

STATELINE AREA TRANSPORTATION STUDY

Pedestrian and Bicycle System Plan Update 2017

DRAFT

Acknowledgements

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Beloit Memorial High School
Beloit Park Commission
City of Beloit
COB Plan Commission
Community Action, Inc.
Council on Aging/Mobility
Equal Opportunities Commission
Latino Service Providers Coalition
Rockton Township
Stateline Family YMCA
Stateline Spinners
Visit Beloit

Prepared for:

Stateline Area
Transportation Study
(SLATS)

Prepared by:



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Section I Introduction



Plan Vision

This plan creates a roadmap for a more connected Greater Beloit region. The project’s study area encompasses the entire Stateline Area Transportation Study (SLATS) Metropolitan Planning Organization (MPO) area. Recommendations focus on regional connections, with projects to be constructed by local agencies-- i.e., the Cities and Towns, Counties, Townships, States, and other entities that make up the region.

The plan update provides a vision for cities and towns that are connected throughout the SLATS MPO planning area that are well connected through high quality on and off street facilities that accommodate walking and bicycling.

Trails, bike lanes, paved shoulders, sidewalks, and comfortable neighborhoods streets let residents and visitors explore the region safely and conveniently. The experience of walking and bicycling along the world class riverside path in Beloit is replicated with safe paths and streets throughout the greater Beloit area.

Downtowns are attractive places to visit and easily reachable without a car. Neighborhoods and regional destinations feel connected to one another. Community events, bike rides, and more help instill this feeling. The effects of barriers such as large streets and the river are minimized. The region is a great place to raise a family and the school system helps them learn safe bicycling and walking. The region is home to a diverse mixture of residents and all are able to enjoy walking and bicycling for daily trips and recreation.

Plan Goals

The project’s goals will bring the plan’s vision to life:

- Create an integrated, connected, and accessible network of transportation infrastructure built to the best practices in bicycle and pedestrian design.
- The region’s transportation network will support people of all ages and abilities.
- Enable trips to regional destinations and regional trail systems without the need of a car.
- Cities and towns in the region will provide educational programming and activities for people of all ages.
- Cities and towns in the region will have well maintained streets, including well maintained places to walk and bike.
- Walking and bicycling are fun, healthy, and expected ways of getting around.
- Residents and visitors feel safe when walking and bicycling. Barriers and dangerous locations are minimized and eliminated through design choices.
- All agencies in the region are dedicated to reducing all traffic fatalities and serious injuries through a variety of countermeasures.

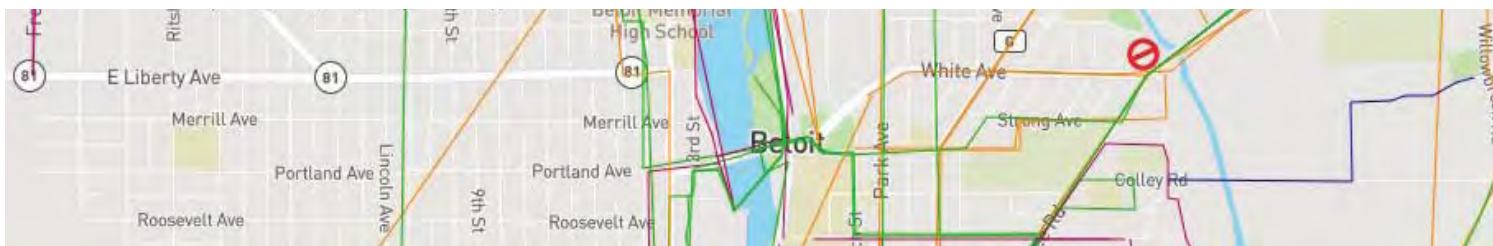


Figure 1. The project’s online map was quickly covered in comments, thanks to enthusiastic area residents.

Plan Objectives

The plan’s objectives correspond with the five Es of bicycle and pedestrian planning: engineering, education, encouragement, enforcement, and evaluation. A sixth E, equity, underlies each of the Five Es.

- Use best practice design guidelines to reduce crashes on roadways, particularly to protect people walking and bicycling.
- Continue coordinating with agencies on either side of the stateline to result in continuous, well maintained walking and bicycling facilities.
- Overcome gaps and barriers to safe and easy walking and bicycling by expanding the current walking and bicycling system.
- Expand education opportunities for residents of all ages, across the entire MPO planning area.
- Organize public events to help residents walk and bike more often.
- Grow the number of agency staff whose work involves walking and bicycling
- Investigate behaviors and types of streets correlated with high crash potential; work with law enforcement agencies to encourage safe walking, bicycling, and driving.
- Partner with law enforcement agencies to develop infrastructure options designed to eliminate traffic fatalities.
- Periodically monitor the plan’s implementation.
- Periodically monitor walking and bicycling activity throughout the region.
- Leverage the region’s advocates and walking and bicycling enthusiasts to assist with plan implementation.
- All municipalities should strive to obtain League of American Bicyclists (LAB) Bicycle Friendly Community (BFC) recognition.



Figure 2. The Five E's of bicycle and pedestrian planning.

Section II Existing System



Introduction

The existing conditions analysis presents the region’s progress since the last SLATS Bicycle and Pedestrian System Plan Update (2010) and key opportunities and challenges towards creating a more walk- and bicycle-friendly regional connections.

This plan is the most recent in a number of Stateline Area Transportation System (SLATS) Bicycle and Pedestrian System Plans. Included in this chapter is a review of previously recommended infrastructure features from the 2010 SLATS Bicycle and Pedestrian System Plan. The chapter connects this 2017 update to other community and transportation plans.

This chapter develops a “state of the region” by discussing how existing street conditions were planned and how they currently function. The discussion then turns to walking and bicycling safety, demand, and equity.

These analyses, along with current street characteristics, such as traffic volume, speed, and lane width, and public comments, set the stage for design inputs used to develop a network of regional walking and bicycling routes.

A review of the transportation network includes a summary of the various types of rural and urban streets that are found in the SLATS metropolitan planning organization (MPO) area. The section summarizes qualities that make these streets comfortable or uncomfortable for people walking and bicycling. Plan recommendations define low stress ways for people to navigate the SLATS region on foot and on bike. The chapter also includes community members’ ideas for reducing barriers to increase walking and bicycling throughout the region.



Figure 3. The City of Beloit downtown area’s vibrancy is fueled by local businesses, attractive streets, and public events that bring people together. Brick paving, public sculptures, and wayfinding kiosks were added after the 2008 Beloit Downtown Redevelopment Plan.

Summary of Findings

- Previous plans emphasize regional connections. A palette of bicycle and pedestrian infrastructure types for people of all ages and abilities will help connect the region. Previous plans rely on signed bicycle routes and off street trails to build routes.
- Beloit has historically acted as the region's center. Downtown Beloit, South Beloit, and Rockton, as well as Rock Township at the northern end of the SLATS area, are important areas to connect through regional walking and bicycling routes.
- The region lacks east-west connectivity. Residents mentioned this as well as a desire to improve north-south connections into downtown Beloit and the riverfront.
- Bicycle infrastructure installed since the 2010 bicycle system plan and the 2014 implementation study are prime opportunities to upgrade to striped bike lanes where feasible. The programmed Park Avenue road diet will enhance connectivity at the state line and will illustrate the benefits of reallocating street space to balance the needs of people walking, bicycling, and driving.
- Residents desire places to walk and bike that feel like the riverfront: comfortable, separated from traffic, and scenic. They look for connections to the river as well as comfortable routes in their home communities.
- Areas of high socioeconomic need must be included in system planning efforts: Rockton Township near Rockton Bog Nature Preserve, South Beloit east of South Beloit Municipal Park, central and western Beloit, and Janesville south of Southern Wisconsin Regional Airport.
- In Wisconsin, areas with the highest demand for walking and bicycling correlate with areas of high levels of socioeconomic need. The correlation is not as pronounced on the Illinois side of the study area.
- Residents' perceptions of barriers to walking and bicycling are echoed in mapping analyses that investigate streets' level of walking and bicycling comfort.
- Streets perceived as high-stress routes in urban areas have multiple lanes and high traffic speeds. High stress routes in rural areas lack space to separate people walking and bicycling from people driving at high speeds.
- Low-stress areas are primarily located in residential neighborhoods. However, residents must cross busy roads to reach important destinations.
- Group bicycle rides and events occur frequently in the region. Local groups fill an advocacy role and are knowledgeable of local lower stress bike routes that connect to destinations.
- Pedestrian crashes occur mainly at intersections of busy streets (i.e., arterials and collectors).
- Bicycle crashes occur mainly at intersections of busy streets that lack bicycle specific infrastructure, such as bike lanes. West Beloit is one exception. Many crashes in this area occurred on streets with low posted speed limits and low traffic volumes.
- The majority of bicycle and pedestrian crashes resulted in injury.

Looking Back to Previous Plans

In total, fourteen planning documents were reviewed as part of the update. Recommended walking and bicycling connections such as sidewalks and signed bicycle routes match areas of “low-hanging fruit” from the existing Bike Compatibility analysis. Previous plans focus on using bike route signage and off street trails to create walking and bicycling routes.

The 2017 plan update seeks to elevate the quality of walking and bicycling infrastructure through the use of a broad palette of infrastructure solutions. For example, by upgrading signed routes to paved shoulders or bike lanes, and upgrading bike lanes to buffered bike lanes that provide greater separation and protection, these recommendations will create comfortable walking and bicycling options for a broader range of SLATS residents and visitors.

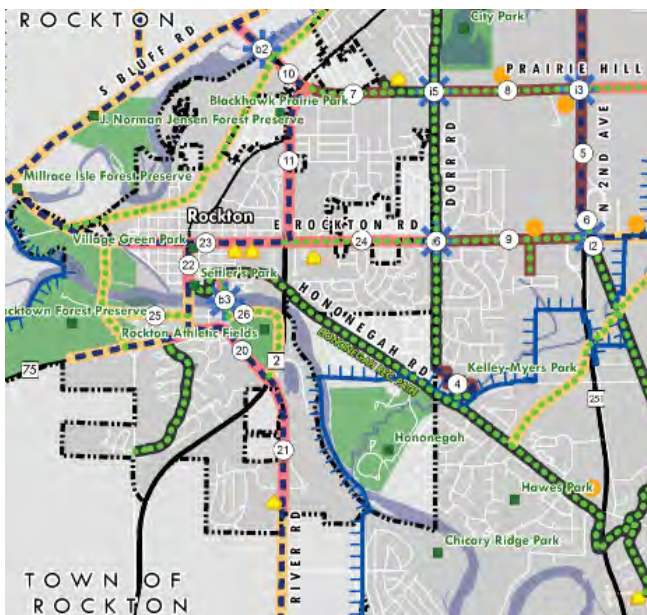


Figure 4. Dashed blue lines represent on street bicycle connections (i.e., Bluff Rd). Dashed green lines represent off street connections (i.e., Hononegah Rd). Dark rose, pink, and beige outlines show proposed project phasing: near, mid, and long term, respectively (source: Stateline Area Bike System Implementation Plan, 2014).

Multiple plans mention the region’s lack of east-west connectivity. Adopted plans show a conceptual north-south connection from Janesville to Rockford. The connection is nearing completion. However, gaps along the route limit the extent to which low-stress walking and bicycling routes are available for continuous north-south travel.

Big Hill Park is an example of a destination to which connections are in development. Another off street trail is planned east of Rock River, next to a railroad. The Rock Trail Coalition has worked to build community and public agency momentum towards developing off street connections to Big Hill Park.



Figure 5. The blue line represents an existing north-south connection. Big Hill Park is circled as a destination and includes a new, proposed connection to the attraction, shown in black. (source: Beloit to Janesville Bicycle Route Corridor Plan and Feasibility Study, 2012).

Desired routes for walking and bicycling radiate from downtown Beloit. Planned recommendations from adopted plans follow this pattern. The rural access routes, shown below (blue), add east-west and north-south routes between the major conceptual connections (pink). This 2017 plan update will propose context sensitive recommendations along streets with rural cross-sections. These recommendations will support people walking and bicycling in these areas.

Public input during the 2017 plan update process indicates that members of the public continue to think of regional connections as radiating from major population centers.

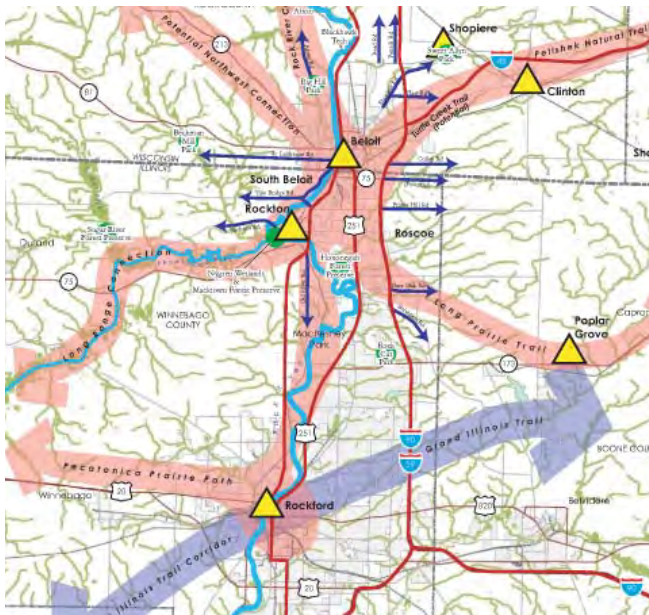


Figure 6. Major regional desire lines indicate conceptual ways to connect to regional destinations. These lines are drawn in pink. Rural access routes fill in the conceptual desire lines and connect to rural areas (source: Stateline Area Bike and Pedestrian System Plan, 2010).

Downtown recommendations have had momentum for implementation. Downtown Beloit has installed brick pavers, sculpture, a kiosk, and other public amenities since the 2008 Beloit Downtown Redevelopment Plan.

This plan update will recommend policy initiatives to consider walking and bicycling connections during the subdivision process. Infill development helps retain the region’s rural character. This plan update will discuss recommendations to link high demand areas throughout the region. Recommendations will discuss opportunities to use transportation improvements to elevate the status of downtown areas in Illinois and Wisconsin.

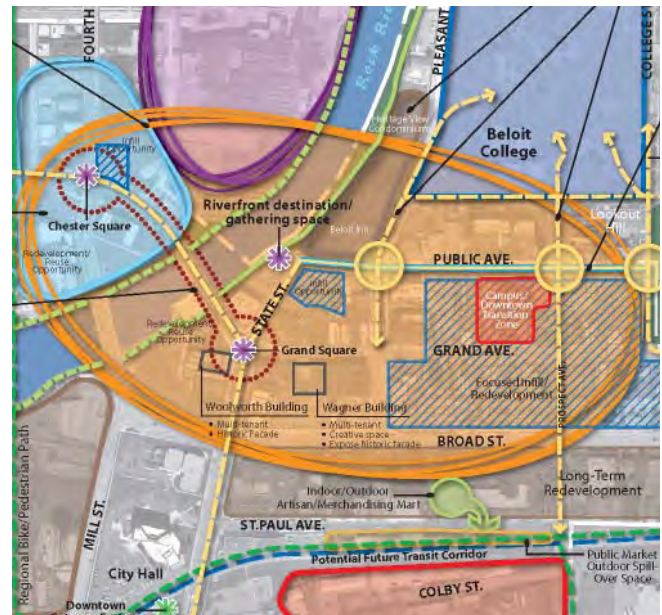


Figure 7. Plans for downtown Beloit show attention to transportation system planning in addition to land use and development aspirations (source: Beloit Downtown Redevelopment Plan, 2008).

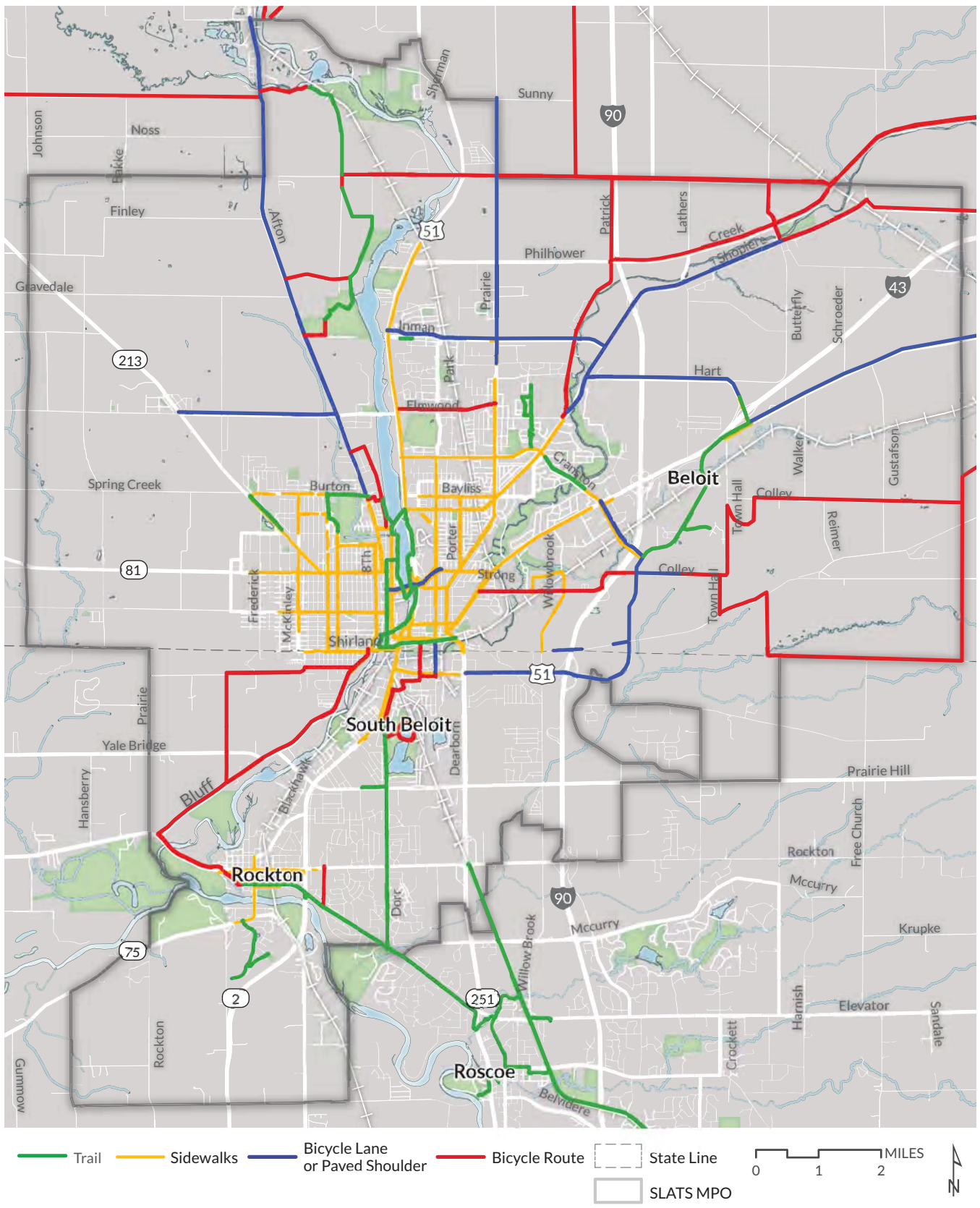


Figure 8. Existing Bicycling and Walking Facilities. Note: Bicycle routes consist of recommended routes for on street bicycling and may or may not include wayfinding signage.

Walking and Bicycling in the Stateline Area Today

Figure 8 shows existing trails, sidewalks, bike lanes, and paved shoulders throughout the Stateline area.

Most of the residents spoken to during this planning process, who indicated that they sometimes walk or bike in the region, said that they mainly use the region's trails or paths in parks. The region is gradually developing a more robust system for walking and bicycling.

Figure 8 shows that although the majority of on street paved shoulders and bike lanes are located on the Wisconsin side of the state line, the Illinois side is served by off street trails connect South Beloit, Rockton, and Roscoe.

Please note that the bicycle routes indicated on the map consist of recommended routes for on street bicycling. The routes may or may not include bicycle route wayfinding signage.


Common Types of Urban and Rural Streets

The region features a mix of urban, suburban, and rural street types. The pictures on this page and the next show common street types and the relative ease to walk and ride bikes in these environments.


Key: **More Stress**     **Less Stress**

RURAL SETTING





Features: No centerline, typically high speed, low traffic volume.
Typical Stress Level: 
Possible Improvements: A shoulder could be added, depending on space available and who owns the space.




Features: Centerline, two lanes, paved/gravel shoulder, typically high speed, low traffic volume.
Typical Stress Level: 
Possible Improvements: Expand shoulder or add a buffer to existing shoulder if space is available.



Features: Centerline, four lanes, sometimes a bike lane, speed limit and traffic volumes vary. No sidewalks. **Typical Stress level:** /  
Possible Improvements: Potential bike lane candidate. Could upgrade to buffered bike lanes, if space allows.



SUBURBAN SETTING




Features: Low-speed street in residential setting. Some feature sidepaths or sidewalks
Typical Stress Level: 
Possible Improvements: Speed management, construct or improve sidewalks/sidepaths

URBAN SETTING



Features: Two- or four-lane, busy and high-speed streets. Some feature sidewalks but often lack bike lanes.
Typical Stress Level:  / 
Possible Improvements: Potential for reallocating travel lane space to people walking or bicycling.



Features: Two-lane street with wide sidewalk and on street parking
Typical Stress Level: 
Possible Improvements: Maintain sidewalk, add shared lane markings. Redesign possible to add bike lanes.

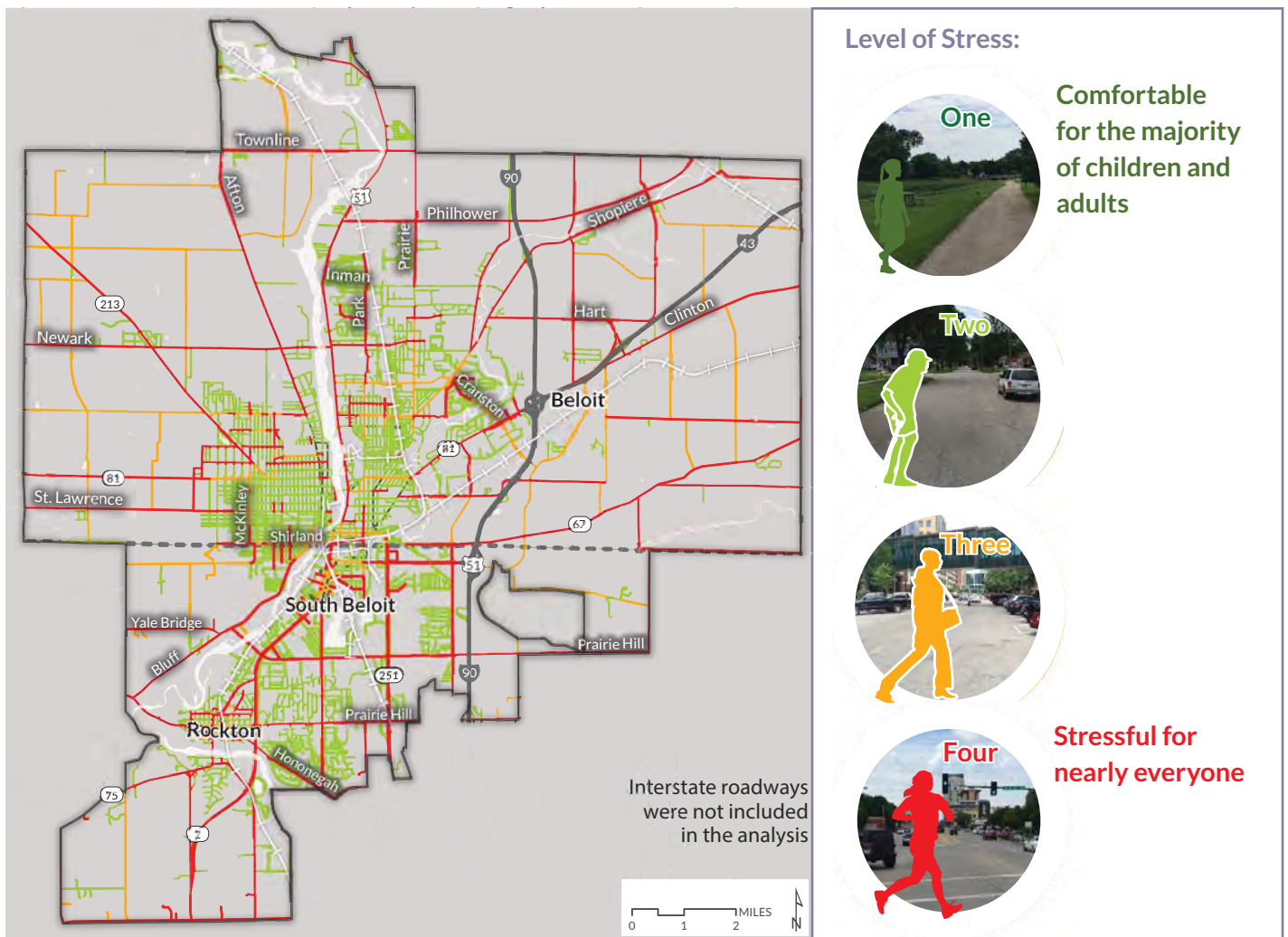


Figure 9. How Does It Feel to Walk in the Region?

What is it Like to Walk in the Region?

People feel comfortable walking when they have separation from car traffic. Residential streets may feel comfortable even without sidewalks if cars typically drive slowly and traffic volumes are low. As speeds and traffic volume increase, more separation is needed between people walking and car traffic. Many busy arterial and collector streets in the region were designed for quickly transporting people by car or goods by trucks. These streets are not comfortable for pedestrian travel unless there is a sidewalk. At especially busy roadways, a grass planting strip, parked cars, or some other buffer is needed between people walking and passing motorists.

Figure 9 shows that neighborhood streets and those closer to downtown areas are comfortable places for people to walk. Other streets, such as Prairie Hill, WI-81, and Philhower would need improvements to create a more comfortable environment for people to walk.

Plan recommendations show opportunities to improve existing walkways and create regionally significant routes. People are willing to walk a shorter distance than they are willing to bike. For this reason, plan recommendations will investigate pedestrian access to major regional destinations. Streets should be comfortable and safe for people of all ages and abilities to walk.

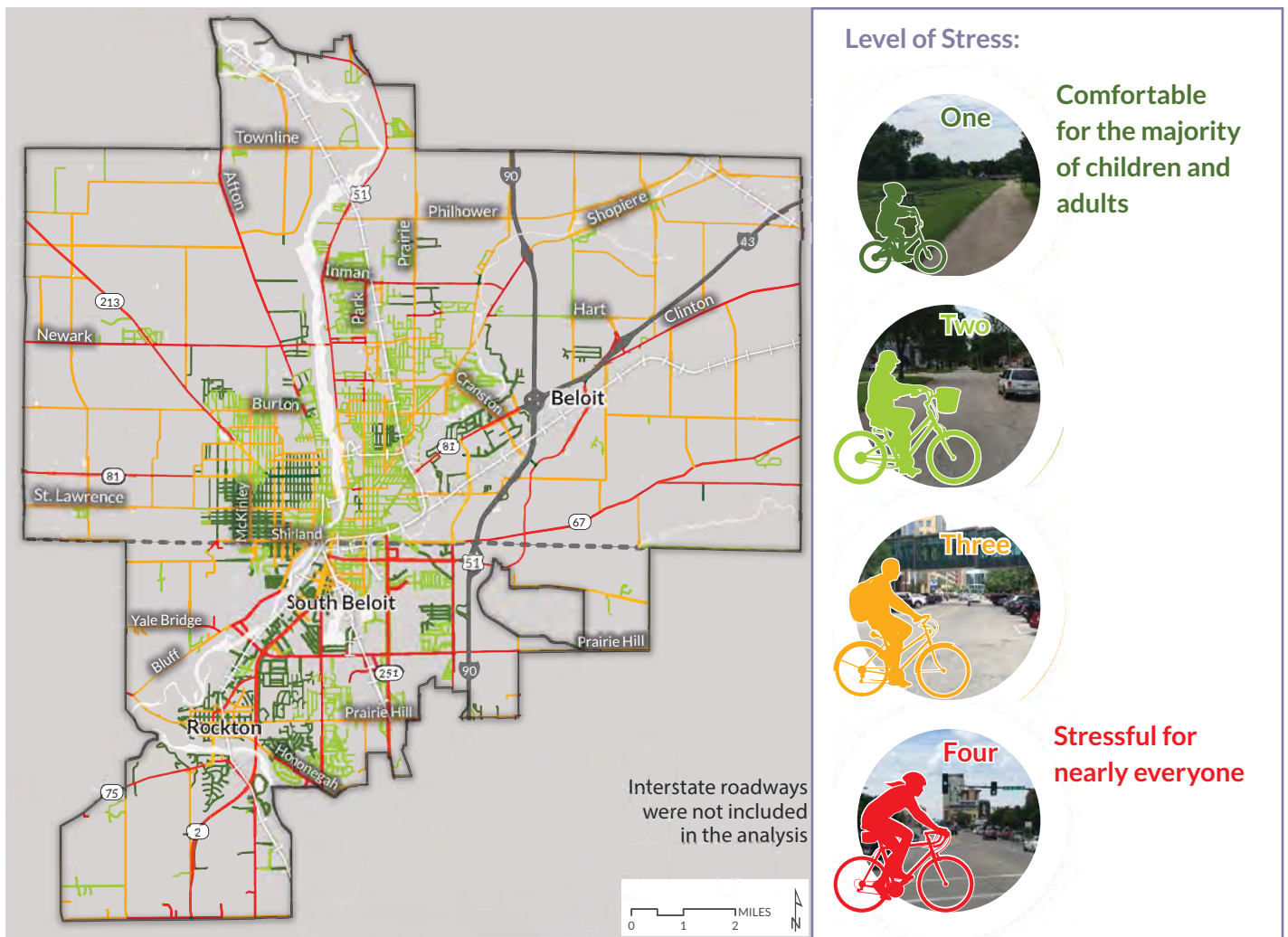


Figure 10. How Does It Feel to Bike in the Region?

How Does It Feel to Bike in the Region?

Similar to walking, stress while bicycling increases as speeds and traffic volumes increase. The average person will only ride a bike if stress levels are low. This is why the region’s trails and residential streets are popular places for bicycling.

People bicycling need more separation from car traffic to feel safe when traveling on high speed, high traffic streets. People bicycling need less separation to feel safe when traveling on lower speed, lower traffic streets.

Figure 10 shows that streets such as McKinley Avenue, In Beloit, are comfortable places for people to bike.

Others would need improvements to invite people to use them to bike for routine trips.

As shown in Figure 10, several “islands” of low-stress roadways exist in residential neighborhoods. These routes may be comfortable for bicycling; however, their connectivity is lacking. They are intersected by major streets that are stressful for many bicyclists, effectively cutting off access to other areas. Options are limited for bicycling from one end of the study area to the other.

A strategy for reducing stress and improving connectivity in these areas will be to provide for (or increase) space for walking and bicycling. Strategic and targeted addition of infrastructure creates safe and comfortable walking and bicycling experiences across many types of streets in the study area.

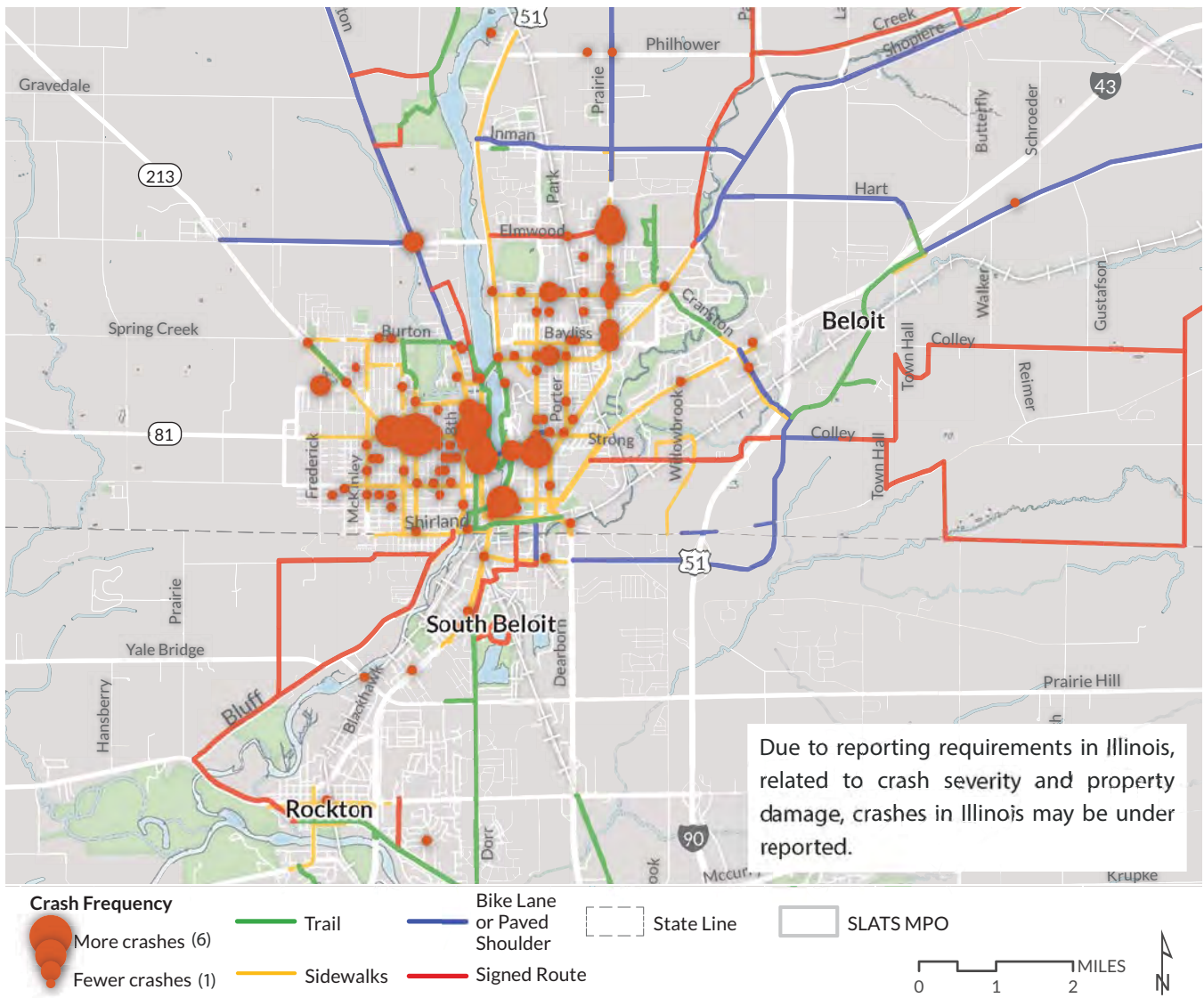


Figure 11. Crash Frequency, 2011-2016: People Walking or Bicycling

Existing Conditions: Safety, Demand, and Equity

Crash History

Figures 11 and 12 show frequency and severity of crashes involving people walking and bicycling. In general, crashes occur most often on high-speed and high-volume roadways. The majority of crashes occur on the Wisconsin side of the state line. Wisconsin is not inherently more dangerous than Illinois. When factoring in population differences, the states do not differ as extremely as the maps show. Differences in crash reporting may also alter the number

of crashes reported in each state. Most reported crashes that were included in the 2011 to 2016 data resulted in an injury to the person walking or bicycling. One fatal bicycle crash was reported in 2015. Another pedestrian crash occurred in 2016. The crash occurred too recently to be included in the crash data that were made available at the time of this writing. Experience from other communities indicates that individuals involved in property damage only (PDO) crashes may later realize they were injured in the crash. National data suggest that motor vehicle speed is a major contributing factor in injuries or deaths to people walking or bicycling. Streets that have high numbers of crashes are not the same streets that were previously identified for bicycle and pedestrian improvements.

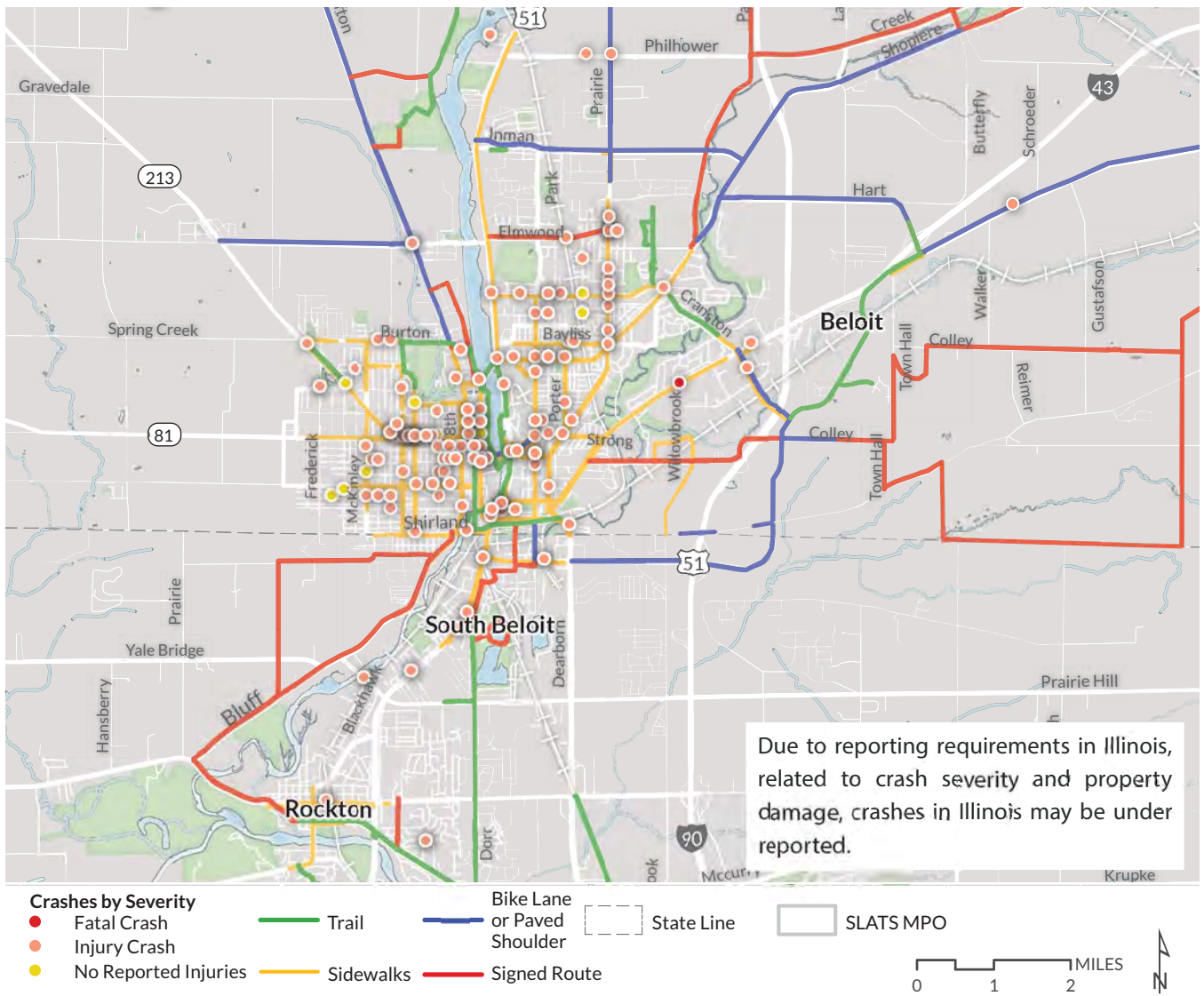


Figure 12. Crash Severity: People Walking or Bicycling



Tefft, B. C. Impact speed and a pedestrian's risk of severe injury or death. Accident Analysis & Prevention 50 (2013) 871-878.

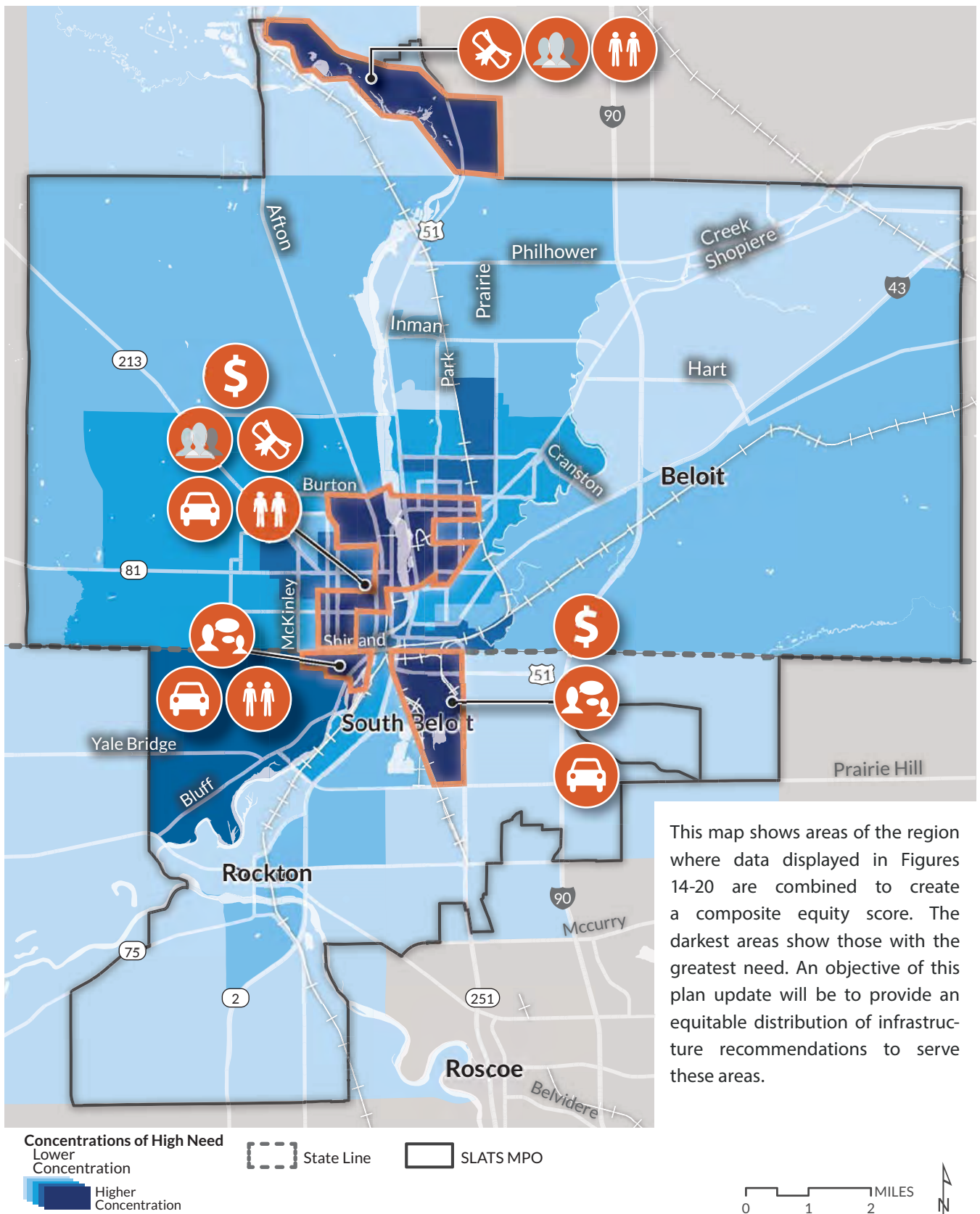


Figure 13. Composite Results of the Equity Analysis

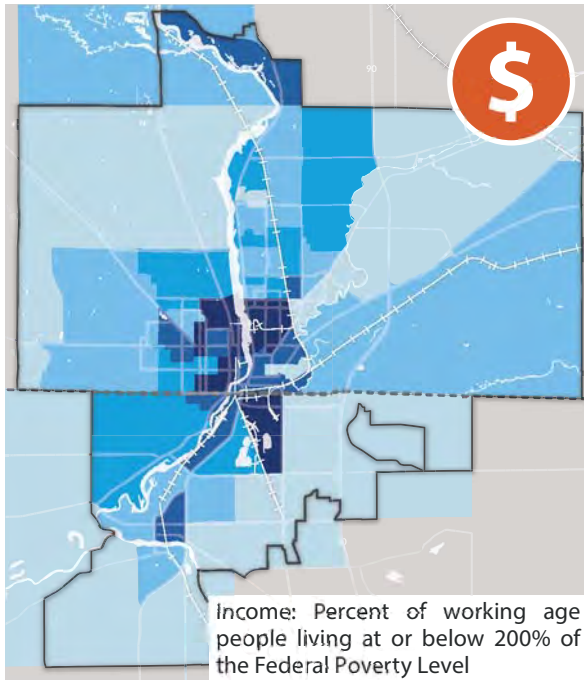


Figure 14. Northern areas of South Beloit along the Rock River and the railroad tracks, downtown Beloit straddling the river, and Janesville, south of the airport show relatively high concentrations of people with low incomes. Lower concentrations of these populations are found in rural areas and generally increase approaching the city cores.

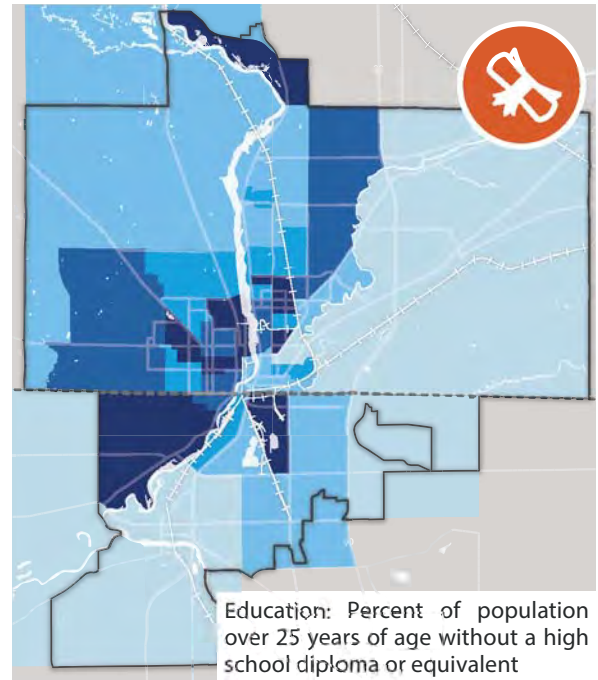


Figure 15. Areas of the region with a high concentration of the population without a high school diploma are shown in Figure 15. The northern edge of South Beloit, west of the Rock River and east of the rail road tracks, downtown and the city core of Beloit, and portions of Janesville all have high concentrations of these populations.

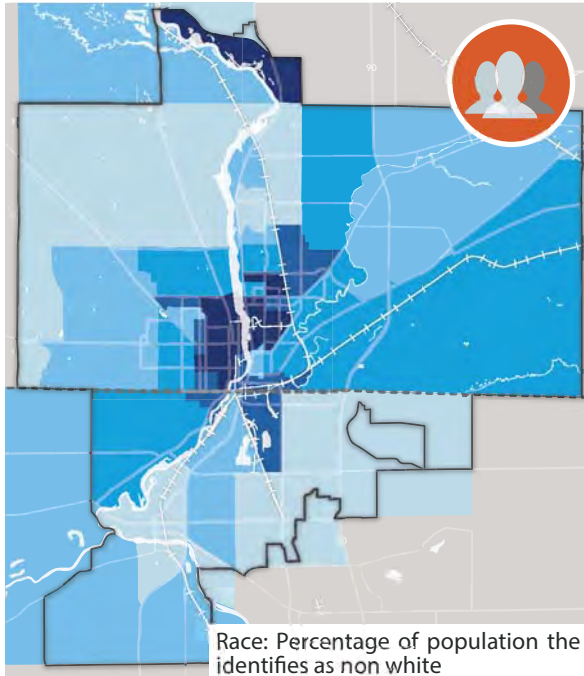


Figure 16. The Beloit city core and downtown, plus Janesville south of the airport have high concentrations of non-white populations. The more rural areas of the region have lower concentrations.

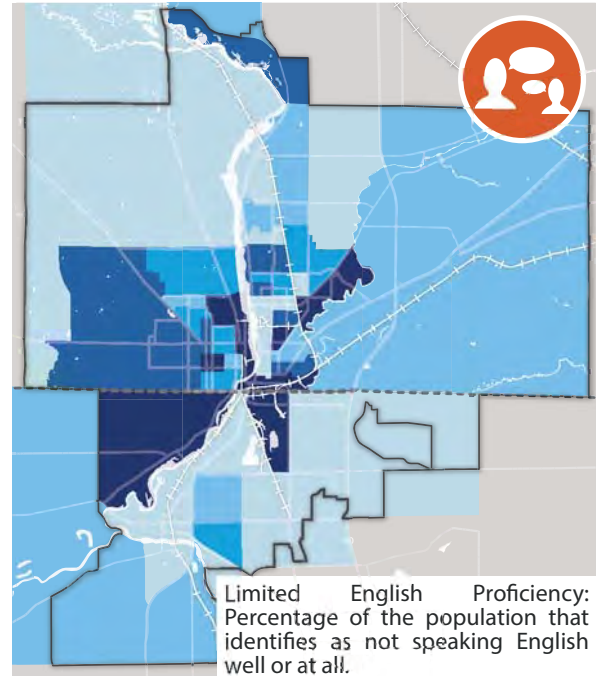


Figure 17. Areas in the northern portion of South Beloit, west of Turtle Creek on the eastern edge of Beloit, and some areas in the Beloit city core have a high concentration of populations with limited English proficiency.

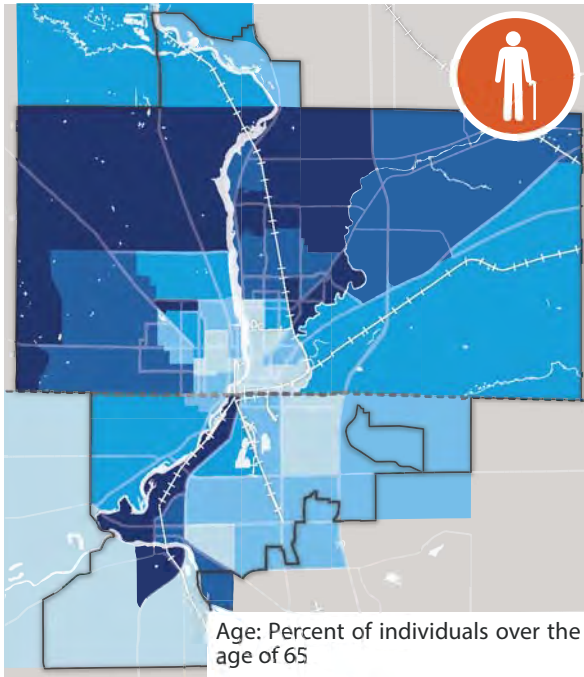


Figure 18. High concentrations of populations over 65 years old are found mostly in the rural areas of the region or on the fringes of cities as they transition to rural areas. Low concentrations of these populations are located in the Beloit city core.

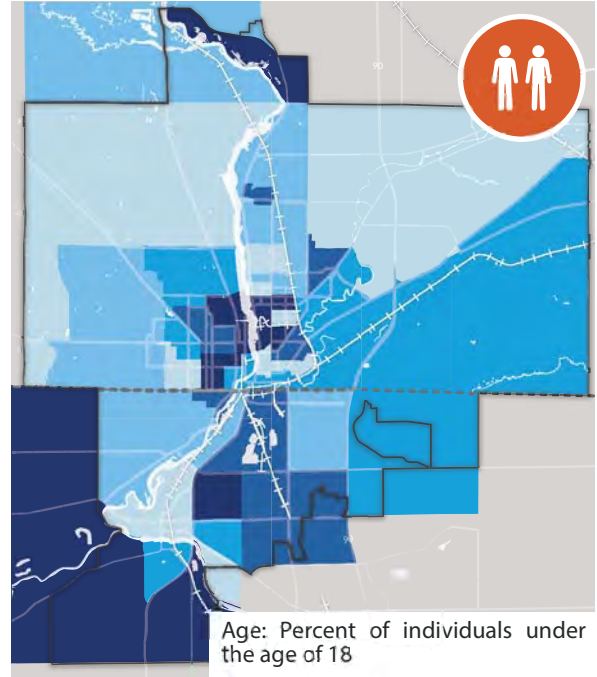


Figure 19. Areas of the region with high concentrations of people under 18 years old are located in the southwest portion of the region, in the Beloit city core, and in Janesville south of the airport.

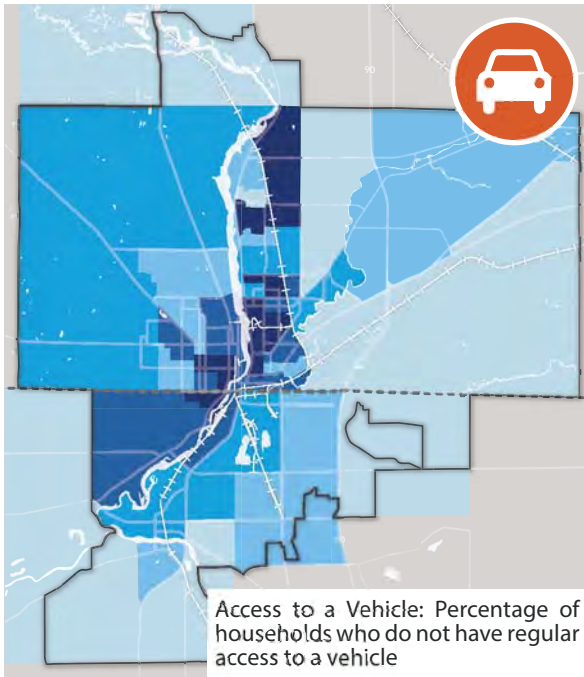


Figure 20. Populations with access to a car are shown in Figure 20. The Beloit city core east of the Rock River, and areas in Crestview have high concentrations of people without access to a car. Areas in the northern and eastern rural portions of the region generally have access to a car.

How to Understand Maps Showing Data for Urban and Rural Areas

The region is composed of urbanized areas with many people living nearby in houses and apartment buildings; the region is also composed of rural areas with homes spread apart and with few people per acre. The presence of these different land uses in the same study area must be considered to understand a map. For example, a hypothetical Census block group has 100 people. If 25 people are living in poverty, 25% of the block group lives in poverty. If 25 people live in poverty in a block group with 1,000 people, then this represents 2.5% of the population. The Census block groups used in these analyses are compared to each other, not state or national averages. This provides relative concentrations, which helps to compare block groups within the region to each other.

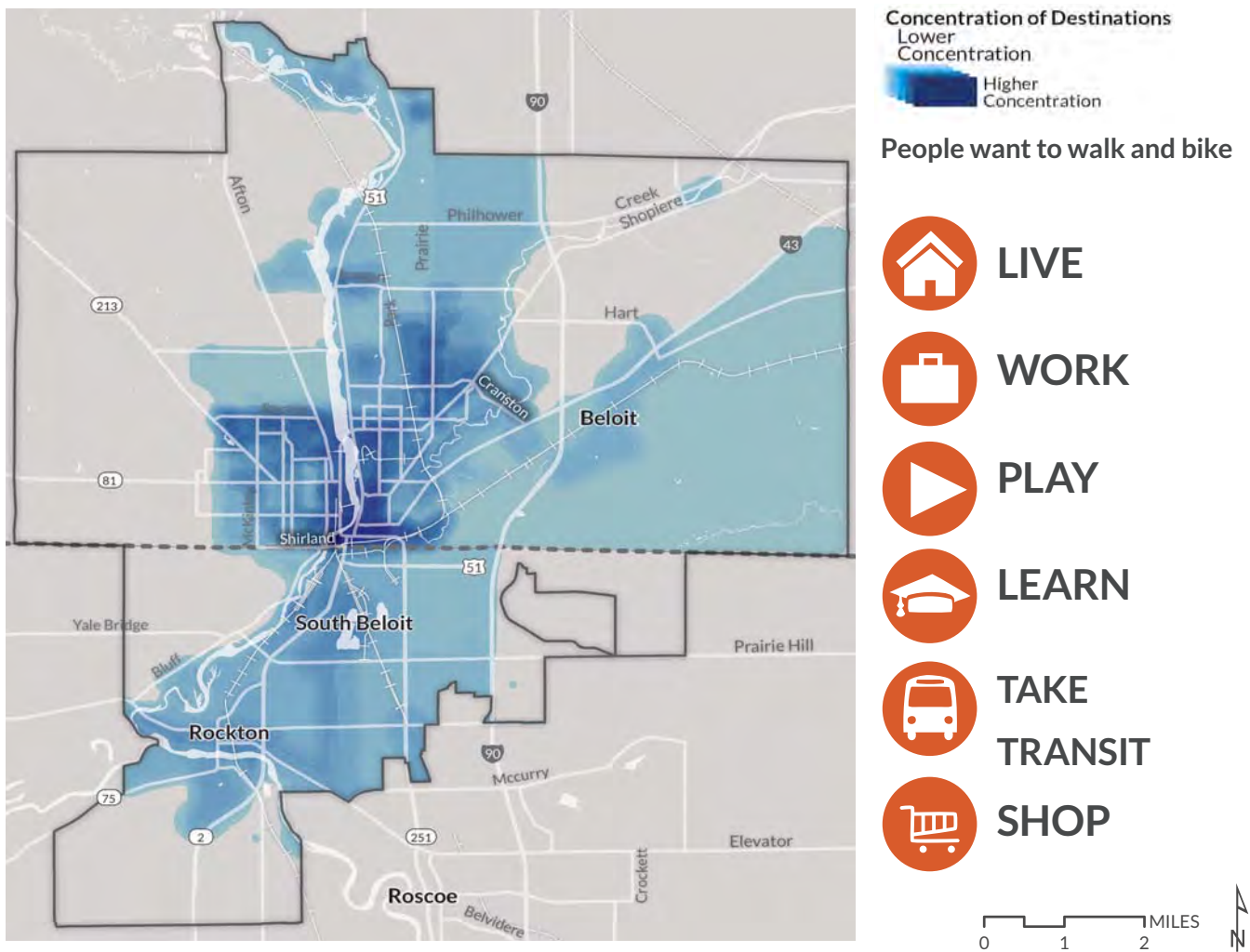


Figure 21. Where People Live, Work, Live, Play, Learn, Take Transit, and Shop

Walking and Bicycling Demand Analysis

Identifying major destinations where people live, work, play, learn, take transit, and shop helps create a walking and bicycling network that supports people as they make trips throughout their day.

The composite map shows a concentration of major destinations in Beloit, Rockton, and the area south of the Southern Wisconsin Regional Airport. The composite maps represents each of the individual factors combined as one overall map.

When looking for opportunities to improve walking and bicycling connections, this analysis helps to identify the areas of greatest interest.

This focus aligns with previous plans that have worked to improve urbanized areas throughout the region, while advancing an overall vision for the stateline area. It is also important to note opportunities for connecting to rural areas. Although these places may have lower populations, it is important to connect these residents to areas with more resources. For instance, the equity analysis found a relatively high concentration of elderly people living in rural areas of Rock county. A relatively high concentration of children live in unincorporated Winnebago county.

Recommendation development will consider these and other factors that act as caveats to the demand and equity analyses.

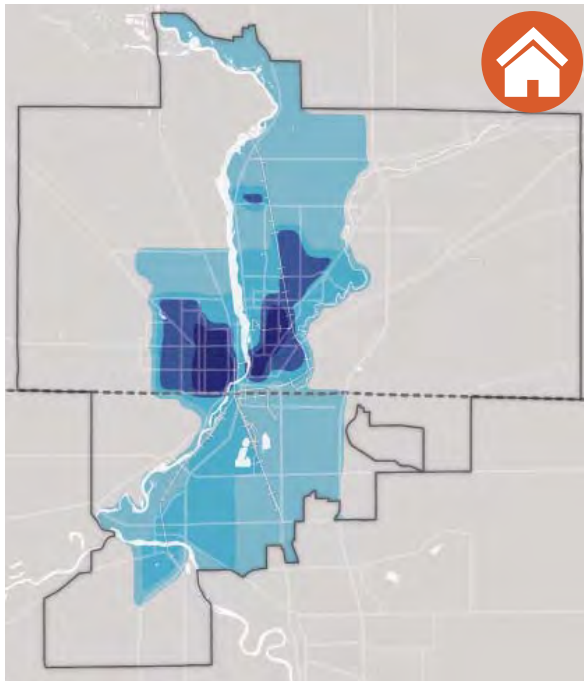


Figure 22. The image above shows areas of the region with higher population densities. Highest concentrations exist near Beloit College student housing, in Rockton, Illinois where there is a greater density of homes, and in two mobile home developments – South Bluff Homes in South Beloit and Rockvale homes in Janesville.

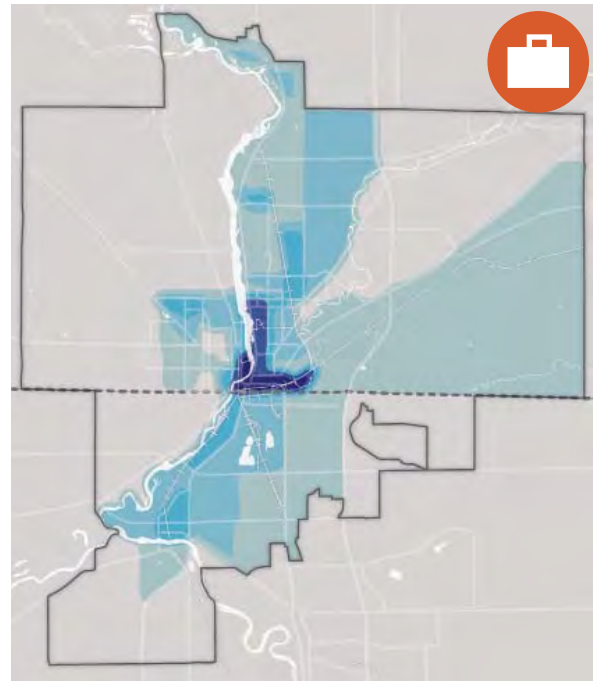


Figure 23. Densities of jobs in the region are shown above. Downtown Beloit and Beloit College, both east of the Rock River are major job centers. In Janesville, Blackhawk Technical College provides employment opportunities to those in the region.

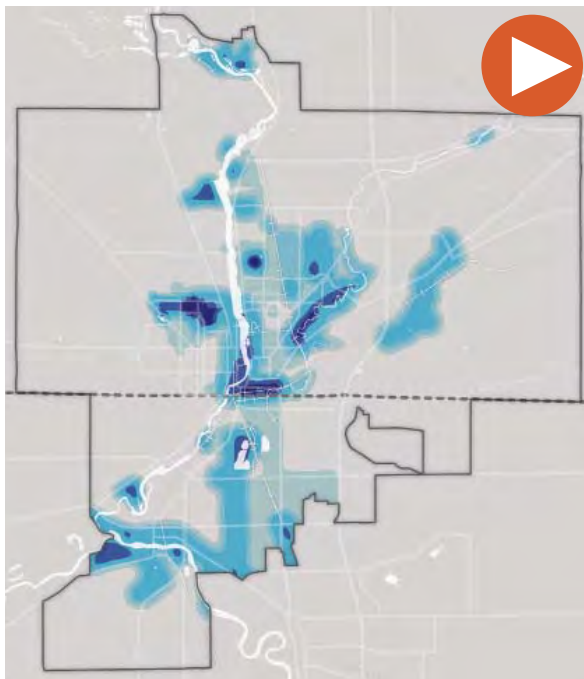


Figure 24. This figure shows where people spend their free time, including trails, park lands, and shopping centers. Winnebago County Forest Preserve and Turtle Creek Park are visible above.

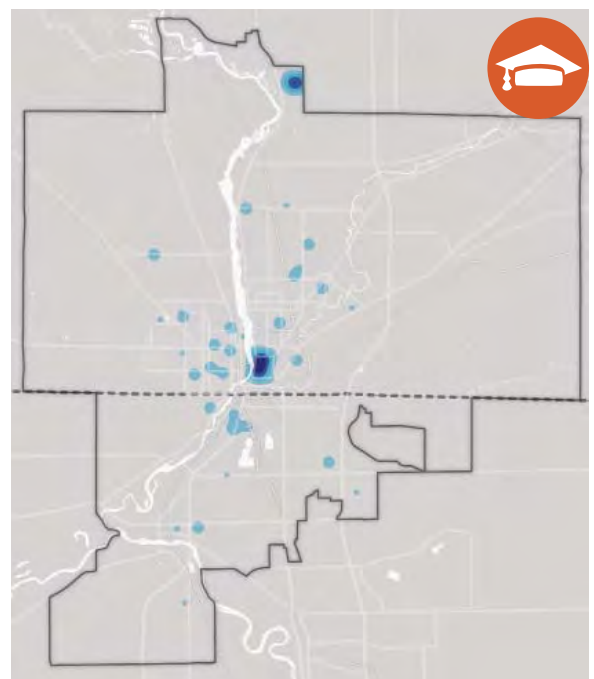


Figure 25. Schools are shown above, based on enrollment data. Blackhawk Technical College and Beloit College are schools with large student bodies, but elementary, middle, and high schools are also shown.

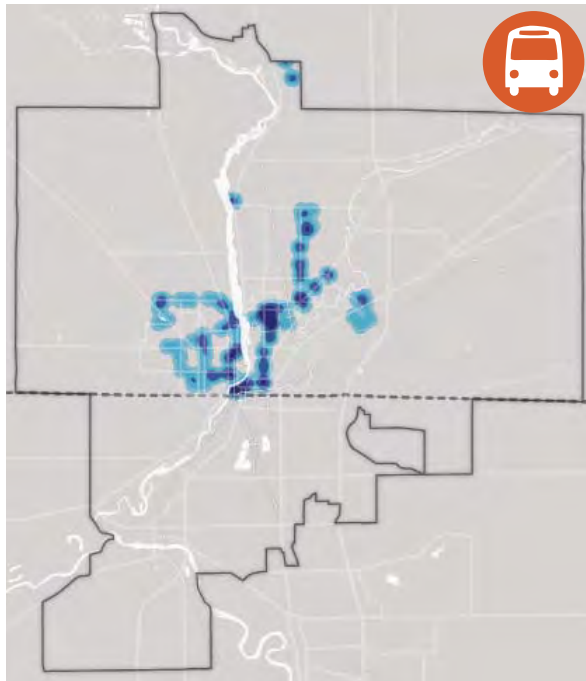


Figure 26. Transit service will attract people walking and biking. Concentrations of higher frequency or express service bus stops are shown in blue, with the assumption that these stops will attract more people walking and biking. Illinois' paratransit services are not shown on this map.

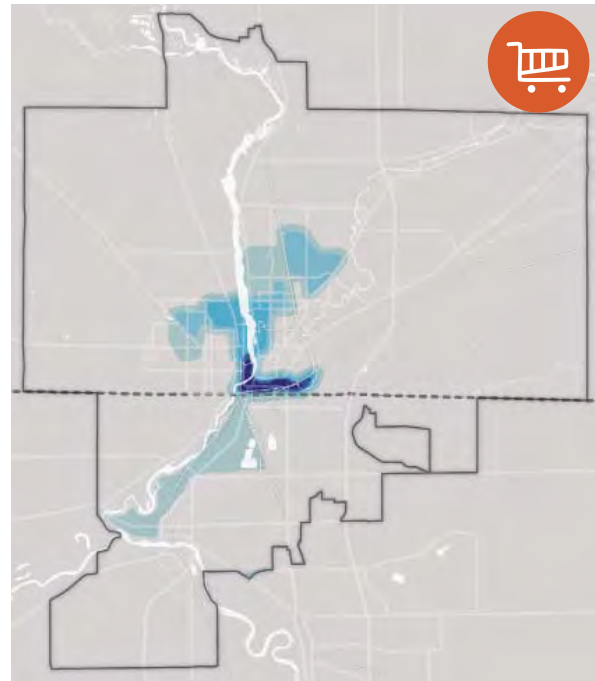


Figure 27. Retail concentrations show areas where people work at jobs in the retail industry. These areas are important from an economic perspective, but also from an entertainment perspective. The largest concentrations of these jobs are found on the state-line in Beloit and South Beloit.

Community Ideas for Improving Walking and Bicycling

This section presents ideas and themes that were collected from area residents during in-person meetings, online map comments, and the online survey.

Public input opportunities were designed to meet people during daily activities, such as the farmers market, Stateline YMCA, Latino Service Providers Coalition, and Community Services. Problem areas, identified by the public, were used as a design input when creating recommendations to improve walking and bicycling in the MPO area. Section III presents these recommendations. All input will be included as an appendix to the final plan.

Main Ideas

- Community members want places to walk that are similar to the riverfront: separated from traffic, scenic, calm, and close to other destinations.
- Community members enjoy using the trails in Rockton and Roscoe. Most reach the trails by driving.
- Milwaukee Avenue was identified as a barrier to children reaching school from neighborhoods located to the west.

- Residents are frustrated by high-traffic, high-speed roadways that discourage walking and bicycling. They are also frustrated when calmer, residential streets lack sidewalks.
- Residents' "desire lines" follow previous plans' ideas. Residents wish to travel from the MPO's communities to downtown Beloit and vice versa.
- Survey responses indicate most respondents drive for most trips. Respondents' interest in improved walking and bicycling reflects national trends of increased interest in walking and bicycling.
- Respondents currently walk and bike for recreation. Routes drawn on the map and indicated in the survey show an interest in walking and bicycling for recreation and transportation.
- Residents note that barriers to walking and bicycling include infrastructure limitations but also driver aggression.



Figure 28. Thanks to all who contributed to the planning process!


What Tools Are Available to Improve Our Streets?

Best practice planning, design, and engineering guidance related to walking and bicycling change as the field continues to evolve. Published guidebooks, as well as experience from other communities, are used in the next chapter to describe approaches for improving the area's regional systems. Regional plans are meant to serve at a broader level than local plans. As such, recommendations in this plan will present ideas for regional connections as well as how local agencies can install recommended projects. The recommendations allow for design flexibility to empower local, County, SLATS MPO, and State agency staff to take ownership of the ideas.

Plan recommendations and design guidelines illustrate how to use these tools in the SLATS MPO area. Broadly, in order to develop high-comfort transportation networks, greater and more robust separation is needed between vehicles and people walking and bicycling.

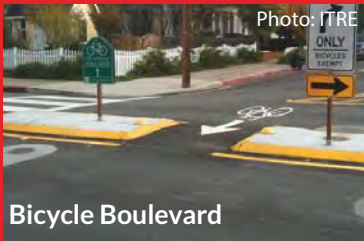
Mixed Traffic

Found in SLATS region




Shared or Yield Roadway


Photo: ITRE



Bicycle Boulevard



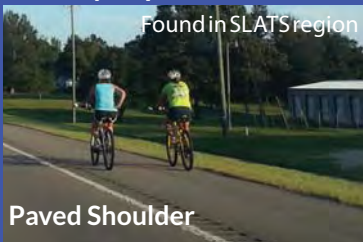
Advisory Shoulder



Streets are shared by people walking, driving, and biking. This only works on quiet streets with low posted speed limits and low traffic volumes.

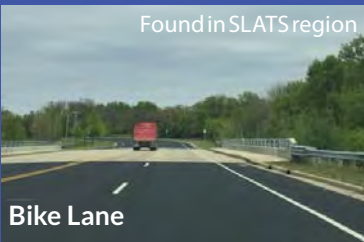
Visually Separated

Found in SLATS region




Paved Shoulder


Found in SLATS region



Bike Lane



Pedestrian Lane



Paint marks space for people bicycling and walking. A street could be a candidate if speeds are moderate and traffic volumes are low to moderate.

Physically Separated

Found in SLATS region



Shared Use Path

Found in SLATS region



Sidepath/Sidewalk



Separated Bike Lane



These designs offer the most separation from drivers. They use physical obstacles, curbs, or planting strips. The goal is to use design changes to make high traffic volume, high speed streets feel comfortable.

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Section III Recommendations: Infrastructure and Programs



Recommendation Development

What Do Developed Walking and Bicycling Networks Look Like?

Safe and connected networks inspire residents and visitors to walk and bike more often. The Federal Highway Administration (FHWA) defines such a network as, “a series of interconnected facilities that allow nonmotorized road users of all ages and abilities to safely and conveniently get where they need to go.”¹

FHWA defines six principles of connected networks²:

- Cohesion
- Directness
- Accessibility
- Alternatives
- Safety and Security
- Comfort

Network recommendations build upon the network analyses shown in the existing conditions chapter. At the regional scale, recommendations focus on developing connections to regional points of interest.

How Do We Develop Network Recommendations?

Recommendations develop according to several variables. Network recommendations focus on creating regional routes that will be built by local agencies. Regional active transportation networks must establish intra- and inter-city routes that are seamless, connected, and that link people to regional destinations. Recommended improvements must consider where it is easy or challenging to walk or bike today, previously adopted plans, and how the region could develop in the future.

All recommendations are subject to change and refinement as site conditions and development patterns change, and as other adjacent or intersecting projects are implemented. Additionally, projects require additional feasibility studies to verify routing or applicability.

Figure 29, below, shows inputs used during the recommendation development process. A more detailed look is displayed on the next page.

Review by the project steering committee and area residents let us know whether draft recommendations hit the mark.



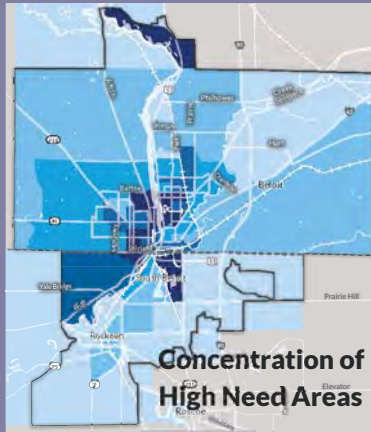
Figure 29. Recommendations were developed using the design inputs shown above.

1 http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/network_report/network_report.pdf

2 Network Report on Case Studies in Delivering Safe, Comfortable and Connected Pedestrian and Bicycle Networks https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/network_report/page09.cfm#ftn4

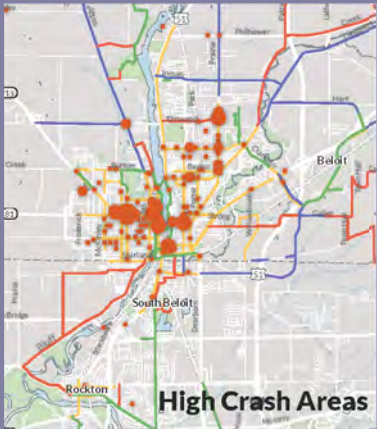


Concentration of Destinations



Concentration of High Need Areas

DEMAND FOR WALKING AND BICYCLING



High Crash Areas



Existing Places to Walk and Bike

EXISTING SUPPLY OF PLACES TO WALK AND BIKE



High and Low Stress Streets to Walk



High and Low Stress Streets to Bike



Where the Public Wants to Walk and Bike



Previously Proposed Projects

PUBLIC INPUT AND PREVIOUS PLANS

For Whom Do We Build Transportation Networks?

When it comes to designing streets, the term “design vehicle” is an important one. The National Association of City Transportation Officials (NACTO) describes the design vehicle as, “a frequent user of a given street” that dictates streets’ characteristics. Instead of designing for the largest trucks,³ NACTO recommends adopting the delivery truck as a design vehicle within urban streets. These vehicles have an inside turning radius of 22.5 feet and an outside turning radius of 29 feet.⁴ Although larger vehicles are accommodated through right turns at intersections, NACTO recommends designing intersections to promote turning speeds of five to 10 miles per hour. Infrequent, large trucks may still use the intersection.

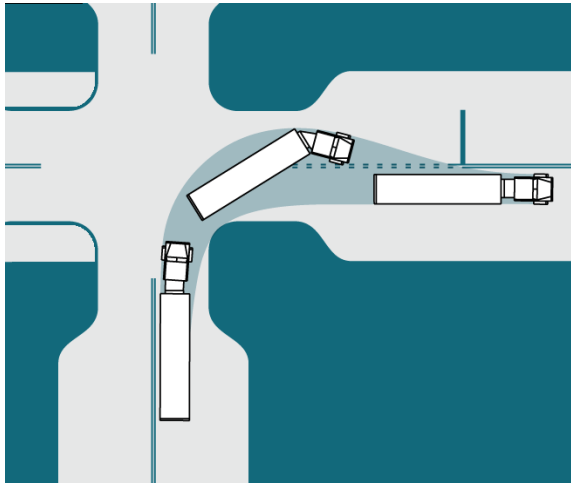


Figure 30. Tight turning radii reduce motor vehicle speeds around corners and create space for pedestrians. Trucks may still use the intersection by traveling over the centerline. Adding a recessed stop bar increases the distance between cars stopped in the opposing direction. (Image credit: nacto.org)

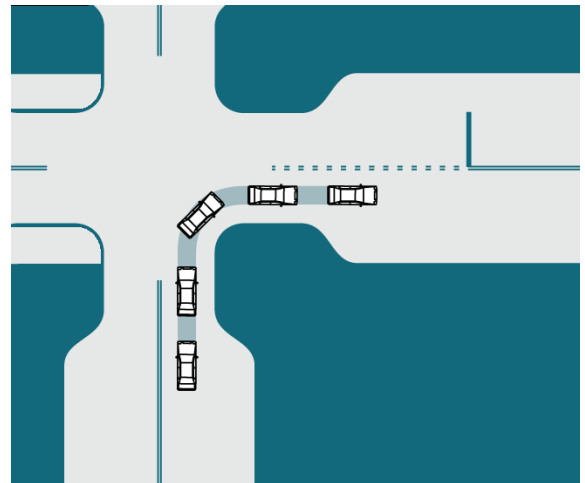


Figure 31. Cars and small trucks are encouraged to make turns at five to 10 miles per hour, which creates a more calm environment in which to walk and bike. (Image credit: nacto.org)

So what does this mean for creating bicycle and walking networks? It means towns and cities can create streets that work better for all types of vehicles: from pedestrians to trucks. Street designers must accommodate these vehicles throughout the transportation system. However, some streets can prioritize certain users over others.

“Designer” Bicyclists and Pedestrians

When thinking of the design vehicle for a person walking or bicycling, planners must think of the needs of people from eight to 80 years old.

Network recommendations consider the need to create streets where young children can travel to school or to play with friends and family. They also think of how to accommodate residents as they age and experience physical or mental changes. Network recommendations aim to invite more people to walk and bike throughout the SLATS region. Although the needs of confident bicyclists are thought of when designing active transportation networks, the planning process must be inclusive of people who are currently hesitant to walk and bike for daily transportation and recreation.

3 <https://nacto.org/publication/urban-street-design-guide/design-controls/design-vehicle/#footnotes>

4 Ibid.

Equitable Transportation Networks and Programming

A multimodal transportation system connects residents to job opportunities, social services, and more. As such, it must be geographically equitable and consider the needs of walking and bicycling in traditionally marginalized areas and areas of high social need. Events that introduce residents to safe walking and bicycling, especially on streets with new types of walking and bicycling infrastructure, must be offered at multiple locations and at multiple times of day to be inclusive. Partnerships with local organizations that serve diverse populations are critical to engaging residents.

When Do We Install Recommendations?

The plan's forthcoming implementation chapter will identify short, medium, and long term ways of building the network. It will identify "low-hanging fruit", or street redesigns that are possible more immediately than other infrastructure changes. Other recommendations are more conceptual and aspirational. Additional coordination and study will be needed to implement these facilities in the future. The needs of all roadway users, including the safety and comfort of people walking, bicycling, and accessing transit, must be balanced with roadway characteristics and corridor constraints.

Where Do Certain Facilities Go?

As the next section demonstrates, planners, designers, and engineers have a large "toolbox" to pull from when redesigning streets for walking and bicycling. Each tool serves a function in creating a complete network, but not every tool is suited for every job. As discussed in the existing conditions section, planners think of the toolbox as divided into three sections:

Mixed Traffic: People walking and bicycling can safely share roadway space with motorists. To picture this type of street, think of a quiet residential street where kids and parents can easily bike to and from school.

Visually Separated: More space is required between people walking/bicycling and driving as traffic speeds or number of cars increase. To picture these types of tools, think of paved shoulders found in rural areas or the bike lane on Shapiero Avenue.

Physically Separated: People walking and bicycling need separate space when a visual cue is not enough to feel safe from passing cars. Some tools are shared by people walking and bicycling, while sidewalks are reserved for pedestrians. The Hononegah path is one example.

Each of these facility types have corresponding intersection treatment types. Intersections are typically the least safe places for people walking and bicycling. The design guideline section that follows discusses approaches for minor and major intersections.

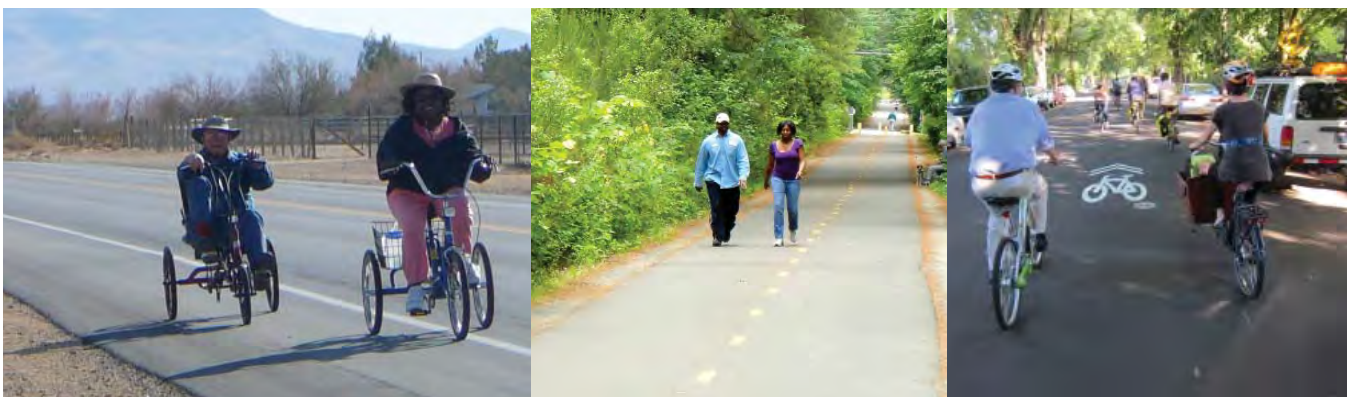


Figure 32. On and off street walking and bicycling infrastructure must be safe and easily accessible by people of all ages and abilities.

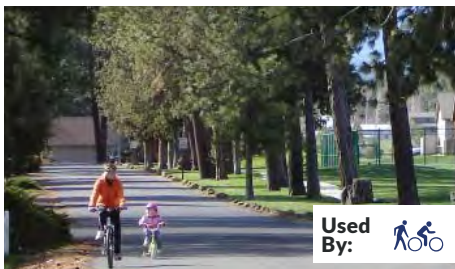
Design Guidelines: A Toolbox of Infrastructure Options

The following tables illustrate a toolbox of design guideline best practices that will work for the SLATS region. Examples are inspired by the FHWA Small Town and Rural Multimodal Networks Guide and the NACTO Urban Bikeway Design Guide.

Walking and bicycling infrastructure should make sense to casual walkers/riders. However, events, signs, resources, or other tactics should also be deployed to teach people how to walk, bike, or drive on streets that use new infrastructure tools. More about this is described following the toolbox.

Mixed Traffic Facilities

Yield Roadway



A yield roadway is designed to serve pedestrians, bicyclists, and motor vehicle traffic in the same slow speed travel area. Yield roadways serve bidirectional motor vehicle traffic without lane markings in the roadway travel area.

Speed (Preferred mph)*	Volume (Preferred ADT)*	Local	Network			Land Use		
			Collector	Highway	Outside of built-up areas	Between built-up areas	Within built-up areas	
0 - 20	0 - 500	X						X

Bicycle Boulevard (Also Known As: Neighborhood Greenway, Neighborhood Bikeway)



A bicycle boulevard is a low-stress shared roadway bicycle facility, designed to offer priority for bicyclists operating within a roadway shared with motor vehicle traffic. Traffic calming also improves the pedestrian environment. Streets planned for neighborhood greenways should incorporate sidewalk construction or repairs and pedestrian crossing improvements.

Speed (Preferred mph)*	Volume (Preferred ADT)*	Local	Network			Land Use		
			Collector	Highway	Outside of built-up areas	Between built-up areas	Within built-up areas	
0 - 20	0 - 1,500	X						X

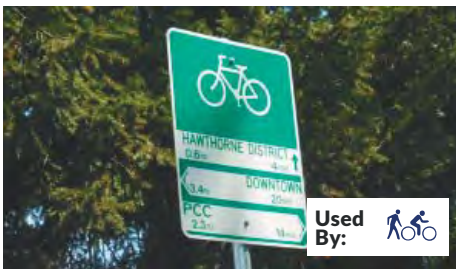
Advisory Shoulder



Advisory shoulders create usable shoulders for bicyclists on a roadway that is otherwise too narrow to accommodate one. The shoulder is delineated by pavement marking and optional pavement color. Motorists may only enter the shoulder when no bicyclists are present and must overtake these users with caution due to potential oncoming traffic. Note: In order to install advisory shoulders, an approved Request to Experiment is required as detailed in Section 1A.10 of the MUTCD. Pedestrians are not prohibited from using the facility, but are not the explicitly intended users.

Speed (Preferred mph)*	Volume (Preferred ADT)*	Local	Network		Outside of built-up areas	Land Use	
			Collector	Highway		Between built-up areas	Within built- up areas
0 - 25	0 - 3,000		X		X	X	X

Wayfinding Signage and Markings

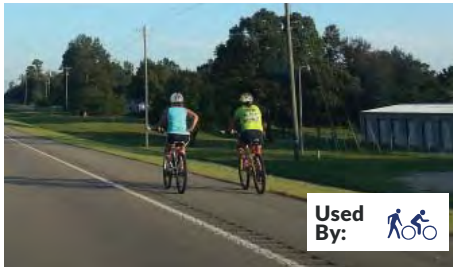


Wayfinding signs are placed on low-stress routes or bicycle and walking facilities to help people navigate. They are great ways to increase visibility of local and regional destinations.

Speed (Preferred mph)*	Volume (Preferred ADT)*	Local	Network		Outside of built-up areas	Land Use	
			Collector	Highway		Between built-up areas	Within built- up areas
0 - 20	0 - 2,000	X	X		X	X	X

Visually Separated Facilities

Paved Shoulder



Paved shoulders on the edge of roadways can be enhanced to serve as a functional space for bicyclists and pedestrians to travel in the absence of other facilities with more separation.

Speed (Preferred mph)*	Volume (Preferred ADT)*	Local	Network		Outside of built-up areas	Land Use	
			Collector	Highway		Between built-up areas	Within built- up areas
25 - 55	1,000 - 12,000+		X	X	X		X

Bike Lane



Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and optional signs. A bike lane is located directly adjacent to motor vehicle travel lanes and follows the same direction as motor vehicle traffic.

Speed (Preferred mph)*	Volume (Preferred ADT)*	Local	Network		Outside of built-up areas	Land Use	
			Collector	Highway		Between built-up areas	Within built- up areas
0 - 40	0 - 9,000	X	X			X	X

Buffered Bike Lane



Buffered bike lanes provide a painted buffered space between the bike lane and a parking lane or travel lane to increase the space between people bicycling and people driving.

Speed (Preferred mph)*	Volume (Preferred ADT)*	Local	Network		Outside of built-up areas	Land Use	
			Collector	Highway		Between built-up areas	Within built- up areas
0 - 20	0 - 500	X					X

Contra-Flow Bike Lane



Contra-flow bike lanes allow bicycle users to travel against the flow of traffic while traveling in a bicycle lane. These types of lanes work best in low speed and low traffic volume environments.

Speed (Preferred mph)*	Volume (Preferred ADT)*	Local	Network		Outside of built-up areas	Land Use	
			Collector	Highway		Between built-up areas	Within built- up areas
0 - 20	0 - 1,500	X					X

Physically Separated Facilities

Shared Use Path



A shared use path provides a travel area separate from motorized traffic for bicyclists, pedestrians, skaters, wheelchair users, joggers, and other users. Shared use paths can provide a low-stress experience for a variety of users using the network for transportation or recreation.

Speed (Preferred mph)*	Volume (Preferred ADT)*	Local	Network		Outside of built-up areas	Land Use	
			Collector	Highway		Between built-up areas	Within built- up areas
-	-				X		X

Sidepath



A sidepath is a bidirectional shared use path located immediately adjacent and parallel to a roadway. Sidepaths can offer a high-quality experience for users of all ages and abilities as compared to on-roadway facilities in heavy traffic environments, allow for reduced roadway crossing distances, and maintain rural and small town community character.

Speed (Preferred mph)*	Volume (Preferred ADT)*	Local	Network		Outside of built-up areas	Land Use	
			Collector	Highway		Between built-up areas	Within built- up areas
10 - 55	0 - 12,000+		X	X			X

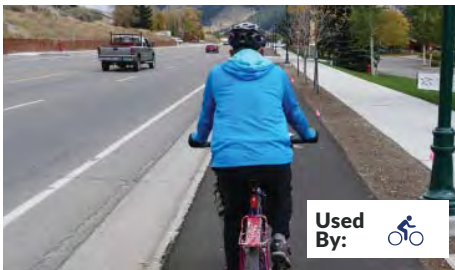
Sidewalk



Sidewalks provide dedicated space intended for use by pedestrians that is safe, comfortable, and accessible to all. Sidewalks are physically separated from the roadway by a curb or unpaved buffer space.

Speed (Preferred mph)*	Volume (Preferred ADT)*	Local	Network		Outside of built-up areas	Land Use	
			Collector	Highway		Between built-up areas	Within built- up areas
10 - 50	0 - 12,000+	X	X				X

Separated Bike Lane



A separated bike lane gives bicyclists the experience of riding in a separated path while riding along a street. These types of facilities are comfortable and inviting for people who do not typically ride bicycles. Separated bike lane design continues to advance and includes lanes on one or both sides of the street.

Speed (Preferred mph)*	Volume (Preferred ADT)*	Local	Network		Outside of built-up areas	Land Use	
			Collector	Highway		Between built-up areas	Within built- up areas
10 - 50	0 - 12,000+	X	X				X

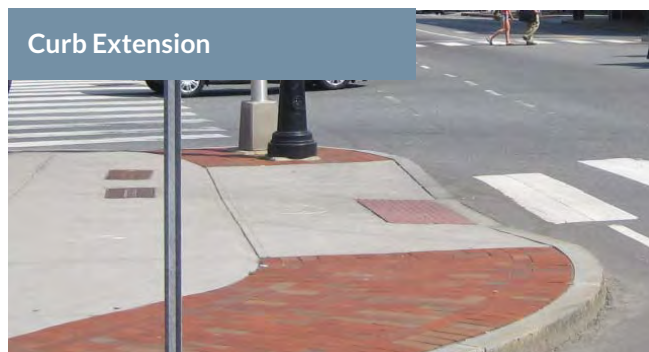
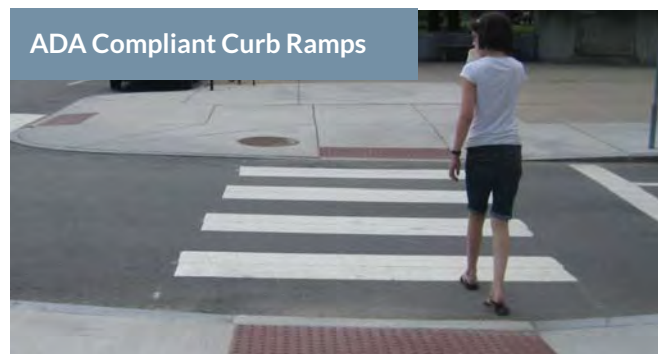
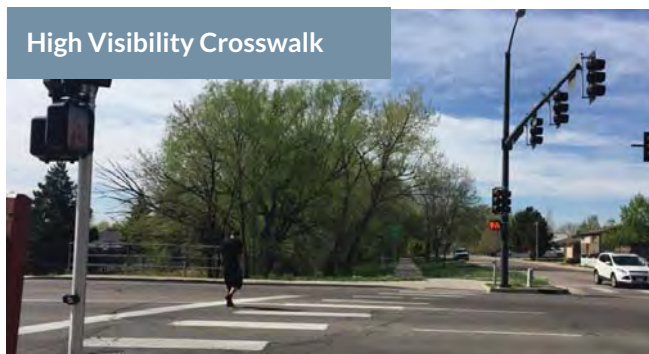
Crossing Improvements

Crossing improvements should be coordinated with corridor improvements. For instance, locations that should include colored intersection crossing markings should be designed when planning to implement bicycle lanes, rather than implemented separately.

Crossing improvements fall into two broad categories: intersections and mid-block crossings.

Intersections

Signalized intersections are typically the preferred crossing location for pedestrians, since traffic is stopped in one direction and motorists generally expect crossing pedestrians. However, vehicular turning speed, visibility, crossing distance, and signal timing can be great barriers for pedestrians on roadways that are designed to primarily accommodate vehicular traffic.

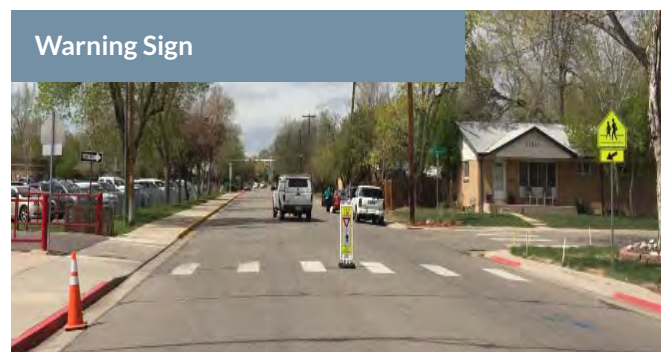


Midblock Crossings

A mid-block crossing typically consists of a marked crossing area, signage, and other roadway design elements to slow or stop traffic. The approach to designing crossings at unsignalized locations depends on an evaluation of vehicular traffic, line of sight, pathway traffic, use patterns, vehicle speed, road type, road width, and other safety issues. The types of mid-block crossing improvements recommended include the addition of beacons, as well as curb extensions and pedestrian refuge islands. The chart below provides contextual guidance for selecting midblock crossing improvements.

	Local Streets		Collector Streets			Arterial Streets							
	2 Lanes	3 Lanes	2 Lanes	2 Lanes with Median Refuge	3 Lanes	2 Lanes	2 Lanes with Median Refuge	3 Lanes	4 Lanes	4 Lanes with Median Refuge	5 Lanes	6 Lanes	6 Lanes with Median Refuge
High Visibility Crosswalk	Not Recommended	Potential Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended
Crosswalk with Warning Signage and Yield Markings	Potential Candidate for Improvement	Not Recommended	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended
Stop Sign	Not Recommended	Not Recommended	Potential Candidate for Improvement	Potential Candidate for Improvement	Potential Candidate for Improvement	Potential Candidate for Improvement	Potential Candidate for Improvement	Potential Candidate for Improvement	Not Recommended	Not Recommended	Not Recommended	Not Recommended	Not Recommended
Active Warning Beacon (RRFB)	Not Recommended	Potential Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Not Recommended	Candidate for Improvement	Not Recommended	Not Recommended	Not Recommended
Hybrid Beacon	Not Recommended	Not Recommended	Potential Candidate for Improvement	Potential Candidate for Improvement	Potential Candidate for Improvement	Potential Candidate for Improvement	Potential Candidate for Improvement	Potential Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement
Full Traffic Signal	Not Recommended	Not Recommended	Potential Candidate for Improvement	Potential Candidate for Improvement	Potential Candidate for Improvement	Potential Candidate for Improvement	Potential Candidate for Improvement	Potential Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement
Grade Separation	Not Recommended	Not Recommended	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement	Candidate for Improvement

Legend	
Candidate for Improvement	
Potential Candidate for Improvement	
Not Recommended	



Getting There from Here, an Implementation Strategy

Infrastructure construction looks different based on the facility category. Each facility category seeks to rebalance our roadway system to make space for multiple transportation modes. What this looks like in practice depends on whether bikes, pedestrians, and cars share space on the roadway or whether they are separated by painted striping or physical barriers.

Mixed Traffic Facilities

Some streets in the SLATS region currently function well as mixed traffic streets. In most residential neighborhoods, it is generally comfortable for families to walk and bike. The level of changes needed on a roadway to provide this experience vary according to the level of traffic stress.

In general, more infrastructure treatments are needed along a yield roadway or neighborhood greenway if a street has a higher posted speed limit and higher average traffic volumes than are typically recommended along neighborhood greenways.

Neighborhood Greenway Corridor Design

Wayfinding Signage and Pavement Markings

Some streets may only need wayfinding signage to act as inviting walking and bicycling routes. Streets with speed limits below 25 MPH, without speeding issues, and with an average of 3,000 cars per day or fewer (1,500 cars preferred) can use this treatment. See page 45 for more about wayfinding.

Speed Management Strategies

NACTO's Urban Bikeway Design Guide recommends using traffic calming along neighborhood greenways to keep average vehicle speeds under 22 miles per hour.

Volume Management Strategies

Cities and towns can use the following tools to reduce traffic volumes along neighborhood greenways:

	Speed hump/ table		Mini roundabouts
	Raised crosswalk		Curb extensions
	Chicanes		

	Partial road diverter		Full closure
	Diagonal diverter		

Neighborhood Greenways: Intersection Design

Intersection without a Traffic Signal

Intersection with Traffic Signals

Speed Limit: <35MPH
Travel Lanes: < 3

Speed Limit: >35MPH
Travel Lanes: >=3



Stop signs on
Intersecting
street



Median
refuge island



Bicycle detection
and actuation



Advance
warning signs



Active
warning beacon



Partial closure



Curb extensions



Hybrid
beacon



Bike box



Bicycle forward
stop bar (Image
source: nacto.org)



Intersection
crossing markings



Raised intersection

Advisory Shoulders

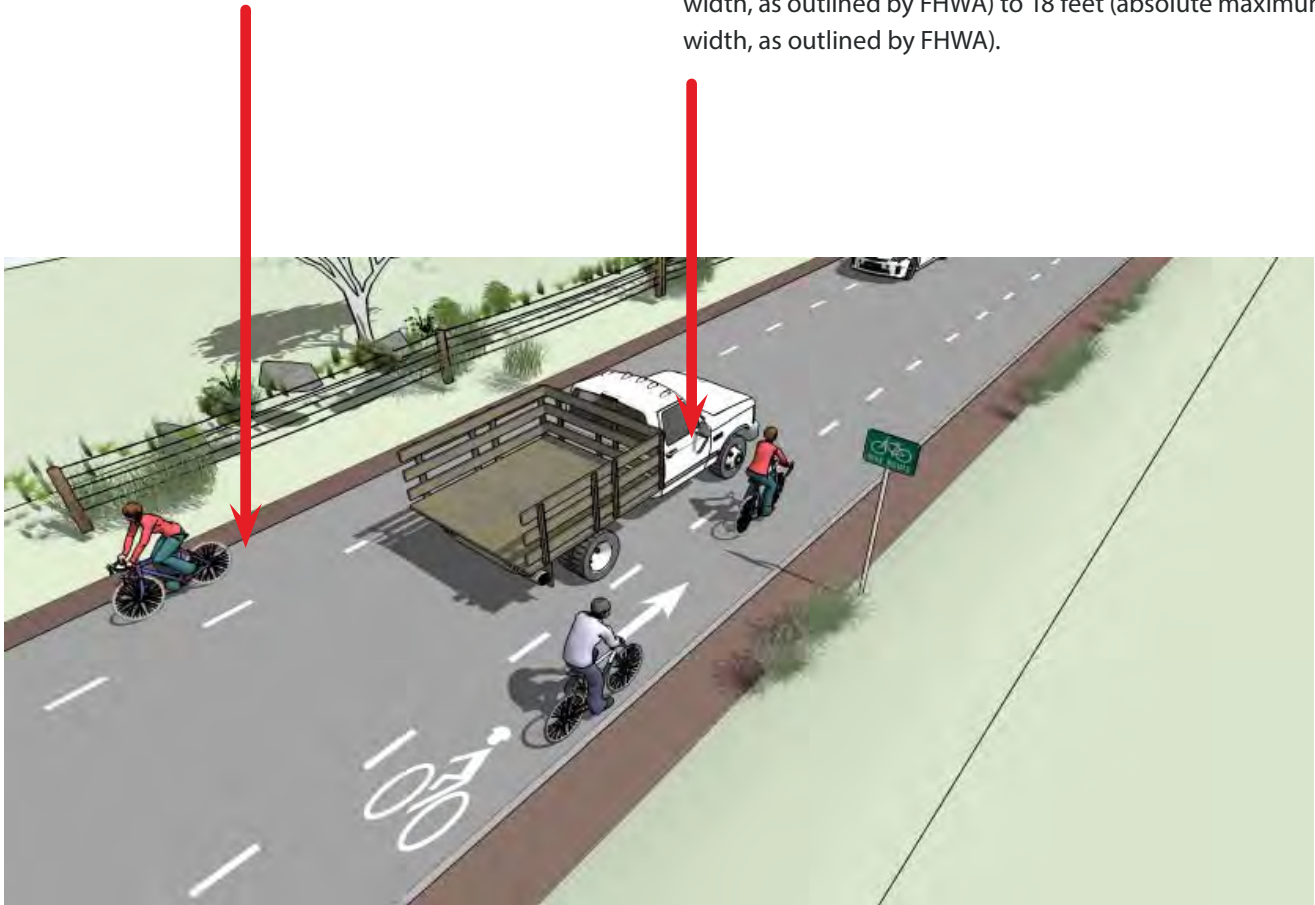
Advisory shoulders are a great tool for streets that would benefit from bike lanes or sidewalks, but are too narrow to fit dedicated lanes for motorized and nonmotorized vehicles.

Streets are candidates for advisory shoulders if they have posted speed limits below 35 miles per hour (25 preferred). The street should move 6,000 cars per day or fewer (3,000 preferred). Advisory shoulders do not have centerlines.

Advisory Shoulder Corridor Design

Dashed white lines are added to provide six foot shoulders (minimum 4 ft, without curb and gutter). This creates space for people to walk and bike.

Adding the dashed lines to the street edges creates one center lane for two-way travel by cars and trucks. The center lane width varies from 10 feet (practical minimum width, as outlined by FHWA) to 18 feet (absolute maximum width, as outlined by FHWA).



Walking and Bicycling Wayfinding Signage

Wayfinding provides navigational assistance to bicyclists, pedestrians, and trail users, including information about destinations, and travel distances. Wayfinding systems are comprised of fundamental wayfinding elements and enhanced off street navigational elements, such as kiosks and mile markers.

Wayfinding Principles



1. CONNECT PLACES

Facilitate travel between destinations and provide guidance to new destinations.



2. KEEP INFORMATION SIMPLE

Present information simply, using clear fonts and simple designs, so that it can be understood quickly.



3. MAINTAIN MOTION

Be legible and visible for people moving so that they can read the signage without stopping.



4. BE PREDICTABLE

Standardize the placement and design of signs so that patterns are established and the signage becomes predictable.



5. PROMOTE ACTIVE TRAVEL

Encourage increased rates of active transportation by helping people to realize they can use the bikeway and pedestrian network to access the places they want to go.

Fundamental Navigational Elements

Fundamental wayfinding elements consist of decision signs, confirmation signs, and turn signs. These signs are intended to be implemented on both on street and off street facilities. Since they will be applied on street, they should conform with MUTCD requirements. Signage elements should include distance to destination information, including both mileage and estimated travel time.

Enhanced Navigational Elements

Enhanced navigational elements provide additional wayfinding assistance beyond decision, confirmation, and turn signs for on street and off street bikeway networks. Signs included in this category are: 1) mile markers, 2) gateway markers, 3) interpretive signage, 4) pavement markings, and 5) map kiosks. Pavement markings are an ideal tool to provide navigational assistance along a neighborhood bikeway or trail route, while reducing sign clutter. Map kiosks, which tend to be located at trailheads and downtown locations, provide people with information about the surrounding area, amenities, and bikeway and trail routes. Kiosks may also include orientation maps. Since this signage is installed off street, there is more flexibility in terms of design.



Figure 33. Wayfinding fundamental navigational elements (MUTCD consistent)

Visually Separated Facilities

Some streets in the SLATS region currently function well as mixed traffic streets. In most residential neighborhoods, it is generally comfortable for families to walk and bike. The level of changes needed on a roadway to provide this experience vary according to the level of traffic stress.

In general, more infrastructure treatments are needed along a yield roadway or neighborhood greenway if a street has a higher posted speed limit and higher average traffic volumes than are typically recommended along neighborhood greenways.

Corridor Design

There are three main ways to use roadway space for bicycle travel:



Roadway Resurfacing

Streets are routinely resurfaced to create smooth travel lanes. Because major streets are resurfaced using a recurring schedule, this offers opportunities to narrow travel lanes and restripe the street with bike lanes during the resurfacing process.

Matching bike lane planning and design schedules in advance of summer construction schedules can lead to lower cost construction.

Infrastructure tools that can use this approach include:

- Bike lane (unbuffered and sometimes buffered)
- Paved shoulder
- Pedestrian lane
- Advisory shoulder
- Advisory bike lane



Image Credit: Simon Blenski, City of Minneapolis/FHWA, *Incorporating On-Road Bicycle Networks into Resurfacing Projects*



Reconfiguring a roadway to narrow travel lanes and add a center turn lane and bike lanes. Image Credit: Randy Dittberner, Virginia Department of Transportation/FHWA *Incorporating On-Road Bicycle Networks into Resurfacing Projects*

Roadway Reconfiguration

This method of making a street more accessible for people walking, bicycling, and driving involves narrowing existing travel lanes and/or using existing travel lanes for other features (i.e., two way center turn lane, pedestrian refuge island/upgraded crossing, bike lanes).

This approach works well when travel speeds and the average number of cars using the street are relatively low.

Infrastructure tools that can use this approach include:

- Bike lane
- Pedestrian lane
- Buffered bike lane
- Physically separated bike lane
- Advisory shoulder
- Paved shoulder
- Sidepath

Roadway Widening

Sometimes, the best way to add bicycle and pedestrian facilities is to repave a street to add additional width to fit these facilities. The needs of people walking and bicycling should be considered if a street is scheduled to be widened to fit additional travel lanes for motor vehicles.

Infrastructure tools that can use this approach include:

- Bike lane
- Buffered bike lane
- Physically separated bike lane
- Paved shoulder

Physically Separated Facilities

Physically separated facilities include sidepaths, separated bike lanes, and trails. The physically separated facilities recommended in this plan mostly focus on sidepaths. A sidepath is a path that runs parallel to a roadway and is used by people walking and bicycling. When designed correctly, sidepaths give the experience of riding along a trail, but could be located in rural or suburban areas.

Many types of physical barriers are used across the country to create separated bike lanes. These barriers include concrete curb, planters, parked cars, or flexible bollards. Separated bike lanes could also be raised at a grade slightly higher than the adjacent travel lanes.

Sidepath Corridor Design

Shared use paths within road right-of-way, also called sidepaths, are a type of path that run adjacent to a street. Sidepaths are for both bicycle and pedestrian travel.

Due to operational concerns, it is generally preferable to place paths within independent rights-of-way away from roadways. However, there are situations where existing roads provide the only corridors available.



Figure 34. Example sidepaths.

Retrofitting Sidewalks

Where space is available, it may be appropriate to retrofit an existing sidewalk into a sidepath. While sidewalks are often used as bicycling routes in the SLATS area, they are not ideal for bicycle traffic. Sidepaths are wider and allow for bidirectional bicycle travel. This may be appropriate where high volumes of bicyclists and pedestrians are expected to be present, and/or when motor vehicle speeds and volumes create unsafe conditions for on street bike lanes.

Other Considerations

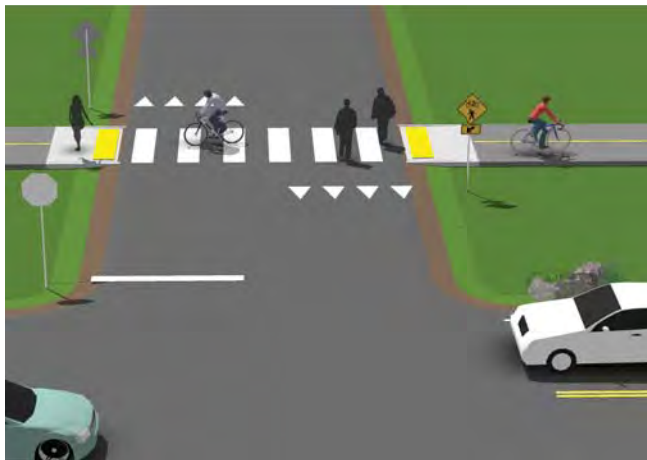
The provision of a shared use path adjacent to a road is not a substitute for the provision of on road accommodation such as paved shoulders or bike lanes, but may be considered in some locations in addition to on-road bicycle facilities.

Crossing Design

It is very important to appropriately design sidepath crossings, since this is where most conflicts between people driving and people walking and bicycling occur along this type of facility.

Setback Crossing

A set back of 25 feet separates the path crossing from merging/turning movements that may be competing for a driver's attention.



Adjacent Crossing

A separation of 6 feet emphasizes the conspicuity of riders at the approach to the crossing.

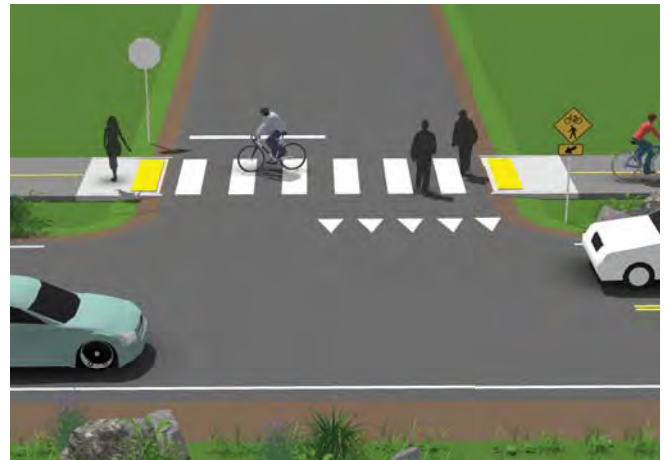


Figure 35. Example crossings: setback and adjacent to turning movements.

One Way Separated Bike Lane Corridor Design

Pavement markings, symbols and/or arrow markings must be placed at the beginning of the separated bike lane and at intervals along the facility (MUTCD 9C.04).

7 ft width preferred (5 ft minimum). 3 ft minimum buffer width adjacent to parking. 18 inch minimum adjacent to travel lanes (NACTO, 2012). Channelizing devices should be placed in the buffer area.

If buffer area is 4 ft or wider, white chevron or diagonal markings should be used.



Two Way Separated Bike Lane Corridor Design

- Works best on the left side of one-way streets.
- 12 ft operating width preferred (10 ft minimum) width for two-way facility.
- In constrained an 8 ft minimum operating width may be considered.
- Adjacent to on street parking a 3 ft minimum width channelized buffer or island shall be provided to accommodate opening doors (NACTO, 2012) (MUTCD 3H.01, 3I.01).
- A separation narrower than 5 ft may be permitted if a physical barrier is present (AASHTO, 2013).
- Additional signalization and signs may be necessary to manage conflicts.



Physical Barriers for Separated Bike Lanes

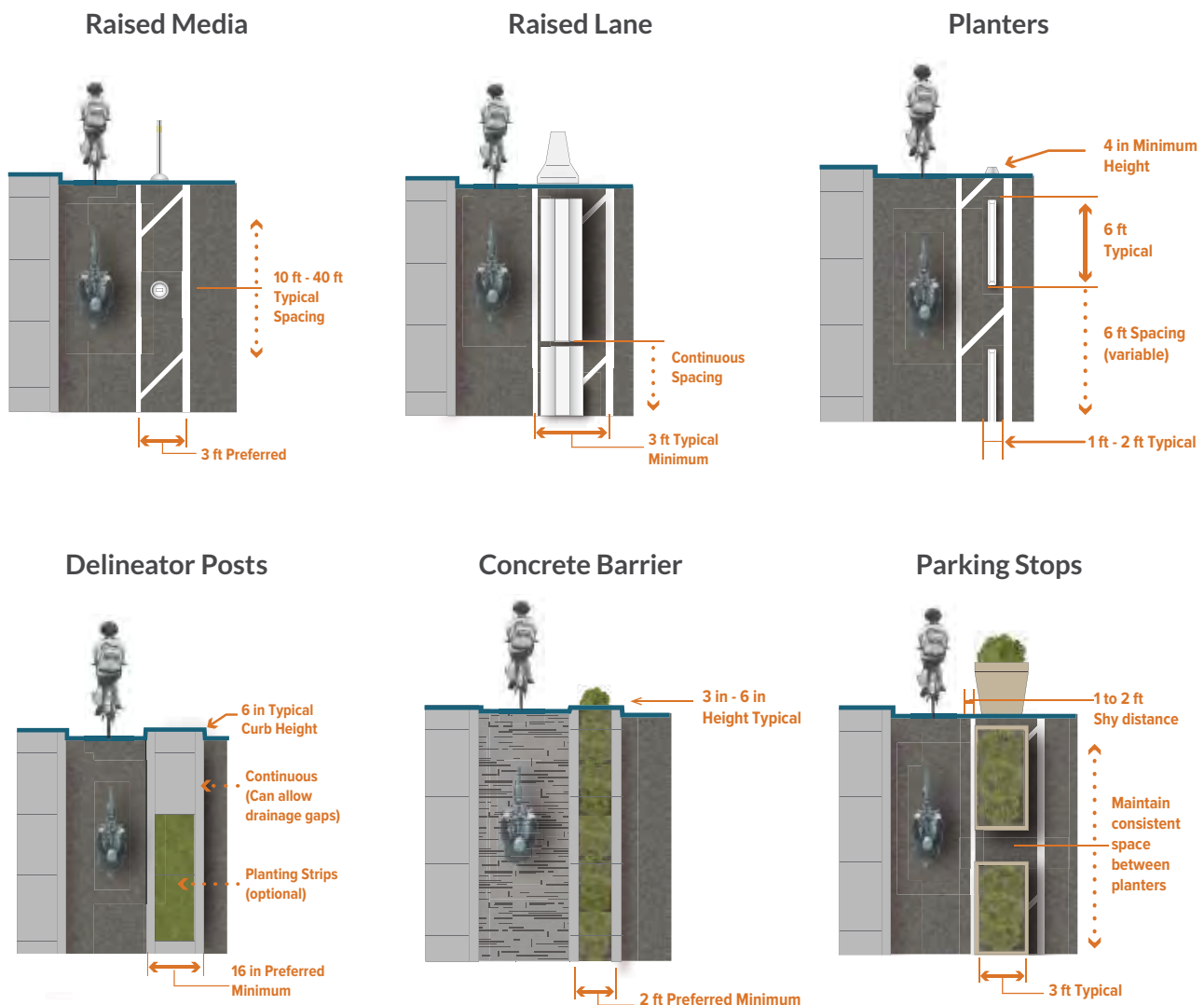
Separated bikeways may use a variety of vertical elements to physically separate the bikeway from adjacent travel lanes. Barriers may be robust constructed elements such as curbs, or may be more interim in nature, such as flexible delineator posts.

Appropriate barriers for retrofit projects:

- Parked Cars
- Flexible delineators
- Bollards
- Planters
- Parking stops

Appropriate barriers for reconstruction projects:

- Curb separation
- Medians
- Landscaped Medians
- Raised separated bike lane with vertical or mountable curb
- Pedestrian Safety Islands



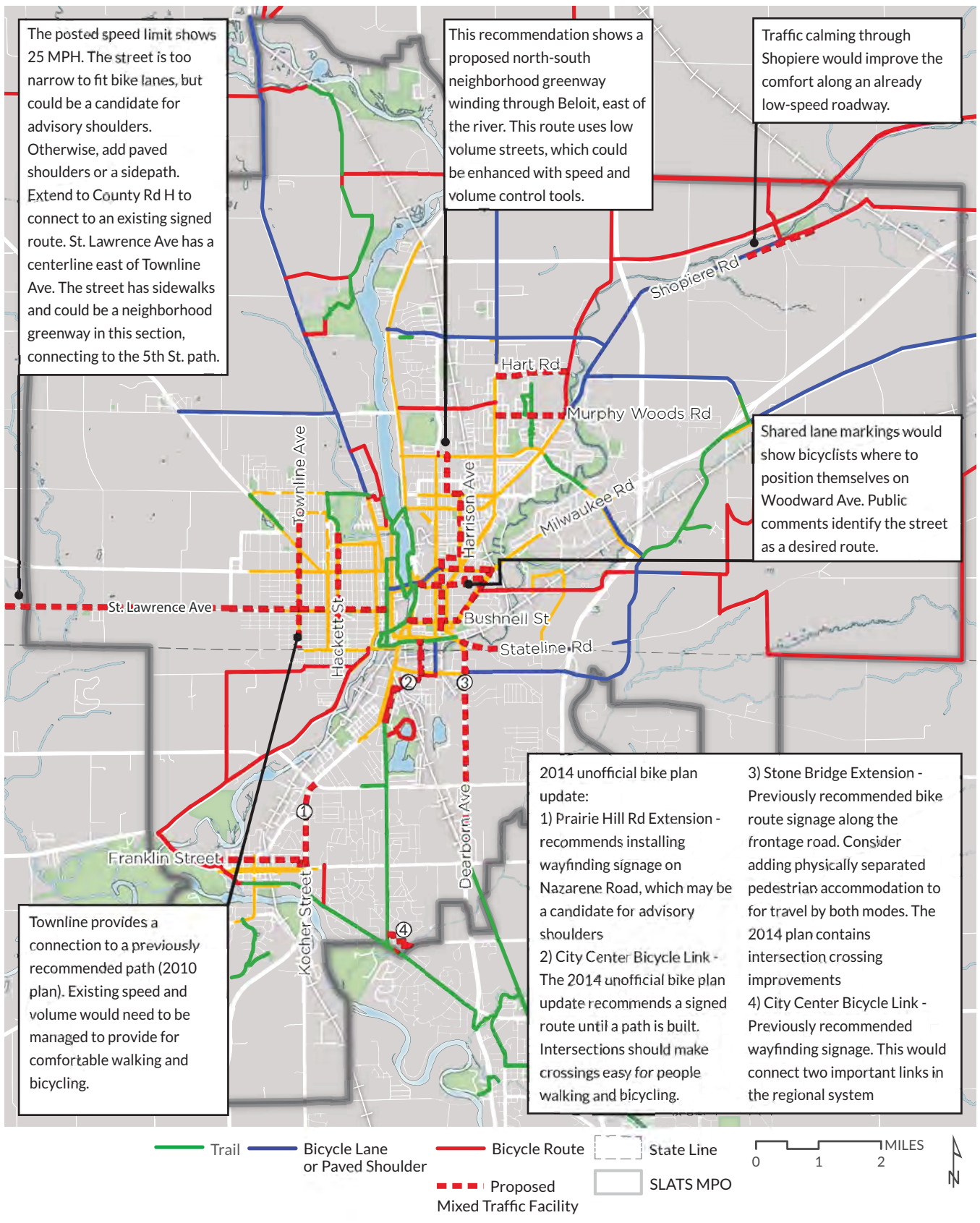


Figure 36. Dashed lines show recommendations for mixed traffic facility improvements.

Mixed Traffic Recommendations

The table below corresponds with the recommendations identified in Figure 36.

The Planning team received a map from a member of the public that shows proposed signed routes on November 8, 2017. These suggestions will be included in the second round of review.

Facility Key

- AS: Advisory Shoulder
- NG: Neighborhood Greenway
- SLM: Shared Lane Markings
- SR: Signed Route
- TC: Traffic Calming

Table 1. Mixed Traffic Recommendations

Street Name	Facility	Notes	Intersection Improvement Notes
Bushnell St	SR	Include signage to new bike/ped bridge and key destinations. Bike lanes could be added if parking is adjusted.	N/A
City Center Bicycle Link	NG	The 2014 unofficial bike plan update recommends a signed route until a path is built. The bridge should still be replaced, but a neighborhood greenway could be an interim design. Intersections should make crossings easy for people walking and bicycling.	Refer to this plan’s design guidelines and recommendation development section for improving bike and pedestrian crossings of major streets along a neighborhood greenway.
City Center Bicycle Link	SR	The 2014 unofficial bike plan update recommends wayfinding signage. This would connect two important links in the regional system.	N/A
Franklin Street	NG	N/A	Refer to this plan’s design guidelines and recommendation development section for improving bike and pedestrian crossings of major streets along a neighborhood greenway.
Hackett St	SR	Hackett St may require traffic volume or speed control to support mixing between people bicycling and motorists.	NA

Street Name	Facility	Notes	Intersection Improvement Notes
Harrison, Keeler, Porter, Bayliss, Harrison, Cranston	NG	This recommendation shows a proposed north-south neighborhood greenway winding through Beloit, east of the river. This route uses low volume streets, which could be enhanced with appropriate speed and volume control tools.	Refer to this plan's design guidelines and recommendation development section and NACTO guidance for improving bike and pedestrian crossings of major streets along a neighborhood greenway.
Hart Rd	NG	Neighborhood greenway along low speed and low volume street.	NA
Kocher Street	SR	Kocher St is a key connection between the proposed physically separated path on Union St and the mixed traffic route on Franklin St.	Franklin St is a "T" intersection. Clarifying route signage should be provided at a minimum
Milwaukee Rd	SR	Signed route in area close to downtown Beloit.	N/A
Murphy Woods Rd	NG	The AADT is higher than recommended for neighborhood greenways and may require traffic volume management.	Refer to NACTO guidance for improving bike and pedestrian crossings of major streets along a neighborhood greenway.
Prairie Hill Road Extension	AS	The 2014 unofficial bike plan update recommends installing wayfinding signage on Nazarene Road. The road may be a candidate for advisory shoulders. The IL-2 and Prairie Hill, IL-2 and Rockton intersections will need improvements for bicyclists' visibility. Progressive Ave may require improvements.	N/A
Saint Lawrence Ave	AS or NG; NG east of Townline Ave	The posted speed limit shows 25 MPH. The street is too narrow to fit bike lanes, but could be a candidate for advisory shoulders. Otherwise, paved shoulders or a sidepath could be added instead. Extending a facility outside the MPO area, to County Rd H would connect to an existing signed route. St. Lawrence Ave has a centerline east of Townline Ave. The street has sidewalks and could be a neighborhood greenway connecting to the 5th St. path.	N/A

Street Name	Facility	Notes	Intersection Improvement Notes
Shopiere Rd (Co Rd J)	TC and SLM	Traffic calming through Shopiere would improve comfort along an already low-speed roadway. This section of Shopiere has existing curb and gutter.	N/A
Stateline Rd (Co Hwy P)	AS	Potential candidate for an advisory shoulder if the centerline is removed. The estimated AADT is 1,400. Otherwise, the County could construct a sidepath or paved shoulders, since the street is too narrow for bike lanes.	N/A
Stone Bridge Extension	SR	The 2014 unofficial bike plan update calls for bike route signage along the frontage road. Consider adding physically separated pedestrian accommodation to for travel by both modes. The 2014 plan contains intersection crossing improvements.	N/A
Townline Ave	SR	Townline provides a connection to a previously recommended path (2010 plan). Existing speed and volume would need to be managed to provide for comfortable walking and bicycling.	The Madison Road/WI-213 intersection requires crossing improvements.
White Ave (WI 81)	NG	The roadway has a centerline.	N/A
Woodward Ave (WI 15)	SLM	Shared lane markings would show bicyclists where to position themselves. Public comments identify the street as a desired route. Additional study is needed to verify that shared lanes markings would act as an appropriate treatment here.	Prairie Ave and Park Ave intersections need improvements to help people walking and bicycling negotiate the multi-lane intersections.
Woodward Ave, Partridge Ave, Strong Ave	NG	The street should be evaluated to see whether speeds or volumes need to be lowered through design treatments. Otherwise, bike route signage could suffice.	Improving the Prairie/Wisconsin intersection would increase the comfort level of people walking and bicycling.

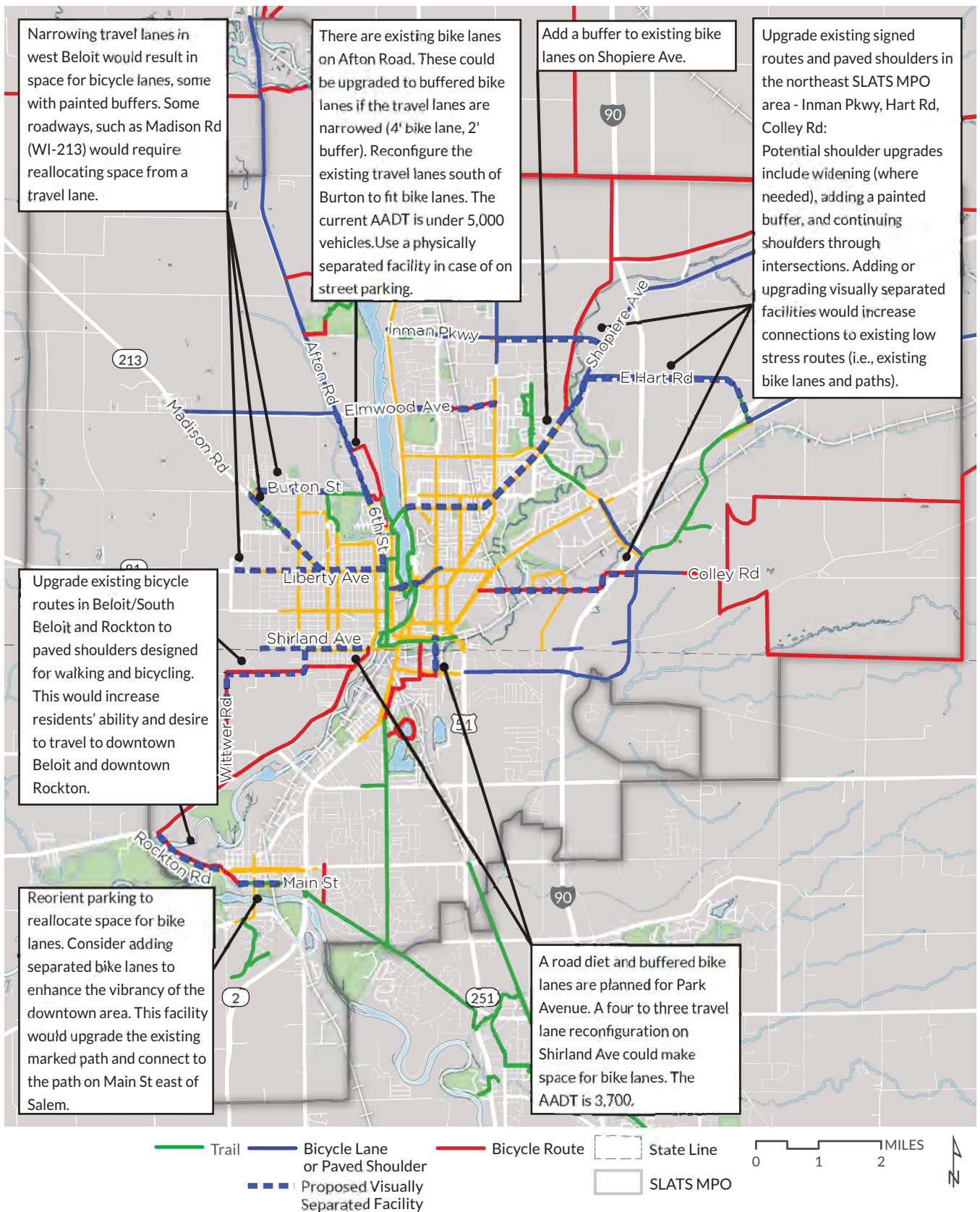


Figure 37. Dashed lines show recommendations for visually separated facility improvements.

Visually Separated Recommendations

The table below corresponds with the recommendations identified in Figure 37.

Facility Key

- BL: Bike lane
- BBL: Buffered bike lane
- PS: Paved Shoulder (including upgrades to existing paved shoulders)

Table 2. Visually Separated Recommendations

Street Name	Facility	Notes	Intersection Improvement Notes
6th St	BL	Reconfigure the existing travel lanes to fit bike lanes. The current AADT is under 5,000 vehicles. Use a physically separated facility in case of on street parking.	N/A
Afton Rd (Co Hwy D)	BBL	There are existing bike lanes on Afton Road. These could be upgraded to buffered bike lanes if the travel lanes are narrowed (4' bike lane, 2' buffer).	Big Hill Road will need improvements to better support bicycle travel. As an example, bicycle crossing markings could be added to the intersection.
Burton St	BL	The existing travel lanes could be narrowed to fit bike lanes with or without a painted buffer.	N/A
Colley Rd	PS	Colley Rd features a signed route west of Gateway Blvd. Adding paved shoulders would add a bicycle connection to the bike lanes located between Gateway Blvd and west of Turtle Town Hall Rd.	N/A
E Hart Rd	PS	Hart Road has an existing 5' wide shoulder. Upgrading the shoulder will improve east-west travel options to connect Shopiere Rd to the Gateway Blvd path.	N/A
Elmwood Ave	PS	Elmwood Ave is one direction from the river to Park Ave. The street becomes two-way east of this point. A visually or physically separated facility would provide for bidirectional pedestrian and bicycle travel.	The intersections of Prairie Ave and Dewey Ave would need upgrades for improved bicycle and pedestrian travel.

Street Name	Facility	Notes	Intersection Improvement Notes
Fisher Rd	PS	Upgrade existing recommended bicycle route with paved shoulders wide enough for walking and bicycling.	Shirland Ave features a recommendation for a visually separated facility. Ensure there are appropriate pavement markings to support people turning onto and off of the paved shoulders on Townline Ave.
Henry Ave	BL	Henry Ave may be able to be reconfigured to fit a two-way center turn lane, one travel lane in each direction, and bike lanes. The existing cross-section changes northeast of Tremont.	N/A
Inman Pkwy (Co Hwy BT)	PS	Inman Pkwy already has bikeable paved shoulders. Potential upgrades include adding a painted buffer and ensuring the shoulders continue through intersections. Ensure that the posted speed limit is no more than 35 MPH.	Shoulders end at the E County Rd S/ Shopiere Rd intersection and the Creek Rd intersection. The existing shoulders turn to bike lanes at Prairie Ave. Striping at Prairie could lower right hook crash risk.
Liberty Ave (WI 81/WI 213)	BBL (McKinley Ave to 5th St); BL (West St to McKinley Ave)	Use existing ROW to narrow lanes and add bike lanes. The street already has sidewalks on both sides.	The McKinley/Madison intersection needs increased visibility for people walking and bicycling.
Madison Rd (WI 213)	BBL	Add bike lanes to the existing ROW. A road diet would be required northwest of Townline Ave.	Madison Road runs on a diagonal. As such, intersections are configured with obtuse angles, requiring improvements for bicycling and walking.
Main St (Co Hwy 8)	BL	Reorient parking to reallocate space for bike lanes. Consider reconfiguring the street to add separated bike lanes to enhance the vibrancy of the downtown area. This facility would upgrade the existing marked path and connect to the path on Main St, east of Salem.	N/A

Street Name	Facility	Notes	Intersection Improvement Notes
Park Ave	BBL	A road diet and buffered bike lanes are planned for Park Ave.	N/A
Portland Ave	BL	Upgrade bike lanes on bridge by narrowing travel lanes and adding a painted buffer. It may be necessary to use physical separation west of the bridge.	Ensure a comfortable connection to the 5th St trail. The 4th Street intersection has multiple turn lanes and a slip lane. Improvements would be needed for comfort and safety.
Rockton Rd	PS	This part of Rockton Rd is marked as a signed bicycle route. Adding paved shoulders would increase comfort for walking and bicycling and enable a connection to downtown Rockton.	N/A
Shirland Ave	BL	A four to three road reconfiguration could make space for bike lanes. The AADT is 3,700.	Investigate opportunities for adding pedestrian refuge islands when restriping the street.
Shopiere Rd (Co Rd 5)	BL or BBL	Reallocating parking space from one side of the street could result in space for bike lanes from Prairie Ave to Cranston Rd. Reallocating space from a travel lane from Cranston Rd to Murphy Woods Rd could continue the corridor's bike lanes. Add a buffer to existing bike lanes from Murphy Woods Rd to Hart St.	Intersections typically have wide radii that will require conflict markings.
Wittwer Rd	PS	Upgrade existing recommended bicycle route with paved shoulders wide enough for walking and bicycling.	Bluff St has a recommendation for a physically separated facility. The intersection's offset angle will need improvements to keep bicyclists' and pedestrians' travel patterns visible and predictable.

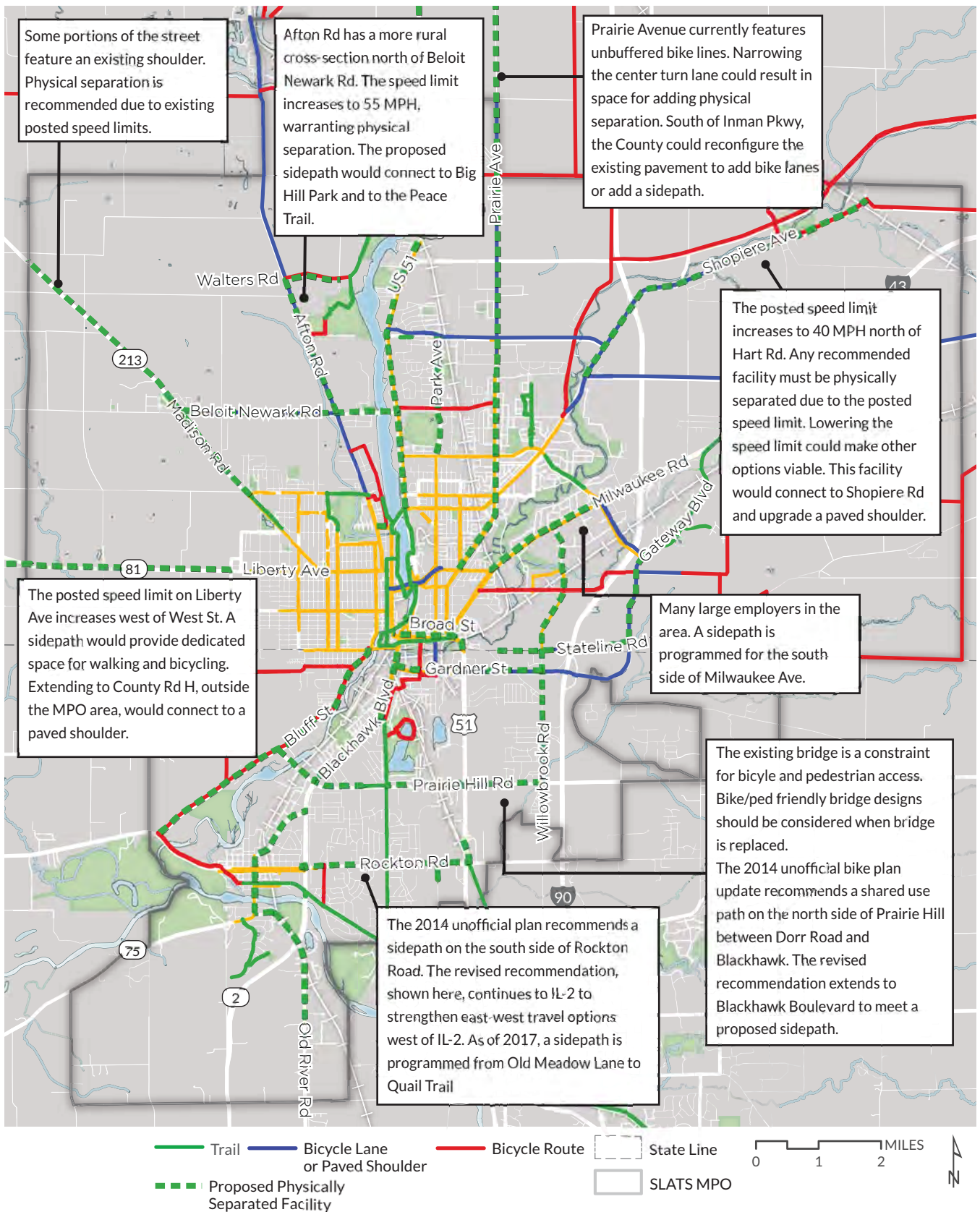


Figure 38. Dashed lines show recommendations for physically separated facility improvements.

Physically Separated Recommendations

The table below corresponds with the recommendations identified in Figure 38.

Facility Key

- PBB: New ped/bike bridge
- PBBi: Ped/bike friendly bridge improvement
- SBL: Separated bike lane
- SP: Sidepath

Table 3. Physically Separated Recommendations

Street Name	Facility	Notes	Intersection Improvement Notes
Afton Rd (Co Hwy D)	SP	Afton Rd has a more rural cross-section north of Beloit Newark Rd. The speed limit increases to 55 MPH, warranting physical separation.	Big Hill Road will need improvements to better support bicycle travel. As an example, bicycle crossing markings could be added to the intersection.
Beloit Newark Rd (Co Hwy Q)	SP	The posted speed limit on Beloit Newark Rd is 45 MPH. Adding physical separation would create a comfortable environment for walking and bicycling. A road diet on the bridge could create a short-term connection before the bridge is replaced.	Madison Rd, Afton Rd, and US 51 would require improvements to promote safe walking and bicycling along this roadway.
Blackhawk Blvd (IL 75)	SP	Nature at the Confluence is located west of IL-2, off Dickop St. This is a longer term recommendation. Numerous driveways increase the difficulty of installing a safe physically separated facility. The City/ DOT could investigate options for using the shoulder/parking area and green space. Major employers are also located along Blackhawk Blvd.	The facility should connect to the proposed Nazarene Rd frontage road improvement.
Bluff St	SP	More information about ROW boundaries is needed due to adjacent residential properties. There appear to be fewer driveways on SW side of Bluff Street. Extending south to Rockton Rd would upgrade an existing signed route.	

Street Name	Facility	Notes	Intersection Improvement Notes
Broad St	SP	Retrofitting the existing wide sidewalk as a physically separated facility (i.e., paint a centerline, add signage and pavement markings about walking and bicycling) would formalize a robust east-west route.	N/A
Bushnell St	PBB	A bicycle and pedestrian bridge is programmed over the Rock River.	Include appropriate signage directing people to the bridge.
Gardner St	SP	Gardner St/US 51 could only be made comfortable for bicycle or pedestrian travel with a separated facility. The facility would ideally travel along both sides of the street west of 2nd Street.	Blackhawk Boulevard, Park Avenue, Manchester Road, and Willowbrook will require crossing improvements
Gateway Blvd	SP	The public expressed interest about improving the existing shoulder. The posted speed limit is 40 MPH, meaning physically separation is needed for a safe and comfortable walking/bicycling facility.	N/A
Liberty Ave (WI 81/WI 213)	SP	The posted speed limit on Liberty Ave increases west of West St. A sidepath would provide dedicated space for walking and bicycling. Extending to County Rd H, outside the MPO area, would connect to a paved shoulder.	N/A
Madison Rd (WI 213)	SP	Some portions of the street feature an existing shoulder. Physical separation is recommended due to existing posted speed limits.	N/A
Maple Ave	SP	Continue sidepath from Henry/Maple bridge to future school building, to be located at southwest corner of 4th and Maple.	N/A
Prairie Ave (Co Hwy G)	SP	Use a sidepath on one or both sides to connect to destinations, including a school. The County could choose to reconfigure the existing pavement to add bike lanes. Or the pavement could choose to add a sidepath.	Shopiere Road intersection will require improvements for walking and bicycling.

Street Name	Facility	Notes	Intersection Improvement Notes
Milwaukee Rd (WI 81)	SP	Many large employers in the area.	N/A
Old River Rd (Co Hwy 64)	SP	The public expressed interest in a separated facility, connecting to downtown Rockton, IL.	N/A
Park Ave	SP	A physically separated facility should provide a connection for walking as well as bicycling through this residential area.	Some intersections along the corridor have wide radii and lack pedestrian and bicycle facilities. A new facility should include marked crossings and may require radii tightening.
Prairie Ave (Co Hwy G)	SBL	Prairie Avenue currently features unbuffered bike lanes. Narrowing the center turn lane could result in space for adding physical separation. The posted speed limit is 40 MPH, warranting more separation between people driving and walking/bicycling. Consider using a sidepath north of Philhower Rd.	N/A
Prairie Hill Rd	SP	The 2014 unofficial plan update recommends a sidepath on the north side of Prairie Hill Road. The segment west of IL-251 is constrained. Refer to the 2014 plan for proposed cross sections.	N/A
Prairie Hill Road Extension	SP, PBBI	The 2014 unofficial bike plan update recommends a shared use path on the north side of Prairie Hill between Dorr Road and Blackhawk. The revised recommendation extends to Blackhawk Boulevard to meet a proposed physically separated improvement.	Consider adding a marked crossing at the Dorr Road intersection. The existing bridge is a constraint for bicycle and pedestrian access. Bike/ped friendly bridge designs should be considered when bridge is replaced.
Rockton Rd (Co Hwy 9)	SP	The 2014 unofficial plan recommends a sidepath on the south side of Rockton Road. The revised recommendation, shown here, continues to IL-2 to strengthen east-west travel options west of IL-2. As of 2017, a sidepath is programmed from Old Meadow Lane to Quail Trail.	N/A

Street Name	Facility	Notes	Intersection Improvement Notes
Russell St	SP	The public expressed interest in a separated facility, connecting to downtown Rockton, IL.	N/A
Shopiere Ave (Co Rd S/Co Rd J)	SP	The posted speed limit increases to 40 MPH north of Hart Rd. Any recommended facility must be physically separated due to the posted speed limit. Lowering the speed limit could make other options viable. This facility would connect to Shopiere Rd and upgrade a paved shoulder.	Intersections typically have wide radii that will require conflict markings
Stateline Rd (Co Hwy P)	SP	Although the street has a low AADT, the posted speed limit is 45 MPH. A sidepath or other form of physical separation would increase comfort of walking or bicycling along Stateline Rd.	N/A
Stone Bridge Extension	SP	The 2014 unofficial bike plan update recommends an off street path from the existing trail's northern terminus, where it would cross Rockton Road (7,300 AADT, per IDOT). The trail continues north beside the railrow right-of-way. Coordination with Union Pacific Railroad is required for this connection.	N/A
Union St (Co Hwy 9)	SP	A sidepath connector would facilitate the connection to Franklin St.	N/A
US 51	SP	N/A	N/A
Walters Rd	SP	Connection to Peace Trail from Afton Rd.	N/A
Willowbrook Rd	SP	The existing speed limit is 40 to 45 MPH, meaning physical separation is required to create a comfortable walking/biking experience. Install a sidepath or use existing shoulders as protected bike lanes. The facility could connect cities on either side of the state line.	N/A

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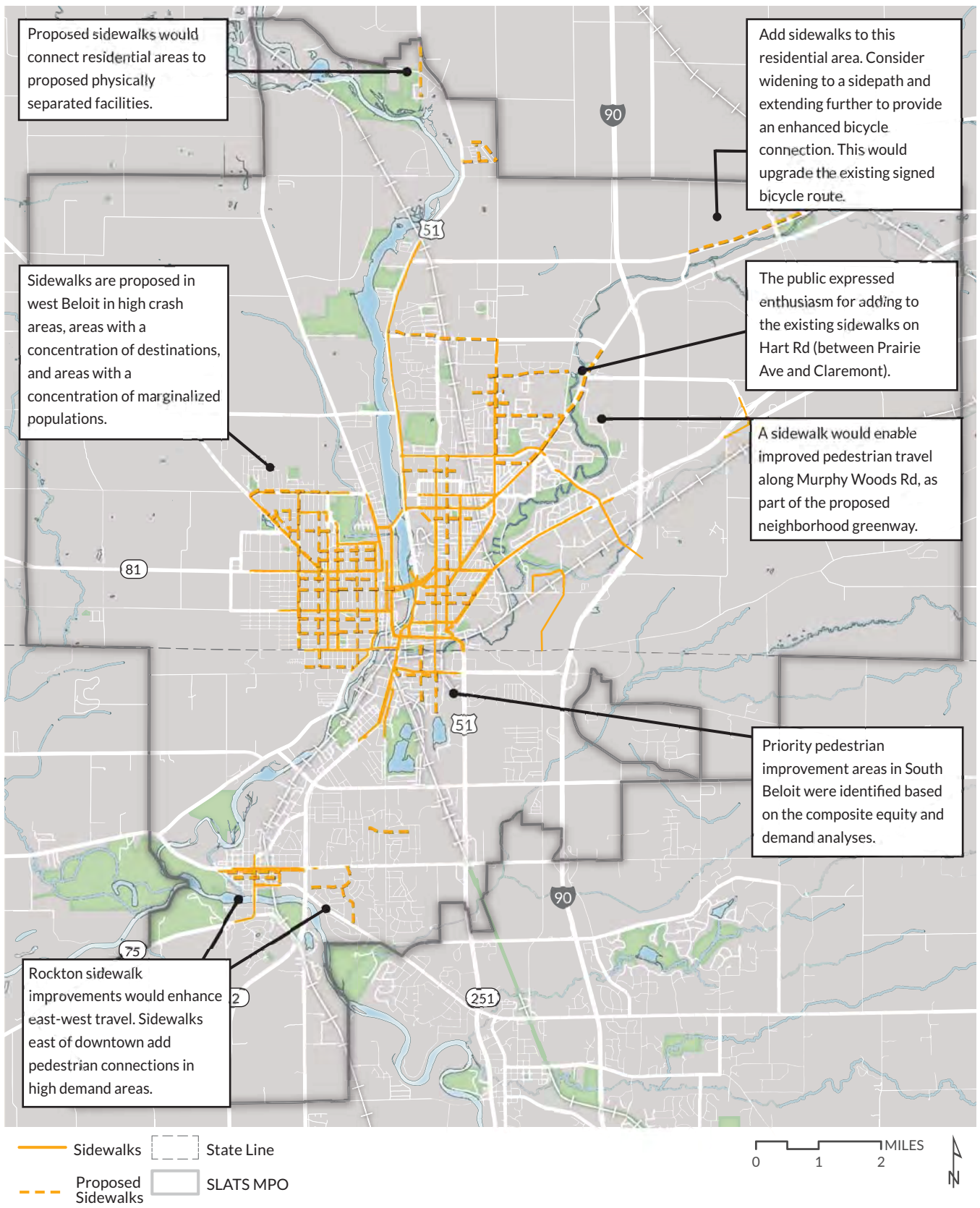


Figure 39. Dashed lines show recommendations for expanding the region’s sidewalk network.

Sidewalk Recommendations

The table below corresponds with the recommendations identified in Figure 39.

Table 4. Sidewalk Recommendations

Street Name	Notes
8th St	N/A
Armstrong Ave	N/A
Blackhawk Blvd (IL 75)	N/A
Burton Rd	Connect existing sidewalk gaps
Chapel St	N/A
Clark St	N/A
Clary St	N/A
Cleora Dr	N/A
Creek Rd	Consider adding a sidepath instead and extend further to provide an enhanced bicycle connection. This would upgrade the existing signed bicycle route.
Crystal Ln	N/A
Driftwood Dr	N/A
Echo Dr	N/A
Elmwood Ave	N/A
Emerson St	N/A
Grand Ave	N/A
Hart Rd	The public expressed enthusiasm for adding to the existing sidewalks on Hart Rd (between Prairie Ave and Claremont).
Henderson Ave	N/A
Highland Ave	N/A
Highland Ave	N/A
House St	N/A
Inman Pkwy (Co Hwy BT)	N/A
Madison Rd (WI 213)	Add sidewalk on southwest side to connect to park. Mark crossings near park.

Street Name	Notes
Marble St	N/A
McKinley Ave	
Mechanic St	N/A
Merrill Ave	N/A
Middle St	N/A
Murphy Woods Rd	A sidewalk would enable improved pedestrian travel along Murphy Woods Rd, as part of the proposed neighborhood greenway. Several cross streets have wide turning radii. They also lack pedestrian crossing infrastructure since the street currently lacks sidewalks.
North St	N/A
Park Ave	N/A
Portland Ave	In addition to any other improvements, wayfinding signage would help direct people walking and bicycling to the Portland bridge with bike lanes and sidewalks. Improvement needed at 4th Street to prevent car/bike conflicts.
Portland Ave	N/A
Post Rd	N/A
Prairie Ave (Co Hwy G)	Fill in sidewalk gaps
Ritsher St	N/A
Rood Ave	N/A
Salem St	N/A
Sandy Ln	N/A
Shopiere Rd (Co Rd S)	Shopiere Rd currently lacks sidewalks north of Schuster Dr.
Summit Ave	N/A
Sunrise Dr	N/A
Townline Ave	Residents discussed the lack of sidewalk. Fill sidewalk gaps in addition to the mixed traffic facility recommendation.
Vail Terr	N/A
Wheeler Ave	N/A
Whipple St	N/A
Wisconsin Ave	N/A

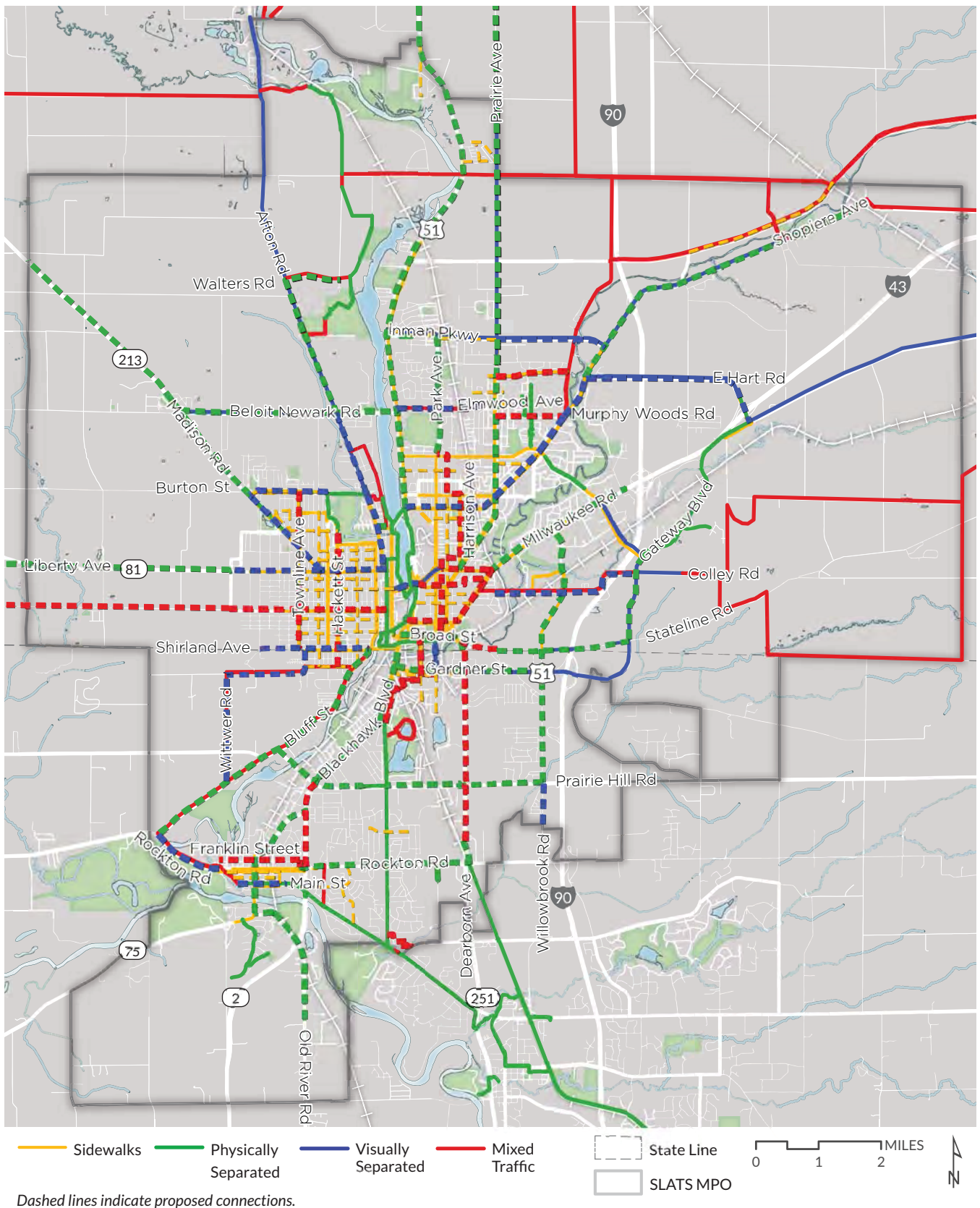


Figure 40. Dashed lines show all corridor recommendations within the study area.

Pedestrian Priority Areas

The project team identified priority pedestrian improvement areas as 1/2 mile areas within which to focus pedestrian improvements. These zones were identified based on one or more of the following criteria:

- High concentration of destinations from the composite demand analysis or the location of an important regional destination
- High hardship area, as defined by this plan's equity analysis
- High walking and bicycling crash area

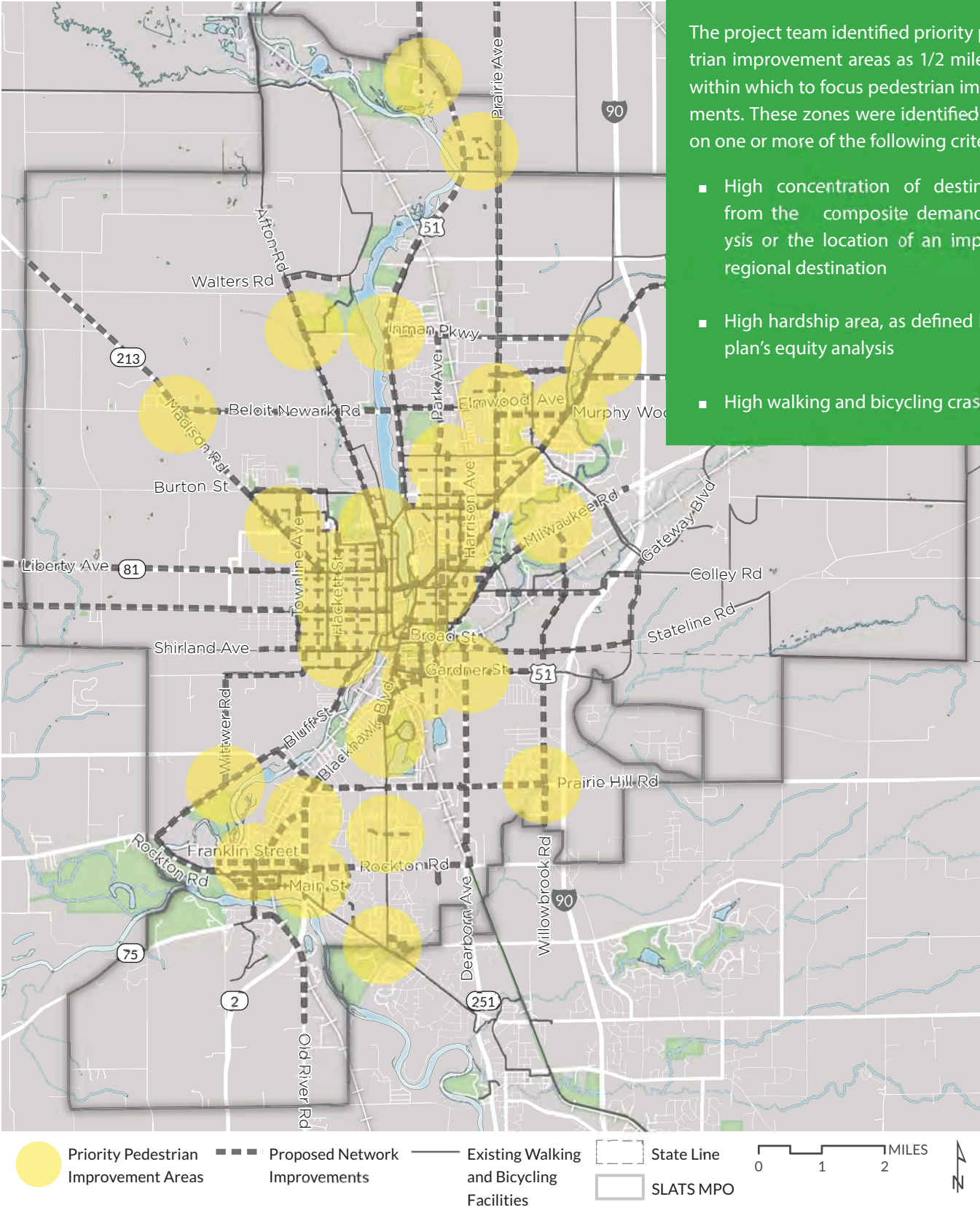


Figure 41. Yellow circles show pedestrian priority areas within the SLATS MPO region.

Program Recommendations: Educating and Encouraging SLATS Area Residents to Try Walking and Bicycling

The SLATS Region has great potential for strategies that enhance walking and bicycling and the infrastructure recommendations in this report. These changes include education, outreach, and encouragement. At the end of this section, there are specific policy recommendations for each municipality that will help support the added bike and pedestrian network.

Hire a Bicycle and Pedestrian Coordinator for the Region

A bicycle and pedestrian coordinator would be a strong resource for the region. In addition to providing expertise at a planning and engineering level, a bike/ped coordinator can be a liaison to the public, between departments and for schools and social service providers on bicycle and pedestrian issues.

Implement Bike and Walk to School Days at Regional Schools

Begin with a goal of involving 1-2 schools in each district, pulling from the 12 responding schools. Encourage as many schools as possible to participate with a target goal of 12 schools total. Target Fall of 2018 to launch. The bike/ped coordinator can serve as the regional manager with the schools themselves being responsible for planning and executing the events at their school. The bike/ped coordinator can provide assistance that will unify the event regionally by creating the event flyers, banners, press releases, coordinating the invitation of local officials, proclamations, and volunteers. Holding a monthly meeting of a coordinating steering committee that includes law

enforcement, school representatives, city staff, public health reps, bicycle clubs, etc. beginning in August will support a successful outcome.

Provide Schools with an In-school Curriculum for Safe Walking and Biking

The League of American Bicyclists has a variety of educational materials for children of all ages. For the SLATS region, good focus ages are 7, 10 and 15 (2nd, 5th and 10th Grades). At 7, children begin to walk by themselves to school (if possible); at 10, kids begin to ride to school as this age corresponds with Junior High and can include going farther distances; at 15 teenagers begin to learn to drive. Making this curriculum available to schools is a good first step in encouraging greater walking and biking in schools,



Figure 42. Children at Todd Elementary School participate in Walk to School Day (Image source: beloitdailynews.com)



Conduct Outreach at New Infrastructure

Providing context and education for any new facility can be enhanced by allowing the public to answer questions face to face about that facility. For each project, budget staff time to spend up to 8-16 hours (total for all staff) to stand at major intersections during rush hour and speak to commuters about the new facilities. Different days of the week have different commuters, so doing all of the outreach within a week is better than doing the same day several weeks in a row. Getting to at least three intersections is also ideal, as people may not be able to talk at one or two intersections. Picking visible locations where people will be willing to talk is the best policy, as new infrastructure can often change the way people get around and this outreach will help encourage them to use it.

Figure 43. A sign in Seattle instructs people how to use new separated bike lanes (Image source: theurbanist.org)



Figure 44. Conducting outreach in tandem with walking and bicycling improvements results in streets that work better for all users. For instance, local staff are able to hear from business owners about loading zone needs and incorporate these into street designs.

Review the Network Bike Map on a Regular Schedule

A Bike Network map can be a tremendous tool for a region or municipality when planning bike facilities. The SLATS Region might not require a yearly update, but reviewing it on a yearly basis will help keep the map current with the network as it both are updated. With online and mobile resources more available, small updates can be made online and larger updates can be included on the paper edition in 2 to 4 year intervals.

Change Policies to Facilitate Better Walking and Biking

Each community in the SLATS region has its own policy position when it comes to bicycling and pedestrian rights. Both Illinois and Wisconsin have their own approach when it comes to the rights and duties of road users. This means that each community will have to modify its municipal code to accommodate any infrastructure changes.

With the installation of new facilities, municipalities must assess their vehicle codes to account for changing roadway behavior. Below, find general recommendations for each community. Specific language corresponding to each set of recommendations can be found in Appendix #XX.

Note: In the Wisconsin communities, any additions to the bikeway network will have to be added by ordinance. Consequently, the following changes do not include any specific bikeways that would be added by such an ordinance.

City of Beloit

The City of Beloit needs several changes to its municipal code to accommodate the potential increase in bicycle and pedestrian facilities:

- Change the definitions in the municipal code for bike routes and bikeways. Right now they are defined through City Council.
- Add language that allows bicycles on shared paths. The current language requires signage to denote paths where cyclists can share space with pedestrians.
- Remove the language specifying pedestrian right-of-way in bike facilities.

Town of Turtle

- No changes at this time

City of South Beloit

- No Changes at this time

Village of Rockton

- Redefine bikes as vehicles. The current language codifies bicycles as toys, and does not have a separate definition for bicycles.
- For the sections of code that prevent bicycles on sidewalks, make sure that there is a corresponding road that bikes can ride on.

Table 5. City of Beloit Municipal Code

Code #	Current Language	Recommended Language	Justification
13.8 (1)	<p>DEFINITIONS. In this section, the following words and phrases shall have the designated meanings:</p> <p>Bicycle. Every device propelled by the feet acting upon pedals and having wheels, 2 of which are not less than 14 inches in diameter.</p> <p>Bicycle lane. That portion of a roadway set aside by the City Council for the exclusive use of bicycles and other modes of travel where permitted under §349.23(2)(a), Wis. Stats., and so designated by appropriate signs and markings.</p> <p>Bike route. Any bicycle lane, way or highway which has been designated by the City Council and is identified by appropriate signs and markings.</p> <p>Bicycle way. A path or sidewalk, or portion thereof, designated for the use of bicycles by the City Council.</p>	<p>No change, included for reference</p> <p>No change, included for reference</p> <p>Bicycle lane. That portion of a roadway set aside by the City Council for the exclusive use of bicycles and other modes of travel where permitted under §349.23(2)(a), Wis. Stats., and so designated by appropriate signs and markings. <u>Bike lanes can be set aside by means of paint, curbs, or bollards or other traffic separation devices.</u></p> <p>Bike route. Any bicycle lane, way or highway which has been designated by the City Council and is identified by appropriate signs and markings.</p> <p>Bicycle way. A path or sidewalk, or portion thereof, designated for the use of bicycles by the City Council.</p>	<p>Defining a bike lane with such a narrow focus and without specifics will lead to confusion when dealing with jurisdiction. While the council approves of and adopts all infrastructure, it does not define it.</p> <p>See above</p> <p>See above</p>
13.8 (4) (c)	<p>No bicycle shall be operated upon any public sidewalk or paths in public parks, except as are designated as "bicycle way," in subsection (5).</p>	<p>No bicycle shall be operated upon any public sidewalk or paths in public parks, except as are designated as "bicycle way," in subsection (5).</p> <p><u>A person operating a bicycle upon a sidewalk, or across a roadway or shoulder on a crosswalk, shall yield the right-of-way to any pedestrian and shall give an audible signal when necessary before overtaking and passing any pedestrian. No person shall ride a bicycle upon a sidewalk within a business district unless permitted by local authorities.</u></p>	<p>Banning bikes from sidewalks and sidepaths is limiting and discourages riding (and requires lots of maintained signage on trails), however, enforcing this is important, so the new language will allow continued enforcement where there is pedestrian/ bicycle conflict.</p>

City of Beloit Municipal Code, Continued

Code #	Current Language	Recommended Language	Justification
13.8 (5) (a)	The portions of roadways designated as bike routes portrayed on the map titled, "Beloit Bike Trails" dated May 1978, with revisions thereto, are set aside as bicycle routes for the use of bicycles as permitted by §349.23(2) (a), Wis. Stats.	The portions of roadways designated as bike routes portrayed on the map titled, "Beloit Bike Trails" dated May 1978, by ordinance with revisions thereto, are set aside as bicycle routes for the use of bicycles as permitted by §349.23(2)(a), Wis. Stats.	This change removes any reliance on a specific map and makes any changes made by city council as current.
13.8 (5) (d)	Bicycles shall yield to pedestrians on the bicycle lane or way.	No change, included for reference	

Table 6. Village of Rockton Municipal Code

Code #	Current Language	Recommended Language	Justification
71.13 (A)	(A) Traffic laws applying to persons riding. Traffic laws apply to all persons riding skateboards, roller skates, coasters, roller blades, in-line skates, bicycles and similar devices. Every person riding such devices upon a roadway, sidewalk or designated bicycle path shall be granted all of the rights and be subject to all of the duties applicable to pedestrians by this title, as amended, and by state law, except as to special regulations in this section and except as to those provisions of this title and state law which by their nature can have no application.	(A) Traffic laws applying to persons riding. Traffic laws apply to all persons riding skateboards, roller skates, coasters, roller blades, in-line skates, bicycles and similar devices. Every person riding such devices upon a roadway, sidewalk or designated bicycle path shall be granted all of the rights and be subject to all of the duties applicable to pedestrians by this title, as amended, and by state law, except as to special regulations in this section and except as to those provisions of this title and state law which by their nature can have no application.	Under state law, bicycles are vehicles. By putting bicycles into this category, drivers and cyclists might not be held liable in the case of a crash. Adopt language that replicates most of what section 71.13 covers, but apply it only to bicycles.

Stage Bike Rodeos, Community Bike Rides, Open Streets

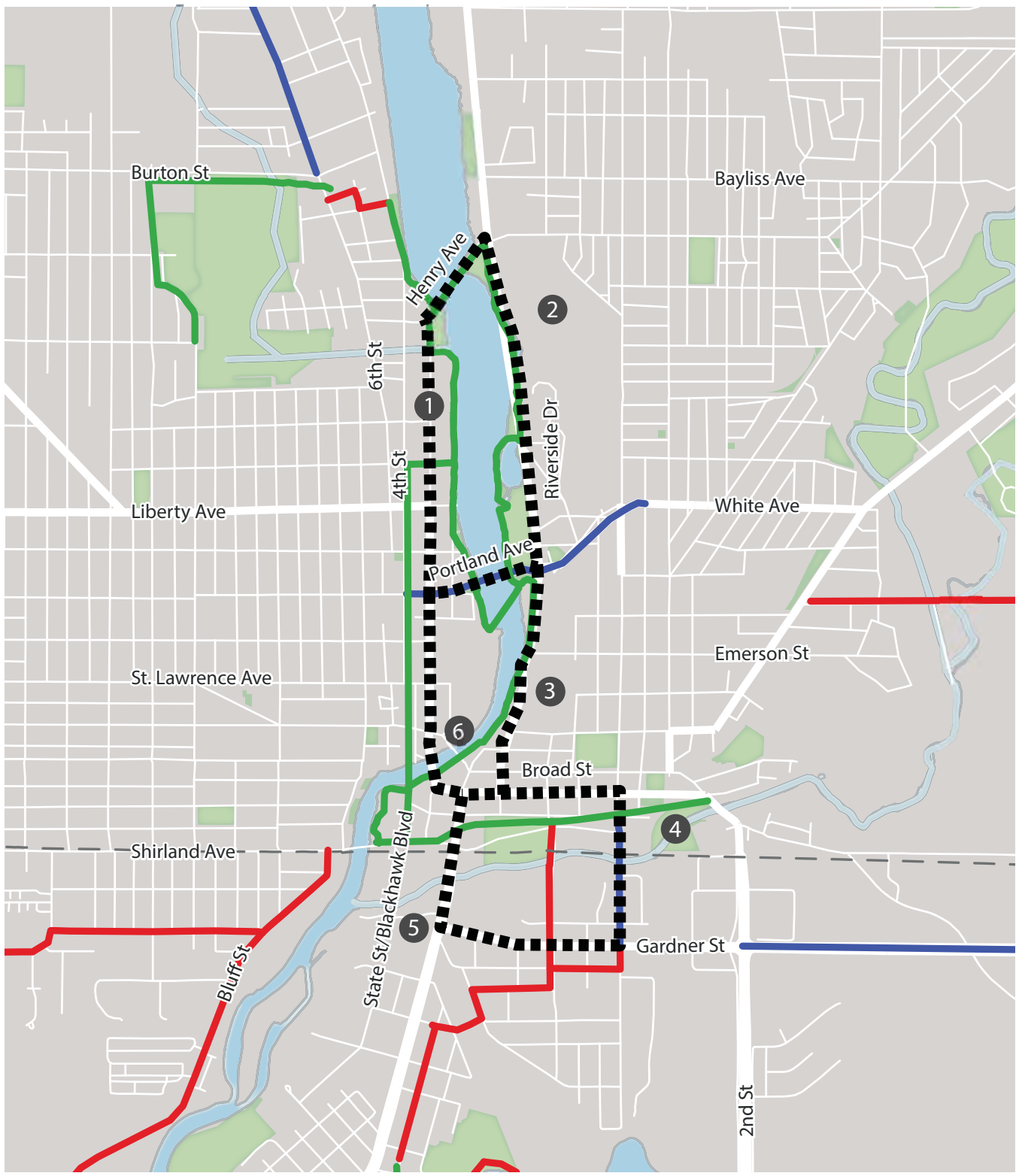
Events highlighting biking in the region will help promote the current state of infrastructure and safety. Schools and community organizations can host bike days and have rides and rodeos around their area. As with education, please consult the League of American Bicyclists for best practices when developing events. Bring in the Beloit Bike Club to help these rides.

In addition to rides and bike days, scheduling an Open Streets event would help promote walking and biking. Open Streets events shut down stretches of major streets and open them to walking, biking and other active play. Open Streets events usually link parks or public spaces to encourage during the event and after. These events are often called “active block parties” because they bring communities together and highlight what the community has to offer. Beloit could be the center of these events, as the downtown is regularly shut down for the farmers market and residents won’t have to reorient themselves for a larger event.

See the map on the following page for a suggested Open Streets route.



Figure 45. An open streets event, group bike ride, and bike rodeo (open streets image source: lajakids.com)

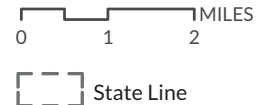


Proposed Open Street Destinations

- | | |
|-----------------------|-----------------------------|
| 1) Beloit Memorial HS | 4) Turtle Creek Park |
| 2) Eclipse Center | 5) Nature at the Confluence |
| 3) Beloit College | 6) Stateline Family YMCA |

- ■ ■ Proposed Route
- Trail

- Bicycle Lane or Paved Shoulder
- Bicycle Route



Section IV Implementing System Improvements



Project Prioritization

As a region, it is important to focus on implementation of recommendations that achieves regional objectives. Improved connectivity, better east-west travel, meeting demand, and serving areas of greatest need are of key importance.

In order to help sort the various recommendations, the following prioritization method was used to identify which projects should be considered priorities to help establish the framework for regional improvements.

Many projects meet more than one objective at a time, and it is important to identify these benefits.

Equity and Demand (E/D)	<ul style="list-style-type: none"> Is the project located in an area with a high concentration of social equity needs? 	<p>“With all of the hotels in this area, there should be better pedestrian access to the restaurants and shopping across the street.”</p>
	<ul style="list-style-type: none"> Is the project located in a high demand area for bicycling and walking? 	

Regional Connections (RC)	<ul style="list-style-type: none"> Does the project connect a significant portion of the SLATS planning area? 	<p>“Connect the Wisconsin trail system with the Illinois trail system.”</p>
	<ul style="list-style-type: none"> Does the project upgrade or extend the length of an existing facility? 	
	<ul style="list-style-type: none"> Does the project close a key gap in the network? 	

Safety (S)	<ul style="list-style-type: none"> Were safety concerns along existing the existing roadway (i.e., are people kept away from traveling here) noted? 	<p>“This bridge needs to be more bike friendly. I was nearly run off the road here once.”</p>
	<ul style="list-style-type: none"> Is the project located in a high crash area? 	

Use and Local Support (U/LS)	<ul style="list-style-type: none"> Is the project recommended in a previously adopted plan? 	<p>“I’m looking forward to the pedestrian bridge over the river at Ironworks.”</p>
	<ul style="list-style-type: none"> Was there evidence of community support on maps or in comments from members of the public or advisory committee members? 	
	<ul style="list-style-type: none"> Is this project in a high pedestrian use area? 	

Readiness (R)	<ul style="list-style-type: none"> Can the project be constructed within the existing roadway’s ROW (i.e., part of restriping/resurfacing project)? 	<p>“On Park Ave...there is a painted bike lane on both sides. However, ...most lines are not visible.”</p>
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Accessibility (A)	<ul style="list-style-type: none"> Does this project improve safety and connectivity to schools and other public facilities? 	<p>“All the [Peace Trail] segments...ought not to remain nameless, but all ought to be named the Peace Trail, and signed as such.”</p>
	<ul style="list-style-type: none"> Does this project modify a previous completely non-accessible route with a fully accessible pedestrian or bicycle route? 	



Prioritization: Honoring Past Plans and Public Input

Project prioritization exercises help planners make decisions about project phasing. Projects score points based on the criteria outlined above. Similar to the recommendation development process, this method honors comments heard from the public, past plans, and opportunities to create a safer and more connected region.

Prioritization Table

The table below shows sample recommended projects scored according to each of the six prioritization criteria.

Colored circles illustrate the extent to which a given project successfully meets each category. For example, partial credit is awarded for a project that meets two of the three criteria in the Regional Connections category.

The full project prioritization table will be completed once the steering committee reviews and approves the plan's recommended projects. The full table will be ranked from highest scoring project to lowest scoring project. This information, along with project feasibility details, will inform recommendations for project implementation.

Table 7. Project Prioritization

Project #	Street Name	Recommendation	Cost (Lower Limit, Thousands)	(Cost (Upper Limit, Thousands)
1	Riverside Dr.	Sidepath	TBD	TBD
2	Prairie Ave (County Hwy G)	Sidepath or Bike Lane	TBD	TBD
3	Prairie Hill Rd.	Sidepath	TBD	TBD
4	Blackhawk Blvd. (IL 2)	Sidepath	TBD	TBD
5	St. Lawrence Ave	Neighborhood Greenway	TBD	TBD
6	E Hart Rd.	Paved Shoulder	TBD	TBD

NOTE: This table shows six example recommended projects, each with sample prioritization score. The full list of recommended corridor improvements will be scored once the client approves project recommendations and prioritization criteria.

Criteria Key:

E/D: Equity/Demand (two questions)

RC: Regional Connections (three questions)

S: Safety (two questions)

U/LS: Use and Local Support (three questions)

R: Readiness (one question)

A: Accessibility (two questions)

E/D	RC	S	U/LS	R	A

Cost Estimates

Public agency staff should refer to this section of the plan for approaches to reducing the cost of installing walking and bicycling infrastructure along and across streets under their jurisdiction.

Staff can also use this section to view cost estimates for infrastructure tools. Refer to the plan’s funding sources table to learn more about financing options for the recommendations included in this plan.

Coordinating with Resurfacing Projects

As discussed in the Design Guidelines: A Toolbox of Infrastructure Options section of this plan, there are multiple approaches to improving streets for walking and bicycling. For example, bike lanes can be installed by narrowing a street’s travel lanes, repurposing a travel lane for other uses (also known as a “road diet”), or widening the street to install bike lanes or paved shoulders.

The first two methods are most often undertaken when a street is eligible for routine resurfacing. Cities and towns follow resurfacing schedules to plan for when streets receive fresh coats of pavement. Coordinating the addition of walking and bicycling facilities to coincide with resurfacing schedules saves towns and cities money. The cost of painting a bicycle lane, for instance, is easier to incorporate in a project budget when the street is already scheduled to have its surface repaved and pavement markings restriped.

Federal Highway Association (FHWA) released the Workbook for Building On-Road Bicycle Networks through Resurfacing Projects to help communities take advantage of such projects. Wisconsin Department of Transportation (DOT) representatives (Pat Fleming, Tom Heydel, Chris Squires, and Rob Stafford), City of Madison, WI staff (Chris Petykoswki and Arthur Ross), and City of Chicago, IL staff (Mike Amsden) contributed local knowledge to the project.

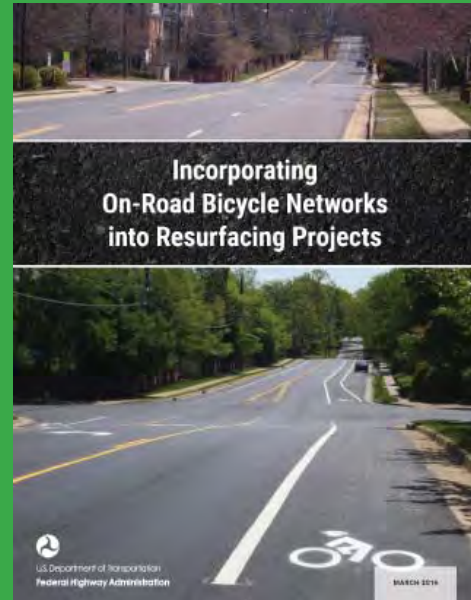


Image and resource: https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/resurfacing/resurfacing_workbook.pdf

Citizen-led Funding and Construction

The SLATS MPO area is home to a number of citizen-led organizations that have succeeded in constructing off street trails for walking and bicycling. The following initiatives are examples of their success.

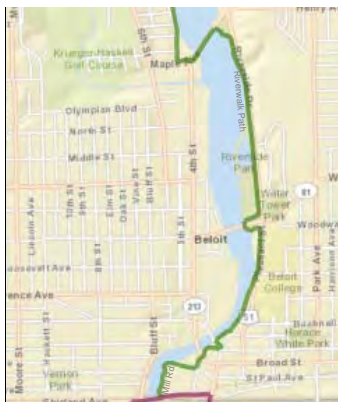


Hononegah Recreation Path

A 12 person citizen committee funded the path through a combination of crowdsourcing and working with legislators to obtain Build Illinois State grant money.

The residents were also successful in helping Winnebago County and Roscoe and Rockton Townships create inter-governmental agreements to maintain the path.

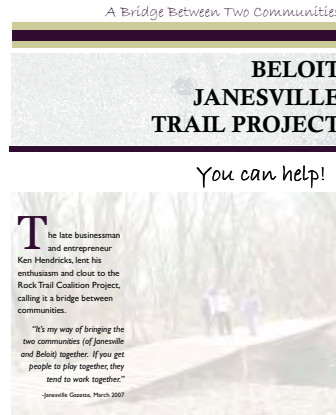
In total, the committee worked with 12 governmental organizations over more than five years to construct the path. Portions of the adjacent roadway were owned by multiple parties. The committee found opportunities to divide repair and ownership responsibilities between the State and County.



Rock River Trail Bike Route

The Rock River Trail is 320 miles long from Rock Island, IL to Theresa, WI. The trail officially opened June 3, 2017 and invites residents to use the trail by hiking, bicycling, driving, riding horses, paddling, and flying.

Forty-one river communities are found along the route. The trail's funding was mostly secured through private donations. The Rock River Trail is a 501(c)(3) organization. The National Park Service, County and local level Parks Departments, and others helped provide consultation and support for the trail.



Beloit-Janesville Peace Trail and Big Hill Park Paths

The non-profit Rock Trail Coalition, Inc. works to link the Hononegah trail system in Roscoe/Rockton through Beloit

to Janesville. As of this plan's publication, the Peace Trail, in northern Beloit, is considered complete. Traveling north from Big Hill Park, the trail includes an off street path on Walters Rd and a combination of on and off street alignments on Duggan Rd to the Rock River. The trail also includes paved paths within Big Hill Park. First convened in 1992, the Rock Trail Coalition has inspired residents to get involved ever since. The Coalition has helped Rock County and local municipalities defray trail costs through a combination of fundraisers, volunteer construction projects, and Wisconsin Department of Natural Resources (DNR) grant money with matching funds from Rock County that included contributions from the Coalition.

Maintenance and Operations

The examples above are successful in part because of their focus in involving multiple decision makers around a single project or focus area. All decision makers must be engaged throughout the project planning, funding, and design process. To install a successful project, advocates must also address the future trail's maintenance funding and responsibilities. Intergovernmental agreements may be needed in order to ensure consistent maintenance along a facility where multiple units of government are involved.

Cost Estimates by Type of Infrastructure

Cost estimates are an essential planning tool used for programming capital improvements and drafting applications for external funding sources. Cost estimates were developed for each project based on initial planning-level examples of similar constructed projects and industry averages.

All facility designs and associated cost estimates proposed in this plan are conceptual in nature and should undergo final engineering design and review in order to arrive at detailed project costs.

These costs do not include costs for right-of-way acquisition or project design, which can include planning, public process, facility design, and other background work required to implement the project. These additional costs can generally be estimated at 25% of the facility construction cost.

Table 8. Mixed Traffic Cost Estimates

Facility Type	Per Mile Cost Estimate (Lower Limit)	Per Mile Cost Estimate (Upper Limit)
Signed Route	\$9,000	\$15,000
Shared Lane Marking	\$12,000	\$20,000
Advisory Shoulder	\$15,000	\$20,000
Neighborhood Greenway	\$70,000	\$130,000
Traffic Calming (bumpouts, median island, raised crossing)	\$115,000	\$175,000

Table 9. Visually Separated Cost Estimates

Facility Type	Per Mile Cost Estimate (Lower Limit)	Per Mile Cost Estimate (Upper Limit)
Bike Lanes (no buffer)	\$40,000	\$75,000
Buffered Bike Lanes	\$60,000	\$120,000
Paved Shoulder		

Table 10. Physically Separated Cost Estimates

Facility Type	Per Mile Cost Estimate (Lower Limit)	Per Mile Cost Estimate (Upper Limit)
Physically Separated Bike Lane		
Sidewalk (estimate for both sides of street)	\$225,000	\$350,000
Sidepath	\$350,000	\$1,500,000
Trail	\$400,000	\$1,800,000

Good Project Timing Can Reduce Cost

As discussed in the design guidelines and recommendations section of this plan, timing walking and bicycling improvements to coincide with general roadway construction projects can lead to reduced costs of adding new walking and bicycling facilities.

City of Beloit

The following streets are included in this plan's recommended project list. The streets are also contained in the City of Beloit's Capital Improvements Plan (CIP) for 2018-2023.

Streets are listed even if extents differ from the current CIP.

2018 CIP

- Shopiere Ave
- Gateway Blvd

2018 Maintenance

- Ridge Rd
- Townline Ave
- 8th St
- Middle St
- Portland Ave
- Stateline Rd

2019 CIP

- Henry Ave
- Keeler Ave
- Prairie Ave
- Willowbrook Rd

2019 Maintenance

- Broad St
- Henderson Ave
- Keeler Ave
- Milwaukee Rd
- Strong Ave

2020 CIP

- Henry Ave
- Liberty Ave
- Townline Ave

2020 Maintenance

- Summit Ave
- Grand Ave
- Whipple St

2021 CIP

- Emerson
- Merrill St
- Maint
- St. Lawrence Ave

2021 Maintenance

- N/A

2022 CIP

- Merrill St
- Strong Ave

2022 Maintenance

- 8th St
- Highland Ave

2023 CIP

- N/A

2023 Maintenance

- Harrison Ave
- Merrill St
- Portland Ave
- Ritscher St
- Grand Ave

Projects and Pavement Quality

Jurisdictions within the SLATS area should only install on street bicycling or walking facilities on streets that are in a state of good repair.

What about streets that could offer an excellent walking or bicycling connection but are currently in need of repair? The flow chart below graphically depicts how to ensure that new facilities offer good surface quality. This approach offers a flexible way to install walking and bicycling projects. Although this plan outlines suggested streets for improvements, municipalities are not limited to these suggested corridors and intersections.



Figure 46. Opportunities for including walking and bicycling improvements in routine projects.

Project Cost Estimate Tables

Planning level cost estimates will be prepared for each recommended improvement. These tables are forthcoming, pending client input regarding recommended project.