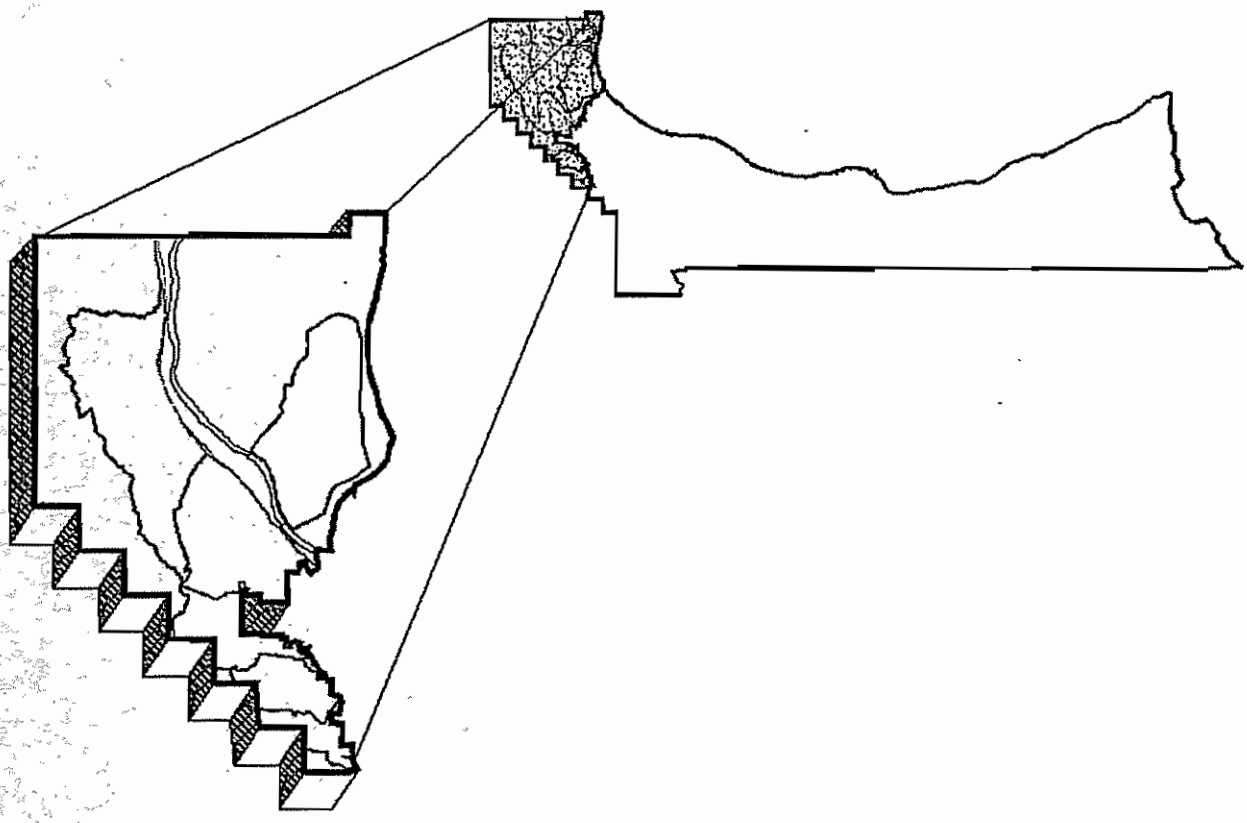
WESTSIDE RURAL MULTNOMAH COUNTY TRANSPORTATION SYSTEM PLAN

Adopted July 2, 1998



PREPARED FOR

MULTNOMAH COUNTY OREGON

BY

CH2MHILL

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BEFORE THE BOARD OF COUNTY COMMISSIONERS
FOR MULTNOMAH COUNTY, OREGON
ORDINANCE NO. 911

An Ordinance adopting the Westside Rural Multnomah County Transportation System Plan.

Multnomah County Ordains as follows:

Section I. Purpose

(A) The purpose of this ordinance is to adopt the Westside Rural Multnomah County Transportation System Plan as an element of the Comprehensive Framework Plan.

Section II. Findings

(A) The Westside Rural Multnomah County Transportation System Plan provides transportation policies and alternatives for the westside rural area of the County to comply with the Statewide Transportation Planning Rule.

(B) In June 1997, a task force and sounding board of 40 area citizens were formed to assist in the preparation of the Westside Rural Multnomah County Transportation System Plan.

(C) The task force met three times between July 1997 and March 1998 and formulated draft policies and projects to be included within the Westside Rural Multnomah County Transportation System Plan.

(D) These draft policies and projects were presented at a public open house in April 1998 within the Westside rural community.

(E) The Multnomah County Planning Commission held a public hearing on the draft Westside Rural Multnomah County Transportation System Plan on May 18, 1998. The Planning Commission recommended the Transportation System Plan (Exhibit A dated April 15, 1998) and Addendum (Exhibit B dated May 8, 1998) with amendments as noted in the attached Resolution C-498 (Exhibit C dated May 18, 1998) for adoption by the Multnomah County Board of Commissioners following the hearing.

(F) On April 21, 1998, the draft Westside Rural Multnomah County Transportation System Plan was sent to the Oregon Department of Land Conservation and Development for a 45 day review period.

(G) On June 15, 1998 the Multnomah County Division of Transportation. and Land Use Planning placed an announcement of a public hearing on the Westside Rural Multnomah County Transportation System Plan in the Oregonian and mailed notices to interested parties who had participated in the development of the Transportation System Plan

(H) On June 25, 1998, the Multnomah County Board of Commissioners conducted a public hearing on the first reading of Westside Rural Multnomah County Transportation System Plan.

(I) On July 2, 1998 the Multnomah County Board of Commissioners considered the second reading of the Westside Rural Multnomah County Transportation System Plan.

Section III. Adoption

ADOPTED this 2nd day of July 1998, being the date of its second reading before the Board of County Commissioners of Multnomah County.

BOARD OF COUNTY COMMISSIONERS
FOR MULTNOMAH COUNTY, OREGON

Beverly Stein, Chair

REVIEWED:

THOMAS SPONSLER, COUNTY COUNSEL
FOR MULTNOMAH COUNTY, OREGON

By _____
Sandra N. Duffy, Chief Assistant Counsel

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Abbreviations and Acronyms

ADA	Americans with Disabilities Act
ADT	average daily traffic
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
BCC	Board of County Commissioners
BNSF	Burlington Northern Santa Fe
CIP	Capital Improvement Program
DEQ	Oregon Department of Environmental Quality
EMCTC	East Multnomah County Transportation Committee
FAA	Federal Aviation Administration
FRA	Federal Railroad Administration
HCM	Highway Capacity Manual
ISTEA	Intermodal Surface Transportation Efficiency Act
LOS	level(s) of service
MTIP	Metro Transportation Improvement Program
NBIS	National Bridge Inspection Standards
OAR	Oregon Administrative Rule
ODF&W	Oregon Department of Fish and Wildlife
ODOT	Oregon Department of Transportation
OTP	Oregon Transportation Plan
ROW	right-of-way
RTP	Regional Transportation Plan
SPIS	Safety Priority Index Number
STIP	State Transportation Improvement Program
TPR	Transportation Planning Rule
TSP	Transportation System Plan
UGB	Urban Growth Boundary

CHAPTER 1

Introduction

Context

Multnomah County, in conjunction with the Oregon Department of Transportation (ODOT), initiated a study of the transportation system in the west rural county area. This study is being conducted to bring the county into compliance with Oregon legislation that requires local jurisdictions to prepare a Transportation System Plan (TSP) as part of their overall Comprehensive Plan.

As shown in Figure 1-1, Multnomah County is experiencing a number of internal and external forces, creating the need and urgency to update its TSP at this time. Most notably, the progress of the U.S. 30 Corridor Plan and the requirements of the Oregon Transportation Planning Rule (TPR) make this period of time a landmark in the history of Multnomah County transportation.

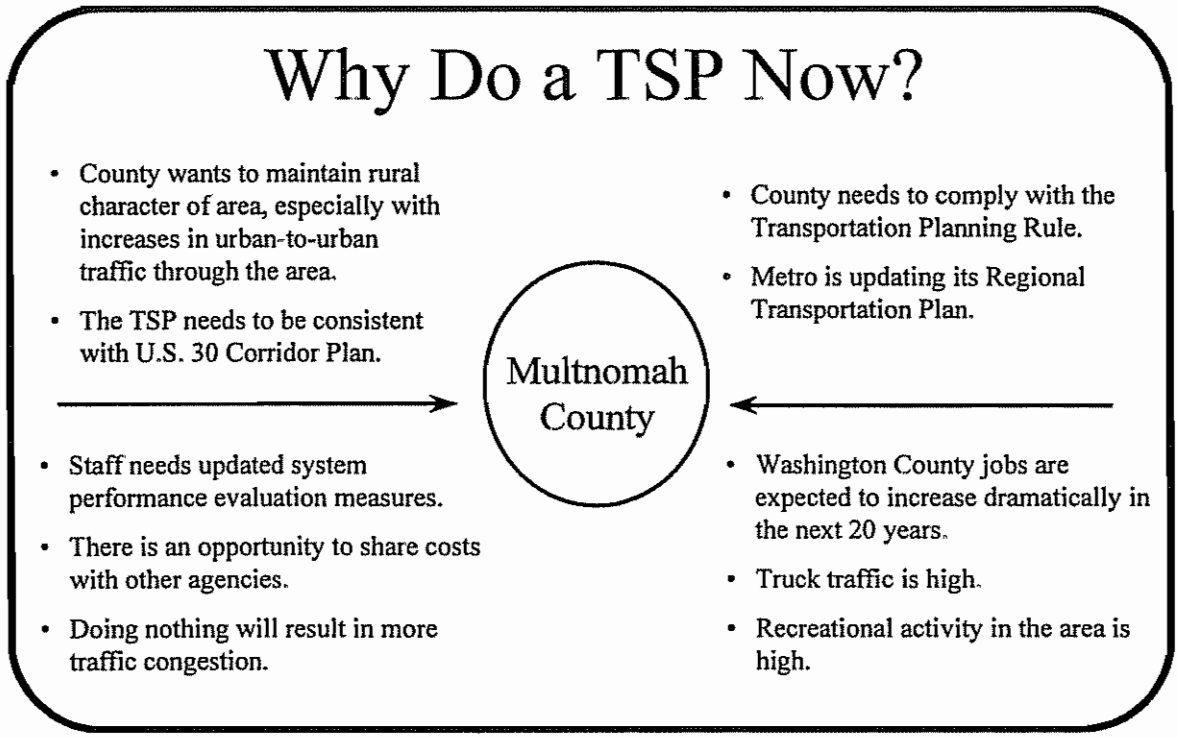

Figure 1-1

According to Oregon Administrative Rule 660.0012, known as the Transportation Planning Rule, all public jurisdictions are required to develop a TSP that includes the following elements:

- A road plan for a network of arterial and collector streets
- A public transit plan
- A bicycle and pedestrian plan
- An air, rail, water, and pipeline plan

- A transportation finance plan
- Policies and ordinances for implementing the TSP

The TPR also requires local communities to coordinate their plans with county and state transportation plans.

Transportation System Planning General Requirements

A TSP is a long-range (20-year) program for managing transportation systems that move people, goods, and services within a specific transportation area. There are several federal, state, and regional mandates affecting transportation system planning. The three most important of these are the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), the Oregon Transportation Plan (OTP) prepared by ODOT (1992), and the TPR. The three share several common themes requiring that transportation plans achieve the following:

- Include a balanced transportation system providing transportation options
- Reduce reliance on the single-occupant vehicle and increase the opportunity for modal choice
- Coordinate with land use plans
- Address the environmental, social, economic, and energy consequences of proposed actions

Under the TPR, ODOT must identify a system of transportation facilities and services adequate to meet state transportation needs and then must prepare a TSP. The OTP and adopted modal and facility plans meet the requirements for the state TSP. The county's TSP must be consistent with the state and regional TSPs.

The OTP contains policies and actions and a system plan. The policies, actions, and minimum levels of service (LOS) applicable to regional and local governments are listed in the Implementation Section of the OTP in the form of guidelines. These guidelines are the basis for determining consistency with the state plan. The OTP describes the transportation system as having the following characteristics:

- Balance
- Efficiency
- Accessibility
- Environmental responsibility
- Connectivity among places
- Connectivity among modes and carriers
- Safety
- Financial stability

County Approach

Multnomah County is very diverse and has subareas of community interests and needs. The county's TSP will be developed in phases by subarea to reflect these interests and needs. To the extent possible, each TSP will be developed as a stand-alone study. The subareas are physically divided by the City of Portland. The east rural county area is split by the Sandy River, which creates two different transportation needs. The county is also responsible for the unincorporated areas within the Urban Growth Boundary (UGB). The subareas within Multnomah County are as follows:

- Westside Rural Multnomah County: including West Hills and Sauvie Island
- Eastside Rural Multnomah County: including rural areas east of the Sandy River
- Eastside Rural Multnomah County: including rural areas west of the Sandy River
- Urban unincorporated areas within the UGB

Study Area

This TSP concerns the first of the subareas listed above, the west rural county area, as shown in Figure 1-2. The subarea is bounded by Columbia County to the north, the Columbia River to the east, Washington County to the west, and the City of Portland to the south. This study area has two distinct parts with differing land uses: Sauvie Island/Multnomah Channel rural area and West Hills rural area. The Sauvie Island/Multnomah Channel area is dominated by agricultural uses and a wildlife refuge, with various water-related uses on and along Multnomah Channel ranging from protected wetlands to marinas. The West Hills area is dominated by steep forest hills and is located between two urban areas.

Land use plans have been adopted in the West Hills and Sauvie Island areas. The plans address statewide land use planning goals, such as farm and forest protection, and natural resources and hazards. These plans reinforce the communities' protection from urbanization. For this TSP, it was agreed to include all county and state roadways with a functional classification of collector or arterial.

U.S. Highway 30 (U.S. 30) bisects the northern portion of the study area as it follows the Multnomah Channel of the Columbia River. The segment of U.S. 30 in Multnomah County was not examined in detail as part of this study since there is a separate corridor planning process under way for the entire corridor. A detailed investigation of its operation, condition, and capacity was performed as part of the U.S. 30 Corridor Plan.

To the east of U.S. 30 are Multnomah Channel and Sauvie Island. Sauvie Island is relatively flat and contains mostly farmland and lakes. This area also attracts many visitors, who come for the "u-pick" fields located on the island and for other recreational opportunities.

To the west of U.S. 30, the West Hills rise 1,100 feet. These hills are primarily forestland, with residential pockets and small farms. Within the study area, the roadways between U.S. 30 and Washington County have curves and steep grades.

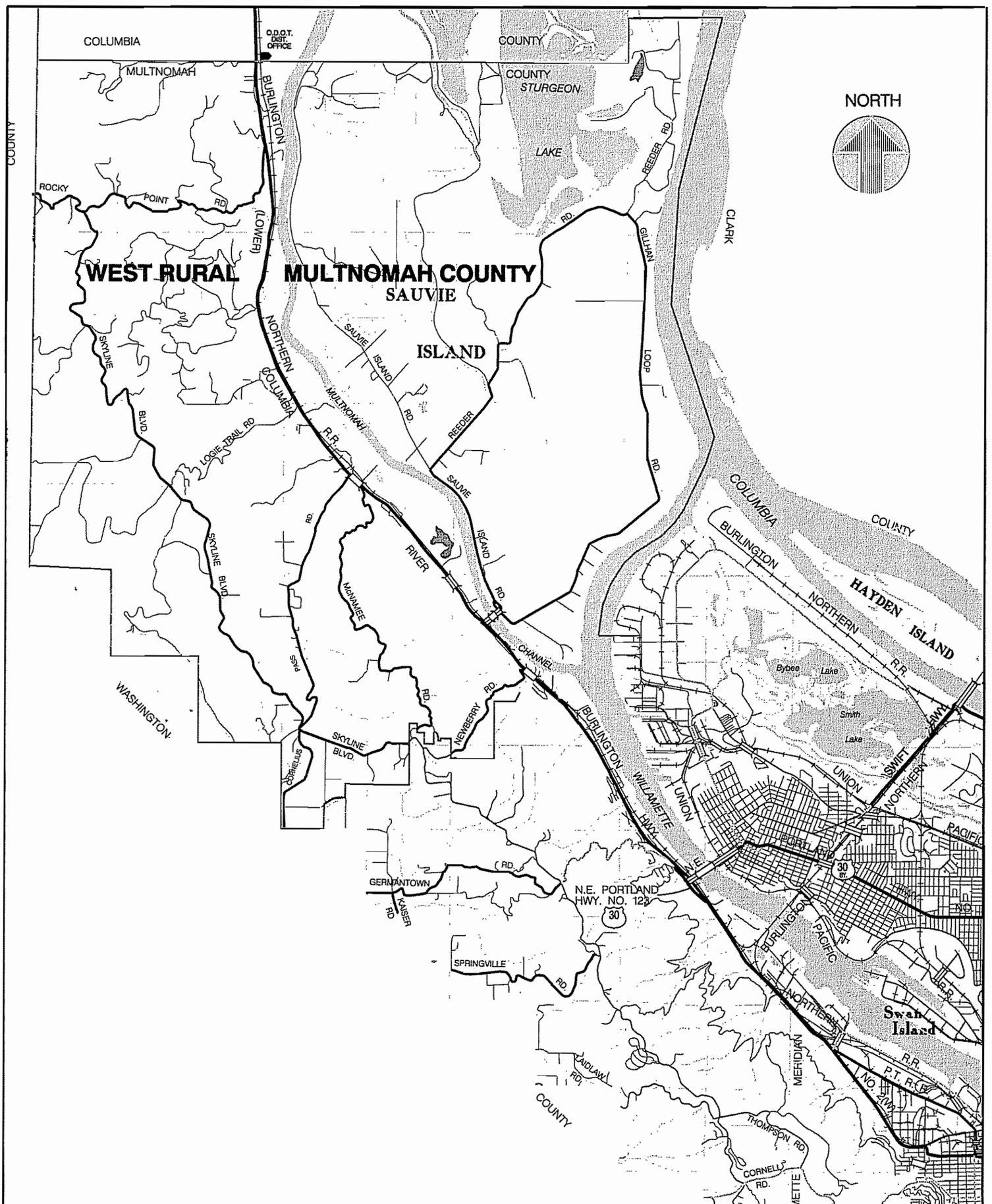

FIGURE 1-2
TSP STUDY AREA

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Public Involvement and Agency Coordination

A vital component in developing and implementing a TSP is to bring the public and affected agencies into the process. Early involvement in the TSP process is important in identifying issues, setting goals, and establishing community understanding of and confidence in the process. The statements below summarize the TPR requirements for public involvement and agency coordination:

- Public participation and agency coordination is required.
- The TSP will be adopted into the local Comprehensive Plan or default to using the TPR for local decisionmaking.
- Local plans need to be consistent with federal, state, and regional plans and policies.

The Westside Rural Multnomah County TSP development process included both public involvement and agency coordination. A telephone survey of over 350 residents in the area was conducted at the beginning of the project. The survey collected information on transportation priorities and needs. Following the survey, a Sounding Board and Task Force assisted the county in developing the TSP. The Sounding Board consisted of area residents and agencies such as Metro, Washington County, etc., who provided input through the mail to the Task Force. The Task Force included 15 residents who provided valuable input regarding transportation issues. Members of both the Sounding Board and Task Force assisted with the development of the goals, objectives, and policies and helped with identification of projects needed in the area. The draft TSP was revised to incorporate feedback received at an open house, and the final TSP was presented to the Planning Commission and the Board of County Commissioners for adoption.

The development process for the TSP is shown on Figure 1-3.

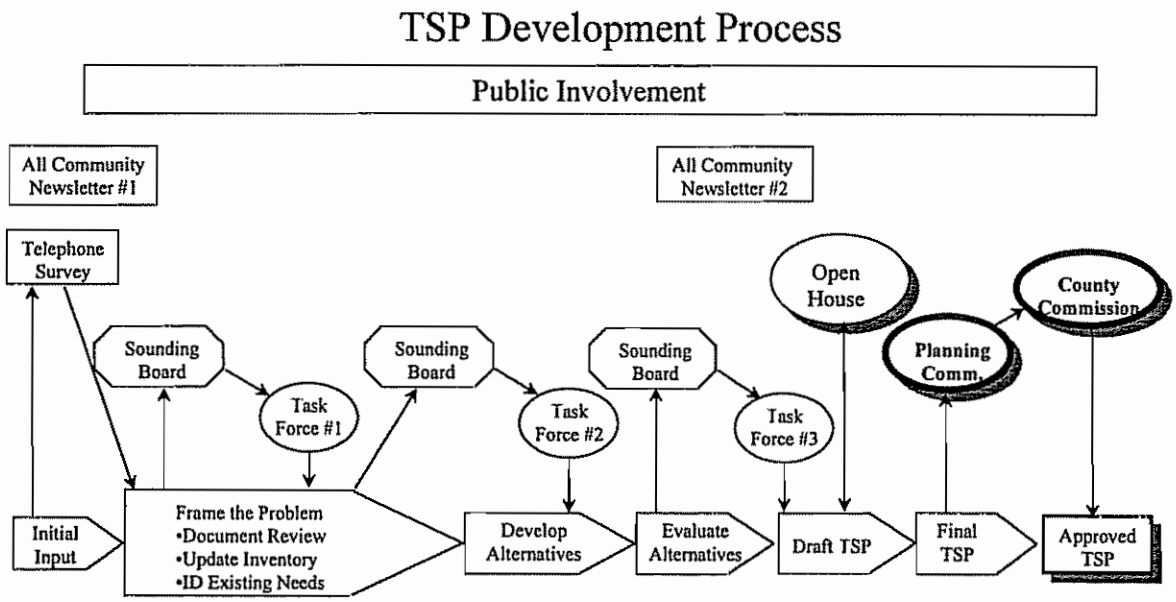

Figure 1-3

Transportation Goals

Transportation goals were established to assist the city, county, and state jurisdictions in meeting the requirements of the TPR. The transportation goals for the Westside Rural Multnomah County study area were developed with Sounding Board and Task Force input and were reviewed at an open house. The five goals established for the study area are listed below, along with the objectives, policies, and implementation strategies identified for each goal.

Additional transportation policies have been adopted in Multnomah County's Rural Area Plans. The West Hills Rural Area Plan and the Sauvie Island/Multnomah Channel Rural Area Plan should be referenced for policies specific to each of the rural areas.

GOAL 1 Implement a transportation system that is safe and efficient in meeting the needs of area residents and those traveling through the area.

Objective A Provide a transportation system that addresses safety concerns for all modes of travel.

Policy Improve roadways to attain appropriate safety levels for all motorized and non-motorized traffic.

Implementation Strategies

- *Monitor accident rates for all modes of transportation and recommend implementation of low-cost operational improvements within budgetary limits. Target resources to reduce accident potential in the top 10 percent of accident locations.*
- *Continue to monitor high accident location sites for all modes of transportation.*
- *Implement access management standards to reduce vehicle conflicts and maintain the rural character of the area.*
- *Conduct a corridor study of Cornelius Pass Road in coordination with Metro, ODOT, the City of Portland, Washington County, and the Port of Portland to determine the long-term function of the facility.*
- *Support the use of I-5 as an alternative route for through truck and auto traffic using U.S. 30 by alerting drivers (via additional guidance signs) to the choice of an alternative route.*

Policy Actively support safe travel speeds on the transportation system.

Implementation Strategies

- *Support speed limit enforcement.*
- *Apply design standards that encourage appropriate motor vehicle and truck speeds.*

Objective B Provide a transportation system that is convenient and limits congestion while meeting minimum safety standards.

Policy Review adopted design standards to determine if 4 feet paved shoulders adequately meet safety standards for all modes of travel.

Implementation Strategies

- *Support the Street Design Guidelines for 2040 and apply them appropriately to maintain the rural character of Multnomah County.*
- *Support Title 6 of the Urban Growth Management Functional Plan and apply level of service standards appropriately to maintain the character of rural Multnomah County.*

GOAL 2 Implement a balanced transportation system that supports all modes of travel.

Objective A Establish a transportation system that accommodates a variety of methods of travel and minimizes reliance on any single travel mode.

Policy Encourage the use of ride-sharing facilities.

Implementation Strategies

- *Support safe and convenient park and ride facilities for car pools and transit service in convenient and appropriate locations.*
- *Encourage the placement of bike lockers at all park and ride / park and car pool locations. Support and promote their use.*
- *Coordinate with other agencies to assist users with convenient services (e.g., ride share matching).*

Policy Encourage mobility for the transportation disadvantaged.

Implementation Strategy

- *Work with public transportation providers to monitor and provide for the transportation needs of the transportation disadvantaged.*

Policy Support the development of multi-use paths.

Implementation Strategy

- *Coordinate multi-use trail transportation needs with Metro Parks and Green Spaces.*

GOAL 3 Develop a transportation system that supports the rural character of West Multnomah County.

Objective A Maintain a transportation system that supports the surrounding rural land use designations.

Policy Discourage through traffic on trafficways with a functional classification of rural local road.

Implementation Strategies

- *Reduce travel conflicts by providing appropriate facilities, signs, and traffic markings based upon user type and travel mode.*

- *On rural local roads with heavy through traffic, consider implementing appropriate traffic-calming measures to reduce such traffic.*

Objective B Provide a transportation system that minimizes impacts to wildlife and agricultural resources.

Policy Apply roadway design safety standards appropriately by balancing the needs of the traveling public and minimizing negative impacts to the environment.

Implementation Strategies

- *Develop and implement a design exception process that considers the relative and incremental benefits of implementation costs and impacts to the environment.*
- *Assess implications of fish passage requirements on county facilities and develop a program for retrofitting drainage facilities.*
- *Adopt and apply drainage system design guidelines and standards to accommodate fish passage.*
- *Adopt and apply rural roadway shoulder standards that preserve the rural character of the area.*
- *Adopt and apply rural roadway standards that accommodate wildlife migration.*

Objective C Maintain the beauty of the area by preserving critical view sheds.

Policy Encourage the placement of new pipelines and transmissions lines in existing rights-of-way whenever possible.

Implementation Strategies

- *Develop general guidelines for utility placement within the county right-of-way that reduce the number of conflicts and cost of implementation.*
- *Enhance the rural character and scenic qualities of the area by placing utilities underground when possible.*
- *Coordinate improvements with utility companies through regular status meetings to maintain and preserve the beauty of the rural character of west Multnomah County.*

Objective D Ensure the transportation plan meets federal, state and regional air, water, and noise standards.

Policy Coordinate transportation improvement projects with appropriate regulatory agencies.

Implementation Strategies

- *Retrofit existing facilities to meet regulatory requirements within budgetary limits.*

- *Obtain permits as necessary for transportation improvement projects and maintenance activities.*

GOAL 4 Develop a transportation system that supports a healthy economy.

Objective A Provide for convenient access while maintaining movement of freight along the U.S. 30 Corridor.

Policy Provide ongoing coordination with state, regional, and local business interests to assure efficient movement of goods and services.

Implementation Strategies

- *Participate in, support, and adopt the U.S. 30 Corridor Plan.*
- *Provide for auxiliary turn lanes on road connections to U.S. 30 to achieve acceptable operating levels of service.*

Policy Promote transportation alternatives for the movement of freight.

Implementation Strategies

- *Encourage rail operators to maintain rail service within the U.S. 30 corridor.*
- *Support the movement of freight on the Columbia River, including the U.S. Army Corps of Engineers' study of deepening the Lower Columbia River navigation channel to accommodate deep draft ships.*

Objective B Preserve the function and safety of the transportation system.

Policy Provide a transportation system that ensures economically viable transportation of goods from farm to market.

Implementation Strategies

- *Conduct a study of the Sauvie Island Bridge.*
- *Conduct a corridor study of Cornelius Pass Road.*

Policy Coordinate transportation system management activities with interested and affected stakeholders.

Implementation Strategies

- *Work with property owners to consolidate existing private accesses when possible and as appropriate to access management standards.*
- *Support limited accesses along U.S. 30 to the extent possible. Support access management along U.S. 30 in accordance with ODOT's Access Management Standards.*

GOAL 5 Provide transportation improvements in a timely manner according to funding capability.

Objective A Maximize cost-effectiveness of transportation improvements using the Capital Improvement Plan process.

Policy Invest in safety and maintenance improvements.

Implementing Strategies

- *Accelerate shoulder paving to safely accommodate automobile, bicycle, and pedestrian use.*
- *Make intersection improvements to improve safety, sight distance, and intersection efficiency.*
- *Continue to provide opportunities to educate and inform citizens with easy-to-understand materials on transportation finance.*
- *Ensure the Capital Improvement Plan evaluation criteria adequately evaluates rural needs.*

Transportation System Plan Organization

The TSP will serve Multnomah County staff and citizens as a decisionmaking tool. The structure of the document is intended to be a valuable asset in creating a livable environment for years to come. The TSP is organized as follows:

- Chapter 1, Introduction—provides a basic overview of the TSP, explaining the basic requirements and development process.
- Chapter 2, Existing Conditions—provides a basic inventory and assessment of current transportation conditions. Basic performance characteristics are discussed for each of the transportation modes, transportation operations, and transportation safety.
- Chapter 3, Future Needs and Alternatives—provides a 20-year forecast of travel demand and an inventory of needs to be addressed.
- Chapter 4, Transportation System Plan—provides a classification system, standards, and recommended improvements for each mode.
- Chapter 5, Financing Plan—provides an overview of the funding processes for achieving the plan's identified projects.
- Chapter 6, Implementing and Supporting Ordinances—provides an overview of the ordinance topics that the county must ensure are in compliance with the TPR.
- Chapter 7, References—provides a list of works cited.

CHAPTER 2

Existing Conditions

Chapter Overview

This chapter summarizes existing transportation conditions in west rural Multnomah County. The following elements of the transportation system are discussed:

- Plans and Policies Review
- Land Use
- Environmental Constraints
- Roadway System
- Public Transportation System
- Pedestrian and Bicycle Systems
- Air, Rail, Water, and Pipeline Systems
- Transportation Safety

Plans and Policies Review

As part of this study, an extensive number of federal, state, regional, and local plans and policies were reviewed to ensure the study would be coordinated with relevant policies, goals, and standards. More than 40 plan and policy documents have been reviewed, representing federal, state, and local government levels. A few examples are listed below:

- Oregon Transportation Plan. Oregon Department of Transportation, September 15, 1992.
- Metro Regional Transportation Plan. Metro, July 1995.
- Portland-Astoria Corridor (U.S. 30) Interim Corridor Strategy, with Annotated Amendments Approved by the Corridor Steering Committee, September 1996.
- Washington County Transportation Plan, October 1988.
- City of Portland Transportation System Plan, Phase One, December 1990.
- Sauvie Island/Multnomah Channel
- Plan October 1997, Amendment to Multnomah County Comprehensive Framework Plan.
- West Hills Rural Area Plan, October 1996, Amendment to Multnomah County Comprehensive Framework Plan.

The findings, conclusions, and recommendations made in these plans have been respected and adhered to wherever possible and have shaped the formulation of the Westside Rural Multnomah County TSP.

Land Use and Demographics

Transportation needs and travel patterns are strongly related to land use patterns and population. When preparing travel forecasts, it is important to achieve a level of understanding of future employment and population trends. The method for gaining this understanding is to examine the land use. Based upon 1994 data, there are 1,966 household residents, 6 retail jobs, and 787 other jobs in the west rural Multnomah County area.

Table 2-1 is an inventory of land use types and dwelling units in west rural Multnomah County. Portions of the study area devoted to each land use is shown on Figure 2-1. The land use regulations are structured to preserve the current use of forest and agriculture lands. Therefore, development in the study area will be relatively low.

TABLE 2-1
Land Use and Dwelling Unit Summary

Land Use	Sauvie Island Acres (1997)	West Hills Acres (1996)	Total Acres
Commercial Forest	0	15,110	15,110
Exclusive Farm Use	11,800	1,820	13,620
Rural Residential	0	2,090	2,090
Multiple Use Agriculture	3,600	280	3,880
Total	15,400	19,300	34,700
Dwelling Units	**Sauvie Island Dwellings**	**West Hills Dwellings**	**Total Dwellings**
Total Existing Dwellings	650[1]	920	1,570
Dwellings to Build Out	69[2]	450	519
Total Dwellings at Build-Out	719	1,370	2,089

Notes:

1 Number includes 200 houseboats and sailboats serving year-round residences.

2 The number of dwelling units is shown as the minimum allowed under current regulations. The number could go up if a prospective developer is granted an exception for the use of high-value farmland.

Additional land use considerations for west rural Multnomah County include the following:

- The expansion of the UGB
- The potential development of urban reserve lands
- Rural centers serving commercial and retail functions for rural residents

According to Metro's 2040 Vision, an expansion of the UGB is expected during the next 20 years within the study area.

Urban reserve lands are those identified to be incorporated into the UGB at some future time when an increase in inventory needs is determined necessary through the comprehensive planning process. Two urban reserve areas have been identified within the study area. Both are in the far southeast

section: one surrounding Laidlaw Road and the other on the east side of Skyline Boulevard by Saltzman Road. Figure 2-1 shows these two urban reserve areas.

Two areas in the plan boundaries have rural center zoning, Burlington and a small area on Sauvie Island. There are no policies or proposals to expand these existing areas at this time.

Environmental Constraints

The Westside Rural Multnomah County study area is characterized by two very different landforms. Sauvie Island is primarily flat, high-value farmland; the West Hills are forested lands. Both landforms are unique in their value because of the proximity of the Portland metropolitan area. Each area's environmental constraints will be covered separately, with U.S. 30 serving as the line of demarcation between the landforms. However, there is a recognized interdependency between the areas.

Sauvie Island

Environmental Quality

Sauvie Island has experienced no significant air quality issues other than those which affect the Portland metropolitan area. Industrial facilities in the City of Portland lie to the east of Sauvie Island, across the Willamette River. These facilities have potential air quality and noise issues associated with them which impact Sauvie Island; however, the issues cannot be addressed without coordination between Multnomah County, the City of Portland, and the Port of Portland.

Within the study area, the property affecting air quality the most is the Morris Brothers' Angell Quarry. This mining and aggregate production operation is in west rural Multnomah County and produces dust and emissions. Air quality emissions are currently regulated by the Oregon Department of Environmental Quality (DEQ). Noise levels from the mining and aggregate production are not considered to be a significant issue, according to noise level standards. Other sources of noise include air traffic to and from Portland International Airport and the industrial property nearby in the City of Portland. Citizens have voiced concern about the noise associated with aircraft. The Port of Portland manages noise impacts from the airport through its Noise Abatement Master Plan.

The Sauvie Island Wildlife Area Management Plan, prepared by the Oregon Department of Fish and Wildlife, addresses water quality. The plan identifies sedimentation to be a particular problem, a characteristic of steep hillsides of the West Hills draining to flat terrain. The implications to transportation are higher maintenance costs for cleaning culverts and drainage ditches.

FIGURE 2-1
LAND USE ZONING AND URBAN RESERVES

Natural Hazards

The most significant natural hazards are related to flooding, groundwater contamination, and earthquakes.

- For natural hazards related to flooding, there is a dike system which has been designed for a 500-year flood event. However, there are locations subject to high water with a 100-year flood event.
- Because the groundwater is shallow, the biggest risks of groundwater contamination currently are associated with failing septic systems and illegal sewerage disposal from houseboats.
- Seismic activity has occurred in the area, and an earthquake measuring 5.2 on the Richter scale has occurred in the nearby vicinity.

Floodplain and seismic requirements are well documented and are incorporated into roadway design parameters.

Natural Resources

Several significant natural resources exist in the area, including the Willamette Greenway, Sauvie Island Wildlife Area, Burlington Bottoms, several parks, and many streams. These areas have an abundance of flora and fauna. The Sauvie Island Wildlife Area is visited frequently, with an estimated 750,000 visitor days annually to the site. Of these visitors, 38 percent are accessing beaches, 20 percent are fishing, 10 percent are viewing nature, 2 percent are hunting, and 30 percent are involved in other activities. Metro has recommended limited access to the Burlington Bottoms area because of the sensitivity of the habitat. Viewing from the perimeter is acceptable.

West Hills

Environmental Quality

The West Hills area has experienced no significant air quality issues other than those which affect the Portland metropolitan area. Odors from an agricultural processing operation at the southern end of Sauvie Island affect areas along U.S. 30/Newberry Road. DEQ has jurisdictional authority to address the issue.

There are no significant noise issues identified in the West Hills. The Angell Quarry operation produces significant amounts of noise from its mining and crushing operations, but this noise is well contained within the quarry's 400-acre site.

Multnomah County currently protects water quality in the West Hills with a requirement that a grading and erosion control permit be obtained for all development activities (with a few exceptions, most notably commercial forest practices). A hillside development permit must also be obtained for any development proposed on steep slopes (greater than 25 percent) or within an identified and mapped slope hazard area.

Natural Hazards

The natural hazards in the area are likely to be associated with floodplains, landslides, and seismic earthquakes.

- Severe soil erosion potential exists in many areas of the West Hills, which can cause impacts to water quality. Multnomah County currently regulates private development and requires best

management practices for development in sensitive areas. Improvements to transportation facilities will need to consider the impacts that ground-disturbing activities can have on water quality.

- The North Slope is particularly susceptible to slides because of the soil characteristics and the degree of slope. Slide prevention and mitigation typically are quite costly but are necessary to provide access and mobility.
- Seismic activity has been registered in the Balch Creek Basin and will need to be considered appropriately in design and maintenance of transportation facilities.

Natural Resources

The West Hills area offers scenic views, numerous streams, wildlife habitat, and mineral and aggregate sources. All of these features have negative and positive impacts on the transportation system. The opportunities to enhance the rural character of the West Hills could include slope stability improvements, retrofitting culverts for fish passage, erosion control, and minimal environmental impacts. While tree removal opens vistas and view sheds, without appropriate mitigation measures there is an increase risk of culvert failure, slides and down slope flooding. Tree removal in the West Hills can affect stormwater runoff and sedimentation rates.

Roadway System

There are various aspects of the roadway system to consider in evaluating the existing conditions. This section will consider the hierarchy or functional classification, truck/freight traffic, bridge conditions, geometric standards, pavement conditions, access management, and existing LOS.

Functional Classification

Policy 34 of the Multnomah County Comprehensive Framework Plan, Volume 2 (titled Trafficways and the Functional Classification of Trafficways Map) identifies the functional class of each road. It is important to have the proper classification for each roadway in order to help identify the proper traffic control along the route and access to adjacent properties. Having correct access and traffic control helps maximize the efficiency of the roadway for all modes and improve movement through the corridor. Roadways are developed according to a functional classification that distinguishes streets and roads by their operational purpose.

The hierarchy of roadway classification is determined according to many factors and generally progresses from low traffic volumes and low speeds to high volumes and high speeds. Typical characteristics that are considered when classifying roadways include trip types and trip lengths, travel modes served, current and projected traffic volumes and capacity requirements, land use types and densities, and the relationship between access and traffic movements. Access to property is inversely related to the mobility function of a roadway. Access to adjacent property is greatest on local roads, but mobility is limited to local trips on local roads. For example, the greatest level of mobility to the greatest number of travelers is provided by the freeway system. However, there is no direct property access provided by freeways.

This study considers roadways with a functional classification of rural collector or rural arterial within the area defined as west rural Multnomah County. Two local roads—Kaiser Road and Newberry Road—were also included as part of the study to assess their potential need for reclassification. U.S. 30 passes through the study area and is classified as a principal arterial.

In west rural Multnomah County, Cornelius Pass Road is the only rural arterial; Kaiser Road and Newberry Road are classified as rural local roads; all other roadways investigated within the study area are rural collectors. See Figure 2-2 for a map of the existing functional classifications.

Truck/Freight Traffic

Truck commodity surveys were performed on Cornelius Pass Road, Germantown Road, Newberry Road, and the Sauvie Island Bridge between Tuesday, June 4, and Thursday, June 6, 1996. The surveys were conducted on trucks moving in both directions and were based on visible or likely cargoes. Overall truck percentages were calculated, as well as the percentage of each type of truck and the percentage of specific commodities and commodity category types.

According to the surveys, Cornelius Pass Road has the highest volume of heavy truck traffic in west rural Multnomah County. This roadway carries 15 percent truck traffic during the afternoon period (from 1:00 PM to 4:00 PM). Of the total truck traffic, 30 percent was recognized as carrying construction materials and 22 percent was carrying dirt or aggregate material. Heavy trucks typically haul these types of loads with double rear axles and trailers. Of the total truck traffic, 54 percent consisted of double rear axle trucks with trailers.

Sauvie Island Bridge has the next highest truck traffic percentage, at 9 percent trucks. Truck traffic on other routes typically hauls construction materials.

West Hills residents have voiced concern about the volume of truck traffic on local roads. Multnomah County has restricted truck travel on Logie Trail, Rocky Point, McNamee, Newberry, and Germantown Roads to loads with origin or destination on these roadways. All through trips are prohibited on the basis of steep grades, sharp curves, and narrow driving lanes. This restriction is to maintain public safety, and authority is granted to the County to impose this restriction under Oregon Revised Statute 810-030 and Multnomah County Code 11.60.040.

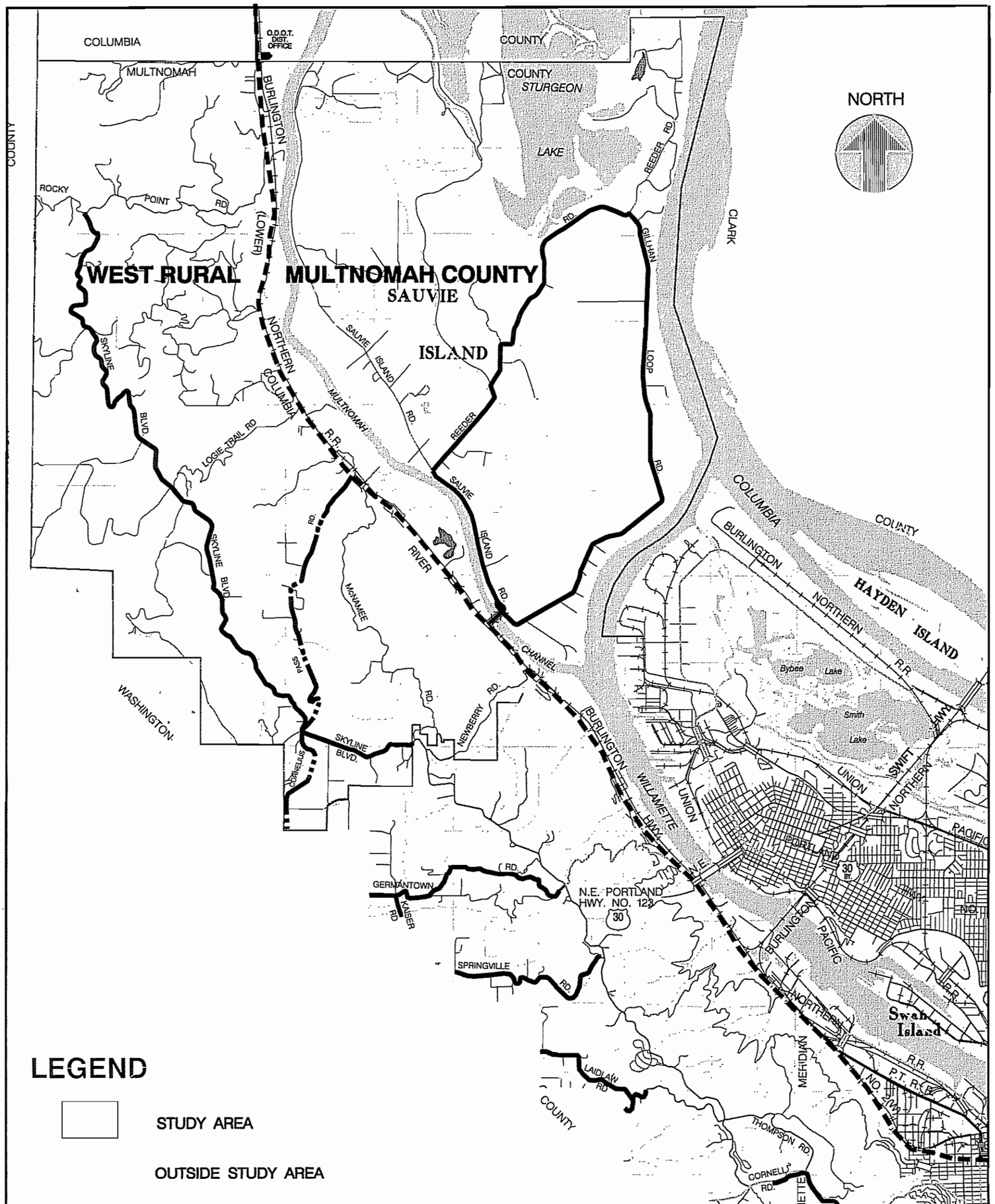

FIGURE 2-2
EXISTING FUNCTIONAL CLASSIFICATION

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Bridge Conditions

This section summarizes the current condition and functional capacity of the Sauvie Island Bridge.

The 1996 routine inspection report indicated the bridge was in fair condition, with deterioration noted primarily in the steel members of the trusses. Pack rust was found in truss components. A 1997 ODOT evaluation of the bridge's safe load-carrying capacity found the bridge sufficient to carry normal legal loads; however, there is very little extra capacity for loads over normal legal limits.

The deterioration of the steel in the main span trusses should be kept in check by spot surface preparations and coatings. The overall condition of the structure appears to be adequate to provide extended service life to the island, provided maintenance items are addressed in a timely manner and special overload trip permits are not issued. The bridge geometrics, with a 26-foot roadway width, and the current traffic volumes classify the bridge as functionally obsolete.

Geometric Standards

Geometric standards are established based on extensive research funded through federal and private sources (auto manufacturers and insurance industries). Multnomah County has adopted design standards, and the typical widths are shown in Table 2-2. A shoulder width of 8 feet for a two-lane facility is normally not recommended because the shoulder can appear to be an additional lane. This can cause a safety problem for those using the shoulder for emergency conditions, walking, or bicycling. The American Association of State Highway and Transportation Officials (AASHTO) recommends 5 feet as a minimum shoulder width, while other jurisdictions have shoulder standards of 4 feet.

TABLE 2-2
Multnomah County Standards for Typical Section (feet)

Street and Roadway Design Standards---Design Speed = 25-35 mph					
Functional Classification	**ROW Width (ft)**	**Paved Width (ft)**	**Travel Lane Width (ft)**	**# of Lanes**	**Shoulder Width (ft) and Type**
Local/Collector-Rural	50-60	24	12	2	2-8 paved or gravel
Arterial – Rural	60-80	24-50	12	2-3	2-8 paved or gravel
Minor Arterial-Urban	80-90	66-72	11-14	5	5 paved
Major/Principal Arterial-Urban	80-100	66-78	12-14	4-5	5 paved

ROW = right-of-way

The county standards were used to assess geometric deficiencies. Roadways with geometric deficiencies are those with substandard width or safe sight distance. The most notable issues in the west rural Multnomah County area are narrow roadways, steep grades in the West Hills, and sharp curves. Narrow roadways often result in safety issues: safe stopping sight distance; conflicts between motorists, bikes, and pedestrians; and the presence of fixed objects near the edge of the roadway, leaving little room for driver error. Table 2-3 lists the highways exhibiting geometric deficiencies.

Excessive speed is a common concern, compounding the issue of sharp curves and limited sight distance. Citizens have expressed concerns about speed specifically in reference to Cornelius Pass Road, Skyline Boulevard, Thompson Road, Laidlaw Road, Germantown Road, Sauvie Island Road, Reeder Road, and Gillihan Road.

Additionally, there is very little guardrail on roadways in the West Hills area, and the guardrail on Sauvie Island is in need of updating to meet current design standards. Approximately 79 percent of the roadways in the study area is geometrically deficient and in need of shoulders and/or geometric improvements. All roadways within the jurisdictional control of Multnomah County are geometrically deficient; only U.S. 30, under ODOT's jurisdiction, has no geometric deficiency.

TABLE 2-3
Geometric Deficiencies (1996)

Roadway	Ownership Jurisdiction	Paved Width (feet)	Length (feet)	Length of Deficient Geometry
Principal Arterial				
U.S. 30	ODOT	84	45,989	0
Rural Arterial				
Cornelius Pass Road	County	20-24	25,835	25,835
Rural Collector				
Skyline Boulevard	County	20	50,878	50,878
Germantown Road	County	20	11,737	11,737
Springville Road	County	21	12,228	12,228
Laidlaw Road	County	21	7,455	7,455
Thompson Road	County	20	2,492	2,492
Cornell Road	County	20	216	216
Gillihan Road	County	20	32,356	32,356
Reeder Road	County	20	22,900	22,900
Sauvie Island Road	County	24	11,358	11,358
Subtotal (feet)			*151,620*	*151,620*
Grand Total (feet)			***223,444***	***177,455***
Total (miles)			***42.32***	***33.61***

Pavement Conditions

Pavement conditions are given a point value and assigned a rating of excellent, very good, fair, poor, or very poor. Pavement in poor or very poor condition is in need of repair or reconstruction. Pavement deteriorates naturally over time from weather, gravity, and heavy loads. According to the

Oregon Benchmarks (Governor's Office, December 1992), the standard is 90 percent fair or better. As part of this study, the conditions maintained in Multnomah County's pavement condition index system were validated for the arterials and collectors. Table 2-4 summarizes the conditions of the arterials and collectors. Multnomah County arterials and collectors are 100 percent fair or better; therefore, no needs are identified based upon pavement conditions.

TABLE 2-4
Pavement Condition Summary (1996)

Roadway	Ownership Jurisdiction	Paved Width (feet)	Length (feet)	Pavement Condition Rating	Length of Deficient Pavement
Principal Arterial					
U.S. 30	ODOT	84	45,989	Fair	0
Subtotal (feet)			45,989		0
Rural Arterial					
Cornelius Pass Road	County	20-24	25,835	Excel	0
Subtotal (feet)			25,835		0
Rural Collector					
Skyline Boulevard	County	20	50,878	Good/Excel	0
Germantown Road	County	20	11,737	Good/Excel	0
Springville Road	County	21	12,228	Good/Excel	0
Laidlaw Road	County	21	7,455	Excel	0
Thompson Road	County	20	2,492	Good/Excel	0
Cornell Road	County	20	216	Good	0
Gillihan Road	County	20	32,356	Good/Excel	0
Reeder Road	County	20	22,900	Good/Excel	0
Sauvie Island Road	County	24	11,358	Good/Excel	0
Subtotal (feet)			*151,620*		*0*
Grand Total (feet)			***223,444***		***0***
Total (miles)			***42.32***		***0***

Slope Stability and Culverts

There are several slope stability issues through the Tualatin Mountains in west rural Multnomah County. Cornelius Pass Road, as a corridor, has unstable and steep slopes with narrow shoulders. Skyline Boulevard, Rocky Point Road, and Newberry Road also have slope stability issues.

Several culverts need replacement throughout Multnomah County, including culverts in both the West Hills and on Sauvie Island. The most critical culvert problems exist in the West Hills,

specifically on Cornelius Pass Road. These culverts are in steep channels, are poorly aligned to the channel, are separating mid-length, and are generally deteriorating from age. Replacement is extremely expensive and necessary to minimize risk of slides. When replaced, culverts will need to be designed and installed to accommodate fish passage.

Access Management

The street or roadway functional classification is a hierarchy system used for a variety of purposes and is helpful in understanding access management. For example, a higher functional classification corresponds to fewer numbers of accesses. Freeways and expressways have no private accesses and the spacing of public road access is relatively far apart. This increases safe traveling speeds and is efficient in carrying large volumes of traffic. Because local roads have private and public accesses relatively close together, local roads carry low-volume traffic efficiently.

Managing the access of roadways benefits the overall roadway system by increasing safety, increasing capacity, and reducing travel times. Controlling access must not become so restrictive, however, as to prohibit local businesses and home owners reasonable access to the roadway system from their property. Overall, access management must balance the needs of through traffic, local traffic, and pedestrians/bicyclists on a particular roadway.

Multnomah County has standards for public access/intersection spacing as well as private-access driveway width and spacing. Multnomah County also has a process for granting variances. A variance to the access requirements may be granted when no imminent traffic hazard would result or when impacts on through traffic would be minimal. The county may impose restrictions when approving a variance request. The restrictions could include limiting the turning movements, requiring a shared access, and/or closing one or more existing driveways. Existing lots of record, too small to meet the requirements, and minor modifications to existing active uses may be given some flexibility when evaluated for a variance request.

For arterials, access for single-family residential uses will not be allowed if an approved alternate access is available. If no alternate is available, then access will only be allowed through the variance procedure. Multi-family residential, commercial, and industrial uses require a site plan and traffic report as required by the county. Collectors and local streets must meet the access requirements outlined below in addition to the width and spacing requirements.

- *Number.* One driveway access per frontage will be the standard for approval. Double frontages will be limited to access from a single street, usually the lower classification street. Additional driveways must be requested through the variance procedure.
- *Width.* Driveways vary in width by land use type and provide minimum and maximum widths. The range is 12 to 25 feet for a single family residence, 20 to 40 feet for an industrial use.
- *Location.* A minimum spacing of 150 feet is required on arterials and 100 ft on collectors between centerlines.

ODOT also has access management standards for U.S. 30. These standards are described in the Oregon Highway Plan, which is in the process of being updated. The standards are listed in Table 2-5.

TABLE 2-5
U.S. 30 Access Standards

Access Management Feature	Requirement
Access Treatment	Limited Control
Public Road/Intersection Type	At Grade/Interchange
Public Road Intersection Spacing	1 mile
Private Drive Spacing	1,200 feet
Signal Spacing	None
Median Control	Partial/None

Table 2-6 assesses the relative density of private access driveways for the various arterials and collectors. There are no minimum access spacing standards for local roadways. In the West Hills, the terrain often does not allow for ideal sight distance and roadway intersection geometry. Review of development permits should consider sight distance and road approach location before approval to ensure safety.

TABLE 2-6
Existing Access Density

Roadway	Ownership Jurisdiction	Length (feet)	Relative Number of Private Accesses
Principal Arterial			
U.S. 30	ODOT	45,989	Low
Rural Arterial			
Cornelius Pass Road	County	25,835	Low
Rural Collector			
Skyline Boulevard	County	50,878	Low-Medium
Germantown Road	County	11,737	Medium-High
Springville Road	County	12,228	Medium
Laidlaw Road	County	7,455	High
Thompson Road	County	2,492	Medium-High
Cornell Road	County	216	Low-Medium
Gillihan Road	County	32,356	Low-Medium
Reeder Road	County	22,900	Low-Medium
Sauvie Island Road	County	11,358	Medium

Existing Levels of Service

Roadway operational performance is measured by level of service (LOS). The factors considered important in determining LOS are traffic volume, roadway capacity, and user delay. A letter grade is assigned based upon the relative LOS. LOS A represents a high grade; LOS F represents a failing grade. (See Appendix A for definitions of the LOS.) The basis for calculating LOS is peak traffic volumes. Figure 2-3 shows existing PM peak volumes for key intersections in the study area.

Table 2-7 summarizes the 1996 existing PM peak hour levels of service at the key intersections in the study area. As shown in the table, all intersections currently operate at LOS C or better except for the intersection of U.S. 30 at Cornelius Pass Road. It operates at LOS E. Field observations confirm the poor operation of this intersection, with significant waiting lines forming on Cornelius Pass Road and on the left turn from U.S. 30 onto Cornelius Pass Road.

TABLE 2-7
Existing Level of Service: 1996 PM Peak Hour

Intersection	Signalized or AWSC LOS	TWSC* LOS
Germantown Rd./Kaiser Rd.	A	
Reeder Rd./Gillihan Rd.		A
Sauvie Island Rd./Reeder Rd.		A
Sauvie Island Rd./Gillihan Rd.		B
Skyline Rd./ Rocky Point Rd.		A
Skyline Rd./Cornelius Pass Rd.		C
Thompson Rd./Laidlaw Rd.		A
U.S 30/Cornelius Pass Rd.	E	
U.S. 30/Newberry Rd.		C

AWSC = all-way stop-controlled
TWSC = two-way stop-controlled

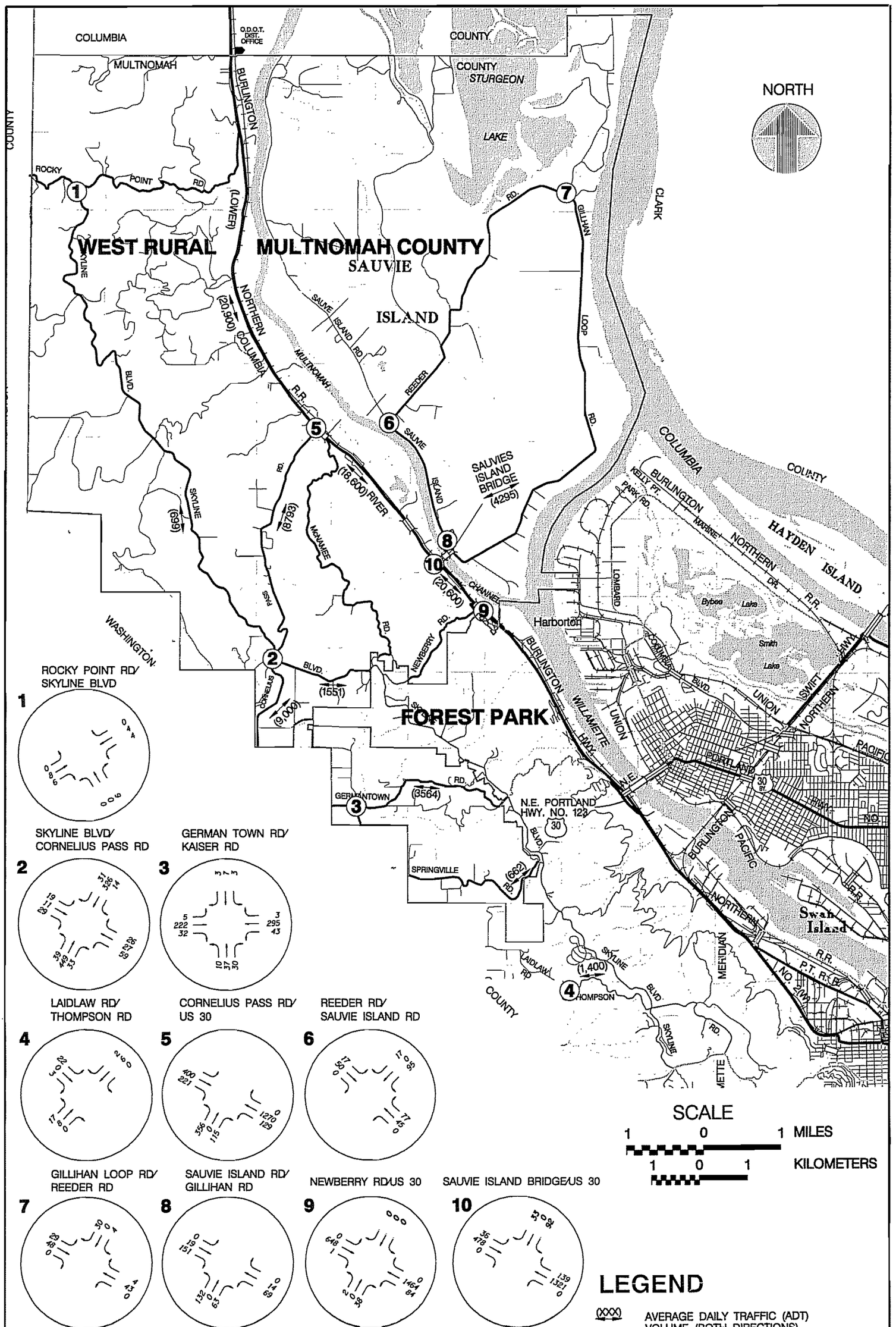

FIGURE 2-3
1996 TRAFFIC VOLUMES

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Pedestrian and Bicycle Systems

The Multnomah County Bicycle Master Plan (December 1990) identifies the county's planned bikeway system. Existing bikeways and sidewalks were noted during a May 1996 field trip. This discussion is based on both the planned bikeways identified in the database and on the existing bikeways identified during the field trip.

Five roadways in west rural Multnomah County are part of the Multnomah County Bicycle Master Plan bikeway system:

- Cornelius Pass Road from U.S. 30 west to the Washington County line
- Cornell Road from Forest Park west to the Portland city limit east of Skyline Boulevard
- Sauvie Island Road from the bridge north to Ferry Road
- Skyline Boulevard from Rocky Point Road south to Portland city limits and a section from south of Cornell Road to the Portland city limit east of St. Helens Avenue
- Springville Road from Skyline Boulevard west to the Washington County line

The county's bikeway standard in rural areas consists of paved shoulders (4 to 6 feet wide). Apart from U.S. 30, no roadways within west rural Multnomah County currently have shoulders adequate to accommodate bicycles

Multnomah County also has a Pedestrian Master Plan (April 1996) that identifies standards. Specific rural pedestrian facilities have not been identified in this plan.

Bicycling and/or walking in the area is largely recreational. Recreational bicycling and walking in the West Hills and Sauvie Island has increased. Recreational uses range from gaining access to the Columbia River, to bird watching, to hunting and exercising.

Public Transportation System

Transit Service

In west rural Multnomah County, Tri-Met has one bus line that provides service to Sauvie Island. The route runs every half hour Monday through Friday from 5:30 AM to 7:00 PM, then every hour from 7:00 PM to midnight. Saturday has hourly service from 6:00 AM to 11:30 PM. No changes in service are expected in this area. According to 1990 statistics, about 40 people per day take this bus to and from the area between St. Johns and Sauvie Island. No service is provided to Sauvie Island on Sundays or holidays.

Tri-Met also offers a ride-matching program for people who would like to carpool. This program provides interested people with a list of neighbors who might make good commute partners. The individuals themselves set up the car pool. Depending upon the destination, there may be parking privileges that can include special rates and reserved parking spaces.

Park and Ride Facilities

North of Sauvie Island Bridge there is an unpaved area that is currently being used as a turnaround area for Tri-Met route 17. While this is not an official park and ride lot, it is informally functioning as one. Recreational users also use the area as a parking lot.

A significant number of people live in Columbia County and work in City of Portland and Washington County employment centers, resulting in significant commuter traffic. Columbia County residents have identified through their TSP a need to have a park and ride facility located near the county line. The intent of the park and ride would be primarily for car pools in Columbia County to reduce congestion in Multnomah County.

Intercity Bus

Colco Transportation is a public transportation operator based in Columbia County that operates through the west rural Multnomah County area. Colco's service is provided on a dial-a-ride basis, primarily targeting individuals with medical needs, the handicapped, and the elderly. Of their more than 20 passenger vans, 60 percent are equipped with wheelchair lifts. Colco does not have a set fare schedule but rather operates on an ability-to-pay basis. The company also provides trips from Columbia County to Portland, Beaverton, Hillsboro and Vernonia, St. Helens, and Scappoose.

There is currently no fixed-route intercity bus operating between St. Helens and Portland along U.S. 30.

Commuter Rail

Currently, no services are provided.

Air, Rail, Water, and Pipeline System

Air Transportation

There are no public or private airports or airfields in west rural Multnomah County, although there are several nearby. Portland International Airport, Oregon's largest commercial airport, is located about 15 miles to the east and provides a full range of flight services and operated by the Port of Portland. Hillsboro Airport is located in Washington County about 10 miles to the southwest and provides flight service through Horizon Air and Charter Service providers. The Scappoose Airpark is just a few miles north of the county line in Columbia County.

Rail Transportation

The Portland-Astoria branch line was originally owned by the Burlington Northern Santa Fe (BNSF) Railroad and is currently owned by ODOT. The line is operated by Portland and Western Railroad. The track is classified as Federal Railroad Administration (FRA) Class 2 track with maximum operating speeds of 25 miles per hour (mph) for freight trains and 30 mph for passenger trains. The condition is a typical example of a branch line railroad carrying moderate volumes of traffic. The line currently handles 350 to 400 cars per month, with approximately 80 percent of the traffic generated between Willbridge mile post (MP) 4.7 and Reichhold MP 31.3.

The Cornelius Pass BNSF line will be improved and reopened; a shortline operator, Portland and Western will provide rail services. An ownership change is in process. The new owner of the line will be ODOT.

In these two cases, ODOT only takes an active role if the line is abandoned. Otherwise all responsibility for operations, maintenance, and improvements is the burden of the rail operator.

Water Transportation

There are commercial and recreational water transportation uses in or adjacent to Multnomah County. Multnomah Channel is used primarily for recreational purposes and the Columbia River for commercial purposes. Recreational activities are under the jurisdiction and authority of the Oregon State Marine Board. The commercial use is under the U.S. Coast Guard.

The Columbia River is a significant transportation route for international trade activities conducted at a variety of ports upstream. The Port of Portland is well known as the largest inland deep water port in the United States. The port is critical to the regional economy, providing more than 2,000 jobs. Efforts are under way to examine the impacts of deepening the Columbia channel to 43 feet below the Columbia River datum. This would allow for deeper loads and more efficiency in the movement of freight. The deepening of the channel would be expected to last for 50 years and provide an average cost savings of $40 million per year.

The Columbia River accommodates ship drafts that carry containers and bulk cargo such as wheat, corn, barley, and wood products between the United States and the Pacific Rim countries.

Pipeline Transportation

High-pressure gas pipelines from Northwest Natural Gas and from Northwest Pipeline Corporation are present in Multnomah County. Northwest Natural Gas has several pipelines and a few high-pressure feeder pipelines in Multnomah County. Northwest Pipeline supplies gas to Northwest Natural Gas and primarily uses high-pressure pipelines. Northwest Pipeline has a high-pressure pipeline from Canada on Sauvie Island. Figure 2-4 shows Northwest Natural Gas and Northwest Pipeline feeder and high-pressure pipelines in west rural Multnomah County.

Transportation Safety

Fatal accidents in Oregon have decreased from 2.7 fatalities per 100 million miles traveled in 1972 to 1.8 per 100 million miles traveled in 1993. Oregon's rates have gone from above the national average to just below the national average for the same time period. The leading factors contributing to fatal accidents are alcohol (43 percent), lack of safety restraints (41 percent), excessive speed (30 percent), and inexperienced drivers (12 percent). Pedestrians were involved in 10.7 percent of fatalities, bicycles in 2.9 percent, and

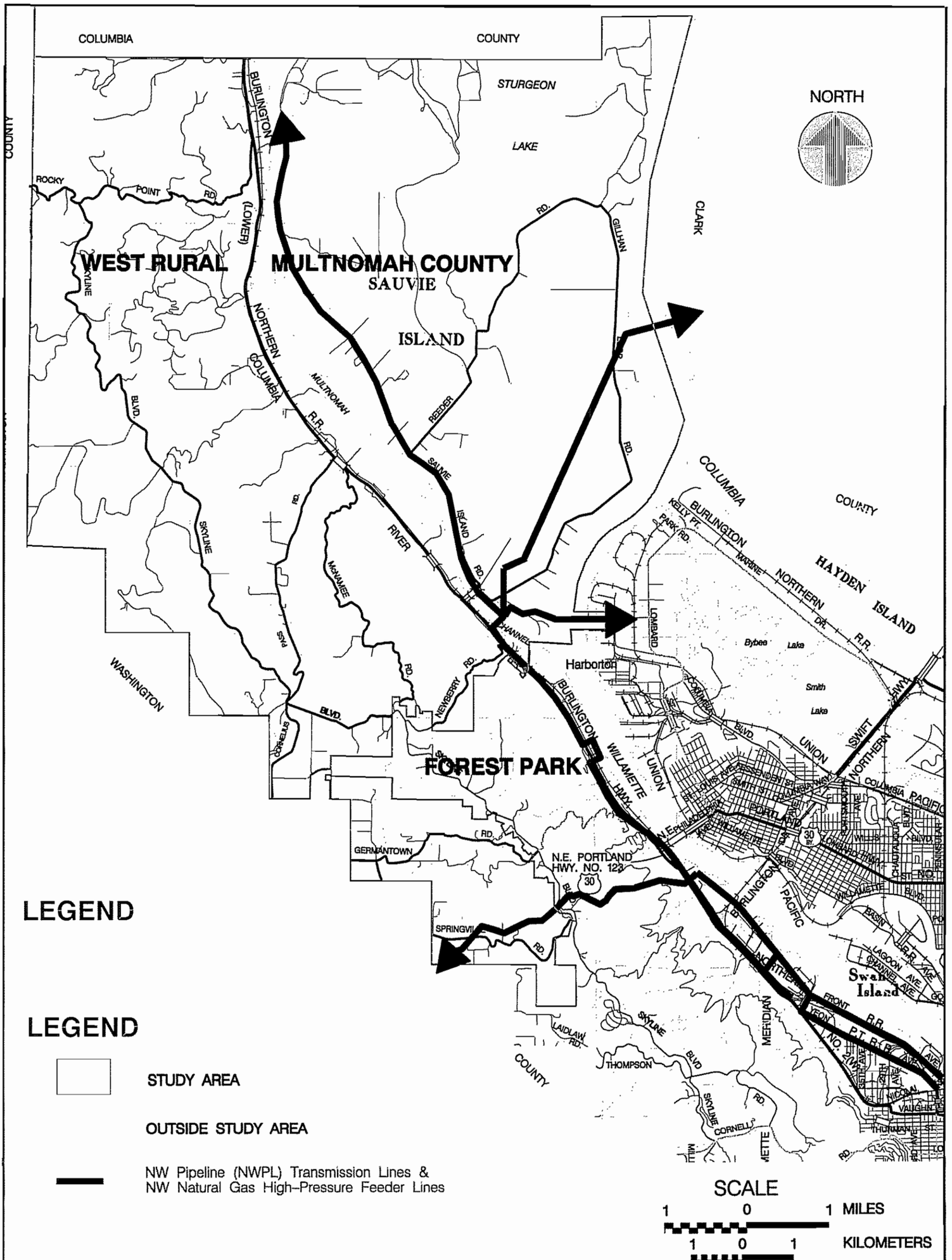

FIGURE 2-4
EXISTING FEEDER AND HIGH-PRESSURE PIPELINES

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motorcycles in 5.3 percent. The following list is a summary of specific actions identified in the Oregon Transportation Safety Action Plan.

- Traffic law enforcement and funding for enforcement
- Continued research and education on transportation safety
- Low tolerance for blood alcohol content (0 percent for drivers under 21 years of age)
- Incident response management programs to reduce interruption and delays to traffic
- Development and implementation of youth transportation safety strategy

Multnomah County monitored high-accident locations over a 3-year period from January 1, 1993 to December 31, 1995, and provided a list that ranks the top intersections within the county according to accident frequency, severity, and average daily traffic (ADT). Only one intersection in west rural Multnomah County appeared on the list: Cornelius Pass Road at Skyline Boulevard, with a ranking of 23rd. The accident data are derived from Department of Motor Vehicles records. By law, drivers involved in a vehicle crash are required to file an accident report if damage exceeds $500. There may be additional unreported accidents exceeding $500 that involve a single vehicle as well as vehicle crashes with damage less than $500. One pedestrian accident was recorded in the last 3 years in the study area, at Cornell Road at Skyline Boulevard.

Speed

Participants in the citizen survey, Sounding Board, Task Force, and open house public involvement process have expressed concern about safety because of the excessive traffic speed in the area. Local residents have observed instances in which drivers cross over the centerline and fog line, endangering other users. In addition, the steep terrain in the West Hills makes stopping even more difficult. Speed is considered by area residents to be a safety issue on the following roadways:

- Cornelius Pass Road
- Skyline Boulevard
- Germantown Road
- Thompson Road
- Laidlaw Road
- Newberry Road
- Reeder Road
- Sauvie Island Road
- Gillihan Loop Road

CHAPTER 3

Future Needs and Alternatives

Overview

This chapter covers the elements involved in determining the future needs and evaluating transportation alternatives for the study area. These elements are discussed in the following sections:

- Transportation System Evaluation
- Future Transportation System Needs
- Transportation System Alternatives

The sections below present the sources of data, analysis methods, and results of the future needs analysis. Recommendations for transportation systems improvements are included in Chapter 4.

Transportation System Evaluation

The future needs for west rural Multnomah County are based on land use and population growth assumptions, which are used to project future traffic growth. Metro prepared a traffic forecasting model for the year 2015, which included a special travel demand forecasting model for Multnomah, Washington, and Clackamas Counties for the development of their rural TSPs. Land use projections are used as direct inputs into the model. These include projections of existing and future households and employment, for both the urban and rural areas. As a result, the model is designed to predict traffic growth resulting from different planned land uses over a given period of time.

Land Use and Population Growth Assumptions

Multnomah County and Metro staff developed land use and population forecasts. Metro staff provided the overall targets for households and employment in each traffic analysis zone based on the approved 2015 population and employment projections, in conformance with the 2040 Regional Plan. These targets include the addition of urban reserves totaling 34,675 households throughout the Portland metropolitan area. Of these households, 277 households (0.8 percent) have been targeted for the Westside Rural Multnomah County area; they are located near Thompson Road between Skyline Boulevard and Washington County. Urban reserve lands are areas slated to be incorporated into the UGB in the future when an increase in developable land is determined necessary through the comprehensive planning process. The two urban reserve areas identified in the study area are shown in Figure 2-1 (Chapter 2).

Because the overall population and employment forecasts were obtained directly from Metro's approved land use forecasts, they incorporate regional assumptions consistent with the other TSPs currently being developed in the area. Projections for population and jobs in west rural Multnomah County are shown in Table 3-1.

TABLE 3-1

Summary of Existing (1994) and Future (2015) Population and Employment

Category	Existing	Future
Household Residents	1,966	6,041
Retail Jobs	6	20
Other Jobs	787	1,381

Traffic Forecast Methodology

The travel demand model provided the basic data needed to estimate future traffic demands on the west rural Multnomah County roadway system. Metro refined the rural portions of the model based on the earlier assessment of existing conditions and a reassessment of the population and employment projections used in the original model.

The model is not accurate enough by itself to provide reliable absolute numbers for future traffic volumes, just as the base year model does not perfectly match existing conditions. However, the difference between the base year (1994) and future year (2015) model does provide a reasonable projection of the increase in vehicles on the major roadways. This difference added to the known existing traffic volumes provides better estimates of future travel demand. This information is then used to assess future needs.

It should be noted that a short segment of Cornell Road has not been included in the transportation system evaluation because it is sandwiched between two urban segments. Therefore, an evaluation of its LOS is not needed.

Future Functional Classification Adequacy

Table 3-2 summarizes the findings of projected average daily traffic (ADT) volumes. The ADT volumes are also shown in Figure 3-1. This growth reflects a number of factors, including anticipated development of remaining undeveloped areas in the West Hills within the City of Portland and continued growth in Columbia and Washington Counties. This growth in traffic volumes is most significant on collector facilities that will directly serve those developing areas, including Skyline Boulevard, Thompson Road, Springville Road, and Laidlaw Road.

In general, the functional classification of a roadway provides an upper threshold to the volume of ADT that can be reasonably accommodated. In general, local streets have an upper threshold of 2,500 to 3,000 ADT, and collectors have an upper threshold of 8,000 to 10,000 ADT; the acceptable threshold may be adjusted downward to reflect adverse topography or high truck percentages.

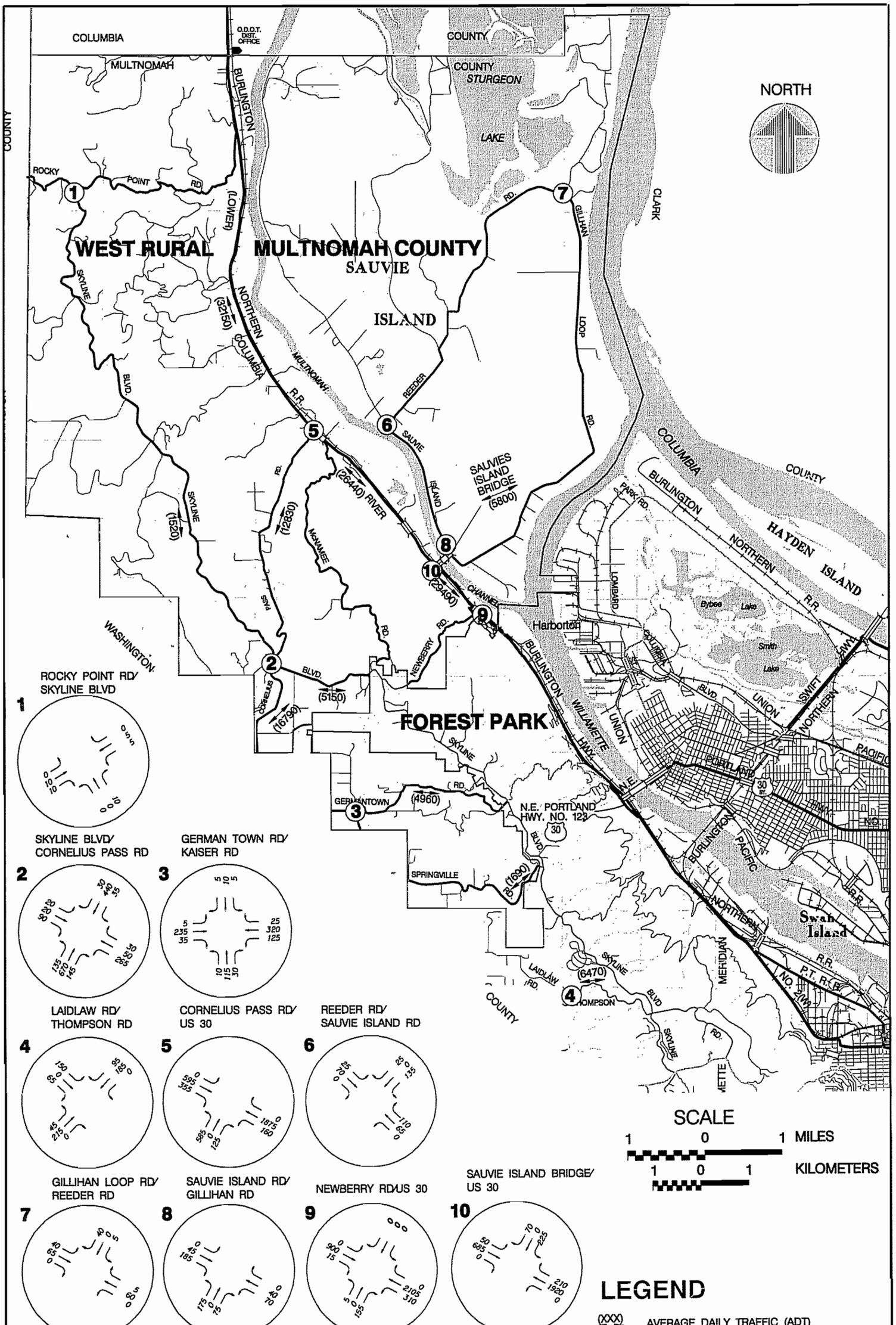

FIGURE 3-1
2015 TRAFFIC VOLUMES

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TABLE 3-2

Summary of Existing and Preliminary Future Traffic Conditions for Selected Roadways

Roadway	Functional Classification	Existing Truck Percent	Average Daily Traffic (ADT)		Is Functional Classification Adequate for Next 20 Years?
			Existing (1996)	Future (2015)	
U.S. 30: Portland to Sauvie Island Bridge	Arterial	11	20,600	29,500	Yes
U.S. 30: Sauvie Island Bridge To Cornelius Pass Road	Arterial	10	18,600	26,400	Yes
U.S. 30: Cornelius Pass Road to Columbia County line	Arterial	10–12*	20,900	32,200	Yes
Cornelius Pass Road: U.S. 30 to Skyline Boulevard	Arterial	15	8,800	12,800	Yes
Cornelius Pass Road: Skyline Boulevard to Washington County line	Arterial	10	9,000	16,800	Yes
Sauvie Island Road	Collector	5	4,300	5,800	Yes
Germantown Road	Collector	2	3,600	5,000	Yes
Skyline Boulevard: Portland city limits to Cornelius Pass Road	Collector	10	1,600	5,200	Yes
Skyline Boulevard: Cornelius Pass Road to Rocky Point Road	Collector	11	700	1,500	Yes
Thompson Road	Collector	8	1,400	6,500	Yes
Springville Road	Collector	2	700	1,700	Yes
Laidlaw Road	Collector	6	400	3,500	Yes
Reeder Road	Collector	3	800	2,200	Yes
Gillihan Road	Collector	5	500	1,400	Yes
Kaiser Road: Cornelius Pass Road to Germantown Road	Local	1*	600	800	Yes
Kaiser Road: Germantown Road to Springville Road	Collector	1	1,600	3,300	Yes
Newberry Road	Local	6	1,300	4,800	No

*Estimated

As can be seen in Table 3-2, all of the existing arterials and collectors in the study area are projected to carry traffic volumes appropriate for their functional classification, despite the substantial percent of traffic growth on some facilities. However, both Cornelius Pass Road and Newberry Road require further discussion.

Cornelius Pass Road

Although the volume of traffic is expected to increase on Cornelius Pass Road, the expected traffic increase does not warrant a change in functional classification. However, there are currently long lines of traffic forming behind trucks climbing the long, steep grades. As truck volumes continue to increase, the backup of vehicles will continue to increase as well. Differences in travel speed also contribute to an increased safety hazard. Prohibiting truck traffic is not practical for a route with regional significance. This route is the hazardous materials route from Washington County north to avoid the tunnel on U.S. Highway 26. Significant out-of-direction travel is required for the alternative hazardous materials route. Corridor solutions need to be examined that would include evaluating alternative routes as well as improvements to the existing alignment (including truck climbing lanes).

Newberry Road

Newberry Road between Skyline Boulevard and U.S. 30 is projected to carry higher traffic volumes than would generally be considered acceptable for a local street. Further analysis of the 2015 travel demand forecasts revealed that 80 to 85 percent of the traffic on Newberry Road also used Cornelius Pass Road south of Skyline Boulevard.

This indicates that a substantial percentage of the projected traffic on Newberry Road is traveling between Portland and Washington County, bypassing Cornelius Pass Road between Skyline Boulevard and U.S. 30. The addition of capacity associated with climbing lanes on Cornelius Pass Road did not demonstrate an appreciable reduction in the projected traffic volumes on Newberry Road. Newberry Road is not intended to function as an alternate route, and reclassification would be inconsistent with other state, regional, and county plans.

Level of Service Deficiencies

The estimated 2015 PM peak hour turning movement traffic volumes for key intersections are shown in Figure 3-1. These volumes were used to calculate LOS. Table 3-3 presents the projected LOS, including the effects of potential mitigation treatments. LOS is a measurement of congestion or delay at an intersection. LOS is graded on a scale of A through F. LOS A reflects traffic flow that is unimpeded or has no delay. LOS F reflects breakdown conditions (demand exceeds capacity). Refer to Appendix A for a complete list of LOS definitions.

U.S. 30/Cornelius Pass Road

The U.S. 30/Cornelius Pass Road intersection is projected to be over capacity during the 2015 weekday PM peak hour. The proposed intersection lane reconfiguration can be implemented in phases with minimal expense for modifications.

For the first phase, a lane would be added to create separate left-turn-only and right-turn-only lanes with the Cornelius Pass Road approach. With this modification, the roadway would operate acceptably for approximately 10 to 15 years. The intersection should be monitored periodically to determine when traffic volumes are sufficiently high to justify converting the right-turn-only lane to a shared left- and right-turn lane.

TABLE 3-3
Projected Intersection Level of Service: 2015 Weekday PM Peak Hour

Intersection	Signalized or AWSC LOS*	TWSC LOS*
U.S. 30/Cornelius Pass Rd.		
Existing configuration	F	
Reconfiguration of turn lanes	C	
U.S. 30/Sauvie Island Rd.		
Existing configuration	B	
Additional turn lanes	B	
Cornelius Pass Rd./Skyline Blvd.		
Existing configuration		F
Signalized (possible mitigation)	C	
U.S. 30/Newberry Rd.		
Existing configuration		F
Signalized (possible mitigation)	B	
Germantown Rd./Kaiser Rd.		C
Reeder Rd./Gillihan Rd.		A
Sauvie Island Rd./Reeder Rd.		B
Sauvie Island Rd./Gillihan Rd.		B
Skyline Blvd./Rocky Point Rd.		A
Thompson Rd./Laidlaw Rd.		B

AWSC = all-way stop-controlled
TWSC = two-way stop-controlled
*Note that LOS is based on average delay per vehicle per the 1994 HCM, not volume-to-capacity ratio.

The second phase would then amount to restriping and modifying signals. A second turn lane should be added on the Cornelius Pass Road approach to U.S. 30, with the one lane striped as a left-turn lane and one as a shared left- and right-turn lane. The addition of the second left-turn lane would provide the capacity needed to serve the anticipated high left-turn movement from Cornelius Pass Road towards Columbia County projected by 2015.

U.S. 30/Sauvie Island Road

The U.S. 30/Sauvie Island Road intersection is projected to operate near capacity during the 2015 weekday PM peak hour with its existing lane configuration. As a result, the intersection will have little reserve capacity for special events or peak seasonal weekend traffic. However, it is recommended that a capacity improvement be made only if and when other bridge improvements are completed.

Cornelius Pass Road/Skyline Boulevard

The intersection of Cornelius Pass Road and Skyline Boulevard is projected to operate at LOS F during the 2015 weekday PM peak hour. Installation of a traffic signal at this intersection, including protected left turns on Cornelius Pass Road because of the speed of oncoming traffic, would improve the LOS to an acceptable level.

U.S. 30/Newberry Road

The second unsignalized intersection operating at LOS F is at U.S. 30/Newberry Road. This intersection is projected to meet signal warrants under projected 2015 traffic volumes. In coordination with ODOT, Newberry Road will continue to be designated a local street.

Although the intersection overall operates at LOS F, this reflects the inability of right-turning vehicles to move around the left-turning vehicles from Newberry Road attempting to enter U.S. 30. The left-turning movement from U.S. 30 onto Newberry Road will operate at LOS C, allowing free movement with minimal delay.

A traffic signal would satisfy the needs of fewer than five northbound left-turning vehicles on Newberry Road and encourage greater use of Newberry Road while delaying 3,400 vehicles during the PM peak hour on U.S. 30. To minimize the impact of the left-turning vehicles on Newberry Road without signalization, the intersection approach on Newberry Road could be widened sufficiently to allow right-turning vehicles to get by a left-turning vehicle. This change would improve the LOS.

Future Transportation System Needs

The following sections describe the results of the future demand analysis that used the land use assumptions and traffic forecasting method outlined on pages 3-1 and 3-2. The needs will be separated by transportation mode for use in the TSP.

Roadway Needs

- *Conduct a Cornelius Pass Road corridor study.* The high percentage of trucks and steep, sustained grades create significant delay for vehicles traveling behind the trucks and a significant reduction in overall function of the facility. In addition, the speed differential between trucks and automobiles presents a significant safety hazard. It is recommended that a corridor study be conducted to consider future demand, hazardous materials routes, slope stability, alternative routes, climbing lanes, geometric alignment, and shoulder needs.
- *Install a traffic signal at the Cornelius Pass Road/Skyline Boulevard intersection.* Provide separate westbound left-turn and through-right lanes on Skyline Boulevard.
- *Provide a staged improvement plan for the intersection of U.S. 30 and Cornelius Pass Road.*
  - Short-term: Provide separate left-turn-only and right-turn-only lanes on the Cornelius Pass

Road approach.

  - Long-term: Convert the right-turn-only lane on the Cornelius Pass Road approach to a shared left- and right-turn lane.

- *Study Sauvie Island Bridge needs.* It is recommended that a study be conducted to consider access to Sauvie Island, rehabilitation, strengthening, maintenance, replacement, bridge geometrics, future demand, and safety.

  - Consider installing separate left- and right-turn lanes on the Sauvie Island Bridge at the U.S. 30/Sauvie Island Road intersection.

- *Retain Newberry Road as a local street.* Newberry Road should remain a local street as a part of this plan, but it should be monitored in the future to determine whether upgrading it to a collector functional classification is advisable.

  - If feasible, consider widening the Newberry Road approach at U.S. 30 to allow right-turning vehicles to bypass vehicles waiting to turn left.

Public Transportation/TDM Needs

- *Sauvie Island Park and Ride.* The area on Sauvie Island Road just north of Sauvie Island Bridge is used as an informal park and ride lot and as a parking lot for other recreational uses on the island. This area could be improved with delineated parking and a traffic circulation plan.

- *North County Line Park and Ride.* A park and ride lot located near the Multnomah/Columbia County line could be used by regional fixed-route operators and for carpooling.

Bicycle and Pedestrian Needs

The bicycle and pedestrian needs in west rural Multnomah County are largely recreational and will continue to be recreational. Very few bicycle and pedestrian trips in the area are utilitarian because of the average length of the trip. Utilitarian trips are typically short in nature, usually less than 5 miles. Residents of Sauvie Island and West Hills have seen an increase in recreational use of bicycling and walking. In rural areas, bicycle and pedestrian facilities generally consist of paved shoulders. Five roadways in west rural Multnomah County are part of the Multnomah County Bicycle Master Plan as planned bikeways. Apart from U.S. 30, there are currently no roadways in the area with shoulders adequate to accommodate bicycles or pedestrians.

Improved facilities are needed to accommodate pedestrians and bicyclists, particularly recreational uses. Projects to add shoulders will increase safety for these and other transportation modes. Corridors suggested for shoulders include Skyline Boulevard, Laidlaw Road, Thompson Road, Gillihan Road, and Reeder Road.

Air, Rail, Water, and Pipeline Needs

Air. No airports are proposed in west rural Multnomah County, and there is no long-term outlook for proposing an airport in the study area.

Rail. There is potential for growth in the Portland-Astoria Branch Line corridor, but no specific project is on the horizon which would add rail traffic. Slide repair work is required near Astoria to provide Astoria to Portland rail service operations.

The Cornelius Pass Line will require various improvements, including structure replacement to restore rail service.

Water. The deepening of the Columbia water channel to provide access to the Port of Portland should be supported. There is a potential economic savings of $40 million per year for 50 years.

Pipeline. There are no proposed Northwest Natural Gas high-pressure feeder pipelines in west rural Multnomah County. Northwest Natural Gas has not identified any additional high-pressure pipeline needs in west rural Multnomah County.

Transportation System Alternatives

Alternatives Analysis

Cornelius Pass Road/Newberry Road

The Newberry Road and Cornelius Pass Road alternative was evaluated. Newberry Road is projected to carry higher traffic volumes than would generally be considered acceptable for a local street. Analysis indicates that a substantial percentage of the projected traffic on Newberry Road is traveling between Portland and Washington Counties, bypassing Cornelius Pass Road between Skyline Boulevard and U.S. 30. Capacity improvements on Cornelius Pass Road appear to have little effect in mitigating this problem.

Newberry Road will be retained as a local street as part of this plan but will need to be monitored and considered for possible upgrading to a collector functional classification in the future. In order to preserve its character as a local street as much as possible, the entrance points to Newberry Road at U.S. 30 and Skyline Boulevard will remain unsignalized to reduce their attractiveness for through trips.

Transportation Demand Management

Participants in the citizen survey, Sounding Board, Task Force, and open house public involvement process expressed a great deal of interest in pursuing public transportation options to reduce congestion, improve safety, and maintain the rural character of the area. A variety of ideas surfaced for consideration:

- Park and ride
- Ride share
- Fixed-route transit from Columbia County to Washington County
- Expansion of existing Tri-Met service
- Commuter rail
- High-occupancy vehicle lanes along U.S. 30

A transit feasibility study of the U.S. 30 corridor was completed in November 1996. The study included gathering user input from 2,000 people on the U.S. 30 mailing list and conducting a more specific telephone survey of 300 people in St. Helens and Scappoose who commute to Washington County. Survey respondents were asked about their travel patterns and attitudes about use of alternative modes. Further, the study included collecting information about existing services in the area and of areas outside the immediate area with similar conditions. Strategies were developed for contracting with private transit providers, van pooling to large employment centers, and establishing park and ride/pool lots.

The results of the study would indicate there are about 1,400 people in St. Helens and Scappoose commuting to other communities, with Portland being the primary destination. This represents a pool of public transportation customers. About 16 percent of the commuters are using Cornelius Pass Road; others are continuing on U.S. 30 towards Portland. The most favorable alternatives from the study are ride share programs, park and ride lots, and van pooling. The expense associated with capital investment and operating costs for other options are not considered feasible within the 20-year planning horizon of this study. Options for other alternatives should be kept open or explored further as opportunities arise.

The implications to the west rural Multnomah County area are that the majority of the congestion occurs during AM and PM peak periods by people outside of the county. Multnomah County is in the position of advocating on behalf of rural residents by coordinating with private interests and public jurisdictions when possible.

CHAPTER 4

Transportation System Plan

Overview

The purpose of this chapter is to detail the transportation classification system and design standards for each transportation mode and to identify recommended improvements based upon the preferred transportation system alternative for west rural Multnomah County. The preferred transportation system is the transportation alternative strategy considered to best meet the goals established through the public input process.

Standards are presented as design guidelines that establish physical parameters based upon safety and uniform travel expectations. Standards are intended to be guidelines, and exceptions can be granted on a case-by-case basis based on careful examination of trade-offs. Recommended improvements are the priorities established through the public process.

Roadway System Plan

This section covers functional classifications and definitions, design standards, and guidelines for roadways. A map of the roadway system plan is provided on Figure 4-1. Recommendations for improvements to the roadway system are presented at the end of Chapter 4, under the subheading Transportation System Improvements.

Roadway Functional Classification Definitions

Policy 34 of the Multnomah County Comprehensive Framework (titled Trafficways and the Functional Classification of Trafficways Map) includes nine roadway functional classifications:

- Four within the arterial classification—principal, major, minor, and rural
- Three within the collector classification—major, neighborhood, and rural
- Two within the local street classification—urban and rural

The classifications in the study area include principal arterial, rural arterial, rural collector, and rural local.

Arterials

Arterial streets make up the regional roadway network and provide for travel between communities within the county and between counties. Arterial streets accommodate the full array of travel modes, including the regional bikeway system, the fixed-route transit network, goods delivery, and a higher volume of automobile traffic than collector streets.

Principal Arterials connect to freeways and highways which serve travelers without an origin or destination in the county. The traffic volume is a combination of interstate and interregional traffic, regional traffic traveling between cities and counties, and traffic generated by intensive and higher density land uses along the arterial corridor. The traffic

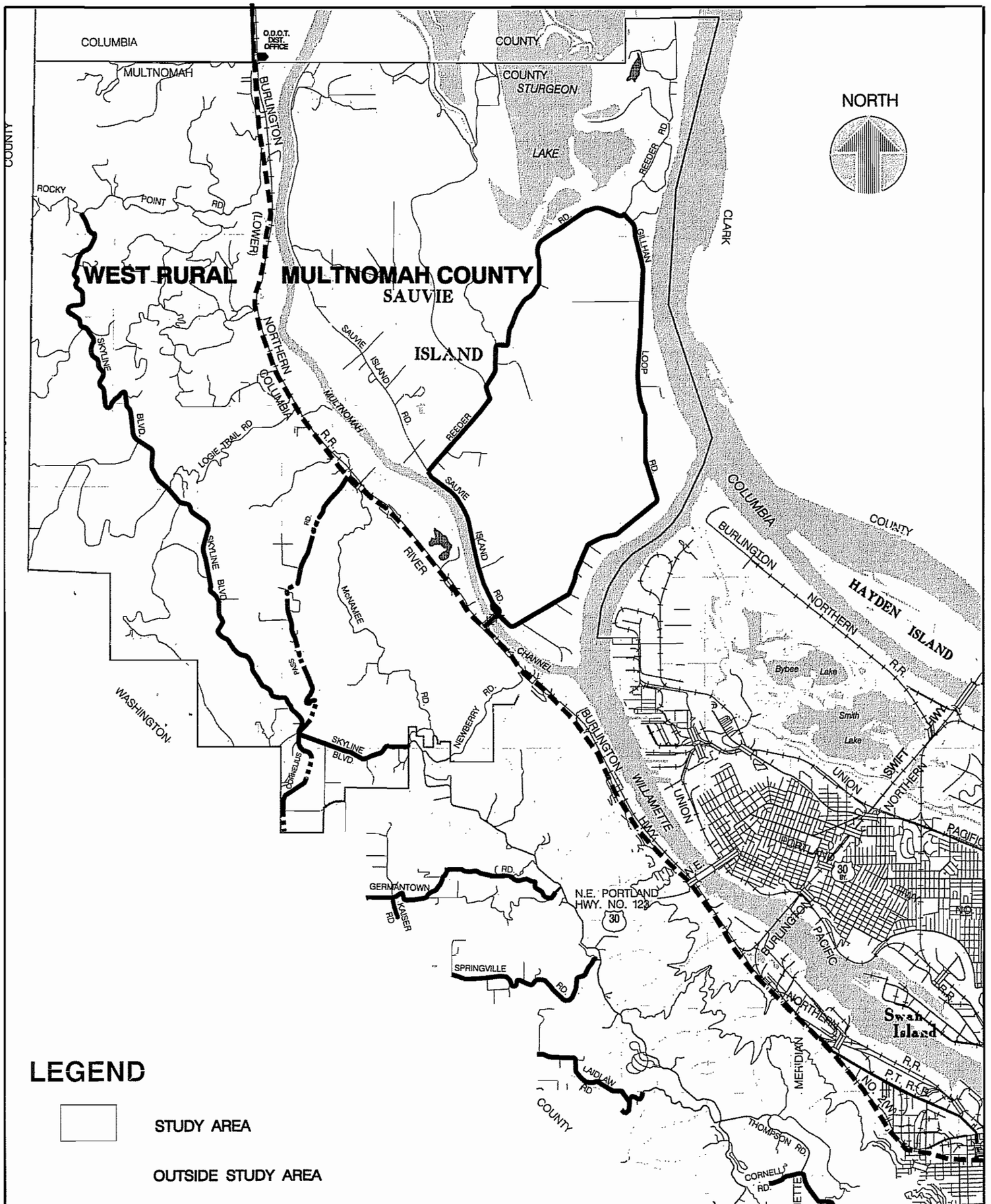

FIGURE 4-1
ROADWAY SYSTEM PLAN

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also includes a significant percentage of truck traffic. The ability to move auto, truck, and regional bicycle traffic is preserved. U.S. 30 is an example of a principal arterial.

Rural Arterial Roads are the primary means of access into the large rural districts, and often they connect between counties to accommodate through movements. Rural arterials connect to freeways or highways and link rural collector and local roads to the urban area and other regions. Rural arterial roads carry greater traffic volumes than rural collector roads, including commuters and other home-based trips, natural resources involving trucks, and recreational trips involving autos, bicycles, pedestrians, and equestrians. Cornelius Pass Road is an example of a rural arterial roadway.

Collectors

Collector streets distribute traffic between local streets and the arterial street network. They are not intended to serve trips with an origin or destination outside the county. Collector streets provide for automobile, bicycle, and pedestrian circulation and for basic transit service.

Rural Collector Roads distribute automobile traffic over large areas and generally connect to urban streets or rural arterials. They may also provide for recreational trips by auto, bicycle, foot, or horse. Skyline Boulevard and Germantown Road are examples of rural collectors.

Local Streets

Local streets provide access to abutting land uses and do not serve through traffic. Local streets may be further classified by adjacent land use, such as residential, commercial, and industrial. In rural areas, local roads serve automobile and farm circulation, as well as local pedestrian, bicycle, and equestrian uses. Rocky Point Road and Logie Trail Road are examples of local streets.

Roadway System Design Standards

Multnomah County is in the process of reviewing and updating its roadway design standards. Most of the standards are in the early draft stages of the process. The current design standards, last updated February 1987, are listed in Table 2-2 (Chapter 2).

At the same time, Metro has developed a set of design concepts and guidelines for each jurisdiction's consideration. The county will strive for consistency with Metro's design guidelines as appropriate for west rural Multnomah County in conjunction with the design standards update.

As roadways are improved, consideration should be given to the trade-off between design speed and sight distance with respect to impacts on roadside slopes. In the West Hills, a design exception for a slower design speed may help minimize impact to slopes while providing additional sight distance through minimal widening.

Public Transportation System Plan

This section establishes functional classifications and definitions, design standards, and guidelines for public transportation. The citizens of west rural Multnomah County recognize a high need for public transportation options. The primary benefit of increased public transportation would be a reduction in commuter trips from Columbia County to Beaverton and the broader Washington County area. The rural nature of the area will provide some limitations to the cost-effectiveness of extended service for local residents. However, as public transportation amenities are established in town centers and nearby communities, it will be more attractive to provide stops at key locations such as park and ride lots. The following sections provide definitions for functional classifications;

suggested improvements to the public transportation system are provided at the end of Chapter 4, under the subheading Transportation System Improvements.

Public Transportation Functional Classification Definitions

These definitions of public transportation were developed by Metro in the Vision 2040 process. The definitions of the functional classifications are contained in the Regional Transportation Plan. The following definitions are from the July 25, 1996, Regional Transportation Policy. Only those that may be pertinent to rural areas are included here.

Secondary Transit Network

This system is made up of secondary bus, minibus, paratransit and park and ride services. Secondary service is focused more on accessibility, frequency of service along the route, and coverage to a wide range of land use options than on speed between two points. Secondary transit is designed to be an alternative to the single-occupant vehicle by providing frequent, reliable service.

Secondary Bus provides coverage and access to a wide range of land uses. Secondary bus service runs as often as every 30 minutes on weekdays. Weekend service is provided as demand warrants.

Minibus provides coverage in lower density areas by providing transit connections to a wide range of land use options. Minibus services, which may range from fixed-routes to purely demand-responsive services (including dial-a-ride, employer shuttles, and bus pools) provide at least 60-minute response time on weekdays. Weekend service is provided as demand warrants.

Paratransit service is defined as non–fixed route service that serves special transit markets, including Americans with Disabilities Act (ADA) service throughout the greater metropolitan region.

Park and Ride facilities provide convenient auto access to regional trunk route service for areas not directly served by transit. Bicycle and pedestrian access as well as parking and storage accommodations for bicyclists are considered in the siting process of new park and ride facilities. In addition, the need for a complementary relationship between park and ride facilities and regional and local land use goals exists and requires periodic evaluation for continued appropriateness.

Interurban Public Transportation

Functional classification designations for interurban public transportation are as follows:

Passenger Rail or intercity high-speed rail is part of the state transportation system and will eventually extend from the Willamette Valley north to British Columbia. Amtrak already provides service south to California, north to Vancouver, British Columbia, and east to the rest of the continental United States. These systems should be integrated with other public transportation services within the metropolitan region with connections to passenger intermodal facilities. High-speed rail needs to be complemented by urban transit systems within the region.

Intercity Bus provides connection points with the region to nearby destinations, including neighboring cities, recreational activities, and tourist destinations. Several private intercity bus services are currently provided in the region.

Passenger Intermodal Facilities serve as the hub for various passenger modes and the transfer point between modes. These facilities are closely interconnected with urban public transportation service and are highly accessible to all modes. They include Portland International Airport, Union Station, and intercity bus stations.

Bicycle System Plan

This section identifies types of bikeways and design standards. A map of the bicycle system plan is provided in Figure 4-2. Recommendations for improvements are presented at the end of Chapter 4, under the subheading Transportation System Improvements.

Types of Bikeways

The following definitions are adopted from ODOT's 1995 Oregon Bicycle and Pedestrian Plan.

Shared Roadways are travel lanes shared by bicyclists and motorists. A motorist will usually have to cross over into the adjacent travel lane to pass a bicyclist. Shared roadways are common on neighborhood streets and on some rural roads and specific highways with low traffic volumes.

Shoulder Bikeways are paved shoulders on rural roadways which provide a suitable area for bicycling and few conflicts with faster moving motor vehicle traffic. Most rural bicycle travel is accommodated on shoulder bikeways.

Bike Lanes are portions of the roadway designated for preferential use by bicyclists. Bike lanes are appropriate on urban arterials and major collectors. Bike lanes must always be well marked to call attention to their preferential use by bicyclists.

Multi-Use Paths are facilities separated from motor vehicle traffic by an open space or barrier, either within the roadway right-of-way or within an independent right-of-way . These are typically used by pedestrians, joggers, skaters and bicyclists as two-way facilities. Shared multi-use paths are appropriate in corridors not well served by the street system, to create short cuts that link destination and origin points, and as elements of a community trail plan.

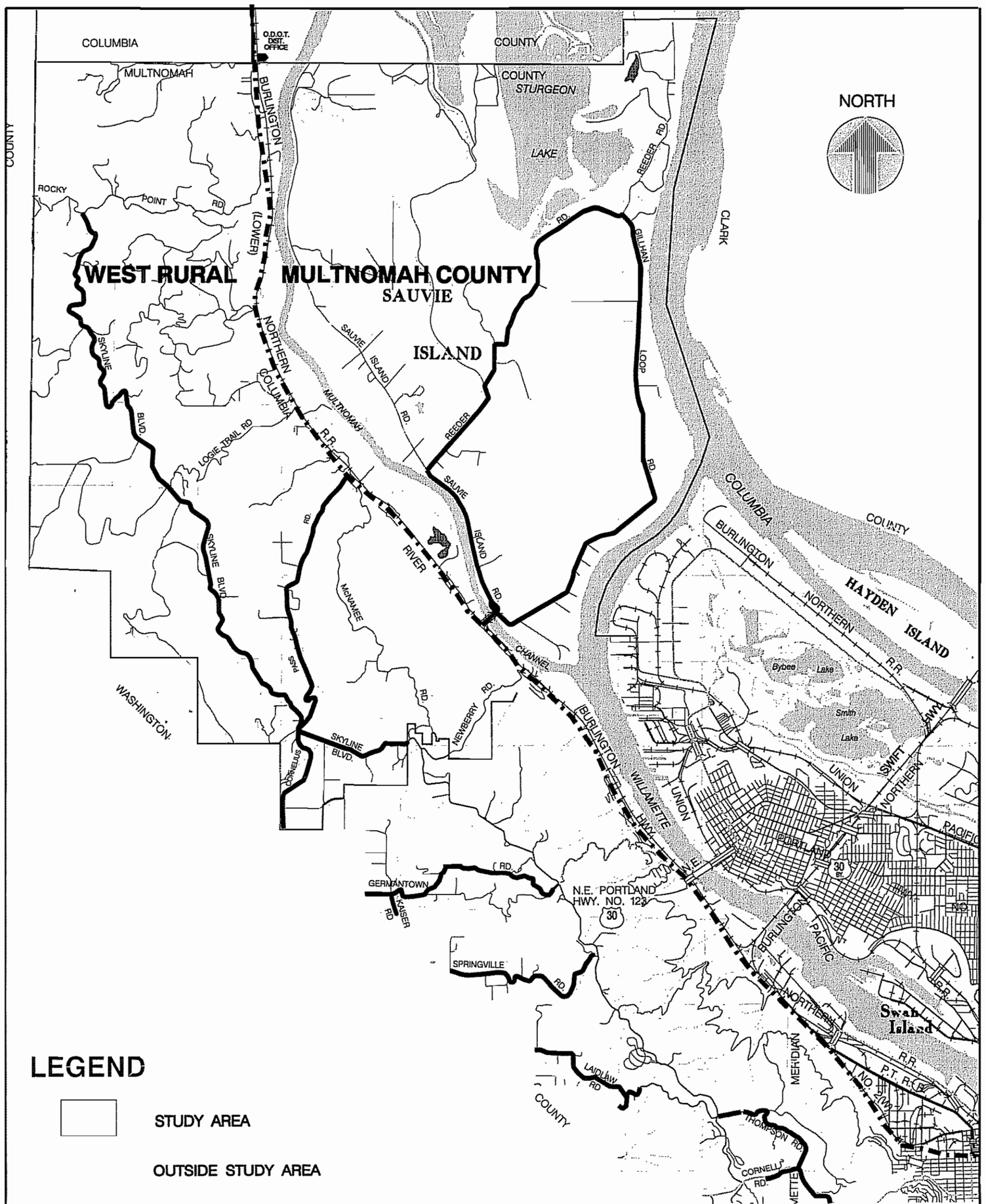

FIGURE 4-2
BICYCLE/PEDESTRIAN SYSTEM IMPROVEMENTS

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Bicycle Design Standards

The Multnomah County Bicycle Master Plan (December 1990) includes bicycle design standards. This plan is currently being updated. Design standards will be updated during that process.

Pedestrian System Plan

This section identifies types of walkways and design standards. Figure 4-2 shows the pedestrian system plan for the study area. Recommended improvements are presented at the end of Chapter 4, under the subheading Transportation System Improvements.

Pedestrian System Functional Classification Definitions

Pedestrian facilities include walkways, traffic signals, crosswalks, and other amenities, such as illumination and benches.

Sidewalks are located along roadways, separated with a curb and/or planting strip, and have a hard, smooth surface. Sidewalks in residential areas are sometimes used by bicyclists, skateboarders, and roller skaters.

Shoulders can serve pedestrians in many rural areas. In rural areas with a residential character, shoulders should be wide enough to accommodate both pedestrian and bicycle traffic.

Multi-Use Paths are facilities separated from motor vehicle traffic by an open space or barrier, either within the roadway right-of-way or within an independent right-of-way . These are typically used by pedestrians, joggers, skaters, and bicyclists as two-way facilities. Shared multi-use paths are appropriate in corridors not well served by the street system, to create short cuts that link destination and origin points, and as elements of a community trail plan.

Pedestrian Design Standards

Multnomah County's Pedestrian Master Plan (April 1996) includes design standards for pedestrian facilities. The county standard for shoulders is 4 feet on local rural roads (gravel) and 8 feet on collector rural roads (paved). Multnomah County has not adopted a standard width for shoulders on arterial rural roads, but the widths are typically equivalent to collector standards.

Multnomah County is currently updating the street design standards and will look at shoulder width. In addition, the Sauvie Island/Multnomah Channel Rural Area Plan adopted a policy to review rural roadway standards to determine the shoulder width in rural areas.

Air, Rail, Water, and Pipeline System Plan

This section establishes functional classifications and definitions and describes design standards for air, rail, water, and pipelines. The pipeline system is the most likely to affect the west rural Multnomah County because of the importance of existing facilities already located in the area.

Air, Rail, Water, and Pipeline System Functional Classification Definitions

Air. International airports provide supporting services to and from international destinations for freight and passengers. Municipal airports are open for all aircraft users without the support services

needed for international flights. Private airports are closed or restricted to exclusive users and/or commercial enterprises.

Rail. Rail services are provided for transport of freight and passenger services. Service is classified by the track criteria, such as track geometry, tie and rail condition, ballast, drainage, and conditions of switches and frogs according to the Federal Rail Administration.

Water. Ports are classified by depth and type of cargo handled. Vessels require different depths of channel depending upon size, cargo type, and load distribution. Waterways may also have speed restrictions based upon adjacent land use, erosion, and other environmental factors.

Pipelines. Gas pipelines are classified by pressure and size of pipeline. Table 4-1 shows the gas pipeline classification provided by Northwest Natural Gas.

TABLE 4-1
Pipeline Classification

Class	Description	Pressure Range	Typical Pressure
A	Low Pressure		9.5 inches of water column
B	Distribution Pressure	1 psig—60 psig	35 psig
C	Feeder Pressure	61 psig—175 psig	125 psig
D	High Pressure	176 psig—400 psig	350 psig
E	High Pressure	401 psig—720 psig	450 psig
F	High Pressure	over 720 psig	800 psig

Psig = pounds per square inch gauge

Air, Rail, Water, and Pipeline System Design Standards

Reference is made to the appropriate design standards used within the industry and/or professional practice.

Air. The design standards used for design of airports are found in the Federal Air Administration's (FAA) advisory circulars. FAA Advisory Circulars 150-5300-13 and 150-5320 are the primary design standards of airports.

Rail. The design standards used for design of new track are the American Railway Engineering Association design standards.

Pipelines. The design standards used by Northwest Natural Gas are American Society for Testing and Materials (ASTM) and American National Standards Institute (ANSI) design standards.

Land Use

Land Use Functional Classification Definitions

The Multnomah County Comprehensive Plan, the West Hills Rural Area Plan, and the Sauvie Island/Multnomah Channel Rural Area Plan address land use definitions and issues. These plans are

adopted by reference and should be consulted for a more extensive discussion on land use issues in the area.

Access Management

Access management is needed to ensure both the safety and efficiency of traffic flow for vehicles traveling on the roadway system. Managing the access of roadways benefits the overall roadway system by increasing safety, increasing capacity, and reducing travel times. Controlling access must not become so restrictive, however, as to prohibit local businesses and home owners reasonable access to the roadway system.

Overall, access management must balance the needs of through traffic, localized traffic, and pedestrians/bicyclists on a particular roadway. Arterials require the highest access management standards, while collectors and local streets require less restrictive access management standards. Access management standards are part of Multnomah County's design standards. The design standards are currently being revised to reflect the needs of the TPR and other needs particular to the county as a whole.

Access management standards for U.S. 30 are adopted according to the Oregon Highway Plan. These standards are listed in Table 2-5 (Chapter 2).

Transportation System Improvements

The proposed improvement projects incorporate a number of modal options. Most of the projects are roadway improvements that result from the rural nature of the study area. These improvements are shown on Figure 4-3. There are several projects that benefit bicyclists and pedestrians by widening the roadway for shoulders. This provides a separation of motorized and non-motorized travel increasing the safety of the overall system.

Project scope and cost estimates have been developed for each of the improvements. The projects were evaluated to determine the process most likely to be used to secure funds as described in Chapter 5. Table 4-2 lists the candidate improvement projects that required evaluation through the transportation funding process. Refer to Appendix B for a full listing and ranking of projects, including operational projects. The assumptions used for estimating costs are contained in Appendix C.

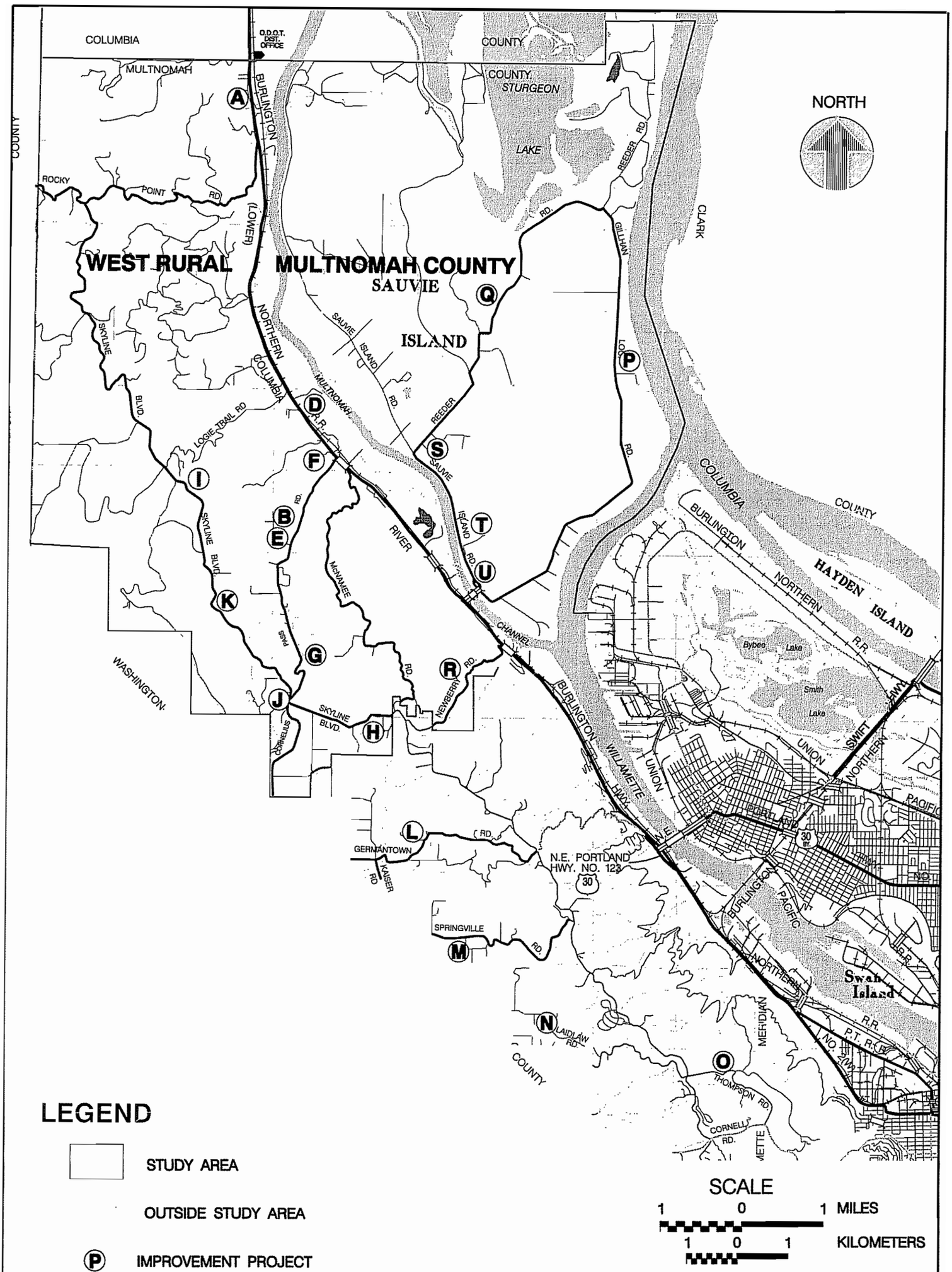

FIGURE 4-3
TRANSPORTATION SYSTEM IMPROVEMENTS

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TABLE 4-2
List of Candidate Projects

Location of Improvement[1]	Transportation Improvement[2]	Jurisdiction[3]	Cost Estimate (1,000)	Process[4]
	U.S. 30	ODOT and Columbia and Multnomah Counties	$325	RTP STIP
A	Ride share parking—Provide parking for 100 spaces next to truck scale near county line. Project to be coordinated with ODOT, Multnomah and Columbia Counties.			
	U.S. 30/Cornelius Pass Road	ODOT and Columbia County	$78/year	RTP STIP
B	Public transportation—Provide commuter van pool or transit service from Columbia County over Cornelius Pass Road to Washington County			
	U.S. 30	Metro Parks and Green-spaces	$350	Other
D	Scenic viewing opportunities—Access provided across railroad tracks adjacent to Burlington Bottoms using existing road approaches (per location). Exact locations to be determined. Providing linear pull outs or widening adjacent to U.S. 30 will not be acceptable on the basis of safety and access management standards.			
	Cornelius Pass Road	County	$200	CIP
E	Safety improvement—Install reflectors, delineators, and traffic striping (4.89 miles).			
	Cornelius Pass Road	County	$695	STIP CIP
F	U.S. 30 intersection improvements—Include a northbound turn lane and shared northbound left-turn/right-turn lane.			
	Cornelius Pass Road	County	$2,020	CIP
G	Realignment—Reduce curvature and eliminate switchback while minimizing grade increase of 1,500-foot section (assume average cut of 60 feet).			
	Skyline Boulevard	County	$2,039	CIP
H	Safety improvement—Add to shoulders[5] from UGB to Cornelius Pass Road (length 1.49 miles).			
	Skyline Boulevard	County	$11,153	CIP
I	Safety improvement—Add to 8.15 miles of shoulders (4 ft) from Cornelius Pass Road to Rocky Point Road.			

TABLE 4-2
List of Candidate Projects

Location of Improvement[1]	Transportation Improvement[2]	Jurisdiction[3]	Cost Estimate (1,000)	Process[4]
	Skyline Boulevard	County	$695	CIP
J	Cornelius Pass Road intersection improvements—Install signal, provide westbound left-turn lane and through/right lane on Skyline Blvd.			
	Skyline Boulevard	Metro Parks and Green-spaces	$350	Other
K	Scenic viewing opportunities—Acquire property through fee or donation for development of parking area adjacent to roadway.			
	Germantown Road	County	$6,744	CIP
L	Safety improvement—Add to 2.22 miles of shoulders (4 ft).			
	Springville Road	County	$3,160	CIP
M	Safety improvement—Add to 2.31 miles of shoulders (4 ft).			
	Laidlaw Road	County	$1,930	CIP
N	Safety improvement—Add to 1.41 miles of shoulders (4 ft).			
	Thompson Road	County	$643	CIP
O	Safety improvement—Add to 0.47 miles of shoulders (4 ft).			
	Gillihan Loop Road	County	$8,400	CIP
P	Safety improvement—Add to 6.13 miles of shoulders (4 ft).			
	Reeder Road	County	$5,925	CIP
Q	Safety improvement—Add to 4.33 miles of shoulders (4 ft).			
	Newberry Road	County	$450	CIP
R	Safety spot improvements—Install guardrail ¼ mile south of U.S. 30.			
	Reeder Road	County	$350	CIP
S	Safety improvements—Improve intersection sight distance with Sauvie Island Road.			
	Sauvie Island Road	County	$3,675	CIP
T	Safety improvement—Add to 2.15 miles of shoulders (4 ft) and add guardrail from Gillihan Road to Reeder Road. Replace culverts.			

TABLE 4-2
List of Candidate Projects

Location of Improvement[1]	Transportation Improvement[2]	Jurisdiction[3]	Cost Estimate (1,000)	Process[4]
	Sauvie Island Road	Tri-Met	$300	RTP
U	Create park and ride---Delineate parking and traffic circulation.			

1 Corresponds to locations shown on Figure 4-3, which are identified by letters A-U.

2 Candidate projects are based upon public input, current needs, and future needs.

3 Jurisdictional control over facility.

4 Indicates the process most likely for securing funding for candidate project.

5 In all cases, adding to the shoulders includes providing an overlay of existing pavement.

*Projects with an asterisk (*) are projects that were added at the Task Force meeting on March 4.

CHAPTER 5

Financing Plan

Overview

The Westside Rural Multnomah County TSP covers a subarea of Multnomah County. The county does not track expenditures or allocate funds on the basis of a subarea formula. Rather, the county assesses countywide needs when budgeting and developing the CIP. For the purposes of this study, a countywide view of expenditures and revenues has been developed. This information will be used when all TSP work is completed by the county.

A list of candidate projects has been developed through a public involvement process. The projects from Westside Rural Multnomah County reflect improvements designed to address the existing and future needs while maintaining the rural character of the area. The projects were identified after the transportation goals and objectives were developed for this plan. In addition, projects were identified to meet the 20-year transportation system needs. The time frame for their accomplishment has not been determined. A countywide, 20-year, financially constrained system will be identified when the county completes its transportation system planning processes.

Westside Rural Multnomah County candidate projects will compete for funding from a variety of county, state, and federal sources. This chapter describes the processes used to allocate a variety of funding categories.

Funding Processes

Various processes are used to allocate funding for transportation projects within Multnomah County. These processes are applied countywide and/or statewide. Therefore, the candidate projects are competing for dollars based on the funding available.

Capital Improvement Program (CIP)

Description

The Multnomah County CIP is a continuous and open process, allowing citizen input annually. The county road system is dynamic, changing in response to land use decisions and infrastructure life cycles. Consequently, the Capital Improvement Plan and Program must be reconsidered and revised on a regular basis.

Public meetings are held in various communities to solicit public input regarding transportation needs. Project proposals are also solicited from each of the four east-county cities. The list of projects is reviewed and revised before it is transmitted to the East Multnomah County Transportation Committee (EMCTC) for review and to the Board of County Commissioners (BCC) for approval.

The Capital Improvement Plan is reviewed by the Transportation and Land Use Division on an annual basis. A full update process involving all interested parties will be scheduled every 2 years. The annual review and the biennial updates ensure that limited resources for capital projects will be efficiently allocated to the most critical capital needs.

Over the next fiscal year the Roadway Project Evaluation Framework (see Appendix D) will be reviewed and updated to include criteria that weigh the importance of the land use goals of a roadway segment along with its functional efficiency. In a rural area this may mean including criteria that weigh the importance of maintaining the rural character of a roadway and preservation of the natural environment.

Current Application

Each potential roadway project is evaluated and scored using the Project Evaluation Framework (see Appendix D). The framework uses ten different evaluation criteria utilizing 45 pieces of information for each candidate project. The criteria includes existing roadway conditions, traffic congestion and levels of service, and safety.

Roadway projects are ranked and priorities are established using a scoring system for each classification of facility. The point system uses base points plus bonus points. For example, if a candidate project meets either an immediate or short-term need, it will be designated Priority 1 or Priority 2, respectively, through the assignment of project base points. A project that deals with a long-term need will be classified Priority 3 and assigned a base score of zero.

After base points have been assigned to each project, bonus points are awarded when certain conditions exist (transit route, bike route, etc.). Bonus points are used to rank projects within each category and priority.

The highest ranking roadway projects (designated Priority 1) have the most immediate need for implementation. Priority 1 projects require attention before lower priority projects within the 5-year capital program. Priority 2 projects are also necessary, but funding levels do not provide for immediate resolution. Resources remaining after completing Priority 1 projects will be allocated towards Priority 2 projects for construction during the program period, generally in years 3 through 5. Priority 3 projects have no immediate need but will be re-evaluated in future updates of the CIP.

Bikeway projects are evaluated and scored using the Criteria for Bicycle Project Evaluation identified in the CIP. Bikeway projects received points in six different categories: accidents, traffic conditions (such as amount and speed of traffic), current bicycle use, destinations along the roadway, outside funding opportunities, and providing connections in the bikeway system.

Pedestrian projects are evaluated and scored using the Criteria for Pedestrian Project Evaluation identified in the CIP. Pedestrian projects are scored on safety, surrounding land use, transit location, connection of pedestrian facilities, public input, the facilities' appeal to pedestrians, and the functional classification of the roadway.

Funding Potential

Westside Rural Multnomah County candidate projects that can be funded through the CIP will be forwarded through that process for scoring and funding allocation. The candidate projects will receive a rating and funding according to the Project Evaluation Framework. Candidate projects identified in the TSP will receive community support points in the CIP update process.

Regional Transportation Plan (RTP)

Description

Public meetings are held in the various communities to solicit public input regarding transportation needs. The projects are required to meet air quality and environmental standards as put forward in federal and state regulations.

The RTP is developed for the three-county metropolitan area including Clackamas, Multnomah, and Washington Counties. The RTP is updated using a public process and two-tier committee at a technical and policy level before being sent to a seven-member council.

Funding Potential

Only those projects in the Westside Rural Multnomah County TSP that can be identified as regionally significant qualify to be included in the Metro Transportation Improvement Program (MTIP) process. The Cornelius Pass Road study and the Sauvie Island Bridge needs study are two examples that could qualify. These projects and others that qualify will be forwarded to the RTP and MTIP process for funding allocation. Candidate projects in Westside Rural Multnomah County will require continued involvement by citizens in the MTIP update process.

State Transportation Improvement Program (STIP)

Description

The STIP update process is a periodic and open process, allowing citizen input during update years. ODOT manages the update process, reviewing the projects generally in 2-year intervals. In recent years, a third year was included between update cycles due to a lack of new funds.

Public meetings are held in various communities around the state to solicit public input regarding transportation needs. Project proposals are also solicited from each of the local jurisdictions and metropolitan planning organizations (MPOs) from around the state. The list of projects is reviewed for air quality conformity and approved by the Oregon Transportation Commission before being sent to the U.S. Department of Transportation in Washington, D.C., for approval.

Funding Potential

Westside Rural Multnomah County candidate projects that qualify for state funding will be forwarded to the STIP process for funding allocation through ODOT's Region 1. Candidate projects will receive funding based upon statewide priorities and parameters as set forth by the Oregon Transportation Commission for Modernization, Preservation, and Alternative Modes. The most likely projects to be selected for the STIP are bridges and alternative modes projects. Other projects eligible for federal funds may also be included.

Other Processes

Operations and Maintenance

Description. Multnomah County and ODOT each have operational budgets that are developed for the purposes of ongoing maintenance and operations. These budgets are set up to maintain facilities and services at minimum thresholds established by each jurisdiction. The budgets are designed to be responsive to changing site conditions and customer requests. The budgets are limited to expenditures allowed by Oregon Statute and organizational policy.

Current Application. Operational budgets are applied to routine maintenance for traffic signing, travel lane markings, pavement management, vegetation control, winter weather patrol, and other activities. Each agency is responsible for maintenance and operations of its roadways unless there is an intergovernmental agreement transferring responsibilities.

Aside from the maintenance activities mentioned above, ODOT has a budget set aside for speed zone investigations when recommendations are made to the State Speed Control Board for changes in posted speeds.

Funding Potential. Westside Rural Multnomah County candidate projects that qualify for funding through the operations and maintenance budget will be recommended for funding to the appropriate operations and maintenance department.

Grants

Description. Grant programs are sponsored by various federal and state agencies for special studies and/or improvement projects beyond the processes identified above.

Current Application. Grants relating to economic development and growth management-related activities are available. The grants are usually very specific in their evaluation criteria. Grant dollars are usually for specific studies or project types.

Funding Potential. Westside Rural Multnomah County candidate projects will be evaluated as grant funding opportunities arise. Most grant programs focus on urban-related issues.

CHAPTER 6

Implementing and Supporting Ordinances

Overview

The TPR requires Multnomah County to amend the Comprehensive Framework Plan and code to reflect adopted TSPs. Figure 6-1 shows the context of interactions between a number of related plans and policies. The context for the TSP is described in the large box in the middle as a 20-year plan to implement a safe, efficient, effective, and balanced transportation system that is coordinated with other plans. The boxes on the left and right side represent the plans, policies, and standards with which the Multnomah County TSP must be coordinated. For the purposes of consistency, updates to these plans, policies, and standards may be necessary based upon the transportation system planning processes.

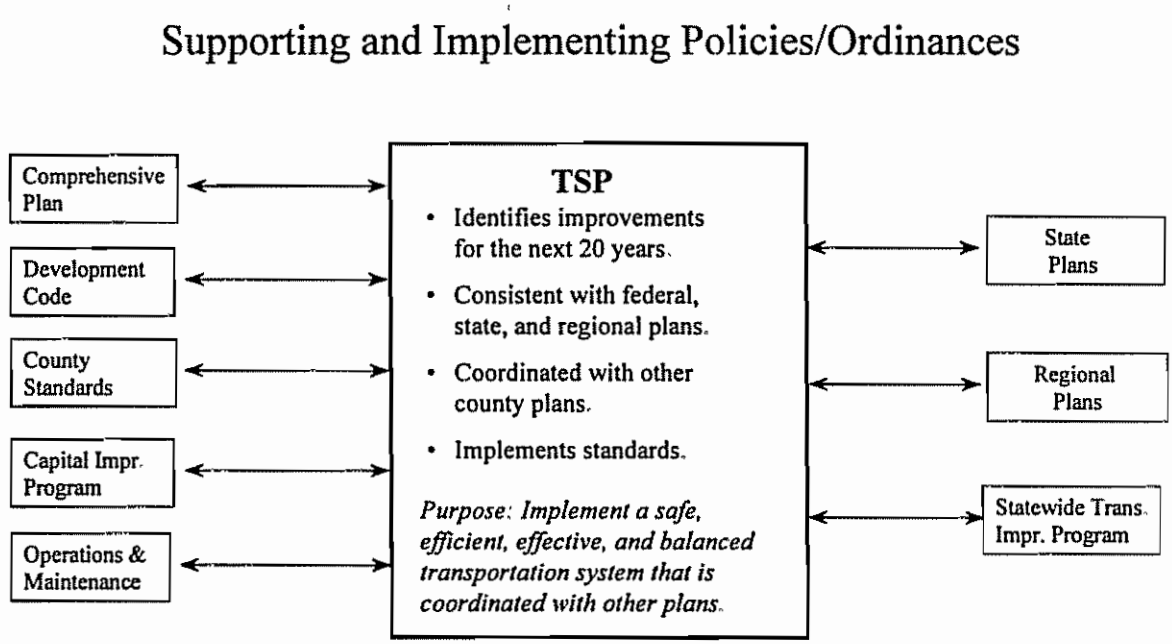

Figure 6-1

Revisions to the language in the county's Comprehensive Plan and development code will be prepared when all the county's area-specific TSPs are complete. The following section lists the TPR requirements and the recommended actions for updating the county's plans and policies.

Recommended Actions

The recommended strategy is to revise the existing language of Multnomah County's planning documents. Table 6-1 identifies TPR requirements for implementing and supporting ordinances and lists the recommended actions.

TABLE 6-1
TPR Requirements for Implementing and Supporting Ordinances

Implementing and Supporting Ordinances	Recommended Actions
Plan review and coordination—consistent with ODOT and other applicable plans	Refer to Comprehensive Plan policy covering agency coordination. Update development code to be specific about transportation considerations in the development application review process.
TSP adoption	Develop an ordinance for adoption of the TSP.
Transportation Land Uses • Facilities, services, and improvements ordinarily not subject to land use regulations • Facilities, services, and improvements permitted outright or subject to clear and objective standards • Facilities, services, and improvements having a significant impact on land use or subject to standards that require interpretation or judgment: – Review and approval process consistent with 660-12-050 – Consolidated review of land use decisions required to permit a transportation project	Clarify permitted transportation uses and criteria/ standards for decisions affecting land uses in the Comprehensive Plan *(i.e., describe preservation and operational activities that will be allowed outright without requiring amendment to the Comprehensive Plan and/or TSP)*. Establish an efficient review and approval process for transportation actions within the land use permitting process *(i.e., accept environmental impact studies as permit application technical studies)*.
Land use or subdivision regulations for rural areas and rural communities requiring: • Access control measures • Operational standards • Airport protection • Coordinated land use review • Development conditions to protect facilities, corridors, or sites • Notification to agencies affected by land use actions • Land use/standards amendments consistent with transportation function	Review and update access control and operational standards to be consistent with transportation function in coordination with surrounding jurisdictions. Support U.S. 30 Corridor Plan as appropriate to Multnomah County. Refer to and amend as appropriate the Comprehensive Framework Plan for protection, notification of land use actions, and land use consistent with transportation function.
Land use or subdivision regulations for rural communities requiring: • Bicycle parking • Safe and convenient pedestrian and bicycle access: – Bikeways along arterials and major collectors	Address bicycle parking in the development code for park and ride share facilities Update the Pedestrian Master Plan, Bicycle Master Plan, development code, and design standards.

TABLE 6-1
TPR Requirements for Implementing and Supporting Ordinances

Implementing and Supporting Ordinances	Recommended Actions
Land use and subdivision regulations to require: • New industrial and commercial developments to provide preferential parking for car and van pools	Update the development code and design standards. (*Note: The majority of this topic is urban related.*)
Transportation financing/capital improvements program	Evaluate CIP evaluation criteria and develop constrained system when TSPs are complete.

CHAPTER 7

References

This section lists both resources cited within the TSP and resources consulted during the transportation planning process.

General References

Manual on Uniform Traffic Control Devices. Federal Highway Administration. 1985.

Highway Capacity Manual. Transportation Research Board. 1994.

National Policy

Intermodal Surface Transportation Efficiency Act of 1991, 1992. United States Department of Transportation.

Statewide Plans and Policies

Access Oregon Highways, Corridor Studies. Oregon Department of Transportation. February 1990.

Draft Statewide Transportation Improvement Program. ODOT. 1997.

Oregon Benchmarks. Governor's Office. December 1992.

Oregon Bicycle and Pedestrian Plan. Oregon Department of Transportation. June 14, 1995.

Oregon Highway Plan. Oregon Department of Transportation. June 1991.

Oregon Public Transportation Plan. April 1997.

Oregon Rail Freight Plan. Oregon Department of Transportation. 1994.

Oregon Rail Passenger Policy and Plan. Oregon Department of Transportation. 1992.

Oregon Transportation Initiative. Governor's Statewide Advisory Committee. November 18, 1996.

Oregon Transportation Plan. Oregon Department of Transportation. September 15, 1992.

Oregon Transportation Planning Rule. Oregon Administrative Rule (OAR) 660.0012. May 1995.

Oregon Transportation Safety Action Plan. Oregon Department of Transportation. June 1995.

Willamette Valley Transportation Strategy. Oregon Department of Transportation. August 16, 1995.

Regional Plans and Policies

Metro's Transportation Demand Management Analysis.

Draft Recommended Alternatives Report: Western Bypass Study. PCA. September 1995.

Portland-Astoria Corridor (U.S. 30) Interim Corridor Strategy, with Annotated Amendments Approved by the Corridor Steering Committee. September 1996.

Highway 26 East Corridor Planning, Document Evaluation. March 1995.

Portland-Astoria Interim Corridor Plan (U.S. 30), Update to Chapter 7. February 1996.

Portland-Astoria Interim Corridor Plan, Action Steps to Implement Strategies. April 1996.

Metro's Growth Concept Plan. Metro. December 1994.

Portland-Astoria Interim Corridor Plan (U.S. 30). June 1995.

Metro Regional Transportation Plan. Metro. July 1995.

Urban Growth Report, Discussion Draft. Metro. March 1996

Metro Regional Transportation Policy. Metro. July 25, 1996.

Portland-Astoria Branch Line Study. January 1997.

Local Plans and Policies

City of Portland Transportation System Plan, Phase One. December 1990.

Multnomah County Bicycle Master Plan. December 1990.

Multnomah County Comprehensive Framework Plan, Volume 2: Policies. June 1995.

Multnomah County Natural Area Protection and Management Plan. June 1992.

Multnomah County Pedestrian Master Plan. April 1996.

Multnomah County Transportation Capital Improvement Program. May 1996.

Northwest Subarea Transportation Study. 1991-94.

Origin Destination Travel Survey for Sauvie Island. November 1990.

Sauvie Island/Multnomah Channel Rural Area Plan, Draft Scoping Report. July 1996.

Sauvie Island/Multnomah Channel Rural Area Plan, Staff Recommended Draft. May 19, 1997.

West Hills Rural Area Plan October 1996, Amendment to Multnomah County Comprehensive Framework Plan

APPENDIX A

Level of Service Definitions

APPENDIX A

Level of Service (LOS) Definitions for Freeways, Arterials and Signalized Intersections[1]

LOS	Freeways (average travel speed) (average spacing)	Arterials (average travel speed)	Signalized Intersections (delay per vehicle)	Traffic Flow Characteristics
A	> 60 mph 22 car lengths	> 35 mph	Less than 5 seconds; most vehicles do not stop at all	Virtually free flow; completely unimpeded Volume to capacity ratio less than or equal to 0.60
B	57 to 60 mph 13 car lengths	28 to 35 mph	5.1 to 15 seconds; more vehicles stop than LOS A	Stable flow with slight delays; reasonably unimpeded Volume to capacity ratio 0.61 to 0.70
C	54 to 57 mph 9 car lengths	22 to 28 mph	15.1 to 25 seconds; individual cycle failures may begin to appear	Stable flow with delays; less freedom to maneuver Volume to capacity ratio 0.71 to 0.80
D	46 to 54 mph 6 car lengths	17 to 22 mph	25.1 to 40 seconds; individual cycle failures are noticeable	High density, but stable flow Volume to capacity ratio 0.81 to 0.90
E	30 to 46 mph 4 car lengths	13 to 17 mph	40.1 to 60 seconds; individual cycle failures are frequent; poor progression	Operating conditions at or near capacity; unstable flow Volume to capacity ratio 0.91 to 1.00
F	30 to 46 mph 4 car lengths	<13 mph	>60 seconds; not acceptable for most drivers	Forced flow, breakdown conditions Volume to capacity ratio > 1.00

[1] Source: 1985 *Highway Capacity Manual.*

APPENDIX B

Task Force and Sounding Board Ranking of Projects

APPENDIX B

Task Force and Sounding Board Ranking of Projects

During the public involvement process, the Sounding Board and Task Force members were asked to validate the transportation needs and identify improvement projects. The participants were then asked to rank potential improvement projects based on project importance to the community. The list of improvement projects was refined further based upon comments received at the open house and agency review of the draft TSP.

TABLE B-1
Ranking of Candidate Projects

Transportation Improvement[1]	Jurisdiction[2]	Score[3]	Cost Estimate (1,000)	Process[4]
Cornelius Pass Road	County	*33	$20	CIP
Safety improvement—Find ways to enforce posted speed limits and safe travel speeds. Install photo radar.				
Cornelius Pass Road	County	*31	$200	CIP
Safety improvement—Install reflectors, delineators, and traffic striping.				
Sauvie Island Road	County	30	$3,675	CIP
Safety improvement—Add to shoulders (4 ft) and add guardrail from Gillihan Road to Reeder Road. Replace culverts.				
U.S. 30	ODOT	27	$100	RTP STIP CIP
Commuter rail study—Conduct study to determine feasibility of commuter rail from Portland to Astoria.				
Gillihan Road	County	27	$2,055	CIP
Safety improvement—Add to shoulders (4 ft).				
Reeder Road	County	27	$5,925	CIP
Safety improvement—Add to shoulders (4 ft).				
Newberry Road	County	27	$450	CIP
Safety spot improvements—Install guardrail ¼ mile south of U.S. 30 and install speed hump 1.2 miles from U.S. 30.				
U.S. 30	ODOT	26	$325	RTP STIP
Ride share parking—Provide parking for 100 spaces next to truck scale near county line.				

TABLE B-1
Ranking of Candidate Projects

Transportation Improvement[1]	Jurisdiction[2]	Score[3]	Cost Estimate (1,000)	Process[4]
Cornelius Pass Road	County	26	$5	State
Speed zone study—Conduct speed zone study to determine average running speed, safe operating speed, and needs for enforcement.				
Germantown Road	County	26	$6,744	CIP
Safety improvement—Add to 2.22 miles of shoulders (4 ft).				
Skyline Boulevard	County	26	$2,039	CIP
Safety improvement—Add to shoulders from UGB to Cornelius Pass Road (1.49 miles).				
Skyline Boulevard	County	25	$11,153	CIP
Safety improvement—Add to shoulders from Cornelius Pass Road to Rocky Point Road (4 ft).				
U.S. 30	ODOT	25	$5	State
Speed zone study—Conduct speed zone study to determine safe speed zone from Linnton north.				
Skyline Boulevard	County	25	$695	CIP
Cornelius Pass Road intersection improvements—Install signal, provide westbound left-turn lane and through/right lane on Skyline Blvd.				
U.S. 30/Cornelius Pass Rd.	ODOT	*24	$78/year	RTP STIP
Public transportation—Provide commuter transit service from Columbia County over Cornelius Pass Rd. to Washington County				
Cornelius Pass Road	County	23	$180	CIP
Safety and capacity needs—Study to look at climbing lanes, guardrail, drainage, addition of shoulders, and alternate routes.				
Cornelius Pass Road	County	23	$695	STIP CIP
U.S. 30 intersection improvements—Include a northbound turn lane and shared northbound left-turn/right-turn lane.				
Germantown Road	County	23	$750	CIP
Safety spot improvements—Widen lanes on curves only, install center skip line reflective markers, and install mirror at intersection with Old Germantown Road.				
Reeder Road	County	22	$250	CIP
Improve parking and intersection safety with Sauvie Island Road.				

TABLE B-1
Ranking of Candidate Projects

Transportation Improvement[1]	Jurisdiction[2]	Score[3]	Cost Estimate (1,000)	Process[4]
Sauvie Island Bridge	County	22	$170	CIP
Conduct bridge replacement study.				
U.S. 30	RAZ	21	$78/year	Other
RAZ service expansion—Expand assuming 20 hours of additional service per work day for one bus.				
Sauvie Island Wildlife Refuge	ODF&W[5]	21	$1,060	Other
Recreational bike path—Conduct study to determine feasibility of a bike path north of Reeder Road for recreational purposes only, followed by implementation of the findings.				
Cornelius Pass Road	County	*20	$50/year	Other
Safety improvement—Contract with the City of Portland for speed enforcement. Assume 0.25 staff per year including equipment and overhead.				
Skyline Boulevard	County	*20	$5	State
Speed zone study—Conduct speed study to determine appropriate speed limit for Skyline Blvd. from Cornelius Pass Road east to city limits of Portland.				
Sauvie Island Road	Tri-Met	20	$300	RTP
Improve park and ride—Delineate parking and traffic circulation.				
Springville Road	County	20	$3,160	CIP
Safety improvement—Add to shoulders (4 ft).				
Laidlaw Road	County	20	$1,930	CIP
Safety improvement—Add to shoulders (4 ft).				
Thompson Road	County	19	$643	CIP
Safety improvement—Add to shoulders (4 ft).				
U.S. 30	ODOT	19	$100	STIP
Exclusive car pool lane study—Conduct study to determine feasibility and cost of adding a reversible exclusive car pool lane on U.S. 30.				
Cornelius Pass Road	County	19	$2,020	CIP
Realignment—Reduce curvature and eliminate switchback while minimizing grade increase of 1,500-foot section (assume average cut of 60 feet).				

TABLE B-1
Ranking of Candidate Projects

Transportation Improvement[1]	Jurisdiction[2]	Score[3]	Cost Estimate (1,000)	Process[4]
U.S. 30 Harborton sign installation—Provide signing for Harborton.	ODOT	18	$1	State
Skyline Boulevard Safety improvement—Install traffic calming devices such as speed humps to reduce speeds from UGB to Cornelius Pass Road.	County	18	$485	CIP
U.S. 30 Scenic viewing opportunities—Access provided across railroad tracks adjacent to Burlington Bottoms using existing road approaches (per location). Exact locations to be determined. Providing pull outs or widening along U.S. 30 will not be acceptable on the basis of safety.	Metro Parks and Greenspaces	15	$350	Other
Skyline Boulevard Scenic viewing opportunities—Acquire property through fee or donation for development of parking area adjacent to roadway.	Metro Parks and Greenspaces	12	$350	Other
Cornelius Pass Road Safety Improvement—Construct pullouts at a number of locations for the purposes of speed enforcement.	County	*11	$750	CIP
Germantown Road Safety improvement—Install traffic calming devices such as speed humps to reduce speeds	County	*0	$887	CIP

[1] Candidate projects are based upon public input, current needs, and future needs.

[2] Jurisdictional control over facility.

[3] Ranking score as established by Sounding Board mailing. Projects with an asterisk (*) are projects that were added at the Task Force meeting on March 4.

[4] Indicates the process most likely for securing funding for candidate project.

[5] ODF&W is the Oregon Department of Fish and Wildlife.

*Projects with an asterisk (*) are projects that were added at the Task Force meeting on March 4, 1998.

APPENDIX C

Cost-Estimating Assumptions

APPENDIX C

Cost-Estimating Assumptions

Alternatives Analysis Cost Estimating Guide[1]

New Roadway — $1,861,000 per mile

Includes clearing and grubbing, excavation or embankment of 0 to 2 feet, removal of structures, culverts every 500 lf, sub-grade preparation, 14 inches of aggregate base, and 6 inches of asphalt concrete. Mobilization and utility adjustment factors included. Additional excavation or embankment 10 feet high per twelve feet width.

Reconstruct Existing Roadway — $782,000 per mile

Includes removing the existing roadway and rebuilding a new facility. This cost is a removal cost plus the "New Roadway" cost listed above. Assume the existing facility to be removed is 4 inches of asphalt concrete over 14 inches of aggregate base. Mobilization and utility adjustment factors included.

Overlay Existing Roadway — $250,000 per mile

Includes grinding 25 percent of existing surface and 4 inches of asphalt concrete overlay. Mobilization factor included.

Restriping Existing Roadway — $4 per foot

Includes removing existing striping and restriping the facility with plastic line, adding delineation ($25 each), and recessed pavement reflectors ($3 each).

Drainage Ditches — $27,000 per mile

Includes trapezoidal ditch, both sides, 1-foot bottom, 2 feet deep, 2:1 side slopes. Cost is for trench excavation only, surface treatments would need to be added in.

Bike Boulevard (Separated Facility) — $137,000 per mile

Assumes a separated bike facility 10 feet wide, 2 inches of asphalt over 12 inches of aggregate base. Clearing and grubbing and removal of structures are included. Cross drain 20 feet long culverts placed every 400 feet. Mobilization and utility adjustment factors are included.

Intersection Widening — $137,000 per leg

Includes widening an existing intersection to fit two left-turn lanes and two right-turn bays. This entails four lanes of widening for an estimated 150 feet. Assume demolition of all approache curbs and sidewalks, 4 inches of asphalt concrete over 14 inches of aggregate base. Includes curb, gutter, and sidewalk on two of the approaches for a total of 300 feet. Includes relocation of obstructions. Mobilization, clearing and grubbing, and landscape factors are included.

New Signal — $130,000 per signal

Includes the signal, pole, wiring, detection devices, etc.

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[1] From the Metro Arterial Bond Estimate (9-25-95). Prices updated for March 1997 using ENR Index factor of 1.068.

Signal Modifications **$65,000 each**

Includes all evaluations and modifications of controller and signal timing and some minor structural modifications.

Traffic Calming **$202,000 per mile**

This item can be applied in many ways. For this estimate, it is assumed to entail median strips, traffic circles, or possibly speed humps. This cost is 10 percent of the total construction cost. Mobilization factor included.

Bridges **$96 per square foot**

Includes costs for labor and materials to span a distance of approximately 100 feet or less. Additional costs would need to factored in for architectural texturing, additional span length, and approach work. Structure costs amount to approximately 60 percent of improvement costs. The remainder consist of bridge approach work, utility relocates, and temporary detours.

Wetland Mitigation **$100,000 per acre**

Includes mobilization, clearing and grubbing, general excavation, and landscaping.

Park and Ride Lots **$200,000 per 100 spaces**

Includes mobilization, clearing and grubbing, general excavation, 4 inches of asphalt concrete over 14 inches of aggregate base, curb, gutter, and storm drain, and minor landscaping.

Photo Radar Speed Detection **$20,000 each**

Includes radar and photo detection technology. Often installation can be negotiated in conjunction of a percentage of fine collection.

Fish Passage Culvert Replacement **$1,000 per foot**

Includes trench excavation, culvert removal and installation of 48-inch pipe with special inlet to avoid conflicts with buried fiber optic cable, embankment, aggregate and asphalt surfacing. Assumes minor shoulder work and paving is required.

Contingency Factor **61 percent**

Includes 15 percent for construction engineering factor, 40 percent for overall bid item and site specific variations.

Right-of-Way Acquisition **$3,000 to 5,000 per acre**

Includes the cost for acquiring exclusive agriculture or forest use zoned property. Purchasing properties of other designations would need to be factored up as well as damages to improvements. Residential property will range in value from $30,000 to 60,000 per acre depending upon location.

APPENDIX D

CIP Evaluation Criteria

APPENDIX D

CIP Evaluation Criteria

APPENDIX I
1998-2002 CAPITAL IMPROVEMENT PLAN
PROJECT EVALUATION FRAMEWORK

PROJECT PRIORITIZATION CRITERIA

Priority 1 Projects (Immediate Need)

1. The facility requires reconstruction within the first two years of the planning period; or,
2. The street or intersection operates at a level of service E or F; or,
3. A hazardous condition exists which results in a high accident rate; or,
4. Substantial increases of traffic are anticipated within the first two years of the planning period that would result in a substandard level of service of E or F; or,
5. Construction of a new arterial or collector street would logically develop the street system and is needed to serve an area that will develop within the first two years of the planning period; or,
6. Projects have outside funding committed.

Priority 2 Projects (Intermediate Need)

1. The facility requires reconstruction between the third and the fifth years of the planning period; or,
2. A hazardous condition currently exists; or,
3. Substantial increases in traffic are anticipated between the third and the fifth years of the planning period that would result in a substandard level of service of E or F; or,
4. Construction of a new arterial or collector street would logically develop the street system and is needed to serve an area that will develop between the third and the fifth years of the planning period.

Priority 3 Projects (No Immediate Need)

1. An acceptable level of service exists of A through D; and
2. No reconstruction is needed within the five year planning period; and
3. No hazardous condition currently exists; and
4. No traffic increases are anticipated within the five year planning period that would result in a level of service below D; or,
5. The facility currently meets County street standards.

APPENDIX II
1998-2002 CAPITAL IMPROVEMENT PLAN

PROJECT BACKGROUND DATA

Data Describing Proposed Projects

Reconstruction of the facility is required
Installation or upgrading of traffic signals
Sign upgrading
Stripe upgrading
Widen Pavement
Installation of turn lanes
Intersection improvements
Provide drainage facilities
Provide sidewalks
Provide bikeways
Provide lighting
Provide additional right-of-way width
Provide additional pavement width
Provide additional travel lanes
Project source (Who identified the project.)
Estimated project cost
Federal funding source
Federal share of funding
County share of funding
Jurisdiction
Map number

Data Describing Existing Conditions

Existing right-of-way width
Existing pavement width
Existing number of lanes
Existing sidewalks
Existing bikeways
Existing street lighting
Existing drainage facilities

Street Classifications

As designated on the County Functional Classification of Trafficways Map.

Current Peak Hour Daily Traffic Volume

Current traffic counts were provided by the Multnomah County Traffic Engineering Section.

Projected Two and Five Year Peak Hour Traffic Volumes

Metro forecasts and traffic studies were used to project traffic volumes over the program period.

Existing Peak Hour Road Capacity

Two sources were used to determine the design capacity for street segments and intersections: Gresham/East County Traffic Impact Fee Study, 1992 and County traffic studies. Where capacity information was not available, estimates were made by Transportation Division staff.

Levels of Service

Levels of service were calculated by Transportation Division staff or provided by the Gresham/East County Traffic Impact Fee Study.

Number of Accidents

The total number of accidents for the previous three year period (1991-93) were compiled from Oregon Dept. of Transportation reports.

Hazardous Locations

Project locations were investigated to determine if hazardous conditions exist.

Transit Relationship

Existing and future bus routes, light rail transit routes, and street access to Max park-and-ride lots were identified in conjunction with Tri-Met.

Land Use

Land use designations were gathered from local zoning maps and comprehensive plan maps.

Bicycle/Pedestrian Facilities

The Multnomah County Bicycle Master Plan and local comprehensive plans were used to identify bikeways and pedestrian facilities.

Reconstruction Needs

The Multnomah County Pavement Management Program was used to identify road segments that will require reconstruction within the program period.

Traffic engineering staff identified traffic signal equipment needing to be replaced or upgraded.

Project Length

The length of each project (in feet) was derived from the Multnomah County Master Road List report.

Economic Development Relationship

Local jurisdictions and Multnomah County planning staff determined the scale of development anticipated for large vacant parcels within their jurisdiction. Parcels were classified using the following typology:

Regional Scale Industrial

Large Industrial Areas (100 acres and above)

Other Industrial

Regional Retail Centers (such as Portland CBD, Lloyd Center, Mall 205)

Major Retail Center (Dept. of Commerce definition)

Clustered Commercial (as noted by land use plans)

Regional Community Service & Office (Major hospitals, community colleges, large scale government facilities)

Major Community Service & Office (Hospitals, community college branches, medium scale government facilities)

Outside Funding Potential

Projects listed in the ODOT Six Year Program the Metro Transportation Improvement Plan were identified as having outside funding potential.

Environmental Impact

Projects which would require additional right-of-way, noise mitigation or building demolition were identified by Multnomah County Transportation Division staff.

Community Support

Projects listed in local comprehensive plans, the Regional Transportation Plan or community plans were identified by Multnomah County and local jurisdiction planning staffs.

APPENDIX III
1996-2000 CAPITAL IMPROVEMENT PLAN
SCHEDULE OF POINT ASSIGNMENTS

BASE POINT ASSIGNMENT

Street Priority	Arterial/Transit Corridor	Collector/Scenic Route	Local
1	400	300	200
2	300	200	100
3	0	0	0

BONUS POINT ASSIGNMENT

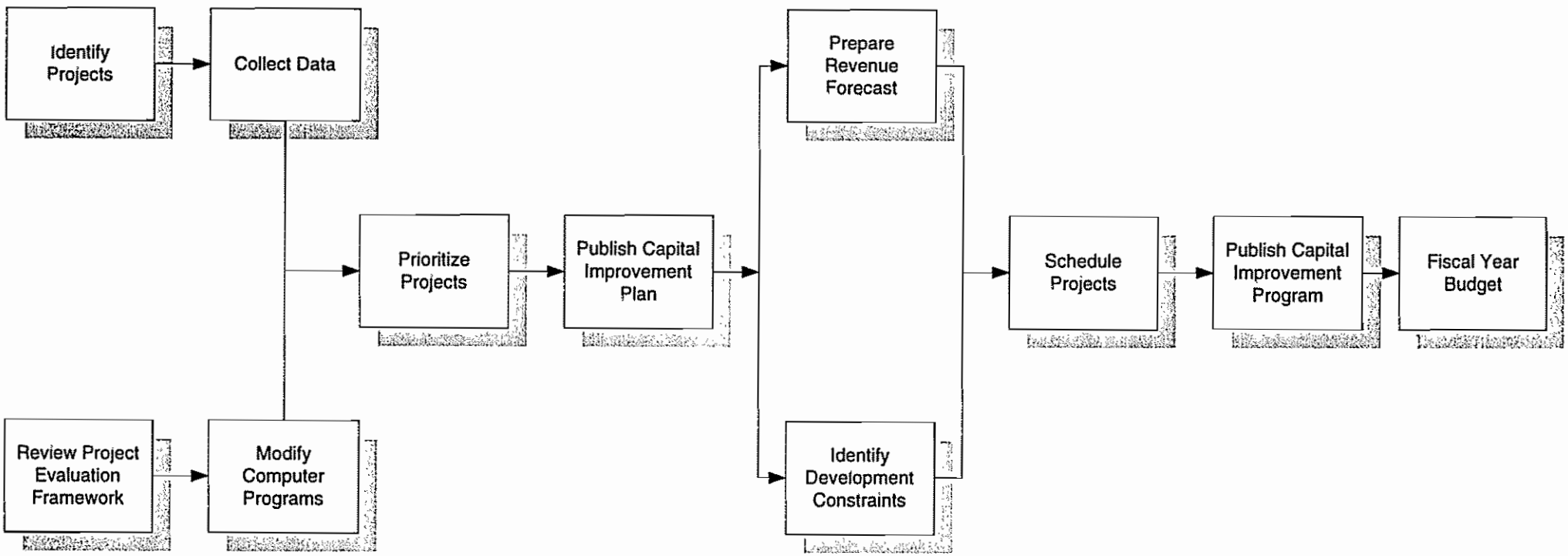
Transit	
Bus Route	10
Future Bus Route	5
Park & Ride Access	10
Light Rail Transit	10
Future LRT	5
Designated Land Use	
Light Manufacturing	8
Heavy Manufacturing	8
Regional Commercial	10
Central Commercial	10
Other Commercial	5
Reg Community Service	10
Other Community Service	4
High Density Residential	5
Other Residential	2
Economic Development	
Regional Scale Industrial	10
Large Ind. Area (100 Ac+)	7
Other Industrial	5
Regional Retail	10
Major Retail	7
Clustered Commercial	5
Reg. Com. Service & Office	10
Major Community Service	3

Outside Funding	
Committed	10
Potential	5
Environmental Impact	
Right-of-Way Acquisition	
Building	-15
Land Only	-10
Noise Problem	-10
Community Support	
Local Plans	10
Written Support	5
Bicycle Related	5
Street Importance (see below)	1-10

	Street Length (feet)					
Land Use	**500**	**1000**	**2000**	**3000**	**4000**	**4001+**
Reg/Cent. Commercial	5	6	7	8	9	10
Community Service	4	5	6	7	8	9
Other Commercial	3	4	5	6	7	8
Residential	2	3	4	5	6	7
Manufacturing	1	2	3	4	5	6

Capital Improvement Plan and Program

Flow Chart



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