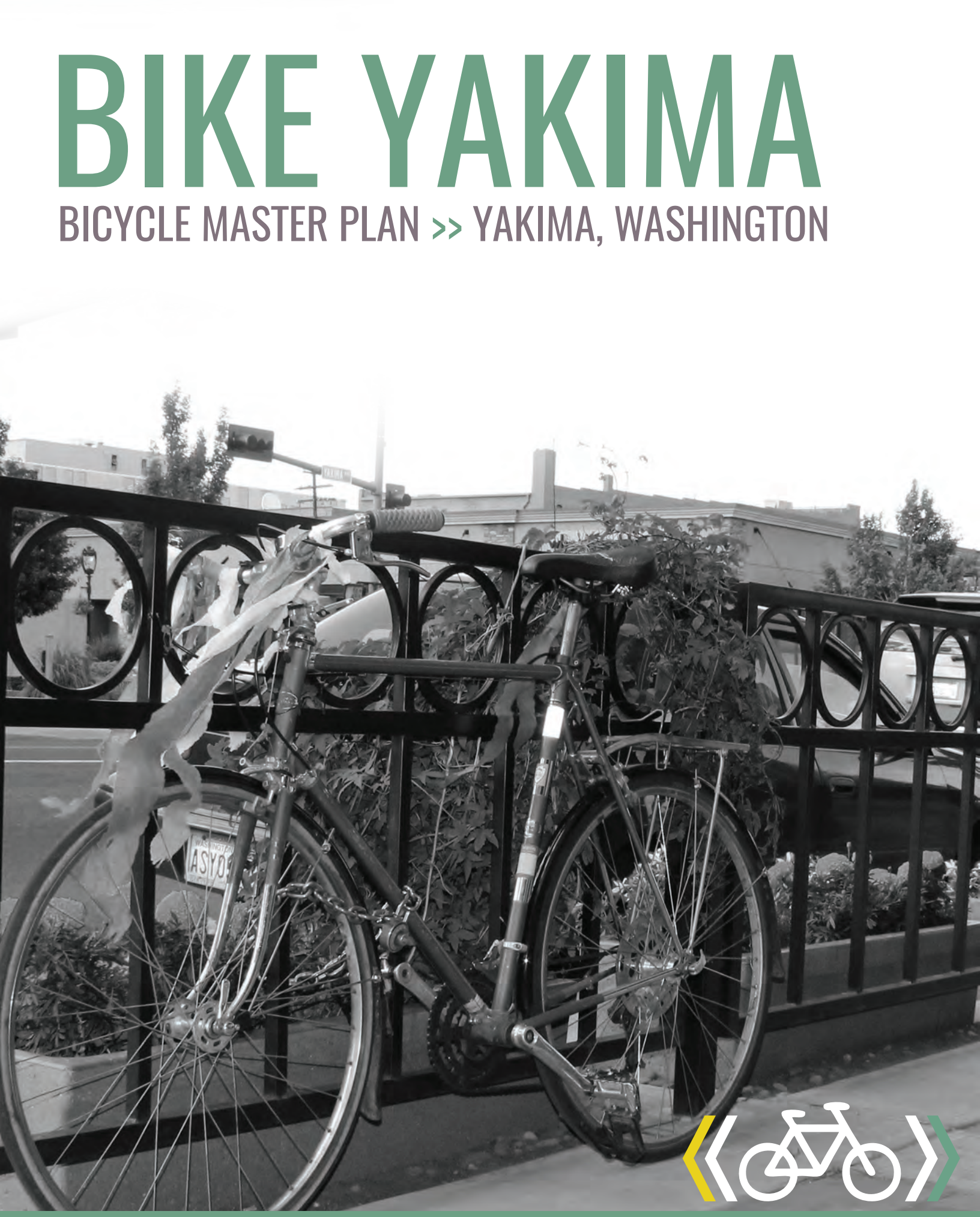
BIKE YAKIMA

BICYCLE MASTER PLAN >> YAKIMA, WASHINGTON



NOVEMBER 2017

Acknowledgments

The City of Yakima's Utilities and Engineering, and Planning Departments led the development of the 2017 Yakima Bicycle Master Plan (BMP). The intention was for this plan to be contained within the Comprehensive and Transportation Plans, as required by the Washington State Growth Management Act (GMA). At the completion of the Preliminary Draft Bicycle Master Plan in November 2015, the City's Planning Department began the State mandated updates of the 2017 Transportation Systems Plan and Transportation Element of the Comprehensive Plan, and as a result, the BMP was not adopted by council at that time. The Comprehensive and Transportation Plans have since been completed and the Bicycle Master Plan has been updated to align with these plans, bringing all Plans into compliance.

The City and Project Team would like to extend their special appreciation to the Built Environment Committee of City Council, the Project Advisory Committee, and the many members of the public, all of whom provided valuable input to the development of the Plan.

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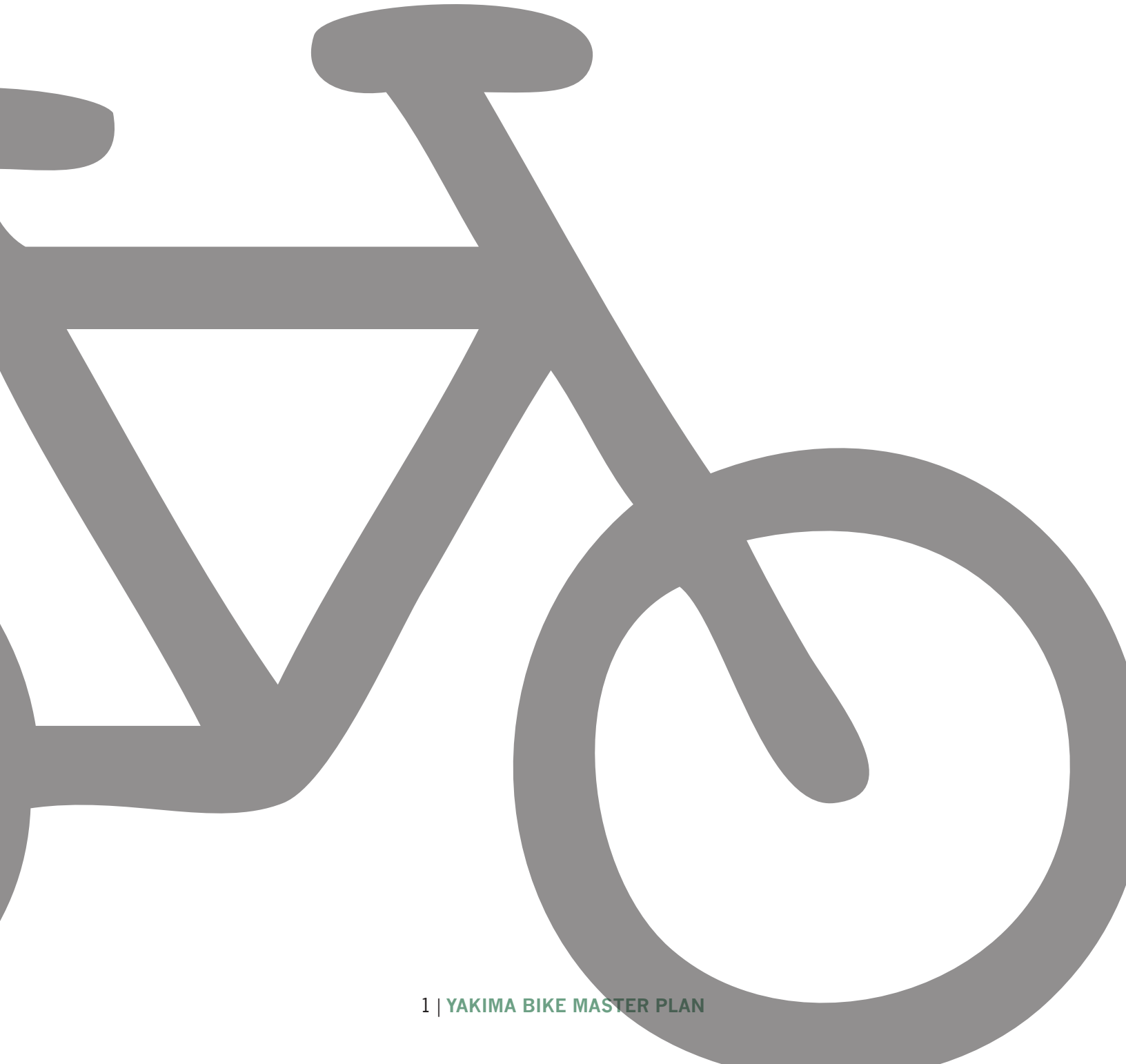


INTRODUCTION

With its beautiful natural setting, central Pacific Northwest location, and low cost of living, Yakima offers a high quality of life for its 94,000 plus residents. Many families and seniors call Yakima home, which is a critical factor in the City's efforts to provide safer and more convenient transportation choices throughout Yakima. The City has recognized that safe bicycling facilities for all ages and abilities provide many benefits that contribute to Yakima's high quality of life. Benefits include reduced air pollution, increased tourism, improved health, and reduced transportation costs. In addition to institutional support, tremendous community support for active transportation exists in Yakima, as exemplified by private efforts such as the Yakima Greenway Foundation, the growing local momentum around Complete Streets design and policy through the Yakima Health District and Yakima Valley Conference of Governments, and advocacy groups like Yakima Bikes and Walks.

PURPOSE AND PROCESS

The intent of the Yakima Bicycle Master Plan project is to develop a bicycle network plan that, when implemented, will improve bicycle transportation throughout the City of Yakima. The Plan will guide planning, development, and management of existing and future bicycle connections within the City of Yakima. The focus of the Plan is to provide a coordinated vision for accommodating and encouraging bicycling as a viable transportation mode so that Yakima residents of all ages and abilities may safely, comfortably, and conveniently bike through the City for both recreation and utilitarian trips such as shopping, commuting to work and school, and accessing transit.

The Plan builds upon previous City of Yakima initiatives, including the 1995 Bicycle Master Plan, the Yakima Greenway Master Plan, and numerous on- and off-road bicycle investments made to date. The Plan identifies challenges, opportunities, and recommended strategies for developing and maintaining a community-wide bicycle network. The Plan will position Yakima to make more strategic and cost-effective investments in its bicycle network, receive funding from a broader range of sources, and continue to provide a high quality of life.

The Yakima Bicycle Master Plan establishes a vision of bicycling for the future and identifies practical steps needed to implement projects and programs that support bicycling. With this Plan, the City aims to determine the most logical method of creating a connected network of bicycle facilities that serve the broad spectrum of individuals that bicycle in Yakima.

> **"YAKIMA IS A SMALL ENOUGH COMMUNITY, WE SHOULD HAVE MANY MORE PEOPLE RIDING BIKES THAN WE DO. I THINK THAT YOU ARE TAKING THE RIGHT STEPS TOWARDS HELPING TO CREATE A SAFE AND COMFORTABLE BICYCLING ENVIRONMENT. I ENVISION A COMMUNITY THAT IS SAFE FOR MY CHILDREN TO BICYCLE EVERYWHERE THEY NEED/WANT TO GO.**
> *-Survey Respondent*

The Yakima Bicycle Master Plan will be contained within the Comprehensive Plan and Transportation Master Plan. These plans are required by the Washington State Growth Management Act (GMA).

The City's Departments of Engineering, Public Works, Community Development and Planning oversaw the development of the Master Plan with input from the following groups:

- City Council Neighborhood and Community Building Committee
- Yakima Bicycle and Pedestrian Advisory Committee
- Yakima BMP Project Advisory Committee (PAC)
- Yakima community (residents, business owners, bicyclists, students and others).

During the planning process, the City of Yakima sought to:

- Gather community input on existing conditions, barriers to bicycling in Yakima, and priorities for improvement
- Build on the existing and planned bicycle facilities and bicycle-friendly trails
- Develop a Citywide bicycle network that includes arterial and neighborhood routes
- Prioritize improvements to the bicycle network and develop a plan for implementation
- Develop policy and program recommendations in the areas of education, encouragement, enforcement, and evaluation
- Gain community support by soliciting input from a wide range of stakeholders.

"I COMMUTE TO WORK IN DOWN TOWN YAKIMA FROM GLEED AND LOVE THE ALL THE ROUTE OPTIONS I HAVE FOR GETTING TO MY DESTINATION. I CAN SLACK AND TAKE THE EASY FLAT PATHS AND ROADS OR GO OUT OF MY WAY AND DO SOME CLIMBING. I WOULD LOVE TO SEE YAKIMA PROGRESS EVEN FARTHER THAN THEY HAVE WITH BECOMING A BIKE FRIENDLY CITY. *-Survey Respondent*

TIME LINE

This Plan was developed in four phases:

1. **Data Collection (February-July 2015):** The data collection phase included gathering public input at a public open house, meeting with City staff, the Built Environment Committee of the City Council, the Project Advisory Committee, and reviewing previous plans for bicycle facility recommendations. It also included extensive field analysis of Yakima's existing transportation network to determine locations where bicycle facilities could be integrated into the existing street network.

2. **Draft Plan (May-August 2015):** Upon completion of the data collection, a draft Plan was developed for public review. The Plan goals, objectives, actions, priorities and performance measures reflect community preferences identified through the public process.

3. **Final Draft (November 2015-August 2017):** The final draft plan was held to incorporate updates to the Comprehensive and Transportation Plans. These updates were completed in June 2017 and this plan was revised to reflect these updates.

4. **Final Plan Adoption:** The Plan will be voted on by the Yakima City Council (Fall 2017).

A PLAN FOR ALL TYPES OF BICYCLISTS

The 2012 AASHTO Guide for the Development of Bicycle Facilities discusses the ways in which to classify different types of bicycle riders, including comfort level, physical ability, and trip purpose. The AASHTO Guide classifies people willing to ride into two primary groups: experienced and confident, and casual and less confident. It is the latter group that makes up the majority of potential bicyclists: those who ride frequently for multiple purposes; those who enjoy bicycling occasionally but may only ride on paths or low-traffic streets in favorable conditions; those who ride for recreation, perhaps with children; and those for whom the bicycle is a necessary mode of transportation. In order for this group to regularly choose bicycling when making mode choices, a physical network of visible, convenient and well-designed bicycle facilities is needed.

VISION AND GOALS

The Plan vision and goals provide a framework for the Plan document, including recommendations for programs, policies, project prioritization, and implementation.

THE VISION

The Vision of the Yakima Bicycle Plan is to identify a transportation system for bicyclists of all ages and abilities that promotes safe and accessible commuting and recreational opportunities between parks, schools, the Yakima Greenway, employment and commercial centers, and other points of interest. Through public education initiatives, the Plan encourages safe relationships and interactions between people who bicycle, walk, and drive motor vehicles.

PLAN GOALS

The goals for the Yakima Bicycle Master Plan were developed with input from the Project Advisory Committee and prioritized at the project open house. The goals were used to frame the Plan document in terms of programs and policies, project prioritization, and implementation.

The Yakima Bicycle Master Plan goals and objectives provide the framework for the Plan's policy and project recommendations, and implementation strategies. The goals and objectives were developed through a multi-step process that involved City staff, the Built Environment Committee of the City Council, the Project Advisory Committee (PAC), and the general public through an on-line survey and open house.

Early conversations with City and Council staff about what they hoped to achieve with the Plan revealed five major areas of interest and concern: safety and comfort, connectivity, cost-efficiency, increased mobility options, and education and encouragement. These topics were then presented to the PAC. Through discussions and interactive exercises the team created a list of seven core goals and objectives.

The refined goals and objectives were presented at an open house as part of a ranking activity. Attendees were given three dots

and asked to place the dots on the goals and objectives board to identify their top priorities. The resulting ranked list (below) is a reflection of this input along with feedback from the PAC, City staff, and City Council members.

1. **CONNECTIVITY –** Create a connected network of on- and off-street bicycle facilities that link destinations, transit, and neighborhoods.
2. **SAFETY –** Create a bicycle network that is safe and comfortable for bicyclists of all ages and abilities.
3. **EDUCATION –** Educate both motorists and bicyclists about the rights and responsibilities of all road users in order to increase understanding and foster safe interactions. Provide city staff with information about best practices for bicycles in planning, design, and construction.
4. **MAINTENANCE OF BIKE FACILITIES –** Maintain existing infrastructure, while installing new bicycle facilities.
5. **COST EFFICIENCY –** Identify funding sources, policy changes, and other mechanisms for developing partnerships that are cost effective.
6. **WAYFINDING –** Provide easily accessible information (e.g., signage, maps) on how to use the bicycle network system.
7. **INCREASED MOBILITY OPTIONS –** Provide the ability to take trips by multiple modes and establish connections between modes.

> **"GOOD FOR MY WAISTLINE, MY BOTTOM LINE, AND MAKES ME FEEL LIKE A KID AGAIN.** *-Survey Respondent*

> **"WE NEED TO ACTIVELY PROMOTE NON-MOTORIZED TRANSPORTATION OPTIONS TO REDUCE CLIMATE CHANGE IMPACT AND REDUCE OBESITY IN YAKIMA.** *-Survey Respondent*

BENEFITS OF BICYCLING

Presently, a number of key trends are converging and resulting in a ground swell of interest in promoting bicycling as a viable transportation mode. Many cities are facing challenges in terms of economic development, repairing and maintaining infrastructure, addressing local and global environmental issues, and distributing basic services fairly. In addition, households are feeling the pressure of increasing fuel costs. There is great public interest in pursuing development and transportation solutions that are more sustainable—meaning less costly to maintain over time, less polluting, and more equitable. The bicycle is a key component of sustainable transportation systems. These trends, as well as growing public demand for more transportation choices and

opportunities for integrating walking and biking into daily routines, point to the need for implementing this Master Plan.

Cities across the country are embracing the bicycle as a viable transportation mode and a means to achieving multiple objectives, including economic development, maximizing transportation investments, improving public health, addressing transportation equity, and reducing environmental impacts.

ECONOMIC DEVELOPMENT

In many industries, the competition for workers is measured on a global scale, and people are choosing employers not just based on salary and traditional benefits, but on external criteria such as lifestyle and quality of life. Many employers are recognizing that their ability to recruit top employees depends significantly on local culture and amenities. Cities that are making investments to become more walkable and bikeable are seeing dividends in the form of attracting new residents and employers.

According to the League of American Bicyclists, a motor vehicle is the second-highest household expense, after housing itself. The American Automobile Association estimates that Americans spend on average $8,485 each year to own and operate a car. This number increases each year as gas prices, maintenance costs, and insurance costs continually increase. It is estimated that about $7,000 of this leaves the local economy (through fuel purchase, insurance, etc.) while about $1,400 remains (through taxes, maintenance, registration, etc.). Providing transportation choices can give households the option of owning fewer cars, thus freeing up more household money that can be spent in the local economy.

Investing in bicycle and pedestrian infrastructure is a key strategy for revitalizing neighborhoods by improving access to businesses, making streets more attractive to a broader range of users, improving neighborhood livability by increasing social interaction and perceptions of personal safety, as well as reducing vehicle congestion.

Many regions and states have found that bicycle tourism supports local economic development due to spending by travelers as well as bicycle related businesses. With its scenic location near Central Washington wine and hop country, Yakima has the potential to foster economic development through bicycle tourism. Recent research shows that people bicycling support local businesses, often spending more per trip than people driving.

MAXIMIZING TRANSPORTATION INVESTMENTS

Dollar for dollar, bicycling is by far one of the cheapest transportation modes to support. Often bicycle facilities utilize existing roadway space, and only require relatively low-cost pavement markings and/or signage. Additionally, bicycles cause far less wear and tear on roadways than motor vehicles.

The City of Yakima has already made substantial investments in its transportation infrastructure. Implementation of on-street bicycle facilities is a key strategy for maximizing the return of this investment. By increasing the percentage of miles traveled by bicycle, Yakima can improve the efficiency of its existing roadway system, and forego costly congestion management projects. A walking or bicycling trip may end at a destination such as work or shopping, or it can be part of a longer journey that involves transit. Pairing bicycle facility improvements with transit gives people more transportation choices and expands the reach of the transit system. Targeting the provision of safe and convenient bicycle facilities such as lanes, trails, and parking will increase the service radius of a transit stop or station, and will provide options where transit does not run frequently.

HEALTH

The Centers for Disease Control and Prevention recommends 150 minutes of moderate-intensity aerobic activity every week, which is equivalent to 10 minutes of brisk walking, 3 times a day, 5 days a week. Providing opportunities for people to integrate walking or biking into their daily routines can help them more easily meet these guidelines and stay healthy and fit.

According to recent Centers for Disease Control information, the rates of obesity among children and adolescents age 2 to 19 remains a serious problem. Recent studies show the prevalence of childhood obesity at about 17 percent.

Given that many elementary and middle schools in Yakima are located on low traffic collector and local streets, there is tremendous opportunity for increasing the number of children able to integrate physical activity into their daily routines by walking or biking to school through the installation of relatively low-cost safety improvements.

ENVIRONMENTAL

One-quarter of all trips taken in the United States are within a mile, or about a 20-minute walk. Half of all trips taken are within three miles, or a 20-minute bike ride. Yet for the vast majority—78 percent—of these shortest trips, people are using their cars. Replacing short-distance car trips with bicycling and walking trips can contribute to the reduction of harmful emissions.

EQUITY

Providing the community viable and affordable transportation choices that include transit, bicycling and walking is a key component of an equitable transportation system. In Yakima, the poverty rate was 21.1 percent, compared to 14.1 percent in the state as a whole. Nationally, research shows that people from disadvantaged neighborhoods are more likely to bike for transportation. Bicycling can also provide a link to public transit, which many depend on to reach critical destinations, including work, shopping, and health services.

EXISTING FACILITIES

The Yakima Greenway Trail is an outstanding, well used 18-mile paved trail that connects parks, lakes, playgrounds, natural areas, and other amenities along the north and east sides of the city, parallel to the Yakima and Naches Rivers. The Greenway Trail, along with other trails, bike lanes in the downtown area and the west side, and several signed bicycle routes provide a basis for creating a connected, integrated network. With the exception of the Yakima Greenway Trail, existing bike lanes and separated paths exist in isolation--they do not connect with other bike facilities or provide connections to key destinations. While connections may be made via limited shared roadways and signed routes, these roadways may not be comfortable for all types of bicycle riders. The goal of this Plan is to provide a safe, comfortable, connected network for the citizens of Yakima.

> **"YAKIMA IS A BEAUTIFUL CITY TO CYCLE IN. I HAVE HAD MORE POSITIVE INTERACTIONS WITH MOTORISTS THEN I HAVE NEGATIVE. WHILE CLIMBING A FEW OF YAKIMA'S HILLIER SECTIONS I HAVE HAD MOTORISTS SLOW DOWN AND GIVE ME WORDS OF ENCOURAGEMENT WHICH I GREATLY APPRECIATE!**
> *-Survey Respondent*

The Plan builds and expands upon Yakima's existing bicycle facility network. Yakima currently has approximately 5 miles of bike lanes; 14 miles of shared-use paths (trails); signed bike routes that follow W Chestnut Ave, S 37th Ave, W Lincoln Ave, and W Martin Luther King, Jr. Blvd; and close to ten miles of shared lane markings on arterial streets (see Appendix B).

The Yakima Bicycle Master Plan is predicated on the creation of a network of dedicated bicycle facilities that provide safe connected routes through the City for riders of all abilities. In this spirit, the Plan recommends the use of shared lane markings sparingly, in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and National Association NACTO guidelines. In addition, the plan recommends conversion of many existing signed bike routes and roadways with shared lane markings to dedicated bicycle facilities. Existing bicycle lanes and trails are incorporated into the Plan, with proposed facilities completing gaps in the network.

SHARED LANE MARKINGS

National guidance on the use of shared lane markings has evolved in recent years. Shared lane markings, as defined in MUTCD and NACTO, are not considered facility types, since they do not designate dedicated space for bicyclists. However, they can be important tools in a complete bicycle network, providing wayfinding and bicycle route definition as well as lane positioning cues for bicyclists on shared roadways. FHWA has documented studies on the value of shared lane markings, which demonstrate that the markings increase the distance between bicyclists and parked cars, increase the distance between motorists and cyclists, and reduce the number of bicyclists riding the wrong way on roads and riding on sidewalks. While shared lane markings provide value to the subset of bicycle riders that are comfortable sharing space with motor vehicles, they do not provide a comfortable facility for the majority of riders.

Because national guidance on the use of shared lane markings is evolving, the Plan recommends only a few miles of shared lane markings, and instead focuses primarily on creating lower stress facilities such as bicycle boulevards.

"I ALSO WOULD APPRECIATE SPOTLIGHT SENSORS SENSITIVE ENOUGH FOR BIKES. I SPEND A LOT OF TIME AT STOP LIGHTS WAITING FOR A CAR TO ARRIVE TO ALLOW ME TO SAFELY PASS THROUGH AN INTERSECTION.
-Survey Respondent

SIGNED BIKE ROUTES AND WAYFINDING SIGNS

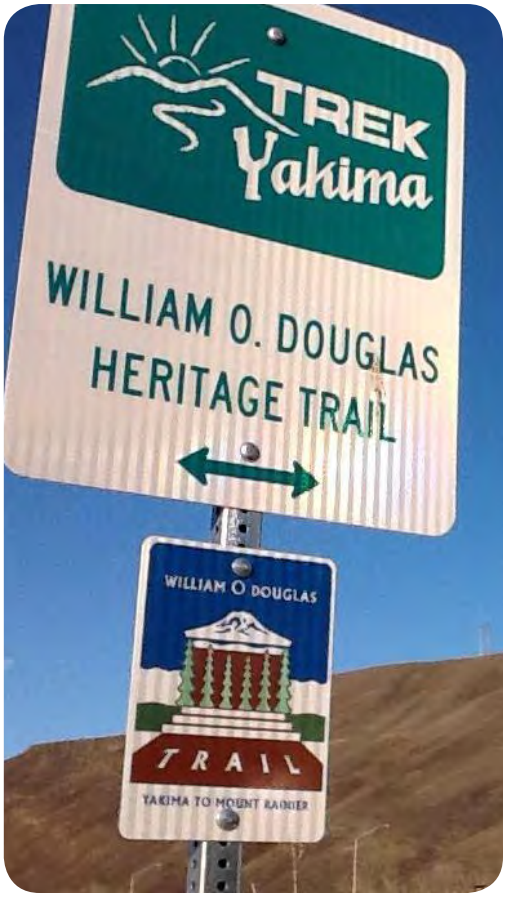
Signed bike routes and bicycle wayfinding signs, while not bicycle facilities per se, are another important tool for the development of a bicycle network, especially in support of transportation trips by bicycle. Wayfinding information can be used to provide navigation; information about distance and time to destinations; and to mark bike routes, connections to shared use paths, and bicycle boulevards. For example, wayfinding signs should be installed to bolster the effectiveness and use of the bicycle boulevards as proposed in this plan (see bicycle network plan map). The MUTCD provides guidance about signs standards, placement, and installation of wayfinding signs.

BICYCLE LANES

In the downtown area, there are bike lanes on W Lincoln Ave, W MLK Jr. Boulevard, S 3rd Street, and S 6th Street. There are also a few segments of bike lanes on the east end of town, on Tieton Drive, W Nob Hill Boulevard, and W Washington Avenue. These bike lanes, once connected as recommended in this Plan, will be important components in the city-wide comprehensive bicycle network.

TRAILS

The Powerhouse Trail and the Yakima Valley Greenway Trail are recreational and commuting trails. The Yakima Valley Greenway Trail is approximately 10 miles long and provides access to several parks, fishing lakes, playgrounds, and natural areas. The Powerhouse Trail is an in-city trail that connects to schools, city parks, and residential areas.



REVIEW OF POLICIES AND PLANS

This section provides a review of plans and policies related to bicycling and transportation in the Yakima Valley. To maintain focus on the most relevant plans, only plans adopted after 2005 were reviewed. The purpose of this review is to summarize the plans already in place and to discover already identified opportunities and challenges concerning bicycle usage in the Yakima area. Plans reviewed are listed in Table 1.1 below.

Table 1.1: Reviewed Plans & Policies

PLAN	JURISDICTION	YEAR
YVCOG METROPOLITAN AND REGIONAL TRANSPORTATION IMPROVEMENT PROGRAMS FOR 2017-2020	Yakima Valley Conference of Governments	2016
YAKIMA COUNTY TRAILS PLAN (2014)	Yakima County	2014
YAKIMA VALLEY REGIONAL TRANSPORTATION PLAN	Yakima Valley Conference of Governments	2013
CITY OF YAKIMA PARKS AND RECREATION COMPREHENSIVE PLAN	City	2017
YAKIMA URBAN AREA COMPREHENSIVE PLAN 2040	City	2017
YAKIMA URBAN AREA TRANSPORTATION PLAN UPDATE, 2040	City	2017
BICYCLE AND PEDESTRIAN ADVISORY COMMITTEE	City	N/A
YAKIMA REVENUE DEVELOPMENT AREA	City	N/A

YAKIMA VALLEY CONFERENCE OF GOVERNMENTS METROPOLITAN AND REGIONAL TRANSPORTATION IMPROVEMENT PROGRAMS FOR 2017-2020

This plan covers improvement projects from 2017-2020. The City of Yakima should coordinate with the Yakima Valley Conference of Governments to include bicycle improvements in future transportation improvement programs.

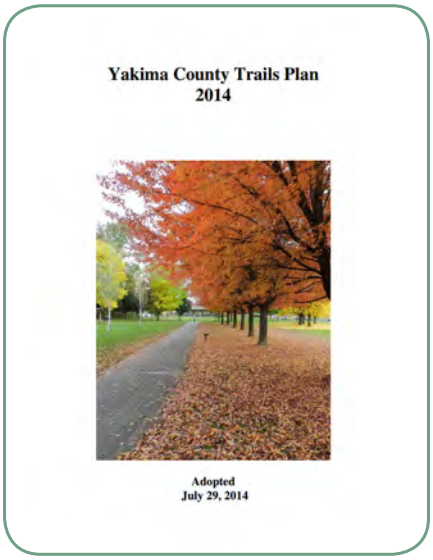
YAKIMA COUNTY TRAILS PLAN (2014)

The Yakima County Trails Plan (Trails Plan) stresses the community, economic, and health benefits of trails and greenways. A survey found that the highest priorities for residents were for more bike lanes on county roads and trail connectors with other communities. The Trails Plan focuses on routes in unincorporated areas of Yakima County and recognizes that non-motorized travel should not be seen as strictly recreational. Several greenway corridors already exist in the Valley, including the Yakima Greenway, the Cowiche Canyon Conservancy, the Sunnyside/ Grandview Pathway and the County Line Pathway.

The Trails Plan describes in detail existing trails and lists proposed trails, including condition, length, and type of use allowed. Forty-nine miles of trails are currently in use, with 153 miles proposed. Motorist awareness, local initiatives, and law enforcement are considered important parts of the Trails Plan.

YAKIMA VALLEY REGIONAL TRANSPORTATION PLAN

The goal of the Regional Transportation Plan (RTP) is to develop and maintain a regional multimodal transportation system that provides for the safe and efficient movement of people and goods, supports the economic growth of the region, and is compatible with land use plans and the environment. The Regional Transportation Plan is focused on preservation, including maintenance of existing facilities. The first chapter stresses agency coordination and public involvement. Policies in the Regional Transportation Plan support the development of a bicycle network along with the need to routinely include pedestrian and bicycle accommodations as a part of capital and maintenance projects.



- Policy 6.8: Monitor and expand on Commute Trip Reduction (CTR) programs for affected employers and voluntary work sites. CTR work sites are served by a well-developed network of bicycle facilities. With the exception of five of the work sites (Yakima Valley Farmers Clinic, Department of Ecology, City of Moxee, Alexandria Moulding and Yakima Valley Hospital), the sites directly connect to a bicycle network route.
- Policy 6.9: Improve systems for pedestrian and bicycle travel as part of capital roadway projects and maintenance programs.

Appendix C of the RTP lists existing transportation facilities. The RTP notes that over 99% of arterial roadways have a v/c (volume/capacity ratio) of less than 0.70 (70% capacity), meaning that there is underutilized capacity on the roadways that could be reallocated to improve efficient movement of people and safety for all users.

YAKIMA URBAN AREA COMPREHENSIVE AND TRANSPORTATION SYSTEMS PLAN 2040

The Yakima Urban Area Comprehensive Plan and Transportation Systems Plan 2040 include goals and policies supportive of multi-modal improvements, and also incorporates the priority projects of this plan, as identified in Section 3.

The Bicycle Master Plan will be incorporated as a modal plan within the Transportation Systems Plan (TSP) and the Transportation Element (TE) of the Comprehensive Plan; these projects will be completed in 2017.

The TSP and TE will incorporate key elements of the Bicycle Master Plan, including a bicycle system map, the list of prioritized projects, and guidance for bicycle facility roadway design standards. There may be refinements to the bicycle network plan to ensure consistency.

CITY OF YAKIMA 2017-2022 PARKS AND RECREATION COMPREHENSIVE PLAN (2017)

Bicycling is included as a form of recreation in the City of Yakima Parks and Recreation Comprehensive Plan. The Plan suggests that safe bicycle and pedestrian access to parks be considered when siting future parks. One of the policies is to use existing irrigation canals and Yakima Valley Transportation corridors for pathways. The William O. Douglas Trail is an important regional facility, and the Parks Plan recommends establishing connectivity with the trail portion that passes through Yakima.

BICYCLE AND PEDESTRIAN ADVISORY COMMITTEE

The committee was created in 1994 and reestablished in 2017 to provide counsel in the creation of a Yakima Bicycle/ Pedestrian Master Plan and to seek consensus among staff, committee members, affected citizens, local neighborhoods, and other interested groups on bicycle/pedestrian projects and implementation. The committee was formed to review and adopt preliminary and final plans for creating and financing specific bicycle/pedestrian projects, keep the public informed about existing and proposed bicycle/pedestrian projects, and encourage citizen participation in the planning and implementation process.

YAKIMA REVENUE DEVELOPMENT AREA

A new development is planned on the northeast side of Yakima. According to a Yakima City Council briefing on November 26, 2013, new streets and a new interchange ramp for I-82 are planned between Yakima Avenue and US 12. The new Cascade Mill area is intended to provide a regional commercial center for the Yakima Valley Region, specifically large-lot commercial and industrial sites with easy interstate access. The development of this area provides an opportunity to link the Greenway with downtown. While the intent may be to serve regional customers arriving via automobile, the proximity to downtown and the Greenway provides an excellent opportunity for bicycle access.

COMPLETE STREETS

Yakima Valley Conference of Governments (YVCOG) has been advocating a Complete Streets approach when planning and designing streets. YVCOG staff have been working with local jurisdictions such as Union Gap, Mabton, and Sunnyside to adopt their own ordinances. The City, along with the YVCOG and the Yakima Health District, hosted a Complete Streets event in May 2015 during the master plan process called Voices for Our Streets. The City of Yakima is working with YVCOG to develop a Complete Streets network policy that will allow all modes to safely and efficiently access all parts of the city. A complete streets network policy will likely be adopted in 2016, and included in the 2040 Transportation Plan.

CHALLENGES

Yakima's current land use is somewhat dispersed, with large lot commercial and industrial areas. Truck movement is vital to Yakima's economy, and due to the dispersed nature of industrial sites, warehouses, and freeways, most arterials will need to maintain access for trucks. The Yakima Greenway is on the opposite side of I-82 and SR-12, which presents challenges to connecting the Greenway to the rest of the bicycle network. Another challenge is the rail line that divides the City, running north/south west of I-82, it interrupts the grid and limits opportunities for on- and off-street connections. Railroad and freeway crossings should not be neglected as they are vital to the usability of the entire system.

Arterial crossings are one of the main challenges echoed by members of the public and the bicycle advisory board. Several residential streets that continue north/south or east/west through town provide a low stress place to ride a bike, but are interrupted by very difficult crossings, particularly at 16th and 40th Avenues.

Finally, the existing maintenance budget does not currently include adequate resources to maintain an expanded bicycle network, which is an important element of implementation.

OPPORTUNITIES

The residential areas in Yakima have been built in a traditional grid. This, combined with the fact that many areas of the city are relatively flat, means that there are many street options for bicycling.

As noted in the Yakima Valley Regional Transportation Plan, many of Yakima's roads are currently operating under capacity. Yakima recognizes the benefits of "road diets," which are the conversion of four lane roads to three lane roads (see Goal 6.7.6 of the Yakima Urban Area Comprehensive Plan). These conversions provide safety benefits for all modes, reducing motor vehicle crashes while providing roadway space for bicycle facilities such as bike lanes or buffered bike lanes. While truck access must be considered, there are many examples around the country of bicycle facilities and freight facilities existing on the same roadway. There is an opportunity for the Yakima Bicycle Plan to follow best practices related to reducing bicycle and truck conflicts.

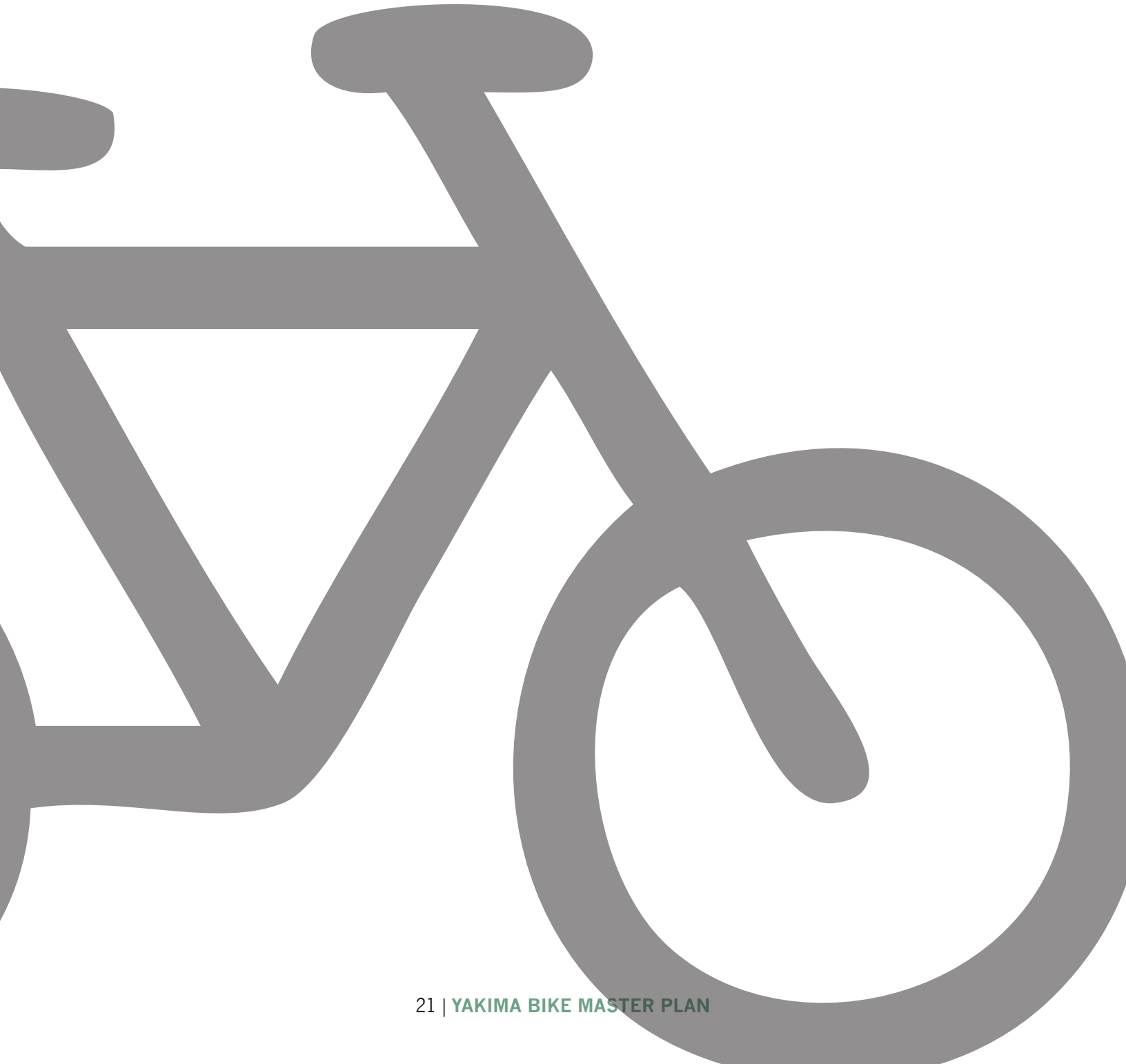
The Yakima Valley Regional Transportation Plan states that bicycle and pedestrian facilities should be improved as a part of capital projects and maintenance (Policy 6.9), and the Yakima Urban Area Transportation Plan establishes a policy to include multimodal facilities in capacity and system projects in Yakima. Additionally, Yakima's Municipal Code requires bicycle lanes and sidewalks to be provided along all new or reconstructed arterial and collector arterial streets, where feasible (12.06.040). Thus, there is an opportunity to use existing policies to include bicycle facilities in all new construction, including the planned Cascade Mills development.

Yakima has an active advocacy group, Yakima Bikes and Walks, which can be used as a resource for improving bicycling in Yakima. This group has already helped obtain and implement a grant to install bicycle racks in downtown Yakima in coordination with local businesses. In order to expand the accessibility of bike parking in Yakima, there is an opportunity to institute a requirement for installing short or long term bicycle parking for new development (in the Yakima Municipal Code). This type of program would also support Yakima Valley's commute trip reduction goals and promote economic development.

Street maintenance is a priority for Yakima. As part of the transportation network, re-striping and sweeping of bicycle facilities and replacement of bicycle network signs should be included in the maintenance budget.

The Yakima County Trails Plan affirms the need to provide on-street facilities and trail connectors that link the regional greenway systems to neighboring communities and to Yakima's business districts. The trail network has the potential to provide inter- and intra-city travel for utilitarian and recreation trips for local residents as well as tourists. A well-established bicycle network would contribute to the overall economic success of Yakima, allowing residents to spend less money on transportation and contributing to the tourist economy by drawing in bicycle tourists.

PUBLIC & STAKEHOLDER ENGAGEMENT «2



INTRODUCTION

The public involvement and stakeholder engagement process for the Bicycle Master Plan solicited input at multiple levels: from City Staff; the Neighborhood and Community Building Committee (NCBC) of the City Council; a specially-convened Project Advisory Committee (PAC); and the general public. Information and feedback from each of these groups helped steer the project goals and Plan development. The process also sought to understand bicycle commuting needs as well as development of educational efforts geared toward improving driver behavior and encouraging bicycle travel throughout the City.

Events and social media were also used to communicate with the public about ongoing Plan development. An online map and survey allowed the public to provide speci ic input on network recommendations, individual bicycling behaviors, and bicycle infrastructure.

NEIGHBORHOOD AND COMMUNITY BUILDING COMMITTEE

The project team gathered input from the NCBC of the City Council throughout the course of the project.

Some of the hopes and concerns the committee members brought up during the meetings included:

- Desire for a well-connected bicycle network
- Desire for a family friendly bike community, prioritizing connections to schools and providing protected bikes lanes where possible
- Concern about overlap between bicycle network and freight routes
- Interest in and discussion about particular routes in the bicycle network: the role of N 1st Street, Chestnut Avenue and the intersections with N 16th and 40th Avenues.

Members of the public provided valuable insights at the BEC meetings voicing their concerns and hopes for the project. One particularly important exchange led to an effort to provide information and solicit input at the Cinco de Mayo Cultural Fiesta held in early May and put on by Hispanic Chamber of Commerce/ Cámara de Comercio Hispana.

BICYCLE AND PEDESTRIAN ADVISORY COMMITTEE

When reestablished in 2017, the Council's Bicycle and Pedestrian Advisory Committee was instrumental in reviewing the final draft documents. The committee reviewed the project list, identified areas for future facilities, and also ensured consistency of the BMP to the Transportation Systems Plan 2040.

PROJECT ADVISORY COMMITTEE

A project advisory committee (PAC) of approximately a dozen members was assembled by City staff. The PAC members were selected to represent a broad range of bicycle interests and included representatives from the following groups:

- City Community Development, Planning, Public Works, Police, and Engineering Departments
- Yakima Bike and Walks
- Yakima Basin VELO
- YVCOG
- Local bike shops
- Yakima Greenway
- Yakima Transit

The PAC met three times over the course of the project, in April, June, and September of 2015. The PAC provided valuable input to the project regarding the project vision and goals, education and outreach ideas, network planning, and priority projects.

OPEN HOUSE

Yakima Valley Conference of Governments has been advocating a Complete Streets approach in the planning and design of roadways. YVCOG staff have been working with local jurisdictions including Union Gap, Mabton, and Sunnyside to adopt their own Complete Streets ordinances. The City, along with the YVCOG and the Yakima Health District, hosted a combined Complete Streets/ Bicycle Master Plan open house event on May 21, 2015. The

event, Voices for Our Streets, was held at the Yakima Convention Center.

Two speakers spoke about designing streets for all users. Speakers included Professor Marc Schlossberg, a professor of City and Regional Planning at the University of Oregon and co-author of Rethinking Streets: An Evidence Based Guide to 25 Complete Street Transformations. Professor Schlossberg discussed Complete Streets principles and case studies from his book. Peter Lagerwey, of Toole Design Group, a nationally-known expert on non-motorized projects and a Complete Streets trainer, in his talk titled, “Implementing Complete Streets in Your Community—Steps and Stories,” outlined practical steps communities can take to execute a Complete Streets policy.

Before and after the lectures, local agency representatives were stationed at information tables and displays, providing an opportunity for community members to gain information and ask questions about local and regional transportation plans and services.

The Bicycle Master Plan project team had the following boards on display:

- Project overview
- Project goals, including an interactive board where participants ranked their priorities
- Project schedule
- Bicycle facility types
- Maps where participants could note challenges and concerns for biking in Yakima

The event was attended by nearly 60 people. Between the lively discussion during the question answer period, the comment forms, and the informal discussions, the team received detailed input about where people would like to bike in Yakima and the challenges that need to be addressed. One theme that came up repeatedly was a desire for more protected bike facilities.

SURVEY AND CROWD SOURCED MAP

To capture a broad spectrum of attitudes and interests about bicycling in Yakima, the project team developed an online survey and crowd sourcing map. Links to these input tools were provided on the City website and publicized at events and through interested individuals and groups like Yakima Bikes and Walks.

The survey assessed interest and attitudes toward bicycling and bicycling facilities, as well as opinions on potential changes to the street network required to accommodate bicycle facilities.

The map allowed people to identify locations where bicycling barriers or opportunities exist, routes that people commonly ride or would like to ride, or add a comment to any feature. All suggestions and comments were reviewed by the project team and were used to inform the development of the bicycle network plan and facility, policy and program recommendations.

Results from the survey and map are featured in Appendix D.

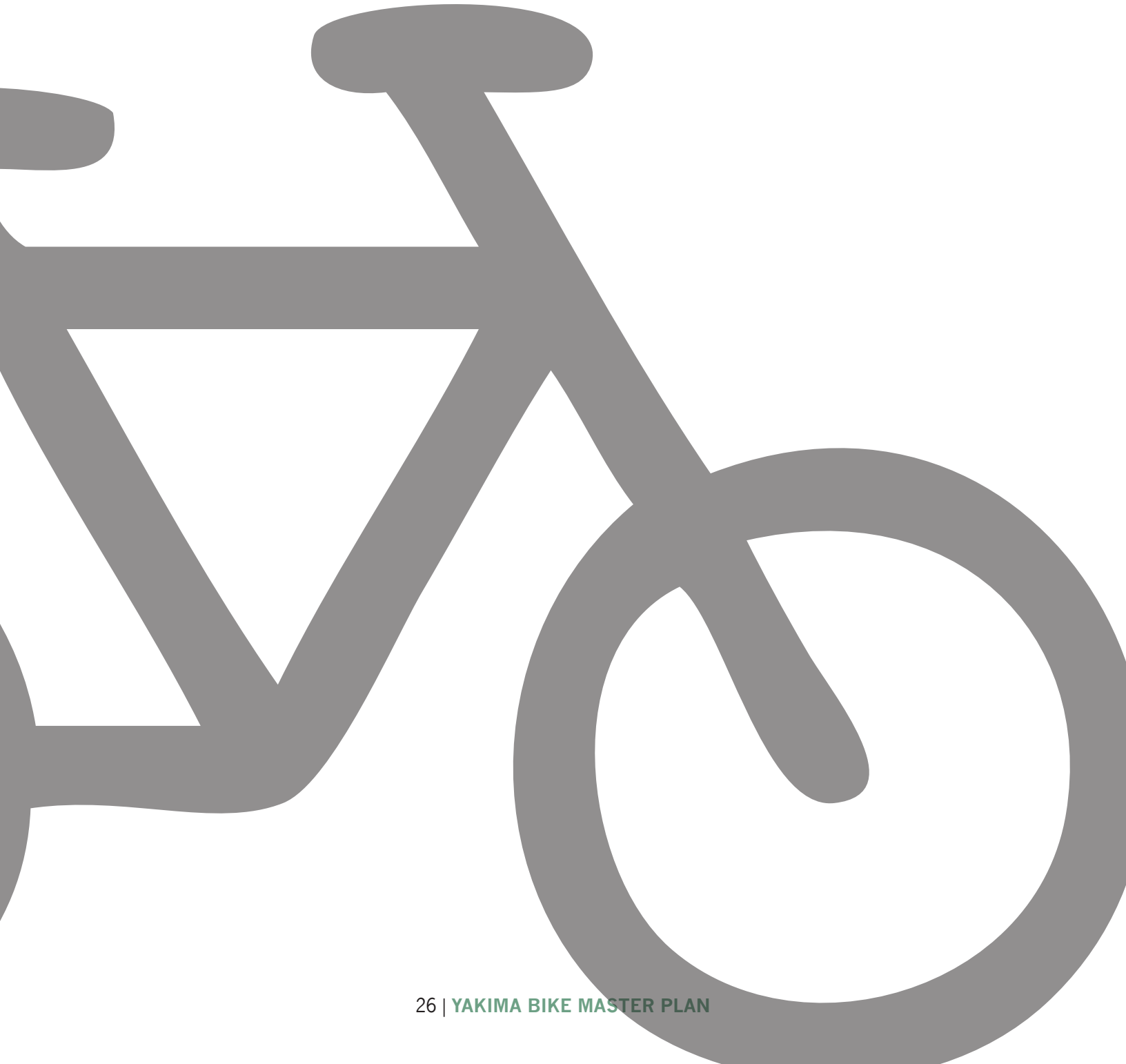
OTHER EVENTS

The City hosted an event in mid-May called Feet in the Street. The event included many activities geared toward different age groups and bicycling abilities and presented an opportunity for City staff to provide community members with project information and publicize links to the Plan online survey and map.

DRAFT PLAN OUTREACH

The draft master plan was presented to the Built Environment Committee and the Project Advisory Committee on September 17, 2015. Following these meetings, the draft plan and maps were posted on the project webpage for public comment. Comments were taken until the end of October.

BICYCLE NETWORK RECOMMENDATIONS « 3



INTRODUCTION

The Bicycle Master Plan recommends a city-wide, connected bicycle network that provides opportunities for inexperienced and experienced bicyclists of all ages and abilities. It reflects extensive stakeholder input, the latest guidelines in facility planning and design, and field analysis of all recommended facilities. The recommended bicycle network includes 74 miles of on-street bicycle improvements ranging from shared streets to protected bike lanes. It also recommends approximately 4 miles of new trail connections that link key parts of the network. Table 2.1 provides a summary of miles for each type of recommended bicycle facility. Appendix A provides more information on designing and maintaining the bicycle network.

The following factors were considered in the development of the recommended bicycle network. These reflect input received from the public, city staff, review of existing plans, and recognized best practices.

- One mile or less spacing of bike facilities
- Review and consideration of existing facilities
- Routes that complete or connect to existing bicycle facilities
- Routes that connect schools (supporting Safe Routes to School efforts) and other community facilities such as recreation centers, parks, and libraries
- Routes that connect to major trails
- Roadways that have existing excess capacity (e.g. peak-hour traffic volumes are significantly below what the roadway can accommodate)
- Roadways that provide parallel routes to arterials with high traffic volumes
- Routes that connect to commercial and retail destinations
- Routes that will attract the “casual and less confident” rider.

BY THE NUMBERS: RECOMMENDATIONS OF THE YAKIMA BIKE MASTER PLAN

NEW ON-STREET FACILITIES	*TOTAL RECOMMENDED MILES*
BIKE LANES	27
BUFFERED BIKE LANES	17
SHARED LANE MARKINGS	4
CLIMBING LANE	1
BICYCLE BOULEVARD	23
PROTECTED BIKE LANE	2
TRAIL CONNECTIONS	4
TOTAL	78

FACILITY DEFINITIONS

SHARED LANE MARKINGS

Shared lane markings are not technically considered a bicycle facility, since all travel lanes where bicycles are not prohibited are shared lanes. However, shared lane markings are an important tool that can assist bicyclists and motorists by indicating appropriate bicycle positioning on a roadway, increasing safety and visibility.

BICYCLE LANE

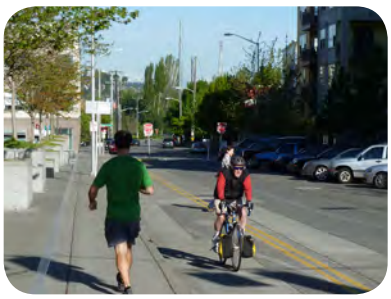
Marked space along a length of roadway designated for use by bicyclists.

BICYCLE CLIMBING LANE

On a sloped roadway where there is not sufficient space to provide bicycle lanes on both sides of the street, a bicycle lane on the up-hill provides space for slow climbing bicycles, with shared lane markings on the downhill.

BUFFERED BICYCLE LANE

A bike lane with additional buffer space between the bike lane and the auto lane or parked cars. Used on high-volume or high-speed roads, or roadways with high parking turnover.



CONTRA FLOW BICYCLE LANE

Bicycle lane separated by a painted yellow centerline marking on a street with one-way motor vehicle traffic, to allow contra-flow bicycle traffic.

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.

A bicycle boulevard incorporates several design elements to accommodate bicyclists. These may include, but are not limited to:

- Stop signs on side streets to allow free flow of bicyclists
- Traffic circles to slow motor vehicles
- Wayfinding signs for bicyclists
- Shared lane markings where appropriate for wayfinding
- Crossing improvements at major streets
- Traffic diverters for motor vehicles designed so bicyclists may pass through

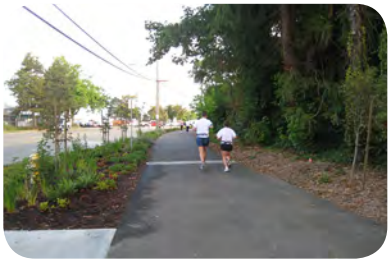
Every street is different and will require varying levels of treatment. For this type of facility to be effective, crossing treatments at major arterials are essential.

PROTECTED BIKE LANE (ALSO CALLED CYCLE TRACK)

A portion of a right-of-way which has been designated by curbs, planting strips, flex posts, parked cars, or other physical barrier for the exclusive use of bicyclists. Protected bike lanes are typically one-way, but may be two-way under special circumstances. Protected bike lanes can operated sidewalk level or street level.

SHARED-USE TRAIL

A pathway (paved or soft surface) not adjacent to a roadway that accommodates pedestrians and bicycles, dog walkers, joggers, etc.



SIDEPATH

A shared-use pathway that is physically separated from motorized vehicular traffic by an open space or barrier, and is either within the highway right-of-way or within an independent right-of-way. As shared-use paths, sidepaths may also be used by pedestrians, skaters, wheelchair users, joggers and other non motorized users.

WAYFINDING SIGNS AND PAVEMENT MARKINGS

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

GREEN BIKE LANE

Part of a bike lane that demarcates a conflict zone or an area where motor vehicles may be merging across the bicycle lane. Used as a spot treatment, colored bike facilities like green bike lanes provide proven safety benefits through increased visibility and awareness of bicyclists.

BICYCLE DETECTION AT INTERSECTIONS

A pavement marking symbol that indicates the appropriate position for a bicycle to trigger a traffic signal.

BIKE PARKING

Bicycle racks should be designed so that they:

- Support the bicycle at two points above its center of gravity
- Accommodate high security U-shaped bike locks
- Accommodate locks securing the frame and one or both wheels
- Provide adequate distance (minimum 36”) between racks so that bicycles do not interfere with each other
- Do not contain protruding elements or sharp edges
- Do not bend wheels or damage other bicycle parts
- Do not require the user to lift the bicycle off the ground

BICYCLE NETWORK RECOMMENDATIONS

EXISTING FACILITIES

Yakima has approximately 5 miles of bike lanes currently installed that are noted on the network maps in Appendix B. There are several signed bike routes and shared lane markings throughout the city. Signed bike routes are not considered a roadway facility type, and while they may add value to the network, they are not covered in this Plan. Guidance from the MUTCD, AASHTO, and NACTO on shared lane markings has changed since Yakima installed markings on city roadways. The existing shared lane markings were therefore not considered as part of the network.

DEVELOPMENT OF STUDY NETWORK

Streets considered for potential bicycle facilities included streets with existing bicycle accommodations (bicycle lanes, signed bicycle routes or shared lane markings), arterials with excess capacity (based on traffic counts provided by the City of Yakima), trail network connections, streets that provide critical access across barriers such as the railroad tracks and freeways, and continuous residential streets.

FIELD WORK

The consultant team completed a field review of the entire existing and potential bicycle network, as outlined in the study network. Lane configuration and width were measured and topography was observed for each of the roads in the draft study network. At some locations, width could not be measured because of safety concerns related to traffic volume or speeds. In these cases, fairly accurate (within a foot or two) measurements were taken from Google Earth. Using the data from the field, public input, and traffic counts provided by the City, the draft network was developed.

RECOMMENDED NETWORK MAP

Upon completion of the field work, a draft network was developed and then refined to better reflect Plan goals and objectives, public input gathered at the open house and through the on-line map, best practices for improving safety, and links for improving connectivity of all recommended facilities. The result is a cost-effective network that creates a safe way to travel around the entire city by bicycle and access schools, businesses and neighborhoods. The recommended network map is included in Appendix B.

PROJECT PRIORITIZATION

PROJECT NETWORK DEVELOPMENT PROCESS

As a first step to providing a safe, connected network of bicycle facilities through Yakima, a “skeleton” network was identified that connects the existing facilities and provides connections through downtown and to the Greenway. The following set of criteria was used to select the facilities included in the project network.

1. **VALUE IN NETWORK AND CONNECTIVITY:** The projects selected provide a spine for the future network, filling critical network gaps and linking to existing facilities, the Greenway, and downtown.
2. **EASE OF IMPLEMENTATION:** Projects were generally selected that would not require additional right-of-way acquisition or major modification to existing roadways. Funding strategies are addressed in Chapter 5.
3. **PUBLIC INPUT:** Projects that were often mentioned on the online map and in the open house were considered for inclusion in the project network.

The project network map is included in Appendix C. The numbered labels on the map correspond with the project numbers below.

The City has the flexibility to implement projects that are not in project network as funding and other types of opportunities arise.

LIST OF SHORT TERM PROJECTS

1. Chestnut Avenue and Yakima Avenue Bicycle Boulevard and Walnut Street Bike Lanes

Chestnut is already a signed and well-used east/west bicycling route. The project team heard many times that Chestnut is a good route, but that crossing arterials is difficult. Crossing improvements are proposed at S 40th Avenue and Chestnut, and improvement to the existing signalized intersection at S 16th Avenue and Yakima Avenue is needed. These streets are heavily trafficked motor vehicle routes, and careful study is needed to create a safe crossing. The complete east-west route utilizes bike lanes and buffered bike lanes on W Walnut Street to connect to downtown.

2. 32nd Avenue Bicycle Boulevard

N 32nd Avenue has the advantage of signals at major arterial crossings. Additional signage, speed humps, and diverters would make this road an excellent bicycle boulevard. Current motor vehicle volumes are approximately 4,000 ADT at the section with the highest volume. At Englewood Avenue, where the proposed route jogs west to N 34th Avenue, a two-way protected bike lane could be added by removing the right turn lane from Englewood to N 34th. The bike boulevard would then continue on N 34th, where a stoplight is proposed at Fruitvale Blvd. This route connects Chestnut Street, the Powerhouse Trail, and River Road

3. Greenway Connections

The Yakima Greenway Trail has a few existing gaps that, if completed, would make this facility more continuous, accessible and usable.

3a. N 16TH AVENUE CONNECTOR

Currently, N 16th Avenue provides a connection to the Yakima Greenway Trail on the SR 12 overpass. However, N 16th Avenue only has a southbound bike lane and no northbound bike lane. The road is wide enough to add a two-way protected bike lane on the west side of N 16th Avenue. Motor vehicle lanes could be shifted east on the bridge to accommodate the protected bike lane. Freeway exit ramp crossings must be very well marked. The City/WSDOT should consider adding refuge islands at freeway exit ramp crossings. Temporary refuge islands can be created with paint and bollards at a lower cost than concrete islands.

3b and 3c. YAKIMA AVENUE AND NOB HILL OVERPASSES

Yakima Avenue and Nob Hill Boulevard provide two of the three connections from downtown Yakima across I-82 to the Yakima Greenway Trail. Both have wide sidewalks that serve as bike paths across I-82, and both need significant improvements. Curb bulbs are recommended to shorten crossing distances and slow vehicles making turns on and off the interstate ramps. Trail crossing signs at crosswalks would alert motorists to the presence of bicyclists and pedestrians. The sidewalk on Nob Hill Boulevard should be widened and improved for bicycle travel west to S 18th Street to connect the proposed north/south bike lanes on S 18th Street with the overpass and Greenway.

Example of mixing zone near a freeway interchange

On Yakima Avenue, there is an opportunity for the south sidewalk to connect to the Greenway through a vacant parcel after the S 18th Street overpass.

4. I Street Bike Lanes

I Street connects to downtown over the railroad tracks and is an important link in the bicycle network, as well as the overall transportation network. Bike lanes are recommended, but this street will need further study to determine the best way to accommodate freight and bicycles.

5. 3rd Street Bike Lanes

N 3rd Street already has bike lanes from Walnut Street to Race Street, and is a good north-south connector. Buffered bike lanes are recommended from I Street to E Street, and new bike lanes from E street to Walnut Street and Race Street to Pacific Avenue.

6. Lincoln Avenue and MLK Jr. Boulevard protected Bike Lanes

Lincoln Avenue and Martin Luther King Jr. Boulevard are important downtown connectors, providing bicycle linkages under the railroad tracks. Existing bike lanes and shared lane markings are recommended for an upgrade to protected bike lanes, providing a more comfortable experience for bicyclists. Both Lincoln Avenue and MLK Jr. Boulevard can be reduced to two vehicle travel lanes to provide space for protected bike lanes.

7. Fair and Pacific Avenue Bike Lanes

S Fair Avenue and Pacific Avenue provide a connection through the southeast portion of downtown and connect to the proposed path over I-82 on E Nob Hill Boulevard. Bike lanes could be installed by narrowing lanes and restricting parking on one side of the road on Pacific Avenue from S 3rd Street to S Fair Avenue, and narrowing lanes or removing the center turn lane on Pacific Avenue/ S 18th Street from S Fair Avenue to E Nob Hill Boulevard. Bike lanes could be installed on Fair Avenue by implementing a road diet from E Nob Hill Boulevard to Pacific Avenue, and by removing the center turn lane from Pacific Avenue to the junction with E Lincoln Avenue and E Martin Luther King Jr Boulevard.

Example of a trail crossing sign

8. Fifth Avenue Bike Lanes

Fifth Avenue is a good candidate for bike lanes through the west part of downtown. Bike lanes are recommended, with buffered bike lanes where space allows.

9. Powerhouse Canal Pathway Connections

The Powerhouse Canal Pathway has a major gap along Lincoln Avenue between 24th Avenue and 20th Avenue. Bike lanes on Englewood can complete this gap, but the ideal long-term solutions would be a shared-use trail. Possible strategies include removing one lane of traffic or widening the sidewalks.

More intuitive connections are needed where the Powerhouse Canal Pathway offsets at N 20th Avenue and N 16th Avenue. A bike boulevard treatment on Willow Street and bike lanes on N 6th Avenue complete the connection to the rest of the network.

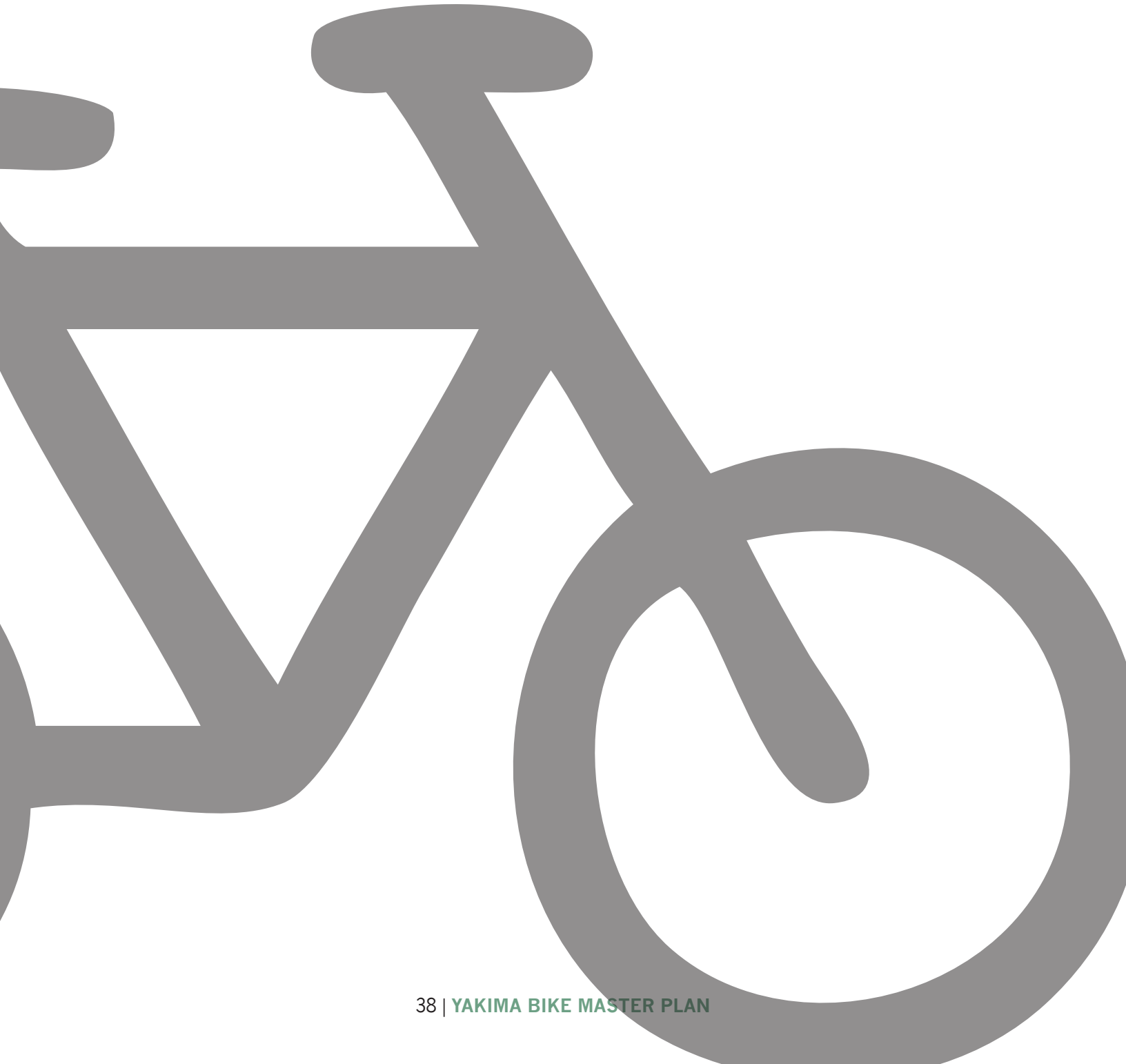
10. S 11th Avenue/S 10th Avenue Bicycle Boulevard

South of W Chestnut Ave, a bicycle boulevard on S 11th Ave, transitioning to S 10th Ave north of Nob Hill Boulevard, would provide a low-stress route to the southeastern part of the city.

11. Washington Avenue Buffered Bike Lane

Washington Avenue from S 24th Avenue to S 64th Avenue is a good candidate to add buffered bike lanes. This area is near the Yakima Airport and provides a southern connection to West Valley.

PROGRAM RECOMMENDATIONS «4



INTRODUCTION

Infrastructure is only part of the solution to making a city more bicycle-friendly. Efforts must also be made to address non-infrastructure elements such as unsafe behaviors of all roadway users, the development of safe bicycling skills, and general awareness of bicyclists on the roadway.

The Project Advisory Committee (PAC) held a robust discussion on the "Five E's" with a particular focus on education, which resulted in a set of three key messages that the City and its partners can use to effectively target their programmatic efforts as they move forward with implementation of the Yakima Bicycle Master Plan. Prioritization of these three messages, below, were determined to be the most important education related issue for Yakima.

1. **SHARE THE ROAD.** Encourage people who drive to respect bicyclists' right to use the roadway; and increase awareness of bicyclists as vulnerable users of the roadways who need safe and comfortable places to ride.
2. **BICYCLING IS AN ECONOMICAL AND ATTRACTIVE TRAVEL CHOICE.** Bicycling is a flexible and economic way to travel that can increase Yakima residents' trip range and reduce roadway congestion. Developing a well-connected bicycle network will make Yakima an appealing place to visit, and may attract prospective businesses.
3. **BICYCLING IS A HEALTHY ACTIVITY THAT BENEFITS THE WHOLE COMMUNITY.** Bicycling is an excellent way for children and adults to meet the recommended physical activity targets to maintain good health (see Chapter 1, Benefits of Bicycling). According to the Centers for Disease Control, "Creating or modifying environments to make it easier for people to walk or bike is a strategy that not only helps increase physical activity, but can make our communities better places to live."

This rest of this section documents recommendations developed by the PAC and the project team to leverage existing programs undertaken by the City of Yakima, partnering agencies, and volunteer organizations as well as recommendations for additional programs that can help the City communicate these key messages.

It is worth emphasizing the important role that volunteers and advocates will play in improving conditions for bicyclists in Yakima. The City can set the course via policies and infrastructure

improvements, but the actions of all citizens both in daily conduct and organized group actions have the power to make bicycling in Yakima enjoyable, safe, and comfortable for a wider range of users. Fortunately, there are groups, clubs and individuals dedicated to improving bicycling conditions in Yakima. A number of agencies and organizations could potentially play an active role in encouragement and education efforts, including but not limited to the Yakima Valley Conference of Governments, Yakima Police Department, Washington State Department of Transportation, Yakima Health District, Washington Bikes, Yakima Greenway Foundation, Yakima Parks and Recreation, Yakima Bikes and Walks, and bike shops. The combined efforts of the City and its partners will help to establish and sustain a healthy bike culture.

THE 5 E'S, FROM THE LEAGUE OF AMERICAN BICYCLISTS:

EDUCATION: Giving people of all ages and abilities the skills and confidence to ride.

ENCOURAGEMENT: Creating a strong bike culture that welcomes and celebrates bicycling.

ENFORCEMENT: Ensuring safe roads for all users.

ENGINEERING: Creating safe and convenient places to ride and park.

EVALUATION & PLANNING: Planning for bicycling as a safe and viable transportation option.

EDUCATION

The ranking exercise conducted at the project open house identified education as a key component to the success of the plan. A safe transportation system begins with an understanding of the rights and responsibilities of all residents that use the City's streets, sidewalks, and trails. Education is required to address issues such as wrong-way riding, how bicycles and cars can safely share the road, the importance of looking both ways, and compliance with stopping regulations. This information needs to reach as many residents as possible and it needs to be provided in both English and Spanish. Below is a discussion of programs and other efforts focused on educating the public about bicycling safety, some of which the City of Yakima and its partners are already offering or pursuing.

SAFE ROUTES TO SCHOOL (SRTS)

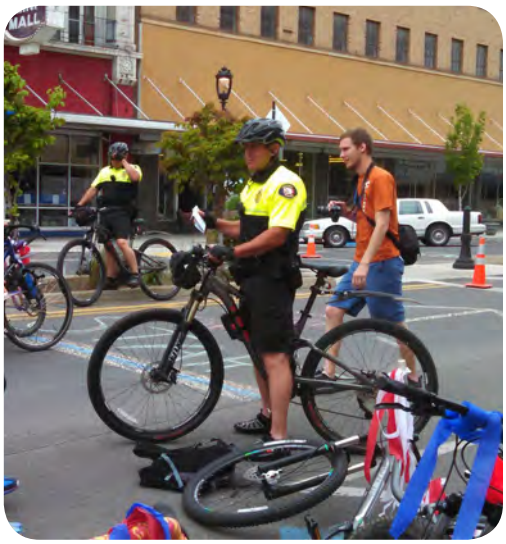
Safe Routes to School (SRTS) programs involving parents, schools, community leaders and local, state, and federal governments work to improve the health and well-being of children by enabling and encouraging them to walk and bicycle to school.

Many of Yakima's public schools are located on collector streets and accessibility via walking and biking would be greatly improved with implementation of the recommended bicycle network. Many schools in Yakima provide walk route maps for the students; safe bicycling routes, along with safety information, could be included with such materials. The City of Yakima has received funding for SRTS projects from WSDOT in the past, and the City should continue to apply for funding.

Bicycle and pedestrian safety skills will benefit the children throughout their lives. According to the National Center for Safe Routes to School, it is more likely for children today to be driven to school and activities than their parents were, resulting in fewer opportunities to practice safe biking and walking skills. Ensuring consistent, certified instruction for all children of Yakima will help to improve safety for the City's next generations. The National Highway Traffic Safety Administration (NHTSA) offers many materials about bicycle and pedestrian safety, including curriculum materials, and resources in Spanish. The school district could also develop a Bike to School Day—a good opportunity to provide bicycle education materials and training.

EDUCATING LAW ENFORCEMENT OFFICERS ABOUT BICYCLES

It is important for all law enforcement officers to fully grasp the rights and responsibilities of all roadway users. Educating law enforcement officers about the laws applying to bicycles, as well as the operational characteristics of bicycles can help officers better understand what behaviors they should be targeting from an enforcement point of view. A police bike patrol unit is an excellent way for officers to engage in the community and experience the challenges faced by bicyclists. Yakima police should continue to operate their bike patrol in the summer.



POLICE EDUCATION SEMINARS & RODEOS

Police officers or staff have shown support by assisting with bicycle rodeos, and could continue to provide bicycle safety education such as seminars and bicycle rodeos. Rodeos begin with the instructor providing an explanation of bicycle skill expectations for students. Various stations are set up to give students the opportunity to practice a variety of specific bike handling skills for operating a bike safely and legally on the street. Bicycle rodeos are provided during the school day, and at events upon request. Health fairs and safety events, such as the Feet in the Street event, also provide opportunities to promote safe cycling clinics for children, families and adults.

CITY WEBSITE

The City's website is very helpful and functions as a clearinghouse for several important transportation-related resources. The City should consider utilizing the web site to distribute educational information in a focused, centralized transportation and recreation section oriented toward bike (and pedestrian) safety in English and Spanish. The City could expand and maintain an online reference that provides easy access to bicycle laws, safety tips, maps of the bicycle network, and links to programs that encourage people to bike more often. Ideally, this information should be presented all in one place on the City's website, or if this is not desired, then links to relevant pages, i.e. 'Planning', or 'Parks and Recreation' should be compiled and provided in one place. Other ideas to consider:

ADD A CALENDAR SHOWING BICYCLE EVENTS

Posting bicycle events on a monthly calendar would help people become more aware about upcoming events. The City could partner with agencies and interest groups that have bicycling events, such as Yakima Bikes and Walks, and publicize information about the events on the City's website, Facebook page, and distribute through email notices. All postings and event information should be available in a format that is accessible and easy to read.

USE YAK BACK TO REPORT PROBLEMS WITH BICYCLE INFRASTRUCTURE

The City's Yak Back site can be used as a way for citizens to report issues with bicycle infrastructure. https://www.yakimawa.gov/yak-back/

CROSS-POST BICYCLE-RELATED VOLUNTEER OPPORTUNITIES, ACTIVITIES, AND PROGRAM

The City's Parks and Recreation, Planning, and Public Works departments and YVCOG all have projects or programs that either address bicycling directly or have complementary objectives. Cross posting the efforts of other City agencies and departments will make for a more convenient experience for the web user, and will promote cooperation and joint development across City departments.

DEVELOP A COMPREHENSIVE SAFETY EDUCATION PROGRAM

As resources become available, the City, in partnership with other organizations such as YVCOG, the Health District, and private industry, e.g. healthcare, could develop a comprehensive safety education program. The tone should be cooperative, emphasizing that all modes need to be aware and respectful of each other on roads and trails. Below are additional activities that should be marketed under the umbrella of an energized and comprehensive program.

CREATE AND & DISTRIBUTE EDUCATIONAL AND PROMOTIONAL MATERIALS

Educational and promotional materials such as maps, bumper stickers, billboards, website content, flyers, etc., with a unified theme and message can be very effective in raising awareness about bicycle safety driving motor vehicles with care. Materials could be made available in both English and Spanish.

PROMOTE AND SUPPORT ADULT BICYCLE SAFETY CLASSES

Many adults are unaware of how to properly fit and wear a helmet, signal turns to vehicular traffic and are unfamiliar with other safe road riding skills. The City could promote adult bicycle fun rides, clinics and engage volunteers that are certified bicycle instructors (by the League of American Bicyclists) to organize and conduct the clinics and rides. Clinics and rides could be posted on the bicycle calendar of events. The City bicycle web page can also provide links to those groups that provide publicly accessible clinics, rides and workshops.

Additionally, the City could provide classroom space for bicycle safety workshops. Groups and clubs regularly offer clinics and workshops but have difficulty finding spaces that can provide both classroom space and areas to practice maneuvers. The City and County buildings may have meeting rooms and parking lots that can be used for instruction. These spaces are usually unused during weekend and evening hours. Providing these spaces for free would increase the frequency that clinics and workshops are offered.

ENCOURAGEMENT

Yakima is fortunate to have an enthusiastic cycling community. The City has several cycling groups that promote bicycling in and around the city and organize group rides. While many of the groups are oriented to recreational riding, their members' presence on the roads and paths increases awareness of all cyclists.

BIKE TO WORK DAY

The purpose of Bike to Work Day is to encourage people to try substituting a bicycle for their car for one day, with the hope that the experience will inspire more regular bicycle commuting. The City could partner with YVCOG, the Health District, and other organizations to host bike to work events in Yakima. The City could promote greater participation by encouraging its employees to bike to work, as well as holding bike commuter "lunch-and-learn" workshops. Another idea to increase participation is to partner with bicycle shops and other organizations to have a mobile unit to provide free bike tune-ups. The City could also partner with health related organizations, bicycle groups, and local restaurants to provide a breakfast station and prizes for participants. The City could seek partners to promote this event, and should explore other strategies for increasing the number of participants.

CREATE A BICYCLE FACILITIES MAP

A bicycle facility map can be an effective tool for encouraging novice bicyclists to ride more often because it helps them understand key connections for getting to their destination. The map should be available in both print and digital formats (downloadable PDF and mobile device format), in English and Spanish. The map should provide detailed bicycle facilities information (on-street routes and off-street trails), and could potentially include safety tips and bikes on buses information. It could also include a summary of laws and regulations applying to bicyclists.

BICYCLES AND TRANSIT

Public transit can be an attractive solution for extending bicycle trips. Secure bicycle parking facilities should be provided at the transit center and potentially other transit stops. Additionally, the entire fleet of Yakima Transit buses are equipped with bicycle racks which allow individuals to take their bicycles with them as they travel on the bus. The bus attached bicycle racks can be used at no additional cost.

INCENTIVE PROGRAMS

Employer incentive programs are excellent tools to promote commute trips by bicycling and walking. Such programs benefit both the employees as well as the employers, who have to supply fewer parking places for their employers and have healthier employees. Incentives can take a variety of forms, from vouchers to payroll credits and gift cards. Employees earn them by meeting a target number of weekly or monthly commute trips by bike.

PAC members suggested incentive programs for school children based on existing programs, such as: the Yakima Transit program that allows kids free admittance to the public pool with a bus transfer; the Kiddin' Around on the Yakima Greenway activity program; and the Mileage Club through Clary Motors, which rewards kids who achieve perfect school attendance. Such programs could be adapted to promote bike trips by kids (e.g. admittance to the public pool with a bicycle helmet, rewards for bike to school mileage or trips, organized recreational rides for kids, and similar programs).

PARTNERING

Entities and interest groups outside the City can contribute to the success of the Master Plan. Below is a list of organizations that the City should collaborate with to encourage bicycling. Several of these groups participated in the Master Plan process.

Yakima Valley Conference of Governments and the **Yakima Health District** have been involved Complete Street policy and planning, and administer grants and programs related to promoting bicycling and walking. YVCOG promotes biking to work and provides information on their website.

Yakima Greenway Foundation "works to conserve, enhance and maintain the Yakima Greenway as a continuing living resource." The Greenway is an important part of the Bicycle Network, and the City should continue to partner with the Foundation to ensure high quality connections between the Greenway path and the City streets. Programmatically, there are opportunities for partnership and promotions such as the Jr. Gap to Gap race on the Yakima Greenway, which could add bicycling to their activities for kids.

Yakima Walks and Bikes is an advocacy group that is focused on creating a bicycle and pedestrian friendly environment in Yakima, and the surrounding communities.

Yakima Basin VELO is a membership-based, recreation-focused group that conducts regular rides in and around Yakima.

Yakima has multiple bicycle shops through which education and encouragement information could be disseminated. Shops may also be potential sponsors of events like Bike to Work Day or community rides.

Other potential partners include major employers and other schools of higher education including Pacific NW University of Health Sciences, Perry Technical Institute, and Yakima Valley Community College.

CHAMBER OF COMMERCE/ LATINO CHAMBER OF COMMERCE

Bicycle trips often involve shopping or restaurant/café visits. The chambers could promote and capitalize on the patronage bicyclists to local businesses around Yakima by installing more bicycle parking and supporting special events such as bike to work day.

GROUP RIDES

Whether for recreation or commuting purposes, riding in groups gives novice cyclists confidence to ride both on and off-road, and introduces new and convenient routes for everyday rides. The rides can cover vast areas and provide tours of the City, or they can help people identify comfortable and convenient routes to work. The best rides are those that start and end in the same location but explore new routes and destinations, giving people a new awareness of the bicycle network. Group rides have the added benefit of creating a strong bicycle presence on the roads. Yakima Walks and Bikes, Yakima Basin VELO, and area bicycle shops have all been active in promoting bicycle group rides.

Students can also benefit from group rides. The Safe Routes to School movement encourages young cyclists to bike to school in groups with adult chaperones. These rides increase the students' confidence in their bicycling skills and establish healthy habits for life. Bicycle trains have been especially effective for high-school aged students, providing a cheaper alternative to driving.

While the actual rides may be led by volunteers from local bicycling organizations, the City can provide resources and materials on planned group rides by including information about the events on

the City's website, and in email distributions. The City can also link to other groups that produce how-to materials for organizing group rides or bicycle trains to school.

EVENTS

The events the City and YVCOG conducted during the Plan development, Feet in the Street and Voices for our Streets, were examples of opportunities for the City to promote bicycling, provide education, and deliver key messages around safety, fun, active living. The City should continue to seek out and take advantage of these opportunities. Establishing these or similar events as annual affairs would help maintain momentum by leveraging existing relationship with volunteer groups and support Yakima's growing bike culture.

ENFORCEMENT

POLICE ON BIKES

An effective way to engage bicyclists and model safe bicycling maneuvers is to put police officers on bicycles. Police on bicycles also tend to have a more thorough understanding of the rights and responsibilities of all users if they receive specialized training on bicycle safety skills and laws. An added benefit to using bicycles instead of cars is that officers on bicycles travel at slower speeds and are more engaged with their surroundings.

PROGRESSIVE/EDUCATIONAL TICKETING

Through the public process, community members indicate that many drivers appear to be unaware of bicycle safety legislation. While it is everyone's responsibility to be educated on current laws, it is more effective to educate drivers and bicyclists before issuing citations. With progressive ticketing, officers offer educational materials, and then warnings before issuing citations and fines. Offering this grace period allows drivers time to adjust to new laws. This approach can also be applied to bicycle enforcement.

SUPPORT DISTRACTED DRIVING CAMPAIGNS

Drivers that are not fully paying attention to the road and other vehicles create unsafe conditions for all modes. Bicyclists are especially vulnerable as they are often hidden in driver's blind spots. Washington has a hand-free law, but distracted driving messages are still important as it remains a threat to all roadway users.

Schools can also participate by conducting pledges for parents promising that they will not use their cell phones while driving, especially in school zones. The City could also consider adopting an ordinance that allows police to issue fines specifically to individuals caught using hands-on cell phone devices while driving in school zones.

PARKING ENFORCEMENT

Motor vehicles are not allowed to park or load/unload in bicycle lanes. Proper enforcement and ticketing must be employed to prevent people from blocking the bike lanes.

CROSSWALK ENFORCEMENT

For Yakima's network of bicycle boulevards to work correctly, motorists must yield to greenway users at arterial crossings. Targeted enforcement of motorists failing to yield may produce beneficial results. Some cities have also tried positive enforcement, where they reward motorists for proper yielding behaviors. This type of enforcement usually generates additional education and encouragement if it is picked up by local media outlets or social media.

ENGINEERING

Engineering is a critical element of the Plan, as reflected in Chapter 3, Network Recommendations. A well-engineered bike facility invites proper behavior by all road users, reduces conflicts, and encourages bicycling. A full Design and Maintenance Guide is included in Appendix A. Several national publications, including the AASHTO Guide for the Design of Bicycle Facilities, the NACTO Urban Bikeway Design Guide, and the FHWA Separated Bike Lane Planning and Design Guide, should be consulted for additional guidance.

EVALUATION

Performance measures should be used to track implementation of Plan goals as well as project development. The first year's goal is for the Plan to be adopted by the City of Yakima.

Thereafter, the City will integrate the Bicycle Master Plan with the annual Transportation Improvement Program (TIP). Project recommendations should be related to the implementation strategies and performance measures in the Plan.

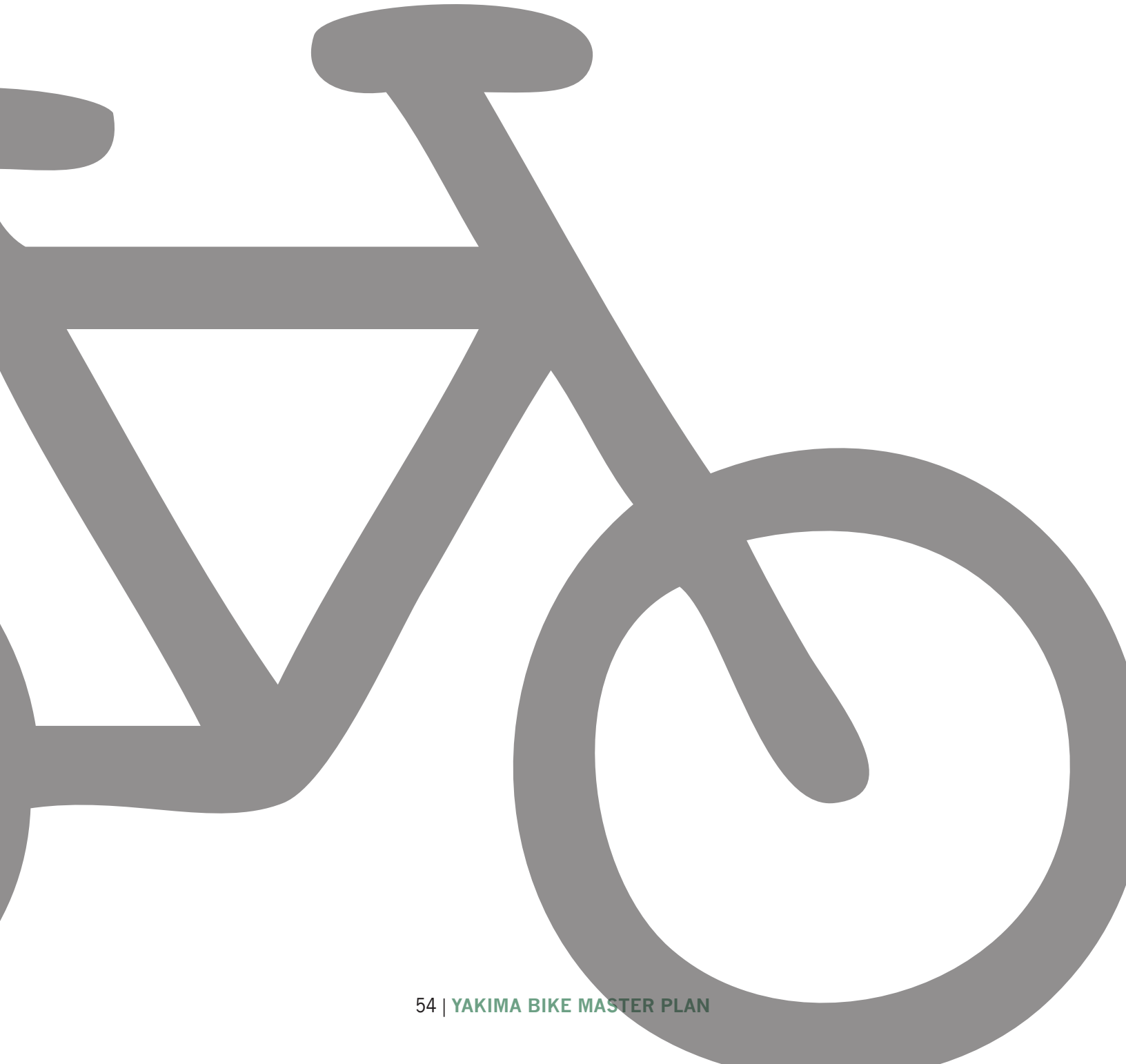
Since the Bicycle Master Plan is based on current concepts, it should be thoroughly reviewed every ten years for content and updates, consistent with the State-mandated Growth Management Act Comprehensive Plan update cycle.

Example Plan performance measures are included in the following table:

Example plan performance measures

PERFORMANCE MEASURE	PERFORMANCE TARGET	BASELINE MEASUREMENT	DATA COLLECTION FREQUENCY
ADOPT THE BICYCLE MASTER PLAN AND INCORPORATE INTO YAKIMA TRANSPORTATION PLAN AND COMPREHENSIVE PLAN	2017	N/A	N/A
REDUCE BICYCLE CRASHES	Reduce bicycle crashes by 50% by 2025	2015 rate	Annually
MILES OF RECOMMENDED ON-STREET BICYCLE NETWORK COMPLETE	Annually install a minimum of 5 miles of the adopted bicycle network plan (bike lanes, bicycle boulevards, etc.). Complete network by 2025.	2015	Annually
NUMBER OF BICYCLE PARKING RACKS INSTALLED	Install a minimum of 5 bicycle racks per year	To be counted in 2016	Annually
NUMBER OF TRAIL ACCESS POINTS CONNECTED BY ON-STREET BICYCLE FACILITIES	Complete one trail access point per year	Number of new trail access points identified in the bicycle network plan	Annually
INSTITUTE A BIKE COUNT PROGRAM, *using the National Bicycle and Pedestrian Documentation Project methodologies and volunteers to conduct count*	Establish program in 2016, begin annual counts	2016 counts	Annually
INCREASE BICYCLE RIDERSHIP	Number of bicyclists counted at locations through the City	Increase number of at count locations by 2% per year	Annually
ADOPT A COMPLETE STREETS NETWORK POLICY *(routine accommodation of bicycle facilities in capital and maintenance transportation projects)*	2016	N/A	N/A

IMPLEMENTATION STRATEGIES «5



INTRODUCTION

This chapter describes practical and feasible strategies for implementing the Yakima Bicycle Master Plan. In order for bicycling to become an attractive mode of transportation that is accessible to Yakima residents, it is essential to institute practices to ensure the proper construction and maintenance of the physical network and to provide programs for the encouragement of bicycle use. It will also be important to establish complementary laws and regulations and to expand the planning and support functions of the City to ensure this work can be accomplished. This chapter provides a framework for plan implementation and addresses funding opportunities.

INVESTMENT – PLANNING LEVEL COST ESTIMATE

The level of investment that will be required to implement this Plan is modest in comparison to other transportation facilities. The planning level cost estimate to implement the on-street elements of the proposed 78 mile network is just under seven million dollars (estimate for 4 miles of off-road trail requires additional engineering analysis and is not included in the estimate). The bicycle network includes approximately 45 miles of bicycle lanes (conventional, buffered, and climbing lanes) 4 miles of shared lane markings, 23 miles of bicycle boulevards, and 2 miles of protected bike lanes. Table 5.1 outlines the costs per facility type for the full bicycle network. It is important to note that the cost of bicycle boulevards takes into account traffic calming and intersection improvements.

Table 5.1: Proposed Facility Costs By Type

NEW ON-STREET FACILITIES	TOTAL RECOMMENDED MILES	NETWORK COSTS
BIKE LANES*	27	$1,035,364
BUFFERED BIKE LANES*	17	$1,425,000
SHARED LANE MARKINGS	4	$ 36,415
CLIMBING LANE*	1	$ 60,160
BICYCLE BOULEVARD**	23	$3,747,156
PROTECTED BIKE LANE	2	$ 381,190
TRAIL CONNECTIONS	4	*Variable*
TOTAL	**78**	**$6,685,285**

** Cost calculation assumes no on-street parking lane stripe. Costs will be slightly higher where there is a striped parking lane.*

***Costs assume one pedestrian signal for every two miles of bicycle boulevard. Depending on further study, this level of signalization may not be needed, and may bring costs down. Some proposed bicycle boulevards already have several signals in place, such as S 10th Avenue and N 32nd Avenue.*

IMPLEMENTATION STRATEGIES

The City should identify annual funding for Plan implementation, as well as routine and unexpected maintenance. Funding will come from a variety of sources, including local, regional, state, and federal sources. This section provides recommendations for activities to achieve implementation of the recommended network.

Strategy 1: Continue to accommodate bicycle facilities during roadway construction, reconstruction, and overlays when possible.

Overlays provide an excellent opportunity to improve bikeway conditions when executed appropriately. Special caution should be taken to ensure that no pavement seam is left in the roadway space designated for bicyclists (or in areas where bicyclists are expected to ride in the case of shared roads). In addition to ensuring an even and well-marked surface for cyclists, overlays are a practical occasion to consider widening the roadway, especially in areas with planned paved shoulders. Pavement overlays present the opportunity to:

- Create bike lanes and other bicycle facilities
- Install signal sensors that can detect the presence of bicycles
- Consider bigger projects such as channelization changes.

Many of the facilities within the recommended network will be implemented as part of larger roadway projects, including the development of bicycle facilities when new streets are constructed or when existing streets are scheduled for resurfacing. When planning new developments, connecting non-arterial roads is key to continuing to develop the bicycle boulevard network. If cul-de-sacs and dead ends continue to be used by developers, through bicycle and pedestrian connections should be required. Implementation or improvement of bicycle facilities should be considered during all major roadway, and where appropriate, utility projects in an effort to reduce costs.

Strategy 2: Identify funding for programs and facility improvements in support of the bicycle network.

Dedicated funds are needed for supporting elements such as education programs, wayfinding, and expansion of the City's bicycle rack installation and bicycle count program. A portion of the Public Works budget will need to be reallocated to these efforts.

Strategy 3: Pursue a variety of mechanisms for funding infrastructure projects.

Bicycling infrastructure attracts users of all ages and abilities and offers a high return on investment. Most bicycle improvements are low cost when compared to new street construction projects. At the same time, such improvements offer numerous benefits, from optimizing the roadway's ability to move people and goods to providing low cost transportation choices for households. Perhaps most importantly, bicycle facilities contribute to community livability, which helps to attract and retain residents and employers.

The majority of the recommended bicycle network will be implemented by routinely incorporating bicycle facilities when streets are initially constructed, resurfaced, or substantially reconstructed. Other methods for funding and implementing recommended improvements may include:

- Where private developers are required to make street frontage improvements, bicycle facilities should be included where recommended in the Plan.
- Local, regional, state, and federal grant funds for transportation and non-transportation programs (such as environmental or heath programs).
- Dedicated local funding sources, such as transportation benefit district funds specifically allocated for non-motorized transportation infrastructure.

Partnerships with agencies, organizations, and private interests such as Yakima Transit, Yakima School District, Yakima Chamber of Commerce, Yakima Greenway Foundation, Visitors and Conventions Bureau, local colleges and universities (Yakima Valley College), the Downtown Association of Yakima, Yakima County, private companies, developers, and others will be needed throughout the implementation of this Plan. Partners may support plan implementation in a number of ways such as providing direct

financial support, dedicating rights-of-way, contributing mitigation or transportation impact fees, pursuing grant opportunities, sponsoring events, conducting media and public education campaigns, etc.

Strategy 4: Incorporate funding for maintenance of bicycle facilities into the annual maintenance budget.

Dedicated funds are needed to cover periodic, annual and long term maintenance of the existing and future bicycle network. Maintenance activities may include replacing pavement markings, fixing potholes, filling concrete joints, changing out drain grates, replacing and repairing signs, etc. A portion of the Public Works budget should be allocated to bicycle facility maintenance.

Strategy 5: Pursue grant funding.

In addition to making internal budget adjustments in order to maximize investments, the City should continue to pursue a robust mixture of outside funding including other local, regional, state, and federal sources. Obtaining outside funding can be challenging due to increasing competition for limited amounts of transportation grant funds. However, being the largest urban area within Yakima County, Yakima is in a good position to receive funding from outside grant funding sources.

Good data is critical to winning grants. Yakima should consider conducting bicycle counts. The National Bike and Pedestrian Documentation project provides guidance for implementing a count program. Good crash data and tracking safety issues can help the City pursue WSDOT funding, much of which is safety-focused.

Strategy 6: Establish a grant match reserve fund (or similar system) in order to take full advantage of state and federal grants.

State and federal grants typically require between 13.5% and 20% of the total project cost to be provided from local funding sources and grant applications with higher local funds are far more competitive than applications that provide the minimum local funds. Local transportation funding can include dollars derived from the local Street Fund, Real Estate Excise Taxes (REET), special sales taxes, and funding contributions from other agencies. In addition, grant funding agencies look very favorably on projects that include mitigation funds derived from private development, such as transportation impact fees.

Strategy 7: Institutionalize the Yakima Bicycle Master Plan into plans and policies of the City.

Integrating Plan recommendations into existing City policies, plans and procedures is essential to ensure the Plan is implemented in a cost efficient way. Routine consideration of bicycle facilities in the City's project planning and review process will help to ensure they are incorporated into projects where recommended by this Plan. Bicycle Master Plan recommendations will be integrated into the Transportation and Comprehensive Plans, which will be updated in the near future.

Strategy 8: Enhance transportation policies that facilitate Complete Street design.

Implementation of bicycle facilities will be most efficient if they continue to be integrated into a comprehensive vision of multimodal transportation improvements. This can be further achieved through adopting a Complete Streets policy. It will be important to consider the wider transportation network when determining how and where bike facilities can be accommodated through Complete Streets implementation.

The Yakima Bicycle Master Plan lays the groundwork for the planning, prioritization, funding, and installation of bicycle facilities as well as programs that will require a comprehensive funding strategy. Future funding should be a combination of federal, state, regional, and local monies. The following sections outline funding opportunities that the City of Yakima should consider for resources toward Plan implementation. Additional local funds could be sought through public-private partnerships which may also be instrumental in implementing certain segments of the network.

FUNDING SOURCES AND OPPORTUNITIES

FEDERAL FUNDING OPPORTUNITIES

Federal funding available for bicycle related projects is in a state of flux until a new federal transportation bill is updated. The Federal Transportation Bill passed in 2012—known as Moving Ahead for People in the 21st Century (MAP-21)—restructured and redefined eligibility for federal funding of bicycle and pedestrian projects. With the advent of MAP-21, there is more local control of transportation dollars related to walking and biking, as 50% of funds are allocated to the discretion of Metropolitan Planning Organizations (MPO). Another trend in the new transportation legislation is less funding specifically earmarked for programs such as Safe Route to School. As an interim measure, congress has passed legislation authorizing continued funding of MAP-21. As new federal transportation legislation is adopted, the City of Yakima should work closely with YVCOG to monitor and take advantage of the new funding opportunities.

TRANSPORTATION ALTERNATIVES PROGRAM (TAP)

MAP-21 combines previous programs: Recreational Trails, Safe Routes to School and Transportation Enhancements into one: the Transportation Alternatives Program (TAP). TAP funds are split 50/50 between a competitive state grant program and statewide distribution according to population.

Washington State allocates Transportation Alternatives Program (TAP) funds for projects including pedestrian and bicycle facilities. Fifty percent of annual TAP funding includes $1.8 million set aside for recreational trails and $2.4 million set aside for Safe Routes to School. The remaining TAP funds are distributed to MPOs and Regional Transportation Planning Organizations. These organizations are responsible for prioritizing and selecting projects. In the 2014 fiscal year, the YVCOG had a total of $283,287 in Transportation Alternative Program funds to allocate among all jurisdictions in Yakima County.

SURFACE TRANSPORTATION PROGRAM (STP)

The Surface Transportation Program (STP) provides flexible funding that can be used by local jurisdictions or states for roadway, bridge and transit projects. Because Yakima falls within the jurisdiction of an MPO, the funds are distributed through the YVCOG for prioritizing and selecting projects. Bicycle infrastructure and programming such as maps, educational materials etc. may be supported using these funds.

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP)

This program funds safety related projects that aim to reduce serious traffic injuries and deaths. Bicycle safety projects are eligible for this funding on all roadway types including state highways and residential streets. Eligible improvement projects include bike facilities, intersections, pedestrian crossings, etc. A percentage of this funding ($1.2 million annually) is set aside for Safe Routes to School projects.

The State of Washington administers these federal funds and has distributed HSIP into four invitation-only competitive grants: City Safety Program, County Safety Program, Quick Response Safety Program and the City/County Corridor Safety Program. All of these grants can be used to fund engineering, enforcement, education and encouragement improvements. Like the Traffic Safety Grants, the highway and local program grants are directed by the state Strategic Highway Safety Plan called Target Zero. More information can be found at: **http://www.wsdot.wa.gov/LocalPrograms/Traffic/FedSafety.htm**

FEDERAL TRANSIT PROGRAM

These federal funds can be used for establishing bicycle and pedestrian access to mass transit, including parking and storage.

Funding for the improvement of mobility for seniors and people with disabilities is expanded under MAP-21. The ‘New Freedom’ activities have been revised into Section 5310 revenue stream. All Section 5310 projects must be initiated from locally developed, coordinated public transit-human services transportation plans. Additionally there are potential multimodal projects that may be eligible for this funding that would improve bicycle access, especially for older adults and people with mobility limitations.

STATE AND REGIONAL FUNDING

The Yakima Valley Conference of Governments (YVCOG) is the Metropolitan Planning Organization/ Regional Transportation Planning Organization (MPO/RTPO) serving Yakima and other cities within Yakima County. It distributes both state and federal funds through a variety of programs. Federal transportation dollars are allocated throughout the region and the YVCOG Transportation Improvement Program (TIP) includes projects that are important to the region and included in local plans.

Of the $25 million allocated to the Transportation Alternatives fund for Washington State, approximately $13 million was allocated by population to state MPOs, with the YVCOG region receiving approximately $280,000. The YVCOG's regional TIP documents the distribution of state and federal funds for projects that include bicycle facilities.

SAFE ROUTES TO SCHOOLS (SRTS)

Safe Routes to School funding comes to the state from the Highway Safety Improvement Program and Transportation Alternatives Program. It is available to local governments through a competitive grant program and via a data-driven approach to identify the top infrastructure priorities based on Washington's Strategic Highway Safety Plan. The goal of SRTS funding is to increase the number of children walking and biking to school and to decrease the number of collisions involving children on foot or bike. WSDOT distributes these funds on a state-wide basis.

TRAFFIC SAFETY GRANTS

The Washington Traffic Safety Commission (WTSC) offers annual state grants to projects that help reach "Target Zero" goals of reducing roadway injury and fatalities. The grants range from $5,000 to $150,000.

PEDESTRIAN AND BICYCLE SAFETY GRANTS

These competitive grants are offered by the State through gas taxes to address areas with high collision and injury rates for pedestrians and bicyclists

WSDOT BIENNIUM BUDGET

Washington State Department of Transportation (WSDOT) has a biennium budget approved by the State legislature every two years. In the 2015 legislative session, a new 16-year transportation

revenue package called “Connecting Washington” was passed. The revenue package includes $9.7 billion for state and local road projects and $1.3 billion for non-highway projects, including bike paths. The City should track the distribution of these funds and vigorously pursue them as they become available.

WASHINGTON STATE TRANSPORTATION IMPROVEMENT BOARD (TIB)

The Washington State Transportation Improvement Board (TIB) funds high priority transportation projects in communities throughout Washington to enhance the movement of people, goods, and services. TIB is an independent state agency, created by the Washington State legislature, which distributes and manages street construction and maintenance grants to 320 cities and urban counties throughout Washington State. Funding for TIB’s grant programs comes from revenue generated by three cents of the statewide gas tax.

STREET OVERLAY AND RECONSTRUCTION FUND

The Street Overlay and Reconstruction Fund consists of $2 million annually for “enhancement in quality and value of City street infrastructure” per 2014 City Charter amendment. Where applicable, capital projects that involve roadway resurfacing or paving should incorporate bicycle improvements.

YAKIMA REAL ESTATE EXCISE TAX (REET)/ PUBLIC WORKS TRUST

Comprised of 1/4 of 1% of the total real estate revenue within city limits for a given year, REET funding can be used for limited types of transportation projects. Availability of these funds may fluctuate, as they did during the recession, in a given year.

LOCAL IMPROVEMENT DISTRICTS (LID)

Local Improvement Districts (LID) are established areas where local property owners, through self-imposed taxation, fund local improvements within the district. LIDs have been used in Yakima to fund roadway improvements. Yakima City Council or local property owners may establish an LID for bicycle related improvements as long as the majority of business or property owners within the district agree to the property tax increase. Properties adjacent to the improvement must pay a portion of the overall cost of the improvement project until the full cost of the improvement is paid.

YAKIMA DOWNTOWN BUSINESS IMPROVEMENT DISTRICT

The Central Business District Capital Improvement Fund has been used for downtown planning, as well as transportation design and construction, including parking facilities ("for the benefit of the area"), maintenance, and security. The CBD Fund may be useful for bicycle facilities and amenities such as bicycle parking.

OTHER AGENCIES, CORPORATE FUNDING, AND PRIVATE FOUNDATIONS

There is a broad range of private funding available for bicycle related improvements. Bicycle projects can be supported by funding aimed at a variety of areas including economic development, community health and fitness, transportation, transit mobility and access, and public infrastructure. Creative use of private grants can bolster public funds to implement the Yakima Bicycle Master Plan, keeping in mind that grants are not a reliable or consistent source of revenue. The following organizations provide grants of different sizes for bicycle infrastructure and programmatic activities.

PEOPLE FOR BIKES

The Green Lane Project provides funding for the implementation of innovative, low-stress bicycle facilities such as protected bike lanes. The Community Grants Program offers small amounts of funding for bicycle related projects to leverage federal funds and promote bicycling at the local level. Local governments and non-profits are eligible to apply.

ROBERT WOOD JOHNSON FOUNDATION

The Robert Wood Johnson Foundation is dedicated to improve "health and health care of all Americans," including public education, prevention, communications activities, and investing in vulnerable populations. Municipalities are eligible for these funds and many bicycle and pedestrian related projects may be eligible.

ORAM FUND FOR THE ENVIRONMENT AND URBAN LIFE

This fund supports programs that impact sustainable urban development and environmental quality. Funding is available

for public transportation, bicycling and walking, education, and transportation planning. Projects are prioritized over programing needs.

YAKIMA GREENWAY FOUNDATION

The Yakima Greenway Foundation is a private, non-profit land trust. The Foundation has a network of supporters and volunteers that may be vital partners to increasing bicycle access to the Greenway trail.

YAKIMA HEALTH DISTRICT

Local health organizations are beginning to realize that an active lifestyle leads to increased overall health. Funding to support active lifestyles in the form of a robust bicycle network may be available.

DESIGN & MAINTENANCE RECOMMENDATIONS

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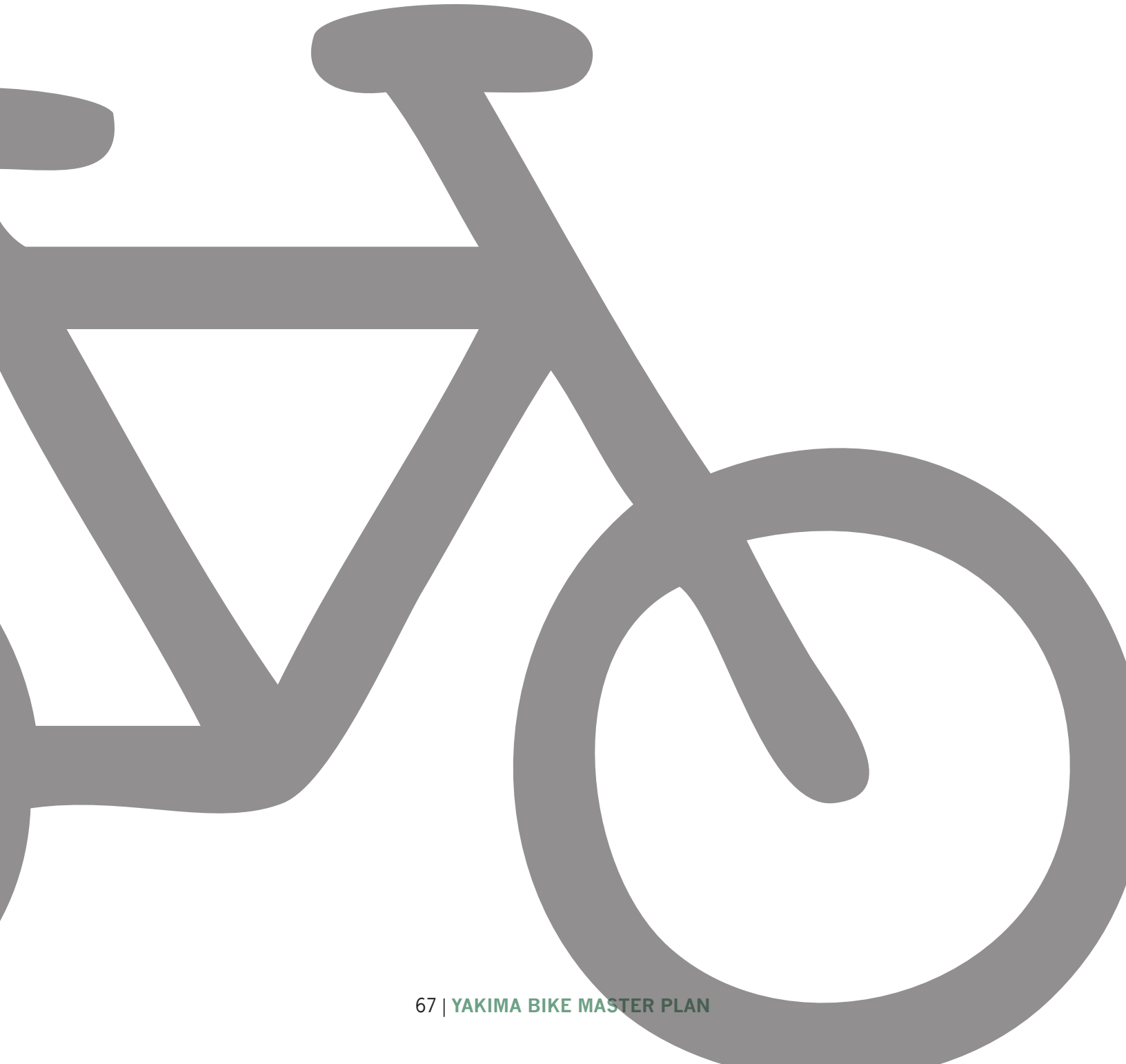


INTRODUCTION

The guidance in this appendix is intended to serve as a guide for implementation of the Bicycle Master Plan. Design guidance in this document is based on the Manual on Uniform Traffic Control Devices (MUTCD), 2009; the American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, 2012; and the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide, 2012. Guidance in this document is consistent with these manuals. Application of guidance in this document requires the use of professional engineering judgment.

DESIGN

Preference surveys and research studies have found widespread support and interest for bicycling with strong preferences given to the provision of high quality bikeways which provide the following elements:

- Separation from high volumes of fast-moving automobiles
- Maneuverability within the bikeway to operate safely
- Space for cyclists to ride together in a social manner, side-by-side.

These qualities are routinely provided on trails, and are increasingly provided on streets through the provision of bicycle lanes, protected bicycle lanes, or bicycle boulevards. Well-maintained, high quality facilities have been demonstrated to attract higher levels of use than poorly maintained or low quality facilities. Likewise, interconnected systems with minimal gaps or interruptions are essential to a functioning bicycle system that supports and attracts high use.

THE QUALITY OF BICYCLE FACILITIES HAS A DIRECT IMPACT ON THE OVERALL EXPERIENCE OF THE USER, AND WILL THEREFORE HAVE A TREMENDOUS INFLUENCE ON THE ABILITY OF THE FACILITY TO SUSTAIN AND ATTRACT HIGH LEVELS OF RIDERSHIP.

ROADWAY DESIGN STRATEGIES FOR ACCOMMODATING BIKE FACILITIES

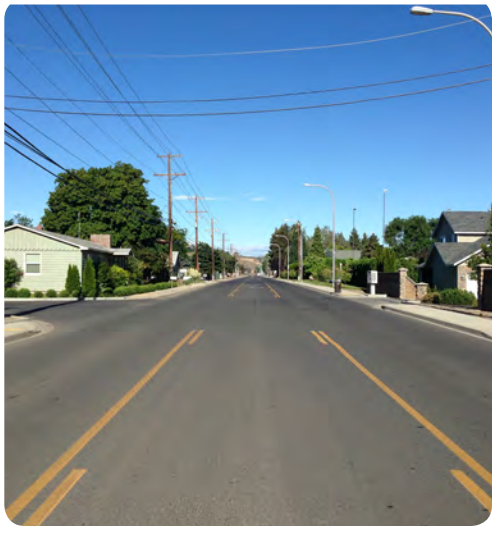
LANE WIDTHS

Travel lane narrowing is one of the retrofit methods recommended to implement the planned network. Travel lane widths were observed to vary from 10 feet to 17 feet throughout the City on all classifications of roadways. Some streets appeared to have wide lanes where parking lane stripes are not provided and parking demand is low. For bicycle lanes or separated bikeways to be retrofitted onto some Yakima streets, existing travel lanes may need to be narrowed.

Providing wide travel lanes has not proven to provide any safety benefits on low speed urban roadways,[1] whereas wider parking and bike lanes reduce the potential for a hazardous crash between a bicyclist and an opening vehicle door. Wider bike lanes create enough space to allow a bicyclist to pass another bicyclist without having to encroach into the adjacent travel lane. The resulting bicycle lane is more comfortable and is more likely to attract use.

The 2011 AASHTO Green Book states “lane width of 10 feet may be used in more constrained areas where truck and bus volumes are relatively low and speeds are less than 35 mph.” [2] This is backed up by recent research[3] focused on the safety of travel lane widths varying between 10 and 12 feet for motorists operating on arterial roadways with posted speeds of 45 mph or less. This research found lane width had no impact on safety or capacity under the majority of urban conditions. The study resulted in a virtual elimination of the capacity reduction formula in the 2010 Highway Capacity Manual related to lane widths as it found little difference between 10, 11 and 12 foot lanes.

The AASHTO Green Book is vague with regard to defining what percentage of truck and bus volume is “low” however there is guidance in research and pavement design guidelines that suggest 10% as a decision point.[4]



FOUR TO THREE LANE CONVERSIONS

Another strategy for adding bicycle facilities to the existing road network is converting a four-lane road to a three-lane road: two travel lanes in each direction and a two-way center turn lane (sometimes called a road diet). In addition to providing space

for bicycle lanes, this type of restriping can reduce all types of crashes and lower the amount of speeding on a roadway. Road diets must be carefully considered within the context of the larger transportation system. However, studies have shown that "well-designed road diets do not divert drivers onto other roads. Many roads actually experience an increase in vehicle traffic after a successful diet."[5] Roads with Average Daily Traffic (ADT) volumes of up to 20,000, and in certain cases, higher, are appropriate candidates for a conversion. Yakima has already successfully re-channelized several roads in this manner.

FACILITY TRANSITIONS

Corridors that effectively accommodate bicycles often combine multiple facility types due to existing roadway conditions, surrounding land uses, available right-of-way, and other characteristics. While consistency of facility type is desired, when it is not feasible, transitions between facilities should be functional, intuitive, and as infrequent as possible. Properly engineered transitions will invite proper use. For example, a path that transitions to an on-street facility should provide signage, markings, curb cuts, and crossing treatments that direct bicyclists to the correct side of the street to reduce wrong-way riding.

FACILITY TYPES

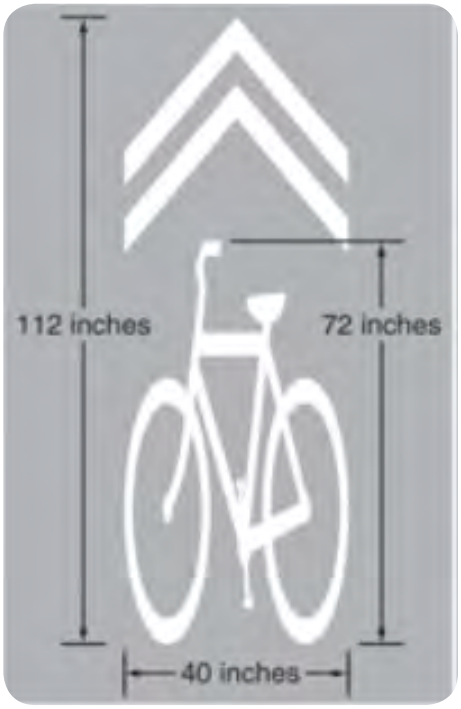
This section provides design guidance for on-street bicycle facilities, off-street facilities, and crossing (intersection and mid-block) treatments that are recommended for the City of Yakima bicycle network.

PAVED SHOULDERS

Paved shoulders are most often used on rural roadways. Paved shoulders provide space on the outside of travel lanes for bicycle and pedestrian use. Paved shoulders should be a minimum of four feet without the curb, and five foot minimum with a curb. Additional space is recommended if motor vehicle speeds exceed 50 mph or if heavy trucks, buses, or recreational vehicles often use the road.

SHARED LANES

By law, all lanes of all roads where bicycles are not prohibited are shared lanes. When a higher level of guidance and awareness is desired, such as in an urban bikeway network where bikes are likely to be present, a shared lane marking may be used. A shared lane marking is a pavement symbol consisting of a bicycle with two chevron markings above it that is placed in the roadway lane indicating that motorists should expect to see and share the lane with bicycles, and indicating the legal and appropriate line of travel for a bicyclist. In general, shared lane markings are installed on streets where there is not enough space for bicycle lanes or when bicycle lanes are not appropriate due to low speeds or volumes (e.g., on bicycle boulevards). According to the 2012 AASHTO Guide for the Development of Bicycle Facilities and the MUTCD, shared lanes are not appropriate for roads with speed limits over 35 mph.



Unlike bicycle lanes, they do not designate a particular part of the roadway for the exclusive use of bicyclists. The purpose of shared-lane markings is to:

- Assist bicyclists with lateral positioning in a shared lane with on-street parallel parking in order to reduce the chance of a bicyclist's impacting the open door of a parked vehicle
- Assist bicyclists with lateral positioning in lanes that are too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane
- Alert road users of the lateral location bicyclists are likely to occupy within the traveled way
- Encourage safe passing of bicyclists by motorists
- Reduce the incidence of wrong-way bicycling.

Shared lane markings may be considered in the following situations:

- On arterial streets with a posted speed limit of 35 mph or less, where space constraints and operations make it unfeasible to provide a bike lane.
- On low speed, low volume arterial street sections where gaps exist between two other bicycle facility types to create an on-street bike network connection.

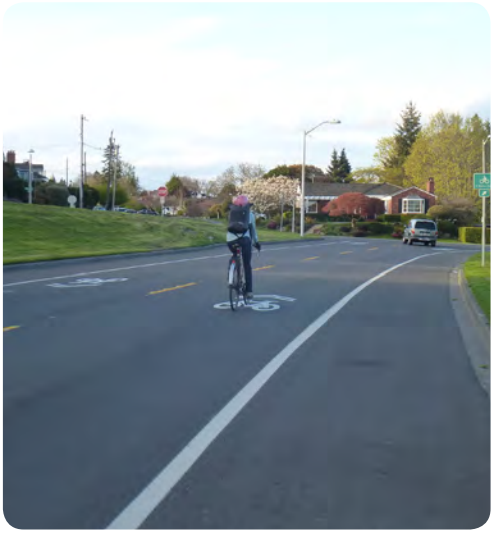
- On bicycle boulevards as a form of on-street wayfinding.
- On low speed, low volume arterial streets with on-street parking, to help position bicyclists to avoid collisions with car doors opening into the travel lane.

SHARED LANE MARKING PLACEMENT

CONSIDERATION FOR SHARED LANE MARKING PLACEMENT WITHIN A TRAVEL LANE

The center of shared lane markings should be located a minimum of 11 feet from the curb or edge of roadway at locations where parking is permitted adjacent to the travel lane. The center of shared lane markings should be located a minimum of 4 feet from the curb or edge of roadway at locations where parking is prohibited.

It may be appropriate to move the shared lane marking towards the center of the travel lane if engineering judgment determines that this placement will enhance the safety of the bicyclist operating within the travel lane. In most cases, it will be a combination of two or more of the following factors which will indicate that consideration should be given to moving the Shared Lane Marking towards the center of the travel lane:



- Travel lane is less than 12 feet in width
- Number of travel lanes (it may be desirable to place the shared lane marking towards the center of a narrower outside travel lane when a center turn lane is present or when there are multiple travel lanes in the same direction)
- Grade of roadway and expected bicyclist speed (center lane placement often works well when going downhill on streets with grade and higher bicycle speeds).

SITUATIONS WHERE TRAVEL LANES ARE LESS THAN OR EQUAL TO 12 FEET IN WIDTH

Shared lane markings should be placed in the center of the travel lane where travel lanes are less than 12-13 feet to encourage bicyclists to occupy the full lane and not ride too close to parked vehicles or the edge of the roadway. A “BIKES MAY USE FULL LANE” (R4-11) sign may be used to supplement the marking.

Travel lanes of this dimension are too narrow for sharing side by side with vehicles, although 13 foot lanes may appear shareable to road users.

SITUATIONS WHERE TRAVEL LANES ARE GREATER THAN OR EQUAL TO 13 FEET IN WIDTH

Where travel lanes are 13 feet or wider, motorists will generally be able to pass bicyclists within the same lane or will only need to slightly encroach on adjacent lanes to pass bicyclists. The Shared Lane Marking should generally be located in the right portion of the lane (per the MUTCD minimum requirements) with exceptions for locations adjacent to parking where it is desirable to encourage riding further from parked vehicles. A “SHARE THE ROAD” sign (W11-1 AND W16-1P) may be used to supplement the marking.

Research has shown placing the marking in the center of travel lanes wider than 13 feet will likely result in poor compliance by bicyclists who will travel in the right portion of the lane which may undermine the effectiveness of shared lane markings in narrower lanes. Lanes 15 feet or wider generally should not use shared lane markings, and should instead be marked with a 10 foot travel lane and a 5 foot bike lane.

CONSIDERATIONS FOR SYMBOL PLACEMENT FREQUENCY

Shared Lane Markings should be placed at the far side of an uncontrolled intersection, at both sides of an arterial intersection with traffic control, and at mid-block locations where block faces are more than 250 feet long.

When placing mid-block shared lane markings, they should be placed in such a manner that the first shared lane marking a bicyclist or motorist would come upon would be in their direction of travel.

Where there are mid-block marked crosswalks, the tip of the chevron should be placed 25 feet beyond the far side of the marked crosswalk.

CLIMBING LANES

Climbing lanes are bike lanes provided only on the uphill side of the street. Bicyclists travel uphill at significantly slower speeds than motor vehicles, and therefore benefit from the presence of a separated lane. Climbing lanes may be used on any street with an uphill grade and insufficient space for bicycle lanes on both sides of the street. Shared lane markings are provided on the downhill portion of the street. Climbing lanes are not appropriate on streets with rolling hills because lane shifts and transitions would potentially confuse both bicyclists and motorists.

BIKE LANES

Bike lanes designate a portion of the roadway exclusively for bicyclists, and encourage bicyclists to ride with traffic where they are visible to motorists. Bicyclists are not required to ride in bike lanes; a bicyclist may need to leave the bike lane to make a turn, avoid debris or potholes, avoid conflicts with other road users or pass another bicyclist.

In order to maximize bicyclist comfort and reduce potential conflicts associated with opening car doors, bike lanes should be as wide as feasible, with a minimum of 5 feet. Whenever possible, parking lane width should be minimized to increase bicycle lane width. Where there is space for wide bike lanes, buffers may be added to discourage driving or parking in the bicycle lane (see “Buffered Bike Lane”).

The surface of the bike lane should be smooth, stable and slip resistant. Longitudinal or frequent horizontal seams can reduce the quality of the riding surface. Concrete joints should be saw-cut to provide a smooth riding surface, and utility covers should be flush with the bicycle lane surface. Standard bike lane symbols and arrows shall be provided in bike lanes.

HEAVY VEHICLES

On streets with significant heavy vehicle volume and bicycle facilities, consideration should be given to lane widths to prevent heavy vehicles encroaching on the bicyclist’s path. Where possible, buffered or separated bicycle facilities should be used for bicycle facilities on heavy vehicle routes and design should accommodate safe crossings at driveways and to minimize conflict points.

BUFFERED BIKE LANES

Buffered bike lanes provide distinct advantages over merely providing a wider bike lane. Buffered bike lanes appeal to a wider cross-section of existing and potential bicycle users, provide greater shy distance between motor vehicles and bicyclists, provide space for bicyclists to pass one another without encroaching into the adjacent motor vehicle travel lane, and provide a greater space for bicycling without making the bike lane appear so wide that it might be mistaken for a travel lane or a parking lane.

The preferred location of the buffer is between travel lanes and bike lanes. The buffer may be placed between the bike lane and parking lane where parking turnover is high or on extended downhill segments where bicyclist speeds can be expected to be higher than normal.

Buffer width should be a minimum of 18 inches. On streets with speeds 35 mph or greater, buffer width should be increased and a physical separation element should be used. Buffer zones 4 feet or greater in width should be marked using a chevron pattern as depicted in Chapter 3D of the MUTCD 'Markings for Preferential Lane.' Otherwise a diagonal crosshatch may be used.

PROTECTED BIKE LANES

A protected bike lane, sometimes called a separated bike lane or a cycle track, is a bicycle facility that is physically separated from both the roadway and distinct from the sidewalk. A protected bike lane can be constructed at the roadway level or the sidewalk level.

Roadway Level - Uses roadway space and must be separated from motor vehicle traffic. Separation methods include curbs, raised concrete medians, bollards, on-street parking, large planting pots/ boxes, landscaped buffers (trees and lawn) or other methods.

Sidewalk Level – Uses space adjacent to the sidewalk and must be separated from pedestrian traffic. Separation methods include different surface treatments, street lighting, plants, etc.

Intersections where protected bike lanes are present require engineering consideration to ensure appropriate sightlines and yielding behavior. Intersection treatments include restricting turns or using signaling to temporally separate right and left turning vehicles from through bicyclists, and shared turn lanes. The NACTO Urban Bikeway Design Guide includes several intersection solutions for protected bike lanes.

By separating bicyclists from motor traffic, protected bike lanes can offer a higher level of safety and comfort than bike lanes and are thus attractive to less confident cyclists. Typical applications for protected bike lanes include:

- Streets with high bicycle volumes.
- Streets on which bike lanes would cause all but the most skilled bicyclists to feel stress because of factors such as multiple lanes, high traffic volumes, higher speed traffic, high incidence of illegal parking in the bike lane, and high parking turnover.
- Recreational corridors, scenic corridors, or parkways that are part of a regional trail system.
- As part of a bicycle boulevard or trail system connection.
- Protected bike lanes may be one-way or two-way. In general, one-way cycle tracks are preferred. Two-way cycle tracks may be appropriate for the following situations:
    - Streets with few conflicts such as driveways or cross- streets on one side of the street.
    - Streets where there is not enough room for a one-way cycle track on both sides of the street.
    - One-way streets where contra-flow bicycle travel is desired for connectivity purposes.
    - Streets where more destinations are on one side, thereby reducing the need to cross the street.
    - As part of a trail or bicycle boulevard facility; for example, where a bicycle boulevard route uses offset residential roads.

BICYCLE BOULEVARDS

Bicycle boulevards will play an important role in Yakima's bicycle network. A primary objective of this Plan is to extend Yakima's trail network by supplementing trails with an on-street bicycling network. The types of riders that are attracted to trails will feel comfortable using bicycle boulevards that are properly designed.

Bicycle boulevards are typically located on non-arterial streets with low motorized traffic volumes and speeds. They include traffic calming measures to reduce vehicle speeds. Safe arterial crossings must be provided. People of all ages and abilities should feel comfortable biking and walking on these streets. Bicycle boulevards may serve as cross-city routes or as a segment of a bike route that includes other protected facility types (e.g., off-street trails or protected bike lanes). A bicycle boulevard may be developed as a parallel alternative to a busier street within the same district, but should generally not be provided in lieu of facilities on the busier street if that street is a more direct route to important destinations. Crosswalks, median islands, Rectangular Rapid Flashing Beacons, stoplights, and half-signals may be used to facilitate crossing major arterials that intersect the bicycle boulevard. The cost of construction will vary depending on the specific traffic calming and intersection treatments implemented.

DESIGN CONSIDERATIONS

There are a number of design considerations that should be made before implementing a bicycle boulevard (discussed below). Streets with existing low volumes (less than 1,000 ADT) are good bicycle boulevard candidates as they typically require minimal or no traffic diversion treatments. These streets may only require traffic calming measures to get speeds down to 20-25 MPH and increase the comfort and safety of bicyclists. Where traffic volumes exceed 1,000 ADT, traffic reduction measures should be considered in addition to traffic calming measures. One of the most important elements of a bicycle boulevard is creating arterial street crossings that are accessible, safe, and comfortable.

ARTERIAL CROSSINGS

Bicycle boulevards commonly intersect arterial roadways at unsignalized locations. In some cases, they may utilize existing signals or require a new signal, depending on motor vehicle traffic volumes, speed limits, and width of the arterial roadway. Many intersection crossing treatments for bicyclists are based

on pedestrian crossing signals, but require special consideration for bicycle operating characteristics such as bicyclist positioning, crossing times, and vehicle length. Crossing treatments including RRFBs, HAWKs, and half signals are included later in this chapter.

BICYCLE PRIORITY/ADVANTAGE

Design elements that prioritize travel on the bicycle boulevard are intended to raise awareness of the route as a bicycle priority thoroughfare and create conditions that reduce unnecessary delay for cyclists. Design treatments include pavement markings and wayfinding signage, adjustments to stop/yield control, and arterial crossing enhancements.

Employing distinctive symbols and/or colors to distinguish the bicycle boulevard from other roadway signs provides visual cues to motorists and cyclists that this is a different type of roadway. Supplementing wayfinding signage with pavement markings helps to further establish bicycle priority, and also encourages proper positioning by bicyclists while sharing the lane with motor vehicles. Yakima has several recommended bicycle boulevards that make frequent turns due to a disconnected street network. Shared lane markings at intersections can help provide wayfinding and define the bicycle boulevard.

Stop signs increase cycling time and energy expenditure due to frequent starting and stopping, and therefore tend to result in non-compliance by bicyclists. Bicyclists should be able to travel continuously for the entire length of the bicycle boulevard with a minimum of stops. Assigning stop or yield signs to control cross traffic is one way to minimize stops for bicyclists. Mini traffic circles may be an alternative to stop and yield controlled intersections. Parking may need to be removed near the intersection to improve sight distance of bicyclists and motorists approaching the intersection. After stop or yield signs are reoriented to cross streets to provide bicycle priority, an increase in motor vehicle volume or speed along the route may occur which reduces the comfort and safety of cyclists, negatively impacts the neighborhood, and negatively influences opinions regarding the utility of bicycle boulevards in general. Cut through traffic can be mitigated using traffic calming and diverting treatments.

TRAFFIC CALMING

MINI TRAFFIC CIRCLES AT 4-WAY INTERSECTIONs- Raised circular islands located in the center of intersections of local streets, intended to reduce speed of vehicles approaching the intersection while minimizing delay. Stop and yield signs may be eliminated when mini traffic circles are used. Signage indicating counter-clockwise circulation should be installed in advance and/or on the traffic circle.

MINI TRAFFIC CIRCLES WITH NECK DOWNS AT T- Intersection. T-intersections require the use of smaller circles, limited parking restrictions within the circle, and approach neck downs to deflect the movement across the top of the tee which otherwise could not be deflected by the circle.

CHICANES –Raised curb features in the middle of the road or along the edge that create horizontal shifting of travel lanes, which reduces vehicles' speeds. Chicanes are typically used on long stretches of straight roadway and are ideal for approaches to signalized intersections where motorists may be inclined to accelerate towards the signal. A "chicaning" effect may also be achieved by alternating the location of on-street parking.

SPEED TABLES OR RAISED CROSSWALKS - long and broad, flat-topped sections of raised roadway (3-4 inches high and 22 feet wide) that slow traffic by requiring motorists to reduce their speed. Speed tables are more comfortable than speed humps for bicyclists to ride over without reducing their speed. A 22 foot table has a motor vehicle design speed of 25 miles per hour.

TRAFFIC CALMING (CONT)

SPEED CUSHIONS – Similar in design to speed humps, speed cushions are rounded raised areas placed in the center of travel lanes to reduce vehicle speeds. They are generally 10 to 14 feet long (in the direction of travel) with. These are designed to allow free passage of larger chassis vehicles such as fire trucks through the flattened area.

SPEED HUMPS – Speed humps are rounded raised areas placed across the roadway to reduce vehicle speeds. They are generally 10 to 14 feet long (in the direction of travel).

REMOVE CENTERLINES—Studies have shown that motorists speeds are reduced[6] and more room is given when passing cyclists when center lanes are not present.[7] The MUTCD recommends center lines on urban arterials and collectors that have an ADT of over 6,000 vehicles per day. Yakima has several residential streets with center lines that are likely under this threshold. Where bicycle boulevards are proposed, center lines are not recommended.

TRAFFIC VOLUME MANAGEMENT

Traffic volume management design elements are intended to maintain existing low volumes or reduce the overall volume of motor vehicle through trips on the bicycle boulevard, while allowing continuous through travel by bicyclists and other non-motorized users. Impacts on nearby local streets and emergency response should be analyzed before implementing traffic volume management elements.

PARTIAL DIVERTERS - Restrict motor vehicle access while allowing bicycle and pedestrian access, typically restricting through movements or left turns. This type of treatment is typically placed on minor streets at an intersection with an arterial street to manage motor vehicle volumes on the minor street.

TRAFFIC VOLUME MANAGEMENT (CONT)

DIAGONAL DIVERTERS – restrict through motor vehicle access completely at standard 4-way intersections while allowing bicycle and pedestrian access. This type of treatment is typically placed at an intersection of two minor streets to manage motor vehicle volumes on the bicycle boulevard.

MEDIAN CLOSURES – restrict through motor vehicle access to right-in right-out at standard 4-way intersections while allowing bicycle and pedestrian passage. This type of treatment is typically placed on minor streets at an intersection with an arterial street to manage motor vehicle volumes on the minor street. This treatment can include center medians used to allow bicyclists to cross the arterial.

The previous traffic calming and traffic volume management design elements have been in use in many communities for many years. However, concerns regarding traffic calming and reduction that occur on the bicycle boulevard are likely to be similar to concerns that are raised when these improvements are implemented anywhere else in the community. Most commonly, residents and officials will raise concerns about four potential issues related to traffic volume management and calming:

- Access to property
- Impact on traffic patterns
- Enforcement issues with motorcycles and mopeds
- Emergency response

These are all legitimate concerns that need to be considered, and can be addressed through a combination of good design and, if needed, enforcement.

To deal with each of these concerns it is important to involve stakeholders early. For residents living along a planned bicycle boulevard street and concerned about accessing their property, presenting the design so that they can see how their access is

affected is an important first step. Trial installations of design elements can alleviate resident concerns regarding access by allowing them to "try out" design features and allow any necessary modifications to be made before the city commits to a permanent installation. It is also very important during the initiation and conceptual planning phases to highlight the positive attributes of bicycle boulevards and the benefits residents can expect, including fewer cars on their street, fewer speeders, and less noise.

When motor vehicle traffic is restricted on the bicycle boulevard it may induce an increase in motor vehicle traffic on adjacent streets. It is important to examine the impacts of diversion elements both on the proposed bicycle boulevard and nearby streets, and include mitigation (e.g., additional traffic calming on adjacent streets) for any impact in their designs.

Traffic-calming elements can be a concern to first responders if the design substantially increases response times to properties along the bicycle boulevard. Having the support of the fire and police department is critical--without it development of a bicycle boulevard may be delayed or permanently deferred. Emergency services need to be engaged early in the planning process in order to identify acceptable design elements. Traffic volume management and calming design elements may be designed in such a way that allows a wide-chassis vehicle, such as a fire truck, to pass over, while preventing a similar movement of most passenger vehicles.

TRAILS

Trails or shared use paths accommodate both pedestrians and bicyclists and may be located in independent rights-of-way or adjacent to a roadway. The AASHTO Guide for the Development of Bicycle Facilities provides additional guidance on shared use path design.

Widths of shared use paths should be evaluated based on user volumes and established level of service measures. Wider paths are also necessary when there is significant use by in-line skaters, adult tricycles, children, or other users that need more operating width, larger maintenance vehicles, steep grades, and/or curves. Recommended widths are as follows:

Minimum width is 10 feet, desirable is 12 feet or wider in areas with high pedestrian volumes.

- A minimum of 11 feet width is needed to enable bicyclists to pass another user going in the same direction while a user approaches from the opposing direction.

TRAIL/SHARED USE PATH CROSSINGS

- Right-of-way priority should not automatically be assigned to motor vehicles. Trail user volumes and behavior must be considered, observed and adjusted as volumes shift over time.
- Curb bulbs may be used to enhance visibility of trail users at crossing.
- Bollards should be used only if drivers may mistake the trail for a road.
- Rectangular rapid flashing beacons or a signal should be considered where traffic volumes and speeds on the intersecting roadway make it difficult for trail users to find a gap in traffic that allows them to cross comfortably, where motorist yielding compliance is low, or where there are high volumes of path users.
- Raised crosswalks may be considered on lower volume roadways.

Trails adjacent to the roadway are called sidepaths, and have some unique operational challenges. Sidepaths are useful on roadways with high volume and high speed motor vehicle traffic that might discourage bicyclists from riding on the roadway.

- The sidepath should terminate in a bicycle facility at both ends to discourage wrong-way riding on the roadway.
- Sidepaths are best for areas where there are few roadway crossings, as motorists may not expect a bicyclist at driveways.
- Driveway and intersection design approaches that reduce driver speeds and heighten awareness or path users should be employed. Strategies include:
    - Tight corner radii.
    - Maintenance of path elevation through driveway (raised crosswalk).
    - Reduce the density of driveways through access management.

INTERSECTION TREATMENTS

Intersections are where most conflicts between bicyclists and motorists occur. Complicated or busy intersections can act as barriers to less confident bicyclists, especially if they are not designed in a way that makes it clear how and where bicyclists and motorists are intended to travel. Design innovations such as green bike lanes, bike boxes, and bicycle signals can make traveling through an intersection more comfortable for all modes.

Bicycle boulevards must have proper intersection treatments to function well as a bicycle facility. The Yakima recommended network includes marking crosswalks, installing Rectangular Rapid Flashing Beacons (RRFBs), half-signals, and full signalized intersections. Median islands, curb ramps, and bicycle markings and signage can enhance these crossings. Crossing treatments recommended in the network maps (Appendices B and C) require further engineering review to ensure proper installation.

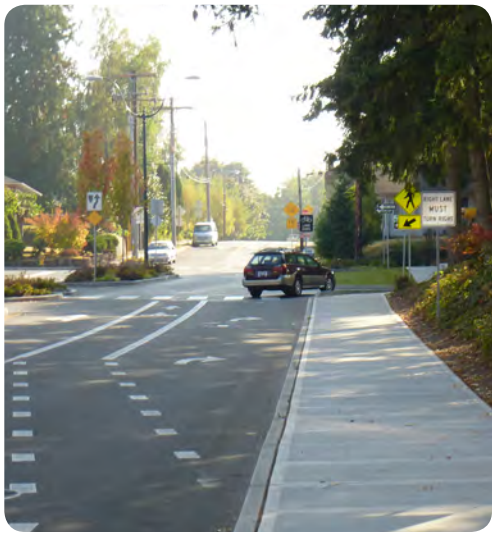
BIKE LANES AT INTERSECTIONS

BIKE LANES THROUGH INTERSECTIONS

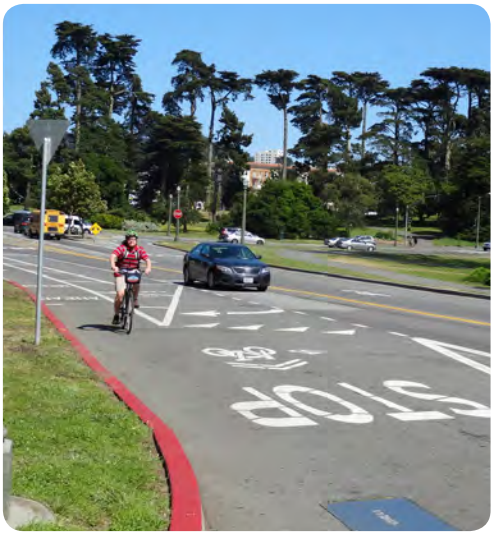
For bike lanes on arterials, the bike lane should remain solid at minor driveways and alleys, and may be striped with a dotted line through minor intersections or major driveway crossings. Bike lanes are not normally striped through major intersections, but a dotted extension line may be appropriate to guide the bicyclist through the intersection. At high conflict areas, some cities have had success with green pavement markings through intersections.

THROUGH BIKE LANES ADJACENT TO TURN ONLY LANES

Where intersections include right-turn only lanes for motor vehicles, the bike lane should not be continued on the right side of the right-turn only lane. The bicycle lane should transition to the left of the right-turn lane with a merging area. A “BEGIN RIGHT TURN LANE/ YIELD TO BIKES” sign (R4-4) is recommended at the beginning of the merge area. A “RIGHT (OR LEFT) LANE MUST TURN RIGHT (OR LEFT)” sign (R3-7R) should be located adjacent to the turn lane per the MUTCD. Green markings within the merge area and the bicycle lane may increase visibility and awareness.

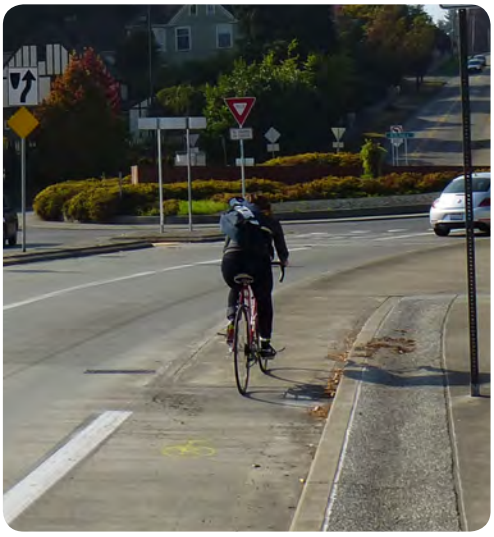


SHARED BICYCLE TURN LANE



Another option for providing guidance for road users where bike lanes and right-turn only lanes exist is a shared bicycle turn lane. Shared lane markings are placed within the inside portion of a turn-only lane to guide bicyclists to the intersection and improve positioning of motorists within the turn lane. For right turn lanes which are less than 13 feet, shared lane markings should be placed within the center or left hand portion of the turn lane. An “EXCEPT BIKES” plaque should be posted beneath any mandatory turn lane signs to permit through travel by bicycles. A sign indicating combined lane and/or vehicles must yield to bicyclists may be desirable. Shared lane markings may be placed on green pavement markings to further raise motorist awareness of the shared lane.

ROUNDABOUTS



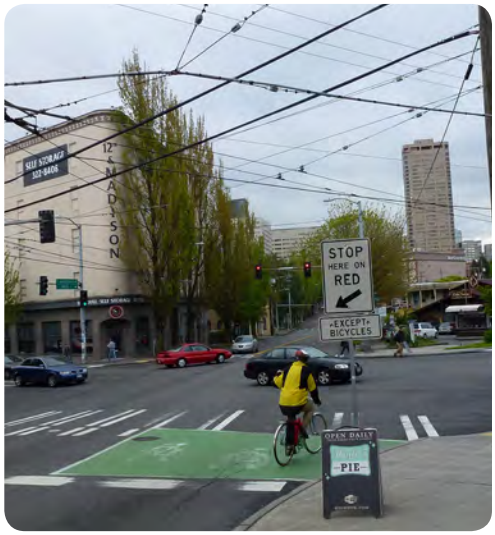
Roundabouts provide non-signalized traffic control at intersections. They typically include a one- or two-lane roadway that encircles a central island around which vehicles travel counterclockwise. Continuing bicycle lanes through roundabouts has not been shown to improve safety. Rather, bicycle lanes should terminate in advance of crosswalks at roundabouts, providing sufficient space for bicyclists to merge with motor vehicles. The installation of shared lane markings at the entrance to roundabouts informs bicyclists of proper lane positioning while riding through the roundabout and alerts motorists to expect merging bicyclists. Providing ramps up to the sidewalk allows bicyclists the option of navigating the roundabout as a pedestrian.

INTERSECTION MEDIAN BARRIERS

Intersection median barriers are raised curbs or islands that extend along a street, preventing vehicles from making U-turns or left turns from cross streets. The median barrier is typically placed on the street with higher traffic volumes. Median barriers can improve safety and convenience for bicyclists and pedestrians when crossing refuges are installed, and are often used in conjunction with bicycle boulevards.

Intersection median barriers are a type of traffic diversion and should be used only after a complete traffic analysis. This treatment may be considered in the following locations:

- Where cut-through traffic on a neighborhood street has been observed to be a problem
- Where analysis of traffic patterns in the area shows that cut-through traffic would not be diverted to a nearby street
- Where local residents would not have to drive excessive distances to access their homes. Excessive distance may be defined during the planning process, but generally residents should not have to drive more than a quarter mile (total distance) beyond the direct route
- Where there are bicycle/pedestrian priority routes (i.e. Bicycle Boulevards). Intersection median barriers not only reduce motor vehicle volumes on residential streets, making these streets safer and more comfortable for biking and walking, but also provide an opportunity to enhance crossings of higher volume and speed roadways
- Where emergency response times are not negatively impacted.



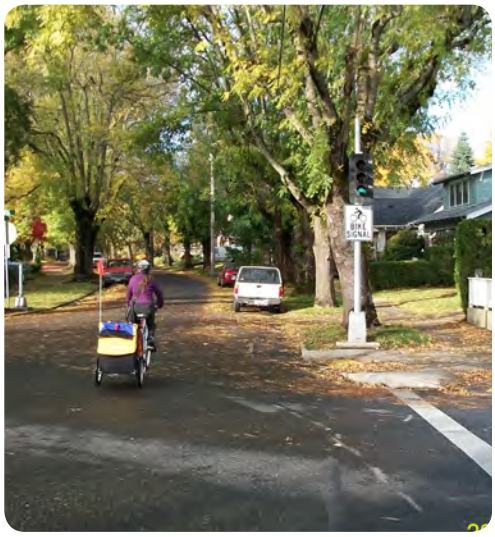
BICYCLE BOX

A bicycle box provides a head start at the onset of the green signal, reduces the potential for “right hook” collisions, and facilitates bicyclists’ left turns by enabling a “J” or “Copenhagen” left from the crossing street. A bicycle box should be 10 feet minimum depth, and the full width of bicycle lane (if present) and adjacent general purpose travel lane together. Green pavement markings and a lead-in approach/ingress lane can be used to enhance visibility. Stop lines for motor vehicles are placed behind the bike box. Include “STOP HERE ON RED” sign (R10-6A) “WAIT HERE”

or “LET’S GET BEHIND IT!” sign, pavement markings within the box are advisable, as are “NO TURN ON RED” restrictions (R10-11). The bicycle box should be located to minimize the likelihood of motor vehicle encroachment from turning vehicles. This may require the stop line be recessed further from the crosswalk in some locations.

SIGNAL TIMING

Where bicycle facilities intersect with arterials or other roadways where signals require actuation, signal detection systems need to be calibrated to explicitly detect bicyclists (see RCW 47.36.025). 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.



BICYCLE SIGNAL HEAD

Bicycle signal heads provide clear direction to bicyclists crossing signalized intersections. Instructing bicyclists to use the pedestrian signal is less costly, but pedestrian signals are not timed for bicycle movements. The result is that bicyclists may have unclear information about when it is safe to enter the intersection. Bicycle signal heads can be designed to call a green signal phase through the use of loop detectors (or other passive detection such as video or radar) or push button. Bicycle signal heads and separate bicycle signal phase should be considered at intersections and trail crossings with very high volumes of cyclists or locations where it is desirable to provide separate phasing for the bicyclists. Presently the MUTCD has no provision for bicycle signals; however bicycle signals are under experimentation in many jurisdictions, and detailed in the NACTO Urban Bikeway Design Guide. It is expected that bicycle signals will be incorporated in the next edition of the MUTCD.

PAVEMENT DETECTION MARKING

Bicycle detection is used at actuated signals (signals that are user-activated by pavement sensor/loops, video, or push buttons) to alert the signal controller of bicycle crossing demand on a particular approach. Bicycle pavement markings may be used to show where a bicyclist should stop to trigger a demand-actuated signal.

For installation of signal detection markings, signal equipment should be investigated first to ensure that it can detect bicycles. When installing roadway markings, consider the following priorities:

- Place detector markings at all new and upgraded signals with loop detectors
- Systematically adjust sensitivity and add pavement markings at all signals along existing and new bicycle routes
- Investigate and adjust (if possible) signal sensitivity and add markings at locations requested by the public.

Placement of bicycle detector markings should consider the following:

- The bicycle detector symbol should be placed in the optimum location for the bicycle to actuate the signal
- The detection zones and markings should be placed within the pathway of bicycles so that they do not have to maneuver into a different position within the lane in order to be detected
- If bicyclists are expected to use multiple lanes of a roadway (e.g. right and left turn lanes) provide detection and markings in multiple lanes.

BIKE ACTIVATED PUSH BUTTON

Signals specifically intended for pedestrian and bicycle street crossings such as mid block crossings, HAWK signals, or RRFBs (see below for RRFB and HAWK details) may require special activation. Bicycle-activated push buttons are a separate push buttons located along the curb or location easily accessed by bicyclists. Bicycle activated push buttons allow bicyclists to activate the signal without having to change their course of travel, dismount or detour onto the sidewalk to use a pedestrian push button. This improves convenience, compliance and efficacy of the signal. The disadvantage of push buttons is that they are challenging

for bicyclists wanting to make a left turn. The following design considerations should be taken into account:

- Place push button within reach of the curb but with appropriate setbacks to avoid being hit by passing motor vehicles
- Push buttons work well on streets without parking or where there are parking restrictions at the approach to the intersection
- Use a large button for easy actuation by bicyclists
- Placement of the push button assembly and bicycle queuing should take right-turning motor vehicles into consideration.

RRFB

A Rectangular Rapid Flashing Beacon is a pedestrian warning signal consisting of yellow LED lights in two rectangular clusters, or beacons, that employ a stutter-flash pattern similar to that used on emergency vehicles. The beacons are often mounted below a standard pedestrian crossing warning sign and above the arrow plaque used to indicate the crossing location. RRFBs are actuated either by a push-button or passive detection.

- RRFBs should be considered at uncontrolled intersections or at mid-block crossings where additional measures are needed due to high volumes and speeds
- They should be considered where there are high volumes of pedestrians or bicyclists, a high number of vulnerable pedestrians (e.g. near schools, senior centers), or at off-street path crossings or as part of a bicycle boulevard network.

HAWK/PEDESTRIAN HYBRID BEACON

“HAWK” stands for High-intensity Activated crossWalK and is also referred to as a pedestrian hybrid beacon. A HAWK signal is a push button-activated pedestrian and bicycle signal that increases pedestrian and bicycle safety at crossings while stopping vehicle traffic only as needed.

HAWK signals may be used at mid-block crossings (including off-

street path crossings) and should be considered at crossings where high traffic volumes and speeds make it difficult for pedestrians and bicyclists to cross the street, and where warrants for a conventional signal are not met. HAWK signals provide a protected crossing while allowing vehicles to proceed through a pedestrian/bicycle crossing as soon as it is clear, thus minimizing vehicle delay. HAWK signals may also provide audible information for visually impaired pedestrians.

HALF SIGNAL

Half signals are located at the intersection of an arterial and non-arterial. The traditional signal heads face the arterial, while the local street is stop-controlled. The signal heads on the major street rest in green until activated by a pedestrian or bicyclist, and they then turn yellow and red, allowing a pedestrian or bicyclist to cross the arterial. Half signals may be confusing for motorists using the side street, and are best paired with right-in, right-out restrictions such as on a neighborhood greenway.

BIKE PARKING

Conveniently located bicycle parking is an important element of a multimodal transportation system because it allows bicyclists to secure their bicycles at their intended destination. Bicycle parking may be provided in a variety of forms depending on whether it is for short-term or long-term use (e.g. a brief shopping stop, an all-day event, or workplace and residential parking). Short-term parking may include individual or multiple bike racks placed within the furniture or building frontage zones on a sidewalk or in high-capacity corrals placed within the street (where there is a defined motor vehicle parking lane). Long-term parking racks may be sheltered and placed in off-street locations such as parking garages/lots or transit station entrances. Long-term parking may have limited access depending on the operational hours of the parking area. When installing bicycle parking, the following considerations should be kept in mind:

Well-designed and placed bicycle parking promotes a more orderly streetscape, preserves the pedestrian right-of-way and prevents damage to trees and street furniture.

- Bike racks should support the bike at two points and provide a sturdy frame to secure a U-lock around the rack, bike frame, and one wheel.
- Bicycle parking should be conveniently placed within close proximity to destinations such as businesses, parks, schools

and other community facilities, and major transit stops and stations.

» In general, placing one or two racks at multiple locations along a block face is preferred to grouping all the racks at one location. In order to ensure that there is adequate parking to meet demand, parking utilization should be periodically assessed, and additional parking should be provided where demand is high.

» In areas with high bicycle parking demand and limited sidewalk space, in-street corrals or other high capacity bike rack designs may be considered. In-street corrals have an added benefit of improving sightlines for motor vehicles when placed at the near side of an intersection.

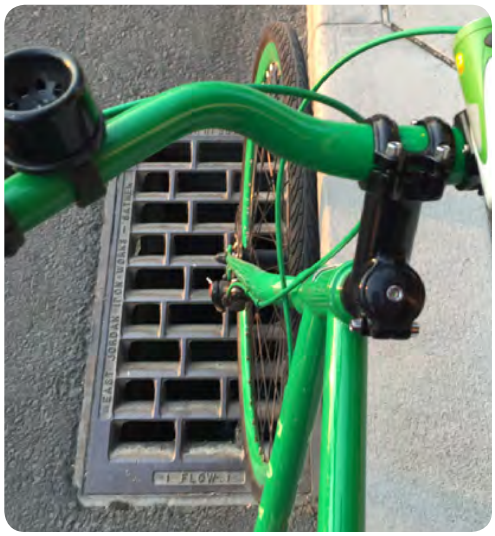
BIKES AND TRAIN TRACKS

Train tracks that cross roadways or shared use paths can create safety issues for bicyclists. Bike tires are easily caught in the flange way and may slip on the rails when wet. As described in the 2012 AASHTO Guide for the Development of Bicycle Facilities, design considerations for bikes and railroad tracks include:

» Crossing angle: Bicycle facilities should be designed to cross railroad tracks at an angle of 60 to 90 degrees, such that bicyclists can avoid getting wheels caught in the flange way.

» Crossing surfaces: Concrete or rubber crossing surfaces are recommended (concrete performs best). Timber and asphalt surfaces are not recommended.

» Flange way width should be minimized when practical. This is a greater issue with heavy rail track.



DRAIN GRATES

Utility covers and drainage structures should be located outside of the surface of on-street bicycle facilities where feasible. Where they are unavoidable, utility covers in the bike lane should be smooth and flush with the roadway surface. Drain grates must be designed such that narrow tires cannot get caught. When new drain grates are installed or existing drain grates replaced, they must conform to bicycle friendly grate design standards specified by WSDOT (vaned grate, herringbone grate, or other grate with an opening

perpendicular to the direction of travel, 4 inches or less center to center, see WSDOT Design Manual).

Deck grating can be extremely slippery, particularly in wet conditions. Bicycle tires, with their small contact area, are extremely vulnerable to loss of traction. If deck grating must be installed, it must be treated to increase traction and the seam width between the decking and the adjacent pavement should be no wider than 3/8 inch.

ADDITIONAL STREET DESIGN RESOURCES

The following list provides information on where to find additional bicycle facility and street design guidance.

- AASHTO Guide for the Development of Bicycle Facilities (https://bookstore.transportation.org/item_details.aspx?ID=1943)
- MUTCD (http://mutcd.fhwa.dot.gov/)
- WSDOT Design Manual (http://www.wsdot.wa.gov/Publications/Manuals/M22-01.htm)_
- NACTO Bikeway Design Guide (http://nacto.org/publication/urban-bikeway-design-guide/)
- FHWA Separated Bike Lane Planning and Design Guide (http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/separated_bikelane_pdg/page00.cfm)
- BIKESAFE (http://pedbikesafe.org/BIKESAFE/index.cfm)
- APBP Bicycle Parking Guide (http://www.apbp.org/?page=publications)
- PEDSAFE (http://pedbikesafe.org/PEDSAFE/index.cfm)

MAINTENANCE

RECOMMENDED APPROACH TO SCHEDULES AND COSTS CONSIDERATIONS

Roadway surfaces are subject to deterioration and debris accumulation. If unmitigated, a facility that was in perfect condition may become unusable for bicyclists or pedestrians. It is important to consider that surface conditions that are satisfactory for motorists may cause complications for bicyclists who utilize narrower tires. Bicyclists face a variety of impediments that can be easily managed through an effective maintenance program. While safety of all roadway users is a top priority, a good maintenance program should also aim to protect public funds invested in bicycle and pedestrian infrastructure.

This section outlines responsibilities relative to the maintenance of Yakima owned assets in the public right-of-way. The Public Works Department (PWD) is the primary owner of and manages the reconstruction of city streets, sidewalks and bridges. The PWD is also responsible for installing and operating traffic and parking management devices and managing access for pedestrians, motor vehicles and bicyclists. Yakima Transit is responsible for maintenance of transit property such as bus shelters and signage.

MAINTENANCE SCHEDULE

The City of Yakima aims to improve the life and sustainability of roadways and sidewalks in the most cost-effective and efficient way possible. Below is a breakdown of the typical life cycle of city roadways and sidewalks with respect to operations and maintenance. During the design of a project, an operations and maintenance plan should be developed to address all aspects of the life of a street, from daily, weekly, and seasonal requirements to routine maintenance. Note that maintenance practices are opportunities to incorporate Complete Streets principles.

The list below is a general guide for when maintenance practices typically occur; however, improvements may be needed at any time to address safety and access concerns.

STREET SWEEPING

Streets may feature high-quality bicycle facilities; however, if these facilities are strewn with gravel, sand, or other debris, they become far less safe and attractive to users. As a part of routine maintenance, roadways should be swept to remove any litter. When sweeping vehicle lanes, bicycle lanes or sidewalks, debris should not be swept from one facility to the other. Debris can be removed from roadways with curbs through the use of vehicles that vacuum the debris, while uncurbed roads can be swept. The following recommendations apply to street sweeping:

- All bicycle facilities should be swept routinely. Identifying routes of particular importance will help ensure greater rider comfort. Facilities that may require more frequent sweeping include popular commuter or recreational corridors and roadways that regularly build up debris.
- Establish a sweeping schedule for facilities that anticipates both routine and irregular sweeping needs. Routine sweeping schedules may occur at regular intervals, with greater frequency seasonally. Strategies for inspection and sweeping after unanticipated events should also be established. These events may include flooding, storm events, or vandalism.
- Sweep project area after roadway repairs.
- Continue to update priority routes for street sweeping as new facilities are constructed.
- Reduce the volume of debris on roadways through ordinances that require parties responsible for debris to contain it. Possible requirements include paving gravel and dirt driveway approaches, enforcing coverage of tarps on trucks loaded with gravel or sand, or clean up after construction operations that leave gravel and dirt on the roadway.

SNOW REMOVAL AND STORAGE

Cold winter weather with snow is common in Yakima. Snow, slush, and ice impact all modes of transportation and timely clearance is essential to maintaining safe and accessible streets. Street design should proactively incorporate provisions to facilitate snow clearance and storage for all modes, with pedestrians, bicyclists, and transit users given the same attention as motorists. Street

crossings and sidewalks should be accessible for the elderly, young children, the disabled, and people pushing carts and strollers.

Prior to a major snow or freezing rain event, the City aims to spread de-icing material on all major arterial streets. Other priority locations include streets near schools, hospitals, stop signs and hills. When snow accumulations reach three inches, the City of Yakima plows the major arterial streets, and the streets near schools, hospitals, stop signs and hills.

Sidewalks must have a clear unobstructed accessible pathway. Particular attention should be given to clearing curb ramp at crosswalks. Hydrants, catch basins, crossing islands, medians, and building entrances must also be accessible. Sidewalks should be cleared within three hours of snowfall ending (or three hours from sunrise if snow falls overnight).

CONSIDERATIONS

- Bike lanes and center turn lanes do not get the heavy traffic to break up snow and ice. Special maintenance such as extra salt is needed to reduce snow and ice accumulation.
- Some in-street elements such as raised medians, traffic circles, pork chop islands, etc. may be obstacles to plowing and may need additional maintenance such hand shoveling to fully clear snow from pedestrian pathways.

RESTRIPING

All markings should be maintained in a legible condition so they can be easily interpreted by all roadway users, including motorists. While newly installed markings are highly visible, they may fade over time, greatly reducing their perceptibility, especially at night. The following strategies apply to pavement marking maintenance:

- Establish routine marking inspections, including assessing visibility at night.
- Markings should be replaced on an as needed basis, with substandard markings being replaced as soon as possible. Markings in high-use areas may need restriping more than once a year.
- Roadways where markings don't follow current City design guidelines should be updated to standards as part of regular maintenance.

- Transitions to county roadways should be evaluated, especially at frequently traveled routes in and out of the city. Coordination with the County may be necessary.
- Consider the cost of using more durable materials such as thermoplastic versus more frequent maintenance of less durable materials such as paint.

RESURFACING

Resurfacing of streets is an excellent opportunity to add bicycle lanes, curb ramps and new or realigned crosswalks. The bike plan should be considered before every resurfacing project.

SURFACE REPAIR

Pavement surface condition significantly affects the quality of a bicycle facility, and poor surfaces can deter riders. Defects such as longitudinal cracks or joints, potholes, and root heaves can degrade riding conditions considerably. The following recommendations apply to maintaining the surfaces of bicycle facilities:

- Perform routine assessments of roadway surfaces for abnormalities. Make the necessary repairs in a timely manner after observing or receiving comment of any abnormality.
- Correct any pavement edges, seams, or potholes. Keep in mind that bicyclists have a higher level of sensitivity to surface irregularities during the overlay process.
- In order to avoid leaving an edge or seam on the surface of a bicycle facility, the overlay should encompass the whole roadway surface when possible.
- As funding allows, replace parallel-slatted drain grates with bicycle-safe grates. Prioritize replacements on routes with bicycle facilities. Install bicycle-safe grates on all new projects.
- Use overlays as an opportunity to complete multiple projects at once. Projects that might be completed in conjunction with an overlay include road widening or paving approaches to unimproved road and driveway connections.

- Ensure that surface repairs do not result in pavement seams running longitudinally through bicycle facilities or areas which are anticipated to have high ridership.
- In order to lessen inconvenience to bicyclists and extend the life cycle of bicycle facilities, carry out preventative maintenance on a consistent basis. Preventative maintenance may include eliminating intrusive tree roots, placing root barriers, selecting paving materials with longer life cycles, and removing debris from storm drains.

[1]Potts, Ingrid, Harwood, Douglas and Richard Karen, "Relationship of Lane Width to Safety for Urban and Suburban Arterials, TRB 2007 Annual Meeting

[2]2011 AASHTO Green Book, Urban Arterial Travel Lane Widths, page 7-29

[3]Potts, Ingrid, Harwood, Douglas and Richard Karen, "Relationship of Lane Width to Safety for Urban and Suburban Arterials, TRB 2007 Annual Meeting

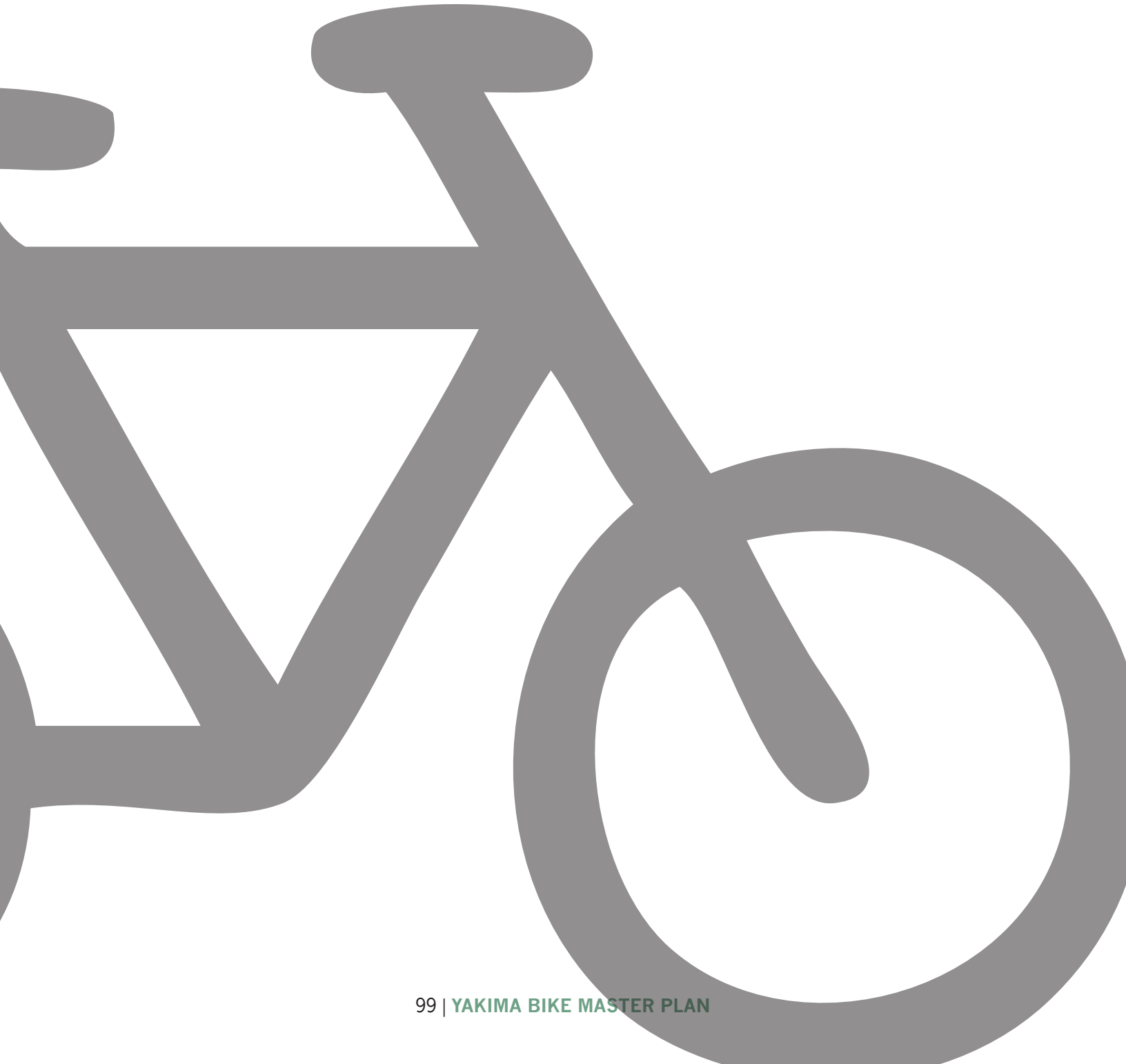
[4]TRB Special Report 214 – Designing Safer Roads, 1987. It is important to note this report documented research proving wider travel lanes increased safety, but this research was only based on rural, 2 lane highways.

[5]Road Diets, a Livability Fact Sheet. AARP, Walkable and Livable Communities Institute.

[6]Transport for London. Centreline Removal Trial. August 2014. https://tfl.gov.uk/cdn/static/cms/documents/centre-line-removal-trial.pdf

[7]Shackel, S. C. and Parkin, J. (2014) Influence of road markings, lane widths and driver behavior on proximity and speed of vehicles over taking cyclists. Accident Analysis & Prevention, 73. pp 100-108.

COMPLETE NETWORK



YAKIMA BICYCLE MASTER PLAN COMPLETE NETWORK

LEGEND

EXISTING INTERSECTION TREATMENTS

- Half Signal
- Full Signal
- Crosswalk

EXISTING FACILITIES

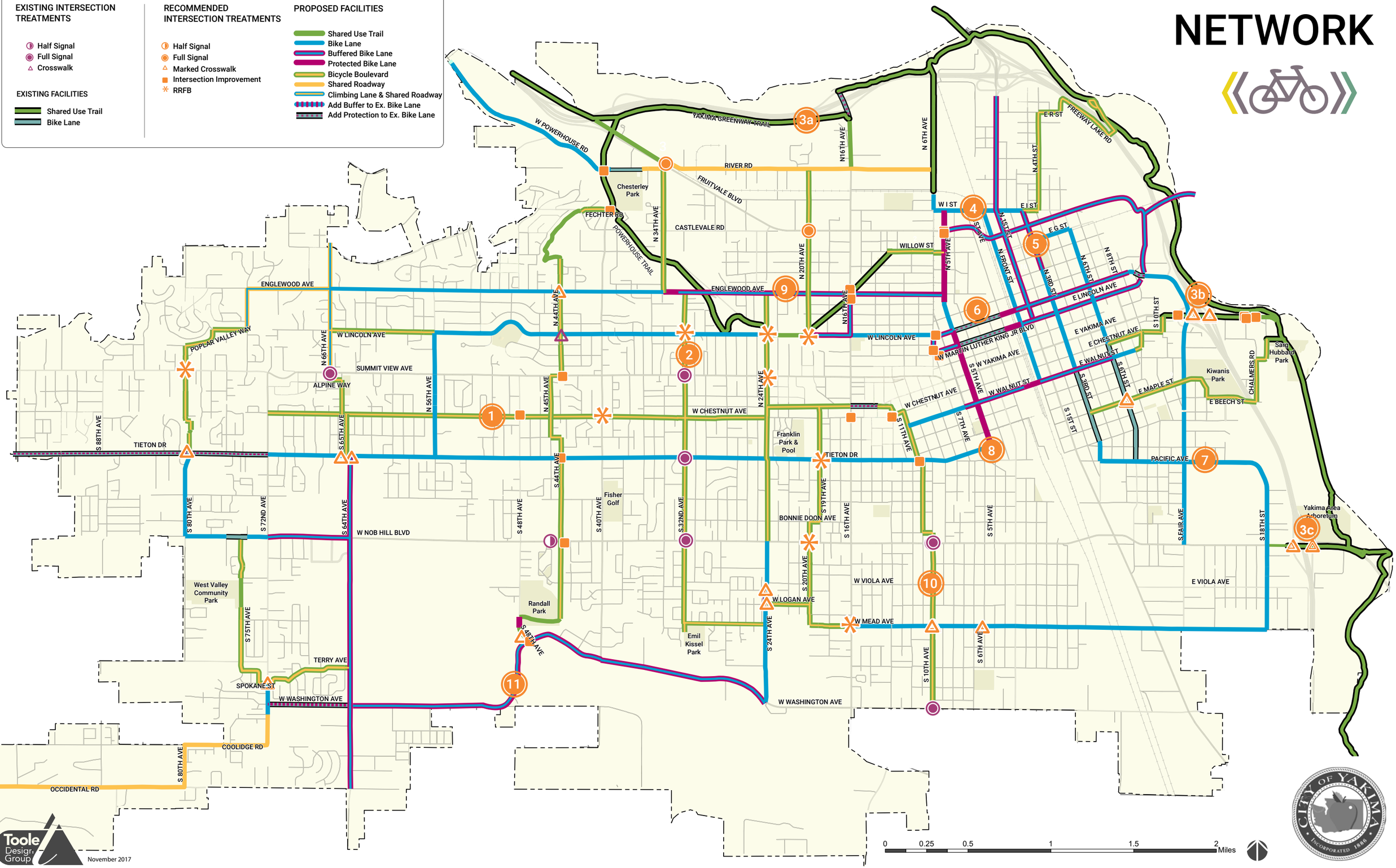
- Shared Use Trail
- Bike Lane

RECOMMENDED INTERSECTION TREATMENTS

- Half Signal
- Full Signal
- Marked Crosswalk
- Intersection Improvement
- RRFB

PROPOSED FACILITIES

- Shared Use Trail
- Bike Lane
- Buffered Bike Lane
- Protected Bike Lane
- Bicycle Boulevard
- Shared Roadway
- Climbing Lane & Shared Roadway
- Add Buffer to Ex. Bike Lane
- Add Protection to Ex. Bike Lane



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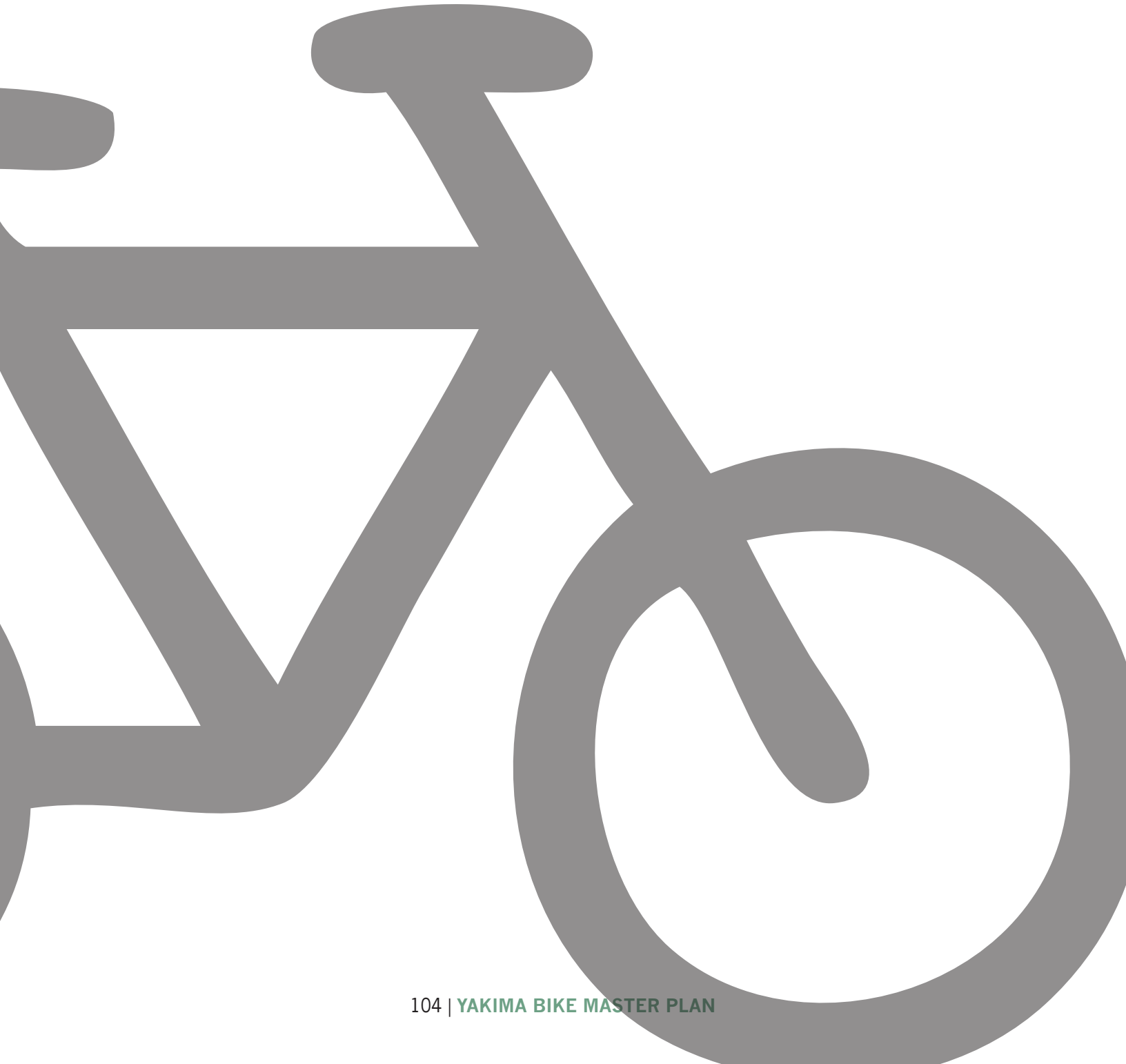
November 2017

CITY OF YAKIMA INCORPORATED 1886

PROJECT NETWORK «C



YAKIMA BICYCLE MASTER PLAN PROJECT NETWORK

LEGEND

EXISTING INTERSECTION TREATMENTS
- Half Signal
- Full Signal
- Crosswalk

EXISTING FACILITIES
- Shared Use Trail
- Bike Lane

RECOMMENDED INTERSECTION TREATMENTS
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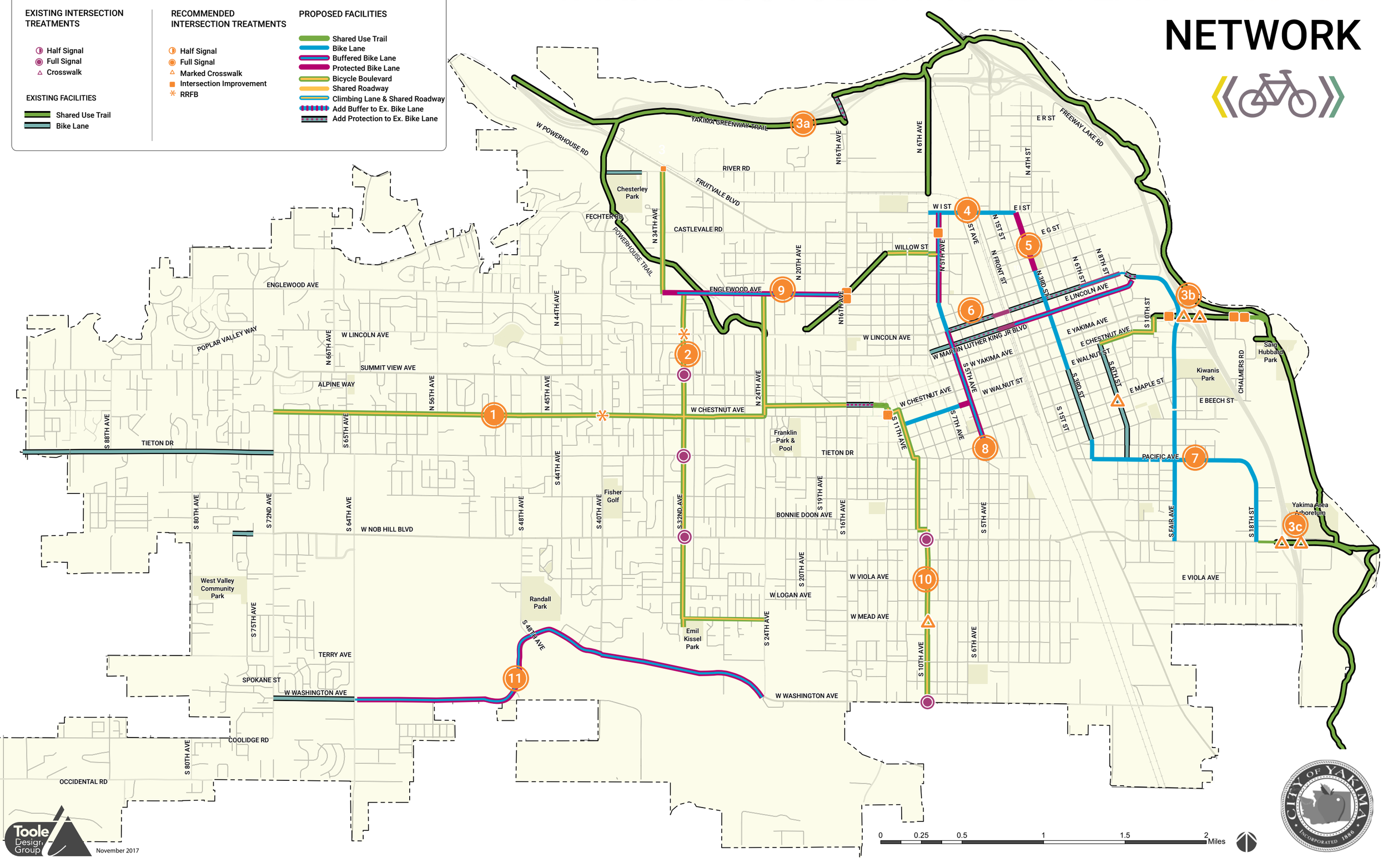

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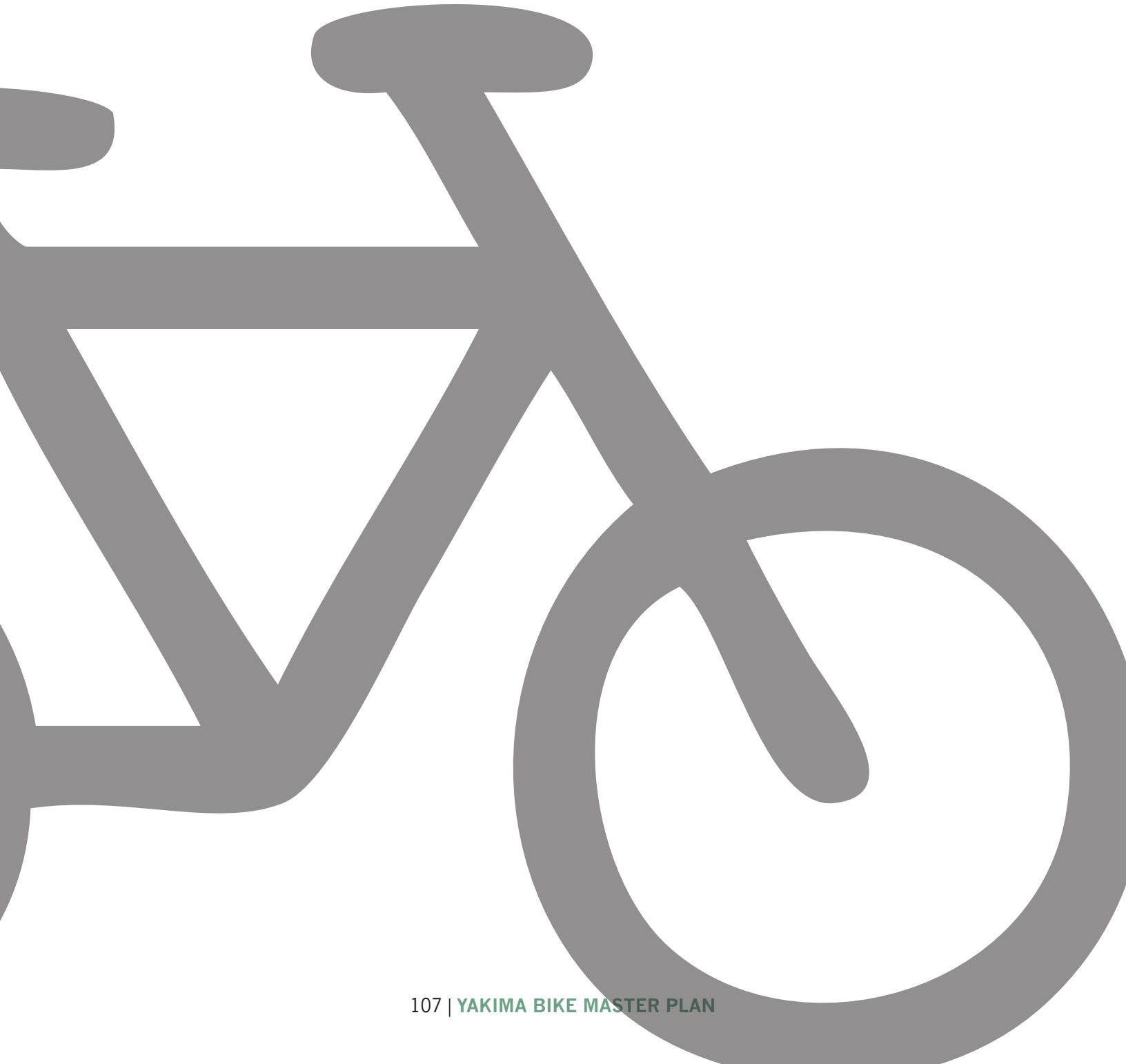
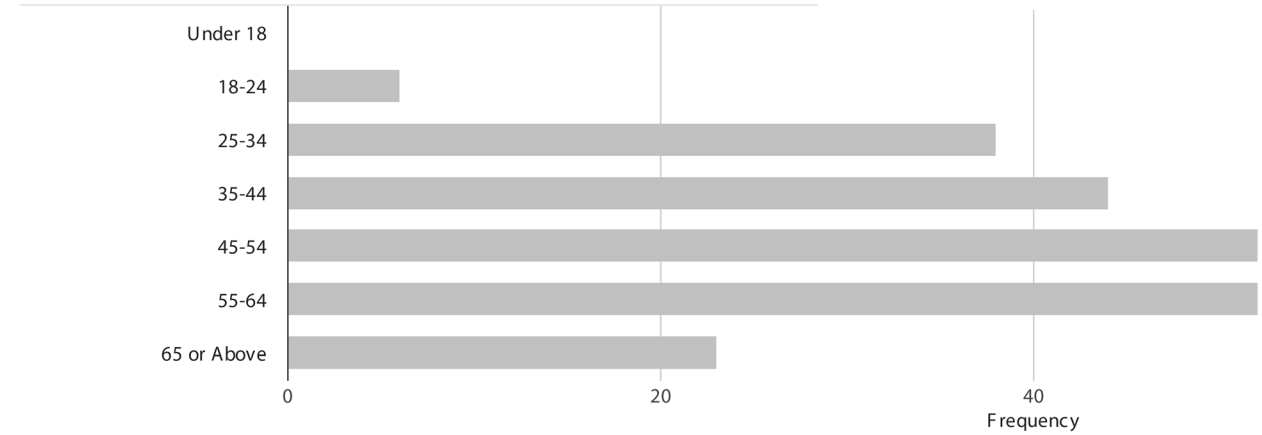
SURVEY RESULTS & SUMMARY «D



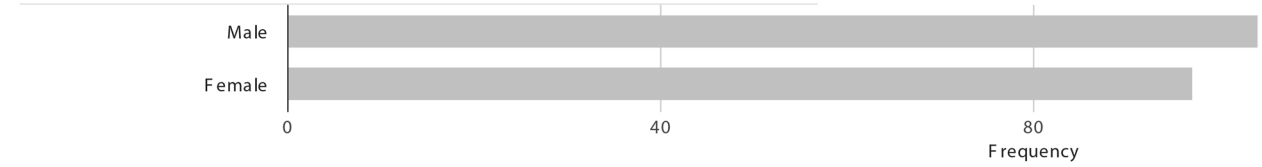
SURVEY SUMMARY

Input from Yakima citizens was solicited through an online survey. The survey was intended to gather attitudes about the current conditions of bicycling in Yakima. The survey was open for approximately six months. Survey responses are summarized below.

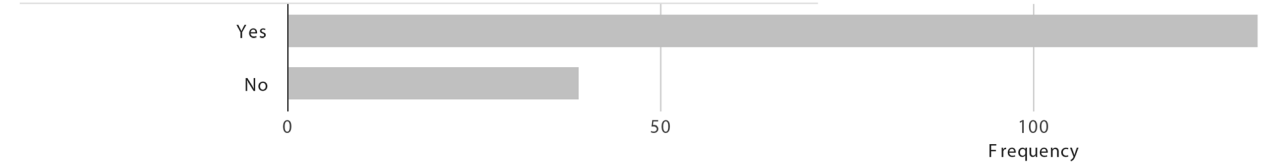
YOUR AGE?



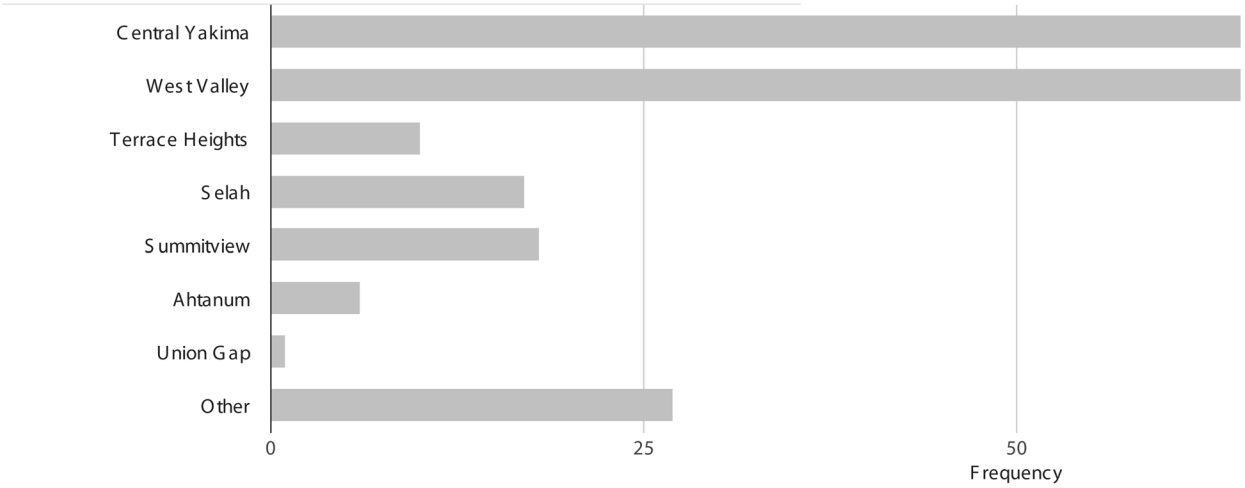
YOUR GENDER?



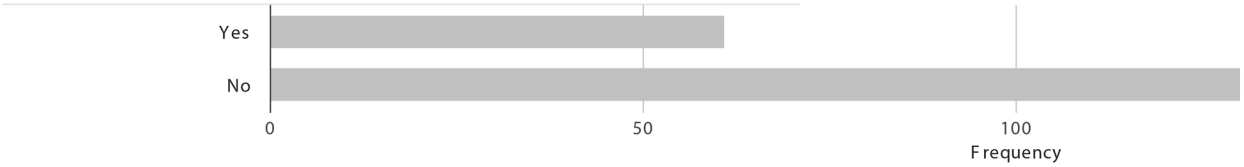
HAVE YOU BICYCLED IN YAKIMA IN THE LAST YEAR?



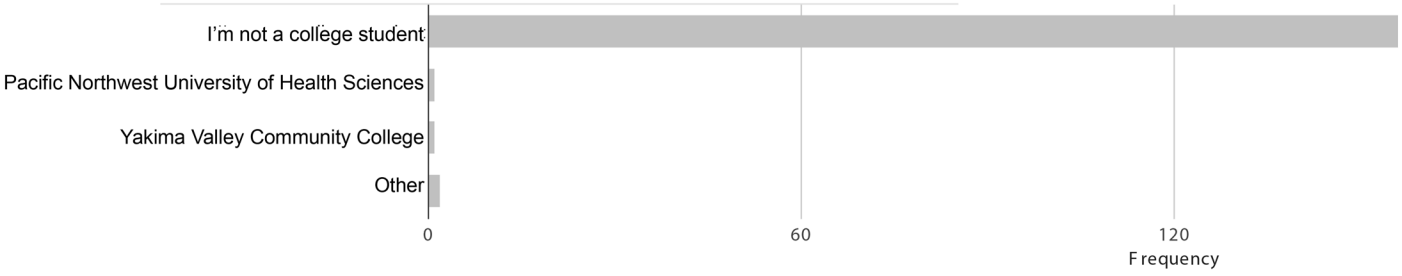
IN WHAT GENERAL AREA DO YOU LIVE?



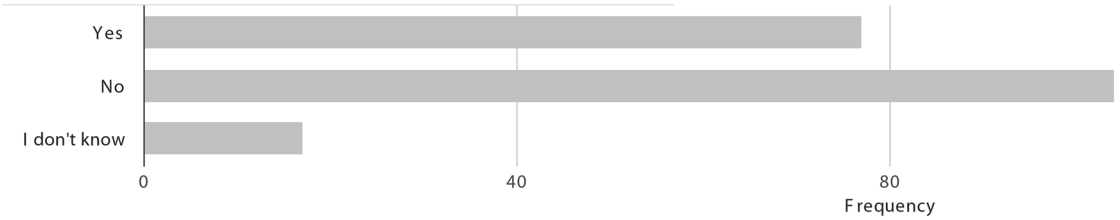
DO YOU BICYCLE WITH CHILDREN?



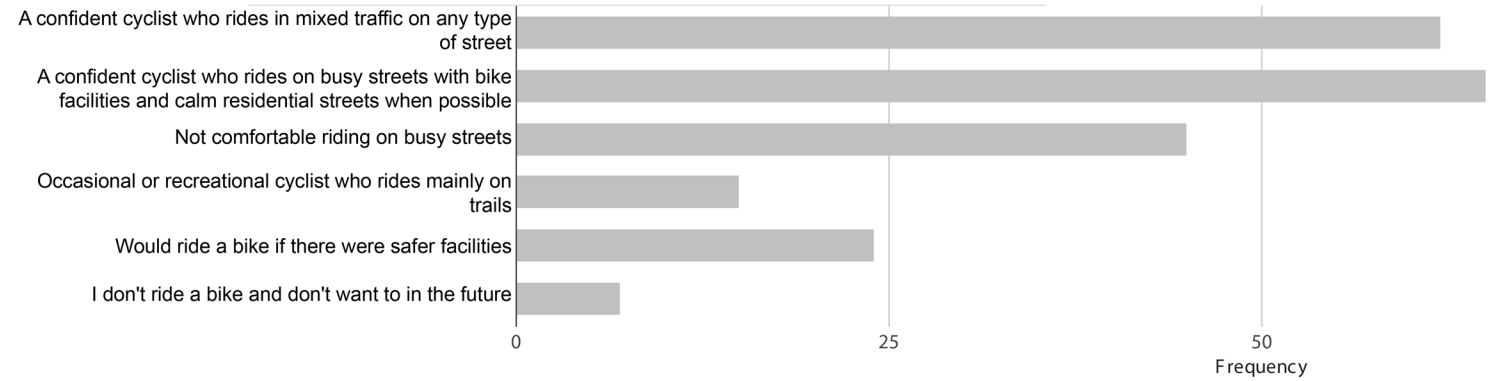
ARE YOU A COLLEGE STUDENT, IF SO WHERE?



DO YOU LIVE WITHIN 4 BLOCKS OF A BICYCLE FACILITY?



WHICH OF THE FOLLOWING BEST DESCRIBES YOU?



WHAT DISTANCE DO YOU BICYCLE ONE-WAY FOR THE FOLLOWING TRIPS?

	0 Miles	Less than 2 Miles	2-5 Miles	5-10 Miles	10+ Miles
Commute to school or work	69	18	45	38	12
Shopping or errands	62	36	51	13	7
Recreation, health or exercise	16	19	37	41	107
Social or entertainment	38	20	47	26	52

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
90	80	44	7	5

Off-street multi-use trails

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
30	35	66	65	28

DO ANY OF THE FOLLOWING FACTORS PREVENT YOU FROM BICYLING IN YAKIMA? (DRAG OPTIONS AND PLACE IN ORDER OF IMPORTANCE TO YOU, 1 BEING MOST IMPORTANT.)

Item	Total Score	Aggregate Rank
There are gaps in the network of trails and bike lanes	2798	1
Road surfaces are poor (potholes - cracks - debris etc.)	2704	2
There are too many barriers in between destinations (multi-lane streets - lack of connecting streets - etc.)	2663	3
I do not feel physically safe when riding on streets because of traffic	2564	4
I do not feel comfortable when riding on streets because of traffic	2425	5
There are not enough trails	2336	6
Trail surfaces are poor (gravel - puddles - debris - etc.)	2244	7
It would take me too long to bike to the places I need to go	1855	8
Driving a motor vehicle is more convenient/comfortable	1595	9
I do not feel personally safe from crime while riding a bicycle in Yakima	1547	10
I have too much to carry	1205	11
Weather	1120	12
I have small children	990	13
Hills	920	14
Other (please specify below under comments)	394	15

WHEN MAKING A BICYCLE TRIP, WHICH OF THE FOLLOWIGN FACILITIES DO YOU MOST PREFER TO USE? (DRAG OPTIONS AND PLACE IN ORDER OF IMPORTANCE, TOP BEING MOST IMPORTANT)

Item	Total Score	Aggregate Rank
Striped bicycle lanes	1552	1
Neighborhood streets with minimal traffic and low speeds	1424	2
Off-street or multi-use trails	1142	3
Wide travel lanes that allow motorists to safely pass bicycles on the left.	1100	4
Any roadways where bicycles are allowed	970	5
Shared lane markings	969	6
Sidewalks	746	7
Other	305	8

WHAT DO YOU LIKE MOST ABOUT BICYCLING IN YAKIMA?

I live within bicycling distance of many important destinations

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
17	29	36	98	45

Motorists respect bicyclists on the roadways

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
94	67	41	20	3

Crossing roadways is safe and easy

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
57	108	40	18	2

Road surfaces are well maintained

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
29	84	81	30	1

It is a quick way to get around

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
16	44	67	81	14

I feel like I am helping the environment

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
9	7	39	99	72

WHAT WOULD YOU LIKE TO SEE THE CITY SPEND MONEY ON TO IMPROVE BICYCLING IN YAKIMA? (DRAG OPTIONS AND PLACE IN ORDER OF IMPORTANCE, TOP BEING MOST IMPORTANT)

Item	Total Score	Aggregate Rank
More bike facilities on busy streets	1907	1
More bike facilities on calm streets	1676	2
Multi-use trail and roadway crossings	1619	3
Off-street multi-use trails	1503	4
Filling gaps in bicycle facilities	1437	5
Road surface maintenance (filling potholes/pavement cracks/street sweeping)	1426	6
Bicycle parking	1057	7
Barrier crossings (e.g. bridges or tunnels)	1027	8
Trimming vegetation	601	9
Other (please specify below under Comments)	287	10

Sometimes when the City makes changes to the streets to better accommodate more modes of travel such as walking, transit and bicycling, there can be compromises. If installing bicycle facilities requires trade-offs with other transportation modes, then what trade-offs are acceptable to you to encourage more bicycling? Imagine the following example taking place in front of your home or along your route to work, school or other important activities, and note your opinion about the trade-off.

EXAMPLE A: Change on a slow, resiential street: A bicycle boulevard is installed with traffic circles and slow speed zone signs. The trade-offs could be (check one box per trade-off):

	Like	Neutral	Don't Like
Some parking removal	73	114	36
More bicycle traffic	180	38	7
Slower traffic speeds	149	57	19

EXAMPLE B: A bike facility is installed on an arterial street and requires a reduction in on-street parking. Trade-offs could be:

	Like	Neutral	Don't Like
Safety improvements for pedestrians Physical separation between cars and bicycles	192	24	8
Physical separation between cars and bicycles	190	27	7
Some parking removal	68	124	30

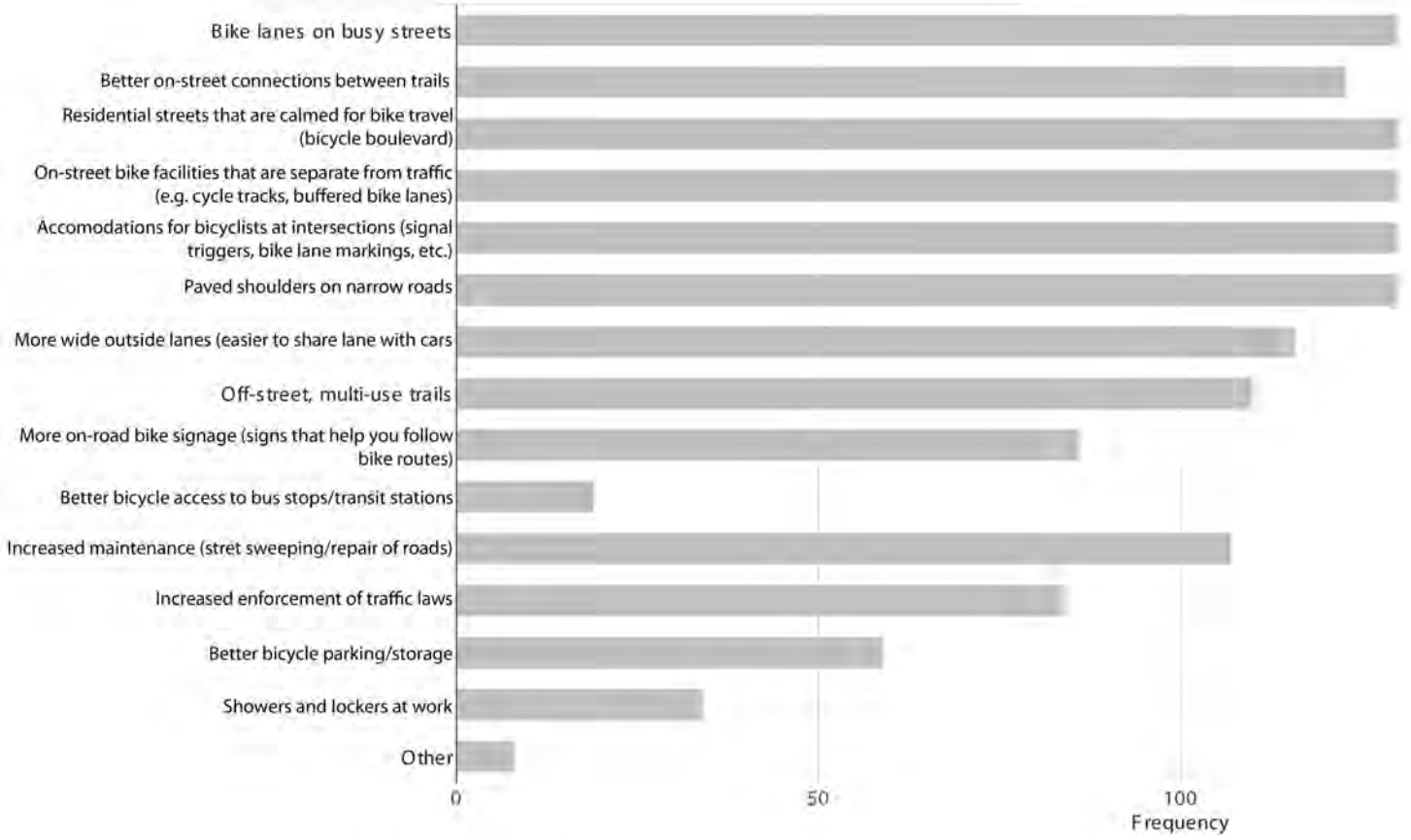
EXAMPLE C: A four-lane arterial street is reduced to three lanes (two through travel lanes and a center turn lane). Trade-offs could be:

	Like	Neutral	Don't Like
Slightly slower motor vehicle speeds	117	62	44
Possible increased congestion at rush hours	23	102	95
Fewer collisions	191	23	7
Safer pedestrian crossings	188	27	5
Addition of a bicycle facility	186	25	9

EXAMPLE D: A bike lane is installed on an arterial street and travel lanes are narrowed. Trade-offs could be:

	Like	Neutral	Don't Like
More bicycles on the street	174	38	10
Slightly slower motor vehicle speeds	136	60	26
Addition of a bicycle facility	182	31	8

WHICH OF THE FOLLOWING STREET OR TRAIL IMPROVEMENTS WOULD ENCOURAGE YOU TO BIKE MORE OFTEN? (SELECT ALL THAT APPLY)



WHICH OF THE FOLLOWING PROGRAMS OR INFORMATION WOULD ENCOURAGE YOU TO BIKE MORE OFTEN? (SELECT ALL THAT APPLY)