

CASPER AREA TRAILS, PATH AND BIKEWAY PLAN



CASPER AREA
METROPOLITAN PLANNING ORGANIZATION
Casper - Mills - Evansville - Bar Nunn - Natrona County



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Town of Evansville
Town of Mills
Town of Bar Nunn
Natrona County

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CHAPTER I: INTRODUCTION

The Casper Area Trails, Path and Bikeway Plan is a regional vision for a comprehensive and connected bicycle and pedestrian network that is safe, comfortable, and convenient for people of all ages and abilities.

The Plan, which was commissioned and funded by the Casper Area Metropolitan Planning Organization (MPO), builds upon previous planning and ongoing infrastructure implementation efforts to identify gaps and barriers to walking and biking in the Casper Area, and recommends both infrastructural improvements, as well as policies, programs, and practices that support these modes. Plan recommendations are guided by the U.S. DOT policy statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, which recognize that:

- Bicycling and walking provide low-cost mobility options that place fewer demands on local roads and highways
- Increased commitment to and investment in bicycle and walking networks can help meet goals for less congested roadways and more livable, safe and cost-efficient communities

And as such:

- Walking and biking should be considered with other transportation modes when planning, designing, and implementing transportation system improvements'
- Walking and biking facility design should go beyond minimum standards, where feasible, to ensure long-term viability and minimize need for future retrofits

This Plan will also help the Casper Area MPO, and its member jurisdictions, meet national performance goals for the Federal highway program as established in the Moving Ahead for Progress in the 21st Century (MAP-21) transportation bill, which are as follows:

- Safety - To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- Infrastructure Condition - To maintain the highway infrastructure asset system in a state of good repair

- Congestion Reduction - To achieve a significant reduction in congestion on the National Highway System
- System Reliability - To improve the efficiency of the surface transportation system
- Freight Movement and Economic Vitality - To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- Environmental Sustainability - To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- Reduced Project Delivery Delays - To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices

A. Plan Overview

The Casper Area Trails, Path and Bikeway Plan identifies deficiencies in bicycle and pedestrian infrastructure and recommends infrastructural improvements, as well as policies and programs that support walking and biking. The Plan covers the entire Casper Area, including the City of Casper, the towns of Mills, Bar Nunn, and Evansville and portions of unincorporated Natrona County. The Plan consists of several components:

- A summary of existing policies and plans and their relevancy to the Casper Area Trails, Path and Bikeway Plan (Chapter 2)
- An assessment of gaps and barriers in the non-motorized system (Chapter 3) Recommended strategies for achieving Plan goals and objectives. Strategies are focused on Education, Encouragement, Enforcement, Evaluation and infrastructure improvements (Engineering) intended to make it easier and safer to walk and bike (Chapter 4).
- Implementation strategies, including prioritized lists of recommended bicycle projects, intersection improvements, and sidewalk gaps to be filled, as well as facility design and funding strategies (Chapter 5).

In addition, several appendices provide additional information on:

- Public Input
- Recommended Bicycle Network Map
- Full list of prioritized projects and associated costs
- Design Strategies for Achieving High Quality Facilities
- Wayfinding Signage

Plan Vision, Goals, Objectives

A plan vision and framework of goals and objectives that support this vision were identified through the public and stakeholder engagement process:

Plan Vision

Walking and bicycling are enjoyable, viable and safe modes of travel throughout the Casper Area.

Plan Goal

Increase the number of people walking and bicycling in the Casper Area.

Plan Objectives

- Make it safe for people of all ages and abilities to walk and bike.
- Make it convenient to walk and bike by developing a connected network and removing barriers.
- Foster the development of a culture where walking and bicycling are accepted and viable travel mode choices.



CHAPTER 2: REVIEW OF EXISTING PLANS

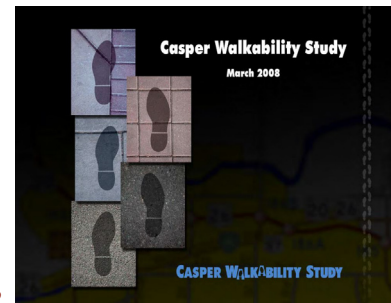
This section provides a brief summary of planning documents and policies that have been previously developed/adopted. The Casper Area Trails, Path and Bikeway Plan builds upon this previous work.

A. Casper Metropolitan Area Multi Use Trail System Plan, 1993

The primary goal of the Multi Use Trail System Plan was to identify safe and functional commuter routes for bicycle riders of all abilities. The Plan identifies major barriers to bicycling including the Platte River, Wyoming Highway 220, Wyoming Boulevard, Interstate 25, and US Highway 20 & 26. Recommendations from this effort encompass three categories: on-street shared roadway routes (23.5 recommended miles), on-street bike lanes (58 recommended miles), and off-street bike paths (9.5 recommended miles). The Platte River Parkway was envisioned as the “spine” of Casper’s multi-use trail system within the Plan.

B. Casper Walkability Study, 2008

The Casper Walkability study was developed in 2008 and its focus was on identifying needed infrastructure, program and policy improvements for creating a safe, convenient and, enjoyable walking environment in the Casper area. Demand for pedestrian facilities was assessed as a part of the Study; areas within ¼ mile of parks, transit routes, schools, shopping areas and hotel clusters, employment areas were identified as priorities. Recommended actions included improvements to funding, maintenance, education, and infrastructure. Acknowledged infrastructure needs included: raised median or refuge island, crosswalk pavement markings, signalized crosswalks, countdown pedestrian signals, sight distance improvements and street furniture. Land use and development standards were also recommended to aid in expediting development of pedestrian facilities and encourage walkable development patterns.



C. Casper Wyoming Safe Routes to School, 2011

The 2011 update to the Casper Safe Routes to School program identified existing issues and set goals remedying poor walking and biking conditions around schools. A central issue identified was the lack of transportation policy regarding schools in City and MPO documents.



Additionally the siting of schools and the “schools of choice” policy were cited as causing significant challenges to children walking and biking to school. Infrastructure concerns recognized include wide streets that promote high vehicle speeds and are difficult to cross, as well as substantial sidewalk gaps. Prominent goals established in this plan endorse designing new roadways to be pedestrian friendly with speeds appropriate for adjacent land uses, promoting traffic calming on residential streets, and providing direct pedestrian and bicycle connections from residential neighborhoods to key destinations.

D. Platte River Parkway Master Plan, 1982

The 1982 Platte River Parkway Master Plan envisioned developing a 14 mile long greenway and trail corridor along the North Platte River. Recommended improvements from this plan include assessing neighborhood connections, providing better connections between multi-use paths, and providing bicycle furnishings along paths.

E. Garden Creek/Sedar Draw Conceptual Trail Design Study, 2004

In 2004 the Garden Creek/Sedar Draw Conceptual Trail Design Study assessed the potential of increasing safety and formalizing trails. Development of the plan included a multi-day charrette at which public comments and concerns were solicited. Prominent concerns expressed at the charrette included that street crossings are difficult, traffic calming is desired, and that safety of all users should be the principal goal.

E. Implementation of the 2008 Casper Area Walkability Study and 2010 Safe Routes to School Study

The implementation of the 2008 Casper Area Walkability Study and 2010 Safe Routes to School Study achieved numerous goals, while also identifying strategies for further improvements. Since 2009 funding for walkability has increased significantly, with an annual designation of \$300,000 from the Capital Improvement Plan. As a result of this funding, a variety of pedestrian improvements have been implemented. Between 2009 and 2012 66 ladder style crosswalks, 52 countdown pedestrian heads, 130 ADA compatible ramps, and 13 pathway projects have been implemented as stand along projects. Many more improvements have been made in conjunction with larger roadway projects. The Study developed a list of future pathway projects (short to long term) which totaled 8 miles and an estimated 2.53 million dollars. Goals for improving walkability resulting from this process include a full assessment of sidewalks in the downtown needing repair, the promotion of pedestrian and bicycle friendly environments, and the continuation of intersection improvements.

F. TIP for the Casper Metropolitan Area: FY 2012-2015

The 2012-2015 Transportation Improvement Program reaffirmed the MPOs commitment to projects which decrease pedestrian and bicycle conflicts with vehicles, as well as projects which establish street standards for trails, bikeways, and bicycle route development. Key projects recommended to improve multimodal transportation include:

- Improve pathways and unimproved trails, \$200,000 each year: 2012, 2013, 2014, 2015
- Pathway on Evans Street from 5th Street to Highway 20/26, \$205,000 in 2013
- Sidewalk Improvement on Western Avenue, \$180,000 in 2014
- Improvements to transit amenities including shelters, benches, and signs; \$20,000 in 2013

Funding for pathways and trails identified in the TIP may be used to implement some of the recommendations in the CATPBP.

G. Casper Area 2030 Long Range Transportation Plan, Technical Memos 4, 5 & 6, 2006: Year 2030 Growth Scenarios; 2030 No-Build Model Results; 2030 Existing + Committed Transportation Model Results; and 2030 Transportation Network Deficiencies

The Long Range Transportation Plan identified and assessed fifty growth management areas within the Casper metropolitan area. The main corridors assessed as a part of the plan were I-25, CY Avenue, Wyoming Boulevard, and Poplar Street. The Plan addresses projected volumes for arterial roadways, identifies areas with high potential for congestion, and proposes conceptual street improvements.

- Improvements around Caspar College including 15th, McKinley, and 21st Streets.
- Extension of Bryan Stock Trail
- I-25 ramp design concerns.

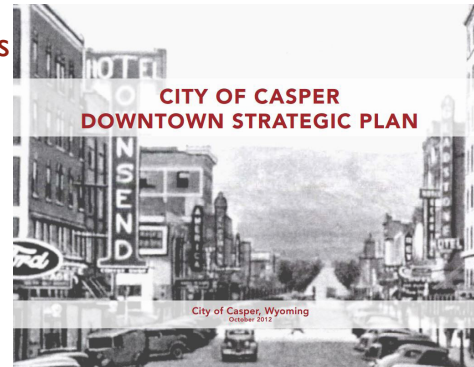
NOTE: The LRTP is being updated in 2013-2014 and will incorporate findings and recommendations from this Plan and other transportation studies currently underway.



H. City of Casper Downtown Strategic Plan, 2012

The Downtown Strategic Report States that the “success of the vision will depend, in part, on circulation improvements that establish a continuous network of pedestrian and bicycle facilities connecting outlying uses to key downtown destinations.” To achieve a well-connected downtown, the Plan identified the following projects:

- **Downtown Pedestrian and Bike Loop:** a continuous loop that builds upon the existing rail trail and planned riverfront trail infrastructure. New facilities include a combination of recreation pathways and protected bikeways within existing street rights-of-way.
- **David Street Protected Bikeway:** To supplement recent streetscape improvements along David Street, this bi-directional protected bikeway along the west side of the street links the downtown loop with the conference center, plaza, and downtown government employment destinations.
- **2nd Street Improvements:** This project aims to establish a thriving pedestrian and bicycle friendly retail environment along 2nd Street. In order to achieve this goal the existing serpentine roadway requires straightening, conversion of angled parking to parallel parking, and the addition of striped bike lanes to connect the David Street protected bikeway with the Beech Street section of the downtown loop.

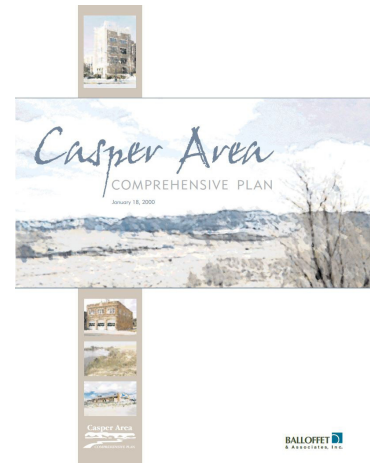


While only portions of the recommended pedestrian and bicycle improvements identified in the Downtown Strategic Plan were identified as recommended projects in the CATBPB, implementing those projects would make a significant contribution to the bicycle and pedestrian network and non-motorized circulation in the Downtown area.

I. Casper Area Comprehensive Plan (2000)

The Casper Area Comprehensive Plan is a joint effort between Natrona County, the towns of Mills, Evansville, Bar Nunn and the City of Casper. The Plan provides a complete analysis of conditions in Casper, with significant focus on land use and transportation. The Plan envisions a community that provides a safe, efficient, convenient, cost-effective, multi-modal transportation system. It stresses the need to establish quality connections between land uses for all modes of transportation. Prominent themes and goals related to biking and walking in the Casper area include:

- Promotion of bicycling and walking as viable alternatives to driving.
- Connecting neighborhoods and surrounding areas through street, sidewalk and park improvements.
- Promote traffic calming designs and solutions to reduce speeds through residential neighborhoods.
- Provide direct pedestrian and bicycle connections from residential neighborhoods to schools, parks, public institutions, commercial areas, and downtown.
- Design new streets and redesign existing streets to be pedestrian-friendly and compatible in scale, width, and design speeds with the adjacent land uses.
- Design rights-of-way to be shared, attractive and safe for all modes of transportation.
- Utilize abandoned railroad and other rights-of-way as the backbone of the parks, open space and trails system.
- Develop a system of parks, open space, and residential neighborhoods that is connected by pedestrian and bicycle facilities.



Among the themes repeatedly heard throughout the planning process was the lack of sidewalks and pedestrian facilities or need for repair of these facilities throughout the Casper area. Walking in these areas often resulted in pedestrians sharing the roadway with vehicles due to the lack of sidewalks and paved shoulders. The Plan stated that these missing sidewalk gaps, while sometimes considerable in length, more typically exist block to block. In addition, the Plan found that Casper area bicyclists prefer local streets with lower traffic volumes due to the unsafe conditions on higher volume streets. The Plan recommended improving bicycling conditions by implementing traffic calming on low volume, local streets and through the installation of dedicated on-street facilities on higher volume streets. The Plan acknowledged the need to plan for a variety of bicyclist types and skill levels, with a particular focus providing direct routes for commuters.

Summary of Existing Plans and How they Inform the CATPBP

There are a number of findings and themes from previous plans and studies that have directly informed the development of the CATPBP. Most notably is the need to improve walking and biking infrastructure for safety and comfort, and to support walking and biking as viable transportation modes. The Comprehensive Plan provides policy support for developing the CATPBP, or a system of pedestrian and bicycle facilities that interconnects parks, open space, neighborhoods and other destinations. The Comprehensive Plan, Downtown Strategic Plan, and Safe Routes to School study all acknowledge the important interface between transportation and land use, which is foundational to developing a functional pedestrian and bicycle network that attracts ridership. In addition, Safe Routes to School Plan and Walkability Study present a number of pedestrian infrastructure best practices that should be referenced when implemented CATPBP recommendations.

Previous planning studies have also acknowledged the importance of education, encouragement and enforcement, which the CATPBP builds upon. Educating the population about how to be safe while walking and biking, as well as motorists to be aware of bicyclists and pedestrians, is a key strategy to improving safety and encouraging more people to walk and bike. Enforcement has also been acknowledged as important for improving safety of all roadway users, which has been addressed in the CATPBP through specific enforcement-related strategies.

CHAPTER 3: NEEDS AND OPPORTUNITIES ASSESSEMENT

A. Public Input

People who are walking and biking, or would like to walk or bike more, have the best understanding of those conditions that present challenges and opportunities within the existing transportation network. Throughout the CATPBP planning process the public was asked to provide input on bicycle and pedestrian needs and opportunities using a variety of methods. Public outreach consisted of the following elements:

- Two public workshops (May and Sept 2013) with over 90 total attendees
- Online survey with 148 respondents in 5 week period
- Online interactive map allowing users to identify where they walk/bike and identify problems/issues with nearly 70 comments
- Project website, Facebook page
- 7 meetings with the Advisory Committee consisting of representatives from City of Casper, WYDOT, Bar Nunn, CATC/The Bus, Casper College, Platte River Trails, Natrona County Schools, Senior Center, CEPI, CINCH, Natrona County Parks



Public workshop attendees indicate on map where they would like to see improvements to bicycling and walking infrastructure

Through these outreach efforts, the following bicycling and walking needs emerged as being most critical to the public:

- Improving the safety and comfort of walking and biking
- Improving connections to trails, creating a more comprehensive biking and walking network
- Integrating bicycling and walking considerations into all roadway planning, design, construction, and maintenance
- Improving accessibility for bicyclists and pedestrians around/through barriers such as intersections, freeways, discontinuous streets, and flood prone areas.
- Improving roadway crossings
- Providing more bicycle parking
- Improving access to Casper College and Downtown
- Educating all road users to respectfully share the road and interact safely

A complete summary of public input is provided in Appendix A.

B. High-level Overview of Transportation System

The Casper Metropolitan Planning Area (MPA) is presently served by a roadway network that includes over 810 roadway miles. The majority of this mileage falls within the jurisdiction of the City of Casper (nearly 429 miles of classified roadways) followed by Natrona County with approximately 311 miles of classified roadways. The Wyoming Department of Transportation (WYDOT) has jurisdiction over the interstate, freeways/expressways and the majority of other principal arterials within the MPA. The total WYDOT roadway mileage is approximately 158 miles of limited access highways, arterial, collector, and local streets. The Towns of Evansville, Mills, and Bar Nunn have 27 miles, 26, and 17 miles of roadway, respectively.

With the exception of limited access highways, bicycles and pedestrians are permitted and can be expected on all roadways. However, some roadways are more conducive than others for non-motorized travel given traffic characteristics and potential for improving infrastructure. Below is a summary of general conditions and assessed needs for each type of roadway in the Casper Area.

C. Walking and Biking Needs Assessment by Roadway Type

i. Arterial Roadways

Arterial roadways are primarily tasked with providing traffic movement with a secondary function being the provision of direct access to abutting property. Arterials typically serve as connections between major traffic generators and land use concentrations. Arterial roadways are typically higher speed (35 to 50 MPH) and have higher volumes of traffic. Arterial roadway lane configurations vary and include 5-lane (including center turn lane), 4-lane (divided and undivided), and 3-lane (including center turn lane). There are two types of arterial roadways: principal and minor. Principal arterials have attributes at the higher end of the ranges presented above. Examples of principal arterials include CY Ave, Wyoming Blvd, and Yellowstone Highway. Examples of minor arterial roadways in the Casper Area include Poplar St (south of CY Ave), 12th St, E 2nd St and Wolcott St.



W Yellowstone Highway, a principal arterial roadway



Beverly St, a minor arterial roadway

Walking and Arterial Roadways

Walking conditions along arterial roadways vary throughout the Casper Area. Below is a summary conditions and needs based on field observations.

Sidewalks

Sidewalks are generally present on both sides of the street within the older parts of the City of Casper. In newer areas sidewalk are generally present on one or both sides of the street, however there are notable sidewalk gaps. In the downtown Casper area sidewalks are typically buffered from vehicle travel lanes by a landscaped buffer or on-street parking. In other areas sidewalks are directly adjacent (attached) to travel lanes, which creates an uncomfortable walking environment. Typical sidewalk width varies from 3.5 ft to 5 ft.

Curb Ramps

Many intersections have curb ramps, however there is little consistency in terms of their design. Where there are attached sidewalks most curb ramps do not have a minimum 5 ft by 5 ft landing (per ADA) at the top of the ramp due to the lack of available right-of-way. Other design elements where consistency is lacking include tactile warning strip coloring, orientation of ramp to the curb (should ideally be 90 degrees), and alignment with crosswalks. In some cases curb ramps have a deep scoring pattern perpendicular to direction of travel which may act as a barrier to people in wheelchairs or pushing carts and strollers. Standardized tactile warning strips should be used instead of scoring. Taken together, these design variations can present challenges to pedestrian movement, particularly disabled pedestrians.

Pedestrian Crossings

Pedestrian crossings are generally marked near schools and other pedestrian attractors and at signalized intersections with high visibility markings (ladder style). In some locations within the City of Casper stained concrete has been used to demarcate the crosswalk. This treatment is not highly visible, and in some cases the City has installed high visibility markings on the stained concrete-this should be done at all locations where stained concrete has been used. There are several locations where marked crosswalks have been installed at uncontrolled locations (i.e. no signal, stop or yield signs) on multi-lane roadways. Best practice in crosswalk placement dictates that these markings should be removed or enhanced with other treatments such as active warning signals, crossing islands, and/or high visibility signage.

Signage

Lastly, pedestrian crossing warning signage placed at crossing locations is inconsistent in terms of color and placement. Over time, as signs are replaced, all crossing warning signage should use high visibility green per MUTCD. Crossing warning signage should consist of signs placed in advance (typically 100 to 300 ft) of the crossing location and signage placed at the crossing. The use of advanced signage is inconsistent-in some cases it is being used and in others it is not. The placement of signage at the crossing location is also inconsistent-in some cases it is placed slightly in advance of the crossing location whereas it should be placed directly adjacent to the crossing location. The use of in-street signs (S4-3P) at crosswalk locations, and STOP HERE FOR PEDESTRIANS (R1-5b) signs with advanced stop bars should be considered at uncontrolled crossing locations. Also, double-sided signage should be used wherever crossing warning signs are placed so the sign is visible from both directions of travel.

Bicycling and Arterial Roadways

While arterial streets provide the most direct routes for bicyclists wanting to access major destinations, the high traffic volumes and speeds of many of these streets create a high stress condition for the average cyclist. On principal arterial roadways the standard practice is to provide trail/sidepath facilities that separate bicyclists and pedestrians from the roadway. This has been done on portions of CY Ave, on parts of Beverly St, and is currently being studied for Wyoming Blvd. A bike lane has been installed on Center St, a minor arterial, however it does not meet current guidelines in terms of minimum width.



Less confident bicyclists are often seen riding on sidewalks in the Casper Area

In order to attract a broader range of cyclists (i.e. those that are less stress tolerant) to ride on arterial roadways, a number of strategies should be pursued, including providing more separation between motor vehicles and bicyclists (i.e. sidepath or buffered/protected bike lane), speed management (i.e. lowering vehicle speeds through roadway design), and accommodating cyclists at intersections (more on this below). In some cases removal of a travel lane or parking lane (i.e. road diet) would be required in order to pursue these strategies.

Bicycle Accommodation at Intersections

Bicyclists are currently not well-accommodated at most arterial intersections. Bicyclists are expected to mix with motor vehicles, which is stressful for the majority of riders (and potential riders). In addition, signal detection for bicyclists is lacking. Where bicycle facilities intersect with arterials or other roadways where signals require actuation, signal detection systems need to be calibrated to explicitly detect bicyclists. Section 9D.02 of the 2009 MUTCD states: "On bikeways, signal timing and actuation shall be reviewed and adjusted to consider the needs of bicyclists." Accommodating bicyclists at actuated intersections is one relatively cost-effective way in which a city can make significant strides to improve the safety and level of service provided to bicyclists. It is recommended the city review its signal timing policy and revise as necessary to accommodate bicyclists at all intersections located on the bicycle network as it is implemented, and develop a protocol for assessing concerns from bicyclists regarding detection or additional time to cross at other locations.



College Dr, a collector roadway

ii Collector Roadways

Collector roadways are typically intended to provide for a balance of traffic movement and property access. Traffic movement is often internal to localized areas, with collectors connecting residential neighborhoods, parks, churches, etc. with the arterial system.

Collector roadway speeds are typically lower speed (25 to 35 MPH) and traffic volumes are lower. Collector roadways may have two to four lanes. Examples of collector roadways in the Casper Area include College Dr, 15th St, and Walsh St.

Walking and Collector Roadways

Similar to arterial roadways walking conditions vary on collector roadways in terms of the width of sidewalk, relationship to vehicle travel lanes, and condition. Sidewalks without buffers (i.e. directly attached to roadway) are typical on collector roadways outside of the older portions of the City of Casper. Typical sidewalk width ranges from 3.5 ft to 5 ft. Though vehicle speeds and volumes are lower on collector roadways, narrow, attached sidewalks still result in a decreased sense of comfort and safety for pedestrians. Other pedestrian conditions related to crossings discussed above also apply to collector roadways.



Sidewalks without buffers create less comfortable and safe walking conditions



Wolcott St, like many collector roadways, present opportunities for making bicycling improvements that would attract a broad range of bicyclists

Bicycling and Collector Roadways

Given the lower traffic volumes and speeds on collector roadways relative to arterial roadways, these roadways may attract a wider range of cyclists. However, many collector roadways have four vehicle lanes, which contributes to higher stress bicycling conditions due to the higher vehicle speeds this type of lane configuration induces. Bike lanes have been installed on Blackmore Rd, Centennial Village Dr, and Centennial Blvd, however these bike lanes do not meet minimum width guidelines and get very little use according to staff and other knowledgeable

individuals. On each of these roadways space has been allocated for on-street parking, which is utilized in only a limited number of spot locations. With on-street parking there is not sufficient space to provide 5 ft bike lanes, the minimum width per AASHTO guidelines. By removing parking on one side of the street, wider bike lanes that are more likely to attract a broader range of cyclists could be installed.

Other issues related to accommodating bicyclists at intersections discussed above under arterial roadways also apply to collectors.



A typical local roadway

iii. Local Roadways

Local roadways function to provide access to abutting property and to collect and distribute traffic between individual parcels of land and collector or arterial streets. The local roadway network in the Casper MPA varies in character from a grid network with regular block size in the older parts of Casper to a more curvilinear and, in many areas, discontinuous system with fewer through streets. Local roadways

are characterized by low vehicle volumes (less than 1,000 vehicles per day) and speeds (20 to 25 MPH). Many local roadways have widths of 32 ft or greater, which, given the function of these roadways is excessive. Wider local streets induce higher vehicle speeds and generally create a less comfortable walking environment.

Walking and Local Roadways

Walking conditions on local roadways are generally good. Sidewalks are present on one or both sides of the street in most areas. On-street parking on local roadways provides a buffer between the sidewalk and travel lanes. Where sidewalks are not present traffic calming should be considered as a low cost strategy (compared to constructing sidewalks) for improving walking conditions in the street, particularly on local streets that are wider than 32 ft or have low on-street parking utilization.

Local streets typically intersect arterial or collector roadways at locations where no traffic signals are present. This presents a challenge to pedestrians wanting to cross these streets, particularly where they must cross more than one vehicle travel lane in one direction. These crossing locations should be enhanced with active warning signals, high visibility crosswalks (only if less than 3 lanes or the ability to install a crossing island), and signage. In some cases the arterial or collector roadway may be redesigned to improve crossings of local roadways. For example, converting a four-lane roadway to a three lanes (two travel lanes and a center turn lane) reduces the number of travel lanes in a each direction that a pedestrian must cross and also provides an opportunity to install a crossing island, which further facilitates the crossing.

Bicycling and Local Roadways

Most local roadways are very conducive for people of all ages and abilities to bicycle given the low vehicle speeds and volumes. As with pedestrians, bicyclists would benefit from traffic calming on roadways where there are documented speeding issues, and from crossing enhancements where local roadways intersect arterial and collector roadways.

D. Natural and Constructed Barriers to Walking and Bicycling

The Casper Area has a number of natural and constructed barriers that constrain the transportation system and create barriers to bicyclists and pedestrians. Roadway crossings of the Platte River, railroad, and the interstate are limited, and therefore they play a critical network connectivity role for all roadway

users. Because all roadway users are funneled to just a handful of crossings, these locations tend to be high traffic corridors and intersections that are difficult for pedestrians and bicyclists to traverse. Particular attention needs to be given to improving pedestrian and bicycle conditions in these locations. The Poplar St bridges over the Platte River and railroad facility are notable barriers to pedestrians and bicyclists. At a minimum these bridges should be retrofitted with sidewalks on one or both sides, or the feasibility of a separated pedestrian/bicycle bridges should be explored. High traffic, high speed streets may also act as barriers if there is no easy and safe way for pedestrians and bicyclists to cross or travel on them.



Poplar St bridges over the North Platte River and railroad are known barriers to walking and biking

E. Other Needs and Conditions

Field observations revealed several other needs and conditions that should be noted as they impact the overall walkability and bikeability of the Casper Area. These are listed in no particular order:

Use of landscaping rock in sidewalk buffer areas

The use of smaller landscaping rock should generally be discouraged, particularly along bicycle routes. Dislodged rock may impede wheelchairs on sidewalks and can also be a hazard to bicyclists traveling in the roadway.

Advanced stop bars

Advanced stop bars should be more widely used at pedestrian crossing locations to discourage motor vehicles from encroaching on the crosswalk and provide a greater sense of comfort to crossing pedestrians. At unsignalized locations advanced stop bars should be accompanied by R1-5 signage.

Colored Concrete Crosswalks

Colored concrete (typically red) has been used to define crosswalks at many crossing locations. This treatment is ineffective at alerting motorists to the crosswalk due to poor visibility and often results in motorists encroaching into the crosswalk area when stopped at a signal. This treatment also does not meet MUTCD standards. In some cases, the City of Casper has retrofitted the colored concrete with high visibility ladder style



Motorists often encroach into the crosswalk area at locations where colored concrete has been used

markings. At a minimum colored pavement crosswalks should be retrofitted with two parallel white lines defining the crosswalk area.

Restrict parking at intersections

On-street parking should be restricted a minimum 30 ft from intersections in order to improve visibility at pedestrian crossings and of traffic approaching on the intersecting street.

On-street parking

There are a significant number of roadways where on-street parking is permitted, but not utilized. The roadway space that has been allocated for on-street parking that is only occasionally, or never, used represents an opportunity to reallocate roadway space to benefit bicyclists and pedestrians.



Two-way center turn lanes on streets where left-turn volumes are low provide an opportunity to reallocate roadway space and stripe bike lanes.

Two-way Center Turn Lanes

Two-way center turn lanes have been striped on many roadways within the Casper Area even though the volume of left-turns does not warrant their use. Where two-way center turn lanes have been striped and left-turn volumes are low there is an opportunity to reallocate this roadway space to provide bicycle lanes.

Tactile warning strips

As noted above tactile warning strips on curb ramps should be consistent in terms of color (or more importantly contrast value), and they should also be continuous across ramps. In some locations separate strips have been applied to a curb ramp, leaving a gap between the strips.



Field assessment was conducted on most roadways in the Casper Area to determine opportunities and constraints for installing bicycle facilities.

CHAPTER 4: RECOMMENDED STRATEGIES FOR IMPROVING BIKING AND WALKING

Plan recommendations address infrastructural improvements, as well as policies, programs and practices affecting walking and biking conditions in the Casper Area. Recommendations are organized by the “5 E’s”: Education, Encouragement, Enforcement, Evaluation, and Engineering. Bicycle-related recommendations directly address Bicycle Friendly Community criteria.

A. Supporting Policies, Programs, and Practices

The following strategies are focused on developing a community culture that is supportive of walking and biking as viable, safe and comfortable modes of transportation. These strategies are intended to complement and accompany implementation of the recommended bicycle network and pedestrian improvements. Strategies are grouped by the “E” (i.e. education, encouragement, etc.) they most directly address.

B. Education and Enforcement

The bicycle and pedestrian network will be designed to provide safe and convenient access for bicyclists to travel to destinations throughout the Casper Area. Like facilities for other transportation modes, this network of bicycle and pedestrian facilities must be used appropriately to be effective. For example, bicycle facilities are designed under the assumption that bicyclists ride the correct direction on streets and stop at red traffic signals and stop signs. It is also assumed that motorists yield to bicyclists when turning, provide sufficient space when passing, and do not drive or park in designated bicycle lanes.

Strategy 1: Distribute Information on Proper use of Bicycle Facilities

As the multi-modal network in the Casper Area continues to be built out and improved, information should be provided to remind roadway users of how to interact safely with other users. Information should also be provided about the various bicycle facility types and the rules that ensure safe operation (e.g. not parking in bike lanes). Materials on bicycle facilities should be distributed in multiple mediums so as to be accessible to as many users as possible. Graphics and videos can be particularly beneficial and should be available on the City’s website, through local media outlets, and pamphlet form throughout the community in areas frequented by bicyclists and pedestrians. Signage that accompanies bicycle on-street bicycle facilities can also help to raise awareness and educate people about facilities. See Strategy 12 and Appendix D for more information on signage.

¹ Bicycle Friendly Community is a program of the League of American Bicyclists which recognizes communities that welcome bicyclists by providing safe accommodation for cycling and encouraging people to bike for transportation and recreation. More information can be found at <http://www.bikeleague.org/content/communities>

Strategy 2: Deliver Bicycle and Pedestrian Education through Safe Routes to School Programming and Partnerships

A key component of developing a community culture that recognizes walking and biking as viable, acceptable and fun modes of transportation is providing



Bike or walk to school events are a fun way to educate students about walking and biking safety

encouragement, and enforcement and the applicability to Casper Area schools. The National Center for Safe Routes to Schools Clearinghouse has many education materials available for no charge.

children with the opportunity to walk and bike to school. In 2011 the Casper Area MPO developed a Safe Routes to School report that provides specific recommendations for improving the physical walking and biking conditions around schools. It also contains good examples of programs and

policies addressing education,

The City of Casper should continue to make infrastructure safety improvements near schools while also working with the school district to educate students on the rules of the road and safe walking and biking practices. This could occur through a variety of methods. Schools can host safety assemblies with certified bicycling instructors. The City's Police Department could play an active role by visiting classrooms or attending safety assemblies. Additionally the City and School District might consider the establishment of a SRTS Coordinator, who would work to incorporate bicycle and walking safety education into curriculums. A SRTS Coordinator could identify certified instructors with the school districts and investigate funding opportunities to compensate the instructors and further advance Casper's SRTS program. Community organizations or the health department may also be partners in delivering safety education.

Strategy 3: Provide Adult Bicycling Education Courses

Offering courses on bicycle safety and bicycle handling skills to adults is an effective strategy for improving compliance with traffic laws and reducing non-vehicular crashes. Such courses may cover an assortment of skills including beginning bicycling, traffic skills, basic bike maintenance, and commuting tips. The League of American Bicyclists' Smart Cycling program certifies instructors to teach responsible bicycling skills to children as well as adults. There are likely a number of certified instructors already in the Casper Area and additional certification of instructors should be encouraged. Partnering organizations and agencies may provide a venue for these courses. Partnership opportunities include

educational institutions, such as Casper College and the Casper School District and the Natrona County Department of Health, through Casper’s Initiative to Nurture Community Health (CINCH). Strategies for increasing participation may include offering courses through employers, offering a variety of course formats, e.g. full-day, two-half-day, or weekly for several consecutive weeks.

Strategy 4: Promote Safety through Local Ordinances

Local ordinances should be reviewed to ensure they promote safety and comfort for bicyclists, pedestrians, and motorists alike. The City of Casper Code of Ordinances currently addresses headlight requirements for bicycles, permits riding on sidewalks outside of the business district and with regard to pedestrians, and addresses how bicyclists should obey traffic rules. Additional ordinances to consider include helmet requirements (for children or all residents) and “go on red” law (similar to what was recently adopted in Nevada), which permits cyclists (and motorcycles) to proceed through a red light after not being detected for two light cycles. It may also be appropriate to establish regulations for motorist behaviors. Common motorist ordinances focused on improving bicycle safety include: establishing a minimum passing distance between motor vehicles and bicycles (i.e. a “3-foot law”); opening a vehicle door in front of (“dooring”) a cyclist; and driving or parking in bicycle lanes.



Many communities have passed “3-foot” laws

Strategy 5: Provide Regular All Mode Road Safety Training for Patrol Officers and Institute a Bicycle Infraction Diversion Program

Police officers can be hesitant to give bicyclists or motorists a ticket for bicycle related infractions because they are not fully aware of the safety impacts of non-compliant behaviors and because of not wanting to impose a fine for the bicycle related infraction. Educating police officers on the laws pertaining to bicyclists and bicycle facilities, the leading causes of bicycle crashes, and the operating characteristics of bicycle facilities and bicyclists is an effective strategy for improving safety. Trainings should be offered to new and existing enforcement officers on an annual basis. The National Highway Traffic Safety Administration (NHTSA) has made available a 2-hour self-paced interactive video training



Enforcement officers have a significant role in creating safer walking biking conditions through targeted enforcement and education.

for all law enforcement officers. More details about the course and ordering information for the CD-ROM can be found by searching “NHTSA Enhancing Bicycle Safety”. Another video entitled “Enforcing Law for Bicyclists”, which is available for download from the NHSTA website, provides a basic overview of laws pertaining to bicyclists, why it is important to address motorist and bicyclist behaviors that lead to crashes, and the importance of reporting crashes.

Instituting a Bicycle Infraction Diversion Program is another way to build police officers’ support of bicycle related enforcement. A Bicycle Infraction Diversion Program is one that allows bicyclists and motorists who receive a bicycle related infraction to attend a Bicycle Education Course instead of paying the fine. The program would allow a bicycle infraction to be dismissed if proof is submitted of completion of an approved bike education course. The City of Tucson has been operating such a program since 2008. More information on the program can be found on the Pima County Justice Court Home page (<http://cms3.tucsonaz.gov/prosecutor/diversion>) by scrolling down to “Bicycle Safety Diversion.” Establishing a similar program in the Casper Area would require coordination with the Natrona County and/or City of Casper courts.

Strategy 6: Expand Police Bicycle Patrol

The City of Casper Police Department has officers on bicycles on a regular basis. This practice should be continued, and expanded. Officers on bicycles will become familiar with the bicycling environment in Casper and develop a mutual respect with cyclists, who may consider warnings or citations from officers who patrol on bikes more thoroughly than those who patrol in automobiles.

Furthermore, ensuring the safety of trail users is a task uniquely suited to bicycle patrols. While there are likely to be fewer warnings issued on off road facilities, such an environment provides officers with a venue to distribute educational materials and encourage safe riding habits.

C. Encouragement

Strategy 7: Develop a Map of the Casper Area’s Bicycle Facilities

As the recommended bicycle network gets built out development of a comprehensive bicycle map will encourage more people to bike by providing them with information to make informed route choices based on their ability and comfort level. Bicycle maps may also have supplemental information such as tips for commuting and educational information and illustrations on topics including information on different bicycle facility types, how to load bicycles on to buses, rules of the road, and safety tips.

Bicycle maps should be available in a variety of formats including print, PDF, and for mobile devices. Hard copies of maps should be available throughout the community at local bike shops, health clubs, trail information boards, local businesses and government facilities as well as community events. Platte River Trails has developed a trails map, which also includes on-street bicycle facilities, would be a logical entity to spearhead the effort to update the regional bicycle map on a periodic basis. Other potential partners for development and

distribution of the map and supplemental safety information include the Natrona County Department of Health as a part of active living efforts (through CINCH), Casper Area MPO and Wyoming Department of Transportation, and the Casper Parks Division.

Strategy 8: Partner with Local Businesses, Colleges and Organizations

There are multiple strategies for encouraging employers to encourage their employees to commute by biking, walking or transit. These approaches include educating employers on federal tax benefits and employee health benefits, which translate into lower healthcare costs, and honoring local employers for their efforts to reduce vehicle trips. These programs may benefit employers in at least two ways: they may receive both financial benefit and positive local publicity. Partnering with the Casper Area Transportation Coalition and Casper's Initiative to Nurture Community Health (CINCH) may be an ideal opportunity to promote how walking and biking, coupled with transit, as a viable and healthy commute alternative.



Casper College has many students biking to and around campus

Businesses and colleges in the Casper community should be encouraged to engage in the League of American Bicyclists' (LAB) recognition programs, Bicycle Friendly Business (BFB) and Bicycle Friendly University (BFU). These programs recognize efforts made by employers and higher education institutions to accommodate and encourage bicycling. The program honors innovative efforts and provides technical assistance and information to help companies and organizations become even more welcoming to cyclists.

Community walking and biking events are another way to encourage more people to walk and bike. Such events expose the broader community to the fun of walking and biking and may also heighten awareness of what it is like to walk and bike in the Casper Area. Events may be organized as part of national efforts (e.g. bike to work day) or more local efforts. Platte River Trails and organizations focused on promoting walking and biking are natural partners for establishing one time or annual events.

² Bicycle Level of Service is an evaluation of bicyclist perceived safety and comfort with respect to motor vehicle traffic while traveling in a roadway corridor. It has been incorporated into the 2010 Highway Capacity Manual. The research is more highly developed for midblock segments than for intersection nodes.

³ Maaza C. Mekuria, Peter G. Furth, and Hilary Nixon, Low-Stress Bicycling and Network Connectivity, Mineta Transportation Institute, 2012.

D. Engineering

The quality of bicycle and pedestrian facilities has a direct impact on the experience of the bicyclist and pedestrian and will therefore have a significant influence on the ability of the facility to attract and sustain use. Well maintained and high quality facilities have been demonstrated to attract higher levels of users than poorly maintained or low quality facilities. Likewise, interconnected systems with minimal gaps or interruptions are essential.

Research has documented the quality of the bicyclist's experience and comfort is directly related to their space (i.e. width of bicycle lane or trail), separation from adjacent traffic, speed and volume of adjacent traffic, as well as the composition of the traffic (cars/trucks on roadways, people/ bikes on trails). This research has resulted in the incorporation of bicycle level (quality) of service² into the Highway Capacity Manual which accounts for the experience and comfort of the bicyclist operating on the roadway. Additional research has been conducted on level of traffic stress and strategies for attracting the widest possible segment of the population through the provision of a connected, low stress, bicycling network.³

The following recommendations are focused on the planning, design, implementation and maintenance of bicycle and pedestrian infrastructure.

Strategy 9: Institutionalize the CATBPB Plan into plans, policies and practices.

Integrating this Plan into other planning documents is one way to “institutionalize” the Plan’s recommendations. Development of a complete street ordinance or similar policy that mandates consideration of bicyclists and pedestrians in the planning, design, construction, and retrofit of roads is another effective strategy for institutionalizing accommodation of these modes. The National Complete Streets Coalition offers extensive guidance about Complete Streets policy elements, model language, and implementation. Complete Streets policies represent a change in transportation planning and design that requires review and update of all relevant policies, including funding, planning, design, maintenance and operations. Activities involved in implementing a Complete Streets policy include: assessment of current procedures and activities; update of procedures, activities, processes; update of design guidance and standards; establishment of education, training and support opportunities; and establishment of performance measures.



Convening an inter-departmental team is an effective strategy for ensuring all concerns/interests are addressed and key opportunities are not missed when implementing Plan recommendations.”

The creation of policies to reserve space for future bicycle and pedestrian facilities is another aspect of routine accommodation. There may be occasions when corridors for trails or space within the right of way are identified for facilities which cannot yet be constructed. In some of these instances, it may be beneficial to preserve space in order to provide easy installation at a future time.

Lastly, establishing an inter-departmental coordination team consisting of representatives from key departments (e.g. planning, public works, parks, leisure services) is another strategy for ensuring all concerns/interests are addressed and key opportunities are not missed. This team might meet quarterly or semi-annually, or on an as needed basis to:

- Review upcoming capital projects and street overlay projects to ensure integration of bicycle improvement recommendations included in the Plan.
- Adjust the schedule of when projects are implemented based on achieving multiple objectives, including implementation of high priority bicycle improvements and safety improvements for other roadway users.
- Identify funding needs (cost estimates) for incorporating recommended bicycle improvements into capital projects and annual programs, including maintenance.

Strategy 10: Continue to Collect and Analyze Bicycle and Pedestrian Crashes

The recording and analysis of crash data (reported crashes, hospital data, etc.) can help determine where to best focus efforts to improve safety. For example, rural bicycling crashes differ from crashes on local streets or business districts; behavior, street design and conditions may play a greater or lesser role depending on the setting. Crash data can help illuminate whether education, increased enforcement or infrastructure changes are the best approach to reduce crashes. These efforts should be coordinated among all transportation agencies in the Casper Area, but particularly, the Wyoming Department of Transportation and City of Casper Public Works.

Strategy 11: Develop a Connected, Convenient and Comfortable Bicycle Network

This Plan recommends infrastructural improvements to roadways and intersections to create safer and more comfortable conditions for people of all ages and abilities to bicycle. Appendix B is the Recommended Network map, which shows recommended bicycle improvements by facility type (e.g. bike lane, path), as well as key sidewalk gaps to fill and intersections needing improvements. Table I provides a summary of the recommended improvements.

Table I: Summary of Recommended and Existing Bicycle Facilities

<i>Recommendations</i>		<i>Existing Facilities</i>	
<i>Facility Type</i>	<i>Mileage</i>	<i>Facility Type</i>	<i>Mileage</i>
Bike Lane	32.48	Bike Lane	3.35
Buffered Bike Lane	0.65	N/A	
Climbing Bike Lane	2.02	N/A	
Paved Shoulder	3.60	Paved Shoulder	16.74
Install New Trail/Path	8.04	Trail/Path	43.34
Bike Boulevard	8.62	N/A	
Shared Lane Marking	20.58	N/A	
Shared Lane	17.08	N/A	
Upgrade Bike Lane	3.35	N/A	
Upgrade Trail/Path	2.36	N/A	
Further Study Needed	4.87	N/A	
<i>Recommendations Total</i>	<i>103.66</i>	<i>Existing Total</i>	<i>63.43</i>
<i>Network (Recommendations + Existing) Total</i>			<i>167.09</i>

In addition to the above recommendations, a number of intersections have been identified for pedestrian and/or bicycle improvements. Improvements include basic upgrades such as installing curb ramps or signage, as well as more significant improvements such as installing a crossing island or reducing curb radius. Recommended improvements at these intersection locations are intended to address conditions that act as barriers to walking and biking, and establish a consistently comfortable user experience throughout the recommended network. A list of intersections that have been identified for needing improvements is included in Appendix C.

Bicycle Facility Definitions

The following are definitions for each bicycle facility type included in the recommended network.

Shared Road

Bicycles may be operated on all roadways except where prohibited by statute or regulation. Design features that make shared lanes more compatible with bicycling include good pavement quality, adequate sight distances, lower vehicle speeds, and detection of bicycles at traffic signals.



Shared Lane Markings

A pavement marking symbol that indicates appropriate bicycle positioning in a shared lane. Typically placed on lower speed roadways on downhill or connector segments.



Bicycle Lane

Marked space along a length of roadway designated for use by bicyclists.



Climbing Bike Lane

On a sloped roadway: a bicycle lane on the up-hill to provide space for slow climbing bicycles and shared lane marking on the downhill



Buffered Bike Lane

A bicycle lane with additional buffer space between the vehicle travel lane or parking lane, used on high-volume or high-speed roads, or roadways with high parking turnover.



Bicycle Boulevard

A low-volume and low-speed street or series of streets that have been optimized for bicycle travel while discouraging or calming through automobile travel. Local access is maintained.



Wayfinding

Signs and/or pavement markings that help bicyclists find important destinations and routes within the bicycle facility network.

Bicycle Signal Detection

Some traffic signals change only when a vehicle is detected. On bicycle routes signal detection may be calibrated or installed so that bicycles can trigger a green when other vehicles are not present. Below is a pavement marking symbol that indicates where bicyclist should be positioned to trigger a traffic signal.



Strategy 12: Provide Wayfinding Signage on the Recommended Bicycle Network

Wayfinding signs provide information about destinations, direction and distance to help bicyclists determine the best routes to take to major destinations. Signs provide on-the-ground information that helps bicyclists understand and use the on-street and trail network without the use of a map. Directional signs also provide additional messaging to motorists to expect bicycles on the roadway. The

presence of signs encourages bicycling on designated corridors because users feel the signs will direct them to the best route for getting to their destination. Signs may also be used to direct bicyclists around barriers.



Providing wayfinding signage is an effective way to integrate the trail system with on-street bicycle facilities.

The installation of signing and other bicycle network improvements do not need to occur at the same time. For example, for some lower speed/low volume roadways installation of wayfinding signage may precede any other improvements such as pavement markings, and in this sense, could be used as an interim step toward implementing additional recommended treatments. Recommended Shared Lane routes, which are intended to provide connections between destinations/ neighborhoods and the primary bicycle network via low volume/low speed streets, should eventually all have wayfinding signage.

Appendix D provides guidance for establishing a system of wayfinding signs.

Strategy 13: Provide Convenient and Secure Bicycle Parking

The provision of end of trip facilities such as bicycle parking is a key component of making bicycling a viable and convenient mode of transportation. Neglecting to provide convenient and secure bike parking discourages people from biking, and it also can result in bicycles being parked in areas in which they may interfere with traffic or pedestrian movement. Proper placement and design of bicycle racks will help integrate bicycles into Casper's multi-modal transportation vision.

In order to ensure that bicycle parking is adequately provided an assortment of solutions should be explored including establishing a city program for installing bike parking in the public right-of-way and at public facilities, transportation demand management, and requirements for new and existing development. For example, code provisions that require new multifamily developments to provide short and long term bicycle parking could be adopted. Additionally, requiring employers to provide bicycle parking facilities, through either incentive-based programs or by ordinance should be explored. The Association of Pedestrian and Bicycle Professionals' Bicycle Parking Guidelines provide guidance on rack type and placement, as well as considerations for long-term parking, and sample quantity requirements to meet parking needs by land use type.



Providing convenient and secure bike parking is an effective strategy for encouraging people to ride their bikes

Strategy 14. Incorporate Bicycle and Pedestrian Facilities into Existing Maintenance Policies and Programs

Regular maintenance of bicycle and pedestrian facilities not only demonstrates commitment to supporting walking and biking, but helps to ensure that these facilities are safe and attractive for existing and potential users. Full integration of on-road bicycle facilities into routine roadway maintenance means bicycle facilities are kept free of debris, pavement markings are visible, the pavement is in good condition, and bike lanes and paths are kept free of snow. Maintenance costs should be factored into all improvements, but particularly off-road facilities where there are fewer opportunities to piggyback with routine roadway maintenance. Below is a list of general maintenance considerations associated with bicycle and pedestrian facilities:

- Pavement markings, particularly those that are placed within the path of motor vehicles, will require periodic “restriping”. The City of Casper uses inlaid thermoplastic for all of its longitudinal striping, which has a lifespan of up to 10 years, and in some cases longer. This means that initial implementation

costs are higher, but long-term maintenance costs are much lower. Pavement markings such as bike lane symbols and shared lane markings will likely need to be re-applied every 3 to 5 years if placed within the path of motor vehicles, and much less often in other cases.

- Signage is replaced on average every 10 years taking into consideration vandalism, other damage that may occur, and reduction of retro reflectivity properties. Steps should be taken to ensure that the signage is upgraded as advances are made in techniques, products and materials.
- Sidewalk and trail facilities are subject to tree root damage, erosion and other factors that may deteriorate the pavement condition. Good initial design that includes consideration of appropriate plant material, root barriers, drainage, and base course is critical to extending the life of these facilities.
- Sweeping of on-street bicycle facilities such as bicycle lanes and shoulders may require additional passes of sweeper vehicles, which results in higher sweeping costs. Generally sweeping should occur on a regular basis as debris tends to accumulate on the side of the roadway where bicycle facilities are typically placed. Seasonal factors such as leaf debris in the fall months may require additional sweeping.
- Winter maintenance should include clearing of on-road bicycle facilities. Priority should be given to those routes where there is high demand (i.e. within Downtown Casper, between Casper College and Downtown). In addition, the City should be prepared to respond to requests for snow removal from on-road bicycle facilities. Property owners are responsible for clearing snow from adjacent sidewalks.

The City of Casper should consider establishing a system such as an on-line form or telephone hotline that allows residents to make maintenance requests. An on-line form has the advantage of automatically storing requests in a database that would allow the City to identify where spot maintenance is needed and to set maintenance priorities.

In some cases community groups or other organizations may be recruited to assist with minor maintenance activities on off-street facilities such as trails. The City should work with bicycle organizations, community groups, civic organizations, and businesses to provide periodic upkeep along trail corridors and other locations that may be more difficult to maintain using standard equipment, but would not compromise the safety of volunteers.



CHAPTER 5: IMPLEMENTATION STRATEGIES

This Plan establishes a regional vision for connected, comfortable and safe bicycle and pedestrian networks. The Casper Area MPO will have a significant role to play in supporting the non-infrastructure components of the Plan, as well as directing funding to projects that support this Plan's recommendations. Infrastructure recommendations will be implemented incrementally over time largely by WYDOT and the local jurisdictions of Casper, Mills, Bar Nunn and Evansville.

The implementation timeline for infrastructure improvements will vary depending on a number of factors, including available funding, anticipated demand, safety factors, potential to piggy-back improvements on other capital improvement and street maintenance projects, and opportunities that arise through other projects among other things.

Strategy 15: Pursue a Multi-Pronged Implementation and Funding Strategy

Numerous studies have shown that bicycling infrastructure that attracts users of all ages and abilities offers a high return on investment⁴. Bicycle infrastructure improvements are low cost when compared to typical roadway projects. At the same time such improvements offer numerous benefits from optimizing the roadway's ability to move people and goods, to providing lower cost transportation choices for households, and perhaps most importantly, contributing to community livability, which helps to attract and retain residents and employers⁵.

The majority of the recommended bicycle network will likely be implemented by routinely accommodating bicycle facilities when roadways are milled and overlaid, constructed or substantially reconstructed. Other methods for funding and implementing recommended improvements may include:

- Required improvements as dictated by zoning and subdivision codes.
- Regional, state, and federal funds and grants related to transportation and even non-transportation programs.
- Dedicated funding sources at the local and regional levels. Dedicated funding may vary from year to year, but member jurisdictions should seek to reallocate a portion of transportation budget to implementing the recommended bicycle network. More cities are also dedicating annual city budget funds to walking and biking improvements and maintenance, which range from a \$200,000 to \$15 million with a median of \$1.6 million. Dedicated funding may be modest

⁴ Bicycling Means Business: The Economic Benefits of Bicycle Infrastructure, League of American Bicyclists, 2012 [http://www.advocacyadvance.org/site_images/content/Final_Econ_Update\(small\).pdf](http://www.advocacyadvance.org/site_images/content/Final_Econ_Update(small).pdf)

⁵ Alliance for Biking and Walking 2012 Benchmarking Report.

to start and build as demand increases.

- Partnerships with agencies and organizations such as the Natrona County Health Department, the Casper Area Economic Development Alliance, Casper Downtown Development Authority, Platte River Trails, Natrona County Schools, bike clubs, among others. Partners may support plan implementation in a number of ways including direct financial support, pursuing grant opportunities, sponsoring events, media and public education campaigns, etc.

Strategy 16: Prioritize Recommended Bicycle Improvements

The recommended bicycle network consists of a variety of facility types that require different levels of investment. Constrained budgets make it is necessary to prioritize recommended improvements. Improvements have been prioritized using a number of variables that address three main factor categories: Safety, Connectivity, and Demand. Table 2 lists the factors and variables, and how these variables were weighted, to determine priorities.

Table 2: Factors and Variables for Prioritizing Bicycle Improvements

Factors	Variable Weight
Demand	
Elementary/Middle School/High School within 0.5 mi	5%
Lower Density Employment Centers within 2.0 mi	3%
Higher Density Employment Centers within 2.0 mi	7%
Neighborhood Parks within 0.5 mi	3%
Regional Parks within 1.0 mi	7%
College within 2.0 mi	10%
SUBTOTAL	35%
Connectivity	
Existing On Street Facilities within 0.5 mi	5%
Trail Intersections within 0.5 mile	15%
Trail Intersections within 1.0 mile	5%
SUBTOTAL	25%
Safety	
Barriers within 0.25 mi	10%
Crashes within 0.5 mi	20%
Population Under 18 (block group)	10%
SUBTOTAL	40%
TOTAL	100%

Recommended improvements that are ranked the highest have been included in the near-term improvements list (Table 3). These projects are estimated to provide the highest return on investment in terms of contributing to a connected and safe bicycle network that attracts the greatest numbers of users. Near-term projects are intended to be implemented within 1 to 5 years. Table 3 lists the near-term projects. Medium (6 to 10 years) and long-term (10 years or more) projects, and high priority locations for intersection improvements have been included in Appendix C.

Table 3: Near-term Bicycle Improvements

Name	Facility Type	Weighted Score	Mileage
Lowell from Highland path to Farnum St	Shared Lane Markings	82.08	0.21
trail from Poplar/17th to CY/Boxelder	Path	80.00	0.08
E 14th St/ Farnum from Wolcott to Sage Path	Bike Boulevard	79.05	1.88
Fairside from Wyoming Blvd to Fairgrounds	Bike Lane	78.50	0.17
Durbin from College Dr to E 14th St	Buffered Bike Lane	77.50	0.15
Cherry/14th/Willow/Boxelder from Collins to CY	Bike Boulevard	77.43	0.64
Midwest Ave from Poplar to Durbin	Bike Lane	76.80	0.79
Eagle Dr from Talon to Wyoming Blvd	Bike Lane	76.52	0.41
Poplar from 19th to 1st	Further Study	76.18	1.14
Beech from E A St to E 15th St	Mixed	76.16	1.10
S Chestnut/W 10th Shared Lanes	Shared Lane Markings	76.13	0.53
13th from Collins to CY	Bike Lane	75.89	0.51
McKinley from E K St to E A St	Shared Lane Markings	75.81	0.67
Talon/Aspen from Plaza to W 38th	Bike Lane	75.80	0.44
Aspen/W 38th from Wolf Creek to Eagle Dr	Shared Lane Markings	75.75	0.74
Glendale Ave from E 15th to Conwell	Shared Road	75.15	0.62
Talon from CY Ave to Plaza	Shared Lane Markings	75.00	0.33
W 8th from Oak to Beech	Shared Lane Markings	75.00	0.50
E 5th/Sun Dr/Bruhn/Huber from County Club to Rail Trail	Shared Road	74.91	1.08
N Center from W B Street to W K Street	Shared Lane Markings	74.82	0.51
W 17th from Poplar to College Dr	Shared Lane Markings	74.50	0.42
E 1st St from Yellowstone to Beverly	Bike Lane	74.49	0.90
E 3rd/Collins/Kimball from Durbin to Jefferson	Shared Lane Markings	74.35	0.57
E 3rd from Jefferson to Conwell	Shared Lane Markings	73.91	0.41
E A St from Wolcott to Yellowstone	Bike Lane	73.91	0.58

Implementation Costs

It is estimated that near-term bicycle improvements will cost approximately \$2,123,747. Cost estimates are based on local bid costs and industry standards. Cost assumptions and individual costs for all recommended bicycle projects are provided in Appendix C.

Strategy 17: Prioritize Completion of Sidewalks Where Gaps Exist

There are a number of gaps in the sidewalk network which impede pedestrian travel. Many of these gaps are short, but represent true barriers to walking safely and comfortably. Sidewalks may be constructed as part of new roadways or development projects, or constructed as stand-alone projects. While filling all sidewalk gaps is important, it is not financially feasible to do so in the near-term.

Therefore, it is important to decide which sidewalk gaps should get filled first based on demand and safety factors. Table 4 is a ranked list of sidewalk gaps to be filled. High priority sidewalk gaps that exist because development is anticipated on the adjacent property, but hasn't yet occurred should be filled. Governments may receive payment from developers to pay for such improvements even after such improvements have been made through impact fees or payment in-lieu mechanisms.



Sidewalk gaps reduce the functionality and safety of the pedestrian network

Table 4: Ranked list of sidewalk gaps to be filled

Project Name	Score	Feet (Approximate)
Path from Casper Rail Trail to Fenway Street	80	49
Wyoming Boulevard from Wyoming/CY Avenue to Outer Road	78.55	1359
Northwest crossing of Wyoming Boulevard and Cy Avenue	78.1	192
Thelma Drive from 2nd to Gannett St	75.5	952
15th from Carriage Ln to Wyoming Blvd	71	488
Legion Lane from N Walsh Drive to Wyoming Blvd and 150 feet south of Legion on Thelma Drive	68.67	1936
Connector Path from Birch Street to Meadow Park	68	49
Crossing of Cy Avenue at Talon Drive	65	125
E 12th St from Jefferson St to McKinley St	60	209
Paradise Valley Parks Path Improvements	58	337
Medicine Bow St/S Walsh Dr from Wind River Ave to Gannett St	58	489
Melrose St sidewalks from E A St to E 1st St (upgrade to sidepath)	55	435
E 3rd St, Lenox St, E 4th St from 100 ft W of Lenox to Kenwood and E 4th	55	902
Beverly from 750 Feet south of Bryan Evansville to Casper Rail Trail (upgrade to sidepath)	53.98	2123
7th Street Connector from Jefferson St to McKinley St	53.5	432
2nd Street Sidewalks Near Mall/Walmart	53	1342
Path from Casper Rail Trail to E A/Melrose St	52.27	154
College Drive from W 15th St through intersection with Casper Mountain Drive	49	682
Meadowlark Link trail from Pheasant Drive to Central Drive (upgrade to sidepath)	48	268
E 4th from 100 ft east of Pennsylvania to 100 ft east of Illinois St	47.2	776
Path from Camellia Street end to Paradise Valley Pool	47	208
15th from Beverly to Nebraska	45	375
Casper St from Fairgrounds Rd to 500 feet east of Fairgrounds Rd	45	445
Bruhn Way from N Sun Drive to Provence Court	44.55	506
E 18th Street Improvements from Long Creek Path to Outer Drive	43.83	805
Werner Court from Poplar to Wilkins Circle	43.75	1323
Sidewalk improvements from Northwestern Drive/1st Street south to existing trail	43	230
Path from Northeastern Ave 200 feet northwest of 4th street to existing path	43	90
11th Street Connector from S Mitchell St to McKinley St	42.2	515
Bruhn Way from N Sun Drive to Provence Court Alternate Configuration	41	147
N Poplar St from 500 ft north of Werner Ct to 100 feet south of Werner Ct	40	636
Missouri from E 18th St to Lynn Ln	38	596
Path South of Sunrise Shopping Center from Coffman Street to Poplar Street (upgrade to sidepath)	35.4	610
Centennial Park Path from Centennial Park to Wyoming Boulevard Path	35	526
Frog Pond Connector (Washington Park 400 feet North of E 10th St) from Jefferson St to McKinley St	32	435
8th Street Connector from Nebraska Ave to 8th Street end east of Beverly Streets	30	144
Lillian Lane Path from Trigoood Drive to Sage Creek Path	29.2	145
Trail from Casper Events Center to National Historic Trails Center (upgrade to sidepath)	27.8	634
Buckboard Walk from Whispering Springs Lane to Buckboard Park	26.4	425
Kelly Walsh High School Connector Trail from Sage Creek Path to High School	25	104
Buckboard Walk from Trevett Lane to Buckboard Park	23.2	630
Whispering Springs Walk from Cold Srpings Road to Herrington Drive	23	208
Path from Cottonwood Estates to Buckboard Park	23	160
Beverly from Sagewood Ave to Amherst Ave	23	243
Long Lake Path Improvemets	17	58

Strategy 18: Utilize Engineering Strategies which Maximize the Safety and Comfort of Bicyclists and Pedestrians of All Ages and Abilities

Roadway Intersections

A fundamental strategy for increasing bicycling rates is to improve the experience and safety of bicycling on the roadway network. Nationally, historic crash statistics demonstrate the vast majority of crashes occur within intersections. Improvements for the comfort and safety of bicyclists on street segments with bicycle facilities should be extended through the functional area of intersections rather than terminating prior to the intersection. It is preferable to develop separate right turn lanes to the right of through bicycle lanes where space allows. At signalized intersections signal operations should consider the bicyclists both in actuating the signal and in having sufficient time to clear the intersection safely. At non-signalized intersections, consideration should be given to implementing engineering strategies which reduce crossing delay and improve comfort and safety for the bicyclists and pedestrians.

The provision of crossing enhancements at intersections can be obtained by the following engineering methods:

- Providing a bicycle facility (bicycle lanes, cycle track, etc) through the functional area of the intersection.
- Adding or improving bicycle detection/activation.
- Adjusting signal timing to provide pedestrians and bicyclists sufficient time to cross.
- Providing crossing enhancements such as medians, active warning devices, or signals.
- Geometric design that includes smaller curb returns to slow the speed of turning vehicles.

Roadway Segments

The space available within the street cross section should maximize the space provided to the bicyclists via wider shoulders, travel lanes, or bicycle lanes, or be utilized to create additional separation from adjacent traffic in the form of buffered bicycle lanes or separated bikeways (e.g. cycle tracks). Safety research has shown that on lower speed streets (less than 45 mph), additional width provided to motorists has zero to minimal value while extra width provided to bicyclists provides extensive benefits (see Appendix D for details). This extra width can be obtained by the following engineering methods:



Mill markings indicate where pavement markings were removed to convert (i.e. road diet) a roadway with 4 travel lanes to 2 travel lanes with a two-way center turn lane and bike lanes.

- Narrowing parking lanes
- Narrowing travel lanes
- Narrowing medians
- Removing travel lanes
- Removing parking
- Widening roadways

Appendix D provides additional design guidance intended to address local conditions and supplement readily available manuals that have been endorsed by FHWA such as the AASHTO Guide for the Development of Bicycle Facilities and Guide for the Planning, Design, and Operation of Pedestrian Facilities, the NACTO Urban Bikeway Design Guide, and ITE Guide for Designing Walkable Urban Thoroughfares: A Context Sensitive Approach.

A. Evaluation

Strategy 19: Establish a Bicycle and Pedestrian Advisory Committee

Bicycle/Pedestrian advisory committees are often established to aid in the implementation of bicycle facilities or studies or to serve as an intermediary between the City and groups in the broader community that are concerned with walking and biking conditions. Such a committee should be invited to review roadway projects, provide input to the City on bicycling and pedestrian issues, and periodically reevaluate priorities. The committee should be comprised of people of varied ages, cultural backgrounds, gender, and skill/experience levels, and have good geographical distribution across the region. Organizational perspectives the City may wish to engage on such a committee include local business groups such as CAEDA and the Downtown Development Association, the Natrona Public Schools, Platte River Trails, bicycle clubs or advocacy organizations, neighborhood organizations, and others interested in bicycling and pedestrian safety, as well as how walking and biking can contribute to a vibrant and livable community.

Strategy 20: Establish Performance Measures

Establishing performance measures in order to monitor progress allows for regular assessment of implementation and the effectiveness of bicycle and pedestrian policies and practices. Developing these measures will permit the creation of routine progress reports, which can inform periodic adjustments to the Plan. Establishing such a reporting mechanism is also a way of communicating with stakeholders to show the impact of their public investment. Table 5 provides some example performance measures.

Table 5: Example Performance Measures

Performance Measure	Performance Target	Baseline Measurement	Data Collection Frequency
Incorporate the Casper Area Trails, Path and Bikeway Plan into the Long Range Transportation Plan	2014	N/A	N/A
Miles of recommended on-street bicycle network complete	Install a minimum of 15 miles of bicycle network (including route wayfinding) annually. Complete recommended network by 2023	2013	Annually
Number of bicycle parking racks installed in the public right-of-way and with new development	40 to 50 racks per year	Number racks installed in 2013	Annually
Achieve Bicycle-Friendly Community recognition	2017 (submit application), if unsuccessful, address gaps and reapply in 2019	N/A	N/A

