

TECHNICAL MEMORANDUM

DATE: September 4, 2024

TO: Kevin Howard | City of Bend

FROM: Brianna Velasquez, EIT; Kayla Fleskes-Lane, PE | DKS Associates
Gavin Powell | David Evans and Associates

SUBJECT: Bend Bikeway Project: Recommended Cross Section Widths for Project # 24039-000
SE 15th Street

This memorandum discusses the recommended minimum width for the planned shared use paths along the Key Walking and Bicycling Route (Key Route) along SE 15th Street between North Suntree Street and King Hezekiah Way in Bend, Oregon. The shared use paths will stretch approximately 4,200-feet long. Given existing land uses and right-of-way constraints, the shared use path (SUP) is assumed to be on the east side of SE 15th Street (~1,000-ft in length) north of Reed Market Road while south of Reed Market Road, the SUP is assumed to be on the west side (~3,200-ft).

For a Key Route, City of Bend targets Level of Traffic Stress (LTS) values of 1 within a quarter-mile of schools, parks, and mobility hubs and LTS 2 elsewhere on Key Routes¹. The more general requirement for a low stress walking and biking route is LTS 1 or 2. The Larkspur Park Community Center is located on the northeast corner of the intersection at SE 15th Street and Reed Market Road.

The following sections describe the current conditions on SE 15th Street, the standard arterial cross section in Bend, including why deviation is needed for this segment of SE 15th Street and then describes recommended cross-sections to incorporate the shared use paths.

¹ City of Bend Complete Streets Manual, May 2023

CURRENT CONDITIONS

Currently, both sides of SE 15th Street have a 5-to-6-foot striped bicycle lane generating bicycle level of traffic stress (BLTS) 3 since there is no buffer to separate from the single 11-to-12-foot travel lanes. At the Reed Market Road roundabout, the on-street bicycle lanes transition to shared use paths with an overall LTS of 1. The Larkspur Trail also meets SE 15th Street just south of South Suntree Street and connects to the east side of the Reed Market Road roundabout. There are mostly 6-foot sidewalks on both sides along this segment which yield a pedestrian level of traffic stress (PLTS) of 3 since the bicycle lanes are the only form of separation from the travel lanes. There are also a couple enhanced marked crosswalks with a median refuge in the southern portion.

BEND STANDARD CROSS SECTION

As a three-lane minor arterial without parking, the applicable standard cross section for this segment, along with the resulting LTS, is shown below in Figure 1. Since the posted speed limit through this segment is 35 miles per hour (MPH), this standard cross section would yield LTS 1 for people walking or riding bicycles along a shared use path. According to the City's Complete Streets Manual definition of a shared use path, it is "a paved travel way eight feet wide or more that is shared between people walking and riding bicycles".² Additionally, to achieve BLTS 1, an SUP should be physically separated from motor vehicle traffic by a landscape strip.

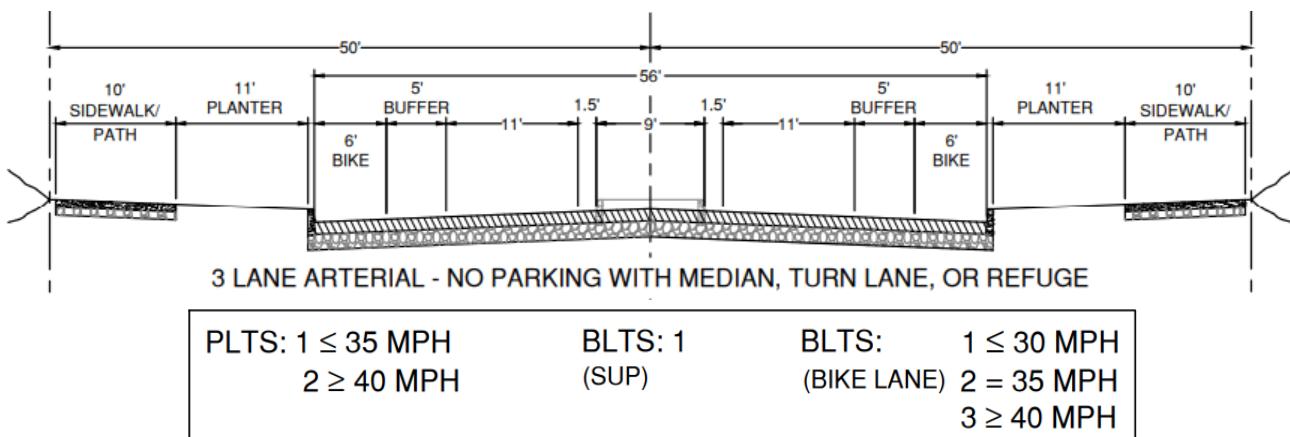


FIGURE 1: CITY OF BEND ARTERIAL STANDARD CROSS SECTION (STD DWG R-1A)

While Figure 1 represents the standard, a cross section like this is not feasible to implement through this segment of SE 15th Street due to constraints such as limited right-of-way, project costs, etc. In such cases, alternative cross sections may be considered that achieve City goals for LTS with a smaller footprint.

² City of Bend Complete Streets Manual (May 2023) pg. iii

RECOMMENDED WIDTH GUIDANCE

Table 1 summarizes the requirements to achieve a minimum BLTS/PLTS of 1 or 2 on SE 15th Street given the number of travel lanes and speeds.

TABLE 1. CROSS SECTION ELEMENT WIDTHS

ELEMENT	REQUIREMENTS TO ACHIEVE MINIMUM BLTS/PLTS 1	REQUIREMENTS TO ACHIEVE MINIMUM BLTS/PLTS 2
BUFFERED/SEPARATED BIKE LANE	Bike lane physically separated from traffic by landscaped buffers, curbs, bollards, or other vertical delineators. City of Bend targets 6-6.5' bike lane with 2.5' buffer for separated bike lanes.	5' wide bike lane with 2' painted buffer
SHARED USE PATH	SUP physically separated from the street by a buffer ^A	SUP physically separated from the street by a buffer ^A
SIDEWALK	≥6' wide with a buffer	≥6' wide with a buffer
BUFFER	Landscaped buffer with trees/vertical element; ≥10' wide (≥15' wide when three lane of traffic are present)	Any buffer of any width

^A Physically separated paths (like SUPs) are generally classified as BLTS 1, assuming full bike standards are met. See discussion below about minimum recommended widths for SUPs.

When considering a shared use path, the following agencies provide minimum width guidance:

- American Association of State Highway and Transportation Officials (AASHTO)³: 10-feet minimum width.
- Oregon Department of Transportation (ODOT)⁴: 10-feet minimum width with a 5-foot minimum buffer between path and travel way.
- City of Bend⁵: The width of the standard cross-section shared use path varies from 8-10 feet due to right-of-way width limitations and is assumed on both sides of the roadway. Wider paths of 12-14 feet should be considered where wider right-of-way exists.

In general, LTS values that meet City of Bend standards (LTS 2 or less) for a Key Route are possible along a shared use path given the minimum widths shown in Figure 2. This cross section assumes the existing roadway section would be maintained but a new shared use path would be constructed on one side of the roadway to serve the full range of cyclists; more skilled commuters can elect to ride in the striped bicycle lanes while the new shared use path can serve less comfortable riders that prefer separation from vehicles. Given geometric and design constraints,

³ AASHTO Guide for the Development of Bicycle Facilities Fourth Edition, American Association of State Highway and Transportation Officials, 2012

⁴ Highway Design Manual, Oregon Department of Transportation, March 2024

⁵ City of Bend Complete Streets Manual, May 2023

the shared use path is proposed on the west side of SE 15th Street south of Reed Market Road, which is also consistent with guidance from the City's Complete Streets Manual to maximize sunshine exposure. North of Reed Market Road, the share use path is proposed on the east side of SE 15th Street to connect to the existing Larkspur Trail and to the Larkspur Community Center, as well as a future shared use path extension planned on the east side of SE 15th Street with the Wildflower Development north of SE Bronzewood Avenue. A similar cross section as shown in Figure 2 would also be applicable north of Reed Market Road to achieve BLTS/PLTS 2 (although the SUP would be on the east side instead of the west side). People walking and biking to/from the opposite side of the street would need to cross SE 15th Street to access the new low-stress shared use path. The width of the SUP could be flexed between 8-14' depending on available right-of-way, although wider paths would be desirable given a SUP is only proposed on one side of the street.

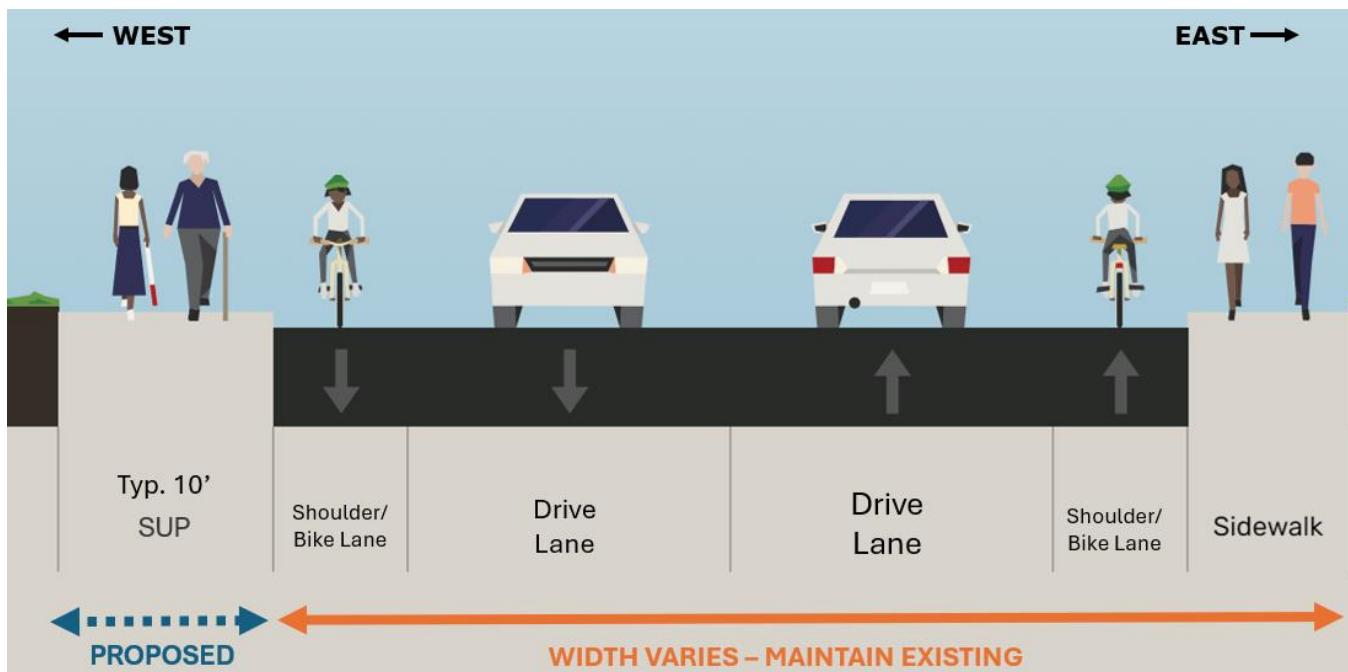


FIGURE 2: MINIMUM CROSS SECTION ELEMENTS ON SE 15TH STREET SOUTH OF REED MARKET ROAD TO ACHIEVE BLTS/PLTS 2 VIA A SHARED USE PATH
 Source: StreetMix, DKS Associates

To achieve the lowest traffic stress (BLTS= 1; PLTS=1), a landscaped strip with trees or other vertical elements would need to be added to fulfill the minimum required 10-foot buffer from traffic, as shown below in Figure 3. The width of the SUP could be flexed between 10-14' depending on the available right-of-way, although wider paths would be desirable given a SUP is only proposed on one side of the street.

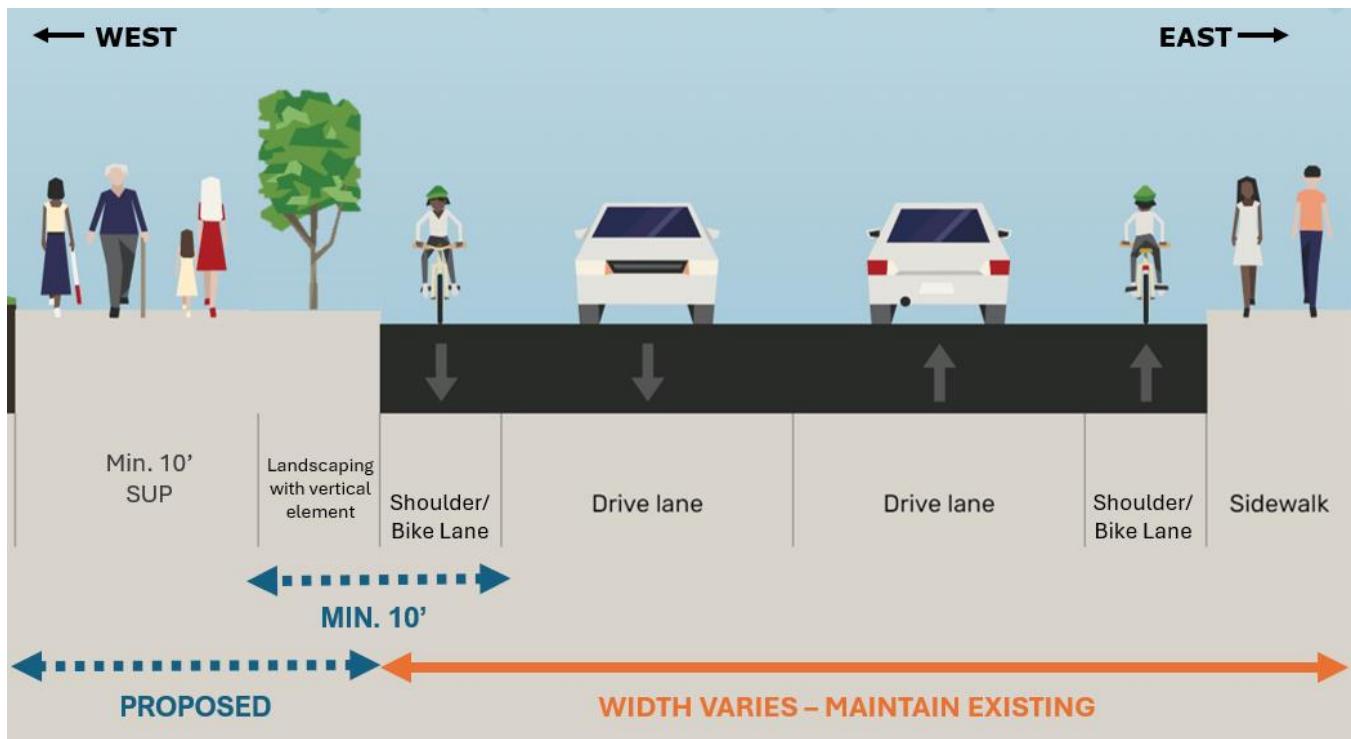


FIGURE 3: RECOMMENDED CROSS SECTION ELEMENTS ON SE 15TH STREET SOUTH OF REED MARKET ROAD TO ACHIEVE BLTS/PLTS 1 VIA A SHARED USE PATH

Source: StreetMix, DKS Associates