

Transportation System Plan

Multnomah County Transportation System Plan

Multnomah County, Oregon

Draft

March 2016

Transportation System Plan

Multnomah County TSP

Multnomah County, Oregon

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VOLUME II

Appendix A Baseline Report Memo

Appendix B Existing and Future Conditions Memo

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GLOSSARY OF TERMS

The following terms are applicable only to the Multnomah County Transportation System Plan and are used in this document as defined below:

Access Management: Refers to measures regulating access to streets, roads and highways from public roads and private driveways. Measures may include but are not limited to restrictions on the type and amount of access to roadways, and use of physical controls such as signals and channelization including raised medians, to reduce impacts of approach road traffic on the main facility.

Americans with Disabilities Act (ADA): A civil rights law that prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public.

Arterial (Street): County roads that comprise the regional transportation network and provide for travel between communities within the County as well as between counties. Arterials are typically three to five lanes in width and serve a high volume of through traffic. Minor, Major, Principal and Rural are sub-categories of the Arterial Classification..

Average Annual Daily Traffic (AADT): A measure used primarily in transportation planning and traffic engineering that represents the total volume of vehicular traffic on a highway or roadway for a year divided by 365 days.

Average Daily Traffic (ADT): This is the measurement of the average number of vehicles passing a certain point each day on a highway, road or street.

Bicycle Facility: Any facility provided for the benefit of bicycle travel, including bikeways and parking facilities.

Bicycle Network: A system of connected bikeways that provide access to and from local and regional destinations.

Bike Lane: Area within street right-of-way designated specifically for bicycle use. Typically delineated from the vehicular travel lane by an 8 inch white stripe.

Bikeway: Area within street right-of-way for bicyclists as well as other uses such as walking. Typically delineated from the vehicular travel lane by a 4 inch white stripe.

Capital Improvement Plan (CIP): A community planning and fiscal management tool used to coordinate the location, timing and financing of capital improvements over a multi-year period.

Capacity: The maximum number of vehicles or individuals that can traverse a given segment of a transportation facility with prevailing roadway and traffic conditions.

Collector (Street): County roads that distribute traffic between local streets and the Arterial network. Collectors are typically two to three lanes in width, and serve more local trips and fewer through trips than Arterials. Neighborhood, Major, and Rural are sub-categories of the Collector classification.

Comprehensive Plan Advisory Committee (CAC): An advisory committee consisting of volunteer community members from the community they represent. CAC members reviewed, discussed, and recommended approval of all of the policies and strategies identified in the Comprehensive Plan, including new policies and those retained from earlier editions of the Comprehensive Plan and Rural Area Plans. Members of the CAC also served on four subcommittees, transportation and public facilities being one, where they engaged in more in-depth discussion of policy issues and recommendations.

Context Sensitive Design: Roadway standards and development practices that are flexible and sensitive to community values. Context sensitive design allows roadway design decisions to better balance economic, social and environmental objectives.

Department of Environmental Quality (DEQ): A regulatory agency whose job is to protect the quality of Oregon's environment.

Department of Land Conservation and Development (DLCD): A public agency that helps communities and citizens plan for, protect and improve the built and natural systems that provide a high quality of life.

Driveway (DWY): A private means of access, connecting one or more properties to the local public road system. A private driveway may be a private access easement that connects properties to the local public road system.

Eastbound (EB): Traveling toward the east.

Fiscal Year (FY): A year as reckoned for taxing or accounting purposes.

Geographic Information Systems (GIS): A system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data.

Grade: A measure of the steepness of a roadway, bikeway or walkway, usually expressed in a percentage form of the ratio between vertical rise to horizontal distance, (e.g. a 5% grade means that the facility rises 5 feet in height over a 100 feet in length.)

Impervious Surfaces: Hard surfaces that do not allow water to soak into the ground, increasing the amount of stormwater running into the drainage system.

Level of Service (LOS): A qualitative measure describing the perception of operation conditions within a traffic stream by motorists and or passengers. An LOS rating of "A" to "F" describes the traffic flow on streets and at intersections, ranging from LOS A, representing virtually free flow conditions and no impedance to LOS F representing forced flow conditions and congestion.

Local (Street): A public road under Multnomah County jurisdiction that is outside a city and is not a county road, state highway or federal road. The County is not responsible to maintain, repair or improve a local access road unless the Board finds an emergency or public need as required under ORS 368.031.

Manual on Uniform Traffic Control Devices (MUTCD): A document issued by the Federal Highway Administration (FHWA) of the United States Department of Transportation (USDOT) to specify the standards by which traffic signs, road surface markings, and signals are designed, installed, and used.

Metropolitan Planning Organization (MPO): An organization in each federally recognized urbanized area (population over 50,000), as designated by the Governor, which has the responsibility for planning, programming and coordinating the distribution of federal transportation resources.

Multi-Modal: Involving several modes of transportation including bus, rail, bicycle, motor vehicle, etc.

Multi-Use Path: Off-street route (typically recreationally focused) that can be used by several transportation modes, including bicycles, pedestrians and other non-motorized modes (i.e. skateboards, roller blades, horses, etc.)

Neighborhood Route (Street): A street that provide access primarily to residential land uses and link neighborhoods to higher order roads. They generally have higher traffic volumes than local streets.

Northbound (NB): Traveling toward the north.

Oregon Administrative Rules (OAR): The official compilation of rules and regulations having the force of law in the U.S. state of Oregon. It is the regulatory and administrative corollary to Oregon Revised Statutes, and is published pursuant to ORS 183.360 (3).

Oregon Department of Transportation (ODOT): A public agency that helps provide a safe, efficient transportation system that supports economic opportunity and livable communities throughout Oregon.

Oregon Revised Statutes (ORS): The codified body of statutory law governing the U.S. state of Oregon, as enacted by the Oregon Legislative Assembly, and occasionally by citizen initiative. The statutes are subordinate to the Oregon Constitution.

Peak Period or Peak Hour: The period of the day with the highest number of travelers. This is normally between 7:00 to 9:00 AM or 4:00 to 6:00 PM on weekdays.

Pedestrian Facility: A facility provided for the benefit of pedestrian travel, including walkways, crosswalks, signs, signals and benches.

Right-Of-Way (ROW or R/W): Property that the public has a right to use for transportation and transportation related purposes.

Safety Priority Index System (SPIS): An indexing system used by Oregon Department of Transportation to prioritize safety improvements based on crash frequency and severity on state facilities.

Safe Routes to School (SRTS): Federal, state, and local programs that create safe, convenient, and fun opportunities for children to bicycle and walk to and from schools.

Shared Roadway: Roadways where bicyclists and autos share the same travel lane. May include a wider travel lane and/or bicycle boulevard treatment (priority to through bikes on local streets).

Southbound (SB): Traveling toward the south.

Statewide Transportation Improvement Plan (STIP): The capital improvement program that identifies funding and schedule of statewide projects.

Technical Advisory Committee (TAC): An advisory committee consisting of state, county, and city staff that review and provide feedback on technical memorandums for the Comprehensive Plan and Transportation System Plan Update.

Technical Memorandum (TM): A document that is specifically targeted to technically-trained persons, such as practicing engineers, engineering managers, or planners, who are interested in the technical details of the project or task.

Traffic Control Devices: Signs, signals or other fixtures placed on or adjacent to a travelway that regulates, warns or guides traffic. Can be either permanent or temporary.

Transportation Analysis Zone (TAZ): A geographic sub-area used to assess travel demands using a travel demand forecasting model. Often defined by the transportation network and US Census blocks.

Transportation Demand Management (TDM): A policy tool as well as any action that seeks to reduce single-occupant vehicle trips, especially during peak travel demand periods. Refers to actions which are designed to change travel behavior in order to improve performance of transportation facilities and to reduce need for additional road capacity. Methods may include subsidizing transit for the journey to work trip, charging for parking, starting a van or car pool system, or instituting flexible work hours.

Transportation and Growth Management (TGM): A program of the Oregon Department of Transportation (ODOT) that supports community efforts to expand transportation choices. By linking land use and transportation planning, TGM works in partnership with local governments to create vibrant, livable places in which people can walk, bike, take transit or drive where they want to go.

Transportation Planning Rule (TPR): A series of Oregon Administrative Rules intended to coordinate land use and transportation planning efforts to ensure that the planned transportation system supports a pattern of travel and land use in urban areas that will avoid the air pollution, traffic and livability problems faced by other large urban areas of the country through measures designed to increase transportation choices and make more efficient use of the existing transportation system.

Transportation System Plan (TSP): Is a comprehensive plan that is developed to provide a coordinated, seamless integration of continuity between modes at the local level as well as integration with the regional transportation system.

Two-Way Stop Control (TWSC): An intersection, where one or more approaches is stop controlled and must yield the right-of-way to one or more approaches that are not stop controlled.

Urban Growth Boundary (UGB): A regional boundary, set in an attempt to control urban sprawl by mandating that the area inside the boundary be used for higher density urban development and the area outside be used for lower density development.

Vehicle Miles Traveled (VMT): The cumulative distance a vehicle travels, regardless of number of occupants.

Volume to Capacity Ratio (V/C): A measure that reflects mobility and quality of travel of a roadway or a section of a roadway. It compares roadway demand (vehicle volumes) with roadway supply (carrying capacity).

Westbound (WB): Traveling toward the west.

PREFACE

The development of this plan was guided by the Project Management Team (PMT) and the Comprehensive Plan Community Advisory Committee (CAC) and their Transportation Subcommittee. The PMT and CAC Transportation Subcommittee rosters are below, along with members of the consultant team. The CAC Transportation Subcommittee members devoted a substantial amount of time and effort and their participation was instrumental in the development of the Multnomah County Transportation System Plan (TSP). Multnomah County's future transportation system has been enhanced because of their commitment.

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Section 1

Introduction

INTRODUCTION

Transportation is the movement of people and goods from one place to another. Our transportation systems affect nearly every aspect of life. We import the basic necessities of life – food, clothing, and building materials – to our homes. A constant flow of freight supplies our lives. We travel to work and school, and move about to socialize and play. Streets create the framework around which our cities and counties are built. Personal choices about how we travel affect our daily lives and our physical and mental well-being. Transportation is the backbone that supports a community as it grows and evolves.

The Multnomah County Transportation System Plan (TSP) forms the transportation element of the Multnomah County Comprehensive Plan. Prior to this update to TSP, the Comprehensive Plan was supported by separate Transportation System Plans (TSPs) for the Rural Westside and West of Sandy River areas (covering the West Hills, Sauvie Island, and West of Sandy River Area Plans) and, the transportation components of the East of Sandy River Area Plan and the Columbia River Gorge Scenic Area Management Plans. The updated Multnomah County TSP incorporates relevant elements from all of these plans into this one document.

The TSP is the master plan for how the County's rural transportation system will evolve and develop for the next 20 years. The plan's primary focus is on enhancing the safety of the transportation system and balancing the needs of agricultural, visitor, residential, bicycle, pedestrian, and freight travel to and from the rural areas. The TSP supports economically vital and healthy communities.

This TSP provides Multnomah County with guidance for operating and improving the multimodal transportation system. The TSP includes transportation policies and priorities for projects and programs to implement over the next 20 years. It also provides a vision for longer term projects that could be implemented, should additional funding become available. The TSP is intended to be flexible to respond to changing community needs and revenue sources over the next 20 years and will be updated approximately every 5 to 10 years. The TSP builds consensus among the County, state, and other agencies on area transportation needs and priority projects and informs local citizens on the projects that will be carried forward for funding from local, state, and federal sources.

TRANSPORTATION SYSTEM PLAN GOAL

Review of the County's previous TSPs and Area Plans and input from the Project Management Team (PMT) and Comprehensive Plan Community Advisory Committee (CAC) provided the base for which the goal for this plan was developed. The goal provides a clear vision of what Multnomah County aims to achieve.

GOAL: To provide a safe and efficient transportation network for all modes of travel that serves the rural areas of the County and achieves the following objectives:

1. Implement a transportation system that is safe and efficient in meeting the needs of area residents.
2. Implement a balanced transportation system that supports all modes of travel.
3. Develop a transportation system that supports the rural character of unincorporated Multnomah County.
4. Develop a transportation system the supports a healthy economy.
5. Provide transportation improvements in a timely manner according to funding capability.
6. Reduce vehicle traffic on rural County roadways caused by those traveling through the area.

The CAC also provided direction on policies to guide Multnomah County and assist with achieving the goals outlined above. These are included in Section 4.

KEY TRANSPORTATION ISSUES

The plan focuses on addressing both current as well as year 2035 needs of the transportation system. The central needs identified as part of this process are:

- **Reduce Modal Conflicts**— Most of Multnomah County’s rural areas are served by two-lane narrow rural roadways. A variety of users with diverse needs and varying speeds (e.g., farm equipment, an active cycling community, pedestrians, and motorists) use the roadway, which can result in conflicts between modes.
- **Enhance Safety for All System Users** – Recent crash history reflects a tendency toward single vehicle crashes with fixed objects after leaving the roadway.
- **Manage Travel Demand**— Peak traffic conditions, resulting from commuter traffic, seasonal events (such as access to public beaches, recreational areas and pumpkin patches) and limited duration events (such as concerts and farm-to-table dinners), result in traffic congestion and long vehicle queues. In addition to causing delays, highly congested roadways can have a potential impact on emergency response times.
- **Address Increasing Traffic and Safety Issues While Maintaining Rural Character** – Although there are an increasing number of vehicles on the roads, residents are concerned transportation improvements and roadway widening will affect the rural character of the area. The County will have to address the issues caused by this increase through planning of safety and other improvements that do not change the character of the area. Improvements and solutions should include context sensitive design.
- **Reduce Traffic Pressure on County Roads**— County rural roads are increasingly used as an alternative route to State highways, creating heavy traffic flows and congestion during commute hours and increasing safety concerns. Examples include the use of West Hills Roads to connect US-30 and US-26. Solutions for these roads are needed that increase

safety and traffic flow without encouraging more traffic, building more roadways, or widening roadways and impacting wildlife and their habitat.

- **Bicycle Infrastructure** – Traveling and commuting by bicycle has become increasingly popular in Multnomah County, but most bicycle network improvements have been focused in the urban areas. As the number of bicyclists continues to grow, investment also needs to be made in the rural areas of the County. Some types of bicycle infrastructure can also serve pedestrians in rural areas, such as providing for shoulders.
- **Better Road Maintenance** – The County’s rural roads are experiencing increased traveler use, creating a need for better road maintenance. State and local gas tax have been the primary funding in the past but are not keeping pace to needs.
- **Health and Equity** – Recent research has shown that transportation has a significant impact on health and the well-being of members of the community. Transportation can also cause or support health inequities between different sub-groups within the community. The benefits and burdens of the transportation system should be equitably distributed throughout the County.
- **Water Transport** – Due to the Willamette River and the freight transportation it supports, water transport is important to the County’s economy and transportation system.
- **Wildlife Crossings** – Transportation improvements often negatively impact wildlife and their habitats, especially roadway widening. Further partnerships and research can be examined to create design treatments that minimize these negative impacts.

TSP UPDATE PROCESS

The TSP Update process included a series of technical memoranda, meetings with the Comprehensive Plan Community Advisory Committee (CAC) and Transportation Subcommittee to review policies, projects, and priorities, two public workshops, meetings with the Bicycle and Pedestrian Advisory Committee, and meetings with other stakeholders and interested parties. The technical memoranda included a review of existing plans and policies, memos on existing and proposed policies, a review of the existing transportation network, and draft plan elements including maps, projects, and priorities. Regular meetings with the PMT allowed for effective coordination throughout the project. All technical memoranda can be found in the Technical Appendices.

PLAN ORGANIZATION

Sections 2 through 5 comprise Volume 1 of the TSP and provide the main substance of the plan. Technical Appendices in Volume 2, which contains the technical memoranda, supplement Volume 1.

Section 2 describes the transportation system existing and future conditions and needs.

Section 3 presents an overview of potential solutions and treatments included in the TSP.

Sections 4 and 5 will form the Transportation Element of the Comprehensive Plan and include goals and policies (Section 4) and transportation projects, studies, and programs to implement over the next 20 years (Section 5).

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Section 2

Existing and Future Conditions

EXISTING AND FUTURE CONDITIONS

The following section describes the existing plans, policies, and transportation system needs within five rural areas of Multnomah County. Additionally, this section describes the existing population, demographics, and land uses within the rural areas. This section also describes future projections for population and employment in unincorporated Multnomah County, projected traffic volumes on ODOT facilities, and an overview of currently planned projects to address existing and future needs.

STUDY AREA

The Transportation System Plan (TSP) focuses on the five rural areas of the county, including West Hills, Sauvie Island, West of Sandy River, East of Sandy River, and Columbia River Gorge National Scenic Area. These areas are illustrated in Figures 1A and 1B.

PLANS AND POLICIES

Plans and documents that include policies and projects relevant to the Transportation System Plan include:

- Multnomah County Comprehensive Framework Plan [Policies 33 – 36]
- Rural Area Plans
 - Columbia River Gorge NSA Rural Area Plan Policy Document (2005)
 - Columbia River Gorge National Scenic Area Management Plan (2011)
 - East of Sandy River Rural Area Plan (1997) [Transportation Section]
 - West of Sandy River Rural Area Plan (2005) [Transportation Section]
 - West Hills Rural Area Plan (1996) [Transportation Section]
 - Sauvie Island/Multnomah Channel Rural Area Plan (2015)
- Transportation Plans
 - Westside Rural Area Transportation System Plan (1998)
 - Sauvie Island/Multnomah Channel Transportation System Plan (2015)
 - Functional Classification of Trafficways Findings and Recommendations Technical Report (2003)
 - Pedestrian Master Plan (1996)
 - Bicycle Master Plan (1990)
- Transportation Capital Improvement Plan and Program Fiscal Years 2014-2018 (2014)

The Baseline Report Memo dated November 2014 in Volume II, Appendix A, contains the description of these documents and policies.

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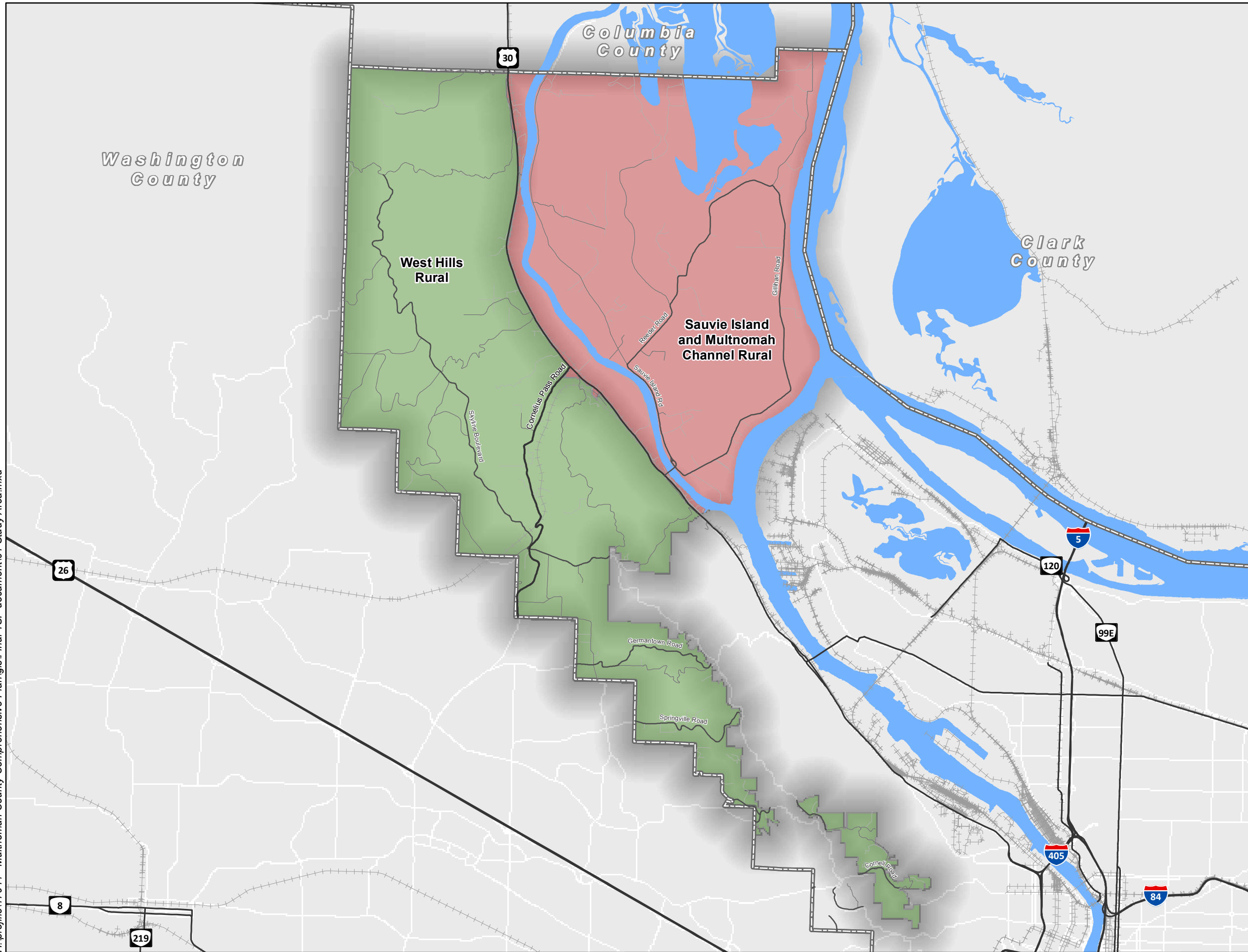


Figure 1A
Study Area

Plan Areas

-  Sauvie Island and Multnomah Channel Rural
-  West Hills Rural
-  County Boundaries

0 0.5 1 2 Miles



Prepared By: Kittelson & Associates, Inc. Date: 2/18/2016

Coordinate System: NAD 1983 HARN State Plane Oregon North FIPS 3601

Disclaimer: This map is intended for informational purposes only. While this map represents the best data available at the time of publication, Multnomah County makes no claims, representations, or warranties as to its accuracy or completeness. Metadata available upon request.

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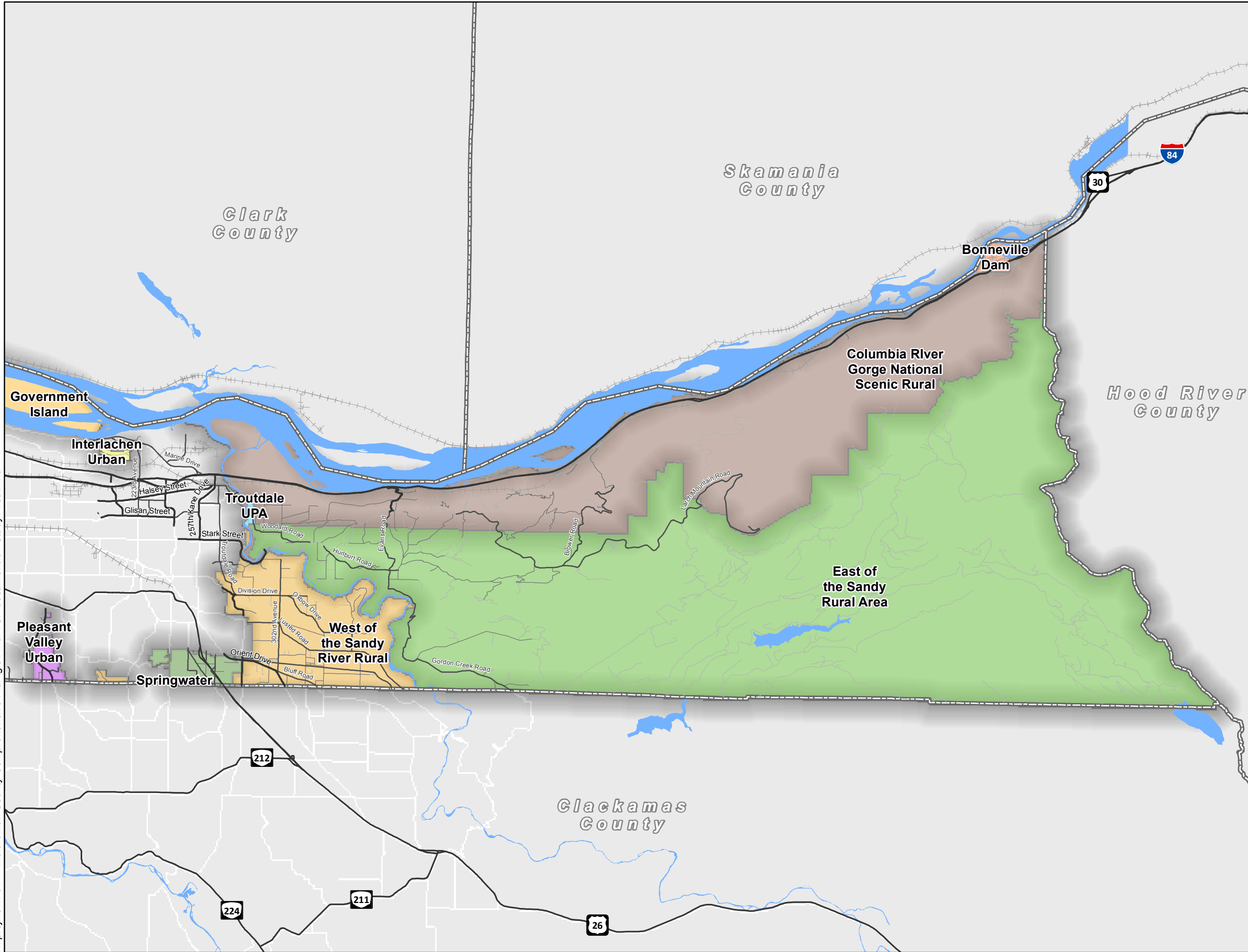
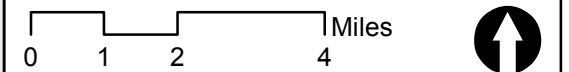


Figure 1B
Study Area

Plan Areas

-  Bonneville Dam
-  Columbia River Gorge National Scenic Rural Area
-  East of the Sandy Rural Area
-  Government Island
-  Interlachen Urban
-  Pleasant Valley Urban
-  Springwater
-  Troutdale UPA
-  West of the Sandy River Rural
-  County Boundaries



Prepared By: Kittelson & Associates, Inc. Date: 2/18/2016

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NAD 1983 HARN State Plane Oregon North FIPS 3601

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KEY TRANSPORTATION ISSUES

This TSP addresses current and future transportation needs, particularly related to the increasing traffic on rural roads, increasing modal conflicts, and the need for increased safety, bicycle and pedestrian infrastructure, and better road maintenance. The TSP also considers transportation needs related to community health, equity, and the potential for wildlife impacts. A key component of the plan is the identification of a range of potential programs, policies, and projects that the County can implement over the next 20 years.

The following sources provided insights on existing transportation needs:

- public outreach related to the Sauvie Island & Multnomah Channel Rural Area Plan Update in 2013;
- review of relevant plans and policies;
- a review of the existing transportation system inventory, traffic data and crash data;
- needs identified through Sauvie Island and Multnomah Channel stakeholder interviews conducted from November 2014 through February 2015 by the project team;
- feedback from the public on transportation issues and project maps at TSP public meetings including 14 CAC meetings and four transportation subcommittee meetings; and,
- implementation needs for transportation related policies in the Sauvie Island & Multnomah Channel Rural Area Plan and the on-going countywide Comprehensive Plan Update.

Based on information from the above efforts, the transportation needs generally fall into the following categories:

- Reduce Modal Conflicts
- Enhance Safety
- Manage Travel Demand
- Address Increasing Traffic and Safety Issues While Maintaining Rural Character
- Reduce Traffic Pressure on Westside Roads
- Bicycle Infrastructure
- Better Road Maintenance
- Health and Equity
- Water Transport
- Wildlife Crossings

The following sections outline the relevant needs to consider for each of these categories.

Reduce Modal Conflicts

The majority of Multnomah County rural areas are served by two-lane narrow rural roadways. A variety of users with diverse needs and varying speeds (e.g., an active cycling community, pedestrians and

motorists, farm equipment) share the roadway, which can result in conflicts between modes. Some of the issues related to these potential conflicts are discussed below.

In the West Hills and Sauvie Island, there are no dedicated pedestrian or bicycle facilities along roadways today, and roadway shoulders are narrow or non-existent in most places. There are short segments of dedicated bicycle facilities in East County, including parts of Highway 26, Telford Road, and Stark Street. The 1998 Transportation System Plan, focused on the west side of Multnomah County and identified the need for four foot shoulders along major segments of Skyline Boulevard, Germantown Road, Springville Road, Laidlaw Road, Thompson Road, Sauvie Island Road, Reeder Road, and Gillihan Road, but the County has not yet implemented these projects. Constraints on most of these roadways include limited right-of-way to provide wider shoulders or a parallel multi-use path and potential improvement costs and construction constraints near the levees on Sauvie Island create significant barriers to implementation. A complete list of the study area projects included in the County's 2014-2018 Capital Improvement Program (CIP) is provided in the Existing and Future Conditions Memo in Appendix 2.

In addition to safer facilities, stakeholders identified the need to provide wayfinding and information related to restrooms, water, and parking locations as well as education and outreach for all road users on sharing and obeying the rules of the road. Within Multnomah County, East County and Sauvie Island are popular destinations for recreational cyclists, particularly on weekends

There are constraints throughout the County to constructing wider shoulders for bicycles including right-of-way, drainage, grades, and wildlife crossings. A unique situation on Sauvie Island is that many areas along Sauvie Island Road and Reeder Road are within the Sauvie Island Drainage Improvement Company (SIDIC) levee right-of-way and set back area. Construction along these sections of the roadways require special permitting from the Army Corps of Engineers and can only be considered if they will enhance the structural integrity of the levee. The County or Corps of Engineers would need to determine if construction of a multi-use path parallel to the loop roadways, on the island side of the levee could enhance the structural integrity of the levee and be approved by the Corps.

Enhance Safety

Both the County's policies and stakeholder feedback identify the importance of improving safety for all transportation system users in Multnomah County.

Crash data was obtained from ODOT and reviewed to establish a baseline for identifying potential safety-related improvements. This review revealed the following areas with a pattern of crashes:

- I-84
- US 30
- Cornelius Pass Road

- Skyline Boulevard
- Germantown Road
- Corbett Hill Road
- Reeder Road/Sauvie Island Road intersection

Manage Travel Demand

The majority of the year the transportation network primarily serves residents, agricultural uses, and daily business operations in Multnomah County rural areas. Average daily traffic volumes on most of the roadways throughout the county are typically less than 3,000 vehicles per day. The West Hills experience high levels of commuting traffic during peak hours. Local and collector roadways are used to cross through the West Hills in addition to Cornelius Pass Road, an arterial.

Additionally, the popularity of the trails and recreational areas in East County and beaches, hunting and fishing areas, recreational cycling opportunities, seasonal festivals, and agri-tourism activities on Sauvie Island, lead to significant fluctuations in daily traffic volumes during the summer and fall peak seasons. During these times for example, Sauvie Island Road can serve as many as 17,000 vehicles per day and 1,800 cyclists per month. These higher demand periods result in traffic congestion and long vehicle queues at access points to key visitor destinations. In addition to causing delays, highly congested roadways concern residents because of the potential impact on emergency response times.

This TSP includes solutions for managing traffic in Multnomah County during peak hour, events, and seasons to ensure safe multimodal travel while supporting a vibrant economical, agricultural, and recreational economy over the next 20 years. This TSP also recognizes that efforts to reduce travel demand will have to happen in coordination with other cities and counties because the traffic generators are not always located within rural Multnomah County.

Address Increasing Traffic and Safety Issues While Maintaining Rural Character

Although rural County residents recognize the need for improving the local road system, they also cherish the rural character of the areas they live in and prefer not to have more roads built or existing roads widened to a significant degree in order to accommodate increased traffic and to provide greater travel safety. Many of the comments from the public recognize the traffic problems caused by growing population and commute patterns, but seek solutions that will not result in more road construction. Although traffic continues to grow, rural County roads are not meant to handle regional through traffic. Residents value the trees, wildlife, and the pastoral countryside characteristic of Multnomah County's rural areas and do not want to see the landscape and habitat diminished by construction of new and expanded roads, particularly in areas of steep slopes where large retaining walls would be necessary. Rural residents will see even greater demands placed on the local road system as nearby urban lands are developed. Possible solutions for addressing increasing traffic and safety concerns might include

traffic signal timing plan updates, dedicated bike facilities, sidewalks or wider shoulders in appropriate places, and travel demand management.

Context Sensitive Design

Context sensitive design is an important strategy to maintain the rural character of roadways in unincorporated Multnomah County. It allows for minimal changes to the system, right-of-way, and character of the roadways while improving service to roadway users. As seen below through the range of solutions in Section 3 and in the planned projects listed in Section 5, there are context sensitive options for addressing transportation issues, especially in terms of providing bicycle and pedestrian facilities. These options include intermittent shoulders, bicycle pull outs, climbing lanes, and others that would create less impact than full shoulder improvements or bicycle lanes.

Reduce Traffic Pressure on County Roads

Many of the comments from the public identify the need to reduce traffic pressure on roads in unincorporated Multnomah County. These issues are related to increased volumes of both vehicles and bicyclists on fairly, narrow two lane roadways. Many of these roadways have little to no shoulders and do not have any facilities for pedestrians and runners. The West Hills roads serve both recreational and regional commute needs, which create inherent conflicts. Additionally, in East County, some conflicts arise from traffic resulting from visitors and truck traffic travelling through the area. The County has begun to address some of these issues through planning for safety improvements to Cornelius Pass Road and other improvements identified in Rural Area Plan transportation system plans.

Bicycle Infrastructure

Bicycle use has become increasingly popular in the Portland Metropolitan Region as a desirable commuter alternative as well as for recreational activity. Within Multnomah County's heavily populated urban areas, significant investment is being made to improve the transportation system for the safety of bicycles now sharing the roads with vehicles. For the more scarcely populated rural areas, less investment has been made in improving the road system to accommodate bicycles and to reduce road sharing conflicts with vehicles. Promotion of bike touring as an economic engine will likely draw an even greater number of bicyclists in the future to our rural roadways and bike paths. Community members also indicated some desire for bicycle facilities that can also serve pedestrians, such as shoulders along the roadway.

Better Road Maintenance

With increased use of the County's rural roads comes the need for more road maintenance. Rural residents have cited the need for more frequent road maintenance as a major concern. For the County, the key to sustaining an effective, ongoing maintenance program is a stable funding source. Typically,

state and local gas tax money is used for local road maintenance. However, the state gas tax revenues have been diminishing revenues associated with improved fuel efficiency and have not been adjusted accordingly to keep pace with the growing maintenance need. Deferred roadway maintenance activities in turn increase the overall cost of road maintenance. The County has a local gas tax which similarly has not been adjusted to reflect cost increases.

Health and Equity

An increasingly large body of research now shows that transportation decisions directly and indirectly impact human health by influencing a wide range of “health determinants”. Health determinants—also referred to as “social determinants of health” or “risk factors”—are features of the built, social, and natural environment that are known to impact an individual’s risk of experiencing negative health outcomes such as injury or illness. According to the American Public Health Association, “fifty percent of the leading causes of death and illness in the United States—traffic injuries, heart disease, cancer, diabetes, and respiratory illness—are preventable” because “these diseases have several risk factors that can be mitigated by transportation policies.”¹ The Baseline Report in Appendix A that was prepared for the Comprehensive Plan update contains existing conditions information about planning related health determinants and outcomes in different parts of Multnomah County.

The majority of this research has also highlighted that the benefits and burdens of transportation decisions have fallen unequally on different sub-groups within communities. As a result, many transportation decisions to date have inadvertently supported or exacerbated health inequities.

As a result of the increasing awareness of the connections between transportation systems, health, and equity, transportation plans must provide an opportunity to address historical inequities and improve the health and well-being of all its community members. An increasing number of state, regional, and local transportation plans are acknowledging these connections by including goals and metrics that mention both health and equity. Locally, this trend is evident in the inclusion of health and equity policies and goals in Metro’s Regional Transportation Plan and in Clackamas County’s recently updated TSP. In Multnomah County, the cities of Portland and Gresham are working on including similar policies and goals into their Comprehensive Plan and TSP updates. Multnomah County itself has addressed equity and health, by including criteria in the County’s Capital Improvement Plan and Program.

Water Transport

Water transport is a significant freight resource in Multnomah County due to the Willamette River and the ports along its length. This additional option for transporting freight reduces the number of trucks

¹ American Public Health Association. (2009). *At the Intersection Of Public Health And Transportation*. Washington, DC: American Public Health Association.

and trains needed on land to support the county's economy and has a significant impact on the transportation system. Future projects and policies looking forward must work together with water transport to not interfere with this important mode of freight transportation.

Wildlife Crossings

There are concerns from the County and its residents about the impacts to wildlife due to transportation improvements, specifically due to widening of roadways. Road and shoulder widening projects can disturb wildlife habitat, widen wildlife crossing distances, and increase vehicle volumes and speeds on the roadway further increasing the challenge of crossing roadways for wildlife. The County, as part of this process, has started collaborating with Metro and other agencies to identify key wildlife corridors and select studies and data that can lead to developing design standards in the future that minimize impacts of transportation improvements on wildlife.

Metro has a literature review on wildlife corridors and permeability, specifically addressing trail effects and road effects, including noise and artificial light. These issues are described in more detail in Metro's Wildlife Crossings Guidebook. The Portland-Vancouver Regional Conservation Strategy can help identify fish, wildlife, and habitat locations and provide information about natural resources. Additionally, local and state development regulations can be examined including Clean Water Services, City of Portland Bureau of Environmental Services, Clackamas County Water Environment Services, Division of State Lands, and city tree regulations.

POPULATION AND DEMOGRAPHICS

Information about the rural area population and demographics was gathered to support the existing and future conditions analysis, particularly in working with the public to develop and evaluate transportation scenarios that capture the County's vision.

For further information on land use and population, please see the "Population Demographics, Zoning, and Development" section of the Baseline Report memo, Appendix B, prepared for the Comprehensive Plan Update by Angelo Planning Group dated December, 2014.

Population and Growth

As shown in Table 1 reports the population of Multnomah County and its sub-areas. Multnomah County's population in 2010 was just over 735,000 whereas the 2000 Census figure was 660,446. The county grew by 11.3%, or about 1.08% per year, from 2000 to 2010. This growth follows a similar trend to that experienced by the overall State of Oregon, which grew by 11.97%, or about 1.14% per year, during the same period. Appendix B provides more details on population and growth.

Table 1 Year 2010 Area Populations

Area	2010 Census
Multnomah County	735,334
East of Sandy River	3,926
West of Sandy River	10,184
West Hills	10,052
Sauvie Island	888

Source: 2010 Census Block Group Data

Family and Household Data

Figures 2A and 2B show the existing household density represented by households per acre. Additional information can be found in Appendix B.

Future Employment and Household Projections

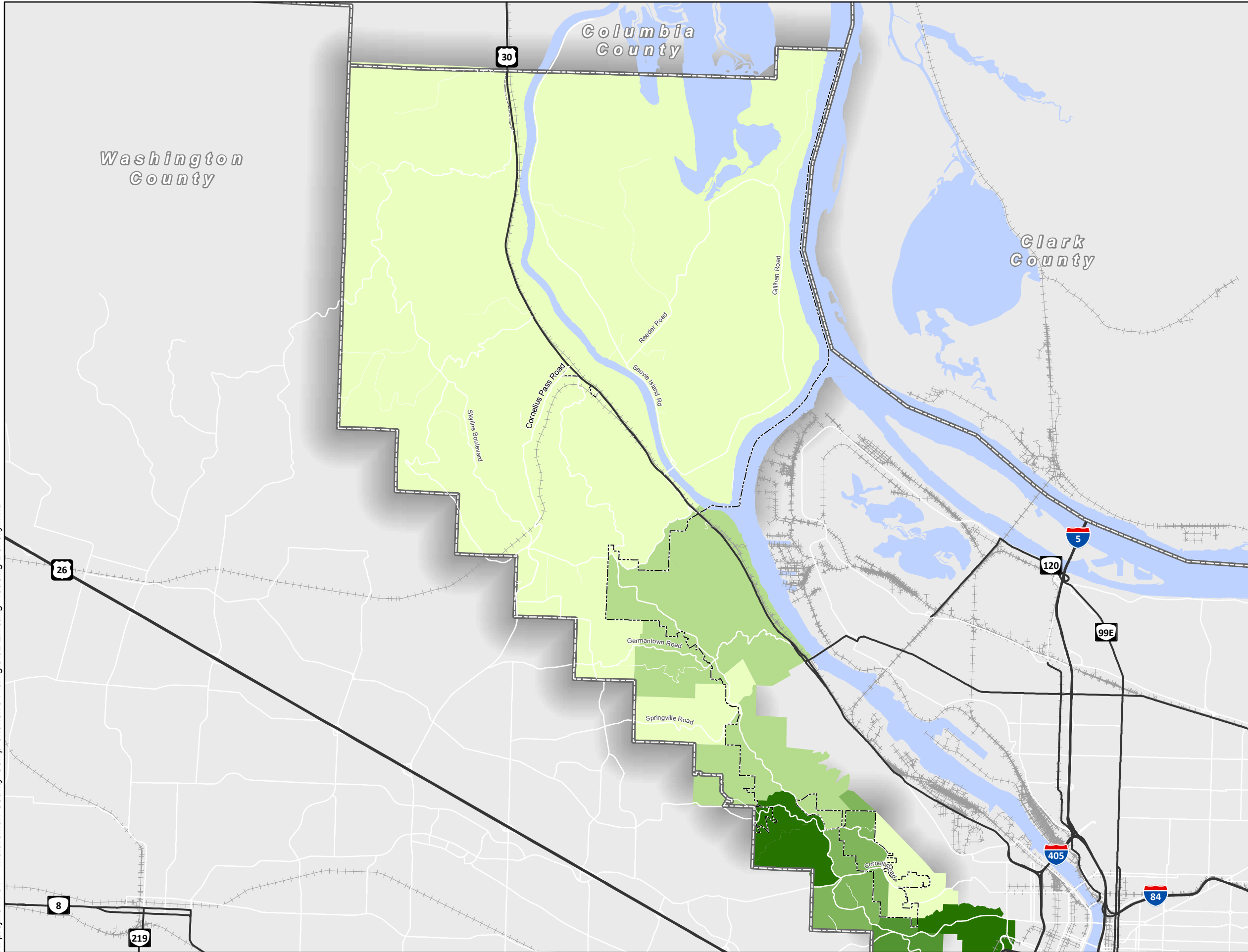
Metro provided information about anticipated employee and household growth in Multnomah County's unincorporated areas. This information is summarized in Table 2. Employment is projected to grow at approximately 3.5 percent per year from 2010 to 2040. Households are projected to grow at about 3.2 percent per year from 2010 to 2040. However, these projections include both the urban and rural areas of unincorporated Multnomah County.

Table 2 Employee and Household Projections for Unincorporated Areas in Multnomah County

Year	2010	2025	2035	2040	2010-2040 Growth	Annual % Growth
Employees	3,961	5,866	7,170	8,100	4,139	3.48%
Households	4,911	6,555	7,092	9,579	4,668	3.16%

Minimal increases in jobs and housing are projected for the majority of the East County rural areas with the exception of moderate projected growth in households and employment in the western portions of the West of Sandy River area. In West County, Sauvie Island is projected to have moderate growth in employment and the northern portion of the West Hills Rural Area is projected to have moderate growth in both employment and households.

H:\profile17944 - Multnomah County Comprehensive Plan\gis\02 Existing Housing Density.mxd



Comprehensive Plan

Figure 2A
Existing Household
Density

Existing Housing Density / Housholds per Acre by TAZ

- 0.00 - 0.07
- 0.08 - 0.16
- 0.17 - 0.60
- 0.61 - 2.03
- 2.04 - 4.52

Plan Areas

County Boundaries

0 0.5 1 2 Miles



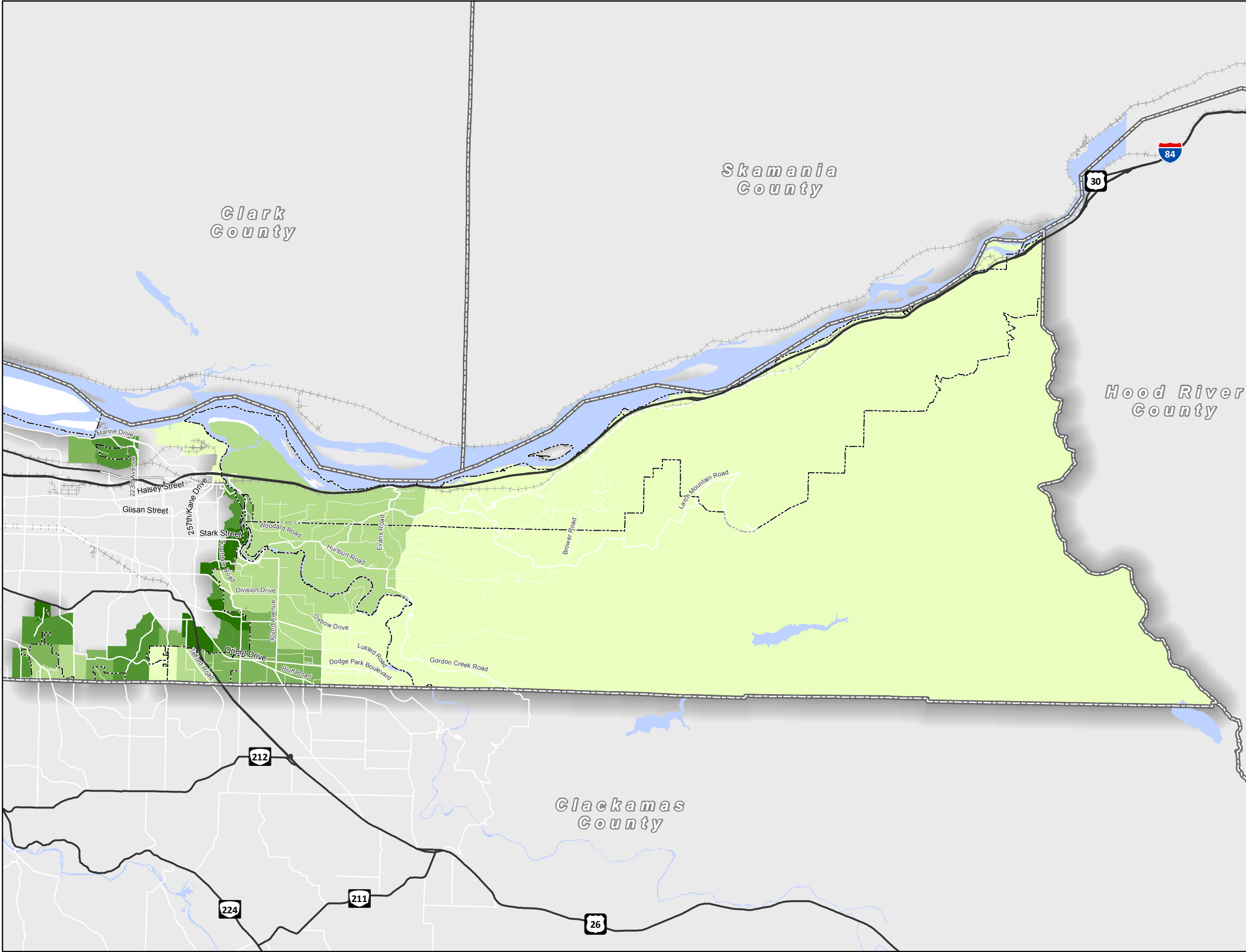
Prepared By:
Kittelsohn & Associates, Inc.

Date:
2/18/2016

Coordinate System:
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H:\profile\17944 - Multnomah County Comprehensive Plan\gis\02 Existing Housing Density.mxd



Comprehensive Plan

Figure 2B
Existing Household
Density

Existing Housing Density / Households per Acre by TAZ

- 0.00 - 0.07
 - 0.08 - 0.16
 - 0.17 - 0.60
 - 0.61 - 2.03
 - 2.04 - 4.52
- Plan Areas
- County Boundaries

0 1 2 4 Miles

Prepared By: Kittelson & Associates, Inc. Date: 2/18/2016

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Land Use and Zoning

The majority of the rural areas of Multnomah County are zoned for agricultural and forest uses. Rural residential and single family residential makes up most of the rest of the lands with little commercial and industrial development in the rural areas. For further information see Appendix B.

Key Destinations and Community Centers

Many of the key destinations and community centers in the rural areas are schools. Sauvie Island has public beaches as well as farm lands that attract visitors with corn mazes, pumpkin patches, and fresh produce for sale. East County has a number of key destinations in National Forest, National Scenic Area and State parks including but not limited to recreation areas in the Mount Hood National Forest, Sandy River Delta Park, Multnomah Falls, Mt. Hood National Forest, and the Columbia River Gorge Scenic Area. Figures in Appendix B (4A and 4B) show key destinations and community centers in the study area.

STREET SYSTEM AND TRAFFIC ANALYSIS

Primary roadway facilities, their characteristics, and existing operational performance are summarized below for each of the study areas.

Roadway Jurisdiction

As shown in Figures 3A and 3B, all roadways in rural Multnomah County, except interstates, highways and the Historic Columbia River Highway, are operated and maintained by the county.. The state facilities within Multnomah County provide interstate, statewide, and regional connectivity. These facilities include Interstate 84 (I-84), Oregon Highway 30 (US 30), Historic Columbia River Highway through the Columbia River Gorge (travelling east from Sandy River), and a small section of Oregon Highway 26 (US 26). Highway 30 provides access to both the west and east sides of the county. I-84 serves the east area of the county.

Existing Traffic Volumes

Average annual daily traffic on roadway segments throughout the study area are shown in Figures 4A and 4B. As shown, the majority of the roadways carry less than 1,000 vehicles per day on average. As expected, the arterial roadways, such as Cornelius Pass Road, SE Foster Road and Troutdale Road carry higher volumes of traffic.

From the Sauvie Island and Multnomah Channel TSP update, average daily traffic volumes on most of the roadways throughout Sauvie Island are less than 3,000 vehicles per =. The popularity of the beaches, hunting and fishing areas, recreational cycling opportunities, seasonal festivals, and agri-tourism activities lead to significant fluctuations in average daily traffic volumes during the peak

seasons, typically occurring in the summer and fall. During these times, the Sauvie Island Road can have as many as 17,000 vehicles per day. The peak traffic conditions are a result of both seasonal all-day events (such as access to public beaches and pumpkin patches) as well as limited duration events (such as concerts and farm-to-table dinners).

ODOT records annual average daily traffic (AADT) volumes on all state highways. Traffic volumes on ODOT facilities in Multnomah County have generally followed the overall state trends related to decreases during the recession and an increase since 2011. Volumes on US 30/St. Helens Road through West County have gone down since 2006 and are still at levels lower than recorded in 2007. Overall growth between 2003 and 2013 has averaged to less than one percent per year on US 26 and I-84 in East County. Appendix B provides a table with more details on the historical AADT.

Future Traffic Volumes

ODOT provides information about future anticipated growth on all state facilities. A discussion of the future traffic volumes can be found in Appendix B. Due to regional population growth and continued housing development in adjacent urban areas, traffic volumes on rural County roads are anticipated to continue to increase.

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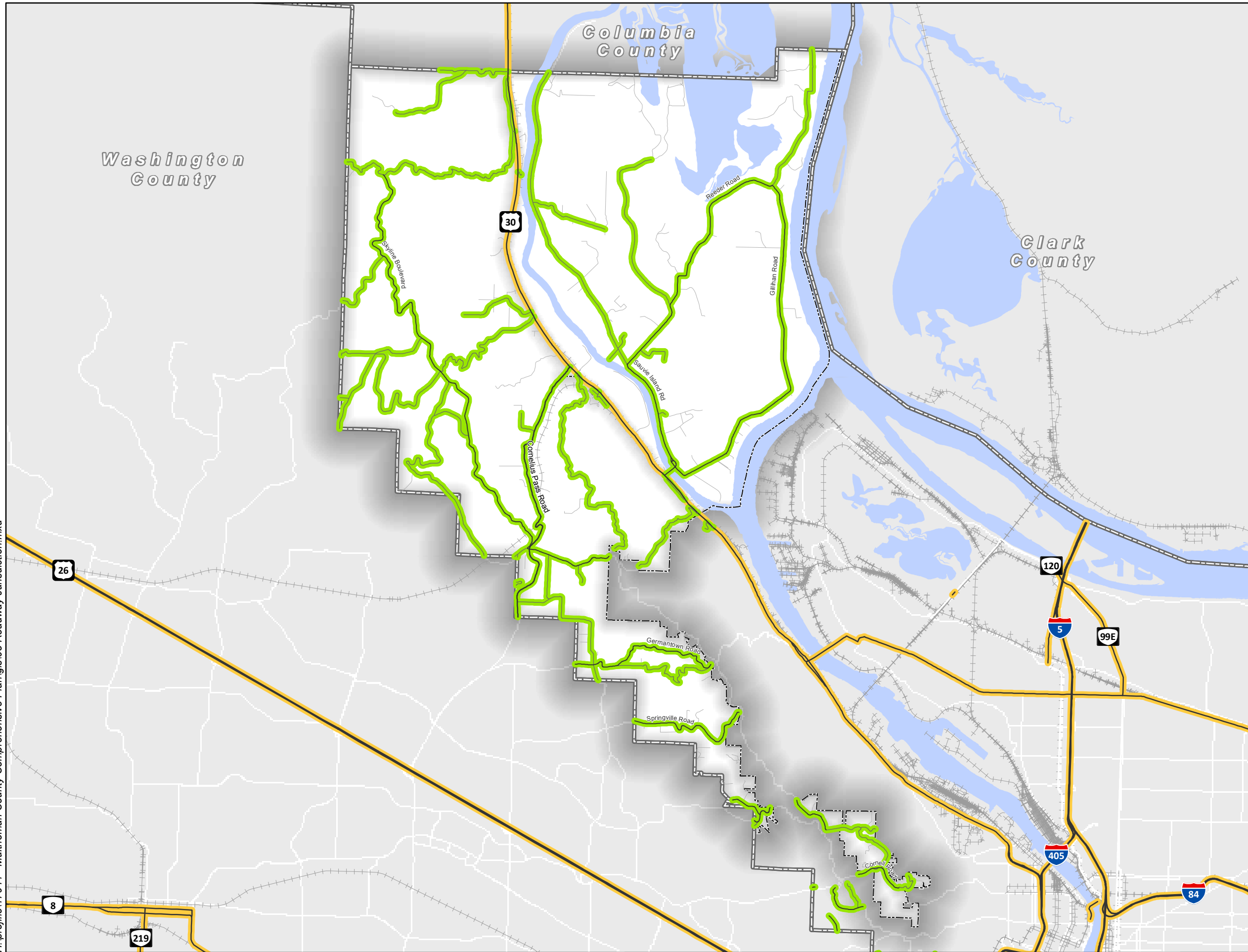


Figure 3A
Roadway Jurisdiction

-  Multnomah County Roadways
-  ODOT Roadways
-  Local Roads (not maintained by county)
-  Plan Areas
-  County Boundaries

0 0.5 1 2 Miles



Prepared By: Kittelson & Associates, Inc. **Date:** 2/18/2016

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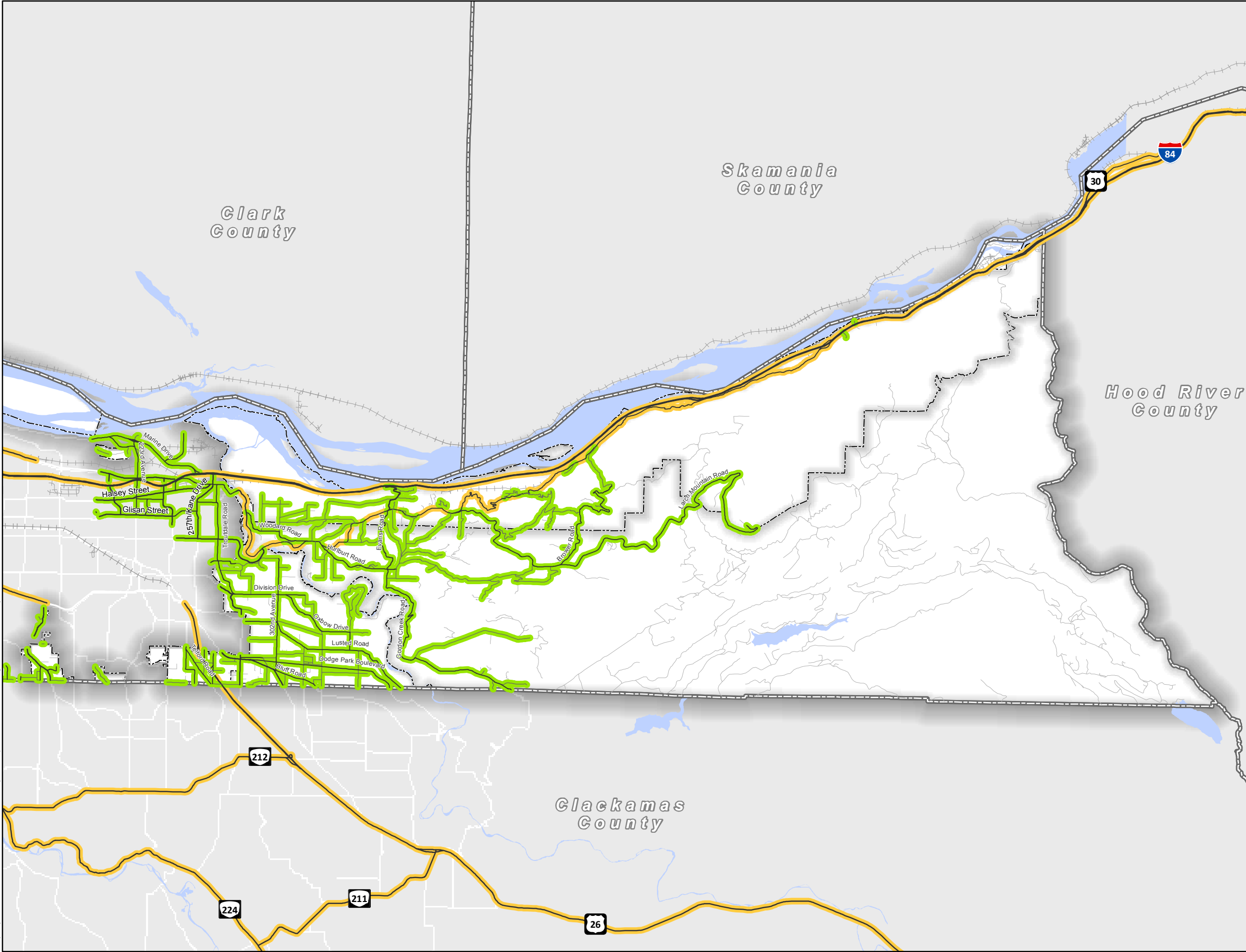
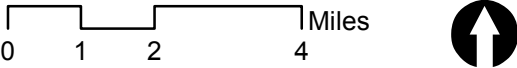


Figure 3B
Roadway Jurisdiction

-  Multnomah County Roadways
-  ODOT Roadways
-  Local Roads (not maintained by county)
-  Plan Areas
-  County Boundaries

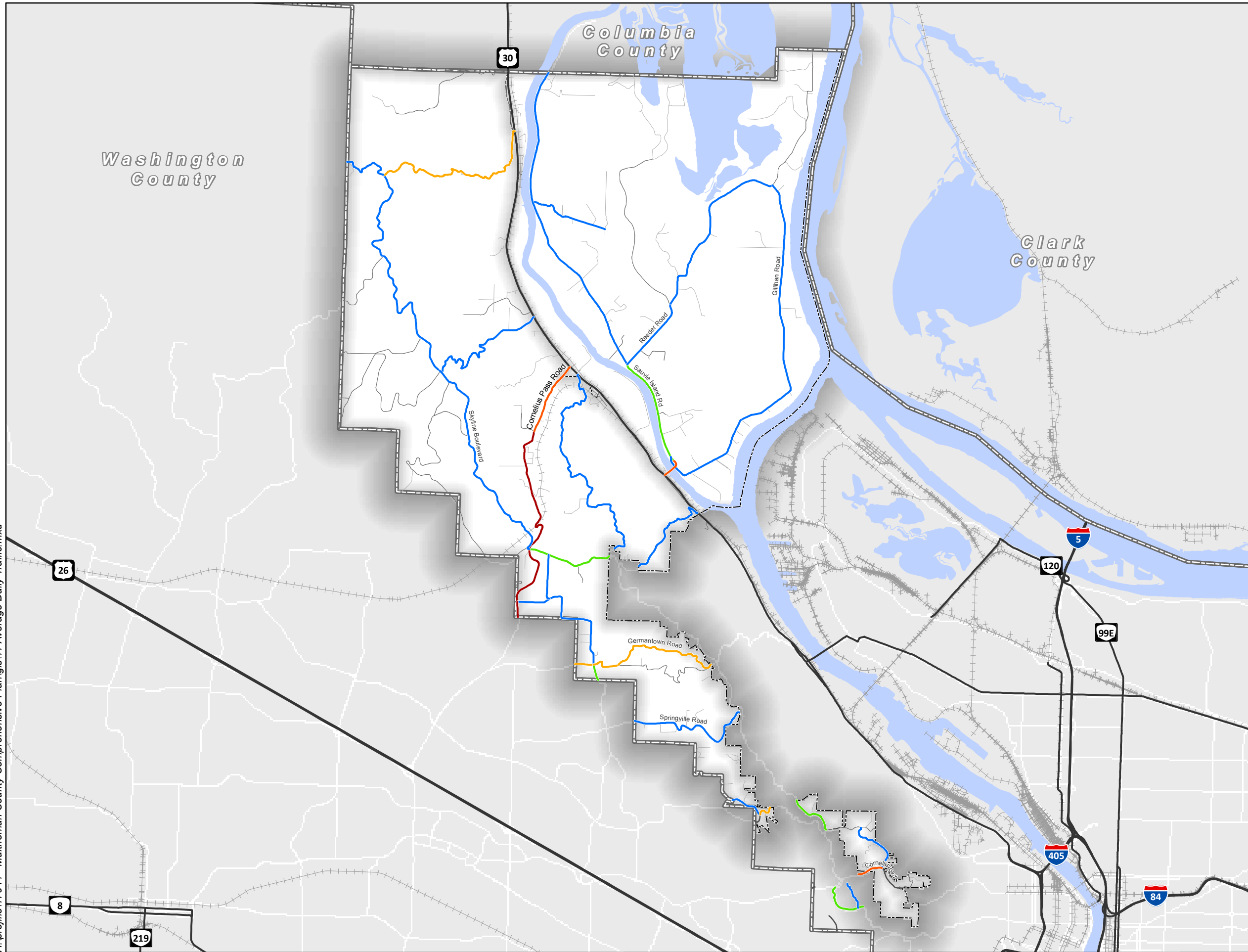


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Comprehensive Plan

Figure 4A
Average Daily Traffic

Average Daily Traffic
(records from 2006 to 2014)

- <1,500
- 1,500 - 3,000
- 3,001 - 5,000
- 5,001 - 10,000
- >10,000

- Plan Areas
- County Boundaries

0 0.5 1 2 Miles

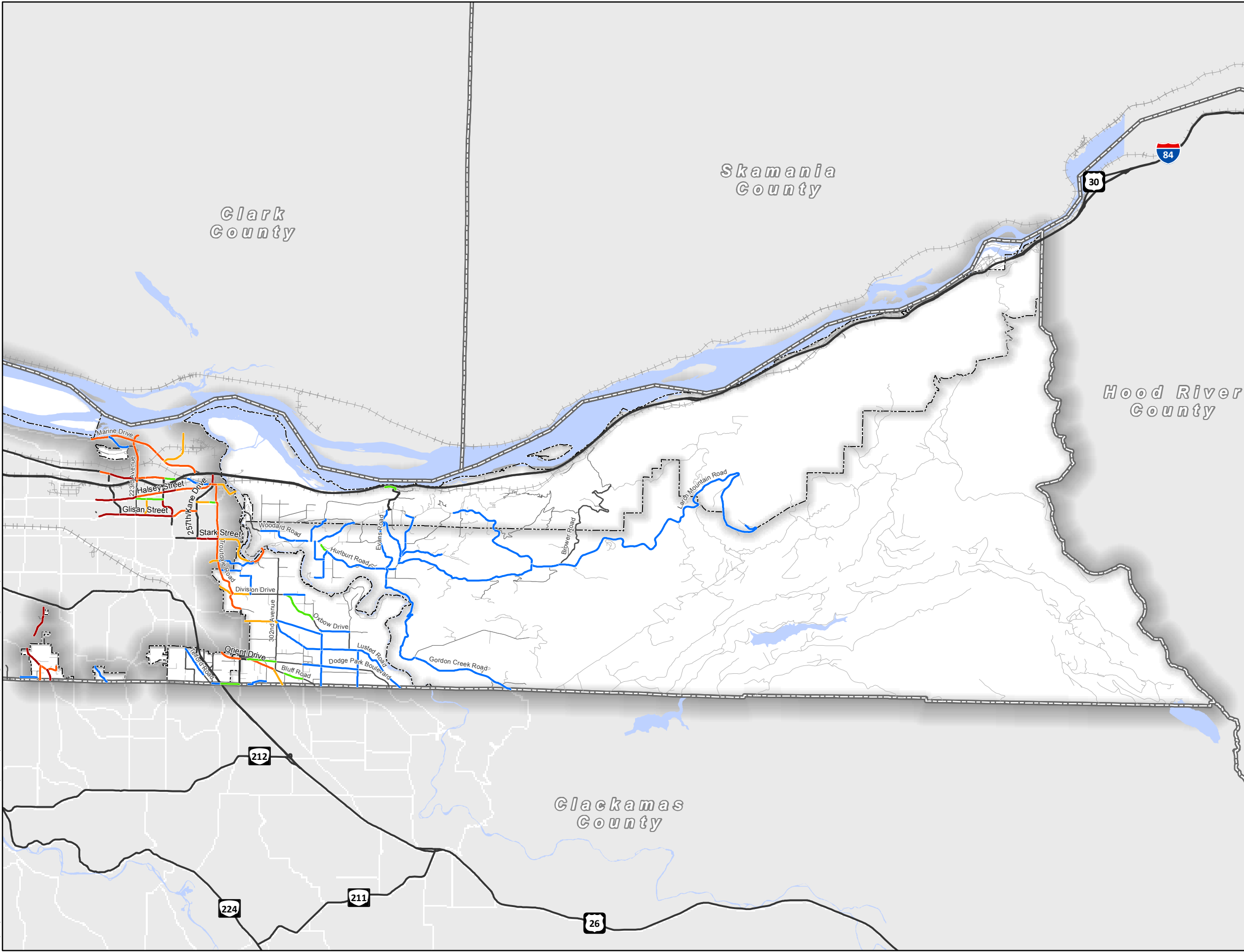


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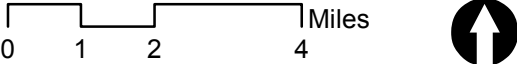
Comprehensive Plan

Figure 4B
Average Daily Traffic

Average Daily Traffic
(records from 2006 to 2014)

- <1,500
- 1,500 - 3,000
- 3,001 - 5,000
- 5,001 - 10,000
- >10,000

- Plan Areas
- County Boundaries



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HISTORIC CRASH ANALYSIS

Crash data from the latest five years (January 1, 2009 through December 31, 2013) was obtained from ODOT for all State and County roadways within the study areas.

County Crash Patterns

A total of 1,403 crashes were reported in in the study areas between 2009 and 2013. Of the 1,403 crashes, 401 were reported on I-84.

Table 3 summarizes the reported crashes by severity. Half of the reported crashes involved an injury, and 24 crashes involved a fatality. Of the fatal crashes, 14 were reported as a fixed object crash. The second most common crash type reported for fatalities was head-on collisions. One fatality was the result of a collision between a pedestrian and motor vehicle. This crash occurred under dark light and wet road conditions. The report states the pedestrian was in the roadway illegally and wearing non-visible clothing. The majority of the fatal crashes occurred in clear weather, on dry roads, and in the daylight. Excessive speed was reported in 10 of the 24 fatal crashes.

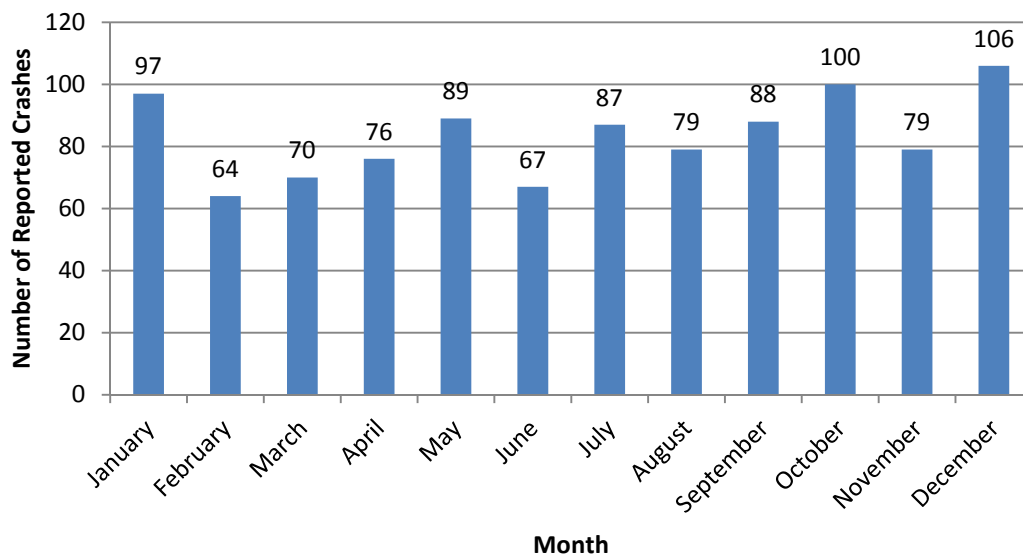
Figures 5A and 5B provide the location of each of the recorded crashes in the study areas. As shown, many of the recorded crashes occurred along I-84 and US 30, as well as key arterials such as Cornelius Pass Road, Skyline Boulevard, Germantown Road, and Corbett Hill Road.

Table 3 Reported Crashes by Severity in Multnomah County Rural Areas (2009 – 2013)

	Crash Severity			Total
	Fatal	Injury	Property Damage Only	
Number of Reported Crashes	24	511	467	1,002
Percentage of Total Crashes	2%	51%	47%	100%

Seasonal Trends

To understand any possible weather and/or seasonal trends, Exhibit 1 shows the number of crashes reported by month over the five year period.

Exhibit 1 Reported Crashes by Month (2009-2013)

As shown in Exhibit 1, the highest crash frequency occurred during late fall winter months, from October through January. Winter months in Multnomah County can include inclement weather conditions producing wet, icy, and/or snowy conditions. Further review of crashes in October, November, December, and January (382 crashes) indicate that 60% (228 crashes) occurred on roadway surfaces that were wet, icy, or snow-covered. Additionally, 55% (210 crashes) occurred in dark, dawn, or dusk lighting conditions.

Crash Type Analysis

Over the study period, 54% of crashes (537 crashes) were single vehicle crashes including fixed object, overturn, and non-collision crashes. Speed was a contributing factor in one-third (327 crashes) of all crashes. Over 40% (409 crashes) occurred on roadway surfaces that were wet, icy, or snow-covered. Forty-two percent (417 crashes) occurred in dark, dawn, or dusk lighting conditions.

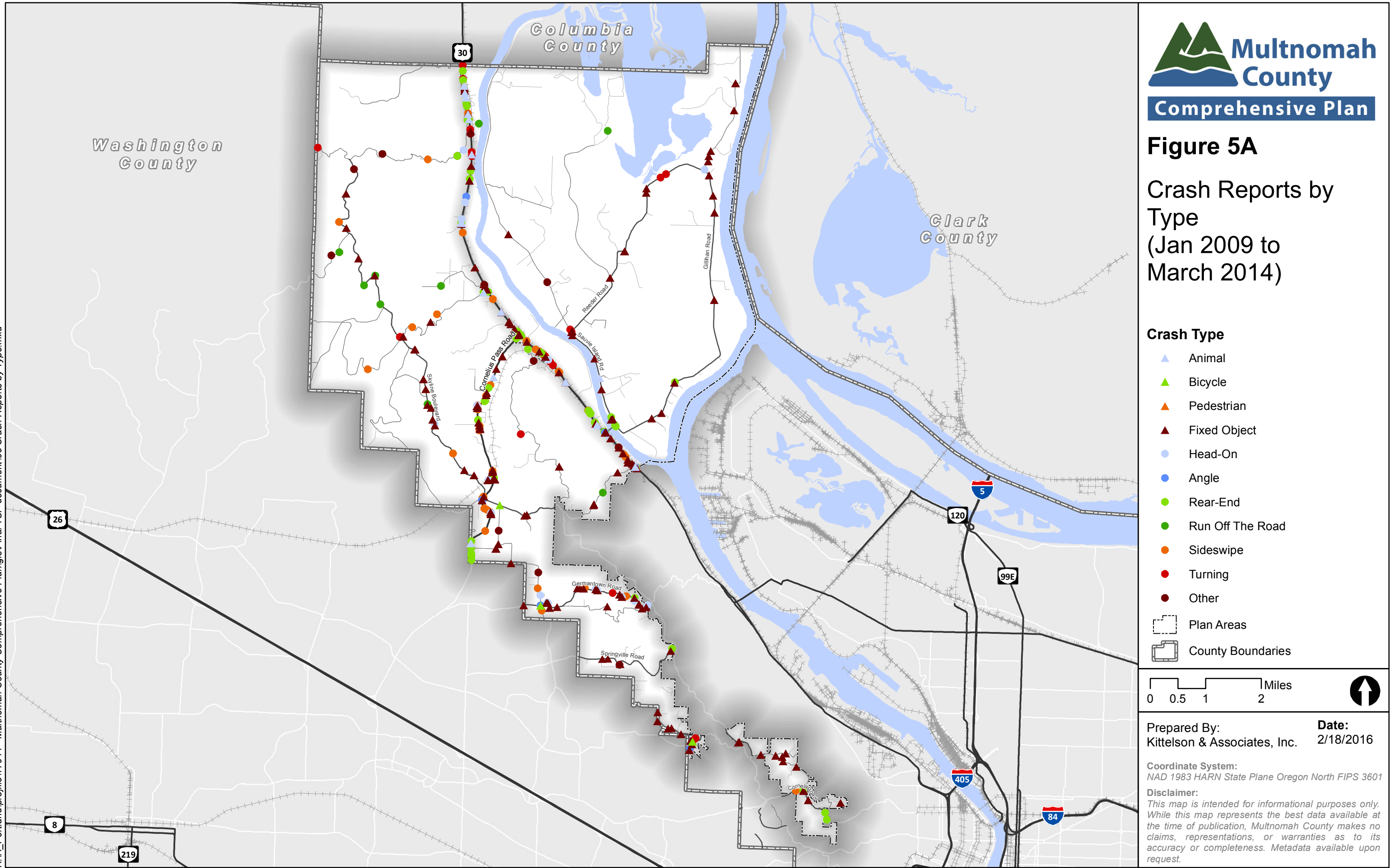
Four pedestrian crashes were reported in the study period with one resulting in a fatality. The fatality occurred in dark, rainy conditions. The report states the pedestrian was in the roadway illegally and wearing non-visible clothing. The pedestrian crashes occurred at the following locations:

- US 30 – 2,000 feet south of Watson Road
- Lusted Rd – 3,300 feet from Cottrell Road
- Hurlburt Rd – 260 feet east of Kimbley Rd (west access)
- Haines Road and Thompson Mill Road

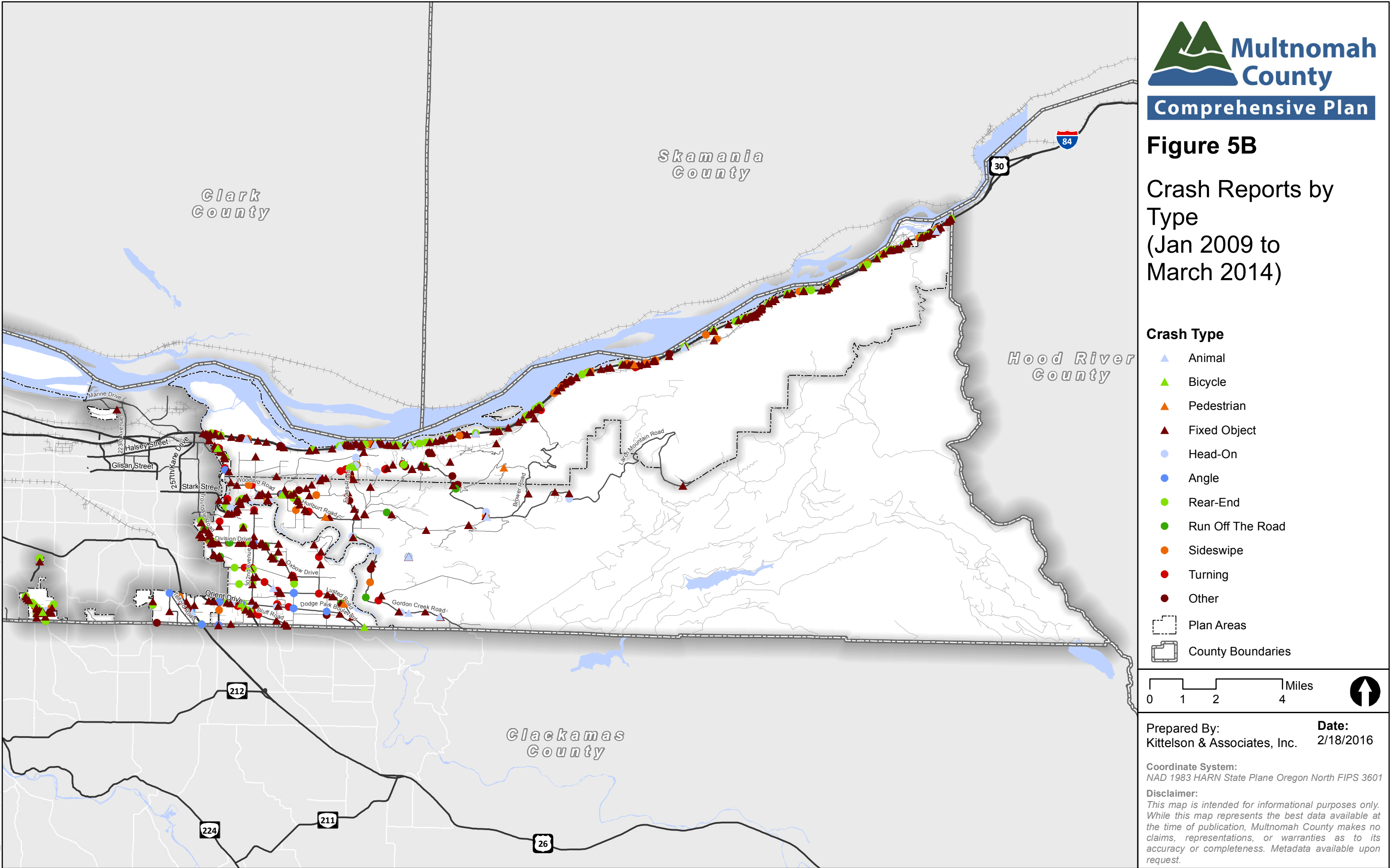
Eleven bicycle crashes were reported in the study period all resulting in non-fatal injuries. All but one crash occurred under clear weather conditions, dry road surface, and in the daylight. The majority (seven) of the crashes were attributed to not yielding to the right-of-way. The other causes were following too closely, non-motorist illegally in the roadway, and other improper driving. The bicycle crashes occurred at the following locations:

- Skyline Boulevard and Brooks Road
- Laidlaw Road and Thompson Road – two crashes occurred here
- HCRH and Crown Point Highway – two crashes occurred here
- Foster Road and Richey Road
- Lusted Road 2,000 ft north of Dodge Park Boulevard
- Lusted Road at Sam Barlow High School
- HCRH – 400 feet west of Lucas Road
- Dodge Park Boulevard and Short Road
- HCRH and Evans Road

K:\H_Portland\profile17944 - Multnomah County Comprehensive Plan\gis\Final TSP document\05 Crash Reports by Type.mxd



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Source: Oregon Department of Transportation Crash Reports from January 2009 to March 2014

Intersection and Segment Crash Analysis

In addition to the countywide data, ten locations, four intersections and six segments within the study areas, were analyzed and compared to statewide averages for similar facilities, when possible.

Intersection Crash Rates

Reported crashes at four key intersections are summarized in Table 4. Intersection exposure was measured in terms of total entering vehicles (TEV), derived from the link volumes data. To provide a basis of comparison, ODOT identifies 90th percentile crash rates for similar facilities in the Analysis Procedures Manual, (Reference 1). As shown, all of the study intersections reported higher crash rates than ODOT's 90th percentile crash rates for the respective intersection type.

Table 4 Reported Crashes at Study Intersections

Intersection ID and Name	# of Crashes	TEV (in millions)	Crash Rate	90 th Percentile Crash Rates	Crash Type						Severity		
					Angle	Rear-End	Turning	Ped/Bike	Fixed-Object	Other	PDO	Injury	Fatality
A - Reeder Road/Sauvie Island Road	6	4.95	1.21	0.475	0	0	2	0	4	0	3	2	1
B - Foster Road/172 nd Avenue	25	17.82	1.40	0.475	0	14	8	0	2	1	6	19	0
C - Foster Road/Richey Road	10	17.82	0.56	0.475	1	2	1	0	4	2	5	5	0
D - Orient Drive/282 nd Avenue	17	13.78	1.23	0.579	3	6	6	0	2	0	9	8	0

¹TEV = Total entering vehicles

²PDO = Property damage only

³Crash Rate = Crashes per million entering vehicles

One fatality occurred at the study intersections above. It was a single-vehicle, fixed-object crash that occurred at the Reeder Road/Sauvie Island Road intersection. It occurred in the rain, with wet road surface, and in the dark. Speeds too fast for conditions were a contributing factor.

Segment Crash Rates

Reported crashes along study roadway segments are summarized in Table 5. Exposure on the segments was measured based on average daily traffic (ADT) volumes from available link volume data. ODOT publishes statewide average roadway segment crash rates for the past five years for urban and rural areas, by functional classification. The statewide average roadway segment crash rates for rural minor collectors are provided in Table 5 for comparison to calculated crash rates for highways in the study areas. As shown, all of the study segments reported higher crash rate than the state average crash rates for the respective functional classification.

Table 5 Reported Crashes at Study Roadway Segments

ID	Segment Name	Segment Boundaries	Segment Length (miles)	Number of Crashes	ADT	Crash Rate (2009 – 2013 average)	State Average	Crash Type		Severity		
								Fixed-Object	Other	PDO	Injury	Fatality
E	Germantown Road	Between Skyline Road and Old Germantown Road	2.0	25	4800	2.85	1.30	14	11	12	11	2
F	Skyline Boulevard	From ½ miles north of Rock Creek Road to ¼ miles south of Rock Creek Road	1.25	8	1340	3.27	1.30	6	2	1	7	0
G	Corbett Hill Road	Between I-84 and Historic Columbia River Highway	1.4	29	2520	6.32	0.71	6	23	12	17	0
H	Lusted Road	¼ of a mile east starting 1/3 of a mile east of Cottrell Road	0.25	7	650	5.90	1.30	4	3	3	3	1
I	Hurlburt Road	From Springdale School to Kimbley Road (East)	1.5	11	1490	4.05	1.30	5	6	4	7	0
J	Stark Street	Between 36 th Street and Historic Columbia River Highway	1.3	21	5410	2.13	0.71	12	9	8	11	2

Findings from the study intersection and segment crash analysis indicate the following:

- Corbett Hill Road, which is an arterial connecting to I-84, has the highest crash frequency among the study segments.
- The intersection of Reeder Road and Sauvie Island Road has the highest crash frequency among the study intersection.
- Over 46% of reported crashes along the studied intersections and segments areas occurred on a wet, icy, or snowy roadway.
- Over a third (52 crashes) of the crashes recorded at the study intersections and segments indicated speeding or speed too fast for conditions as a contributing cause.
- Of the six fatal crashes on the study segments, five were fixed object crashes with four of attributing speed too fast for conditions or speeding as a contributing factor. The other fatal crash involved a pedestrian who was in the roadway illegally.

- Four pedestrian and bicycle crashes were reported at the study intersections and segments throughout the five year analysis period, one of which was fatal and described above. Three of the four crashes occurred with clear weather conditions, on dry roadways, in the daylight. The two reported causes were “did not yield right-of-way” and “non-motorist illegally in roadway.”
- Among the injury crashes, the majority were single-vehicle crashes. Speed was a contributing factor in approximately half of the reported injury crashes. Over half of the injury crashes occurred with some sort of precipitation on the roadway.

Both the County’s policies and stakeholder feedback identify the importance of improving safety for all transportation system users in Multnomah County.

Crash data from 2007 through 2013 was obtained from ODOT and reviewed to establish a baseline for identifying potential safety-related improvements. This review revealed the following:

- There were four pedestrian crashes reported in the study area. One of these crashes resulted in a fatality.
- There were eleven bicycle crashes reported in the study area. All resulted in non-fatal injuries.
- 54% of crashes were reported as fixed object/run off the road/overtake single vehicle crashes.
- There were 24 recorded fatal crashes.
 - 14 of these crashes were reported as a fixed object crash.
 - The second most common crash type reported for fatalities was head-on collisions.
 - Excessive speed was reported for 10 of the fatality crashes.
- Areas with a pattern of crashes include:
 - I-84
 - US 30
 - Cornelius Pass Road
 - Skyline Boulevard
 - Germantown Road
 - Corbett Hill Road
 - Reeder Road/Sauvie Island Road intersection

Stakeholder interviews and reviewed documents identified other safety concerns related to the multiple crossings of the railroad that runs north-south between US 30 and the Multnomah Channel on Sauvie Island. These concerns primarily relate to the lack of active crossing measures, such as gates and flashing lights at these crossings. These interviews also identified “perceived safety” as an issue that

concern community members. The discussion revolved around near misses, perceived unsafe driving conditions and behavior, and other factors that cannot be recorded in crash reports and statistics.

Additional road segments and intersections were identified as areas that could benefit from a separate safety study. These areas include:

- US 30
- Skyline Boulevard
- Lusted Road
- Corbett Hill Road
- Hurlburt Road
- Gillihan Road/Reeder Road intersection
- Sauvie Island Road/Reeder Road intersection

PUBLIC TRANSPORTATION SYSTEM

Three transit agencies serve Multnomah County's rural areas, including TriMet, Columbia County Rider, and Sandy Area Metro. The highlights of this service include:

- TriMet primarily serves Portland Metro urban areas but has transit stops located near the perimeter of several of the County's rural areas including the West Hills, Sauvie Island, Troutdale and Gresham.
- TriMet has a Park-and-Ride located on Sauvie Island and several in Gresham that could serve residents of East County.
- Columbia County Rider has a route along Highway 30 but it does not currently stop on Sauvie Island but may in the future.
- Sandy Area Metro has a route along Highway 26 in the West of Sandy River area.

The County's rural areas are not served by fixed route transit; however, fixed route transit and park-and-ride facilities are provided at the urban fringes to help provide access to commuters from rural areas.

Figures in Appendix B (16 A and 16B) show the transit routes, stops, centers, and park n' ride locations in and near the rural areas.

RAIL

The Portland and Western railroad has two routes through the west side of the County, one going up the West Hills and the other along Highway 30. Union Pacific has a route on the east side of the County that follows I-84. The majority of the railroad crossings throughout the rural areas are private crossings

(crossings of private roads, driveways, and accesses). There are two public County owned crossings in the Multnomah Channel area; one at-grade crossing located on Lower Rocky Point Road on the east side of Highway 30 and one grade-separated crossing on NW McNamee Road. Figures in Appendix 2 (14A and 14B) depict the railroads traversing Multnomah County as well as the locations of public and private railroad crossings in the rural areas.

AIR TRANSPORTATION SYSTEM

The Sandy River Airport is the only public airport located in the study areas. In addition, Lehman Airport is a private airport located three miles southeast of Corbett. Troutdale Airport also provides service in the area located ten miles east of the central business district of Portland. Portland International Airport serves most air passenger and freight transportation needs for Multnomah County.

WATER

The Columbia River and Willamette River are both used currently to transport goods locally and internationally. Water transport remains a significant resource in Multnomah County due to the number of existing and potential ports along its length. This option for transporting freight reduces the number of trucks and trains needed on land to support the county's economy and has a significant impact on the transportation system.

EXISTING CONDITIONS AND FUTURE NEEDS SUMMARY

The key highlights of the existing and future conditions are summarized below.

- The primary transportation issue in Multnomah County's rural areas is safety. Identifying and prioritizing safety improvements will be a primary objective of the TSP Update.
- General County-wide trends indicate that some low-cost systemic treatments such as shoulder widening in select locations and installation of centerline and shoulder rumble strips may be effective on County facilities in addition to treatments addressing speed and improving intersections with poor geometry.
- Paved shoulders serve multiple functions in rural areas. They increase safety for vehicles, provide space for farm equipment and emergency pull-offs, but they also act as pedestrian and bicycle facilities. The needs and priorities for shoulder improvements for vehicle safety should also be coordinated with additional considerations below and balanced with potential environmental and wildlife impacts.
- Despite the lack of shoulder bikeways, many of the County's rural roadways are popular cycling routes. A desired network and priorities of shoulder bikeway facilities for the purpose of transportation and tourism should be included in the TSP Update.
- The County's rural areas are not served by fixed route transit; however, fixed route transit and park-and-ride facilities are provided at the urban fringes to help provide access to commuters from rural

areas. Access to these park-and-rides for pedestrians and bicycles should be considered in the TSP Update.

- Multnomah County has a number of designated freight routes extending into the rural areas from the ODOT freight routes. These should be considered in the prioritization of shoulder improvements.
- Multnomah County should continue to support the movement of freight via air, rail, and water through ensuring access to intermodal facilities to reduce the number of trucks on the roadways.
- Population and employment in the rural areas is expected to grow at approximately 3 – 3.5 percent per year. Although not projected to result in traffic congestion in the rural areas, concerns about increasing traffic volumes on rural road remains. Additionally, this growth will continue to have impacts on safety and conflicts between different modes.

Section 3
Range of
Solutions

RANGE OF SOLUTIONS

Solutions to address the primary existing and future Multnomah County transportation issues and needs in the rural areas fall into four general categories: bicycle and pedestrian facilities, safety, signage and signal treatments, and transportation demand management.

Table 6 summarizes the solutions that are included in the TSP. The following pages provide additional information on each of the solutions.

Table 6 Potential Solutions Summary Table

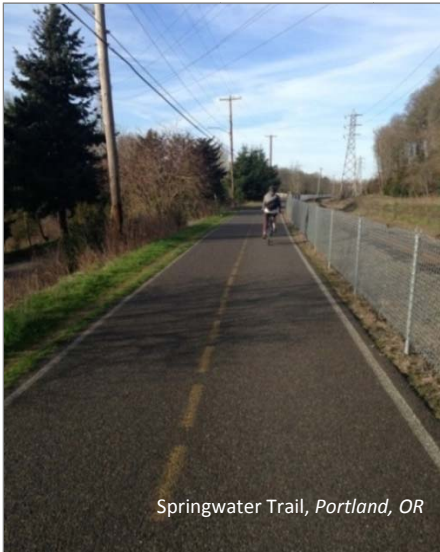
Reference Number	Potential Solutions
Bicycle and Pedestrian Facilities	
BPF-1	Multi-use path
BPF-2	Advisory bike lane
BPF-3	Buffered shoulder bikeway
BPF-4	Shoulder bikeway
BPF-5	Shared lane roadways
BPF-6	Bicycle pullout
BPF-7	Bicycle climbing lane
BPF-8	Bike map
BPF-9	Pedestrian shoulder
BPF-10	Pedestrian path (sidepath)
Safety	
SA-1	Rumble strips
SA-2	Increased shoulder width
SA-3	Curve improvements
SA-4	Rural intersection improvements
SA-5	Railroad crossing improvements
Signage and Signal Treatments	
SI-1	Wayfinding signage
SI-2	Warning/advisory signs
SI-3	Speed limit signs
SI-4	Signal Controller/Timing Plans
Transportation Demand Management	
D-1	User-generated parking information
D-2	Real-time parking information
D-3	Pricing parking permit
D-4	Parking enforcement
D-5	Park-n-ride lots
D-6	Shuttle service
D-7	Event permit calendar
D-8	Event-based "TDM" plan

The following pages serve as a toolbox of information on the four categories of solutions in Table 6. Each solution has one page describing the solution, pros, cons, applicability to the TSP area, and other information.



Bicycle and Pedestrian Facilities

MULTI-USE PATH



Springwater Trail, Portland, OR



Orlando, FL

Multi-use paths are paved, bi-directional trails separated from roadways that serve both pedestrians and bicyclists. Multi-use paths increase the safety and comfort level of the user. They play an integral role in recreation, commuting, and accessibility due to their appeal to users of all ages and skill levels.

TSP Area Applicability

Several roadways in Multnomah County could benefit from a multi-use path including Burlington Northern Trail in the West Hills and the main loop road on Sauvie Island that consists of Sauvie Island Road, Reeder Road, and Gillihan Loop Road. Multi-use paths would improve accessibility for residents and increase safety for all users including recreational cyclists.

Pros

- Provides facility for both pedestrians and bicyclists in less space than separated facilities.
- Providing separation from motor vehicles can attract pedestrians and cyclists of all ages and abilities.
- Would improve accessibility for residents and increase safety for all users including recreational cyclists.

Cons

- May result in conflicts between modes in areas with frequent crossings or driveways.
- May result in conflicts between bicyclists and pedestrians.
- When parallel to roadways, the path must be buffered from motorists which requires substantial right-of-way.
- Speed differentials between more experienced cyclists and slower cyclists and pedestrians can cause conflicts on a shared facility.

Design Considerations

- Best suited in areas where roadway crossings can be minimized (such as parallel to travel barriers such as highways, railroad tracks, rivers, shorelines, natural areas, etc.). High-visibility treatments are needed at path crossings.
- Can be parallel to a roadway or on its own right-of-way.
- A minimum width of 10 feet is recommended for low-pedestrian/bicycle-traffic contexts and would be appropriate for some areas of the county; 12 to 20 feet should be considered in areas with moderate to high levels of bicycle and pedestrian traffic such as the Sauvie Island loop.
- Pavement markings can be used to indicate separate space for pedestrian and bicycle travel.
- May need right-of-way acquisition and levee restrictions may alter design and alignment.
- Permeable paving options could help minimize surface water runoff and be compatible with the rural character of the area.

Complementary Strategies

- Bike map, Wayfinding signage



Bicycle and Pedestrian Facilities

ADVISORY BIKE LANE



Numansdorp, The Netherlands



Hanover, NH
Photo: Danny Kim,
The Dartmouth



Hanover, NH
Photo: Danny Kim,
The Dartmouth

Advisory bike lanes, also known as “suggestion lanes,” are bicycle lanes that motor vehicles can use to pass oncoming motor vehicles after yielding to bicyclists. Advisory bicycle lanes are used in combination with a single center lane (without a centerline) for bi-directional motor vehicle travel on relatively low-volume streets.

TSP Area Applicability

This treatment is applicable to streets with less than 6,000 average daily motorized traffic (ADT) that do not have sufficient width for dedicated bicycle-only facilities. Most roadways in the rural areas of Multnomah County have annual average ADT below 3,000 with exceptions for major roadways such as Cornelius Pass Road and Germantown Road. Special considerations should be made for roadways on Sauvie Island due to seasonal traffic peaks which result in ADT up to 17,000 vehicles in a day on Sauvie Island Road. This treatment could be suitable on some Sauvie Island roads as well as other roads in east and west county that have relatively low traffic volumes and that are popular cycling routes.

Pros

- Provides striped bicycle facility on roadways with very limited right-of-way or pavement width.
- Encourages slower motor vehicle speeds and motorists yielding to bicyclists.
- Inexpensive treatment consisting of only signing and striping.

Cons

- Motorists may not initially understand advisory lanes due to limited applications in the US to date; education would be required.
- Does not provide physical protection from vehicles and may not attract bicyclists of all levels.
- Does not improve pedestrian environment.
- No US design guidelines available.

Design Considerations

- Advisory bike lanes can be striped as 5-7 foot lanes with a single center motorized vehicle lane of 10 to 18 feet.
- Explanatory signage may be helpful in US contexts to communicate to motorists that they must yield to bicyclists before passing oncoming vehicles.

Complementary Strategies

- Bike map
- Wayfinding
- Speed limit signs



Bicycle and Pedestrian Facilities

BUFFERED SHOULDER BIKEWAY



Buffered bicycle lanes or buffered shoulder bikeways are on-street lanes that include an additional striped buffer of typically 2-3 feet between the bicycle lane and the vehicle travel lane and/or between the bicycle lane and the vehicle parking lane.

TSP Area Applicability

This treatment is applicable to streets that are long-distance links within and between communities. Any segment of the bicycle network with moderate vehicle speeds or volumes and sufficient pavement width to provide a buffer can be considered within the study area.

Pros

- A parking-edge buffer on streets with on-street parking can reduce the likelihood of “dooring.”
- Increased separation from motor vehicles (over standard bicycle lanes) can increase bicyclist comfort.

Cons

- Does not provide physical protection and therefore may not attract bicyclists of all levels.
- The additional width provided by the buffer may invite motorists to illegally park in the lane if not adequately signed and enforced.

Design Considerations

- Typical buffer width is 2-3 feet, in addition to standard bicycle lane width of 5-6 feet, but a combined width of 6 feet is acceptable.
- Green pavement markings or striping can add visibility and awareness in “conflict areas” or intersections where bicycle and vehicle travel paths cross.
- Buffer space can have markings or rumble strips to deter vehicles from traveling or parking in the space.

Complementary Strategies

- Bike map
- Wayfinding
- Speed limit signs



Bicycle and Pedestrian Facilities

SHOULDER BIKEWAY



Tucson, AZ



KAI



Boise, ID

A shoulder bikeway can serve as a bicycle and pedestrian facility that provides space separated from motor vehicle traffic in rural areas.

TSP Area Applicability

Shoulders bikeways could be applied to most of Multnomah County's rural roadways but would require special permits to be constructed on roadways on the levee.

Pros

- Provides a space separated from motorists.
- Requires less right-of-way than a separated multi-use path.
- Standard treatment for Multnomah County and equipment for maintenance available.

Cons

- Does not provide physical protection from vehicles and may not be comfortable for all users.
- Shoulders serving other uses, such as disabled vehicles, farm equipment, or pedestrians may require bicyclists and pedestrians to use travel lanes.
- Potential impacts to wildlife crossings and rural character.

Design Considerations

- A 6-foot width is preferred to accommodate bicycle and pedestrian travel, with a 3-foot minimum in constrained areas. Greater widths can be used in higher-speed locations.
- Rumble strips or profiled striping can be used to enhance safety and minimize motorists encroaching on the shoulder in areas without significant agricultural activity.
- May require right-of-way acquisition.
- On Sauvie Island, levee restrictions may alter design or prohibit construction.

Complementary Strategies

- Bike map
- Wayfinding



Bicycle and Pedestrian Facilities

SHARED LANE ROADWAYS



Cornell Road,
Portland, OR



Clackamas County, OR



Shared lane roadways are those where motorists and cyclists share the same travel lanes. Shared lane roadways that are part of a designated bicycle network may include shared lane markings (“sharrows”) or signage to indicate the legal presence of bicyclists in the travel lane.

TSP Area Applicability

A majority of the roadways in rural Multnomah County are currently shared facilities. Posting “Bikes on Roadway” signs would indicate to road users that bicyclists may be present and are on the roadway.

Pros

- Allows for bicycle travel when other treatments are not feasible.
- Low- to no-cost.

Cons

- Does not provide any separation from vehicles.
- Without additional traffic-calming treatments, it is likely to only attract confident bicyclists.
- Does not improve pedestrian environment.

Design Considerations

- Provide guidance signage to alert drivers of the shared road. See warning/advisory signs section.
- Educate drivers on the rules of sharing the road.
- Increase signage and pavement markings.

Complementary Strategies

- Pedestrian path
- Bike map
- Bicycle pullouts
- Bicycle climbing lanes



Bicycle and Pedestrian Facilities

BICYCLE PULLOUTS



Bicycle pullouts are areas provided along shared lane roadways to allow cyclists to move out of the vehicle travel lane to stop or allow faster-moving vehicles to pass. They include short pullouts to provide cyclists a place to stop and long pullouts that would allow cyclists to keep traveling while allowing vehicles to pass.

TSP Area Applicability

Bicycle pullouts can be applied to any roadway without shoulder bikeways or other bicycle treatments. They are intended to be provided on designated bikeways as lower impact alternative to continuous shoulder bikeways in constrained areas. They are most applicable on uphill roadways or long stretches of roadways without passing opportunities for vehicles.

Pros

- Provides a space separated from motorists.
- Creates opportunities for vehicles to pass bicyclists on the roadway.
- Minimizes impacts to property, wildlife, and rural character of roadway.

Cons

- Requires right of way.
- Does not provide a continuous bikeway.

Design Considerations

- A 6-foot width is preferred to accommodate bicycle travel, with a 4-foot minimum in constrained areas. Greater widths can be used in higher-speed locations.
- May require right-of-way acquisition.
- Signage needed to require bicyclists to use pullouts.
- Pavement has to be smooth and maintained and/or swept regularly to ensure usage.
- Should be a suitable length to provide time for vehicles to pass (200 feet or more) if designed as a passing area rather than stopping location.

Complementary Strategies

- Paved Shoulder
- Shared lane roadways
- Bike map
- Wayfinding



Bicycle and Pedestrian Facilities

BICYCLE CLIMBING LANES



A bicycle climbing lane consists of a bicycle lane on one side of a roadway in the uphill direction and a shared lane on the downhill side. It allows bicyclists to travel at slower speeds when going uphill without interfering with vehicle travel.

TSP Area Applicability

Bicycle climbing lanes can be applied to any roadway in the study and should be considered as a lower impact alternative to shoulder bikeways in both directions in constrained areas.

Pros

- Provides a space separated from motorists for bicyclists traveling slower uphill.
- The pavement markings help indicate proper bicycle direction on both sides of the street.
- Requires less right of way than providing a bicycle lane or shoulder bikeway on both sides of the street.

Cons

- Does not provide physical protection from vehicles and may not be comfortable for all users on the downhill side.

Design Considerations

- May require right-of-way acquisition.
- Provide guidance signage to alert drivers of the shared road. See warning/advisory signs section.
- Educate drivers on the rules of sharing the road.
- Increase signage and pavement markings.
- Typical shoulder bikeway width is 6 feet, with 4-5 feet in constrained locations. A minimum 3-foot width can be used on constrained segments that are not principal arterials.
- Green pavement markings or striping can add visibility and awareness in "conflict areas" or intersections where bicycle and vehicle travel paths cross.

Complementary Strategies

- Shared lane roadways
- Bicycle Pullouts
- Bike map, Wayfinding
- Rumble strips



Bicycle and Pedestrian Facilities

BIKE MAP



Source: FMATS Bike Map

Bike maps generally include the type of bicycle facilities available as well as destinations and other useful information within a defined area.

TSP Area Applicability

- Bike maps can provide guidance to infrequent cyclists regarding potential areas of interest such as types and locations of recreational activities, bike parking locations, restrooms, and access to drinking water.
- Could be privately funded by bike friendly businesses.

Pros

- Provides valuable information to bicyclists.
- Reduces trespassing.
- Map is portable and could also be available electronically.

Cons

- Cost of production and regular updates to ensure information remains relevant.

Complementary Strategies

- Multi-use paths
- Advisory bike lanes
- Buffered shoulder bikeways
- Paved shoulder
- Shared lane roadways
- Bicycle pullouts
- Bicycle climbing lanes
- Park-N-Ride Lots



Bicycle and Pedestrian Facilities

PEDESTRIAN SHOULDER



A pedestrian shoulder facility provides access for pedestrians on a hard surface in rural areas where sidewalks are not present.

TSP Area Applicability

Paved shoulders can be applied to any roadway in the study area but is most suited to roadways with low volumes but that have pedestrian demand.

Pros

- Provides a space separated from motorists.
- Requires less right-of-way than a separated multi-use path.
- More cost-effective than installing sidewalks.

Cons

- Does not provide physical protection from vehicles and may not be comfortable for all users.
- May be used by cyclists in both directions and conflict with pedestrians.
- Shoulders serving other uses, such as disabled vehicles or farm equipment may require bicyclists and pedestrians to use travel lanes.

Design Considerations

- A 6-foot width is preferred to accommodate bicycle and pedestrian travel, with a 4-foot minimum in constrained areas. Greater widths can be used in higher-speed locations.
- Rumble strips or profiled striping can be used to enhance safety and minimize motorists encroaching on the shoulder.
- May require right-of-way acquisition.

Complementary Strategies

- Rumble Strips





Bicycle and Pedestrian Facilities

PEDESTRIAN PATH (SIDEPATH)



Skyline Boulevard
Portland, OR



Skyline Boulevard
Portland, OR



Skyline Boulevard
Portland, OR

A pedestrian path is a hard-surface path adjacent to the roadway in lieu of a sidewalk in areas where other bicycle facilities exist or bicyclists share the roadway. While similar to a multi-use path, pedestrian paths are narrower in width and generally do not invite bicycle travel.

TSP Area Applicability

Pedestrian paths can be applied to any constrained roadways in the study area where sidewalks are not present and multi-use paths cannot be accommodated.

Pros

- Provides a hard surface for pedestrians buffered from the roadway.
- Requires less right-of-way than a multi-use path.
- Lower cost than construction of a full sidewalk with curb and gutter.

Cons

- May also attract bicyclists, creating the potential for conflicts between pedestrians and bicyclists.
- Requires right-of-way

Design Considerations

- Typically 5- to 8-foot wide asphalt surface.
- Pedestrian paths are typically separated from the roadway by a gravel or vegetated buffer instead of a curb and gutter.
- Should follow ADA standards to allow for universal access.
- Though not intended for bicyclists, pedestrian paths may attract bicyclists if a separate bicycle facility is not provided.

Complementary Strategies

- Shoulder Bikeways
- Bicycle Pullouts
- Bicycle Climbing Lanes

Safety Treatments

RUMBLE STRIPS



Rumble strips are pavement surface treatments intended to cause drivers to experience vehicular vibrations signaling them to slow down. Rumble strips can be raised pavement markers across the roadway or grooves along the shoulder or centerline. Rumble strips are best used in conjunction with other traffic calming treatments.

TSP Area Applicability

During the past five years, more than 50 percent of the reported crashes in Multnomah County were single vehicle crashes. Rumble strips could be effective at reducing these types of crashes by alerting drivers that they are entering a part of the roadway not intended for use.

Pros

- Low cost.
- Speed reduction and increase in driver awareness.
- Increased sense of safety for pedestrians and bicyclists if the shoulder width is adequate.

Cons

- Vibration noise created may be inappropriate in residential areas.
- Impact the comfort and control of bicyclists and agricultural equipment.
- Potential impacts on pavement deterioration based on pavement quality and placement.

Design Considerations

- All road users need to be considered and accommodated. Bicycles need particular attention, especially if they are expected to use the roadway or shoulders.
- There are a variety of types of rumble strips, so the site application should be considered to determine the most appropriate design.
- May not be suitable in areas with significant agricultural activity.

Complementary Strategies

- Shoulder Bikeways
- Bicycle Climing Lanes
- Pedestrian Shoulder

Safety Treatments

INCREASED SHOULDER WIDTH



A wide shoulder can be used to provide a separated space for cyclists and pedestrians, assist with vehicular recovery during driver inattentiveness, assist with incident response and emergency situations, and provide space for motorists to bypass slow moving vehicles such as farm equipment.

TSP Area Applicability

During the past five years, more than 50 percent of the reported crashes in Multnomah County were single vehicle crashes. Widening the shoulders could be effective at reducing these types of crashes by providing space for recovery along more narrow roads, especially Germantown Road, Skyline Boulevard, Reeder Road, Sauvie Island Road, Gillihan Road



Pros

- Provides drivers more opportunity to recover before departing the roadway or slow their vehicle to a controlled stop.
- Wider shoulders may be used by pedestrian and bicyclists when other facilities are not present.
- Widening the shoulder could allow for shoulder rumble strips.
- As a current Multnomah County standard, knowledge and equipment for maintenance is available.

Cons

- Additional right-of-way may be required.
- Potential impacts to wildlife crossings and rural character.
- Potential increase in vehicle speed due to wider street cross-section.

Design Considerations

- Adequate right-of-way is necessary.
- On Sauvie Island, levee restrictions may alter design or prohibit construction.

Complementary Strategies

- Curve improvements
- Rumble Strips

Safety Treatments

CURVE IMPROVEMENTS



Source: MUTCD

Curve improvements include a variety of treatments that help to inform the driver of the presence and characteristics of curves. Treatments include, but are not limited to, curve warning signs, decreased speed signs, curve delineation posts, and illumination.

TSP Area Applicability

Curve improvements can be applied county-wide. Many of the rural roads in Multnomah County are winding with limited warning to drivers of the impending curves. In addition, many of the reported crashes in Multnomah County occur on or around roadway curves. Providing curve warning signs and delineation posts may help to reduce crashes along county roadways., especially along Cornealius Pass Road, Germantown Road, Gillihan Road, and Lusted Road.

Pros

- Provides advanced notification to road users of location and characteristics of potentially unexpected curves.
- May help to decrease crashes on curves.

Cons

- Contributes to sign clutter.
- Requires additional cost and maintenance

Complementary Strategies

- Increased shoulder width

Safety Treatments

RURAL INTERSECTION IMPROVEMENTS



Anchorage, AK

Intersection improvements include a variety of treatments to help all modes efficiently and safely travel through intersections. Treatments include, but are not limited to changing intersection control type or changing the stop-controlled approaches, adding turn lanes, adding marked or active crossing treatments, and providing adequate roadway illumination.

TSP Area Applicability

Many locations in the West Hills, Sauvie Island, and East County would benefit from intersection improvements that help all modes move safely and efficiently on the roadway system. More in depth analysis is necessary to provide recommendations on specific treatments to the intersections.

Pros

- Lighting increases night-time visibility of roadway users and animals and sense of security for all roadway users.
- Possible improved operations of the intersection.

Cons

- Cost of design and construction.
- Potential right-of-way acquisition.
- Increased maintenance costs with signals and illumination

Complementary Strategies

- Shoulder widening
- Rumble strips
- Wayfinding signage

Safety Treatments

RAILROAD CROSSING IMPROVEMENTS



Source: www.iqtrafficcontrol.com



Source: urbanpostmortem.wordpress.com

Railroad crossings can have passive control (devices that mark the location of a crossing such as cross-bucks and yield or stop signs) or active control (devices that mark the location of a crossing and indicate the approach or presence of a train such as flashing lights and gate arms). Active crossings are relatively expensive to install and maintain but provide increased safety compared to a passive crossing.

Design Considerations

For private railroad crossings (those at a driveway or private road), improving the crossing from passive control to active control requires railroad permission and a contract between the property owner and the railroad. Public crossings in Oregon (generally those at a crossing of a public road) are regulated by the Oregon Department of Transportation (ODOT). ODOT's Rail Division follows a federal mandate to consolidate at-grade railroad crossings. The federal direction has resulted in a requirement to close one or more crossings when a new crossing is constructed or an existing crossing is upgraded.

Upgrading crossings to active control in rural areas typically ranges from \$200,000 - \$500,000. In addition, railroad companies typically require crossing owners to pay \$5,000 - \$10,000 per year per crossing in annual maintenance fees to compensate for additional weekly inspections and maintenance required over the life of the crossing.

When railroad crossings are upgraded to active crossings the railroad tracks and the road bed typically also require reconstruction to current standards. The road grade at the crossing must have no more than approximately a three inch rise or fall within 30 feet of either side of the tracks per national standards. This can result in the need to re-grade the roadway or railroad track approaches to the crossing.

TSP Area Applicability

There are several passive railroad crossings in the study area along Highway 30 and the Historic Columbia River Highway. Private property owners may be able to get permission to upgrade crossings from the railroad; however, public crossing upgrades will require a plan to consolidate and close one to two other public or private crossings. The best candidates for crossing upgrades are those with flat crossings with good visual clearance.

Pros

- Provide active control and effectively communicates to vehicles, pedestrians, and bicyclists the need to stop at the railroad crossing.

Cons

- Costly and likely to require closure of other crossings.

Complementary Strategies

- Warning/advisory signs

Signage and Signal Treatments

WAYFINDING SIGNAGE



Signage indicating to bicyclists and pedestrians the direction and distance to points of interest along a corridor. Wayfinding signs can also be used to inform drivers of key recreational destinations, parking, etc.

TSP Area Applicability

Provide guidance to motorized and non-motorized users to areas of interest such as types and location of recreation, parking, and other key destinations.

Pros

- Encourages walking and biking by providing access information to major attractions.

Cons

- Additional cost and maintenance.
- Potential for sign clutter.

Design Considerations

- Place in key locations/decision points such as intersections.

Complementary Strategies

- Multi-use paths
- Bike lanes
- Pedestrian paths
- Bike map

Signage and Signal Treatments

WARNING/ADVISORY SIGNS



Signage providing guidance or warning about unexpected conditions for all users of the roadway.

TSP Area Applicability

Signs can be used on county roadways to inform motorists of bicycles sharing the road, locations of frequent pedestrian crossings, and roadway curvature. Signage may be particularly helpful along those roadways that remain “shared use” as well as areas with limited visibilities of roadway curvature and upcoming intersections.

Pros

- Provides advanced notification to road users of unexpected conditions; i.e. pedestrians entering the roadway, curves, etc.
- Creates more awareness by motorists of the shared use and to look for bicyclists.

Cons

- Contributes to sign clutter.
- Additional cost and maintenance.

Complementary Strategies

- Curve improvements
- Shared lane roadways

Signage and Signal Treatments

SPEED LIMIT SIGNS



Signage providing guidance on appropriate speeds for traveling the roadway.

TSP Area Applicability

Speed limit signs can be applied at any un-signed roadways throughout rural Multnomah County, including Gillihan Road.

Pros

- Alerts the driver to speeds appropriate for the roadway.
- Informs pedestrians and bicyclists about the suitability of the road for their comfort level.

Cons

- Contributes to sign clutter.
- Additional cost and maintenance.

Complementary Strategies

- Shoulder bikeways and shared lane roadways

Signage and Signal Treatments

SIGNAL CONTROLLER/TIMING PLANS



A traffic signal controller runs the signal timing and phase plan for a given traffic signal. Various timing plans can be used for different times of day (e.g. peak and off peak hour), time of years, and special events.

TSP Area Applicability

There are opportunities to at intersections throughout the County to improve/install signal controllers or timing plans. In particular, the existing controller at the intersection of Sauvie Island Road and Highway 30 is programmed but operation has degraded with age. The internal clock that controls the timing plans is faulty. Upgrading the controller to a newer version could provide more effective signal operations.

Pros

- Effective movement of vehicles through an intersection.
- Better efficiency reduces congestion which can lead to safety benefits.

Cons

- Controller upgrades can be expensive.

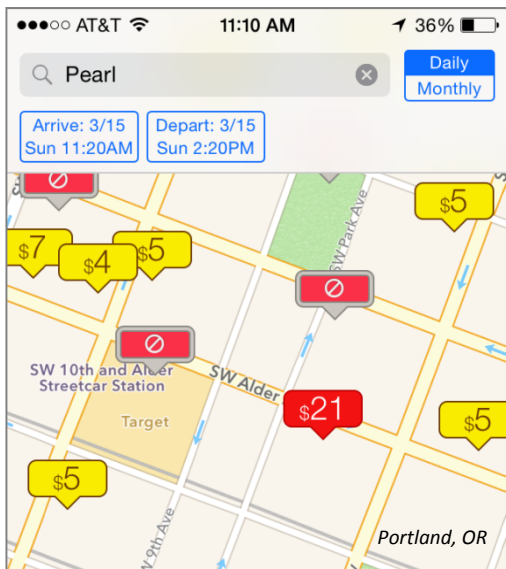
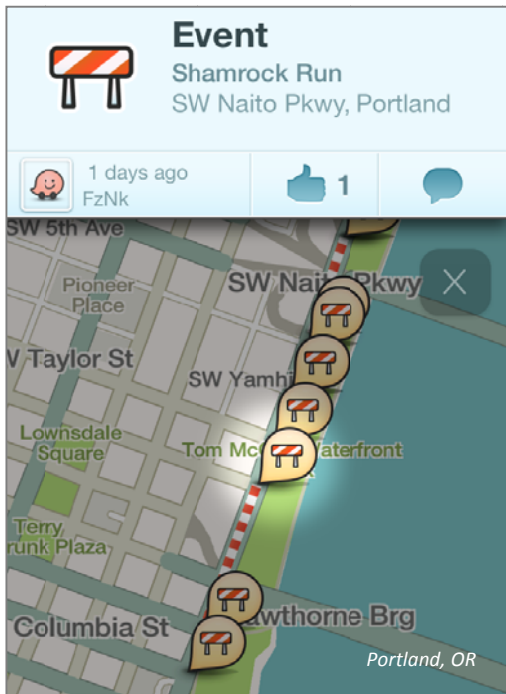


Complementary Strategies

- Event permit calendar
- Event-based TDM plans

Transportation Demand Management

USER-GENERATED PARKING INFORMATION



User-generated parking information would provide visitors and/or event participants with information about public or privately-held parking availability. This information is “shared” amongst system users through “apps” and other electronic means. This type of strategy has been implemented successfully for real-time user-generated traffic information by apps such as Waze, where users can report incidents or other temporary issues affecting traffic.

TSP Area Applicability

This strategy could be implemented through the development of a smart-phone app and corresponding installation of real-time signage at key locations in the county. These signs could be useful to:

- Visitors arriving at popular locations, such as the Sauvie Island beaches and Gorge area tourist areas, are encouraged to log-in to the app and report on the current availability of parking.
- Provide users traveling to the county with information about parking availability and traffic congestion.
- Business owners and event organizers that can advise potential visitors to come later or park at alternate locations.

Pros

- Can help avoid unnecessary trips when no parking is available.
- After the development of the app and installation of the signage, does not require additional staffing or investment.

Cons

- Relies on users to generate information, which may result in inconsistent or infrequent updates.
- Limited cell phone coverage in parts of Multnomah County. Only users with smartphones and cell service can access.

Design Considerations

- Signage should be visible and easy to understand
- App could be designed with a “points” system and rewards for consistent users that report parking information, such as discounts on permits.

Complementary Strategies

- Parking permit pricing
- Park-N-Ride lots

Transportation Demand Management

REAL-TIME PARKING INFORMATION

Real-time parking information can help avoid unnecessary trips by letting visitors know when and where parking is already fully occupied. Digital displays are frequently used in parking garages, where automated counting or sensing is installed. Lower-tech options are also possible that rely upon a person to update the sign message. This information is provided by a designated staff person or through the use of parking sensors or video, rather than relying on users to report parking availability to other users.

TSP Area Applicability

Due to the predominance of graveled parking on Sauvie Island and other recreational areas throughout the County, it is not currently feasible to install detection or sensor on most parking locations. Instead, this strategy could be implemented through lower-tech methods such as:

- Informational maps of all parking locations can be readily available for visitors and tourists, with various locations numbered or color-coded for easy “real-time” information communication
- On Sauvie Island, on the busiest weekends, patrol officers, ODF&W, paid attendants, or volunteers at busy locations could relay information to the Cracker Barrel store, where information about the parking locations shown on the map would be posted for visitors arriving to the Island.
- In cases where popular parking locations are full, an information board could suggest alternate parking locations.
- Video cameras could be installed at key parking areas with complementary displays posted near the entrance to the Island, other advance information areas, and online.

Pros

- Can help avoid unnecessary trips when no parking is available.
- Provides a low-tech way to provide information to all visitors

Cons

- May require manual updates from people at the locations of parking and a display board, unless video cameras are installed.
- Video cameras may raise privacy concerns

Design Considerations

- Signage with information about parking locations and availability should be positioned so that it is easily understood and visible to visitors entering Sauvie Island.

Complementary Strategies

- Parking permit Pricing
- Park-N-Ride lots

Transportation Demand Management

OPTIMIZE PARKING PERMIT PRICING



Pricing parking is a powerful tool for managing demand.

Requiring payment for parking can influence travelers' choice to carpool or use other modes.

TSP Area Applicability

Visitors to specific locations within Multnomah County pay for daily or hourly parking. For example, Sauvie Island visitors currently pay \$7 for a daily permit to park in wildlife areas on the island, and annual permits cost \$22. Permitting could also be considered for additional tourist and recreation areas including in the Gorge. Additional strategies for consideration include:

- Permit pricing could be implemented or increased during high-traffic times, such as prime weekends, and decreased during lower-traffic times, such as week days or winter months, to help address concerns with the amount of visitors.
- Annual permit costs could be increased or split into two "season" permits, with winter season having a much lower cost.
- Requiring permits for all vehicles entering high-demand areas, such as Sauvie Island. Resident parking could be free or at a low cost covering only permit administration.
- Additional fees for parking could be collected in popular or congested locations, such as the beaches.

Pros

- Can generate revenue as long as administrative costs are not substantial.
- Is demonstrated to help manage demand, since people are price-sensitive.

Cons

- May be perceived as unfair or bad for business by some county businesses if all visitors are required to obtain permits. Today, only those visitors desiring to use a public parking facility are required to buy permits for Sauvie Island.
- Cost of enforcement.

Design Considerations

- Any increases or changes to the pricing structure could be accompanied by an explanation of where the additional revenue will be used. In examples where people are able to see the local benefit of the parking revenue, they are much more likely to support the increased costs.

Complementary Strategies

- Park-N-Ride lots

Transportation Demand Management

PARKING ENFORCEMENT



Regular enforcement of existing parking regulations can improve compliance. If people expect to receive a ticket for improper parking, they are more likely to seek other options.

TSP Area Applicability

Enforcement officers could increase the amount of patrolling and ticketing on peak weekends during the summer in wildlife or trailhead parking areas or in areas not designated for parking. Communication about the increased enforcement could motivate visitors to follow parking regulations before getting tickets.

Depending on results, enforcement efforts could be limited to specific times or days to minimize the additional staffing investment.

Pros

- Provides an economic incentive to follow the rules on parking locations by fining people for breaking them.
- Can generate additional revenue.

Cons

- Requires parking enforcement staff
- May raise concerns from visitors or residents that have been accustomed to more relaxed parking enforcement.

Complementary Strategies

- Parking Information
- Park-N-Ride lots

Transportation Demand Management

PARK-N-RIDE LOTS



Park-n-ride lots offer people a place to park their cars when transferring to a different mode, such as carpooling with another person, bicycling, or taking transit.

TSP Area Applicability

Due to high visitor demand during peak seasons on Sauvie Island and increased Gorge tourism, several areas in the County could benefit from the addition of a park-n-ride service. An off-island park-n-ride could be located along Highway 30 south of Sauvie Island in an industrial area. Partnerships for shared parking could be established for existing private parking that is used primarily during the week. This could enable:

- Beach-goers and Gorge visitors to form carpools to go to the island or key tourist and recreational areas, leaving other vehicles at the park-n-ride locations.
- Bicyclists to leave their cars and ride their bicycles from parking locations on Highway 30 or near the HCRH.
- Provision of shuttle service from the park-n-rides during events or high-traffic weekends.



Portland, OR, Google Earth

Pros

- Facilitates use of carpooling and can reduce need for parking on the island and at key tourist destinations.
- Can more effectively utilize parking spaces that are normally used primarily during the week.

Cons

- Would need to negotiate public access to existing parking locations.
- More distant park-n-ride lots may not appeal to bicyclists if bike route to the destination is not comfortable for many riders.
- May raise liability issues for parking arrangements on private properties.

Design Considerations

- Signage and online information to promote the park-n-ride lot would need to be prominent to ensure that visitors know its location and that they can use it.

Complementary Strategies

- Shuttle service
- Parking pricing
- Event TDM strategies

Transportation Demand Management

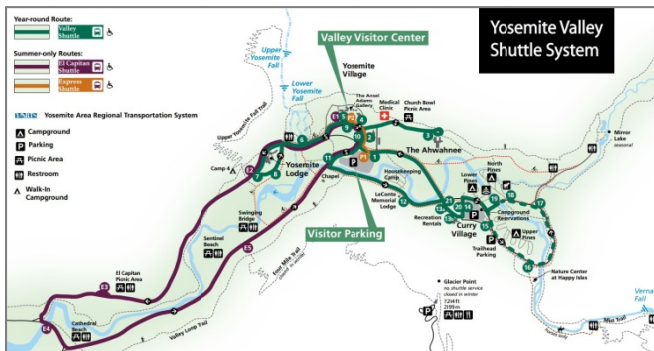
SHUTTLE SERVICE



A shuttle circulator service could provide access to popular county locations during peak weekend days during the summer.

TSP Area Applicability

- A service for Sauvie Island or the Gorge could operate as a circulator during peak weekend days, allowing people to park once and then travel in the shuttle to popular locations. On Sauvie Island, this shuttle could run between the Cracker Barrel store and the beach during the peak summer days. In addition, shuttles could be chartered for particular event weekends, or by large events, to serve special event visitors. In these cases, shuttles could also travel to and from off-island park-n-ride locations.



Pros

- Could provide an alternative to driving and parking on the island and key tourist destinations.
- If effectively utilized, could allow for more visitors with fewer traffic and parking impacts.

Cons

- Funding shuttle service may be difficult to sustain.
- Without consistent service, people may not be able to rely on the shuttle being available.

Design Considerations

- Signage and online information to promote the shuttle service would need to be prominent to ensure that visitors know its location and how they should use it.



Complementary Strategies

- Parking pricing
- Event permits / calendar
- Park-n-ride lots

Transportation Demand Management

EVENT PERMITS / CALENDAR

A system of event permits requires event organizers to register events through a central calendar system. A permit issued for each event states the requirements that each would have to meet.

TSP Area Applicability

This system could allow for coordination between same day events throughout Multnomah County or in smaller sub-areas. This idea builds on the existing voluntary event permit system through the Sauvie Island Community Association and could remain informal or could be administered by a local TMA or by the County. This system could include:

- Events over a certain size limit could be required to implement a transportation demand management (TDM) plan for the event which would outline how the event will utilize any number of different TDM strategies to reduce traffic impacts.
- Provision of incentives, such as partial reimbursement for shuttle costs, for events demonstrating a certain level of non-drive-alone mode share.
- For Sauvie Island, provision of a daily “cap,” if necessary, on the total number of event attendees arriving to the island in private vehicles, in order to help avoid days with the highest levels of congestion. For example, under the same cap, one large event or four smaller events may be able to occur on the same day – but all five would not be able to be held concurrently.

Pros

- Allows for anticipation of heavy traffic days
- By capping total anticipated event attendance per day, events can be spread more evenly throughout the year
- Provides a mechanism for coordination TDM strategies among event planners

Cons

- Administration of the permit system and calendar may require additional staff time.
- Event planners may have to commit to certain dates earlier than they would otherwise.
- Could result in conflicts between event organizers/local businesses in the competition for popular dates.

Complementary Strategies

- Park-n-ride lots
- Event-based shuttle system
- Modified signal timing

Transportation Demand Management

EVENT-BASED “TDM” PLANS



Events of a certain size would be required to submit a transportation demand management (TDM) plan in order to receive an approved event permit.

TSP Area Applicability

Organizers of large events would need to provide a transportation demand management plan to demonstrate ways that they will manage impacts.

Transportation demand management plans could include:

- Traffic management plan – organizers must demonstrate how they would manage the arrivals and parking for attendees of the event, including:
 - providing adequate parking to accommodate attendees
 - employing flaggers, if needed
 - arranging for overflow parking in alternate locations, if needed
 - coordinating with other events occurring in the same time-frame.
- Demand management strategies – organizers can draw on a number of demand management strategies to reduce vehicle trips:
 - Carpool/ride-matching for event attendees
 - Promotion of park-n-ride location for carpools, bicyclists, or other recreational visitors
 - Provide shuttle or van service from a park-n-ride location
 - Charging fees for event parking



Pros

- Reduces congestion on roadways
- Adds accountability for events
- Will encourage thorough planning and help mitigate impacts of larger events
- Can be tied to development code requirements for agri-tourism activities

Cons

- Increases the organizational burden for event planners
- Requires staff time to review TDM plans and work with event planners.

Complementary Strategies

- Park-n-ride lots
- Event permit / calendar
- Shuttle service
- Valet bike parking
- Modified signal timing

Section 4

Goals and Policies

GOALS AND POLICIES

This section details the transportation goal and policies that guide the following Multnomah County Transportation System Plan. They represent the culmination of the existing needs and guidance from the CAC, citizens, business owners, the PMT and governmental agencies within Multnomah County.

TRANSPORTATION GOAL

GOAL: To provide a safe and efficient transportation network for all modes of travel that serves the rural areas of the County and achieves the following objectives:

1. Implement a transportation system that is safe and efficient in meeting the needs of area residents.
2. Implement a balanced transportation system that supports all modes of travel.
3. Develop a transportation system that supports the rural character of unincorporated Multnomah County.
4. Develop a transportation system the supports a healthy economy.
5. Provide transportation improvements in a timely manner according to funding capability.
6. Reduce vehicle traffic on rural County roadways caused by those traveling through the area.

TRANSPORTATION POLICIES

Policy 1: Overall Transportation System

Maintain and improve the transportation system for all modes of travel with the following goals: reducing vehicle miles travelled, minimizing carbon emissions, reducing conflict between travel modes, and improving the natural environment by minimizing stormwater runoff and facilitating wildlife movement. Ensure that the transportation system reflects the community's rural character while ensuring efficiency and local connectivity.

Strategies

- a) Explore implementing measures for traffic calming, traffic diversion, and speed enforcement.
- b) Address climate change impacts and the Climate Action Plan's recommended actions when planning transportation investments and service delivery strategies.

Policy 2: Overall Transportation System

Develop and implement effective use of signage designed to educate the public about farm equipment using roads, wildlife crossings and bicycle and pedestrian safety, as well as additional way finding signage.

Policy 3: Overall Transportation System

Promote a transportation system that prioritizes and supports the efficient and safe movement of farm and forest vehicles and equipment.

Policy 4: Overall Transportation System

Coordinate with public service providers and private utility suppliers to maximize the efficient delivery of both public and private utilities and facilities in County Right of way.

Strategies

- a. Work with utility companies that own transmission and distribution lines to strive to bury the power lines to provide more secure power service during emergency situations and improve scenic qualities.
- b. Coordinate utility and road work whenever possible.

Policy 5: Overall Transportation System

Implement and maintain a balanced, safe, and efficient transportation system using the existing roadway network.

Strategies

- a) Review and maintain a trafficway classification system integrated with land uses and travel needs. The hierarchy of functional classifications should be based on trip types and length, traffic volume and travel modes, and access to adjacent land uses.
- b) For capital projects, improve streets to the standards established by the classification system and the Multnomah County Design and Construction Manual while maintaining context sensitivity.
- c) Implement access management standards established in the Multnomah County Road Rules and the Multnomah County Design and Construction Manual while maintaining context sensitivity.
- d) Place priority on maintaining the existing trafficways.
- e) Review land use development and condition improvements on County Roads based on functional classification and standards set forth in the Multnomah County Design and

Construction Manual to mitigate impacts. Transportation and land use development review should be coordinated.

- f) Implement the land development process adopted in the Multnomah County Road Rules where half-street improvements or dedication of a right-of-way or easements can be required as conditions of a permit for land development abutting a County road.
- g) Maintain inventory of current and projected deficiencies on the County's road network as the basis for Capital Improvement Plan and Program, including general roadway improvements, bicycle improvements, pedestrian improvements, and wildlife crossing improvements.
- h) Coordinate policy and development review work with Multnomah County Land Use Planning program which regulates off-street parking and loading areas, including parking for vehicles, trucks, and bicycles through Multnomah County Code.

Policy 6: Active Transportation

Identify, prioritize, and implement short- and long- term solutions to safely accommodate multiple modes of travel on County roads including on-road bikeways, separated multi-use paths, and explore funding options.

Strategy

- a) Apply context sensitive roadway improvements and evaluation of projects.

Policy 7: Active Transportation

Implement context sensitive design when reviewing rural road standards to determine appropriate paved shoulder widths to preserve the rural character of roads, while supporting all modes of travel.

Strategies:

- a) Explore options for bike pull outs and passing lanes to allow for resting and passing
- b) Consider bike-friendly road treatments, especially in regards to maintenance of the road
- c) Consider bike and environment friendly materials and treatments such as pervious asphalt
- d) When widening, shoulders should aim to achieve a minimum 3 foot paved width.
- e) Explore services and facilities to support multimodal uses that reflect rural character and reduce impacts on surrounding land uses and wildlife connectivity.
- f) Prioritize use of centerline rumble strips for the purpose of supporting efficient and safe movement of vehicles and avoid the use of fog line rumble strips which endanger bicyclists. If fog line rumble strips are used, safe facilities should be designed that allows for bikes to ride safely, such as the application of adequate shoulders.
- g) In areas with steep slopes, landslide hazards, or wildlife habitat, first consider alternatives such as signage and TDM strategies that do not require additional impervious surfaces.

Policy 8: Active Transportation

Develop and support programs and projects that educate and increase the safety of non-motorized transportation options in the County, and reduce dependency on automobile use and to reduce vehicle miles traveled (VMT) by:

- a) Promoting bicycling and walking as vital transportation choices.
- b) Assuring that future street improvement projects on a designated bikeway and walkways are designed to accommodate and improve safety for bicyclists, pedestrians and transit users.
- c) Striving to use federal, state, and local best design practices for bicycle and pedestrian facilities when improving County roadways while maintaining context sensitivity.
- d) Providing for bicycle and pedestrian travel through the development and adoption of a County-wide Transportation Capital Improvements Program (CIP) that includes all the bikeways and walkways identified in the Multnomah County Bikeway and Pedestrian System Maps.
- e) Placing priority on transportation system improvements in the Capital Improvement Plan that reduce the number of crashes involving bicyclists and pedestrians, the roadway's most vulnerable users.
- f) Supporting transportation options programs in the region including Safe Routes to School, bicycle tourism initiatives (where appropriate), the development of future Transportation Management Associations (TMAs), and other programs funded through the Regional Travel Options program.
- g) Supporting programs and policies that increase awareness of transportation options and education about safety on the transportation system for all modes and users.
- h) Supporting the conversion of railroad lines to multi-use paths, such as the Burlington Northern Cornelius Pass Road rail line.

Strategies

The following strategies should be used to implement the County's bicycle and pedestrian system:

- a) Identify a connected network of pedestrian and bicycle facilities and access to transit, which provides the framework for future walkway and bikeway projects.
- b) Periodically review and update the Multnomah County Design and Construction Manual to include the most up-to-date national, state, and local best practice for the design of bicycle and pedestrian facilities.
- c) Coordinate with Metro to implement bicycle and pedestrian networks in the Regional Transportation Plan (RTP, the Regional Transportation Functional Plan (RTFP), and other local transportation system plans. Participate in updates to regional and local transportation plans.
- d) Continue to support and coordinate with Metro and other partner agencies in regional trails projects that may affect rural Multnomah County, recognizing trails as a vital component to the regional active transportation network while protecting natural resources and habitat.

- e) Continue to seek funding for identified bicycle and pedestrian improvements, such as but not limited to state and regional grant sources.
- f) Maintain the Bicycle and Pedestrian Citizen Advisory Committee to provide input on Multnomah County Transportation Division projects and programs, including proposed bicycle and pedestrian project criteria and project design.
- g) Ensure there is a comment, review, and public involvement process for planning, engineering, operations and maintenance projects for the appropriate neighborhood groups and cities within Multnomah County.

Policy 9: Active Transportation

Support and promote bicycle and pedestrian safety and education in County Schools

Strategies

- a) Develop and maintain an active program in schools, consistent with the federally recognized program utilizing the five Es: education, encouragement, enforcement, engineering, and evaluation.
- b) Continue to identify and fund bicycle and pedestrian infrastructure to increase safety around schools through the Capital Improvement Program

Policy 10: Mobility and Freight

Address regional freight mobility, and explore alternative routes and modes for freight mobility through unincorporated Multnomah County.

Strategies

- a) Explore alternatives to routes through the West Hills.
- b) Participate in Regional Overdimensional Truck Routes Study and other regional studies as applicable.
- c) Examine the suitability of use of County roads as truck routes.
- d) Coordinate with other jurisdictions on truck impacts and ensure proper mitigation.
- e) Promote transportation alternatives for the movement of freight
- f) Review and implement weight and length limitations for County roads.

Policy 11: Mobility and Freight

Oppose placement of new regional roadways on Multnomah County roads, should such roadways be contemplated by any regional transportation authority in the future.

Policy 12: Mobility and Freight

Discourage through traffic on trafficways within unincorporated Multnomah County.

Strategies

- a) Reduce travel conflicts by providing appropriate facilities, signs, and traffic marking based upon user type and travel mode.
- b) On rural roads with heavy through traffic, consider implementing appropriate measures such as Transportation Demand Management (TDM) to reduce such traffic.

Policy 13: TDM, Outreach, and Transit

Implement a range of Transportation Demand Management (TDM) policies encouraging existing businesses and requiring new development (beyond single family residential use and agricultural uses) to help reduce vehicle miles traveled (VMT), and alleviate congestion on county roads caused by seasonal and special event traffic, as well as through commuter traffic.

Strategies

- a) Develop a Countywide TDM program. Program concepts could include strategies such as shuttle buses, ride sharing, work-from-home, flex time, improved transit and access to transit, user fees or congestion pricing.
- b) Seek funding opportunities, such as Metro's Travel Options grant program, to support TDM programming.

Policy 14: TDM, Outreach, and Transit

Coordinate and work with transit agencies and service providers (including, but not limited to, TriMet, CC Rider, and C-Tran) to identify existing transit deficiencies and the improvements necessary to increase access to transit services by potential users.

Policy 15: Safety

Work with the Oregon Office of Emergency Management, Multnomah County Emergency Management and Multnomah County rural fire protection districts to ensure that the transportation system supports effective responses to emergencies and disasters.

Policy 16: Funding and Maintenance

Explore alternative supplemental funding sources to improve County's road maintenance, safety projects, and other improvements.

Strategies

- a) Consider long term maintenance costs with development of capital projects.
- b) Review and update the County's Road Maintenance Program to implement applicable policies and strategies of the Comprehensive Plan and SIMC Rural Area Plan.
- c) Review internal protocols related to road and right-of-way maintenance, including roadside hedgerow trimming and weed eradication. Work with the Soil & Water Conservation Districts, ODFW and wildlife conservation organizations to protect wildlife and manage invasive plant species to ensure that habitat and water resource restoration projects are coordinated with County road maintenance and drainage control programs.
- d) Ensure that non-profit organizations and property owners are aware of County programs that may limit wildlife habitat restoration projects, and that County road staff are aware of existing and completed habitat restoration projects when they conduct their operations.
- e) To implement this policy, the County Road Maintenance program will review the following recommendations:
 - a. Except in emergency situations, County road mowing should be done between August 15 and March 15 to minimize impact to nesting birds, and workers should avoid mowing at identified turtle, frog and salamander crossings during nesting season (May and September).
 - b. Culverts under county roads should be surveyed, then repaired and replaced as needed to limit barriers to fish and wildlife passage.
 - c. County staff should work with ODFW and wildlife conservation organizations to identify and mitigate in areas where wildlife corridors cross county roads.
 - d. Mowing equipment should be regularly cleaned so that seeds of invasive plants are not spread into areas where they have not yet been introduced. Incorporate erosion control best practices for mowing and other maintenance activities.
 - e. County staff should confer with the Soil & Water Conservation Districts on best management practices for mowing operations and removing invasive weeds along road right-of-way.
 - f. County staff should be trained to recognize invasive and desirable native plant species; Multnomah County should prioritize plant species for control.
 - g. County staff should inform property owners of the existing Owner Vegetation Maintenance Agreement, which allows abutting property owners to maintain right-of-way vegetation.

Policy 17: Funding

Maximize cost-effectiveness of transportation improvements using the Capital Improvement Plan process and maintenance program.

Strategies

- a) Coordinate intersection improvements as appropriate through the County's Capital Improvement Plan and the County's maintenance program.
- b) Provide minor improvements during maintenance projects where possible.
- c) Ensure the Capital Improvement Plan evaluation criteria adequately evaluates rural needs:
 - a. Maintenance
 - b. Cost effective improvements
 - c. Safety
 - d. Bicycle and pedestrian improvements
 - e. Wildlife
 - f. Equity
 - g. Health
 - h. Climate change

Policy 18: Safety

Provide a transportation system that functions at appropriate safety levels for all motorized and non-motorized traffic.

Strategies

- a) Consider recorded accident rates and documented perceived risks (smart phone applications, websites, reported near misses, etc.) 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
- b) Continue to monitor high accident location sites for all modes of transportation.
- c) Implement access management standards to reduce vehicle conflicts and maintain the rural character of the area.
- d) Perform safety audits to identify locations where roadway characteristics increase risks and work to reduce those risks.

Policy 19: Safety

Support safe travel speeds on the transportation system.

Strategies

- a) Support speed limit enforcement through a variety of available techniques.
- b) Apply design standards that encourage appropriate motor vehicle and truck speeds.

Policy 20: Environment

Avoid and minimize impacts to the natural environment, fish, and wildlife habitat when applying roadway design standards.

Strategies

- a) Implement standards and best practices for all transportation projects with regard to water quality treatment - the reduction, detention and infiltration of stormwater runoff from existing and new impervious surfaces - to improve water quality as well as fish and wildlife habitats, consistent with requirements of the National Pollutant Discharge Elimination System - Municipal Separate Storm Sewer System Phase I Permit and the Water Pollution Control Facility - Underground Injection Control Permit, issued by the Oregon Department of Environmental Quality under the Federal Clean Water Act and Safe Drinking Water Act.
- b) Implement standards and best practices for all transportation projects with regard to protection restoration of existing riparian buffers where waters of the state border current and future rights of way.
- c) Implement a program for the assessment and prioritization of fish passage barriers at stream crossings following the Oregon Department of Fish and Wildlife (ODFW) Fish Passage Rules.
- d) Secure funding for the restoration of existing fish passage barriers at stream crossings to meet ODFW Fish Passage Rules.
- e) Identify and protect critical fish and wildlife migration corridors to prevent the further fragmentation of existing habitats by future project alignments.

Policy 21: Environment

Work with ODFW and other partners to identify wildlife corridors and wildlife crossings on County roads, and ensure that project design is wildlife friendly.

Strategies

- a) Review and update Multnomah County Design and Construction Manual to include wildlife friendly design and construction options in the Zoning Ordinance and Transportation System Plan.
- b) Implement project prioritization criteria that address wildlife and climate change in the Capital Improvement Plan and Program.
- c) Improve identified wildlife crossings through the development and adoption of a countywide Transportation Capital Improvement Program (CIP) that includes projects that address deficient fish passage barriers and wildlife crossings.

Policy 22: Transportation Health

Ensure that the transportation system is designed to minimize negative health impacts and promote healthy behaviors and environments by:

A. Improving safety for all modes

Strategies

- a) Lowering traffic speeds through speed limits, enforcement, and roadway design.
- b) Minimizing modal conflict by planning and building bicycle and pedestrian networks that encourage travel on low-traffic streets or off-street trails.
- c) Identifying and addressing real and perceived high crash corridors or hot spots with high crash rates.
- d) Incorporating safety-related features and best practices when designing new facilities or renovating existing facilities.
- e) Ensuring that vulnerable groups such as youth, elderly, low-income and disabled are engaged in planning and design efforts.
- f) Supporting Safe Routes to School and other education and encouragement programs that teach people how to safely use the transportation system
- g) Developing a transportation safety action plan.
- h) Coordinating with land use planning for safe traffic control and parking at events and other peak use generators.
- i) Coordinating with other agencies such as ODOT when appropriate.

B. Increasing opportunities for physical activity by promoting active transportation modes (walking, bicycling, transit, and equestrian) and multimodal access to parks, trails, open space, and other recreational facilities and employment centers.

Strategies

- a) Building out multimodal transportation networks.
- b) Ensuring safe, convenient, multimodal access to parks, trails, open space and other recreational facilities and employment centers.
- c) Supporting Safe Routes to School and other education and encouragement programs that teach and encourage people to safely use active transportation modes.
- d) Partnering with the Multnomah County Health Department on health promotion and chronic disease prevention programs and initiatives that focus on increasing physical activity.

C. Ensuring multimodal access to health supportive resources such as healthy food retail, employment, affordable housing, and parks and recreation facilities.

Strategies

- a) Coordinating land use planning to ensure that such resources are easily accessible by multiple modes.
- b) Working with transit providers to ensure that service plans are coordinated with development.
- c) Working with transit providers to ensure that bicycle and pedestrian improvements support transit use.
- d) Ensuring site design guidelines and requirements provide and promote multimodal site access and circulation, and appropriate connections.

D. Reducing exposure to air, light, and noise pollutants

Strategies

- a) Encouraging programs that reduce dependence on single occupant vehicle miles travelled and increasing use of electric and low emission vehicles.
 - b) Encouraging bicyclists and pedestrians to use parallel low traffic streets where possible instead of high traffic roadways.
 - c) Coordinating transportation and land use planning to avoid locating sensitive land uses near high traffic roadways. Sensitive land uses include schools, parks and playfields, community and senior centers, affordable housing, and other places where vulnerable groups such as youth, seniors, and people with low incomes spend significant amounts of time.
 - d) Establishing vegetative buffers (trees and shrubs) along roadways to filter and reduce the air and light pollutants.
 - e) Implementing anti-idling campaigns around schools, road construction zones, and other places where drivers tend to idle.
 - f) Using paving materials that are designed to minimize the production of road noise.
- E. Working with Multnomah County Health Department staff to ensure that the TSP and related planning documents incorporate the findings and recommendations from the most recent versions of their Community Health Assessment and Community Health Improvement Plan.

Strategies

- a) Having relevant health department staff serve on planning related technical and advisory committees.

- b) Having relevant planning staff participate in the development of the community health assessments and community health improvement plans.

Policy 23: Transportation Equity

Ensure that transportation system plans and investments not only equitably distribute the benefits and burdens of the system improvements, but also prioritize and support programs and projects that eliminate transportation-related disparities faced by groups that have historically had significant unmet transportation needs or who have experienced disproportionate negative impacts from the existing transportation system.

Strategies

- a) Incorporation of project prioritization criteria that address equity in the County Capital improvement Plan and Program to address investments in road, bicycle, and pedestrian programs and infrastructure in order to improve mobility and access for people who don't have access to a personal vehicle.
- b) Investments in areas with relatively high concentrations of people that have historically received relatively little benefit from transportation system investments should be considered. These people include:
 - a. *People who cannot drive.* People in this category include many older adults, children, and persons with disabilities.
 - b. *People experiencing poverty,* including those who do not have access to a car, are struggling with the high costs of car ownership, maintenance, and operation, or are struggling with the cost of transit. People in this category include many people with low incomes, people of color, older adults, persons with disabilities, people who are geographically isolated, and people who experience language barriers.
 - c. *People with limited mobility.* People in this category include many older adults and persons with disabilities.
 - d. *Isolated individuals living far from community centers and lacking direct routes for accessing goods and services.*
 - e. *Communities experiencing racism and discrimination.*
- c) Coordinating transportation planning with land use and development to avoid locating sensitive land uses near high traffic roadways. Sensitive land uses include schools, parks and playfields, community and senior centers, affordable housing, and other places where vulnerable groups such as youth, seniors, and people with low incomes spend significant amounts of time.
- d) Coordinating transportation planning with land use and development to ensure that new development is well connected with existing development and provides convenient multi-modal access to health supportive resources such as schools, healthy food retail, employment, affordable housing, parks and recreation facilities, and medical and social services.

- e) Ensure that public participation includes outreach to equity focused or population specific organizations or culturally specific organizations and explore partnerships with these groups to develop the capacity to effectively participate in planning processes.
- f) Working with the Multnomah County Office of Diversity and Equity to use their Equity and Empowerment Lens tool to ensure that county planning staff and project stakeholders are prepared to engage in internal and external conversations about equity and use this input to inform plans, policies and projects.
- g) Conducting equity analyses that identify existing disparities as a part of county planning processes.
- h) Gathering available data and public input useful for understanding equity issues, impacts and opportunities.

SAUVIE ISLAND AND MULTNOMAH CHANNEL RURAL AREA TSP POLICIES

Policy 5.1

The Multnomah County Bicycle and Pedestrian Advisory Committee should maintain continuous Sauvie Island representation to the extent possible.

Policy 5.5

Coordinate with ODOT Rail and Public Transit Division to promote appropriate safety devices at crossings.

Policy 5.6

Coordinate with the Oregon Department of Fish and Wildlife (ODFW) and Columbia County to manage and reduce demand on the Sauvie Island transportation system, especially during peak use periods, by making more efficient use of capacity on the system through strategies such as user fees, shuttles, and parking management programs. Strategies may include, but are not limited to:

- a) Encourage and support action by the Oregon Fish and Wildlife Commission to increase daily fees during peak use periods to an amount that will effectively reduce the traffic burden on Sauvie Island roads and reduce adverse wildlife impacts resulting from heavy traffic, noise and dust.
- b) Encourage Columbia County and the Columbia County Sheriff to prohibit parking on county roads outside designated parking areas and to post and enforce its parking restrictions.
- c) Encourage the use of ride sharing, and support safe and convenient park-and-ride facilities for carpools and transit service in convenient and appropriate off-island locations.

- d) Explore options for shuttle support and traffic reduction strategies such as traffic fees and parking management programs.
- e) Coordinate with transit agencies and service providers to identify existing transit deficiencies and the improvements necessary to increase accessibility to transit service by potential users.

Policy 5.13

Encourage the Multnomah County Sheriff's Office to explore increased patrols and service to the island and keep the Sheriff's Office apprised of identified peak periods (days and seasons).

Policy 5.14

Maintain updated traffic counts for the plan area capturing peak season volumes.

Policy 5.15

Explore opportunities to connect Marina Way to Larson Road and extend Larson Road north of the Sauvie Island Bridge to provide safer and more convenient access for marina residents and patrons along Multnomah Channel.

Policy 5.16

Explore opportunities to provide public restroom facilities for Sauvie Island visitors.

Section 5 Transportation System Plan

TRANSPORTATION SYSTEM PLAN

This section details the projects and programs needed to serve Multnomah County through 2035. They represent the culmination of the existing needs and guidance from the CAC, citizens, business owners, the PMT, and governmental agencies within Multnomah County. The projects and programs help to ensure and support the efficient and safe multimodal movement of people and goods throughout the county.

ROADWAY FUNCTIONAL CLASSIFICATION AND STANDARDS

Functional classification systems are used to establish a hierarchy of roadways based on their primary function (e.g., moving people across regions or providing access to local destinations). These classification levels are identified by ODOT for state facilities, the County for County facilities, and local agencies for their own classification levels within their community. The classification levels also determine the recommended roadway cross-sections for different facilities. The functional classification of roadways that Multnomah County established is based on the following hierarchy:

- **Minor Arterials** represent the lowest order arterial facility in the regional street network. They typically carry less traffic volume than principal and major arterials, but have a high degree of connectivity between communities. Access management may be implemented to preserve traffic capacity. Land uses along the corridor are a mixture of community and regional activities. Minor arterial streets provide major links in the regional road and bikeway networks; provide for truck mobility and transit corridors; and are significant links in the local pedestrian system.²
- **Rural Arterials** are the primary means of access into the County's large rural districts, and often 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, truck trips related to farm, forest, and other natural resource products, and recreational trips involving autos, bicycles and equestrians.³
- **Major Collectors** serve several purposes including linking neighborhoods to the regional system of bicycle and automobile streets, and basic transit services. They typically provide direct access between residential and commercial developments, schools and parks and carry higher volumes of traffic than neighborhood streets. Major collector streets are also utilized to access industrial and employment areas and other locations with large truck and over-sized load volumes.³

² Multnomah County Functional Classification (Policy 34). <https://multco.us/transportation-planning/multnomah-county-functional-classification-policy-34>. Accessed May 2015.

- **Neighborhood Collectors** provide access primarily to residential land uses and link neighborhoods to higher order roads. They generally have higher traffic volumes than local streets.³
- **Local Urban and Rural** provide access to abutting land uses on low traffic volume and low speed facilities. Their primary purpose is to serve local pedestrian, bicycle and automobile trips and limited public transportation use in urban areas; and auto and farm vehicle circulation with local pedestrian, bicycle and equestrian use in rural areas.³

Figures 6A and 6B depict the functional classifications of the roadways in the five rural study areas. As shown, the areas are mostly served by collectors and local roadways. Key arterials and state facilities that connect the rural areas to the regional system include I-84, Highway 30, Cornelius Pass Road, Orient Drive, Stark Street, Corbett Hill Road, and Troutdale Road.

Expectations about speed limits generally correspond with the functional classification of the roadway with higher classification (e.g. arterials) having greater speeds and lower classifications (e.g. locals) having lesser speeds. Figures 7A and 7B show the speed limits on roadways within the study area.

Roadway Cross-Section Standards

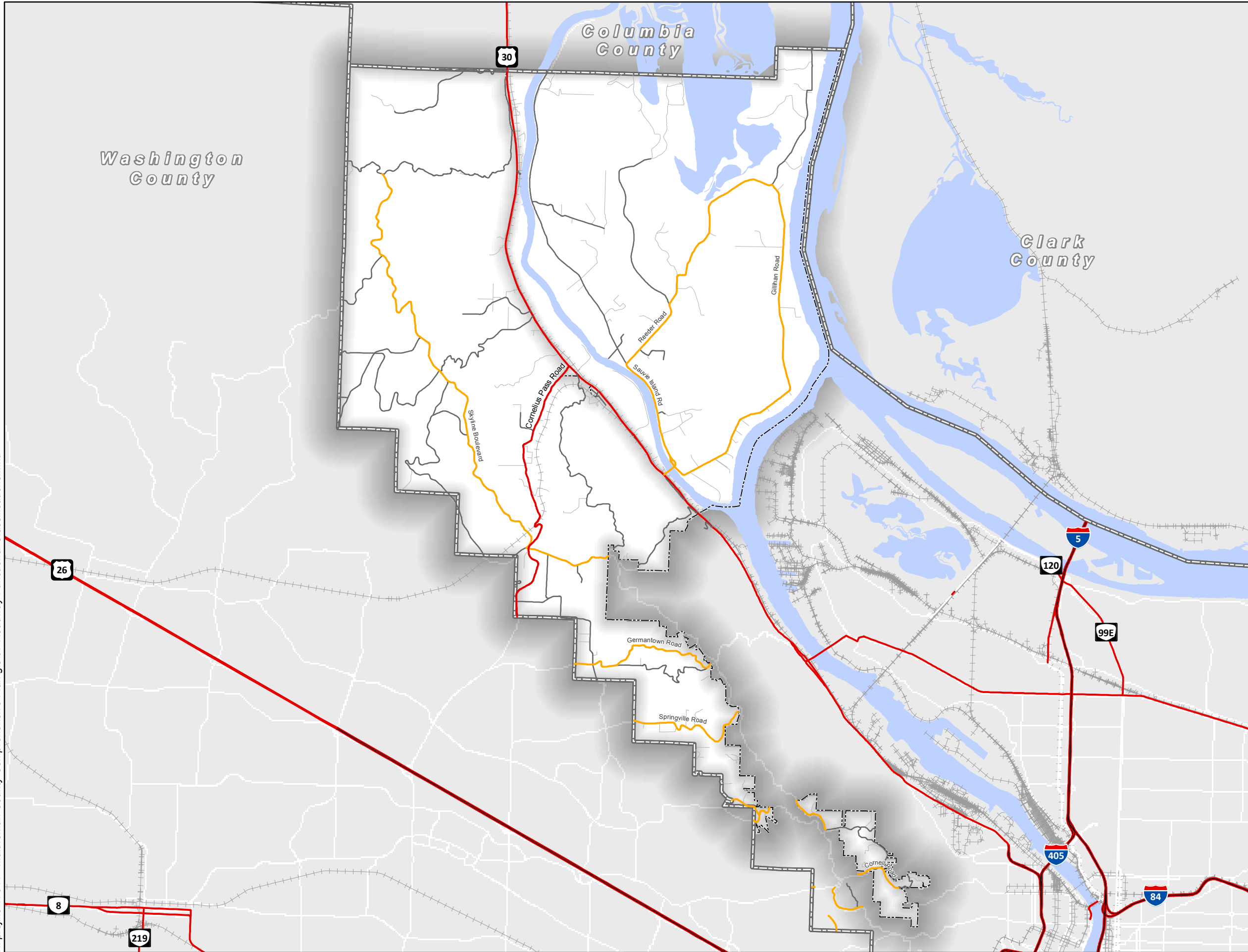
Expectations about roadway cross-sections are provided for each of the County's functional classifications. These cross-sections identify the required width for pedestrian facilities, bicycle facilities, landscaping/drainage, and number and width of vehicular travel lanes. The cross-section standards typically inform new construction of roadways or roadway modification and modernization projects. Older roadways are typically upgraded to current standards when modified or reconstructed.

The County's current Design and Construction Manual³ identifies rural roadway design standards. These standards are summarized below in Table 7. The County is in the process of revising these to incorporate context sensitive standards.

As shown in the Table 7, rural roadways in the County are not currently required to have bike lanes or marked bicycle facilities. The roadway design standards indicate that bicyclists shall be accommodated on the shoulder, when appropriate, based on the facility's traffic volumes. The Design and Construction Manual indicates that shoulders on collectors and arterials should be paved for a minimum of five feet. Rural roadways are also not required to have separate pedestrian facilities. Instead, rural roadway shoulders are typically used by pedestrians, bicycles, oversized vehicles, and for emergency pull-off purposes.

³ Multnomah County Design and Construction Manual. <https://multco.us/file/16499/download>.

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Comprehensive Plan

Figure 6A
Roadway Functional
Classifications

Roadway Functional Classification (MultCo)

- Interstate / Expressway
- Arterials
- Collectors
- Local
- Local (not maintained by county)
- Railroad (ODOT)
- Plan Areas
- County Boundaries

0 0.5 1 2 Miles



Prepared By: Kittelson & Associates, Inc. Date: 2/18/2016

Coordinate System:
NAD 1983 HARN State Plane Oregon North FIPS 3601

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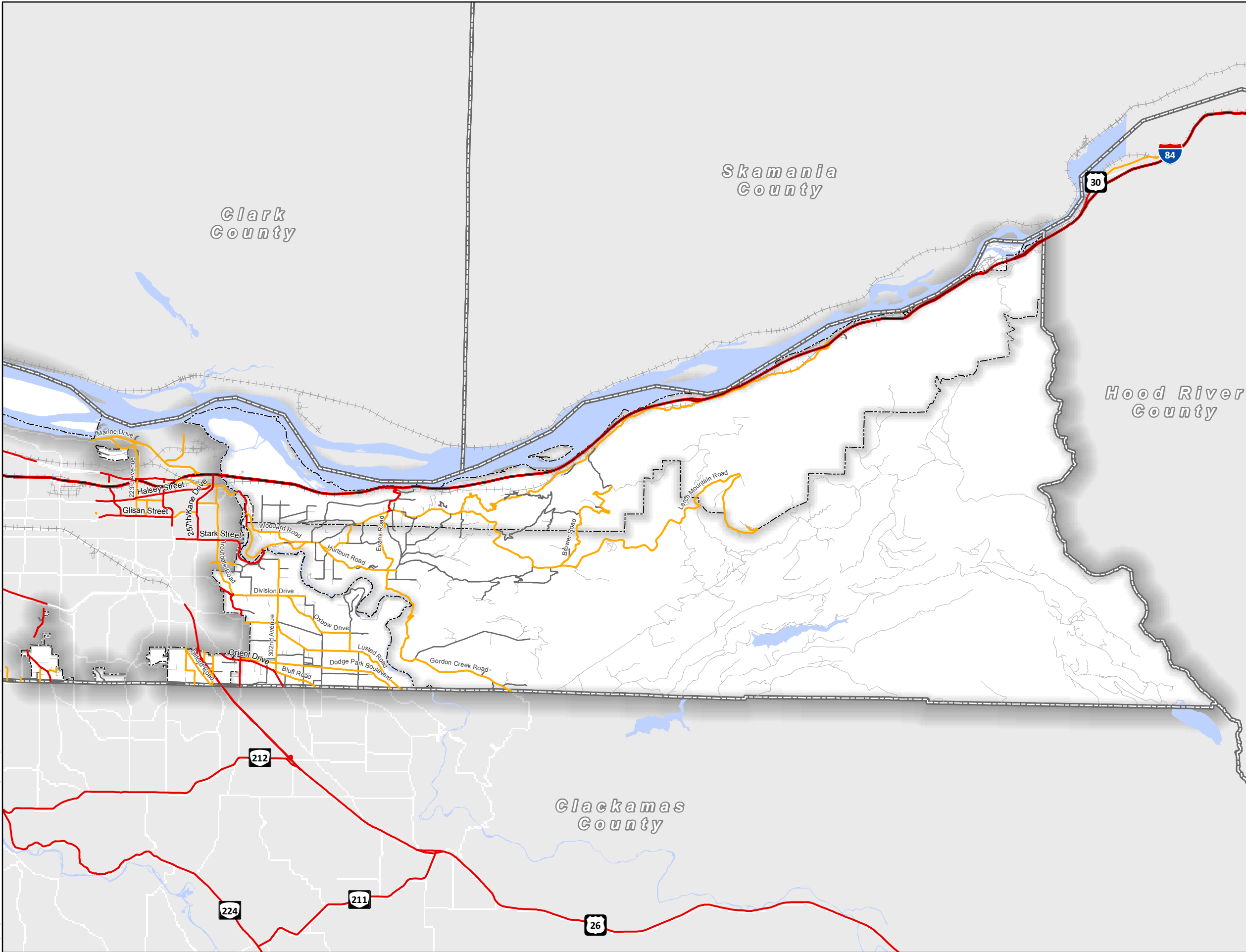


Figure 6B
Roadway Functional Classifications

Roadway Functional Classification (MultCo)

-  Interstate / Expressway
-  Arterials
-  Collectors
-  Local
-  Local (not maintained by county)
-  Railroad (ODOT)
-  Plan Areas
-  County Boundaries

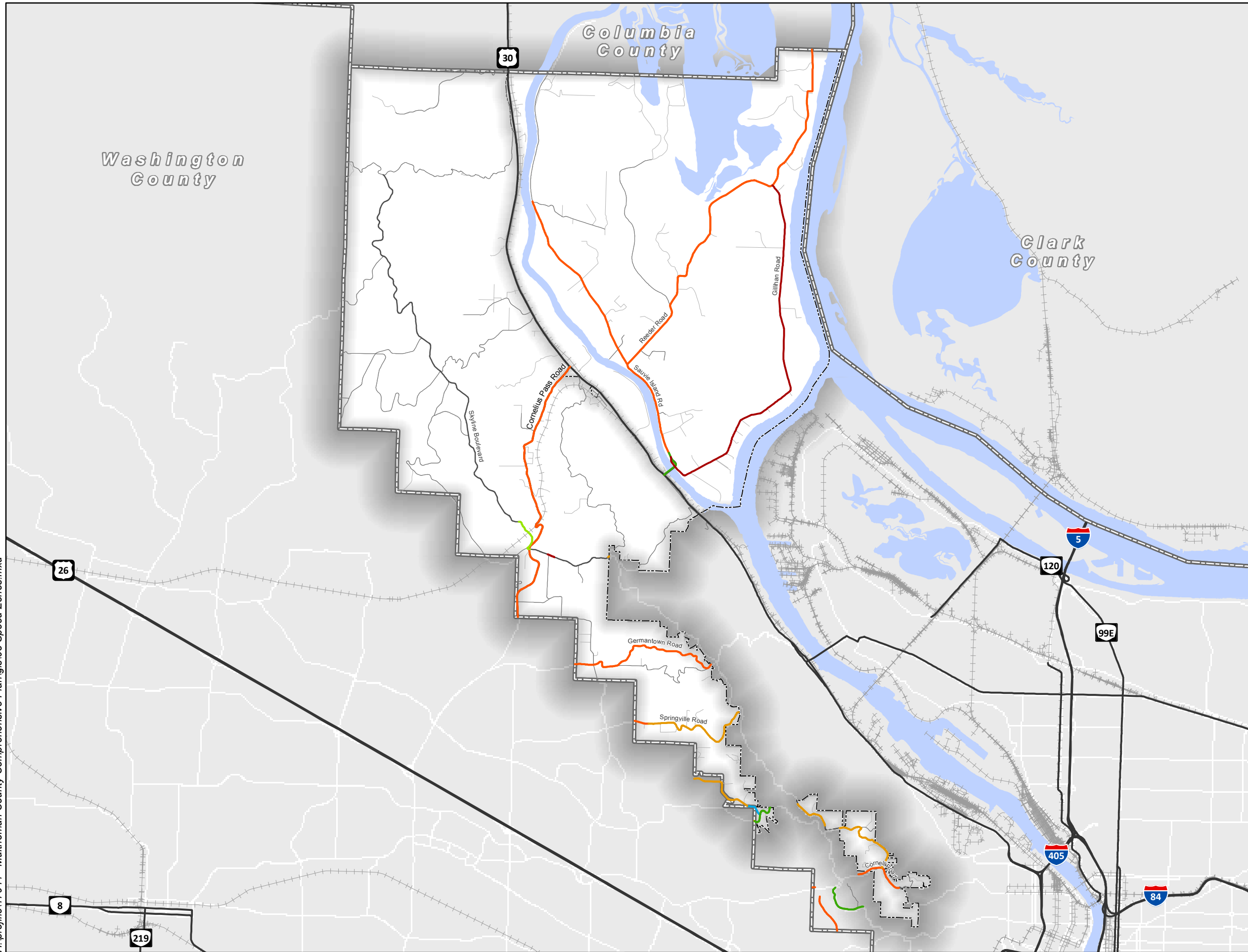


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H:\profile\17944 - Multnomah County Comprehensive Plan\gis\08 Speed Zones.mxd



Comprehensive Plan

Figure 7A Speed Zones

Speed Zones MPH

- 20
- 25
- 30
- 35
- 40
- 45
- 55

Plan Areas

County Boundaries

0 0.5 1 2 Miles



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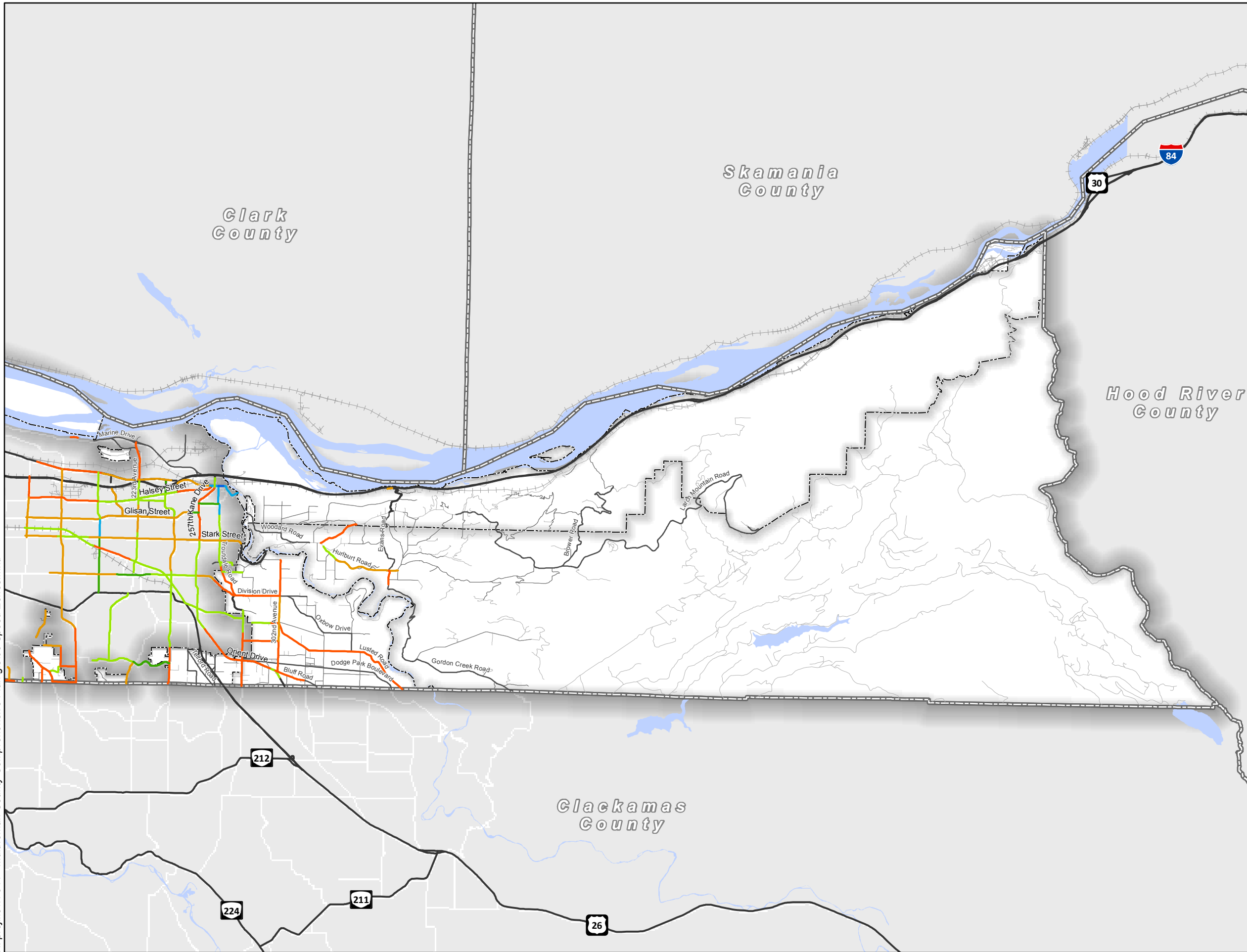


Figure 7B
Speed Zones

Speed Zones MPH

-  20
-  25
-  30
-  35
-  40
-  45
-  55

-  Plan Areas
-  County Boundaries

0 1 2 4 Miles



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Table 7 Multnomah County Standards for Typical Rural Sections

Classification	Right-of-Way Width (ft)	Paved Width (ft)	Number of Lanes	Shoulder Width (ft)	Travel Lane Width (ft)
Arterial	60-90	20-55	2-4	6-8 (min. 5 ft. paved)	10-14
Collector	50-80	20-24	2	5-8 (5 ft. paved)	10-12
Local	50-60	20-24	2	5-6	10-12

Paved Width refers to the travel way and does not include shoulders

Figures 8A and 8B show the current width of roadways in the study area including both travel ways and paved shoulders. As shown, most roads are 28 feet or less with many 23 feet or less. This indicates that many of the rural roadways have narrow or no paved shoulders.

BRIDGES

Within the study areas, the County owns 25 bridges and associated ramps and supporting structures. With the exception of the Willamette River bridges, the majority of the County's bridges are in the rural areas. The locations of the County bridges are shown in Appendix B (Figures 13A and 13B). The County's Capital Improvement Plan identifies the needs for these bridges. The County's Willamette River Bridges are further addressed in detail as part of the Willamette River Bridges Capital Improvement Plan and Program updated in 2015.

ODOT maintains an inventory of bridge conditions within Multnomah County. State, County, and City owned facilities over 20-feet in length are assigned a sufficiency rating based on inspections conducted at regular intervals, usually every two years. The sufficiency rating is a measure between 0 and 100 calculated by the Federal Highway Administration (FHWA), based on factors such as condition, materials, load capacity, and geometry (i.e., dimensions). Structural sufficiency rating data for Multnomah County bridges is summarized in Table 8. Bridge IDs that include letters at the end signify that they are a ramp associated with the main structure. As seen in Table 8, the NW Broadway Ramp over the Broadway Street connection, the Stark Street Bridge, and the Latourell Falls Road Bridge are currently considered structurally deficient.

Table 8 Multnomah County Bridges

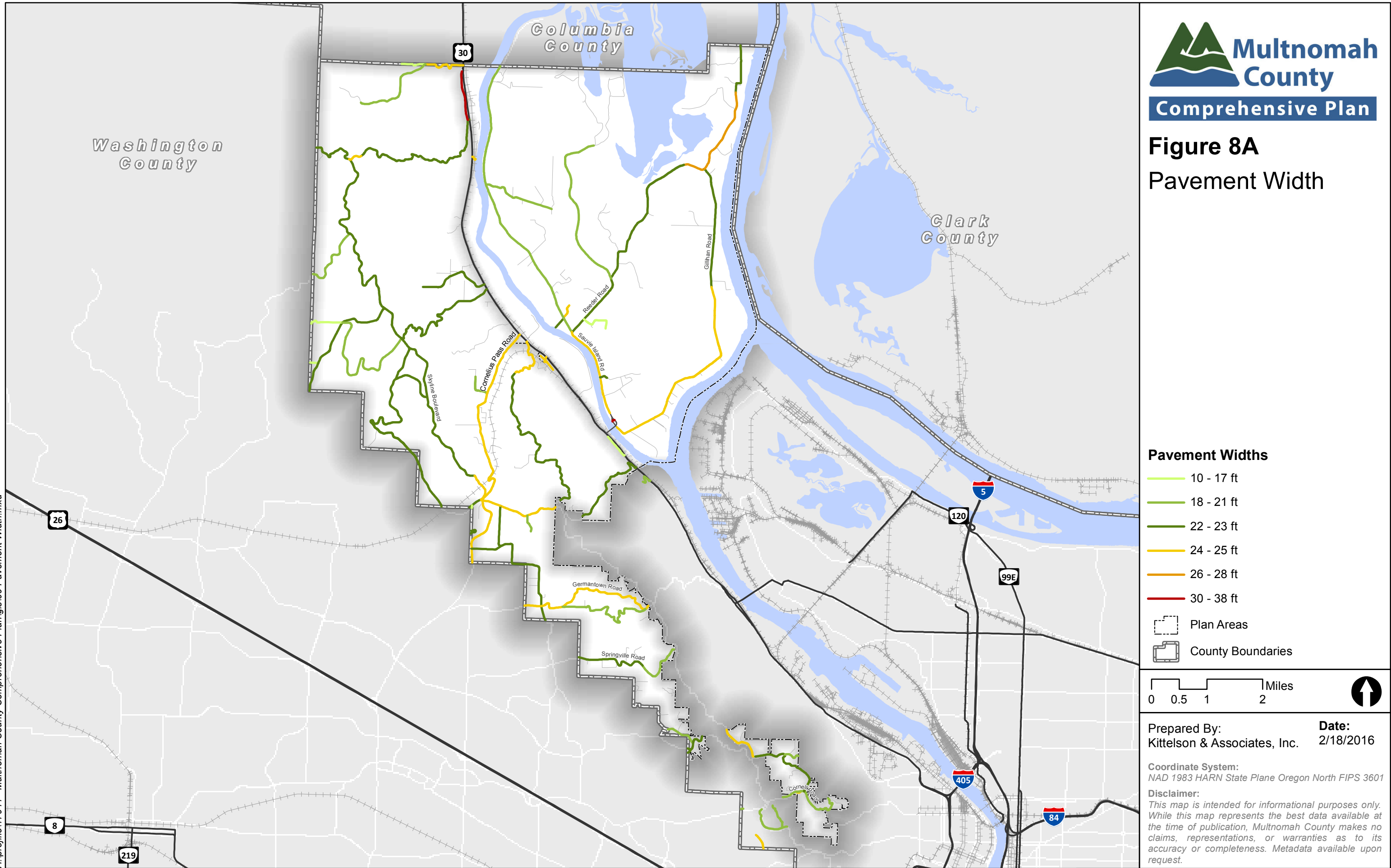
Map ID	County Bridge ID	Name	Sufficiency Rating	Sufficiency
1	511	Burnside Bridge	69.1	Not Deficient
1a	511A	West Burnside Approach	40.1	Not Deficient
1b	511B	East Burnside Approach	44.0	Not Deficient
2	2757	Hawthorne Bridge	55.9	Not Deficient
2a	2757A	Hawthorne Blvd Ramp to Hwy 1E SB	58.0	Not Deficient
2b	2757B	SE Madison St Ramp over Hwy 1E SB	61.7	Not Deficient
2c	2757D	Willamette River, SW Hawthorne Blvd	47.6	Not Deficient
2d	2757F	SE Hawthorne Blvd over SE Water Ave	56.9	Not Deficient
3	2758	Morrison Bridge	53.5	Not Deficient
3a	2758A	SE Belmont St over Hwy 1 & Conns	71.7	Not Deficient
3b	2758B	W Morrison Br Conn over Hwy 1W & Park	64.5	Not Deficient
3c	8589 (with 2758)	Willamette R & Hwy 1, SE Morrison St	61.7	Not Deficient
3d	8589Y (with 2758)	SE Yamhill St Ramp over Hwy 1 & Conn	70.0	Not Deficient
4	4522	Beaver Creek Bridge	48.8	Not Deficient
5	6757	Broadway Bridge	58.4	Not Deficient
5a	6757A	NW Broadway Ramp over Broadway St Conn	48.7	Structurally Deficient
5b	6757C	N Broadway St over N Interstate Ave	70.8	Not Deficient
6	21493 (formerly 6879)	Sellwood Bridge	82.0	Not Deficient
7	9321	223rd/Marine Drive Overpass	78.1	Not Deficient
8	11112	Stark Street Bridge	47.9	Structurally Deficient
9	11113	Stark Street Viaduct	86.6	Not Deficient
10	17211	207th Ave over UPRR	98.0	Not Deficient
11	17356	238th Ave over UPRR	91.6	Not Deficient
12	18206	207th over Fairview Creek	97.7	Not Deficient
13	20136	Sauvie Island Bridge	68.0	Not Deficient
14	20722	282nd over Johnson Creek	98.3	Not Deficient
15	25T05	Halsey Street Box Culvert	76.7	Not Deficient
16	25T08	252nd Avenue Bridge	56.2	Not Deficient
17	25T16	Jenne Road/174th Av Bridge	58.9	Not Deficient
18	51C09	Littlepage Rd Box Culvert	71.4	Not Deficient
19	51C10	Latourell Falls Road Bridge	37.0	Structurally Deficient
20	51C12	Smith Road Bridge	96.0	Not Deficient
21	51C13	Gordon Creek Road Viaduct	78.7	Not Deficient
22	51C14	Gordon Creek Bridge	57.0	Not Deficient
23	51C15	Circle Avenue Bridge #1	67.2	Not Deficient
24	51C34	Circle Avenue Bridge #2	69.6	Not Deficient
25	6967A	257th over UPRR	88.9	Not Deficient

FREIGHT ELEMENT

The freight plan includes a countywide Freight Map that identifies the freight needs in the rural areas and urban areas of Multnomah County. Figures 9A and 9B show County-designated freight routes, including ODOT freight routes and roadways under freight restrictions. Restrictions include roadways limited to 40-foot-long vehicles, to 50-foot-long vehicles, and to local deliveries only. Appendix 2 describes the existing rail and freight system conditions and inventory.

DRAFT

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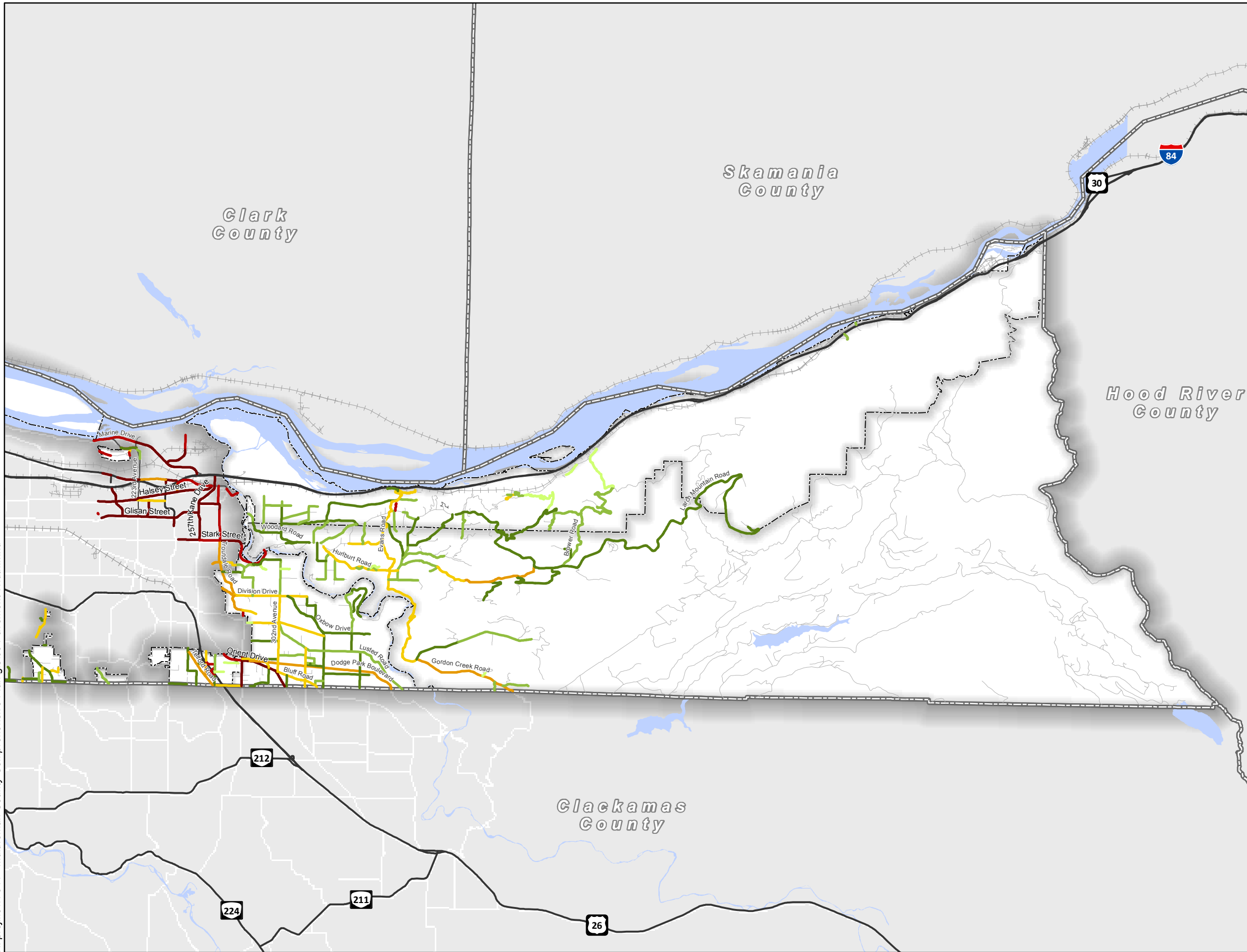
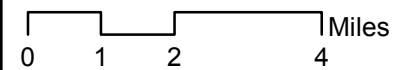


Figure 8B
Pavement Width

Pavement Widths

- 10 - 17 ft
- 18 - 21 ft
- 22 - 23 ft
- 24 - 25 ft
- 26 - 28 ft
- 30 - 38 ft
- >39 ft

-  Plan Areas
-  County Boundaries

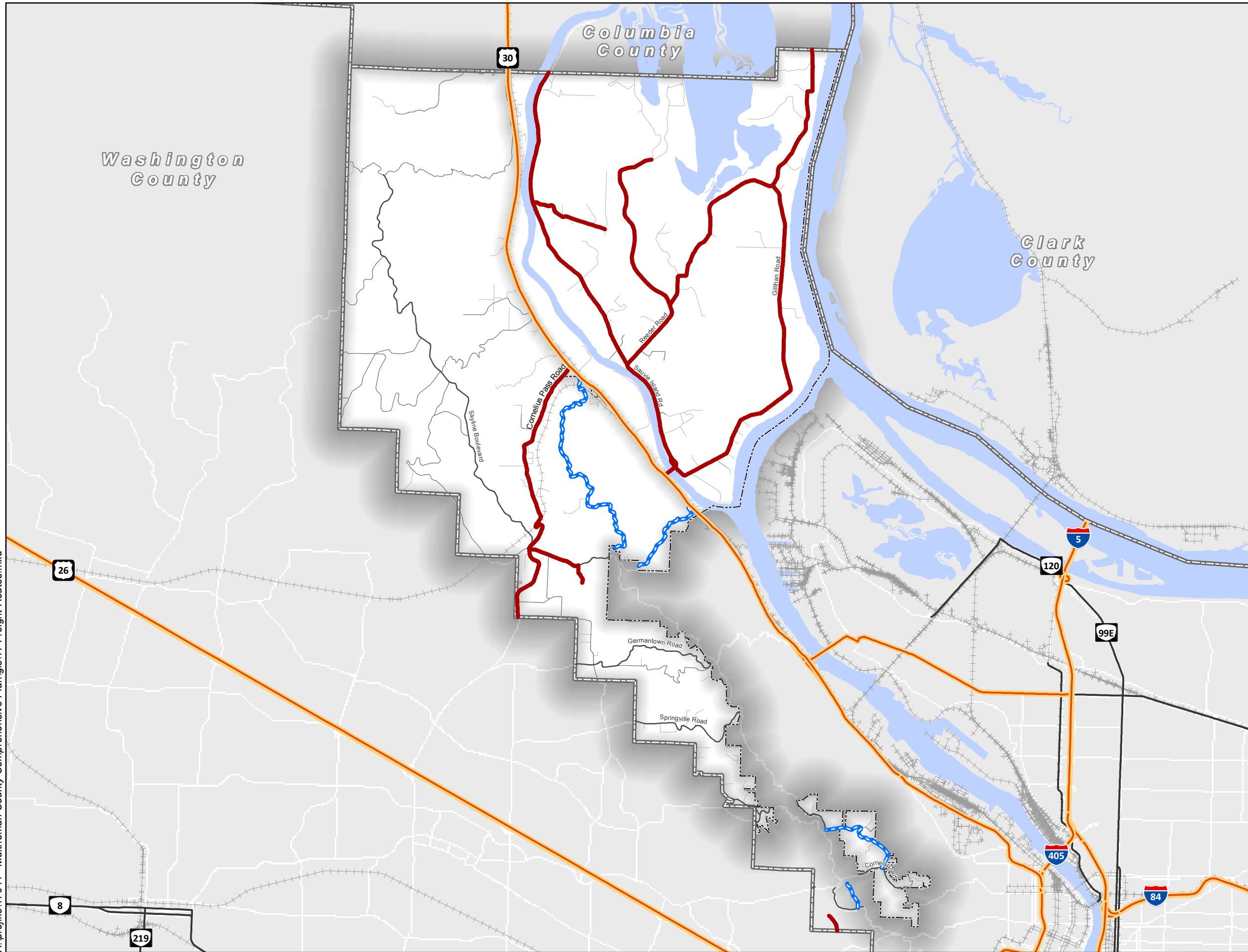


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H:\profile\17944 - Multnomah County Comprehensive Plan\gis\17 Freight Routes.mxd



Comprehensive Plan

Figure 9A Freight Routes

- No Additional Restrictions
- Limited to 40 ft. Overall Length
- Limited to 50 ft. Overall Length
- Through Trucks Prohibited, Local Deliveries Only
- ODOT Freight Routes
- Plan Areas
- County Boundaries

0 0.5 1 2 Miles

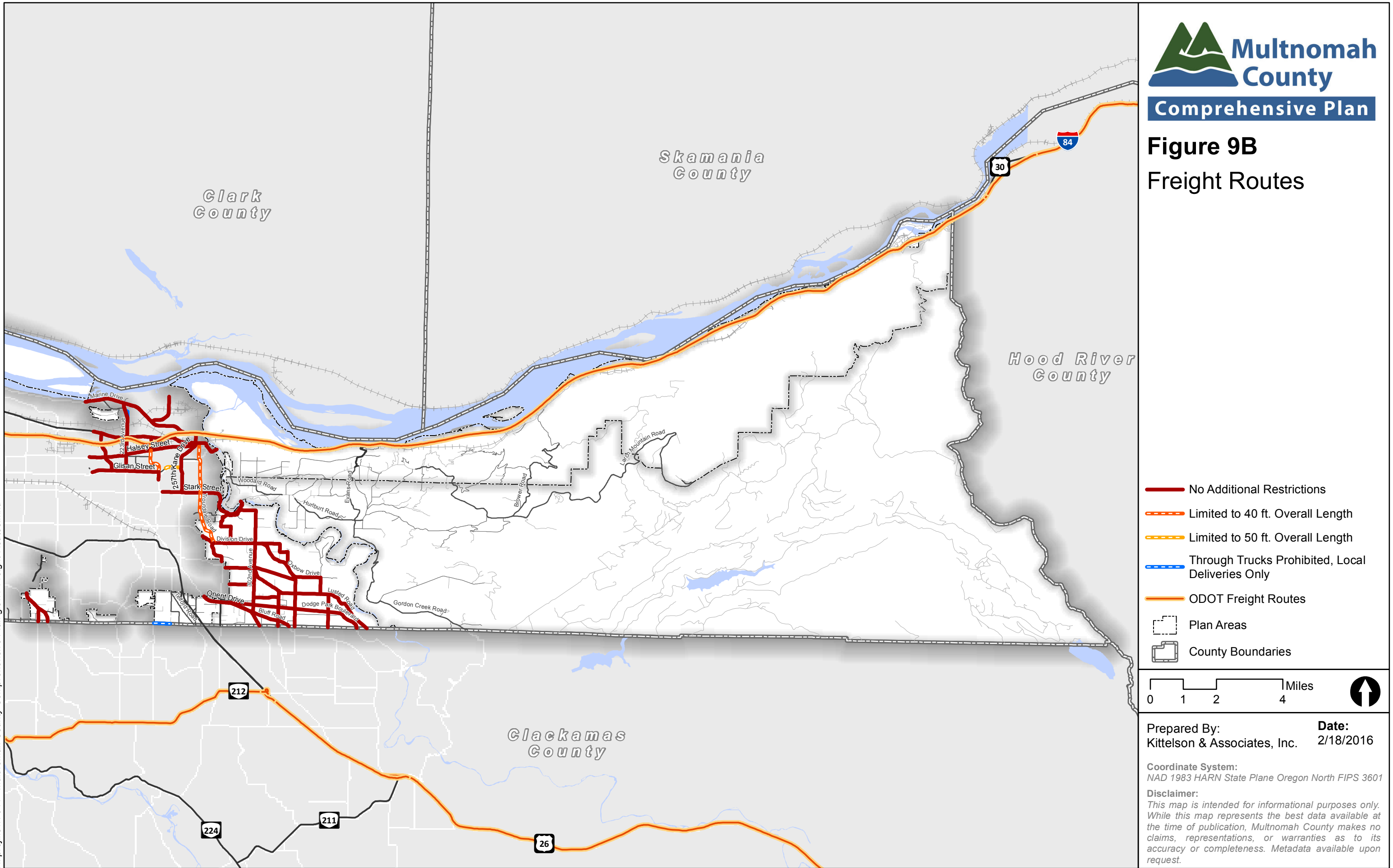


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PEDESTRIAN AND BICYCLE ELEMENT

The pedestrian and bicycle plan includes a countywide Roadway Bicycle Designation map as well as projects to address the needs of bicycles and pedestrians in the rural areas (see Figures 10A and 10B).

Pedestrian needs within the rural areas are primarily addressed through the addition of shoulders that serve pedestrians and bicyclists or through shared use paths. In rural areas, the shoulders are the primary facility available to pedestrians.

The Roadway Bicycle Designation map illustrates the roadway bicycle designations for all County and ODOT facilities. The designations help define the type of bicycle facility planned for each roadway. The three designations are described below.

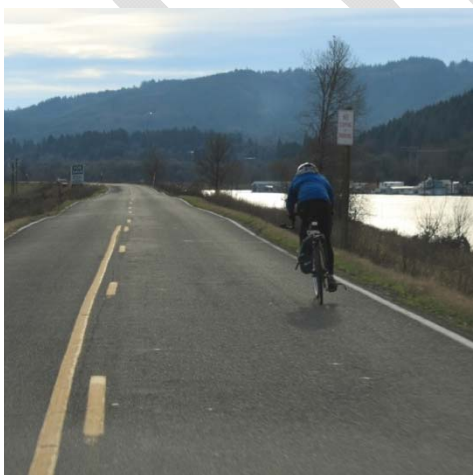
Non-Designated Routes

Non-Designated Routes are roads without bicycle facilities that are not signed or designated bicycle routes; however, bicycles may still use these routes.

Shared Roadway

Shared Roadways are roads without bicycle facilities that are designated bicycle routes. This designation may influence how the County signs, maintains, or makes other decisions with regard to these facilities.

Shared Roadways could have signage indicating a bike route. Bicyclists share the lane with vehicles on shared roadways. Shared roadways are common on low volume rural roads and highways and may, or may not, include “sharrows” (pavement marking that indicate the shared use of the roadway).





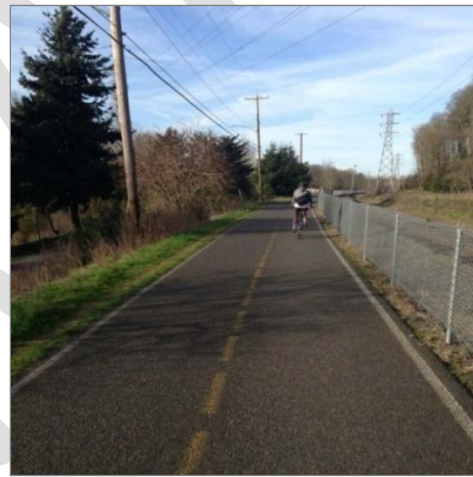
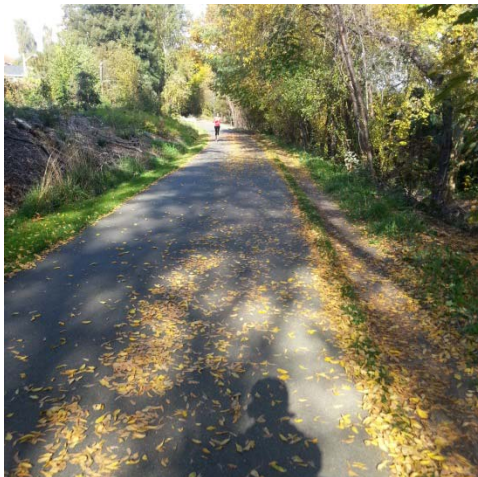
Bikeway

Multnomah County's current roadway standards require 5-8 foot shoulders depending on the roadway functional classification with a minimum of 5-foot paved shoulders on all roadways. Shoulder bikeway designated routes should provide space for cyclists to travel outside of the vehicle travel lane where warranted by prevailing conditions and traffic volumes. This could be accomplished by including continuous shoulder bikeways on both sides of the roadway ranging from 3-foot to 6-foot wide, depending upon the rural character of the area, but could also include uphill climbing lanes only, intermittent shoulders in low visibility areas, or bike pull-out areas. Shoulder bikeway designated routes typically have higher vehicular speeds and traffic volumes than routes where a shared roadway designation would be appropriate in both directions for the entire length of the roadway. Shoulder facilities also benefit pedestrians in rural areas.

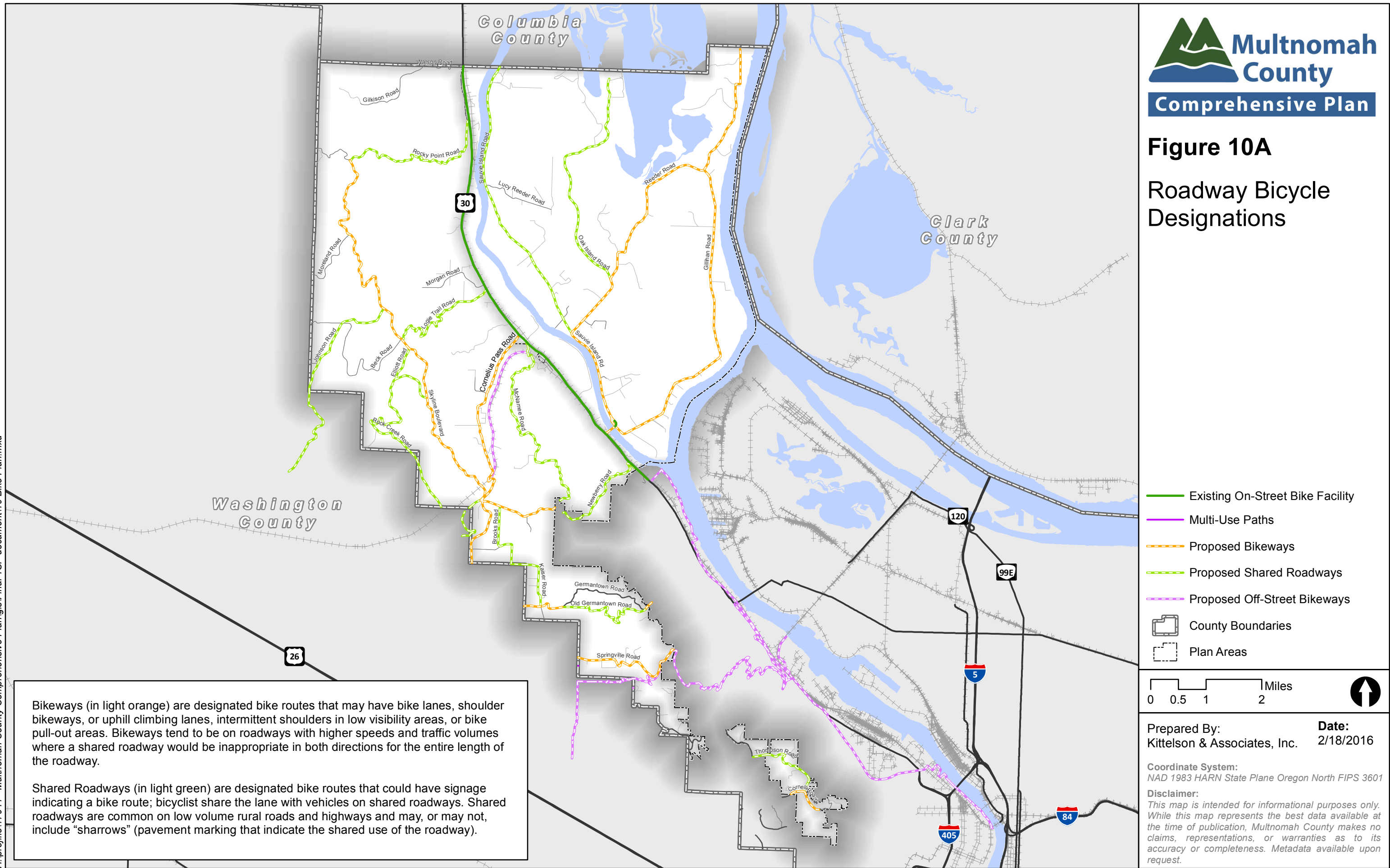




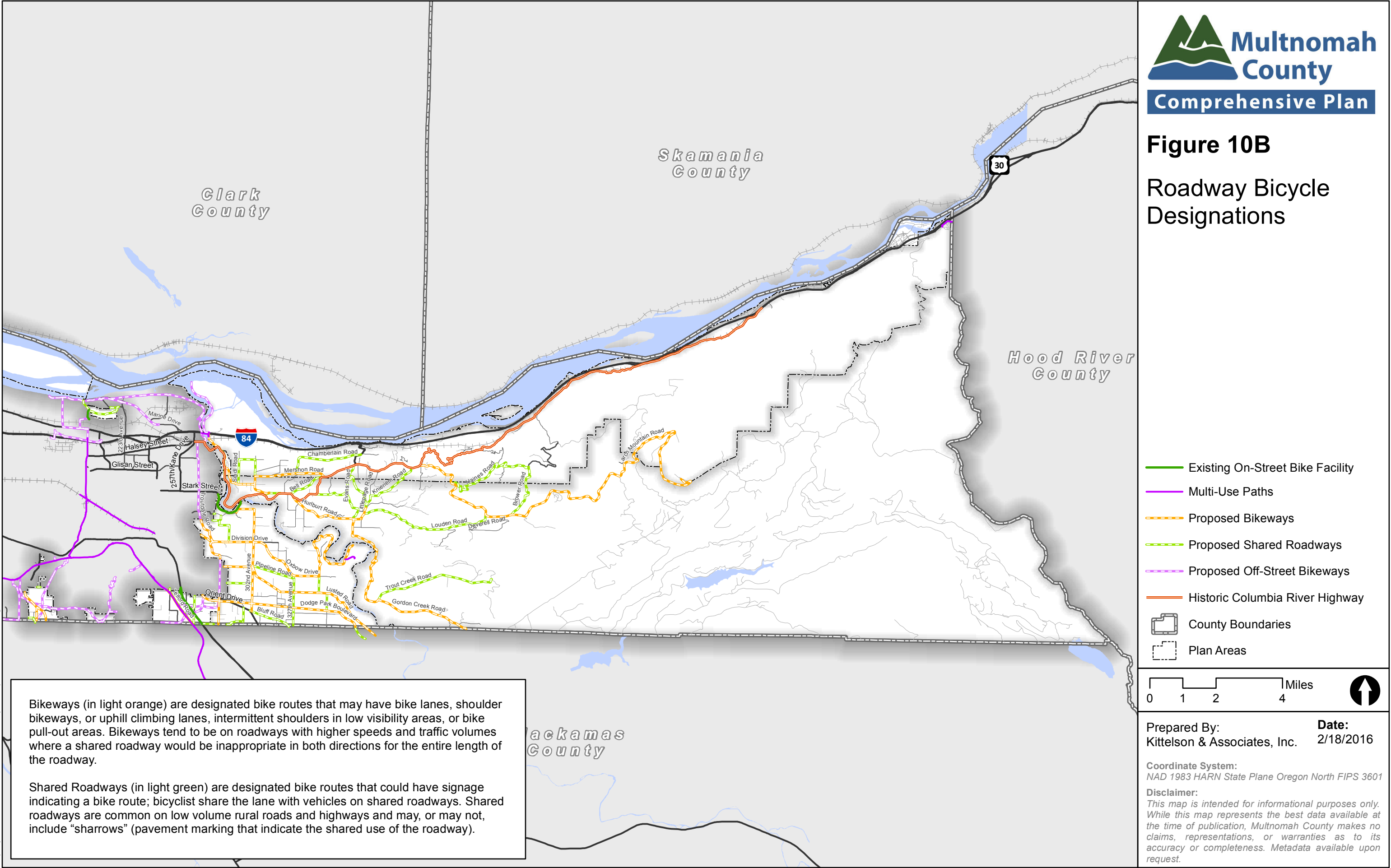
Shared-use paths are separated from the roadway by an open space or barrier. Shared-use paths are typically used by pedestrians and bicyclists as two-way facilities. Such paths can also be constructed on alignments separate from roadways to create more direct routes between destinations and also serve as elements of a recreational trail system.



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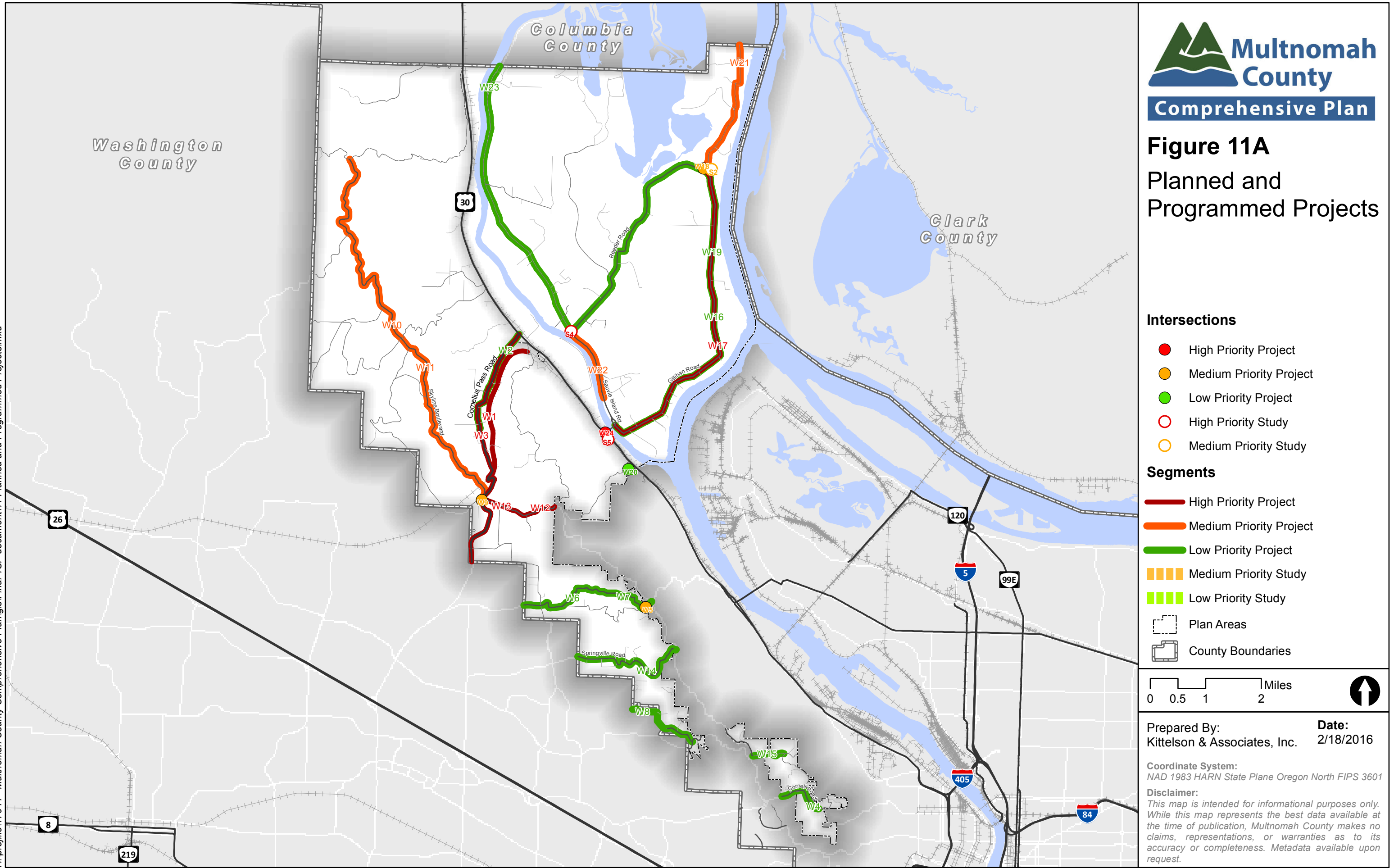


IMPROVEMENT PROJECTS

Two community workshops and multiple CAC subcommittee meetings provided feedback on the potential range of solutions in Section 3 and informed a 20-year list of programs and policies for TSP implementation. The resulting set of solutions intends to help manage traffic and ensure safe multimodal travel in the rural areas of Multnomah County during the next 20 years. The projects are categorized into one of three groups: high, medium, and low priority. High priority projects include those to be addressed within the next five years or as funding allows. Mid-term projects could be addressed within the next six to ten years, depending on funding and local priorities. Long-term could be addressed within 11 to 20 years; however, the County's current funding sources will only allow for funding of the high-priority projects over the next 20 years. Figure 11A and 11B and Tables 9 and 10 illustrate the project list.

Project priorities were developed through an iterative process. Every project was first ranked in several different categories including safety and crash history, bicycle route designation, roadway functional classification, average daily traffic, proximity to activity centers and destinations, pavement condition, and project cost. These rankings were combined to find a project priority score, which was used to group the projects into the three priority categories (high, medium, low). These initial project priorities were then adjusted based on committee and public input. The project priorities shown below reflect current sentiment of the CAC but are not binding. The priorities may vary over time and are dynamic.

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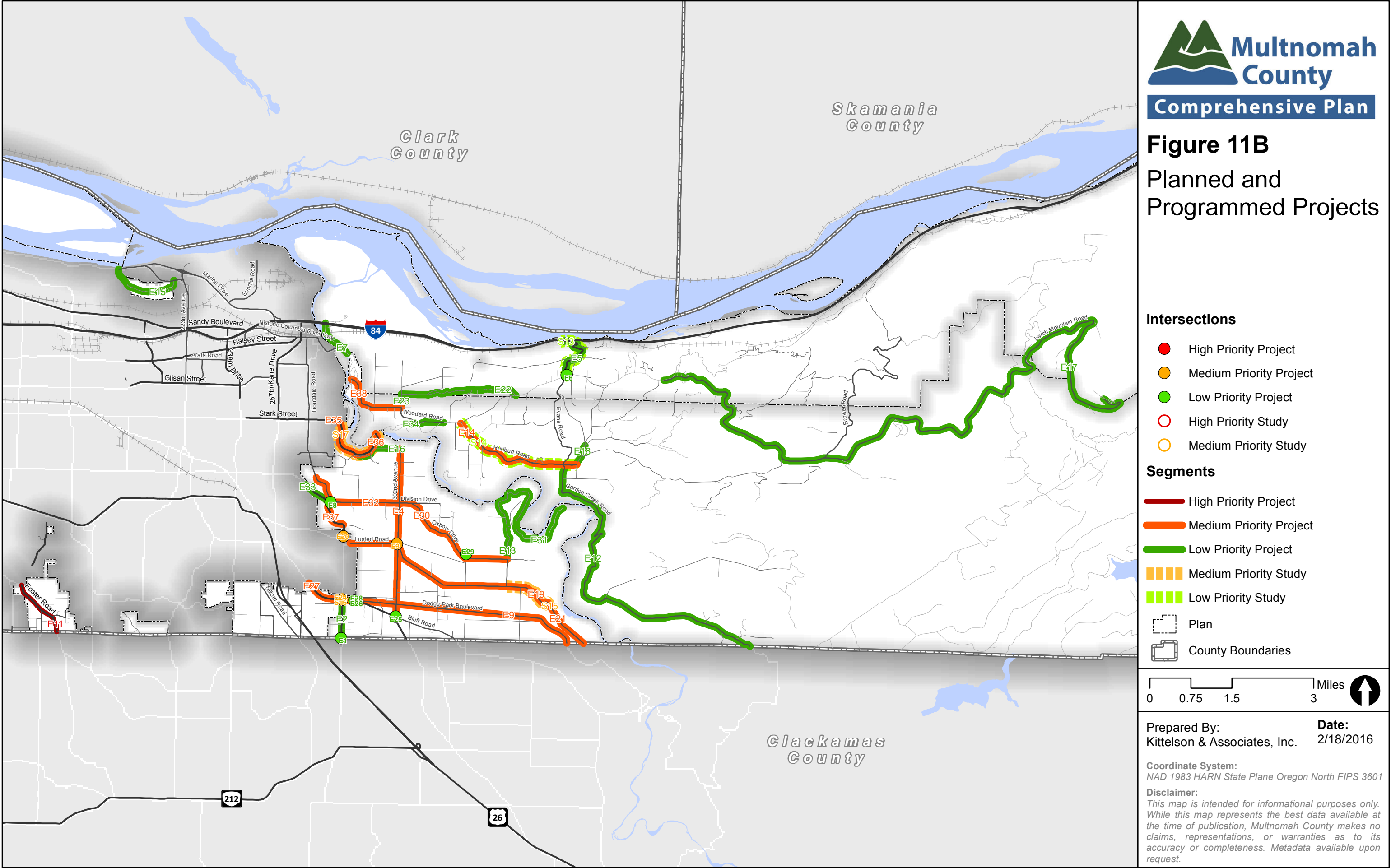


Table 9 Planned and Programmed Projects

Project Number	Project Location	Project Description	Priority	Cost
West County: West Hills				
W1	Burlington Northern Trail: Cornelius Pass Rd to McNamee Rd	County does not manage or develop trails. Work with partners to study the conversion of Burlington Northern railroad corridor parallel to Cornelius pass Road to a mixed-use trail.	high	\$\$\$
W2	Cornelius Pass Road: (old) St. Helens Road to MP 2	This project is only to be pursued if the Burlington Northern Trail does not move forward. Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs.	low	\$\$\$
W3	Cornelius Pass Road: US 30 to County Line	Safety improvements - 8th Avenue; S curves; Boyd's lower driveway; curves south of Plainview; Kaiser Road signage, clearing, and flashing beacons; corridor signage; vehicle pullouts; barrier and guardrail upgrades; reduce pavement drop offs; variable message signs. If applicable, tie into wayfinding signage that lets bicyclists know that Old Cornelius Pass Rd is a lower volume option.	high	\$\$\$
W4	Cornell Road: UGB TO UGB	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	low	\$\$\$
W5	Germantown Road/Old Germantown Road	Widen Germantown Road to create southwest bound left turn pocket and improve sight distance.	medium	\$\$\$
W6	Germantown Road: Skyline Boulevard to County Line	Provide safety improvements such as augmenting shoulders in a context-sensitive manner.	low	\$\$\$
W7	Germantown Road: Skyline Boulevard to County Line	Safety spot improvements – Widen lanes on curves only, install center skip like reflective markers, and install mirror at intersection with Old Germantown Road. Install Dynamic Curve Speed Warning System. Two flashing speed signs each direction on Germantown Rd west of Skyline Blvd between mileposts 2.5-3.5. Install traffic calming devices to reduce speeds.	low	\$\$
W8	Laidlaw Road: McDaniel Rd to Saltzman Rd	Provide safety improvements such as augmenting shoulders in a context-sensitive manner.	low	\$\$\$
W20	Newberry Road	Safety spot improvement – Install guardrail ¼ mile south of US 30 and identify if there is a speeding concern and if so, install countermeasures 1.2 miles from US 30.	low	\$
W9	Skyline Boulevard/Cornelius Pass Road	Cornelius Pass Road intersection improvements – install signal, provide westbound left-turn lane and through/right lane on Skyline Boulevard.	medium	\$\$
W10	Skyline Boulevard: Beck Road to Rocky Point Road	Provide safety improvements such as augmenting shoulders in a context-sensitive manner.	medium	\$\$\$
W11	Skyline Boulevard: Cornelius Pass Road to Beck Road	Provide safety improvements such as augmenting shoulders in a context-sensitive manner.	medium	\$\$\$
W12	Skyline Boulevard: UGB to Cornelius Pass Road	Provide safety improvements such as augmenting shoulders in a context-sensitive manner.	high	\$\$\$

W13	Skyline Boulevard: UGB to Cornelius Pass Road	Safety improvement – Install traffic calming devices to reduce speeds to be consistent with outcome of future speed zone study (Project S1) from UGB to Cornelius Pass Road.	high	\$\$
W14	Springville Road: UGB to County Line	Provide safety improvements such as augmenting shoulders in a context-sensitive manner. Also consistent with on-street bike/ped option in the Westside Trail Master Plan	low	\$\$\$
W15	Thompson Road: 53rd Dr to UGB	Provide safety improvements such as augmenting shoulders in a context-sensitive manner.	low	\$\$\$
West County: SIMC				
W16	Gillihan Road Curve Improvements: Sauvie Island Rd to Reeder Rd	Provide warning signs and delineation posts on curves along the loop roads.	high	\$
W17	Gillihan Road Signage Improvements: Sauvie Island Rd to Reeder Rd	Install speed limit signs on unsigned sections of Gillihan Road.	high	\$
W18	Gillihan Road/Reeder Road Intersection Upgrades	Implement a three-way stop control at the intersection of Gillihan Road and Reeder Road to be consistent with outcome of future intersection study (Project S2).	medium	\$
W19	Loop Road Shoulder Improvements	Provide 3-4 foot paved shoulders on the loop roads including Reeder Road, Sauvie Island Road, and Gillihan Road.	low	\$\$\$
	Line intentionally left blank.			
W21	Reeder Road Shoulder Improvements: Gillihan Rd to County Line	Provide separation for bicycles where warranted and/or feasible on Reeder Road from Gillihan Road to the Columbia County line. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	medium	\$\$\$
W22	Sauvie Island Road Multi-Use Path	Construct multi-use path parallel to sections of Sauvie Island Road located on the levee.	medium	\$\$\$
W23	Sauvie Island Road Shoulder Improvements: Reeder Rd to County Line	Provide separation for bicycles where warranted and/or feasible on Sauvie Island Road from Reeder Road to the Columbia County line. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	low	\$\$\$
W24	US 30/Sauvie Island Road Intersection Upgrades	Upgrade the traffic signal controller at the intersection of US 30 and Sauvie Island Road to be consistent with outcome of future intersection upgrade study (Project S5).	high	\$
W25	Advisory Bike Lane Pilot Project	Implement advisory lane pilot test project to be consistent with outcome of future advisory lane test study (Project S6). The project will temporarily implement an advisory lane and be monitored for compliance and use.	low	\$
W26	Event Permit Calendar	Develop event permit calendar and implement use.	high	\$
W27	Sauvie Island and Multnomah Channel (SIMC) Bike Map	Work with Sauvie Island Community Association (SICA) and other Sauvie Island stakeholders to develop a bike map that includes wayfinding and education	high	\$
W28	Sauvie Island Mobile Speed Radar Implementation	Obtain a mobile speed radar unit for Sauvie Island that can be relocated at regular intervals.	low	\$
W29	Sauvie Island Speed Photo Radar Implementation	Implement permanent speed photo radar signs at several locations on Sauvie Island.	low	\$

W30	Sauvie Island Speed Photo Radar Ticketing Implementation	Implement photo radar ticketing at several locations on Sauvie Island	low	\$\$\$
W31	Share the Road Improvements	Install warning/advisory signs are to inform motorists of bicycles and farm equipment sharing the road along facilities (all roads under existing conditions)	high	\$
W32	SIMC Travel Demand Management Plan	Develop a Travel Demand Management Plan for the island that further explores each of the potential TDM strategies and explores and identifies a potential Transportation Management Association (TMA) for Sauvie Island. Elements of the TDM plan should include input from study projects S3, S7-S10, and S12).	high	\$
W33	SIMC Wayfinding Upgrades	Install additional wayfinding to provide guidance to motorized and non-motorized users to areas of interest such as types and location of recreation, parking, and other key destinations.	high	\$
East County				
E1	282 nd Avenue/Stone Road Turn Lanes	The addition of right turn channelization lanes in the northbound and southbound direction on 282 nd would reduce the high incidence of rear end crashes at this location. Some roadway widening would be necessary.	low	\$\$
E2	282nd Avenue: Orient to County Line	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	low	\$\$\$
E3	302 nd Avenue/Lusted Road	Realign Lusted Road and Pipeline Road to create perpendicular intersection at 302 nd , add left turn lane to each leg of intersection.	medium	\$\$\$
E4	302 nd Avenue: Kerslake to Bluff	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	medium	\$\$\$
E5	Corbett Hill Road Safety Improvements	Implement safety improvements from future Corbett Hill Road Safety Study (Project S13).	low	\$\$\$
E6	Corbett Hill Road/Historic Columbia River Highway	Improve intersection alignment by making stops at right angle.	low	\$\$\$
E7	Corbett Hill Road: I-84 to HCRH	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	low	\$\$\$
E8	Division Drive/Troutdale Road	Realign intersection, eliminating NE leg, producing a 4-way intersection. Replace 3 existing culverts identified as fish barriers.	low	\$\$\$
E9	Dodge Park Boulevard: Orient to County Line	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	medium	\$\$\$
E10	Line intentionally left blank.			

E11	Foster Road: Jenne to County Line	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders). See also Springwater Master Plan Transportation System Plan (September 2005, Gresham).	high	\$\$\$
E12	Gordon Creek Road	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	low	\$\$\$
E13	Hosner Road: Hosner Terrace to Oxbow Park Road SE	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	low	\$\$\$
E14	Hurlburt Road: HCRH to Littlepage Road	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	medium	\$\$\$
E15	Interlachen Lane: Marine Dr to Blue Lake Rd	Add sidewalks to both sides	low	\$\$\$
E16	Kerslake Road: Wilson to 302 nd	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	low	\$\$\$
E17	Larch Mt. Road: HCRH to end of county road	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	low	\$\$\$
E18	Littlepage Road: Hurlburt to Knieriem	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	low	\$\$\$
E19	Lusted Road Safety Improvements	Implement safety improvements from future Lusted Road Safety Study (Project S15).	medium	\$\$\$
E20	Lusted Road/Powell Valley Road/282 nd Avenue Consolidation	Realignment to connect SE Lusted Road directly with SE Powell Valley Road is included in the County's Capital Improvement Plan and Program. The project would require further engineering analysis and coordination with the City of Gresham to develop a recommend alignment. A traffic signal is warranted based on projected 2020 PM peak hour volumes, and would provide LOS B operations.	medium	\$\$\$

E21	Lusted Road: 282nd to County line	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	medium	\$\$\$
E22	Mershon Road: Ogden to HCRH	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	low	\$\$\$
E23	Ogden Road: Mershon to Woodard	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	low	\$\$\$
E24	Orient Drive/282nd Avenue Safety Improvements	Implement safety improvements from future Orient Drive/282nd Avenue Safety Study (Project S16).	medium	\$\$\$
E25	Orient Drive/Bluff Road	Widen Orient Drive to create eastbound left turn lane to Bluff Road, realign Bluff and Teton to create perpendicular intersection.	low	\$\$\$
E26	Orient Drive/Dodge Park Boulevard	Widen Orient Drive to create eastbound left turn lane.	low	\$\$
E27	Orient Drive: Welch Road to Dodge Park Boulevard	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	medium	\$\$\$
E28	Orient Drive/Dodge Park Boulevard Realignment	Realign the intersection to create a more perpendicular angle. Driveway modifications would be required to serve the auto body shop in the northwest quadrant of the intersection.	low	\$\$\$
E29	Oxbow Drive/327th Avenue/Altman Road Realignment	Channelizing the broad paved area on SE 327 th Avenue at the approach to SE Oxbow Drive to create a more perpendicular intersection is recommended to improve sight distance and reduce the potential for conflict between westbound left turns and northbound left turns. Widen Oxbow Drive to create westbound left turn lane to Altman Road/327th Avenue.	low	\$\$\$
E30	Oxbow Drive: Division Drive to Hosner Road	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	medium	\$\$\$
E31	Oxbow Parkway: Hosner Road to Road End	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	low	\$\$\$

E32	SE Division Drive: Troutdale to Oxbow Parkway	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	medium	\$\$\$
E33	SE Division Drive: UGB to Troutdale Road	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	low	\$\$\$
E34	SE Nielson Road - SE Woodward Road Bicycle Detour	Install signage to encourage cyclists to use SE Nielson Road - SE Woodward Road as a detour to the adjacent segment of Historic Columbia River Highway with curves and no shoulders.	low	\$
E35	Stark St: City Limit to 35th St	Add pedestrian improvement to south side from City limits to 35th Street. Pedestrian facility type and width may vary throughout the corridor depending upon the context available, ROW, and context.	high	\$
E36	Stark Street Safety Improvements	Implement safety improvements from future Stark Street Safety Study (Project S17).	medium	\$\$\$
E37	Troutdale Road: Strebin Road to 282 Avenue	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	medium	\$\$\$
E38	Woodard Road: HCRH to Ogden Road	Provide separation for bicycles where warranted and/or feasible. Improvements could include narrow shoulders (3-4 feet) to full width shoulders (6 feet) in one or both directions or could include minimal improvements such as uphill bicycle climbing lanes or intermittent bicycle pull-outs. Solutions can be used for pedestrian use (i.e. shoulders).	medium	\$\$\$
E39	Sandy River to Springwater multi-modal connection	Partner with City of Gresham, Metro and other regional partners to construct the Sandy to Springwater Multi-modal Corridor according to the Master Plan to be developed in 2016	low	\$\$\$
	Line intentionally left blank.			
County-wide				
C1	Wayfinding Upgrades	Install additional wayfinding to provide guidance to motorized and non-motorized users to areas of interest such as types and location of recreation, parking, and other key destinations.	medium	\$

Table 10 Planned and Programmed Study Projects

Project Number	Project Location	Project Description	Priority	Cost
West County: West Hills				
S1	Skyline Boulevard: UGB to Cornelius Pass Road	Speed zone study – Conduct speed study to determine appropriate speed limit for Skyline Boulevard from Cornelius Pass Road east to city limits of Portland.	high	\$
S20	West Hills Transportation Demand Management Study	Conduct a study to determine the best TDM practices to implement in the West Hills.	high	\$
West County: SIMC				
S2	Gillihan Road/Reeder Road Intersection Improvement Study	Conduct an engineering/safety study to determine impacts and safety considerations for implementing three-way stop-control at the intersection of Gillihan Road and Reeder Road.	medium	\$
S3	Sauvie Island Bridge Toll Study	Study the implications of a Sauvie Island Bridge toll for non-residents.	low	\$
S4	Sauvie Island Road/Reeder Road Intersection Improvement Study	Conduct an engineering/safety study to determine impacts and safety considerations for implementing three-way stop-control and channelized right-turn for northbound traffic at the intersection of Sauvie Island Road and Reeder Road.	high	\$
S5	US 30/Sauvie Island Road Intersection Signal Study	Conduct study of signal timing at the intersection of US 30 and Sauvie Island Road for possible truck extensions, westbound detection issues, and optimization of green and red time.	high	\$
S6	Advisory Bike Lane Study	Conduct engineering study to identify potential locations for an advisory bike lane pilot test and verify adequate sight distance.	low	\$
S7	Daily Trip Study	Study to explore a daily trip cap.	low	\$
S8	Parking Information Distribution Study	Study to determine the most effective and feasible method to implement distribution of parking information.	low	\$
S9	Permitting Study	Work with ODF&W to implement an increased parking permit fee and/or limit number of permits. Include bicycle permitting.	low	\$
S10	Sauvie Island Park-n-Ride and Shuttle Service Study	Study to determine location of off-island park-n-ride lots and plan for on-island shuttle service for events.	low	\$
S11	SIMC Rail Study	Conduct rail corridor study to identify feasible local street connections and railroad crossing consolidation and upgrades. Project will include coordinate with owners of the private rail crossings.	low	\$
S12	Ticket and Permit Enforcement Study	Study the implementation of increased permits and enforcement of permits; including illegally parked vehicles, beach day use permits, and existing permit compliance.	high	\$
East County				
S13	Corbett Hill Road Safety Study	Study Corbett Hill Road between I-84 and Historic Columbia River Highway for potential safety improvements including curve warning signs, delineation, and shoulder widening.	low	\$
S14	Hurlburt Road Safety Study	Study the need for further safety measures after the implementation of Project E14.	low	\$
S15	Lusted Road Safety Study	Study Lusted Road for 1/4 of a mile in the east direction starting 1/3 of a mile east of Cottrell Road for potential safety improvements including curve warning signs, delineation, and shoulder widening.	medium	\$

S16	Orient Drive/282nd Avenue Safety Study	Study Orient Drive/282nd Avenue for potential safety improvements including advanced warning signs and signal modifications (timing, phasing, controller).	medium	\$
S17	Stark Street Safety Study	Study Stark Street between 36th Street and Historic Columbia River Highway for potential safety improvements including advanced warning signs and signal modifications (timing, phasing, controller).	high	\$
S18	East County Transportation Demand Management Study	Conduct a study to determine the best TDM practices to implement in East County.	low	\$
County-wide				
S19	Shared Bikeways Signage Study	Study all shared bikeways designated on the Bicycle Map for potential signage needed.	low	\$

KEY CODE AMENDMENTS

The Transportation Planning Rule (TPR), as codified in Oregon Administrative Rules (OAR) 660-012-0020(2)(h), requires that local jurisdictions identify land use regulations and code amendments needed to implement the TSP, and include them as the implementation element.

Multnomah County's TSP will be implemented through a variety of activities, including:

Planning, designing and constructing proposed projects. The County plans for and builds capital projects through its Transportation Capital Improvement Plan and Program (CIPP). The CIPP is updated every five years and is reviewed biennially for programming corrections. The Capital Improvement Plan identifies and ranks transportation improvement needs on county roadways and bridges over the next 20 years, drawing in large part from projects identified in the TSP. County staff uses objective criteria to evaluate and score potential projects. Criteria include safety, health, equity, access to transit, congestion relief, support of regional land use goals, and community support. The Capital Improvement Program assigns anticipated revenues to the highest priority projects for a five-year period. The program is reviewed by the County Transportation Division annually for programming updates. Detailed design and public outreach is conducted for projects that are funded through the CIPP process, prior to construction.

Updating applicable development code standards. As part of the TSP process, the project team evaluated the County's Zoning Ordinance for consistency with Oregon Transportation Planning Rule (TPR) requirements, as well as for its consistency with the TSP generally. Potential updates to the zoning ordinance have been identified and will be adopted as part of adoption of the TSP.

Updating other design standards. Additional road design standards also may need to be updated to implement specific recommendations in the TSP Range of Solutions Toolkit. Some updated design standards may be incorporated in revisions to the County's Transportation Design and Construction Manual in the very near term. Others will require a follow-up effort to prepare and approve additional revisions to the manual.

Transportation facility review and permitting. The County reviews proposed improvements or projects to provide access to County roads on an ongoing basis, including driveways, drainage facilities, intersection or crossing improvements necessitated by nearby development or other similar projects. Ensuring consistency with the goals, policies and strategies in the TSP will be an essential element of those processes.

FUNDING ANALYSIS

The following provides an overview of Multnomah County's historical and existing transportation funding, a projection of future funding based on historical information, and an overview of additional potential funding sources.

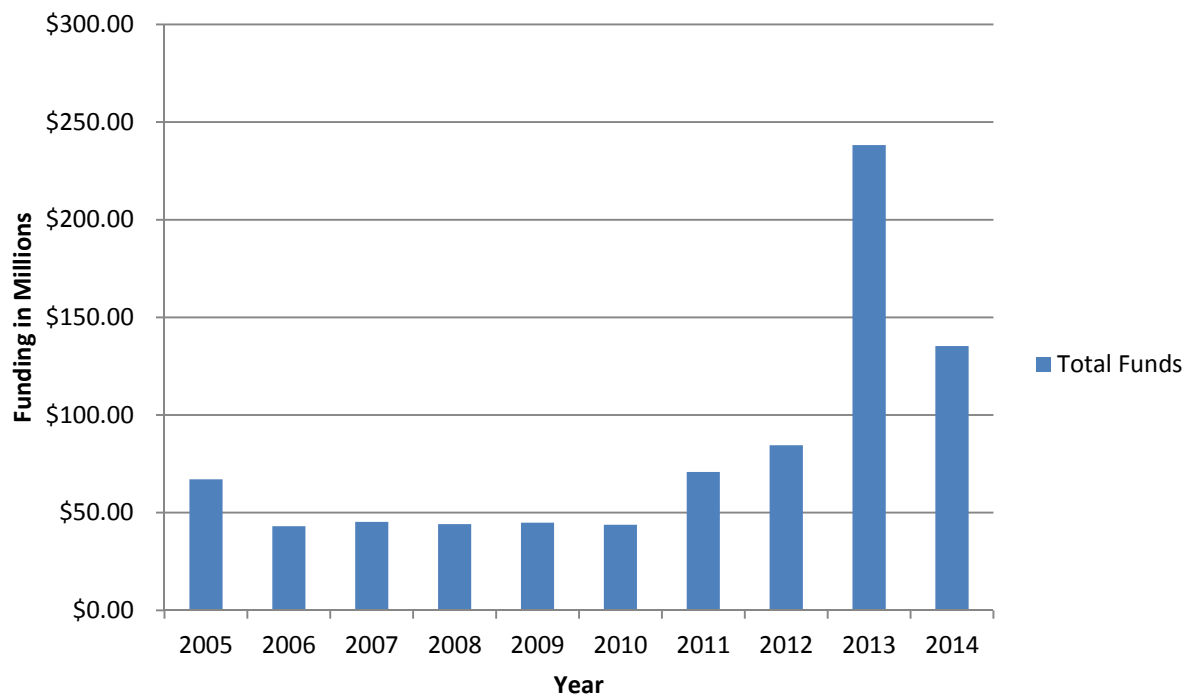
Historical and Existing Funding

This section summarizes the historical transportation funding sources for Multnomah County. The information summarized below will be used to assist in identifying potential funding gaps associated with future county projects and programs.

Historically, transportation funds have been collected through local sources, private contributions, state government, federal government, and non-jurisdiction work. Local sources include, but are not limited to, fuel taxes and local governments such as cities. Motor vehicle registration fees were introduced and collected starting in the year 2011 and are a part of the funds from local sources. Federal stimulus funds (ARRA) dedicated to transportation projects represent a new federal funding source for 2010. The transportation program includes streets, sidewalks, bike paths, railroad crossings, and transit.

Exhibit 2 reports the total transportation funding for Multnomah County for the year 2005 through 2014. Table 11 details the County's transportation funding by source. As shown, 2013 and 2014 received the most funding over the last decade with over double the funding of prior years. In 2013, funding from local sources spiked due to sales of bonds totaling \$128,000,000. Funds from fuel tax have remained fairly consistent over the last decade contributing between \$6,500,000 and \$7,400,000 each year. Like fuel tax, state funds have remained within a relatively narrow range, between \$29,000,000 and \$39,000,000, with the exception of 2005 which saw a contribution of about \$55,600,000. State funding is the biggest funding source throughout the past ten years, excluding the 2013 sale of bonds as previously mentioned.

Other funding options are being explored such as user fees, congestion pricing, and mileage-based registration fees. For example, the State of Oregon set up the Road Usage Charge Program in 2015, with a pilot study in 2012, that charges volunteer users based on vehicle-miles-traveled. There is a set charge rate per mile, and credits are given for state tax paid on fuel purchased.

Exhibit 2 Multnomah County Funding for Transportation (2005-2014)**Table 11 Multnomah County Funding for Transportation Years 2005-2014**

Year	Source						Total
	Fuel Tax	Local Sources	Private Contributions	State Funding	Federal Funding	Non-Jurisdictional Work	
2005	\$6,744,233	\$2,037,616	\$0	\$55,586,395	\$1,869,318	\$837,315	\$67,074,877
2006	\$7,114,721	\$2,337,147	\$213,243	\$31,040,765	\$1,417,995	\$943,352	\$43,067,223
2007	\$7,110,272	\$1,567,375	\$130,880	\$32,385,736	\$1,105,605	\$2,963,682	\$45,263,550
2008	\$7,356,083	\$1,339,539	\$0	\$29,298,036	\$3,418,294	\$2,681,591	\$44,093,543
2009	\$6,878,197	\$2,569,042	\$0	\$30,370,214	\$2,884,584	\$2,179,068	\$44,881,105
2010	\$6,982,150	\$1,311,827	\$0	\$29,004,662	\$4,363,057	\$2,121,595	\$43,783,291
2011	\$7,052,045	\$17,519,052	\$0	\$33,561,224	\$9,883,713	\$2,856,357	\$70,872,391
2012	\$6,811,257	\$26,294,096	\$0	\$36,227,457	\$12,990,232	\$2,222,274	\$84,545,316
2013	\$6,573,115	\$188,254,386	\$0	\$38,972,767	\$2,399,555	\$1,992,451	\$238,192,274
2014	\$6,627,984	\$61,920,847	\$0	\$38,527,230	\$26,201,381	\$2,059,726	\$135,337,168

Exhibit 3 reports the total expenditures of Multnomah County for transportation in the years 2005 through 2014. Table 12 summarizes the County's transportation expenditures by source. Years 2013 and 2014 had the most spending with over double what the majority of the other years spent. Those

years also saw additional local funding from bonds as discussed above. Spending on Capital Projects and Payments to other Governments/Jurisdictions were the two largest expenditures over the past decade. Payments to other governments and jurisdictions included payments to counties, cities, other local agencies, and state and state highway projects.

Spending on capital projects increased significantly starting in 2012. The majority of the spike in spending went to system preservation for the Sellwood Bridge Project. The year 2012 increase was almost evenly split between project engineering and system preservation, each with approximately \$21 million, but 2013 and 2014 spent about \$56 million and \$73 million, respectively, on system preservation alone.

Exhibit 3 Multnomah County Expenditures for Transportation (2005-2014)

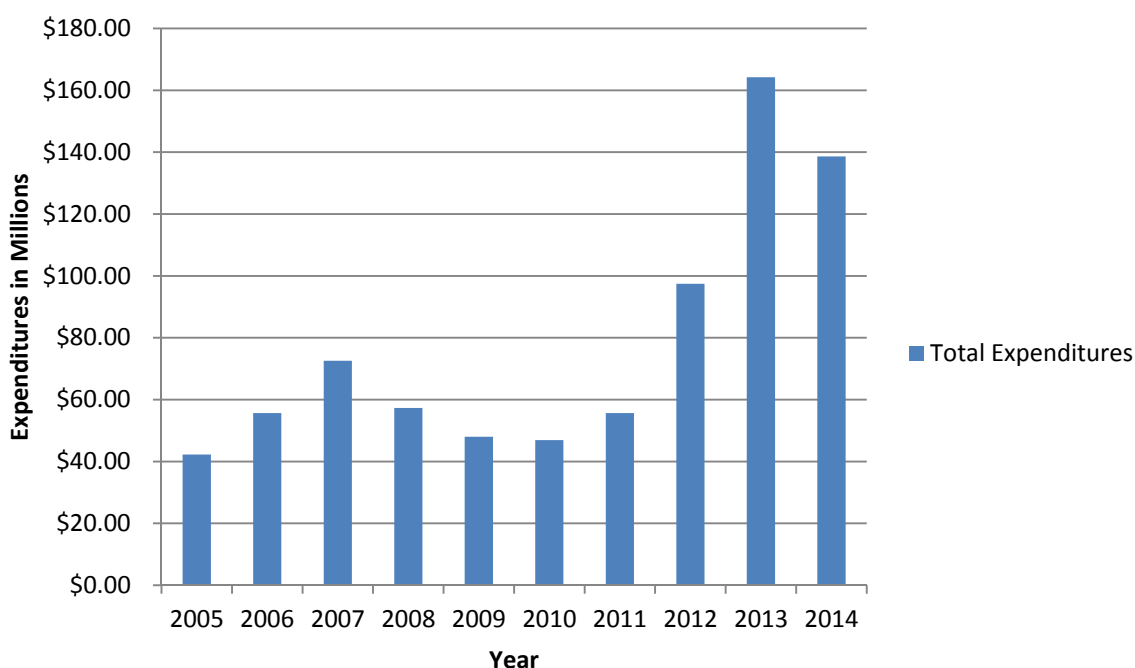


Table 12 Multnomah County Expenditures for Transportation Years 2005-2014

Year	Source							Total
	Capital Projects (Improvements and Preservation)	Operations & Maintenance	Administration & General Engineering	Match Payments for Local Agency Projects	Debt Service on Local Obligations	Payments to Other Governments/Jurisdictions	Reimbursements ¹	
2005	\$8,822,124	\$7,403,780	\$3,423,016	\$0	\$288,022	\$21,349,429	\$942,708	\$42,229,079
2006	\$7,788,562	\$7,164,162	\$3,943,756	\$0	\$291,289	\$35,333,705	\$1,440,134	\$55,661,608
2007	\$21,856,624	\$5,821,601	\$4,080,165	\$14,534,934	\$287,996	\$23,493,283	\$2,513,914	\$72,588,517
2008	\$18,669,634	\$5,942,808	\$3,931,355	\$3,065,694	\$287,996	\$22,903,091	\$2,508,531	\$57,309,109
2009	\$11,156,600	\$7,797,336	\$4,318,754	\$1,356,283	\$288,000	\$20,885,234	\$2,179,068	\$47,981,275
2010	\$8,481,991	\$9,107,884	\$3,126,007	\$1,458,258	\$288,000	\$20,008,305	\$2,432,796	\$46,903,241
2011	\$15,646,108	\$8,445,260	\$2,828,115	\$1,487,761	\$288,000	\$24,673,775	\$2,263,774	\$55,632,793
2012	\$54,067,309	\$9,061,593	\$3,215,765	\$780,522	\$701,151	\$27,415,906	\$2,222,275	\$97,464,521
2013	\$69,568,440	\$8,075,180	\$4,563,300	\$0	\$52,495,665	\$27,523,385	\$1,990,000	\$164,215,970
2014	\$85,669,337	\$7,554,458	\$4,582,540	\$0	\$9,929,719	\$28,793,395	\$2,109,428	\$138,638,877

¹Expenditures that are reimbursed for work done on others' roads/streets

Projected Funding and Funding Needs

Prior to the bond funds in 2012, average annual spending on capital projects from 2005 through 2011 was approximately \$13 million per year including both engineering and preservation projects. This equates to approximately \$260 million over the next 20 years.

Potential Funding Sources List

The County has three basic categories of funding to draw from to fund transportation projects in the unincorporated areas. A brief description of each category is below.

- Federal Sources
 - Congestion Mitigation and Air Quality (CMAQ)
 - Highway Safety Improvement Program (HSIP)
 - Fixing America's Surface Transportation Act (FAST Act)
- State Sources
 - Road Fund (also referred to as the Oregon State Highway Trust Fund)
 - Surface Transportation Program
 - All Roads Transportation Safety (ARTS)
 - ConnectOregon

- o Statewide Transportation Improvement Program (STIP -Fix-It)
- o Statewide Transportation Improvement Program (STIP - Enhance)
- o Transportation and Growth Management Grants (TGM)
- Local Sources
 - o Economic Improvement Districts (EID)
 - o Bond Measure
 - o Fuel Tax/Registration Fee
 - o Local Improvement Districts (LID)
 - o Road District

Federal Sources

Congestion Mitigation and Air Quality (CMAQ)

The Congestion Mitigation and Air Quality (CMAQ) program provides funding for projects that help reduce emissions and meet national air quality standards, such as transportation demand management programs, bicycle and pedestrian improvements, transit projects, diesel retrofits, and vehicle emissions reductions programs.

More Information: http://www.fhwa.dot.gov/environment/air_quality/cmaq/.

Highway Safety Improvement Program (HSIP)

The Highway Safety Improvement Program (HSIP) provides funding for infrastructure and non-infrastructure projects that improve safety on all public roads, including non-State-owned public roads and roads on tribal lands. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance. ODOT administers HSIP funding through the All Roads Transportation Safety (ARTS) program described below.

More information: <http://safety.fhwa.dot.gov/hsip/>.

Fixing America's Surface Transportation Act (FAST Act)

The Fixing America's Surface Transportation Act (FAST Act) provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, and environmental mitigation; recreational trail program projects; safe routes to school projects; and projects for planning, designing, or constructing boulevards and

other roadways largely in the right-of-way of former Interstate System routes or other divided highways.

More Information: <http://www.fhwa.dot.gov/map21/guidance/guidetap.cfm>.

State Sources

Surface Transportation Program (STP)

The Surface Transportation Program (STP) provides flexible funding that may be used by states and localities, such as Multnomah County, for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals.

Road Fund (Oregon State Highway Trust Fund)

The expenditures of the Road Fund are restricted for construction, reconstruction, improvement, repair, maintenance, operation, use and policing of public highways, roads and streets within the County. The funding stream is considered stable but is anticipated to decrease as vehicle fuel efficiency increases. The cost of maintaining roadways and building new ones is also increasing, which means the purchasing power of these funds will not provide the same level of maintenance or as many capital projects as in the past. There is potential in the future for a mileage-based fee to replace the gas tax.

All Roads Transportation Safety (ARTS)

The All Roads Transportation Safety (ARTS) program (formerly known as Jurisdictionally Blind Safety Program) is intended to address safety needs on all public roads in Oregon. By working collaboratively with local road jurisdictions (cities, counties, MPO's and tribes) ODOT expects to increase awareness of safety on all roads, promote best practices for infrastructure safety, compliment behavioral safety efforts and focus limited resources to reduce fatal and serious injury crashes in the state of Oregon. The program is data driven to achieve the greatest benefits in crash reduction and should be blind to jurisdiction. The ARTS program primarily uses federal funds from the HSIP.

More Information: <http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/Pages/ARTS.aspx>.

ConnectOregon

ConnectOregon is a lottery bond based initiative to invest in air, rail, marine, transit, and bicycle/pedestrian infrastructure to ensure Oregon's transportation system is strong, diverse, and efficient. ConnectOregon projects are eligible for up to 80% of project costs for grants and 100% for loans. A minimum 20% cash match is required from the recipient for all grant funded projects. Projects

eligible for funding from state fuel tax revenues (section 3a, Article IX of the Oregon Constitution, the Highway Trust Fund), are not eligible for ConnectOregon funding. If a highway or public road element is essential to the complete functioning of the proposed project, applicants are encouraged to work with their ODOT region, city, or county to identify the necessary funding sources.

More Information: <http://www.oregon.gov/ODOT/TD/TP/pages/connector.aspx>.

Statewide Transportation Improvement Program (STIP)

The Statewide Transportation Improvement Program (STIP) is ODOT's four-year transportation capital improvement program. It is the document that identifies the funding for, and scheduling of, transportation projects and programs. It includes projects on the federal, state, city, and county transportation systems, multimodal projects (highway, passenger rail, freight, public transit, bicycle and pedestrian), and projects in the National Parks, National Forests, and Indian tribal lands. STIP project lists are developed through the coordinated efforts of ODOT, federal and local governments, Area Commissions on Transportation, tribal governments, and the public.

The STIP is divided into two broad categories: Fix-It and Enhance. The Enhance category funds activities that enhance, expand, or improve the transportation system. The project selection process for the Enhance category has undergone significant changes in the last few years and reflects ODOT's goal to become a more multimodal agency and make investment decisions based on the system as a whole, not for each mode or project type separately. ODOT has requested assistance from its local partners in developing Enhance projects that assist in moving people and goods through the transportation system. The projects are selected through a competitive application process. The Fix-it category funds activities that fix or preserve the transportation system. These projects are developed mainly from ODOT management systems that help identify needs based on technical information for things like pavement and bridges.

More information: <http://www.oregon.gov/ODOT/TD/STIP/Pages/default.aspx>.

Transportation and Growth Management Grants (TGM)

The Transportation Growth Management (TGM) program supports community efforts to expand transportation choices for people. By linking land use and transportation planning, TGM works in partnership with local governments to create vibrant, livable places in which people can walk, bike, take transit or drive where they want to go. TGM is partnership between the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. The program receives support from the State of Oregon and the Federal Highway Administration of the U.S. Department of Transportation. TGM grants are awarded on an annual basis in two categories: transportation system planning and integrated land use & transportation planning.

More Information: <http://www.oregon.gov/LCD/TGM/pages/index.aspx>.

Local Sources

The following section describes local funding options available to implement the projects contained within the TSP Update. Each description includes the potential funding level, the action needed to implement the option, the administrative cost of implementation, anticipated community acceptance of the action, and the types of projects that could be implemented through the option. All options discussed are allowable and commonly used in other Oregon communities. Some require specific action in order to establish the program for the first time.

Economic Improvement Districts (EIDs)

Transportation improvements can often be included as part of larger efforts aimed at business improvement and retail district beautification. Economic Improvement Districts collect assessments or fees on businesses in order to fund improvements that benefit businesses and improve customer access within the district. Adoption of a mutually agreed upon ordinance establishing guidelines and setting necessary assessments or fees to be collected from property owners is essential to ensuring a successful EID.

Local Bond Measures

Local bond measures, or levies, are usually initiated by voter-approved general obligation bonds for specific projects. Bond measures are typically limited by time, based on the debt load of the local government or the project under focus. Funding from bond measures can be used for right-of-way acquisition, engineering, design, and construction of transportation facilities. Transportation-specific bond measures have passed in other communities throughout Oregon. Though this funding source is one that can be used to finance a multitude of project types, although the accompanying administrative costs are high and voter approval must be gained.

Local Fuel Tax, Fuel Efficiency Charge and/or Registration Fee

Every state collects an excise tax on fuel, and this includes diesel and biodiesel. Only nine states permit cities or counties to impose a local fuel tax, and Oregon is one of those states. Many Oregon counties and cities, have chosen to implement this mechanism in order to pay for street operation, maintenance and preservation activities.

Local Improvement Districts (LIDs)

Local Improvement Districts (LIDs) are most often used by Countys to construct localized projects such as streets, sidewalks, or bikeways. Through the LID process, the costs of local improvements are generally spread out among a group of property owners within a specified area. The cost can be allocated based on property frontage or other methods such as trip generation. Though the costs of an

LID project are borne primarily by the property owners, moderate administrative costs must be factored in, and the public involvement process must still be followed.

Road District

Road districting is a technique used to localize road construction or maintenance to a portion of a county and to place financial responsibility within the localized area. Typically this tool is used to facilitate the improvement of local access or unimproved roads and is not used on roads already maintained by the county. Attachment “C” includes additional information on Road Districts.

Additional information: <http://www.oregonlaws.org/ors/chapter/371>

Urban Growth Management Agreement

An Urban Growth Management Agreement (UGMA) is an intergovernmental agreement that outlines how facilities are managed in the area outside the City limits, but inside the City’s Urban Growth Boundary (UGB).

Urban Renewal District/Tax Increment Financing

Urban Renewal Districts are separate taxing districts created to remove blight within a District as defined by State statute and local Urban Renewal Plans. Each Urban Renewal Plan has identified actions that will remove the blight within the District. Those actions are funded by debt financing (e.g., bonds) using the incremental tax revenue generated from improvements on private property that increase the tax assessable value of that property that then create additional property tax revenue. The additional tax revenue (i.e., tax increment) is then directed to the Urban Renewal District to be used for blight removal. This public finance method is referred to as Tax Increment Financing (TIF) and is limited to Urban Renewal in the State.