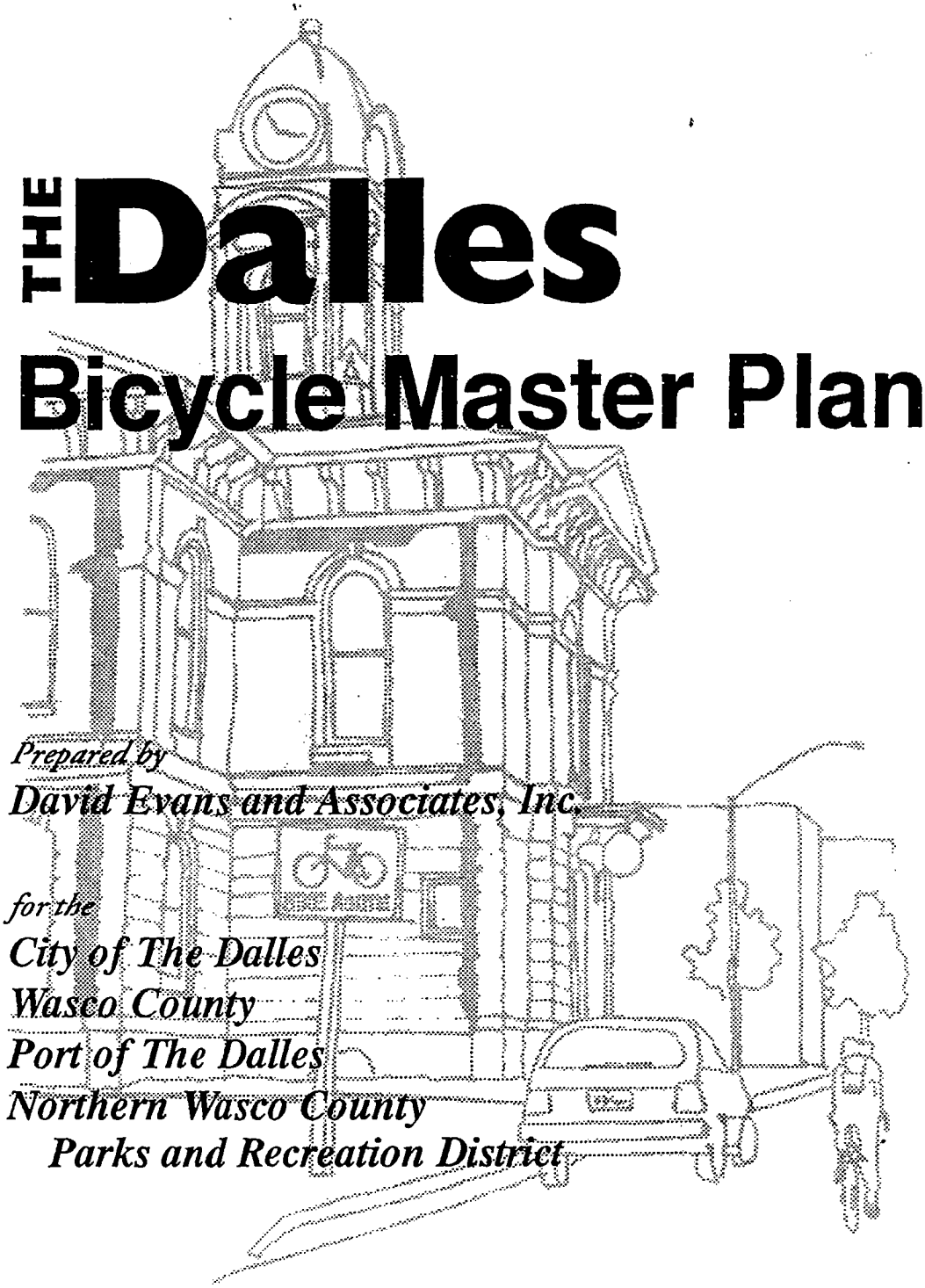
THE Dalles Bicycle Master Plan



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for the
City of The Dalles
Wasco County
Port of The Dalles
Northern Wasco County
Parks and Recreation District

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ACKNOWLEDGMENTS

Preparation of The Dalles Bicycle Master Plan began in 1989 as a cooperative effort by Wasco County, the City of The Dalles, and the Northern Wasco County Parks and Recreation District. The Bicycle Master Plan is a natural outgrowth of and complement to The Dalles Riverfront Plan which was completed in October of 1989.

The dedicated members of The Dalles Bicycle Advisory Committee which met regularly to ride their bikes over all of the proposed routes and assemble recommendations for The Dalles Bicycle Master Plan include:

Kimberly Jacobsen	Wasco County Planning & Economic Dev. Director
Chuck Langley	Chairman
Randy Skov	Vice Chairman
Dan Boldt	Wasco County Road Department
Karl Cozad	N. Wasco Co. Parks and Recreation District Director
Boyd Jacobsen	Interested Citizen
Dennis Kramer	Wasco County Road Department
Ed Schmidt	Wasco County Juvenile Department Director
Katy Young	Interested Citizen

The Dalles Bicycle Master Plan was prepared by Karen Swirsky and Nils Eddy of David Evans and Associates, Inc., a professional services consulting firm with offices in Oregon, Washington, California, and Arizona. Karen is also a member of the Oregon State Bicycle Advisory Committee.

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SUMMARY

Background

Bicycle planning is a part of the overall transportation planning undertaken by all levels of government. This document provides The Dalles with a comprehensive, bicycle-specific transportation plan that aims to promote bicycle use.

Bicycles are an attractive option to an automobile-dominated system that has reached the limits of our ability to sustain it and threatens community livability. Various new transportation guidelines at the State and Federal levels provide further impetus to bicycle planning as a means to lessen energy demands, reduce pollution, and make options available to those who do not drive an automobile (about half the population). Notable among these guidelines are the State Transportation Planning Rule and the Federal Intermodal Surface Transportation Efficiency Act.

The Dalles has much to offer bicyclists. Although bicycle use is currently low, the potential for substantial increase is high due to the compact community and existing road system. Also, the surrounding rural areas and Columbia River frontage have great recreational potential.

Previous bicycle planning efforts have pointed to the need for a safe, continuous east-west route, for better access to the Columbia River, and for improved facilities on many existing roads. The Riverfront Plan stresses how bicycling can contribute to a more prosperous, accessible and livable area.

Highlights

Priorities

A successful bicycle program must embrace not only facilities construction but also maintenance, community awareness, education, and enforcement. The most appropriate agency to maintain a strong and active bicycle program should be determined. A staff Bicycle Coordinator should be the focal point for program efforts, and an appointed Bicycle Advisory Committee should oversee all efforts.

Bicycle system priorities

- Bike path along Columbia River and creeks.
- Bike lanes on arterials and collectors.
- Shoulder bikeways on highways.
- Shared roadways on residential streets.
- Direct routes that minimize travel distances between residential areas and employers, businesses, schools, and recreational sites.
- Elimination of hazards, including speeds or amounts of automobile traffic that discourage local bicycle travel.
- Convenient and secure parking at destinations.
- Regular sweeping, patching and maintenance.
- Active education and enforcement programs.
- Bicycle Coordinator and Bicycle Advisory Committee to coordinate efforts.

Adoption and Implementation

In order for this Bicycle Master Plan to be effective both for obtaining funds and improving bicycle use, it must be formally adopted into the Transportation Element of The Dalles Comprehensive Plan. The prioritized list of bikeway projects should be placed on the Transportation Improvement Plan and appropriate

projects included on the Six-Year Capital Improvement Plans in order to improve the chances for obtaining State and Federal funding.

The bicycle plan will be implemented through the codes, ordinances and standards that are the working documents referenced by planners, engineers and developers. These documents should reflect the needs of bicyclists so that bicycle facilities are routinely considered during project application, review, approval, and design.

The entire bikeway system of about 37 mi will take many years to complete. By scheduling 2 to 3 mi each year, the system can be finished in about 15 years. This should keep pace with a gradual conversion from an automobile-dominated system to one that incorporates more cycling and walking for short-range trips.

Funding

Bicycle facilities and programs can be funded through a broad combination of local, state, federal and private sources. By State law, bikeways must be created whenever City, County, State or Federal roads are built or reconstructed. Arterials and collectors require bike lanes. The Dalles should ensure that any road project in the area is built to bikeway standards for the street classification and that costs are included as a normal part of the project.

Standards

The Oregon Bicycle Plan contains detailed standards based on the AASHTO Guide. It contains many excellent and comprehensive recommendations for all types of bikeways and situations. Prominent features are a hierarchical system of bikeways tied into the existing road grid, bicycle parking requirements, and a focus on maintenance.

Projects

Existing roads, with relatively minor improvements, can change character from poor bikeways to good ones. Often, this is a simple matter of overcoming a few obstacles such as dangerous intersection design, or giving riders more space through striping of bike lanes. Several highly needed bikeway projects are identified (see summary below), along with other useful and less expensive spot improvements.

Trails along the Columbia River and its drainages, as described in the Riverfront Plan, present an excellent opportunity for the community to develop an off-road bikeway framework. A multi-use trail, offering walking and bicycling paths, nature observation, and pleasant scenery, could be a recreational centerpiece for the community as well as an important part of the non-motorized transportation system.

Project summary

Facility Type	Length, mi	Projects
Bike Path	9.2	3
Bike Lane	11.7	14
Shoulder Bikeway	3.2	5
Shared Roadway	13.7	6

INTRODUCTION

Purpose

This document provides a bicycle-specific planning guide to the City of The Dalles and Northern Wasco County. It is intended to meet the needs of the residents and to pursue the vision of the Oregon Bikeway and Pedestrian Program:

> *Oregonians envision the day when they will be able to bicycle safely, conveniently and pleasurably to all destinations within five miles of their homes. All streets and roads will be "bicycle friendly" and well-designed to accommodate both motorized and nonmotorized modes of transportation.*

Goals

The Bicycle Master Plan has fourprimary goals:

- Integrate bicycle planning into the community's overall transportation planning.
- Provide and maintain a comprehensive system for safe and convenient bicycle access to all destinations within the City.
- Promote bicycling as a viable form of transportation for all ages and trip purposes.
- Increase bicycle use within the City every year until 10 percent of all trips are made by bicycle.

Each of these goals—integration, provision, promotion, and use—is consistent with The Dalles' vision of a prosperous and liveable community.

Highlights

- This document addresses the unique characteristics of The Dalles in providing a comprehensive and bicycle-specific plan.
- A Bicycle Advisory Committee shall coordinate the Plan.
- The area poses numerous challenges to cycling but shows great potential as well.

Objectives

Objectives to meet the goals are:

Integration

- Adopt the goals and policies of this Plan by the City Council as part of the City's Transportation Plan. (This will be needed to satisfy the State's Transportation Planning Rule.)
- Adopt implementing ordinances, codes and standards necessary to carry out the Plan.
- Appoint a Bicycle Coordinator and Bicycle Advisory Committee, possibly in conjunction with Wasco County.
- Develop dependable funding sources and actively seek additional sources.
- Encourage land uses that give priority to pedestrians and bicyclists.
- Integrate with the proposed Riverfront Trail in The Dalles Riverfront Plan.

Provision

- Improve access and mobility by identifying routes that penetrate barriers, avoid bottlenecks and obstacles, and minimize travel distances.
- Designate and develop bikeways connecting neighborhood, school, commercial, industrial and recreational centers.

- Eliminate hazards, including speeds or amounts of automobile traffic that discourage local bicycle travel.
- Provide convenient and secure parking and commuter facilities at destinations.
- Conduct regular sweeping, patching and maintenance.
- Review project scheduling and implementation annually and amend the project list as needed to respond to changes in funding opportunities, demographics and development.

Promotion

- Enhance the quality of the bicycling experience by identifying attractive routes with desired amenities and support services.
- Provide guidance to educational and enforcement agencies to enhance cyclists' safety and effectiveness.
- Maintain public awareness and support of the Plan.

Use

- Establish benchmarks to measure progress.
- Collect and analyze data annually to increase bicycle usage and to improve the system's safety and efficiency.

Authority

The Dalles Bicycle Master Plan is in accordance with the City's Comprehensive Plan, the Riverfront Plan, and the State Transportation Planning Rule, all of which require city-wide bicycle planning.

A broad range of planning, public works, enforcement, and promotional activities are described in the Bicycle Master Plan. To coordinate these efforts, there shall be a Bicycle Advisory Committee. The Committee shall be perpetual with the responsibility of monitoring the continuing achievement of thePlan.

The Committee should primarily include cyclists, but should also include other concerned persons such as law enforcement personnel, city and county administrative personnel, and persons with route maintenance and design expertise.

Challenges

In recent years there has been an increased interest in bicycling as healthy, clean, cost-effective transportation in urban settings. Various new transportation policies, plans and standards at the State and Federal levels provide futher impetus to bicycle planning as a means to lessen energy demands, reduce pollution, and make options available to those who do not drive an automobile.

The development of a quality bikeway system is a prerequisite to promoting bicycling. The Dalles has much to offer cyclists despite a lack of bicycle-specific facilities. Although bicycle use is low, the potential of bicycling in the area is high.

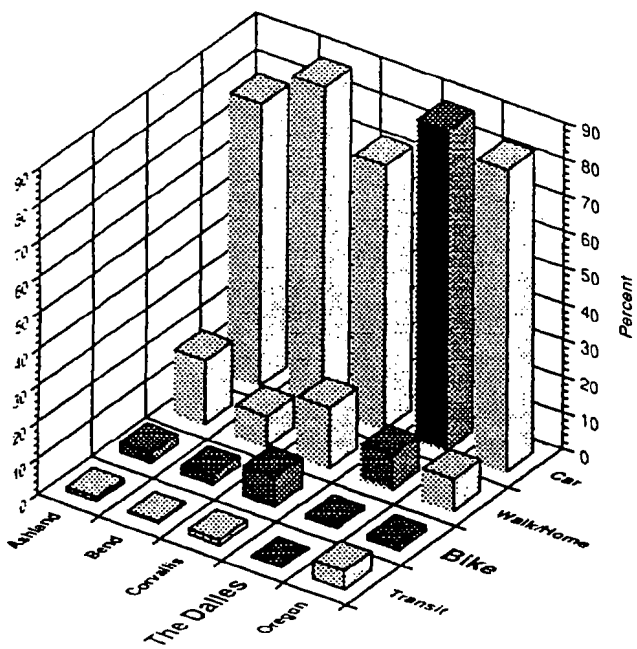
The Dalles faces some challenges in developing a bikeway system:

- The city is located in a topographically difficult area for cycling because of fairly steep hills and abrupt cliffs, which limit available and reasonable routes for cycling. The Columbia River Gorge is also noted for its high winds which can affect The Dalles.
- The street layout and width does not present ideal conditions for convenient and safe bicycle routing, nor for the most part in providing separated bike lanes without taking space from motorists. Thus, nearly all the local routes are currently shared roadways. Sixth St. (U.S. 30) from the Chenowith bridge to Webber St. (about 1.5

mi) is the only striped, signed bike route in The Dalles.

- Clearly designated bike routes connecting neighborhoods, schools, commercial, industrial and recreational centers do not exist.
- Very few bicycle parking racks and other facilities exist.
- The City has been cut off from recreational and transportation access to and along the Columbia River by construction of Bonneville Dam, the railroad, and the I-84 Freeway.
- The transportation system is dominated by the automobile (see Figure 1). In particular, single-occupancy automobile use ranks in the top third among cities in Oregon at 70.7%.

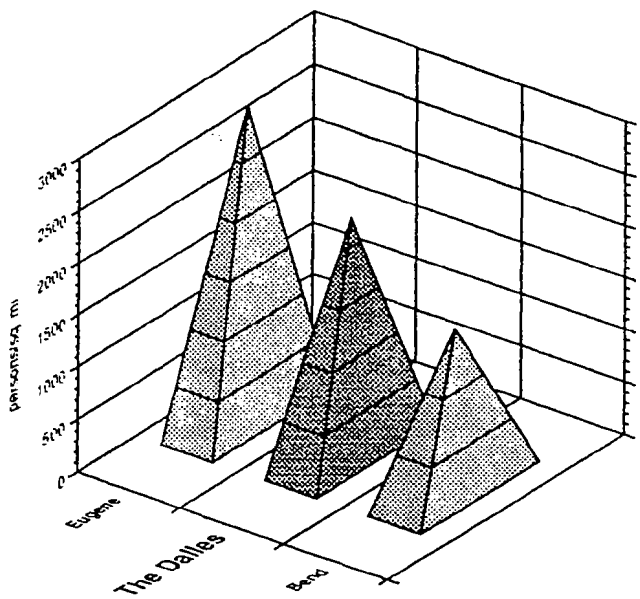
Figure 1. Transportation in The Dalles is dominated by automobiles



Source: 1990 Journey-to-Work data

Despite these negatives, there are strong opportunities for improving the cycling environment and increasing ridership. The restrictive topography has also limited sprawl, so that urban destinations are always close. Indeed, The Dalles has a moderate density, compared to some other popular cycling cities (see Figure 2), which makes cycling attractive.

Figure 2. The Dalles has moderate density



Source: 1990 Census data

...just as an ecological system is healthiest when it displays great diversity and differentiation, so too is a transportation system most healthy and robust when diverse modal options are available to those moving people and goods. A transportation system dependent on only one or two modes of transport is far more susceptible to disruption and system failure.

Transportation coordinator and author
Michael Replogle

The City wraps around a bend in the Columbia River, providing a strong community identity. A central downtown is within easy bicycling distance of the adjacent residential neighborhoods (see Figure 3). Scenic, historical and recreational attractions bring visitors and contribute to the community's vitality. A mild climate generally favorable to cycling is due to the river's moderating influence and the low elevation.

Organization

The following chapters delve into the range of bicycling issues and recommend actions to create a comprehensive bikeway system. Additional information is included in the Appendices, and a foldout map of the bikeway system is attached.

Chapter 2 provides background information, including a review of applicable documents.

Chapter 3 summarizes proposed bikeway projects.

Chapter 4 discusses how to implement a bicycle program.

Chapter 5 details the suitability criteria used to select bicycle routes.

Chapter 6 describes bikeway standards.

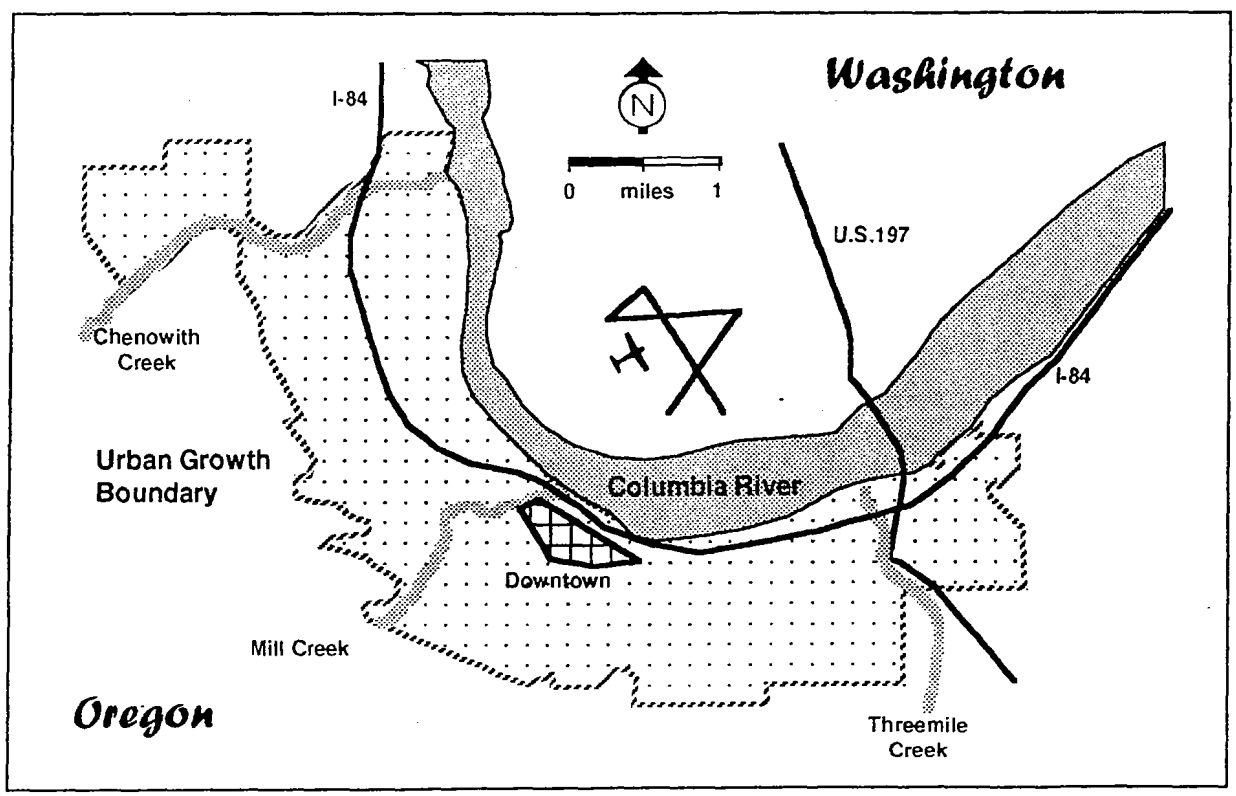
Chapter 7 discusses supplementary facilities.

Chapter 8 deals with education.

Chapter 9 deals with law enforcement.

Chapter 10 covers operation amd maintenance issues.

Figure 3. The Dalles area



PLANNING BACKGROUND

Bicycle planning is an integral part of the overall transportation planning undertaken by local, State and Federal government. Transportation agencies are unique in their ability to determine the nature of the roads and how bicycles fit in.

Municipal planning undertaken by The Dalles has identified local bicycle needs, established priorities, and put forth solutions as described below.

State and Federal transportation planning has also acknowledged the bicycle as an attractive option for urban travel. Various new transportation policies, plans and standards have been created that draw on a wealth of bicycle-related experience. The relevant documents are summarized below.

- Existing plans establish the need and desire for an improved bicycle system.
- State and Federal guidelines provide standards and funding sources.
- The Riverfront Plan features several multiuse paths that could form the backbone of a city-wide bikeway system.
- The Dalles Bicycle Master Plan Task Force has coordinated research and provided an avenue for public participation.

Bicycle Planning in The Dalles

Several planning efforts in The Dalles specifically endorse improved bicycle conditions. Together, they provide a clear statement that the community would like a safe and functional bikeway network and decreased dependence on the automobile.

Riverfront Plan

The Dalles Riverfront Plan, adopted in October 1989, is the community's vision for a 9-mile length of the Columbia River. Given the importance of the River in the area's past and future, the Plan touches on nearly all aspects of the community, including transportation. The Plan recommends:

- A City-County bikeway plan and system to provide safe, pleasant ways to ride from home to schools, parks, other community facilities, business areas, and the riverfront.
- The Riverfront Trail and greenway trails along Mill and Chenowith Creeks, for bicycling and walking to and from neighborhoods, parks, schools, other community facilities and business areas throughout the community.
- Coordinated transportation and recreation planning among local agencies to develop bikeways and trails.
- Incorporation of bikeways into public and semi-public capital improvements and routine construction, improvement and maintenance of sidewalks, streets, utilities and other corridors.
- Subdivision and site plan regulations and review that encourage incorporation of trails, bikeways and walkways for transporatation.

The Riverfront Plan also identified:

- Bicycle lanes on:

  E. 2nd St.
  W. 6th St./3rd Pl./4th St.
  W. 10th St.
  U.S. 197
  Brewery Grade and overpass

Cherry Heights Rd.
Court St. (S. of 4th)
Hostetler St.
Old Dufur Rd./Fremont St.
Scenic Dr.
Washington St. (N. of 4th)
Webber St.

The Riverfront Trail would serve as a centerpiece of a bikeway system. Besides the aesthetic attractions, there are over 1,300 people presently employed near the Riverfront from The Dalles Dam on the east to the Mountain Fir Chip Mill on the west. To this will be added additional employees in the Port Industrial Center plus many recreational users as the Interpretive (Discovery) Center is built.

Bicycle Master Plan Task Force

The Bicycle Master Plan Task Force first met in March 1990 to develop a bicycle plan in accordance with the Riverfront Plan and with the State of Oregon Bicycle Master Plan. They reviewed the efforts of other communities, discussed options, examined routes, surveyed riders, held a public hearing, and made a list of recommendations that are the foundation of this plan.

A rider survey, extensive route evaluations, and other efforts of the Task Force are summarized below.

The written ***rider survey,*** conducted in August 1990, received 81 responses. The results are summarized in Appendix A. Some of the results are:

- The respondants are predominantly male (70%), over 16 years of age (90%), and recreational or fitness riders (87%).
- Over 64% ride more than 10 mi per week with 17% riding over 50 mi per week.
- Many (88%) feel that signed bike routes are a good idea and would encourage them to ride more often (69%).
- The only existing bike lane (on W. 6th St.) is rated only 5.5 for safety (10 being very dangerous). The street is rated 7.2 without the bike lane.
- The most important factor in choosing a route is traffic volume, with surface material and width being of second highest importance. Directness of route does not rate as highly.
- Respondant comments tend to focus on poor road maintenance and conflicts with cars (especially due to narrow streets).

This survey provides a snapshot of a subset of existing cyclists. While not representative of all cyclists, much less of the average citizen, the survey provides useful information from a group that knows the local riding conditions. They reiterate the primary concerns expressed by cyclists in many communities about inadequate maintenance, poor bike lane design, and discomfort with high traffic levels on shared roadways.

The ***route evaluations*** are aimed at identifying primary routes to be signed and secondary routes to be included only on a map. The signing is intended to help cyclists find the primary routes and to alert motorists to expect cyclists on the roadway. In most cases, existing conditions (road surface, intersections, traffic volume, lane width, etc.) are used to determine the safest routes. Elevation gain (or 'energy output'), directness, continuity, and destinations are also considered. The Task Force is well aware of the tradeoffs involved in choosing one route over another and that not everyone will agree with the choices.

The resulting recommendations from the Task Force are a system of primary and secondary routes that provide several options for east-west and north-south travel. While occasionally devious, these routes are a useful synthesis of the committee's experience with local streets.

The Committee also studied plans from other communities, and members attended State-sponsored conferences for bicycle advisory committees. This research broadened their perspective by seeing how other communities have responded to similar needs and how the State plays a key role in providing guidance and funding. The critical contribution of maintenance, education and law enforcement in creating a safe and attractive environment for cyclists became apparent to the Committee, and these concerns are incorporated into the Plan.

Community Profile

A community profile, *Pioneering The Dalles: Exploring the Trail to 2020*, was produced in January 1993. This included an analysis of the community and an "attitudes and values" survey.

The analysis pointed out how highway development and increased use of the automobile caused the City to grow away from the river. Reestablishment of the river connection is a high priority. A *bikeway and pedestrian plan* to provide safe access throughout the community is seen as a way to support planned growth and to encourage economic development. Gradual population growth between 1% and 2% is predicted.

A survey of 1500 randomly-selected households in The Dalles was conducted to help guide community development. A supplemental survey of high school students was also conducted. A variety of questions were asked to determine community values and priorities. Several questions touched upon transportation and access:

- Bicycle and pedestrian pathways are important to The Dalles (77% of households and 69% of students agreed).
- The city should place more emphasis on paving and maintaining streets (63% of households and 70% of students agreed).
- More and better access to the river will benefit residents and visitors (79% of households and 72% of students agreed).
- The Dalles should implement the Riverfront Master Plan (74% of households and 69% of students agreed).
- There is a need for public transportation in The Dalles (58% of households and 59% of students agreed).

The survey indicates that improvements in bicycle facilities as well as other nonmotorized modes are a high priority among residents.

Prior Planning

Bicycle planning in The Dalles dates back to at least 1976 when C. Dennis Kramer, Wasco County Surveyor, wrote *A Guide for Bikeway Development in The Dalles and Vicinity*, a 14-page document with map attachment. It argued for the need to service and promote bicycling, summarized the facility design standards available at the time, and recommended a system of developed bicycle routes not much different from the ones chosen by the Task Force in 1990.

The City of The Dalles Comprehensive Plan, December 1982, recognizes the bicycle as a desirable mode of transportation, establishes basic standards, and directs that bikeways be considered.

Existing Road System and Constraints

The Dalles is craddled between the south shore of the Columbia River and the nearby hills (see Figure 4). Urban destinations are scattered throughout the area, and several roads lead into the surrounding country. There are few east-west through routes, and the north-south routes are hilly. Two major east-west highways, I-84 (Columbia River Hwy.) and U.S. 30 (Mosier-The Dalles Hwy.) traverse the city. U.S. 197 (The Dalles-California Hwy.) passes through the east end of the city and provides the only nearby river crossing.

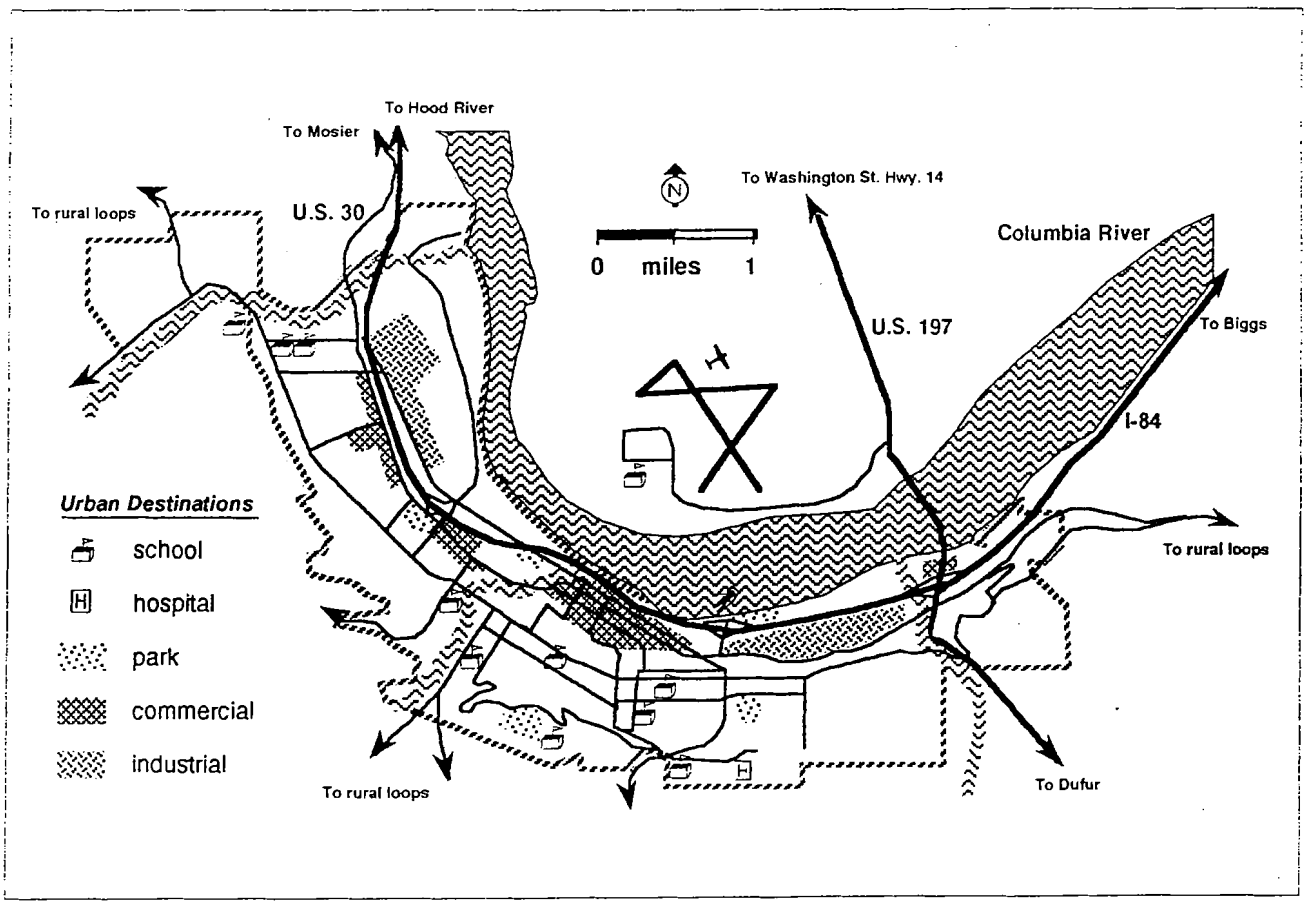
Roadway Classifications

The Dalles Transportation Plan is being updated. The existing functional classification map of the urban area shows the following arterials and collectors:

East-west trending urban arterials:

2nd-3rd St. couplet (U.S. 30)
6th St. (U.S. 30) (the only bike lane is along this street)
Chenowith Rd./10th St./Old Dufur Rd./ Fremont St.
Seven Mile Hill Rd.
Hostetler St.

Figure 4. The Dalles area



East-west trending urban collectors:

1st St.
4th St.
9th St. (east of Dry Hollow)
12th St. (east of Kelly)
13th St. (west of Kelly)
Scenic Dr.
19th St.

North-south trending urban arterials:

Cherry Heights Rd.
Mt. Hood St. (south of 10th)/Mill Creek Rd.
Skyline Rd.
Union St. (north of 10th)
Court St. (north of 10th)
Washington/7th/Kelly
Brewery Grade/Dry Hollow Rd.

North-south trending urban collectors:

Snipes St.
Walnut St.
Webber St.
Trevitt St.
Liberty St. (1st to 2nd)
Union St. (10th to 13th)
Federal St. (2nd to 4th)
Laughlin St. (2nd to 4th)
Jefferson St. (2nd to 4th)
Madison St. (1st to 4th)
Quinton St. (north of 12th)
Thompson St.
Richmond St.

Except for a section of bike lane on W. 6th St., all these facilities are shared roadways with a few short segments of shoulder bikeway (refer to Chapter 6: Bikeway Design Standards for definitions of bikeway types).

Bicycle Counts

The limited bicycle data that are available show mixed bicycle use in The Dalles. Journey-to-work data, which includes only work trips made by those over 17 years of age, is a meager 0.9%. However, a 1990 bicycle count at W. 6th St. (along the U.S. 30 bike lane) yielded an ADT (average daily traffic) of about 40. Pedestrian counts taken in 1992 showed many streets exceeding 100 ADT, which implies that bicycle use is probably over 20 ADT at those locations (based on experience in other communities). While not high, these numbers show that bicycle use continues despite obstacles and little encouragement.

Central City

The central city is built on a tight grid (approximately 300 ft) with ample sidewalks. Curb-to-curb width varies but 38 ft is typical. Most streets allow parking on both sides (even Liberty St. which is only 32-ft wide). There is some diagonal parking downtown. The major physical impediments to bicycling (and walking) are the hills to the south, Mill Creek which has limited east-west crossings, and U.S. 30 which is difficult to cross.

Bicycle travel is complicated by inconsistent street widths, extensive on-street parking, traffic congestion on the main through routes, little space allocation to bicycles, and scarce bicycle parking.

Access to the river is limited due to the multiple barriers of I-84 and the parallel railroad tracks.

State and Federal Bicycle Planning

Oregon is fortunate in having a long-standing and supportive state program. Oregon was one of the first states to appoint a bicycle program manager and to establish a dependable funding source. Much of what Oregon pioneered is now reflected in new Federal legislation that applies to all states. The following sources provide the framework from which local bicycle programs are designed.

State Policies

Oregon has long led the way in bicycle planning in the U.S. It provides cities with clear and strong directions about bicycle provisions.

- **Bicycle Program**

Oregon has had a State-wide program for over 20 years that is supported by the 1971 "Oregon Bicycle Law" that mandates a minimum 1% gas-tax expenditure on bicycle and pedestrian facilities (refer to *Chapter 4: Implementation*). The Oregon Bicycle Plan (1992) describes how the program "serves the needs of bicyclists within the State by supporting bicycling as a form of transportation and recreation that enhances the livability of Oregon." The Oregon Bicycle Plan provides extensive information about the program, facility standards, and design issues that are directly applicable to The Dalles.

- **Transportation Planning Rule**

The Oregon Transportation Planning Rule (1991), OAR Chapter 660, Division 12, implements Statewide Planning Goal 12 (Transportation). The rule requires cities and counties to plan for non-automotive choices, including bicycling and walking, through various measures. The Rule states:

1. Local governments shall adopt land use or subdivision regulations for urban areas and rural communities to require:
   a. *Bicycle parking facilities* as part of new multi-family residential developments of four units or more, new retail, office and institutional developments, and all transfer stations and park-and-ride lots.
   b. *Facilities providing safe and convenient pedestrian and bicycle access* within and from new subdivisions, planned developments, shopping centers and industrial parks to nearby residential areas, transit stops, and neighborhood activity centers, such as schools, parks and shopping. This shall include:
      - Sidewalks along urban arterials and collectors.
      - Bikeways along arterials and major collectors.
      - Where appropriate, separate bike or pedestrian ways to minimize travel distances within and between the areas and developments listed above.
   c. Routes shall be:
      - Reasonably free from hazards, particularly types or levels of automobile traffic which would interfere with or discourage pedestrian or cycle travel for short trips.
      - Provide a direct route of travel between destinations.
      - Meet travel needs of cyclists and pedestrians considering destination and length of trip.
2. Local governments shall identify improvements to facilitate bicycle and pedestrian trips to meet local travel needs in developed areas. Appropriate improvements should provide for more direct, convenient and safer bicycle or pedestrian travel within and

between residential areas and neighborhood activity centers (i.e., schools, shopping, transit stops). Specific measures include, for example, constructing walkways between cul-de-sacs and adjacent roads, providing walkways between buildings, and providing direct access between adjacent uses.

The Rule has a goal of no increase in metropolitan automobile trips in the first 10 years, a reduction of 10% in 20 years, and a reduction of 20% in 30 years.

- **Oregon Transportation Plan**

Oregon has also created a 20-year Transportation Plan in 1992 to meet the requirements of Goal 12 and the ISTEA. The Plan stresses that people must have choices and that transportation systems must support land-use plans. This includes improved circulation systems for bicycles and pedestrians whereby housing, daycare, schools, commercial areas and employment can be reached easily and safely.

- **Model Bicycle Ordinances**

The Oregon Chapter of the American Planning Association developed the Model Bicycle Ordinances (1993) to recommend specific ordinances for use by Oregon municipalities when implementing bicycle plans. These are designed to meet the requirements of the Transportation Planning Rule.

Federal Policies

The Federal government has recently taken a strong stand in promoting bicycles as an alternative to automobiles.

- **National Bicycling and Walking Study**

The Federal Highway Administration conducted the National Bicycling and Walking Study to explore various issues and present existing data in a way that local agencies can use. Many studies have been completed, and the results provide useful insight into the benefits of bicycle transportation and the means required to promote bicycle use. For example, successful bicycle programs have been found to address three basic goals: provide usable facilities, establish program support, and make cycling attractive (see Figure 5).

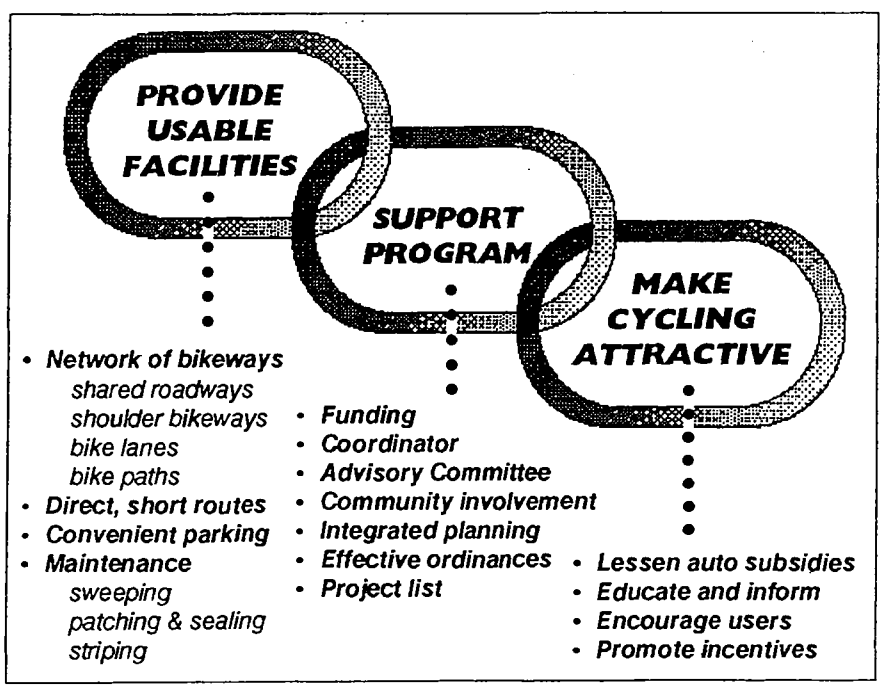


Figure 5. Essential links in a bicycle program

- ISTEA

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 set new Federal policy. It establishes bicycling and walking as legitimate forms of transportation and provides support to the widespread development of bicycle and pedestrian facilities. States and metropolitan areas are required to develop multimodal transportation systems that maximize mobility while minimizing fuel consumption and pollution.

ISTEA stresses a wide range of transportation options rather than just highways and automobiles. It requires States to staff a bicycle and pedestrian coordinator, requires metropolitan areas to plan for bicycles, and makes available funds to the States for a variety of bicycle projects.

Because the Federal highway classification system is being revised and new funding categories developed, The Dalles will need to keep close watch on how these changes will affect bikeway projects. The funding aspects of ISTEA are discussed in *Chapter 4: Implementation.*

- Facility Standards

Local bicycle plans depend heavily on two Federal documents:

- *Guide for the Development of Bicycle Facilities (1991), American Association of State Highway and Transportation Officials, Washington, D.C.* establishes national standards for the planning, design and operation of bicycle facilities. The AASHTO Guide recognizes that bicycle planning must be conducted in conjunction with planning for other transportation modes and should be consistent with overall community goals. It breaks down the planning process into three steps: inventory of existing conditions, analysis of improvements, and selection of facilities. It was adopted and supplemented by the Oregon Bicycle Plan.
- *Manual on Uniform Traffic Control Devices (1988), Federal Highway Administration, Washington, D.C.* the MUTCD establishes basic national standards for the signing and marking of bikeways. It, too, was adopted and supplemented by the Oregon Bicycle Plan.

RECOMMENDATIONS

Introduction

Bikeways are the basic framework of a bicycle system, but they must be accompanied by other facility improvements such as parking, site access, changing areas at employers, and rest rooms in public areas. The bikeways themselves need not be expensive, compared to other road projects. Many of the projects described below are simple adjustments of the right-of-way space.

As discussed in later chapters, well-designed facilities are only one aspect of a successful bicycle system. People must be shown how to use the facilities safely and efficiently and be encouraged to do so. Transportation planning then becomes linked to other municipal functions such as land-use planning, redevelopment, education, law enforcement, and taxation.

The considerable work of the Bicycle Master Plan Task Force was used as a foundation for the bikeway recommendations described in this chapter. Their knowledge of the local area and its residents is invaluable. To this was added bicycle planning techniques that have been successfully applied in other communities and strategies employed to meet the Oregon Transportation Planning Rule.

The resulting recommendations are more extensive than those originally proposed by the Task Force two years ago. There are several good reasons for this:

- Residents in The Dalles have shown a desire to return to the freedom of access and mobility that only bicycling and walking can provide.

- With minor improvements, the present roadway system provides direct and cost-effective routes suitable for bicycling.
- Arterials and collectors with high traffic loads should have bike lanes; other high-traffic roads should have shoulder bikeways.
- Multi-use paths along the Columbia River and its drainages will provide enhanced facilities when tied into the roadway system.

- The State-mandated reduction in automobile use can only be achieved by, among other things, an agressive promotion of bicycling for short-range trips.
- Recent changes in federal and state guidelines increase the emphasis on enhanced bicycle facilities, especially on major roads.
- New funding opportunities require a long-range bicycle plan that is integrated with a community's transportation planning.
- The signing of bike routes without other improvements has been shown to have neglible effect on bicycling's safety and promotion.

Considerations

The criteria considered in choosing routes is described in *Chapter 5: Suitability Criteria.* Additional considerations used to determine the type of bikeway are described below. Funding strategies are discussed in *Chapter 4: Implementation.*

Categorization of Bikeways as Class I, II or III has given way to a more descriptive classification scheme that includes bike paths, bike lanes, shoulder bikeways, and shared roadways. Each of these bikeway types has specific application and design criteria (refer to *Chapter 6: Bikeway Standards*).

Traffic is a primary consideration in facility designation and ADT (average daily trips) of all vehicles is the unit of measure. For the purposes of this Plan, traffic is estimated as light, medium, heavy, and very heavy per Table 1. The appropriate bikeway type considering the traffic volume is given in the table.

Table 1. Traffic volume and bikeways

Traffic Volume	Average Daily Traffic (ADT)	Appropriate Bikeway
Light	Less than 2,000	Shared roadway or shoulder bikeway
Medium	2,000-5,000	Bike lane considered
Heavy	5,000-10,000	Bike lane
Very heavy	More than 10,000	Bike lane

The appropriate bikeway on a medium traffic street must be judged on a case-by-case basis. Some Oregon cities in which cycling is encouraged, such as Eugene and Corvallis, use an ADT of 3000 for striping a bike lane. However, a road with good shoulders or wide travel lanes may offer comfortable cycling if other conditions are suitable, such as moderate speeds and limited truck traffic. Excessive curb cuts may also argue against bike lanes.

Even on a medium-traffic street, bike lanes should be considered because traffic may reach the heavy level in the near future. When the traffic volume exceeds 5000 ADT, bike lanes should be considered mandatory.

Project Summary

In The Dalles, the road grid is contained by the hills to the south and the Columbia River to the north. It is interrupted by the railroad tracks to the north. U.S. 30 and 197 are the prominent corridors; such *highways should typically offer shoulder bikeways in rural settings and bike lanes in urban areas.*

All roadways in The Dalles are open to bicycles and should be designed, constructed and maintained with bicyclists' needs in mind. In particular, designated arterials and collectors are natural bicycle routes because they generally provide for the most direct and unimpeded path to destinations. *As arterials and collectors are built to full standards or become congested, bike lanes should be added.* Some arterials and collectors, due to their particular characteristics, have been identified as the most desirable bicycle routes and should receive special consideration for increased maintenance and for improvement projects as noted.

The river and its drainages present the opportunity to create a system of separated bike paths that interconnect many urban destinations. *This system could form the backbone of a bikeway system* if properly designed and adequately connected to arterials and collectors. It would attract not only recreational riders and local commuters, but would provide a safe training ground for new cyclists.

To serve recreational riders, the urban system should have links to popular rural routes and destinations in the region. These destinations include the Columbia River, Riverfront Park, Sorosis Park, and rural roads in all directions. Access and parking at schools, employers and commercial businesses also need attention.

At present traffic levels many streets, including some arterials and collectors, function adequately as shared roadways. Recommendations for shared roadways involve primarily spot improvements (modified grates, outside lane width, etc.) and maintenance. However, these routes should be monitored for *upgrade to bike lanes when traffic levels increase.*

The bikeway projects are organized by type. Table 2 summarizes the projects and their relative priorities. More detailed descriptions are given below. Priorities are judged to be high, medium or low:

Table 2. Bikeway project summary

Project	From-To	Miles	Cost	Priority
	Bike Paths (9.2 mi)			
Chenowith Creek Trail	W. 6th to W. 10th	1.1	$180,000	Low
Mill Creek Trail	W. 2nd to W. 13th to Cherry Heights	1.1	$150,000	High
Riverfront Trail	W. to E. urban boundaries	7.0	$980,000	High
	Bike Lanes (11.7 mi)			
W. 2nd St. (U.S. 30)	Webber to Lincoln	0.9	$16,000	High
W. 6th St. (U.S. 30)	Chenowith Creek to Cherry Hts	1.9	$1,300	High
W. 6th St. (U.S. 30)	Cherry Heights to 3rd	0.6	$11,000	Low
W. 10th St./Chenowith	~~Chenowith Creek~~ Cherry Heights to Murray Dr.	2.6	$48,000	High
E. 19th St.	Dry Hollow to Thompson	0.9	$16,000	Low
Brewery Grade overpass	Riverfront Park to E. 2nd	0.3	$5,400	High
Cherry Heights Rd.	6th to 10th	0.2	$3,600	Medium
Chenowith Loop	6th to 10th	0.6	$75,000	High
Dry Hollow Rd.	9th to 19th	0.8	$14,000	Medium
Hostetler St.	6th to 10th	0.6	$125,000	Low
Kelly Ave. & 16th Place	7th to Dry Hollow	0.8	$11,000	Medium
Mt. Hood St.	10th to Skyline	0.5	$9,000	Medium
Snipes St.	6th to 10th	0.5	$70,000	High
Webber St.	River Rd. to 10th	0.5	$9,400	High
	Shoulder Bikeways (3.2 mi)			
E. 2nd St. (U.S.30)	Taylor to U.S. 197	1.3	$150,000	High
U.S. 197	E. 2nd to Fremont	0.5	$55,000	Low
Columbia View Dr.	U.S. 197 to Summit Ridge	0.5	$40,000	Low
Fremont St.	Old Dufur to U.S. 197	0.2	$25,000	High
Old Dufur Rd.	Thompson to Richmond	0.7	$90,000	Low
	Shared Roadways (4.2 mi listed, 13.7 mi total)			
W. 10th St.	Cherry Heights to Union	0.8	resurface	Medium
E. 10th St.	F St. to Lewis	0.5	widen	Low
Brewery Grade	2nd to 9th	0.2	wide uphill	High
Laughlin St.	7th to 12th	0.3	resurface	Low
Liberty St.	2nd to 6th	0.2	resurface	Low
Scenic Dr. and Trevitt	10th to Kelly	2.2	fix grates	High

Costs are estimates for comparison. They do not include administration, mobilization, special grading and fill operations, or major contingencies. See text for complete project descriptions.

- High—removes significant barrier, eliminates hazard, provides important link, or greatly improves access. May be difficult to accomplish immediately due to magnitude of the task and funding constraints, but should be pursued.
- Medium—less critical element of bikeway system that can await future improvements, often in conjunction with an arterial or collector that will be reconstructed. Also includes projects that will improve overall conditions and attract cyclists.
- Low—completes a final segment of the bikeway system that has low current use or need for improvement.

Bike Paths

Separated paths work best along routes with few intersections. Three such opportunities along waterways exist in The Dalles, totalling about 9.2 mi in the urban area and 12.2 mi total.

1. Chenowith Creek Trail (1.1 mi)

   Proposed recreational trail along Chenowith Creek from Riverfront Trail to 10th St. with a crossing of 6th St.

2a. Mill Creek Trail—W. 2nd to W. 10th (0.7 mi)

   Proposed recreational trail along west bank of Mill Creek with several potential access points from residential streets.

2b. Mill Creek Trail—W. 10th to W. 13th to Cherry Heights (0.4 mi)

   Proposed extension to recreational trail along Mill Creek toCherry Heights and 13th along N. Boundary Cemetary.

3. Riverfront Trail (approx. 7 mi in urban area and 3 mi outside)

   Proposed recreational trail along Columbia River. Access points at Chenowith Creek, Webber St., and Riverfront Park.

Bike Lanes

Preferential lanes on high-volume streets are the backbone of a bikeway system. Bike lanes on arterials and collectors provide cyclists with direct and inviting routes to all city destinations, as they do for automobiles. The following streets are candidates for lanes. The total length is about 11.7 mi.

(4.) W. 2nd St. (U.S. 30)— Webber to Lincoln (0.9)

Arterial, commercial, very heavy traffic, 35 mph, 12-14 ft lanes (54-64 ft width), shoulder good but generally has excessive debris, little on-street parking. Destinations: swimming pool and north end of Mill Creek. Link to Webber. Recommend striping 6-ft bike lanes. Cost: about $16,000.

(5a.) W. 6th St. (U.S. 30)—Chenowith Creek to Cherry Heights (1.9 mi)

Arterial, commercial, heavy traffic, 35 mph. Existing bike lane both directions, signed, striped (the only one in the city). Destinations: commercial uses and Kramer Field. Link to Webber and industrial area. Recommend better maintenance and debris removal. Intersections at Webber and Cherry Heights are confusing to cyclists and motorists. Bike lane appears to end and become a right turn lane for cars. Recommend bike lane striping to left of turn lane to stop bar (Webber to Cherry Heights is 64-ft wide with no parking). See Chapter 8 of the Oregon Bicycle Plan for basic turn-lane configurations. Cost: about $1300.

5b. W. 6th St. (U.S. 30)—Cherry Heights to West 3rd & Lincoln (0.6 mi)

Arterial, commercial, heavy traffic, 25 mph, 12-ft lanes, heavy on-street parking, road surface good, old style storm sewer

drains should be replaced. Width (42 ft) will not allow a bike lane without elimination of on-street parking on one side. Bridge crossing Mill Creek narrow and in disrepair. Destinations: commercial uses. Direct route from west-side commercial area to downtown; access to dead-end road along Mill Creek and potential trail. Recommend striping 6-ft bike lanes (discontinued at bridge) with parking on one side (6-11-11-6-8 ft). Cost: about $11,000.

6a. W. 10th St.—~~Chenowith Creek~~ Murray Dr. to Cherry Heights (2.1 mi)

Arterial, residential, medium traffic, 35 mph, wide lanes with good paved shoulder (44-ft pavement). Destinations: County Shops, Nursing Home, Kramer Field, and St. Mary's Academy. Link to Chenowith Rd. Recommend striping 6-ft bike lanes. Cost: about $38,000.

6b. Chenowith Rd.—W. 10th to Murray Dr. (0.5 mi)

Arterial, residential, medium traffic (24-ft pavement). Continuation of W. 10th St. to subdivision and rural recreational routes. Recommend striping 6-ft bike lanes as street is widened. Cost: about $10,000.

7. E. 19th St.—Dry Hollow to Thompson (0.9 mi)

Collector, residential and commercial, dead ends east of hospital. Destinations: Dry Hollow School and hospital. Eventual link to Thompson. Recommend striping 6-ft bike lanes when street is extended. Cost: about $16,000.

8. Brewery Grade overpass—Riverfront Park to E. 2nd (U.S. 30) (0.3 mi)

Arterial, heavy traffic, bridge spanning railroad yards and I-84, 30-ft width plus sidewalk. Destinations: Riverfront Park and proposed Riverfront Trail. Recommend striping 5-ft bike lanes (10-ft travel lanes). Cost: about $5400.

9. Cherry Heights Rd.—6th to 10th (0.2 mi)

Arterial, commercial, heavy traffic, 35 mph, wide lanes and paved shoulder (44-ft width), little on-street parking. Destinations: commercial uses. North-south connector leading to residential area and recreation riding route south of town; nearby 9th St. crossing of Mill Creek. Recommend striping 6-ft bike lanes and center turn lane (6-11-10-11-6 ft). Cost: about $3600.

10. Chenowith Loop—6th to 10th (0.6 mi)

Commercial and residential, medium traffic, 35 mph slowing to 20 mph past schools, 12-ft lanes with paved shoulder except between 6th and 7th, little on-street parking. Destinations: Wahtonka High School and Chenowith School. Connection between 6th and 10th. Recommend constructing 6-ft bike lanes. Cost: about $75,000.

11. Dry Hollow Rd.—9th to 19th (0.8 mi)

Arterial, residential with commercial area at 12th Street, 25 mph, heavy traffic, medium on-street parking 9th to 14th and no on-street parking from 14th to 19th, 4-way stops at 10th and 12th, 52-ft wide up to 14th, 42-ft wide to 19th, hill. North-south connector to residential areas, schools, hospital, Scenic Dr., and recreational rides south of town. Recommend striping 5-ft bike lanes and center turn lane (5-11-10-11-5 ft). Cost: about $14,000.

12. Hostetler St.—6th to 10th (0.6 mi)

    Arterial, commercial and residential, medium traffic, narrow. Destinations: Wahtonka High School and Chenowith School. Connection between 6th and 10th. Recommend 6-ft bike lanes when road is reconstructed. Cost: about $125,000.

13. Kelly Ave. and 16th Place—7th to Dry Hollow (0.8 mi)

    Arterial, residential with commercial area from 10th to 12th, 25 mph, medium to heavy traffic, medium on-street parking, 10-12 ft lanes with paved shoulder, variable width (28 to 44 ft), hill. North-south connector to residential areas, schools, hospital, Scenic Dr., and recreational rides south of town. Bike lanes possible except north of 9th if on-street parking removed. Recommend striping 6-ft bike lanes south of 10th (0.6 mi). Cost: about $11,000.

14. Mt Hood St.—10th to Skyline (0.5 mi)

    Arterial, residential, medium traffic, 25 mph, 13-ft lanes with good shoulder (42-ft pavement to 21st). Light on-street parking. Hill southbound. Link to Skyline Rd, Mill Creek Rd., and recreational rides south of town. Recommend 6-ft bike lanes with parking on one side (6-11-11-6-8 ft). Cost: about $9000.

15. Snipes St.—6th to 10th (0.5 mi)

    Collector, commercial and residential, light traffic, 35 mph, 12-ft lanes with paved shoulder except between 9th and 10th, little on-street parking. Destinations: commercial uses. Connection between 6th and 10th. Recommend construction of 6-ft bike lanes. Cost: about $70,000.

16a. Webber St.—River Rd. to 2nd (0.2 mi)

    Collector, industrial, heavy traffic, 35 mph, RR Crossing with tracks at 90 degree angle representing only minor hazard to bicyclists, wide lanes (44-ft pavement), good surface, no on-street parking. Destinations: industrial uses and proposed Riverfront Trail. Link to industrial uses and River Rd. Recommend striping 6-ft bike lanes. Cost: about $3600.

16b. Webber St.—2nd to 6th (0.1 mi)

    Collector, commercial, heavy traffic, 35 mph, 12-ft lanes with paved shoulder (44-ft pavement), no on-street parking. North-south connector between 2nd and 6th and to proposed Riverfront Trail. Recommend striping 6-ft bike lanes. Cost: about $1800.

16c. Webber St.—6th to 10th (0.2 mi)

    Collector, commercial, light traffic, 25 mph, wide lanes with little on-street parking except during ball games at Kramer Field. Destinations: Kramer Field and nursing home. Connection between 6th and 10th. Recommend striping 6-ft bike lanes with possible event parking (convertible signs). Cost: about $4000.

Shoulder Bikeways

A paved shoulder is a typical bicycle facility on rural highways and minor urban arterials. It provides a margin of safety for both motorists and bicyclists, as well as increasing road life. There are several such routes in The Dalles, totalling about 3.2 mi.

17. E. 2nd St. (U.S. 30)—Taylor to U.S. 197 (1.3 mi)

    Arterial, commercial, heavy traffic, 40 mph, 12-14 ft lanes (nominal 38-ft width), shoulder condition fair and narrow (1-4 ft), rocks and other debris on shoulder, minimal access from driveways, westbound shoulder is better but still needs more frequent cleaning. Link to Old Mill District, Columbia View Heights, and rural recreation rides. Recommend maintenance and widening of shoulder to 5 ft. Cost: about $150,000.

18. U.S. 197—E. 2nd to Fremont (0.5 mi)

    Connect commercial area of Old Mill District with residential areas of Columbia View Heights and Old Dufur Rd. area on east side. Recommend maintenance and widening of shoulder to 5 ft. Cost: about $55,000.

19. Columbia View Dr.—U.S. 197 to Summit Ridge (0.5 mi)

    Residential, hill. Connection to U.S. 197 and Fremont for residents of Columbia View Heights. Recommend shoulder bikeway with 5-ft shoulder uphill. Cost: about $40,000.

20. Fremont St.—Old Dufur Rd. to U.S. 197 (0.2 mi)

    Arterial, residential, medium traffic, 35 mph, hill, narrow lanes (10 ft), no shoulder, curves with poor visibility. Link to Columbia View Heights and U.S. 197. Recommend shoulder bikeway with 5-ft shoulder uphill. Cost: about $25,000.

21. Old Dufur Rd.—Thompson to Richmond (0.7 mi)

    Arterial, residential, medium traffic, 35 mph, 10-12 ft lane width, poor shoulder condition (not paved), pavement condition poor, no on-street parking. Good scenic view and important east-west residential connection route. Link to Fremont St. and Columbia View Heights. Recommend resurface of road and paving 4-ft shoulders. Cost: about $90,000.

Shared Roadways

Most residential streets and low-traffic rural roads are adequate with shared lanes. This may also be acceptable on congested downtown streets where traffic speeds are low and there is adequate outside lane width. The following shared roadways, totalling about 13.7 mi, are considered to be of special importance to a bicycle system.

22. 1st St.—Liberty to Taylor (0.6 mi)

    Collector, commercial. Destinations: transit station and Visitor's Center.

23. 2nd St. (U.S. 30)—Taylor to Lincoln (0.7 mi)

    Arterial, commercial, very heavy traffic, 20 mph, heavy on-street parking, 40-ft pavement. One-way westbound through downtown. Destinations: downtown and commercial uses. Link to transit, swimming pool, north end of Mill Creek.

24. 3rd St. (U.S. 30)—Lincoln to Taylor (0.7 mi)

    Arterial, commercial, very heavy traffic, 20 mph, 12-ft lanes (40-ft pavement), heavy on-street parking. One-way eastbound through downtown. Destina-

tions: downtown and commercial uses. Link to transit; direct route to east side of town and connection to Brewery Grade overpass to Riverfront Park and proposed Riverfront Trail.

25. 4th St.—3rd to 9th (0.9 mi)

Collector, commercial, residential, medium traffic, 36-ft width (30-ft Madison to 9th), hill. Connector between H St. and downtown.

26. E. 7th St.—Washington to Kelly (0.2 mi)

Arterial, commercial, residential, heavy traffic, 25 mph, 12-ft lanes (40-ft width), medium on-street parking, hill. Destinations: commercial uses and library. Connector between Washington and Kelly.

27a. E. 8th St.—Laughlin to H St. (0.3 mi)

Residential, 25 mph, light traffic, medium on-street parking. Part of one east-west residential route which connects to Dry Hollow Rd. (see 26b and c); BIKE ROUTE, directional and destination signs are needed because of the many turns.

27b. H St.—8th to 9th (0.05 mi)

Residential, 25 mph, light traffic, low on-street parking. 8th Street does not go through to Dry Hollow so one possible route jogs up to 9th.

27c. E. 9th Street—H St. to Dry Hollow (0.4 mi)

Residential, 25 mph, light to medium traffic, medium on-street parking. Alternate to 10th as an east-west route to Dry Hollow Rd. Intersection at Dry Hollow is awkward because Brewery Grade approaches at a sharp angle from below the hill.

28a. W. 10th St.—Cherry Heights to Washington (0.9 mi)

Arterial, residential, medium to heavy traffic, 25 mph, medium on-street parking (36 to 40-ft pavement). Bike lanes could only be possible with elimination of parking on one or both sides. Road surface very rough to Union. Destinations: St. Mary's Academy and High School. Recommend resurfacing Cherry Heights to Union (0.8 mi).

28b. E. 10th St.—Washington to Dry Hollow (0.9 mi)

Arterial, residential, medium traffic, 25 mph, width narrows to 25 ft with parking on one side between F St. and Lewis. Link to Old Dufur Rd. Although it is possible for cyclists to avoid this narrow section by jogging over to 9th or 12th, neither of these options is as direct as 10th. If removing on-street parking entirely from the 0.5-mi section is impractical, it is recommended that it be widened to 36 ft or made one-way to cars (east bound) and two-way to bicycles (still with parking on one side only).

28c. E. 10th St.—Dry Hollow to Thompson (0.5 mi)

Arterial, residential, light to medium traffic, 25 mph, good lane width (36 ft) and surface, light on-street parking. Link to Old Dufur Rd.

29a. Washington St.—10th to 11th (0.05 mi)

Arterial, residential, light traffic, 25 mph, school zone. 10th narrows (26 ft) east of Washington, so a jog one block south to wider 12th was examined (see 28b and c); BIKE ROUTE, directional and destination signs are needed because of the many turns.

29b. E. 11th St.—Washington to Federal (0.05 mi)

Residential, light traffic, 25 mph, heavy on-street parking. Possible east-west route along 10th jogs to 12th via Washington, 11th, and Federal to avoid hill on Washington.

29c. Federal St.—11th to 12th (0.05 mi)

Residential, light traffic, 25 mph, hill, light on-street parking.

30. 12th St.—Mt Hood to Thompson (2.1 mi)

Collector, residential, light to medium traffic, 25 mph, hills, medium on-street parking. Good width (36 ft) and road surface. Parallel alternate to 10th street with more elevation gain. Stop signs at Trevitt, Union, Washington, Kelly, and Dry Hollow. Destinations: High School, Jr. High School, J. G. Wilson School, and Quinton Ballpark.

31. W. 13th St.—Irvine to Emerson (0.6 mi)

Residential, light traffic, 24-ft wide. Link to Chenowith Middle School from 10th.

32. Brewery Grade—2nd to 9th (0.2 mi)

Arterial, commercial and residential, 25 mph, heavy traffic, no on-street parking, 12-ft lanes, 3-ft shoulders, good surface, sidewalk, hill, encroaching trees. Link to 2nd St. and downtown. Recommend shared roadway downhill (14 ft) and shoulder bikeway (11-ft lane, 5-ft shoulder) uphill. Also maintain landscaping.

33. Court St.—2nd to 10th (0.4 mi)

Arterial, commercial and residential, medium traffic and on-street parking, 56-ft wide. Destinations: downtown, city offices, library, and high school.

34. Laughlin St.—7th to 12th (0.3 mi)

Residential, 25 mph, light traffic, medium on-street parking, 10-12 ft lanes, hill, rough surface. Low-traffic alternative to Kelly to connect downtown commercial district with 12th St. east-west route. Recommend improvement of road surface.

35a. Liberty St.—2nd to 6th (0.2 mi)

Commercial and residential, 25 mph, light traffic, medium on-street parking, 8-12 ft lanes, hill. Part of low traffic north-south route from 2nd to 10th. Part of one possible north-south route via Liberty and Pentland (see 35b and c); BIKE ROUTE, directional and destination signs are needed because of the many turns. Recommend improvement of road surface.

35b. W. 6th St.—Liberty to Pentland (0.1 mi)

Residential, 25 mph, low traffic, medium on-street parking. Part of one possible north-south route via Liberty and Pentland.

35c. Pentland St.—6th to 10th (0.2 mi)

Residential, 25 mph, low traffic, medium on-street parking, slight hill.

36. Scenic Dr., Trevitt—10th & Trevitt to Kelly Ave (2.2 mi)

Collector, residential, light to medium traffic, 25 mph, lane width (30-36 ft) and surface condition good. Steep hills, strenuous ride. Several hazardous sewer grates. Destinations: Col. Wright School, Sorosis Park, scenic overlook, and Oregon Baptist College. Recommend fix of sewer grates.

37. Thompson St.—10th to 12th (0.1 mi)

    Collector, residential, light traffic, 25 mph, hill, 12-14 ft lane width, gravel shoulder. Link to Old Dufur, 10th and 12th east-west routes. If E. 19th is put through, Thompson north of 12th should be brought up to standard.

38. Union St.—1st to 12th (0.6 mi)

    Arterial, commercial and residential, heavy traffic and on-street parking, 36-40 ft wide. Destinations: downtown, city offices, park, and high school.

39. Walnut St.—6th to 10th (0.2 mi)

    Collector, commercial, light traffic, 25 mph, 24-40 ft wide. Destinations: Kramer Field. Connection between 6th and 10th.

40. Washington St.—2nd to 6th (0.2 mi)

    Arterial, commercial, heavy traffic, 20 mph, 12-ft lanes (56-ft width), heavy on-street parking. Destinations: commercial uses and library. North-south connector between commercial and residential areas.

Additional shared roadways that leave the urban area as primarily recreational routes include:

U.S. 30 (N. of Chenowith Creek)
Sevenmile Hill Rd.
Chenowith Rd.
Cherry Heights Rd. (S. of 10th)
Mill Creek Rd.
Skyline Rd.
Dry Hollow Rd. (S. of 19th)
Three Mile Rd.
Lower Eight Mile Rd.
Columbia View Dr. (E. of Summit Ridge)
U.S. 197
Fifteen Mile Rd.

IMPLEMENTATION

Introduction

Many well-intended bicycle plans have languished in the files of agencies for lack of implementation. Any of several things may have gone wrong. The government agencies empowered to implement the plan may have not had the skills or interest. Enthusiastic politicians may have failed to gain public support. Competition for funding may not have been successful.

The following discussion deals with techniques for working within agencies, gaining the community's support and securing funding. Neglect of any of these can seriously harm a bicycle program.

Plan Adoption

In order for this Bicycle Master Plan to be effective both for obtaining funds and improving the bicycle use in The Dalles, it must be formally adopted into the Transportation Element of the City of The Dalles. The Goals and Policy section of the Comprehensive Plan should be updated to include the goals and policies included in this Bicycle Master Plan (refer to *Chapter 1: Introduction*), and the proposed bikeway system included in the Transportation Plan. It should be noted that this action will also bring the City into conformance with the bicycle requirements of the Transportation Planning Rule.

The prioritized list of bikeway projects should be placed on the Transportation Improvement Plan and appropriate projects included on the Capital Improvement Plan in order to improve the chances for obtaining State and Federal funding.

Codes, ordinances and standards used in The Dalles should be modified to reflect the contents of the Bicycle Master Plan. In this way bicycle facilities can be routinely considered during development application, review, approval, and design. A set of model ordinances developed by the Oregon Chapter of the American Planning Association is included in Appendix B.

- Adopt the Bicycle Master Plan into the City's Comprehensive Plan and Transportation Element, and incorporate implementing ordinances.
- Assign a Bicycle Coordinator and Bicycle Advisory Committee to guide implementation.
- A variety of local, state and federal funding sources are available (projects should be on the local Capital Improvement List).

Responsibility for Implementation

A bicycle program touches many disciplines such as planning, engineering, public relations, recreation, education and law. It is often difficult to know where to assign responsibility to overall program implementation.

Bicycle programs in Oregon are found in various municipal and county departments including planning, public works, parks and recreation, police, and others. With so many interests involved, coordination and communications become highly important. Indeed, programs are often directed by an individual called a Bicycle Coordinator. Also, a bicycle advisory committee comprised of public representatives and department staff (often from several agencies) also contribute.

Bicycle Coordinator

The primary responsibility of the Coordinator is to maintain a strong and active bicycle program. Even the best of plans need knowledgeable staff to oversee implementation and see to

it that projects are completed. An agency spokesperson for bicycling matters is also important.

The Federal government recognized these needs in the new Transportation Act when it required States to staff a bicycle coordinator. Oregon's Bicycle Program is a part of the Department of Transportation.

The most appropriate agency in The Dalles to guide a bicycle program should be determined. Responsibilities of that agency and the assigned individual include:

- Coordinate the use and implementation of the Bicycle Master Plan among the different agencies, groups and special interests in The Dalles.
- Assure that Public Works and other government agencies plan for and apply the specifics of the Bicycle Master Plan; strive to institutionalize the consideration of bicycles into everyday government work.
- Review and update policy, planning and regulatory documents.
- Help train planners, engineers and staff in bicycle transportation planning.
- Ensure that transportation consultants hired by the City consider bicycle planning.
- Be cognizant of the Cities' bicycle funding, including the minimum 1% bicycle funds, and plan the allocation of those funds within the constraints of the budget.
- Apply for grants from the State Department of Transportation and other appropriate agencies to fund projects.
- Work with the maintenance departments of the City, County and State to correct problems, improve bicycling conditions, and maintain bicycle system quality.
- Research and recommend short and long-term projects to the City, County and State.
- Recommend bicycle facility designs to the Public Works Departments and to private developers.
- Assist the Planning Department in land-use decisions and planning that affect bicycle facilities or use.
- Monitor and analyze accident and enforcement data.
- Work with local businesses and government agencies to encourage bicycle races, rides, workshops and other events that promote bicycle use and safety.
- Help businesses with bicycle commuter and wellness programs.
- Keep abreast of current bicycle issues, facility designs, standards and practices both locally and globally.
- Be a point-of-contact on bicycling matters to citizens, government agencies and media.
- Establish and maintain contacts with community, business and government organizations and keep them appraised of bicycle issues.
- Respond to inquires and requests, both public and government, on bicycle matters.
- Report findings and recommendations to government agencies as requested.
- Work to improve the status of bicycling in the community and with government agencies.
- Keep the Department Directors appraised of the program's activities and needs.

The responsible individual should be knowledgeable of bicycling issues, roadway design, local government and the project development

process. It is expected that these duties would be only a part of the individual's job. In all likelihood, existing staff would need to be trained in some bicycling matters.

The importance of these functions in a developing community bicycle program cannot be overstated. Successful programs are multi-faceted efforts in planning, design, implementation, and community relations. There are many bicycle issues little understood by today's planners, engineers and developers who have been educated and employed in an automobile-dominated culture. Mistakes and oversights can be very long lasting and damaging. Until the community establishes a tradition of bicycling, it is essential that a dedicated Coordinator be utilized.

Bicycle Advisory Committee

An advisory committee comprised of public and agency members, including the Bicycle Coordinator, is an excellent means of gathering public input and maintaining continuity in the bicycle program. The committee should:

- Develop exclusive bicycle lanes as well as shared facilities, and provide signing to identify the most convenient routes for cyclists and to alert motorists of the likely presence of cyclists.
- Provide guidance for road maintenance personnel regarding need for replacement or repair of signs and roadways, the need for sweeping of cycling routes, and consultation with authorities on new roadways.
- Promote development of routes that provide safe, convenient alternative transportation for people employed both in town and along the Columbia Riverfront to conserve energy, help eliminate auto pollution, and provide a healthful alternative to motor vehicle transportation.
- Enhance recreational cycling by defining recreational sites, historical locations, and access to the adjacent countryside, and by pointing out the most convenient and safest routes, both within the city and to outlying areas.
- Promote improvement of present cycling routes and the development of additional routes that provide a safe, attractive experience which avoid conflict with motor vehicles, and which have desired amenities and support services. The Riverfront Trail and its connecting Mill Creek and Chenowith Greenways plus a new interchange and underpass accessing the Riverfront are examples of such routes.
- Provide and plan for facilities such as bicycle racks, storage lockers, and public rest rooms at convenient locations which would encourage alternative bicycle transportation and provide secure, convenient storage facilities.
- Provide educational materials and opportunities to the community.
- Provide maps to guide both locals and tourists through town and to specific city, scenic, historic, and adjacent countryside locations.
- Be alert for problem traffic situations which might develop in the routes suggested, and recommend needed changes or improvements.
- Provide support, education materials, and assistance to law enforcement personnel in citing violations by cyclists and motorists, and in the use of bicycles for patrol.
- Seek Federal and State grants to develop bikeways and trailways throughout the area.

Public Participation

When it comes to transportation, it is often difficult to translate the planning and engineering principles into terms that the average citizen can grasp. Collectors, ADT's, mixed-use zoning and such are the jargon of the agencies and do not communicate to the public. This is unfortunate because the public must support successful efforts.

Lack of consensus has been the undoing of many plans. This usually happens when some interests have been left out of the planning process or when information has been flawed, withheld, or poorly presented.

Consensus can be easier to achieve when benchmarks are used to establish realistic expectations and a way to judge progress. Benchmarks not only give a basis on which to have constructive discussions, but they tend to keep the focus on long-term goals. They should be modified as the planning process progresses. When it is time for a final hearing on the bicycle plan, approval should be quick because all questions have already been addressed.

Useful benchmarks for bicycle use relate to the ratio of total trips taken by bicycle, the miles of bikeways created, and the number of bike racks installed. For example, The Dalles might use the following benchmarks:

- The trips within the three communities taken by bicycle will increase 1 percent a year until at least 10 percent is reached.
- At least 2-3 miles of bikeways will be added each year until all destinations can be reached by safe and convenient routes built to adopted standards.
- All public destinations, including government offices, community service centers, commercial businesses, places of employment, and recreational facilities, will have adequate bicycle parking within 10 years.

Funding Sources and Strategy

Bicycle facilities and programs can be funded through a broad combination of local, state, federal and private sources:

- Local: road construction and maintenance budget, the general fund, system development charges, and joint projects with utilities and other agencies.
- State: highway projects, 1% Bicycle Fund distribution, matching Local Assistance Grants, and support from other agencies.
- Federal: surface transportation, maintenance and air quality programs.
- Other: donations, grants, development costs, and miscellaneous.

By State law, bikeways must be created whenever City, County, State or Federal roads are built or reconstructed. Arterials and collectors require bike lanes. The Dalles should ensure that any road project in the area is built to bikeway standards for the street classification and that costs are included as a normal part of the project. Similarly, resurfacing of an arterial or collector is an excellent time to restripe for bike lanes at little additional cost. Bikeway maintenance should also be funded along with routine roadway maintenance.

Bikeways may be constructed or improved as a part of roadway repairs. For example, routine resurfacing of a shared roadway may be expanded to include new shoulder bikeways. In such cases, additional funding may be sought for the portion of the project that includes the bikeway improvements. Special projects such as separated bike paths, shoulders added to a road in good condition, and restriping for bike lanes also require unique funding.

It is advantageous to develop a consistent funding source for critical projects and maintenance, and to actively seek additional sources

for the remaining projects. Available money should be leveraged to the greatest extent possible by using it for matching grants and joint projects.

> *Footpaths and bicycle trails, including curb cuts or ramps as part of the project, shall be provided wherever a highway, road or street is being constructed, reconstructed or relocated.*
>
> *—ORS 366.514*

Local Government Funding

Bike lanes and shoulder bikeways, which make up the majority of a bikeway system, are usually placed within the standard roadway width and so add negligible cost to the road department's budget. As new arterials and collectors are constructed or old ones are reconstructed to current standards, bikeways are simply incorporated into the project designs. In this way, a bikeway system can develop incrementally over time in step with the road system for minimal cost.

In private developments, bicycle facilities are made a condition of approval, just as are the roads and parking lots. In some cases, system development charges can be imposed or, if the impact of a development on adjacent streets is not immediate, the developer may participate in future improvements through a Local Improvement District (LID).

Availability of funds may limit alternatives and delay projects, but lack of funds should not be an excuse for poorly designed, constructed or maintained facilities. The initial investment in a properly done facility will be more than offset by its durability, utility, attractiveness and safety. Some communities earmark up to 10% of their road construction budget for bicycle projects because they realize that the return to the community will be manyfold.

When a bicycle project steps beyond the normal road standards, other local government funding may be needed. Examples of expenses outside the normal road budget are construction of a separated path, widening a road to accommodate a bikeway, and building a bikeway to higher standards than required. Parks, recreation, tourism, transit and planning departments are often supporters of such projects and may have funds available. The general fund can also be tapped for special projects.

In all bikeway construction projects, it is important to coordinate with other road work so as to keep expenses— administration, material unit costs, mobilization, traffic control—to a minimum by sharing them with larger road projects. For example, a shoulder widening effort to accommodate bicycles along a popular route might be prohibitively expensive unless done at the same time as a scheduled pavement overlay; this can reduce bicycle-related costs by as much as half.

The Dalles should consider whether it wants to continue supporting automobile use far beyond what other forms of transportation, including bicycles, enjoy. Many cities have looked towards various user tolls, taxes and fees to cover automotive-related costs and provide more funds for other modes. Gas taxes and "wheel taxes" are the most common methods.

When considering this type of funding, it is important to remember that a shift from automobile use to bicycles, even of a few percent, translates into fewer dollars spent for road construction, maintenance, and repair.

State Funding

The principle state funding resource is the State Highway Fund that is gathered from weight-mile taxes, fuel taxes, licensing and registration fees, and truck load violations. The Fund totaled $455M in FY 1991, of which $176M was distributed to cities and counties for roadways and $279M went to DOT. By law, at least 1% of the DOT moneys (after small deductions) must be used for qualifying bicycle and pedestrian expenditures.

The law also states that bikeways and footpaths must be established as part of all highway projects except under special circumstances. These moneys, called the 1% Bicycle Fund, can only be spent on bikeway construction projects within a publicly owned road or highway right-of-way. The 1% Bicycle Fund should total about $3.16M in FY 1993. Eligible expenditures include administration, development, construction, and maintenance of bicycle and pedestrian facilities within the road right-of-way.

The majority of 1% Funds are used by communities for bicycle program administration and engineering efforts, or as leverage to obtain matching grant funds. When used for construction projects, the funds should only be directed towards those expenses that exceed what would be routinely included. For example, simply providing basic road space for bicyclists is routine, but retrofitting lanes on a street, developing feeder routes and adding grade-separated crossings is beyond ordinary and qualify as legitimate bicycle expenses.

The Bikeway and Pedestrian Program Office allocates funds and assists municipalities in developing and implementing bicycle plans. It identifies worthy bikeway projects and reviews state highway construction plans to ensure that bicycle facilities are incorporated. A portion of the 1% Bicycle Fund is distributed to the cities and counties by two means:

- An annual sum proportional to population. Because 1% in any given year may be too low to be useful, this money can be accumulated in a special reserve fund for up to ten years. The Dalles received $4244 for 1991 and $25,093 during the previous 10 years, while Wasco County received $9,644 for 1991 and $57,625 for 10 years.
- Local assistance grants, called Category 4 money, that are awarded annually to selected applications. The applications can be made for:
  - Construction projects with 80% state grants up to $50,000 (most of the bike lane striping projects in *Chapter 3: Recommendations* are below $62,500 and so could be financed at an 80/20 match).
  - Bicycle plan development with 50% state grants up to $20,000 (which is how this plan was funded).
  - Bicycle map development with 50% state grants up to $10,000 (for example, a map for distribution to the public showing route suitability).

Applications should be submitted annually by September 1 and grants are awarded later in the year. Proposed construction projects are reviewed in the field and rated according to criteria developed by the State Bicycle Advisory Committee that include:

- Service population
- Linkages
- Standards
- Problem corrected
- Cost and relation to other projects

Category 4 projects represent about 10% of the total 1% Bicycle Funds. After receiving a grant, the recipient must wait a year to be eligible for the next one.

Bikeways may also be funded as Category 1 and 3 projects on state right-of-ways, like U.S. 30 and 197:

- Category 1 refers to the construction of bikeways associated with new, reconstructed or relocated highways. The cost is typically a small fraction of the overall project.
- Category 3 refers to bikeway projects within State Highway right-of-ways such as bike paths and shoulder widening for bikes. Category 3 projects represent about 50% of the State's 1% Bicycle Funds. Improvements to State routes are eligible for this category.

Category 1 and 3 projects are included in the State's 6-Year Transportation Improvement Program. Proposed projects are submitted to the DOT Region Engineer who evaluates the proposal and considers it for inclusion in the next preliminary 6-Year Program. Category 3 projects are then reviewed by the State Bicycle Advisory Committee before recommendations are passed on to the DOT.

Finally, Category 2 covers the maintenance of existing state bikeways and represents about 7.5% of the State's 1% Bicycle Funds. This activity strives to give cyclists a smooth and clean surface by periodic repair and sweeping of state bikeways such as the TransAmerica Route through Oregon. It also replaces damaged and obsolete signs.

The Oregon Traffic Safety Division helps fund educational and safety programs such as Portland's Community Traffic Safety Initiative and the State-sponsored Smart Cycling courses. Other potential State funding sources for community infrastructure improvements, including possibly bikeways, are the Oregon Community Development Block Grant Program and the Oregon Special Works Fund.

Federal Funding

The National Transportation Policy is to promote the increased use of bicycling, to accommodate bicycle and pedestrian needs in designing transportation facilities for urban and suburban areas, and to increase pedestrian safety. Federal-aid money is available for bicycle facilities as part of a normal federal-aid highway construction project at the same financial match ratio as the other highway work. Bikeway projects independent of other construction projects, as well as nonconstruction projects related to bicycle use, can be funded with an 80% federal share as provided in 23 USC, Section 217. Such projects must be principally for transportation rather than recreation, however.

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 authorizes expenditures of $151 billion over 6 years and has opened up new funding opportunities for bicycle projects. There are several programs in the ISTEA for which bicycle facilities and programs are eligible:

- The National Highway System (NHS), which includes former FAP and FAS designations, provided Oregon with $34.5M in FY 1992. Eligible projects areas include bicycles and safety. Half to all of this system will be transferred to the Surface Transportation Program.
- The Surface Transportation Program (STP) provides funds ($64.5M to Oregon in FY 1992) for a variety of uses including bicycles and safety. The funds are distributed by population (50%), statewide (30%), for safety and railroad crossings (10%), and for enhancements (10%). The Transportation

Enhancement Activities (TEAs) include bicycle facilities, conversion of abandoned railway corridors to bicycle trails, and recreational projects. "Enhancements" are improvements independent of new construction or reconstruction (which already require bicycle facilities) such as wide curb lanes and shoulders on rural roads. Oregon's TEA share is $38M for FY 1992-7 is over $6M per year.

- The Congestion Mitigation and Air Quality Improvement (CMAQ) Program gave Oregon $4.4M in FY 1992 for use primarily in nonattainment areas under the Clean Air Act (there are currently none in Central and Eastern Oregon). The Program encourages states to invest in bicycle facilities and programs.
- The Interstate Maintenance Program stresses cost-effective ways of extending pavement life and prevents new construction to increase capacity for single-occupancy vehicles. Oregon received $35.1M in FY 1992.

Most of the projects listed in *Chapter 3: Recommendations* could potentially be funded through the above programs. To be eligible for these funds, a construction project should be in the local CIP or on the State's 6-year TIP.

The State allocates the funds through its regional offices—Region 4 in the case of The Dalles. Contact Mark DeVoney, Region Planner, or Kelly Hanslovan, Alternative Transportation Coordinator, Oregon State Highway Division, P.O. Box 5309, Bend, OR 97708, 503-388-6180. The funding request must come from a City or County government. Proposed projects generally require some local matching funds, which can include Bicycle Funds or grants. Local or State funding must be reasonably available during the time period of the proposed project.

In addition, the Land and Water Conservation Fund (Public Law 88-578) money is available for the acquisition of lands and waters or for the development of public outdoor recreation facilities, such as the proposed river and creek trails. These funds, like the ISTEA funds, must be applied for by an eligible agency such as a City, County, or Park District.

Other Funding

Bikeway facilities and programs are a community investment shared by all sectors—private, business and government. Each can contribute in many ways, including land dedications, donations of engineering and public relations talent, special grants, sponsorship of fund-raising events, and so on.

Developers can also choose to include extra bikeway projects, beyond what is required, in their project designs. Businesses can voluntarily construct showers and offer incentives for their bicycling employees. These sources should be actively sought and nurtured.

There are other means for obtaining materials, funds or right-of-ways that are up to the inventiveness of the City. Some methods that have been used in other cities include:

- Environmental impact mitigation
- Street vacation moneys
- Enforcement of franchise agreements for railroad crossings
- Utility tax for public works
- Utility easements
- Tax-deductible gifts in the form of signs, equipment and trail segments

Facility Costs

Estimated costs for typical bicycle facilities are given in Table 3. These figures include engineering, installation, minor contingencies, striping and signing. They do not include administration, special grading and fill operations, unusual construction (e.g., bridges and tunnels) or land acquisition.

Separated bike paths tend to cost more than indicated because of special design considerations (bridges, intersections, fences, drainage, etc.) not usually encountered on other bikeway projects.

All bicycle projects are markedly cheaper than equivalent automotive projects because bicycles are smaller, lighter, and travel at a lower speed. For example, construction costs for a new four-lane urban arterial may run about two million dollars per mile, with the bike lanes representing only about 10%. Nor do on-road bikeways benefit only cyclists—the space is also used by turning vehicles, as emergency parking, and as a buffer for pedestrians.

Priorities

Bicycle projects should be planned and scheduled with the same care given to all roadway projects. Projects should be given priority ratings (refer to *Section 3: Recommendations*) and incorporated into the City's maintenance and capital improvement lists. This not only establishes continuity in the bicycle program, but it establishes eligibility for ISTEA funding.

The entire bikeway system of about 37 mi will take many years to complete. By scheduling 2 to 3 mi each year, the system can be finished in about 15 years. This should keep pace with a gradual conversion from an automobile-dominated system to one that incorporates more cycling and walking for short-range trips.

As opportunities arise for unscheduled improvements, such as during other roadway construction, consideration should be given to including bikeway work. Road improvements may be triggered by adjacent development, increased traffic levels, or preservation overlays. In any case, bikeway improvements should be included because they are much more cost effective when included with other road work than when retrofitted latter.

Occasionally, a project may be judged impractical for the moment due to nontechnical reasons such as neighborhood resistance. Nevertheless, the long-term goal should be completion of all projects because a fragmented system will not serve the community's transportation needs.

Table 3. Bikeway facility costs

Facility	Description	Cost
Striping	4-in. stripe on existing roadway	$0.55/linear ft
Sign	Typical sign	$100 each
Traffic signal	Intersection	$70,000/pole
Pedestrian signal	Crosswalk	$2500/unit
Pedestrian/ bicycle bridge	10-ft wide	$5600/linear ft
Sweeping	Once a month at 5 mph	$40/hr
Repair	10-ft wide path, seal every 5 years	$0.70/linear ft
Repair	10-ft wide path, resurface every 10 years	$5/linear ft
Shoulder bikeway	4-ft wide on both sides to highway standards (4-in asphalt/9-in aggregrate) with 4-in stripe	$24/linear ft
Bike lane	5-ft wide on both sides to highway standards (4-in asphalt/9-in aggregrate) with curbs and 8-in stripe	$40/linear ft
Bike path	10-ft wide (2-in asphalt/4-in aggregrate) with clearing and preparation, no fences	$15/linear ft (see text)
Bike path	10-ft wide (3-in asphalt/6-in aggregrate) with clearing and preparation, no fences	$22/linear ft (see text)
Bike path	12-ft wide (3-in asphalt/6-in aggregrate) with clearing and preparation, no fences	$28/linear ft (see text)
Bike path	10-ft wide (5-in concrete/3-in aggregrate) with clearing and preparation, no fences	$31/linear ft (see text)
Parking	Short-term	$50/bike
Parking	Long-term and sheltered for 10 bikes	$300/bike

SUITABILITY CRITERIA

Roads as Bikeways

The Dalles area contains numerous origins and destinations. Consequently, a functional bicycle network needs to connect all areas with some type of safe and convenient bikeway. This means an interconnected grid of bikeways that includes major thoroughfares for the most heavily traveled routes, smaller branches leading away from the major routes, and a fine grid of minor bikeways reaching out to all destinations. High-use areas near 'attractors' (retail businesses, employers, schools, parks) require special attention through careful treatment of access and conflicts with other modes.

This type of network is well served by the existing road grid. Highways and major arterials and collectors are the bikeway trunks, minor arterials and collectors become the bikeway branches, and small neighborhood streets fan out from there. In essence, all roads are considered bikeways, even in the absence of any special design treatments. By Oregon law, bicycles are vehicles and share the roads with other vehicles such as cars and trucks. Bicyclists have the same rights and responsibilities as other road users.

However, roadways differ greatly in what they offer cyclists. The primary consideration for most roads has been automobile use. Bicyclists' particular needs have often been neglected. The problem is how to fit bicycling into the automobile-dominated transportation system.

Suitability criteria are tools whereby roadways can be evaluated as to how well they suit cyclist's needs, how they might be improved, and the most feasible design. The criteria below are among those considered in the development of The Dalles Bicycle Master Plan.

- Cyclist's needs are well served by the existing road grid.
- The best route and type of bikeway are influenced by a multitude of factors involving physical, aesthetic and other considerations.

Overview

Route selection is inherently complex because of the wide range of user preferences and abilities, as well as the many alignment, design and traffic factors. After gathering cyclists' inputs, assessing the various aspects of the transportation system, and attempting to minimize hazards, one is often left with confusing and conflicting choices.

Numerous physical subfactors enter into the considerations, including road and lane widths, shoulders, alignment, pavement, traffic controls, turning movements, automobile parking, bicycle parking, sight distance, grade, intersections, and the volume, speed, and mix of traffic.

Add to this the different types of riders—children, novices, commuters, shoppers, tourists, and racers—anyone of which may use any of the four bikeway types, and the equation becomes complicated indeed. The typology of bicyclists must consider such factors as trip purpose; average trip length, operating speed, skill, knowledge of traffic rules, age, experience, and so on. A given person may fall into more than one category.

Some of these factors are discussed below. At the end of the chapter, a formula is provided for computing the physical suitability of a roadway for cycling.

Factors

Use

Demand analysis is often used by transportation planners. They measure and forecast demand and build facilities accordingly. The process feeds on itself. The more facilities that are built, the more demand that is created. "Build it and they will come" is the popular refrain of those who see demand analysis as a tool to increase automobile use. The results have been impressive. While other modes continue to decline, automobile miles per capita have steadily increased about 2 percent a year for 30 years.

Some bicycle facility standards found in the U.S. are based on minimum levels of bicycle use, much in the same way automotive facilities are gauged. Unfortunately, the increasingly high levels of automobile use have squeezed cyclists out of the picture. If a location has little existing usage, the conclusion should not only be that demand is lacking but that some impediment may exist that discourages use.

Furthermore, criterion which cite bicycles per day as a minimum standard usurps a community's right to define its own needs. The correct minimum level of usage is whatever the community believes is appropriate, given its needs and constraints.

Usage data are important and should be gathered routinely. But such data are more a tool to measure progress than an indicator of need. The proper approach is to establish goals, such as increasing ridership a certain amount each year, and then gathering data to see if the goals are being achieved by current practices.

Width

Width is the fundamental physical requirement of a bikeway. Experience has shown which minimum widths work best and that substandard facilities are selfdefeating. If a facility cannot provide adequate width, alternatives need to be explored. See *Chapter 6: Bikeway Standards* for dimensional layouts and lane striping recommendations.

Most streets and roads in The Dalles were originally surveyed with adequate right-of-way to accommodate multiple uses. Unfortunately, in some cases the available roadway width has been almost entirely given over to the space-eating automobile. Wide through lanes, turn lanes and on-street parking may leave little room for dedicated bikeways without expensive roadway widening. Various solutions can be explored to provide width for a bikeway:

- Reduce inside travel lane width to provide more width in the outside lane.
- Reduce the number of lanes from 4 to 3 with a center turn lane.
- Remove parking on one or both sides or decrease the width of the parking spaces.
- In hilly areas, shift the center line so that the slow, uphill cyclist has ample room.

Often, all that is needed to improve cyclist's comfort is a few extra feet that can be easily obtained by inexpensive restriping.

Connectivity

Continuity, directness and destination are the basic elements of connectivity.

A continuous, logical route is desired by cyclists. This is true of motorists, too, and we have gone to great lengths to provide an elaborate, well-signed system that leads the motorist to most any destination. Bicycle facilities should be no less carefully thought out.

Cyclists have a very strong desire to maintain the forward momentum their efforts have created. They also naturally desire to minimize their own delay and are usually more comfortable on the move. A facility with numerous full

stops or abrupt turns is likely to be unacceptable. In most locations, design treatments can maximize the cyclists' ability to maintain momentum. Only where such treatments are infeasible does an alternate route become important.

Out-of-direction travel can be discouraging to a cyclist, especially if they have a 'utilitarian' purpose (commuting, shopping or on personal business). It is not as important to the recreational bicyclist, but is still a consideration. For the utilitarian cyclist, connectivity is desired along the lines which define the minimum distance or "minimum energy" path from origin to destination; little deviation is tolerated. A busy street that would be shunned by the recreational cyclist may be the choice of the utilitarian cyclist because of its directness.

For trips of up to 0.5 mi, utilitarian cyclists may object to diversions as short as one block; however, for trips in the 1 to 2 mi range, this much diversion will generally be acceptable. Cyclists on longer utilitarian trips will generally not perceive a nearby alternate route to be beneficial if its extra length is significant.

The recreational cyclist is more willing to accept a longer or more strenuous path to avoid unpleasant environmental conditions or hazardous situations. This is providing, of course, that the detour is not out of scale with trip length and perceived severity of the conditions avoided.

Closely related to continuity is destination. The ability to get from one human activity point to another is essential to the fulfillment of the purpose of a utilitarian bicycle trip. If bicycle facilities are to serve such trips, they cannot simply be placed where it is easy to provide bicycle facilities; they must be located to provide convenient, direct access to centers of activity. For this reason, the existing road grid serves cyclists well.

Safety

Bicycle safety encompasses a wide range of topics, including facility design, rider skill, knowledge of laws and traffic principles, enforcement, and bicycling equipment and clothing. Traditional methods of accessing traffic safety rely primarily on extensive accident records. While this works well for automobiles, it is not very useful to improve cycling conditions because most bicycle accidents are not reported and those that are reported are recorded in a system developed for automobiles.

Programmatic aspects of safety deal primariy with providing suitable bikeways and encouraging their proper use. Safety evaluation of a bikeway is really a study of existing or potential conflicts. Once identified, conflicts can be minimized through use of established design standards.

Often the existence of a large volume of cars adjacent to a bicycle facility is taken to be an inherently unsafe situation. This is generally not true. High traffic volume is a hazard only if there is close and continual conflict between vehicles and bicycles.

Potential conflicts can best be categorized into four conditions: parallel, right-turning, left-turning and crossing conflicts. Each of these conflicts should be evaluated separately and combined for a final safety ranking.

Parallel conflicts are caused by two conditions: close proximity of auto and bike travel, and large speed differential between the two. Bicycles and motor vehicles can successfully mix in the traffic stream if speeds of the two types of vehicles are compatible, as is usually the case on residential streets with low speed limits. A cyclist on level terrain and in negligible wind conditions typically averages about 12 mph, slower than motor vehicles sharing the facility but not significantly so. On higher-

speed arterials, wide outside lanes or bike lanes are necessary.

Right-turning conflicts are primarily caused by excessive curb cuts, poor intersection design and narrow outside lanes. Older arterials and collectors, especially in areas of automotive-oriented strip development, have far too many driveways. Newer developments can minimize these. An unchannelized intersection presents relatively minor problems for cyclists; a wide-radius corner poses a problem; a double-right turn lane presents unacceptable hazards. When evaluating this conflict, consideration must be given to costs of corrective measures. Often, careful striping of a bike lane to clearly define the road space and to allow the through cyclist to merge left is all that is needed.

Left-turning conflicts occur because a bicycle has low visibility and is often observed after initiation of the vehicle's turning movement. This is particularly true at high-volume intersections where bicycle visibility is further masked by other vehicles. Thus, left-turn conflicts are caused by the turning volume, its opposing through volume, merging traffic and the type of intersection control. Intersections with left-turn phase signalization present few hazards. Close consideration must be given to signalized intersections without separate turn phasing as well as major unsignalized intersections and driveways on major streets.

Crossing conflicts are caused both by traffic volume and the width of the cross street. Any location which controls crossing vehicles by signals or STOP or YIELD signs is relatively safe. Locations where controls confront the cyclist's path are more hazardous, since this situation implies a higher level of motor vehicle cross traffic. In any case, major bikeways should be on through streets that involve few stops. Separated paths should have few street crossings, and where streets must be crossed, the facility should be well marked, have good sight distance, and conform to normal intersection design.

Grades

Grades not only influence a cyclist's route selection, they also affect operational safety. A slow or hard-braking bicycle is less stable, and a fast-moving bicycle needs more room to maneuver. Cyclists may accept out-of-direction travel as well as less safe and attractive conditions to avoid excessively steep grades.

However, some moderate grades can add interest and challenge for recreational bikeways. In hilly areas, even the utilitarian cyclist is resigned to coping with the natural terrain. Where the traffic engineer can help is to provide sight distances and maneuvering room appropriate to the expected speed, especially on turns and at intersections.

Sight Distance

Sight distance is dependent on design speed and profile gradient. Bikeways on or adjacent to roadways usually have adequate sight distances since motor vehicle speeds are equal to or greater than bicycle speeds. An exception to this is where on-street parking is allowed too close to an intersection. The ASSHTO guide defines appropriate sight distances for separated bike paths.

Pavement Quality

Bicycles are sensitive to pavement irregularities that may go unnoticed by the motorist, partly because bicycle tires are smaller and partly because the bicycle is usually traveling near the edge of the road where cracks, debris,

storm grates and pavement unravelling are common. The quality of the road surface will have a significant impact on usage of a facility. Ride quality as well as tire damage can be involved. High surface quality is an essential part of the bikeway design.

Attractiveness

Given the close interaction between the cyclist and the environment, the attractiveness of that environment should be evaluated. This quality has two imports:

- The utilitarian cyclist considers attractiveness nice so long as it coincides with the directness of the trip. In contrast, the recreational cyclist will tend to seek out attractive bikeways. Attractiveness primarily concerns view, sound and smell.
- Elements related to attractiveness such as air quality, noise levels and truck traffic can be quantified. Elements that must be evaluated but cannot be quantified may include imageability.

Imageability

A route that employs clearly defined major streets has this quality. Bikeway markers, destination signs and descriptive route maps improve the imageability of the route, which is a subjective criterion enhancing a bikeway rather than a standard.

Air Quality

Air quality is a potentially important suitability criterion since air pollution has serious implications for persons involved in physical exercise such as bike riding. Exercise increases lung intake of a pollutant and causes irritation to the eyes and muscus membranes. Most irritation is short-lived but can inhibit people from cycling. Sources of localized pollution, especially truck traffic and industrial uses involving chemicals, should be considered in bikeway alignment.

Smog exists as a dispersed area phenomenon and so, while it is an overall health concern, its presence is not meaningful as a criterion for bikeway selection in a given area.

Noise

Traffic noise, particularly that caused by trucks, is more an amenity factor than a safety criterion. But the presence of heavy vehicles discourages bicycling and is definitely a negative factor in the suitability of a bikeway. This is generally not a concern in The Dalles.

Aerodynamic Impact

Aside from the noise impact caused by heavy vehicles, a direct safety concern is the affect the aerodynamic force from these vehicles place on the cyclist. At certain speeds a truck can create enough aerodynamic force to spill a cyclist. Truck traffic traveling at 30-40 mph 2-4 feet away from the cyclist exerts a moderate effect on the cyclist that can be magnified in a cross-wind. A truck traveling at 50 mph exerts enough of a side force on a cyclist 4 feet away to spill the cyclist. The same can occur when the truck is traveling 60 mph and the cyclist is up to 6 feet from the truck. When vehicular speeds exceed these tolerance limits a separation should be provided, usually in the form of a buffer strip or physical barrier.

Funding

There are several programs and major sources of bikeway funding that provide all or part of the monies necessary for construction. Refer to *Chapter 4, Implementation*, for a listing of sources.

Competing Uses

Certain aspects of locating a bikeway relate to the non-user public rather than the quality of service to the cyclist:

• Aside from the safety concerns a shared bikeway presents, social conflicts may also exist. The removal of on-street parking or a travel lane may be technically feasible and even desirable from a traffic engineering standpoint, yet be opposed by adjacent businesses or residences. In these situations, the planner may choose to rely on elected officials for decision making after providing them with a studied evaluation of the alternatives.

• Conflict may occur whenever there is a clear difference in apparent lifestyle between the cyclists and the residents whose homes they pass. The conflict may be ethnic, it may be socio-economic, or it may be one of mores. If the planner is aware of this type of conflict, he should attempt to deal with it in the planning process through public participation rather than struggling with adverse reaction when his plans are made public.

• A type of competing use occurs when one agency has responsibility for bicycle planning and another (such as a water or utility district) has responsibility and control over a right-of-way ideal for biking but used for other purposes. Often these other agencies may have no interest in aiding bikeway development and may in fact have sound reasons, such as added maintenance and insurance costs, for opposing bicycle usage of the right-of-way. These situations can be negotiated. The objective should be to maximize the public's benefit rather than that of the specific agency. In these cases, solutions should be investigated as with any other alternative. Any special costs associated with these facilities on the competing right-of-way should be reconciled.

Security

Cyclists or residents may have real or imagined fear of crime generation with the implementation of a bikeway:

- Bicyclists' concerns for security of their persons and property are genuine and well-founded. An obvious response to concern for property is provisions of effective bicycle parking facilities at all destinations. Parking standards are discussed in *Chapter 7: Supplementary Facilities.*
- Personal security of bicyclists is of greater concern. A number of design considerations can help minimize this concern. For instance, a bicycle path passing through a park area would preferably be located in an open meadow rather than a secluded wooded area. An overpass treatment open to view is preferable to an underpass treatment in shadow. When an underpass is necessary, its sight distance properties should allow cyclists to see, prior to entering, if anyone is loitering there.
- The possibility of street crime should not preclude building a bicycle facility, particularly when there appears to be real potential for use. But it is good reason to use prudent judgement in locating and designing the bicycle facility so as to minimize crime potential.

Other Issues

Two aspects of bikeways that were hotly debated until recent years are separated versus on-road facilities, and bicyclist versus pedestrian needs. Two other issues that reappear in every city are on-street car parking versus bike lanes and the perceived carelessness of bicycle riders.

Integration and separation. Proponents of separated facilities cite a more pleasant riding environment and (unsubstantiated) safety benefits, while the on-road facility advocates point out the cheaper costs of on-road bikeways and the need to treat bicycles as legitimate vehicles.

Experience has found that a functional bicycle system involves a variety of facility types that must be integrated with the other modes including pedestrians. No single approach works best for all roads or even all roads of a particular type. Where separated bike paths or lanes are used, it is important is to avoid using them to restrict cyclists from regular streets. The referenced documents reflect this in their application guidelines.

Bicycling and walking. Bicycling and walking (as well as other nonmotorized modes such as wheelchairs and roller skates) often have different participants, needs and facilities. It is important to keep their unique requirements in mind so as to avoid conflicts. In general, though, improving the pedestrian environment also benefits cycling and vice versa. Bicycling and pedestrian concerns are often allied and can be dealt with simultaneously.

For example, sidewalks, by providing pedestrians with safe access, also help reduce bicycle-pedestrian conflicts; adequate crossings of arterials benefit both pedestrians and bicyclists; narrow travel lanes that reduce motor vehicle speed create safer and more pleasant conditions for all nonmotorized modes (providing they have their own space).

Whereas bicycle issues are well addressed in the State Bicycle Plan, one must look harder to find pedestrian-oriented guidelines in Oregon. Ashland, Eugene and Portland have taken the lead in establishing pedestrian-friendly areas. Oregon's Bikeway and Pedestrian Program Office has been rechartered to include pedestrian transportation and is developing pedestrian policies and guidelines.

On-street parking. On-street parking occurs in both residential and commercial areas, especially in older districts that were never designed to handle the number of vehicles in use today. However, the Census Bureau reports that only 10% of households do not have off-street parking, and that only 5% of homeowners and 19% of renters have to use public streets. The resistance to losing on-street parking is often more a matter of convenience and status-quo than necessity.

These kinds of interrelated problems point out the necessity of careful, integrated planning that covers an entire neighborhood, if not the entire city. Solutions that maintain access while creating a pleasant environment can be found. The right of all travelers, including bicyclists and pedestrians, to have safe use of public right-of-ways for transportation should take precedence over motorists' desire to store cars there.

Carelessness. Oregon accident statistics do not indicate that bicyclists are a particularly careless group. The blame for accidents involving bicycles and cars are about evenly divided between bicyclists and motorists. The accidents span all age groups as well. It is important to treat all roadway users equally, both in planning considerations and in law enforcement. This will help overcome cyclist's inferiority complex which prompts erratic behavior, and it will encourage them to obey traffic laws.

Cyclist's behavior will also improve as facility improvements become more widespread. Some of the perceived recklessness of cyclists is a logical response to a traffic system that often does not accommodate them. Narrow outside lanes, intersections designed to expedite only car movement, signals that are not sensitive to bicycles, buildings oriented towards car access, walls of parked cars, and many other aspects of an auto-oriented system cause some cyclists to, reasonably enough, look for shortcuts.

Suitability Formula

The previous discussion may not be of great help to planners and engineers who want objective criteria on which to base decisions. To help provide consistent, bicycle-specific data for an entire road network, a formula (see Table 4)was devised that has been successfully used in Florida and Tennessee (W. Davis and M. Horowitz, *Assessing Roadway Conditions for Bicycle Suitability*, paper presented at Conférence Vélo Mondiale, Montreal, Canada, Sept. 1992).

The formula evaluates the physical characteristics of roadways that affect cycling. By using primarily existing data, it provides a cost-effective way to assess route suitability and to isolate deficiencies.

The Dalles should consider using this formula to categorize its bike routes. The resulting suitability rating index (SRI) should be calibrated by 'handlebar surveys' to suit local conditions. Note that when street conditions change significantly or when a bike route turns onto a different street, a new SRI calculation should begin.

Besides its usefulness to access road conditions, the data can also be transferred to a color-coded map to show the best streets for cycling. This type of suitability map is useful to cyclists in choosing routes.

Table 4. Suitability Rating Index

$$\frac{ADT}{L \cdot 2500} + \frac{S}{35} + \frac{14-W}{2} + PF + LF = SRI$$

where:

ADT	=	average daily traffic
L	=	number of travel lanes
S	=	speed limit (mph)
W	=	outside lane width (feet) (W>14, factor = 0)
PF	=	pavement factors
LF	=	location factors

Pavement Factors:

Cracking	0.50
Patching	0.25
Weathering	0.25
Potholes	0.75
Rough edge	0.75
Curb & gutter	0.25
Rough RR crossing	0.50
Drainage grates	0.75

Location Factors:

Typical Section	
Angle parking	0.75
Parallel parking	0.50
Right-turn lanes	0.25
Physical median	-0.25
Center-turn lane	-0.25
Paved shoulder	-0.75
Roadway alignment	
Severe grades	0.50
Moderate grades	0.25
Frequent curves	0.25
Restricted sight distance	0.50
Roadway environment	
Numerous drives	0.50
Numerous stops	0.75
Industrial land use	0.50
Commercial land use	0.25

BIKEWAY STANDARDS

Oregon Bicycle Plan

- Bicycles are vehicles that use the roads, and facilities must allow bicyclists to act like other vehicles and blend into the traffic flow.
- Oregon bikeway designs are based on AASHTO standards.
- Design applications are detailed in the Oregon Bicycle Plan.
- There are four basic bikeway types: bike path, bike lane, shoulder bikeway, and shared roadway.

Bikeway standards are basic guidelines used for design, construction, signing, and striping purposes. The Oregon Bikeway and Pedestrian Program has developed standards, based on over two decades of experience, for the wide range of urban and rural applications that occur in the state. The standards are based on the *Guide for Development of Bicycle Facilities* (1991), published by the American Association of State Highway and Transportation Officials (AASHTO), to which Oregon contributed many ideas.

The Oregon Bicycle Plan covers many applications for all types of bikeways and situations (summarized in Table 5). It is much more than a plan, in that it provides comprehensive discussions of design considerations, examples of good and bad practices, a glossary of bicycle terms, and expanded guidelines for separated bike paths, retrofit bike lanes, shoulder widening, interchange areas, maintenance activities, and exceptions to AASHTO standards. It is a valuable reference source for planners, engineers and maintenance personnel.

The Dalles should refer to the Oregon Bicycle Plan—in particular, *Chapter 8: Design Practices and Standards*, *Chapter 9: Signing and Striping*, and *Chapter 10: Operation and Maintenance*.

Table 5. Bikeway types

Bikeway Type	Description	Application	Width
Shared Roadway	Bicyclists share the normal vehicle lanes with motorists	City residental streets and low-traffic rural roads	14-ft desirable 12-ft min. 15-ft max.
Shoulder Bikeway	Smooth, paved shoulder with 4-in. stripe	Highways and minor arterials and collectors	6-ft desirable 4-ft min. uncurbed 5-ft min. curbed
Bike Lane	Preferential lane on roadway with 8-in. stripe, signs and pavement markings	Arterials and collectors as well as other high-volume routes	6-ft desirable 4-ft min. uncurbed 5-ft min. curbed
Bike Path	Separated from roadway by open space or barriers and closed to motorized traffic	Along busy highways, through roadless corridors, and in urban areas with extensive traffic control	Normally two-way 12-ft desirable 10-ft min. 8-ft if one-way

Application to The Dalles

The planning and route studies described earlier provide the information on the corridor, type of bikeway and the anticipated level of service. The majority of the bikeways proposed for The Dalles area are on-road facilities, with the highway or street dictating the geometric design such as alignment, grades and drainage.

There is a wide range of facility improvements which can enhance bicycle transportation in The Dalles. Improvements can be simple and involve minimal design consideration (e.g., changing drainage grate inlets) or they can involve a detailed design (e.g., providing a bicycle path). The controlling feature of the design of every bicycle facility is its location (i.e., whether it is on the roadway or on an independent alignment).

Roadway improvements such as bicycle lanes depend on the roadway's design. On the other hand, bicycle paths such as the Riverfront Trail are located on independent alignments. Consequently, their design depends on many factors, including the performance capabilities of the bicyclist and the bicycle.

Improvements in The Dalles area for motor vehicles through appropriate planning and design can enhance bicycle travel and, in any event should avoid adverse impacts on bicycling. The Dalles' overall goals for transportation improvements should, whenever possible, include the enhancement of bicycling. Public involvement in the form of public meetings or hearings and an ongoing Bicycle Coordinator and Bicycle Advisory Committee will help develop a widely accepted plan.

Design Practices

To varying extents, bicycles will be ridden on all roadways and highways where they are permitted. All new highways, except those where bicyclists will be legally prohibited, should be designed and constructed under the assumption that they will be used by bicyclists. Bicycle-safe design practices, as described in this document, should be followed to avoid the necessity for costly retrofitting. Refer to the Oregon Bicycle Plan for more information, roadway cross-sections, and typical pavement markings.

Because most highways have not been designed with bicycle travel in mind, there are often many ways in which roadways should be improved to more safely accommodate bicycle traffic. Roadway conditions should be examined and, where necessary, safe drainage grates and railroad crossings, smooth pavements, and signals responsive to bicycles should be provided. In addition, the desirability of adding facilities such as bicycle lanes, bicycle routes, shoulder improvements, and wide curb lanes should be considered.

Design Speed

Design speed is a critical factor in providing for adequate horizontal curvature and stopping sight distance; it is also an element in assessing the feasibility of grades. A design speed of 20 mph is desireable for the correlations of bikeway features which provide safe and comfortable cycling. On grades which exceed 7%, a design speed of 30 mph is recommended as a safe minimum. On bikeways with "one-way" climbing grades exceeding +3% it is considered sufficient to use a design speed of 15 mph.

Stopping Sight Distance

Unexpected obstacles on a bikeway such as broken glass, broken pavement or other impediments may cause a cyclist causing to brake or swerve. To safely provide the cyclist with an opportunity to see and react, bicycle stopping sight distances have been studied and criteria compiled (refer to AASHTO Guide).

Generally, there is no problem in attaining adequate stopping sight distances for bicycle lanes because the roadway alignment usually has been designed to accommodate motor vehicle speeds that are equal to or greater than bicycle speeds. There are exceptions, however, especially where on-street parking is permitted. The stopping sight distance factor should be routinely checked in locating bikeways.

Grades

The Dalles area is hilly. A composite of studies establishing the most economical criteria which will meet acceptable energy demands recommends bicycle grades at up to 11% and grade distances up to 2000 ft. Sometimes, ramp and bridge approaches have steeper grades. Acceptable grades in such cases can be adjusted accordingly, but should not exceed 15%.

Drainage Grates

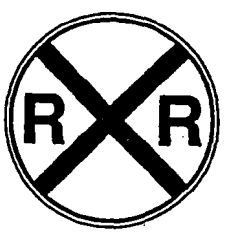
Drainage grate inlets and utility covers are potential problems to bicyclists. When a new roadway is designed, all such grates and covers should be kept out of bicyclists' expected path. On new construction where bicyclists will be permitted, curb inlets should be used wherever possible to completely eliminate exposure of bicyclists to grate inlets. It is important that grates and utility covers be adjusted flush with the surface, including after a roadway is resurfaced.

Parallel bar drainage grate inlets can trap the front wheel of a bicycle causing loss of steering control and, often, the bar spacing is such that they allow narrow bicycle wheels to drop into the grates, resulting in serious damage to the bicycle wheel and frame and/or injury to the bicyclist. These grates should be replaced with bicycle-safe and efficient ones. When this is not immediately possible, consideration should be given to welding steel cross straps or bars perpendicular to the parallel bars to provide a maximum safe opening between straps. This should be considered a temporary correction.

While identifying a grate with a pavement marking, as indicated in the Manual for Uniform Traffic Devices (MUTCD), would be acceptable in most situations, parallel bar grate inlets deserve special attention. Because of the serious consequences of a bicyclist missing the pavement marking in the dark or being forced over such a grate inlet by other traffic, these grates should be physically corrected, as described above, as soon as practicable after they are identified.

Railroad Crossings

Railroad-highway grade crossings should ideally be at a right angle to the rails. The greater the crossing deviates from this ideal crossing angle, the greater is the potential for a bicyclist's front wheel to be trapped in the flangeway. It is also important that the roadway approach be at the same elevation as the rails.



Consideration should be given to the materials of the crossing surface and to the flangeway depth and width. If the crossing angle is less than approximately 45 degrees, consideration should be given to widening the outside lane, shoulder, or bicycle lane to allow bicyclists adequate room to cross the tracks at a right angle. Where this is not possible, commercially available compressible flangeway fillers can enhance bicyclist safety. In some cases, abandoned tracks can be removed. Warning signs and pavement markings should be installed.

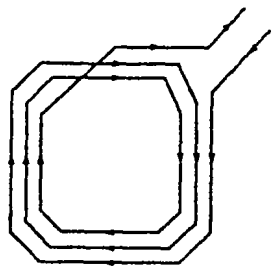
Pavements

Pavement surface irregularities can do more than cause an unpleasant ride. Gaps between pavement slabs or drop-offs at overlays parallel to the direction of travel can trap a bicycle wheel and cause loss of control; holes and bumps can cause bicyclists to swerve into the path of motor vehicle traffic. Thus, to the extent practicable, pavement surfaces should be free of irregularities and the edge of the pavement should be uniform in width. On older pavements it may be necessary to fill joints, adjust utility covers or, in extreme cases, overlay the pavement to make it suitable for bicycling. Tarred and graveled roadways are unsuitable for cycling. The loose gravel is not only extremely unstable for bicyclists but the added danger of passing cars spitting rocks pose a hazard.

Traffic Control Devices

At intersections, bicycles should be considered in the timing of the traffic signal cycle, as well as the traffic detection device. Normally, a bicyclist can cross an intersection under the same signal phasing arrangement as motor vehicles; however, on multi-lane streets special consideration should be given to ensure that short clearance intervals are not used. If necessary, an all-red clearance interval may be used.

To check the clearance interval, a bicyclist's speed of 10 mph and a perception/reaction/braking time of 2.5 seconds should be used. Detectors for traffic-actuated signals should be sensitive to bicycles and should be located in the bicyclist's expected path, including left turn lanes. Where programmed visibility signal heads are used, they should be checked to ensure that they are visible to bicyclists who are properly positioned on the road.



At signal-controlled intersections with high bicycle traffic, it may be desirable to have a staggered stop bar for automobiles where the bike lane stop is several feet in front. This gives bicycles a head start on a green light which makes crossing the intersection easier. Cars are not permitted to turn right on red, which is a good idea at any intersection with substantial pedestrian and bicycle traffic.

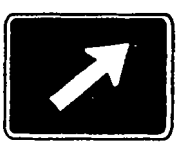
It is also desirable to avoid unnecessary stop signs along bike routes. If a stop is deemed necessary to slow down automobile traffic, as is often the case in residential areas or near schools, consideration should be given to employing traffic calming measures instead. There are various roadway designs, such as narrow lanes and restrictors, that slow traffic without stopping it. This also has the advantages of reduced noise and pollution from accelerating cars and of improved traffic flow.

Bike Routes

Signing bike routes was very popular 10 to 20 years ago among cities trying to instantly create a bicycle "system." Unfortunately, there was rarely anything done to improve cycling conditions or to logically connect routes. The signs became counterproductive, telling the

cyclist nothing that they did not already know, often leading them onto obscure secondary streets away from destinations, and leading motorists to believe that bicycles did not belong on non-signed streets.

By today's bikeway standards, bike route signs are reserved for situations on shared roadways or shoulder bikeways where a preferred route is not obvious. Two common situations where bike route signs are employed are to lead cyclists on a popular route through a section that is difficult to follow, and to steer cyclists around a section of roadway that is poor for cycling when a better alternate route is close by. In both cases, the purpose is to maintain continuity in the bikeway system.



A bike route is simply an informational designation meant to make bicycle travel easier and in no way restricts bicycles from adjacent steets. The signs work best when accompanied with another sign giving useful information such as the name of the route (if it has one), direction of travel (if there is a change), destination, or distance to destination. Bicycle route signing cannot end at a barrier; information directing the bicyclists around the barrier must be provided.

Bike route signs should be used carefully and should not be a substitute for needed bikeway improvements. Where the bikeway system is developing, as in The Dalles, an interim map showing all proposed routes and their current suitability is useful to cyclists, even when the routes themselves are not signed.

Overall, the decision to provide bicycle routes in and around The Dalles has been based on a determination that it is advisable to encourage bicycle use on a particular road. The roadway width and condition along with factors such as the volume, speed and type of traffic; parking conditions; grade; and sight distance have been considered in determining a feasible bicycle route. Bicycle traffic should not be encouraged on a less direct alternate route unless the favorable factors outweigh the inconvenience to the bicyclist. Roadway improvements, such as safe drainage grates, railroad crossings, smooth pavements, maintenance schedules, and signals responsive to bicycles must always be considered before a roadway is identified as a bicycle route.

Wide Curb Lanes

On highway sections without bicycle lanes, a right lane wider than 12 ft can better accommodate both bicycles and motor vehicles in the same lane and thus is beneficial to both bicyclists and motorists. In many cases where there is a wide curb lane, motorists will not need to change lanes to pass a bicyclist.

Also, more maneuvering room is provided when drivers are exiting from driveways or in areas with limited sight distance. In general, a lane width of 14 ft of usable pavement width is desired. Usable pavement width would normally be from curb face to lane strip, or from edge line to lane stripe, but adjustments need to be made for drainage grates, parking, and longitudinal ridges between pavement and gutter sections. Widths greater than 14 ft can encourage the undesirable operation of two motor vehicles in one lane, especially in urban areas, and consideration should be given to striping as a bicycle lane when wider widths exist.

Shoulders

Wide curb lanes and bicycle lanes are usually preferred over shoulders for use by bicyclists. However, if it is intended that the bicyclists ride on shoulders, smooth paved shoulder surfaces must be provided. Pavement edge lines supple-

ment surface texture in delineating the shoulder from the motor vehicle lanes. Rumble strips can be a deterrent to bicycling on shoulders and their benefits should be weighed against the probability that bicyclists will ride in the motor vehicle lanes to avoid them.

Shoulder width should be a minimum of 4 ft when intended to accommodate bicycle travel. Roads with shoulders less than 4 ft wide normally should not be signed as bikeways. If motor vehicle speeds exceed 35 mph , if the percentage of trucks, buses, and recreational vehicles is high, or if static obstructions exist at the right side, then additional width is desirable. Adding or improving shoulders can often be the best way to accommodate bicyclists in rural areas, and they are also a benefit to motor vehicle traffic. Where funding is limited, adding or improving shoulders on uphill sections first will give slow moving bicyclists needed maneuvering space and decrease conflicts with faster moving motor vehicle traffic.

Bike Lanes

Bike lanes separated by a stripe can be considered when it is desirable to delineate available road space for preferential use by bicyclists and motorists, and to provide for a more predictable movements by each. Bicycle lane markings can increase a bicyclist's confidence that motorists will not stray into their path of travel. Likewise, passing motorists are less likely to swerve to the left out of their lane to avoid bicyclists on their right, thereby improving overall traffic flow.

Bicycle lanes should always be one-way facilities and carry traffic in the same direction as adjacent motor vehicle traffic. Two-way bicycle lanes on one side of the roadway are unacceptable because they promote riding against the flow of motor vehicle traffic. Wrong-way riding is a major cause of bicycle accidents and violates the Rules of the Road stated in the Uniform Vehicle Code. Bicycle lanes on one-way streets should be on the right side of the street, except in areas where a bicycle lane on the left will decrease the number of conflicts (e.g., those caused by heavy bus traffic, awkward intersections, etc.).

Normal bike lane width is 6 ft. Under some conditions, a width as narrow as 4 ft is acceptable on uncurbed roadways and 5 ft on curbed roadways.

Bicycle lanes should always be placed between the parking lane and the motor vehicle lanes. Bicycle lanes between the curb and the parking lane create hazards for bicyclists from opening car doors and poor visibility at intersections and driveways, and they prohibit bicyclists from making left turns; therefore this placement should never be considered.

Where parking is permitted but a parking lane is not provided, the combination lane, intended for both motor vehicle parking and bicycle use, should be a minimum of 12 ft wide. However, if it is likely the combination lane will be used as an additional motor vehicle lane, it is preferable to designate separate parking and bicycle lanes. In both instances, if parking volume is substantial or turnover is high, an additional 1 or 2 ft of width is desirable for safe bicycle operation.

Angled vehicular parking prohibits the location of bicycle lanes. The backing up of vehicles and poor visibility until a vehicle is partially backed out promotes collisions with bicyclists.

Bicyclists do not generally ride near a curb because of the possibility of debris, of hitting a pedal on the curb, of an uneven longitudinal joint, or of a steeper cross-slope. If the longitu-

dinal joint between the gutter pan and the roadway surface is uneven, a minimum of 4 ft should be provided between the joint and the motor vehicle lanes.

For a highway without a curb or gutter, bicycle lanes should be located between the motor vehicle lanes and the roadway shoulders. Bicycle lanes may have a minimum width of 4 ft, where the shoulder can provide additional maneuvering width. A width of 5 ft or greater is preferable; additional widths are desirable where substantial truck traffic is present, where prevailing winds are a factor, on grades, or where motor vehicle speeds exceed 35 mph.

Intersections

For bicycle lanes to work properly at intersections, care must be taken to provide both bicycles and motor vehicles with clear paths through the intersection and for turns according to established Rules of the Road. Bicyclists proceeding straight through and motorists turning right must cross paths. Striping and signing configurations which encourage these crossings in advance of the intersection, in a merging fashion, are preferable to those that force the crossing in the immediate vicinity of the intersection.

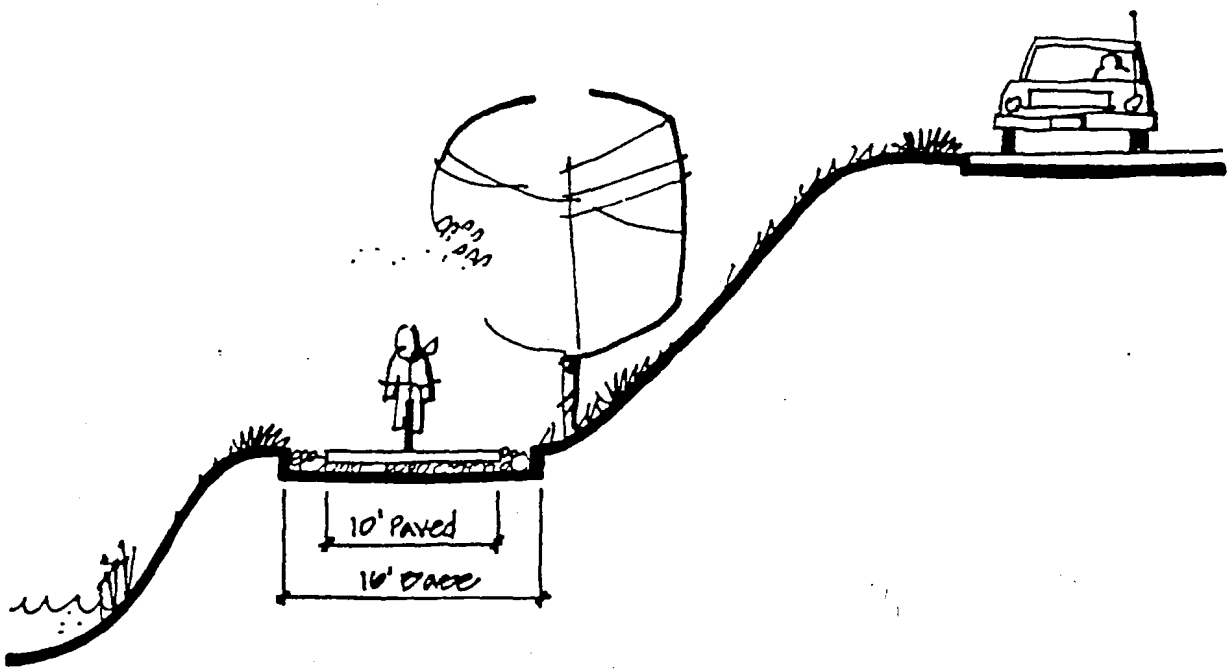
To a lesser extent, the same is true for left-turning bicyclists; however, in this maneuver, the vehicle code allows the bicyclist the option of making either a "vehicular style" left turn (where the bicyclist merges leftward to the same lane used for motor vehicle left turns) or a "pedestrian style" left turn (where the bicyclist proceeds straight through the intersection, turns left at the far side, then proceeds across the intersection again on the cross street). Where there are numerous left-turning bicyclists, a separate turning lane should be considered.

Adequate pavement surface, bicycle-safe grate inlets, safe railroad crossings, and traffic signals responsive to bicycles should always be provided on roadways where bicycle lanes are being designated. Raised pavement markings and raised barriers can cause steering difficulties for bicyclists and should not be used to delineate bicycle lanes.

Bicycle Paths

Bicycle paths are facilities on exclusive rights-of-way and with minimal cross flow by motor vehicles. Bicycle paths can serve a variety of purposes. They can provide a commuting bicyclist with a shortcut through a residential neighborhood (e.g., a connection between two cul-de-sac streets). Located in a park, they can provide an enjoyable recreational opportunity. Bicycle paths can be located along abandoned railroad rights-of-way, the banks of rivers, and other similar areas. Bicycle paths can also provide bicycle access to areas that are otherwise served only by limited-access highways closed to bicycles. The Dalles Riverfront Plan features several bike paths.

Bicycle paths can be thought of as extensions of the highway system that are intended for the exclusive or preferential use of bicycles in much the same way as freeways are intended for the exclusive or preferential use of motor vehicles. There are many similarities between design criteria for bicycle paths and those for highways (e.g., in determining horizontal alignment, sight distance requirements, signing, and markings). On the other hand, some criteria (e.g., horizontal and vertical clearance requirements, grades, and pavement structure) are dictated by operating characteristics of bicycles that are substantially different from those of motor vehicles. The designer should always be conscious of the similarities and the differences between bicycles and motor vehicles and of how these similarities and differences influence the design of bicycle paths.



Bike path design points...

The standard width for a bike path is 10 ft. Do not go below this width—it will come back to haunt you! Because the Riverfront and Creek Trails will attract many different users (walkers, joggers, bicyclists, skaters, baby strollers) 12 ft is recommended.

Clearance should be at least 3-ft (shy distance) on both sides and 10 ft overhead. Adequate sight distances at street crossings should be planned.

Because part of the proposed routes feature shrubs and trees, special care must be taken to protect the path from root damage. A deep aggregate base combined with root barriers where necessary are two recommended methods.

Signing at entrances and street crossings is important. For example:

SUPPLEMENTAL FACILITIES

The motorist benefits not only from roads leading to nearly any destination, but also from extensive signals, parking, signing, and special services. Motoring would not be nearly as popular without these added features.

Likewise, a complete bicycle system incorporates not only bikeways but also parking, commuter facilities, rest areas, and bicycle-oriented signing.

Parking Facilities

Just as omnipresent parking is essential to automobile use, convenient and secure bicycle parking is needed to promote that mode.

Any bicycle trip involves parking. The lack of secure and convenient parking is often the missing link in bicycle facilities and is a great deterrent to bicycle use. It is increasingly common for local governments to require bicycle parking in new developments just as they do for automobile parking (sample ordinances are included in the Appendix).

Bicycle parking falls into two basic categories of user need: commuter (or long term) and convenience (or short term). The minimum needs for each differ in their placement and protection, as shown in Table 7.

A basic guideline for capacity is that bicycle parking should be about 10% of motor vehicle parking. For example, a use that requires 35 motor vehicle parking spaces would require facilities for parking four bikes. Some uses, such as a public library or popular ice cream store, may require a higher ratio of bike parking to motor vehicle parking.

- Bicycles facilities are incomplete without parking, changing areas for commuters, and bicycle-oriented signs.
- Parking should be convenient and secure.

The primary design considerations are:

- Bicycle parking should be convenient and easy to find. Where necessary, a sign should be used to direct users to the parking facility.
- Each bicycle parking space should be at least 2 by 6 ft with a vertical clearance of 7 ft.
- An access aisle of at least 5 ft should be provided in each bicycle parking facility, and the facility should not interfere with the normal pedestrian flow.
- Facilities should be able to accommodate a wide range of bicycle shapes and sizes including tricycles and trailers if used locally. Finally, facilities should be simple to operate. If possible, signs depicting how to operate the facility should be posted.
- Parking facilities should offer security in the form of either a lockable enclosure in which the bicycle can be stored or a rack to which the bicycle can be locked. Structures that require a user-supplied lock should accommodate both cables and a U-shaped locks and should permit the frame and both wheels to be secured (avoid the need for removing the front wheel). Note: businesses may provide long-term, employee parking by allowing access to a secure room within a building, although additional short-term, customer parking may also be required.
- The rack should support the bicycle in a stable position without damage (for example, bent rims are common with racks that only support one wheel).

Table 7. Bicycle parking categories

Commuter (Long-Term) Parking	Convenience (Short-Term) Parking
• Employment areas • Schools and colleges • Multifamily dwellings • Public transit transfer stations	• Shopping centers • Hospitals and health care offices • Libraries and museums • Public service government agencies • Recreation and entertainment areas
• Weather-protected area that is covered and drained. • Securing device that supports the frame or handlebars rather than the wheels only. • Securing device that easily allows bicycles to be locked to it through the frame and both wheels. • Lighting consistent with automobile parking lighting.	• Device that allows the frame and both wheels to be secured by the bicyclist's own lock. • Parking location free of unnecessary conflicts with motor vehicles and pedestrians. • Well-lit location that is as closely situated to the most easily monitored access to an entry in order to reduce theft.
• Security ranks over convenience, although bicycle parking should be at least as conveniently located as automobile parking. • Bicycle parking should not conflict with motorized uses in a dangerous or congested manner.	• Weather-protected bicycle parking is not always necessary or cost effective for the short-term user. • Note that these locations are also a place of employment and should have some long-term parking.

- Long-term parking should be sheltered so that bicycles are not exposed to the sun, rain and snow.
- Care should be given in selecting the location to ensure that bicycles will not be damaged by motor vehicles.

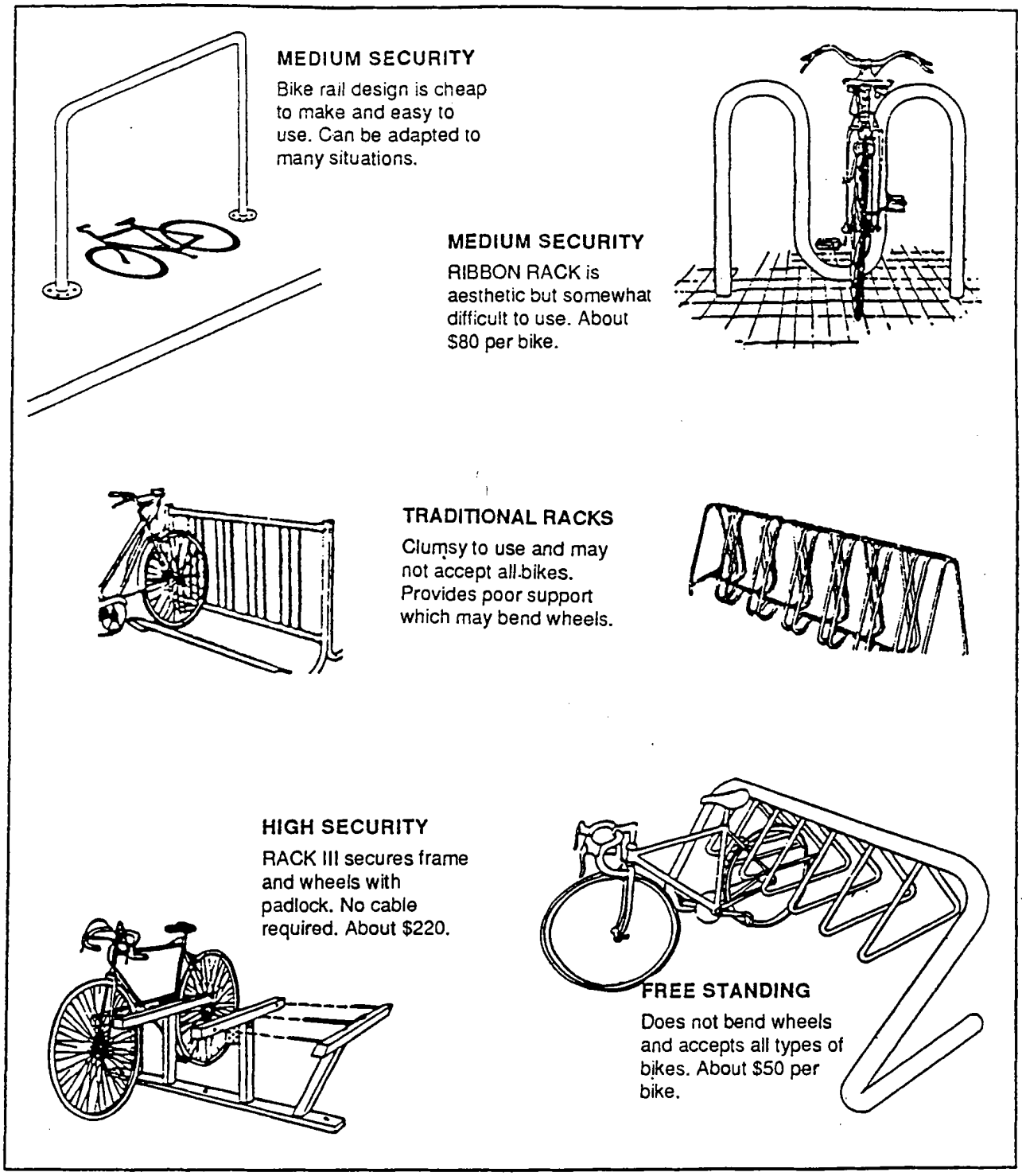
There are many acceptable designs in use throughout the State. Several such designs are shown in Figure 6. Others are noted in *Bicycle Parking Facilities*, Oregon Department of Transportation, Dec. 1992.

Bicycle parking should be provided in all types of new development (both public and private) and for changes in use, and for expansions and other remodeling that increase the required level of automobile parking.

Commuter Facilities

Besides parking, showers and changing rooms at large employers (at least 10,000 square feet and 25 employees) should be required in new construction or major remodelling to promote bicycle commuting. Many employers find that such facilities pay for themselves quickly in increased employee fitness and health, not to mention morale.

Figure 6. Typical bike racks



Signing

Signs serve three basic purposes: regulating usage, directing bicyclists along established routes, and warning them of unexpected conditions.

Because of a cyclist's lower line-of-sight, the bottom of the signs should be about 5 ft above the travel surface. If a secondary sign is mounted below another sign, it should be at least 4 ft above the travel surface. The signs should provide at least 2 ft lateral clearance from the edge of the bikeway. Standards for signing are contained in the Oregon Bicycle Plan and the MUTCD and are summarized below:

- ***Regulatory Signs*** are used to inform bicyclists, motorists and other users of traffic laws or regulations. Common regulatory signs are: R5-3 (MOTOR VEHICLES PROHIBITED), R1-1 (STOP, 18x18 in.) and R1-2 (YIELD, 24x24x24 in.).

- ***Directional Signs*** are used to guide bicyclists and other users along a route. The basic sign is D11-1 (BIKE ROUTE) and is used to designate popular or preferred routes along bikeways except for bike lanes which use sign R3-17 (RIGHT LANE, BIKE ONLY). It is placed at the beginning of a designated bike route and after all major intersections (Note: BEGIN and END signs are no longer used with D11-1). Because a bike route designation tells the cyclist that there are advantages to using the bikeway, care should be taken to assure its suitability.

Direction of travel signs are used at junctions and places where the bicycle route differs from the standard motor-vehicle route. Destination and distance information along heavily traveled bicycle routes are useful for orientation and to encourage use, although such signs should not duplicate existing road signs. Signs should be mounted under sign D11-1 and should be no more than 24 in. wide.

- ***Warning Signs*** are used to inform bicyclists and other users of potentially hazardous conditions such as turns and curves, intersections, stops, hills, slippery surfaces, and railroad tracks. A variety of signs may be used as described in the Oregon Bicycle Plan.

EDUCATION

Introduction

Bicycling means different things to people. Some see it as one answer to the problems besetting our automobile-dominated communities. Others see it as pleasant recreation. Some consider it an annoyance and a dangerous sport. To children, it may be a way to get around until they can drive a car. In some countries, bicycling is simply a part of daily life, little different than eating and sleeping. Education's role is to bring together these disparate views in a way that can promote cycling within the community.

A bicycle system is most evident in its facilities, which are the most visible and expensive element. Indeed, some transportation agencies have felt that their job was finished once the bicycle facilities were provided, and that it is was then up to the people to figure out how to use the facilities. This approach generally works with motorists because they must be a minimum age and pass a competence exam before they can drive. They also have the benefit of an extensive, highly structured road system complete with traffic control and directional devices.

Bicyclists, on the other hand, are practically unregulated, and a would-be cyclist may venture out on the roads with few skills and little judgement. This ignorance, combined with the fact that automobiles are the dominant form of transportation in our society, often keeps people from even considering bicycling as a choice. The result is that fine facilities may be misused or ignored and may even be perceived as unnecessary.

Getting people to use bicycle facilities and to use them safely requires follow-through in various programs that promote awareness,

- Education is necessary for effective and safe use of bicycle facilities.
- Promotion builds support and encourages potential users.
- There are many successful programs to offer guidance.

safety, skills and enforcement. Although these programs might be best handled by private or community groups instead of government agencies, it is important that they be encouraged and supported.

There are numerous strategies for pursuing education including information packages, training courses, commuter programs, special incentives, event sponsorship, and other promotional efforts.

Information Packages

A bicycle information packet is one tool that is easily and cheaply provided by the City. The contents should include a map, suggested routes (both recreational and commuter), local services, contacts, and perhaps riding safety tips. Its purpose is to help bicyclists choose appropriate routes for their skill level, to orient visitors and to encourage first-time riders. The State Bikeway Program Office has samples of both color and black & white maps using preferred symbols and styles.

Training Classes

The existence of good facilities is not enough to get many people out on their bicycles because they are afraid, and those who do ride often endanger themselves and others with unsafe behavior. Potential and unskilled bicyclists need to be shown how to ride safely and easily. Motorists, too, need to be taught how to interact with bicyclists. Numerous training courses and

materials have been designed for all age groups, for example:

- Smart Cycling Class for Kids from the Oregon Bicycle Safety Education Program, Salem, OR.
- National Safe Kid's Campaign from the Children's National Medical Center, Washington, D.C.
- Sprocketman series from Bikecentennial, Missoula, MT.
- The Basics of Bicycling (BOBS) from the Bicycle Federation of America, Washington, D.C.
- Street Smarts from Bicycling Magazine, Rodale Press, Emmaus, PA.
- Effective Cycling from the League of American Wheelmen, Washington, D.C.

While some of these courses are highly structured and involve on-bike training, most of the materials can be presented in local school classrooms, the workplace, church, recreation departments, club and community events, skills fairs and rodeos, or at home. Palo Alto, California even has a traffic school for juveniles who violate bicycle laws.

Traffic education should be a regular part of school curriculum. Nationally, we spend about $200 on driver's education for each 16-year-old but only $1 worth of traffic-safety education before age 15.

A few communities have a Traffic Training Officer who visits each first grade class early in September to instill safety guidelines. If no such person is available locally due to budgetary and staffing limitations, a knowledgeable adult cyclist or school teacher could present the same information.

A simple informative brochure, understandable by the elementary school children should be given, such as the pamphlet "Say, you're not from this planet, are you?" available from the State Bicycle Safety Program. Additional information can be sent home to the parents, such as the brochure, "Prevent Bicycle Accidents—A Message for Parents." This is an efficient way to present information to the children and the parents.

Informative brochures and packets also are available to provide good information for school teachers. Additionally, posters are available which can be placed in conspicuous places in the school.

The state has a 20 minute video, "Bicycle Rules for the Road," which reviews state rules, and is ideal for kids ages 6-12, and is often used in connection with a "Bike Rodeo." Also, a video could be produced locally showing local areas, illustrating proper use of lanes, demonstrating intersection conflict and accidents, unpredictable maneuvers by young riders, errors of bicyclists and motorists, improper turning, disobedience at STOP sign or traffic signal, need for nighttime visibility, helmets, etc.

The young teenagers also should have their bicycling etiquette reinforced. A state available video, "Be Safe On Your Bike," is aimed at ages 12-15, and is also good for families, with emphasis placed on anticipating problems, visible hints of problems, and communicating properly with cars and pedestrians.

The state also provides a brochure "Smart Cycling, Class for Kids," which is an instructor's guide in teaching 10 to 12-year olds good cycling skills, including bike handling, traffic awareness and positioning, and safe maneuvers. The highlight of this course in on-bike practice, as well as classroom instruction and exercises. The State Bicycle Safety Program offers instructor training for these courses. As of 1991, 50 people had been trained as instructors in 15 communities.

Each spring in the 1960's, one of the local service clubs held a bicycle rodeo at the Junior High School parking lot where the children received some educational information, had their bicycles checked for proper equipment and safety, and participated in bicycling skill drills. The Oregon Traffic Safety Commission has a brochure describing a "Bike Skills Fair" and how to organize and present such an event. It is typically held on a Saturday or a summer day, directed to kids aged 6 to 12. A pool of 15 organizers and volunteers can guide 30-60 kids through the skills fair in groups of about 10 or 12.

Some areas also have used such an event as an opportunity to stamp the parent's driver's license numbers into the metal on the crank of the children's bicycles as an aid in recovery of lost and stolen bicycles. This seems to be more effective than licensing in returning missing bicycles to their rightful owners. Advertising such a free service tends to increase the attendance at such an event.

Such an event could be organized by the Bicycle Advisory Committee or the Northern Wasco County Parks and Recreation Department, perhaps in conjunction with one of the service clubs. Good media coverage to advertise the event is vital if it is to reach an important segment of the youngsters.

Driver education courses in high school prepare students for driving vehicles safely. Defensive driving lessons learned there in addition to making the students better drivers and decreasing their involvement in accidents, provide an opportunity to emphasize bicycle safety. Many of these students have bicycles and are aware of problems from a bicyclist's point of view. This is the perfect time to encourage new drivers to establish proper, safe driving relationships with bicyclists.

The DMV has a publication, "Oregon Bicyclist's Manual," which tells all the rules both for the cyclists and the motor vehicle drivers riding on Oregon's highways.

Commuter Programs

People need advice on how to commute by bicycle because most of them have never done it and they do not know what it entails. By far the most popular means of getting people to try bicycle commuting are the various bike-to-work events sponsored throughout the country. Many such programs have been designed for beginning commuters and offer much the same information. Some of the better publications are listed below. In Central Oregon, Biking for a Better Community is a good source of information and sponsors a Bike Commute Week in late May to coincide with the Oregon Bike Commute Week and the National Bike Commute Day. In Portland, the Bicycle Transportation Alliance pursues similar events.

Bike Week Guide for Colorado Communities, Colorado Bicycle Program, Colorado Department of Highways, Denver, CO, May 1991.

Boulder started a bike week in 1982. It progressed from a single-day event to one of the largest in the U.S. By 1991, the project had evolved into a state-wide Bike Week. It is a 7-day series of fun and educational events tailored to each community, with a Wednesday Bike-to-Work-Day being conducted at all locations. The Guide is a tool to help communities produce a Bike Week most beneficial to their citizens. It describes what is needed in the way of organization, skills, volunteers, budget, sponsors and media coverage. Suggested events include celebrity media events (commuting races, relays), rides of various types (century, family, seniors, church), parades, displays and bike-checkup stations.

Bike-to-Work Day Organization Manual, Jessica Denevan, for People Power and the Santa Cruz County Regional Transportation Commission, Santa Cruz, Calif., Feb. 1992. ($4 from County Bicycle Coordinator, 701 Ocean Street, Santa Cruz, CA 95060.)

Santa Cruz built on Boulder's experience in designing their own bike-to-work day which is in its fifth year. Participation grew dramatically and drew about 660 riders last year. The manual lead the reader through how to organize and implement an annual bike-to-work-day. There is much useful information on organization, budget, sponsors, choosing event sites, media, promotion, materials, volunteers, and employer and school participation. One unique aspect in 1991 was the use of bicycle trailers to haul all 3,800 pounds of food to the breakfast sites.

Bike Commute Week Planning Guide, Oregon Bicycle Safety Coordinator, Oregon Department of Transportation, 400 State Library Building, Salem, OR 97310, (503)378-3669.

Tuscon Area Bicycle Commuter Handbook, Alternate Modes Planner, Tucson Department of Transportation, Tucson, AZ, 1989.

Another Way to Work: The Employer's Handbook on Bicycle Commuting in the Delaware Valley, Bicycle Coalition of the Delaware Valley, Philadelphia, PA, 1983.

Bicycles Make Good Business Sense!, Bicycle Program Office, D.C. Department of Public Works, Washington, D.C., 1981.

Special Incentives

Many employers and government agencies have found ways to make it easier to bicycle and to reward those who do. Some tried and true carrot-and-stick techniques are:

- Stipends and Subsidies. The direct approach to encourage bicycling is to pay employees to do it. Stipends of about $25-$30 per month can be effective and have been used in California (for example, the Alza Corporation in Palo Alto pays its employees $1 for each day they ride to work). Reimbursing employees for business travel on bicycles (the City of Palo Alto pays its employees $0.07 per mile for business and travel), as is done for cars, is becoming increasingly common. Employees who commute by bicycle should also be included in any incentive programs offered to those who rideshare.

  The health benefits of cycling have been acknowledged by some employers who include it as part of company-sponsored wellness programs or offer insurance discounts to employees who commute by bicycle regularly. For example, the U.S. Forest Service allows employees to spend part of their working day in aerobic fitness activities that include bicycling.

  Another approach was taken by Emanuel Hospital in Portland that offered employees $4000 to buy homes in the local neighborhood--within walking distance of work. An even more direct subsidy would be to forego parking costs and give the money directly to employees.

- **Flex Time.** Allowing bicyclists to schedule their work day so as to avoid rush hour or darkness encourages some commuters.

- **Bicycles and Maintenance Provided.** Rather than give stipends, some employers have offered to pay for an employee's bicycle after a certain period of riding in regularly or to set up a credit program for its purchase (such as the City of Glendale, Arizona; City of Pasadena, California; and Food 4 Less Supermarkets, Inc. in La Habra, California). Arranging for service at a local

shop is another perk. Another incentive that can be arranged by the employer is a special discount at a local bike shop for commuter accessories and clothing; if a bike shop can expect some business to develop, they are often willing to give a discount (locally, Sunnyside Sports in Bend, Oregon offers a 10% discount on commuting accessories).

- **Ride-Home Services.** For companies with a vehicle at their disposal, an offer to take the employee home if the weather turns bad, if they need to work late unexpectedly, or if they become ill can ease the fears of both the employee and the employer about bicycling or walking (such as done by Fleetwood Enterprises Inc. in Riverside, California).
- **Awards and Commendations.** Approval is a powerful incentive. By singling out employees who commute by bicycle or walking, others can be encouraged to try. Competitions can even be arranged between departments. The Jet Propulsion Laboratory Bicycle Club in Pasadena, California has one such program.
- **Company Motor and Nonmotor Pools.** People who occasionally need a car to do their work may still commute by bicycle if their company has a motorpool from which employees can reserve a vehicle a day ahead (for example, David Evans and Associates in Bend, Oregon). In fact, some cities (Ashland, Oregon and Seattle, Washington) have discovered that city-furnished bicycles are actually a more efficient and healthy way to conduct business such as road and building inspections. Numerous police departments have also added bicycles to their rolling stock.
- **Relaxed Dress Code.** Some offices have formal or informal dress codes that are not entirely compatible with a commuting bicyclist or walker. For example, wrinkle-free fabrics, comfortable shoes and minimum makeup should be approved.

Event Sponsorship

Rides are an excellent way to introduce people to bicycling. These can be easy, neighborhood rides for the family or longer distance tours for people wanting a challenge. The atmosphere should be friendly and supportive, with plenty of help and information available. Refreshments and even door prizes add to the festivities. Once they try it, many people get hooked on cycling for life. A local bicycle club or shop can help in staging events.

Promoting Bicycling

A clear understanding of transportation issues is fundamental to accepting the bicycle on the roads. Transportation planning has been so dominated by the automobile the past several decades that the basic needs of people—access, mobility, and low cost—are often overlooked. It is important to present all sides of the transportation equation:

- *Access* has become a prominent issued with the disabled, but the inability to reach many destinations is also a problem for the able-bodied public. Lack of sidewalks and bike lanes, building entrances across parking lots, drive-throughs, no stopping for right turns, and many other street features make access by means other than automobiles difficult.
- *Mobility* is what transportation planning is all about—moving people. The present system is so focused on moving automobiles that the half of the population which does not own a car (and the 10 percent that does not even have access to one) is left out of the planning. Many who do not drive become dependent on those who do, which ties people into a chauffeur role, generates more car trips, and limits personal options.

- *Low cost* transportation is a basic community need. Superior automobile access and mobility are beneficial, up to a point, for those who can afford it. But as moving people around becomes too expensive, discrimination occurs, the community's resources are taxed, and prosperity suffers. By all accounts, the line of reasonable cost has been passed. That this issue is not addressed more often is because few communities keep tack of the costs.

The cost of transportation bears closer examination. Perhaps the most overlooked aspect of transportation planning is automotive subsidies. Few people consider more than the costs of car ownership and operation, estimated by the American Automobile Association to be $3583 to $7505 per vehicle per year in 1991.

However, the costs to the community are rarely considered: direct costs (road construction, maintenance, and police and emergency services) and indirect costs (land consumption for parking and automobile-related activities, property damage, medical costs due to automobile pollution, and the oil subsidy) which amount to about $500 annually per vehicle. (Ref.: Mark E. Hanson, *Automobile Subsides and Land Use*, Journal of the American Planning Association, Vol. 58, No. 1, Winter 1992.)

Only a fraction of the direct costs are paid for out of user taxes and fees, the remaining coming from the general fund. This represents a considerable burden on the community, often from 30% to 60% of the local tax levy. The indirect costs are not usually accounted for but have been estimated to be as much as $3100 per capita.

In sum, the automobile is an amazingly expensive way to move people. It is now the single-most expensive consumer item (23% of spending), ranking above even shelter (20%) and food (19%). (Ref.: *Consumer Expenditure Survey,* 1988-89, Bureau of Labor Statistics.)

Many cities have looked towards various user tolls, taxes and fees to cover automotive-related costs, to provide more funds for competing forms of transportation such as bicycles, and to create motivation to change driving habits. Additional taxes and fees upset citizens until they realize the extent to which driving has been subsidized. Indeed, the overall costs of supporting a transportation system can be decreased substantially when trips are shifted to more efficient modes than the automobile.

ENFORCEMENT

Need

State motor vehicle law states: "Every person riding a bicycle or an animal upon a public way is subject to the provisions applicable to and has the same rights and duties as the driver of another vehicle..." (ORS 814.400). There are 32 other statutes pertaining to bicycles listed in the Oregon Bicycle Plan The DMV provides a brochure, "Bicycle Rules of the Road," that tells the rules for riding on Oregon's highways.

It is important to recognize that bicycles are vehicles and need to behave as such on the roadways. Most of the problems relating to bicycles—improper use, poor facilities, safety, etc.—are because someone is not treating them like the vehicles they are.

Law enforcement is a recognized aspect of efficient use of bikeways and of bicycle safety. Typical violations include running stop signs and traffic signals, riding the wrong way on a street, riding at night without light, drunk driving, and turning motorists not yielding to bicyclists. Most bicycle accidents that involve other vehicles are initiated by one of these illegal actions. Frequent violations deteriorate the trust between cyclists and motorists and can contribute to lack of support for bikeways.

Many communities have had difficulty in getting their police to enforce the vehicle code with cyclists (and motorists, too). This is partly due to inadequately trained officers who are not aware of the importance of citing bicyclists. Heavy criminal workloads also interfere and point to the need for more police staff.

Enforcement is not a cure-all for all problems relating to bicycling. However, it reinforces the attitude that bicycles are partners on the road. The long-term effects of consistent enforcement are smoother and more efficient traffic flow with reduced accidents.

- Bicycles are legally vehicles that must follow the same basic rules of the road as automobiles.
- Bicycle infractions are rarely enforced, and automobile infractions may go unpunished due to overworked police.
- It is important to support and fund police enforcement efforts.

Accident Causes

Eugene has a well developed bicycle network and has much experience in coping with numerous cyclists. In Eugene, disobedience at traffic signals cause about 44% of citations, not obeying a STOP sign 32%, and improper turns only 2 percent. Eugene's bicycle accident statistics showed failure to yield right-of-way and running a stop sign or traffic signal were two of the tree most frequent bicyclist errors causing accidents with motor vehicles.

In 1986, State bicycle/motor vehicle accident statistics showed 45% occurred at intersections, 26% were the result of bicycles or motor vehicles entering or leaving roadways at midblock locations, 13% were caused by wrong-way riding, 8% were caused by the cyclist or motorist turning or swerving, and 8% were from miscellaneous causes. Figures in 1990 were similar. The 1990 report notes several things:

- Most cycling accidents do not involve motor vehicles.
- In bicycle-motor vehicle accidents, the blame is almost equally shared between cyclists and motorists.
- Young cyclists are most often responsible for accidents caused by disregard or ignorance of the law.

Locally, bicycle/vehicle accident statistics from 1985 to May 1991 show 18 injuries and 1 fatality. Of these, 7 were listed as of unknown cause, 2 as failure to yield, 4 as inattention, 1 disobeying stop sign, 1 failure to stop, 1 improper turn, 1 blocked vision, 1 careless driving, and 1 due to alcohol. It would help if these accidents were reported in more detail as those from the state statistics in order to be better able to evaluate and then suggest changes which might improve safety.

Selective enforcement should be emphasized along corridors where frequent bicycle activity or accidents are noted. In The Dalles these should include all of 10th St. from the west end of town to the High School, all of the commercial area of W. 6th St., and downtown.

Support

It is important that the police be encouraged and supported through adequate funding and the establishment of courses to train police in proper bicyclist behavior. Some cities have had success with traffic enforcement, especially in regards to car parking and bicycle violations, by using trainees and bicycle-mounted patrols.

Motivation

It is sometimes difficult for an officer who has been specially trained for police work to regard citing bicycle violators as a high priority item compared to dealing with criminal activities. The normal first reaction is that it is no fun citing kids, especially since contemporary police policy is generally directed toward improving the image of law enforcement with young people.

The task of bicycle safety enforcement can be eased considerably when the police are supported strongly by the community. It is also important to have active safety education programs directed toward bicyclists and motorists, constant engineering efforts geared toward reducing illogical or compromising situations, and coordination with the courts to assure understanding of enforcement goals in the light of judicial prerogatives.

The Oregon Traffic Safety Commission provides a 15 minute video, "Ride on By," for the law enforcement community. The narrator explains in detail why enforcement in the bicycle arena is so important. It helps overcome embarrassment about pulling over cyclists.

It is useful to bridge the gap between token enforcement and a strong effort by conducting a public awareness campaign, followed by a warning phase leading into total enforcement and citations. Newspaper, radio, and school educational programs could all be used effectively. Cities that have tried this technique have found they receive only a small number of complaints when the program is implemented.

Bicycle Equipment

Bicycles are *required* to have a white light visible from the front for a distance of 500 feet at night as well as a red reflector or lighting device or material, big enough and mounted so that it can be seen from all distances up to 600 feet to the rear when directly in front of motor vehicle headlights on low beam. These lighting requirements apply only when riding on a public way from sunset to sunrise or when people or vehicles cannot be clearly seen 500 feet ahead because of darkness or bad weather.

It is also a good idea to wear light-colored, reflective clothing at night. Commonly, most bikes do not have permanent lights as standard equipment and most riders avoid installing one for fear of vandalism. Some riders do carry a flashlight but the majority appear to ride in the dark, especially if the trip is short and made on

dark, especially if the trip is short and made on local streets. New lights are small and are designed for quick removal to avoid theft or vandalism.

Nearly all bicycles are equipped originally with rear reflectors. However, wear and tear and oftentimes inferior reflector mountings or impact resistance take their toll. Checking of bicycles at schools found that about one half of the bicycles did not have rear reflectors. This is a dangerous degree of deficiency and parents should take a look at the family bicycles and make corrections as soon as possible.

The use of an annual bike rodeo with a maintenance check as part of the agenda could assist in improving equipment safety. A combination of preventive maintenance, common sense and enforcement should reduce the number of bicycles traveling with deficient equipment in violation of the law.

Bicycle Court

Enforcement presupposes a system of laws and adjudication. The courts are utilized for processing citations of older bicyclists. However, there is a problem with treating young cyclists. Oftentimes the young rider who violates the law requires an additional educational experience as well as a reprimand. The Bicycle Court concept was developed to provide this experience rather than to totally rely on regular traffic citations that are processed in the Municipal or Juvenile Court.

Bicycle Court is not a criminal court, nor a court of record. It is an educational experience for cyclists from 10 to 17 years of age. For children under 10 years old, a letter is sent to the parents explaining the violation and requesting parental assistance to prevent accidents rather than requiring an appearance in Bicycle Court.

The purpose of the Bicycle Court is to impress upon juvenile bicycle operators a proper regard for the rules of the traffic safety and the property of others. It is believed that the experience they receive in connection with appearance before the Bicycle Court will be of real value to them as they grow older and graduate from bicycles to automobiles.

If instituted locally, the judges of the Bicycle Court could be selected from the high school students by faculty and student body representatives based upon scholastic ability and leadership. Typically, three judges take part in each Saturday Court session and they are charged with judging their peers and classmates. Violators appear before the Court and are asked to recount the circumstances of the violation. Judges ask questions and a police officer or police cadet are in attendance to clarify the law relating to the violation.

If the judges determine that the violator is guilty, then an appropriate penalty is dispensed. Typically, these could include obtaining a bicycle license, correcting equipment deficiencies, having parents take away the bicycle for a specified number of days, copying the applicable section of the bicycle ordinance a given number of times, writing an essay on the subject of the violation, or being given a verbal reprimand.

The Bicycle Court appears to have been worthwhile in other localities. Less than 5 percent of the violators make repeat appearances. High school students selected to conduct the Bicycle Court also benefit from the experience by conducting court procedures and being involved with the maturing responsibility of judgment.

Another suggestion from some communities has been to form police bicycle patrols. The belief is expressed that police officers do not

and need to be educated to broaden their perspective. It is suggested that this education could best be achieved by officers actually riding a bicycle. It would give bicycle routes more thorough enforcement than is currently available without causing problems in traffic flow.

Police bicyclists can also be effective in patrolling areas with burglary problems since a bicycle is quiet, unobtrusive and offers speed and flexibility not available by patrol cars in certain situations. Two local Oregon cities that have effectively used bicycle patrols are Redmond and Sisters. Seattle, Washington helped make bicycle patrol nationally known.

A bicycle patrol actually might be very useful when the Riverfront Trail is a reality. Patrol cars would have a difficult if not impossible time accessing the trail.

OPERATION AND MAINTENANCE

Maintenance Standards

It often seems easier to plan for and build a project than to maintain it. Yet, without the commitment to maintenance, bikeway projects can be a step backwards. Inevitable accumulations of debris along the road edges as well as surface deterioration renders bikeways unpleasant and dangerous. Unswept shoulders are one of the most common complaints from cyclists. Thick gravel, glass, rough overlays, and cracks force cyclists into the travel lane to find a smooth surface, which causes animosity in motorists who do not understand the dilemma.

A few of The Dalles' roads are in poor condition (see *Chapter 3: Recommendations*). The condition of other roads may vary due to seasonal sanding, flooding, and repair work. A regularly scheduled inspection and maintenance program is essential, and all road work should be performed with an understanding of how it affects cyclists. In particular, the following activities should be stressed.

Sweeping

Some road shoulders, primarily outside the downtown areas, are covered with gravel due to unpaved driveways and sanding of the roads during winter storms. Automobiles tend to sweep the debris into a thick layer on the shoulders.

Sweeping shoulders and bike lanes consistently is probably the single easiest step that can be taken to improve bicycling conditions. Although it may not be cost-effective to sweep every road frequently, several actions can improve the situation:

- Unmaintained bikeways are a major source of rider complaints and create safety problems.
- Regular sweeping of shoulders is the easiest and cheapest thing that can be done to improve cycling conditions.
- Maintainance should be included in the annual bikeway budget.

- Establish a seasonal, area-wide sweeping schedule and sweep high bicycle use areas after each major storm.
- Pave gravel driveways to the road right-of-way. This adds a small cost (about $200 plus material per driveway) to road construction and greatly benefits both bicyclists and residents.
- Publicize a phone number where cyclists can report glass and other hazards for immediate removal.

Vegetation Removal

Trees, shrubs, and other vegetation and their roots encroaching into and under the bikeway cause safety and maintenance problems: loss of clearance, reduced sight distance, debris, and pavement breakup. Pruning, mowing and leaf removal should be part of routine maintenance. New construction should employ 12-in root barriers where necessary.

Oiling and Chip Sealing

Attention should be given to maintaining the full pavement width and not allowing the edges to ravel or deteriorate. Because work that extends partially into the shoulder leave a dangerous, raised ridge, oiling and chip sealing should extend the full width or stop at the shoulder stripe. The preferred chip seal size is 3/8 in. to #10 or smaller for bike lanes and shoulder bikeways. All utility access points, manhole covers, and drainage grates should be raised to

match the new surface within 0.75 in. All edges should be feathered to provide a smooth transition from the lane to other surfaces.

Overlays and Patching

Spot maintenance work can degrade bikeways if care is not taken. Where the work is in the bikeway, a smooth surface with feathered edges is important. Ideally, the work should extend the entire width of the bikeway to avoid discontinuities parallel to the bicycle travel. When a grader blade is used, the last pass may leave a rough tire track in the patch, so either a smooth tire should be used or the area should be rolled.

Even work confined to the travel lanes can cause problems because loose asphalt often ends up in the bikeway where it adheres to the existing surface and creates a rough spot. Work should be compacted sufficiently and loose materials should be swept away before they become a problem. Leaving the work of flattening a patch to passing vehicles is dangerous to cyclists.

Widening and Restriping

Improvement and periodic restriping of roads present a excellent opportunity to improve cycling conditions. Bikeways should be resurfaced, as a minimum, to the same width as the existing pavement and, where possible, should be widened to standard.

Wide travel lanes can often be restriped to 11 or 12 ft to provide wider shoulders for bicyclists with no loss in automobile safety and movement (indeed, 11-ft lanes in urban areas are now recommended by many authorities to reduce vehicle speed on overdesigned roads). An extra foot in shoulder width can mean a lot to bicyclists' safety and pleasure. Many existing gravel shoulders have sufficient width and base to support shoulder bikeways. Minor excavation and the addition of 3 to 4 in. of asphalt is often all that is required. Care should be taken to avoid a joint at the edge of the existing pavement by feathering the new asphalt or creating a clean saw cut at the transition.

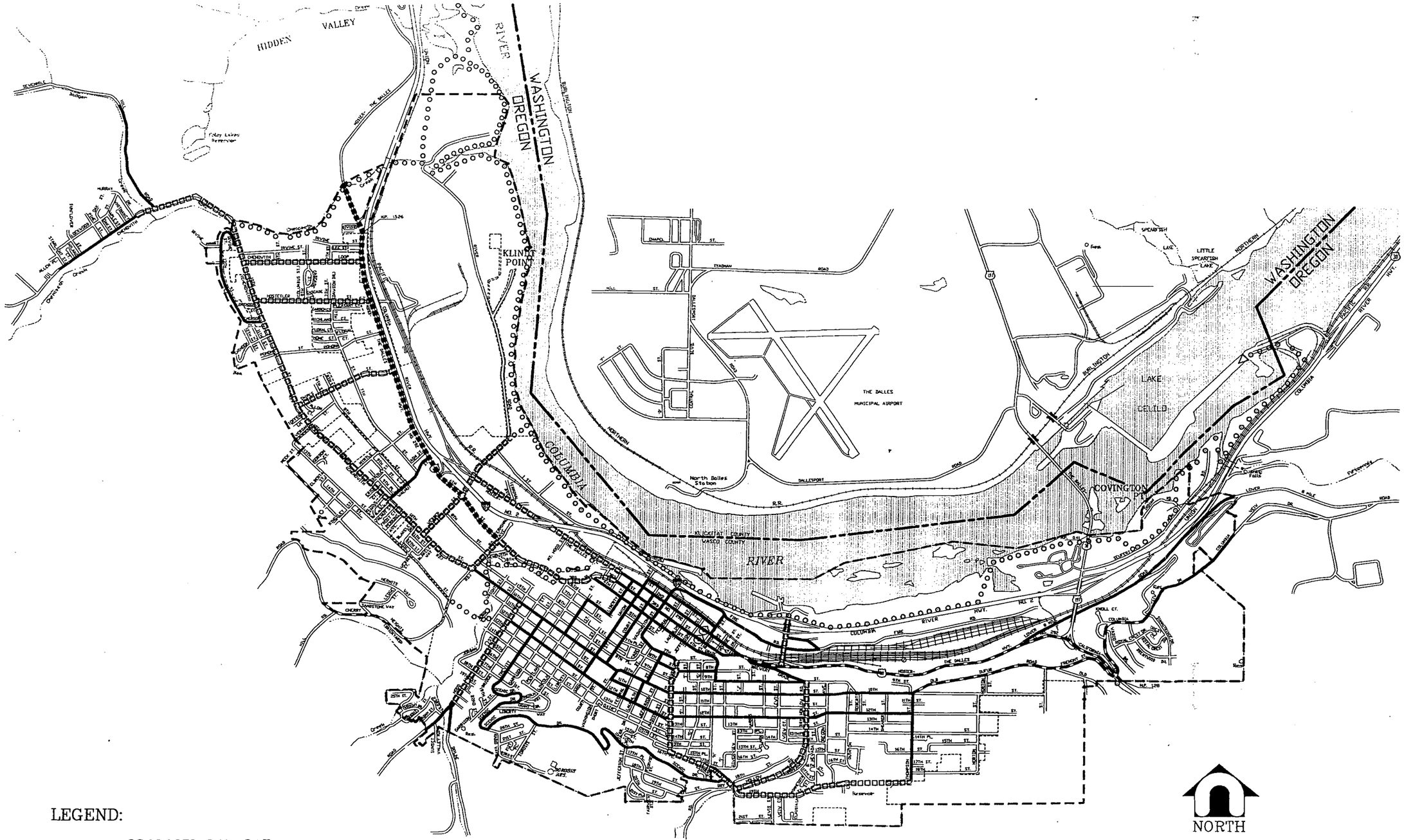
Four-lane arterials and collectors without bike lanes can often benefit from restriping to two lanes with outside bike lanes and a center turn lane. This has proven to increase safety and convenience for all users—motorists, bicyclists and pedestrians—while maintaining vehicle capacity.

Responsibility

The agencies responsible for the control, maintenance, and policing of bicycle facilities should be established prior to construction. The costs involved with the operation and maintenance should be considered and budgeted for when planning a facility. The State dedicates about 7.5 percent of its bicycle budget to maintenance.

Neglected maintenance will render bicycle facilities unrideable, and the facilities will become a liability to the community. Regular inspections should be scheduled. Bicyclists should be encouraged to report bicycle paths and roadways needing maintenance. A central contact person with authority to authorize maintenance work should be designated to receive such reports.

THE DALLES
BICYCLE MASTER PLAN



LEGEND:

- PROPOSED BIKE PATH
- EXISTING BIKE LANE
- PROPOSED BIKE LANE
- PROPOSED SHOULDER BIKEWAY
- SHARED ROADWAY

DAVID EVANS AND ASSOCIATES, INC
709 NW WALL STREET, SUITE 102
BEND, OREGON 97701 (503)389-7614

scale 1" = 2609.0' design
date 5/11/93 drawn JHL
file WASC0001 - WASC001A.DWG (717)

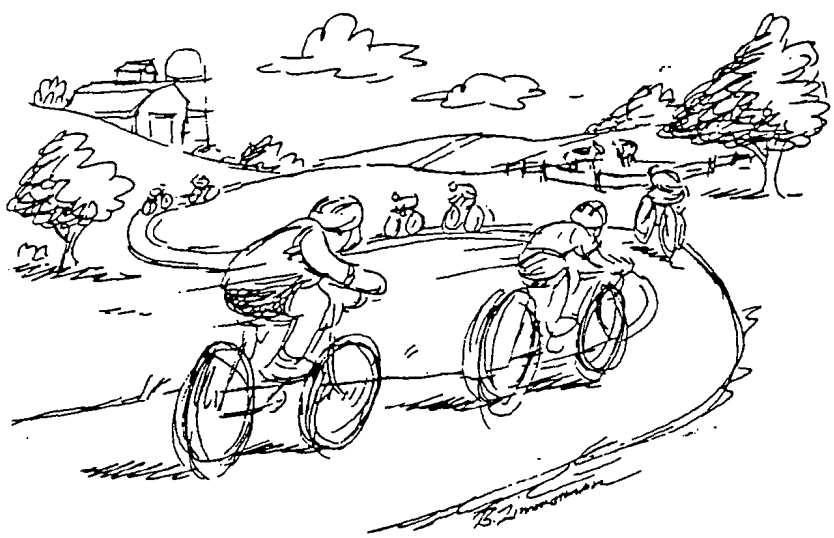
APPENDICES

A - Bike Survey Results

B - Model Bicycle Ordinances

Never doubt that a small group of thoughtful, committed citizens can change the world: Indeed, it's the only thing that ever has.

--Margaret Mead



August 16, 1990
Total Responses 81

BICYCLING SURVEY RESULTS

1. What type(s) of bicycling best describes you?

12	Commuter to/from work
7	Commuter to/from school
66	Recreational
16	Touring
44	Fitness

2. What type of bicycle do you ride?

4	1 speed	41	Mountain Bike
49	multi-geared	4	Other (specify) City bike, BMX 2-speed

3. How many times per week do you ride?

7	1	3	3-4	2	5-7
6	1-2	4	4	1	6
10	2	1	4-5	5	7
74	3	11	5	5	Other ("many", "21")

4. How many miles per week do you ride?

26	0 - 10	38	11 - 50	14	greater than 51

5. Do you feel that signed bike routes throughout The Dalles would be beneficial to riders? 71 Yes 4 No

6. If there were designated bike routes in The Dalles and surrounding area would you ride more often? 56 Yes 12 No

7. What specific barriers or difficulties to bicycling do you encounter?
See page 3.

8. How would you rate the W. 6th Street (west of Webber) bike lane for safety? Scale of 1 - 10. (10 = very dangerous)

2	1	4	6		
7	2	14	7		
6	3	8	8		
6	4	2	9		
17	5	2	10	1	9.56

a. If you do not feel W. 6th is a safe route, what factors make it unsafe?
See page 5

9. How safe would W. 6th Street be without a bike lane? (1 - 10 scale used in #8)

0	1	5	6	1	9.6
5	2	7	7	18	10
4	3	1	7-8		
2	4	10	8		
5	5	3	9		

10. How wide should a typical bike lane be along 10th Street west of Cherry Heights?

20	4 1/2 feet	48	6 feet	7	8 feet

11. When choosing a bike route, how important are the following factors in making your route selection?

(Scale: 1 = very important, 2 = important, 3 = considered, 4 = minimal consideration, 5 = not important)

	1	2	3	4	5
Width	20	27	13	9	4
Surface material	23	24	16	5	5
Terrain	15	14	29	8	6
Traffic volume	44	18	11	1	0
Parked cars	14	20	22	14	4
Driveways	4	7	17	30	15

12. Which of the following additional factors help determine your route? (1 - 5 scale used in #11)

	1	2	3	4	5
Safety	39	15	8	1	0
Difficulty of terrain (hills, etc.)	13	17	18	10	4
Directness of route	13	10	20	7	9
Attractiveness	13	13	17	11	6

[Lighting at Night]

13. Your age. See page 6.
14. Your sex See page 6.

7. What specific barriers or difficulties to bicycling do you encounter?

- Motorists whom are not aware of the goings on around them!
- Stop signs/lights - lack of clean, paved shoulder
- Gravel roads, roads without shoulders, bike lanes not kept clean/swept - glass ruins a bike lane.
- Car traffic - road width and surface
- Lack of safe space operating in traffic without established bike lane.
- Other drivers, I think that we should get the same rights as other people in cars.
- Hills - need flat areas for younger riders.
- Lack of local organized activities.
- Traffic - rough roads
- Lack of clean and clear shoulder space, lack of marked and signaled path areas.
- Bad roads, lots of gravel on W 6th bike lane
- Too many hills
- Glass on shoulders, shoulders are poorly maintained, W 3rd bridge is too narrow - sidewalk in poor condition - Kelly is dangerous.
- Rough (gravel road surfaces, glass on roads)
- Lack of highway shoulders. Lack of control over dogs. Drivers not being careful and giving bikes the right-of-way.
- No room for bicycles in downtown.
- Lack of shoulder width, or bike lane.
- Traffic and hills and wind.
- Narrow streets, hills, traffic.
- No bike lanes.
- No bike lanes, roads not wide enough, hills.
- Too narrow streets. Limited bicycle paths
- Too many cars parked, not enough room
- Guard rails
- Traffic, uneven road surfaces
- Slight curbs
- Narrow pavement - cracks, holes. Motorists who don't give any room
- Visibility
- Cross traffic, specifically egress/ingress perpendicular to travel route
- 6th Street Bridge, 6th & Terminal, and 6th & Webber
- Conflicts with cars -- "This road's not big enough for the two of us."
- Lack of designated bike parking downtown where bikes can be locked up.
- Finding good trails
- Traffic right-of-way -- Motorists jump out ahead so I wind up dashing across, in order to get where I need to be. We have to follow same right-of-way as cars!
- Many cyclists and drivers of cars do not know of or abide by bicycling safety rules, so I am always a bit nervous in traffic. Many unknowns.
- Disrespect from motorists, poorly marked bike routes in unsuitable locations.
- Dogs off leashes.

- Parked cars, inattentive drivers.
- Gravel left on streets too long in spring after snow and ice.
- Curbs and obnoxious drivers of cars.
- Narrow streets, roads. Need Columbia View Heights to downtown.
- Theft

8. How would you rate the W. 6th Street (west of Webber) bike lane for safety? Scale of 1 - 10. (10 = very dangerous)

a. If you do not feel W. 6th is a safe route, what factors make it unsafe?

- Unclean path -- too many driveways!
- Traffic entering from parking lot accesses looking for cars, not bikes.
- Traffic is the number one factor.
- Curb parking & cross traffic.
- The path is often unswept with glass and gravel along the path.
- Large gravel on path.
- Auto traffic crossing lane at whim. Parked car motorists opening car doors into bike lanes.
- Glass on shoulders, shoulders are poorly maintained.
- Cross traffic does not watch for bikes; gravel & pot holes; parking in bike lane.
- Good except for intersections...Webber & 6th especially.
- Competition with cars.
- Too much congestion
- Traffic - turn lane used incorrectly
- Other riders
- Too much business traffic from Cascade Square & Fred Meyer -- but it is unavoidable. Bikes should detour around, if necessary.
- Difference in speed coupled with narrowness of shoulder creates hazard.
- Too many cars, driveways. Rude drivers -- but usually it's o.k. Confusing lanes at 6th & Webber.
- Traffic -- no physical bike lane separation.
- It's a little too narrowed. Needs to be remarked.
- Too many cars, rude drivers, gravel pits on roadside and on road!
- Bike lane used by motorists.
- Make it wider.
- Not easy to see.
- Right turn lanes and bike path is confusing.
- Too much off and on traffic; very commercial.
- Car traffic: (a) turning to other streets; (b) riding bike between parked cars and traffic.

BICYCLE SURVEY

AGE	MALE	FEMALE
5		
6		
7		
8		
9	1	1
10		
11	2	1
12		1
13	1	
14		
15		
16		
17	2	
18	1	
19	3	1
20		
21	1	1
22		
23		1
24	1	
25	1	1
26	1	
27	2	2
28	2	3
29		
30		
31		
32	1	1
33	3	
34	1	
35	3	1
36	1	
37	3	
38	3	2
39	2	1
40		1
41	1	4
42	3	
43	1	
44	1	1
45	4	
46	1	
47	2	
48	1	
49	1	
50	1	

AGE	MALE	FEMALE
51		
52		
53		
54	1	
55	1	
56		
57		
58		
59		
60		
61		
62		
63		
64		
65		
66		
67	1	
68		
69		
70		