

CHAPTER

6

Bicycle Plan

This chapter summarizes strategies to be used in evaluating the future needs and recommends various improvements for the City of West Linn's bicycle system (policy, operations, and facilities). The Bicycle Plan is intended to outline all bicycle needs over the next 20 years and develop specific policy changes, operational enhancements and new capital projects to address those needs. The cost for the policy changes, enhanced operations, and new capital projects is tallied at the end of this chapter.

Needs

Bicycle trips are typically longer than walking trips and generally shorter than motor vehicle trips. Where walking trips are attractive at lengths of a quarter mile (generally not more than a third of a mile), bicycle trips are attractive up to three miles. Because of the length of the trip, bicycle lanes and multi-use paths both provide good accommodations for these trips. Many shorter bicycle trips can also be made on local streets without additional accommodations or via connections to arterials and collectors with bicycle facilities. The needs and deficiencies for the existing bicycle system can be categorized into two areas: Connectivity and Street Designations. Both of these categories are described in this section.

Connectivity

There are two prominent north/south roadways that provide bike lanes in the city (Willamette Drive and Salamo Road). However, these facilities are not well connected by other facilities that could allow for travel to other destinations within the city, particularly to the east and west. The lack of east/west on-street bicycle facilities creates a significant gap in the bicycle system to travel in and around the city. Overall, with so few connected bike lanes, connectivity of on-street bike lanes is poor. This lack of connectivity causes significant problems for bicyclists. Without connectivity within the bicycle system, this mode of travel is severely limited.

Street Designations

Arterials and collectors designated to include bike facilities do not fully address bicycle travel needs in and around the city. If not on an arterial or collector facility, bicycle trips generally should be accommodated on lower traffic volume streets. Many trips occur on local streets that connect to parks,

schools, retail activity centers, etc. There is a current need for designated routes that accommodate these trips. These facilities could be considered a “shared” facility or could have a specific designation such as a “bike boulevard” where actual treatments to the roadway are made that enhance the bicycle environment and/or make additional connections to bicycle destinations.

Because all of these needs are different, there is no single bicycle solution. The most common need is to provide a safe and interconnected system that legitimizes bicycling as a mode of travel for all user types.

User Types

Bicyclists are a varied group of people with different skill levels, abilities, bicycling experience, and trip types. Their needs and comfort level with the City of West Linn’s bicycle infrastructure vary as a result of these differences. The City should accommodate these user types by providing adequate facilities for the majority of its users. There are multiple bicycle facility types available for the city to construct which appeal to the different user types. For instance, multi-use paths are often favored by less experienced or recreational users, while bike lanes on major roads tend to be used by commuters and other more experienced users.

Current Policy

Policy related to bicycle lane infill is identified in the TSP Project Goals and Objectives. Bicycle policy 3 states:

Provide striped and signed bicycle lanes on all arterial and collector roadways consistent with the policies of the Transportation System Plan.

The current policy for building and maintaining bicycle infrastructure (such as bicycle lanes) allows the opportunity to fill in gaps directly adjacent to new development, as well as to fill in gaps in the bicycle network even if the gap is not adjacent to a new development (or redevelopment). As defined in the Community Development Code, the land division provisions arrange for mitigation of impacts (including bicycle traffic) generated by development.

These impacts are to be mitigated at the developer’s cost, by the provision of streets, sidewalks, bicycle and foot paths, and traffic control devices within, contiguous to, and nearby the development site.¹

This policy provides one funding strategy by collecting fees from new development to help fill in gaps in the bicycle system that may not be adjacent to the developing parcel.

However, as West Linn is a mature city, the potential for new development to fund infill bicycle improvements is limited. As such, an annual allocation of revenues dedicated towards bicycle projects could provide a means to fill gaps in the bicycle network.

¹ Community Development Code 85.010, Chapter 85, Land Division – General, pg. 85-2, City of West Linn, May 2007.

Facilities

Bicycle facilities can generally be categorized as multi-use/off-street bike paths, bike lanes, bike boulevards, and/or shared roadways. Each of these facilities serves a particular purpose for bicycle travel. Table 6-1 summarizes each of these facilities with a general description of the elements inherent to each facility.

Table 6-1: Bikeway Types

Bikeway	Description
Multi-use Path	Off-street route (typically recreationally focused) that can be used by several transportation modes, including bicycles, pedestrians and other non-motorized modes (i.e. skateboards, roller blades, etc.)
Bike Lane	Area within street right-of-way designated specifically for bicycle use.
Shared Roadway	Roadways where bicyclists and autos share the same travel lane. May include a wider outside lane and/or bicycle boulevard treatment (priority to through bikes on local streets).
Bike Boulevard	Lower-order, lower-volume streets with various treatments to promote safe and convenient bicycle travel. Usually accommodate bicyclists and motorists in the same travel lanes, often with no specific vehicle or bicycle lane delineation. Assign higher priority to through bicyclists, with secondary priority assigned to motorists. Also include treatments to slow vehicle traffic to enhance the bicycling environment.

Bicycle Facility Design Considerations

As their name implies, multi-use paths are conducive to a mix of user types and are typically constructed along an independent alignment such as a stream or greenway, but can also be built parallel to a roadway. Parallel off-street trails can be built with a buffer or curb-tight to the roadway. Off-street trails and sidewalks that are constructed on a curb-tight basis should be planned for 12 feet in width, which is desirable for mixed-use activity (pedestrian and bike). However, according to the American Association of State Highway and Transportation Officials (AASHTO)², mixed-use paths directly adjacent to roadways (with minimal or no separation) should be discouraged for the following reasons:

- Half of bicycle traffic would ride against the normal flow of vehicle traffic, contrary to the rules of the road.
- When the path ends, cyclists riding against traffic tend to continue to travel on the wrong side of the street, as do cyclists making their way to the path. Wrong-way bicycle travel is a major cause of vehicle/bicycle crashes.
- At intersections, motorists crossing the path often do not notice bicyclists approaching from certain directions, especially where sight distances are poor.
- Bicyclists on the path are required to stop or yield at cross-streets and driveways, unless otherwise posted.
- Stopped vehicles on a cross-street or driveway may block the path.
- Because of the closeness of vehicle traffic to opposing bicycle traffic, barriers are often

² *A Guide for the Development of Bicycle Facilities*, American Association of State Highway and Transportation Officials, 1999

necessary to separate motorists from cyclists. These barriers serve as obstructions, complicate facility maintenance and consume available right-of-way.

- Paths directly adjacent to high-volume roadways diminish users' experience by placing them in an uncomfortable environment. This could lead to a path's underutilization.

As cited by AASHTO³ and The Oregon Department of Transportation (ODOT)⁴, mixed-use paths can be designed along roadways, provided several design considerations are met:

- A minimum 5-foot buffer should be provided between the path and roadway to address potential conflicts between motorists and path users.
- There are few vehicle/path user conflict points (e.g., cross-streets or driveways).
- The path can be terminated at each end onto streets with good bicycle/pedestrian facilities or onto another safe, well-designed path through appropriate street crossing treatments.
- The path should not take the place of bicycle/pedestrian facilities (e.g., sidewalks and bicycle lanes) on the parallel street.

Bicycle lanes adjacent to the curb are preferred to bicycle lanes adjacent to parked cars or bicycle lanes combined with sidewalks. However, bike lanes adjacent to on-street parking are better than no bike lanes at all. Six-foot bicycle lanes are recommended and provide additional room for cyclists to steer clear of the curb or parked cars, while also maintaining a comfortable distance from adjacent moving traffic. Wide bike lanes also enable cyclists to maneuver around drainage grates, manhole covers, glass and debris. Provision of a bicycle lane not only benefits bicyclists, but also motor vehicles, which gain greater shy distance/emergency shoulder area, and pedestrians, which gain a buffer between walking areas and moving vehicles. On reconstruction projects where right-of-way is limited, reduced bicycle lane widths of five feet may need to be considered. Widening the curb travel lane (for example, from 12 feet to 14 or 15 feet) can provide bicycle accommodations as well. This extra width better accommodates bicycle travel and provides a greater measure of safety. However, with higher-volume roadways (e.g., streets with more than 3,000 ADT), dedicated bike lanes are much more preferable than wide outside lanes.

Grade separated bike lanes improve safety for bicyclists as compared to standard bike lanes. These bike lanes, on pavement raised approximately six inches above the roadway, provide users a greater sense of separation from traffic. These facilities may include a mountable, rolled curb, which allows cars to make right turns into driveways while increasing driver awareness of bicyclists. As the raised bike lane approaches intersections, it is dropped and becomes level with the roadway. Grade separated bicycle facilities are recommended along Willamette Drive.⁵ Further examination and ODOT approval will be required prior to construction of raised bike lanes on Willamette Drive.

Signing and marking of bicycle lanes should comply with the current version of the *Manual on Uniform Traffic Control Devices (MUTCD)* that is approved by Oregon as well as the Oregon Supplement to the MUTCD. Design features in the roadway can improve bicycle safety as well. For example, using curb storm drain inlets rather than catch basins significantly improves bicycle facilities.

³ IBID

⁴ *Oregon Bicycle and Pedestrian Plan, An Element of the Oregon Transportation Plan*, Oregon Department of Transportation, Adopted June 14, 1995.

⁵ *West Linn OR 43 Conceptual Design Plan*, Cogan Owens Cogan, SERA, DKS Associates, June 2007

Figure 6-1 illustrates an example of an appropriate warning signs. Supplemental “XING” or “ON BRIDGE ROADWAY” plaques may be used to draw more attention to the fact that slow moving forms of transportation may be using the roadway. When used, the supplemental plaques must be installed below the warning sign on the same sign post. Directional pavement markings may also be considered on shared roadways to supplement the bicycle warning signs when desired. The pavement markings illustrated in Figure 6-1 below are typically called “Sharrows” or “Shared Lane Markings” and are utilized on travel routes for bicycles that have parking, but no designated bicycle lanes. Sharrows are commonly used on streets where dedicated bike lanes are desirable, but are not possible for any number of reasons. The marking helps to align bicyclists to shift their travel pattern out of the direction of a parked car door opening into their travel path.

Figure 6-1: Bicycle Signs and Markings



Bicycle Warning Signs



Bike Route Signs



Bicycle Pavement Markings

It should be noted, however, that while the provision of “Bike Route” signage for bicyclists is an acceptable way for the City to demarcate bike routes, it needs to be coupled with pavement markings and/or wayfinding signage for bicyclists to get the most value out of the City’s investment. Although this is an adopted MUTCD sign, the sign alone does not give the bicyclist much information, and all too often, these signs are not placed in useful locations (e.g., where a “bike route” makes a turn that is not intuitive to riders). Signage with additional wayfinding components is recommended.

Bike Boulevard

Bicycle boulevards generally follow lower-order streets with lower traffic volumes and vehicle speeds, such as Minor Collector or Local Streets passing through residential neighborhoods. Traffic controls along a boulevard assign priority to through cyclists while encouraging through vehicle traffic to use alternate parallel routes. Traffic calming and other treatments along the corridor reduce vehicle speeds so that motorists and bicyclists generally travel at the same speed, creating a safer and more-comfortable environment for all users. Boulevards also incorporate treatments to facilitate safe and convenient crossings where bicyclists must traverse major streets. Bicycle boulevards work best in well-connected street grids, where riders can follow reasonably direct and logical routes with few “twists and turns.” Boulevards also work best when higher-order parallel streets exist to serve through vehicle traffic.

West Linn’s bicycle boulevard network could be developed through a variety of improvements ranging from minor street enhancements (e.g., directional pavement markings) to larger-scale projects (e.g., intersection signalization). The various treatments fall into five major bicycle boulevard “application levels” based on their degree of physical intensity, with Level 1 representing the least physically-intensive treatments that could be implemented at relatively low cost:

- Level 1: Signage (e.g., wayfinding and warning signs along and approaching the bicycle boulevard)
- Level 2: Pavement markings (e.g., directional pavement markings, shared lane markings)
- Level 3: Intersection treatments (e.g., signalization, curb extensions, refuge islands)
- Level 4: Traffic calming (e.g., speed humps, mini traffic circles)
- Level 5: Traffic diversion (e.g., choker entrances, traffic diverters)

It should be noted that corridors targeted for higher-level applications would also receive relevant lower-level treatments. For instance, a street targeted for Level 3 applications should also include Level 1 and 2 applications as necessary. It should also be noted that some applications may be appropriate on some streets while inappropriate on others. In other words, it may not be appropriate or necessary to implement all “Level 2” applications on a Level 2 street. Furthermore, several treatments could fall within multiple categories as they achieve multiple goals.

A number of bicycle boulevards could be targeted for “Level 4” applications, including signage, pavement markings, intersection treatments and traffic calming. Each corridor would currently include several boulevard components (e.g., speed humps). Due to limited street connectivity, Level 5 bicycle boulevard applications (traffic diversion) are not recommended for West Linn. To identify and develop additional site-specific treatments, the city should involve the bicycling community, neighborhood groups, and the Public Works Department. Further analysis and engineering work may also be necessary to determine the feasibility of some applications.

Proposed bicycle boulevards include:

- Old River Road from Willamette Drive to North City Limits
- Pimlico Drive from Santa Anna Drive to Willamette Drive
- Clark Street / Long Street / Simpson Street / Kelly Street from Skyline Drive to Sunset Avenue (through Wilderness Park)

Bicycle Parking

The availability of bicycle parking is an important component of a well designed bicycle system. Lack of proper storage facilities discourages potential riders from traveling by bicycle. Bicycle racks should be located at significant activity generators including schools, parks, and commercial areas. Racks should be placed in highly-visible locations and within convenient proximity to main building entrances. Bike racks should be designed to provide two points of contact to the bicycle (e.g., so the user can lock both the wheel and the frame to the rack). Bike lockers or other storage facilities would be helpful at locations where long-term parking is expected, such as major employment centers. The attractiveness of bike parking may also be improved by providing covered parking and/or secured facilities where bicycles may be locked away.

Strategies

Bikeway improvements are aimed at closing the gaps in the bicycle network along arterial and collector roadways, establishing low-traffic routes that parallel arterials and collectors, and providing multi-modal links to improve livability. Several strategies were identified to address bicycle system needs and to guide project prioritization. This prioritization process helps to focus community investment on those projects that are most effective at meeting important needs, while deferring other projects of lesser need.

The strategies for bicycle facilities are to:

- Fill in gaps in the existing network where bike corridors exist (arterials and collectors);
- Construct bike lanes on strategic arterials and collectors;
- Connect key bicycle corridors to schools, parks, and activity centers;
- Improve crossing safety and connectivity;
- Designate bicycle boulevards on lower volume streets that connect major bike facilities and/or bicycle destinations; and
- Provide appropriate facilities to secure bicycles at trip terminations.

These strategies are used to guide and develop projects which address the needs of the bicycling community in the City of West Linn, as well as bicyclists throughout the region.

Bicycle Master Plan

A list of potential bicycle projects to meet the identified needs and achieve these strategies was developed into a Bicycle Master Plan. The Master Plan shown in Figure 6-2 and summarized in Table 6-2 is an overall plan and summarizes the “wish list” of bicycle related projects in West Linn.

Table 6-2: Bicycle Master Plan Map

#	Priority	Location	Improvement	From	To	Cost(s) \$1,000s
1	High	Rosemont Road*	On-street Bike Lanes	Carriage Way	Summit Street	
2	High	Salamo Road*	On-street Bike Lanes	10 th Street	Barrington Drive	
3	Med	Clark Street / Long Street / Simpson Street / Kelly Street	Bicycle Boulevard Treatment	Skyline Drive	Sunset Avenue	
4	Med	Old River Road	Bicycle Boulevard Treatment	Willamette Drive	North City Limits	
5	Med	Pimlico Drive	Bicycle Boulevard Treatment	Santa Anna Drive	Willamette Falls Drive	
6	Med	Blankenship Road	On-street Bike Lanes	Ostman Road	Debok Road	
7	Med	Hidden Springs Road*	On-street Bike Lanes	Rosemont Road	Willamette Drive	
8	Med	Santa Anita Drive*	On-street Bike Lanes	Rosemont Road	Hidden Springs Road	
9	Med	Skyline Drive*	On-street Bike Lanes	Summit Street	West A Street	
10	Med	Summit Street*	On-street Bike Lanes	Skyline Drive	Cornwall Street	
11	Med	Sunset Avenue	On-street Bike Lanes	Parker Road	Willamette Falls Drive	
24	Med	Willamette Drive	On-street Bike Lanes - Raised	North City Limits	McKillican Street	
12	Med	Willamette Falls Drive*	On-street Bike Lanes	Jenny Lane	West City Limits	
13	Med	Willamette Falls Drive*	On-street Bike Lanes	Willamette Drive	Ostman Drive	
14	Med	Johnson Road	Shoulder Bike Lane	Blankenship Road	City Limits	
15	Low	New Off-Street Accessway*	Construct new bicycle and pedestrian connection.	Wisteria Road	Bland Circle	
16	Low	New Off-Street Accessway*	Construct new bicycle and pedestrian connection.	Sinclair Street	Holly Street	
17	Low	New Off-Street	Construct new bicycle and	Rosepark Drive	Rosemont Road	

Comment [d1]: Should read Willamette Drive (Hwy 43), not Willamette Falls Drive – different road in the city.

Comment [d2]: Is Hidden Springs too steep for a bike route designation? I think one section may be the steepest road in West Linn!

Comment [d3]: Should be Epperly St, not Jenny Street.

#	Priority	Location	Improvement	From	To	Cost(s) \$1,000s
		Accessway*	pedestrian connection.			
18	Low	New Off-Street Accessway*	Construct new bicycle and pedestrian connection.	Hillcrest Court	Marylhurst Drive	
19	Low	10th Street*	On-street Bike Lanes	Salamo Road	Willamette Falls Drive	
20	Low	12th Street	On-street Bike Lanes	Willamette Drive	Tualatin Avenue	
21	Low	Blankenship Road	On-street Bike Lanes	Virginia Lane	13 th Street	
22	Low	Parker Road*	On-street Bike Lanes	Sunset Avenue	500' east of Coho Lane	
23	Low	Tualatin Avenue	On-street Bike Lanes	12 th Street	Tualatin River	

Comment [d4]: Should be Willamette Falls Drive, not Willamette Drive.

*Included in previously adopted 1998 TSP.

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