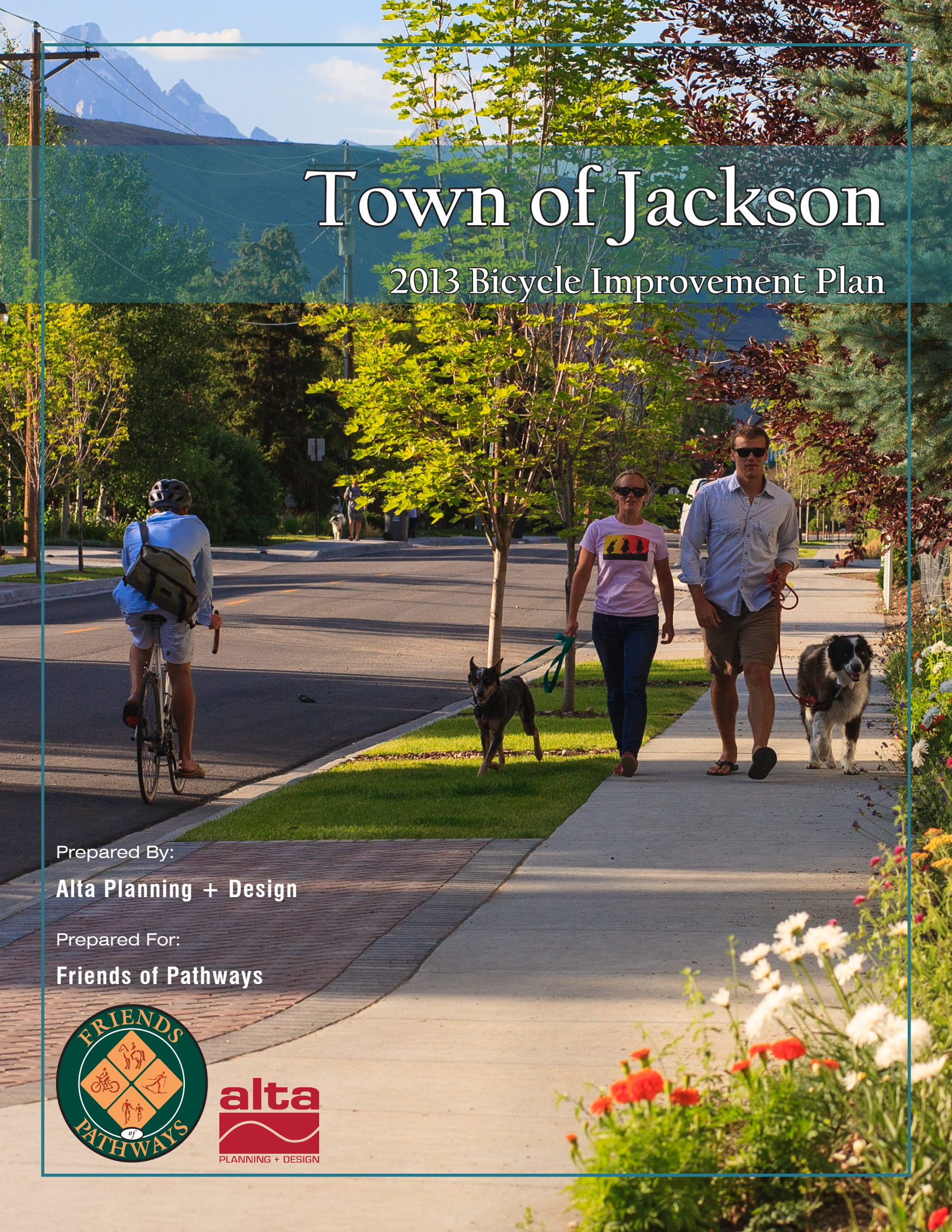

Town of Jackson

2013 Bicycle Improvement Plan

Prepared By:

Alta Planning + Design

Prepared For:

Friends of Pathways

FRIENDS of PATHWAYS

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ACKNOWLEDGEMENTS

Town Council

Mark Barron, Mayor

Bob Lenz, Councilor

Hailey Morton, Councilor

Jim Stanford, Councilor

Don Frank, Councilor

Friends of Pathways

Mike Welch, Executive Director

Jack Koehler, Development and Operations Director

Town Staff

Brian Schilling, Pathways Coordinator

Alta Planning + Design

Joe Gilpin, Project Manager

Jeff Olson, Advisor

Brandon Dalton, Mapping

Brett Hussong, Graphics

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1

OVERVIEW

The 2013 Bicycle Improvement Plan is a document that will guide rapid and substantial improvements for bicycling in the Town of Jackson. The types of bicycle improvements that are recommended vary from street-to-street, but the end result will achieve a connected network that is safe and effective for all users, and most bicyclists.

The 2007 Pathways Master Plan is currently the main visioning document for non-motorized facilities in Teton County and the Town of Jackson. This document primarily focuses on pathway development and has been very successful considering the tremendous progress that has been made in implementing much of the vision plan over the past five years. With the completion of WY 22 Pathway over the next few years, this achievement will be even more dramatic. The Pathways Master Plan also identifies a network of 'Complete Streets', but does not specify the package of improvements for these important routes. Rather, the Pathways Master Plan recommends the creation of a Complete Streets Action Plan as the first priority within its five-year capital project list. This Bicycle Improvement Plan provides recommendations that will make Jackson's street network more 'complete'; however a full package of pedestrian improvements will be needed to finish the job in the coming years.

2007 Pathways Master Plan Recommendation: Complete Streets

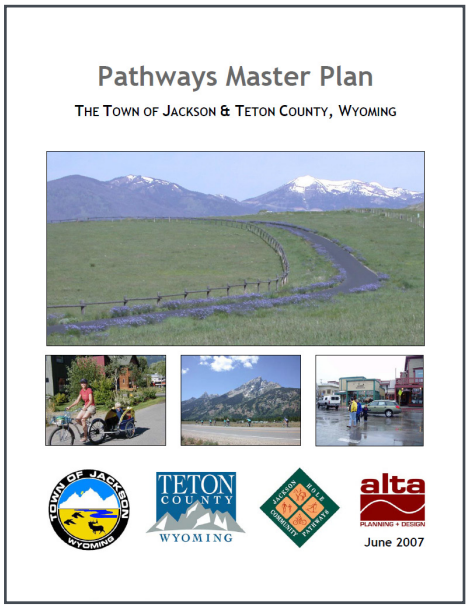
Concept: Develop and implement a Complete Streets Plan for the Town of Jackson and mixed-use villages in Teton County

Action/Acquisition: Complete Streets improvements will generally be implemented in the existing right-of-way. However, easements may need to be acquired for some portions of this project.

Project Description: Provide a network of on-street bikeways and pedestrian connections throughout downtown Jackson and in the mixed-use villages in Teton County. This network may include a combination of bike lanes, signed shared roadways and "bicycle boulevards" to create a user-friendly system for utilitarian bicycling within the town center. Pedestrian needs may be met by a system of sidewalks, street crossings, pedestrian signals, street furniture, and transit connections. This project involves short-term and long-term components, and will require development of a separate Complete Streets plan.

This Bicycle Improvement Plan is a focused planning effort intended to bring about rapid development and improvement to the on-street bikeway network in the Town of Jackson. Rapid implementation of the recommendations contained in this plan is essential to provide improved transportation and recreation choices for residents and visitors alike. Adding additional emphasis on timely improvements are a series of major upcoming roadway projects that are programed for construction in 2013. These projects include the complete rebuild of the Five-way Intersection of West Broadway, Pearl Avenue and Flat Creek Drive. This is one of the major access points to the town center and will result in increased congestion. Additional construction projects are also planned along Broadway including commercial development and the addition of bikeway and pedestrian improvements as part of the Path 22 project.

While the analysis and recommendations contained as part of this Bicycle Improvement Plan do contain limited recommendations for in-town pathways, this project does not examine pathway expansion. The 2007 Pathways Master Plan is still the guiding document for pathways in Teton County. The Pathways Master Plan calls for a scheduled update after five years, which is a recommendation that should be acted upon soon. The update of the Pathways Master Plan will be the appropriate time and project to explore more visionary pathway proposals such as a pathway along Flat Creek among others.



The 2007 Pathways Master Plan is the guiding resource for pathway expansion

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BIKE ROUTE
NO
PARKING

2

Existing Conditions

Bicycle Existing Conditions

The Town of Jackson has made substantial gains in non-motorized transportation and recreation with its extensive pathway network; however, this network does not penetrate the core of Jackson and few other routes designated for bicycle travel exist. Two bike lanes exist in Jackson, one on Snow King Avenue and on High School Road. Shared Lane Markings were recently installed on Redmond Street. Both Snow King Avenue and Redmond Street are currently the most notable examples of Complete Streets in Jackson.

Bike lane on Snow King Avenue.

Several projects are proposed that will significantly impact bicycle accommodation in Jackson. One-way raised cycle tracks are planned along Broadway from the 'Y' intersection of Highway 22 and Broadway to the Flat Creek Bridge. A rebuild planned for 2013 of the '5-way' intersection of Broadway and Pearl Street will include bike lanes from the Flat Creek Bridge to Jackson Street. There are also plans to improve Cache Street from Snow King Avenue to Broadway that could include a high quality bicycle facility.

The existing bikeway network and proposed bikeway projects are depicted Map 1.

Pedestrian Existing Conditions

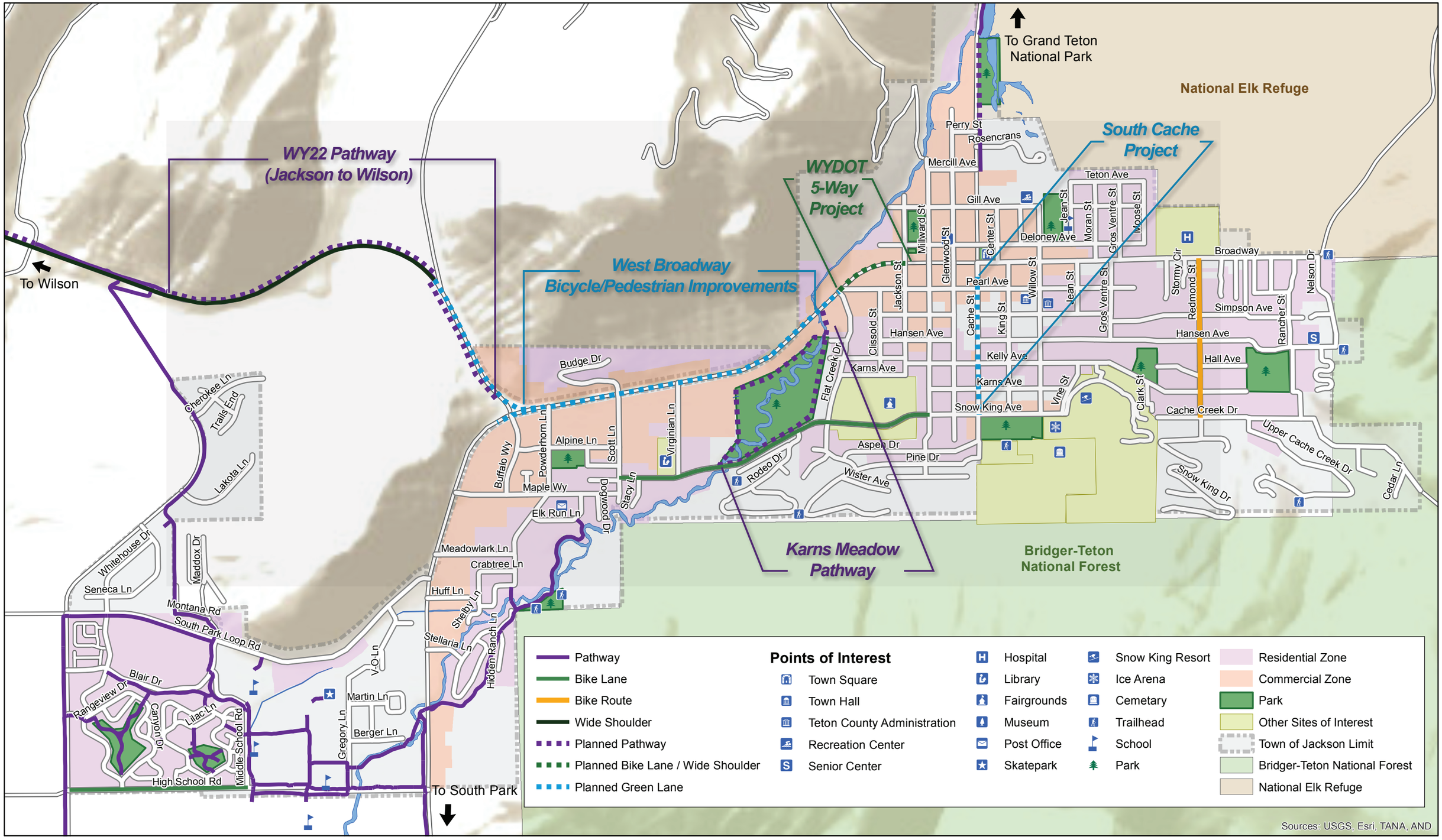
Sidewalks in Jackson can vary significantly, many are narrow and do not have a planted buffer or ADA compliant curb ramps.

Like many mountain communities, Jackson has a well-developed pedestrian network centered around the town center with diminishing coverage outside of key routes farther out. Pedestrian facilities vary in configuration and in quality. The Town has a boardwalk network that serves the town center and tourist destinations that reflects the Town's western character. Most of the pedestrian sidewalks are concrete and vary from narrow monolithic facilities to high quality wide facilities with streetscape elements, or detached with a planted buffer. Some sections of sidewalk are either missing entirely, or are asphalt expanses that are part of a parking lot with no protection or delineation for pedestrians. Jackson has almost 41 miles of roadway, 25 of which lack sidewalks completely. Of the sidewalks that exist, approximately 2.5 miles is boardwalk in the town center, 8.9 miles has been classified as higher quality, either wide sidewalk, or detached from the street and buffered with a planted buffer. The remaining 11 miles is of a lower quality narrow curbside sidewalk (see photo) that is typically 4 feet in width. Street lighting and landscape plantings are not consistent throughout the pedestrian network.

Sidewalks downtown can be very crowded during the high season, leaving precious little space for people to stop and interact.

Jackson has a number of marked unsignalized pedestrian crossings, many of the existing pedestrian crossings are owned and maintained by WYDOT, such as those along North Cache Street and Broadway; all signalized crossings in Jackson exist on WYDOT facilities. The Town maintains marked crossings on the local road network including the town center, near schools and at select other locations. Pedestrian facilities including marked crossings and sidewalks are depicted in Map 2.

Another key component to Complete Streets is having accessible infrastructure for persons with disabilities. All pedestrian improvements undertaken in recent years have included the latest features for pedestrian accessibility. Improvements such as these constitute but a minor amount of the pedestrian network that meets the accessibility guidelines proposed in the Public Rights Of Way Accessibility Guidelines (PROWAG).



Map 1 : Existing and Planned Bicycle Facilities

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To Grand Teton National Park

National Elk Refuge

To Wilson

Bridger-Teton National Forest

To South Park

Saddle Butte Dr
Rosencrans
Mercill Ave
Teton Ave
Gill Ave
Gill Ave
Moose St
Jean St
Moran St
Center St
King St
Deloney Ave
Glenwood St
Cache St
Willow St
Jean St
Gros Ventre St
Stormy Cir
Wapiti Dr
Nelson Dr
Broadway
Pearl Ave
Simpson Ave
Simpson Ave
Hansen Ave
Redmond St
Clissold St
Jackson St
Millward St
Flat Creek Dr
Karns Ave
Kelly Ave
Hall Ave
Rancher St
Henley Rd
Karns Ave
Vine St
Clark St
Snow King Ave
Cache Creek Dr
Upper Cache Creek Dr
Cedar Ln
Budge Dr
Virginian Ln
Powderhorn Ln
Alpine Ln
Scott Ln
Buffalo Way
Aspen Dr
Pine Dr
Rodeo Dr
Wister Ave
Snow King Dr
Maple Way
Elk Run Lane
Cherokee Ln
Trails End
Lakota Ln
Tribal Trail Rd
Whitehouse Dr
Seneca Ln
Montana Rd
South Park Loop Rd
Josephine Loop
Blair Dr
Rangeview Dr
Canyon Dr
Lilac Ln
South Park Loop Rd
Middle School Rd
High School Rd
Broadway
Meadowlark Ln
Crabtree Ln
Huff Ln
Shelby Ln
Stellaria Ln
Hidden Ranch Ln
V-O Ln
Martin Ln
Gregory Ln
Carol Ln
Highway 89

Pathway
Boardwalk
Wide Sidewalk
Narrow Sidewalk
Signalized Intersection
Crosswalk

Points of Interest

Town Square
Town Hall
Teton County Administration
Recreation Center
Senior Center
Hospital
Library
Fairgrounds
Museum
Post Office
Skate Park
Snow King Resort
Ice Arena
Cemetary
Trailhead
School
Park

Residential Zones
Commercial Zones
Parks
Other Sites of Interest
Town of Jackson Limit
Bridger-Teton National Forest
National Elk Refuge

Sources: USGS, ESRI, TANA, AND

Map 2 : Existing Pedestrian Facilities

0 0.25 0.5 Miles

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Transit Existing Conditions

The START bus service is a significant factor in the Jackson transportation network. This is true both for local in-town trips as well as regional trips, such as those to Wilson, Teton Village, South Park, or even Victor and Driggs ID. START states that they carry over 800,000 trips annually on their bus fleet. Other benefits include a reduction in an estimated 3 million vehicle miles travelled annually, saving 1.8 million pounds of carbon emissions. Transit improvements are for the most part well integrated into several streets within Jackson. Bus pullouts, high-quality shelters, and other amenities are common in high use stop locations. Some streets with good transit infrastructure include Redmond Street, Snow King Avenue, and Maple Way. START Transit has been active in pursuing improvements to transit infrastructure and has even worked out easements with landowners to allow for some infrastructure that could not fit with existing public right-of-way. In 2013 START hopes to add a bus pullout on South Park Loop Road at the middle school.

START bus stop in Jackson

START buses can carry bicycles attached to external racks and are heavily used as a range extending conveyance for bicycle trips.

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3

Recommendations

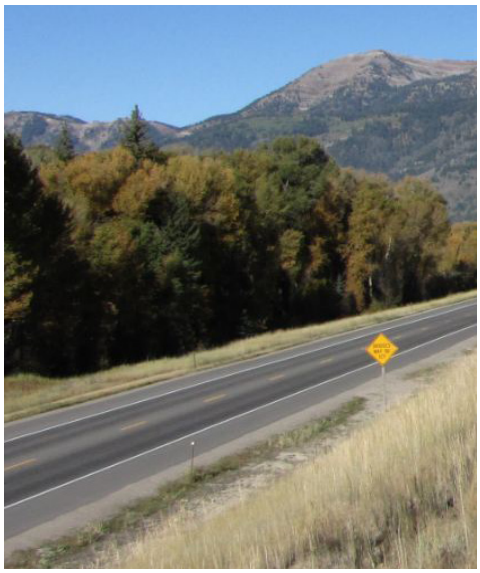
Bicycle Recommendations

Facility Types

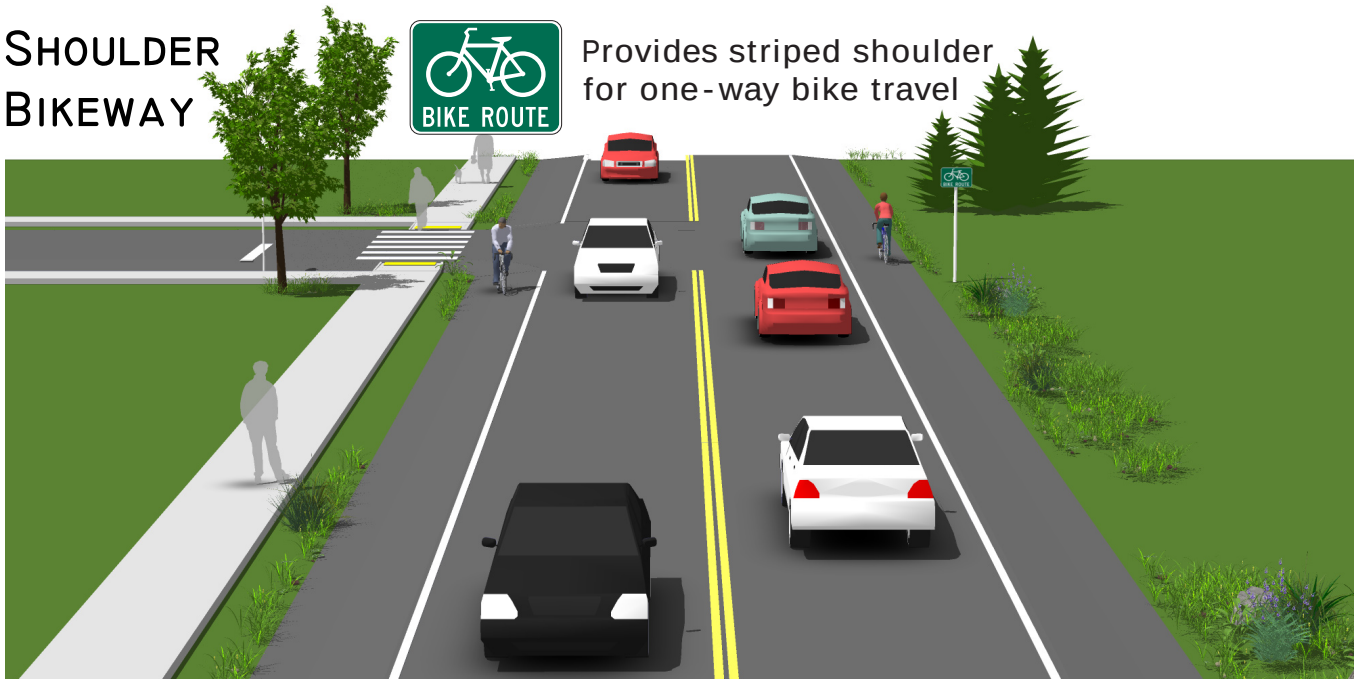
The following bicycle facility types are either existing in Jackson, already proposed as part of other projects (such as the Broadway cycle track), or are proposed as a part of this Action Plan.

Shoulder Bikeways

Shoulder bikeways are paved roadways with striped shoulders (4'+) wide enough for bicycle travel. Shoulder bikeways often, but not always, include signage alerting motorists to expect bicycle travel along the roadway. Shoulder bikeways should be considered a temporary treatment, with full bike lanes



A shoulder bikeway on US 22 outside of Wilson, WY



planned for construction when the roadway is widened or completed with curb and gutter. This type of treatment is not typical in urban areas. Jackson has a shoulder bikeway on High School Road, Highway 22, and a marginal shoulder on South Park Loop Road. No additional shoulder bikeways are recommended.

Bike Lanes

A bike lane on Snow King Ave in Jackson

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is typically located on the right side of the street, between the adjacent travel lane and curb, and is used in the same direction as motor vehicle traffic. The only bike lane in Jackson currently exists on Snow King Avenue.

Buffered bike lanes are conventional bicycle lanes paired with a designated buffer space, separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane. Buffered bike lanes are allowed as per MUTCD guidelines for buffered preferential lanes (section 3D-01).

Buffered bike lanes are designed to increase the space between the bike lanes and the travel lane or parked cars. Jackson streets are generally narrow enough that providing buffered bike lanes within existing streets will be difficult and typically would require elimination of parking on at least one side, if not both sides of the road.

Cycle Tracks

A cycle track is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk. Cycle tracks have different forms but all share common elements—they provide space that is intended to be exclusively or primarily used for bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks. By separating bicyclists from motor traffic, cycle tracks can offer a higher level of security than bike lanes and are attractive to a wider spectrum of the public. Intersections and approaches must be carefully designed to promote safety and facilitate left-turns from the right side of the street. One-way raised cycle tracks (like the right side of the below graphic) are planned for Broadway between the 'Y' and the Flat Creek Bridge.

A raised cycle track in Bend, OR

A street-level cycle track in Chicago, IL

One-way Cycle Track

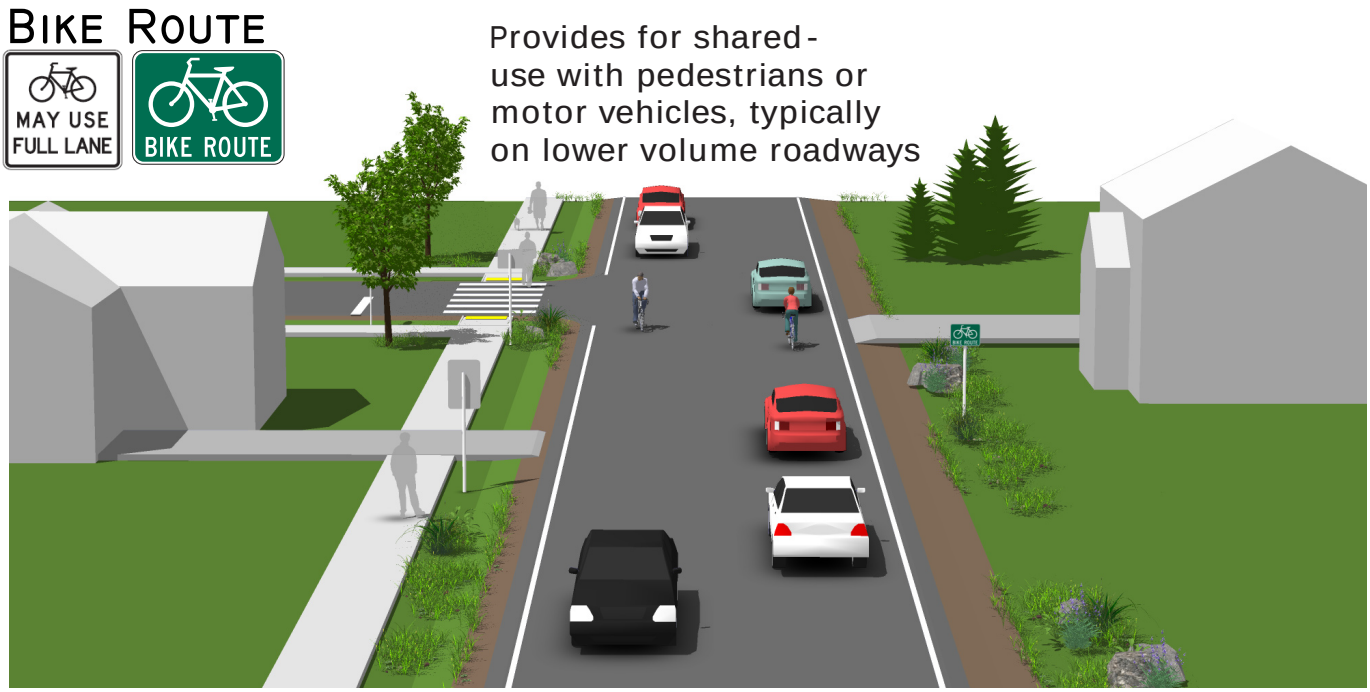
Customized Bike Route sign in Bozeman, MT

Generic Bike Route Sign with supplemental arrow

Bike Routes

On most bike routes, bicyclists and motor vehicles use the same roadway space. These facilities are typically used on roads with relatively low speeds and traffic volumes. A motor vehicle driver will usually have to cross over into the adjacent travel lane to pass a bicyclist.

Bike routes can employ a large variety of treatments from simple signage and shared lane markings to more complex treatments including directional signage, traffic diverters, speed humps, and/or other traffic calming devices to reduce vehicle speeds or volumes. Streets with wayfinding signage, shared lane markings and speeds and volumes low enough can be designated as bicycle boulevards.



Bicycle Boulevards

Bicycle boulevards are low-volume, low-speed streets modified to enhance bicyclist comfort by using treatments such as signage, pavement markings, traffic calming and/ or traffic reduction, and intersection modifications. These treatments allow through movements of bicyclists while discouraging similar through-trips by non-local motorized traffic.

- Signs and pavement markings are the minimum treatments necessary to designate a street as a bicycle boulevard.
- Slow motor vehicle speeds are most compatible with bicycles. Bicycle boulevards should have a maximum posted speed of 25 mph, with 20 mph being the most desirable.
- Consider implementing volume control treatments based on the context of the bicycle boulevard, using engineering judgment. Target motor vehicle volumes range from 1,000 to 3,000 vehicles per day.
- Intersection crossings should be designed to enhance safety and minimize delay for bicyclists.

A Bicycle Boulevard in Madison, WI

Wayfinding 'Sharrows' in Portland, OR

Bicycle Boulevard

'Enhanced' Bike Route with wayfinding signage and shared lane markings. Also involves intersection treatments and follows streets with low volumes and speeds.

Facility Selection

Selecting the best bikeway facility type for a given roadway can be challenging, due to the range of factors that influence bicycle users' comfort and safety. One of the most important factors to consider when designing for bicyclists is determining the type of bicycle user the facility is meant to attract. User preference varies with bicyclist's skill level, trip purpose, and individual characteristics, and no simple rule exists for determining what users prefer. Nationwide, there is an increasing trend toward reducing the stress level of bicycling, thereby making it a more attractive activity for a larger percentage of the population. Jackson is somewhat different than most places in the United States in that many of the pathway users are visitors. Many of these visitors are attracted to the low-stress pathways, but may not be comfortable nor have sufficient local knowledge to navigate the town.

Bicycle planning and engineering professionals currently use several systems to classify the population, which can assist in understanding the characteristics and infrastructure preferences of different bicyclists. The most conventional framework classifies the "design cyclist" as Advanced, Basic, or Child. A more detailed understanding of the US population as a whole was developed by planners in the City of Portland, OR and supported by data collected nationally since 2005. This classification provides the following alternative categories to address 'varying attitudes' towards bicycling in the US, and takes into account not only existing bicyclists, but represents a vast potential for increased levels of bicycling if facilities are made to be more comfortable.

There is no standard national approach for formulaic bicycle facility selection. Most

The Four Types of Bicyclists

- **Strong and Fearless** (Very low percentage of population) – Characterized by bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes and will typically choose roadway connections -- even if shared with vehicles -- over separate bicycle facilities such as multi-use trails.
- **Enthused and Confident** (5-10% of population) -This user group encompasses 'intermediate' bicyclists who are fairly comfortable riding on all types of bicycle facilities but usually choose low traffic streets or multi-use trails when available. These bicyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists such as commuters, recreationalists, racers and utilitarian bicyclists.

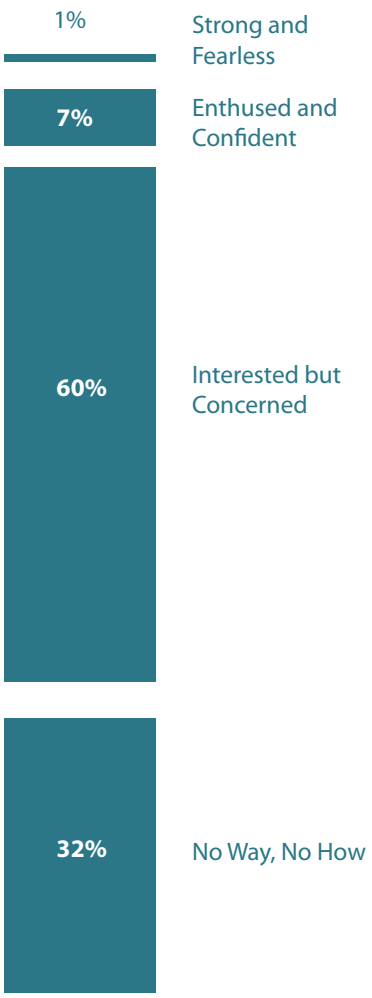


Figure 1: Typical distribution of bicyclist types

- **Interested but Concerned** (approximately 60% of population) – This user type comprises the bulk of the cycling population and represents bicyclists who typically only ride a bicycle on low traffic streets or multi-use trails under favorable weather conditions. These bicyclists perceive significant barriers to their increased use of cycling, specifically traffic and other safety issues. These bicyclists may become "Enthused & Confident" with encouragement, education and experience.
- **No Way, No How** (approximately 30% of population) – Persons in this category are not bicyclists, and perceive severe safety issues with riding in traffic. Some people in this group may eventually become more regular cyclists with time and education. A significant portion of these people will not ride a bicycle under any circumstances.

agencies work to craft a customized set of criteria unique to local conditions. Alta's experience derived from working with many cities has resulted in the general guidance provided in Figure 2.

This is only a broad overview whereby roadway speed and volume can provide some insight into what types of bicycle facility may be appropriate. Additional factors may influence the decision to select one facility type over another beyond looking at speed and volume characteristics by themselves. For example, high frequency bus service could indicate a bike lane or an alternate corridor be considered. Similarly, under utilized curb parking, or curb parking adjacent to large surface parking lots could be substituted for bike lanes if sufficient space does not exist to add bike lanes on their own. Finally, many local streets will have low enough traffic volumes and speeds that sharing travel lanes with vehicles is comfortable for most bicyclists.

Selection Criteria in Jackson

Alta performed a field review in Jackson in October 2012. This included meetings to review the 2007 Pathways Master Plan "Complete Street" routes, additional route recommendations provided by Friends of Pathways Staff, and data provided by Town of Jackson Staff. Map 3 depicts a network of recommended bikeway corridors that would ultimately connect the majority of destinations within Jackson. These corridors in Map 3 are not defined specifically by bikeway type, but are identified here to note their importance to connectivity in Jackson. Destinations that were considered in the network planning included:

- Schools
- Parks
- Pathway entrances
- Trailheads
- Hospital
- Town and County Offices
- Post offices
- Shopping centers
- Fairgrounds

Through fieldwork, discussion and analysis, several factors were identified that were major considerations when refining the general bikeway corridors into specific facility recommendations. These factors are not the only criteria that are considered in other US cities, but these are the most significant and relevant in Jackson.

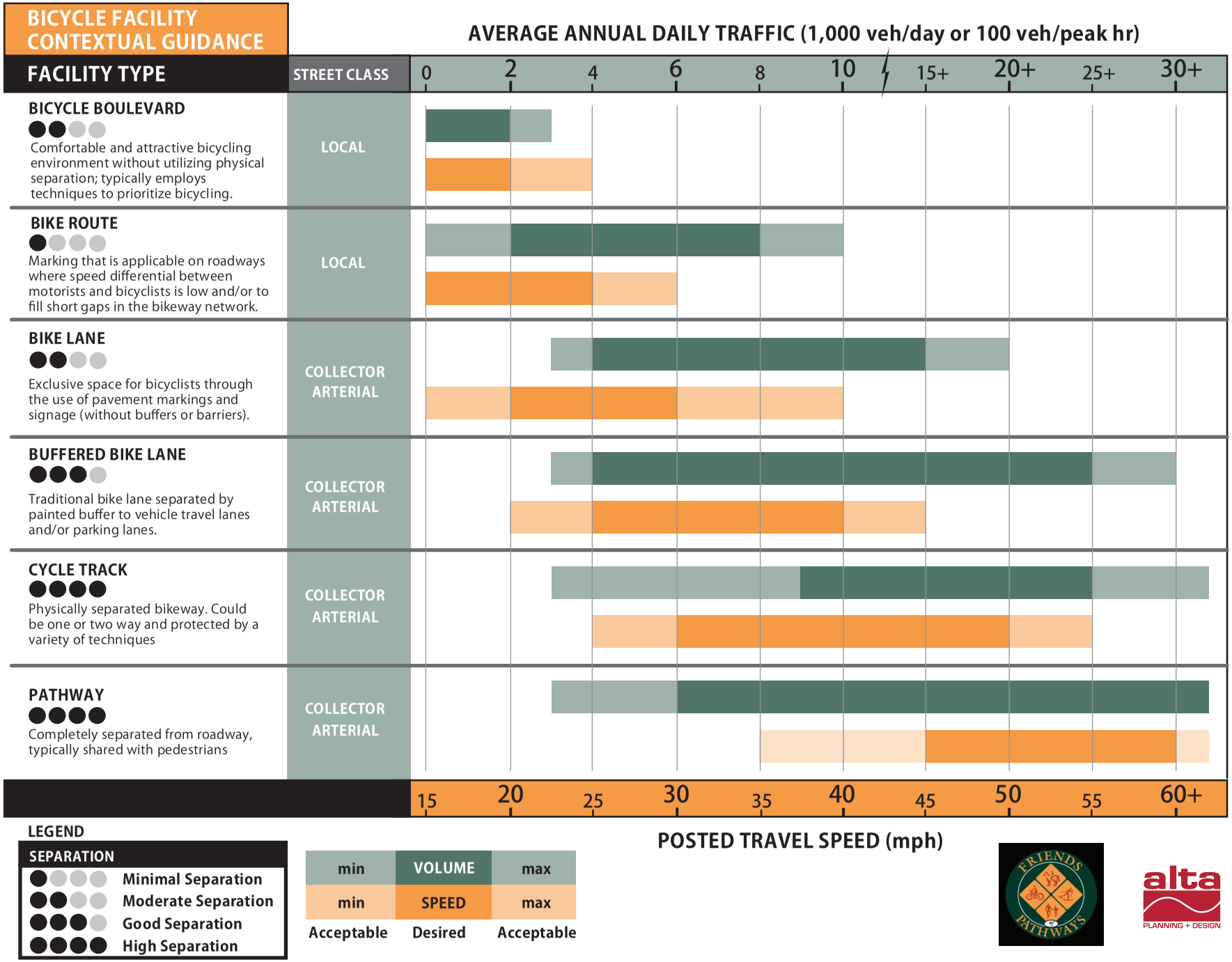


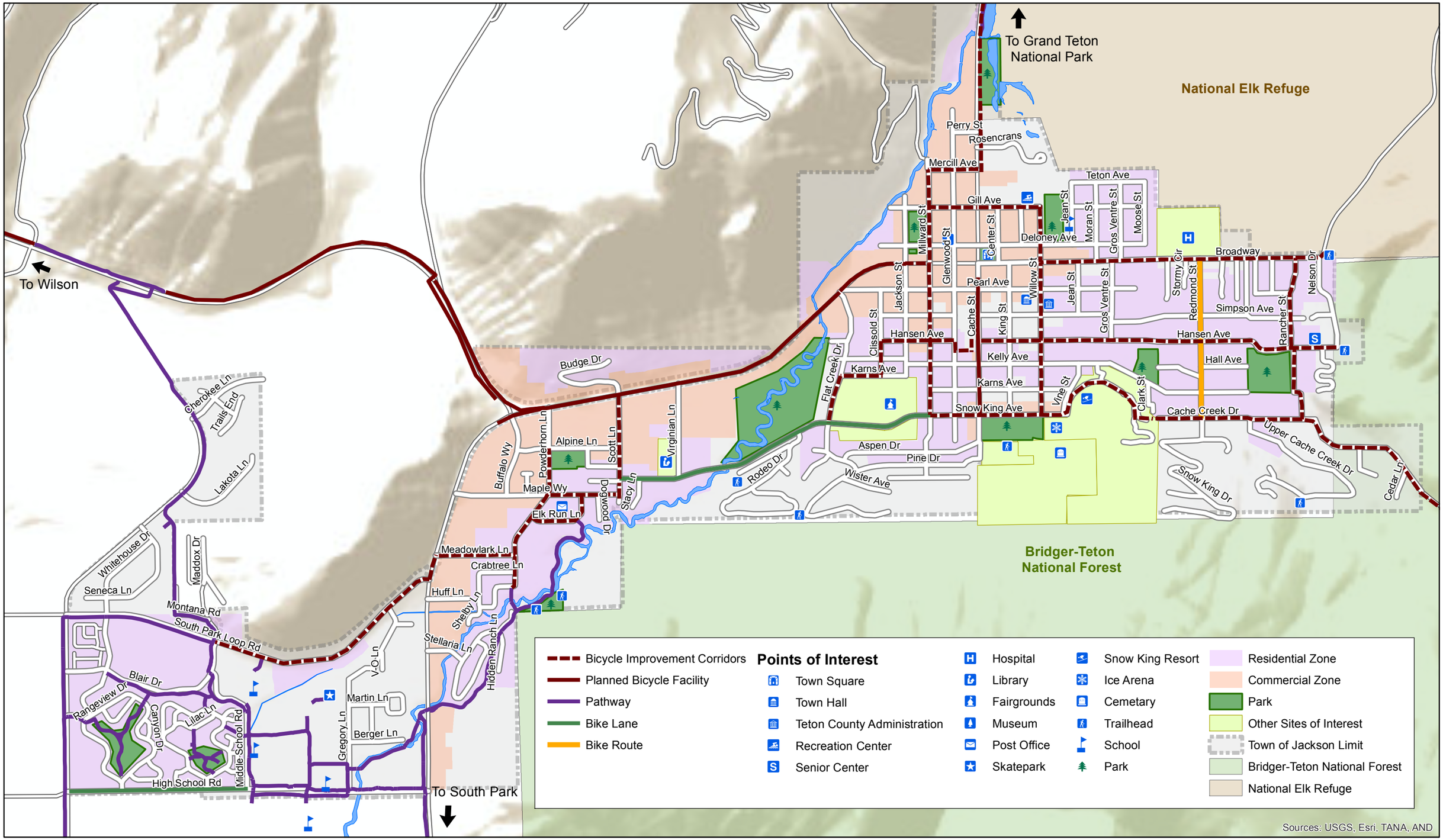
Figure 2 – Bicycle Facility Selection Guidance (Speed & Volume)

Factors that were considered include:

- Motor vehicle speed and volume
- Presence of heavy vehicles/trucks
- Presence of bus routes
- Street width
- Street classification
- Presence and type of parking

A map displaying some of these constraints including traffic counts, and bus routes are provided in Map 4.

A summary of the bikeway corridors is provided in Table 1. Each of the informational columns in this table provide key information that influences what the options might be compatible with each street. The traffic volume on a street is very important. The higher the volume, the more stress a bicyclist will feel. Generally, family friendly bicycle boulevard facilities have maximum recommended volumes of 1,500-3,000 vehicles per day in several cities where they have been implemented as networks. Signed bike routes can still be effective for volumes of 3,000-6,000 vehicles per day. Physical separation, such as a bike lane or protected bicycle facility is generally desired where volumes exceed 6,000 vehicles per day. Street width is also an important consideration; roads with sufficient width can in many cases accommodate bike lanes with simple narrowing of travel lanes where they are overly wide. Most streets with curb-to-curb widths in excess of 44 feet can maintain standard width travel lanes, parking, and bike lanes. In other cases, parking may need to be removed on one side to provide the necessary space for a bike lane. Streets with frequent START bus activity would fare better with bicycle lanes if possible. Where vehicle volumes are high and no physical space within the roadway can be made available for dedicated bicycle facilities, off street facilities, such as a wide streetscape, or a parallel pathway should be considered.



Map 3: Recommended Bicycle Improvement Corridors

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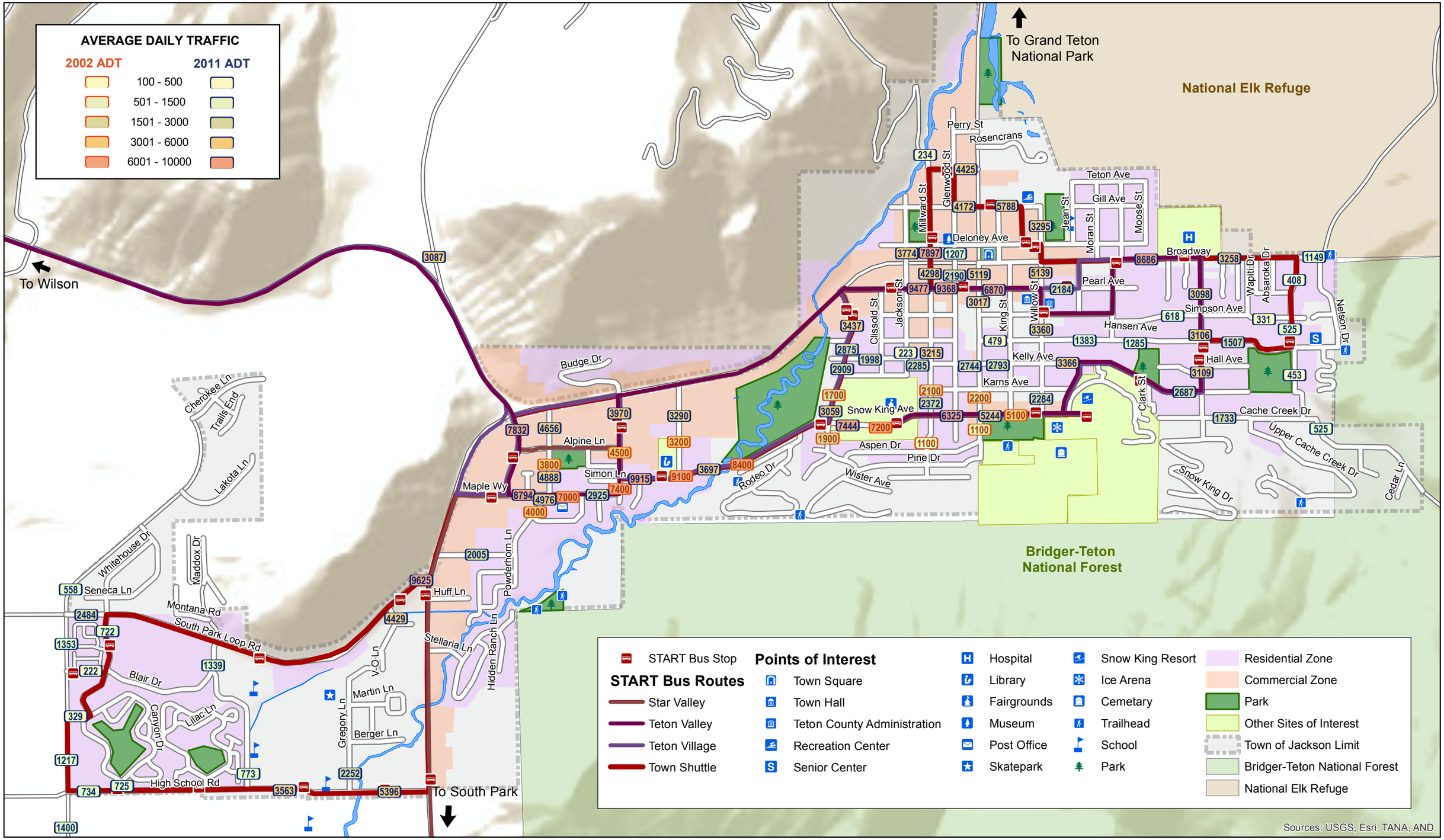

Map 4: Bikeway Selection Considerations

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Table 1: Bikeway Corridor Characteristics

Street	From	To	Traffic Volume	Street Width	START Bus Route
West Broadway	South Park Loop Road	Meadowlark Lane	35,000	60-70 feet	Yes
North Cache Street	Wyoming Game & Fish	89 Pathway	20,000	62 feet	No
South Park Loop Road	Blair Drive	Broadway	10,000	32 feet	Yes
East Broadway	Willow Street	Redmond Street	9,100	44 feet	Yes
Millward Street	Mercill Avenue	Broadway	8,000	48 feet	Yes
Scott Lane	Snow King Avenue	Maple Way	7,400	34 feet	Yes
Maple Way	Scott Lane	Powderhorn Lane	7,000	40 feet	Yes
Snow King Ave	Millward Street	Snow King Resort	5,000-6,000	39 feet	Yes
Gill Avenue	Cache Street	Willow Street	5,800	40-42 feet	Yes, part
Powderhorn Lane	Apine Lane	Meadowlark Lane	5,000	44 feet	No
Willow Street	Broadway	Snow King Avenue	2,200-5,139	38 feet	Yes, 1 block
Scott Lane	Broadway	Snow King Avenue	4,500	44 feet	Yes
Mercill Avenue	Cache Street	Millward Street	4,500	48 feet	Yes
Gill Avenue	Millward Street	Cache Street	4,200	42 feet	Yes, part
Hansen Ave	Clissold Street	Nelson Drive	500-1,500	32 feet	No
Clissold Street	Hansen Ave	West Karns Ave	unknown	38 feet	No
West Karns Ave	Flat Creek Drive	Clissold Street	unknown	38 feet	No
Flat Creek Drive	West Karns Ave	Snow King Drive	3,000	38 feet	Yes
Willow Street	Gill Avenue	Broadway	3,300	48 feet	No
Cache Street	Snow King Ave	Broadway	2,000-5,000	38-42 feet	Yes
Millward Street	Broadway	Snow King Avenue	2,400-3,200	36-42 feet	No
Meadowlark Lane	Broadway	Powderhorn Lane	2,000	44 feet	No
Cache Creek Drive	Snow King Ave	Cache Creek TH	500-1,700	28 feet	Yes, part
Rancher Street	Broadway	Cache Creek Drive	500	26 feet	No
East Broadway	Redmond Street	Nelson Drive	1,150-3,258	24 -44 feet	Yes, part
Powderhorn Lane	Meadowlark Lane	Pathway Entrance	unknown	38 feet	No
Elk Run Lane	Powderhorn Lane	Maple way	unknown	30 feet	No

Bicycle Recommendations

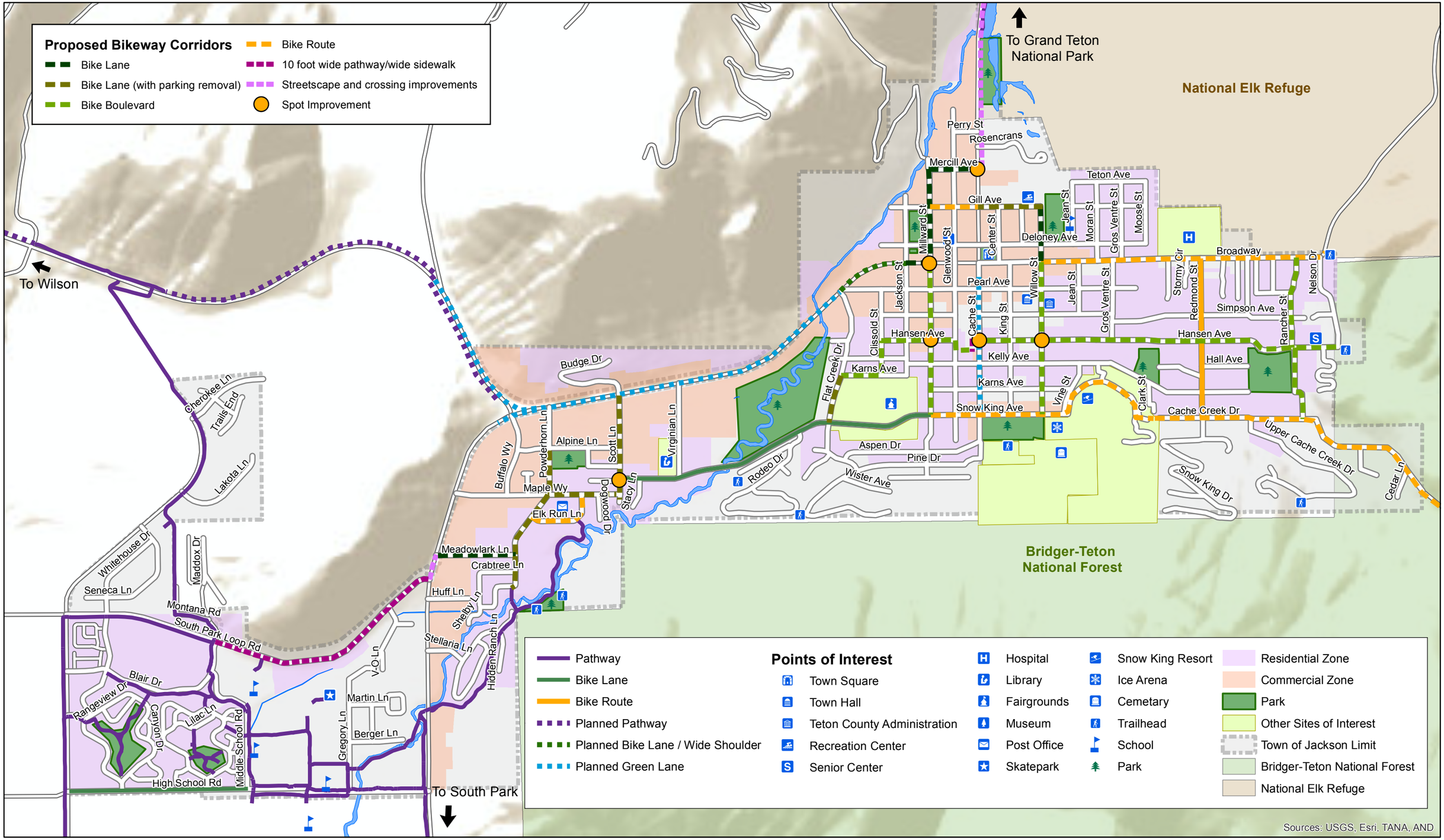
Based on analysis from Table 1 and the existing conditions, the following network recommendations include on-road and off-road facilities such as bicycle lanes, signed routes, bicycle boulevards, streetscape improvements and pathways. Map 5 depicts the recommended network by facility type combined with the existing and previously planned projects to form a complete bicycle system in Jackson. A variety of bicycle facilities are recommended due to both the range of skill and comfort levels involved in bicycling, and the range of existing conditions for bicycling on different street environments.

Corridor Bicycle Recommendations

Recommendations for corridor bicycle improvements are separated by facility type and presented in Tables 2 through 5. Bicycle lane configuration ranges for Jackson streets are provided in Figure 3. Additional detail and graphics are provided for selected projects at the end of this section.

Table 2: Recommended Bike Lanes

Street	From	To	Length (ft)	Notes
Mercill Avenue	Cache Street	Millward Street	775	Bike lanes will fit with no loss of parking, dashed striping will be necessary where heavy vehicles may turn and encroach over bike lane.
Millward Street	Mercill Avenue	Broadway	1,400	Bike lanes will fit with no loss of parking, dashed striping will be necessary where heavy vehicles may turn and encroach over bike lane.
Scott Lane	Snow King Avenue	Maple Way	250	No parking currently exists here, road has sufficient width for bike lanes.
Willow Street	Gill Avenue	Broadway	820	Bike lanes will fit with no loss of parking. There is a bulbout approaching Deloney Avenue where the bike lane will need to drop.
Meadowlark Lane	Broadway	Powderhorn Lane	1,160	Bike lanes will fit with no loss of parking, however if one lane of parking could be removed it would be more comfortable. Recommend north side of street have parking removed as all properties have surface lots.
Maple Way	Scott Lane	Powderhorn Lane	1,020	Remove parking on south side. Most businesses have ample off-street parking.
Gill Avenue	Cache Street	Willow Street	960	Remove parking on north side (minimal effect as large surface lots exist along the length of this street).
Scott Lane	Broadway	Snow King Avenue	1,230	Remove parking on east side for a portion of the length, preserve parking on both sides for the first block south of Broadway. Most businesses have ample off-street parking.
Flat Creek Drive	West Karns Ave	Snow King Drive	730	Remove parking from one side, sign so that bike lanes can be used for parking during County Fair.
Powderhorn Lane	Apine Lane	Meadowlark Lane	1,740	Could remove parking on one side of the road, or just put signs up. 5,000 ADT is pushing stencils.
Broadway	Jackson Street	Millward Street	330	Consider removing turn lane to provide bike lanes. Provide exclusive left turn phase at Millward to facilitate truck route. Alternate method: remove one WB travel lane between Jackson and Cache Street. WYDOT project.



Map 5: Recommended Bikeways

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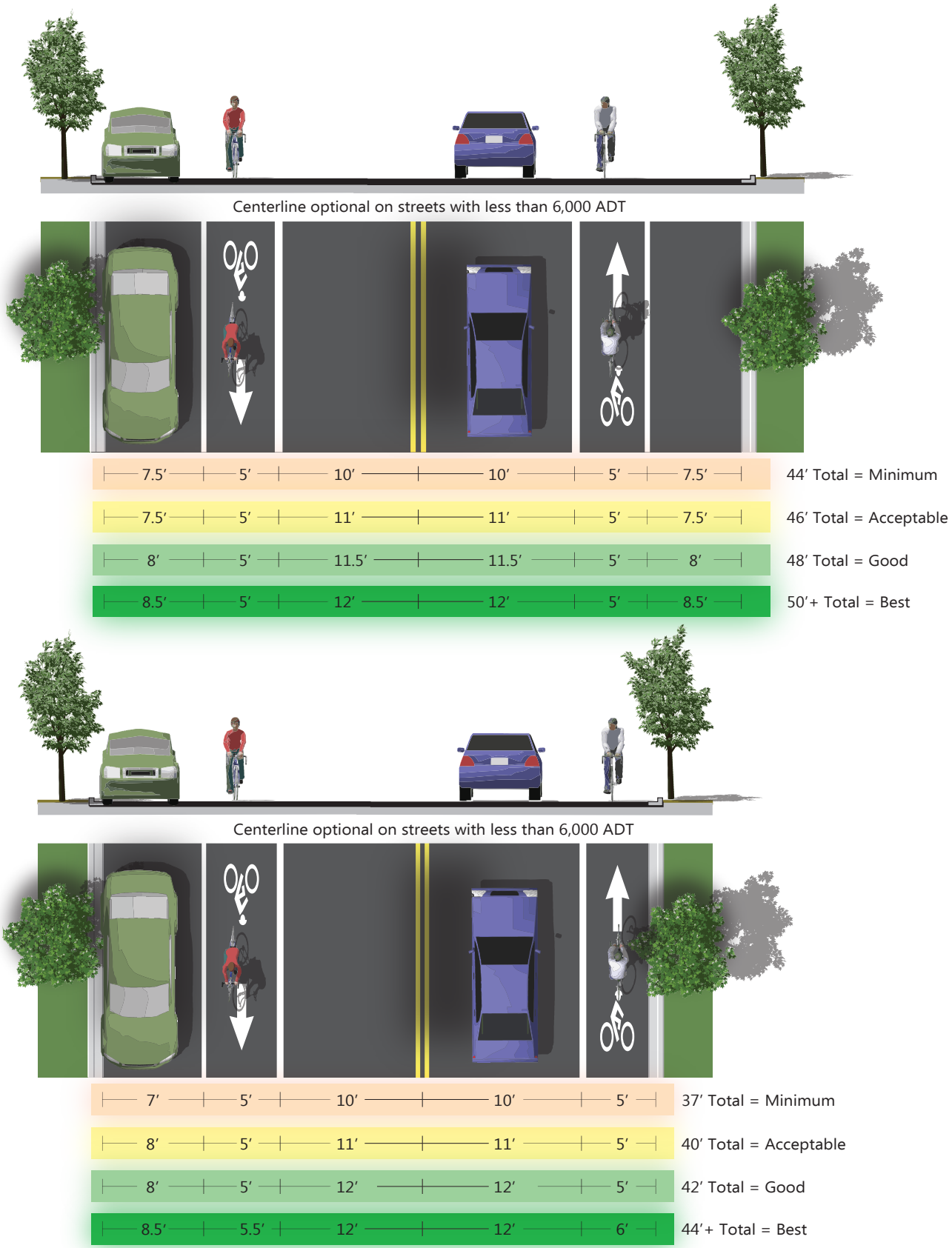

Figure 3: Bike Lane Configuration Ranges

Table 3: Recommended Bike Routes

Street	From	To	Length (ft)	Notes
East Broadway	Willow Street	Redmond Street	4,260	Could be bike lane due to surface parking along north side of street... need? At Jean street the road widens and could have bike lanes and parking until Willow Street.
Snow King Ave	Millward Street	Snow King Resort	3,860	Too narrow for bike lanes if parking is maintained. Bike Lane could fit if parking along south side is removed. Parking along south side services several recreational facilities that have infrequent need.
Gill Avenue	Millward Street	Cache Street	710	Parking could be removed on north side from Glenwood to Cache to create a bike lane, but from Millward to Glenwood it would be more difficult to remove. Could be partial bike lane, partial bike route with sharrows.
Cache Street	Snow King Ave	Broadway	2,200	Signed bike route only with or without sharrows. Future project may reconstruct the street with higher quality bikeway being possible.
Cache Creek Drive	Snow King Ave	Cache Creek TH	4,970	Signed bike route only with or without sharrows.
East Broadway	Redmond Street	Nelson Drive	4,260	Signed bike route only with or without sharrows.
Powderhorn Lane	Meadowlark Lane	Pathway Entrance	500	Signed bike route only with or without sharrows.
Elk Run Lane	Powderhorn Lane	Maple way	1,080	Signed bike route only with or without sharrows.

Table 4: Recommended Pathways/Streetscape Improvements

Street	From	To	Length (ft)	Notes
South Park Loop Road	Blair Drive	Broadway	3,700	A pathway or wide 10 foot sidewalk could be constructed on the south side of the street to link the middle school with Broadway. There would be many driveways to interface with.
West Broadway	South Park Loop Road	Meadowlark Lane	310	Streetscape is deteriorating, improvements on east side of the roadway could beautify the highway and make a inviting connection from South Park Loop Road to other Town Bikeways
North Cache Street	Wyoming Game & Fish	89 Pathway	1,900	Continue streetscape that currently exists in front of Wyoming Game & Fish.
South Cache Street	Hansen Avenue	Alley South of Hansen Avenue	150	New pathway along side of Center for the Arts park to enhance Hansen Avenue Bicycle Boulevard.

Table 5: Recommended Bicycle Boulevards

Street	From	To	Length (ft)	Notes
Willow Street	Broadway	Snow King Avenue	2,260	Some Interventions may be needed in the vicinity of Broadway. Add W11-15 warning signs on crossing of Kelly Avenue. Consider mini-traffic circle at intersection with Hansen Ave.
Hansen Ave	Clissold Street	Nelson Drive	7,100	Hansen is the ideal candidate, however spot improvements needed at Cache (see Table 2). Stop signs should be removed along Hanson at Rancher Street, and Gros Ventre Street. Flip stop signs on King Street to favor Hansen. Consider mini-traffic circle at intersection with Willow and Millward Streets.
Clissold Street	Hansen Ave	West Karns Ave	520	Warning signage needed at Kelly Avenue.
West Karns Ave	Flat Creek Drive	Clissold Street	620	Alley to the east could also be paved as an alternate route.
Millward Street	Broadway	Snow King Avenue	2,250	Remove center line. Add crosswalk and W11-15 warning signs on crossing of Kelly Avenue. Partial diverter might be necessary if traffic volumes increase too much beyond 3,000 vehicles per day.
Rancher Street	Broadway	Cache Creek Drive	1,350	Ideal candidate for bicycle boulevard.

Bicycle Stencil and Shared Lane Marking Placement Guidelines

Pavement markings for bike lanes shall be the graphic representation of cyclist with directional arrow to be used at:

- Beginning of bike lane
- Far side of any pathway crossings
- At approaches and at far side of all arterial crossings
- At far side of any collector or local street crossing
- At major changes in direction
- At intervals not to exceed 500 feet
- At beginning and end of bike lane pockets at approach to intersection.

Shared lane markings for bike routes and bicycle boulevards shall used at:

- At the far side of any street crossing
- At major changes in direction (chevrons can be rotated as a wayfinding tool)
- At intervals not to exceed 200 feet or mid-block if appropriate
- At any other location deemed useful (such as for lane positioning)

Bicycle Spot Improvements

In addition to corridor improvements, there are several locations that would benefit from improvements to bicycle operation. Such locations include existing signalized intersections, unsignalized intersections and select locations that occur in the local street system. Table 6 provides a summary of specific recommendations for bicycle spot improvements.

Table 6: Recommended Spot Improvements

cross-street 1	cross-street 2	Improvement Type
Hansen Avenue	Cache Street	Change W1-1 pedestrian warning signs to W11-15 bicycle/ pedestrian warning signs. Provide wide curb ramp on east side of the park linking to pathway to the alley. See Figure 5 and 6.
Scott Lane	Snow King Avenue	Provide bicycle forward stop bars westbound on Snow King and northbound on Scott Lane. A bicycle bypass island to facilitate free right turns by bicyclists should be installed on the southeast corner on the residential lot that the town owns. See Figure 4.
Mercill Avenue	Cache Street	A wide driveway exists on the north side of Mercill where no on-street parking can occur. This space can be used to provide a left turn only lane from Mercill Avenue to Cache Street and a combination right/through lane. An advanced stop line or bike box can be provided in front of this outside through/right lane to facilitate bicyclist movements to the streetscape on the east side of North Cache Street. A similar arrangement can be configured leading from the streetscape westbound to Mercill. Provide wayfinding direction southbound on the east side to reach Mercill Avenue. Few vehicles use the westbound signal.
Broadway	Millward Street	Mark 'advance stop line' on the northbound Millward Street approach. This functions similar to a bike box, without the same impacts. Signage on eastbound Broadway should direct bicyclists to use this as a waiting area to make left turns onto Millward Street.
Hansen Avenue	Willow Street	Consider mini-traffic circle to join both bicycle boulevards
Hansen Avenue	Millward Street	Consider mini-traffic circle to join both bicycle boulevards

Bicycle forward stop bar in Missoula, MT

Guide sign for two-stage turn

Mini-traffic circle in Missoula, MT

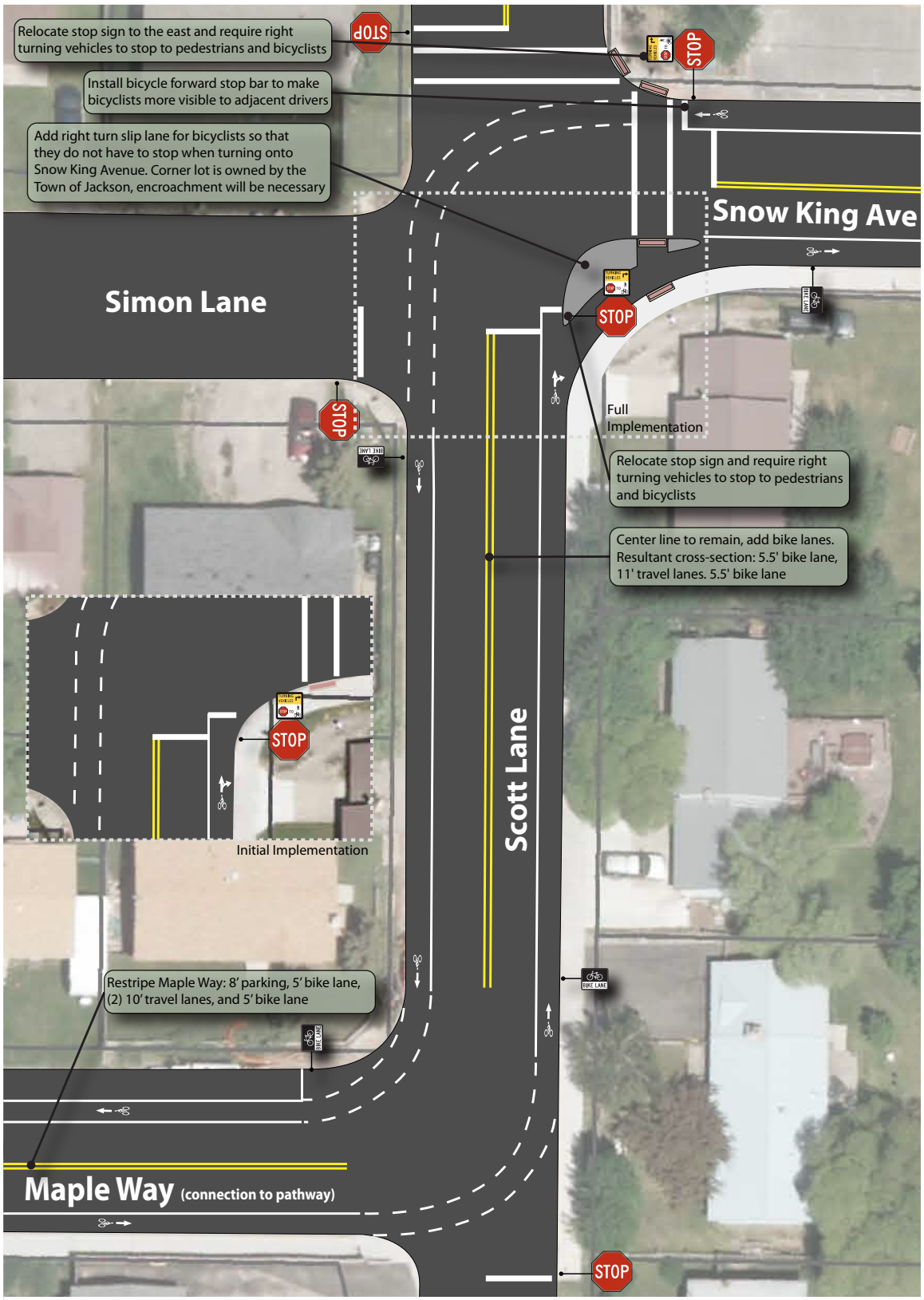

Figure 4: Initial Spot Improvements at Maple Way and Snow King Avenue

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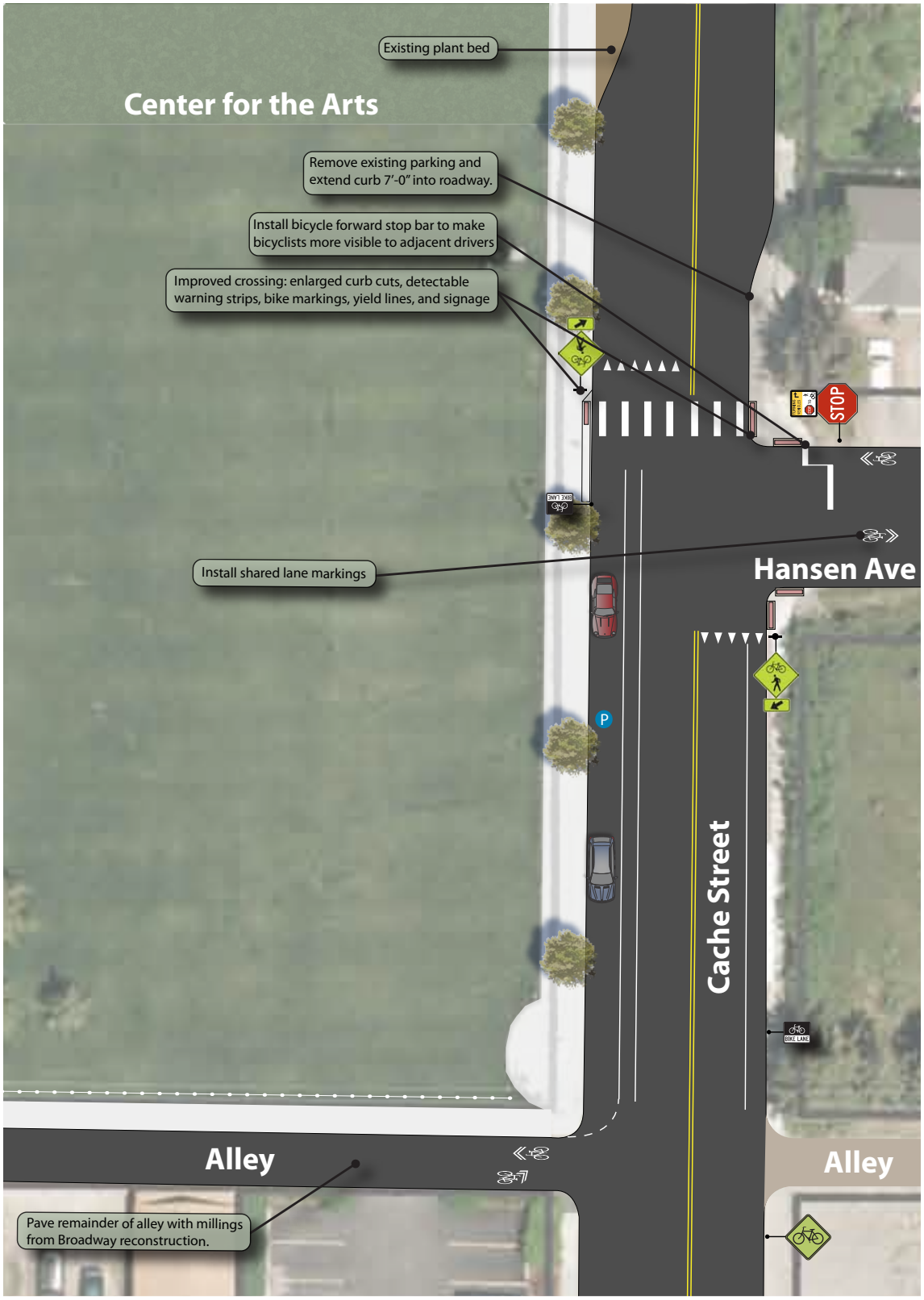

Figure 5: Initial Spot Improvements at Center for the Arts

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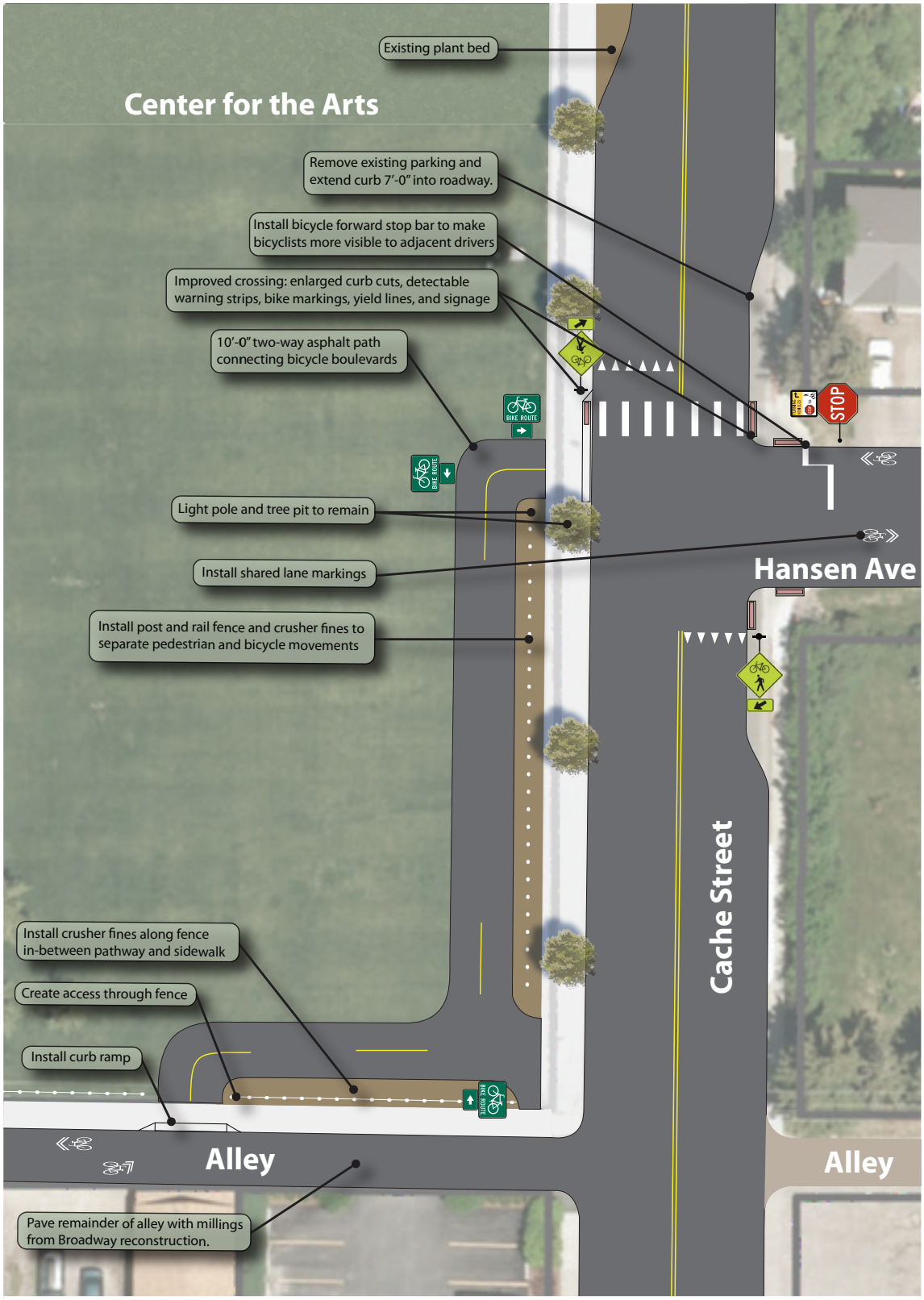

Figure 6: Preferred Spot Improvements at Center for the Arts

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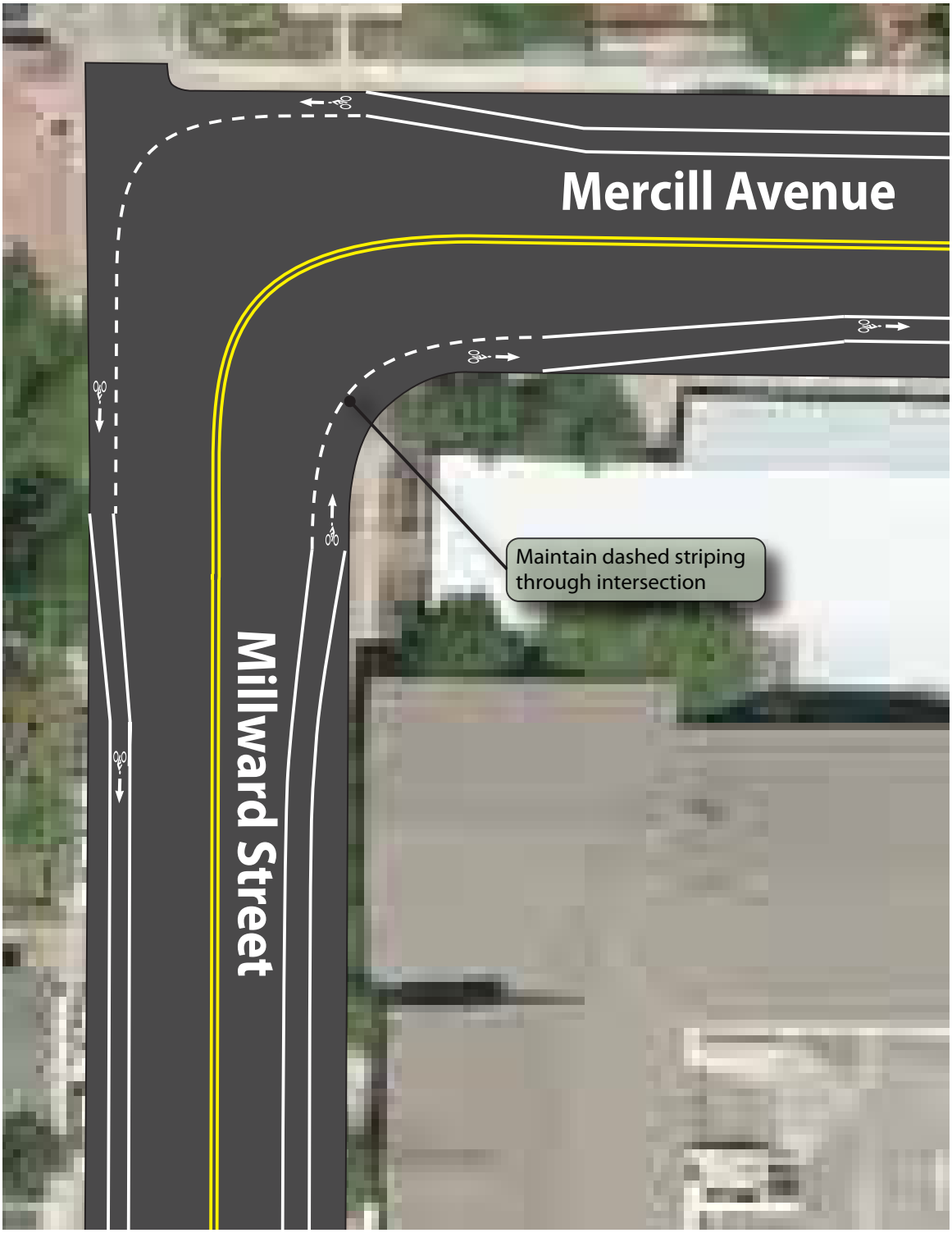

Figure 5: Spot Improvements at Mercill Avenue and Millward Street

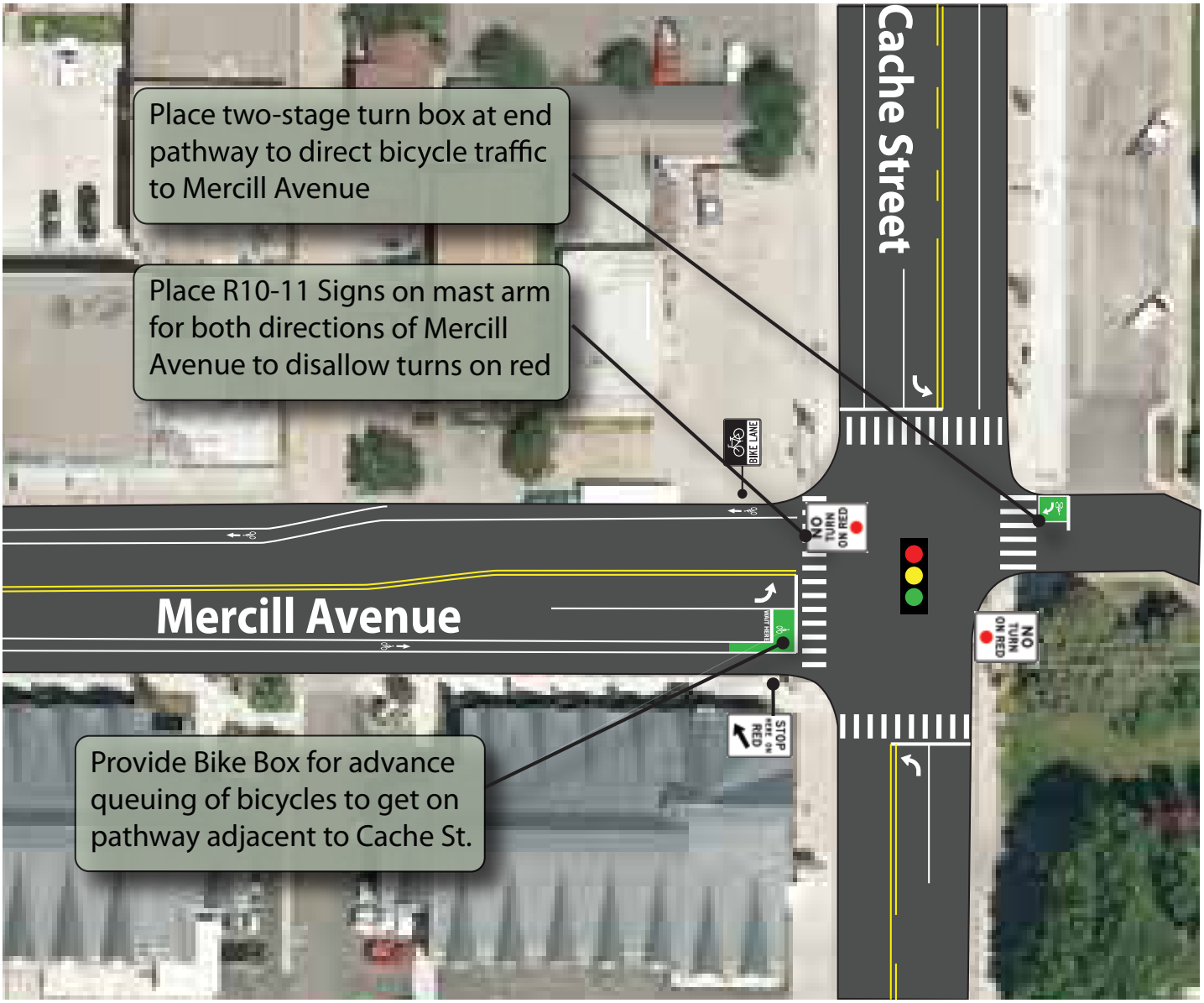

Figure 6: Spot Improvements at Mercill Avenue and Cache Street

Figure 7: Sample Spot Improvements along Hansen Avenue Bicycle Boulevard

Pedestrian Recommendations

While not the primary focus of this improvement plan, pedestrian facilities are also a very important component of achieving Jackson's active transportation goals and those for achieving more complete streets. None of the bicycle improvements proposed in this plan preclude the possibility of adding pedestrian infrastructure at a later date. The 2007 Pathways Master Plan provides recommendations for closing the "missing links". These recommendations are still valid and could provide significant value to Jackson residents and visitors.

2007 Pathways Master Plan Recommendation: Missing Links

Lead Agency:	Town of Jackson Department of Public Works
Project Cost:	$140,000 / year
Potential Funding Source(s):	CIP funds
Maintenance / Operations:	Town of Jackson PW
Notes / Other:	Sidewalk and streetscape projects can also be integrated in private sector developments and in roadway reconstruction projects.

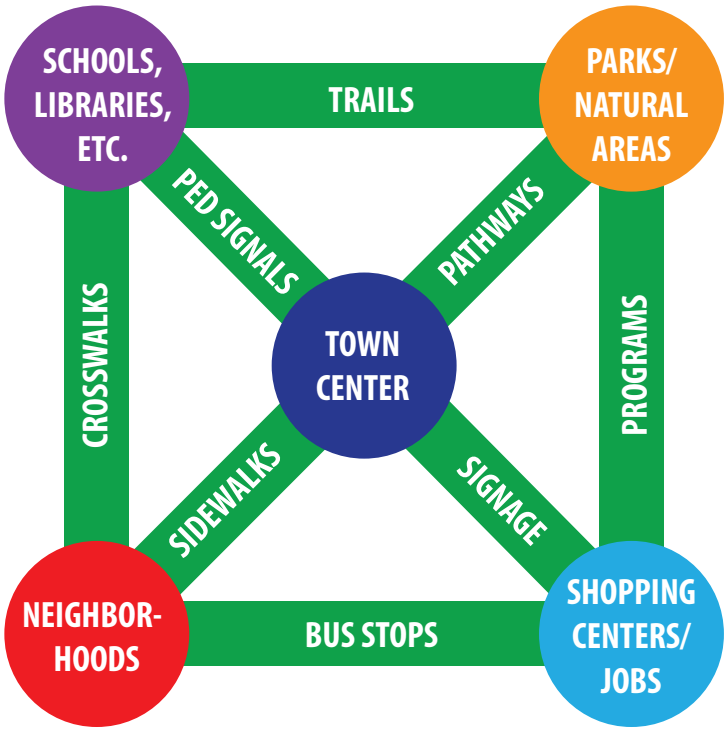

Figure 7: Pedestrain 'Hub & Spokes' Diagram

The Town of Jackson has maintained a list of sidewalks to be constructed or repaired. This list is extensive, but has not been itself effective in aiding sidewalk infill. No prioritization exercise has been conducted.

The guiding philosophy in devising a complete pedestrian network is the hubs and spokes model. Pedestrian corridors (spokes) should connect to trip attractors (hubs), such as parks, schools, transit stops, Downtown, shopping centers, and other pedestrian corridors. The network then becomes a practical solution for pedestrian connectivity.

The Town of Jackson should seize any opportunity available through capital improvement projects to provide and improve pedestrian infrastructure. This approach should ideally include not just improvements within the extents of a project or road improvement, but also if the project can be used to provide pedestrian improvements to link to other nearby facilities. Such a focus would likely require inter jurisdictional cooperation between the Town, WYDOT and Teton County in certain cases.

Sidewalk Program

In order to continue to expand and improve the pedestrian network in Jackson a more aggressive stance must be made with regard to both the repair of existing sidewalk infrastructure which is deteriorating, and the construction of new sidewalks. Many other agencies large and small have used strategies found in Table 7 to expand and renew their sidewalk networks.

Table 7: Potential Sidewalk Funding Strategies

Strategy	Description
50/50 Cost Share	The 50/50 program is a model that splits the cost of sidewalk replacement and/or construction between the property owner and the local agency. The source of funding can vary, but is typically a defined item in the agencies annual budget. The manner payment can also vary by the property owner, including whether the property owner pays the town, a contractor, or pays the town in installments.
Subsidized loans	A low or no-interest loan can be provided to the property owner. Payment terms can vary, and can be collected as an assessment or as part of property taxes.
Health Plan Program	The financing model is based on the concept used in the health insurance industry. The town pays the first $1,000; The town and property owner split 50-50 any additional expense up to $7,000; and the town pays the remainder up to $15,000. (example from Missoula, MT)
Street Maintenance Fees	A defined portion of street maintenance fees can be set aside for sidewalk projects.
Improvement Districts	Special Improvement Districts (SIDs), Local Improvement Districts (LIDs) and Business Improvement Districts (BIDs) are special assessment districts within a city, formed by property and/or business owners as a means of funding and implementing local improvement projects. Establishment of a LID/BID offers low-interest financing, funded through the sale of bonds, for district-wide improvement projects.
Parking Tolls	If Jackson were to charge for parking downtown, a portion of the revenue could be designated for pedestrian improvements.
Tax Increment Financing	Tax Increment Financing (TIF) is a method to use future gains in taxes to subsidize current improvements, which are projected to create the conditions for said gains. The completion of a public project often results in an increase in the value of surrounding real estate, which generates additional tax revenue. Sidewalk and other streetscape improvements are popular applications of TIF funding. TIF districts (a geographic boundary around the business district) are often created by local economic development officials such as a downtown association, or a renewal board.
Voter Approved taxes	Another successful means of funding sidewalk construction is through voter-approved tax increases. These usually come in the form of a tax increment attached to a local sales tax or utilities tax.

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Wilson
Centennial Trail

Bikeway Wayfinding

4

Introduction

Bikeway signs are a cost-effective treatment to improve the Town of Jackson's bicycling environment. Wayfinding signs help people traveling along the bicycle network and direct them to community destinations. The benefits of a town-wide and even a regional bikeway wayfinding system include:

- Enhance users ability to navigate Jackson's bikeway and pathway network and find key destinations
- Provide key information such as destinations, direction, distance, and even travel time
- Support and promote the Town of Jackson's identity
- Raise community and visitor awareness of the bikeway network
- Integrate the bikeway wayfinding system with the community wide pathway wayfinding system

A coordinated, well-designed signage system improves the coherency of the bikeway system and can provide a greater sense of user security and comfort, as users receive confirmation that they are on the correct route and are aware of how far they have to travel to reach their destination. Wayfinding signs also visually cue motorists that they are driving along a bicycle route and should use caution.

In this Chapter we will provide an overview of standard and enhanced bicycle wayfinding signs and address features of a wayfinding program in Jackson including sign design, placement, destination names and implementation.

Standard Wayfinding Signs

National guidance on bicycle wayfinding signage can be found in the 2009 Manual on Uniform Traffic Control Devices (MUTCD) and the 2012 American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities. The MUTCD provides details on the signs themselves, and AASHTO provides additional guidance on placement. Many communities around the country use standard MUTCD bicycle wayfinding signs. Some communities have performed customizations to these MUTCD signs to provide an enhanced level of branding.

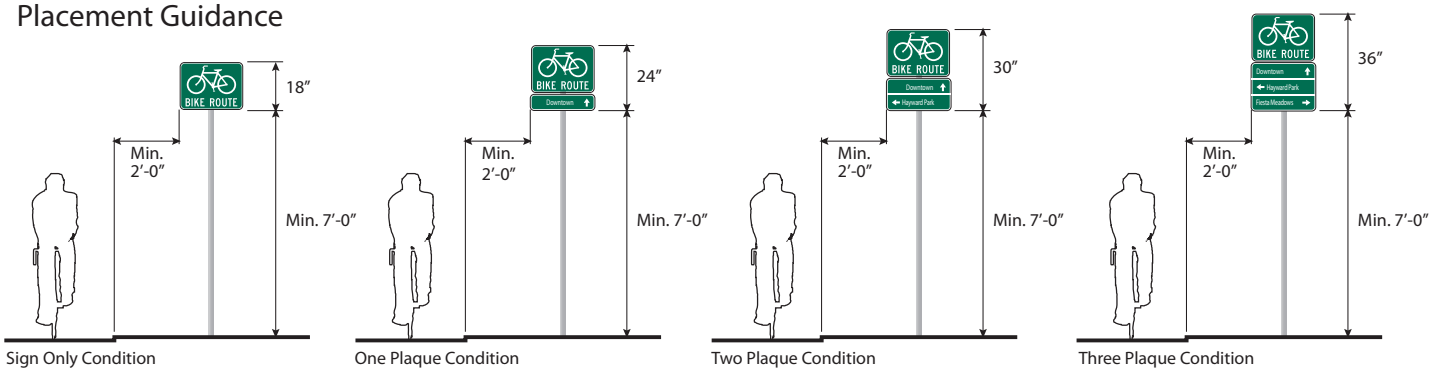
The MUTCD defines standards for bikeway wayfinding signs in Section 9B.20 Bicycle Guide Signs. The MUTCD states that Destination (D1-1, D1-1a) signs, Street Name (D3) signs, or Bicycle Destination (D1-1b, D1-1c, D1-2b, D1-2c, D1-3b, D1-3c) signs may be installed to provide direction, destination, and distance information as needed for bicycle travel.

D11-1

Standard MUTCD Bike Route Sign and MUTCD Inspired signs in Bozeman, MT and San Mateo, CA

The majority of the objectives of a wayfinding system can be accomplished with standard MUTCD, or MUTCD inspired signs. Using standard wayfinding signs requires multiple signs be fabricated for each location where wayfinding information is desired. Figure 8 depicts standard MUTCD bicycle wayfinding signs.

Placement Guidance



MUTCD Standard Signs (Figure 9B-4) Width can vary for D1 series signs

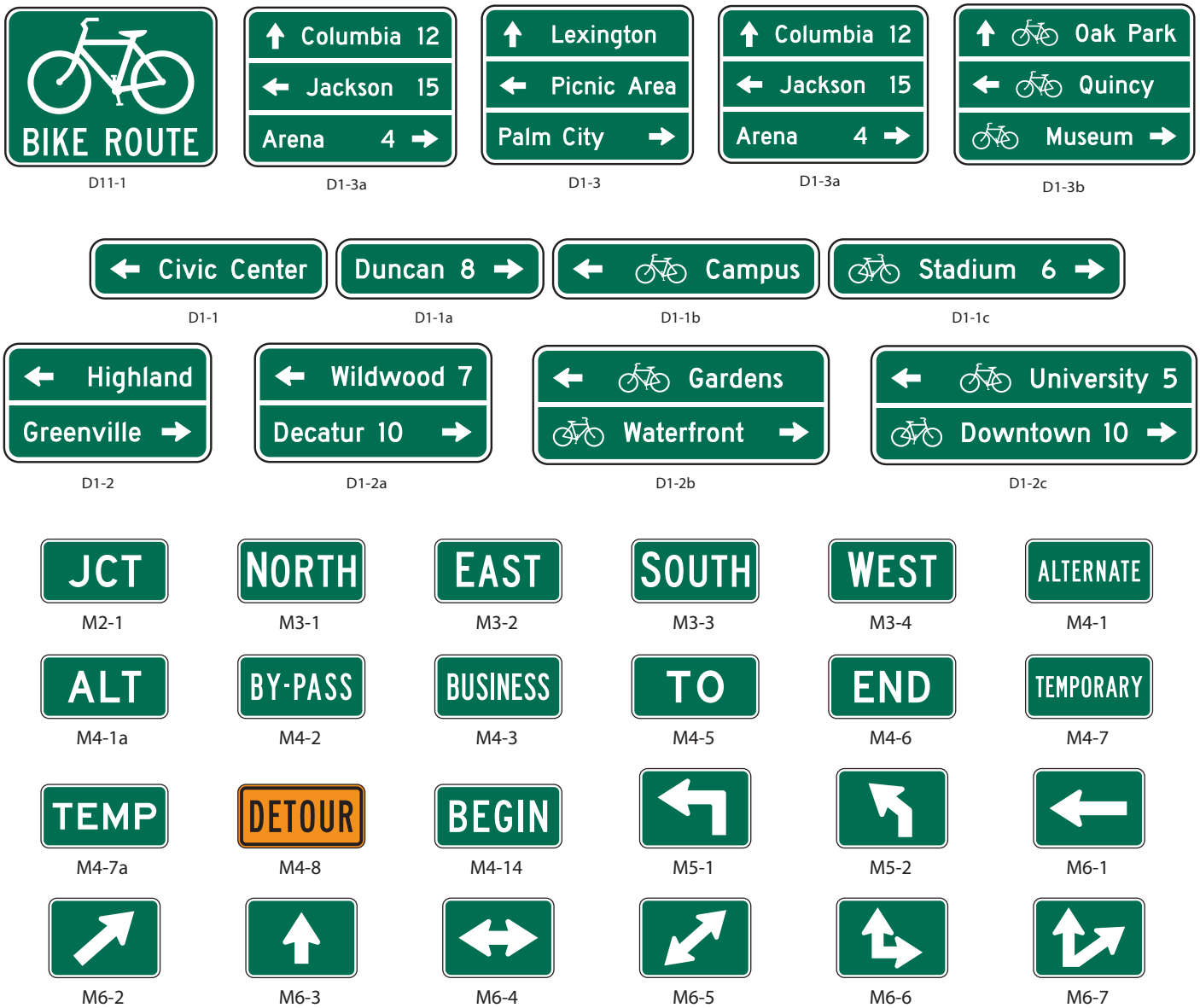


Figure 8: Standard MUTCD Signs

Enhanced Wayfinding Signs

A growing number of cities around the nation are employing an 'enhanced' style of wayfinding sign on their bikeway networks, in particular their bicycle boulevard networks. This set of signs uses generally the same size and shape as the previous MUTCD signs; they are 24-inches wide and slightly shorter at 34-inches tall with three destinations. These signs use a single, clean rectangle shape rather than multiple sign plaques. Enhanced signs may also include both mileage and travel time estimates to help minimize the tendency to overestimate the amount of time it takes to travel by bicycle. A 10 mile-per-hour (mph) speed is used to estimate travel time.

Enhanced bicycle wayfinding signs in Milwaukie OR. Berkeley CA. Wilmington NC, and Nampa ID

The closest destination to each sign is placed in the top slot. Destinations that are further away are placed in slots two and three. This allows the nearest destination to 'fall off' the sign and subsequent destinations to move up the sign as the bicyclist approaches.

Destination names may be stacked or abbreviated to accommodate longer destination names. Text size will only be reduced when necessary to accommodate route directions. The decision to abbreviate or stack text should be made based on the following:

1. A destination name will be abbreviated if the abbreviation will fit on a single line (e.g., the preference would be to keep the abbreviation "Grand Teton NP" on one line).
2. Unabbreviated destination names will be stacked on two lines if sufficient space exists on the sign.
3. Abbreviations will be used on stacked text if necessary to accommodate long destination names.

Mileage and travel time for each destination will be listed when text is stacked, if possible. Time and distance may be listed as a single line of text to the right, left, or below the destination if necessary.

Pavement markings may be used to help reinforce routes and directional signage. Pavement markings such as the shared lane marking with either a canted chevron, or a full arrow on the top of the bicycle symbol can help bicyclists navigate difficult turns and provide route reinforcement.

Examples of shared lane markings modified for wayfinding purposes at discontinuous bike routes

Sign Placement Principles

The following principles, derived from Alta's work on the NACTO Urban Bikeway Design Guide (www.nacto.org) inform the placement of individual signs. Figure 9 depicts how the three types of signs may be used to provide a comprehensive bicycle wayfinding system.

Confirmation signs: Every ¼ to ½ mile on off-street facilities and every 2 to 3 blocks along bicycle facilities, unless another type of sign is used (e.g., within 150 feet of a turn or decision sign), should be placed soon after turns to confirm destination(s). Pavement markings can also act as confirmation that a bicyclist is on a preferred route.

Turn Signs: Near-side of intersections where bike routes turn (e.g., where the street ceases to be a bicycle route or does not go through). Pavement markings can also indicate the need to turn to the bicyclist.

Decision Signs: Near-side of intersections in advance of a junction with another bicycle route. Along a route to indicate a nearby destination. The decision or turn sign should always be located in the block immediately preceding the junction or turn and at least 25 feet past the preceding intersection.

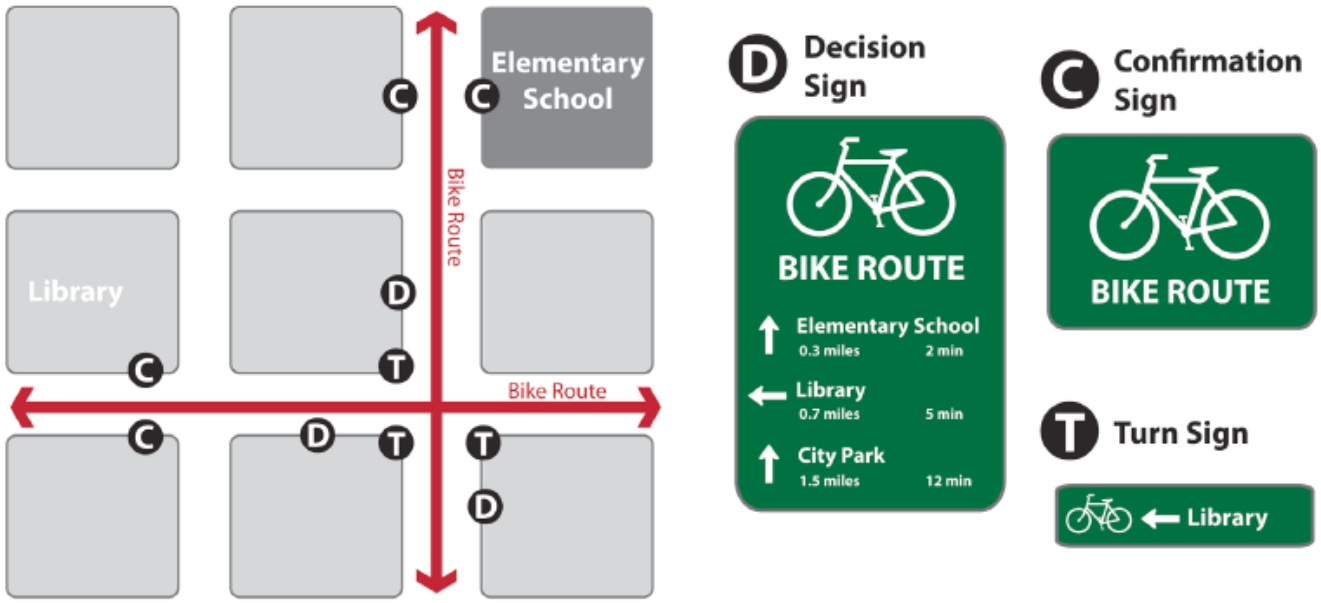


Figure 9: Types of Wayfinding Signs (Adapted from NACTO Urban Bikeway Design Guide)

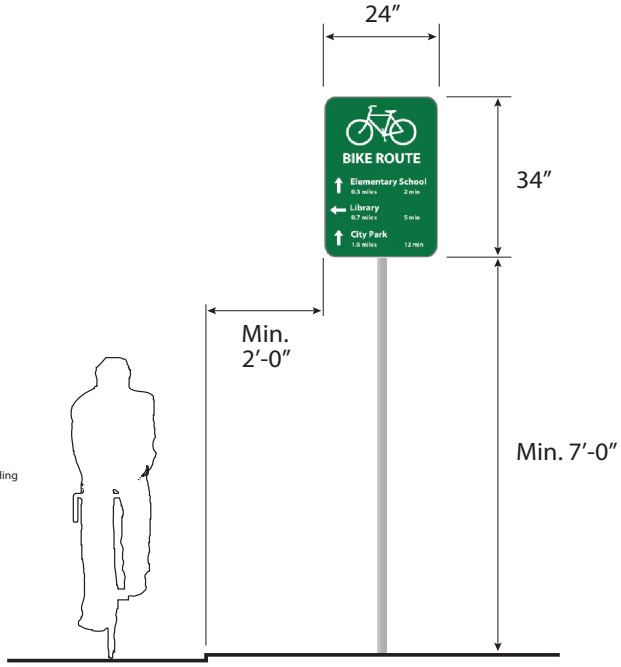
Recommended Sign Types

Standard MUTCD, MUTCD inspired and enhanced sign concepts were developed and discussed thought the development of this Bicycle Improvement Plan. As part of this task, a work session was held with the Town Council that provided an overview of the sign types, their function and some sign concept designs. Through subsequent discussion with Town, Pathways, and Friends of Pathways staff a final design was refined and selected. A type of MUTCD inspired sign was chosen for its role as a confirmation sign along bike facilities. This sign could also be used anywhere in Teton County on other bikeways as well. Enhanced signs were chosen for decision and turn signs due to their ability to supply directional information in addition to distance and travel time information. Elements of the enhanced signs will integrate with the community pathways wayfinding signs which will begin to be implemented over the next several years. A version of all sign types was also developed that includes a route naming area to provide additional legibility to the public and to provide greater continuity with the pathway system. Bikeway names are intended to provide context to the bike route and make certain routes easier to follow. For example, the 'Grand Loop' bikeway will connect the Garaman Path to the North 89 Path through the town center. Eventually, this route may be the key discontinuity in a 35 mile pathway loop connecting Teton Village, Moose, Wilson and Jackson. Other named bikeway routes include the 'Cross-Town' route following the Hansen Avenue corridor and the Cache Creek route connecting Snow King Avenue to the Cache Creek trailhead. Figure 10 depicts the recommended sign types for Jackson. Signs purchased with lodging tax funding (an identified source) will have a sticker or supplemental plaque identifying this source.

Lodging Tax Supported

Jackson Lodging Tax Logo

Example Decision Sign (with named route)



One Plaque Condition

Example Turn Sign (without named route)

Example Confirmation Sign (with named route)

M6-1

Example Supplemental Sign (allowing confirmation sign to be used as turn sign where no intersecting routes exist)

Figure 10: Recommended Jackson Wayfinding Signs

Sign Frequency

A full build-out of the proposed 9 miles of in-town on-street bikeways will require approximately 170 bicycle wayfinding signs.

Symbology

In certain circumstances it may be advantageous to include symbology with destination information so that key information may be more easily recognizable. The following symbols could be applied as stickers to screen printed signs with the relevant destinations.

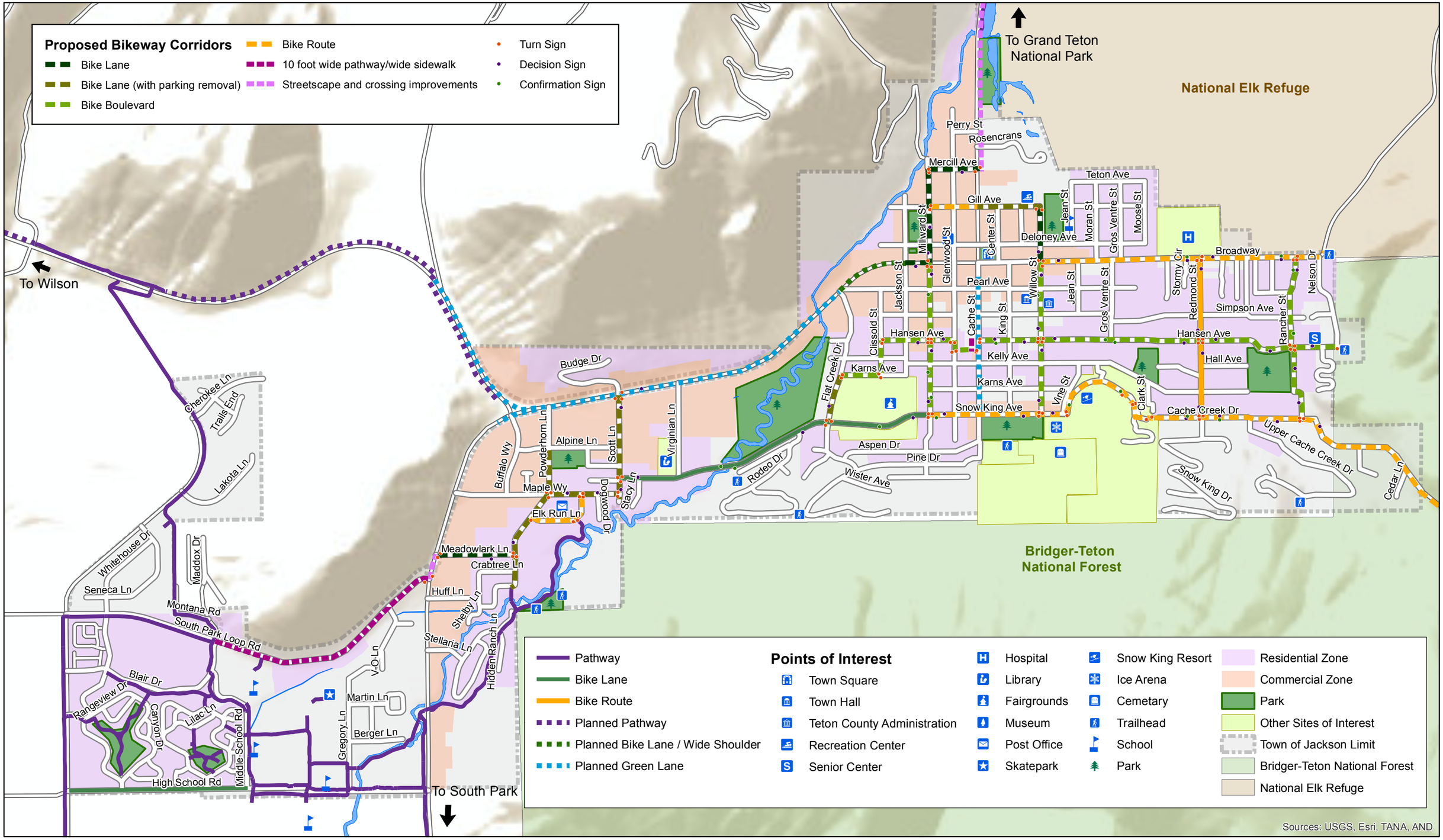
	Pathway Connections – where a bike route meets or connects to a pathway utilizing the Jackson Hole Community Pathways Logo will help increase legibility between the on and off-street systems.
	START Bus – some destinations, such as the Transfer Center may benefit from the branding of the START Bus logo
	Trailheads – Many of the bikeways provide connections to the popular in-town trails available in Jackson. An easily recognizable logo may increase comprehension and make the destination text more space efficient
	Hospital – Using a symbol to highlight St. Johns Medical Center could improve legibility.

Destination Information

Destinations placed on bikeway wayfinding signage are typically organized into three categories:

1. Primary Destinations: key regional/community or tourist destinations (up to five miles)
2. Secondary Destinations: schools, parks and activity centers (up to two miles)
3. Tertiary Destinations: local shopping, local destinations, (up to one mile)

Tables 8, 9 and 10 list primary, secondary and tertiary destinations within and around the Town of Jackson. The destinations included on a sign will include the destinations that are located on the bikeway, off-route destinations that are within a few blocks of the corridor, and destinations served by intersecting bikeways. Map 6 shows the approximate locations of recommended on-street bikeway wayfinding signs.



Map 6: Recommended Bikeway Wayfinding Sign Locations

0 0.25 0.5 Miles

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Table 8: Primary Destinations

Destination	Signed As	Landmark Type
Town Center	Town Center	Downtown
Grand Teton National Park	Grand Teton NP	Regional Destination/Tourism
Wilson	Wilson	Regional Destination
South Park	South Park	Regional Destination
Teton Village	Teton Village	Regional Destination/Tourism

Table 9: Secondary Destinations

Destination	Signed As	Landmark Type
Museum of Wildlife Art	Museum of Wildlife Art	Tourism Destination
Snow King Mountain	Snow King Mtn	Tourism Destination
START Transfer Station	Transfer Station	Public Transit
Jackson Hole High School	High School	School
Jackson Hole Middle School	Middle School	School
Jackson Elementary School	Elementary School	School
Colter Elementary School	Colter School	School
Rodeo Grounds	Rodeo Grounds	Civic / Community
St. John's Medical Center	St. Johns	Medical Center
Jackson Hole Visitors Center	Visitors Center	Tourism Destination
Recreation Center	Recreation Center	Recreational Facility
Center for the Arts	Center for the Arts	Civic / Community
Senior Center of Jackson Hole	Senior Center	Civic / Community
Town Hall	Town Hall	Civic / Community
Teton County Library	Library	Civic / Community
Post Office	Post Office	Civic / Community

Table 10: Secondary Destinations

Destination	Signed As	Landmark Type
Skate Park	Skate Park	Recreational Facility
Miller Park	Miller Park	Local Park
Range View Park	Range View Park	Local Park
Cottonwood Park	Cottonwood Park	Local Park
Powderhorn Park	Powderhorn Park	Local Park
Ball Fields	Ball Fields	Regional Park
Russ Garaman Park	Russ Garaman Park	Local Park
Cache Creek Trailhead	Cache Creek Trailhead	Local Trailhead
Putt Putt Trailhead	Putt Putt Trailhead	Local Trailhead
National Elk Refuge	National Elk Refuge	Tourism Destination
Locations with multiple trails	Trails	Local Trailhead
Mike Yokel Park	Mike Yokel Park	Local Park
Wapiti Pathway	Wapiti Pathway	Pathway
Russ Garaman Pathway	Russ Garaman Pathway	Pathway

Alta planning + Design

5

IMPLEMENTATION

Introduction

This Bikeway Improvement Plan is a focused planning effort intended to bring about rapid development and improvement to the on-street bikeway network in the Town of Jackson. Rapid implementation of the recommendations contained in this plan is essential to provide improved transportation and recreation choices for residents and visitors alike. Adding additional impetus for these improvements is provided by a series of major upcoming roadway projects that are programed for construction in the near term. These projects include the complete rebuild of the Five-way Intersection of Broadway/Pearl Avenue and Flat Creek Drive. Broadway is one of the major access points to the town center and will result in increased congestion. Additional construction projects are also planned along Broadway including new commercial development and the addition of bikeway and pedestrian improvements as part of the Path 22 project.

The majority of the bikeway projects identified in this project can be implemented with minimal design and require signing and marking only. As such, these projects may be implemented at low cost and be installed as soon as weather allows during the spring 2013 construction season. Some of the recommended bikeway improvements contain geometric elements that will involve additional expense and design services. These items are identified and should be implemented in 2014, or at a later date as soon as feasible. Finally, a small number of projects such as the new pathway along South Park Loop Road, or streetscape enhancements along North Cache Street may require additional time for design and to allocate funding.

Phasing

The majority of the recommended improvements are distributed over two phases. Phase 1 is intended to be implemented during the Summer of 2013 and focuses primarily on providing a seamless bikeway connection between the Garaman pathway and the North 89 (Wapiti Path). Two north-south routes are included following Hansen Avenue and Willow Street. This phase will also involve full implementation of the Town's bicycle wayfinding sign system as funding is available and placing one order would be more efficient and

cost effective than splitting it over multiple phases. Map 7 shows the recommend Phase 1 improvements.

Phase 2 is intended to be implemented beginning in Spring 2014. This phase focuses on expanding the Town's bikeway network along Hansen Avenue, Snow King/Cache Creek Drive, and East Broadway. Map 8 shows the recommended Phase 2 improvements.

Other improvements recommended as part of Chapter 3 should be implemented as funding or as needs develop across the network. For example, the bike lane recommended along Scott Lane from Snow King Avenue to Broadway may not provide a significant connectivity benefit until the cycle tracks are complete along Broadway as part of the Path 22 project. Similarly, some of the spot improvements such as the mini-traffic circles along Hansen Avenue may require a traffic study coordinated with analysis regarding flipping some stop signs.

Cost Estimates

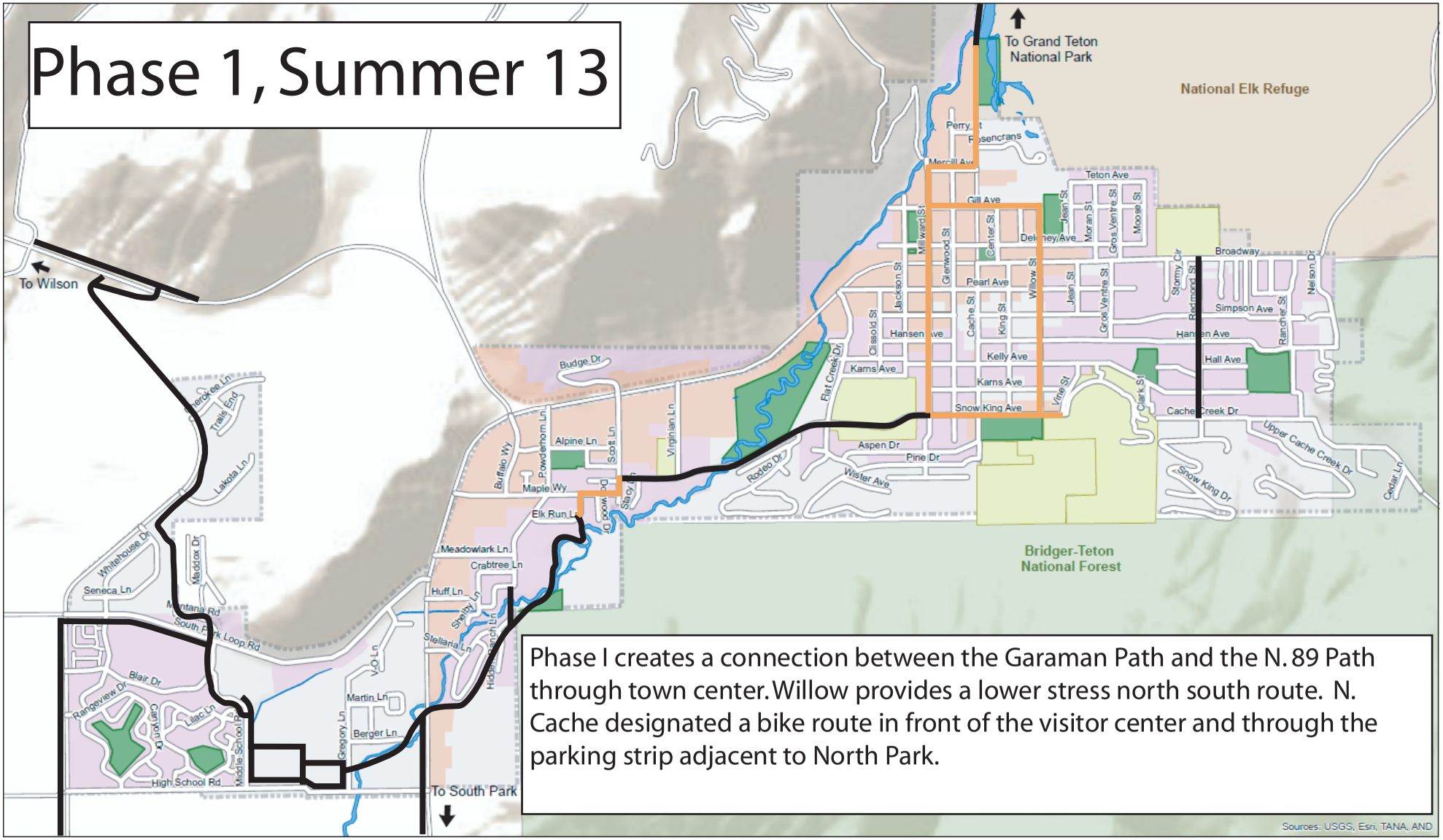
This section presents planning-level cost opinions for the comprehensive network of on-street bikeways and multi-use paths recommended in this Bicycle Improvement Plan. Cost estimates for bikeway facilities are based on cost opinions provided by the Town of Jackson and through contractor and vendor estimates. The cost of implementing bikeway facilities can vary significantly by facility type. For example, the addition of shared lane markings (sharrows) to an existing roadway requires few changes to the existing roadway, but provides no exclusive space for bicycle use. By contrast, a separated pathway provides a far greater level of separation from the roadway, but at a greater fiscal burden.

Phase I improvements for the Summer of 2013 are estimated to cost approximately $64,480. Phase 2 improvements for the Spring of 2014 are estimated to cost $21,193

Since these preliminary estimates are based on a planning-level understanding of project components, rather than on a detailed design, they should be considered as "Order of Magnitude". American Society for Testing and Materials (ASTM) Standard E2620 defines Order of Magnitude as being accurate to within plus 50% or minus 30%.

Many factors can affect final construction costs, including material cost variations, labor, performing the work 'in house' with Town crews, versus hiring it out to a contractor, etc.

Cost estimates for Phase I and II projects have been brought to a higher level of percision. These estimates are available in the Appendix. Tables 11 through 16 provide the overall estimated cost of the improvements with phasing recommendations. Many of the projects may be implemented in stages, while some may need several years of development prior to implementation.



Existing ——— Phase I ———

Map 7: Phase I Implementation

0 0.25 0.5 Miles

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Table 11: Bicycle Wayfinding Sign Cost Estimate

Sign Type	Quantity	Unit Cost	Cost
Confirmation	46	$290	$13,340
Decision	39	$300	$11,700
Turn	76	$300	$22,800
		Total:	**$51,390**

Table 12: Bike Lane Cost Estimates*

Street	From	To	Length (ft)	Cost
Mercill Avenue	Cache Street	Millward Street	775	$1,222
Millward Street	Mercill Avenue	Broadway	1,400	$1,740
Scott Lane	Snow King Avenue	Maple Way	250	$835
Willow Street	Gill Avenue	Broadway	820	$630
Meadowlark Lane	Broadway	Powderhorn Lane	1,160	$3,350
Maple Way	Scott Lane	Powderhorn Lane	1,020	$2,177
Gill Avenue	Cache Street	Willow Street	960	$2,070
Scott Lane	Broadway	Snow King Avenue	1,230	$3,270
Flat Creek Drive	West Karns Ave	Snow King Drive	730	$1,915
Powderhorn Lane	Apine Lane	Meadowlark Lane	1,740	$4,512
Broadway	Jackson Street	Millward Street	330	$1,037
			Total:	**$22,762**

* Bike Lane signs are optional as per 2009 MUTCD and are not included in this estimate. It is assumed that wayfinding signs will provide similar emphsis.

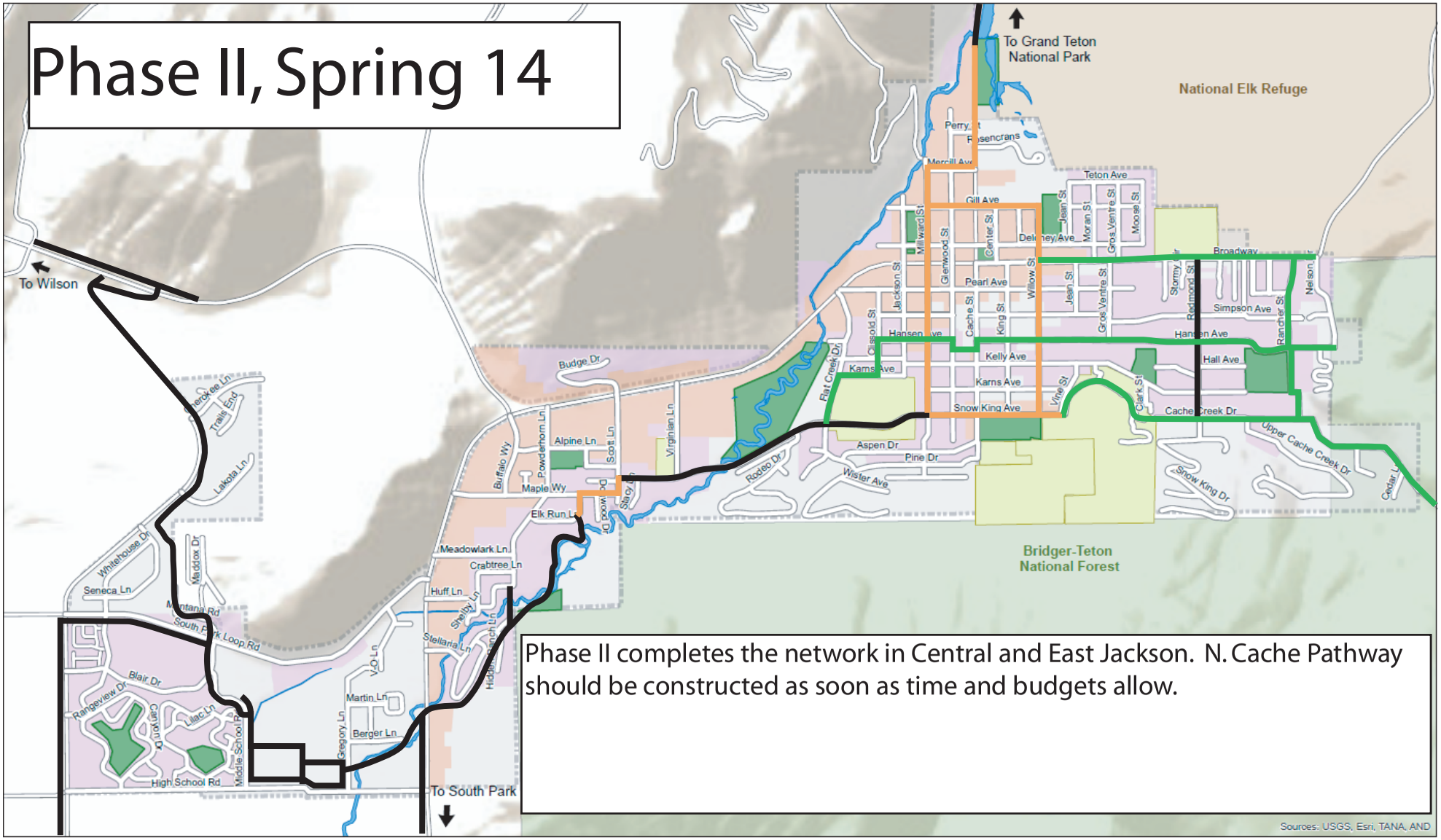
Table 13: Bike Route Cost Estimates*

Street	From	To	Length (ft)	Cost
East Broadway	Willow Street	Redmond Street	4,260	$840
Snow King Ave	Millward Street	Snow King Resort	3,860	$750
Gill Avenue	Millward Street	Cache Street	710	$120
Cache Street	Snow King Ave	Broadway	2,200	$420
Cache Creek Drive	Snow King Ave	Cache Creek TH	4,970	$1,020
East Broadway	Redmond Street	Nelson Drive	4,260	$840
Powderhorn Lane	Meadowlark Lane	Pathway Entrance	500	$120
Elk Run Lane	Powderhorn Lane	Maple way	1,080	$240
			Total:	**$4,350**

* Sharrow placment averaged at 300 foot spacing. Wayfinding signs are not included in this estimate and are depicted in Table 11.

Table 14: Pathways/Streetscape Improvements Cost Estimates

Street	From	To	Length (ft)	Cost
South Park Loop Road	Blair Drive	Broadway	3,700	$500,500
West Broadway	South Park Loop Road	Meadowlark Lane	310	$39,060
North Cache Street	Wyoming Game & Fish	89 Pathway	1,900	$144,000
South Cache Street	Hansen Avenue	Alley South of Hansen Avenue	150	$18,750
			Total:	**$702,310**



Existing Phase I Phase II

Map 8: Phase II Implementation

0 0.25 0.5 Miles

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Table 15: Bicycle Boulevard Cost Estimates*

Street	From	To	Length (ft)	Cost
Willow Street	Broadway	Snow King Avenue	2,260	$2,280
Hansen Ave	Clissold Street	Nelson Drive	1,460	$16,320
Clissold Street	Hansen Ave	West Karns Ave	520	$960
West Karns Ave	Flat Creek Drive	Clissold Street	620	$180
Millward Street	Broadway	Snow King Avenue	2,250	$4,110
Rancher Street	Broadway	Cache Creek Drive	1,350	$900
			Total:	**$24,750**

* Sharrow placment averaged at 100 to 150 foot spacing for bicycle boulevards. Wayfinding signs are not included in this estimate and are depicted in Table 11. Cost estimates for spot improvements associated with these projects are provided in Table 16.

Table 16: Recommended Spot Improvements*

cross-street 1	cross-street 2	Notes	Cost
Hansen Avenue	Cache Street	Initial Improvements	$1,911
		Full Improvements	$18,750
Scott Lane	Snow King Avenue	Initial Improvements	$835
		Full Improvements	$4,110
Mercill Avenue	Cache Street	Option 1 (no color in bike Box)	$1,700
		Option 2 (color in bike box)	$7,200
Broadway	Millward Street		$250
Hansen Avenue	Willow Street		$8,700
Hansen Avenue	Millward Street		$8,700

* Some projects have short and long-term implementation potential, these have been separated.

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PARKING
CYCLE TRACK

6

Maintenance

Introduction

While implementing bikeway facilities is important, keeping them in good condition is equally important. This section discusses potential strategies the Town of Jackson can employ to facilitate regular maintenance of its on-street bikeway network.

Winter Maintenance

Winter weather conditions can create challenges for on-street bikeway maintenance. When the roads are clear bicyclists may choose to travel along routes with on-street bike lanes that are often more direct and for convenience since stopping is generally minimal. If these same routes are snow covered, bicyclists will often elect to use local streets for much of their journey as the potential for slipping on ice and crashes with faster moving vehicles is lower. Most local maintenance programs plow snow off the main portion of the street to the shoulder if one exists, as close to the street edge as possible or along a planted sidewalk buffer if one exists. Unfortunately, with streets that include bike lanes at the edge of the roadway, the bike lane often becomes the area for snow storage on the roadway. This practice leaves bicyclists either trying to share the vehicle travel lane or riding to the edge of the travel lane while trying to avoid piled-up snow and stay clear of the vehicles – both are unsafe and uncomfortable conditions for bicyclists on streets with

Winter need not be a impediment to bicycling. Cities like Anchorage Alaska and Minneapolis Minnesota maintain bicycle facilities in the winter.

Keeping streets and sidewalks clear can be challenging

Thermoplastic marking scraped off by plow blade in Bozeman, MT

Recessed thermoplastic markings in Minneapolis, MN

designated bike lanes. Bike lanes adjacent to parking are typically easier to keep clear than curb bike lanes, however snow piled at the edge of the roadway can cause parking encroachment into the bike lane.

Frequent snow events require plowing of major roadways after each snowfall to make the roadways passable for all users. Frequent plowing reduces the lifetime of paint and other materials used to mark bicycle lanes or shared roadways. Some cities have used recessed thermoplastic stencils that are installed below the roadway surface by grinding down around the marking area and applying the marking within it. Cost estimates provided in the previous chapter assume paint will be used for pavement markings and stencils. Thermoplastic lasts significantly longer (up to 10 years or more), however each stencil can cost approximately $200 to install.

Jackson's location and climate already necessitate a robust snow removal program. Keeping all bikeways completely clear during or immediately after a heavy snow event is infeasible. Streets with significant bicycle traffic such as Snow King Avenue, Millward Street, and Scott Lane should be cleared first, providing the best access to the greatest number of people. Streets with bike lanes should also be prioritized over bike routes where sharing the lane with vehicles is expected.

Spring Maintenance

This bike lane has collected winter grit and needs sweeping

During the spring thaw streets in Jackson are often covered in debris. Significant dirt and gravel can collect at the edge of the vehicle travel lane, precisely where bicyclists often ride. When a bicycle lane becomes filled with debris, bicyclists may be forced into the motor vehicle lane. Poor bikeway maintenance can contribute to crashes and deter potential bicyclists unwilling to risk flat tires and skidding on roadways. Street sweeping of on-street facilities needs particular priority and may be needed frequently. The Town of Jackson currently operates street sweepers as part of its maintenance program. Keeping the on-street bikeways clear of debris should be a key priority for the town and integrated into existing operations and procedures.

Summer Maintenance

If spring maintenance is robust, summer maintenance should generally be minimal. Emphasis should be put on keeping bike lanes and roadway shoulders clear of debris and keeping vegetation overgrowth from blocking visibility or creeping into the roadway. Summer may be the time that is most often used to refresh bikeway pavement markings. This needed maintenance can be the most expensive and burdensome activity that public works departments face. Bike lane markings can last longer than regular roadway markings due to fewer motor vehicle tires running over them. Table 17 summarizes the estimated length of bikeway striping and stencils that will have to be maintained by the Town of Jackson separate from existing maintenance commitments that exist. Maintaining on-street bikeways will require approximately $5,200 per year. Initial years may require less, with subsequent years requiring the full estimate or perhaps slightly more as the system ages. This cost estimate assumes that volunteer labor or in-kind services provided by Friends of Pathways could refresh the shared lane markings along bike routes and bicycle boulevards once the locations of the markings are initially established.

Table 17: Maintenance Costs of On-Street Bikeways

Item	Quantity	Estimated Frequency	Estimated Annual Cost
Bike Lane Stripes	29,780 Linear feet	Every 3rd year	$2,482
Bike Lane Stencils	80 Stencils	Every 3rd year	$800
Shared Lane Markings	371 Sharrows	Every year	$1,855
		Total:	**$5,137**

Fall maintenance

Fall in the Town of Jackson can start in September and often can mean early snows and in certain areas of the town significant leaf accumulation in the streets. Where snow or leaf accumulation significant impacts performance of the Town's on-street bikeways sweeping or plowing should be focused to maintain functionality.

Pathway Maintenance

Maintenance of Teton County's pathway system is outlined in detail within Chapter 5 of the 2007 Pathways Master Plan.

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Appendix

A

Detailed Cost Estimate 78
Bicycle Wayfinding Signs 82

Bicycle Improvement Plan Phase 1&2 Project Cost		
Phase I		
Wayfinding Signs	$	47,840.00
In Street Bike Lane Symbols	$	1,680.00
In Street Bike Route Symbols (Sharrows)	$	3,120.00
In Street Striping	$	9,539.65
Intersection Improvements (Regulatory Signs and In Street Paint)	$	2,300.00
Phase I Total	**$**	**64,479.65**
Phase II		
In Street Bike Lane Symbols	$	180.00
In Street Bike Route Symbols (Sharrows)	$	5,340.00
In Street Striping	$	1,762.00
Intersection Improvements (Regulatory Signs and In Street Paint)	$	1,911.00
Alley Pavement	$	12,000.00
Phase II Total	**$**	**21,193.00**

Bicycle Improvement Plan Phase I Detailed Project Costs

Wayfinding Signs

Sign Type	Item	Item Description	Unit	Cost	Quantity	Item Cost
Confirmation Signs	1001	24" x 18" Confirmation Sign	EA	$ 40.00	46	$ 1,840
	1003	Sign install including labor, Footing and post	EA	$ 250.00	46	$ 11,500
Decision Signs	1002	24" x 34" Decision/Turn Sign	EA	$ 50.00	39	$ 1,950
	1003	Sign install including labor, Footing and post	EA	$ 250.00	39	$ 9,750
Turn Signs	1002	24" x 34" Decision/Turn Sign	EA	$ 50.00	76	$ 3,800
	1003	Sign install including labor, Footing and post	EA	$ 250.00	76	$ 19,000
					Total -->	**$ 47,840**

Bike Lane in Street Symbols

Street	From	To	Overall Length	Item	Item Description	Unit	Cost	Quantity	Item Cost
Mercill Avenue	Millward Street	Cache Street	716	1011	Bike Lane Symbol Installation	EA	$ 30.00	10	$ 300
Millward Street	Mercill Avenue	Broadway	1385	1011	Bike Lane Symbol Installation	EA	$ 30.00	17	$ 510
Maple Way	Elk Run	Scott Lane	557	1011	Bike Lane Symbol Installation	EA	$ 30.00	5	$ 150
Scott Lane	Snow King Avenue	Maple Way	230	1011	Bike Lane Symbol Installation	EA	$ 30.00	4	$ 120
Willow Street	Gill Avenue	Broadway	820	1011	Bike Lane Symbol Installation	EA	$ 30.00	8	$ 240
Gill Avenue	Cache Street	Willow Street	920	1011	Bike Lane Symbol Installation	EA	$ 30.00	12	$ 360
								56	**$ 1,680**

Bike Route in Street Symbols (Sharrows)

Street	From	To	Overall Length	Item	Item Description	Unit	Cost	Quantity	Total Cost
Gill Avenue	Millward Street	Cache Street	720	1012	Sharrow installation	EA	$ 30.00	8	$ 240
Snow King	Millward	Willow Street	1,643	1012	Sharrow installation	EA	$ 30.00	12	$ 360
Elk Run Lane	Garaman TH	Maple way	405	1012	Sharrow installation	EA	$ 30.00	5	$ 150
Millward	Broadway	Snow King	2,252	1012	Sharrow installation	EA	$ 30.00	24	$ 720
Redmond	Broadway	Cache Creek Dr	2,361	1012	Sharrow installation	EA	$ 30.00	16	$ 480
North Cache	N 89 TH	Mercill Avenue	1950	1012	Sharrow installation	EA	$ 30.00	13	$ 390
Willow	Gill Avenue	Broadway	820	1012	Sharrow installation	EA	$ 30.00	2	$ 60
Willow	Broadway	Snow King	2,250	1012	Sharrow installation	EA	$ 30.00	24	$ 720
								104	**$ 3,120**

Bike Lane Striping

Street	From	To	Overall Length	Item	Item Description	Unit	Cost	Quantity	Item Cost
Mercill Avenue	Millward Street	Cache Street	716	1006	Removal of centerline stripe	LF	$ 0.75	150	$ 113
Mercill Avenue	Millward Street	Cache Street		1008	New Centerline application	LF	$ 1.00	151	$ 151
Mercill Avenue	Millward Street	Cache Street		1009	New 4" white stripe	LF	$ 0.25	1028	$ 257
Mercill Avenue	Millward Street	Cache Street		1010	New 6" white stripe	LF	$ 0.35	1220	$ 427
Millward Street	Mercill Avenue	Broadway	1,385	1009	New 4" white stripe	LF	$ 0.25	2318	$ 580
Millward Street	Mercill Avenue	Broadway		1010	New 6" white stripe	LF	$ 0.35	2473	$ 866
Millward Street	Broadway	Snow King Ave	2252	1006	Removal of centerline stripe	LF	$ 0.75	1941	$ 1,456
Millward Street	Broadway	Snow King Ave		1020	Regulatory or Warning sign post mounted next to	EA	$ 300.00	2	$ 600
Millward Street	Broadway	Snow King Ave		1022	Install Piano Key type crosswalk (thermoplastic)	LF	$ 30.00	34	$ 1,020
Maple Way	Elk Run	Scott Lane	557	1006	Removal of centerline stripe	LF	$ 0.75	460	$ 345
Maple Way	Elk Run	Scott Lane		1008	New Centerline application	LF	$ 1.00	460	$ 460
Maple Way	Elk Run	Scott Lane		1009	New 4" white stripe	LF	$ 0.25	460	$ 115
Maple Way	Elk Run	Scott Lane		1010	New 6" white stripe	LF	$ 0.35	946	$ 331
Scott Lane	Snow King Avenue	Maple Way	230	1010	New 6" white stripe	LF	$ 0.35	696	$ 244
Willow Street	Gill Avenue	Broadway	820	1009	New 4" white stripe	LF	$ 0.25	806	$ 202
Willow Street	Gill Avenue	Broadway		1010	New 6" white stripe	LF	$ 0.35	1194	$ 418
Gill Avenue	Cache Street	Willow Street	920	1006	Removal of centerline stripe	LF	$ 0.75	725	$ 544
Gill Avenue	Cache Street	Willow Street		1008	New Centerline application	LF	$ 1.00	725	$ 725
Gill Avenue	Cache Street	Willow Street		1009	New 4" white stripe	LF	$ 0.25	710	$ 178
Gill Avenue	Cache Street	Willow Street		1010	New 6" white stripe	LF	$ 0.35	1460	$ 511
									$ 9,540

Intersection Safety Improvements

Cross-street 1	Cross-street 2	Item	Item Description	Unit	Cost	Quantity	Item Cost
Scott Lane	Snow King Avenue	1020	Regulatory or Warning sign post mounted next to	EA	$ 300.00	2	$ 600
Mercill Avenue	Cache Street	1014	Bike Box (uncolored)	EA	$ 250.00	2	$ 500
		1016	Regulatory sign mounted to signal mast	EA	$ 300.00	2	$ 600
		1020	Regulatory or Warning sign post mounted next to	EA	$ 300.00	2	$ 600
							$ 2,300

Phase I Total	Wayfinding Signs	**$ 47,840**	In Street Paint & Regulatory Signs	**$ 16,640**	**Total**	**$ 64,480**

Bicycle Improvement Plan Phase II Detailed Project Cost

Bike Lane in Street Symbols

Street	From	To	Overall Length	Item	Item Description	Unit	Cost	Quantity	Item Cost
Flat Creek Drive	West Karns Ave	Snow King Avenue	720	1011	Bike Lane Symbol Installation	EA	$ 30.00	6	$ 180
								6	**$ 180**

Bike Route in Street Symbols (Sharrows)

Street	From	To	Overall Length	Item	Item Description	Unit	Cost	Quantity	Total Cost
East Broadway	Willow Street	Redmond Street	2,360	1012	Sharrow installation	EA	30	16	$ 480
East Broadway	Redmond Street	Nelson Drive	1,760	1012	Sharrow installation	EA	30	10	$ 300
Hansen	Clissold	Glenwood	1,089	1012	Sharrow installation	EA	30	14	$ 420
Hansen	Glenwood	Cache Street	675	1012	Sharrow installation	EA	30	12	$ 360
Hansen	Cache Street	Nelson Drive	5,381	1012	Sharrow installation	EA	30	43	$ 1,290
Karns	Flat Creek	Clissold	600	1012	Sharrow installation	EA	30	6	$ 180
Snow King Loop	Willow Street	Cache Creek Dr	2,315	1012	Sharrow installation	EA	30	19	$ 570
Cache Creek	Snow King	Town Limit	4,467	1012	Sharrow installation	EA	30	30	$ 900
Clissold	Hansen	Karns	520	1012	Sharrow installation	EA	30	8	$ 240
Rancher	Broadway	Cache Creek	2,518	1012	Sharrow installation	EA	30	20	$ 600
								178	**$ 5,340**

Bike Lane Striping

Street	From	To	Overall Length	Item	Item Description	Unit	Cost	Quantity	Item Cost
Flat Creek Drive	West Karns Ave	Snow King Drive	720	1006	Removal of centerline stripe	LF	$ 0.75	646	$ 485
Flat Creek Drive	West Karns Ave	Snow King Drive		1008	New Centerline application	LF	$ 1.00	646	$ 646
Flat Creek Drive	West Karns Ave	Snow King Drive		1009	New 4" white stripe	LF	$ 0.25	650	$ 163
Flat Creek Drive	West Karns Ave	Snow King Drive		1010	New 6" white stripe	LF	$ 0.35	1340	$ 469
									$ 1,762

Interesection Safety Improvments

Cross-street 1	Cross-street 2	Item	Item Description	Unit	Cost	Quantity	Item Cost
Hansen Avenue	Cache Street	1020	Regulatory or Warning sign post mounted	EA	$ 300.00	4	$ 1,200
		1006	Removal of centerline stripe	LF	$ 0.75	120	$ 90
		1008	New Centerline application	LF	$ 1.00	120	$ 120
		1009	New 4" white stripe	LF	$ 0.25	120	$ 30
		1010	New 6" white stripe	LF	$ 0.35	260	$ 91
		1011	Bike Lane Symbol Installation	EA	$ 30.00	4	$ 120
		1018	Install new concrete	SF	$ 6.50	40	$ 260
							$ 1,911

Alley Surface Improvements

Pave Alley south of The Center for the Arts		1025	Pave alley (14 feet wide)	LF	60	200	**$ 12,000**

Phase II Total	**Total**	**$ 21,193**

Bicycle Improvement Plan Item Master Costs

Item	Item Description	Unit	Cost
1001	24" x 18" Confirmation Sign	EA	$ 40.00
1002	24" x 34" Decision/Turn Sign	EA	$ 50.00
1003	Sign install including labor, Footing and post	EA	$ 250.00
1004	Estimate Pathway cost per LF in Jackson	LF	$ 125.00
1005	Estimate of streetscape similar to North Cache Street	LF	$ 170.00
1006	Removal of centerline stripe	LF	$ 0.75
1007	Removal of 4" white stripe	LF	$ 0.20
1008	New Centerline application	LF	$ 1.00
1009	New 4" white stripe	LF	$ 0.25
1010	New 6" white stripe	LF	$ 0.35
1011	Bike Lane Symbol Installation	EA	$ 30.00
1012	Sharrow installation	EA	$ 30.00
1013	Mini-Traffic Circle (demolition, concrete, signs)	EA	$ 7,500.00
1014	Bike Box (uncolored)	EA	$ 250.00
1015	Bike Box (colored with thermoplastic	EA	$ 3,000.00
1016	Regulatory sign mounted to signal mast	EA	$ 300.00
1017	Remove and dispose of concrete	SF	$ 4.00
1018	Install new concrete	SF	$ 6.50
1019	Flip stop signs along bicycle boulevard	EA	$ 500.00
1020	Regulatory or Warning sign post mounted next to street	EA	$ 300.00
1021	Remove stop signs	EA	$ 200.00
1022	Install Piano Key type crosswalk (thermoplastic)	LF	$ 30.00
1023	Record new legal description (per parcel)	EA	$ 2,500.00
1024	Refresh sharrow (volunteer labor - FOP)	EA	$ 5.00
1025	Pave alley (14 feet wide)	LF	$ 60.00

NOTES: All costs include labor to install unless otherwise noted.

Costs do not include amounts for Design/Construction Engineering/ or Bidding Services
Costs do not include mobilization or traffic control, these costs will vary depending on how the projects are bid
Costs do not include a contingency, additional items may need to be accounted for once crews are on the job

Average sharrow Spacing in lineal feet	300
Average bike lane marking spacing in lineal feet	200

Named Route Decision Sign

MESSAGE 2 for this Sign Sub-Type

Type spec: 215 point Clearview Hwy 1-B

MESSAGE 3 for this Sign Sub-Type

Type spec: "distance & time" 80 point

Clearview Hwy 1-B, right justified

Generic Decision Sign

MESSAGE 2 for this Sign Sub-Type

Type spec: 215 point Clearview Hwy 1-B

MESSAGE 3 for this Sign Sub-Type

Type spec: "distance & time" 80 point

Clearview Hwy 1-B, right justified

Named Route Turn Sign

MESSAGE 2 for this Sign Sub-Type

Type spec: 215 point Clearview Hwy 1-B

MESSAGE 3 for this Sign Sub-Type

Type spec: "distance & time" 80 point

Clearview Hwy 1-B, right justified

Generic Turn Sign

MESSAGE 1 for this Sign Sub-Type

Type spec: 114 point Myriad Pro (Bold)

MESSAGE 1 for this Sign Sub-Type

Type spec: 114 point Myriad Pro (Bold)

Generic and Named Route Confirmation Signs

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