

TRANSPORTATION SYSTEM PLAN

City of Cascade Locks



November 2001

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INTRODUCTION

In the mid-1970s, Oregon adopted 19 statewide planning goals to be implemented through local comprehensive plans. The aim of Goal 12, Transportation, is "to provide and encourage a safe, convenient, and economic transportation system."

The City of Cascade Locks has updated the transportation element of their comprehensive plans according to the following guidelines set forth in Goal 12:

"A transportation plan shall (1) consider all modes of transportation including mass transit, air, water, pipeline, rail, highway, bicycle and pedestrian; (2) be based upon an inventory of local, regional, and state transportation needs; (3) consider the differences in social consequences that would result from utilizing differing combinations of transportation modes; (4) avoid principal reliance upon any one mode of transportation; (5) minimize adverse social, economic, and environmental impacts and costs; (6) conserve energy; (7) meet the needs of the transportation disadvantaged by improving transportation services; (8) facilitate the flow of goods and services so as to strengthen the local and regional economy; and (9) conform with local and regional comprehensive land use plans.

This Transportation System Plan (TSP) for the City of Cascade Locks will guide the management of existing transportation facilities and the design and implementation of transportation facilities for the next 20 years. This transportation system plan constitutes the transportation element of the city's comprehensive plan and satisfies the requirements of the Oregon Transportation Planning Rule.

PLANNING AREA

The Cascade Locks planning area includes the entire urban growth boundary as illustrated in Figure 1-1. This encompasses all the land east of MP 43.4 on I-84 (a mile or so south of the Bridge of the Gods), the land west of MP 47.1 on I-84, the land south of the Columbia River (including Thunder Island and the southern half of the Bridge of the Gods), and all land north of I-84 plus areas to south of the highway near Moody Avenue, Ruckel Street, the Cascade Locks Port of Entry, and the electric substation.

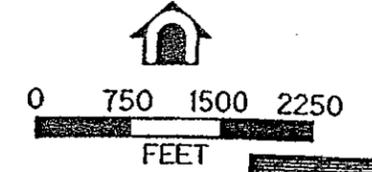
PLAN ORGANIZATION

The TSP was developed through technical analysis combined with input and review by the City of Cascade Locks, a technical advisory committee, a project management team, and the public. This TSP was prepared as part of a coordinated effort involving the Transportation Advisory Committee (TAC), the City of Cascade Locks, Hood River County, the City of Hood River, and the Oregon Department of Transportation (ODOT). Key elements of this TSP include:

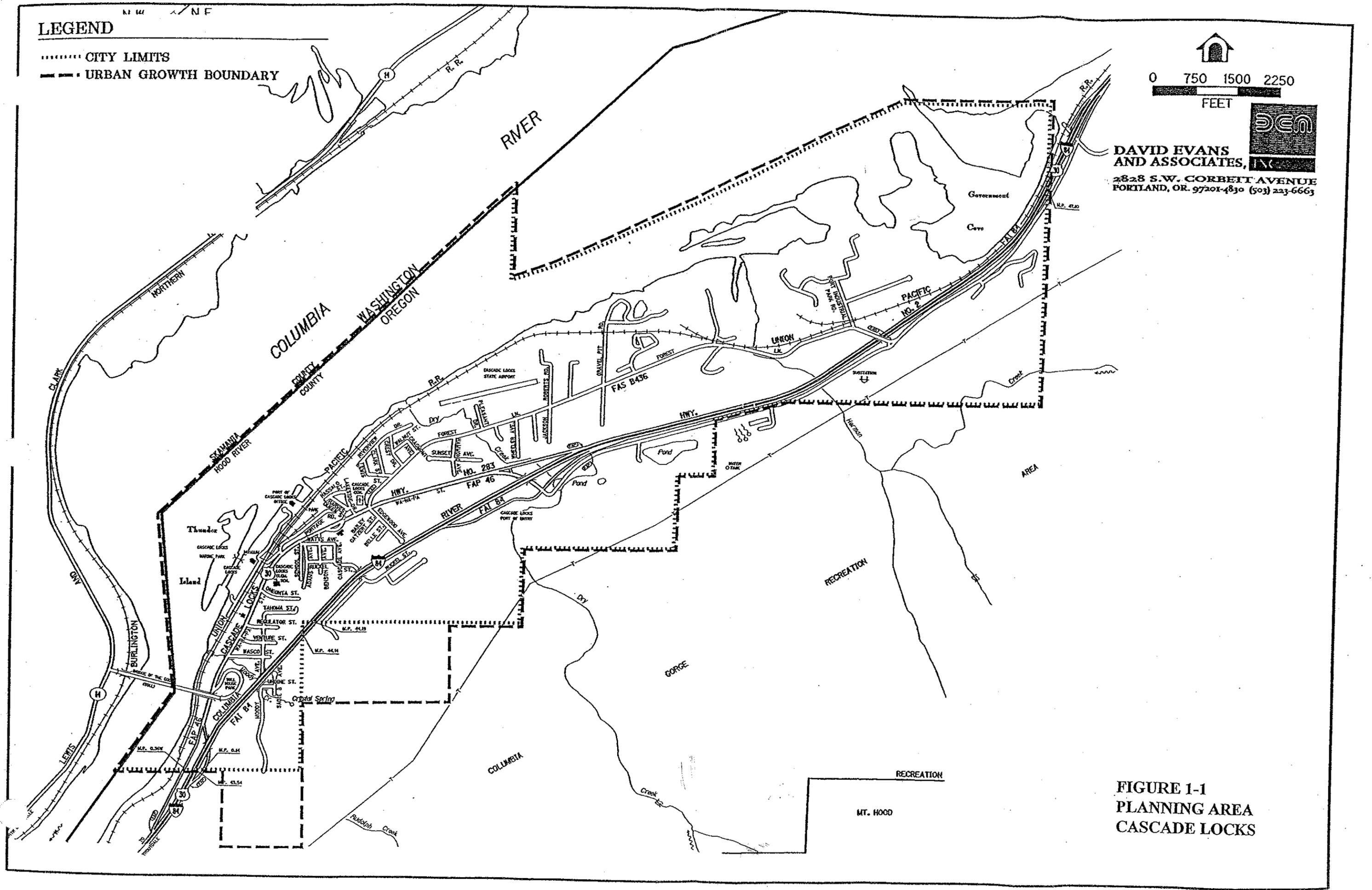
- Plans and Studies (Chapter 1)
- Community Involvement/Project Goals and Objectives (Chapter 2, Appendix A)
- Current Conditions (Chapter 3)
- Access Management (Chapter 4, Appendix B)
- Population/Employment and Traffic Forecasts (Chapter 5)
- Transportation Systems Plan (Chapter 6)
- Funding (Chapter 7)

LEGEND

- CITY LIMITS
- - - - - URBAN GROWTH BOUNDARY



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**FIGURE 1-1
PLANNING AREA
CASCADE LOCKS**

REVIEW OF EXISTING PLANS AND POLICIES

Chapter 1 provides an overview of the existing plans and policies that will impact or guide the decision making process for this Transportation Systems Plan. These include city, county, and state policies and plans.

COMMUNITY INVOLVEMENT/GOALS AND OBJECTIVES

Community involvement was an important part of developing the TSP. Interaction with the community was achieved by holding open community meetings and forming a Management Team and a TAC. The Management Team and the Advisory Committee included representatives from the City of Cascade Locks, Hood River County, the City of Hood River, ODOT, and the public. These two groups were formed to provide guidance to the consultant, review work products, and aid the city in making decisions regarding the TSP.

The open houses were held jointly in Cascade Locks and Hood River. One open house was held in each community and included discussion and inquiry about the countywide and community efforts. This enabled residents throughout the county to learn about and provide input on both rural and urban transportation issues. Through this process, both the county and the cities became better positioned to coordinate future transportation system projects.

Project goals, objectives, and implementation actions were developed for each jurisdiction early in the planning process by the Management Team and the Transportation Advisory Committee and reviewed by the general public. The goals and objectives were used to formulate and evaluate system improvements. The project goals and objectives are discussed in Chapter 2.

Review and Inventory of Existing Public Facilities and Conditions

To begin the planning process, existing plans and policies were reviewed and an inventory of public facilities was conducted. The purposes of these efforts were twofold. The review establishes the history of planning in the city, including how population and employment were projected and how those projections compare with current measurements, what street system improvements were planned and which were implemented, how other transportation facilities were planned and implemented, and how the county and the cities currently manage their ongoing development.

The inventory of existing facilities catalogs the current transportation system and identifies how that system currently operates. The results of the inventory are described in Chapter 3 (Current Transportation Conditions), while Chapter 6 (Transportation Improvement Projects) describes measures to address existing system deficiencies.

Access Management

Access management is a set of strategies to maintain acceptable levels of operation on the street networks in the future. These strategies and guidelines for implementation are described in Chapter 4.

Future Transportation System Demands

The Transportation Planning Rule requires the TSP to address a 20-year forecasting period. The 20-year travel forecasts were developed based on traffic volumes along the state highways and projections of population and employment. This process (described in greater detail in Chapter 5) provides a conservative estimate of the transportation needs of the City of Cascade Locks.

Transportation System Improvements

Based upon public and TAC input, and travel forecasting, this study identifies a series of roadway system improvement options. The first alternative evaluated was a "No-Build" system, which only used the existing street system plus any committed street system improvements. Capacity deficiencies for county highways were projected within the 20-year planning period. This "No-Build" option illustrated future capacity, safety, and access management problems. Improvement options to correct or mitigate these problems were identified. After comparing the options with the goals and objectives established at the beginning of the process and with criteria for determining the benefits and costs of each alternative, a number of transportation system improvements were identified. The specific transportation system improvements recommended for the TSP are detailed in Chapter 6.

Modal Plans and Implementation Program

The TSP addresses the following transportation modes: automobile, freight, bicycle, pedestrian, rail, transit (intercity and intracity), pipeline, and air. The street system plan was developed from the inventory, forecasting, and public input process described above. The bicycle and pedestrian plans were developed based on the requirements set forth by the Transportation Planning Rule and on public input. The public transportation, air, water, rail, and pipeline plans were developed based on existing plans and discussions with service providers. Road standards, access management guidelines, modal plans, and an implementation program are detailed in Chapter 6.

The city will implement the TSP through the following actions:

- Adopting a revised street standards resolution that includes the street standards described in this document and circulation standards that are consistent with state Goal 12, Transportation and the Transportation Planning Rule;
- Working to develop the transportation projects described in Chapters 6 and 7; and
- Requiring public street improvements related to new development that are consistent with the street standards noted in this document and the street standards resolution.

Funding

This chapter discusses project funding for the City of Cascade Locks. Since many of the selected improvement options are on or adjacent to state highways, the city will need to closely coordinate future funding with ODOT.

1. PLANS AND STUDIES

1.1 INTRODUCTION

Improvements recommended in the TSP will need to take into account relevant applicable plans and policies as well as previously approved projects. This section of the plan summarizes the major findings of recent plans and studies conducted in or affecting the study area. These documents can be broken into three categories: federal and statewide plans and studies, jurisdictional specific studies, and other related plans/studies.

1.2 PLANS AND STUDIES AFFECTING ALL JURISDICTIONS IN HOOD RIVER COUNTY

1.2.1 Federal and Statewide Plans and Studies

1.2.1.1 Transportation Equity Act for the 21st Century (TEA-21)

The Transportation Equity Act for the 21st Century (TEA-21) authorized highway, highway safety, transit and other surface transportation programs for federal fiscal years 1998-2003. Signed into law in June 1998, it replaces the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), the last major authorizing legislation for surface transportation.

TEA-21 builds on the initiatives established in ISTEA, emphasizing balanced investment in highways, transit, and intermodal projects, and allowing state and local governments flexibility in the use of federal funds. Funding through TEA-21 is targeted to improvements that help implement a region's transportation systems plan, enhance the multi-modal nature of the transportation system and meet local land use, economic, and environmental goals.

Federal funds authorized through TEA-21 will make up approximately one-third of Oregon's highway budget. The average federal funds available to state highway programs are approximately \$57.8 million per year. The actual amount that Oregon will receive depends on spending limitations placed by Congress and future gas tax receipts.

1.2.1.2 2000-2001 Statewide Transportation Improvement Program (STIP)

The Statewide Transportation Improvement Program (STIP) fulfills the requirements of TEA-21 and the Transportation Planning Rule (TPR) by providing a staged, statewide, intermodal program of transportation projects. The STIP is not a planning document, rather it is a project prioritization and scheduling document developed through various planning processes with local and regional agencies and transportation agencies. Projects listed in the document receive funding by ODOT.

1.2.1.3 The Oregon Transportation Plan (1999)

The Oregon Transportation Plan (OTP), identifies how the state will meet the transportation and land use requirements of the Oregon Statewide Planning Goals and TEA-21. It lays out planning and performance guidelines to help ensure that city and county plans are consistent with the state plan. (The TPR requires that local plans be consistent with the OTP.)

The OTP establishes standards for each mode of travel and minimum levels of service. Standards applying to Hood River County and the City of Cascade Locks include:

- Local public transit services and elderly and disadvantaged service providers should regularly connect with intercity passenger service. Intercity passenger service should be available for an incorporated city or groups of cities within five miles of one another having a combined population of over 2,500, and located 20 miles or more from the nearest Oregon city with a larger population and economy. Service should include a round-trip made within a day.
- Air service connections between Portland, or other West Coast hubs, and other areas of Oregon should be provided whenever commercially viable.
- Open access should be provided to and from all railroad facilities and to major ports.
- Bicycle and pedestrian networks should be developed and promoted in all urban areas to provide safe, direct, and convenient access to all major employment, shopping, educational, and recreational destinations in a manner that would double person trips by bicycle and walking.
- Secure and convenient bicycle storage available to the public should be provided at all major employment and shopping centers, park and ride lots, passenger terminals, and recreation destinations.

1.2.1.4 1999 Oregon Highway Plan

The Oregon Highway Plan (OHP) is one of the modal elements of the Oregon Transportation Plan. It outlines the current status of the highway system and standards for modernization, preservation, maintenance, bridge operations, and other programs. The plan projects growth trends and provides a vision for the future with policies and strategies to meet that vision. It also outlines specific policies to meet transportation needs including level of importance (LOI), access management, access Oregon highways (AOH), and truck load restrictions, as well as revenue requirements to meet needs from 1991 to 2019.

Inventory

The OTP identifies several transportation facilities of significance in Hood River County. Interstate 84 is classified as an interstate highway level of importance (LOI). As defined in the OHP, the function of an interstate highway is "to provide for safe and efficient high-speed, continuous-flow operation in urban and rural areas."

Interstate 84 is expected to operate at LOS C within urban and urbanizing areas and LOS B in rural areas (outside of urban growth boundaries and rural development centers).

Access Management

The Oregon Highway Plan establishes a policy for access management on the highway system. The access management categories for I-84 and US 30 are discussed in the Transportation System Plan (Chapter 6).

1.2.1.5 The Transportation Planning Rule

The Transportation Planning Rule (TPR), adopted by the Oregon Land Conservation and Development Commission (LCDC) in 1991, is implementing regulation of Statewide Planning Goal 12.

Among other things, the Transportation Planning Rule requires that cities, counties, metropolitan planning organizations, and state agencies prepare and adopt Transportation System Plans. A Transportation System Plan is "a plan for one or more facilities that is planned, developed, operated, and maintained in a coordinated manner to supply continuity of movement between modes, and within and between geographic and jurisdictional areas."

The goal of the TPR is to encourage a multimodal transportation network throughout the state that will reduce reliance on the automobile and ensure that local, state, and regional transportation systems "support a pattern of travel and land use in urban areas which will avoid the air pollution, traffic, and livability problems faced by other areas of the country."

TPR requirements vary based on population size and geographic location of each jurisdiction. The County of Hood River is responsible for creating a regional transportation plan for the area that is consistent with adopted elements of the OTP, while the City of Hood River is required to prepare a transportation system plan as part of its comprehensive plan that is consistent with the county's regional transportation system plan.

The City of Cascade Locks falls into the jurisdictional category of an urban area with a population less than 2,500. Therefore, the following six plan elements are required for the City of Cascade Locks to satisfy the TPR.

1. A determination of transportation needs.
2. A street system plan for a network of arterial and collector roadways.
3. A public transportation plan.
4. A bicycle and pedestrian plan.
5. An air, rail, water, and pipeline plan.
6. Policies and land use regulations for implementing the transportation system plan.

The TPR states that its intent is not to duplicate or to supplant existing applicable transportation plans and programs. The jurisdictions may incorporate existing plans into their transportation system plans to meet some or all of the rules' requirements.

1.2.1.6 Oregon Benchmarks

The State of Oregon has set measures to assess how well it is attaining its goals of developing an outstanding quality of life; exceptional people; and a diverse, robust economy. Each of the benchmarks listed have a goal that is to be attained by the year 2010. A number of these benchmarks affect transportation.

The urban mobility benchmark sets the goal of increasing the percentage of Oregonians commuting during peak hours by means other than single-occupancy automobiles to 60 percent. The air quality benchmark is measured by the percentage of Oregonians living where the air meets government ambient air quality standards. Its goal is for 100 percent of the population to live where the air meets these standards. Livability benchmarks call for 88 percent of Oregonians to be commuting (one-way) between work and home within 30 minutes; the percent of limited access highways in urban areas not heavily congested during peak hours to increase to 60 percent; and the transit hours per capita per year in metropolitan areas to increase to 1.7 hours. Also, economic prosperity benchmarks pertaining to Hood River County call for the percentage of Oregonians living within 50 miles of an airport with daily

scheduled air passenger service to increase to 75 percent; and the backlog of city, county, and state roads and bridges in need of repair and preservation to be reduced to five percent.

1.2.1.7 Oregon Bicycle and Pedestrian Plan (June 1995)

The Oregon Bicycle and Pedestrian Plan, an element of the Oregon Transportation Plan, provides direction for establishing efficient and interconnected bicycle and pedestrian facilities on state, county, and city transportation systems. The plan is divided into two sections. Section One establishes policies and implementation strategies, while Section Two presents design, maintenance, and safety information.

The plan envisions Oregon developing "a transportation system where walking and bicycling are safe and convenient transportation modes for urban trips." Its primary goal is "to provide safe, accessible, and convenient bicycling and walking facilities and to support and encourage increased levels of bicycling and walking."

1.2.1.8 Oregon Rail Passenger Policy and Plan (1992)

The Oregon Rail Passenger Policy and Plan (ORPP) is a comprehensive long-range plan for rail passenger service prepared in coordination with the OTP. The ORPP provides detailed strategies for the rail passenger mode and policies based upon OTP rail policies. The ORPP was created to meet the requirements of Senate Bill 763 which states that ODOT "shall develop and maintain a state transportation policy for railroad passenger service and a comprehensive, long-range plan for railroad passenger service...." It is the policy of the State of Oregon to support intercity rail passenger service as part of a balanced transportation system. According to the ORPP, the rail passenger system "shall operate efficiently, be reliable, provide access to all potential users, and comply with state environmental and land use standards." It will also have convenient connections with all other modes of transportation.

The ORPP specifies the Union Pacific (UP) mainline, which runs along the Columbia Gorge through Hood River County, as a corridor of statewide significance warranting further study. This is because it contains cities with populations greater than 2,500 (Hood River). According to the Multimodal System Element of the OTP, cities with populations over 2,500 are required to have at least one daily round-trip to the nearest city of higher importance.

1.2.1.9 Oregon Transportation Safety Action Plan (1995)

The Oregon Transportation Safety Action Plan (OTSAP) was developed as the safety element of the Oregon Transportation Plan and is considered part of the Statewide Transportation Plan. It is one of several modal or multimodal plans called for in the OTP that defines in greater detail system improvements and legislative and financial needs. The OTSAP lists 70 actions that could be taken to improve Oregon transportation safety. Of these key actions, 11 were identified to reduce transportation-related deaths and injuries. These key actions are intended to be implemented by the year 2000.

1.2.1.10 State of Oregon Continuous Aviation System Plan Draft

The Draft Oregon Continuous Aviation System Plan outlines the roles of Oregon's system airports and evaluates their adequacy to meet the state's economic development needs.

The plan defines the Cascade Locks State Airport. The Cascade Locks State Airport is a Level 4 airport. Level 4 airports support the system through community, remote, emergency, and US government access; accommodate agricultural business, recreation/tourism, or commercial aviation-related businesses, or support the Portland Metropolitan Area Airport System; and are non-NPIAS (National Plan of Integrated Airport Users) and public-use.

The Oregon Continuous Aviation System Plan also projects the level of operations for each state system airport. It projects constant activity for the Cascade Locks State Airport with operations remaining at 1,100 per year through 2014, and the airport maintaining a Level 4 significance.

1.2.1.11 Historic Columbia River Highway Master Plan

The Master Plan for the Historic Columbia River Highway (HCRH) provides direction for the rehabilitation of the highway and the construction of connecting trails along the abandoned sections. The highway, constructed from 1913 to 1922, originally ran from Portland to The Dalles. Much of the original highway in Hood River County was abandoned or destroyed when I-84 was built. Many short, discontinuous segments still remain parallel to I-84 in various stages of disrepair. The HCRH (defined in ORS 366.550) exists as city streets through Cascade Locks. In Cascade Locks, it is Wa-Na-Pa Street and Forest Lane Roads.

1.2.1.12 Management Plan for the Columbia River Gorge National Scenic Area

The Management Plan for the Columbia River Gorge National Scenic Area (NSA) was prepared to ensure that land within the National Scenic Area is used consistently with the purposes and standards of the Columbia River Gorge National Scenic Area Act. The Act divides the gorge into three distinct categories: Special Management Area (SMA), General Management Area (GMA), and Urban Areas. The land within the SMA and GMA are managed to maintain the scenic, natural, cultural, and recreational resources. Urban Areas (including Cascade Locks) are exempt from Scenic Area requirements.

1.2.1.13 Intelligent Transportation System Study (I-84 Portland to Boise)

The Federal Highway Administration and Oregon, Washington, and Idaho Transportation Departments conducted a study to determine how the use of Intelligent Transportation System (ITS) technology could improve service in the Interstate 84 corridor from Portland to Boise. The study evaluated the benefits of using available technologies like electronic traffic signs to alert drivers to accidents, road closures, and adverse weather conditions on the highway. It also looks at transportation on a corridor basis including alternate highways (SR 14 in Washington), the Columbia River, and both railroads (Union Pacific and Burlington Northern).

1.3 PLANS FOR THE CITY OF CASCADE LOCKS

1.3.1 City of Cascade Locks Comprehensive Plan (May 2001)

The Comprehensive Plan is a statement of official long-range policy for the City of Cascade Locks. The Plan is organized in two parts with the first containing the goals, policies, and implementation strategies. The Plan goal calls for the city "to provide safe, convenient, and economical transportation opportunities for all Cascade Locks residents and businesses as provided in the Cascade Locks Transportation System Plan". The second part of the Plan provides background information to support the goals. The goals, policies, and implementation strategies in Chapter 2 of this document are incorporated as part of the Cascade Locks Comprehensive Plan.

The plan allocates land use designations for the entire area inside the urban growth boundary (corporate limits and unincorporated areas alike). Since the county is responsible for all unincorporated regions, the designations for these areas will only take effect following annexation into the City.

1.3.2 City of Cascade Locks Design Handbook for a Downtown Street Theme (September 1992)

The Design Handbook is an overall guide for the city to develop and redevelop with a strategy of accentuating the unique attributes and qualities that will make the downtown "a more pleasant experience for residents and visitors." The guidelines in the handbook have not yet been integrated into the Comprehensive Plan or the zoning code and are not therefore mandatory.

Guidelines which affect the transportation system include:

- Create and/or enhance the views of the surrounding area from downtown for motorists and pedestrians.
- Establish a more friendly pedestrian/bicycling environment that will reduce the impact of automobiles. This would involve providing bike lanes on both sides of Wa-Na-Pa Street (portion of US 30 through Cascade Locks), increasing the street's sidewalk widths to 12 feet, narrowing its lane widths, as well as improving circulation by adding walking loops within downtown and out to the locks, and developing more clearly defined crosswalks. Finally, this plan calls for limiting vehicular access onto Wa-Na-Pa Street.
- Accommodate parking needs for autos, trucks, and buses in a manner that is screened from view.

1.3.3 Resource Team Report for Cascade Locks, Oregon (October 1998)

This report provided some additional concepts to the handbook for the design of the downtown. The primary elements include:

- Design of public spaces.
- Business infill and mix.
- Image and marketing.
- Potential project funding sources.

The report proposes a different Wa Na Pa Street cross section than the handbook. A recommended street tree list is provided.

1.3.4 Cascade Locks Housing Study (September 1997)

This study was undertaken to better understand the factors which affect housing supply and availability for all income levels in Cascade Locks and to develop a program to improve the quantity and quality of housing opportunities for city residents. Background information for the report indicated that there was approximately 493 acres of undeveloped residential land are located in the city with a reasonable potential for over 800 homes, which could accommodate more than 2,000 new residents if completely developed.

1.3.5 Cascade Locks Street Design Standards

The city has a two-tier street classification system including "commercial" streets (those serving high density residential development or business areas) and "residential" streets (those serving low density and low traffic flow areas).

The following standards are required except in special circumstances:

Two-Way Street Standard City of Cascade Locks		
Standard	Commercial	Residential
Roadway Width	40 feet	44 feet
Pavement Width	24 feet	24 feet
Curb Type	A, B, C	none
Sidewalks	4 feet	none
Minimum Base Rock Thickness	6 inches	6 inches
Minimum Surface Rock Thickness	2 inches	2 inches
Minimum Asphaltic or Oil Mat Thickness	2 inches	2 inches
Shoulders	none	2 feet wide gravel
Ditches	none	yes
Parking	none	none

One-Way Street Standards City of Cascade Locks		
Standard	Commercial	Residential
Roadway Width	32 feet	32 feet
Pavement Width	16 feet	12 feet
Curb Type	A, B, C	none
Sidewalks (when required)	4 feet	none
Minimum Base Rock Thickness	6 inches	6 inches
Minimum Surface Rock Thickness	2 inches	2 inches
Minimum Asphaltic or Oil Mat Thickness	2 inches	2 inches
Shoulders	none	2 feet wide gravel
Ditches	none	yes
Parking	none	none

1.3.6 Comprehensive Economic Development Plan for the City of Cascade Locks (1995)

The Comprehensive Economic Development Plan contains a community description, a vision statement describing how the citizen Action Team would like its community to develop, a community assessment, goals and objectives, top priority projects, criteria and standards to evaluate potential projects, a work force analysis, economic assistance opportunities, a description of city and port district roles in economic development, and a comparison of economic conditions for the County of Hood River and the city.

One of the plan's goals is to create better transportation and visual access to the business area. Objectives to achieve the goal include: providing an interstate interchange for the Forest Lane route with a new rest stop; constructing a belt-line road; providing shuttle service from the airport; increasing the viewing opportunities to the city and the bridge from the interstate; creating a covered walkway from the

riverside park area to downtown; adding informational signs on the interstate; and improving relations and cooperation between the city and the railroad. Another goal is to improve and enhance all aspects of the city's infrastructure including roads, sewer, water, and electrical. An objective of this goal is to build a railroad crossing for access to Government Island.

Top priority projects listed were building an emergency services building and a water storage reservoir. No transportation projects were listed as top priority for the city.

1.3.7 Findings of Compliance with Statewide Planning Goals and Acknowledged Plan Policies

As a result of reviewing and comparing the plans and studies with this TSP for the City of Cascade Locks, it was found that this TSP couples with the statewide goals and acknowledged plan policies.

2. COMMUNITY INVOLVEMENT/GOALS AND OBJECTIVES

2.1 INTRODUCTION

This document identifies goals, objectives, and implementation actions for the City of Cascade Locks TSP. These TSP elements are derived, for the most part, from objectives identified for the Hood River Transportation. That plan is a cooperative effort of ODOT, the cities of Hood River and Cascade Locks, and Hood River County to prepare a countywide transportation plan. The objectives in that plan were developed by a project management team, consisting of ODOT and local government staff and consultants, and by a Technical Advisory Committee (TAC) consisting of key stakeholders.

Separate goals, objectives and implementation actions have been prepared for the City of Hood River and Hood River County transportation system plans. In addition, long-term management objectives for the Hood River-Mt. Hood Summit (OR 35) Corridor have been established in an Interim Corridor Strategy.

2.2 ROLE/FUNCTIONS

The City of Cascade Locks transportation system includes local streets, a portion of the Historic Columbia River Highway (US 30 west through downtown and Forest Lane to the eastern city limit), the Cascade Locks State Airport, and the Port of Cascade Locks. Key functions include:

- Access to and from I-84;
- Connection between I-84 and SR 14 via the Bridge of the Gods;
- Port-of-Entry; and
- Access to tourist and recreation facilities, e.g., locks and excursion boats.

2.3 ASSUMPTIONS

A number of assumptions are made related to other planning efforts, use of the transportation system, and other factors. These assumptions, which are not repeated as goals, objectives, or implementation actions, include:

- Standard levels of roadway maintenance and repair.
- Increasing recreational use of the transportation system, including bicycle and pedestrian traffic.
- Environmental constraints to highway improvements.
- Establishment of management direction for the Historic Columbia River Highway (HCRH) through the HCRH Master Plan.
- Limitation on new road construction to "local" and not state roads.
- Development of an additional I-84 rest area at the ODOT sandshed or Forest Lane area.
- No I-84 capacity improvements except for interchange improvements where warranted.

2.4 COMMUNITY AND AGENCY INVOLVEMENT

The City of Cascade Locks TSP has been developed with the active participation of local governments in the county, transportation and other stakeholder groups, and the general public. These participants have been involved in development of the plan through the following mechanisms.

2.4.1 Project Management Team

The Project Management Team (PMT) is composed of local government and ODOT staff representatives and transportation planning and public involvement consultants. The 10-member PMT serves as the project staff, developing draft products for Technical Advisory Committee and local government review and approval.

2.4.2 Technical Advisory Committee

The Technical Advisory Committee (TAC) is composed of representatives of the City of Cascade Locks, the Confederated Tribes of the Warm Springs Reservation, the ports and other local governments within the county, other transportation service providers in the county, and key stakeholder groups. The 35-member group serves as a review and steering committee for development of the Transportation Plan. It has met eight times since initiation of the planning process in October 1995.

2.4.3 Issues Survey

A survey of transportation interest groups and other parties was distributed in October 1995 to solicit input on issues to be addressed in the Plan. This survey and other information about the planning process was also distributed at the October 1995 Hood River Harvest Festival.

2.4.4 Project Newsletters

A newsletter update on the Transportation Plan was widely distributed in September 1996. The newsletter provided notice of open houses to be conducted on the Plan and solicited input through a questionnaire on key objectives drafted by the TAC. (A report on questionnaire responses is included as Appendix A).

2.4.5 Open Houses

As part of the Goals and Objectives development phase of the City of Cascade Locks Transportation System Plan, public open houses were held in September 1996.

The purpose of the open houses was to disseminate information on the transportation planning process and to solicit public input on preliminary goals, objectives and implementation actions to be addressed in the Transportation Systems Plan (TSP) for the City of Cascade Locks. The open houses were advertised through a September 1996 newsletter, press releases, public service announcements and paid advertisements in the *Hood River News*. Prior to adopting the TSP, the city held a public open house and a Planning Commission hearing in October 2001, followed by a public hearing before the City Council in November 2001.

Activities included:

- Live/work map – using dots, attendees indicated where they lived and worked;
- Storyboards on the transportation planning processes and schedule;
- Prioritization of key objectives – using dots, participants prioritized key objectives and identified additional objectives that should be prioritized;
- Site-specific transportation issues and improvements – participants identified site-specific issues and transportation system improvements on maps of the City of Cascade Locks;
- Cascade Locks Comprehensive Plan Amendment Project – participants reviewed and made comments on a Vision Statement and Preferred Alternative, including citywide objectives and objectives for specific areas within the city; and
- Miscellaneous questions.

2.4.6 Agency Review

The Issues and Objectives component of the plan, as well as a preliminary draft Plan, were reviewed by ODOT headquarters and regional staff and by two statewide groups established by ODOT to provide input on the agency's corridor planning process – the Statewide Agency Coordinating Committee and the Statewide Stakeholder's Group.

2.4.7 Other

Information on the planning process has also been distributed and input on draft plan products solicited through briefings with local government officials, interest groups, and local community planning organizations.

2.5 GOALS, POLICIES, AND IMPLEMENTATION STRATEGIES FOR THE CITY OF CASCADE LOCKS

2.5.1 Goal A. Transportation Balance

Design a balanced transportation system that maximizes the efficiency of the existing system, provides transportation options at appropriate minimum service standards, reduces reliance on the single occupant automobile where other modes or choices can be made available, takes advantage of the inherent efficiencies of each mode, and provides safe, convenient and economical transportation opportunities for all Cascades Locks residents and businesses.

A1. Automobile

Policies

- Improve traffic circulation and safety throughout the city.
- Develop and improve the city's street system by connecting all important destinations in a manner which is compatible with nearby land uses.
- Provide convenient access and adequate parking to support downtown commercial and service centers.

- Develop and improve the city's transportation system to provide multimodal links between all important destinations on either side of I-84.
- Require new development to provide street improvements in a manner that is commensurate with its related traffic impacts.

Implementation Strategies

- Establish a network of arterials, collectors and local streets that are interconnected, appropriately spaced to meet needs, and minimize out-of-direction travel.
- Adopt standards that are appropriate for arterial, collector, and local streets and apply these standards to future street improvement projects.
- Develop an interconnected system of streets to serve existing and planned development.
- Accommodate increased tourist traffic through better access to attractors, improved signage, and other measures.
- Develop a non-remonstrance agreement policy.

A2. *Bicyclists and Pedestrians*

Policies

- Provide a network of safe and convenient bicycle and pedestrian facilities linking activity centers and connecting to a countywide system.
- Provide properly designed facilities for bicyclists and pedestrians.
- Require new development to provide appropriate facilities for bicyclists and pedestrians.

Implementation Strategies

- Amend the city street improvement standards to address needs for pedestrians and bicyclists.
- Work with the Oregon Department of Transportation (ODOT) to implement the Downtown Street Theme.
- Recognize both local and through travel needs in designing bicycle and pedestrian facilities.
- Improve signing of bikeways, particularly destination signing.
- Add or improve bike lanes or widen shoulders as part of improvements to the roadway system.
- Provide bicycle lanes on the routes shown in Figure 6-1.
- At a minimum, provide unobstructed six-foot sidewalks on both sides of Wa Na Pa Street along with convenient and safe pedestrian crossings. In residential areas, provide at least five-foot sidewalks on one or both sides of local streets whenever practical.
- At a minimum, provide unobstructed six-foot sidewalks on one or both sides of the routes shown in Figure 6-1.
- When bicycle lanes or sidewalks are not feasible along the routes shown in Figure 6-1, provide five-foot paved shoulders to accommodate bicycling and walking.

- Provide connections to local bicycle and hiking systems where feasible.
- Develop a direct pedestrian connection between Marine Park and downtown.
- Continue the Historic Columbia River Highway pedestrian and bicycle system through the city.
- To the extent feasible, utilize pipeline and utility easements as bicycle and pedestrian pathways and wildlife corridors.
- Improve lighting of pedestrian crossings.
- Develop an interconnected pedestrian system that includes the Pacific Crest Trail, HCRH, and Chinook Trail (loop hiking trail).
- Investigate alternative funding sources, use of volunteer groups, and other methods for off-highway bikeway maintenance.

A3. Public Transit

Policies

- Promote the increased use of transit as an alternative to automobiles and to serve the transportation disadvantaged.
- Work with public, non-profit, and private agencies and organizations to develop improved transportation opportunities for disadvantaged individuals in the community.
- Encourage housing and services to be located close together to improve transportation convenience and efficiency.

Implementation Strategies

- Ensure the continuity of transit services. Encourage stops in Cascade Locks.
- Utilize transit as a primary means to ensure transportation accessibility for the transportation disadvantaged.
- Work with Greyhound and Grayline to provide regular bus service.
- Work with CAT – Columbia Area Transit to provide service to Hood River and Portland.
- Work with other transportation companies, such as Columbia Gorge Tours and the airport shuttle to provide improved transportation services.
- Incorporate transit service needs in land use decisions.
- Investigate opportunities to provide shuttle services to ski areas.
- Establish a multi-modal transportation center.
- Develop “Park and Ride” and “Park and Pool” lots and additional bus stops and shelters.

A4. Rail Service

Policies

- Encourage continued rail service for freight.
- Support the return of rail passenger service.

- Ensure interconnection of rail with other modes.

Implementation Strategies

- Make infrastructure improvements (railroad, streets, utilities, etc.) to enhance the investment climate for rail users.
- Upgrade rail crossings in conjunction with other roadway improvements.
- Maintain historic access points across the railroad to the river and to recreation sites; develop additional formal crossings to allow recreational access to the Columbia River.
- Promote excursion tourism uses on Union Pacific, with connections to the Washington side of the Gorge.
- Explore opportunities for dedicated service to ski areas from Portland via railroad/buses.
- Consistent with environmental constraints, promote double-tracking of Union Pacific sections to provide more capacity.

A5. Truck Freight

Policy

- Accommodate needed truck movements in the design of the city's street system.

Implementation Strategies

- To the extent feasible, separate local truck traffic from through traffic.
- Investigate methods to reduce truck speeding on US 30 and Forest Lane through the city.
- Improve truck access to industrial sites, including turn and acceleration/deceleration lanes where appropriate.
- Review and modify if needed, the current hazardous materials response program. Identify potentially unsafe locations (e.g., access/egress points to industrial sites) and develop necessary improvements to accommodate customary freight transport needs.

A6. Water Transport/Ports

Policies

- Assess opportunities for increased water transportation.
- Improve access by all modes to port facilities.

Implementation Strategies

- Identify means to reduce conflicts among commercial and recreational waterway users.
- Develop transit connections from the waterfront to downtown.

A7. Other Modes (e.g., air service, pipelines, telecommunications)

Policy

- Promote transportation modes that reduce the reliance upon automobiles as the primary transportation mode.

Implementation Strategies

- Develop improved emergency landing facilities.
- Encourage the Port to develop aircraft refueling facilities.
- Encourage private airport shuttle service to Portland.
- Accommodate pipelines in highway rights-of-way.
- Promote telecommunication technologies and programs that reduce vehicle miles traveled.
- Consolidate telecommunications facilities to reduce the number of towers and visual impacts.
- Coordinate the installation of fiber optics with highway improvements.

2.5.2 Goal B. Regional Connectivity

Provide a transportation system with connectivity among modes within and between all areas of the city and with ease of transfer among modes and between local and state transportation systems.

Policies

- In lieu of major capacity expansions, strive to maintain existing travel times for both autos and freight through high levels of facility management (acceleration/deceleration lanes, turn refuges, and access management).
- Provide an interconnected network of local streets.
- Provide an interconnected network of pedestrian facilities.

Implementation Strategies

- Establish travel times compatible with the promotion of compact, pedestrian friendly "Main Streets".
- Promote use of parallel routes to reduce reliance on state facilities for local trips.
- Improve existing I-84 interchanges as needed to promote the efficient movement of goods and people, e.g., eastbound on and off ramps to Cascade Locks at same interchange.
- Improve/expand signage to inform travelers of route choices available.

2.5.3 Goal C. Highway Congestion

Define minimum levels of service and assure balanced, multimodal accessibility to existing and new development to achieve the goal of a compact, highly livable city.

Policy

- Adopt access management categories, consistent with existing or planned adjacent land uses, to reduce congestion and intermodal conflicts.

Implementation Strategies

- Ensure consistency in street classifications, and speed and access standards with other jurisdictions in the county.
- Develop parallel streets (e.g., south side of I-84) to redirect truck traffic off OR 30.
- Achieve LOS C or better on all collectors and arterials.
- Improve traffic signalization to improve safety and livability.
- Investigate signalization on US 30 in downtown Cascade Locks to address congestion.
- Address conflicts between pedestrians, commercial uses, and through traffic in downtown Cascade Locks (US 30) by providing sidewalk and street crossing improvements in coordination with ODOT.

2.5.4 Goal D. Roadway Conditions

Ensure adequate roadway conditions to meet goals regarding accessibility, levels of service and reduced congestion.

Policy

- Maintain existing facilities as the highest priority for the allocation of resources.

Implementation Strategies

- Preserve the roadway by investing in roadbed and pavement reconstruction as needed to minimize maintenance costs.
- Maintain roadway surface conditions at 90 percent fair/better by the year 2010.
- Ensure that speed limits are coordinated with roadway geometry and congestion.
- Improve intersections with limited sight distances by realignment and other means.
- Target realignment and widening to sections with above average accident rates and to sections with high congestion rates where there is a favorable cost/benefit ratio.
- In the short term, target pavement of substandard shoulders to "easy fix"/low cost area.
- Strengthen enforcement of speed and weight restrictions to extend roadway longevity.
- Upgrade substandard guard rails and shoulders.
- Address drainage problems including those that affect the function and condition of the roadway; water ponding; lack of drainage systems for older highway sections; and drainage from I-84, US 30 and other state, county, and city facilities onto private property.
- Require mitigation for storm runoff with new developments.

2.5.5 Goal E. Safety

Integrate safety as a primary consideration in the design, improvement and maintenance of the transportation system.

Policy

- Identify and implement measures to enhance transportation user safety.

Implementation Strategies

- Target improvements to highway sections with above average accident rates.
- Apply facility management techniques, including access management, to improve safety in congested areas.
- Promote cooperative enforcement among police and sheriff offices and target enforcement activities to high-accident locations.
- Improve lighting at key locations and maintain delineation (e.g., fog lines, reflector buttons) to be highly visible.
- Install safety barriers, e.g., guard rails, gabions, in high hazard locations to meet highway safety standards.
- Investigate the need for improvements (in addition to stop signs) to address poor sight distances at the Port of Entry/I-84 intersection.
- Review and modify if needed, the current hazardous materials response program. Identify potentially unsafe locations (e.g., access/egress points to industrial sites) and develop necessary improvements to accommodate customary freight transport needs.
- Improve bicycle/pedestrian facilities.

2.5.6 Goal F. Environmental and Energy Impacts

Avoid effects to the natural and built environments in the design, construction and operation of the transportation system. Where adverse effects cannot be avoided, minimize or mitigate their effect on the environment.

Policies

- As part of transportation improvement projects, seek opportunities to rectify negative impacts to previously impacted scenic and natural resources.
- Avoid transportation system improvement impacts to identified scenic resources and sensitive natural areas.

Implementation Strategies

- Where feasible, transportation system improvements shall be designed to avoid unnecessary removal of significant vegetation.

- When vegetation must be removed to accommodate transportation system improvements, reasonable efforts will be made to mitigate this impact by planting trees, ground cover, and/or other appropriate vegetation in the area affected by construction.
- Remove and prohibit scenic intrusions such as billboards. Investigate alternatives to billboards, e.g., Oregon Tourism Alliance and Travel Information Council travel information programs.
- Identify and construct additional roadside turnoffs at scenic viewpoints.
- Improve signing of existing attractions.
- Develop protection measures for identified scenic resources.
- Promote the marketing of the Mt. Hood Loop and other tour routes within the county.
- Design for aesthetics in the siting of telecommunications towers.
- Use vegetation management practices, e.g. thinning, to improve visual access to Cascade Locks and to the Columbia River.
- Implement recommendations on road improvement and maintenance practices from the Governor's Salmon Recovery Plan.
- Modify/remove barriers to fish passage as part of road maintenance and improvements projects.
- Promote more energy-efficient freight movement by rail and water.
- Promote the use of alternative fuels.
- Design roadway improvements and new facilities to minimize surface runoff and pollutants.
- Improve the street sweeping program to reduce impacts of water runoff.

2.5.7 Goal G. Social and Land Use Impacts

Develop a transportation system that supports planned land uses and balances the expansion of transportation facilities with the protection of social, cultural and environmental resources.

Policies

- Design transportation system improvements to preserve community livability and to avoid, minimize or eliminate impacts to sensitive cultural resources and other community resources.
- Encourage transportation-efficient land use patterns that reduce vehicle miles traveled and promote a live/work balance.
- Ensure that land use regulations support the provision of efficient transportation services.

Implementation Strategies

- Develop land use regulations that encourage transportation efficient land use patterns, e.g., increased densities, infill and clustered development, mixed uses, maximum parking ratios, and circulations systems that reduce out-of-direction travel.
- Continue to cooperate with ODOT in planning and project development.

- Utilize access management to limit the impacts of new development on highway congestion.
- Establish standards for setbacks adjacent to state rights-of-way.
- Take advantage of multi-modal capabilities/capacities to promote development that is not solely auto/truck dependent.
- Consider use of noise barriers to reduce noise impacts and visual mitigation techniques as part of arterial and urban collector improvements near residentially zoned areas.
- Encourage building siting and design to reduce noise and visual impacts from adjacent transportation facilities.
- If implemented, design the Forest Lane overpass to ensure access to vacant industrial properties and no adverse impact upon the Historic Columbia River Highway.

2.5.8 Goal H. Economic Impacts

Expand and diversify the city's economy through the efficient movement of goods, services and passengers in a safe, energy-efficient and environmentally sound manner.

Policies

- Recognize Regional Strategies for technology, industry, and tourism.
- Grant high priority to projects that promote efficient transportation system connections to existing and planned industrial and commercial sites.
- Improve convenient access to a variety of recreational opportunities.

Implementation Strategies

- Support projects identified through the Regional Strategies Program and other economic development activities through appropriate transportation system improvements.
- Promote I-84/OR 35 as an alternative route from Portland to Mt. Hood recreation areas.
- Provide adequate parking for downtown businesses and services.
- Investigate opportunities to improve access to vacant industrial lands in east Cascade Locks.
- Provide connections between local pedestrian/bicycle systems and recreational trails.
- Promote excursions and other water recreation uses, including recreational opportunities associated with seaplanes and commercial helicopter services.

2.5.9 Goal I: Funding

Ensure adequate funding of needed transportation system improvements.

Policy

- Identify sources and strategies to fund needed transportation system improvements.

Implementation Strategies

- Allocate resources to transportation projects according to the following priorities:
 1. Maintenance of the existing facility to ensure that it remains safe and functional, e.g., fixing potholes;
 2. Preservation of the roadway by investing in roadbed and pavement reconstruction as needed to minimize maintenance costs;
 3. Safety improvements;
 4. Managing the existing system to maximize capacity/operation; and
 5. Capacity improvements.

- Investigate alternative financing mechanisms to finance transportation system improvements, e.g., public/private partnerships, tollways, road maintenance improvement districts, etc.

3. CURRENT CONDITIONS

3.1 INTRODUCTION

Current transportation conditions of the planning area serve as a basis for the Transportation System Plan. These conditions are the result of many factors, including policies, employment, population, and funding availability. The traffic generated in the city is a combination of both external and internal forces. The existing roadway and traffic conditions illustrated in this chapter will be used as the basis for forecasts made in Chapter 5.

The City of Cascade Locks is the second largest city in Hood River County with a 1991 population of 975. It is located about 45 miles east of Portland and 19 miles west of Hood River. Cascade Locks provides a wealth of recreational opportunities for visitors and residents with access to the Columbia River, Oregon and Washington national forests, Mount Hood, many creeks, and numerous hiking trails, including the Pacific Crest National Scenic Trail.

Cascade Locks' road system includes an interstate bridge across the Columbia River, two state highways, urban collector streets, and residential streets. Street classifications for Cascade Locks are illustrated in Figure 3-1. The Bridge of the Gods is located in the western part of the city and connects Cascade Locks to Stevenson, Washington, and Washington State Route 14. I-84 runs east and west through the city with two partial interchanges. The western partial interchange for eastbound off and westbound on traffic is just west of the city limits near the Bridge of the Gods and the eastern partial interchange for westbound off and eastbound on traffic is located near the port of entry at the intersection with Highway 30 (Wa-Na-Pa Street). Highway 30 (Historic Columbia River Highway) or Wa-Na-Pa Street, runs east-west through the western half of the city. It is designated as a minor arterial. Forest Lane, which runs east-west through the eastern portion of the city, is designated a collector. The rest of the streets are designated as local streets.

Highway and street configurations constrain movement in Cascade Locks. The construction of I-84 created 19 dead end streets. The resulting lack of interconnectivity has forced a majority of the traffic in the city onto Wa-Na-Pa Street and Forest Lane. It has also added to the desire for another interchange with I-84 at Forest Lane.

The city provides some facilities for forms of transportation other than the automobile. The Cascade Locks Airport is located in the northern part of the city, providing local area service that supports 1,100 flights per year.¹ The Union Pacific Railroad line is located north of the city center along the shoreline. The railroad is used to transport cargo, mainly wood products, from Cascade Locks to destinations east and west. Rail facilities consist of a main line switching track and spur lines. Although the nearest passenger service is in White Salmon, Washington, facilities for passengers still exist in the city. The Columbia Area Transit District (CAT) provides dial-a-ride transit service. This service links passengers to other areas within the city and county. Except for the excellent hiking trails around the city and walking and biking areas in the parks, pedestrian and bicycling facilities are lacking. However, bicycle lanes have recently been added along Wa-Na-Pa Street, and there are plans to also improve pedestrian facilities, including sidewalks.

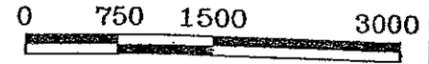
¹ 1996 Transportation Volume Tables, Oregon Department of Transportation.

LEGEND:

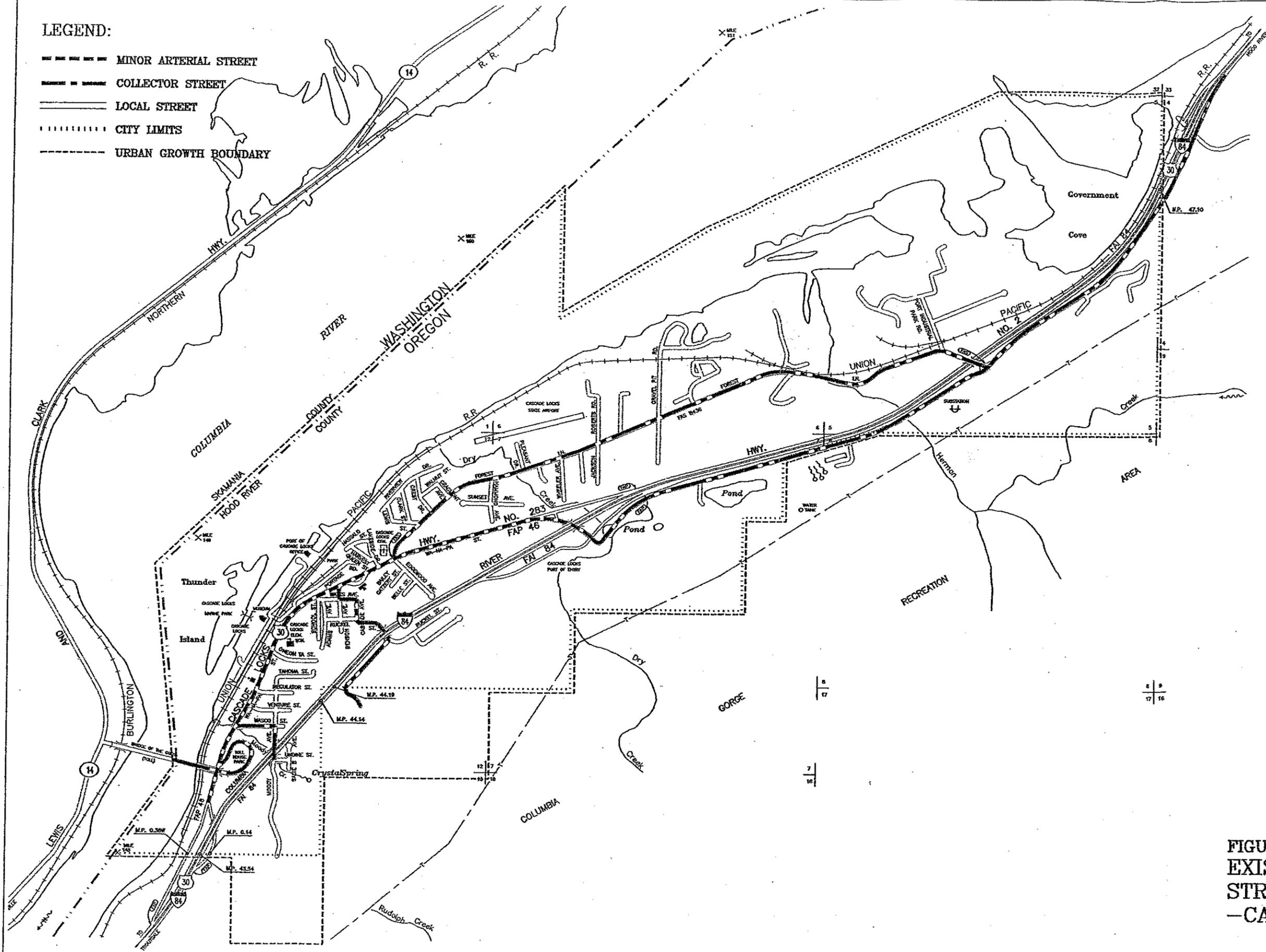
- MINOR ARTERIAL STREET
- COLLECTOR STREET
- LOCAL STREET
- CITY LIMITS
- URBAN GROWTH BOUNDARY



NOT TO SCALE



DAVID EVANS AND ASSOCIATES, INC.



**FIGURE 3-1
EXISTING
STREET CLASSIFICATION
-CASCADE LOCKS**

3.2 URBAN AND CULTURAL FEATURES

The city has many historical features. The Bridge of the Gods is a popular tourist attraction and photo opportunity. This bridge was constructed in 1926, spanning the Columbia River to connect the city to Stevenson, Washington. The bridge was named for a huge landslide, which occurred about 1,000 years ago creating a temporary dam and legendary land bridge across the river. Navigational locks were built at Cascade Locks in 1896. They provided safe passage for riverboat traffic until the locks at the Bonneville Dam were opened in 1937. The locks provide outstanding examples of stone masonry and are used by sport and native American fishermen today. Located near the locks is the Cascade Locks' Sternwheeler Museum. This museum is located in one of three "Lock Tenders" residences built in 1905. It provides information, photos, and artifacts of Oregon's early transportation and houses the "Oregon Pony," the first steam locomotive used in the Oregon Territory. The Historic Columbia River Highway runs through the city along Wa-Na-Pa Street and Forest Lane and has been posted with signs denoting the historic significance of the route. The Historic Columbia River Highway was the first highway in the country specifically designed as a scenic highway and the first major paved highway in the Pacific Northwest.

3.3 HIGHWAY SYSTEM

Figure 3-2 displays the 1994 Average Daily Traffic (ADT) volumes for Cascade Locks. Daily traffic volumes for the city were determined from ODOT's 1994 Traffic Volume Tables and several road tube counts performed in 1995. The year 1994 was chosen as the base year since ODOT's traffic volume tables for 1995 were not yet published when the traffic forecast for the city was performed. The ADT volume on the Bridge of the Gods was obtained from the Port of Cascade Locks.

Because the 1994 ADT volumes were low, traffic volumes were not recorded for the PM peak hour. ODOT traffic counts for 2000 are generally consistent with the 1994-5 information with 3,800 to 4,300 vehicles per day on US 30 and 17,000 to 20,900 vehicles per day on I-84.

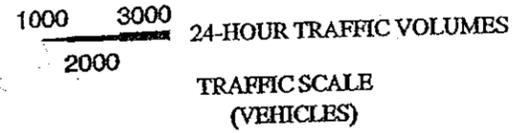
3.3.1 Congestion

Transportation engineers have established various standards for measuring traffic flow, congestion, or traffic operations of intersections and roadways. Each standard is associated with a particular level of service (LOS). The LOS concept requires consideration of factors that include traffic demand, capacity of intersection or street, delay, frequency of interruptions in traffic flow, relative freedom for traffic maneuvers, driving comfort, and convenience and operating cost. Six standards have been established ranging from LOS "A" where traffic flow is relatively free-flowing, to LOS "F", where the street system is totally saturated with traffic and movement is very difficult.

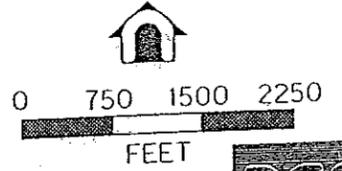
The OHP calls for providing a LOS of B or better in rural areas and LOS C or better in urban portions of the county. To determine if highways were meeting these standards, ODOT used the HPMSAP analytical package to compute congestion on many of Oregon's interstate and statewide highways. The package computed the volume to service flow ratios (V/SF) at peak hour conditions. The V/SF ratio is defined as the ratio of the amount of traffic demand to roadway capacity. These ratios were then broken into three categories: low/no, moderate, and high congestion.

Low/no congestion corresponds to a V/SF ratio that indicates stable to free flowing traffic conditions with low to moderate traffic volumes (LOS A, B, or C). Speed is restricted only slightly by traffic if at all. There is high maneuverability and driving comfort and convenience with little or no delays.

LEGEND



..... CITY LIMITS
- - - URBAN GROWTH BOUNDARY



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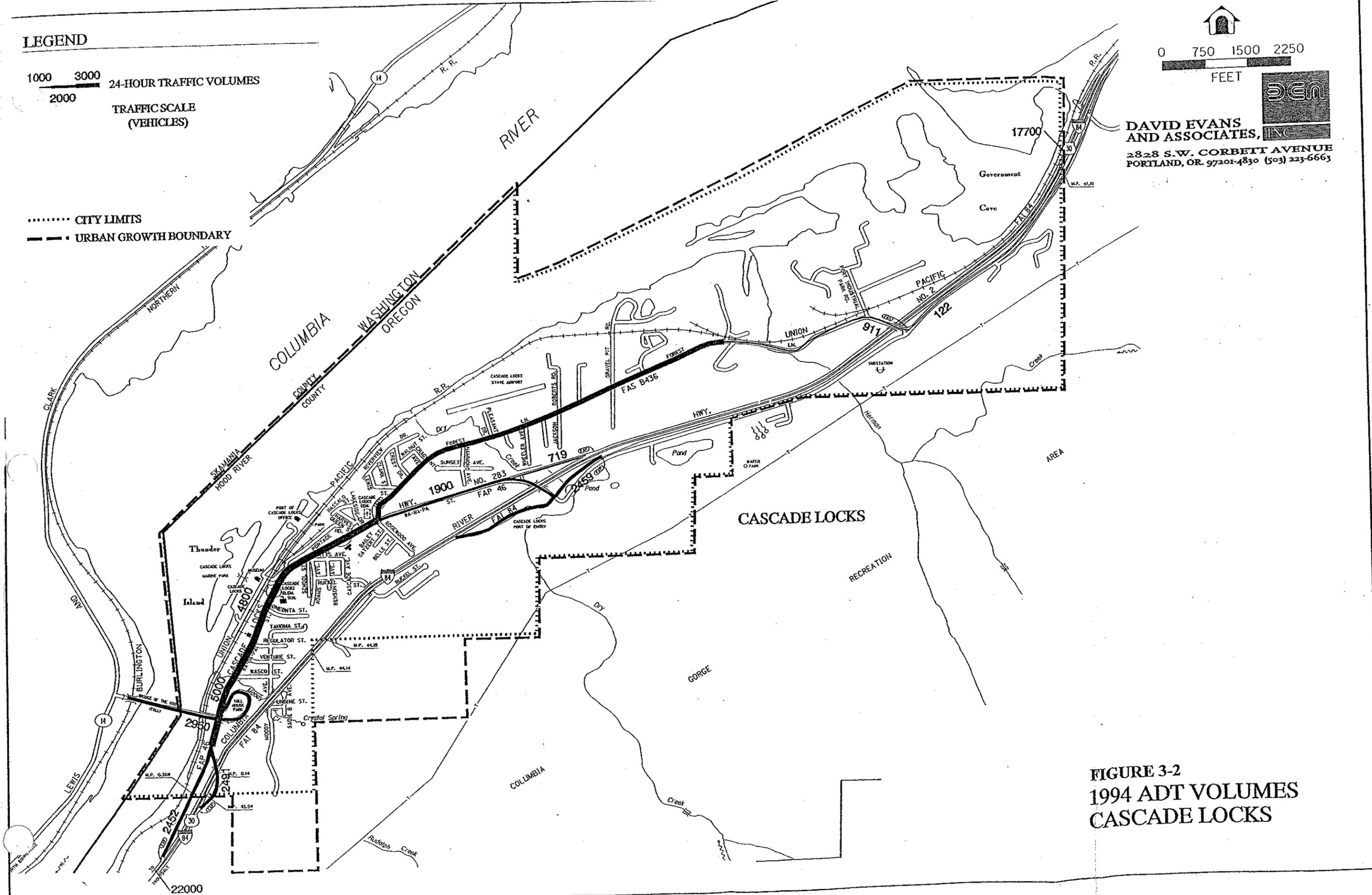


FIGURE 3-2
1994 ADT VOLUMES
CASCADE LOCKS

Moderate congestion corresponds to V/SF ratios for traffic flows approaching unstable levels (LOS D). On rural two-lane highways, speeds fall below 50 miles per hour, fairly long lines of cars form, and passing becomes extremely difficult. In urban areas, average travel speeds fall to about 40 percent of free-flow speeds and small increases in traffic can significantly increase delay at intersections.

High congestion corresponds to V/SF ratios for traffic flow conditions that are unstable or that exceed roadway capacity (LOS E or F). Under conditions of high congestion, a driver on a rural two-lane highway will be traveling in long lines of traffic at considerably less than the posted speed and passing will be virtually impossible. A driver on an urban road will be traveling at substantially reduced speeds and will experience considerable delays at intersection. Under these conditions, even minor incidents can trigger stop and go traffic.

The HPMSAP analysis does not provide data for urban roadways in the City of Cascade Locks. However, congestion on the street system was determined from the operations analyses of the most highly traveled sections of road. The 1994 ADT volumes were used to determine the volume-to-capacity (V/C) ratio and Level of Service (LOS) on specific roadways. The V/C ratio is a measure of traffic demand divided by the capacity of the roadway. ADT volumes were converted to PM peak hour traffic volumes using a 10 percent peak hour factor, which is typical for most cities. It was assumed that an urban street would have a capacity of about 900 vehicles per lane per hour (vplph), and that interstate highway would have a capacity of about 1,700 vplph. The calculated V/C ratios were then used in conjunction with travel speeds to determine the LOS as described in Chapter 7, "Rural and Suburban Highways," in the *Highway Capacity Manual*, 1994 Edition.

Table 3-1 shows that the existing V/C ratio and LOS for each segment of the roadway in Cascade Locks. All V/C ratios are less than 0.32 and all segments operate at LOS A. These conditions allow drivers freedom to maneuver and travel at their desired speed.

**TABLE 3-1
EXISTING V/C AND LOS OF ROADWAYS IN CASCADE LOCKS**

Location	V/C Ratio	Speed	LOS
US 30, north of foot of the Bridge of the Gods	0.28	35 mph	A
I-84 westbound on-ramp at Exit 44	0.14	45 mph	A
I-84 eastbound off-ramp at Exit 44	0.14	45 mph	A
I-84 west of Exit 44	0.32	65 mph	A
I-84 westbound off-ramp at Exit 44	0.04	45 mph	A
I-84 eastbound on-ramp at Exit 44	0.14	45 mph	A
I-84 east of Exit 44	0.26	65 mph	A
Wa-Na-Pa Street east of Edgewood Avenue	0.11	55 mph	A

3.3.2 Safety

The Oregon Transportation Plan calls for the creation of a transportation system that is not only "balanced, efficient, accessible, environmentally sound, and connective," but also safe and secure. Accident rates and locations have been inventoried to identify safety problem areas. Accident locations are summarized below for both the urban and rural areas.

3.3.2.1 Interstate 84

The accident rate along the urban portions of the highway was 0.40, which is lower than the statewide average of 0.93 for an urban primary freeway.

Accidents recorded along the highway vary by location. Eleven accidents were recorded along a 3.56-mile stretch through Cascade Locks in 1994. Accidents in this area have increased in the last four years from 0.10 accidents per million vehicle miles in 1990, to 0.40 accidents per million vehicle miles in 1999.

3.3.2.2 Urban Area

The City of Cascade Locks has no locations with more than one accident reported during the period of analysis. This implies that there are no roadways with safety problems within the city at this time. Safety conditions on the transportation system may change as the number of vehicles increase.

3.3.3 Pavement Conditions

The OHP requires for improving and maintaining pavement to fair or better conditions. The state highways in Hood River County were rated by the Pavement Services Unit of ODOT in 1995. Interstate 84, being part of the National Highway System (NHS), was rated using the NHS Objective Rating procedure. US 30 ratings are the same as I-84 for most of the county (they share a common alignment). Where US 30 has an independent alignment, the ODOT GFP (Good/Fair/Poor) rating procedure was used.

According to the 1995 Pavement Condition Report, the Objective Rating procedure rates highways using index values to represent pavement conditions. These index values are based on distress type, severity, and quantity present in the pavement surface. Data on distress are collected frequently along the roadways (roughly every 0.1 mile). Index values range from zero to 100, with larger index values indicating better pavement conditions, and are broken into five descriptive categories-Very Good (99-100), Good (76-98), Fair (46-75), Poor (11-45), and Very Poor (0-10).

The GFP Rating method used for non-NHS highways involves driving highways, conducting a visual survey, and scoring pavement sections with a subjective value. The five rating categories are: Very Good (1.0-1.9) – stable, no cracking, no patching, no deformation, excellent riding quality, in short, nothing would improve the roadway; Good (2.0-2.9) – stable, minor cracking (generally hairline and hard to detect), minor patching and possibly some minor deformation evident, dry or light colored appearance, rutting less than 1/2 inch, and very good riding quality; Fair (3.0-3.9) – generally stable, minor areas of structural weakness, cracking is easier to detect, patched but not excessively, deformation more pronounced and easily noticed, riding qualities are good to acceptable; Poor (4.0-4.9) – areas of instability, marked evidence of structural deficiency, large crack patterns (alligatoring), heavy and numerous patches, deformation very noticeable, riding qualities range from acceptable to poor; and Very Poor (5.0) – pavement in extremely deteriorated condition, numerous areas of instability, majority of section showing structural deficiency, ride quality is unacceptable (probably should slow down).

3.3.3.1 Pavement Conditions off the State Highway System

The pavement conditions off the state highway system in Cascade Locks were rated using a subjective system. Data was collected through a visual survey of the arterial and collector streets. Roadways were put in three categories: Good if they were stable, had minor cracking and patching if any, and a very good riding quality; Fair if they were generally stable, had more easily detected cracking, were patched but not excessively, and had acceptable riding quality, and Poor if they had areas of instability, numerous cracks and patches, were in need of immediate repair, and had poor riding quality.

The city's three minor arterial and collector roads were surveyed – Highway 30 (Wa-Na-Pa Street), Forest Lane, and Frontage Road. The overall condition of the roads was good. Of the roughly five and one half miles of pavement surveyed, 64 percent were rated Good and 36 percent were rated Fair.

Frontage Road was in the best condition (100 percent rated Good) followed by Highway 30 (95 percent rated Good and five percent rated Fair). Highway 30 was also rated using the GFP method (see above). Forest Lane received the lowest rating with 68 percent of its pavement deemed Fair and 32 percent deemed Good. No portions of the roadways received a Poor rating.

3.4 RAIL SERVICE

Rail service in the city is provided on the Union Pacific main line, which runs through the Gorge near I-84.

3.4.1 Freight

The Union Pacific line runs through northern part of the county hauling freight to Portland where it links with north and south lines. It also travels south to Colorado, then east to Chicago. From its Cascade Locks interchange, the line primarily hauls wood products.

3.4.2 Passenger Rail

Passenger service is not provided anywhere in Hood River County. Passenger service on AMTRAK on the Union Pacific Line was discontinued in November 1996 due to a lack of federal funding. The nearest passenger rail line for the Hood River County area is located in Bingen, Washington. AMTRAK provides service on the Northern Pacific Line, which runs from Portland to Vancouver, Washington, then east to Bingen and White Salmon, then north to Spokane. In Spokane, the train meets the Empire Builder Line. The two merged lines then run east to Chicago. This Northern Pacific passenger line runs four times a week. Direct Portland to Denver rail service no longer exists.

Although Cascade Locks does not have passenger rail service, there are passenger facilities adjacent to the Union Pacific. Therefore, if federal funding is reinstated, it would be easy to supply service.

3.5 AIR SERVICE

Cascade Locks State Airport is located within the city limits and is administered by the State Aeronautics Division. With one 1,800-foot paved runway, it is classified as a Level 4 facility, because it plays a supportive role to the system in terms of recreational and emergency uses.

The closest commercial air service is approximately 40 miles west of Cascade Locks at the Portland International Airport in Portland. Portland International Airport is a full service airport, handling both passengers and cargo. The accessibility of this airport and the wide range of services it offers limit the likelihood of significant expansions of the smaller airports in Hood River County. The City recognizes the importance of providing aviation services for businesses and residents. The City will work with the Oregon Aeronautics Division to look for opportunities to enhance these services.

3.6 WATER TRANSPORTATION

The Port of Cascade Locks owns a marine facility, two passenger carrying sternwheeler boats, the Bridge of the Gods, a campground and visitor center, and roughly 150 acres of industrial lands. The marine facility is in the western portion of the city adjacent to the Union Pacific mainline near US 30 and I-84. The shallow draft port is used for recreational trips by the sternwheeler boats, which make up the majority of river traffic. No commercial shipping or freight movement occurs at the port. The Bridge of

the Gods toll bridge is operated by the Port and connects the city to Skamania County, Washington. Except for some forest products business, the Port's industrial lands are largely undeveloped. These lands are located within Cascade Locks and will be available for commercial, industrial, and recreation/resort development when the city completes the upgrade of its wastewater treatment facility.

The Port of Cascade Locks does not plan on adding commercial or shipping uses to its port operations. However, the development of its industrial property is anticipated, as well as an increase in use of its recreational facilities.

3.7 TRANSIT

Transit is an important part of a multi-modal transportation system, and is an essential service for those without access to automobile travel. The *Transportation Planning Rule* calls for the creation of a multimodal transportation network that will reduce reliance on the automobile and "support a pattern of travel and land use in urban areas which will avoid the air pollution, traffic and livability problems faced by other areas of the country."

3.7.1 Local Service

Public transit service within Hood River County is coordinated by Columbia Area Transit District (CAT). The district provides demand responsive service county wide, and regular trips to Portland.

CAT's demand-responsive, door-to-door service operates weekly between Cascade Locks and Parkdale. Also, "as needed" trips to the Portland area are made primarily for people needing access to medical attention, but others wishing to go to Portland may use the service.

As of July 1996, the CAT had thirteen, thirty-two passenger, wheelchair-accessible buses. Transit services in the region are going to be expanded in the future with plans for a commuter service to Portland that would connect to the MAX light rail line, Portland International Airport, and other major destinations.

3.7.2 Intercity Transit

Besides the demand responsive service provided by CAT, there is no intercity bus line in Cascade Locks. The nearest intercity bus service is provided by Greyhound bus lines in Hood River. The buses stop in Hood River en route to Portland on Interstate 84 west, and to The Dalles and Boise, Idaho, on Interstate 84 east. This service operates three times a day. Greyhound also runs a bus from Hood River to Biggs and then north to Spokane, Washington. Although Greyhound runs past Cascade Locks on I-84, currently it does not stop in the city.

3.8 BICYCLE

In Cascade Locks, bicyclists must share the roadway with motorists on most roads except on Wa-Na-Pa Street from I-84 westbound off-ramp to Forest Lane where shoulders are provided. Apart from the downtown core of Cascade Locks, bicyclists might share the roadways with motorists in areas where population densities are low and destinations are widely spaced.

3.9 PEDESTRIANS

In most of Cascade Locks, pedestrians share the roadway with motor vehicles and bicycles by using roadway shoulders; except for portions of Wa-Na-Pa Street and Forest Lane. On Wa-Na-Pa Street, sidewalks are provided on both sides of the street from the foot of the Bridge of the Gods to Oneonta Street and on the north side of the roadway from Oneonta Street to Lakeside Drive. On Forest Lane, sidewalks are available on the south side of the roadway from Wa-Na-Pa Street to Wheeler Avenue.

Cascade Locks, in its Design Theme for a Downtown Street Plan, has identified the need to establish a more pedestrian-friendly environment through its downtown on Wa-Na-Pa Street (US 30). The plan proposes increasing sidewalk widths to 12 feet, adding areas for street trees and benches, and developing numerous walking loops within the downtown and the locks. An obstacle to creating a better pedestrian environment is the large number of dead end streets in the city.

3.10 OIL AND GAS PIPELINES

There are no major pipelines or natural gas service in Cascade Locks.

3.11 INTERMODAL LINKS

The Oregon Transportation Plan identifies connectivity between different modes of travel as a key element in meeting the state's quality-of-life and economic development goals. Many of the major transportation facilities in the county are clustered, making intermodal connections possible. In Cascade Locks, the airport is located adjacent to the Union Pacific Railroad, and very near I-84 and the Port of Cascade Locks. Pedestrian and bicycle access to these transportation hubs is currently limited. However, the demand responsive transit service operated by the Columbia Area Transit District can bring passengers to any of the transportation facilities.

3.12 POPULATION AND EMPLOYMENT

Population and employment within the study area strongly impact the service levels of the highways, local roads, and parts of the transportation system. Population forecasts for Hood River County and the city show a potential maximum population of approximately 3,200. However, the city expects substantially less growth over the planning period. Additional employment opportunities are expected, particularly in the eastern portion of the city. The Port of Cascade Locks owns land, which is available primarily for commercial and industrial development.

4. ACCESS MANAGEMENT

4.1 NEED FOR MANAGEMENT

Access management is a process of managing vehicular access to adjacent land use while simultaneously preserving the flow of traffic on the surrounding road system. This management is achieved by providing standards for accessing the roadway via driveways or curb cuts. On high volume arterials or highways, frequent driveways can reduce the capacity and safety of the roadway. Access management strategies and guidelines are therefore needed for arterial and collector streets. Local streets primarily serve as access streets and the access guidelines in this report generally do not apply on local streets.

Access management is essential to preserving the 'functional integrity' of the street system by reserving the high speed and high capacity roads for longer distance trips, and assigning the lowest restriction of access to local roads. Additional driveways along arterial streets lead to an increased number of potential conflict points between vehicles entering and exiting the driveway, and through vehicles on the arterial streets. This not only leads to increased vehicle delay and a deterioration in the level of service on the arterial, but also leads to a reduction in safety. Thus, it is essential that all levels of government try to maintain the efficiency of existing arterial streets through better access management, by reserving the high speed and high capacity roads for longer distance and higher speed travel, and assigning the lowest restriction of access to local roads.

Access management is best implemented by integrating it into the land development and permitting process. The problem of applying access management to a developed major arterial poses a much greater challenge due to right-of-way limitations and concerns by the owners of the adjacent properties and the affected businesses. In such cases, access management can be implemented as part of roadway improvement plans or as part of roadway retrofit plans.

4.2 ACCESS MANAGEMENT STRATEGIES AND TECHNIQUES

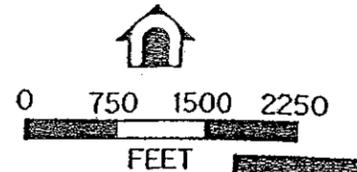
The main goals of an access management program are enhanced mobility and improved safety. This is achieved by limiting the number of traffic conflicts. A traffic conflict point occurs where the paths of two traffic movements intersect. Vehicle maneuvers on the street system in the order of increasing severity of conflict are diverge, merge, and cross. In each case, drivers of one or more vehicles may need to take appropriate action in order to avoid a collision.

A wide variety of access management strategies were reviewed by the TAC and the public through various public involvement opportunities. The following strategies were selected for more detailed description and for having the most potential for application:

- Optimize traffic signal installations, spacing, and coordination;
- Regulate minimum spacing of driveways;
- Consolidate access for adjacent properties;
- Consolidate existing access whenever separate parcels are assembled under one purpose, plan, entity, or usage;
- Restrict parking on roadways adjacent to driveways to increase driveway turning speeds;
- Provide direct access on lower functional class street when available;

LEGEND

Average Access Points Per Mile	
	50-60
	40-50
	30-40
	20-30
	10-20
	0-10



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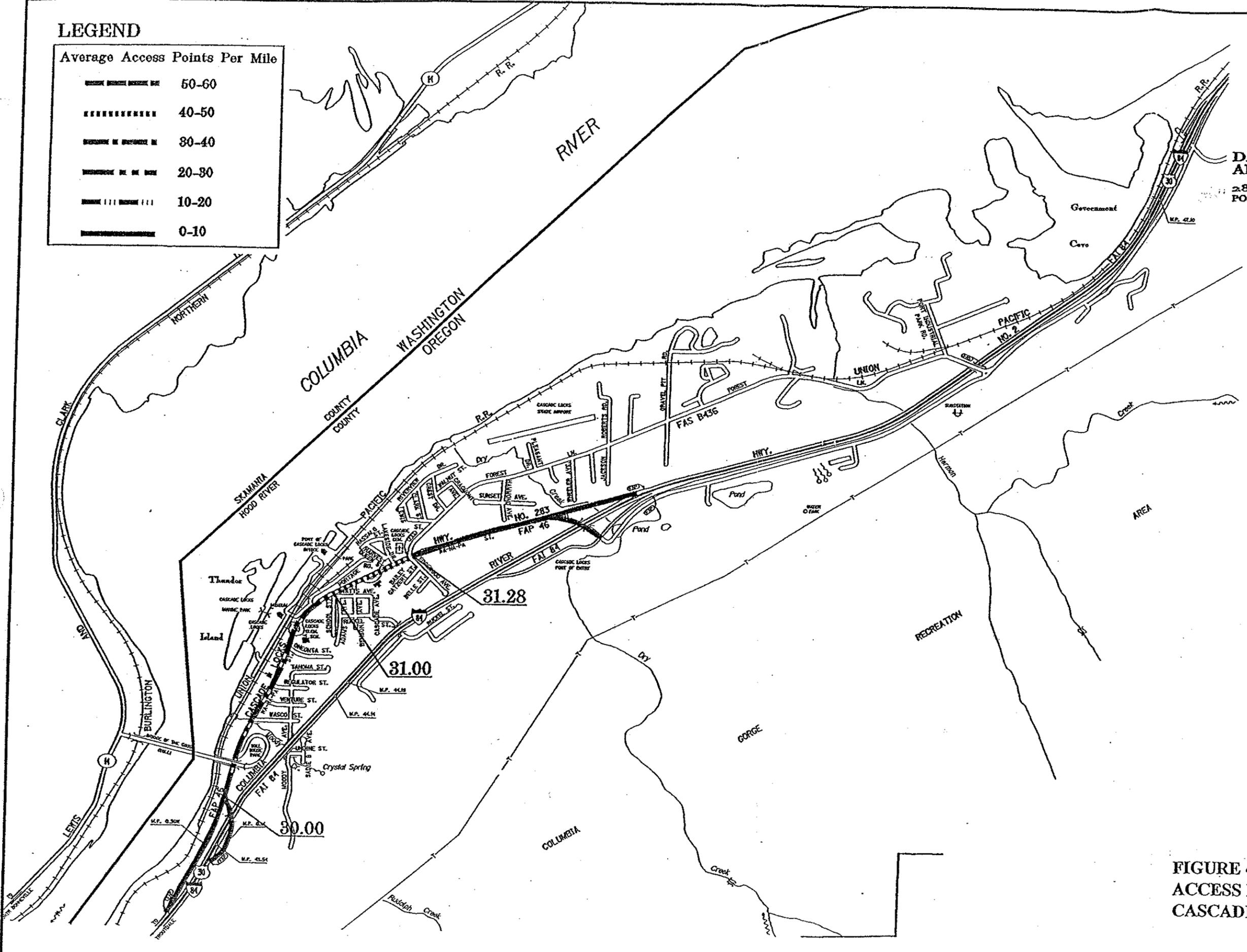


FIGURE 4-1
ACCESS LOCATIONS SUMMARY
CASCADE LOCKS

- Encourage connections between adjacent properties; and
- Require adequate internal design and circulation plan.

A complete listing and descriptions of the selected strategies are included in Appendix B.

4.3 CURRENT ACCESS CONDITIONS

The following is a summary of the access conditions for Cascade Locks.

The average spacing between interchanges was determined on I-84 in Hood River County. For the other state highways, the average spacing between accesses was determined. Accesses included driveways, streets, and ramps.

The segment of Interstate 84, MP 42.08 to MP 67.72, runs east-west through Hood River County. It consists of three half interchanges and five full interchanges. The average spacing is about 3.3 miles between interchanges. Table 4-1 summarizes the spacing between the midpoints of each interchange. (see Figure 4-1).

Two segments of US 30 were evaluated. One segment, MP 30 to MP 33.25, runs through the City of Cascade Locks with a total of 47 access points. The average spacing is about 14 access points per mile (see Figure 4-1). The access density is considerably less than the rule of thumb for high density access of over 60 access points per mile.

**TABLE 4-1
INTERSTATE 84 INTERCHANGE SPACING IN HOOD RIVER COUNTY**

Interchange Location	MP	Spacing From Previous Interchange (mile)
Bonneville Dam (Multnomah County)	40.27	
West Cascade Locks City Limits*	43.54	3.27
East Cascade Locks City Limits*	45.11	1.57
Herman Creek*	47.53	2.42
Wyeth Interchange	50.99	3.46
Starvation Creek	54.93	3.94
Viento Park Interchange	56.04	5.05
Mitchell Point	58.51	3.58
Frontage Road	59.96	0.70
Ruthton Point	60.66	1.40
Mt. Hood Hwy Junction	62.06	6.02
Hood River 2nd Street Interchange	63.92	1.86
East Hood River Interchange	64.44	0.52
Mosier-The Dalles Hwy Junction (Wasco County)	69.79	5.35
Average Spacing		3.01

Note: * indicates that the interchange is a half interchange. See the following discussion on safety for additional information on half interchange spacing impacts:

Economic, Safety and Historic Highway Preservation

Economic. Half interchanges limit access to commercial and industrial areas. Full interchanges would enhance the ability to attract and retain commercial and industrial employers.

The lack on full interchanges also impacts retail businesses that cater to travelers and tourists. If eastbound travelers miss the off-ramp at the west end of town at MP 43.54 they must travel 7.45 miles to Wyeth to turn around and return 4.84 miles to the off-ramp at MP 45.11 at the east end of the commercial district on Wa-Na-Pa; a total of 12.29 miles. If westbound travelers miss the off-ramp onto Wa-Na-Pa at the east end of town (MP 45.11), they must travel 4.84 miles to the Bonneville Interchange to turn around and return 3.27 miles to the west end of the commercial district; a total of 8.11 miles.

Safety. The Cascade Locks Fire and Ambulance departments serve I-84 in addition to the city of Cascade Locks. Fire and rescue responses outside the city represent 90 percent of the Fire Department's calls. Ambulance responses outside the city represent about 50 percent of the Ambulance Department's calls. The half interchanges mean that the response vehicles often must travel extensive distances, as mentioned in the previous paragraph, to reach emergencies.

Historic Highway Preservation. Westbound industrial traffic from the Port Industrial Park must travel over Forest Lane and Wa-Na-Pa street (the Historic Highway) to reach the westbound I-84 access by the Bridge of the Gods. Wa-Na-Pa is a wide thoroughfare and has been improved, so the impact is from traffic volume and truck noise. Forest Lane is a two lane road and the addition of industrial truck traffic would be detrimental to the Historic Highway. Houses and driveways enter onto Forest Lane, and industrial truck traffic would negatively impact the residences along this street. Forest Lane should remain residential in character from Edgewood Avenue east to the city limit. An alternative route(s) for trucks should be developed in coordination with ODOT and Hood River County. The frontage road on the south side of I-84 is being considered to provide this alternative. A full interchange at Forest Lane and I-84 would alleviate truck traffic on the Historic Highway.

4.4 GENERAL ACCESS MANAGEMENT GUIDELINES FOR COLLECTOR AND LOCAL STREETS

Access management is hierarchical, ranging from complete access control on freeways to increasing the use of streets for access purposes, parking and loading at the local and minor collector level.

Access management restrictions are not intended to eliminate existing intersections or driveways. Rather, they are best implemented by instituting them into the land use permitting process and applying them as new development occurs.

The challenge is greater in applying access management guidelines to a developed major arterial due to right-of-way limitations, costs, and concerns by the owners of the adjacent properties and the affected businesses. In such cases, access management can be implemented as part of roadway improvement plans or as part of roadway retrofit plans.

To summarize, access management strategies consist of managing the access points and the solution is a balanced, comprehensive program which provides reasonable access while maintaining the safety and efficiency of traffic movement.

5. TRAFFIC FORECASTS AND ANALYSIS

Travel demand forecasting helps identify future traffic demand along streets and at intersections. Future traffic volumes were projected based on existing and future land use projections and historical growth trends in traffic on the highway system. Forecasts focused on existing (1995) and future year (2015) traffic conditions during either an average weekday (24-hour period) or the PM peak hour which occurs between 4:00 PM and 5:00 PM for an average weekday. The PM peak hour is the time period when traffic volumes on the highway and local street system are usually the greatest.

The traffic volume forecasts for Cascade Locks are based on historical and projected population growth, proposed land use, and historical traffic growth on Interstate 84 and Wa-Na-Pa Street (Historic Columbia River Highway). Traffic volumes for the future year (2015) are in terms of ADT volumes. Traffic volumes were also estimated for the PM peak hour of a typical weekday to reflect the critical time period for traffic operations. Traffic forecasts were prepared for Interstate 84, Wa-Na-Pa Street, and related roadways since the volumes on these roadways are much higher than on any of the other roads in Cascade Locks.

5.1 LAND USE

Land use and population growth play an important part in projecting future traffic volumes. The land use characteristics which define growth in the City of Cascade Locks are population, employment, and number of housing units. Historical trends and their relationship to historical traffic demand are the basis of the future projections. Table 5-1 summarizes both the historical and projected populations, employment, and number of housing units for Cascade Locks.

**TABLE 5-1
CASCADE LOCKS POPULATION, EMPLOYMENT, AND
HOUSING UNIT TRENDS**

Year	Population	Employment	Housing Units
1980	838	N/A	357
1990	848	374	420
1995	1,080	487	N/A
2000	1,115	N/A	N/A
2015	1,605 ¹	1,500 ²	1,300 ³

Source: McKeever/Morris, Inc.

Notes:

1. The population is projected with the continuation of recent trends.
2. The employment projection is the sum of current employment and the proposed employment in the Port Area Industrial Park and hotel/resorts.
3. The housing unit projection is the sum of the current housing unit and proposed potential units from undeveloped land.

5.1.1 Historical Land Use

Cascade Locks has experienced a slow population growth over the last 15 years. The average annual growth rate was about 1.2 percent from 1980 to 1990, and 2.3 percent from 1990 to 1995.

In Cascade Locks, tourism is a major summer employment generator. Tourism generated over one hundred part-time jobs in 1995, which is about 25 percent of all employment in Cascade Locks.

The housing vacancy rate is low in the City of Cascade Locks. New housing units are expected to support some of the new employment.

5.1.2 Projected Land Use

Factors that will affect the future population growth rate of Cascade Locks include employment opportunities, available land area for development, and community efforts to manage growth. The following future land use and development could occur considerably before or after the year 2015. For the purposes of the analysis in this study, it was estimated the development will occur by 2005.

The City of Cascade Locks provided information on future proposed land use for the 2015 Build-Out scenario. This scenario was based upon general land use changes in the revised Cascade Locks Comprehensive Plan (adopted in May 2001) as well as several specific developments which were anticipated at the time the TSP was being formulated. For conservative forecasting, about 890 new housing units and 1,000 employees in the Port of Cascade Locks industrial area were estimated before 2015.

Although most of the specific projects listed below did not materialize, they are indicative of the type of development, which will ultimately occur. The proposed developments consist of a:

- 29-unit condominium subdivision on the east side of Sadie Avenue.
- 45-unit motel near the Bridge of the Gods.
- 100-room resort along the Columbia River north of the Port Area Light Industrial Park.
- 250-room resort will be developed on Government Rock.
- 75-room resort on Forest Lane west of I-84 westbound off ramp.

5.1.3 Work Trips

The 1990 census indicate that 39.5 percent of the total population in Cascade Locks were employed. There were 366 full time employees and 121 part-time employees in 1995. In general, most of the part-time employment is tourism-related summer positions.

Historically, half of the new employment was steadily filled by residents living outside Cascade Locks. Table 5-2 shows the origins of employees.

**TABLE 5-1
TRIP ORIGINS FOR EMPLOYMENT WITHIN CASCADE LOCKS**

Employee Origin	Percentage
Within Cascade Locks	47.8 %
Outside of Cascade Locks	52.2 %
Total	100.0 %

Source: McKeever/Morris, Inc.

Note: The percentage is based on the number of employees.

At the same time as new employment in Cascade Locks was filled by outside commuters, approximately half (48 percent) of the working population in Cascade Locks found employment outside of the city. For those workers who worked outside of Cascade Locks, 24 percent worked outside of Hood River County (most are believed to be working in the Portland Area); plus 11 percent worked outside of Oregon (they are believed to be working in Stevenson and its surrounding communities); the remaining 65 percent worked in Hood River County (most are believed to be working in the City of Hood River and its surrounding communities). Table 5-3 shows the distribution of employment destinations for residents of Cascade Locks.

**TABLE 5-2
EMPLOYMENT DESTINATIONS FOR
RESIDENTS OF CASCADE LOCKS**

Employment Location	Percentage	
<i>Within Cascade Locks</i>		52%
<i>Outside of Cascade Locks</i>		
Portland	(24 %)	12%
Stevenson	(11 %)	5%
Hood River County	(65 %)	31%
Subtotal	(100 %)	48%
Total		100%

Source: ECONorthwest.

Note: The percentage is based on the total number of employees.

5.2 HISTORICAL HIGHWAY GROWTH TRENDS

ODOT annually collects traffic count data at several locations along Interstate-84. The traffic on Interstate-84 has a 4.5 percent average annual growth rate in and around Cascade Locks.

Average Daily Traffic (ADT) counts on Wa-Na-Pa Street, a segment of the Historic Columbia Highway from mile post 30.41 to 31.26, were collected at several locations in three year intervals. The last count was conducted in 1995. The traffic on Wa-Na-Pa Street had a less than two percent average annual growth rate.

The Port Authority provided the historical traffic counts on the Bridge of the Gods. The traffic counts indicated a 4.5 percent average annual traffic growth rate on the bridge.

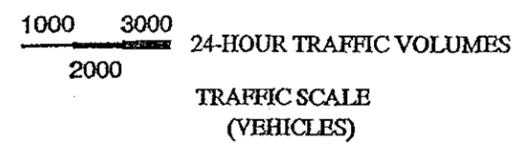
5.3 TRAFFIC FORECASTING PROCESS

The traffic forecast for the year 2015 included two traffic components: growth in through traffic on the highways and bridges and future additional locally generated traffic. The through traffic is a function of historical highway growth while the locally generated traffic is a function of the growth of the city. Traffic volumes for the year 2015 without any street improvements are illustrated in Figure 5-1. Traffic conditions with specific street improvements are discussed in the next section.

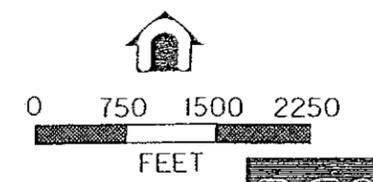
5.3.1 Through Traffic

The first step in developing traffic projections was to break out the existing through traffic volumes from total traffic on Interstate-84 and the Bridge of the Gods.

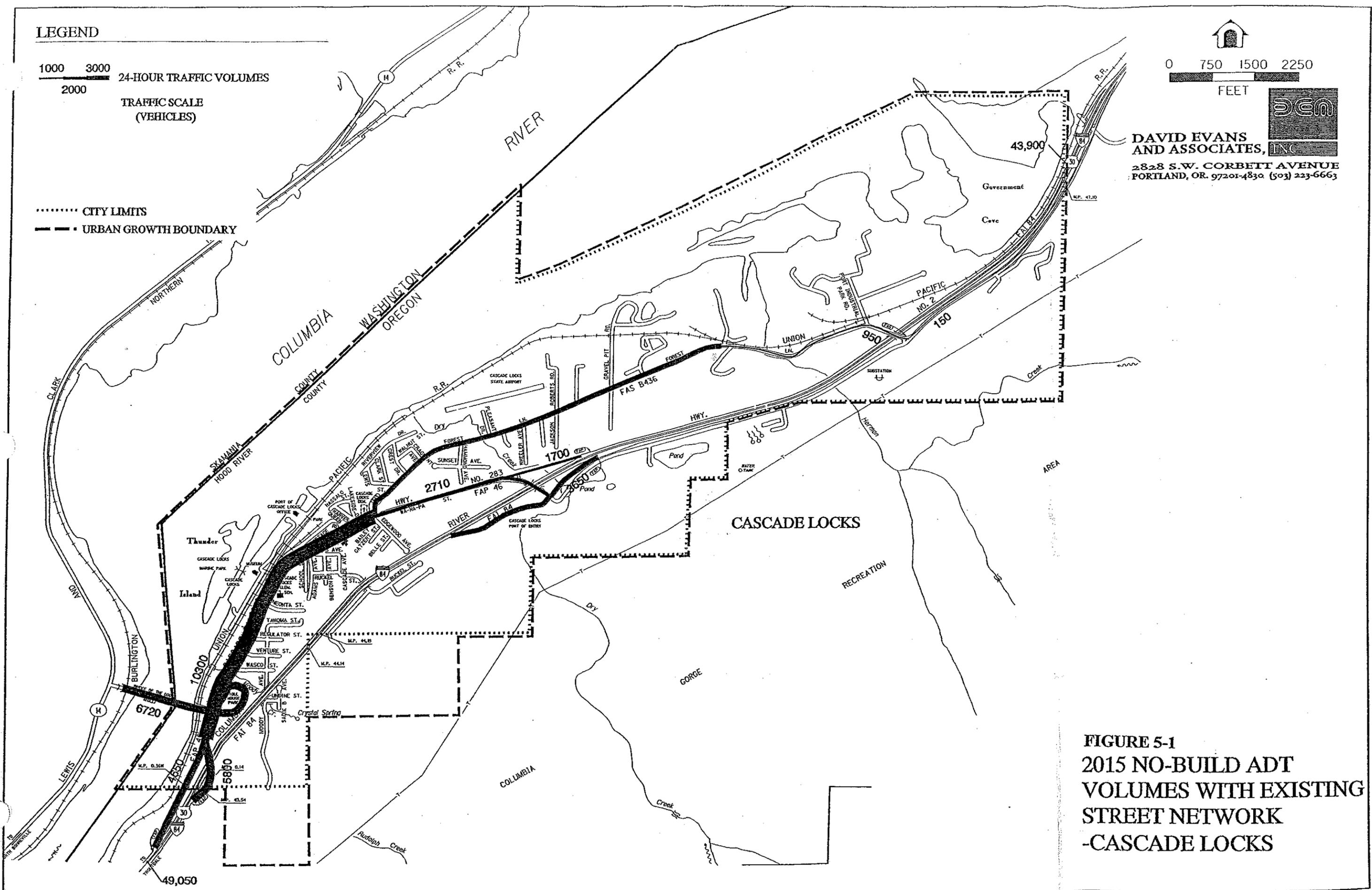
LEGEND



..... CITY LIMITS
- - - - URBAN GROWTH BOUNDARY



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**FIGURE 5-1
2015 NO-BUILD ADT
VOLUMES WITH EXISTING
STREET NETWORK
-CASCADE LOCKS**

On Interstate 84, a 50 percent directional split westbound and eastbound was assumed. The through traffic was calculated by subtracting the on-ramp and off-ramp traffic from the traffic on the through segment on Interstate 84. A 4.5 percent average annual growth rate for Interstate 84 through traffic was used based on the historical trend.

On the Bridge of the Gods, two thirds of the traffic was assumed to be through traffic between Interstate 84 and Washington. The through traffic was then assigned to two on-ramps and two off-ramps in the proportion of the existing traffic on these ramps.

Growth on Interstate 84 and the Bridge of the Gods exceeded the population growth in Cascade Locks (traffic volumes are growing at a higher rate than the city population). This relationship reflects the modern trend toward an increase in per person vehicle miles traveled. It also supports the assumptions that trips in and out of Cascade Locks, such as intercity commuter trips among Portland, Stevenson, and Hood River County, are also increasing.

5.3.2 Locally Generated Traffic

The forecasting methodology used to project locally generated traffic in 2015 has two assumptions: 1) the relationship of the existing population and traffic demand will continue to remain the same; 2) all future additional traffic will be generated by new developments and new housing units. The first assumption is that the remaining traffic volumes after the through traffic has been removed will remain unchanged between 1995 and 2015 on Interstate-84, Bridge of the Gods, and Wa-Na-Pa Street. Traffic from new developments will then be distributed and added to existing local traffic.

5.3.3 Trip Generation

The new site generated trips are calculated based on the Institute of Transportation Engineers (ITE) *Trip Generation* 5th Edition. Table 5-4 illustrates the 24-hour trips generated by each development.

**TABLE 5-1
PROPOSED DEVELOPMENT TRIP GENERATION**

Land Use	Size	24-Hour Two-Way Volume
Condominium	29 Units	170
Port-Area Light Industrial	1,000 Employees	3,020
Hotel	45 Rooms	459
Resort Hotel	75 Rooms	762
Resort Hotel	100 Rooms	1,016
Resort Hotel	250 Rooms	2,540
Mix Housing	890 Units	6,221

Source: ITE *Trip Generations* 5th Edition.

5.3.4 Trip Distribution

Trips to be generated by hotel/resort developments were assumed to be made by tourists mostly from the Portland area. For the future Light Industrial Park development, it was assumed that 50 percent of trips generated would be distributed to Cascade Locks and 50 percent to Portland, Stevenson, and Hood River County. Trips generated by future residential developments were assumed to be made within Cascade Locks, Stevenson, and Hood River County. Table 5-5 illustrates the trip distribution of each land use type.

**TABLE 5-1
DISTRIBUTION OF FUTURE TRIPS**

New Developments	Cascade Locks	Portland	Stevenson	Hood River County
Hotel/Resort	10%	60%	10%	20%
Light Industrial Park	50%	12%	5%	33%
Residential	50%	0%	17%	33%

5.3.5 Trip Assignment

This is the final step in the City of Cascade Locks modeling process. Once the distribution of traffic is determined, future additional traffic is now assigned to the street network. This was done using a manual assignment. A manual assignment is performed by hand, assigning trips from one zone to another using one or more paths on the street network.

The goal of a manual assignment is to choose travel paths that simulate real life choices made by the driver. Typically, a driver wants to take the quickest route, one which takes the least amount of time. This methodology was applied in the manual assignment considering several factors which determine the quickest routes. These include the geographical orientation, and speed and capacity characteristics of each roadway.

Once the future additional traffic is assigned it is then added to existing local traffic on the street network.

5.4 FUTURE ANALYSES

A "No-Build" alternative, transportation system management measures, and three improved roadway system alternatives were developed, analyzed, and compared as part of the future system analysis. These alternatives were developed with the help of the City of Cascade Locks and ODOT, keeping in mind the goals and objectives of the transportation plan.

Each of the alternatives was developed to address specific street system deficiencies and/or access concerns. The list below briefly describes the alternatives.

- 2015 No-Build with existing street network - assumes no new site generated traffic on existing street system.
- 2015 Build-Out with existing street network - assumes new site generated traffic on existing street system.
- 2015 Build-Out with proposed street network - assumes new site generated traffic on the new proposed street network in Cascade Locks.
- 2015 Build-Out with proposed street network and proposed interchange - assume new site generated traffic on the new proposed street network in Cascade Locks and the new Forest Lane interchange east of I-84, Exit 44.

The 2015 No-Build scenario with the existing street network is shown in Figure 5-1. The future through traffic was added to the existing non-through traffic on and off the Bridge of The Gods and I-84.

The 2015 Build-Out with existing street network scenario is shown in Figure 5-2. The new site generated traffic was added to the 2015 No-Build scenario with the existing street network.

The 2015 Build-Out with proposed street network scenario is shown in Figure 5-3. The new site generated traffic was added to the 2015 No-Build scenario with the proposed street network.

The 2015 Build-Out with proposed street network and proposed interchange scenario is shown in Figure 5-4. The new site generated traffic was added onto the 2015 No-Build scenario with the proposed street network and proposed interchange.

5.4.1 Future Operating Conditions

The same standards used for measuring existing operating conditions are used for measuring future operating conditions.

5.4.2 2015 No-Build With Existing Street Network

Table 5-6 shows the estimated V/C ratios and LOS for selected segments of the roadways in Cascade Locks for the 2015 No-Build with existing Street network. Interstate 84 and the on- and off-ramps along the interstate are expected to be at LOS C or better with V/C ratios of 0.72 or less. Highway 30, north of the Bridge of the Gods is expected to operate at LOS C with a V/C ratio of 0.57. On the remaining roadways, the traffic operations will be LOS A with V/C ratios of 0.15 or less.

**TABLE 5-1
2015 NO-BUILD WITH EXISTING STREET NETWORK ESTIMATED V/C AND
LOS OF STREET ROADWAYS IN CASCADE LOCKS**

Location	V/C Ratio	Speed	LOS
I-84 west of Exit 44	0.72	65 mph	C
I-84 east of Exit 44	0.65	65 mph	C
I-84 westbound on-ramp at Exit 44	0.26	45 mph	A
I-84 eastbound off-ramp at Exit 44	0.32	45 mph	B
I-84 westbound off-ramp at Exit 44	0.09	45 mph	A
I-84 eastbound on-ramp at Exit 44	0.20	45 mph	A
US 30, north of foot of the Bridge of the Gods	0.57	35 mph	C
Wa-Na-Pa Street east of Edgewood Avenue	0.15	55 mph	A

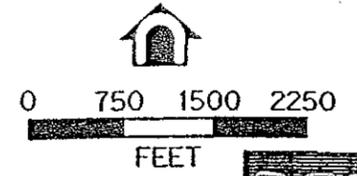
5.4.3 2015 Build-Out With Existing Street Network

Table 5-7 shows the estimated V/C ratios and LOS for selected segments of the roadways in Cascade Locks for the 2015 Build-Out, with the existing street network. Interstate 84 and the on- and off-ramps along the interstate are expected to be at LOS of C or better with V/C ratios of 0.77 or less. On Highway 30, north of the Bridge of the Gods, a V/C ratio 0.67 and a LOS of D is anticipated. On the remaining roadways, the traffic conditions are estimated to be LOS B or better with V/C ratios of 0.36 or less.

LEGEND

1000 3000
2000
TRAFFIC SCALE
(VEHICLES)
24-HOUR TRAFFIC VOLUMES

..... CITY LIMITS
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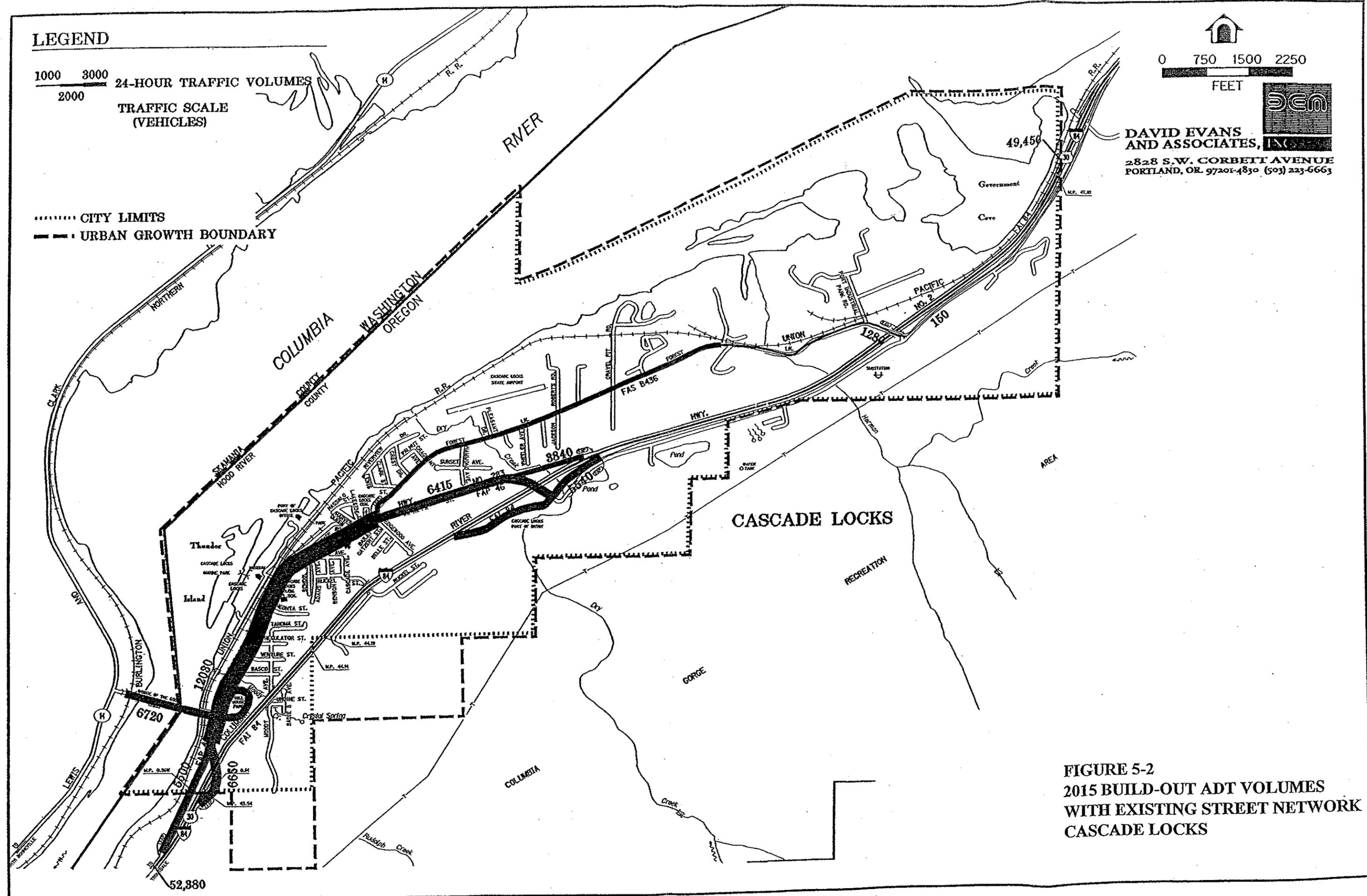
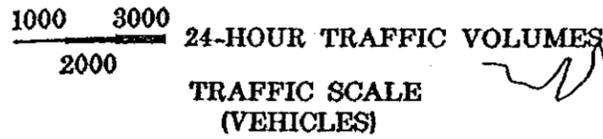
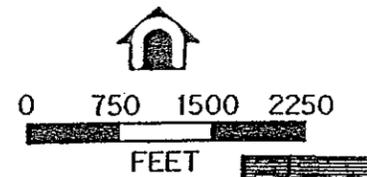


FIGURE 5-2
2015 BUILD-OUT ADT VOLUMES
WITH EXISTING STREET NETWORK
CASCADE LOCKS

LEGEND



..... CITY LIMITS
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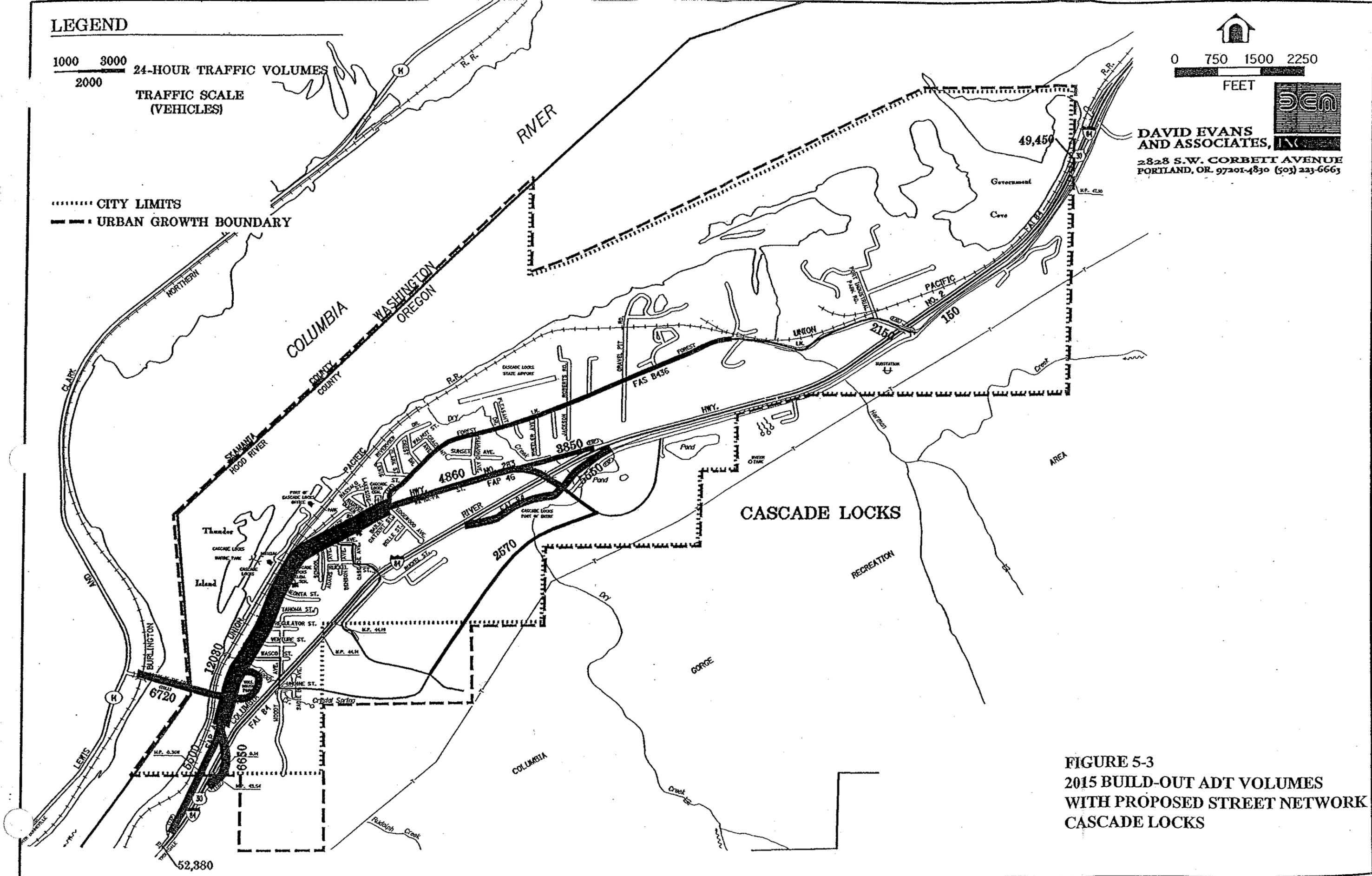


FIGURE 5-3
2015 BUILD-OUT ADT VOLUMES
WITH PROPOSED STREET NETWORK
CASCADE LOCKS

**TABLE 5-1
2015 BUILD-OUT WITH EXISTING STREET NETWORK ESTIMATED V/C AND
LOS STREET ROADWAYS IN CASCADE LOCKS**

Location	V/C Ratio	Speed	LOS
I-84 west of Exit 44	0.77	65 mph	C
I-84 east of Exit 44	0.73	65 mph	C
I-84 westbound on-ramp at Exit 44	0.31	45 mph	B
I-84 eastbound off-ramp at Exit 44	0.37	45 mph	B
I-84 westbound off-ramp at Exit 44	0.21	45 mph	A
I-84 eastbound on-ramp at Exit 44	0.31	45 mph	B
US 30, north of foot of the Bridge of the Gods	0.67	35 mph	D
Wa-Na-Pa Street east of Edgewood Avenue	0.36	55 mph	B

5.4.4 2015 Build-Out With Proposed Street Network

Table 5-8 shows the estimated V/C ratios and LOS for selected segments of the roadways in Cascade Locks for the 2015 Build-Out, with the proposed street network. Interstate 84 and the on- and off-ramps along the interstate are expected to be at LOS of C or better with V/C ratios of 0.77 or less. On Highway 30, north of the Bridge of the Gods, a V/C ratio 0.67 and a LOS of D is anticipated. On the remaining roadways, the traffic conditions are estimated to be LOS A or better with V/C ratios of 0.27 or less.

It appears that an additional collector street would reduce the V/C ratio and improve the LOS on Wa-Na-Pa Street.

**TABLE 5-1
2015 BUILD-OUT WITH PROPOSED STREET NETWORK
ESTIMATED V/C AND LOS OF ROADWAYS IN CASCADE LOCKS**

Location	V/C Ratio	Speed	LOS
I-84 west of Exit 44	0.77	65 mph	C
I-84 east of Exit 44	0.73	65 mph	C
I-84 westbound on-ramp	0.31	45 mph	B
I-84 eastbound off-ramp	0.37	45 mph	B
I-84 westbound off-ramp	0.21	45 mph	A
I-84 eastbound on-ramp	0.31	45 mph	B
US 30, north of foot of the Bridge of the Gods	0.67	35 mph	D
Wa-Na-Pa Street east of Edgewood Avenue	0.27	55 mph	A
Proposed street south of I-84 (two lanes)	0.14	35 mph	A

5.4.5 2015 Build-Out With Proposed Street Network and Proposed Interchange

Table 5-9 shows the estimated V/C ratios and LOS for selected segments of the roadways in Cascade Locks for the 2015 Build-Out, with the proposed street network and proposed interchange. Interstate 84 and the on- and off-ramps along the interstate are expected to be at LOS of C or better with V/C ratios of 0.77 or less. On Highway 30, north of the Bridge of the Gods, a V/C ratio of 0.59 and a LOS of C is also anticipated. On the remaining roadways, the traffic conditions are estimated to be LOS A or better with V/C ratios of 0.26 or less.

It appears that the proposed interchange would shift some of the new traffic from using I-84, Exit 44, to this new interchange. The new interchange would reduce the V/C ratio on all four ramps at I-84 Exit 44; and it would also improve their LOS except on the I-84 eastbound off-ramp.

**TABLE 5-1
2015 BUILD-OUT WITH EXISTING STREET NETWORK ESTIMATED V/C AND
LOS STREET ROADWAYS IN CASCADE LOCKS**

Location	V/C Ratio	Speed	LOS
I-84 west of Exit 44	0.77	65 mph	C
I-84 east of Exit 44	0.73	65 mph	C
I-84 westbound on-ramp at Exit 44	0.31	45 mph	B
I-84 eastbound off-ramp at Exit 44	0.37	45 mph	B
I-84 westbound off-ramp at Exit 44	0.21	45 mph	A
I-84 eastbound on-ramp at Exit 44	0.31	45 mph	B
US 30, north of foot of the Bridge of the Gods	0.67	35 mph	D
Wa-Na-Pa Street east of Edgewood Avenue	0.36	55 mph	B

5.4.4 2015 Build-Out With Proposed Street Network

Table 5-8 shows the estimated V/C ratios and LOS for selected segments of the roadways in Cascade Locks for the 2015 Build-Out, with the proposed street network. Interstate 84 and the on- and off-ramps along the interstate are expected to be at LOS of C or better with V/C ratios of 0.77 or less. On Highway 30, north of the Bridge of the Gods, a V/C ratio 0.67 and a LOS of D is anticipated. On the remaining roadways, the traffic conditions are estimated to be LOS A or better with V/C ratios of 0.27 or less.

It appears that an additional collector street would reduce the V/C ratio and improve the LOS on Wa-Na-Pa Street.

**TABLE 5-1
2015 BUILD-OUT WITH PROPOSED STREET NETWORK
ESTIMATED V/C AND LOS OF ROADWAYS IN CASCADE LOCKS**

Location	V/C Ratio	Speed	LOS
I-84 west of Exit 44	0.77	65 mph	C
I-84 east of Exit 44	0.73	65 mph	C
I-84 westbound on-ramp	0.31	45 mph	B
I-84 eastbound off-ramp	0.37	45 mph	B
I-84 westbound off-ramp	0.21	45 mph	A
I-84 eastbound on-ramp	0.31	45 mph	B
US 30, north of foot of the Bridge of the Gods	0.67	35 mph	D
Wa-Na-Pa Street east of Edgewood Avenue	0.27	55 mph	A
Proposed street south of I-84 (two lanes)	0.14	35 mph	A

5.4.5 2015 Build-Out With Proposed Street Network and Proposed Interchange

Table 5-9 shows the estimated V/C ratios and LOS for selected segments of the roadways in Cascade Locks for the 2015 Build-Out, with the proposed street network and proposed interchange. Interstate 84 and the on- and off-ramps along the interstate are expected to be at LOS of C or better with V/C ratios of 0.77 or less. On Highway 30, north of the Bridge of the Gods, a V/C ratio of 0.59 and a LOS of C is also anticipated. On the remaining roadways, the traffic conditions are estimated to be LOS A or better with V/C ratios of 0.26 or less.

It appears that the proposed interchange would shift some of the new traffic from using I-84, Exit 44, to this new interchange. The new interchange would reduce the V/C ratio on all four ramps at I-84 Exit 44; and it would also improve their LOS except on the I-84 eastbound off-ramp.

6. TRANSPORTATION SYSTEM PLAN

The purpose of this chapter is to provide long-range plans for each mode of the transportation system within the City of Cascade Locks. Components of the transportation system plan include: 1) street classification standards, 2) access management recommendations, 3) transportation demand management measures, 4) modal plans, and 5) a systems plan implementation program.

6.1 STREET CLASSIFICATION STANDARDS

Street classification standards relate the design of a roadway to its function. The function is determined by operational characteristics such as traffic volume, traffic composition (through/local), operating speed, safety, and capacity. Street standards are necessary to provide a community with roadways which are relatively safe, aesthetically pleasing, and easy to administer when new roadways are planned or constructed. They are based on experience, and policies and publications of the profession.

Existing street classification standards for Cascade Locks are summarized in Chapter 3.

The street specifications do not include sidewalks as part of the cross section, although separate drawings for sidewalks and ADA-standard curb cuts are provided, showing a five-foot minimum width, except in the historical area, which has a six-foot minimum width. Bikeways are not shown.

The development of the TSP provides the City of Cascade Locks with an opportunity to review and revise the existing street classification and street design standards to more closely meet the goals and objectives of the Transportation System Plan. The recommended future street classifications are illustrated in Figure 6-1. Included in these figures are the street classifications for all proposed future roadways, as well as for existing streets. The alignment of new roadways may vary considerably from the illustration (Figure 6-1) depending on topography, etc. More exact alignments will be determined as part of project refinement. The recommended street design standards are shown graphically in Figures 6-2 through 6-6, summarized in Table 6-1, and described in detail in the following sections.

Although portions of the study areas, especially immediately outside city boundaries but within urban growth boundaries, may presently have a rural appearance, these lands will ultimately be part of the urban area. Urban road standards should also be applied to these outlying areas. Retrofitting rural streets to urban standards in the future is expensive and controversial; it is better to initially build them to an acceptable urban standard if expected to be urban in the future.

**TABLE 6-1
STREET DESIGN STANDARDS**

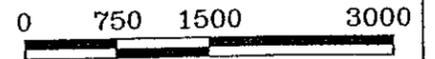
Classification	Pavement Width	Right-of-Way Width	Minimum Posted Speed
Local Residential	24-38 ft.	50-60 ft.	none
Local Industrial	40 ft.	60-80 ft.	25 mph
Collector	40 ft.	60 ft.	25 mph
Minor Arterial	46-52 ft.	80 ft.	30 mph
Wa Na Pa Street	50-56 ft.	80 ft.	30 mph

LEGEND:

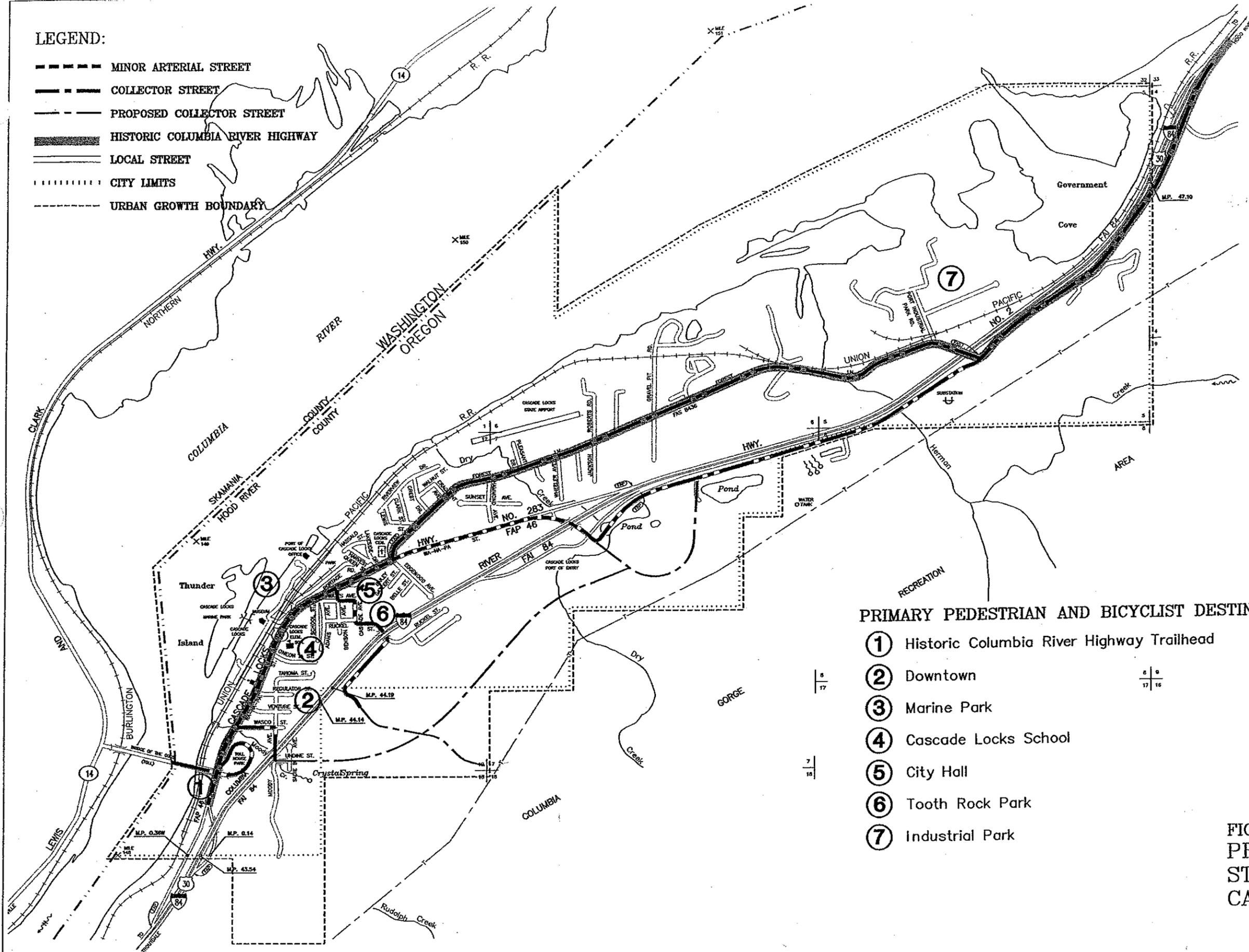
- MINOR ARTERIAL STREET
- - - COLLECTOR STREET
- - - PROPOSED COLLECTOR STREET
- ▬ HISTORIC COLUMBIA RIVER HIGHWAY
- ▬ LOCAL STREET
- ⋯ CITY LIMITS
- - - URBAN GROWTH BOUNDARY



NOT TO SCALE



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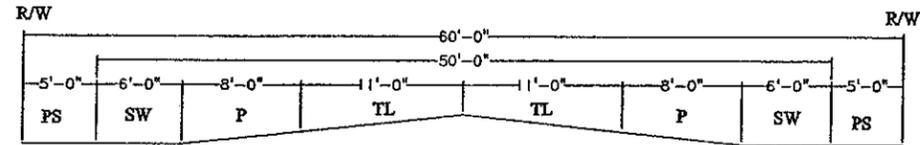


PRIMARY PEDESTRIAN AND BICYCLIST DESTINATIONS

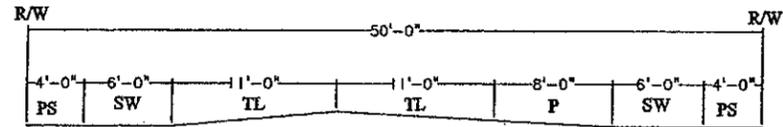
- ① Historic Columbia River Highway Trailhead
- ② Downtown
- ③ Marine Park
- ④ Cascade Locks School
- ⑤ City Hall
- ⑥ Tooth Rock Park
- ⑦ Industrial Park

**FIGURE 6-1
PROPOSED FUTURE
STREET CLASSIFICATION
CASCADE LOCKS**

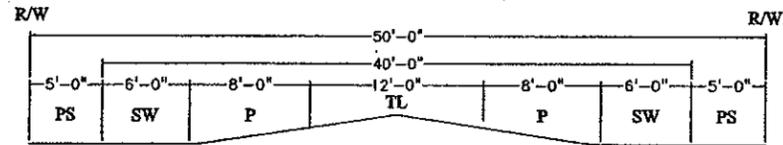
LOCAL - RESIDENTIAL - 38 FEET WIDE
PARKING BOTH SIDES



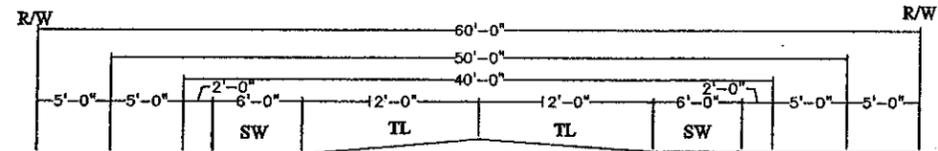
PARKING - ONE SIDE ONLY



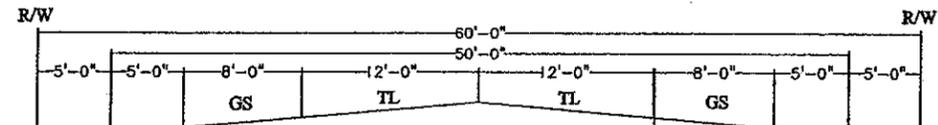
LOCAL - RESIDENTIAL - 28 FEET WIDE
PARKING BOTH SIDES



CUL-DE-SAC
WITHOUT PARKING



COUNTRY LANE
WITHOUT CURB OR SIDEWALK

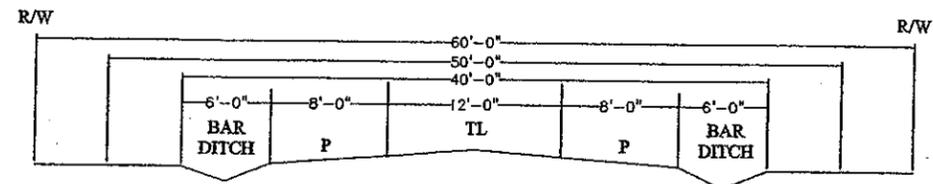


LEGEND

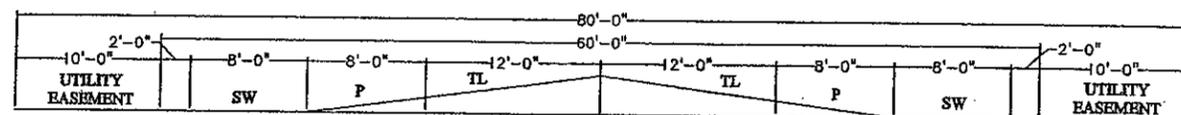
- TL = TRAVEL LANE
- P = PARKING
- PS = PUBLIC STRIP
- SW = SIDEWALK
- R/W = RIGHT OF WAY LINE
- GS = GRAVEL SHOULDER

FIGURE 6-2
PROPOSED STREET
DESIGN STANDARDS
Local Streets
Not to Scale

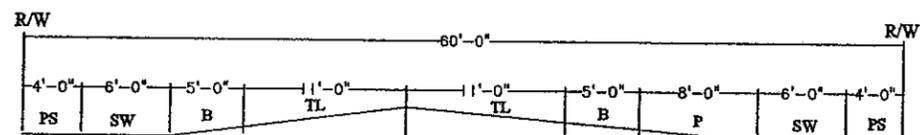
LOCAL ONE WAY STREET



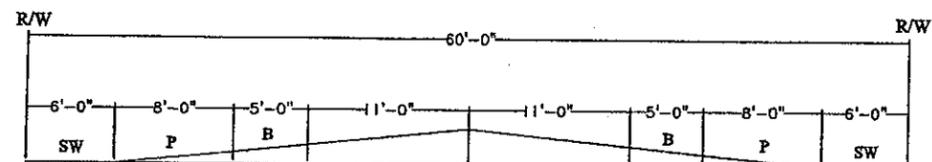
LOCAL INDUSTRIAL STREET



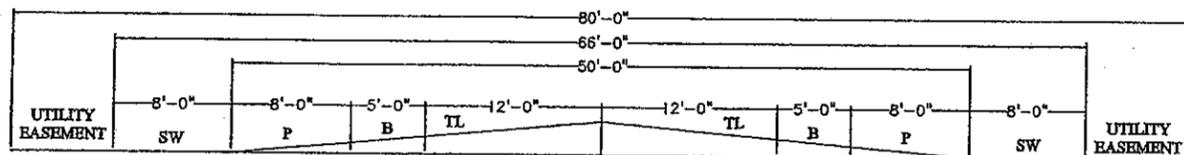
COLLECTOR - 40 FEET WIDE



COLLECTOR - 48 FEET WIDE



MINOR ARTERIAL



LEGEND

- TL = TRAVEL LANE
- P = PARKING
- PS = PLANTING STRIP
- SW = SIDEWALK
- R/W = RIGHT OF WAY LINE
- B = BIKE LANE

FIGURE 6-3
 PROPOSED STREET
 DESIGN STANDARDS
 Industrial, Collector and Arterial Streets
 Not to Scale

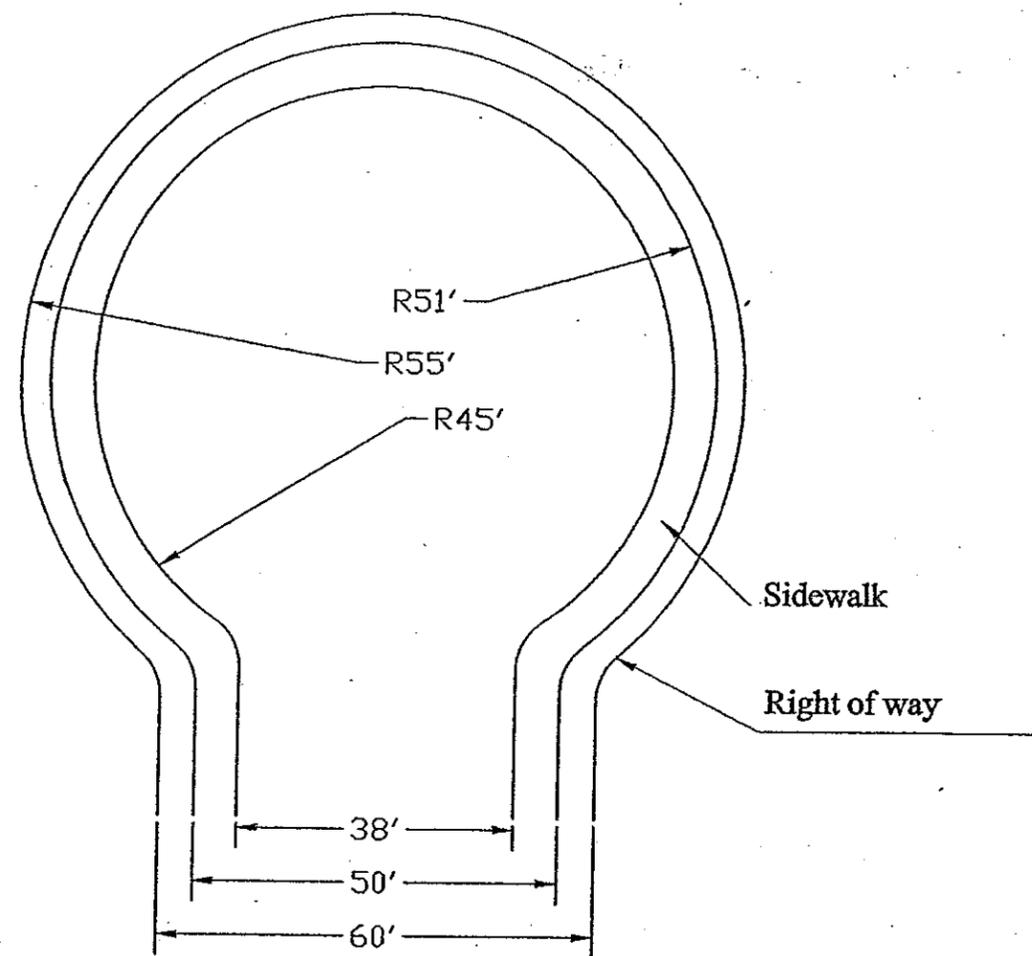


FIGURE 6-4
PROPOSED STREET
DESIGN STANDARDS
Cul-De-Sac
Not to Scale

6.2 STREET DESIGN STANDARDS

The street design standards are intended to apply to new streets or major street construction. The standards represent the ideal designs to be applied for local, collector, and minor arterial streets in the City. As noted in the following subsections, allowances should be made to adjust the standards to accommodate significantly constrained circumstances, such as steep topography, environmentally sensitive areas, and existing improvements that cannot be reasonably removed or modified. In these circumstances, it is appropriate to modify the standards only to the degree necessary while allowing the facility to function appropriately.

6.2.1 Local Residential Streets

The design of a residential street affects its traffic operation, safety, and livability. The residential street should be designed to enhance the livability of the neighborhood, as well as to generally accommodate less than 1,200 vehicles per day. Speeds are normally not posted, with a statutory 25 mph applying. When traffic volumes exceed approximately 1,000 to 1,200 vehicles day, traffic becomes a noise and safety problem. To maintain neighborhoods, local residential streets should be designed to encourage low speed travel and to discourage through traffic.

A well-connected grid system of relatively short blocks can minimize excessive volumes of motor vehicles by providing a series of equally attractive or restrictive travel options. This street pattern is also beneficial to pedestrians and bicyclists.

The proposed standard for a local residential street is a 28- to 38-foot roadway, curb face-to-curb face within a 50- to 60-foot right-of-way, as shown on Figure 6-2. Six-foot-wide sidewalks should be provided on each side of the roadway, depending on right-of-way limitations. A 0 to 5-foot utility easement is also recommended on both sides of the road, as needed.

The 38-foot cross section will accommodate passage of two lanes of moving traffic in each direction with curb parking on both sides. The 30-foot cross section allows parking on only one side. On low volume residential streets where curb parking may occur on both sides of a 28-foot-wide street, traffic will move freely but slowly. Narrower streets improve neighborhood aesthetics and discourage speeding and through traffic. They also reduce right-of-way needs, construction costs, stormwater run-off, and the need to clear vegetation unnecessarily. Narrower street standards may be appropriate in some cases where adequate off-street parking is provided. These streets have to be wide enough for fire emergency vehicles and sanitary service trucks. Minimum street widths should be 20 feet without parking.

Sidewalks are normally included on all urban streets. To maintain a safe and convenient walkway for at least two adults, a six-foot sidewalk standard with a five-foot minimum is applied in residential areas. Steep slopes, dead end streets, and new development on existing streets (infill) are all cases where it may be appropriate to approve modifications such as narrower streets and sidewalk modifications.

Cul-de-sac, or "dead end" residential streets are intended to serve only the adjacent land in residential neighborhoods. These streets should be short, serving a maximum of 20 single-family houses. Because the streets are short and the traffic volumes relatively low, the street width can be narrower than a standard residential street, allowing for the passage of two lanes of traffic when no vehicles are parked at the curb or one lane of traffic when vehicles are parked at the curb.

The street width of a cul-de-sac is 24 feet, curb face-to-curb face within a 50-foot right-of-way, as shown in Figures 6-2 and 6-4. A six-foot-wide sidewalk shall be located on each side of the roadway, adjacent to the curb.

Because cul-de-sac streets limit street and neighborhood connectivity, they will be used only where topographical or other environmental constraints prevent street connections. Where used, pedestrian and bicycle connections to adjacent cul-de-sacs or through streets should be encouraged.

The majority of the residential streets in the city do not meet the local street standards described herein. For many of these neighborhoods, which typically are fully developed, there is realistically no financing available for street widening, curbs, and sidewalks in the foreseeable future. For minor developments that occur within these neighborhoods, such as a partition, it is not prudent to develop isolated sections of local street to the desired local street standards. It will be more reasonable to match new street improvements with those in the area. A country lane standard, which is also shown in Figure 6-2, is intended for these situations.

Local Residential Application Guidelines

Street Type

38 feet parking both sides	Intended for new residential or mixed residential/commercial development with anticipated average daily traffic (ADT) for the street of over 600 vehicles per day. Anticipated on-street parking demand is relatively high due to existing uses with limited on-site parking, nearby commercial uses, or other factors. Generally, this standard should be required for developments with more than 40 residential units. If parking is considered critical and physical constraints prevent construction of all design elements, curb-to-curb pavement width should be reduced first, followed by omitting a sidewalk on one side of the street.
30 feet parking one side or 28 feet parking both sides	Intended for new residential development with anticipated average daily traffic (ADT) for the street of less than 600 vehicles per day. Anticipated on-street parking demand is relatively low because of sufficient on-site parking, low density uses, or other factors. Generally, this standard should always be required for developments with more than 20 residential units. This standard is also appropriate for infill development of any size when comparable street improvements, such as curb and sidewalk, exist or are anticipated in the immediate vicinity. If physical constraints prevent construction of all design elements, curb-to-curb pavement width should be reduced first, followed by omitting a sidewalk on one side of the street.
Cul-de-sac	Intended for new residential development with anticipated average daily traffic (ADT) for the street of less than 200 vehicles per day. Street width and cul-de-sac bulb radii should be designed to accommodate anticipated on-street parking and emergency access. Generally should be allowed to serve a maximum of 20 residential units.
Country Lane	Intended for new residential development with anticipated average daily traffic (ADT) for the street of less than 600 vehicles per day. Anticipated on-street parking demand is relatively low because of sufficient on-site parking, low density uses, or other factors. This standard should be required for developments of any size only when it is determined that the 38-foot or 30-foot standards are not appropriate.

6.2.2 Local Industrial Streets

This type of local street is solely intended for industrial and commercial areas in the city. The wider street cross section is designed to accommodate maneuvering needs of larger trucks. The street design is shown on Figure 6-3.

6.2.3 Collector Streets

Collectors are intended to carry between 1,200 and 10,000 vehicles per day, including limited through traffic, at a minimum posted speed of 25 mph. A collector can serve residential, commercial, industrial, or mixed land uses. Collectors focus on connecting arterials, typically in higher volume commercial areas.

Figure 6-3 shows two alternative cross sections with a 60-foot right-of-way. Alternative 1 is a 40-foot paved width. This allows two travel lanes, two bicycle lanes, and parking on one side of the street. The roadway can also be striped to provide two travel lanes plus left-turn lanes at intersections or driveways by removing parking for short distances. Alternative 2 allows two travel lanes and parking on both sides

with separate bicycle lanes. If the topography limits street width and the development provides for off street parking, narrower streets may be approved.

Six-foot sidewalks should be provided on each side of the roadway. In commercial or business areas, the sidewalks may be eight feet wide, and may be located adjacent to the curb to facilitate loading and unloading at the curb.

A 0 to 4-foot utility easement is also recommended on both sides of the road, as needed.

The maximum grade under normal circumstances should be 12 percent. However, this may be reduced by 2 percent due to the ice and snow, or made 2 percent steeper for short lengths (less than 500 ft.) on low volume collectors.

If traffic volume forecasts exceed 5,000 vehicles per day on a collector, new driveways serving single- or multi-family houses should be limited.

Collector Street Type	Application Guidelines
-----------------------	------------------------

40 feet parking one side	Intended for designated collector streets where the anticipated on-street parking demand is relatively low because of low intensity uses and/or sufficient on-site parking. Although it may take a long time to complete, sidewalks and bicycle lanes should be planned for and ultimately provided on both sides of the street. This street design should be used in areas with difficult topography or similar physical constraints. For significantly constrained situations, consideration should be given to omit design features in the following general order: 1. Sidewalk on one side; 2. Bicycle lanes; and 3. Prohibit parking on both sides. Safety and anticipated need should be evaluated to determine which features to omit.
48 feet parking both sides	Intended for designated collector streets where the anticipated on-street parking demand is relatively high due to existing uses with limited on-site parking, nearby commercial uses, or other factors. Although it may take a long time to complete, sidewalks and bicycle lanes should be planned for and ultimately provided on both sides of the street.

6.2.4 Minor Arterial Streets

Minor arterials provide service between collectors and major arterials. They generally provide high volume connections, but still serve adjacent land uses. These streets are often the "main street" in a neighborhood shopping district.

Two-way minor arterial streets consist of two 12-foot travel lanes, two six-foot bike lanes, and two eight-foot parking lanes, as shown in Figure 6-3. These streets will include six-foot sidewalks on both sides of the roadway. Minor arterials should have an 80-foot right-of-way.

One way minor arterial streets have a similar cross section to two way minor arterials, but with only one bike lane. The street cross sections are shown in Figure 6-3.

6.2.5 Wa Na Pa Street

Wa Na Pa Street serves the downtown core of Cascade Locks. It must meet special demands for on-street parking and pedestrian comfort and accessibility. If possible, sidewalks are to be 8 to 12 feet wide for commercial streets (6 feet wide for industrial streets), and such details as clearly marked crossings, street furniture and landscaping should be considered. Diagonal parking is to be avoided if possible. A utility easement is also recommended, ranging from 0 to 10 feet on each side of the road.

6.2.6 Alleys

Alleyways can be a useful way to diminish street width by providing rear access and parking to residential areas. Including alleys in a subdivision design allows homes to be placed closer to the street and eliminates the need for garages to be the dominant architecture feature. This pattern, once common, has been recently revived as a way to build better neighborhoods. In addition, alleys can be useful in commercial and industrial areas, allowing access by delivery trucks that is off of the main streets. Alleys are encouraged when appropriate. Alleys are to be 12 to 20 feet wide, with a 20-foot right-of-way.

6.2.7 Bike Lanes

In cases where a bikeway is proposed within the street right-of-way, 10 feet of roadway pavement (between curbs) should be provided for a five-foot bikeway (collector and arterial streets) on each side of the street. Except in rare circumstances, bike lanes on one-way streets are located on the right side of the roadway and flow in the same direction as vehicular traffic. The striping is done in conformance with the State Bicycle and Pedestrian Plan (1995). In cases where curb parking will exist with a bike lane, the bike lane will be located between the parking and travel lanes. In some situations, curb parking may have to be removed to permit a bike lane.

Bikeways must be integrated with the construction of new streets or as part of street improvement projects. The implementation program identifies an approximate schedule for street improvements.

On arterial and collector streets that are not scheduled to be improved as part of the street system plan, bike lanes should be added to the existing roadway at any time to encourage cycling or when traffic volumes exceed or are expected to exceed 2,500 to 3,000 vehicles per day.

6.2.8 Sidewalks

A complete pedestrian system should be implemented in the Cascade Locks. Every street should have sidewalks on both sides of the roadway. Sidewalks on residential streets should have a six-foot-wide paved width. Collector and arterial streets should have six-foot-wide sidewalks. Where possible, Wa Na Pa Street should have 12-foot-wide curb sidewalks. In addition, pedestrian and bicycle connections should be provided between any cul-de-sac or other dead-end streets.

Another essential component of the sidewalk system is street crossings. Intersections must be designed to provide safe and comfortable crossing opportunities.

6.2.9 Curb Parking Restrictions

Curb parking should be prohibited at least 25 feet from the end of an intersection curb return to provide sight distance at street crossings. In addition, parking restrictions may be necessary to provide planned bike lanes.

6.2.10 Street Connectivity

Street connectivity is important because a well-connected street system provides more capacity than a disconnected one, provides alternate routes for local traffic, and is more pedestrian and bicycle-friendly. It is critical that the street grid system be extended as development occurs in Cascade Locks. To this end, a maximum block perimeter of 1,600 feet is recommended as a guideline. Street connectivity is a problem due to the river, topography, I-84, and the railroad. Projects have been included in the street system plan to improve connectivity. In addition, the city shall adopt a new street standards resolution, which will include requirements for

6.3 ACCESS MANAGEMENT

Access management is an important tool for maintaining an efficient and safe transportation system. The lack of a prudent access management plan can result in excessive numbers of access points along arterial streets. Too many access points can diminish the function of an arterial, mainly due to delays and safety hazards created by turning movements. Traditionally, the response to this situation is to add lanes to the street. However, this can lead to increases in traffic and, in a cyclical fashion, require increasingly expensive capital investments to continually expand the roadway.

Reducing capital expenditures is not the only argument for access management. Additional driveways along arterial streets lead to an increased number of potential conflict points between vehicles entering and exiting the driveway, and through vehicles on the arterial streets. This not only leads to increased vehicle delay and a deterioration in the level of service on the arterial, but also leads to a reduction in safety.

Research has shown a direct correlation between the number of access points and collision rates. In addition, the wider arterial streets that can ultimately result from poor access management can diminish the livability of a community.

6.3.1 Potential Access Management Techniques

The access points to an arterial can be restricted through the following techniques:

- Restricting spacing between access points (driveways) based on the type of development and the speed along the arterial.
- Sharing of access points between adjacent properties.
- Providing access via collector or local streets where possible.
- Constructing frontage roads to separate local traffic from through traffic.
- Providing service drives to prevent spill-over of vehicle queues onto the adjoining roadways.
- Providing acceleration, deceleration, and right turn only lanes.
- Offsetting driveways to produce T-intersections to minimize the number of conflict points between traffic using the driveways and through traffic.
- Installing median barriers to control conflicts associated with left turn movements.
- Installing side barriers to the property along the arterial to restrict access width to a minimum.

Access management is hierarchical, ranging from complete access control on freeways to increasing use of streets for access purposes, parking and loading at the local and collector level. The access management techniques and standards in this report are applicable to the arterial and collector streets. Local streets are intended to primarily provide access; therefore access management techniques are not needed along local streets.

These access management restrictions are generally not intended to eliminate existing intersections or driveways. Rather, they should be applied as new development or major construction occurs. Over time, as land is developed and redeveloped or the roadway is modernized, the access to roadways will meet these guidelines. However, where there is a recognized problem, such as an unusual number of collisions, these techniques and standards can be applied to retrofit existing roadways.

6.3.2 Recommended Access Management Techniques

Based upon public and TAC review, a variety of potential access management techniques were reviewed. The following techniques are identified as key strategies for access management. Other techniques may be applied as appropriate to meet access management goals. These techniques would be applied to arterials and collectors, not local streets.

- Optimize traffic signal installation, spacing and coordination;
- Regulate minimum spacing of driveways;
- Regulate maximum number of driveways per property frontage;
- Consolidate access for adjacent properties;
- Restrict parking on roadway adjacent to driveways to increase driveway turning speeds;
- Provide direct access on lower functional class street when available;
- Encourage connections between adjacent properties; and
- Require adequate internal design and circulation plan.

These eight access management techniques are described in more detail in Appendix B.

6.3.3 Access Management Guidelines

Access management is important for promoting safe and efficient travel for both local and long distance users within the planning area. The 1999 Oregon Highway Plan (OHP) classifies I-84 as an interstate facility and the Historic Columbia River Highway as a district highway. These highways are to be managed to ensure that each will continue to serve its intended function by maintaining the capacity and condition of each facility. The OHP establishes access management categories for state routes ranging from full control for freeways to partial control for regional or district highways.

Intersection and driveway spacing for future improvements on Wa Na Pa Street (US 30) is limited to 400 feet. This spacing is not practical to meet in the next 20 years particularly in the highly developed areas. The recommended spacings are shown in Table 6-2.

The City or Hood River County have jurisdiction regarding access management for the collector and local streets within the Cascade Locks Urban Growth Boundary. The access management guidelines for these streets are also shown in Table 6-2.

**TABLE 6-1
ACCESS MANAGEMENT GUIDELINES**

Highway Section Description	Class	Min. Street Spacing (feet)	Min. Access** Spacing (feet)
<i>State Jurisdiction</i>			
US 30 through Cascade Locks	Minor Arterial	400	400
Frontage Road in Cascade Locks	Collector	400	400
<i>City/County Jurisdiction</i>			
Forest Lane	Collector	250	100
New Collector Streets	Collector	250	100
New Local Streets – Residential and Industrial	Local Street	100	--

Note: *spacing for signals may vary based on traffic engineering analysis, including signal coordination.
 **exceptions reviewed on a case-by-case basis.

It is acknowledged by ODOT, Hood River County, and the City that it is not always possible to satisfy the access management guidelines. Therefore, procedures have been established to review requests for street access which do not meet the guidelines. For roads under state jurisdiction, Section OAR 734.051.0329 Requests for Deviations to Access Management Standards, of the Oregon Administrative Rules is used to judge such requests. Deviations are approved or denied by the ODOT Region Manager based on consideration of traffic operation and safety, circumstances which make compliance with the guidelines impractical (e.g., topography, environmentally sensitive areas, existing improvements, no alternate access).

Deviations from City and/or County streets shall be approved or denied by the City Engineer. The decision will also be based similar consideration of traffic operation and safety, circumstances, which make compliance with the guidelines impractical. For County streets, the City shall request a recommendation from the County.

6.4 MODAL PLANS

The modal plans are based on TSP goals and objectives, physical inventory, forecasts, input from transportation service providers, and public input. The plans consider transportation system needs for the City of Cascade Locks. Specific transportation system improvement projects for all modes of travel were identified to address identified needs. The timing for individual improvements will be guided by the changes in land use patterns and growth of the population in future years. Adjustment to specific projects and improvement schedules will likely need to be adjusted depending on where growth occurs within the planning area.

This chapter discusses ten modal plans. These are: 1) Pedestrian System, 2) Bicycle System, 3) Street System, 4) Transportation Demand Management, 5) Public Transportation Plan, 5) Rail Service, 6) Air Service, 7) Pipeline Service, 8) Truck Freight, 9) Water Transport/Ports, and 10) Telecommunications. All of these plans closely interrelate; for example, the street system plan, although primarily designed around the motor vehicle traffic forecasts, will also serve pedestrians, bicyclists, and transit users.

Projects for the transportation modes are short-range (0-5 years), intermediate-range (5-10 years), and long-range (10-20 years). Each modal plan also includes a budgetary cost estimate. Funding for the Transportation System Plan is discussed in Chapter 7.

6.4.1 Pedestrian System Plan

A complete pedestrian system should be implemented in the city. Every paved street should have sidewalks on both sides of the roadway meeting the street standards described above. Pedestrian access on walkways should be provided between all buildings including shopping centers and abutting streets and adjacent neighborhoods. Priority for pedestrian improvements should be given to routes that will provide connections between important destinations.

Within Cascade Locks, sidewalks are lacking in most neighborhoods and pedestrians must frequently share roads with cars. The City of Cascade Locks has identified the need to establish a more pedestrian-friendly environment throughout its downtown on Wa-Na-Pa Street/US 30. This plan aims to generally increase sidewalk widths to 12 feet, provide additional areas for street trees and benches, shorten pedestrian crossings, and develop numerous walking loops within the downtown and Marine Park. An obstacle to creating a better pedestrian environment is the large number of dead end streets.

Table 6-3 contains a list of specific pedestrian improvements that are planned for construction over the next 20 years. (Figure 6-5 shows where most of these projects are located.)

The pedestrian improvements include only sidewalk projects. Although shoulder additions can serve pedestrians, they are not ideal because they are not separated from the roadway. However, in rural areas where development may not occur quickly, the addition of shoulders is often the most practical improvement that can be implemented. Generally, shoulders are more of a benefit to cyclists than to pedestrians; therefore, proposed shoulder-widening or additions are discussed in the Bicycle System Plan section of this chapter.

A six-foot wide sidewalk with curbs already in place costs about \$30 per linear foot. Adding a curb as well as a six-foot wide sidewalk costs about \$35 per linear foot. In commercial areas, an eight-foot wide sidewalk with a curb would cost about \$45 per linear foot. A typical block in Cascade Locks would require about 300 linear feet of sidewalk (2 x 150 ft). For a six-foot-wide sidewalk including curbs, the cost would be approximately \$10,500. With curbs already in place, the cost would be approximately \$9,000.

Other Streets: Missing sidewalk segments should be completed whenever an opportunity presents itself (such as infill development, special grants, etc.), concentrating on arterial streets, collectors, and school routes.

Pedestrian Crossings: Improve the safety of pedestrian crossings through additional/improved signing and lighting, curb extensions, and speed control measures.

**TABLE 6-1
RECOMMENDED SIDEWALK PROJECTS**

Project No.	Location	Description	Length (feet)	Cost (\$K)
Short-Range				
NCL3	School Access Road, South From Wa-Na-Pa St. (west side – completed in 1998)	Install sidewalks	650	\$20,000
NCL4	Various	Curb ramps at 20 locations	NA	\$9,000
NCL5	Wa-Na-Pa St. at Forest Ln. and at School Access Road Intersections	Install striped crosswalks	NA	\$600
NCL8	Highway 30 to Visitors Center	Pedestrian trail	NA	\$200,000
Intermediate-Range				
NCL1	Wa-Na-Pa St., East of Oneonta St. to Forest Ln. (south side)	Install sidewalks	2,105	\$63,150
Long-Range				
NCL2	Forest Ln., Wa-Na-Pa St. to Wheeler Ave. (north side)	Install sidewalks	3,080	\$92,400
Total Cost				\$385,150

Note: Pedestrian projects include sidewalks on both sides unless otherwise noted.

Project NCL1

Sidewalks along Wa-Na-Pa Street (collector) from east of Oneonta Street to Forest Lane, south side, 2,105 feet.

Cost: \$63,150

Project NCL2

Sidewalks along Forest Lane (collector) from Wa-Na-Pa Street to Wheeler Avenue, north side, 3,080 feet.

Cost: \$92,400

Project NCL3 - Completed

Sidewalks along School access street south from Wa-Na-Pa Street, west side, 650 feet.

Cost: \$20,000

Project NCL4

Curb ramps are recommended at about 20 locations on arterial and collector streets.

Cost: \$9,000 (\$450 per ramp)

Project NCL5

Striped crosswalks are recommended at Wa-Na-Pa Street and Forest Lane and at the school access street.

Cost: \$600

Project NCL8

Construct pedestrian trail from Highway 30 to the visitor center.

Cost: \$200,000

6.4.2 Bicycle System

A list of recommended bikeway improvements for Cascade Locks is displayed in Table 6-4. In addition to the projects proposed in Table 6-4, the new collectors and arterial streets recommended as part of the Street System Plan will include bike lanes (Figure 6-6).

Bike lanes should be one-way, five or six feet wide and located adjacent to the curb, except where there is curb parking or a right-turn lane. Where these conditions occur, the bike lane is located between the through travel lane and the parking or right-turn lane. The bike lane is marked in the same direction as the adjacent travel lane. Striping and signing should conform with the State Bicycle and Pedestrian Plan.

Shared roadway facilities are appropriate for local residential streets where speeds and volumes of motor vehicles are relatively low. A shared roadway facility is one where motorists and cyclists occupy the same roadway. A shoulder bikeway accommodates bicyclists on the hard shoulder of the road.

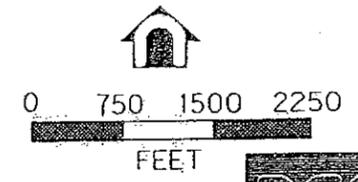
Establishing a complete bike system through Cascade Locks would be difficult due to a lack of connecting streets and steep topography. Some of the streets are too narrow to include bike lanes. The city will focus on developing a continuous east-west route between the Historic Columbia River Highway Trail Head at the Bridge of the Gods to the east city limit. Projects NCL6 and NCL7 in Table 6-4 are intended to provide this route. In the future, bike lanes should be considered for the entire length of Forest Lane. Bicycle trips in a north-south direction will generally be accommodated using the local street system.

To further improve the bicycle network, the city will work with ODOT to evaluate the desirability and feasibility of a bicycle facility along the frontage road on the south side of I-84, between the port of entry and Forest Lane. This could include a separate pedestrian/bicycle path between the frontage road and I-84. Improved accommodation of bicyclists will become increasingly important as more development occurs on the south side of the freeway and if the frontage road becomes a truck route.

Shoulders are sufficient for bicyclists, particularly in rural areas where traffic volumes are lighter. Shoulders improve the road function for all users. However, as land use densities and traffic increases over the long-term, the best solution for all users is to reconstruct the street to full standards with sidewalks and bike lanes.

Where there is significant traffic (more than 6,000 to 10,000 ADT in all directions) or turn lanes at intersections, through and turning bike lanes should be considered.

Bicycle parking is generally lacking in the city. Bike racks should be installed in front of downtown businesses and all public facilities (schools, post office, library, city hall, and parks). Typical rack designs cost about \$50 per bike plus installation. An annual budget of approximately \$500 should be established so that Cascade Locks can place racks where needs are identified and to respond to requests for racks at specific locations.



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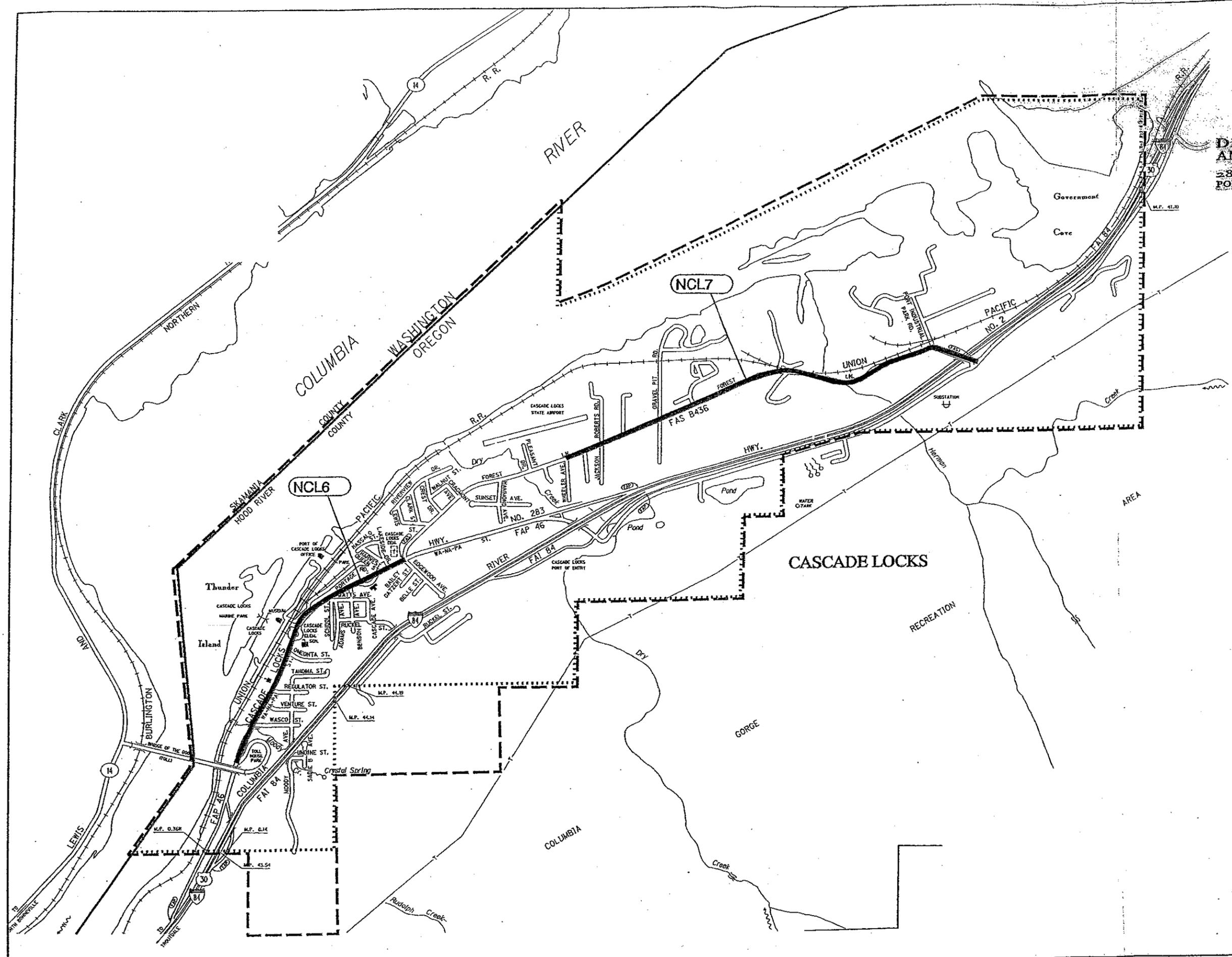


FIGURE 6-6
RECOMMENDED
BIKEWAY PROJECTS
-CASCADE LOCKS

**TABLE 6-1
RECOMMENDED BIKEWAY PROJECTS**

Project No.	Location	Description	Length (ft)	Cost (K)
Short-Range				
NCL6	Wa-Na-Pa St., Bridge of the Gods to Forest Ln.	Stripe Bike Lanes (8P-5B-12-12-5B-8P)	4,500.	\$4,500
Long-Range				
NCL7	Forest Ln., I-84 to Wheeler Ave.	Install 4 ft paved shoulders	12,000	\$290,000
Total Short-Range Projects				\$4,500
Total Long-Range Project				\$290,000
Total Projects				\$294,500

Project NCL6

Bike lanes are recommended on Wa-Na-Pa Street (collector) from the Bridge of the Gods to Forest Lane, 4,500 feet. Two 12-foot travel lanes, five-foot bike lanes, and two eight-foot parking lanes; east of Lakeside Drive there could be a center turn lane instead of the parking lanes.

Cost: \$4,500 for striping, signing and stencils

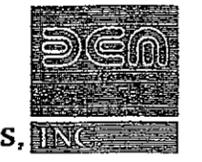
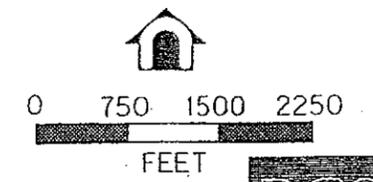
Project NCL7

Paved shoulders are recommended on Forest Lane (collector) from I-84 to Wheeler Avenue, 12,000 feet.

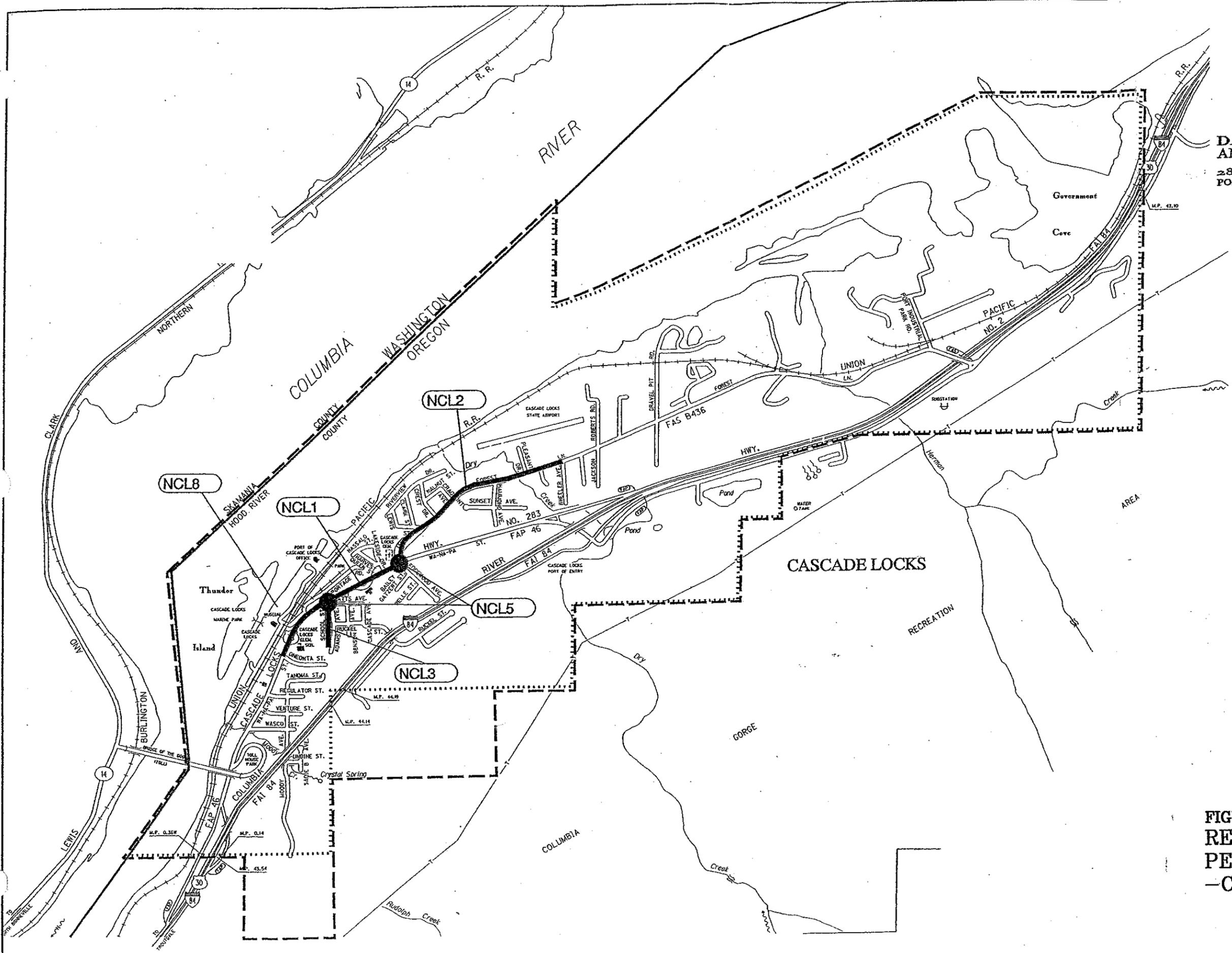
Cost: \$290,000

6.4.3 Street System Plan

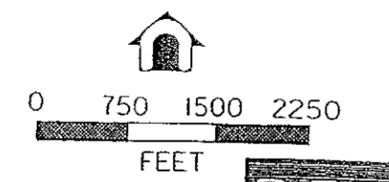
The street system plan outlines a series of improvement options that are recommended for construction within the planning area during the next 20 years. The street system plan was developed by applying recommended street classification standards to the year 2015 traffic forecasts for the recommended street system. The proposed street system plan is summarized in Table 6-5 and Figure 6-7.



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**FIGURE 6-5
RECOMMENDED
PEDESTRIAN PROJECTS
-CASCADE LOCKS**



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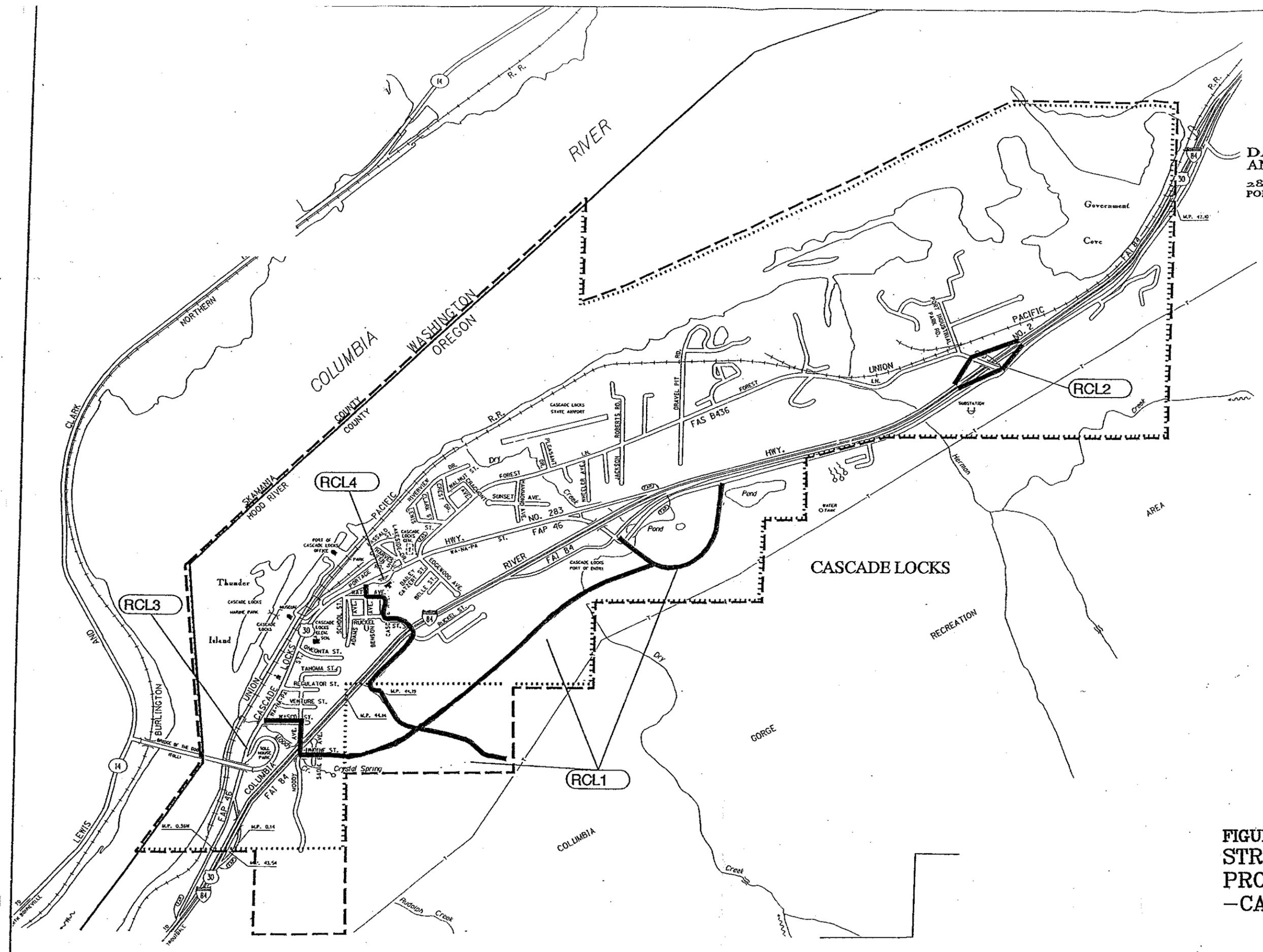


FIGURE 6-7
STREET IMPROVEMENT
PROJECTS
-CASCADE LOCKS

**TABLE 6-1
RECOMMENDED ROADWAY IMPROVEMENT PROJECTS**

Project No.	Description/Location	Cost (\$K)
<i>City of Cascade Locks</i>		
Intermediate-Range		
RCL4	Improve street connection to area south of City Hall	\$150,000
Long-Range		
RCL1	New Road Connecting Frontage Road and Wa-Na-Pa Street	\$1,000,000
RCL2	New Interchange at Forest Lane*	\$2,000,000
RCL3	New Signal at Wa-Na-Pa Street and Bridge of the Gods access road.	\$100,000
Total - City of Cascade Locks		\$3,250,000
<i>Port of Cascade Locks</i>		
Short-Range		
RPCL1	Bridge Approaches Improvements	\$200,000
Long-Range		
RPCL2	Bridge Deck Improvements	\$5,000,000
Total - Port of Cascade Locks		\$5,200,000
Subtotal Short-Range Projects		\$200,000
Subtotal Intermediate-Range Projects		\$3,250,000
Subtotal Long-Range Projects		\$5,000,000
Total		\$8,450,000

Notes: These projects include sidewalks and bike lanes with construction or reconstruction of roadway segments. RCL1 is a top priority for the City due to the Interstate 84 access conditions described in Chapter 4. This project will also require refinement as part of the Interstate 84 rest area environmental impact statement project work.

* This improvement is presently not a high priority for ODOT, however, it may be financed along with development near this proposed interchange.

6.5 TRANSPORTATION DEMAND MANAGEMENT (TDM) PLAN

Through transportation demand management, peak travel demands could be reduced or spread to more efficiently use the transportation system, rather than building new or wider roadways. Techniques that have been successful and could be initiated to help alleviate some traffic congestion include carpooling and vanpooling, alternative work schedules, bicycle and pedestrian facilities, and programs focused on high density employment areas.

6.5.1 Alternative Work Schedules

Alternative work schedules (such as flex-time or staggered work hours), especially with large employers, can help spread the peak period traffic volumes over a longer time period, thus providing greater service out of a fixed capacity roadway. Staggered work schedules shall be encouraged with new industries and be coordinated to eliminate high surges of traffic.

6.5.2 Carpooling and Vanpooling

Ridesharing programs can be established to encourage carpooling. The service allows interested drivers to call a toll-free number, provide information about their trip, and receive a list of others in their general area. The park-and-ride lots in the project list can be used for carpools as well as for transit.

Cities in Hood River County should jointly work with large employers to establish a carpool and vanpool program. These programs, especially oriented to workers living in other neighboring communities, will help to reduce the travel and parking requirements, and to reduce air pollution. Employers can

encourage ridesharing by providing matching services subsidizing vanpools, establishing preferential car and vanpool parking and convenient drop-off sites, and through other promotional incentives.

6.5.3 Bicycle/Pedestrian Facilities

Bicycling and walking can be encouraged by implementing strategies discussed earlier in this plan. Providing secure and convenient bicycle parking, showers, and locker facilities helps to encourage bicycle commuting and walking to work.

6.5.4 Telecommuting

Telecommuting is identified by the OTP as a TDM technique that reduces auto usage. The ability for people to work at home with the telecommuting technology is likely to continue to grow during the next two decades. During the past ten years, the percent of people working at home has more than doubled. If this trend continues, an additional three percent of the work force could stay home and work, thus reducing trips during the peak hour. This could reduce work trips during the peak hour by approximately one percent.

No costs have been estimated for this modal plan. Grants may be available to set up programs; other aspects of Transportation Demand Management can be encouraged through ordinance and policy.

6.6 PUBLIC TRANSPORTATION PLAN

Public transit service within the county is coordinated by the Hood River County Transit District (CAT). The district provides demand-responsive services countywide and regular trips to Portland.

The district intends to expand its countywide transit services.

The existing public transportation services already meet the requirements of the Oregon Transportation Plan. Connections are possible and convenient between all the services provided, and the service frequency meets the required daily trip to a larger city specified for communities the size of Cascade Locks. Cities the size of Cascade Locks do not require a detailed public transportation plan. However, growth should be guided so that it does not prevent transit development in the future.

CAT has identified one capital project in Cascade Locks, which is the construction of a park-and-ride lot, with an estimated cost of \$50,000. The proposed location is somewhere near the Bridge of the Gods.

6.7 RAIL SERVICE PLAN

The Union Pacific freight service runs through the county parallel to I-84, with stops in Hood River and Cascade Locks. The Union Pacific carries cargo to Portland where it links with both north and south lines. Eastbound, it links with lines serving the Rocky Mountain states, Midwest, and eastern portions of the country.

No plans are known to alter these services to the City of Cascade Locks. Efforts should be made by the city to retain or expand their rail service.

6.8 AIR SERVICE PLAN

The Cascade Locks Airport, located near the Columbia River, provides transportation for business industries and tourists commuting to and from Portland. The airstrip consists of a 1,800 by 30-foot black top runway with one telephone located on-site. The state of Oregon owns the airport and the majority of the surrounding parcels. These parcels are subject to height and development restrictions.

The Cascade Locks Airport is a local area service that supports approximately 1,100 flights per year (one-way travel is counted as one flight). It is strategically located for emergency or safety stops in the event of hazardous weather conditions. The airport is used to support emergency rescue and emergency medical evacuations and to fight local forest fires. Aircraft operate visually when traveling in the Gorge. Single or light twin propeller engines are the common aircraft used at the Cascade Locks Airport. The growth of aircraft travel in Cascade Locks is modest with a significant portion of air traffic dedicated to business viability. The state is not considering any airport improvements at this time.

6.9 PIPELINE SERVICE PLAN

There are no natural gas or major pipeline services to Cascade Locks.

6.10 TRUCK FREIGHT SERVICE PLAN

As a primary east-west corridor through the state, I-84 carries high volumes of truck traffic and freight movement. Annual freight volumes through Hood River County on I-84 are estimated at between 23 and 32 million tons. Additional modernization projects are not expected to be required on I-84.

Through truck traffic on Wa Na Pa Street and Forest has long been recognized as a safety and noise problem by city residents. The city shall work with Hood River County and ODOT to establish an appropriate truck route alternative to Forest Lane. The frontage road on the south side of I-84 between the port of entry and Forest Lane appears to be a suitable route. However, this route may need to be improved to accommodate turning movements for large trucks. A reduction of the speed limit and prohibition of exhaust brake use for trucks on Forest Lane shall also be considered by the city.

6.11 WATER TRANSPORT/PORTS SERVICE PLAN

Port of Cascade Locks properties include a marine facility in the western portion of the city adjacent to the Union Pacific mainline and near US 30 and I-84. This shallow draft marina, which is heavily used by recreational watercraft, sits just east of the locks. From the port facilities, recreational trips on the Port's sternwheeler boat and private boats make up the majority of the river traffic.

6.12 TRANSPORTATION SYSTEM PLAN IMPLEMENTATION PROGRAM

Implementation of the Cascade Locks Transportation System Plan will require changes to the comprehensive plan and zoning code. These actions will enable the City of Cascade Locks to address both existing and emerging transportation issues throughout the planning area in a timely and cost effective manner. The "Model Transportation Planning Rule Ordinances and Policies for Small Jurisdictions," dated August 1996 and prepared by David Evans and Associates, Inc., can serve as a guide for the ordinances and policies adoption. This implementation program is geared towards providing these communities with the tools to fund and schedule transportation system improvements.

Many of these Transportation Planning Rule (TPR) requirements are incorporated in the recently adopted Community Development Code. In addition, the city shall adopt a street standards resolution that will further support the TPR.

Table 6-6 lists the projects by type, shows justification, lists project phasing, and provides cost information. The cost estimates for all the projects listed were prepared on the basis of 1996 dollars. These costs include design, construction, right-of-way acquisition, and contingencies where appropriate. The highway and street cost estimates are preliminary by road segment and do not include the cost of adding or relocating public utilities or detailed design of existing street intersections.

The 20-year Improvement Program for the city is estimated to cost approximately \$4 million and for the Port of Cascade Locks it is estimated to cost approximately \$5 million.

This is a list of potential future transportation projects for the City of Cascade Locks. This list provides possible solutions to transportation needs forecasted over the next 20 years. These lists and the plan are intended to be periodically revised. This list may be added to or projects may be deleted as a result of these discussions. Projects are presented for several transportation modes.

7. FUNDING

This chapter evaluates potential funding for projects included in this Transportation System Plan. The evaluation begins with a description of existing funding for transportation improvements in the county from local and non-local sources. This is followed by a description of project costs in this plan and potential funding sources that are outside of the county's budget.

7.1 PROJECT FUNDING IN THE CITY OF CASCADE LOCKS

7.1.1 City of Cascade Locks

Funding in the City of Cascade Locks is primarily from State Highway Fund revenue; the city does not have another source of funding dedicated for transportation expenditures. Transportation-related revenue has been entirely spent on maintenance and preservation of the existing infrastructure--the city has not recently funded any capital improvements such as those included in this plan.

7.1.2 Port of Cascade Locks

The Port of Cascade Locks owns and operates a toll bridge over the Columbia River. Tolls are the primary funding sources for maintenance and improvements to the bridge. The toll is currently \$0.75 for passenger vehicles. This toll currently generates about \$900,000/year for the Port of Cascade Locks.

As owner of the bridge, the Port is entirely responsible for its operation, maintenance, and improvement. Port districts have the authority to issue revenue bonds backed by future toll revenue to fund bridge improvements.

7.2 STATE FUNDING FOR PROJECTS IN HOOD RIVER COUNTY

ODOT allocates state funding for improvement projects through the Statewide Transportation Improvement Program (STIP). The STIP generally allocates funding over a four-year period, and is updated every two years. The current STIP for 2000-2003 includes several projects in Hood River County that will enhance traffic circulation and safety.

7.3 PROJECT COSTS AND FUNDING IN THE CITY OF CASCADE LOCKS

Table 7-1 summarizes project costs in the City of Cascade Locks by type of project.

**TABLE 7-1
SUMMARY OF PROJECT COSTS IN THE CITY OF CASCADE LOCKS BY TYPE OF PROJECT**

Number	Project Location	Project Description	Year	Cost
Roadway Projects				
RPCL1	Bridge of the Gods Road Approaches	Bridge Improvements	1-5	\$200,000
RCL4	Connections to Hwy 30	Street Improvements	6-10	\$150,000
RCL1	Frontage Rd. to Wa-Na-Pa St.	New Roadway	11-20	\$1,000,000
RCL2	New Interchange at Forest Ln.	New Interchange	11-20	\$2,000,000
RCL3	Wa-Na-Pa St. and Bridge of the Gods	New Signalization	11-20	\$100,000
RPCL2	Bridge of the Gods Redecking	Bridge Improvements	11-20	\$5,000,000
Non-Motorized Projects				
NCL3	School Access St. from Wa-Na-Pa St.	Pedestrian Railing	1-5	\$20,000
NCL4	20 Selected Locations	Curb Ramps	1-5	\$9,000
NCL5	Wa-Na-Pa St., Forest Ln., and School Access	Striped Crosswalks	1-5	\$600
NCL6	Wa-Na-Pa St. from Bridge of the Gods to Forest Ln.	Bike Lanes	1-5	\$4,500
NCL8	Hwy 30 to Visitor Center	Pedestrian Trail	1-5	\$200,000
NCL1	Wa-Na-Pa St. from Oneonta to Forest Ln.	Sidewalks	6-10	\$63,150
NCL2	Forest Ln. from Wa-Na-Pa St. to Wheeler Ave.	Sidewalks	11-20	\$92,400
NCL7	Forest Ln. from I-84 to Wheeler Ave.	Shoulder Paving	11-20	\$290,000
NCL 8	Wa Na Pa St. from Bridge of the Gods to Forest Ln.	Antique street lighting	1-5	\$250,000
Transit				
TCL1	Park-and-Ride Lot	Park-and-Ride Lot	6-10	\$50,000

Source: David Evans and Associates, Inc., summarized by ECONorthwest.

Roadway costs in the City of Cascade Locks include \$2 million for a new interchange at I-84 and Forest Road in years 11-20. Since this project is on an interstate highway, it should primarily be funded by ODOT through the STIP. In addition, \$250,000 is for new signals along Wa-Na-Pa Street, which is Hwy 30. ODOT has a policy of sharing 50 percent of the cost of traffic signals on state highways when signal warrants indicate a need. Additional grant funding for this project may be available through ODOT safety programs.

A new road connecting Wa-Na-Pa Street and Frontage Road would cost \$1 million in years 11-20. While this road would not be a state highway, funding through ODOT may be available because this road would improve traffic flow on Hwy 30 through Cascade Locks, improve access to the Cascade Locks Port of Entry, and resolve safety concerns in the city. In addition, this new road would serve an area that is planned for new residential development; this development may contribute funding for this new roadway.

The Port of Cascade Locks is responsible for funding improvements to the Bridge of the Gods. Toll revenue should be available to fund improvements to the bridge approaches and deck. The Port has the authority to issue bonds backed by toll revenue to fund bridge improvements.

Because Wa-Na-Pa is a state highway, projects that would provide sidewalks and bike lanes on Wa-Na-Pa could be funded by ODOT through the STIP. Remaining costs would be eligible for funding through several federal and state funding programs that grant funding for pedestrian and bicycle improvements, including the Federal Transportation Enhancement Program and the Oregon Bicycle and Pedestrian Program, which provides up to \$100,000 for projects selected for funding by the Oregon Bicycle and Pedestrian Advisory Committee. Federal and state grants for bicycle and pedestrian projects on local streets would require a local 20 percent match.

The transit project would construct a park and ride lot in Cascade Locks. This project may be eligible for funding from a wide variety of transit funding programs, including the Community Transportation Program, and the NonUrbanized Area Formula Program. These funding programs are administered by the Public Transit Section of ODOT, which recommends projects for funding to the Oregon Transportation Commission. Most of these funding sources would require a 20 percent local funding match.

The Antique Street Light project for the downtown could be through various federal and state funding programs. The project would ideally be in conjunction with sidewalk projects in the downtown to keep costs to a minimum. The antique streetlights would be placed on the north side of Wa Na Pa Street to serve both as street lighting and decorative purposes. If funding sources require a match, the City could provide up to 30 percent match for this project.

APPENDIX A

Questionnaire Responses

September 30, 1996

**HOOD RIVER TRANSPORTATION PLAN
REPORT ON PUBLIC OPEN HOUSES AND QUESTIONNAIRE RESPONSES**

A. INTRODUCTION

As part of the Goals and Objectives development phase of the Hood River Transportation Plan, open houses were held in September 1996 at the following locations:

- September 18 Wacoma Center, Hood River
- September 19 City Hall, Cascade Locks

The purpose of the open houses was to disseminate information on the transportation planning process and to solicit public input on preliminary goals, objectives and implementation actions to be addressed in the Transportation System Plans (TSPs) for the cities of Hood River and Cascade Locks and for Hood River County, and in the Interim Corridor Strategy for the Hood River-Mt. Hood Summit (OR 35) Corridor Plan. The open houses were advertised through a September 1996 newsletter, press releases, public service announcements and paid advertisements in the *Hood River News*.

Activities included:

- Live/work map – using dots, attendees indicated where they lived and worked;
- Storyboards on the transportation planning process and schedule;
- Storyboards comparing existing traffic volumes, travel times, congestion and other attributes of the Hood River-Mt. Hood Summit (OR 35) Corridor with future conditions if no improvements are made, if improvements are limited, or if no major capacity increases are made;
- Aerial video of the Highway 35 corridor;
- Prioritization of key objectives – using dots, participants prioritized key objectives and identified additional objectives that should be prioritized;
- Site-specific transportation issues and improvements – using stickies, participants identified site-specific issues and transportation system improvements on maps of the cities of Hood River and Cascade Locks and the County;
- Map of the Hood River County draft Bicycle Plan – using stickies, participants commented on the draft Plan;
- Cascade Locks Comprehensive Plan Amendment Project – participants reviewed and commented on a Vision Statement and Preferred Alternative, including citywide objectives and objectives for specific areas within the city; and
- Miscellaneous questions.

Public input on key objectives was also solicited through questionnaires included in the September 1996 Corridor Plan newsletter.

B. PRELIMINARY OBJECTIVES

Participants were asked to prioritize key objectives identified by the Plan's Technical Advisory Committee. Each person was provided five dots for "voting" on priorities.

Objective	No.	Percent
• Allocation of state resources to highway projects according to the following priorities:		
1) Maintenance of existing facilities to ensure that they remain safe and functional, e.g., fixing potholes;	12	14
2) Preservation of the roadway by investing in roadbed and pavement reconstruction as needed to minimize maintenance costs;	5	6
3) Transportation system management to optimize existing highway capacity;	4	4
4) Safety and capacity improvements; and	6	7
5) Projects that support economic development, particularly recreation and tourism.	4	4
• No additional expansion in capacity of state highways except for climbing/passing lanes and turning lanes.	4	4
• Improved access to the Columbia River for water-related recreation.	7	8
• Development of alternative east-west routes in Hood River and Cascade Locks to minimize use of I-84 for local trips.	4	4
• Improved I-84 interchange safety at the east Cascade Locks and at the OR 35 interchanges.	5	6
• Application of the most restrictive access management standards (regulating the number, spacing, type, opportunities for left turns and location of driveways, intersections and traffic signals) consistent with existing or planned adjacent land uses.	2	2
• Promotion of transportation-efficient land use patterns that reduce vehicle miles traveled and provide a live/work balance.	8	9
• Promotion of I-84/OR 35 as an alternative to Highway 26 for access to Mt. Hood ski areas and other winter and summer recreation activities.	2	2
• Promotion of continued use of the Mt. Hood Railroad for freight movement and recreation.	5	6
• Reduction of traffic speeds on US 30 through downtown Hood River and Cascade Locks.	1	1
• Expanded use of intermodal transportation systems, including transit services and van services, to meet the needs of county residents.	7	8
• Prioritization of transportation improvements that serve the County's key economic components of farming, forestry and tourism.	3	3

• Provision of adequate aggregate sources for maintenance of the County's road system.	3	3
• Promotion of connectivity among different transportation modes.	2	2
• Addressing safety problems at state highway intersections.	6	7
TOTAL	90	100

Additional Objectives

Other objectives identified by participants as priorities for the Plan include:

- Highway 35 has signs for wineries, motels, etc. but not for school bus stops coming up. Shouldn't school bus stop signage be a higher priority?
- Make county forest practices address the numbers of highway users that are here as tourists viewing the scenery.
- ODOT needs to be involved in the review of county timber harvests that affect the Highway 35 viewshed.
- Hood River Transportation Plan Objectives need to focus on "livability", i.e. reduce pollution from cars via park & ride centers/bus transportation centers, preserve open space when creating roads, access for pedestrians/bike use.
- Encourage alternative transportation in Gorge, e.g., bikes, walking, carpooling, public transit.
- Hood River Transportation Plan needs to maximize pedestrian use of waterfront and promote open spaces.

D. KEY ISSUES

Using stickies, participants identified, by jurisdiction, key issues and/or site-specific improvements to be addressed in the individual TSPs.

Hood River

- Frankton safety problems: hill with curves and narrow road; school and new subdivisions increasing traffic. Objective to improve safety.
- Safety objective: Consistent speed limit on May from one end to the other regardless of city/county designation.
- State and Front - change signage; it is very confusing to visitors.
- Poor site distance at westbound approach to 13th and Belmont.
- Pacific and 12th intersection is a problem.
- Pacific and 12th needs a stop light.

Cascade Locks

- To address winter safety problems, level Moody Street coming up to Undine and Sadie B coming onto Undine.

- Left turn lane into Hardware off Wanapa.

Hood River County

- Pine Grove to north on Highway 35 should have no passing.
- Lack of left lane turn coming down OR 35 at Centralvale. Booth Hill and OR 35 also.
- Problem is turning left off of OR 35 into 2 lanes coming uphill.

E. MISCELLANEOUS QUESTIONS

Flipcharts were randomly located to provide opportunities for input on the following questions:

- 1) What are the most important actions to be taken to improve bicycle and pedestrian transportation?
- 2) What are the most important actions to be taken to improve transit service?
- 3) What are the most important actions to be taken to improve freight movement (by truck, air or water)?
- 4) How should transportation system improvements be financed?

1. Bicycle and Pedestrian Improvements

Hood River

- Create better access to waterfront.
- Indian Creek Trail east of 12th linking elsewhere.
- Comprehensive plan linking various bike/pedestrian paths of various agencies (ODOT, Scenic Area, Port, County, City, etc.)
- Access from Hood River port area to Koberg Beach for pedestrians and bikes, possibly along north side of I-84. It looks like there's room for a trail here. It would probably be an ODOT project?
- For safety, regulate speed on roadways heavily used by pedestrians/bicycles/pets.

Cascade Locks

- Sidewalks on WaNaPa and Forest Lane.
- Walking path north of WaNaPa along railroad and overpass to park.
- Better speed control coming off exits.
- No overnight parking trucks on WaNaPa.
- Another access to industrial park from Forest Lane.

2. Transit Service Improvements

Hood River

- More frequent uptown service.
- Fixed routes.
- More countywide service (e.g., fixed routes).
- Make system free for a year to encourage initial use by public.
- Affordable daily transportation to and from Portland for commuters and students.
More carpooling (number of cars going from Hood River to Portland daily?)
- Coordinate local, state and national transit services prioritizing train service (return of Amtrak service).

F. QUESTIONNAIRE RESPONSES

Number of responses: 26

	1 Agree	2	3	4	5 Disagree
1. Allocate resources to highway projects according to the following priorities:	21	3			
a) Maintenance of the existing facility to ensure that it remains safe and functional, e.g., fixing potholes.					
b) Preservation of the roadway by investing in roadbed and pavement reconstruction as needed to minimize maintenance costs.	18	5	1		
c) Safety improvements.	17	2	2	1	1
d) Managing the existing system to maximize capacity/operation.	15	4	1	2	1
e) Capacity improvements, e.g., adding lanes.	7	4	5	3	4
2. Accommodate additional growth through:	13	6		1	2
a) Improvements to the existing road system.					
b) Construction of a new westside access from the upper valley to the Hood River urban area.	3	4	2	5	9
c) Promotion of alternative modes, such as transit.	15	4	3	1	1
d) Land use development patterns that reduce automobile trips.	14	6	2		2
3. Provide no expansion in highway capacity for I-84 and state highways, except for climbing/passing lanes and turning lanes.	14	3	3	1	2
4. Except potentially at Cascade Locks and Mt. Hood Meadows, provide no new interchanges to I-84 and OR 35. Rather, focus on rebuilding existing interchanges to address safety and capacity needs.	16	4	1	1	2
5. Reduce congestion in the Hood River and Cascade Locks urban areas through:	9	2	8	1	1
a) Strict access controls.					
b) Reduced traffic speeds.	9	7	5		1
c) Improved traffic signalization.	11	4	6	1	

d) Restrictions on truck loading/unloading.	11	4	5	2	1
e) Development of additional parking facilities.	9	4	5	1	3
f) Land use controls.	16	2	2	1	3
6. Provide convenient access and adequate parking to support downtown commercial and service centers.	12	4	4	1	1
7. Improve transportation access to port facilities and other commercial and industrial properties.	6	8	5	1	2
8. Link developed areas on either side of I-84 with multi-modal access.	11	4	4	1	2
9. Preserve rural sections of highway as rural by concentrating services within rural community centers and restricting additional access points.	12	6	1	3	1
10. Create a continuous bicycle route by adding/improving bicycle lanes or widening shoulders as part of highway improvement projects.	17	4	1		2
11. Provide safe and convenient pedestrian travel by providing sidewalks at interchanges and by improving pedestrian crossing opportunities, particularly at rural community centers.	19	2	2		1
12. Ensure ongoing intercity bus service between Hood River, Cascade Locks, Klicitat County and Portland.	17	4		2	1
13. Encourage and facilitate the use of the Hood River Railroad for:	15	3		2	3
a) Transport of lumber, aggregate and other bulk products.					
b) Excursion/tourism uses.	15	2		4	2
14. Focus additional law enforcement to entrances/exits of rural community centers, areas of high accident rates, and where travel speeds should be reduced (e.g., sunken grades/slide areas).	7	6	7	1	1
15. Design new improvements and retrofit existing transportation facilities to encourage the conservation, restoration and protection of natural resources, particularly salmon habitat.	15	4	1	2	2
16. Design transportation system improvements to preserve community livability and to avoid, minimize or mitigate impacts to sensitive cultural and other community resources.	8	4	2	1	2
17. Promote I-84/OR 35 as an alternative to US 26 for access to Mt. Hood ski areas and other summer and winter recreation activities.	4	5	4	1	10
18. Improve access to the Columbia River for water-related recreation.	9	3	6	5	
19. Investigate opportunities for county assumption of Forest Service roads and local jurisdiction assumption of state highways.	1	1	10	3	8
20. Investigate alternative financing mechanisms for transportation improvements and maintenance, e.g., public/private partnerships, tollways, road maintenance improvement districts, etc.	9	6	2	1	5

What other objectives for long-term improvements to and management of transportation facilities within the county should be considered?

- We would like to see a route established connecting the west side of Hood River with Hwy. 35 without going through downtown core, such as from the Experiment Station road.
- Fix the drainage problem on the newly reconstructed Highway 35 between Mt. Hood community and Hanel's Lumber. We pointed out the potential problem during the community meetings but to no avail. We were flooded in February with water running down the highway and across our properties and our neighbors' properties.
- Coordination with adjacent counties to address common interests, i.e., the Mt. Hood Planning Unit effort.
- Consider paint striping in April and September - do a touch up.
- I highly recommend a public transportation system within the Hood River County area. Parkdale-Odell-Hood River and return (or use Mt. Hood Railroad).
- Daily Amtrak (or other) rail service to Portland for commuters (i.e., to Portland early morning, return evening).
- There should be bike and pedestrian paths in addition to bike lanes. The county needs to encourage scheduled mass transit. Maintenance of the main streets of our city should be a high priority.
- Retain existing highway system - but provide additional maintenance to repair road system and structures. Important to provide best and safe system. Also include mitigation for visuals and scenic resources.
- It is important to the Hood River Valley Residents Committee to focus on keeping the qualities that make our county special - i.e., scenery, forests, orchards and recreational opportunities. We want to promote economic development where development has already occurred - thus preserving agricultural and forest land for the future. Transportation should promote these goals.
- Bicycle and walking areas off I-84 as much as possible to ensure safety of all. Use any available routes to help locals avoid I-84 when traffic is heavy.
- Intersection of old Highway 30 and Highway 35. At times traffic is backed up to 1st Street all the way across the Hood River Bridge on 30. Proper lighting should be addressed at this intersection also. Very hazardous at night, especially during adverse weather conditions.
- A number one priority should be to make every road crossing wheelchair accessible. Is this the city of Hood River's responsibility? It's outrageous that a person in a wheelchair can't independently travel the streets of Hood River!

Other comments?

- I strongly advocate for better handicap access in downtown Hood River. Currently, there is only one sidewalk street access for persons in wheelchairs. I want also to see

a priority given to pedestrians, bike paths and local mass transit throughout the Hood River valley as well as throughout the Gorge from The Dalles to Portland.

- Mt. Hood Meadows may have a capacity of 13,000 to 15,000 with expansion. Hood River City has 4,000. We can't handle a lot of ski traffic in Hood River on Hwy. 35. When a lot of skiers do use Hwy. 35 it is a mess - has happened several times. This isn't the solution. Bussing and off-mountain parking is a solution to Hwy. 26 problems.
- Spending money to open the tunnels between Hood River and Mosier, building the Neal Creek Bridge and the old highway reconstruction at Bonneville seem to be poor use of the public's money. It would be more appropriate to maintain existing high use roads.
- #15 presumes that the existing system doesn't already adequately address these issues or are detrimental. #17 - if no improvement is made to Hwy. 26.
- Too many cars. Ever considered pedestrian or bike zones in downtown Hood River?
- Fix State and Front street intersection signage. Complete down major crossing at 12th Street.
- Increase open green space downtown. Not parking. Promote a park & ride and bus service. Enough pavement already.
- I commute from Gresham to Hood River to work here each week day. I feel maintenance and state police patrols are most important for a safe highway.
- Not in favor of Mt. Hood Meadows interchange.
- Cars and trucks use I-84 as a race track. Many go 70 to 80 mph as regular speed and not just for passing.
- How can you possibly consider Highway 35 improvements to a ski area when Highway 26, a major east/west highway across the county continues to suffer congestion year around?
- Need to consider bus/shuttle transportation to the airport. Also I would like to see bus transportation from the upper valley to several sites in Hood River so older children taking classes or doing events at the high school wouldn't need to be constantly driven. There are many community education classes that upper valley kids would attend if there were transportation.
- ODOT should require review of county forest practices in Hwy. 35 viewshed.
- Amtrak's scuttling of the Pioneer could be an ideal opportunity to actually improve rail service over the Oregon part of this route. ODOT has talked a lot about pursuing "public-private partnerships" and "intermodal solutions". Here is a chance for them to walk their talk. "The Columbia Gorge" - Why not institute a new state sponsored rail service between Portland and Boise with schedules designed to meet the needs of the Northwest traveler. This could be primarily an Oregon project since over 85% of the route is in this state. The Schedule - I believe, with two round trips a day, seven days a week, a respectable passenger base could be developed. The running time is about ten hours. If day trains left both Portland and Boise in the morning between 7 and 9 am and night trains left between 8 and 10 pm they would

provide the kind of schedule flexibility needed to attract a broad spectrum of passengers. Connecting Buses and Trains - With eastbound and westbound trains serving Pendleton in the midday, a Spokane connecting bus (running time of 4 to 5 hours) could leave Spokane early in the morning, connect with both the eastbound and westbound trains and arrive back in Spokane in the early evening. This bus could also serve either Pasco or Walla Walla. Connecting through bus service to Pocatello and Salt Lake City could easily be established if Idaho and Utah were willing to underwrite it. The schedules in and out of Portland could allow connections with both the northbound Mount Rainier and the Mount Adams as well as its connecting bus from Eugene. Also some southbound connections could be made. Columbia Gorge Day Excursions - Day excursions through the Columbia Gorge could now be possible with possible stopovers at Multnomah Falls, Cascade Locks, Hood River or The Dalles which would add substantially to the ridership especially during the vacation season. Commuter Service - The eastbound and westbound night trains could also serve commuters living in Cascade Locks, Hood River and The Dalles and if a station is established at Troutdale or Edgefield, East Multnomah County commuters as well. Rolling Stock - Seating capacity needs could vary greatly depending on location, time of day and season. The night train may have light loads compared to the day train but if it becomes popular for commuter service, more cars may be needed near Portland. The same may also be the case with the day train if Gorge excursions become popular, especially in the summer. Because of this varied need for capacity it seems to me that self powered units like the Danish IC3 or even rebuilt Budd RDCs would be more appropriate than locomotive powered trains. For excursions or commuter service, cars could be easily dropped off or picked up as needed.

G. DRAFT BIKE PLAN

Comments on the draft Hood River County Bike Plan included:

- Bike path on Hyeth Road, not I-84.
- Bike path should be for locals to reduce car trips.
- Add Summit Road to make loop with Wyen Street.
- Add Sunday Drive/Neil Creek Road/Thumsen Road to connect to eastside.
- Add Dethman Ridge Drive.
- Add Indian Creek Trail(s) east of 12th.
- Post Canyon Drive receives heavy bike use.
- Connect scenic area bike path with Hood River city and port paths.
- Port/city east-west bike/pedestrian route.
- Bike/pedestrian trail on north side of I-84 connecting Koberg Park and Port area would be nice.

APPENDIX B

Access Management Strategies and Techniques

ACCESS MANAGEMENT STRATEGIES AND TECHNIQUES

Crossing conflicts are the most serious because of the potential for high speed head-on collisions, nearly head-on collisions, or right-angle collisions. Hence, these conflict points are often referred to as 'major conflict points.' Diverge and merge conflicts are potentially less severe and are often referred to as 'minor conflict points.' Diverge conflicts occur when a driver slows down in the through lane to execute a left-turn or right-turn maneuver, and merge conflicts occur where a vehicle makes a left or right-turn and enters a through traffic stream.

The area and complexity of the crossing conflicts are also affected by the roadway cross section. For example, on a two-lane roadway, each of the conflict points with the traffic stream approaching from the left and the right involves only one lane. With a four-lane cross-section, each conflict point involves two lanes.

Figure B-1 illustrates conflict points at a typical four-way unsignalized intersection, consisting of a four-lane highway intersecting with a two-lane highway. As shown, the traffic maneuvers at the intersection form 32 conflict points, 16 of which are major crossing-type conflicts and the other 16 are minor conflict points. The 16 minor conflict points consists of eight each of the merge- and diverge-type conflict points.

Traffic conflicts can be reduced with the help of the following strategies:

1. limiting the number of conflict points that a vehicle experiences in its travel;
2. separating conflict points as much as possible when they cannot be completely eliminated;
3. limiting vehicle deceleration requirements; and
4. removing slower turning vehicles which require access to adjacent sites from the traffic lanes of through vehicles.

Each of the four access management strategy categories are listed, with the techniques for implementation.

Limit Conflict Points

Techniques for limiting the number of conflict points directly reduce the frequency of either basic conflicts or encroachment conflicts, or they reduce the area of conflict at some or all driveways on the highway by limiting or preventing certain kinds of maneuvers.

The following techniques are used to limit the number of conflict points (not listed by priority):

- Install median barrier with no left-turns at the median opening.
- Install raised median divider with left-turn deceleration lane at key intersections.
- Install or expand one-way operations on the highway.
- Install traffic signal at high volume driveways.
- Optimize traffic signal installation, spacing, and coordination.
- Channelize median opening to restrict left-turn ingress or left-turn egress.
- Median closure to eliminate left-turn ingress and egress movements.

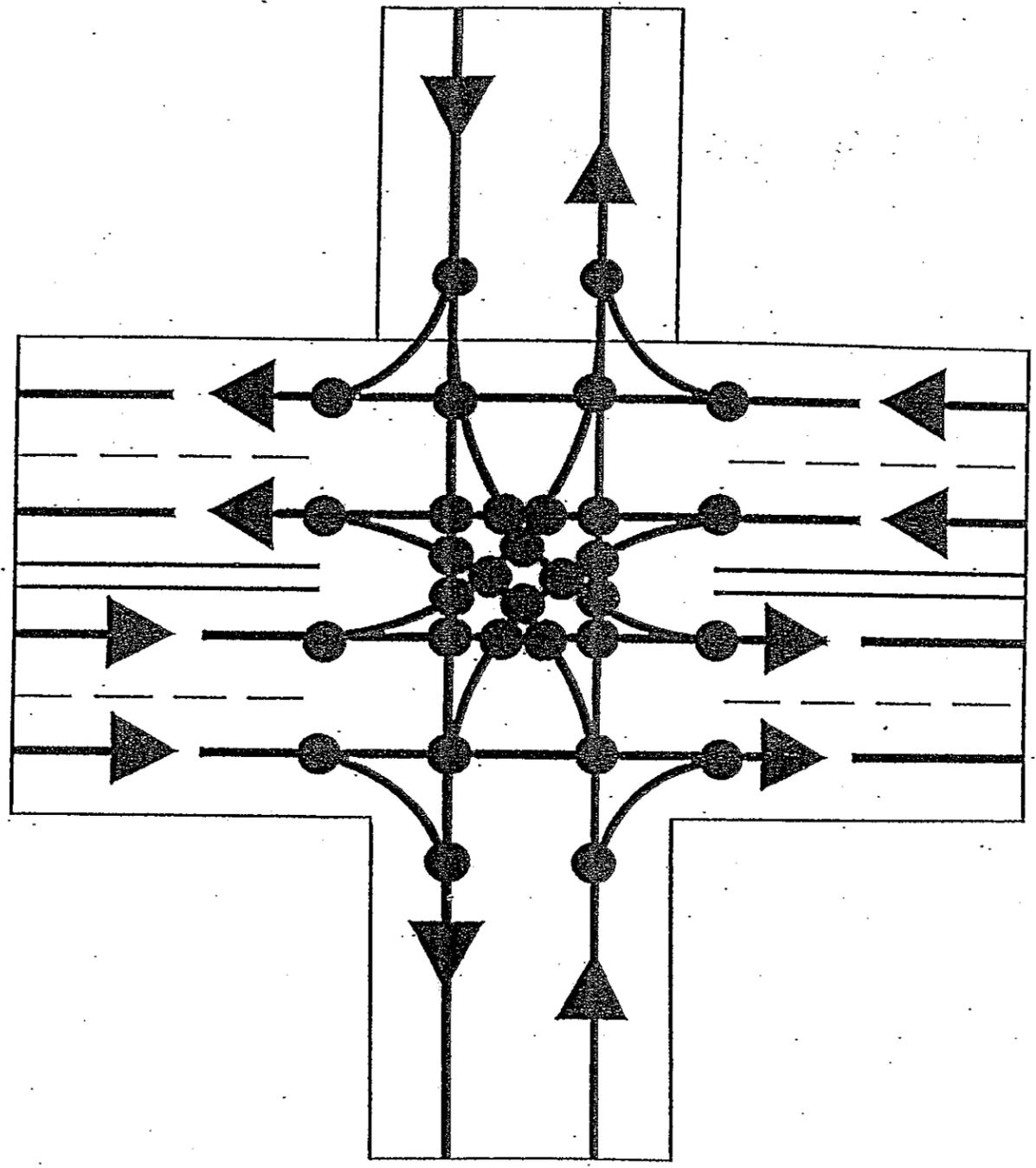


FIGURE B-1
POTENTIAL CONFLICTS

- Install divisional island to discourage entry into left-turn bay when weave area is inadequate.
- Install curbs, fences, plantings, etc. to prevent uncontrolled access along property frontages.
- Install median channelization to control merge of left-turn egress vehicles.
- Offset opposing driveways.
- Locate driveway opposite a three-leg intersection or driveway and install traffic signals where warranted.
- Reconfigure driveways (two-way/one-way).
- Install channelizing island to discourage left-turn maneuvers.
- Install driveway divisional island to prevent driveway encroachment conflicts.
- Install channelizing island to control the merge area of right-turn egress vehicles.
- Regulate the width of driveways (also total driveway widths per property frontage).

Separate Conflict Areas

Techniques for separating basic conflict areas either reduce the number of driveways or directly increase the spacing between driveways and intersections. They directly reduce the frequency of conflicts by separating turning vehicles at adjacent access points and by increasing the decision-process time for the through driver between successive conflicts with driveway vehicles at successive driveways.

The following techniques are used to separate the conflict areas (not listed by priority):

- Regulate minimum spacing of driveways.
- Regulate minimum corner clearance.
- Regulate minimum property line clearance.
- Provide feasibility standards to optimize driveway spacing in the permit authorizing stage.
- Regulate maximum number of driveways per property frontage.
- Consolidate access for adjacent properties.
- Buy abutting properties.
- Deny access to small frontage.
- Consolidate existing access whenever separate parcels are assembled under one purpose, plan, entity, or usage.
- Designate the number of driveways to each existing property and deny additional driveways regardless of future subdivision of that property.
- Require access on adjacent cross-street (when available).

Reduce Deceleration Requirements

Techniques for reducing deceleration requirements reduce the severity of conflicts by increasing driveway turning speeds, by decreasing through highway speeds, or by increasing driveway perception time.

The following techniques are used to limit vehicle deceleration requirements (not listed by priority):

- Restrict parking on roadway adjacent to driveways to increase driveway turning speeds.
- Install visual cues of the driveway.
- Improve driveway sight distance.
- Establish minimum sight distance standards.
- Optimize driveway location in the permit authorization stage.
- Increase the effective approach width of the driveway.
- Improve the vertical geometrics of the driveway.
- Require driveway paving.
- Regulate driveway construction (performance bond) and maintenance.
- Install right-turn acceleration lane.
- Install channelizing islands to prevent driveway vehicles from backing onto the highway.

Remove Turning Vehicles from Through Lanes

These techniques directly reduce both the frequency and severity of conflicts by separating vehicle turning paths from the through movements along the highway, and by providing storage areas for turning vehicles.

The following techniques are used to separate turning traffic from through traffic (not listed by priority):

- Install continuous two-way left-turn lane.
- Install alternating left-turn lane.
- Install isolated median and deceleration lane to shadow and store left-turn vehicles.
- Install left-turn deceleration lane to remove turning vehicle from through lane.
- Install median storage for left-turn egress vehicles.
- Increase storage capacity of existing left-turn deceleration lane.
- Install continuous right-turn lane.
- Construct a local service road.
- Construct a bypass road.
- Remove through traffic.
- Install supplementary one-way right-turn driveways to divided highway.
- Provide direct access on lower functional classification street when available.
- Install right-turn deceleration lane.
- Install additional exit lane on driveway.
- Encourage connections between adjacent properties.
- Require adequate internal design and circulation plan.

SELECTED ACCESS MANAGEMENT STRATEGIES

All of the previously listed strategies may be applied for access management in this study area. Some of the strategies may be applied more than others. The following techniques for access management were selected as part of the public involvement process for more detailed discussion and definition.

Optimize Traffic Signal Installation, Spacing, and Coordination

Traffic signals should be appropriately placed and coordinated to enhance the progressive movement of traffic along the highway. If properly designed, installed, and maintained, traffic signals tend to reduce right-angle collisions, vehicular-pedestrian collisions, and opposing left-turn collisions. However, rear-end collisions commonly increase. Delay to the driveway traffic will be decreased; however, total delay at the intersection will be increased if the signal interferes with progression. Moreover, if the signal system has poor progression, the resulting traffic backups can block upstream access from driveways. Also, improperly located signals will increase total traffic delays throughout the system, cause a deterioration in the speed and efficiency of progression and seriously increase fuel consumption and vehicular emissions.

The higher the efficiency of traffic progression (progression band width divided by cycle length), the higher is the capacity of the major arterial highway. Moreover, at high efficiencies, fewer vehicles are required to come to a stop, deceleration noise is reduced, and vehicle emissions, fuel consumption, and delay are minimized. Since highway capacity is always an issue along major urban arterials, the signal spacing should be selected such that it leads to very high progression efficiencies.

Application

A driveway should be considered for signalization only if installation of the signal does not interfere with traffic progression on the major arterial or will not interfere when the major street system reaches capacity conditions when the area becomes fully urbanized. This normally means that signalization should be limited to driveways meeting the uniform signalized intersection spacing (described in the next strategy). This will provide maximum progression efficiency at the desired speed and at the longest cycle length which is expected to be utilized during the peak periods when the area becomes fully urbanized. When the high volume access drive does not conform to the selected uniform spacing criteria, consideration of signalization should be based upon a traffic engineering study which demonstrates that the signal will not interfere with efficient traffic progression during peak and off-peak conditions.

Progression at reasonable speeds can be achieved at a short signal spacing such as 1/4 mile only if the traffic volumes are very low and short cycles can be used. For example, a progression speed of 30 mph can be achieved with a 60-second cycle length at a signal spacing of 1/4 mile. However, as major arterial and cross-street volumes increase, longer cycle lengths must be used in order to increase capacity by minimizing lost time. With a longer 90-second cycle length, signal spacing of 1/4 mile will result in a progression speed of 20 mph along the major arterial.

Table B-1 illustrates the optimum signalized intersection spacing in feet needed to achieve efficient traffic progression at various speeds and cycle lengths. For example, a major arterial spacing of 2,050 feet (0.39 miles) will enable traffic flow at 35 mph with the use of a 80-second cycle length.

**TABLE B-1
OPTIMUM SIGNALIZED INTERSECTION SPACING
FOR EFFICIENT TRAFFIC PROGRESSION**

Cycle Length (seconds)	Speed (miles per hour)						
	25	30	35	40	45	50	55
60	1,100'	1,320'	1,540'	1,760'	1,980'	2,200'	2,430'
70	1,280'	1,540'	1,800'	2,050'	2,310'	2,500'	2,820'
80	1,470'	1,760'	2,050'	2,350'	2,640'	2,930'	3,220'
90	1,630'	1,980'	2,310'	2,640'	2,970'	3,300'	3,630'
120	2,200'	2,640'	3,080'	3,520'	3,960'	4,400'	4,840'
150	2,750'	3,300'	3,850'	4,400'	4,950'	5,500'	6,050'

Source: *Technical Guidelines for the Control of Direct Access to Arterial Highways* - Volumes I and II, Federal Highway Administration (FHWA-RD-76-86).

Regulate Minimum Spacing of Driveways

The minimum spacing of driveways is a regulatory method used by many agencies to regulate the frequency of access points along highways. This technique can be implemented at existing locations or during the driveway permit authorization stage. Strategies for achieving this objective at existing driveways include closing driveways or closing and relocating driveways.

This technique reduces the frequency of conflict by separating adjacent, basic conflict areas and limiting the number of basic conflicts points per length of highway. The technique is expected to reduce the severity of rear-end collisions as it allows more deceleration distance and perception time for motorists. Some tradeoffs may be realized by increasing average delay and the potential for rear-end collisions at driveways as a result of increasing the average volume per access point.

Application

This access control technique is generally applicable for all types of arterials where conflict areas overlap and delays are excessive. Highways with volumes greater than 5,000 vpd and speed greater than 25 mph are candidates for consideration.

The minimum allowable spacing of non-signalized intersections for various speeds is shown in Table B-2.

**TABLE B-2
MINIMUM ALLOWABLE DRIVEWAY SPACING**

Posted Speed Limit	Minimum Allowable Driveway Spacing
30 mph	100 feet
35 mph	150 feet
40 mph	200 feet
45 mph	300 feet

Source: *Technical Guidelines for the Control of Direct Access to Arterial Highways - Volumes I and II*, Federal Highway Administration (FHWA-RD-76-86).

The optimization of driveway spacing in the permit authorization stage would indirectly reduce the frequency of conflicts by separating adjacent conflict areas and limiting the number of basic conflict points per length of highway. The implementation of this technique is also expected to reduce the severity of conflicts as it allows more deceleration distance and perception time between driveways.

Consolidate Access for Adjacent Properties

This general operating practice encourages adjacent property owners to construct joint-use driveways in lieu of separate driveways. Strategies for implementing this technique include closing existing driveways or encouraging joint-use driveways.

The feasibility of this technique is viewed primarily at the permit-authorization stage. The joint driveway will cause a reduction in the concentration of driveways along an arterial. The reduction in driveway concentrations is expected to be accompanied by a reduction in the frequency and severity of conflicts.

Application

This technique is applicable on all major roadways. Driveway pairs with more than 50 vehicles using each driveway per hour will be good candidates for this technique.

The physical means by which access can be consolidated between two adjacent properties involves construction of joint use driveway between the two properties. It is recommended that both owners have property rights in a joint-use driveway. That is, the driveway should be located straddling the property line with each having a permanent easement on the other. This practice will not enable either owner the opportunity to deny or restrict access to the neighboring property. The resulting parking area should have an efficient internal circulation plan.

Consolidate Existing Access Whenever Separate Parcels Are Assembled under One Purpose, Plan Entity or Usage

This is a general operating practice that requires specific changes on commercial sites when they are assembled for development or redevelopment. The consolidation is accomplished by voiding existing driveway permits upon alteration of the property functions. The new permit authorization depends on the developer's plans to use some existing driveways and close or relocate other driveways.

The objective of this technique is to increase average spacing of access points along the highway. The consolidation of driveways reduces the number of access points, thereby increasing the driveway spacing. The increase in driveway spacing provides motorists of turning vehicles more time and distance to properly execute their maneuvers. The severity of conflicts should decrease because deceleration requirements are reduced.

Designate the Number of Driveways to Each Existing Property and Deny Additional Driveways Regardless of Future Subdivision of That Property

This is a general regulatory policy which designates the maximum number of driveways permitted to each existing property before development. The implementation of this technique requires an advance planning policy with a formal planning document made readily available to abutting property owners. Such policy denies additional driveways regardless of future subdivision of that property.

The objective of this technique is to maintain average spacing of access points along the highway. This objective is achieved by regulating the maximum number of driveways per property frontage. The increase in average driveway spacing provides motorists turning into driveways with more time and distance to properly execute their maneuvers.

This access control measure increases the minimum spacing of access points. This results in a reduction in the frequency of conflicts. The severity of conflicts should also decrease because deceleration requirements are reduced.

Restrict Parking on Roadway Adjacent to Driveways to Increase Driveway Turning Speeds

This technique increases turning speeds by removing parked vehicles, from areas adjacent to driveways. Parked vehicles may indirectly contribute to driveway accidents by limiting the sight distance or influencing the turning paths of driveway vehicles. This technique is intended as a point measure, although route applications are also feasible.

This technique will reduce the severity and frequency of conflicts. Severity is reduced because the speed differential between turning and through vehicles is reduced. Conflict frequency also benefits from the increase in turning velocity. One trade-off is a reduction in parking capacity.

Application

This technique is applicable at any driveway location where parking is permitted. Drivers in the outside through traffic lane must have adequate stopping sight distance. Driveway traffic must have adequate intersection sight distance to safely select a gap and to accelerate to the speed of through traffic.

Provide Direct Access on Lower Functional Class Street When Available

This driveway location technique is aimed at removing turning vehicles or queues from sections of the through lanes. The strategy for achieving this objective is to provide supplementary access to a single property at a collector street location. The technique provides an additional access point for vehicles to use when entering or exiting a property.

The average volume of all driveways to a property will decrease after the supplementary driveway absorbs some of the total volume. Conflict frequency will be reduced on the highway, and total conflict severity should be reduced by moving some of the conflicts to the lower speed collector. Delay to arterial and driveway vehicles will be reduced because the individual driveway volumes are smaller.

Application

This technique is applicable at all corner parcels having frontage on a major roadway and a collector.

Encourage Connections Between Adjacent Properties

This driveway operation technique is aimed at removing turning vehicles or queues from the through lanes by encouraging adjacent property owners to permit property-to-property movements away from the highway.

A prime example of this access control measure is the neighborhood shopping center where several adjacent properties are served by one open parking lot area. The patrons frequenting nearby establishments do not need to exit onto highway and then enter the neighboring driveway.

Highway conflicts will be reduced because the highway will no longer be used in traversing from one property to the next.

Application

This technique is applicable on all highway types. It is intended to serve adjacent properties with small frontage widths through use of common access points. Thought must be given to internal circulation and storage space for driveway vehicles as well as geometric layout and existing highway operation.

Require Adequate Internal Design And Circulation Plan

This is a general access control policy that may be applied on existing facilities or during the driveway permit stage. An adequate internal design and circulation plan is intended to ensure harmony between highway, driveway and internal operations. Driveway and internal operations will be improved by providing adequate internal property design and controls. Through traffic will experience a decrease in interference because the internal design will minimize queuing on the highway and vehicles searching for parking places are able to circulate internally. Conflict frequency and severity are expected to decrease because deceleration requirements are reduced.

Application

This technique is applicable to all types of highways. Implementation is feasible on existing facilities, but primary consideration should be given to this policy during site plan approval.

Internal circulation designs should provide adequate handling of limited parking and maneuvering areas, minimize internal interference by supplying storage areas to egress movements, and distribute ingress vehicles

into the main circulation patterns with minimal hesitation and confusion (see Figure B-2). The following list reflects recommendations by which this technique can be properly applied.

- General location of driveway entrances should be approved by code authorities.
- Wherever possible, the long sides of parking areas should be parallel.
- Curved, triangular and other irregularly shaped parking areas should be avoided.
- Driveway throats should be designed long enough to allow free movement on and off of the highway.

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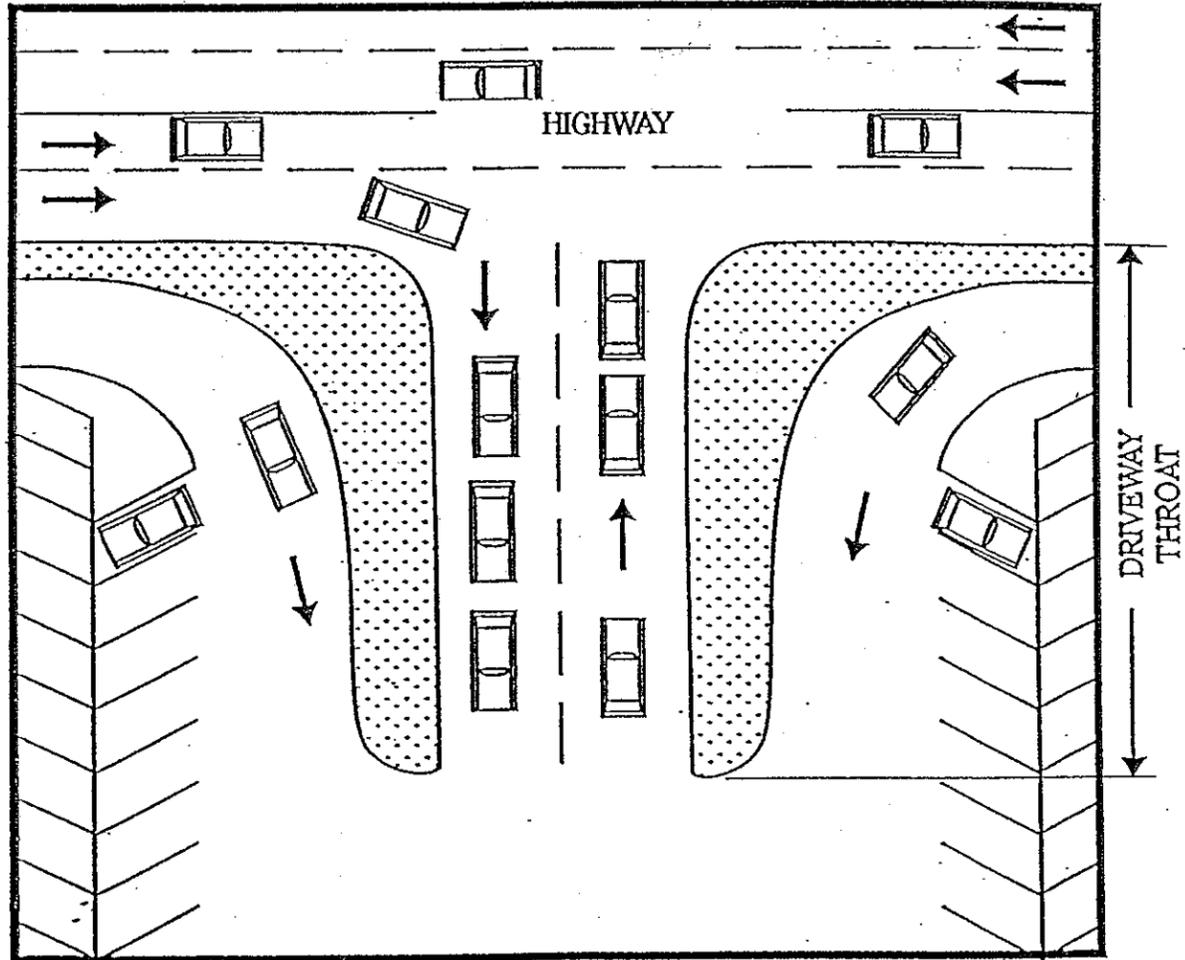


FIGURE B-2
ON-SITE CIRCULATION
DESIGN

Table 13: Access Management Spacing Standards for Statewide Highways
①②

(Measurement is in Feet)*

Posted Speed③	Rural		Urban			
	Expressway	Other	Expressway	Other	UBA	STA
≥55	5280	1320	2640	1320		
50	5280	1100	2640	1100		
40 & 45	5280	990	2640	990		
30 & 35		770		770	720	④
≤25		550		550	520	④

NOTE: The numbers in circles (②) refer to explanatory notes that follow tables.

*Measurement of the approach road spacing is from center to center on the same side of the roadway.

**Spacing for Expressway at-grade intersections only. See Table 12 for interchange spacing.

Table 14: Access Management Spacing Standards for Regional Highways
①②

(Measurement is in Feet)*

Posted Speed③	Rural		Urban			
	Expressway	Other	Expressway	Other	UBA	STA
≥55	5280	990	2640	990		
50	5280	830	2640	830		
40 & 45	5280	750	2640	750		
30 & 35		600		600	425	④
≤25		450		450	350	④

NOTE: The numbers in circles (②) refer to explanatory notes that follow tables.

* Measurement of the approach road spacing is from center to center on the same side of the roadway.

**Spacing for Expressway at-grade intersections only. See Table 12 for interchange spacing.

Table 15: Access Management Spacing Standards for District Highways
 ①②

(Measurement is in Feet)*

Posted Speed ^①	Rural		Urban			
	Expressway	Other	Expressway	Other	UBA	STA
≥55	5280	700	2640	700		
50	5280	550	2640	550		
40 & 45	5280	500	2640	500		
30 & 35		400		400	350	④
≤25		400		400	350	④

NOTE: The numbers in circles (②) refer to explanatory notes that follow tables.

* Measurement of the approach road spacing is from center to center on the same side of the roadway.

**Spacing for Expressway at-grade intersections only. See Table 12 for interchange spacing.

Notes on Tables 13, 14 and 15:

① Where a right of access exists, access will be allowed to a property at less than the designated spacing standard only if that property does not have reasonable access and the designated spacing cannot be accomplished. If possible, other options should be considered such as joint access.

Where the right of access exists, the number of approach roads (driveways) to a single property shall be limited to one, even when the property frontage exceeds the spacing standards. More than one approach road may be considered if, in the judgment of the Region Access Management Engineer, additional approach roads are necessary to accommodate and service the traffic to a property, and additional approach roads will not interfere with driver expectancy and the safety of the through traffic on the highway.

Approach roads shall be located where they do not create undue interference or hazard to the free movement of normal highway or pedestrian traffic. Locations on sharp curves, steep grades, areas of restricted sight distance or at points which interfere with the placement and proper functioning of traffic control signs, signals, lighting or other devices that affect traffic operation will not be permitted.

If a property becomes landlocked (no reasonable access exists) because an approach road cannot be safely constructed and operated, and all other alternatives have been explored and rejected, ODOT might be required to purchase the property. (Note: If a hardship is self-inflicted, such as by partitioning or subdividing a property, ODOT does not have responsibility for purchasing the property.)

(Note ① has precedence over notes ②, ③ and ④.)

② These standards are for unsignalized access points only. Signal spacing standards supersede spacing standards for approaches.

③ Posted (or Desirable) Speed: Posted speed can only be adjusted (up or down) after a speed study is conducted and that study determines the correct posted speed to be different than the current posted speed. In cases where actual speeds are suspected to be much higher than posted speeds, ODOT reserves the right to adjust the access spacing accordingly. A determination can be made to go to longer spacing standards as appropriate for a higher speed. A speed study will need to be conducted to determine the correct speed.

④ Minimum spacing for public road approaches is either the existing city block spacing or the city block spacing as identified in the local comprehensive plan. Public road connections are preferred over private driveways, and in STAs driveways are discouraged. However, where driveways are allowed and where land use patterns permit, the minimum spacing for driveways is 175 feet (55 meters) or mid-block if the current city block spacing is less than 350 feet (110 meters).

Access Management Spacing Standards for Interchanges

The following tables show the access spacing standards for interchanges as discussed in Goal 3, Policy 3C: Interchange Access Management Areas.

Table 16: Minimum Spacing Standards Applicable to Freeway Interchanges with Two-Lane Crossroads

Category of Mainline	Type of Area	Spacing Dimension			
		A	X	Y	Z
FREEWAY	Fully Developed Urban	1 mi. (1.6 km)	750 ft. (230 m)	1320 ft. (400 m)	750 ft. (230 m)
	Urban	1 mi. (1.6 km)	1320 ft. (400 m)	1320 ft. (400 m)	990 ft. (300 m)
	Rural	2 mi. (3.2 km)	1320 ft. (400 m)	1320 ft. (400 m)	1320 ft. (400 m)

- Notes: 1) If the crossroad is a state highway, these distances may be superseded by the Access Management Spacing Standards, providing the distances are greater than the distances listed in the above table.
- 2) No four-legged intersections may be placed between ramp terminals and the first major intersection.

A = Distance between the start and end of tapers of adjacent interchanges

X = Distance to the first approach on the right; right in/right out only

Y = Distance to first major intersection; no left turns allowed in this roadway section

Z = Distance between the last right in/right out approach road and the start of the taper for the on-ramp

Figure 18: Measurement of Spacing Standards for Table 16

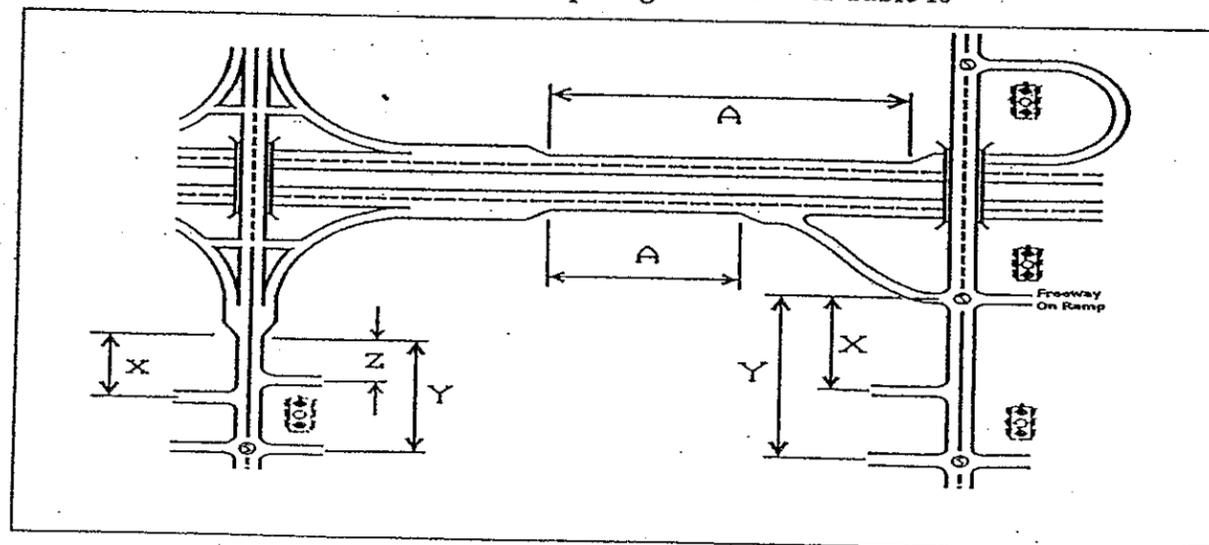


Table 17: Minimum Spacing Standards Applicable to Freeway Interchanges with Multi-Lane Crossroads

Category of Mainline	Type of Area	Spacing Dimension				
		A	X	Y	Z	M
FREEWAY	Fully Developed Urban	1 mi. (1.6 km)	750 ft. (230 m)	1320 ft. (400 m)	990 ft. (300 m)	1320 ft. (400 m)
	Urban	1 mi. (1.6 km)	1320 ft. (400 m)	1320 ft. (400 m)	1320 ft. (400 m)	1320 ft. (400 m)
	Rural	2 mi. (3.2 km)	1320 ft. (400 m)	1320 ft. (400 m)	1320 ft. (400 m)	1320 ft. (400 m)

Notes: 1) If the crossroad is a state highway, these distances may be superseded by the Access Management Spacing Standards, providing the distances are greater than the distances listed in the above table.

2) No four-legged intersections may be placed between ramp terminals and the first major intersection.

A = Distance between the start and end of tapers of adjacent interchanges

X = Distance to first approach on the right; right in/right out only

Y = Distance to first major intersection

Z = Distance between the last approach road and the start of the taper for the on-ramp

M = Distance to first directional median opening. No full median openings are allowed in nontraversable medians to the first major intersection

Figure 19: Measurement of Spacing Standards for Table 17

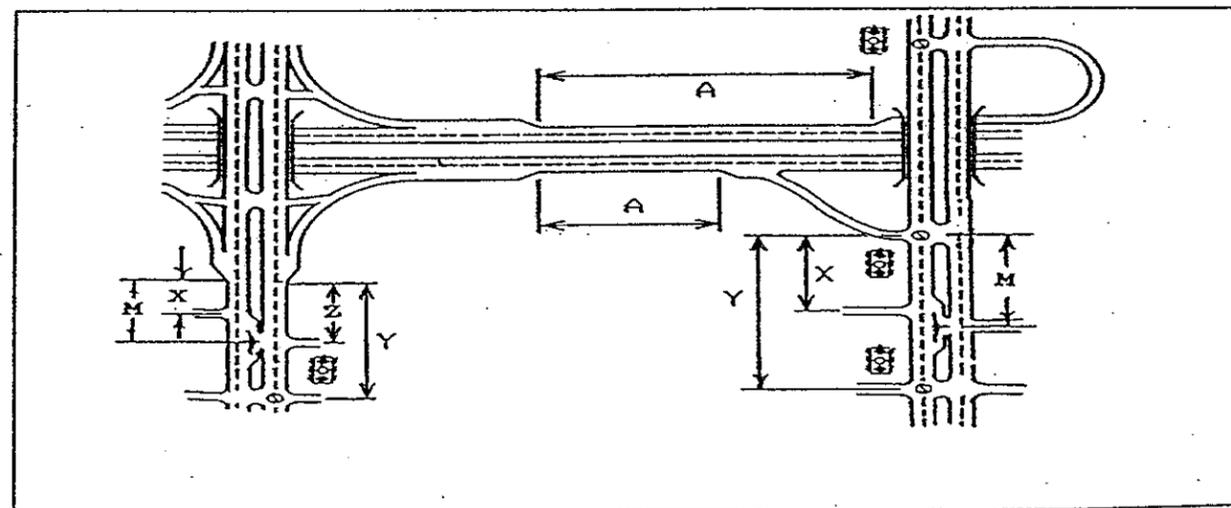


Table 18: Minimum Spacing Standards Applicable to Non-Freeway Interchanges with Two-Lane Crossroads

Category of Mainline	Type of Area	Speed of Mainline	Spacing Dimension				
			B	C	X	Y	Z
EXPRESSWAY	Fully Developed Urban	45 mph (70 kph)	2640 ft. (800 m)	1 mi. (1.6 km)	750 ft. (230 m)	1320 ft. (400 m)	750 ft. (230 m)
	Urban	45 mph (70 kph)	2640 ft. (800 m)	1 mi. (1.6 km)	1320 ft. (400 m)	1320 ft. (400 m)	990 ft. (300 m)
	Rural	55 mph (90 kph)	1 mi. (1.6 km)	2 mi. (3.2 km)	1320 ft. (400 m)	1320 ft. (400 m)	1320 ft. (400 m)

- Notes: 1) If the crossroad is a state highway, these distances may be superseded by the Access Management Spacing Standards, providing the distances are greater than the distances listed in the above table.
 2) No four-legged intersection may be placed between ramp terminals and the first major intersection.
 3) Use four-lane crossroad standards for urban and suburban locations that are likely to be widened.
 4) No at-grade intersections are permitted between interchanges less than 5 miles apart.

B = Distance between the start and end of tapers

C = Distance between nearest at-grade and ramp terminal intersections or the end/start of the taper section

X = Distance to first approach on the right; right in/right out only

Y = Distance to first major intersection

Z = Distance between the last right in/right out approach road and the start of the taper for the on-ramp

Figure 20: Measurement of Spacing Standards for Table 18

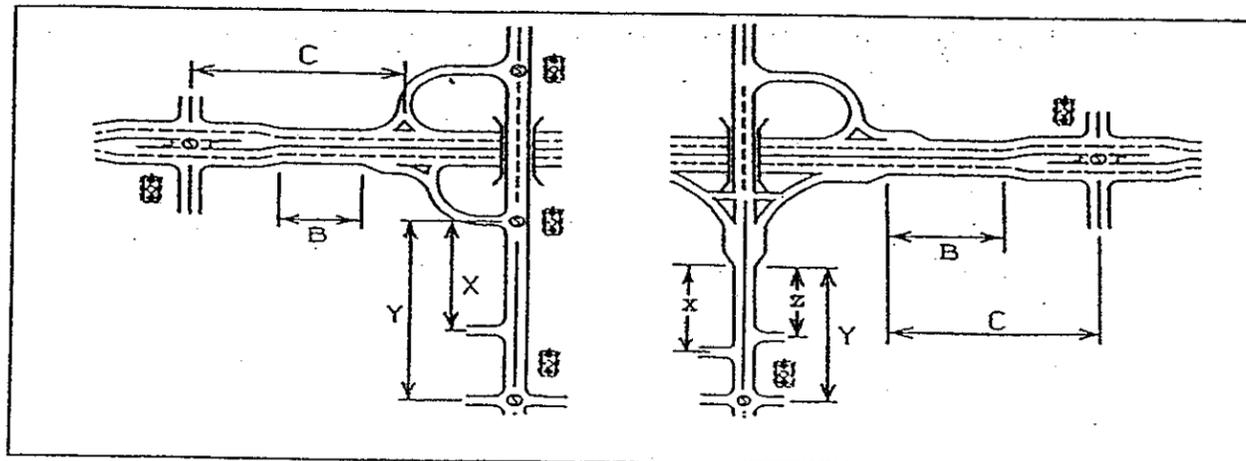


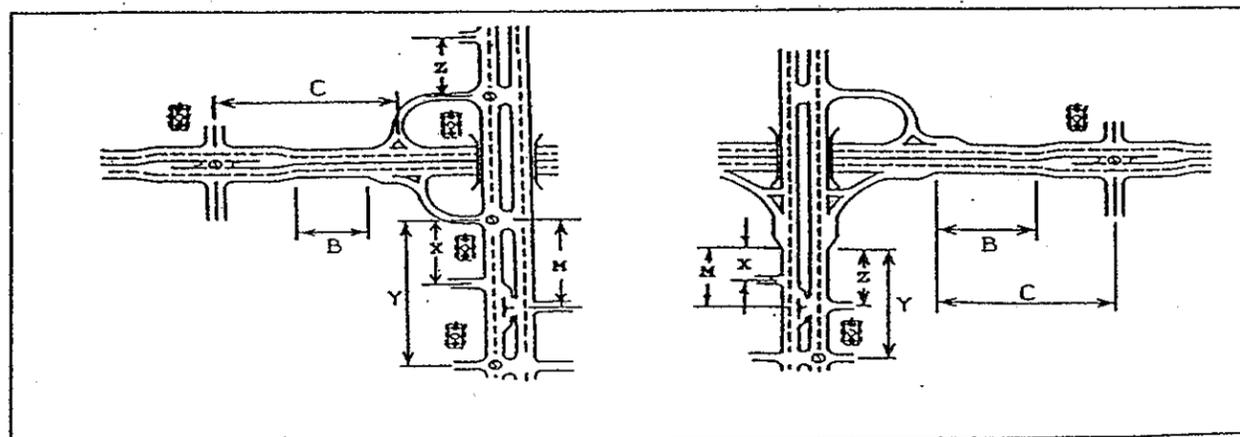
Table 19: Minimum Spacing Standards Applicable to Non-Freeway Interchanges with Multi-Lane Crossroads

Category of Mainline	Type of Area	Speed of Mainline	Spacing Dimension					
			B	C	X	Y	Z	M
EXPRESSWAY	Fully Developed Urban	45 mph (70 kph)	2640 ft. (800 m)	1 mi. (1.6 km)	750 ft. (230 m)	1320 ft. (400 m)	990 ft. (300 m)	1320 ft. (400 m)
	Urban	45 mph (70 kph)	2640 ft. (800 m)	1 mi. (1.6 km)	1320 ft. (400 m)	1320 ft. (400 m)	1320 ft. (400 m)	1320 ft. (400 m)
	Rural	55 mph (90 kph)	1 mi. (1.6 km)	2 mi. (3.2 km)	1320 ft. (400 m)	1320 ft. (400 m)	1320 ft. (400 m)	1320 ft. (400 m)

- Notes: 1) If the crossroad is a state highway, these distances may be superseded by the Access Management Spacing Standards, providing the distances are greater than the distances listed in the above table.
 2) No four-legged intersections may be placed between ramp terminals and the first major intersection.
 3) No at-grade intersections are permitted between interchanges less than 5 miles apart.

B = Distance between the start and end of tapers
 C = Distance between nearest at-grade and ramp terminal intersections or the end/start of the taper section
 X = Distance to first approach on the right; right in/right out only
 Y = Distance to first major intersection
 Z = Distance between the last approach road and the start of the taper for the on-ramp
 M = Distance to first directional median opening. No full median openings are allowed in nontraversable medians to the first major intersection

Figure 21: Measurement of Spacing Standards for Table 19



Access Management Spacing Standard Minor Deviation Limits

The following tables show the access management spacing standard minor deviation limits for the access management classifications listed in Goal 3, Policy 3A: Classification Spacing Criteria, Action 3A.1. The Access Management Spacing Standards are shown in Tables 13, 14 and 15 of this Appendix. Minor deviations may be considered down to the deviation limits shown in Tables 20, 21 and 22. Any request to deviate beyond these limits is considered a major deviation.

Table 20: Access Management Spacing Standard Minor Deviation Limits for Statewide Highways
 ①②
 (Measurement is in Feet)*

Posted Speed③	Rural		Urban			
	Expressways	Other	Expressways	Other	UBA	STA
≥55	(none)	(950)	(none)	(870)		
	[none]	[1150]	[none]	[1000]		
50	(none)	(700)	(none)	(640)		
	[none]	[900]	[none]	[810]		
40 & 45	(none)	(560)	(none)	(530)		
	[none]	[810]	[none]	[740]		
30 & 35		(400)		(350)	(350)	④
		[675]		[600]	[600]	
≤25		(280)		(250)	(250)	④
		[525]		[400]	[400]	

NOTE: The numbers in circles (②) refer to explanatory notes that follow the tables.

*Measurement of the approach road spacing is from center to center on the same side of the roadway.

**Spacing for Expressway at-grade intersections only. See Table 12 for interchange spacing.

() = Driveway Spacing Minor Deviation Limit.

[] = Public Street Spacing Minor Deviation Limit.

Table 21: Access Management Spacing Standard Minor Deviation Limits for Regional Highways

①②
(Measurement is in Feet)*

Posted Speed③	Rural		Urban			
	Expressways	Other	Expressways	Other	UBA	STA
≥55	(none)	(700)	(none)	(700)		
	[none]	[870]	[none]	[870]		
50	(none)	(540)	(none)	(540)		
	[none]	[640]	[none]	[640]		
40 & 45	(none)	(460)	(none)	(460)		
	[none]	[550]	[none]	[550]		
30 & 35		(300)		(300)	(300)	④
		[375]		[375]	[375]	
≤25		(220)		(220)	(220)	④
		[350]		[350]	[350]	

NOTE: The numbers in circles (②) refer to explanatory notes that follow the tables.

*Measurement of the approach road spacing is from center to center on the same side of the roadway.

**Spacing for Expressway at-grade intersections only. See Table 12 for interchange spacing.

() = Driveway Spacing Minor Deviation Limit.

[] = Public Street Spacing Minor Deviation Limit.

Table 22: Access Management Spacing Standard Minor Deviation Limits for District Highways

②
(Measurement is in Feet)*

Posted Speed③	Rural		Urban			
	Expressways	Other	Expressways	Other	UBA	S/A
≥55	(none)	(650)	(none)	(650)		
	[none]	[660]	[none]	[660]		
50	(none)	(475)	(none)	(475)		
	[none]	[525]	[none]	[525]		
40 & 45	(none)	(400)	(none)	(400)		
	[none]	[475]	[none]	[475]		
30 & 35		(275)		(275)	(250)	④
		[325]		[325]	[300]	
≤25		(200)		(200)	(175)	④
		[245]		[245]	[200]	

NOTE: The numbers in circles (②) refer to explanatory notes that follow the tables.

*Measurement of the approach road spacing is from center to center on the same side of the roadway.

**Spacing for Expressway at-grade intersections only. See Table 12 for interchange spacing.

() = Driveway Spacing Minor Deviation Limit.

[] = Public Street Spacing Minor Deviation Limit.

Notes on Tables 20, 21 and 22:

① Where a right of access exists, access will be allowed to a property at less than minor deviation limits only if that property does not have reasonable access and the minor deviation limits cannot be accomplished. If possible, other options should be considered, such as joint access.

Where the right of access exists, the number of approach roads (driveways) to a single property shall be limited to one, even when the property frontage exceeds the spacing standards. More than one approach road may be considered if, in the judgment of the Region Access Management Engineer, additional approach roads are necessary to accommodate and service the traffic to a property, and additional approach roads will not interfere with driver expectancy and the safety of the through traffic on the highway.

Approach roads shall be located where they do not create undue interference or hazard to the free movement of normal highway or pedestrian traffic. Locations on sharp curves, steep grades, areas of restricted sight distance or at points which interfere with the placement and proper functioning of traffic control signs, signals, lighting or other devices that affect traffic operation will not be permitted.

If a property becomes landlocked (no reasonable access exists) because an approach road cannot be safely constructed and operated, and all other alternatives have been explored and rejected, ODOT might be required to purchase the property. (Note: If a hardship is self-inflicted, such as by partitioning or subdividing a property, ODOT does not have responsibility for purchasing the property.)

(Note ① has precedence over notes ②, ③ and ④.)

② These standards are for unsignalized access points only. Signal spacing standards supersede spacing standards for approaches.

③ Posted (or Desirable) Speed: Posted speed can only be adjusted (up or down) after a speed study is conducted and that study determines the correct posted speed to be different than the current posted speed. In cases where actual speeds are suspected to be much higher than posted speeds, ODOT reserves the right to adjust the access spacing accordingly. A determination can be made to go to longer spacing standards as appropriate for a higher speed. A speed study will need to be conducted to determine the correct speed.

④ Minimum spacing for public road approaches is either the existing city block spacing or the city block spacing as identified in the local comprehensive plan. Public road connections are preferred over private driveways, and in STAs driveways are discouraged. However, where driveways are allowed and where land use patterns permit, the minimum spacing for driveways is 55 meters (175 feet), or mid-block if the current city block spacing is less than 110 meters (350 feet).