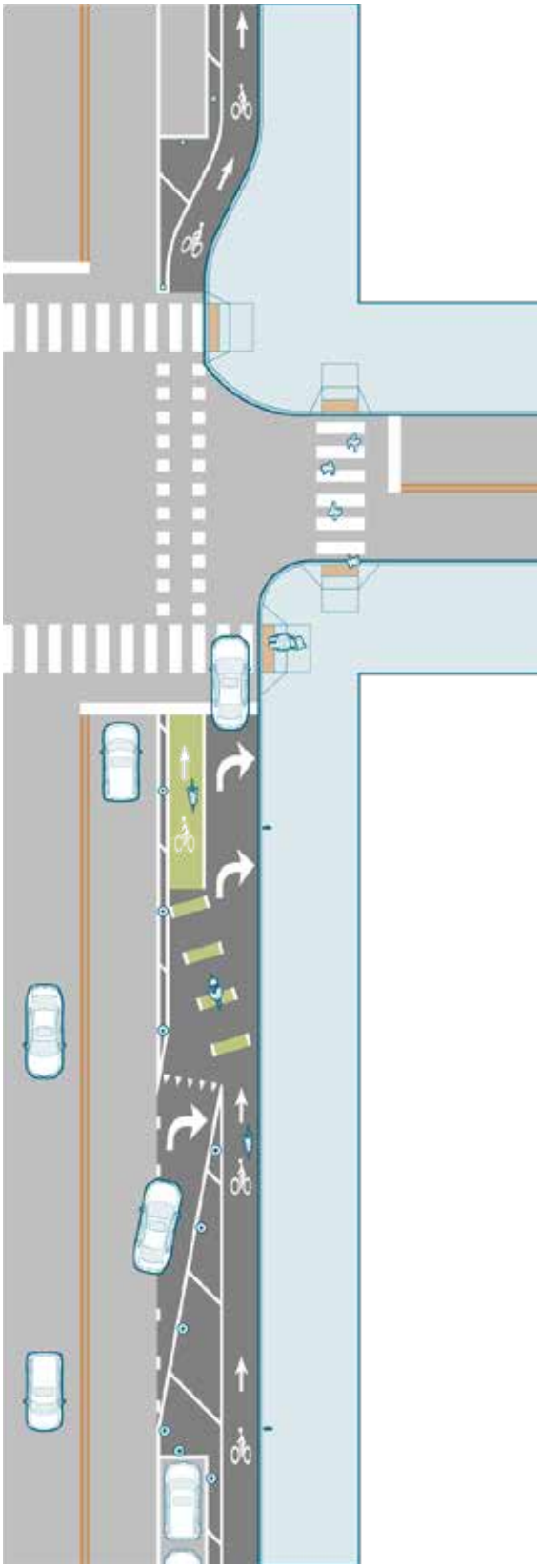
Intersection pavement markings designed to improve visibility, alert all roadway users of expected behaviors, and to reduce conflicts with turning vehicles are critical to establishing a safe and comfortable network.

GUIDANCE

- The level of emphasis and visibility: dashed lane lines may be sufficient for guiding bicyclists through intersections; however, consider providing enhanced markings with green pavement and/or symbols at complex intersections or at intersections with documented conflicts and safety concerns.
- Symbol placement within intersections should consider vehicle wheel paths for maintenance.
- Driveways with higher volumes may require additional pavement markings and signage.
- Consideration should be given to using intersection pavement markings as spot treatments or standard intersection treatments. A corridor-wide treatment can maintain consistency; however, spot treatments can be used to highlight conflict locations.
- Dashed white lane lanes should conform to the latest edition of the MUTCD. These can be used through different types of intersections based on engineering judgment.
- A variety of pavement marking symbols can enhance intersection treatments to guide bicyclists and warn of potential conflicts.
- Green pavement markings can be used along the length of a corridor or in select conflict locations.

Mixing Zones

A mixing zone requires turning motorists to merge across a separated bike lane at a defined location in advance of an intersection. Unlike a standard bike lane, where a motorist can merge across at any point, a mixing zone design limits bicyclists' exposure to motor vehicles by defining a limited merge area for the turning motorist. Protected intersections are preferable to mixing zones. Mixing zones are generally appropriate as an interim solution or in situations where severe right-of-way constraints make it infeasible to provide a protected intersection. Mixing zones are only appropriate on street segments with one-way separated bike lanes. They are not appropriate for two-way separated bike lanes due to the contra-flow bicycle movement.



MIXING ZONE GUIDANCE

- Locate merge points where the entering speeds of motor vehicles will be 20 mph or less by: (a) minimizing the length of the merge area; and (b) locating the merge point as close as practical to the intersection.
- Minimize the length of the storage portion of the turn lane and provide a buffer and physical separation (e.g. flexible delineator posts) from the adjacent through lane after the merge area, if feasible.
- Highlight the conflict area with green surface coloring and dashed bike lane markings, as necessary, or shared lane markings placed on a green box.
- Provide a BEGIN RIGHT (or LEFT) TURN LANE YIELD TO BIKES sign (R4-4) at the beginning of the merge area.
- Restrict parking within the merge area.
- At locations where raised separated bike lanes approach the intersection, the bike lane should transition to street elevation at the point where parking terminates.
- Where posted speeds are 35 mph or higher, or at locations where it is necessary to provide storage for queued vehicles, it may be necessary to provide a deceleration/storage lane in advance of the merge point.

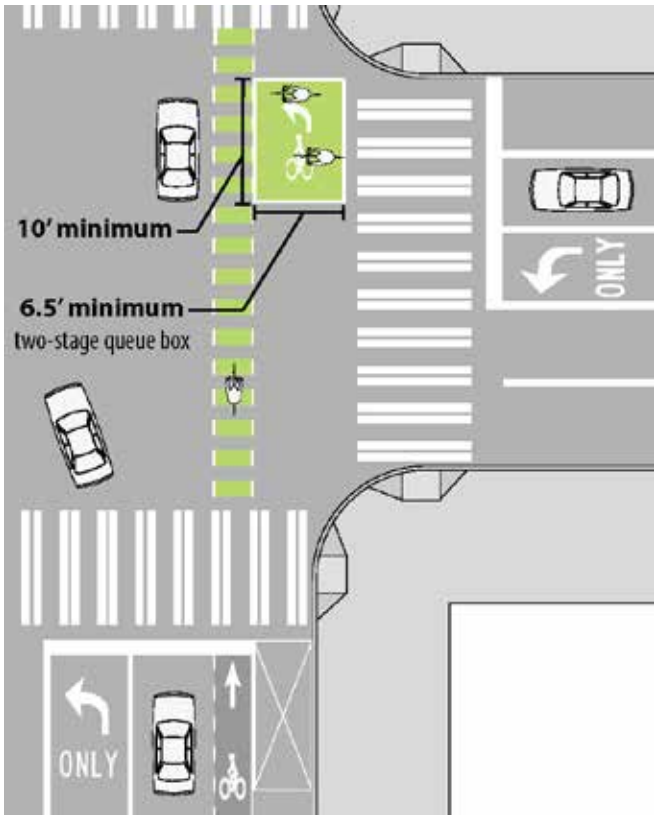
IMAGE 21: R4-4 SIGNS

Two-Stage Turn Queue Boxes

A two-stage turn queue box should be considered where separated bike lanes are continued up to an intersection and a protected intersection is not provided. The two-stage turn queue box designates a space for bicyclists to wait while performing a two-stage turn across a street at a location outside the path of traffic.

GUIDANCE

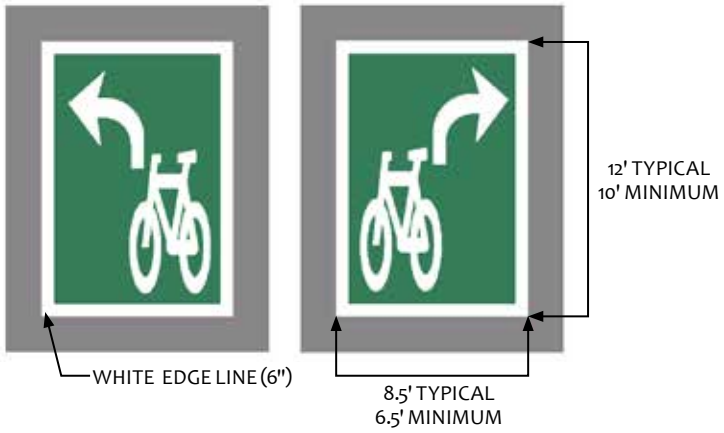
- The use of a two-stage turn queue box requires FHWA permission to experiment.
- Two-stage turn queue box dimensions will vary based on the street operating conditions, the presence or absence of a parking lane, traffic volumes and speeds, and available street space. The turn box may be placed in a variety of locations including in front of the pedestrian crossing (i.e., the crosswalk location may need to be adjusted), in a 'jug-handle' configuration within a sidewalk, or at the tail end of a parking lane or a median island.
- Dashed bike lane extension markings may be used to indicate the path of travel across the intersection. A minimum width of 10 feet is recommended.
- A minimum depth of 6.5 feet is recommended.
- NO TURN ON RED (R10-11) restrictions should be used to prevent vehicles from entering the queuing area.
- The use of a supplemental signs (D11-20 and/or D11-20a) instructing bicyclists how to use the box is optional.
- The box should consist of a green box outlined with solid white lines supplemented with a bicycle symbol and a turn arrow to emphasize the crossing direction.



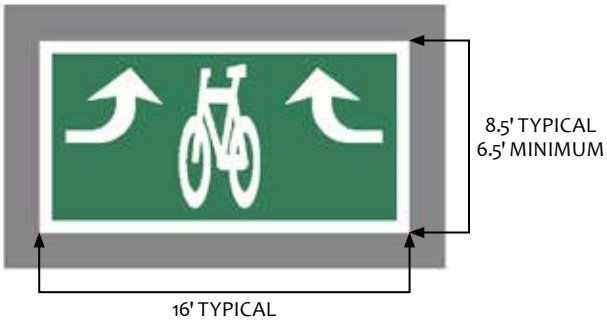
Queue Box Pavement Markings

Green pavement markings with white bicycle and turn arrow symbols.

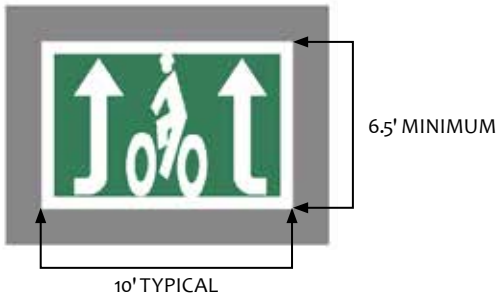
LEFT & RIGHT TURN BOXES



DUAL LEFT TURN BOX



DUAL LEFT TURN BOX - CONSTRAINED



Queue Box Signs

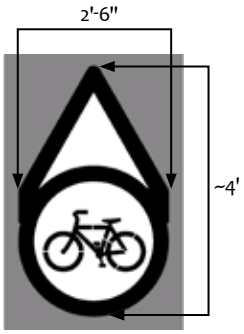
While signs D11-20 and D11-20A are optional, they may provide guidance to users.

D11-20

D11-20A

Wayfinding Dot

White and black pavement markings.

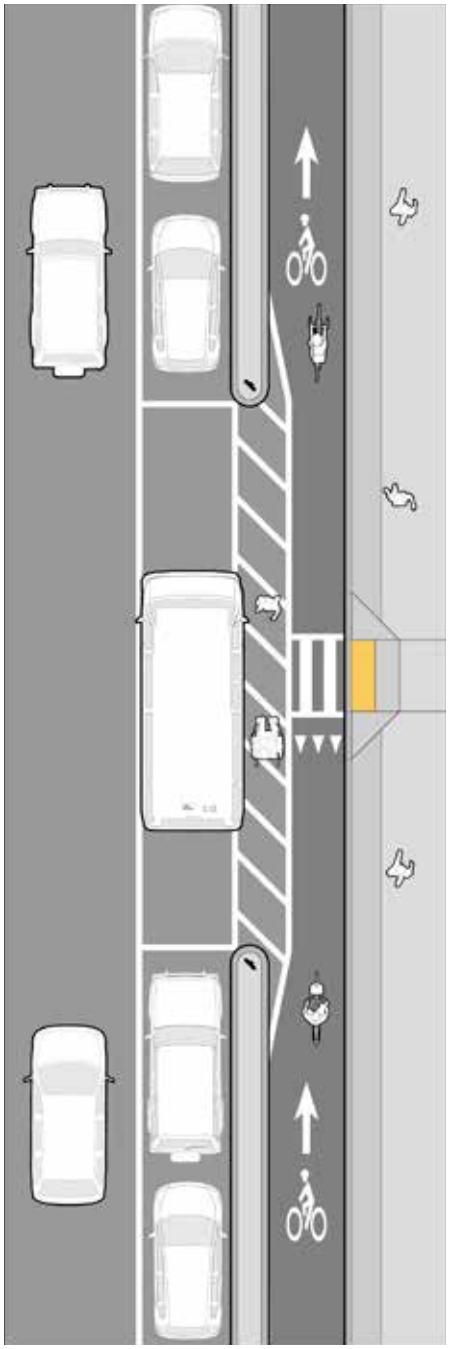


Loading Zones

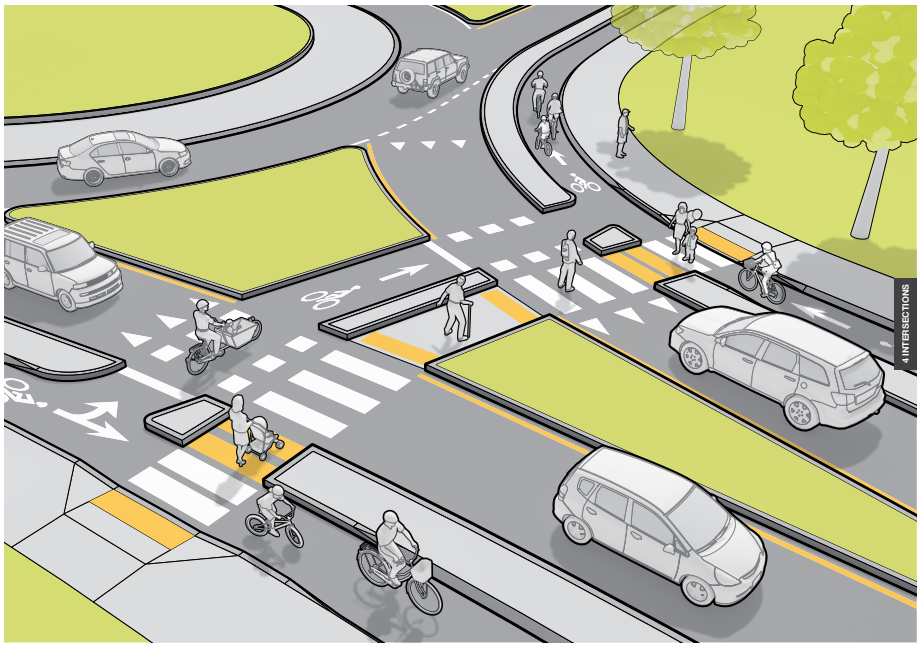
Truck loading operations typically involve pulling over to the side of the roadway. This action may result in blocking a bike lane or crossing through a bike lane to access a loading zone. Dedicated commercial loading zones can save trucking companies time and money and improve air quality. Commercial loading zones should be designated where they will provide convenient access to businesses, while causing minimal conflict with bicycle facilities. This should be balanced with providing convenient dedicated loading zones.

GUIDANCE

- Consider consolidating commercial loading zones to a single location on each block to reduce potential conflicts. Consider the length of typical loading vehicles that use the space when determining the length of the loading zone.
- A curb ramp with a separated bike lane crosswalk can simplify loading and unloading activity.
- Green-colored pavement can be used to notify freight operators of a potential conflict with a bicyclist.
- Consider locating a commercial loading zone on an adjacent block or alley where a loading zone is desired but on-street parking is not present. A lateral shift of the separated bike lane and the sidewalk should be considered as a last resort.
- Streets with heavy freight usage, high parking demand, and bike lanes benefit from dedicated commercial loading zones after an intersection. Loading zones may help reduce obstruction of the bike lane and make deliveries easier for businesses. These zones can be striped and signed or managed for off-peak deliveries.
- Where on-street parking and separated bike lanes are provided, consider a 5-foot minimum access aisle between the commercial loading zone and the bike lane. Vertical objects used to delineate the bike lane should be discontinued where an access aisle is provided.
- The loading zone should be 8 to 10 feet wide.



Separated Bike Lanes at Roundabouts



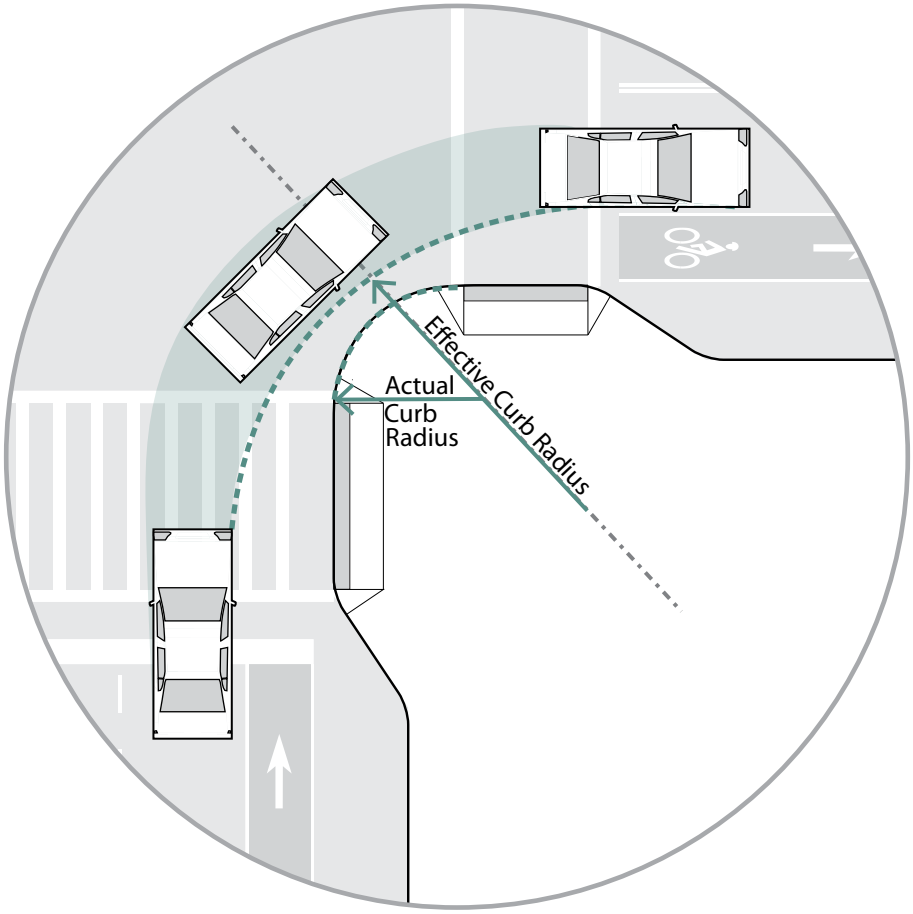
When separated bike lanes are provided at roundabouts, they should be continuous around the intersection, and parallel to the sidewalk. Separated bike lanes should generally follow the contour of the circular intersection.

GUIDANCE

- At crossing locations of multi-lane roundabouts or roundabouts where the exit, geometry will result in faster exiting speeds by motorists (i.e., reducing the likelihood that they will yield to bicyclists and pedestrians), additional measures should be considered to induce yielding such as providing an actuated device such as a Rectangular Rapid Flash Beacon (RRFB) or Pedestrian Hybrid Beacon.
- The bicycle crossing should be immediately adjacent to and parallel with the pedestrian crossing, and both should be at the same elevation.
- Consider providing supplemental yield lines at roundabout exits to indicate priority at these crossings.
- The decision of whether to use yield control or stop control at the bicycle crossing should be based on available sight distance.
- The separated bike lane approach to the bicycle crossing should result in bicyclists arriving at the queuing area at a perpendicular angle to approaching motorists.
- Curb radii should be a minimum of 5 feet to enable bicyclists to turn into the queuing area.
- Channelizing islands are preferred to maintain separation between bicyclists and pedestrians but may be eliminated if different surface materials are used.

Corners and Curb Radii

Pedestrian safety and comfort are directly impacted by the width and configuration of street corners; however, streets must accommodate large turning vehicles, including school buses and transit vehicles. One of the most challenging aspects of intersection design is to determine methods of accommodating large vehicles while keeping intersections as compact as possible. This requires a great deal of design flexibility and engineering judgment, as each intersection is unique in terms of the angles of the approach and departure, the number of travel lanes, the presence of a median, and a number of other features that fundamentally impact corner design.

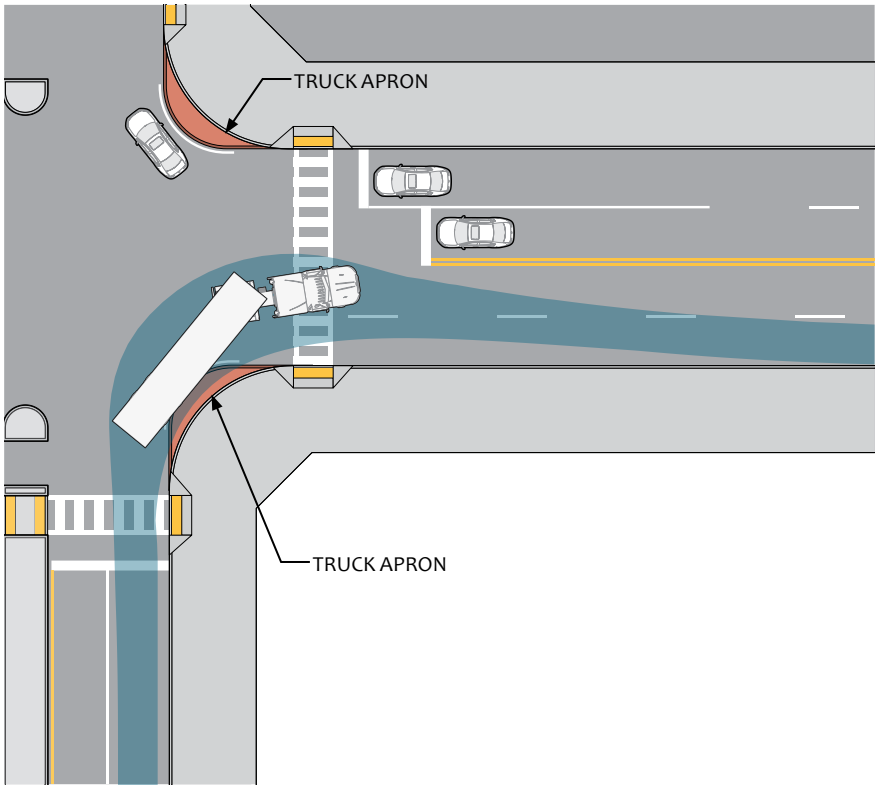


CORNER AND CURB RADII GUIDANCE

- The design vehicle should be selected according to the types of vehicles using the intersection with considerations to relative volumes and frequencies. In most cases, the curb radii are based on a Single Unit (SU) vehicle with a 42-foot turning radius. If the City anticipates the need to accommodate a larger design vehicle, a radius evaluation based on this larger vehicle would be required. Examples of typical turning templates would include an SU, WB-40, WB-50, WB-60 and WB-62.
- Intersection design should strive for an actual curb radii that is between 10 feet to 25 feet. The default curb radii for two intersecting Neighborhood Residential Streets is 10 feet (i.e., exceptions apply for angled streets). For all other street classifications, including streets that intersect with Neighborhood Residential Streets, corner design should strive for an actual curb radius that is no more than 15feet (i.e., exceptions apply for angled streets).
- Methods to minimize curb radii include:
  - » On-street parking and bicycle lanes may provide the larger effective radii to accommodate the appropriate design vehicle.
  - » On low volume (i.e., less than 4,000 vehicles per day), two-lane streets, corner design should assume that a large vehicle will use the entire width of the departing and receiving travel lanes, including the oncoming travel lane.
  - » At signalized intersections, corner design should assume the large vehicle will use the entire width of the receiving lanes on the intersecting street.
  - » At signalized intersections where additional space is needed to accommodate turning vehicles, consideration can be given to recessing the stop bar on the receiving street to enable the vehicle to use the entire width of the receiving roadway (i.e., encroaching on the opposing travel lane).
  - » In some cases, it may be possible to allow a large turning vehicle to encroach on the adjacent travel lane on the departure side (i.e., on multi-lane roads) to make the turn.
  - » A compound curve can be used to vary the actual curb radius over the length of the turn so that the radius is smaller as vehicles approach a crosswalk and larger when making the turn.
  - » In some cases where there is a grid network and/or alternative access routes, it may be possible to restrict turning movements by large vehicles at certain intersections and driveways to enable tighter curb radii.

Truck Aprons

While bicyclist and pedestrian safety is negatively impacted by wide crossings, bicyclists and pedestrians are also at risk if the curb radius is too small. Curb radii that are too small for large vehicles to navigate can result in the rear wheels of a truck tracking over queuing areas at the corner. Maintenance problems are also caused when trucks must regularly drive over street corners to make turns. Mountable truck aprons are a solution that can reduce turning speeds for passenger vehicles while accommodating the off-tracking of larger vehicles where a larger corner radius is necessary. In locations where large vehicles make occasional turns, designers can consider mountable truck aprons. Mountable truck aprons deter passenger vehicles from making higher-speed turns but accommodate the occasional large vehicle without encroachment or off-tracking into pedestrian waiting areas. Mountable truck aprons should be visually distinct from the adjacent travel lane and sidewalk.



GUIDANCE

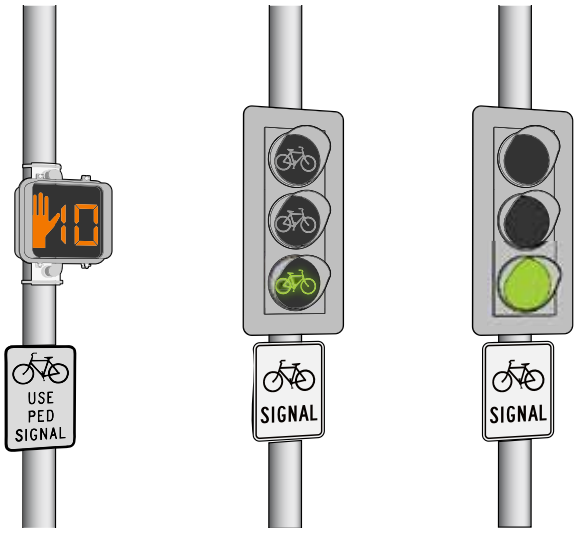
» Mountable truck aprons are part of the travel way and as such should be designed to discourage pedestrian or bicycle refuge. Bicycle stop bars, detectable warning panels, traffic signal equipment and other intersection features must be located behind the mountable surface area.

» The mountable surface should be visually distinct from the adjacent travel lane, sidewalk, and separated bike lane. The heights of mountable areas and curbs should be no more than 3 inches above the travel lane to accommodate lowboy trailers.

Bicycle Signals, Detection, Actuation

Bicyclists have unique needs at signalized intersections. Bicycle movements may be controlled by the same indications that control motor vehicle movements, by pedestrian signals, or by bicycle-specific traffic signals. The introduction of separated bike lanes creates situations that may require leading or protected phases for bicycle traffic, or place bicyclists outside the cone of vision of existing signal equipment. In these situations, provision of signals for bicycle traffic will be required.

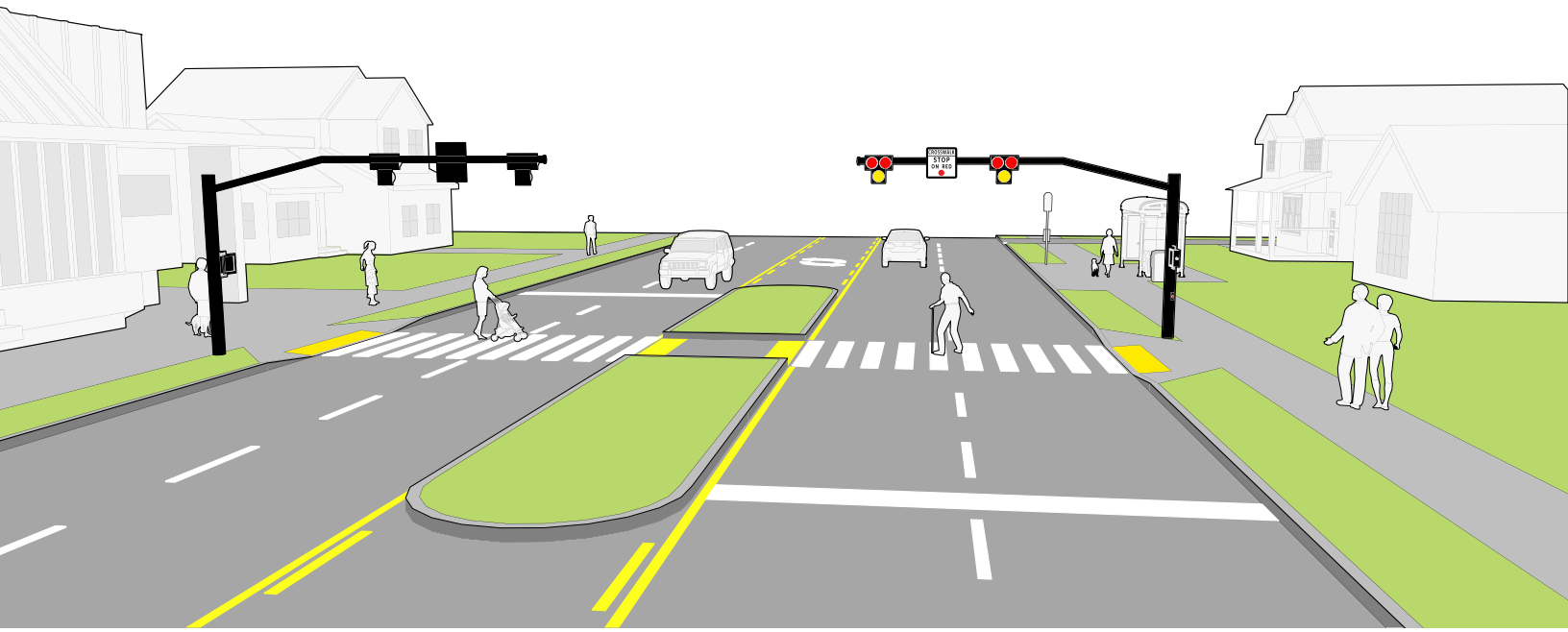
FIGURE 61: SIGNAL TYPES



GUIDANCE

- Bicycle-specific signals may be appropriate to provide additional guidance or separate phasing for bicyclists per the AASHTO Guide for the Development of Bicycle Facilities.
- It may be desirable to install advanced bicycle detection on the intersection approach to extend the phase, or to prompt the phase and allow for continuous bicycle through movements.
- Video, microwave, and infrared detection can be alternates to loop detectors.
- Another strategy in signal timing is coordinating signals to provide a "green wave," such that bicycles will receive a green indication and not be required to stop. Several cities including Portland, OR and San Francisco, CA have implemented "green waves" for bicycles.
- A stationary, or "standing," cyclist entering the intersection at the beginning of the green indication can typically be accommodated by increasing the minimum green time on an approach per the AASHTO Guide for the Development of Bicycle Facilities.
- A moving, or "rolling," bicyclist approaching the intersection towards the end of the phase can typically be accommodated by increases the red times (i.e., change and clearance intervals) per the AASHTO Guide for the Development of Bicycle Facilities.
- Set loop detectors to the highest sensitivity level possible without detecting vehicles in adjacent lanes and field check. Type D and type Q loops are preferred for detecting bicyclists.
- Install bicycle detector pavement markings and signs per the MUTCD, AASHTO Guide for the Development of Bicycle Facilities, and the NACTO Urban Bikeway Design Guide.

High Intensity Activated Crosswalk Beacon



Pedestrian-activated beacons, including the High-intensity Activated Crosswalk Beacon (HAWK), are a type of hybrid signal intended to allow pedestrians and bicyclists to stop traffic to cross high-volume arterial streets. This type of signal may be used in lieu of a full signal that meets any of the traffic signal control warrants in the MUTCD. It may also be used at locations which do not meet traffic signal warrants but where assistance is needed for pedestrians or bicyclists to cross a high-volume arterial street.

While this type of device is intended for pedestrians, it would be beneficial to retrofit it for bicyclists as the City of Portland, OR has, using bicycle detection and bicycle signal heads on major cycling networks. Depending upon the detection design, the agency implementing these devices may have the option to provide different clearance intervals for bicyclists and pedestrians. The provision of bicycle signal heads would require permission to experiment from FHWA.

GUIDANCE

- The MUTCD recommends minimum volumes of 20 pedestrians or bicyclists an hour for major arterial crossings (i.e., volumes exceeding 2,000 vehicles/hour).
- This type of device should be considered for all arterial crossings in a bicycle network and for path crossings if other engineering measures are found inadequate to create safe crossings.
- Pushbutton actuators should be "hot" (i.e., respond immediately when pressed), be placed in convenient locations for all users, and abide by other ADA standards. Passive signal activation, such as video or infrared detection, may also be considered.
- See FHWA's Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations publication and the MUTCD to determine warrants for traffic control at mid-block crossings.

Driveways

Most bicycle facilities will need to cross streets, driveways, or alleys at multiple locations along a corridor. At these locations, the crossings should be designed to: (a) delineate a preferred path for people bicycling through the intersection; and (b) to encourage driver yielding behavior, where applicable. Bicycle crossings may be supplemented with green pavement, yield lines, and/or regulatory signs.

FIGURE 63: DIRECTIONAL SEPARATED BIKE LANE DRIVEWAY CROSSING

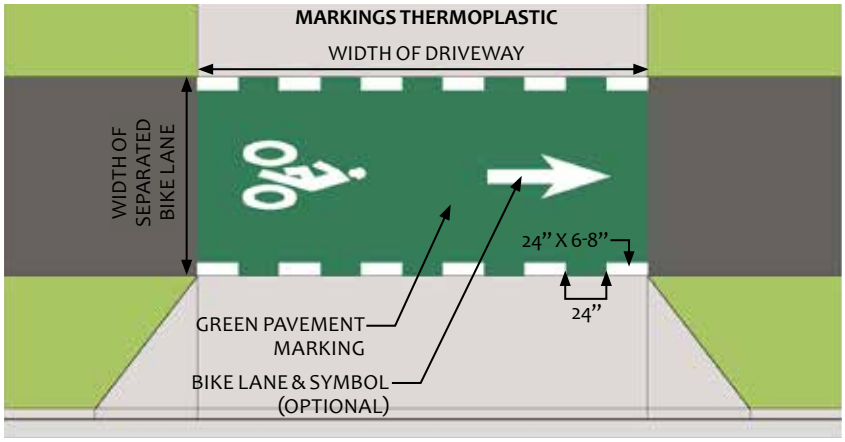


FIGURE 62: TWO-WAY SEPARATED BIKE LANE DRIVEWAY CROSSING

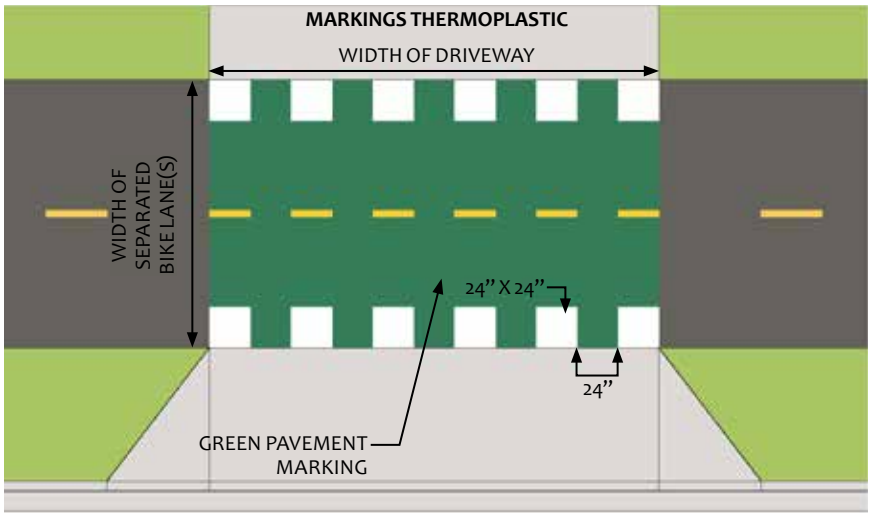


FIGURE 64: BUFFERED BIKE LANE DRIVEWAY CROSSING- A

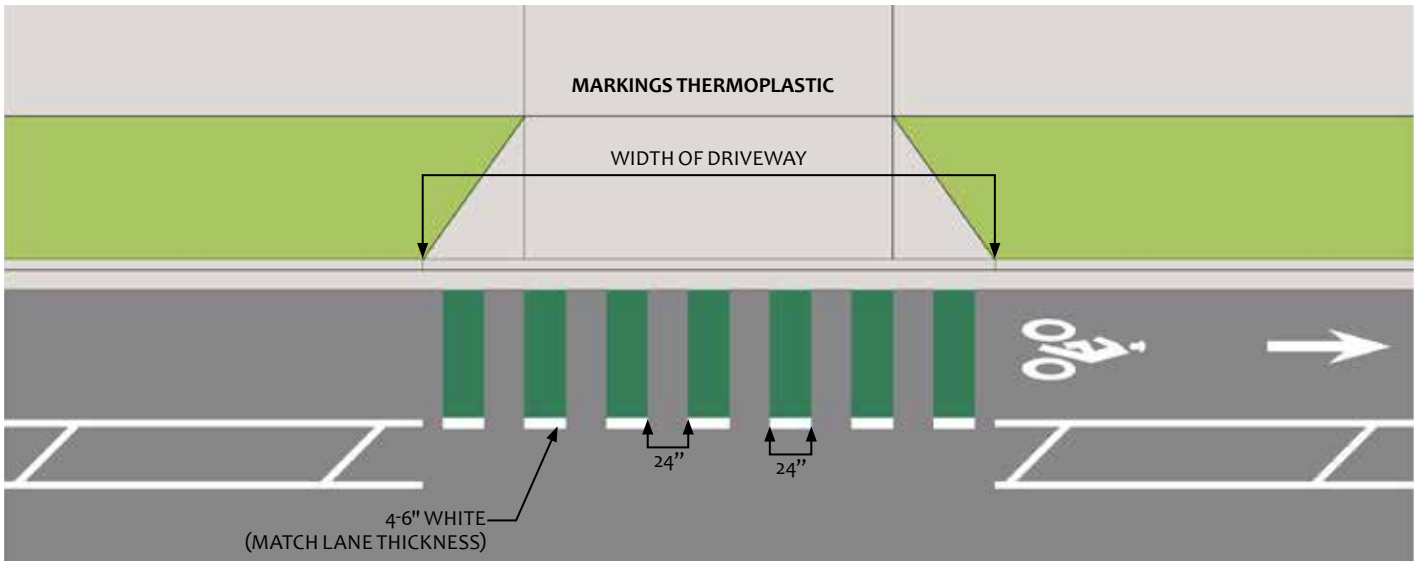


FIGURE 65: BUFFERED BIKE LANE DRIVEWAY CROSSING-B

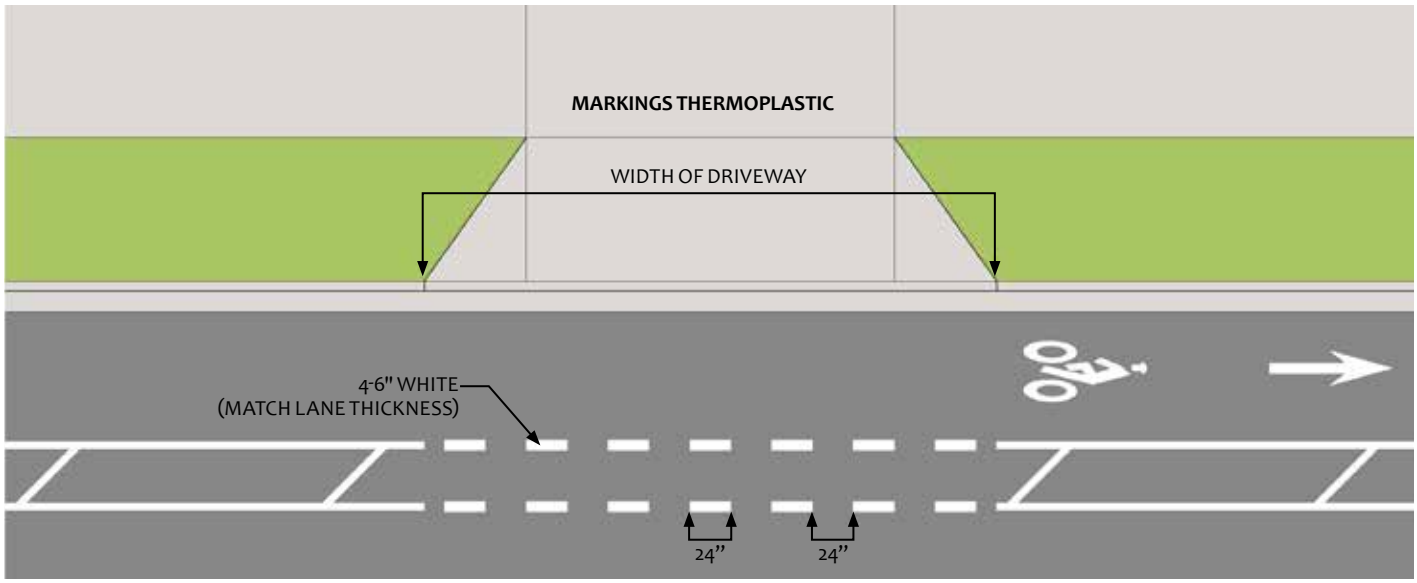
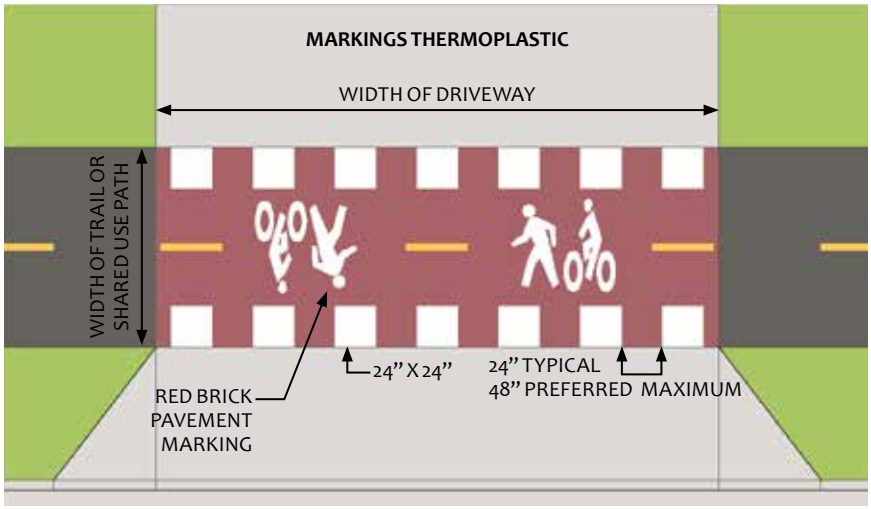


FIGURE 66: TRAIL OR SHARED-USE PATH DRIVEWAY CROSSING



DRIVEWAY GUIDANCE

- Supplemental yield lines, otherwise known as shark's teeth, can be used to indicate priority for people bicycling and may be used in advance of unsignalized crossings at driveways, at signalized intersections where motorists may turn across a bicycle crossing during a concurrent phase, and in advance of bicycle crossings located within roundabouts.
- Raised bicycle crossings further promote driver yielding behavior by slowing their speed before the crossing and increasing visibility of people bicycling.
- The bicycle crossing may be bounded by 12-inch (perpendicular) by 24-inch (parallel) white pavement dashes, otherwise known as elephant's feet. Spacing for these markings should be coordinated with zebra, continental, or ladder striping of the adjacent crosswalk.
- The bicycle crossing should be a minimum of 6 feet wide for one-way travel and 10 feet wide for two-way travel, as measured from the outer edge of the elephant's feet. Bicycle lane symbol markings should be avoided in bicycle crossings. Directional arrows are preferred within two-way bicycle crossings.
- Dashed green colored pavement may be utilized within the bicycle crossing to increase the conspicuity of the crossing where permitted conflicts occur. Green color may be desirable at crossings where concurrent vehicle crossing movements are allowed and where sightlines are constrained, or where motor vehicle turning speeds exceed 10 mph.

Transitions Between Bicycle Facilities

Facility types may vary along a roadway corridor based on land use, parking needs, right-of-way constraints and other characteristics. Additionally, a common or logical route for bicyclists may turn at an intersection. It is important to provide transitions between different types of facilities (e.g., wayfinding signage, pavement markings, turn-queue boxes).

Planning for appropriate connections and transitions between facility types should be conducted as a part of network planning. It is important that facilities have logical termini and a network is planned that serves a range of users. Enhance visibility with green pavement markings and/or bicycle symbols at conflict locations. Two-stage left turn movements can be accommodated using two-stage turn queue boxes. These movements can be easier for some bicyclists to execute. Two-stage left turns may be more comfortable for many bicyclists because the maneuver does not require waiting for gaps in the adjacent same-direction traffic stream before merging laterally to reach a left-turn lane.

FIGURE 67: TRAIL TO STREET-LEVEL BICYCLE LANE TRANSITION-A

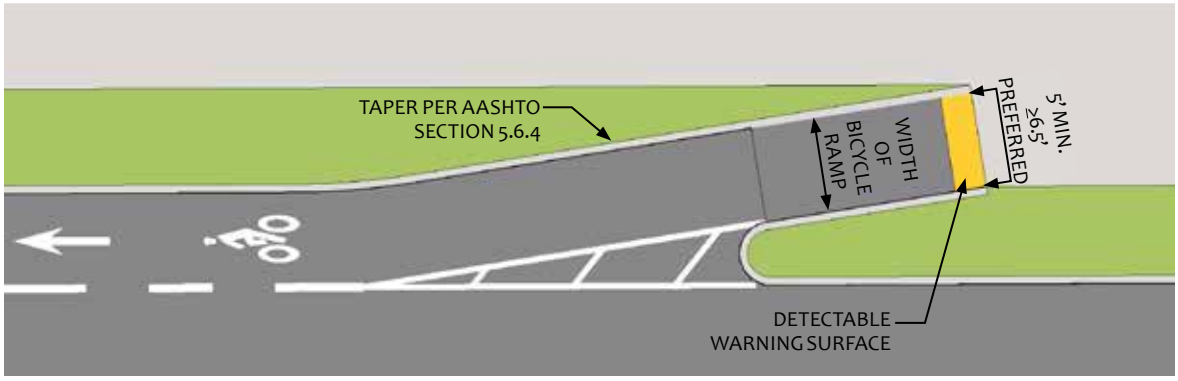
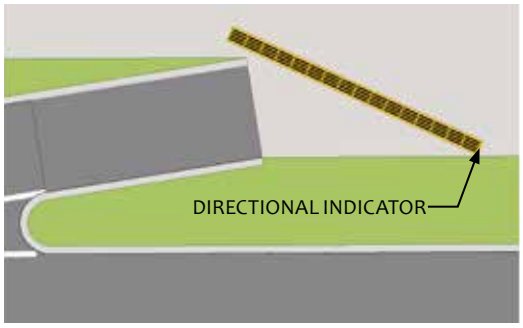


FIGURE 68: TRAIL TO STREET-LEVEL BICYCLE LANE TRANSITION-B



GUIDANCE FOR TRANSITIONS BETWEEN BICYCLE FACILITIES

- Always carry bicycle facilities to a logical terminus. Specifically, designers should avoid abruptly ending facilities without considering transitions and interactions with vehicles.
- At locations where bicycle lanes transition to shared lanes, it may be desirable to provide a transition to a short segment of shared lane markings, even if the shared lane markings will not continue.
- Signage should be provided per recommendations in the latest edition of the MUTCD and AASHTO Guide for the Development of Bicycle Facilities. Pavement markings should alert motorists of the change in facility and intended shared use of travel lanes.
- Taper lengths for lane drops and transitions should follow the MUTCD and AASHTO Green Book recommendations.
- Bicycle boxes and turn-queue boxes should be placed out of vehicle paths and be wide/long enough to support multiple bicyclists queuing at intersections. Bicycle boxes should only be used where a dedicated facility is provided prior to the intersection (e.g., bicycle lane); however, queue boxes may be used at a variety of locations with or without dedicated facilities.

Bike Parking

Bicycle parking enhances the usefulness of bicycle networks by providing locations for the secure storage of bicycles during a trip. Bicycle parking enables bicyclists to secure their bicycles while enjoying the offerings of a street or patronizing businesses and destinations in the city. Bicycle parking requires far less space than automobile parking- in fact, 10 bicycles can typically park in the area needed for a single car.

Bicycle parking consists of a rack that supports the bicycle upright and provides a secure place for locking. Bicycle racks should be permanently affixed to a paved surface. Movable bicycle racks are only appropriate for temporary use, such as at major community gatherings. On-street bicycle parking is intended for short term use. Bicyclists parking overnight should utilize off-street bicycle parking facilities. Bicyclists typically find a variety of fixed objects in the street to which they lock their bicycles. These include parking meters, tree well fences, lawn fences or other objects. These objects may satisfy the need for bicycle parking, but if this is the intent, they should be designed and located with this use specifically in mind. The use of such objects for parking may indicate insufficient or inappropriately located bicycle parking facilities, create obstructions in accessible pathways, and/or result in an unsightly and disorganized street frontage.

GUIDANCE

» Bicycle racks should provide two points of support for bicycles to prevent locked bicycles from falling over.

» Bicycle rack footings can be mounted in soil, concrete, or asphalt, or mounted to stable surfaces using anchors.

FIGURE 69: BICYCLE PARKING RECOMMENDATIONS

Chapter 5 Sources:

1) https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa18077.pdf

2) https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/fhwahep17024_lg.pdf

3) https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/background/regulatory-assessment/accessible-pedestrian-signals-and-pedestrian-pushbuttons

4) https://nacto.org/wp-content/uploads/2015/04/AASHTO_Bicycle-Facilities-Guide_2012-toc.pdf

APPENDIX

A

Plan & Policy Review

This Appendix includes a detailed review of previously adopted planning documents with consideration of how each plan addresses the performance measures identified in *Connecting Bentonville*.

TABLE A-1: DETAILED PLAN REVIEW

	Total bicycle network mileage to total street network mileage	Short trip mode share	Quality of Low-Stress Network	Pedestrian and Bicycle Crashes (Safety)	Sidewalk Gaps
LOCAL PLANS					
Bentonville Bike and Pedestrian Plan (2012) [1]	2011 Existing Facilities • 20.3 miles of bike routes • 37.76 miles of trails	• (P) Coordinate the trail and bicycle network with the public transit system (ORT)	• (P) Support the regional trail system • (P) Ensure that signage along the routes and in key areas are highly visible and user friendly. • (P) Encourage low-maintenance landscaping along trails. Design trail landscaping with maintenance in mind. • (P) Encourage trail users to clean up after pets by providing pet waste stations and signage. • *(P) The connected active transportation network should consist either of a multi-use trail, or an on-road bike route plus pedestrian connectors.* • (P) Bike routes should be marked with a bike route sign indicating the route and direction to other routes, and have on-pavement shared route markings in the form of a sharrow. • (A) Identify existing sidewalk access around schools and create a plan for adding or repairing sidewalks within ½ mile of schools. • (A) Review and make a determination of the need for lighting along off-road trails. • (A) Identify and address crosswalk needs and improvements. • (A) Specific trail connectors are identified in Goal 6 (28.89 miles, minimum).	• (P) The safety of pedestrian and bicyclists should be accommodated in all street improvement projects. • (A) Monitor crash statistics and develop strategies to reduce opportunities for shared user conflicts.	
Bentonville Bike and Pedestrian Plan Update (2015) [1]	2015 Existing Facilities • 26.9 miles of shared roadways (routes and sharrows) • 42.33 miles of trails	• (P) Coordinate the trail and bicycle network with the public transit system (ORT)	• (P) Support the regional trail system • (P) Ensure that signage along the routes and in key areas are highly visible and user friendly. • (P) Encourage low-maintenance landscaping along trails. Design trail landscaping with maintenance in mind. • (P) Encourage trail users to clean up after pets by providing pet waste stations and signage. • (P) Bike routes should be marked with a bike route sign indicating the route and direction to other routes, and have on-pavement shared route markings in the form of a sharrow. • (P) Continue developing safe routes to schools, parks and other local destinations. • (A) Develop and implement streetscape design guidelines that foster a pleasant and comfortable environment for pedestrians and bicyclists. • (A) Specific trail connectors are identified in Goal 6 (28.69 miles, minimum).	• (P) The safety of pedestrian and bicyclists should be accommodated in all street improvement projects. • (A) Monitor crash statistics and develop strategies to reduce opportunities for shared user conflicts. • (A) Hold an annual meeting with police, planners, and engineers to evaluate collision trends, infrastructure needs and areas for targeted enforcement.	• (P) Continue developing sidewalks with new development and filling in gaps as necessary. Continue integrating shared use paved trails and sidepaths as part of pedestrian network improvement where feasible.
Master Street Plan (2008)					• Not specifically addressed; all cross sections for new construction include provisions for sidewalks

Vehicle Speed Reduction (similar to safety)	Bicycle-friendly ordinances and policies	Providing low-stress bikeways along high-speed streets	Bikeways and Sidewalks on Priority Streets (connecting a lot of destinations)	Share of Transportation budget dedicated to Bike/Ped	Other Notes from Plan Reviews
• (P) Continue to use traffic calming measures as a way to slow down vehicle traffic and increase safety for bicyclists and pedestrians.	• (P) Encourage and promote commuter and recreational bicycling, walking and running. • (P) Enforce unsafe and unlawful bicyclists and motorist behavior. • *(A) Seek additional funding for bicycle and safety education. Alternative funding, through AHTD (sic), grants and loans can leverage the city's budget.* • (A) Establish practices to educate motorists and bicyclists about sharing the road. • *(A) Develop and maintain a city-operated bike share program.*	• (A) Study the feasibility of an at-grade crossing at 3rd and Walton Blvd. • (A) Add improved signals and signage at the intersection of Tiger and Walton Blvd.	• (P) The Bicycle and Pedestrian Master Plan should be used to consider priorities for street resurfacing, reconstruction and streetscape projects. • (A) Specific on-road bicycle routes are identified in Goal 7 (6.36 miles).	• (A) Include trail projects in all Capital Improvement Planning. • (A) Establish an annual budget amount earmarked for trail design and construction. • (A) Review and seek grant opportunities for trail design, construction, enhancement, improvements and education.	
• (P) Continue to use traffic calming measures as a way to slow down vehicle traffic and increase safety for bicyclists and pedestrian (sic), particularly where narrow roadway corridors limit sidewalk development or separated bikeways.	• (P) Encourage and promote commuter and recreational bicycling, walking and running. • (P) Enforce unsafe and unlawful bicyclists and motorist behavior. • (A) Consider adopting a complete streets policy. • (A) Establish practices to educate motorists and bicyclists about sharing the road. • (A) Maintain and expand the city-operated bike share program. • (A) Work with employers to identify end user needs at the facilities and establish programs that support and encourage bicycle commuters.	• (P) Continue making intersection improvements as the bicycle and pedestrian network develops, especially at key crossing points of Walton Boulevard, J Street, and other high speed, high traffic volume corridors. Innovative intersection treatments should be implemented as needed. • (P) Consider a raised crossing, grade separated crossing, or high visibility treatment where a shared use paved trail crosses a medium or high traffic road. • (A) Continue to work with AHTD (sic) to execute bicycle and pedestrian planning on state roadways through Bentonville.	• (P) The Bicycle and Pedestrian Master Plan should be used to consider priorities for street resurfacing, reconstruction and streetscape projects. • (A) Specific on-road bicycle routes are identified in Goal 7 (4 miles).	• (A) Include trail projects in all Capital Improvement Planning. • (A) Establish an annual budget amount earmarked for trail design and construction. • (A) Review and seek grant opportunities for trail design, construction, enhancement, improvements and education.	• (P) Improve connectivity to the south and west sides of the city. • (A) Establish a walking, bicycling and trails report card.
		• Reflects the Master Trail Plan	• The 2008 Master Street Plan reflects preferred design alternatives along specific routes in accordance with the Master Trail plan and the Downtown Master Plan	• None specifically dedicated to bicycle and pedestrian facilities or improvements.	• "Standard" and "Boulevard" cross sections include sidewalks on each side of the street, but not on-road bicycle facilities • "Trail" cross sections depict an 8'-10' separated trail parallel to the street • The "Urban" cross section depicts a 13' sidewalk on each side of the street • "Trail" and "Urban" cross sections list specific routes in accordance with the Master Trail Plan and Downtown Master Plan

TABLE A-1: DETAILED PLAN REVIEW CONTINUED

	Total bicycle network mileage to total street network mileage	Short trip mode share	Quality of Low-Stress Network	Pedestrian and Bicycle Crashes (Safety)	Sidewalk Gaps
LOCAL PLANS					
Bentonville Minimum Standard Specifications for Streets (2006)					• Applicable to streets identified in the City of Bentonville Master Trail Plan or as directed by the City.
North Walton Blvd Corridor Enhancement Plan (2013)					
Bentonville Community Plan (2018)	• "Guided by the 2015 Bike and Pedestrian master Plan, approximately 70 miles of new trails, sidepaths, and shared or separated on-road facilities have been added, representing a 400% collective increase in trail, path, and lanes since 2006."	• Of the 46,723 people who work in Bentonville: o 57% commute less than 10 miles to work o 25% commute 10-50 miles o 18% commute more than 50 miles	• Recommends designating bike routes or bike lanes in "Areas of Neighborhood Stability" • Recommends adequate right-of-way for on-street bike routes or dedicated bikeways in "Areas of New Neighborhood Investment" • Extension of the Razorback Greenway near the future Walmart Home Office • Relocation of east-west trail in downtown to the former rail right-of-way south of the historic train station building • Recommends provision of enhanced pedestrian crossings along arterial corridors (crosswalks, signal phasing, ADA compliance, refuge islands) • Recommends restriping local roadways to include on-street bike lanes or extend sidewalks to create sidepaths • Recommends requiring logical connections to existing roadway, trail, and sidewalk systems. • Extend South Bentonville Trail to the Razorback Greenway		• Recommends completing sidewalks in "Areas of Neighborhood Stability" • Recommends completion of sidewalk network along South Walton Blvd • Recommends sidewalk construction and sidewalk infill in neighborhoods • Recommends prioritizing construction of sidewalks and accessible crosswalks around parks and open spaces
Downtown Bentonville Master Plan (2004)		• Proposed the development of a Trolley Route incorporating the square, Walmart Home Office and Bentonville Plaza, and SW A Street.	• Proposed A Downtown Trail from the Walmart General (sic) Office to Compton Gardens, then continuing further north to connect to the North Bentonville Trail • Recommended to better identify a Heritage Trail and Trail of Tears Route		• A partial downtown sidewalk inventory was completed as part of this plan. A full inventory was recommended.
SE Downtown Area Plan (2014)		• Recommends ensuring that transit stops are available within residential areas.	• Proposes a trail connection from the Market District to the Arts District (now completed) • Proposes bike/ped connections along 6th Street (sidewalks completed) • Recommends identifying corridors appropriate for sharrows or bike lanes		• Recommends "Construct sidewalks in areas where missing. Top priority should be connecting the experience districts and the square, then radiate out from those primary connections." • Recommends repair of existing sidewalks

Vehicle Speed Reduction (similar to safety)	Bicycle-friendly ordinances and policies	Providing low-stress bikeways along high-speed streets	Bikeways and Sidewalks on Priority Streets (connecting a lot of destinations)	Share of Transportation budget dedicated to Bike/Ped	Other Notes from Plan Reviews
			• Sidewalk construction applicable to streets identified in the City of Bentonville Master Trail Plan or as directed by the City.		
		• The plan recommends a green public space along the west side of the corridor with a street tree canopy, decorative street lights, wayfinding signage, and a reduced visual impact of overhead power lines. • The plan recommends 6' wide (minimum) sidewalks on both sides of the road. • It also recommends boulevard sections and enhanced intersections to create safe crossing points for pedestrians.			• Since the 2013 plan, a 10' sidepath has been constructed along the west side of N Walton Blvd from West Central Ave to Ridgefield (the plan study area), extending north of the study area to Wishing Spring Trail as well as south of the study area to SW I Street. Wayfinding signage has been added, as well as intermittent street trees along the west side. Sidewalks have not been added along the east side of N Walton (beneath the power lines).
	• Recommends supporting multi-modal access to goods, services, and jobs, including transit and bike/ped connections		• Proposes modifications to planned pedestrian facilities along 8th Street near A and Main Streets		• Recognizes and integrates recommendations from 2015 Bike and Pedestrian Master Plan
					• Tasks: Establish pedestrian count benchmarks for future measurement

TABLE A-1: DETAILED PLAN REVIEW CONTINUED

	Total bicycle network mileage to total street network mileage	Short trip mode share	Quality of Low-Stress Network	Pedestrian and Bicycle Crashes (Safety)	Sidewalk Gaps
REGIONAL PLANS					
NWARPC Walk Bike Northwest Arkansas (2015) [2]	• (PM) Include total miles of facilities in annual report (total miles of bike lanes and linear feet of sidewalk) • (PM) Complete 10 catalyst projects by 2020, and the final 10 (20 total) by 2025 • (PM) Complete the next 10 catalyst projects by 2020	• (PM) Increase the bicycling and walking mode share from 2.75% to 5.00% by 2020 • (BCAP) Bentonville is connected to Ozark Regional Transit route 11 with three stops throughout Bentonville. Bicycle parking, infrastructure connectivity, and other amenities should be considered here.	• (PRR) Expand bike parking mandates and incentives to private developments to increase the density and number of bicycle parking spaces • (PRR) Establish regional trail wayfinding program and provide guidance on placement, standard design and relevant destinations • (PRR) (POR) Develop a regional safe routes to school program • (POR) Adopt the design guidelines developed for this Plan • (POR) Establish a connectivity policy, pedestrian-friendly block length standards and connectivity standards for new developments, and convenient pedestrian access requirements • (POR) Ensure that planned greenways are referenced as part of the land development process so that the right-of-way for planned greenways can be preserved through purchase or dedicated easements • (POR) Work with AHTD (sic) to develop model programs for Arkansas • (BCAP) Improve connectivity to the south and west sides of Bentonville in particular • (BCAP) The Heritage Trail connects through the heart of Bentonville along AR 72, connecting Bentonville with Centerton and Pea Ridge. A southwest branch following I Street, AR 12, and AR 112 also connects through Bentonville.	• (PM) Reduce bicycle and pedestrian crashes by 50% by 2020 • (PM) Move toward 0 bicycle and pedestrian fatalities by 2020 • (PRR) Develop and implement regional bicycle and/or pedestrian safety education campaigns, with a goal of reducing the frequency and severity of bicycle and pedestrian involved crashes • (PRR) Based on crash data analysis and observed patterns of behavior, use consistent targeted enforcement to focus on key violations • (PRR) Educate police on current bike/pedestrian laws, common collision types, and community education programs • (PRR) Review protocols for properly completing collision forms when pedestrians and bicyclists are involved in a collision • (PRR) Coordinate with state agencies to address safety issues on State and US highways. The crash analysis conducted as part of this Plan indicates that approximately ¼ of crashes involving bicyclists and more than 1/3 [of] crashes involving pedestrians occur on state or US highways. • (POR) Adopt policy requiring the collection of data related to pedestrian/bicycle-vehicle crashes, traffic volumes and motor vehicle speeds on existing or future corridor improvement projects.	• (POR) Adopt policy requiring sidewalks on both sides of arterial and collector streets. • (BCAP) Continue developing sidewalks with new development, continue filling sidewalk gaps as necessary, continue integrating shared use paved trails and sidepaths
Northwest Arkansas Open Space Plan					
2035 NWA Transportation Plan (2011 NWARPC	• Chapter V, pages 21-24 shows completed trail segment with total miles by each city in NWA between 2006 – 2011.	• Park and ride transfer locations are listed in Chapter V, pages 70-71. They do not address last mile or specific bicycle connectivity but some of those locations may be near the Razorback Greenway.			• AHTD sidewalk policy with graphic is shown in Chapter V, page 26.
2040 Metropolitan Transportation Plan (2016) - NWARPC	• As of March 23rd, 2016 the NWA Trail counts in miles were as follows: o Shared Use Paved Trail = 107.7 o Protected Bike Lane = 1.0 o Bike Lanes = 18 o Shared Roadway = 14.5 o Neighborhood Park Trail = 22 o Natural Surface = 143.3 o Sidewalk = 1408.9 o Total = 1715.4 miles	• Chapter 9: Ozark Regional Transit received a $2.9 mil. Grant in 2018 to improve safety and accessibility at its operations center. It does not state if some of those funds were directed toward pedestrian facilities.	• NWARPC has worked toward development of regional policies and a Model Access Management Ordinance. Page 8-8 provides overview and Appendix C has the ordinance	• As of March 23rd, 2016 the NWA Number and Severity of bicyclist and Pedestrian Crash data for 2009-2013 was 168 bicycle and 189 pedestrian. A chart provides a further breakdown level of severity.	
NWARPC Congestion Management Process Update (2014)					
NWA Transportation Alternatives Analysis (2014)					

Vehicle Speed Reduction (similar to safety)	Bicycle-friendly ordinances and policies	Providing low-stress bikeways along high-speed streets	Bikeways and Sidewalks on Priority Streets (connecting a lot of destinations)	Share of Transportation budget dedicated to Bike/Ped	Other Notes from Plan Reviews
• (BCAP) Traffic calming measures should be considered where narrow roadway corridors limit sidewalk development and/or separated bikeways • (BCAP) Continue making intersection improvements as the bike/ped network develops, esp. at key crossing points of Walton Blvd, J St., and other high speed, high traffic volume corridors. • (BCAP) Consider a raised crossing, grade separated crossing, or a high visibility treatment where a shared use paved trail crosses a medium or high traffic road	• (PM) Add 5th grade bicycle safety education to three new schools each year • (PM) Distribute 1,000 copies of bicycle route map (sic) each year and post it online	• (PRR) (POR) Adopt complete streets policy language • (BCAP) Separated Bikeway/Shared Roadways – due to many roads characterized by higher traffic volumes and speeds and narrow roadway corridors, most bicycle and pedestrian improvements should include separation from the road accompanied by wide buffers and landscaping where feasible.	• (BCAP) C Street: Develop separated bicycle and pedestrian [facilities] along C Street, connecting downtown Bentonville to Bentonville Elementary, Middle, and High Schools as well as Phillips Park, Walton Blvd, the Community Center, and south Bentonville. • (BCAP) 8th Street: Sidepath development is scheduled, making a key connection from Moberly Lane to Walton Blvd • (BCAP) Walton Blvd: Shared use paved trail and sidepath development is also scheduled along Walton Blvd, connecting the Bark Park trail, Tiger Blvd, and continuing south to Central Ave. • (BCAP) 2nd Street: Develop sidepath connection west along 2nd Street from Walton Blvd to Centerton, providing a connection to Centerton, Elm Tree Elementary School, and McKisic Creek • (BCAP) McKisic Creek: Develop shared use paved trail connection along McKisic Creek, eventually connecting downtown Centerton to west Bentonville, Lake Bella Vista, the Blowing Springs trails, and the Razorback Regional Greenway • (BCAP) Community Center Connection: Develop shared use paved trails/sidepaths linking the Community Center, south Bentonville, Walton Blvd commerce, Phillips Park, Northwest Medical Center, and the Razorback Regional Greenway	• (PRR) Identify additional funding for bicycle and pedestrian projects • (PRR) Develop a regional bicycle and pedestrian report card (annual or bi-annual) to measure investments and track progress over time • (PRR) Develop reports to document how trails impact local economies, which can help make the case for continued investment in these natural spaces	• (PRR) NWARPC to convene non-motorized transportation training for engineers and planners across the region • (PRR) Include bicycle and pedestrian facilities in standard roadway details. Use Complete Streets Cross Sections (sic) of the design guidelines to update the Regional Transportation Plan and local Master Street Plans. • (PRR) Evaluate current state and regional transportation planning policy to ensure land use is considered in concert with transportation • (PRR) Develop regional safe routes to school program • (PRR) Organize annual League Certified Instructors (LCI) training programs • (PRR) Organize LAB Smart Cycle classes, led by LCIs to educate the general public • (PRR) Develop a planning and design studio to educate college students on active transportation planning, engineering, and design concepts and professions • (PRR) Convene police, planners and engineers to share their unique perspectives to develop comprehensive strategies for enhancing pedestrian and bicycle safety • (PRR) Establish a regional bicycle, pedestrian and trail count program to allow for the analysis of trends in walk and bike activity across the region • (POR) Update materials to educate motorists, pedestrians and cyclists on their rights and responsibilities as road users
					• Document references the value of the Razorback Greenway on page 108 but no bicycle and pedestrian policies or considerations.
	• AHTD policy regarding bicycle lanes and sidewalks shown in Chapter V, page 8. o On-street bike route: Add 2' to each outside lane for bicycle safety (4' total) OR add 8' total to ROW for 4'-5' striped bicycle lanes o Sidewalks: 5' sidewalk with 3' buffer between roadway and sidewalk			• Funding alternatives for Federal and State sources are listed in Chapter V, pages 27-28	• Chapter VII provides plan recommendations for bicycle and pedestrian facilities on page 1. These are continuations of current programs and funding options. Page 2 addresses transportation alternatives but only focuses on rail and bus transit.
				• Page 9-5 shares projected Transportation Alternative Program (TAP) estimated funds from 2016-2040. Projection is a statewide amount accounting for 3% annual inflation. • Page 10-27 lists all municipalities that received AHTD grants in 2015 for TAP, RTP and SRTS projects. The grant total of all was $2.6 mil.	• Document contains a sample Complete Street resolution for NWA on page 8-4. TOD section on Page 8-23 discusses the financial benefits of Transit Oriented Development but does not mention how bicycle and pedestrian usage fits into this scenario.
					• Document focuses on vehicular travel data, analysis, programs, strategies and evaluations. No mention of bicycle and pedestrian safety or management.
					• Document focuses on commuter rail and bus modes of transit with no mention of last mile bicycle and pedestrian option or any info on trailhead locations.

TABLE A-1: DETAILED PLAN REVIEW CONTINUED

	Total bicycle network mileage to total street network mileage	Short trip mode share	Quality of Low-Stress Network	Pedestrian and Bicycle Crashes (Safety)	Sidewalk Gaps
REGIONAL PLANS					
NWA Transit Development Plan (2010)					
Hwy 112 Corridor Study (2015)					
NWA Eastern North-South corridor Study (2011)					
NARTS TIP (2018)				• Number of non-motorized fatalities and serious injuries for 2008-2016 found on Attachment C-5	
STATEWIDE PLANS					
AR Bicycle and Pedestrian Transportation Plan (2017)	• Four Bike Network Tiers Identified: o Tier 1 – U.S. Bicycle Routes o Tier 2 – Arkansas State Bicycle Routes o Tier 3 – Shared-Use Paths of Regional and Statewide Significance o Tier 4 – Bicycle Hub Communities and Mountain Bicycling Venues • Objective 5: Develop a Statewide Bikeway Network using a tiered system that coordinates and connects to the US Bicycle Route Numbering System.		• (NWA Regional "High" or "Highest" Level of Concern) Bicycle access to recreational destinations • (NWA Regional "High" or "Highest" Level of Concern) Bicycle access to utilitarian destinations • (NWA Regional "High" or "Highest" Level of Concern) Trail design guidelines • (NWA Regional "High" or "Highest" Level of Concern) Addressing the barrier effect of Interstate highways	• (NWA Regional "High" or "Highest" Level of Concern) Include bicyclists and pedestrians in the Toward Zero Deaths campaign • Objective 1: Enhance laws and policies, enforcement, and local empowerment to promote alternative transportation and increase safety. • Objective 7: Further integrate bicycle and pedestrian safety into the Toward Zero Deaths campaign.	• (NWA Regional "High" or "Highest" Level of Concern) Sidewalks [network of], especially in cities and suburbs
AR Transit Coordination Plan (2018)					

The major goal is that we have reviewand identified if and how (when applicable) the plan speaks to the performance measures that the steering committee has noted as most important. I do not believe that every cell in unless the point is directly speaking tœ performance measure.

Bentonville Bike and Pedestrian Plans(A) = Action

NWARPC Bike Walk Northwest Arkarerformance Measure; (PRR) = Program Recommendation; (POR) = Policy Recommendation; (BCAP) = Bentonville Community Action Plan

Vehicle Speed Reduction (similar to safety)	Bicycle-friendly ordinances and policies	Providing low-stress bikeways along high-speed streets	Bikeways and Sidewalks on Priority Streets (connecting a lot of destinations)	Share of Transportation budget dedicated to Bike/Ped	Other Notes from Plan Reviews
					• No bicycle and pedestrian policies or considerations. No mention of last mile accommodations near TOD locations and no mention of bicycle & ped safety issues or recommendations.
					• Planning Considerations: Bicycle & Pedestrian – Acknowledges the nearby Razorback Greenway that promotes recreational activity and alternate travel mode choices. States the following: "Improvements to the plan should accommodate bicycle and pedestrians"
					• Document focuses on north-south vehicular movement with no considerations or policies for bicycle and pedestrian facilities.
				• NARTS TIP projects funded in the fiscal years 2019-2022 shown in Appendix F – trail projects on page 11. $1.875 million ($1.5 million RTP, $375,000 Local)	
	• (NWA Regional "High" or "Highest" Level of Concern) Safety education for motorists, bicyclists, and children • Objective 8: Provide leadership and support for public education and policy advocacy that relate to the built environment.	• (NWA Regional "High" or "Highest" Level of Concern) Safe bikeways on urban arterials • (NWA Regional "High" or "Highest" Level of Concern) Recognition and support for bicycling and walking as legitimate and important modes of travel on State and local roadways • (NWA Regional "High" or "Highest" Level of Concern) Routine accommodation guidelines on bridges and roads • (NWA Regional "High" or "Highest" Level of Concern) Improved roadway and shoulder maintenance • (NWA Regional "High" or "Highest" Level of Concern) Use of new road designs and treatments/context sensitive design • Objective 4: Review of the bicycle and pedestrian accommodation guidelines for Arkansas highways. Actions include shoulder width design guidelines based on posted speeds, appropriate bike/ped accommodations, the use of		• Objective 2: Sustain and continue to improve the bicycle and pedestrian program in Arkansas. Actions include investigating guidelines on how agencies will coordinate with communities that have adopted bike/ped plans or complete streets policies, exploring the use of innovative or non-traditional funds, and exploring a small project funding program • Objective 3: Consider innovative or non-traditional funding sources.	• Objective 6: Research and develop marketing strategies to be used at the state, regional, and local levels
					• Benton County has a "low need" for public transportation providers, per the Transportation Needs Index. Benton County has the fourth lowest "need" of all 75 counties. • Benton County has 4 transit providers at a ratio of 3.27 vehicles per 10,000 persons (seniors and persons with disabilities, only)

the matrix will be filled but when notes are placed in the cell for an individual plan, it is completely fine to put an introductory sentence followed by a few bullet points. I do not believe we should quote other plans

Statewide Bicycle Policies

TABLE A-2: ARKANSAS BICYCLE POLICIES

CATEGORY	POLICY I.D.	DESCRIPTION
Rights and Duties of Cyclists	§§27-49-219; 27-49-111	Bicycles are not considered vehicles under Arkansas state law (§27-49-219). However, cyclists have all of the rights and all of the duties applicable to drivers of motor vehicles (§27-49-111).
Distracted Driving	Act 738	In July 2019, the state of Arkansas updated SB534 to make it illegal to text or use cell phone data while driving. Drivers under 18 are prohibited entirely from using a cellphone while driving, drivers 18 to 21 years old are allowed to use hands-free technology while driving, and drivers 21 years and older are permitted to talk on the phone while driving (except when driving though a school or highway work zone).
E-Bikes	Act 957	As of 2017, Arkansas state law defines three types of e-bikes and regulates their use. An e-bike is a bike with pedals and a motor capable of putting out no more than 750 watts. Class 1 - an e-bike equipped with a motor that provides assistance only when the operator is pedaling and that ceases to provide assistance when the e-bike reaches 20mph Class 2 - an e-bike equipped with a motor that may be used exclusively to propel the e-bike and that is incapable of providing assistance when the e-bike reaches 20mph Class 3 - an e-bike equipped with a motor that provides assistance only when the operator is pedaling and that ceases to provide assistance when the e-bike reaches 28mph Class 1 and Class 2 e-bikes are allowed wherever regular bicycles are allowed, whereas Class 3 e-bikes are only allowed on roadways (except in special circumstances).
Reflective Equipment	§27-36-220	All bikes must be equipped with a front white light and a rear red light visible from a distance of at least 500 feet. A red reflector may be used in lieu of a rear light.
Passing a Cyclist	§27-49-111	Motorists wishing to pass a cyclist proceeding in the same direction on a roadway must do so at a distance of not less than three (3) feet.
Signaling	§§27-51-403; 27-49-111	§27-51-403 is another instance of a law that technically applies only to vehicles. However, in accordance with §27-49-111, cyclists should also comply. As such, cyclists must indicate their intention to turn left, turn right, stop, or slow down by using the appropriate hand signals, unless it is unsafe to do so (e.g., if a pothole impels you to keep both hands on the bars).
"Idaho Stops"	Act 650	As of April 2019, people on bikes in Arkansas can begin treating stop signs as yields and red lights as stop signs. The law requires bicycle riders to slow down when approaching a stop sign, but they don't have to stop unless it's necessary. Cyclists must yield to any pedestrians who might be at the intersection. Regarding red lights, the cyclist must come to a complete stop, but may proceed through the intersection once traffic is clear.

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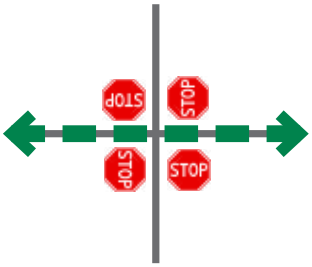
APPENDIX

B

Infrastructure Inventory

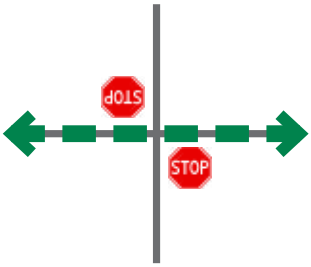
This Appendix contains additional inventory of existing pedestrian and bicycle infrastructure in Bentonville. A list of various local and statewide policies that affect bicycling is also included.

Intersection Types



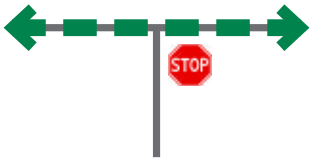
ALL-WAY STOP

Traffic stops in all directions. Bikeway proceeds through intersection or turns.



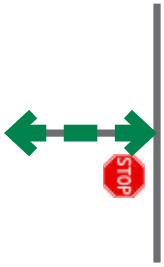
2-WAY STOP

Two directions of traffic stop (usually two side streets converging at an intersection). Bikeway proceeds through intersection with no stop.



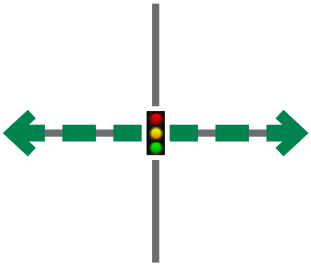
SIDE STREET STOP

A side street stops and ends at an intersection. Bikeway proceeds along primary street without a stop.



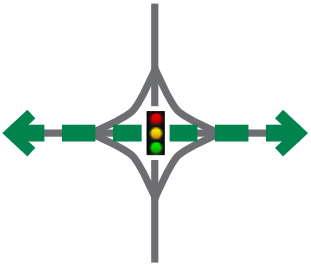
STOP

Bikeway traverses a street that stops or ends at another road. Stop is required and direction of travel changes.



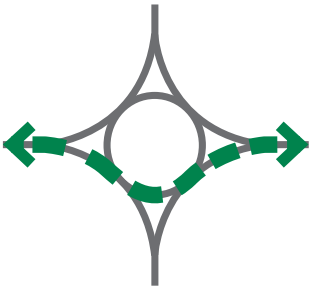
SIGNAL

Signalized intersection. All directions of travel stop. Bikeway proceeds through intersection.



SLIP LANE

Intersection of one-way right turn slip lanes through an intersection, typically at a signalized intersection or highway entrance or exit ramps.



ROUNDABOUT

Bikeway proceeds through a roundabout or traffic circle.

FUTURE

Future intersection not yet constructed. Typically the intersection of a future trail with street. Occasionally, these occur along streets that are planned but not yet constructed and will include future bicycle facilities.

INTERSECTION TYPE FINDINGS

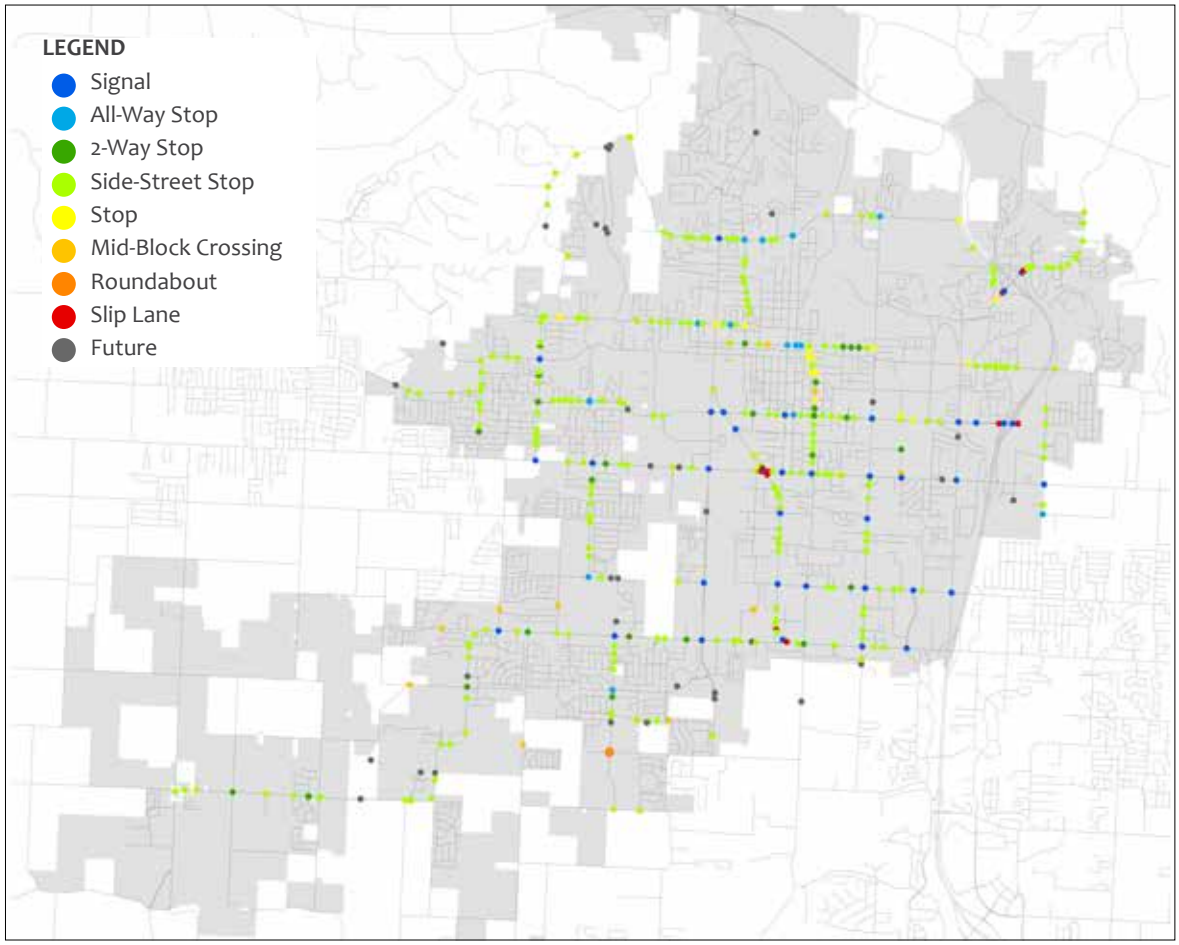
Intersections along the Primary Bikeway and Future Greenway networks have been inventoried by intersection type, refer to the previous page for details. Two "intersections" along the Primary Bikeway network were not classified, since they were endpoints along a route and not a formal intersection.

The majority of intersections are "side street stops", or side streets which intersect the primary street on one side only. 35 intersections will be created as the bicycle and pedestrian network is built out.

TABLE A-3: INTERSECTION COUNTS

INTERSECTION TYPE	COUNT
All-Way Stop	15
2-Way Stop	27
Side Street Stop	262
Stop	16
Signal	37
Slip Lane	10
Roundabout	4
Future	35

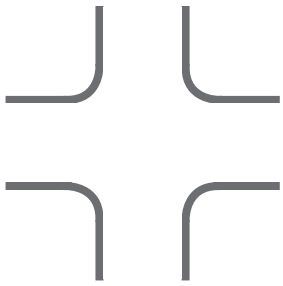
FIGURE A-1: INTERSECTION TYPES



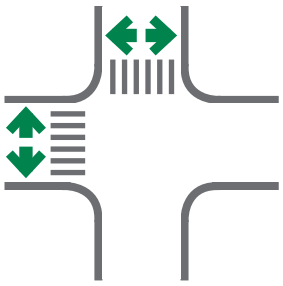
Intersection Scoring

CROSSWALK COUNTS

Crosswalks were scored from 0-4, with a single value assigned for each direction of travel accommodated.



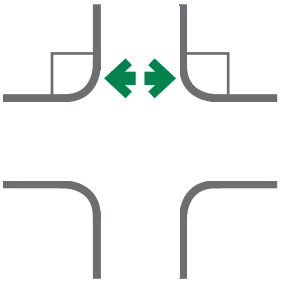
CROSSWALK VALUE = 0



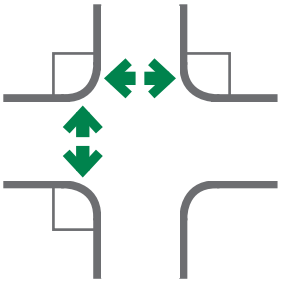
CROSSWALK VALUE = 2

CURB RAMP COUNTS

Curb ramps scores range from 0-4, with a single value assigned for each direction of travel accommodated.

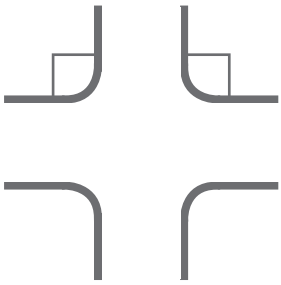


CURB RAMP VALUE = 1

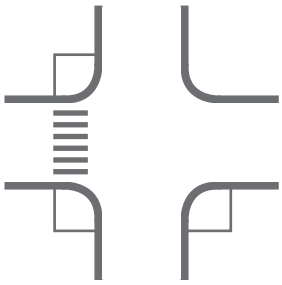


CURB RAMP VALUE = 2

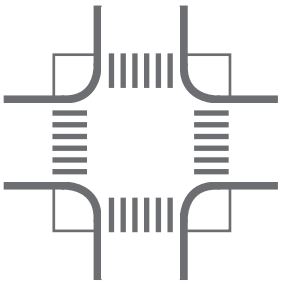
EXAMPLES



CROSSWALK VALUE = 0
CURB RAMP VALUE = 1



CROSSWALK VALUE = 1
CURB RAMP VALUE = 2



CROSSWALK VALUE = 4
CURB RAMP VALUE = 4

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APPENDIX

Priority Projects

This Appendix provides a complete list of priority pedestrian and bikeway projects categorized by priority tier.

Pedestrian Projects

At an open house event, the public was invited to vote on the commute zones they felt should be first, second, and third priority for the City of Bentonville. These results impacted which commute zones were considered for early action projects. Table A-4 shows public opinion for commute zone priorities.

TABLE A-4: PUBLIC RANKINGS FOR PEDESTRIAN COMMUTE ZONE PRIORITY

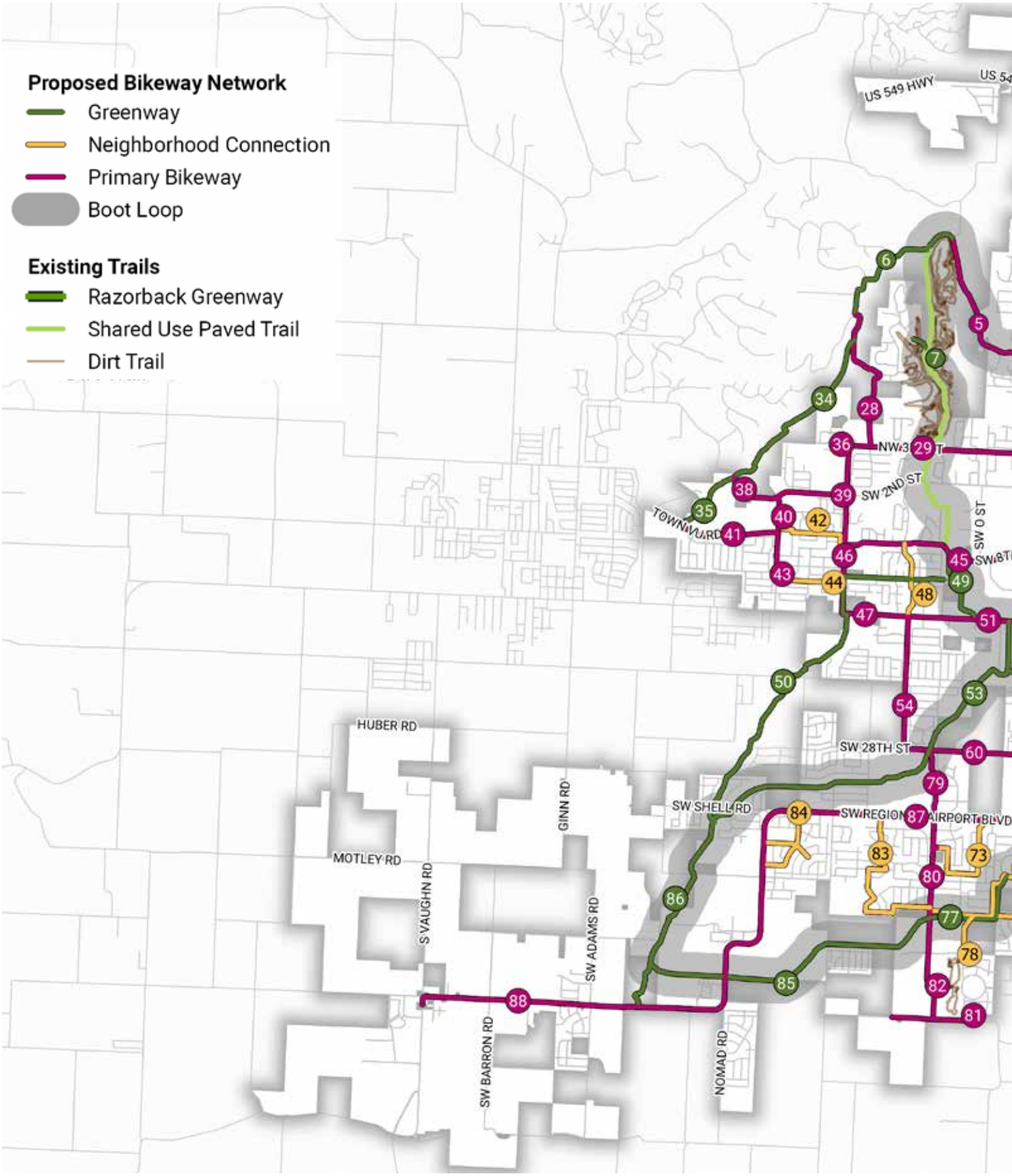
COMMUTE ZONE	1ST PRIORITY (# OF VOTES)	2ND PRIORITY (# OF VOTES)	3RD PRIORITY (# OF VOTES)
8th Street Market and Momentary	7	5	6
Apple Glen Elementary School	8	8	3
Ardis Ann Middle School	2	0	3
Bentonville High School	3	1	3
Brightfield Middle School/ Willowbrook Elementary School	6	6	4
Central Park Elementary School	1	0	1
Crystal Bridges	2	1	2
Downtown Square	5	10	11
Elm Tree Elementary School	3	3	0
Fulbright Junior High School	1	0	0
Junior High School (Future)	0	0	1
Lincoln Junior High School	6	1	4
Mary Mae Jones Elementary School	2	0	0
Old High Middle School	1	3	4
Osage Creek Elementary School/ Creekside Middle School	1	1	2
R.E. Baker Elementary School	1	4	1
Ruther Barker Middle School	0	3	0
Sugar Creek Elementary School	2	3	4
Thomas Jefferson Elementary School	1	3	2
Washington Junior High School	3	4	4

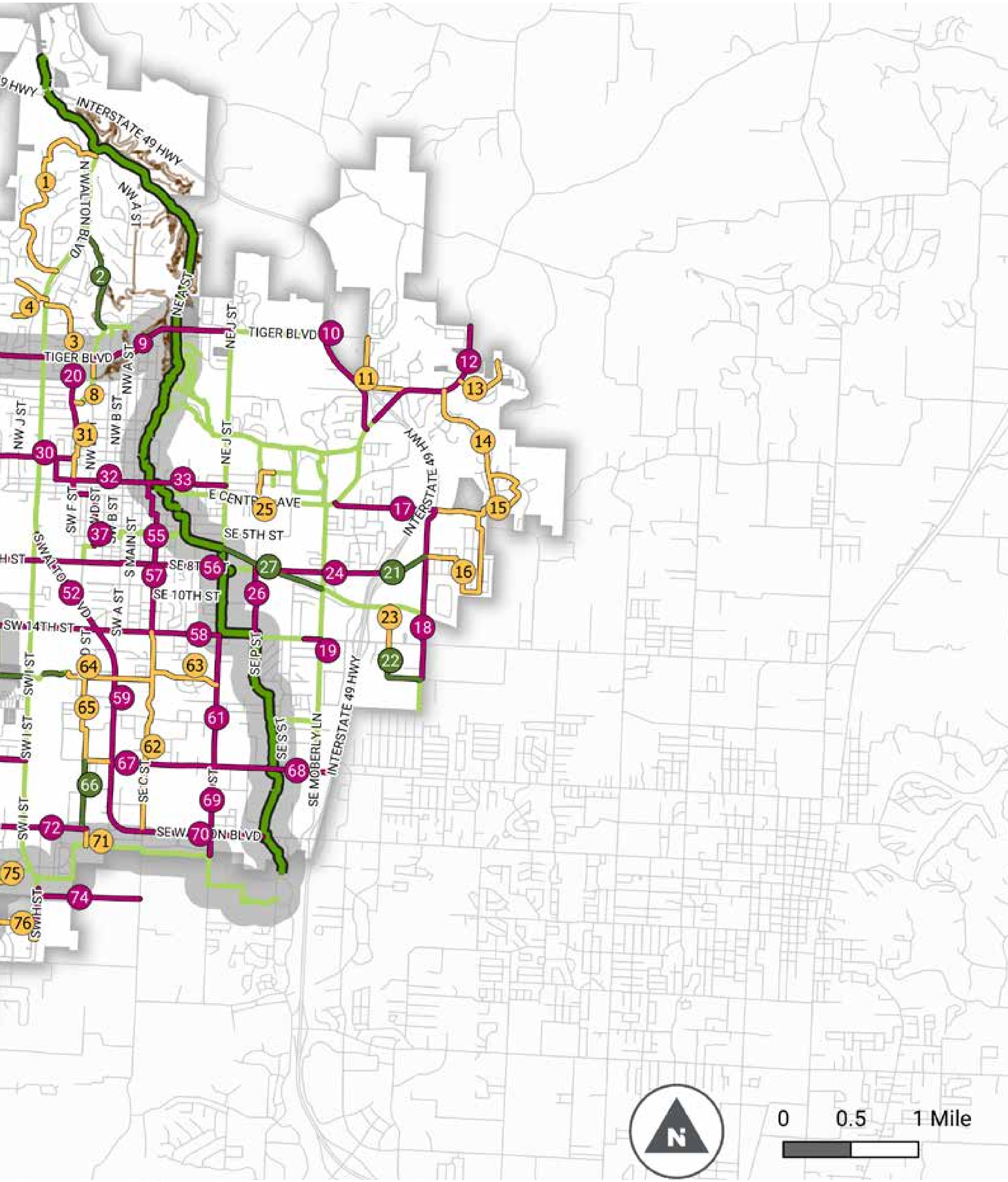
Bikeway Projects

Bikeway Project Prioritization Scores and Tiers

Figure A-2, on the following pages, shows the location and project ID number for all proposed bikeway projects by facility type in relation to existing facilities. The subsequent tables summarize prioritization scores for all bikeway projects identified in *Connecting Bentonville*. Priority tiers were based on overall prioritization score. Tier 1 facilities scored highest, followed by Tier 2 facilities, while Tier 3 facilities scored the lowest. It is important to keep in mind that just because a project has been categorized as Tier 2 or Tier 3, it is still a vital component of Bentonville's bikeway network.

FIGURE A-2: PRIORITY BIKEWAY PROJECTS BY FACILITY TYPE




INTERSTATE 49 HWY
N WALTON BLVD
NW A ST
NE A ST
NE J ST
TIGER BLVD
NW A ST
NW B ST
NW J ST
E CENTRAL AVE
SE 5TH ST
SE 8TH ST
SE 10TH ST
SW 14TH ST
S MAIN ST
S WALTON BLVD
SW A ST
SW I ST
SE P ST
SE S ST
SE MOBERLY LN
SE C ST
SE WALTON BLVD
0
0.5
1 Mile

Primary Bikeway Projects

Primary Bikeways will serve as primary challenges for bicycling between major destinations in Bentonville. Many of the primary bikeway projects are on streets that are less comfortable for bicycling today and would benefit from separated facilities for bicycling. Table A-5 highlights how each primary bikeway project scored during the prioritization process, as well as which tier the project was assigned.

TABLE A-5: PRIMARY BIKEWAY PROJECT TIERS AND SCORING

PROJECT ID	STREET NAME(S)	OVERALL SCORE
TIER 1 PROJECTS		
45	SW 8th Street from SW Elm Tree Road to SW I Street	37
55	SE B Street/SE C Street from NW 2nd Street to SE 8th Street	37
30	NW 3rd Street from N Walton Boulevard to NW F Street	35
56	SE 8th Street from SE J Street to SW I Street	34
57	SE C Street from SE 8th Street to SW 14th Streetw	34
29	NW 3rd Street from NW Elm Tree Road to S Walton Boulevard	30
32	NW G Street/NW 2nd Street from NW 3rd Street to S Main Street	30
51	SW 14th Street from Been Road to S Walton Boulevard	30
58	SE 14th Street from S Walton Boulevard to SE J Street	30
61	SE J Street from SE 14th Street to SE 28th Street	30
26	SE P Street from SE 14th Street to SE 8th Street	28
33	NW 2nd Street from Main Street to NE J Street	27
37	SW F Street/SW 2nd Street/SW D Street from NW 2nd Street to SW 6th Street	27
TIER 2 PROJECTS		
59	S Walton Boulevard from SE 14th Street to SW Rainbow Road	25
67	SE 28th Street from S Walton Boulevard to SE J Street	25
68	SE 28th Street from SE J Street to I-540	25
69	SE J Street/SE Dodson Road from SE 28th Street to existing sidepath near W Myers Ranch Boulevard	25
72	SW Regional Airport Boulevard from SW Bright Street to SW Crockett Street	23
87	SW Regional Airport Boulevard from Mill Dam Road to SW Bright Road	23
5	Pumpkin Hollow Road/NW 12th Street from Peach Orchard Road to Bella Vista Road	22
17	E Battlefield Avenue from E Central Avenue to Water Tower Boulevard	22
20	Bella Vista Road/Dickson Street from Tiger Boulevard to Magnolia Lane	22
36	Elm Tree Road from NW 3rd Street to SW 8th Street	22

TABLE A-5: PRIMARY BIKEWAY PROJECT TIERS AND SCORING CONTINUED

PROJECT ID	STREET NAME(S)	OVERALL SCORE
52	S Walton Boulevard from SW I Street to SW 14th Street	20
46	SW Elm Tree Road from SW 14th Street to SW 8th Street	19
24	SE 8th Street from SE P Street to proposed greenway	18
9	Tiger Boulevard from NW D Street to NE J Street	17
10	McCollum Road from Tiger Boulevard to E Central Avenue	17
TIER 2 PROJECTS CONTINUED		
80	SW Bright Road from SW Farringdon Avenue to SW Regional Airport Boulevard	17
12	E Central Avenue from Benton Ridge Circle to existing sidepath	15
19	SE 14th Street from SE Moberly Lane to existing sidepath	15
28	Peach Orchard Road from Pumpkin Hill Drive to NW 3rd Street	15
39	SW 2nd Street from Elm Tree Road to SW Tater Black Road	15
82	SW Bright Road from Windmill Road to SW Farringdon Avenue	13
88	SW Regional Airport Boulevard from S Vaughn Road to Mill Dam Road	13
TIER 3 PROJECTS		
43	SW Tater Black Road from SW Town Vu Road to SW Carriageway Avenue	12
38	W Highway 72 from SW Tater Black Road to proposed greenway	10
70	SE Walton Boulevard from SE Fountain Boulevard to Razorback Greenway	10
74	SE Walton Boulevard from SE Rainbow Road to SE Fountain Road	10
79	SW Bright Road from SW Regional Airport Boulevard to SW 28th Street	10
41	Town Vu Road from SW Tater Black Road to Christian Lane	9
47	SW 14th Street from Been Road to SW Elm Tree Road	7
54	Been Road from SW 28th Street to SW 14th Street	7
60	SW 28th Street from Been Road to SW I Street	7
81	Windmill Road	7
18	Water Tower Boulevard from E Battlefield Avenue to existing sidepath near W Bekaert Drive	5
40	SW Tater Black Road from SW 2nd Street to SW Town Vu Road	5

Greenway Projects

Greenway projects provide an off-street facility for people to bicycle, walk, wheel. These projects are separated from motor vehicle traffic, providing a highly comfortable and safe user experience. The proposed greenway projects supplement Bentonville's existing greenway and shared use path system by increasing access to high-comfort, off-street facilities throughout the City. Table A-6 highlights how each greenway project scored during prioritization, as well as which tier the project was assigned.

TABLE A-6: GREENWAY PROJECT TIERS AND SCORING

PROJECT ID	GREENWAY CORRIDOR	OVERALL SCORE
TIER 1 PROJECTS		
50	From SW Arrowhead Drive along SW 10th Street, SW Elm Tree Road, and Little Osage Creek tributary to SW Shell Road	25
27	From Razorback Greenway at SE J Street along stream corridor and railroad easement to SE Moberly Lane	18
TIER 2 PROJECTS		
49	From Applegate Trail on SW 8th Street along SW 8th Street, Melissa Drive, and Mayflower Road to area adjacent to Little Osage Creek tributary	15
77	From Bentonville Community Center along utility easement to SW Bright Road	15
85	From SW Bright Road through Preston Park and along utility easement parallel to SW Wentworth Avenue to Little Osage Creek	15
6	From Peach Orchard Road (County Road 39) along McKisic Creek to Peach Orchard Road (County Road 37)	10
7	From NW Santorini Lane to Applegate Trail through greenspace	10
53	From Bentonville Municipal Airport along Little Osage Creek tributary to SW Shell Road	10
66	From SW Airport Road at Bentonville Utility Complex along unnamed stream corridor to SW Regional Airport Boulevard near SW Crockett Street	10
86	From SW Shell Road along Little Osage Creek tributary and Little Osage Creek to SW Regional Airport Boulevard	10
TIER 3 PROJECTS		
22	From Water Tower Road through greenspace north of NWACC Nature Preserve to SE 8th Street	8
21	From SE Eagle Way through greenspace to Red Line Trail near W Bekaert Drive	8
34	From Peach Orchard Road (County Road 37) along McKisic Creek to AR-72	5
35	From AR-72 along McKisic Creek to Town Vu Road	5
2	From North Bentonville Trail near NW Trinity Way along Tristan Trail to NW Leopard Way	2

Neighborhood Connection Projects

Neighborhood connection projects serve to connect neighborhoods with primary routes. These streets are envisioned to become "neighborhood greenways" – routes that encourage residential bicycling for connection to primary routes and for recreation. Neighborhood greenways are mostly residential routes with low traffic speeds and volumes, fewer travel lanes, and higher volumes of people bicycling and walking. Table A-7 on the following page highlights how each neighborhood connection project scored during the prioritization process, as well as which tier the project was assigned.

TABLE A-7: NEIGHBORHOOD CONNECTION PROJECT TIERS AND SCORING

PROJECT ID	STREET NAME(S)	OVERALL SCORE
TIER 1 PROJECTS		
25	NE Wildcat Way/NE Brave Lane from E Central Avenue to Coleman Avenue	27
62	SE C Street from SE 14th Street to SE Walton Boulevard	27
64	SE 18th Street from SE C Street to existing off-street trail	27
31	Magnolia Lane/Huffman Street/NW F Street from Dickson Street to NW 2nd Street	22
63	SE 18th Street from SE C Street to SE J Street	22
3	Bella Vista Road from N Walton Boulevard to Tiger Boulevard	20
65	SW D Street/Airport Road from SW 18th Street to S Walton Boulevard	19
TIER 2 PROJECTS		
83	SW Buckeye Street/SW Joshua Avenue/SW Lilly Street/SW Farringdon Avenue from SW Regional Airport Drive to SW Bright Road	17
1	NW A Street/Cardinal Creek Circle/Red Fox Ridge/ Stonehenge Drive from existing off-street trail near NW A Street to existing off-street trail near N Walton Boulevard	15
4	Somerset from Canterbury Park and Ridgefield from Saddleworth Place to N Walton Boulevard	15
8	NW D Street from Tiger Boulevard to existing off-street trail & NW 9th Street from Bella Visa Road to existing off-street trail	13
75	SW Hayfield Avenue/SW Hollowbrook Street from SW 41st Street to SW Bright Street	13
48	Turnbridge Drive from SW 8th Street to SW 14th Street	12
73	SW Fir Avenue/SW Cherry Road/SW Banbury Drive from SW Regional Airport Boulevard to SW Bright Road	12
84	SW Cornerstone Road from SW Regional Airport Boulevard to SW Regional Airport Boulevard & SW Gemstone Boulevard from SW Regional Airport Boulevard to SW Rhinestone Boulevard	12
TIER 3 PROJECTS		
42	SW Town Vu Road/SW Elmside Drive from SW Elm Tree Road to SW Tater Black Road	9
16	E Battlefield Boulevard/SE Georgetown Street/SE Hendrix Street/SE 10th Street/SE 6th Street from Water Town Road to Water Town Road	7
44	SW Carriageway Avenue from SW Elm Tree Road to SW Tater Black Road	7
76	SW Edinburgh Avenue/SW Westchester Road from SW Hollowbrook Street to SW H Street	7
13	N Kensington Avenue from E Central Avenue to Spring Valley Road	5
14	Woods Creek Road from E Battlefield Boulevard to E Central Avenue	5
15	NE Blue Spruce Avenue/NE Marina Drive from Woods Creek Road to Woods Creek Road	5
23	SE Eagle Way from SE NWACC Boulevard to end of road	5
71	SW Crockett Street from SW Regional Airport Boulevard to existing off-street trail	5
11	Rice Road/NE 11th Street from E Central Avenue to Rice Lane	2
78	New path from SW Gator Boulevard to route created by project #75	0

APPENDIX

D

Funding

This Appendix identifies local, state, and federal sources in addition to various grant programs that may offer funding opportunities for many of the recommended projects in *Connecting Bentonville*.

Local Funding

Dedicated local funding is the most consistent and reliable funding source to implement pedestrian and bicycle projects. The amount of dollars a local community commits to active transportation signals that community's commitment to bicycle and pedestrian infrastructure, strengthening applications for federal and state funding. The following descriptions include both public and private funding sources and tools available in Northwest Arkansas.

Bentonville A&P Tax

Bentonville's Advertising and Promotion (A&P) Commission has a funding program to offset the cost of events and meetings that will utilize the City's hotels and restaurants. This program is operated through Visit Bentonville, which is governed by the A&P Commission. The grant funding source is the Hotel, Motel, and Restaurant Tax, which taxes 2% for lodging and meeting spaces and 1% for prepared food and beverages.

Capital Projects Fund

The City's Capital Projects Fund allocates funds for all major capital improvement projects that meet the requirements of the Series 2007 Sales and Use Tax Bonds, the Series 2009 Sales and Use Tax Bonds, the Series 2010 Sales and Use Tax Bonds, and the Series 2017 Sales and Use Tax Bonds. These bonds finance street, park and recreation, fire, police, and airport capital improvement projects. As one of the City's major funding sources, the Capital Projects Fund is an important tool for creating a safe, well-connected, and accessible bicycle and pedestrian network in Bentonville that provides an enjoyable user experience.

Impact Fees

Municipal governments in Arkansas have the authority to shift the fiscal burden of expanding public infrastructure to developers through impact fees for water, sewer, drainage, and roads to capture the impact imposed by development on municipal budgets. Best practices tie these impact fees to new demand for public infrastructure, such as traffic impacts on the transportation network. Some communities have given developers opportunities to reduce impact fees by contributing to on- or off-street bikeway improvements. Fees paid-in-lieu of providing required off-street parking may also contribute to the funding of new or improved bicycle parking facilities. And while not impact "fees" per se, development code requirements to build sidewalks as part of any new development are an effective policy for ensuring future pedestrian accessibility while reducing burden on public resources. The City of Bentonville has approved impact fees on residential development for public resources, including parks and trails.

NWA Trailblazers

NWA Trailblazers is a non-profit dedicated to developing multi-use and soft-surface trails across Northwest Arkansas. They request grant funding from the Walton Family Foundation for specific park and trail projects throughout the region. A partnership with NWA Trailblazers would allow the two entities to share resources and responsibilities for trail planning, development, and construction towards a common goal.

Walton Family Foundation

Through their Northwest Arkansas Design Excellence Program, the Walton Family Foundation funds projects developed with a clear understanding of how people use and experience public space in the intersection of life, space, and buildings. The foundation regularly partners with local municipalities and non-profit organizations by offering financial support for all aspects of design. Projects are selected from either a direct invitation from the Walton Family Foundation to apply or an open call for applications that complement the Foundation's efforts to support a specific design area.

State Funding

While state agencies and Metropolitan Planning Organizations (MPOs) help to administer a variety of federal funds, there is only one significant state-level funding source that applies to active transportation and recreational projects, as described below.

Outdoor Recreation Grants

Administered by the Arkansas Department of Parks, Heritage and Tourism (ADPHT), the mission of the Outdoor Recreation Grants program is to improve the management, planning, and overall quality of Arkansas' outdoor recreation resources. Two different grant programs are offered, Matching Grants and FUN Park Grants. While both grant programs help cities and counties achieve better outdoor recreation within their local communities, there are a few key differences in the grant specifics, as shown in Table A-8.

TABLE A-8: OUTDOOR RECREATION GRANTS PROGRAM COMPARISON: MATCHING GRANTS VS. FUN PARK GRANTS[1]

CATEGORY	MATCHING GRANT	FUN PARK GRANT
Eligible Applicants	All municipalities and counties in Arkansas	Municipalities in Arkansas with populations of 2,500 or less, and unincorporated communities sponsored by the county governments
Maximum Award	Up to $250,000 + an equal match by applicant	Up to $75,000, no match required
Eligible Projects	Development of outdoor recreation facilities and land acquisition	Development of most outdoor recreation facilities
Funding	Reimbursement up to 50% of project costs	Grantee will be issued entire grant amount prior to project development
Grant Completion Timeframe	Grant projects should be completed within two years following the award notice.	Grant projects should be completed within two years following the award notice.

Source:
1) https://www.outdoorgrants.com/grants

Federal Funding

There are also a variety of federal funding programs that apply to bicycle and pedestrian projects. Pertinent federal funding sources that are pertinent to the City of Bentonville are summarized in the following sections.

Surface Transportation Block Grant Program

Through the Northwest Arkansas Regional Planning Commission (NWARPC), the region's MPO, and Arkansas Department of Transportation (ARDOT), the Surface Transportation Block Grant (STBG) Program leverages federal funds to preserve and improve the conditions and performance of federal-aid highway, bridge and tunnel projects on public roads, pedestrian and bicycle infrastructure, transit capital projects, and public bus terminals and facilities. The current policy has a focus on projects of regional significance, defined as improvements to major routes that enhance access, reduce crash rates, and/or relieve congestion.

Transportation Alternatives Program

The Fixing America's Surface Transportation (FAST) Act replaced the Transportation Alternatives Program (TAP) with a set-aside of STBG Program funding for transportation alternatives. These set-aside funds include all projects and activities that were previously eligible under TAP, encompassing a variety of smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trails, Safe Routes to School projects, community improvements such as historic preservation and vegetation management, and environmental mitigation related to stormwater and habitat connectivity. While the Federal Highway Administration (FHWA) refers to these funds as the "Transportation Alternatives Set-Aside", ARDOT and NWARPC continue to refer to the program as TAP for consistency. For projects funded under this program, the federal share is 80% and a 20% match is required from the eligible project sponsor. Federal funds provided can only be used for project construction. Costs associated with preliminary engineering, environmental documentation, right-of-way and utility adjustments, and construction inspection will be the responsibility of the eligible sponsor.

Recreational Trails Program

ARDOT administers FHWA's National Recreational Trails Fund in the State of Arkansas. The Recreational Trails Program is an annual competitive cost-sharing opportunity that is funded through a portion of the Transportation Alternatives Set-Aside that is specifically directed to the construction and maintenance of non-motorized recreational trails and trail support facilities. Up to 80% of project costs can be funded through this program, with maximum awards up to $200,000 for trail grants. Eligible projects include construction of recreational trail projects, land acquisition for trails, enhancing existing trails, and the development of trailheads and trailside facilities.

Better Utilizing Investments to Leverage Development Transportation Grants

Better Utilizing Investments to Leverage Development (BUILD) Transportation grants (i.e., previously known as TIGER grants) are nationally competitive grants for capital investments on surface transportation projects that achieve a significant impact for a local or metropolitan area. A total of $1 billion has been allocated to BUILD Grants in 2020, which the U.S. Department of Transportation (USDOT) aims to benefit a greater number of projects located in rural areas. States are eligible to receive up to $100 million in BUILD Grants. The BUILD program enables USDOT to use a rigorous merit-based process to select projects with exceptional benefits, explore ways to deliver projects faster and save on construction costs, and make needed investments in national infrastructure. This is a highly competitive program. In 2019, USDOT received nearly 670 applications, with over ten times the available funding being requested; only 55 applicants received awards.

Land & Water Conservation Fund

The Land and Water Conservation Fund (LWCF) is a federal program supporting the protection of federal public lands and waters – including national parks, forests, wildlife refuges, and recreation areas – and voluntary conservation on private land. Investments from the LWCF secure public access, improve recreational opportunities, and preserve ecosystem benefits for local communities. The grant program provides matching grants to state and tribal governments for the acquisition and development of public parks and other outdoor recreation areas and facilities.

Federal Lands Access Program

The Federal Lands Access Program was established to improve transportation facilities that provide access to, are adjacent to, or are located within federal lands. The program supplements state and local resources for public roads, transit systems, and other transportation facilities, with an emphasis on high-use recreation sites and economic generators. Funding for the program is provided from the Highway Trust Fund and allocated among the states using a statutory formula based on road mileage, number of bridges, land area, and visitation. In Arkansas, this program is administered through ARDOT. A minimum of 18.45% matching share of the project total is required for this program. With some exceptions, other federal funds may be used as a match.

Public Health Funding through the Centers for Disease Control and Prevention

A wide variety of grants are provided by the Centers for Disease Control and Prevention (CDC) to fund public health programs that advance the agency's mission to keep Americans safe and healthy where they work, live, and play. In Fiscal Year 2019, over $7.8 billion in grant funding was provided for public health programs across the nation. Local, regional, or state public health departments could assist the City of Bentonville in navigating the grant application process.

Railway-Highway Crossing Program

The Railway-Highway Crossings Program provides funds for the elimination of hazards at railway-highway crossings. In 2015, this program's annual set-aside for railway-highway crossing improvements was continued through the FAST Act. The funds are set-aside from the Highway Safety Improvement Program apportionment and are distributed to states by a formula. Projects funded through this program are awarded a 90% federal share.

Other Sources

In addition to local, state, and federal funds, there are other grant programs, primarily from national private foundations that could be leveraged to implement *Connecting Bentonville*.

AARP Livable Community Initiatives Grant

Through their Livable Community Initiatives grant program, the American Association of Retired Persons (AARP) provides small grants to fund "quick-action" projects to help communities become more livable for people of all ages. As an action-oriented program, planning activities, assessment, and surveys are not eligible for funding, as well as land or building acquisition. Of relevance to the goals of *Connecting Bentonville*, the AARP prioritizes projects that deliver a range of transportation and mobility options by increasing connectivity, walkability, bikeability, wayfinding, access to transportation options, and roadway improvements. Grant awards can range from several hundred dollars for smaller, short-term activities to several thousand or tens of thousands of dollars for larger projects.

Conservation Alliance Grant

The Conservation Alliance seeks to protect threatened wild places throughout North America for their habitat and recreational values. Grants are awarded to registered 501(c)(3) organizations whose project meets the following criteria: 1) secures lasting and quantifiable protection of a specific wild land or waterway; 2) engages citizens through grassroots action in support of conservation effort; 3) has a clear recreational benefit; and 4) has a good chance of success within four years.

PeopleForBikes Community Grant Program

This program provides funding for projects that build momentum for bicycling in communities across the U.S. These projects include bike paths and rail trails, mountain bike trails, bike parks, BMX facilities, and large-scale bicycle advocacy initiatives. Grants of up to $10,000 are awarded to non-profit organizations and local governments and have totaled more than $3.5 million since 1999. This program is funded by PeopleForBike's partners in the bicycle industry, including the following companies: Batch, Cannondale, Giant, Niner, Shimano, Trek, and Vaast.

Kodak American Greenway Awards Program

The Eastern Kodak Company, The Conservation Fund, and the National Geographic Society team up each year to sponsor the Kodak American Greenways Awards Program. The program provides seed grant funding to non-profit organizations, public agencies, and community groups for projects that create or improve greenways, walking trails and waterways across the country. A wide variety of planning, design, implementation, and educational projects have been awarded in the past. Most grants range from $500 to $1,000, with a maximum grant of $2,500.

Rails-to-Trails Conservancy

Through their grant programs, Rails-to-Trails Conservancy emphasizes strategic investments that support regional and community trail development goals. Many of the projects they fund are small in scope and scale and are more difficult to finance within traditional funding streams. They focus these relatively small investments on completing and connecting trails, improving the trail user experience, and supporting local organizations dedicated to new and existing trails across the country. They have awarded nearly 300 grants totaling approximately $2 million since 2008.

APPENDIX

Cost Estimates

The tables on the following pages include detailed probable costs for key pedestrian and facilities, many of which are included in Chapter 5 of *Connecting Bentonville* as recommended facility types. The costs presented are planning-level estimates for each facility. This table should serve as a just one tool in creating more accurate estimates for construction and design of such projects.

More detailed costs should be calculated at the time of design based on individual project criteria and constraints. Where feasible, costs reflect ArDOT bid unit prices for the Spring of 2020; construction costs should be adjusted for inflation at the time of implementation. Furthermore, estimates do not include any costs for easements, right-of-way acquisition, utility relocation, general roadway improvements, major drainage modifications, or life-cycle maintenance.

TABLE A-9: PROBABLE COST ESTIMATE ASSUMPTIONS

ITEM ID	ITEM	ASSUMPTIONS
1	Sawcut & Removal	$1 per LF
2	Curb & Gutter	$22 per LF multiplied by number of standard curb & gutters within the cross section(s).
3	Pavement	$7 per SF multiplied by total width of pavement within the cross section(s).
4	Pavement Overlay	$1.50 per LF. Based on milling existing surface and 1.5" overlay.
5	Striping- Linear	$1 per LF multiplied by number of stripe lines within the cross section(s).
6	Striping-Arrows; Symbols; Legend	$1.25 per LF for one direction of travel. Based on $250 per arrow/symbol/legend every 200 LF.
7	Crosswalk	$5 per LF. Based on two crosswalks (one per each side of street) every 400 LF. Assumes $1,200 per crosswalk.
8	Driveway Striping	$3 per LF. Based on 12'x8' hi-visibility thermoplastic every 200 LF per each side of street.
9	Sidewalk	$8 per LF multiplied by total sidewalk width within the cross section(s). Based on 4" thick concrete sidewalk and associated earthwork.
10	Raised Buffer	$15 per LF (based on 6" thick concrete median). Includes earthwork; does not include curb and gutter.
11	Drainage	$25 per LF based on $10 per LF plus one inlet per 100 LF.
12	Street Lights	$58.30 per LF based multiplied by number of lights within the cross section(s).Assumes $3,500 per pedestrian light spaced 60' O.C.
13	Sod/Landscape	$0.60 per LF multiplied by total width of sod or landscape within the cross section(s).
14	Trees	$5 per LF multiplied by number of street sides and medians with trees. Based on $500 per 4" caliper tree, spaced 30' O.C. minus driveways and intersections.
15	Irrigation	$1.50 per LF multiplied by width sod/landscape within cross section(s).
16	Tree Wells & Planters	$79 per LF based 24'x6' tree wells or planters spaced 30' O.C. with linear pavers in between. Assumes $1,500 per tree well.
17	Pavers: Vehicular	
18	Pavers: Pedestrian	
19	Wayfinding Signage	$3 per LF for one direction of travel. Based on $600 per sign, every 200 feet.
20	Signage	$1.75 per LF for one direction of travel. Based on 350 per sign, every 200 feet.
21	Traffic Signal	$20,000 for signal modifications every 1,000 feet. Linear foot cost estimated based on one direction of travel.
22	Traffic Calming	$20,000 per 400 LF
23	Clearing, Grubbing, & Grading	$50,000 per mile
24	Erosion Control	$12 per LF

TABLE A-10: COST ESTIMATES OF KEY PEDESTRIAN AND BICYCLE FACILITIES

FACILITY	UNIT	COST	ASSUMPTIONS
Greenway Trail	LF	$225	Table A-3 Items: 5, 8, 9, 13, 14, 15, 20, 23, 24
Shared Use Path -Paved	LF	$280	Table A-3 Items: 1, 2, 5, 7, 8, 9, 13, 14, 15, 20, 23, 24
Shared Use Path - Paved; Constrained	LF	$234	Table A-3 Items: 1, 2, 5, 7, 8, 9, 13, 15, 20, 23, 24
Directional Separated Bike Lane (SBL)	LF	$660	Table A-3 Items: 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 20, 23, 24
Directional SBL - Constrained	LF	$623	Table A-3 Items: 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 20, 23, 24
Two-Way Protected Bike Lane	LF	$528	Table A-3 Items: 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 20, 21, 23, 24
Two-Way Protected SBL - Constrained	LF	$498	Table A-3 Items: 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 20, 21, 23, 24
Buffered Bike Lane	LF	$58	Table A-3 Items: 5, 6, 7, 8, 19
Directional Bike Lane	LF	$51	Table A-3 Items: 5, 6, 7, 8, 19
Neighborhood Greenway	LF	$120	Table A-3 Items: 5, 6, 7, 19, 20, 22
Yield Roadway	LF	$35	Table A-3 Items: 5, 7, 20
Advisory Shoulder	LF	$43	Table A-3 Items: 5, 6, 7, 19, 20
Sidewalk without Curb & Gutter	LF	$91	Table A-3 Items: 1, 7, 9, 23, 24
Sidewalk with Curb & Gutter	LF	$125	Table A-3 Items: 1, 2, 7, 9, 23, 24
Raised Intersection	EA	$168,000.00	
Mid-block Crossing	EA	$20,000.00	Refuge median island not included
Curb Extension	EA	$19,500.00	Per corner; 40'x8'-9' at each corner of extension; No pavement overlay or upgrades
Pedestrian Signal (Single Approach)	EA	$24,000.00	
Rectangular Rapid Flash Beacon (RRFB)	EA	$25,000.00	Per crossing (Two RRFBs)
Hight Intensity Activated Crosswalk (HAWK)	EA	$97,500.00	Per crossing (Two poles)
Raised Crossing	EA	$47,000.00	
Chicane	EA	$13,000.00	25'x8'-9' chicane; No pavement overlay or upgrades
ADA Curb Ramp	EA	$2,500.00	
Raised Median	LF	$75.00	2' Concrete buffer; Two curbs
Neighborhood Traffic Circle	EA	$43,000.00	40' Street width; 32' Diameter circle
Median Pedestrian Refuge	EA	$18,000.00	20'x6' Medians
Crosswalk - Standard	EA	$400.00	Two 12" transverse lines
Crosswalk - High Visibility	EA	$1,500.00	40' Curb-to-curb; Pavement markings 4' O.C.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