

Chapter 7: Pedestrian and Bicycle System

Introduction

Pedestrian and bicycle facilities are integral elements of the transportation system and valuable components in the strategy to reduce reliance on automobiles. The community benefits in many ways from adequate pedestrian and bicycle facilities including reducing traffic congestion, supporting tourism, and providing accessibility to all parts of the community. Further, the segment of the population without automobile access, benefits from quality pedestrian and bicycle facilities. The year 2000 US Census data show that approximately four percent of households in Deschutes County have no vehicles.

Trip Potential

Travel by bicycle and foot has tremendous potential in the Bend urban area. A large part of this is attributable to the region's predominantly sunny weather and relatively flat terrain. In addition, the outdoor spirit of the citizenry, the desire to engage in healthy exercise and the interest in alternative modes of travel provide a strong population base for generating non-automobile trips. The visibility of pedestrian and bicycle traffic throughout the year confirms the importance of these travel options.

Bend's relatively small size makes travel by bicycle or foot fairly feasible. Depending on the type of trip, studies indicate a willingness of people to walk between a quarter and a half mile, and bicycle upwards to 2 or 3 miles. In 2006, the Oregon Department of Transportation (ODOT) funded the *Individual Transportation Options Pilot Project*. The project evaluated the transportation behavior of a random sample of persons in Bend. The results of the project showed that 16 percent of all automobile trips are one mile or less and 56 percent are three miles or less. These data suggest that many trips could possibly be made on bicycle or on foot.

The 2000 census data shows walking and bicycling accounted for about six-percent of trips to work in the city of Bend. Throughout Deschutes County, about four-percent of trips to work are made on bicycles or on foot. Throughout Deschutes County, travel time to work for all trips was less than five minutes for four-percent of workers, less than ten minutes for 21 percent and less than 15 minutes for 45 percent. Short trip lengths and travel times are part of the equation for encouraging non-auto trips. A complete and safe network of trails, sidewalks and bicycle facilities will further encourage these trips.

Other Benefits

In addition to reducing traffic, non-motorized trips conserve fossil fuels, reduce noise, protect air and water quality, reduce the demand for parking spaces, and improve personal health. The air quality issue is particularly important to Central Oregonians, as the pristine mountain views and clean air are cherished resources of the community. A concerted effort to reduce automobile trips and the resultant exhaust emissions will be valuable in diminishing the impact on air quality. Non-motorized trips can also directly

address the obesity crisis facing the United States. Getting people to walk or bicycle directly benefits personal health.

Community and Site Design

An adequate bike and pedestrian system requires a complete network of walkways and bikeways that connect parks, schools and activity centers. Orienting buildings to the street and providing safe and easy connections from stores to the sidewalk, and providing convenient bike parking all help make bicycling and walking more desirable trip choices.

Maintenance and Repair

Maintenance and repair of the bicycle and pedestrian system are critical to the use of these transportation modes. Timely snow removal, sweeping, cinder removal, patching, surface repair and striping are all necessary to maximize the use of bike lanes and sidewalks as alternative transportation modes. Property-tight sidewalks may require less maintenance than curb-tight sidewalks because the landscape strip provides a place to pile snow and separates the sidewalk from road debris accumulation.

In general, responsibility for sidewalk maintenance and repair is assigned to the adjacent property owners. This system may not adequately assure timely maintenance and repair of the sidewalk network.

The use of cinders can negatively impact the bicycle lane and pedestrian system. The city of Bend has implemented a street sweeping system that helps remove the cinders as soon as weather conditions allow. Chip sealing can also have a negative impact on bicycle safety. The city of Bend and Deschutes County have worked with bicyclists in recent years to minimize the impacts of chip sealing on the bicycle system.

The Pedestrian System

Walking is the most basic form of transportation, undertaken by almost every citizen. Sidewalks are an essential element of the transportation system since every trip involves at least one walking segment. Because the primary function of sidewalks is to provide a safe place for pedestrians, facilities need to be designed accordingly. Sidewalks also need to be constructed to Americans with Disabilities Act (ADA) requirements. The requirements are meant to insure that everyone, regardless of mobility issues, can safely travel on sidewalks.

In the city of Bend, sidewalk construction has been required in all new residential and commercial developments since the late 1980s. Sidewalks are normally located on both sides of the street and separated from the street by a curb and a landscape strip. In steep topography or unusual topography, sidewalks may be allowed on only one side of the street and may be curb-tight. Sidewalks are normally constructed with a concrete material although special paver blocks may be utilized in high-use pedestrian areas, such as downtown Bend, to enhance surface aesthetics. Sidewalks vary in width depending on anticipated pedestrian volumes but have certain minimum widths

established to meet ADA requirements. Minimum sidewalk widths are established in the implementing ordinances of the city and county.

The existing and proposed sidewalk system is delineated in the *Bend Urban Area - Bicycle and Pedestrian System Plan – TSP: Map Exhibit B*. A copy of this map is included in Appendix F of this document. The system as proposed should be considered general in nature. Flexibility should be permitted during the development and design of roadways and private lands to locate these planned sidewalks to fit the context of the natural terrain, to minimize sidewalk grade, to consider street crossings and other safety issues, and consider any other topographic or geographic barriers or issues. It is the intent of the sidewalk system to provide direct and convenient walking connections to parks, schools, open spaces, employment areas, shopping destinations, and the like.

The Landscape Strip

The area located between a sidewalk and the curb serves many important functions and is commonly referred to as the planting or landscape strip. The landscape strip creates space for a variety of underground utilities such as telephone, cable television, fiber optic cables, etc. The landscape strip is also beneficial for locating utility poles, fire hydrants, benches, bus shelters and other features that might otherwise block or obstruct pedestrian travel along sidewalks.

Landscaping helps to soften the hard edge created by pavement and curbs. Large trees can also provide cooling summer shade for parked cars and pedestrians. A canopy of street trees can help to slow traffic and enhance the beauty of the community. The physical separation from the street also improves the design of sidewalks by maintaining a constant grade without dipping at driveways, and makes American with Disabilities Act compliance easier. During winter months, snow can be plowed into these areas from the street and not block sidewalks. The landscape strip provides a physical separation from the adjacent roadway, providing enhanced pedestrian comfort and improved walking experience.

Street Crossings

Crossing local street intersections is normally not difficult because of lower traffic volumes and because the distances are relatively short. Crossing arterial streets can be much more challenging because of street widths, high traffic volumes and speeds. Minimizing crossing distances required for pedestrians is important to reduce the psychological barrier created by wide streets and to increase pedestrian safety.

Construction of curb extensions is one method to improve the visibility of pedestrians and reduce the crossing distance of the street. These extended “bulb-outs” add valuable pedestrian space and can help facilitate a quicker movement of pedestrians across busily traveled roadways. The additional space can also provide a location for bike parking or other sidewalk amenities. Downtown Bend is an excellent example of where this type of design has been used very successfully.

Another solution to addressing conditions where traffic volume is high, or roadways are wide, is the construction of raised medians, islands or refuges. Medians can significantly improve pedestrian visibility and provide a place to wait for safe gaps in the traffic stream while crossing busy roadways. Medians can also improve the aesthetics of a community with added landscaping. Islands and refuges are especially important at large intersections to reduce the crossing distance and improve pedestrian comfort by minimizing exposure to motor vehicles.

One important function of traffic signals is providing for the movement of pedestrians across busy intersections. Where large radius corners have been constructed at the intersection to accommodate higher speed turn or truck movements, building a dedicated turn lane with a raised island for pedestrians is important. This significantly improves the comfort of pedestrians by reducing the amount of uninterrupted pavement to cross.

Rural Walkways

In sparsely populated areas, the shoulders of rural roads usually accommodate pedestrians. There are, however, roadways outside urban areas where the developing urban character creates a need for sidewalks, such as on highly developed commercial strips or in residential clusters along county roads or state highways.

Multi-Use Trails

Trails provide important transportation connections and shortcuts to destination points that make travel by foot or bicycle safe, pleasant and convenient. Recreational activity is also a common use of the trail system, with scores of residents and tourists using these areas for walking, jogging, bicycling and other activities.

Trails also provide citizens and visitors with links to the natural environment. One special quality of a trail is the opportunity they provide to escape the bustle of the city - while remaining within the city. This is particularly evident along the Deschutes River trail system. Public opinion supports this sentiment, as people cite the ability to depart from traffic congestion, noise and exhaust as a prime factor in their enjoyment of trails.

The first trail plan in the area was established in the Bend Area General Plan in 1981. This has been the policy tool that has provided some protection of trail corridors and has promoted the construction of the current limited system. Several additions were adopted by the City and County and incorporated into the General Plan in 1996. The current "primary" trail plan is illustrated in the City of Bend Transportation System Plan (Bicycle and Trail System Map). The city of Bend and the Bend Metro Park and Recreation District are working together in the planning and development of a trail system to meet the recreational and transportation needs of the community.

Neighborhood Accessways

An August, 2006, report provided an assessment of the city of Bend's neighborhood accessways. The neighborhood accessway system is comprised of a wide range of

facilities that include; a variety of trail types and on-street facilities, that are collectively referred to as “accessways”.

The purpose of these facilities is; to minimize travel distances within and between residential areas and commercial centers, major employment areas, transit stops, or within and between nearby neighborhood activity centers such as schools and parks. The greater system of proposed accessways will provide transportation and recreation mobility opportunities for non-automobile travel through out the community. This accessway plan for the City generally uses a geographic spacing for accessways on an interval of approximately every *quarter-mile*.

The Primary Trail plan is delineated on the *Bend Urban Area - Bicycle and Pedestrian System Plan – TSP: Map Exhibit B*. A copy of this map is included in Appendix F of this document. The alignments depicted as proposed should be considered general in nature. Flexibility should be permitted during the development and design of private lands to locate these planned primary trails to fit the context of the natural terrain, to minimize trail grade, to consider street crossings and other safety issues, to account for the pattern and design of the development, or consider any other topographic or geographic barriers or issues, etc. Also, while it may be suitable to locate a trail next to a street due to existing difficult to resolve issues for trail location, it is the intent of the plan to locate trails - as much as possible - away from streets to minimize conflicts with other types of conflicting traffic. It is also the intent of the trail system (both connector and primary) to provide direct and convenient walking and bicycling connections to parks, schools, open spaces, employment areas, shopping destinations, and the like. Balancing these trail design criteria may require a concerted coordination effort between the City, the Park District and new development to satisfactorily locate these trails to ensure that the intent of the plan will be fulfilled.

Railroad Right-of-way Trails: There has been a growing interest nationwide in developing both “abandoned” and “active” railroad right-of-ways as part of local trail systems. One recent study examined these special trail corridors in detail; *Rails-with-Trails - Lessons Learned 2002*. This report was prepared for the U.S. Department of Transportation and provides a comprehensive analysis and evaluation of current rails with trails (RWT) development practices. The report illustrates how trails can be successfully developed along railroad right-of-ways and provides valuable guidance concerning trail design and development that help to address important issues such as safety, liability and aesthetics.

The Springwater Trail in the Portland area and the bikepath in Ashland along the Central Oregon and Pacific rail line are excellent examples of this type of trail development that is located along an active railroad right-of-way within the State of Oregon.

A trail within/parallel to the Burlington Northern-Santa Fe Railroad corridor in the Bend area could provide a substantial enhancement of the Primary Trail system. The *Bend Urban Area - Bicycle and Pedestrian System Plan* illustrates the alignment of this “Rails-

with-Trails” concept. It should be acknowledged that, due to site specific railroad operational requirements, alternative parallel accessway/roadway corridors may be more suitable for avoiding problematic sections of this rail-trail corridor. Also, grade-separated rail-roadway crossings may be difficult to retrofit or may be operationally unsuitable for joint trail and rail operation and parallel alternative routes should be considered. Typically, these alternative routes, if used, should not deviate physically too far from the intended corridor alignment (i.e., follow the nearest parallel alternative corridor). Further planning and discussion with the railroad representatives, adjacent property owners and field investigations are required to determine the feasibility of this concept.

Unpaved Paths

In general, the standard width of an unpaved path is the same as for sidewalks. An unpaved path should not be constructed where a sidewalk is more appropriate. The surface material should be packed hard enough to be usable by wheelchairs and children on bicycles (the roadway should be designed to accommodate more experienced bicyclists). Recycled pavement grindings provide a suitable material: they are usually inexpensive and easy to grade (this should be done in the summer, when the heat helps pack and bind the grindings).

The Bicycle System

Residents and tourists of all ages enjoy bicycling for both transportation and recreational use. Bend’s relatively small size and short distances encourage travel by bicycle. The majority of the current bike system is found on arterial and collector streets as bike lanes. The network of multi-use trails also serves as an important part of the planned bike system.

Based on need and road characteristics, all roads open for public use should be considered for the potential to improve bicycling and walking. Facilities should safely accommodate the majority of users. Roads designed to accommodate cyclists with moderate skills will meet the needs of most riders; special consideration should be given close to school areas, where facilities designed specifically for children should be provided. Roads designed to accommodate young, elderly and disabled pedestrians serve all users well.

The existing and proposed bicycle system is delineated in the *Bend Urban Area - Bicycle and Pedestrian System Plan – TSP: Map Exhibit B*. A copy of this map is included in Appendix F of this document. The system as proposed should be considered general in nature. Flexibility should be permitted during the development and design of roadways and private lands to locate these planned bicycle facilities to fit the context of the natural terrain, to minimize grade, to minimize safety issues, and consider any other topographic or geographic barriers or issues. It is the intent of the bicycle system to provide direct and convenient bicycling connections to parks, schools, open spaces, employment areas, shopping destinations, and the like.

Bike lanes

A bike lane is a space on the road shoulder that is delineated from the adjacent vehicle travel lane by a solid white striped line. Bike lanes are provided on both sides of the street and promote travel in the same direction as the adjacent lane of traffic. This practice provides a safer place for bicycles and requires a cyclist to conform to the laws of motor vehicle travel.

Bike lanes are intended to provide a convenient and safe location for bicycles on collectors and arterials. Bike lanes provide a clear and distinctive location on the road for bikes to travel at their own speed. They improve driver expectation of bike movements and they reduce bike and auto conflicts. Bike lanes provide a benefit to all modes of travel. For pedestrians, they help separate bike movements from the sidewalk and they increase walking comfort due to the increased sidewalk separation from adjacent auto traffic. For motor vehicle traffic, the lanes add buffer space from roadside obstacles, they improve driveway and intersection sight distances and they provide a temporary place for disabled vehicles to pull out of the travel stream.

It is preferable not to permit on-street parking next to a bike lane due to the hazard of opening car doors and the conflict of cars moving in and out of the parking stalls. However, there may be locations where it is necessary to provide both parking and bike lanes. Where space is limited, one design solution is the construction of recessed parking bays to better accommodate the space requirements for both needs. In other cases, such as the commercial downtown core area where a large inventory of on-street parking is essential, the need to provide vehicle parking may take priority over the delineation of bike lanes. In that case, where lower traffic speeds can be maintained, bikes can better mix with traffic without causing significant problems.

Rural Bikeways

On most rural roadways, shoulder bikeways are appropriate, accommodating cyclists with few conflicts with motor vehicles. In general, the minimum shoulder widths recommended by Oregon Bicycle and Pedestrian Plan for rural highways are adequate for bicycle travel. These standards take into account traffic volumes and other considerations. Shared roadways are adequate on low-volume rural roads, where motor vehicle drivers can safely pass bicyclists due to the low likelihood of encountering on-coming traffic. Shoulder bikeways can be added to roads with high bicycle use, such as in semi-rural residential areas or close to urban areas. It may be appropriate to stripe and mark shoulders as bike lanes near schools or other areas of high use. Even adding minimal-width shoulders can improve conditions for bicyclists on roads with moderate traffic volumes. On roads with high use, it may be necessary to add full-width shoulders in areas of poor visibility due to topography.

Shared Roadways

There are no specific bicycle standards for most shared roadways; they are simply the roads as constructed. Shared roadways function well on local streets and minor collectors, and on low-volume rural roads and highways. The majority of rural roads in the region are shared roadways. Shared roadways are suitable in urban areas on

streets with low speeds (25 MPH or less) or low traffic volumes (3,000 ADT or less, depending on speed and land use). In rural areas, the suitability of a shared roadway decreases as traffic speeds and volumes increase, especially on roads with poor sight distance.

Wide Curb Lanes

A wide curb lane may be provided where there is inadequate width to provide the required bike lanes or shoulder bikeways. This may occur on retrofit projects where there are severe physical constraints, and all other options have been pursued, such as removing parking or narrowing travel lanes. Wide curb lanes are not particularly attractive to most cyclists; they simply allow a motor vehicle to pass cyclists within a travel lane.

To be effective, a wide lane must be at least 14ft wide, but less than 16ft. Usable width is normally measured from curb face to the center of the lane stripe, but adjustments need to be made for drainage grates, parking and the ridge between the pavement and gutter. Widths greater than 16ft encourage the undesirable operation of two motor vehicles in one lane. In this situation, a bike lane or shoulder bikeway should be striped.

Shoulder Bikeways

Paved shoulders are provided on rural highways for a variety of safety, operational and maintenance reasons:

- Space is provided for motorists to stop out of traffic in case of mechanical difficulty, a flat tire or other emergency;
- Space is provided to escape potential crashes;
- Sight distance is improved in cut sections;
- Highway capacity is improved;
- Space is provided for maintenance operations such as snow removal and storage;
- Lateral clearance is provided for signs and guardrail;
- Storm water can be discharged farther from the pavement; and
- Structural support is given to the pavement.

Bike Parking Facilities

For a bikeway network to be used to its full potential, secure bicycle parking should be provided at likely destination points. Bicycle thefts are common and lack of secure parking is often cited as a reason people hesitate to ride a bicycle to certain destinations. Bicycle parking should also be convenient, easy to access and provide suitable protection from the weather. Bike parking needs to be designed for both short- and long-term use depending on site conditions and demands. The city of Bend has provided a number of short-term bike racks throughout the central business area. These racks have helped reduce some of the automobile parking demand in this activity center. To support the public transportation service, bike-parking facilities should be provided at all park and ride lots, major transit stops and transit center facilities. Adequate bike parking facilities need to be provided where other public facilities such as libraries, parks, recreation centers and schools are constructed.

Bicycle and Pedestrian Policies

1. Assist the City, County, State, Forest Service, Park District and public agencies to acquire, develop and maintain a series of trails along the Deschutes River, Tumalo Creek, and the canal system so that these features can be retained as a community asset. Work with these same agencies to identify and develop connections between the Bend Urban Area Bicycle and Trails System and the USFS trail system.
2. Assist the City and Park District to acquire, develop and maintain the primary trails designated on the Bend Urban Area - Bicycle and Pedestrian System Plan – TSP: Map Exhibit B.
3. Assist the City with developing safe and convenient bicycle and pedestrian circulation to major activity centers, including the downtown, schools, shopping areas and parks. Particular emphasis should be given to east-west access barriers to the downtown area (e.g. the Bend Parkway, the railroad, etc.).
4. Work with the City to facilitate easy and safe bicycle and pedestrian crossings of major collector and arterial streets. Work with the City to identify intersection designs that include pedestrian refuges or islands, curb extensions and other elements where needed for pedestrian safety and extend bike lanes to meet intersection crosswalks.
5. Work with the city and county to insure that bike lanes or bikeways are included on all new and reconstructed arterials and collectors. Add bike lanes to existing arterial and collector streets with particular emphasis to fill the gaps in the on-street bikeway system. Provide an appropriate means of pedestrian and bicyclist signal actuation at all new or upgraded traffic signal installations.
6. Work with the city to insure that property-tight sidewalks are included on both sides of all new or reconstructed arterial and collector streets except where extreme slopes, severe topographical constraints, or special circumstances exist. Add sidewalks to all existing arterial and collector streets to fill the gaps in the pedestrian system.
7. Work with the City and County to develop a program to ensure timely maintenance and repair of all sidewalks, including but not limited to assigning responsibility for maintenance and repair.
8. Work with the City and County to insure that bicycle and pedestrian facilities are maintained in a manner that promotes use and safety. Perform street repair and maintenance in a manner that does not negatively impact bicycle and pedestrian facilities and their use.
9. Work with the City to ensure that bicycle parking facilities are provided at all new multifamily residential, commercial, industrial, recreational, and institutional facilities, major transit stops, transit stations and park and ride lots.

10. Encourage the City to establish or maintain accessways, paths, or trails prior to vacating any public easement or right-of-way.
11. Work with the City, County, and State to support bicycle and pedestrian education and safety programs.
12. Work with the City and the Burlington Northern – Santa Fe (BNSF) Railroad to determine where, if possible, railroad right-of-ways could be used also as trail corridors. Provided a joint-use agreement can be reached with BNSF, work with the City to evaluate the entire Rails with Trails Corridor in light of opportunities to augment the local primary trail system.
13. Work with the City, County, and Park and Recreation District, to identify funding options for right-of-way acquisition, design, construction and maintenance of priority trails.
14. Work with the City, County, and Park and Recreation District to update sidewalk, trail and bike lane systems inventories and identify gaps and missing system segments and prioritize these for completion.
15. Work with the City to identify specific annual targets for sidewalk in-fill projects.
16. Work with the City and County to identify specific annual targets for bikeway in-fill projects.
17. Work with the City and Park and Recreation District to identify specific annual targets for securing public right-of-ways or easements for trails and constructing trails.