2012

MONTANA DPHHS
Healthy People. Healthy Communities.

NAPA
MONTANA NUTRITION AND PHYSICAL ACTIVITY PROGRAM

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PLANNING + DESIGN

Montana Complete Streets Toolkit

For Cities, Small Towns and Tribal Communities

Communities Putting Prevention to Work

Making healthy living easier.

Forward - July 2012

In 2004, Montana became one of 28 states to receive Centers for Disease Control and Prevention (CDC) funding to establish a Nutrition and Physical Activity Program (NAPA) to Prevent Obesity and Other Chronic Diseases. NAPA is a program of the Montana Department of Public Health and Human Services (DPHHS) (see www.mtnapa.com).

NAPA's mission is to decrease the prevalence of obesity and improve the health of Montanans by increasing access to healthy foods and creating safe places to be physically active—making the healthy choice the easy choice.

Overweight and obesity substantially raise the risk of illness from high blood pressure, type 2 diabetes, heart disease, certain types of cancer, and other chronic diseases. As a result of these increased risks, researchers predict that this generation of children may be the first generation to have a life expectancy shorter, rather than longer, than that of their parents.

In 2010, DPHHS received a two-year CDC grant called Communities Putting Prevention to Work. The goal of this initiative is to reduce risk factors and prevent/delay chronic disease and promote wellness in both children and adults. Regular physical activity is essential to overall health and can also help people maintain a healthy weight and reduce their risk for chronic disease.

As stated in the National Physical Activity Plan (www.physicalactivityplan.org), "Transportation systems, development patterns, and community design and planning decisions all can have profound effects on physical activity. People can lead healthier, more active lives if our communities are built to facilitate safe walking and biking and the use of public transportation, all considered forms of active transportation.

Changes to improve active transportation will require many individuals and agencies – transportation engineers, city planners, architects, schools, health professionals, government agencies at all levels, community advocates, citizens, and employers – to rethink the way we plan and develop our communities."

This Toolkit is a Montana-specific resource for communities as they strive to improve healthy and safe transportation and recreation options.

Toolkit Authors: Joe Gilpin, Principal, Alta Planning + Design

Cathy Costakis, Senior Consultant-Built Environment, NAPA Program

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alta PLANNING + DESIGN

PREPARED BY:
Alta Planning + Design
125 W. Main St.
Bozeman, MT 59715
www.altaplanning.com

Planning Guidance

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Design Guidance

Introduction

Montana is a large rural state; however most of its one million residents live in cities, small towns and tribal communities. Throughout modern history Montanans prospered through economies based on agriculture, ranching and resource development and came together in communities large and small to maximize the exchange of goods and services, culture, ideas, and social ties and to minimize travel. The role of transportation in this equation was to maximize this exchange. Today, the role of cities and small towns is similar—to create a climate that attracts good jobs, provides access to quality education and healthcare and fosters a high quality of life and social connectedness.

Rural communities in Montana are diverse and face unique challenges. In fact, there is a well known saying, "when you have seen one rural community…you have seen *one* rural community." Some rural communities are close to larger urban areas which provide residents with close access to economic opportunities and services while other rural communities are isolated. Some rural communities are close to high-amenity recreational or tourist areas and see their population swell and shrink seasonally due to tourism and second homes. Other communities face pressures due to boom and bust cycles tied to natural resource development. Despite these diverse challenges, residents and community leaders across Montana strive for the best possible economic, social, environmental, and public health outcomes while working to maintain the unique character, historic significance, and quality of life of rural communities.

Harrison Avenue in Butte, MT before reconstruction

Transportation plays a crucial role in the sustainable development of rural areas and small communities. Whether it's the building and planning of pedestrian-oriented main streets in small towns to stimulate economic development, or the improvement of public transportation infrastructure to enhance the movement of goods or access to jobs, transportation literally binds a community together.[1]

Streets represent one of the largest public resources of a community and take a sizable portion of public budgets to design, build and maintain. Especially during difficult economic times, communities need to make the most effective use of limited public dollars to maximize the function of public streets. Streets can enhance communities by providing an attractive and highly functional public realm that attracts private investment and increases existing property values. A well-designed street network can provide a variety of accessible, and safe options (walk, bike, transit, or drive) for residents of all ages and abilities to access jobs, education, healthcare, recreation and retail—or they can be unsafe and dangerous places that are accessible only to those in vehicles. A Complete Street is a road that is designed to be safe for drivers; bicyclists; transit vehicles and users; and pedestrians of all ages and abilities. A Complete Streets approach focuses not just on individual roads but on changing the decision-making and design process so that all users are routinely considered during the planning, designing, building and operating of all roadways. It is about policy and systems change.

"Speed management is a significant challenge for most communities in the United States. This is particularly true for small, rural communities where the main roadway through the town serves a dual role. Outside the town, the roadway provides high-speed travel over long distances; within the built-up area, however, the same roadway accommodates local access, pedestrians of all ages, on-street parking, bicycles, and the many other features unique to the character of a community. This convergence of roadway purposes presents both an enforcement challenge for the community and a potential safety problem for the public."[2]

Toolkit Purpose: Small/Rural Community Needs & Focus

The purpose of this toolkit is to: 1) explain what is meant by a Complete Streets approach to designing and building a transportation network; 2) share the benefits of Complete Streets; 3) identify the various elements that make streets truly "complete" and describe the needed amenities to accommodate users of Montana's roadways and 4) share innovative ways in which Montana's cities, small towns and tribal communities are already working to complete their streets. This document will provide a resource to engineers, planners, elected officials, and residents who desire safe and efficient facilities for bicycling, walking and transit within their communities. This toolkit is organized into three sections - Planning Guidance, Case Studies in Montana communities, and Design Guidance.

History of Land Use & Transportation in Montana

Montana developed as its vast natural resources were discovered. In the early 1860s, settlements dotted the state as gold, silver, copper, lead, coal, and oil were found. Cattle ranching played a significant part of the economic and land development of Montana. In the 1880s, the railroad came to Montana and with it, national access to Montana's natural resources. The state became traversable through the main lines of the three east-west transcontinental routes: the Milwaukee, the Great Northern, and the Northern Pacific. Small towns of every description were established along the railroad. These towns were planned and laid out in a grid pattern with relatively short blocks and intersecting streets occurring at right angles.

Main Street in Hamilton, Montana. 1939. Photo courtesy of the Library of Congress Archives

Since the 1950s, transportation planners and engineers have been focused on the movement of vehicles between destinations as directly and quickly as possible. Gateways to Montana cities and towns were widened and absorbed the majority of commercial growth. Often these roadways became dotted with automobile oriented businesses—gas stations, dry cleaners, fast food restaurants, etc.—each with multiple entrances and no access between them. Some cities stopped requiring the installation of sidewalks as part of new road construction, even in new neighborhood developments. Without a safe place to walk and an inhospitable environment between home and nearby destinations, people began relying more and more on their private automobiles for even the shortest trips. This trend is seen in many Montana communities with strip-mall style development eclipsing commerce in historic downtowns. Many communities have managed to revitalize their downtowns, attracting new business and investment, but the land uses established many years ago remain influential decades later.

Residential Development

Residential development, even in small towns, can be a barrier to bicycling and walking. Many of Montana's small communities and their respective residential neighborhoods were built along the grid-system. The grid frequently provides multiple opportunities for navigation; and homes within the historic grid of most Montana communities are generally regarded as the most walkable and bikeable. Newer developments often provide one or two entrances to serve residences lining long blocks or short cul-de-sacs. Adjacent neighborhoods often have no connecting streets between them, resulting in a limited number of access points. These access points can often overload the collector roadways by producing too many trips from too few locations.

Rural residential subdivisions have also become commonplace. These developments specialize in larger lots along curvy roads and often lack sidewalks and other amenities to any mode of transportation other than driving. The land use and locations of these subdivisions essentially guarantee that the primary mode of transportation must be motorized.

Aerial view of grid streets in Shelby, MT

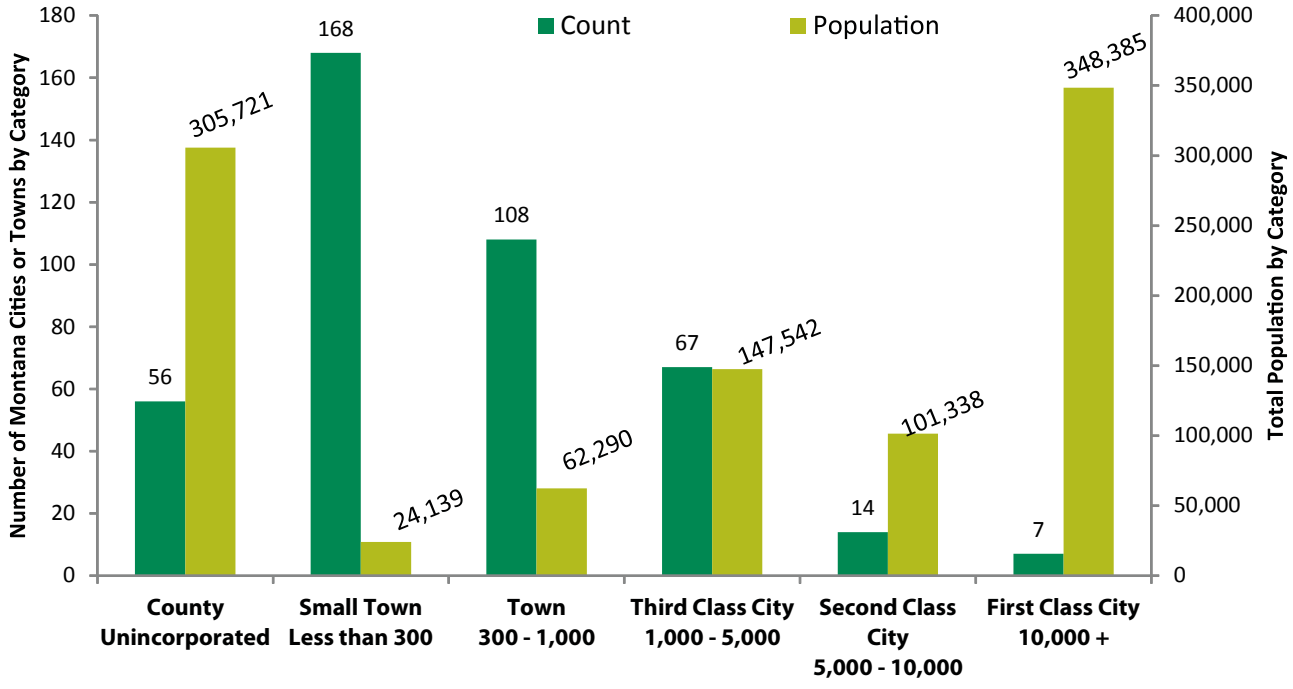
Aerial view of the Pintail Skyview rural subdivision in Ennis, MT

Montana Today

The 2009 American Community Survey[3] and the 2010 US Census provide a wealth of data that offer an understanding of some of the qualities that make Montana unique. As of the 2010 Census, Montana has approximately 50 cities and 75 towns as identified by the Census Bureau, with a total population of about 683,600, or about 69 percent of the state's population. Smaller areas such as Census-Designated Places (CDP) and unincorporated areas hold the remainder, or 31 percent of Montana's 989,000 residents. There are 56 counties in Montana, 36 of which have populations less than 10,000. Montana is clearly a very rural state with a large percentage of its residents living in rural areas as well as in towns and cities. When the population is broken out by size of city, 35 percent of Montana residents live in the seven largest urban areas (Billings, Bozeman, Butte, Great Falls, Helena, Kalispell, and Missoula). It is likely that a significant percentage of residents that live in unincorporated areas do so in direct vicinity to one of Montana's cities or towns.

Montana Communities by Population Size

MCA (Montana Code Annotated) 7-1-4111 divides cities and towns into four classes according to size[4]:



2010 Census Montana cities and towns.[5]

When compared to most states, Montana's seven largest cities are considered small. Billings, the largest city in the state, only measures seven miles at the longest point between the city limits and downtown. The other Montana first class cities are significantly more compact. The majority of Montana's smaller communities are mostly within nationally recognized walkable/bikeable distance.

Distance from City Center to City Limit

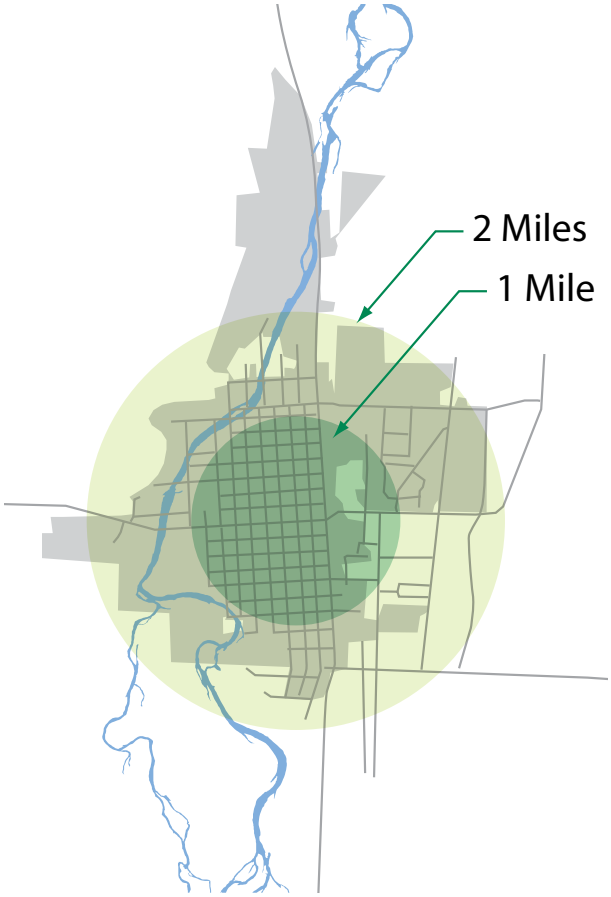
Montana City	Maximum Distance (miles)	Average Distance (miles)*
Helena	2.5	1.5
Kalispell	2.5	1.0
Bozeman	4.0	2.0
Butte	4.5	2.0
Missoula	5.5	3.0
Great Falls	6.0	2.5
Billings	7.0	4.0

* Average distance is an estimate

FACT:

Average Walking Trip in US = 1.2 miles (with approx. 50 percent of walking trips less than half a mile).

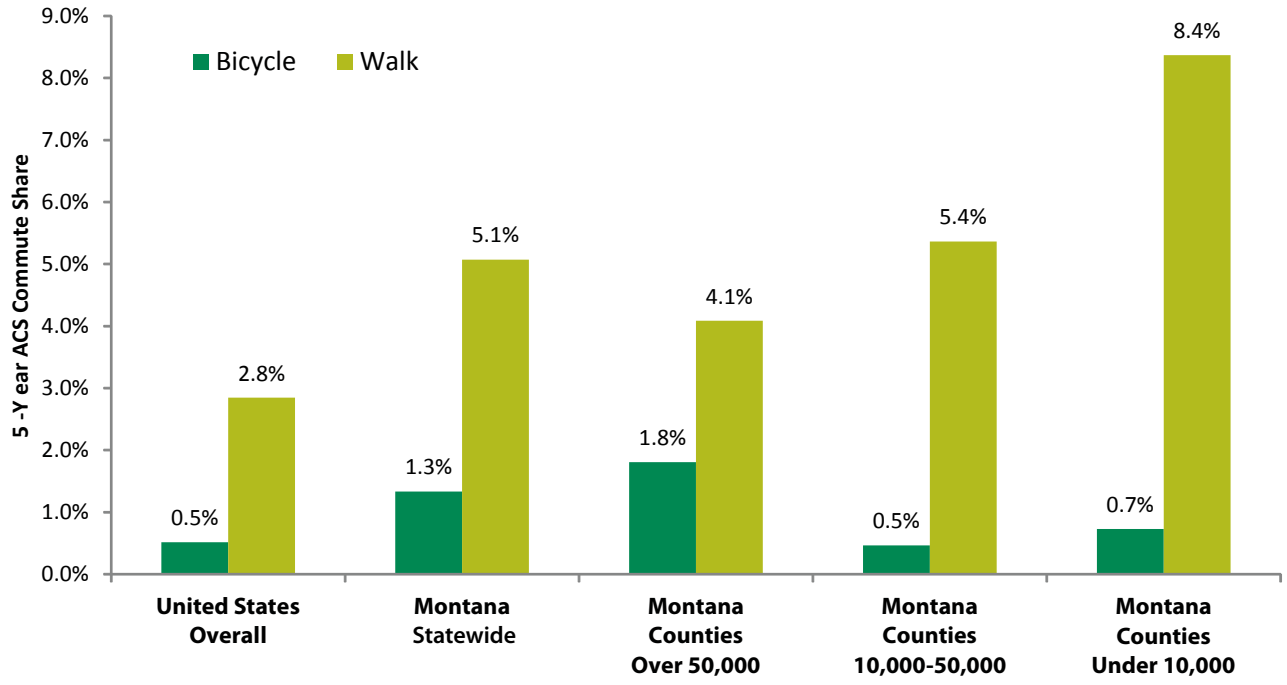
Average Bicycling Trip in US = 4 miles (with approx. 60 percent of bicycling trips less than 2 miles).[6]



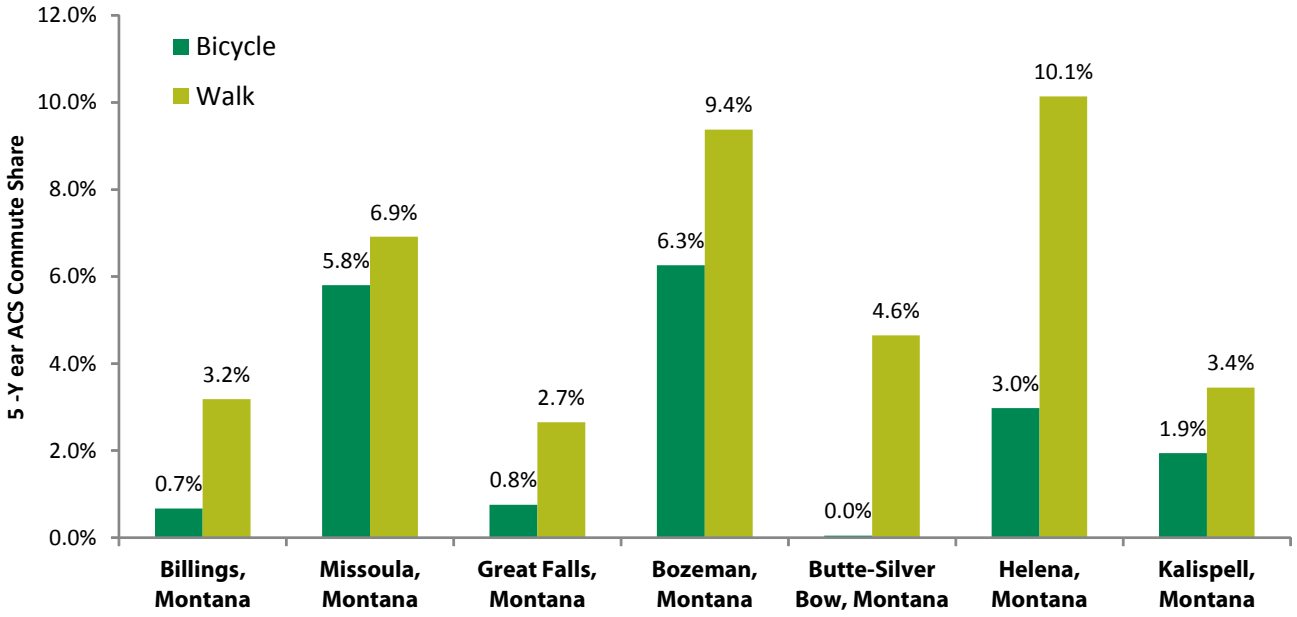
The size of Hamilton, MT is representative of many Montana communities

It is somewhat difficult to make an accurate determination of the existing walking and bicycling mode share in Montana. There are no reliable data sources to track all trips made by walking and bicycling, though the American Community Survey (ACS) tracks 'journey to work' data that includes these modes. Data obtained from the ACS shows that Montana maintains an overall walking mode share of 5.1 percent versus a national average of 2.8 percent, and a bicycle mode share of 1.3 percent versus a national average of 0.5 percent. With regard to bicycling, Montana ranks 3rd as a state in the US, behind Colorado and Oregon. In fact, the ACS rates of walking and bicycling for commute purposes are likely under represented, particularly in states like Montana where the climate changes so drastically in the winter months. The ACS asks respondents how they traveled to work 'last week', and does not record details about modes that are used occasionally. For example, a Portland Oregon Auditors report showed that an additional 10 percent of residents listed bicycling as a secondary mode choice.[7]

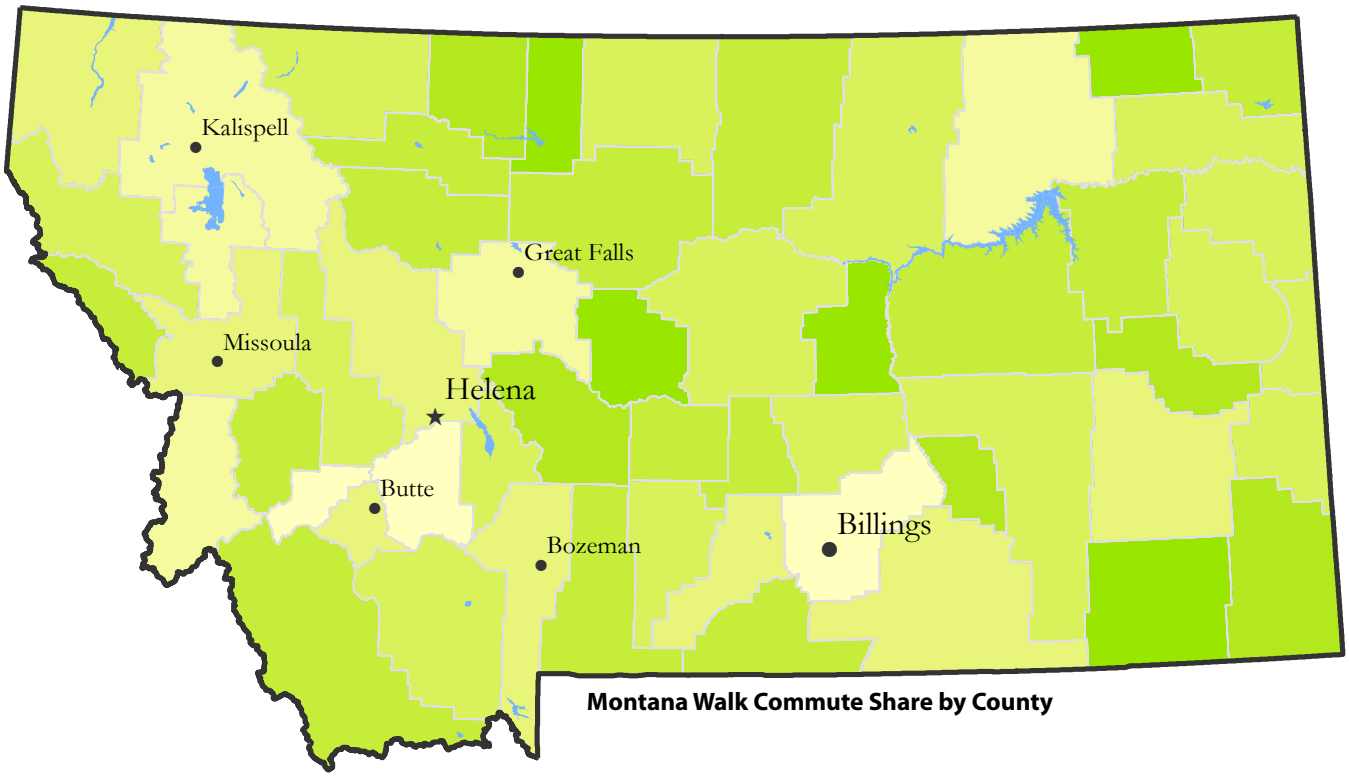
When the ACS data is segregated by population size, it is clear that as population density decreases, walking mode share increases, and bicycling mode share decreases. The decrease in bicycle use in more rural areas can likely be explained by the absence of dedicated bicycle facilities. Montana cities that have made investments in bicycle infrastructure exhibit the highest bicycle commute mode share: including Missoula at 5.8 percent and Bozeman at 6.3 percent. This observation mirrors national research which reviewed data from 90 cities and found that "the presence of off-road bike paths and on-street bike lanes were, by far, the biggest determinant of cycling rates in cities."[8] Rates of walking in urban areas in Montana can also be high: Helena 10.1 percent, Bozeman 9.4 percent, Missoula 6.9 percent. Ten of Montana's 56 counties have walking mode shares above 10 percent.



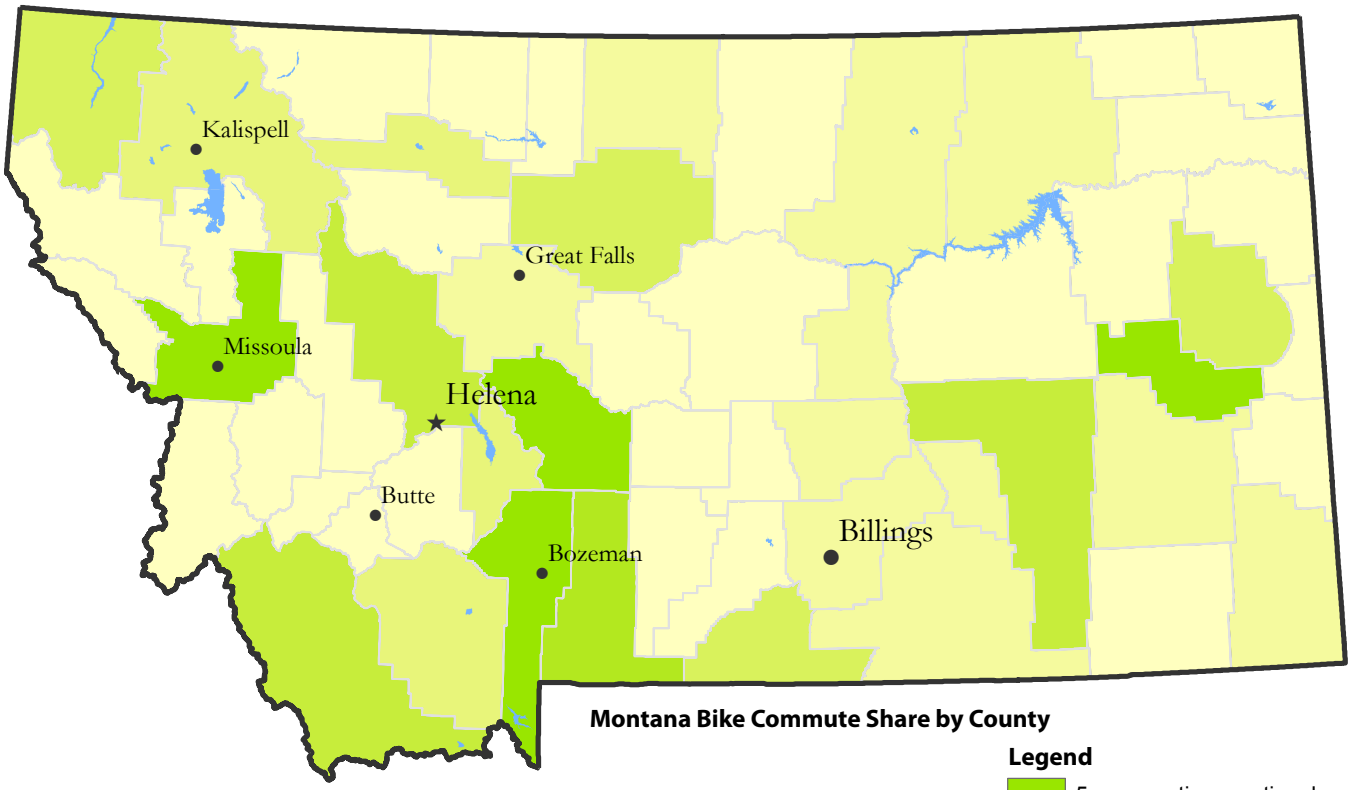
5-Year ACS Commute Mode Share - Montana Overall



5-Year ACS Commute Mode Share - Seven Largest Montana Cities



Montana Walk Commute Share by County

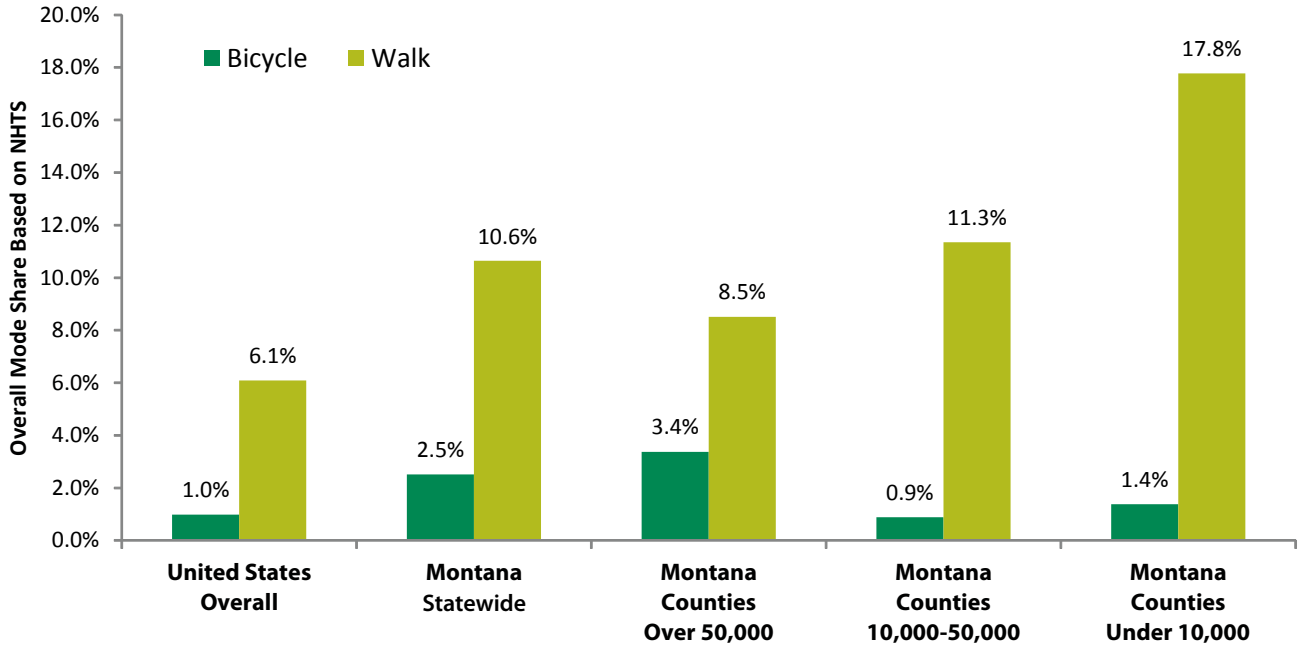


Montana Bike Commute Share by County

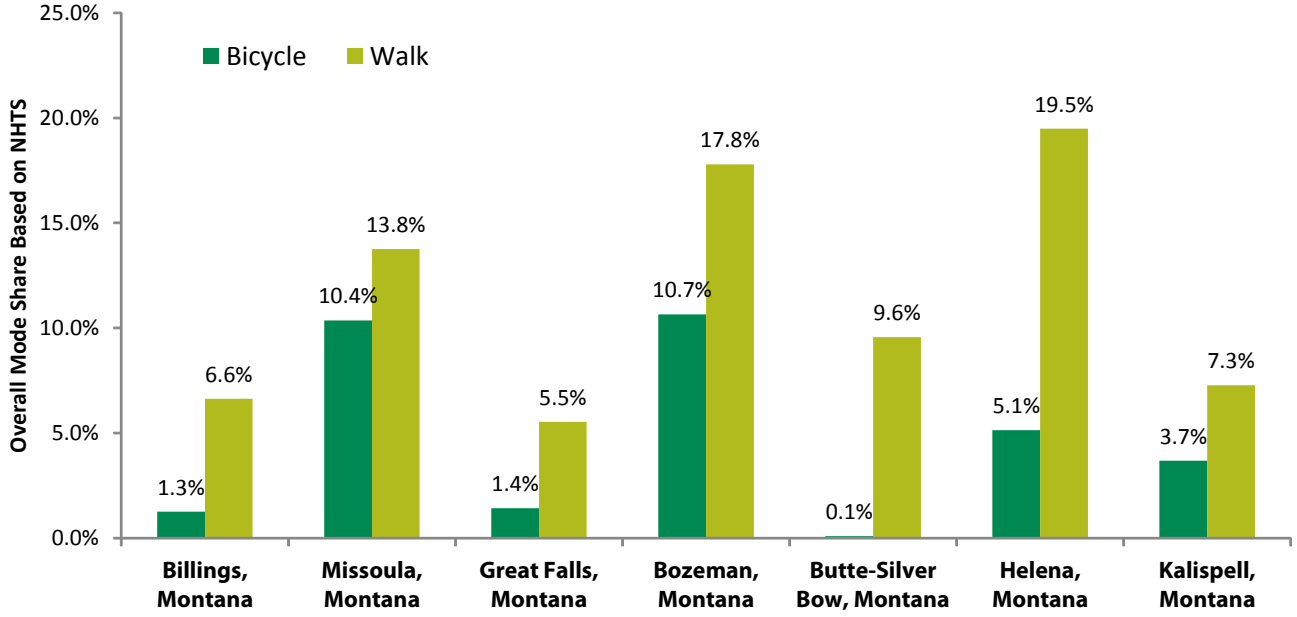
Legend

- 5 or more times national average
- 4 - 5 times national average
- 3 - 4 times national average
- 2 - 3 times national average
- 1.5 - 2 times national average
- 1 - 1.5 times national average
- Less than national average

When Data from the National Household Transportation Survey (NHTS) is included in the analysis it is possible to make an estimate of the number of walking and bicycling trips as a percentage of all trips. The NHTS found that in the United States the percentage of commute (journey to work) trips versus overall trips varies significantly by mode. For example, 20 percent of vehicle trips are commute trips, while only 10 and 11 percent of bicycling and walking trips are. This means that Americans are walking and bicycling in far greater numbers for other trips, such as for other utilitarian and recreational trips that are not accurately being accounted for in census data. If this national data is applied to the specific Montana commute trip data it can be estimated that the overall percentage of bicycling and walking trips increases dramatically.



Estimated Overall Mode Share Estimate based on NHTS - Montana Overall



Estimated Overall Mode Share Estimate based on NHTS - Seven Largest Montana Cities

Conclusion

- Nearly all of Montana's communities initially developed in a compact form with strong downtowns and a well-connected grid network.
- Over the past half-century, some of the larger cities in Montana have developed lower density growth and commercial development patterns focused along street and highway corridors that are much less friendly to non-motorized transportation. Despite this growth, Montana cities are still small in comparison with those in most other states, and their size alone does not make them unfriendly to non-motorized or transit trips.
- Montana's smaller communities are still mostly intact and experience high rates of walking, some with over five times the national average.
- Montana's larger communities also have impressive walking and bicycling mode share. Cities that have invested in facilities for bicycling experience a bicycle commute mode share of up to ten times the national average.
- Greater investment in Complete Streets has the potential to further improve non-motorized mode share and provide benefit to all Montana residents.

What are Complete Streets?

A Complete Street is one that is designed and operated to safely accommodate all users, including: motorists, pedestrians, bicyclists, transit users, and people of all ages and abilities. A Complete Street is comprised of many different elements; these elements may include, but are not limited to: sidewalks, bike lanes, crosswalks, curb-cuts, wide shoulders, medians, bus pullouts, audible pedestrian signals, sidewalk bulb-outs, and more. The elements that are used can vary from project to project, but the end result is still to achieve a connected network that is safe and effective for all modes of travel.

Complete Streets meet the needs of all users of the right of way

Elements of Complete Streets should be applied on Montana roads when possible. Not every roadway in Montana demands every recommended component of a Complete Street. Some streets that could benefit from enhanced bicycle and pedestrian facilities might not require transit facilities if existing or planned bus service is not available. Urban or suburban corridors might benefit more from Complete Streets applications than rural roadways lacking commercial or residential development. The exception to this would be roadways that are frequently used by recreational bicyclists traveling longer distances; these roads should be provided with an unobstructed shoulder that is wide enough to provide a safe riding location for bicyclists.

Context Sensitive Solutions

The last decade has brought many transportation projects large and small to Montana's small and rural communities. Many have resulted in substantial improvements in safety and convenience to a wide variety of users, while some have not. Local city and county governments have undertaken some roadway and circulation projects; however the majority of projects that significantly impact Montana's communities occur on roadways and highways that the Montana Department of Transportation (MDT) administers. These facilities carry higher traffic volumes/speeds and often serve as strategic regional or statewide transportation links. While these facilities serve as important connections *between* Montana communities, they may also create barriers *within* communities for non-motorized users. MDT currently applies 'Context Sensitive Solutions' (CSS) principles to project development.

"Context sensitive solutions (CSS) is a collaborative, interdisciplinary approach that involves all stakeholders in providing a transportation facility that fits its setting. It is an approach that leads to preserving and enhancing scenic, aesthetic, historic, community, and environmental resources, while improving or maintaining safety, mobility, and infrastructure conditions."

– Results of Joint AASHTO / FHWA Context Sensitive Solutions Strategic Planning Process, Summary Report, March 2007

Main Street in Boulder, MT

CSS has been successfully applied in many Montana communities such as Boulder's Main Street, Wollard Avenue in Absorkee, and US 93 in Whitefish. Successes aside, CSS has traditionally framed bicycle, pedestrian and transit improvements as optional amenities to be determined through the stakeholder and public process, rather than as essential components of street design.

The National Complete Streets Coalition has suggested this short explanation for inclusion in the new Institute of Traffic Engineers/Congress for the New Urbanism Context Sensitive Solutions Guide:

"While Context-Sensitive Solutions involve stakeholders in considering a transportation facility in its entire social, environmental and aesthetic context, complete streets policies are a reminder that providing for safe travel by users of all modes is the primary function of the corridor. Under complete streets, basic facilities for bicyclists, pedestrians, transit users, and disabled travelers are necessities, rather than optional items. Their needs must be included regardless of their presence or lack thereof at stakeholder meetings. All modes and users are important on all thoroughfares."

Benefits

The benefits of Complete Streets within communities are numerous and have been documented by planners, engineers, state legislatures, non-profit coalitions, state and county health departments, and others. The National Complete Streets Coalition (www.completestreets.com) has published fact sheets on the many direct and indirect benefits Complete Streets provide. Some of the benefits that Montana can expect to realize include the following:

Healthy Communities

Today, many local governments and businesses are facing a crisis as they attempt to cope with the growing healthcare costs associated with chronic diseases, many of which are preventable. Obesity and sedentary lifestyles are major contributors to chronic disease for both adults and children. A recent Institute of Medicine report states that "obesity rates are generally higher for ethnic minorities, for those who are low-income or less educated, and for rural populations."[9] The report goes on to state that the estimated annual cost of obesity-related illness is $190.2 billion (in 2005 dollars), or nearly 21 percent of annual medical spending in the United States. Childhood obesity alone is responsible for $14.1 billion in direct medical costs.

Solving the obesity epidemic is a complex issue and will require multi-faceted solutions and coordinated change at multiple levels—from individuals, to families, to communities, to society as a whole. Local governments have a role to play in creating places where children and adults can live healthy active lives. Studies have shown that people walk more in neighborhoods that are safe, walkable, and aesthetically pleasing. Improved pedestrian and cycling infrastructure may promote physical activity by making walking and cycling more appealing, easier, and safer.[10]

FACT:

In 1969, approximately 50% of children walked or bicycled to school, with approximately 87% of children living within one mile of school walking or bicycling. Today, fewer than 15% of schoolchildren walk or bicycle to school. As a result, kids today are less active, less independent, and less healthy. As much as 20 to 30% of morning traffic can be generated by parents driving their children to schools, and traffic-related crashes are the top cause of death and major injury for children in the U.S. ages 1 to 17.[11]

Communties that accommodate bicyclists and pedestrians benefit generations of residents and help children lead healtheir lives

Over 40 percent of Montana 7th and 8th grade students and 70 percent of Montana high school students do not get the recommended 60 minutes of daily physical activity necessary for health.[12] Implementing Complete Streets in Montana provides children with dedicated, continuous, and safe facilities to travel between school and home and many other community destinations on their own power. Providing these facilities is in line with the national effort known as Safe Routes to Schools (SRTS), which is dedicated to improving safety and encouraging more children to choose to walk or bike to school.

The public health community recognizes that non-motorized or "active" travel helps citizens meet recommended levels of physical activity, thereby reducing the risk of chronic disease and associated health care costs. Though Montana ranks in the bottom 10 for state obesity rates, nearly one quarter (23.5%) of its adult population is obese and over one third (37.8%) are overweight.[13] Over forty percent (41.4%) of Montana adults do not meet the minimum recommended guidelines for daily physical activity needed to reduce the risk of chronic disease. For those Montanans with a disability, rates of obesity and inactivity are much higher.

In 2009, the Centers for Disease Control and Prevention (CDC) released *Recommended Community Strategies and Measurements to Prevent Obesity in the United States*, a report recommending Complete Streets policy adoption as a strategy for obesity prevention.[14] Montana communities that adopt Complete Streets policies do so as a way of providing facilities that will encourage and promote healthier, more active lifestyles for their residents.

FACT:

"Two-thirds of adults and one-third of children are overweight or obese. Left unchecked, obesity's effects on health, health care costs, and our productivity as a nation could become catastrophic".[15]

In May 2012, the Institute of Medicine committee released *Accelerating Progress in Obesity Prevention* and offered five recommendations along with strategies for implementation.

Recommendation 1: Communities, transportation officials, community planners, health professionals, and governments should make promotion of physical activity a priority by substantially increasing access to places and opportunities for such activity. Strategy 1-1: Enhance the physical and built environment.

Air Quality

Reducing congestion along a roadway results in less vehicle idle times, thus reducing smog and ground level ozone, which are both large contributors of greenhouse gases. In Montana, transportation emissions account for the majority of nitrogen oxides and volatile organic compounds (VOCs) that are released on hot, sunny days. Other contributors include farm equipment, smokestacks, and natural resources.

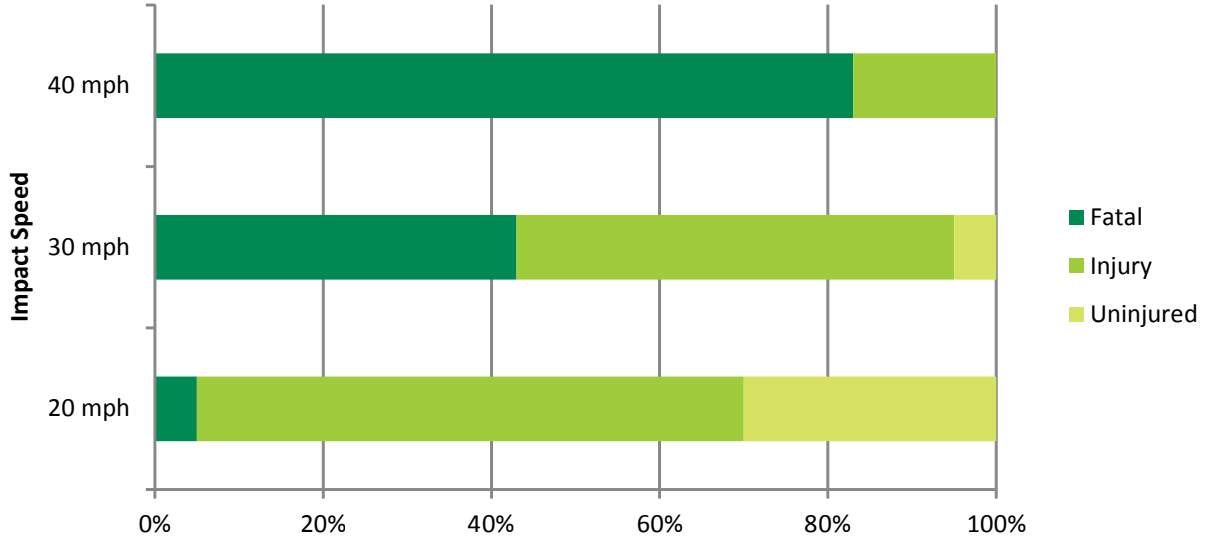
Complete Streets-designed corridors improve traffic flow by lessening the stop-and-go pace of vehicular traffic, help regulate vehicle speeds to appropriate levels for the corridor's function, and reduce the number of cars on the road as some motorists become choice pedestrians, bicyclists, and transit riders.

Improved Safety
Streets without safe places to walk, cross, catch a bus, or bicycle put people at risk. From 2007 to 2009, 41 pedestrians were killed on Montana roads with a fatality rate slightly below the national average. The National Complete Streets Coalition publishes some sobering national statistics:[16]

"Pedestrian crashes are more than twice as likely to occur in places without sidewalks; streets with sidewalks on both sides have the fewest crashes. Of pedestrians killed in 2007 and 2008, more than 50% died on arterial roadways, typically designed to be wide and fast. Roads like these are built to move cars and too often do not meet the needs of pedestrian or bicyclist safety [SIC]. More than 40% of pedestrian fatalities occurred where no crosswalk was available."

"Speed reduction has a dramatic impact on pedestrian fatalities. Eighty percent of pedestrians struck by a car going 40 mph will die; at 30 mph the likelihood of death is 40 percent. At 20 mph, the fatality rate drops to just 5 percent. Roadway design and engineering approaches commonly found in complete streets create long-lasting speed reduction. Such methods include enlarging sidewalks, installing medians, and adding bike lanes. All road users - motorists, pedestrians and bicyclists - benefit from slower speeds."

"Complete streets encourage safer bicycling behavior. Sidewalk bicycle riding, especially against the flow of adjacent traffic, is more dangerous than riding in the road due to unexpected conflicts at driveways and intersections. A recent review of bicyclist safety studies found that the addition of well-designed bicycle-specific infrastructure tends to reduce injury and crash risk. On-road bicycle lanes reduced these rates by about 50%."



Vehicle Impact Speed and Pedestrian Injury Severity (NHTSA)

Improved Access
Access to jobs, education, groceries, healthcare, and other destinations is just as vital in rural communities as in suburban or urban areas. In Montana, two percent of households do not have access to a car; furthermore 37 percent of Montana residents are either under the age of 18, or over the age of 65, demographics which have much lower vehicle use. More than a quarter of independent-living Montanans have a disability which also may limit their ability to drive.[17]

By 2030, one in every four Montanans is projected to be over the age of 65; the fifth highest state percentage in the US. Many of Montana's rural counties already experience these high rates. More than one in five Americans age 65 and older do not drive because of poor health or eyesight, limited physical or mental abilities, concerns about safety, or because they have no car. More than half of non-drivers, or 3.6 million Americans, stay home on any given day—and more than half of that group, or 1.9 million, have disabilities.[18] Respondents with disabilities were asked to categorize the kinds of difficulties that made travel outside the

home impossible. The one difficulty cited most frequently was the lack of a personal vehicle. Other difficulties cited by respondents included public transportation availability or cost, physical problems that made using transportation too difficult, and personal preferences, such as not wanting to ask others for help or having to depend on someone else for transportation.[19]

Creating safe streets that allow access and travel by walking, rolling, bicycling, and public transportation builds a more livable, accessible community for people of all ages, abilities, and income levels.

Changing demographics

"Between 2010 and 2020, "boomers" will make more than 200 million residential moves. Most moves will be within or between metropolitan (metro) regions, where 80 percent of this cohort now reside. However, boomers also will increase the size and reshape the demographic character of rural areas and small towns throughout the country. Older boomers are moving through a life-cycle stage marked by peak employment earnings, the end of childrearing duties, changing housing preferences, and early retirement options. Quality-of-life considerations have begun to replace employment-related factors in decisions about when to move and where to live. Boomers as a group have already demonstrated, at times, a higher preference than older or younger cohorts for staying in or moving to non-metropolitan (non-metro) counties. Demographically speaking, they are poised to move rural and smalltown America in new directions."[20]

America's young people, including the 'Generation Y' and the maturing 'Millennials', are decreasing the amount they drive and increasing their use of transportation alternatives.[21] National Household Transportation Survey Data compared between 2001 and 2009 has shown that America's 16-34 year olds are driving less and walking, bicycling and taking transit more. Young people's transportation priorities and preferences differ from those of older generations. Preferences for living in places where they can easily walk, bike or take public transportation are clearly exhibited by a recent study by the National Association of Realtors. Environmental consciousness is also becoming more evident with nearly twice as many 18 to 34 year olds stating that they drive less to protect the environment than older generations (16 percent versus 9 percent). The trend toward reduced driving among young people is likely to persist as a result of technological advancements that reduce the need to travel and increased legal and financial barriers to driving.

'Unplugging' can be a challenge for Generation Y

Economic Development
A city that invests in creating Complete Streets is showing an investment in its people, and overall quality of life. Increasingly, business decisions are made with the consideration of what kind of quality of life a community will provide to its employees and their families. Sidewalks, bike lanes, and transit service are important quality of life indicators, and show a community's commitment to multimodal transportation opportunities and healthy lifestyles.

The connection between non-motorized facilities and quality of life has been highlighted in Billings, where the Chamber of Commerce has organized a 95 member Trails Committee focused on developing, sustaining, and educating citizens about trails. The Billings Chamber uses the growing non-motorized network as a business recruitment tool noting that employees expect to live and work in a city with a high quality of life. The Billings Chamber has since dubbed the city as 'Montana's Trailhead.' One in four businesses in Montana was started after the owner visited Montana as a tourist.

Branding livibility - Billings Chamber of Commerce

Statewide and nationally, roadways with established identities and sense of purpose benefit adjacent land uses by providing convenience for patrons. Businesses along corridors that have undergone a reduction in lane widths, striping of bike lanes, and the installation and widening of sidewalks have noted increases in sales and patronage from nearby residents, who enjoy the reduced congestion and increased convenience found along Complete Streets. Streets serve as a first impression for first-time visitors to a city. Streets lined with overhead utilities, multiple curb cuts, gaps in the sidewalk network, and underutilized parking lots do not provide people with the impression of a hospitable environment or a city that is proud of its community.

Costs

The cost associated with Complete Streets is an issue that is raised early in the discussion process of whether to adopt a Complete Streets policy. The purchase of additional right-of-way is often the most expensive element of roadway improvements. The purchase of additional right-of-way is not very common and is typically done for larger roadway improvement projects in Montana. These projects are focused on roadway improvements for motor vehicles, but can also carry significant opportunity to be developed as Complete Streets for a small fraction of the overall project cost.

FACT:

The estimated replacement cost of Portland's entire 300+ mile bikeway network—acknowledged as the best in North America—is approximately $60 million (in 2008 dollars), which is roughly the cost of one mile of four-lane urban freeway. The monitory investment on bicycle specific infrastructure represents just less than one percent of the funding the metropolitan area spent on transportation between 1995 and 2010.[22]

Retrofitting streets as projects arise to accommodate additional modes of travel is the most common and least expensive way of achieving Complete Streets. The vast majority of projects are accomplished within a city's existing streets, curbs, sidewalks, etc. Many bicycle related improvements can be provided with the small cost of painting a few new lines and putting up a few new traffic signs as part of a regular street maintenance program.

Landscaping is an important element of Complete Streets because of the numerous benefits to pedestrians, the environment, an area's sense of place, and the calming of vehicle speeds, yet is often reduced or omitted during the construction process as a way to keep project costs low. Elements of Complete Streets, such as landscaping, can be offset through the donations of materials and man hours by local civic organizations, area organizations, and professional societies.

Policies in Montana

A Complete Streets policy causes transportation agencies to design and operate the entire right of way to encompass users of all types and to promote safe access and travel for the users. A Complete Streets policy is put in place to ensure that the streets are safe for bicyclists, children, persons with disabilities, motorists, movers of commercial goods, pedestrians, users of public transportation, and seniors.

Complete Streets is gaining momentum in some of the larger cities in Montana. In the past few years, the following cities have passed Complete Streets policies/resolutions:

- Billings (2011)
- Bozeman (2010)
- Helena (2010)
- Missoula (2009)

With the success of the Complete Streets movement in some of Montana's larger communities, it is hoped that other communities in Montana will find the information contained herein helpful in moving towards the adoption and implementation of a Complete Streets approach to transportation planning.

National Policies

Complete Streets policies have been gaining traction as more places realize the benefits of having safe, accessible, and healthy streets in their communities. According to the National Complete Streets Coalition 352 cities and counties, 26 states, the Commonwealth of Puerto Rico, and the District of Columbia have adopted policies or have made written commitment to do so. In 2011 alone, over 140 jurisdictions adopted a policy, up from 80 that committed to Complete Streets in 2010.

Complete Streets Partners

Federal Government

The Federal Highway Administration (FHWA) is a division of the United States Department of Transportation and is responsible for overseeing federal funds used for the construction and maintenance of the National Highway System to ensure that construction standards and contract administration adhere to FHWA requirements. In Montana, many roadway projects are administered through MDT with FHWA oversight, since federal gasoline tax is used for construction and maintenance funds.

FACT:

FHWA Guidance on Bicycle and Pedestrian Provisions of the Federal-aid Program (1999)

"Bicycling and walking ought to be accommodated, as an element of good planning, design, and operation, in all new transportation projects unless there are substantial safety or cost reasons for not doing so."

Although the FHWA does not have an official Complete Streets policy, the concept is closely associated with the principles promoted by the Interagency Partnership for Sustainable Communities, a joint endeavor involving the U.S. Department of Transportation (USDOT), U.S. Department of Housing and Urban Development (HUD), and U.S. Environmental Protection Agency (EPA).

Montana Department of Transportation (MDT)

The Montana Department of Transportation, as the owner of 18 percent of all roadways in Montana, is responsible for transportation planning and the allocation of federal funds. The federal transportation planning process is a cooperative effort between MDT, city/county governments, and transit providers. Roadways owned and maintained by MDT form the majority of main streets and commercial corridors within Montana's small communities.

The state is divided into five engineering districts, with each having its own administrator, and governing engineers for construction, maintenance, traffic, and mechanical engineering. MDT is governed by the Transportation Commission, which is comprised of five commissioners appointed by the governor.

MDT's Policy Goals & Actions

The Montana Department of Transportation outlines statewide policies for the development of bicycle and pedestrian facilities in its 2007 Transplan 21 – Bicycle and Pedestrian Transportation Policy Paper. In this plan, several actions are outlined in concurrence with Complete Streets policies:

- Action A.3. Assist other units of government to provide transportation facilities that encourage or consider use by bicyclists and pedestrians.
- Action A.6. Encourage the implementation of bicycle and pedestrian projects in the vicinity of kindergarten through grade 8 schools through the Safe Routes to School Program.
- Action B.1. Identify the most significant bicycle routes designated through metropolitan planning organization and urban area plans and selected rural "touring routes" with the greatest demand or potential demand as the basis for planning and system improvement decisions.
- Action B.2. Establish a consistent planning approach and design guidelines for incorporating bicycle and pedestrian facilities into highway improvement projects.
- Action B.4. Improve bicycle and pedestrian facilities in Montana through incorporation in existing projects.
- Action B.6. Maintain consistent bicycle- and pedestrian-friendly design and maintenance standards.

These policies show MDT's support of bicycle and pedestrian facilities. Of note to many of the rural communities in Montana is Action B.4. Because many of the major roadways that travel through smaller communities are MDT/State operated, they are entitled to receive consideration for bicycle and pedestrian planning and facilities as a part of improvement projects. Communities need to emphasize the importance of bicycle, pedestrian and transit accommodations during all MDT improvement projects within their jurisdiction.

Tribal Governments

Montana is home to 11 American Indian Tribes that occupy seven reservations: Blackfeet, Crow, Flathead (Confederated Salish and Kootenai Tribes), Fort Belknap (Assiniboine and Gros Ventre), Fort Peck (Assiniboine and Sioux), Northern Cheyenne, and Rocky Boy (Chippewa/Cree). An adequate transportation system in Indian country is vitally important because roads connect tribal citizens to vital services; they provide for travel to and from school, access to medical facilities, delivery of emergency services, and access to jobs and economic markets.

FACT:

Native Americans make up 6.2 percent of Montana's population, yet in 2010 they accounted for 15.9 percent of the state's fatalities.[23]

"The Surface Transportation Assistance Act of 1982 (Public Law 97–424) created the Federal Lands Highways Program (Title 23 U.S. Code, Chapter 2) which established the Indian Reservation Road (IRR) Program as a category of public roads providing access to or within Indian reservations, lands, communities and Alaska Native villages. The IRR Program is jointly administered by the BIA and the Federal Highways Administration (FHWA), which is within the Department of Transportation. The IRR Program comprises over 126,000 miles of public roads with multiple owners, including Indian tribes, the BIA, states and counties. Coordination among all of these owners is required in order to maximize available resources to address transportation needs."[24]

"Millions of vehicle miles are travelled annually on the Indian reservation road system, even though it's among the most rudimentary of any transportation at work for the United States. More than 60 percent of the system is unpaved and about 24 percent of the bridges are classified as deficient. These conditions make basic travel associated with the community difficult for residents of tribal communities. Despite reaching record-low traffic deaths last year on all the nation's roads, the annual fatality rate on Indian reservation roads is still more than three times the national average. To address this serious problem the FHWA has co-sponsored seven state-based safety summits in the past two years [as of 2010] focused on this issue and to bring safety partners together".[25]

American Indians also have the highest rate of pedestrian injury and death per capita of any racial or ethnic group in the United States.[26] In 2002, La Valley and colleagues conducted two series of focus groups in nine American Indian/Alaska Native communities across the US to assess change readiness and strategies that might be effective in addressing the high rates of pedestrian injury among American Indian/Alaska Native communities. Focus groups identified successful strategies for addressing pedestrian injury among American Indian communities including education and media-based interventions, law enforcement interventions, child education, and pedestrian facility improvements.[27]

Despite significant challenges, Montana tribes and partners have been successful in building many innovative and creative projects to improve safety for walking, bicycling and public transportation in tribal communities. One of these projects is the People's Way, a section of US 93 from Evaro to Polson that runs through the Flathead Reservation.[28]

"Traditions teach that land, wildlife, and people are all deeply connected. A highway is not just a highway. Decisions about the highway are decisions about the land, made for seven generations of people that belong to it."

- Confederated Salish Kootenai Tribes Tribal Cultural Spokesman Tony Incashola[29]

Pablo pedestrian bridge over Highway 93 on the Flathead Reservation (photo credit: Sherry Pratt Van Voorhis)

Tribal governments give legislative authority to elected officials, commonly referred to as the "Tribal Council." While not subject to state governance, Montana's tribes work in partnership with the Montana Department of Transportation and other state agencies when appropriate. Because many state highways run through Montana's tribal communities, this partnership is critical when considering the importance of these roads to the community. Often, state highways are one of the more significant corridors in the tribal community. The success of Complete Streets in Montana's tribal communities is dependent on close coordination between the tribal governments, state agencies, and federal funding sources.

Rates of walking and bicycling are generally lower within tribal boundaries, though the Fort Belknap and Fort Peck reservations have high walking mode share.

The National Local Technical Assistance Program (LTAP) mission is to foster a safe, efficient, environmentally sound transportation system by improving skills and knowledge of local transportation providers through training, technical assistance, and technology transfer. The Northern Plains Technical Assistance Program (NPTTAP) is a Tribal Local Technical Assistance Program (LTAP). Established under ISTEA in 1992, the Tribal Technical Assistance Program (TTAP) is comprised of six American Indian LTAP Centers. The goals of the program are to assist American Indian Tribal Governments by increasing their technical capabilities in transportation and to expand their workforces to effectively address their transportation needs.

5-Year ACS Commute Mode Share - Indian Reservations

Geography	Population	Bicycle	Walk
Montana US Census American Indian Areas	73,488	0.3%	4.5%
Blackfeet Indian Reservation and Off-Reservation Trust Land, MT	10,429	0.2%	3.8%
Crow Reservation and Off-Reservation Trust Land, MT	6,609	0.0%	1.3%
Flathead Reservation, MT	28,119	0.5%	5.1%
Fort Belknap Reservation and Off-Reservation Trust Land, MT	2,798	0.0%	7.8%
Fort Peck Indian Reservation and Off-Reservation Trust Land, MT	9,528	0.1%	7.7%
Northern Cheyenne Indian Reservation and Off-Reservation Trust Land, MT--SD	4,635	1.3%	5.5%
Rocky Boy's Reservation and Off-Reservation Trust Land, MT	3,099	0.0%	2.3%
Turtle Mountain Reservation and Off-Reservation Trust Land, MT--ND--SD	8,271	0.0%	0.3%

Cities/Towns

Cities and counties within Montana typically rely on comprehensive plans (sometimes called the growth policy) that serve as that government's vision for the next 20 to 30 years. These plans also help outline zoning within their boundaries. Comprehensive plans are typically updated every five to seven years and contain certain elements that address accommodations of future growth within the community. The land use and transportation elements of these documents describe current patterns, future trends, and serve as the blueprint for the community to enact its vision for the future. Many community transportation plans are stand-alone documents with detailed transportation improvement recommendations. Periodically, corridor studies, small area plans, non-motorized plans, among others, are completed to provide a more focused analysis of the needs of transportation facilities and adjacent land uses. Often, these studies are adopted into the greater comprehensive plan. The planning and engineering departments of local governments should work collaboratively to ensure that recommendations that come out of completed studies are designed and constructed following the specifications included in the plan. Often, the concept of an improvement is adopted while the details become unclear and lost along the way. Open communication between planning/engineering departments and elected officials will help ensure that Complete Streets recommendations are implemented.

Public Health Organizations

The public health community recognizes the relationship between quality non-motorized transportation networks and facilities and the health of Montana's children and adults. As a result, many public health employees are active participants on committees that desire to improve the lifestyles of community residents.

Non-profits, Advocacy Groups, Clubs, Schools, etc.

Local and statewide organizations, non-profit groups, professional associations, and other groups are playing an increasingly important role in the planning and advocacy of quality of life issues that affect Montana communities.

Citizens across Montana are forming groups to serve as a collective voice asking for better bicycling and walking facilities for themselves, their children, and their neighbors. These organizations and groups form to identify solutions to barriers to walking and bicycling, and many have grown and applied for non-profit status to pursue funding and grants for facilities and improvements. Transportation planners and engineers at the local, regional, and state level sit alongside community activists and concerned citizens as members of the same groups and organizations to work toward implementing solutions that will lead to Montana roadways becoming more complete.

Working with Transportation Professionals[30]

Whether working for MDT, a county, a city or a town, Montana's civil engineers are highly trained professionals who want to complete successful projects that benefit the public. By definition, engineers solve problems, and for much of the last 60 years the problems that have dominated the profession revolve around improving travel conditions for motor vehicles. Criteria such as, reduced travel time, reduced intersection delay, and increased level of service have all created a transportation system that has optimized travel for vehicles while not providing the same level of consideration for pedestrians, bicyclists and transit users.

The following methods can be effective when working with transportation professionals and agencies alike and can result in successful projects that serve the needs of the entire community.

Define new problems
To create a Complete Street, the safety and needs of all roadway users need to be integrated into the project's design from the start. Roads were originally invented to move people and goods – all types of people. Framing the problem as improving mobility for all roadway users can have a dramatic impact on the project design. Depending on the type of roadway and its setting, the solutions to these problems can vary greatly. Many roadway projects evolve from planning documents such as local transportation plans and the Statewide Transportation Improvement Program. The goals of these documents are to manage real and projected growth in vehicle use while maintaining a certain level of service. Often times, the majority of these objectives can be achieved while also prioritizing accommodation for pedestrians, bicyclists and transit users.

Collaboration
Transportation professionals have a dedication to public service and want to be helpful. Working collaboratively with these professionals, while treating them with dignity and respect, will achieve a much more beneficial result than becoming confrontational.

Encourage design flexibility
Complete Streets can be designed and implemented within the existing standards, policies, and regulations of the transportation profession. There are typically ranges of acceptable variables for nearly every design element of a roadway; these also can change greatly depending on the design speed or posted speed limit of the roadway. Pursuing the ranges that encourage lower travel speeds and narrower facilities can often result in safer and more functional facilities for all roadway users. Space that might have been dedicated to additional turn lanes, wider travel lanes or other features can be repurposed to enhance sidewalks or provide landscaping and bicycle facilities.

Complete Streets Policy Recommendations

Introduction

The purpose of this section is to provide guidance to Montana's communities for improving bicycle and pedestrian policy. Upon implementation, these recommendations provide citizens and agency staff with a foundation whereon Complete Streets can be built. A Complete Streets policy can be effected through several approaches:

- A **resolution** is issued by a community's governing body such as a city council/commission, or a county commission. Resolutions are broad statements of support by elected officials; however, as they do not require action they can be overlooked easily if an implementation plan is not created and executed. Resolutions make up almost half of Complete Streets policies nationwide.
- **Ordinances** are legally-binding changes to code which must be addressed in transportation and development projects. Since they are enforceable by law, they are difficult to overlook. Ordinances are a very effective approach. Ordinances and other legislation make up approximately 20 percent of Complete Streets policies nationwide.
- Complete Streets principles can be built into a community's **planning documents**. To be effective, Complete Streets principles must be integrated into all aspects of plans, rather than restricted to a specific non-motorized element. These planning documents are typically adopted by a community's governing body. Approximately 10 percent of Complete Streets policies are solely vested in planning documents, but this approach should always be considered an implementation tool to be developed over time as a product of a resolution or ordinance.
- A **policy** may be adopted by a community's governing body. Policies are typically guided by an internal group of stakeholders with broad representation. Policies typically represent a high level of community and staff support for Complete Streets. Policies tend to be lengthier and more detailed than resolutions or ordinances; however, like resolutions these policies are not legally binding.
- Adding specific **design guidelines** and/or standards ensures that as new projects are developed, Complete Streets elements are included. Simple changes such as standard street cross-sections can be done quickly, while providing more comprehensive guidance focusing on infrastructure in greater detail is a necessary step. Design guideline/standard revisions are also a natural evolution from a Complete Streets resolution or policy.

Key Elements

Complete Streets policies that have been adopted around the nation vary significantly to reflect local conditions for communities large and small. Most policies have common elements that are essential parts of crafting a successful policy. The following is provided by the National Complete Streets Coalition as a summary of the key elements that form the basis of a successful policy:

- Includes a vision for how and why the community wants to complete its streets
- Specifies that 'all users' includes pedestrians, bicyclists and transit passengers of all ages and abilities, as well as trucks, buses and automobiles
- Applies to both new and retrofit projects, including design, planning, maintenance, and operations, for the entire right of way
- Makes any exceptions specific and sets a clear procedure that requires high-level approval of exceptions
- Encourages street connectivity and aims to create a comprehensive, integrated, connected network for all modes
- Is adoptable by all agencies to cover all roads

- Directs the use of the latest and best design criteria and guidelines while recognizing the need for flexibility in balancing user needs
- Directs that Complete Streets solutions will complement the context of the community
- Establishes performance standards with measurable outcomes
- Includes specific next steps for implementation of the policy

In order for a Complete Streets policy or resolution to gain traction in any community, the concepts and policy direction must be integrated into daily planning and project development activities by local government. Many of these steps can and should be undertaken even prior to a formal policy or resolution being established. The *Complete Streets: Best Policy and Implementation Practices* guide by the American Planning Association identifies five areas where Complete Streets policies should be included:

1. Long-Range Community Visioning and Goal Setting
2. Plan Making
3. Standards, Policies and Incentives
4. Development Work
5. Public Investment

This section provides a brief description of how components of Complete Streets can be integrated with these processes.

Long Range Community Visioning and Goal Setting

Long Range Plans and Visions are documents that allow the community to decide what direction it would like to head into the future. These opportunities are perfect for community members to assemble around the components of Complete Streets, including creating a more walkable and bikeable community. The goals and objectives included in these documents/exercises can provide a foundation for community members, planners and city staff, and others to join forces around Complete Streets policies and provide momentum.

Plan Making

County, city and town planning departments typically have several plans that address various aspects of living within the jurisdiction, including land-use, open-space, transportation, housing, etc. Elements of Complete Streets can often be integrated into these plans when they are renewed or updated.

Comprehensive Plans

Comprehensive plans take a "big picture" approach to a community and give guidance for the development of a community for the next 10, 20 or 50 years. During the planning process, Complete Streets elements can be brought up and included in various components of the comprehensive plan. Having Complete Streets in the comprehensive plan allows the community to incorporate facilities that will serve bicyclists and pedestrians as growth occurs.

Transportation Plans

Many communities in Montana have transportation plans. The majority of these plans include some level of planning for non-motorized transportation, with some cities having separate documents that cover the subject. These plans provide specific guidance on bicycle and pedestrian infrastructure and programs that will be pursued by the community as it seeks to implement the plan. Opportunities to include critical components of Complete Streets are abundant within bicycle and pedestrian plans, but may require greater organization and attention in the context of a general transportation plan.

Standards, Policies and Incentives

Standards, policies and incentives play a crucial role in determining how the city will invest in future infrastructure. These elements may be found in zoning code, subdivision regulations, growth policies, design manuals/standards or regulations and ordinances. Communities should review these documents to see how they can better reflect a more equitable transportation system for their residents.

Development Work

As development occurs, so too does the opportunity for improved infrastructure near/adjacent to the property. Depending on what types of improvements are recommended or required in city ordinances and documents, development may provide an opportunity for a community to improve bicycle and pedestrian facilities.

Public Investment

It is important for government staff to be involved in the design of projects as they play a critical, oversight role in determining the design and location of many, if not all of the design features typically included in a Complete Street.

Capital Improvement Programs (CIP)

Capital improvement programs lay out the schedule of public improvements and costs over a five year period. Staff should play an active role in CIP activities to ensure that the community's investments are in harmony with the community's desires to have Complete Streets. Often various criteria are used to rank or prioritize projects. These criteria should include measures of pedestrian and bicycle accommodation to give traction for Complete Streets projects while pursuing funding.

Utility Upgrades

When a community improves its utilities, this can be an opportunity for the city to also upgrade bicycle and pedestrian accommodations in the adjacent corridor. Improvements like sidewalks, boulevards, street trees, and on-street bike facilities can frequently be added to the upgrade and minimize the cost of the installation of the facility.

Street Resurfacing

Street re-surfacing can commonly be the "low-hanging" fruit for many on-street bike facilities. When streets are resurfaced, they will have to be repainted. In the process of repainting, bicycle facilities can be added depending on existing roadway width and feasibility. Taking advantage of this opportunity dramatically reduces the cost of installing bicycle facilties to the community and is usually the fastest way to provde on-street bicycle facilities in a fiscally palatabe way.

Implementation

After adoption of the Complete Streets policy or resolution, effective implementation requires additional steps to ensure success. The community will need to review their procedures and, if necessary, restructure them, to accommodate all users on every project. In addition, applicable changes to design manuals or public works standards will need to be made to fully encompass the safety and needs of all users by employing the latest in design standards and innovation. Periodic education and training of planners and engineers is also recommended to ensure the latest techniques in balancing the needs of roadway users are being applied. Finally, existing data sources and projects can be tapped to track how well the streets are serving all users.

Performance Measures

Once a commitment to providing Complete Streets is made, tracking progress can be hard for many agencies to grasp. Performance measurement is an important tool in the implementation of Complete Streets policies, yet it remains a challenging area. Performance measures provide a quantitative (and sometimes qualitative) indicator of actual or potential performance of a specific street, a section of the street network, or of the street system as a whole. Communities must consider both how to use performance measures and how to measure performance. The following suggestions are measurable and should be visited where applicable on an annual basis and compared year to year. The level of measurement each community should undertake may vary depending on resources and available data.

Policy Performance Measures

- Changes in internal procedures (e.g., city code, public works standards, plan review)
- Adoption/recognition of new facility standards
- Number of trainings for staff per year
- Number of exemptions to Complete Streets policies requested and/or granted
- Use of Multimodal Level of Service (LOS), as established within the 2010 Highway Capacity Manual, in addition to vehicular LOS

Facility Performance Measures

- Percent of roadway miles/intersections with non-motorized transportation facilities (sidewalks, bike lanes, ADA ramps, paved shoulders in rural areas, etc.)
- Reduction in traffic volumes, congestion, and vehicle miles traveled
- Reduction in crashes (frequency and severity)
- Noticeable increase in walking/biking/transit (bicycle/pedestrian counts and transit boarding data)
- Number of trees installed
- Number/percentage of bus stops served by sidewalk/sheltered waiting areas

Community Performance Measures

- Improved public health indicators (e.g., Community Health Assessment)

Facility Maintenance

While implementing non-motorized facilities is important, keeping them in good condition is equally important. When a bicycle lane becomes filled with debris, bicyclists are forced into the motor vehicle lane. Sidewalks that are not cleared of snow are hazardous to pedestrians and can be a public liability. Periodic checks should be made of non-motorized networks as part of normal city crew operations with work being typically confined to spot fixes and damage response. Street sweeping of on-street facilities will need to be coordinated with the management agency's roadway maintenance program to ensure that the roadway is cleared curb to curb. Maintenance activities can also be driven by maintenance requests from the public. If possible, bike lanes should be kept clear of snow during the winter months. On streets with a planted strip separating the sidewalk from the traveled way, this buffer can be used for snow storage.

Funding Sources

The following section outlines sources of funding for bicycle and pedestrian projects in Montana. Federal, state, local, and private sources of funding are identified. The following descriptions are intended to provide an overview of available options and do not represent a comprehensive list. Funding sources can be used for a variety of activities, including: planning, design, implementation and maintenance. It should be noted that this section reflects the funding available at the time of writing. The funding amounts, fund cycles, and even the programs themselves are susceptible to change without notice.

Federal

The passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991 signaled a major change to allocation of federal funding for transportation projects. As the first federal legislation after the completion of the Interstate Highway System, ISTEA presented an intermodal approach to transportation planning and funding, giving additional control to the country's Metropolitan Planning Organizations. ISTEA and subsequent transportation legislation, the Transportation Equity Act for the 21st Century (TEA-21) (1998) and the Safe, Accountable, Flexible, Efficient Transportation Equity Act, a Legacy for Users (SAFETEA-LU) (2005), have allocated dedicated funding for transit, bicycle and pedestrian projects and programs. Bicycle and pedestrian projects are funded at a very small percentage compared to highway projects, but SAFETEA-LU provided broader eligibility requirements than previous acts that allow bicycle and pedestrian projects to qualify for traditional "highway" funding.

On June 29, 2012 a new transportation bill (MAP-21) was passed that has many changes to the funding of Complete Streets elements. SAFETEA-LU, the previous legislation, contained dedicated programs including - Transportation Enhancements, Safe Routes to School, and Recreational Trails - which were all commonly tapped sources of funding to make non-motorized improvements nationwide. MAP-21 combines these programs into a single source called 'Transportation Alternatives.' Overall levels of funding for these programs were reduced from $1.2 billion annually to approximately $800 million – a reduction of one third. Additionally, states may 'opt-out' of up to 50 percent of the funding and use it for other projects. If Montana decides to opt-out, this will result in a reduction in funding for Complete Streets related improvements by up to two-thirds when compared to 2011 levels.

At the time of publication of this toolkit, these funding mechanisms are completely new, and it will take some time to fully understand all of the implications of MAP-21 and to get this new program up and running.

Federal Transit Funds

An August 2011 policy statement by the Federal Transit Administration ruled that federal transit funds may be used on an 80 percent federal and 20 percent state or local basis for bicycle and pedestrian access to transit facilities, or to install racks or other equipment for transporting bicycles on transit vehicles.

"All pedestrian improvements located within one-half mile and all bicycle improvements located within three miles of a public transportation stop or station shall have a de facto physical and functional relationship to public transportation. Pedestrian and bicycle improvements beyond these distances may be eligible for FTA funding by demonstrating that the improvement is within the distance that people will travel by foot or by bicycle to use a particular stop or station."[31]

At the time of publication (July 2012), it remains unclear how MAP-21 will fully impact transit funding.

State Administered Funding Sources

Historically, MDT has been actively involved in the funding of bicycle and pedestrian facilities. The 1985 Footpath and Bicycle Act (Montana Code Annotated 60-3-301) is the only Montana statute that specifically addresses bicycle and pedestrian funding. This act sets a minimum annual spending requirement for footpaths and bicycle trails. Through the federal programs and other initiatives, MDT has consistently exceeded this minimum requirement. With the passage of MAP-21 at the Federal level it remains to be seen how this will impact spending on the state level, as such programs such as CTEP, Safe Routes to School and Recreational Trails will most likely not continue in their 2005-1012 form - They will be combined into the new 'Transportation Alternatives' program.

Land & Water Conservation Fund Program – (LWCF)

The Land and Water Conservation Fund Act of 1965 established a federal grants program encouraging a full partnership between national, state, and local governments in planning and funding outdoor recreation projects. The LWCF Program in Montana is administered by FWP. The program is a competitive grant process. Trails are an eligible facility type.

Local Funding Sources

Local Bond Measures

Local bond measures, or levies, are usually initiated by voter-approved general obligation bonds for specific projects. Bond measures are typically limited by time based on the debt load of the local government or the project under focus. Funding from bond measures can be used for right-of-way acquisition, engineering, design and construction of pedestrian and bicycle facilities. Jackson, Wyoming recently passed a $6 million bond for trail/pathway construction.

Street Maintenance Fees

Montana cities and towns typically administer street user maintenance fees generated from individual property owners. The revenue generated by the fee is used for operations and maintenance of the street system, and priorities are established by the Public Works Department. Revenue from this fund should be used to maintain on-street bicycle and pedestrian facilities, including routine sweeping of bicycle lanes and other designated bicycle routes. The City of Bozeman recently increased its street maintenance fees to pay for increased levels of service to the community.

Gas Tax Apportionment

Revenues are generated though State gasoline taxes apportioned from the State of Montana. Transfers are made from this fund to the General Fund to reimburse expenditures for construction, reconstruction, repair and maintenance of streets. Half of a city's allocation is based on population, and half is based on the miles of streets and alleys in the city. It is possible to formally dedicate a portion of this funding to non-motorized facility maintenance for facilities within public rights-of-way.

Developer Impact Fees

Where applicable, these fees are paid by developers to help finance improvements (including bike lanes, sidewalks and trails) to the street network. The fee structure is based on the number of residential units or gross square footage of commercial buildings being constructed.

Developer Exactions

Road construction or roadway improvements (including bike lanes, sidewalks and trails) are performed by developers as a condition of approval for their development project pursuant to the Montana Subdivision and Platting Act. Improvements are typically limited to the local roads within, and the road system adjacent to, the proposed development.

Tax Increment Financing (TIF)

When a TIF district is created, property values are established at a base level. After that, any taxes generated by increased property values are diverted from traditional taxing entities and invested into public infrastructure such as streets, water and sewer or new buildings for a specified number of years. TIF money can also be used for sidewalks, bicycle racks, and pedestrian/trail connections.

Special Improvement District (SID)

A Special Improvement District (SID) is a defined area within which property owners pay an additional tax or fee in order to fund improvements within the district's boundaries. SIDs can provide services, such as cleaning streets, providing security, making capital improvements, construction of pedestrian and streetscape enhancements, and marketing the area. The services provided by SIDs are supplemental to those already provided by the municipality.

Dedicated City/County Funding Source

Many cities also provide an annual amount from the city general fund for the expressed purpose of developing or supporting bicycle, pedestrian, transit and/or trail projects.

Conclusion

Implementing Complete Streets is easier if all levels of government responsible for planning, engineering, construction, and maintenance of roadways are applying Complete Streets concepts and principles. Achieving Complete Streets begins with adopting a Complete Streets policy that states the community's (municipality, county or tribal government) desire to consistently provide safe and connected facilities for pedestrians, bicyclists, transit users, and motorists. The website of the National Complete Streets Coalition (www.completestreets.org) provides resources to guide planning staff in drafting a policy that clearly states the community's vision with text that meets the legal requirements of the city or county attorney. Because the policy needs to minimize individual interpretations, using "shall" instead of "should" or "consider" is preferred. The concept of Complete Streets is gaining momentum in small and large communities all throughout the United States.

Online Resources

The following websites and organizations can provide extra assistance to communities seeking to implement Complete Streets:

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ChangeLab Solutions - http://changelabsolutions.org/publications/model-laws-and-resolutions-complete-streets

FHWA's Partnership for Sustainable Communities - http://www.sustainablecommunities.gov/

Livability in Transportation Guidebook - goo.gl/p1xzm

National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide - http://nacto.org/cities-for-cycling/design-guide

National Center for Safe Routes to School – www.saferoutesinfo.org

National Complete Streets Coalition - www.completestreets.org

Putting Smart Growth to Work in Rural Communities, ICMA -http://www.ruraltransportation.org/uploads/SG_inRuralComm.pdf

Transportation Health Impact Assessment Toolkit http://www.cdc.gov/healthyplaces/transportation/HIA_toolkit.htm

Walkable and Livable Communities Institute – www.walklive.org

Endnotes

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Case Studies

Elected officials, community groups, local government staff and concerned citizens across Montana are working hard to make it safer and more convenient for all people of all ages and abilities to access the places they need to go—whether travel is by walking, biking, rolling, taking a bus or driving. Many of Montana's larger communities have adopted a Complete Streets policy and are integrating all modes into transportation planning, construction and maintenance. Small communities across the state are also motivated to provide safe, accessible transportation and recreation options to residents of all ages and abilities.

This section contains a collection of "case studies" detailing how small communities in Montana are working to "complete their streets." These are just a few examples and over time more may be added. Case studies include: 1) a background of the project, policy or program; 2) a description of the project, program or policy; 3) the benefit to the community; 4) critical factors for success; 5) lessons learned, and; 6) contact information to learn more.

Special thanks to all the individuals that contributed to these case studies.

This section includes:

Case Study

Shelby Connectivity Efforts—streets, sidewalks and trails

Background

Shelby, the county seat of Toole County, in North Central Montana, has a population of 3,376 (2010 Census). As with other isolated frontier towns, the area does not have a lavish public health budget, but that hasn't stopped the City, and community partners from working to create a healthy environment for its residents. The first project entailed partnering with the local hospital to open a community fitness center. The next projects—a 5 ½ -mile paved walking/rolling trail, a successful Safe Routes to School program and an ongoing sidewalk program to fix and fill- in sidewalks—have resulted in a well connected and safe network of pedestrian and bicycle facilities for the Shelby community.

Roadrunner Recreational Trail

Description

Trail project: In 2008, the City of Shelby received Montana Fish Wildlife & Parks (MFWP) Recreational Trail Program (RTP) Funding for the Roadrunner Recreation Trail. The trail officially begins on Main Street traveling north over Coyote Overpass - along Oilfield Avenue (a state highway). The trail heads north on the bike path along Oilfield Avenue approximately 1.3 miles where it leaves Oilfield at North Lake Sheloole Drive and circumvents Lake Sheloole for approximately 2.6 miles. Finally, the trail joins the City Shop Road, continuing into Shelby on Galena Avenue and back to Main Street.

The portion of the path along Oilfield Avenue was financed with the addition of Community Transportation Enhancement Program (CTEP) monies. This area is a major roadway leading to the school campus. Addressing walkability/bikeability along a portion of this busy street was critical as part of Shelby's Safe Routes to School Program and greatly impacted the trail system. At the present time, the City is working with the Montana Department of Transportation to extend the bike path on Oilfield Avenue. MFWP RTP funding will be used to pave a small portion of the trail that is still dirt/gravel. Through this wonderful grant program Shelby has completed over 5.5 miles of trail construction connecting business's, schools, medical facilities and recreation opportunities.

Safe Routes to School program: The City of Shelby was very fortunate to receive 4 years of infrastructure funding from the Montana Safe Routes to School Program. The funding was for construction of missing sidewalks, handicapped radius and alley aprons along several streets leading to the Shelby School campus. The City sought approval from the various homeowners along those pathways in addressing missing sidewalks and was able to address critical streets that large numbers of children walk/ride daily to and from school. A portion of this funding also addresses education/encouragement activities, including a successful Walking School Bus program, to encourage more walking and biking to school.

Safe Routes to School in Shelby

Case Study

Shelby Connectivity Efforts—streets, sidewalks and trails

Description (continued)

Sidewalk Program: The City of Shelby has a policy in which all building permits trigger a sidewalk-curb-gutter inspection. If the sidewalks meet guidelines…no action is required of the property owner. If inspection proves deficiencies in the sidewalks, the City requires the property owner to install/complete sidewalk work within three years of when the permit was issued.

In addition, every 3-5 years the City offers property owners the option to take part in a city-wide sidewalk construction project. The City advertises this option, and property owners notify the City if they are interested in taking part in the project. Generally this project also involves city projects - making the cost much more affordable given the quantities being bid.

The City of Shelby's contracted engineering firm inspects all interested properties to determine quantities and gives property owners an estimate of the expected cost (tax add-on) as well as determines the bid specifications. Property owners still have the opportunity to opt out of the project at this point, but they must complete their sidewalk projects within the 3-year time frame warranted by the building permit whether they use the city-wide project or hire their own contractor.

The City offers the property owner a 12-year financing package with a maximum interest rate of 5 percent. The repayment is placed on their local taxes which are paid twice yearly. The City borrows the project funds through the issuance of bonds, which homeowners re-pay through their payments to the City. This year the City will have nearly $1,000,000.00 in concrete projects including city/commercial/residential projects.

Tree project: In 2005, the City started the Wild Turkey Tree Farm along a portion of the Roadrunner Recreation Trail. Currently the farm has over 100 trees that were all financed through Department of Natural Resources Funding – Arbor Day and Forestry Development Grants. The City is giving these trees a couple of years to mature before initiating park tree replacement projects. These grants also funded the solar water pump system that waters the farm. This year Arbor Day grant funding financed tree purchases for planting along the Roadrunner Recreation Trail to create shade areas for trail users.

Benefit to the community:

A mission of the City of Shelby is to provide safe pedestrian/bicycle pathways for the health and wellbeing of community residents. The City realizes the many incredible benefits of creating a trail system and completing sidewalks throughout the community creating safe pathways for pedestrians and bicyclists to use; creating healthy (cost-free) recreational facilities; and alternative transportation options for residents and visitors.

Missing sidewalk slated for constuction with Safe Routes to School funding in Shelby

Case Study

Shelby Connectivity Efforts—streets, sidewalks and trails

Critical factors for success:

City leadership is critical in the success of these programs. Forward-thinking and diligent in their efforts city officials hired a part-time economic development director in 2005 who seeks out and writes grant applications for the City of Shelby. This position also administers the grant awards and oversees programs such as Safe Routes to School, Shelby Tree Board, Recycle Shelby and housing. Funding for these projects are considered well in advance in determining annual City budgets and match requirements of the grants being sought.

The City of Shelby also has a 5-year professional service agreement with two engineering firms enabling the City to react quickly to grant applications and awards to estimate engineering; design layout; and budget amounts. Coordination with city projects provides a very cost effective mechanism for property owners to afford the high cost of sidewalk work. It has worked very well for the City as well as the residents who have participated in the program.

Community support is also critical. Several components of the trail including signage, benches, and pet stations were donated by businesses, organizations and individuals who believed in the value of the project and supported the City's efforts.

Roadrunner Recreational Trailhead Signage

Contact Information:

Lorette Carter
Shelby Community Economic
Development Director
City of Shelby
112 1st St. So.
Shelby, MT 59474
(406) 424-8799
shbcdc@3rivers.net

Lessons learned:

Look ahead! Many of the grant opportunities have a match requirement. Include it in your city budgets in anticipation of potential granting.

Talk with granting agencies. There are many creative ways to finance critical community projects such as combining CTEP funds with Montana FWP RTP funding.

Look at your assets. Landfill fees, city personnel time, materials on hand can all be utilized as match in meeting grant requirements.

Be patient, yet persistent. Opportunities present themselves in many ways and the community that can react given the circumstances will be successful.

Case Study

Anaconda Street Tree Project

Background:

Anaconda, the county seat of Anaconda - Deer Lodge County, in mountainous southwestern Montana, has a population of 9,298. It is the 9th largest county in Montana and was home to the Anaconda Copper Mining Company which started in 1881. Although copper mining brought wealth to this community it also came at great cost to the environment due to heavy metal contamination of the soil. This contamination affected the trees in the area and for years there were little to no trees in the downtown area. Providing shade and beautifying the downtown were the motivating factors leading to the start of the street tree project. Downtown streets and city parks were the first targets for placement of the new trees.

Volunteers planting trees

Description:

Anaconda is a Tree City USA and in 2010 received the Department of Natural Resource Conservation (DNRC) Tree City Excellence Award for their decade of work to bring more trees into Anaconda-Deer Lodge County. What started as a small pilot project has resulted in over 2,000 new trees being planted in the Anaconda urban area.

In compliance with Tree City USA requirements, Anaconda has a Tree Committee, a tree ordinance and commits match money for the program. They have funded the program with grant monies from various sources including MT DNRC Arbor Day and DNRC Urban Forestry grants. Montana State University Extension Agent, Barbara Andreozzi, has provided leadership and coordination for this project.

It takes good partnerships to accomplish this work. Due to high levels of arsenic or lead in the soil some project trees have died. Consequently, Deer Lodge County is assisting the Street Tree Project in replacing soil and will continue soil testing to ensure a good base of support for successful tree growth. Volunteers are used extensively to accomplish the work and recently crews from the local prison have been hired to do the heavy labor. Local restaurants provide food for the planting crews. Other partners include local community development, the Garden Club, the Chamber of Commerce, DNRC, Master Gardeners, 4-H, the schools, the senior center and many others.

The Street Tree Committee selects four to five trees each year that are appropriate for streetscape trees and allows local residents to also purchase them at their low wholesale cost. This has raised the street tree inventory count from a mere 286 trees to over 1130 trees along the streetscape in Anaconda. Targeted areas have been the two major streets through the town that also make-up Highway 1. Residents and business owners along Park and Commercial Streets have been offered a 50% match for planting on the streetscape. All residents and business owners who plant a tree sign a tree care agreement to water and keep the tree healthy.

Trees require maintenance to be successful and Andreozzi offers a tree care and pruning workshop each year to celebrate Arbor Day. Over 350 individuals have taken this workshop over the last eight years, resulting in fewer calls about tree care and planting in the Anaconda region and greater success with tree survival.

Case Study

Anaconda Street Tree Project

Benefit to the community:

It is amazing what a difference 2,000 trees can make to the look and feel of a community. Even though most of the trees are still small they have added greatly to the beautification of the downtown and the community as a whole. The trees will eventually provide a great shade canopy and create an environment where cars naturally slow down and people feel more comfortable walking. In addition, due to the success of the Street Tree Project, interest in tree planting from residents has grown. As a result, a successful new business, a nursery, has started in Anaconda.

Critical factors for success:

Andreozzi credits starting small with a pilot project as a factor leading to success. There was a perception in the community that "nothing would grow". But as soon as community members saw what a difference a few trees could make then the project caught on and the volunteers just came. It was also critical to select the right trees for the area (Zone 3 trees). Previously, a local big box store was selling Zone 4 trees and the trees were not successful, adding to the belief that "nothing would grow".

Tree trimming clinic

Downtown Anaconda after tree planting

Lessons learned:

What Anaconda has learned is that if you start small and build the project one block at a time, it's easier than you might think. Over time the partners figured out how to make the project really work and now it works like a well-oiled machine. The project has taken the tree canopy from under 2% to over 8% with a long-term goal of 25% shade canopy throughout Anaconda.

Contact Information:

Barbara Andreozzi
MSU-Deer Lodge County Extension Agent
and Street Tree Project Coordinator
800 Main Street
Anaconda, MT 59711
406 563-4036
bandreozzi@montana.edu

Case Study

Lewistown Rail Trail

Background:

Lewistown, the county seat of Fergus County, is located in central Montana, the geographic center of the state. As of the 2010 census, Lewistown had a population of 5,901. On October 30, 1903, the first railway train ran to Lewistown. Almost 100 years later, on February, 2003, rail service to Lewistown ended. The last owner of the rail corridor was the Burlington Northern Santa Fe Railroad (BNSF). The company initially drafted a Donation/Transfer of Ownership Contract and sent it to the City of Lewistown. This donation offer was later retracted (May 3, 2005) and BNSF planned to file for abandonment of the corridor. Meanwhile, the city undertook a Targeted Brownfields Assessment through the EPA to characterize the environmental conditions along the rail right-of-way. This was a Phase I assessment and the report was filed on October 21, 2005.

A "historic" section of track remains adjacent to the trail

The Notice of Intent to Abandon was published in the Lewistown News Argus on November 9, 2005. BNSF filed a notice of exemption to abandon the railroad line and it was published in the Federal Register. The City requested the Surface Transportation Board for reconsideration of the intent to abandon the corridor. The next step for the city was to apply for rail banking and file a Notice of Interim Trail Use with the Surface Transportation Board. The City then received 180 days to negotiate a rail banking agreement with BNSF. A voluntary agreement was required. The negotiating period was extended for another 180 days.

The railroad salvaged the ties and track. As part of the historic mitigation, they left 150 feet of track for historic interpretation.

Description:

On September 5, 2006, the Railbanking and Bargain Sale Contract between the City and BNSF was deliberated in a public meeting held before the Lewistown City Commission. The negotiated purchase price was $500,000. This money came from the Recreational Trails Program (RTP) ($300,000) and CTEP ($200,000). The city commission approved entering in a Railbanking and Bargain Sale Contract on September 18, 2006. The closing date was set for January, 2007. The FWP RTP provided an additional $75,000 for associated development and management of the corridor. Because of this, it was possible to hire a staff person for trail management activities.

The total length of the rail purchase was 14.47 miles and consisted of 250.62 acres. The value of the purchase was considered to be $2,644,000. The Quitclaim Deed and Bill of Sale was filed with the Fergus County Clerk and Recorder on August 17, 2007. BNSF issued a $5,000 check to the Lewistown Historic Preservation Office for the purpose of historic mitigation. This mitigation was agreed to by the State Historic Preservation Office (SHPO).

Since the purchase, much of the corridor within the city has been converted to a trail system. Some of this is now paved using RTP funds and Safe Routes to School funding. About 8 miles of the corridor lies outside the City's incorporated area. This has yet to be developed into a trail but is available for non-motorized use. Horse enthusiasts use the corridor in the rural area. They now have an unrestricted corridor on which to ride.

A part time trails coordinator is on staff and is under the direction of the Parks and Recreation Department. Maintenance, including weed management, is an ongoing task. Much of the trail planning is coordinated by a trails committee made up of interested citizens plus city staff. The

Section of trail that connects to a school

Case Study

Lewistown Rail Trail

Friends of the Trails is the fund-raising arm of this group. An endowment has been set up in the Central Montana Foundation. The endowment balance now stands at about $15,000 and will be used for trail related activities. Recreational Trails Program grants are applied for each year through the FWP.

Benefit to the community:

The rail corridor acquisition and subsequent trail system development has been well received by the public. There was some resistance at first by those who thought the corridor should be put back on the tax rolls and by those who wanted the part of the corridor that traversed by their land. The community has had only one instance where an adjoining property owner has complained about the trail being too close to the property owners back deck with a subsequent loss of privacy. This issue is being resolved. The resistance has mostly faded and it is realized by most that the system is a very real community asset.

The trail corridor accesses every neighborhood and school in the community. It is easily accessed for both transportation and recreation. It is becoming evident that property values actually increase by having trail access nearby. This is in accordance with those who have knowledge of real estate values.

People using the trail with dogs not being on leases and users not cleaning up after their dogs seems to be a recurring complaint. Property signage indicating trail rules must be prominently displayed. Mile markers are desirable since visitors always want to know how far a trail segment is in length. Maps must be made available. Information kiosks are helpful.

Critical factors for success:

The Community Design Center at the MSU School of Architecture completed a master trails plan for the trail system in the fall of 2009. Trail sections were determined and proposals for each section were portrayed in the master plan. Part of the plan is to have the trail system serve as a gateway into the downtown area through development of an extensive creekside park and trailhead that would incorporate both public and private lands. The Yogo Inn is reviewing the proposal and is considering the development of a performing arts center and brew pub in connection with development.

Trail with signage

Lessons learned:

Developing a community-wide trail system, especially through the railbanking process, is not always an easy process. It takes time and persistence. Support is needed from the public and the affected governing bodies. Vigilance is needed if success is to be achieved because a corridor could easily be lost to public use and forever lost for resumption of rail use in the future. Railbanking is not considered railroad abandonment; therefore, rail service could resume in the future and an intact corridor would still be in place. The Rails-to-Trails Conservancy (www.railstotrails.org) is a valuable resource when going through the process.

Contact Information:

Duane Ferdinand
Planning Director
City of Lewistown
305 W. Watson St.
Lewistown, MT 59457
406 535-1775
planning@ci.lewistown.mt.us

Case Study

Three Forks Headwaters Trail System

Background:

The City of Three Forks is located in Gallatin County and has a population of 1,869 (2010 Census). The city got its name because it is geographically located near the point where the Jefferson, Madison, and Gallatin rivers converge to form the Missouri River, the longest river in North America. Two of Three Forks' unique assets are the historic Sacajawea Hotel and the Missouri Headwaters State Park. Another asset is one that Mayor Gene Townsend and the City of Three Forks have created over the years, the Headwaters Trail System.

In 1995, Gene Townsend, the mayor of Three Forks, started walking for exercise and to clear his head and get some fresh air. He soon discovered that there were not as many safe places to walk as he would like—many citizens were walking or running on roads with no sidewalks and no shoulders. He also saw how dust negatively affected people's ability to comfortably walk on gravel roads. It was at that point that Mayor Townsend vowed to work toward building more safe routes for the citizens of Three Forks.

Family on the Doulliard trail

To date 8.5 miles of paved trail have been built in the system—including two bicycle/pedestrian bridges—that connect the Three Forks residents (and visitors) with the Headwaters State Park and many other destinations around the city. In 2007 the Headwaters Trail was named Trail of the Year by Montana Fish, Wildlife and Parks.

Description:

The project started when Mayor Townsend saw a small announcement in the Billings Gazette about a grant opportunity from the Recreational Trails Program (RTP) at Montana Fish, Wildlife and Parks (FWP). He applied and was awarded $10,000 in 1996. There was a 20% match required for the grant and that money (plus another $2,000) was donated by the mayor's employer, Rio Tinto Minerals, formerly Luzenac. It was enough money to build a small section of gravel trail by some ponds. People in the community thought it was nice but as the mayor recalls they said "that's nice but where is it going?" So, the next year he applied and received more RTP funding and was also awarded a grant from the Land and Water Conservation Fund (LWCF) program which required a dollar for dollar match. Mayor Townsend began writing letters asking for more donations to make the match requirement and this allowed him to extend the trail further and pave it. At this point people really started to see what he was trying to do and they got behind the project.

The mayor kept writing grants and building more trail with the goal of connecting to the Headwaters State Park. Then he came to a stumbling block…the Madison River. There was a bridge in place that is being used by Montana Rail Link Railroad but he was told that he couldn't attach to the bridge for safety reasons and liability concerns…he would need to build his own. In the meantime he just kept going, building more paved trail on the other side of the river until he came to another fork in the river that required a bridge. This time he found an old 90 foot bridge from the Stillwater River that had been replaced and was being stored in a construction materials yard in Billings. For the price of trucking it back to Three Forks and rebuilding it to fit its new home, the mayor had a recycled bridge and trail building continued until he finally reached the Headwaters State Park.

The 'recycled' bridge being hoisted into position

Case Study

Three Forks Headwaters Trail System

The bridge over the Madison needed to be 140 feet long. Word reached the mayor that there were some old I-beams from an I-90 interchange in a salvage yard in Missoula. For $14,000 and $3,000 for shipping, the mayor had his materials for the bridge. It took five and a half years and $275,000 but the bridge was finally constructed and then trucked to the river and carefully installed. In June of 2011, in honor of National Trails Day, the bridge was dedicated and the first people walked and biked from Three Forks all the way to the Headwaters State Park.

Completed bridge over the Madison River

Another goal of the mayor was to make the Headwaters Trail system fully accessible for older people and for people with disabilities—a group that represented a significant number of Three Forks citizens. In 2008, the City of Three Forks, the Montana Nutrition and Physical Activity Program, and the Montana Disability and Health Program collaborated to conduct a series of group interviews to identify potential barriers to access and use of community trails for older adults and adults with disabilities. Information gained from the group interviews and a technical assessment of the trail was used by the mayor and city council of Three Forks to improve the accessibility of their community trail system.

The mayor has said on numerous occasions that he is now much more aware of the needs of older adults and citizens with mobility issues and has and will continue to incorporate the findings from this project into the design and construction of future trail projects. For more detailed information on this project please see page 15 of the fall 2011 issue of the Montana Policy Review at http://www.mtnapa.org/images/MTPolicyReview-2011-Fall1.pdf).

The trail became so successful that people living in other parts of town started asking when the trail would come closer to where they lived. So another section of trail was built on the west side of town to connect with the popular Droulliard state fishing access site on the Jefferson River. Then a grocery store opened up on that end of town and the mayor noticed that many people, including kids and people in motorized wheelchairs, would walk and roll in the road in order to get to it. Knowing that the Montana Department of Transportation was planning a repaving project to the town's main street, the mayor is working with them to use the town's Community Transportation Enhancement (CTEP) funding to build a separated pathway to connect the downtown to the grocery store. This project will get the trail within a few blocks of connecting to the Droulliard trail. After that, the mayor has his sights on a small gap in the trail that will more fully connect the downtown to the local school.

What began as a small gravel section of trail around a couple of ponds has grown to a big vision of connecting citizens and visitors alike to major destinations—parks, hotels, homes, downtown, schools, fishing access, and a grocery store. The next big goal of the mayor is to connect Three Forks with the neighboring town…and then the next town…through a countywide system of trails.

Image taken during the Three Forks Trail Assessment Activities

Case Study

Three Forks Headwaters Trail System

Benefit to the community:

Every day more and more people are seen enjoying the trail—walking, rolling, biking, strolling, skateboarding, roller-blading, dog walking and socializing. The Headwaters Trail has also become a popular destination for neighboring community residents and tourists. The recent restoration of the historic Sacajawea Hotel and Headwaters Trail improvements connecting the town to the Missouri Headwaters State Park is attracting attention as well as tourism from around the state and across the country. The mayor has already seen more individuals and groups coming to Three Forks specifically to enjoy these town amenities. In addition, the Sacajawea Hotel has capitalized on increased interest in bicycling by adding bike rentals as part of their hotel amenity package and a new business, a bike shop, has opened in town.

Rental bikes at the Sacajawea Hotel

Critical factors for success:

Funding is one of the most important factors leading to the success of this project—CTEP, RTP, LWCF, foundation funding and private donations. A non-profit, Friends of the Headwaters Trail, was formed to accept donations and many citizens donate to the trail in memory of loved ones. Every year there is a 5K and 10K run and this year a half-marathon will be added—corporate sponsors and entry fees raise about $5,000 each year. In-kind contributions and volunteer service is also critical. Volunteers as well as kids doing community service help with spraying weeds along the trail and plowing the trail in the winter. Helpful partners such as FWP, MDT, and Gallatin County have also been essential as have other groups such as Boy Scouts, Eagle Scouts, FCCLA (Family, Career and Community Leaders), and others.

The mayor is quick to credit others but without his leadership it is safe to say this project might never have happened. He has been the mayor for 27 years and through his big vision and dogged persistence, great things have happened. He also writes a lot of grants! In recognition of his significant efforts he was the recipient of the 2010 State Trail Advocacy Award during the 20th American Trails National Symposium.

Lessons Learned:

"Plan big but go in small steps and don't get discouraged" are the mayor's words of advice. He also says finding a great local contractor with vision and a design sense, like his friend Jack Roadarmel, has also helped create a beautiful and functional trail system. Keeping maintenance in mind when designing and building the trail—such as avoiding building too close to certain trees—is also important. But mainly persistence, partners, adequate funding, being opportunistic, and being in it for the long haul are the keys to success.

Contact Information:

Gene Townsend,
Mayor of Three Forks
PO Box 1
Three Forks, MT 59752
406 285 3633
d239gene@yahoo.com

Case Study

Connecting Small Communities on Montana's Hi-Line

Reprinted from TR News, September-October 2010, pp.38-39, with permission of the Transportation Research Board on behalf of the National Academy of Sciences.

Background:

Transportation has been a major need for people living in the Hi-Line region of north central Montana; residents often must travel to obtain or retain employment, receive an education, and gain access to medical care and other basic services. Blaine and Hill Counties along Montana's border with Canada were without public transportation services for nearly 20 years. A previous transit system had offered limited service connecting two towns, Havre and Great Falls, but eventually ceased operation.

Havre is the Hill County seat, with a population of 9,310 (2010 census), and offers medical, employment, and retail services. But the population density in the outlying areas is low—1.5 residents per square mile—so that establishing a transit system that would allow residents access to services in Havre was difficult. In addition, two Native American reservations, Rocky Boy's in Hill County and Fort Belknap in Blaine County, had struggled to provide transit services within and outside their boundaries.

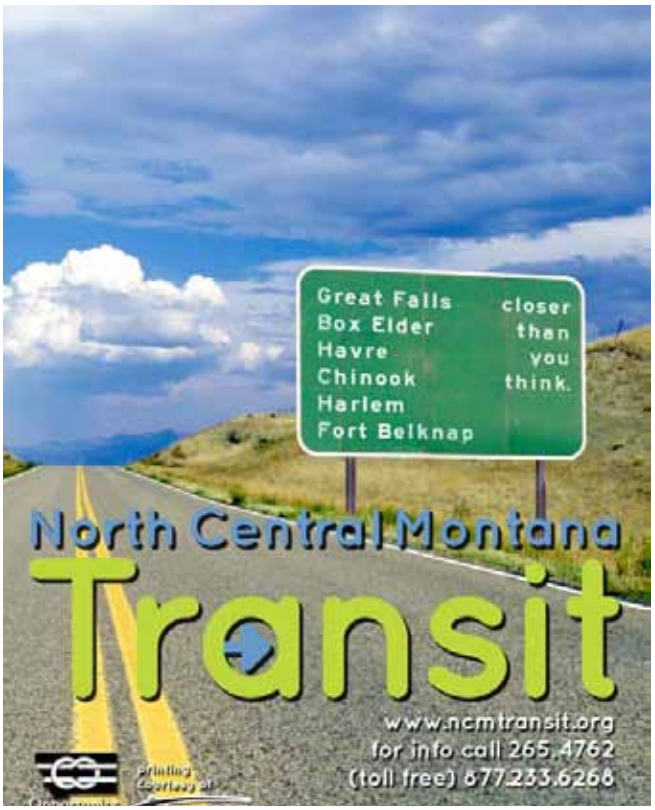
Description:

Initiating a regional transit service in this area had been a key goal of Opportunity Link, Inc., a non-profit organization based in Havre. The organization strives to create and implement strategies to reduce poverty in the Hi-Line region and to encourage community-driven partnerships. In August 2008, efforts began on the development of a transit service. Dubbed North Central Montana Transit (NCMT), the proposed service aimed to connect Havre, the largest city in the region, to Harlem, Chinook, and the Fort Belknap Indian Reservation in Blaine County, and to Box Elder and Laredo in Rocky Boy's Indian Reservation. Additional service would connect all of these communities to Great Falls, Montana, 114 miles from Havre. Great Falls (pop. 58,505) is the only urban community in the area, with larger medical, educational, and retail facilities.

Opportunity Link enlisted the public transit research expertise of the Western Transportation Institute (WTI) at Montana State University. The WTI team was asked to provide project management and to develop a plan for implementing public transportation on the Hi-Line. WTI's coordination plan considered the resources available for a transit system and how the various stakeholders would work together to implement and support the proposed service. The plan was developed through community meetings and through meetings with key partners, such as the tribal and county governments.

The planning process also included the system's partner agencies and organizations, as well as representatives of the communities and areas to be covered by the bus system, in considering the proposed routes and services.

Route planning tasks addressed specific operational details, such as identifying origins and destinations and the best routes for connecting those points. The cost of operating these routes was compared against a draft budget, and adjustments were made to keep service levels and the overall cost of the services within the budget. The routes and service levels were modified several times as updated budget information became available.



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Case Study

Connecting Small Communities on Montana's Hi-Line

As part of the process, stakeholders formed a Transportation Advisory Committee (TAC) consisting of elected officials; representatives from senior centers, transportation agencies, and medical, education, social service, community-based, and minority advocacy organizations in Hill and Blaine Counties; and representatives of tribal agencies from the Fort Belknap and Rocky Boy's Indian Reservations. The North Central Montana Regional TAC approved the coordination plan in February 2009.

With the help of WTI, Opportunity Link submitted the application and coordination plan to the Montana Department of Transportation's Operating Grant Program. In the application, the TAC requested $75,000 for operating funds from the Federal Transit Administration and three 21-passenger buses. Partners including Montana State University–Northern, Blaine and Hill Counties, Northern Montana Hospital in Havre, and other local agencies and organizations provided local funding.

North Central Montana Transit Vehicle

On August 24, 2009, one of the new NCMT buses, with 18 passengers on board, made its maiden voyage; more than 200 supporters cheered it on. In the first week of operation, NCMT provided 139 rides, followed by more than 200 rides in the second week, when the line received its first request for posting marketing materials in the buses. As of March 2010, NCMT ridership had increased to an average of 300 to 400 rides per week, with a monthly average of nearly 1,600 rides. The weekly totals matched what some had projected for the monthly ridership totals.

Benefit to the community:

In urban areas, public transportation, or transit, is often viewed as a means to address congestion. In rural and frontier areas, however, transit is often needed to provide mobility for those who lack access to basic services—such as the grocery store, medical care, or education. Despite this critical need, public agencies traditionally have considered transit systems infeasible and unaffordable in areas with low population densities.

The successful creation of a transit system within a region can expand viable transportation options, providing economic and environmental benefits for the communities and an improved quality of life for residents. For this reason, the Federal Highway Administration and the Federal Transit Administration recognized Opportunity Link and its partners in NCMT with the 2010 Transportation Planning Excellence Award. The biennial award recognizes outstanding initiatives to develop and implement innovative transportation planning practices. NCMT was honored in two categories: Planning and Leadership and Tribal Transportation Planning. NCMT has shown that public transportation can succeed in rural and frontier areas through partnerships and coordination.

Update: Since this article was first published, Opportunity Link has increased its coordination with the transit systems on the Rocky Boy's and Fort Belknap Reservations, and MSU Northern's YouthBuild program. In addition, North Central Montana Transit has provided service to get kids to the Boys & Girls Club in Havre, which increases summer ridership by over 78 rides per day.

Case Study

Connecting Small Communities on Montana's Hi-Line

Critical factors for success:

Factors critical to success begin with having all of the relevant stakeholders at the table. This includes elected officials (or their designees), health care (hospital/clinic) providers, employment-related people (job service, etc.), and many others. There is a list of potential stakeholders in the Montana Coordinated Transportation Handbook©, which is available online at www.mtcdd.org. A good, open dialogue between all the stakeholders will lay the foundation for a successful public transportation system that serves multiple needs. Another critical factor is that all stakeholders should be willing to commit some funds to help the transit system start. Instead of relying on one funding source (for say $50,000), a project is much more likely to succeed in a small town when multiple funding sources (of say $5,000 each) are sought.

Finally, expect that the system won't be perfect the first day it begins. While planning is important, the transit agency will learn as the system progresses, and changes can be made to routes and/or schedules so that the maximum number of people can use the service.

Route map

Lessons learned:

Smaller cities/towns can benefit from public transportation. Whether providing service within the community, or providing connections to smaller and larger communities, transit can provide a critical link to people who need a ride. In many communities, a non-profit organization may be the best agency to lead the effort, as non-profits are often more flexible with the services they can provide. Further, non-profits typically don't have to worry as much with jurisdictional issues, such as having transit services that may cross a city or county boundary.

Expect the service to grow and adjust to demands. The first year of service will likely bring even more requests for service. Many people and/or organizations need to see the service on the street before they will support the service and/or request services. For example, in Havre, the Boys & Girls Club figured out that the transit service could provide transportation services to get more kids to the Club. Ridership for the North Central Montana Transit service continues to increase as more people try the service and figure out that it can work for them.

Contact Information:

David Kack, Program Manager
Mobility Public Transportation,
Western Transportation Institute at
Montana State University-Bozeman.
406 994 7526
dkack@coe.montana.edu

Jim Lyons
Transit Manager,
Opportunity Link
P.O. Box 80
Havre, MT 59501-0080
406 265 4762
transit@opportunitylinkmt.org

Case Study

Livingston Sidewalk Inventory and Replacement

Background:

Livingston, the county seat of Park County, Montana, has a population of 7,044 (2010 Census). Livingston is located in southwestern Montana, on the Yellowstone River, north of Yellowstone National Park. Several years ago, Livingston decided they needed to have a survey of their sidewalks so that they would know how many feet of sidewalk needed to be replaced as well as the location of important gaps in the network. The goal of the sidewalk program is to replace as many linear feet as possible of deteriorating or defective sidewalks per year, starting with the worst and eventually resulting in a high quality sidewalk network throughout the City of Livingston.

Description:

The City of Livingston started this project by initially signing up for the iWorQ program (www.iworq.com). This is an online site that helps collect and store data such as work orders and inventory. Livingston now has a tree survey, sidewalk, curb and gutter, and a pavement inventory. These inventories are updated annually by a staff person doing a physical assessment. Each year the city accomplishes as much as their budget, man hours, and time constraints allow as it is an ongoing project. A tree survey was conducted by hiring a college student to assess each tree throughout one summer. Similar inventories can be undertaken for sidewalks or other assets.

Livingston ordinances state that the property owner abutting the sidewalk is responsible for the repair and replacement of damaged sidewalk. Because they understand that the price of replacing sidewalk can be too much for some residents, they offer the ability to choose the city's contractor and have it added to their taxes for 5 years with a 6% interest fee added to the total cost. This process does limit the amount of sidewalk that can be replaced each budget year due to the initial financial outlay on the part of the city.

Benefit to the community:

The most obvious benefit to the community is safety. The second benefit is that the cost can be divided for 5 years. New sidewalks also make a town look more inviting to visitors. There is a feeling of pride in a community where sidewalks are well maintained and safe access is provided to community members and visitors alike.

Critical factors for success:

A critical factor in the success of this program is the ability to budget enough money each year to enable the city to replace further distances. Eventually the 6% interest grows and helps fund the project. Making sure that staff stay on top of the inventory and sends letters out immediately to either repair or replace sidewalks helps reduce insurance rates because of trip/falls and helps keep the entire city a safer place to commute by foot.

Missing section of sidewalk in Livingston

Lessons learned:

Once sidewalks are inventoried the town is more aware of the dangers and more responsible for trips and falls. Budgeting is difficult as it is hard to know how many property owners will want to finance the sidewalk replacement each year. Having a dedicated person that is constantly monitoring and keeping up with letters is a must.

Contact Information:

Sandy Wulf
Assistant Public Works Director,
City of Livingston,
Livingston, MT 59047
406 222 1142
swulf@livingstonmontana.org

Design Guidance

Installing a sidewalk, striping a bike lane, and providing a transit stop along a corridor does not make it a Complete Street. In order for a Complete Street to be successful, the design needs to be comprehensive and functional for each type of user. The following are recommended design considerations and improvements for roadways based on the facility type.

Overall

The elements below address the roadway in its entirety without focusing on a single type of user. These elements are important to a corridor regardless of the type of facility or its function.

- **Establishing a roadway's purpose** Roadways serve different roles and have different functions within our communities. Some serve as the main corridors between downtown and suburban areas, while others feed into residential neighborhoods, and still others serve as centers of commerce and government. A roadway's purpose should be reflected in its design and layout. Downtown streets lined with businesses, lunchtime eateries, and pedestrians along wide sidewalks function differently than arterial roads with higher speed limits, less mixed uses, and limited on-street parking. Establishing a roadway's purpose is an important step in identifying what elements of Complete Streets should be incorporated along it.

- **Sense of Place** Many of Montana's smaller communities have a distinctive sense of place. From their historic downtowns or Main Streets, to their breathtaking vistas, Montana's smaller communities are special places to live and visit. Their compact size lends themselves well to non-motorized transportation. Establishing an identity and marketing a community's roadways can increase the revenues of area businesses while promoting tourism.

- **Landscaping** Street trees and landscaping play many important roles in the environment, in local communities, and along corridors. Yet, landscaping is frequently the element that is left out of the construction and maintenance process, often due to funding limitations. When costs are estimated and funding is sought for a roadway improvement project, landscaping should never be omitted. In addition to making streets more attractive, the benefits of trees and landscaping are numerous. The list below is only a partial compilation of the positive impacts that trees and landscaping can have along corridors:

- Vertical elements, to include trees, make corridors feel narrower, thereby reducing vehicle speeds;
- Trees and landscaping provide natural stormwater management and reduce runoff of pollutants;
- Trees capture carbon dioxide and help mitigate air pollution. Street trees absorb 9 times more pollutants than distant trees;
- Trees dampen street noise;
- Trees create safer walking environments by providing a buffer between vehicles and pedestrians;
- Street trees and landscaping improve commerce. Businesses along landscaped streets experience 20 percent more sales revenue than urban areas without landscaping;
- Trees lower urban air temperatures in the summer and reduce the heat island effect;
- Trees shield pedestrians from rain, sun, and heat, creating a more hospitable environment;
- Trees and landscaping soften and shield necessary street features such as utility boxes and light poles;
- The shade from urban street trees can lead to longer pavement life, reducing the frequency of maintenance and repaving;
- Trees and landscaping add value to nearby real estate, both commercial and residential;
- Trees and landscaped corridors alter the perception of time in travel: a treeless environment is perceived to be longer than one that is landscaped.

The Toolkit

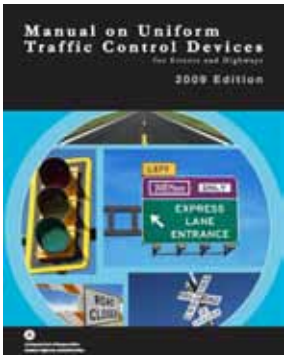
This facility toolkit is intended to assist Montana agencies in the design of Complete Streets. The following sections pull together best practices by facility type from public agencies and municipalities nationwide. Within the design sections, treatments are covered within a single sheet tabular format relaying important design information and discussion, example photos, schematics (if applicable), and existing summary guidance from current or upcoming draft standards. Existing standards are referenced throughout and should be the first source of information when seeking to implement any of the treatments featured here.

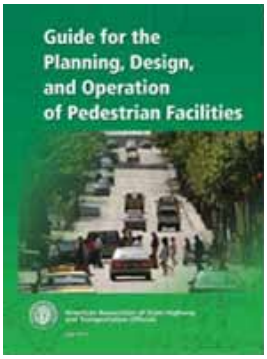
Guiding Principles

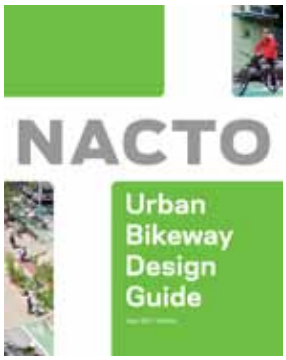
The following are guiding principles for these design guidelines:

- **The street environment should be safe.** All bicycling and walking routes should be physically safe and perceived as safe by all users. Safe means minimal conflicts with external factors, such as noise, vehicular traffic and protruding architectural elements. Safe also means routes are clear and well marked with appropriate pavement markings and directional signage.
- **The street environment should be accessible.** Sidewalks, shared-use paths, bike routes and crosswalks should permit the mobility of residents of all ages and abilities. The pedestrian and bicycle network should employ principles of universal design. Bicyclists have a range of skill levels, and facilities should be designed with a goal of providing for inexperienced/recreational bicyclists (especially children and seniors) to the greatest extent possible.
- **Facility improvements should be economical.** Complete Streets improvements should achieve the maximum benefit for their cost, including initial cost and maintenance cost, as well as a reduced reliance on more expensive modes of transportation. Where possible, improvements in the right-of-way should stimulate, reinforce and connect with adjacent private improvements.
- **The pedestrian and bicycle network should connect to places people want to go.** The pedestrian and bicycle network should provide continuous direct routes and convenient connections between destinations such as homes, schools, shopping areas, public services, recreational opportunities and transit. A complete network of on-street bicycling facilities should connect seamlessly to existing and proposed multi-use trails to complete recreational and commuting routes.
- **The walking and bicycling environment should be clear and easy to use.** Sidewalks, shared-use paths and crossings should allow all people to easily find a direct route to a destination with minimal delays, regardless of whether these persons have mobility, sensory, or cognitive disability impairments. All roads are legal for the use of bicyclists (except those roads designated as limited access facilities, which prohibit bicyclists). This means that most streets are bicycle facilities and should be designed, marked (if appropriate) and maintained accordingly.
- **The walking and bicycling environment should be attractive and enhance community livability.** Good design should integrate with and support the development of complementary uses and should encourage preservation and construction of art, landscaping and other items that add value to communities. These components might include open spaces such as plazas, courtyards and squares, and amenities like street furniture, banners, art, plantings and special paving. These along with historical elements and cultural references, should promote a sense of place. Public activities should be encouraged and the municipal code should permit commercial activities such as dining, vending and advertising when they do not interfere with safety and accessibility.
- **Design guidelines are flexible and should be applied using professional judgment.** This document references specific national guidelines for bicycle, pedestrian and transit facility design, as well as a number of design treatments not specifically covered under current guidelines. Statutory and regulatory guidance may change. For this reason, the guidance and recommendations in this document function to complement other resources considered during a design process, and in all cases sound engineering judgment should be used.

National Standards







The Federal Highway Administration's **Manual of Uniform Traffic Control Devices** (MUTCD) defines the standards used by road managers nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public traffic. The MUTCD is the primary source for guidance on lane striping requirements, signal warrants, and recommended signage and pavement markings.

To further clarify the MUTCD, the FHWA created a table of contemporary bicycle facilities that lists various bicycle-related signs, markings, signals, and other treatments and identifies their official status (e.g., can be implemented, currently experimental). See **Bicycle Facilities and the Manual of Uniform Traffic Control Devices.**[1]

Bikeway treatments not explicitly covered by the MUTCD are often subject to experiments, interpretations and official rulings by the FHWA. The **MUTCD Official Rulings** is a resource that allows website visitors to obtain information from these supplementary materials. Copies of various documents (such as incoming request letters, response letters from the FHWA, progress reports, and final reports) are available on this website.[2]

American Association of State Highway and Transportation Officials (AASHTO) **Guide for the Development of Bicycle Facilities** last updated in 2012 provides detailed guidance on dimensions, use, and layout of specific facilities. The standards and guidelines presented by AASHTO provide basic information about the design of bicycle and pedestrian facilities, such as minimum sidewalk widths, bicycle lane dimensions, more detailed striping requirements and recommended signage and pavement markings.

Offering similar guidance for pedestrian design, the 2004 AASHTO **Guide for the Planning, Design and Operation of Pedestrian Facilities** provides comprehensive guidance on planning and designing for people on foot.

The National Association of City Transportation Officials' (NACTO) 2011 **Urban Bikeway Design Guide**[3] is the newest publication of nationally recognized bikeway design standards, and offers guidance on the current state of the practice designs. The NACTO Urban Bikeway Design Guide is based on current practices in the best cycling cities in the world. The intent of the guide is to offer substantive guidance for cities seeking to improve bicycle transportation in places where competing demands for the use of the right of way present unique challenges. All of the NACTO Urban Bikeway Design Guide treatments are in use internationally and in many cities around the US.

Meeting the requirements of the Americans with Disabilities Act (ADA) is an important part of any bicycle and pedestrian facility project. The United States Access Board's proposed **Public Rights-of-Way Accessibility Guidelines**[4] (PROWAG) and **ADA Accessibility Guidelines**[5] (ADAAG) contain standards and guidance for the construction of accessible facilities. This includes requirements for sidewalk curb ramps, slope requirements, and pedestrian railings along stairs.

Some of these treatments are not directly referenced in the current versions of the AASHTO Guide to Bikeway Facilities or the Manual of Uniform Traffic Control Devices (MUTCD), although many of the elements of these treatments are found within these documents. In all cases, engineering judgment is recommended to ensure that the application makes sense for the context of each treatment, given the many complexities of urban streets.

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1 *Bicycle Facilities and the Manual of Uniform Traffic Control Devices. (2011). FHWA. http://www.fhwa.dot.gov/environment/bikeped/mutcd_bike.htm*

2 *MUTCD Official Rulings. FHWA. http://mutcd.fhwa.dot.gov/orsearch.asp*

3 *http://nacto.org/cities-for-cycling/design-guide/*

4 *http://www.access-board.gov/prowac/*

5 *http://www.access-board.gov/adaag/html/adaag.htm*

Additional References

In addition to the previously described national standards, the basic bicycle and pedestrian design principals outlined in this chapter are derived from the documents listed below. Many of these documents are available online and provide a wealth of public information and resources.

Additional U.S. Federal Guidelines

- American Association of State Highway and Transportation Officials. (2001). *AASHTO Policy on Geometric Design of Streets and Highways*. Washington, DC. www.transportation.org
- United States Access Board. (2007). *Public Rights-of-Way Accessibility Guidelines (PROWAG)*. Washington, D.C. http://www.access-board.gov/PROWAC/alterations/guide.htm
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Best Practice Documents

- Alta Planning + Design and the Initiative for Bicycle & Pedestrian Innovation (IBPI). (2009). *Fundamentals of Bicycle Boulevard Planning & Design*. http://www.ibpi.usp.pdx.edu/media/BicycleBoulevardGuidebook.pdf
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- Rosales, Jennifer. (2006). *Road Diet Handbook: Setting Trends for Livable Streets.*
- *TCRP Report 19: Guidelines for the Location and Design of Bus Stops, FTA Transit Cooperative Research Program. http://online-pubs.trb.org/onlinepubs/tcrp/tcrp_rpt_19-a.pdf*
- *Transit Guidelines in Project Development, (2011) Missoula Urban Transportation District. http://www.mountainline.com/files/MUTD%20Transit%20Guidelines%20in%20Project%20Development%20Final.pdf*
- *Bus Stop Safety and Design Guidelines, (2004). Orange County Transportation Authority. http://www.octa.net/uploadedfiles/publication_bus_guidelines.pdf*
- *Kansas Rural Transit Assistance Program (RTAP). http://www.kutc.ku.edu/cgiwrap/kutc/rtap/index.php/tech*

Glossary

The following list is comprised of common terms, acronyms and concepts used in bicycle transportation planning, design and operation.

AASHTO – American Association of State Highway and Transportation Officials

Accessible route – In the ADA, a continuous route on private property that is accessible to persons with disabilities. There must be at least one accessible route linking the public sidewalk to each accessible building.

Actuated signal – A signal where the length of the phases for different traffic movements is adjusted for demand by a signal controller using information from detectors.

ADA – Americans with Disabilities Act of 1990; broad legislation mandating provision of access to employment, services, and the built environment to those with disabilities.

At-grade crossing – A junction where bicycle path or sidewalk users cross a roadway over the same surface as motor vehicle traffic, as opposed to a grade-separated crossing where users cross over or under the roadway using a bridge or tunnel.

Audible pedestrian signals – Pedestrian signal indicators that provide an audible signal to assist visually impaired pedestrians in crossing the street.

BAFUL - Bicycles Allowed Full Use of Lane

Bicycle boulevard - See neighborhood greenway. Streets designed to give bicyclists priority by limiting or prohibiting motor vehicle through traffic by using barriers or other design elements, in order to enhance bicycle safety and enjoyment.

Bicycle facilities - A general term used to describe all types of bicycle-related infrastructure including linear bikeways and other provisions to accommodate or encourage bicycling, including bike racks and lockers, bikeways, and showers at employment destinations.

Bike lane - A striped lane for one-way bike travel on a street or highway.

Bicycle level of service (BLOS) – Indication of bicyclist comfort level for specific roadway geometries and traffic conditions. Roadways with a better (lower) score are more attractive (and usually safer) for bicyclists.

Bike path – A paved pathway separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent alignment. Bike paths may be used by pedestrians, bicyclists, skaters, wheelchair users, runners, and other non-motorized users.

Bike route - A shared roadway specifically identified for use by bicyclists, providing a superior route based on traffic volumes and speeds, street width, directness, and/or cross-street priority; designated by signs only.

Bikeway – A generic term for any road, street, path or way that in some manner is specifically designed for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

Bollard – Post used to restrict motor vehicle use of bicycle paths.

Clearance interval – The length of time that the DON'T WALK indication is flashing on a pedestrian signal indication.

Clearance, lateral – Width required for safe passage of bicycle path users as measured on a horizontal plane.

Clearance, vertical – Height required for safe passage of bicycle path users as measured on a vertical plane.

Crosswalk – any portion of a roadway at an intersection or elsewhere that is distinctly indicated for pedestrian crossing. Where there are no pavement markings, there is a crosswalk at each leg of every intersection, defined by law as the prolongation or connection of the lateral lines of the sidewalks.

Curb extension – An area where the sidewalk and curb are extended into the parking lane, usually in order to shorten pedestrian crossing distance. Also called "bulb-out" or "curb bulb."

Curb ramp – A combined ramp and landing to accomplish a change of level at a curb in order to provide access to pedestrians using wheelchairs.

Directional signs – Signs typically placed at road and bicycle path junctions (decision points) to guide bicycle path users toward a destination or experience.

Geometry - The vertical and horizontal characteristics of a transportation facility, typically defined in terms of gradient, degrees, and super elevation.

Grade separation - Vertical separation of travelways through use of a bridge or tunnel so that traffic conflicts are minimized.

Grade-separated crossing – A bridge or tunnel allowing bicycle path users to cross a major roadway without conflict.

HCM - Highway Capacity Manual

HDM – Highway Design Manual

Level of service (LOS) - Term for the measurement of how well traffic "flows" on a roadway system or how well an intersection functions.

Loop detector - A device placed under the pavement at intersections to detect a vehicle or bicycle and subsequently trigger a signal to turn green.

Medians – Area in the center of the roadway that separates directional traffic; may provide a striped crossing and halfway point for pedestrians (also can be effective traffic calming design). Medians may be level with the surrounding roadway or "raised" using curb and gutter. Medians may include landscaping, concrete, paint/striping or any combination thereof.

Multi-use path – A trail that permits more than one type of user, such as a trail designated for use by both pedestrians and bicyclists.

MUTCD – Federal Manual of Uniform Traffic Control Devices

Neighborhood Greenways – Streets designed to give bicyclists priority by limiting or prohibiting motor vehicle through traffic by using barriers or other design elements, in order to enhance bicycle safety and enjoyment. See bicycle boulevard.

Paved shoulder – The edge of the roadway beyond the outer stripe edge that provides a place for bicyclists; functions as this only when it is wide enough (4-5 feet), free of debris, and does not contain rumble strips or other obstructions.

Pavement marking – An assortment of markings on the surface of the pavement that provide directions to motorists and other road users as to the proper use of the road (the "Manual of Uniform Traffic Control Devices" determines these standard markings).

Pedestrian – A person afoot; a person operating a pushcart; a person riding on, or pulling a coaster wagon, sled, scooter, tricycle, bicycle with wheels less than 14 inches in diameter, or a similar conveyance, or on roller skates, skateboard, wheel-chair or a baby in a carriage.

Pedestrian signal indication – The lighted WALK/DON'T WALK signal that indicates the pedestrian phase.

Refuge islands – Corner raised triangles or medians, used by pedestrians and bicyclists at intersections or mid-block cross-ings for assistance with crossing wide streets, especially where motor vehicle right turn lanes exist.

Right-of-way (ROW) - The right of one vehicle, bicycle or pedestrian to proceed in a lawful manner in preference to another vehicle, bicycle, or pedestrian. Also the strip of property in which a transportation facility or other facility is built.

Shared lane marking (SLM) or **Sharrow** – Shared Lane Pavement Marking used to indicate proper lane positioning.

Shared roadway - A roadway where bicyclists and motor vehicles share the same space with no striped bike lane. Any roadway where bicycles are not prohibited by law (i.e. interstate highways or freeways) is a shared roadway.

Sidewalk – an improved facility intended to provide for pedestrian movement; usually, but not always, located in the public right-of-way adjacent to a roadway. Typically constructed of concrete.

Sight distance - The distance a person can see along an unobstructed line of sight.

Traffic calming - Changes in street alignment, installation of barrier, and other physical measures to reduce traffic speeds and/or cut-through traffic volume in the interest of street safety, livability, and other public purposes.

Traffic control devices - Signs, signals or other fixtures, whether permanent or temporary, placed on or adjacent to a travelway by authority of a public body having jurisdiction to regulate, warn, or guide traffic.

Traffic volume - The number of vehicles that pass a specific point in a specific amount of time (hour, day, year).

Wide curb lane – A 14 foot (or greater) wide outside lane adjacent to the curb of a roadway that provides space for bicyclists to ride next to (to the right of) motor vehicles. Also referred to as a "wide outside lane". If adjacent to parking, 22 foot wide pavement may also be considered a wide curb lane.

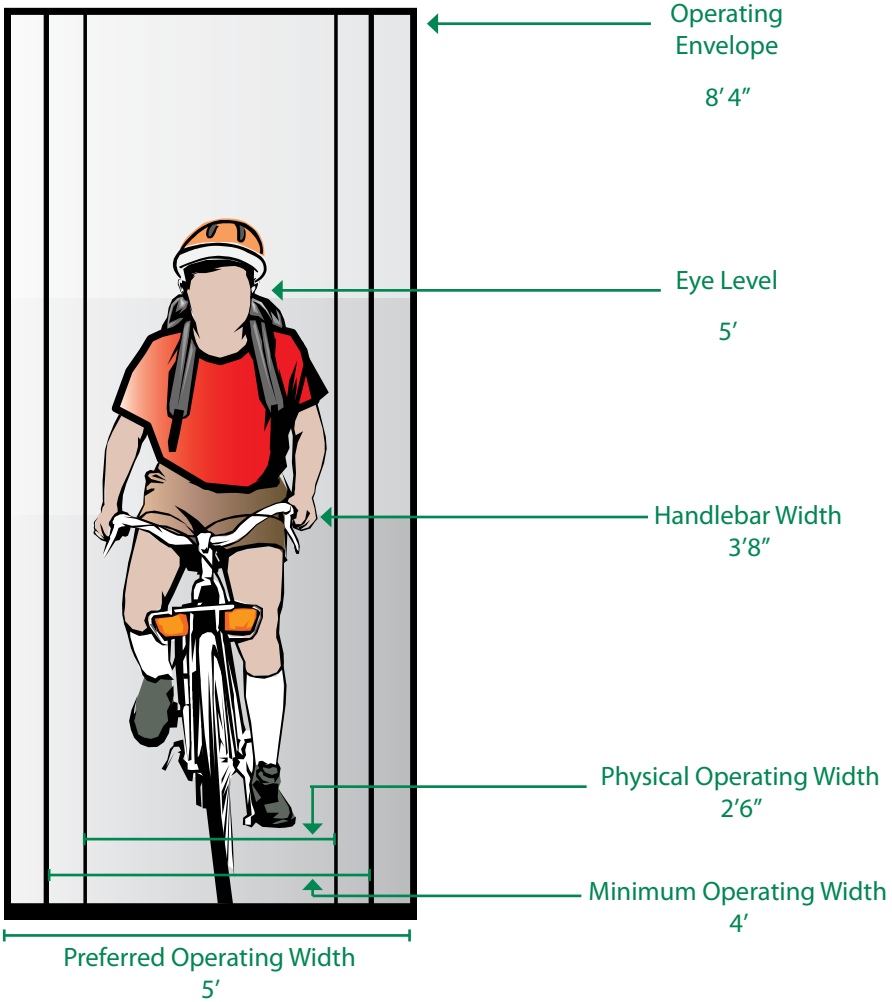
Design Needs of Bicyclists

The purpose of this section is to provide the facility designer with an understanding of how bicyclists operate and how their bicycle influences that operation. Bicyclists, by nature, are much more affected by poor facility design, construction and maintenance practices than motor vehicle drivers. Bicyclists lack the protection from the elements and roadway hazards provided by an automobile's structure and safety features. By understanding the unique characteristics and needs of bicyclists, a facility designer can provide the highest quality facilities and minimize risk to their users.

Bicycle as a Design Vehicle

Similar to motor vehicles, bicyclists and their bicycles exist in a variety of sizes and configurations. These variations occur in the types of vehicle (such as a conventional bicycle, a recumbent bicycle or a tricycle), and behavioral characteristics (such as the comfort level of the bicyclist). The design of a bikeway should consider reasonably expected bicycle types on the facility and utilize the appropriate dimensions.

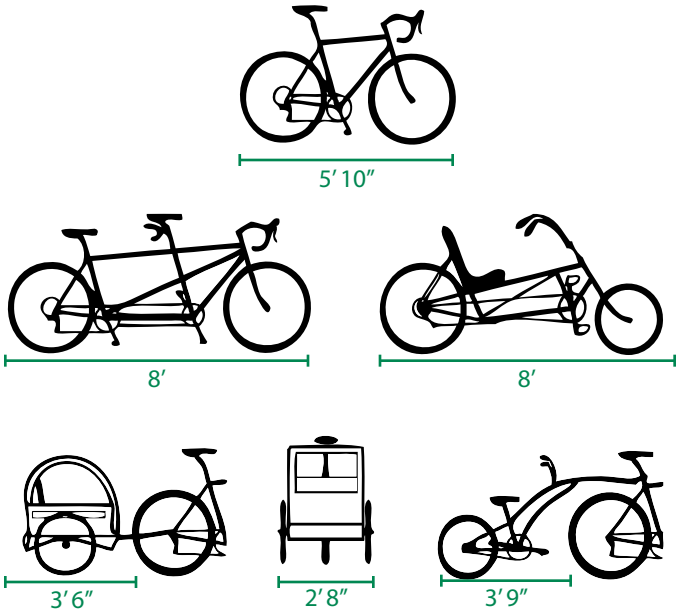
The figure below illustrates the operating space and physical dimensions of a typical adult bicyclist, which are the basis for typical facility design. The bicyclist requires clear space to operate within a facility; this is why the minimum operating width is greater than the physical dimensions of the bicyclist. Bicyclists prefer five feet or more operating width, although four feet is minimally acceptable.



Standard Bicycle Rider Dimensions

Source: AASHTO Guide for the Development of Bicycle Facilities, 3rd Edition

In addition to the design dimensions of a typical bicycle, there are many other commonly used pedal-driven cycles and accessories to consider when planning and designing bicycle facilities. The most common types include tandem bicycles, recumbent bicycles, and trailer accessories. The figure and table below summarize the typical dimensions for bicycle types.



Bicycle as Design Vehicle - Typical Dimensions

Source: AASHTO Guide for the Development of Bicycle Facilities, 3rd Edition *AASHTO does not provide typical dimensions for tricycles.

Design Speed Expectations

The expected speed that different types of bicyclists can maintain under various conditions also influences the design of facilities such as shared use paths.

The skill level of the bicyclist also provides dramatic variance in expected speeds and behavior. There are several systems of classification currently used within the bicycle planning and engineering professions. These classifications can be helpful in understanding the characteristics and infrastructure preferences of different bicyclists.

It should be noted that these classifications may change in type or proportion over time as infrastructure and culture evolve. Often times an instructional course can change a less confident bicyclist into one that can comfortably and safely share the roadway with vehicular traffic. Bicycle infrastructure should be planned and designed to accommodate as many user types as possible with the consideration of separate or parallel facilities to provide a comfortable experience for the greatest number of bicyclists.

Bicycle as Design Vehicle - Typical Dimensions

Bicycle Type	Feature	Typical Dimensions
Upright Adult Bicyclist	Physical width	2 ft 6 in
	Operating width (Minimum)	4 ft
	Operating width (Preferred)	5 ft
	Physical length	5 ft 10 in
	Physical height of handlebars	3 ft 8 in
	Operating height	8 ft 4 in
	Eye height	5 ft
	Vertical clearance to obstructions (tunnel height, lighting, etc)	10 ft
	Approximate center of gravity	2 ft 9 in - 3 ft 4 in
Recumbent Bicyclist	Physical length	8 ft
	Eye height	3 ft 10 in
Tandem Bicyclist	Physical length	8 ft
Bicyclist with child trailer	Physical length	10 ft
	Physical width	2 ft 6 in

Bicycle as Design Vehicle - Design Speed Expectations

Bicycle Type	Feature	Typical Speed
Upright Adult Bicyclist	Paved level surfacing	15 mph
	Crossing intersections	10 mph
	Downhill	30 mph
	Uphill	5 -12 mph
Recumbent Bicyclist	Paved level surfacing	18 mph

*Tandem bicycles and bicyclists with trailers have typical speeds equal to or less than upright adult bicyclists.

Types of Bicyclists

It is important to consider bicyclists of all skill levels when creating a non-motorized plan or project. Bicyclist skill level greatly influences expected speeds and behavior, both in separated bikeways and on shared roadways. Bicycle infrastructure should accommodate as many user types as possible, with decisions for separate or parallel facilities based on providing a comfortable experience for the greatest number of bicyclists.

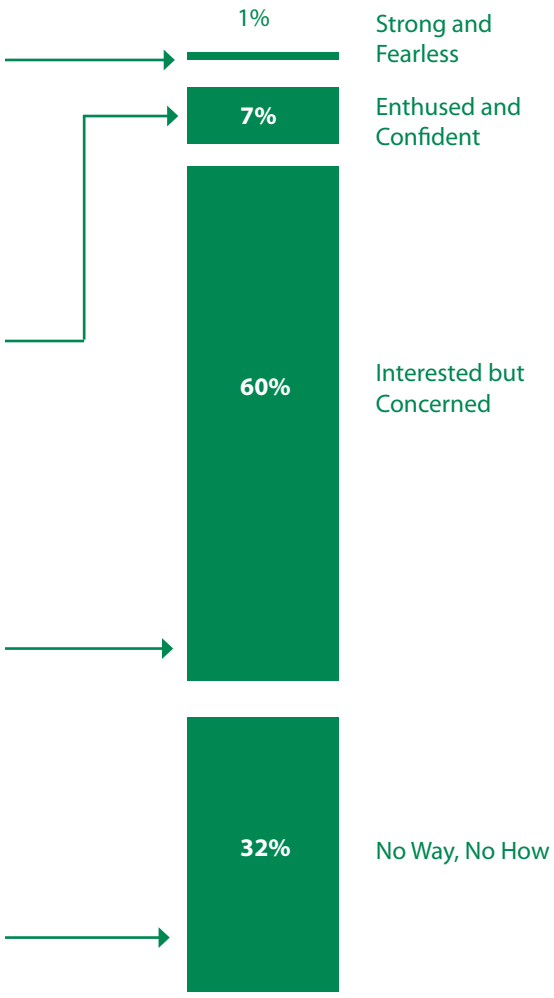
The bicycle planning and engineering professions currently use several systems to classify the population, which can assist in understanding the characteristics and infrastructure preferences of different bicyclists. The most conventional framework classifies the "design cyclist" as *Advanced*, *Basic*, or *Child*.[1] A more detailed understanding of the US population as a whole is illustrated below. Developed by planners in the City of Portland, OR[2] and supported by data collected nationally since 2005, this classification provides the following alternative categories to address 'varying attitudes' towards bicycling in the US:

- **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.

- **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.



Typical distribution of bicyclist types

1 *Selecting Roadway Design Treatments to Accommodate Bicycles. (1994). Publication No. FHWA-RD-92-073*

2 *Four Types of Cyclists. (2009). Roger Geller, City of Portland Bureau of Transportation. http://www.portlandonline.com/transportation/index.cfm?&a=237507*

Design Needs of Pedestrians

Types of Pedestrians

Similar to bicyclists, pedestrians have a variety of characteristics and the transportation network should accommodate a variety of needs, abilities, and possible impairments. Age is one major factor that affects pedestrians' physical characteristics, walking speed, and environmental perception. Children have low eye height and walk at slower speeds than adults walk. They also perceive the environment differently at various stages of their cognitive development. Older adults walk more slowly and may require assistive devices for walking stability, sight, and hearing. The table below summarizes common pedestrian characteristics for various age groups.

The MUTCD recommends a normal walking speed of three and a half feet per second when calculating the pedestrian clearance interval at traffic signals. The walking speed can drop to three feet per second for areas with older populations and persons with mobility impairments. While the type and degree of mobility impairment varies greatly across the population, the transportation system should accommodate these users to the greatest reasonable extent.

Pedestrian Characteristics by Age

Age	Characteristics
0-4	Learning to walk
	Requires constant adult supervision
	Developing peripheral vision and depth perception
5-8	Increasing independence, but still requires supervision
	Poor depth perception
9-13	Susceptible to "dart out" intersection dash
	Poor judgment
	Sense of invulnerability
14-18	Improved awareness of traffic environment
	Poor judgment
19-40	Active, fully aware of traffic environment
41-65	Slowing of reflexes
65+	Difficulty crossing street
	Vision loss
	Difficulty hearing vehicles approaching from behind

Source: AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities (July 2004), Exhibit 2-1.

The table below summarizes common physical and cognitive impairments, how they affect personal mobility, and recommendations for improved pedestrian-friendly design.

Disabled Pedestrian Design Considerations

Impairment	Effect on Mobility	Design Solution
Wheelchair and Scooter Users	Difficulty propelling over uneven or soft surfaces.	Firm, stable surfaces and structures, including ramps or beveled edges.
	Cross-slopes cause wheelchairs to veer downhill.	Cross-slopes to less than two percent.
	Require wider path of travel.	Sufficient width and maneuvering space
Walking Aid Users	Difficulty negotiating steep grades and cross slopes; decreased stability.	Smooth, non-slipperly travel surface.
	Slower walking speed and reduced endurance; reduced ability to react.	Longer pedestrian signal cycles, shorter crossing distances, median refuges, and street furniture.
Hearing Impairment	Less able to detect oncoming hazards at locations with limited sight lines (e.g., driveways, angled intersections, right-turn slip lanes) and complex intersections.	Longer pedestrian signal cycles, clear sight distances, highly visible pedestrian signals and markings.
Vision Impairment	Limited perception of path ahead and obstacles.	Accessible text (larger print and raised text), accessible pedestrian signals (APS), guide strips and detectable warning surfaces, safety barriers, and lighting.
	Reliance on memory.	
	Reliance on non-visual indicators (e.g., sound and texture).	
Cognitive Impairment	Varies greatly. Can affect ability to perceive, recognize, understand, interpret, and respond to information.	Signs with pictures, universal symbols, and colors, rather than text.

Persons With Disabilities

The Americans with Disabilities Act (ADA) was signed into law July 26, 1990, providing assurance that a disabled person will have full access to all public facilities throughout the United States. In planning and designing for the new construction or retrofit of pedestrian facilities, the law requires federal adherence to the ADA. As a civil rights law, it is important to comply with the spirit and the letter of the law. Technical details, such as sidewalk width, cross slope, curb cut slope at intersection crossings, detectable warning markings, height and accessibility of pedestrian signals, and the location of street furniture must comply with ADA standards.

Meeting the requirements of the Americans with Disabilities Act (ADA) is an important part of any Complete Street with dedicated pedestrian facilities. The United States Access Board's proposed **Public Rights-of-Way Accessibility Guidelines**[1] (PROWAG) contains standards and guidance for the construction of accessible facilities.

Pedestrian amenities along a corridor are important for the convenience of those on foot as well as user safety of all modes.

AASHTO provides the most specific guidance for the placement of sidewalks along streets:

> *"Sidewalks used for pedestrian access to schools, parks, shopping areas, and transit stops and placed along all streets in commercial areas should be provided on both sides of the street. In residential areas, sidewalks are desirable on both sides of the streets but need to be provided on at least one side of all local streets."*

The following section provides design guidance on the important elements of Complete Streets that should be considered when designing a roadway to be safe and accessible for pedestrian users.

1 *http://www.access-board.gov/prowac/*

Pedestrian Treatments

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel that is separated from vehicle traffic. Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped planting strip area. Sidewalks are a common application in both urban and suburban environments.

Attributes of well-designed sidewalks include the following:

Accessibility: A network of sidewalks should be accessible to all users.

Adequate width: Two people should be able to walk side-by-side and pass a third comfortably. Different walking speeds should be accounted for. In areas of intense pedestrian use, sidewalks should accommodate the high volume of walkers.

Safety: Design features of the sidewalk should allow pedestrians to have a sense of security and predictability. Sidewalk users should not feel they are at risk due to the presence of adjacent traffic.

Continuity: Walking routes should be obvious and should not require pedestrians to travel out of their way unnecessarily.

Landscaping: Plantings and street trees should contribute to the overall psychological and visual comfort of sidewalk users, and be designed in a manner that contributes to the safety of people.

Drainage: Sidewalks should be well graded to minimize standing water.

Social space: There should be places for standing, visiting, and sitting. The sidewalk area should be a place where adults and children can safely participate in public life.

Quality of place: Sidewalks should contribute to the character of neighborhoods and business districts.

This Section Includes:

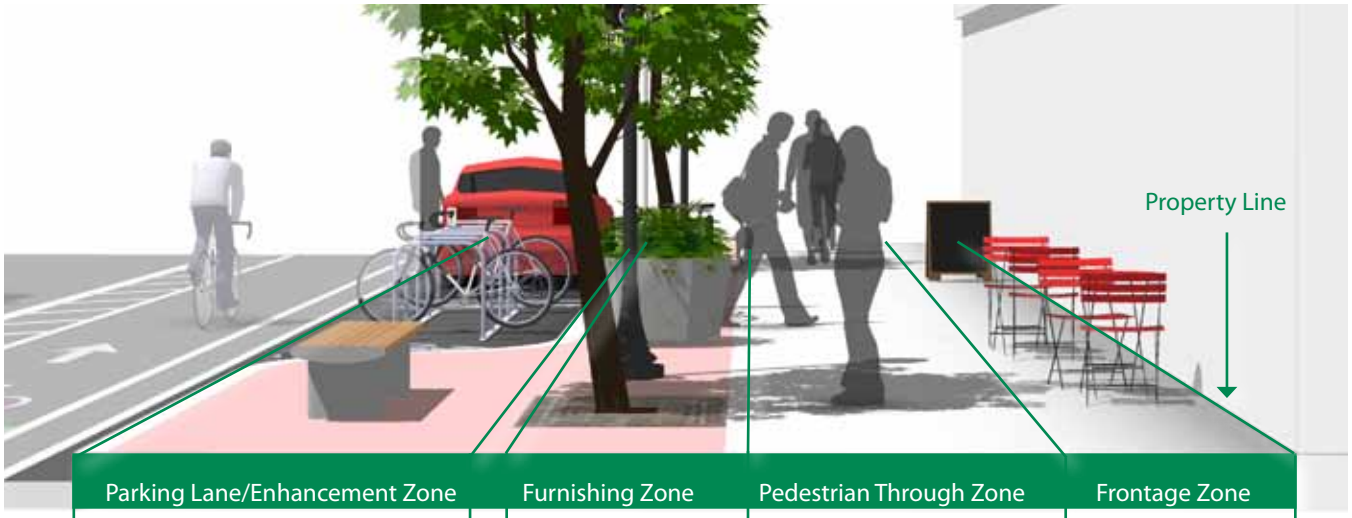
- The Sidewalk Corridor
- Marked Crosswalks
- Hybrid Beacons
- Pedestrians at Intersections
- Pedestrian Amenities

Sidewalks

The Sidewalk Corridor

Description

Sidewalks are the most fundamental element of the walking network, as they provide an area for pedestrian travel separated from vehicle traffic. A variety of considerations are important in sidewalk design. Providing adequate and accessible facilities can lead to increased numbers of people walking, improved safety, and the creation of social space.



Parking Lane/Enhancement Zone	Edge Zone	Furnishing Zone	Pedestrian Through Zone	Frontage Zone
The parking lane can act as a flexible space to further buffer the sidewalk from moving traffic. Curb extensions, and bike corrals may occupy this space where appropriate. In the edge zone there should be a 6 inch wide curb.		The furnishing zone buffers pedestrians from the adjacent roadway, and is also the area where elements such as street trees, signal poles, signs, and other street furniture are properly located.	The through zone is the area intended for pedestrian travel. This zone should be entirely free of permanent and temporary objects. Wide through zones are needed in downtown areas or where pedestrian flows are high.	The Frontage Zone allows pedestrians a comfortable "shy" distance from the building fronts. It provides opportunities for window shopping, to place signs, planters, or chairs. Not applicable if adjacent to a landscaped space.

Discussion

Sidewalks should be more than areas to travel; they should provide places for people to interact. There should be places for standing, visiting, and sitting. Sidewalks should contribute to the character of neighborhoods and main streets, strengthen their identity, and be an area where adults and children can safely participate in public life.

Additional References and Guidelines

United States Access Board. (2002). Accessibility Guidelines for Buildings and Facilities.
United States Access Board. (2007). Public Rights-of-Way Accessibility Guidelines (PROWAG).
AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

Materials and Maintenance

Sidewalks are typically constructed out of concrete and are separated from the roadway by a curb or gutter and sometimes a landscaped boulevard. Colored, patterned, or stamped concrete can add distinctive visual appeal.

Local Application

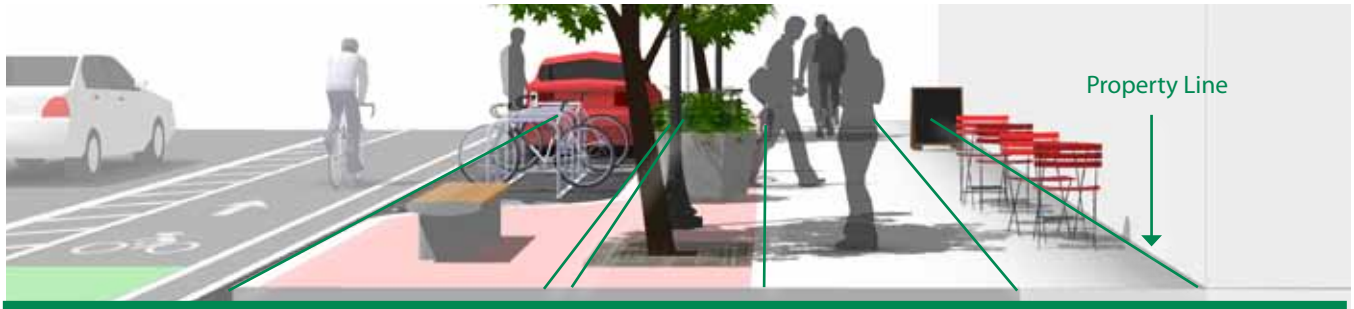
The Sidewalk Corridor

Local Details

The width and design of sidewalks will vary depending on street context, functional classification, and pedestrian demand. Below are preferred widths of each sidewalk zone according to general street type. Standardizing sidewalk guidelines for different areas of the community, dependent on the above listed factors, ensures a minimum level of quality for all sidewalks. All sidewalks are recommended to include a furnishning or planting zone that can act as snow storage in the winter.

Local street sidewalk environment

Downtown Kalispell



Street Classification	Parking Lane/ Enhancement Zone	Furnishing Zone/ Landscape Buffer	Pedestrian Through Zone	Frontage Zone	Total
Local Streets	Varies	2 - 5 feet	4 - 6 feet	N/A	6.5 - 10 feet
Main Street Areas	Varies	4 - 6 feet	6 - 12 feet	2.5 - 10 feet	11 - 28 feet

Additional Locations and Notes

It is important to provide adequate width along a sidewalk corridor. Two people should be able to walk side-by-side and pass a third comfortably. In areas of high demand, sidewalks should contain adequate width to accommodate the high volumes and different walking speeds of pedestrians. The Americans with Disabilities Act requires a 4 foot clear width in the pedestrian zone plus 5 foot passing areas every 200 feet.

Six feet of through zone width enables two pedestrians (including wheelchair users) to walk side-by-side, or to pass each other comfortably. Lanscape buffers or furnishing zones on main streets are recommended.

Marked Crosswalks

Marked Crosswalks

Guidance

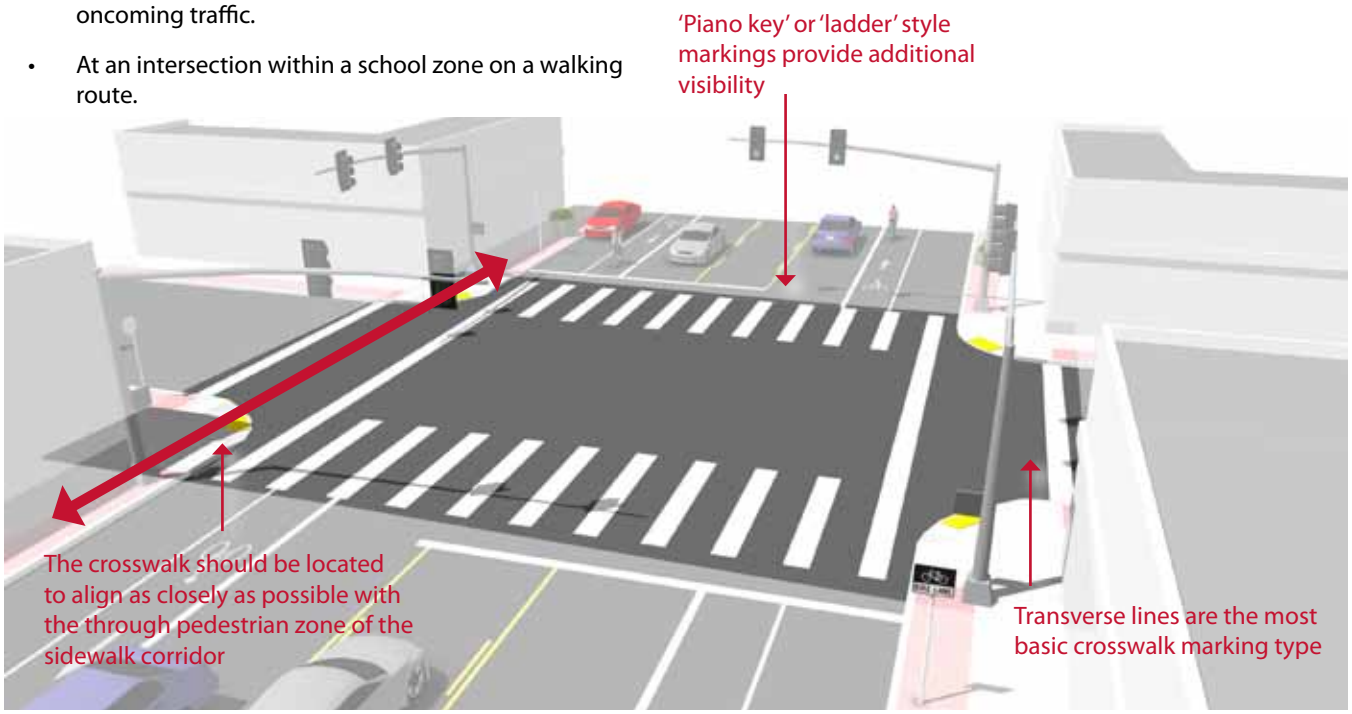
At signalized intersections, all crosswalks should be marked. At un-signalized intersections, crosswalks may be marked under the following conditions:

- At a complex intersection, to orient pedestrians in finding their way across.
- At an offset intersection, to show pedestrians the shortest route across traffic with the least exposure to vehicular traffic and traffic conflicts.
- At an intersection with visibility constraints, to position pedestrians where they can best be seen by oncoming traffic.
- At an intersection within a school zone on a walking route.

Description

A marked crosswalk signals to motorists that they must stop for pedestrians and encourages pedestrians to cross at designated locations. Installing crosswalks alone will not necessarily make crossings safer especially on multi-lane roadways.

At mid-block locations, crosswalks can be marked where there is a demand for crossing and there are no nearby marked crosswalks.



Discussion

High visibility crosswalk markings should be used at crossings with high pedestrian use or where vulnerable pedestrians are expected, including: school crossings, across arterial streets for pedestrian-only signals, at mid-block crosswalks, at intersections where there is expected high pedestrian use and the crossing is not controlled by signals or stop signs.

See **Intersection Signalization** for a discussion of enhancing pedestrian crossings.

Additional References and Guidelines

FHWA. (2009). Manual of Uniform Traffic Control Devices. (3B.18)
AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.
FHWA. (2005). Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations.
FHWA. (2010). Crosswalk Marking Field Visibility Study.

Materials and Maintenance

Because the effectiveness of marked crossings depends entirely on their visibility, maintaining marked crossings should be a high priority. Thermoplastic markings offer increased durability to conventional paint.

Local Application

Marked Crosswalks

Local Details

'Piano Key' crosswalk in Kalispell

Transverse lines in Whitefish

Colored crossing in Bozeman

Additional Notes

- In locations with significant pedestrian activity, crosswalks should be placed no further than 200-300 feet apart, and no closer than 150 feet apart.
- In other locations with limited pedestrian activity crosswalk frequency may be varied but should not require excessive out of direction travel for a pedestrian to reach a crossing.
- The stripes in parallel pavement marking crosswalks should be placed 10 feet apart. In situations where the crosswalk must be narrower, the minimum distance for parallel striping is 6 feet apart. Ladder pavement markings should measure 2 foot wide by 10 foot long bars.
- Colored crossings must be bordered by traditional transverse white stripes. If the colored crossing is given a stamped texture, this can be unpleasant for wheelchair users and strollers.

Path/Roadway Crossings

Signalized/Controlled Crossings

Guidance

Hybrid beacons (illustrated here) may be installed without meeting traffic signal control warrants if roadway speed and volumes are excessive for comfortable path crossings.

Full traffic signal installations must meet MUTCD pedestrian, school or modified warrants. Additional guidance for signalized crossings:

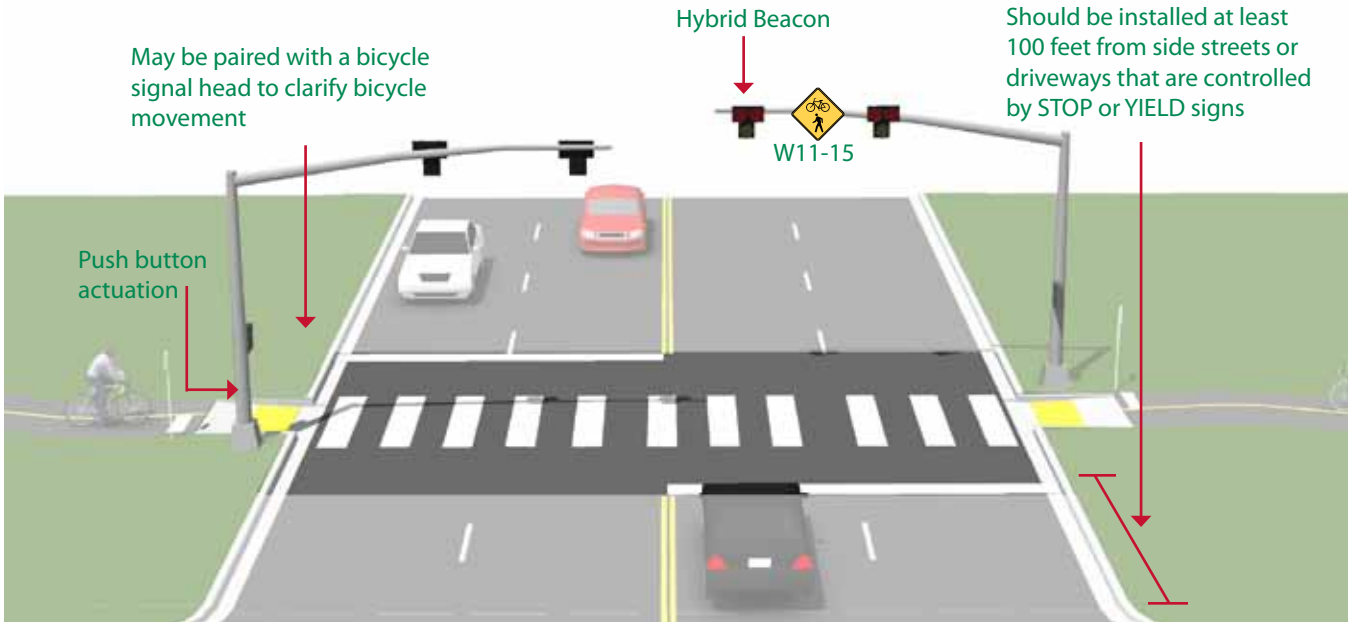
- Located more than 300 feet from an existing signalized intersection
- Roadway travel speeds of 40 MPH and above
- Roadway ADT exceeds 15,000 vehicles

Description

Signalized crossings provide the most protection for crossing path users through the use of a red-signal indication to stop conflicting motor vehicle traffic. The two types of path signalization are full traffic signal control and hybrid signals.

A full traffic signal installation treats the path crossing as a conventional 4-way intersection and provides standard red-yellow-green traffic signal heads for all legs of the intersection.

Hybrid beacon installation (shown below) faces only cross motor vehicle traffic, stays dark when inactive, and uses a unique 'wig-wag' signal phase to indicate activation. Vehicles have the option to proceed after stopping during the final flashing red phase, which can reduce motor vehicle delay when compared to a full signal installation.



Discussion

Shared-use path signals are normally activated by push buttons but may also be triggered by embedded loop, infrared, microwave or video detectors. The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street.

Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity and safety.

Additional References and Guidelines

FHWA. (2009). Manual of Uniform Traffic Control Devices.
NACTO. (2011). Urban Bikeway Design Guide.

Materials and Maintenance

Hybrid beacons are subject to the same maintenance needs and requirements as standard traffic signals. Signing and striping need to be maintained to help users understand any unfamiliar traffic control.

Local Application

Signalized/Controlled Crossings

Local Details

Pedestrian actuated flashing beacon in Whitefish

Hybrid Beacon in Bloomfield, MI

Full pedestrian signal in front of Bozeman High School

Additional Notes

Hybrid beacons may be installed without meeting traffic signal control warrants if roadway speed and volumes are excessive for comfortable pedestrian crossings.

- If installed within a signal system, signal engineers should evaluate the need for the hybrid signal to be coordinated with other signals.
- Parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the marked crosswalk to provide adequate sight distance.

Signalization

Active Warning Beacons

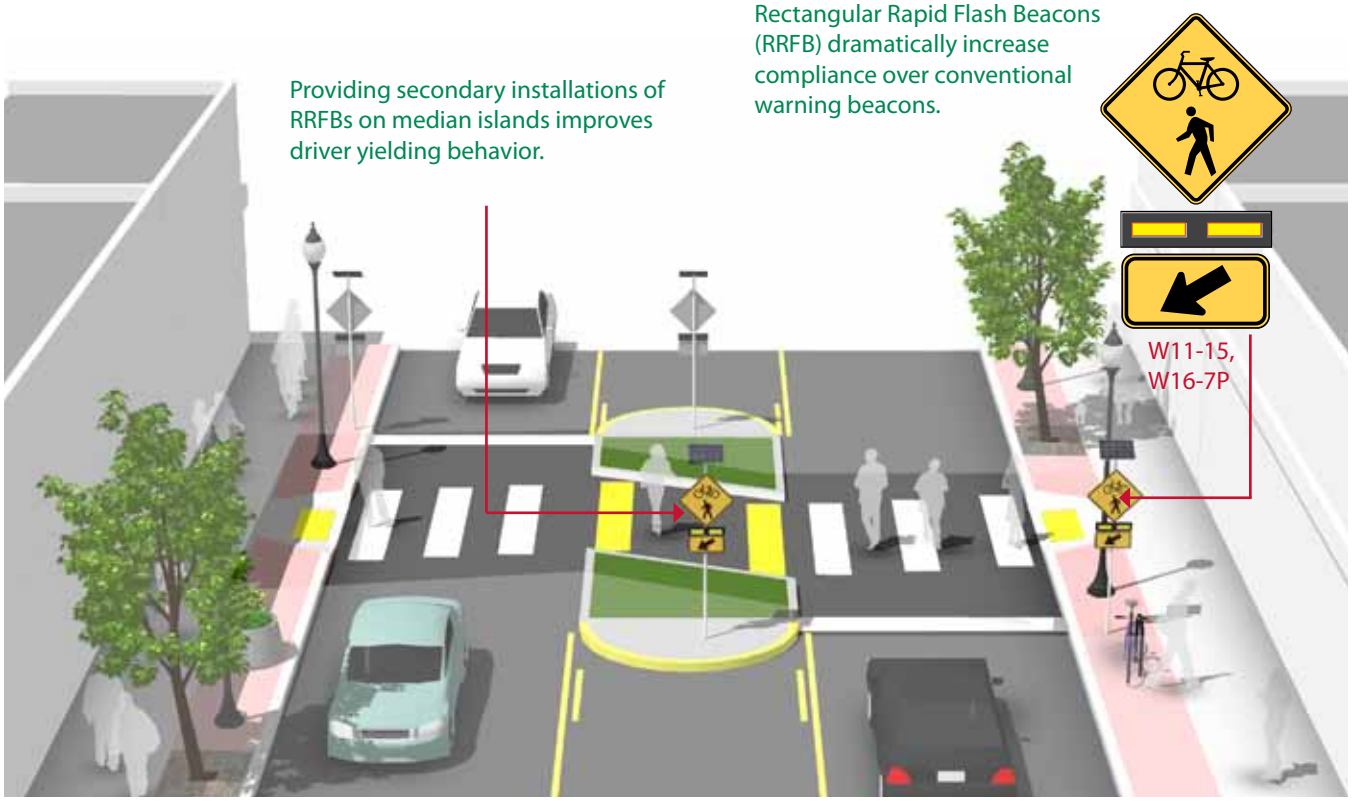
Guidance

- Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic signals.
- Warning beacons shall initiate operation based on pedestrian or bicyclist actuation and shall cease operation at a predetermined time after actuation or, with passive detection, after the pedestrian or bicyclist clears the crosswalk.

Description

Active warning beacons are user actuated illuminated devices designed to increase motor vehicle yielding compliance at crossings of multi lane or high volume roadways.

Types of active warning beacons include conventional circular yellow flashing beacons, in-roadway warning lights, or Rectangular Rapid Flash Beacons (RRFB).



Discussion

Rectangular rapid flash beacons have the most increased compliance of all the warning beacon enhancement options.

A study of the effectiveness of going from a no-beacon arrangement to a two-beacon RRFB installation increased yielding from 18 percent to 81 percent. A four-beacon arrangement raised compliance to 88 percent. Additional studies over long term installations show little to no decrease in yielding behavior over time.

Additional References and Guidelines

NACTO. (2011). Urban Bikeway Design Guide.
FHWA. (2009). Manual of Uniform Traffic Control Devices.
FHWA. (2008). MUTCD - Interim Approval for Optional Use of Rectangular Rapid Flashing Beacons (IA-11)

Materials and Maintenance

Depending on power supply, maintenance can be minimal. If solar power is used, RRFBs should run for years without issue.

Local Application

Active Warning Beacons

Local Details

RRFB crossing of Shiloh Avenue in Billings

RRFB crossing in Billings - Note debris on sidewalk

RRFB on King Avenue West in Billings

RRFB on King Avenue West in Billings

Additional Notes

Active warning beacons can be used for pedestrian mid-block crossings, unsignalized intersections, and for shared-use path crossings. Active warning beacons can also be effective for bicycle route crossings of major streets. When used for bicycle crossings, activating buttons should be accessible to bicyclists so that they do not have to dismount. Active warning beacons work best when coupled with a median refuge island.

Signalization

Pedestrians at Signalized Intersections

Description

Pedestrian Signal Head

Pedestrian signal indicators demonstrate to pedestrians when to cross at a signalized crosswalk. All traffic signals should be equipped with pedestrian signal indications except where pedestrian crossing is prohibited by signage.

Countdown pedestrian signals are particularly valuable for pedestrians, as they indicate whether a pedestrian has time to cross the street before the signal phase ends. Countdown signals should be used at all signalized intersections.

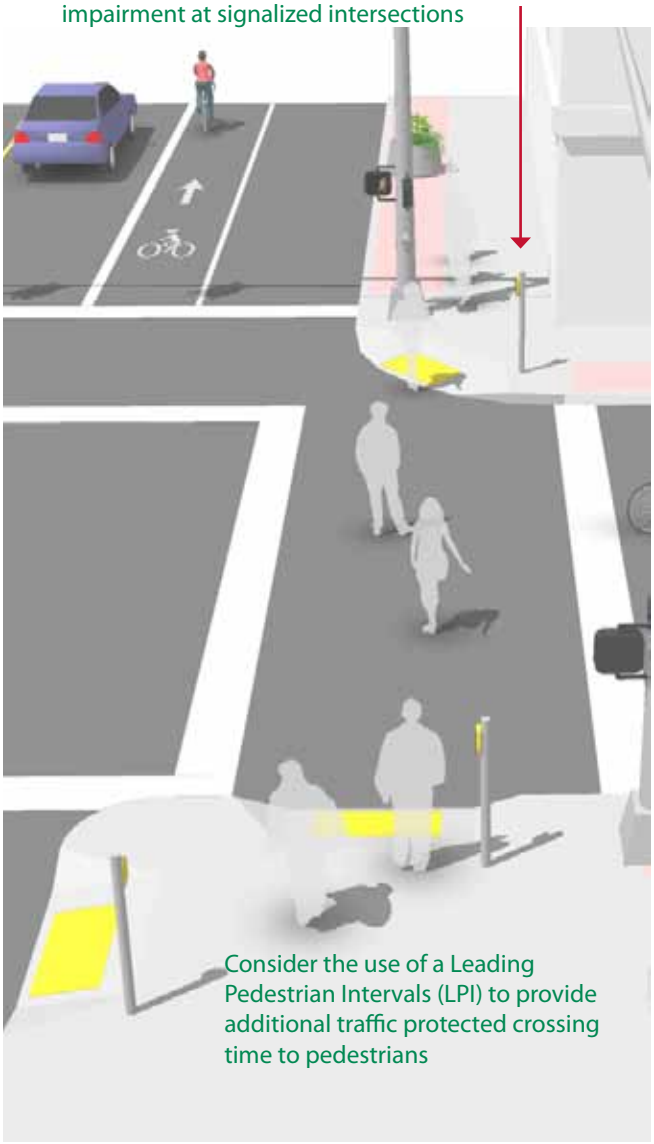
Signal Timing

Providing adequate pedestrian crossing time is a critical element of the walking environment at signalized intersections. The MUTCD recommends traffic signal timing to assume a pedestrian walking speed of 4' per second, meaning that the length of a signal phase with parallel pedestrian movements should provide sufficient time for a pedestrian to safely cross the adjacent street.

At crossings where older pedestrians or pedestrians with disabilities are expected, crossing speeds as low as 3' per second may be assumed. Special pedestrian phases can be used to provide greater visibility or more crossing time for pedestrians at certain intersections.

In busy pedestrian areas such as downtowns, the pedestrian signal indication should be built into each signal phase, eliminating the requirement for a pedestrian to actuate the signal by pushing a button.

Audible pedestrian traffic signals provide crossing assistance to pedestrians with vision impairment at signalized intersections



Consider the use of a Leading Pedestrian Intervals (LPI) to provide additional traffic protected crossing time to pedestrians

Discussion

When push buttons are used, they should be located so that someone in a wheelchair can reach the button from a level area of the sidewalk without deviating significantly from the natural line of travel into the crosswalk, and marked (for example, with arrows) so that it is clear which signal is affected.

In areas with very heavy pedestrian traffic, consider an all-pedestrian signal phase to give pedestrians free passage in the intersection when all motor vehicle traffic movements are stopped.

Additional References and Guidelines

United States Access Board. (2007). Public Rights-of-Way Accessibility Guidelines (PROWAG).
AASHTO. (2004). Guide for the Planning, Design, and Operation of Pedestrian Facilities.

Materials and Maintenance

Depending on power supply, maintenance can be minimal. If solar power is used, RRFBs should run for years without issue.

Local Application

Pedestrians at Signalized Intersections

Local Details

If pedestrian volumes are high, push buttons are not needed.; these push buttons in Bozeman were deactivated for daytime use

Countdown pedestrian signal in Bozeman

Downtown Kalispell has ample pedestrian amenities at signalized intersections

Additional Notes

- Pedestrian push buttons should be located at the level top of the curb ramp cut at approximately 40 inches off the ground.
- Pedestrian pushbuttons should be located where sight impaired pedestrians can easily find them.
- Vibrotactile pedestrian signals should be provided wherever sight-impaired pedestrians are expected.
- All pedestrian signal placement should comply with MDT guidelines.

Pedestrian Amenities

Description

A variety of streetscape elements can define the pedestrian realm, offer protection from moving vehicles, and enhance the walking experience. Key features are presented below.

Street Trees

In addition to their aesthetic and environmental value, street trees can slow traffic and improve safety for pedestrians. Trees add visual interest to streets and narrow the street's visual corridor, which may cause drivers to slow down. It is important that trees do not block light or the vision triangle.

Street Furniture

Providing benches at key rest areas and viewpoints encourages people of all ages to use the walkways by ensuring that they have a place to rest along the way. Benches should be 20" tall to accommodate elderly pedestrians comfortably. Benches can be simple (e.g., wood slats) or more ornate (e.g., stone, wrought iron, concrete). If alongside a parking zone, street furniture must be 3 feet from the curbface.

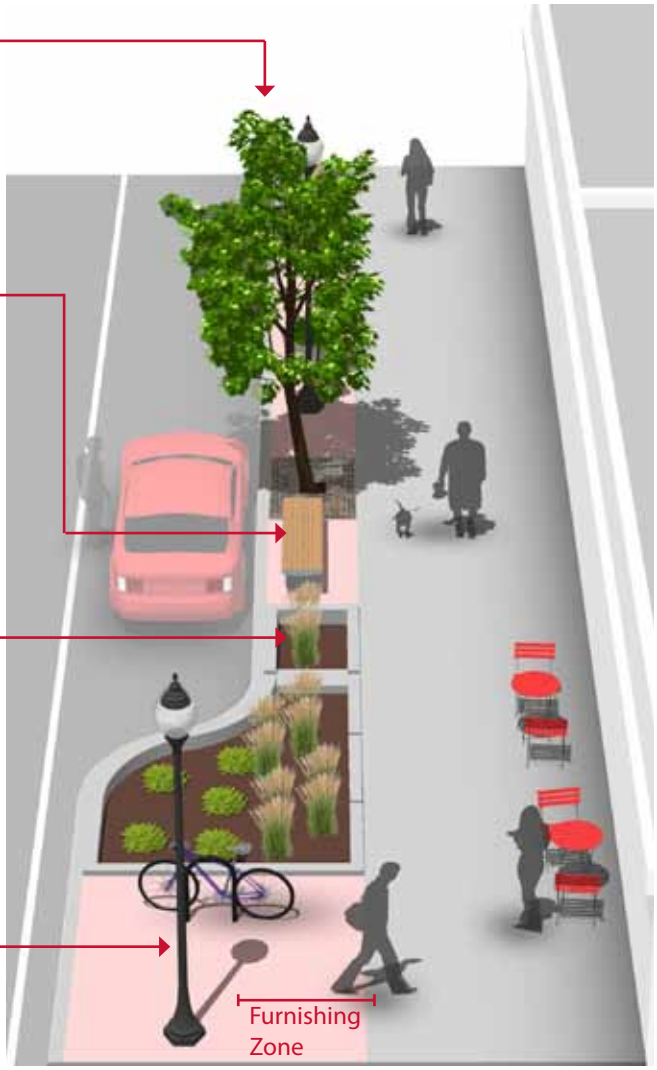
Green Features

Green stormwater strategies may include bioretention swales, rain gardens, tree box filters, and pervious pavements (pervious concrete, asphalt and pavers).

Bioswales are natural landscape elements that manage water runoff from a paved surface. Plants in the swale trap pollutants and silt from entering a river system.

Lighting

Pedestrian scale lighting improves visibility for both pedestrians and motorists - particularly at intersections. Pedestrian scale lighting can provide a vertical buffer between the sidewalk and the street, defining pedestrian areas. Pedestrian scale lighting should be used in areas of high pedestrian activity.



Discussion

Additional pedestrian amenities such as banners, public art, special paving, along with historical elements and cultural references, promote a sense of place. Public activities should be encouraged and commercial activities such as dining, vending and advertising may be permitted when they do not interfere with safety and accessibility.

Pedestrian amenities should be placed in the furnishing zone on a sidewalk corridor. See **The Sidewalk Corridor** for a discussion of the functional parts of a sidewalk. Signs, meters, and tree wells should be placed in the furnishing zone.

Additional References and Guidelines

United States Access Board. (2007). Public Rights-of-Way Accessibility Guidelines (PROWAG).

Materials and Maintenance

Establishing and caring for your young street trees is essential to their health. Green features may require routine maintenance, including sediment and trash removal, and clearing curb openings and overflow drains.

Bicycle Facilities

Designated exclusively for bicycle travel, bicycle facilities are comprised by striping, signage, and can include pavement stencils and other treatments. Separated bikeways, such as shoulders, bike lanes and shared-use paths are most appropriate on arterial and collector streets where higher traffic volumes and speeds warrant greater separation.

Separated bikeways can increase safety and promote proper riding by:

- Defining road space for bicyclists and motorists, reducing the possibility that motorists will stray into the bicyclists' path.
- Discouraging bicyclists from riding on the sidewalk.
- Reducing the incidence of wrong way riding.
- Reminding motorists that bicyclists have a right to the road.


Shoulder Bikeways


Bicycle Lanes


Share Lane Markings


Shared-Use Paths

This section includes:

- Shoulder Bikeways
- Bicycle Lanes
- Shared Lane Markings
- Shared-Use Paths

Bicycle Facilities

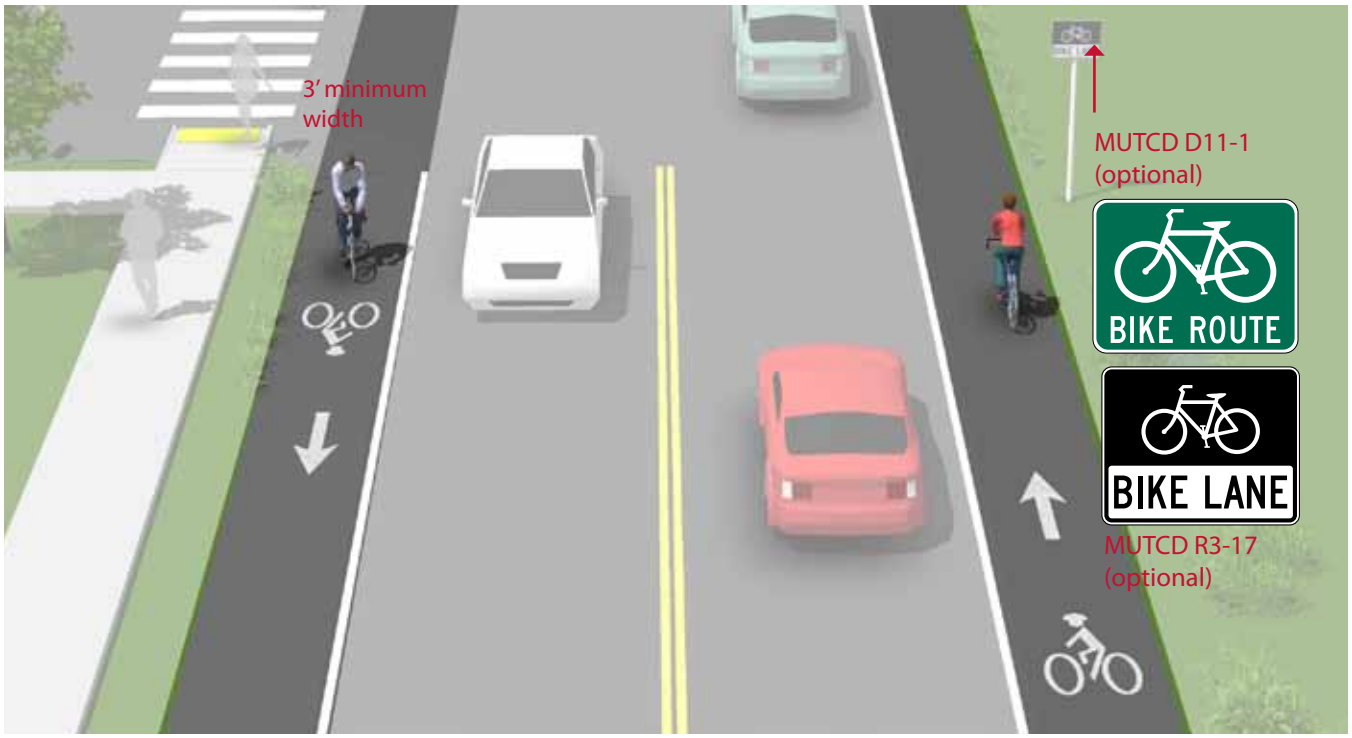
Shoulder Bikeways

Guidance

- If 4 feet or more is available for bicycle travel, the full bike lane treatment of signs, legends, and an 8" bike lane line would be provided.
- If it is not possible to meet minimum bicycle lane dimensions, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roadways. In these situations, a minimum of 3 feet of operating space should be provided.

Description

Typically found in less-dense areas, 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 planned for construction when the roadway is widened or completed with curb and gutter. This type of treatment is not typical in urban areas and should only be used where constraints exist.



Discussion

A wide outside lane may be sufficient accommodation for bicyclists on streets with insufficient width for bike lanes but with space available to provide a wider (14'-16') outside travel lane. Consider configuring as a **marked shared roadway** in these locations.

Where feasible, **roadway widening** should be performed with pavement resurfacing jobs, but not exceeding desirable bike lane widths.

Additional References and Guidelines

AASHTO. (1999). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual of Uniform Traffic Control Devices.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Shoulder bikeways should be cleared of snow through routine snow removal operations.

Local Application

Shoulder Bikeway

Local Details

Shoulder bikeway near Shelby - Note: shoulder not chip sealed

Shoulder bikeway with rumble strip

Rural highway shoulder bikeway

Additional Locations and Notes

If a rumble strip is present (such as on a state highway), it is recommended to include a skip (or gap) in the rumble strip to allow bicyclists to cross from the shoulder to the travel lane when encountering debris. This skip pattern is recommended to be 12 feet in length with intervals of 40 or 60 feet between skips.

Bicycle Facilities

Bicycle Lanes

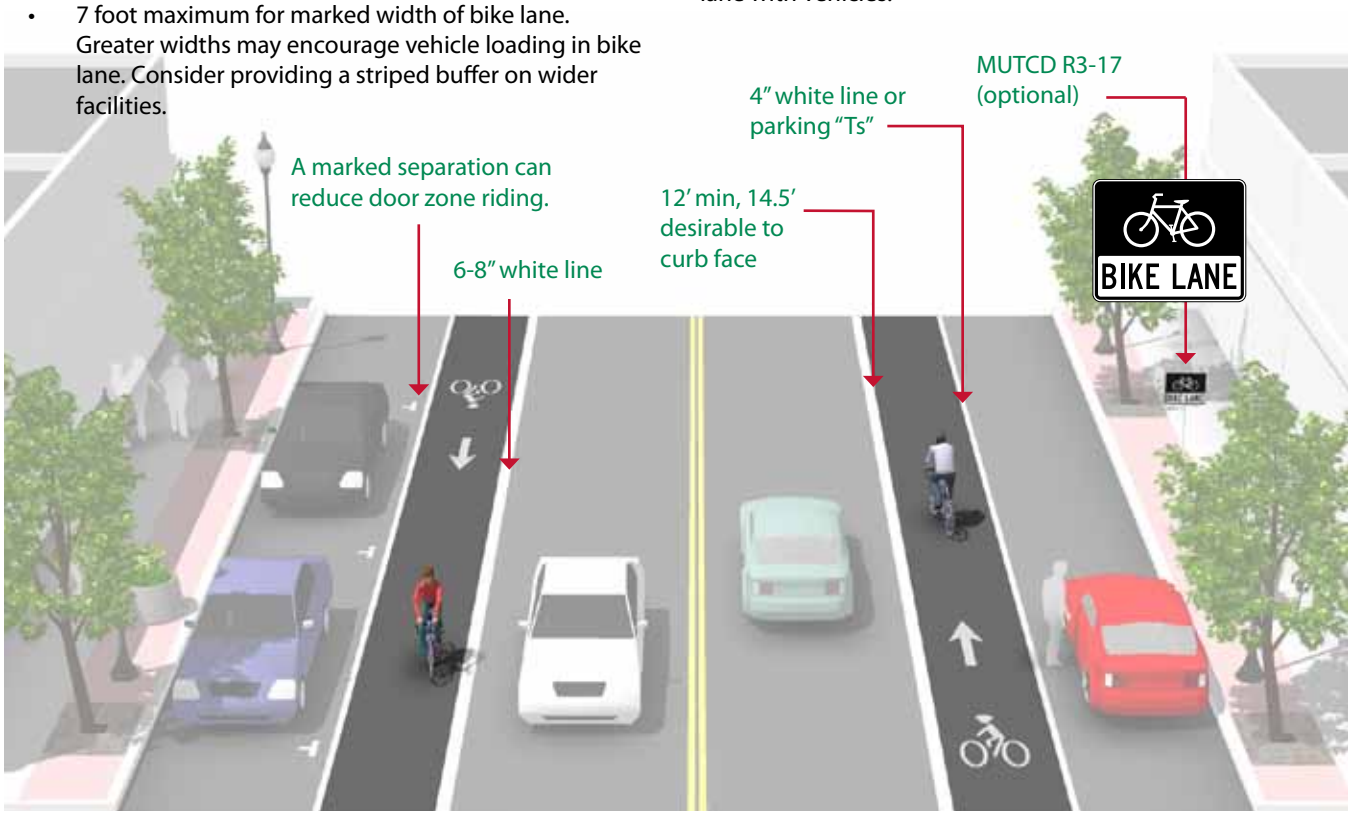
Guidance

- 4 foot minimum when no curb and gutter is present.
- 5 foot minimum when adjacent to curb and gutter or 3 feet more than the gutter pan width if the gutter pan is wider than 2 feet.
- 12 foot minimum from curb face to edge of bike lane.
- 14.5 foot preferred from curb face to edge of bike lane.
- 7 foot maximum for marked width of bike lane. Greater widths may encourage vehicle loading in bike lane. Consider providing a striped buffer on wider facilities.

Description

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is located adjacent to motor vehicle travel lanes and is used in the same direction as motor vehicle traffic. Bike lanes are typically on the right side of the street, between the adjacent travel lane and curb, road edge or parking lane.

Many bicyclists, particularly less experienced riders, are more comfortable riding on a busy street if it has a striped and signed bikeway than if they are expected to share a lane with vehicles.



Discussion

Bike lanes adjacent to on-street parallel parking require special treatment in order to avoid crashes caused by an open vehicle door. The bike lane should have sufficient width to allow bicyclists to stay out of the door zone while not encroaching into the adjacent vehicular lane. Parking stall markings, such as parking "Ts" and double white lines create a parking side buffer that encourages bicyclists to ride farther away from the door zone.

Additional References and Guidelines

AASHTO. (1999). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual of Uniform Traffic Control Devices.
NACTO. (2011). Urban Bikeway Design Guide.

Materials and Maintenance

Paint can wear more quickly in high traffic areas or in winter climates. Bicycle lanes should be cleared of snow through routine snow removal operations.

Local Application

Bicycle Lanes

Local Details

Bike lane in Bozeman adjacent to parallel parking

Bike lane in Shelby

Back-in angled parking provides increased visibility for bicyclists in Missoula

Additional Notes

In certain areas with high parking demand such as urban commercial areas, diagonal parking can be used to increase parking supply.

Back-in diagonal parking improves sight distances between drivers and bicyclists when compared to conventional head-in diagonal parking. Back-in diagonal parking provides other benefits to vehicles including: loading and unloading of the trunk at the curb rather than in the street, and passengers (including children) are directed by open doors towards the curb; there is also no door conflict with bicyclists. While there may be a learning curve for some drivers, using back-in diagonal parking is typically an easier maneuver than conventional parallel parking.

Left-side bike lanes are conventional bike lanes placed on the left side of one-way streets or two-way median divided streets. Left-side bike lanes offer advantages along streets with heavy delivery or transit use, frequent parking turnover on the right side, or other potential conflicts that could be associated with right-side bicycle lanes.

Bicycle Facilities

Shared Lane Markings

Guidance

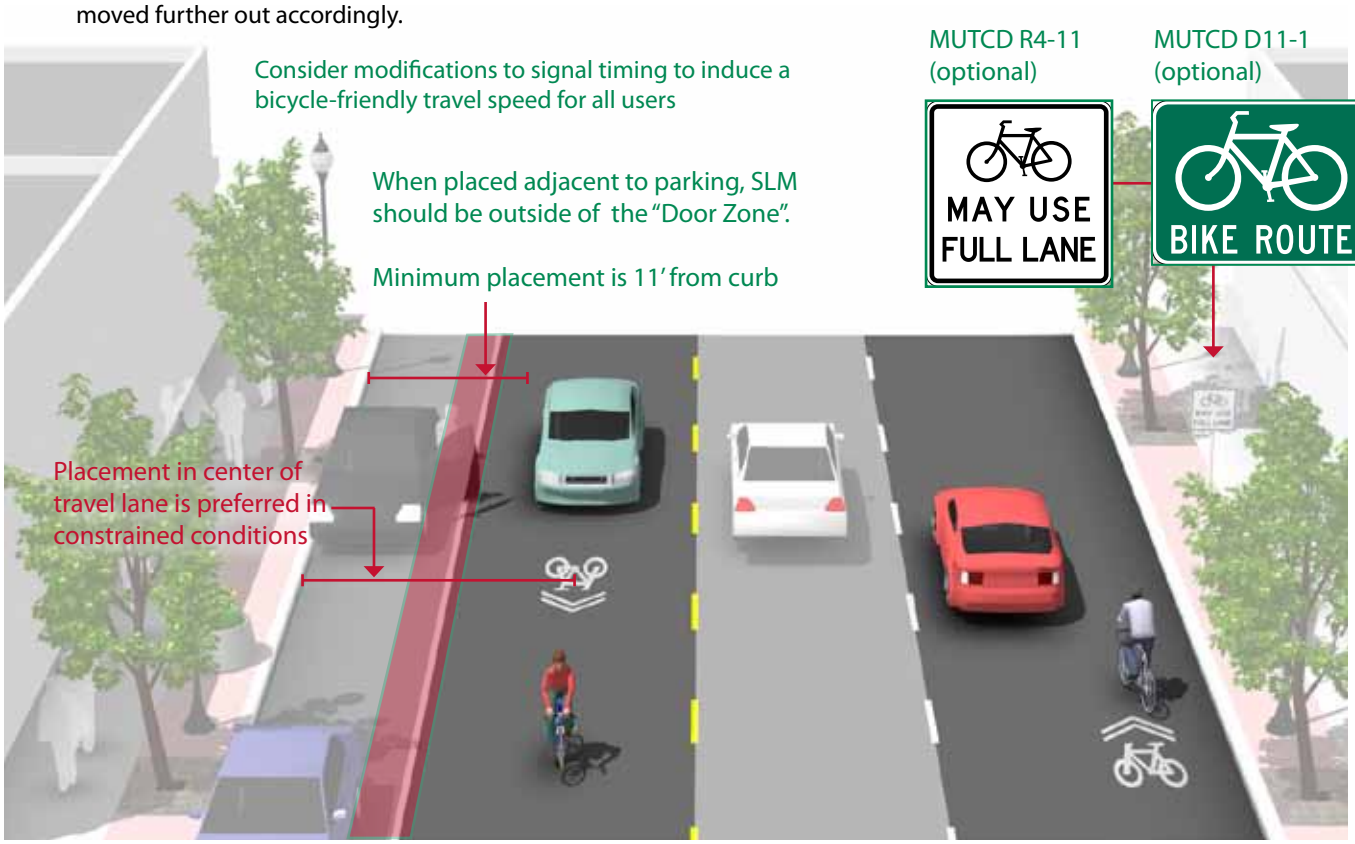
- In constrained conditions, preferred placement is in the center of the travel lane to minimize wear and promote single file travel.
- Minimum placement of SLM marking centerline is 11 feet from edge of curb where on-street parking is present, 4 feet from edge of curb with no parking. If parking lane is wider than 7.5 feet, the SLM should be moved further out accordingly.

Description

Shared lane markings (SLM) are used to encourage bicycle travel and proper positioning within the lane where a bicycle lane cannot be provided.

In constrained conditions, the SLMs are placed to discourage unsafe passing by motor vehicles. On a wide outside lane, the SLMs can be used to promote bicycle travel next to (to the right of) motor vehicles.

In all conditions, SLMs should be placed outside of the door zone of parked cars.



Discussion

Bike lanes should be considered on roadways with outside travel lanes wider than 15 feet, or where other lane narrowing or removal strategies may provide adequate road space. Shared Lane Markings shall not be used on shoulders, in designated **bicycle lanes**, or to designate **bicycle detection** at signalized intersections. (MUTCD 9C.07 03)

This configuration differs from a **neighborhood greenway** due to a lack of traffic calming, wayfinding, and other enhancements designed to provide a higher level of comfort for a broad spectrum of users.

Additional References and Guidelines

AASHTO. (1999). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual of Uniform Traffic Control Devices.
NACTO. (2011). Urban Bikeway Design Guide.

Materials and Maintenance

Placing the SLM markings between vehicle tire tracks will increase the life of the markings and minimize the long-term cost of the treatment.

Local Application

Shared Lane Markings

Local Details

Custom bicycle wayfinding signs in Bozeman

Mini traffic circle in Missoula

Shared lane marking in Missoula

Shared lane markings in Billings

Additional Notes

Bicycle boulevards are a special class of shared roadways designed to accommodate a broad spectrum of bicyclists. Also known as neighborhood greenways, bicycle boulevards are low-volume, low-speed streets that have been optimized for bicycle travel using treatments such as signage, shared lane markings, traffic calming and/or traffic reduction, and intersection modifications.

Bicycle Facilities

Shared Use Paths

Description

Shared use paths can provide a desirable facility, particularly for recreation, and users of all skill levels preferring separation from traffic. Bicycle paths should generally provide directional travel opportunities not provided by existing roadways.

Guidance

Width

- 8 feet is the minimum recommended by AASHTO for a two-way bicycle path and is only recommended for low traffic situations.
- 10 feet is recommended in most situations and will be adequate for moderate to heavy use.
- 12 feet is recommended for heavy use situations with high concentrations of multiple users. A separate track (5' minimum) can be provided for pedestrian use.

Lateral Clearance

- A 2 foot or greater shoulder on both sides of the path should be provided. An additional foot of lateral clearance (total of 3') is required by the MUTCD for the installation of signage or other furnishings.

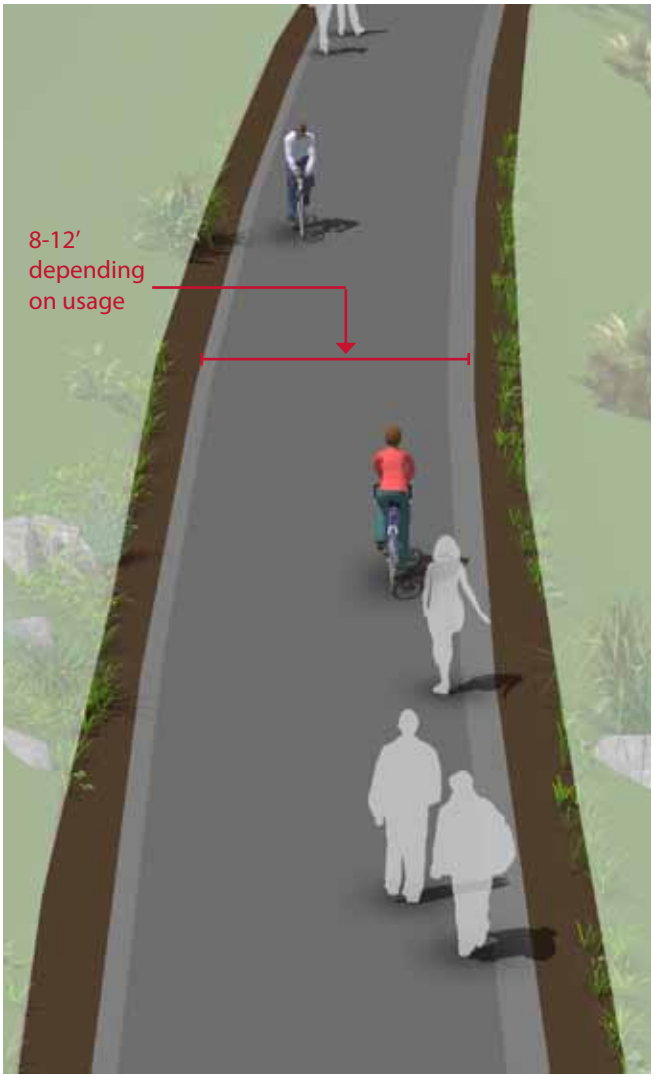
Overhead Clearance

- Clearance to overhead obstructions should be 8 feet minimum, with 10 feet recommended.

Striping

- When striping is required, use a 4 inch dashed yellow centerline stripe with 4 inch solid white edge lines.
- Solid centerlines can be provided on tight or blind corners, and on the approaches to roadway crossings.

Terminate the path where it is easily accessible to and from the street system, preferably at a controlled intersection or at the beginning of a dead-end street.



Discussion

The AASHTO Guide for the Development of Bicycle Facilities generally recommends against the development of **shared use paths along roadways**. Also known as "sidepaths," these facilities create a situation where a portion of the bicycle traffic rides against the normal flow of motor vehicle traffic and can result in wrong-way riding when either entering or exiting the path. Additional treatments such as warning signage and crossing markings should be added at commercial driveways and side streets to maximize visibility.

Additional References and Guidelines

AASHTO. (1999). Guide for the Development of Bicycle Facilities.
FHWA. (2009). Manual of Uniform Traffic Control Devices.
Flink, C. (1993). Greenways: A Guide To Planning Design And Development.

Materials and Maintenance

Asphalt is the most common surface for bicycle paths. The use of concrete for paths has proven to be more durable over the long term. Saw cut concrete joints rather than troweled improve the experience of path users.

Local Application

Shared Use Paths

Local Details

Shared-use path in Sidney

Shared-use path in Lewistown

Shared-use path in Three Forks

Small & Rural Communities

Shared-use paths can be expensive propositions for many small communities. AASHTO recommends 8 feet as being the minimum acceptable width for bicycle use. In some cases reducing this minimum to 6 feet may be advisable to control costs and make an otherwise infeasible project possible. Pavement thickness and subgrade depth should not be compramised to control costs as deficiencies can result in a facility that degrades and becomes unusable within a matter of years.

Design Needs of Transit Users

Types of Transit

All of Montana's larger communities, most medium-sized communities and many small communities have some form of transit, totaling over 30 transit systems statewide. Montana communities tend to be creative about meeting the transportation needs of their residents. Services like North Central Montana Transit and the Fort Peck Transportation System run a mix of services that are part fixed route, deviated route, commuter service, non-emergency medical transportation, and intercity service. In different communities transit options include various combinations of the following services:

Fixed Route Systems – Montana's seven largest communities as well as Big Sky and Glacier National Park have fixed route or deviated route transit system. Fixed route systems have buses operating on a fixed schedule with designated stops that have varying amounts of infrastructure. These systems generally include a centralized transfer station building that serves as a hub. They operate on weekdays and in some cases on weekends. Most fixed routes buses in Montana communities can accommodate bicycles and wheelchairs.

Deviated Fixed Route Systems – These services have buses operating along fixed routes at generally fixed times, but buses may deviate from the route alignment to collect or drop off passengers who have requested the deviation by a phone call to the transit operator.

Demand Response Service – Local governments and/or social service organizations often operate dail-a-ride services that offer door-to-door transportation for individuals with disabilities and seniors. These services range from non-emergency medical transportation to services providing access to a wide range of destinations. In smaller communities without fixed routes, demand response services tend to be open to the general public. In some communities these services may be the only form of transit, while in many others they are coordinated to varying degrees with other transit services. It is important to note that many individuals who use demand-response services are fully capable of using pedestrian facilities if they exist. For example, individuals with motorized wheelchairs can enjoy great independence if they have access to good pedestrian facilities that connect them to bus stops and other destinations. Demand-response services are expensive to operate and demand for these services will increase anywhere that seniors and disabled individuals are trapped in their homes by a lack of pedestrian facilities.

School Buses – All Montana communities have school buses and providing safe bicycle/pedestrian access to school bus stops is an important goal for Complete Street design and infrastructure.

Commuter Service – A number of commuter services operate in Montana providing transportation from smaller communities to larger communities for access to jobs, social services, shopping and other needs.

Intercity Transit – Greyhound, Rimrock Trailways and several other private operators provide bus service linking Montana communities to each other, and to the network of intercity bus service providing access to destinations throughout the nation and the continent. In larger communities, intercity buses sometimes stop at transit hubs shared with the local transit system. Intercity busses also stop at many small communities that lie along their routes. Most communities on I-90, I-94, I-15 and US 93 have intercity bus stations. Stations are typically located near the highway and/or in the downtown. In smaller communities the intercity bus stop can be co-located with a local business. Many of these small communities have little other transit service.

Car Pools & Van Pools – In communities of any size, car pools and van pools can be important transportation options for residents. Providing designated park-and-ride areas can be essential for making this option viable. Providing safe bicycle/pedestrian access to park-and-ride areas is an important goal for Complete Street design and infrastructure.

Transit Facilities

Transit services provide significant benefits for both rural and urban residents. Especially for low income individuals, students, seniors, and persons with disabilities, transit services often provide opportunities that would otherwise not exist. These opportunities include access to jobs, education and medical care. Transit facilitates 'aging in place' and independent living for seniors and people with disabilities, decreasing societal costs of more expensive living and health care options by providing access to health care, social services, and shopping. Transit can play an important role in allowing residents to continue living in rural communities and in strengthening rural economies. Additionally, it can help sustain and enhance our region's recreation and tourism economy while reducing its environmental footprint. Transit services are an essential element of multi-modal transportation networks that provide significant healthy living and environmental benefits to air quality, energy use, carbon emissions, view sheds, water quality and wildlife corridors. At the community level and beyond, a well-designed, well integrated system that includes transit, bicycle and pedestrian facilities can greatly improve quality of life, increase property values, and attract new businesses and investments.

More than 30 transit systems operate in Montana, but no Montana city provides the level and frequency of service found in major metropolitan areas. Providing facilities as part of a Complete Streets initiative for transit operations should be planned with the same level of importance as biking and walking facilities in communities with fixed-route transit service. Transit service in smaller communities typically consists of a small number of routes centered around the major commercial corridors. Pedestrian and bicycle infrastructure are important components of a successful and efficient transit network as many transit users walk or bike to bus stop locations. Therefore, many of the same principles for pedestrian and bicycle infrastructure and facilities will also be discussed here.


Stop Location Types


Stop Amenities


Bicycle Access to Transit


Pedestrian Access to Transit

This section includes:

- Stop Location Types
- Stop Amenities
- Bicycle Access to Transit
- Pedestrian Access to Transit

Transit Facilities

Stop Location Types

Description

Illustrations and discussion of different bus stop designs and location options.

Guidance

Curbside Stop (near-side, far-side, or mid-block)
Provides easy access for bus drivers, and minimal delay. Can cause traffic backup behind the bus, and may encourage unsafe passing by motorists. Easy to install and relocate. Requires a 'no parking zone.'

Nub, or 'Bus Bulb'
Provides easy access for bus drivers, and minimal delay. Can cause traffic backup behind the bus, and may encourage unsafe passing by motorists. Reduces pedestrian crossing distance and provides additional sidewalk area at the stop. Requires adequate road space to install.

Bus Bay (with acceleration and/or deceleration lane)
Minimizes delay to passing traffic. Bus drivers may have difficulty reentering the traffic stream when heavy. Often used on higher speed streets. Requires adequate right of way so that pedestrian area is not sub standard.

Open Bus Bay
Similar to bus bay, but allows bus to decelarate as it moves through the intersection. Requires adequate right of way so that pedestrian area is not sub standard.

Queue Jumper Bus Bay
Similar advantages to bus bay and open bus bay, but allows bus to bypass traffic queues at a signalized intersection. May cause delays to right-turning vehicles. Requires adequate right of way so that pedestrian area is not sub standard.

Discussion

For most Montana communities, opportunities to reconfigure streets are very rare, so choices are generally limited to curbside stops on the near side or far side of an intersection or mid-block. Decisions should be made on a case by case basis.

Additional References and Guidelines

TCRP Report 19: Guidelines for the Location and Design of Bus Stops, FTA Transit Cooperative Research Program. http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_19-a.pdf

Materials and Maintenance

Varies by jurisdiction.

Local Application

Stop Location Types

Local Details

Bus bulb in Butte

Bus bay on Kagy Blvd in Bozeman

Tranfer station using bus bays in Billings

Curbside bus stop in Missoula (source: Missoulian)

Additional Notes

When there is new development or road improvements on a street with no parking lane, there may be opportunities for a bus bay.

Operational factors include, traffic volume, traffic speed, bus frequency, bus passenger volumes, traffic signals or stop signs. Additionally, geometric considerations such as turn lanes, street right-of-way and sidewalk width, space for installing a bench or shelter, lighting, affect on adjacent businesses or land owners, and the presence of on-street vehicle parking. Finally, factors such as how a stopped bus will affect the sight distance for pedestrians using crosswalks and the sight distance for parallel traffic and cross traffic, and how the bus will affect the traffic stream as it enters or leaves a stop can all be legitimate considerations.

Transit

Stop Amenities

Guidance

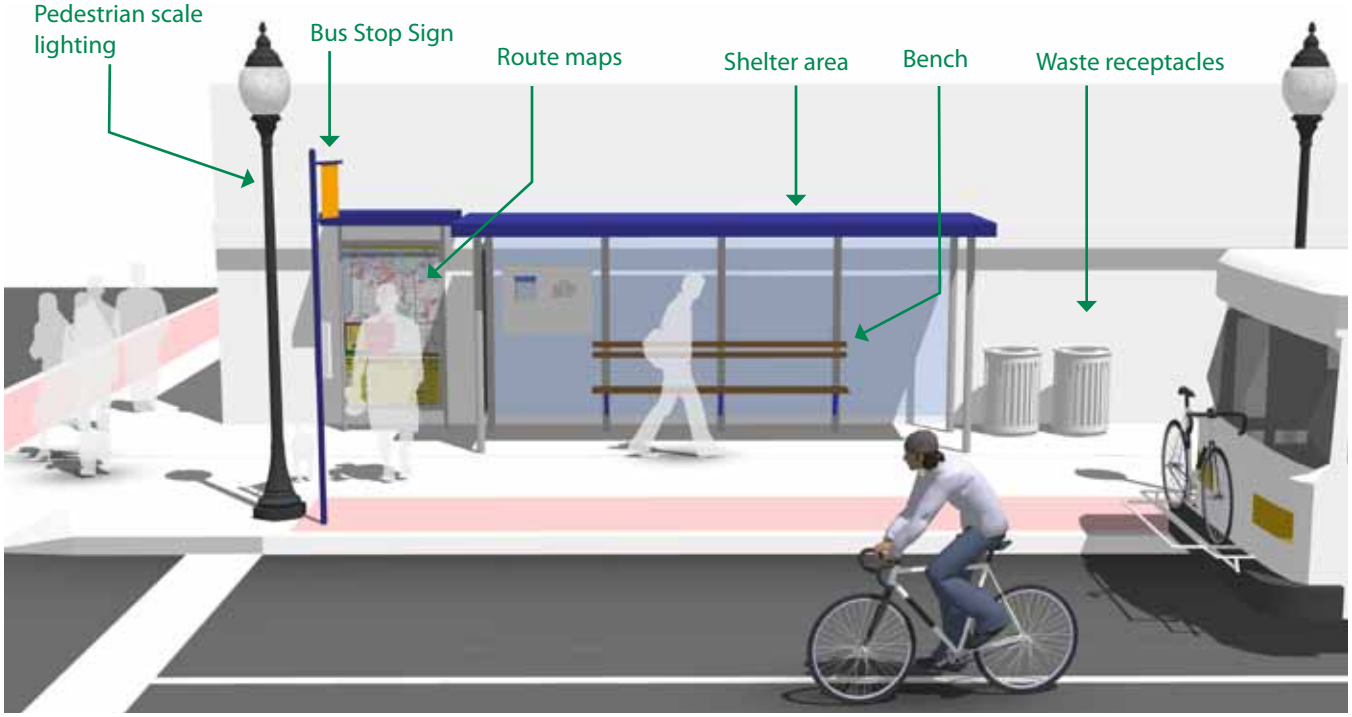
Signs at bus stops are an important element of good transit service. Signs serve as a source of information to patrons and operators regarding the location of the bus stop and are excellent marketing tools to promote transit use.

Benches provide comfort and convenience at bus stops and are usually installed on the basis of existing or projected ridership figures. A bench may be installed by itself or as part of a shelter.

Shelters provide protection from the elements and seating for patrons waiting for rides. An attractive, well designed shelter can also be a positive addition to a streetscape that contributes to a sense of place. It also provides an excellent opportunity to improve the visibility of the transit service and to provide maps and other informational signage to help people use the service.

Lighting is important for safety and security of transit patrons. A brightly lit bus stop makes it easier for the bus driver to observe waiting passengers and allows motorists to see pedestrians moving to and from the bus stop.

Waste receptacles can be provided at higher use transit stops to reduce unwanted items being brought on the transit vehicle.



Discussion

Signs and/or pavement markings identifying a bus stop and restricting parking are the bare minimum bus stop infrastructure. The Manual of Uniform Traffic Control Devices (MUTCD) (maintained by the Federal Highway Administration) includes general specifications for no parking signs at bus stops and curb markings to indicate parking restrictions, as well as guidelines for the placement of the signs. Ideally traffic regulations should be established prohibiting parking, standing, or stopping at bus stops. An allowance for passenger vehicles to stop to load or unload passengers in the bus stops may be included.

Additional References and Guidelines

FHWA. (2006). Federal Highway Administration University Course on Bicycle and Pedestrian Transportation. Lesson 18: Bicycle and Pedestrian Connections to Transit

Materials and Maintenance

Varies by jurisdiction.

Local Application

Stop Amenities

Local Details

Benches and waste receptacles as part of a bus stop in Bozeman

Custom transit shelter in Bozeman

Well lit transit stop with all amenities in Butte

Bus stop with sign and shelter in Missoula (source: Montana Kaimin)

Additional Notes

Standardized Shelters – A variety of standardized shelters can be purchased from different manufacturers. Standardized shelters can help minimize maintenance costs and provide consistent branding for a transit service. If paired with advertising, some vendors will supply the shelters free of charge to the city.

Custom Shelters – Neighborhoods, developers or representatives of historic downtown areas may request custom shelters that are more in keeping with the architectural character of an area. Funding for construction and maintenance of custom shelters is generally shared or entirely the responsibility of the party that requests the shelter. Custom shelters can take longer to implement and be more expensive than standardized shelters.

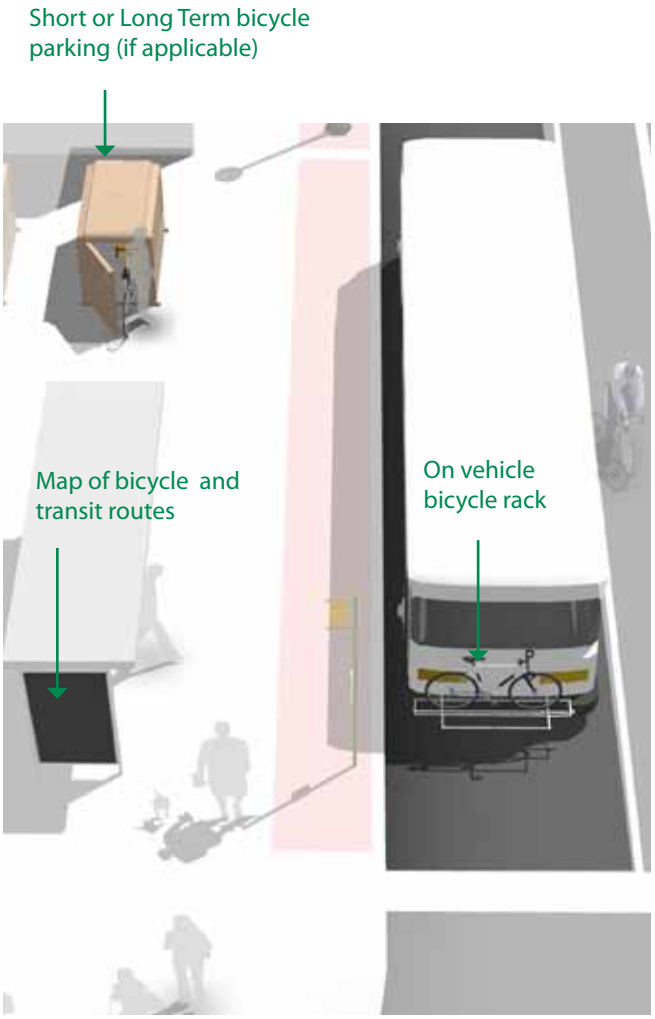
Transit Facilities

Bicycle Access to Transit

Description

Safe and easy access transit stations and secure bicycle parking facilities are necessary to encourage commuters to access transit via bicycle. Bicycling to transit reduces the need to provide expensive and space consuming car parking spaces.

Many people who ride to a transit stop will want to bring their bicycle with them on the transit portion of their trip, so buses and other transit vehicles should be equipped accordingly.



Guidance

Access

- Provide direct and convenient access to transit stations and stops from the bicycle and pedestrian networks.
- Provide maps at major stops and stations showing nearby bicycle routes.
- Provide wayfinding signage and pavement markings from the bicycle network to transit stations.
- Ensure that connecting bikeways offer proper **bicycle actuation and detection**.

Bicycle Parking

- Provide well lit and visible routes from bicycle parking locations to station/stop platforms.
- Provide signage that notes the location of bicycle parking, rules for use, and instructions as needed.
- Provide safe and secure long term parking such as **bicycle lockers** at transit hubs. Parking should be easy to use and well maintained.

Discussion

Providing bicycle routes to transit helps combine the long-distance coverage of bus travel with the door-to-door service of bicycle riding. Transit use can overcome large obstacles to bicycling, including distance, hills, riding on busy streets, night riding, inclement weather, and breakdowns. High-visibility crosswalks and mid-block crossings are often appropriate treatments to provide safer bicycle and pedestrian access to bus stops, particularly at high-usage transit stops. If a bus stop is located mid-block, adequate crossing treatments should be provided, based on the level of traffic on the roadway. All transit riders will need to cross the street to access or leave the bus stop.

Additional References and Guidelines

APBP. (2010). Bicycle Parking Guide 2nd Edition.
FHWA. (2006). Federal Highway Administration University Course on Bicycle and Pedestrian Transportation. Lesson 18: Bicycle and Pedestrian Connections to Transit

Materials and Maintenance

Regularly inspect the functioning of long-term parking moving parts and enclosures. Change keys and access codes periodically to prevent access to unapproved users.

Local Application

Bicycle Access to Transit

Local Details

3 position bike rack on Bozeman's Streamline Bus

Transit station with bicycle parking and good snow removal in Butte

A bicycle being loaded on a Billings MET bus

Short term bike rack at bus stop in Missoula

Additional Notes

Route maps promote the use of transit, trails, a community's non-motorized transportation network and its connectivity to important community attractions/destinations. Route maps should be available online, in print form, and in a larger scale at transit stops/trailheads.

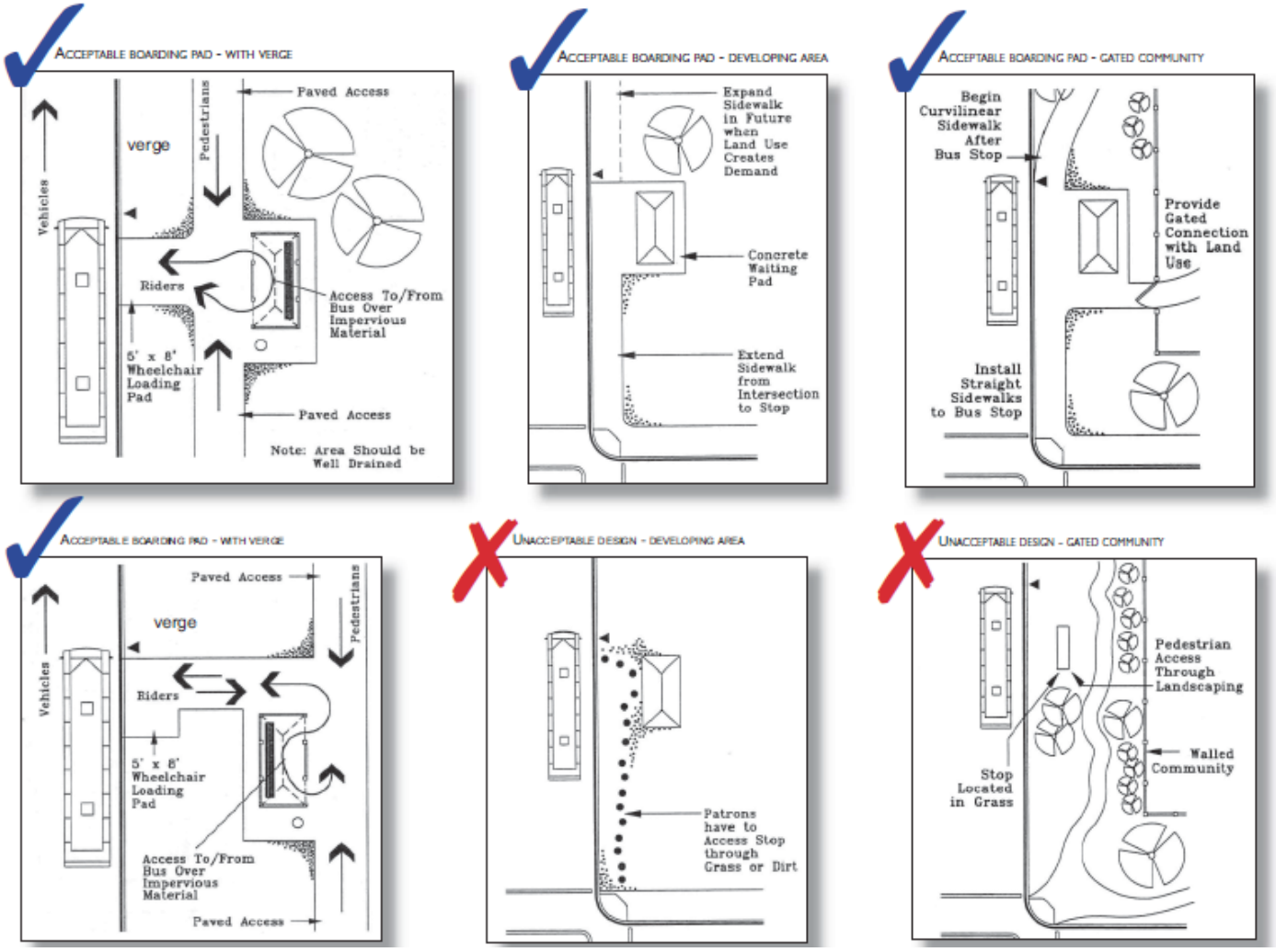
Transit

Pedestrian Access to Transit

Description

Maintain pedestrian circulation and coordinate with existing landscaping. Americans with Disabilities Act (ADA) requirements must be followed around the shelter and between the shelter and other street furniture.

Guidance



TCRP Report 19 Guidelines for the Location and Design of Bus Stops

Discussion

Bus stops should be designed such that pedestrians in wheelchairs can access the bus shelter and board the bus. At transit stops where neither a bus turnout nor bus bulb-out can be accommodated, buses may sometimes be unable to pull directly adjacent to the curb to deploy a lift. Curb ramps in such locations allow wheelchair users to board the bus from the street; if a bus stop is not adjacent to a corner curb ramp, a curb ramp at the bus stop should be provided.

Additional References and Guidelines

TCRP Report 19: Guidelines for the Location and Design of Bus Stops, FTA Transit Cooperative Research Program. http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_19-a.pdf

Materials and Maintenance

Varies by jurisdiction.

Local Application

Pedestrian Access to Transit

Local Details

Transit stop with good pedestrian/disabled access

Transit stop cut off from pedestrian access

This transit shelter in Butte is not connected to any pedestrian infrastructure

In Missoula, this sidewalk acts as a manuvering space for disabled users

Additional Notes

Landing Pads

A paved landing pad is an important feature, especially for disabled and elderly riders. Typical dimensions are 5-feet by 8-feet. A grass boulevard between the curb and sidewalk may appear attractive when a bus stop is first established, but it is a barrier to wheelchairs and will quickly become a hazard to all riders as the grass is worn away and the surface turns to mud in wet weather. With Montana's long winters a landing pad is particularly important because it allows snow and ice to be cleared. In spite of these benefits, landing pads are often missing at rural and medium density bus stops in Montana.

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Complete Street Roadways

Most major streets are characterized by conditions (e.g., high vehicle speeds and/or volumes) for which dedicated bike lanes are the most appropriate facility to accommodate safe and comfortable riding. Although opportunities to add bike lanes through roadway widening may exist in some locations, many major streets have physical and other constraints that would require street retrofit measures within existing curb-to-curb widths. As a result, much of the guidance provided in this section focuses on effectively reallocating existing street width through striping modifications to accommodate dedicated bike lanes.

Although largely intended for major streets, these measures may be appropriate for any roadway where bike lanes would be the best accommodation for bicyclists.

This section also addresses the issue of vehicle speeds and relationship to pedestrian and bicyclist comfort, as well as keeping facilities functional during the winter months.

This section includes:

- Roadway Widening
- Lane Narrowing
- Lane Reconfiguration
- Parking Reduction
- Vehicle Speeds
- Winter Considerations

Complete Street Roadways

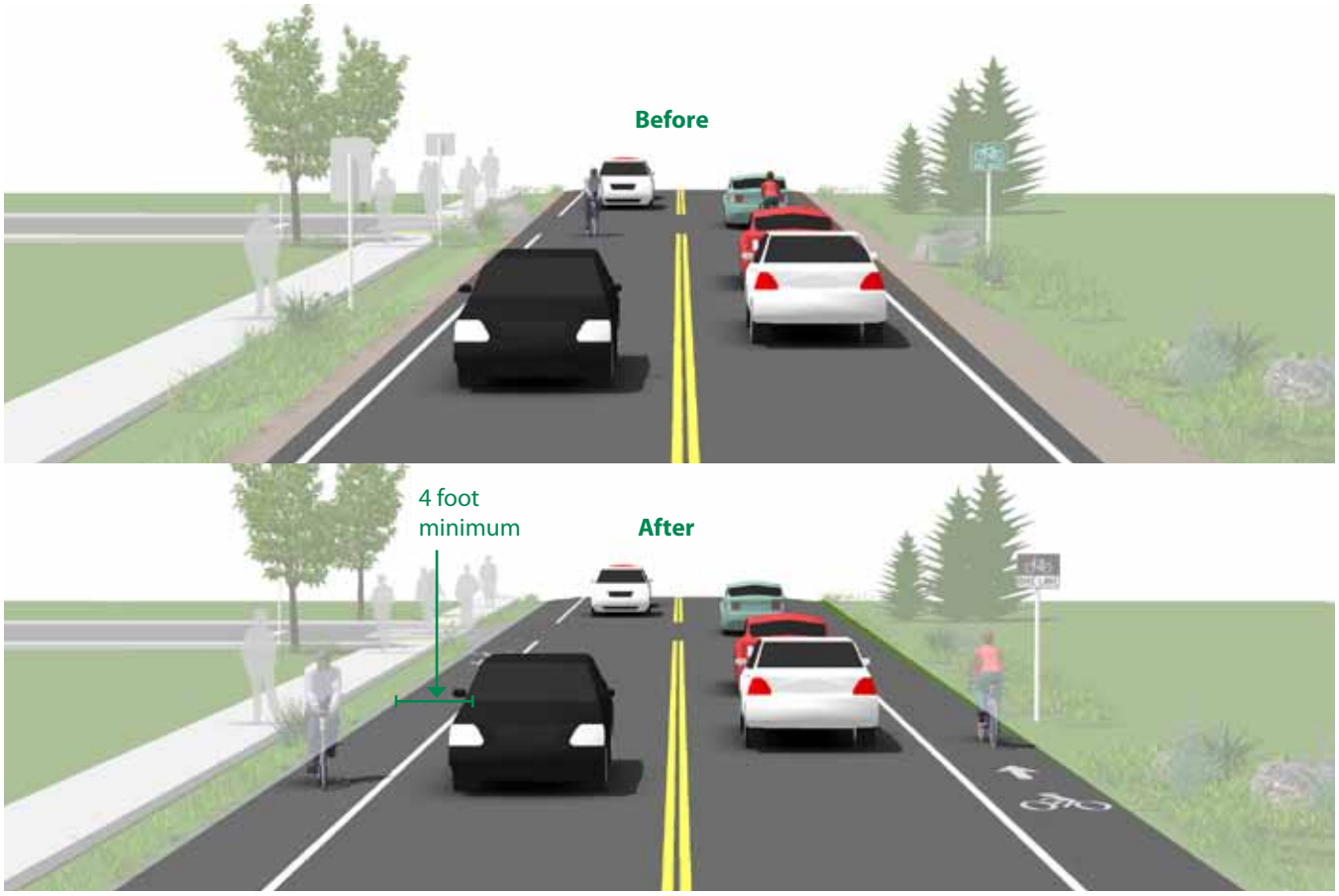
Roadway Widening

Guidance

- Guidance on **bicycle lanes** applies to this treatment.
- 4 foot minimum width when no curb and gutter is present.
- 6 foot width preferred.

Description

Bike lanes, or a shoulder bikeway can be accommodated on streets with excess right-of-way through shoulder widening. Although roadway widening incurs higher expenses compared with re-striping projects, bike lanes can be added to streets currently lacking curbs, gutters and sidewalks without the high costs of major infrastructure reconstruction.



Discussion

Roadway widening is most appropriate on roads lacking curbs, gutters and sidewalks.

If it is not possible to meet minimum bicycle lane dimensions, a reduced width paved shoulder can still improve conditions for bicyclists on constrained roadways. In these situations, a minimum of 3 feet of operating space should be provided. If a rumble strip is to be installed as part of the project, a minimum of 4 feet of shoulder should be present outside of the rumble strip.

Additional References and Guidelines

AASHTO. (1999). Guide for the Development of Bicycle Facilities.

Materials and Maintenance

The extended bicycle area should not contain any rough joints where bicyclists ride. Saw or grind a clean cut at the edge of the travel lane, or feather with a fine mix in a non-ridable area of the roadway.

Local Application

Roadway Widening

Local Details

Rural highway with no shoulder

Rural highway with shoulder

This rumble strip renders bicycle travel impossible

Well designed rumble strip

Additional Notes

Roadway shoulders have many benefits beyond those to bicycling including:

SAFETY:

- Room to avoid crashes
- A place to pull over
- Room for pedestrians

CAPACITY:

- Greater effective turning radii
- Slower vehicles can pull over

MAINTENANCE:

- Better drainage
- Structural support to pavement

Complete Street Roadways

Lane Narrowing

Guidance

Vehicle lane width:

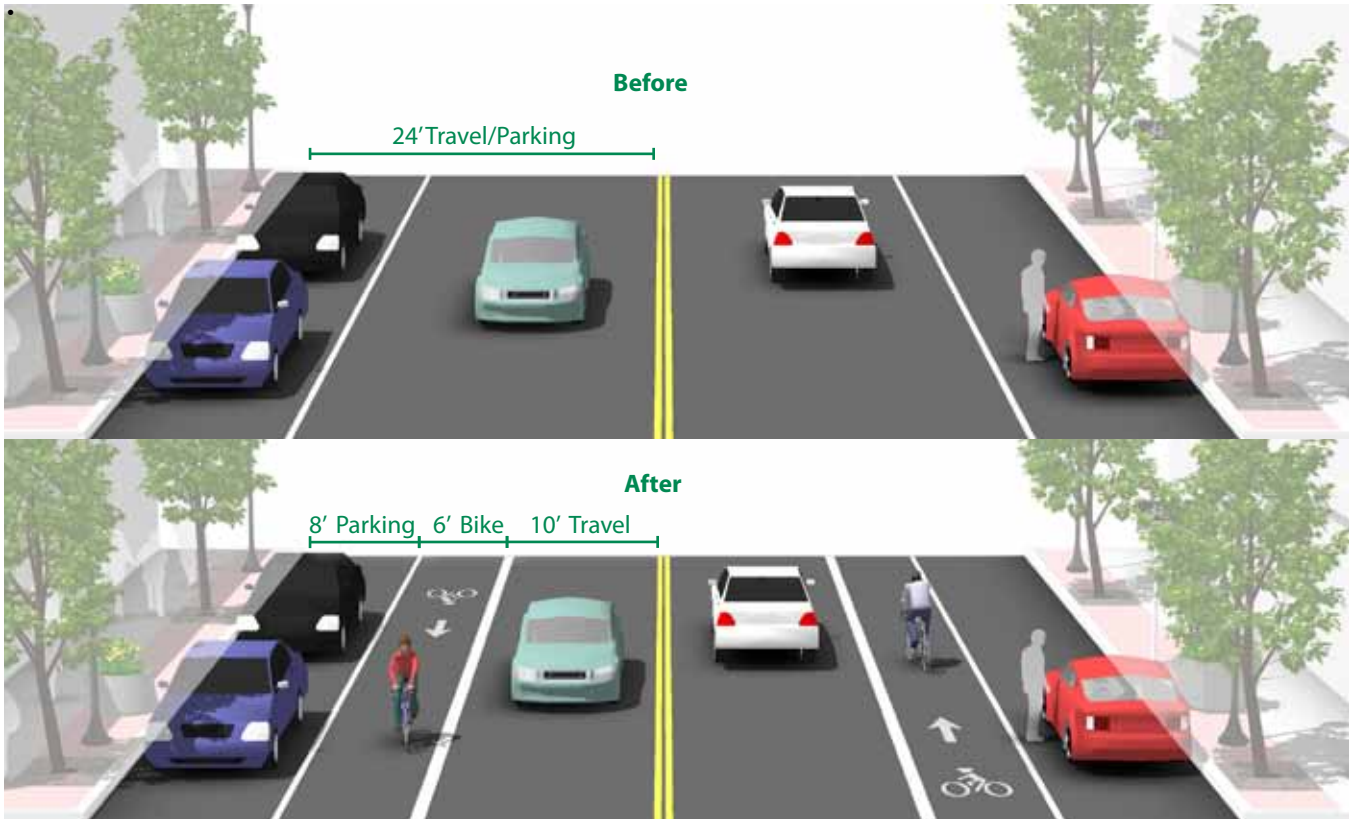
- Before: 10-15 feet
- After: 10-11 feet

Bicycle lane width:

- Guidance on **Bicycle Lanes** applies to this treatment.

Description

Lane narrowing utilizes roadway space that exceeds minimum standards to provide the needed space for bike lanes. Many roadways have existing travel lanes that are wider than those prescribed in local and national roadway design standards, or which are not marked. Most standards allow for the use of 11 foot and sometimes 10 foot wide travel lanes to create space for bike lanes.



Discussion

Special consideration should be given to the amount of heavy vehicle traffic and horizontal curvature before the decision is made to narrow travel lanes. Center turn lanes and parking lanes can also be narrowed in some situations to free up pavement space for bike lanes.

AASHTO supports reduced width lanes in *A Policy on Geometric Design of Highways and Streets: "On interrupted-flow operation conditions at low speeds (45 mph or less), narrow lane widths are normally adequate and have some advantages."*

Additional References and Guidelines

AASHTO. (2004). A Policy on Geometric Design of Highways and Streets.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

Local Application

Lane Narrowing

Local Details

Main Street in Scobey could accomodate a bike lane

This street in Butte could accommodate a bike lane

This arterial has sufficient curb-to-curb and overall right-of-way to accomodate bike lanes and sidewalks

Additional Notes

The 2010 Highway Capacity Manual lists saturation flow rates as being the same for10-foot and 12-foot lanes. This means that there is no capacity basis for not allowing the use of 10 foot travel lanes.

Complete Street Roadways

Lane Reconfiguration

Guidance

Vehicle lane width:

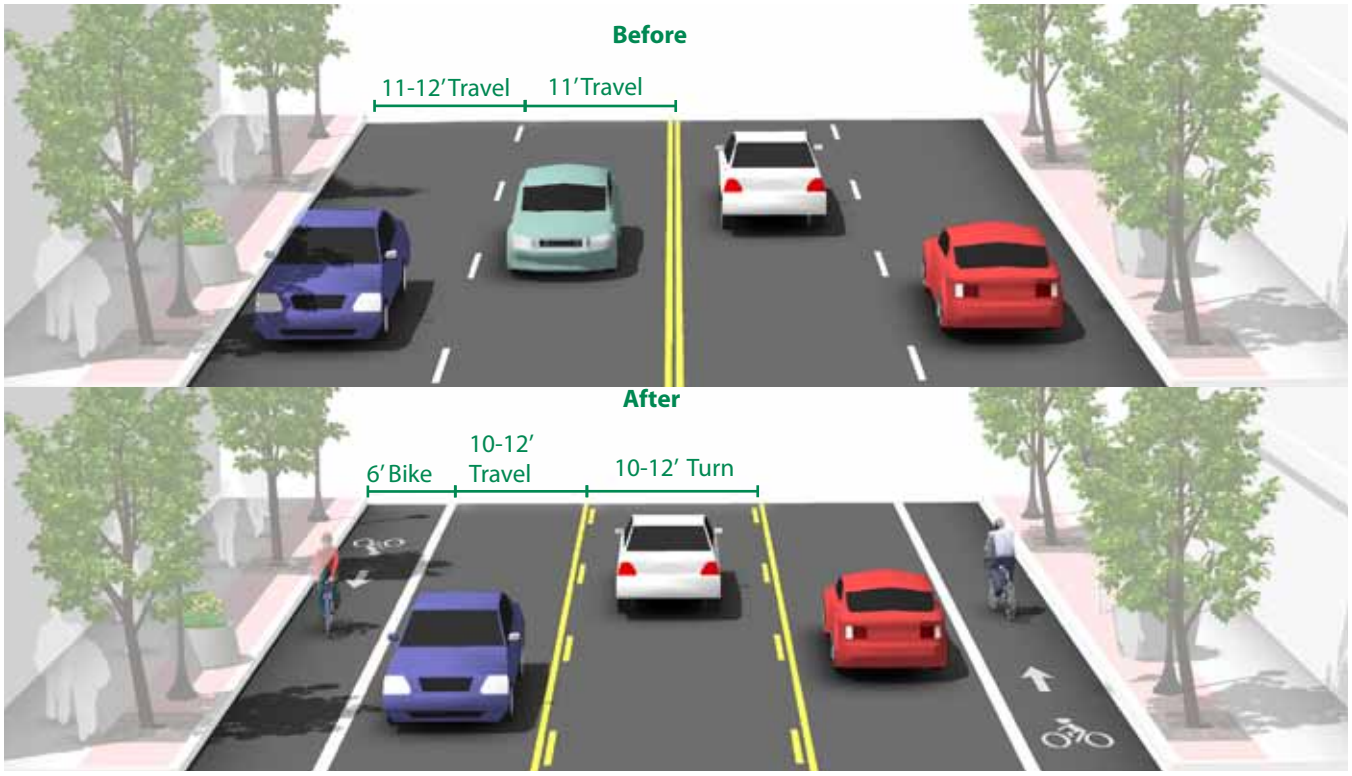
- Width depends on project. No narrowing may be needed if a lane is removed.

Bicycle lane width:

- Guidance on **Bicycle Lanes** applies to this treatment.

Description

The removal of a single travel lane will generally provide sufficient space for bike lanes on both sides of a street. Streets with excess vehicle capacity provide opportunities for bike lane retrofit projects.



Discussion

Depending on a street's existing configuration, traffic operations, user needs and safety concerns, various lane reduction configurations may apply. For instance, a four-lane street (with two travel lanes in each direction) could be modified to provide one travel lane in each direction, a center turn lane, and bike lanes. Prior to implementing this measure, a traffic analysis should identify potential impacts. By providing a center turn lane safety benefits can be realized as backups will no longer occur in the inside travel lane caused by left turning vehicles.

Additional References and Guidelines

FHWA. (2010). Evaluation of Lane Reduction "Road Diet" Measures on Crashes. Publication Number: FHWA-HRT-10-053.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

Local Application

Lane Reconfiguration

Local Details

Higgins Avenue in Missoula - After (3-lane with cycle track 2010)

Broadway Street in Missoula - After (3-lane with bike lane 2009)

Higgins Avenue in Missoula - Before (4-lane)

Broadway Street in Missoula - Before

Additional Notes

Missoula and Billings have completed successful 4 to 3 lane reconfigurations (road diets). Such conversions can handle upwards of 14,000 vehicles per day.

Road diets have increased traffic efficiency in cities across the nation by providing a dedicated turn lane. This results in fewer rear-end collisions and weaving collisions caused by vehicles stopped in a travel lane. Crash frequency has reduced between 30 and 60 percent across many road diet conversions nationwide.

Complete Street Roadways

Parking Reduction

Guidance

Vehicle lane width:

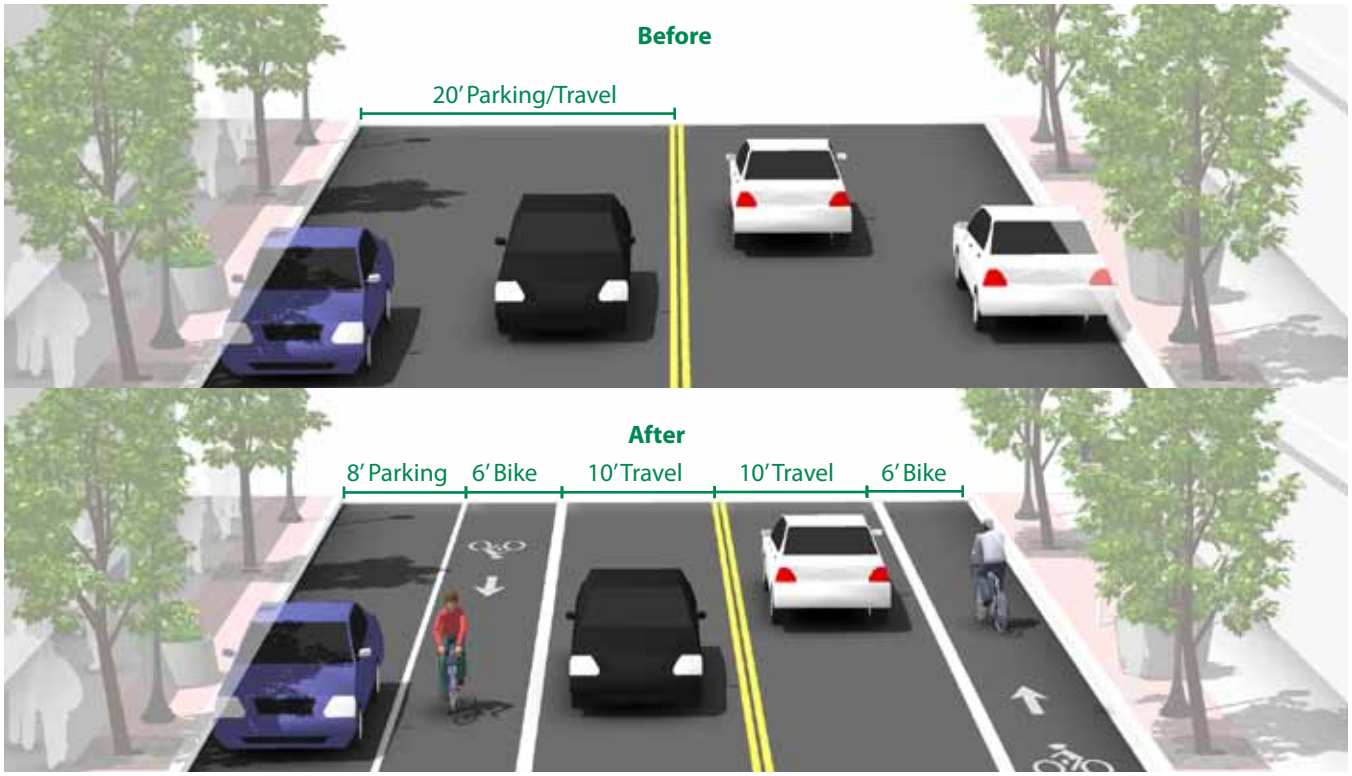
- Parking lane width depends on project. No travel lane narrowing may be required depending on the width of the parking lanes.

Bicycle lane width:

- Guidance on **Bicycle Lanes** applies to this treatment.

Description

Bike lanes can replace one or more on-street parking lanes on streets where excess parking exists and/or the importance of bike lanes outweighs parking needs. For example, parking may be needed on only one side of a street. Eliminating or reducing on-street parking also improves sight distance for bicyclists in bike lanes and for motorists on approaching side streets and driveways.



Discussion

Removing or reducing on-street parking to install bike lanes requires comprehensive outreach to the affected businesses and residents. Prior to reallocating on-street parking for other uses, a parking study should be performed to gauge demand and to evaluate impacts to people with disabilities.

Additional References and Guidelines

AASHTO. (2004). A Policy on Geometric Design of Highways and Streets.

There is no currently adopted Federal or State guidance for this treatment.

Materials and Maintenance

Repair rough or uneven pavement surface. Use bicycle compatible drainage grates. Raise or lower existing grates and utility covers so they are flush with the pavement.

Local Application

Parking Reduction

Local Details

Parking remains on one side of the street

The old centerline is still partially visible

Parking removal for bike lane on Peach Street in Bozeman

Additional Notes

Bozeman's Peach Street was given a bike lane through parking reduction in 2011. This section of roadway extends an existing bike lane from Durston Road to Rouse Avenue. City Engineering determined existing parking demand was light and would result in minimal inconvienence for adjacent residents. The residents, a school, and the adjacent businesses were consulted in the design.

Complete Street Roadways

Vehicle Speeds

Guidance

- Adopt street speed standards that do not isolate bicyclists and pedestrians, and promote safe travel around areas with strong concentrations of bicyclists, pedestrians, and transit users.

Description

Cities and towns should implement standards that better regulate vehicle speeds to provide a safer environment for bicyclists and pedestrians, and reduce congestion by creating a more uniform traffic flow. In downtown or commercial areas, posted speed limits should not be greater than 35 mph and are recommended to be 25 mph. The design speeds of these roadways should be only 5 mph higher than the posted limit. Many roadways have posted speed limits much lower than the intentional or unintentional design speed. The tendency of greater vehicle speed along these corridors results from excessively wide lanes and overall roadway widths, and lack of facilities and amenities that can serve as traffic calming measures. Narrowing lane widths, landscaping, and altering curb lines (such as bulb-outs at intersections) can all help achieve lower vehicle speeds along corridors.

High traffic speeds require greater separation for comfort

Moderate traffic speeds help pedestrians, bicyclist, and other road users feel comfortable on and near the road.

Discussion

From the Complete Streets Coalition:

"Speed reduction has a dramatic impact on pedestrian fatalities. Eighty percent of pedestrians struck by a car going 40 mph will die; at 30 mph the likelihood of death is 40 percent. At 20 mph, the fatality rate drops to just 5 percent. Roadway design and engineering approaches commonly found in complete streets create long-lasting speed reduction. Such methods include enlarging sidewalks, installing medians, and adding bike lanes. All road users - motorists, pedestrians and bicyclists - benefit from slower speeds."

Complete Street Roadways

Winter Considerations

Guidance

- Major pedestrian thoroughfares and bike routes should be identified in the transportation plan and prioritized for snow removal.
- Bike lanes and roadway shoulders can offer additional snow storage capacity following a large snow event. Snow plow operators should always attempt to clear roadways from curb to curb barring prohibitive accumulations.
- If roadway snow removal operations obstruct publicly maintained sidewalks the sidewalks should be cleared following roadway clearing operations.
- Arterial and collector streets are the first priority. Once snow removal is completed on these streets staff is assigned to plow snow from the trails accompanying the roadways.

Description

Winter presents a challenge for many individuals who would like to walk or bike in Montana. In addition to cold temperatures, the accumulation of snow presents a physical barrier or hazard to bicyclists, pedestrians and transit users.

Regardless, Montana ranks 3rd among states for bicycling, even with winter bicycling conditions. In fact, many parts of the world enjoy high rates of bicycling with a winter climate including: Minneapolis MN, Anchorage AK, Copenhagen Denmark, Calgary Canada and others.

Winter bicycling is less challenging when roads are plowed

Sidewalk furnishing zones and bike lanes can provide temporary snow storage capacity, until the roadway can be properly cleared

Snow Removal on Sidewalks

Keeping pedestrian walks clear of snow and ice in the winter is crucial to a street maintaining its ability to function. In general, snow removal on pedestrian walks should be completed by the property owner, with public agencies being responsible for snow removal on pubically fronted walkways, and in many cases along arterials and collector roadways.

Sidewalks should be cleared within 24 hours following snowfalls. Agressive enforcement of some property owners or tennents may be necessary to ensure a clear continuous sidewalk network.