CLACKAMAS COUNTY
ACTIVE TRANSPORTATION PLAN





CLACKAMAS COUNTY

June 1, 2015

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PREFACE

The development of this plan was guided by the Project Management Team (PMT) made up of Clackamas County staff with input from the Oregon Department of Transportation (ODOT), a Technical Advisory Committee (TAC) and a Public Advisory Committee (PAC). Members of these committees are as follows:

Project Management Team (PMT)

- Karen Buehrig, Clackamas County Transportation Planning Supervisor
- Gail Curtis, ODOT Region 1, TGM Grant Manager
- Abbot Flatt, Clackamas County, Associate Transportation Planner
- Scott Hoelscher, Clackamas County, Project Manager
- Lori Mastrantonio, Clackamas County Multi-Modal Planner
- Susan Wright, P.E., Kittelson and Associates, Inc., Consultant Project Manager

PMT Support:

- Matt Berkow, Alta + Design
- Jesse Boudart, E.I., Kittelson and Associates, Inc., Transportation Analyst
- Ellen Rogalin, Clackamas County Public & Government Affairs

Public Advisory Committee (PAC)

Clackamas County Pedestrian / Bikeway Advisory Committee

- Gwenn Laubach Alvarez
- Naomi Angier
- Peter Goodkin
- Kelli Grover
- Dale Guenther
- Pete Ihrig
- Blane Meier
- Del Scharffenberg
- Dick Weber

At-Large Representatives:

- Ralph Goldstein: Bicycle Transportation Alliance (BTA)
- Skip Haak: Estacada Parks & Recreation Commission

- Matthew Hampton: Damascus-Boring Area Resident
- Ted Hartzell: Happy Valley Resident
- Joseph Lowe: Transportation-Disadvantaged
- Blane Meier: Bike Shop Owner
- Melinda Montecucco: Canby Bicycle and Pedestrian Advisory Committee
- Lynn Mutrie: Oregon Safe Routes to School Program
- Jack Pendleton: Canby-Molalla Area Resident
- Lesa-Kay Pinker: Pedestrian Interests
- Sally Rask: Equestrian Resident Representative
- Rob Smoot: Clackamas County Parks Board
- George Wilson: Mt. Hood Area Resident

Technical Advisory Committee (TAC)

Clackamas County

- Jae Heidenreich: Tourism & Cultural Affairs
- Scott Hoelscher: Planning & Zoning Division
- Jeroen Kok: North Clackamas Parks & Recreation District
- Joe Marek: Traffic Engineer
- Lori Mastrantonio: Transportation Engineering Division
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- Gail Curtis: Senior Planner
- Jessica Horning: Transit and Active Transportation Liaison

TriMet

- Jeff Owen

Metro

- Lake McTighe

EXECUTIVE SUMMARY

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The purpose of the Clackamas County Active Transportation Plan (ATP) is to identify key active transportation routes that connect destinations and communities in Clackamas County, both rural and urban. The 24 Principal Active Transportation (PAT) routes detailed in this plan provide access to popular and needed services such as transit, shopping and employment centers, and provide safe facilities for recreation and exercise. Making the pedestrian and bicycling improvements along the PAT routes will increase active transportation opportunities, improve safety and provide more convenience for people to walk, bike and use transit in Clackamas County.

At the project outset, the following vision was developed by the Project Management Team (PMT), in conjunction with the Public Advisory Committee (PAC):

> ***Active Transportation Vision*** *- Clackamas County will have an interconnected, safe and equitable active transportation network accessible to and used by people who live, work, do business and play within the County.*

A set of goals that support this vision for active transportation were prepared following the development of the vision. The goals for active transportation in Clackamas County include:

- *Active Transportation Infrastructure*: Plan an active transportation network consisting of multi-use paths, bikeways and walkways in Clackamas County to encourage more residents to bicycle or walk for recreation and transportation.
- *Connectivity*: Plan and develop the Principal Active Transportation routes to enhance connections to transit, schools, communities, town centers, shopping, employment, parks and other significant destinations in Clackamas County.
- *Tourism Development*: Create an active transportation system that will be a draw for tourists and an opportunity to promote Clackamas County as one of the premier cycling destinations in Oregon.
- *Accessibility and Safety*: Build an active transportation network that is accessible and safe for all ages, abilities and incomes.
- *Improve Health*: Plan and provide infrastructure that allows people to safely walk, run or cycle for improved health.

PLAN OVERVIEW

The Active Transportation Plan (ATP) covers both the urban and rural portions of the County and works together with the Bicycle Master Plan and the Pedestrian Master Plan to identify key active transportation facilities in Clackamas County. While the existing Bicycle and Pedestrian Master Plans

provide a comprehensive assessment of bicycle and pedestrian forms of transportation, the ATP focuses on the priority routes that connect Clackamas County communities and provide access to important destinations. The ATP sets future pedestrian and bicycle infrastructure priorities by identifying 24 Principle Active Transportation (PAT) routes. The PAT routes, shown in Figure 1, are an interconnected network of off-streets trails and on-street bikeways and pedestrian facilities linking communities and destinations in Clackamas County. Due to their unique role in providing connections, the PAT routes are considered the spine of the active transportation network and the highest functional class for county bikeways and pedways. The other local, neighborhood bikeways and pedways identified in the Bicycle and Pedestrian Master Plans connect to the PAT routes and complete the county-wide network of active transportation routes.

The Clackamas County Active Transportation Plan includes three key components:

1. *Principal Active Transportation Routes*: Detailed analysis of 12 of the PAT routes, including project costs; route description; proposed facility types for various route segments; route map and description of existing facilities along the route.
2. *Facility Design Toolkit*: Catalog of pedestrian and bicycle facility types for a range of rural and urban settings. Each facility type includes a photo illustration; general description of the facility; dimensions and any design considerations unique to that facility.
3. *Signage Plan*: Description and location of amenities for PAT Routes. Recommended amenities include signage, informational kiosks and bike parking.

The Need for a Plan

Why does Clackamas County need an Active Transportation Plan? One reason is the growing popularity of bicycling for recreation as well as commuting and the subsequent need to coordinate previous plans and projects to ensure development of a cohesive active transportation system throughout the County. Second, development of an active transportation strategy and the prioritization of active transportation routes helps position the County for future grant opportunities for infrastructure improvements. Without a plan in place identifying active transportation priorities the County may miss out on opportunities for federal and/or state funding.

In addition, there are 984.4 planned bikeway miles in the Transportation System Plan (TSP) for urban and rural Clackamas County. Consequently, it is necessary to narrow down the nearly 1,000 miles of bikeways and identify the principal or most important routes in the County. Finally, the plan will increase walking and biking opportunities throughout the County and is an opportunity to position the County as a bicycling tourist destination.

Active Transportation Network

The active transportation network detailed in this plan is intended to facilitate both recreational and utilitarian transportation in urban and rural Clackamas County. The 24 Principal Active Transportation (PAT) Routes contain approximately 250 miles of on- and off-road facilities, including 67 miles of multi-

use paths, 77 miles of shoulder bikeways, 20 miles of shared lane marking bikeways, 27 miles of bike lanes, and 17 miles of buffered bike lanes.

There are three PAT route categories:

1. **Principal Active Transportation Routes (PATS)**: The most important routes to connect communities and key destinations in the county. Section 3 of the ATP includes a detailed analysis of these routes, including recommended facility types and a cost analysis for individual route segments.
2. ***Ideal* Principal Active Transportation Routes (I-PATS)**: Routes that are the best or most ideal active transportation option; however, due to ownership, topographical and/or environmental constraints, I-PATs are considered visionary or long-term projects. Detailed cost and facility-type analysis are not included for the I-PATS.
3. ***Connector* Principal Active Transportation Routes (C-PATS)**: Routes selected due to their regional significance and importance in providing connections. Detailed cost and facility type analysis are not included for C-PAT's.

Figure 1 illustrates the location of the PAT routes while Table 1 provides the route name and number, proposed facility type, route length in miles and the relative project cost.

Public Involvement

A key component of the project was outreach to and involvement of stakeholders – people and organizations that are or may be affected by increased active transportation opportunities in Clackamas County. The Principal Active Transportation routes documented in this plan were identified through a public involvement process and formalized with the project Public Advisory Committee (PAC). Primary public involvement elements included the following:

- **17-member Public Advisory Committee**
- **10-member Technical Advisory Committee**
- **Outreach to community and AT groups**
- **News releases/flyers/fact sheets**
- **Project Website**
- **Virtual open house**
- **Active Transportation survey**
- **Hamlet meetings**

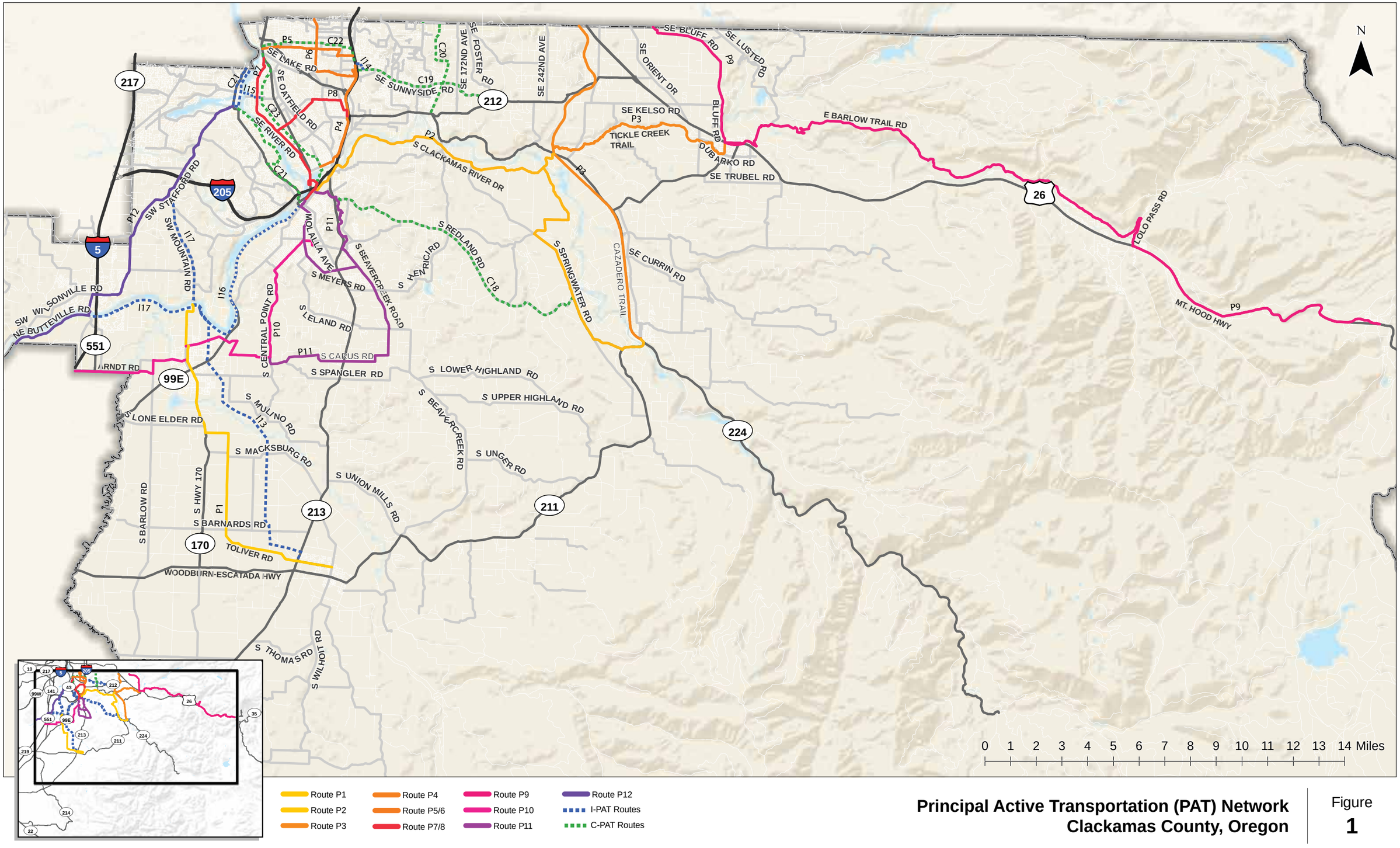
Route Development

One of the primary objectives of the Clackamas County ATP was to identify a connected active transportation network consisting of the highest priority, most important routes in both the urban and rural areas. The PAT Route network documented in this plan includes routes that were identified through a systematic process that involved public and stakeholder consultation at various stages. Key steps in the process included:

1. Development of active transportation corridors – broad swaths of land between destinations for active transportation connectivity. Within each *corridor,* potential routes that connect communities, employment centers, recreational opportunities and/or tourist destinations were identified.

2. Development and application of the following route selection criteria:
    - Route contains many community attractors
    - Route serves existing demand
    - Route benefits transportation-disadvantaged areas
    - Route aligns with adopted plans
    - Route leverages previous investment
    - Route is scenic
    - Route is direct
    - Route is suitable given the volume of traffic or posted speed
    - Route is cost effective
    - Route is feasible given natural features, right of way, etc.

The route alternatives in each corridor were shared with the public through a virtual open house (VOH). Nearly 400 Clackamas County residents expressed their views and preferences on active transportation during the two-week open house. Following the VOH and application of the above route selection criteria, route candidates were refined based on input from the Technical Advisory Committee and the Public Advisory Committee and then investigated in the field to confirm their suitability for inclusion in the Active Transportation Plan. Based on this approach, a set of 24 on- and off-road active transportation routes were identified linking key destinations and municipalities throughout the county.



Principal Active Transportation (PAT) Network
Clackamas County, Oregon

Figure **1**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

Table 1: Clackamas County Active Transportation Plan Principal Active Transportation Routes

Principal Active Transportation Routes				
Route #	***Route Name***	***Proposed Facilities***	***Length (Miles)***	***Relative Project Cost***
P1	Canby to Molalla	Shoulder bikeway, stripe bike lane	14.8	Medium
P2	Clackamas River Drive	Shoulder bikeway	23.3	Medium
P3	Tickle Creek Trail - Cazadero Trail	Multi-use path	23.5	Medium
P4	I-205 Multi-Use Path	Multi-use path	5.1	Low
P5	Monroe Neighborhood Greenway	Bike boulevard	4.1	Low
P6	Linwood Avenue	Stripe bike lanes, multi-use path	3.9	Low
P7	River Road	Buffered bike lane	7.3	Low
P8	Oetkin Road - Naef Road	Bike boulevard	3.8	High
P9	Sandy to Mount Hood	Shoulder bikeway, multi-use path parallel to roadway	49.8	Medium
P10	Oregon City to Canby	Buffered bike lane, advisory lanes, shoulder bikeway	14.9	Medium
P11	Newell Creek Trail and Oregon City Loop	Sidewalk, shoulder bikeway, bike lane, multi-use path	18.0	High
P12	Stafford Road	Protected bikeway, bridge, shoulder bikeway	14.3	Medium
Ideal Principal Active Transportation Routes				
Route #	***Route Name***	***Proposed Facility***	***Length (Miles)***	***Relative Project Cost***
I-13	Molalla Forest Road	Multi-use path	11.0	-
I-14	I-205 Ped/Bike Bridge	Pedestrian-bicycle bridge	0.1	-
I-15	Willamette Greenway Trail - Lake Oswego to County line	Multi-use path	1.1	-
I-16	Willamette Greenway Trail – Oregon City to Canby	Multi-use path	8.1	-
I-17	Stafford to Canby Trail	Multi-use path	9.1	-
Connector Principal Active Transportation Routes				
Route #	***Route Name***	***Proposed Facility***	***Length (Miles)***	***Relative Project Cost***
C18	Redland Road	Shoulder bikeway	13.5	-
C19	Sunnyside Road	Buffered bike lanes / cycle track	5.9	-
C20	Scouters Mountain / Mt. Scott Loop Trail	Multi-use path / bike lane	4.0	-
C21	Old River Road/Hwy. 43	Buffered bike lane, cycle track, bike boulevard	6.7	-
C22	King Road	Sidewalks	4.4	-
C23	Trolley Trail	Buffered bike lane, cycle track, pedestrian/bicycle overpass	6.4	-
C24	Borland Road/Willamette Falls Dr.	Shoulder bikeway / bike lane	7.9	-

IMPLEMENTATION STRATEGY

The ATP identifies a series of projects that will help Clackamas County establish a countywide active transportation network. The County will work with the Oregon Department of Transportation (ODOT), Oregon State Parks, Metro and local agencies within the County to ensure coordination with adopted transportation and trail plans. Funding and development of the routes and projects identified in the ATP will require champions for each potential project from local communities and agencies in order to successfully design and construct the recommended treatments.

The key implementation considerations for completing the recommended active transportation network should focus on safety, completing system gaps and cost effectiveness. The individual projects for each of the proposed Principal Active Transportation (PAT) route segments are recommended to be incorporated into the Clackamas County Comprehensive Plan, specifically in the following Transportation System Plan (TSP) project lists:

- *20-Year Capital Projects*: The prioritized list of needed transportation projects that can reasonably be undertaken given the current estimates of available funding.
- *Preferred Capital Projects*: A second group of needed, prioritized transportation projects that the County would undertake if additional funding becomes available during the next 20 years.
- *Long Term Capital Projects*: The remainder of the needed transportation projects. Although these projects will be needed to meet the transportation needs of the County in the next 20 years, they are not expected to be funded or constructed by the County.

No specific funding source has been identified to implement the facility recommendations in the ATP. There are, however, a variety of funding options available at the federal, regional and local level that could be the building blocks to a comprehensive pedestrian and bicycle network. Identified potential funding sources and grant opportunities are listed in Appendix F.

1 – INTRODUCTION

1 - INTRODUCTION

Active Transportation (AT) is increasingly recognized as an important component of the transportation system. AT refers to human forms of transportation, in particular walking and bicycling. As forms of transportation, walking and bicycling are healthy, energizing, environmentally sound and low cost. AT also includes the use of mobility devices such as wheelchairs and can be combined with other transportation modes such as public transit. In some regions, AT may encompass other activities such as cross-country skiing, equestrian activities and even kayaking.

The Clackamas County Active Transportation Plan (ATP) is comprised of a set of priority active transportation routes that, when implemented, will make it safer and more convenient for people to walk and bike throughout the County.

Why does Clackamas County need an Active Transportation Plan?

As biking continues to grow in popularity for recreation as well as commuting, there is a need to coordinate previous plans and projects to ensure a cohesive active transportation system throughout the County. Second, development of an active transportation strategy and the prioritization of active transportation routes helps position the County for future grant opportunities for infrastructure improvements. Without a plan identifying active transportation priorities, the County may miss out on opportunities for federal and/or state funding. In addition, there are 984.4 miles of planned bikeways in the Transportation System Plan (TSP) for urban and rural Clackamas County. Consequently, it is necessary to narrow down the number of bikeway miles and to identify the principal or most important routes and

bikeways in the County. Finally, the plan will increase walking and biking opportunities throughout the County and help position the County as a bicycling tourist destination.

1.1 PURPOSE, GOALS AND VISION OF THE ACTIVE TRANSPORTATION PLAN

The purpose of the ATP is to identify Principal Active Transportation routes that connect destinations and communities in Clackamas County, both rural and urban. The principal routes are intended to provide access to necessary services such as transit, shopping and employment centers, and to recreation and exercise. The 24 principal routes are considered the highest priority and most important active transportation connections in the county. When fully implemented, the principal routes will increase active transportation opportunities and make it safer and, in some circumstances, possible for people to walk, bike and use transit in Clackamas County.

An active transportation plan should be guided by a defined vision and goals. The following vision was developed with the Public Advisory Committee (PAC) at the project outset:

> ***Active Transportation Vision*** *- Clackamas County will have an interconnected, safe and equitable active transportation network accessible to and used by people who live, work, do business and play within the County.*

Five goals guided development of the Clackamas County ATP:

- ***Active Transportation Infrastructure***: Plan an active transportation network consisting of multi-use paths, bikeways and walkways in Clackamas County to encourage more residents to bicycle or walk for recreation and transportation.
- ***Connectivity***: Plan and develop the Principal Active Transportation routes to enhance connections to transit, schools, communities, town centers, shopping, employment, parks and other significant destinations within Clackamas County.
- ***Tourism Development***: Create an active transportation system that will draw tourists and promote Clackamas County as a premier cycling destination in Oregon.
- ***Accessible and Safe***: Build an active transportation network that is accessible and safe for all ages, abilities and incomes.
- ***Improve Health***: Plan and provide infrastructure that allows people to safely walk, run or cycle for improved health.

1.2 COMMUNITY CONTEXT

Clackamas County, located in northwest Oregon, is one of three counties that make up the Portland metropolitan region. The County land area is approximately 1,880 square miles, about half of which is national forest lands in the eastern and southern reaches of the county. Clackamas County's urban area, located in the northwest quadrant of the county, contains about 72% of the county's population in nine cities and unincorporated areas. The rural area contains five cities, two Rural Service Centers, six Rural Communities, one Resort Community and one unincorporated community near Mt. Hood, and a rural population involved in farming and forestry. The sparse settlement patterns and vast forest/farm lands outside the Urban Growth Boundary create large distances between destinations and communities in rural Clackamas County.

The County's topography includes low valleys, high river bluffs and the rolling agricultural fields of the northern Willamette Valley to the west, with timber stands and increasing hills and mountainous areas to the east, including the western slopes of Mt. Hood. There are many rivers in addition to the Willamette, including the Sandy, Clackamas, Molalla and Pudding. Many of the rural two-lane roads contain steep pitches and long climbs, and do not have facilities for active transportation. Figure 2 is a topographic map of Clackamas County, illustrating some of the challenges due to steep terrain in establishing a robust active transportation network.

Service Layer Credits: Sources: Esri, USGS, NOAA

Topographic Map of Clackamas County

Figure **2**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

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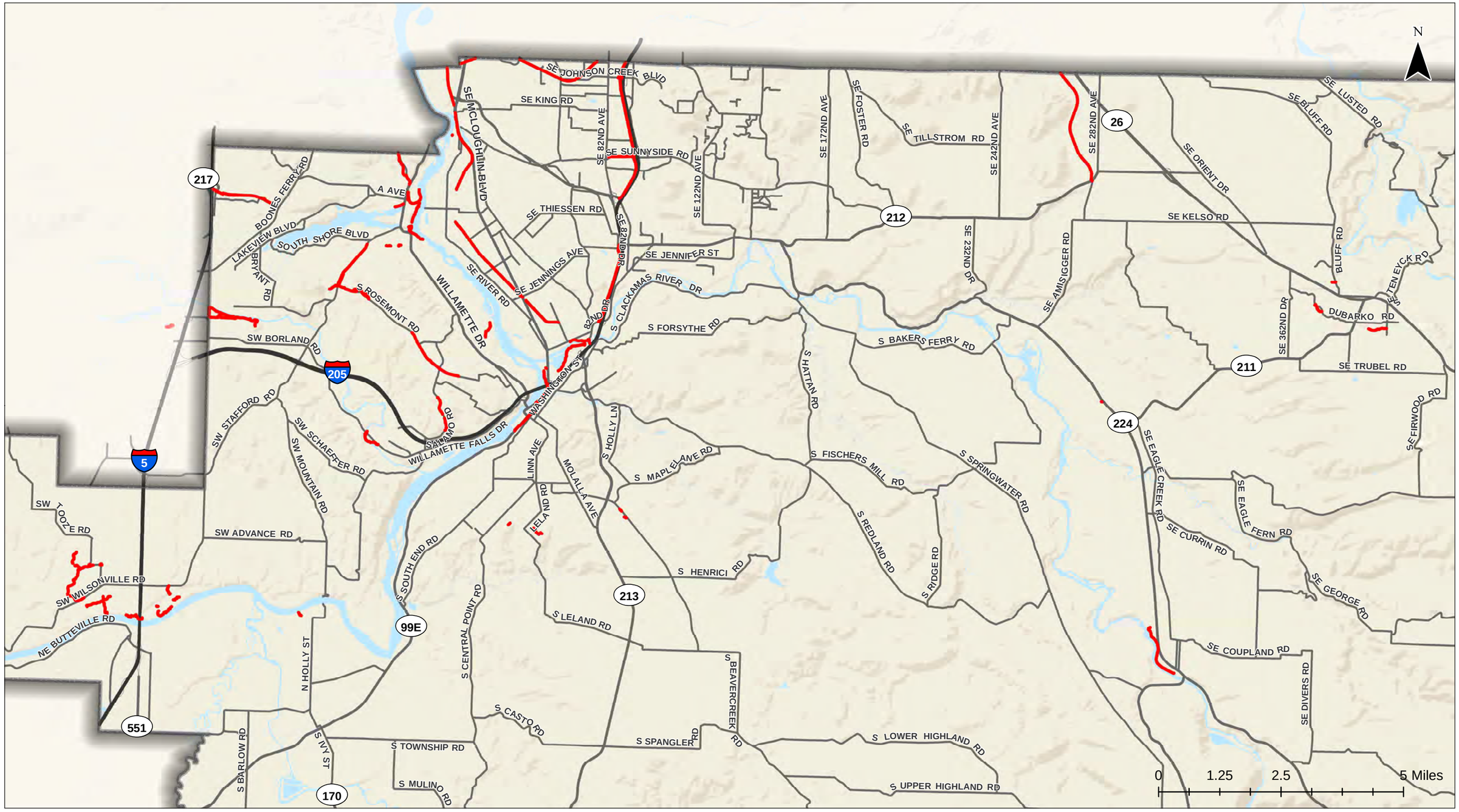
1.3 EXISTING CONDITIONS SUMMARY

An inventory of existing active transportation assets and bicycle and pedestrian conditions was conducted at the start of the planning process. The existing conditions report includes current bicycle and pedestrian infrastructure inventories as well summaries of County plans and projects impacting active transportation. Appendix A contains the entire report.

The existing active transportation network includes bike lanes on several arterial and collector roadways in the urban area, and multi-use path facilities such as the I-205 multi-use path and the Trolley Trail. There are currently no cycle tracks or neighborhood greenways on County-maintained roads. Most existing bikeways are concentrated in the urban area and are used primarily for commuting and utility trips. There are some sidewalks in the urban areas, but few sidewalks in the rural areas. The rural areas typically lack adequate facilities for bicycle or pedestrian travel. However, some highways -- such as Highway 213 between Oregon City and Molalla and U.S. 26 east of the City of Sandy -- contain shoulder bike lanes. Rural Clackamas County, where many of the roads have low traffic volumes and beautiful scenery, has a higher level of recreational use. Maps showing the locations of existing pedestrian and bicycle facilities in the urban and rural areas are provided on Figure 3 and Figure 4. Additional planned facilities from the Clackamas County Transportation System Plan, community attractors, the County's *Bike It!* map, and other pertinent maps are in Appendix B.



Existing Paved Multi-use Paths

Clackamas County Multi-use Paths

Figure **3**

Service Layer Credits: Sources: Esri, USGS, NOAA

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

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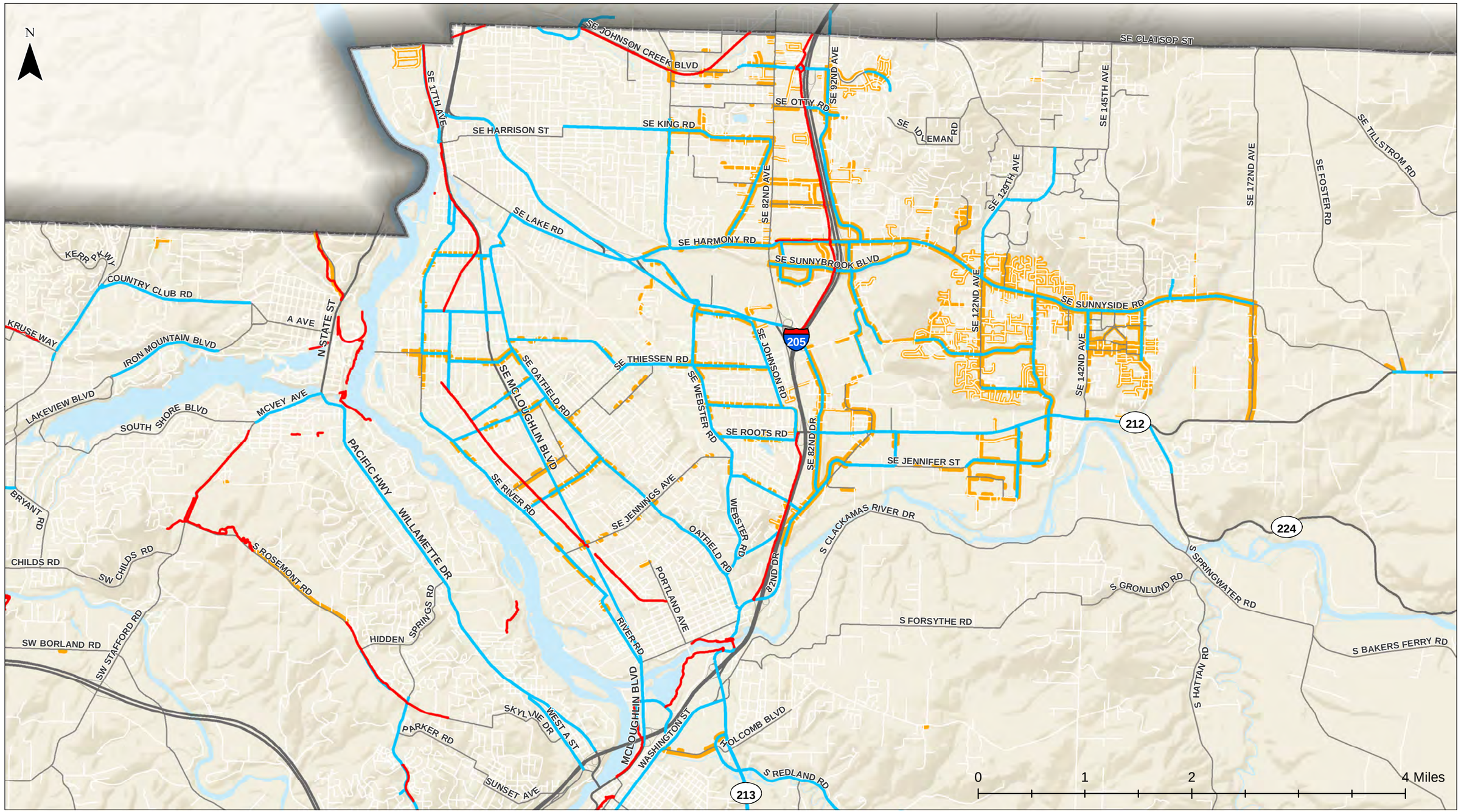

- Existing Paved Multi-use Paths
- Existing Bike Lanes
- Existing Sidewalks in Unincorporated Clackamas County

Urban Pedestrian and Bicycle Facilities
Clackamas County, Oregon

Figure **4**

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Service Layer Credits: Sources: Esri, USGS, NOAA

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

1.4 BENEFITS OF ACTIVE TRANSPORTATION

Active transportation benefits include health, safety, the environment, economics and tourism.

Health

Walking and biking are affordable and convenient ways to exercise. The Centers for Disease Control and Prevention (CDC) reported that in 2011-12, 34.9% of adults aged 20 and older were considered obese in the United States. With sedentary lifestyles and obesity on the rise, planning for active transportation is more important than ever. When walking and bicycling are integrated into daily activities or one short vehicle trip is replaced with active transportation, people can easily achieve the recommended 30 minutes of daily physical activity.

Safety

Safety fears prevent many people from choosing to walk or bike. Feeling and being safe while walking and cycling is an important part of a complete active transportation system. Active transportation facilities provide safety benefits for a variety of roadway users. Many built environment improvements that support walking and biking have safety benefits for all roadway users.

Environment

More transportation options result in people driving less. When walking or biking replaces a motor vehicle trip, overall harmful transportation-related emissions, noise and congestion are reduced. Transportation-related emissions such as carbon monoxide have a direct negative effect on human health; short-term exposure can exacerbate asthma and other respiratory diseases. Shifting motor vehicle trips to walking, biking or transit reduces greenhouse gas emissions and contributes to cleaner air.

Economics

Walking and biking are affordable ways to travel. The cost to an individual who owns, maintains and regularly drives a car is about 12 times higher than transportation costs for a person who relies on walking, biking and transit. By driving less, household transportation costs are reduced, keeping more money circulating in the local economy. In addition, safe bicycle and pedestrian routes to commercial districts and other activity centers encourage local shopping.

Tourism

There is potential for active transportation, in particular bicycle tourism, to generate significant economic benefit for Clackamas County.

Bicycle tourism generated $400 million in spending in Oregon last year, including $46 million in the Mt Hood/Columbia Gorge Region, according to recent research conducted by Dean Runyan Associates for Travel Oregon.[1] This study defines "cycling tourists" as visitors who travel for a bicycle activity 50 miles or more from home one way. Activities by visiting cyclists included day road rides, sanctioned bicycle races, organized non-competitive group rides, independent bike touring, day mountain bike rides, organized group tours and other cycling events.

In 2012, the Travel Oregon study found that cycling tourists spent their money in the Mt Hood/Columbia Gorge Region and in Oregon on:

- Lodging and Food Services: $20.3 million ($174.6 million total in Oregon)
- Groceries and Snacks: $5.8 million ($53.5 million total in Oregon)
- Motor Fuel/Transportation/Parking: $8 million ($71.5 million total in Oregon)
- Bicycle Event Fees: $4.8 million ($31.9 million total in Oregon)
- Bike Repairs/Clothing/Accessories: $3.8 million ($27.9 million total in Oregon)

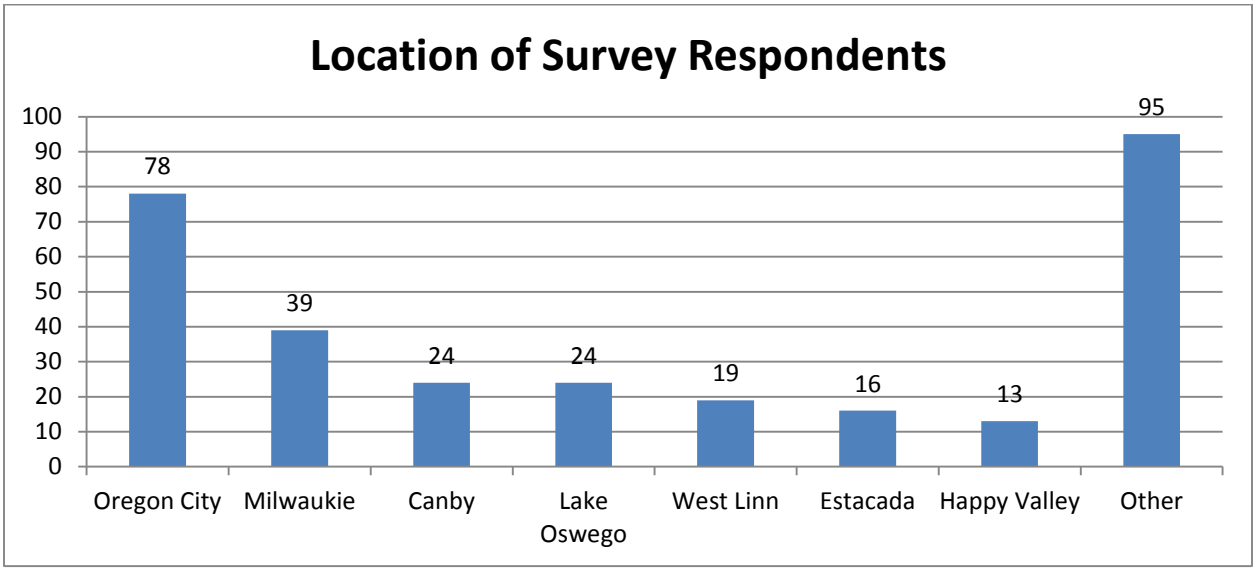
Clackamas County also hosts several annual bike events drawing cyclists from all over Oregon including:

- Barton Cyclocross races – 800-1100 racers and approximately 400 spectators; 1,500 total
- Sandy Ridge Mountain Biking Trail system – more than 40,000 visitors each year
- Clackamas Cove Triathlon – a first year event in 2013, drew almost 300 participants
- Pioneer Century – one of the biggest bike rides in the state and now in its 26th year, draws well over 1,000 visitors each June

[1] *The Economic Significance of Bicycle-Related Travel in Oregon: 2012*, Dean Runyan Associates

1.5 SURVEY OF CLACKAMAS COUNTY USERS

An active transportation survey was available online from February 10-24, 2014. The survey received 399 responses. The table below provides an overview of the where most participants live within Clackamas County. There is a relatively high quantity of 'other' responses because there are many different cities, hamlets and villages in Clackamas County.



The survey included questions about people's travel patterns and the types of facilities or policies that would encourage them to make more trips by walking, biking or taking transit. The full survey responses are included in Appendix C. A brief summary of responses follows.

Bicycle

Bicycle Trips:

- The greatest demand for facilities are for bike lanes, which may indicate people want to use the bicycle for utilitarian purposes (shopping, work, school, etc.) as well as recreation.
- Recreation is currently the most popular form of bicycle use.

Bicycle Facilities:

- People indicate they would most likely ride on multi-use paths.
- Bicycle lanes were the next most popular facility, with protected and buffered bike lanes also scoring very high.

Walking

Walking Trips:

- Proximity of destinations for walking is the leading reason people would walk more, followed by presence of sidewalks.

- Recreation is the most popular purpose for walking, and shopping is also significant.

Walking Policies:

- All walking policies are seen as effective means to make walking more enjoyable. The highest number of 'very effective' responses was from the policy "to include all transportation modes when building or rebuilding streets."

Walking Facilities:

- The presence of sidewalks and off-road trails for walkers had the highest effectiveness levels to make walking more enjoyable.
- The rest of the facilities had generally high effectiveness ratings.

Transit

- People indicated they would use more transit if it ran at a more convenient time.

1.6 PUBLIC INVOLVEMENT SUMMARY

The Clackamas County ATP was produced with the help of community members and active transportation stakeholders – people and organizations that will or may be affected by increased active transportation opportunities. A Stakeholder Involvement Strategy (SIS) was developed at the outset of the study in order to provide a framework for engaging these stakeholders and members of the public. The SIS was designed to:

- Provide a transparent decision-making process conducted through equitable and constructive public discussion and input;
- Provide early and ongoing opportunities for stakeholders to raise issues and concerns that can be considered by the project team;
- Proactively inform and engage a wide range of stakeholders in the study and decision-making process;
- Build widespread community understanding of findings and decisions, and
- Encourage the participation of all stakeholders regardless of race, ethnicity, age, disability, income or primary language.

The primary public involvement elements of the ATP are summarized below:

Public Advisory Committee (PAC): A 17-member group of Clackamas County residents met five times during the ATP development process to review materials, and provide input and advice. The PAC included current members of the Clackamas County Pedestrian/Bikeway Advisory Committee, as well as other residents representing the geographic diversity of the County.

Technical Advisory Committee (TAC): This 10-member group met four times to guide the technical development of the plan, including providing policy and technical guidance, reviewing and commenting on materials, and providing feedback on draft recommendations. The TAC included representatives from the Oregon Department of Transportation, Metro and TriMet as well as County staff from Transportation Engineering, Planning and Zoning, Tourism and Cultural Affairs, and the North Clackamas Parks and Recreation District.

Web Page: A project web page included background documents and materials, meeting notices, agendas and minutes.

Virtual Open House: An on-line open house was hosted on the project web page for two weeks to share information and ask people to respond to specific proposals, ideas or recommendations. The virtual open house was publicized through the web page and other methods, including emails, news releases, presentations and articles in County publications.

Community Groups: Key community groups -- including Citizen Planning Organizations (CPOs), Hamlets and Villages in the County -- were informed of the progress of the project through email notifications from County staff. Information about the project was shared and discussed at a quarterly Community Leaders Meeting and four community group meetings.

News Releases/Articles/Flyers/Fact Sheets -- Printed material for the media, email and distribution at meetings were prepared by County staff to inform the public about upcoming events, the progress of the project and opportunities for input. News releases and an article in the County-wide newsletter, Citizen News, informed the public about specific activities.

2 –ROUTE DEVELOPMENT PROCESS

2 - ROUTE DEVELOPMENT

2.1 PRINCIPAL ACTIVE TRANSPORTATION ROUTES

A key component of the Active Transportation Plan is a proposed network of existing and future on- and off-road walking and biking routes. The 24 Principal Active Transportation (PAT) routes are the backbone of the active transportation network and the highest bikeway functional classification. PAT routes provide connections to key County destinations and link to Metro-designated bicycle parkways and regional bikeways. Each PAT route features bicycle and pedestrian facility design types to enhance the bicycling and pedestrian experience. Existing and future local routes will feed into the PAT routes to form a comprehensive active transportation network throughout Clackamas County.

The development of the network involved the following five general steps:

1. **Collect and Assemble Background Information –** Prepare an inventory of existing bicycle and pedestrian infrastructure and summarize the plans and projects impacting active transportation in the County.
2. **Map Destinations –** Identify and map major current and potential attractions and places that could generate significant pedestrian and bicycle traffic, including key destinations such as town centers, parks, transit stations, educational institutions and employment centers. Equestrian trailheads were also mapped.
3. **Develop Route Selection Criteria –** Develop a set of 10 qualitative and quantitative criteria to help guide the selection of the routes. The selection criteria were reviewed and refined with the Public Advisory Committee (PAC), County staff and the Technical Advisory Committee (TAC). The approach to applying the selection criteria is described below.
4. **Formalize Active Transportation Corridors –** Identify active transportation corridors-- geographic areas between two points/destinations -- to provide a framework for route development. Urban and rural maps indicating the 12 corridor locations and written descriptions are provided below. A set of on- and off-road alternative routes was identified within each corridor by the project technical team and the Public Advisory Committee.
5. **Route Evaluation and Selection –** Score and assign points to the 83 potential routes in the 12 Active Transportation Corridors based on the selection criteria developed in step 3. Based on the criteria and public feedback obtained during the two-week virtual open house, a network of Principle Active Transportation routes was created. Final route selection was presented to and confirmed by the Public Advisory Committee. *Appendix D contains the public comments on each corridor and corresponding routes, and the scoring breakdown of route criteria.*

2.2 ACTIVE TRANSPORTATION CORRIDORS

Active Transportation (AT) corridors are geographic areas (broad swaths of land) between destinations for active transportation connectivity. Candidate AT corridors were identified at a Technical Advisory Committee brainstorm session and refined by the project Public Advisory Committee. With the aid of information gathered from the existing conditions report and stakeholder institutional knowledge, candidate corridors were selected based on criteria such as the amount of community attractors and ability to connect communities within a geographic area. The TAC and PAC then reviewed the candidate corridors and developed a final list of 12. A summary of the 12 AT corridors, separated between urban and rural, is provided below.

Urban Active Transportation Corridors

Stafford

The Stafford Corridor connects the cities of Lake Oswego and Wilsonville and provides a connection to Champoeg State Park - the northern terminus of the Willamette Valley Scenic Bikeway. Destinations of note include Luscher Farm, the Tualatin River and trail systems in the area including the Rosemont Trail. The corridor includes connections to Regional ATP off-street and on-street bikeways and a regional off-street parkway connecting to West Linn. Stafford Road was noted as a project in the 2005 Bicycle Transportation Alliance (BTA) Blueprint as a roadway in a rapidly growing area that is a popular route for recreational riders. Several of the destinations in the Stafford Corridor are part of a suggested bicycle recreational ride noted in the Clackamas County *Bike It!* Map.

Lake Oswego to Oregon City

This corridor connects the cities of Lake Oswego, West Linn and Oregon City. Some of the destinations within this area include Tryon Creek State Natural Area, George Rogers and Mary S. Young parks, the Willamette River and the downtown districts/town center areas of Lake Oswego, West Linn and Oregon City. There is also the potential to provide connections to the trails within those cities, as well as access along the Willamette River. The historic Oregon City/West Linn Arch Bridge provides the connection to Oregon City. Highway 43 is designated in the Regional ATP as a Bicycle Parkway. Several of the destinations in this corridor are part of a suggested bicycle recreational ride noted in the Clackamas County *Bike It!* Map.

Milwaukie to Oregon City

The Milwaukie to Oregon City north-south corridor consists of multiple destinations such as the Park Avenue MAX Orange Station (currently under construction), the Oak Grove employment center, the Trolley Trail, the City of Gladstone, the Willamette River, schools and parks, McLoughlin Boulevard (a high frequency transit corridor with many businesses and services) and River Road.

Milwaukie to Clackamas Regional Center (CRC)

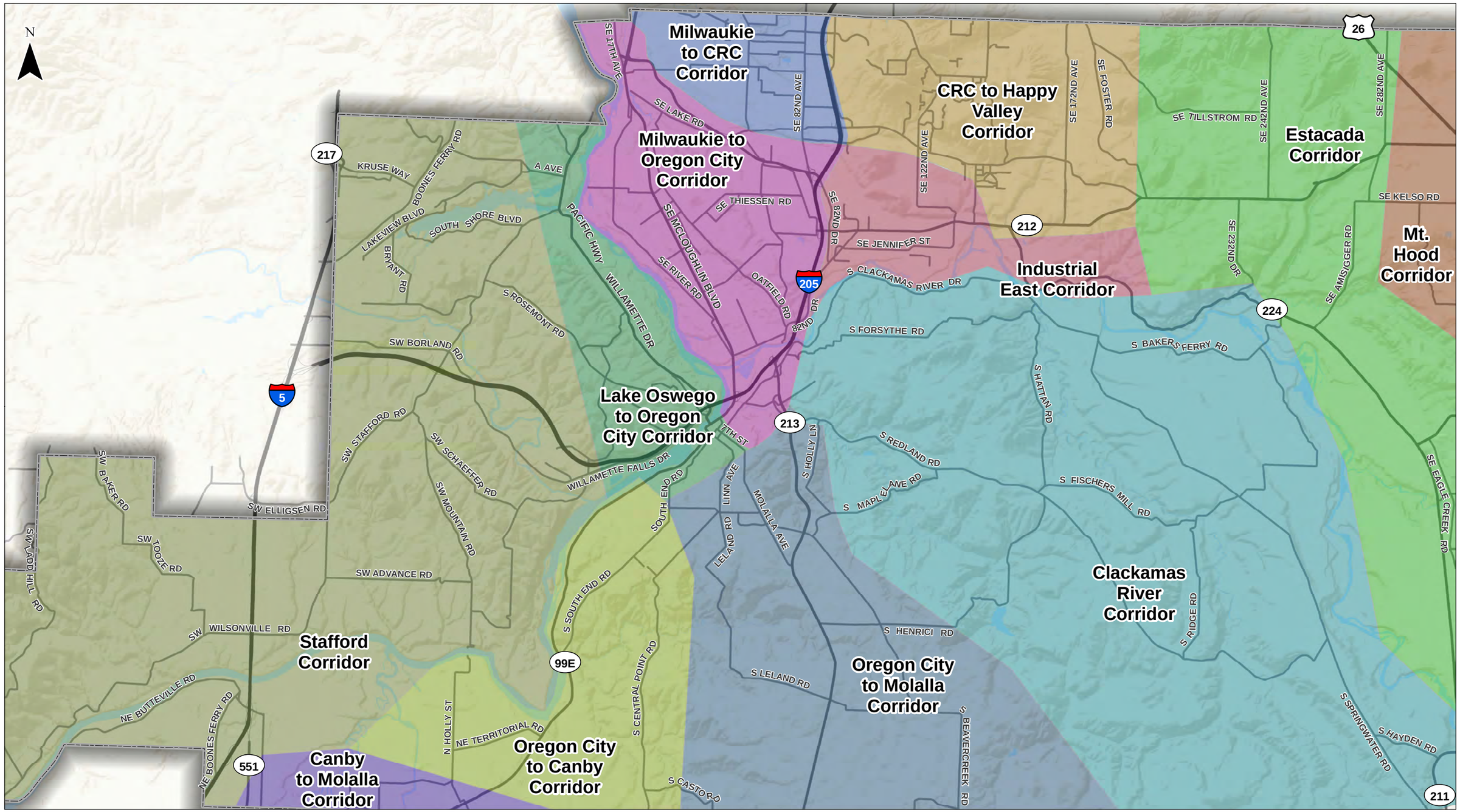
This corridor includes the city of Milwaukie/town center and connections to the MAX Orange Line scheduled to open in September 2015, the MAX Green Line, the Clackamas Regional Center area, schools, parks, Providence Milwaukie hospital, Springwater Corridor, I-205 multi-use path and an active transportation corridor previously identified as the Monroe Street bike boulevard. Linwood and King Roads are designated in the Regional ATP as Bicycle Parkways.

Clackamas Regional Center (CRC) to Happy Valley

Destinations in the CRC to Happy Valley Corridor include Kaiser Permanente Hospital, Mt. Talbert Nature Park, Mt Scott/Scouters Mountain Trail, City of Happy Valley/Town Center and Damascus. An important north/south connecter in this area is the planned 172nd Avenue Corridor that will provide connections north to Portland and south to the Sunnyside and Clackamas Industrial areas. Sunnyside Road, 129th Ave., 172nd Ave. and the Sunrise Corridor Multi-Use Path are designated on the Regional ATP as Bicycle Parkways.

Industrial East

The Industrial East Corridor has the potential to provide pedestrian and bicycle facilities from the Max Green Line at Clackamas Town Center to industrial employment areas along Highway 212/224 and Jennifer Avenue. This corridor includes the first phase of the Sunrise Corridor, which includes the multi-use path connecting the I-205 multi-use path (a Regional Active Transportation (ATP) designated Bicycle Parkway) east to SE 122nd Avenue. The Sunrise multi-use path is also designated in the Regional ATP as a Bicycle Parkway.



0 1 2 4 Miles

Urban Active Transportation Corridors
Clackamas County, Oregon

Figure **5**

Service Layer Credits: Sources: Esri, USGS, NOAA

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

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Rural Active Transportation Corridors

Oregon City to Canby

The rural county roads south of Oregon City provide opportunities for recreational and commuter cyclists. This corridor connects the cities of Oregon City and Canby. Destinations within this corridor include the Canby Ferry, Clackamas County Fairgrounds and the downtown districts of Oregon City and Canby. The conceptual Newell Creek Canyon Trail within the Highway 213 canyon provides a unique opportunity for an active transportation facility between the hilltop area of Oregon City and the river flats.

Canby to Molalla

The Canby to Molalla Corridor consists primarily of agricultural and forest lands and two-lane rural county roads. The area is popular with recreational and fitness cyclists. There is also a significant level of equestrian usage in this area. Within this corridor, there is an opportunity to develop the Molalla Forest Road, a historic logging connection between Canby and Molalla as a multi-use path. A master plan for the Molalla Forest Road pathway was developed in 1994.

Oregon City to Molalla

There are several active transportation route options between Oregon City and Molalla. This corridor has the potential to serve a number of users, including cyclists, pedestrians, equestrians and transit users. Land uses include farm and forest lands, urban development and the Beavercreek rural community. A mini-AT corridor connecting Oregon City and Beavercreek would provide connections to several community attractors, including Clackamas Community College, Clackamas High School, the Red Soils area of Oregon City and designated Metro Regional Parkways.

Clackamas River

This corridor connects Oregon City with the Redland and Carver rural communities. Clackamas River Drive, a popular cycling route in the Clackamas Cove Triathlon bike route, is in this corridor. Redland Road west of the Redland community is also a popular cycling route; however, significant truck traffic limits its appeal to beginners and families. The Clackamas River Corridor includes hilly terrain and several steep climbs, which are popular with fitness riders. Lower volume roads outside of the city limits provide training ride opportunities.

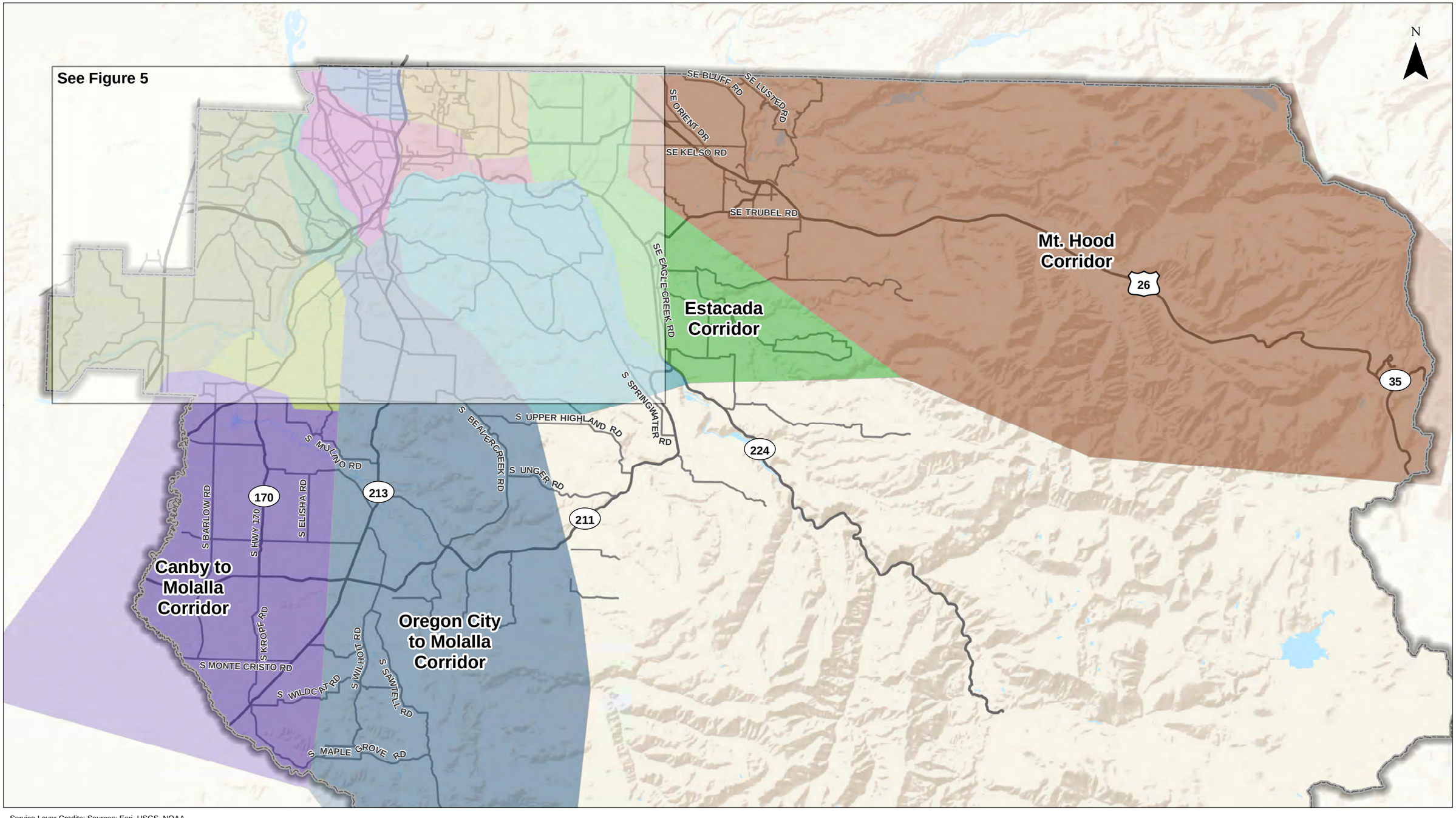
Estacada

The low-volume roads around Estacada and proximity to the Mt. Hood National Forest offer a multitude of cycling and active transportation opportunities. The Map My Ride website includes 79 routes near or leading to Estacada. In addition, cyclocross racing and the Oregon Bicycle Racing Association annual time trial series draw hundreds of cyclists to this part of Clackamas County. Important connections include the Springwater Trail and Cazadero Trail extension to Estacada; the proposed Scenic Bikeway Routes from Estacada to Detroit, and parks such as Eagle Fern, Timber and McIver.

Mt. Hood

This corridor will consider routes from the rural community of Boring to Mt. Hood. The corridor includes the city of Sandy and extends eastward to the Villages of Mt. Hood and Government Camp. There are numerous bike tourism and trail development opportunities. Connections to the Springwater and Cazadero trails offer future potential to bike from downtown Portland to Mt. Hood. Projects of note within this corridor include the Mt. Hood to Rose City Trail Corridor and the Tickle Creek Trail.

Figure 6 illustrates a map of the rural active transportation corridors.



Service Layer Credits: Sources: Esri, USGS, NOAA

0 3 6 12 Miles

Rural Active Transportation Corridors
Clackamas County, Oregon

Figure **6**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

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2.3 ROUTE SELECTION CRITERIA

Route selection criteria were established to select one Principal Active Transportation (PAT) route in each corridor. The selection criteria helped compare routes in each corridor based on safety, connectivity and equity, among other guiding principles. The intent of the route selection criteria scoring process was to rank projects on an objective, data-based (where available) set of criteria. The selection criteria were reviewed and refined with the Public Advisory Committee (PAC), County staff and the Technical Advisory Committee (TAC).

The 10 selection criteria were weighted using a 1-5 scale. For example, the "county-wide significance / community attractors" criterion was considered to have significant importance in selecting a route and was assigned a weight value of 5, whereas the scenic quality of a route was considered less critical and therefore received a weight value of 1.

The definition, scoring method and weight value for each criterion are described below in Table 2.

Table 2: Route Selection Criteria

Criteria	Score	Weight
County-Wide Significance/Community Attractors Definition: Whether a route goes to or connects places that attract people such as shopping centers, employment centers, parks, schools and libraries. Scoring Summary: Quantitative utilizing Geographic Information Systems (GIS) software.	1 point = route within half mile of 0-9 community attractors. 2 points = route within half mile of 10-19 community attractors. 3 points = route within half mile of 20-33 community attractors. 4 points = route within half mile of 34-59 community attractors. 5 points = route within half mile of 60-89 community attractors.	5

Criteria	Score	Weight
Serves Existing Demand Route Definition: Whether the route serves an area already frequented by walkers and/or bicyclists. Scoring Summary: Applied qualitatively using the following resources: *Rubber to the Road* cycling guide; Portland Bureau of Transportation recommended recreational routes; *Bike IT!* Map*;* other mapping resources such as Canby Bike Map, Estacada Area Bike Map, Farm Loop Maps – Canby and Molalla; County-permitted cycling events (Pioneer Century; Oregon City Triathlon; Barlow Trail Road Ride, etc.).	1 point = serves no existing, designated or identified popular routes. 3 points = serves some existing, designated or identified popular routes. 5 points = serves many existing, designated or identified popular routes.	3
Transportation Disadvantaged Areas Definition: An active transportation route should serve transportation disadvantaged users. This criterion is based on a Transportation Disadvantaged Index which takes into account a number of demographic characteristics including age, income, ethnicity, vehicle ownership, ability to speak English and proximity of freeway to a household. Scoring Summary: Evaluated and scored quantitatively using GIS software.	1 = <20% disadvantaged or most disadvantaged area within a half mile buffer of route 2 = 20-30% disadvantaged or most disadvantaged area within a half mile buffer of route 3 = 30-40% disadvantaged or most disadvantaged area within a half mile buffer of route 4 = 40-60% disadvantaged or most disadvantaged area within a half mile buffer of route 5 = >60% disadvantaged or most disadvantaged area within a half mile buffer of route	2

Criteria	Score	Weight
Adopted Plans Definition: Whether a route is already in one or more local or regional plans such as the Metro Regional Active Transportation Plan; Clackamas County TSP Tier One; adopted transportation system plans for Clackamas County municipalities and adopted rural city plans. Routes or portions of routes identified in adopted plans indicate an already-established level of community support. Scoring Summary: Primarily applied qualitatively based on staff review of adopted transportation system plans for municipalities in Clackamas County. Also used GIS to determine if potential routes aligned with the Metro Regional Active Transportation Plan and Clackamas County TSP projects.	1 = No part of route is included in any other adopted plan. 2 = <33% of route is included in any other adopted plan. 3 = 33-66% of route is included in any other adopted plan. 4 = 66-99% of route is included in any other adopted plan. 5 = 100% of route is included in any other adopted plan.	3
Leverages Previous Investment Definition: Routes with existing facilities present an opportunity to complete existing network gaps. For this criterion, routes that have existing walking or bicycling facilities have priority over routes with less or no existing facilities. Scoring Summary: Evaluated and scored quantitatively depending on the percentage of the completed route.	1 = No part of route is improved. 2 = <25% of route is improved. 3 = 25-50% of route is improved. 4 = 50-75% of route is improved. 5 = 75-100% of route is improved.	2
Scenic Routes Definition: Active transportation routes should take advantage of attractive and scenic areas. For this criterion, more scenic routes have priority over less scenic routes. Scoring Summary: "Scenic" was measured based on designated Clackamas County Scenic Roads: Comprehensive Plan Map 5-1. Routes were evaluated and scored quantitatively.	1 = No part of route is scenic 2 = <25% of route is scenic 3 = 25-50% of route is scenic 4 = 50-75% of route is scenic 5 = 75-100% of route is scenic	1

Criteria	Score	Weight
Direct Routes Definition: The route should provide a relatively straight connection between one community/attraction and another. For this criterion, more direct routes have priority over less direct routes. Scoring Summary: Qualitative analysis that involved visual inspection of draft corridor maps.	1 = Not very direct 3 = Moderately direct 5 = Most direct	3
Suitability Definition: Routes with lower traffic volumes and/or lower speeds are preferable to routes with higher traffic volumes and/or speeds. Scoring Summary: Used GIS to score routes based on average daily traffic (ADT) and posted travel speed. Scores were assigned based on averaging of the two scales.	5 = <5,000 ADT — 5 = 25 MPH 4 = 5,000 – 10,000 — 4 = 30 MPH 3 = 10,000 – 15,000 — 3 = 35 MPH 2 = 15,000 – 20,000 — 2 = 40 MPH 1 = >20,000 — 1 = >40 MPH	3
Cost Effectiveness Definition: Roadway conditions along a particular route can be made safe and comfortable using cost-effective strategies. Scoring Summary: Scores were assigned to routes qualitatively based on considerations such as permitting and construction costs.	1 = Least cost-effective. Route consists of multi-use trail for the entire (or nearly) length. 2 = At least half of route consists of multi-use trail. 3 = Moderately cost-effective. Likely needs shoulder widening and/or ROW purchase. 4 = Side path or shoulder widening without ROW purchase. 5 = Only needs striping for bike lanes, sharrows within the ROW.	3

Criteria	Score	Weight
Feasibility Definition: Whether there significant barriers such as ownership, limited right-of-way or presence of natural features that could prevent route development. Scoring Summary: Scores assigned qualitatively.	1 = Significant barriers. ROW purchase required and significant natural features (e.g. stream or river crossing). 2 = Purchase of ROW likely and significant natural features (e.g. stream or river crossing). 3 = Moderate barriers. Possible, but not significant, ROW and natural resource issues. 5 = Few barriers. Few, if any, ROW issues and no identified natural resource issues.	3

3 – ACTIVE TRANSPORTATION NETWORK

3 - ACTIVE TRANSPORTATION NETWORK

The Active Transportation Plan process resulted in the development of an active transportation network consisting of the 24 Principal Active Transportation (PAT) routes listed in Table 3 below. PAT routes are designed to provide a high degree of comfort and safety for multiple users. They may contain a mix of on-road and off-road facility treatments and often include a combination of existing and/or planned facilities.

There are three PAT route categories:

1. **Principal Active Transportation Routes (PATS)**: The most important routes to connect communities and key destinations in the county. A detailed analysis of these 12 routes, including recommended facility types and a cost analysis for individual route segments, is provided below.
2. ***Ideal* Principal Active Transportation Routes (I-PATS)**: Due to ownership, topographical and/or environmental constraints, I-PATs are considered visionary or long-term projects. Detailed cost and facility-type analysis are not included for the 5 I-PATS.
3. ***Connector* Principal Active Transportation Routes (C-PATS)**: Due to their regional significance and importance in providing connections, 7 additional routes were included. Detailed cost and facility type analysis are not included for C-PAT's.

Planning-level cost estimates were developed for PAT routes by segment according to the proposed facility, length and topographical/geometric features. Specific intersection treatments were not considered, meaning the total project cost may be higher. The intersection treatment will vary depending on the final proposed facility, the ability to purchase right-of-way, geometric constraints and other planning/engineering considerations. When PAT routes intersect ODOT facilities, ODOT staff will need to review the proposed crossing treatments. When steps are taken to develop final plans and designs for each PAT route, the planner/engineer should consult *Conflict Area Treatment Types* in section 5 for further guidance on the appropriate intersection crossing treatment before creating more refined intersection crossing treatments.

In general, PAT route cost estimates include low-to-high cost based on a minimum and maximum additional width. The low and high costs were developed to work with the Facility Design Toolkit (in Section 5) that recommends a minimum and maximum width for each pedestrian and bicycle facility type. The reported cost per mile for each route is provided for comparative purposes and is based on the maximum width recommendation (the high cost estimate). The cost estimates do not include ROW and intersection crossing treatments. Details on estimated ROW needs and costs are in Appendix E.

Table 3: Clackamas County Active Transportation Plan (ATP) Routes

Principal Active Transportation Routes				
Route #	***Route Name***	***Proposed Facilities***	***Length (Miles)***	***Relative Project Cost***
P1	Canby to Molalla	Shoulder Bikeway, Stripe Bike Lane	14.8	Medium
P2	Clackamas River Drive	Shoulder Bikeway	23.3	Medium
P3	Tickle Creek - Cazadero Trails	Multi-use Path	23.5	Medium
P4	I-205 Multi-Use Path	Multi-use Path	5.1	Low
P5	Monroe Neighborhood Greenway	Bike Boulevard	4.1	Low
P6	Linwood Avenue	Stripe Bike Lanes; Multi-use Path	3.9	Low
P7	River Road	Buffered Bike Lane	7.3	Low
P8	Oetkin Road - Naef Road	Bike Boulevard	3.8	High
P9	Sandy to Mount Hood	Shoulder Bikeway and Multi-use Path Parallel to Roadway	49.8	Medium
P10	Oregon City to Canby	Buffered Bike Lane, Advisory Lanes, and Shoulder Bikeway	14.9	Medium
P11	Newell Creek Trail and Oregon City Loop	Sidewalk, Shoulder Bikeway, Bike Lane, Multi-use Path	18.0	High
P12	Stafford Road	Protected Bikeway, Bridge, Shoulder Bikeway	14.3	Medium
Ideal Principal Active Transportation Routes				
Route #	***Route Name***	***Proposed Facility***	***Length (Miles)***	***Relative Project Cost***
I-13	Molalla Forest Road	Multi-use Path	11.0	-
I-14	I-205 Ped/Bike Bridge	Pedestrian – Bicycle Bridge	0.1	-
I-15	Willamette Greenway Trail - Lake Oswego to County line	Multi-use Path	1.11	-
I-16	Willamette Greenway Trail – Oregon City to Canby	Multi-use Path	8.1	-
I-17	Stafford to Canby Trail	Multi-use Path	9.1	-
Connector Principal Active Transportation Routes				
Route #	***Route Name***	***Proposed Facility***	***Length (Miles)***	***Relative Project Cost***
C18	Redland Road	Shoulder Bikeway	13.5	-
C19	Sunnyside Road	Buffered Bike Lanes / Cycle Track	5.9	-
C20	Scouters Mountain / Mt. Scott Loop Trail	Multi-Use Path / Bike Lane	4.0	-
C21	Old River Road/Hwy. 43	Buffered Bike Lane, Cycle Track, Bike Boulevard	6.7	-
C22	King Road	Sidewalks	4.4	-
C23	Trolley Trail	Buffered Bike Lane, Cycle Track, Pedestrian/Bicycle Overpass	6.4	-
C24	Borland/Willamette Falls Dr.	Shoulder bike lane/ bike lane	7.9	

The following two sections provide an overview of the five I-PATs and the seven C-PATs. Section 3.1 of this chapter focuses on the 12 PAT routes. Because they were the focus of this planning effort, the PAT route section includes a project table and figure that divides the route into logical segments and lengths for future project development and implementation. Each segment includes information regarding the project name, extent, length, facility type, reason, constraints (including any additional pavement width or right-of-way[2] needed), planning considerations and estimated cost.

I-PAT – Ideal Principal Active Transportation Routes

Route I-13 - Molalla Forest Road

Built initially as a direct route for hauling forest products, the former logging road would provide a safe off-road active transportation route for a variety of users. The Molalla Forest Road is an opportunity to augment a historic connection between Canby and Molalla.

Route I-14 - I-205 Ped/Bike Bridge

The I-205 Ped/Bike Bridge is a proposed pedestrian / bicycle crossing over Interstate 205 to connect the Clackamas Town Center and MAX Green Line with the Eagle Landing neighborhood and the employment area located east of I-205. The bridge would provide safe and convenient passage over I-205 for pedestrians and cyclists.

Route I-15 - Willamette Greenway Trail – Lake Oswego to County Line

This route is a series of multi-use trails that are recognized on the Metro Regional Trails and Greenways map. The Willamette Greenway Trail follows the east and west banks of the Willamette River from Champoeg State Park to the river's confluence with the Columbia River in north Portland. Major built segments include trails in George Rogers Park in Lake Oswego and Mary S. Young Park in West Linn. This route follows the west side of the Willamette River from downtown Lake Oswego to the county line. Route I-15 includes the Lake Oswego to Milwaukie Bridge, a bike/pedestrian crossing over the Willamette River. Currently there is a significant multi-model gap between Sellwood and Oregon City. A pedestrian/bicycle bridge across the Willamette River would create a needed east-west route and connect the Trolley Trail to Lake Oswego. On the east side of the Willamette River, this route provides on-street connection to the Trolley Trail via Denny St., Maloy Lane and Courtney Ave.

[2] Right-of-way acquisition can be a significant obstacle to project delivery. The need for additional right-of-way to implement the desired facility width is noted in the constraints column (where applicable), along with the additional right-of-way needed to implement the minimum allowable width facility in parenthesis.

Route I-16 - Willamette Greenway Trail – Oregon City to Canby Segment

This route connects Oregon City to Canby via the Willamette Greenway Trail. A shared use path on the east side of the Willamette River would provide safe, convenient active transportation between two Clackamas County communities. The Willamette Greenway Trail is recognized on the Metro Regional Trails and Greenways map.

Route I-17 – Stafford to Canby Trail

This route consists of two proposed regional trails: the Stafford to Canby Trail will connect the Stafford Hamlet to the Canby Ferry, while the Willamette Greenway Trail segment will provide active transportation connection from the Canby Ferry west toward the City of Wilsonville. Each trail segment is approximately 5 miles long.

C-PAT Routes – Connector Principal Active Transportation Routes

Route C-18 - Redland Road

This route connects Oregon City with the Redland and Carver rural communities as well the City of Estacada. Adding improved active transportation facilities to not only Redland Road but also Fischers Mill Road, Mattoon Road and Jubb Road would provide significant connections to east county communities.

Route C-19 - Sunnyside Road

Sunnyside Road is an important east-west connector between the Clackamas Regional Center (CRC) and the cities of Happy Valley and Damascus. Improved active transportation facilities between the CRC and east county communities would provide safer transportation alternatives for bicyclists and pedestrians. Potential facility type improvements include a cycle track or buffered bike lanes.

Route C-20 - Scouter's Mountain / Mt. Scott Loop Trail

Parts of the Scouter's Mountain trail system are constructed. In particular, Happy Valley has many completed segments. This trail will connect the Springwater Trail south through Happy Valley to the future Sunrise Corridor Trail. A master plan for the Mt. Scott-Scouter's Mountain Loop Trail system was completed in 2014.

Route C-21 - Old River Road-Highway 43

Old River Road offers a scenic route along the Willamette River south of George Rogers Park. Combined with improved facilities on Highway 43, this route would provide a direct connection between Lake Oswego and West Linn as well as access to employment, parks and shopping.

Route C-22 - King Road

King Road connecting west to Harrison Street and Lake Road and ultimately to the Trolley Trail and east to 82nd Avenue is designated in the Regional Active Transportation Plan as a Regional Bikeway and Pedestrian Parkway and is along a high ridership transit route. This route would provide a continuous pedestrian and bicycle connection from Milwaukie to the Clackamas Regional Center area and the I-205 multi-use path.

Route C-23 - Trolley Trail

The 6-mile Trolley Trail connects Milwaukie to Gladstone along a former streetcar right-of-way that operated from 1893 until 1968. The paved multi-use path provides connections to schools, parks, commercial centers, and the neighborhoods of Oak Grove and Jennings Lodge. Improving active transportation facilities near the Trolley Trail's southern terminus in Gladstone would provide a safe and convenient connection to the I-205 path located approximately one mile to the east.

Route C-24 – Borland Road – Willamette Falls Drive

This route links Tualatin with West Linn and connects to downtown Willamette, a National Register Historic District in the southwest corner of West Linn. Currently, pedestrian and bicycle facilities along Borland Road and Willamette Falls Drive are limited and discontinuous. Improved active transportation facilities are needed on both roads to increase the safety of all users along this heavily used commuter and recreation corridor.

3.1 PRINCIPAL ACTIVE TRANSPORTATION ROUTES

(P1) Canby to Molalla

Route Summary

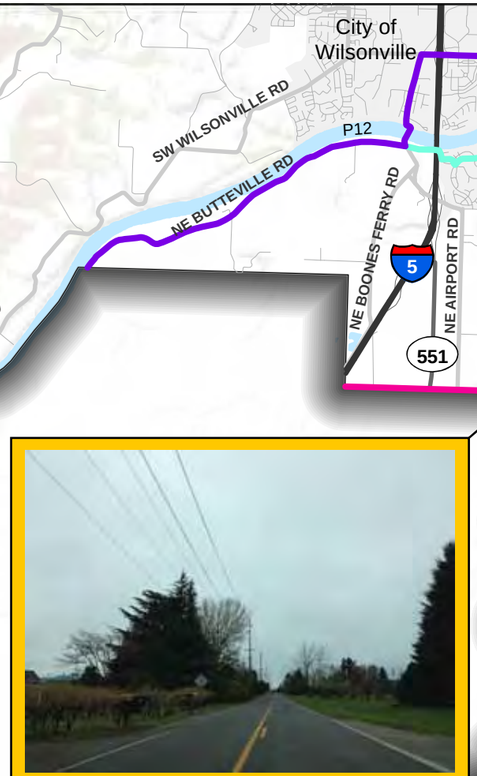
Extent:	Canby Ferry to downtown Molalla
Total Length:	14.8 miles
Environment:	Suburban/Rural
Proposed Facility Type(s):	Sidewalk, shoulder bikeway, and bike lane
Expected Pedestrian Use:	Highest potential between the Canby Ferry and the City of Canby (approximately 2 miles). The route between Molalla and Canby is less likely to attract pedestrians, recreational or otherwise.
Expected Bicycle User Group:	Recreational bicyclists are expected due to the low number of trip attractors/destinations along this route.

Route Description

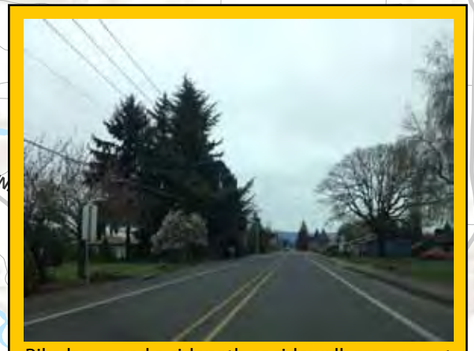
The route between the Canby Ferry and downtown Molalla can be largely characterized by its adjacent agricultural and pastoral lands and lower-traffic streets. In general, relatively low traffic volumes, low speeds and a number of existing facilities make this route an attractive choice for active transportation users.

Traveling north from central Canby, existing bike lanes and complete sidewalks on N Ivy Street provide a safe and comfortable connection to NE Territorial Road, which links up with N Holly Street/NE 37th Avenue, a lower traffic two-lane roadway with intermittent paved or gravel shoulders that provides access to Molalla River State Park and the Canby Ferry.

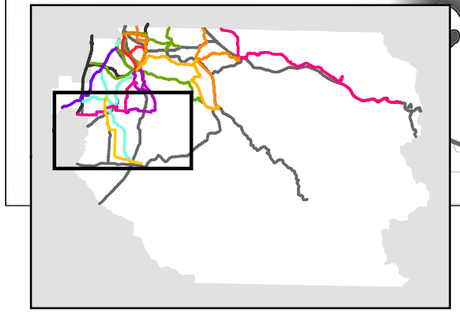
Traveling south toward the City of Molalla on Ivy Street is made more comfortable by the presence of bike lanes/paved shoulders and sidewalk on at least one side, but as NW Territorial Road begins to leave the urban core and transition into Highway 170, the sidewalks disappear. Higher traffic volumes on Highway 170 make conditions less comfortable for active transportation users until the route transitions to S Kraxberger Road and rural farm roads that connect users to the multi-use path on the south side of Toliver Road that begins east of Highway 213 in Molalla.



Rural, two lane road with intermittent shoulders and low traffic volumes



Bike lanes and a sidepath or sidewalk are present for the majority of this segment in Molalla



Route P1
Route P2
Route P3
Route P4
Route P5 / P6
Route P7 / P8
Route P9
Route P10
Route P11
Route P12
I-PAT
C-PAT

Principal Active Transportation (PAT) Routes
Route P1 - Canby to Molalla
Clackamas County, Oregon

Figure **7**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

Proposed Facility Type

The majority of this route is along low-traffic streets. In the urban areas of both Canby and Molalla, the route takes advantage of existing facilities that support walking and biking. There are few physical constraints such as trees, utility poles and drainage ditches, so dedicated active transportation facilities such as shoulder bikeways and advisory lanes would be cost effective outside the urban areas.

The needs of pedestrians traveling in the developed areas are well accommodated in Canby by the sidewalks on both sides of N Ivy Street. In Molalla, a multi-use path on the south side of Toliver Road gives pedestrians a comfortable place to walk. Between the City of Canby and the Canby Ferry, there are intermittent gravel/paved shoulders for pedestrians to walk, though separated active transportation facilities would improve conditions considerably.

Project Segments

- **(1.01) NE 37th Avenue/N Holly Street from Canby Ferry to NE Territorial Road:** This segment would benefit from the addition of wayfinding signage and continuous paved shoulders for pedestrian and bicyclist use. An alternate solution to a shoulder bikeway would be a multi-use path, which would provide an attractive active transportation connection for users of all ages and abilities to access Molalla River Park and the Canby Ferry.
- **(1.02) N/S Ivy Street from NE Territorial Road to SE 16th Avenue:** This section of the route has active transportation facilities and only needs wayfinding signage to improve route legibility and direct people to key destinations.
- **(1.03) Canby-Marquam Hwy/Kraxberger/Dryland/Toliver Road from SE 16th Avenue to Highway 213:** This is largely a two-lane rural roadway that best serves recreational bicyclists. Shoulder bikeways and wayfinding and/or bicycle warning signage would help formalize the route and improve conditions for a variety of roadway users. There is an opportunity to provide advisory lanes on Kraxberger Road/S Harms Road between Highway 213 and S Macksburg Road. This section has very low traffic volumes and no center line stripe (a requisite for advisory bike lane applications). There are also deep drainage ditches on both sides of this roadway that would make roadway expansion more expensive.
- **(1.04) Toliver Road from Highway 213 to Molalla Avenue:** An existing multi-use path between Highway 213 and Zimmerman Lane serves pedestrians well, as does the sidewalk between Zimmerman and Molalla Avenue. There are no formal bicycle facilities between Highway 213 and Zimmerman Lane, but low speed/low traffic conditions and a constrained right-of-way make shared lane markings an attractive option. East of Zimmerman Lane, the roadway widens and there are bicycle lanes.

Table 4: Canby to Molalla (P1) Project List

Project Number	Project Name	Extent	Length (Miles)	Existing Facility	Proposed Facility	Reason for Project	Constraints	Planning Considerations	Estimated Cost
1.01	NE 37th Avenue/N Holly Street	Canby Ferry to NE Territorial Road	1.90	None	Shoulder bikeway. A multi-use path may also be considered.	Provides active transportation connection between Canby city limits and the Canby Ferry and Molalla River State Park.	Needs 8'-10' of additional pavement width and 14' of additional ROW (10' for minimum width facility)	Transition between N Ivy and N Holly needs way-finding signage; coming from the Ferry it is not obvious what road the route follows. Wayfinding signage for Champoeg State Park needed at Territorial Rd. and Holly St.	$4,596,000 (cost estimate for shoulder bikeway)
1.02	N/S Ivy Street	NE Territorial Road to SE 16th Avenue	1.93	Bike lanes. Sidewalks from NE Territorial to Hwy 99	Wayfinding signage; Sidewalk infill south of Hwy 99	Connects downtown Canby with residential area south of Hwy 99	-	Possibility of installing buffered bike lanes south of SW 2nd Avenue; Narrow bike lanes just east of the Hwy 99 intersection for one block	$198,000
1.03	Canby-Marquam Hwy/ Kraxberger/Dryland/Toliver	SE 16th Avenue to Hwy 213	9.57	None	Shoulder bikeway	Recreational connection between Canby and Molalla	Major ditches, large trees and lack of shoulders. Requires 0'-14' of additional pavement width. Needs 14'-25' of additional ROW in certain sections (10'-21' for minimum width facility)	There is an opportunity to install advisory bike lanes on Kraxberger Road	$11,424,000
1.04	Toliver Road	Hwy 213 to Molalla Avenue	1.37	Multi-use path on south side between Hwy 213 and Molalla River School Dist. Sidewalk on at least one side east of school	Shared lane markings where there are no bike facilities (west of school). Sidewalk infill from school east to end of route in Molalla	Provides a connection between Molalla and rural areas west of Hwy 213	Needs 8' of additional pavement width	Shared lane markings may be considered on sections without bike lanes. There are bike lanes between Molalla Avenue and the school.	$1,592,000

(P2) Clackamas River Drive

Route Summary

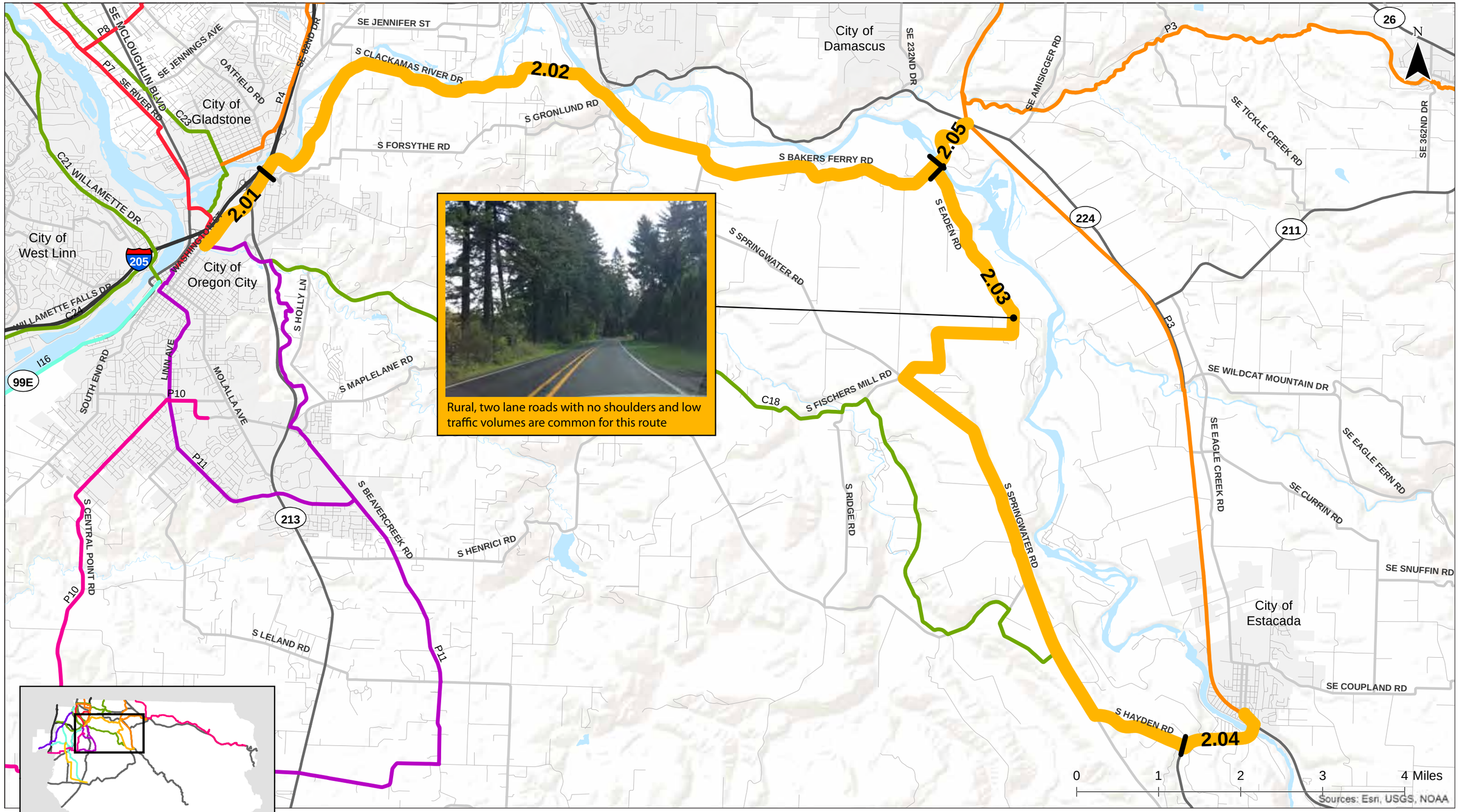
Extent:	Downtown Oregon City to Estacada
Total Length:	23.3 miles
Environment:	Rural
Proposed Facility Type(s):	Shoulder bikeway, bike lanes
Expected Pedestrian Use:	Unlikely due to large distances between destinations and overall length of the route.
Expected Bicycle User Group:	Rolling terrain and lower traffic volumes make this route a popular recreational bicycling route. Utilitarian bicycle commuters are not expected in significant numbers due to a lack of destinations.

Route Description

Clackamas River Drive is a popular cycling route east of Oregon City used for events such as the Oregon City Triathlon. There are no dedicated bicycle facilities along this route, nor is there warning signage to alert motorists to expect bicyclists on the roadway. Bicyclists share a narrow travel lane with motorists that may be traveling at high speeds, which feels unsafe or uncomfortable for the majority of bicycle users.

Once east of the Oregon City limits, this route follows a number of relatively low-traffic two-lane roadways that generally lack paved shoulders, with only the occasional gravel shoulder. The pavement width is narrow, fluctuating between 20 ft. and 22 ft., and there are numerous corners with restricted sight lines. Travel speeds are high and only the most confident bicyclists are currently riding in this environment.

For the section of this route along Clackamas River Drive, widening is not feasible due to physical constraints including steep slopes, ditches and utility lines. Traffic calming may be an alternate solution for this section, but should be used in conjunction with significant educational outreach to the public and the identification of alternate routes for non-local motorized traffic.



Rural, two lane roads with no shoulders and low traffic volumes are common for this route

Route P1
Route P2
Route P3
Route P4
Route P5 / P6
Route P7 / P8
Route P9
Route P10
Route P11
Route P12
I-PAT
C-PAT

Principal Active Transportation (PAT) Routes
Route P2 - Clackamas River Drive
Clackamas County, Oregon

Figure **8**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

Proposed Facility Type

This route follows lower traffic streets (though speeds can be high) for nearly its entirety, with two exceptions: the one mile where it follows Highway 211 into Estacada, and the segment of Springwater Road between Carver and Bakers Ferry Road. Given the relatively low traffic volumes and recreational nature of the route, shoulder bikeways are proposed (though drainage ditches, utility lines and large trees will impact the cost of any roadway widening). There are also opportunities to improve active transportation conditions with appropriate signage on Clackamas River Drive, such as bicycle warning signs or 'Bikes on Roadway'' signs.

Project Segments

- **(2.01) Clackamas River Drive from Washington Street to Forsythe Road:** This section is within Oregon City limits and currently has sidewalks and bike lanes.
- **(2.02) Clackamas River Drive/Springwater Road from Forsythe Road to SE Bakers Ferry Road**: This section should be studied to improve driver-bicycle interactions because of roadway widening constraints.
- **(2.03) S Bakers Ferry Road/Eaden/Springwater/Hayden Road from Market Road 39 to Highway 211:** The route from Carver to Highway 211 begins at S Bakers Ferry Road. The roads should be expanded to include paved shoulders, and bicycle warning or 'Bikes on Roadway' signs.
- **(2.04) Highway 211 from Hayden Road to Estacada:** This one-mile stretch of highway has significantly higher traffic volumes than the rest of the route. Given the proximity to an urban core, the paved shoulders should be formalized into bike lanes with pavement markings and signage.
- **(2.05) SE Bakers Ferry Road from Highway 224 to Eaden Road:** This short segment will provide an on-street connection between the proposed Cazadero Trail and the Clackamas River Drive Route.

Table 5: Clackamas River Drive (P2) Project List

Project Number	Project Name	Extent	Length (Miles)	Existing Facility	Proposed Facility	Reason for Project	Constraints	Planning Considerations	Estimated Cost
2.01	Clackamas River Drive	Washington Street to Forsythe Road	1.13	Complete sidewalks and bike lanes	Wayfinding Signage	Direct bicyclists to this planned bicycle route to Estacada, once implemented.	None	Segment is in Oregon City	$3,000
2.02	Clackamas River Drive/ Springwater Road	Forsythe Road to S Bakers Ferry Road	6.85	None	None – A study to improve driver-bicycle interactions is needed	Provides a recreational bicycling opportunity. Connects Oregon City and Carver.	Narrow roadway with guard rails and no shoulders. Retaining wall would need modification. Irrigation ditches and utility lines adjacent to roadway. Needs 14’ pavement width to accommodate facility.	A traffic study is needed to improve driver-bicycle interactions. Shared lane markings are not allowed on streets with speed limits above 35 mph	$100,000
2.03	S Bakers Ferry Road/Eaden/ Springwater/Hayden Road	Springwater Road to Hwy 211	13.3	None	Shoulder bikeway	Provides a recreational bicycling opportunity. Connects Oregon City and the City of Estacada.	Ditches, utility lines and large trees adjacent to the roadway. Topography and corners create visibility concerns. Needs 11’-14’ of additional pavement width and 14’ of additional ROW (10’ for minimum width facility) to accommodate facility.	None	$29,161,000
2.04	Hwy 211	Hayden Road to Hwy 224	1.15	None	Bike lane	Provides a recreational bicycling opportunity. Connects Oregon City and the City of Estacada.	Ditches adjacent to roadway. Needs 8’ of additional pavement width to accommodate facility.	Existing striped wide shoulders are sufficient. Add pavement markings and optional signage. High traffic speeds and volumes.	$6,000
2.05	SE Bakers Ferry Road	Hwy 224 to Eaden Road	0.9	None	Shoulder bikeway; shared lane markings on bridge	Provides an on-street connection to the proposed Cazadero Trail.	Ditches adjacent to the roadway and a narrow bridge crossing. Needs 14’ of additional pavement width to accommodate facility.	Add shared lane markings to the 300’-long bridge crossing.	$1,657,000

(P3) Tickle Creek Trail – Cazadero Trail

Route Summary

Extent:	City of Sandy to City of Estacada
Total Length:	23.5 miles
Environment:	Rural/suburban
Proposed Facility Type(s):	Multi-use path
Expected Pedestrian Use:	Recreational and utilitarian walkers
Expected Bicycle User Group:	Recreational and utilitarian bicyclists

Route Description

This route consists of two distinct sections: the proposed Tickle Creek Trail traveling east/west and the proposed north/south-oriented Cazadero Trail. Both of these trails would provide recreational opportunities for residents of several communities including Gresham, Sandy, Estacada, Oregon City and Portland.

The Cazadero Trail is a 14-mile portion of the proposed Metro to Mt. Hood Trail, going from downtown Portland to the Pacific Crest Trail in the Mt. Hood National Forest. It will connect with the Springwater Corridor in Boring and to Timber Park in Estacada.

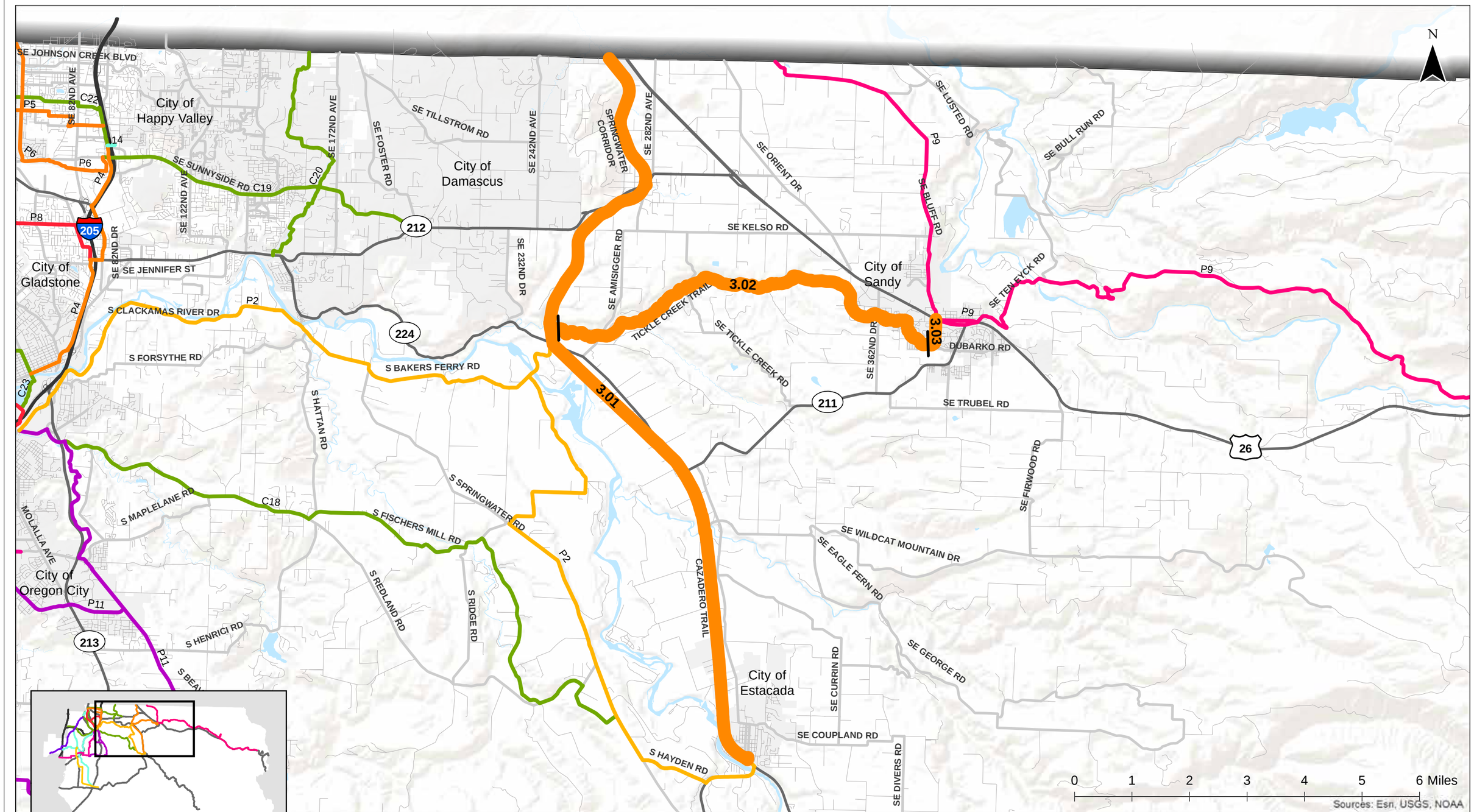
The Tickle Creek Trail is also part of Metro's Mt. Hood Connections project and consists of funding and building a trail connection between Sandy and the eastern terminus of the Springwater Corridor in Boring. The majority of the Tickle Creek Trail is a planned off-street multi-use path. A short segment (0.7 miles) will be an on-street connection between the trail and downtown Sandy.

Proposed Facility Type

Both of these routes will be off-street multi-use paths providing low-stress transportation and recreational connections between several communities. A short on-street connection between the trail and downtown Sandy can be accomplished with buffered bike lanes (may need to remove parking) or shared lane markings, and sidewalks.

Project Segments

- **(3.01) Cazadero Trail:** This section will be an off-street multi-use path.
- **(3.02) Tickle Creek Trail between the Springwater Corridor and Dubarko Road:** This section will be an off-street multi-use path.
- **(3.03) Tickle Creek Trail between Dubarko Road and Pioneer Boulevard:** Buffered bike lanes and sidewalks are recommended for the on-street section of the Tickle Creek Trail.



Route P1
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Route P7 / P8
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Route P10
Route P11
Route P12
I-PAT
C-PAT

Principal Active Transportation (PAT) Routes
Route P3 - Tickle Creek Trail - Cazadero Trail
Clackamas County, Oregon

Figure **9**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

Table 6: Tickle Creek Trail – Cazadero Trail (P3) Project List

Project Number	Project Name	Extent	Length (Miles)	Existing Facility	Proposed Facility	Reason for Project	Constraints	Planning Considerations	Estimated Cost
3.01	Cazadero Trail	Washington Street to Forsythe Road	14.48	None	Multi-use path	Provides a connection between Boring and Estacada.	-	-	$17,730,000
3.02	Tickle Creek Trail	Springwater Corridor to Dubarko Road	8.29	A portion of the trail is within the City of Sandy; otherwise, none.	Multi-use path	Provides a connection between Sandy and Portland.	-	Shared lane markings are not allowed on streets with speed limits above 35 mph.	$10,152,000
3.03	Tickle Creek Trail	Dubarko Road to Pioneer Boulevard	0.68	None	Buffered bike lane and sidewalk	Provides an on-street connection between Sandy and Tickle Creek Trail.	-	May need removal of on-street parking to add buffered bike lanes. Shared lane markings are an alternative option.	$782,000

(P4) I-205 Multi-Use Path

Route Summary

Extent:	Clackamas Town Center to Gladstone
Total Length:	5.1 miles
Environment:	Urban/ suburban
Proposed Facility Type(s):	Sidewalk, bike lane
Expected Pedestrian Use:	Recreational and utilitarian walkers
Expected Bicycle User Group:	Recreational and utilitarian bicyclists

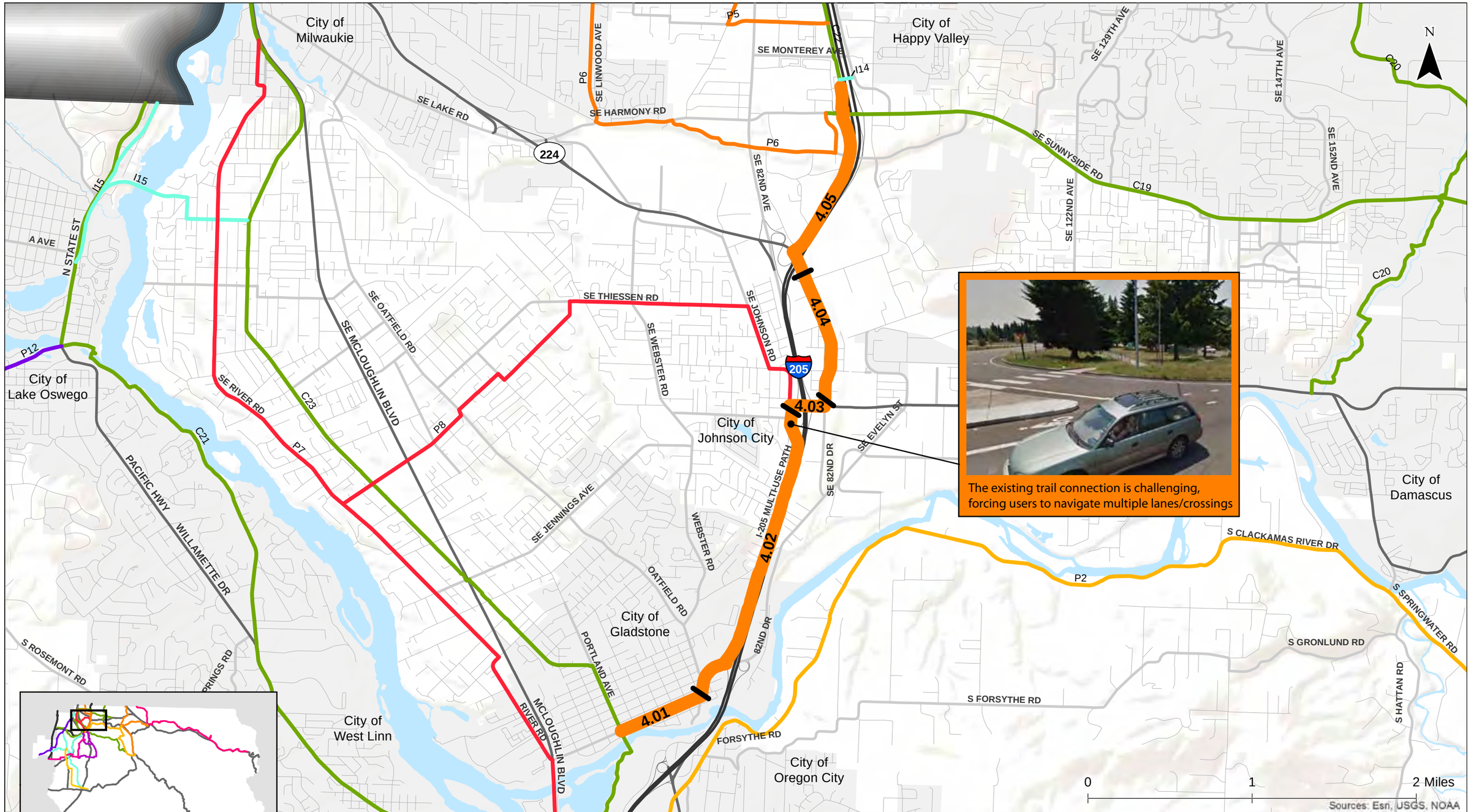
Route Description

This route between Clackamas Town Center and Portland Avenue in Gladstone is of regional significance and is designated as a Bicycle Parkway in Metro's Regional Active Transportation Plan. It is a combination of on-street facilities and the existing I-205 Path, terminating just north of the bike-pedestrian bridge that connects Gladstone and Oregon City. The route provides connections to the MAX Green Line, the Clackamas Regional Center and the industrial employment centers concentrated along Highway 212/224.

This project focuses on the gap in the I-205 Path between Lawnfield Road and Highway 212/224. Of special concern is the transition from the off-street path (from the southern end of the gap near McKinley Avenue) to the on-street bike lanes on SE 82nd Drive. This transition routes bicyclists to a highway interchange over multiple slip lanes. A lack of clear wayfinding in the area makes it difficult to identify the best travel path for continuing the trip on a designated facility.

Access to the I-205 Path entrance on SE Ambler Road is also a significant challenge for active transportation users transitioning from the on-street facilities on SE 82nd Drive to the beginning of the path at Ambler Road. There is no trail crossing at this intersection to facilitate a safe crossing.

Improvements to this section of the trail and its various connections in the area will be carried out by ODOT as outlined in its Sunrise Jobs and Transportation Act (JTA) Improvements Plan. In the interim, a number of lower cost solutions that may significantly improve conditions for pedestrians and bicyclists in this area are identified below.



The existing trail connection is challenging, forcing users to navigate multiple lanes/crossings

Route P1
Route P2
Route P3
Route P4
Route P5 / P6
Route P7 / P8
Route P9
Route P10
Route P11
Route P12
I-PAT
C-PAT

Principal Active Transportation (PAT) Routes
Route P4 - I-205 Multi-Use Path
Clackamas County, Oregon

Figure **10**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

Proposed Facility Type

There is a possibility the I-205 Path will be re-routed with a new pedestrian/bicycle overcrossing when the Sunrise Corridor plan is implemented. The trail will continue to connect users to SE 82nd Drive, albeit with a more seamless transition from the path to on-street facilities. In the interim, the connection between the end of the I-205 path at Highway 224 and its continuation as an on-street facility along 82nd Drive could be improved.

The Highway 224 bridge overcrossing of I-205 has two sidewalks separated by jersey barriers and bike lanes. A recommendation is to re-configure the roadway so that all pedestrian and bicycle traffic is directed to the north side of the bridge on a two-way facility (similar to the Morrison Bridge crossing in Portland) and separated by a jersey barrier. This would provide a separated bicycle facility across the busy highway overcrossing, as compared to the existing on-street bike lanes which may not feel comfortable for many bicyclists. This treatment should also consider intersection crossing improvements such as a high visibility crosswalk and active warning beacons at McKinley Avenue and Highway 224 and at 82nd Drive and Highway 224, as well as striping modifications to the existing I-205 bridge.

Project Segments

- **(4.01) Arlington Street from Portland Avenue to SE 82nd Drive:** There are no bike facilities. It may be necessary to remove one or both lanes of on-street parking to accommodate bike lanes.
- **(4.02) SE 82nd Drive/I-205 Path from E Arlington Street to Highway 212 Overcrossing:** This segment is comprised of the existing bike lanes on SE 82nd Drive as well as the I-205 path from its southern terminus to the Highway 212 overcrossing.
- **(4.03) Highway 212 Overcrossing from McKinley Avenue to SE 82nd Drive:** There are on-street bike facilities, but the transitions to/from the path should be considered.
- **(4.04) SE 82nd Drive:** This segment is comprised of the bike lanes on SE 82nd Drive. If there is available pavement, a road diet should be considered to add buffered bike lanes.
- **(4.05) I-205 Path from Hwy 212 Overcrossing to CTC MAX Station:** This is the I-205 path that leads to the Clackamas Town Center MAX station.

Table 7: I-205 Multi-Use Path (P4) Project List

Project Number	Project Name	Extent	Length (Miles)	Existing Facility	Proposed Facility	Reason for Project	Constraints	Planning Considerations	Estimated Cost
4.01	Arlington Street	Portland Avenue to SE 82nd Drive	0.53	Sidewalk	Bike Lane	Provide a continuous bikeway connection between Gladstone bike/ped bridge and the I-205 path	Existing on-street parking on Arlington Street	There are bike lanes on SE 82nd Drive.	$2,000
4.02	SE 82nd Drive/I-205 Path	E Arlington Street to Hwy 212 Overcrossing	2.0	Bike lane/multi-use path	-	-	-	-	-
4.03	Hwy 212 Overcrossing	McKinley Avenue to SE 82nd Drive	0.2	Bike lane	Intersection Improvements and Multi-Use Path (Hwy 212 section only)	Improve non-motorized access at a difficult section of the I-205 path gap		See 'Recommended Facility Refinement' section above. ODOT recently upgraded the bike crossing here and may be less willing to make significant changes.	Not available at this time.
4.04	SE 82nd Drive	Hwy 212 Overcrossing to I-205 path	1.24	Bike lanes	Buffered Bike Lane	Provide a more comfortable connection on SE 82nd Drive	-	ODOT planners and engineers should be involved in the design and planning process.	$22,000
4.05	I-205 Path	SE 82nd Drive to CTC MAX Station	1.11	Multi-use path	-	-	-	-	Not Available at this time.

(P5) Monroe Neighborhood Greenway

Route Summary

Extent:	Highway 99 to I-205
Total Length:	4.1 miles
Environment:	Suburban
Proposed Facility Type(s):	Neighborhood Greenway
Expected Pedestrian Use:	Utilitarian and recreational pedestrians
Expected Bicycle User Group:	Utilitarian and recreational bicyclists

Route Description

The Monroe Street Route provides connections to the future MAX Orange Line, the MAX Green Line, the I-205 Path, and a number of parks and schools. In general, increased separation between motorists and pedestrians should be considered by providing a separate sidewalk on at least one side of the street along the length of this route. This route is characterized by low traffic and low speed streets. There are bike lanes on the portion of the route along Fuller Street.

Proposed Facility Type

Neighborhood greenway treatments such as wayfinding and traffic calming are planned for this route. Milwaukie plans to develop the portion of SE Monroe Street within its city limits into a neighborhood greenway. Likewise, Clackamas County plans to develop a neighborhood greenway street design and connections to the Clackamas Regional Center area for the segment of Monroe Street in unincorporated Clackamas County.

Route P1
Route P2
Route P3
Route P4
Route P5 / P6
Route P7 / P8
Route P9
Route P10
Route P11
Route P12
I-PAT
C-PAT

Principal Active Transportation (PAT) Routes
Route P5 - Monroe Neighborhood Greenway
Clackamas County, Oregon

Figure **11**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

Project Segments

- **(5.01) SE Monroe Street between Highway 99 and SE Linwood Avenue**: This section in Milwaukie is being planned as a neighborhood greenway.
- **(5.02) SE Monroe Street from SE Linwood Avenue to SE Causey Avenue:** Beginning at Linwood Avenue, the ATP recommends continuing a bike boulevard treatment along Monroe Street. The route then turns right to utilize existing bike lanes on Fuller Road. Sidewalk construction is needed on one side.
- **(5.03) SE Fuller Road between Monroe Street and Causey Avenue**: This section within unincorporated Clackamas County is served by bike lanes and sidewalks on at least one side of the road.
- **(5.04) SE Causey Avenue from SE Fuller Road to I-205 Path:** This four-block section has significantly increased housing density and vehicle traffic. Consideration should be given to improve active transportation user comfort through traffic calming, such as speed humps and shared lane markings. For the one block between SE Fuller Road and SE 82nd Avenue, the travel lanes and center turn lane should be narrowed to accommodate bike lanes. The county has considered removing the left turn lane at 85th Avenue, which could also be part of this project.

Table 8: Monroe Neighborhood Greenway (P5) Project List

Project Number	Project Name	Extent	Length (Miles)	Existing Facility	Proposed Facility	Reason for Project	Constraints	Planning Considerations	Estimated Cost
5.01	SE Monroe Street	Hwy 99 to Linwood Avenue	2.08	-	-	-	-	This section is within the City of Milwaukie and currently planned as a neighborhood greenway.	-
5.02	SE Monroe Street	Linwood Avenue to SE Causey Avenue	1.0	-	Neighborhood greenway, add sidewalk to one side	Provides a continuous low-stress connection between the planned Milwaukie Bike Boulevard and the Clackamas Town Center/I-205 Path	None	Clackamas County has jurisdiction over the roadway east of Linwood. There is an opportunity to provide a pedestrian/bicycle connection cut-through at 78th Avenue. Wayfinding signage is needed at 72nd Avenue to keep people on the neighborhood bikeway.	$1,235,000
5.03	SE Fuller Road	SE Monroe Street to SE Causey Avenue	0.36	Bike Lane/Sidewalk	-	-	-	-	-
5.04	SE Causey Avenue	SE Fuller Road to I-205 Path	0.62	Sidewalk	Neighborhood greenway /bike lane	Provides continuous low-stress connection between the planned Milwaukie Bike Boulevard and the Clackamas Town Center/I-205 Path	None	On-street parking is in high demand. The crossing at Fuller and Causey will need to be improved to facilitate a safe and comfortable crossing with a high visibility crosswalk and active warning beacons Lane narrowing on Causey between SE 82nd Avenue and Fuller will allow for the addition of bike lanes.	$7,000

(P6) Linwood Avenue

Route Summary

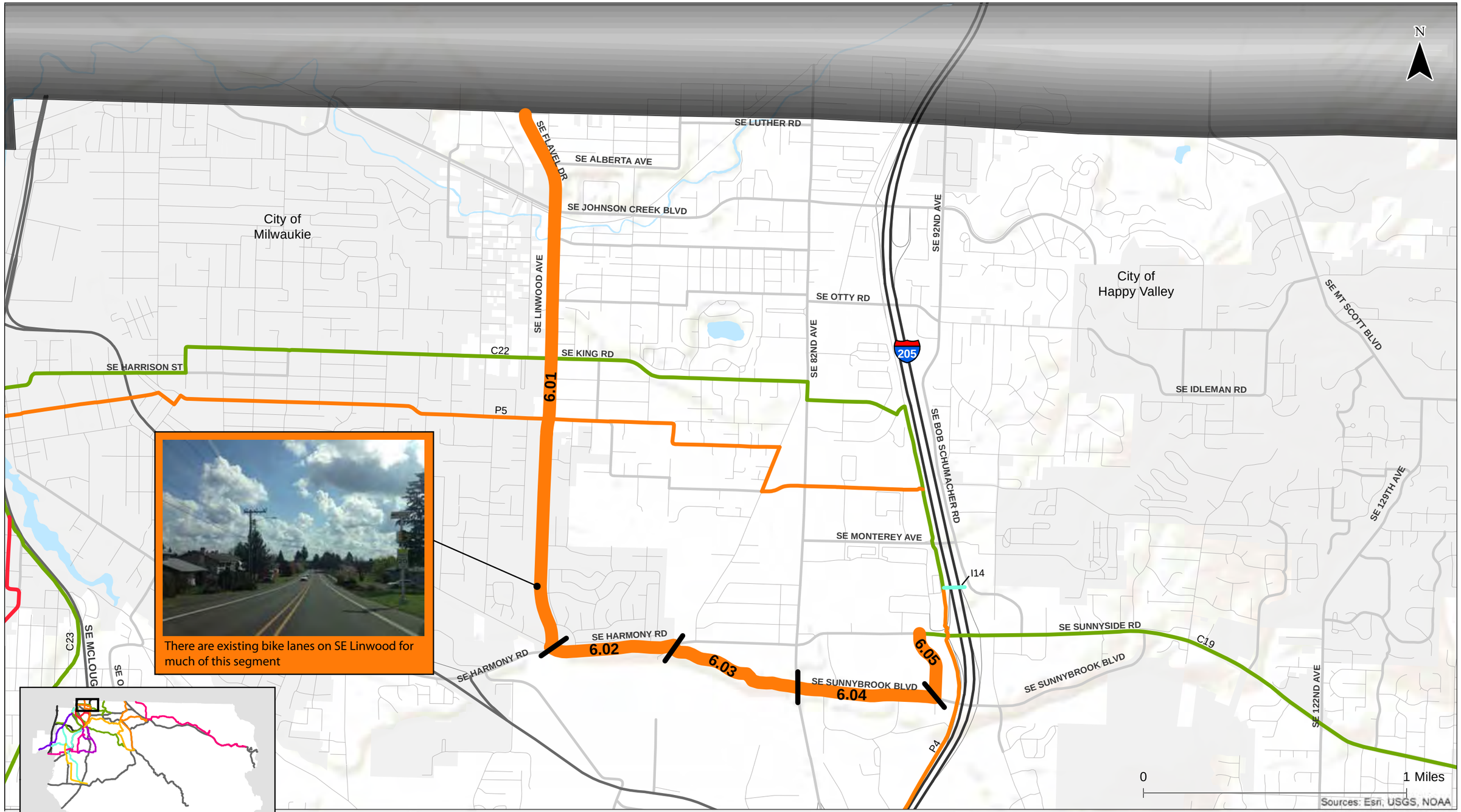
Extent:	SE Clatsop Street to Clackamas Town Center
Total Length:	3.9 miles
Environment:	Suburban
Proposed Facility Type(s):	Sidewalk, bike lane, multi-use path
Expected Pedestrian Use:	Utilitarian and recreational pedestrians
Expected Bicycle User Group:	Utilitarian and recreational bicyclists

Route Description

This route provides a connection to the Springwater Corridor, the North Clackamas Aquatic Park and Clackamas Town Center. With the exception of the multi-use path near the Aquatic Park, the majority of this route is on collector and arterial roadways. SE Linwood Avenue is identified as a proposed bicycle parkway in Metro's Regional Active Transportation Plan and is a transit route. There are bike lanes on SE Harmony Road that provide access to the multi-use path that leads to the Aquatic Center.

Proposed Facility Types

Bike lanes and sidewalk on both sides of the route will improve connectivity for confident bicyclists and pedestrians. An extension of the Aquatic Center path to SE 82nd Avenue would provide a connection to the bike lanes and sidewalks on Sunnybrook Boulevard, which leads to Clackamas Town Center.



There are existing bike lanes on SE Linwood for much of this segment

Route P1
Route P2
Route P3
Route P4
Route P5 / P6
Route P7 / P8
Route P9
Route P10
Route P11
Route P12
I-PAT
C-PAT

Principal Active Transportation (PAT) Routes
Route P6 - Linwood Avenue
Clackamas County, Oregon

Figure
12

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

Project Segments

- **(6.01) SE Flavel Drive/SE Linwood Avenue from SE Clatsop Street to Aquatic Center:** Bike lanes would provide bicyclists with greater access to destinations to the south and an established connection to the Springwater Corridor to the north. Utility poles and large trees on the west side of Linwood could impact the development of sidewalk and roadway expansion to include bike lanes.
- **(6.02) Harmony Road from SE Linwood Avenue to Aquatic Center:** There are bike lanes. A multi-use path on Harmony Road is an alternative to expanding the roadway for buffered bike lanes.
- **(6.03) Aquatic Center Path from Aquatic Center to SE 82nd Drive:** By extending the multi-use path at the Aquatic Center to SE 82nd Drive, active transportation users can choose to continue traveling east without having to walk or bike on Harmony Road or SE 82nd Avenue.
- **(6.04) Sunnybrook Boulevard/93rd Avenue from SE 82nd Drive to Clackamas Town Center:** This section is fully built out with sidewalks and bike lanes except where it turns north on SE 93rd Avenue to connect to Clackamas Town Center.
- **(6.05) 93rd Avenue from Sunnybrook Boulevard to Clackamas Town Center:** This section has sidewalks. Bike lanes are needed to complete the bicycle route to Clackamas Town Center. Bicycle detection is needed at 93rd and Sunnyside and again at 93rd and Sunnybrook.

Table 9: Linwood Avenue (P6) Project List

Project Number	Project Name	Extent	Length (Miles)	Existing Facility	Proposed Facility	Reason for Project	Constraints	Planning Considerations	Estimated Cost
6.01	SE Flavel Drive/ SE Linwood Avenue	SE Clatsop Street to Harmony Road	2.06	Paved shoulders/ sidewalks (50% complete) on Linwood	Bike lane	Connects Milwaukie and Clackamas Town Center	Utility poles and large trees on the west side of the roadway could impact sidewalk development. Needs an additional 0'-12' of pavement width to accommodate facilities.	Linwood Ave. between Harmony and Monroe is a City of Milwaukie road.	$826,000
6.02	SE Harmony Road	SE Linwood Avenue to Aquatic Center	0.47	Bike lane	Multi-use path	Connects Milwaukie and Clackamas Town Center	-	There is no room to convert the existing bike lanes to buffered bike lanes. However, there is room on the south side of SE Harmony Road to add a multi-use path that connects to the Aquatic Center.	$583,000
6.03	Aquatic Center Path	SE Harmony Road to SE 82nd Avenue	0.52	Multi-use path (partial)	Multi-use path	Connects Milwaukie and Clackamas Town Center	None	The intersection of SE 82nd Avenue will need to be improved for pedestrian and bicyclist use. There is a MUP between Harmony Road and the Aquatic Center.	$631,000
6.04	Sunnybrook Boulevard	SE 82nd Drive to 93rd Avenue	0.53	Bike lane/ sidewalk	-	Connects Milwaukie and Clackamas Town Center	None	There are sidewalks and bike lanes between SE 82nd and SE 93rd.	-
6.05	93rd Avenue	Sunnybrook Blvd to Clackamas Town Center	0.27	Sidewalks	Bike lane	Connects Milwaukie and Clackamas Town Center	None	Bicycle detection is needed at 93rd and Sunnyside and at 93rd and Sunnybrook.	$16,000

(P7) River Road

Route Summary

Extent:	Trolley Trail at Highway 99E to Downtown Oregon City
Total Length:	7.3 miles
Environment:	Suburban
Proposed Facility Type(s):	Sidewalk, buffered bike lane
Expected Pedestrian Use:	Recreational and local trips
Expected Bicycle User Group:	Recreational

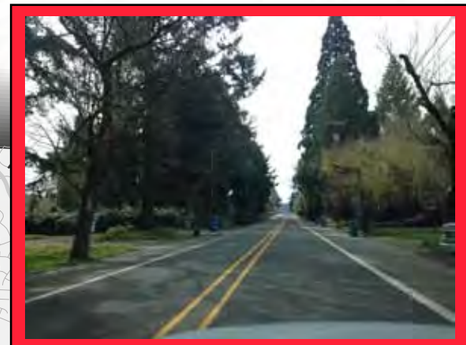
Route Description

This route follows a low traffic and scenic route from the Trolley Trail near Highway 99E and SE 22nd Avenue to downtown Oregon City. The route connects the future MAX Orange Line at Park Avenue, the Oak Grove employment center, the Trolley Trail, Gladstone, the Clackamas River Trail and Oregon City. There are wide bike lanes on SE 22nd Avenue/River Road. Because the bike lanes are wider than seven feet in many places, people sometimes park their vehicles in the bike lane. As the route transitions into Gladstone near the bridge over the Clackamas River, people walking and biking leave the relative quiet of River Road and cross the river on Highway 99E, with high volumes of fast-moving traffic. Calm conditions return on Clackamette Drive, following the crossing, and on through to Main Street leading into Oregon City.

Proposed Facility Type

A buffered bike lane is recommended as an enhancement to the wide bike lane on SE 22nd Avenue/River Road. Just south of Oak Grove, the roadway narrows considerably on the steep grade. The bike lane ends in the downhill (southbound) direction, while a narrow 4-foot bike lane is present in the uphill direction. While expanding the roadway to accommodate full bike lanes in both directions would be ideal, a lower cost solution would be to add shared lane markings to the downhill direction.

The Clackamas River crossing routes bicyclists from the on-street bike lane to the sidewalk on the bridge. Adding pavement markings to the ramps and wayfinding signage would clarify the route and lead to fewer cyclists taking the lane across the bridge.



Existing wide (>7') bike lanes can be retrofitttted into buffered bike lanes

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7.02
7.03
7.04
7.05

City of Milwaukie
City of Happy Valley
City of Gladstone
City of Oregon City
City of West Linn
City of Tualatin

SE KING RD
SE LAKE RD
SE HARMONY RD
SE RIVER RD
SE 129TH AVE
SE 152ND AVE
SE 122ND AVE
SE 142ND AVE
SE 135TH AVE
SE 82ND AVE
SE 82ND DR
SE SUNNYSIDE RD
SE THIESSEN RD
SE OATFIELD RD
SE MCLOUGHLIN BLVD
SE WEBSTER RD
SE JENNINGS AVE
SE JENNIFER ST
KRUSE WAY
MEADOWS RD
LAKEVIEW BLVD
SOUTH SHORE BLVD
MCVEY AVE
BRYANT RD
CHILDS RD
PACIFIC HWY
WILLAMETTE DR
S ROSEMONT RD
HIDDEN SPRINGS RD
SALAMO RD
PARKER RD
SKYLINE DR WEST A ST
SUNSET AVE
SW BORLAND RD
N STATE ST
WEBSTER RD
OATFIELD RD
PORTLAND AVE
WASHINGTON ST
HIGH ST
S HOLLY LN
S REDLAND RD
S CLACKAMAS RIVER DR
S GRONLUND RD
S FORSYTHE RD

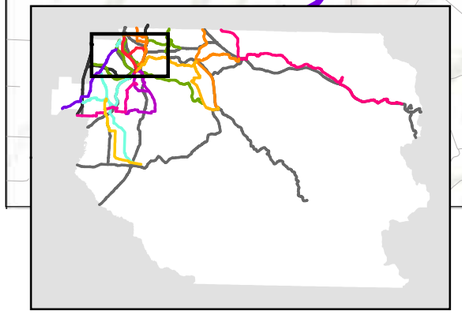
I-5
I-205
224
212
213

C18 C19 C20 C21 C22 C23 C24
P2 P4 P5 P6 P8 P11 P12

N

0 1 2 3 Miles

Sources: Esri, USGS, NOAA



Route P1
Route P2
Route P3
Route P4
Route P5 / P6
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Principal Active Transportation (PAT) Routes
Route P7 - River Road
Clackamas County, Oregon

Figure
13

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

Project Segments

- **(7.01) SE 22nd Avenue from Highway 99E to SE River Road**: The wide bike lane could be enhanced by adding a hatched buffer, thereby establishing a buffered bike lane.
- **(7.02) SE River Road from SE Lark Street to Oak Grove Boulevard:** The bike lane continues to be wide (more than 7 feet) in this section. A hatched buffer, bicycle stencil markings and no-parking signs would help reinforce that the on-street bikeway is not a parking lane.
- **(7.03) SE River Road from Oak Grove Boulevard to Glen Echo Avenue:** The roadway narrows considerably south of Oak Grove, but widens again after the steep hill near Rosebrier Court. A buffered bike lane could be added in this section with ease, except in the steep section between Oak Grove Boulevard and Rosebrier Court. An interim solution could be to add shared lane markings in the downhill direction.
- **(7.04) River Road from Glen Echo Avenue to Dunes Drive:** Traffic volumes increase and the roadway narrows where River Road terminates into Glen Echo Avenue. There are bike lanes and sidewalks. Signage and pavement markings should be added to direct bicyclists onto the bridge sidewalk.
- **(7.05) Dunes Drive/Main Street from Highway 99E to 14th Street:** Dunes Drive has bike lanes that lead downhill to the river. Where Dunes Drive transitions into Main Street, the bike lanes disappear and are replaced by narrow shoulders. Roadway expansion should be considered to accommodate buffered bike lanes in this section.

Table 10: River Road Route (P7) Project List

Project Number	Project Name	Extent	Length (Miles)	Existing Facility	Proposed Facility	Reason for Project	Constraints	Planning Considerations	Estimated Cost
7.01	SE 22nd Avenue	Hwy 99 to SE River Road	0.38	Bike lane	Buffered bike lane	On-street connection between Gladstone and Oregon City		There is enough pavement width to accommodate buffered bike lanes	$6,000
7.02	SE River Road	SE Lark Street to Oak Grove Blvd	1.23	Bike lane	Buffered bike lane	On-street connection between Gladstone and Oregon City	Many driveways and intersections limit the feasibility of a cycle track.	There is enough pavement width to accommodate buffered bike lanes	$20,000
7.03	SE River Road	Oak Grove Boulevard to Glen Echo Avenue	3.0	Bike lane	Buffered bike lane and some shoulder widening	On-street connection between Gladstone and Oregon City	Needs 16' of additional pavement width in the area between Oak Grove and Rosebrier Court	There is an uphill bike lane (4'), but no facility in the downhill direction between Oak Grove and SE Rosebrier Court; an interim solution could be to add shared lane markings in the downhill direction.	$372,000
7.04	River Road	Glen Echo Avenue to Dunes Drive	0.75	Bike lane, sidewalks south of SE Rinearson Road, multi-use path on Hwy 99 bridge	Buffered bike lane	On-street connection between Gladstone and Oregon City	None.	There is pavement width to accommodate buffered bike lanes. The Hwy 99 bridge has a narrow multi-use path that does not comfortably accommodate pedestrians and bicyclists traveling in tandem.	$12,000
7.05	Dunes Drive/Main Street	Hwy 99 to 14th Street	1.94	None	Buffered bike lane	On-street connection between Gladstone and Oregon City	Narrow roadway shoulders. The roadway will need to be expanded 7' to accommodate buffered bike lanes.	None.	$32,000

(P8) Oetkin Road - Naef Road

Route Summary

Extent:	I-205 Path to SE River Road
Total Length:	3.8 miles
Environment:	Suburban
Proposed Facility Type(s):	Sidewalk, neighborhood greenway, buffered bike lane
Expected Pedestrian Use:	Utilitarian and recreational
Expected Bicycle User Group:	Utilitarian and recreational

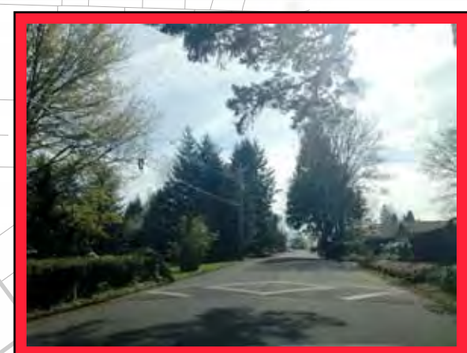
Route Description

This route connects the I-205 Path with SE River Road and the neighborhoods that lie between. It also provides a low-stress connection from the surrounding neighborhoods to the Trolley Trail. The route takes advantage of low traffic, low speed streets to provide a comfortable walking and biking route that would appeal to people of all ages and abilities. The topography on some sections is relatively steep and may be difficult for some bicyclists. However, there is no flatter route available in the vicinity.

Proposed Facility Type

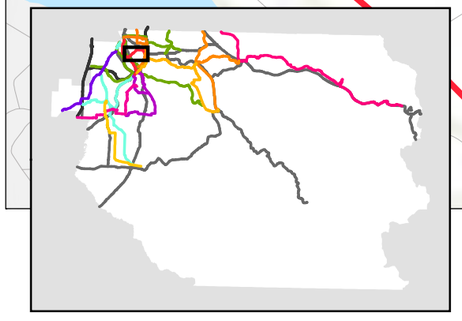
While southbound motorists traveling on SE Naef Road must turn on to Oatfield Road, there is a pedestrian/bicycle connection that allows non-motorized users to access the continuation of SE Naef Road (which is a dead end street south of Oatfield Road). However, this connection is overgrown with shrubbery and unmarked. It should be enhanced with pavement markings and signage.

A variety of improvements from sidewalks, shared lane markings, traffic calming and buffered bike lanes are proposed on this route.



Existing traffic calming on Naef/Oetken makes the route a great Neighborhood Greenway candidate

SE OAK GROVE BLVD
SE THIESSEN RD
8.04
SE JOHNSON RD
SE 82ND DR
SE 82ND AVE
N
P4
SE CONCORD RD
SE OETKEN RD
8.03
SE OATFIELD RD
SE MCLOUGHLIN BLVD
SE WEBSTER RD
205
212
SE ROOTS RD
City of Johnson City
SE 82ND DR
C23
SE RIVER RD
SE NAEF RD
8.02
8.01
P4
SE JENNIFER ST
SE JENNINGS AVE
City of Gladstone
WEBSTER RD
OATFIELD RD
P7
P2
Sources: [illegible]GS, NOAA



Route P1
Route P2
Route P3
Route P4
Route P5 / P6
Route P7 / P8
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Principal Active Transportation (PAT) Routes
Route P8 - Oetkin Road - Naef Road
Clackamas County, Oregon

Figure
14

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

Project Segments

- **(8.01) SE Naef Road from SE River Road to Highway 99E:** This section provides a connection from SE River Road to the Trolley Trail. Due to low traffic volumes, a neighborhood greenway treatment is recommended. Bicycle detection (e.g. loop, video, infrared or push button) should be added to the intersection with Highway 99E to help bicyclists across the signalized intersection.
- **(8.02) SE Naef Road from Highway 99E to Oatfield Road:** Low traffic volumes and speeds make a neighborhood greenway the appropriate treatment. The visibility of the active transportation connection at Oatfield Road can be improved with signage and pavement markings.
- **(8.03) SE Naef Road/Oetkin Road from Oatfield Road to SE Thiessen Road:** SE Naef/Oetkin Road is traffic calmed in this section with speed humps. Adding pavement markings and sidewalks will further improve the route for active transportation users.
- **(8.04) SE Thiessen Road from SE Oetkin Road to I-205 Path:** Bike lanes on SE Thiessen Road lead to the I-205 Path, but traffic speeds and volumes are much higher in this section. Buffered bike lanes are recommended to increase comfort for bicyclists traveling between the I-205 Path and the proposed neighborhood greenway on Oetkin/Naef Road.

Table 11: Oetkin Road - Naef Road (P8) Project List

Project Number	Project Name	Extent	Length (Miles)	Existing Facility	Proposed Facility	Reason for Project	Constraints	Planning Considerations	Estimated Cost
8.01	SE Naef Road	SE River Road to Hwy 99	0.48	Sidewalks approximately 50% complete	Neighborhood greenway /sidewalk	Provides a low stress connection between the I-205 path and River Road	None	-	$2,489,000
8.02	SE Naef Road	Hwy 99 to Oatfield Road	0.46	Sidewalks mostly complete on both sides south of SE Harold Avenue	Neighborhood greenway /sidewalk	Provides a low stress connection between the I-205 path and River Road	None	Improved crossing at Hwy 99 necessary. There is a pedestrian / bike only connection at Naef and Oatfield that can be used to continue on Naef.	$1,034,000
8.03	SE Naef Road/Oetkin Road	Oatfield Road to SE Thiessen Road	1.0	Traffic calming (speed humps)	Neighborhood greenway /sidewalk	Provides a low stress connection between the I-205 path and River Road	None	-	$2,492,000
8.04	SE Thiessen Road	SE Oetkin Road to I-205 Path	1.84	Bike lane	Buffered bike lanes/sidewalk	Provides a low stress connection between the I-205 path and River Road. Needs 4'-10' of additional pavement width and 2' of additional ROW (0' for minimum width facility)	None	-	$4,708,000

(P9) Sandy to Mount Hood

Route Summary

Extent:	Sandy to Government Camp (northern connection to Gresham via Bluff Road)
Total Length:	49.8 miles
Environment:	Rural
Proposed Facility Type(s):	Shoulder bikeway, shared lane markings
Expected Pedestrian Use:	Local trips near areas with higher population
Expected Bicycle User Group:	Recreational

Route Description

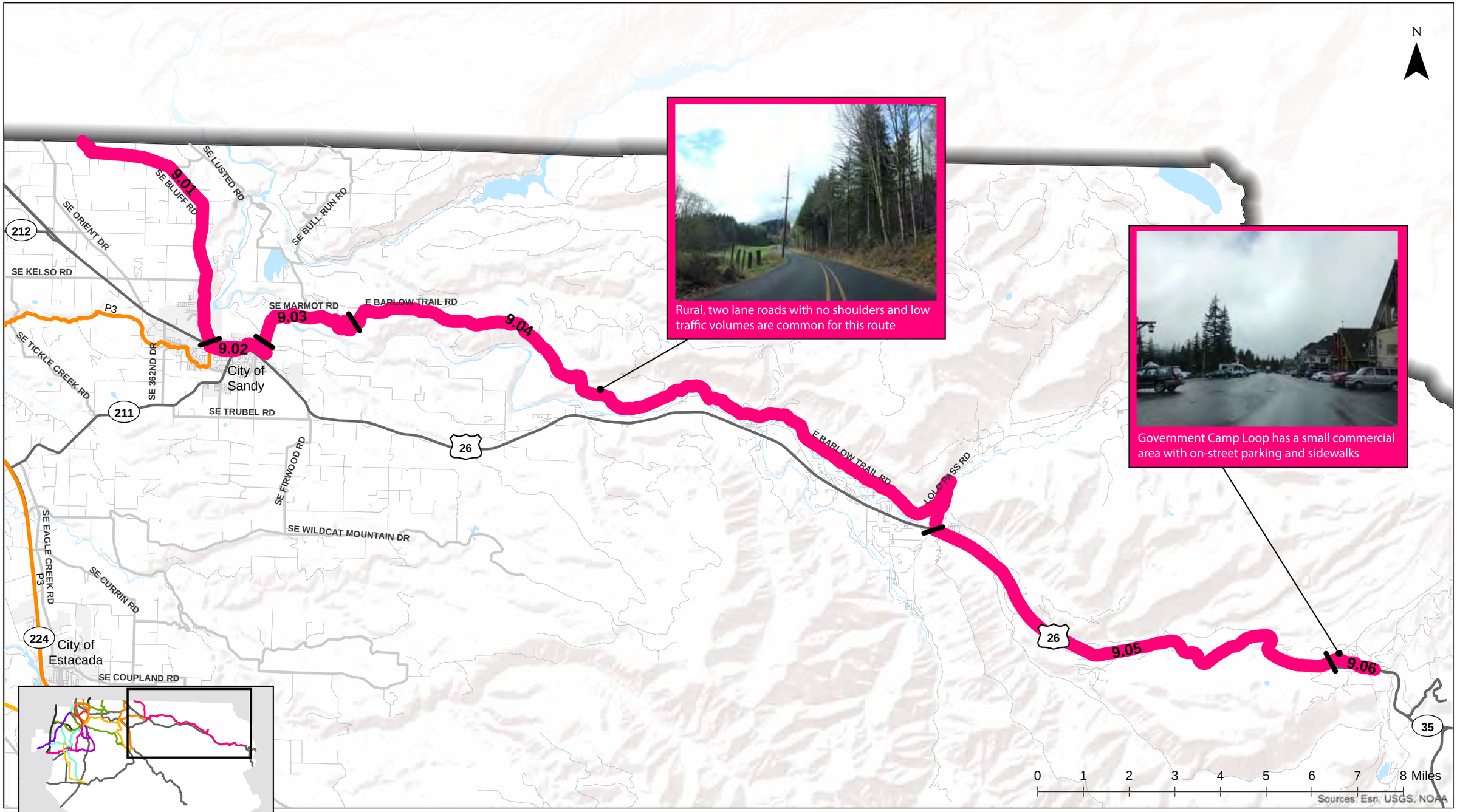
The Barlow Trail Route is a popular ride for recreational bicyclists that also serves as a scenic and low traffic alternative to riding on Highway 26. The route connects the City of Sandy and the Villages of Mt Hood. Connections to the planned Cazadero Trail and the existing Springwater Trail further enhance this route's recreation potential.

The proposed route in this plan connects Government Camp to Sandy and extends to the Gresham city limits. Conditions are characterized by narrow, winding low-traffic mountain roads. With the exception of the segment on U.S. 26 with wide shoulders suitable for bicycling, there are no separated facilities for walking or biking.

Pedestrians are generally not expected to use this route due to very long distances between destinations. Local trips in the population centers of Sandy and Government Camp are served by sidewalks. Therefore, no dedicated pedestrian facilities are recommended on this route.

Proposed Facility Types

This route primarily appeals to recreational bicyclists who are typically more confident riders. While the relatively low traffic volumes accommodate this rider group, shoulder bikeway would enhance the route and allow motorists to more easily pass cyclists. Irrigation ditches, trees relatively close to the roadway, fences placed within the public right-of-way and steep slopes are the most common constraints along this route for expanding the roadway to include paved shoulders. Wayfinding signage at all major decision points would help formalize this route as well.



Route P1
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Principal Active Transportation (PAT) Routes
Route P9 - Sandy to Mount Hood
Clackamas County, Oregon

Figure **15**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

Projects Segments

- **(9.01) SE Bluff Road from SE 322nd Avenue to U.S. 26:** This roadway has bike lanes leading from U.S. 26 toward the Sandy River, but these facilities end where the county boundary begins at SE Kelso Road. There are few constraints for expanding the roadway to include paved shoulders where they do not currently exist.
- **(9.02) U.S. 26 Couplet (Proctor Boulevard and Pioneer Boulevard) from Ten Eyck Road to SE Bluff Road:** Within the City of Sandy, with bike lanes and complete sidewalks.
- **(9.03) Ten Eyck Road/Marmot Road from U.S. 26 to SE Shipley Road:** Ten Eyck Road has a moderate amount of traffic as motorists approach Sandy from the outlying area. This area lacks shoulders and is characterized by steep roadway grades. Shoulder bikeways would be difficult to add.
- **(9.04) SE Marmot Road/Barlow Trail/E Lolo Pass Road from SE Shipley Road to U.S. 26:** This isolated section with low traffic volumes is comprised of narrow, two-lane roadways. Expanding the roadway to include shoulder bikeways would be met with some moderate constraints, such as trees and drainage ditches. There is a higher level of housing development with greater walking and biking activity along Barlow Trail Rd. However, the roadway conditions do not change significantly in this area and no change to the proposed facility type is required.
- **(9.05) U.S. 26 from E Lolo Pass Road to Government Camp Road:** Upon leaving E Lolo Pass Road, the route continues on the higher volume and higher speed of U.S. 26 where wide shoulders accommodate bicycle travel to Government Camp.
- **(9.06) Government Camp Loop (entire roadway):** The commercial core of Government Camp has well-utilized on-street parking. Shared lane markings can be added to this section, and there is ample room to add bike lanes from the end of the commercial areas to the intersection with U.S. 26.

Table 12: Sandy to Mount Hood (P9) Project List

Project Number	Project Name	Extent	Length (Miles)	Existing Facility	Proposed Facility	Reason for Project	Constraints	Planning Considerations	Estimated Cost
9.01	SE Bluff Road	SE 322nd Avenue to U.S. 26	4.9	Bike lanes between U.S. 26 and Kelso Road	Shoulder bikeway	Connects the outer Gresham/Troutdale area and the City of Sandy	Needs 11' of additional pavement width north of Kelso Road		$6,423,000
9.02	U.S. 26 couplet (Proctor Boulevard and Pioneer Boulevard):	Ten Eyck Road to SE Bluff Road	0.75	Bike lane/sidewalk	-	-	-	-	-
9.03	Ten Eyck Road/SE Marmot Road	U.S. 26 to SE Shipley Road	3.72	None	Shoulder bikeway	Connects the City of Sandy and Government Camp	The roadway would need to be expanded 5'-14' to accommodate a facility. Large trees and some drainage ditches adjacent to the roadway. Retaining walls assumed necessary.	Steep terrain and higher traffic volumes on Ten Eyck Road between Sandy city limits and SE Fish Hatchery Road.	$29,412,000
9.04	SE Marmot Road/Barlow Trail/E Lolo Pass Road	SE Shipley Road to U.S. 26	17.4	None	Shoulder bikeway	Connects the City of Sandy and Government Camp	The roadway needs to be expanded 6'-12' to accommodate a facility. Large trees and some drainage ditches adjacent to the roadway	This is a low traffic two lane roadway that is a popular route with recreational bicyclists.	$22,539,000
9.05	U.S. 26	E Lolo Pass Road to Government Camp Road	10.4	Shoulder bikeway	-	Connects the City of Sandy and Government Camp	None	There are wide paved shoulders, but a MUP would be a terrific asset between the communities of Government Camp and Brightwood	-
9.06	Government Camp Loop	Government Camp Loop (full extent)	1.3	None	Shared lane markings	Provides a dedicated place to ride in the main commercial area of Government Camp	-	There is high demand on-street parking and no room to expand the roadway with existing commercial development.	$11,000

(P10) Oregon City to Canby

Route Summary

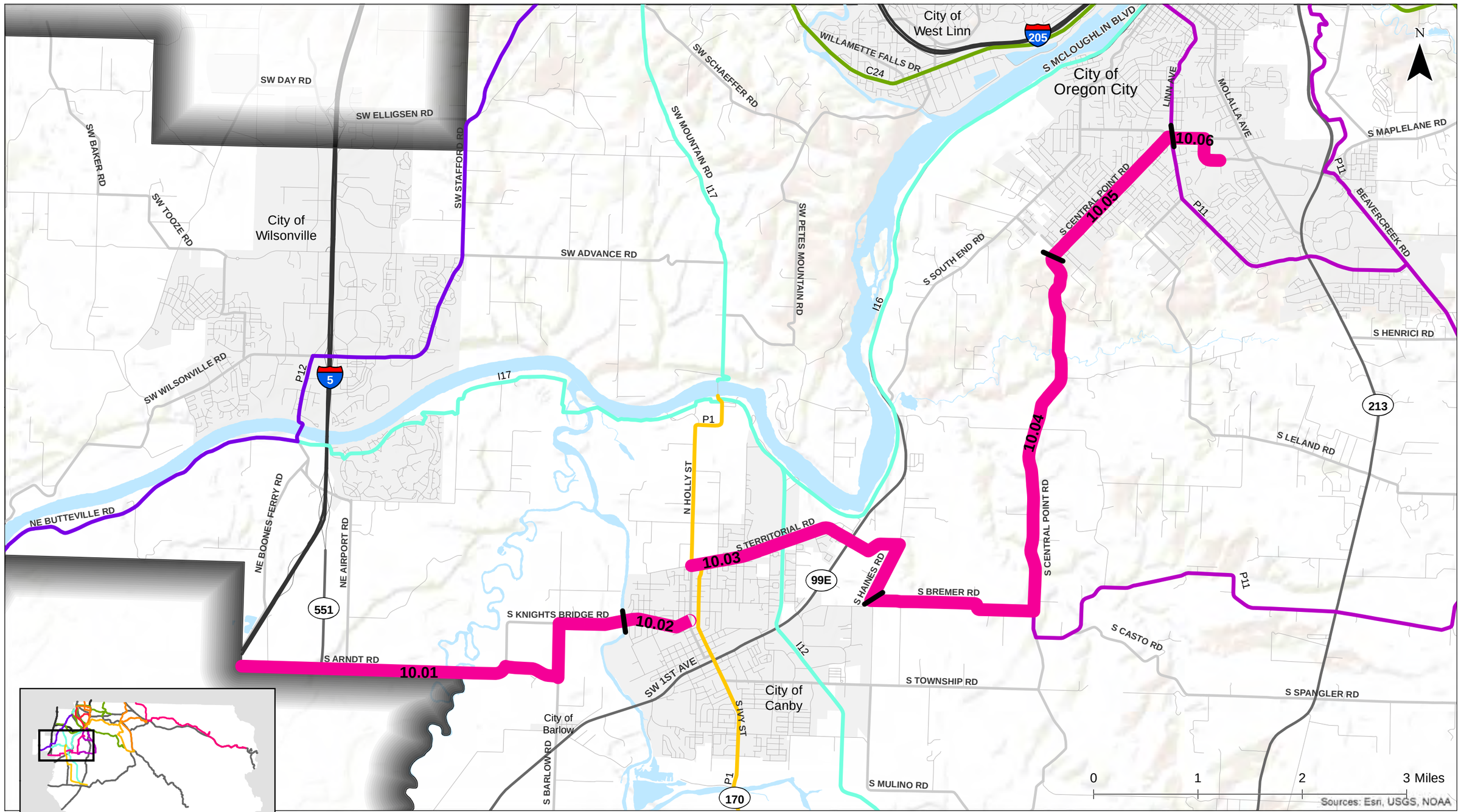
Extent:	Red Soils Campus to Canby (Champoeg Connection)
Total Length:	14.9 miles
Environment:	Suburban/rural
Proposed Facility Type(s):	Sidewalk, shoulder bikeway, bike lane, advisory bike lanes
Expected Pedestrian Use:	Recreational between cities. Utilitarian trips possible within urban areas.
Expected Bicycle User Group:	Recreational between cities. Utilitarian trips possible within urban areas.

Route Description

This route mainly uses rural two-lane roadways to provide a connection between Canby and Oregon City. It provides access to a number of key destinations, including the Canby Ferry (via Route P1), Clackamas County Fairgrounds, Champoeg State Park, the Willamette Valley Scenic Bikeway, and the commercial areas of Canby and Oregon City. Outside of the population centers, there are few facilities to support walking and biking. Where the route transitions into a more suburban environment, sidewalks and bike lanes are mostly present. While this route has the greatest appeal for recreational bicyclists, improving it could attract utilitarian trips at either end and serve commuter travel between the two cities.

Proposed Facility Type

This route spans the suburban/rural divide, and a bike lane (urban context) or shoulder bikeway/advisory lane (rural context) is preferred. Steep slopes (especially on Central Point Road), irrigation ditches, utility lines and trees are some common constraints for roadway expansion to add shoulders. Where the route is adjacent to flat agricultural lands, there are no physical constraints to expanding the roadway to add paved shoulders.



Route P1
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Principal Active Transportation (PAT) Routes
Route P10 - Oregon City to Canby
Clackamas County, Oregon

Figure
16

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

Project Segments

- **(10.01) S Knights Bridge/S Barlow Road/Arndt Road from N Knights Bridge Road to I-5:** This rural roadway has shoulder bikeways for much of its length.
- **(10.02) N Knights Bridge Road from N Holly Street to S Knights Bridge Road:** This section within Canby city limits includes complete sidewalks and bike lanes except for a small gap in the bike lane between N Holly Street and Grant Street.
- **(10.03) South Territorial Road from Highway 99E to N Holly Street:** There are fewer constraints to roadway widening in this section, though fence encroachment and irrigation ditches are present in some areas.
- **(10.04) S Central Point Road/S Bremer Road/Territorial Road from Warner-Milne Road to Highway 99E:** Central Point Road is narrow and steep with several constraints, including drainage ditches and large trees, which impact the ability to widen the roadway to add paved shoulders for shoulder bikeways.
- **(10.05) S Central Point Road from Warner Milne Road to Parish Road:** This section within Oregon City city limits has approximately 50% complete bike lanes and sidewalks.
- **(10.06) Beavercreek Road/Warner-Milne Road from Red Soils Campus to Central Point Road:** This roadway within Oregon City city limits has bike lanes and sidewalks.

Table 13: Oregon City to Canby (P10) Project List

Project Number	Project Name	Extent	Length (Miles)	Existing Facility	Proposed Facility	Reason for Project	Constraints	Planning Considerations	Estimated Cost
10.01	S Knights Bridge/S Barlow Road/ Arndt Road	N Knights Bridge Road to I-5	4.22	Mostly shoulder bikeway, some locations without facilities	Advisory lanes or use existing shoulder bikeway	Connects Canby, the agricultural area west of Canby, Champoeg State Park and the Willamette Valley Scenic Bikeway.	Ditches constrain inexpensive roadway widening to accommodate wider shoulder bikeways.	Outreach needed to encourage positive driver-bicyclist interactions due to posted speeds of 45 mph or greater.	$55,000
10.02	N Knights Bridge Road	N Holly Street to S Knights Bridge Road	0.66	None	Bike lane	Connects Canby and the agricultural area west of Canby	10’ of additional pavement width necessary to accommodate facility.	The bridge crossing is wide enough to accommodate shoulder bikeways of 4’-5’ without widening.	$802,000
10.03	NE Territorial Road	Haines Road to N Holly Street	2.73	None	Shoulder bikeway/ advisory bike lanes between Haines Road and the beginning of urban area	Connects Oregon City and Canby	4’-14’ of additional pavement width needed to accommodate facility.	None	$2,575,000
10.04	S Central Point Road/S Bremer Road/ Territorial Road	Warner-Milne Road to Haines Rd	5.13	None	Shoulder bikeway	Connects Oregon City and Canby	Steep terrain, narrow stream crossings and utility poles adjacent to roadway. Needs 13’-16’ additional pavement width and 14’ of additional ROW to accommodate facility.	None	$10,158,000
10.05	S Central Point Road	Warner Milne Road to Parish Road	1.45	Bike lane and sidewalk are 50% complete	Bike lane/sidewalk	Connects Oregon City and Canby	0’-16’ of additional pavement width needed to accommodate facility.	This is in urban Oregon City. A parking lane on one side of the road can be reconfigured into bike lanes on both sides.	$1,786,000
10.06	Beavercreek Road/Warner-Milne Road	Red Soils Campus to Central Point Road	0.68	Bike lane/ sidewalk	-	-	-	This is in urban Oregon City.	-

(P11) Newell Creek Trail – Oregon City Loop

Route Summary

Extent:	Loop around Oregon City
Total Length:	18.0 miles
Environment:	Suburban/rural
Proposed Facility Type(s):	Sidewalk, shoulder bikeway, bike lane, shared lane markings, multi-use path
Expected Pedestrian Use:	Utilitarian trips
Expected Bicycle User Group:	Utilitarian trips in developed areas and recreational trips outside city limits

Route Description

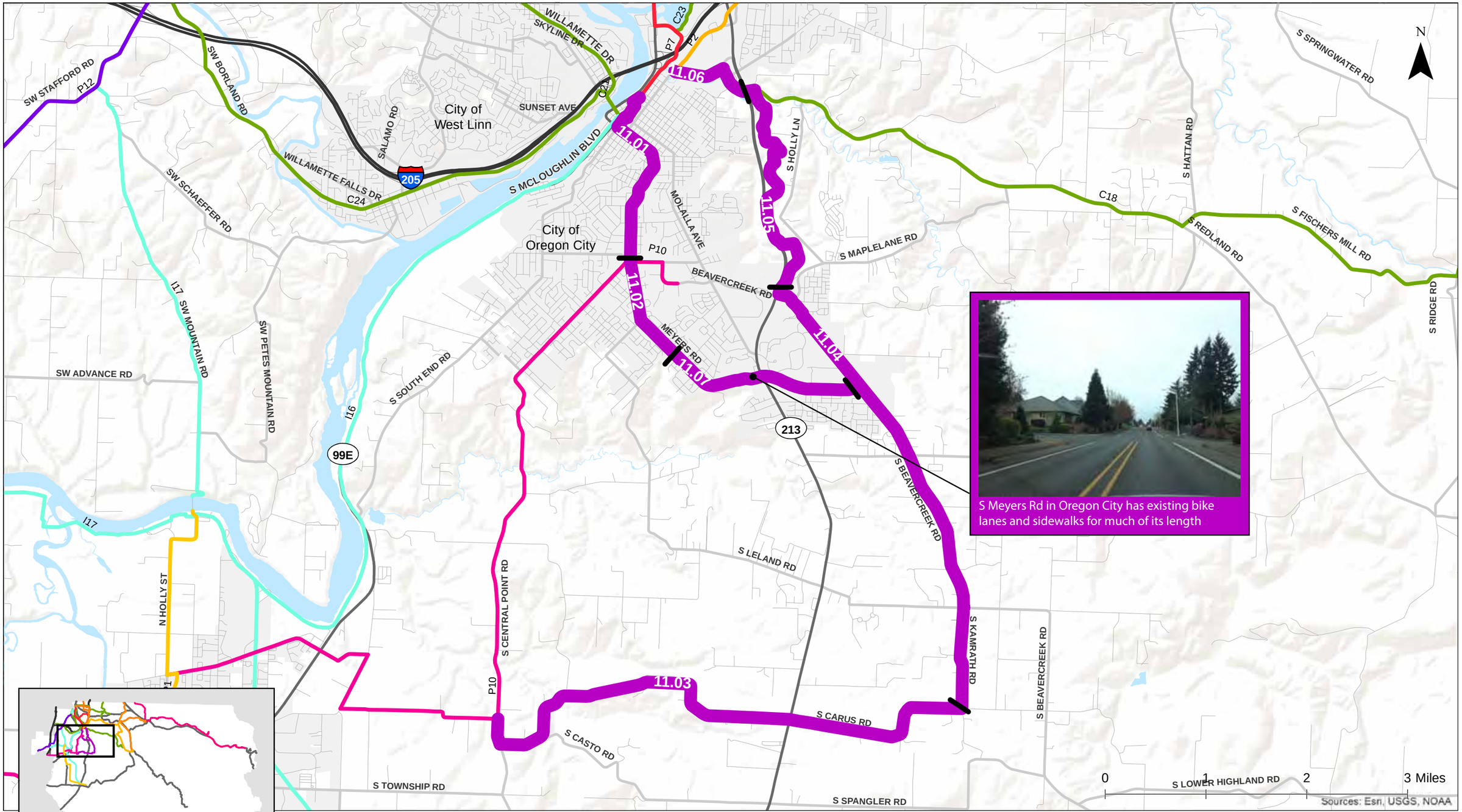
This route consists of two overlapping loops.

The inner loop is intended to better accommodate utilitarian walking and biking trips by connecting residential areas with key destinations such as Clackamas Community College and downtown Oregon City. There are existing or proposed (Oregon City TSP) pedestrian and bicycle facilities for the length of this inner loop.

The outer loop takes advantage of low traffic, rural, two-lane roadways to provide recreational bicyclists with an attractive ride through the agricultural lands south of Oregon City. Both routes provide a connection to the future Newell Creek Trail, which will attract recreational pedestrians and bicyclists.

Proposed Facility Type

Shoulder bikeways are desirable in these more rural sections of the route. The southern section of the outer loop is on scenic rural roadways, but the roads are narrow with a significant number of adjacent physical constraints. Steep terrain, irrigation ditches and utility lines will be a challenge for expanding the roadway to accommodate paved shoulders.



S Meyers Rd in Oregon City has existing bike lanes and sidewalks for much of its length

Route P1
Route P2
Route P3
Route P4
Route P5 / P6
Route P7 / P8
Route P9
Route P10
Route P11
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Principal Active Transportation (PAT) Routes
Route P11 - Newell Creek Trail - Oregon City Loop
Clackamas County, Oregon

Figure
17

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

Project Segments

- **(11.01) Singer Hill Road/5th Street/Linn Avenue from Downtown Oregon City to Warner-Milne Road:** This section within Oregon City's jurisdiction has bike lanes or shared lane markings for its entirety, with the exception of Singer Hill Road, which needs shared lane markings installed.
- **(11.02) Leland Road from Warner-Milne Road to Frontier Parkway:** South of Warner Milne, the route transitions to Leland Road which has planned bike lanes in the Oregon City TSP.
- **(11.03) Carus Road from Kamrath Road to Central Point Road:** This section is on a low traffic, two-lane rural roadway. A shoulder bikeway is proposed.
- **(11.04) Kamrath Road/S Beavercreek Road from Carus Road to Clackamas Community College (CCC):** This largely rural route has paved shoulders in some areas and relatively few constraints for adding shoulders where they do not currently exist.
- **(11.05) Redland Road to CCC:** This section takes advantage of the planned Newell Creek Trail.
- **(11.06) Abernethy Road/Redland Road from Washington Street to Newell Creek Trail:** This section connects Washington Street in Oregon City to the planned Newell Creek Trail.
- **(11.07) Spur Route on Meyers Road:** This provides a more direct connection between the neighborhoods on either side of Highway 213, as well as improved active transportation access to Oregon City High School and Clackamas Community College.
    - Meyers Road from Frontier Parkway to S Molalla Avenue (Highway 213): There are bike lanes on Meyers Road between Leland and Highway 213.
    - There is a planned roadway expansion of Meyers Road (east of Highway 213) between the highway and its current terminus at High School Road.

Table 14: Newell Creek Trail – Oregon City Loop (P11) Project List

Project Number	Project Name	Extent	Length (Miles)	Existing Facility	Proposed Facility	Reason for Project	Constraints	Planning Considerations	Estimated Cost
11.01	Main Street/Singer Hill Road/Linn Avenue	Downtown Oregon City to Warner-Milne	1.98	Shared lane markings on Main Street, bike lane on Linn Avenue.	Shared lane markings on Singer Hill Road	Provides an on-street connection in bikeway gap between downtown Oregon City and neighborhoods on the bluff	None	In Oregon City. Proposed facility is based on Oregon City TSP.	$17,000
11.02	Leland Road/Meyers Road	Warner-Milne to S Frontier Parkway	1.4	Intermittent paved shoulder and sidewalks on Leland Road, speed humps and sidewalks on Frontier, bike lane on Jessup Avenue	Bike lane/ sidewalk	Offers a recreational route in the rural area southeast of Oregon City	Between 2'-12' of additional pavement width needed to accommodate facility on Leland Road.	There is a lot of residential development in this area that would support sidewalks.	$1,702,000
11.03	S Carus Road	Kamrath Road to Central Point Road	5.33	None	Shoulder bikeway	Offers a recreational route in the rural area southeast of Oregon City	Roadway would need to be expanded to accommodate the shoulder bikeway facility. Some drainage ditches adjacent to roadway.	Needs a crossing improvement at the intersection with Hwy 213.	Undetermined
11.04	Kamrath Road/ Beavercreek	Carus Road to CCC	4.5	Paved shoulders in some areas	Shoulder bikeway	Offers a recreational / commuter route in the rural area southeast of Oregon City	A few physical constraints for adding shoulders. Small retaining wall section assumed. 8'-12' of additional pavement width and 6' of addition ROW needed for shoulder bikeway	None	Undetermined
11.05	Newell Creek Trail	Redland Road to CCC	2.95	None	Multi-use-path	Provides a recreational opportunity between CCC and downtown Oregon City		Planned Newell Creek Trail.	$3,613,000
11.06	Abernethy Road/Redland Road	Washington Street to Newell Creek Trail	0.94	Incomplete sidewalks on Abernethy Road	Bike lane/ sidewalk	Provides a recreational opportunity between CCC and downtown Oregon City	0'-8' of additional pavement width needed to accommodate facility	Planned Newell Creek Trail;	$1,151,000
11.07	Meyers Road	Leland Road to Frontier Pkwy	2.38	Sidewalks and bike lanes between S Beavercreek Road and High School Road and west of Hwy 213	Bike lane/sidewalk	Offers utilitarian connection between residential areas of Oregon City and the High School and CCC	West of Hwy 213, bike lane ends at Autumn. 0'-5' of additional pavement needed to accommodate facility	Meyers Road planned for expansion between the High School and Hwy 213 (Oregon City TSP).	$925,000

(P12) Stafford Road

Route Summary

Extent:	Lake Oswego to Wilsonville (Champoeg Connection via Butteville Rd)
Total Length:	14.3 miles
Environment:	Suburban/rural
Proposed Facility Type(s):	Shoulder bikeway, protected bike lane
Expected Pedestrian Use:	Utilitarian and recreational pedestrians in the more densely populated areas of Wilsonville and Lake Oswego
Expected Bicycle User Group:	Utilitarian and recreational

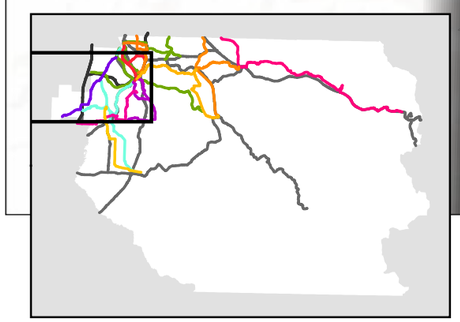
Route Description

This route connects the cities of Lake Oswego and Wilsonville, and formalizes connections with trail systems at Luscher Farm, the Tualatin River and Rosemont Road. Sections of the route are popular recreational rides. The rural sections are mainly comprised of low-traffic two-lane roadways with no paved shoulders. The suburban sections have dedicated facilities for active transportation users, including sidewalks, multi-use paths and bike lanes.

Proposed Facility Type

For the most part, the more urbanized areas of the route have quality facilities serving both utilitarian and recreational walking trips. While most bicyclists currently riding this route in the rural areas are more confident recreational bicyclists, development of a shoulder bikeway on the two-lane roadways would likely appeal to a greater number of less confident bicyclists who could ride the moderate distance between Wilsonville and Lake Oswego. There are some steep slopes, mainly along Stafford Road, that will impact the cost of adding shoulders. A new bridge (French Prairie Bridge) across the Willamette River at SW Boones Ferry Road would connect to NE Butteville Road and improve the directness of this route.

There are few constraints to expanding Stafford Rd to accommodate a shoulder bikeway



Route P1
Route P2
Route P3
Route P4
Route P5 / P6
Route P7 / P8
Route P9
Route P10
Route P11
Route P12
I-PAT
C-PAT

Principal Active Transportation (PAT) Routes
Route P12 - Stafford Road
Clackamas County, Oregon

Figure **18**

Coordinate System: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl
Data Source: Clackamas County GIS

Project Segments

- **(12.01) McVey Avenue/Stafford Road from Highway 43 to SW Rosemont Road:** A narrow (less than 8 feet) multi-use path on the northwest side of the roadway connects to downtown Lake Oswego. Where the multi-use path ends, bicyclists using the path continue by traveling on the sidewalk. A protected bike lane is proposed to give bicyclists a similar level of comfort as they would have using the multi-use path.
- **(12.02) Stafford Road from SW Rosemont Road to I-205:** This section has the greatest number of physical constraints, with steep slopes on at least one side.
- **(12.03/12.04) SW Stafford Road from I-205 to SW Advance Road:** SW Advance Road marks the end of the County's jurisdiction. There are no paved shoulders and some constraints for expanding the roadway to include a shoulder bikeway. Steep slopes exist in some places.
- **(12.05) SW Boones Ferry Road / SW Wilsonville Road from SW Advance Road to Willamette River:** Sidewalks and bike lanes are present, with the following exceptions on the short segment of Boones Ferry Road near the river: lack of sidewalks and bike lanes on the east side south of Bailey, lack of sidewalks on both sides south of 4th, only a wide asphalt area for bikes on the west side, and no bike lane on the east side south of 4th.
- **(12.06) French Prairie Bridge:** Proposed bridge across the Willamette River into Wilsonville.
- **(12.07) NE Butteville Road from Willamette River to County Boundary (near Butteville):** This section is on a low traffic, two-lane rural roadway. A shoulder bikeway and signage are proposed.

Table 15: Stafford Road (P12) Project List

Project Number	Project Name	Extent	Length (Miles)	Existing Facility	Proposed Facility	Reason for Project	Constraints	Planning Considerations	Estimated Cost
12.01	McVey Avenue/Stafford Road	Hwy 43 to SW Rosemont Road	1.84	Multi-use path from Hwy 43 to McVey Road (narrow, suitable for pedestrian use only); sidewalks on the one block west of Hwy 43	Protected Bike Lane	Provides a low-stress physically separated connection between residential areas and Lake Oswego	20' of additional pavement width and 14' of additional ROW (6' for minimum width facility) needed to accommodate facility. Many driveways to re-build. New retaining walls needed starting at Kilenny Road and 400' to the south. Electrical transmission lines run along the west side of road. Ditch along east side from Rosemont to South Shore would need to be shifted	None	$6,205,000
12.02	Stafford Road	SW Rosemont Road to I-205	1.96	Small section of sidewalks near Stafford Primary School; paved shoulder in some sections	Shoulder Bikeway	Connect Lake Oswego and Wilsonville	0'- 9' of additional pavement width needed to accommodate facility.	None	$1,791,000
12.03	SW Stafford Road	I-205 interchange area	0.35	Short segment of bike lane from Trail Road to I-205	Shoulder Bikeway	Connect Lake Oswego and Wilsonville	0'-14' of pavement width and 24' of additional ROW width (20' for minimum width facility) needed to accommodate facility.	None	$376,000
12.04	SW Stafford Road	I-205 to Advance Road	4.21	None	Shoulder Bikeway	Connect Lake Oswego and Wilsonville	Ditches and utility lines adjacent to roadway. 0'-12' of additional pavement width needed to accommodate facility.	None	$5,457,000
12.05	SW Boones Ferry Road/ SW Wilsonville Road	Advance Road to the Willamette River	2.73	Sidewalks and bike lanes, except short segment of Boones Ferry Road near the river	Complete few sidewalk and bike lane gaps	Connect Lake Oswego and Wilsonville	2' of additional ROW (0' for minimum width facility) needed to accommodate facility.	Boones Ferry Road near the river lacks sidewalks and bike lanes on the east side south of Bailey, sidewalks on both sides south of 4th, has only a wide AC area for bikes on west side, and no bike lane on the east side south of 4th.	$6,799,000

Project Number	Project Name	Extent	Length (Miles)	Existing Facility	Proposed Facility	Reason for Project	Constraints	Planning Considerations	Estimated Cost
12.06	French Prairie Bridge	NE Butteville Road to SW Boones Ferry Road	0.19	None	Proposed new bridge across the Willamette River	Connects Lake Oswego and Wilsonville	-	A planned bridge (French Prairie Bridge) at the end of SW Boones Ferry Road would connect to Butteville Road (below). The bridge is not included in the cost estimate for this project.	-
12.07	NE Butteville Road	NE Butteville Road to County Boundary (near Butteville)	3.26	None	Shoulder bikeway	Connects Lake Oswego and Wilsonville	13'-14' pavement width needed to accommodate facility	None	$5,136,000

Table 16 illustrates the low, high and total cost per mile for all PAT routes studied. These are planning-level cost estimates, excluding potential right-of-way acquisition costs, and a more thorough engineering study will be needed to determine the final project cost. *Information related to right-of-way costs and needs is in Appendix E.*

Table 16: PAT Route Cost Estimate Summary

Route #ID	Route	Pedestrian/Bicycle Improvement	Total Length (Miles)	Estimated Low Cost ($)	Estimated High Cost ($)	Estimated Cost per Mile	Relative Cost
P1	Canby to Molalla	Sidewalk, Shoulder Bikeway, and Bike Lane	14.8	$9,865,000	$17,810,000	$1,201,000	Medium
P2	Clackamas River Drive	Shoulder Bikeway and Bike Lane	23.3	$15,158,000	$30,927,000	$1,327,000	Medium
P3	Tickle Creek Trail - Cazadero Trail	Multi-Use Path	23.5	$16,912,000	$28,664,000	$1,222,000	Medium
P4	I-205 Multi-Use Path	Sidewalk, Bike Lane	5.1	-	$24,000	$5,000	Low
P5	Monroe Neighborhood Greenway	Bike Boulevard, Sidewalk (one side)	4.1	-	$1,242,000	$305,000	Low
P6	Linwood Avenue	Sidewalk, Bike Lane, Multi-Use Path	3.9	$1,639,000	$2,056,000	$536,000	Low
P7	River Road	Sidewalk, Buffered Bike Lane	7.3	$13,000	$442,000	$61,000	Low
P8	Oetkin Road - Naef Road	Sidewalk, Bike Boulevard, Multi-Use Path, Buffered Bike Lane	3.8	$5,333,000	$10,723,000	$2,816,000	High
P9	Sandy to Mount Hood	Shoulder Bikeway, Shared Lane Markings	49.8	$25,798,000	$58,385,000	$1,172,000	Medium
P10	Oregon City to Canby	Sidewalk, Shoulder Bikeway, Bike Lane, Advisory Lanes	14.9	$8,957,000	$15,376,000	$1,033,000	Medium
P11	Newell Creek Trail and Oregon City Loop	Sidewalk, Shoulder Bikeway, Bike Lane, Shared Lane Markings	19.4	-	-	-	High
P12	Stafford Road	Shoulder Bikeway, Protected Bike Lane	14.3	$12,653,000	$25,764,000	$1,799,000	Medium

3.2 SHOULDER WIDENING VS. MULTI-USE PATH COST

A shoulder bikeway is a common proposed facility type for many of the rural PAT routes in section 3; however, shoulder widening can be very costly to construct. Extra pavement cannot be added to the existing shoulder (or lack of shoulder) without excavation because a strong foundation for the new pavement must be established. For example, to widen to a 6-foot shoulder from a 3-foot shoulder, the existing 3-foot shoulder is excavated, any existing pavement is removed, a foundation is established and the shoulder pavement is laid. In addition, ditches and drainage may need to be shifted and reconstructed. For these reasons, construction of a two-way multi-use path on one side of the roadway may cost only marginally more than two-sided shoulder widening and be more comfortable in rural areas for cyclists and pedestrians.

Based on planning level cost estimates, the construction of a multi-use path on one side of the roadway will cost 10-20% more per mile than widening a shoulder on both sides of the road[3]. Based on the relatively high cost of adding a shoulder, constructing a multi-use path for 10-20% more per mile may be worth the extra cost. Exhibit 1 illustrates a two-way multi-use path adjacent to the roadway, which includes a grassy area in between the multi-use path (left) and the roadway (right).

Exhibit 1:Rural side path

A multi-use path parallel to a roadway should also include high quality treatments at intersections and driveway crossings raising the visibility of bicyclists and pedestrians. Also, a multi-use path parallel to a

[3] Based on a shoulder widening project of 3’ to 6’ on both sides of the roadway compared with an existing 3’ shoulder and constructing a 10’ side path. 2’minimum roadway shoulders are still desirable. Right-of-way costs are not included.

roadway may not be suitable if there are frequent and high volume intersections intersecting the multi-use path.

In summary, while constructing a wider shoulder does provide a benefit to cycling, a multi-use path is likely to provide more benefit to cycling and walking as compared with a shoulder. A multi-use path parallel to a roadway should be considered during project planning and implementation as an alternative to a shoulder bikeway.

3.3 AUGMENTING THE ACTIVE TRANSPORTATION NETWORK

Constrained roadway funding and the high cost of some pedestrian and bicycle facility types present significant challenges to full development of the infrastructure improvements identified in the Active Transportation Plan. Achieving the vision identified in Chapter 1 will require incremental changes to the transportation network and a concerted effort to engage and educate community members on transportation safety. Despite limited resources, there are opportunities to expand the active transportation network and increase active transportation levels using the following three-pronged approach:

1) Basic Signing and Markings
2) Rural and Urban Active Streets – Roadway Space Sharing
3) Everyone is Your Neighbor – Active Transportation Education

Basic Signing and Markings

For bicyclists, signage is an important first step toward improved roadway conditions. On-pavement bike lane markings, lane striping, warning signage, wayfinding signs and other appropriate signing can be an important first step to encourage active transportation users and raise awareness and acceptance of cycling. Pedestrian wayfinding signs in the urban area and multi-use path signs can also help create community awareness and direct users, especially those unfamiliar with the area. Metro has created the Intertwine Regional Trails Signage Guidelines, which are a useful tool for integrating signing into the built environment.

Rural and Urban Active Streets – Roadway Space Sharing

As the Portland Metro area continues to grow and more people engage in physical activity for transportation, health and recreational purposes, increased space sharing for various transportation modes is inevitable. Limited resources require a level of creativity to create shared spaces that accommodate multiple transportation modes. Sharing the limited spaces and creating a high level of safety for all users presents many challenges and opportunities. Innovative solutions are necessary in order to achieve the necessary goals for mobility and safety. Many great examples exist for multi-modal sharing, particularly in urban environments. One such example is the Neighborhood Greenway concept where streets with low vehicle traffic volumes and speeds are designated and designed to give priority to bicycle and pedestrian travel.

Rural environments require a different approach. There are pockets of pedestrian activity in rural centers and unincorporated rural communities such as Beavercreek and Redland. Making pedestrians feel welcome and safe on a street with no sidewalks and with no cost-effective means to add facilities is a challenge. One cost-effective concept is that of an "active street," where walking areas are designated with pavement markings and, through education, neighbors honor the markings. Such efforts could be a follow-up project to support the ATP.

Everyone is Your Neighbor – Active Transportation Education

Certainly infrastructure is needed to help create a level of comfort and safety for many modes of transportation, but education and overall acceptance of alternative transportation modes are vital. The importance of transportation education and safety programs cannot be understated. This includes not only educating adults and children about how to walk and bicycle safely in all environments and conditions, but also driver education so all users of the road can safely navigate within shared space. As noted in the County's *Drive to Zero* campaign supporting the Clackamas County Transportation Safety Action Plan, culture change is a strong focus of reducing fatal and injury crashes. Building a community-wide sense of care and compassion for neighbors will lead to different attitudes and, it is hoped, safer habits when engaged in activities on the transportation system.

Active Transportation Pilot Projects

The following pilot projects will consider suburban and rural roadway sharing concepts and entail examination of best practices for creative suburban and rural modal-sharing focused on situations of fiscal constraints. Development of cross-sections, signing and educational plans would be products associated with the four pilot projects.

- **McLoughlin Area Plan Active Transportation Corridors Plan** – Using the existing planning documents, create a network of connected corridors to better welcome active transportation. Engage the community to build capacity and support for health using the McLoughlin Health Impact Assessment/Road Safety Audit (HIA/RSA) results. Engage and partner with ODOT to create design concepts for friendlier crossing opportunities of McLoughlin Boulevard.
- **Villages at Mount Hood Active Transportation Corridors Plan** – Cycle tourism is growing in this part of the County. Whether on the road, off-road from Zig Zag to Government Camp or on the vast network of trails at Sandy Ridge, change is occurring. The roadway system in this area is largely rural with one travel lane in each direction and limited shoulders. Funding prospects for traditional improvements are elusive. Through education, pavement marking, signing and other treatments, a template for Rural Shared Roadways can be created.
- **Clackamas River Drive Roadway Sharing Project** – A review of the Strava Heat Map shows Clackamas River Drive as a high-use facility. With construction of the Sunrise Corridor, improvements to the Highway 212 corridor may create the opportunity to down-class Clackamas River Drive and create a Rural Shared Roadway for motorized vehicles, bicycles,

and perhaps even walkers and joggers. Development of cross-sectional concepts and building community support would be elements of this project.

Some ideas to increase safety for all users include:

- Install an actuated beacon to alert drivers of pedestrians or bicyclists are on the road.
- Construct turn-outs in strategic locations.
- Implement a "sting operation" in conjunction with the Sheriff's department to help curtail unlawful driving and pedestrian/bicyclist harassment.
- Assess the posted speed limit and its influence on driver behavior.

- **Holly Lane-Newell Creek Canyon Active Transportation Corridor Study – Connecting Oregon City Communities through the Rural Interface –** Holly Lane has been the subject of much discussion as a rural interface between communities in Oregon City. In addition, Newell Creek Canyon, a natural area largely owned by Metro, is aligned parallel to Holly Lane. Active transportation between the Park Place area and Beavercreek Master Plan area of Oregon City provides a unique opportunity to blend a rural roadway and forested wild space as part of an active transportation corridor. Partners in this study would include the County, Oregon City, Metro and the Holly Lane community. Building upon existing plans and coordinating with the Metro Newell Creek planning efforts, corridors, connections and multi-model safety could be addressed.

4 – ACTIVE TRANSPORTATION SIGNAGE AND AMENITIES

4 – ACTIVE TRANSPORTATION SIGNAGE AND AMENITIES

The addition of amenities along the PAT routes is a key element of the active transportation network design. Signage and amenities help to brand or identify routes that constitute the active transportation network. Recommended PAT route amenities include signage, informational kiosks, bike hubs, bike pods and bike parking. The ATP recommends signage along five of the recommended PAT routes and other amenities for nine of the recommended PAT routes.

4.1 BICYCLE SIGNAGE

PAT route signage should include wayfinding signs as well as traffic warning/regulatory signs such as "Bikes on Roadway" or "Bike Lane Ends" signs. Wayfinding signs will provide navigational assistance, while the addition of warning/regulatory signs should encourage active transportation users, and raise awareness and acceptance of cycling in the County. The type of bicycle wayfinding signage proposed for the urban PAT routes is shown in Exhibit 2 below. The 24-inch x 30-inch ODOT-approved sign includes approximate ride time and distance to significant destinations. Installation of this sign on PAT routes will ensure consistency with existing signs in the County and adjacent jurisdictions including Milwaukie and Portland. In the rural areas, due to distance between destinations and variation in rate of speed, ride time has been dropped from the wayfinding signs. An example of a rural wayfinding sign is shown in Exhibit 3.

Exhibit 2*: Urban Bicycle Wayfinding Sign*

Exhibit 3*: Rural Bicycle Wayfinding Sign*

Bike Wayfinding Sign Guidelines

- Each sign can hold up to three destinations.
- The straight ahead destination shall be listed on top, the left destination in the middle and the right destination on the bottom.
- For a destination with a straight arrow, the arrow shall be placed to the left of the destination; for a destination with a left arrow, the arrow shall be placed to the left of the destination, and for a destination with a right arrow, the right arrow shall be placed to the right of a destination.
- Signs are typically placed in the public right-of-way. In rural settings, consideration should be given to agricultural lands. Signs should not be placed adjacent to cultivated farm lands because this can conflict with tractors and large equipment accessing and working in the fields.
- Signs should be placed at major intersections, high bicycle traffic areas and at important wayfinding decision points / directional changes in route or anywhere else a cyclist faces a decision point.
- Distance from intersection: Signs shall be placed at a distance to allow adequate notification of left or right turns.
- Frequency: Sign spacing and overall quantity is critical. Signs should be frequent enough so cyclists can find destinations, but not so numerous that they clutter the environment. Periodic signs at regular, predictable intervals are recommended. (Note: Urban areas typically need more signs per mile than rural areas because of more route intersections and more decision points.)

Bicycle Regulatory Signs

In addition to wayfinding signage, the ATP recommends warning or regulatory signs on selected PAT routes. The addition of regulatory signs such as “Bikes on Roadway” should provide encouragement to active transportation users and raise awareness and acceptance of cycling in the County. Warning signs such as “Bike Lane Ends” can be used to highlight route conditions that may pose a potential safety issue for network users.

On some bikeways in the region, “Share the Road” signs have been added. Due to the ambiguity and various interpretations of “Share the road,” the ATP recommends moving toward alternative signs. Possible options include a standard bicycle symbol with “In Lane”; “May Use Full Lane” or “On Roadway.” The “May Use Full Lane” signs should be used in lower speed urban environments where there is no separated bicycle facility. For example, where painted sharrows are installed, the “May Use Full Lane” sign would be appropriate. Three alternatives to the “Share the Road” sign are shown in Exhibit 4. The specific type of regulatory/warning sign should be determined when the sign plans for the PAT routes is implemented.

Exhibit 4: Approved MUTCD Signs.

4.2 PEDESTRIAN AND TRAIL SIGNAGE

Pedestrian wayfinding signs should be installed in areas with high amounts of pedestrian traffic such as the terminus of Routes P6: Linwood Avenue near the MAX Green Line. Signage for multi-use trails will be considered when trail development occurs. The following guidelines should be considered when signing pedestrian facilities and multi-use trails:

- Consider the Intertwine Regional Trails Signage Guidelines when signing off-street regional multi-use trails: .http://library.oregonmetro.gov/files/intertwine_regional_trail_signage_guidlines.pdf
- Consider the Intertwine Regional Trails Signage Guidelines when signing on-street facilities that serve as the primary routes connecting one regional trail segment to the next. An example of an Intertwine sign type that can be used along street right-of-way that connects off-street trail segments is shown in Exhibit 5.
- Trailhead signs conforming to Intertwine Signage Guidelines with a map of the entire route should be placed at origin/destination points such as trailheads and entry points to multi-use paths. An example of a trailhead sign conforming to Intertwine Signage Guidelines is shown in Exhibit 6.
- As funding becomes available, route maps or way-finding kiosks providing a map and other pertinent route information should be installed at the start / end points of each of the 12 PAT routes.
- To enhance the sense of place and provide navigational assistance, “on-street pedestrian” directional signs should be considered in the street right-of-way to provide direction in town centers and regional centers.

Exhibit 5: Trailhead Sign

Exhibit 6: On-Street Directional

4.3 PAT ROUTE SIGNAGE

The ATP recommends a total of 51 bicycle wayfinding signs and 26 warning/regulatory signs along the five PAT routes identified in Table 17.

Table 17: Principal Active Transportation (PAT) Routes: Recommended Signage

Principal Active Transportation Routes: Recommended Signage			
Route #	***Route Name***	***Sign Type***	***Quantity***
P1	Canby to Molalla	Wayfinding / Traffic Warning, Regulatory	1 Wayfinding 10 Bicycle Warning
P2	Clackamas River Drive	Wayfinding / Traffic Warning, Regulatory	5 Wayfinding 7 Bicycle Warning
P7	River Road	Wayfinding	25 Wayfinding
P8	Oetkin Road - Naef Road	Wayfinding	20 Wayfinding
P9	Sandy to Mount Hood	Traffic Warning, Regulatory	10 Bicycle Warning

4.4 PAT ROUTE AMENITIES

Providing PAT route amenities is a key element of an active transportation network. Amenities such as informational kiosks enhance user experience and enjoyment of the PAT routes. The four types of amenities recommended are described below.

Bike Hub

Day Use Bike Hubs serve the needs of all levels of cyclists, whether cycling for recreation, commuting or utility trips. As shown in Exhibit 7, a Bike Hub gives cyclists an opportunity to rest on a sheltered bench away from the elements. Other features of a Bike Hub may include a work stand so bikes can be serviced, wayfinding information or a charging station for cell phones. Bike Hubs can be tailored for each particular site.

Exhibit 7: Bike Hub

Bike Pod

Bike Pods are similar to Bike Hubs, but designed for the long distance cyclist and overnight camping. Bike Pods are appropriate at locations where overnight camping is allowed, such as Barton County Park or McIver State Park. As shown in Exhibit 8, a Bike Pod features amenities that would meet the needs of a cyclist on an extended bike tour. In addition to the Bike Hub features, a Bike Pod may include a covered rest shelter, picnic table, water source to refill water bottles, and lockers for food and valuables.

Exhibit 8: Bike Pod

Informational Kiosk

PAT routes can also benefit from information kiosks or trailhead signs such as the Intertwine sign shown in Exhibit 9. There are opportunities on several PAT routes for information kiosks used in conjunction with the Intertwine Sign Guidelines.

Exhibit 9: Information Kiosk

Bike Parking

Bike parking is an important element in building an integrated active transportation network. The lack of bicycle parking has the potential to be a barrier to making a trip by bicycle. Pursuant to Section 1015 of the Clackamas County Zoning and Development Ordinance (ZDO), bicycle parking is a requirement of all new construction. However, even with the ZDO requirement there is still the possibility for a significant gap in bicycle parking. For the PAT routes, bike parking can be combined with other amenities or installed separately.

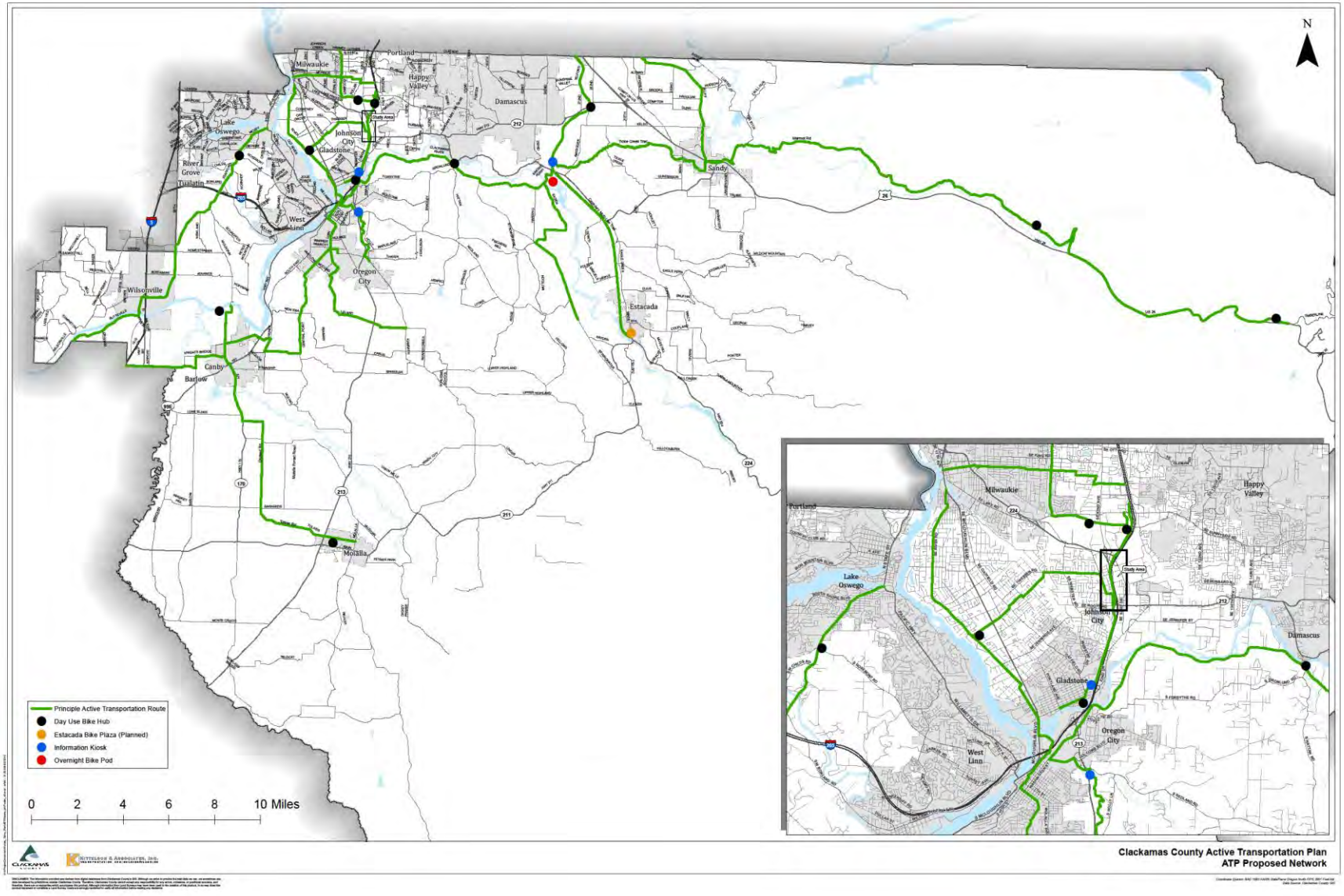
Amenity Locations

Recommended amenities for the PAT routes are shown in Table 18. The recommended amenities include 11 Day Use Bike Hubs; one Bike Pod and three Information Kiosks. A County map with an urban in-set showing the location of the recommended amenities is in Figure 19.

Table 18: Active Transportation Amenities

Amenity #	*Route*	*Type*	*Location*
P1 - a	Canby to Molalla	Day Use Bike Hub	Molalla River State Park
P1 - b	Canby to Molalla	Day Use Bike Hub	Molalla City Park (902 Toliver Rd)
P1 - c	Canby to Molalla	Day Use Bike Hub	Canby Ferry – south side
P1 - d	Canby to Molalla	Day Use Bike Hub	Wait Park – City of Canby
P2 - a	Clackamas River Drive	Day Use Bike Hub	Carver Park
P2 - b	Clackamas River Drive	Bike Pod	Barton Park
P3 - a	Tickle Creek Trail - Cazadero Trail	Day Use Bike Hub	Boring Station Trailhead
P3 - b	Tickle Creek Trail - Cazadero Trail	Information Kiosk	Intersection of Tickle Creek Trail and Cazadero Trail
P3 - c	Tickle Creek Trail – Cazadero Trail	Information Kiosk	Tickle Creek Trailhead in Sandy
P4 - a	I-205 Multi-Use Path	Day Use Bike Hub	Intersection of I-205 path and Costco path
P4 - b	I-205 Multi-Use Path	Information Kiosk	Start of I-205 Path in Gladstone
P4 - c	I-205 Multi-Use Path	Day Use Bike Hub	Cross Park
P6 - a	Linwood Avenue	Day Use Bike Hub	Aquatic Center Multi-Use Path
P8 - a	Oetkin Road – Naef Road	Day Use Bike Hub	Stringfield Family Park
P9 - a	Sandy to Mount Hood	Day Use Bike Hub	Sandy Ridge Trailhead
P10 - b	Oregon City to Canby	Day Use Bike Hub	Government Camp
P11 - a	Newell Creek Trail and Oregon City Loop	Information Kiosk	Newell Creek Trailhead
P12 - a	Stafford Road	Day Use Bike Hub	Luscher Farms

Figure 19: Map of all amenities placed on active transportation network



5 – FACILITY DESIGN TOOLKIT

5 - FACILITY DESIGN TOOLKIT

This Facility Design Toolkit provides a catalog of facility types used to develop specific route recommendations that can be referenced during project planning and implementation.

The ATP identifies PAT routes that provide the highest level of protection with the vulnerable road user in mind, but also recognizes the need to balance this with the extent to which each route connects key destinations in the most direct way possible, prioritizes lower speed/volume routes, includes aesthetic/scenic features, cost effectiveness and overall feasibility (*see PAT Route Selection Criteria*).

The ATP also recognizes that the presence of a pedestrian or bicycle facility alone does not necessarily result in a user feeling safe or comfortable on a facility. There are complex interactions between the pedestrian and bicycle facilities and vehicles on the roadway. Sometimes a facility may be considered comfortable only if there are other treatments such as lighting and roadway crossings (e.g., marked crosswalks, curb extensions, ramps, median refuge islands, flashing beacons, pedestrian or bicycle signals, countdown signal heads, etc.). In addition to enhanced roadway crossings, comfort and security can be improved for bicyclists by applying treatments that increase awareness of motorists and bicyclists in conflict areas (such as colored pavement, driveway crossing markings, bicycle boxes at intersections, etc.). Additional information and design considerations of conflict area treatments are provided following the facility design types for pedestrians and bicyclists.

5.1 FACILITY SELECTION PROCESS

The interaction between the facility design type, the built environment and conflict area treatments should be considered when planning for a safe and comfortable pedestrian/bicycle environment considering that the interaction of these factors will likely maximize the quality and, ultimately, effectiveness of the facility. Selection and design of conflict area treatments will occur during ATP implementation phases.

In addition to considering the context of the facility, the ATP facility types also reflect the suitability for application by Clackamas County roadway classifications in both urban and rural areas. There are three basic steps to choose the appropriate facility type, as shown below. **Error! Reference source not found.**, hich specifies which facility type is appropriate for each roadway classification, lists facility types in preferential order to reflect the PAT's goal to prioritize facility types that provide greater separation between auto and non-motorized road users to minimize auto-pedestrian/bicyclist encounters. Additional information in the catalog related to design considerations can be referenced when determining the highest quality feasible facility type for a particular route segment among the options listed.

Table 19: Facility Design Types by Roadway Functional Classification

Functional Classification	Urban	Rural
N/A	Multi-use path	Multi-use path
Major Arterial	Multi-use path adjacent to roadway	Multi-use path adjacent to roadway
	Raised cycle track	
	Two-way cycle track	
	Protected bike lane	
	Buffered bike lane	Buffered bikeway
	Bike lane	Shoulder bikeway
	Sidewalk or pedestrian path	Pedestrian path
Minor Arterial	Multi-use path adjacent to roadway	Multi-use path adjacent to roadway
	Raised cycle track	
	Two-way cycle track	
	Protected bike lane	
	Buffered bike lane	Buffered bikeway
	Bike lane	Shoulder bikeway
	Sidewalk or pedestrian path	Pedestrian path
Collector	Multi-use path adjacent to roadway	Multi-use path adjacent to roadway
	Raised cycle track	
	Two-way cycle track	
	Protected bike lane	
	Buffered bike lane	Buffered bikeway
	Bike lane	Shoulder bikeway
	Advisory lanes	Advisory lanes
	Shared lane markings	Shared lane markings
	Sidewalk or pedestrian path	Pedestrian path
Connector	Multi-use path adjacent to roadway	Multi-use path adjacent to roadway
	Two-way cycle track	
	Protected bike lane	
	Buffered bike lane	Buffered bikeway
	Bike lane	Shoulder bikeway
	Advisory lanes	Advisory lanes
	Neighborhood greenway	Neighborhood greenway
	Shared lane markings	Shared lane markings
	Sidewalk or pedestrian path	Pedestrian path
Local	Advisory lanes	Advisory lanes
	Neighborhood greenway	Neighborhood greenway
	Shared lane markings	Shared lane markings
	Sidewalk or pedestrian path	Pedestrian path

Potential Phasing Options

There are certain contexts in which the preferred facility treatment may not be initially feasible. In these situations, a near-term solution for a corridor may provide benefits to bicyclists and pedestrians prior to implementation of the preferred, long-term solution. For example, a near-term treatment could be to stripe a buffered bicycle lane in a constrained right-of-way by restriping the roadway and reducing the vehicle travel lane widths; whereas the preferred treatment for both pedestrians and bicyclists is a buffered bicycle lane and a sidewalk or multi-use path adjacent to the roadway. Similarly, there could be low volume rural roadways where a minimum width shoulder bikeway could be striped in one direction (providing a separated space for pedestrians and one direction of bicyclists) as an interim treatment; whereas the preferred treatment would be standard-width shoulder bikeways in both directions. The ATP identifies the preferred treatment for each PAT route while at the same time offering the County the flexibility to respond to opportunities to implement near-term, low-cost treatments that improve conditions for pedestrians or bicyclists prior to implementation of the preferred solution.

In addition to phasing options, different facility types may be warranted on each side of the roadway. Consideration of hybrid options of the facility types (or multiple facility types on one roadway) can be made segment by segment based on existing conditions and constraints as part of facility design during the ATP implementation phases.

Facility Design Types

The following catalog provides pedestrian and bicycle facility types for a range of rural and urban settings, with varying levels of separation and buffer from traffic, and varying roadway speeds and traffic volumes. Each facility type includes:

- Photo illustration (urban and rural example, if applicable)
- General description of the type and intent of the facility
- Facility dimensions – both preferred and minimum widths
- Special design considerations unique to that facility type
- References to national publications that may provide useful in facility design and application
- Applicability/suitability in the following environments (either an "x" in the check box or specified value)
    - Urban areas[4]
    - Rural areas
    - Accommodation of pedestrians

[4] The urban areas are assumed to be any area within the Metro boundary. Outside the Metro boundary, urban areas are assumed to include incorporated areas (including Barlow, Canby, Estacada, Molalla and Sandy) and rural centers (including Beavercreek, Boring, Brightwood, Colton, Government Camp, Mulino, Redland, Rhododendron, Welches and Zig Zag). Clackamas County's current roadway standards include a bikeway (bike lane, shoulder lane or bike path) and pedway (sidewalk or pedestrian path) in each of these urban area types. The roadway standards in rural areas include bikeways only.

- Accommodation of bicyclists
- Compatibility with the Metro's *August 2013 Draft Regional Active Transportation Plan* (Regional ATP) Bicycle Parkway designations
- Compatibility with the Regional ATP Bikeway designations
- Applicability to speeds of the roadway environment
- Applicability to vehicle volumes of the roadway environment

Table 19 summarizes the applicability/suitability for each facility type in the catalog. The bicycle facility types are generally ordered from the highest level of separation from traffic (to attract the broadest range of users) to the least level of protection. Different facility types may be warranted on each side of the roadway due to right-of-way, topographic or other constraints. Consideration of hybrid options of the facility types (or multiple facility types on one roadway) can be made on a segment-by-segment basis based on existing conditions and constraints as part of facility design during the ATP implementation phases.

The design for PAT routes or segments along Oregon Department of Transportation (ODOT) facilities should be coordinated with the ODOT Pedestrian and Bicycle Facility Specialist or Regional Bicycle and Pedestrian Coordinator to determine if a design exception is required[5].

[5] ODOT has adopted AASHTO standards but also considers FHWA's endorsement of the use of the NACTO Urban Bikeway Guide in their "Design Flexibility" memorandum.

Table 19: Facility Type Application Overview

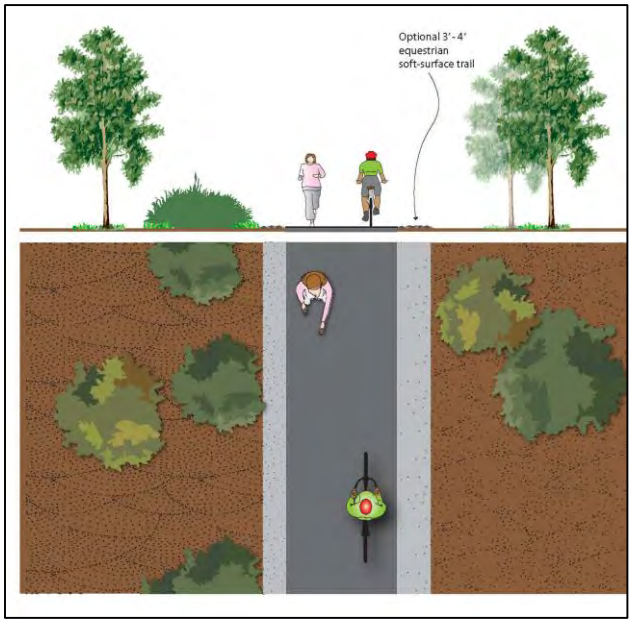
Facility Type	Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway[1]	Metro Regional Bikeway[2]	Posted Speed Limit Thresholds	Vehicle Volume Thresholds
Multi-Use Path	X	X	X	X	X	X	N/A	N/A
Multi-Use Path Parallel to Roadway	X	X	X	X	X	X	N/A	N/A
Raised Cycle Track	X			X	X	X	Above 45 mph, greater separation of bicyclist from traffic desirable	N/A
Two-Way Cycle Track	X			X	X	X	Above 45 mph, greater separation of bicyclist from traffic desirable	N/A
Protected Bike Lane	X			X	X	X	Above 45 mph, greater separation of bicyclist from traffic desirable	N/A
Buffered Bike Lane	X	X		X	X	X	**Urban:** Above 40 mph, greater separation desirable **Rural:** Above 45 mph, greater separation desirable	Above 10,000 ADT, greater separation desirable
Bike Lane	X			X	X	X	Above 40 mph, greater separation of bicyclist from traffic desirable	Above 7,000 ADT, greater separation of bicyclist from traffic desirable
Shoulder Bikeway		X	X (in rural areas only)	X			Above 45 mph, greater separation of bicyclist from traffic desirable	Above 5,000 ADT, greater separation of bicyclist from traffic desirable
Advisory Lanes	X	X	X (in rural areas only)	X			**Urban:** Up to 30 mph **Rural:** Up to 40 mph	**Urban:** Up to 5,000 ADT **Rural:** Up to 3,000 ADT
Neighborhood Greenway	X			X	X	X	Up to 25 mph	Up to 3,000 ADT
Shared Lane Markings	X	X		X			Up to 30 mph	Up to 3,000 ADT
Sidewalk	X		X				N/A	N/A
Pedestrian Path	X	X	X				N/A	N/A

[1]Metro Bicycle Parkway - The highest functional class for bicycle facilities which are high quality routes, the highways for bicycle travel, and connect to and through regional centers. Parkways can be any type of facility designed to parkway standards, including off-street shared use paths, separated in-street bikeways and neighborhood greenways. Shared use path bicycle parkways are also pedestrian parkways. The Metro Active Transportation Plan Functional Classification System has three levels of bicycle parkways which should be reviewed for most appropriate treatment.

[2]Metro Regional Bikeway - High-quality routes with seamless connections to bicycle parkways. Regional bikeways can be any type of facility, including off-street trails, bike lanes and neighborhood greenways. On-street regional bikeways located on arterial and collector streets are designed to provide separation from traffic on streets with higher auto speeds and volumes. The Metro Active Transportation Plan Functional Classification System has three levels of regional bikeways which should be reviewed for most appropriate treatment.

5.2 FACILITY TYPES

Multi-Use Paths



Description

- Bi-directional pathways in their own right-of-way for use by pedestrians, bicyclists and equestrians.
- Desirable for users of all skill levels preferring separation from traffic.

Dimensions

- 18-20' or greater preferred in urban and suburban areas high use areas with frequent trail access and mix of pedestrian and bicycle uses.
- 12' wide or greater recommended for most situations.
- 8' minimum in rural or suburban areas with limited trail access locations, longer segments and lower proportion of pedestrians.
- 2' gravel shoulder should be provided on each side; 3-4' soft-surface adjacent to one side of trail to accommodate equestrians, if desired.
- 10' minimum vertical clearance required.

Design Considerations

- Best suited in areas where roadway crossings can be minimized (e.g., parallel to travel barriers such as highways, railroad tracks, utility easements, natural areas, etc.)
- Terminate path where it is easily accessible to the street system, preferably at a controlled intersection or dead-end street.
- Provide high-visibility treatments (markings and signage) for crossings and transitions.

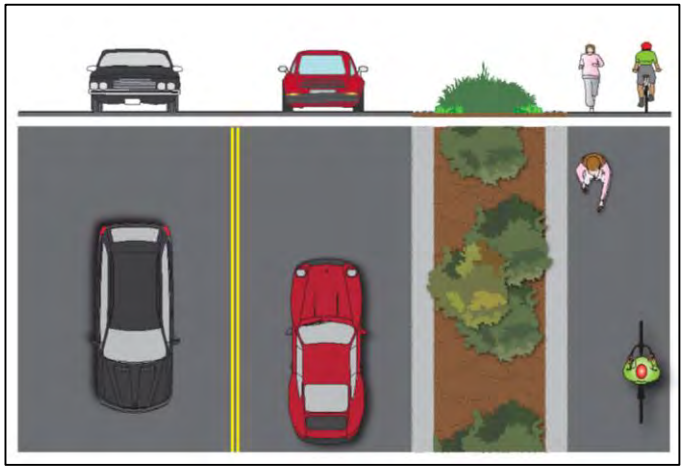
Additional Guidance

- AASHTO Guide for the Development of Bicycle Facilities; Metro Greenway Trails; ODOT Highway Design Manual

Applicability/Suitability

Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway	Metro Regional Bikeway	Speed	Volume
X	X	X	X	X	X	N/A	N/A

Multi-Use Path Adjacent to Roadway



Description

- Bi-directional pathways next to roadways. Typically in the roadway right-of-way and for use by pedestrians and bicyclists.
- Desirable for users of all skill levels preferring separation from traffic.
- Pedestrians could have a separated sidewalk in urban areas.

Dimensions

- 18-20’ or greater preferred in urban and suburban high use areas with frequent trail access and mix of pedestrian and bicycle uses.
- 12’ wide or greater recommended for most situations.
- 8’ minimum in rural or suburban areas with limited trail access locations, longer segments and lower proportion of pedestrians (10’ minimum along ODOT facilities).
- Should be curb-separated from the roadway (in urban areas) and buffered with a minimum 5’ landscape buffer (10’ buffer desirable) or physical barrier.

Design Considerations

- Best suited for roadways with minimal side streets and driveways.
- Provide high quality and high visibility treatments at intersections and driveway crossings.

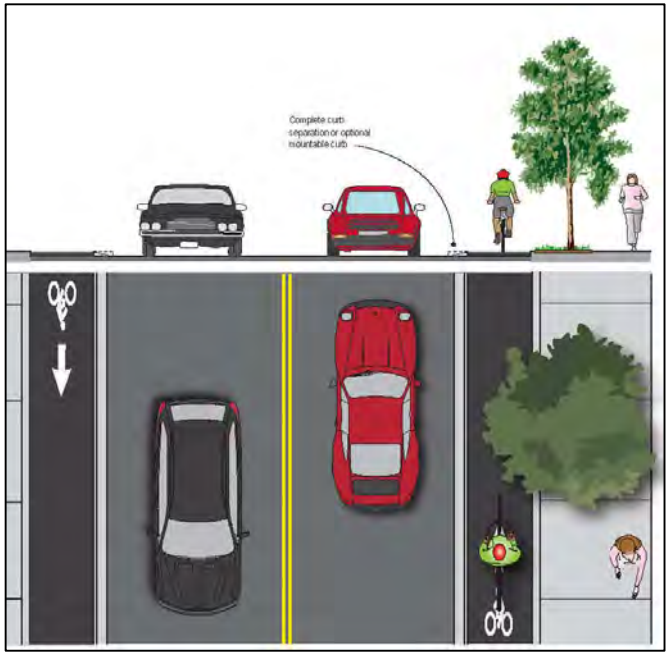
Additional Guidance

- NACTO Urban Bikeway Design Guide; AASHTO Guide for the Development of Bicycle Facilities; Metro Greenway Trails; ODOT Highway Design Manual

Applicability/Suitability

Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway	Metro Regional Bikeway	Speed	Volume
X	X	X	X	X	X	N/A	N/A

Raised Cycle Track



Description

- One-way bicycle paths parallel to the roadway and elevated from the vehicle roadway by a mountable curb.
- Provides easy transition for bicyclists in and out of the travel lane for turns.
- The raised cycle track may be separated from the roadway by parked cars.

Dimensions

- 8’ preferred, 6’ minimum in areas with constrained right-of-way.
- 1.5’ wide mountable curb with a 4:1 slope edge (4-5 inches high) or at sidewalk level.

Design Considerations

- Best suited for roadways with minimal side streets and driveways.
- Recommended for roads with posted speeds up to 45 mph. For posted speeds of 50 mph or greater, mixed-use paths preferable.
- Provide high visibility pavement markings at intersections and transition areas.
- Cycle tracks may be painted with colored paint for added visibility.
- Provide separated pedestrian facilities such as a sidewalk or pedestrian path.

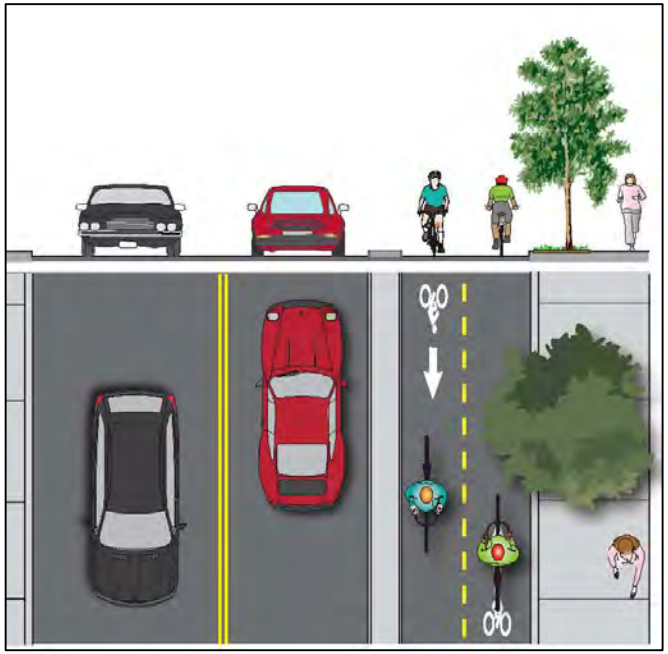
Additional Guidance

- NACTO Urban Bikeway Design Guide; CROW Design Manual for Bicycle Traffic; ODOT Highway Design Manual; ODOT Bicycle and Pedestrian Design Guide

Applicability/Suitability

Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway	Metro Regional Bikeway	Speed	Volume
X			X	X	X	Greater separation preferred above 45 mph	N/A

Two-Way Cycle Track



Description

- Bi-directional bicycle pathways next to roadways typically protected by parked cars for use by bicyclists.
- Useful for two-way bicycle traffic on one-way streets.

Dimensions

- 12’ preferred.
- 10’ minimum in areas with low bicycle volumes or with constrained right-of-way.

Design Considerations

- Best suited for roadways with limited to no driveways and controlled intersections.
- Recommended for roads with posted speeds up to 45 mph. For posted speeds of 50 mph or greater, mixed-use paths preferable.
- Special markings or signage may be needed at driveways and intersections alerting drivers to two-way bicycle traffic.
- Provide separated pedestrian facilities such as a sidewalk or pedestrian path.

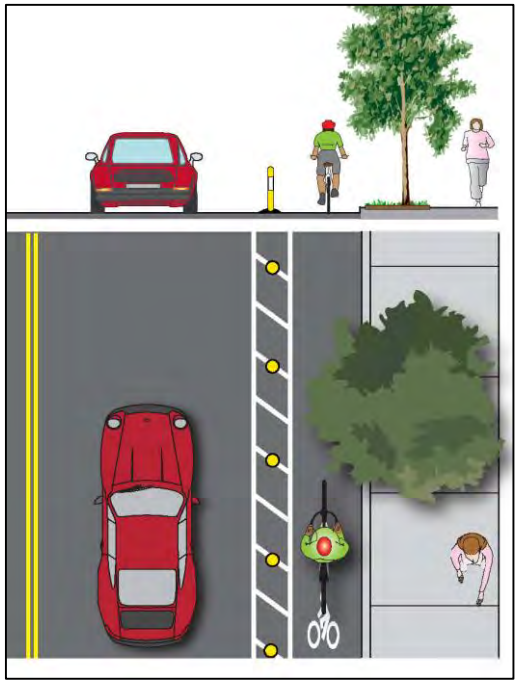
Additional Guidance

- NACTO Urban Bikeway Design Guide; CROW Design Manual for Bicycle Traffic

Applicability/Suitability

Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway	Metro Regional Bikeway	Speed	Volume
X			X	X	X	Greater separation preferred above 45 mph	N/A

Protected Bike Lane



Description

- Bicycle lanes parallel to the roadway and separated from traffic by a buffer as well as by a barrier such as a landscaped buffer, parked cars or flexible bollards.

Dimensions

- 8’ preferred.
- 6’ minimum in areas with low bicycle volumes or with constrained right-of-way.
- 2’-3’ buffer or greater plus barrier treatment. Wider buffer may be required on ODOT facilities (see ODOT Highway Design Manual guidance for Protected Bike Lanes).

Design Considerations

- Best suited for roadways with minimum driveways and side streets.
- Recommended for roads with posted speeds up to 45 mph. For posted speeds of 50 mph or greater, mixed-use paths preferable.
- Provide high visibility treatments at intersections and transition areas.
- Intersection treatments such as bike signals and/or two-stage left-turn pavement markings may be needed.
- Provide separated pedestrian facilities such as a sidewalk or pedestrian path.

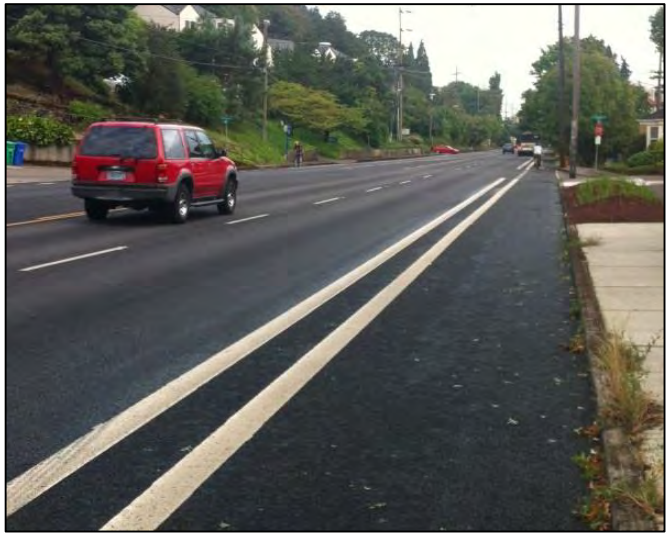
Additional Guidance

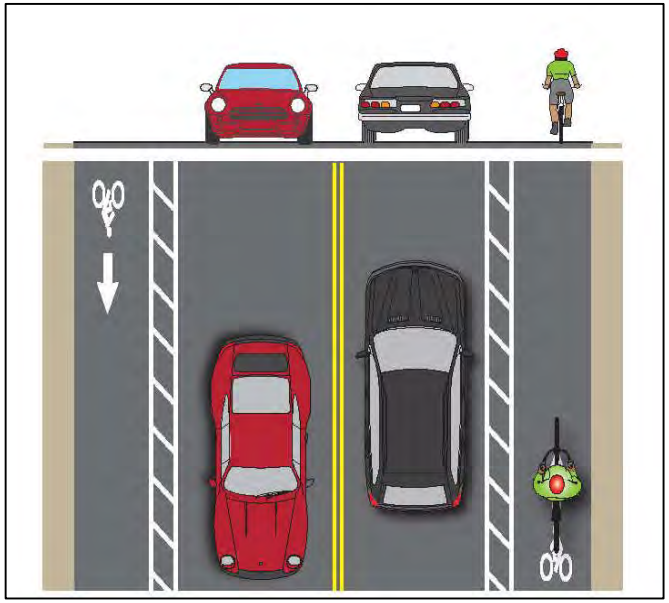
- NACTO Urban Bikeway Design Guide; ODOT Highway Design Manual; ODOT Bicycle and Pedestrian Design Guide

Applicability/Suitability

Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway	Metro Regional Bikeway	Speed	Volume
X			X	X	X	Greater separation preferred above 45 mph	N/A

Buffered Bike Lane





Description

- Bicycle lanes with a striped buffer providing greater separation from vehicles than a typical bike lane.

Dimensions

- 6’ bike lane plus buffer preferred; wider bike lane widths may be warranted in urban, high bicycle volume areas.
- 5’ minimum bike lane width plus buffer in rural or suburban areas where bicycle volumes are low or in areas with constrained right-of-way.
- 2’-3’ buffer area. Wider buffer width is preferred with progressively increasing speeds or volumes. Wider buffer may be required on ODOT facilities (see ODOT HDM guidance).
- Provide separated pedestrian facilities such as a sidewalk or pedestrian path.

Design Considerations

Urban	*Rural*
• Recommended for roads with posted speeds up to 40 mph and up to 10,000 average daily vehicle trips (ADT). • For posted speeds above 45 mph or with 10,000 ADT and greater, protected bikeways, cycle tracks or mixed-use paths preferable.	• Recommended for roads with posted speeds up to 45 mph and up to 10,000 average daily vehicle trips (ADT). • For posted speeds of 50 mph or with 10,000 ADT and greater, mixed-use paths preferable.

- Applicable anywhere a bike lane or shoulder bikeway is suitable and where adequate pavement width exists or can be provided.

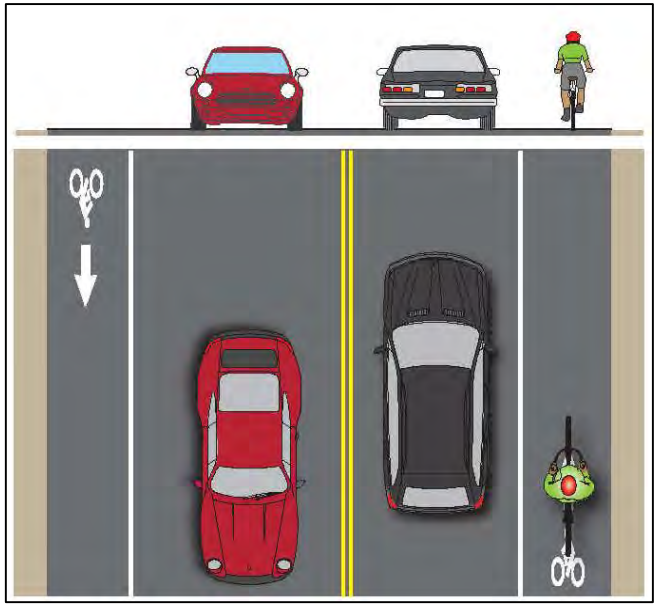
Additional Guidance

- NACTO Urban Bikeway Design Guide; London Cycling Design Standards; ODOT Highway Design Manual; ODOT Bicycle and Pedestrian Design Guide

Applicability/Suitability

Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway	Metro Regional Bikeway	Speed	Volume
X	X		X	X	X	Greater separation preferred above 45 mph in urban areas and 50 mph in rural areas	Greater separation preferred above 10,000 ADT

Bike Lane



Description

- On-street facility with a designated space for bicycle travel.

Dimensions

- 7’ maximum without buffer.

Design Considerations

- Minimum facility recommended at posted speeds of 25 mph or higher and over 3,000 average daily trips (ADT).
- Recommended for roads with posted speeds up to 40 mph and up to 7,000 ADT. For higher speeds and volumes, buffered or protected bike lanes, cycle tracks, or mixed-use paths are preferable.
- Colored pavement or other conflict area treatments preferred in conflict areas.
- Provide separated pedestrian facilities such as a sidewalk or pedestrian path.

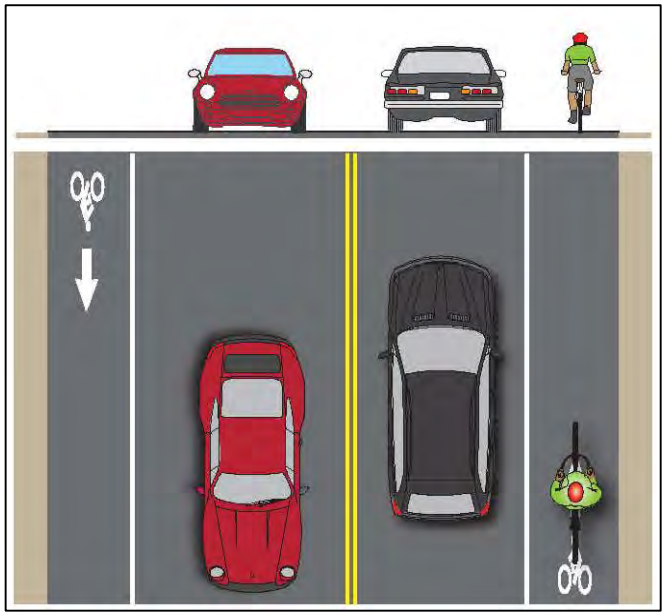
Additional Guidance

- AASHTO Guide for the Development of Bicycle Facilities; NACTO Urban Bikeway Design Guide; ODOT Highway Design Manual; ODOT Bicycle and Pedestrian Design Guide

Applicability/Suitability

Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway	Metro Regional Bikeway	Speed	Volume
X			X	X	X	Greater separation preferred above 40 mph	Greater separation preferred above 7,000 ADT

Shoulder Bikeway



Description

- On-street facility that provides a designated space for bicycle and/or pedestrian travel.
- Typically applied on rural roadways.

Dimensions

- 6’ preferred.
- 4’ minimum in areas with constrained right-of-way.

Design Considerations

- Minimum facility recommended at posted speeds of 25 mph or higher and over 3,000 average daily trips (ADT).
- Recommended for roads with posted speeds up to 45 mph and up to 5,000 ADT. For higher speeds and volumes, buffered bike lanes or mixed-use paths preferable.
- Consider bicycle friendly rumble strips or profiled striping.

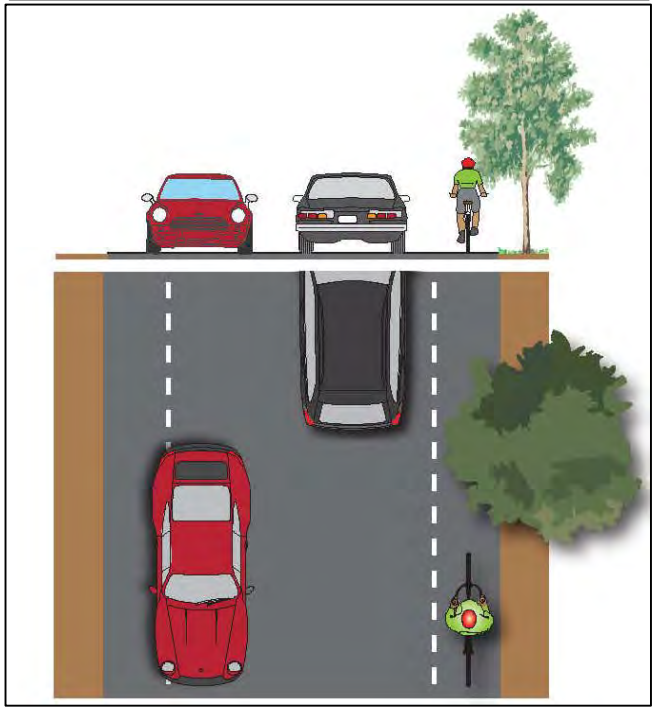
Additional Guidance

- AASHTO Guide for the Development of Bicycle Facilities; ODOT Highway Design Manual

Applicability/Suitability

Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway	Metro Regional Bikeway	Speed	Volume
	X	X	X			Greater separation preferred above 45 mph	Greater separation preferred above 5,000 ADT

Advisory Lanes



Description

- Center travel lane is shared by two-way traffic. No center stripe provided.
- Vehicles may use the shoulder bikeways for passing, but must yield to bicyclists and oncoming motorists.

Dimensions

- Dashed line 5’ (minimum) to 7’ (preferred) from curb or edge of pavement if on-street parking provided and depending on right-of-way constraints.
- 13’ to 18’ two-way motor vehicle center lane width depending on right-of-way constraints.

Design Considerations

Urban

- Recommended for roads with posted speeds up to 30 mph and up to 5,000 average daily vehicle trips (ADT).
- Provide separated pedestrian facilities such as a sidewalk or pedestrian path.

Rural

- Recommended for roads with posted speeds up to 40 mph and up to 3,000 average daily vehicle trips (ADT).

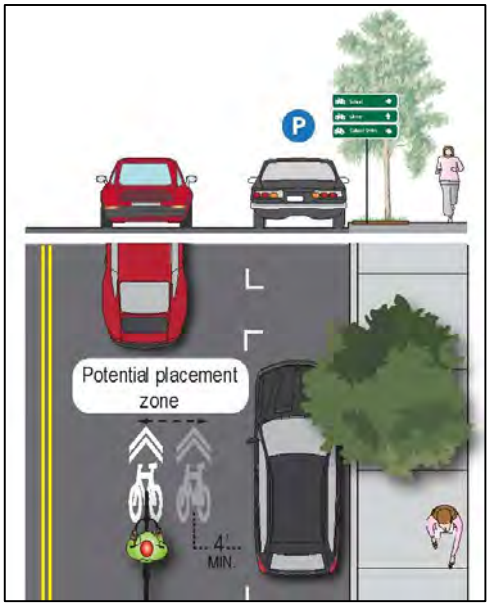
Additional Guidance

- CROW Design Manual for Bicycle Traffic; London Bicycle Design Standards; U.S. case studies available

Applicability/Suitability

Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway	Metro Regional Bikeway	Speed	Volume
X	X		X	X	X	Up to 30 mph in urban areas and 40 mph in rural areas	Up to 5,000 ADT in urban areas and 3,000 ADT in rural areas

Neighborhood Greenways



Description

- A bicycle facility in a network of connected low volume and low speed roads (typically local roadways or connector roadways) where bicycles share the roadway with vehicles, but bicycle movements are prioritized over vehicle movements. The network should include routes that are parallel to higher order roadways.
- Traffic calming elements such as speed humps, traffic circles, mini-roundabouts and traffic diverters should be provided to keep vehicle speeds and volumes low.

Dimensions

- Bike boulevard or shared lane markings preferred to be at least 4' from edge of curb or on-street parking.
- Shared lane marking dimensions in MUTCD Section 9C.07.

Design Considerations

- Not recommended for roadways with posted speeds above 25 mph or volumes greater than 3,000 Average Daily Trips (ADT).
- Wayfinding signs are recommended on neighborhood greenways that meander through a local street network.
- Provide separated pedestrian facilities such as a sidewalk or pedestrian path.

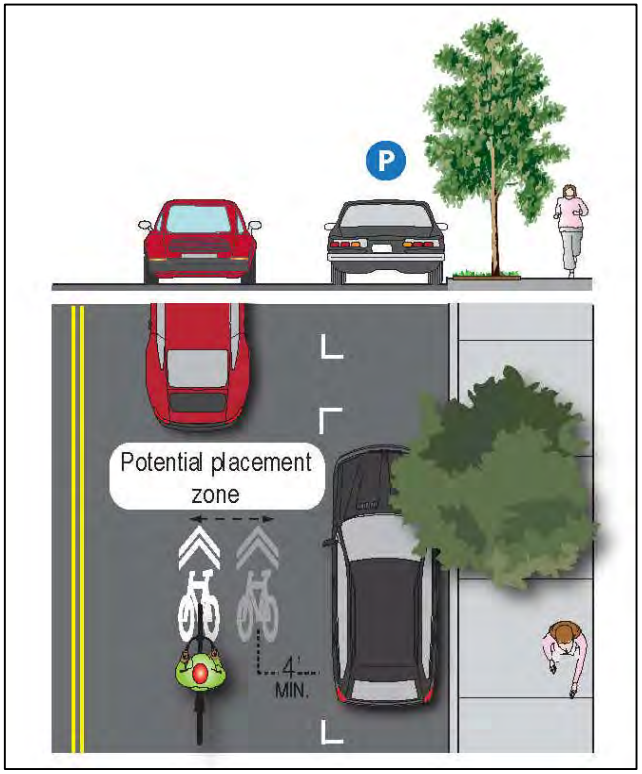
Additional Guidance

- NACTO Urban Bikeway Design Guide; Manual on Uniform Traffic Control Devices (MUTCD)

Applicability/Suitability

Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway	Metro Regional Bikeway	Speed	Volume
X	X		X	X	X	Up to 25 mph	Up to 3,000 ADT

Shared Lane Roadways



Description

- A facility where bicycles share the roadway with vehicles. Shared lane markings should be provided in the roadway to designate the shared use of the roadway by bicyclists and motorists.

Dimensions

- Markings preferred to be at least 4' from edge of curb or on-street parking.
- Shared lane marking dimensions in MUTCD Section 9C.07.

Design Considerations

- Not recommended for roadways with posted speeds above 30 mph or volumes greater than 3,000 Average Daily Trips (ADT).
- May be suitable above 3,000 ADT in urban areas where the travel speed is 20 mph or less (such as in a downtown environment).
- Provide separated pedestrian facilities such as a sidewalk or pedestrian path.

Additional Guidance

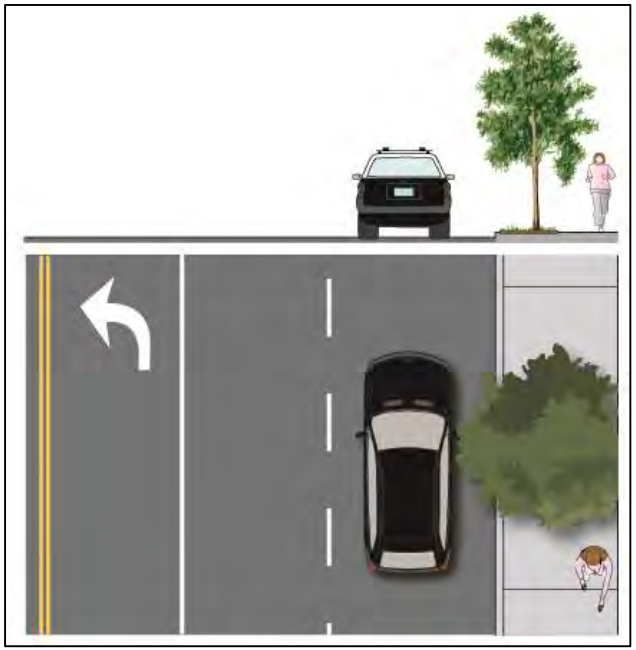
- NACTO Urban Bikeway Design Guide; Manual on Uniform Traffic Control Devices (MUTCD)

Applicability/Suitability

Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway	Metro Regional Bikeway	Speed	Volume
X	X		X			Up to 30 mph	Up to 3,000 ADT unless speeds below 20 mph

5.3 PEDESTRIAN FACILITY TYPES

Sidewalk



Description

- A dedicated pedestrian walking path adjacent to the roadway.
- Separated from traffic by a curb and landscape buffer (preferred) typically consisting of street trees.

Dimensions

- 8’ on collector or arterial roadways classified as commercial or institutional sidewalk (see Clackamas County Zoning and Development Ordinance [ZDO] 1007-10).
- 6’ preferred unless ZDO requires more.
- 5’ minimum in areas with low pedestrian volume and constrained right-of-way.
- On ODOT facilities a 6’ sidewalk plus a 4’ buffer or 8’ sidewalk without buffer is required. 10’ sidewalks required in Central Business Districts, Special Transportation Areas and traditional downtowns; 14-16’ sidewalks required in high use business areas.

Design Considerations

- Should be built to Americans with Disabilities Act (ADA) standards.
- High quality transitions/crossings are advised such as refuge islands, rectangular rapid flashing beacons, pedestrian hybrid beacons, high visibility crosswalks, lighting, etc.

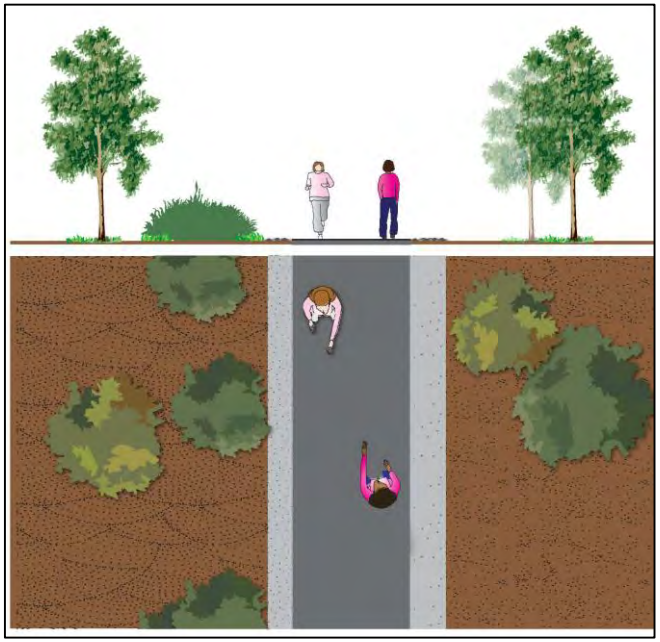
Additional Guidance

- Clackamas County ZDO; FHWA Designing Sidewalks and Trails for Access; ODOT Highway Design Manual; ODOT Bicycle and Pedestrian Design Guide

Applicability/Suitability

Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway	Metro Regional Bikeway	Speed	Volume
X		X				N/A	N/A

Pedestrian Path



Description

- Can be provided adjacent to a roadway in lieu of a sidewalk in a constrained or rural area where separate facilities are provided for bicyclists.
- A multi-use path is preferred if safe bicycle facilities are not provided adjacent to the pedestrian path or along the roadway.

Dimensions

- 8’ preferred in pedestrian volume areas.
- 6’ minimum in suburban or rural areas with low pedestrian use.

Design Considerations

- Usually excludes bicycle travel.
- Although pedestrian-only paths may be intended for pedestrian-only travel, they will often still be used by bicyclists. Separate bicycle facilities should be provided to connect the origins and destinations served by the pedestrian-only path.
- Should be built to ADA standards.
- High quality transitions/crossings are advised such as refuge islands, rectangular rapid flashing beacons, pedestrian hybrid beacons, high visibility crosswalks, lighting, etc.

Additional Guidance

- Clackamas County Zoning and Development Ordinance; FHWA Designing Sidewalks and Trails for Access; ODOT Highway Design Manual

Applicability/Suitability

Urban	Rural	Pedestrian	Bicyclist	Metro Bicycle Parkway	Metro Regional Bikeway	Speed	Volume
X	X	X				N/A	N/A

Additional Protected Bikeway Considerations

As shown in the catalog, buffered bike lanes, protected bike lanes, raised cycle tracks and multi-use paths use different design features to create physical separation between bicyclists and vehicle traffic. The protected facilities may use a variety of separation treatments including flexible bollards (i.e. candle sticks), textured pavement, bollards or on-street parking. The use of a mountable curb to separate the vehicle travel lane from the bicycle lane typifies a raised cycle track that can be located adjacent to the travel lane or behind on-street parking. Separating a cycle track from the travel lane with a continuous landscape strip can also make the facility comparable to a multi-use path adjacent to the roadway.

The design features often used as buffers between vehicles and bicyclists include:

- Striping and/or paint
- Textured pavement
- Skipped rumble strip or profiled striping on fog line (rural area only)
- Flexible bollards (candle sticks)
- Mountable curb
- On-street parking
- Landscaping
- Water treatment facility (i.e., green street treatment)

CONFLICT AREA TREATMENT TYPES

Careful consideration for addressing potential motorist/pedestrian/bicyclist conflict areas at intersections, crossings and transitions between facility types will be part of the facility design process. Conflict areas pose significant deterrents for many users and can result in a decision not to use a facility. The ATP recognizes these challenges and includes conflict area treatments that reduce potential for conflict by improving visibility for bicyclists and motorists, delineating clear right-of-way, facilitating eye contact between conflicting modes and setting behavior expectations for each mode. Appropriate design treatments can both increase a driver's awareness of bicyclists and pedestrians in conflict areas and guide the bicyclist or pedestrian on how to navigate the intersection or conflict area safely.

Conflict area treatments included in the catalog include the following:

- Mid-block crossings
- Colored pavement in conflict zone
- Intersection crossings
- Driveway crossings
- Bicycle signals
- Uphill/downhill markings
- Bicycle box
- Two-stage left-turn markings

Mid-block crossing treatments address pedestrian and bicyclist conflicts with vehicles. The other treatments generally apply to both urban and rural environments and are primarily used to address vehicle-bicycle conflicts.

5.4 CONFLICT AREA TREATMENT TYPES

Mid-Block Roadway Crossings

Description

- Ideally, crossings should occur at signalized or stop-controlled intersections to maximize user safety.

Treatments may include:

- Raised median/refuge island
- Rectangular rapid flashing beacon
- Pedestrian hybrid beacon
- High visibility crosswalks
- Raised crosswalk
- In-street "Yield to Pedestrians" signs
- Bulb-outs/curb extensions
- Lighting

Dimensions

- Varies depending on treatment type.

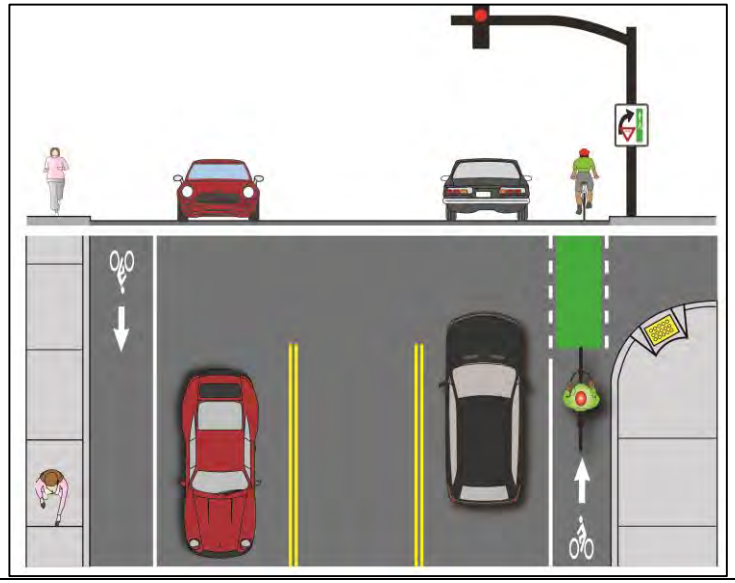
Design Considerations

- There may be locations where the desired PAT route will warrant a crossing at an uncontrolled or mid-block location. In these circumstances, signage and striping, changes in the roadway geometry and/or installation of pedestrian signals are preferred.

Additional Guidance

- NACTO Urban Bikeway Design Guide; Manual on Uniform Traffic Control Devices; AASHTO Guide for the Development of Bicycle Facilities

Colored Pavement in Conflict Zone



Description

- Colored pavement can be used to indicate where motorists and bicyclists may potentially cross paths due to turning movements (primarily due to right-turning vehicles).

Dimensions

- Width of marking is the same as pedestrian/bicycle pavement through marking.

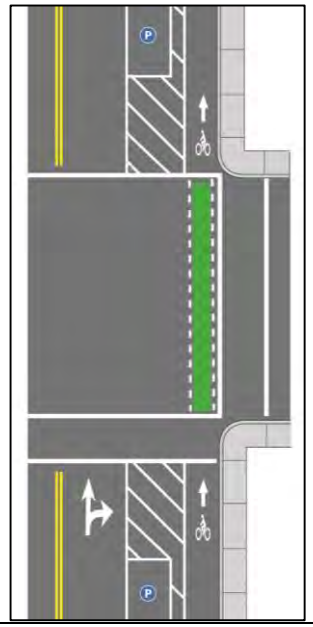
Design Considerations

- Green color thermoplastic is best for longevity. Paint can work if the surface is prepared correctly and markings are placed with consideration for vehicle wheel tracks.
- 'Skip striping' is an alternate striping treatment instead of solid green pavement in the actual conflict area.
- Can be accompanied by 'Yield to Bikes' signs.

Additional Guidance

- NACTO Urban Bikeway Design Guide; MUTCD

Intersection Crossing Markings



Description

- Colored pavement indicates motorists and/or bicyclists may potentially cross paths. Can be colored pavement or a skip-striped bike lane through the intersection.

Dimensions

- Width of marking is the same as pedestrian/bicycle pavement through marking.

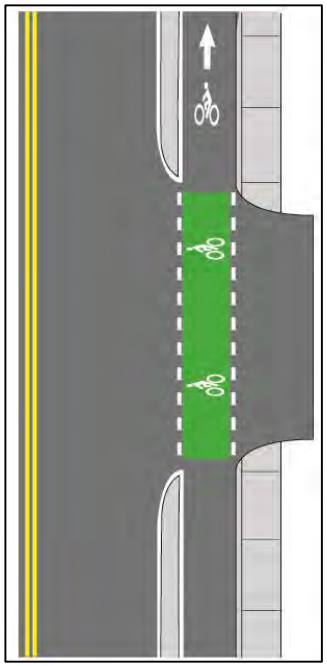
Design Considerations

- Green color thermoplastic is best for longevity.
- Paint can work if the surface is prepared correctly and markings are placed with consideration for vehicle wheel tracks.
- Chevrons and/or shared lane markings can be used.

Additional Guidance

- NACTO Urban Bikeway Design Guide; MUTCD; AASHTO Guide for the Development of Bicycle Facilities

Driveway Crossings



Description

- Colored pavement or bicycle stencils indicate to motorists a bicyclist may be passing through a driveway.

Dimensions

- Width of marking is the same as pedestrian/bicycle pavement through marking.

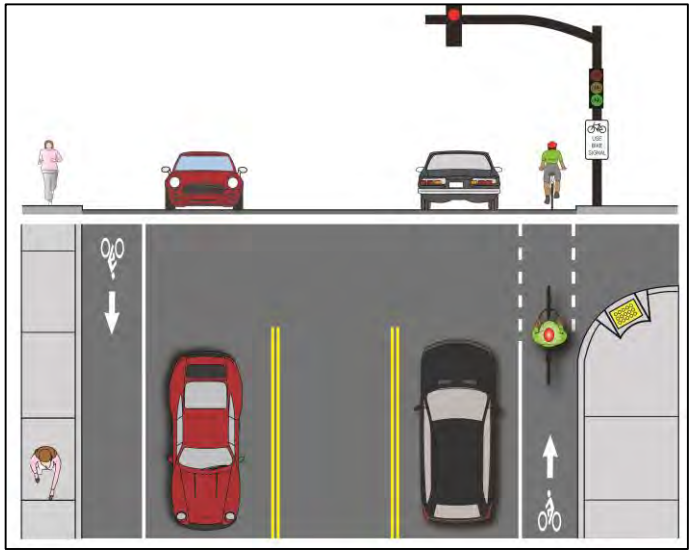
Design Considerations

- Green color thermoplastic is best for longevity.
- Can be accompanied by 'Yield to Bikes' signs.
- 'Skip striping' may be used instead of the solid green pavement.
- Rotates bicycle stencils can be used in combination or alone.
- Usage is preferred at high entrance/exit vehicle volume locations.

Additional Guidance

- NACTO Urban Bikeway Design Guide; MUTCD; AASHTO Guide for the Development of Bicycle Facilities

Bicycle Signals



Description

- Bicycle traffic signals can be used to provide a separate signal phase or queue jump for bicyclists separate from motorists.
- They are often used to separate right-turn vehicle traffic from through bicyclist traffic and to facilitate a diagonal crossing of an intersection for a multi-use path crossing or trail head.

Dimensions

- 12” bike signal heads are typically used on the far side of the intersection.
- 4” or greater bike signal heads may be used on the near side of the intersection for added visibility.

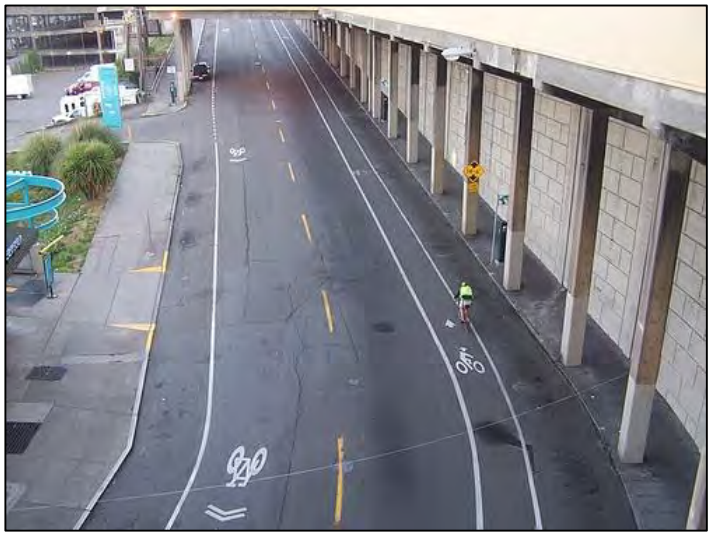
Design Considerations

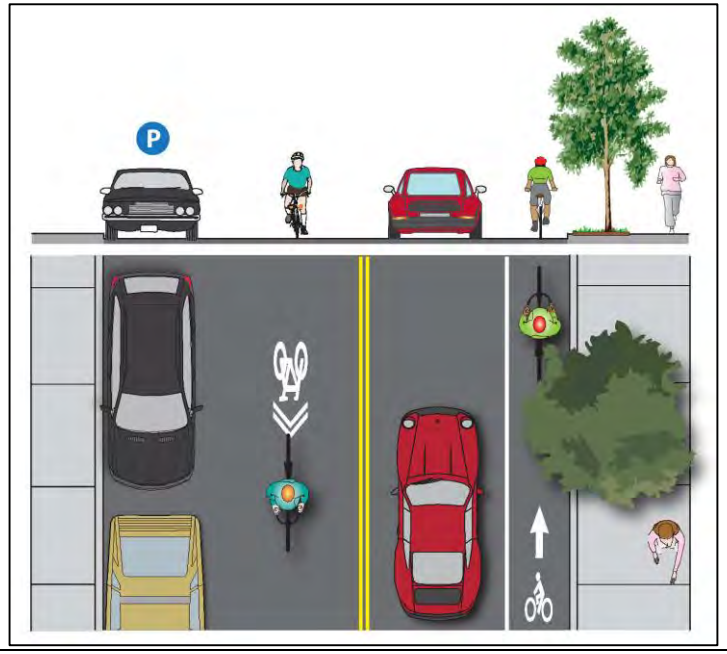
- Signal may be accompanied by ‘Yield to Bikes’ or ‘No Turn on Red’ signs.
- Average waiting time of less than 20 seconds is desirable to reduce bicyclist waiting time and increase bicyclist signal compliance.
- In-roadway bicycle loop detectors or bike signal actuation is preferable.
- The bicycle signal phase needs to provide adequate clearance time based on bicycle speeds.

Additional Guidance

- NACTO Urban Bikeway Design Guide; AASHTO Guide for the Development of Bicycle Facilities; CROW Design Manual for Bicycle Traffic
- Bicycle traffic signals are still experimental.

Uphill/Downhill Markings





Description

- Uphill bicycle lane and downhill shared lane markings can be used in constrained right-of-way to provide separation and protection for uphill bicyclists that travel significantly slower than vehicle traffic while alerting drivers that the downhill lane is shared with bicyclists.

Dimensions

- 6’ or greater preferred uphill bike lane width.
- Shared lane markings are preferred to be placed 4’ from curb or on-street parking. See marking dimensions in MUTCD Section 9C.07.

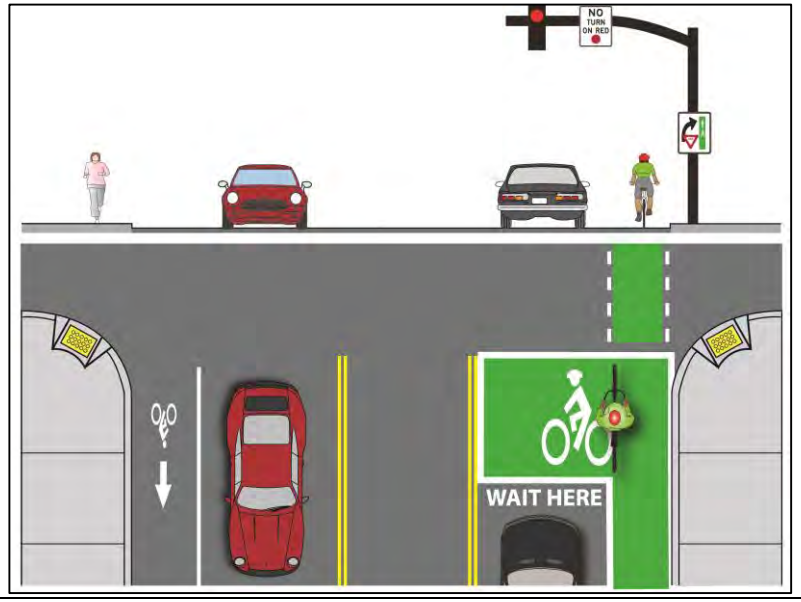
Design Considerations

- Right-of-way
- Topography

Additional Guidance

- NACTO Urban Bikeway Design Guide; Seattle Bicycle Master Plan

Bicycle Box



Description

- In locations with relatively high bicycle traffic, a bike box allows bicyclists to queue in front of motorists for increased visibility.

Dimensions

- Transverse lines should be used to create 10’ to 16’-deep bike box indicating where motor vehicles are required to stop.
- A bike stencil should be centered between the crosswalk line and stop line.

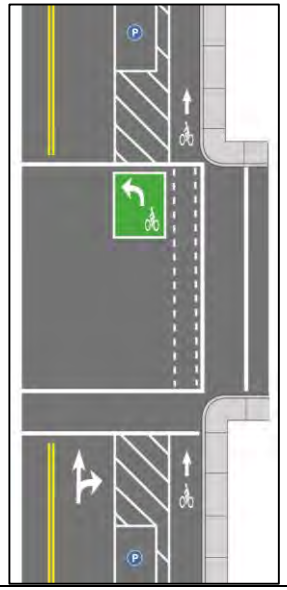
Design Considerations

- Applicable at locations with frequent vehicle right turns or bicyclist left-turns.

Additional Guidance

- NACTO Urban Bikeway Design Guide; MUTCD
- Bike boxes have interim FHWA approval.

Two Stage Left-Turn Marking



Description

- In a two-stage left turn, bicyclists proceed straight through the intersection with the green signal and wait in a queue box on the cross street to proceed through the intersection on its next green signal.
- This provides a safe and easy alternative to difficult left-turns in high traffic volumes or in multiple lanes of traffic.

Dimensions

- A left-turn bike box should be approximately 10’ by 10’ to hold one or more left-turning vehicles.

Design Considerations

- Good for high volume intersections with high bicyclist left-turn volumes.
- Colored pavement and bike stencil are preferred to increase visibility of left-turn bike box.

Additional Guidance

- NACTO Urban Bikeway Design Guide; MUTCD